



SOLAR CABLES

WITH E-BEAM IRRADIATED TECHNOLOGY





APAR CABLE SOLUTIONS

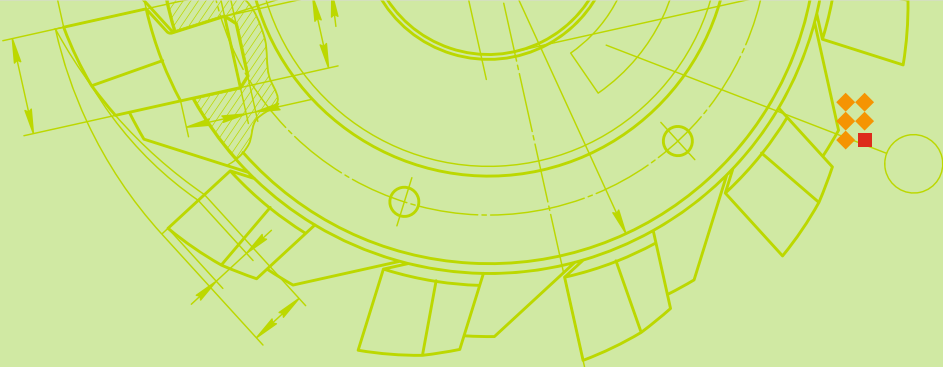
Leading the innovation curve as one of the world's largest manufacturers of specialised cables

- We have been growing at 25% CAGR in the last decade.
- Footprints in 100+ countries.
- Exports contribute to 30% of revenue.
- Our factories and products have been accredited and certified by the global standards of ISO, NABL, ABS, TUV, UL and more.
- Capability to manufacture cables as per IS, IEC, BS, VDE, AS & NZS and as per other international standards.
- We cater to various speciality sectors like railway locomotive, coaches, naval ships, submarines, solar plants, windmills, hybrid cables and harnesses. We also supply fibre optic cables and general-purpose wires & cables (fixed and flexible) such as LV, MV and XLPE.

Product Portfolio

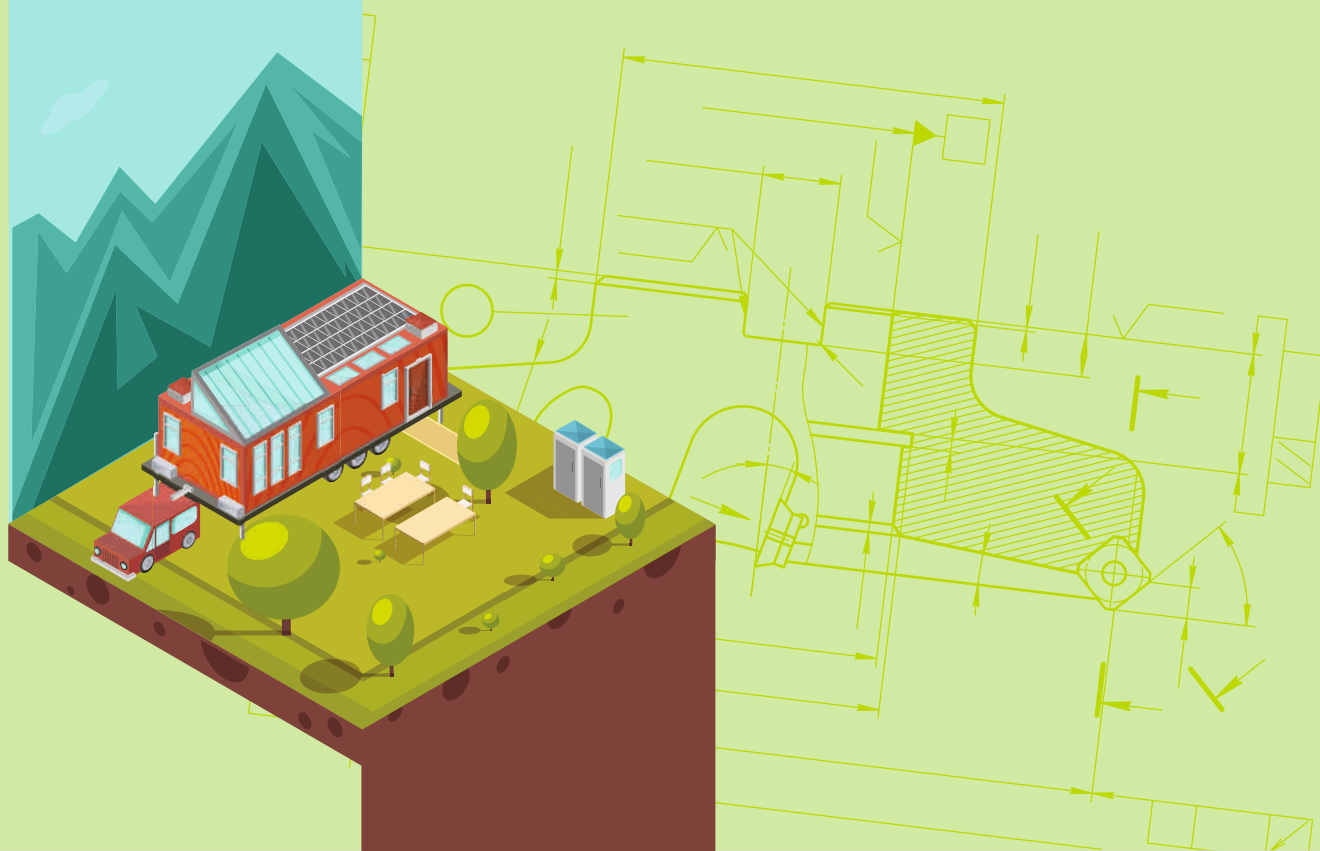
- Electrical Power & Control Cables
- Light Duty Cable & Wires
- Elastomer & E-Beam Cables
- Fibre Optic Cables
- Speciality Cables & Products





