

# ÖLFLEX® and EPIC® Solar products

System Competence in Photovoltaics

**NEW**



**LAPP GROUP**

## On the Sunny Side

Count on a partner who can offer you perfect system competency in wiring, connectors and interfaces to the photovoltaics from a single source. If you value excellent quality and services, the Lapp brand products ÖLFLEX® and EPIC® can ideally equip you for your individual project.



You could soon be stepping over to the sunny side too – with ÖLFLEX® and EPIC® products from Lapp.





### ■ Quality counts

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Many different aspects of our components make them so popular with users. Not only are they UV-resistant, but extremely weather- and temperature-resistant too. In short – products of our brand exhibit durable top performance in a wide variety of applications across the globe. You will learn specific details about these products on the following pages:

- ÖLFLEX® SOLAR XLR ST
- ÖLFLEX® SOLAR XLS
- ÖLFLEX® XLV
- ÖLFLEX® V4A
- EPIC® SOLAR M XL multi
- EPIC® SOLAR F XL multi
- EPIC® SOLAR M mountable for M12
- EPIC® SOLAR Modul Box (with cable)

### ■ Used all around the world

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You can rely on the performance of our components wherever you wish to realize your photovoltaic project. They are used in the solar park in Bovera, Spain, for example, where more than 5,000 solar modules were installed over an area of 24,700 m<sup>2</sup>. A total of 20 km of ÖLFLEX® SOLAR lines assure perfect operation there. Not just on large-scale projects, but on smaller ones too, we would be glad to serve as your partner – a partner you can rely on.

### ■ Personal commitment to solar technology

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As a leading supplier in the fields of photovoltaics, we were setting milestones as early as 2005 when we installed a solar energy system on the roof of the Logistics Center 1 building at our headquarters in Stuttgart. The 1,092 solar modules – spanning a roof area of 4,500 m<sup>2</sup> – generate a total power of 168 kWp, producing about 160,000 kWh of electrical energy annually. The CO<sub>2</sub> savings amount to about 94,000 kg per year.

# ÖLFLEX® SOLAR XLR ST

The latest solar cable generation according to PV 1-F design



## Info

- According to DKE requirements specification PV1-F
- TÜV Type Approved (2PFg 1169/08.07)



## Benefits

- High thermal capacity for long lasting operation of the PV system at all seasons
- Reduced spreading of fire source and formation of toxic combustion gases in event of fire
- Variously coloured core insulations simplify on demand the differentiation of the polarity during installation
- Robust against mechanical impact
- Exact quantity control during installation by meter marking on the cable sheath

## Application range

- For cabling of solar modules among themselves and as extension cable between the individual module strings or DC/AC inverter
- Gable and flat roof photovoltaic systems
- Open land solarfield plants

## Product features

- Excellent weather-, temperature- and UV resistance
- Good notch and abrasion resistance
- Good heat pressure resistance
- Halogen-free and flame-retardant.
- Resistant against ammonia- and biogases, oxalic acid, sodium hydroxide and other chemical media

## Approvals (Norm references)



- TÜV Type Approved (2PFg 1169/08.07)
- Halogen-free according to EN 50267-2-2
- Ozone resistant according EN 50396
- Weather-/UV resistant according HD 605/A1
- Acid-/brine resistant according EN 60811-2-1

## Product Make up

- Conductor: Fine wired tinned copper strands
- Core insulation: Electron beam cross-linked copolymer
- Outer sheath: Electron beam cross-linked Copolymer
- Colour: Black (RAL 9005)
- **XLR = X-Linked Radiated**

## Technical data



**Approvals**  
PV1-F (TÜV Type approved according 2 PFg 1169/08.2007)



**Conductor stranding**  
Fine wire in accordance to VDE 0295 Class 5/IEC 60228 Cl. 5



**Minimum bending radius**  
Fixed installation:  
4 x cable diameter



**Rated voltage**  
AC U<sub>0</sub>/U : 600/1000 V  
DC U<sub>0</sub>/U : 900/1500 V  
Max. permissible operating voltage: DC 1800 V



**Test voltage**  
AC 6500 V



**Range of temperature**  
-40° C up to +120° C max.  
conductor temperature Ambient temperature according IEC 60216-2 : At +90° C the expected service life amounts to 25 years

## Accessoires

- EPIC® SOLAR – Industrially injection overmoulded and field mountable solar connectors for safe connection of PV modules
- SKINTOP® ST/SKINTOP® CLICK – Approved cable glands for use for PV junction boxes, electric meters and DC/AC converters

