DE **Betriebsanleitung** / EN **Operating instructions**
FR **Mode d'emploi** / ES **Instructivo de servicio**

Maxi Flex/HD; Basic Flex/HD

DE **MasterLiner**
EN **MasterLiner**
FR **MasterLiner**
ES **MasterLiner**

ABICOR BINZEL® ROBOTIC SYSTEMS

www.binzel-abicor.com

EN English Translation of the original operating instructions

Our latest product documents as well as all contact details for the **ABICOR BINZEL** national subsidiaries and partners worldwide can be found on our website at www.binzel-abicor.com

1 Identification

The **MasterLiner** is used in industry and the trade. It is suitable for use in all applications/joining processes involving filler materials (wires) with a diameter of up to 4 mm.

The following versions are available:

- **Maxi Flex/HD**
- **Basic Flex/HD**

Quick connectors and G1/4 connectors can be used with the **MasterLiner** versions.

These operating instructions only describe the **MasterLiner**. The **MasterLiner** must only be operated using original **ABICOR BINZEL** spare parts.

1.1 Marking

This product fulfills the requirements that apply to the market to which it has been introduced. A corresponding marking has been affixed to the product, if required.

2 Safety

The attached safety instructions must be observed.

2.1 Designated use

- The equipment described in these instructions may be used only for the purpose and in the manner described in these instructions. In doing so, observe the operating, maintenance and servicing conditions.
- Any other use is considered improper.
- Unauthorised modifications or changes to enhance the performance are not permitted.

2.2 Obligations of the operator

- Keep the operating instructions within easy reach at the device for reference and enclose the operating instructions when handing over the product.
- Putting into operation, operating and maintenance work may only be carried out by qualified personnel. Qualified personnel are persons who, based on their special training, knowledge, experience and due to their knowledge of the relevant standards, are able to assess the tasks assigned to them and identify possible dangers (in Germany see TRBS 1203).
- Keep other persons out of the work area.
- Please observe the accident prevention regulations of the country in question.
- Ensure good lighting of the work area and keep the work area clean.
- Occupational health and safety regulations of the country in question. For example, Germany: Protection Law and the Company Safety Ordinance
- Regulations on occupational safety and accident prevention

2.3 Personal protective equipment (PPE)

To avoid danger to the user, these instructions recommend the use of personal protective equipment (PPE).

- This consists of protective clothing, safety goggles, a class P3 respiratory mask, protective gloves and safety shoes.

2.4 Classification of the warnings

The warnings used in the operating instructions are divided into four different categories and appear prior to potentially dangerous work steps. Arranged in descending order of importance, they have the following meanings:

⚠ DANGER

Describes an imminent threatening danger. If not avoided, this will result in fatal or extremely critical injuries.

⚠ WARNING

Describes a potentially dangerous situation. If not avoided, this may result in serious injuries.

⚠ CAUTION

Describes a potentially harmful situation. If not avoided, this may result in slight or minor injuries.

NOTICE

Describes the risk of impairing work results or potential material damage to the equipment.

2.5 Emergency information

In case of emergency, immediately interrupt the following:

- Electrical power supply
- Compressed air
- Welding shielding gas

For further actions to be taken in such circumstances, consult the operating instructions of all pertinent peripheral devices.

3 Product description

⚠ WARNING

Hazards caused by improper use

If improperly used, the product can present risks to persons, animals and material property.

- Use the product according to its designated use only.
- Do not convert or modify the product to enhance its performance without authorisation.
- The product may only be used by qualified personnel (in Germany, see TRBS 1203).

3.1 Technical data

Ambient temperature	–10°C to +45°C	
Relative humidity	Up to 50% at 40°C	Up to 90% at 20°C

Tab. 1 Ambient conditions during operation

Storage in a closed environment, ambient temperature	–25°C to +55°C
Ambient temperature for shipment	–25°C to +55°C
Relative humidity	Up to 90% at 20°C

Tab. 2 Ambient conditions for transport and storage

Type	Protective corrugated pipe	Kevlar sheath	Outer ø mm	Wire ø range mm	Max. wire feed speed m/min	Smallest permissible bending radius mm	Weight per g/m	Tensile strength N	Max. rec. wire feed distance[1]	Area of application type
Basic Flex	✓	×	34	0.8 – 1.2	30	150[2]/300[3]	490	600	25 m	A
Basic HD	×	✓	27				530	1,500		A, B
Maxi Flex	✓	×	34	1.2 – 4.0			610	600		A
Maxi HD	×	✓	32				540	1,500		A, B

Tab. 3 **MasterLiner** versions

1 Without auxiliary drive (depending on the process and the system setup)
2 With dynamic laying
3 Bending radius during wire inching

Type A	**Type B**
Arc welding and soldering applications	Robot welding and soldering applications
Machine applications, submerged arc welding applications, flame spraying applications and arc welding and soldering applications	Machine applications, submerged arc welding applications, flame spraying applications
Medium mechanical loads	High mechanical loads
Suitable for laying in cable carrier chains *	Suitable for laying in cable carrier chains *

Tab. 4 Areas of application

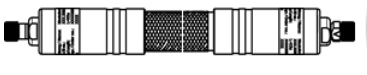
(*) Note the tensile strength of the **MasterLiner** used.

