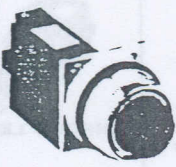


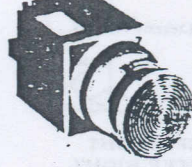



PUSH BUTTON UNITS, BRIGHT CHROME RING Legend plate not included.

CONTACTS ⑥ Explanation of symbols, page 49.	HEAD COLOR ②										
		UNGUARDED Catalog No.	Price	GUARDED Catalog No.	Price	MUSHROOM Catalog No.	Price	PUSH-PULL 2-Position, maintained Catalog No.	Price	LESS GUARDRING Modification Unit ① Catalog No.	Price

COMPLETE ASSEMBLIES, OPERATORS WITH CONTACTS

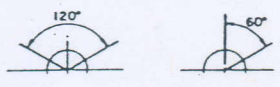






1 N.O.—1 N.C. ② Lt. ④ ③	Black Red Green Yellow ⑥	100M-A11A A12A A13A A14A —	100M-A21A A22A A23A A24A —	\$22.80 22.80 22.80 22.80 —	100M-B11A B12A B13A B14A B10A	\$34.80 34.80 34.80 34.80 30.80	100M-B21A B22A B23A B24A B20A	\$46.80 46.80 46.80 46.80 42.80	100M-A01A A02A A03A A04A —	\$21.80 21.80 21.80 21.80 —
2 N.O.—2 N.C. ② ② Lt. ④ ③ ④ ③ Rt.	Black Red Green Yellow ⑥	100M-A11B A12B A13B A14B —	100M-A21B A22B A23B A24B —	34.80 34.80 34.80 34.80 —	100M-B11B B12B B13B B14B B10B	46.80 46.80 46.80 46.80 42.80	100M-B21B B22B B23B B24B B20B	58.80 58.80 58.80 58.80 54.80	100M-A01B A02B A03B A04B —	33.80 33.80 33.80 33.80 —
2 N.O. ② Lt. ④ ③	Black Red Green Yellow ⑥	100M-A11C A12C A13C A14C —	100M-A21C A22C A23C A24C —	22.80 22.80 22.80 22.80 —	100M-B11C B12C B13C B14C B10C	34.80 34.80 34.80 34.80 30.80	100M-B21C B22C B23C B24C B20C	46.80 46.80 46.80 46.80 42.80	100M-A01C A02C A03C A04C —	21.80 21.80 21.80 21.80 —
2 N.C. ② Lt. ④ ③	Black Red Green Yellow ⑥	100M-A11D A12D A13D A14D —	100M-A21D A22D A23D A24D —	22.80 22.80 22.80 22.80 —	100M-B11D B12D B13D B14D B10D	34.80 34.80 34.80 34.80 30.80	100M-B21D B22D B23D B24D B20D	46.80 46.80 46.80 46.80 42.80	100M-A01D A02D A03D A04D —	21.80 21.80 21.80 21.80 —
3 N.O.—1 N.C. ② ② ② Lt. ④ ③ ④ ③ Rt.	Black Red Green Yellow ⑥	100M-A11E A12E A13E A14E —	100M-A21E A22E A23E A24E —	34.80 34.80 34.80 34.80 —	100M-B11E B12E B13E B14E —	46.80 46.80 46.80 46.80 —	100M-B21E B22E B23E B24E —	58.80 58.80 58.80 58.80 —		
4 N.O. ② ② ② ② Lt. ④ ③ ④ ③ Rt.	Black Red Green Yellow ⑥	100M-A11F A12F A13F A14F —	100M-A21F A22F A23F A24F —	34.80 34.80 34.80 34.80 —	100M-B11F B12F B13F B14F —	46.80 46.80 46.80 46.80 —	100M-B21F B22F B23F B24F —	58.80 58.80 58.80 58.80 —		
1 N.O.—3 N.C. ② ② ② ② Lt. ④ ③ ④ ③ Rt.	Black Red Green Yellow ⑥	100M-A11G A12G A13G A14G —	100M-A21G A22G A23G A24G —	34.80 34.80 34.80 34.80 —	100M-B11G B12G B13G B14G —	46.80 46.80 46.80 46.80 —	100M-B21G B22G B23G B24G —	58.80 58.80 58.80 58.80 —		
4 N.C. ② ② ② ② Lt. ④ ③ ④ ③ Rt.	Black Red Green Yellow ⑥	100M-A11H A12H A13H A14H —	100M-A21H A22H A23H A24H —	34.80 34.80 34.80 34.80 —	100M-B11H B12H B13H B14H —	46.80 46.80 46.80 46.80 —	100M-B21H B22H B23H B24H —	58.80 58.80 58.80 58.80 —		
Push-Push 1 N.O.—1 N.C. Lt. ④ ③ Alternate Action	Black Red Green Yellow ⑥	100M-A11P A12P A13P A14P —	100M-A21P A22P A23P A24P —	28.80 28.80 28.80 28.80 —	100M-B11P B12P B13P B14P —	40.80 40.80 40.80 40.80 —				

OPERATORS ONLY FOR ABOVE, LESS CONTACTS


















































For explanation of notes, see next page.

Contact blocks in any combination of 2 maxi- mum may be added to "Operator" to make com- plete assembly. Blocks listed on page	Black Red Green Yellow ⑥	100M-A11 A12 A13 A14 —	100M-A21 A22 A23 A24 —	\$10.80 10.80 10.80 10.80 —	100M-B11 B12 B13 B14 B10	\$22.80 22.80 22.80 22.80 18.80	100M-B21 B22 B23 B24 B20	\$34.80 34.80 34.80 34.80 30.80	
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SELECTOR SWITCH UNITS, BRIGHT CHROME RING—2 POSITION Legend plate not included.

