

c3controls' Series 620 assembled starters are compact in size, are easy to install, and provide reliable and accurate protection against overload and phase loss conditions. Power and control circuit terminals are readily accessible for easy wiring, while shared accessories enable starters to be customized for virtually any application. c3's starters will help reduce your costs and enhance the features and performance of your equipment.

# IEC CONTACTOR & OVERLOAD RELAY ASSEMBLIES

Direct-On-Line Starters 68  
Contactor + Overload Relay

Accessories, Replacement 71  
Components and Circuit Diagrams

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NOTE: The scope (range, description, price, specifications, dimensions, etc.) of the product featured in this section is subject to change without notice. Refer to [www.c3controls.com](http://www.c3controls.com) for product updates.

#### Conformity to Standards:

**CONTACTORS**  
UL 508

CSA C22.2 No. 14  
IEC 60947-1, 60947-4-1

#### OVERLOAD RELAYS

UL 508  
CSA C22.2 No. 14  
IEC 60947-1, 60947-4-1

#### Certifications:

UL File #: E236197 (Guide NLDX, NLDX7),  
E68568 (Guide NKCR, NKCR7)

CE Marked (per EU Low Voltage Directive  
2006/95/EC and 93/68/EEC)

UL File #: E68568 (Guide NKCR, NKCR7)

CE Marked (per EU Low Voltage Directive  
2006/95/EC and 93/68/EEC)



Visit [www.c3controls.com](http://www.c3controls.com) to download product certifications.

**IT'S EASY TO BUILD YOUR OWN DIRECT-ON-LINE (DOL) STARTER**

Simply pick the code number from each of the sections below and combine them to build your part number. See page 6 for more detailed directions.

**Direct-On-Line Starters (Contactor + Overload Relay)**

**620** - I II III IV V

Example: To build one of our most popular DOL Starters, the part number would be **620 + II + III + IV + V** or **620-S09D10-2C40**


**I. STARTER TYPE**

CODE	DESCRIPTION	PRICE
620	Direct-On-Line (DOL) Starter: Series 300 Contactor + Series 320 Overload Relay	\$ 7.00

**II. NON-REVERSING CONTACTOR (3 NORMALLY OPEN POLES)**

CODE	MAX. Ie (A)		RATINGS FOR SWITCHING AC MOTORS - AC-2, AC-3, AC-4										CONTACTOR CAT. NO.	PRICE
			kW (50Hz)				HP (60Hz)							
			3 PHASE				1 PHASE		3 PHASE					
	AC-3	AC-1	230V	400/415V	500V	690V	115V	230V	200V	230V	460V	575V		
S09	9	25	2.2	4	5.5	5.5	1/2	1-1/2	3	3	5	7-1/2	300-S09N30	\$ 12.00
S12	12	25	3	5.5	7.5	7.5	3/4	2	3	3	7-1/2	10	300-S12N30	\$ 18.00
S18	18	32	4	7.5	10	10	1	3	5	5	10	15	300-S18N30	\$ 23.00
S25	25	45	7.5	11	15	15	2	5	7-1/2	7-1/2	15	15	300-S25N30	\$ 29.00
S32	32	60	9	15	18.5	18.5	3	5	10	10	20	25	300-S32N30	\$ 35.00
S40	40	60	11	18.5	25	30	3	5	10	15	30	25	300-S40N30	\$ 48.00
S50	50	90	15	22	30	35	3	7-1/2	15	15	40	40	300-S50N30	\$ 59.00
S65	65	110	18.5	30	40	45	5	10	20	20	50	50	300-S65N30	\$ 67.00
S80	80	110	22	37	45	45	7-1/2	15	20	25	50	60	300-S80N30	\$ 77.00
S95	95	140	25	45	55	55	7-1/2	15	25	30	60	75	300-S95N30	\$133.00
S105	105	140	30	55	65	65	10	20	30	40	75	75	300-S105N30	\$153.00

**III. COIL VOLTAGE CODE**
**AC COIL VOLTAGE CODES**

VOLTAGE	12	24	48	110	120	208	220	230	240	277	380	400	400 ~ 415	440	480	500	550	600
50Hz	G	H	K	D	—	—	M	—	—	—	Q	AM	R	S	—	T	U	—
60Hz	B	C	J	—	D	L	—	—	F	P	—	—	—	—	R	—	—	T
50/60Hz	XB	XC	XJ	XD	XAD	—	XAJ	XN	XF	—	—	XAM	—	XQ	—	—	—	—

**DC COIL VOLTAGE CODES**

VOLTAGE	12	24	24 ~ 28	48	42 ~ 50	110	125	110 ~ 130	208 ~ 240	250	PRICE
-S09 to -S25	ZB	ZC	—	ZK	—	ZD	ZQ	—	—	ZP	\$ 8.00
-S32 to -S40	—	—	EC	—	EK	—	—	EL	EE	—	\$ 28.00
-S50 to -S105	—	—	EC	—	EK	—	—	EL	EE	—	\$131.00

**IV. CONTACTOR AUXILIARY CONTACT CONFIGURATION**

CODE	DESCRIPTION	PRICE
00	Without Auxiliary Contacts (Contactors 300-S25 to 300-S105 only)	\$ —
10	1 Normally Open*	\$ 4.00
01	1 Normally Closed*	\$ 4.00

\*NOTE: Integral right side mounted on 9A ~ 18A contactors, front mounted on 25A ~ 105A contactors.