⚠ CAUTION

Wire feed irregularities

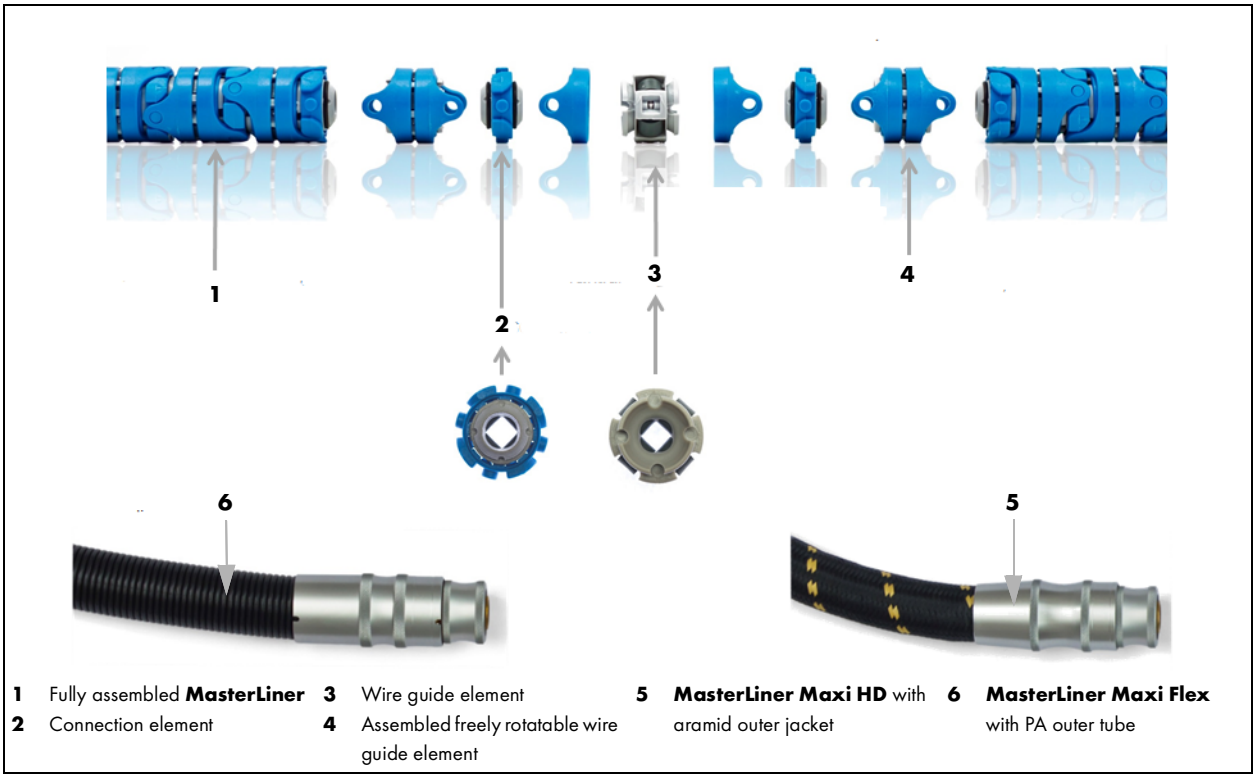
Wire feed irregularities due to the lowest permissible bending radii being breached, the number of bending radii and wire feed distances exceeding 25 m.

- Please note the specifications with regard to the permissible bending angles, bending radii and maximum lengths.
  ⇨ 3.2 Suspension/total bending angle of all bending radii on page EN-7
- Use an additional drive in the event of wire feed distances of over 25 m.

MasterLiner HD with QC quick connector and threaded connection		MasterLiner Flex with QC quick connector and threaded connection	
			
	**Basic HD G1/4** Hose ø 27 mm Largest ø 32 mm		**Basic Flex G1/8** Hose ø 34 mm Largest ø 34 mm
	**Maxi HD G1/4** Hose ø 34 mm Largest ø 40 mm		**Basic Flex G1/4** Hose ø 34 mm Largest ø 38 mm
			**Maxi Flex QC** Hose ø 34 mm Largest ø 40 mm
			**Maxi Flex G1/4** Hose ø 34 mm Largest ø 40 mm

Tab. 5 **MasterLiner** connections

3.1.1 Setup of the individual components



1 Fully assembled **MasterLiner**
2 Connection element
3 Wire guide element
4 Assembled freely rotatable wire guide element
5 **MasterLiner Maxi HD** with aramid outer jacket
6 **MasterLiner Maxi Flex** with PA outer tube

Fig. 1 Setup of the individual components

3.2 Suspension/total bending angle of all bending radii

⚠ CAUTION

Wire feed irregularities

Wire feed irregularities due to the lowest permissible bending radii being breached, too many bending radii and wire feed distances exceeding 25 m.

- Please note the specifications with regard to the permissible bending angles, bending radii and maximum lengths.
  ⇨ 3.2 Suspension/total bending angle of all bending radii on page EN-7
- Use an additional drive in the event of wire feed distances of over 25 m.