CONTACTS & SEQUENCE  Explanation of symbols on page 49. LEFT-RIGHT CENTER-RIGHT 	OPERATION	 KNOB Standard black color  Catalog No. Price	 CHROME LEVER Catalog No. Price	 KEY Key withdrawal in both positions  Catalog No. Price
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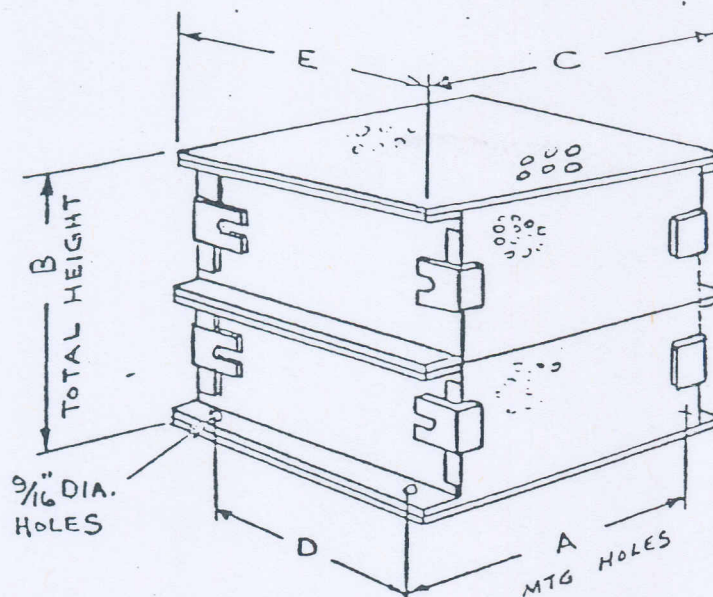
COMPLETE ASSEMBLIES, OPERATORS WITH CONTACTS

1 N.O.—1 N.C.  Lt.  Rt.  4 3 4 3 Lt.  Rt.  2-1 X O 4-3 O X	Maintained L-R Spring C↔R	100M-CA1A \$26.80 CD1A 34.80	100M-CA9A \$32.80 CD9A 40.80	100M-DA1A \$50.80 DD4A 58.80
2 N.O.—2 N.C.  Lt.  Rt.  4 3 4 3 Lt.  Rt.  2-1 X O 4-3 O X X O 2-1 O X 4-3	Maintained L-R Spring C↔R	100M-CA1B 38.80 CD1B 46.80	100M-CA9B 44.80 CD9B 52.80	100M-DA1B 62.80 DD4B 70.80
2 N.O.  Lt.  Rt.  4 3 4 3 Lt.  Rt.  0-9 O X 4-3 O X	Maintained L-R Spring C↔R	100M-CA1C 26.80 CD1C 34.80	100M-CA9C 32.80 CD9C 40.80	100M-DA1C 50.80 DD4C 58.80
2 N.C.  Lt.  Rt.  8 7 8 7 Lt.  Rt.  2-1 X O 8-7 X O	Maintained L-R Spring C↔R	100M-CA1D 26.80 CD1D 34.80	100M-CA9D 32.80 CD9D 40.80	100M-DA1D 50.80 DD4D 58.80
3 N.O.—1 N.C.  Lt.  Rt.  4 3 4 3 Lt.  Rt.  2-1 X O 4-3 O X O X 0-9 O X 4-3	Maintained L-R Spring C↔R	100M-CA1E 38.80 CD1E 46.80	100M-CA9E 44.80 CD9E 52.80	100M-DA1E 62.80 DD4E 70.80
4 N.O.  Lt.  Rt.  4 3 4 3 Lt.  Rt.  0-9 O X 4-3 O X O X 0-9 O X 4-3	Maintained L-R Spring C↔R	100M-CA1F 38.80 CD1F 46.80	100M-CA9F 44.80 CD9F 52.80	100M-DA1F 62.80 DD4F 70.80
1 N.O.—3 N.C.  Lt.  Rt.  4 3 8 7 Lt.  Rt.  2-1 X O 4-3 O X X O 2-1 X O 8-7	Maintained L-R Spring C↔R	100M-CA1G 38.80 CD1G 46.80	100M-CA9G 44.80 CD9G 52.80	100M-DA1G 62.80 DD4G 70.80
4 N.C.  Lt.  Rt.  8 7 8 7 Lt.  Rt.  2-1 X O 8-7 X O X O 2-1 X O 8-7	Maintained L-R Spring C↔R	100M-CA1H 38.80 CD1H 46.80	100M-CA9H 44.80 CD9H 52.80	100M-DA1H 62.80 DD4H 70.80
1 N.C.—3 N.O.  Lt.  Rt.  4 3 4 3 Lt.  Rt.  0-9 O X 4-3 O X X O 2-1 O X 4-3	Maintained L-R Spring C↔R	100M-CA1E1 38.80 CD1E1 46.80	100M-CA9E1 44.80 CD9E1 52.80	100M-DA1E1 62.80 DD4E1 70.80
3 N.C.—1 N.O.  Lt.  Rt.  8 7 4 3 Lt.  Rt.  2-1 X O 8-7 X O X O 2-1 O X 4-3	Maintained L-R Spring C↔R	100M-CA1G1 38.80 CD1G1 46.80	100M-CA9G1 44.80 CD9G1 52.80	100M-DA1G1 62.80 DD4G1 70.80

OPERATORS ONLY FOR ABOVE, LESS CONTACTS

See page 51 for notes.

Contact blocks in any combination of 2 maximum may be added to "Operator" to make complete assemblies.	Maintained L-R Spring C↔R	100M-CA1 \$14.80 CD1 22.80	100M-CA9 \$20.80 CD9 28.80	100M-DA1 \$38.80 DD4 46.80
Blocks listed on page 61.				



