



# IEC Contactors & Starters

## Guideform Specifications

### Description

All contactors shall follow European design conventions and shall conform to the standards of the International Electro-technical Commission (IEC), be listed by Underwriters Laboratories (UL) and be certified by the Canadian Standards Association (CSA). They shall include:

1. A full line of power contactors (3- and 4-pole)
2. A complete range of current overload relays
3. A full array of auxiliary devices to allow wide control functionality

The devices shall be easily assembled by either the supplier or the user. They shall be configurable into full-voltage non-reversing motor starters, full-voltage reversing motor starters, full-voltage two-speed two-winding motor starters, and wye delta motor starters. The accessories shall be easily assembled and shall include:

1. Auxiliary contacts, both normally open and normally closed, mountable on the front or either side of the contactor
2. Timer, front mountable
3. Mechanical latch attachment, front mountable
4. Mechanical-electrical interlock with two built-in normally closed contacts for units through 75hp @ 460V
5. Surge suppressor: RC, varistor and diode types
6. Panel mounted overload relay capability

All components of the line shall be suitable for low voltage applications and shall therefore carry a 600V AC rating.

The power components (contactors and overload relays) shall be tested to UL and CSA standards and carry those listing marks. They also shall carry the appropriate listing marks showing compliance with European agency approvals based on IEC performance standards.

Auxiliary components, such as auxiliary contacts, also shall carry all of the above agency approvals and be capable of carrying 10 amperes of AC current at 600 volts in accordance with heavy pilot industrial duty (A600 rating) or clearly mark any and all exceptions.

### Product

#### Contactors

Contactors shall function as electrically operated, three phase (or, in some cases, single phase) power switches that, when coupled with appropriate overload relays, function as full-voltage non-reversing motor starters. They shall have the capability of providing these functions for standard motors throughout the range of horsepower ratings from 5hp to 500hp @ 460Vac, three phase. The contactor line shall include 4-pole contactors in two versions: 4NO from 25A to 650A as a maximum current rating AC-1, and 2NO-2NC from 7.5hp to 50hp @ 460V.

The contactors shall provide a suitable method by which the user can connect power wires to both sides of the contactor. In the smaller sizes (5hp-75hp @ 460V), the wiring shall be fully inserted into a box lug (screw or terminal) and, in the larger sizes (125hp-500hp @ 460V), a bus bar shall be provided. It shall be possible to attach a separate lug as an accessory to the bus bar for ease of wiring if desired. The power terminals in the smaller frame sizes of contactor shall be recessed within the frame of the device, as shall the wire lugs, to provide finger and back-of-hand protection.

The power line and load lug connection of the power devices shall be labeled and identified with both U.S. terminology (i.e., L1, L2, L3, T1, T2, T3) and European terminology (i.e., 1,3,5,2,4,6). These markings shall be large and easy to read.

Electrical operation of the power contactor shall occur when a single phase control power voltage is applied across a wide horsepower/kilowatt range. Horsepower/ kilowatt ratings are shown below:

General Purpose Ratings	Max. FLA	1 Phase - Hp (A)		3 Phase - Hp (A)				Power In 380/400V kW (A)
		115V	230V	200V	230V	460V	575V	
25	10	.5 (9.8)	1.5 (10)	3 (11)	3 (9.6)	5 (7.6)	7.5 (9)	4 (9)
25	13.8	.75 (13.8)	2 (12)	3 (11)	3 (9.6)	7.5 (11)	10 (11)	5.5 (12)
32	17.5	1 (16)	3 (17)	5 (17.5)	5 (15.2)	10 (14)	15 (17)	7.5 (18)
32	22,22,17 <sup>A</sup>	1.5 (20)	3 (17)	5 (17.5)	7.5 (22)	15 (21)	15 (17)	11 (25)
54	32	2 (24)	5 (28)	10 (32)	10 (28)	20 (27)	25 (27)	16 (32)
55	34,34,27 <sup>A</sup>	3 (34)	5 (28)	10 (32)	10 (28)	25 (34)	25 (27)	18.5 (40)
80	48	3 (34)	7.5 (40)	15 (48)	15 (42)	30 (40)	40 (41)	22 (50)
100	62	5 (56)	10 (50)	20 (62)	20 (54)	40 (52)	50 (52)	30 (65)
110(O) 102(E)	68	5 (56)	15 (68)	20 (62)	25 (68)	50 (65)	60 (62)	37 (80)
140(O) 120(E)	80	7.5 (80)	15 (68)	25 (78)	30 (80)	60 (77)	75 (77)	45 (95)
140(O) 120(E)	104,96,80 <sup>A</sup>	10 (100)	20 (88)	30 (92)	40 (104)	75 (96)	75 (77)	55 (105)
175	156	—	—	50 (149.5)	60 (145)	125 (156)	125 (125)	90 (185)
200	192	—	—	60 (169.4)	75 (192)	150 (180)	150 (144)	132 (250)
310	302	—	—	100 (285)	100 (248)	250 (302)	300 (289)	160 (310)
500	398	—	—	125 (358)	150 (360)	300 (361)	400 (382)	220 (420)
650	480	—	—	150 (414)	200 (480)	400 (477)	500 (472)	280 (550)
650(E) 750(O)	602	—	—	200 (552)	250 (602)	500 (590)	600 (574)	375 (700)