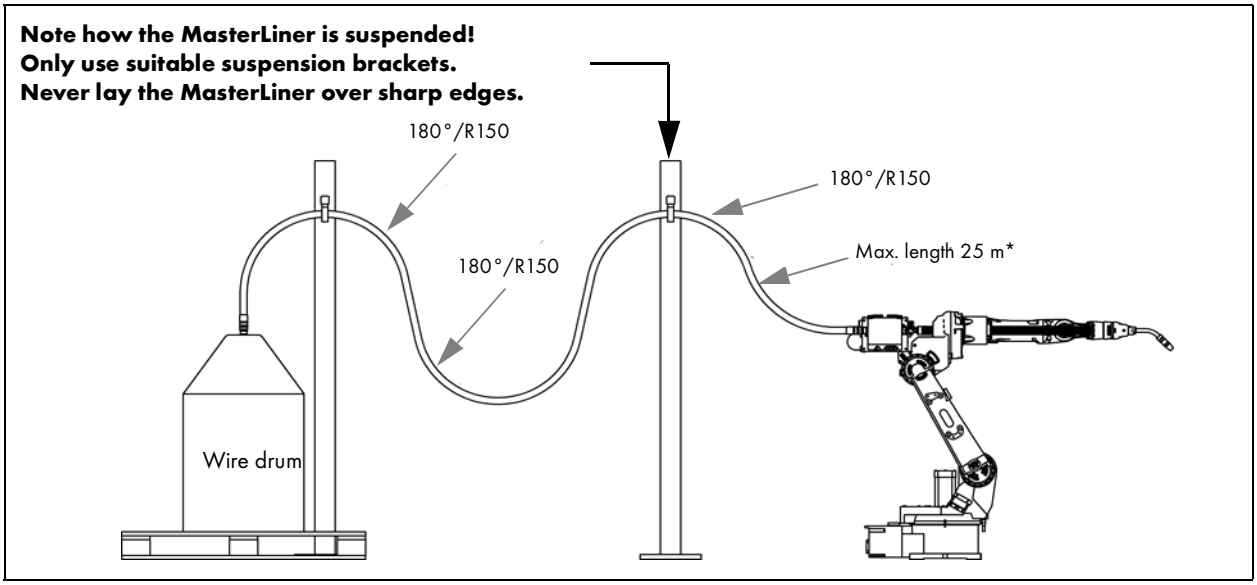


Fig. 2 Suspension/total bending angle of all bending radii

* Depending on the process and the system properties

Max. total bending angle 3x180°+1x90° ~ 630°

The manner in which the wire guide is laid can differ greatly. Note the individual instructions on how to correctly lay the **MasterLiner**.

3.3 Abbreviations

HD	Heavy duty The HD version is sheathed with durable, aramid-fibre-reinforced protective fabric
QC	Quick connector

Tab. 6 Abbreviations

Unit of measurement in drawings or diagrams	Millimetre [mm]

Tab. 7 Dimensions

3.4 Nameplate

The **MasterLiner** is labelled with a nameplate as follows:

⚠ CAUTION

Property damage

Wire jam; problems when feeding in the wire due to the wrong wire feed direction.

- Note the wire feed direction indicated on the product label or the threaded connections during installation.

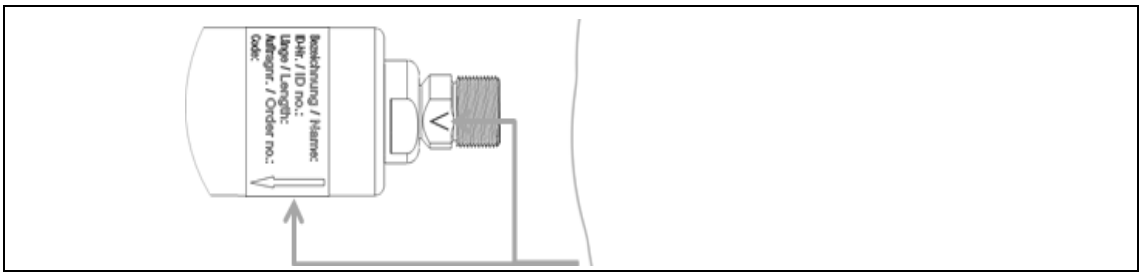


Fig. 3 Nameplate

When making enquiries, please note the following information:

- Liner type
- Length
- ID number

Only note the specified wire feed direction for the **MasterLiner Basic** (all versions)!

3.5 Signs and symbols used

The following signs and symbols are used in the operating instructions:

Symbol	Description
•	Bullet symbol for instructions and lists
⇨	Cross-reference symbol refers to detailed, supplementary or further information
1	Step(s) described in the text to be carried out in succession

4 Scope of delivery

• Relevant version of the **MasterLiner**	• Operating instructions

Tab. 8 Scope of delivery

The compatible connection adapter is available on request.

Order the equipment parts and wear parts separately.
The order data and ID numbers for the equipment parts and wear parts can be found in the current product catalog. Contact details for support and placing orders can be found online at *www.binzel-abicor.com*.

4.1 Transport

Although the items delivered are carefully checked and packaged, it is not possible to fully exclude the risk of transport damage.

Goods-in inspection	Use the delivery note to check that everything has been delivered. Check the delivery for damage (visual inspection).
In case of complaints	If the delivery has been damaged during transportation, contact the last carrier immediately. Retain the packaging for potential inspection by the carrier.
Packaging for returns	Where possible, use the original packaging and the original packaging material. If you have any questions concerning the packaging and/or how to secure an item during shipment, please consult your supplier.

