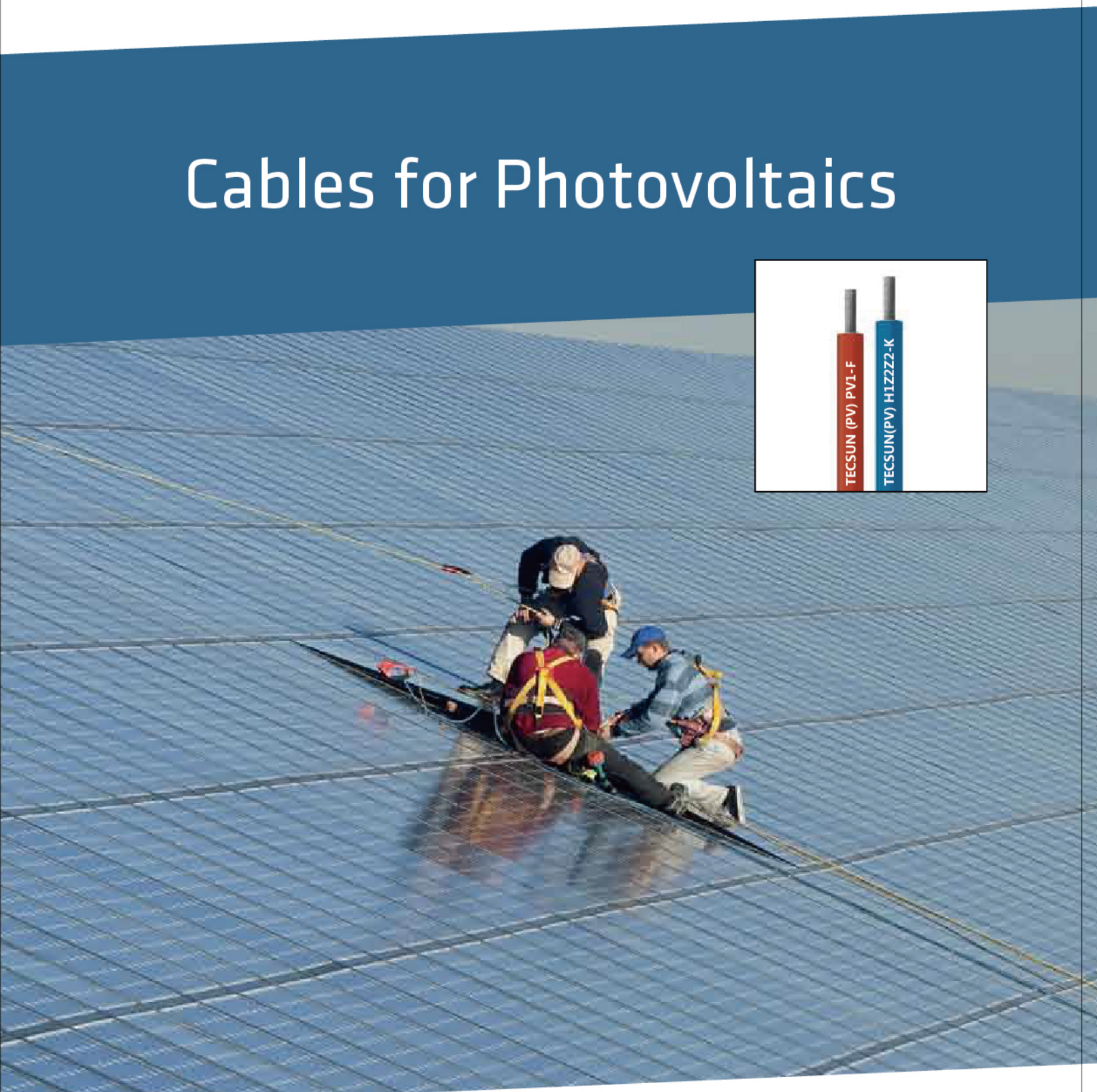


# Cables for Photovoltaics





# Linking the future

As the worldwide leader in the cable industry, Prysmian Group believes in the effective, efficient and sustainable supply of energy and information as primary driver in the development of communities.

With this in mind, we provide major global organisations in many industries with best-in-class cable solutions, based on state-of-the-art technology.

