



BEIJING HUAYUAN GAOKE CABLE CO.,LTD.
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Branch Cable



■ Product standard

JG/T147-2002 and Enterprise standard and the technical demands of buyer side exactly.

1) Description products

In the recent years, with the development of our national economy and basic establishment, more middle buildings, high buildings and super high buildings distribution have been built up. Owing to the increase of the complexity and capacity of distribution among modern buildings, stability and economic requirement to mainline of distribution are getting higher and higher. In order to satisfy the market requirement, we consulted international and national relevant information, and under the direction of relative expert, we researched and developed branch cable (pre-made branch cable). The product was tested by the authorization dept. of national wire & cable -National quality supervising & testing center for cable and wire and antiflame construction material. All the technical functions are up to the enterprise standard requirements. The main function exceed JCS376 Japan Standard Requirement of "With Branch Cable". It is mainly suitable for power supply units and controller switching equipment transmitting electricity with 1000V rated voltage and below in middle and high building, industrial and mining unit, enterprise unit and institution. The product has the advantages of safe and reliable power supply, excellent insulating performance, convenient construction and installation, low cost of distribution, wide application scope, wide arrange of varieties and specification, and low requirements of installation environment. In foreign advanced countries, cable with branch has been widely applied to replace the transmission method of bus slots. Compared with bus slots, the product has the additional functions of anti-vibration, water proofing, and flame-resistance, which avoid troubles of installation and maintenance of bus slots.

■ Merits of Prefabricated Branch Cable

1. The product possesses fine power supply reliability

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- (1) There is no joint on main cable's conductor, so it has a good continuity while fault points being reduced.
- (2) The joints of prefabricated branch cable have been manufactured by whole factory-used mechanical equipment so that the instability caused by human factor will be greatly reduced.
- (3) The Japanese advanced technology has been introduced for designing branch joint structure, the contact resistance of it is very small and never be influenced by heat expansion or cold shrinkage.
- (4) The branch joint is shaped in a short time, so changes of contact resistance, caused by oxidation because the conductor being exposed in the open air for a long time, can be completely avoided.

2. Electric Distribution Cost Being Obviously Reduced

(1) As compared with bus-bar groove, it can reduce the engineering cost while its technical and economic targets are so high and comprehensive economic benefits are obvious.

3. Various Specifications, Flexible Selection and Free Combination

- (1) Main cable from 10mm² to 630mm²; branch cable from 6mm² to 400mm², freely combined.
- (2) A variety of cables, such as FZ-VV, FZ-ZR-VV, FZ-NH-VV, FZ-YJV, FZ-ZR-YJV, FZ-NH-YJV, FZ-WDZ-YJE, FZ-DL-NH-YJV etc, all of them can be selected according to different requirements.
- (3) Branch cable can be installed in the light of building conditions.

4. Low Environment Requirements for Installation, Easy for Construction

- (1) Occupying a small area, the product is nice for the effective use of construction area, while it needs only a limited space in construction.
- (2) Both its requirements for environment conditions and installation precision are very common.
- (3) It can be installed easily and one winder is enough for installation; and its installation period is also very short, it only needs 5%-10% installation hours of that of bus-bar groove, with low labor strength.
- (4) Due to its bending radius is small, the installation difficulties of such product will be greatly reduced, and the occupied space is also small.

5. Excellent Vibration Resistance, Air-Tightness, Waterproof and Refractory

- (1) Fine Vibration resistance: When the joint of bus-bar groove is connected with machinery, looseness of especially, no measures should be adopted when the cable passes the settlement joint of building.
- (2) Fine air-tightness and waterproof: the product can work normally in a wet circumstance and also can be laid in the open air or underground.
- (3) "NH" type of prefabricated branch cable is adopted, so 90 min of normal power supply still can be kept under firing.

6. No Maintenance

- (1) If the prefabricated branch cable is correctly installed following the relative requirements, its one-time cutting-in function is effective.
- (2) The normally operated prefabricated branch cable is no necessary to make any maintenance.

