MURR ELEKTRONIK

stay connected

| **Manual**
IMPACT67-E

| Installation

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Publisher's Note

Service and Support

Website:

www.murrelektronik.com

In addition, our Customer Service Center (CSC) will be glad to assist you:

Our Customer Service Center can support you throughout your project: planning and the conception of customer applications, configuration, installation, and startup. We also offer competent consulting or – in more complex cases – we even provide direct onsite support.

The Customer Service Center provides support tools. It performs measurements for fieldbus systems, such as ProfiBus DP, DeviceNet, CANopen, and AS interface, as well as energy, heat, and EMC measurements.

Our coworkers at the Customer Service Center provide their competence, know-how, and years of experience. They are knowledgeable about hardware and software, and compatibility with products made by various manufacturers.

You can contact the Customer Service Center at

telephone number +49 7191 47-424

or by email at csc@murrelektronik.de.

About the User Manual and its Structure

Bus Manual:
General explanations and functions for each bus.

On this subject, please click on the links to the next page.

System/Product Manuals:
Describe the system and product-specific features.

Art. No.   Designation

55364   Impact67 ProfiBus
55365   Impact67 CanOpen
55367   Impact67 DeviceNet
55366   Impact67 ProfiNet
55368   Impact67 EtherNet/IP
55369   Impact67 EtherCat

www.murrelektronik.com

The following links will provide you with more information on bus systems, as well as the standards and specifications on which they are based:

EtherNet/IP™   >>> **EtherNet/IP (www.odva.org)**

Table of Contents

Important Information

Symbols and Icons

This manual contains information and instructions you must comply with in order to maintain safety and avoid personal injury or damage to property. They are identified as follows:

Notes indicate important information.

Warnings contain information that, if you ignore this information, may cause damage to equipment or other assets or, if you fail to comply with safety precautions, may constitute a danger to the user's health and life.

These instructions are recommendations issued by Murrelektronik.

Intended Purpose

Before starting the devices, read this manual carefully. Keep it in a location that is accessible to all users at all times.

The products that are described in this manual were developed, manufactured, tested, and documented in compliance with the relevant safety standards. In normal cases, these products do not constitute any danger to persons or objects, provided the handling specifications and safety instructions described in this manual are observed. They conform to the requirements of

- EMC Directive (2004/108/EC)

The products are designed for industrial use. An industrial environment is defined as one in which loads are not connected directly to the public low-voltage power grid. Additional measures must be taken if the products are used in private, business, or trade environments.

The safe, troublefree functioning of the products requires proper transportation, storage, mounting, and installation, and careful operation. Operation of the devices for their intended purposes is only guaranteed when the enclosures are fully mounted. If aggressive media are used, check their material resistance depending on the application.

Current safety and accident prevention laws valid for a specific application must be observed for the configuration, installation, setup, maintenance, and testing of the devices. The power supply must

comply with SELV or PELV. Power sources in accordance with EN 61558-2-6 (transformer) or EN 60950-1 (switched-mode power supply) meet these requirements.

Only use cables that meet the requirements and regulations for safety, electromagnetic compatibility, and, if necessary, telecommunications terminal equipment specifications.

Information on the cables and accessories that are suitable for use with this product are contained in the Section 3.1 of this manual.

Qualified Personnel

Only qualified, trained electricians knowledgeable in the safety standards of automation systems may configure, install, set up, maintain, and test the devices. The requirements concerning qualified personnel are dependent on the requirements profiles described in ZVEI and VDMA. For this reason, electricians must know the contents of the manual "Weiterbildung in der Automatisierung" (Further Training in Automation Systems) published by ZVEI and VDMA published by Maschinenbau-Verlag, Post Box 710864, 60498 Frankfurt, Germany) before installing and maintaining the devices. They are therefore electricians who are capable of assessing the work executed and any possible dangers arising from this due to their professional training, knowledge, experience, and their knowledge of the pertinent standards; or who have a level of knowledge equivalent to professional training due to their many years of activity in a comparable field.

Only Murrelektronik technical personnel are allowed to execute work on the hardware and software of our devices, if they are devices not described in this manual.

Unqualified tampering with the hardware or software, or failure to observe the warnings cited in this manual may result in severe personal injury or damage to property.

1. Description of IMPACT67

Fieldbus modules with IP67 protection are an important module in machine installation and they replace complex wired, and therefore, high-cost terminal boxes. Fieldbuses replace conventional parallel wiring.

An increase in efficiency in installation systems was the prime motivator in developing the IMPACT67. Concentration on what is important, coupled with purposeful connectivity, is our recipe for success to reduce your installation costs.

- Application-specific: compact and dense

- Installation-friendly: well designed and pluggable

- Economic: minimized to what is important

System Design Principle

Art. No. 55085	Art. No. 55086	Art. No. 55087	Art. No. 55088
DI16	DI8 DO8	DO8	DO16
	DO: U_A/ 2A	DO: U_A/ 2A	DO: U_A/ 0,5A
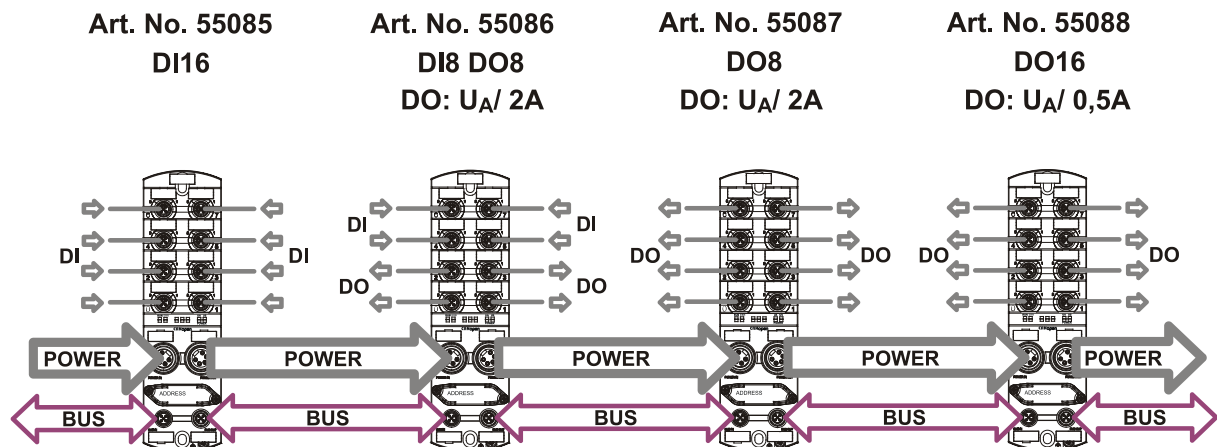
Fig. 1: System design principle

2. Installation

2.1 Mounting

2.1.1 Dimensioning
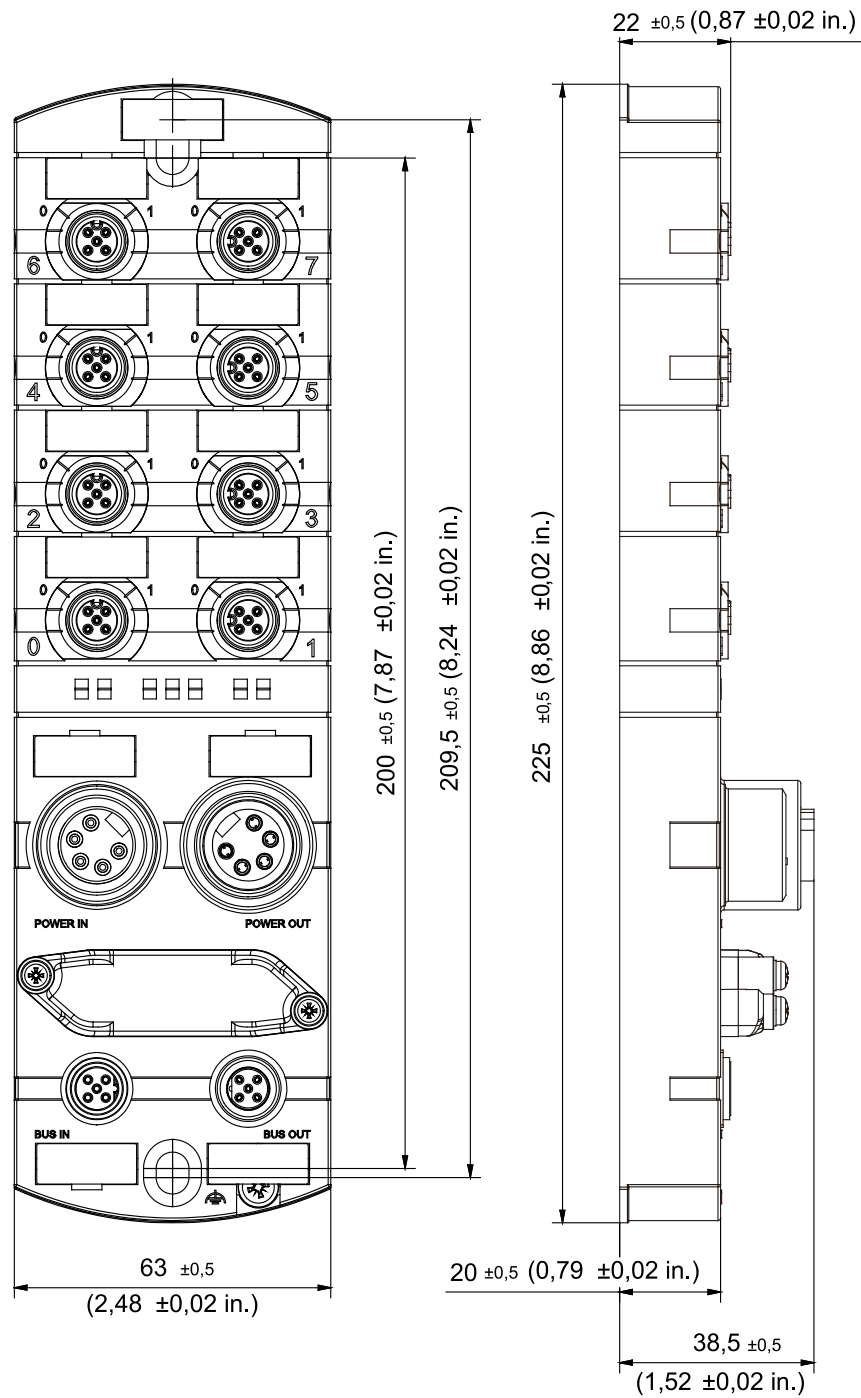
Fig. 2: Dimensioning

2.1.2 Spacing
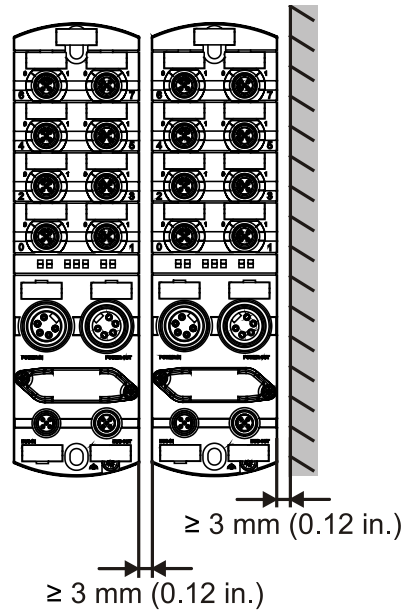
Fig. 3: Spacing

Angled connectors from Murrelektronik require a minimum spacing of 50 mm.

2.1.3 Mounting IMPACT67 Modules

The modules of the IMPACT67 Series can be fitted directly to an installation panel or a machine. The module features two mounting holes for this purpose.

Make sure that the mounting surface is flat and level to prevent mechanical stress in the module housing.

Attach the module using two 6 mm diameter screws and two washers as per DIN 433 T1/T2. The tightening torque is 3 Nm.

Function Ground

The FE connection is located at the bottom facing edge of the module housing. To ensure proper functioning in compliance with the EMC regulations specified in the datasheet, we recommend the use of our grounding strap. It is **not** included in the as-delivered state of the module. You must therefore purchase it separately.

Please refer to the chapter on Accessories.

