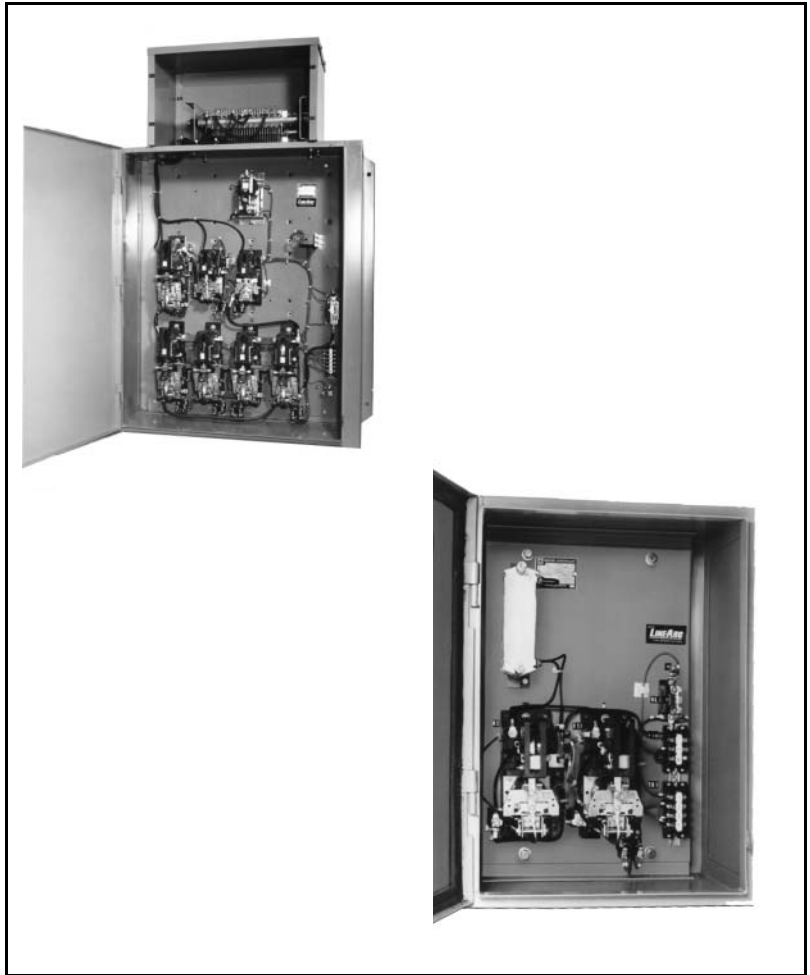


Crane Control Class 7135, 7136, 7145, 7146

Catalog
03



CRANE CONTROL
CLASS 7135, 7136, 7145,
7146

CONTENTS

Description	Page
General Information and Pricing	118
Application Data	121
Wiring Diagrams	122
Dimensions and Weights	124



The Electric Controller and
Manufacturing Company, LLC

Crane Control Class 7135, 7136 DC Reduced-Voltage Motor Starters



Class 7135 Type MCA1

GENERAL INFORMATION AND PRICING

Class 7135, Constant Speed and Class 7136, Adjustable Speed starters are reduced voltage non-reversing type for use with shunt or compound wound DC motors.

These starters provide a time limit acceleration method to accelerate DC motors, which brings the motor up to speed in a definite time, independent of load.

Typical applications include: machine tools, conveyors, pumps, blowers and emergency lube pumps.

- Designed to meet NEMA standards
- Rugged mill duty components
- Time limit acceleration

Class 7135 starter price includes:

- 1 Main contactor (M)
- 1 Set Acceleration contactors (1A, 2A . . .), each with static timer
- 1 Set Acceleration resistors (starting duty, NEMA-rated Class 135)
- 1 Thermal overload relay including heater unit

Class 7136 starter price includes:

- 1 Class 7135 starter as described above; plus
- 1 Field acceleration relay (FA) with series and shunt coils

Class 7135 Non-Reversing Constant Speed

115 VDC Max. HP ▲	230 VDC Max. HP ▲	NEMA Size	Number of Acceleration Points	General Purpose Enclosure NEMA Type 1 Gasketed		Dust Tight Industrial Use Enclosure NEMA Type 12		Open Type	
				Type		Type		Type	
3	5	1	2	MCS1		MCA1		MCO1	
5	10	2	3	MDS1		MDA1		MDO1	
10	25	3	3	MES1		MEA1		MEO1	
20	40	4	3	MFS1		MFA1		MFO1	

Class 7136 Non-Reversing Adjustable Speed ■

115 VDC Max. HP ▲	230 VDC Max. HP ▲	NEMA Size	Number of Acceleration Points	General Purpose Enclosure NEMA Type 1 Gasketed		Dust Tight Industrial Use Enclosure NEMA Type 12		Open Type	
				Type		Type		Type	
3	5	1	2	MCS1		MCA1		MCO1	
5	10	2	3	MDS1		MDA1		MDO1	
10	25	3	3	MES1		MEA1		MEO1	
20	40	4	3	MFS1		MFA1		MFO1	

▲ For higher rated horsepower starters, consult factory.

