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- Concept Comparisons
- Personal Consulting
- System Solutions

INSTALLATION CONCEPTS

Smart Solutions from Murrelektronik

ESCAPE THE INSTALLATION MAZE

FACTS ABOUT MURRELEKTRONIK

- Represented worldwide with 21 branch offices and many international distributors
- 2,700 employees
- Ca. 1 Mio. products in stock in 4 international storage locations (USA, Brazil, China, Germany)
- 65,000 different products

MURRELEKTRONIK PROVIDES

- Solutions for all standard fieldbus systems
- System solutions for all different kinds of applications
- Comprehensive diagnostics
- Rugged products
- Excellent logistics for fast deliveries

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THE RIGHT CHOICE
FOCUS ON COST-EFFECTIVENESS

Efficient installation concepts connect all I/O points in a system or in a machine to maximize cost-effectiveness. However, this can mean different things. The various aspects of cost-effectiveness like...

- Material costs
- Time required for the installation
- Service level: project planning, installation, setup, maintenance, etc.

...play different roles, depending on a company's philosophy.

With Murrelektronik, you can choose from a variety of installation concepts. We always offer more than one solution to a challenge.

Our customers can pick between different installation strategies. You can decide on the concept that meets your technical requirements, as well as focuses on the cost-effective aspects that are important to you.

USE OUR CONSULTING SERVICE

We offer expert consulting services. Our specialists come to your site and take a look at your machine. Together with you, they develop ideas and suggestions for your machine and plant installation. They help you find the right concept: be cost-effective, lower total costs and be more competitive.

CONCEPT COMPARISONS

There are so many different styles: ring structures, line structures, star topologies and more. Finding the right solution for a specific installation requirement is not easy. Several options can often reach the same goal. The questions is: which one is the best for you?

We want to create transparency with you our customer. All concepts presented in this brochure are based on installations with 40 inputs and 24 outputs. This makes it easier to compare and focus on transparency. It helps to get an overview of how to proceed.

AT A GLANCE

64 I/Os for optimum comparability

- 40 digital inputs
- 24 digital outputs

I/O	40 DI / 24 DO
Time	WP 14 / CP 114 (47 min)
Level	★★★★

WP ➔ Wiring Point

Number of single wires to be connected by hand.

1 WP ≙ 120 seconds

CP ➔ Connection Point

Number of connections with connectors: screwed in or plugged in.

1 CP ≙ 10 seconds

Service Level

The service level describes the level of functionality and technology of an installation concept.

High level = easier planning, quicker setup, more detailed diagnostics, easier maintenance

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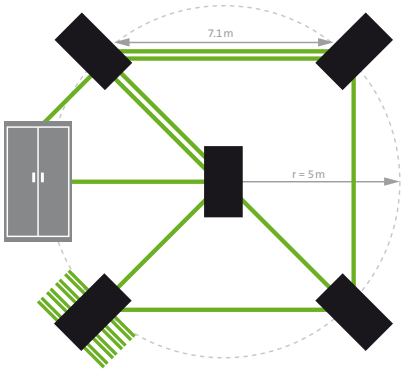
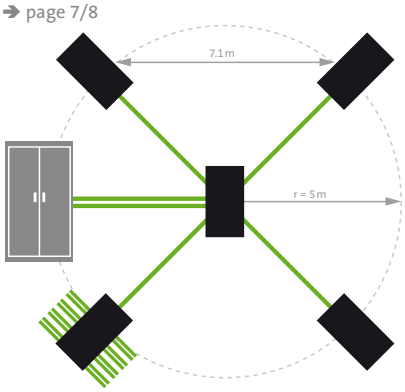
MVK METALL CONCEPT