Connect the FE terminal on the housing at low impedance to the function ground (refer to EMC information).
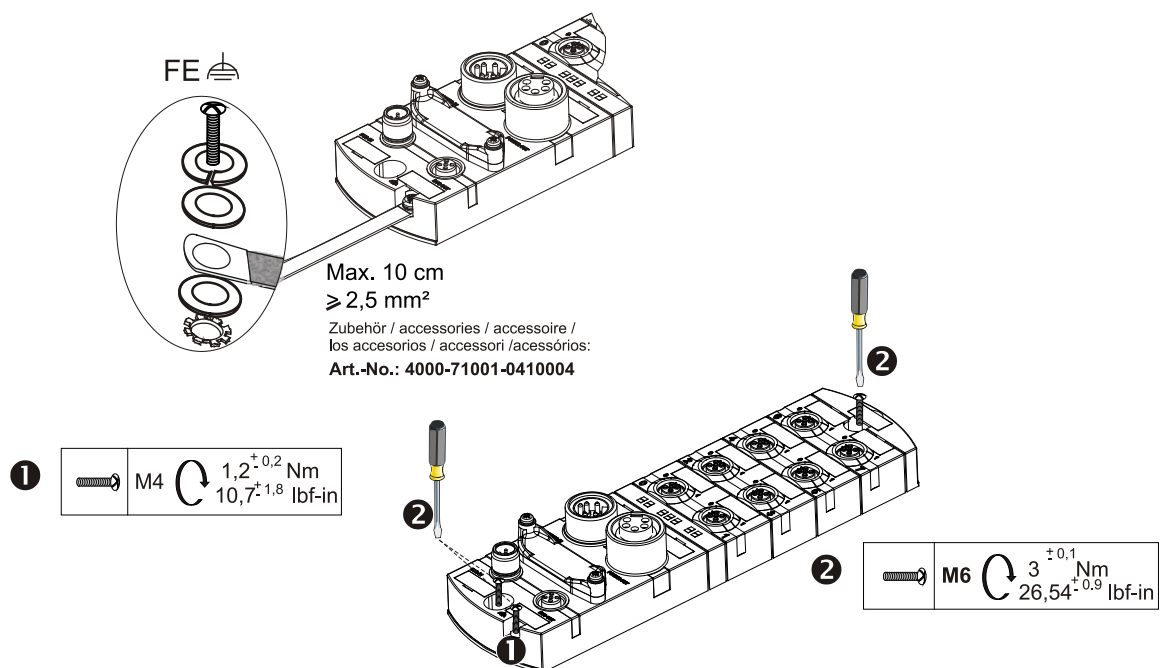
Fig. 4: Mounting

2.1.4 Addressing

0,3 $^{+0,1}$ Nm
2,6 $^{+0,9}$ lbf-in

❸

x100 x10   x1

IP Address   Byte 1
              Byte 2
              Byte 3
              Byte 4

0	- DHCP / BOOTP
1 ... 254	- IP Address Byte 4
255 ... 997	- DHCP / BOOTP
998	- Werkseinstellungen/Factory setting
999	- Static IP
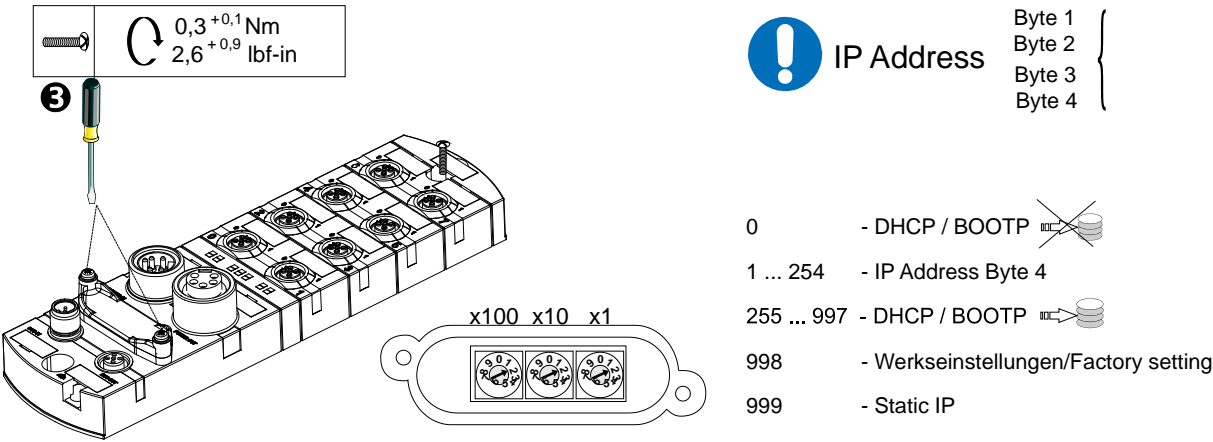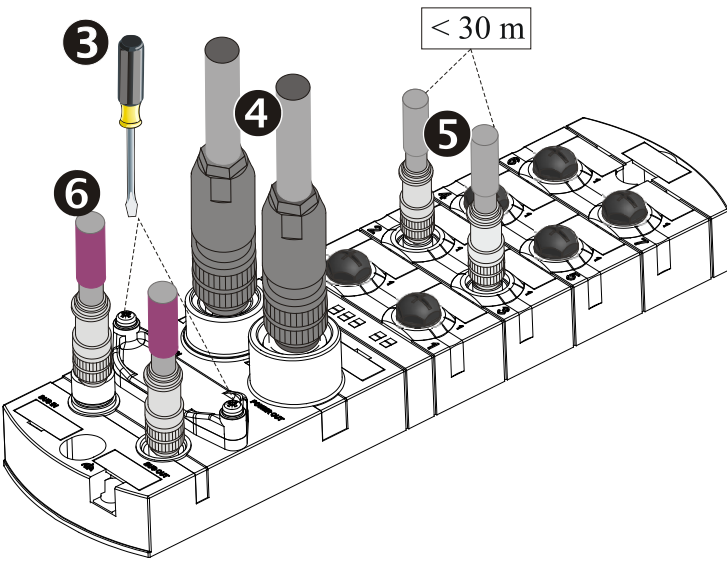
Fig. 5: Data rate and Node ID Switches

Further information on addressing is contained in the chapter on Startup.

2.1.5 IP67 Protection

IP67 protection is only guaranteed when all sockets are wired up or provided with blank plugs.

3 | M3 | $0,3^{-0,1}_{-0,9}$ Nm
$2,6$ lbf-in

4 | 7/8" | $1,5^{+0,2}$ Nm
$13,27^{+1,8}$ lbf-in

Zubehör / accessories / accessoire / acessórios / accessori / los accesorios:
blind plug
Art.-No.: 55385 (plastic)
or
Art.-No.: 55390 (metal)
torque screwdriver for 7/8"
Art.-No.: 7000-99104-0000000

5
6 | M12 | $0,6^{+0,1}$ Nm
$5,31^{+0,9}$ lbf-in

Zubehör / accessories / accessoire / acessórios / accessori / los accesorios:
blind plug
Art.-No.: 58627
x 10

torque screwdriver for M12
Art.-No.: 7000-99102-000 0000

Fig. 6: Example of assembly for IP67

2.2 Connection Diagram of IMPACT67 E

A

IMPACT67 E DI16

M12

Pin 1	+24V Us / 0,2A
Pin 2	DI 10-17
Pin 3	0V
Pin 4	DI 00-07
Pin 5	⏚

IMPACT67 E DI8 DO8

M12

M12 0, 1, 2, 3

Pin 1	n.c.
Pin 2	DO 04-07
Pin 3	0V
Pin 4	DO 00-03
Pin 5	⏚

M12 4, 5, 6, 7

Pin 1	24V Us / 0,2A
Pin 2	DI 04-07
Pin 3	0V
Pin 4	DI 00-03
Pin 5	⏚

DO: 8x 2A

A

IMPACT67 E DO8

M12

M12 0, 2, 4, 6

Pin 1	n.c.
Pin 2	
Pin 3	0V
Pin 4	DO 00,02, DO 04,06
Pin 5	⏚

M12 1, 3, 5, 7

Pin 1	n.c
Pin 2	n.c
Pin 3	0V
Pin 4	DO 01,03, DO 05,07
Pin 5	⏚

DO: 8x 2A

IMPACT67 E DO16

M12

Pin 1	n.c.
Pin 2	DO 10-17
Pin 3	0V
Pin 4	DO 00-07
Pin 5	⏚

DO: 16x 0,5 A

POWER IN   **POWER OUT**

Pin 1	0V
Pin 2	0V
Pin 3	⏚
Pin 4	+24V U_S / max. 9 A
Pin 5	+24V U_A / max. 9 A

Adressierung / Adressage / Addressing / Direccionamiento / Indirizzamento / Endereçamento :

IP Address
{ Byte 1
  Byte 2   0   - DHCP / BOOTP
  Byte 3
  Byte 4   1 ... 254 - IP Address Byte 4

x100 x10 x1

998   - Factory setting

999   - Static IP

D **PORT 1 / 2**

Pin 1	TD +
Pin 2	RD +
Pin 3	TD -
Pin 4	RD -
Pin 5	n.c.
Gewinde Thread Filet Rosca Filetto Rosca	⏚

Fig. 7: Connection Diagram of IMPACT67 E

3. Configuration Notes

3.1 System Components

3.1.1 Product Designation Code

The designation format of IMPACT67 system components explains their function.

Examples:

Name			Description
IMPACT67	**E**	**DI8 DO8**	
			I/O channels
			D = Digital
			I = Input
			O = Output
			Fieldbus System
			P = ProfiBus
			DN = DeviceNet
			C = CANopen
			EC = EtherCat
			E = EtherNet/IP
			PN = ProfiNet
			Product Family

Tab. 1: Example of product designation

3.1.2 IMPACT67 Modules

The purpose of the IMPACT67 system is the decentralized routing of signals at the I/O level and the supply of this information over a Fieldbus network (e.g. ProfiBus, CANopen, DeviceNet, EtherCAT, EtherNet/IP).

The module and I/O units are powered by a 5-pin power plug 7/8" (mini style).

Article Number	Description	
55 085	IMPACT67 E DI16	
55 086	IMPACT67 E DI8 DO8 (2A)	
55 087	IMPACT67 E DO8 (2A)	
55 088	IMPACT67 E DO16 (0,5A)	

Tab. 2: IMPACT67 E Modules

3.1.3 Accessories

Most cables and connectors are available in angled style.

3.1.3.1 BUS Cables

EtherNet		
Article Number	Description	
	Straight connector / straight connector violet	Cable length
7000-44511-7980150		1.5 m
7000-44511-7980300		3 m
7000-44511-7980500		5 m
7000-44511-7980750		7.5 m
7000-44511-7981000		10 m

Tab. 3: EtherNet

EtherNet		
Article Number	**Description**	
	Straight connector / with nonterminated wire end. violet	Cable length
7000-14541-7980150		1.5 m
7000-14541-7980300		3 m
7000-14541-7980500		5 m
7000-14541-7980750		7.5 m
7000-14541-7981000		10 m

Tab. 4: EtherNet

EtherNet		
Article Number	**Description**	
	Straight connector / straight socket green	Cable length
7000-44511-7960150		1.5 m
7000-44511-7960300		3 m
7000-44511-7960500		5 m
7000-44511-7960750		7.5 m
7000-44511-7961000		10 m

Tab. 5: EtherNet

EtherNet		
Article Number	**Description**	
	Straight connector / with nonterminated wire end green	Cable length
7000-14541-7960150		1.5 m
7000-14541-7960300		3 m
7000-14541-7960500		5 m
7000-14541-7960750		7.5 m
7000-14541-7961000		10 m

Tab. 6: EtherNet

3.1.3.2 POWER Cables

Power cable 7/8"		
Article Number	**Description**	
	Straight socket / with nonterminated wire end	Cable length
7000-78021-9610150		1.5 m
7000-78021-9610300		3 m
7000-78021-9610500		5 m
7000-78021-9610750		7,5
7000-78021-9611000		10 m

Tab. 7: Power cable 7/8"

Power cable 7/8"		
Article Number	**Description**	
	Straight connector / straight socket	Cable length
7000-50021-9610030		0.3 m
7000-50021-9610060		0.6 m
7000-50021-9610100		1 m
7000-50021-9610150		1.5 m
7000-50021-9610200		2 m

Tab. 8: Power cable 7/8"

3.1.3.3 I/O Cables

I/O		
Article Number	**Description**	
	Straight connector / with nonterminated wire end yellow	Cable length
7000-12041-0250150		1.5 m
7000-12041-0250300		3 m
7000-12041-0250500		5 m
7000-12041-0250750		7.5 m
7000-12041-0251000		10 m

Tab. 9: I/O

The input/output cables are of course available in all shapes, colors, and combinations.