■ Does not include field rheostat.

Ordering Information Required:

1. Class and Type number.
2. Horsepower, voltage, full load current.
3. Specify additions and special features by form number.
4. Class 7135 Starters requiring field relays, specify: shunt field resistance and shunt field current.
5. Class 7136 Starters, specify: speed range (or ratio) of rheostat, shunt field current at normal and maximum speeds, shunt field resistance.



Crane Control Class 7145, 7146 DC Reduced-Voltage Motor Starters

GENERAL INFORMATION AND PRICING



Class 7145 Type MES1

Class 7145, Constant Speed and Class 7146, Adjustable Speed starters are reduced voltage reversing type for use with shunt or compound wound DC motors.

These starters provide a time limit acceleration method to accelerate DC motors, which brings the motor up to speed in a definite time, independent of load.

To minimize the motor stopping time, dynamic braking is supplied on all reversing starters.

Typical applications include: machine tools and conveyors.

- Designed To Meet NEMA Standards
- Rugged Mill Duty Components
- Time Limit Acceleration
- Dynamic Braking

Class 7145 starter price includes:

- 2 Two pole directional contactors (F,R) with mechanical interlocks
- 1 Dynamic braking contactor (DB), normally closed
- 1 Set Acceleration contactors (1A, 2A . . .), each with static timer
- 1 Set Acceleration resistors (starting duty, NEMA-rated class 135)
- 1 Non-plug relay (NP), normally closed, single pole
- 1 Surge suppressor
- 1 Thermal overload relay including heater unit

Class 7146 starter price includes:

- 1 Class 7145 starter as described above; plus
- 1 Field acceleration relay (FA) with series and shunt coils

Class 7145 Reversing Constant Speed

115 VDC Max. HP ▲	230 VDC Max. HP ▲	NEMA Size	Number of Acceleration Points	General Purpose Enclosure NEMA Type 1 Gasketed		Dust Tight Industrial Use Enclosure NEMA Type 12		Open Type	
				Type		Type		Type	
3	5	1	2	MCS1		MCA1		MCO1	
5	10	2	3	MDS1		MDA1		MDO1	
10	25	3	3	MES1		MEA1		MEO1	
20	40	4	3	MFS1		MFA1		MFO1	

Class 7146 Reversing Adjustable Speed ■

115 VDC Max. HP ▲	230 VDC Max. HP ▲	NEMA Size	Number of Acceleration Points	General Purpose Enclosure NEMA Type 1 Gasketed		Dust Tight Industrial Use Enclosure NEMA Type 12		Open Type	
				Type		Type		Type	
3	5	1	2	MCS1		MCA1		MCO1	
5	10	2	3	MDS1		MDA1		MDO1	
10	25	3	3	MES1		MEA1		MEO1	
20	40	4	3	MFS1		MFA1		MFO1	

▲ For higher rated horsepower starters, consult factory.

■ Does not include field rheostat.

Ordering Information Required:

1. Class and Type number.
2. Horsepower, voltage, full load current.
3. Specify additions and special features by form number.
4. Class 7145 Starters requiring field relays, specify: shunt field resistance and shunt field current.
5. Class 7146 Starters requiring field relays, specify: speed range (or ratio) of rheostat, shunt field current at normal and maximum speeds, shunt field resistance.