■ **Type and Name of Cable**

Type	Designation
FZ-VV	Copper conductor PVC insulated and sheathed prefabricated branch cable.
FZ-ZR-VV	Copper conductor PVC insulated and sheathed



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	flame-retardant prefabricated branch cable
FZ-NH-VV	Copper conductor PVC insulated and sheathed fire resisting prefabricated branch cable
FZ-YJV	Copper conductor XLPE insulated and PVC sheathed prefabricated branch cable
FZ-ZR-YJV	Copper conductor XLPE insulated and PVC sheathed flame-retardant prefabricated branch cable
FZ-NH-YJV	Copper conductor XLPE insulated and PVC sheathed fire resisting prefabricated branch cable
FZ-WDZ-YJE	Copper conductor XLPE insulated and polyolefine sheathed low-fume-no-halogen flame-retardant prefabricated branch cable
FZ-DL-NH-YJE	Copper conductor XLPE insulated and polyolefine sheathed low-fume-no-halogen fire-resisting prefabricated branch cable
FZ-N-VV	Copper conductor PVC insulated and sheathed stranded prefabricated branch cable
FZ-N-ZR-VV	Copper conductor PVC insulated and sheathed flame-retardant stranded prefabricated branch cable
FZ-N-NH-VV	Copper conductor PVC insulated and sheathed fire-resisting stranded and prefabricated branch cable
FZ-N-YJV	Copper conductor XLPE insulated and sheathed stranded prefabricated branch cable
FZ-N-ZR-YJV	Copper conductor XLPE insulated and sheathed flame-retardant stranded prefabricated branch cable
FZ-N-NH-YJV	Copper conductor XLPE insulated and sheathed fire-resisting stranded and prefabricated branch cable
FZ-N-WDZ-YJE	Copper conductor XLPE insulated polyole fine sheathed low-fume-no-halogen stranded prefabricated branch cable
FZ-N-DL-NH-YJV	Copper conductor XLPE insulated polyole fine sheathed low-fume-no-halogen fire-resisting stranded prefabricated branch cable

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■ Specifications of Main Cable & branch Cable of Prefabricated Branch Cable

Cross Section of Main Cable mm ²	Cross Section of branch Cable mm ²													
10	6	10												
16	6	10	16											
25	6	10	16	25										
35	6	10	16	25	35									
50	6	10	16	25	35	50								
70	6	10	16	25	35	50	70							
95	6	10	16	25	35	50	70	95						
120	6	10	16	25	35	50	70	95	120					
150	6	10	16	25	35	50	70	95	120	150				
185	6	10	16	25	35	50	70	95	120	150	185			
240	6	10	16	25	35	50	70	95	120	150	185	240		
300	6	10	16	25	35	50	70	95	120	150	185	240	300	
400	6	10	16	25	35	50	70	95	120	150	185	240	300	400
500	6	10	16	25	35	50	70	95	120	150	185	240	300	400
630	6	10	16	25	35	50	70	95	120	150	185	240	300	400

■ Structure of Prefabricated Branch Cable

Both standard main cable and line cable are insulated and sheathed with the relative materials conforming to their types and manufactured according to the IEC, GB and JCS. Usually the main cable is made with single-core or stranded multi-core (2-core to 5-core), branch cable is adopted single-core. The features of cable structure as follows.

1. Non-fire-resisting cable structure
 1. Conductor
 2. Insulation
 3. Sheath
2. Structure of fire-resisting Cable
 1. Conductor
 2. Fire-resisting layer
 3. Insulation
 4. Sheath
3. Joint Structure of Branch Cable

The joint of prefabricated branch cable is adopted special PVC or synthetic material, the right-sided drawing shows the joint of branch cable.

Main Cable mm ²	Branch Cable mm ²	Reference Size mm		
		d1	d2	L
10	~10	54	35	95
16	~16			
25	~25			



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35	~35			
50	~50	57	38	95
70	~70			
95	~95			
120	~120	78	52	145
150	~150			
185	~185			
240	~240	96	70	160
300	~300			
400	~400			
500	~400	106	80	170
630	~400			
Drawing of Branch Cable's Joint				

■ Main Technical Properties of Prefabricated Branch Cable

No.	Items	Property Requirements		
1	Insulation voltage resisting	Power frequency voltage 3.5kV, 5min, no breakdown		
2	Insulation resistance	≥200MΩ		
3	Resistance ratio of branch joint	Resistance ratio of branch joint $k_j \leq 1.2$		
4	Short-circuit test	Change ratio of D.C. Resistance after short circuit $y_j \leq 0.2$		
5	Heat circulation test	Measured value of no.25 period: ≤75℃		
		Measured value of no.26-125 period, smaller than measured value ±8℃ of temperature rise of no.25 period		
6	Flame-retarding	Automatic firing blanked off: within 15 seconds		
7	Metal tool lifting	Tensile force	24h, double weight no tracking out	
		Insulating voltage	Work frequency 3.5kV, 5min, not breakdown	
		Insulating resistance	≥200MΩ	
8	Molding plastic	Original property	Tensile force	≥10MPa
			Extensibility	≥120%
		Property of airbox when ageing	Tensile force	≥8.5MPa
			Extensibility	≥95%
Property after test for temperature resisting		Tensile force	≥8.5MPa	

