ODU-MAC® BLACK-LINE

Operating and assembly instructions

odu-interconnect.com

ODU-MAC® Black-Line

Disclaimer of liability

All dimensions are in mm.
Some figures are for illustrative purposes only. Subject to change without notice. Errors and omissions excepted. We reserve the right to change our products and their technical specifications at any time in the interest of technical improvement.
This publication supersedes all prior publications.

All the connectors shown here are connectors without breaking capacity (COC) according to IEC 61984:2008 (VDE 0627:2009).

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1. IMPORTANT INFORMATION

These assembly instructions contain important information on how to assemble and use this product safely and correctly. Read the assembly instructions carefully before assembling and using this product. Familiarize yourself with the safety information before assembling and using this product.

1.1 Application area

The products in the "ODU-MAC® Black-Line" family comprise a mass interconnect interface.
This is used in test and measurement engineering to test PCBs and electronically assembled units.

Configuration and transmission options

- Electric signals
- Electric power
- High current
- High voltage
- HF signals (coax)
- Compressed air coupling
- Fluid coupling
- Shielded feedthrough / high-speed
- Vacuum
- Fiber optic
- Blank module
- PCB termination modules

1.2 Depiction of safety information

To make sure safe working conditions are maintained, important safety information is given in a standard format. Standard safety information is always positioned before the sequence of actions that is associated with a risk of injury or damage to equipment. Follow these measures to avoid such risks.

Four different types of safety information are used in this document:

⚠ DANGER **Type and source of the risk! Consequences.**

▶ How to avoid this risk.

DANGER: Indicates a dangerous situation, which will result in death or serious injury if not avoided. This signal word is only used for extreme situations.

⚠ WARNING **Type and source of the risk! Consequences.**

▶ How to avoid this risk.

WARNING: Indicates a dangerous situation, which may result in death or serious injury if not avoided.

⚠ CAUTION **Type and source of the risk! Consequences.**

▶ How to avoid this risk.

CAUTION: Indicates a dangerous situation, which may result in minor to moderate injury if not avoided.

ATTENTION **Type and source of the risk! Consequences.**

▶ How to avoid this risk.

ATTENTION: Indicates a dangerous situation, which will result in damage to property if not avoided.

ⓘ NOTICE Indicates additional information and recommendations.

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2. INTENDED USE

The ODU-MAC® Black-Line contact system is solely intended for the use defined in these ODU assembly instructions and described in the associated technical documents.
The specific modules used in each case, and how they are combined, determine the technical limits of use. They can be taken from the specifications contained in these ODU assembly instructions and the relevant product catalog.
Compliance with all the specifications outlined in these ODU assembly instructions falls within the scope of intended use.
The ODU-MAC® Black-Line contact system has been designed according to the state of the art and in line with the latest safety requirements.

2.1 Structure of ODU-MAC® Black-Line

The ODU-MAC® Black-Line contact system basically consists of a receiver and an interchangeable test adapter (ITA).

- The receiver is intended for installation in fixed systems such as test boards or machines.
- The adapter (ITA) is installed in a mobile component.

2.2 Foreseeable misuse

The following are classed as misuse and do not comply with intended use:

- Use of ODU-MAC® Black-Line for any purpose other than contacting connectors
- Overloading of ODU-MAC® Black-Line
- Incorrect or incomplete assembly
- Operation with modifications, e.g., extension of the operating lever
- Operation with covers, housing or safety devices removed
- Operation with components not intended for this purpose
- Use with an impermissible power supply
- Use with impermissible spare parts
- Incorrect cleaning
- Use in an unsuitable environment
- Operation by untrained individuals
- Lack of maintenance or cleaning

2.3 Personnel qualifications

2.3.1 Design and integration of ODU-MAC® Black-Line into the terminal device

ODU-MAC® Black-Line must be designed and integrated into the terminal device by qualified skilled personnel (electricians) who, based on their training and experience, are able to assess the specific risks associated with the application at hand and to introduce suitable measures to minimize said risks.

2.3.2 Service, maintenance, and commissioning

ODU-MAC® Black-Line must be commissioned, assembled, installed, serviced, and maintained by qualified skilled personnel (maintenance personnel or technicians) who, based on their training, experience, and instruction, as well as their knowledge of the applicable standards, specifications, accident prevention regulations, and operating conditions, are authorized to perform the necessary tasks and able to recognize and avoid the associated potential risks.

Tasks required during service, maintenance, and commissioning are:

- ▶ Selection, positioning, wiring, and assembly of connectors and selection, positioning, and assembly of slot covers
- ▶ Assembly and disassembly of the receiver/adapter (ITA) and accessories
- ▶ Opening of the receiver via emergency release
- ▶ Adapter (ITA) assembly
- ▶ Receiver assembly
- ▶ Troubleshooting, component repair
- ▶ Maintenance and cleaning

2.3.3 Operation

This device is intended for use by trained operators once it has been installed and fully assembled.
The operator must have read and understood these ODU assembly instructions in full or had the instructions explained to them.

Tasks required during operation are:

- ▶ Selection of the correct adapter (ITA)
- ▶ Placement of the adapter (ITA) in the locking position
- ▶ Start of the locking/unlocking procedure
- ▶ Adapter (ITA) removal

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3. GENERAL SAFETY INFORMATION

The ODU-MAC® Black-Line contact system has been designed according to the state of the art and in line with the latest safety requirements. However, residual risks do remain, which mean personnel must act with caution.
Below is a list of these residual risks, along with the conduct and measures required to mitigate them.

3.1 Danger from electric current

DANGER **Danger from electric current!**

Touching live parts in the event of a fault can lead to an electric shock.

- Only ever allow skilled personnel to perform assembly, installation, commissioning, repair, maintenance, and servicing work.
- Always operate the device with the protective conductor connected.
- Visually inspect the components for damage at regular intervals.
- De-energize the device before working on the contact system.
- Take additional safety precautions to prevent restarting throughout the whole system.
- Wear personal protective equipment.
- Use additional protective equipment as appropriate for the work at hand.
- Only remove and insert connectors when the device is de-energized.
- Only ever perform assembly, installation, repair, and maintenance work when the device is de-energized.
- Use the protective covers supplied to close off empty slots.

DANGER **Danger from transmitting electric current and producing electric arcs!**

Touching live connectors can lead to an electric shock.

If electric arcs are produced, they can result in injury caused by fire or by molten parts being ejected, and in an electric shock.

- Only ever allow skilled personnel to perform assembly, installation, commissioning, repair, maintenance, and servicing work.
- Only remove and insert connectors when the device is de-energized.
- Only use connectors according to specifications.
- Wear personal protective equipment.
- Use additional protective equipment as appropriate for the work at hand.

DANGER **Danger from electric energy stored in components such as capacitors or inductors (e.g., relays, motors)!**

Touching live components can lead to an electric shock.

- Only ever allow skilled personnel to perform assembly, installation, commissioning, repair, maintenance, and servicing work.
- Wear personal protective equipment.
- Use additional protective equipment as appropriate for the work at hand.
- Use additional protective equipment as appropriate for the work at hand.
- Observe additional safety precautions throughout the whole system during automatic operation.
- Provide emergency-stop functions in the higher-level system.

3.2 Risk of accident

WARNING **Risk of accident from damaged connectors!**

If you drop a connector, this could damage it.

Damaged connectors can cause accidents and represent a risk.

- Never use damaged connectors (e.g., housing, insulators, contacts).

WARNING **Risk of tipping from control cabinet having an incorrect center of gravity!**

If the control cabinet tips/falls over, this can cause injury, e.g., by crushing personnel.

- When assembling the receiver in the control cabinet, make sure the control cabinet's center of gravity is stable.
- Take the additional weight of installed equipment such as the adapter (ITA), platform, slide mount, and attached cables into account.

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3.3 Risk of explosion

⚠ WARNING **Risk of explosion from an improperly treated capacitor!**

Explosions can damage hearing. Injuries may also be sustained from parts flying through the air and from the effects of personnel being startled (and subsequently collapsing, for example).

- Only ever allow skilled personnel to perform assembly, installation, commissioning, repair, maintenance, and servicing work.
- Wear personal protective equipment.

3.4 Risk of burns

⚠ CAUTION **Risk of burns from surfaces that become hot during operation!**

Touching components that become hot during operation, e.g., connectors or the housing, without protection can cause burns.

- Do not touch the hot connectors without protection.
- Wear personal protective equipment.
- Use additional protective equipment as appropriate for the work at hand.
- Select which ODU-MAC® Blue-Line contacts to install based on the available amperages. When powered in the nominal current range, temperatures of up to 85 °C can occur at the contacts themselves. The permissible nominal current can be modified accordingly to avoid these excessive temperatures.

⚠ WARNING **Danger from conveying media such as liquids and gases!**

Touching components that become hot during operation, e.g., connectors or the housing, without protection can cause burns.

- Only ever allow skilled personnel to perform assembly, installation, commissioning, repair, maintenance, and servicing work.
- Only remove and insert connectors according to their specifications.
- Only use connectors according to their specifications, particularly as regards permissible fluids and pressures.
- Do not use connectors close to open flames or in excessively hot environments or atmospheres with an oxygen content of over 25%; rather, only use them within the range stated in the specifications.
- Never use flammable or explosive gases or liquids.
- Only use strongly corrosive, caustic or alkaline liquids or gases after coordinating with the manufacturer regarding technical issues.
- Wear personal protective equipment (suitable safety goggles).
- Use additional protective equipment as appropriate for the work at hand.

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3.5 Risk of injury

⚠ WARNING **Danger from transmitting optical (laser) radiation via connectors!**

Laser radiation can cause injury, particularly to the eyes.

- Only ever allow skilled personnel to perform assembly, installation, commissioning, repair, maintenance, and servicing work.
- Wear personal protective equipment (suitable safety goggles).
- Use additional protective equipment as appropriate for the work at hand.
- Only remove and insert connectors if they are not transmitting optical radiation.
- Only remove and insert connectors according to their specifications.
- Only use connectors according to specifications.

⚠ WARNING **Danger from improper assembly or overloading of components!**

Falling and/or breaking components can cause injury.

- Only ever allow skilled personnel to perform assembly, installation, commissioning, repair, maintenance, and servicing work.
- Take note of the assembly information contained in these instructions.
- Comply with the maximum load limits.
- Visually inspect the components at regular intervals.
- Maintain the components at regular intervals.
- Only use mounting materials according to the specifications in these instructions.
- Only use genuine spare parts.

⚠ CAUTION **Risk of injury from sharp edges and corners!**

Sharp edges and corners can cause abrasions and cuts.

- Be careful when working near to sharp edges and corners.
- Wear personal protective equipment.

⚠ WARNING **Danger from working within the range of a spring under tension!**

- Wear personal protective equipment (suitable safety goggles).

⚠ CAUTION **Risk of crushing from tightening mechanism!**

Hands may become crushed between the receiver and adapter (ITA).

- Make sure the travel path of the tightening mechanism is unobstructed before operating it.

⚠ CAUTION **Weight of the adapter may be too heavy for the operator when using the device without a platform.**

- Observe occupational health and safety regulations.
- Use additional aids.

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3.6 Safety label

NOTICE Do not remove the safety label!

The following safety symbols are attached to all receivers:

Warning of hand injuries

Risk of crushing injuries, particularly of the hands.

Follow assembly instructions

Read these assembly instructions before assembling, commissioning, maintaining, and using this device.

3.7 Rating plates

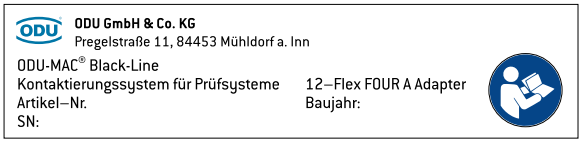
NOTICE Do not modify or remove the rating plate.

The figures show sample ODU-MAC® Black-Line rating plates.

3.7.1 12-Flex FOUR A Receiver rating plate

3.7.2 12-Flex TWO M Receiver rating plate

3.7.3 12-Flex FOUR A Adapter rating plate



3.7.4 12-Flex TWO M Adapter rating plate

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3.8 Position of the safety label and rating plate

3.8.1 Position on the 12-Flex FOUR A Receiver

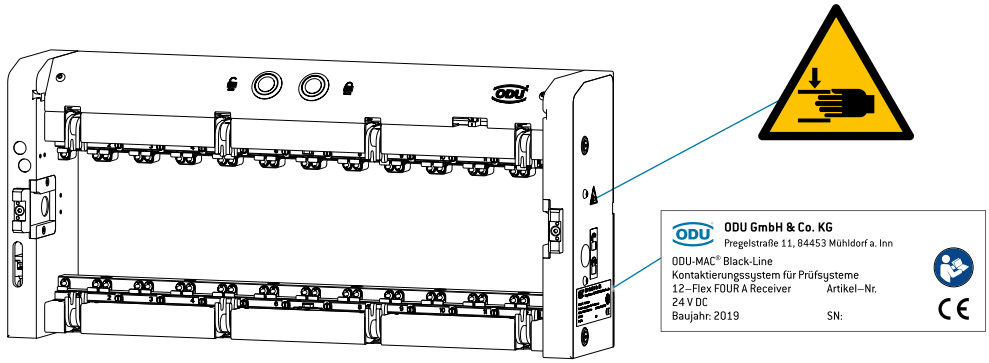


Fig. 1

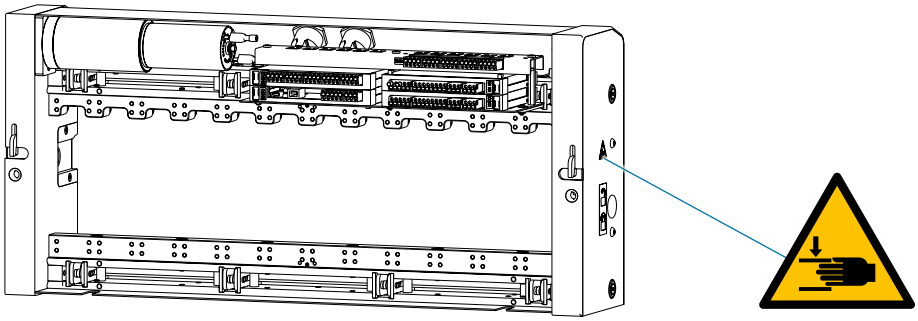


Fig. 2

3.8.2 Position on the 12-Flex TWO M Receiver

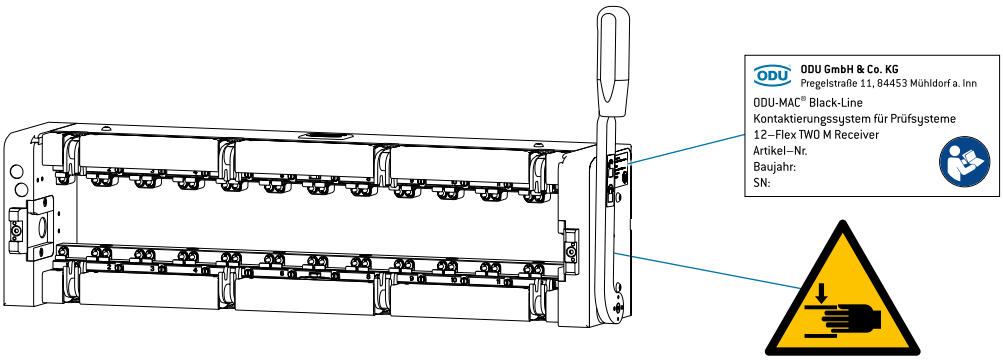


Fig. 3

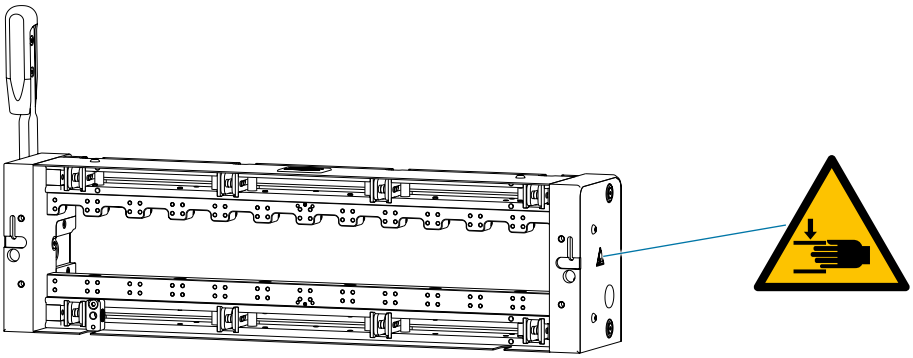
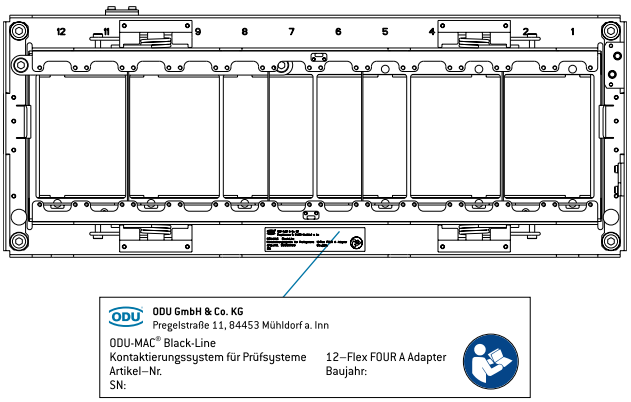


Fig. 4

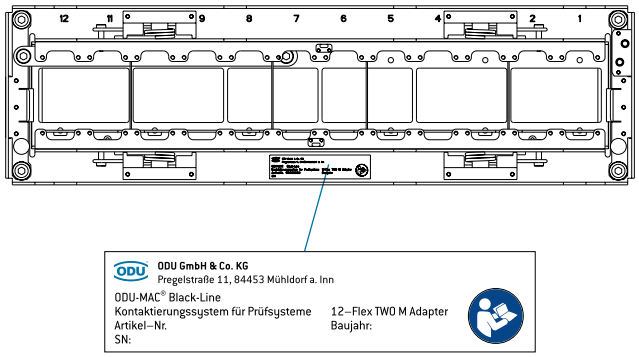
3.8.3 Position on the 12-Flex FOUR A Adapter

Fig. 5



3.8.4 Position on the 12-Flex TWO M Adapter

Fig. 6



4. DESCRIPTION AND FUNCTION

4.1 Device layout: 12-Flex FOUR A Receiver with slide mount, platform, and keyboard tray

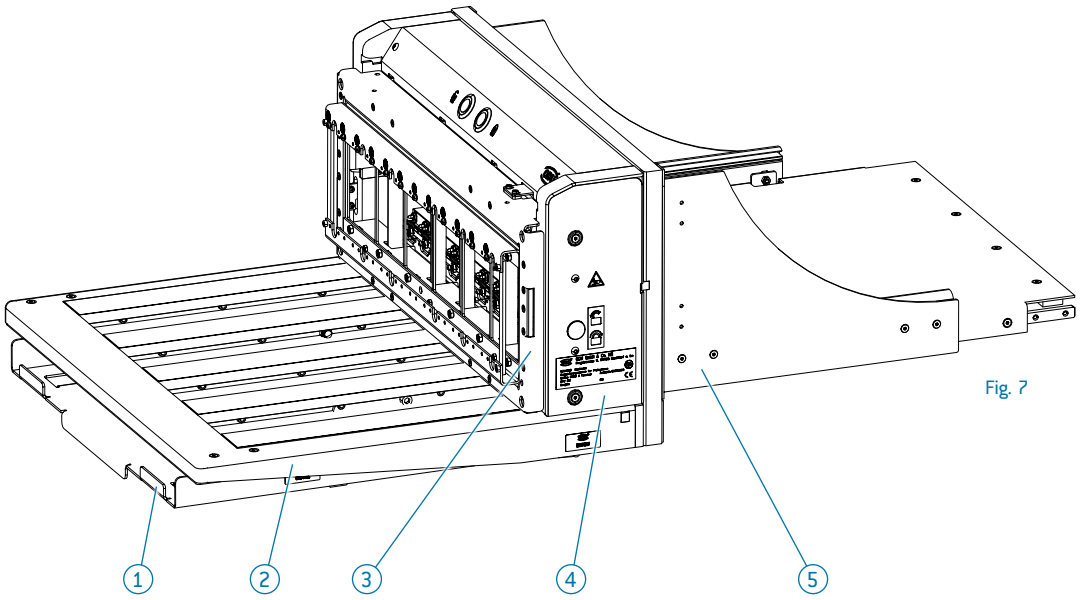


Fig. 7

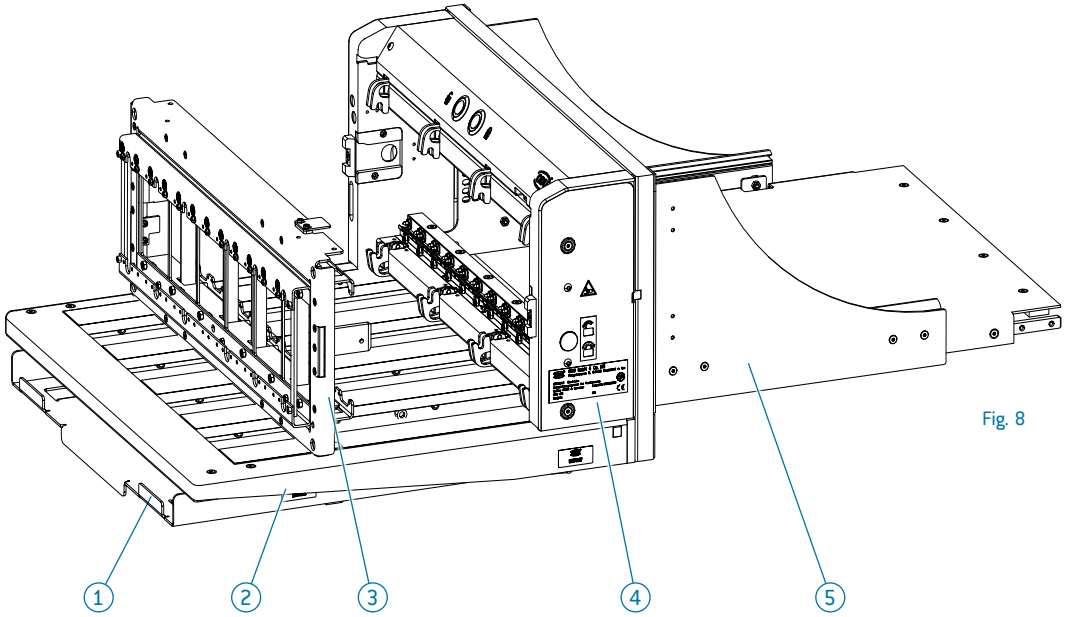


Fig. 8

1. Keyboard tray
2. 12-Flex TWO/FOUR 15" Platform
3. 12-Flex FOUR A Adapter
4. 12-Flex FOUR A Receiver
5. 12-Flex FOUR A Receiver slide mount with platform flange

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4.2 Device layout: 12-Flex TWO M Receiver with slide mount, without platform flange

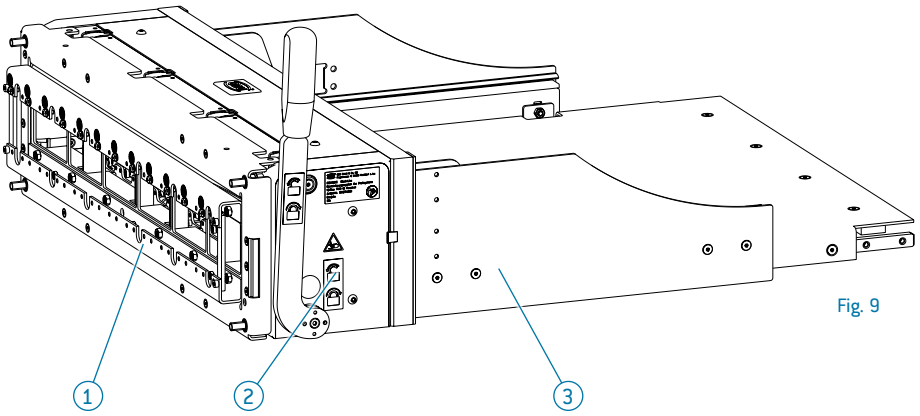

Fig. 9

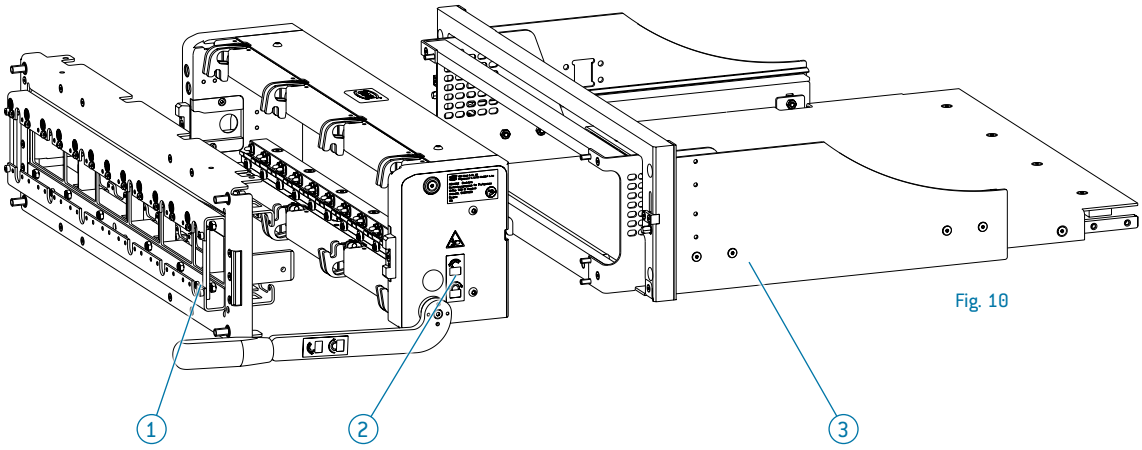

Fig. 10

1. 12-Flex TWO M Adapter
2. 12-Flex TWO M Receiver
3. 12-Flex TWO M Receiver slide mount without platform flange

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4.3 Device layout: 12-Flex TWO M Tabletopcover and platform

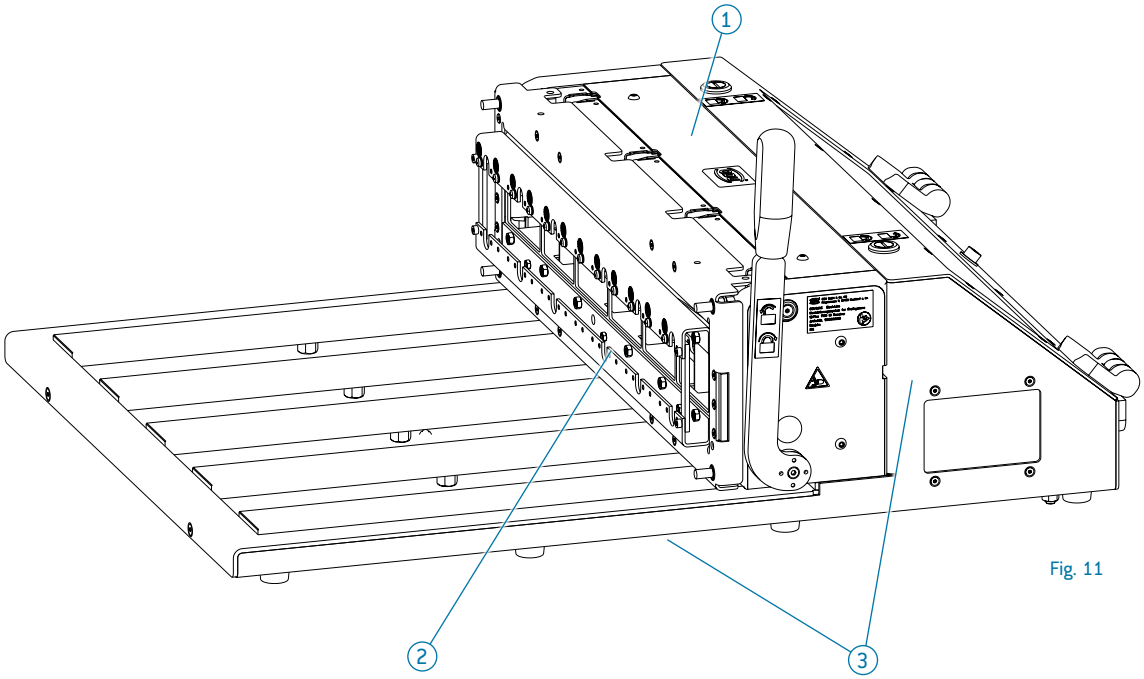

Fig. 11

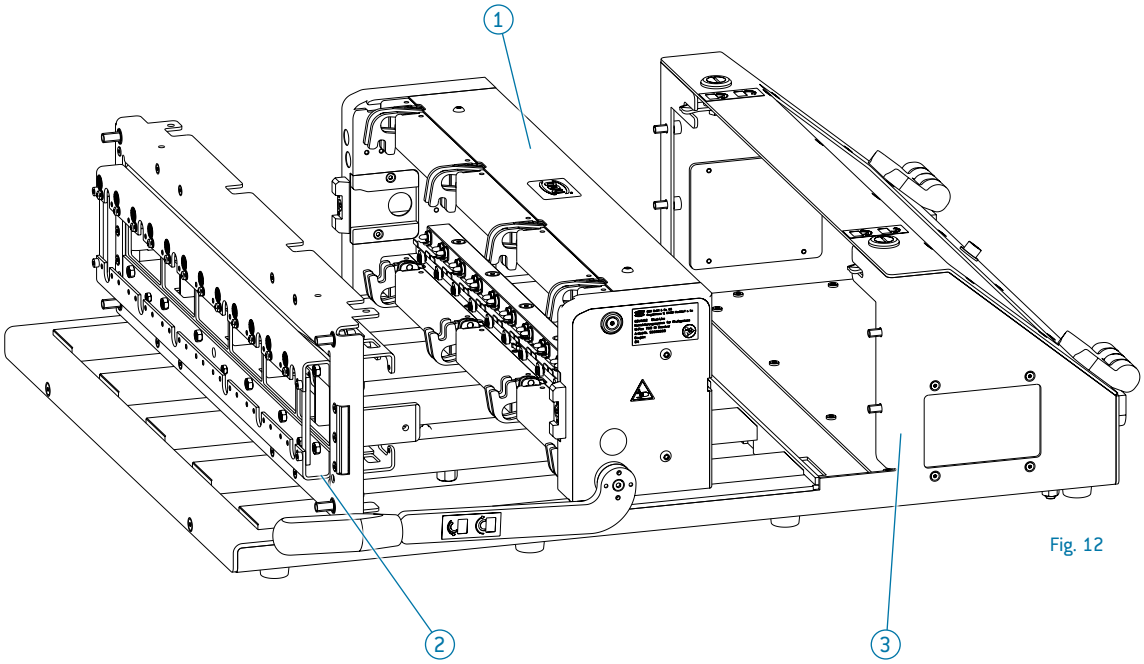

Fig. 12

1. 12-Flex TWO M Tabletop receiver
2. 12-Flex TWO M Adapter
3. 12-Flex TWO M Tabletopcover and platform

4.4 12-Flex FOUR A Receiver front view

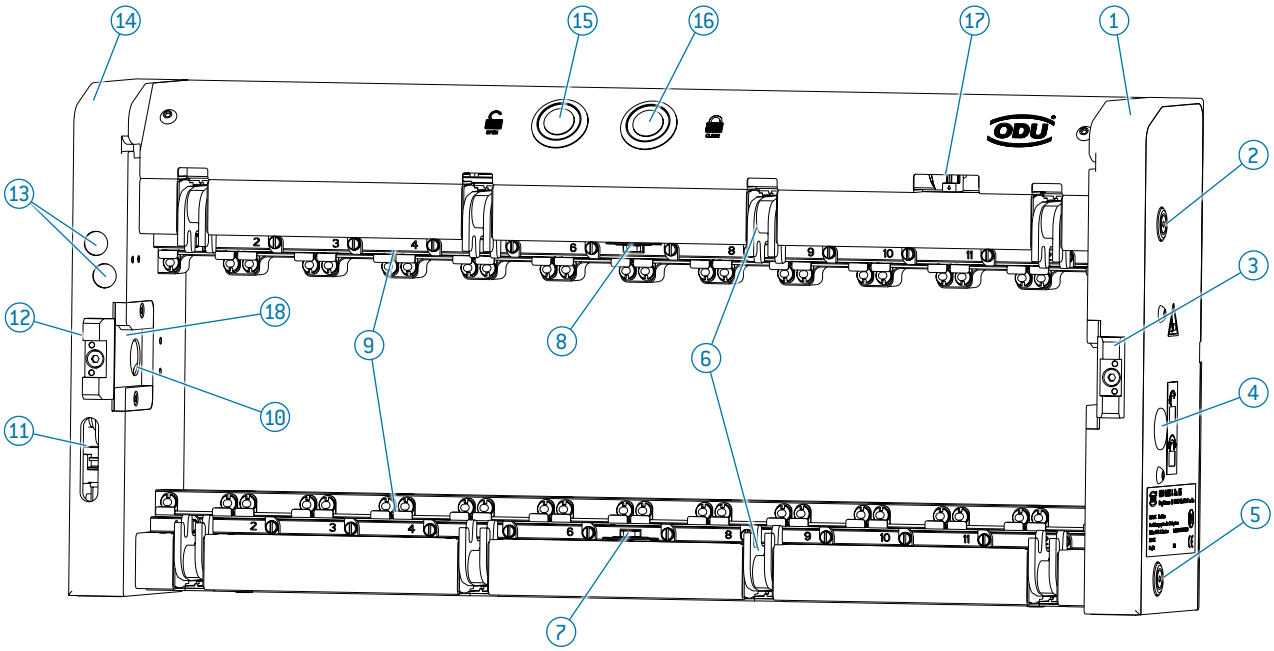

Fig. 13

1. Right side panel
2. Top right emergency release
3. Right pre-centering piece
4. Service access (lock)
5. Bottom right emergency release
6. Locking hook
7. Bottom condition-monitoring microswitch (optional)
8. Top condition-monitoring microswitch (optional)
9. Slot 1 – 12 including frame fixture
10. Mounting position for optional RFID
11. Fork light barrier
12. Left pre-centering piece
13. Resistance coding (optional)
14. Left side panel
15. Unlock (Open) button
16. Lock (Close) button
17. Fork light barrier
18. Centering blade holder

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4.5 12-Flex FOUR A Receiver rear view

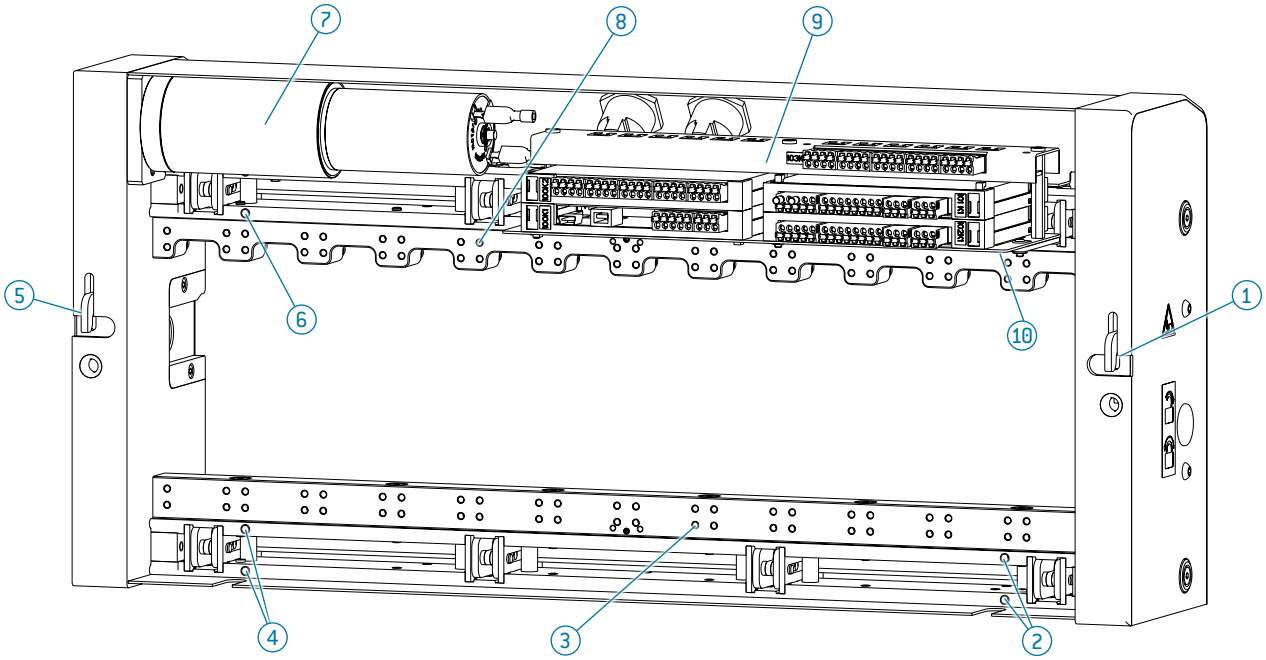

Fig. 14

1. Left locking hook for service access
2. Bottom left receiver fixing points
3. Bottom strain-relief plate fixing points
4. Bottom right receiver fixing points
5. Right locking hook for service access
6. Top right receiver fixing point
7. Drive unit (motor)
8. Top strain-relief plate fixing points
9. Controller
10. Top left receiver fixing point

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4.6 12-Flex TWO M Receiver front view