**SEE OPPOSITE PAGE FOR  
PART BUILDER CHART V.**

DISCOUNT  
SCHEDULE **C**

## SOME OF OUR MOST POPULAR DOL STARTER CONFIGURATIONS

RATINGS FOR SWITCHING AC MOTORS, AC-2, AC-3, AC-4												
MAX. IE (A) AC-3	HP (60HZ)						COIL VOLTAGE	CONTACTOR AUX. CONTACTS		CURRENT ADJUSTMENT RANGE (A)*	CAT. NO.	PRICE
	1 PHASE		3 PHASE					NO	NC			
	115V	230V	200V	230V	460V	575V						
9					1/2	1/2	120V 60Hz/110V 50Hz	1	0	0.8 ~ 1.2	620-S09D10-2D12	\$ 46.50
					3/4	3/4	120V 60Hz/110V 50Hz	1	0	1.2 ~ 1.8	620-S09D10-2D18	\$ 46.50
						1	120V 60Hz/110V 50Hz	1	0	1.8 ~ 2.8	620-S09D10-2D28	\$ 46.50
		1/6	1/2	1/2	1	1-1/2	120V 60Hz/110V 50Hz	1	0			
						2	120V 60Hz/110V 50Hz	1	0			
		1/4	3/4	3/4	1-1/2	3	120V 60Hz/110V 50Hz	1	0	2.8 ~ 4.0	620-S09D10-2D40	\$ 46.50
		1/3				2	120V 60Hz/110V 50Hz	1	0			
	1/6	1/2	1	1	3		120V 60Hz/110V 50Hz	1	0	4.0 ~ 6.3	620-S09D10-2D63	\$ 46.50
	1/4						120V 60Hz/110V 50Hz	1	0			
	1/3	3/4	1-1/2	1-1/2		5	120V 60Hz/110V 50Hz	1	0	5.6 ~ 8.0	620-S09D10-2D80	\$ 46.50
12		1	2	2	5	7-1/2	120V 60Hz/110V 50Hz	1	0	7.0 ~ 10.0	620-S09D10-2U10	\$ 46.50
	1/2	1-1/2	3	3			120V 60Hz/110V 50Hz	1	0	8 ~ 12.5	620-S09D10-2U12	\$ 46.50
					7-1/2	10	120V 60Hz/110V 50Hz	1	0	8 ~ 12.5	620-S12D10-2U12	\$ 52.50
18	3/4	2					120V 60Hz/110V 50Hz	1	0	10 ~ 15	620-S12D10-2U15	\$ 52.50
	1			5	10		120V 60Hz/110V 50Hz	1	0	11 ~ 17	620-S18D10-2U17	\$ 57.50
25		3	5			15	120V 60Hz/110V 50Hz	1	0	15 ~ 23	620-S18D10-2U23	\$ 57.50
				7-1/2	15		120V 60Hz/110V 50Hz	1	0	15 ~ 23	620-S25D10-2U23	\$ 63.50
32	2	5	7-1/2				120V 60Hz/110V 50Hz	1	0	22 ~ 32	620-S25D10-2U32	\$ 63.50
				10	20	20	120V 60Hz/110V 50Hz	1	0	15 ~ 23	620-S32D10-2U23	\$ 69.50
40		5				25	120V 60Hz/110V 50Hz	1	0	22 ~ 32	620-S32D10-2U32	\$ 69.50
	3		10				120V 60Hz/110V 50Hz	1	0	25 ~ 40	620-S32D10-3U40	\$ 83.50
50				10		25	120V 60Hz/110V 50Hz	1	0	22 ~ 32	620-S40D10-2U32	\$ 82.50
	3				30		120V 60Hz/110V 50Hz	1	0	25 ~ 40	620-S40D10-3U40	\$ 96.50
	3	7-1/2		15	30	30	120V 60Hz/110V 50Hz	1	0	32 ~ 50	620-S50D10-4U50	\$115.00
65					40		120V 60Hz/110V 50Hz	1	0			
			15		40		120V 60Hz/110V 50Hz	1	0	40 ~ 57	620-S50D10-4U57	\$115.00
		10			40	50	120V 60Hz/110V 50Hz	1	0	40 ~ 57	620-S65D10-4U57	\$123.00
80	5			20			120V 60Hz/110V 50Hz	1	0	50 ~ 63	620-S65D10-4U63	\$123.00
			20		50		120V 60Hz/110V 50Hz	1	0	57 ~ 70	620-S65D10-4U70	\$123.00
95							120V 60Hz/110V 50Hz	1	0	50 ~ 63	620-S80D10-4U63	\$133.00
		15		25	50	60	120V 60Hz/110V 50Hz	1	0	57 ~ 70	620-S80D10-4U70	\$133.00
105			25		60	75	120V 60Hz/110V 50Hz	1	0	63 ~ 80	620-S95D10-5U80	\$197.00
	7-1/2			30			120V 60Hz/110V 50Hz	1	0	78 ~ 97	620-S95D10-5U97	\$197.00
105						75	120V 60Hz/110V 50Hz	1	0	63 ~ 80	620-S105D10-5U80	\$217.00
		20	30				120V 60Hz/110V 50Hz	1	0	78 ~ 97	620-S105D10-5U97	\$217.00
	10			40	75		120V 60Hz/110V 50Hz	1	0	90 ~ 112	620-S105D10-5X11	\$217.00

