

Benefits of Type E/Type F Motor Protection Circuit Breakers

Motor Control Configuration Challenges

Designing motor-driven electrical equipment and panels can be a labor-intensive process due to installation requirements mandated by NFPA 70 National Electric Code (NEC) Article 430: Motors, Motor Circuits, and Controllers, which defines the requirements for all motor branch circuits and the operational functionality of panel devices to include:

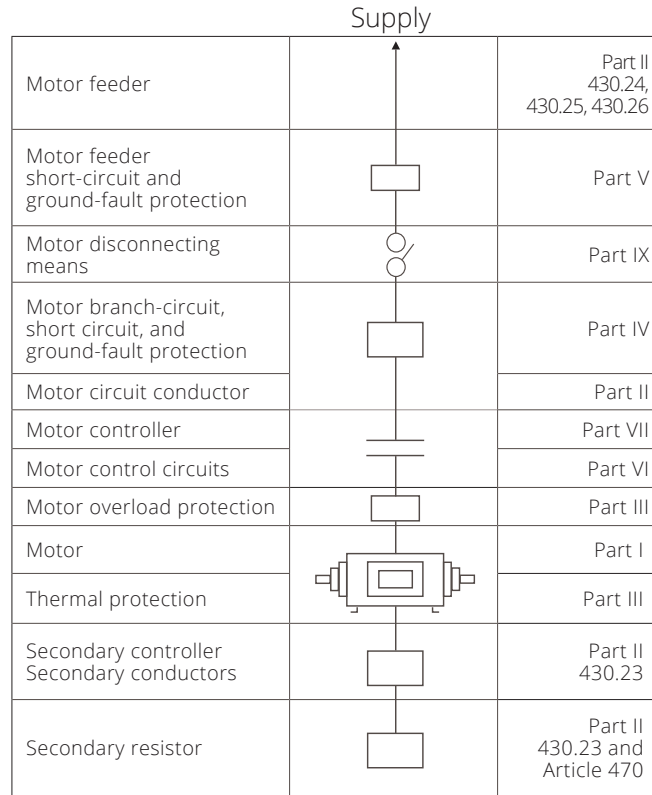
- Motor disconnecting means – disconnect switch, molded case switch or molded case circuit breakers
- Motor branch-circuit, short-circuit, and ground fault protection – molded case circuit breaker or fuses
- Motor controller – contactor
- Motor overload protection – thermal overload relay

Electrical control products must be able to be used globally in addition to being compliant with NEC codes and standards. To ensure compliance with NEC codes, third party certifications (such as Underwriters Laboratories) and international standards, controls engineers often times would size and install individual single function devices that would meet all industry specifications.

These efforts resulted in panels being packed with multiple controls with each individual device requiring proper sizing and spacing to fit within the panel — resulting in larger enclosures, increased panel complexity, decreased configuration flexibility, and a higher overall installation cost.

There had to be a better way — Simplify the motor disconnect, control, and protection processes by reducing the number of panel components by creating a multi-functional, standalone replacement component.

The expansion of the IEC motor protection circuit breaker's performance could provide all of the motor protection functions required by NEC Article 430:

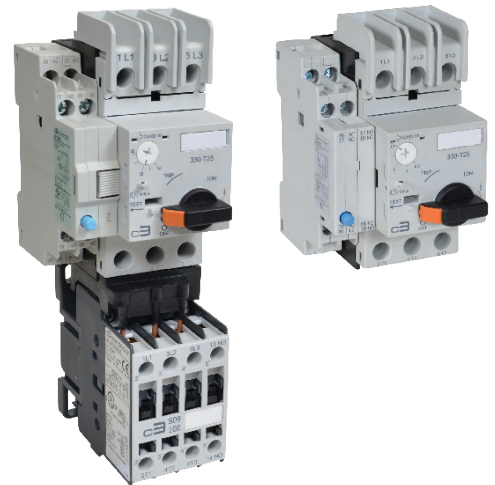


At c3controls, this approach resulted in a UL Listed Type E/Type F combination motor controller, which provides motor disconnecting means, branch-circuit, short-circuit, and ground fault protection as well as motor control and overload protection.

These multi-functional devices come installed with:

- Series 330 thermal and magnetic motor protection circuit breaker (c3controls' catalog number 330-T25)
- Line side terminal barrier (c3controls' catalog number 330-LSTB25)
- Trip indicating auxiliary contact module (c3controls' catalog number 330-STA22S25)

The Type E manual, self-protected combination motor controller was tested with a Series 300 Contactor creating a Series 630 Direct-On-Line Starter, providing the customer with the option to take advantage of the contactor's extended switching life, while simultaneously achieving the required motor disconnect capability and short circuit/overload protection.



Type F construction is very similar to Type E with the following exceptions:

Type E vs. Type F	
Type E	Type F
The entire assembly is self-protected.	Same combination kA ratings as Type E.
There is a separate set of short circuit and endurance performance tests just for Type E self-protected category.	Only the manual motor starter is self-protected.
The entire assembly is subjected to the Type E short circuit and endurance performance tests.	The contactor is not subjected to the Type E short circuit and endurance performance tests.