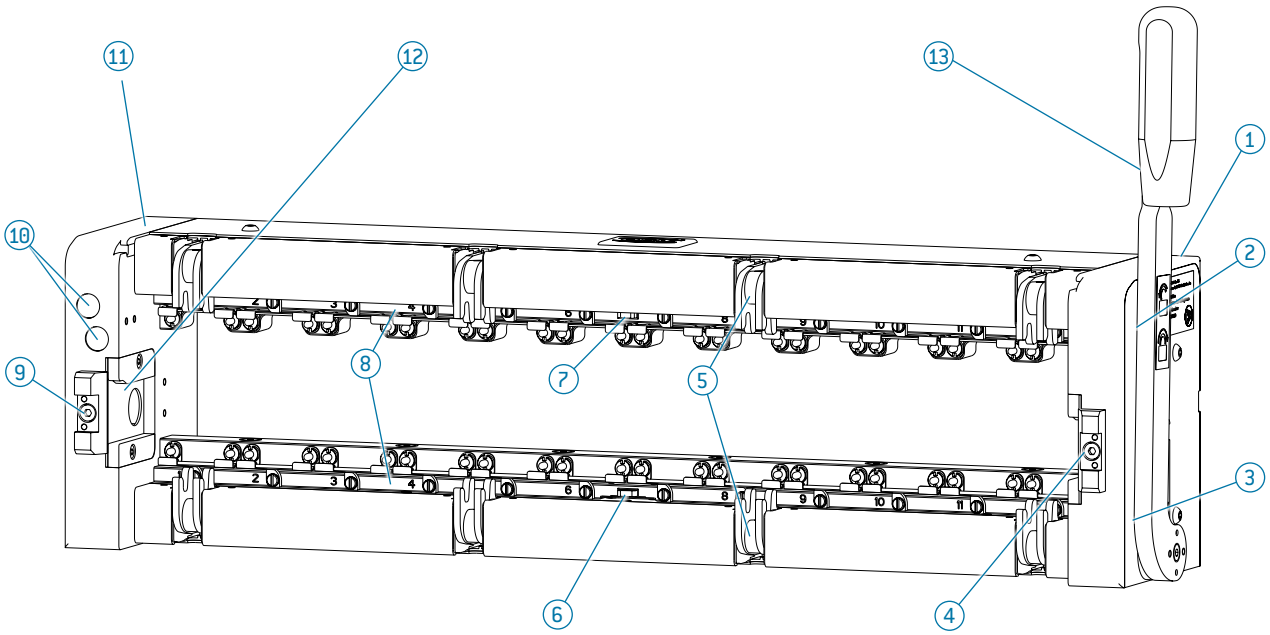

Fig. 15

1. Right side panel
2. Top right emergency release
3. Right service access
4. Right pre-centering piece
5. Locking hook
6. Bottom condition-monitoring microswitch (optional)
7. Top condition-monitoring microswitch (optional)
8. Slot 1 – 12 including frame fixture
9. Left pre-centering piece
10. Resistance coding (optional)
11. Left side panel
12. Left centering blade holder
13. Hand lever

4.7 12-Flex TWO M Receiver rear view

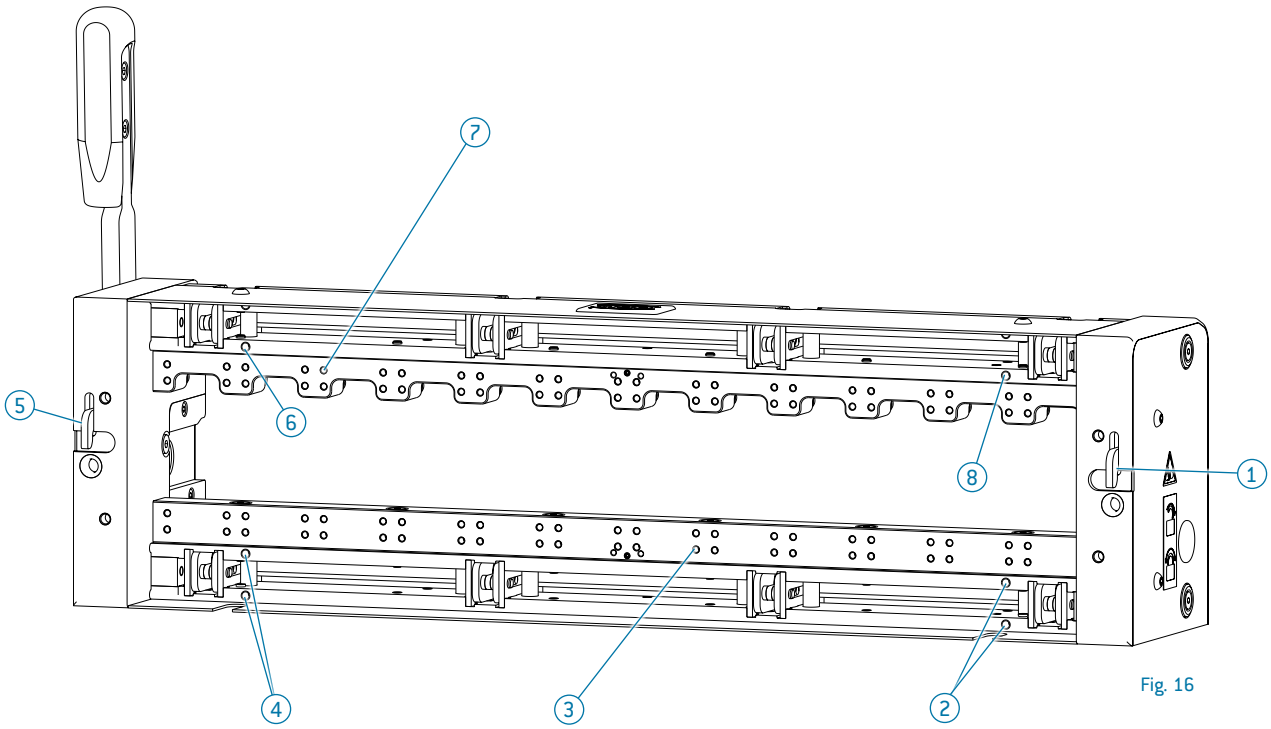

Fig. 16

1. Left locking hook for service access
2. Bottom left receiver fixing points
3. Bottom strain-relief plate fixing points
4. Bottom right receiver fixing points
5. Right locking hook for service access
6. Top right receiver fixing point
7. Top strain-relief plate fixing points
8. Top left receiver fixing point

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4.8 12-Flex TWO M Tabletop receiver front view

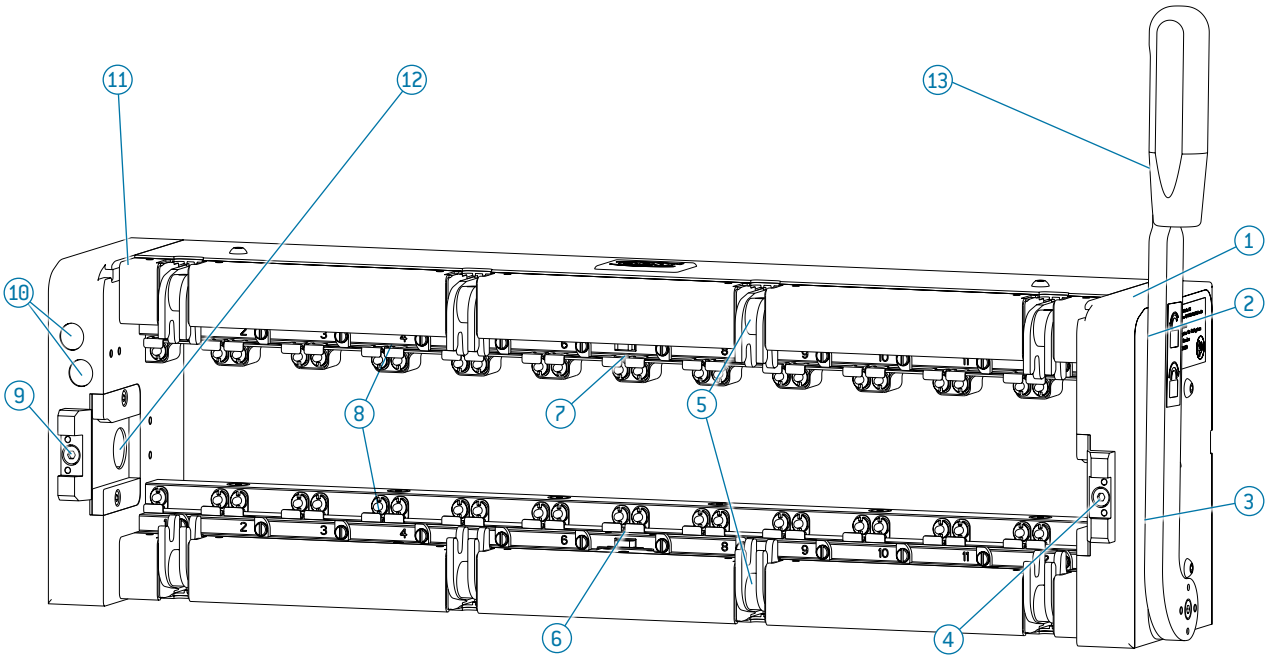

Fig. 17

1. Right side panel
2. Top right emergency-release screw (hidden)
3. Service access
4. Right pre-centering piece
5. Locking hook
6. Bottom condition-monitoring microswitch (optional)
7. Top condition-monitoring microswitch (optional)
8. Slot 1 – 12 including frame fixture
9. Left pre-centering piece
10. Resistance coding (optional)
11. Left side panel
12. Left centering blade holder
13. Hand lever

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4.9 12-Flex TWO M Tabletop receiver rear view

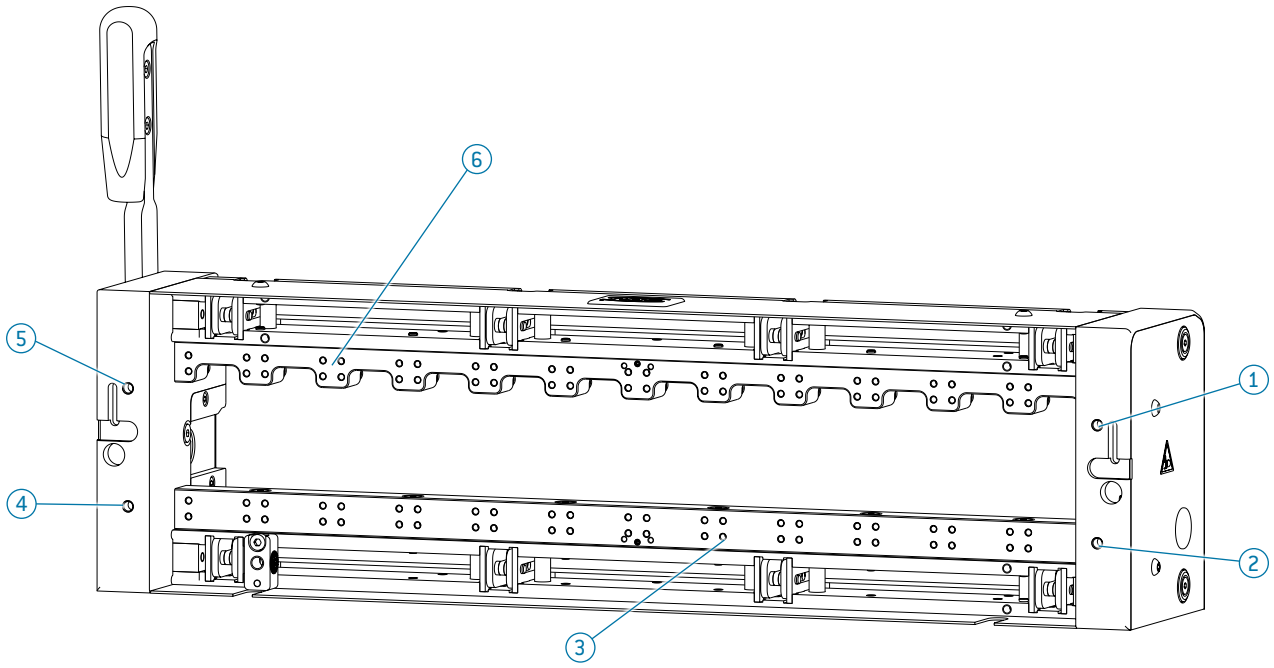

Fig. 18

1. Top left fixing point for tabletop housing
2. Bottom left fixing point for tabletop housing
3. Bottom strain-relief plate fixing points
4. Bottom right fixing point for tabletop housing
5. Top right fixing point for tabletop housing
6. Top strain-relief plate fixing points

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4.10 12-Flex TWO M Tabletop housing front view

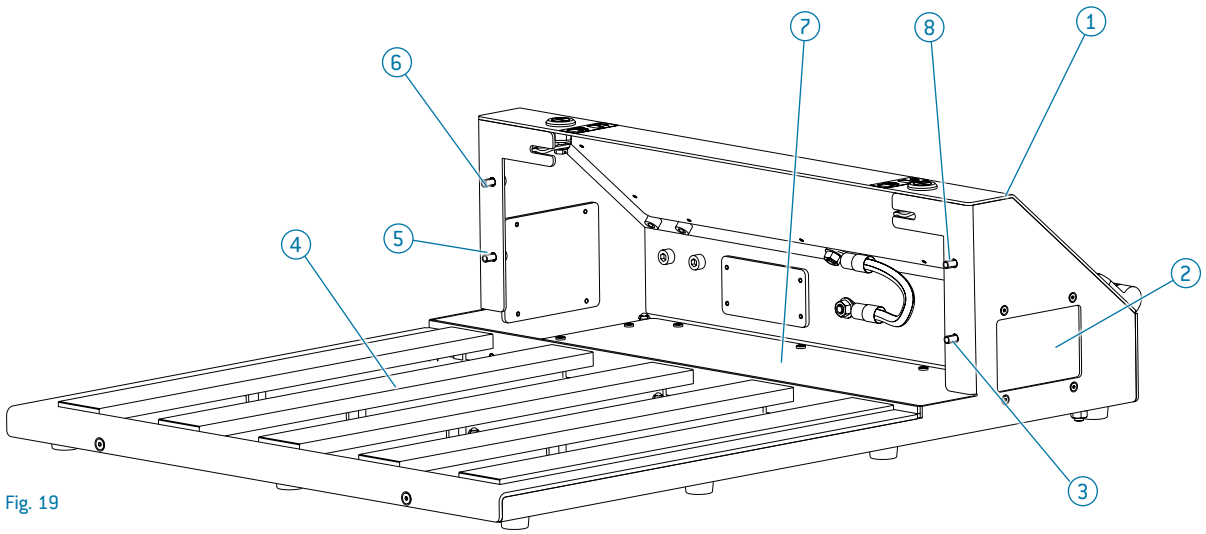

Fig. 19

1. Tabletop housing
2. Right side cable outlet
3. Bottom right receiver fixing point
4. Guiding rails
5. Bottom left receiver fixing point
6. Top left receiver fixing point
7. Bottom cable outlet
8. Top right receiver fixing point

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4.11 12-Flex TWO M Tabletop housing rear view

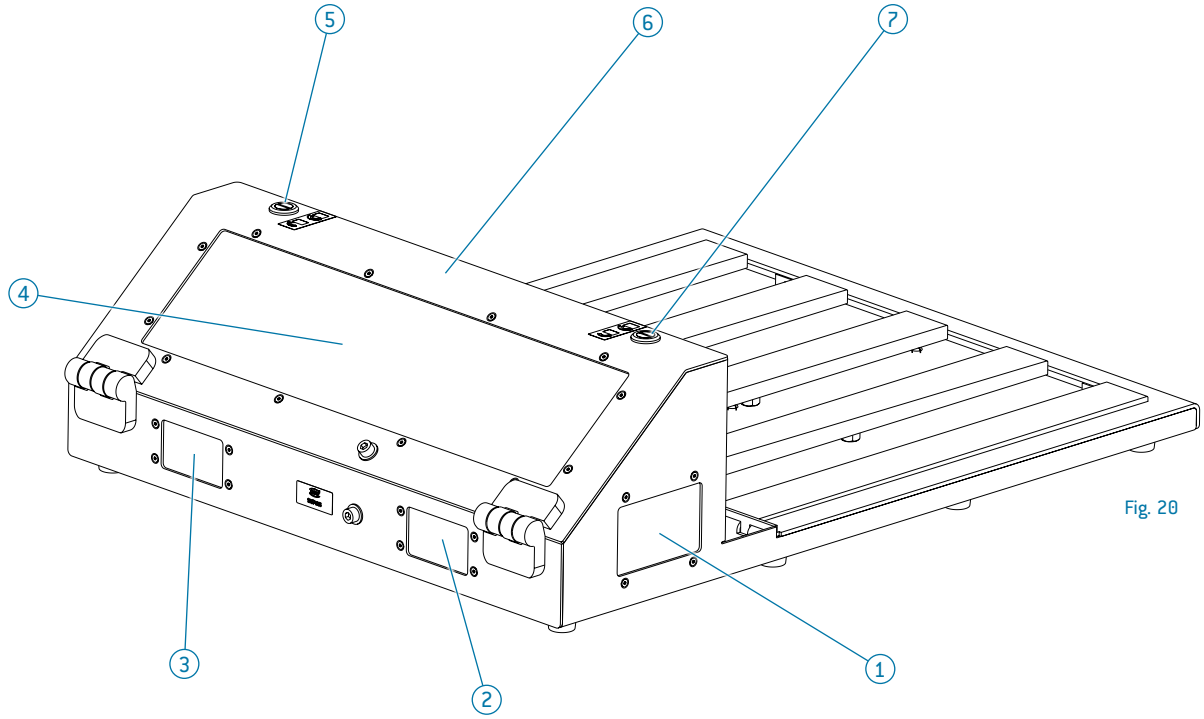

Fig. 20

1. Left side cable outlet
2. Rear left cable outlet
3. Rear right cable outlet
4. Central cable outlet
5. Right service flap lock
6. Service flap
7. Left service flap lock

4.12 12-Flex Four A Adapter front view

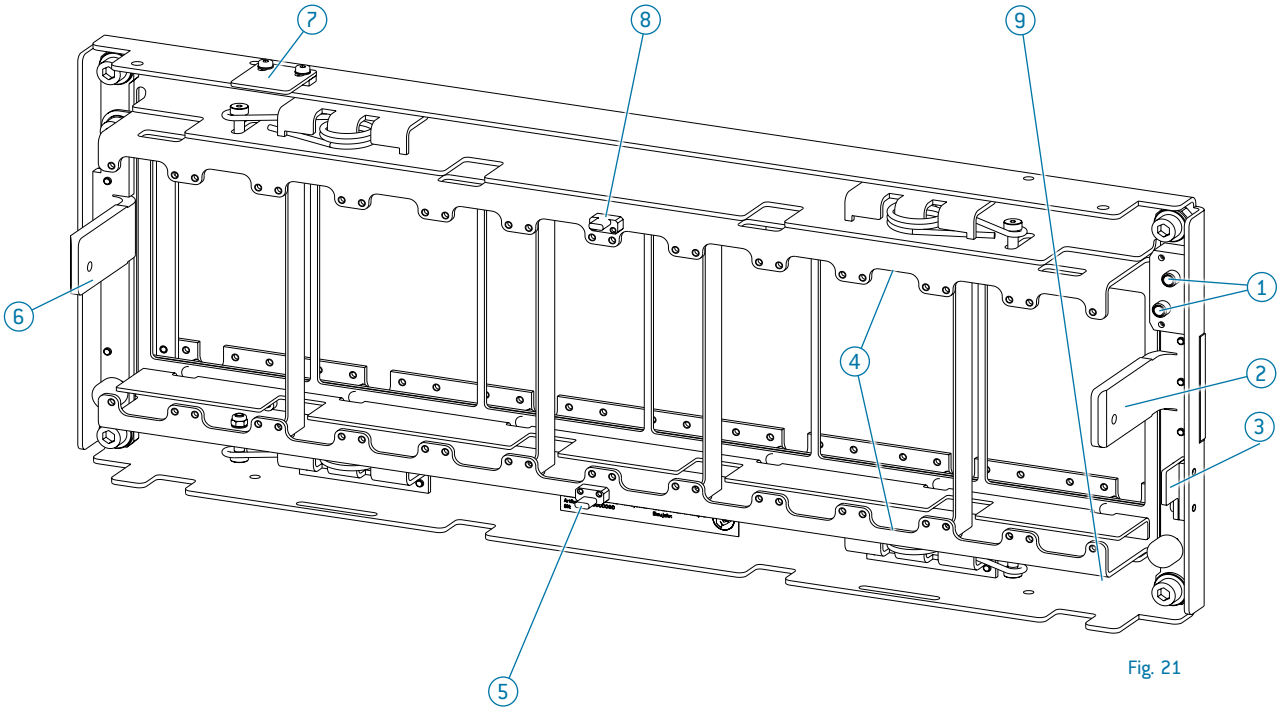

Fig. 21

1. Resistance coding (optional)
2. Left centering blade
3. Actuator lug
4. Slot 1 – 12
5. Bottom condition-monitoring actuator pin
6. Right centering blade
7. Actuator lug
8. Top condition-monitoring actuator pin
9. Mounting position for optional RFID

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4.13 12-Flex Four A Adapter rear view

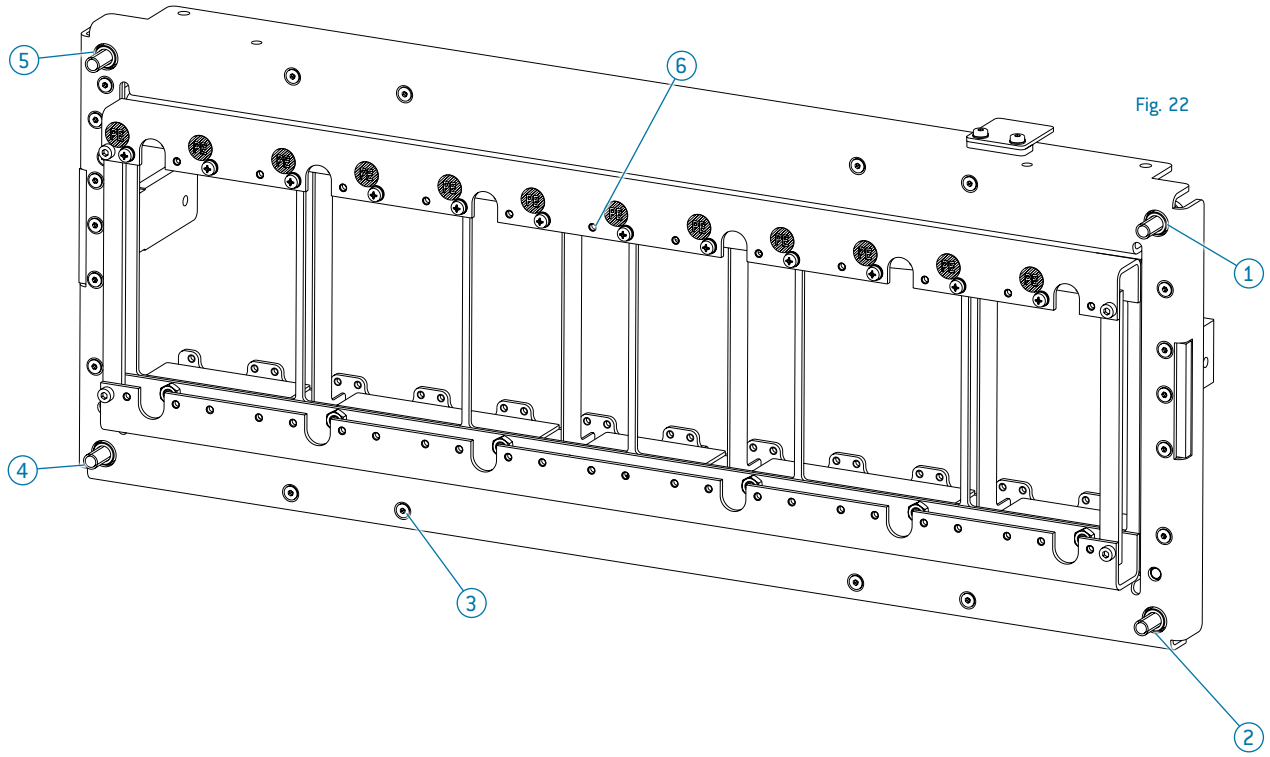

Fig. 22

1. Top right adapter (ITA) fixing point
2. Bottom right adapter (ITA) fixing point
3. Bottom strain-relief plate fixing points
4. Bottom left adapter (ITA) fixing point
5. Top left adapter (ITA) fixing point
6. Top strain-relief plate fixing points

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4.14 12-Flex FOUR Enclosure 6” front view

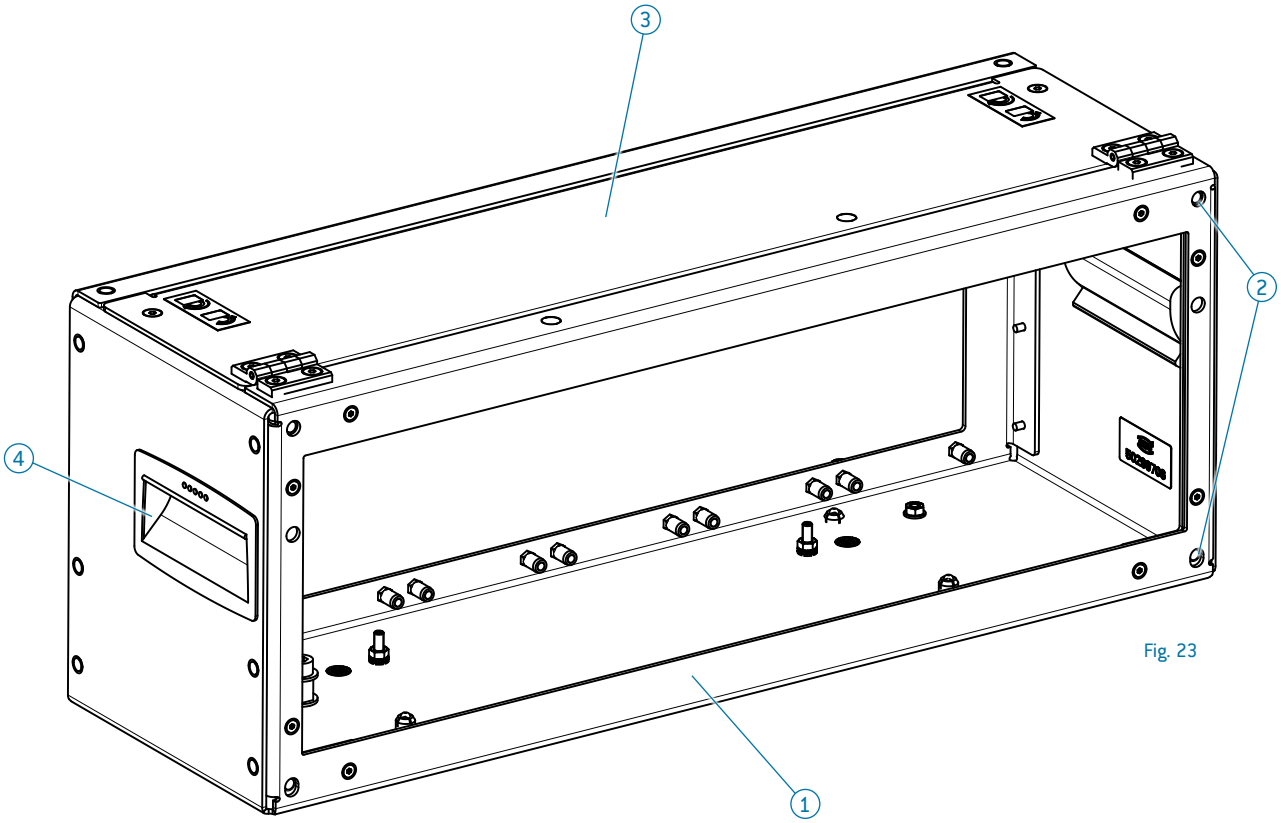

Fig. 23

1. Adapter mounting surface
2. Thread M6
3. Service flap
4. Recessed grip

4.15 12-Flex FOUR Enclosure 6” back view

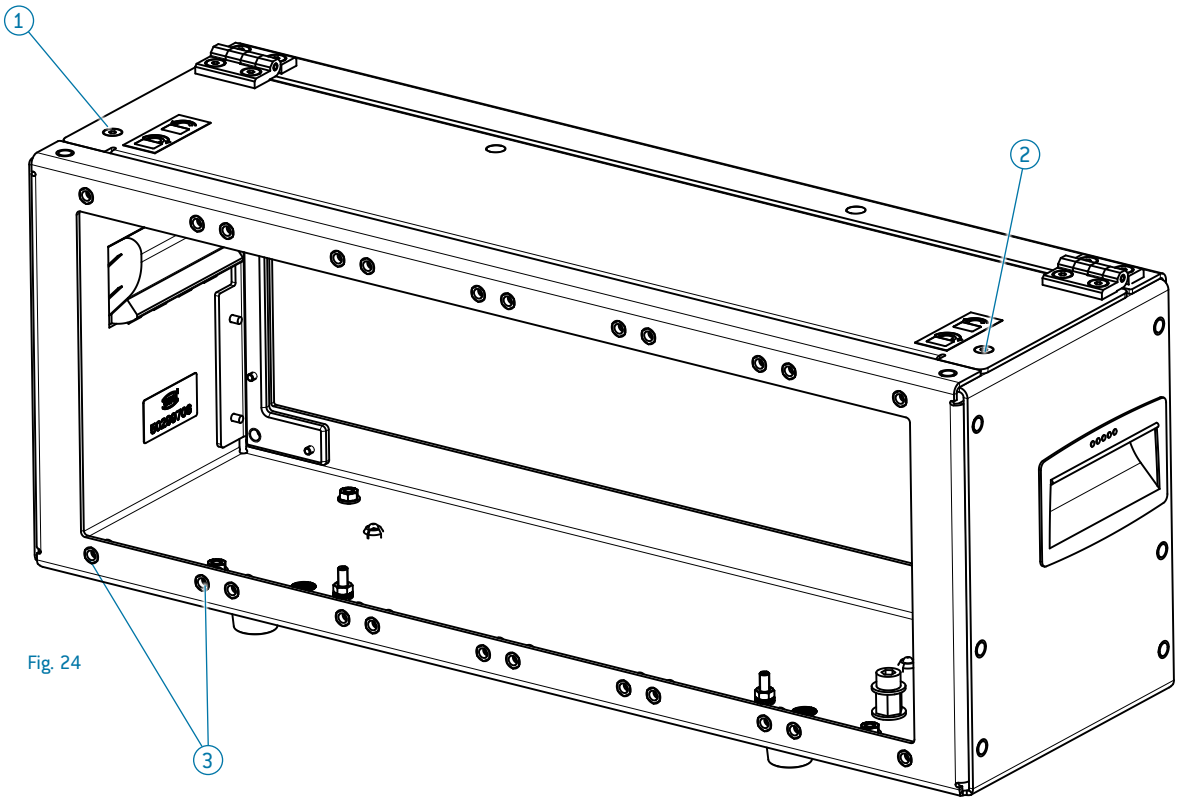

Fig. 24

1. Left service flap lock
2. Right service flap lock
3. Mounting thread for flange plates

5. TECHNICAL DATA

5.1 Receiver technical data

NOTICE If the maximum operating temperature is exceeded, the customer must incorporate additional cooling into the control cabinet.

NOTICE The rear of the receiver must be protected against ingress in line with IP20 (protection against solid objects >12.5 mm, for use in dry areas).

5.1.1 12-Flex FOUR A Receiver (electric receiver)

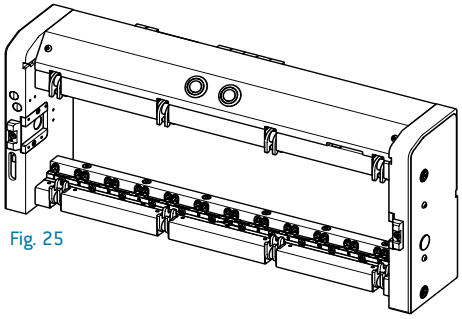

Fig. 25

Variants/Item no.	50274947	50274948	50274949	50274950
Condition monitoring		●	●	
Resistance coding			●	●

Dimensions	482 x 22 x 156 mm
Weight	7,400 g
Supply voltage	24 V DC power supply safe against return feed with a minimum capacity (within the power supply or external) of 6600 µF (Class 2 for UL)
Current/power consumption	Max. 2 A (without inrush peak)
Power supply requirement (provided by customer)	Power cable no longer than 3 m
Connectors to use	ODU-MAC® Blue-Line/Black-Line size 4
Number of connectors	Max. 12 ODU-MAC® Blue-Line/Black-Line size 4 connectors
Storage temperature	–20…+85 °C
Operating temperature	0…+55 °C
Protection class	IP20 in mated condition
Service life, mating cycles	Mechanism/drive: 20,000 operation cycles (1 cycle = 1x open + 1x close)
Permissible pollution degree	3
Air humidity	0 to 80 % r. h., non-condensing
Maximum weight of adapter (ITA) to use	30 kg
Safety	An emergency-stop function must be provided in the higher-level system.

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5.1.2 12-Flex TWO M Receiver (manual receiver)

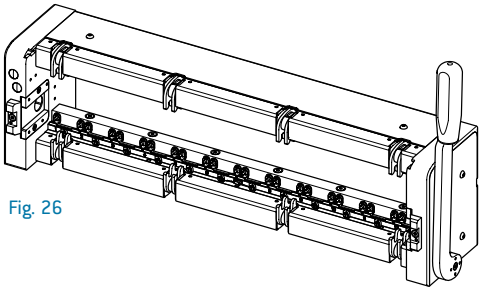

Fig. 26

Variants/Item no.	50274951	50274952	50274953	50274954
Condition monitoring		●	●	
Resistance coding			●	●

Dimensions	482 x 182 x 98 mm
Weight	4,860 g
Connectors to use	ODU-MAC® Blue-Line/Black-Line size 2
Number of connectors	Max. 12 ODU-MAC® Blue-Line/Black-Line size 2 connectors
Storage temperature	–20…+85 °C
Operating temperature	0…+55 °C
Protection class	IP20 in mated condition
Service life, mating cycles	Mechanism/drive: 20,000 operation cycles (1 cycle = 1x open + 1x close)
Permissible pollution degree	3
Air humidity	0 to 80 % r. h., non-condensing
Maximum weight of adapter (ITA) to use	30 kg

5.1.3 12-Flex TWO M Tabletop receiver (manual receiver)

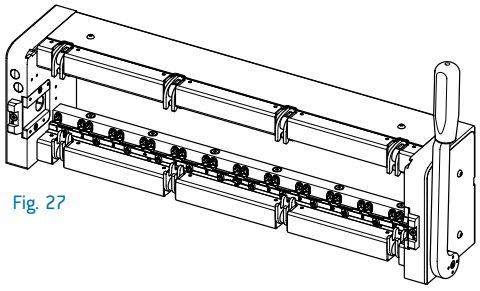

Fig. 27

Variants/Item no.	50274955	50274956	50274957	50274958
Condition monitoring		●	●	
Resistance coding			●	●

Dimensions	482 x 182 x 98 mm
Weight	4,770 g
Connectors to use	ODU-MAC® Blue-Line/Black-Line size 2
Number of connectors	Max. 12 ODU-MAC® Blue-Line/Black-Line size 2 connectors
Storage temperature	–20…+85 °C
Operating temperature	0…+55 °C
Protection class	IP20 in mated condition
Service life, mating cycles	Mechanism/drive: 20,000 operation cycles (1 cycle = 1x open + 1x close)
Permissible pollution degree	3
Air humidity	0 to 80 % r. h., non-condensing
Maximum weight of adapter (ITA) to use	30 kg

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5.2 12-Flex TWO M Tabletopcover and platform technical data

NOTICE

The cable outlets in the tabletop housing must be protected against ingress in line with IP20 (protection against solid objects >12.5 mm, for use in dry areas).

5.2.1 12-Flex TWO M Tabletopcover and platform

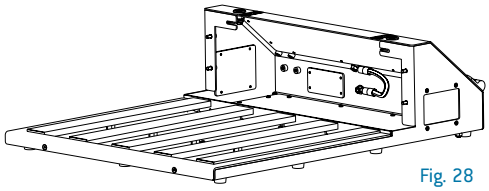

Fig. 28

Item no.	50274966

Dimensions	482 x 627 x 173 mm
Weight	8,410 g
Receiver to use	12-Flex TWO M tabletop receiver (manual receiver)
Number of connectors	Max. 12 ODU-MAC® Blue-Line/Black-Line size 2 connectors
Storage temperature	–20…+85 °C
Operating temperature	0…+55 °C
Protection class	IP20 in mated condition
Service life, mating cycles	Mechanism/drive: 20,000 operation cycles (1 cycle = 1x open + 1x close)
Permissible pollution degree	3
Air humidity	0 to 80 % r. h., non-condensing
Maximum weight of adapter (ITA) to use	30 kg

5.3 Adapter (ITA) technical data

NOTICE If the maximum operating temperature is exceeded, the customer must incorporate additional cooling.

NOTICE The rear of the adapter (ITA) must be protected against ingress at the cable outlet in line with IP20 (protection against solid objects >12.5 mm, for use in dry areas).

