

## DC MAGNETIC MILL DUTY CRANE CONTROL

### HOIST SERVICE

### REVERSING DYNAMIC LOWERING CONTROL

### NEMA CLASS I SERVICE

### CMAA CLASSIFICATIONS C, D, E, F SERVICE

FILNOR CLASS 2010 DC CONTROLLERS ARE RECOMMENDED FOR USE WITH DC SERIES MOTORS ON CRANE HOIST DRIVES WITHOUT MECHANICAL LOAD BRAKES. CONTROLLERS ARE FOR USE WITH SERIES BRAKES. APPLICATIONS INCLUDE A.I.S.E. CRANES, CHARGING MACHINES, FORGING MANIPULATORS, AND OTHER SPECIAL MILL EQUIPMENT.

- AVAILABLE FOR 230 VDC CRANE RATED (30 MINUTE) MOTORS TO 500 HP (SINGLE) AND 1000 HP (DUPLEX) APPLICATIONS.
- HEAVY-DUTY, OPEN, STEEL PANELS STANDARD, CUSTOM NEMA TYPE ENCLOSURES AVAILABLE.
- FRONT WIRING, FRONT ACCESSIBILITY TO ALL COMPONENTS MINIMIZE INSPECTION AND SERVICE TIME. REAR ACCESS NOT REQUIRED.
- CUSTOMER SPECIFIED COMPONENT MANUFACTURER AND SPECIAL CONTROL CIRCUITRY AVAILABLE.

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STANDARD SINGLE MOTOR CLASS 2010 CONTROLLER CONSISTS OF:

- 1 - TWO POLE FUSED CONTROL CIRCUIT KNIFE SWITCH WITH PADLOCK CLIP.
- 1 - TWO POLE UNFUSED MAIN LINE KNIFE SWITCH WITH PADLOCK CLIP.
- 4 - SINGLE POLE CONTACTORS WITH MECHANICAL INTERLOCKS FOR HOISTING AND LOWERING CIRCUITS.
- 1 - SINGLE POLE NEGATIVE LINE CONTACTOR.
- 4 OR 5 - SINGLE POLE ACCELERATION CONTACTORS.
- 3 OR 4 - STATIC ACCELERATION TIMERS.
- 1 - VOLTAGE RELAY FOR ACCELERATION LOWERING.
- 1 - LIMIT SWITCH RELAY.
- 1 - SINGLE POLE SPRING-CLOSED DYNAMIC LOWERING CONTACTOR
- 1 - UNDERVOLTAGE RELAY.
- 2 - MAGNETIC OVERLOAD RELAYS (ONE INSTANTANEOUS AND ONE INVERSE TIME).

DUPLEX (TWO MOTORS CONNECTED IN PARALLEL) CONTROL PANEL CONSISTS OF THE EQUIPMENT FOR A SINGLE MOTOR CONTROL PANEL WITH THE EXCEPTION THAT ALL CONTACTORS ARE DOUBLE POLE DEVICES AND THE FOLLOWING EQUIPMENT IS ADDED:

- 1 - TWO POLE MAINLINE KNIFE SWITCH WITH PADLOCK CLIP FOR SECOND MOTOR.
- 2 - MAGNETIC OVERLOAD RELAYS (ONE INSTANTANEOUS AND ONE INVERSE TIME) FOR SECOND MOTOR.