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			Extensibility	≥95%
		Cold-proof	Non-fracture	
		Deform when heating	Extenuation ratio of thickness not over 50%	

- Structure Parameter & Electricity Property of 0.6/1kV Single-Core XLPE Insulated Prefabricated Branch Cable.
(Also suiting for the prefabricated branch cable of flame-retarding, fire-resisting, low-halogen, low-fume and no-halogen)

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Conductor			Nominal Insulation thickness mm	Nominal Thickness of nylon sheath mm	Calculated Diameter of Cable mm	Calculated Weight of Cable kg/km	A.C. Voltage Test kV/5min	Max. D.C. resistance of conductor (20°C) Ω/km	Reference current carrying capacity (40°C) (A)	Voltage Drop V/A. m
Area of Nominal cross-section mm ²	Form & Structure No./mm	Diameter (Reference Value) mm								
10	Round Densified Cross	4.05	0.7	1.4	9.0	150	3.5	1.3	93	0.002
16		5.1	0.7	1.4	9.5	210	3.5	1.15	120	0.0013
25		6.0	0.9	1.4	11.0	310	3.5	0.727	155	0.00084
35		7.0	0.9	1.4	12.0	410	3.5	0.524	195	0.00063
50		8.3	1.0	1.4	14.0	555	3.5	0.387	235	0.00049
70		10.0	1.1	1.4	15.0	760	3.5	0.268	295	0.00036
95		11.6	1.1	1.4	17.0	1020	3.5	0.193	370	0.00029
120		13.0	1.2	1.6	19.0	1260	3.5	0.153	430	0.00024
150		14.6	1.4	1.6	21.0	1570	3.5	0.124	495	0.00021
185		16.2	1.6	1.6	23.0	1920	3.5	0.0991	570	0.00019
240		18.4	1.7	1.7	26.0	2470	3.5	0.0754	680	0.00016
300		20.6	1.8	1.8	29.0	3090	3.5	0.0601	790	0.00015
400		23.8	2.0	1.9	32.0	4080	3.5	0.0470	920	0.000131
500		26.6	2.2	2.0	36.0	5080	3.5	0.0366	1080	0.00012
630	30.0	2.4	2.2	40.0	6390	3.5	0.0283	1260	0.000111	

Note: The interval between two cables for flat laying is 2-fold of cable's diameter.



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■ Structure Parameter & Electricity Property of 0.6/1kV Single-Core PVC Insulated Prefabricated Branch Cable. (Also suiting for branch cable of flame-retarding and fire-resisting type)

Conductor			Nominal Insulation thickness mm	Nominal Thickness of nylon sheath mm	Calculated Diameter of Cable mm	Calculated Weight of Cable kg/km	A.C. Voltage Test kV/5min	Max. D.C. resistance of conductor (20°C) Ω/km	Reference current carrying capacity (40°C) (A)	Voltage Drop V/A. m
Area of Nominal cross-section mm ²	Form & Structure No./mm	Diameter (Reference Value) mm								
10	Round Densified Cross	4.05	1.0	1.4	9.0	150	3.5	1.83	70	0.002
16		5.1	1.0	1.4	10.0	215	3.5	1.15	97	0.0013
25		6.0	1.2	1.4	11.3	310	3.5	0.727	120	0.00084
35		7.0	1.2	1.4	12.3	410	3.5	0.524	150	0.00063
50		8.3	1.4	1.4	14.0	570	3.5	0.387	180	0.00049
70		10.0	1.4	1.4	15.7	770	3.5	0.268	230	0.00036
95		11.6	1.6	1.7	18.4	1030	3.5	0.193	280	0.00029
120		13.0	1.6	1.7	19.8	1280	3.5	0.153	325	0.00024
150		14.6	1.8	1.8	22.8	1590	3.5	0.124	375	0.00021
185		16.2	2.0	1.8	25.1	1950	3.5	0.0991	430	0.00019
240		18.4	2.2	1.8	28.5	2490	3.5	0.0754	515	0.00016
300		20.6	2.4	2.1	32.0	3140	3.5	0.0601	595	0.00015
400		23.8	2.6	2.2	35.4	4140	3.5	0.0470	700	0.000131
500		26.6	2.8	2.3	40.0	5140	3.5	0.0366	810	0.00012
630		30.0	2.8	2.4	46.0	6440	3.5	0.0283	950	0.000111



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Note: The interval between two cables for flat laying is 2-fold of cable's diameter.

