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Assembly instructions DIN fittings

Safety instructions

Tube fittings are safe high-pressure connections

A carefully assembled Parker tube fitting will provide a sealed joint even up to tube burst. Experience has shown that break-downs, re-tightening and leaks can be avoided by following these safety instructions. Please review your fitting procedures.

General safety instructions

- Uncomplete assembly will reduce the pressure and vibration capability of a fitting. It can reduce the life cycle time of a connection and leakage can occur. In extreme cases the connection can fail due to tube shear or tube crack.
- After opening a tube connection, the unit has to be retightened with the same force used during prior assembly. Undertightening can result in leakage and can reduce the vibration resistance. Overtightening can reduce the possibilities of repeated assembly. In extreme cases the components can be destroyed.
- Dirt and metal contamination can lead to damage to the system and leaks.
- The operating parameters given (e.g. pressure, temperature, medium compatibility) are to be adhered to.
- Avoid flow rates > 8 m/s. The resulting forces are high and can destroy the tube lines.
- Relevant guidelines (e.g. CE, ISO, BG, TÜV, DIN) are to be observed.
- Weld fittings are manufactured out of weldable materials. No other fittings are suitable for welding.
- EO-Niromont and Parflange LUBSS are high-performance lubricants. The use of other lubricants generally leads to an increase in assembly force.
- The tools and lubricants recommended by Parker guarantee safe assembly.
Parker tube fittings are intended solely for connections for fluid applications.

- Observe tube recommendations. Non-standard materials or tolerances lead to incorrect assembly.
- Do not use ball bearings, fitting pins or tapered pins, coins or washers instead of the correct Parker blanking plug as blanking parts for 24° cones.
- Tube connection and fitting body once assembled, should remain together. Fitting body is to be used once only for pre-assembly.
- Air bleeding of tube fittings which are under pressure can be dangerous.
- Tube under tension can lead to vibration failure. Tube length and bend angles are to be adhered to precisely. Fix tube lines with tube clamps.
- Tubes are not to be clamped to one another but to suitable fixed points. Plate brackets, cable connections and fixing elements are not suitable. Tubes are not mountings on which to integrate other components e.g. filters, ventilators or shut-off valves.
- Prevent oscillation, pressure surges and inherent strain by using flexible hoses for example.
- Under and overtightening of fittings during assembly reduces the capacity for withstanding pressure and vibration loads and therefore reduces the life of the tube fitting. Leaks from the tube can occur under these circumstances.
- When dismantling/transporting and re-assembling, make sure that no dirt enters the system, that the connection elements (threads, sealing surfaces) are not damaged, seals are not lost and tubes are not bent or flattened. We recommend the use of suitable protective caps.
- Disassembled fittings are to be checked for accuracy and damage and replaced if necessary.
- Do not use hand cutters or tube cutters.

- Components and tooling of different manufacturers are not necessarily compatible. For complete safety, use only Parker components.
- Fittings are to be handled with care.
- Tubelines need to be adapted tension free of the relevant connectors before assembly. An easy turning of the nut is required for the complete thread length. Otherwise leakage can occur. In extreme cases with additional vibrations tube cracks can occur.
- Vibrations have to be clamped by tube clamps. Independent vibrating units need to be separated with hoses. Otherwise tube cracks can occur.

### Specific safety instructions for assembly

- During a progressive ring and EO-2 fitting assembly the tube has to bottom up in the stud or in the tool. Without tube bottoming the ring cannot bite sufficiently. Under load the connection can fail due to tube shear.
- Correctly flared tubes are essential for leak free performance of Triple-Lok® fittings. Special care must be taken over the flare diameter and surface finish.
- Preset bite type fittings (Progressive ring) need a final assembly according to assembly instructions.
- Stainless steel progressive ring fittings have to be preassembled in hardened tools. Otherwise the connection may fail under load due to tube shear.
- Do not assemble progressive rings and functional nuts on self-made standpipe stud ends. There is a risk of false assembly with the result of connection shear under load.
- The use of steel cutting rings for stainless steel tubes or other unauthorised tool combinations leads to incorrect assembly.

In case of doubt please contact your Parker representative!
Assembly instructions DIN fittings

General

Assembly of Parker tube fittings always follows the same pattern:

Material combinations
- Use recommended tube material
- Select suitable components according to tube material

Tube preparation
- Cut and deburr thoroughly
- Follow recommendations for minimum straight tube length
- Apply support sleeves when necessary
Machine assembly
- Preferred method
- Most efficient method
- Recommended for large ED progressive ring and ED-2
- Parflange® recommended for 37° flaring

Manual assembly
- Economical for assembly of small quantities
- Suitable for small O.D. tube
- For repair work
- Hand flaring does not provide reliable results
- Stainless steel progressive ring fittings need to be assembled with pre-assembly tools

Assembly check
- Check assembly tube preparation result
- Incorrect assemblies must be corrected or scrapped

Final installation
- Final fitting assembly according to instruction
- Do not assemble under tension
- Clamp onto rigid fixtures
- Tighten tube clamps after final fitting installation
Assembly instructions DIN fittings