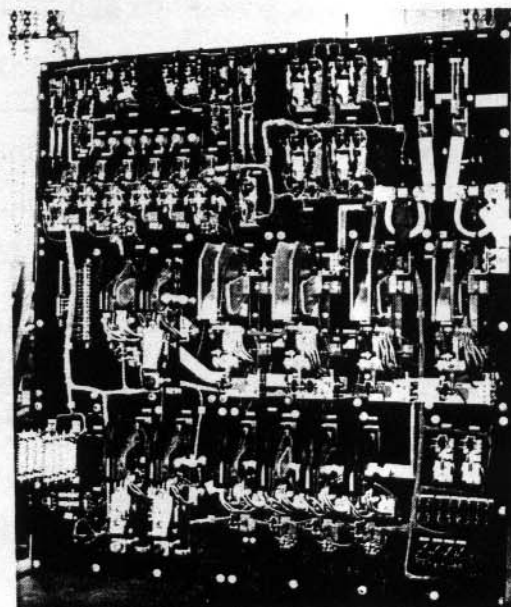
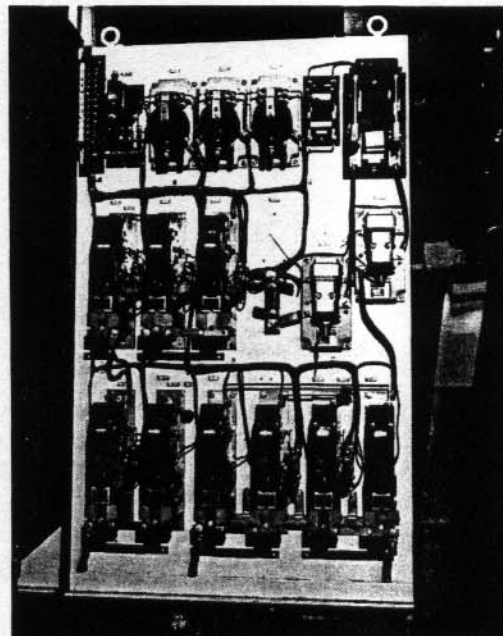
NOTE: SERIES BRAKE TRANSFER SWITCH NOT INCLUDED AS STANDARD. DUPLEX CONTROLLERS REQUIRE TWO SETS OF RESISTORS.

VOLTS	CRANE RATING			NUMBER OF SPEED POINTS	
	MAX. HP	CONTACTORS			
		NEMA SIZE	AMPS		
<b>SINGLE MOTOR CONTROL</b>					
230	(1) 15	2	67	5	
	35	3	133	5	
	55	4	200	5	
	110	5	400	5	
	225	6	800	6	
	275	(2) 6A	1000	6	
	330	7	1200	6	
	500	8	1800	6	
	<b>DUPLEX MOTOR CONTROL</b>				
	230	(1) 2-15	2	6	5
2-35		3	133	5	
2-55		4	200	5	
2-110		5	400	5	
2-225		6	800	6	
2-275		(2) 6A	1000	6	
2-330		7	1200	6	
2-500		8	1800	6	

(1) NOTE: SIZE 2 CONTACTOR MEETS NEMA CLASS I I ONLY.  
(2) NOTE: NOT A NEMA SIZE/RATING.

**ORDERING INFORMATION REQUIRED:**

1. FILNOR CLASS 2010, NEMA SIZE.
2. MOTOR HORSEPOWER.
3. MOTOR DUTY RATING (30 MINUTE OR 1-HOUR)
4. SYSTEM VOLTAGE.
5. COMPONENT MANUFACTURER PREFERENCE
6. CRANE SERVICE CLASS OR USAGE.
7. OPTIONAL FEATURES (REFER TO PAGE 5).



**DC MAGNETIC MILL DUTY CRANE CONTROL**  
**BRIDGE OR TROLLEY SERVICE**  
**REVERSING PLUGGING CONTROL**  
**NEMA CLASS I SERVICE**  
**CMAA CLASSIFICATIONS C, D, E, F SERVICE**

FILNOR CLASS 2011 DC CONTROLLERS ARE RECOMMENDED FOR USE WITH DC SERIES MOTORS ON CRANE TRAVEL DRIVES. CONTROLLERS ARE FOR USE WITH SERIES BRAKES. SHUNT BRAKES CAN BE USED WHEN A BRAKE RELAY IS ADDED. APPLICATIONS INCLUDE A.I.S.E. CRANES, CHARGING MACHINES, FORGING MANIPULATORS, AND OTHER SPECIAL MILL EQUIPMENT.

- AVAILABLE FOR 230 VDC CRANE RATED (60 MINUTE) MOTORS TO 500 HP (SINGLE) AND 1000 HP (DUPLEX) APPLICATIONS.
  - HEAVY-DUTY, OPEN, STEEL PANELS STANDARD, CUSTOM NEMA TYPE ENCLOSURES AVAILABLE.
  - MILL DUTY FRONT MOUNTED COMPONENTS USED THROUGHOUT CONTROLLER.
  - FRONT WIRING, FRONT ACCESSIBILITY TO ALL COMPONENTS MINIMIZE INSPECTION AND SERVICE TIME. REAR ACCESS NOT REQUIRED.
  - CUSTOMER SPECIFIED COMPONENT MANUFACTURER AND SPECIAL CONTROL CIRCUITRY AVAILABLE.
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STANDARD SINGLE MOTOR CLASS 2011 CONTROLLER CONSISTS OF:

