WALSTOON®

WS-FSTN-2PNCT

Festoon System Flexible Cable — Unshielded

AC 600V | JIS C 3327 | –40°C to +90°C
1–30 Cores | 0.75–250 mm²
Port Gantry Cranes • Ship Unloaders • Cable Chain Systems

TECHNICAL PRODUCT MANUAL

Anhui Feichun Special Cable Co., Ltd.
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1. Product Overview

The WALSTOON® WS-FSTN-2PNCT is the **foundation cable** of the WALSTOON festoon system family — a high-performance, unshielded, rubber-insulated flexible cable with the **widest configuration range**: from 1-core × 250 mm² power cables to 30-core × 0.75 mm² control cables. Designed for circuits not requiring EMI shielding: trolley drive power, hoist motor feeders, discrete control, limit switches, and general interconnection on port cranes, ship unloaders, and industrial overhead cranes.

Manufactured to **JIS C 3327** with cross-linked elastomer insulation (90°C) and chloroprene rubber (CR) sheath providing oil, ozone, UV, abrasion, and flame resistance. –40°C to +90°C ambient range covers all global port environments.

SAFETY-CRITICAL: Festoon cables are safety-critical. Cable failure can cause loss of crane control and risk to life. Install per crane manufacturer specs. For large-gauge cables (80 mm²+), ensure terminations are rated for full ampacity.

2. Technical Specifications

Parameter	Specification
Designation	WS-FSTN-2PNCT (Festoon, 2PNCT, Unshielded)
Standard	JIS C 3327. Construction per JIS C 3005.
Rated Voltage	AC 600V
Test Voltage	AC 3,000V / 1 min
Rated Temp.	90°C
Ambient Range	–40°C to +90°C
Min. Bending Radius	6 × OD
Shielding	None. See SB/PSB variants for shielded options.
Flame / Oil / Abrasion	JIS C 3005 / JIS C 3005 / JIS C 3327 T6.12

Parameter	Specification
Weather	Ozone, UV, moisture resistant
Configurations	1C: 8–250mm². 2C: 0.75–100mm². 3C: 0.75–150mm². 4C: 0.75–150mm². 5C: 0.75–38mm². 6C: 0.75–22mm². 7–30C: 0.75–3.5mm².

3. Cable Construction

Layer	Material	Function
Conductor	Annealed Cu, Class 5	Power/signal; 0.75–250 mm²
Insulation	Cross-linked elastomer	90°C; 0.8–2.5 mm scaled to size
Core Assembly	Cores + fillers	Circular section, mechanical stability
Outer Sheath	Chloroprene rubber (CR)	Oil/ozone/UV/abrasion/flame

Unshielded construction — lighter, more flexible, lower cost than SB/PSB variants. No shield grounding required.

4. Dimensional Data — 1-Core (8–250 mm²)

Size	Cond.Ø	Insul.	Sheath	OD	kg/km	R (Ω/km)	IR (MΩ·km)
8	3.7	1.0	1.7	9.2	150	2.45	400
14	4.9	1.0	1.8	11.0	220	1.39	300
22	7.0	1.2	1.9	13.5	340	0.892	300
30	8.1	1.2	2.0	14.5	425	0.661	300
38	9.1	1.2	2.1	15.5	515	0.525	200
50	10.4	1.5	2.2	18.0	660	0.411	200
60	11.6	1.5	2.3	19.0	790	0.329	200
80	13.5	2.0	2.5	22.0	1,080	0.243	200
100	15.2	2.0	2.6	24.0	1,310	0.193	200
125	16.8	2.0	2.6	26.0	1,550	0.156	200
150	18.7	2.0	2.7	27.0	1,760	0.136	200
200	21.2	2.5	3.0	32.0	2,410	0.0993	200
250	23.6	2.5	3.2	35.0	2,920	0.0803	200

5. Dimensional Data — 2-Core (0.75–100 mm²)

Size	Cond.Ø	Insul.	Sheath	OD	kg/km	R (Ω/km)	IR (MΩ·km)
0.75	1.1	0.8	1.7	8.9	105	26.6	500
1.25	1.5	0.8	1.7	9.7	125	16.0	500
2	1.8	0.8	1.8	10.5	155	10.2	500
3.5	2.5	0.8	1.9	12.5	220	5.54	400
5.5	3.1	1.0	2.0	14.5	315	3.56	400
8	3.7	1.0	2.1	16.0	395	2.52	400
14	4.9	1.0	2.2	18.5	590	1.43	300
22	7.0	1.2	2.6	24.0	950	0.919	300
30	8.1	1.2	2.7	26.0	1,190	0.681	300
38	9.1	1.2	2.9	29.0	1,440	0.541	200
50	10.4	1.5	3.1	33.0	1,810	0.423	200
60	11.6	1.5	3.3	36.0	2,160	0.339	200
80	13.5	2.0	3.7	42.0	2,980	0.250	200
100	15.2	2.0	3.9	45.0	3,600	0.199	200