3.1.3.4 Valve Connector Combination Style A

- Contact spacing 18 mm

- Operating voltage 24 V AC/DC

- Operating current max. 4 A

Article Number	Description	
	M12 top connection	Cable length
7000-41501-2260000		110 mm
7000-41521-2260000		150 mm
7000-41541-2260000		200 mm
	M12 rear connection	Cable length
7000-41561-2260000		110 mm
7000-41581-2260000		150 mm
7000-41601-2260000		200 mm
Other system accessories on request		

Tab. 10: Valve connector combination Style A

3.1.3.5 Valve Connector Style A

- Contact spacing 18 mm

- Operating voltage 24 V AC/DC, pressure switch 24 V DC

- Operating current max. 4 A

Article Number	Description	
7000-41341-0000000	M12 top connection	LED yellow, protection circuit for valves
7000-41361-0000000		LED yellow/green for pressure switch
7000-41461-0000000	M12 rear connection	LED yellow, protection circuit for valves
7000-41481-0000000		LED yellow/green for pressure switch

Tab. 11: Valve connector Style A

> **We also offer a very wide product portfolio of sensors and actuators. From connectors, cables, adapters, through to special requests.**
>
> **Please visit our online shop:**
>
> **onlineshop.murrelektronik.com**

3.1.3.6 Connector for Self-Connection

Article Number	Description
7000-14521-0000000	CAT5 Bus M12 connector D-coded, 4-pin, straight
7000-99051-0000000	CAT5 Bus RJ45 D-coded, 4-pin, straight IP20
7000-00000-7969999	Bus cable for EtherNet, 100 m collar
7000-78081-0000000	Power 7/8" straight connector 5-pin, self-connecting
7000-78201-0000000	Power 7/8" socket straight 5-pin, self-connecting

Tab. 12: Connector for self-connection

3.1.3.7 Adapter

Article Number	Description	
7000-99052-0000000	Adapter M12 / RJ45, CAT 5, Socket /socket	

Tab. 13: Adapter

3.1.3.8 Blank Plug

Article Number	Description
7000-41241-0000000	M12 diagnostic adapter (for line monitoring to bridges)
58 627	M12 plastic plug (SP 10 pieces)
338155	Diagnosis blanking plug M12x1 (VP 1 pc.)
55 390	7/8" screw plug, metal with chain (SP 1 piece)
55 385	7/8" screw plug, plastic (SP 1 piece)

Tab. 14: Blank plug

3.1.3.9 Identification Labels

Article Number	Description
996067	IDENTIFICATION LABELS 20X8MM (SP 10 pieces)

Tab. 15: Identification labels

3.1.3.10 Grounding Strap

Article Number	Description
4000-71001-0410004	Grounding strap 4 mm² 100 mm for M4 (SP 1 piece)

Tab. 16: Grounding strap

3.1.3.11 Torque Wrench

Article Number	Description
7000-99102-0000000	Set of M12 torque wrenches (SP 1 piece)
7000-99104-0000000	Set of 7/8" torque wrenches (SP 1 piece)

Tab. 17: Torque wrench

3.1.3.12 MICO

- – Fire protection (EN 60950-1)

- – Operating voltage protection (EN 61131-2)

- – Operating state memory device (EN 61131-1)

Article Number	Description	Nominal operating branch-circuit current (full load)	
9000-41034-0100400	MICO 4.4 (4 channels)	each 4 A	
9000-41034-0100600	MICO 4.6 (4 channels)	each 6 A	
9000-41034-0401000	MICO 4.10 (4 channels)	each 10 A	
9000-41042-0100400	MICO 2.4 (2 channels)	each 4 A	
9000-41042-0100600	MICO 2.6 (2 channels)	each 6 A	
9000-41042-0401000	MICO 2.10 (2 channels)	each 10 A	

Tab. 18: Overview of MICO variants

Information on products and accessories are available in our catalog and our online shop at:

onlineshop.murrelektronik.com

3.2 Information for First-Time Users

Ethernet/IP is based on a generator/receiver communication model that allows the multicast Ethernet communication to achieve rapid report-by-exception replies.

Connection to the controller in an Ethernet/IP network is exclusively by means of Fast Ethernet switches (100 MBit/s). In this case, pay attention to the maximum cable length to the terminal point of 100 m without the use of auxiliary equipment. The bus node includes a 2-port switch.

Switches send multicast messages to all switch ports and then behave like a hub. When unmanaged switches are used, it means the more multicast users (Ethernet/IP users) are added to the system, and the higher the multicase traffic for the users. This leads to the consumption of a greater amount of bandwidth in the network. In turn, this slows down response times since each user must provide more CPU performance to view and reject messages that are not addressed to it.

If the number of messages processed is excessive, the user may be subject to an overload, missing replies may be at the incorrect RPI speed, and ultimately this may lead to a communication break-down. This overload condition can be affected by either the PC/PLC scanner or the I/O user.

It is therefore advisable to divide the entire network into several segments by means of several switches. As a result, high-speed networks can be uncoupled from time-uncritical systems by selecting the suitable RPI time and switches.

Please remember that, with Ethernet/IP, unmanaged switches should only be used in small isolated systems (systems that are not connected to the corporate network or program-wide networks). Managed switched are recommended for high-speed control systems of medium size or any size.

The switch must support the IGMP snooping function (Internet Group Management Protocol) in order to administrate multicast traffic. A virtual LAN switch function or the use of routers is required to connect a control system to a large plant or corporate network.

For additional information, please contact the ODVA at www.odva.org.

Requested Packet Interval (RPI)

When an Ethernet/IP system is set up, the RPI value must be carefully set in the bus master. Depending on the manufacturer version, this value lies within the range of 1 ms to several 100 ms. The RPI value determines the speed at which the scanner sends Ethernet/IP packets. It also determines the maximum speed at which the bus node sends messages.

The value set in the bus master is also transferred to the bus node during the connection initialization phase so that the system runs on the same time base. Besides setting the speed for data updates, the RPI value also sets the speed at which the scanner expects on-time reception.

If the RPI time setting is too low, a higher network load is generated automatically. As a result, the bus node also requires more time to process the inquiries due to the now higher network load. This also affects messages that are not addressed to the bus node itself since the messages must still be received and rejected.

This leads to an overload condition in which the bus node can no longer execute its internal processes and the required RPI time can no longer be fulfilled.

If telegram reception exceed minimum 4 times the RPI time setting, the controller interrupts I/O communication and switches to error condition.

Configurations that require RPI times under 10 ms must first be tested for correct operation.

The minimum RPI time supported by IMPACT67 is 5 ms!

You will find us and ODVA online at:

www.murrelektronik.com, www.odva.org

Fig. 8: EtherNet logo, general

3.3 EtherNET/IP Bus Cable

Murrelektronik offers a number of preterminated and matching round cables. Please refer to Chapter 3.1 System Components.

Electrical aspects are decisive when choosing suitable transmission lines:

The figures below illustrate the cable make-up.

Cables (EtherNet Bus Cable)

violet or green

Wires (EtherNet bus cable)

white   - fieldbus system cable (RD+)

blue   - fieldbus system cable (RD-)

yellow   - fieldbus system cable (TD+)

orange   - fieldbus system cable (TD-)

Make-up of EtherNet round cable
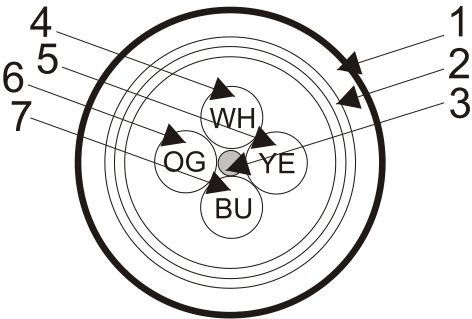
Fig. 9: EtherNet round cable

1	Sheath	4	bus conductor, white (RD+)
2	Line shield	5	bus conductor, yellow (TD+)
3	Central filler	6	bus conductor, orange (TD-)
		7	Bus conductor,, blue (RD-)

Contact assignment of 5-pin EtherNet connector

Socket

PORT 1 / 2

Pin 1	TD +
Pin 2	RD +
Pin 3	TD -
Pin 4	RD -
Pin 5	n.c.
Gewinde Thread Filet Rosca Filetto Rosca	⏚

Tab. 19: Contact assignment of EtherNet connector

3.4 Power Supplies

We recommend the use of primary switched-mode power supplies in applications with the IMPACT67 and to supply the sensors and actuators.

IMPACT67 modules require a DC power supply in the range 18 to 30 V.

System-related limit values regarding system power supply must be strictly observed if maximum functional safety and fault-free operation are to be ensured.

Always ensure that the system power, measured at the device furthest from the power supply, does not drop below 18 VDC.

A load current-related voltage drop in the power supply cable occurs due to the central power supply of IMPACT67 modules, including all their connected sensors.

In critical cases, voltage drop optimization is obtainable by changing the location of the power supply unit within the overall system and by using power supply cables with a larger conductor cross-section.

Calculating the required conductor cross-sections is dependent on installation-specific configuration data and is therefore not discussed in this manual.

The power supply module may be damaged if power supply is polarity-reversed. For this reason, we recommend the use of our preterminated 7/8" cables.

3.4.1.1 Connecting the Power Supply to the Module

The auxiliary power is required to power the actuators and sensors. The electronics of the IMPACT67 are powered from the sensor power supply.

The 7/8" connector is designed to carry a maximum current of 9 A per pin. This is taken into account when connecting the power supply to another circuit.

Power Supply Line

Module supply cables must have VDE approval and a maximum core cross-section of 1.5 mm². All further power supply line characteristics depend on individual applications and are not covered in this manual.

The maximum permitted core cross-section is 1.5 mm².

Connecting to IMPACT67

1. Mounting the IMPACT67 module.

2. Attach function ground cable to IMPACT67 module.

3. Connect sensor/actuator level.

4. Hook up bus connection.

5. Connect power supply.

Never switch off the sensor power supply (Pin 4) at the power supply connector in service and do not route via the emergency off circuits. Otherwise, the IMPACT67 module can no longer participate in bus communication. Therefore, the module electronics, the entire I/O section, and the sensors are powered via Pin 4.

3.4.1.2 System Power Supply

EtherNet modules require a DC voltage of typically 24 VDC (Class 2) as power supply.

Power supply unit performance is dependent on the number and power requirements of the connected users.

It is recommended to take different power supplies to power the sensors and actuators in order to achieve greater immunity from interference and decoupling.

We recommend the use of primary switched-mode power supplies for application with the EtherNet bus and for supplying the sensors and actuators.

The actuator power supply (Pin 5) may be designed for EMERGENCY OFF circuits.

Cable assignment of 5-pin power plug 7/8" (mini style)

Conductors (power cable)

Black conductors 1 0 V
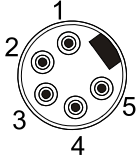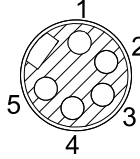
Black conductors 2 0 V

green/yellow   FE

Black conductors 3 sensor and bus supply

Black conductors 4 actuator power supply

Pin assignment of 5-pin power plug 7/8" (mini style)

Connector		Socket
POWER IN		**POWER OUT**

0V	**Pin 1**	0V
0V	**Pin 2**	0V
⏚	**Pin 3**	⏚
+24V U_S / max. 9 A	**Pin 4**	+24V U_S / max. 9 A
+24V U_A / max. 9 A	**Pin 5**	+24V U_A / max. 9 A

Tab. 20: Pin assignment of power plug 7/8" (mini style)

3.5 Connecting Sensors and Actuators

3.5.1 Connecting Sensors

The table below depicts all the general pin assignments for the M12 socket slots

M12

Pin 1	+ 24 V	Sensor supply
Pin 2	Function channel	Channel
Pin 3	0 V	Reference potential
Pin 4	Function channel	Channel
Pin 5	⏚	Function ground
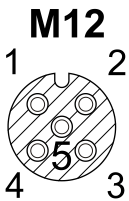
Tab. 21: General pin assignment of M12 slots

3.5.1.1 IMPACT67 E DI16

M12
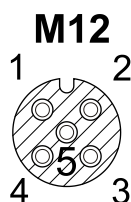
Pin 1	+24V Us / 0,2A
Pin 2	DI 10-17
Pin 3	0V
Pin 4	DI 0-7
Pin 5	⏚

The table below depicts the assignment between M12 slots and I/O labels.

M12 slot	Channel (Pin 4)	Channel (Pin 2)
0	DI 00	DI 10
1	DI 01	DI 11
2	DI 02	DI 12
3	DI 03	DI 13
4	DI 04	DI 14
5	DI 05	DI 15
6	DI 06	DI 16
7	DI 07	DI 17

Tab. 22: M12 slots to I/O labels

3.5.1.2 IMPACT67 E DI8 DO8

M12
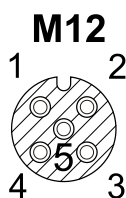
M12 0, 1, 2, 3

Pin 1	n.c.
Pin 2	DO 4-7
Pin 3	0V
Pin 4	DO 0-3
Pin 5	⏚

M12 4, 5, 6, 7

Pin 1	24V Us / 0,2A
Pin 2	DI 4-7
Pin 3	0V
Pin 4	DI 0-3
Pin 5	⏚

DO: U_A / 2 A

The table below depicts the assignment between M12 slots and I/O labels.