## V. OVERLOAD RELAY CURRENT ADJUSTMENT

CODE	INSTALLS ON CONTACTOR	CURRENT ADJUST. RANGE (A)	OVERLOAD RELAY CAT. NO.	PRICE
2C40	-S09, -S12, -S18, -S25, -S32, -S40	0.28 ~ 0.40	320-B2C40	\$ 23.50
2C63		0.4 ~ 0.63	320-B2C63	\$ 23.50
2C80		0.56 ~ 0.8	320-B2C80	\$ 23.50
2D12		0.8 ~ 1.2	320-B2D12	\$ 23.50
2D18		1.2 ~ 1.8	320-B2D18	\$ 23.50
2D28		1.8 ~ 2.8	320-B2D28	\$ 23.50
2D40		2.8 ~ 4.0	320-B2D40	\$ 23.50
2D63		4.0 ~ 6.3	320-B2D63	\$ 23.50
2D80		5.6 ~ 8.0	320-B2D80	\$ 23.50
2U10		7.0 ~ 10.0	320-B2U10	\$ 23.50
2U12		8 ~ 12.5	320-B2U12	\$ 23.50
2U15		10 ~ 15	320-B2U15	\$ 23.50
2U17		11 ~ 17	320-B2U17	\$ 23.50
2U23		15 ~ 23	320-B2U23	\$ 23.50
2U32		22 ~ 32	320-B2U32	\$ 23.50
3U40	-S32, -S40	25 ~ 40	320-B3U40	\$ 37.50
4U50	-S50, -S65, -S80	32 ~ 50	320-B4U50	\$ 45.00
4U57		40 ~ 57	320-B4U57	\$ 45.00
4U63		50 ~ 63	320-B4U63	\$ 45.00
4U70		57 ~ 70	320-B4U70	\$ 45.00
5U80	-S95, -S105	63 ~ 80	320-B5U80	\$ 53.00
5U97		78 ~ 97	320-B5U97	\$ 53.00
5X11		90 ~ 112	320-B5X11	\$ 53.00

\*NOTE: HP ratings shown in the table above are for reference. The final selection of the overload relay must be based on the actual motor full load current.

## AVAILABLE FRAME SIZES FOR DOL STARTERS



## IEC DIRECT-ON-LINE (DOL) STARTERS

c3controls Series 620 Direct-On-Line (DOL) Starters are assemblies of a Series 300 Contactor and a Series 320 Overload Relay. The contactor provides the repeated On/Off switching for the motor. The overload relay includes Class 10 thermal trip elements for overload protection of the motor and motor branch circuit conductors. Small size, IP20 guarded terminals with dual terminal markings, and shared accessories will help reduce your total installed costs and enhance the features and performance of your equipment. Just look and see what the Series 620 assembled starters have to offer.

Product features include:

- Modular design and common accessories including auxiliary contacts and surge suppressors.
- Snap-on accessories are easily installed without the use of tools, lowering assembly and installation costs.
- IP20 guarded terminals with dual terminal markings prevent accidental contact with live parts.
- Device identification marker for labeling the starter simplifies trouble shooting in panels with many devices.
- Universal ratings and markings: A, kW, and HP ratings as well as applicable 3rd party certification markings.
- Single phase sensitivity to protect motors against damaging phase loss conditions.
- Stop button for convenient and economical control circuit wiring.
- Ambient temperature compensation ensures reliable motor protection even in high temperature environments.
- Compact size – five (5) frame sizes for devices rated from 9A to 105A. Starters rated 15HP @ 460V (11kW @ 400V) are only 45mm (1-49/64") wide reducing panel area requirements – smaller enclosures can be used for lower installed costs.
- AC and DC operating coils for control circuit application flexibility. 32A to 105A DC operated devices feature electronic coil control.
- Single 35mm DIN rail mounting for all starters from 9A to 105A for fast and easy installation and removal or panel mounting for more secure installation in high shock and vibration applications. Our 9A to 25A starters are easily installed or removed without the use of tools.
- Unobstructed access to the two contactor coil terminals on the line-side of the starter makes control circuit wiring simple.
- All Series 300 Contactor and Series 320 Overload Relay features.



## UNIQUE PRODUCT FEATURES

### MULTI-FUNCTION RELAYS

c3controls Series 320 Bimetallic Overload Relays feature a multi-function reset button enabling the user to select the reset mode – manual or automatic and whether or not to enable the test function.

When the reset button is pressed, with the test function enabled, the Normally Open (NO) contact closes and the Normally Closed (NC) contact opens to verify the control circuit functionality. In addition, the NC contact can be used in a "Stop" circuit. With the test function disabled, the NO and NC contacts do not change state when the reset button is pressed – preventing unauthorized personnel from operating the control circuit.

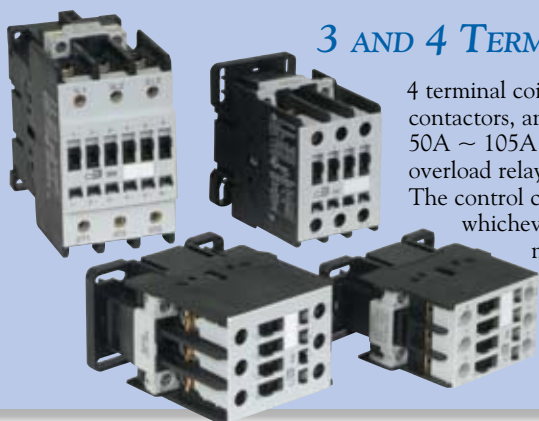
Multiple functions in a single device help you to reduce inventory and customize the overload relay operation to provide the performance and features you need for your specific application.