➔ page 5/6



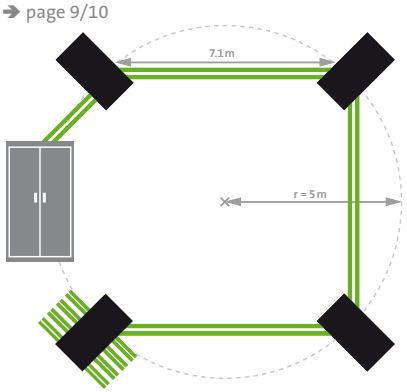
CUBE67 CONCEPT

➔ page 7/8



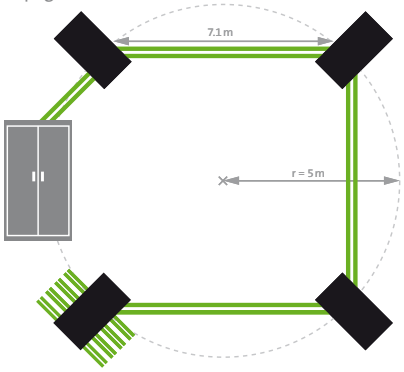
SOLID67 CONCEPT

➔ page 9/10



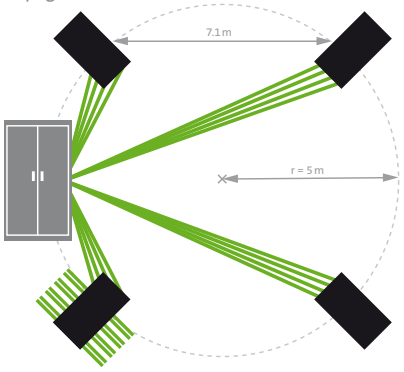
IMPACT67 CONCEPT

➔ page 11/12



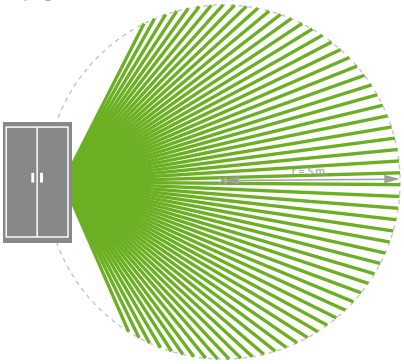
PASSIVE CONCEPT

➔ page 13/14



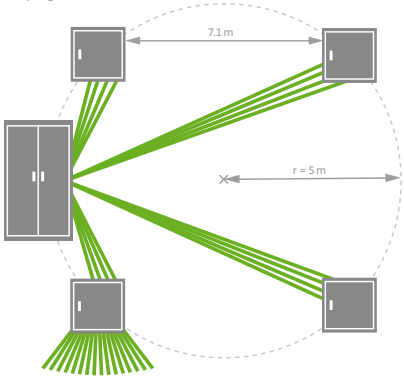
POINT-TO-POINT CONCEPT

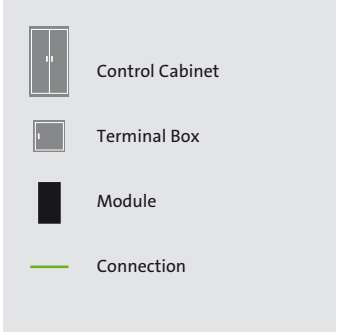
➔ page 15/16



TERMINAL BOX CONCEPT

➔ page 17/18

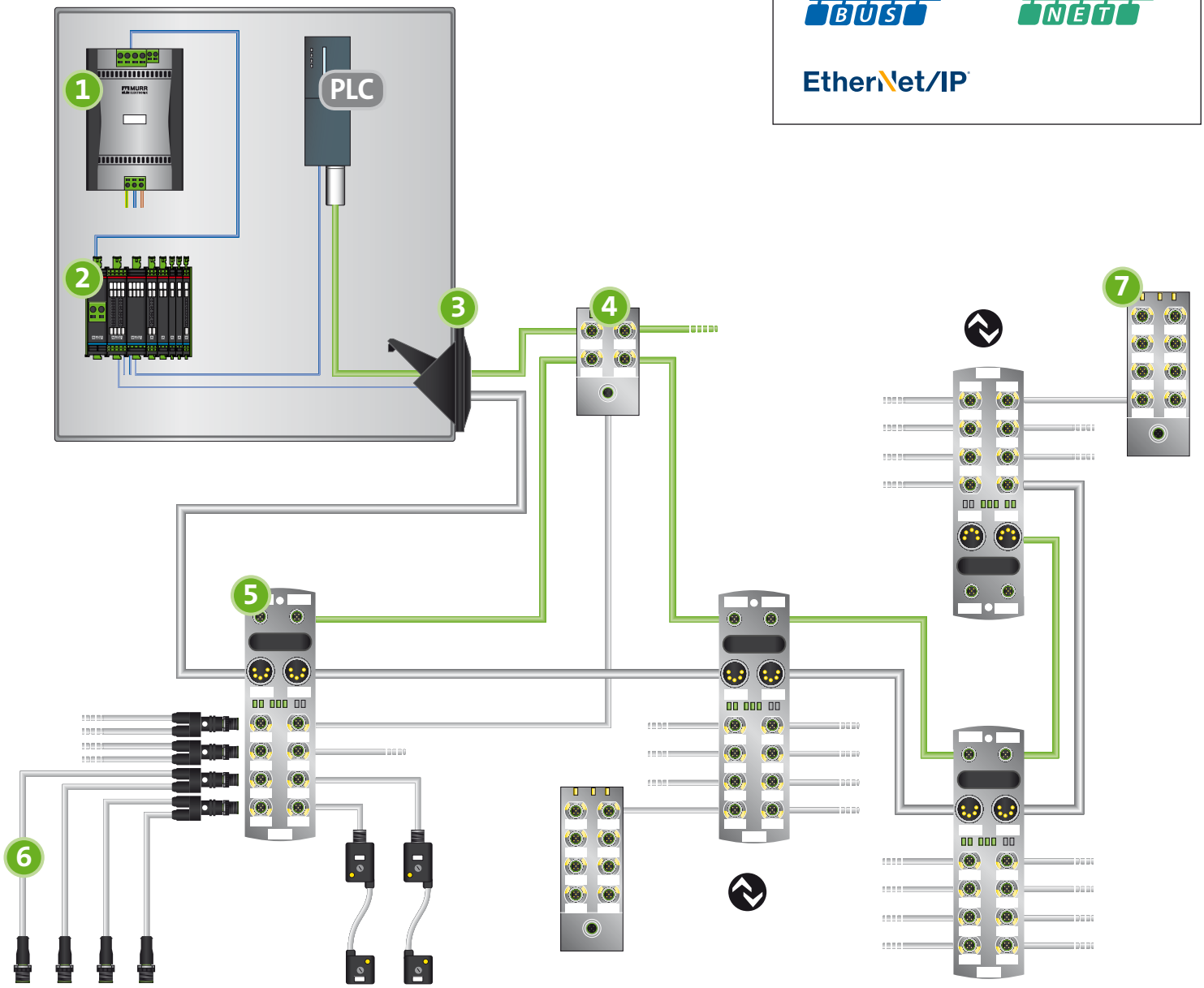




With IO-Link

PROFIBUS® PROFINET®

EtherNet/IP



Digital I/Os | Analog I/Os | IO link | Active safety I/Os

+ more...

SYSTEM COMPONENTS

1 EMPARRO
- 1 or 3 phase switch mode power supply units
- extremely reliable
- high-performing efficiency

2 MICO PRO
- innovative current monitoring system for 12 & 24 VDC
- Combine components modularly
- Customizable tripping currents
- Integrated potential distributor

3 HYBRID FIELDBUS COUPLING
- Pluggable connection
- Allows quick installation and service
- Very rugged

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MVK METALL CONCEPT

The MVK Metal concept is a robust and resistant installation concept especially for harsh and demanding environments. It handles high currents and is very resistant to EMC interference. The components feature multifunctional ports and the topology can be easily expanded.

PROS

- Multifunction I/Os lower inventory costs
- Ideal for harsh environments
- Star, linear, and tree topologies with switch or repeater

CONS

- High material costs
- Heavy weight

INDUSTRY SECTORS

- Automotive industry
- Forming
- Foundry plants
- Welding machines
- ...

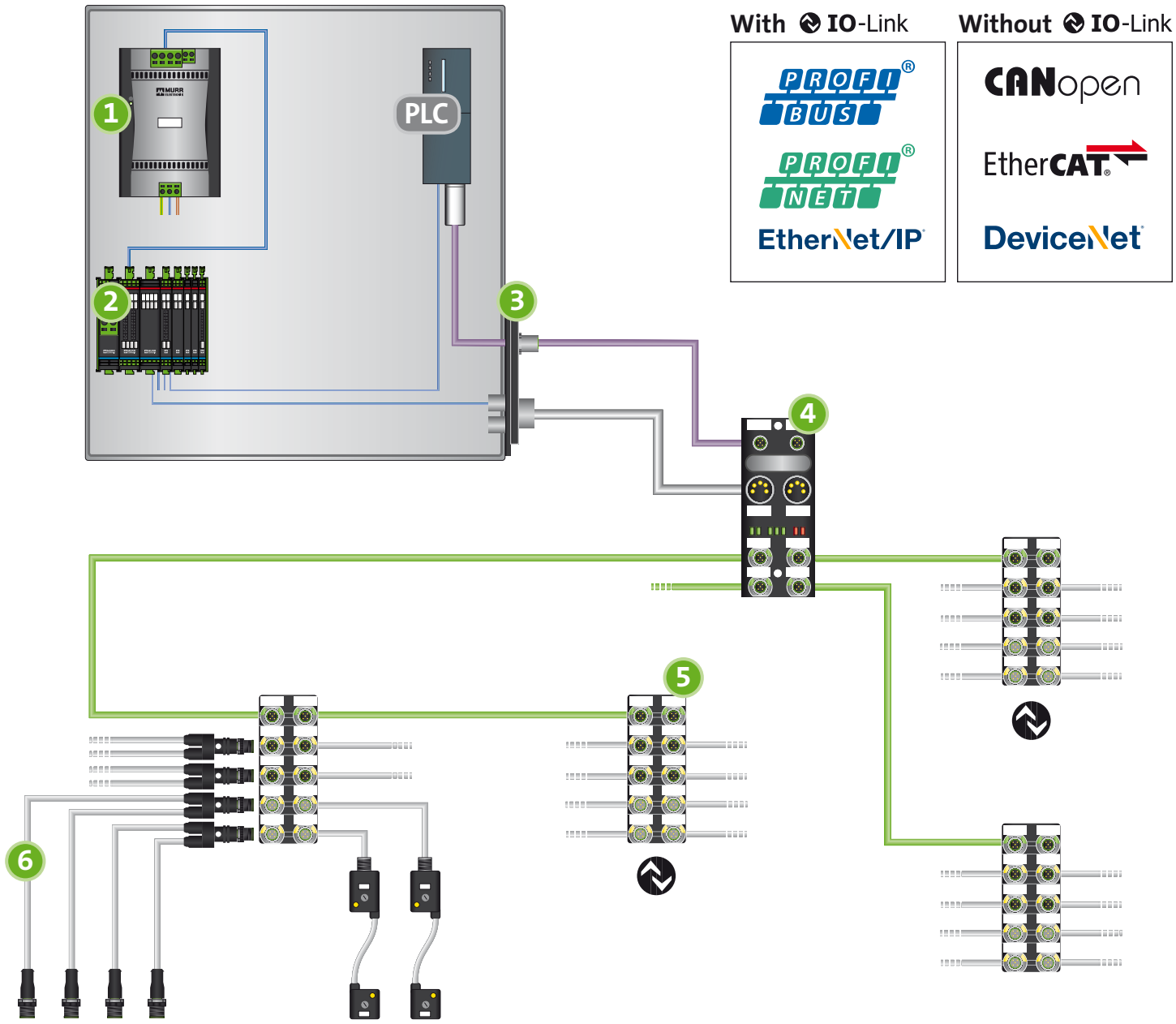
I/O	40 DI / 24 DO
Time	WP 7 / CP 122 (34 min)
Costs	★★★★
Level	★★★★

4 SWITCH
- IP67 – rugged and fully potted
- Plug and play principle
- Redundant supply voltage

5 MVK METAL
- Resistant to coolants and lubricants
- High resistance to shock and vibration
- Multi-function I/Os

6 PUR PRE-WIRED/PTFE
- 100% quality tested
- Wide variety
- Weld spark resistant

7 IO-LINK HUBS
- 8 I/O ports
- Power supply directly from IO-Link Master
- Easy to connect classic I/Os



Digital I/Os	Analog I/Os	Valve clusters	Motors
Serial interfaces	IO link	Passive safety I/Os	Function Modules

SYSTEM COMPONENTS

1 EMPARRO
- 1 or 3 phase switch mode power supply units
- extremely reliable
- high-performing efficiency

2 MICO PRO
- innovative current monitoring system for 12 & 24 VDC
- Combine components modularly
- Customizable tripping currents
- Integrated potential distributor

3 MPV CONTROL CABINET COUPLINGS
- Durable connections
- Modular system
- High degree of protection

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CUBE67 CONCEPT

The cube67 concept provides the most flexibility when planning the system and later for expansions. The systems feature consistent and extensive diagnostics. Pre-wired connectors significantly reduce installation time.

PROS

- Reduced installation costs
- Hybrid cables
- Change the bus without having to change the system
- Minimum space required in the energy chain
- Multifunction I/Os lower inventory costs

CONS

- High material costs for small systems

INDUSTRY SECTORS

- Handling technology
- Robotics
- Packaging Industry
- Machine tools
- ...

