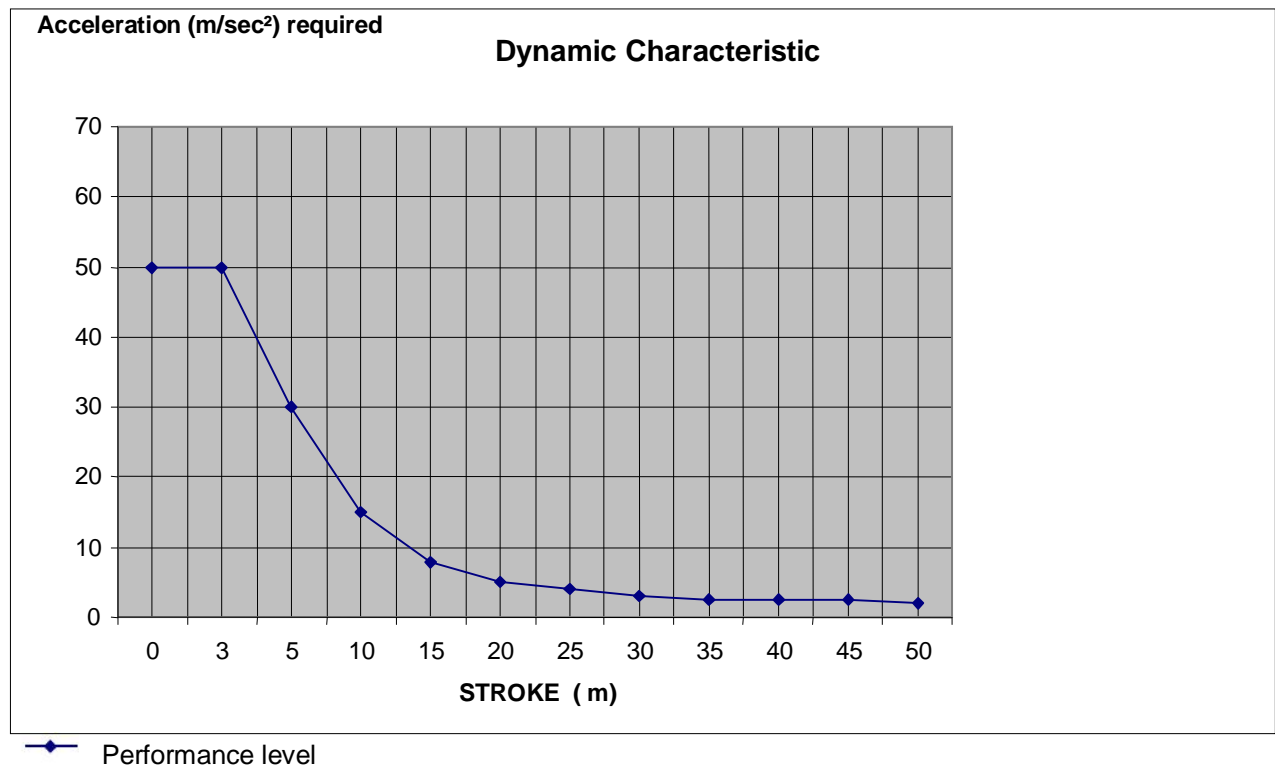


**SERVO LK SMS FX8PLUS SIGNAL**DB 00277101EN  
valid from: 30.03.2011**Application**

LAPP servo cables according to Siemens®\* (see footnote) Standard **FX8008 PLUS SIGNAL** are a new generation of very highly flexible screened signal (encoder and resolver)- cables (P/Ns **00277101** to **00277171**), with PUR outer sheath and UL/CSA approvals. They are suitable in **very high dynamically operating power chain applications** under accelerations up to **50m/s<sup>2</sup>** as well as for static use. Lapp FX8PLUS Signal cables are made in accordance to Siemens Motion Connect\* typically used for interconnection in between encoders, resolvers and similar devices and servo drive controllers of Siemens SINAMICS\* drive systems. Typical kind of application: In power chains of **modern high speed/high efficient machine tools**, production plants, car body presses, transfer lines...

