

## Guide to Fault Analysis and Troubleshooting of Overhead Crane Electrical Equipment

| Serial number | Equipment name       | Fault phenomenon   | Cause of fault   |
|---------------|----------------------|--|--|
| 1             | Main hook motor      | Overheating, abnormal speed, and burnout.  | Poor motor cooling, brake solenoid failing to open properly, high frequency of continuous heavy load (jogging) operation, stator phase loss, rotor phase loss, motor slip ring damage, and winding insulation breakdown. |
| 2             | Auxiliary hook motor | Overheating, abnormal speed, and burnout.  | Poor motor cooling, brake solenoid failing to open properly, high frequency of continuous heavy load (jogging) operation, stator phase loss, rotor phase loss, motor slip ring damage, and winding insulation breakdown. |
| 3             | Trolley motor        | Overheating, abnormal speed, and burnout.  | Poor motor cooling, brake solenoid failing to open properly, high frequency of continuous heavy load (jogging) operation, stator phase loss, rotor phase loss, motor slip ring damage, and winding insulation breakdown. |
| 4             | Cart motor           | Overheating, abnormal speed, and burnout.  | Poor motor cooling, brake solenoid failing to open properly, high frequency of continuous heavy load (jogging) operation, stator phase loss, rotor phase loss, motor slip ring damage, and winding insulation breakdown. |
| 5             | Main hook brake      | No operation, insufficient electromagnetic force, loud electromagnetic noise, and burnout. | Wire breakage, burned coil, core misalignment, deformed or broken positioning spring, cracked core, reduced stroke, loose or broken mounting screws, etc.  |
| 6             | Auxiliary hook brake | No operation, insufficient electromagnetic force, loud electromagnetic noise, and burnout. | Wire breakage, burned coil, core misalignment, deformed or broken positioning spring, cracked core, reduced stroke, loose or broken mounting screws, etc.  |
| 7             | Trolley brake        | No operation, insufficient electromagnetic force, loud electromagnetic noise, and burnout. | Wire breakage, burned coil, core misalignment, deformed or broken positioning spring, cracked core, reduced stroke, loose or broken mounting screws, etc.  |
| 8             | Cart brake           | No operation, insufficient electromagnetic force, loud electromagnetic                     | Wire breakage, burned coil, core misalignment, deformed or broken positioning spring, cracked core, reduced stroke, loose or broken mounting screws,   |

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| 9  | Main hook resistor                     | Abnormal overheating, resistance value change, and burnout or failure.                             | Poor heat dissipation, severe resistance oxidation, high frequency of continuous heavy load (jogging) operation, long-term low-speed operation, motor overload, and phase loss in the circuit. |
| 10 | Auxiliary hook resistor                | Abnormal overheating, resistance value change, and burnout or failure.                             | Poor heat dissipation, severe resistance oxidation, high frequency of continuous heavy load (jogging) operation, long-term low-speed operation, motor overload, and phase loss in the circuit. |
| 11 | Trolley resistor                       | Abnormal overheating, resistance value change, and burnout or failure.                             | Poor heat dissipation, severe resistance oxidation, high frequency of continuous heavy load (jogging) operation, long-term low-speed operation, motor overload, and phase loss in the circuit. |
| 12 | Cart resistor                          | Abnormal overheating, resistance value change, and burnout or failure.                             | Poor heat dissipation, severe resistance oxidation, high frequency of continuous heavy load (jogging) operation, long-term low-speed operation, motor overload, and phase loss in the circuit. |
| 13 | Protection distribution cabinet        | Severe deformation and significant wobbling.   | Solder joint detachment, failure to function as an integrated unit, causing internal equipment displacement and resulting in short circuits or various   |
| 14 | Main power contactor                   | No operation, loud electromagnetic noise, burnout, contact overheating, and arc noise.             | Wire breakage, burned coil, core misalignment, damaged contacts, contact sticking, damaged arc extinguishing cover, loose or broken mounting screws, etc.                                      |
| 15 | Main overcurrent relay                 | False operation and auxiliary contacts not conducting.   | Degraded operational characteristics and damaged or burned auxiliary contacts.   |
| 16 | Trolley overcurrent relay              | False operation and auxiliary contacts not conducting.   | Degraded operational characteristics and damaged or burned auxiliary contacts.   |
| 17 | Cart overcurrent relay                 | False operation and auxiliary contacts not conducting.   | Degraded operational characteristics and damaged or burned auxiliary contacts.   |
| 18 | Main hook main control controller      | Unable to reset to the zero position and chaotic gear  | Abnormal operation causing shutdown and failure of auxiliary relays.   |
| 19 | Auxiliary hook main control controller | Unable to reset to the zero position and chaotic gear  | Same as the trolley frequency converter.   |
| 20 | Trolley cam controller                 | Unable to reset to the zero position, erratic gear engagement, and contact overheating or burnout. | Severe wear of the mechanical structure, failure of the gear system, damaged contacts, contact sticking, damaged arc extinguishing cover, loose mounting screws, etc.                          |