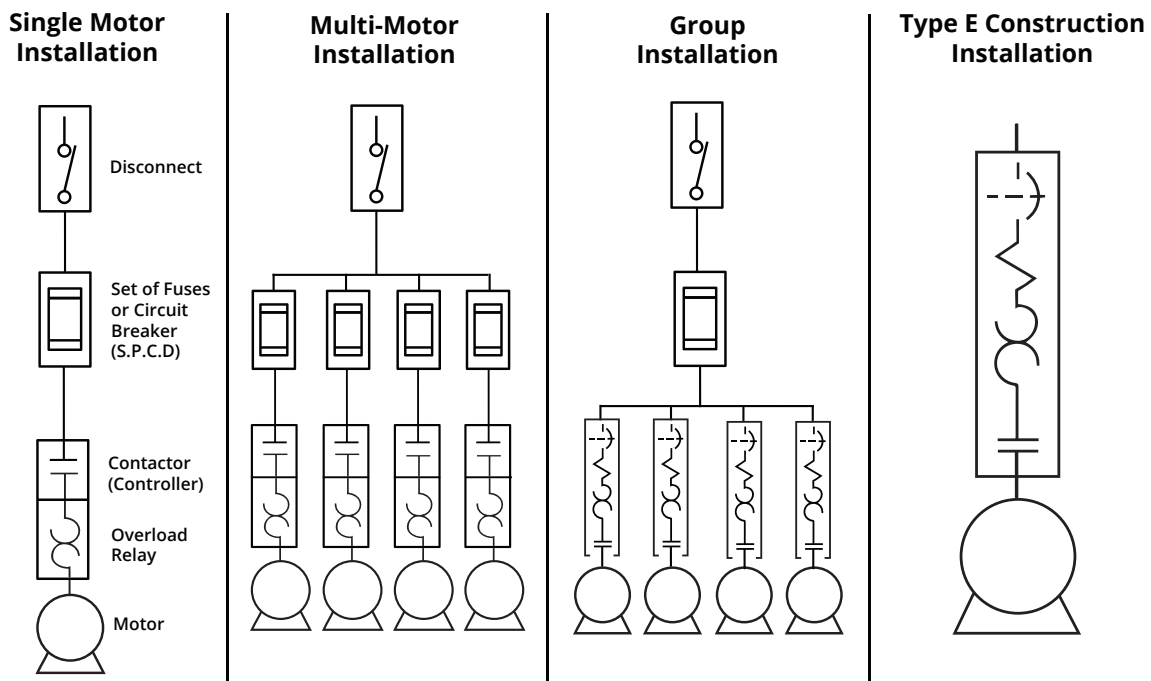
Since the contactor is not part of the self-protected test, the Type F combination motor controller will clear a short and protect equipment and operators, but the device may not be operational immediately after a fault occurs.

Type E/Type F Benefits

A Type E self-protected combination motor controller can be specified as either a Series 330 or a Series 630, while a Type F self-protected combination motor controller is specified as a Series 630. As a result, c3controls' customers can take advantage of our single part number cataloging system to order a complete starter assembly. If more configuration flexibility is required, he or she can take advantage of the modularity of the device and purchase the desired components separately.

c3controls' Type E/Type F combination motor controllers are optimized for single motor or few motor (less than 3) applications and provide the greatest benefit when used with any three phase motor $\leq 20\text{Hp}$ @ 460VAC that requires Trip Class 10 thermal overload protection. Both Series 330 and Series 630 devices mount onto a single 35 mm DIN rail or can be panel mounted, reducing labor costs and making installation quick and easy.

Application Summary



c3controls' users do not need to identify and size additional short circuit protective devices. Rather, these are determined by the self-protected combination motor controller. As a result, customers who purchase Type E/Type F devices will recognize simpler bills of materials, reduced inventory requirements, and lower overall costs.

The lock-off features of these devices ensure safety during maintenance and repair. The trip indicator allows a user to determine which type of fault has occurred, whether overload or short circuit, to ensure timely resolutions and minimal operational downtime. Additionally, since the Type E device is self-protected, equipment does not need to be replaced once a fault occurrence has been resolved.

The Type E/Type F combination motor controller's compact design and multi-functionality reduce panel space requirements allowing customers to increase panel density using smaller enclosures, which result in lower installation costs. Furthermore, the decreased number of total panel components and increased ease of specification produce panels and machines capable of operating with more function at lower overall costs.

c3controls' Type E/Type F combination motor controllers provide the kind of high functionality, simplistic specification and ease of installation that our customers require at a value unmatched in the electrical controls industry. These product features and benefits combined with c3controls' factory direct pricing, lifetime warranty, and guaranteed same day shipping make Type E/Type F combination motor controllers your one-stop motor control solution.

For more information about c3controls' IEC motor control product line, visit us at www.c3controls.com/products/direct-on-line-starters

References

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