

AC CRANE CONTROL

| Description | CONTENTS | Class | Page |
|---|-------------------------------|-------|--------------|
| With Mill Duty Type M Contactors | | | |
| AC Dynamic Lowering Hoist..... | 6421..... | | 4-5 |
| CONTRA-TORQUE® Hoist..... | 6422..... | | 6-7 |
| Reversing Hoist or Reversing Plugging..... | 6426..... | | 8-9 |
| Dimensions..... | 6420 / 21 / 22 / 26..... | | 10-11 |
| Manual Magnetic Disconnect Switches..... | 6440..... | | 17-19 |
| With NEMA Duty Type S Contactors..... | 6435..... | | 12-15 |
| Dimensions..... | 6435..... | | 16 |
| Resistor Selection for AC Crane Control Systems..... | 6715..... | | 20-21 |
| Master Switch Selection for AC Crane Control Systems..... | 9004..... | | 22 |
| Modifications and Applications Data..... | 6420 / 21 / 22 / 26 / 35..... | | 23-25 |
| Crane Control Selection Guide..... | | | 27 |



AC DYNAMIC LOWERING GENERAL INFORMATION

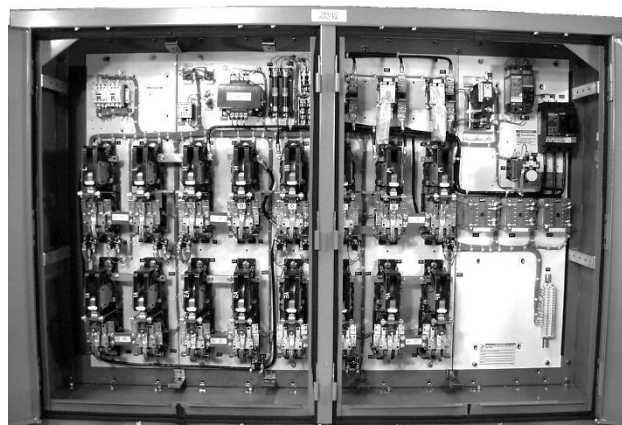
HOIST SERVICE

Class 6421 reversing dynamic lowering controllers are recommended for use with ac wound rotor motors on crane hoist without mechanical load brakes. All controllers are arranged for use with rectifier operated dc shunt brakes or ac operated brakes.

The standard single motor reversing dynamic lowering controller consists of:

- 1—Two pole control molded case switch (CMCS)
- 1—Three pole magnetic main line circuit breaker with padlock clip (LCB)
- 4—Type M two-pole contactors with mechanical interlock for hoisting and lowering circuits (H, L, DB, M)
- 4,5 or 6—Type M two-pole acceleration contactors (1A, 2A, 3A, 4A, 5A, 6A)
- 3, 4 or 5—Type SZF static acceleration relays (2AR, 3AR, 4AR, 5AR)
- 1—460/380/230 to 255 volt fused control circuit transformer (CTR)
- 1—Control Circuit Rectifier (RECT)
- 1—Type KFO under voltage relay (UV)
- 1—Brake relay (BR)
- 1—Pneumatic timing transition relay (TR)
- 3—Type AO magnetic inverse time overload relays (1OL, 2OL, 3OL)
- 1—SZF power loss protection relay circuits (SPR, 2RECT, 2MOV, 2RES)

- USES SINGLE PHASE MOTOR CONNECTION FOR DYNAMIC LOWERING
- SUITABLE FOR APPLICATIONS NOT REQUIRING SLOW LOWERING SPEED
- MILL DUTY CLASS 8503 TYPE M CLAPPER TYPE CONTACTORS
- CLASS 8501 TYPE SZF STATIC ACCELERATION TIMERS



| Volts 3Ø 50/60Hz | Crane Rating* | | NEMA Contactor Size | | No. Speed Points | Open Type | General Purpose Enclosure NEMA Type 1 Gasketed | Outdoor Enclosure NEMA Type 3R | Dusttight Enclosure NEMA Type 12 |
|-----------------------------|---------------|--------|---------------------|-----------|------------------|-----------|--|--------------------------------|----------------------------------|
| | Max Amperes | Max Hp | Primary | Secondary | | | | | |
| SINGLE MOTOR CONTROL | | | | | | | | | |
| 380 | 67 | 30 | 2 | 2 | 5 | DOH71 | DSH71 | DWH71 | DAH71 |
| | 133 | 60 | 3 | 3 | 5* | EOH71 | ESH71 | EWH71 | EAH71 |
| | 200 | 100 | 4 | 4 | 5* | FOH71 | FSH71 | FWH71 | FAH71 |
| | 400 | 150 | 5 | 5 | 5* | GOH71 | GSH71 | GWH71 | GAH71 |
| | 400 | 235 | 5 | 5 | 6♦ | GOH91 | GSH91 | GWH91 | GAH91 |
| 460 | 67 | 40 | 2 | 2 | 5 | DOH71 | DSH71 | DWH71 | DAH71 |
| | 133 | 80 | 3 | 3 | 5* | EOH71 | ESH71 | EWH71 | EAH71 |
| | 200 | 125 | 4 | 4 | 5* | FOH71 | FSH71 | FWH71 | FAH71 |
| | 400 | 200 | 5 | 5 | 5* | GOH71 | GSH71 | GWH71 | GAH71 |
| | 400 | 300 | 5 | 5 | 6♦ | GOH91 | GSH91 | GWH91 | GAH91 |

*Select controller based on horsepower and rated primary and secondary current. For explanation, refer to Controller Ratings section of Application Data.

*These controllers have six speed points available but are used with 5point master switches, the last acceleration point being relay controlled.

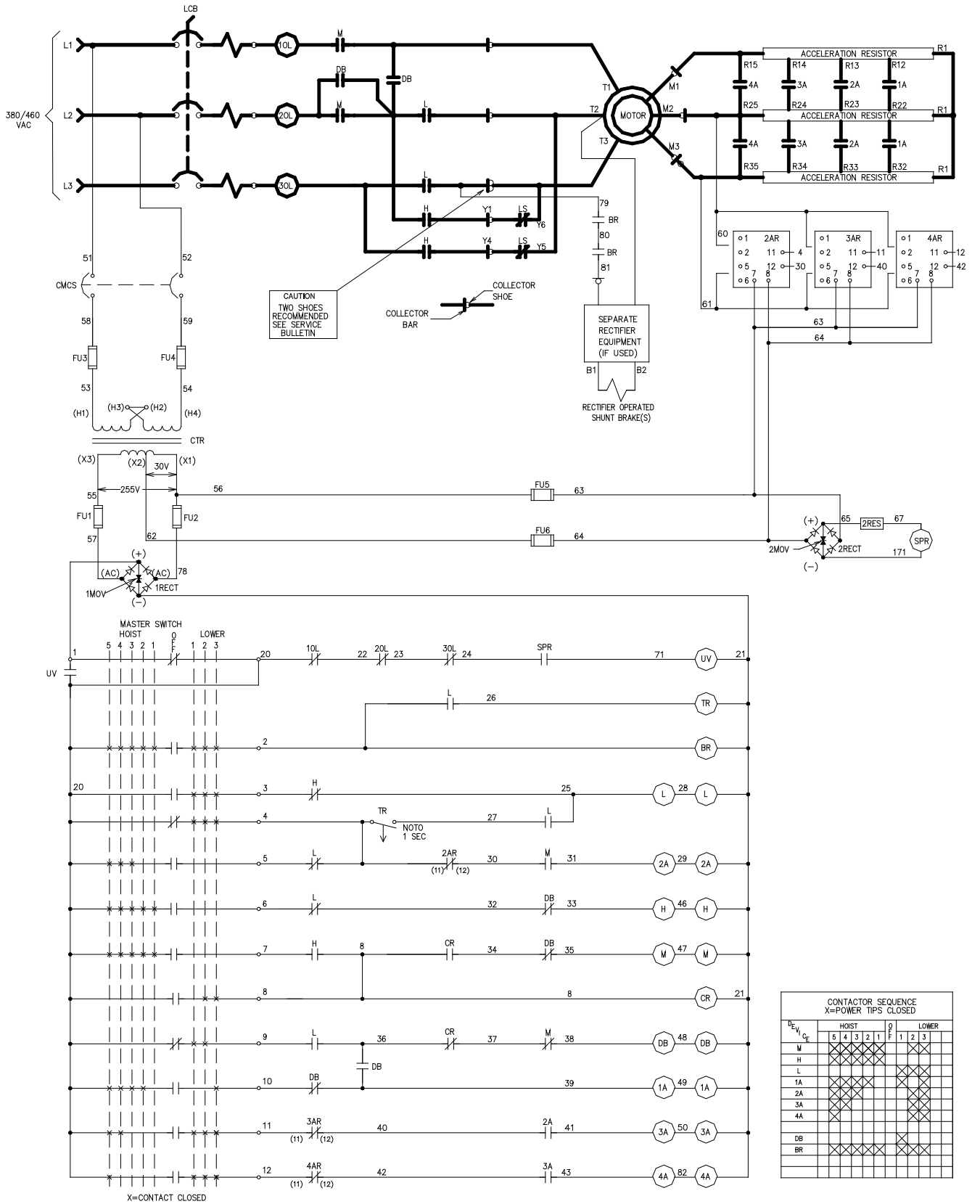
♦These controllers have seven speed points available but are used with 6point master switches, the last acceleration point being relay controlled.

ORDERING INFORMATION REQUIRED: See Page 23
MODIFICATIONS: See Page 23

APPLICATION INFORMATION: See Pages 23-25
DIMENSIONAL INFORMATION: See Pages 10&11



DYNAMIC LOWERING ELEMENTARY DIAGRAM



CONTRA-TORQUE® GENERAL INFORMATION

HOIST SERVICE

Class 6422 reversing CONTRA-TORQUE® controllers are recommended for use with ac wound rotor motors on crane hoists without mechanical load brakes but with fixed overhauling loads such as bucket crane hoists. All controllers are arranged for use with rectifier operated dc shunt brakes or ac operated brakes.

The standard single motor reversing CONTRA-TORQUE® controller consists of:

- 1—Two pole control molded case switch (CMCS)
- 1—Three pole magnetic main line circuit breaker with padlock clip (LCB)
- 2—Type M two-pole contactors with mechanical interlock for hoisting and lowering circuits (H, L)
- 1—Type M two-pole main contactor (M)
- 5 or 6—Type M two-pole acceleration contactors (1A, 2A, 3A, 4A, 5A, 6A)
- 5 or 6—Type SZF frequency relays (3AR, 4AR, 5AR, 6AR OS, NH)
- 1—460/380/230 to 255 volt fused control circuit transformer (CTR)
- 1—Control Circuit Rectifier (RECT)
- 1—Type KFO under voltage relay (UV)
- 2—Pneumatic timing relays for counter-torque and lowering relays (CTR, LR)
- 1—Pneumatic timing transition relay (TR)
- 3—Type AO magnetic inverse time overload relays (1OL, 2OL, 3OL)
- 1—SZF power loss protection relay circuits (SPR, 2RECT, 2MOV, 2RES)

- PROVIDES SLOW LOWERING SPEEDS FOR OVERHAULING LOADS ONLY
- MILL DUTY CLASS 8503 TYPE M CLAPPER TYPE CONTACTORS
- CLASS 8501 TYPE SZF STATIC ACCELERATION TIMERS



| Volts 50/60Hz | Crane Rating* | | NEMA Contactor Size | | No. Speed Points | Open Type | General Purpose Enclosure NEMA Type 1 Gasketed | Outdoor Enclosure NEMA Type 3R | Dusttight Enclosure NEMA Type 12 |
|-----------------------------|---------------|--------|---------------------|-----------|------------------|-----------|--|--------------------------------|----------------------------------|
| | Max Amperes | Max Hp | Primary | Secondary | | | | | |
| SINGLE MOTOR CONTROL | | | | | | | | | |
| 380 | 67 | 30 | 2 | 2 | 5* | DOH72 | DSH72 | DWH72 | DAH72 |
| | 133 | 60 | 3 | 3 | 5* | EOH72 | ESH72 | EWH72 | EAH72 |
| | 200 | 100 | 4 | 4 | 5* | FOH72 | FSH72 | FWH72 | FAH72 |
| | 400 | 150 | 5 | 5 | 5* | GOH72 | GSH72 | GWH72 | GAH72 |
| | 400 | 235 | 5 | 5 | 6* | GOH92 | GSH92 | GWH92 | GAH92 |
| 460 | 67 | 40 | 2 | 2 | 5* | DOH72 | DSH72 | DWH72 | DAH72 |
| | 133 | 80 | 3 | 3 | 5* | EOH72 | ESH72 | EWH72 | EAH72 |
| | 200 | 125 | 4 | 4 | 5* | FOH72 | FSH72 | FWH72 | FAH72 |
| | 400 | 200 | 5 | 5 | 5* | GOH72 | GSH72 | GWH72 | GAH72 |
| | 400 | 300 | 5 | 5 | 6* | GOH92 | GSH92 | GWH92 | GAH92 |

•Select controller based on horsepower and rated primary and secondary current. For explanation, refer to Controller Ratings section of Application Data.