I/O	40 DI / 24 DO
Time	WP 7 / CP 110 (32 min)
Costs	★★★☆
Level	★★★★

4 **CUBE67 BUS NOTE**
- Change the bus instead of the system
- Fully potted IP67 modules
- System cable

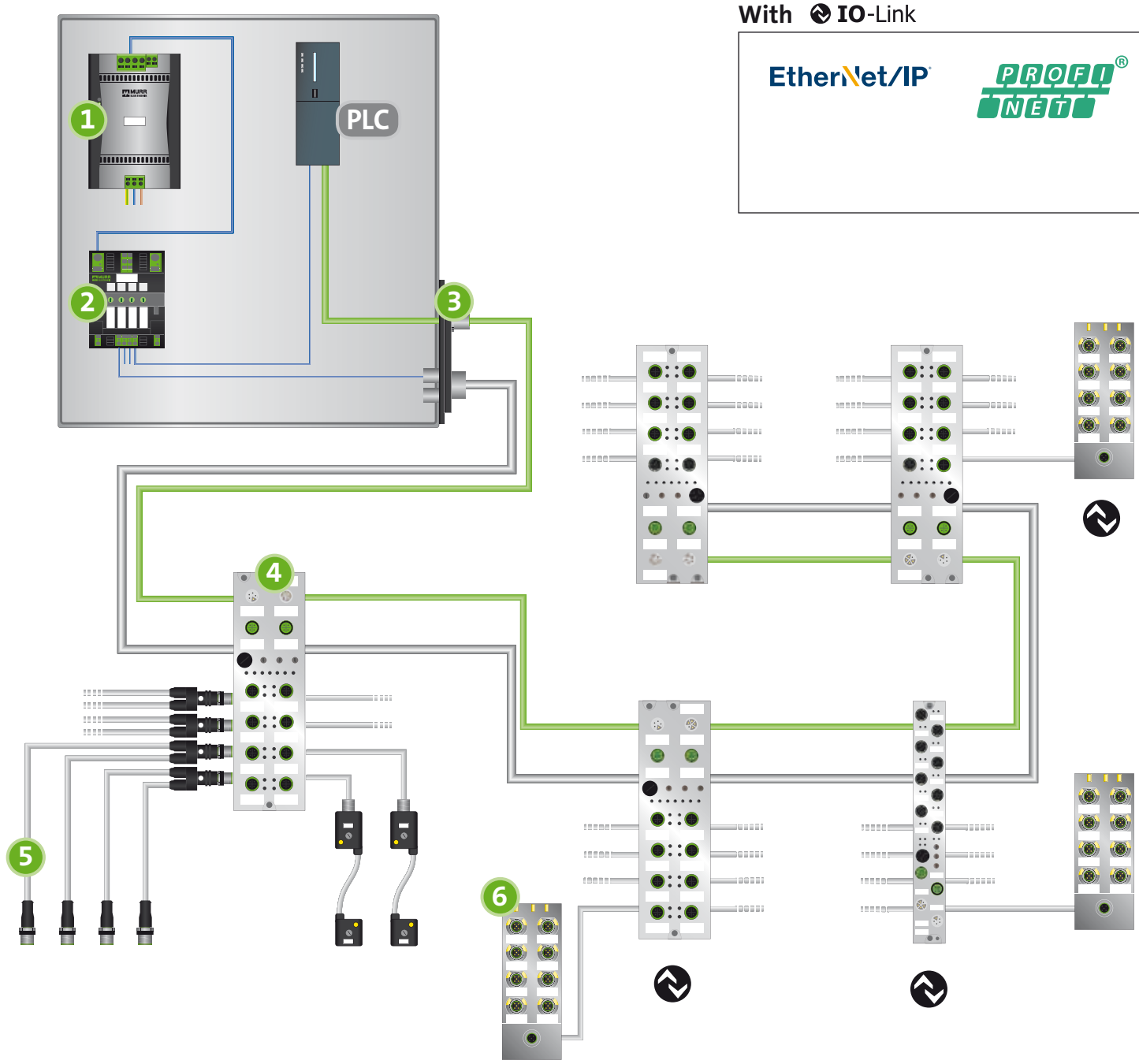
5 **CUBE67 I/O-MODULES**
- Many different models
- Digital/analog/serial/safe
- M12/M8/valve cluster/ cable

6 **PUR PRE-WIRED/PTFE**
- 100% quality tested
- Wide variety
- Weld spark resistant

With IO-Link

EtherNet/IP

PROFINET



Digital I/Os

+ more...

SYSTEM COMPONENTS

1 EMPARRO
- Single phase switch mode power supply unit
- Efficiency up to 95%
- Small width

2 MICO
- Electronic current monitoring
- Indicates when approaching the maximum load
- Adjustable current ranges

3 MPV CONTROL CABINET COUPLINGS
- Durable connections
- Modular system
- High degree of protection

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SOLID67 CONCEPT

The Solid67 concept requires a minimum amount of wiring and does not need parameterization. Good diagnostics support setup and troubleshooting. Using connectors that are pre-wired on one end provides maximum flexibility when wiring the I/O points.

PROS

- multiprotcol moule for Profinet or EtherNet/IP with the flip of a switch
- multifunktional I/Os reduce warehousing space
- M12 Power for high loads

CONS

- multiple cables for signal and power
- only line topologies due to missing external switch

INDUSTRY SECTORS

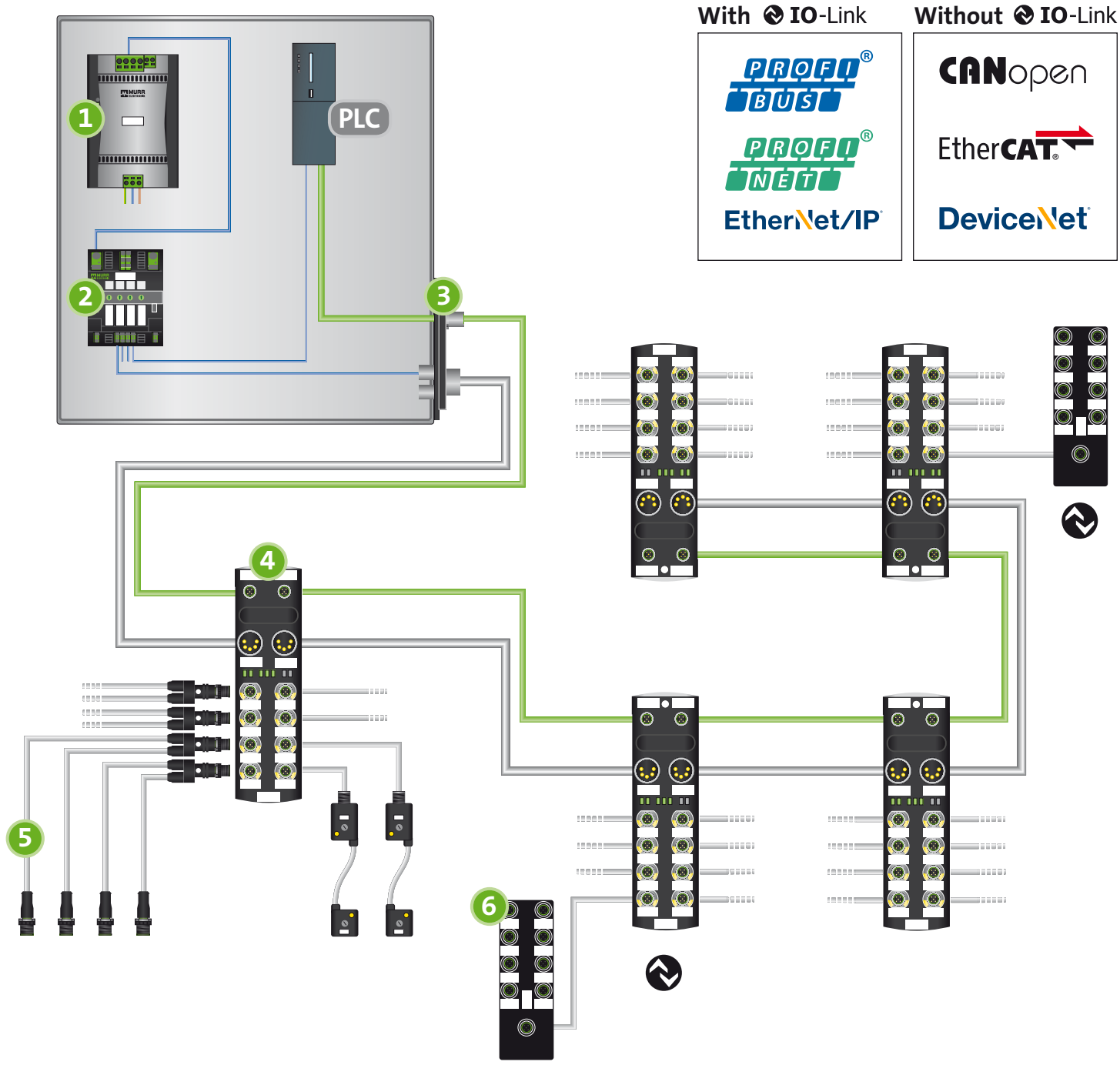
- Logistics
- Sheet metal processing
- Handling technology
- Packaging industry
- ...