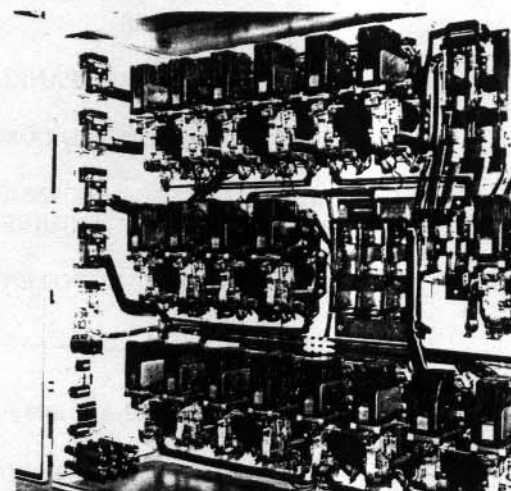
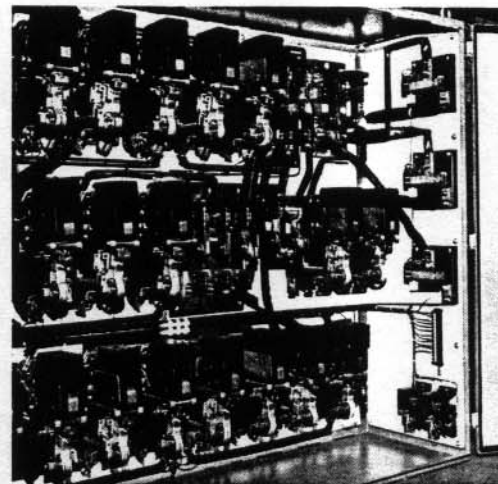
- 1 - TWO POLE FUSED CONTROL CIRCUIT KNIFE SWITCH WITH PADLOCK CLIP.
- 1 - TWO POLE UNFUSED MAIN LINE KNIFE SWITCH WITH PADLOCK CLIP.
- 4 - SINGLE POLE DIRECTIONAL CONTACTORS WITH MECHANICAL INTERLOCKS.
- 1 - SINGLE POLE NEGATIVE LINE CONTACTOR.
- 4 OR 5 - SINGLE POLE ACCELERATION CONTACTORS (INCLUDING ONE FOR PLUGGING).
- 3 OR 4 - STATIC ACCELERATION TIMERS.
- 1 - PLUGGING RELAY WITH RECTIFIER.
- 1 - UNDERVOLTAGE RELAY.
- 2 - MAGNETIC OVERLOAD RELAYS (ONE INSTANTANEOUS AND ONE INVERSE TIME)

DUPLEX (TWO-MOTORS CONNECTED IN PARALLEL) CONTROL PANEL CONSISTS OF THE EQUIPMENT FOR A SINGLE MOTOR CONTROL PANEL WITH THE EXCEPTION THAT ALL CONTACTORS ARE DOUBLE POLE DEVICES AND THE FOLLOWING EQUIPMENT IS ADDED:

- 1 - TWO POLE MAINLINE KNIFE SWITCH WITH PADLOCK CLIP FOR SECOND MOTOR
- 2 - MAGNETIC OVERLOAD RELAYS (ONE INSTANTANEOUS AND ONE INVERSE TIME)

