Green and yellow earth cable (insulated copper earth wire) for protective conductors and bonding



KALOT Group green and yellow earth cable is a stranded copper conductor with green and yellow PVC insulation, used above ground as the earthing conductor from the earth pit bar to the main earth bar, as the protective conductor (PE) of panels and circuits, and as the bonding conductor for pipes, metal structures and equipment. We supply this cable in sizes from 6 to 300 square millimetres, rated 450/750 V. The green and yellow colour identifies the protective conductor along its whole route, on the earth bar and inside the panel, and the insulation keeps the conductor away from corrosion and from contact with dissimilar metals; where mechanical damage is likely, run the cable in conduit or trunking.

- Class 2 stranded copper conductor with green and yellow PVC insulation, sizes 6 to 300
- Earthing conductor, protective conductor (PE) and bonding, above ground
- KALOT cable lugs, earth bars, pit bars and bonding parts for the connections
- Supplied in coils or on drums, cut to order; special sheaths made to order

Technical specifications

Product type	Single-core unsheathed cable with green and yellow PVC insulation, for protective conductors, bonding and earthing conductors
Conductor	Annealed copper, stranded (multi-wire) Class 2 to IEC 60228
Insulation	Green and yellow PVC, conductor operating temperature up to 70 degrees Celsius
Sunlight resistance	UV-protected insulation; in sunlight, run it in conduit
Rated voltage	450/750 V
Reference standard	IEC 60227-3 (family of 60227 IEC 01)
Size (cross-section)	6 to 300 mm²
Outer diameter	From 4.7 mm (size 6) to 27.5 mm (size 300); size 50: 11.7 mm
Weight per metre	From 0.07 kg (size 6) to 2.93 kg (size 300); size 50: 0.49 kg
Special sheaths	Termite-resistant, rodent-resistant, low-smoke, high-temperature and oil-resistant PVC, made to order
Supply form	Coils for short lengths and drums for long lengths; cut to order
Order code	GYCC 006–300
Connections	Tinned copper cable lugs, earth bars, earth pit bars and KALOT bonding parts
Main application	Earthing conductor from the pit bar to the main earth bar, protective conductor (PE), main and supplementary bonding, bonding of the lightning protection system

"Size" is the nominal cross-section of the conductor in square millimetres. The maximum resistance for each size is the IEC 60228 limit for Class 2 stranded copper conductors. We supply green and yellow earth cable in coils or on drums, cut to the length ordered. Our products are continually improved; please confirm final specifications with our specialists before ordering.

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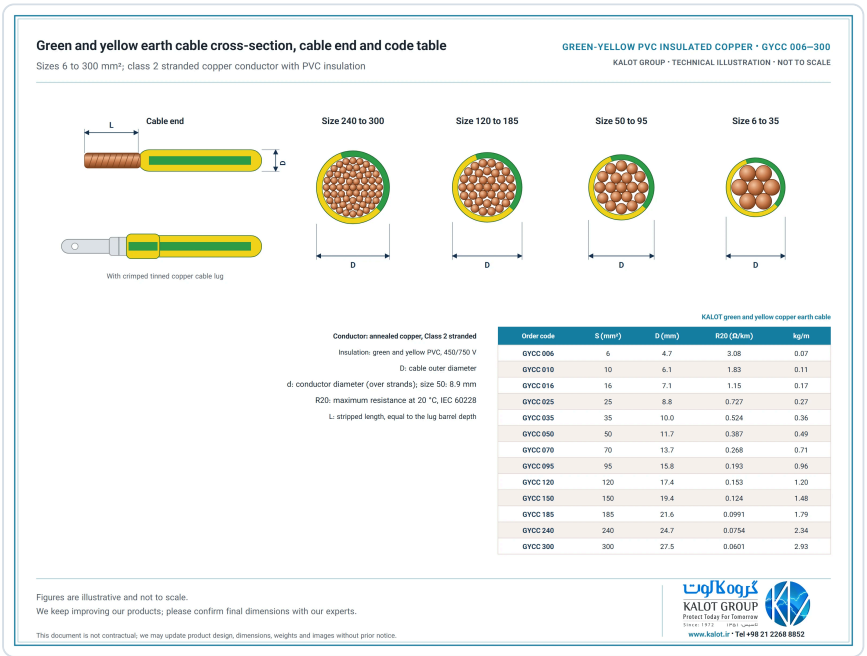
Codes, sizes and specifications of green and yellow earth cable