I/O	40 DI / 24 DO
Time	WP 7 / CP 110 (32 min)
Costs	★★★☆
Level	★★★☆

4 **IMPACT67**
- Predefined I/Os
- IP67 – rugged and fully potted
- Single channel diagnostics

5 **PUR PRE-WIRED**
- 100% quality tested
- Wide variety
- Very resistant cable jacket

6 **IO-LINK HUBS**
- 8 I/O ports
- Power supply directly from IO-Link Master
- Easy to connect classic I/Os



Digital I/Os | + more...

SYSTEM COMPONENTS

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- Single phase switch mode power supply unit
- Efficiency up to 95%
- Small width

2 MICO
- Electronic current monitoring
- Indicates when approaching the maximum load
- Adjustable current ranges

3 MPV CONTROL CABINET COUPLINGS
- Durable connections
- Modular system
- High degree of protection

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IMPACT67 CONCEPT

The Impact67 concept requires a minimum amount of wiring and does not need parameterization features automatic parameterization. Good diagnostics support setup and troubleshooting. Using connectors that are pre-wired on one end provides maximum flexibility when wiring the I/O points.

PROS

- Star, linear, and tree topologies with switch or repeater
- Good diagnostic options
- Easy to integrate into the control

CONS

- Many cables for bus and power
- only line topologies due to missing external switch

INDUSTRY SECTORS

- Logistics
- Sheet metal processing
- Handling technology
- Packaging industry
- ...

I/O	40 DI / 24 DO
Time	WP 7 / CP 128 (35 min)
Costs	★★☆☆
Level	★★★☆

4 IMPACT67
- Predefined I/Os
- IP67 – rugged and fully potted
- Single channel diagnostics

5 PUR PRE-WIRED
- 100% quality tested
- Wide variety
- Very resistant cable jacket

6 IO-LINK HUBS
- 8 I/O ports
- Power supply directly from IO-Link Master
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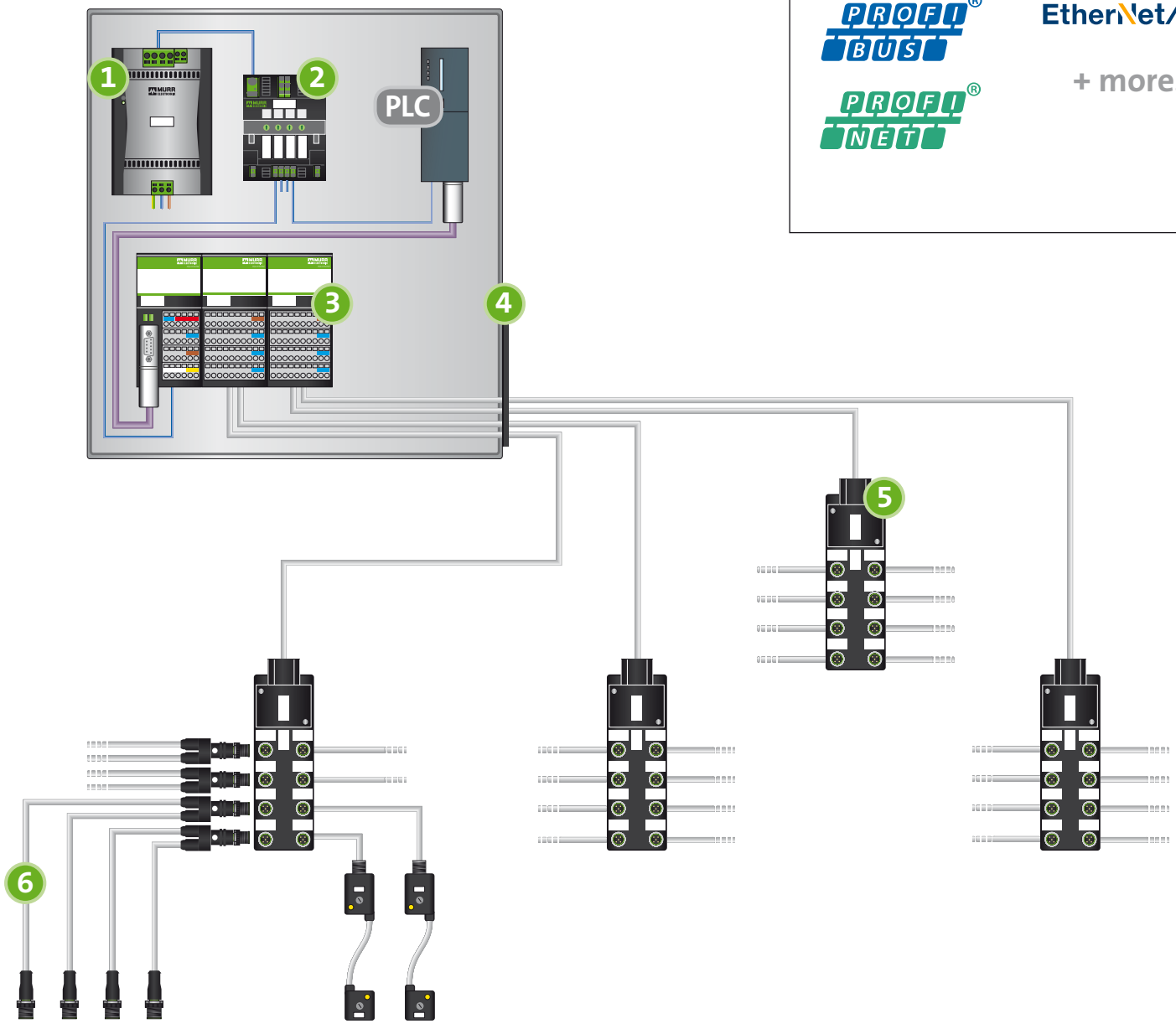

PROFIBUS® EtherNet/IP

PROFINET® + more...

Digital I/Os | Analog I/Os | + more...

SYSTEM COMPONENTS

1 EMPARRO
- 1 or 3 phase switch mode power supply units
- extremely reliable
- high-performing efficiency

2 MICO
- Electronic current monitoring
- Indicates when approaching the maximum load
- Adjustable current ranges

3 CUBE20
- IP20 I/O system
- Flat and compact design
- Easy to operate
- Up to 488 inputs and outputs

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PASSIVE CONCEPT

The passive concept optimizes I/O wiring by using pre-wired connectors and passive distribution boxes. There is a significantly smaller number of I/O points to connect. LEDs on the connection points facilitate troubleshooting. The risk of wiring errors is reduced, but not eliminated.

PROS

- Low material costs
- Using homerun cables makes laying cables easy
- Wide range of products

CONS

- Medium amount of wiring
- Large space required in the energy chain
- Still prone to errors
- No diagnostics in the field

INDUSTRY SECTORS

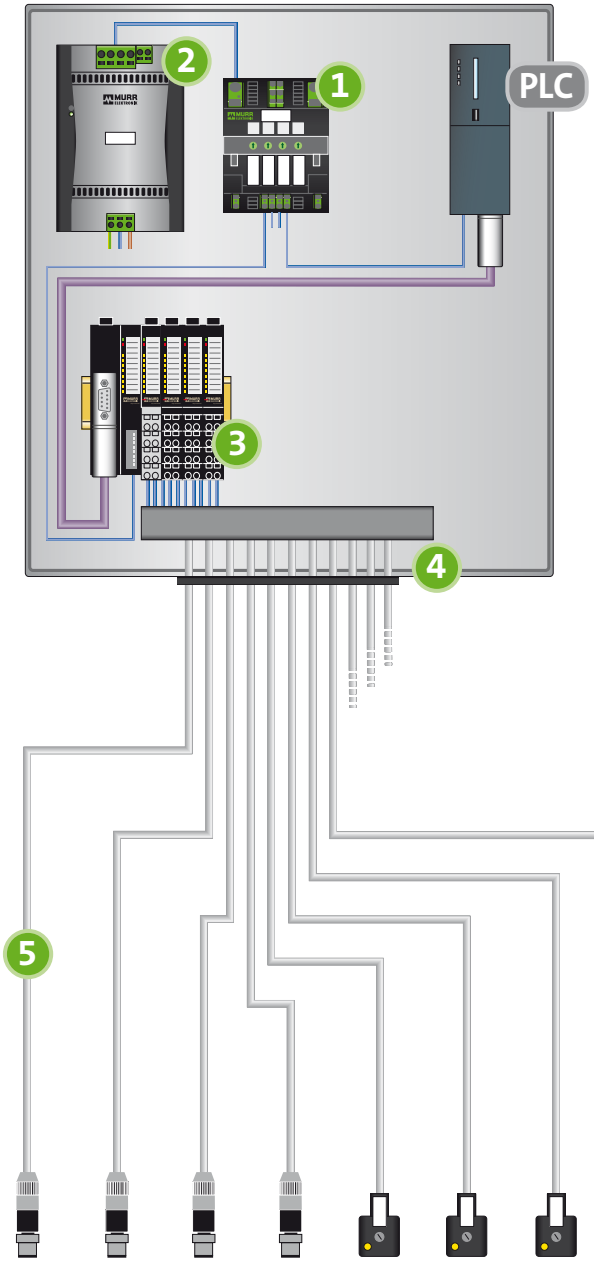
- Handling technology
- Special machines
- Packaging industry
- Machine tools
- ...