Part number	Conductor cross section in mm <sup>2</sup>	Outer diameter in mm approx.	Copper index kg/km	Weight kg/km approx.
<b>ÖLFLEX® SOLAR XLR ST</b>				
<b>Core insulation: black / Outer sheath: black</b>				
0025850	1.5	4.8	14.4	40.0
0025855	2.5	5.6	24.0	53.0
0025860	4.0	6.0	38.4	74.0
0025865	6.0	7.0	57.6	92.0
0025870	10.0	8.4	96.0	152.0
<b>Core insulation: red / Outer sheath: black</b>				
0025851	1.5	4.8	14.4	40.0
0025856	2.5	5.6	24.0	53.0
0025861	4.0	6.0	38.4	74.0
0025866	6.0	7.0	57.6	92.0
0025871	10.0	8.4	96.0	152.0
<b>Core insulation: blue / Outer sheath: black</b>				
0025852	1.5	4.8	14.4	40.0
0025857	2.5	5.6	24.0	53.0
0025862	4.0	6.0	38.4	74.0
0025867	6.0	7.0	57.6	92.0
0025872	10.0	8.4	96.0	152.0

Copper price basis: EUR 150 / 100 kg

Please find our standard lengths at: [www.lappkabel.de/en/cable-standardlengths](http://www.lappkabel.de/en/cable-standardlengths)

Packaging size: Coil 100 m; Drum (500; 1000) m

# ÖLFLEX® SOLAR XLS

## Cross-linked standard solar cables



**Info**

- Temperature range -40°C up to +100°C



### Benefits

- Robust against mechanical abuse
- Reduced spreading of fire source and formation of toxic combustion gases in event of fire
- Exact quantity control during installation by meter marking on the cable sheath

### Application range

- For cabling of solar modules among themselves and as extension cable between the individual module strings or DC/AC inverter
- Gable and flat roof photovoltaic systems
- Open land solarfield plants

### Product features

- Weathering-, abrasion and UV resistant
- Good heat pressure resistance
- Halogen free and flame retardant
- Resistant against ammonia- and biogases, oxalic acid, sodium hydroxide and other chemical media
- On request and considering economic minimum lengths also available with red and blue outer sheath

### Approvals (Norm references)



- Flame retardant according IEC 60332-1-2
- Halogen free according EN 50267-2-2
- Ozone resistant according EN 50396
- Weather-/UV resistant according HD 605/A1
- Acid-/brine resistant according EN 60811-2-1

### Product Make-up

- Conductor: fine wired tinned copper strands
- Core insulation: cross-linked copolymer
- Core insulation colour: black, red or blue
- Outer sheath: cross-linked copolymer
- Outer sheath colour: black (RAL 9005)

### Technical data

- Conductor stranding**  
fine wire in acc. to VDE 0295  
Class 5/IEC 60228 Cl.5
- Minimum bending radius**  
fixed installation:  
4 x cable diameter
- Rated voltage**  
AC U<sub>0</sub>/U : 600/1000 V  
DC U<sub>0</sub>/U : 900/1500 V  
max. permissible operating  
voltage: DC 1800 V
- Test voltage**  
4000 V
- Range of temperature**  
fixed installed:  
-40° C up to +100 °C

### Accessories

- EPIC® SOLAR – Industrially injection over-moulded and field mountable solar connectors for safe connection of PV modules
- SKINTOP® ST/SKINTOP® CLICK – Approved cable glands for use for PV junction boxes, electric meters and DC/AC converters

Part number	Conductor cross-section in mm <sup>2</sup>	Outer diameter in mm approx.	Copper index kg/km	Weight kg/km approx.
<b>ÖLFLEX® SOLAR XLS</b>				
<b>Core insulation: black / Outer sheath: black</b>				
0025800	1.5	5.4	14.4	29.0
0025805	2.5	5.4	24.0	45.0
0025810	4.0	6.0	38.4	72.0
0025815	6.0	7.1	57.6	102.0
0025820	10.0	8.9	96.0	159.0
0025825	16.0	9.8	153.6	247.0
<b>Core insulation: red / Outer sheath: black</b>				
0025801	1.5	5.4	14.4	29.0
0025806	2.5	5.4	24.0	45.0
0025811	4.0	6.0	38.4	72.0
0025816	6.0	7.1	57.6	102.0
0025821	10.0	8.9	96.0	159.0
0025826	16.0	9.8	153.6	247.0
<b>Core insulation: blue / Outer sheath: black</b>				
0025802	1.5	5.4	14.4	29.0
0025807	2.5	5.4	24.0	45.0
0025812	4.0	6.0	38.4	72.0
0025817	6.0	7.1	57.6	102.0
0025822	10.0	8.9	96.0	159.0
0025827	16.0	9.8	153.6	247.0