MILL TYPE
STANDARD TERMINALS
OR WELDED TERMINALS
WITH TOP AND
BOTTOM SCREEN

ALL DIMENSIONS IN INCHES

NO UNITS PER SECTION	A	C
1	7 ¹³ / ₁₆	9 ¹ / ₁₆
2	10 ⁵ / ₈	11 ⁷ / ₈
3	13 ⁷ / ₁₆	14 ¹¹ / ₁₆
4	16 ¹ / ₄	17 ¹ / ₂
5	19 ¹ / ₁₆	20 ⁵ / ₁₆
6	21 ⁷ / ₈	23 ¹ / ₈
7	24 ¹¹ / ₁₆	25 ¹⁵ / ₁₆

SECTIONS HIGH	B
1	6
2	12
3	18
4	24
5	30
6	36
7	42
8	48
9	54
10	60
11	66
12	72

PORC PER UNIT	D	E
WELDED	STD	
3	12 ¹ / ₁₆	16 ¹ / ₁₆
4	15	19
5	17 ¹⁵ / ₁₆	21 ¹⁵ / ₁₆
(5)	20 ⁷ / ₈	24 ⁷ / ₈
6	23 ¹³ / ₁₆	27 ¹³ / ₁₆
7	26 ³ / ₄	30 ³ / ₄
8	33 ¹¹ / ₁₆	33 ¹¹ / ₁₆

CERTIFIED FOR HYDRAMACH CRANE LTD ORDER NO 11664-1635 W.O. 52-04-1726-1

FOR USE ON 8³/₄ H.P. CLASS WOUND VOLTS 162 DUTY ROTOR

R.V. = 175

CERTIFIED BY ES/4/1/

R.A. = 25

DATE March 31/52

B/M: CA-120527A-2

MADE BY <u>R.H.</u>	APPD. BY _____	BUIL <u>4000</u>	DATE _____
DATE <u>DEC 11/78</u>	DATE _____	TYPE _____	

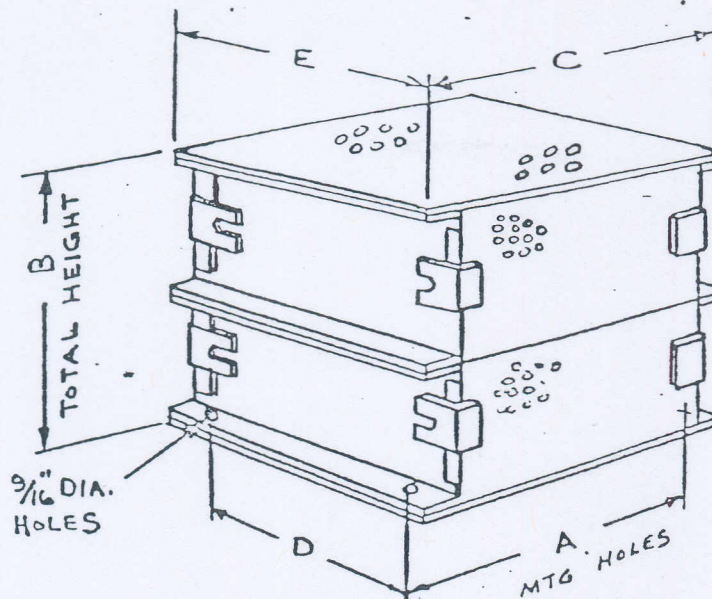
Canadian Controllers
Limited

RESISTOR ENCLOSURE
VENTILATED TYPE
DIMENSION PRINT

CA-43500-2

184

[illegible]



MILL TYPE
STANDARD TERMINALS
OR WELDED TERMINALS
WITH TOP AND
BOTTOM SCREEN

ALL DIMENSIONS IN INCHES

NO UNITS PER SECTION	A	C
1	$7\frac{13}{16}$	$9\frac{1}{16}$
2	$10\frac{5}{8}$	$11\frac{7}{8}$
3	$13\frac{7}{16}$	$14\frac{1}{16}$
4	$16\frac{1}{4}$	$17\frac{1}{2}$
5	$19\frac{1}{16}$	$20\frac{5}{16}$
6	$21\frac{7}{8}$	$23\frac{1}{8}$
7	$24\frac{1}{16}$	$25\frac{15}{16}$

SECTIONS HIGH	B
1	6
2	12
3	18
4	24
5	30
6	36
7	42
8	48
9	54
10	60
11	66
12	72

PORC PER UNIT		D	E
WELDED	STD		
3	4	$12\frac{1}{16}$	$16\frac{1}{16}$
4	5	$17\frac{15}{16}$	$21\frac{15}{16}$
5	6	$20\frac{7}{8}$	$24\frac{7}{8}$
6	7	$23\frac{13}{16}$	$27\frac{13}{16}$
7	8	$26\frac{3}{4}$	$30\frac{3}{4}$
8	X	$29\frac{1}{16}$	$33\frac{1}{16}$

CERTIFIED FOR HYDRAMACH CRANE LTD ORDER NO 11664-1635 W.082-04-1726-2

FOR USE ON 3 H.P. — CLASS WOUND VOLTS 162 DUTY ROTOR

R.V. = 150

R.A. = 10

B/M: CA-120528A-2

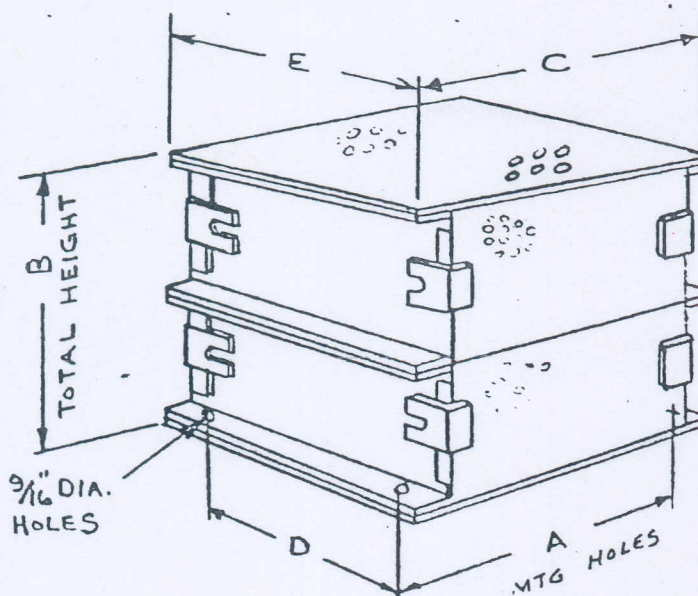
CERTIFIED BY 22/1/11

DATE March 31/92

MADE BY <u>R.H.</u>	APPD BY _____	BUL <u>4000</u>	REV
DATE <u>DEC 11/78</u>	DATE _____	TYPE _____	
Canadian Controllers Limited IMPORT. - CANADA		TITLE RESISTOR ENCLOSURE VENTILATED TYPE DIMENSION PRINT	