I/O	40 DI / 24 DO
Time	WP 90 / CP 112 (199 min)
Costs	★☆☆☆
Level	★★☆☆

4 **CABLE ENTRY PLATE**
- Easy to install
- No separation for transport
- Low material costs

5 **EXACT12**
- Passive distribution box
- Diagnostics via LED
- Electronics completely molded

6 **PUR/PVC PRE-WIRED**
- 100% quality tested
- Wide variety
- Very resistant cable jacket



PROFIBUS® · PROFINET® · CANopen · EtherCAT® · EtherNet/IP · DeviceNet · Modbus · + more...

Digital I/Os	Analog I/Os	Serial interfaces	Passive safety I/Os
Active safety I/Os	+ more...		

SYSTEM COMPONENTS

1 MICO
- Electronic current monitoring
- Indicates when approaching the maximum load
- Adjustable current ranges

2 EMPARRO
- 1 or 3 phase switch mode power supply units
- extremely reliable
- high-performing efficiency

3 CUBE20S
- modular I/O system
- up to 64 modules per bus module
- Safety module for safe I/Os up to protection level PLe

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POINT-TO-POINT CONCEPT

Wiring concepts with a central control cabinet provide a lot of flexibility. However, the wiring efforts are high. That makes it a system prone to errors. Accessory parts, large control cabinets and comprehensive planning efforts often mean indirect costs are high, reducing the cost-effectivity.

PROS

- Very flexible
- High added value

CONS

- High installation costs
- High risk of wiring errors
- Large space required in the energy chain
- Difficult transport separation

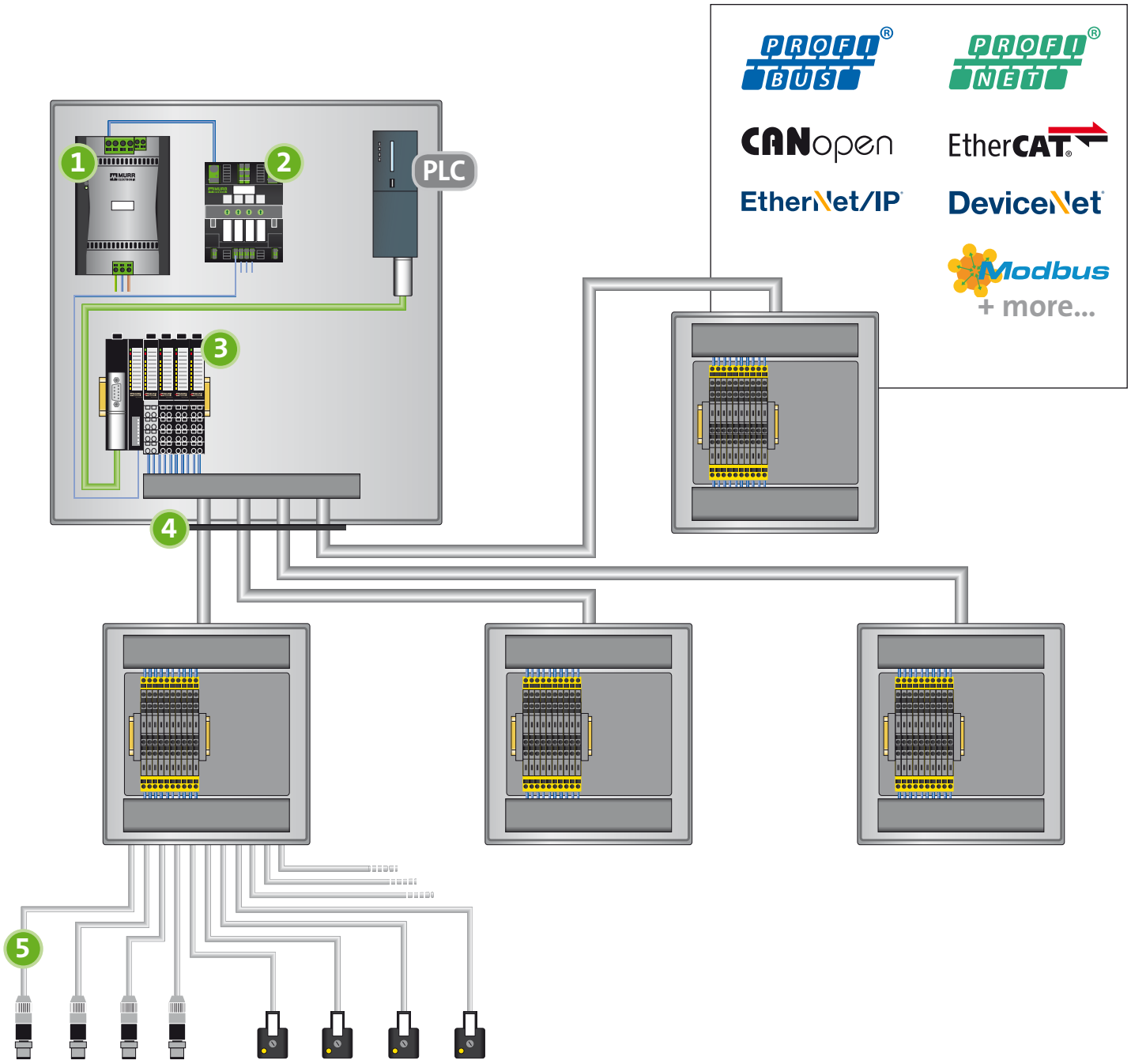
INDUSTRY SECTORS

- Machine building
- Special machines
- System construction
- Process industry
- ...

I/O	40 DI / 24 DO
Time	WP 518 / CP 71 (1048 min)
Costs	★☆☆☆
Level	★☆☆☆

4 CABLE ENTRY PLATE
- Easy to install
- No separation for transport
- Low material costs

5 MOSA
- Field wireable connectors
- Cabling flexible to install
- Quick connection technology



Digital I/Os	Analog I/Os	Serial interfaces	Passive safety I/Os
Active safety I/Os	+ more...		

SYSTEM COMPONENTS

1 EMPARRO
- 1 or 3 phase switch mode power supply units
- extremely reliable
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2 MICO
- Electronic current monitoring
- Indicates when approaching the maximum load
- Adjustable current ranges

3 CUBE20S
- modular I/O system
- up to 64 modules per bus module
- Safety module for safe I/Os up to protection level PLe

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TERMINAL BOX CONCEPT

The terminal box concept is based on a central control cabinet with passive terminal boxes for field wiring. This is the base for decentralized installation concepts. Many accessories are required and the mechanical and electronic expenses are high, which results in equally high indirect costs. The comprehensive planning efforts also reduce cost effectiveness.