WORLD-CLASS MANUFACTURING CAPABILITIES

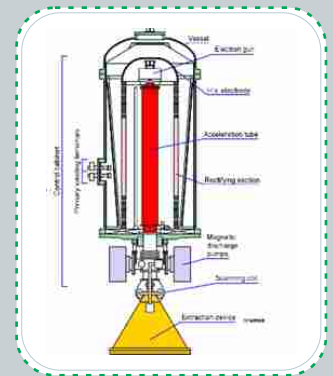
- 2 cable manufacturing facilities, in South Gujarat, India
- Facilities are strategically located 150 Km from the Mumbai seaport for quick export shipments.
- Vast manufacturing infrastructure of 250,000 SQM.
- Both our facilities are well equipped with advanced manufacturing infrastructure and accredited with ISO 9001, ISO 14001 and OHSAS 45001.
- India's only cable company with 3 E-Beam irradiation facilities i.e. 1.5 MeV, 2.5 MeV & 3.0 MeV.
- Annual production capacity for 30,000 MT aluminum & 10,000 MT copper cables.
- In-house facility to produce nearly all the insulation and sheathing compounds (used for manufacturing cables).
- Latest plant & machinery sourced from world-renowned suppliers to achieve maximum output without compromising cable quality.
- Wire drawing machines are from Niehoff, Germany and the electroplating tinning facility is from OTOMEC, Italy.
- Royale USA, Scholz/ Supermac, Troester CCV line for cable up to 66kV and the state of the art extruders from Troester, Covema, Royale, Rosendahl, Maillefer, etc.

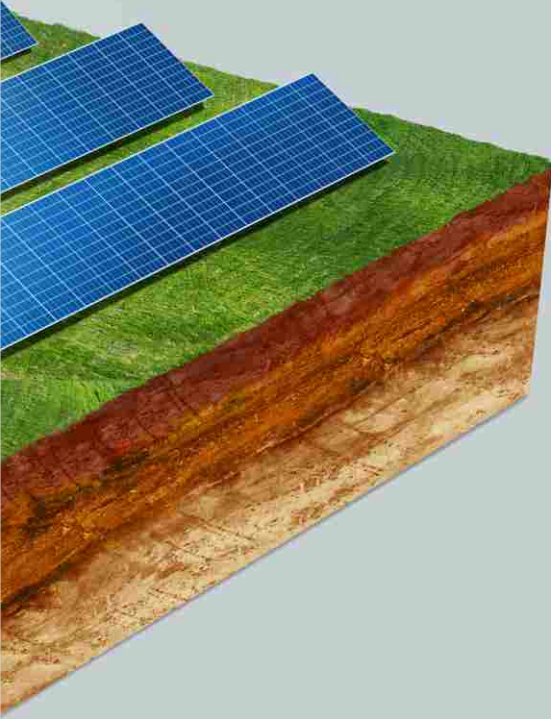




TYPICAL WORKING OF E-BEAM

- An electron gun is housed in a thick vessel called an acceleration tube.
- In a regulated environment, electrons are accelerated in the tube.
- With the help of magnets, the electrons are directed to a scanning device.
- Required cables or material are kept for irradiation before the scanning device (receiving exposure in predetermined doses.)
- The highly accelerated electrons penetrate the cable's insulation or sheath, resulting in double carbon radicals that cross-link the plastic's polymer chains three-dimensionally.





E-BEAM IRRADIATION FACILITY

APAR Industries, Cable Solutions division has diversified into a technologically advanced state of the art greenfield project at Khatalawad, Dist. Vapi, Gujarat with 1.5 MeV, 2.5 MeV and 3.0 MeV Electron Beam Accelerators. The E-Beam facilities have handling systems suitable for irradiation of various types of electrical cables and wires, PE sheets, polymeric tubes/pipes, heat shrink products, gems & diamonds, medical product sterilisation, reprocessing of PTFE scrap, which is being imported into India for industrial lubricants, greases, waxes, paints, mouldings, PTFE linking, etc.

Solar and wind energy cable developers prefer E-Beam cables for withstanding harsh environmental conditions compared to conventional chemically cross-linked cables.