*These controllers have six speed points available but are used with 5point master switches, the last acceleration point being relay controlled.

♦These controllers have seven speed points available but are used with 6point master switches, the last acceleration point being relay controlled.

ORDERING INFORMATION REQUIRED: See Page 23
MODIFICATIONS: See Page 23

APPLICATION INFORMATION: See Pages 23-25
DIMENSIONAL INFORMATION: See Pages 10&11



REVERSING HOIST OR REVERSING PLUGGING CONTROL

Class 6426 controllers are recommended for used with ac wound rotor motor on hoist and travel drives of general-purpose overhead cranes. The hoist controllers are of the reversing hoist type and are used on cranes with mechanical load brakes. The travel panels are of the reversing plugging type. Both the hoist and the travel controllers are arranged for use with rectifier operated dc shunt brakes or ac operated brakes.

HOIST SERVICE[♦]

The standard single motor reversing hoist controller consists of the equipment for a reversing plugging controller but without SZF frequency relay for plugging (PR). Device designations are changed.

BRIDGE OR TROLLEY SERVICE

The standard single motor reversing controller consists of:

- 1—Two pole control molded case switch (CMCS)
- 1—Three pole magnetic main line circuit breaker with padlock clip (LCB)
- 2—Type M two-pole contactors with mechanical interlock (F, R)
- 1—Type M two-pole main contactor (M)
- 4, 5 or 6 Type M two-pole acceleration contactors (including one for plugging) (P, 1A, 2A, 3A, 4A, 5A, 6A)
- 3, 4 or 5 Type ST1 static acceleration timers (1AR, 2AR, 3AR, 4AR, 5AR)
- 1—Type SZF frequency relay for plugging (PR)
- 1—460/380/230 to 255 volt fused control circuit transformer (CTR)
- 1—Control Circuit Rectifier (RECT)
- 1—Type KFO under voltage relay (UV)
- 3—Type AO magnetic inverse time overload relays (1OL, 2OL, 3OL)
- 1—SZF power loss protection relay circuit (SPR, 2RECT, 2MOV, RES)

- MILL DUTY CLASS 8503 TYPE M CLAPPER TYPE CONTACTORS
- CLASS 8501 TYPE SZF FREQUENCY ACCELERATION RELAYS FOR PLUGGING
- CLASS 7001 TYPE ST1 STATICACCELERATION TIMERS



The standard duplex reversing plugging controller consists of the equipment for a single motor controller with the exception that the following equipment is added:

- 4 or 5—Type M two-pole acceleration contactors (2P, 21A, 22A, 23A, 24A)
- 3—Type AO magnetic inverse time overload relays (4OL, 5OL, 6OL)

| Volts 50/60Hz | Crane Rating* | | Max Hp | NEMA Contactor Size | | No. Speed Points | Open Type | General Purpose Enclosure NEMA Type 1 Gasketed | Outdoor Enclosure NEMA Type 3R | Dusttight Enclosure NEMA Type 12 |
|---|---------------|-----------|--------|---------------------|-----------|------------------|-----------|--|--------------------------------|----------------------------------|
| | Max Amperes | | | Primary | Secondary | | | | | |
| | Primary | Secondary | | | | | | | | |
| SINGLE MOTOR CONTROL[♦] | | | | | | | | | | |
| 380 | 67 | 67 | 30 | 2 | 2 | 5 | DOR76 | DSR76 | DWR76 | DAR76 |
| | 133 | 133 | 60 | 3 | 3 | 5 | EOR76 | ESR76 | EW76 | EAR76 |
| | 200 | 200 | 100 | 4 | 4 | 5* | FOR76 | FSR76 | FWR76 | FAR76 |
| | 400 | 400 | 150 | 5 | 5 | 5* | GOR76 | GSR76 | GWR76 | GAR76 |
| | 400 | 400 | 235 | 5 | 5 | 6□ | GOR96 | GSR96 | GWR96 | GAR96 |
| 460 | 67 | 67 | 40 | 2 | 2 | 5 | DOR76 | DSR76 | DWR76 | DAR76 |
| | 133 | 133 | 80 | 3 | 3 | 5 | EOR76 | ESR76 | EW76 | EAR76 |
| | 200 | 200 | 125 | 4 | 4 | 5* | FOR76 | FSR76 | FWR76 | FAR76 |
| | 400 | 400 | 200 | 5 | 5 | 5* | GOR76 | GSR76 | GWR76 | GAR76 |
| | 400 | 400 | 300 | 5 | 5 | 6□ | GOR96 | GSR96 | GWR96 | GAR96 |
| DUPLEX MOTOR CONTROL | | | | | | | | | | |
| 380 | 67 | 67 | 30 | 2 | 2 | 5 | DOR86 | DSR86 | DWR86 | DAR86 |
| | 133 | 133 | 60 | 3 | 2 | 5 | EOR86 | ESR86 | EW86 | EAR86 |
| | 200 | 200 | 100 | 4 | 3 | 5 | FOR86 | FSR86 | FWR86 | FAR86 |
| | 400 | 400 | 150 | 5 | 4 | 5* | GOR86 | GSR86 | GWR86 | GAR86 |
| | 400 | 400 | 235 | 5 | 5 | 6□ | GOR106 | GSR106 | GWR106 | GAR106 |
| 460 | 67 | 67 | 40 | 2 | 2 | 5 | DOR86 | DSR86 | DWR86 | DAR86 |
| | 133 | 67 | 80 | 3 | 2 | 5 | EOR86 | ESR86 | EW86 | EAR86 |
| | 200 | 133 | 120 | 4 | 3 | 5* | FOR86 | FSR86 | FWR86 | FAR86 |
| | 400 | 200 | 200 | 5 | 4 | 5* | GOR86 | GSR86 | GWR86 | GAR86 |
| | 400 | 400 | 300 | 5 | 5 | 6□ | GOR106 | GSR106 | GWR106 | GAR106 |

♦Select controller based on motor horsepower and rated primary and secondary current. For explanation, refer to Controller Ratings section of Application Data.

♦Price is for single motor reversing plugging or reversing hoist. For reversing hoist, change the R in the type to an H.

*These controllers have 6 speed points available but are used with 5point master switches, the last acceleration point being relay controlled.

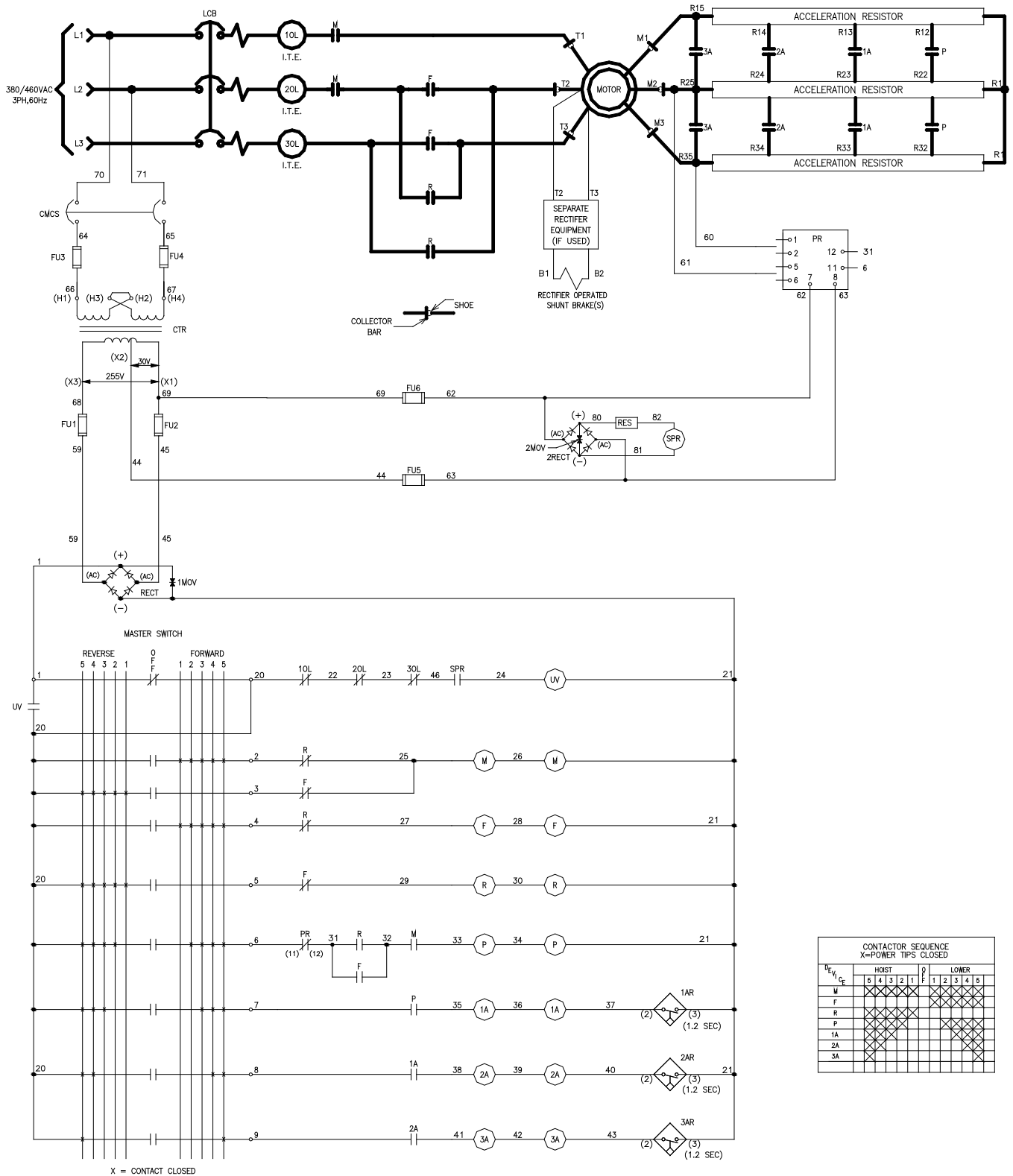
□These controllers have seven speed points available but are used with 6point master switches, the last acceleration point being relay controlled.