NOTE: DUPLEX CONTROLLER REQUIRE TWO SETS OF RESISTORS

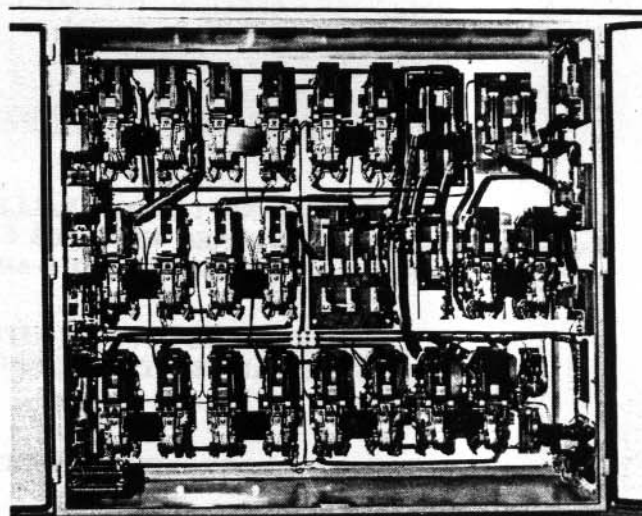
VOLTS	CRANE RATING			NUMBER OF SPEED POINTS	
	MAX. HP	CONTACTORS			
		NEMA SIZE	AMPS		
<b>SINGLE MOTOR CONTROL</b>					
230	(1) 15	2	67	5	
	35	3	133	5	
	55	4	200	5	
	110	5	400	5	
	225	6	800	6	
	275	(2) 6A	1000	6	
	330	7	1200	6	
	500	8	1800	6	
	<b>DUPLEX MOTOR CONTROL</b>				
	230	(1) 2-15	2	67	5
2-35		3	133	5	
2-55		4	200	5	
2-110		5	400	5	
2-225		6	800	6	
2-275		(2) 6A	1000	6	
2-330		7	1200	6	
2-500		8	1800	6	



(1) NOTE: SIZE 2 CONTACTOR MEETS NEMA CLASS II ONLY  
(2) NOTE: NOT A NEMA SIZE/RATING

**ORDERING INFORMATION REQUIRED:**

1. FILNOR CLASS 2011, NEMA SIZE
2. MOTOR HORSEPOWER
3. MOTOR DUTY RATING (30 MINUTE OR 1 HOUR)
4. SYSTEM VOLTAGE
5. COMPONENT MANUFACTURER PREFERENCE
6. CRANE SERVICE CLASS OR USAGE
7. OPTIONAL FEATURES (REFER TO PAGE 5)





## DC MAGNETIC MILL DUTY CRANE CONTROL

### 1. CONTROLLER OPTIONAL FEATURES:

- A. ENCLOSURE: NEMA TYPE 1 (GASKETED), 3R, 4, 4X, 12 OR MILL EXTRA HEAVY DUTY.
- B. REAR CONNECTED COMPONENTS.
- C. CABINET SPACE HEATER
- D. 2-MAIN LINE POWER FUSES.
- E. LOADSIDE POWER TERMINAL BOARD.
- F. ADDITIONAL ACCELERATION POINT.
- G. ARMATURE SHUNT CONTACTOR.
- H. SHUNT BRAKE RELAY.
- I. ELECTRONIC OVERLOAD RELAY INSTEAD OF MAGNETIC.
- J. AMMETER SHUNT WITH OR WITHOUT PANEL MOUNTED METER.
- K. ARC INHIBITORS, PENDANT OR RADIO OPERATED CONTROLLERS.
- L. TIME CURRENT TYPE OF ACCELERATION INSTEAD OF STATIC TIMERS.
- M. DUPLEX CONTROLLER SERIES BRAKE TRANSFER KNIFE SWITCHES.
- N. TRAVEL CONTROLLER SECOND PLUGGING STEP.
- O. SERVICE DYNAMIC BRAKING.
- P. EMERGENCY DYNAMIC BRAKING.

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### 2. A COMPLETE SET OF MOTOR CONTROL EQUIPMENT CONSISTS OF A CONTROLLER WITH SEPARATELY MOUNTED MILL TYPE RESISTORS AND MASTER SWITCH.

- A. 26½" STANDARD MILL DUTY RESISTOR BANKS AVAILABLE MOUNTED IN RACKS, UNWIRED, WITH EXPANDED METAL GUARDS.
- B. NEMA SERVICE CLASSIFICATIONS:
  - CLASS 152--RECOMMENDED FOR LIGHT CRANE DUTY.
  - CLASS 162--RECOMMENDED FOR STANDARD DUTY.
  - CLASS 172--RECOMMENDED FOR SEVERE CRANE DUTY.
  - CLASS 92--RECOMMENDED FOR CONTINUOUS DUTY.
- C. ARMATURE SHUNT RESISTORS ARE INTERMITTENT RATED FOR USE WITH AN ARMATURE SHUNT CONTACTOR.
  - TWO MOTORS IN PARALLEL REQUIRE ONE SET OF RESISTORS FOR EACH MOTOR.
  - TWO MOTORS IN SERIES REQUIRE ONE SET OF RESISTORS.
  - SLOWDOWN RESISTORS ARE DESIGNED TO LIMIT BRIDGE DRIVES TO APPROXIMATELY 50% OF THE PRESENT FREE RUNNING SPEED.
- D. RESISTOR ORDERING INFORMATION:
  - 1. CLASS OF CONTROLLER.
  - 2. TYPE OF CONTROLLER AND OPTIONAL FEATURES.
  - 3. D.C. MOTOR NAMEPLATE DATA.
  - 4. SYSTEM VOLTAGE
  - 5. RESISTOR MANUFACTURER PREFERENCE.
  - 6. NEMA RESISTOR CLASSIFICATION