The Advantage of E-Beam cables:

- The superior performance of cables and wires
- Improved mechanical properties
- Improvement in tensile strength
- Abrasion resistance
- Thermal resistance
- Stress cracking resistance
- Flame propagation resistance
- Deformation resistance and cut-through resistance.
- These cables offer a 15% extra current rating over conventional cables.

QUALITY ASSURANCE & TESTING FACILITIES

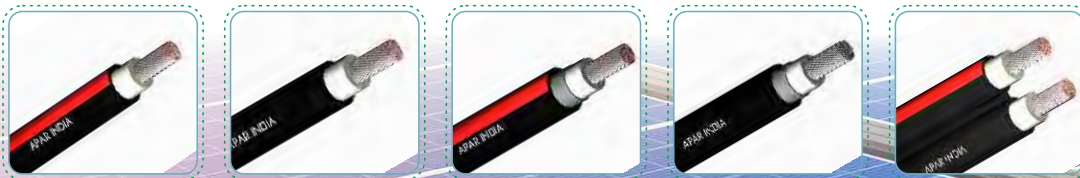
- APAR's facilities are well equipped with advanced testing infrastructure and are accredited with ISO 9001, ISO 14001 & OHSAS 45001.
- Certification of Solar Cables as per BS EN 50618, TUV 2pfg 1990/05.12 Standard, IEC 17025:2005 & UL 4703.
- Assembly & Wire Harness as per TUV, EN, IEC, etc.





APAR SOLAR CABLES OFFERINGS

- Backed by our 30 years of experience in manufacturing Elastomeric Insulated Cables, we introduced a range of Solar Cables for emerging PV based renewable energy installations.
- APAR has installed an Electron Beam Irradiation facility with 1.5 MeV, 2.5 MeV and 3 MeV accelerators and uses this technology to cross-link elastomeric insulation and sheaths of Solar DC Cables.
- Power Cables used for solar projects with XLPE insulation armoured or unarmoured are specially manufactured with UV stabilised PVC ST2 outer sheathing with in-house specially formulated compounds to sustain the direct/ diffused/ indirect sunlight in case of exposed cables at any stage of installation.
- APAR has several international certifications and manufactures these cables conforming to various international specifications. EN 50618: 2014, TUV 2pfg 1990/05.12 Standard, IEC 62930: 2017, UL 4703
- Solar Cables are also available with HEPR (Ei6) insulation as per EN 50363-1 & EVA (EM8) sheath as per EN 50363-2-1 (chemical resistance: mineral, acid and alkali oil, ammonia), which is generally to EN 50618 /2014.
- **Complete range of cables for solar projects:**
 - 2.5 to 300 sq mm cables with Electron Beam cross-linking.
 - Solar PV cables with rodent resistant feature.
 - Flexible aluminium conductor Solar Cables AC and DC.
 - Aluminium cables with steel tape / flat strip/ round wire armouring for combiner box to an inverter.
 - Nylon intermediate sheath cable as per AS/ NZ specs also available for rodent protection.
 - Electron Beam Irradiated LT XLPE cables suitable up to 120°C operating temperature.
 - Fibre Optic and RS:485 communication cables





APPLICATIONS OF SOLAR CABLES

A. PV module to PV module & PV modules to array junction box

These cables are exposed to direct and indirect & diffused sunlight throughout the day and harsh atmospheric conditions in the open air.

DC Solar Cables

Single core copper cables each for +ve and -ve. The annealed tinned copper flexible conductor is XLPO insulated, and XLPO sheathed, with UV and Ozone protection properties. The cross-linking is done by Electron Beam irradiation process that ensures the longer life span of the cables > 30 years.

The cables are halogen-free and can operate up to 120°C, Rated 1.5 kV (Max 1.8 kV)

B. Array junction box to main junction box & main junction box to inverter

These Solar DC cables are not exposed to sunlight and are generally routed through conduit pipes laid underground.

APAR can offer:

XLPO insulated and sheathed cables, XLPE Insulated PVC cables with copper or aluminium conductors, stranded compacted, flexible types, unarmoured or armoured types as per customer requirements.

C. Inverter to the transformer primary

The three-phase AC output from the inverters is connected to the transformer primary through underground armoured cables

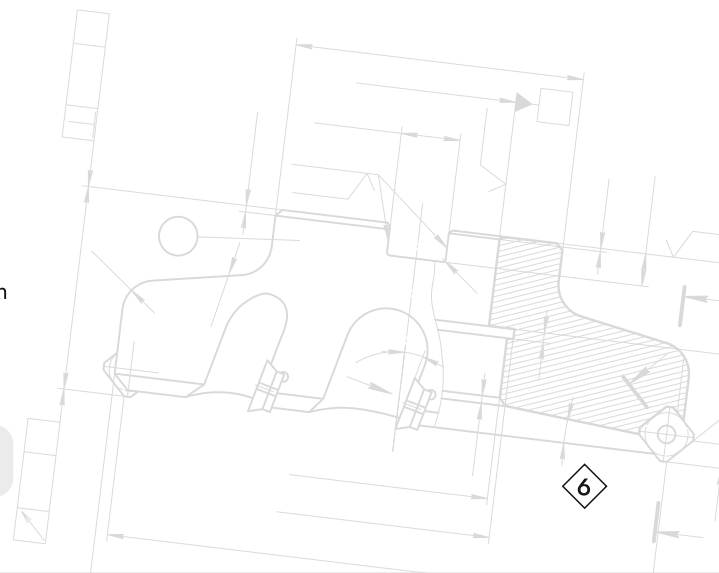
D. Transformer secondary to RMU/switchyard

The three-phase AC output from the transformer secondary is connected to the RMU/switchyard through armoured cables.