USA: According NFPA 79 Ed. 2007 AWM is accepted only, when part of a listed assembly. Cables can be used in dry and damp areas and also outdoor provided the recommended temperatures of use are respected. Usage of these cables in moving cable carriers, respectively on motor drum guidance or under a strain of more than 20 N/mm<sup>2</sup> is not allowed. LK SMS-FX8PLUS cables are increased oil-resistant, halogen-free and free of lacquer destructive substances ("free of silicones").

**Table A LK SMS FX8PLUS Signal****Common data of all signal cables:**

|                          |   |
|--------------------------|---|
| <b>Conductors:</b>       | stranded tinned copper wires,                     |
| <b>Insulation:</b>       | PP Polypropylene                                  |
| <b>Conductor ID code</b> | see P/N's individual Add-on datas                 |
| <b>Jacket</b>            | TMPU Polyurethane EN 50363-10-2. Green (~RAL6018) |
| <b>Rated voltage</b>     | UL AWM & CSA AWM: U = 30V                         |
| <b>Temperature range</b> | Operating: - 20°C up to +60°C                     |

Originator: H. Huber / PCM  
 approved: H. Pfeffer/ PDC  
 27.8.2011: V3\_Correction: V Huber

Document: DB00277101EN\_V3

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Static / storage.     - 50°C up to +80°C  
 Max allowable on conductors:     +80°C

**Dynamic performance**

|  |   |
|--|---|
| <b>Pulling force (Dynamic)</b>                 | ≤ 20 N/mm <sup>2</sup>  |
| <b>Pulling force (Static)</b>                  | ≤ 50 N/mm <sup>2</sup>  |
| <b>Max. Acceleration</b>                       | See Table A   |
| <b>Max. Length horizontal of Signal cables</b> | See Table A   |
| <b>Max. Speed</b>                              | 5m/s respectively 300m/min  |
| <b>Min. bending radii</b>                      | Dynamic applications:   8 x cables outer diameter<br>Static applications:     4 x cables outer diameter |
| <b>Max torsion load</b>                        | +/- 30° /m  |
| <b>Bends</b>                                   | 10.000.000  |
| <b>Oil resistance</b>                          | DIN EN 50363-10-2   |
| <b>Halogen free</b>                            | VDE0472-815   |
| <b>Flame resistance</b>                        | IEC/ EN 60332-1-2 IEC/EN 60332-1-3; FT1, VW-1   |
| <b>Approvals</b>                               | USA:   UL AWM rec. Style 20236 80°C 30V VW-1<br>Canada: CSA AWM I/II A/B 80°C 30V FT1                   |
| <b>Conformities</b>                            | DESINA, RoHS,   |

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**Add-on data of P/N**                    **00277101**                    **8 x 2 x 0.18 C**

**0.18mm<sup>2</sup> ID code**                    Pairs:   white/yellow + white/green;  
   white/red + white/orange;  
   white/black + white/brown;  
   grey + white.  
   blue + violet;  
   yellow + green;  
   red + orange;  
   black + brown.

**Overall screen**                        Tinned copper braid, optical coverage ≥ 80%

**Outer diameter**                        Approx.   7.8mm

**Electrical characteristics (at 20°C)**

**Conductor resistance**                ≤ 117 Ohm/km

**Test voltage**                            500V rms x 1min, C/C & C/S

**Insulation resistance**                ≥ 1000 MOhm x km, resp. 10MOhm x km at 80°C

**Capacitance (800-1200Hz)**           per pair 60 +/- 20pF/m

**Impedance (3MHz)** per pair: 100 Ohm +/- 10%

**Shield transfer impedance:** 0.01 MHz to 4 MHz: ≤ 20 mOhm/m  
 10 MHz: ≤ 50 mOhm/m  
 30 MHz: ≤ 150 mOhm/m

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**Add-on for P/N**      **00277111**      **4 x 2 x 0.34 + 4 x 0.5**      **C**