Selection of assembly process for bite systems

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Process/Time*</th>
<th>Process</th>
<th>Equipment</th>
<th>EO progressive ring PSR/DPR</th>
<th>EO2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-assembly using EOMAT II machine</td>
<td>30 sec.</td>
<td>ideal for workshop assembly, not suitable for LL series</td>
<td>ideal for workshop assembly, not suitable for LL series</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-assembly using EOMAT III machine</td>
<td>30 sec.</td>
<td>ideal for serial production</td>
<td>ideal for serial production</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tube forming using EO2-FORM F3 machine</td>
<td>40 sec.</td>
<td>not applicable</td>
<td>not applicable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tube flaring using Parflange® 1025 machine</td>
<td>45 sec.</td>
<td>not applicable</td>
<td>not applicable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tube flaring using Parflange® 1050 machine</td>
<td>30 sec.</td>
<td>not applicable</td>
<td>not applicable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Procedure</td>
<td>Equipment</td>
<td>Process/Time*</td>
<td>EO progressive ring PSR/DPR</td>
<td>EO2</td>
<td></td>
</tr>
<tr>
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<td>------------------------</td>
<td>-----------------------------------------------------------------</td>
<td>------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Direct in fitting</td>
<td></td>
<td>60 sec.</td>
<td>field repair only</td>
<td>field repair only</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>not for efficient production and tubes larger than 22mm OD,</td>
<td>not for efficient production and tubes</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>preferred method for PSR</td>
<td>larger than 22mm OD</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>not for stainless steel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-assembly in vice</td>
<td></td>
<td>45 sec.</td>
<td>field repair only</td>
<td>field repair only</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>not for efficient production</td>
<td>not for efficient production</td>
<td></td>
</tr>
<tr>
<td>Flaring in vice</td>
<td></td>
<td>120 sec.</td>
<td>not applicable</td>
<td>not applicable</td>
<td></td>
</tr>
<tr>
<td>Pre-assembly using HVM-B</td>
<td></td>
<td>30 sec.</td>
<td>final assembly in fitting must be 1/2 turn, not for tubes</td>
<td>not applicable</td>
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</tr>
<tr>
<td></td>
<td>device</td>
<td></td>
<td>larger than 15mm OD, not for stainless steel</td>
<td></td>
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</tr>
<tr>
<td>Pre-assembly using EO-</td>
<td></td>
<td>60 sec.</td>
<td>ideal for repair jobs</td>
<td>ideal for repair jobs</td>
<td></td>
</tr>
<tr>
<td>KARRYMAT</td>
<td></td>
<td></td>
<td>and small on-site installations, not suitable for volume</td>
<td>and small on-site installations, not</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>production</td>
<td>suitable for volume production</td>
<td></td>
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<tr>
<td>Tube flaring using</td>
<td></td>
<td>60 sec.</td>
<td>not applicable</td>
<td>not applicable</td>
<td></td>
</tr>
<tr>
<td>KarryFlare</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

*Average for total assembly time of medium size fitting including assembly check and final tightening
## Assembly instructions DIN fittings

### Selection of assembly process for tube forming systems

<table>
<thead>
<tr>
<th>Process / Time*</th>
<th>Process</th>
<th>Equipment</th>
<th>Product</th>
<th>Workshop machines for industrial assembly</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pre-assembly</strong></td>
<td><strong>using EOMAT II machine</strong></td>
<td><img src="image1.png" alt="Image" /></td>
<td><strong>not applicable</strong></td>
<td>suitable for workshop assembly preferred process is Parflange</td>
</tr>
<tr>
<td><strong>Pre-assembly</strong></td>
<td><strong>using EOMAT III machine</strong></td>
<td><img src="image2.png" alt="Image" /></td>
<td><strong>not applicable</strong></td>
<td>suitable for workshop assembly preferred process is Parflange</td>
</tr>
<tr>
<td><strong>Tube forming</strong></td>
<td><strong>using EO2-FORM F3 machine</strong></td>
<td><img src="image3.png" alt="Image" /></td>
<td><strong>ideal for workshop assembly and serial production</strong></td>
<td><strong>not applicable</strong></td>
</tr>
<tr>
<td><strong>Tube flaring</strong></td>
<td><strong>using Parflange® 1025 machine</strong></td>
<td><img src="image4.png" alt="Image" /></td>
<td><strong>not applicable</strong></td>
<td>ideal for workshop assembly not recommended for mass production not suitable for assembly of SS tubes over 25mm</td>
</tr>
<tr>
<td><strong>Tube flaring</strong></td>
<td><strong>using Parflange® 1050 machine</strong></td>
<td><img src="image5.png" alt="Image" /></td>
<td><strong>not applicable</strong></td>
<td>ideal for workshop assembly and serial production automatic sleeve feeder available for mass production</td>
</tr>
</tbody>
</table>

*Times in seconds.*
### Manual assembly for field repair

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Equipment</th>
<th>EO2-FORM</th>
<th>Triple-Lok®</th>
<th>O-Lok®</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct in fitting</td>
<td></td>
<td>not possible use EO2 for field repair</td>
<td>not possible use 1015 device or hand flaring tools for field repair</td>
<td>not possible use braze sleeves for field repair</td>
</tr>
<tr>
<td>Pre-assembly in vice</td>
<td></td>
<td>not possible use EO2 for field repair</td>
<td>not possible use 1015 device or hand flaring tools for field repair</td>
<td>not possible use braze sleeves for field repair</td>
</tr>
<tr>
<td>Flaring in vice</td>
<td></td>
<td>not applicable</td>
<td>field repair only not for efficient production not for stainless steel tubes</td>
<td>not possible use braze sleeves for field repair</td>
</tr>
<tr>
<td>Pre-assembly using HVM-B device</td>
<td></td>
<td>not applicable</td>
<td>not applicable</td>
<td>not applicable</td>
</tr>
<tr>
<td>Pre-assembly using EO-KARRYMAT</td>
<td></td>
<td>not possible use EO2 for field repair</td>
<td>not applicable</td>
<td>not applicable</td>
</tr>
<tr>
<td>Tube flaring using KarryFlare</td>
<td></td>
<td>not possible use EO2 for field repair</td>
<td>ideal for repair jobs and small on-site installations not suitable for industrial production</td>
<td>not applicable</td>
</tr>
</tbody>
</table>

*Average for total assembly time of medium size fitting including assembly check and final tightening
New EO assembly for 30° final assembly