E. RMU to Switchyard

A three-phase AC connection from the RMU is connected to the switchyard through armoured cables.

These are Copper or Aluminium XLPE insulated, GI armoured, UV stabilised PVC St2





E-BEAM IRRADIATED, SOLAR PV CABLES

APAR has developed an in-house XLPO compound for Electron Beam irradiation for a range of solar Photovoltaic Cables for emerging PV based renewable energy installations. Globally almost 90% of Solar PV cables are manufactured with this Electron Beam irradiation technology.

Application: ATC flexible conductor, dual wall Electron Beam irradiation insulated for photovoltaic power applications for connection from PV cell to junction box/inverter in dry, damp or wet conditions. It can be installed in open trays or ducts /conduits—rodent resistant design of Solar PV Cable is also available below.

Construction: Annealed electro-tinned fine copper strands (bunched to meet class 5 flexibility as per IEC 60228/VDE 0295), insulated and sheathed with cross-linked polyolefin co-polymer (XLPO), Electron Beam cross-linked.

Sheath colour: black, black with a red stripe.

Rodent Resistant Cables are also available (Nylon intermediate sheath)

Advantages of Electron Beam cross-linked XLPO

- Continuous operating temperature 120°C, hence current carrying capacity is higher.
- Better UV & Ozone resistance and improved weather resistance in adverse conditions.
- Improved oil & chemical resistance, improved crack resistance.
- Enhanced mechanical properties of the cables in high-temperature conditions.
- Improved flammability properties, halogen free.

Solar DC Cables as per EN 50618 and IEC 62930/2017

TECHNICAL SPECIFICATION

Voltage rating:

Test voltage: 6.5 KV 50 Hz Or 15 KV DC for 5 min

Temperature rating: -40° C up to + 120° C

Ambient temperature: -40° C up to + 90° C

Max. short circuit temp: 250° C (for 5 Sec)

Oil & chemical resistance: IEC 60811-1

Bending radius: > 4x0(cable OD)

STANDARD/ MATERIAL PROPERTIES

Fire performance: EN 60332-1-2

Smoke emission: EN 61034 -2 (light transmission > 60%)

Halogen free: EN 50525-1 (HCL content < 0.5%)

Expected life of cable: > 25 years at 90°C

Conforming to EN 50618/2014 H1Z2Z2K



E-BEAM IRRADIATED ATC / XLPO SOLAR CABLE AS PER BS-EN-50618/2014

Size	Conductor	Max.DC resistance of conductor at 20°C (Ohm/Km)	Insulation thickness	Sheath thickness	Cable OD	Weight of cable	Current rating (A)		
Sq.mm	No./ dia of strand(mm) (nom.)		mm (Nominal)	mm (Nominal)	mm (Nominal)	Kg/km (Approx.)	At 60°C in air	Single cable on surface	2 Cables adjacent on surfaces
2.5	50/0.26	8.21	0.7	0.8	5.1	43	41	39	33
4	56/0.31	5.09	0.7	0.8	5.6	57	55	52	44
6	84/0.31	3.39	0.7	0.8	6.1	75	70	67	57
10	80/0.41	1.95	0.7	0.8	7.5	120	98	93	79
16	126/0.41	1.24	0.7	0.9	8.8	178	132	125	107
25	196/0.41	0.795	0.9	1.0	10.9	275	176	167	142
35	276/0.41	0.565	0.9	1.1	12.2	370	218	207	176
50	396/0.41	0.393	1.0	1.2	13.8	520	276	262	221
70	360/0.51	0.277	1.1	1.2	16.0	700	347	330	278
95	475/0.51	0.21	1.1	1.3	17.8	910	416	395	333
120	608/0.51	0.164	1.2	1.3	19.8	1140	488	464	390
150	760/0.51	0.132	1.4	1.4	22.2	1430	566	538	453
185	925/0.51	0.108	1.6	1.6	24.9	1760	644	612	515
240	1221/0.51	0.0817	1.7	1.7	28.0	2290	775	736	620
300	1525/0.51	0.0654	1.8	1.8	30.5	2910	895	850	716

E-BEAM IRRADIATION ATC CONDUCTOR, FR-XLPE INSULATED SOLAR CABLE AS PER UL 4703 (2000 V)