Tab. 9 Transport

4.2 Storage

For ambient conditions for storage in a closed environment:

⇨ Tab. 2 Ambient conditions for transport and storage on page EN-4

5 Functional description

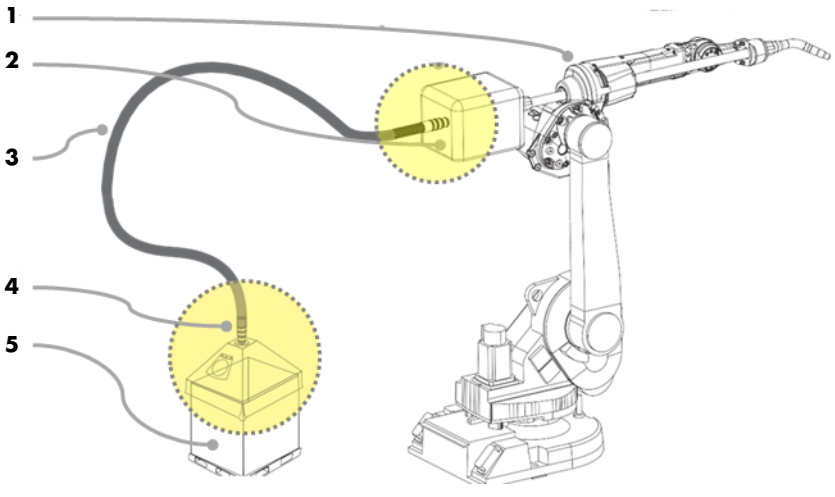
The **MasterLiner** consists of individual segments that can each be rotated by 360°. Each segment contains four rollers that make it possible to almost seamlessly feed the wire from the available wire container (drum/spool) to the wire feeder.

When using two wire feeders, the **MasterLiner** is installed in the middle.

5.1 System overview

NOTICE

- Note the bending radius directly after the wire feeder. We recommend mechanically securing the **MasterLiner** in such a manner that the robot's movement does not transfer any bending and tensile forces that occur to the **MasterLiner**.
- When using the **MasterLiner Basic**, note the wire feed direction.



1 Welding robot
2 Wire feeder
3 **MasterLiner**
4 **MasterLiner** to wire drum connection
5 Wire drum

Fig. 4 Robot welding cell setup

6 Commissioning

⚠ DANGER

Risk of injury due to unexpected start-up

The following instructions must be followed during all maintenance, servicing, assembly, disassembly, and repair work:

- Switch off the power source.
- Disconnect all electrical connections.

⚠ WARNING

Electric shock

Dangerous voltage due to defective cables.

- Check all live cables and connections for proper installation and damage.
- Replace any damaged, deformed or worn parts.

NOTICE

- Please take note of the following instructions:

  ⇨ 3 Product description on page EN-4

- The system may only be installed and commissioned by qualified personnel (in Germany, see TRBS 1203).
- Components must only be used in environments with sufficient ventilation.
- The interconnection (serial or parallel connection) of several power sources may result in material damage.

6.1 Attaching the MasterLiner

NOTICE

- Ensure the **MasterLiner** is the correct length.
- Avoid bending the **MasterLiner** unnecessarily when it is laid. Laying in a cable carrier is essentially possible. However, breaches of the minimum bending radii can cause damage and wire feed irregularities. Note the bending radii for use when dynamically laying the **MasterLiner**:

  ⇨ 3.2 Suspension/total bending angle of all bending radii on page EN-7

- When suspending **MasterLiner** of any type, use suitable mounts, strain relief devices for the wire feeder and wire drums as well as the total wire feed distance.

The section below presents and describes the installation using a QC quick connector.

6.1.1 Wire drum connection – feeding in the wire through an internal wire guide

NOTICE

- Note the minimum passage size and the permissible wire dimensions for the various **MasterLiner** types.

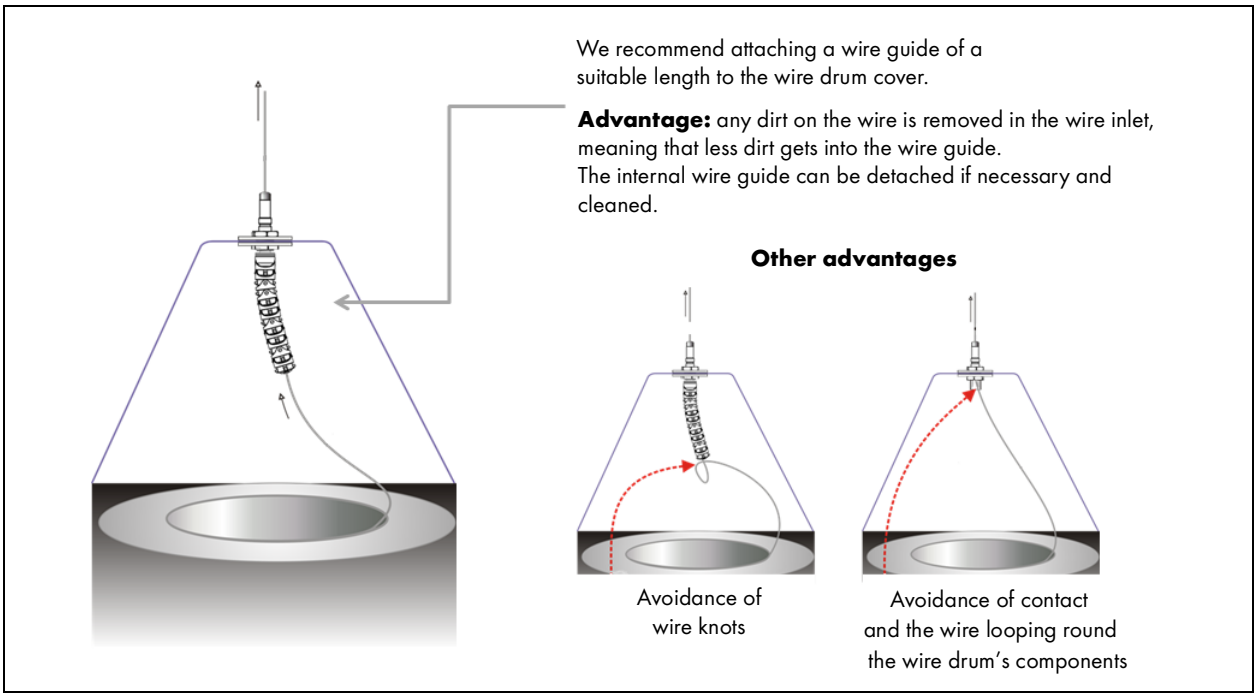


Fig. 5 Advantages

NOTICE

- If the wire ends are not close fitting, the small passage size of the **MasterLiner Basic** may prevent the wire from being fed in.