Through two renowned commercial brands - Prysmian and Draka - based in almost 100 countries, we're constantly close to our customers, enabling them to further develop the world's energy and telecoms infrastructures, and achieve sustainable, profitable growth.

In our energy business, we design, produce, distribute and install cables and systems for the transmission and distribution of power at low, medium, high and extra-high voltage.

In telecoms, the Group is a leading manufacturer of all types of copper and fibre cables, system and accessories - covering voice, video and transmission.

Drawing on over 140 years' experience and continuously investing in R&D, we apply excellence, understanding and integrity to everything we do, meeting and exceeding the precise needs of our customers across all continents, at the same shaping the evolution of our industry.



# What links sustainable ideas to real-world results?

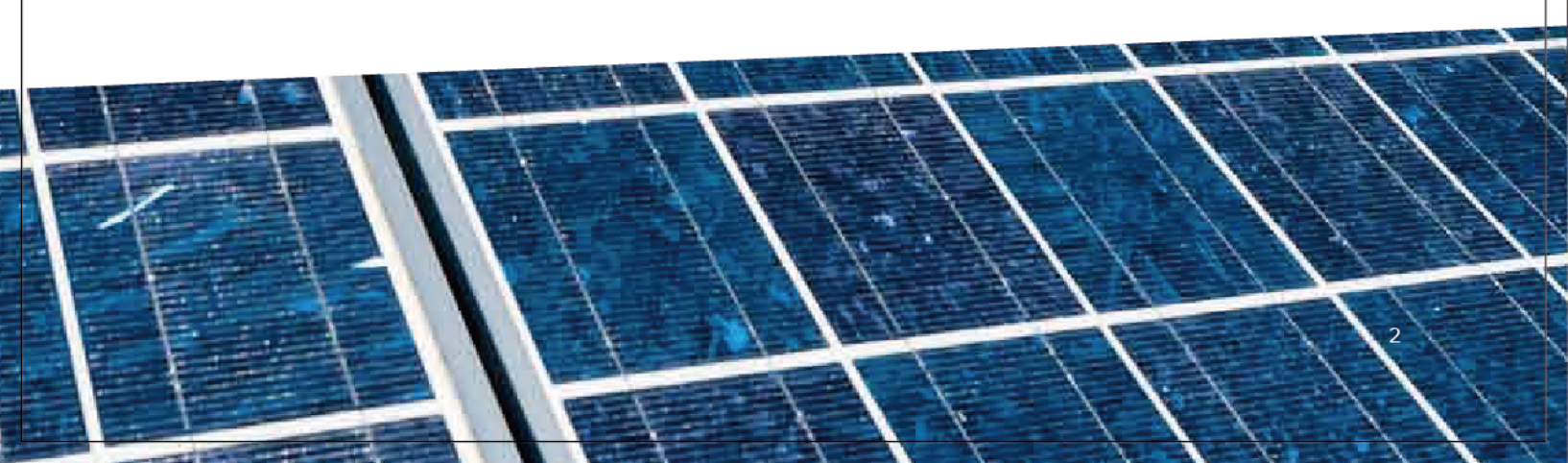
## Cable solutions to enable the production and supply of renewable energy

To meet an ever-growing need for power, the world is increasingly turning to renewable and sustainably sourced wind and solar energy. In response to this demand, Prysmian cables are helping businesses in the renewable industry around the globe convert these new opportunities into reality.

Our technologies - which cover cables used in wind turbine and tower operations, submarine inter-array, platform connection and export cables to link the various turbines and underground power transmission and distribution cable system for wind

power applications - are at work across the renewables sector, supporting the operations of turbine manufacturers, contractors and developers, grid operators, system integrators and panel makers.

Always aware of our responsibility to the planet, we're constantly driving innovation in our industry, aiming to help renewable industry partners deliver projects with benefits for the future of both our world and their businesses.



## TECSUN(PV) PV1-F 0,6/1kV AC (1,5kV DC)



## TECSUN(PV) PV1-F 0,6/1kV AC (1,5kV DC) PV cables, rubber insulated, TÜV and VDE certified



### Application

PRYSMIAN Solar cables TECSUN (PV) PV1-F acc. to TÜV 2PFG 1169/08.2007, are intended for use in Photovoltaic Power Supply Systems at nominal voltage rate up to 1,5kV DC.