Size	Conductor material (Class-B stranded)	Conductor dia. (Approx.)	Max. DC resistance of conductor at 20°C	Insulation thickness (Nom.)	Cable OD (Nom.)	Weight of cable in (Approx.)	Current rating (A)		
AWG (No. of wires) (Sq.mm)		inches (mm)	Ohm/1000ft (Ohm/Km)	inches (mm)	inches (mm)	lbs/1000ft (Kg/Km)	At 60°C	At 75°C	At 90°C
12 (19) (3.31)	Bare copper	0.0915 (2.32)	1.65 (5.43)	0.075 (1.90)	0.241 (6.12)	40 (60)	20	25	30
10 (19) (5.26)		0.116 (2.95)	1.04 (3.41)	0.075 (1.90)	0.266 (6.75)	55 (82)	30	35	40
8 (19) (8.37)		0.146 (3.71)	0.654 (2.14)	0.085 (2.15)	0.316 (8.01)	80 (119)	40	50	55
10 (19) (5.26)	8000 series aluminium	0.116 (2.95)	1.70 (5.59)	0.075 (1.90)	0.266 (6.75)	32 (48)	25	30	35
8 (19) (8.37)		0.146 (3.71)	1.07 (3.52)	0.085 (2.15)	0.266 (6.75)	46 (68)	35	40	45
6 (19) (13.3)		0.184 (4.67)	0.674 (2.21)	0.085 (2.15)	0.354 (8.97)	60 (89)	40	50	55

Size	Conductor material (Class-B stranded)	Conductor dia. (Approx.)	Max. DC resistance of conductor at 20°C	Insulation thickness (Nom.)	Cable OD (Nom.)	Weight of cable in (Approx.)	Current rating (A)		
AWG (Sq.mm)		inches (mm)	Ohm/1000ft (Ohm/Km)	inches (mm)	inches (mm)	lbs/1000ft (Kg/Km)	At 60°C	At 75°C	At 90°C
400 (203)	8000 series aluminium	0.659 (16.74)	0.0442 (0.145)	120 (3.04)	0.899 (22.82)	507 (755)	225	270	305
500 (253)		0.736 (18.69)	0.0354 (0.116)	120 (3.04)	0.976 (24.77)	614 (914)	260	310	350
600 (304)		0.813 (20.65)	0.0295 (0.0967)	135 (3.43)	1.083 (27.51)	747 (1111)	285	340	385
750 (380)		0.908 (23.06)	0.0236 (0.0774)	135 (3.43)	1.178 (29.92)	902 (1342)	320	385	435
1000 (507)		1.060 (26.92)	0.0177 (0.0580)	135 (3.43)	1.33 (33.78)	1162 (1729)	375	445	500

*Other sizes on request



Electron Beam machine at Khatalwada plant.



APAR LV XLPE (120°C) INSULATED POWER CABLE

APAR has successfully developed Electron Beam cross-linked XLPE (120°C) Insulated Power & Control Cables suitable for insulation rating 120°C (maximum continuous operating temperature). These cables are provided with 105°C rated inner & outer PVC sheath to support cable usage at higher operating temperatures. Comparatively, the XLPE cables are conventionally manufactured by a chemical cross-linking process and are suitable for a maximum operating temperature of 90°C.

Insulated Power Cables can be installed in open trays or ducts/conduits. The rodent resistant design of the Solar PV Cable is also available

The following factors are generally considered for selecting suitable cable size LV cables for connection from inverter output (AC) to LV panels, LV panels/ switchgear to transformer primary, protection equipment and other auxiliary equipment.

Maximum Load Current.

- Magnitude and duration of possible overload and short circuit current.
- Voltage Drop and line Length.

Type of Installation:

Underground (direct or in ducts), in air, combination of underground and in air.

- Cables in the vicinity, especially in ducts/cable trays.
- Fire safety requirements.

Maximum & Minimum Ambient Temperature.

- Chemical and physical properties of soil for UG installations
- Technical specifications and any special requirements

The cable system designer selects the cable size taking into account all the de-ratings of installation conditions such that there is sufficient cushion available for any unforeseen situations and the possibility of any future overloading. Hence, for standard (90°C) LV XLPE cables, the cable system designer tends to load the cable maximum up to 75°C to 80°C maximum operating temperature, keeping the balance as a cushion. Solar installations generally occur in high ambient zones, like forests, deserts, open lands, etc., where the ambient temperature in summer reaches as high as 50°C to 55°C. Since the cable cannot be loaded beyond 80°C, occasionally the cable designer opts for oversized cable, leading to higher capital costs.

APAR LV XLPE cables suitable for max 105°C (though its XLPE insulation is rated 120°C) can be considered for total loading of cable up to 90°C keeping the balance 15°C as an available cushion for any future overloading.

APAR LV XLPE offers two options:

- a) Keep the conductor size the same, it allows the cable system designer to consider cable loading up to 90°C (keeping balance as a cushion), and it will ensure a much longer life of the cable.
- b) There is an opportunity for cable system designers to consider one size lower, thus offering unprecedented cost reduction benefits and technical advantage.