ORDERING INFORMATION REQUIRED: See Page 23
MODIFICATIONS: See Page 23

APPLICATION INFORMATION: See Pages 23-25
DIMENSIONAL INFORMATION: See Pages 10&11



REVERSING PLUGGING ELEMENTARY DIAGRAM



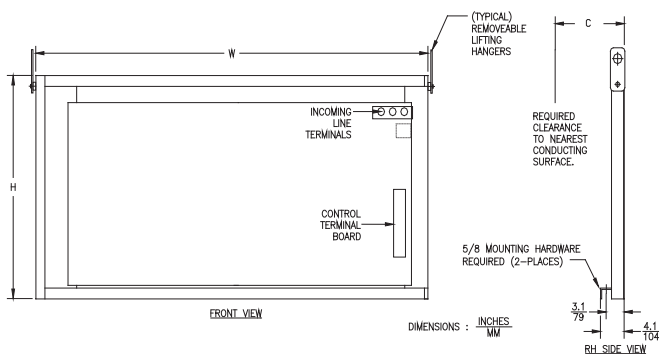
CLASS
6421
6422
6426

FRONTLINE® AC CRANE CONTROL

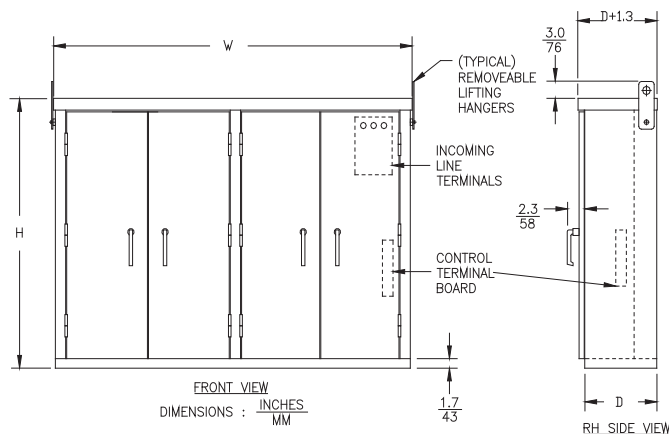
August, 2012

APPROXIMATE DIMENSIONS AND WEIGHTS SINGLE AND DUPLEX MOTOR CONTROL STANDARD CONTROLLERS

OPEN TYPE



ENCLOSED TYPE



| | MAXIMUM HP | | OPEN TYPE | | | | ENCLOSED TYPE | | | | |
|------------------------------------|------------|--|--|-------------------|------------------|--------------------------|-------------------|-------------------|------------------|--------------------------|--|
| | 460V | 380V | H in mm | W in mm | C in mm | NET Weight Lbs./kg | W in mm | C in mm | D in mm | NET Weight Lbs./kg | |
| SINGLE MOTOR CONTROL | | | | | | | | | | | |
| Hoist Class 6420 & 6422 | 40 | 30 | <u>48</u> 1219 | <u>69</u> 1753 | <u>12</u> 305 | 525/238 | <u>48</u> 1219 | <u>69</u> 1753 | <u>15</u> 381 | 750/341 | |
| | 80 | 60 | <u>48</u> 1219 | <u>69</u> 1753 | <u>12</u> 305 | 700/318 | <u>48</u> 1219 | <u>69</u> 1753 | <u>15</u> 381 | 900/409 | |
| | 125 | 100 | <u>48</u> 1219 | <u>69</u> 1753 | <u>12</u> 305 | 700/318 | <u>48</u> 1219 | <u>69</u> 1753 | <u>15</u> 381 | 900/409 | |
| | 200 | 150 | SEE NARROW WIDTH DIMENSIONS OR CONSULT FACTORY | | | | | | | | |
| 300 | 200 | SEE NARROW WIDTH DIMENSIONS OR CONSULT FACTORY | | | | | | | | | |
| DUPLEX MOTOR CONTROL | | | | | | | | | | | |
| Hoist Class 6421 & 6426 | 40 | 30 | <u>48</u> 1219 | <u>69</u> 1753 | <u>12</u> 305 | 500/227 | <u>48</u> 1219 | <u>69</u> 1753 | <u>15</u> 381 | 700/318 | |
| | 80 | 60 | <u>48</u> 1219 | <u>69</u> 1753 | <u>12</u> 305 | 700/318 | <u>48</u> 1219 | <u>69</u> 1753 | <u>15</u> 381 | 900/409 | |
| | 125 | 100 | <u>48</u> 1219 | <u>69</u> 1753 | <u>12</u> 305 | 700/318 | <u>48</u> 1219 | <u>69</u> 1753 | <u>15</u> 381 | 900/409 | |
| Bridge or Trolley Class 6426 | 200 | 150 | CONSULT FACTORY | | | | | | | | |
| | 300 | 200 | CONSULT FACTORY | | | | | | | | |

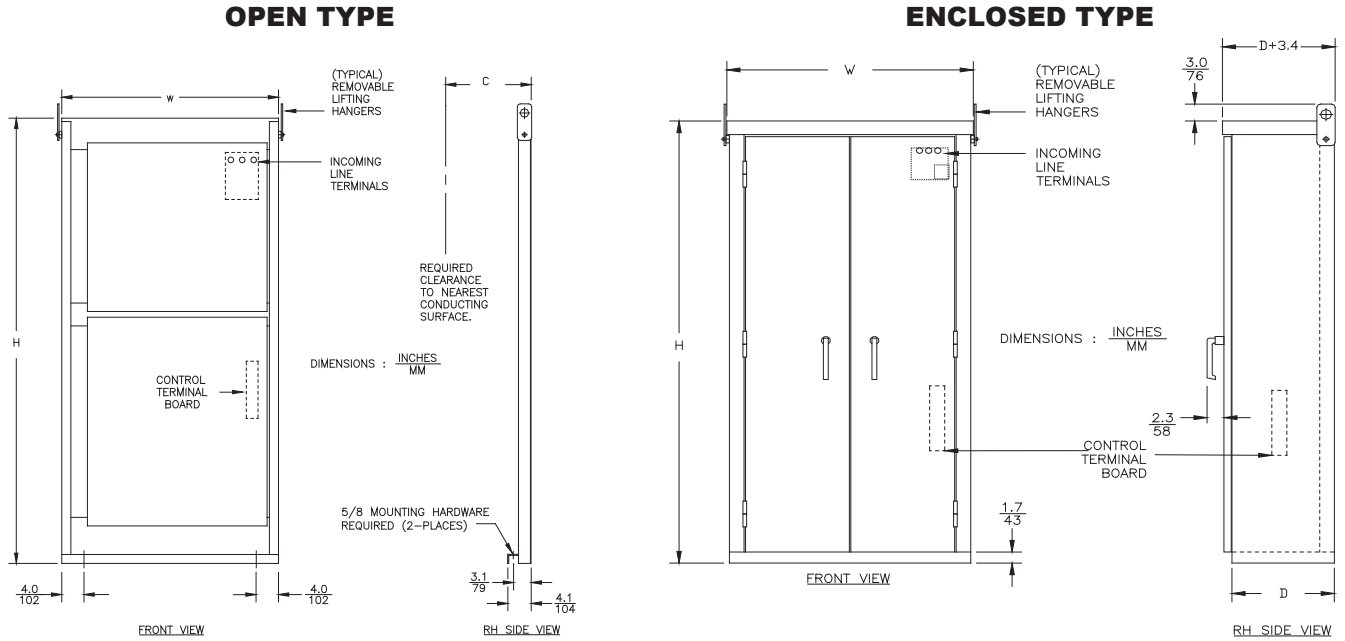


The Electric Controller and
Manufacturing Company, LLC

FRONTLINE® AC CRANE CONTROL

CLASS
6421
6422
6426

APPROXIMATE DIMENSIONS AND WEIGHTS SINGLE AND DUPLEX MOTOR CONTROL NARROW WIDTH CONTROLLERS



| DRIVE | MAXIMUM HP | | OPEN TYPE | | | | ENCLOSED TYPE | | | NET Weight Lbs./kg |
|--|------------|------|------------------------|-------------------|------------------|-----------------------|-------------------|-------------------|------------------|-----------------------|
| | 460V | 380V | H in mm | W in mm | C in mm | NET Weight Lbs./kg | H in mm | W in mm | D in mm | |
| SINGLE MOTOR CONTROL | | | | | | | | | | |
| HOIST (All Classes) and Bridge, Trolley | 40 | 30 | - | - | - | - | - | - | - | - |
| | 80 | 60 | <u>68</u> 1727 | <u>63</u> 1600 | <u>12</u> 305 | 700/318 | <u>68</u> 1727 | <u>63</u> 1600 | <u>15</u> 381 | 900/409 |
| | 125 | 100 | <u>68</u> 1727 | <u>63</u> 1600 | <u>12</u> 305 | 700/318 | <u>68</u> 1727 | <u>63</u> 1600 | <u>15</u> 381 | 900/409 |
| | 200 | 150 | <u>78</u> 1981 | <u>77</u> 1956 | <u>15</u> 381 | 1300/590 | <u>78</u> 1981 | <u>77</u> 1956 | <u>17</u> 482 | 1800/817 |
| | 300 | 200 | <u>78</u> 1981 | <u>77</u> 1956 | <u>15</u> 381 | 1300/590 | <u>78</u> 1981 | <u>77</u> 1956 | <u>17</u> 482 | 1800/817 |
| DUPLEX MOTOR CONTROL | | | | | | | | | | |
| CLASS 6426 Bridge and Trolley only | 40 | 30 | - | - | - | - | - | - | - | - |
| | 80 | 60 | <u>68</u> 1727 | <u>75</u> 1905 | <u>12</u> 305 | 1000/454 | <u>68</u> 1727 | <u>75</u> 1905 | <u>15</u> 381 | 1400/635 |
| | 125 | 100 | <u>68</u> 1727 | <u>75</u> 1905 | <u>12</u> 305 | 1000/454 | <u>68</u> 1727 | <u>75</u> 1905 | <u>15</u> 381 | 1400/635 |
| | 200 | 150 | CONSULT FACTORY | | | | | | | |
| | 300 | 200 | CONSULT FACTORY | | | | | | | |

WITH SQUARE D CLASS 8502 TYPE S CONTACTORS® GENERAL INFORMATION

HOIST SERVICE

Class 6435 controllers are recommended for used with ac wound rotor motor on hoist and travel drives, of general-purpose overhead cranes. The hoist controllers are of the reversing dynamic lowering type when used on cranes without mechanical load brakes and are of the reversing hoist type when used on cranes with mechanical load brakes. The travel controllers are of the reversing plugging type. Both the hoist and the travel controls are designed for use with rectifier operated dc brakes or ac operated brakes.

BRIDGE OR TROLLEY

The standard single motor reversing hoist controller consists of equipment for a single motor reversing plugging controller but without SZF frequency relay plugging. The standard single motor reversing dynamic lowering hoist controller consists of the equipment for a single motor reversing plugging controller, with one additional type S three pole contactor provided for dynamic lowering (DB), one additional control relay provided (CR) and a pneumatic timing delay is deleted (IA).