M12 slot	Channel (Pin 4)	Channel (Pin 2)
0	DO 00	DO 04
1	DO 01	DO 05
2	DO 02	DO 06
3	DO 03	DO 07
4	DI 00	DI 04
5	DI 01	DI 05
6	DI 02	DI 06
7	DI 03	DI 07

Tab. 23: M12 slots to I/O labels

3.5.1.3 Sensor Power Supply

Sensors can be powered directly via pins 1 (+24 V) and 3 (0 V) of the M12 sockets. The sensor power supply is protected per M12 slot. This protection is always self-resetting. The maximum current for the sensor power supply is 200 mA per M12 slot. Note the derating in the drawing below:

Derating Sensor Power Supply
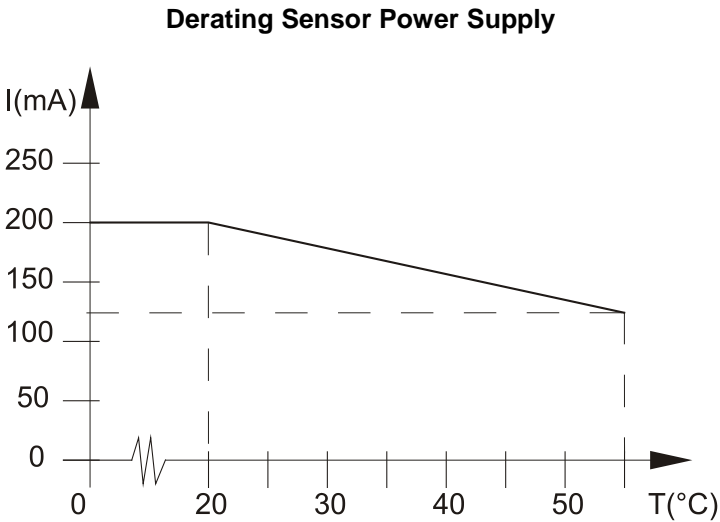
Fig. 10: Derating sensor power supply

IMPACT67 modules may be loaded to max. 200 mA per M12 slot (sensor current).

3.5.2 Connecting Actuators

The table below depicts all the general pin assignments for the M12 socket slots

Pin 1	n.c.	not connected
Pin 2	Function channel	Channel
Pin 3	0 V	Reference potential
Pin 4	Function channel	Channel
Pin 5	⏚	Function ground
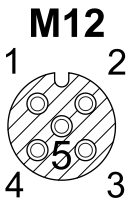
Tab. 24: General pin assignment of M12 slots

3.5.2.1 IMPACT67 E DO16

M12
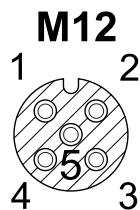
Pin 1   n.c.
Pin 2   DO 10-17
Pin 3   0V
Pin 4   DO 0-7
Pin 5 $\Large\perp$

DO: U_A/ 0,5 A

The table below depicts the assignment between M12 slots and I/O labels.

M12 slot	Channel (Pin 4)	Channel (Pin 2)
0	DO 00	DO 10
1	DO 01	DO 11
2	DO 02	DO 12
3	DO 03	DO 13
4	DO 04	DO 14
5	DO 05	DO 15
6	DO 06	DO 16
7	DO 07	DO 17

Tab. 25: M12 slots to I/O labels

3.5.2.2 IMPACT67 E DO8

M12
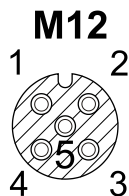
M12 0, 2, 4, 6

Pin 1   n.c.
Pin 2
Pin 3   0V
Pin 4   DO 0,2,4,6
Pin 5 $\Large\perp$

M12 1, 3, 5, 7

Pin 1   n.c
Pin 2   n.c
Pin 3   0V
Pin 4   DO 1,3,5,7
Pin 5 $\Large\perp$

DO: U_A/ 2 A

The table below depicts the assignment between M12 slots and I/O labels.

M12 slot	Channel (Pin 4)	Channel (Pin 2)
0	DO 00	DO 01
1	DO 01	-
2	DO 02	DO 03
3	DO 03	-
4	DO 04	DO 05
5	DO 05	-
6	DO 06	DO 07
7	DO 07	-

Tab. 26: M12 slots to I/O labels

3.5.2.3 Actuators

Each output of the DO8 and DI8/DO8 variants is loadable to max. 2 A.

Each output of the DO16 variant is loadable to max. 0.5 A.

The total current may not exceed 9 A due to the maximum current carrying capacity of the 7/8" power connector.

The module may heat up depending on the load.

If an output channel detects an overload or a short-circuit, the output is shut down.

To reset the output, it must first be reset using the control software.

Outputs are reset by an actuator power supply reset.

In order to achieve rapid short-circuit cutoff times, we recommend not to exceed the following lengths:

max. 15 m feed line (POWER IN) 1.5 mm² and max. 1.5 m actuator line 0.75 mm²

max. 10 m feed line (POWER IN) 1.5 mm² and max. 3 m actuator line 0.75 mm²

3.6 Unused Connections

Unused sockets must be closed off with blank plugs. Otherwise, IP 67 protection is not guaranteed.

4. Startup

First assign an IP address to all connected IMPACT67 modules, a DHCP/BOOTP server, or the web server, using the rotary switch (1). Please refer to the next chapter "Issuing and Setting the IP Address" for precise instructions. In any case, make sure that you do not issue an address two or more times.

Then connect your IMPACT67 modules by means of an M12 Ethernet cable to an EthernetIP controller and connect your sensors and/or actuators using M12 cables.

Only then hook up the power supply using a 7/8" power supply cable.

Configure your controller as described in Chapter "4.4 Configuration in RSLogix5000", for example to a RSLogix5000 controller.

Prior to setup, a competent system structure check of the field bus must be assured.

Each device type possesses an EDS file (*.eds) and a graphic (*.bmp).

See more details in Chapter "4.2 EDS Files".

4.1 Assigning and Setting the IP address

4.1.1 Issuing with the Rotary Switch

IP Address	Byte 1 Byte 2 Byte 3 Byte 4	0 - DHCP / BOOTP
		1 ... 254 - IP Address Byte 4
x100 x10 x1		255 ... 997 - DHCP / BOOTP
		998 - Factory setting
		999 - Static IP
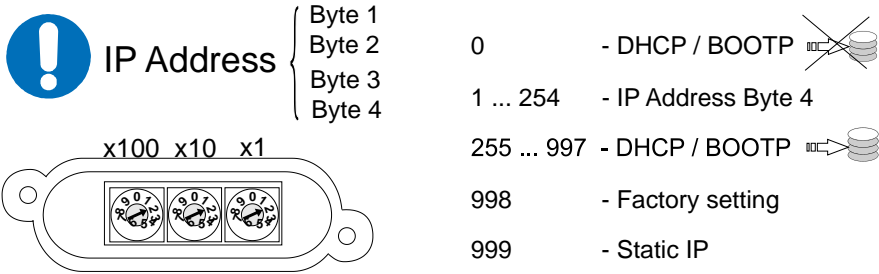
Fig. 11: Issuing with the rotary switch

Set the operating mode using the three rotary switches to obtain the module IP address:

When issuing addresses, please note the following:

Every Ethernet user must be assigned an unambiguous and unique IP address in the network.

Position/Range	Settings
Position 0:	IP address request per DHCP (default), or BOOTP without saving ( )
Range 1 to 254:	Setting the last byte of the IP address (default 192.168.100.xxx)
Range 255 to 997:	IP address request per DHCP (default), or BOOTP with saving () The search for an IP address only takes place if the setting DHCP or BOOTP was selected in the web server (Slot 000 / Properties). If STATIC was selected, the stored IP address is used.
Position 998:	Accept factory settings
Position 999:	Use static IP (default 192.168.100.6)

Tab. 27: Setting the IP address using the rotary switches

It is only possible to set the DHCP and BOOTP modes to refer to the IP address in the web server.

Please note the MAC-ID: it is printed on the side of the module. Set the rotary switches to the required position. Start your DHCP or BOOTP server and assign the required IP address to the module MAC ID that you noted down earlier. After the system is booted, start the service you require depending on the service you selected, and fetch the IP address from the server. If you saved the IP addresses, set all rotary switches to "999", otherwise this service is re-executed after every reboot.

The rotary switch setting is loaded once after applying the power supply. Any change only becomes effective after a power reset. If you want to use a saved IP address, set the rotary switch to 999.

When you issue an IP address or a subnet mask, make sure it corresponds to your actual network configuration. If you make a false input, you may no longer be able to reach the module under certain circumstances. Therefore, first contact your system administrator!

If the

** IP address is obtained from a DHCP/BOOTP server, the b module requests an IP address only within 60 seconds after switch-on. Make sure that a DHCP/BOOTP server is running when the module is switched on.**

Switch position "255 to 997"

Use this switch position when you want to store the IP address in the module and obtain the address from a BOOTP or DHCP server. It is then possible to switch over the module to static IP address. The stored IP address is used. Use the web server to perform the switchover.

If you set the module to a static IP address, the device expects an address to be issued by a DHCP/BOOTP server every time the device is switched.

Switch position "998"

The modules' factory settings are reactivated in switch position "998". The IP configuration, the I/O module settings, the diagnostic methods, and the number of diagnostic buffers are reset.

4.1.2 Issuing via DHCP / BOOTP

If an IP address is issued via DHCP or BOOTP, the IMPACT67 module first sends four DHCP requests and, if they are unanswered, sends four more BOOTP requests.

Note down the MAC ID printed on the right side of the housing and set the rotary switch to the required position. Start your DHCP or BOOTP server and assign the required IP address to the module MAC ID that you noted down earlier. After system boot, the IP addresses are obtained from the server. If you saved the IP addresses, now set all rotary switches to "999", otherwise this service is re-executed after every reboot.

The BCD rotary switch setting is loaded once after applying the power supply. Any change only becomes effective after a power reset. If you want to use a saved IP address, set the BCD rotary switch to 999.

CAUTION:

When you issue an IP address or a subnet mask, make sure that it corresponds to your actual network configuration. If you make a false input, you may no longer be able to reach your IMPACT67 system under certain circumstances. Therefore, first contact your system administrator!

4.1.3 Issuing via the Web Server

The method or the IP address can be set in the web server under the "*Edit IMPACT67"* link under the "*Properties"* tab..
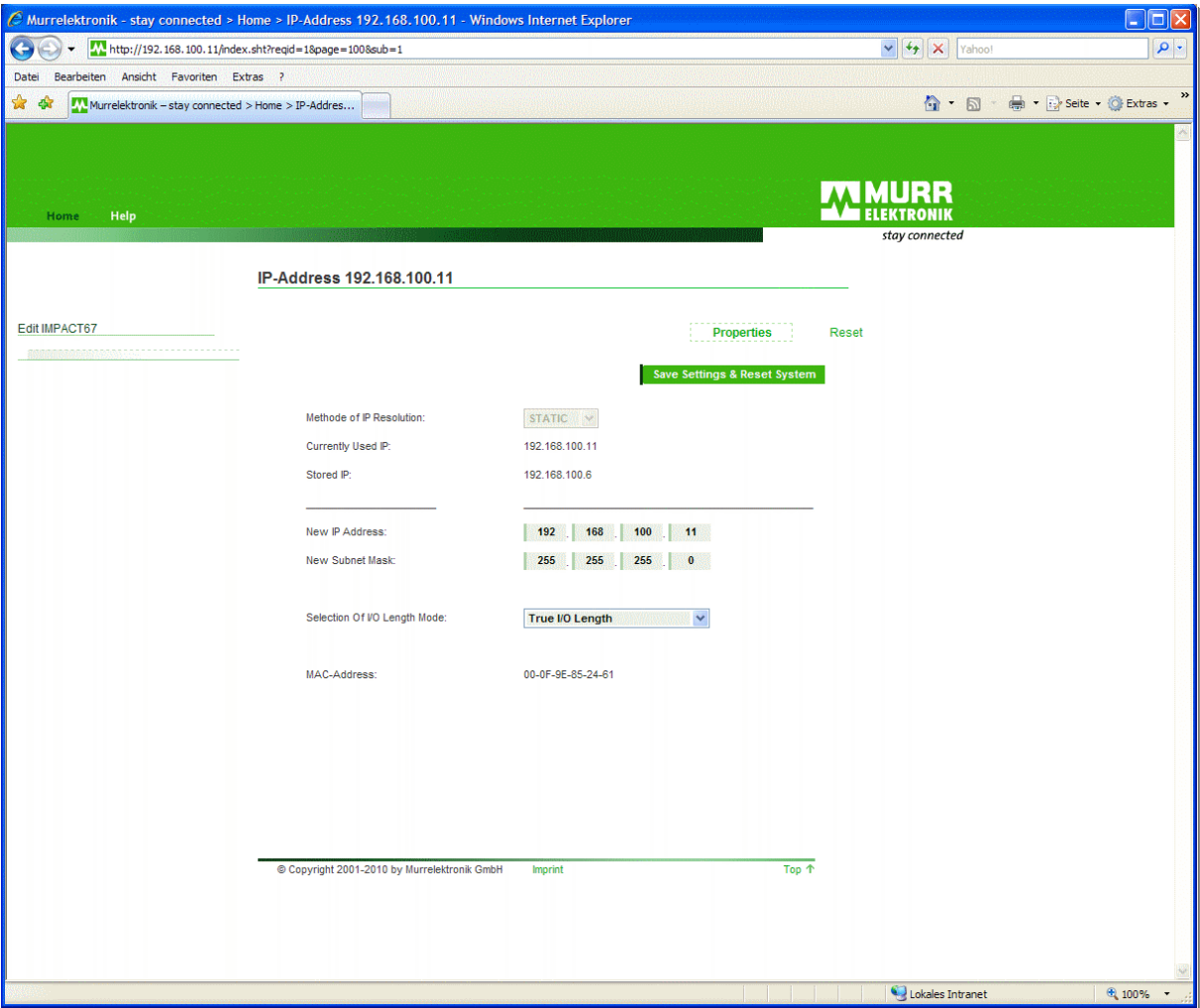
Fig. 12: IP setting in web server

Anzeige	Auswahl
„*Method of IP Resolution*"	To select the method, use the selection menu next to "*Method of IP Resolution"*. Click on the method you require. If you select "Static", the saved IP address is used at the next reboot irrespective of the switch setting, and no DHCP or BOOTP request is sent. Below that, the screen displays the currently used and saved IP address. Please note that the two addresses may be different.