Order code	Cross-section (mm²)	Outer diameter (mm)	Maximum resistance at 20 degrees (Ω/km)	Weight per metre (kg)
GYCC 006	6	4.7	3.08	0.07
GYCC 010	10	6.1	1.83	0.11
GYCC 016	16	7.1	1.15	0.17
GYCC 025	25	8.8	0.727	0.27
GYCC 035	35	10.0	0.524	0.36
GYCC 050	50	11.7	0.387	0.49
GYCC 070	70	13.7	0.268	0.71
GYCC 095	95	15.8	0.193	0.96
GYCC 120	120	17.4	0.153	1.20
GYCC 150	150	19.4	0.124	1.48
GYCC 185	185	21.6	0.0991	1.79
GYCC 240	240	24.7	0.0754	2.34
GYCC 300	300	27.5	0.0601	2.93

Earth cable construction: stranded copper conductor and PVC insulation

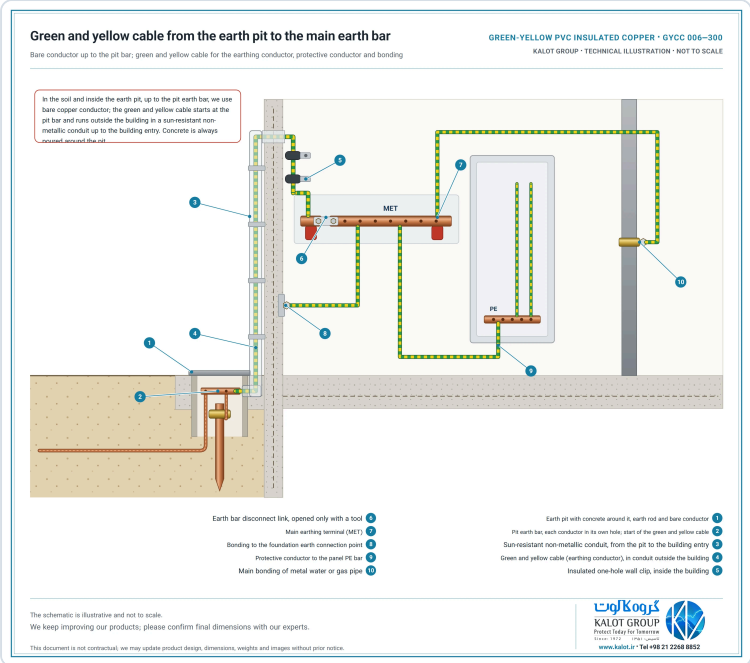
The conductor of the green and yellow earth cable is made of annealed copper strands laid in concentric layers around a central strand. It is a Class 2 stranded conductor: it holds its shape on walls and earth bars and crimps properly in standard cable lugs. Around the conductor is green and yellow PVC insulation rated 450/750 V, for a conductor operating temperature of up to 70 degrees. We supply the cable in coils for short lengths and on drums for long lengths, cut to the length ordered; special sheaths, termite-resistant, rodent-resistant, low-smoke, high-temperature and oil-resistant, are also made to order.

Cross-section, cable end and code table



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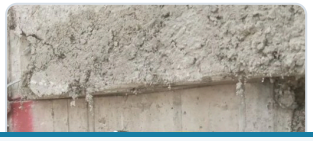
Schematic: earth pit to main earth bar

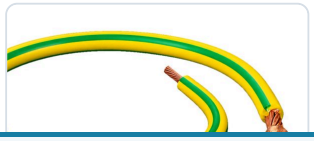


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Applications of green and yellow earth cable