A – Automatic Reset Only  
AUTO – Automatic Reset and Test  
H – Manual Reset Only  
HAND – Manual Reset and Test

### 3 AND 4 TERMINAL COILS

4 terminal coils on 9A ~ 40A AC operated contactors and 32A ~ 40A DC operated contactors, and 3 terminal coils on 9A ~ 25A DC operated contactors and 50A ~ 105A AC or DC operated contactors, are easily accessible on contactor and overload relay assemblies or contactor and motor protection circuit breaker assemblies. The control circuit can be wired from the line side or the load side of the contactor, whichever is most convenient for the installation. Control circuit wire runs can be minimized, and the devices can be easily substituted in your existing equipment without disturbing or changing your control wires. So no matter what components are being used, Series 300 Contactors can be easily and quickly wired, reducing your labor and installation costs.



Modular contactor accessories can be installed in the field on all starters. Front and side mounted auxiliary contacts are common to all starter sizes. Surge suppressors install easily and securely to the contactor coil terminals. IEC STARTERS SERIES 620

## FRONT MOUNTED AUXILIARY CONTACTS



Our front mounted auxiliary contacts feature IP20 guarded terminals to protect against accidental contact with live parts. The device identification marker simplifies trouble shooting in panels with many contactors. These contacts snap-on and install without the use of tools. NOTE: See chart below for maximum number of front mounted auxiliary contacts. See IEC Contactor section, page 34, for front mounted auxiliary contact part number and ordering information.

### MAXIMUM NUMBER OF FRONT OR SIDE MOUNTED AUXILIARY CONTACTS

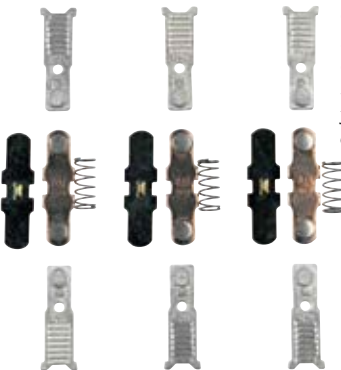
CONTACTOR	MAXIMUM NUMBER
S09, S12, S18, S25	4
S32, S40	6
S50, S65, S80, S95, S105	8

## SURGE SUPPRESSORS



Coil mounted surge suppressors protect sensitive electronic components in control circuits from damaging line voltage spikes. See IEC Contactor section, page 35, for surge suppressor part number and ordering information.

## CONTACT KITS



One contact kit includes six stationary contacts, three moving contacts and miscellaneous parts. See IEC Contactor section, page 36, for contact kit part number and ordering information.

DISCOUNT  
SCHEDULE **C**

## SIDE MOUNTED AUXILIARY CONTACTS



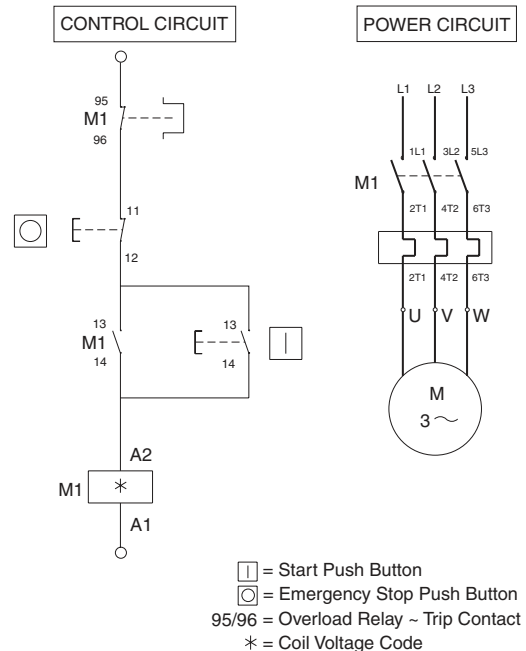
Side mounted auxiliary contacts feature IP20 guarded terminals to protect against accidental contact with live parts. NOTE: See chart at left for maximum number of side mounted auxiliary contacts. See IEC Contactor section, page 34, for side mounted auxiliary contact part number and ordering information.

## OPERATING COILS



Replacement coils for use with S09 - S105 IEC Contactors. See IEC Contactor section, page 36, for operating coil part number and ordering information.