5.3.1 12-Flex FOUR A Adapter

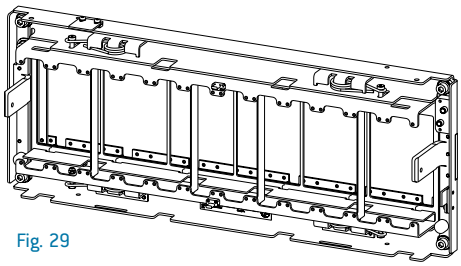

Fig. 29

Variants/Item no.	50274976	50274977
Resistance-coding block		●

Dimensions	474 x 184 x 80 mm
Weight	3,570 g
Connectors to use	ODU-MAC® Blue-Line/Black-Line size 4
Number of connectors	Max. 12 ODU-MAC® Blue-Line/Black-Line size 4 connectors
Storage temperature	–20…+85 °C
Operating temperature	0…+55 °C
Protection class	IP20 in mated condition
Service life, mating cycles	Mechanism/drive: 20,000 operation cycles (1 cycle = 1x open + 1x close)
Permissible pollution degree	3
Air humidity	0 to 80 % r. h., non-condensing
Adapter weight	30 kg

5.3.2 12-Flex TWO M Adapter

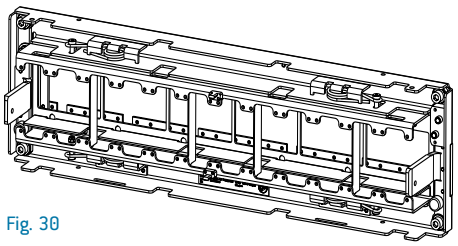

Fig. 30

Variants/Item no.	50274980	50274981
Resistance-coding block		●

Dimensions	474 x 135 x 80 mm
Weight	3,430 g
Connectors to use	ODU-MAC® Blue-Line/Black-Line size 2
Number of connectors	Max. 12 ODU-MAC® Blue-Line/Black-Line size 2 connectors
Storage temperature	–20…+85 °C
Operating temperature	0…+55 °C
Protection class	IP20 in mated condition
Service life, mating cycles	Mechanism/drive: 20,000 operation cycles (1 cycle = 1x open + 1x close)
Permissible pollution degree	3
Air humidity	0 to 80 % r. h., non-condensing
Adapter weight	30 kg

5.4 Slide mount technical data

⚠ WARNING **Risk of the control cabinet tipping or becoming damaged by having a heavy weight attched!**

If the control cabinet tips/falls over, this can cause injury, e.g., by crushing personnel.

▶ Do not pull out the slide mount assembled in the receiver when the adapter is attached.

5.4.1 12-Flex FOUR Receiver slide mount with platform flange

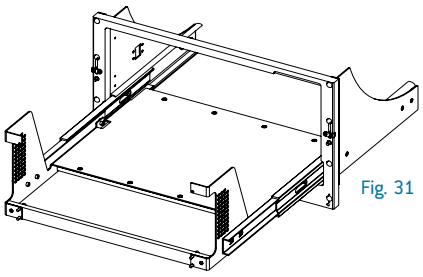

Fig. 31

Item no.	50274959

Dimensions (pushed in)	482 x 480 x 265 mm
Weight	8,160 g
Maximum extension length	Approx. 340 mm
Maximum loading capacity	Receiver including equipment
Maximum loading capacity bearing surface	15 kg
Storage temperature	–20…+70 °C
Operating temperature	0…+55 °C

5.4.2 12-Flex FOUR Receiver slide mount without platform flange

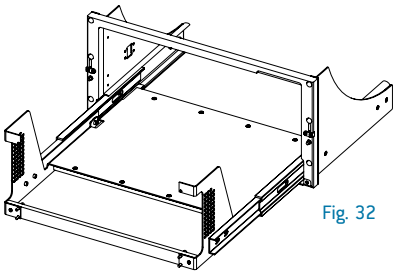

Fig. 32

Item no.	50274960
Dimensions (pushed in)	482 x 480 x 222 mm
Weight	7,230 g
Maximum extension length	Approx. 340 mm
Maximum loading capacity	Receiver including equipment
Maximum loading capacity bearing surface	15 kg
Storage temperature	–20…+70 °C
Operating temperature	0…+55 °C

5.4.3 12-Flex TWO M Receiver slide mount with platform flange

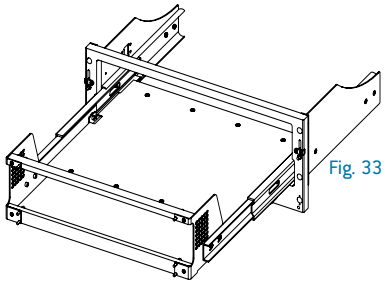

Fig. 33

Item no.	50274961
Dimensions (pushed in)	482 x 482 x 178 mm
Weight	7,870 g
Maximum extension length	Approx. 340 mm
Maximum loading capacity	Receiver including equipment
Maximum loading capacity bearing surface	15 kg
Storage temperature	–20…+70 °C
Operating temperature	0…+55 °C

5.4.4 12-Flex TWO M Receiver slide mount without platform flange

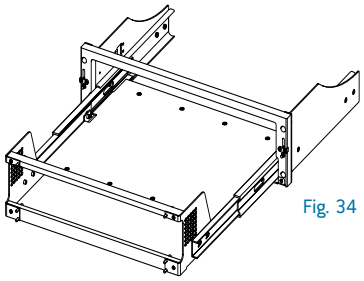

Fig. 34

Item no.	50274962
Dimensions (pushed in)	482 x 482 x 133 mm
Weight	6,870 g
Maximum extension length	Approx. 340 mm
Maximum loading capacity	Receiver including equipment
Maximum loading capacity bearing surface	15 kg
Storage temperature	–20…+70 °C
Operating temperature	0…+55 °C

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5.5 Accessories technical data

5.5.1 200 mm platform extension for slide mount

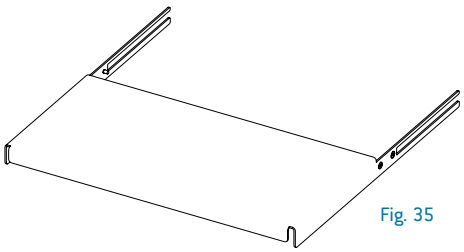

Fig. 35

Item no.	50274963

Dimensions	404 x 400 x 29 mm
Weight	1,620 g
Maximum loading capacity	15 kg
Storage temperature	–20…+70 °C
Operating temperature	0…+55 °C

5.5.2 12-Flex TWO/FOUR 15" Platform

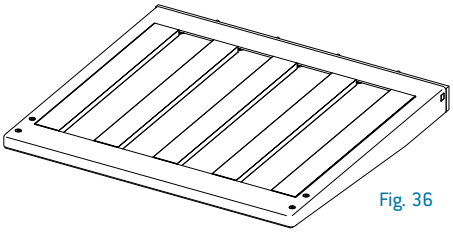

Fig. 36

Item no.	50274967

Dimensions (pushed in)	482 x 448 x 42 mm
Weight	9,720 g
Maximum loading capacity	30 kg
Storage temperature	–20…+70 °C
Operating temperature	0…+55 °C

5.5.3 Keyboard tray for platform

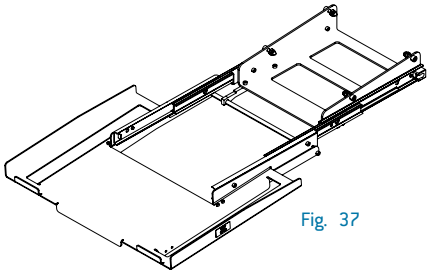

Fig. 37

Item no.	50274968

Dimensions (pushed in)	408 x 440 x 85 mm
Weight	3,470 g
Usable keyboard tray area	400 x 170 x 30 mm
Maximum loading capacity	5 kg
Storage temperature	–20…+70 °C
Operating temperature	0…+55 °C

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5.5.4 12-Flex FOUR A Receiver fixed mounting frame with platform flange

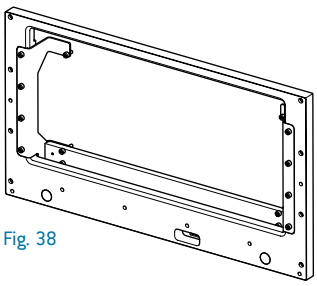

Fig. 38

Item no.	50282431
Dimensions	482 x 265 x 48 mm
Weight	1,980 g
Maximum loading capacity	Receiver including equipment
Storage temperature	–20…+70 °C
Operating temperature	0…+55 °C

5.5.5 12-Flex FOUR A Receiver fixed mounting frame without platform flange

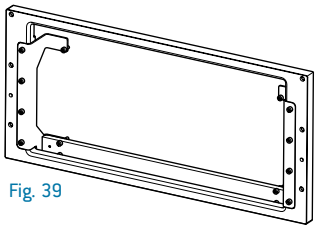

Fig. 39

Item no.	50280646
Dimensions	482 x 222 x 48 mm
Weight	1,820 g
Maximum loading capacity	Receiver including equipment
Storage temperature	–20…+70 °C
Operating temperature	0…+55 °C

5.5.6 12-Flex TWO M Receiver fixed mounting frame with platform flange

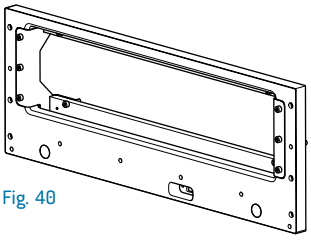

Fig. 40

Item no.	50282430
Dimensions	482 x 177.5 x 48 mm
Weight	1,930 g
Maximum loading capacity	Receiver including equipment
Storage temperature	–20…+70 °C
Operating temperature	0…+55 °C

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5.5.7 12-Flex TWO M Receiver fixed mounting frame without platform flange

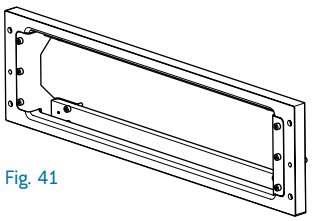

Fig. 41

Item no.	50282429

Dimensions	482 x 133 x 48 mm
Weight	1,770 g
Maximum loading capacity	Receiver including equipment
Storage temperature	–20…+70 °C
Operating temperature	0…+55 °C

5.5.8 Hand lever extension receiver

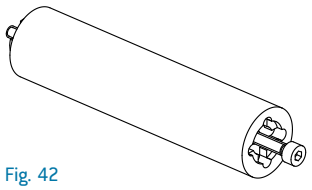

Fig. 42

Item no.	50303292

Dimensions	24 x 100 mm
Weight	340 g
Storage temperature	–20…+70 °C
Operating temperature	0…+55 °C

5.5.9 12-Flex FOUR Enclosure 6”

NOTICE The flange plates on the enclosure must be protected against intrusion in accordance with IP20 (Protection against solid objects >12.5 mm, for use in dry areas).

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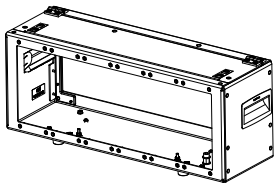

Fig. 43

Item no.	50299706

Dimension	152 x 474 x 184 mm
Weight	1,900 g
Compatible adapter	12-Flex TWO M Adapter / 12-Flex FOUR A Adapter
Number of flange plates	max. 6 flange plates
Storage temperature	–20…+85 °C
Operating temperature	0 … +55 °C
Protection class	IP20 in mated condition
Permissible pollution degree	3
Air humidity	0 to 80 % r. h., non-condensing
Maximum weight	30 kg

5.5.10 12-Flex FOUR Enclosure 15"

NOTICE The flange plates on the enclosure must be protected against intrusion in accordance with IP20 (Protection against solid objects >12.5 mm, for use in dry areas).

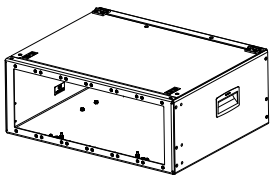

Fig. 44

Item no.	50299705

Dimension	381 x 474 x 184 mm
Weight	3,500 g
Compatible adapter	12-Flex TWO M Adapter / 12-Flex FOUR A Adapter
Number of flange plates	max. 6 flange plates
Storage temperature	–20…+85 °C
Operating temperature	0 … +55 °C
Protection class	IP20 in mated condition
Permissible pollution degree	3
Air humidity	0 to 80 % r. h., non-condensing
Maximum weight	30 kg

5.5.11 12-Flex FOUR Enclosure adapter plate for TWO M Adapter

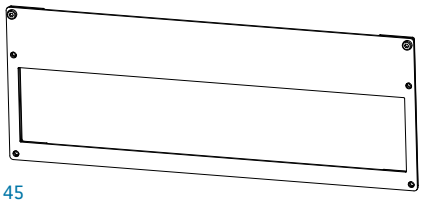

Fig. 45

Item no.	50300030

Dimensions	464 x 176 x 2 mm
Weight	450 g

5.5.12 12-Flex FOUR Enclosure flange plate

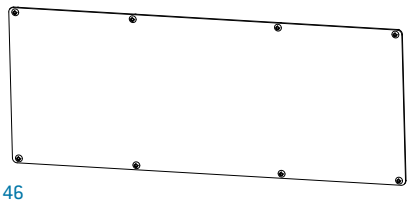

Fig. 46

Item no.	50303236

Dimensions	425 x 170 x 2 mm
Weight	390 g

5.5.13 FOUR Enclosure flange plate, double (without cut-out)

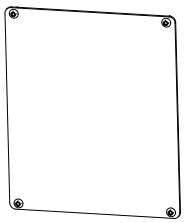

Fig. 47

Item no.	50300029

Dimensions	142 x 170 x 2 mm
Weight	130 g

5.5.14 FOUR Enclosure flange plate (without cut-out)

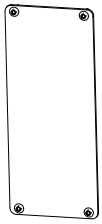

Fig. 48

Item no.	50300025

Dimensions	71 x 170 x 2 mm
Weight	65 g

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5.5.15 FOUR Enclosure flange plate for bulkhead housings

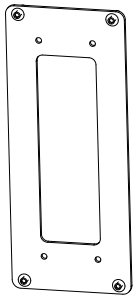


Fig. 49

Item no.	50300019
Dimensions	71 x 170 x 2 mm
Weight	45 g

5.5.16 FOUR Enclosure flange plate for ODU-MAC® Rapid

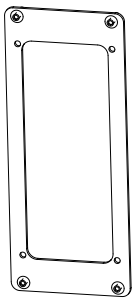


Fig. 50

Item no.	50300021
Dimensions	71 x 170 x 2 mm
Weight	45 g

5.5.17 FOUR Enclosure flange plate for cable feedthroughs

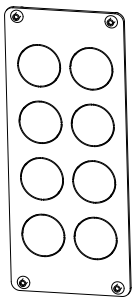


Fig. 51

Item no.	50300023
Dimensions	71 x 170 x 2 mm
Weight	65 g

5.5.18 FOUR Enclosure flange plate 8x D-SUB 15-pin

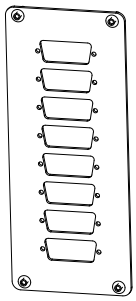


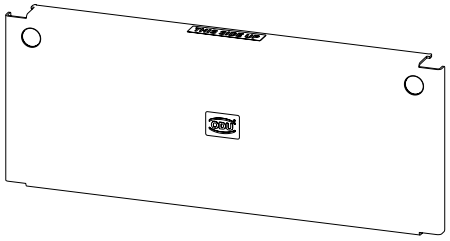
Fig. 52

Item no.	50300027

Dimensions	71 x 170 x 2 mm
Weight	50 g

5.6 Covers

5.6.1 12-Flex FOUR Receiver protective cover

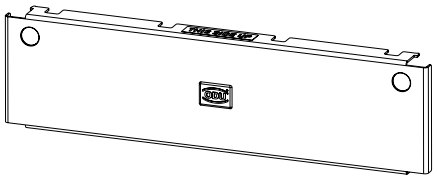


Item no.	50274974

Fig. 53

Dimensions	478 x 189 x 32 mm
Weight	1,810 g

5.6.2 12-Flex TWO Receiver protective cover

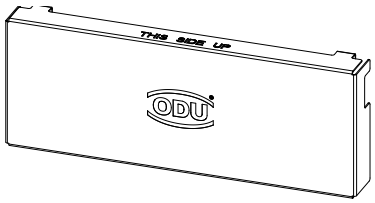


Item no.	50274975

Fig. 54

Dimensions	478 x 126 x 32 mm
Weight	1,310 g

5.6.3 12-Flex FOUR Adapter protective cover

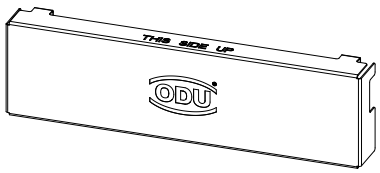


Item no.	50274986

Fig. 55

Dimensions	474 x 181 x 53 mm
Weight	690 g

5.6.4 12-Flex TWO Adapter protective cover



Item no.	50274987

Fig. 56

Dimensions	474 x 132 x 53 mm
Weight	540 g

5.6.5 Cover for 12-Flex FOUR A Receiver slot

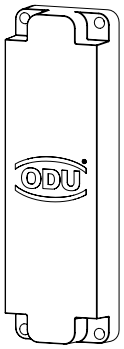


Fig. 57

Item no.	50275305
Dimensions	27 x 104 x 16 mm
Weight	20 g

5.6.6 Cover for 12-Flex TWO M Receiver slot

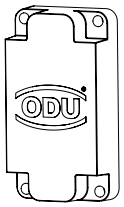


Fig. 58

Item no.	50275304
Dimensions	27 x 57 x 16 mm
Weight	15 g

5.6.7 Cover for 12-Flex FOUR A Adapter slot

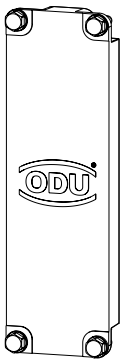


Fig. 59

Item no.	50275366
Dimensions	27 x 104 x 10.7 mm
Weight	20 g

5.6.8 Cover for 12-Flex TWO M Adapter slot

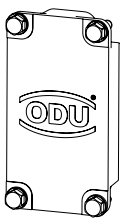


Fig. 60

Item no.	50275365
Dimensions	27 x 57 x 10.7 mm
Weight	15 g

5.7 Strain-relief plates

5.7.1 Flex FOUR Receiver strain-relief plate

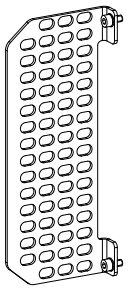


Fig. 61

Item no.	50254971
Dimensions	128 x 54 x 10 mm
Weight	56 g

5.7.2 Flex TWO Receiver strain-relief plate

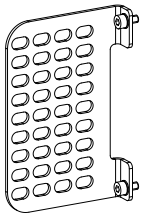


Fig. 62

Item no.	50254972
Dimensions	81 x 54 x 10 mm
Weight	39 g

5.7.3 Flex FOUR Adapter strain-relief plate

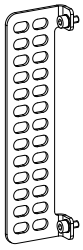


Fig. 63

Item no.	50281436
Dimensions	105 x 48 x 10 mm
Weight	50 g

5.7.4 Flex TWO Adapter strain-relief plate

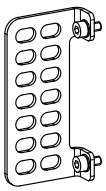


Fig. 64

Item no.	50281434
Dimensions	78 x 53 x 10 mm
Weight	45 g

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5.8 Special tools

5.8.1 Width across flats 8 socket wrench for receiver emergency release

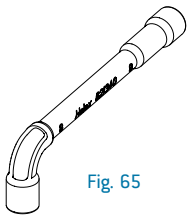

Fig. 65

Item no.	50275359

5.8.2 Socket wrench for service access lock

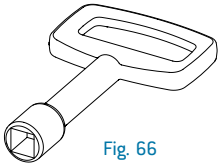

Fig. 66

Item no.	50275360

6. ASSEMBLY

Read the safety information below before carrying out any assembly work and take note of the measures described therein designed to ensure safe assembly.

6.1 Safety information relating to assembly

⚠ WARNING **Danger from improper assembly!**

Improper assembly can lead to accidents and cause injury.

- Only ever allow skilled personnel to perform assembly, installation, commissioning, repair, maintenance, and servicing work.
- Only assemble permissible combinations of devices.
- Take note of the assembly information contained in these instructions.
- Comply with the maximum load limits.
- Only use mounting materials according to the specifications in these instructions.
- Only use genuine spare parts.

⚠ WARNING **Risk of tipping from control cabinet having an incorrect center of gravity!**

If the control cabinet tips/falls over, this can cause injury, e.g., by crushing personnel.

- When assembling the receiver in the control cabinet, make sure the control cabinet's center of gravity is stable.
- Take the additional weight of installed equipment such as the adapter (ITA), platform, slide mount, and attached cables into account.

⚠ CAUTION **Risk of injury from sharp edges and corners!**

Sharp edges and corners can cause abrasions and cuts.

- Be careful when working near to sharp edges and corners.
- Wear personal protective equipment.

⚠ CAUTION **Risk of crushing from tightening mechanism!**

Hands may become crushed between the receiver and adapter (ITA).

- Make sure the travel path of the tightening mechanism is unobstructed before operating it.

⚠ CAUTION **Weight of the adapter may be too heavy for the operator when using the device without a platform.**

- Observe occupational health and safety regulations.
- Use additional aids.

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NOTICE Only assemble the combinations listed below.

6.2 Combination options

Designation/ Item no.	12-Flex FOUR A Receiver 50274947 50274948 50274949 50274950	12-Flex TWO M Receiver 50274951 50274952 50274953 50274954	12-Flex TWO M Tabletop receiver 50274955 50274956 50274957 50274958	200 mm platform extension for slide mount 50274963	15" platform 50274967
Desktop housing					
12-Flex TWO M Tabletop-cover and platform 50274966			● see Section 6.9		
Adapter (ITA)					
12-Flex FOUR A Adapter 50274976 50274977	● see Section 8.4				
12-Flex TWO M Adapter 50274980 50274981		● see Section 8.5	● see Section 8.5		
Slide mounts					
12-Flex FOUR A Receiver slide mount with platform flange 50274959	● see Section 6.8			● see Section 6.11	● see Section 6.7
12-Flex FOUR A Receiver slide mount without platform flange 50274960	● see Section 6.8			● see Section 6.11	
12-Flex TWO M Receiver slide mount with platform flange 50274961		● see Section 6.8		● see Section 6.11	● see Section 6.7
12-Flex TWO M Receiver slide mount without platform flange 50274962		● see Section 6.8		● see Section 6.11	
Keyboard tray					
Keyboard tray 50274968					● see Section 6.6

Designation/ Item no.	12-Flex FOUR A Receiver 50274947 50274948 50274949 50274950	12-Flex TWO M Receiver 50274951 50274952 50274953 50274954	12-Flex TWO M Tabletop receiver 50274955 50274956 50274957 50274958	200 mm platform extension for slide mount 50274963	15" platform 50274967
Fixed mounting frames					
12-Flex FOUR A Receiver fixed mounting frame with platform flange 50282431	● see Section 6.8				● see Section 6.7
12-Flex FOUR A Receiver fixed mounting frame without platform flange 50280646	● see Section 6.8				
12-Flex TWO M Receiver fixed mounting frame with platform flange 50282430		● see Section 6.8			● see Section 6.7
12-Flex TWO M Receiver fixed mounting frame without platform flange 50282429		● see Section 6.8			

6.3 Installation of connectors and slot covers

6.3.1 Installation of connectors and slot covers into the receiver

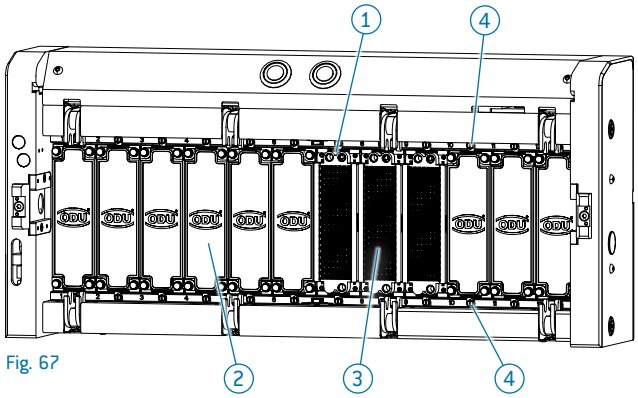

Fig. 67

- There are 12 slots available in the receiver.
- ODU-MAC® Blue-Line/Black-Line connectors (3) or ODU-MAC® slot covers (2) can be installed in these slots.
- The connectors (3) or slot covers (2) are fixed into the receiver with two eccentric screws (4) each.
- Connectors and slot covers are assembled in the same way as one another. The example shows the assembly of a connector.

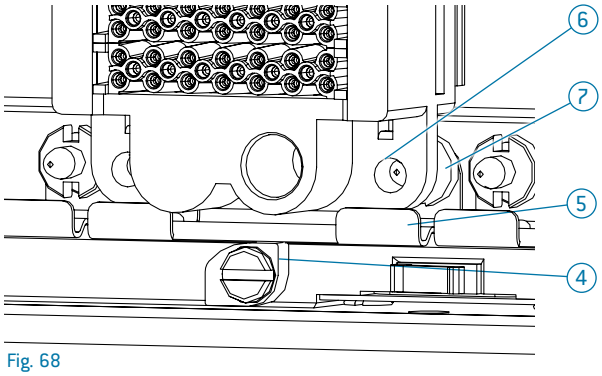

Fig. 68

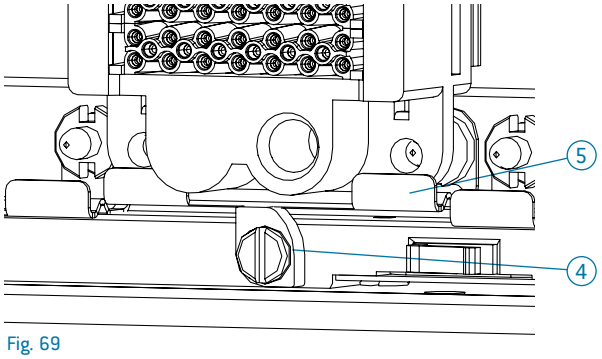

Fig. 69

Installation in the receiver

▶ To insert a connector, undo the top and bottom eccentric screws (4) at the relevant slot.
Do this by turning the eccentric screw counterclockwise by 90° (Fig. 68).

▶ Make sure the edge with the two guide bushings (1) is at the top.

▶ Insert the connector (3) into the slot. Do this by fitting the holes in the frame (6) onto the centering pins (7).

▶ Turn the top and bottom eccentric screws clockwise by 90° to close them.
The spring plate of the bracket (5) moves into the locking position when the eccentric screw (4) is turned. This fixes the connector into position at (4) and (5) (Fig. 69).

ATTENTION **Risk of injury from empty slots!**

▶ Always close off empty slots with slot covers.
For details of covers for slots in the receiver, see Section 5.6.
Make sure all connectors and slot covers have been inserted and locked correctly.

(1) Two guide bushings
(2) Installed slot cover
(3) Installed connector
(4) Eccentric screws
(5) Spring plate
(6) Hole in frame
(7) Centering pin

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6.3.2 Installation of connectors and slot covers into the adapter (ITA)

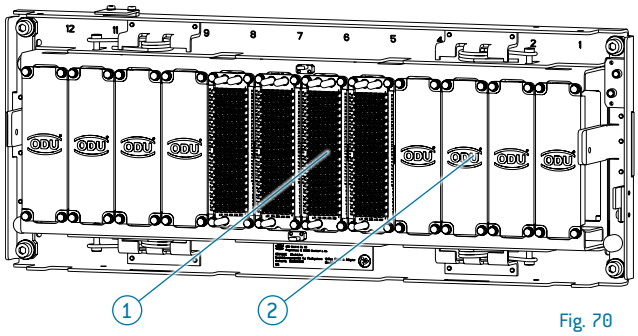

Fig. 70

- There are 12 slots available in the adapter (ITA).
- ODU-MAC® Blue-Line/Black-Line connectors (1) or ODU-MAC® slot covers (2) can be installed in these slots.
- The connectors or slot covers are screwed into the adapter (ITA) with four screws (3) each. The screws are included in the scope of delivery.
- Connectors and slot covers are assembled in the same way as one another. The example shows the assembly of a connector.

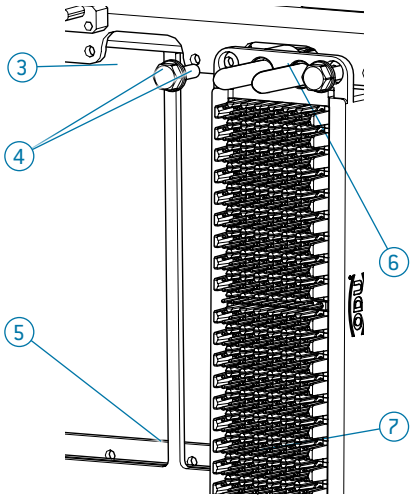

Fig. 71

Installation in the adapter (ITA)

▶ Make sure the guiding pins (4) (5) on the connector are facing the mating direction.

▶ Position the edge with the two guiding pins (4) at the top. Take note of the slot label at the top.

▶ Align the holes in the connector (7) with the threaded holes in the adapter (ITA) (6).

▶ Use the four screws (3) to secure the connector. Take note of the specified tightening torque.

▶ After assembly, the connector (1) must be mounted in a floating position (Fig. 72).

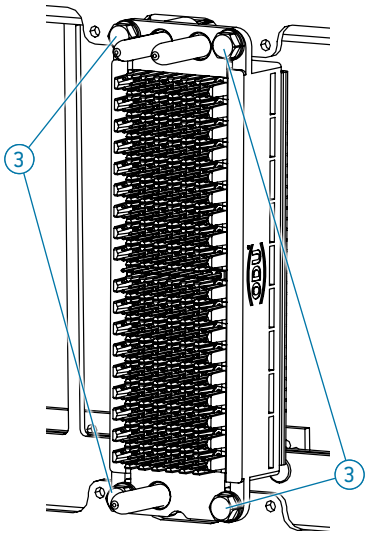

Fig. 72

NOTICE Take note of the specified tightening torques and numbers of screws!

Always tighten screws and nuts to the specified tightening torques.

For details of screws, nuts, and tightening torques, see Section 6.13 .

ATTENTION **Risk of injury from empty slots!**

▶ Always close off empty slots with slot covers.
For details of covers for slots in the adapter (ITA), see Section 5.6 .

(1) Installed connector

(2) Installed slot cover

(3) Screws (4x)

(4) Top two guiding pins

(5) Bottom guiding pin

(6) Threaded holes in adapter (ITA) (4x)

(7) Holes in connector (4x)

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6.4 Assembly of fixed mounting frame into the control cabinet

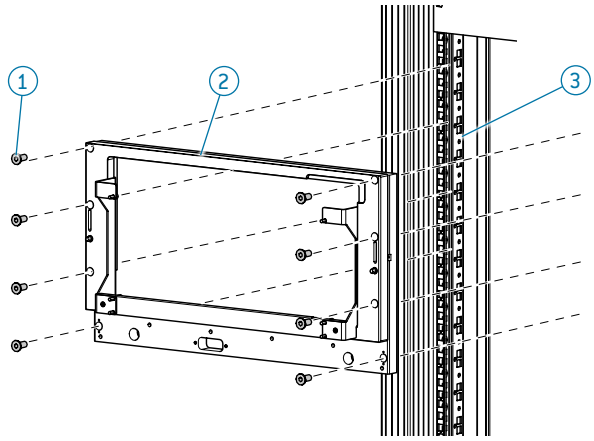

Fig. 73

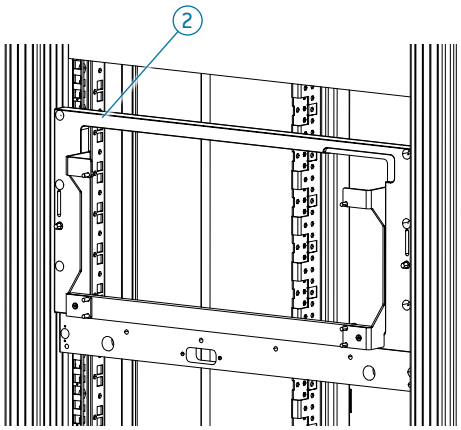

Fig. 74

- The fixed mounting frame (2) is screwed into the control cabinet using the hole pattern in the control cabinet's 19" mounting strips (3).
  The customer should select their own screws (1).
- All fixed mounting frames are assembled in the same way as one another.
- The example shows the assembly of the 12-Flex FOUR receiver fixed mounting frame with platform flange.

Assembling the fixed mounting frame into the control cabinet

▶ Fit the fixed mounting frame (2) onto the control cabinet's mounting strips (3) from the outside.

▶ Use screws to secure the fixed mounting frame to the control cabinet's mounting strips (3).

NOTICE

Take note of the details pertaining to size and number of screws!

The screws required to assemble the fixed mounting frame on the control cabinet are not included in the scope of delivery.

For details of the size and number of screws to use for each fixed mounting frame, see Section 6.13 .

(1) Screws

(2) Fixed mounting frame

(3) Mounting strip

NOTICE

Make sure that the required areas for emergency unlocking are easily accessible, otherwise it will not be possible to open the receiver in the event of a defect in the electromechanical locking system. For additional information please refer to Section 10.2 .

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6.5 Assembly of slide mount into the control cabinet

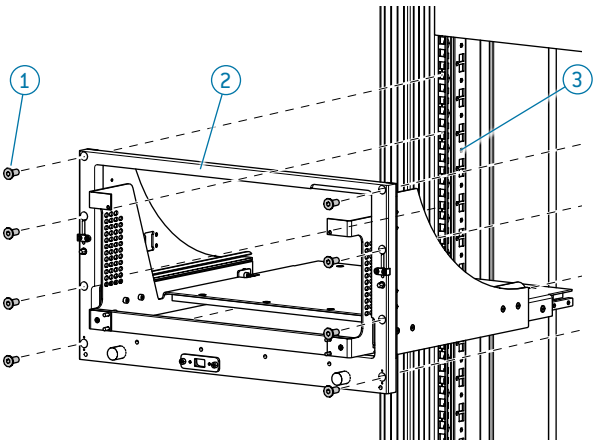

Fig. 75

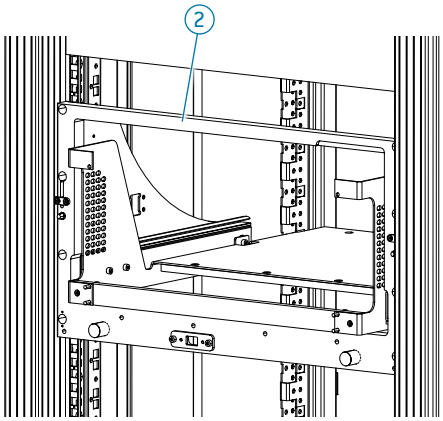

Fig. 76

- The fixed mounting frame (2) is already permanently attached to the slide mounts.
- The slide mount is screwed into the control cabinet using the hole pattern in the control cabinet's 19" mounting strips (3). The customer should select their own screws (1).
- The example shows the assembly of a 12-Flex FOUR receiver slide mount with platform flange.

Assembling the slide mount into the control cabinet

▶ Fit the fixed mounting frame of the slide mount (2) onto the control cabinet's mounting strips (3) from the outside.

▶ Use screws to secure the fixed mounting frame to the control cabinet's mounting strips (3).

NOTICE Take note of the details pertaining to size and number of screws!

The screws required to assemble the fixed mounting frame on the control cabinet are not included in the scope of delivery.

For details of the size and number of screws to use for each fixed mounting frame, see Section 6.13 .

(1) Screws

(2) Fixed mounting frame on the slide mount

(3) Mounting strip

NOTICE Make sure that the required areas for emergency unlocking are easily accessible, otherwise it will not be possible to open the receiver in the event of a defect in the electromechanical locking system. For additional information please refer to Section 10.2 .

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6.6 Assembly of keyboard tray onto the 15" platform

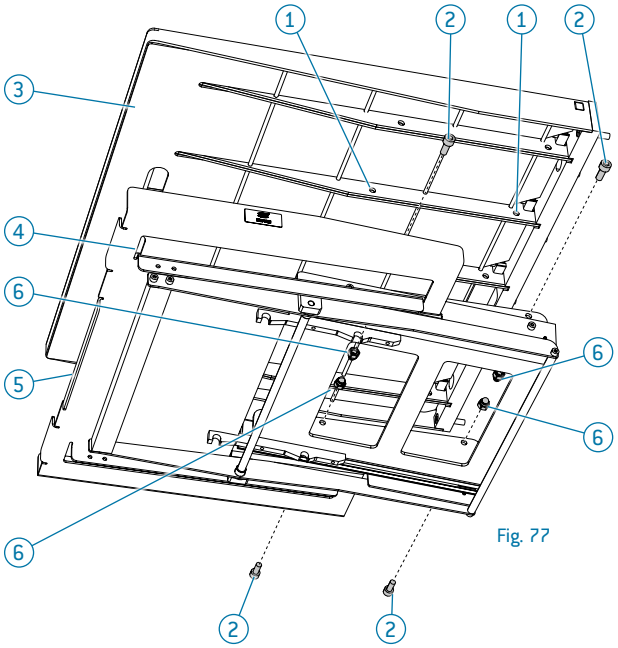

Fig. 77

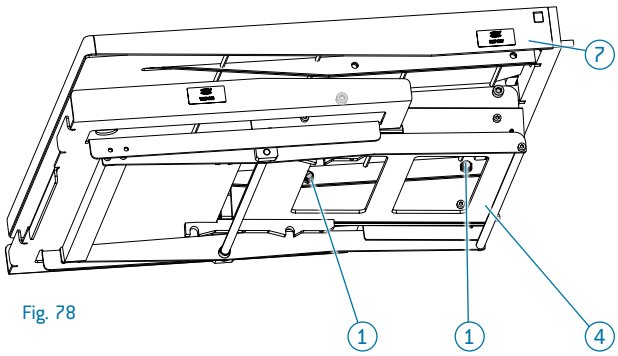

Fig. 78

- The keyboard tray (4) is secured to the underside of the 15" platform (7) at the four fixing points (1) using screws (2). The screws are included in the scope of delivery.

