INSTALLATION & INSTRUCTION MANUAL

Instruction Manual Rev 2.1 - 2018

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GENERAL

This installation and instruction manual covers the MOTARC electric motor arc detection system. It covers the possible configurations available and the operation requirements of the system.

Description

The MOTARC system is a “stand alone”, “plug and play” system that is designed to reduce and minimise the damage caused by flashovers on DC motors and AC slipring motors reducing the damage to costly and long lead time components.

The system comprises of a state-of-the-art relay and light sensitive detectors that are mounted inside the motor enclosure at strategic positions. The system is specifically configured to the end users requirements thus making installation quick and easy.

If an arc is detected the supply to the motor is tripped thus isolating the induced voltage and current in the rotor / armature. The system operates considerably faster than conventional protection relays (7 mS) thus minimizing the arc short circuit and consequential damage to motor components. The total time to clear the detected arc is dependent on the operation time of the motor circuit breaker.

CONFIGURATION OPTIONS

The system is supplied to the end-users requirements to make installation easy and straight forward.

Contacts

The system can be configured to have 2 NO (normally open) latching trip relays, 1 NC (normally closed) latching trip relay. The trip relays are failsafe and remain latched until a reset of the system is carried out.

The NO (normally open) latching trip relays can be configured into 2 groups if needed to cover 2 separate areas on a motor such as the slipring compartment and a connection area.

The system continuously monitors the relay and sensors. If a failure occurs on the system including the sensor wiring a relay / system fault indication is given on the front panel.

Sensors

The system can be configured to accept 4 sensor inputs. A maximum of 3 sensors can be connected in parallel to each sensor input.

Reset

The system has a local reset switch or can be configured for remote reset if required. The local reset option is most favoured and recommended due to the need to investigate the cause of the trip to the motor.

Maintenance Switch

The system has a maintenance switch that can be operated if required to eliminate the possible activation of the system during slipring and brushgear maintenance.

Enclosure

The system is standard in an IP65 stainless steel enclosure however can be supplied in a chemical resistant composite enclosure if required

Indication lamps

The system is standard with Schneider incandescent indication lamps however can be supplied with a LED option if required. A lamp test button is standard.

SENSORS

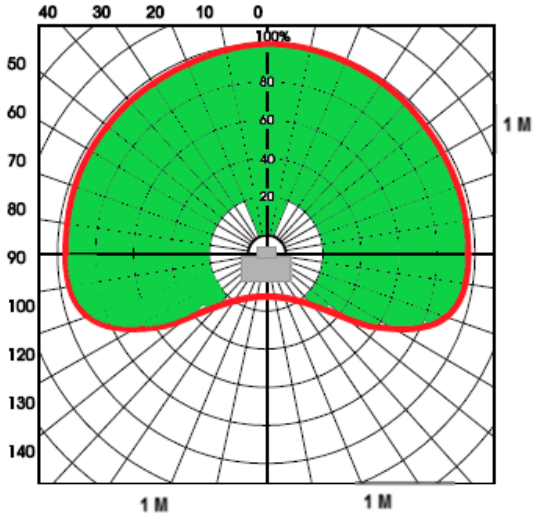
The optic sensor is supplied fitted inside a standard 50 mm round conduit box with a 20 mm entry. This allows for easy installation and in-service protection of the sensor and associated cables.

The light sensitivity of the sensor is fixed at a level that will ensure the activation of the unit without nuisance tripping from other normal light sources.

Do not install the sensors or associated cabling directly onto components that can become energised during normal operation of the motor.

The placement of the sensors should be carefully considered giving as much as possible direct line of sight to the sliprings / commutator and brushgear. Use of the below diagram to determine the best placement is recommended.

It is essential that the sensors are not painted if / when the motor is overhauled. Do not paint stickers are attached to the surface of the sensor enclosure.



