

**3D torsion robot hybrid cable**

# Robot Hybrid Power and Signal Cable

Single-jacket  $\pm 180^\circ/\text{m}$  3D torsion robot power, control & screened signal cable



0.6/1 kV + 24 V + Signal

$\pm 180^\circ/\text{m}$  3D Torsion

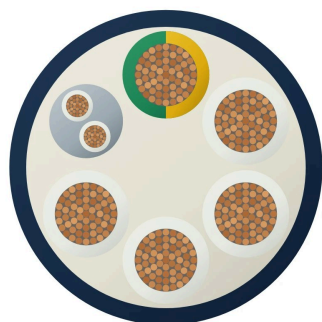
Single-Cable EOAT

## Application

All-in-one 3D torsion-resistant robot dress-pack cable integrating 0.6/1 kV power cores, 24 V brake/valve control cores and individually spiral-screened signal/feedback pairs inside one weld-spatter-proof PUR jacket for hollow-wrist robots and EOAT.

**Typical uses:** Hollow-Wrist 6-Axis Robots, Servo Spot-Welding Guns, Robotic Tool Changers & Grippers, Cobot Force/Torque Wrist Harnesses, Dispensing, Sealing & Laser Heads

## Construction



Cross-section, not to scale

- 1 Hybrid power, control & data conductors
- 2 Low-capacitance TPE-E / PP insulation
- 3 Individual pair spiral D-screens (C)
- 4 Interlayer PTFE sliding wraps
- 5 Overall helical copper D-shield
- 6 Weld-spatter PUR outer jacket

## Technical data

Typical values

|                                 |                                                                     |                              |                                                   |
|---------------------------------|---------------------------------------------------------------------|------------------------------|---------------------------------------------------|
| Rated voltage U0/U              | Power: 0.6/1 kV · Control: 300/500 V · Data: 300 V                  | AC test voltage              | Power: 4000 V AC · Control/Data: 1500–2000 V AC   |
| Screen / Field control          | Individual spiral Cu D-screens + overall D-shield                   | Capacitance                  | Power ≈ 60 pF/m · Signal pairs ≈ 48 pF/m          |
| Near-end cross-talk (NEXT)      | ≥ 60 dB between power cores and screened signal pairs               | Temperature, flexing         | –40 °C to +80 °C                                  |
| Temperature, fixed installation | –50 °C to +80 °C                                                    | Max. conductor temperature   | +90 °C (VDE) · +80 °C (UL AWM)                    |
| Torsional stress                | ±180°/m over 1 m vertical robot dress pack                          | Torsion endurance            | ≥ 5,000,000 combined torsion & bend cycles        |
| Min. bending radius, moving     | 7.5 × OD (≤ 16 mm) · 10 × OD (> 16 mm)                              | Min. bending radius, fixed   | 4 × OD                                            |
| Max. acceleration               | Up to 30 m/s <sup>2</sup> (3D wrist) · 50 m/s <sup>2</sup> (linear) | Oil resistance               | DIN EN 50363-10-2 · UL Oil Res I & II             |
| Flame retardance                | IEC 60332-1-2 · UL 1581 VW-1 / FT1                                  | Halogen-free / Smoke density | IEC 60754-1/2 halogen-free PUR                    |
| Weld-spatter & LABS             | Weld-slag resistant & LABS-free (VW PV 3.10.7)                      | Standards                    | DIN VDE 0250 / 0812 & ISO 10218 hybrid dress-pack |

## Sizes

12 standard constructions

Tick the sizes you need and send this page to info@tebaoflex.com or WhatsApp +86 185 9591 3361.

