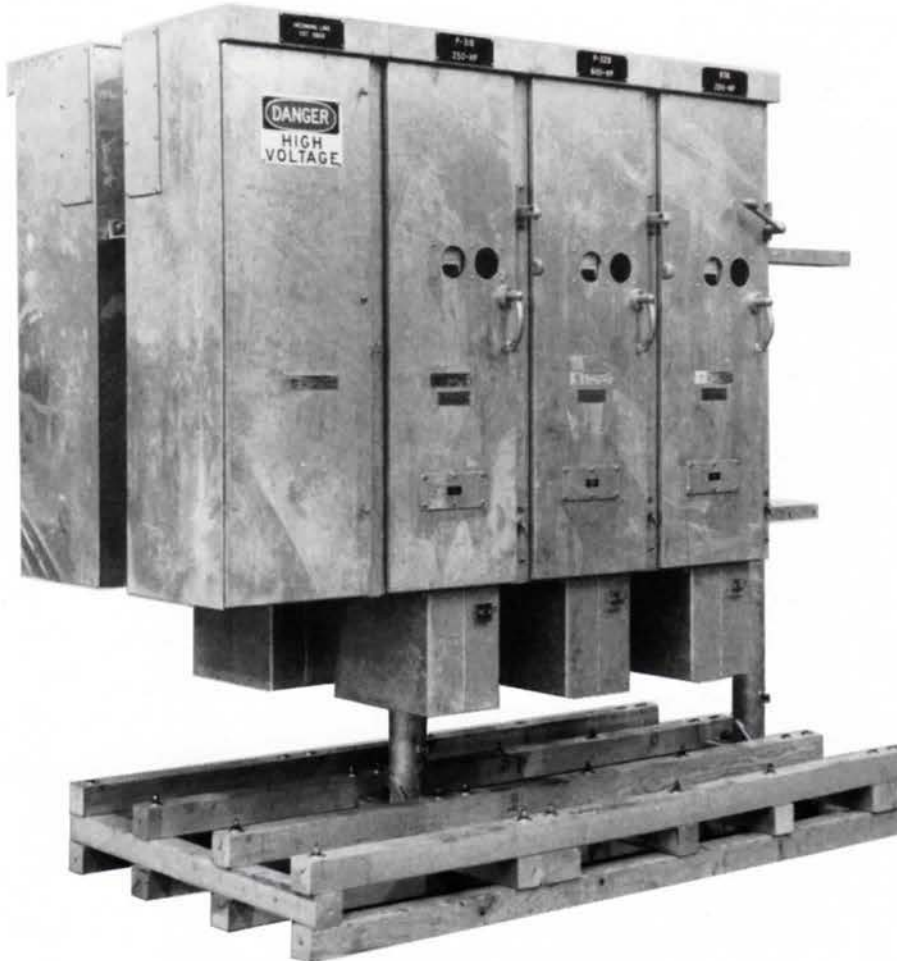




TYPE 211 COMBINATION CONTROLLER



GROUPED CONTROLLERS ON SHIPPING PALLET

IMPORTANT FEATURES & BENEFITS

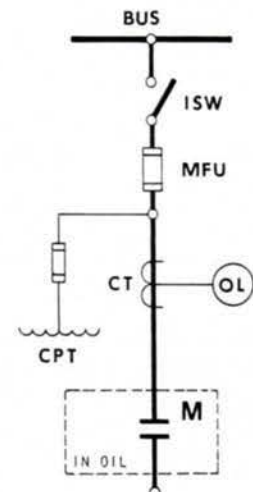
- + Vertical Equipment Arrangement for fast and safe maintenance
- + Visible-break Isolating Switch for maximum safety
- + SAFE-QUICK BREAK Contactor for long contact life with no risk of inducing voltage transients and with no need for high-voltage field testing
- + Corrosion Resisting Design of All Components & Enclosure
- + U. L. Review & Testing to assure compliance with safety standards
- + Coordinated Design of Elliott-manufactured Components
- + Made in U.S.A. to U.S.A. Standards

SCOPE & SUMMARY

This bulletin outlines applications, design features, equipment arrangement, and space planning, for the Type 211 controllers, which were introduced in 1976 and have been enhanced with new features and options. These controllers are for the control and protection of induction motors or transformers on 2300-4160-volt systems. The corrosion-resisting design and reliability features make the Type 211 controllers particularly suitable for outdoor use in oil refineries, chemical plants, and pumping stations.