They are suitable for applications indoor and/or outdoor, in industrial and agriculture fields, in/at equipment with protective insulation (Protecting Class II) and in explosion hazard areas (PRYSMIAN Internal Testing). They may be installed fixed, freely suspended or free movable, in cable trays, conduits, on and in walls.

TECSUN(PV) cables are also suitable for direct burial (PRYSMIAN Internal Testing), where the corresponding guidelines for direct burial shall be considered.

### Global data

Brand	TECSUN(PV)
Type designation	PV1-F
Standard	TÜV 2 PFG 1169/08.2007
Certifications / Approvals	TÜV Cert.-No. R 60013989

### Design features

Conductor	Electrolytic tinned copper, Class 5 in accordance with IEC 60228 (VDE 0295)
Insulation	Cross-linked HEPR 120°C (compound type EI6/EI8)
Outer sheath	Cross-linked EVA rubber 120°C (compound type EM4/EM8). Insulation and sheath are solidly bonded (Two-layer-insulation)
Outer Sheath Colour	Black

### Electrical parameters

Rated voltage	0.6/1 kV (600/1000V)
Maximum PV-System voltage	DC up to 2000 V possible
Max. permissible operating voltage AC	0.7/1.2 kV
Max. permissible operating voltage DC	0.9/1.8 kV
Test voltage	AC: 6,5 kV / DC: 15 kV (5 Min.)
Current Carrying Capacity description	Meets requirements for PV-Wire per TÜV 2 PFG 1169/08.2007
Electrical Tests	TÜV 2PFG 1169/08.2007: meets VDE 0282 Section 2, HD 22.2 and EN 50395 Conductor Resistance, Test Voltages AC and DC, Electric Strength, Surface Resistance, Spark Test on Insulation, EN 50305 Part 6 DC stability (10 days, 85° C, salt water, 1500 V DC), Insulation Resistance at 20° C and 90° C in Water. PRYSMIAN Internal Testing: Insulation Resistance at 120° C in Air.

## TECSUN(PV) PV1-F 0,6/1kV AC (1,5kV DC) PV cables, rubber insulated, TÜV and VDE certified



### Chemical parameters

Resistance to fire	<p>TÜV 2 PFG 1169/08.2007:</p> <ul style="list-style-type: none"> <li>• Flame propagation acc. to IEC 60332-1-2, DIN EN 60332-1-2 (Single Cable Flame Test)</li> <li>• Halogen-free acc. to IEC 60754-1</li> <li>• No Corrosivity acc. to IEC 60754-2</li> </ul> <p>PRYSMIAN Internal Testing:</p> <ul style="list-style-type: none"> <li>• Multiple Cable Flame Test acc. to DIN EN 50305-9</li> <li>• Low Smoke Emission acc. to IEC 61034, EN 61034 (Light Transmittance &gt; 70%)</li> <li>• Low Toxicity acc. to DIN EN 50305, ITC &lt; 3</li> </ul>
Resistance to oil Weather resistance	<p>Acc. to VDE 0473-811-404, DIN EN 60811-404, 24h 100° C</p> <p>TÜV 2PFG 1169/08.2007:</p> <ul style="list-style-type: none"> <li>• Ozone resistance: acc. to DIN EN 50396 Test Type B, HD 22.2 Test Type B</li> <li>• UV-Resistance: acc. to UL 1581 (Xeno-Test), ISO 4892-2 (Method A) and HD605/A1-2.4.20</li> </ul> <p>PRYSMIAN Internal Testing:</p> <ul style="list-style-type: none"> <li>• Absorption of Water (Gravimetric) per DIN EN 60811-1-3</li> </ul>
Acid and alkaline resistance	<p>Meets TÜV 2 PFG 1169/08.2007: 7 days, 23° C (N-Oxalic Acid, N-Sodium Hydroxide) as per EN 60811-404</p>
Ammonia Resistance	<p>30 days in Saturated Ammonia Atmosphere (PRYSMIAN Internal Testing)</p>
Environmentally Friendly	<p>TECSUN(PV) cables comply with RoHS directives 2011/65/EU of the European Union</p>