Anzeige	Auswahl
„*New IP Adress*" „*New Subnet Mask*"	You can enter a new IP address and subnet mask next to the "*New IP Address"* and "*New Subnet Mask"* selection boxes.
„*Save Settings & Reset System*"	When you have completed all the settings, please press the "*Save Settings & Reset System" button* to save all your settings and execute an IMPACT67 system reset to activate the changed settings.
„Selection of I/O Length Mode"	In the "*Selection of I/O Length Mode*" field, set whether you want the device to work with even I/O data lengths or whether the data length should remain unchanged. True I/O Length: The data length leaves unchanged.. Always Even I/O Length: With odd data length a byte is added.
„MAC-Address"	Shows the MAC Address of the device.

The function of the "Static" setting in the "Method of IP Resolution" list box means there is no IP address inquiry over DHCP or BOOTP, even when the switch position is set to 255 to 998 or 0. Instead, the address that is already saved is used.

4.2 EDS Files

The EDS file is created explicitly for the device type (I/O). The consequence is that, in the IMPACT67 product line, each device is assigned a separate EDS file with the extension "*.eds". The devices are assigned a uniform icon with the extension "*.ico".

The EDS file contains a lot of information concerning the module e.g.:

device type, manufacturer, vendor ID, article number, software version, hardware version, etc.

EDS files are module-specific. Only Murrelektronik technical personnel are allowed to perform application-specific modifications.

EDS files are assigned as shown in the table below:

Module type	Name of EDS file	Name of icon
IMPACT67 E DI16	IMPACT67-E DI16 55085.eds	IMPACT67.ico
IMPACT67 E DI8 DO8	IMPACT67-E DI8 DO8 55086.eds	IMPACT67.ico

Module type	Name of EDS file	Name of icon
IMPACT67 E DO8	IMPACT67-E DO8 55087.eds	IMPACT67.ico
IMPACT67 E DO16	IMPACT67-E DO16 55088.eds	IMPACT67.ico

Tab. 28: EDS files

> **①** **The latest EDS files are downloadable over the web from:**
> **http://www.murrelektronik.com**. Navigate to the **download section under configuration files**.

4.3 IMPACT67 Web Server

All IMPACT67 EtherNetIP modules has a web server that is accessible via the IP address of each module.

To ensure the correct graphic display, please install the latest version of a web browser on your PC (Mozilla Firefox Version 3.5 or higher, or Microsoft Internet Explorer, Version 7.0 or higher).

The start page provides you with information on the connected module:

- Size of assembly instances

- Article number

- Software version

You can retrieve the software versions of the firmware, its date of creation, and the version of your web under the option "Help -> Version Info".

To change the device IP address via the web server, pay attention to the pervious instructions in the Chapter 4.1 "Issuing and Setting the IP Address".

4.4 Configuration in RSLogix5000

The procedure may differ slightly depending on the controller used. In this example, a CompactLogix from Allen Bradley is used.

Go to the backplane and your EtherNet port in RSLogix5000 under option "*I/O Configuration"*. Right-click "*New Module"*.

The screen below appears:
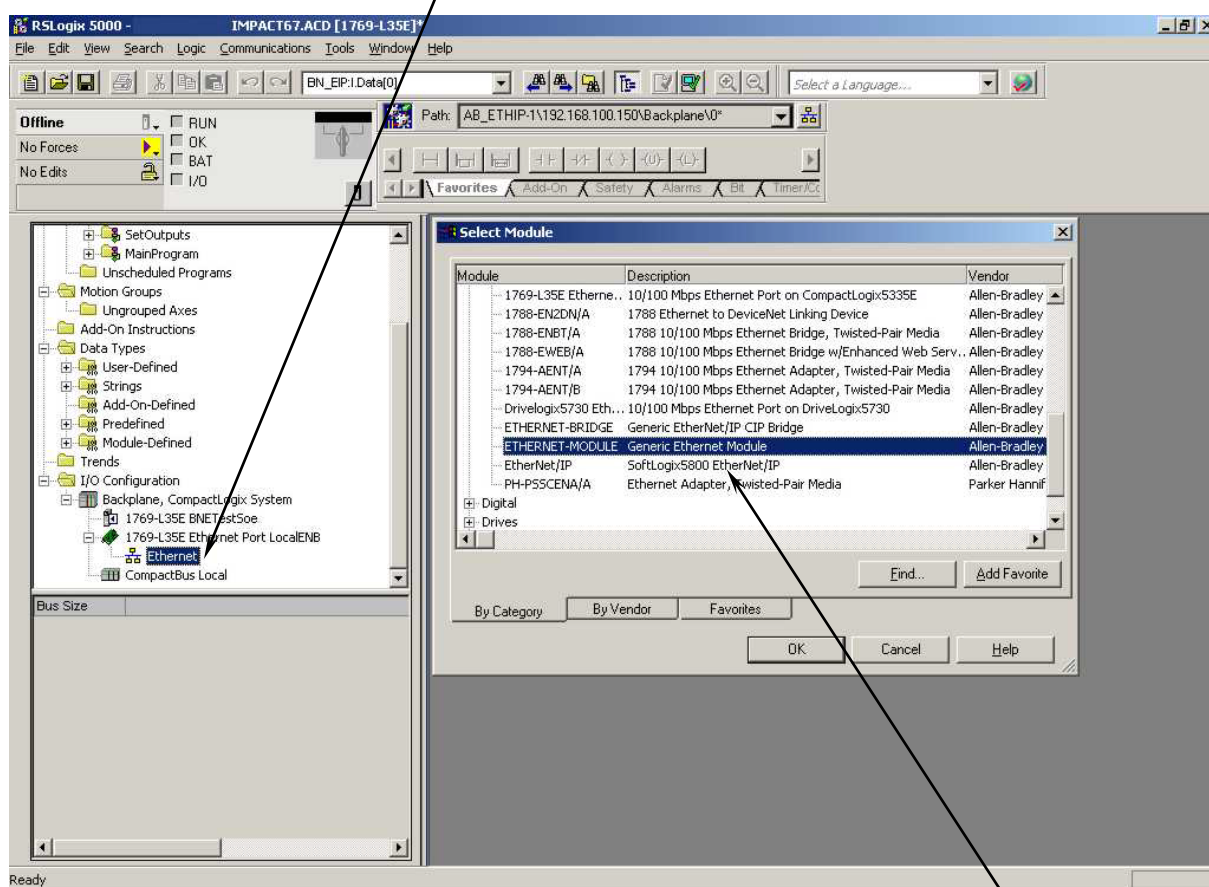
Fig. 13: RSLogix5000 Generic EtherNet Modules

Expand the option "*Communications'*"" and select the modules "*EtherNet Module – Generic EtherNet Module"*.

> **!** **Please make sure that you choose the option "EtherNet Module - Generic EtherNet Module" in the I/O configuration in RSLogix!**

Then enter the required parameters.
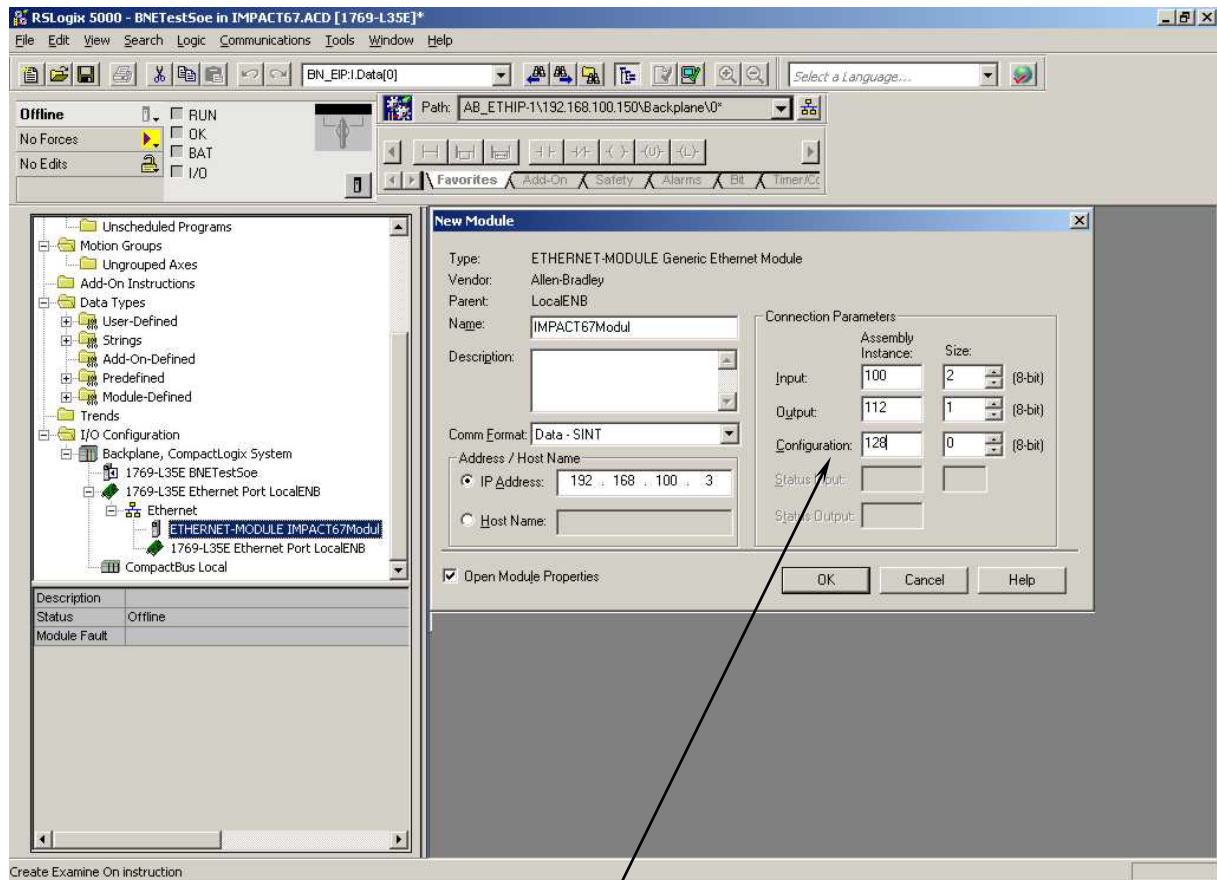
Fig. 14: RSLogix – Entering data lengths

The bus node uses the following instances:

- Inputs: assembly instance 100_{dec}

- Outputs: assembly instance 112_{dec}

- Configuration assembly instance 128_{dec}

> **Please note that the instance 128_{dec} is not supported for the configuration and therefore the size must always be ZERO!**

> **Please note that IMPACT67 calculates the data lengths in bytes. For this reason, make sure you set the correct data type, in our example SINT (8 bits).**