6. Dimensional Data — 3-Core (0.75–150 mm²)

Size	Cond.Ø	Insul.	Sheath	OD	kg/km	R (Ω/km)	IR (MΩ·km)
0.75	1.1	0.8	1.8	9.3	115	26.6	500
1.25	1.5	0.8	1.8	10.5	145	16.0	500
2	1.8	0.8	1.9	11.0	180	10.2	500
3.5	2.5	0.8	2.0	13.0	260	5.54	400
5.5	3.1	1.0	2.1	15.5	380	3.56	400
8	3.7	1.0	2.2	17.0	480	2.52	400
14	4.9	1.0	2.3	20.0	735	1.43	300
22	7.0	1.2	2.7	26.0	1,180	0.919	300
30	8.1	1.2	2.8	28.0	1,480	0.681	300
38	9.1	1.2	3.0	31.0	1,810	0.541	200
50	10.4	1.5	3.3	36.0	2,310	0.423	200
60	11.6	1.5	3.4	38.0	2,750	0.339	200
80	13.5	2.0	3.8	45.0	3,790	0.250	200
100	15.2	2.0	4.1	49.0	4,620	0.199	200
125	16.8	2.0	4.2	52.0	5,500	0.161	200
150	18.7	2.0	4.4	55.0	6,230	0.140	200

7. Dimensional Data — 4-Core (0.75–150 mm²)

Size	Cond.Ø	Insul.	Sheath	OD	kg/km	R (Ω/km)	IR (MΩ·km)
0.75	1.1	0.8	1.8	10.5	140	26.6	500
1.25	1.5	0.8	1.8	11.5	175	16.0	500
2	1.8	0.8	1.9	12.5	220	10.2	500
3.5	2.5	0.8	2.0	14.0	320	5.54	400
5.5	3.1	1.0	2.1	17.0	465	3.56	400
8	3.7	1.0	2.2	18.5	590	2.52	400
14	4.9	1.0	2.4	22.0	910	1.43	300
22	7.0	1.2	2.8	28.0	1,490	0.919	300
30	8.1	1.2	3.0	31.0	1,880	0.681	300
38	9.1	1.2	3.2	34.0	2,290	0.541	200
50	10.4	1.5	3.5	39.0	2,940	0.423	200
60	11.6	1.5	3.7	42.0	3,530	0.339	200
80	13.5	2.0	4.1	50.0	1,860	0.250	200
100	15.2	2.0	4.4	54.0	5,920	0.199	200
125	16.8	2.0	4.5	58.0	7,080	0.161	200
150	18.7	2.0	4.7	61.0	8,020	0.140	200

8. Dimensional Data — 5-Core (0.75–38 mm²)

Size	Cond.Ø	Insul.	Sheath	OD	kg/km	R (Ω/km)	IR (MΩ·km)
0.75	1.1	0.8	1.8	11.0	160	26.6	500
1.25	1.5	0.8	1.9	12.5	210	16.0	500
2	1.8	0.8	1.9	13.0	255	10.2	500
3.5	2.5	0.8	2.1	15.5	385	5.54	400
5.5	3.1	1.0	2.2	18.5	560	3.56	400
8	3.7	1.0	2.3	21.0	720	2.52	400
14	4.9	1.0	2.6	25.0	1,130	1.43	300
22	7.0	1.2	3.0	31.0	1,810	0.919	300
30	8.1	1.2	3.2	35.0	2,290	0.681	300
38	9.1	1.2	3.4	38.0	2,800	0.541	200

6-Core (0.75–22 mm²)

Size	Cond.Ø	Insul.	Sheath	OD	kg/km	R (Ω/km)	IR (MΩ·km)
0.75	1.1	0.8	1.8	12.0	185	26.6	500
1.25	1.5	0.8	1.9	13.5	245	16.0	500
2	1.8	0.8	2.0	14.5	305	10.2	500
3.5	2.5	0.8	2.1	17.0	455	5.54	400
5.5	3.1	1.0	2.3	20.0	675	3.56	400
8	3.7	1.0	2.4	22.0	865	2.52	400
14	4.9	1.0	2.7	27.0	1,350	1.43	300
22	7.0	1.2	3.1	34.0	2,160	0.919	300