# ÖLFLEX® SOLAR XLV

## Robust solar cables with big conductor cross sections



**Info**

The heavy-duty version  
For high electrical power loads  
Suitable for direct burial



### Benefits

- Reinforced outer sheath protects well against mechanical stress
- High thermal capacity for long lasting operation of the PV system at all seasons
- Reduced spreading of fire source and formation of toxic combustion gases in event of fire
- Considering universally valid installation guidelines also suitable for direct burial
- Exact quantity control during installation by meter marking on the cable sheath

### Application range

- For cabling of individual module strings as well as for fixed solar generators and moved tracking systems
- Open land solarfield plants
- Large conductor cross-sections are used as collecting main to transmit high power loads between the individual panel-strings and as connection to the DC/AC inverter of huge PV plants resp. solar fields

### Product features

- Excellent weather-, abrasion-, temperature- and UV resistance
- Halogen free and flame retardant (IEC 60332-1-2)
- Good resistance against ammonia- and biogases

### Approvals (Norm references)



- Weatherproof according ISO 4892-2 resp. UL 1581 Section 1200

### Product Make up

- Conductor: fine wired tinned copper strands
- Core insulation: special polyolefin, cross-linked, black
- Outer sheath: modified copolymer, cross-linked
- Outer sheath colour: black (RAL 9005)

### Technical data

- Core identification code: black
- Conductor stranding: fine wire in acc. to VDE 0295 Class 5/IEC 60228 Cl. 5
- Minimum bending radius: fixed installation: 4 x cable diameter
- Rated voltage:  $U_0/U$  AC 600/1000 V DC 900/1500 V
- Test voltage: 4000 V
- Range of temperature: fixed installation: -40°C up to +120°C short-circuit temperature: +250°C

### Accessories

- SKINTOP® ST/SKINTOP® CLICK - Approved cable glands for use for PV junction boxes, electric meters and DC/AC converters

Part number	Conductor cross-section in mm <sup>2</sup>	Outer diameter in mm approx.	Copper index kg/km	Weight kg/km approx.
<b>ÖLFLEX® SOLAR XLV black</b>				
0027080	4.0	8.0	38.4	97.0
0027081	6.0	9.1	57.6	135.0
0027082	10.0	10.5	96.0	206.0
0027083	16.0	11.9	153.6	315.0
0027084	25.0	13.2	240.0	460.0
0027085	35.0	14.5	336.0	570.0
0027086	50.0	17.7	480.0	763.0
0027087	70.0	19.7	672.0	987.0
0027088	95.0	22.0	912.0	1,276.0
0027089	120.0	23.8	1,152.0	1,702.0

Copper price basis: EUR 150 / 100 kg

Our standard lengths, please visit: [www.lappkabel.de/en/cable-standardlengths](http://www.lappkabel.de/en/cable-standardlengths)

Packaging size: Coil 100 m; Drum (500; 1000) m

Considering economic minimum lengths we produce on request versions with red resp. blue core insulation colour or an imprinted code stripe on the black outer sheath as distinctive feature

# ÖLFLEX® SOLAR V4A

## High-grade steel armoured solar cables



### Info

- Protected against rodents and termites
- New cable design



### Benefits

- Stainless high-grade (class V4A) steel wire braiding protects very effectively against martens, rodents and even termites
- Robust against mechanical abuse
- High thermal capacity for long lasting operation of the PV system at all seasons

### Application range

- For the use in PV systems for instance on stable and barn roofs in densely forested areas and farmsteads
- Gable and flat roof photovoltaic systems
- Open land solarfield plants

### Product features

- Excellent weathering resistance
- Good resistance against ammonia- and biogases
- Flame retardant according IEC 60332-1-2

### Approvals (Norm references)



- Flame retardant according IEC 60332-1-2
- Halogenfree according EN 50267-2-2
- Weathering test according ISO 4892-2

