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BS EN ISO 9001:2008
FMS6231

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This is Crompton Controls

Installation & Maintenance Instructions

A.C. Motor Controls & Custom Built Equipment



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GENERAL

Crompton Controls starters are manufactured to IEC 947 and under registered quality control system approved to BS EN ISO 9001:2008. All control panels/starters give protection to BS EN60529:1992 and are suitable for use up to an altitude of 2000 meters above sea level and for operation in ambient temperatures of -5°C to +40°C.

IMPORTANT/SAFETY

All control panels/starters for operating on low voltage contain devices which are dangerous and can cause serious or fatal injury.

Some control panels/starters may contain live terminals which are supplied from a separate external source.

It is essential that all supplies are isolated before working on the control panel/starter.

Because of this danger, it is recommended that any personnel working on the equipment are within sight of other personnel at all times.

Persons responsible for installation should have a working knowledge of the IEE Wiring Regulations, Health & Safety At Work act 1974 and the Electricity At Work Regulations 1989.

Guidance on Installation

Before Installation

Remove all packaging materials and check inside and outside the control panel/starter for any obvious defects or damage.

Check that the control panel/starter is correct in all respects for the application particularly in respect of:

1. Voltage
2. Frequency
3. Number of phases
4. Current rating
5. The starter is suitable for the operating environment

Check all moving parts of contactors, relays, etc. for ease of operation to ensure that they have not been damaged in transit.

NOTE: Where control panel/starters have been in transit, which may have subjected the equipment to vibration, it is advisable to check all terminals and fixings for tightness before installation.

12. INSTRUMENTS

Ensure all instruments are reading zero when no power is supplied. Adjust if necessary. Check that all instrument cases and glasses are intact. Replace if necessary. Ensure instrument mountings are effectively tight and that instrument connections (particularly ammeters) are tight and not suffering from any corrosion. Remove corrosion and protect with electrical varnish or replace instrument if necessary.

CHECKING INTERVALS

It is also advisable to carry out the mechanical checks detailed previously at regular intervals throughout the life of the equipment. How often these checks are carried out depends on the particular circumstances of the site and operation involved. For starters operating once or twice a day in a relatively clean environment, a check every 12 months is probably all that is necessary. However, for a site which is very dusty and where a starter may operate several hundred times a day, it may be necessary to carry out the checks every 2 to 3 months to ensure that no problems develop to an extent that could cause failures.

SPARES

Most parts of the equipment are not regarded as serviceable items and therefore, in general, complete components are required.

In order to ensure that the correct parts are supplied please quote the details given on the starter legend place.

WARRANTY

All goods are guaranteed for one year from date of purchase. This does not affect the statutory rights of the user.

FINAL CONNECTION

Ensure that any cables are kept clear of any parts that are liable to excessive temperature rise and that any lengthy cable runs are adequately supported.

Ensure that all earth connections are secure and free from mechanical stress.

WORKING ON LIVE EQUIPMENT

If during servicing it is necessary to work on the equipment with the supply connected (e.g. checking voltages, currents, setting up, testing etc...) the main burden of responsibility for the safe conduct of those carrying out the work rests with those under whose authority they act.

It is essential to observe personnel safety precautions particular to the installation and electrical equipment including:

- 1. Ensure that it is absolutely necessary to work on the equipment whilst in a live condition.**
- 2. Ensure that that only suitably qualified, authorised and competent persons are permitted to carry out the work, who recognise the nature of the hazards and are in compliance with any particular working procedures relating to their safety.**
- 3. Ensure that the persons conducting the work are fully aware of the layout of the starter or control panel and where to expect live conditions.**
- 4. Ensure that any tools or equipment used are suitable for working on live equipment.**
- 5. Ensure that persons conducting the work are within sight of other people who could come to their aid if necessary.**

GENERAL GUIDANCE ON ROUTINE INSPECTION

DISCONNECT ALL EXTERNAL SUPPLIES

Open panel/starter and make visual inspections for:

1. Overheating/arcng.
2. Ingress of dirt/moisture.
3. Check all screws and fixings to ensure that they are tight.
4. Check all wiring connections to ensure that they are tight.
5. Check all moving parts for ease of operation.
6. Examine all wiring, particularly in the vicinity of metal parts of the equipment to ensure that none of the insulation is damaged.
7. Check mechanical interlocks of contactors, isolators, etc. to ensure that they are functioning correctly.
8. Check push buttons and switches for normal mechanical operation.
9. Check door seals are free from damage and ensure door hinges are also free from damage and do not restrict door opening.
10. Check cable entry plates and glands to ensure that incoming and outgoing cables are securely fastened to the enclosure.

11. Check all earth connections are tight and free from corrosion. Particular attention should be paid to the earth links between the enclosure and the doors where they are fitted.
12. Electrical checking of the wiring should be carried out by means of high voltage test equipment to check the insulation resistance to earth and between phases. It should be noted that the electronic equipment may require disconnecting in order to carry out this test.
13. Check all earth connections for continuity, particularly on enclosure doors which are fitted with electrical equipment.

DETAILED CHECK OF COMPONENTS AND ACTION REQUIRED

1. BUSBARS

Check all busbar connections for tightness and ensure that all busbar mountings are secure. Check all busbar mountings for damage and replace any that are cracked or broken.