**Traditional pre-assembly**
- According to DIN 3859 T2
- Can be used optional as usual
- Machine preset ≠ manual preset

**Optimized EO pre-assembly**
- Machine preset ≠ manual preset

**Manual presetting:**
- Tighten the nut by 1 1/4 turns

**Machine presetting:**
- Machine preset corresponding to 1 1/2 turn of nut

**Manual presetting:**
- Tighten the nut by 1 1/2 turns

**Machine presetting:**
- Machine preset corresponding to 1 1/4 turn of nut
Final assembly
Before 90°
1/4 turn
after perceptible rise in force

Final assembly
Now 30°
1/12 turn
after perceptible rise in force
Assembly instructions DIN fittings

EO progressive ring PSR/DPR

### Material combinations
- Select suitable EO progressive ring fitting

<table>
<thead>
<tr>
<th>Tube material</th>
<th>EO-Fitting body</th>
<th>assembly instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel</td>
<td>Steel (LL=D-Ring)</td>
<td></td>
</tr>
<tr>
<td>Stainless Steel</td>
<td>Stainless Steel</td>
<td>Pre-assembly by machine or hardened tool required</td>
</tr>
<tr>
<td>Copper</td>
<td>Brass (D-Ring)</td>
<td></td>
</tr>
<tr>
<td>Plastic, e.g., Polyamide</td>
<td>Steel, Brass, Stainless Steel</td>
<td>Support sleeve E required, Check assembly devices for suitability</td>
</tr>
<tr>
<td>Stainless Steel</td>
<td>Steel</td>
<td>Stainless Steel DPR must be used, Pre-assembly by machine or hardened tool required</td>
</tr>
</tbody>
</table>

### Tube preparation
- Cut and deburr thoroughly
- Do not assemble under tension
- Clamp onto rigid fixtures
- Minimum lengths of straight tube-ends, H=2x nut length
- Use swivel union "GZ" instead of short tubes
- Cut tube squarely max ±1° deviation
- Do not use pipe cutters
- EO tube-cutting tool (AV) for manual cutting
- Remove internal and external burrs
- max chamfer 0.3mm x 45°
- Recommendation: In-Ex Tube Deburring Tool 226
Support sleeves VH
- Support sleeve VH for thin wall or soft metal tubes (see chart)

Tube insert E
- Support sleeve E for plastic tubes

Insert support sleeve like shown
Drive VH into tube-end

VH selection chart for EO Progressive Ring
For steel tubes material ST 37.4
and for stainless steel tubes material 1.4571 and 1.4541

For soft metal tubes (e.g. copper)

Support sleeve required
Support sleeve required for heavily loaded lines (vibrations)
Assembly instructions DIN fittings

EO progressive ring PSR/DPR

100% Pre-assembly with EOMAT/EO-KARRYMAT

- Preferred method
- Most efficient method

⚠ HVMB-device not suitable for 100% assembly of PSR fittings

1. EOMAT II and EO-KARRYMAT: Adjustment according to pressure chart on machine (PSR/DPR)
   - Reduction of preset pressures for tube materials softer than steel and stainless steel required
2. EOMAT III/A: Menu selection (PSR/DPR)
3. EO-KARRYMAT: See pressure chart on machine (PSR/DPR)
4. Non-EOMAT-machines: Check suitability

- Control (see checking instructions)
- Clean and lubricate assembly cone and thread regularly
- Insert proper tools
- Clean and lubricate assembly cones regularly
- EO-KARRYMAT: Close valve on handpump
- 2-piece backing plates for 35-L and 42-L
- Slide nut and progressive ring as shown onto the end of the tube
5. Place tube with progressive ring and nut into the die. Press tube-end firmly into the assembly cone.

6. Hold tube firmly. EOMAT: Press and hold start button. Use support and foot switch for long tubes.

7. After completion of pre-assembly, remove the tube for assembly check. EO-KARRYMAT: Operate handpump until assembly pressure is reached.

8. Check to make sure that a visible collar covers the front of the first cutting edge. It does not matter if the ring can be rotated on the tube-end.


10. Then tighten fitting firmly by 30° (1/2 flat). Recommended to use spanner extension for sizes over 20 mm O.D. (see chart).

Assembly torques are available on request.

Spanner length

<table>
<thead>
<tr>
<th>Size</th>
<th>Spanner length H [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>22-L</td>
<td>400</td>
</tr>
<tr>
<td>28-L</td>
<td>500</td>
</tr>
<tr>
<td>35-L</td>
<td>800</td>
</tr>
<tr>
<td>42-L</td>
<td>1000</td>
</tr>
<tr>
<td>38-S</td>
<td>1200</td>
</tr>
</tbody>
</table>
Assembly instructions DIN fittings

EO progressive ring PSR/DPR

Pre-assembly with hardened tool VOMO

1. For stainless steel assembly threads must be lubricated
   - Use EO-NIROMONT special high-performance lubricant for stainless steel fittings
2. Control (see checking instructions)
3. Use pre-assembly tool VOMO
   - Fitting body may be used one time only (not for stainless steel)
   - Screw on nut until finger-tight
4. Press tube-end firmly into the assembly cone

- Reliable method for repair jobs
- Only economic for assembly of small quantities
- Stainless steel EO progressive rings must be pre-assembled using a hardened tool (VOMO)
- For tubes over 25mm, EO-KARRYMAT / EOMAT is recommended

- Cones of pre-assembly bodies must be checked regularly (after 50 pre-assemblies) with cone gauges (KONU)
- Clean and lubricate assembly cone and thread regularly
Assemble check:

- Loosen nut
- Check to make sure that a visible collar covers the front of the first cutting edge
- It does not matter if the ring can be rotated on the tube-end

Then tighten fitting firmly by 30° (1/2 flat)

Recommended to use spanner extension for sizes over 20 mm O.D. (see chart)