INSTALLATION AND TERMINALS

The system is designed to be secured directly onto or adjacent to the motor under protection. Due to the large variation of possible options the system is supplied with no pre drilled holes for mounting. Adequate clearance is provided around the internal components to allow for easy drilling and insertion of hardware for the securing of the system. Sealing of the holes to maintain an acceptable IP rating is essential.

Since the system is supplied configured to the end-users requirements the necessary connections are made on a segregated terminal strip that accommodates up to 2.5 mm^2 conductors.

Power Terminals

The power terminals are labelled as follows-

E – Earth
A – Active
N – Neutral

Trip / Monitoring Contact Terminals

The contact terminals are marked in pairs as follows –

T1 & T2 – NC (normally closed)
T3 & T4 – NO (normally open)
T6 & T6 – NO (normally open)
M1 & M2 – DCS contacts

Sensor Terminals

The 4 sensor channel terminals are marked in pairs as follows –

S1 & S2 – Channel 1
S3 & S4 – Channel 2
S5 & S6 – Channel 3
S7 & S8 – Channel 4

Note – The sensors are not polarity sensitive

COMMISSIONING

The system is configured to the end-user's requirements making commissioning easy and relatively straight forward.

Connection of the required wiring for the power, trip / monitoring contacts and sensors should be carried out as per the details in the installation and terminals section of this manual. Connection of the monitoring / trip contacts should be made as per the procedure below. Once this is completed the following steps should be taken to ensure the system is completely operational –

- Close the single pole circuit breaker located in the lower right-hand side of the enclosure. This will energise the system and it will carry out a self-test function immediately and will be ongoing whilst ever the system is powered up. The green MOTARC ON lamp will illuminate.
- Turn the spring-loaded Reset switch to the right to ensure any tripped circuits are reset.
- Pres the lamp test button to ensure all lamps are operational.
- To check the self- testing function is operational disconnect either S1, S3, S5 or S7. This will result in the red relay fault lamp becoming illuminated on the front of the system. Re-connection will result in the lamp going off.
- To test the operation of the system with the sensors connected an independent light source is required. The flash on mobile phones is not enough to trip the system and LED lights are not recommended. The flash from most compact digital cameras has been found to be enough if held close enough to the sensors. Alternatively, a flash light fitted with a Xenon bulb can be utilised. Test the operation of the supplied trip / indication relay with a standard multimeter ensuring the relay latches as required. Press the reset button between each test ensuring the relay returns to its normal state.
- Connect the wiring to the DCS or trip circuits as per the terminals section of this manual.

MAINTENANCE

There are no user serviceable parts in the system except for the lamp bulbs. The relay has been modified specifically for MOTARC use and has a security seal attached. Removal or tampering with the security seal will result in the warranty being void.

The sensors should be cleaned during brush maintenance with compressed air and a lint free cloth.

The system enclosure should be checked regularly to ensure its IP rating is maintained. The frequency of this inspection will depend on the end-user sites particular environment and needs.

The lamp test button should be pressed as part of the brushgear / brush maintenance regime.

TECHNICAL DATA

System voltage

19 to 265 V dc / 40 to 265 V ac

Trip / monitoring contacts

Number of contacts - 3

Rated voltage - 250V ac/dc

Continuous carry - 5A

Minimum making current - 100 mA @ 24 Vdc

Typical operation time - 7 ms

Make and carry for 0.5s - 30A

Make and carry for 3s - 15A

Breaking capacity DC (L/R=40ms)
48 Vdc: 1.15 A
110 Vdc: 0.5 A
220 Vdc: 0.25 A

Dimensions

200 x 300 x 160 mm

Weight

6 kG without sensors

WARRANTY

The MOTARC system is warranted to be free from defects in material and workmanship for a period of five years from the date of purchase.

CoxCo will (at CoxCo's option) repair, replace, or refund the original purchase price of a MOTARC system that is determined by CoxCo to be defective if it is returned, freight prepaid, within the warranty period. This warranty does not apply to repairs required because of misuse, negligence, an accident, improper installation, tampering, or insufficient care. CoxCo will not warrant products that have been found to be repaired or modified or with the security seal broken or tampered with.