NOTE: DUPLEX CONTROLLERS ARE NOT AVAILABLE

The standard single motor reversing plugging controller consists of:

- 1—Two pole control molded case switch (CMCS)
- 1—Three pole magnetic main line circuit breaker with padlock clip (LCB)
- 2—Type S three-pole directional contactors with mechanical interlock (F, R)
- 3—Type S three-pole acceleration contactors (including one for plugging) (1A, 2A, P)
- 2—Pneumatic timing acceleration adder blocks (P, 1A)
- 1—Type SZF frequency relay for plugging (PR)
- 1—460 or 380 to 115 volt fused control circuit transformer (CTR)
- 1—Control Circuit Rectifier (RECT)
- 1—Undervoltage relay (UV)
- 3—Magnetic inverse time overload relays (1OL, 2OL, 3OL)
- 1—SZF power loss protection relay circuit (SPR, 2RECT, 2MOV, and RES)

- CLASS 8502 TYPE S CONTACTORS
- PNEUMATOC TIMING ACCELERATION
- CLASS 8501 TYPE SZF FREQUENCY RELAY FOR PLUGGING



Combined Class 6435 Type DSR76 (x2)
NEMA Size 2 Bridge & Trolley

NEMA SERVICE CLASSIFICATIONS

Standard 6435 controllers meet the requirements of NEMA services classification II (CMAA service classifications A2 and B). To meet the requirements of NEMA service classifications I (CMAA service classifications A1, C, D, E and F), the controller must be provided with the 5th speed point modification, Form M3.

| Volts 50/60Hz | Crane Rating* | | | NEMA Contactor Size | No. Speed Points | Open Type | General Purpose Enclosure NEMA Type 1 Gasketed | Outdoor Enclosure NEMA Type 3R |
|---|----------------|-----------|-----------|---------------------------|------------------------|--------------|--|-----------------------------------|
| | Max Amperes | | Max HP | | | | | |
| | Primary | Secondary | | | | | | |
| REVERSING AC DYNAMIC LOWERING HOIST CONTROL | | | | | | | | |
| 380 | 67 | 100 | 30 | 2 | 4 | DOH71 | DSH71 | DWH71 |
| | 133 | 199 | 60 | 3 | 4 | EOH71 | ESH71 | EWH71 |
| 460 | 67 | 100 | 40 | 2 | 4 | DOH71 | DSH71 | DWH71 |
| | 133 | 199 | 80 | 3 | 4 | EOH71 | ESH71 | EWH71 |
| REVERSING HOIST CONTROL | | | | | | | | |
| 380 | 67 | 100 | 30 | 2 | 4 | DOH76 | DSH76 | DWH76 |
| | 133 | 199 | 60 | 3 | 4 | EOH76 | ESH76 | EWH76 |
| 460 | 67 | 100 | 40 | 2 | 4 | DOH76 | DSH76 | DWH76 |
| | 133 | 199 | 80 | 3 | 4 | EOH76 | ESH76 | EWH76 |
| REVERSING PLUGGING BRIDGE OR TROLLEY CONTROL | | | | | | | | |
| 380 | 67 | 100 | 30 | 2 | 4 | DOR76 | DSR76 | DWR76 |
| | 133 | 199 | 60 | 3 | 4 | EOR76 | ESR76 | EWR76 |
| 460 | 67 | 100 | 40 | 2 | 4 | DOR76 | DSR76 | DWR76 |
| | 133 | 199 | 80 | 3 | 4 | EOR76 | ESR76 | EWR76 |

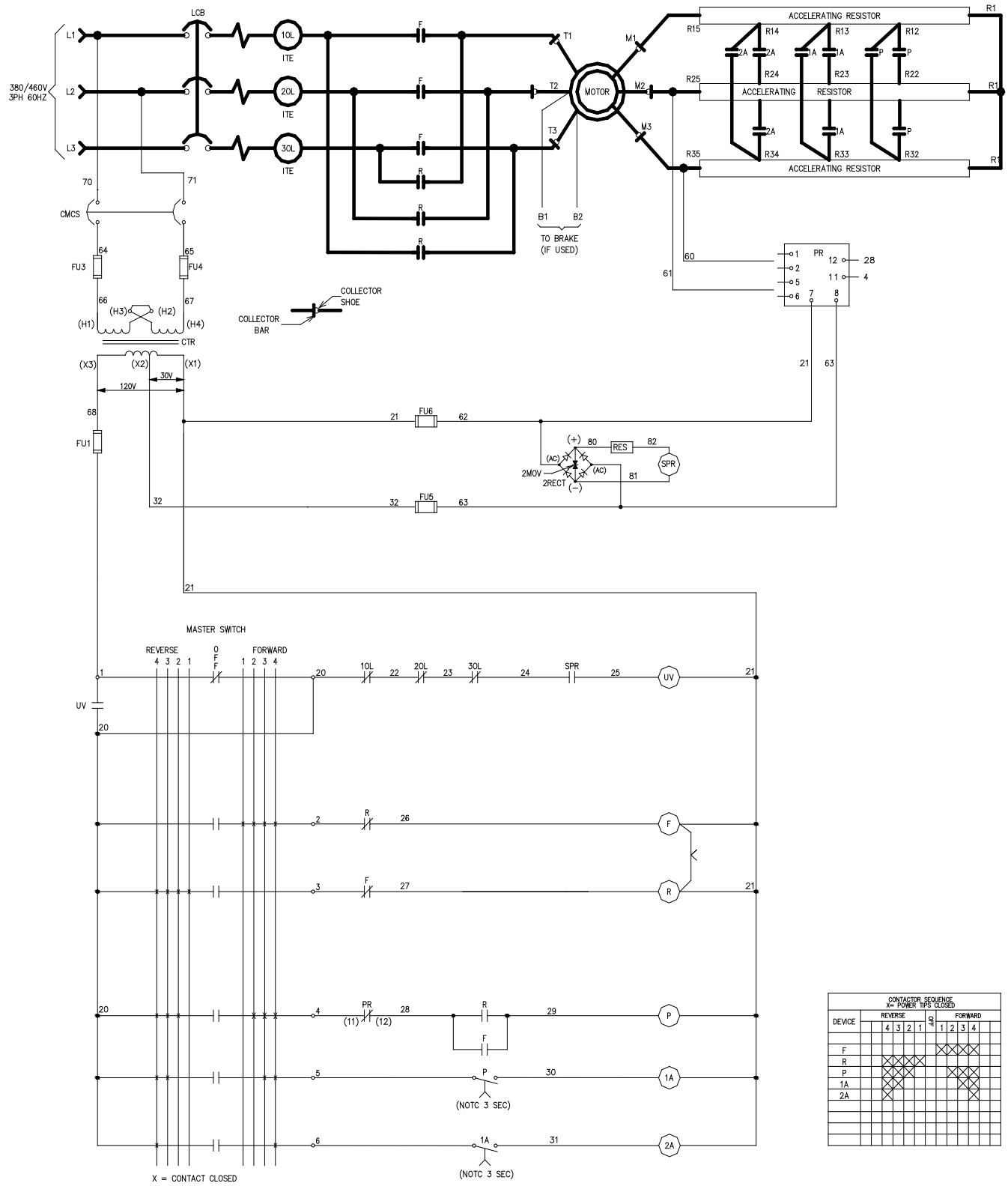
•Select controller based on horsepower and rated primary and secondary current. For explanation, refer to Controller Ratings section of Application Data.

ORDERING INFORMATION REQUIRED:

- | | | |
|---------------------|---|---------------------------------------|
| 1. Class | 4. Motor Primary Rated Voltage and Current | 7. Resistors Services Classification |
| 2. Type | 5. Motor Secondary Rated Voltage and Current | 8. Master Switch Type and Form Number |
| 3. Motor Horsepower | 6. Controller Modifications: Specify Form Numbers | |

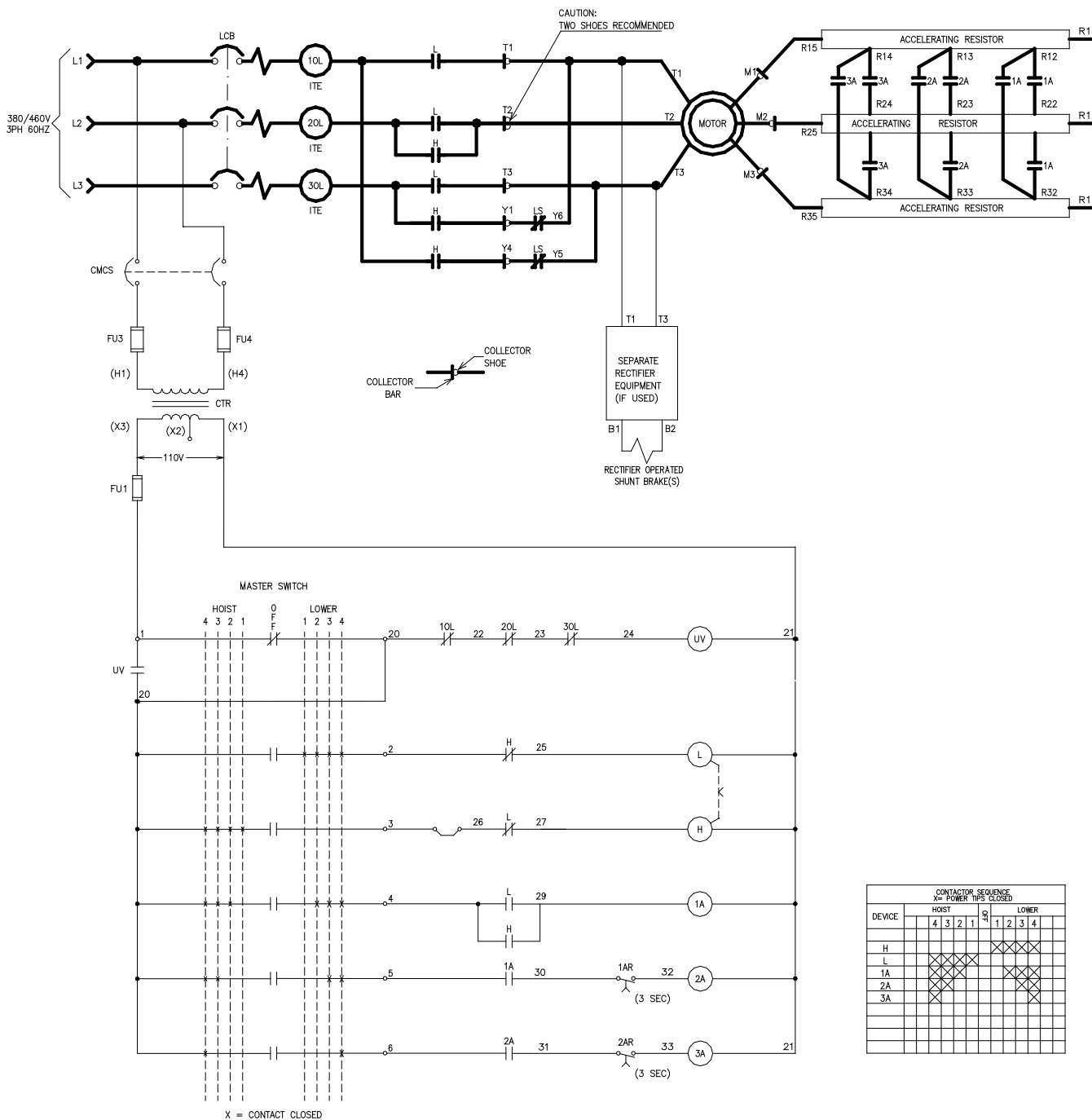


WITH CLASS SQUARE D 8502 TYPE S CONTACTORS[®] TRAVEL CONTROL ELEMENTARY DIAGRAM



WITH CLASS SQUARE D 8502 TYPE S CONTACTORS[®]