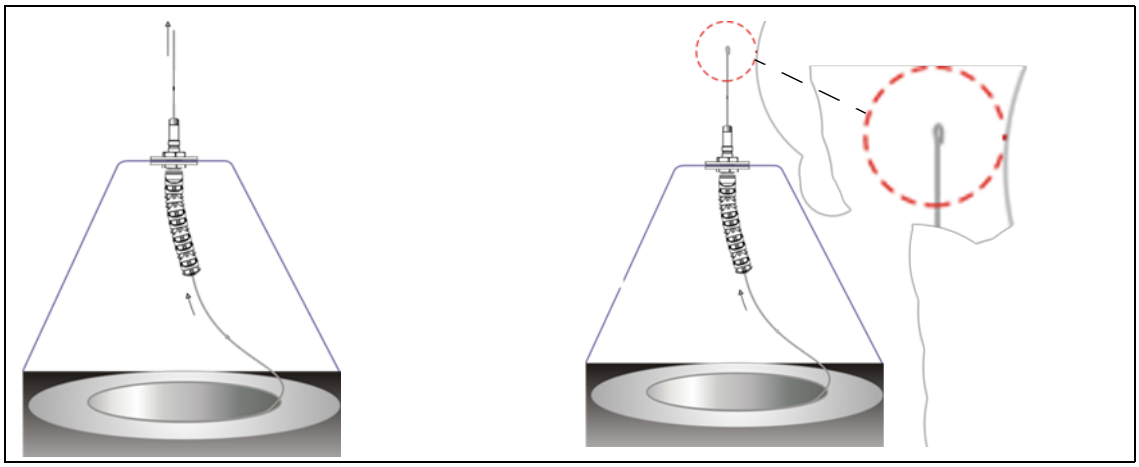


Fig. 6 Wire feed

1 Push the wire end through the internal wire guide.

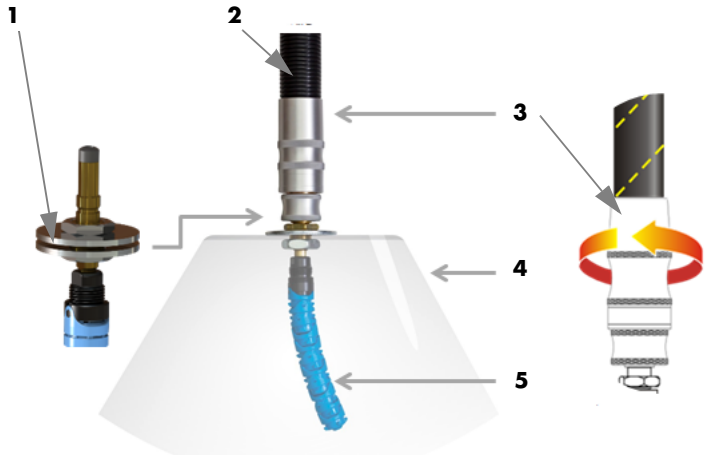
2 Bend the wire end over by approx. 10 mm.

⇨ Fig. 6 on page EN-11

6.1.2 Connecting the MasterLiner to a wire drum

NOTICE

- We recommend connecting the wire guide to the wire drum cover using a QC quick coupling.
- Ensure that the quick coupling is correctly and securely attached to the wire drum.



1 Connection for the wire drum cover **2** **MasterLiner Maxi** with quick coupling **3** Connection sleeve (quick coupling) **4** Wire drum cover **5** Wire guide (inside wire drum)

Fig. 7 Wire drum connection

1 Push the connection sleeve (quick coupling) **(3)** with the wire guide onto the connection **(1)**. Twisting the connection sleeve **(3)** prevents the connection from accidentally coming loose.

Compatible threaded connections are available for all **MasterLiner** versions without a QC quick coupling. The order data and ID numbers can be found in the current product catalogues.
Contact details for support and placing orders can be found online at *www.binzel-abicor.com*.