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| 21 | Cart cam controller              | Unable to return to the zero position, chaotic gear engagement, and contact overheating or burnout. | Severe wear of the mechanical structure, failure of the gear system, damaged contacts, contact sticking, damaged arc extinguishing cover, loose mounting screws, etc.  |
| 22 | Magnetic control screen          | Severe deformation, excessive wobbling.   | Solder joint detachment, failure to function as an integrated unit, causing internal equipment displacement and resulting in short circuits or various unusual faults. |
| 23 | Main hook overcurrent relay      | False activation, auxiliary contacts not conducting.  | Degraded operational characteristics and damaged or burned auxiliary contacts.   |
| 24 | Auxiliary hook overcurrent relay | False activation, auxiliary contacts not conducting.  | Degraded operational characteristics and damaged or burned auxiliary contacts.   |
| 25 | Forward contactor                | No operation, loud electromagnetic sound, burnout, contact heating, and arc noise.                  | Wire breakage, burned coil, core misalignment, damaged contacts, contact sticking, damaged arc extinguishing cover, loose or broken mounting screws, etc.              |
| 26 | Reverse contactor                | No operation, loud electromagnetic sound, burnout, contact heating, and arc noise.                  | Wire breakage, burned coil, core misalignment, damaged contacts, contact sticking, damaged arc extinguishing cover, loose or broken mounting screws, etc.              |
| 27 | Reverse brake contactor          | No operation, loud electromagnetic sound, burnout, contact heating, and arc noise.                  | Wire breakage, burned coil, core misalignment, damaged contacts, contact sticking, damaged arc extinguishing cover, loose or broken mounting screws, etc.              |
| 28 | Acceleration contactor           | No operation, loud electromagnetic sound, burnout, contact heating, and arc noise.                  | Wire breakage, burned coil, core misalignment, damaged contacts, contact sticking, damaged arc extinguishing cover, loose or broken mounting screws, etc.              |
| 29 | Braking contactor                | No operation, loud electromagnetic sound, burnout, contact heating, and arc noise.                  | Wire breakage, burned coil, core misalignment, damaged contacts, contact sticking, damaged arc extinguishing cover, loose or broken mounting screws, etc.              |
| 30 | Zero voltage protection relay    | No operation, loud electromagnetic sound, burnout, contact heating, and arc noise.                  | Wire breakage, burned coil, core misalignment, damaged contacts, contact sticking, damaged arc extinguishing cover, loose or broken mounting screws, etc.              |
| 31 | Main hook limit switch           | Auxiliary contacts not conducting.  | Mechanical deformation and damaged auxiliary contacts.   |
| 32 | Auxiliary hook limit switch      | Auxiliary contacts not conducting.  | Mechanical deformation and damaged auxiliary contacts.   |
| 33 | Trolley limit switch             | Auxiliary contacts not conducting.  | Mechanical deformation and damaged auxiliary contacts.   |

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| 34 | Cart limit switch  | Auxiliary contacts not conducting. | Mechanical deformation and damaged auxiliary contacts. |
| 35 | Door safety switch | Auxiliary contacts not conducting. | Mechanical deformation and damaged auxiliary contacts. |
| 36 | Emergency switch   | Auxiliary contacts not conducting. | Mechanical deformation and damaged auxiliary contacts. |