Assembly of the keyboard tray

- ▶ Place the keyboard tray (4) on the underside of the 15" platform.
- ▶ Align the keyboard tray (5) with the fixing points (1).
- ▶ Pull out the keyboard platform.
- ▶ Secure the keyboard tray at the four fixing points (1) using screws (2) and cap nuts (6). Take note of the specified tightening torque.
  First mount the two front screws (2) using the cap nuts (6) at the front fixing points (1).
  For details of tray operation, see Section 8.6 .

NOTICE Take note of the specified tightening torques and numbers of screws!

Always tighten screws and nuts to the specified tightening torques.

For details of screws, nuts, and tightening torques, see Section 6.13 .

(1) Fixing points (4x)

(2) Screws (4x)

(3) Front edge of platform

(4) Keyboard tray

(5) Lug of the keyboard tray

(6) Cap nuts (4x)

(7) 15" platform

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6.7 Assembly of 12-Flex TWO/FOUR 15" Platform onto the platform flange

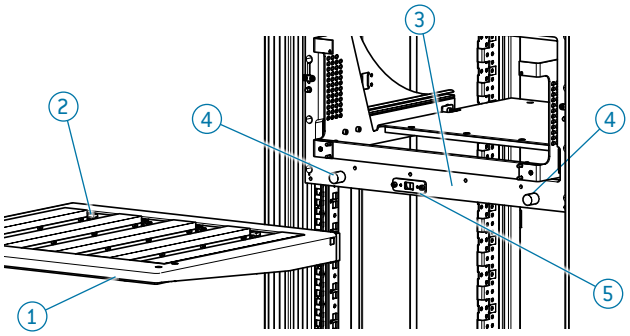

Fig. 79

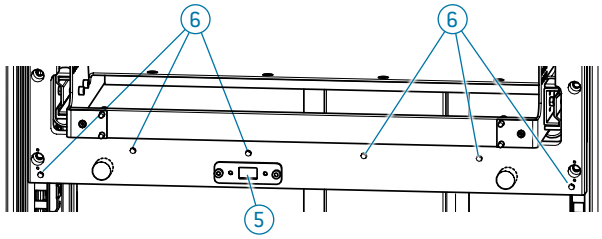

Fig. 80

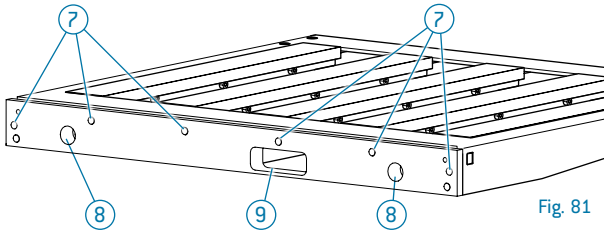

Fig. 81

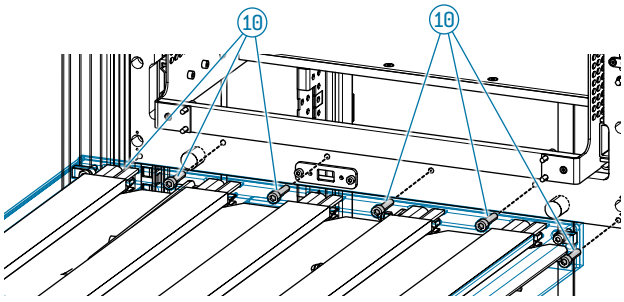

Fig. 82

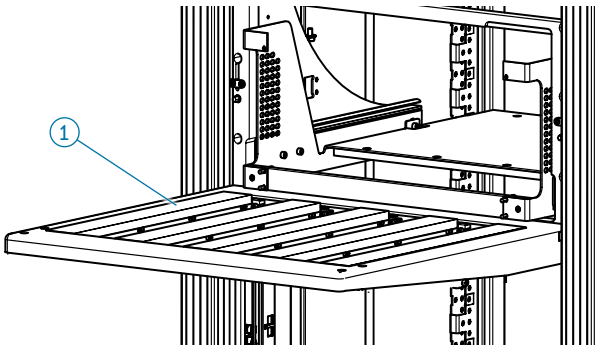

Fig. 83

- The 15" platform (1) is screwed onto the platform flange (3) using six screws (included in the scope of delivery).
- The example shows the assembly of the 15" platform onto the 12-Flex FOUR receiver slide mount with platform flange.
- All items with a platform flange are assembled in exactly the same way.

Assembling the 15" platform onto the platform flange

▶ Pull the Easy Clean plate (2) forward and out of the platform by the indentations on the underside.

▶ Align the cylindrical slots in the 15" platform (8) with the cylindrical pins on the platform flange (4).

▶ Push the 15" platform (1) on as far as the platform flange (3) . The 15" platform is aligned by the cylindrical pins (4) on the platform flange.

▶ Screw the 15" platform onto the platform flange at the designated fixing points (6) and (7). Take note of the specified tightening torque.

▶ Reinsert the Easy Clean plate.

NOTICE Take note of the specified tightening torques and numbers of screws!

Always tighten screws and nuts to the specified tightening torques.

For details of screws, nuts, and tightening torques, see Section 6.13 .

(1) 15" platform

(2) Easy Clean plate

(3) Platform flange

(4) Cylindrical pins on platform flange

(5) Cable feedthrough for keyboard

(6) Fixing points on platform flange

(7) Fixing points on 15" platform

(8) Cylindrical slots in 15" platform

(9) Cable feedthrough

(10) Screws (6x)

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6.8 Assembly of unequipped receiver onto the slide mount

ATTENTION **Risk of damage from excessive weight!**

▶ Do not pull out the slide mount assembled in the receiver when the adapter (ITA) is attached.

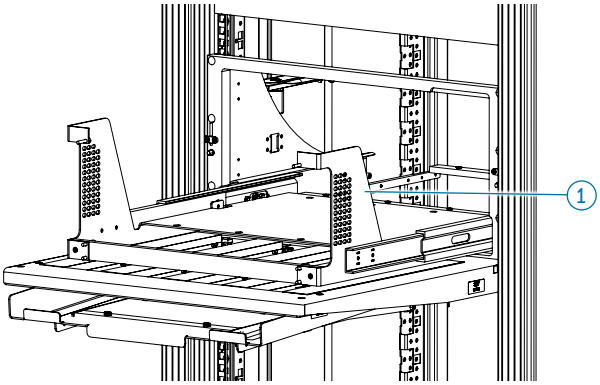

Fig. 84

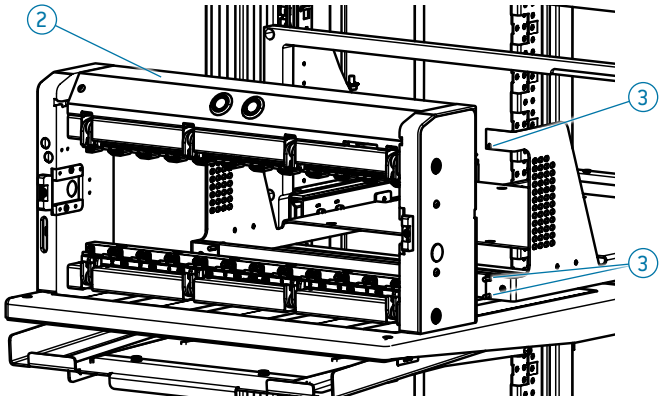

Fig. 85

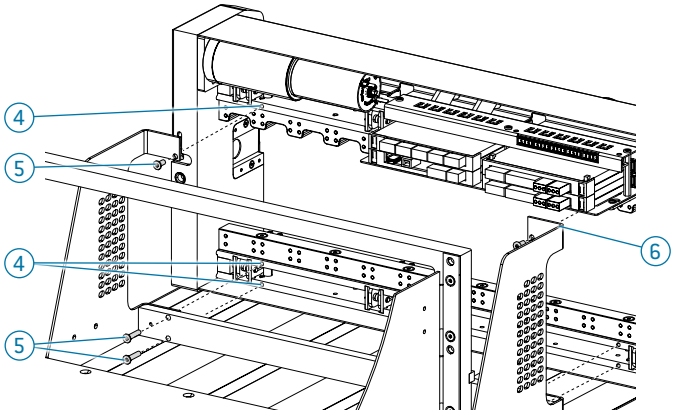

Fig. 86

- The receiver (2) is secured to the slide mount (1) using screws (included in the scope of delivery).
- All slide mounts are assembled in the same way as one another.
  The example shows the assembly of a 12-Flex FOUR A receiver onto the 12-Flex FOUR Receiver slide mount with platform flange.

Assembling the receiver onto the slide mount

▶ Pull out the slide mount (1).

▶ Guide the top left bracket (6) of the slide mount behind the controller (Fig. 86).

▶ Position the receiver (2) so its fixing points (4) align with the fixing points on the slide mount (3). Screw the slide mount onto the receiver fixing points.

▶ Lock the receiver to the slide mount, see Section 8.3 .

NOTICE Take note of the specified tightening torques and numbers of screws!

Always tighten screws and nuts to the specified tightening torques.

For details of screws, nuts, and tightening torques, see Section 6.13 .

(1) Slide mount pulled out

(2) Receiver

(3) Fixing points on the slide mount (6x)

(4) Fixing points on the receiver (6x)

(5) Screws

(6) Top left bracket

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6.9 Assembly of tabletop receiver onto the tabletop housing

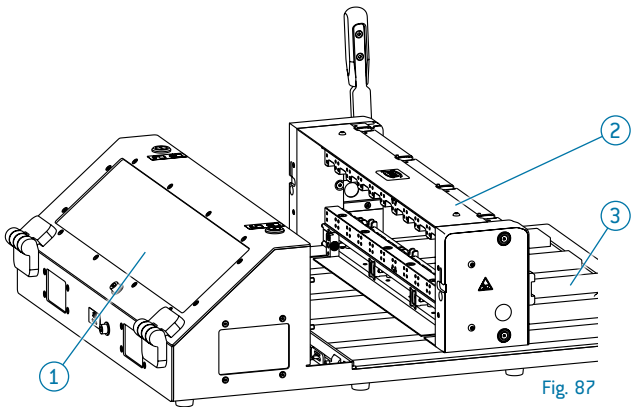

Fig. 87

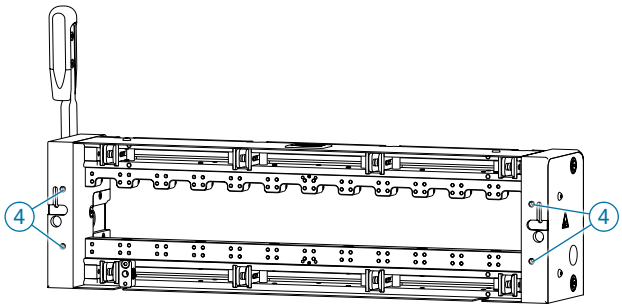

Fig. 88

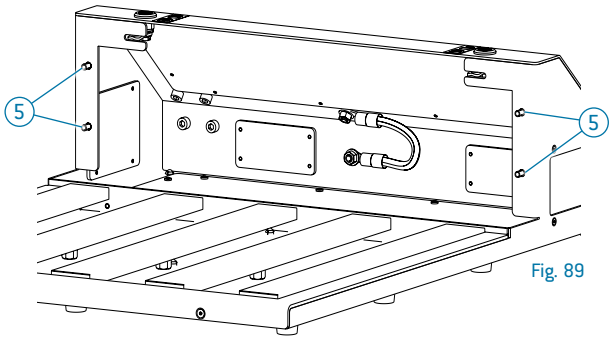

Fig. 89

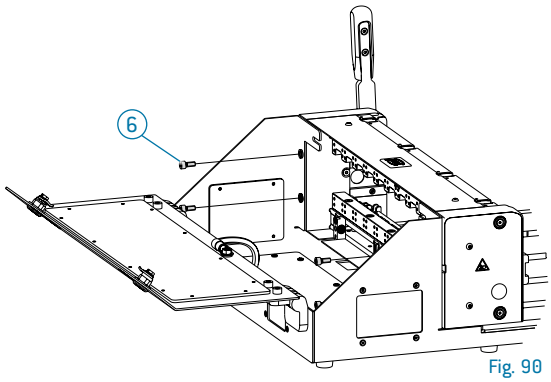

Fig. 90

- The tabletop receiver is secured to the tabletop housing (4) using screws and washers (6) (included in the scope of delivery).

Assembling the tabletop receiver onto the tabletop housing

- ▶ Place the tabletop receiver (2) on the platform of the tabletop housing (3).
- ▶ Position the tabletop receiver so its fixing points (5) align with the fixing points of the tabletop housing (5).
- ▶ Open the service flap (1).
- ▶ Assemble the tabletop receiver (2) onto the tabletop housing (3). Do this by screwing the tabletop receiver onto the tabletop housing fixing points (5).
- ▶ Close the service flap (1).

NOTICE Take note of the specified tightening torques and numbers of screws!

Always tighten screws and nuts to the specified tightening torques.

For details of screws, nuts, and tightening torques, see Section 6.13 .

(1) Service flap

(2) Tabletop receiver

(3) Tabletop platform

(4) Fixing points on the tabletop housing

(5) Fixing points on the tabletop receiver

(6) Screws with washers (4x)

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6.10 Repositioning of hand lever on manual receivers

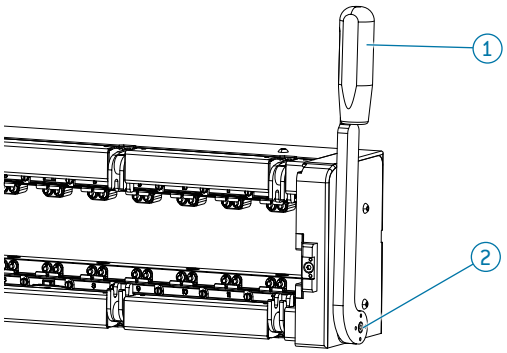

Fig. 91

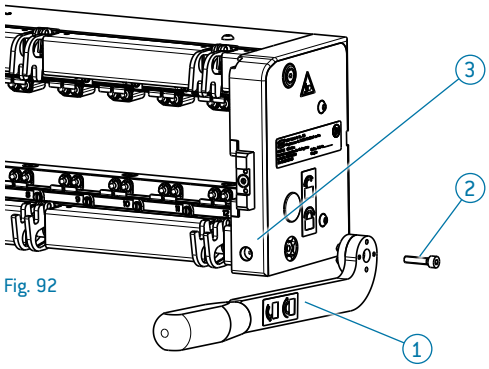

Fig. 92

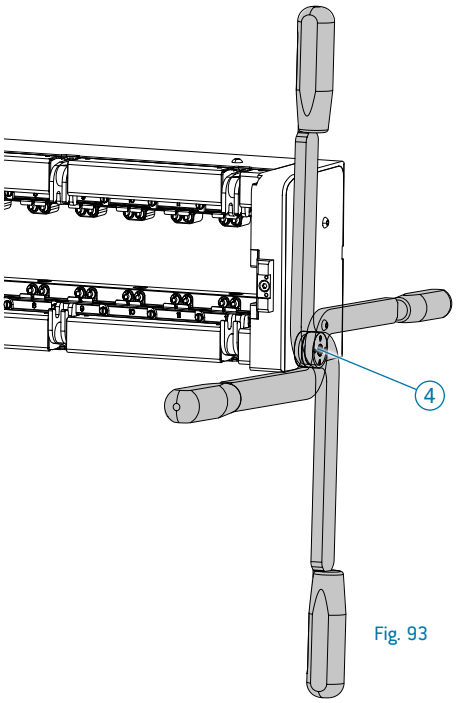

Fig. 93

- The position of the hand lever (4) can be changed if necessary on manual receivers.

Repositioning the hand lever

▶ Remove the screw (2) from the hand lever (1).

▶ Take the hand lever (1) off the mount (3).

▶ Turn the hand lever (1) into the required position.

▶ Reattach the turned hand lever (1) onto the mount (3).

▶ Secure the hand lever with the screw (2).

NOTICE Take note of the specified tightening torques and numbers of screws!

Always tighten screws and nuts to the specified tightening torques.

For details of screws, nuts, and tightening torques, see Section 6.13.

(1) Hand lever

(2) Screw

(3) Mount

(4) Positions of the hand lever, each turned by 90°

NO_D000116491 / Rev. c

6.10.3 Installing the hand lever extension

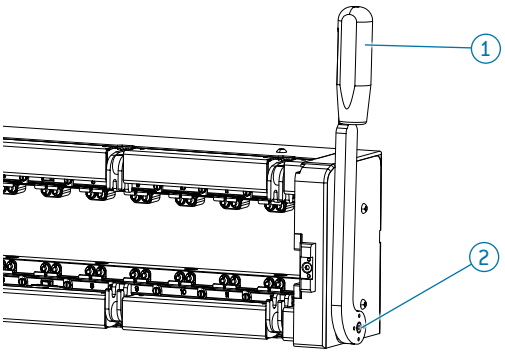

Fig. 94

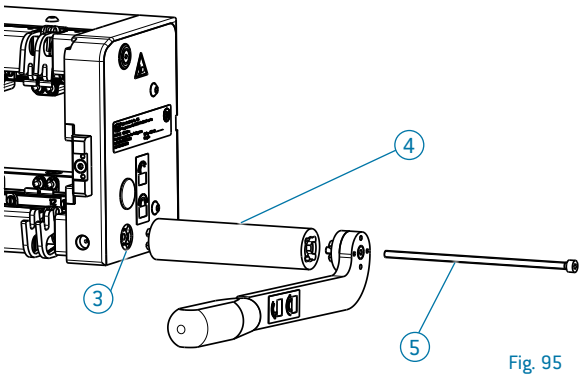

Fig. 95

- A hand lever extension can be used with manually operated receivers if required (4).

Installing the hand lever extension

- ▶ Remove the screw M4 x 18 (2) from the hand lever (1).
- ▶ Take the hand lever (1) off the mount (3).
- ▶ Insert the hand lever (1) with the additional hand lever extension (4) into the mount (3).
- ▶ Secure the hand lever (1) with the screw M4 x 120 (5).

HINWEIS Observe the specified tightening torques and number of screws!

Always tighten screws and nuts to the specified tightening torques.

For details of screws, nuts, and tightening torques, see Section 6.13 .

(1) Hand lever

(2) M4 x 18 screw

(3) Mount

(4) Hand lever extension

(5) M4 x 120 screw

6.11 Assembly of 200 mm platform extension onto the slide mount

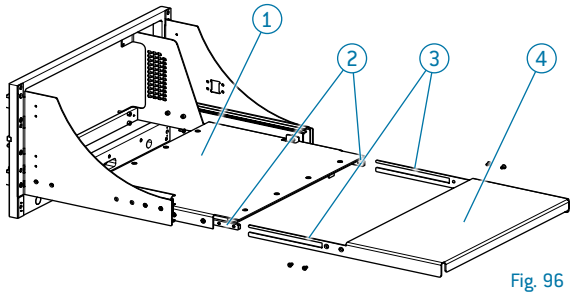

Fig. 96

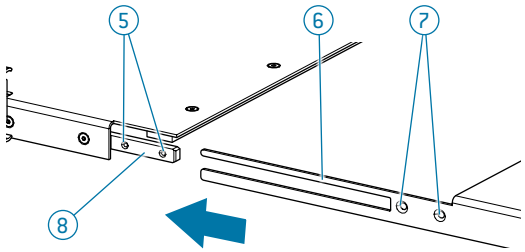

Fig. 97

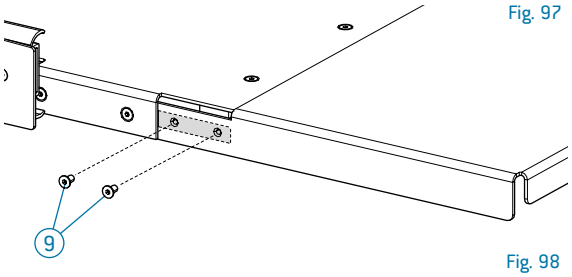

Fig. 98

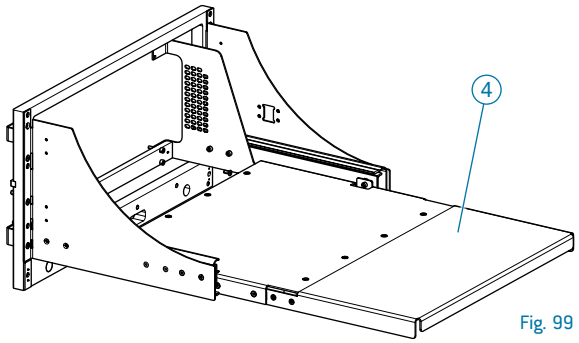

Fig. 99

- The platform extension (4) is assembled onto all slide mounts in the same way. The example shows the assembly of the 200 mm platform extension onto the 12-Flex FOUR receiver slide mount with platform flange.

Assembling the extension plate

- ▶ Push the slide mount (1) in fully.
- ▶ Position the extension platform (4) so the guide slots (3) align with the holders on the slide mount (2).
- ▶ Push the guides of the platform extension (6) onto the holders (8) of the slide mount.
- ▶ Make sure the platform extension does not tilt as you are pushing it in.
- ▶ Position the platform extension so the holes for the fixing screws (7) sit over the threaded holes (5) on both sides.
- ▶ Secure the platform extension (4) with the screws (9). Take note of the specified tightening torque.

NOTICE Take note of the specified tightening torques and numbers of screws!

Always tighten screws and nuts to the specified tightening torques.

For details of screws, nuts, and tightening torques, see Section 6.13.

(1) Slide mount pushed in

(2) Left and right holders

(3) Left and right guide slots

(4) Platform extension

(5) Threaded holes

(6) Guides of the platform extension

(7) Holes for fixing screws

(8) Holders of the slide mount

(9) Screws (2x2)

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6.12 Assembly of adapter housing provided by the customer with platform variant

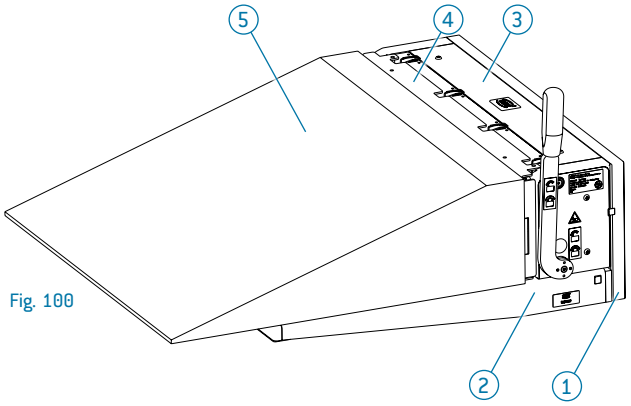


Fig. 100

- If using the 12-Flex TWO/FOUR Adapter (4) with 15" platform (2) or tabletop housing including platform, the adapter housing provided by the customer (5) must be fixed in a floating position.
- A platform-variant adapter assembly kit (6) and (7) is included in the scope of delivery for the Flex TWO/FOUR Adapter (4) as standard for this purpose.

Assembling the adapter on the adapter housing provided by the customer

▶ Position the adapter housing (5) so the fixing points of the adapter (4) align with the adapter housing (5).

▶ Insert the guide bushings (6) into the adapter.

▶ Insert the screws (7) through the guide bushings into the adapter housing.

▶ Secure the adapter housing using a nut or by tightening the screw directly, depending on the mounting variant.

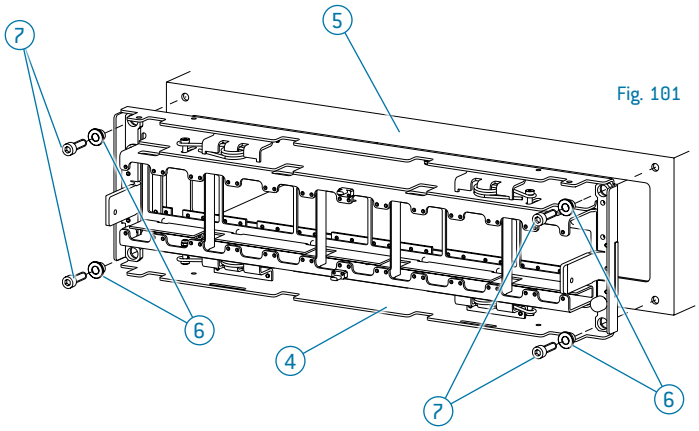


Fig. 101

NOTICE Take note of the specified tightening torques and numbers of screws!

Always tighten screws and nuts to the specified tightening torques.

For details of screws, nuts, and tightening torques, see Section 6.13 .

(1) Fixed mounting frame

(2) 15" platform

(3) Receiver

(4) Adapter

(5) Adapter housing

(6) Guide bushing

(7) Screw

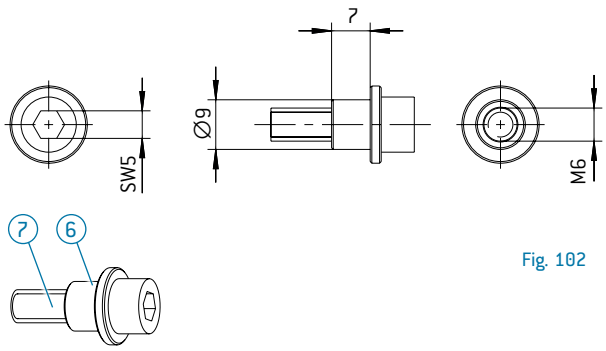
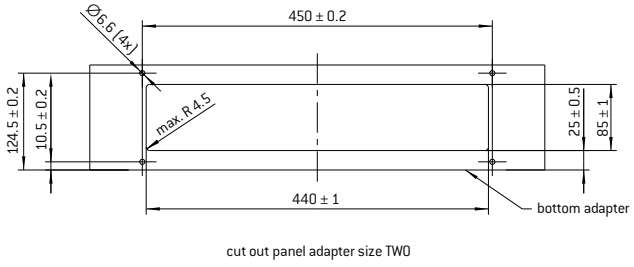
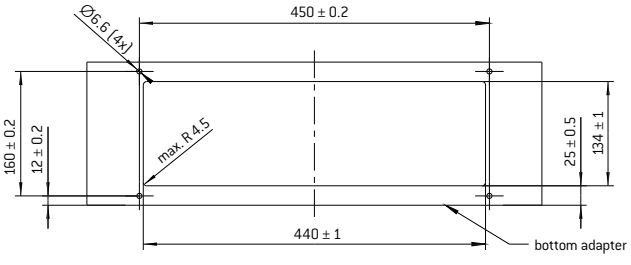


Fig. 102



cut out panel adapter size TWO



cut out panel adapter size FOUR

Fig. 103

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6.12.1 Assembly of adapter housing provided by the customer with platform variant

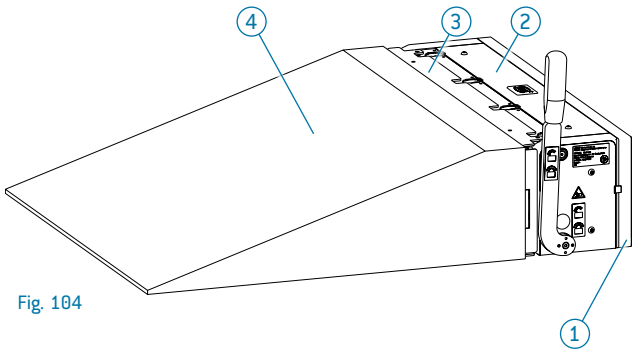


Fig. 104

- If using the hanging variant of the 12-Flex TWO/FOUR Adapter (3) (without 15" platform or without tabletop housing including platform), the manufacturer recommends fixing the adapter housing provided by the customer in a rigid position.
- A hanging-variant adapter assembly kit (5) and (6) must be ordered separately for this purpose.

Assembling the adapter on the adapter housing provided by the customer

▶ Position the adapter housing (4) so the fixing points of the adapter (3) align with the adapter housing (4).

▶ Insert the guide bushings (5) into the adapter.

▶ Insert the screws (6) through the guide bushings into the adapter housing.

▶ Secure the adapter housing using a nut or by tightening the screw directly, depending on the mounting variant.

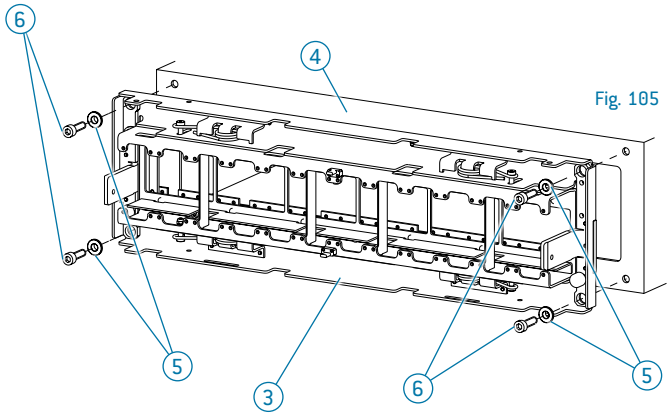


Fig. 105

NOTICE Take note of the specified tightening torques and numbers of screws!

Always tighten screws and nuts to the specified tightening torques.

For details of screws, nuts, and tightening torques, see Section 6.13 .

(1) Fixed mounting frame

(2) Receiver

(3) Adapter

(4) Adapter housing

(5) Guide bushing

(6) Screw

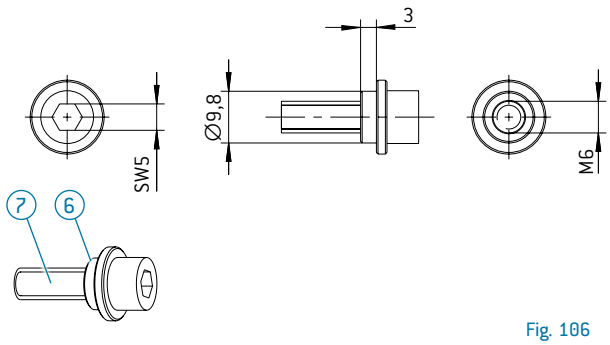
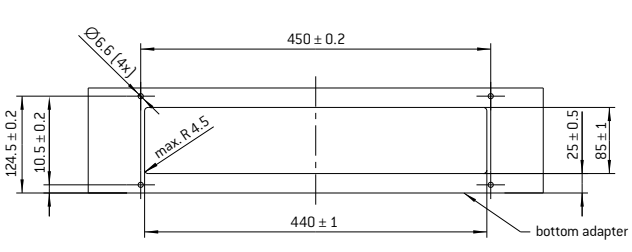
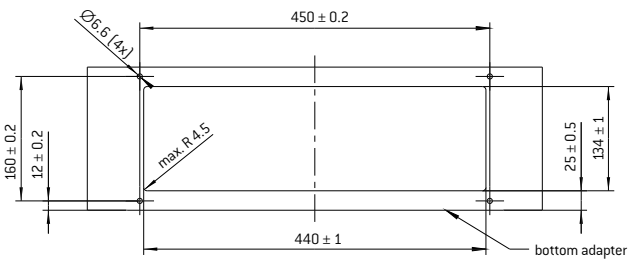


Fig. 106



cut out panel adapter size TWO



cut out panel adapter size FOUR

Fig. 107

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6.12.2 Assembly of alignment system onto adapter housing provided by the customer

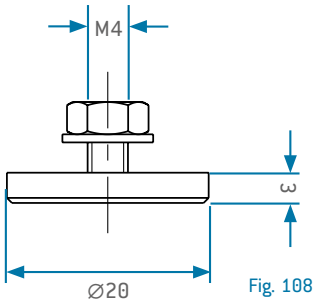

Fig. 108

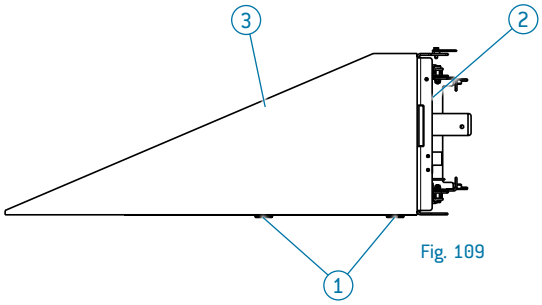

Fig. 109

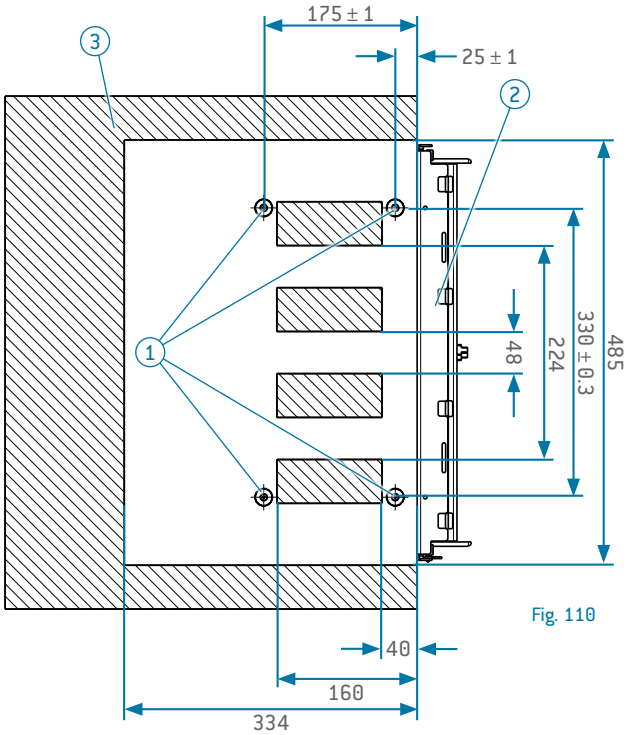

Fig. 110

All dimensions are in mm.

- If using the 15" platform or the tabletop housing including platform, the manufacturer recommends assembling an alignment system.
- The alignment system must be assembled on the underside of the adapter (ITA) housing provided by the customer, as per the drawings.
  The customer must create the necessary holes and provide the mounting materials.
- The example (see Fig. 109) shows the assembled adapter alignment system for the platform. Item no. 50282839.

▶ Assemble the alignment system as per the drawings on the left.

▶ You can add more adapter feet in the shaded area.
Maximum height of adapter feet: 15 mm

(1) Adapter alignment system for platform

(2) Adapter (ITA)

(3) Adapter (ITA) housing provided by the customer

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6.12.3 Assembly of strain-relief plate onto the receiver

- Strain must be relieved for outgoing cables leaving the ODU-MAC Blue-Line® frame. This strain-relief plate, which is available as an optional extra, can be used for this purpose.
- The strain-relief plate (1) is screwed on at the fixing points for strain relief (2) (3).
- The strain-relief plate is assembled in exactly the same way for all 12-Flex receivers.
- The example shows the assembly of a strain-relief plate onto a 12-Flex FOUR A Receiver.

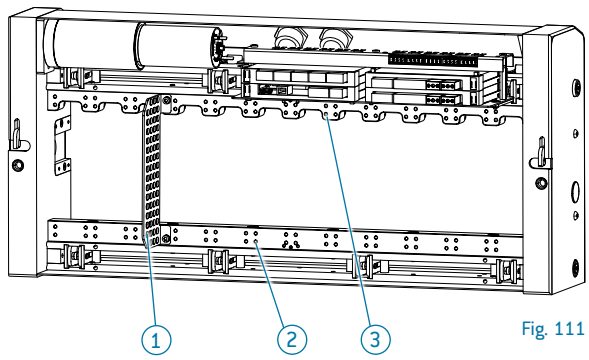


Fig. 111

Assembling the strain-relief plate

▶ Screw the strain-relief plate (1) on at the fixing points for strain relief (2) (3).

NOTICE Two fixing points are available per slot for the strain-relief plate or the protective conductor.

NOTICE Take note of the specified tightening torques and numbers of screws!

For details of screws, nuts, and tightening torques, see Section 6.13 .

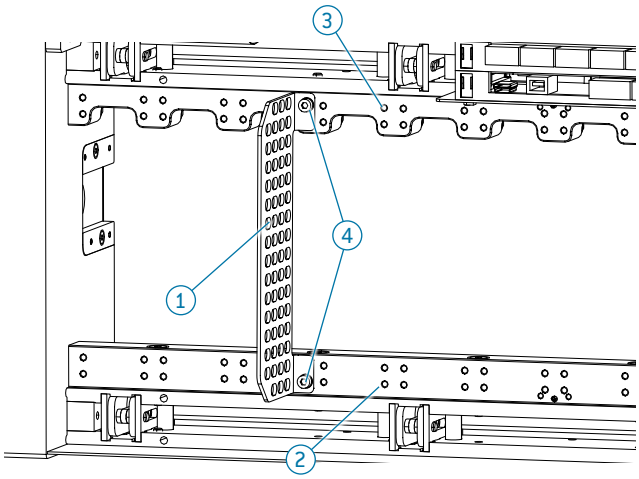


Fig. 112

(1) Strain-relief plate

(2) Bottom strain-relief plate/protective-conductor fixing points

(3) Top strain-relief plate/protective-conductor fixing points

(4) Screws

NO_D000116491/Rev. c

6.12.4 Assembly of strain-relief plate onto the adapter (ITA)

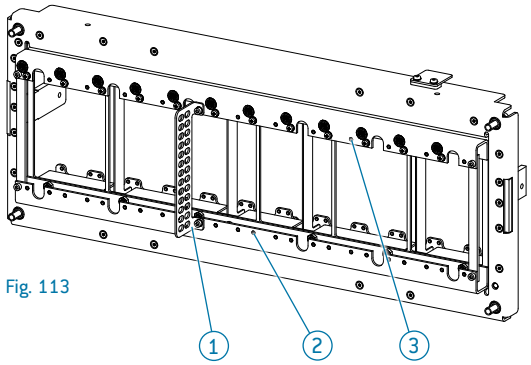


Fig. 113

- Strain must be relieved for outgoing cables leaving the ODU-MAC® Blue-Line frame. This strain-relief plate, which is available as an optional extra, can be used for this purpose.
- The strain-relief plate (1) is screwed on at the fixing points for strain relief (2) (3).
- The strain-relief plate is assembled in exactly the same way for all 12-Flex Adapters.
- The example shows the assembly of a strain-relief plate onto a 12-Flex FOUR A Adapter.
- During the unlocking and locking process, the adapter frame is moved by approx. 16 mm. All cables must absorb this difference by means of a cable loop (6). The cable packages must be fastened to the strain relief (1) with suitable cable ties (5). Make sure that the cable packages contain a reasonable number of cables.