6.1.3 Wire feed side

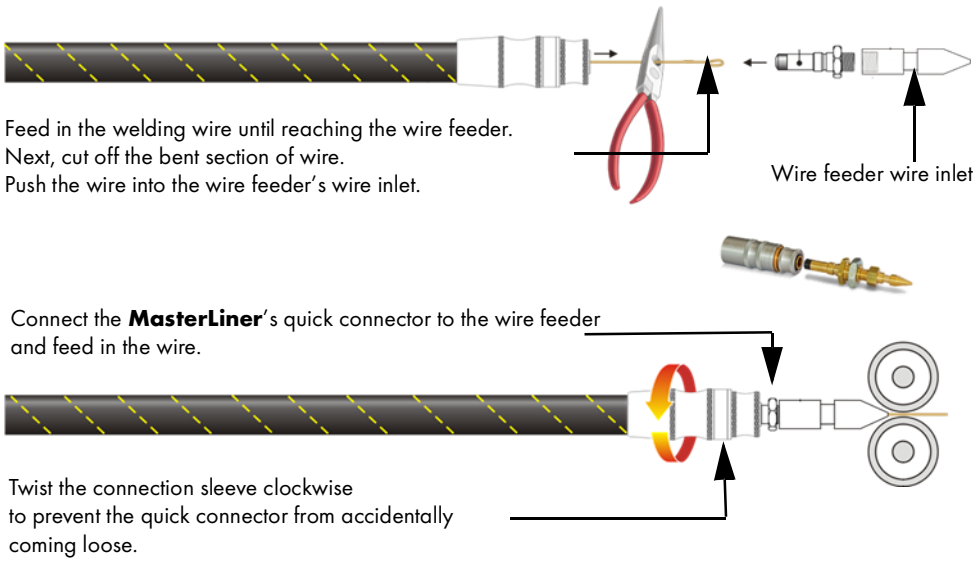


Fig. 8 Wire feed side

6.2 Laying

6.2.1 Robot welding cell

⚠ CAUTION

Device damage

Device damage as a result of inadequate strain relief on the wire feeder.

- Ensure sufficient strain relief on the wire feeder.
- Connect and lay the **MasterLiner** without kinks.

⚠ CAUTION

Device damage

Device damage as a result of unsuitable suspension devices.

- Only use suitable suspension devices when suspending the **MasterLiner**.
- Do not suspend the **MasterLiner** using cable ties.

⚠ CAUTION

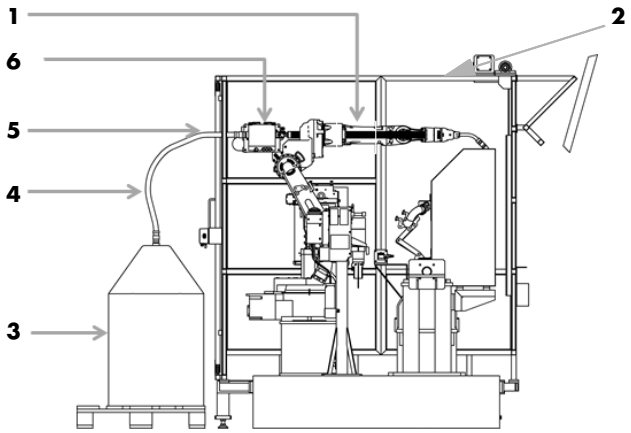
Wire feed irregularities

Wire feed irregularities due to the lowest permissible bending radii being breached, too many bending radii and wire feed distances exceeding 25 m.

- Please note the specifications with regard to the permissible bending angles, bending radii and maximum lengths.

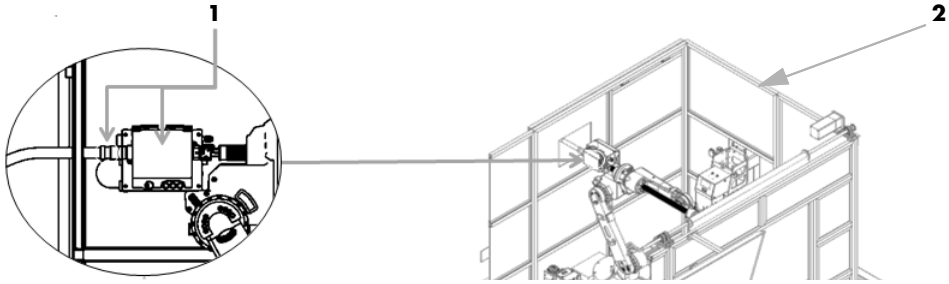
  ⇨ 3.2 Suspension/total bending angle of all bending radii on page EN-7

- Use an additional drive in the event of wire feed distances of over 25 m.



1 Welding robot
2 Robot welding cell
3 Wire drum
4 **MasterLiner**
5 Lead-through from **MasterLiner** protective housing to robot welding system
6 Wire feeder

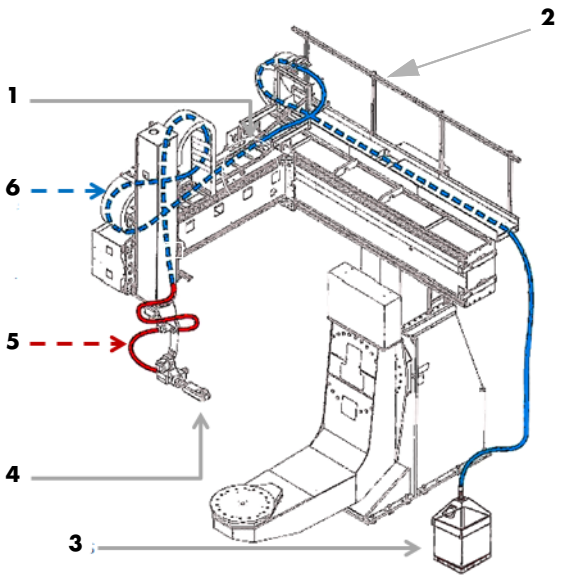
Fig. 9 Robot welding cell setup



1 Wire feeder
2 Robot welding system

Fig. 10 Robot welding cell installation

6.2.2 Laying in the cable carrier



1	Wire feeder	**3**	Wire drum	**5**	**MasterLiner** laying
2	Gantry welding system	**4**	Welding robot	**6**	Laying the **MasterLiner** in a cable carrier