### Thermal parameters

Max. operating temperature of the conductor	<p>Max. 90°C at the conductor (lifetime acc. to Arrhenius-Diagram = 30 years). 20.000 hours of operation at conductor temperature of 120°C (and 90°C ambient temperature) are permitted.</p>
Max. short circuit temperature of the conductor	250 °C (5 s.)
Ambient temperature for fixed installation	min -40 °C ; max +90 °C
Ambient temperature in fully flexible operation	min -40 °C ; max +90 °C
Resistance to cold	<p>Cold Bend Test at -40° C temperature per DIN EN 60811-1-4. Impact Test -40° C temperature similar to DIN EN 50305</p>
Damp-Heat Test	<p>Meets TÜV 2 PFG 1169/08.2007 and EN 60068-2-78: 1.000 h at 90° C and 85% humidity</p>

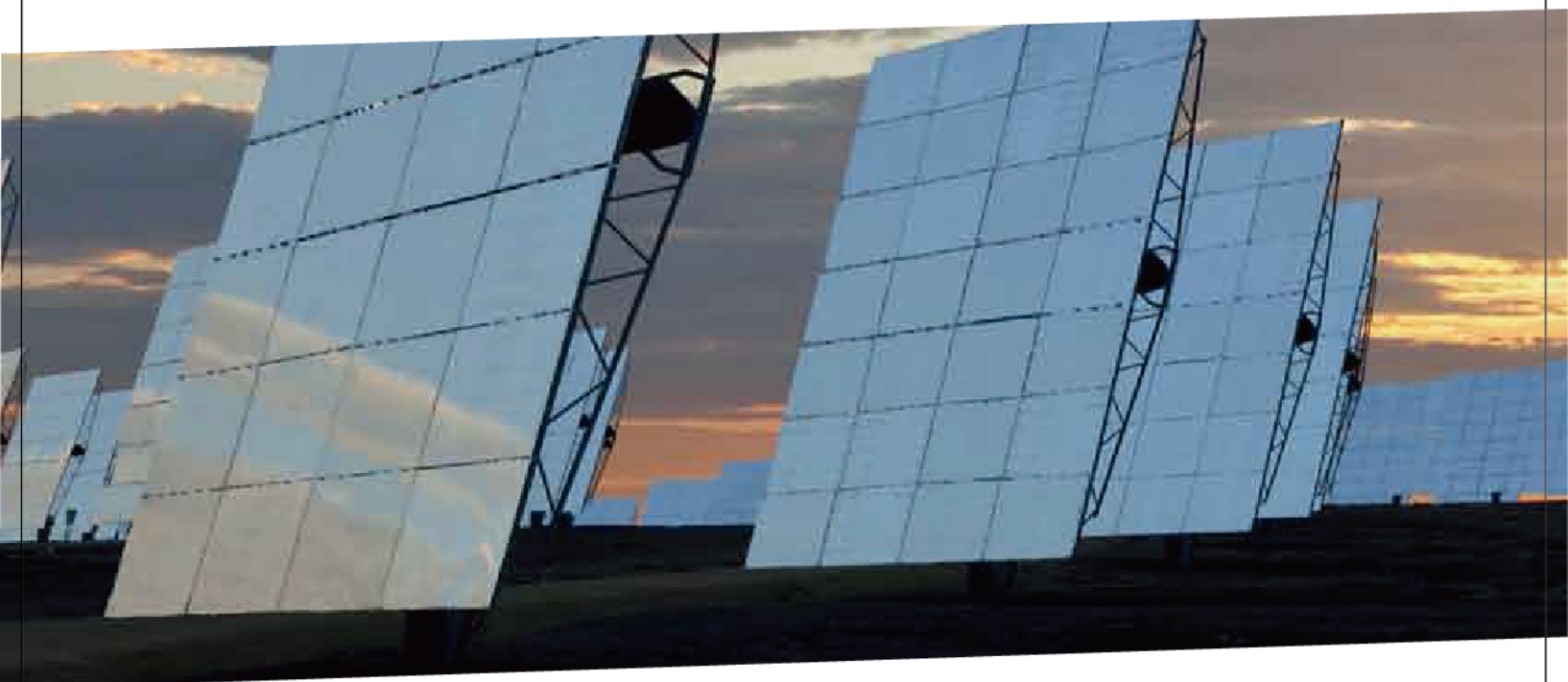
### Mechanical parameters

Max. tensile load	15 N/mm <sup>2</sup> in operation, 50 N/mm <sup>2</sup> during installation
Min. bending radius	4 x D
Abrasion resistance	<p>PRYSMIAN Internal Testing:</p> <ul style="list-style-type: none"> <li>• Acc. to DIN ISO 4649 against abrasive paper</li> <li>• Sheath against sheath</li> <li>• Sheath against metal</li> <li>• Sheath against plastics</li> </ul>
Shrinkage Test	Meets TÜV 2PFG 1169/08.2007 <2% acc. to EN 60811-1-3
Pressure Test at High Temperature	Meets TÜV 2PFG 1169/08.2007 <50% acc. to EN 60811-3-1
Dynamic Penetration Test	Meets requirements as per TÜV 2 PFG 1169/08.2007
Shore-Hardness	Type A: min. 85 nach DIN EN ISO 868 (PRYSMIAN Internal Testing)
Rodent resistance	Safety can be optimized by utilizing protective hoses, or protective element, such as a metallic screen braid.

**Datasheet 电缆参数**

Number of cores x cross section	Colour	Conductor diameter max. mm	Outer diameter min. mm	Outer diameter max. mm	Bending radius fixed min. mm	Weight (ca.) kg/km	Permissible tensile force max. N	Conductor resistance at 20°C max. Ω/km	Current carrying capacity for single cable free in air (60°C ambient temp.) A	Current carrying capacity for single cable on a surface (60°C ambient temp.) A	Short Circuit Current (1s. from 90°C to 250°C) kA