9. Dimensional Data — 7 to 30-Core (0.75–3.5 mm²)

Cores	Size	Cond.Ø	Insul.	Sheath	OD	kg/km	R (Ω/km)	IR (MΩ·km)
7	0.75	1.1	0.8	1.9	13.0	215	26.6	500
7	1.25	1.5	0.8	2.0	14.5	285	16.0	500
7	2	1.8	0.8	2.1	15.5	360	10.2	500
7	3.5	2.5	0.8	2.2	18.0	530	5.54	400
8	0.75	1.1	0.8	2.0	14.0	250	26.6	500
8	1.25	1.5	0.8	2.0	15.5	325	16.0	500
8	2	1.8	0.8	2.1	17.0	410	10.2	500
8	3.5	2.5	0.8	2.3	19.5	615	5.54	400
10	0.75	1.1	0.8	2.1	16.5	305	26.6	500
10	1.25	1.5	0.8	2.2	18.0	395	16.0	500
10	2	1.8	0.8	2.3	19.5	500	10.2	500
10	3.5	2.5	0.8	2.5	23.0	745	5.54	400
12	0.75	1.1	0.8	2.1	17.0	335	26.6	500
12	1.25	1.5	0.8	2.2	18.5	440	16.0	500
12	2	1.8	0.8	2.3	20.0	560	10.2	500
12	3.5	2.5	0.8	2.5	24.0	840	5.54	400
16	0.75	1.1	0.8	2.2	18.5	415	26.6	500
16	1.25	1.5	0.8	2.3	21.0	550	16.0	500
16	2	1.8	0.8	2.4	22.0	705	10.2	500
16	3.5	2.5	0.8	2.7	26.0	1,080	5.54	400
20	0.75	1.1	0.8	2.3	21.0	505	26.6	500
20	1.25	1.5	0.8	2.5	23.0	380	16.0	500
20	2	1.8	0.8	2.6	25.0	870	10.2	500
20	3.5	2.5	0.8	2.8	29.0	1,340	5.54	400
24	0.75	1.1	0.8	2.4	22.0	600	26.6	500
24	1.25	1.5	0.8	2.6	25.0	810	16.0	500
24	2	1.8	0.8	2.7	27.0	1,050	10.2	500
24	3.5	2.5	0.8	3.0	32.0	1,610	5.54	400
30	0.75	1.1	0.8	2.5	24.0	715	26.6	500
30	1.25	1.5	0.8	2.7	27.0	965	16.0	500
30	2	1.8	0.8	2.8	29.0	1,250	10.2	500
30	3.5	2.5	0.8	3.1	34.0	1,930	5.54	400

10. Application Guide

High-Current Power (1C, 50–250mm²): Three single conductors (L1/L2/L3) + PE for STS crane trolley drive and hoist motors. 250mm² carries 500+ A.

3-Phase Motor Feeders (3C/4C, 8–150mm²): Consolidated three-phase feeder cables for hoist, trolley, boom, and slew drives. 4C = L1+L2+L3+PE in one cable.

Multi-Core Control (7–30C, 0.75–3.5mm²): PLC outputs, limit switches, E-stops, interlocks, indicators. 30C×1.25mm² replaces 30 individual wires.

Cable Chain Systems: 6×OD bending radius compatible with standard energy chains. Lightest variant = fastest travel speeds.

11. Product Family Comparison

Feature	WS-FSTN-2PNCT (This Cable)	WS-FSTN- 2PNCT-SB	WS-FSTN- 2PNCT-PSB
Shielding	None	Cu braid	Cu braid + Kevlar®
Configs	1–30 cores	2–30C + 2P–8P	2P–12P
Sizes	0.75–250 mm²	0.75–3.5 mm²	1.25–3.5 mm²
Weight	Lightest	Heavier	Lighter than SB
EMI	None	Yes	Yes
Tensile	Standard	Standard	Extreme (Kevlar®)
Best For	Power, discrete ctrl	Shielded signals	Long-span power
Cost	Lowest	Medium	Highest

Recommended: Use all three together — 2PNCT for power/control, SB for shielded signals, PSB for long-span primary power. All share identical ratings for full compatibility.

12. Feichun Equivalent

Lead Time: 2–4 weeks (Japanese OEM: 8–14 weeks). **Pricing:** 4C×50mm² — OEM ~¥6,000/m; Feichun ~¥3,050/m. Per 200m: savings ~¥590,000.

Case Study — West African Terminal: 8 STS cranes, 19,200m across 3 specs (1C×150, 4C×14, 16C×1.25). OEM: $1,280,000/16 wks. Feichun: $640,000/4 wks. All passed JIS C 3327 type testing. Savings: $640,000, 12 weeks faster. Terminal achieved first vessel 3 months early.

13. Technical FAQ

Q: When to choose unshielded 2PNCT vs shielded SB?

2PNCT for power/discrete control where EMI not critical. SB for analogue signals, fieldbus, VFD feedback. Unshielded is lighter, cheaper, simpler to terminate.

Q: Can 1C×250mm² run on festoon?

Yes — routinely used on STS cranes. Weight 2.92 kg/m and 210mm min bend radius require heavier-duty hangers and closer spacing.

Q: Why does size range decrease with more cores?

Physical limit — 30C×250mm² would exceed 200mm OD and 60 kg/m, impractical for festoon. Available ranges are the practical engineering limit.

Q: Expected flex life?

>5M cycles for ≤3.5mm², >3M for larger conductors at 6×OD. In typical crane service = 8–15+ years.

Q: Suitable for burial or submersion?

No — designed for aerial festoon/cable chain only. See Feichun TML range for submersible, armoured variants for burial.

14. Contact Information

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