## SERIES 620 DOL STARTER CIRCUIT DIAGRAMS



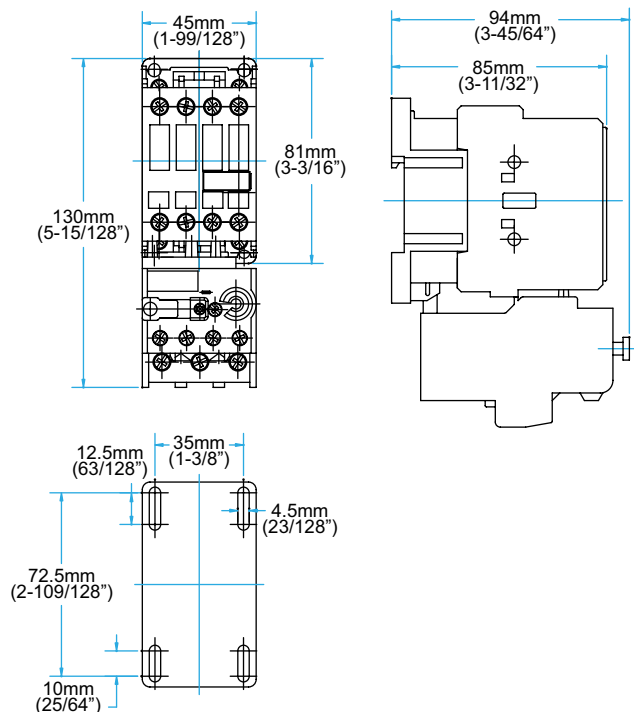


**SPECIFICATIONS:**
**SERIES 620 DIRECT-ON-LINE (DOL) STARTER SPECIFICATIONS**

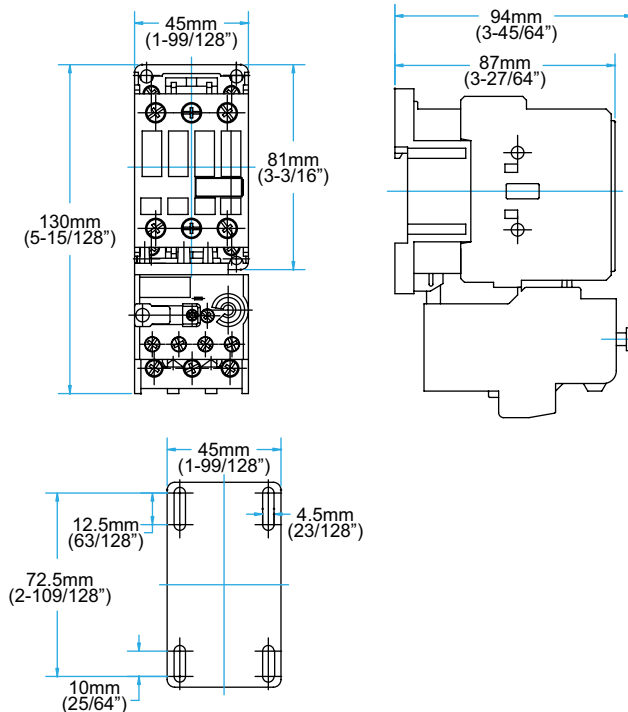
		STARTER CURRENT RATING CODE										
	UNITS	S09	S12	S18	S25	S32	S40	S50	S65	S80	S95	S105
ELECTRICAL GENERAL												
		For detailed contactor specifications by starter rating code, see page 37										
		For detailed overload relay specifications by catalog number prefix, see page 62										
Rated Operating Frequency	Hz	25 ~ 400										
Rated Control Frequencies	Hz	AC: 50Hz, 60Hz, 50/60Hz; DC; DC/AC 50/60Hz										
ELECTRICAL UL/CSA APPLICATIONS												
		For detailed contactor specifications by starter rating code, see page 37										
		For detailed overload relay specifications by catalog number prefix, see page 62										
Rated Operating Voltage, Ue	VAC	600										
Short Circuit Current Ratings @ 600V AC	kA	5						10				
Maximum Fuse Size (varies by current adjustment range of overload relay)	A	25	25	32	32	60	60	90	110	110	140	140
ELECTRICAL IEC APPLICATIONS												
		For detailed contactor specifications by starter rating code, see page 37										
		For detailed overload relay specifications by catalog number prefix, see page 62										
Rated Insulation Voltage, Ui	V	1,000										
Rated Impulse Voltage, Uimp	kV	6							8			
Rated Operating Voltage, Ue	VAC	690										
COIL CHARACTERISTICS												
		For detailed contactor specifications by starter rating code, see page 38										
Rated Insulation Voltage, Ui	V	1,000										
Operating Limits		80 ~ 110% of Rated Coil Voltage										
MECHANICAL												
		For detailed contactor specifications by starter rating code, see page 39										
ENVIRONMENTAL												
		For detailed contactor specifications by starter rating code, see page 39										
		For detailed overload relay specifications by catalog number prefix, see page 62										
Ambient Operating Temperature	°C/°F	-25 to +55 (-13 to +131)										
Ambient Storage Temperature	°C/°F	-40 to +70 (-104 to +158)										
Altitude	m/ft.	2,000/6,528										
CONSTRUCTION - GENERAL												
		For detailed contactor specifications by starter rating code, see page 39										
		For detailed overload relay specifications by catalog number prefix, see page 63										
Number of Poles		3										
Pollution Degree		3										
Trip Class		10										
INGRESS PROTECTION												
Main Terminals (with conductors connected)		IP20										
Coil Terminals		IP20										
Auxiliary Contact Terminals		IP20										
RoHS Compliance		For RoHS compliance documentation by product, refer to <a href="http://www.c3controls.com">www.c3controls.com</a> .										
CONSTRUCTION - CONDUCTOR CROSS SECTIONS												
		For detailed contactor specifications by starter rating code, see page 39										
		For detailed overload relay specifications by catalog number prefix, see page 63										

**CONTACTOR + OVERLOAD RELAY ASSEMBLIES - AC COIL**

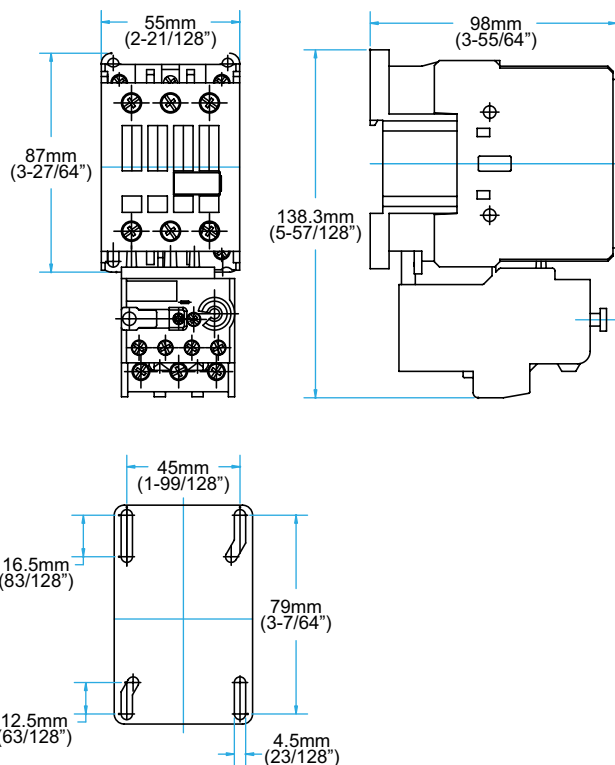
300-S09, 300-S12 or 300-S18 CONTACTOR WITH  
320-B2\*\*\* OVERLOAD RELAY