1x1,5	black	1.6	4.4	4.8	14.4	34	23	13.7	30	29	0.21
1x2,5	black	1.9	4.7	5.1	15.3	44	38	8.21	41	39	0.36
1x4	black	2.4	5.2	5.6	16.8	59	60	5.09	55	52	0.57
1x6	black	2.9	5.7	6.13	18.3	81	90	3.39	70	67	0.86
1x10	black	4	6.8	7.2	21.6	120	150	1.95	98	93	1.43
1x16	black	5.6	8.3	8.9	36	190	240	1.24	132	125	2.29
1x25	black	6.4	10	10.7	43	280	375	0.795	176	167	3.58
1x35	black	7.5	11.1	11.8	47	380	525	0.565	218	207	5.01
1x50	black	9	12.6	13.3	53	530	750	0.393	276	262	7.15
1x70	black	10.8	14.8	15.8	61	720	1050	0.277	347	330	10.01
1x95	black	12.6	16.2	17	68	900	1425	0.21	416	395	13.59
1x120	black	14.2	17.7	18.7	75	1150	1800	0.164	488	464	17.16
1x150	black	15.8	19.7	20.7	83	1420	2250	0.132	566	538	21.45
1x185	black	17.4	21.3	22.3	89	1710	2775	0.108	644	612	26.46
1x240	black	20.4	24.2	25.5	102	2200	3600	0.082	775	736	34.32

## TECSUN(PV) H1Z2Z2-K 1/1kV AC (1,5/1,5kV DC)





## TECSUN(PV) H1Z2Z2-K 1/1kV AC (1,5/1,5kV DC) PV cables, rubber insulated, TÜV and VDE certified as per EN 50618



### Application

PRYSMIAN Solar cables TECSUN (PV) H1Z2Z2-K acc. to EN 50618, are intended for use in Photovoltaic Power Supply Systems at nominal voltage rate up to 1,5/1,5kV DC.

They are suitable for applications indoor and/or outdoor, in industrial and agriculture fields, in/at equipment with protective insulation (Protecting Class II), in explosion hazard areas (PRYSMIAN Internal Testing). They may be installed fixed, freely suspended or free movable, in cable trays, conduits, on and in walls.

TECSUN(PV) H1Z2Z2-K cables are suitable for direct burial (PRYSMIAN Internal Testing), where the corresponding guidelines for direct burial shall be considered.

