ROSENBERGER –
AN OUTSTANDING STORY OF SUCCESS

From its humble beginnings in the year 1958 in a locksmith shop Rosenberger has developed into a worldwide operating company with an international reputation. The unique business sense and entrepreneurship of Hans sen. (d. 2007) and Katharina (d. 2004) Rosenberger and, in ensuing years, the vision, management style and leadership of their three sons Hans, Bernhard and Peter lead Rosenberger to today’s prominence.

PRODUCTS AND MARKETS
The product range covers RF coaxial, DC and data connectors, RF test & measurement products, RF connectors for automotive electronics, medical electronics as well as fiber optic products and cable assemblies. Renowned companies in high-tech industries, e.g. telecommunication, data systems, medical electronics, test & measurement, aerospace engineering or automotive electronics trust the precision and quality of Rosenberger products.

THE ROSENBERGER GROUP
The headquarters of Rosenberger is located in Fridolfing/Tittmoning (Oberbayern, Germany) where today approx. 1100 people are employed. Worldwide, the Rosenberger group operates 18 manufacturing and assembly locations as well as the Rosenberger sales network in Europe, Asia and North and South America where – in total – more than 4500 employees develop, produce and sell our products.
SUPERIOR QUALITY
The quality of our products and services is an essential part of our corporate strategy. Rosenberger’s quality philosophy is not just to optimize components and products, but to continuously improve and optimize all processes to ensure customer satisfaction: from product development, planning, purchasing, production, sales, logistics and service to environmental policy – all in all, to offer maximum benefit to our customers all over the world.

Responsibility for quality also means being proactive in protecting our environment and natural resources. We endeavour to avoid or minimize environmental pollution – even beyond the requirements of legal regulations whenever possible.

Rosenberger is certified according to ISO/TS 16949, ISO 9001 and ISO 14001.

EUROPEAN ENVIRONMENTAL DIRECTIVES
Connectors and cable assemblies manufactured by Rosenberger correspond to the following European Directives:

• 2002/95/EG – Restriction of the use of certain Hazardous Substances in electrical and electronic equipment (RoHS)
• 2002/96/EG – Waste Electrical and Electronic Equipment (WEEE)

The objective of the above mentioned European Directives is to avoid or to limit the use of the following hazardous substances:

• Lead
• Mercury
• Cadmium
• Chrome VI
• PBB (Polybrominated Biphenyls)
• PBDE (Polybrominated Diphenyl Ethers)
FIBER SOLUTIONS FOR ALL APPLICATIONS

DISCRETE CABLING

The Rosenberger Discrete Cabling solution is ideal for single runs of fiber cable. Installation of this design gives the flexibility of one fiber pair per sector.

On the other hand, expansion requires several runs of fiber cable up the tower, increasing cost. Rosenberger has several other solutions addressing the issue.

**VARIANT 1**
Mono pole installation with three separate runs of fiber cable

**VARIANT 2**
Roof top installation with three separate runs of fiber cable
FEATURES AND BENEFITS
- Single runs of fiber duplex feeders per RRU
- Fiber feeder
  - Outdoor rated
  - 5 or 7 mm outer diameter
  - LC-Duplex connectors or Rosenberger Duplex Connectors (RDC)
  - Cable ends matching a variety of Remote Radio Unit entries

Three individual runs of fiber feeders for three RRU's

Individual fiber feeder pairs

Antenna

RRU
PreCONNECT® FIBER FEEDER OUTDOOR
(Single-channel)

APPLICATIONS
• Single-channel cable for harsh outdoor environment
• To integrate mobile telecommunications (FTTA) equipment in unprotected outdoor environment into structured cabling

PROPERTIES
• Appropriate for use in temperature range -40 °C to +85 °C
• High UV resistance
• High crush resistance
• Both sides factory assembled with FO connectors
• Single data channel in one cable
• Standard light propagation “channelwise crossed” (pairwise flipped)
• Leg lengths applicationspecific selectable
• Cable length to be selected

