



# Electrical Contactors

## How long should they last?

### *Contactors can and should be sized so that they never need replacing*

#### **Their Function**

Electrical contactors are electro-mechanical devices inside the crane's control panel that "open" and "close" when the pendant/remote control buttons are pushed. When an electrical contactor is "closed" the circuit is completed and a drive motor is turned on.

#### **Lots of Confusion: 3 Types of Contactors**

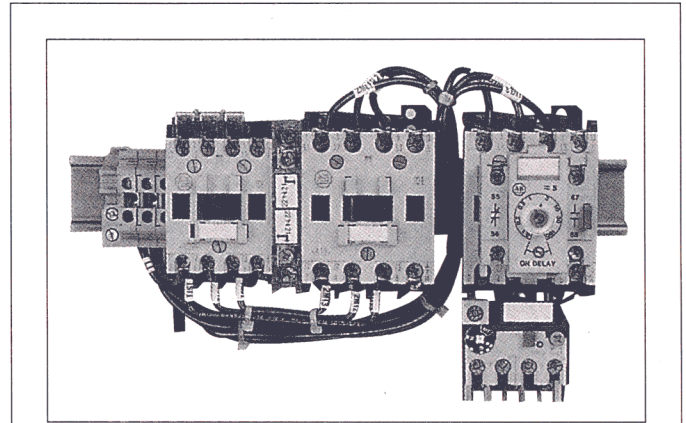
Over the years, electrical contactor manufacturers have played many "marketing games". Historically, 3 types of contactors were made: 1) NEMA rated contactors, 2) Definite purpose contactors, and 3) General purpose contactors. Marketing people said that NEMA rated contactors are the best, and general purpose contactors the worst. In fact, that contactors were quite similar in construction, but they were *sized* differently. For a given horsepower, a NEMA rated contactor was sized to provide 10 million starts/stops. A general purpose contactor was sized for only 1 million starts/stops. Had a larger general purpose contactor been used, 10 million starts/stops could have been achieved, and a general purpose contactor could have been as "good" as a NEMA rated contactor.

#### **Even More Confusion: A Fourth Type**

In an effort to end the confusion and make contactors the same around the world (Europe and Asia don't use this 3-tier system), major manufacturers such as Allen Bradley, Cutler Hammer and Square D, developed a new contactor – the IEC contactor. IEC stands for International Electro-technical Commission. These contactors are rated by the number of lifetime starts/stops and maximum allowable amperage. This no-nonsense approach was intended to eliminate the confusion, it didn't! Because an IEC contactor can be sized for 20 million, 10 million, or 1/4 million starts/stops, it remains difficult to make an easy comparison between the 4 types of contactors. Nearly all crane and hoist companies have switched to IEC contactors, for they are more readily available due to world wide mass production.

\*Based on standard design incorporating control panel with soft starts for bridge and trolleys. Hoist contactors are standard H-4 controls as provided by the manufacturer, and have differing lifetime starts/stops.

North American would like to thank the engineers at Allen-Bradley and Cutler-Hammer for their help in researching this technical report.



Many types of contactors are available, but it is lifetime starts/stops that matters most.

#### **Lifetime Starts/Stops is What Counts**

A crane purchaser should be concerned with how many starts/stops is the contactor rated for over its lifetime, not the type of contactor. North American IEC contactors\* are manufactured by Allen Bradley and are sized for 20 million starts/stops, which is twice what NEMA rated contactors are typically designed for.

#### **Achieving Maximum Contactor Life**

Contactors typically wear out because when they "close" a spark is created between the 2 metal tips that complete the circuit. Over time, this sparkling will either cause pitting of the tips or build up of non-conducting residue on the tips. To achieve extremely long contactor life, one of 2 approaches can be used:

**Options 1** – Simply use bigger tips to better handle the pitting and residue buildup caused by the sparking. This is approach of NEMA rated contactors.

**Option 2** – Eliminate the sparking, by use of advanced circuitry built into the control panel. With no sparks, there is no pitting or residue build up. This is the method used by North American Industries.

**North American sizes its contactors such that under normal operating conditions they will never need replacing**

| Crane Class              | Rated Life of Contactors (Starts/Stops) |
|--------------------------|---|
| Class "C"                | 250,000                                 |
| Standard Class "D"       | 10,000,000                              |
| North American Class "D" | 20,000,000                              |