Fig. 11 Laying in the cable carrier

NOTICE

- When laying the **MasterLiner** in a cable carrier, note and observe the permissible bending radii.
- Avoid bending the **MasterLiner** unnecessarily when it is laid. Laying in a cable carrier is essentially possible. Breaches of the minimum bending radii can cause damage and wire feed irregularities. Note the bending radii for use when dynamically laying the **MasterLiner**:

  ⇨ 3.2 Suspension/total bending angle of all bending radii on page EN-7
- All **MasterLiner** types are essentially suitable for dynamic movements. For very high dynamic forces and rapid robot movements, use the **MasterLiner HD** version.
- For applications involving a longer wire feed distance and/or multiple bends, we strongly recommend using an additional wire drive near the wire drum.
- When suspending **MasterLiner** of any type, use suitable mounts, strain relief devices for the wire feeder and wire drums as well as the wire feed distance.
- The **MasterLiner HD** and **MasterLiner Flex** can, in principle, be used in combination. To do so, use suitable connectors.

7 Operation

NOTICE

- The system may only be operated by qualified personnel (in Germany see TRBS 1203).
- Before connecting the cable assembly to the wire feeder, check whether the proper wire guide (liner or PA liner) in accordance with the wire diameter and wire type has been inserted.

8 Putting out of operation

NOTICE

- As the **MasterLiner** is integrated into a welding system, the process for putting it out of operation depends on the control system. Please make sure that the shutdown procedures for all components integrated in the welding system are strictly observed.

9 Maintenance and cleaning

Under normal operating conditions, the **MasterLiner** does not require maintenance. Scheduled maintenance and cleaning are prerequisites for a long service life and trouble-free operation.

⚠ DANGER

Risk of injury due to unexpected start-up

The following instructions must be followed during all maintenance, servicing, assembly, disassembly, and repair work:

- Switch off the power source.
- Disconnect all electrical connections.

⚠ DANGER

Electric shock

Dangerous voltage due to defective cables.

- Check all live cables and connections for proper installation and damage.
- Replace any damaged, deformed or worn parts.

NOTICE

- Maintenance and cleaning work may be carried out only by qualified personnel (in Germany see TRBS 1203).
- Always wear your personal protective equipment when performing maintenance and cleaning work.
- Please also consult the operating instructions for all welding components, e. g. the coolant recirculator, wire feeder and welding torch.

9.1 Maintenance intervals

NOTICE

- The specified maintenance intervals are standard values and refer to single-shift operation. The additional operating conditions can shorten the maintenance intervals.

When using arc welding equipment, always observe the provisions of EN 60974-4 Inspection and testing, as well as any national laws and regulations.

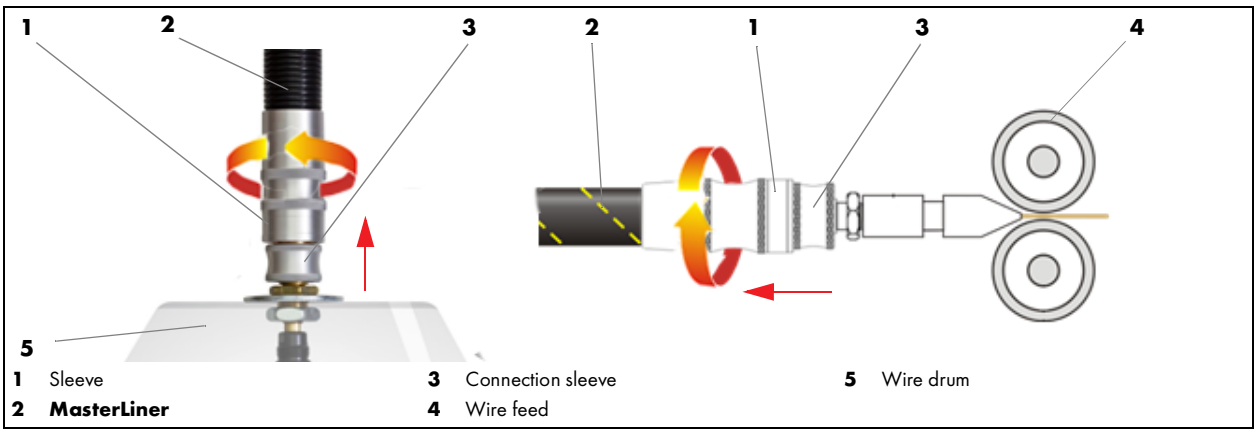
We recommend conducting the following checks when replacing an empty wire drum with a full one.

Check the following:

Weekly	Monthly
Visual inspection for external damage. • If necessary, completely replace the **MasterLiner**. ⇨ 9.2 Replacing the MasterLiner on page EN-16	Check that the wire feed movement is smooth running. • Check how the **MasterLiner** is laid (note bending radii). ⇨ 3.2 Suspension/total bending angle of all bending radii on page EN-7 • If necessary, completely replace the **MasterLiner**. ⇨ 9.2 Replacing the MasterLiner on page EN-16

Tab. 10 Maintenance intervals

9.2 Replacing the MasterLiner



1 Sleeve
2 **MasterLiner**
3 Connection sleeve
4 Wire feed
5 Wire drum

Fig. 12 Wire feed side

1 Hold the connection sleeve **(3)** tightly and twist the sleeve **(1)** clockwise to unlock it.

2 Replace the **MasterLiner (2)**.

For instructions on attaching the **MasterLiner**, see the following section:

⇨ 6.1 Attaching the MasterLiner on page EN-10

10 Troubleshooting

⚠ DANGER

Risk of injury and machine damage when handled by unauthorised persons

Incorrect repair work and changes of the product may lead to significant injuries and damage to the device. The product warranty will be rendered invalid if work is carried out on the product by unauthorized persons.