LENGTH DEFINITION
• Length tolerances:
  up to 10 m = +/- 50 cm
  11 m to 30 m = +/- 100 cm
  31 m to 100 m = +/- 150 cm
  longer than 100 m = +/- 2 %

CABLE TYPES
• Fiber feeders 5 mm - 7 mm
• IEC and UL specified cable available
• Cable data sheets on request

FIBER TYPES
• Singlemode (9/125 µm) and multimode (50/125 µm)
• Bend insensitive fiber available

CONNECTORS
• LC-Duplex, LC-Compact, Rosenberger Duplex Connector (RDC)
• Other connector types on request

DELIVERY FORM
• Factory measured Insertion Loss (IL), including measurement report
• Product ID labels on both sides
• Connector protection on request
• Dependent on the length as cable ring in cardboard box or on cardboard drum
### PARTNUMBERS
#### CONVENTIONAL FIBER FEEDER

<table>
<thead>
<tr>
<th>CHANNELS/FIBERS</th>
<th>Ø</th>
<th>CONNECTOR</th>
<th>G657A 9/125</th>
<th>OM 2 50/125</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 CH / 2 F</td>
<td>5 mm</td>
<td>LC-Duplex » LC-Duplex RDC » LC-Duplex</td>
<td>L98B-003</td>
<td>L98C-023</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>L98B-004</td>
<td>L98C-026</td>
</tr>
<tr>
<td>1 CH / 2 F</td>
<td>7 mm</td>
<td>LC-Duplex » LC-Duplex RDC » LC-Duplex</td>
<td>L98B-068</td>
<td>L98C-025</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>L98B-006</td>
<td>L98C-024</td>
</tr>
</tbody>
</table>

OM3 and OM4 on request

### PARTNUMBERS
#### FIBER FEEDER OVERMOLDED

<table>
<thead>
<tr>
<th>CHANNELS/FIBERS</th>
<th>Ø</th>
<th>CONNECTOR</th>
<th>G657A 9/125</th>
<th>OM 2 50/125</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 CH / 2 F</td>
<td>5 mm</td>
<td>LC-Compact » LC-Compact RDC » LC-Compact</td>
<td>L98B-052</td>
<td>L98C-043</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>L98B-053</td>
<td>L98C-044</td>
</tr>
<tr>
<td>1 CH / 2 F</td>
<td>7 mm</td>
<td>LC-Compact » LC-Compact RDC » LC-Compact</td>
<td>L98B-054</td>
<td>L98C-045</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>L98B-055</td>
<td>L98C-046</td>
</tr>
</tbody>
</table>

OM3 and OM4 on request
FIBER SOLUTIONS FOR ALL APPLICATIONS

FTTA TRUNKING SYSTEM

The FTTA Trunking system utilizes one fiber trunk with 3 to 18 pairs / channels of optical fiber, with a FTTA Distribution Enclosure. One trunk can provide fiber for up to 18 RRUs. Deploying a fiber trunk provides the fiber needed for today plus spare fiber for future growth.

Fiber Jumpers are used from the FTTA Distribution Enclosure to RRU or equipment. For upgrading systems with unique fiber interfaces, only the jumpers will require modification or replacement.

FEATURES AND BENEFITS
- Single fiber trunk with 6 to 36 fibers (3 to 18 Pairs / Channels)
- LC connections to customer specified connections
- Singlemode or multimode
- Distribution enclosure at tower top
- Fiber jumper go to RRU at tower top

TOWER TOP
- Fiber trunk terminate in distribution enclosure – fiber jumpers connect to RRU

TOWER BOTTOM
- Fiber trunk fanouts terminate directly to equipment (solution 1) in shelter or connect to multiple equipment cabinets at base (solution 2)

SOLUTION 1
Direct fanout connection to BBU

![Diagram of FTTA Trunking System]

- LTE Equipment
- UMTS Equipment
- GSM Equipment
- Spare Fiber for Future Growth
- Shelter
FTTA TRUNKING SYSTEM