CA-43500-2

186



MILL TYPE
STANDARD TERMINALS
OR WELDED TERMINALS
WITH TOP AND
BOTTOM SCREEN

ALL DIMENSIONS IN INCHES

NO UNITS PER SECTION	A	C
1	7 ¹³ / ₁₆	9 ¹ / ₁₆
2	10 ⁵ / ₈	11 ⁷ / ₈
3	13 ⁷ / ₁₆	14 ¹¹ / ₁₆
4	16 ¹ / ₄	17 ¹ / ₂
5	19 ¹ / ₁₆	20 ⁵ / ₁₆
6	21 ⁷ / ₈	23 ¹ / ₈
7	24 ¹¹ / ₁₆	25 ¹⁵ / ₁₆

SECTIONS HIGH	B
1	6
2	12
3	13
4	24
5	30
6	36
7	42
8	48
9	54
10	60
11	66
12	72

PORC PER UNIT		D	E
WELDED	STD		
	3	12 ¹ / ₁₆	16 ¹ / ₁₆
3	4	15	19
4	5	17 ¹⁵ / ₁₆	21 ¹⁵ / ₁₆
(5)	6	20 ⁷ / ₈	24 ⁷ / ₈
6	7	23 ³ / ₁₆	27 ³ / ₁₆
7	8	26 ³ / ₄	30 ³ / ₄
8	9	29¹/₁₆	33¹/₁₆

CERTIFIED FOR HYDRAMACH CRANE LTD ORDER NO 11664-1635 W.O 82-04-1726-3

FOR USE ON 7 1/2 H.P. — CLASS WOUND VOLTS 162 DUTY ROTOR

R.V. = 165

CERTIFIED BY g/4/1

R.A. = 22

DATE March 31 / 82

B/M: CA-120529A-2

MADE BY R.H.
DATE DEC 11/78

APPROVED BY _____
DATE _____

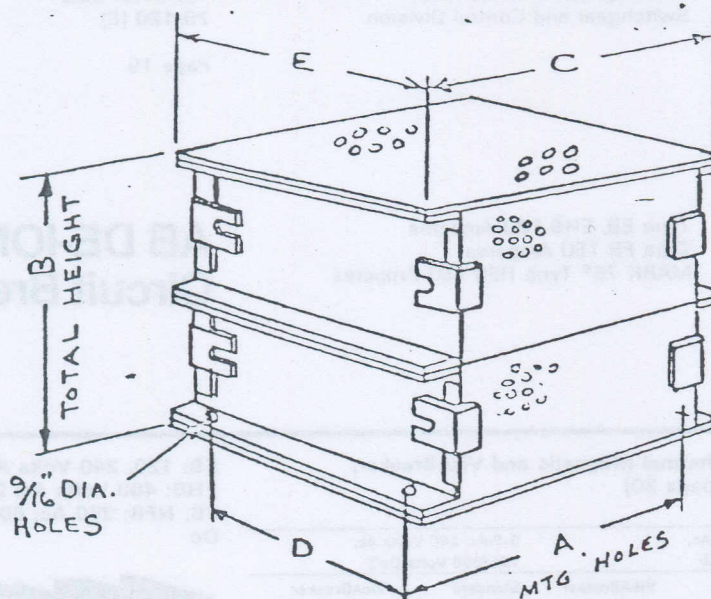
BUL 4000
TYPE _____

Canadian Controllers
Limited

TITLE
RESISTOR ENCLOSURE
VENTILATED TYPE

CA-43500-2

100



MILL TYPE
STANDARD TERMINALS
OR WELDED TERMINALS
WITH TOP AND
BOTTOM SCREEN

ALL DIMENSIONS IN INCHES

NO UNITS PER SECTION	A	C
1	7 ¹³ / ₁₆	9 ¹ / ₁₆
2	10 ⁵ / ₈	11 ⁷ / ₈
3	13 ⁷ / ₁₆	14 ¹ / ₁₆
4	16 ¹ / ₄	17 ¹ / ₂
5	19 ¹ / ₁₆	20 ⁵ / ₁₆
6	21 ⁷ / ₈	23 ¹ / ₈
7	24 ¹ / ₁₆	25 ¹⁵ / ₁₆

SECTIONS HIGH	B
1	6
2	12
3	18
4	24
5	30
6	36
7	42
8	48
9	54
10	60
11	66
12	72

PORC PER UNIT	D	E
WELDED	STD	
3	4	15
4	5	17 ⁵ / ₁₆
5	6	20 ⁷ / ₈
6	7	23 ¹³ / ₁₆
7	8	26 ³ / ₄
8		29 ¹ / ₁₆

CERTIFIED FOR HYDRAMACH CRANE LTD. ORDER NO 11664-1635W.082-04-1725-4
CLASS WOUND
FOR USE ON 2 H.P. — VOLTS 162 DUTY ROTOR

R.V. = 150

CERTIFIED BY QJ/aff

R.A. = 7

DATE Nov 31 / 82

B/M: CA-120530A-2

MADE BY R.H.
DATE DEC 11/78

APPD BY _____
DATE _____

BUL 4000
TYPE _____

Canadian Controllers
Limited

TITLE
RESISTOR ENCLOSURE
VENTILATED TYPE

CA-43500-2
190



June, 1983
Supersedes issue dated June, 1978
Mailed to: 201, 302 and 352

Type EB, EHB 100 Amperes
Type FB 150 Amperes
MARK 75* Type HFB 150 Amperes

AB DE-ION® Circuit Breakers

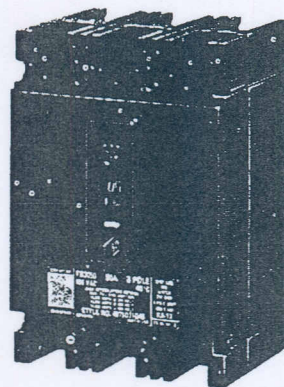
Type EB 1, 2, 3 Poles; 240 Volts Ac Max.; Thermal Magnetic and VisABreaker. (Includes Load Terminals Only; see Terminals page 20)