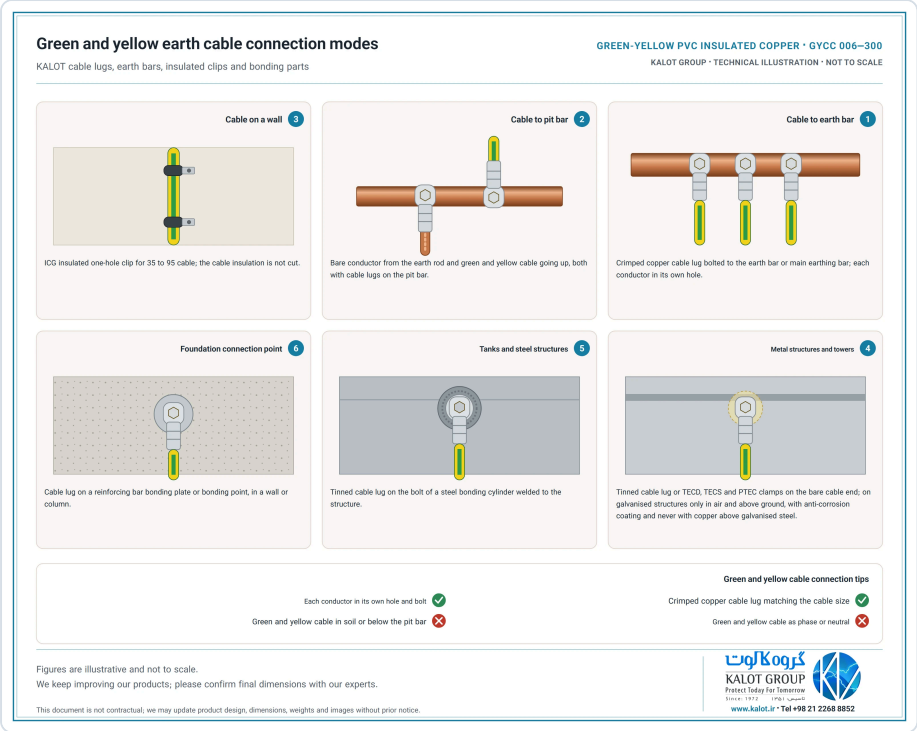
- Earthing conductor: from the earth pit bar to the earth bar or main earth bar of the building; from the pit to the building entry inside sunlight-resistant non-metallic conduit, and inside the building visible or in conduit. Below the pit bar, bare copper conductor is used.
- Protective conductor (PE): protective conductor of main and sub-distribution panels, motor, pump and equipment circuits, up to the panel PE bar; for background, see The difference between protective earth (PE) and functional earth (FE) and the TN-S system.
- Main bonding: connecting metal water and gas pipes, steel frames, service ducts and foundation earth bonding points to the main earth bar.
- Supplementary bonding: bonding equipment, cable trays and ladders, steel tanks with the steel bonding cylinder, and raised floor pedestals with the pedestal clamp; see Bonding and equipotential bonding.
- Lightning protection system bonding: connecting bonding bars to the earthing system, and metal installations inside the building to the bonding bar; IEC 62305-3 requires 16 and 6 square millimetres of copper for these two respectively.
- Metal structures, towers and cable trays: with tinned cable lugs or TECD and TECS clamps (sizes 16 to 185) and PTEC (120 to 300), stripping the cable to the length of the clamp; on galvanised structures only in air and above ground level, covering the joint with anti-corrosion coating, and without placing copper above galvanised parts.
- Foundation earthing and columns: connecting the reinforcing bar bonding plate and bonding point to the main earth bar; the bonding design and installation guideline requires non-flexible copper conductor of at least 16 square millimetres beside the columns between floors, and makes insulation mandatory for columns that will be plastered.
- Solar power plants: bonding panel frames and mounting structures; run the bonding cable parallel and close to the DC and AC cables, inside sunlight-resistant conduit or duct, and on aluminium or galvanised structures use tinned cable lugs, cover the joint with anti-corrosion coating and do not place copper above galvanised parts. See Lightning protection of photovoltaic systems.





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Connection modes



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Installation steps for green and yellow earth cable

۱. Set the cable size according to its role, from the "Selecting the earth cable size" table on this page or by calculating the fault current.

۲. Run the earthing conductor from the pit bar in a non-metallic conduit to above ground level, then exposed or in conduit to the main earth bar (Topic 13). Outside the building and on roofs, run the cable in a sunlight-resistant conduit: our cable's insulation is UV-protected, but long exposure to the sun damages it, and Topic 13 also requires cables to be protected from direct sunlight.

۳. Do not unroll, bend or install the cable in air colder than 3 degrees Celsius, unless the cable has been kept at 20 degrees or more for at least 72 hours beforehand and the work is finished within 8 hours (Topic 13).

۴. Keep the bending radius at no less than 8 times the sum of the cable's outer diameter (D) and the conductor diameter (d, over the strands) (Topic 13). For size 50 (D of 11.7 mm and d of 8.9 mm), that is at least 165 mm.

۵. Fix cables of size 35 to 95 to walls with the insulated one-hole clip (ICG) and other sizes with an insulated clip matching the cable size, without cutting or squeezing the insulation; Topic 13 requires clip spacing on horizontal runs of no more than 20 times the cable's outer diameter (234 mm for size 50) and accepts up to 50 per cent more on vertical runs.

۶. Strip the insulation at the cable end to the depth of the lug barrel, without cutting or spreading the strands.

۷. Crimp a copper cable lug matching the cable size with a hydraulic press and matching die, and fit green and yellow heat-shrink sleeving over its barrel; Topic 13 does not permit cable lugs connected by solder alone.