Set the RPI time in the "**Connection"** tab. The default RPI is 10 ms.
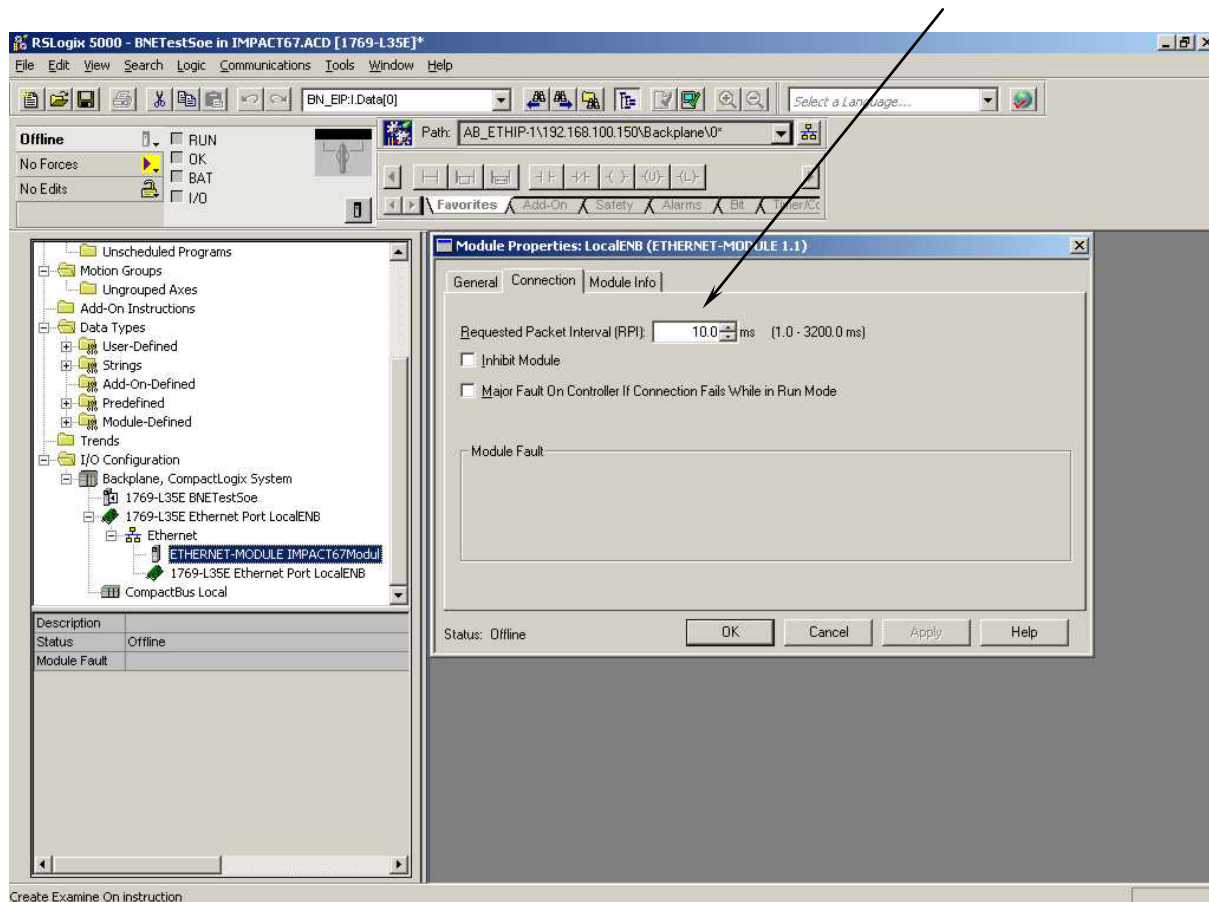
Fig. 15: RSLogix5000 Setting the RPI time

When you have completed all the settings, click on the "OK" button. Go to the Offline button and download the configuration to the controller. Based on the previous data settings, the controller verifies the correct data lengths and instances, and if correct, establishes the connection with the bus node. The bus node then switches the NS-LED to static green.

Configurations that require RPI times under 10 ms must first be tested for correct operation.

The minimum RPI time supported by IMPACT67 is 5 ms!

4.5 I/O Data

4.5.1 True I/O Length Mode

The table displays the input and output instances for each module with the corresponding length:

Module	Assembly Instance Input	Assembly Instance Output	Assembly Instance Configuration
IMPACT67 E DI16 55085	100_{dec} Length: 3 (8 bits)	112_{dec} Length: 1 (8 bits)	128_{dec} Length: 0
IMPACT67 E DI8 DO8 55086	100_{dec} Length: 3 (8 bits)	112_{dec} Length: 1 (8 bits)	128_{dec} Length: 0
IMPACT67 E DO8 55087	100_{dec} Length: 2 (8 bits)	112_{dec} Length: 1 (8 bits)	128_{dec} Length: 0
IMPACT67 E D016 55088	100_{dec} Length: 3 (8 bits)	112_{dec} Length: 2 (8 bits)	128_{dec} Length: 0

4.5.2 Always Even I/O Length Mode

The function is available for the following software version:

software version 1.03   modules 55085, 55086, 55087

software version 1.04   module 55088

The table displays the input and output instances for each module with the corresponding length:

Module	Assembly Instance Input	Assembly Instance Output	Assembly Instance Configuration
IMPACT67 E DI16 Art.-No. 55085	100_{dez} Länge: 4 (8-bit)	112_{dez} Länge: 2 (8-bit)	128_{dez} Länge: 0
IMPACT67 E DI8 DO8 55086	100_{dez} Länge: 4 (8-bit)	112_{dez} Länge: 2 (8-bit)	128_{dez} Länge: 0
IMPACT67 E DO8 Art.-No. 55087	100_{dez} Länge: 2 (8-bit)	112_{dez} Länge: 2 (8-bit)	128_{dez} Länge: 0
IMPACT67 E D016 Art.-No. 55088	100_{dez} Länge: 4 (8-bit)	112_{dez} Länge: 2 (8-bit)	128_{dez} Länge: 0

4.5.3 I/O Data IMPACT67 E DI16 55085

Manufacturer-specific format with 16-bit inputs, group diagnosis for the module. 100_{dec} and 112_{dec} are used.

Assembly instance 100_{dec}:

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Input channel 07	Input channel 06	Input channel 05	Input channel 04	Input channel 03	Input channel 02	Input channel 01	Input channel 00
1	Input channel 17	Input channel 16	Input channel 15	Input channel 14	Input channel 13	Input channel 12	Input channel 11	Input channel 10
2	Reserved	Reserved	Reserved	Reserved	Reserved	Sensor short-circuit diagnosis	Reserved	Sensor power supply undervoltage diag-nosis
3	0x00							

> **!**
>
> **Dashed line:**
>
> **The *„Always Even I/O Length Mode"* adds a further bit.**

Assembly instance 112dec:

Reserved

4.5.4 I/O Data IMPACT67 E DI8 DO8 55086

Manufacturer-specific format with 8-bit inputs and 8-bit outputs, group diagnosis for the module and actuator short-circuit diagnosis. Assembly instances 100_{dec} and 112_{dec} are used.

Assembly instance 100_{dec}:

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Input channel 07	Input channel 06	Input channel 05	Input channel 04	Input channel 03	Input channel 02	Input channel 01	Input channel 00
1	Reserved	Reserved	Reserved	Reserved	Actuator short-circuit diagnosis	Sensor short-circuit diagnosis	Actuator power supply undervoltage diagnosis	Sensor power supply undervoltage diagnosis
2	Actuator short-circuit channel 07	Actuator short-circuit channel 06	Actuator short-circuit channel 05	Actuator short-circuit channel 04	Actuator short-circuit channel 03	Actuator short-circuit channel 02	Actuator short-circuit channel 01	Actuator short-circuit channel 00
3	*0x00*							

Assembly instance 112_{dec}:

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Output channel 07	Output channel 06	Output channel 05	Output channel 04	Output channel 03	Output channel 02	Output channel 01	Output channel 00
1	0x00							

Dashed line:

The *„Always Even I/O Length Mode"* adds a further bit.

4.5.5 I/O Data IMPACT67 E DO8 55087

Manufacturer-specific format with 8-bit outputs, group diagnosis for the module and actuator short-circuit diagnosis. Assembly instances 100_{dec} and 112_{dec} are used.

Assembly instance 100_{dec}:

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Reserved	Reserved	Reserved	Reserved	Actuator short-circuit diagnosis	Reserved	Actuator power supply undervoltage diagnosis	Sensor power supply undervoltage diagnosis
1	Actuator short-circuit channel 07	Actuator short-circuit channel 06	Actuator short-circuit channel 05	Actuator short-circuit channel 04	Actuator short-circuit channel 03	Actuator short-circuit channel 02	Actuator short-circuit channel 01	Actuator short-circuit channel 00

Assembly instance 112dec:

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Output channel 07	Output channel 06	Output channel 05	Output channel 04	Output channel 03	Output channel 02	Output channel 01	Output channel 00
1					0x00			

Dashed line:

The *„Always Even I/O Length Mode"* adds a further bit.

4.5.6 I/O Data IMPACT67 E DO16 55088

Manufacturer-specific format with 16-bit outputs, group diagnosis for the module and actuator short-circuit diagnosis. Assembly instances 100_{dec} and 112_{dec} are used.

Assembly instance 100_{dec}:

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Reserved	Reserved	Reserved	Reserved	Actuator short-circuit diagnosis	Reserved	Actuator power supply undervoltage diag-nosis	Sensor power supply undervoltage diag-nosis
1	Actuator short-circuit channel 07	Actuator short-circuit channel 06	Actuator short-circuit channel 05	Actuator short-circuit channel 04	Actuator short-circuit channel 03	Actuator short-circuit channel 02	Actuator short-circuit channel 01	Actuator short-circuit channel 00
2	Actuator short-circuit channel 17	Actuator short-circuit channel 16	Actuator short-circuit channel 15	Actuator short-circuit channel 14	Actuator short-circuit channel 13	Actuator short-circuit channel 12	Actuator short-circuit channel 11	Actuator short-circuit channel 10
3	0x00							

Assembly instance 112dec:

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Output channel 07	Output channel 06	Output channel 05	Output channel 04	Output channel 03	Output channel 02	Output channel 01	Output channel 00
1	Output channel 17	Output channel 16	Output channel 15	Output channel 14	Output channel 13	Output channel 12	Output channel 11	Output channel 10

Dashed line:

The *„Always Even I/O Length Mode"* adds a further bit.

5. Diagnostics

Diagnostic information is an important basis for easy setup and quick troubleshooting.

Clear information from the I/O module and its connected periphery components, such as sensors and actuators, identify, rectify, and therefore minimize downtimes.

5.1 LED Displays

All IMPACT67 modules have separate and clearly arranged displays for bus status, device status, and I/O status displays. These displays are located on the front of the device.

5.1.1 Bus and Device Status LEDs

The LEDs on the front of the module are clearly marked for identification. Display is provided by LEDs that light up permanently or flash. The figure below depicts LED layout and the table lists the functions.
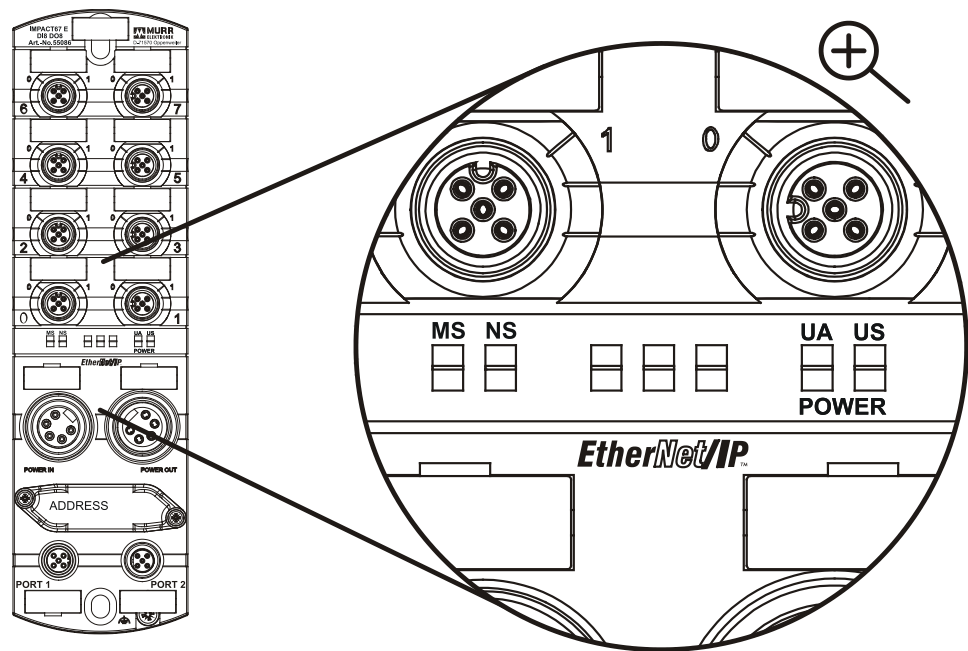
Fig. 16: Bus and device status LEDs on the module front panel

When the IMPACT67 module is supplied with power, the device starts with an automatic self-test which takes about 2 seconds.