Assembly torques are available on request

Spanner length

<table>
<thead>
<tr>
<th>Size</th>
<th>Spanner length H [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>22-L</td>
<td>400</td>
</tr>
<tr>
<td>28-L</td>
<td>20-S 500</td>
</tr>
<tr>
<td>35-L</td>
<td>25-S 800</td>
</tr>
<tr>
<td>42-L</td>
<td>30-S 1000</td>
</tr>
<tr>
<td>38-S</td>
<td>1200</td>
</tr>
</tbody>
</table>
Assembly instructions DIN fittings

EO progressive ring PSR/DPR

**Direct assembly**
- Simple procedure for single assemblies of small dimensions
- Not economic for series assembly
- Tubes Ø 30, 35, 38 and 42 mm must be pre-assembled in vice
- Stainless steel connections have to be assembled using pre-assembly tool (VOMO)
- Properly cleaned studs ("BE") have to be assembled with pre-assembly tools

1. **Lubrication of threads will reduce wear and assembly forces**
2. **Threads on stainless steel fittings must be lubricated**
3. **Use EO-NIROMONT special high-performance lubricant for stainless steel fittings**

1. **Screw on nut until finger-tight**
2. **Press tube-end firmly into fitting body**
3. **Mark position of the nut**
4. **Tighten the nut by 1 1/2 turns**
5. **Recommended to use spanner extension for sizes over 20 mm O.D. (see chart)**
6. **Fitting body may be used one time only**

**Assembly check:**
- **Loosen nut**
- **Check to make sure that a visible collar covers the front of the first cutting edge**
- **It does not matter if the ring can be rotated on the tube-end**
Repeated assembly

- Each time the tube-end has been disconnected, the fitting must be properly tightened again.
- EO progressive rings cannot be replaced, once assembled.

1. Threads on stainless steel fittings must be lubricated.
2. Use EO-NIROMONT special high-performance lubricant for stainless steel fittings.
3. Each time the fitting has been loosened, re-assembly must be performed with the same torque as initial assembly.
4. The body must be held rigid.
5. Recommended to use spanner extension for sizes over 20 mm O.D. (see chart).
6. Then tighten fitting firmly by 30° (1/2 flat).
7. Assembly torques are available on request.
8. Recommended to use spanner extension for sizes over 20 mm O.D. (see chart).

<table>
<thead>
<tr>
<th>Size</th>
<th>Spanner length H [mm]</th>
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<tbody>
<tr>
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<td>35-L</td>
<td>800</td>
</tr>
<tr>
<td>42-L</td>
<td>1000</td>
</tr>
<tr>
<td>38-S</td>
<td>1200</td>
</tr>
</tbody>
</table>
Assembly instructions DIN fittings

EO-2 assembly instructions

Detailed assembly instructions are included in each EO-2 product box. Details on Eomat setting and selection of support sleeves can be found there as well.

Material combinations

- Select suitable FM-type

<table>
<thead>
<tr>
<th>Steel tube</th>
<th>Stainless steel tube</th>
<th>Plastic tube</th>
</tr>
</thead>
<tbody>
<tr>
<td>FM...A3C</td>
<td>FM...SSA</td>
<td>FM...A3C+E</td>
</tr>
<tr>
<td></td>
<td>FM...71</td>
<td>FM...71+E</td>
</tr>
</tbody>
</table>

Tube preparation

- Cut and deburr thoroughly
- Do not assemble under tension
- Clamp onto rigid fixtures

- Cut tube squarely
- max ± 1° deviation
- Do not use pipe cutters
- EO tube-cutting tool (AV)

- Remove internal and external burrs
- max. chamfer 0.3mm x 45°
- Seal can be damaged by large burrs

Support sleeves VH

- Support sleeve VH for thin wall or soft metal tubes

Use of support sleeves "VH" with EO-2 fittings

<table>
<thead>
<tr>
<th>Tube O.D</th>
<th>0.5</th>
<th>0.75</th>
<th>1</th>
<th>1.5</th>
<th>2</th>
<th>2.5</th>
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</table>
Drive VH into tube-end

Support-sleeve selection: see instruction shipped with product box

Replacement of sealing ring/Repeated assembly

Sealing ring DOZ can be changed separately

Support sleeve VH required for FM/71 and operating pressure above 100 bar.

Support sleeve VH not required for EO-2/71 or EO-2/SSA and stainless steel tube.

Support sleeve VH not required for EO-2 or steel tube.

Functional test required for other materials or dimensions not specified.

After disassembly, sealing ring can be pulled off the tube-end

Check for damage and replace if necessary

Abrasion on outer rubber parts does not affect performance

Assemble fitting until wrench-tight (without spanner extension)

Then tighten fitting firmly by min 1/6 (max 1/4) turn (1 to 1 1/2 flats)

Recommended to use spanner extension for sizes over 20 mm O.D. (see chart)

Spanner length

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<td>42-S</td>
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</table>

min: 1/6
max: 1/4

22/28/35/42 mm O.D.
Assembly instructions DIN fittings

EO-2 assembly instructions

- EOMAT II:
  - Adjustment according to pressure on machine
- EOMAT III/A:
  - Menu selection
- EO-KARRYMAT:
  - Refer to chart on machine
- Non-EOMAT-machines:
  - check suitability

1. Check according to MOK checking instructions
2. Place tube with functional nut into the die
3. Insert proper tools
4. Press tube-end firmly into the assembly cone

Assembly with EOMAT/EO-KARRYMAT
- Preferred method
- Most efficient method
- HVM-B device is not suitable for EO-2
Assembly check:
- Gap between sealing ring and retaining ring must be closed
- A little relaxation (approx. 0.2 mm) is allowed
- Gap not closed: Check all components, tube, machine, tools and pressure setting
- Repeat assembly with increased pressure if necessary