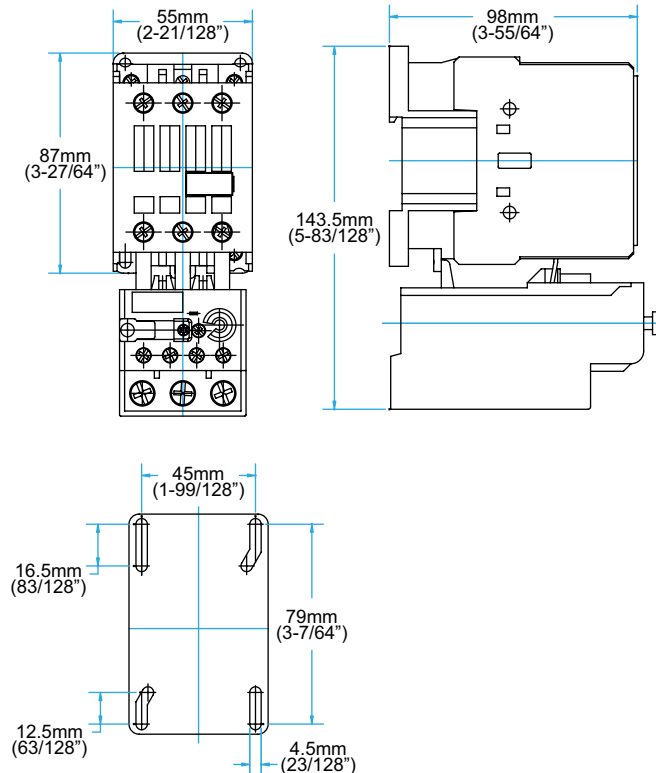
300-S25 CONTACTOR WITH  
320-B2\*\*\* OVERLOAD RELAY