Bus status LEDs on module front panel

LED Designation	LED Display	Response	Meaning
MS		off	Device is off
MS		green	Operational, device in service
MS		green / red flashing	Self-test
NS		off	Device is off Device has no IP address
NS		flashing green	IP address exists but no connection to the Master
NS		green	Connection to Master exists
NS		flashing red	At least one connection has timeout
NS		red	The module detected that its IP address is used by a different device
NS		green / red flashing	Self-test

Tab. 29: Bus status LEDs on module front panel

Device status LEDs on the module front panel
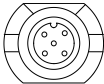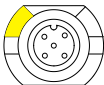
LED Description	LED Display	Response	Status	Meaning
US POWER (red/green)		off	No voltage	Failure of module and sensor power supply
		green	voltage applied	Module and sensor power supply applied
		red	Undervoltage	Module and sensor power supply undervoltage
UA POWER (red/green)		off	No voltage	Failure of actuator power supply
		green	voltage applied	Actuator supply OK
		red	Undervoltage	Undervoltage, actuator power supply

Tab. 30: Device status LEDs on the module front panel

5.1.2 I/O Status LEDs at M12 Slots
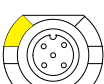
Each input and output is assigned a separate status display They are labeled with '00 to 07' and '10 to 17'. The displays are located directly next to the corresponding M12 socket. This makes it easy to identify the status of peripheral components, such as sensors and actuators.

LED Display of Digital Inputs

Input with NO Contact Function	Voltage at Input	Logic Value	LED Display	
	0 V	0		off
	24 V	1		yellow

Tab. 31: LED display of digital inputs

LED Display of Digital Outputs

Output	Logic value	Voltage at Output	LED Display	
	0	0 V		off
	1	24 V		yellow

Tab. 32: LED display of digital outputs

5.1.3 LED Display for Diagnostics

5.1.3.1 IMPACT67 DI16 Modules

Error	LED at M12 Socket		LED Designation
	Socket No. x		U_S
	Channel 0x	Channel 1x	
Module/sensor power supply undervoltage			red
Short-circuit (sensor supply)	both red		

Tab. 33: LED display for diagnostics

5.1.3.2 IMPACT67 DI8 DO8 Modules

Error	LED at M12 Socket		LED Designation	
	Socket No. x		U_A	U_S
	Channel 0x	Channel 1x		
Module/sensor power supply undervoltage				red
Actuator power supply undervoltage			red	
No actuator supply			off	
Deactivate actuator	red	red		
Short-circuit (sensor supply)	both red			

Tab. 34: LED display for diagnostics

5.1.3.3 IMPACT67 DO8 Modules

Error	LED at M12 Socket		LED Designation	
	Socket No. x		U$_A$	U$_S$
	Channel 0x	Channel 1x		
Module/sensor power supply undervoltage				red
Actuator power supply undervoltage			red	
No actuator supply			off	
Deactivate actuator	red			

Tab. 35: LED display for diagnostics

5.1.3.4 IMPACT67 DO16 Modules

Error	LED at M12 Socket		LED Designation	
	Socket No. x		U$_A$	U$_S$
	Channel 0x	Channel 1x		
Module/sensor power supply undervoltage				red
Actuator power supply undervoltage			red	
No actuator supply			off	
Deactivate actuator	red	red		

Tab. 36: LED display for diagnostics

5.2 Module / Sensor Power Supply

5.2.1 Undervoltage

There are two levels of undervoltage detection:

1. $U_s < 18$ V : In this case, the module is still working but:

- The POWER - Us LED lights up red

- the respective diagnostic is transferred via the bus.

$U_s < 1.5$ V : In this case, the device switches off and bus communication runs until $U_s < 6V$

5.3 Actuator Power Supply

5.3.1 Undervoltage

There are two levels of undervoltage detection :

1. $U_A < 18$ V : In this case the module is still working but:

- The POWER U_A LED lights up red

- The respective diagnostic data are transferred to the scanner

2. $U_A < 13.5$ V : In this case, the outputs are not longer functional.

- The POWER U_A LED goes out

- All outputs are reset to 0

5.4 Sensor Power Supply

Power supply for the sensors is provided at the M12 sockets between pin 1 (+24V) and Pin 3 (0V).

5.4.1 Short-Circuit or Overload

The sensor power supply is protected by a self-resetting multifuse for each M12 socket. The maximum current draw for the sensor power supply is 200 mA per M12 slot. Note the derating in the drawing below:

Derating Sensor Power Supply
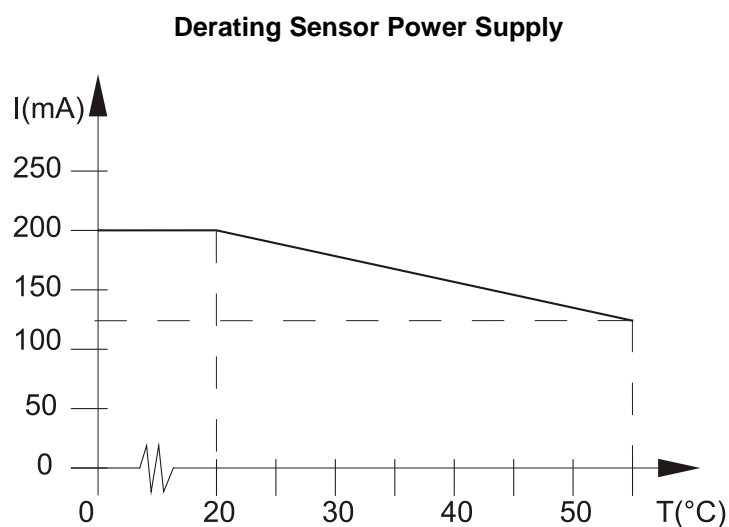
Fig. 17: Derating sensor power supply

In the event of a short-circuit or overload in the sensor supply, the following symptoms are observed on the IMPACT67 module:

- The diagnostic LEDs light up red on the associated M12 socket.

- The respective diagnostic data are transferred over the bus to the master.

- All other inputs function correctly.

When an overload or short-circuit is rectified or the sensor supply is connected, the LEDs and diagnostic data are reset.

5.5 Outputs (Actuators)

5.5.1 Short-Circuit or Overload

In the event of an output short-circuit or overload, the following symptoms are observed on the IM-PACT67 module:

- The diagnostic LEDs light up red on the associated M12 socket

- The output status LED extinguishes

- The respective diagnostic data are transferred over the bus to the master.

In order to reactivate an output after a short circuit or overload has been corrected, the following procedure must be observed:

1. The output must first be set to "0"

2. and then to "1" again

Outputs are reset by an actuator power supply reset.

5.6 Diagnostics via the Fieldbus

The following diagnostics are reported:

- Sensor short-circuit group signal

- Actuator shutdown by channel and group signal

- Module / sensor power supply undervoltage (The power supply U_S is lower than 18V)

- Actuator power supply undervoltage (the power supply U_A is lower than 18 V)

The group diagnosis consists of one byte. The corresponding bit for the error is set when the error occurs and is deleted as soon as the error is rectified.

5.6.1 Group Diagnostic Data for IMPACT67 E

The diagnostic concerning the EtherNet fieldbus is sent for all modules in the assembly instance 100_{dec} of Class 4.

Group Diagnostic Byte Format

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3 (only modules with outputs)	Bit 2 (only modules with inputs)	Bit 1 (only modules with outputs)	Bit 0 (all modules)
Reserved				Actuator short-circuit diagnosis	Sensor short-circuit diagnosis	Actuator power supply undervoltage diagnosis	Sensor power supply undervoltage diagnosis

Tab. 37: Group diagnostic byte format

6. Technical Data

6.1 Art. No. 55085 IMPACT67 E DI16

General

Ethernet Slave Generic I/O Module IP67

with 16 inputs

[M12 socket, Pin 4] → 8 inputs

[M12 socket, Pin 2] → 8 inputs

EMC

EN 61000-4-2 ESD ....: Contact ± 4 kV, air ± 8 kV
EN 61000-4-3 RF-Field ....: 10 V/m
EN 61000-4-4 Burst ....: ± 2 kV
EN 61000-4-5 Surge ....: asym./symm. ± 500 V (DC net input)
.... asym. ± 1 kV (Signal connections)
EN 61000-4-6 HF-asymmetric ....: 10 V
EN 55011 Interference field strength ....: QP 40 dBµV/m (30 - 230 MHz)
.... QP 47 dBµV/m (230 - 1000 MHz) (class A)

Ambient conditions

Operating temperature ....: 0°C ... +55°C
Storage temperature...: -25°C … +70°C
Enclosure type according to IEC 60529 ....: IP 67

Mechanical ambient conditions

Oscillation according to EN 60068 Part 2-6 ....: 5 - 60 Hz: constant amplitude 0,35 mm,
.... 60 – 150 Hz: constant acceleration 5 g
Shock according to EN 60068 Part 2-27 ....: Amplitude 15 g, 11 ms duration

Miscellaneous

Dimensions (L × W × H)...: 225 × 63 × 39 mm
Attachment distance ....: 208 mm
Weight ....: approx. 420 g

Bus Data

Transfer protocol ....: Ethernet/IP
Transfer rates ....: 10/100 Mbit/s, IEEE 802.3, Auto-Negotiation,
.... half- or full Duplex by 10 and 100 Mbit/s available,
.... automatically settings
Electrical isolation ....: 500 V between bus and internal logic
Vendor ID..: 640Dec
Data length input and diagnostics.......................................: Assembly Instance Input: 100
.... Size: 3 (8-bit)

Data length output ....: Assembly Instance Output: 112
.... Size: 1 (8-bit)
Data length configuration ....: Assembly Instance Configuration: 128
.... Size: 0

Connection Possibilities

Supply cable ....: 2 × connector 7/8" female / male connector
Data cable ....: 2 × M12 connector 5-pin
....: (male connector, D-coded)
Inputs ....: 8 × 5-pin M12 connector
Maximum length of input cable...: < 30 m

Power Supply

Voltage U_s over 7/8" power in connector..............................: 24 VDC
Voltage U_s range ....: 18 – 30 VDC
Sensor supply 7/8" power in connector ....: max. 9 A
Current consumption (without In-/Output)............................: <= 130 mA

Inputs

Number of inputs..: 16
Input characteristics...: EN 61131-2 Type 2
Supply for sensors ....: max. 200 mA per socket
Short circuit protection for sensors ....: Multifuse,
.... up to 100 mA load: automatic start-up
.... from 100 mA load: a reset is required
Multi-fuse reaction time (time to trip) ....: 1s at IK >= 1 A and 23 °C

Derating Supply for Sensors
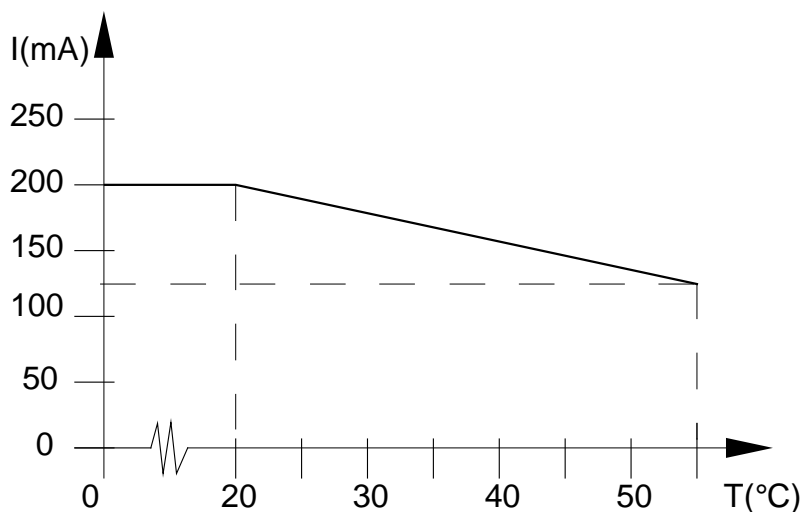
6.2 Art. No. 55086 IMPACT67 E DI8 DO8

General

Ethernet Slave Generic I/O Module IP67

with 8 inputs and 8 outputs

[M12 socket 4, 5, 6, 7; Pin 4 und Pin 2] → 8 inputs

[M12 socket 0, 1, 2, 3; Pin 4 und Pin 2] → 8 outputs

EMC

EN 61000-4-2 ESD ....: Contact ± 4 kV, air ± 8 kV
EN 61000-4-3 RF-Field ....: 10 V/m
EN 61000-4-4 Burst ....: ± 2 kV
EN 61000-4-5 Surge ....: asym./symm. ± 500 V (DC net input)
.... asym. ± 1 kV (Signal connections)
EN 61000-4-6 HF-asymmetric ....: 10 V
EN 55011 Interference field strength ....: QP 40 dBµV/m (30 - 230 MHz)
.... QP 47 dBµV/m (230 - 1000 MHz) (class A)