Cable construction:

0.65/1.1kV grade stranded aluminium or copper conductor, EB-XLPE insulated, PVC inner / outer sheathed, armoured /un-armoured cables conforming to 15:7098 or IEC:60502-1 or other international standards.

TECHNICAL PARAMETERS

APAR aluminium conductor armoured EB-XLPE insulated armoured power cable 650/1100 volts as per is 7098 part-1



Size	EB-XLPE (120°C) insulation	Inner sheath-extruded	Armour	Outer sheath	Overall dia. of cable	Net weight of cable	Max. D.C resistance of conductor at 20°C	Max. A.C resistance at 105°C	Reactance at 50Hz	CapacitanceImpedance	Voltage drop	Continuous current carrying capacity	Short circuit rating (duration 1 sec.)	Continuous current carrying capacity	Packing
												at conductor temp. 90°C		at conductor temp. 90°C	
Cores x cross sectional area	Nom. thickness	Min. thickness	Alu. wire (nom.dia.)	Pvc type ST-2 105°C (min thickness)	Approx	Approx			Approx	Approx		In Air (at 40°C) EB-XLPE cable	In ground (at 30°C) EB-XLPE cable	In ground (at 30°C) standard cable	Tol. ±5%
Cores X sq.mm	mm	mm	mm	mm	mm	Kg/Km	Ohm/Km	Ohm/Km	Ohm/Km	µf/Km	V/A/Km	Amps	Amps	Amps	m
1 X 25	1.2	NA	1.4	1.24	14.5	250	1.20	1.608	0.117	0.40	1.612	121	118	98	1000
1 X 35	1.2	NA	1.4	1.24	15.5	300	0.868	1.163	0.112	0.44	1.168	146	138	119	1000
1 X 50	1.3	NA	1.4	1.24	16.5	350	0.641	0.859	0.106	0.46	0.866	185	168	145	1000
1 X 70	1.4	NA	1.4	1.24	18.5	445	0.443	0.594	0.100	0.51	0.602	235	202	185	1000
		NA	ALU. STRIP												
1 X 95	1.4	NA	4.0 X 0.8	1.4	20.5	580	0.320	0.429	0.099	0.59	0.44	0.76	236	202	235
1 X 120	1.5	NA	4.0 X 0.8	1.4	22.5	675	0.253	0.339	0.095	0.62	0.352	0.61	263	230	276
1 X 150	1.7	NA	4.0 X 0.8	1.4	24.0	790	0.206	0.276	0.093	0.62	0.291	0.50	292	256	314
1 X 185	1.9	NA	4.0 X 0.8	1.4	26.0	945	0.164	0.220	0.092	0.60	0.238	0.41	331	290	366
1 X 240	2.0	NA	4.0 X 0.8	1.4	28.5	1150	0.125	0.168	0.089	0.65	0.190	0.33	380	335	434
1 X 300	2.1	NA	4.0 X 0.8	1.56	31.0	1390	0.100	0.134	0.087	0.69	0.160	0.28	425	376	500
1 X 400	2.4	NA	4.0 X 0.8	1.56	35.5	1790	0.0778	0.104	0.086	0.70	0.135	0.23	483	429	589
1 X 500	2.6	NA	4.0 X 0.8	1.56	39.5	2210	0.0605	0.081	0.084	0.72	0.117	0.20	546	485	685
1 X 630	2.8	NA	4.0 X 0.8	1.72	43.5	2745	0.0469	0.063	0.083	0.77	0.104	0.18	611	546	793
1 X 800	3.1	NA	4.0 X 0.8	1.72	48.5	3425	0.0367	0.049	0.082	0.77	0.096	0.17	675	608	907
1 X 1000	3.3	NA	4.0 X 0.8	1.88	55.0	4300	0.0291	0.039	0.081	0.81	0.09	0.16	727	665	1022
			GI. STRIP												
2 X 25	0.9	0.3	4.0 X 0.8	1.4	21.0	660	1.20	1.608	0.0802	0.089	1.61	3.22	136	114	109
2 X 35	0.9	0.3	4.0 X 0.8	1.4	22.0	755	0.868	1.163	0.080	0.096	1.17	2.34	161	136	133
2 X 50	1.0	0.3	4.0 X 0.8	1.4	24.5	895	0.641	0.859	0.076	0.098	0.862	1.72	197	161	162
2 X 70	1.1	0.3	4.0 X 0.8	1.56	27.5	1125	0.443	0.594	0.075	0.100	0.599	1.20	235	197	204
2 X 95	1.1	0.4	4.0 X 0.8	1.56	29.5	1320	0.320	0.429	0.073	0.110	0.435	0.87	270	235	251
2 X 120	1.2	0.4	4.0 X 0.8	1.56	32.0	1560	0.253	0.339	0.071	0.110	0.346	0.69	305	266	287
2 X 150	1.4	0.4	4.0 X 0.8	1.72	35.0	1850	0.206	0.276	0.071	0.110	0.285	0.57	339	296	328
2 X 185	1.6	0.5	4.0 X 0.8	1.72	38.0	2190	0.164	0.220	0.071	0.110	0.231	0.46	385	335	379
2 X 240	1.7	0.5	4.0 X 0.8	1.88	42.0	2660	0.125	0.168	0.071	0.110	0.182	0.36	437	385	448
2 X 300	1.8	0.6	4.0 X 0.8	2.04	46.0	3200	0.100	0.134	0.071	0.120	0.152	0.30	488	432	513
2 X 400	2.0	0.6	4.0 X 0.8	2.36	51.5	3955	0.0778	0.104	0.070	0.120	0.125	0.25	542	487	593
3 X 95	1.1	0.4	4.0 X 0.8	1.56	32.0	1640	0.320	0.429	0.077	0.61	0.435	0.75	228	197	216