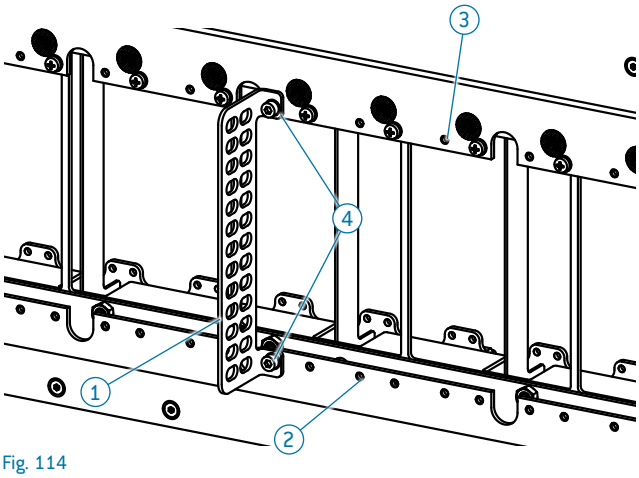


Fig. 114

Assembling the strain-relief plate

▶ Screw the strain-relief plate (1) on at the fixing points for strain relief (2) (3).

NOTICE Two fixing points are available per slot for the strain-relief plate or the protective conductor.

NOTICE Take note of the specified tightening torques and numbers of screws!

For details of screws, nuts, and tightening torques, see Section 6.13.

Tightened condition

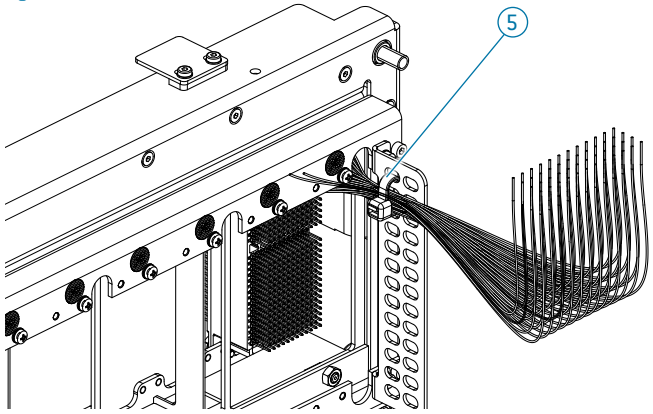


Fig. 115

(1) Strain-relief plate

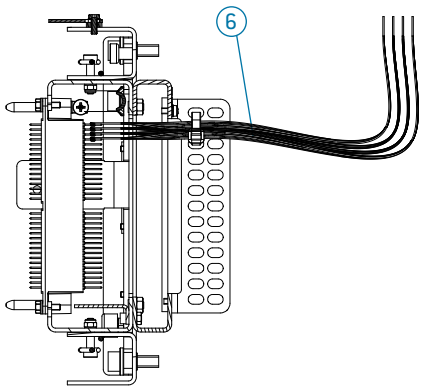
(2) Bottom strain-relief plate/protective-conductor fixing points

(3) Top strain-relief plate/protective-conductor fixing points

(4) Screws

(5) Cable tie to strain relief

(6) Cable loop



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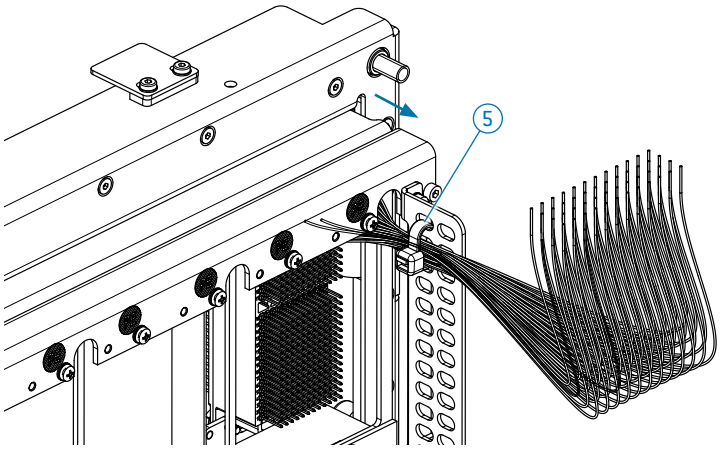
Reliefed state



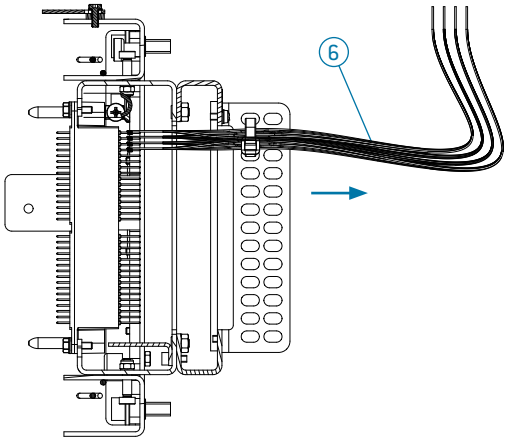


Fig. 116

6.12.5 Assembling the enclosure on the adapter (ITA)

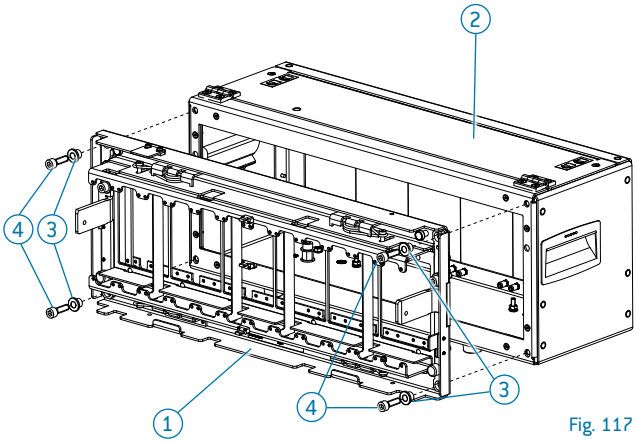


Fig. 117

- If you are using the 12-Flex FOUR Adapter (1), it can be mounted directly on the 12-Flex FOUR Enclosure (2).

Mount the adapter on the enclosure

▶ Mount the adapter as described in Section 6.12.

NOTICE Take note of the specified tightening torques and numbers of screws!

Always tighten screws and nuts to the specified tightening torques. For details of screws, nuts, and tightening torques, see Section 6.13 .

(1) 12-Flex FOUR Adapter

(2) 12-Flex FOUR Enclosure

(3) Guide bushing

(4) Screws

6.12.6 Assembling the enclosure on the adapter (ITA)

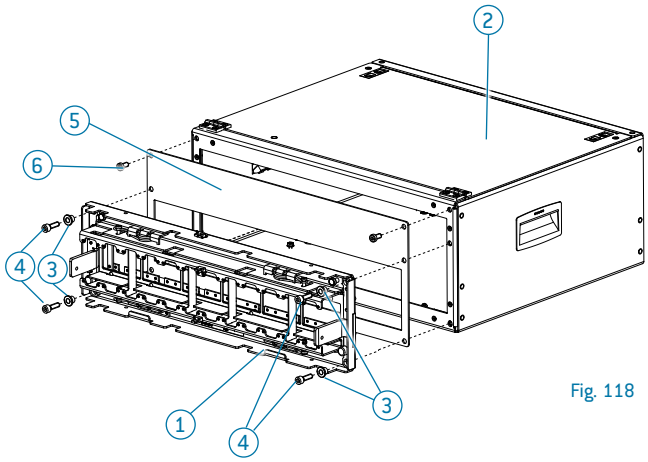


Fig. 118

- If you are using the 12-Flex TWO Adapter (1), it cannot be mounted directly on the 12-Flex FOUR Enclosure (2).
- In this case, the 12-Flex FOUR Enclosure adapter plate (5) is required.

Mount the adapter on the enclosure

▶ Position the 12-Flex FOUR Enclosure adapter plate (5) so that the mounting points on the plate are aligned with those on the enclosure (2).

▶ Secure the adapter plate (5) with the screws (6).

▶ The adapter can then be mounted as described in Section 6.12.

NOTICE Take note of the specified tightening torques and numbers of screws!

Always tighten screws and nuts to the specified tightening torques. For details of screws, nuts, and tightening torques, see Section 6.13 .

(1) 12-Flex FOUR Adapter

(2) 12-Flex FOUR Enclosure

(3) Guide bushing

(4) Screws

(5) 12-Flex FOUR Enclosure adapter plate

(6) Screw

6.12.7 Assembling the flange plates on the enclosure

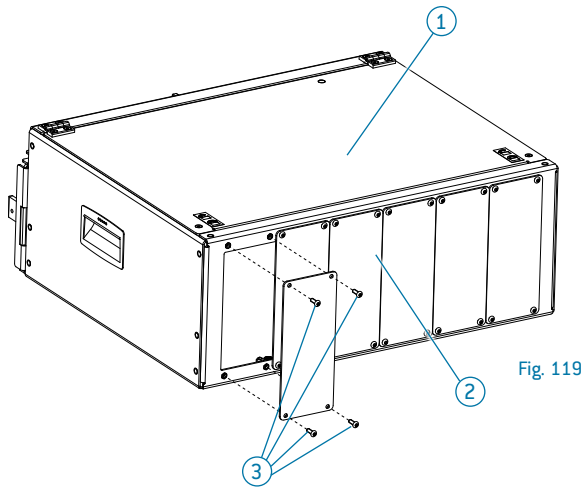


Fig. 119

- Up to six flange plates (2) ican be mounted on the rear wall of the Enclosure (1).
- A selection of different plates can be found in Section 5.5.

Mount the flange plate on the enclosure

▶ Position the flange plate (2) so that the mounting points on the plate are aligned with those on the enclosure (1).

▶ Secure the flange plate (2) with the screws (3).

NOTICE Take note of the specified tightening torques and numbers of screws!

Always tighten screws and nuts to the specified tightening torques. For details of screws, nuts, and tightening torques, see Section 6.13 .

(1) Enclosure

(2) Flange plate

(3) Screws

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6.13 Table of mounting specifications for components

⚠ WARNING **Danger from improper mounting of components!**

Improper mounting of components can lead to accidents and cause injury.

- Take note of the specified tightening torque when mounting the components.
- Use screws and nuts according to the specifications in these instructions.
- Use the specified number of screws and nuts.

Component	Mounting on	Tightening torque [Nm]	Prescribed screws
Fixed mounting frames			
12-Flex FOUR A Receiver fixed mounting frame with platform flange 50282431	For mounting the receiver on the fixed mounting frame	2.2 ± 0.2	4 x cylinder screw M4x20 2 x cylinder screw M4x10 Hexagon wrench 3 mm
	Mounting on the control cabinet		8 x M6 cylinder screw Screws not included in the scope of delivery
12-Flex FOUR A Receiver fixed mounting frame without platform flange 50280646	For mounting the receiver on the fixed mounting frame	2.2 ± 0.2	4 x cylinder screw M4x20 2 x cylinder screw M4x10 Hexagon wrench 3 mm
	Mounting on the control cabinet		6 x M6 cylinder screw Screws not included in the scope of delivery
12-Flex TWO M Receiver fixed mounting frame with platform flange 50282430	For mounting the receiver on the fixed mounting frame	2.2 ± 0.2	4 x cylinder screw M4x20 2 x cylinder screw M4x30 Hexagon wrench 3 mm
	Mounting on the control cabinet		6 x M6 cylinder screw Screws not included in the scope of delivery
12-Flex TWO M Receiver fixed mounting frame without platform flange 50282429	For mounting the receiver on the fixed mounting frame	2.2 ± 0.2	4 x cylinder screw M4x20 2 x cylinder screw M4x30 Hexagon wrench 3 mm
	Mounting on the control cabinet		4 x M6 cylinder screw Screws not included in the scope of delivery
Slide mounts			
12-Flex FOUR A Receiver slide mount with platform flange 50274959	For mounting the receiver on the slide mount	2.2 ± 0.2	4 x cylinder screw M4x20 2 x cylinder screw M4x10 Hexagon wrench 3 mm
	Mounting on the control cabinet		8 x M6 cylinder screw Screws not included in the scope of delivery
12-Flex FOUR A Receiver slide mount without platform flange 50274960	For mounting the receiver on the slide mount	2.2 ± 0.2	4 x cylinder screw M4x20 2 x cylinder screw M4x10 Hexagon wrench 3 mm
	Mounting on the control cabinet		6 x M6 cylinder screw Screws not included in the scope of delivery
12-Flex TWO M Receiver slide mount with platform flange 50274961	For mounting the receiver on the slide mount	2.2 ± 0.2	4 x cylinder screw M4x20 2 x cylinder screw M4x30 Hexagon wrench 3 mm
	Mounting on the control cabinet		6 x M6 cylinder screw Screws not included in the scope of delivery

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Component	Mounting on	Tightening torque [Nm]	Prescribed screws
12-Flex TWO MReceiver slide mount without platform flange 50274962	For mounting the receiver on the slide mount	2.2 ± 0.2	4 x cylinder screw M4x20 2 x cylinder screw M4x30 Hexagon wrench 3 mm
	Mounting on the control cabinet		4 x M6 cylinder screw Screws not included in the scope of delivery
Tabletop housing			
12-Flex TWO M Tabletop-cover 50274966	For mounting the receiver on the tabletop housing	4.0 ± 0.2	4 x screw M5x10 Hexagon wrench 4 mm
	Mounting of sealing caps for cable outlets	0.9 ± 0.1	M3x5 countersunk screw Hexagon wrench 2 mm
Platform extension			
200 mm platform extension for slide mount 50274963	For mounting on the slide mount	2.2 ± 0.2	4 x countersunk screw M4x8 Hexagon wrench 2.5 mm
15" platform			
12-Flex TWO/FOUR 15" Platform 50274967	For mounting on the platform flange of the fixed mounting frame	8.0 ± 0.4	6 x cylinder screw M6x25 Hexagon wrench 5 mm
Keyboard tray for 15" platform			
Keyboard tray 50274968	For mounting on the 15" platform	8.0 ± 0.4	4 x cylinder screw M6x16 Hexagon wrench 5 mm 4 x cap nut Width across flats 10 mm
Strain-relief plates			
Flex FOUR Receiver strain-relief plate 50274972	For mounting on the receiver	0.9 ± 0.1	2 x cylinder screw M3x6 Hexagon wrench 2.5 mm
Flex TWO Receiver strain-relief plate 50274971	For mounting on the receiver	0.9 ± 0.1	2 x cylinder screw M3x6 Hexagon wrench 2.5 mm
Flex FOUR Adapter strain-relief plate 50281436	For mounting on the adapter (ITA)	0.9 ± 0.1	2 x cylinder screw M3x6 Hexagon wrench 2.5 mm
Flex TWO Adapter strain-relief plate 50281434	For mounting on the adapter (ITA)	0.9 ± 0.1	2 x cylinder screw M3x6 Hexagon wrench 2.5 mm
Monoblock and slot cover			
Monoblock on adapter (ITA)	For mounting on the adapter (ITA)	0.6 ± 0.1	4 x M3 Width across flats 5.5 mm
Adapter (ITA) slot cover	For mounting on the adapter (ITA)	0.6 ± 0.1	4 x M3 Width across flats 5.5 mm
ODU-MAC® Blue-Line frame or ODU-MAC® Black-Line frame			
Pin frame on adapter (ITA)	For mounting on the adapter (ITA)	0.6 ± 0.1	4 x M3 Width across flats 5.5 mm
Controller			
Control board 50270919	For mounting on the controller holder	0.6 ± 0.1	3 x fillister head screw M3x6 Hexagon wrench 2 mm

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Component	Mounting on	Tightening torque [Nm]	Prescribed screws
Centering blades			
Centering blade kit for Flex FOUR A Adapter 50281249	For mounting on the adapter (ITA)	1.2 ± 0.1	10 x countersunk screw M3x8 Hexagon wrench 2 mm
Centering blade kit for Flex TWO M adapter 50281247	For mounting on the adapter (ITA)	1.2 ± 0.1	6 x countersunk screw M3x8 Hexagon wrench 2 mm
Resistance coding			
Resistance-coding block for adapter (ITA) 50274984	For mounting on the adapter (ITA)	0.6 ± 0.1	2 x countersunk screw M3x14 Hexagon wrench 2 mm
Adapter housing			
Adapter housing provided by the customer	For mounting on the adapter (ITA)	Max. 8.0 ± 4.0	4 x cylinder screw M6x20 Hexagon wrench 5 mm
Pre-centering piece			
Pre-centering piece kit for receiver	For mounting on the receiver	2.2 ± 0.2	2 x cylinder head screw M4x8 Hexagon wrench 3 mm
Motor unit			
Motor unit for receiver 50274973	For mounting on the receiver	5.7 ± 0.3	2 x screw M5x12 Hexagon wrench 4 mm
Alignment system			
Adapter alignment system 50282839	For mounting on the adapter housing provided by the customer	2.2 ± 0.2	4 x M4x10 hexagon wrench 2.5 mm 4 x nut M4 width across flats 7 mm
Hand lever			
Hand lever for Flex TWO Receiver	For mounting on the receiver	2.2 ± 0.2	1 x cylinder head screw M4x18 Hexagon wrench 3 mm
Receiver hand lever extension 100 mm	For mounting on the receiver	2.2 ± 0.2	1 x cylinder head screw M4x120 Hexagon wrench 3 mm
Enclosure			
12-Flex FOUR Enclosure flange plate 50303236	Fastening the flange plate to the enclosure	1.2 ± 0.15	8x fillister head screw M4x12 Hexagon wrench 2.5 mm
FOUR Enclosure flange plate, double (without cut-out) 50300029	Fastening the flange plate to the enclosure	1.2 ± 0.15	8x fillister head screw M4x12 Hexagon wrench 2.5 mm
FOUR Enclosure flange plate (without cut-out) 50300025	Fastening the flange plate to the enclosure	1.2 ± 0.15	8x fillister head screw M4x12 Hexagon wrench 2.5 mm
FOUR Enclosure flange plate for bulkhead housings 50300019	Fastening the flange plate to the enclosure	1.2 ± 0.15	8x fillister head screw M4x12 Hexagon wrench 2.5mm
FOUR Enclosure flange plate for ODU-MAC® Rapid 50300021	Fastening the flange plate to the enclosure	1.2 ± 0.15	8x fillister head screw M4x12 Hexagon wrench 2.5 mm
FOUR Enclosure flange plate for cable feedthroughs 50300023	Fastening the flange plate to the enclosure	1.2 ± 0.15	8x fillister head screw M4x12 Hexagon wrench 2.5 mm

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Component	Mounting on	Tightening torque [Nm]	Prescribed screws
FOUR Enclosure flange plate 8x D-SUB 15-pin 50300027	Fastening the flange plate to the enclosure	1.2 ± 0.15	4x fillister head screw M4x12 Hexagon wrench 2.5 mm
Screw plug for service flap 50299705 50299706	To close the service flap	1.2 ± 0.15	2x countersunk screw M4x10 IHexagon wrench 2.5 mm
12-Flex FOUR Enclosure adapter plate for TWO M Adapter 50300030	Fastening the adapter plate to the enclosure	8.0 ±0.4	2x cylinder screw M6x12 Hexagon wrench 4 mm
12-Flex FOUR A Adapter 50274976 50274977	Fastening the adapter to the housing	8.0 ±0.4	2x cylinder screw M6x12 Hexagon wrench 4 mm
12-Flex TWO M Adapter 50274980 50274981	Fastening the adapter to the housing	8.0 ±0.4	2x cylinder screw M6x12 Hexagon wrench 4 mm

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6.14 Table of mounting specifications for protective-conductor terminals

Component	Mounting on	Tightening torque [Nm]	Prescribed screws
Tightening torques for structural parts of the protective connection			
12-Flex FOUR A Receiver	Slide mount/fixed mounting frame	2.2 ± 0.2	4 x cylinder screw M4x20 2 x cylinder screw M4x10 Hexagon wrench 3 mm
12-Flex TWO M Receiver	Slide mount/fixed mounting frame	2.2 ± 0.2	4 x cylinder screw M4x20 2 x cylinder screw M4x30 Hexagon wrench 3 mm

Component	Mounting on	Tightening torque [Nm]	Prescribed screws
Protective-conductor terminals			
12-Flex FOUR A Receiver	Fixing point for protective conductor	1.2 ± 0.1	Cylinder screw M4 (not included in the scope of delivery) Hexagon wrench 3 mm
12-Flex TWO M Receiver	Fixing point for protective conductor	1.2 ± 0.1	Cylinder screw M4 (not included in the scope of delivery) Hexagon wrench 3 mm
12-Flex TWO M Tabletop receiver	Fixing point for protective conductor	3.0 ± 0.3	Cylinder screw M6 (not included in the scope of delivery) Hexagon wrench 5 mm
12-Flex FOUR A Receiver slide mount with platform flange	Fixing point for protective conductor	3.0 ± 0.3	Cylinder screw M6 (not included in the scope of delivery) Hexagon wrench 5 mm
12-Flex FOUR A Receiver slide mount without platform flange	Fixing point for protective conductor	3.0 ± 0.3	Cylinder screw M6 (not included in the scope of delivery) Hexagon wrench 5 mm
12-Flex TWO M Receiver slide mount with platform flange	Fixing point for protective conductor	3.0 ± 0.3	Cylinder screw M6 (not included in the scope of delivery) Hexagon wrench 5 mm
12-Flex TWO M Receiver slide mount without platform flange	Fixing point for protective conductor	3.0 ± 0.3	Cylinder screw M6 (not included in the scope of delivery) Hexagon wrench 5 mm
12-Flex FOUR A Receiver fixed mounting frame with platform flange	Fixing point for protective conductor	3.0 ± 0.3	Cylinder screw M6 (not included in the scope of delivery) Hexagon wrench 5 mm
12-Flex FOUR A Receiver fixed mounting frame without platform flange	Fixing point for protective conductor	3.0 ± 0.3	Cylinder screw M6 (not included in the scope of delivery) Hexagon wrench 5 mm
12-Flex TWO M Receiver fixed mounting frame with platform flange	Fixing point for protective conductor	3.0 ± 0.3	Cylinder screw M6 (not included in the scope of delivery) Hexagon wrench 5 mm
12-Flex TWO M Receiver fixed mounting frame without platform flange	Fixing point for protective conductor	3.0 ± 0.3	Cylinder screw M6 (not included in the scope of delivery) Hexagon wrench 5 mm
12-Flex TWO M Receiver tabletop housing	Fixing point for protective conductor	3.0 ± 0.3	Cylinder screw M6x6 (not included in the scope of delivery) Hexagon wrench 5 mm
Black-Line frame	Fixing point for protective conductor on Black-Line frame and adapter	1.2 ± 0.1	2 x fillister screw M3x6 Phillips cross-head screwdriver size 1

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Component	Mounting on	Tightening torque [Nm]	Prescribed screws
12-Flex FOUR Enclosure 6" 50299706	Fixing point for protective conductor	3.0 ± 0.3	Cylinder screw M6x6 Screw drive Hexagon socket 5 mm
12-Flex FOUR Enclosure 6" 50299706	Fixing point for protective conductor	1.2 ± 0.1	Nut M4 Width across flats 7mm
12-Flex FOUR Enclosure 15" 50299705	Fixing point for protective conductor	3.0 ± 0.3	Cylinder screw M6x6 Screw drive Hexagon socket 5 mm
12-Flex FOUR Enclosure 15" 50299705	Fixing point for protective conductor	1.2 ± 0.1	Nut M4 Width across flats 7 mm

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7. ELECTRIC CONNECTION AND CONTROL

Read the safety information below before establishing an electric connection and take note of the measures described therein designed to ensure safe electric connection.

7.1 Safety information relating to electric connection and control

DANGER **Danger from electric energy stored in components such as capacitors or inductors (e.g., relays, motors)!**

When the motor decelerates, it runs in generator mode and feeds back to the power supply. This return feed can lead to voltage peaks of up to 42 V.

Touching live components can lead to an electric shock.

- Use a power supply that is safe against return feed with a minimum capacity (within the power supply or external) of 6600 µF to limit the return voltage to a maximum of 30 V.
- Only ever allow skilled personnel to perform assembly, installation, commissioning, repair, maintenance, and servicing work.
- Wear personal protective equipment.
- Use additional protective equipment as appropriate for the work at hand.
- Observe additional safety precautions throughout the whole system during automatic operation.
- Provide emergency-stop functions in the higher-level system.

NOTICE If the Sigmatek controller is connected to an IP network containing devices that do not run on a Sigmatek operating system, it can cause problems.

Ethernet packets (e.g., broadcasts) may then be sent to the Sigmatek controller at such a high frequency that the high interrupt load causes a realtime runtime error or a runtime error in the Sigmatek controller.

If this happens, configure a corresponding packet filter (firewall or router).

Connectors to use

The connectors required are included in the scope of delivery. If necessary, use only the following connectors:

Item	Manufacturer	Manuf. item no.
BCF 3.81 / 03 / 180 SN BK BX	Weidmüller	1969920000
FMC 1.5 / 3-ST-3.5 Gray / Blue	Phoenix-Contact	1705386
FMC 1.5 / 4-ST-3.5 Gray / Blue	Phoenix-Contact	1714992
FMC 1.5 / 5-ST-3.5 Gray / Blue	Phoenix-Contact	1705390
FMC 1.5 / 8-ST-3.5 Gray / Blue	Phoenix-Contact	1707473

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7.2 Pin assignment for +24 V / 0 V distributor

7.2.1 Module layout

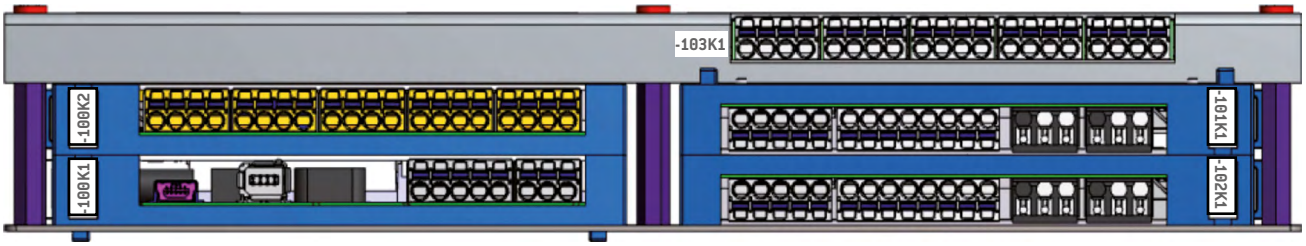


Fig. 120

7.2.2 Controller delivery condition in standalone operation

Power supply
L+ / M
24 V DC

Power-supply fuses
Fuse provided by the customer (max. T3A)

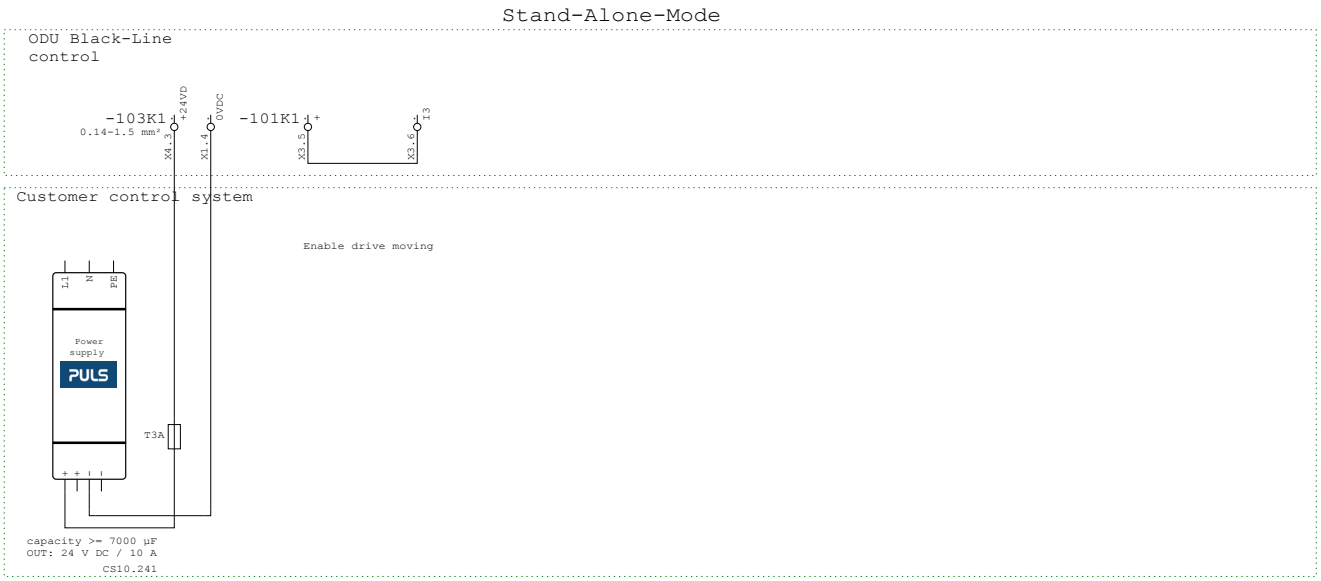


Fig. 121

7.3.1 Connection to remote customer controller (inline operation)

Power supply
L+ / M
24 V DC

Power-supply fuses
Fuse provided by the customer (max. T3A)

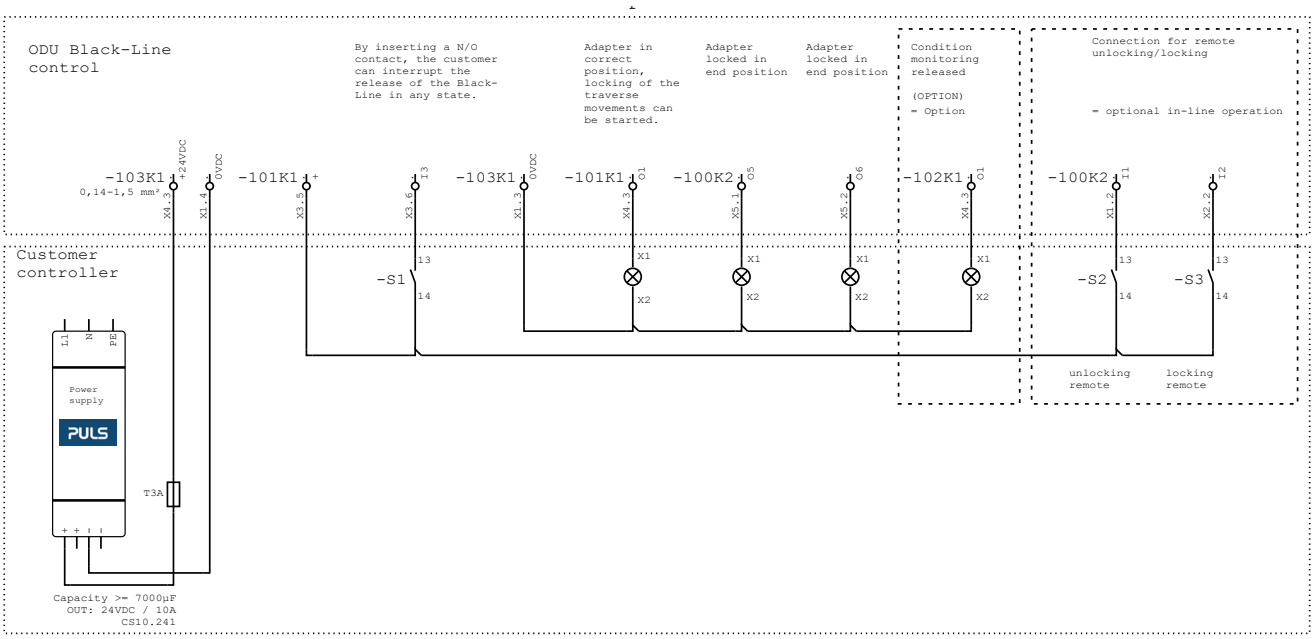


Fig. 122

7.3 Pin assignment for controller

NOTICE

A connection can be established with CANopen.

Please contact ODU to discuss.

For contact details, see Section 13 .