**Element 1**      4 x 2 x 0.34mm<sup>2</sup>

**Pair ID code**      Brown + black, red + orange, yellow + green, blue + violet

**Element 2**      4 x 0.5mm<sup>2</sup>

**Cond. ID code**      White/blue, white/black, white/red, white/yellow

**Overall screen**      Tinned copper braid, optical coverage ≥ 80%

**Outer diameter**      Approx. 8.9mm

**Electrical characteristics (at 20°C):**

**Conductor resistance:** 0.34mm<sup>2</sup>: ≤ 58.6 Ohm/km  
 0.5mm<sup>2</sup>: ≤ 43.3 Ohm/km

**Test voltage:** 500Vrms x 1min, C/C & C/S

**Insulation resistance** ≥ 1000 M Ohm x km, resp. 10M Ohm x km at 80°C

**Capacitance (800-1200Hz):** pairs 0.34mm<sup>2</sup>: 70 +/- 20pF/m

**Impedance (3MHz):** pairs 0.34mm<sup>2</sup>: 90 Ohm +/-10%

**Shield transfer impedance** 0.01 MHz to 4 MHz: ≤ 20 mOhm/m  
 10 MHz: ≤ 50 mOhm/m  
 30 MHz: ≤ 150 mOhm/m

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**Add-on for P/N**      **00277121**      **3 x (2 x 0.14) + 2 x (0.5)**      **C**