REVERSING HOIST ELEMENTARY DIAGRAM

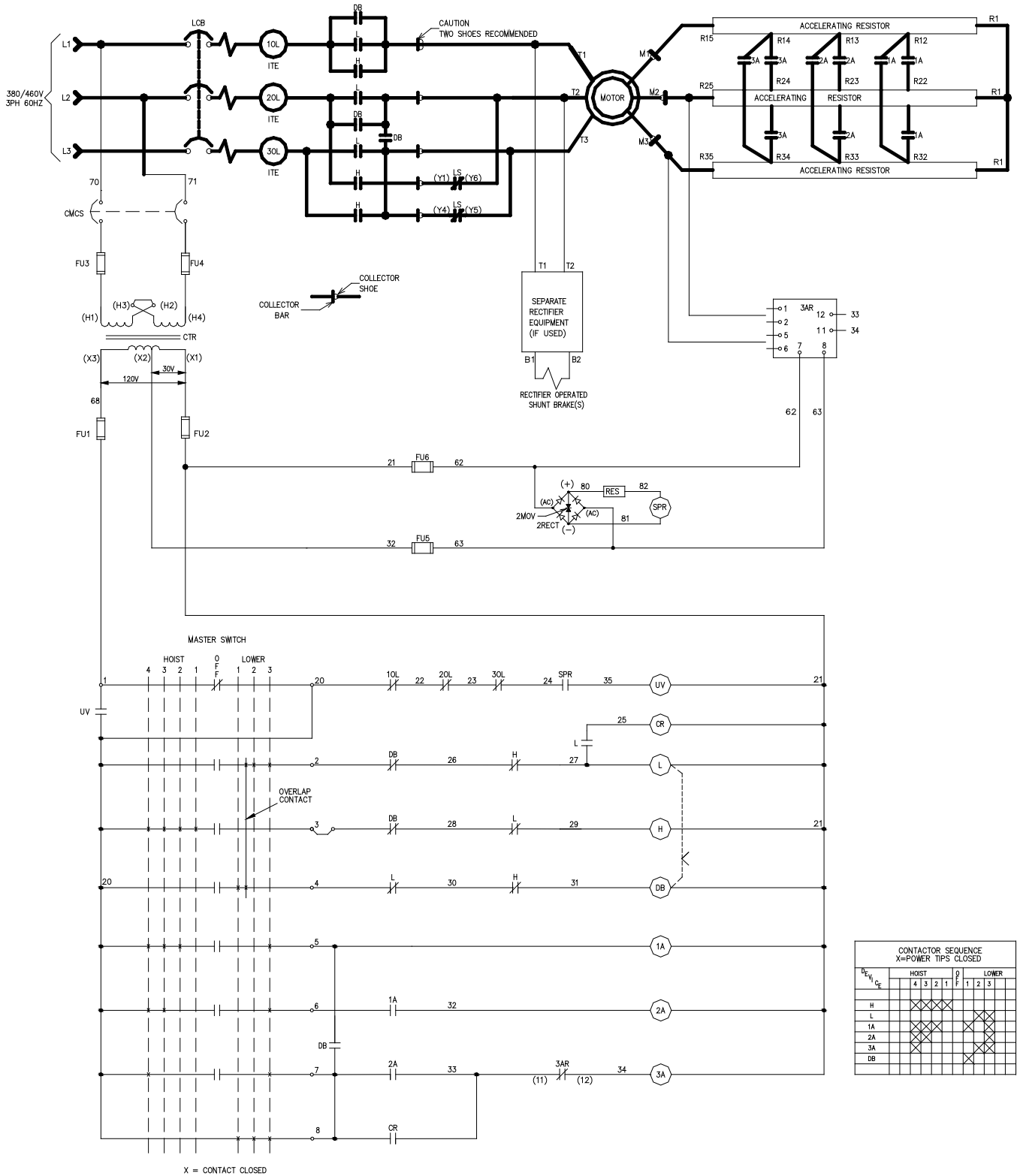


CONTACTOR SEQUENCE
X = POWER TIPS CLOSED

| DEVICE | HOIST | | | | LOWER | | | |
|--------|-------|---|---|---|-------|---|---|---|
| | 4 | 3 | 2 | 1 | 1 | 2 | 3 | 4 |
| H | | | | | | | | |
| L | X | X | X | X | | | | |
| 1A | | | | | X | X | X | X |
| 2A | X | X | X | X | | | | |
| 3A | X | X | X | X | | | | |

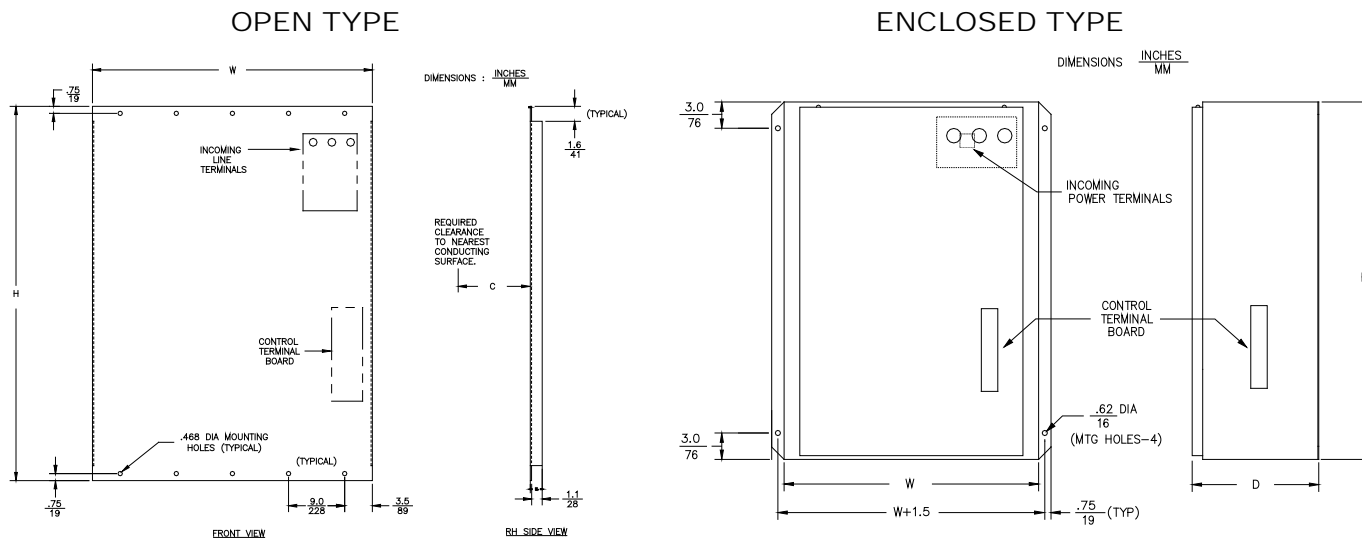


WITH CLASS SQUARE D 8502 TYPE S CONTACTORS[®] DYNAMIC LOWERING HOIST ELEMENTARY DIAGRAM



WITH SQUARE D CLASS 8502 TYPE S CONTACTORS®

APPROXIMATE DIMENSIONS AND WEIGHTS



| Drive | Maximum HP (Volts) | Open Type | | | | Enclosed Type | | | |
|-----------------|--------------------|---------------|---------------|---------------|-----------------------|---------------|---------------|---------------|-----------------------|
| | | H in mm | W in mm | C in mm | Net Weight Lbs./kg | H in mm | W in mm | D in mm | Net Weight Lbs./kg |
| Hoist or Travel | 20 | 40 | 24 | 8.5 | 150/68 | 42 | 30 | 15 | 300/136 |
| | (380) | 1016 | 607 | 216 | | 1067 | 762 | 381 | |
| | 40 | 40 | 24 | 8.5 | 150/68 | 42 | 30 | 15 | 300/136 |
| | (460) | 1016 | 607 | 216 | | 1067 | 762 | 381 | |
| | 40 | 40 | 30 | 10 | 200/91 | 42 | 36 | 15 | 385/175 |
| | (380) | 1016 | 762 | 254 | | 1067 | 914 | 381 | |
| | 80 | 40 | 30 | 10 | 200/91 | 42 | 36 | 15 | 385/175 |
| | (460) | 1016 | 762 | 254 | | 1067 | 914 | 381 | |



GENERAL INFORMATION

AC MANUAL MAGNETIC DISCONNECTS SWITCHES

The manual magnetic disconnect switch is used for protecting electrical crane circuits, except lifting magnet circuits. The disconnect meets OSHA requirements for a crane disconnect switch.

The standard disconnect switch consists of:

3—Class 8503 Type M, form Y781 (with silver faced power contact tips), SPNO contactors. The contactors are mechanically tied. One normally open and one normally closed electrical interlocks are included for indicating lights

1—Two pole control molded case switch with padlock clip (CMCS)

1—460/380/230 to 255 or 115V volt, fused control circuit transformer (CTR)

1—Intermediate control relay (CR)

1—Class 9999A11 Arc Suppressor

- CAM OPERATOR PREVENTS CONTACTOR FROM CLOSING WHEN HANDLE IS IN OFF POSITION
- CONTACTORS OPERATED REMOTELY OR BY HANDLE ON THE ENCLOSURE



| Volts 50/60Hz | NEMA Contactor Size | Max Amperes | Enclosures | |
|------------------|---------------------------|----------------|---|--|
| | | | General Purpose NEMA Type 1 gasketed | Dusttight NEMA Type 12 Outdoor NEMA Type 3R |
| 380 or 460 | 4 | 150 | MFS12 | MFA12 |
| | 5 | 300 | MGS12 | MGA12 |
| | 6 | 600 | MHS12 | MHA12 |
| | 8 | 1350 | MKS12 | MKA12 |

*Not a NEMA size rating

DISCONNECT MODIFICATIONS

| Form | Description |
|------|---|
| F30* | 3 Main Line Power Fuses |
| A3 | Start-Stop Push Button |
| X11 | Additional Control Circuit Interlocks. A maximum of 4 N.O. / 4 N.C. interlocks can be added |
| A3 | "On/Off" Pushbutton |
| P1 | Red "On" Pilot Light |
| P2 | Green "Off" Pilot Light |
| T12 | 200VA Additional Transformer Capacity |
| V99 | System voltage other than 460/380/230VAC |

* Class L fuse mounting is standard. Customer to supply fuse rating.

PILOT DEVICES SELECTION

The pilot devices should be selected so the current rating is adequate for controlling the disconnect switch. For coil currents, refer to Class 9998 Coil Data catalog sheets. An arc inhibitor may be required depending upon the ratings of the pilot device.

DISCONNECT SWITCH SELECTION

When applied to cranes, the continuous ampere rating of the disconnect switch shall not be less than 50 percent of the total rated current required by all motors on the crane, nor less than 75 percent of the rated motor current required by any single crane motion.