Continuous Ampere Rating @ 40°C	Catalog Numbers				
	1-Pole, 120 Volts Ac, 125 Volts Dc②		2-Pole, 240 Volts Ac, 125/250 Volts Dc②	3-Pole, 240 Volts Ac, 125/250 Volts Dc②	
	Standard		Standard	VisABreaker	Standard
5①	EB1005		EB2005	EB2005S	EB3005
10①	EB1010		EB2010	EB2010S	EB3010
15	EB1015⑥		EB2015	EB2015S	EB3015
20	EB1020⑥		EB2020	EB2020S	EB3020
25	EB1025		EB2025	EB2025S	EB3025
30	EB1030		EB2030	EB2030S	EB3030
35	EB1035		EB2035	EB2035S	EB3035
40	EB1040		EB2040	EB2040S	EB3040
45⑥	EB1045		EB2045	EB2045S	EB3045
50	EB1050		EB2050	EB2050S	EB3050
60	EB1060		EB2060	EB2060S	EB3060
70	EB1070		EB2070	EB2070S	EB3070
80⑥	EB1080		EB2080	EB2080S	EB3080
90	EB1090		EB2090	EB2090S	EB3090
100	EB1100		EB2100	EB2100S	EB3100
100 MCS	EB1100N		EB2100N	EB2100SN	EB3100N

Approx. Ship. Wt.: 2 lbs. Approx. Ship. Wt.: 3 lbs.

Approx. Ship. Wt.: 4½ lbs.

EB: 120, 240 Volts Ac; 125/250 Volts Dc
EHB: 480 Volts Ac; 250 Volts Dc
FB, HFB: 350 Ac; 600 Volts Ac, 250 Volts Dc



Type EHB 2, 3 Poles; 480 Volts Ac Max.; Thermal Magnetic and VisABreaker (Includes Load Terminals Only; see Terminals page 20)

Continuous Ampere Rating @ 40°C	Catalog Number			
	2-Pole, 480 Volts Ac, 250 Volts Dc②		3-Pole 480 Volts Ac	
	Standard	VisABreaker	Standard	VisABreaker
10①	EHB2010	EHB2010S	EHB3010	EHB3010S
15	EHB2015	EHB2015S	EHB3015	EHB3015S
20	EHB2020	EHB2020S	EHB3020	EHB3020S
25	EHB2025	EHB2025S	EHB3025	EHB3025S
30	EHB2030	EHB2030S	EHB3030	EHB3030S
35	EHB2035	EHB2035S	EHB3035	EHB3035S
40	EHB2040	EHB2040S	EHB3040	EHB3040S
45⑥	EHB2045	EHB2045S	EHB3045	EHB3045S
50	EHB2050	EHB2050S	EHB3050	EHB3050S
60	EHB2060	EHB2060S	EHB3060	EHB3060S
70	EHB2070	EHB2070S	EHB3070	EHB3070S
80⑥	EHB2080	EHB2080S	EHB3080	EHB3080S
90	EHB2090	EHB2090S	EHB3090	EHB3090S
100	EHB2100	EHB2100S	EHB3100	EHB3100S
100 MCS⑥	EHB2100N	EHB2100SN	EHB3100N	EHB3100SN

Approx. Ship. Wt.: 3 lbs.

Approx. Ship. Wt.: 4½ lbs.

Listed with CSA except as noted.

CSA Listed Interrupting Ratings⑥

Max Volts	Amperes
EB Breakers	
120 and 240 Ac	10,000 Asym., Sym.
125/250 Dc	5,000②
EHB, FB Breakers	
240 Ac	20,000 Asym., 18,000 Sym.
350 Ac (FB)	15,000 Asym., 14,000 Sym.
480 Ac	15,000 Asym., 14,000 Sym.
600 Ac (FB)	15,000 Asym., 14,000 Sym.
250 Dc	10,000②

MARK 75 Type HFB

240 Ac	75,000 Asym., 65,000 Sym.
350 Ac③	
480 Ac	30,000 Asym., 25,000 Sym.
600 Ac	20,000 Asym., 18,000 Sym.
250 Dc (2 Pole)	20,000②④

List Prices: See Price List 29-020

Accessories and Modifications Description: Pages 49-58

- ⑥ Changed or added since previous issue.
- ① Not listed with CSA
- ② Dc ratings apply to substantially non-inductive circuits.
- ③ 15 thru 30 amp ratings only have 30,000 amp Sym. I.C.
- ④ 40 thru 100 amp ratings have 18,000 amp Sym. I.C.
- ⑤ Ratings above 10,000 amps not CSA Listed
- ⑥ All 4 poles have thermal magnetic trip elements.
Can be supplied with 3 poles protected plus 1 pole non-automatic if required. Order by description. No price or dimensional differences.
- ⑦ Switching duty rated for 120 volts Ac fluorescent light applications only.
- ⑧ Switching duty rated for 350 volts Ac fluorescent light applications only.
- ⑨ Two pole breakers are supplied in three pole frames with current carrying parts omitted from center pole.
- ⑩ Interrupting capacities shown do not apply to molded

Type FB, HFB 1, 2, 3, 4 Poles; 600 Volts Ac Max.; Thermal Magnetic, MARK 75® VisABreaker (Includes Load Terminals Only; see Terminals, page 20)

Continuous Ampere Rating @ 40°C	1-Pole		2-Pole		
	350 Volts Ac 125 Volts Dc②		600 Volts Ac 250 Volts Dc		
	Standard	MARK 75	Standard	VisABreaker	MARK 75⑥
10①	FB1010H	HFB1010H	FB2010	FB2010S	HFB2010
15	FB1015H⑦	HFB1015H⑦	FB2015	FB2015S	HFB2015
20	FB1020H⑦	HFB1020H⑦	FB2020	FB2020S	HFB2020
25	FB1025H	HFB1025H	FB2025	FB2025S	HFB2025
30	FB1030H	HFB1030H	FB2030	FB2030S	HFB2030
35	FB1035H	HFB1035H	FB2035	FB2035S	HFB2035
40	FB1040H	HFB1040H	FB2040	FB2040S	HFB2040
45⑥	FB1045H	HFB1045H	FB2045	FB2045S	HFB2045
50	FB1050H	HFB1050H	FB2050	FB2050S	HFB2050
60	FB1060H	HFB1060H	FB2060	FB2060S	HFB2060
70	FB1070H	HFB1070H	FB2070	FB2070S	HFB2070
80⑥	FB1080H	HFB1080H	FB2080	FB2080S	HFB2080
90	FB1090H	HFB1090H	FB2090	FB2090S	HFB2090
100	FB1100H	HFB1100H	FB2100	FB2100S	HFB2100
100 MCS⑥			FB2100N	FB2100SN	
110⑥			FB2110	FB2110S	HFB2110
125			FB2125	FB2125S	HFB2125
150			FB2150	FB2150S	HFB2150
150 MCS⑥			FB2150N	FB2150SN	