FTTA Distribution Enclosure

FTTA Trunking System with shelter at base

Antenna

RRU

Fiber trunk

SOLUTION 2
Trunk terminated in ODF.
BBU equipment connected via jumper to ODF

Fiber jumper

Equipment cabinets at base

Jumper

LTE Equipment

UMTS Equipment

GSM Equipment

Spare Fiber for Future Growth

FTTA SITE SOLUTIONS
PreCONNECT® FIBER FEEDER OUTDOOR (Multi-channel)

APPLICAIONS
- Multi-channel cable for harsh outdoor environment
- To integrate mobile telecommunications (FTTA) equipment in unprotected outdoor environment into structured cabling

PROPERTIES
- Appropriate for use in temperature range -40 °C to +85 °C
- High UV resistance
- High crush resistance
- Both sides factory assembled with FO connectors
- 3, 6, 12 or 18 data channels in one cable
- Singular coded duplex connectors
- Standard light propagation “channelwise crossed” (pairwise flipped)
- Leg lengths applicationspecific selectable
- Cable length to be selected

LENGTH DEFINITION
- Order length: length between the connectors at the longest legs at both sides (not between the cable dividers)
- Length tolerances:
  
<table>
<thead>
<tr>
<th>Length Range</th>
<th>Tolerance</th>
</tr>
</thead>
<tbody>
<tr>
<td>up to 10 m</td>
<td>+/- 50 cm</td>
</tr>
<tr>
<td>11 m to 30 m</td>
<td>+/- 100 cm</td>
</tr>
<tr>
<td>31 m to 100 m</td>
<td>+/- 150 cm</td>
</tr>
<tr>
<td>longer than 100 m</td>
<td>+/- 2 %</td>
</tr>
</tbody>
</table>

CABLE TYPES
- Minibreakout 6 mm - 7.7 mm
- IEC and UL specified cable available
- Cable data sheets on request

FIBER TYPES
- Singlemode (9/125 µm) and multimode (50/125 µm)

CONNECTORS
- LC-Duplex and LC-Compact
- Other connector types on request

DELIVERY FORM
- Factory measured Insertion Loss (IL), including measurement report
- Product ID labels behind both cable dividers
- Connector legs packed in dust-proof foil-tubes, on request in robust installation tubes available too
- Dependent on the length as cable ring in cardboard box or on cardboard drum
**PART NUMBERS**
PreCONNECT® FIBER BREAKOUT OUTDOOR

<table>
<thead>
<tr>
<th>CHANNELS/FIBERS</th>
<th>CONNECTOR</th>
<th>G657A 9/125</th>
<th>OM2 50/125</th>
<th>FTTA DISTRIBUTION ENCLOSURE</th>
<th>DISTRIBUTION PANEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 CH / 6 F</td>
<td>LC-Duplex × LC-Duplex</td>
<td>L 9 8 B – 0 2 3</td>
<td>L 9 8 C – 0 0 2</td>
<td>SLFDU003-03</td>
<td>SLODF001-03</td>
</tr>
<tr>
<td>6 CH / 12 F</td>
<td>LC-Duplex × LC-Duplex</td>
<td>L 9 8 B – 0 3 0</td>
<td>L 9 8 C – 0 0 3</td>
<td>SLFDU003-06</td>
<td>SLODF001-06</td>
</tr>
</tbody>
</table>

SM OS2, MM OM3 and OM4 on request.

**PART NUMBERS**
PreCONNECT® FIBER TRUNK OUTDOOR

<table>
<thead>
<tr>
<th>CHANNELS/FIBERS</th>
<th>CONNECTOR</th>
<th>G657A 9/125</th>
<th>OM2 50/125</th>
<th>FTTA DISTRIBUTION ENCLOSURE</th>
<th>DISTRIBUTION PANEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 CH / 12 F</td>
<td>LC-Compact × LC-Compact</td>
<td>L 9 8 B – 0 0 1</td>
<td>L 9 8 C – 0 0 4</td>
<td>SLFDU004-06</td>
<td>SLODF011-006</td>
</tr>
<tr>
<td>12 CH / 24 F</td>
<td>LC-Compact × LC-Compact</td>
<td>L 9 8 B – 0 2 2</td>
<td>L 9 8 C – 0 0 5</td>
<td>SLFDU005-12</td>
<td>SLODF011-012</td>
</tr>
<tr>
<td>18 CH / 36 F</td>
<td>LC-Compact × LC-Compact</td>
<td>L 9 8 B – 0 6 9</td>
<td>on request</td>
<td>SLFDU008-18</td>
<td>SLODF011-018</td>
</tr>
</tbody>
</table>