7.3.2 Controller

In-line operation

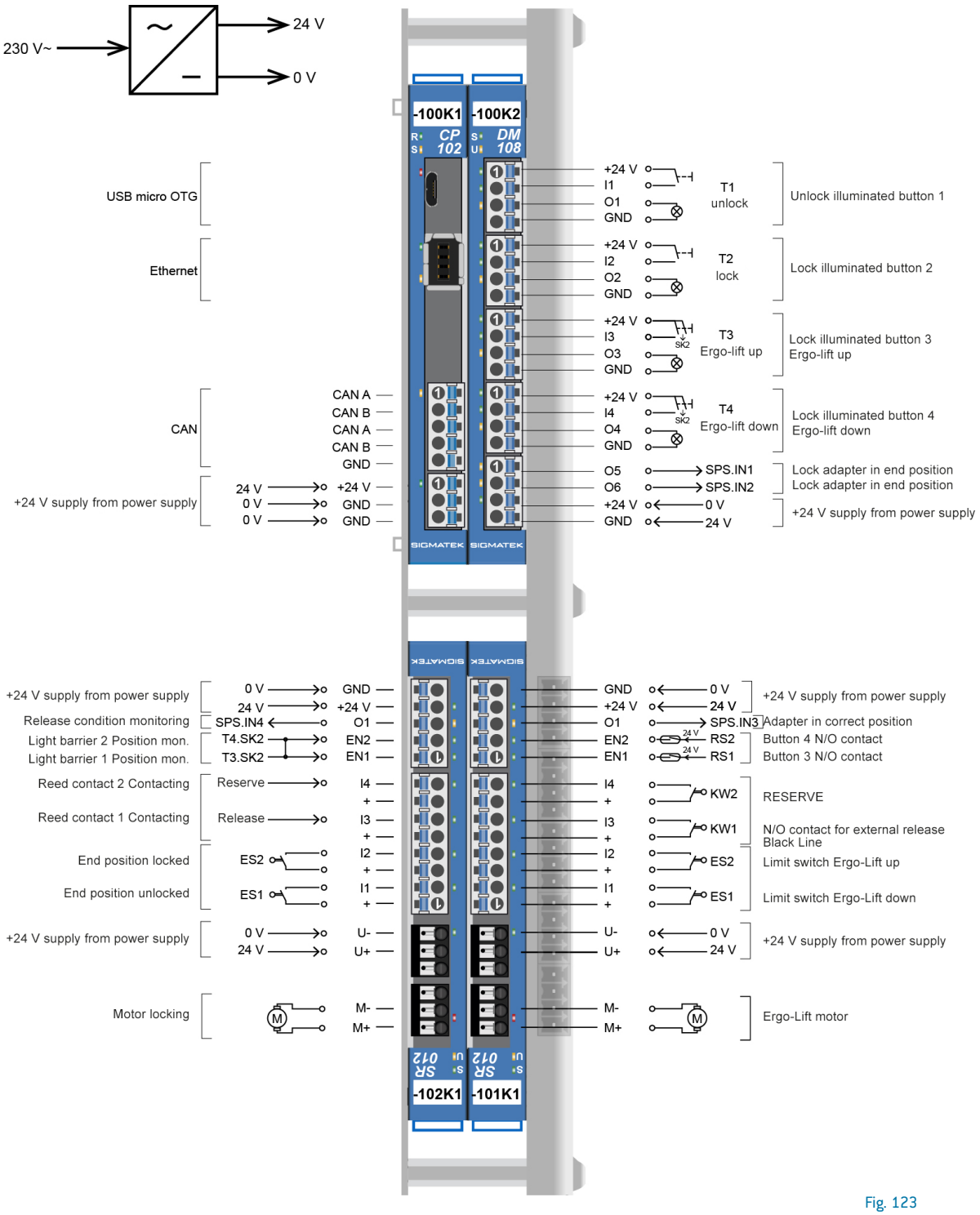


Fig. 123

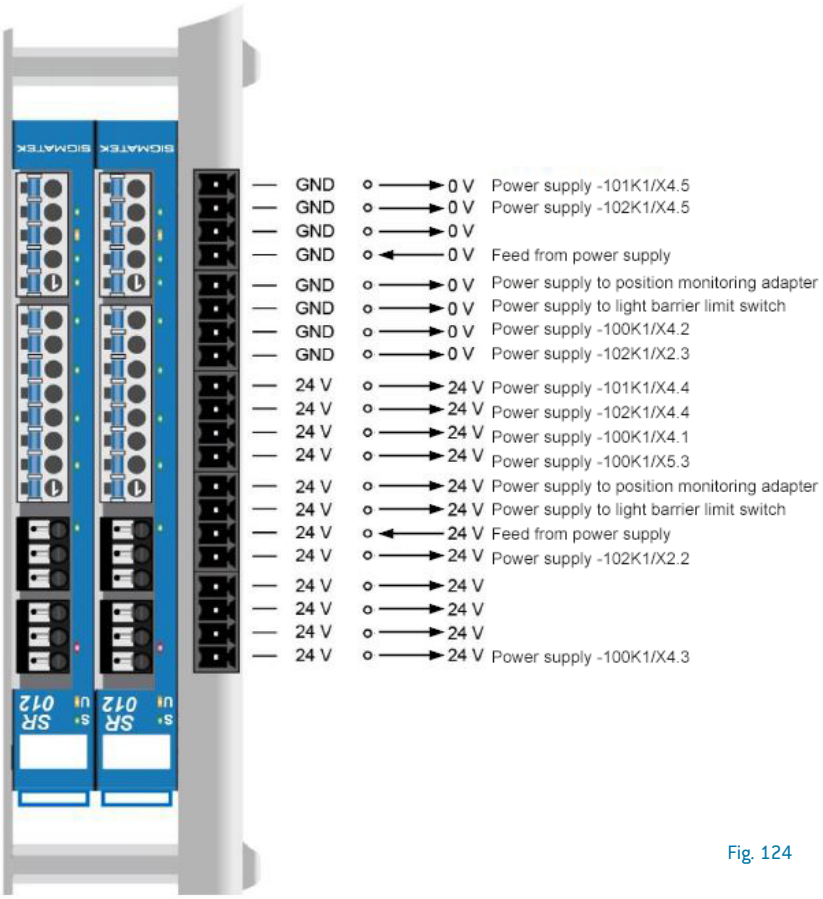
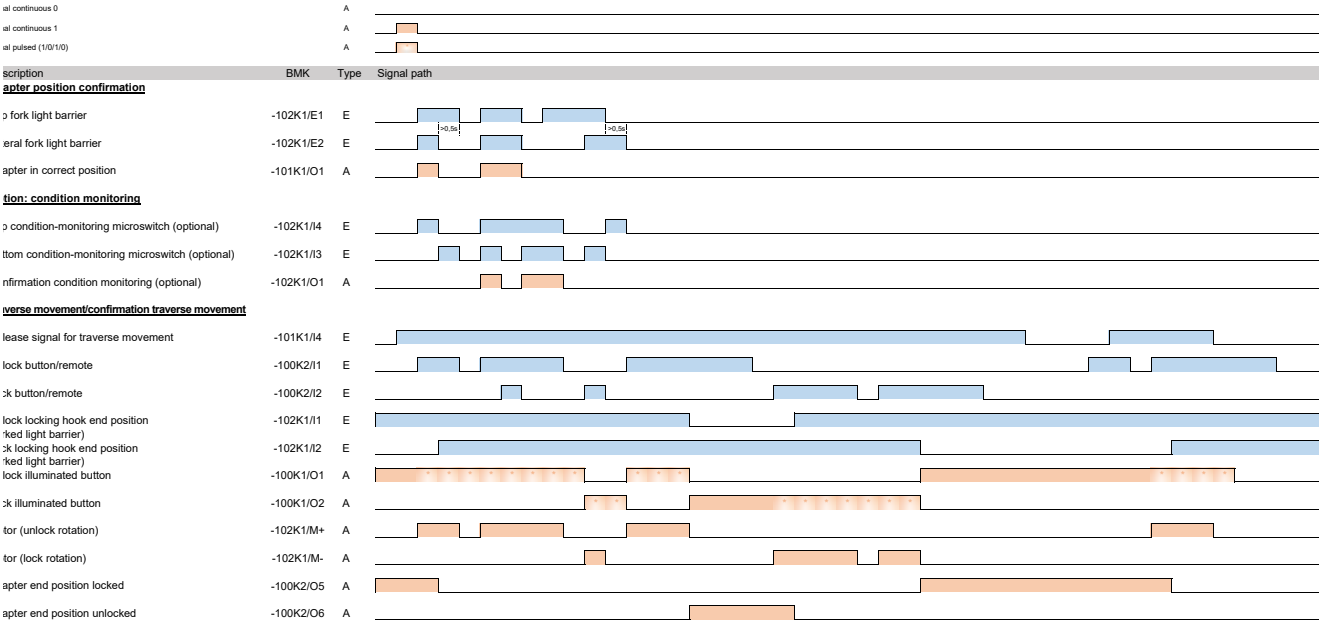

GND 0 V Power supply -101K1/X4.5
GND 0 V Power supply -102K1/X4.5
GND 0 V
GND 0 V Feed from power supply
GND 0 V Power supply to position monitoring adapter
GND 0 V Power supply to light barrier limit switch
GND 0 V Power supply -100K1/X4.2
GND 0 V Power supply -102K1/X2.3
24 V 24 V Power supply -101K1/X4.4
24 V 24 V Power supply -102K1/X4.4
24 V 24 V Power supply -100K1/X4.1
24 V 24 V Power supply -100K1/X5.3
24 V 24 V Power supply to position monitoring adapter
24 V 24 V Power supply to light barrier limit switch
24 V 24 V Feed from power supply
24 V 24 V Power supply -102K1/X2.2
24 V 24 V
24 V 24 V
24 V 24 V
24 V 24 V Power supply -100K1/X4.3

Fig. 124

Time-distance diagram



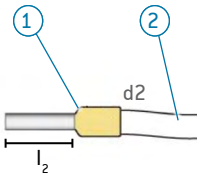
The Black-Line can be connected to enable “In-Line operation” as shown in Figure 123 (in-line operation). Figure 124 (connection positions) shows the assignment on the controller. Figure 125 (time-distance diagram) shows the temporal relationships of the sensors and actuators.

By inserting a normally open contact (-101K1 X3.5 and X3.6), the release for the travel movement can be interrupted (“emergency stop”).

Fig. 125

7.4 Connector specifications

Fig. 126



Connector with Phoenix spring-type terminal FMC 1.5 / 4-ST-3.5

(1) Wire end ferrule

(2) Cable

Stripping length	10 mm
Mating direction	Parallel to conductor axis or to PCB
Rigid conductor cross-section	0.2 – 1.5 mm^2
Flexible conductor cross-section	0.2 – 1.5 mm^2
Conductor cross-section AWG/kcmil	24 – 16
Flexible conductor cross-section with wire end ferrule without plastic sleeve	0.25 – 1.5 mm^2
Flexible conductor cross-section with wire end ferrule with plastic sleeve	0.25 – 0.75 mm^2 (reduction base d2 of wire end ferrule)

7.5 Wiring

NOTICE The input filters, which suppress interfering pulses, allow the device to be used in harsh environmental conditions.

Establish wiring carefully to guarantee fault-free operation.

NOTICE Observe the following:

- Avoid routing the input cables in parallel with load circuits.
- Equip all contactor coils with a protective circuit (RC elements or freewheeling diodes).
- Make sure correct grounding is provided.

The outputs are also connected to an internal protective circuit.
However, an additional protective circuit is also recommended directly at inductive loads (freewheeling diode) to avoid a system malfunction caused by voltage peaks (e.g., cross-talk with analog cables) (EMC Directive).

7.5.1 General information on digital outputs

- The cable cross-section of the +24 V supply and the 0 V supply must be dimensioned for the maximum output current that can be consumed by a group.
- The outputs can be shut down in groups by shutting down the +24 V power supply.

NOTICE It is not permissible to apply a voltage to an output that exceeds the supply voltage by more than 0.7 V.

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7.5.2 Optional condition monitoring

Receivers with a controller

For receivers with a controller, condition monitoring can be ordered as an option. In this case, each receiver is equipped with centrally mounted microswitches at the top and bottom. If the receiver is correctly locked, the signal can be tapped at the controller via output –102K1/o1.

Receivers without a controller

For receivers without a controller, condition monitoring can be ordered as an option. In this case, each receiver is equipped with centrally mounted microswitches at the top and bottom. For receivers without a controller, the cables for the microswitches are not wired and must be integrated into a controller provided by the customer. The microswitches are designed as normally open contacts.

Technical data for connections:
maximum connection voltage and connection current: 30 V DC; 0.5 A

7.5.3 Optional condition monitoring

- Loosen the screws (2) on the adapter (1). The resistance coding (3) can be removed. Solder the desired resistor (4) onto the resistance coding (3). Then mount the resistance coding (3) again using the screws (2).
- On the receiver, the resistance coding (5) is connected to the customer's control system via the cables (6).

NOTICE Take note of the specified tightening torques and numbers of screws!
Always tighten screws and nuts to the specified tightening torques. For details of screws, nuts, and tightening torques, see Section 6.13 .

(1) Adapter
(2) Screws
(3) Resistance coding (adapter)
(4) Resistor (not included in the scope of delivery)
(5) Resistance coding (receiver)
(6) Cable

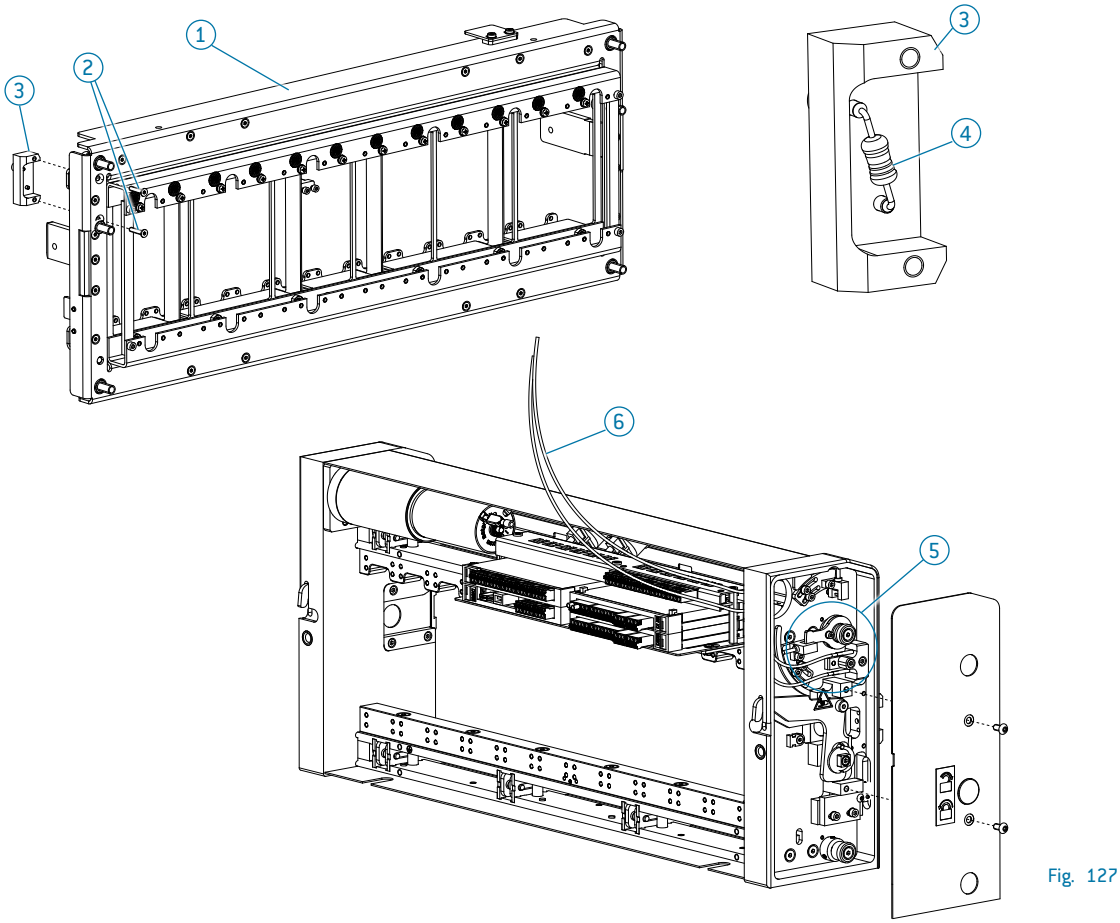

Fig. 127

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7.6 Protective-conductor terminal

A protective-conductor terminal is mandatory according to the applicable standards (DIN EN 60204-1:2018, DIN EN 61140:2016, DIN EN 61010-1:2010 Section 6.5) if the "limit values for EXPOSED parts" outlined in the respective standards are exceeded and no other safety precautions to protect against electric shock have been taken.

In all cases, the protective connection and all EXPOSED PARTS must be checked according to the respective standards (DIN EN 60204-1:2018, DIN EN 61010-1:2010 Annex F and Section 6.5.2.4) prior to commissioning.

If the insulation resistance is checked or a voltage test is performed on the "solid insulation", all electronic components of the controller must be disconnected and grounded before this inspection takes place.

(5) Cable lug
(6) Contact washer
(7) Screw

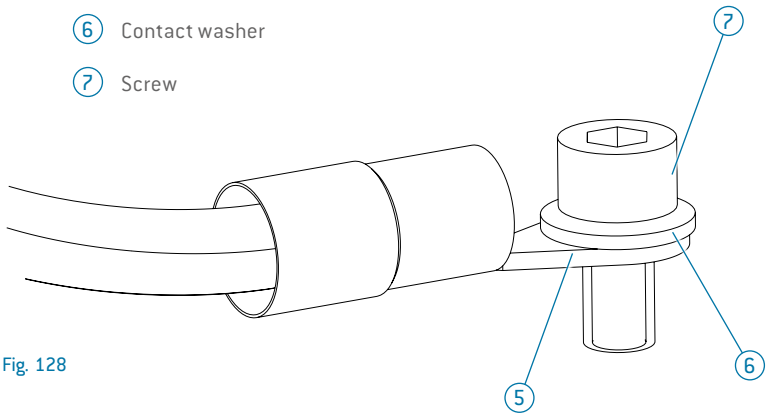

Fig. 128

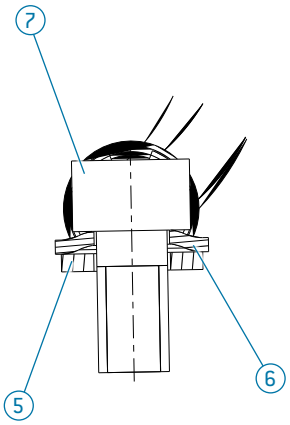

Fig. 129

7.6.1 Protective-conductor terminal on the 12-Flex FOUR A Receiver

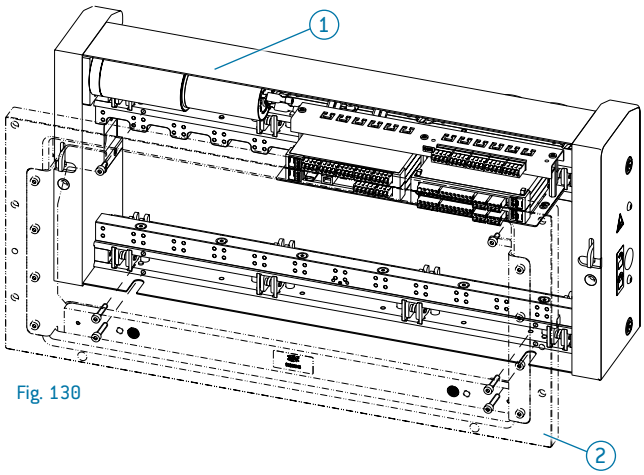

Fig. 130

- If the receiver (1) is operated without additional screw-on parts (2), the protective-conductor terminal should be attached at the position marked (4) in Fig. 129; see Table Section 6.14 for the prescribed torque.
  The protective-conductor terminal must be structured as described in Section 7.6 , Fig. 128 and 129.
- If the receiver (1) is operated with additional screw-on parts (e.g., fixed mounting frame (2) or slide mount 7.6.3), the protective connection should be attached at the positions (4) marked there. The protective connection is then realized via the mounting points shown (3); comply with the torque specifications in Table Section 6.14 in this case too.

NOTICE Take note of the specified tightening torques and numbers of screws!

Always tighten screws and nuts to the specified tightening torques.

For details of screws, nuts, and tightening torques, see Section 6.14 .

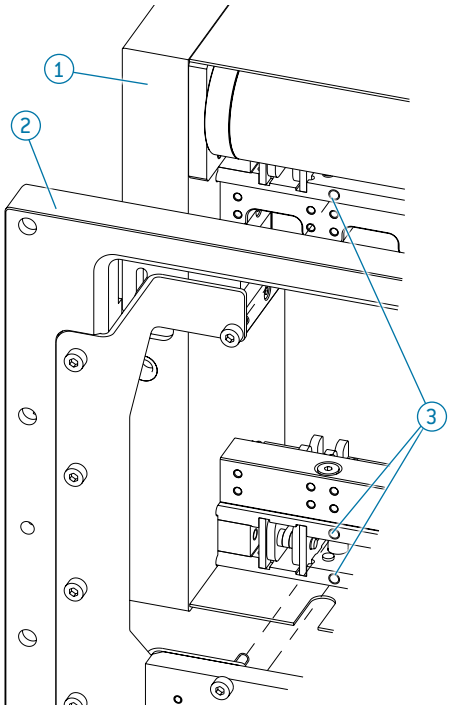

Fig. 131

(1) Receiver

(2) Fixed mounting frame

(3) Mounting points

(4) Protective-conductor terminal

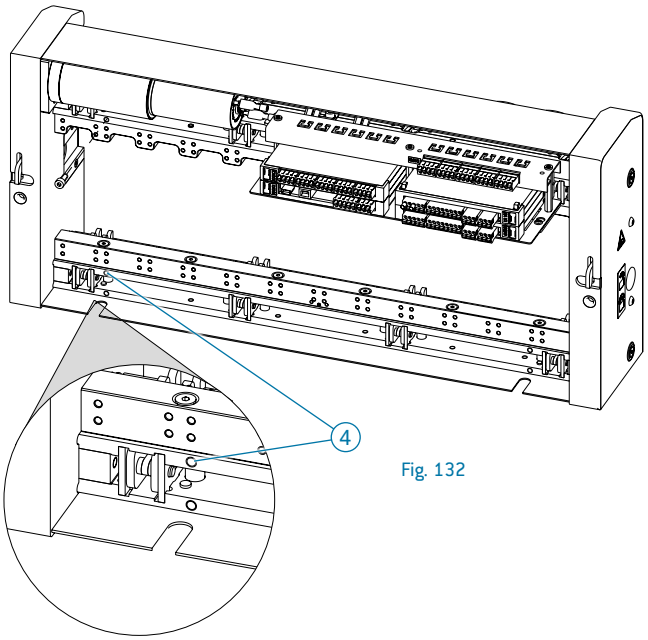

Fig. 132

7.6.2 Protective-conductor terminal on the 12-Flex TWO M Receiver

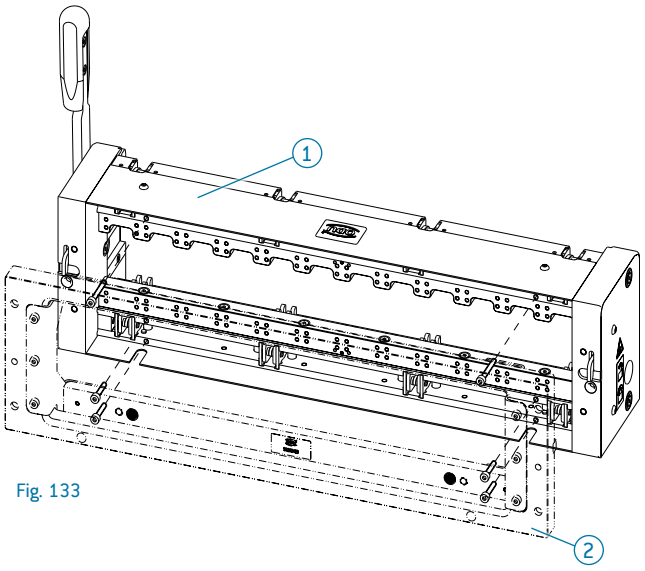

Fig. 133

- If the receiver (1) is operated without additional screw-on parts (2), the protective-conductor terminal should be attached at the position marked (4) in Fig. 111; see Table Section 6.14 for the prescribed torque.
  The protective-conductor terminal must be structured as described in Section 7.6 , Fig. 128 and 129.
- If the receiver (1) is operated with additional screw-on parts (e.g., fixed mounting frame (2) or slide mount 7.6.3), the protective connection should be attached at the positions (4) marked there. The protective connection is then realized via the mounting points shown (3); comply with the torque specifications in Table Section 6.14 in this case too.

NOTICE Take note of the specified tightening torques and numbers of screws!

Always tighten screws and nuts to the specified tightening torques.

For details of screws, nuts, and tightening torques, see Section 6.14 .

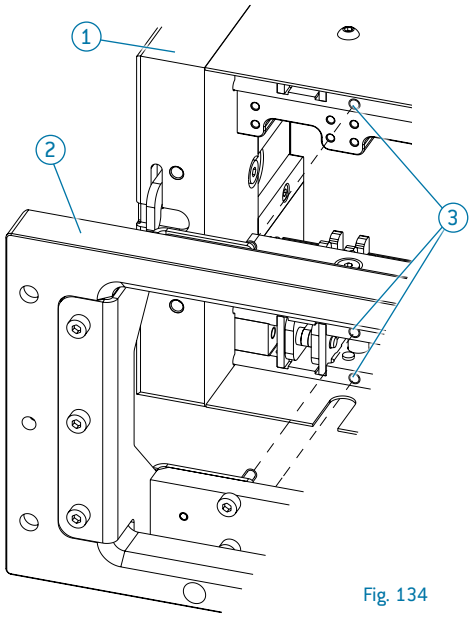

Fig. 134

(1) Receiver

(2) Fixed mounting frame

(3) Mounting points

(4) Protective-conductor terminal

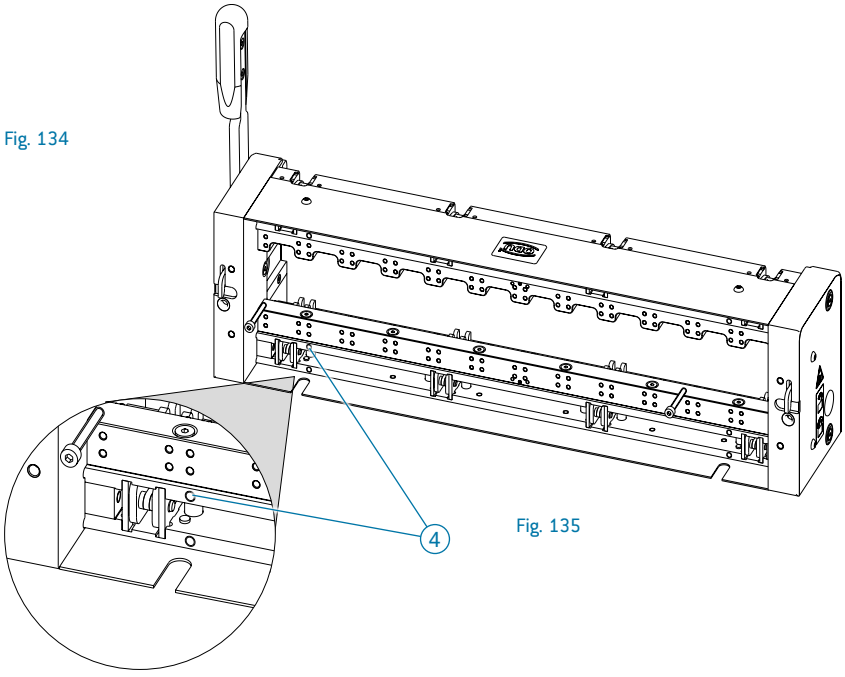

Fig. 135

7.6.3 Protective-conductor terminal on the 12-Flex TWO M Tabletop receiver

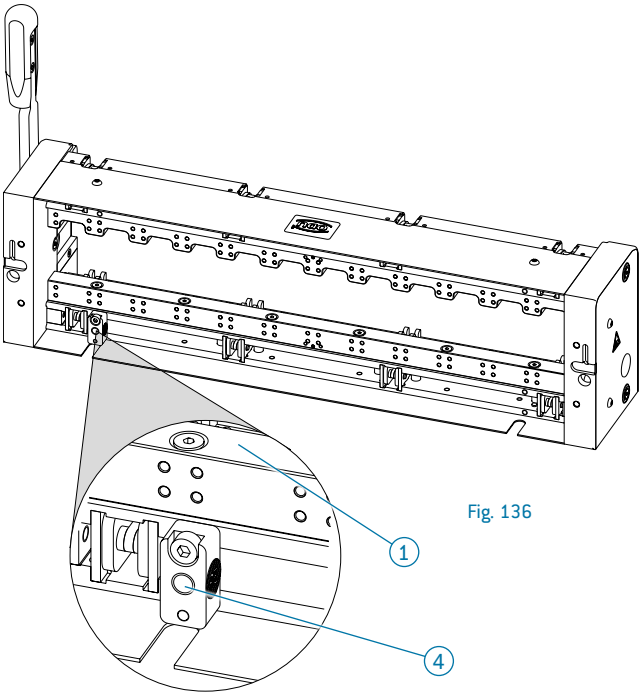

Fig. 136

- On the 12-Flex TWO M Tabletop receiver (1), the protective connection is realized via the protective-conductor terminal (4).
- An M6 thread is provided for the terminal.
  The protective-conductor terminal must be structured as described in Section 7.6 , Fig. 128 and 129.

NOTICE

Take note of the specified tightening torques and numbers of screws!

Always tighten screws and nuts to the specified tightening torques.

For details of screws, nuts, and tightening torques, see Section 6.14 .

(1) Tabletop receiver

(4) Protective-conductor terminal

7.6.4 Protective-conductor terminal on the 12-Flex FOUR A Receiver slide mount with platform flange

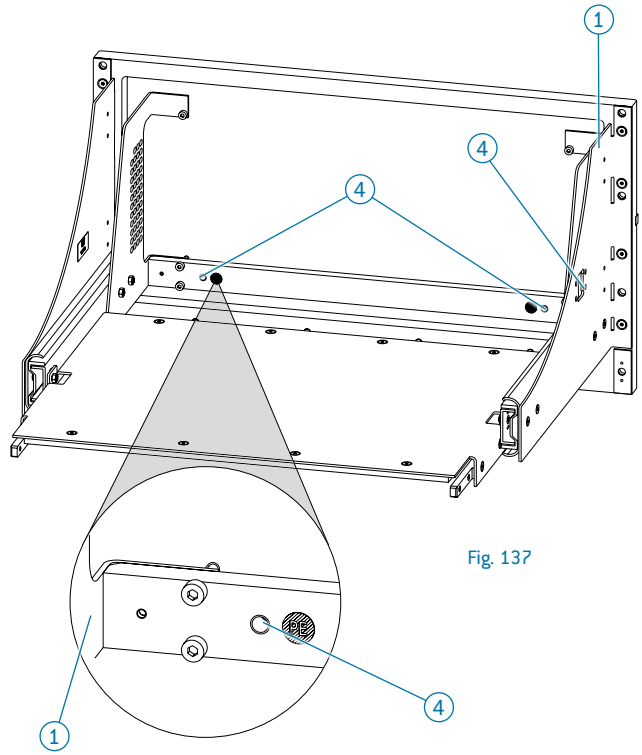

Fig. 137

- On the 12-Flex FOUR A Receiver slide mount with platform flange (1), the protective connection is realized via the protective-conductor terminal (4).
- The protective-conductor terminal is located on both sides of the slide mount.
- An M6 thread is provided for the terminal.
  The protective-conductor terminal must be structured as described in Section 7.6 , Fig. 128 and 129.

NOTICE

Take note of the specified tightening torques and numbers of screws!

Always tighten screws and nuts to the specified tightening torques.

For details of screws, nuts, and tightening torques, see Section 6.14 .

(1) Slide mount

(4) Protective-conductor terminal

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7.6.5 Protective-conductor terminal on the 12-Flex FOUR A Receiver slide mount without platform flange

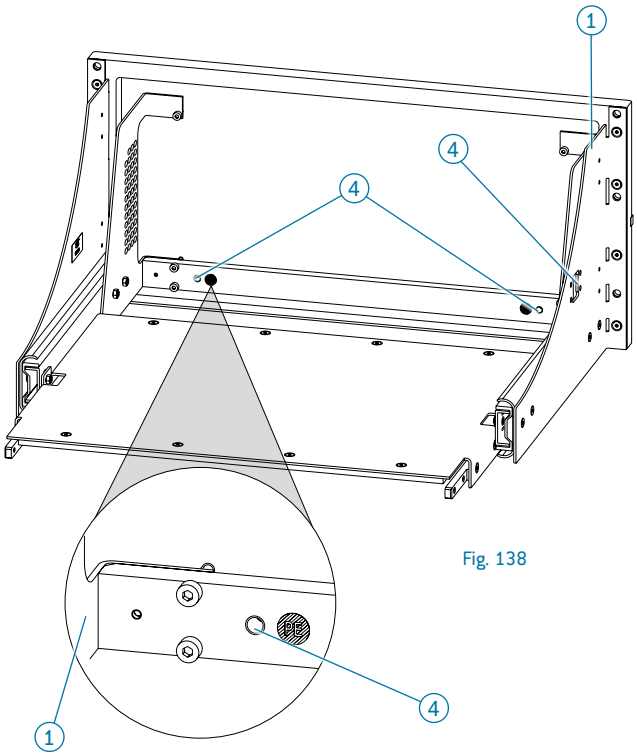

Fig. 138

- On the 12-Flex FOUR A Receiver slide mount without platform flange (1), the protective connection is realized via the protective-conductor terminal (4).
- The protective-conductor terminal is located on both sides of the slide mount.
- An M6 thread is provided for the terminal.
  The protective-conductor terminal must be structured as described in Section 7.6 , Fig. 128 and 129.

NOTICE Take note of the specified tightening torques and numbers of screws!

Always tighten screws and nuts to the specified tightening torques.

For details of screws, nuts, and tightening torques, see Section 6.14.

(1) Slide mount

(4) Protective-conductor terminal

7.6.6 Protective-conductor terminal on the 12-Flex TWO M Receiver slide mount with platform flange

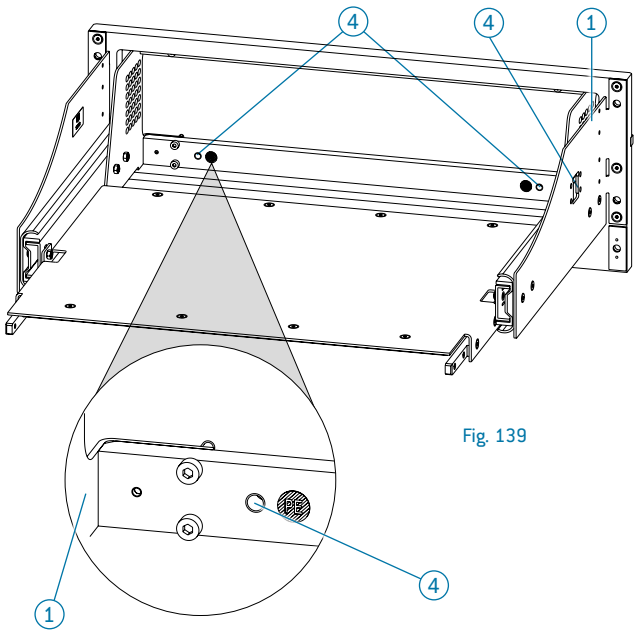

Fig. 139

- On the 12-Flex TWO M Receiver slide mount with platform flange (1), the protective connection is realized via the protective-conductor terminal (4).
- The protective-conductor terminal is located on both sides of the slide mount.
- An M6 thread is provided for the terminal.
  The protective-conductor terminal must be structured as described in Section 7.6 , Fig. 128 and 129.

NOTICE Take note of the specified tightening torques and numbers of screws!

Always tighten screws and nuts to the specified tightening torques.

For details of screws, nuts, and tightening torques, see Section 6.14 .

(1) Slide mount

(4) Protective-conductor terminal

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7.6.7 Protective-conductor terminal on the 12-Flex TWO M Receiver slide mount without platform flange

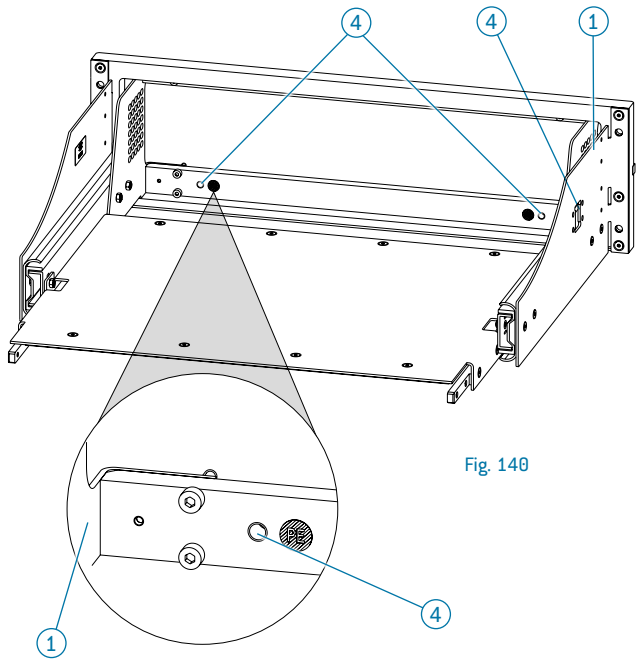

Fig. 140

- On the 12-Flex TWO M Receiver slide mount without platform flange (1), the protective connection is realized via the protective-conductor terminal (4).
- The protective-conductor terminal is located on both sides of the slide mount.
- An M6 thread is provided for the terminal.
  The protective-conductor terminal must be structured as described in Section 7.6 , Fig. 128 and 129.

NOTICE Take note of the specified tightening torques and numbers of screws!
Always tighten screws and nuts to the specified tightening torques.
For details of screws, nuts, and tightening torques, see Section 6.14 .

(1) Slide mount

(4) Protective-conductor terminal

7.6.8 Protective-conductor terminal 12-Flex FOUR A Receiver fixed mounting frame with platform flange

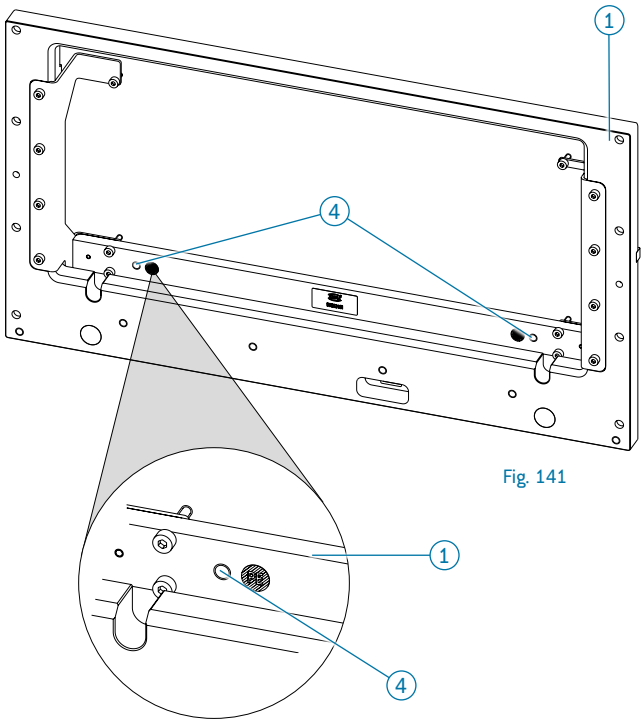

Fig. 141

- On the 12-Flex FOUR A Receiver fixed mounting frame with platform flange (1), the protective connection is realized via the protective-conductor terminal (4).
- The protective-conductor terminal is located on both sides of the fixed mounting frame.
- An M6 thread is provided for the terminal.
  The protective-conductor terminal must be structured as described in Section 7.6 , Fig. 128 and 129.

NOTICE Take note of the specified tightening torques and numbers of screws!
Always tighten screws and nuts to the specified tightening torques.
For details of screws, nuts, and tightening torques, see Section 6.14 .

(1) Fixed mounting frame

(4) Protective-conductor terminal

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7.6.9 Protective-conductor terminal 12-Flex FOUR A Receiver fixed mounting frame without platform flange

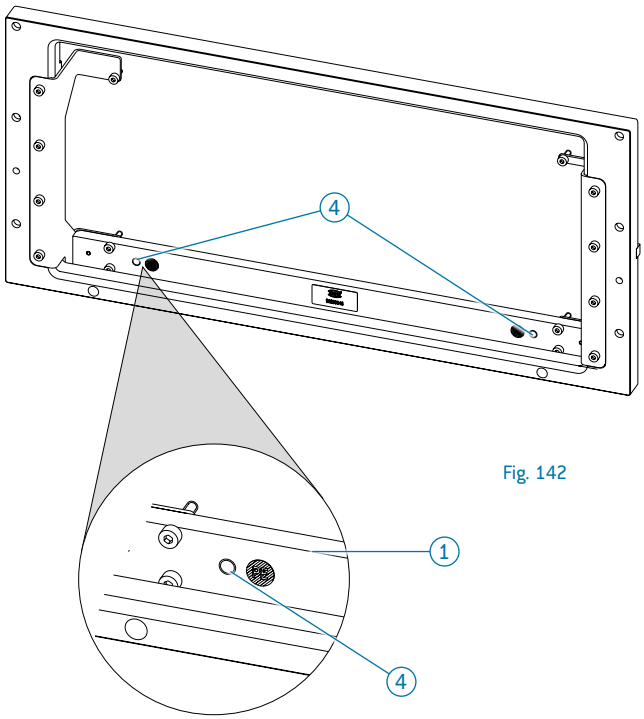

Fig. 142

- On the 12-Flex FOUR A Receiver fixed mounting frame without platform flange (1), the protective connection is realized via the protective-conductor terminal (4).
- The protective-conductor terminal is located on both sides of the fixed mounting frame.
- An M6 thread is provided for the terminal.
  The protective-conductor terminal must be structured as described in Section 7.6 , Fig. Fig. 128 and 129.