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### 3. ACCESSORIES:

- MASTER SWITCH ..... SEE CLASS 5300
- MANUAL-MAGNETIC DISCONNECT SWITCH ..... SEE CLASS 2310
- UNITIZED CONSTRUCTION ..... CONSULT FACTORY

## DC MAGNETIC INDUSTRIAL DUTY CRANE CONTROL

### NEMA CLASS I, I I SERVICE

### CMAA CLASSIFICATIONS A, B, C, AND D SERVICE

FILNOR CLASS 2200 DC CONTROLLERS ARE RECOMMENDED FOR USE WITH DC SERIES MOTORS ON HOIST, BRIDGE AND TROLLEY DRIVES OF HEAVY DUTY AND GENERAL PURPOSE OVERHEAD CRANES. HOIST CONTROLLERS ARE OF THE REVERSING DYNAMIC LOWERING TYPE AND ARE DESIGNED FOR USE ON CRANES WITHOUT MECHANICAL LOAD BRAKES. BRIDGE AND TROLLEY CONTROLLERS ARE OF THE REVERSING-PLUGGING TYPE. TRAVEL CONTROLLERS, LESS PLUGGING RELAY, CAN BE USED TO CONTROL HOISTS WITH MECHANICAL LOAD BRAKES. FILNOR CLASS 2200 CONTROLLERS ARE DESIGNED FOR USE WITH SERIES WOUND MAGNETIC BRAKES. TRAVEL CONTROLLER CAN ALSO BE USED WITH SHUNT WOUND BRAKES WHEN AN OPTIONAL BRAKE RELAY IS SUPPLIED.

FILNOR CLASS 2200 CRANE CONTROL IS NORMALLY QUOTED AS A UNITIZED PACKAGE OF CONTROL EQUIPMENT. CONTROLS FOR BRIDGE, TROLLEY, HOIST MOTIONS AND PROTECTION COMPONENTS ARE MOUNTED IN A SINGLE CUSTOM ENCLOSURE WITH DIMENSIONS TO SUIT AVAILABLE SPACE. MOTOR CIRCUIT RESISTORS ARE MOUNTED ON THE TOP OR SIDE OF ENCLOSURE AND PREWIRED TO CONTROL. UNITIZED CONCEPT MINIMIZES INSTALLATION TIME ON NEW CRANES OR CONVERSION COST ON EXISTING CRANES.

- AVAILABLE IN NEMA CONTACTORS SIZE 1 THROUGH 5, FOR 230 VDC CRANE RATED MOTORS TO 110 HORSEPOWER APPLICATIONS.
- NEMA 1 ENCLOSURE STANDARD.
- MILL DUTY CONTACTORS AND RELAYS USED THROUGHOUT CONTROLLER.
- CMAA MINIMUM NUMBER OF SPEED POINTS STANDARD.
- STATIC TIMERS AND THERMAL OVERLOADS STANDARD.
- CUSTOMER SPECIFIED COMPONENT MANUFACTURER.

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### DC MAGNETIC INDUSTRIAL DUTY CRANE CONTROL

#### 1. CONTROLLER OPTIONAL FEATURES:

- A. ENCLOSURE: NEMA TYPE 1 (GASKETED), 3R, 4, 4X, 12.
- B. MAIN LINE PROTECTIVE EQUIPMENT FOR UNITIZED EQUIPMENT.
- C. PER MOTION PROTECTION (INCLUDES MOTOR KNIFE SWITCH, LINE CONTACTOR, UNDER VOLTAGE RELAY).
- D. LOADSIDE POWER TERMINAL BOARD.
- E. ADDITIONAL ACCELERATION POINTS.
- F. TIME CURRENT TYPE OF ACCELERATION INSTEAD OF STATIC TIMERS.
- G. ARMATURE SHUNT CONTACTOR.