Size	EBXLPE (120°C) Insulation	Inner sheath-extruded	Armour	Outer sheath	Overall dia. of cable	Net weight of cable	Max. D.C resistance of conductor at 20°C	Max. A.C resistance at 105°C	Reactance at 50Hz	Capacitance	Impedance	Voltage drop	Continuous current carrying capacity	Short circuit rating (duration 1 sec.)	Continuous current carrying capacity	Packing
													at conductor temp. 90°C			
Cores X cross sectional area	Nom thickness	Min. thickness	Alu. wire (nom.dia.)	PVC type ST-2 105°C (MIN thickness)	Approx	Approx			Approx	Approx			In ground (at 30°C) EB-XLPE cable	In ground (at 30°C) standard cable	In air (at 40°C) standard cable	Tol. ±5%
Cores X Sq.mm	mm	mm	mm	mm	mm	Kg/Km	Ohm/Km	Ohm/Km	Ohm/Km	µf/Km	Ohm/Km	V/A/Km	Amps	Amps	Amps	m
3 X120	1.2	0.4	4.0 X 0.8	1.56	35.0	1955	0.253	0.339	0.072	0.63	0.346	0.60	257	257	249	223
3 X 150	1.4	0.5	4.0 X 0.8	1.72	38.5	2330	0.206	0.276	0.072	0.64	0.285	0.49	288	288	284	249
3 X 185	1.6	0.5	4.0 X 0.8	1.88	42.5	2840	0.164	0.22	0.072	0.65	0.231	0.40	326	326	329	282
3 X 240	1.7	0.6	4.0 X 0.8	2.04	47.5	3525	0.125	0.168	0.072	0.66	0.182	0.32	370	370	392	327
3 X 300	1.8	0.6	4.0 X 0.8	2.20	52.0	4230	0.100	0.134	0.071	0.67	0.152	0.26	420	420	452	369
3 X 400	2.0	0.7	4.0 X 0.8	2.52	59.0	5320	0.0778	0.104	0.070	0.67	0.125	0.22	472	472	526	420
3.5 X 25	0.9/0.7	0.3	4.0 X 0.8	1.4	23.0	815	1.20/1.91	1.61/2.56	0.080	0.41	1.61	2.79	114	114	93	95
3.5 X 35	0.9/0.7	0.3	4.0 X 0.8	1.4	25.0	970	0.868/1.91	1.16/2.56	0.079	0.47	1.17	2.03	135	135	114	114
3.5 X 50	1.0/0.9	0.3	4.0 X 0.8	1.4	28.0	1210	0.641/1.20	0.859/1.61	0.078	0.50	0.862	1.49	164	164	138	134
3.5 X 70	1.1/0.9	0.4	4.0 X 0.8	1.56	32.0	1540	0.443/0.868	0.594/1.16	0.077	0.53	0.599	1.04	197	197	175	164
3.5 X 95	1.1/1.0	0.4	4.0 X 0.8	1.56	35.0	1880	0.320/0.641	0.429/0.859	0.077	0.61	0.435	0.75	228	228	216	197
3.5 X 120	1.2/1.1	0.4	4.0 X 0.8	1.72	39.0	2290	0.253/0.443	0.339/0.594	0.072	0.63	0.346	0.60	257	257	249	223
3.5 X 150	1.4/1.1	0.5	4.0 X 0.8	1.72	43.0	2680	0.206/0.443	0.276/0.594	0.072	0.64	0.285	0.49	288	288	284	249
3.5 X 185	1.6/1.1	0.5	4.0 X 0.8	1.88	47.0	3265	0.164/0.320	0.220/0.429	0.072	0.65	0.231	0.40	326	326	329	282
3.5 X 240	1.7/1.2	0.6	4.0 X 0.8	2.04	52.5	4045	0.125/0.253	0.168/0.339	0.072	0.66	0.182	0.32	370	370	392	327
3.5 X 300	1.8/1.4	0.6	4.0 X 0.8	2.20	57.5	4850	0.100/0.206	0.134/0.276	0.071	0.67	0.152	0.26	420	420	452	369
3.5 X 400	2.0/1.6	0.7	4.0 X 0.8	2.52	65.5	6115	0.0778/0.164	0.104/0.220	0.070	0.67	0.125	0.22	472	472	526	420
4 X 25	0.9	0.3	4.0 X 0.8	1.4	24.0	885	1.20	1.608	0.080	0.41	1.61	2.79	114	114	93	95
4 X 35	0.9	0.3	4.0 X 0.8	1.4	26.5	1070	0.868	1.163	0.079	0.47	1.17	2.03	135	135	114	114
4 X 50	1.0	0.3	4.0 X 0.8	1.56	30.0	1345	0.641	0.859	0.078	0.50	0.862	1.49	164	164	138	134
4 X 70	1.1	0.4	4.0 X 0.8	1.56	34.0	1715	0.443	0.594	0.077	0.53	0.599	1.04	197	197	175	164
4 X 95	1.1	0.4	4.0 X 0.8	1.56	38.0	2090	0.320	0.429	0.077	0.61	0.435	0.75	228	228	216	197
4 X 120	1.2	0.5	4.0 X 0.8	1.72	41.5	2515	0.253	0.339	0.072	0.63	0.346	0.60	257	257	249	223
4 X 150	1.4	0.5	4.0 X 0.8	1.88	46.5	3040	0.206	0.276	0.072	0.64	0.285	0.49	288	288	284	249
4 X 185	1.6	0.5	4.0 X 0.8	2.04	51.0	3670	0.164	0.220	0.072	0.65	0.231	0.40	326	326	329	282
4 X 240	1.7	0.6	4.0 X 0.8	2.20	57.0	4580	0.125	0.168	0.072	0.66	0.182	0.32	370	370	392	327
4 X300	1.8	0.7	4.0 X 0.8	2.36	62.5	5525	0.100	0.134	0.071	0.67	0.152	0.26	420	420	452	369
4 X 400	2.0	0.7	4.0 X 0.8	2.68	71.0	6945	0.0778	0.104	0.070	0.67	0.125	0.22	472	472	526	420



