

**SPECIFICATION**  
**S015897**

2.6.2015 VR  
 1(4)

**FIRE RESISTANT HALOGEN FREE POWER AND CONTROL CABLE  
 FOR MARINE APPLICATIONS**

**LSM-FRHF 0,6/1 kV AND TEMAR PHFX-AFR 0,6/1 kV**



**APPLICATION**

Power and control cable for fixed installations. Designed to maintain operation during fire and to fulfill the requirements for cabling in ships. Used for safety, alarm and other critical systems.

**STANDARDS**

|                                |  |
|--------------------------------|--|
| <b>Construction</b>            | IEC 60092-353 and IEC 60092-350                              |
| <b>Materials</b>               | IEC 60228 (conductor), IEC 60092-360 (insulation and sheath) |
| <b>Fire resistance</b>         | IEC 60331-1 or IEC 60331-21                                  |
| <b>Flame retardance</b>        | IEC 60332-3-22 (cat A) and IEC 60332-1-2                     |
| <b>Halogen free properties</b> | IEC 60754-1 and -2   |
| <b>Low smoke emission</b>      | IEC 61034-1 and -2   |
| <b>Tests</b>                   | IEC 60092-353  |
| <b>Choice and installation</b> | IEC 60092-352  |

**CHARACTERISTICS**

|                              |                               |
|------------------------------|-------------------------------|
| <b>Rated voltage</b>         | 0,6/1 (1,2) kV                |
| <b>Conductor temperature</b> | Maximum +90 °C                |
| <b>Ambient temperature</b>   | Minimum -15 °C (Installation) |

**DESIGN**

|                   |   |
|-------------------|---|
| <b>Conductor</b>  | Round stranded plain copper conductor 1,5 to 16 mm <sup>2</sup><br>Round compacted plain copper conductor 25 to 300 mm <sup>2</sup><br>Sector shaped plain conductors in 3-4 core cables 50 to 150 mm <sup>2</sup><br>- max dc-resistance at +20 °C i.a.w. IEC 60228 class 2 (see tables 1-3) |
| <b>Wrapping</b>   | Mica tape with overlap as fire resistant layer  |
| <b>Insulation</b> | Extruded halogen free XLPE i.a.w. IEC 60092-360<br>- nominal thickness i.a.w. IEC 60092-353 (see tables 1-3)  |

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|   |  |
|---|--|
| <b>Laying up</b>                        | Insulated conductors are laid up together<br>- inner covering extruded or lapped with suitable tape                              |
| <b>Screen<br/>(only in EMC-version)</b> | In EMC-marked version to improve electrical protection<br>- copper laminated plastic tape, 100% optical coverage                 |
| <b>Armour</b>                           | Braid of copper wires, coverage according to IEC 60092-353<br>- wire diameter i.a.w. IEC 60092-353 (see tables 1-3)              |
| <b>Sheath</b>                           | Extruded orange halogen free polyolefine, SHF1 i.a.w. IEC 60092-360<br>- nominal thickness i.a.w. IEC 60092-353 (see tables 1-3) |

### IDENTIFICATION

|                               |  |
|-------------------------------|--|
| <b>Cable marking examples</b> | PRYSMIAN (F110) LSM-FRHF 3x70 0,6/1 kV TEMAR PHFX-AFR 3x70 Sec<br>PRYSMIAN (F120) LSM-FRHF 3G1,5 0,6/1 kV TEMAR PHFX-AFR 3G1,5<br>PRYSMIAN (F110) LSM-FRHF 3x70 0,6/1 kV EMC TEMAR PHFX-AFR 3G70 Sec<br>+ IEC 60092-353 + IEC 60331-1 + meter marking + manufacturing time |
|-------------------------------|--|

**Core colours  
(cable without earth core)**

| Type                          | N    | Live  |         |      |      |
|-------------------------------|------|-------|---------|------|------|
| 1X                            |      |       | (Black) |      |      |
| 2X                            | Blue | Brown |         |      |      |
| 3X                            |      | Brown | Black   | Grey |      |
| 4X                            | Blue | Brown | Black   | Grey |      |
| 5...37X                       | 1    | 2     | 3       | 4    | 5... |
| White insulation with numbers |      |       |         |      |      |