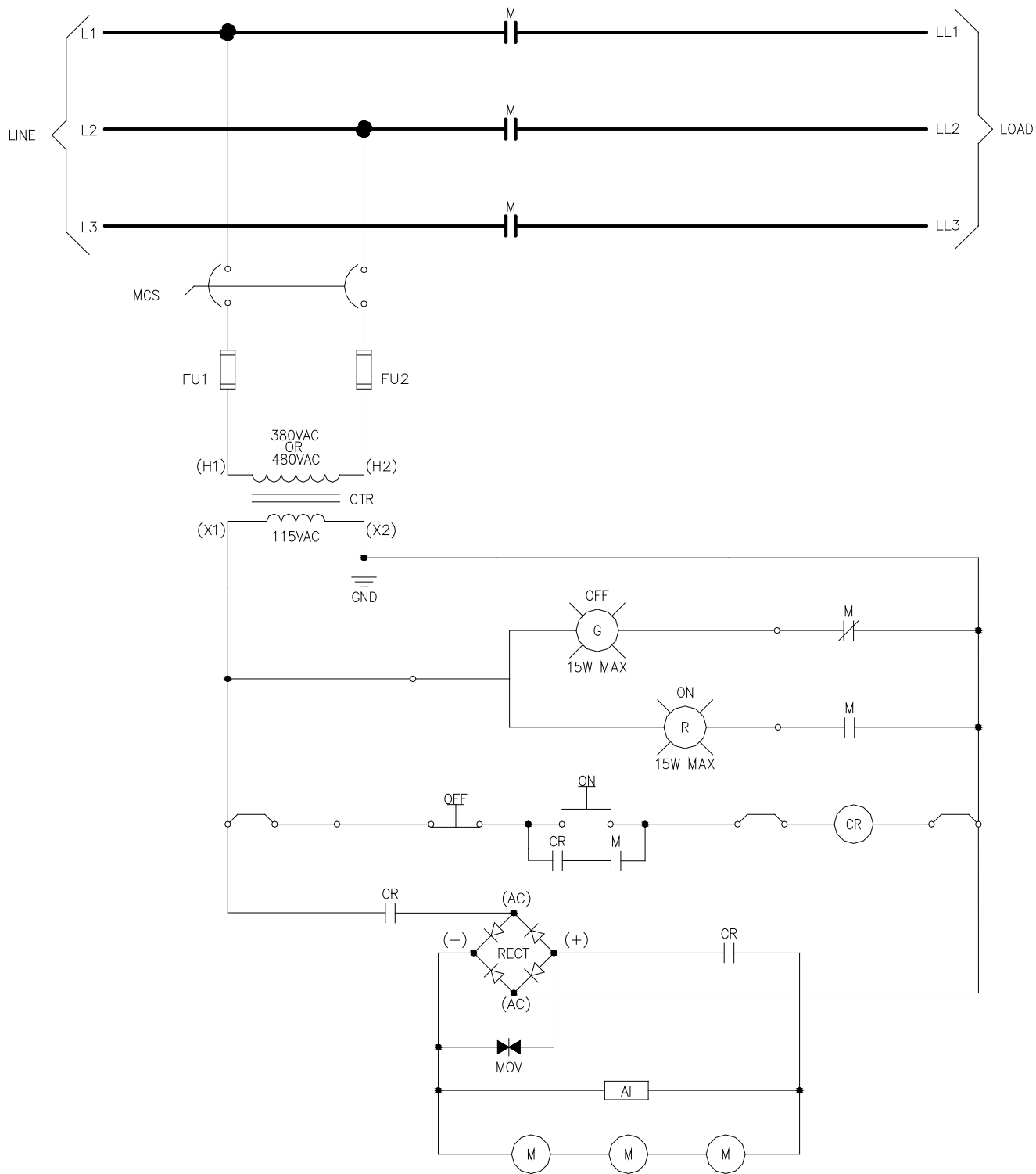
ORDERING INFORMATION REQUIRED:

1. Class
2. Type
3. Voltage
4. Controller Modifications: Specify Forms



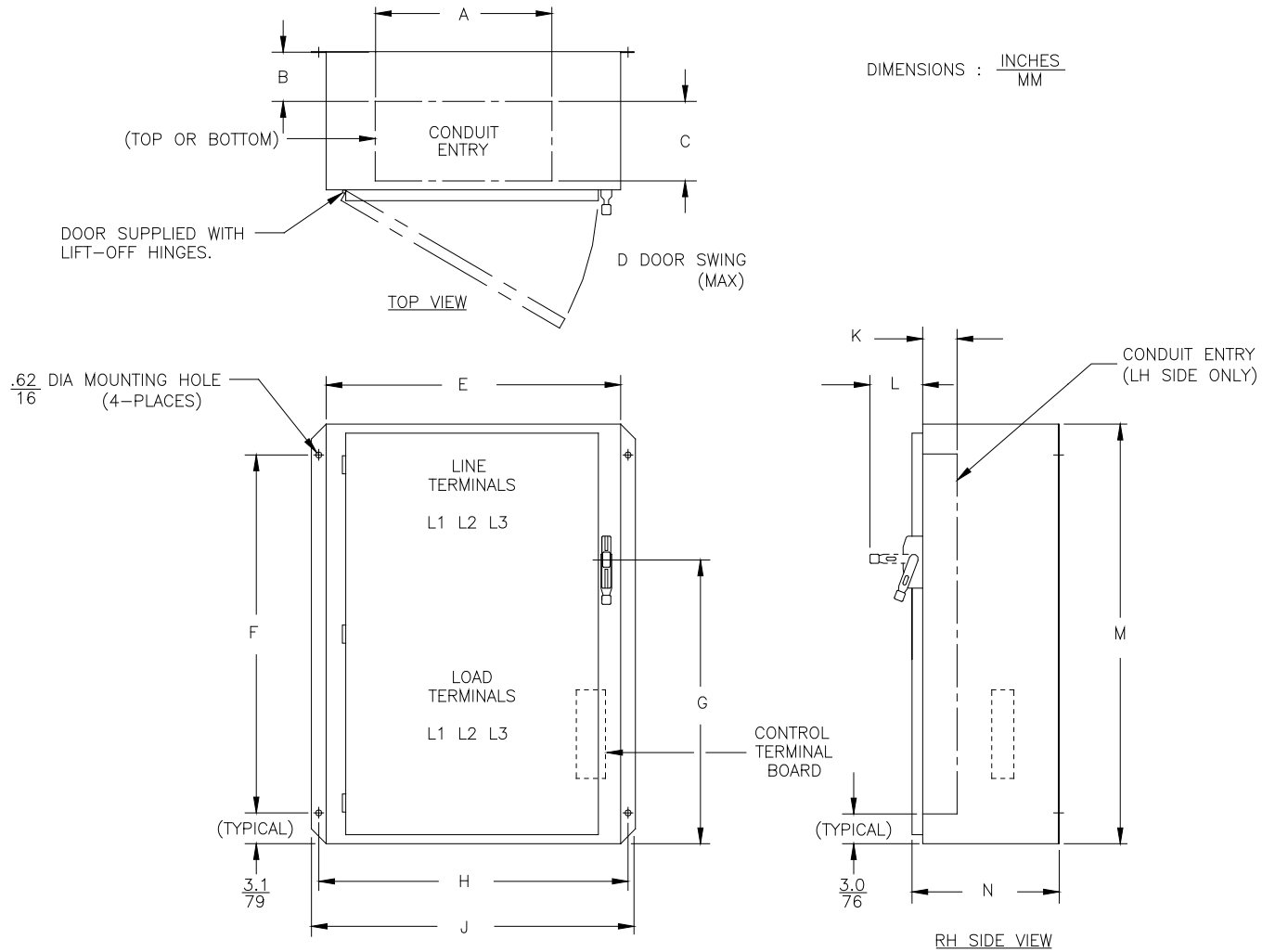
AC MANUAL MAGNETIC DISCONNECT SWITCHES ELEMENTARY DIAGRAM

SIZES 4, 5, AND 6



AC MANUAL MAGNETIC DISCONNECT SWITCHES APPROXIMATE DIMENSIONS AND WEIGHTS

150-600A:



| NEMA Size | Continuous Ampere Rating | A | B | C | D | E | F | G | H | J | K | L | M | N | Net Weight Lbs./kg |
|-----------|--------------------------|------------------------|------------------|-------------------|------------------|-------------------|-------------------|---------------------|---------------------|-------------------|------------------|-------------------|-------------------|------------------|--------------------|
| 4 | 150 | <u>18</u> 457 | <u>5</u> 127 | <u>8</u> 203 | <u>19</u> 483 | <u>30</u> 762 | <u>36</u> 914 | <u>28.64</u> 727 | <u>31.5</u> 800 | <u>33</u> 838 | <u>3.5</u> 89 | <u>16</u> 229 | <u>42</u> 1067 | <u>15</u> 381 | <u>210</u> 96 |
| 5 | 300 | <u>14</u> 356 | <u>3.5</u> 89 | <u>4.5</u> 114 | <u>28</u> 711 | <u>33</u> 838 | <u>36</u> 914 | <u>26.7</u> 678 | <u>34.5</u> 876 | <u>36</u> 914 | <u>7</u> 178 | <u>7.2</u> 183 | <u>50</u> 1270 | <u>20</u> 508 | <u>235</u> 107 |
| 6 | 600 | <u>18</u> 457 | <u>5</u> 127 | <u>8</u> 203 | <u>19</u> 483 | <u>42</u> 1067 | <u>42</u> 1067 | <u>32.2</u> 818 | <u>43.5</u> 1105 | <u>45</u> 1143 | <u>3.5</u> 89 | <u>10</u> 483 | <u>60</u> 1524 | <u>20</u> 508 | <u>285</u> 130 |
| 8 | 1350 | CONSULT FACTORY | | | | | | | | | | | | | |



RESISTOR SELECTION FOR AC CRANE CONTROL SYSTEMS

A set of TABWELD[®] resistors are required for each AC motion control system.
The following table is for selecting resistors for all AC motor crane control applications.

RESISTOR APPLICATION

CLASS 6715 TYPE TW RESISTOR

For resistors mounted in racks, unwired – refer to Class 6715.

Class 151 and 152 is recommended for light crane duty.

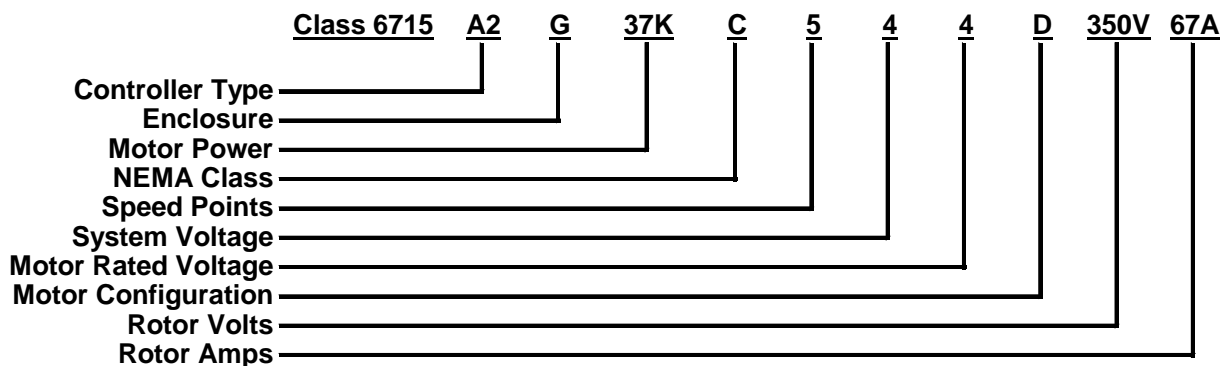
Class 161 and 162 is recommended for standard duty.

Class 171 and 172 is recommended for severe duty.

For explanation of NEMA resistor classifications – refer to Class 6715 catalog



CLASS 6715 RESISTORS TYPE NUMBER SELECTOR*



*This Type Number Selector provides a complete resistor set Type Number to allow part number creation. These Type Numbers are not part numbers.

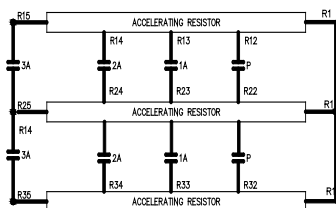
EXAMPLE: ABOVE AC RESISTOR SET

The above Resistor Type Number Selector code describes a set of resistors for a duplex CONTRA[®]-TORQUE hoist (2 motors in parallel), NEMA 161 rated duty cycle, 5 speed points, system & motor voltage applied at 460VAC, 37kW, enclosed in NEMA 1 style rack(s), with rated rotor voltage of 350V and rated rotor current of 67A.