Each Type 211 controller is a NEMA Class E2 coordinated combination of SAFE-QUICK BREAK oil-immersed contactor, thermal overload relays, current transformers, and current-limiting fuses, with safety-interlocked isolating switch. Many optional features are available, including Ground-Fault Protective Relay and Multi-function Protective Relays. The basic design and most optional features are suitable for Class I, Division 2, T3A hazardous locations. Cabinet widths of 20-inches, 34-inches, and 40-inches are available to suit different customer needs.

ONE-LINE DIAGRAM





TYPE 211 COMBINATION CONTROLLER



CONTROLLER WITH CABINET DOOR OPEN & DOOR CLOSED

APPLICATIONS

GENERAL The 211 controllers are for full-voltage, non-reversing, magnetic starting and protection of induction motors. Or they may be used to switch and protect transformers. Optionally, the contactor may be mechanically "latched" for transformer or feeder applications. Alternate designs are available for reduced-voltage starting and for synchronous motor control.

SYSTEM CAPACITY These controllers may be used on power systems capable of producing fault currents up to 80,000-amperes RMS asymmetrical. On a 3-phase basis, that corresponds to 200-MVA at 2300-volts and 350-MVA at 4160 volts for symmetrical current calculations. This assumes 1.6 ratio between asymmetrical current and initial symmetrical current, for first-cycle fault interruption.

LOADS The 211 controllers is made in three continuous current ratings: 180-amp, 240-amp, and 360-amp. These ratings typically may be used for control of induction motors up to 700-HP, 1000-HP, and 1500-HP at 2300-volts or up to 1250-HP, 1750-HP, and 2500-HP at 4160-volts, or higher, depending upon service factor and locked rotor current. All controller ratings incorporate the same SAFE-QUICK BREAK Contactor but differ in fuse sizes and cabinet arrangements.

LOCATION The 211 controllers are particularly suited to outdoor installation and to other installations where protection from dust or corrosive conditions is desirable. The basic design and most optional features are suitable for Class I, Division 2, T3A hazardous locations.



TYPE 211 COMBINATION CONTROLLER

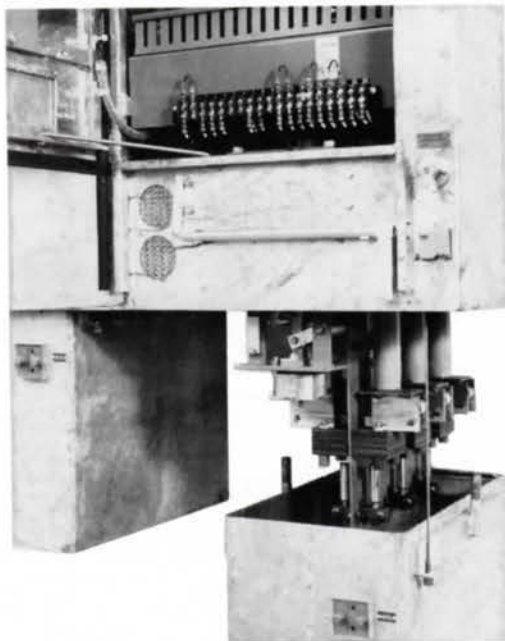
DESIGN FEATURES & CONSTRUCTION

GENERAL Each 211 Controller is a NEMA Class E2 coordinated combination of a SAFE-QUICK BREAK oil-immersed contactor, thermal overload relays, current transformers, and current limiting fuses, with safety-interlocked isolating switch. These major elements, with the accessory and optional parts, are metal-enclosed, factory assembled, and interconnected. The controller is front-connected with all parts readily accessible. The power elements are arranged vertically for easy and safe installation, operation, and maintenance.

STANDARDS & TESTING The Type 211 Controllers are made in U.S.A. to U.S.A. standards, especially NEMA ICS 2-324 and UL-347. The basic design and many optional features have been submitted for "third party review" to Underwriters Laboratories (U.L.) to assure compliance with design and safety standards. Detailed test reports are available. U.L. Inspection and Labels are available optionally for many applications and arrangements.