**Core colours  
(cable with earth core)**

| Type    | PE  |   | N    | Live  |       |      |
|---------|---|---|------|-------|-------|------|
| 3G      | G   | Y | Blue | Brown |       |      |
| 4G      | G   | Y |      | Brown | Black | Grey |
| 5G      | G   | Y | Blue | Brown | Black | Grey |
| 7...37G | White insulation with numbers<br>+ last core green and yellow |   |      |       |       |      |

### TECHNICAL DATA

**Table 1. Single core power cable dimensions LSM-FRHF and TEMAR PHFX-AFR**

| Size<br>(nxmm <sup>2</sup> ) | Conductor                    |                             | Insulation<br>thickness<br>nominal<br>(mm) | Braid                        |                             | Sheath<br>thickness<br>nominal<br>(mm) | Cable                       |                              |
|------------------------------|------------------------------|-----------------------------|--|------------------------------|-----------------------------|--|-----------------------------|------------------------------|
|                              | resistance<br>max.<br>(Ω/km) | diameter<br>approx.<br>(mm) |  | wire dia.<br>nominal<br>(mm) | diameter<br>approx.<br>(mm) |  | diameter<br>approx.<br>(mm) | weight<br>approx.<br>(kg/km) |
| 1x25                         | 0,727                        | 5,8                         | 0,9  | 0,2                          | 10,5                        | 1,2                                    | 13,5                        | 400                          |
| 1x35                         | 0,524                        | 6,8                         | 0,9  | 0,2                          | 11,5                        | 1,2                                    | 14,0                        | 500                          |
| 1x50                         | 0,387                        | 7,9                         | 1,0  | 0,3                          | 13,0                        | 1,3                                    | 16,0                        | 670                          |
| 1x70                         | 0,268                        | 9,6                         | 1,1  | 0,3                          | 15,0                        | 1,4                                    | 18,0                        | 910                          |
| 1x95                         | 0,193                        | 11,3                        | 1,1  | 0,3                          | 16,5                        | 1,4                                    | 19,5                        | 1200                         |
| 1x120                        | 0,153                        | 12,7                        | 1,2  | 0,3                          | 18,5                        | 1,5                                    | 21,5                        | 1500                         |
| 1x150                        | 0,124                        | 14,1                        | 1,4  | 0,3                          | 20,5                        | 1,6                                    | 24,0                        | 1800                         |
| 1x185                        | 0,0991                       | 15,7                        | 1,6  | 0,3                          | 22,5                        | 1,6                                    | 26,0                        | 2200                         |
| 1x240                        | 0,0754                       | 18,1                        | 1,7  | 0,3                          | 25,0                        | 1,7                                    | 29,0                        | 2800                         |
| 1x300                        | 0,0601                       | 20,2                        | 1,8  | 0,3                          | 27,0                        | 1,8                                    | 31,0                        | 3400                         |

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**Table 2. Multicore power cable dimensions LSM-FRHFand TEMAR PHFX-AFR**