CRANE CONTROL
CLASS 7145, 7146



Crane Control Class 7135, 7136, 7145, 7146

DC Reduced-Voltage Motor Starters

MODIFICATIONS, PRICING AND APPLICATION DATA

Additions and Special Features	Form Number	Panel Space
Power Knife Switch		
With DC rated fuses, operable from inside enclosure	D1	2
Non-fused, operable from inside enclosure	D9	1
Molded Case Switch		
With DC rated fuses, operable from outside enclosure	D4	2
Non-fused, operable from outside enclosure	D5	1

Additions and Special Features	Form Number	Panel Space
Pilot Devices (Flange mounted)		
"Start-Stop" push button	A	–
"Forward-Reverse-Stop" push button	A1	–
"On-Off" push button	A3	–
"Hand-Off-Auto" selector switch	C	–
Pilot light (specify color) (P1 = red, P2 = green, P37 = white)	P_	–
Control Circuit Modifications		
Control Circuit knife switch (fusible)	D19	1
Terminal board space for remote pilot devices, per terminal point	G50	–
Extra electrical interlocks (1 N.O. and 1 N.C.)	X11	–
Auxiliary and Protective Relays		
Undervoltage relay	R1	1
Field decelerating relay (limits motor armature current while motor is decelerating to base speed)	R3	1
Field Loss relay (disconnects motor from line in event of loss of field)	R4 ★	1
Field economizing relay (relay inserts resistance in shunt field to prevent overheating of field winding when motor is at rest)	R5 ★	1
Jog control relay: Non-Reversing (Class 7135, 7136) – 1 relay Reversing (Class 7145, 7146) – 2 relays	R16 R27	1 1
Control relay	R17 ▲	1

- ▲ Specify contact arrangement.
- ★ Specify shunt field data.

CRANE CONTROL
CLASS 7135, 7136, 7145,
7146



Crane Control Class 7135, 7136, 7145, 7146 DC Reduced-Voltage Motor Starters

COMPONENT EQUIPMENT

CONTACTORS

Main (M), Reversing (F&R), Acceleration (1A, 2A, 3A), Dynamic Braking (DB).

Construction – Clapper type, Square D Class 7004, Type MX on Sizes 1 and 2; Type M on Sizes 3 and 4.

Volts – 600 VDC Maximum.

CURRENT RATING

NEMA Size	1	2	3	4
Open	25 A	50 A	100 A	150 A
Enclosed	22 A	45 A	90 A	135 A

Contact Tips – Copper

Coil – 120 or 240 VDC, operating range, 110 to 80% of rated voltage.

Auxiliary Contacts – Maximum 2 N.O. + 2 N.C. 10 ADC, double break. Interrupting rating (inductive) is 2.2 A, 1.1 A and 0.4 A at 125V, 250 V and 600 V, respectively.

Lugs – NEMA Size 1 and 2, box lug type; NEMA Size 3 and higher, clam-shell type.

CONTROL CIRCUIT

Wiring – Stranded, 600 V, 90 °C rating.

Overloads – Class 9065, single pole, hand reset melting alloy.

Push buttons – Class 9001, Type K, 10 A continuous rating.

Fuses – 15 A, 250 VDC

Pilot Lights – Class 9001, Type K.

Terminal Blocks – Class 9080, Type GR, 600 V rating, maximum wire 2- #12.

Acceleration Timers – Class 7001, Type ST1, non-adjustable static timer(s), provide 1.2 seconds accelerating time for each acceleration contactor. The static timer is wired in series with the acceleration contactor coil and appears as a normally open timed closed contact.

NEMA Size	Number Acceleration Contactors
1	1
2	2
3	2
4	2

Accelerating Resistors – These starting duty resistors will provide starting torques of at least 150% of motor full load torque. The resistor designs permit 10 seconds on out of each 80 seconds.

CRANE CONTROL
CLASS 7135, 7136, 7145,
7146



Crane Control Class 7135, 7136, 7145, 7146 DC Reduced-Voltage Motor Starters

APPLICATION DATA AND WIRING DIAGRAMS

Enclosures

Construction – Sheet steel, welded construction.

#14 gauge: NEMA Size 1 through 4.

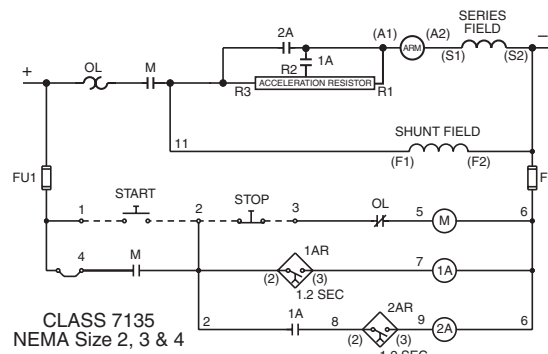
Types–NEMA 1 Gasketed, NEMA 12, and Open.