Threads of stainless steel fittings must be lubricated
- Use EO-NIROMONT special high-performance lubricant for stainless steel fittings

Hold tube firmly
- EOMAT: Press and hold start button
- Use support and foot switch for long tubes
- EO-KARRYMAT: Operate handpump until assembly pressure is reached. Then open valve on handpump

Assemble fitting until wrench-tight (without spanner extension)

Then tighten fitting firmly by
- min 1/6 (max. 1/4) turn (1 to 1 1/2 flats)
- Recommended to use spanner extension for sizes over 20 mm O.D. (see chart)

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<td>38-S</td>
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Assembly instructions DIN fittings

EO-2 assembly instructions

Assembly in vice

- Reliable method
- Only economic for assembly of small quantities

1. Threads on stainless steel fittings must be lubricated
   - Use EO-NIROMONT special high-performance lubricant for stainless steel fittings

2. Check according to VOMO checking instructions
   - Use pre-assembly tool VOMO
   - Fitting body may be used one time only and components must stay together

3. Push functional nut onto tube-end
   - Advantage: Easy tube insertion, particularly large dimensions

4. Press tube-end firmly into the assembly cone
   - Screw on nut until finger-tight
● Tighten until sharp increase of resistance (approx. 1 to 1 1/2 turns)  
△ Recommended to use spanner extension for sizes over 20 mm O.D. (see chart)

● Assembly check:  
Gap between sealing ring and retaining ring must be closed  
△ A little relaxation (approx. 0.2 mm) is allowed

△ Gap not closed:  
Check all components including tube

● Assemble fitting until wrench-tight (without spanner extension)

△ Then tighten fitting firmly by min 1/2 (max. 1/4) turn  
(1 to 1 1/2 flats)  
△ Recommended to use spanner extension for sizes over 20 mm O.D. (see chart)

<table>
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<th>Size</th>
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<td>38-S</td>
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</table>
Assembly instructions DIN fittings

EO-2 assembly instructions

Direct assembly

- Simple procedure for single assemblies of small dimensions
- Not economic for series assemblies
- Threads on stainless steel fittings must be lubricated
- EO-NIROMONT is a special high-performance lubricant for stainless steel fittings
- Press tube-end firmly into the assembly cone
- Turn back nut for easy tube insertion
- Tighten until sharp increase of resistance (approx. 1 to 1 1/2 turns)
- Recommended to use spanner extension for sizes over 20 mm O.D. (see chart)
- Assembly check: Gap between sealing ring and retaining ring must be closed
- A little relaxation (approx. 0.2 mm) is allowed

1. Threads on stainless steel fittings must be lubricated
2. EO-NIROMONT is a special high-performance lubricant for stainless steel fittings
3. Press tube-end firmly into the assembly cone
4. Turn back nut for easy tube insertion

Assembly check:
- Gap between sealing ring and retaining ring must be closed
- A little relaxation (approx. 0.2 mm) is allowed
5. \textbf{Gap not closed:} Check all components including tube.

6. Assemble fitting until wrench-tight (without spanner extension).

7. \textbf{Then tighten fitting firmly by min \( \frac{1}{6} \) (max \( \frac{1}{4} \)) turn (1 to 1\( \frac{1}{2} \) flats).}

\textbf{Recommended to use spanner extension for sizes over 20 mm O.D. (see chart)}

<table>
<thead>
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<th>Size</th>
<th>Spanner length H [mm]</th>
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<tr>
<td>42-L</td>
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</table>

\( H \) is the distance between the fitting and the tube.
Assembly instructions DIN fittings

Checking instructions for EO assembly tools

VOMO tools for manual pre-assembly in vice
MOK for use in EO assembly machines

⚠️ Use of damaged, worn or non-suitable tooling may result in fitting failure or machine damage
⚠️ Tools must be checked regularly, at least after 50 assemblies
⚠️ Worn tools must be replaced ⚠️ Use only genuine Parker tools
⚠️ Tools must be kept clean and lubricated

1. Clean cone surface for checking
2. Visual checks: Cone must be free of wear, damage or cracks
3. Check for deformation of geometry: Special cone gauge KONU must be used
   ⚠️ KONU cone gauges are precision measuring devices and must be handled accordingly
4. Check contour: The rear of the gauge must protrude slightly above the top face of the cone or may be flush
Table: Tool for presetting tool (MOK and VOMO)

<table>
<thead>
<tr>
<th>Type</th>
<th>$T_{\min}$</th>
<th>$T_{\max}$</th>
<th>Type</th>
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</table>

- **Check insertion depth**
- Deviations from the insertion depth can cause leakages

- **Insertion depth T**
Assembly instructions DIN fittings

EO2-FORM assembly instructions

Material combinations
- Select suitable materials
- See catalogue 4100 chapter B for exact tube specifications

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<th>Tube material</th>
<th>Fitting and nut material</th>
<th>Sealing material</th>
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<td>Steel/FKM</td>
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</table>

Tube preparation
- Cut and deburr thoroughly
- Cut and bend tubes exactly
Take extra length into account
(see tube preparation chart)

Minimum lengths $L_2$ of straight tubes (see chart)

Minimum lengths $L_3$ of straight tube-ends before bend
(see chart)

Cut tube squarely
max $\pm 1^\circ$ deviation
Do not use pipe cutters
EO tube-cutting tool (AV) for manual cutting

Remove internal and external burrs
max. chamfer 0.3mm x 45°
Clean tube thoroughly

Chips, dirt, internal or external burrs and paint prevent correct tube insertion
Dirty tubes result in worn-out or damaged tools

Cut tube squarely
max $\pm 1^\circ$ deviation
Do not use pipe cutters
EO tube-cutting tool (AV) for manual cutting

Remove internal and external burrs
max. chamfer 0.3mm x 45°
Clean tube thoroughly