| Size<br>(nxmm <sup>2</sup> ) | Conductor                    |   |  | Insulation<br>thickness<br>nominal<br>(mm) | Braid                        |                             | Sheath<br>thickness<br>nominal<br>(mm) | Cable                       |                              |
|------------------------------|------------------------------|---|--|--|------------------------------|-----------------------------|--|-----------------------------|------------------------------|
|                              | resistance<br>max.<br>(Ω/km) | diameter <sup>1)</sup><br>approx.<br>(mm) | width <sup>2)</sup><br>approx.<br>(mm) |  | wire dia.<br>nominal<br>(mm) | diameter<br>approx.<br>(mm) |  | diameter<br>approx.<br>(mm) | weight<br>approx.<br>(kg/km) |
| 2x1,5                        | 12,1                         | 1,6                                       |  | 0,7  | 0,2                          | 8,5                         | 1,1                                    | 11,0                        | 150                          |
| 2x2,5                        | 7,41                         | 2,0                                       |  | 0,7  | 0,2                          | 9,5                         | 1,2                                    | 12,0                        | 180                          |
| 3x1,5                        | 12,1                         | 1,6                                       |  | 0,7  | 0,2                          | 9,0                         | 1,1                                    | 11,5                        | 170                          |
| 3x2,5                        | 7,41                         | 2,0                                       |  | 0,7  | 0,2                          | 10,0                        | 1,2                                    | 13,0                        | 220                          |
| 3x4                          | 4,61                         | 2,6                                       |  | 0,7  | 0,2                          | 13,0                        | 1,2                                    | 15,5                        | 420                          |
| 3x6                          | 3,08                         | 3,1                                       |  | 0,7  | 0,3                          | 14,5                        | 1,3                                    | 17,5                        | 570                          |
| 3x10                         | 1,83                         | 4,0                                       |  | 0,7  | 0,3                          | 16,5                        | 1,4                                    | 19,5                        | 760                          |
| 3x16                         | 1,15                         | 5,0                                       |  | 0,7  | 0,3                          | 19,0                        | 1,4                                    | 22,0                        | 1050                         |
| 3x25                         | 0,727                        | 5,8                                       |  | 0,9  | 0,3                          | 23,5                        | 1,6                                    | 27,0                        | 1550                         |
| 3x35                         | 0,524                        | 6,8                                       |  | 0,9  | 0,3                          | 26,0                        | 1,7                                    | 29,5                        | 1950                         |
| 3x50                         | 0,387                        | 6,5                                       | 10,7                                   | 1,0  | 0,3                          | 26,0                        | 1,8                                    | 30,0                        | 2200                         |
| 3x70                         | 0,268                        | 7,9                                       | 12,8                                   | 1,1  | 0,3                          | 30,0                        | 1,9                                    | 34,0                        | 2950                         |
| 3x95                         | 0,193                        | 9,3                                       | 15,1                                   | 1,1  | 0,4                          | 33,0                        | 2,1                                    | 38,0                        | 3900                         |
| 3x120                        | 0,153                        | 10,5                                      | 17,0                                   | 1,2  | 0,4                          | 36,0                        | 2,2                                    | 41,0                        | 4800                         |
| 3x150                        | 0,124                        | 11,6                                      | 18,9                                   | 1,4  | 0,4                          | 40,0                        | 2,4                                    | 45,0                        | 5800                         |
| 4x1,5                        | 12,1                         | 1,6                                       |  | 0,7  | 0,2                          | 10,0                        | 1,2                                    | 13,0                        | 230                          |
| 4x2,5                        | 7,41                         | 2,0                                       |  | 0,7  | 0,2                          | 11,0                        | 1,2                                    | 14,0                        | 280                          |
| 4x4                          | 4,61                         | 2,6                                       |  | 0,7  | 0,3                          | 14,5                        | 1,3                                    | 17,0                        | 540                          |
| 4x6                          | 3,08                         | 3,1                                       |  | 0,7  | 0,3                          | 16,0                        | 1,3                                    | 19,0                        | 670                          |
| 4x10                         | 1,83                         | 4,0                                       |  | 0,7  | 0,3                          | 18,0                        | 1,4                                    | 21,0                        | 910                          |
| 4x16                         | 1,15                         | 5,0                                       |  | 0,7  | 0,3                          | 21,0                        | 1,5                                    | 24,0                        | 1200                         |
| 4x25                         | 0,727                        | 5,8                                       |  | 0,9  | 0,3                          | 26,0                        | 1,6                                    | 30,0                        | 1900                         |
| 4x35                         | 0,524                        | 6,8                                       |  | 0,9  | 0,3                          | 29,0                        | 1,8                                    | 33,0                        | 2500                         |
| 4x50                         | 0,387                        | 7,2                                       | 9,9                                    | 1,0  | 0,3                          | 30,0                        | 1,9                                    | 34,0                        | 2800                         |
| 4x70                         | 0,268                        | 8,6                                       | 12,0                                   | 1,1  | 0,3                          | 33,0                        | 2,1                                    | 38,0                        | 3900                         |
| 4x95                         | 0,193                        | 10,2                                      | 14,1                                   | 1,1  | 0,4                          | 37,0                        | 2,2                                    | 42,0                        | 5000                         |
| 4x120                        | 0,153                        | 11,5                                      | 15,8                                   | 1,2  | 0,4                          | 41,0                        | 2,4                                    | 46,0                        | 6100                         |