Ambient Conditions

Operating temperature ....: 0°C … +55°C
Storage temperature ....: -25°C … +70°C
Enclosure type according to IEC 60529 ....: IP 67

Mechanical Ambient Conditions

Oscillation according to EN 60068 Teil 2-6 ....: 5 - 60 Hz: constant amplitude 0,35 mm,
.... 60 – 150 Hz: constant acceleration 5 g
Shock according to EN 60068 Teil 2-27 ....: Amplitude 15 g, 11 ms duration

Miscellaneous

Dimensions (L × W × H)...: 225 × 63 × 39 mm
Attachment distance ....: 208 mm
Weight ....: approx. 420 g

Bus Data

Transfer protocol ....: Ethernet/IP
Transfer rates ....: 10/100 Mbit/s, IEEE 802.3, Auto-Negotiation,
.... half- or full Duplex by 10 and 100 Mbit/s available,
.... automatically settings
Electrical isolation ....: 500 V between bus and internal logic
Vendor ID...: 640Dec
Data length input and diagnostics.......................................: Assembly Instance Input: 100
.... Size: 3 (8-bit)
Data length output ....: Assembly Instance Output: 112
.... Size: 1 (8-bit)
Data length configuration ....: Assembly Instance Configuration: 128
.... Size: 0

Connection Possibilities

Supply cable ....: 2 × connector 7/8" female / male connector
Data cable ....: 2 × M12 connector 5-pin
.... (male connector, D-coded)
Inputs ....: 4 × 5-pin M12 connector
Maximum length of input cable...: < 30 m
Outputs ....: 4 × 5-pin M12 connector
Maximum length of output cable...: with 0.75 mm² max. 10 m
.... with 0.34 mm² max. 5 m

Power Supply

Voltage U_s / U_a over 7/8" power in connector.........................: 24 VDC
Voltage U_s / U_a range ....: 18 – 30 VDC
Actuator supply 7/8" power in connector ....: max. 9 A
Sensor supply 7/8" power in connector ....: max. 9 A
Current consumption U_s (without In-/Output).......................: <= 130 mA

Outputs

Number of outputs ....: 8
Actuator current load ....: approx. 2 A per actuator
Switching frequency ....: approx. 50 Hz 50% duty ratio
Switching frequency inductive load ....: approx. 10 Hz 50% duty ratio
Lamp load ....: max. 40 W

Inputs

Number of inputs ....: 8
Input characteristics...: EN 61131-2, Type 2
Supply for sensors ....: max. 200 mA per socket
Short circuit protection for sensors ....: Multifuse,
.... up to 100 mA load: automatic start-up
.... from 100 mA load: a reset is required
Multi-fuse reaction time (time to trip) ....: 1s at IK >= 1 A and 23 °C

Derating Supply for Sensors
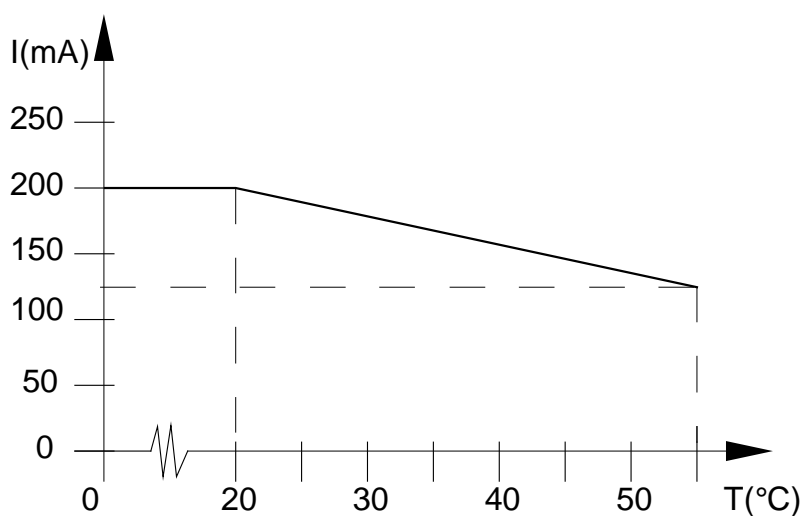
6.3 Art. No. 55087 IMPACT67 E DO8

General

Ethernet Slave Generic I/O Module IP67

with 8 outputs

[M12 socket, Pin 4] → 8 outputs

EMC

EN 61000-4-2 ESD ....: Contact ± 4 kV, air ± 8 kV
EN 61000-4-3 RF-Field ....: 10 V/m
EN 61000-4-4 Burst ....: ± 2 kV
EN 61000-4-5 Surge ....: asym./symm. ± 500 V (DC net input)
.... asym. ± 1 kV (Signal connections)
EN 61000-4-6 HF-asymmetric ....: 10 V
EN 55011 Interference field strength ....: QP 40 dBμV/m (30 - 230 MHz)
.... QP 47 dBμV/m (230 - 1000 MHz) (class A)

Ambient Conditions

Operating temperature ....: 0°C ... +55°C
Storage temperature ....: -25°C … +70°C
Enclosure type according to IEC 60529 ....: IP 67

Mechanical Ambient Conditions

Oscillation according to EN 60068 Teil 2-6 ....: 5 - 60 Hz: constant amplitude 0,35 mm,
.... 60 – 150 Hz: constant acceleration 5 g
Shock according to EN 60068 Teil 2-27 ....: Amplitude 15 g, 11 ms duration

Miscellaneous

Dimensions (L × W × H)...: 225 × 63 × 39 mm
Attachment distance ....: 208 mm
Weight ....: approx. 420 g

Bus Data

Transfer protocol ....: Ethernet/IP
Transfer rates ....: 10/100 Mbit/s, IEEE 802.3, Auto-Negotiation,
.... half- or full Duplex by 10 and 100 Mbit/s available,
.... automatically settings
Electrical isolation ....: 500 V between bus and internal logic
Vendor ID..: 640Dec
Data length input and diagnostics.......................................: Assembly Instance Input: 100
.... Size: 2 (8-bit)
Data length output ....: Assembly Instance Output: 112
.... Size: 1 (8-bit)
Data length configuration ....: Assembly Instance Configuration: 128
.... Size: 0

Connection Possibilities

Supply cable ....: 2 × connector 7/8" female / male connector
Data cable ....: 2 × M12 connector 5-pin
....: (male connector, D-coded)
Outputs ....: 8 × 5-pin M12 connector
Maximum length of output cable...: with 0.75 mm² max. 10 m
....: with 0.34 mm² max. 5 m

Power Supply

Voltage U_s / U_a over 7/8" power in connector.........................: 24 VDC
Voltage U_s / U_a range...: 18 – 30 VDC
Actuator supply 7/8" power in connector ....: max. 9 A
Sensor supply 7/8" power in connector ....: max. 9 A
Current consumption (without In-/Output)............................: <= 130 mA

Outputs

Number of outputs ....: 8
Actuator current load ....: approx. 2 A per actuator
Switching frequency ....: approx. 50 Hz 50% duty ratio
Switching frequency inductive load ....: approx. 10 Hz 50% duty ratio
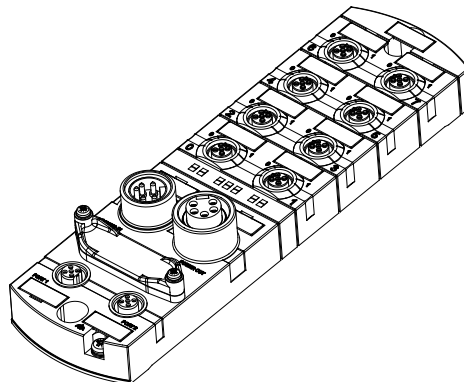Lamp load ....: max. 40 W
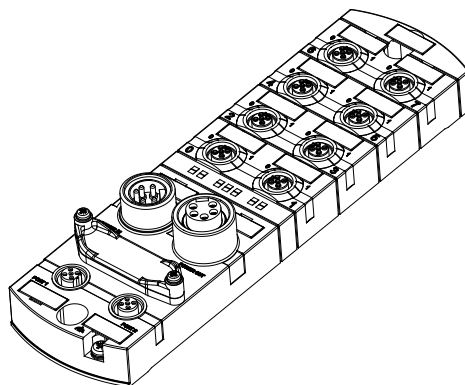
6.4 Art. No. 55088 IMPACT67 E DO16

General

Ethernet Slave Generic I/O Module IP67

with 16 outputs

[M12 socket, contact 4] → 8 outputs

[M12 socket, contact 2] → 8 outputs

EMC

EN 61000-4-2 ESD ....: Contact ± 4 kV, air ± 8 kV
EN 61000-4-3 RF-Field ....: 10 V/m
EN 61000-4-4 Burst ....: ± 2 kV
EN 61000-4-5 Surge ....: asym./symm. ± 500 V (DC net input)
.... asym. ± 1 kV (Signal connections)
EN 61000-4-6 HF-asymmetric ....: 3 V
EN 61000-4-8 Magnetic field 50 Hz ....: 30 A/m
EN 55011 Interference field strength ....: QP 40 dBµV/m (30 - 230 MHz)
.... QP 47 dBµV/m (230 - 1000 MHz) (class A)

Ambient Conditions

Operating temperature ....: 0°C ... +55°C
Storage temperature ....: -25°C … +70°C
Enclosure type according to IEC 60529 ....: IP 67

Mechanical Ambient Conditions

Oscillation according to EN 60068 Teil 2-6 ....: 5 - 60 Hz: constant amplitude 0,35 mm,
.... 60 – 150 Hz: constant acceleration 5 g
Shock according to EN 60068 Teil 2-27 ....: Amplitude 15 g, 11 ms duration

Miscellaneous

Dimensions (L × W × H)...: 225 × 63 × 39 mm
Attachment distance ....: 208 mm
Weight ....: approx. 420 g

Bus Data

Transfer protocol ....: Ethernet/IP
Transfer rates ....: 10/100 Mbit/s, IEEE 802.3, Auto-Negotiation,
.... half- or full Duplex by 10 and 100 Mbit/s available,
.... automatically settings
Electrical isolation ....: 500 V between bus and internal logic
Vendor ID..: 640Dec
Data length input and diagnostics.......................................: Assembly Instance Input: 100
.... Size: 3 (8-bit)
Data length output ....: Assembly Instance Output: 112
.... Size: 2 (8-bit)
Data length configuration ....: Assembly Instance Configuration: 128
.... Size: 0

Connection Possibilities

Supply cable ....: 2 × connector 7/8" female / male connector
Data cable ....: 2 × M12 connector 5-pin
 ....: (male connector, D-coded)
Outputs ....: 8 × 5-pin M12 connector
Maximum length of output cable...: with 0.75 mm² max. 10 m
 ....: with 0.34 mm² max. 5 m

Power Supply

Voltage U_s / U_a over 7/8" power in connector........................: 24 VDC
Voltage U_s / U_a range..: 18 – 30 VDC
Actuator supply 7/8" power in connector ....: max. 9 A
Sensor supply 7/8" power in connector ....: max. 9 A
Current consumption (without In-/Output)............................: <= 130 mA

Outputs

Number of outputs ....: 16
Actuator current load ....: approx. 0.5 A per actuator
Switching frequency ....: approx. 50 Hz 50% duty ratio
Switching frequency inductive load ....: approx. 10 Hz 50% duty ratio
Lamp load   : max. 10 W

Abbreviations

Actuator short-circuit	Short-circuit or overload at an output results in output switchoff. This fault is signaled via the diagnostic data contained in the input data. A red LED indicates the error at the associated M12 socket. There is no automatic output restart. It is necessary to switch off the output via the controller after the cause of the error is rectified. This clears the diagnostic message.
DI	Digital Input
DIN	Deutsches Institut für Normung: German standards institute.
DN	DeviceNet
DO	Digital Output
EN	European Standard
EEC	European Economic Community
EMC	Electromagnetic Compatibility
IEC	International Electrotechnical Commission
ISO	International Standards Organization
LED	Light Emitting Diode
MS	Module Status
NS	Network Status
OSI	Open Systems Interconnection
PLC	Programmable Logic Control
Sensor short-circuit	Short-circuit or overload at Pin 1 of the M12 socket trips the self-resetting circuit-breaker. Every M12 socket has a separate circuit-breaker. A red LED indicates the error at the associated M12 socket. This fault is signaled via the diagnostic data contained in the input data. After the error is rectified, the sensor power supply is restarted automatically.
Undervoltage	The voltages of the module / sensor power supply and actuator power supply are detected separately. If a voltage of 18 VDC is exceeded, this fault is signaled by the diagnostic data contained in the input data. If there is a module / sensor power supply undervoltage, the LED labeled "US Power" lights up. If there is an actuator power supply undervoltage, the LED labeled "UA Power" lights up.

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