NOTICE Take note of the specified tightening torques and numbers of screws!

Always tighten screws and nuts to the specified tightening torques.

For details of screws, nuts, and tightening torques, see Section 6.14 .

(1) Fixed mounting frame

(4) Protective-conductor terminal

7.6.10 Protective-conductor terminal 12-Flex TWO M Receiver fixed mounting frame with platform flange

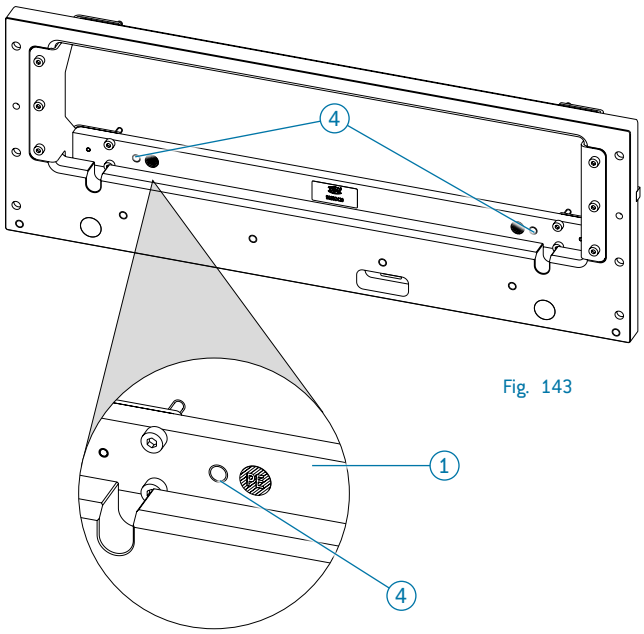

Fig. 143

- On the 12-Flex TWO M Receiver fixed mounting frame with platform flange (1), the protective connection is realized via the protective-conductor terminal (4).
- The protective-conductor terminal is located on both sides of the fixed mounting frame.
- An M6 thread is provided for the terminal.
  The protective-conductor terminal must be structured as described in Section 7.6 , Fig. 128 and 129.

NOTICE Take note of the specified tightening torques and numbers of screws!

Always tighten screws and nuts to the specified tightening torques.

For details of screws, nuts, and tightening torques, see Section 6.14 .

(1) Fixed mounting frame

(4) Protective-conductor terminal

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7.6.11 Protective-conductor terminal 12-Flex TWO M Receiver fixed mounting frame without platform flange

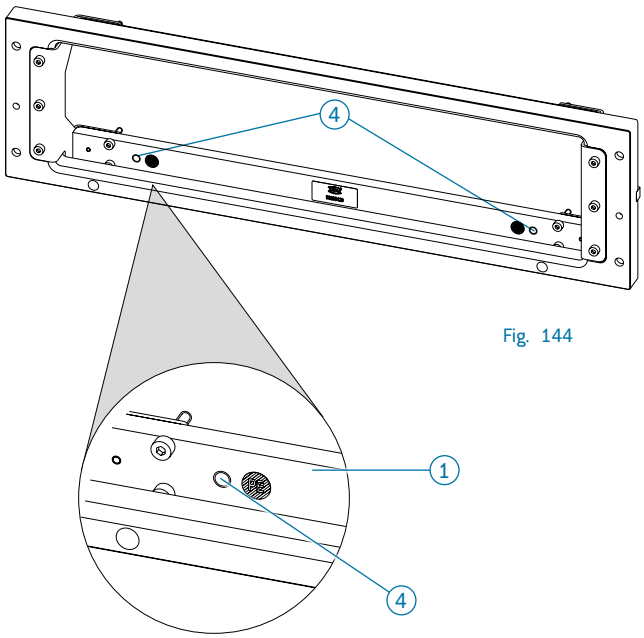

Fig. 144

- On the 12-Flex TWO M receiver fixed mounting frame without platform flange (1), the protective connection is realized via the protective-conductor terminal (4).
- The protective-conductor terminal is located on both sides of the fixed mounting frame.
- An M6 thread is provided for the terminal.
  The protective-conductor terminal must be structured as described in Section 7.6 , Fig. 128 and 129

NOTICE Take note of the specified tightening torques and numbers of screws!

Always tighten screws and nuts to the specified tightening torques.

For details of screws, nuts, and tightening torques, see Section 6.14 .

(1) Fixed mounting frame

(4) Protective-conductor terminal

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7.6.12 Protective-conductor terminal on the 12-Flex TWO M Tabletopcover

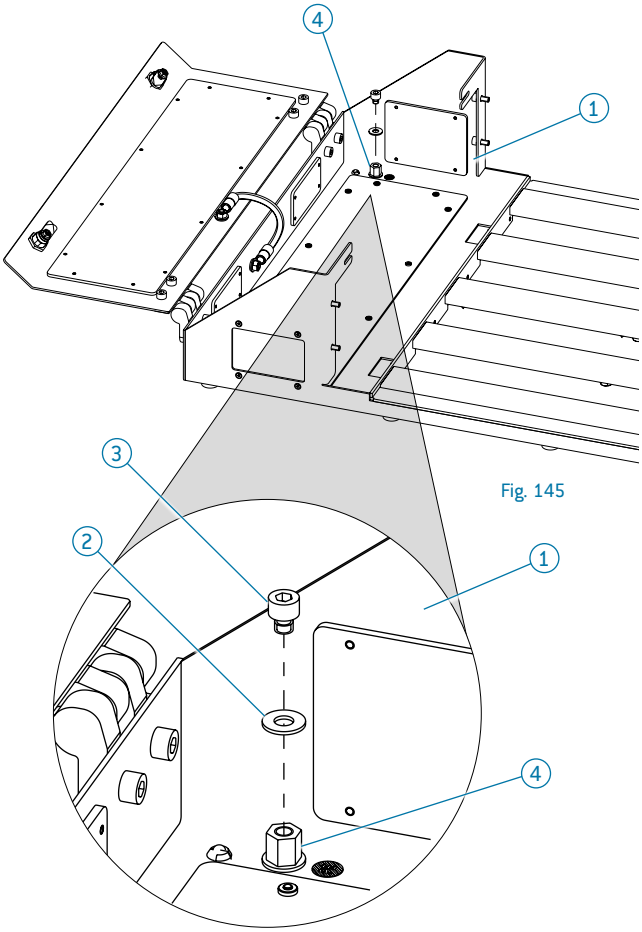

Fig. 145

- On the 12-Flex TWO M Tabletopcover (1), the protective connection is realized via the protective-conductor terminal (4).
- The protective-conductor terminal must be structured as described in Section 7.6 , Fig. 128 and 129.

NOTICE Take note of the specified tightening torques and numbers of screws!

Always tighten screws and nuts to the specified tightening torques.

For details of screws, nuts, and tightening torques, see Section 6.14 .

(1) Tabletop housing

(2) Contact washer

(3) Screw

(4) Protective-conductor terminal

7.6.13 Protective-conductor terminal on the ODU-MAC® Black-Line frame

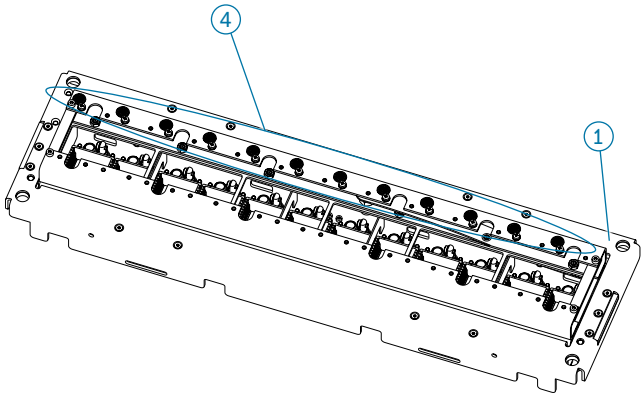

Fig. 146

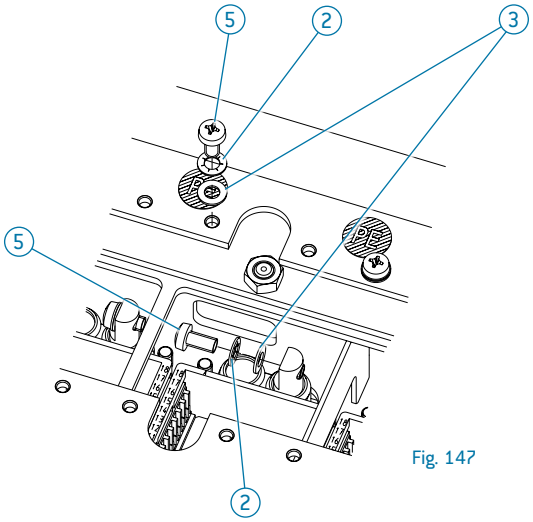

Fig. 147

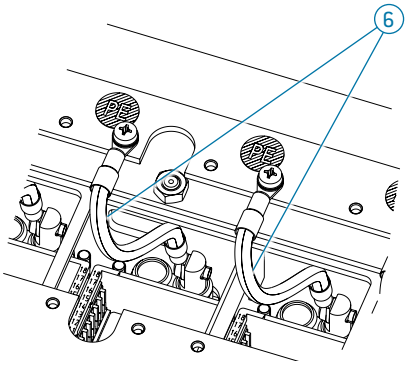

Fig. 148

- On the ODU-MAC® Black-Line frame (6), the protective connection is realized via the 12 protective-conductor terminals (4) on the adapter (1).
- Every ODU-MAC® Black-Line frame has its own protective-conductor terminal point on the adapter.

NOTICE

Take note of the specified tightening torques and numbers of screws!

Always tighten screws and nuts to the specified tightening torques.

For details of screws, nuts, and tightening torques, see Section 6.14 .

(1) Adapter

(2) Contact washer

(3) Washer

(4) Protective-conductor terminals

(5) Screw

(6) Protective-conductor connection (example, not included in the scope of delivery)

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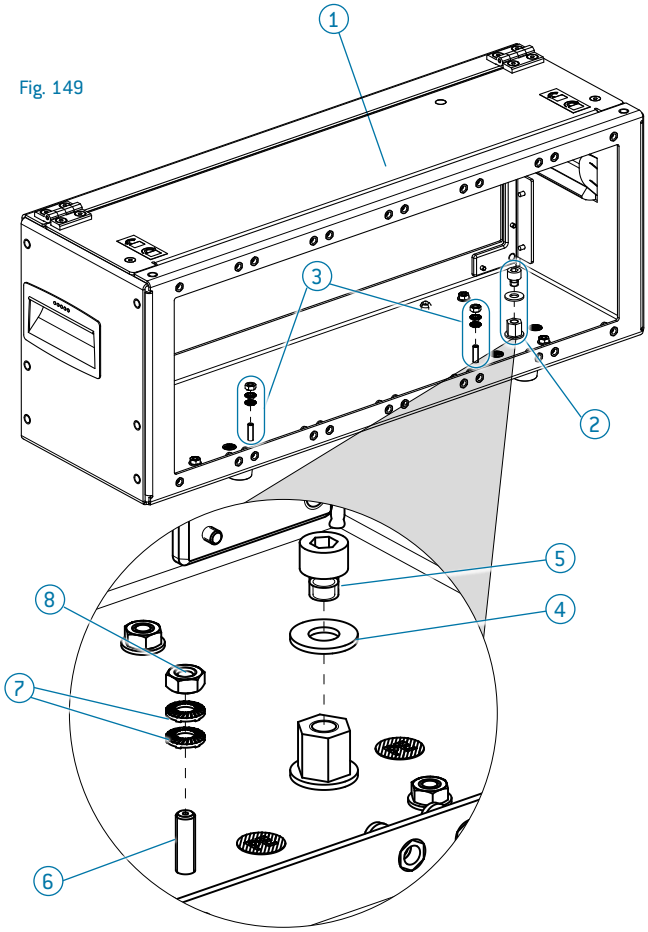
7.6.14 Protective-conductor terminal on the 12-Flex FOUR Enclosure

Fig. 149



- The protective conductor is connected to the 12-Flex FOUR enclosure (1) via the protective-conductor terminal (2).
- The protective conductor is connected to the flange plates via the protective-conductor terminals (3).
- The protective-conductor terminal must be structured as described in Section 7.6 , Fig. 128 and 129.

NOTICE

Take note of the specified tightening torques and numbers of screws!

Always tighten screws and nuts to the specified tightening torques.

For details of screws, nuts, and tightening torques, see Section 6.14 .

(1) Enclosure

(2) Protective-conductor terminals

(3) Contact washer

(4) Screw

(5) Threaded bolt

(6) Contact washer

(7) Nut

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8. OPERATION

Read the safety information below before operation and take note of the measures described therein designed to ensure safe operation.

8.1 Safety information relating to operation

DANGER **Danger from transmitting electric current and producing electric arcs!**

Touching live connectors can lead to an electric shock.

If electric arcs are produced, they can result in injury caused by fire or by molten parts being ejected, and in an electric shock.

- Only ever allow skilled personnel to perform assembly, installation, commissioning, repair, maintenance, and servicing work.
- Only remove and insert connectors when the device is de-energized.
- Only use connectors according to specifications.
- Wear personal protective equipment.
- Use additional protective equipment as appropriate for the work at hand.

WARNING **Danger from unattended operation!**

Injuries can be caused by overheated components, unexpected startup, and fire.

- During automatic operation, take additional safety precautions in line with the situation at hand throughout the whole system.
- Only ever allow skilled personnel to perform assembly, installation, commissioning, repair, maintenance, and servicing work.

ATTENTION **Danger of adapter falling down if not fully mated.**

If the adapter is not positioned precisely on the platform or, for the hanging variant, in the receiver, it could fall down.

- The adapter must be fully mated in the receiver to ensure the ODU-MAC® Black-Line can be operated safely.
- Place all the adapter securely on the platform.

ATTENTION **Danger from damaged devices and connectors, as well as improper use!**

Damaged components and improper use can lead to accidents and cause injury.

- Never pull on a cable to release a connector.
- A lack of, or poorly executed, strain relief can damage the contacting.
- Ensure that contact pins are not bent or otherwise damaged. The connector must no longer be used if damage or other signs of wear are detected.
- An electric overload or overload from other media can damage the connector.
- If a foreign object enters the connector or it becomes contaminated, for example by water, you must stop using the connector.
- Never use the connector or housing as a climbing aid.

8.2 Description of functions

8.2.1 Condition-monitoring microswitch (optional)

The optional condition-monitoring microswitch can be used to guarantee secure contacting.
These microswitches check that the permissible clearance of 0.5 mm from the ODU-MAC® Blue-Line frame is not exceeded.

8.2.2 Resistance coding (optional)

Resistance coding is available as an option and is designed to prevent incompatible adapters (ITA) and receivers being connected.
Resistance coding is realized via a resistance-coding block, which is integrated in the adapter (ITA).
The resistance-coding slot is found in the receiver.
The customer is responsible for ensuring resistance coding is correct and incorporating it into the controller they have provided. For details on contacting release, see Section 7.2.2 .

Please contact ODU if you have any questions.

For contact details, see Section 13 .

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8.2.3 Installation space for RFID read / write head IFM ANT515

The receiver and adapter (ITA) each have installation space for an RFID system, see Section 4.4 and see Section 4.12.
The customer must select and install their own RFID systems.
Please contact ODU if you have any questions.

For contact details, see Section 13.

(1) RFID read/write head

(2) RFID-TAG

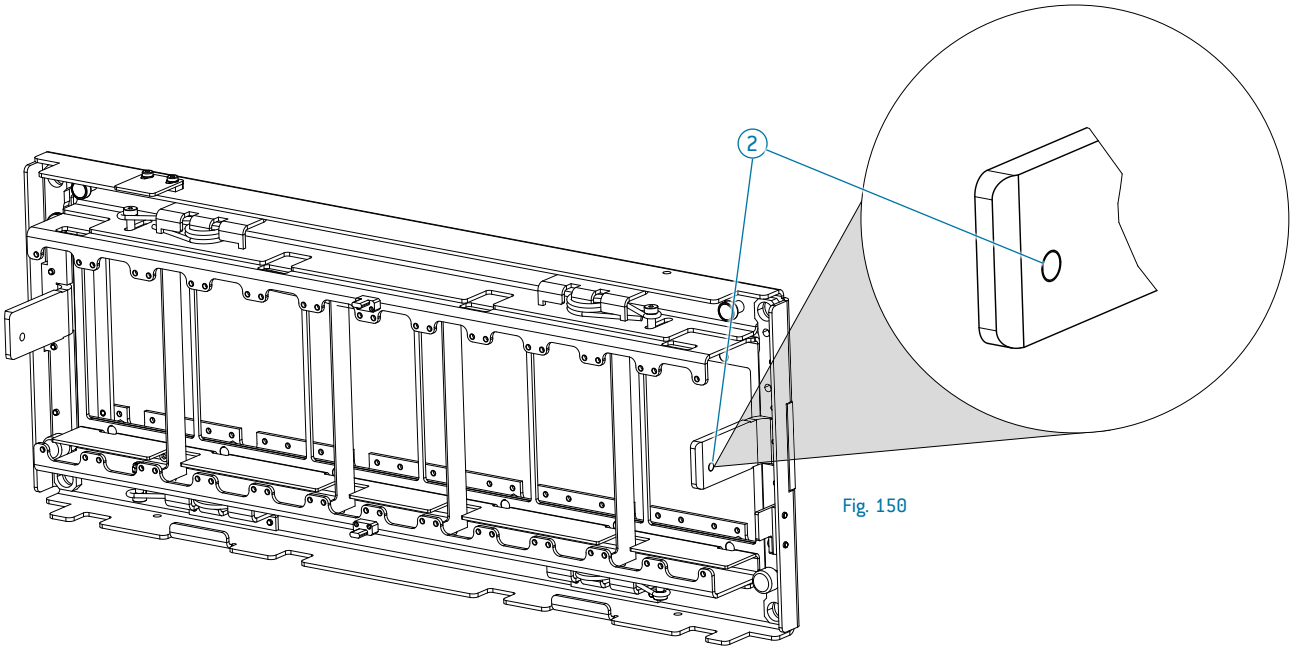

Fig. 150

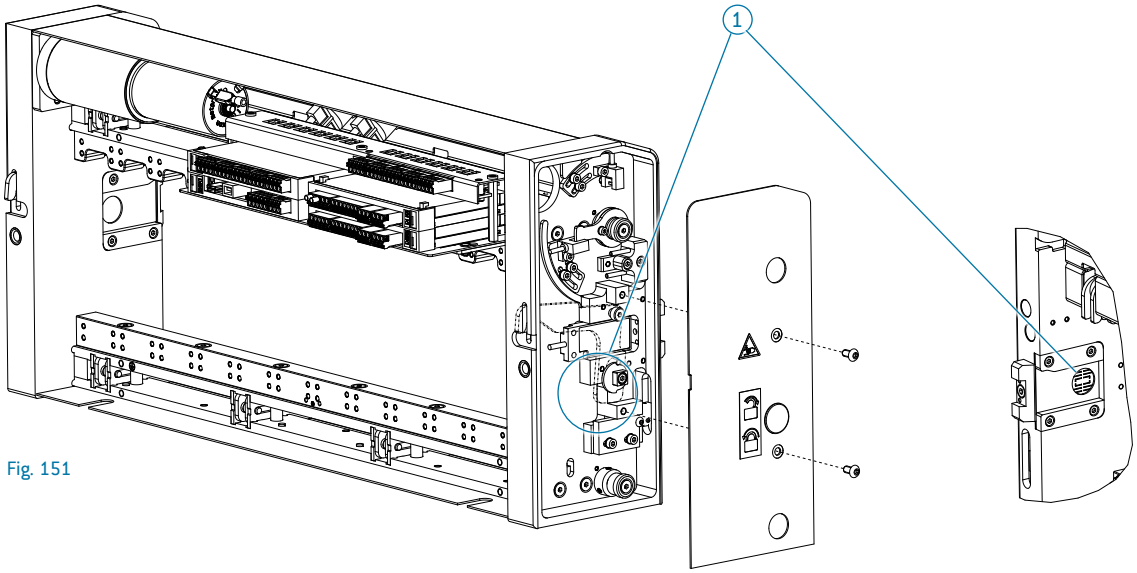

Fig. 151

8.3 Locking of receiver onto the slide mount

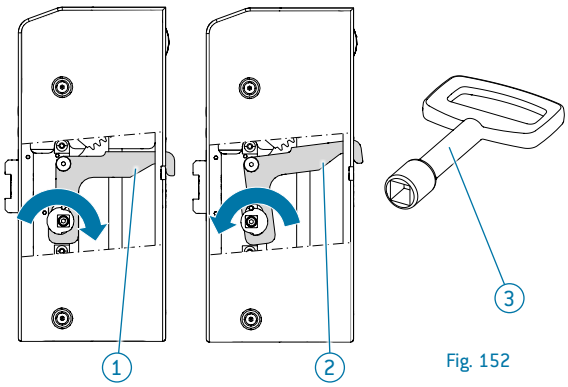

Fig. 152

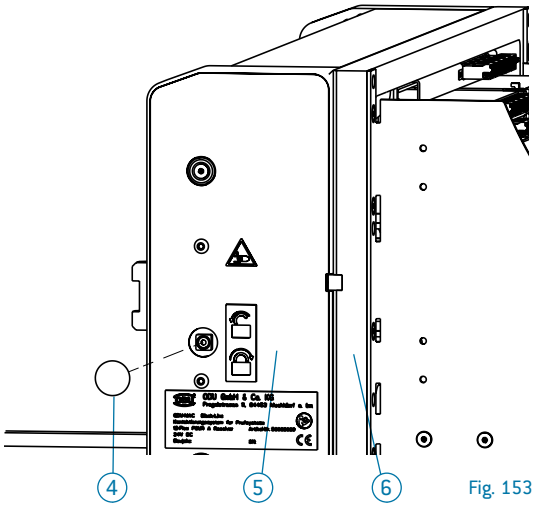

Fig. 153

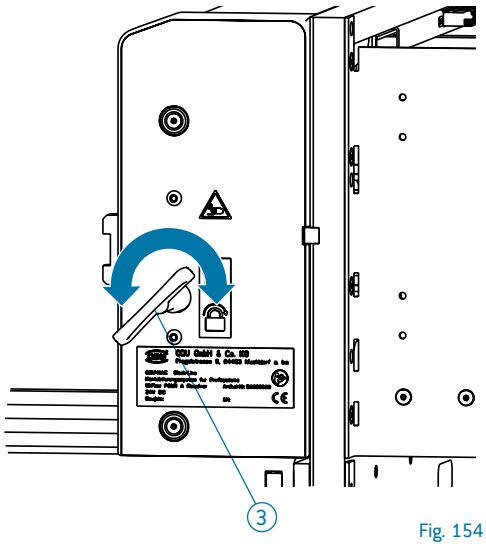

Fig. 154

To unlock and lock the receiver, you will need:

- Socket wrench for lock (3) (item no. 50275360).
- When closing (1) and opening (2), the locking hook only rises just enough to release the lock.
- Locking follows the same principle on all slide mounts. The example shows unlocking and locking of a 12-Flex FOUR A receiver on the 12-Flex FOUR receiver slide mount with platform flange.

NOTICE The receiver must be unlocked or locked on both side panels (left and right)!

Opening the receiver on the slide mount

▶ Remove the cover cap (4) from the side panels.

▶ Open the locking hook.
To open, turn the socket wrench (3) counterclockwise as far as it will go (2). Repeat the procedure as a mirror image on the other side.

▶ Pull the receiver (5) out by the side panels as far as it will go. Service access is now open and the modules are accessible from the rear.

Closing the receiver on the slide mount

▶ Push the receiver (5) by the side panels onto the slide mount (6).

▶ Close the locking hook.
To close, turn the socket wrench (3) clockwise as far as it will go (1). Repeat the procedure as a mirror image on the other side.

▶ Attach the cover cap (4) onto the side panels.

(1) Closed locking hook

(2) Open locking hook

(3) Socket wrench for lock

(4) Cover cap

(5) Receiver

(6) Slide mount

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8.4 Operation of 12-Flex FOUR A Receiver

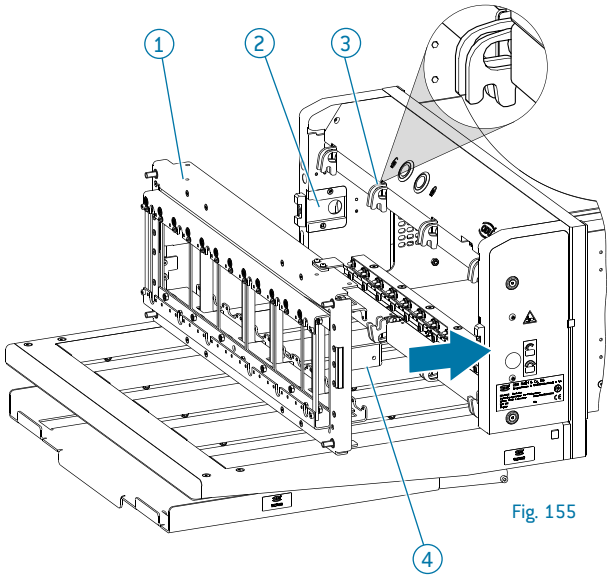

Fig. 155

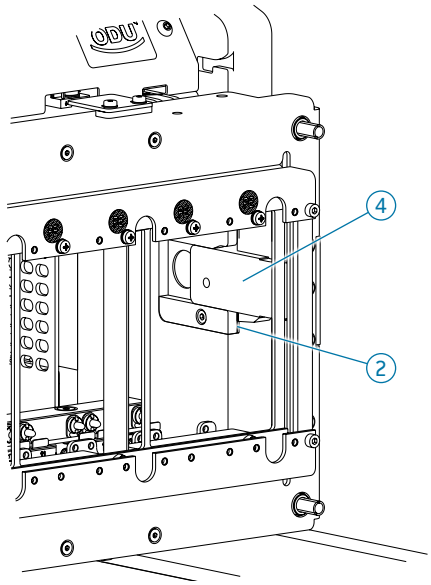

Fig. 156

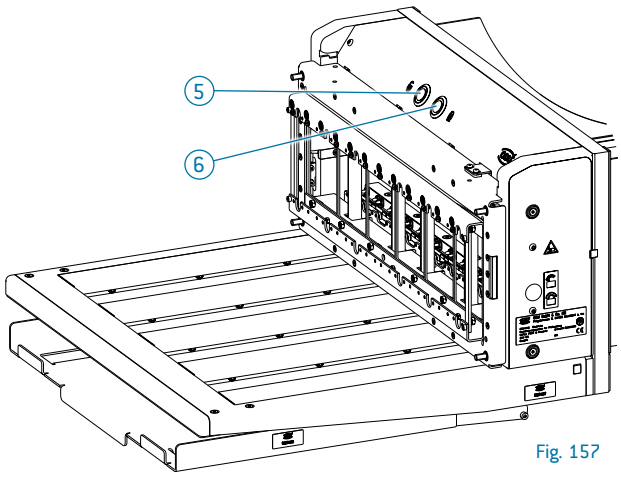

Fig. 157

- On electric receivers, locking and unlocking is done via buttons in inching mode.

Opening the locking hook

▶ Press the Unlock button (5) to open the locking hook.
The locking hooks are open when delivered.

Attaching the adapter (ITA)

▶ Attach the adapter (ITA) so the centering blades (4) are aligned with the centering blade holders (2).

▶ Guide the adapter (ITA) toward the receiver so the centering blades (4) slide into the centering blade holders (2) on both sides.
Make sure the adapter (ITA) does not tilt during this process.

▶ Push the adapter (ITA) onto the receiver as far as it will go.
The release then follows automatically. The Lock button (6) lights up continuously.

Locking the adapter (ITA) and receiver

▶ Press the Lock (Close) button (6) and hold it down until the limit position is reached.

▶ The locking hooks tighten and contacting takes place.
The procedure is complete as soon as the Unlock button (5) lights up continuously.

Unlocking the adapter (ITA) from the receiver

▶ Press the Unlock (Open) button (5) and hold it down until the limit position is reached.
The locking hooks are released.
The procedure is complete when the Lock (Close) button (6) lights up continuously.

Pulling the adapter (ITA) away

▶ Carefully pull the adapter (ITA) away from the receiver.
Do not tilt the adapter (ITA) during this process.
Make sure not to damage the assembled connectors when pulling the adapter (ITA) away.

(1) Adapter (ITA)

(2) Centering blade holder

(3) Open locking hook

(4) Centering blade

(5) Unlock (Open) button

(6) Lock (Close) button

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8.5 Operation of 12-Flex TWO M Receiver and 12-Flex TWO M Tabletop receiver

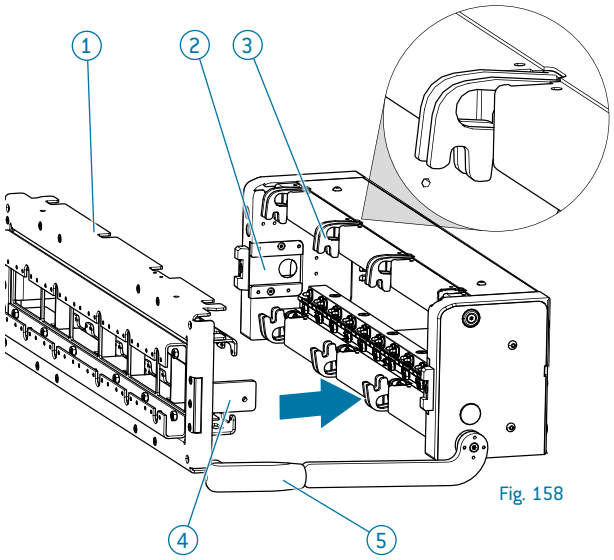

Fig. 158

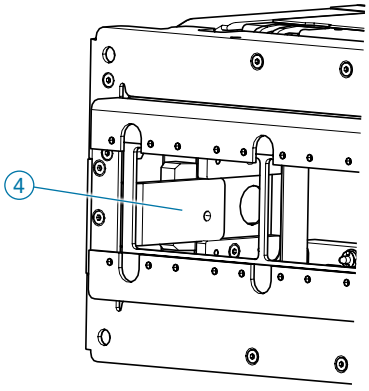

Fig. 159

- On mechanical receivers, locking and unlocking is done via a hand lever (5).

Opening the locking hook

▶ Turn the hand lever (5) counterclockwise.

Attaching the adapter (ITA)

▶ Attach the adapter (ITA) so the centering blades (4) are aligned with the centering blade holders (2).

▶ Guide the adapter (ITA) toward the receiver so the centering blades (4) slide into the centering blade holders (2) on both sides. Make sure the adapter (ITA) does not tilt during this process.

▶ Push the adapter (ITA) onto the receiver as far as it will go.

Locking the adapter (ITA) and receiver

▶ Close the locking hooks with the hand lever (5). Do this by turning the hand lever clockwise as far as it will go.

▶ The locking hooks tighten and contacting takes place.

Unlocking the adapter (ITA) from the receiver

▶ Turn the hand lever (5) counterclockwise as far as it will go. The locking hooks are released.

▶ Carefully pull the adapter (ITA) away from the receiver. Do not tilt the adapter (ITA) during this process. Make sure not to damage the assembled connectors when pulling the adapter (ITA) away.

(1) Adapter (ITA)

(2) Centering blade holder

(3) Open locking hook

(4) Centering blade

(5) Hand lever in bottom position for opening

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8.6 Handling of the keyboard tray

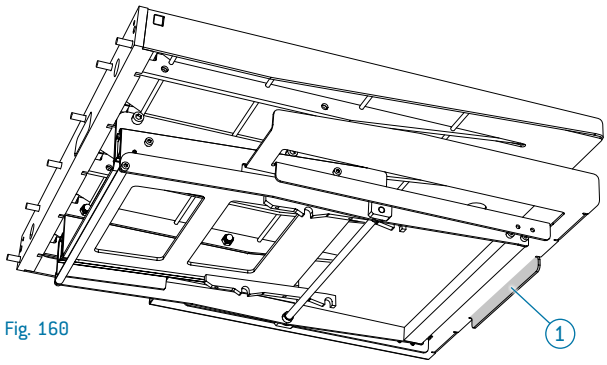

Fig. 160

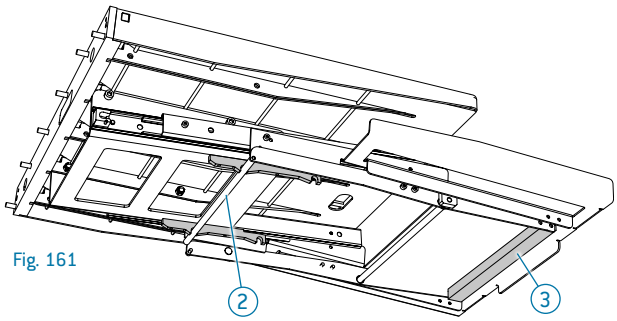

Fig. 161

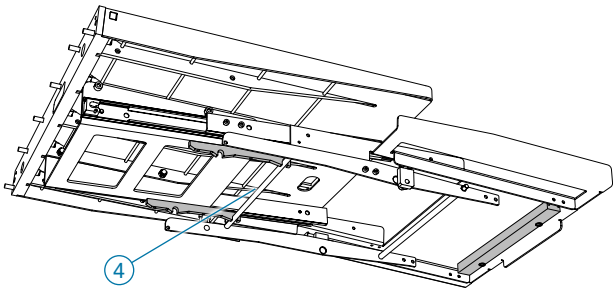

Fig. 162

- The keyboard tray can be locked in two positions when pulled out.

Pulling the keyboard tray out

▶ Pull the lug (1) forward. You will need to apply slight force to do this.

▶ Pull the keyboard tray out until it snaps into place. The keyboard tray is now locked in the first position (2).

Pulling the keyboard tray further out

▶ Push the release button (3) up.
You can now pull the keyboard tray further out or slide it back under the platform.

▶ To pull it further out, keep pulling the keyboard tray until it snaps into the second position (4).
The keyboard tray is now locked in the second position (4).

Pushing the keyboard tray in

▶ Push the release button (3) up.
Push the keyboard tray toward the platform until it snaps into the first position (2).
The keyboard tray is now locked in the first position (2).

Stowing the keyboard tray

▶ Push the release button (3).
Push the keyboard tray under the platform until it snaps into the home position. You will need to apply slight force to do this.

(1) Lug

(2) Latch for first position

(3) Release button

(4) Latch for second position

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8.7 Installation of covers onto the receiver and adapter (ITA)

8.7.1 Use of the cover on the receiver

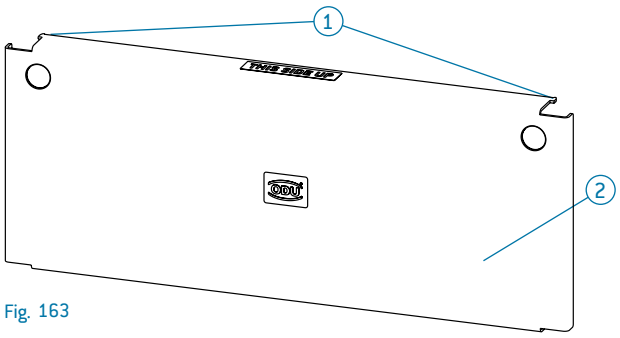


Fig. 163

- The receiver cover (2) hooks into the retaining grooves (3) at the top of the receiver.
- The cover hooks in in exactly the same way for all 12-Flex TWO M receivers and 12-Flex FOUR A receivers.
- The example shows the hooking in of the cover on a 12-Flex FOUR A receiver.

ATTENTION **Risk of damage from the receiver being open.**

▶ When not in use, protect the receiver with the receiver cover.

Assembling the cover on the receiver

▶ Guide the locating lugs on the receiver cover (1) into the retaining grooves on the receiver (3).

▶ Pivot the receiver cover (2) down until it makes contact with the receiver.