OPERATION An electromagnetically-operated, SAFE-QUICK BREAK oil-immersed contactor, is the power-switching element. It is controlled by the customer's 115-VAC pushbutton or other master element, with control power from a self-contained transformer. Optionally, start and stop control switches may be included in the controller. The contactor stays closed on momentary voltage dips but opens on prolonged loss-of-voltage.

PROTECTION Three main-line fuses and two control-transformer primary fuses, provide high-speed fault protection with current-limiting effect. A 3-element thermal overload relay provides running overcurrent protection. Optionally, an instantaneous ground fault protective relay provides added system protection on resistance or impedance grounded systems. Optionally, a multi-function, microprocessor based, protective relay provides added motor protection. The fuses are coordinated with the overload and protective relays, so that the contactor interrupts any overcurrents up to locked-rotor current and the fuses interrupt only fault currents that exceed the contactor rating.



CONTACTOR WITH TANK LOWERED

SAFETY The isolating switch is manually operated to isolate the controller and the circuit from the power supply. The isolating switch may be padlocked open or closed. The enclosure may be padlocked closed. A viewing window permits checking the isolating switch position, when the cabinet door is closed. A gauge shows the contactor oil level. Mechanical interlocks prevent opening the door before opening the isolating switch or closing the isolating switch with the door open. An ammeter shows load current.

ENCLOSURE & MOUNTING The controller enclosure consists of a control cabinet with integrally-mounted oil-filled tank. The cabinet is gasketed, weather-resistant, and ventilated dusttight, with space heater. A unique cabinet and door arrangement makes the cabinet raintight in a 65-mph wind even if the door gaskets are removed. The controller is mounted on a support-frame. Grouped controllers are equipped with self-contained, interconnecting main-bus and are mounted on a common support-frame side-by-side and/or back-to-back.

LIVE PARTS BARRIER When the isolating switch is open and the door may be opened, the line contacts of the isolating switch and the incoming-line terminals or bus, are the only parts still energized. These parts are at the top of the cabinet. Accidental contact with these energized parts is prevented by a vertical, grounded "Live Parts Barrier" and by a horizontal barrier. A maintenance shutter is available for added safety when working near the live parts.

ISOLATING SWITCH The safety-interlocked isolating switch is 3-pole, gang-operated, with external operating handle. Contact travel is vertical, and the air-gap is easily seen when the switch is open. To prevent accidental operation under load, the isolating switch and the main contactor are mechanically interlocked with a control-power switch which is externally operated. The isolating switch may be opened or closed only when the control-power switch is in the "stop" position and the main contactor is open.

FUSES The main-line fuses are ribbon element, totally-enclosed, and non-vented, mounted in fixed-position with bolted-in fuse-clamps. When these fuses interrupt, there is no noise and any pressure generated is self-contained and sealed. These fuses exhibit an increase in resistance immediately after melting, so that they have a current limiting effect on major fault currents. For Class I, Division 2 applications, these fuses are completely sealed (without operation indicators).

CONTACTOR The SAFE-QUICK BREAK oil-immersed contactor is solenoid-operated, and the solenoid is energized through a rectifier at 115-volts. The contactor has a unique contact arrangement and operating mechanism designed for high momentary current-carrying and fast current-interrupting at all current levels. Long contact life is assured with no risk of inducing voltage transients and with no need for high-voltage field testing. All power circuit insulation is vertically arranged so that surface contaminants or arc products cannot reduce the insulation strength. The contactor includes a tanklifter with stainless-steel lifter cables that may be detached from the tank.

OVERLOAD RELAY The thermal-overload relay is ambient-compensated type, 3-element. The current-elements are energized from current transformers. The relay may be arranged for automatic reset when used with 3-wire control circuit. Optionally, the relay may be equipped with external, manual reset.

FINISH The cabinet, tank, and support-frame are hot-dip galvanized after fabrication. External hardware, shafts, pins, and springs, are stainless. Current-carrying contacts and connections are oil-immersed or hermetically-sealed or specially plated for maximum corrosion-resistance.