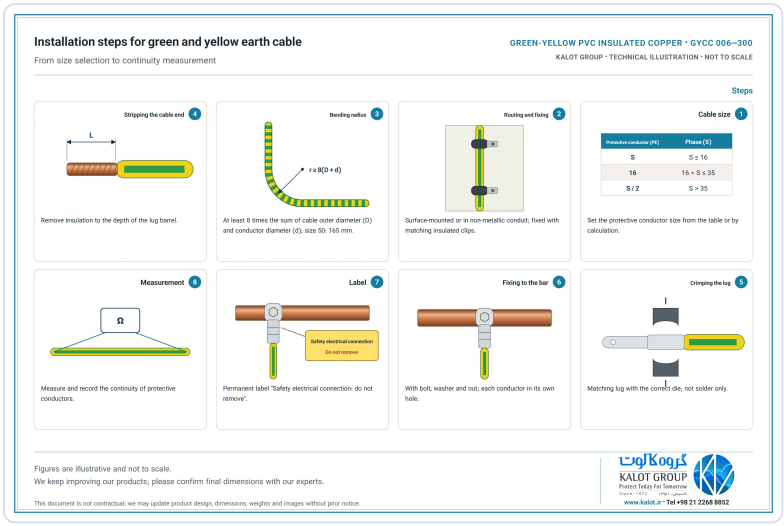
۸. Bolt the cable lug to the earth bar or pit bar with bolt, washer and nut, each conductor in its own hole. On the main earth bar, each conductor must be separate and removable only with a tool (IEC 60364-5-54). Tighten the nuts to the manufacturer's instructions.

۹. Inside the earth pit, use bare copper conductor below the pit bar and run the green and yellow cable upwards from the pit bar; pour concrete around the earth pit.

۱۰. At the connection point of the earthing conductor and bonding conductors, fit a permanent label reading "Safety electrical connection: do not remove".

۱۱. After installation, measure the continuity of each protective and bonding conductor with a milliohmmeter (IEC 60364-6)

Steps



The full print-quality version of this drawing (PDF) can be downloaded from the product page at www.kalot.ir.

Selecting the earth cable size by its role

Cable role	Minimum size in the standards (mm²)	Reference	Our recommendation
Circuit protective conductor, with phase conductor up to 16	Same size as the phase conductor	IEC 60364-5-54; Topic 13	GYCC of the same size as the phase conductor (from size 6)
Circuit protective conductor, with phase conductor of 25 and 35	16	IEC 60364-5-54; Topic 13	GYCC 016
Circuit protective conductor, with phase conductor larger than 35	Half the phase conductor size	IEC 60364-5-54; Topic 13	next standard size up; for a 95 phase conductor, GYCC 050
Protective conductor separate from the circuit cable	2.5 with mechanical protection and 4 without it	IEC 60364-5-54; Topic 13	GYCC 006 and above
Protective conductor of equipment with leakage current above 10 mA	10	IEC 60364-5-54	GYCC 010 and above
Earthing conductor, from the pit bar to the main earth bar	6, and no less than the size needed for the fault current; 16 with a lightning protection system; Topic 13 recommends the electrode table size	IEC 60364-5-54; IEC 62305-3 (Table 8); Topic 13	same size as the bare conductor in the pit; at least GYCC 025
Main bonding to the main earth bar	Half the largest protective conductor; at least 6; need not exceed 25	IEC 60364-5-54; Topic 13	GYCC 006 to GYCC 025
Supplementary bonding	2.5 with mechanical protection and 4 without it; 4 in bathrooms; equipment to equipment: the smallest protective conductor; equipment to pipe: half the protective conductor	IEC 60364-5-54; Topic 13; supplementary bonding guideline	GYCC 006 and above, based on the equipment protective conductor
Lightning protection bonding: bonding bar to the earthing system	16	IEC 62305-3	GYCC 016 and above
Lightning protection bonding: metal installations inside the building to the bonding bar	6	IEC 62305-3	GYCC 006 and above
Bonding conductor beside columns that will be plastered	16, insulated	Bonding design and installation guideline	GYCC 016

Sizes from IEC 60364-5-54:2011, Topic 13 of the Iranian National Building Regulations (1395 edition), IEC 62305-3:2010 and the bonding guidelines of the Building Engineering Organisation. The final size is set by the design and the fault current calculation: S = I√t / k, with k equal to 143 for green and