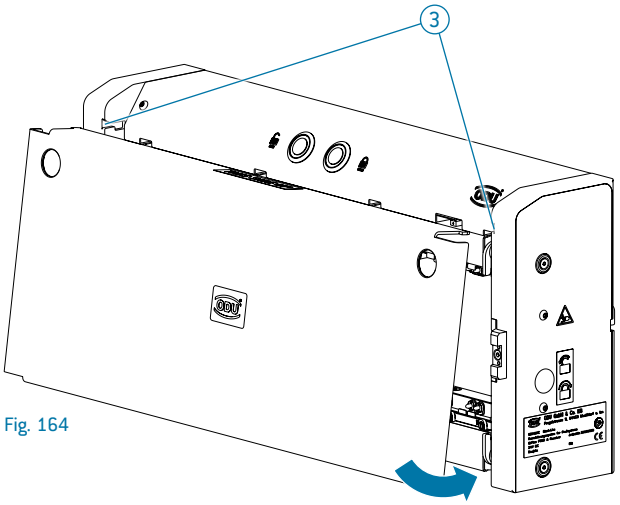


Fig. 164

(1) Locating lugs on the receiver cover

(2) Receiver cover

(3) Retaining grooves on the receiver

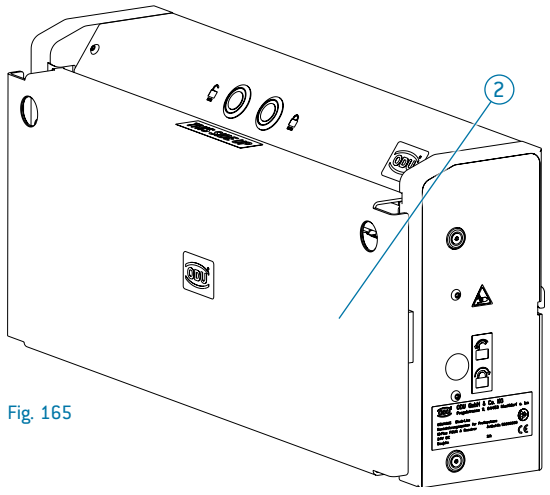


Fig. 165

8.7.2 Use of the cover on the adapter (ITA)

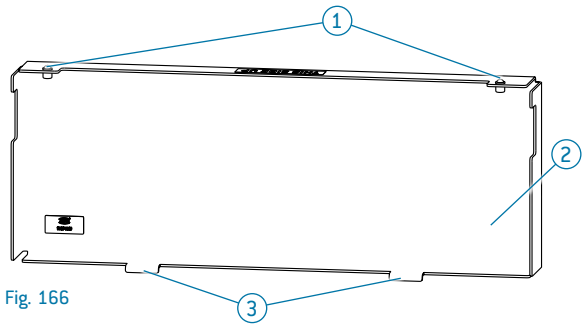


Fig. 166

- The adapter cover (2) is inserted at the bottom of the adapter (ITA) (7) and snapped into place at the top of the adapter (ITA).
- The cover is inserted in exactly the same way for all 12-Flex TWO M adapters and 12-Flex FOUR A adapters.
- The example shows the cover being used on a 12-Flex FOUR A adapter.

ATTENTION **Risk of damage from the adapter (ITA) being open.**

▶ When not in use, protect the adapter (ITA) with the adapter cover.

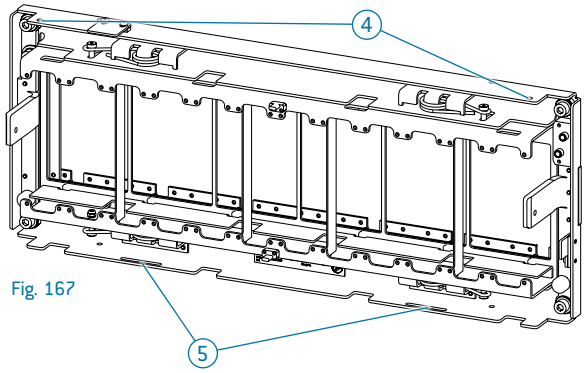


Fig. 167

Assembling the cover on the adapter (ITA)

▶ Insert the lugs (3) of the adapter cover into the elongated holes in the adapter (ITA) (5).

▶ Pivot the adapter cover (2) toward the adapter (ITA) (7) until the domed springs (1) on the adapter cover (2) engage in the slots for the domed springs (4) on the adapter (ITA) (7).

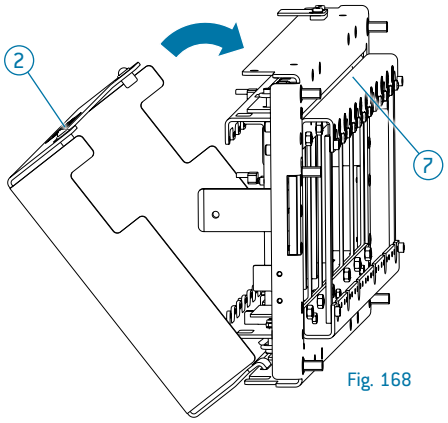


Fig. 168

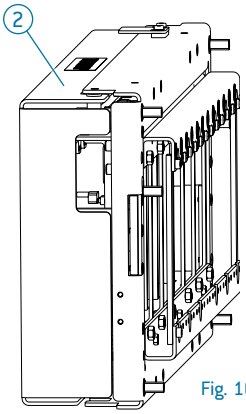


Fig. 169

(1) Domed springs

(2) Adapter cover

(3) Lugs of the adapter cover

(4) Slots for the domed springs

(5) Elongated holes in adapter (ITA)

(7) Adapter (ITA)

9. MAINTENANCE

Read the safety information and other notes below before carrying out any maintenance or cleaning work and take note of the measures described therein designed to ensure safe maintenance and cleaning.

9.1 Safety information relating to maintenance

DANGER **Danger from electric current!**

Touching live parts can lead to an electric shock.

- Always have maintenance and cleaning work carried out by qualified skilled personnel (maintenance personnel or technicians).
- De-energize the combined device before working on the contact system.
- Use a padlock to secure the main switch for the whole system against unauthorized restarting.
- Wear personal protective equipment.
- Use additional protective equipment as appropriate for the work at hand.
- Only remove and insert connectors when the device is de-energized.

WARNING **Danger from improper maintenance!**

Incorrect or improperly conducted maintenance can leave the combined device in a potentially dangerous condition. This then leads to the risk of injury, up to and including electric shock.

- Only ever allow skilled personnel to perform assembly, installation, commissioning, repair, maintenance, and servicing work.
- Only ever allow appropriately skilled personnel to work on electrical equipment!
- Only allow authorized personnel to perform diagnostics, troubleshooting, and recommissioning.
- Follow the applicable safety rules.
- Wear personal protective equipment.
- Only use genuine spare parts.

CAUTION **Risk of injury from sharp edges and corners!**

Sharp edges and corners can cause abrasions and cuts.

- Be careful when working near to sharp edges and corners.
- Wear personal protective equipment.

NOTICE Maintain and clean the device according to the maintenance table.

The maintenance and cleaning intervals may be longer than stated in the maintenance table, depending on the environmental conditions.

9.2 Information on cleaning

ATTENTION **Risk of damage from unsuitable cleaning!**

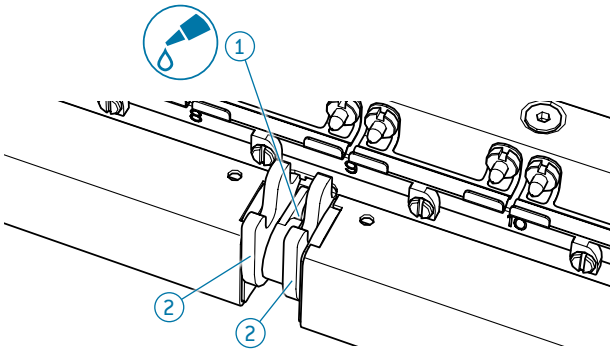
- Never clean the device with compressed air.

Only clean the accessible surfaces and covers of the device.

- Clean the device with a lint-free cloth.
- To remove more stubborn dirt, wipe the device with a damp, lint-free cloth.
- Make sure that no moisture is able to enter the device.

9.3 Lubrication

- Lubricate the locking mechanism (1) of the locking hooks (2) regularly according to the maintenance table.
  Make sure the lubricant is only applied to the locking mechanism.
  A recommended lubricant is included in the Service Kit, item no. 50041989.



(1) Locking mechanism

(2) Locking hook

Fig. 170

9.4 Maintenance table

Interval	Location	Action
Daily	Whole system	Visual check of loose receptacles
Every 5,000 mating cycles	Locking mechanism	Lubricate
Every 5,000 mating cycles	Centering blade holder	Clean
Every 5,000 mating cycles	Whole system	Clean

9.5 List of spare parts

NOTICE Only use genuine spare parts. It is the only way to guarantee safe operation of the device and the whole system. To do otherwise will invalidate the warranty.

Spare part	Item no.
Light barrier kit for receiver	50274969
Motor unit	50274973
Control board	50270919
Resistance-coding block for adapter (ITA)	50274984
Actuator kit for adapter	50274985
Centering blade kit for 12-Flex FOUR A adapter	50281249
Centering blade kit for 12-Flex TWO M adapter	50281247

9.6 List of accessories

Accessory	Item no.
Width across flats 8 socket wrench for emergency release	50275359
Socket wrench for service access lock	50275360
Pre-centering kit	50287059
Flex TWO receiver strain-relief plate	50274972
Flex FOUR receiver strain-relief plate	50274971
Flex FOUR adapter strain-relief plate	50281436
Flex TWO adapter strain-relief plate	50281434
12-Flex FOUR receiver protective cover	50274974
12-Flex TWO receiver protective cover	50274975
12-Flex FOUR adapter protective cover	50274986
12-Flex TWO adapter protective cover	50274987
Cover for 12-Flex FOUR receiver slot	50275305
Cover for 12-Flex TWO receiver slot	50275304
Cover for 12-Flex FOUR A adapter slot	50275366
Cover for 12-Flex TWO M adapter slot	50275365
Adapter alignment system for platform	50282839
Service Kit	50041989
Platform-variant adapter assembly kit	50287609
Hanging-variant adapter assembly kit	50287610

9.6.1 Replacement of the controller

To undo the controller fixing screws, you will need:

- Hexagon wrench width across flats 3 mm

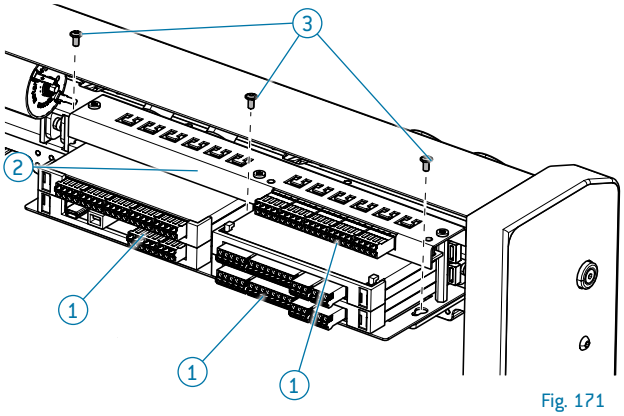


Fig. 171

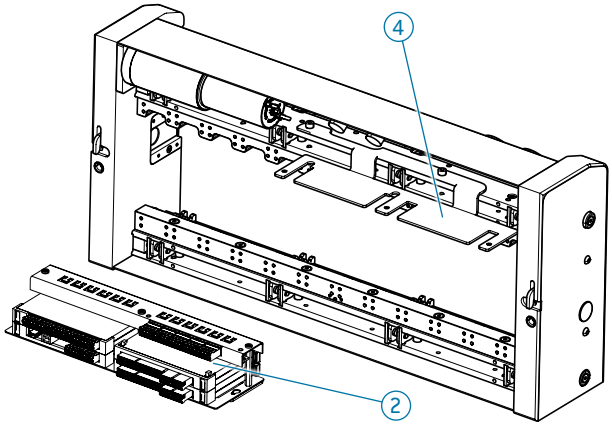


Fig. 172

Replacing the controller

- ▶ Detach all connectors (1) from the controller (2).
- ▶ Remove the fixing screws from the controller (3).
- ▶ Pull the controller (2) off the mount (4).
- ▶ Follow the steps in reverse order to install.

NOTICE

Take note of the specified tightening torques and numbers of screws!
For details of screws, nuts, and tightening torques, see Section 6.13.

(1) Connectors

(2) Controller

(3) Controller fixing screws

(4) Control board mount

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9.6.2 Replacement of the motor unit

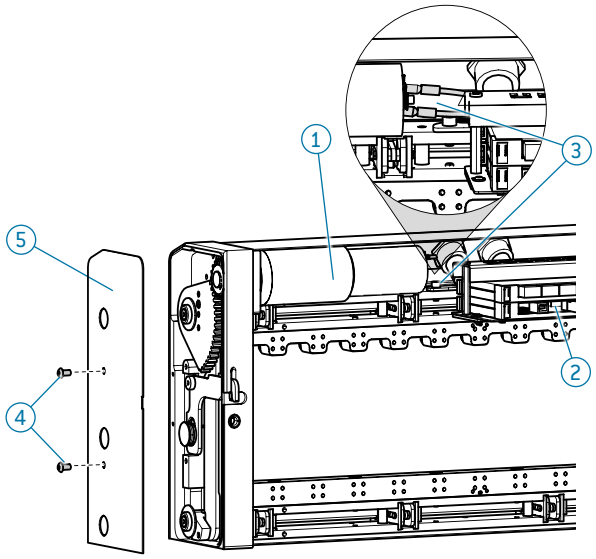

Fig. 173

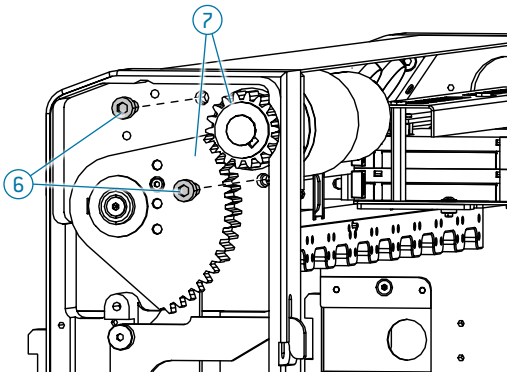

Fig. 174

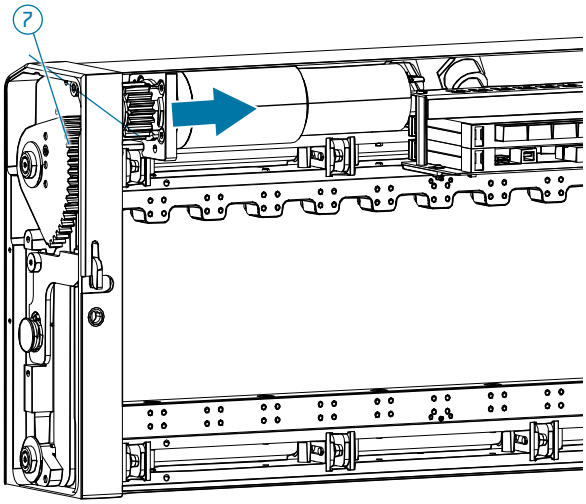

Fig. 175

To undo the cover fixing screws (4), you will need:

- Hexagon wrench width across flats 2.5 mm

To undo the motor fixing screws, (6) you will need:

- Hexagon wrench for hexagon socket width across flats 4 mm

Replacing the motor unit

▶ Detach the connectors (3) from the motor unit (1).

▶ Remove the fixing screws from the cover (4).

▶ Remove the cover (5) from the side panel.

▶ Remove the fixing screws from the motor unit (6).

▶ Push the motor unit (1) toward the controller until the gears (7) are no longer meshed.
Do not tilt the motor unit during this process.
Do not damage the gears (7) of the drive unit.

▶ Follow the steps in reverse order to install.

NOTICE Take note of the specified tightening torques and numbers of screws!
For details of screws, nuts, and tightening torques, see Section 6.13 .

NOTICE Grease the pinion on the motor with Molycote P37 prior to installation.

(1) Motor unit

(2) Controller

(3) Connector

(4) Cover fixing screws

(5) Side-panel cover

(6) Motor-unit fixing screws

(7) Drive-unit gears

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9.6.3 Replacement of the pre-centering piece on the receiver

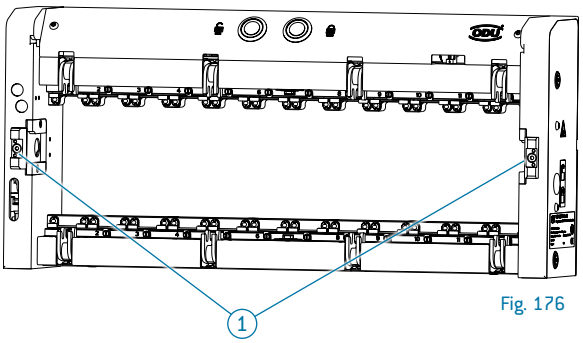

Fig. 176

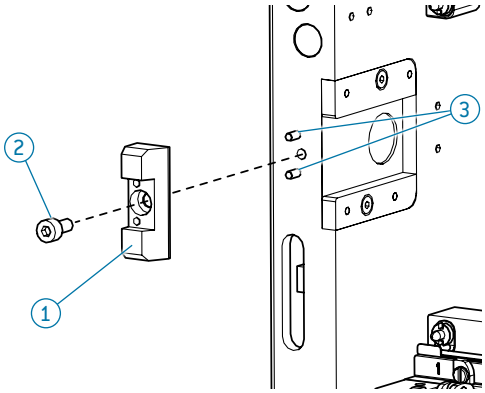

Fig. 177

To undo the screw (2), you will need:

- Hexagon wrench 3 mm
- The pre-centering piece is replaced in exactly the same way for all receivers.
- The example shows the replacement of a pre-centering piece on a 12-Flex FOUR A receiver.

Replacing the pre-centering piece

▶ Remove the screw (2) from the pre-centering piece (1).

▶ Take the pre-centering piece off the mount pins (3).

▶ Follow the steps in reverse order to install.

▶ When assembling, make sure the pre-centering piece sits square on the alignment pins. Do not tilt the pre-centering piece!

NOTICE Take note of the specified tightening torques and numbers of screws!

For details of screws, nuts, and tightening torques, see Section 6.13.

(1) Pre-centering piece (2x)

(2) Screw

(3) Mount pins

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9.6.4 Replacement of the resistance-coding block and the centering blades on the adapter (ITA)

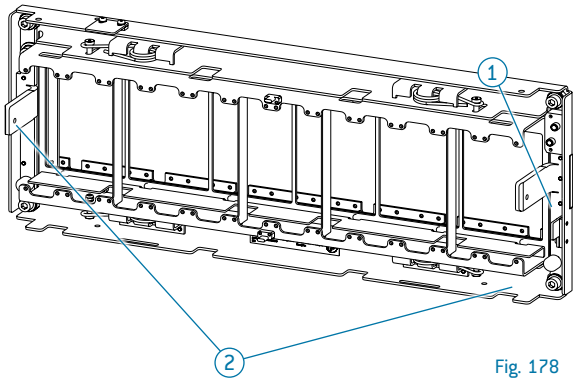

Fig. 178

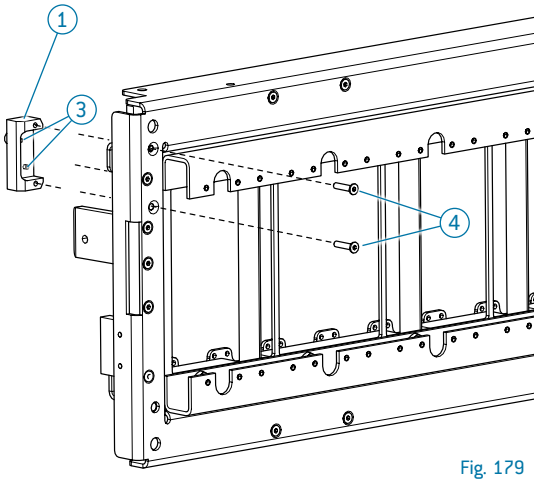

Fig. 179

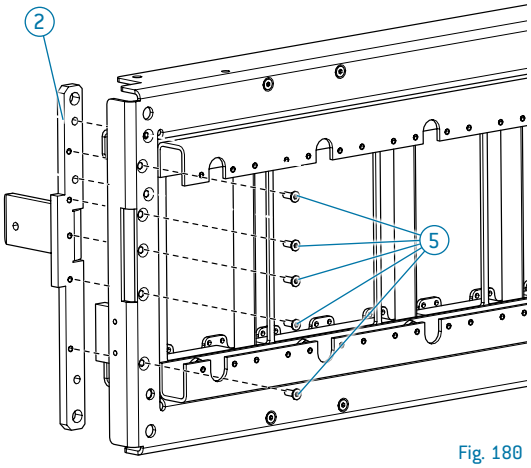

Fig. 180

To undo all screws (4) (5), you will need:

- Hexagon wrench width across flats 2 mm
- The centering blades and the resistance-coding block are replaced in exactly the same way for all adapters (ITA).
- The example shows the replacement of a centering blade and the resistance-coding block on a 12-Flex FOUR A adapter.

Replacing the resistance-coding block (optional)

▶ Remove the screws (4) from the resistance-coding block (1).

▶ Remove the resistance-coding block (1).
Do this by pulling off the resistance-coding block without bending its pins (3).

▶ Follow the steps in reverse order to install.

Replacing the centering blade

▶ First remove the resistance-coding block (1), if present.

▶ Remove the screws (5) from the centering blade.

▶ Take off the centering blade (2).

▶ Follow the steps in reverse order to install.

NOTICE Take note of the specified tightening torques and numbers of screws!
For details of screws, nuts, and tightening torques, see Section 6.13.

(1) Resistance-coding block

(2) Centering blade (2x)

(3) Pins on the resistance-coding block

(4) Screws for the resistance-coding block (2x)

(5) Screws for the centering blade (5x)

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10. TROUBLESHOOTING

Read the safety information below before performing troubleshooting or repairs and take note of the measures described therein designed to ensure safe troubleshooting and repairs.

WARNING **Danger from improper troubleshooting!**

- Always have troubleshooting carried out by qualified skilled personnel (maintenance personnel or technicians).
- Only unlock the receiver with the special tool described.
- Only use genuine spare parts.

NOTICE The possible faults listed in the troubleshooting matrix are based on the standard of knowledge available when these assembly instructions were produced.

The latest findings and experience will be incorporated and added to these possible faults as part of a process of continuous improvement.

10.1 Troubleshooting matrix

Possible fault	Possible cause	Action
Adapter (ITA) will not hook in to receiver	Locking mechanism stiff	Lubricate according to maintenance schedule
	Centering blades bent	Replace centering blades
	Foreign object in contact or hook-in area	Remove foreign object
Adapter (ITA) will not unhook from receiver	Receiver is locked	Unlock receiver
	Locking mechanism stiff	Open receiver via emergency release and lubricate according to maintenance schedule
Will not lock	Light barriers not switching	Check light barriers and replace if necessary
	ITA not in correct position	Check ITA position
	No power supply	Check power supply
	Button not switching	Check button and replace if necessary
	Controller fault	Interrupt power supply (reset)
	Locking mechanism stiff	Lubricate receiver according to maintenance schedule
Will not unlock	Light barriers not switching	Check light barriers and replace if necessary
	Locking mechanism stiff	Open receiver via emergency release and lubricate according to maintenance schedule
	No power supply	Check power supply
	Button not switching	Check button and replace if necessary
	Controller fault	Interrupt power supply (reset)
Controller fault (buttons flashing simultaneously)	Controller fault	Interrupt power supply (reset)
	Faulty signal from light barrier	Check electric components
	Faulty signal from button	Check electric components
	Faulty signal from fork light barrier	Contact service department
Slide mount jamming	Service access lock not open on both sides	Check service access lock and open fully on both sides
	Slide mount bent	Replace slide mount
	Lock not actuated	Actuate lock, check function if necessary
	Keyboard-tray rail bent	Replace keyboard tray

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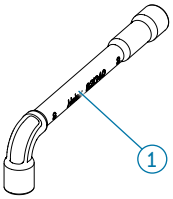
10.2 Opening of the 12-Flex FOUR A Receiver via emergency release



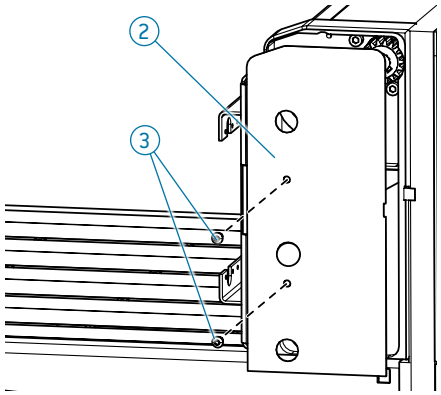


Fig. 181

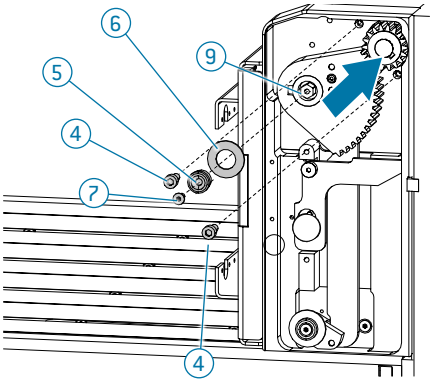


Fig. 182

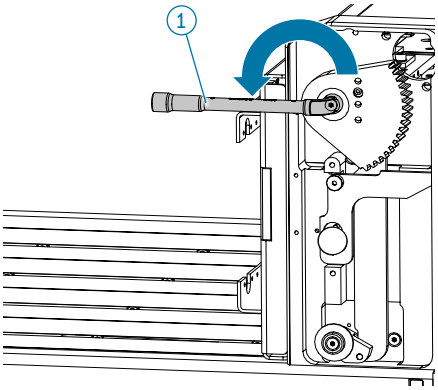


Fig. 183

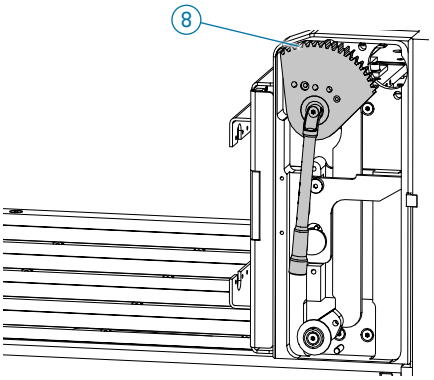


Fig. 184

DANGER **Danger from transmitting electric current!**

Touching live connectors can lead to an electric shock.

- ▶ Only allow skilled personnel to open the receiver via the emergency release.
- ▶ Only ever open the receiver via the emergency release when the device is de-energized.
- ▶ Secure the device against restarting.

To undo the cover fixing screws (3), you will need:

- Hexagon wrench width across flats 2.5 mm

To undo the emergency-release screw (7), you will need:

- Hexagon wrench for hexagon socket width across flats 2.5

To actuate the locking shaft (9), you will need:

- Socket wrench width across flats 8 for emergency release (1) (item no. 50275359)

The emergency-release screw is at the top of the receiver's right side panel.

Opening the receiver via emergency release

- ▶ Remove the fixing screws from the cover (3) (hexagon socket width across flats 2.5).
- ▶ Remove the cover from the side panel (2).
- ▶ Remove the fixing screws (4) from the motor and push the motor back until the gears are no longer meshed.
- ▶ Remove the cover (5) and the washer (6) together with the screw (7) (hexagon socket width across flats 2.5).
- ▶ Place the socket wrench width across flats 8 (1) onto the now-exposed hexagon socket of the locking shaft (9).
- ▶ To unlock the receiver, turn the socket wrench counterclockwise until the system (8) is unlocked completely, see bottom figure.
- ▶ After removing the adapter (ITA), move the socket wrench width across flats 8 (1) back to the home position and reassemble everything by following the steps in reverse order (Fig. 183).
- ▶ When assembling the motor, make sure the gears mesh with one another.

(1) Socket wrench width across flats 8
(2) Cover for right side panel
(3) Cover fixing screws (hexagon socket width across flats 2.5)
(4) Motor fixing screws
(5) Cover for emergency-release screw (hexagon socket width across flats 2.5)
(6) Washer
(7) Screw
(8) System
(9) Locking shaft

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For customer-specific receivers, it must be ensured that the required areas for emergency unlocking are easily accessible, otherwise it will not be possible to open the receiver in the event of a defect in the electromechanical locking system.

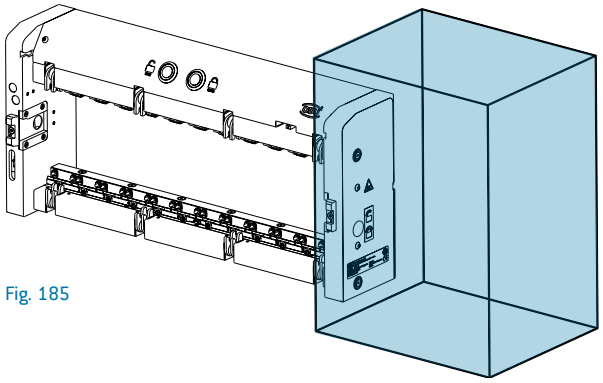

Fig. 185

ATTENTION **If the emergency release cannot be reached; there is a potential hazard as it will not be possible to disconnect the adapter from the receiver in case of a defect!**

- In order to actuate the emergency release, it is necessary to ensure during the design phase that there is a freely accessible area on the side of the receiver. (Fig.158)

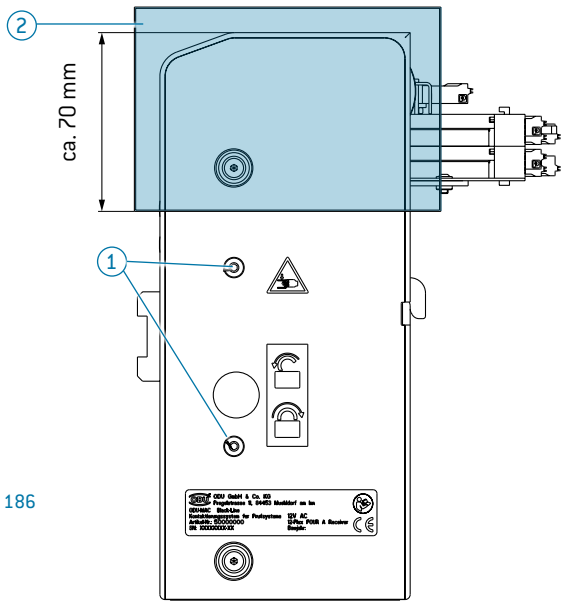

Fig. 186

- If this is not possible, it must at least be ensured that the screws (1) on the cover and the marked area (2) are accessible. (Fig.159)

11. DECLARATION OF INCORPORATION

Declaration of conformity with the required content in accordance with EN ISO/IEC 17050-1

Original Declaration of Incorporation

in accordance with the Machinery Directive for partly completed machinery

A PERFECT ALLIANCE.

Document No./Month Year: D00010598 / June . 2020

For the partly completed machinery described below

Role:	Contact system for testing systems for installation in stationary testing systems
Description, Article No.:	ODU-MAC Black-Line; 12-Flex FOUR A Receiver; Art. No. 50274947, 50274948, 50274949, 50274950

We hereby declare that these products comply with the essential requirements described below for partly completed machinery in accordance with the Machinery Directive 2006/42/EC:

1.1.3, 1.1.5, 1.1.6, 1.2.1, 1.2.2, 1.2.3, 1.3.2, 1.3.3, 1.3.4, 1.3.7, 1.3.9, 1.4.1, 1.5.1, 1.5.2, 1.5.5, 1.5.6, 1.5.7, 1.5.8, 1.5.9, 1.5.10, 1.5.11, 1.6.1, 1.6.2, 1.6.4, 1.6.5, 1.7.1, 1.7.3, 1.7.4

The specific technical documentation referred to in Annex VII, Part B has been created.
Upon substantiated request, we shall provide the national authorities with the specific documentation concerning the partly completed machinery in electronic or paper form.

The partly completed machinery must not be put into service until it has been established that the machine into which the partly completed machinery is to be incorporated complies with the provisions of the Machinery Directive and, where appropriate, any other applicable requirements.

Details of the relevant **standards/technical specifications** used as a basis (if applicable to the partly completed machinery):

EN ISO 12100:2010, EN ISO 13849-1:2015, EN 60204-1:2006 + A1_2009

The manufacturer bears sole responsibility for issuing this declaration of incorporation.

Name: **ODU GmbH & Co. KG**
Address: **Pregelstrasse 11, 84453 Mühldorf am Inn, Germany**

The following person/entity is authorized to compile the relevant technical documentation:
Name: **Otto Dunkel GmbH**
Address: **Pregelstrasse 11, 84453 Mühldorf am Inn, Germany**

Mühldorf am Inn / 26.06.2020

Area / Date — Dipl. Ing. (FH) Stefan Franzl, Segment Manager KB-MDS

Mühldorf am Inn / 26.06.2020

Area / Date — Dr.-Ing. Kurt Woelfl, Technical Manager

This declaration certifies conformity with the so-called harmonization legislation, but does not include any assurance of product characteristics or features.

Additional information
This declaration applies to all specimens manufactured in accordance with the corresponding manufacturing drawings, which are part of the technical documentation. Further information regarding compliance with the above sources is contained in the supporting documentation enclosed with the conformity statement.

NO.D00011649/Rev.c

Declaration of conformity with the required content in accordance with EN ISO/IEC 17050-1

EU Declaration of Conformity

A PERFECT ALLIANCE.

Document No./Month Year: D00010597 / June . 2020

For the product described below

Description, Article No.: ODU-MAC Black-Line
12-Flex FOUR A Receiver
Art No.: 50274947, 50274948, 50274949, 50274950

We hereby declare that this product meets the **essential requirements** laid down in the harmonization legislation referred to below:

Directive 2014/30/EU of the European Parliament and of the Council of February 26, 2014 on the harmonization of the laws of the Member States relating to electromagnetic compatibility – in short: **EMC Directive**

Directive 2011/65/EU of the European Parliament and of the Council of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment – in short: **RoHS Directive**

Details of the relevant **harmonized standards/technical specifications** used as a basis:

Harmonized standards

Source	Issue date	Job title
EN 61000-6-2	2005	Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity for industrial environments
EN 61000-6-4 + A1	2007, 2011	Electromagnetic compatibility (EMC) – Part 6-4: Generic standards – Emitted interference for industrial environments
EN 50581	2012	Technical documentation for the assessment of electrical and electronic equipment regarding the restriction of hazardous substances

The manufacturer or its authorized representative bears responsibility for issuing this declaration.

Name: **ODU GmbH & Co. KG**
Address: **Pregelstrasse 11, 84453 Mühldorf am Inn, Germany**

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12. DISASSEMBLY / DISPOSAL

Do not dispose of old electrical and electronic devices in domestic waste.

When disposing of the device, equipment, and accessories, follow the latest relevant environmental and recycling regulations applicable in your country and region.

NO_D000116491/Rev. c

13. SERVICE / SUPPORT

Direct any questions to:

Customer Service

ODU GMBH & CO. KG

Pregelstraße 11
84453 Mühldorf a. Inn
GERMANY

E-mail: black-line@odu.de

Phone: +49 8631 6156-0

odu-interconnect.com

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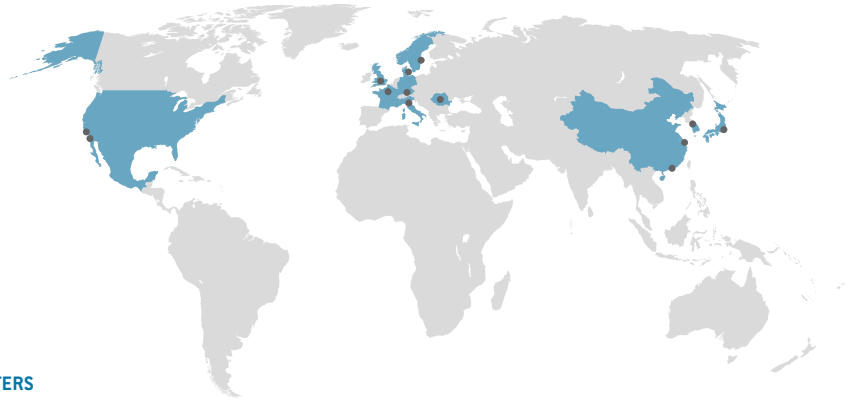
ODU GROUP WORLDWIDE



HEADQUARTERS

ODU GmbH & Co. KG
Pregelstraße 11, 84453 Mühldorf a. Inn, Germany
Phone: +49 8631 6156-0, Fax: +49 8631 6156-49, E-mail: sales@odu.de

SALES LOCATIONS

ODU (Shanghai) International Trading Co., Ltd.
Phone: +86 21 58347828-0
E-mail: sales@odu.com.cn
www.odu.com.cn

ODU (HK) Trading Co., Ltd.
Phone: +852 3963-9588
E-mail: sales@odu.hk
www.odu.hk

ODU Denmark ApS
Phone: +45 2233 5335
E-mail: sales@odu-denmark.dk
www.odu-denmark.dk

ODU-France SARL
Phone: +33 1 3935-4690
E-mail: sales@odu.fr
www.odu.fr

ODU Italia S.R.L.
Phone: +39 331 8708847
E-mail: sales@odu-italia.it
www.odu-italia.it

ODU Japan K.K.
Phone: +81 3 6441 3210
E-mail: sales@odu.co.jp
www.odu.co.jp

ODU Korea Inc.
Phone: +82 2 6964 7181
E-mail: sales@odu-korea.kr
www.odu-korea.kr

ODU Romania Manufacturing SRL
Phone: +40 269 704638
E-mail: sales@odu-romania.ro
www.odu-romania.ro

ODU Scandinavia AB
Phone: +46 176 18262
E-mail: sales@odu.se
www.odu.se

ODU-UK Ltd.
Phone: +44 330 002 0640
E-mail: sales@odu-uk.co.uk
www.odu-uk.co.uk

ODU-USA Inc.
Phone: +1 805 484-0540
E-mail: sales@odu-usa.com
www.odu-usa.com

Further information and specialized representatives can be found at:
www.odu-connectors.com/contact

PRODUCTION AND LOGISTICS SITES

Germany	Otto Dunkel GmbH
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ODU-MAC® Black-Line operating and assembly instructions / TI / 0622 / EN