NOTE

- 1) The current ratings given are for the standard conditions of installation as per IS: 3961. For different ambient or different grouping conditions rating factors given therein shall be applicable to the standard rating.
- 2) For 1 core and 2 core cables, the current ratings for DC current will be provided on request.



APAR PV CABLE ASSEMBLY & WIRING HARNESS

PV projects use solar cable harnesses for off-grid solar plants, on-grid solar power plants, hybrid solar power solutions, rooftop, solar street light, solar traffic signal lights, solar water heater domestic/industrial and many more.

The solar harness is name and entity as one of the most efficient to the holistic energy of the sun through panels and harness.

The harness can be modular with a connectorized section or can be continuous assembly.



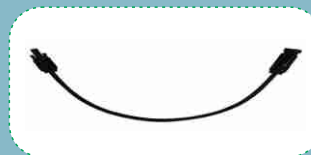
Cable used as per TUV or EN 50618 sizes 4-16 mm² with XLPO, flame retardant, low smoke, halogen free, E-Beam cross-linked double insulation

2 IN 1 OUT OR BRANCH/HARNESS

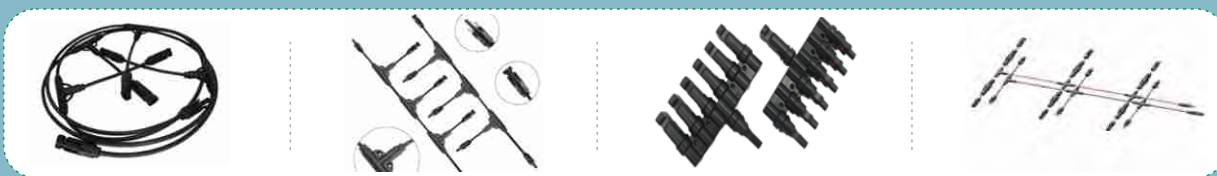


Product Features:

- Cable as per certified TUV or EN 50618
- Cable size 4 - 16 mm²
- IP 66 & above rated
- Inline fuse 1000/ 1500V from 5A to 50A
- Also available with anti-rodent properties



JUMPER HARNESS



Product Features:

- Cable - certified TUV or EN 50618
- Rated voltage (U0/U) IEC- 1.5/1.5 (1.8) kV DC
- IP 66 & above rated
- Also available with anti-rodent properties





ADVANTAGE OF USING APAR SOLAR HARNESES

- Cables need many components for installation like lugs & connectors, heat shrink sleeves, cable management systems (fuses, conduit, cable ties, sleeves, jacket etc.), insulation tapes, jointing kits besides painful follow-ups with multiple suppliers involving a larger team and huge purchase costs, fear of timely completion of a project. Hence choosing harnesses is the wise solution that saves the cost of purchase and the fear of timely project completion.
- Almost over 30% of the electrical contractor's cost is for installing the string & array cables. This and the time needed for the installation can be saved by choosing a cable harness.
- Over 30% of the cable consumption is saved when a cable harness is chosen instead of direct cable installation at the site.
- Over 10% of the cable get scrapped by the electrical contractor during direct installation, which can be saved by choosing a cable harness.

Overall, the savings shall be much more significant when a cable harness is used in place of conventional wiring.





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