Protective and Auxiliary Devices

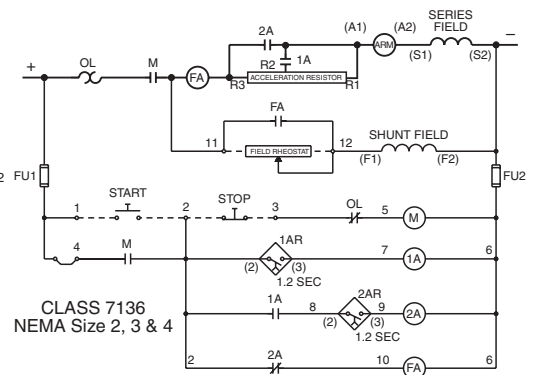
Description	Class & Type	Function
Field Acceleration Relay (FA)	7001, KFO N.O.	Provides full field during acceleration to base speed, and provides current limit control to final operating speed.
Field Deceleration Relay (FD)	7001, KFO N.C.	Avoids the effects of too rapid deceleration and limits the armature current and voltage during deceleration.
Field Loss Relay (FL)	7001, KIO	Prevents motor from "running away" in case the motor field is accidentally opened.
Field Economizing Relay (FE)	7001, KFO N.O. (25 A continuous)	Protects motor shunt field against overheating (by inserting series resistance) when shunt field is energized and motor is at rest.
Non-Plugging Relay (NP)	7001, KGO	Prevents closing of directional contactor until motor has come to rest after running in forward or reverse direction.
Undervoltage Relay (UV)	7001, KFO70	Recommended with master switch operation.
Jog (Inch) Relay	CA3DN	Allows small movements of driven machine.
Control Relay	CA3DN	Used for auxiliary controls.
Overload Relay (OL)	9065 Melting Alloy or Bimetallic or 9055 Magnetic	Current sensing devices which detects overload condition and removes motor from source of power. Relays are hand reset type.
Short Circuit Protection	Per Horsepower Rating	Fused knife switch.
Surge Suppressor	MOV Type	Connected across motor shunt field to provide voltage discharge path when field is opened.
Dynamic Braking Contactor (DB)	7004, Type M	Inserts a resistor in motor armature circuit when armature is disconnected from power source. With shunt field energized this causes motor to run as a loaded generator which makes it to come to a quick stop.