- Operating, maintenance, cleaning and repair work may be carried out only by qualified personnel (in Germany see TRBS 1203).

Please observe the attached document 'Warranty'. Please consult your retailer or the manufacturer in case of any doubts and/or problems.

NOTICE

- Please also consult the operating instructions for the welding components, such as the power source, welding torch system, re-circulating cooling unit etc.

Fault	Cause	Solution
Wire feed irregularities	• **MasterLiner** heavily soiled	• Check if the **MasterLiner** contains foreign bodies (wire residues)
		• Visual inspection of the filler material for dirt
	• **MasterLiner** mechanically damaged (torn apart, broken, etc.)	• Completely replace the **MasterLiner** ⇨ 9.2 Replacing the MasterLiner on page EN-16 ⇨ 3.2 Suspension/total bending angle of all bending radii on page EN-7
		• Possibly reduce the tensile load
	• Too many and two narrow bending radii in the wire feed section	• Check how the MasterLiner is laid ⇨ 6.2 Laying on page EN-13 ⇨ 3.2 Suspension/total bending angle of all bending radii on page EN-7
		• Enlarge the bending radii and reduce the number of bending radii
	• Wire feed distance too large	• Reduce the wire feed distance or use an auxiliary drive
	• Filler material diameter too large	• Use a **MasterLiner** that is compatible with the filler material's diameter ⇨ Tab. 3 MasterLiner versions on page EN-5

Tab. 11 Troubleshooting

11 Disassembly

⚠ DANGER

Risk of injury due to unexpected start-up

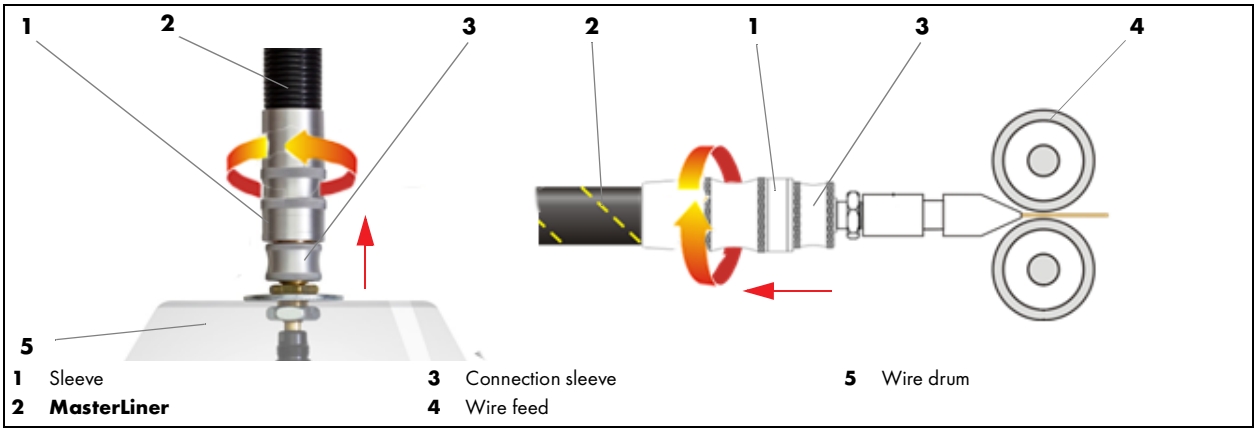
The following instructions must be followed during all maintenance, servicing, assembly, disassembly, and repair work:

- Switch off the power source.
- Disconnect all electrical connections.

NOTICE

- Disassembly may be carried out only by qualified personnel (in Germany see TRBS 1203).
- Please consult the operating instructions for the welding components, such as the power source, welding torch system, re-circulating cooling unit etc.
- Observe the information provided in the following section:

⇨ 8 Putting out of operation on page EN-14



1 Sleeve
2 **MasterLiner**
3 Connection sleeve
4 Wire feed
5 Wire drum

Fig. 13 Disassembly

1 Hold the connection sleeve **(3)** tightly and twist the sleeve **(1)** clockwise to unlock it.

2 Remove the **MasterLiner (2)**, wire and parts to be disassembled.

12 Disposal

When disposing of the system, local regulations, laws, provisions, standards and guidelines must be observed. Observe the regulations on the disposal of electronic scrap and dispose of it at your local waste disposal site (e.g. recycling centre).

To correctly dispose of the product, it must first be disassembled.

⇨ See 11 Disassembly on page EN-18

12.1 Materials

This product is mainly made of metallic materials, which can be melted in steel and iron works and are thus almost infinitely recyclable. The plastic materials used are labelled in preparation for their sorting and separation for later recycling.

12.2 Consumables

Oil, greases and cleaning agents may not contaminate the ground or enter the sewage system. These materials must be stored, transported and disposed of in suitable containers. Observe the relevant local regulations and disposal instructions of the safety data sheets specified by the manufacturer of the consumables. Contaminated cleaning tools (brushes, rags, etc.) must also be disposed of in accordance with the information provided by the consumables' manufacturer.

12.3 Packaging

ABICOR BINZEL has reduced the transport packaging to the necessary minimum. The ability to recycle packaging materials is always considered during their selection.