### Product Make up

- Conductor: fine wired tinned copper strands
- Core insulation: cross-linked polymer,
- Colour: black
- Outer sheath: special polymer
- Armouring: high-grade stainless steel wire braiding (V4A)

### Technical data

	<b>Core identification code</b> black
	<b>Conductor stranding</b> fine wire in acc. to VDE 0295 Class 5/IEC 60228 Cl. 5
	<b>Minimum bending radius</b> fixed installation: 4 x cable diameter
	<b>Rated voltage</b> U <sub>0</sub> /U AC 600/1000 V DC 900/1500 V
	<b>Test voltage</b> 4000 V
	<b>Range of temperature</b> fixed installation: -40°C up to +90°C short-circuit temperature: +250°C

### Accessoires

- EPIC® SOLAR – Industrially injection overmoulded and field mountable solar connectors for safe connection of PV modules
- SKINTOP® ST/SKINTOP® CLICK – Approved cable glands for use for PV junction boxes, electric meters and DC/AC converters

Part number	Conductor cross-section in mm <sup>2</sup>	Outer diameter in mm approx.	Copper index kg/km	Weight kg/km approx.
<b>ÖLFLEX® SOLAR V4A stainless steel</b>				
0025960	4.0	7.0	38.4	98.0
0025961	6.0	8.0	57.6	158.0

Copper price basis: EUR 150 / 100 kg

Our standard lengths, please visit: [www.lappkabel.de/en/cable-standardlengths](http://www.lappkabel.de/en/cable-standardlengths)

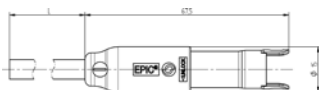
Packaging size: Coil 100 m; Drum (500; 1000) m

## EPIC® SOLAR M XL multi



**Info**

- TÜV Rheinland: certified

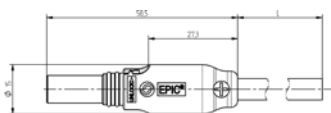


## EPIC® SOLAR F XL multi



**Info**

- TÜV Rheinland: certified



### Benefits

- The LAPP GROUP uses its competence here as a cable and connector manufacturer and moulds ÖLFLEX® SOLAR cables with the EPIC® SOLAR connectors. This distinguishes EPIC® SOLAR from other assembled systems. The injection moulding technology is extraordinarily robust, achieves maximum tensile strength and is unbeatably tight. The injection moulding is made in an industrial process and continuously tested, resulting in products of a consistently high quality.

### Application range

- Pre-assembled injection moulded solar cables for weather proof cabling of Photovoltaic systems

### Product features

- These one-side pre-assembled cables with EPIC® SOLAR connectors are available as a male (M) and female (F) version in combination with ÖLFLEX® SOLAR XLR ST and XL multi in different cross sections.
- Other lengths and cable end versions on request.
- UL: in preparation

### Technical data

- Rated voltage in V  
1000 V AC/DC
- Rated impulse Voltage  
8 kV
- Rated current in A  
30 A
- Pollution degree  
3
- Contact resistance  
< 2 mΩ
- Degree of protection  
IP68 (10h/1m)
- Protection class  
II
- Range of temperature  
-40 °C ... +105 °C



Part number	Type	Cross-section in mm²	Length in m	Copper index kg/1000 pcs.	Pieces / PU
<b>EPIC® SOLAR male with cable ÖLFLEX® SOLAR XL multi</b>					
44428002	EPIC® SOLAR M XL multi 2.5mm² 1m	2.5	1.0	24.6	100
44428007	EPIC® SOLAR M XL multi 4.0mm² 1m	4.0	1.0	39.4	100
44428009	EPIC® SOLAR M XL multi 6.0mm² 1m	6.0	1.0	59.0	100
<b>EPIC® SOLAR female with cable ÖLFLEX® SOLAR XL multi</b>					
44428014	EPIC® SOLAR F XL multi 2.5mm² 1m	2.5	1.0	24.6	100
44428018	EPIC® SOLAR F XL multi 4.0mm² 1m	4.0	1.0	39.4	100
44428019	EPIC® SOLAR F XL multi 6.0mm² 1m	6.0	1.0	59.0	100

Copper price basis: EUR 150 / 100 kg  
Other lengths and cable end versions on request