PROS

- Very flexible
- High added value

CONS

- High installation costs
- No channel diagnostics
- High risk of wiring errors
- Difficult transport separation

INDUSTRY SECTORS

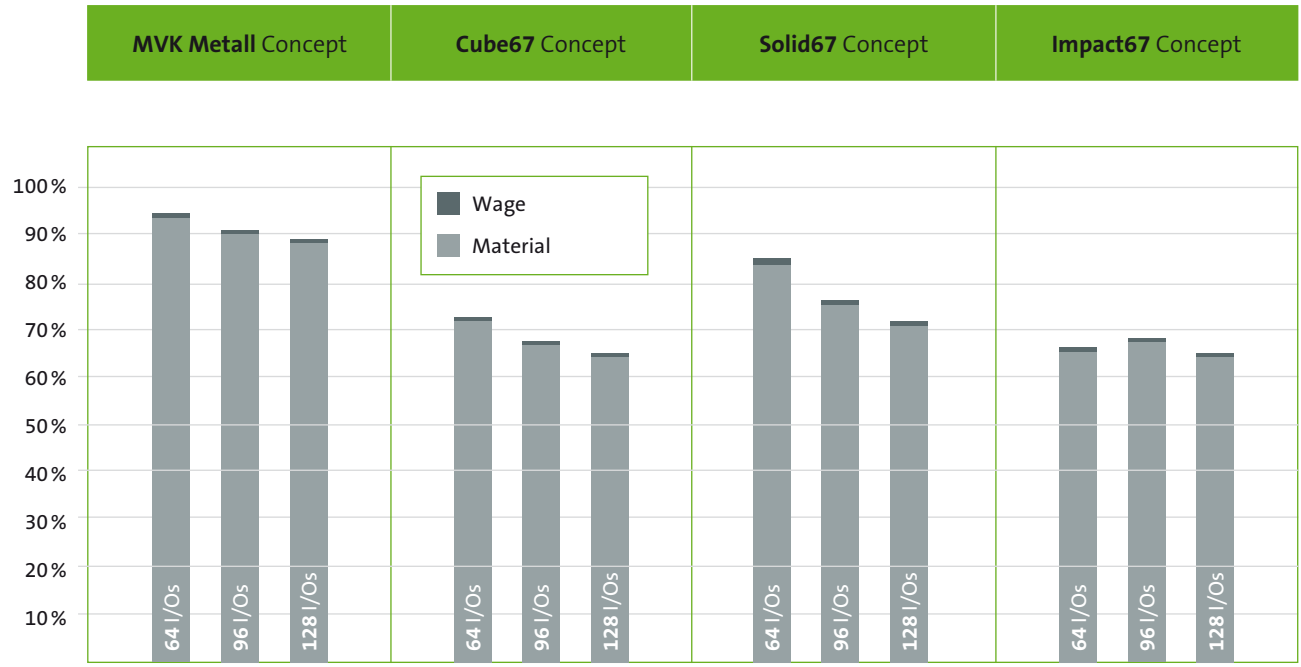
- Machine building
- Special machines
- System construction
- Process industry
- ...

I/O	40 DI / 24 DO
Time	WP 646 / CP 71 (1304 min)
Costs	★★☆☆
Level	★☆☆☆

4 CABLE ENTRY PLATE
- Easy to install
- No separation for transport
- Low material costs

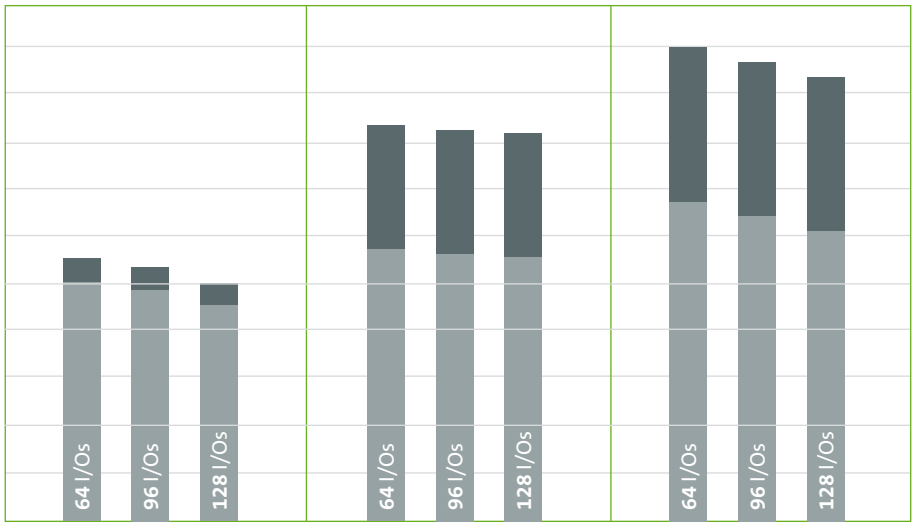
5 MOSA
- Field wireable connectors
- Cabling flexible to install
- Quick connection technology

SELECTION CRITERIA



	MVK Metall Concept	Cube67 Concept	Solid67 Concept	Impact67 Concept
Level	★★★★	★★★★	★★★☆	★★★☆

		MVK Metall Concept	Cube67 Concept	Solid67 Concept	Impact67 Concept
Bus Protocols	PROFIBUS	■	■		■
	PROFINET	■	■	■	■
	CANopen	■	■		■
	EtherCAT		■		■
	EtherNet/IP	■	■	■	■
	DeviceNet		■		■
	+ more...		■		

Passive Concept	**Point-to-Point** Concept	**Terminal Box** Concept
		
★★☆☆	★☆☆☆	★☆☆☆
■	■	■
■	■	■
	■	■
	■	■
■	■	■
	■	■
	■	■

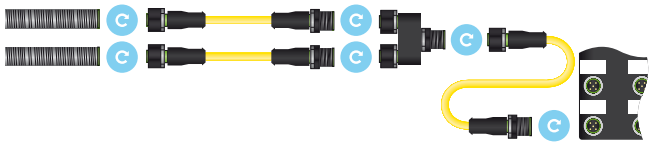
OPTIONS OF I/O WIRING

INPUTS

OPTION 1E

- Pluggable on both sides
- I/O ports using one signal

OPTION 2E



- Pluggable on both sides
- I/O ports using two signals
- Easy cable installation

OPTION 3E

- Optimum number of connection points
- I/O ports using two signals

OPTION 4E

- Pluggable on both sides
- I/O ports using two signals

OPTION 5E

- Pluggable on both sides
- I/O ports using two signals
- Easy cable installation

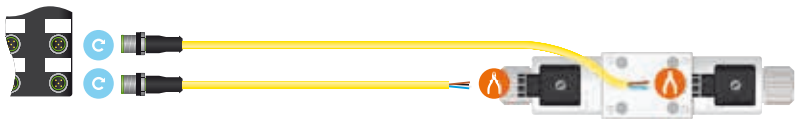
OPTION 6E

- Pluggable on both sides
- I/O ports using two signals
- Easy cable installation
- Optimum number of connection points

OPTION 7E

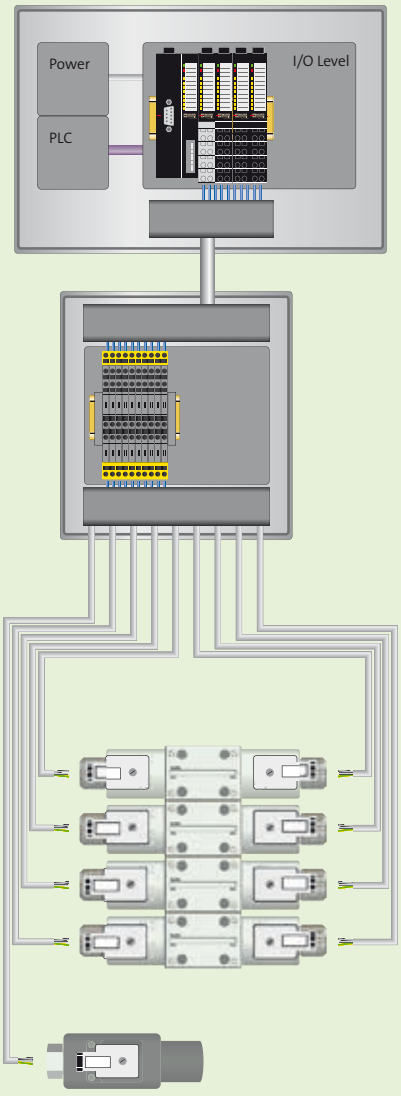
- I/O ports using one signal
- Field wireable on one side

OUTPUTS

OPTION 1 A		• I/O ports using one signal
OPTION 2 A		• I/O ports using one signal • Field wireable on one side
OPTION 3 A		• Pluggable on both sides • I/O ports using one signal
OPTION 4 A		• Pluggable on both sides • I/O ports using two signals
OPTION 5 A		• I/O ports using two signals • Easy cable installation
OPTION 6 A		• Pluggable on both sides • I/O ports using two signals • Easy cable installation • Optimum number of connection points
OPTION 7 A		• I/O ports using one signal • Easy cable installation • Pluggable on both sides