- Structure Parameter & Electricity Property of 0.6/1kV Four-Core Stranded Type Cross-Linking Polythene Insulating & Prefabricated Branch Cable.
 (Also suiting for the prefabricated branch cable of flame-retarding, fire-resisting, low-halogen, low-fume and no-halogen)

Conductor			Nominal Insulation thickness mm	Nominal Thickness of nylon sheath mm	Calculated Diameter of Cable mm	Calculated Weight of Cable kg/km	A.C. Voltage Test kV/5min	Max. D.C. resistance of conductor (20°C) Ω/km	Reference current carrying capacity (40°C) (A)	Voltage Drop V/A. m
Area of Nominal cross-section mm ²	Form & Structure No./mm	Diameter (Reference Value) mm								
10	Round Densified Cross	4.05	0.7	1.4	20.5	620	3.5	1.83	65	0.002
16		5.1	0.7	1.4	23.0	860	3.5	1.15	84	0.0013
25		6.0	0.9	1.4	26.5	1270	3.5	0.727	110	0.00084
35		7.0	0.9	1.4	29.0	1680	3.5	0.524	135	0.00063
50		10.0	1.0	1.4	33.0	2270	3.5	0.387	170	0.00049
70		10.0	1.1	1.4	36.5	3110	3.5	0.268	215	0.00036
95		11.6	1.1	1.4	41.0	4170	3.5	0.193	265	0.00029
120		13.0	1.2	1.6	46.0	5150	3.5	0.153	310	0.00024
150		14.6	1.4	1.6	51.0	6410	3.5	0.124	350	0.00021
185		16.2	1.6	1.6	55.5	7840	3.5	0.0991	405	0.00019
240		18.4	1.7	1.7	63.0	10080	3.5	0.0754	480	0.00016
300		20.6	1.8	1.8	70.0	12610	3.5	0.0601	555	0.00015



■ Correction Factor for calculating current carrying capacity

1. Correction Factor of Temperature

Correction factor	Ambient temperature °C	10	15	20	25	30	35	40	45	50	55	60
	In air		1.26	1.22	1.18	1.14	1.10	1.05	1.00	0.95	0.89	0.84

2. Correction Factor of Different Layings

2.1 Single-core prefabricated branch cable

Laying of single-layer

S=2d, 4-piece parallel-laying
 Conductor temperature 90°C
 Ambient temperature 40°C

Laying of double-layer

S=2d, 4-piece parallel-laying
 Correction factor=0.9

2.2 Stranded multi-core type prefabricated branch cable

Laying of single-piece

Conductor temperature 90°C
 Ambient temperature 40°C

Multi-piece laying

S=2d, 4-piece parallel-laying
 Correction factor=0.9

■ Installation Requirements of Prefabricated Branch Cable

When prefabricated branch cable is installed vertically, the following requirements should be conformed to:

1. Cable drum should be put on wire-holder (usually cable drum is put on the ground of the relative building, then it is lifted).
2. Rope used for lifting is connected with cable through winder.
3. Winder is operated for cable's lift.
4. When net-binding used for lifting cable reaches house-top, the net-binding should be hung on a prepared hook.
5. Central part should be fixed.
6. The terminal of cable should be connected with ammeter or cutout.
7. Main cable should be connected.

■ Matters Needing Attention for Prefabricated Branch Cable When Laying

1. Confirm if prefabricated branch cable has safely passed the through-hole.
2. Adopt preventive measures so as to prevent branch parts damaged when lifting.
3. Not exert any tension on branch line in the course of lifting.
4. Rope should be used for lifting the cable with more than 4-fold weight of the cable.
5. When finishing the lift, cable should be immediately suitably fixed so as to prevent cable drop.

■ Illustrated Instructions for Installing Prefabricated Branch Cable

■ Treatment for Prefabricated Branch Cable's Top Part



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A PVC cap should be covered on each main cable so as to prevent water and the cover-cap is strengthened with heat shrinkable tube for permanent use.

■ Requirements for Ordering Prefabricated Branch Cable

The following materials should be provided when placing orders:

1. System diagram, power of distribution system and method of electricity distribution.
2. Types, specifications and length of main cables.
3. Types, specifications and length of branch cables.
4. When laying, see if cable is pulled from ground or pulled from the top of building.
5. Whether the terminal of cable should be treated or not.
6. Names, types, specifications and quantity of other accessories.
7. Engineering Diagram should be provided.

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