Type FB, HFB — continued

Continuous Rating @ 40°C	3-Pole			4-Pole ①②	
	600 Volts Ac 250 Volts Dc② Standard	VisABreaker	MARK 75	Standard	
10①	FB3010	FB3010S	HFB3010	FB4010	FB4010S
15	FB3015	FB3015S	HFB3015	FB4015	FB4015S
20	FB3020	FB3020S	HFB3020	FB4020	FB4020S
25	FB3025	FB3025S	HFB3025	FB4025	FB4025S
30	FB3030	FB3030S	HFB3030	FB4030	FB4030S
35	FB3035	FB3035S	HFB3035	FB4035	FB4035S
40	FB3040	FB3040S	HFB3040	FB4040	FB4040S
45	FB3045	FB3045S	HFB3045	FB4045	FB4045S
50	FB3050	FB3050S	HFB3050	FB4050	FB4050S
60	FB3060	FB3060S	HFB3060	FB4060	FB4060S
70	FB3070	FB3070S	HFB3070	FB4070	FB4070S
80③	FB3080	FB3080S	HFB3080	FB4080	FB4080S
90	FB3090	FB3090S	HFB3090	FB4090	FB4090S
100	FB3100	FB3100S	HFB3100	FB4100	FB4100S
125	MCS④	FB3100SN	.....	FB4100N	.....
150	FB3110	FB3110S	HFB3110	FB4110	FB4110S
175	FB3125	FB3125S	HFB3125	FB4125	FB4125S
200	FB3150	FB3150S	HFB3150	FB4150	FB4150S
250	MCS④	FB3150SN	.....	FB4150N	.....

Special Breakers ①

Type FB, Magnetic Only, Front Adjustable (Includes Line and Load Terminals)

Continuous Rating @ 40°C	Magnetic Trip Range Amperes	Catalog/Style Numbers				
		2-Pole ①②, 600 Volts Ac		3-Pole, 600 Volts Ac		
		Standard	MARK 75	Standard	VisABreakers	MARK 75
7-22	7-22	FB2022MRL	HFB2022ML	FB3022MRL	FB3022SMRL	HFB3022ML
15-45	15-45	FB2045MRL	HFB2045ML	FB3045MRL	FB3045SMRL	HFB3045ML
35-110	35-110	FB2110MRL	HFB2110ML	FB3110MRL	FB3110SMRL	HFB3110ML
32-80	2606D95G12	.....	.....	2606D95G30	.....	.....
66-190	FB2190MRL	HFB2190ML	.....	FB3190MRL	FB3190SMRL	HFB3190ML
50-150	1268C14G05④	.....	.....	1268C14G06④	.....	.....
90-270	FB2270MRL	HFB2270ML	.....	FB3270MRL	FB3270SMRL	HFB3270ML
66-190	1268C14G01④	.....	.....	1268C14G02④	.....	.....
160-480	FB2480MRL	HFB2480ML	.....	FB3480MRL	FB3480SMRL	HFB3480ML
100-270	2606D95G13	.....	.....	2606D95G31	.....	.....
150-480	1268C14G03④	.....	.....	1268C14G04④	.....	.....
450-1550	FB21550MRL	HFB21550ML	.....	FB31550MRL	FB31550SMRL	HFB31550ML
575-1800	FB21800MRL	HFB21800ML	.....	FB31800MRL	FB31800SMRL	HFB31800ML

Current Limiter Attachment②

LFB Current Limiter is an attachment that connects to the load end of a standard FB thermal magnetic or magnetic only breaker, providing 10,000 amps interrupting capacity at up to 70 volts Ac. Limiters for thermal magnetic breakers are listed with CSA for the above. Current limiters must be applied as indicated in the table.

Standard LFB terminals are suitable for Cu/Al conductors. Ratings thru 70 amps accept (1) #14-#2, and 100 and 150 amp accept (1) #1-4/0.⑦

On all 3 phase Delta, Grounded B phase applications, refer to Westinghouse.

Breaker Rating, Amperes

Limiter Catalog Number

For Thermal Magnetic Breakers ⑦

0	LFB3070R
50	LFB3150R

For Magnetic Only Breakers ⑦①

3	LFB3003MR
5	LFB3005MR
10	LFB3010MR
15	LFB3015MR
20	LFB3020MR
25	LFB3025MR
30	LFB3030MR
35	LFB3035MR
40	LFB3040MR
45	LFB3045MR
50	LFB3050MR
60	LFB3070MR
70	LFB3100MR
80	LFB3150MR

Special Calibrations ①

Special calibration price additions apply to breakers with ratings not listed as standard, or for applications other than 40°C or 50°C. Also price

additions apply to specific calibrations for frequencies other than 0-60 Hertz Ac circuits. See Application Data 29-160 for information regarding special conditions. Maximum calibration for 400 Hz. is 135 amps.

Type of Calibration	1-24 Identical Units	25 or More Identical Units
---------------------	----------------------	----------------------------

Thermal	Add 10% to List Price of Complete Breaker	None
Magnetic	.....	None
Frequency	.....	None

50°C Calibration ①

Add suffix "V" to catalog number for complete breaker, listed above, when ordering listed ampere ratings for breakers to be used in 50°C ambients. Same price as standard 40°C breakers.

Ambient Compensating Breakers ①

To order, add suffix letter "A" to standard thermal magnetic breaker catalog number.

Available in all standard ratings of EB, EHB, FB and HFB breakers up to ratings of 125 amps. Add 10% to price of standard breaker.

Terminals

Breakers include load terminals only ⑤⑥. Terminals are CSA listed as suitable for wire type and size as listed below. When used with aluminum conductors, use joint compound. When line terminals are required, order by style number from table at no charge with the breaker. To order optional aluminum

terminals, add suffix "Z" to complete breaker catalog number, and specify line terminals separately from table when required.