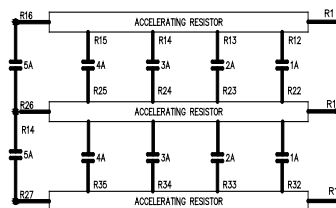
CLASS 6715 RESISTOR TYPE NUMBER SELECTOR CODES

| Controller Class | | Enclosure | | Motor Rating | NEMA DUTY | | Speed Points No. | System Voltage | | Motor Rated Voltage | | Motor Configuration | | Rotor | Rotor | | | | | | | | | |
|------------------|------|----------------------------|------|--------------|-----------------|------|------------------|----------------|------|---------------------|------|---------------------|------|-------|-------|-----|---|-----|-----|---|-----|---|--------|---|
| Control Scheme | Code | Type | Code | Code | Class | Code | Code | V | Code | V | Code | Type | Code | | | | | | | | | | | |
| 6420 | A0 | None | N | “#H” (HP) | 151 | A | 3 | 208 | 2 | 208 | 2 | Simplex | S | Volts | Amps | | | | | | | | | |
| 6421 | A1 | | | | 152 | B | | | | | | | | | | | | | | | | | | |
| 6422 | A2 | | | | 161 | C | | | | | | | | | | | | | | | | | | |
| 6426 | A6 | Open | O | | 162 | D | 4 | | | | | | | | | | | | | | | | | |
| 6435 Hoist | A7 | | | | NEMA 1 | G | | | | | | | | | | 171 | E | 5 | 380 | 3 | 380 | 3 | Duplex | D |
| | | | | | | | | | | | | | | | | 172 | F | | | | | | | |
| 6435 Travel | A8 | NEMA 3R | W | “#K” (kw) | 91 | G | 6 | 460 | 4 | 460 | 4 | Quadruplex | Q | | | | | | | | | | | |
| | | | | | 92 | H | | | | | | | | | | | | | | | | | | |
| Customer Design | A99 | NEMA 1 w/ Screen Covers | C | | Customer Design | CS | 7 | | | | | | | | | 575 | 5 | 575 | 5 | | | | | |

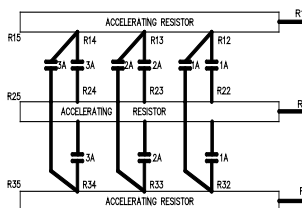
Classes 6420 through 6422
5 SPEED POINT



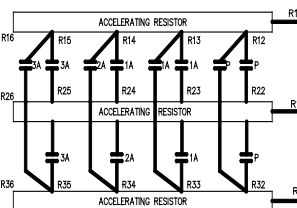
Classes 6420 through 6422
6 SPEED POINT



Class 643b
4 SPEED POINTS WITH PERMANENT SLIP



Class 643b
5 SPEED POINTS WITH PERMANENT SLIP



FRONTLINE® AC CRANE CONTROL

CLASS

6421
6422
6426
6435

APPROXIMATE NUMBER OF SEPARATELY MOUNTED STANDARD CLASS 6715 TABWELD RESISTOR SECTIONS (26.5" LONG)

This tabulation is based on EC&M resistor designs for use with Class 6420, 6421, 6422, 6426 controllers and is for **estimate** only. This tabulation is for typical drive loading and for motors with standard NEMA secondary values of voltage and current. For actual quantities, consult factory with actual motor data.

| Max. H.P. Rating Single Motor | 6420 Hoist | | 6421 Hoist | | | 6422 Hoist | | 6426 Hoist, Bridge, or Trolley | | |
|-------------------------------|-----------------|-----|------------|-----|-----|------------|-----|--------------------------------|-----|-----|
| | 161 | 171 | 152 | 162 | 172 | 161 | 171 | 152 | 162 | 172 |
| | 5 | 2 | 2 | 1 | 1 | 1 | 2 | 2 | 1 | 1 |
| 7 1/2 | 2 | 2 | 1 | 1 | 2 | 2 | 2 | 1 | 1 | 1 |
| 10 | 2 | 2 | 1 | 2 | 2 | 3 | 3 | 1 | 1 | 2 |
| 15 | 2 | 3 | 2 | 2 | 2 | 3 | 4 | 2 | 2 | 2 |
| 20 | 3 | 3 | 2 | 2 | 2 | 4 | 5 | 2 | 2 | 2 |
| 25 | 2 | 3 | 2 | 2 | 3 | 4 | 6 | 2 | 2 | 3 |
| 30 | 3 | 3 | 2 | 2 | 3 | 5 | 7 | 2 | 3 | 3 |
| 40 | 3 | 4 | 2 | 2 | 3 | 6 | 7 | 3 | 3 | 4 |
| 50 | 4 | 6 | 2 | 2 | 4 | 7 | 9 | 3 | 4 | 4 |
| 60 | 4 | 6 | 3 | 3 | 4 | 8 | 9 | 3 | 4 | 4 |
| 75 | 6 | 12 | 4 | 4 | 6 | 9 | 13 | 4 | 4 | 5 |
| 100 | 7 | 9 | 4 | 5 | 7 | 12 | 18 | 4 | 6 | 9 |
| 125 | 8 | 12 | 6 | 6 | 9 | 14 | 21 | 7 | 9 | 9 |
| 150 | 12 | 15 | 6 | 6 | 9 | 18 | 30 | 9 | 9 | 12 |
| 200 | Consult Factory | | | | | | | | | |
| 250 | Consult Factory | | | | | | | | | |

This tabulation is based on EC&M resistor designs for use with Class 6435 controllers and is for **estimate** only. This tabulation is for typical drive loading and for motors with standard NEMA secondary values of voltage and current. For actual quantities, consult factory.

| Max. HP | Hoist Dynamic Lowering | | Hoist Reversing | | Travel Reverse Plugging | |
|---------|------------------------|-----|-----------------|-----|-------------------------|-----|
| | NEMA Class | | NEMA Class | | NEMA Class | |
| | 152 | 162 | 152 | 162 | 152 | 162 |
| 5 | 1 | 1 | 1 | 1 | 1 | 1 |
| 7.5 | 1 | 1 | 1 | 1 | 1 | 1 |
| 10 | 1 | 2 | 1 | 1 | 1 | 2 |
| 15 | 2 | 2 | 1 | 2 | 1 | 2 |
| 20 | 2 | 2 | 1 | 2 | 2 | 2 |
| 25 | 2 | 3 | 2 | 3 | 2 | 3 |
| 30 | 2 | 3 | 2 | 3 | 3 | 3 |
| 40 | 3 | 3 | 3 | 3 | 3 | 4 |
| 50 | 3 | 4 | 3 | 4 | 3 | 4 |
| 60 | 3 | 4 | 3 | 4 | 4 | 5 |
| 75 | 4 | 6 | 4 | 6 | 4 | 6 |



MASTER SWITCH SELECTION FOR AC CRANE CONTROL SYSTEMS

Refer to Class 9004 catalog for more information



Class 9004 Type VM
Floor Mounted Master Switch



Class 9004 Type CM
Console Mounted Master Switch

CLASS 9004 VM OR CM MASTER SWITCHES, NEMA 1 ENCLOSED

| For Control Class | Speed Points | VM TYPE | CM TYPE | Control Type Identification |
|-------------------|--------------|---------|---------|-----------------------------|
| 6420 | 5 | VG9 | ... | C15 |
| | 5 | ... | CG12 | C15 |
| | 6 | VG12 | CG12 | C16 |
| 6421 | 5 | VG12 | CG12 | B15 |
| | 6 | VG16 | CM16 | B16 |
| 6422 | 5 | VG12 | CG12 | D15 |
| | 6 | VG16 | CG16 | D16 |
| 6426 | 5 | VG9 | ... | A15 |
| | 5 | ... | CG12 | A15 |
| | 6 | VG12 | CG12 | A16 |

FOR CONTROL CLASS 6435

| Motion | Speed Points | VM TYPE | CM TYPE | Control Type Identification |
|------------------------------|--------------|---------|---------|-----------------------------|
| Hoist (Dynamic Lowering) | 4 | VG9 | CG8 | A24 |
| | 5 | VG9 | CG12 | A25 |
| Hoist (Reversing) | 4 | VG6 | CG6 | A34 |
| | 5 | VG9 | CG8 | A35 |
| Travel (Reverse Plugging) | 4 | VG6 | CG6 | A34 |
| | 5 | VG9 | CG8 | A35 |

MASTER SWITCH MODIFICATIONS

| Form | Description |
|------|--|
| L | Left Hand Operation |
| S | Spring Return to OFF position |
| B | Push Button in Handle, 1 N.O., 250VDC / 300VAC, 5A rated (Reduces the number of available circuits by one) |
| O | OFF point Mechanical Latch |
| E | Short enclosure, 24 inches high enclosure in place of 30 inch high enclosure |



APPLICATION DATA

MULTIMOTOR DRIVES

Two motors connected in parallel (duplex) – One set of motor control primary equipment and two sets of motor control secondary equipment are required in the controller. Two sets of power resistors are also required.

Four motors connected in parallel (quadruplex) – It is necessary to double the duplex controller price given for two motors in parallel. One set of motor control primary and four sets of motor control secondary equipment are required. Four sets of power resistors are required.

CONTROLLERS

Narrow width controllers – Most controllers are also available in a narrow width construction. These controllers, when compared to standard controllers, are reduced width and increased height. For details, see controller modifications and controller dimension.

CONTROLLER MODIFICATIONS

Standard controllers come equipped with the components listed. Special features to be added to standard controllers are identified by Form number. Most modifications are self-explanatory.

FORM D6 list motor isolation circuit breakers for use on duplex controllers. For operation of the drive on one motor, the motor line and connect breakers will disconnect one motor from the line and connect the frequency relays to the power resistors of the other motor. The brakes of the motor not in service are still released electrically.

FORM G95 lists a 3 1/2" square miniature voltmeter to monitor one phase of motor primary voltage.

FORM G91 lists a 3 1/2" square miniature ammeter to monitor one phase of motor primary current. Current transformers with this form are supplied Form G9 for motors above 10 HP, 230 volt, and 20 HP, 460 volts.

AC CONTROL MODIFICATIONS TABLE

| Form | Description |
|------|--|
| D6▲ | Motor Isolating Circuit Breakers |
| B5 | Brake Relay, Reverse Plugging Controller Only |
| Y17 | Arc Inhibitors, Pendant Operated Controller |
| G95 | Miniature Voltmeter, Panel Mounted |
| G91 | Miniature Ammeter, Panel Mounted |
| E18 | Narrow Width Panel |
| M3 | Additional Speed Point |
| M24 | Substitute Type SZF Frequency Relay For ST1 Static Acceleration Timers |
| H18 | Cabinet Space Heater Controlled By Interlock From M Contactor |
| V99 | Alternate System Voltage, specify system voltage |

▲ For Duplex Controllers

CONTROLLER RATINGS

Controller horsepower ratings are based on AIST and NEMA standard wound rotor motors with synchronous speeds, primary currents, and secondary voltages as listed in Catalog 6100/6400 with the exception of the AIST Frame AC 8 40HP motor. For this

motor and for motors with higher primary or secondary currents than those listed, select the controller by its ampere rating. If the primary or secondary current exceeds the maximum amperes of the controller, it will be necessary to select the next larger size controller. Duplex controller sizes are selected based on the sum of the primary currents of both motors, and the rated secondary current of a single motor.