<sup>A</sup> Amps at 230V/460V/575V

Note: (O) = Open, (E) = Enclosed



## Guideform Specifications

All power contactors above 125hp @ 460V shall incorporate an electronic module to control the voltage coil for lower power consumption, longer life and surge suppression

All models of the power contactor below 75hp @ 460V shall accept the full range of accessory devices and allow mounting of the accessories on the front or either side.

Contactors shall be provided with at least one normally open auxiliary contact for customer use.

A manufacturer's label affixed to each contactor shall clearly show the horsepower and kilowatt ratings of the device, and the UL, CSA and other appropriate listing marks. This label shall be permanent and the marking shall neither fade nor otherwise become illegible.

All power contactors up to 75hp @ 460V shall be provided with three coil terminals (A1-A2, A2). Coil terminal A2 shall be available on both upper and lower faces of the terminal for convenience of user wiring and ease of use.

Terminals on all contactors up to 75hp @ 460V shall simultaneously accept two wires of differing cross-section to simplify wiring and reduce wiring time. Power contactors from 5hp to 15hp @ 460V range shall accept two wires per terminal. Terminals on power contactors from 20hp to 75hp @ 460V shall be double clamp type, permitting the connection of two flexible or rigid power and control wires of differing sizes.

All power contactors up to 75hp @ 460V shall allow mounting both on a 35mm DIN rail, through a permanently installed clip on the device, and to a panel back plate with four-point screw attachment. Power contactors larger than 75hp @ 460V shall mount through a four-point screw attachment only.

The surge suppressor block shall fit directly in the upper A1-A2 coil terminals without reducing available wiring space.

Four different auxiliary contact combinations shall be available on relay devices: 4NO, 3NO-1NC, 2NO-2NC and 4NC.

The complete line of devices, in addition to carrying all UL, CSA and IEC listings, shall also be rated to:

1. CSA elevator-duty ratings
2. Capacitor switching duty values
3. Transformer switching duty values
4. Type 2 protection with approved fuse type
5. DC power current carrying capability values

Contactors shall have a professional appearance reflecting a quality design and industrial ruggedness. The manufacturer's logo shall be clearly visible.

### Overload relays

Overload relays shall consist of models that satisfy applications in all motor current ranges from fractional horsepower ratings ( $\frac{1}{4}$ hp,  $\frac{1}{2}$ hp,  $\frac{3}{4}$ hp) up to 500hp @ 460Vac, three phase power. In addition, they shall have the capability, when wired to the manufacturer's specifications, of being applied in single phase motor circuits of either 230V AC or 115V AC up to a 20hp rating.

The overload relays shall provide Class 10 overload protection to motors. Class 30 overload relays shall be available for contactors rated at 125 hp @ 460V and larger.

The overload relay shall have an auxiliary contact of a normally open form and a normally closed contact to be wired in series with the contactor coil. A method to test the overload relay by manually causing it to trip shall be provided and confirmation of that contact trip shall be visible. The manual trip mechanism shall be accessible without disassembling any components, but protected from accidental actuation.

The overload current setting adjustment shall be front-mounted and screwdriver operable. The calibrated legend and set points shall be easy to read. This adjustment shall change only when deliberately done so. A protective cover for this adjustment shall be an option.