SM OS2, MM OM3 and OM4 on request.
FIBER SOLUTIONS FOR ALL APPLICATIONS

TOWER MULTI-FIBER SYSTEM

The Rosenberger Tower Multi-Fiber System allows for deployment of 6 to 12 pairs of fiber without the need of a tower top distribution enclosure. This system is delivered in one piece and installed directly on the tower. Rosenberger Duplex Connector (RDC) jumpers connect from the Multi-Fiber System to RRU equipment.

FEATURES AND BENEFITS
• All in ONE fiber feeder and tower distribution unit as one piece.
• One run of fiber feeder with 12 to 24 fibers in one cable
• Direct connection to RRU with RDC jumpers
PreCONNECT® TOWER MULTI-FIBER SYSTEM (TMFS) (Multi-channel)

APPLICATIONS
- To integrate security and mobile telecommunications (FTTA) equipment in unprotected outdoor environment into structured cabling

PROPERTIES
- Assembled Rosenberger Duplex Connector (RDC) distribution unit with fix attached multifiber cable
- Distribution unit with up to 12 RDC receptacles
- IP67 water-proof

LENGTH DEFINITION
- Order length: length between the connectors at the longest legs at both sides (not between the cable dividers)
- Length tolerances:
  - up to 10 m = +/- 50 cm
  - 11 m to 30 m = +/- 100 cm
  - 31 m to 100 m = +/- 150 cm
  - longer than 100 m = +/- 2 %

CABLE TYPES
- Central loose tube cables up to 24 fibers available
- IEC and UL specified cable available
- Cable data sheets on request

FIBER TYPES
- Singlemode (9/125 µm) and multimode (50/125 µm)
- Fiber data sheets on request

CONNECTORS
- Side A: LC-Compact
- Side B (distribution unit): Rosenberger Duplex Connector (RDC) receptacle

PARTNUMBERS

<table>
<thead>
<tr>
<th>CHANNELS/ FIBERS</th>
<th>CONNECTOR</th>
<th>G657A 9/125</th>
<th>OM2 50/125</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 CH / 12 F</td>
<td>RDC » LC-Compact</td>
<td>L988-061</td>
<td>L98B-041</td>
</tr>
<tr>
<td>12 CH / 24 F</td>
<td>RDC » LC-Compact</td>
<td>L98B-042</td>
<td>L98C-034</td>
</tr>
</tbody>
</table>

SM OS2, MM OM3 and OM4 on request.

PARTNUMBERS

<table>
<thead>
<tr>
<th>CHANNELS/ FIBERS</th>
<th>Ø</th>
<th>CONNECTOR</th>
<th>G657A 9/125</th>
<th>OM2 50/125</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 CH / 2 F</td>
<td>5 mm</td>
<td>RDC » LC-Compact</td>
<td>L98B-053</td>
<td>L98C-044</td>
</tr>
<tr>
<td>1 CH / 2 F</td>
<td>7 mm</td>
<td>RDC » LC-Compact</td>
<td>L98B-055</td>
<td>L98C-046</td>
</tr>
</tbody>
</table>

SM OS2, MM OM3 and OM4 on request.
FIBER SOLUTIONS FOR ALL APPLICATIONS

HYBRID SOLUTION

The Rosenberger Hybrid Solution provides a single cable option for both optical fiber and copper wire. One Hybrid cable can support up to three RRUs.