- H. SHUNT BRAKE RELAY.
- I. MAGNETIC OVERLOAD INSTEAD OF THERMAL.
- J. ELECTRONIC OVERLOAD RELAY INSTEAD OF THERMAL.
- K. AMMETER SHUNT WITH OR WITHOUT PANEL MOUNTED METER.
- L. ARC INHIBITORS, PENDANT OR RADIO OPERATED CONTROLLERS.

**CLASS 2200 ORDERING INFORMATION REQUIRED:**

- 1. HOIST MOTOR (30 MINUTE) HORSEPOWER.
- 2. HOIST CONTROLLER TYPE. REVERSING OR REVERSING DYNAMIC LOWERING.
- 3. TRAVEL MOTORS (BRIDGE AND TROLLEY) (60 MINUTE) HORSEPOWER.
- 4. SYSTEM VOLTAGE.
- 5. COMPONENT MANUFACTURER PREFERENCE.
- 6. CRANE SERVICE CLASS OR USAGE.
- 7. OPTIONAL FEATURES.
- 8. UNITIZED ASSEMBLY, DIMENSIONS OF SPACE AVAILABLE.

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**2. A COMPLETE SET OF MOTOR CONTROL EQUIPMENT CONSISTS OF CONTROLLERS WITH UNITIZED MILL TYPE RESISTORS, MASTER SWITCHES OR PENDANT PUSHBUTTON STATION.**

A. 26½" STANDARD MILL DUTY RESISTOR BANKS AVAILABLE MOUNTED IN RACKS, WITH EXPANDED METAL GUARDS. BELOW 10 H.P. WIRE WOUND RESISTORS ARE FURNISHED AS STANDARD.

B. NEMA SERVICE CLASSIFICATIONS:

- CLASS 152--RECOMMENDED FOR LIGHT CRANE DUTY.
- CLASS 162--RECOMMENDED FOR STANDARD CRANE DUTY.
- CLASS 172--RECOMMENDED FOR SEVERE CRANE DUTY.
- CLASS 92--RECOMMENDED FOR CONTINUOUS CRANE DUTY.

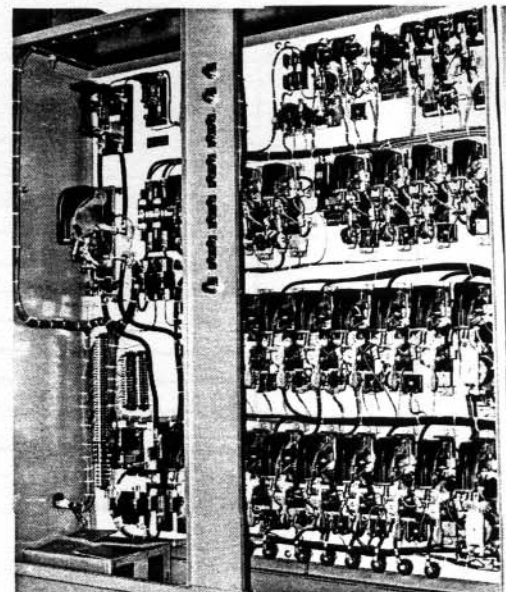
C. ARMATURE SHUNT RESISTORS ARE INTERMITTENT RATED FOR USE WITH AN ARMATURE SHUNT CONTACTOR. SLOWDOWN RESISTORS ARE DESIGNED TO LIMIT BRIDGE DRIVES TO APPROXIMATELY 50% OF THE PRESENT FREE RUNNING SPEED.

D. RESISTOR ORDERING INFORMATION (PER MOTION):

- 1. CLASS OF CONTROLLER.
- 2. TYPE OF CONTROLLER AND OPTIONAL FEATURES.
- 3. D.C. MOTOR NAMEPLATE DATA.
- 4. SYSTEM VOLTAGE.
- 5. RESISTOR MANUFACTURER PREFERENCE.
- 6. NEMA RESISTOR CLASSIFICATION.

**ACCESSORIES:**

- MASTER SWITCH.....SEE CLASS 5300
- MANUAL-MAGNETIC DISCONNECT SWITCH .. SEE CLASS 2310



## MANUAL-MAGNETIC DISCONNECT SWITCH FOR DC CRANES

THE MANUAL-MAGNETIC DISCONNECT SWITCHES ARE COMBINATION MANUALLY AND MAGNETICALLY OPERATED CONTACTORS IN NEMA TYPE 1 ENCLOSURE. CLASS 2310 SWITCHES ARE USED AS CRANE MAIN POWER DISCONNECT.