Chips, dirt, internal or external burrs and paint prevent correct tube insertion
Dirty tubes result in worn-out or damaged tools
Assembly instructions DIN fittings

EO2-FORM assembly instructions

Tube preparation chart - Series L

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<th>L Stainless Steel ± 0.5</th>
<th>L₁ Steel</th>
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Assembly instructions DIN fittings

EO2-FORM assembly instructions

Tube preparation chart - Series S

- Extra length
- Minimum tube length
- Minimum straight length before bend
- Minimum clearance of U-shape bends

<table>
<thead>
<tr>
<th>Tube-OD Series</th>
<th>S Wall thickness</th>
<th>L Steel ± 0.5</th>
<th>L Stainless Steel ± 0.5</th>
<th>L₁ Steel</th>
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- 1.5, 5, 6.5, 12.5, 14, 100, 70, 100, 72, 110, 80, 135, 98, 155, 112, 165, 122, 190, 135
**Assembly instructions DIN fittings**

**EO2-FORM assembly instructions**

**Tube forming with EO2-FORM F3**
- Reliable forming method
- Reliable process

1. Change tool only when drive switched off (button OFF)
2. Obey safety instructions
3. Open doors to access tools and handling devices
4. Tool handling devices are stored in middle on top
5. Select suitable forming pin according to tube material, outer diameter and wall thickness
6. Check forming pin for dirt, wear and damage

Select suitable forming pin according to tube material, outer diameter and wall thickness.
Check clamping dies for dirt, wear and damage

Select suitable clamping die set according to tube outer diameter

Keep stainless tube clamping dies separate from other tube materials to prevent contact corrosion

1. Use magnetic holder to insert forming pin
2. Turn clockwise to lock bayonet fixture
3. Tilt magneto holder to remove handle
4. Use magnetic holder to insert forming pin
5. Use pistol to handle clamping die set
6. Pull and hold handle to grab die set
7. Insert clamping die set until it bottoms up (twist pistol for easy insertion)
8. Release handle to fix die set
9. Release handle to fix die set
10. Never operate machine while pistol is inserted
11. Front surfaces must be completely flat
12. Die segments must fit without gaps

Switch on drive (button ON)
1. Each time the drive is switched on, the reset button (RESET) must be pressed first
2. The automatic tool recognition is initiated
3. Clamping dies will close
4. Reset button (RESET) must be held until it lights up
5. Lighten of reset button (RESET) indicates “ready to start”
Assembly instructions DIN fittings

EO2-FORM assembly instructions

13
- Make sure tube-end is free of burrs, chips and dirt
- Lubricate inside and outside of tube-end
- Use EO-NIROMONT for best performance

14
- Insert tube-end with nut into open tool until it firmly touches the stop at the end
- Press tube-end firmly into the tube stop
- Do not turn tube-end anti-clockwise

15
- Press and hold start button (START) until tube is clamped
- Instead of start-button (START), footswitch can be used
- Hold tube firmly until clamping dies are closed
- Use support for long tubes
- Do not reach into tool area while machine is working

16
- Tube can be taken out after the clamping dies are open
- Reset button (RESET) lights up and the machine is ready for the next operation
- Check tools regularly (approx. 50 assemblies) for dirt and wear
- Remove tools for cleaning
- Clean clamping dies with wire brush
- Clean forming die using compressed air
- Replace worn-out tooling
Assembly instructions DIN fittings

EO2-FORM assembly instructions

Assembly check

- Check assembly result
  Incorrect assemblies
  must be scrapped

- Sealing surface (arrow) must be
  free of scratches and damage

- Check contour: Contact surface
  for sealing ring (arrow) must be
  flat, at right angle to tube

- Check outer diameter Ø...
  (see chart)
  Incorrect tube-ends must be
  scrapped. Tools must be cleaned
  and checked

Installation

- Tube must fit without tension

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<td>30-S</td>
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<td>38-S</td>
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</table>
Place sealing ring (DOZ) onto tube-end

- Threads of stainless steel fittings must be lubricated
- EO-NIROMONT is a special high-performance lubricant for stainless steel fittings

- Tube must fit without tension
- Assemble fitting until wrench-tight (without spanner extension)

Then tighten fitting firmly by 1/6 turn (1 flat)

Recommended to use spanner extension for sizes over 20 mm O.D. (see chart)

Incorrect assembly reduces performance and reliability of the connection

### Spanner length

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<th>Size</th>
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<td>38-S</td>
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</table>
Assembly instructions DIN fittings

Checking instructions for EO2-FORM tools

**Forming pin and clamping dies for EO2-FORM machine**

- Use of damaged, worn or non-suitable tooling may result in fitting failure and damage of machine
- Tools must be checked regularly, at least after 50 assemblies
- Worn tools must be replaced
- Use only genuine Parker tools
- Tools must always be kept clean and lubricated

1. Clean forming pin for checking
   - Do not disassemble
2. Visual check:
   - Surface must be free of wear and damage
   - Use air blowgun to remove chips and dirt
3. Clean clamping pin for checking
   - Do not disassemble
   - Pins must not be loose or damaged
4. Visual check:
   - Grip surface must be clean and free of wear
   - Use wire-brush to remove metal particles from grip surface
Assembly instructions DIN fittings

Weld fitting

Weld fitting assembly
- EO weld nipple and weld fitting
- Use weldable material
- Depending on application or project specification, special requirements may apply for: Tube preparation, welding process, operator qualification, inspection of welding connection and surface finish

Tube preparation
- Cut and deburr thoroughly
- Do not assemble under tension
- Clamp onto rigid fixtures
- Bevel tube-end similar to weld nipple bevel
- Cut tube squarely
- max ±1° deviation
- Do not use pipe cutters
- EO tube-cutting tool (AV) for manual cutting