**Element 1**      3 x (2 x 0.14mm<sup>2</sup>)D:

**Pair ID code**      Yellow + green, black + brown, red + orange

**Pair shield:**      Spiral/wrap made of tinned cooper wires – Covering ≥ 90%  
 Stranded drain wire

**Pair jacket:**      Polyolefine, black

**Element 2**      2 x (0.5mm<sup>2</sup>)D conductors:

**0.5mm<sup>2</sup> cond. ID code**      Black, red

**0.5mm<sup>2</sup> cond. screen**      Spiral/Wrap made of tinned copper wire – Covering > 90%

**0.5mm<sup>2</sup> single jacket:**      Polyolefine, black

**Overall screen** Tinned copper braid, optical coverage ≥ 80%

**Outer diameter** Approx. 8.9mm

**Electrical characteristics (at 20°C)**

**Conductor resistance** 0.14mm<sup>2</sup>: ≤ 148.9 Ohm/km  
0.5mm<sup>2</sup>: ≤ 43.3 Ohm/km

**Test voltage** 500Vrms x 1min, C/C & C/common S

**Insulation resistance** ≥ 1000 M Ohm x km, resp. 10M Ohm x km at 80°C

**Capacitance (800-1200Hz)** pairs 0.14mm<sup>2</sup>: 80 +/- 20pF/m

**Impedance (3MHz)** pairs 0.14mm<sup>2</sup>: 80 Ohm +/- 5%

**Shield transfer impedance** 0.01 MHz to 4 MHz: ≤ 20 mOhm/m  
10 MHz: ≤ 50 mOhm/m  
30 MHz: ≤ 150 mOhm/m

**Add-on for P/N** **00277131** **3 x (2 x 0.14) + 4 x 0.14 + 2 x 0.5** **C**

**Element 1** 3 x (2 x 0.14mm<sup>2</sup>)D

**Pair ID code** Yellow + green, black + brown, red + orange

**Pair screen** Spiral/wrap made of tinned cooper wires – Covering ≥ 90%

**Pair jacket** Polyolefine, black

**Element 2** 2 x 0.5mm<sup>2</sup>

**Con. ID code** Pair: brown/red, brown/blue

**Element 3** 4 x 0.14mm<sup>2</sup>

**Cond. ID code** Grey, blue, white/yellow, white/black

**Overall screen** Tinned copper braid, optical coverage ≥ 80%

**Outer diameter** Approx. 8.8mm

**Electrical characteristics (at 20°C)**

**Conductor resistance:** 0.14mm<sup>2</sup>: ≤ 148.9 Ohm/km  
0.5mm<sup>2</sup>: ≤ 43.3 Ohm/km

**Test voltage:** 500Vrms x 1min, C/C & C/common S

**Insulation resistance** ≥ 1000 M Ohm x km, resp. 10M Ohm x km at 80°C

**Capacitance (800-1200Hz)** pairs 0.14mm<sup>2</sup>: 80 +/- 20pF/m

**SERVO LK SMS FX8PLUS SIGNAL****DB 00277101EN**  
valid from: 30.03.2011**Impedance (3MHz)** pairs 0.14mm<sup>2</sup>: 80 Ohm +/- 10%**Shield transfer impedance** 0.01 MHz to 4 MHz: ≤ 20 mOhm/m  
10 MHz: ≤ 50 mOhm/m  
30 MHz: ≤ 150 mOhm/m**Add-on for P/N** **00277141** **3 x (2 x 0.14)D + 2 x 0.5 + 4 x 0.14 + 4 x 0.22 C****Element 1** 3 x (2 x 0.14mm<sup>2</sup>)D**Pair ID code** Yellow + green, black + brown, red+ orange**Pair screen** Spiral made of tinned copper wires, covering > 90%**Element 2** 2 x 0.5mm<sup>2</sup>:**Cond. ID code** Brown/red, brown/blue**Element 3** 4 x 0.14mm<sup>2</sup>**Cond. ID code** Grey, blue, white/yellow, white/black**Element 4** 4 x 0.22mm<sup>2</sup>**Cond. ID code** Brown/yellow, brown/grey, green/black, green/red**Overall screen** Tinned copper braid, optical coverage ≥ 80%**Outer diameter** Approx. 9.4mm**Electrical characteristics (at 20°C)****Conductor resistance** 0.14mm<sup>2</sup>: ≤ 148.9 Ohm/km  
0.22mm<sup>2</sup>: ≤ 95.0 Ohm/km  
0.5mm<sup>2</sup>: ≤ 43.3 Ohm/km**Test voltage** 500Vrms x 1min, C/C & C/common S**Insulation resistance** ≥ 1000 M Ohm x km, resp. 10M Ohm x km at 80°C**Capacitance (800-1200Hz)** pairs 0.14mm<sup>2</sup>: 80 +/- 20pF/m**Impedance (3MHz)** pairs 0.14mm<sup>2</sup>: 80 Ohm +/- 10%**Shield transfer impedance** 0.01 MHz to 4 MHz: ≤ 20 mOhm/m  
10 MHz: ≤ 50 mOhm/m  
30 MHz: ≤ 150 mOhm/m**Add-on for P/N** **00277151** **4 x 2 x 0.18 C****Element** 4 x 2 x 0.18mm<sup>2</sup>**Pair ID code** Black + brown, red + orange, yellow + green, blue + violet**Overall screen** Tinned copper braid, optical coverage ≥ 80%



|                                  |   |                    |             |         |             |         |              |
|----------------------------------|---|--------------------|-------------|---------|-------------|---------|--------------|
| <b>Conductor resistance</b>      | 0.22mm <sup>2</sup> : ≤ 95 Ohm/km   |                    |             |         |             |         |              |
| <b>Test voltage</b>              | 500Vrms x 1min, C/C & C/common S  |                    |             |         |             |         |              |
| <b>Insulation resistance</b>     | ≥ 1000 M Ohm x km, resp. 10M Ohm x km at 80°C   |                    |             |         |             |         |              |
| <b>Shield transfer impedance</b> | <table> <tr> <td>0.01 MHz to 4 MHz:</td> <td>≤ 20 mOhm/m</td> </tr> <tr> <td>10 MHz:</td> <td>≤ 50 mOhm/m</td> </tr> <tr> <td>30 MHz:</td> <td>≤ 150 mOhm/m</td> </tr> </table> | 0.01 MHz to 4 MHz: | ≤ 20 mOhm/m | 10 MHz: | ≤ 50 mOhm/m | 30 MHz: | ≤ 150 mOhm/m |
| 0.01 MHz to 4 MHz:               | ≤ 20 mOhm/m   |                    |             |         |             |         |              |
| 10 MHz:                          | ≤ 50 mOhm/m   |                    |             |         |             |         |              |
| 30 MHz:                          | ≤ 150 mOhm/m  |                    |             |         |             |         |              |

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