Elementary Wiring Diagrams

Constant Speed, DC Starter



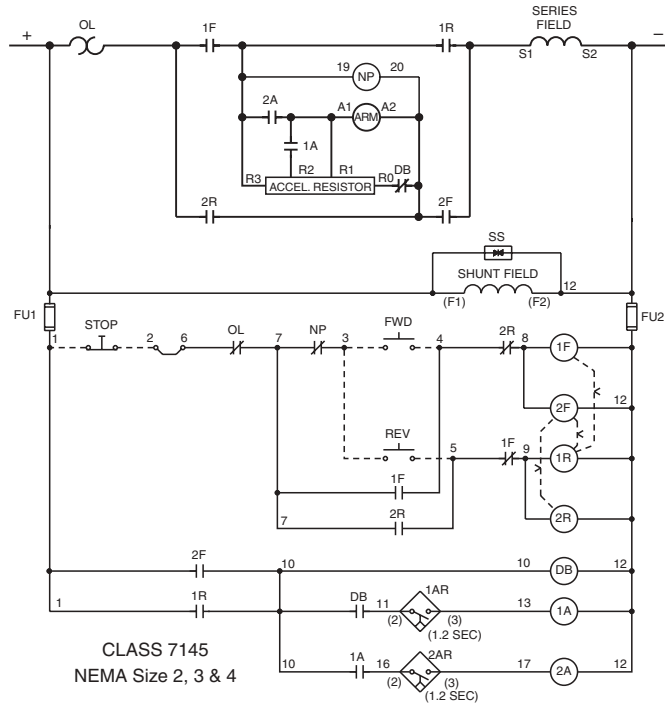
Adjustable Speed, DC Starter



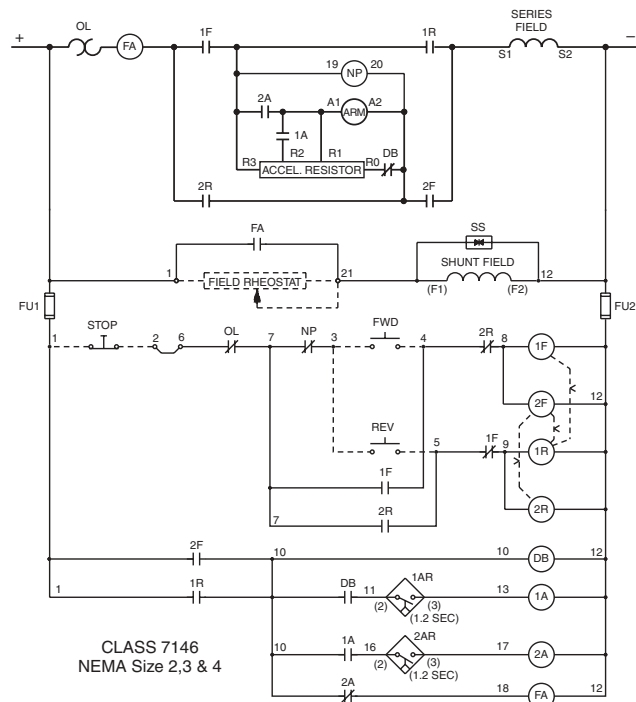
Crane Control Class 7135, 7136, 7145, 7146 DC Reduced-Voltage Motor Starters

ELEMENTARY WIRING DIAGRAMS

Reversing, Constant Speed, DC Starter



Reversing, Adjustable Speed, DC Starter



**CRANE CONTROL
CLASS 7135, 7136, 7145,
7146**



**Crane Control Class 7135, 7136, 7145, 7146
DC Reduced-Voltage Motor Starters**

APPROXIMATE DIMENSIONS

Figure 1

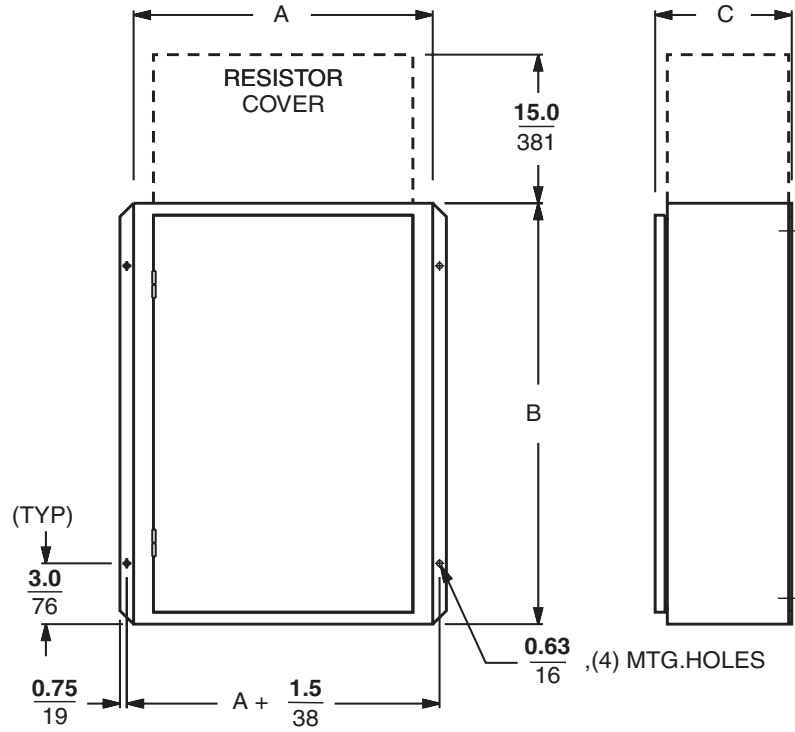
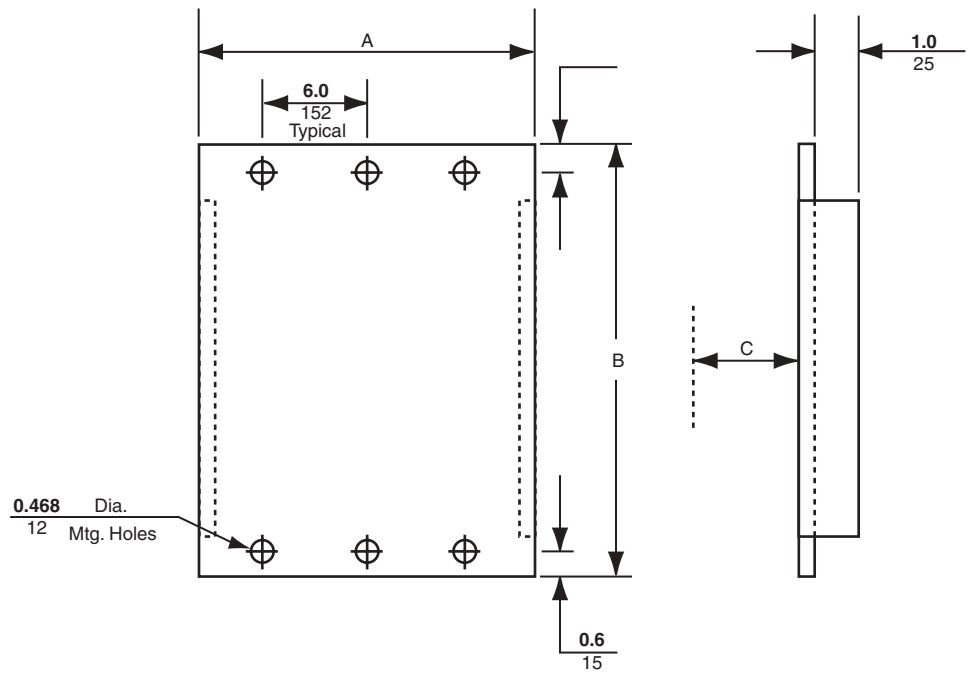