FEATURES AND BENEFITS

- Optical fiber:
  - 6 to 12 fibers (3 to 6 channels) – singlemode
  - Factory terminated connections
- Copper wire:
  - 6, 8, 10 mm² with 3 and 6 conductors
  - Copper covered braided shield or aluminum interlocked armor
- Supply to RRH directly or via distribution enclosures

DISCRETE SOLUTION
Connects directly one RRU separate to BBU

DIRECT SOLUTION
Connects directly to equipment in shelter at base and on tower top to all three RRUs

DISTRIBUTED SOLUTION
Connects to distribution enclosure at base (or tower top) and jumpers connect to equipment from enclosure
HYBRID SOLUTION

HYBRID CABLE SOLUTION

DISCRETE

DIRECT

HYBRID CABLE SOLUTION

DISTRIBUTED

RRU 1 RRU 2 RRU 3

Distribution box
Fiber / Power

Distribution box
Fiber / Power

power

fiber

Optional: Over Voltage Protection available

FTTA HYBRID DISTRIBUTION ENCLOSURE

APPLICATIONS

- Used at tower top for fiber and power management with RRU s. Can also be used at bottom for power and fiber distribution.
- Switching device combination for the DC power supply of the remote radio unit RRU with Hybrid cable
- Can be used in case of physically separated functional equipotential bonding levels
- Can be used in spatially same functional equipotential bonding levels

PROPERTIES

- Used at tower top for fiber and power management with RRU s. Can also be used at bottom for power and fiber distribution.
- Easy terminal connection by using cage clamp technology
- Fiber glass enclosure, lockable, with UL-approval, NEMA classification 4 x / 13
- Modular Surge arrester according to EN 61643-11 / IEC 61643-1/-11 / Class II for a nominal voltage of 48 V DC (max. 60 V DC)
- Surge arrester (Type 2) with a high discharge capacity and a high reliability due to “Thermo Dynamic Control” SPD monitoring device
- Low voltage protection level
- MCBs for the RRU protection

FTTA SITE SOLUTIONS
INTERIOR EXCESS FIBER CABLE ENCLOSURE

The Rosenberger interior excess fiber cable enclosure is designed for indoor on-site storage of excess fiber cable when pre-connected fiber trunk cables are utilized.

FEATURES AND BENEFITS
- Material: unpainted steel
- Rack mount: removable 19” rack ears included
- Capacity: 20 or 30 meters of 10 mm cable + fanouts
- Mounting: wall or rack mount

PARTNUMBERS

<table>
<thead>
<tr>
<th>VARIANT</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1 HU without drawer</td>
<td>SLFC5001-000</td>
</tr>
<tr>
<td>1 HU with drawer</td>
<td>SLFC5003-000</td>
</tr>
</tbody>
</table>

JUMPER CABLES

Rosenberger Jumper Cables are used for the connection between RRU’s and Basestation Antennas. With low intermodulation product IM3 of < -160dBc we support high performance for next generation technologies.

FEATURES AND BENEFITS
- More throughput
- Less dropped calls
- Superior performance

PARTNUMBERS

<table>
<thead>
<tr>
<th>M: male</th>
<th>F: female</th>
<th>xxx: length [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2” super flexible</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7/16 M straight - 7/16 M straight</td>
<td>LC08-333-xxx</td>
<td></td>
</tr>
<tr>
<td>7/16 M straight - 7/16 F straight</td>
<td>LC08-335-xxx</td>
<td></td>
</tr>
<tr>
<td>7/16 M straight - 7/16 M right angle</td>
<td>LC08-343-xxx</td>
<td></td>
</tr>
<tr>
<td>7/16 M right angle - 7/16 M right angle</td>
<td>LC08-383-xxx</td>
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<tr>
<td>7/16 M straight - 7/16 M straight</td>
<td>LC03-186-xxx</td>
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<tr>
<td>7/16 M straight - 7/16 F straight</td>
<td>LC03-136-xxx</td>
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<tr>
<td>7/16 M straight - 7/16 M right angle</td>
<td>LC03-188-xxx</td>
<td></td>
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<tr>
<td>7/16 M right angle - 7/16 M right angle</td>
<td>LC03-201-xxx</td>
<td></td>
</tr>
</tbody>
</table>
CABLE CLAMPS

To install multiple cable runs on towers where space is limited. Without additional adapters, these clamps can provide sturdy, reliable, long-term support to system by means of tough and UV material.