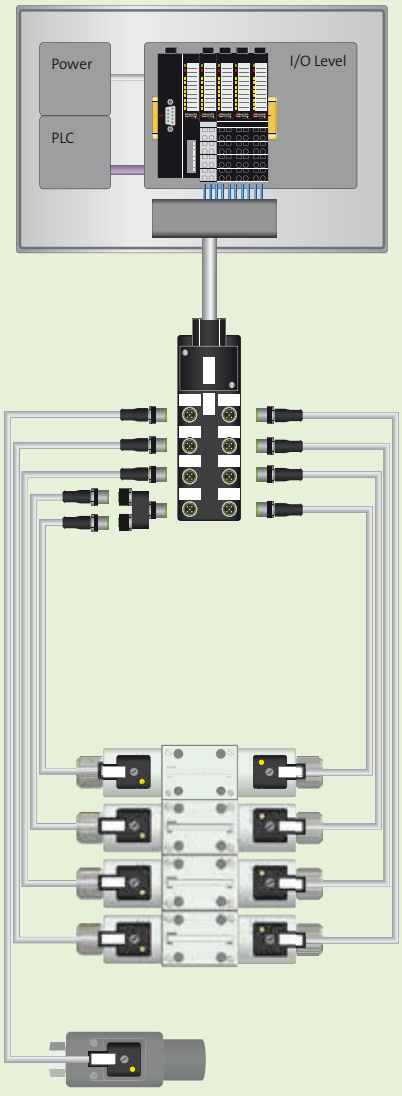
EXAMPLE: **HYDRAULIC POWER UNIT**

➔ SINGLE WIRE CONNECTION



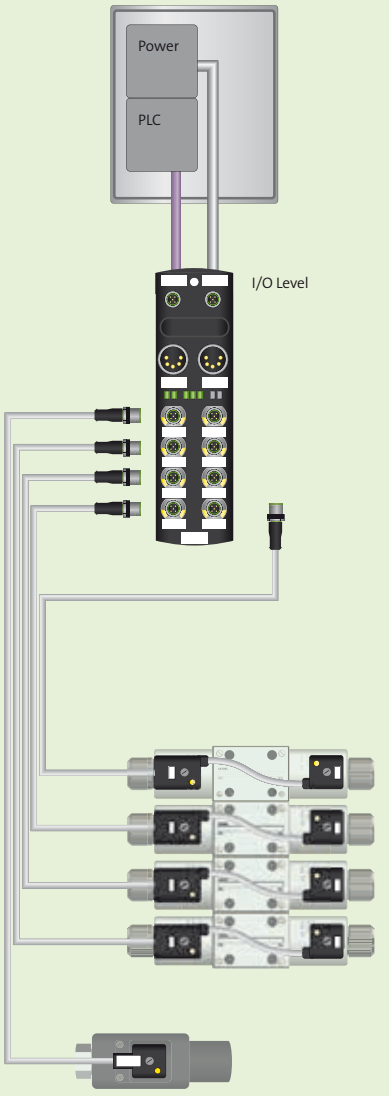
I/O	1 DI / 8 DO
Time	WP 92 / CP 9 (185 min)
Level	★☆☆☆

➔ PASSIVE DISTRIBUTION BOX



I/O	1 DI / 8 DO
Time	WP 24 / CP 19 (51 min)
Level	★★☆☆

➔ FIELDBUS MODULE



I/O	1 DI / 8 DO
Time	WP 7 / CP 16 (17 min)
Level	★★★☆

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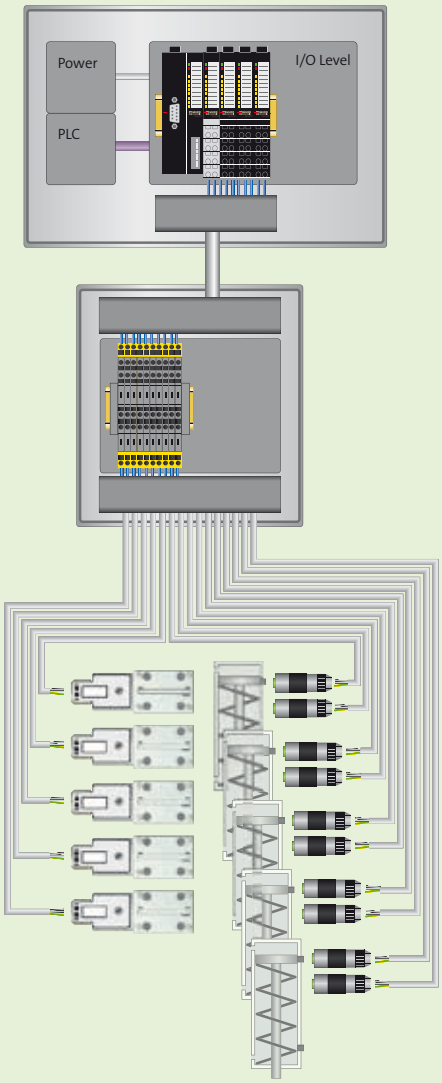
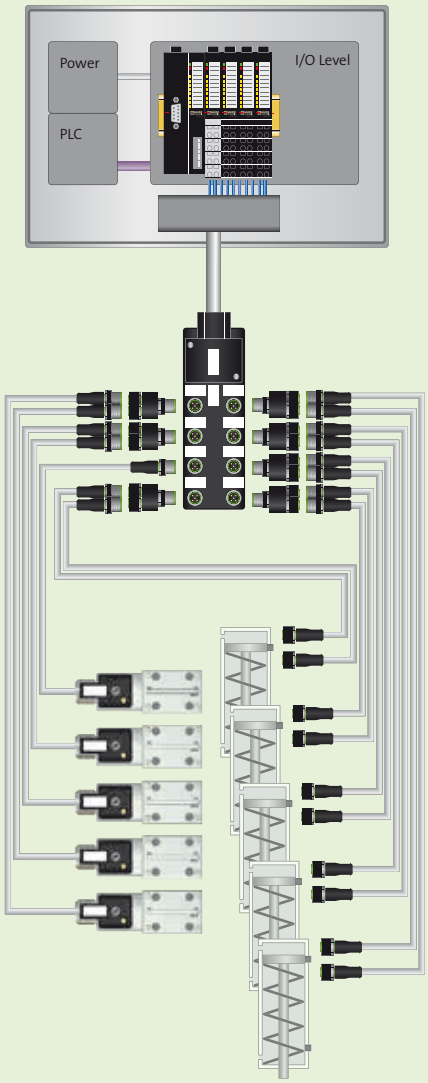
EXAMPLE: **PNEUMATIC CYLINDER WITH POSITION SENSORS**

➔ SINGLE WIRE CONNECTION



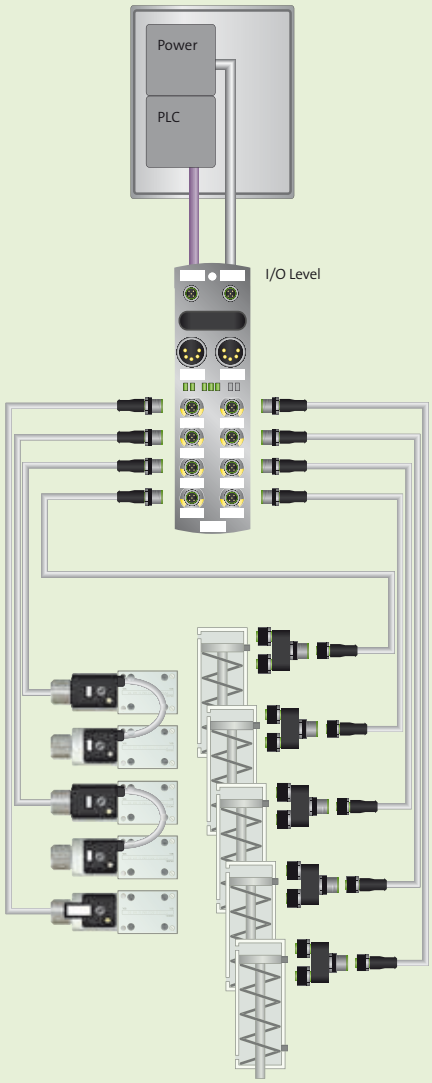
I/O	10 DI / 5 DO
Time	WP 132 / CP 20 (267 min)
Level	★★★★