- 230 VDC, 50 TO 2700 AMPERE RATED UNITS AVAILABLE.
- CONTACTORS OPERATED BY MANUAL LEVER ON ENCLOSURE OR REMOTE PUSHBUTTON AT OPERATORS LOCATION.
- INTERLOCKED TO PERMIT OPERATION ONLY WITH DOOR CLOSED.
- WITH MANUAL LEVER IN OFF POSITION CAM MECHANICALLY LOCKS OUT CONTACTORS.
- PROVISIONS FOR 3-PADLOCKS WHEN MANUAL LEVER IS IN OFF POSITION.

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### STANDARD UNIT CONSISTS OF:

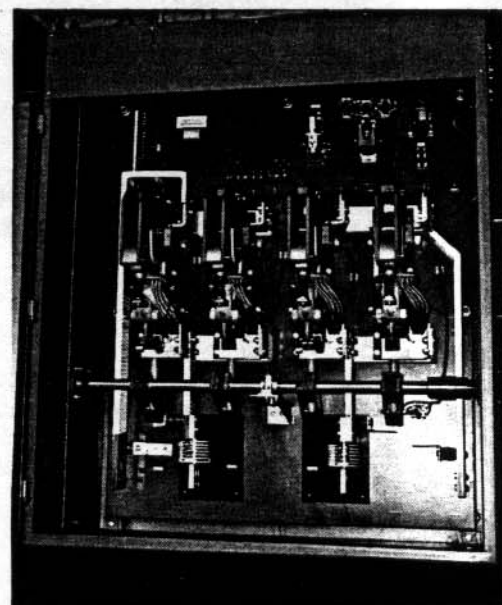
- 2 - SINGLE POLE, NORMALLY OPEN CLAPPER TYPE CONTACTORS, MECHANICALLY TIED. ONE NORMALLY OPEN AND ONE NORMALLY CLOSED CONTROL ELECTRICAL INTERLOCKS FOR CUSTOMER USAGE.
- 1 - FILNOR TWO POLE, FUSED, PADLOCKABLE CONTROL KNIFE SWITCH.
- 1 - SET ARC INHIBITORS/SUPPRESSOR (NEMA SIZE 6, 7, 8 ONLY).
- 1 - INTERMEDIATE RELAY (NEMA SIZE 6 AND LARGER).
- 1 - MANUAL OPERATOR, CAM, AND LINKAGE ASSEMBLY.

### APPLICATION NOTE:

THE CONTINUOUS AMPERE RATING OF CLASS 2310 DISCONNECT SWITCH SHALL BE NO LESS THAN 50% OF THE COMBINED SHORT-TIME AMPERE RATING OF THE MOTORS, NOR LESS THAN 75% OF THE SHORT-TIME AMPERE RATING OF THE MOTORS REQUIRED BY ANY SINGLE CRANE MOTION. CLASS 2310 DISCONNECT SWITCHES ARE NOT APPLICABLE TO LIFTING MAGNET CIRCUITS. REFER TO FILNOR CLASS 3310.

NEMA SIZE	CONTINUOUS AMPERE RATING
2	50
3	100
4	150
5	300
6	600
*6A	800
7	900
8	1350
----	1600
----	2700

\*NOT A NEMA SIZE/RATING





**OPTIONAL FEATURES:**

- A. ENCLOSURE NEMA TYPES 1 (GASKETED), 3R, 4, 4X, 12, OR MILL EXTRA HEAVY DUTY.
- B. DOOR MOUNTED ON-OFF PUSHBUTTONS AND/OR INDICATING LIGHTS.
- C. SEPARATE ON-OFF PUSHBUTTON AND/OR INDICATING LIGHT OPERATOR STATION.
- D. ADDITIONAL CONTROL CIRCUIT INTERLOCKS.
- E. ARC INHIBITORS/SUPPRESSOR.
- F. SET OF TWO MAIN POWER FUSES.
- G. SET OF TWO MAGNETIC OVERLOAD RELAYS.

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**ORDERING INFORMATION REQUIRED:**

- 1. FILNOR CLASS 2310, NEMA SIZE.
- 2. SYSTEM VOLTAGE
- 3. COMPONENT MANUFACTURER PREFERENCE.
- 4. ENCLOSURE TYPE, SPACE AVAILABLE.
- 5. OPTIONS REQUIRED.