### Global data

Brand	TECSUN(PV)
Type designation	H1Z2Z2-K
Standard	DIN EN 50618
Certifications / Approvals	TÜV-Certificate nr. 50360241

### Design features

Conductor	Electrolytic tinned copper, finely stranded class 5 in accordance with IEC 60228
Insulation	Cross-linked HEPR 120°C
Outer sheath	Cross-linked EVA rubber 120°C. Insulation and sheath are solidly bonded (Two-layer-insulation)
Outer Sheath Colour	Black

### Electrical parameters

Rated voltage	DC: 1,5/1,5 kV
Maximum PV-System voltage	AC: 1,0/1,0 kV
Max. permissible operating voltage AC	1,2/1,2 kV
Max. permissible operating voltage DC	1,8/1,8 kV
Test voltage	AC: 6,5 kV / DC: 15 kV (5 Min.)
Current Carrying Capacity description	According to EN 50618, Table A-3
Electrical Tests	Acc. to EN 50618, Table 2: <ul style="list-style-type: none"> <li>• Conductor Resistance;</li> <li>• Voltage Test on completed cable (AC and DC);</li> <li>• Spark Test on insulation; Insulation Resistance (at 20°C and 90°C in water);</li> <li>• Insulation Long-Term Resistance to DC (10 days, in 85°C water, 1,8 kV DC);</li> <li>• Surface Resistance of Sheath.</li> </ul> PRYSMIAN internal test: <ul style="list-style-type: none"> <li>• Dielectric Strength;</li> <li>• Insulation Resistance at 120°C in air.</li> </ul>

## TECSUN(PV) H1Z2Z2-K 1/1kV AC (1,5/1,5kV DC)

### PV cables, rubber insulated, TÜV and VDE certified as per EN 50618



#### Chemical parameters

Reaction to fire	<p>Acc. to EN 50618, Table 2:</p> <ul style="list-style-type: none"> <li>• Single Cable Flame Test per EN 60332-1-2;</li> <li>• Low Smoke Emission per EN 61034-2 (Light Transmittance &gt; 70%);</li> <li>• Halogen-free per EN 50525-1, Annex B.</li> </ul> <p>PRYSMIAN internal test:</p> <ul style="list-style-type: none"> <li>• Multiple Cable Flame Test per EN 50305-9;</li> <li>• Low Toxicity per EN 50305 (ITC &lt; 3).</li> </ul>
Resistance to oil	<p>PRYSMIAN internal test, on sheath:</p> <ul style="list-style-type: none"> <li>• 24h, 100°C (meets VDE 0473-811-404, EN 60811-404).</li> </ul>
Weather resistance	<p>Acc. to EN 50618, Annex E and Table 2:</p> <ul style="list-style-type: none"> <li>• UV Resistance on sheath: tensile strength and elongation at break after 720h (360 Cycles) of exposure to UV lights acc. to EN 50289-4-17, Method A;</li> <li>• Ozone resistance: per Test Type B (DIN EN 50396).</li> </ul> <p>PRYSMIAN internal test:</p> <ul style="list-style-type: none"> <li>• Water Absorption (Gravimetric) per DIN EN 60811-402.</li> </ul>
Acid and alkaline resistance	<p>Acc. to EN 50618, Annex B:</p> <ul style="list-style-type: none"> <li>• 7 days, 23°C (N-Oxalic Acid, N-Sodium Hydroxide) acc. to EN 60811-404.</li> </ul>
Ammonia Resistance	<p>PRYSMIAN Internal Testing:</p> <ul style="list-style-type: none"> <li>• 30 days in Saturated Ammonia Atmosphere.</li> </ul>
Environmentally Friendly	<p>TECSUN(PV) cables comply with the RoHS directive 2011/65/EU of the European Union.</p>