Figure 2

Dual Dimensions $\frac{\text{inches}}{\text{mm}}$



CRANE CONTROL
CLASS 7135, 7136, 7145,
7146



Crane Control Class 7135, 7136, 7145, 7146 DC Reduced-Voltage Motor Starters

APPROXIMATE DIMENSIONS AND WEIGHTS

The panel space shown in table below is the number of optional devices (listed in modification price table) that can be added to a standard starter. If more optional devices are required, consult factory.

The resistor cover shown in the outline drawing is for NEMA Size 3 and larger starters. NEMA Size 1 and 2 starters do not require a resistor cover since resistors are mounted on starter panel.

Class 7135, 7136, 7145, 7146 NEMA Type 1G, 12, & Open

Class	Description		Figure 1				Figure 2				
			MCA1 MCS1	MDA1 MDS1	MEA1 MES1	MFA1 MFS1	MCO1	MDO1	MEO1	MFO1	
7135	Dimensions	A	inch	24	24	26	26	20.4	20.4	22.2	22.2
			mm	610	610	660	660	518	518	564	564
		B	inch	32	32	42	42	30	30	40	40
			mm	813	813	1067	1067	762	762	1016	1016
		C	inch	13.6	13.6	13.6	13.6	9.4	9.4	10.5	10.5
			mm	345	345	345	345	239	239	267	267
	Panel Space			4	3	3	3	4	3	3	3
	Weight	Pounds		73	97	134	134	31	43	47	47
		Kilograms		33	43	60	60	14	19	21	21
	7136	Dimensions	A	inch	24	24	26	26	20.4	20.4	22.2
mm				610	610	660	660	518	518	564	564
B			inch	32	32	42	42	30	30	40	40
			mm	813	813	1067	1067	762	762	1016	1016
C			inch	13.6	13.6	13.6	13.6	9.4	9.4	10.5	10.5
			mm	345	345	345	345	239	239	267	267
Panel Space			3	2	2	2	3	2	2	2	
Weight		Pounds		73	97	134	134	31	43	47	47
		Kilograms		33	43	60	60	14	19	21	21
7145		Dimensions	A	inch	26	26	32	32	22.2	22.2	29.3
	mm			660	660	813	813	564	564	744	744
	B		inch	42	42	52	52	40	40	50	50
			mm	1067	1067	1320	1320	1016	1016	1270	1270
	C		inch	13.6	13.6	13.6	13.6	9.4	9.4	10.5	10.5
			mm	345	345	345	345	239	239	267	267
	Panel Space			4	3	3	3	4	3	3	3
	Weight	Pounds		73	97	134	134	31	43	47	47
		Kilograms		33	43	60	60	14	19	21	21
	7146	Dimensions	A	inch	26	26	32	32	22.2	22.2	29.3
mm				660	660	813	813	564	564	744	744
B			inch	42	42	52	52	40	40	50	50
			mm	1067	1067	1320	1320	1016	1016	1270	1270
C			inch	13.6	13.6	15	15	9.4	9.4	10.5	10.5
			mm	345	345	381	381	239	239	267	267
Panel Space			3	2	2	2	3	2	2	2	
Weight		Pounds		73	97	134	134	31	43	47	47
		Kilograms		33	43	60	60	14	19	21	21

**CRANE CONTROL
CLASS 7135, 7136, 7145,
7146**



CRANE CONTROL
CLASS 7135, 7136, 7145,
7146