Material combinations
- Select suitable tube material
  - Fitting material: Steel, Stainless Steel
  - Tube specification: Weldable Steel, Stainless Steel

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Assembly

3. Slide nut onto tube-end
   - Remove all elastomeric seals before welding
   - Weld fitting onto tube-end
   - Fitting and tube must be aligned

4. Clean weld
   - Calibrate inner diameter
   - Check welding quality
   - Surface protection if necessary

5. Assemble O-Ring
   - Lubricate O-Ring for easy assembly
   - Avoid damage or twisting of O-Ring

6. Threads of stainless steel fittings must be lubricated
   - Use EO-NIROMONT special high-performance lubricant for stainless steel fittings

7. Screw on nut by hand until handtight

8. Then tighten fitting firmly by 1/4 turn (1 1/2 flats)

Parker
Assembly instructions DIN fittings

Port connections

Assembly of metric straight port connections

- Metric Thread
  - DIN ISO 6149-2/3
  - ISO 9974-2/3
  - DIN 3852 T1/T2

1. Screw in until handtight
2. MA
3. Then tighten according to chart

⚠ Threads of stainless steel fittings must be lubricated
- EO-NIROMONT is a special high-performance lubricant for stainless steel fittings

EO-NIROMONT is a special high-performance lubricant for stainless steel fittings
<table>
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<th>Product Series</th>
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<th>O.D.</th>
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<th>Form A</th>
<th>Form B</th>
<th>Form E</th>
<th>Form F</th>
<th>O-ring</th>
<th>WH</th>
<th>SWVE</th>
<th>O-ring</th>
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<th>Blanking plugs</th>
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Tolerance of tightening torques listed in above table: ±10%
Note: Lubricate stud with hydraulic oil before screwing in! Tightening torques relate to counterpart made of steel.

*Thread M27x2
Assembly instructions DIN fittings

Port connections

Assembly of BSPP straight port connections

- BSPP thread G
- ISO 1179-1
- DIN 3852 T2

1. Screw in until handtight
2. Then tighten according to chart

Threads of stainless steel fittings must be lubricated
EO-NIROMONT is a special high-performance lubricant for stainless steel fittings
### Assembly torques for BSPP threads

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<th>Thread size for sealing washer</th>
<th>Form A O.D. inch</th>
<th>Form B with cutting face Nm</th>
<th>Form E with ED-sealing Nm</th>
<th>O-ring sealing and retaining-ring Nm</th>
<th>Non-return valves WH / TH Nm</th>
<th>EO Banjo fittings SWVE Nm</th>
<th>Adjustable ends O-ring and retaining-ring Nm</th>
<th>Blanking plugs Form E with ED-sealing Nm</th>
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Tolerance of tightening torques listed in above table: +10%

Note: Lubricate stud with hydraulic oil before screwing in! Tightening torques relate to counterpart made of steel.
Assembly instructions DIN fittings

Port connections

Assembly of tapered thread port connections

- NPT / NPTF thread
- ANSI / ASME B 1.20.1 - 1983

1. Screw in until handtight
2. Then tighten according to chart
3. Threads of stainless steel fittings must be lubricated
   - EO-NIROMONT is a special high-performance lubricant for stainless steel fittings

one flat = 60°
### Tightening of NPT/NPTF thread

<table>
<thead>
<tr>
<th>Size</th>
<th>Thread NPT/F</th>
<th>Assembly TFFT Turns</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>1/8-27 NPT/F</td>
<td>2.0-3.0</td>
</tr>
<tr>
<td>6</td>
<td>1/4-18 NPT/F</td>
<td>2.0-3.0</td>
</tr>
<tr>
<td>8</td>
<td>3/8-18 NPT/F</td>
<td>2.0-3.0</td>
</tr>
<tr>
<td>10</td>
<td>1/2-14 NPT/F</td>
<td>2.0-3.0</td>
</tr>
<tr>
<td>12</td>
<td>3/4-14 NPT/F</td>
<td>2.0-3.0</td>
</tr>
<tr>
<td>16</td>
<td>1-11 1/2 NPT/F</td>
<td>1.5-2.5</td>
</tr>
<tr>
<td>20</td>
<td>1 1/4-11 1/2 NPT/F</td>
<td>1.5-2.5</td>
</tr>
<tr>
<td>24</td>
<td>1 1/2-11 1/2 NPT/F</td>
<td>1.5-2.5</td>
</tr>
</tbody>
</table>

In the EO fitting range only NPT threads are manufactured. In the Triple-Lok® and O-Lok® fitting range for steel NPTF threads are used, and NPT for stainless steel components.
Assembly instructions DIN fittings

Adjustable fittings with locknut

Assembly of the orientable joint

(EO: e.g. WEE, VEE, TEE, LEE

⚠ Assembly steps must be done in right order

![Diagram showing the assembly of an orientable joint with locknut, back-up washer, O-ring, and retaining ring.](image-url)
1. Screw back locknut as far as possible.
   - O-ring and back-up washer in the non-threaded section should be placed nearest to the locknut.
   - Lubricate the O-ring.
   - With BSPP and metric parallel version slip retaining ring over the O-ring.

2. Screw the fitting in the port by hand until retaining ring or back-up washers bottom.

3. To adjust direction, turn back to a maximum of one full turn.

4. Screw locknut handtight.
   - Assemble locknut until wrenchtight.
   - Hold body in desired position and tighten locknut.