Check that all busbar surfaces are clean and free from corrosion. If any dirt or corrosion is present, clean or replace as appropriate and determine reason for problem.

2. FUSES

Check that all fuses are intact and of the correct size for the application. Ensure that connections to the fuseholder are tight and that the fuse is securely fastened to the fuse carriers. Examine fuse connections for signs of overheating (i.e. discolouration of surrounding metal parts) and if present replace complete fuseholder assembly.

DO NOT:

- Replace cartridge fuses with wire.
- Replace fuses with fuses of a different type or size.
- Attempt to rewire a cartridge fuse.

3. ISOLATORS

Check all connections for tightness and examine the immediate vicinity of the main contacts for excessive arcing. Check the main terminal areas for signs of overheating. If either of the above is present, dismantle isolator and check state of operating mechanism for wear and examine contacts for excessive damage. If appropriate, replace contacts or isolator assembly complete.

Where fitted, ensure that door interlocks are effective in preventing door being opened with isolator in 'on' position and ensure that isolator operation via the handle is satisfactory.

4. CONTACTORS

Check that the moving contact carriage is free to operate and that it returns freely to the fully open position. If the contactor does not return to the fully open position, then it is probable that there is some internal damage to the contactor. If so, the contactor should be dismantled and repaired or replaced. An attempt should be made to determine the cause for the failure.

Checks of the main and auxiliary contacts should be made with suitable checking equipment to ensure that main and auxiliary contacts are open/closing properly.

(NOTE: This may not be practical on some auxiliary contacts because of interwiring. If in doubt disconnect one side of the contact involved).

Mechanically interlocked contactors should be checked for freedom of operation to ensure that the interlock is not interfering with normal operation of the contactor. Whilst holding one contactor in the closed position the other contactor should be checked to ensure that it cannot be pushed into the closed position. If this test fails, dismantle and examine the interlock and contactor mountings.

5. OVERLOAD UNITS

Check that the current range and the position of the setting lever are suitable for the motor involved. Adjust if necessary. If the overload unit is fitted with a 'test' arrangement, check that the unit trips when tested and resets either automatically or via the reset button. In the event of suspected faulty operation, check by replacing the overload unit.

6. RELAYS

Relays should be checked in a similar manner to contactors.

7. PUSH BUTTONS/SWITCHES

Examine push buttons and switches for any external signs of damage and check with suitable test equipment, that circuits are operating in accordance with circuit diagram (i.e. that contacts are closed/open when required).

In the event of any damage or malfunction, replace the complete unit unless a simple repair is obvious.

8. TIMERS

Examine timers for correct range and check with suitable test equipment that the contacts are correct in the off position. Timers in general are not serviceable units and should be replaced completely if suspected of faulty operation.

9. THERMISTOR PROTECTION UNITS

Thermistor protection units should be checked with care, certain parts of the circuit are vulnerable to higher voltages. In the off state (i.e. no supply voltage) the relay should be checked for normally open/closed contact in accordance with the circuit diagram. A test voltage of approximately 500v can be applied between all terminals and earth but on no account should this check be made between the thermistor terminals (terminals 1 and 2). All other checks have to be made with the supply voltage applied (see Pages 3-4). Thermistor units are not serviceable units and should be replaced if faulty.

10. INDICATOR LAMPS

Check all connections to indicator lamps and ensure that they are tight. Ensure that the correct type of bulb is fitted and that the lenses are not cracked. In either case, replace the bulb/lens or complete indicator lamp.

11. WIRING

Should any of the insulation on the panel wiring appear damaged or should any wire fail in the insulation test, then the wire involved should be replaced immediately. Check that all cable supports are in position and all the wiring is effectively supported.

LOCATION AND MOUNTING

1. Vibration free location required.
2. Protect from moisture and water ingress (fit anti-condensation heaters).
3. Ensure enclosure is dust free.
4. **DO NOT** allow swarf to enter enclosure

WIRING

1. All external connections to be in accordance with I.E.E. Regulations.
2. Fit separate earth conductor connecting through to the motor.
3. **DO NOT** earth via conduit fittings

OPERATIONAL CHECKS

1. Connect incoming supply cables as shown in circuit diagram.
2. Conduct operational checks **before** connecting the motor.
3. Check the operation of the control circuit.

It is also advisable to remove as many mains fuses as is practical. The number of mains fuses which may be removed is dependent on how the control circuit is supplied (see circuit diagram). In this condition, the operation of the control circuit can be carried out by means of the push buttons, control circuit switches and remote switches (i.e. pressure switches, level switches, etc.). If a remote switch is not available or functioning, its operation may be simulated by a switch or push button wired across the terminals.

In this mode, correct sequencing can be checked, indicator lamps checked and operation of contactors and relays can be checked for noisy operation without the corresponding equipment being used, thus avoiding the possibility of machine noise interfering with the checks.

4. Check thermistor protection units by disconnecting the thermistors and connecting a push button/switch across the thermistor unit terminals. With this switch closed, the starter circuit should be operated normally. With the switch open, the starter should stop. This test can be used to differentiate between a faulty 'Thermistor Protection' unit and faulty thermistors. - See pages 6-7.
5. Ensure that any overload devices are set to the appropriate full load current as marked on the motor.
6. Check that all timers are set to give the correct time delay.
7. Soft Starters (if fitted) require setting as appropriate for the application - see Manual.
8. Inverters, (if fitted) also require setting - see Manual.