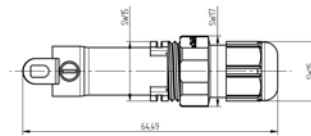


# EPIC® SOLAR M field mountable M 12



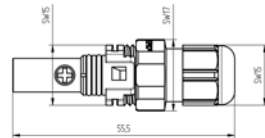
**Info**

- TÜV Rheinland: certified
- Winner of the benchmark test in the magazin PHOTON 9/2007



**Info**

- TÜV Rheinland: certified
- Winner of the benchmark test in the magazin PHOTON 9/2007



## Benefits

- The EPIC® SOLAR connector field mountable is pre-assembled and consists of only two components – the connector part and the SKINTOP® gland. SKINTOP® has proven its stability and robustness for many years in millions of applications and it is in an EPIC® SOLAR connector the first choice for photovoltaic systems. The contact is crimped and the plastic components are simply screwed together. The cable outlet is suitable for cable diameters from 4.5 mm up to 7.3 mm.

## Application range

- Field mountable connector for easy assembly, SKINTOP® cable gland integrated

## Product features

- UL: in preparation

## Technical data

- **Rated voltage in V**  
1000 V AC/DC
- **Rated impulse Voltage**  
8 kV
- **Rated current in A**  
30 A  
19 A at 85 °C
- **Pollution degree**  
3
- **Contact resistance**  
< 2 mΩ
- **Degree of protection**  
IP68 (10h / 1m)
- **Protection class**  
II
- **Range of temperature**  
-40 °C ... +105 °C

Part number	Type	Cross-section in mm²	Pieces / PU
<b>Plug field mountable male M 12</b>			
44428020	EPIC® SOLAR M 2.5 – 4.0 mm² M12	2.5 – 4.0	50
44428021	EPIC® SOLAR M 6.0 mm² M12	6.0	50
<b>Plug field mountable female M 12</b>			
44428022	EPIC® SOLAR F 2.5 – 4.0 mm² M12	2.5 – 4.0	50
44428023	EPIC® SOLAR F 6.0 mm² M12	6.0	50

## EPIC® SOLAR Module Box



## EPIC® SOLAR Modul Box with cables



### Benefits

- Junction boxes for weather proof cabling of Photovoltaic systems

### Application range

- The Module Box is used to glue on the backside of the solar modules. The ribbon bands are terminated in the Module Box
- For further cabling the pre-assembled solar cables, like EPIC® SOLAR XL multi are terminated at the Module Box

### Product features

#### EPIC® SOLAR Module Box

- Rugged junction boxes for cabling of the solar modules with solar cables, like ÖLFLEX® SOLAR
- Dimensions (WxHxD): 118x28,5x109mm
- Housing material: PPO/PPS
- UL: in preparation

#### EPIC® SOLAR Modul Box with cables

- These junction boxes are equipped with pre-assembled cables EPIC® SOLAR XL multi in different cross sections
- Dimensions (WxHxD): 118x28,5x109mm
- Cable length: 1m
- UL: in preparation

### Technical data

**Rated voltage in V**  
1000 V AC/DC

**Rated current in A**  
13 A

**Contact resistance**  
< 5 mΩ

**Contacts**  
Copper alloy, tin plated

**Numbers of contacts**  
2

**Termination methods**  
terminal clamp for ribbon bands:  
up to 7mm wide (folded 10mm)  
Plug-in connection for solar  
cables with multilam plug  
Ø 3mm



**Degree of protection**  
IP 65

**Protection class**  
II



**Range of temperature**  
-40 °C ... +90 °C

Part number	Type	Connection type	Cross-section in mm <sup>2</sup>	Cable clamping range, mm	Length in m	Pieces / PU
<b>EPIC® SOLAR Modul Box</b>						
44428043	EPIC® SOLAR ST200 3D	fitted with 3 bypass diodes	max. 6.0	3.7 - 7.1		100
44428044	EPIC® SOLAR ST200 6D	fitted with 6 bypass diodes	max. 6.0	3.7 - 7.1		100
<b>EPIC® SOLAR Modul Box with cables</b>						
44428045	EPIC® SOLAR ST200 XL 4 mm <sup>2</sup> 1m	pre-wired with solar cable	4.0		1.0	100
44428046	EPIC® SOLAR ST200 XL multi 6 mm <sup>2</sup> 1m	pre-wired with solar cable	6.0		1.0	100

Other construction designs/lengths on request



**ÖLFLEX®**

**UNITRONIC®**

**HITRONIC®**

**SKINTOP®**

**SILVYN®**

**EPIC®**

**FLEXIMARK®**

**ETHERLINE®**