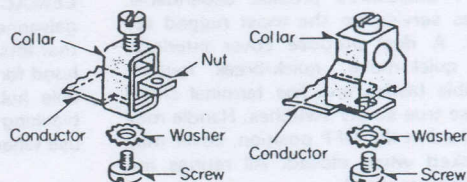
Max. Breaker Amps	Wire Type	Wire Range	Package of 3 Line Terminals ④	Style Number
-------------------	-----------	------------	-------------------------------	--------------

Standard Pressure Type Terminals

20 (EB, EHB)	Al/Cu	#14-#10	624B100G14
100	Al/Cu	#14-1/0	624B100G02
150	Al/Cu	# 4-4/0	624B100G17

Optional Al/Cu Pressure Terminals

50	Al/Cu	#14-#4	624B100G10
100	Al/Cu	# 4-4/0	624B100G17

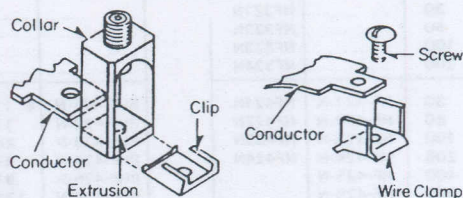


Style 624B100G02

Insert collar enclosing conductor as shown. Locate nut on top of conductor and tighten securely with screw and washer. Caution: Collar must surround conductor.

Style 624B100G10

Assemble collar on top of conductor as shown. Tighten securely with screw and washer.



Style 624B100G17

Insert collar enclosing conductor and center on extrusion on collar. Install clip with legs on top of conductor and snap end around bottom of collar.

Style 624B100G14

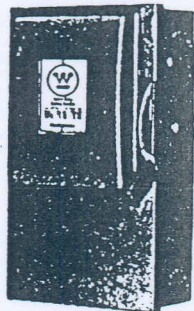
Assemble wire clamp to bottom of conductor as shown.

Further Information

List Prices: See Price List 29-020
Application, Operating Characteristics: AD 29-160
Dimensions: DS 29-170

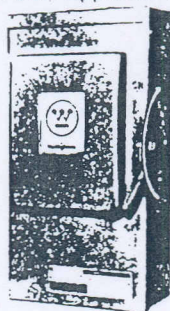
- ④ Changed or added since previous issue.
- ① Not listed with CSA.
- ② Dc ratings apply to substantially non-inductive circuits.
- ③ Magnetic only breakers for Dc applications require special calibration. Order by description.
- ⑤ Style listed is for package of 3 terminals. Order quantity equal to 1/3 total terminals required.
- ⑥ Magnetic-only breakers include both line and load terminals.
- ⑦ Suffix "L" on catalog number indicates line and load terminals included. If factory installation is required, specify on order.
- ⑧ Ratings thru 70 amps can be supplied with terminals for Cu cable only (#14-#2). Order by description.
- ⑨ 2-Pole magnetic only, breakers supplied in 3-Pole frame with current carrying parts omitted from center pole.
- ⑩ All 4 poles have thermal magnetic trip elements. Can be supplied with 3 poles protected plus 1 pole non-automatic if required. Order by description. No price or dimensional differences.

Fusible and Non-Fusible 30 to 1200 Amps. 3 Pole — All CSA Approved for Service Entrance ①



EEMAC 1

Types HF and HU Safety Switches in EEMAC 1 enclosures provide dependable, continuous service on the most rugged applications. A dual purpose cover interlock, positive, quick-make, quick-break mechanism, visible blades and line terminal shield make these true safety switches. Handle may be padlocked in the OFF position, cover may be padlocked when closed. All ratings are dual horsepower rated.



EEMAC 3

Types RHF and RHU Safety Switches in EEMAC 3 Enclosures are constructed of galvanized steel, have a top-hinged cover that lifts up and is "locked" open by the drip hood for wiring or maintenance. Interchangeable hubs 3/4" through 3" can be used; a blanking plate and gasket are included for use when hubs are not used.



EEMAC 12

Types JHF and JHU Safety Switches in EEMAC 12 enclosures are designed for applications where coolants, dust and lint are prevalent. Enclosure has external mounting feet, a gasketed door and is furnished without knockouts. Switches provide all the safety features of the Types HF and HU.

NOTE — FOR 2 POLE APPLICATIONS USE THE 2 OUTER POLES

250 Volts Ac or Dc, 600 Volts Ac, Fusible — EEMAC 1, 3, and 12 Enclosures

Poles	Am- pere Rating	EEMAC 1⑩ General-Purpose H-600 NOVALINE ③HF NF		Trade Price	EEMAC 3 Weatherproof H-600		Trade Price	EEMAC 12 Dust-tight Industrial Use H-600		Trade Price	Solid Neutral④ For Field Mtg. (If Required) NOVALINE H-600 NF		Horsepower Ratings				250 Volts Dc
		Catalogue Number	Catalogue Number		Catalogue Number	Catalogue Number		Catalogue Number	Catalogue Number		Standard Using N.E.C. Fuses	Maximum⑥ Using Time Delay Fuses					
		Catalogue Number	Catalogue Number	Trade Price	Catalogue Number	Trade Price	Catalogue Number	Trade Price	Catalogue Number	Catalogue Number	Trade Price	Single Phase	Three Phase	Single Phase	Three Phase		
Fusible, 250 Volts Ac or Dc																	
3-Wire SN⑤	30	.....	NF321N	.....	.....	.....	.....	.....	.....	Included	.....	2	.....	3	.....	5
	60	.....	NF322N	.....	.....	.....	.....	.....	.....	Included	.....	3	.....	10	.....	10
	100	.....	NF323N	.....	.....	.....	.....	.....	.....	Included	.....	7 1/2	.....	15	.....	20
	200	.....	NF324N	.....	.....	.....	.....	.....	.....	Included	.....	15	.....	15	.....	40
4-Wire SN	30	HF-421-N	NF421N	.....	RHF-421-N	\$ 117	JHF-421-N	\$	Included	Included	.....	2	3	3	7 1/2	5
	60	HF-422-N	NF422N	.....	RHF-422-N	174	JHF-422-N	.....	Included	Included	.....	3	7 1/2	10	15	10
	100	HF-423-N	NF423N	.....	RHF-423-N	262	JHF-423-N	.....	Included	Included	.....	7 1/2	15	15	30	20
	200	HF-424-N	NF424N	.....	RHF-424-N	376	JHF-424-N	.....	Included	Included	.....	15	25	15	60	40
	400	HF-425-N	.....	.....	RHF-425-N	916	JHF-425-N	.....	Included	Included	.....	.....	50	.....	100	50
	600	HF-426-N	.....	.....	RHF-426-N	1330	JHF-426-N	.....	Included	.....	.....	.....	.....	.....	.....	.....
	800	HF-427-N	.....	.....	.....	.....	.....	.....	Included	.....	.....	.....	.....	.....	.....	.....
	1200	HF-428-N	.....	.....	.....	.....	.....	.....	Included	.....	.....	.....	.....	.....	.....	.....