<table>
<thead>
<tr>
<th>PARTNUMBERS</th>
<th>CABLE CLAMP FOR POWER AND FIBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 x power (black) 1 x fiber (grey)</td>
<td>Ø 9 - 13 mm Ø 4.5 - 7 mm</td>
</tr>
<tr>
<td>2 x power (black) 2 x fiber (grey)</td>
<td>Ø 9 - 13 mm Ø 4.5 - 7 mm</td>
</tr>
<tr>
<td>3 x power (black) 3 x fiber (grey)</td>
<td>Ø 9 - 13 mm Ø 4.5 - 7 mm</td>
</tr>
</tbody>
</table>

GROMMETS

Grommets enable the reuse of cable clamps for thinner cables, e.g. fiber optic or power cables in FTTA applications.

<table>
<thead>
<tr>
<th>PARTNUMBERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1/mm</td>
</tr>
<tr>
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</tr>
<tr>
<td>52</td>
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</tbody>
</table>
INSPECTION AND CLEANING KIT

The kit includes all materials and tools for visual inspection and cleaning of FO connectors and adapters. The main component is a video backpanel microscope. It is available with a hand-held monitor or with a USB interface, alternatively. The USB version needs a laptop or PC with USB 2.0 port. That version comprises an additional feature compared to the monitor version: the pictures can be saved for documentation. Microscope adapters for Ø 1.25 mm and Ø 2.5 mm standard ferrules are included, additional adaptions to all frequently used connector types are available as accessory. We are pleased to provide you with a detailed data sheet.

The software delivered with the USB microscope allows to analyze the pictures in an automated way. Scratches and contaminations are marked in different colours and enable a reliable examination of ferrule endfaces. This ensures an inspection in conformity with IEC 61300-3-35.

A large variety of adapters enables to inspect all standard connectors with the video microscope. Connectors can also be inspected through panel mounted couplers.

Screen shot of a ferrule endface

| PARTNUMBERS |
|-----------------|------------------|--------------|
| INSPECTION AND CLEANING KIT | Video microscope with hand-held monitor | 099 A 0388 |
| | USB microscope | 099 A 0389 |
TEST LASER EV-3

Laser light source for defect location, fiber identification and testing of connectors, singlemode and multimode
- With Ø 2.5 mm universal interface and adapter to Ø 1.25 mm
- Technical data sheet available on www.rosenberger-osi.com

| PARTNUMBER | TEST LASER EV-3 | 099A0332 |

REEL CLEANER

Cleaning device with a dry textile ribbon for all FO connectors with the exception of MT-RJ male (with pins)
- One textile reel included
- Up to 400 cleanings per reel
- Dimensions (l x w x h): 127 x 83 x 48 mm
- Weight: approx.: 150 g

<table>
<thead>
<tr>
<th>PARTNUMBERS</th>
<th>REEL CLEANER</th>
<th>099A0025</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>REPLACEMENT REEL</td>
<td>099A0026</td>
</tr>
</tbody>
</table>

CLICK CLEANER

Handy cleaning tool for ferrule endfaces of FO connectors.
- Simple release of the cleaning mechanism by pushing the tool holder
- Unmating of the connector not necessary – cleaning through the adapter is available
- Extendable nozzle for cleaning connectors, being difficult accessible
- Length: approx.: 185 mm
- Weight: approx.: 25 g

<table>
<thead>
<tr>
<th>PARTNUMBERS</th>
<th>CLICK CLEANER, FOR FERRULES Ø 1.25 mm</th>
<th>099A0390</th>
</tr>
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<tbody>
<tr>
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<td>CLICK CLEANER, FOR FERRULES Ø 2.5 mm</td>
<td>099A0391</td>
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<tr>
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<td>CLICK CLEANER, FOR RDC CONNECTORS</td>
<td>099A0395</td>
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<tr>
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<td>MTP® / MPO CLEANER</td>
<td>099A0055</td>
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MTP® is a registered trademark of US Conec Ltd.