➔ PASSIVE DISTRIBUTION BOX



I/O	10 DI / 5 DO
Time	WP 23 / CP 42 (53 min)
Level	★★★★

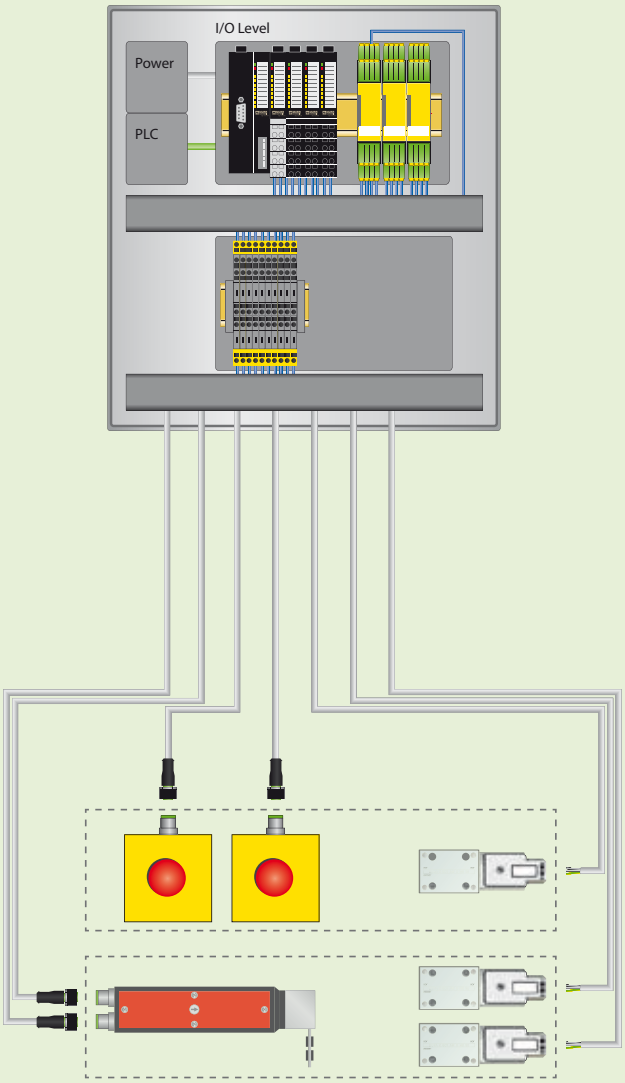
➔ FIELDBUS MODULE



I/O	10 DI / 5 DO
Time	WP 7 / CP 30 (19 min)
Level	★★★★

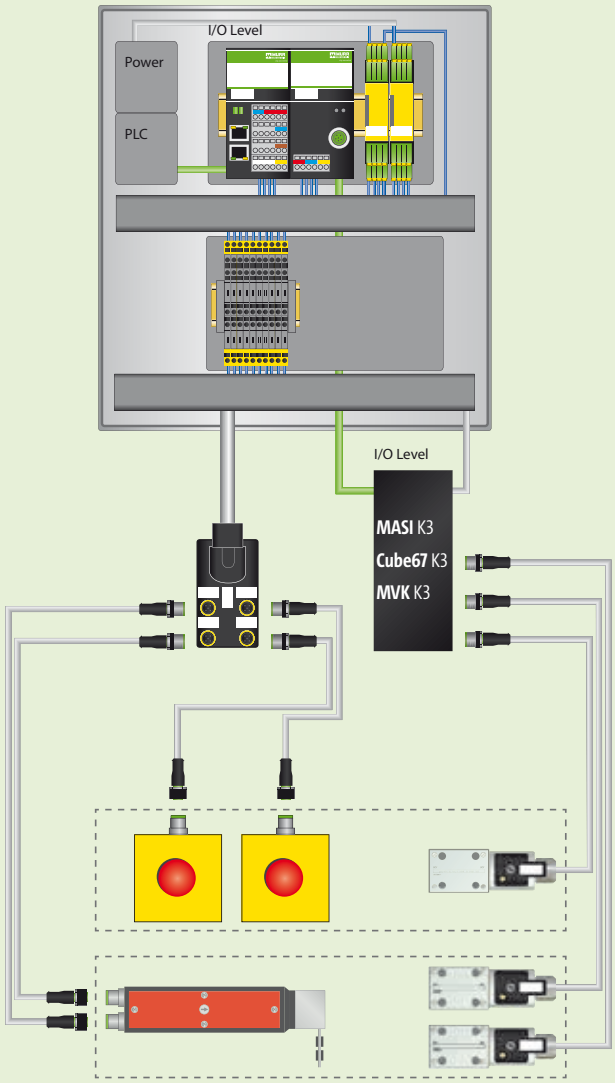
EXAMPLE: **SAFETY SWITCH OFF**

➔ PASSIVE SAFETY OUTPUT CIRCUIT



I/O	3 FDI / 4 FDO
Time	WP 105 / CP 10 (213 min)
Level	★☆☆☆

➔ PASSIVE SAFETY BLOCK CIRCUIT



I/O	3 FDI / 4 FDO
Time	WP 56 / CP 19 (115 min)
Level	★★☆☆

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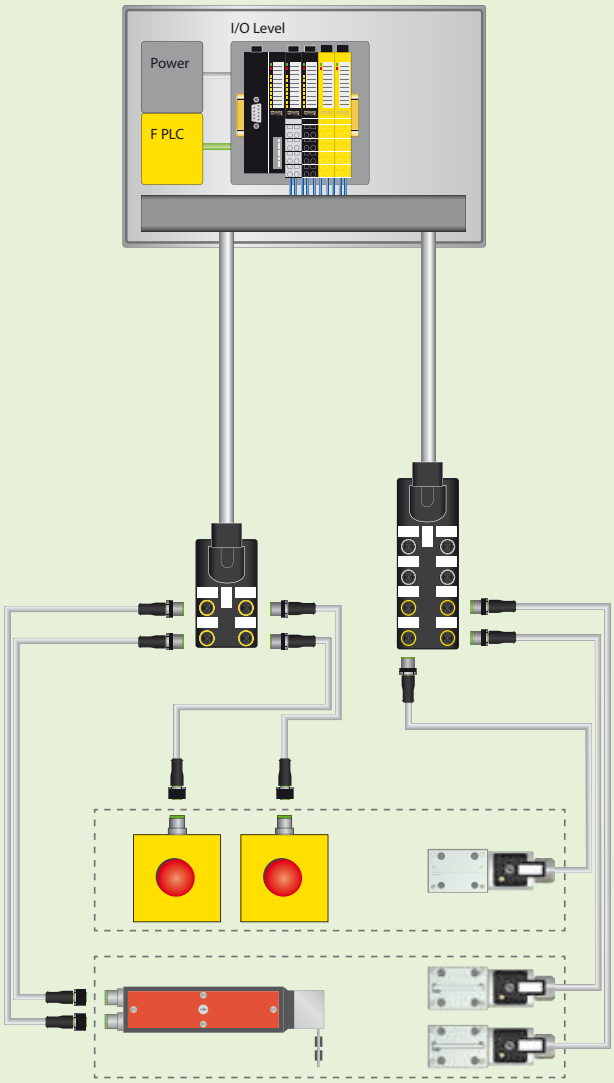
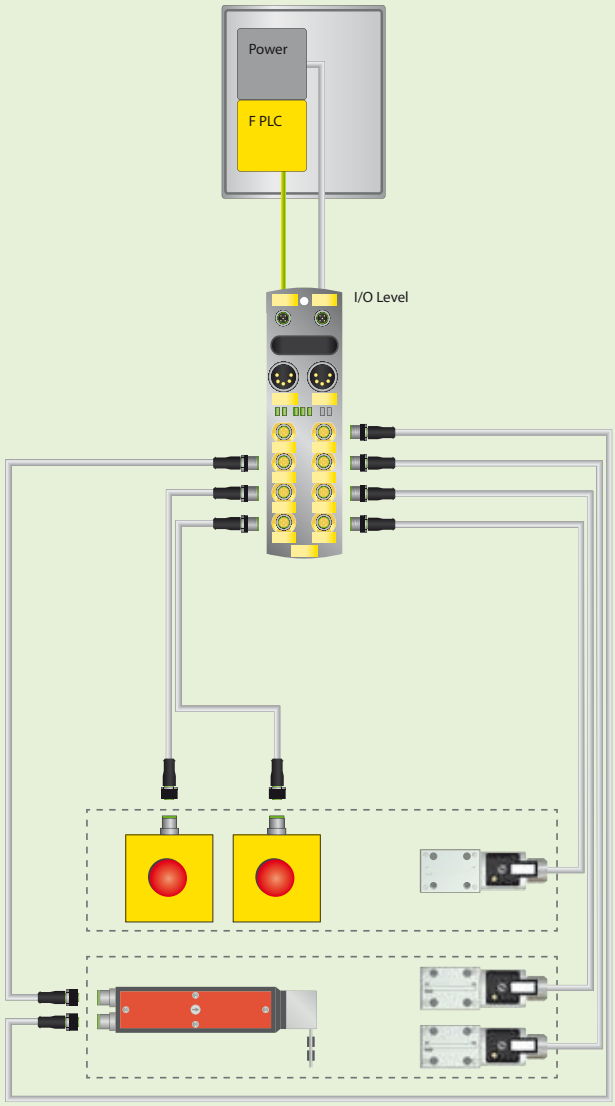
➔ ACTIVE SAFETY OUTPUT CIRCUIT



I/O	3 FDI / 4 FDO
Time	WP 27 / CP 20 (58 min)
Level	★★☆☆

*Extra charge for F PLC

➔ ACTIVE SAFETY DISTRIBUTION BOX



I/O	3 FDI / 4 FDO
Time	WP 7 / CP 15 (17 min)
Level	★★★★

*Extra charge for F PLC

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