**MSR–Instrumentation Cables acc. to EN Standard**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSR-2X(St)Y</td>
<td>Stranded copper conductors, cross linked polyethylene insulated (XLPE), overall screened, polyvinylchloride sheathed (PVC)</td>
</tr>
<tr>
<td>MSR-2X(St)Y-Pimf</td>
<td>Stranded copper conductors, cross linked polyethylene insulated (XLPE), individual &amp; overall screened, polyvinylchloride sheathed (PVC)</td>
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<tr>
<td>MSR-2X(St)YRY</td>
<td>Stranded copper conductors, cross linked polyethylene insulated (XLPE), overall screened, galvanized steel wire armoured, polyvinylchloride sheathed (PVC)</td>
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**Optional:**
- Fire retardant acc. to IEC 60332-3 C
- Fire retardant acc. to IEC 60332-3 A
- Zero halogen acc. to IEC 61034 1+2 & IEC 60754-2
- Fire resistant acc. to IEC 60331-21
- Flexible copper conductors class 5 or solid copper conductors class 1
- PE insulation “2Y” or PVC insulation “Y”
- Copper braid screen “(C)” or Copper tape screen “(CuB)”
- Steel tape armouring “B” or Steel wire braid armouring “Q”
- Zero halogen sheathing materials “H”
- Hydrocarbon resistant outer sheath
- Cold resistant outer sheath

**VDE & German Standards**

<table>
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<tr>
<td>RD-Y(St)Y… BdZ</td>
<td>Industrial Instrumentation cable for power plant applications</td>
</tr>
<tr>
<td>RD-H(C)H… BdZ</td>
<td>Zero halogen industrial Instrumentation cable for power plant applications with copper braid screen</td>
</tr>
<tr>
<td>JE-Y(St)Y… Bd</td>
<td>Instrumentation cable for industrial electronics</td>
</tr>
<tr>
<td>JE-LiY(C)Y… Bd</td>
<td>Instrumentation cable for industrial electronics with copper braid screen</td>
</tr>
</tbody>
</table>

**AFNOR Standards (France)**

... please inquire for our special leaflet!
**Railway Trackside Signalling & Communication Cables**

examples from our product range

- **German DB Standard**
  - A-2Y2Yv, A-2Y2YB2Y, AJ-2Y2YDB2Y, ...
  - cores twisted in layers
  - A-2Y(L)2Yv, A-2Y(L)2YB2Y, AJ-2Y(L)2YDB2Y, ...
  - cores twisted in quads
  - A-2YY, A-2YYBY, AJ-2YYDB2Y, ...
  - cores twisted in layers
  - A-2Y(St)Y, A-2Y(St)YBY, AJ-2Y(St)YDB2Y, ...
  - cores twisted in quads

- **French SNCF Standard**
  - CT, ZPAU, ZPFU, ...

- **Belgian INFRABEL Standard**
  - SXCAV, SXCAG, VS, VST, TWFS(PJ)W, TWFS(PJ)WAW

**Optional:**
- Fire retardant acc. to IEC 60332-3 C
- Zero halogen acc. to IEC 61034 1+2 & IEC 60754-2
- Other standards and customers specifications ...

**Outdoor Copper Telecommunication Cables**

- **Conductors:** copper - 0.4 – 0.5 – 0.6 - 0.8 or 1,0 mm diam.
- **Insulation:** Polyethylene “2Y”
  - Foam skin polyethylene “02YS”
  - Foam polyethylene “02Y”
- **Stranding:** Quads or pairs, assembled in bundles or concentric layers
- **Sheathings:** Polyethylene “2Y” or zero halogen sheathing materials “H”

**Other features:**
- Petroleum jelly filling for longitudinal water tightness “F”
- Aluminium laminated sheath as screen and transversal moisture barrier “(L)”
- Lead alloy sheath “M”
- Different possibilities for steel armouring “B”, “R”, “(SR)”, “Q”, ...
- Hydrocarbon resistant outer sheath
- Cold resistant outer sheath

**Optical Fibre Cables**

- Outdoor, direct burial, aerial – or indoor cables
- **Singlemode** or **multimode** fibres according to different specifications
- **Loose tube in multitube** or **unitube** constructions
- **Dry** “DQ” or **jelly filled** “DF” for longitudinal water tightness
- Appropriate **tensile elements** “(ZN)” as strain relief
- Polyethylene “2Y” or zero halogen sheathing materials “H”

**Other features:**
- Aluminium laminated sheath as transversal moisture barrier “(L)”
- Lead alloy sheath “M”
- Different possibilities for steel armouring “(SR)”, “B”, “R”, ...
- Polyamide “4Y” outer sheath as additional rodent protection
- Fire retardant acc. to IEC 60332-3 C
Abbreviations for Cable Construction Elements:

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<thead>
<tr>
<th>MSR</th>
<th>EUPEN code for instrumentation cables „Messen – Steuern – Regeln“</th>
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<tbody>
<tr>
<td>J-</td>
<td>Cable for indoor installation</td>
</tr>
<tr>
<td>JE-</td>
<td>Cable for industrial electronics</td>
</tr>
<tr>
<td>RD-</td>
<td>Power plant instrumentation cable</td>
</tr>
<tr>
<td>A-</td>
<td>Cable for outdoor installation</td>
</tr>
<tr>
<td>AJ-</td>
<td>Cable for outdoor installation with inductive protection</td>
</tr>
<tr>
<td>NU-</td>
<td>Cable for nuclear power plants</td>
</tr>
<tr>
<td>Li</td>
<td>Flexible copper conductor</td>
</tr>
</tbody>
</table>

**Insulation:**

- m: Mica tape
- 2X: Cross linked polyethylene (XLPE)
- 2Y: Polyethylene (PE)
- 02YS: Foam skin polyethylene
- 02Y: Foam polyethylene
- Y: Polyvinylchloride (PVC)
- H: Zero halogen compound
- HX: Cross linked zero halogen compound

**Screen:**

- PIMF: Pairs in metal foil (individual screen)
- TIMF: Triples in metal foil (individual screen)
- (C): Aluminium wire braid over each pair (individual screen)
- (St): Copper wire braid over each pair with drain wire
- (C): Copper wire braid
- (CuB): Copper tape
- C: Concentric layer of copper wires with a counter-helix of copper – tape
- (St): Corrugated copper tape (Railway signaling cables)
- D: Concentric conductor of copper wires (Railway signaling cables)

**Metallic barrier:**

- K: Lead alloy sheath
- M: Lead alloy sheath (copper telecommunication cables)
- (L): Aluminium tape bonded to PE or Zero halogen sheath (moisture barrier)

**Armour:**

- R: Galvanized steel wires
- B: Double steel tape
- (SR): Corrugated steel tape
- Q: Galvanized steel wire braid

**Sheath:**

- Y: Polyvinylchloride (PVC)
- 2Y: Polyethylene (PE)
- H: Zero halogen, fire retardant compound
- ..v: Reinforced outer sheath thickness
- HX: Cross linked zero halogen & fire retardant compound

**Various:**

- DQ: Dry filled cable core (optical fibre cables)
- DF: Jelly filled cable core (optical fibre cables)
- (ZN): Tensile elements, strain relief (optical fibre cables)
- …Bd: pairs or quads assembled in bundles
- …Lg: pairs or quads assembled in concentric layers