300-S32 or 300-S40 CONTACTOR WITH  
320-B2\*\*\* OVERLOAD RELAY

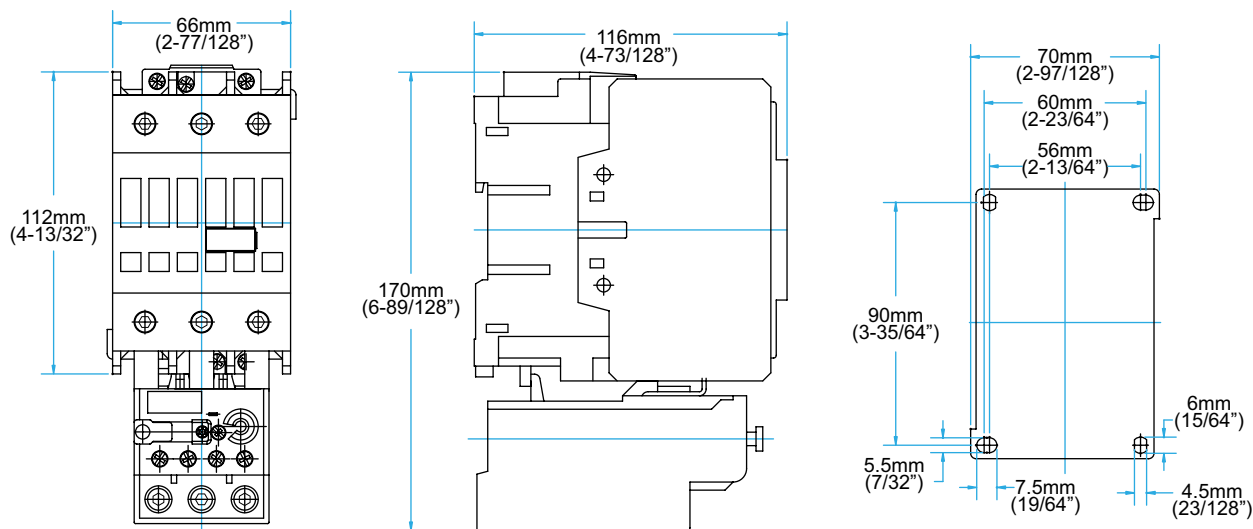


300-S32 or 300-S40 CONTACTOR WITH  
320-B3U40 OVERLOAD RELAY

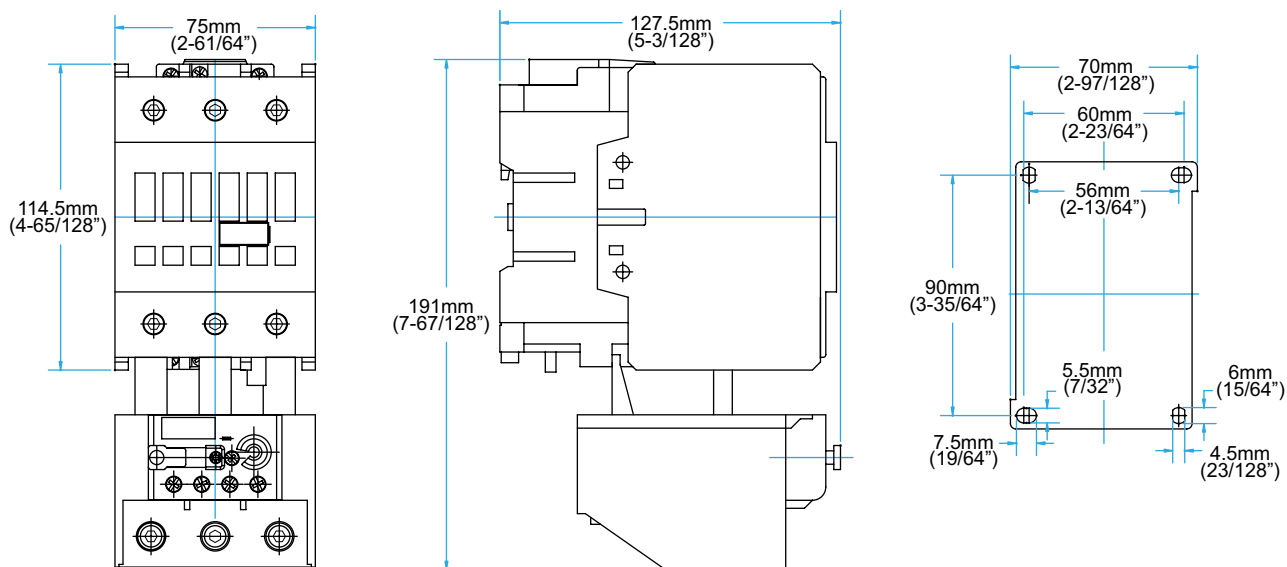


**CONTACTOR + OVERLOAD RELAY ASSEMBLIES - AC COIL (CONT.)**

300-S50, 300-S65 or 300-S80 CONTACTOR WITH 320-B4\*\*\* OVERLOAD RELAY



300-S95 or 300-S105 CONTACTOR WITH 320-B5\*\*\* OVERLOAD RELAY

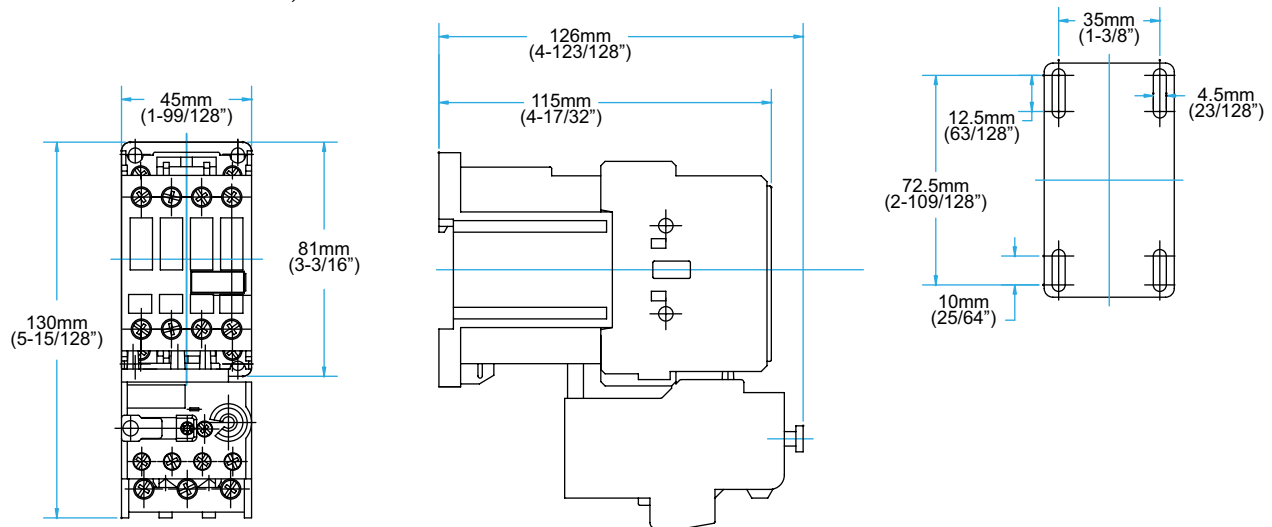


**VISIT [WWW.C3CONTROLS.COM](http://WWW.C3CONTROLS.COM)  
TO DOWNLOAD CAD DRAWINGS**