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TYPE 211 COMBINATION CONTROLLER

EQUIPMENT ARRANGEMENT

Mounted in the Control Cabinet —

- L1/3 Incoming Line Connectors
- BUS Main Bus
- ISW Isolating Switch with Interlocks
- MFU Main Line Fuse
- TFU Transformer Primary Fuse
- CPT Control Power Transformer
- CT Current Transformer
- T1/3 Load Terminal Connector
- CSW Stop-On Control-Power Switch
- CFU Control Fuse
- TB Control Terminal Block
- REC Rectifier for Contactor Coil
- RES Resistor for Contactor Coil
- OL Overload Relay
- m Auxiliary Contact on Contactor
- AM Ammeter
- HTR Space Heater

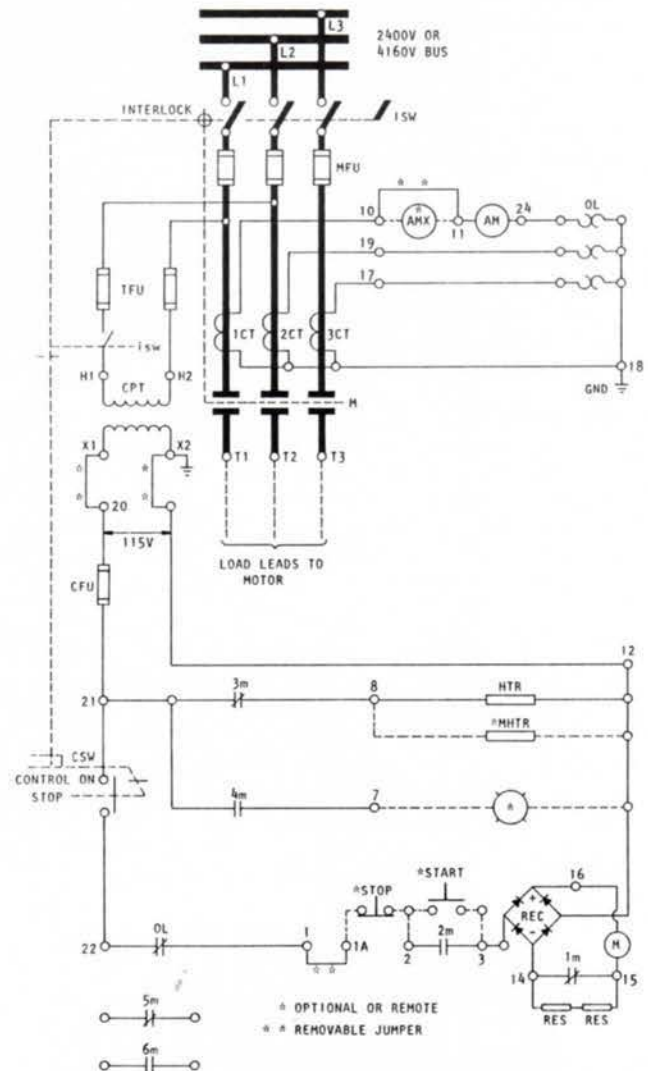
Mounted in the Oil-filled Tank —

- M Solenoid-operated Contactor

Optional Features Include —

- Application Nameplate 3" x 8"
- Manual-Reset of Overload Relay
- Ground Fault Relay
- Multi-function Protective Relay
- Extra Auxiliary Contacts
- Time-Delay Reclosing Relay
- Start & Stop Control Switches
- Hand-Off Auto Selector Switch
- A C Ammeter Transfer Switch
- Mechanically "Latched" Contactor
- Foreign Voltage Switch
- A C Voltmeter
- Extra Potential Transformer & Fuses
- A C Voltmeter Transfer Switch
- Watthour Meter
- Indicating Lights

SCHEMATIC DIAGRAM



SPACE PLANNING

SPACE REQUIRED Each controller is 90-in. high by 20-in. deep and mounts on support-frame 6-in. deep. Cabinet widths of 20-inches, 34-inches, and 40-inches are available to suit different customer needs. When grouped, the controllers are mounted back-to-back with connecting bus section. Suggested minimum working clearance in front of each controller is 4-ft.

CONDUIT ENTRANCES Conduit entrances for the incoming-line, will be provided in an attached box for overhead or underground conduit. Conduit entrances for load and control, are standard in the bottom and (optionally) available in the top.