Fitting **without** Retaining Ring for ISO 6149 or UN/UNF ports

Fitting **with** Retaining Ring for BSPP or Metric Parallel ports with wide or **SMALL** spot faces.
Threads of stainless steel fittings must be lubricated

- EO-NIROMONT is a special high-performance lubricant for stainless steel fittings

**Assembly of EO swivel nut fittings** (e.g. EW, ET, EL, EGE, RED, VKA, SKA)

- Final assembly of swivel nut fittings must be made in appropriate fittings

1. Screw on nut by hand until handtight

2. Then tighten fitting firmly by ¼ turn (1½ flats)
Final assembly of factory pre-assembled EO-standpipe fittings (e.g. EVW, EVT, EVL, EVGE, KOR)

- For all fittings delivered pre-assembled from the factory the final assembly is performed in the appropriate fitting body.

1. Threads of stainless steel fittings must be lubricated
   - EO-NIROMONT is a special high-performance lubricant for stainless steel fittings

2. Assemble fitting until wrench tight (without spanner extension)
   - Mark position of nut

3. Then tighten fitting firmly by ¼ turn (1½ flats)
   - Recommended to use spanner extension for sizes over 20 mm O.D. (see chart)

<table>
<thead>
<tr>
<th>Size</th>
<th>Spanner length H [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-L</td>
<td>300</td>
</tr>
<tr>
<td>22-L</td>
<td>400</td>
</tr>
<tr>
<td>28-L</td>
<td>500</td>
</tr>
<tr>
<td>35-L</td>
<td>900</td>
</tr>
<tr>
<td>42-L</td>
<td>1200</td>
</tr>
<tr>
<td>38-S</td>
<td>1500</td>
</tr>
</tbody>
</table>

Threads of stainless steel fittings must be lubricated.
EO-NIROMONT is a special high-performance lubricant for stainless steel fittings.

Assemble fitting until wrench tight (without spanner extension).
Mark position of nut.

Then tighten fitting firmly by ¼ turn (1½ flats).
Recommended to use spanner extension for sizes over 20 mm O.D. (see chart).
Assembly instructions DIN fittings

Replacement of an EO Bite type connection

Distance piece adapter DA
- EO distance piece adapters allow replacement of bite type connections on existing pipework easily or retrofitting using EO-2
- The existing tubes can be re-used

Use as an extension for stacked assemblies
1. Cut length L off tube-end (see "DA" chapter I Catalogue 4100)
2. Assemble new EO-2 functional nut or EO PSR/DPR and nut
3. Thread on and tighten distance piece adapter onto tube-end

Scrap obsolete nut
Assembly instructions DIN fittings

Tube bending

Instructions for EO hand bending equipment
- For on-site piping jobs
- Not for mass production

1. Think the whole process through and plan each individual step before starting
   - First bend and then cut ends to length
   - Gather all dimensions like minimum straight lengths, extra length for flaring, bending radius, tube lengths for bows, etc.

2. Consider steps
   - Plan for clamping

3. Check bending equipment specifications for limitations

4. Start with first elbow
   - Leave tube-end longer if in doubt
5. Mark start of bend on tube (S) and adjust tube between bending roll (1), clamping roll (2) and pressure roll (3). Bend tube by pulling lever.

6. Check bend angle and correct if necessary. Gather all dimensions for next bending operation.

7. Mark start of bend on tube and check and correct each result before starting next bend.

8. After the last bend, check tube for angles and dimensions. Cut both tube-ends to correct length. Make sure that tube fits without tension.
Assembly instructions DIN fittings

Tube line fabrication guide for leak free systems

Every hydraulic, pneumatic and lubrication system requires some form of tube fabrication and fitting installation for completion. Proper fabrication and installation are essential for the overall efficiency, leak free performance, and general appearance of any system.

After sizing the tube lines and selecting the appropriate style of fitting, consider the following in the design of your system:

1. Accessibility of joints
2. Proper routing of lines
3. Adequate tube line supports
4. Available fabricating tools

Keep tube lines away from components that require regular maintenance:
Right-angled – parallel – clear

Have a neat appearance and allow for easy trouble-shooting, maintenance and repair:

Example for tube to hose connection:
Assembly instructions DIN fittings

Tube line fabrication guide for leak free systems

- Do not use tube lines to support other tubes
- Always fix tubes onto a rigid point with tube clamps
- Do not use cable channels to support tubes

- Use appropriate tube clamps:

- Avoid excessive strain on joint:
  A strained joint will eventually leak
- Allow for expansion effects

- Avoid short tube length:
  - Short tube lengths increase chance of fatigue fractures
  - Use adapter GZR or swivel connector for swivel fittings instead of short tube lengths
Assembly instructions DIN fittings

Tube line fabrication guide for leak free systems

● Support against actuating forces:

Recommended tools for tube line fabrication:

Cutting:
EO Tube cutting tool AV
EO Combined tube bending and cutting tool BAV

tube cutters:
Steel: Type Kloskut;
Stainless Steel: Type 635 B-EX,
Type 218 B-SS Tru-Kut Sawing Vice

deburring:
Parker deburring tool no. 226 DEBURR

Bending:
EO Combined tube bending and cutting tool BAV
EO Tube bending tool BV 6/18, BV 20/25
EO Tube bending tool BVP (programmable)

Tube lines have to be supported in certain distances:
Use sufficient tube clamps to support weight
Use sufficient tube clamps to protect joints from vibration

Vibration has to be eliminated near by the connectors:
Allow expansion and contraction. Do not hamper expansion and contraction near by tube bends:

<table>
<thead>
<tr>
<th>Ø [mm]</th>
<th>L [m]</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.0 – 12.7</td>
<td>1.0</td>
</tr>
<tr>
<td>12.7 – 22.0</td>
<td>1.2</td>
</tr>
<tr>
<td>22.0 – 32.0</td>
<td>1.5</td>
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<tr>
<td>32.0 – 38.0</td>
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<tr>
<td>38.0 – 57.0</td>
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<td>75.0 – 76.1</td>
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<td>76.1 – 88.9</td>
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<tr>
<td>168.0 – 219.0</td>
<td>6.0</td>
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