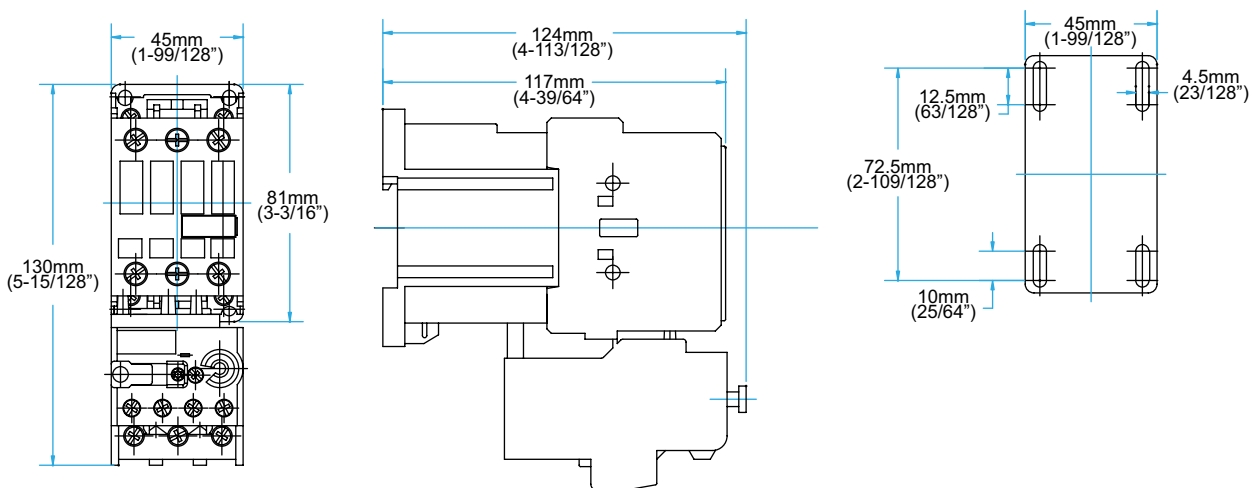


**CONTACTOR + OVERLOAD RELAY ASSEMBLIES - DC COIL**

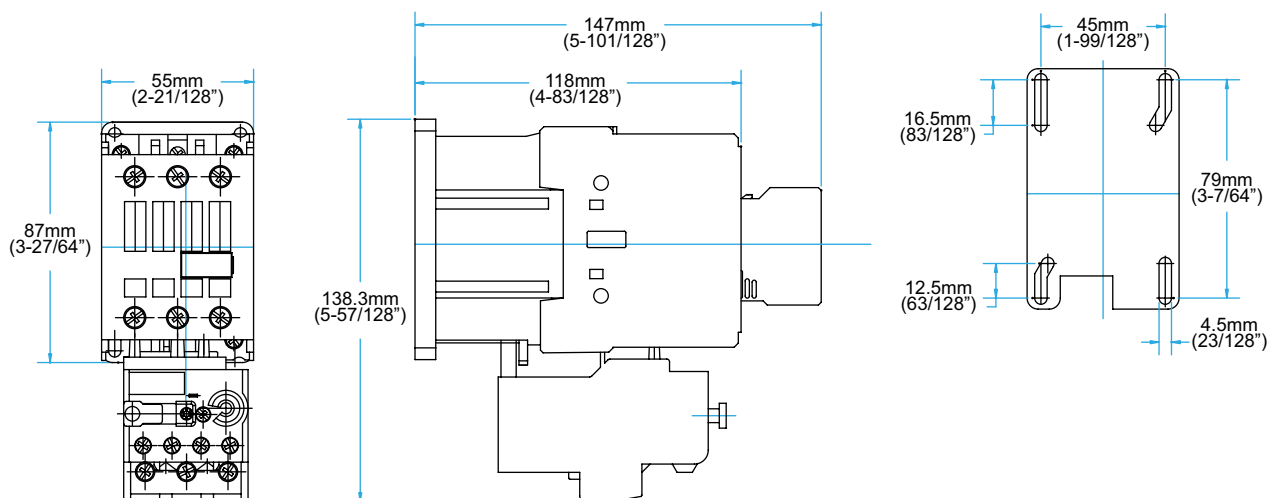
300-S09, 300-S12 OR 300-S18 CONTACTOR WITH 320-B2\*\*\* OVERLOAD RELAY



300-S25 CONTACTOR WITH 320-B2\*\*\* OVERLOAD RELAY

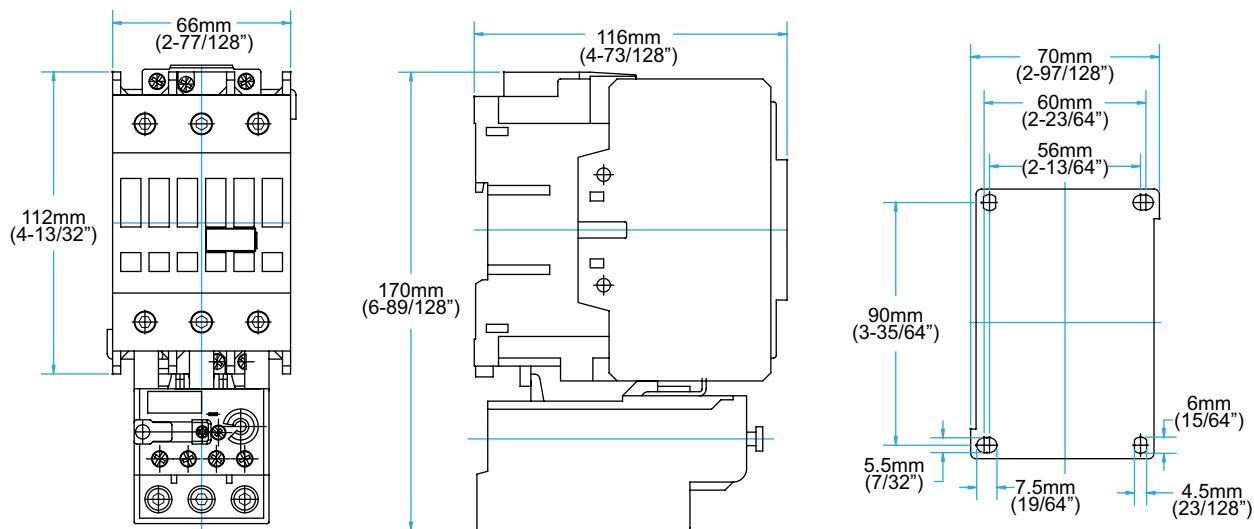


300-S32 OR 300-S40 CONTACTOR WITH 320-B2\*\*\* OVERLOAD RELAY



**CONTACTOR + OVERLOAD RELAY ASSEMBLIES - DC COIL (CONT.)**

300-S50, 300-S65 or 300-S80 CONTACTOR WITH 320-B4\*\*\* OVERLOAD RELAY



300-S95 or 300-S105 CONTACTOR WITH 320-B5\*\*\* OVERLOAD RELAY