All overload relays, up to 75hp @ 460V, shall be easily attached to the contactors for which they have been designed. Mounting stability shall be accomplished by both tightening the three load terminals into which the overload relay fits and by the use of a molded clip that rests on a receiving lip or edge of the contactor.

In accordance with IEC design standards, all electrical current carrying parts (terminals, screws, etc.) shall be recessed in the overload relay's housing to provide total finger and back-of-hand protection to reduce or eliminate the risk of accidental shock.

Overload relays shall be available in two types: manual reset only and manual/automatic reset. In the case of manual/automatic reset, the desired method shall be selectable by setting a switch on the overload relay. When the manual/automatic overload relay is ordered, the manufacturer shall ship it set to the manual operation position.

The manufacturer's nameplate shall display the UL, CSA and appropriate IEC listings and shall clearly show the manufacturer's part number for easy identification. The nameplate shall be permanently affixed and the marking shall not fade, run, smudge or otherwise become illegible over time.

### Coils

Contactors coils shall provide sufficient power to magnetically operate the mechanism within the tolerances of the design and shall be electrically isolated from the power circuit and its pieces.

The coils shall be clearly labeled or stamped by the manufacturer with their voltage and frequency ratings. This marking shall be permanently affixed.

The coils in the smaller devices shall have power applied directly to them, while the coils in sizes 125 hp @ 460V and above shall receive power through an electronic actuation module. The electronic actuation module shall provide positive pickup and positive dropout, thereby avoiding chatter under low voltage conditions. Audible noise during operation shall be minimized for use in offices and quiet environments. Coil inrush shall be 840VA or less. Holding burden shall be 18VA or less. Coils shall be provided with a wide range of power selections of both AC types and, up to 25hp @ 460V, DC types. These selections shall be as shown on the following page:

AC Voltage		DC Voltage
60 Hz	50 Hz	
24	24	—
—	—	12
—	—	24
48	42	—
—	—	48
120	110	—
—	—	125
208	—	—
277	220/230	—
240	—	—
—	—	250
480	380/400	—
—	415	—
600	500	—

Additional coil selections shall be available for specialized applications.

### Accessories

#### Timer

The timer accessory shall be mountable on the front of every contactor up to 75hp @ 460V and shall include two contacts, one normally open and one normally closed. Timers shall be available in two styles, ON delay and OFF delay, and two ranges, 0.1-30 seconds and 10 to 60 seconds. The desired time shall be adjustable throughout the range by turning a calibrated knob to a set point. A mechanical stop will be provided to prevent adjustment beyond setting range. Contact operation shall occur upon time expiration and contact current load shall be consistent with a heavy pilot industry duty rating of A600 P300.

#### Mechanical latch

The mechanical latch accessory shall be a front-mountable device that fits every contactor up to 75hp @ 460V and shall incorporate an electrical release coil for contactor reset. The release coils available shall be as shown below.

- 24V-32V
- 48V-72V
- 110V-125V
- 208V-277V
- 380V-440V
- 480V-600V

#### Front-mount and side-mount auxiliary contacts

With just two front-mounted auxiliary contact blocks — INO and INC — it shall be possible to achieve any combination of auxiliaries while maintaining EN50012 numbering standards, thus reducing inventory requirements and increasing flexibility. Overlapping contact versions also shall be available on both front-mounted auxiliary contact blocks.

All contactors shall accommodate the same side-mounted auxiliary contact block. Such side-mounted auxiliary contact blocks shall be available in 2NO and 1NO-1NC versions.

Contactors shall accommodate maximum auxiliary contacts as shown on the following table.

#### Mechanical-electrical interlock

Horsepower @ 460V	Max. Aux. Contacts	Max. Contact Block Configuration
5-15	4	4 front-mount or 1 side-mount on each side
20-25	6	4 front-mount plus 1 side-mount or 2 front-mount plus 1 side-mount on each side
30-75	8	6 front-mount plus 1 side-mount or 2 side-mount on each side
125-500	8	2 side-mount on each side

Mechanical-electrical interlocks shall fit in all contactors from 5hp to 75hp @ 460V and shall provide two built-in NC contacts. A second mechanical interlock for all contactors 125 hp @ 460 V and larger shall be available.

#### Surge suppressor

Surge suppressors shall mount directly in the upper A1-A2 coil terminals in contactors from 5hp to 75hp @ 460V without reducing the available wiring space. The line shall provide R/C, diode and varistor surge suppressor accessories.



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