1) Height for sector shaped conductor

2) For sector shaped conductor

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**Table 3. Control cable dimensions LSM-FRHF and TEMAR PHFX-AFR**

| Size<br>(nxmm <sup>2</sup> ) | Conductor                    |                             | Insulation<br>thickness<br>nominal<br>(mm) | Braid                        |                             | Sheath<br>thickness<br>nominal<br>(mm) | Cable                       |                              |
|------------------------------|------------------------------|-----------------------------|--|------------------------------|-----------------------------|--|-----------------------------|------------------------------|
|                              | resistance<br>max.<br>(Ω/km) | diameter<br>approx.<br>(mm) |  | wire dia.<br>nominal<br>(mm) | diameter<br>approx.<br>(mm) |  | diameter<br>approx.<br>(mm) | weight<br>approx.<br>(kg/km) |
| 5x1,5                        | 12,1                         | 1,6                         | 0,7  | 0,2                          | 11,5                        | 1,2                                    | 14,0                        | 270                          |
| 7x1,5                        | 12,1                         | 1,6                         | 0,7  | 0,3                          | 14,0                        | 1,3                                    | 17,0                        | 410                          |
| 12x1,5                       | 12,1                         | 1,6                         | 0,7  | 0,3                          | 17,0                        | 1,4                                    | 20,0                        | 570                          |
| 19x1,5                       | 12,1                         | 1,6                         | 0,7  | 0,3                          | 19,5                        | 1,5                                    | 23,0                        | 800                          |
| 27x1,5                       | 12,1                         | 1,6                         | 0,7  | 0,3                          | 24,0                        | 1,7                                    | 28,0                        | 1100                         |
| 5x2,5                        | 7,41                         | 2,0                         | 0,7  | 0,3                          | 13,0                        | 1,3                                    | 16,0                        | 390                          |
| 7x2,5                        | 7,41                         | 2,0                         | 0,7  | 0,3                          | 14,5                        | 1,3                                    | 18,0                        | 490                          |
| 12x2,5                       | 7,41                         | 2,0                         | 0,7  | 0,3                          | 19,0                        | 1,5                                    | 22,0                        | 740                          |
| 19x2,5                       | 7,41                         | 2,0                         | 0,7  | 0,3                          | 22,0                        | 1,6                                    | 26,0                        | 1050                         |

Ordering information:

| Part number | Description                  | GTIN no.      | EL nummer |
|-------------|------------------------------|---------------|-----------|
| 20150752    | TEMAR PHFX-AFR 3x4 1kV       | 6410006058686 | 10 949 20 |
| 20150753    | TEMAR PHFX-AFR 3x6 1kV       | 6410006056293 | 10 949 21 |
| 20150754    | TEMAR PHFX-AFR 3x10 1kV      | 6410006056309 | 10 949 22 |
| 20150755    | TEMAR PHFX-AFR 3x16 1kV      | 6410006056316 | 10 949 23 |
| 20080520    | TEMAR PHFX-AFR 3x25 1kV      | 6410006056323 | 10 949 24 |
| 20080521    | TEMAR PHFX-AFR 3x35 1kV      | 6410006056330 | 10 949 25 |
| 20080522    | TEMAR PHFX-AFR 3x50 Sec1kV   | 6410006056347 | 10 949 26 |
| 20080523    | TEMAR PHFX-AFR 3x70 Sec 1kV  | 6410006056354 | 10 949 27 |
| 20080524    | TEMAR PHFX-AFR 3x95 Sec 1kV  | 6410006058617 | 10 949 28 |
| 20080525    | TEMAR PHFX-AFR 3x120 Sec 1kV | 6410006242696 | 10 949 29 |
| 20080526    | TEMAR PHFX-AFR 3x150 Sec 1kV | 6410006241477 | 10 949 30 |
| 20150758    | TEMAR PHFX-AFR 4x4 1kV       | 6410006241583 | 10 949 32 |
| 20150759    | TEMAR PHFX-AFR 4x6 1kV       | 6410006058693 | 10 949 33 |
| 20150760    | TEMAR PHFX-AFR 4x10 1kV      | 6410006242092 | 10 949 34 |
| 20150761    | TEMAR PHFX-AFR 4x16 1kV      | 6410006241484 | 10 949 35 |
| 20132372    | TEMAR PHFX-AFR 4x25 1kV      | 6410006241491 | 10 949 36 |
| 20150764    | TEMAR PHFX-AFR 7x1,5 1kV     | 6410006056385 | 10 949 40 |
| 20150767    | TEMAR PHFX-AFR 7x2,5 1kV     | 6410006241590 | 10 949 41 |
| 20150765    | TEMAR PHFX-AFR 12x1,5 1kV    | 6410006056392 | 10 949 44 |
| 20150768    | TEMAR PHFX-AFR 12x2,5 1kV    | 6410006241460 | 10 949 45 |
| 20150766    | TEMAR PHFX-AFR 19x1,5 1kV    | 6410006056408 | 10 949 46 |