#### Thermal parameters

Max. operating temperature of the conductor	<p>Max. 90°C at conductor (lifetime acc. to Arrhenius-Diagram TECSUN = 30 years). 20.000 hours of operation at conductor temperature of 120°C (and 90°C ambient temperature) are permitted.</p>
Max. short circuit temperature of the conductor	250 °C (5 s.)
Ambient temperature (for fixed and flexible installation)	<p>Installation and handling: -25°C up to 60°C In operation: -40°C up to +90°C</p>
Resistance to cold	<p>Acc. to EN 50618, Table 2:</p> <ul style="list-style-type: none"> <li>• Cold Bending Test at -40°C acc. to DIN EN 60811-504;</li> <li>• Cold Elongation Test at -40°C acc. to DIN EN 60811-505;</li> <li>• Cold Impact Test at -40°C acc. to DIN EN 60811-506 and EN 50618 Annex C.</li> </ul>
Damp-Heat Test	<p>Acc. to EN 50618, Table 2:</p> <ul style="list-style-type: none"> <li>• 1.000h at 90°C and 85% humidity (test acc. to EN 60068-2-78).</li> </ul>

#### Mechanical parameters

Max. tensile load	15 N/mm <sup>2</sup> in operation, 50 N/mm <sup>2</sup> during installation
Min. bending radius	Acc. to EN 50565-1
Abrasion resistance	<p>PRYSMIAN Internal Testing:</p> <ul style="list-style-type: none"> <li>• Acc. to DIN ISO 4649 against abrasive paper;</li> <li>• Sheath against sheath;</li> <li>• Sheath against metal;</li> <li>• Sheath against plastics.</li> </ul>
Shrinkage Test	<p>Acc. to EN 50618, Table 2:</p> <ul style="list-style-type: none"> <li>• Maximum Shrinkage &lt;2% (test acc. to EN 60811-503).</li> </ul>
Pressure Test at High Temperature	<p>PRYSMIAN Internal Testing:</p> <ul style="list-style-type: none"> <li>• &lt;50% acc. to EN 60811-508.</li> </ul>
Dynamic Penetration Test	<p>Acc. to EN 50618, Annex D:</p> <ul style="list-style-type: none"> <li>• Meets requirements of EN 50618.</li> </ul>
Shore-Hardness	<p>PRYSMIAN Internal Testing:</p> <ul style="list-style-type: none"> <li>• Type A: 85 acc. to DIN EN ISO 868</li> </ul>
Durability of Print	<p>Acc. to EN 50618:</p> <ul style="list-style-type: none"> <li>• Test acc. to EN 50396.</li> </ul>
Rodent resistance	<p>Safety can be optimized by utilizing protective hoses, or protective element, such as a metallic screen braid.</p>

**Datasheet 电缆参数**

Number of cores x cross section	Colour	Conductor diameter max. mm	Outer diameter min. mm	Outer diameter max. mm	Bending radius fixed min. mm	Weight (approx.) kg/km	Permissible tensile force max. N	Conductor resistance at 20°C max. Ω/km	Current carrying capacity for single cable free in air (60°C ambient temp.) A	Current carrying capacity for single cable on a surface (60°C ambient temp.) A	Short Circuit Current (1s. from 90°C to 250°C) kA
1x1,5	black	1.6	4.4	5.2	15	35	23	13.7	30	29	0.21
1x2,5	black	1.9	4.9	5.7	17	46	38	8.21	41	39	0.36
1x4	black	2.4	5.4	6.2	18	61	60	5.09	55	52	0.57
1x6	black	2.9	5.9	6.7	20	80	90	3.39	70	67	0.86
1x10	black	4	7.1	7.8	23	122	150	1.95	98	93	1.43
1x16	black	5.6	9	9.8	30	200	240	1.24	132	125	2.29
1x25	black	6.4	10.4	11.5	34	290	375	0.795	176	167	3.58
1x35	black	7.5	11.7	12.8	50	400	525	0.565	218	207	5.01
1x50	black	9	13.5	14.5	58	560	750	0.393	276	262	7.15
1x70	black	10.8	15.5	16.5	66	750	1050	0.277	347	330	10.01
1x95	black	12.6	17.7	18.7	75	970	1425	0.21	416	395	13.59
1x120	black	14.2	19.2	20.4	82	1220	1800	0.164	488	464	17.16
1x150	black	15.8	21.4	22.6	91	1500	2250	0.132	566	538	21.45
1x185	black	17.4	23.7	25.1	101	1840	2775	0.108	644	612	26.46
1x240	black	20.4	27.1	28.5	114	2400	3600	0.082	775	736	34.32

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