| Order designation                                                                 | Composite configuration         | Primary robot tool application        | Outer Ø ≈ mm | Total Cu kg/km | Weight ≈ kg/km | Min. bend R moving mm |
|-----------------------------------------------------------------------------------|---------------------------------|---------------------------------------|--------------|----------------|----------------|-----------------------|
| Single-Cable Servo Weld-Gun & 7th-Axis Hybrids (Power + Brake + Feedback) 6 sizes |                                 |                                       |              |                |                |                       |
| <input type="checkbox"/> ROBOT-HYB 4G1.5+(2×0.75)C+2×(2×0.25)C                    | 4G1.5 + (2×0.75)C + 2×(2×0.25)C | 7th-Axis / Servo Gripper + Encoder    | 12.6         | 132            | 218            | 94                    |
| <input type="checkbox"/> ROBOT-HYB 4G2.5+(2×1.0)C+2×(2×0.25)C                     | 4G2.5 + (2×1.0)C + 2×(2×0.25)C  | Servo Weld Gun + Brake + Feedback     | 14.1         | 182            | 286            | 106                   |
| <input type="checkbox"/> ROBOT-HYB 4G4.0+(2×1.0)C+2×(2×0.34)C                     | 4G4.0 + (2×1.0)C + 2×(2×0.34)C  | Medium Servo Gun + Bus + Brake        | 15.8         | 258            | 384            | 118                   |
| <input type="checkbox"/> ROBOT-HYB 4G6.0+(2×1.5)C+2×(2×0.34)C                     | 4G6.0 + (2×1.5)C + 2×(2×0.34)C  | High-Force Servo Gun Single-Cable     | 17.9         | 364            | 520            | 134                   |
| <input type="checkbox"/> ROBOT-HYB 4G10+(2×1.5)C+(2×0.5)C                         | 4G10 + (2×1.5)C + (2×0.5)C      | Heavy Spindle / Weld Gun + Sensor     | 20.6         | 548            | 745            | 154                   |
| <input type="checkbox"/> ROBOT-HYB 4G16+(2×1.5)C+(2×0.5)C                         | 4G16 + (2×1.5)C + (2×0.5)C      | MFDC Spot-Weld Transformer Hybrid     | 24.2         | 815            | 1,070          | 182                   |
| End-of-Arm Tooling (EOAT), Gripper & Cobot Wrist Hybrids 6 sizes                  |                                 |                                       |              |                |                |                       |
| <input type="checkbox"/> ROBOT-HYB 4G1.5+4×0.5+(2×0.25)C                          | 4G1.5 + 4×0.5 + (2×0.25)C       | EOAT Actuator + Solenoid Valves + Bus | 11.5         | 108            | 182            | 86                    |
| <input type="checkbox"/> ROBOT-HYB 4G2.5+8×0.5+(2×0.25)C                          | 4G2.5 + 8×0.5 + (2×0.25)C       | Multi-Valve Tool Changer + Power      | 13.8         | 174            | 272            | 104                   |
| <input type="checkbox"/> ROBOT-HYB 3G2.5+4×0.75+2×(2×0.25)C                       | 3G2.5 + 4×0.75 + 2×(2×0.25)C    | Dispensing Head Heater + Flow Sensors | 13.4         | 162            | 256            | 100                   |
| <input type="checkbox"/> ROBOT-HYB 2×1.5+4×0.5+4×(2×0.25)C                        | 2×1.5 + 4×0.5 + 4×(2×0.25)C     | 24 V Cobot Wrist Power + Force/Torque | 11.8         | 114            | 188            | 88                    |
| <input type="checkbox"/> ROBOT-HYB 4G2.5+2×(2×0.5)C                               | 4G2.5 + 2×(2×0.5)C              | Robot Axis Power + Dual CAN/RS-485    | 12.4         | 152            | 238            | 93                    |
| <input type="checkbox"/> ROBOT-HYB 4G6.0+4×1.0+2×(2×0.5)C                         | 4G6.0 + 4×1.0 + 2×(2×0.5)C      | Robotic Deburring Spindle + Tool I/O  | 18.4         | 388            | 552            | 138                   |

– Custom composite lay-ups (combining power cores, coax, Cat.6A Ethernet quads, or pneumatic tubing) can be engineered from 300 m MOQ.

## Electrical parameters by sub-element

8 sizes

| Sub-assembly element                     | Rated voltage | Max. DC R @ 20 °C Ω/km | Current rating at +30 °C (A) | Mutual C pF/m= | AC test V <sub>rms</sub> |
|------------------------------------------|---------------|------------------------|------------------------------|----------------|--------------------------|
| (2×0.25 mm <sup>2</sup> )C Signal Pair   | 300 V         | 79.00                  | 3.5                          | 48             | 1,500                    |
| (2×0.34 mm <sup>2</sup> )C Feedback Pair | 300 V         | 57.00                  | 4.5                          | 50             | 1,500                    |
| 0.50 mm <sup>2</sup> Valve / Bus Core    | 300/500 V     | 39.00                  | 6.0                          | 55             | 2,000                    |
| (2×1.0 mm <sup>2</sup> )C Brake Pair     | 300/500 V     | 19.50                  | 10.0                         | 62             | 2,000                    |
| 1.5 mm <sup>2</sup> Power Core           | 0.6/1 kV      | 13.30                  | 18.0                         | 60             | 4,000                    |
| 2.5 mm <sup>2</sup> Power Core           | 0.6/1 kV      | 7.98                   | 26.0                         | 62             | 4,000                    |

| Sub-assembly element           | Rated voltage | Max. DC R @ 20 °C<br>Ω/km | Current rating<br>at +30 °C (A) | Mutual C<br>pF/m≈ | AC test<br>V <sub>rms</sub> |
|--------------------------------|---------------|---------------------------|---------------------------------|-------------------|-----------------------------|
| 4.0 mm <sup>2</sup> Power Core | 0.6/1 kV      | 4.95                      | 34.0                            | 64                | 4,000                       |
| 6.0 mm <sup>2</sup> Power Core | 0.6/1 kV      | 3.30                      | 44.0                            | 66                | 4,000                       |

– Each screened signal pair is wrapped in PTFE tape and a tinned copper spiral D-screen to maintain ≥ 60 dB isolation from the power cores.

## Standards and approvals

- ✓ CE (2014/35/EU LVD & 2014/30/EU EMC)
- ✓ UL AWM Style 21223 (80 °C 1000 V Composite)
- ✓ VW PV 3.10.7 LABS-Free (Automotive Approved)

## Certifications



Management systems: ISO 9001, ISO 14001, ISO 45001

### Request a quotation

Send the size, length and destination. An application engineer replies within 2 business hours.

WhatsApp / phone

**+86 185 9591 3361**

Email

**info@tebaoflex.com**

Web

**tebaoflex.com/cables/robot-hybrid-power-and-signal-cable**



Typical values for this cable type, based on DIN VDE 0250 / UL AWM Style 21223. Values for your order are confirmed in the quotation. Subject to change without notice. Jiangsu Tebaoflex Special Cable Co., Ltd., Taicang, Jiangsu, China.