APPLICATION DATA

CLASS 6420 EDDYMAG® HOIST
RECOMMENDED EDDY CURRENT BRAKE SIZE*
STROMAG® MODEL FLOOR MOUNTED BRAKE*

| MOTOR HP RATING | Brake Size | | |
|-----------------|----------------|-----------------|-----------------|
| | 900 RPM Motors | 1200 RPM Motors | 1800 RPM Motors |
| 7 1/2 | IBV26C | IBV22C | IBV19C |
| 10 | IBV30C | IBV22C | IBV22C |
| 15 | IBV30C | IBV26C | IBV22C |
| 20 | IBV30C | IBV30C | IBV26C |
| 25 | IBV36C | IBV30C | IBV26C |
| 30 | IBV36C | IBV30C | IBV26C |
| 40 | IBV36C | IBV36C | IBV30C |
| 50 | IBV36C | IBV36C | IBV30C |
| 60 | IBV42C | IBV42C | IBV36C |
| 75 | IBV50C | IBV42C | IBV36C |
| 100 | IBV50C | IBV42C | IBV36C |
| 125 | (2) IBV50C | IBV50C | |
| 150 | (2) IBV50C | IBV50C | |
| 200 | (2) IBV50C | (2) IBV50C | |

| MOTOR HP RATING | DYNAMATIC MODEL AB-FLOOR MOUNTED BRAKE* | | | |
|-----------------|---|---------------------|--------------------|---------------------|
| | Brake Size | | | |
| | 900 RPM Motors | | 1200 RPM Motors | |
| | Light Duty Service | Severe Duty Service | Light Duty Service | Severe Duty Service |
| 7 1/2 | 703 | 704 | 703 | 703 |
| 10 | 704 | 704 | 703 | 704 |
| 15 | 704 | 705 | 704 | 704 |
| 20 | 705 | 705 | 704 | 705 |
| 25 | 705 | 705 | 705 | 705 |
| 30 | 705 | 706 | 705 | 705 |
| 40 | 706 | 706 | 705 | 706 |
| 50 | 706 | 706 | 706 | 706 |
| 60 | 706 | 707 | 706 | 706 |
| 75 | 707 | 707 | 706 | 706 |
| 100 | 707 | 707 | 707 | 707 |
| 125 | 707 | 707 | 707 | 707 |
| 150 | 707 | 708 | 707 | 707 |
| 200 | 708 | 708 | 707 | 708 |
| 250 | 708 | 708 | 708 | 708 |
| 300 | 708 | --- | 708 | 708 |

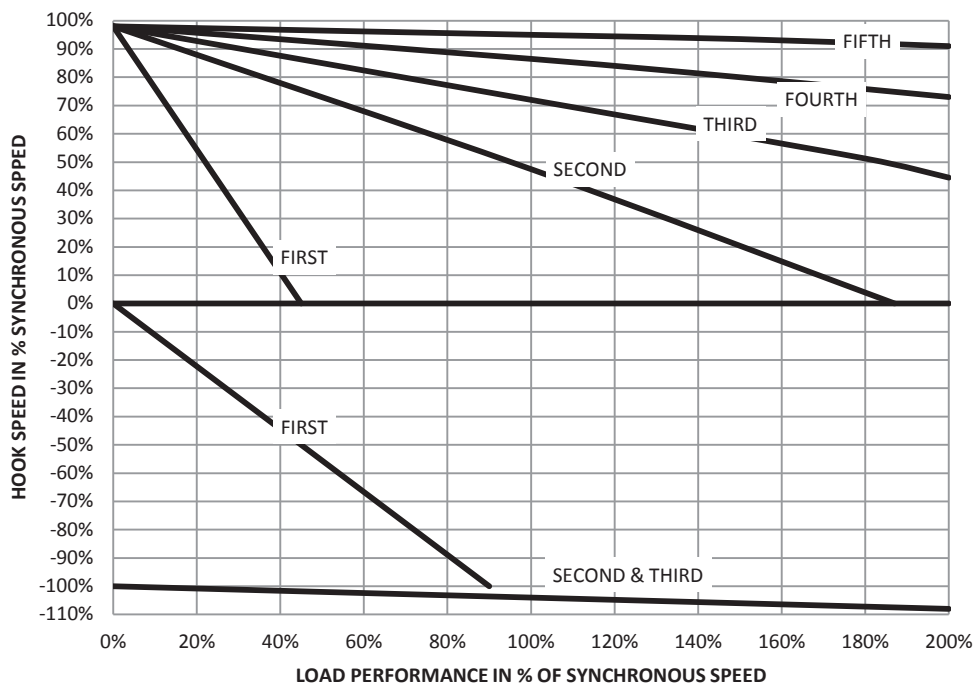
* Class 6420 Hoist Controls are designed as standard for use with 90V eddy current brake coils

ORDERING INFORMATION REQUIRED:

1. Class
2. Type
3. Motor Horsepower
4. Motor Primary Rated Voltage and Current
5. Motor Secondary Rated Voltage and Current
6. Controller Modifications: Specify Form Numbers
7. Resistors Services Classification
8. Master Switch Type and Form Number

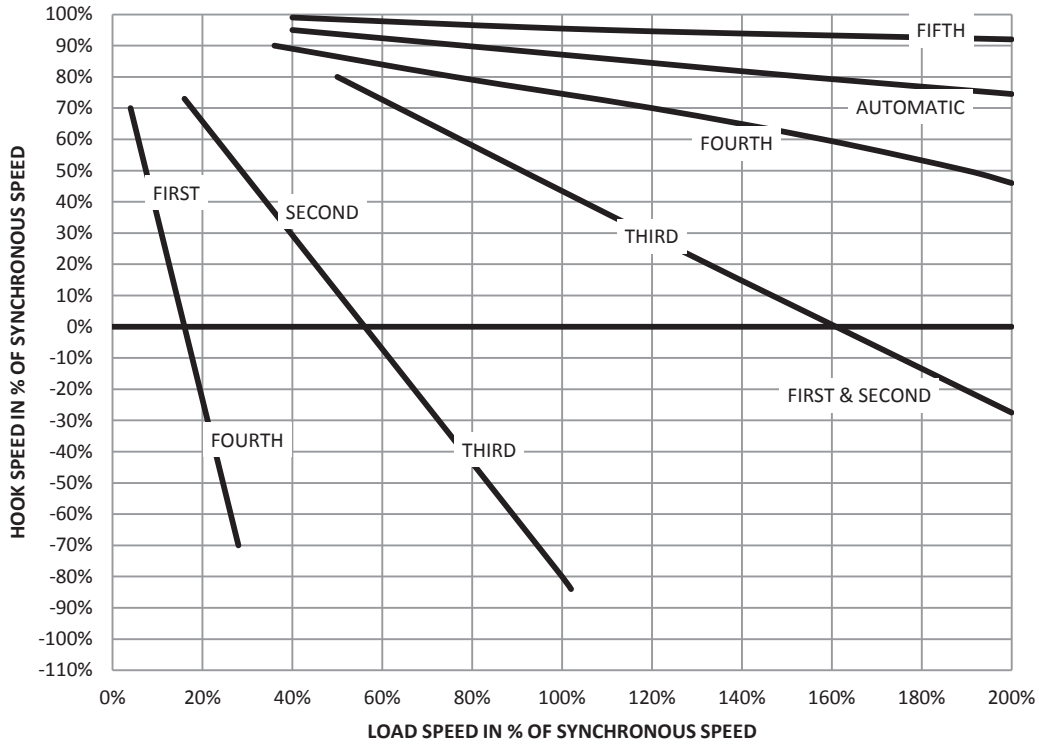
APPLICATION DATA CRANE HOOK SPEED VS LOAD PERFORMANCE

CLASS 6421 DYNAMIC LOWERING HOIST

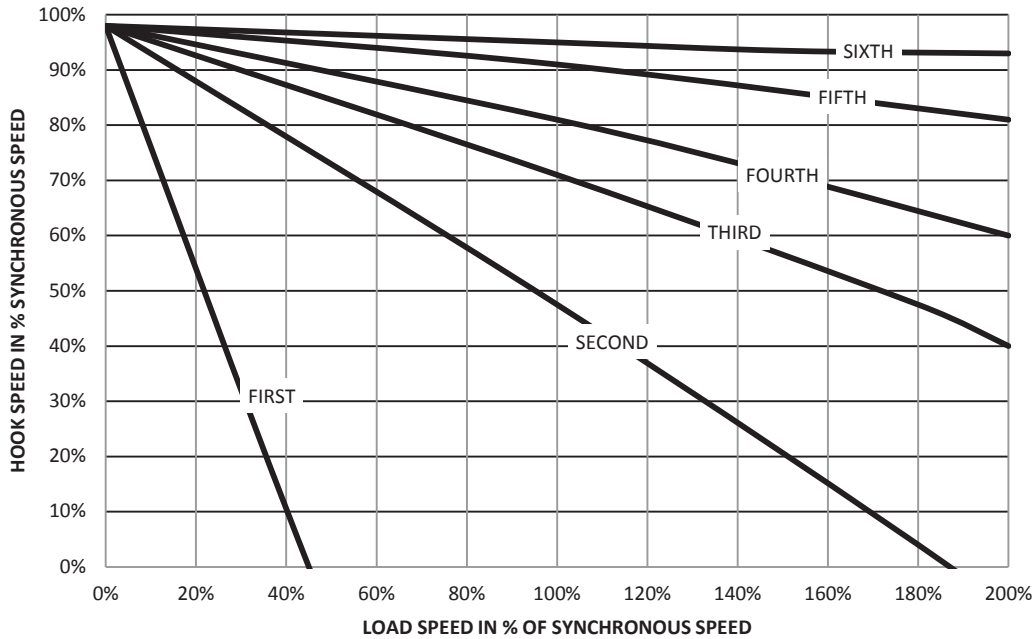


APPLICATION DATA CRANE HOOK SPEED VS. LOAD PERFORMANCE

CLASS 6422 CONTRA-TORQUE®



CLASS 6426 REVERSING HOIST CONTROL (With Mechanical Load Brake)



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Crane Control Selection Guide

For more details, please see our crane control catalog, on-line at www.ECandM.net

CLASS 5010 WB DRUM BRAKES

- AIST rated and suitable for all crane classes
- Spring set, electrically released, DC drum type
- Available for AC operation with brake rectifier controller
- Hold drive stationary when motor is off
- Available in 8" to 30" wheel diameters
- Torque ratings 100 through 9000 ft-lbs
- Corrosion resistant pins are standard on all brake sizes
- Grease fittings are standard on 19", 23" and 30" brake sizes
- Available with optional self-adjuster



CLASS 5060 ADJUSTABLE TORQUE DRUM BRAKES

- AIST rated and suitable for all crane classes
- Used on bridge and trolley (horizontal travel) drives
- Provide fixed holding torque for parking
- Provide electrically controlled adjustable torque for stopping
- Available in 10", 13", and 16" wheel diameters
- Parking torque ratings up to 200, 550 and 1000 ft-lbs respectively
- Stopping torque ratings up to 300, 850 and 1500 ft-lbs respectively
- Available for AC or DC control systems



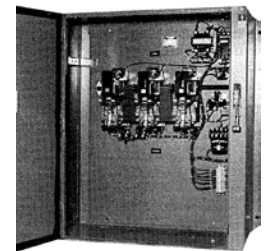
CLASS 6417/6418 VARIABLE FREQUENCY CONTROL

- Stepped or stepless drives for wound rotor or squirrel cage motors
- Open loop travel and closed loop hoist drives available
- Crane specific software included
- Complete drive systems with torque proving, stationary auto tune, brake and power limit switch interface
- Rated 50°C as standard
- Software to monitor inputs, outputs, system logic, parameters, and drive power output as an oscilloscope trace



CLASS 6440 AC MANUAL MAGNETIC DISCONNECT SWITCHES

- Meet OSHA& NEC requirements for AC crane disconnect switch
- Available in continuous ratings of 150 to 1350 Amperes
- Operated remotely by pushbutton or by the enclosure handle
- Mechanical & electrical interlocks prevent switch operation with handle in the OFF position



CLASS 6170 YOUNGSTOWN® HOIST POWER LIMIT SWITCHES

- Final safety limits for hoist upper travel
- Interrupts motor power directly
- Available in ratings up to 500HP at 230VDC, or up to 400HP at 460VAC and 550VAC
- Available auxiliary contacts set to operate prior to main contacts, for variable frequency hoist applications



Please visit our website for additional details on:
**DC MILL DUTY CONTACTOR CONTROL, DIGITAL DC DRIVES,
DC DISCONNECT SWITCHES, DC MAGNET CONTROL, MAGNIFIERAC® AC SOURCED MAGNET CONTROL, DC REDUCED
VOLTAGE STARTERS, MASTER SWITCHES, MILL DUTY RELAYS, OVERLOAD RELAYS, AC CONTACTORS,
AND OTHER MILL DUTY CONTROL COMPONENTS**



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