Fusible, 600 Volts Ac

Poles	Am- pere Rating	HF-361 NF361		Trade Price	RHF-361 \$ 177		Trade Price	JHF-361 \$		Trade Price	N60S NN100		Horsepower Ratings				250 Volts Dc
		Catalogue Number	Catalogue Number		Catalogue Number	Trade Price		Catalogue Number	Trade Price		Catalogue Number	Catalogue Number	Single Phase	Three Phase	Single Phase	Three Phase	
3-Pole	30	HF-361	NF361	\$	RHF-361	\$ 177		JHF-361	\$		N60S	NN100	7 1/2	10	10	20	
	60	HF-362	NF362		RHF-362	237		JHF-362			N60S	NN100	15	20	25	50	
	100	HF-363	NF363		RHF-363	330		JHF-363			N100S	NN100	25	30	40	75	
	200	HF-364	NF364		RHF-364	450		JHF-364			N200S	NN200	50	50	50	100	
	400	HF-365			RHF-365	1040		JHF-365			N600S						
	600	HF-366			RHF-366	1252		JHF-366	1		N600S						
	800	HF-367									N800						
	1200	HF-368									N1200						

Non-Fusible, 250 Volts Ac or Dc, 600 Volts Ac

Poles	Am- pere Rating	HU-361 NU361		Trade Price	RHU-361 \$ 101		Trade Price	JHU-361 \$		Trade Price	N60S NN100		Horsepower Ratings				250 Volts Dc
		Catalogue Number	Catalogue Number		Catalogue Number	Trade Price		Catalogue Number	Trade Price		Catalogue Number	Catalogue Number	Single Phase	Three Phase	Single Phase	Three Phase	
3-Pole	30	HU-361	NU361	\$	RHU-361	\$ 101		JHU-361	\$		N60S	NN100	3	7 1/2	10	20	5
	60	HU-362	NU362		RHU-362	140		JHU-362			N60S	NN100	10	15	25	50	10
	100	HU-363	NU363		RHU-363	212		JHU-363			N100S	NN100	15	30	40	75	20
	200	HU-364	NU364		RHU-364	309		JHU-364			N200S	NN200	15	60	50	100	40
	400	HU-365			RHU-365	768		JHU-365			N600S						
	600	HU-366			RHU-366	1252		JHU-366			N600S						
	800	HU-367		1							N800						
	1200	HU-368		1							N1200						

②800 and 1200 ampere switches have provision for class L fuses (1 fuse per pole), AC service only.

③Increased ratings are permitted only when appropriate fuses are used in accordance with Canadian Electrical Code, Part 1.

④Approved for service entrance when equipped with the solid neutral indicated, except 30A 250V.

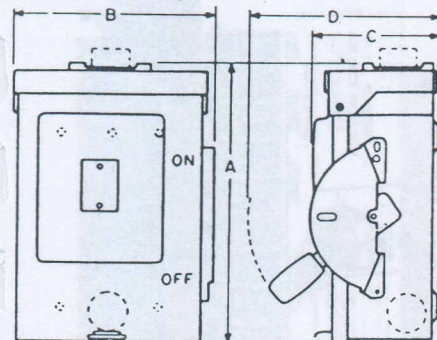
⑤Up to 200A to be superseded by novaline heavy duty switches.

⑥Availability to be advised.

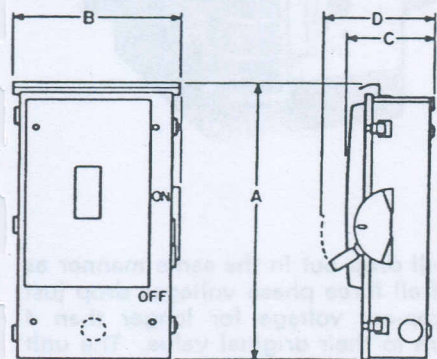
Inches and Millimeters

Not to be used for construction purposes unless approved.

EEMAC 3R Rainproof

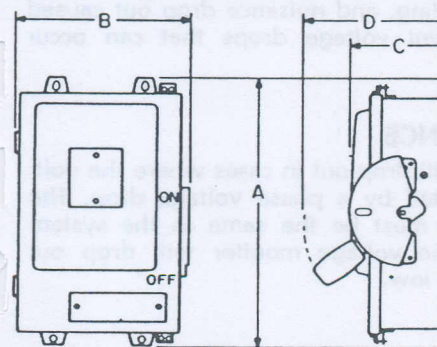


For 30-200 Amp Switches



For 400 and 600 Amp Switches

EEMAC 4 Watertight Stainless Steel, EEMAC 12 Dust-Tight Industrial



EEMAC 3 Rainproof

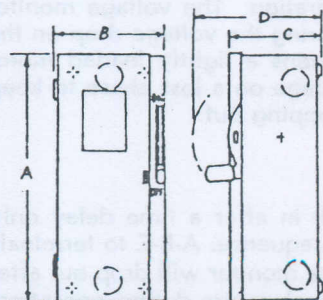
Amp. Rating	No. of Poles	Dimension				Approx. Wt. Lbs.	Conduit Sizes, Inches	Hub Sizes, Inches			
		A	B	C	D						
		In.	mm	In.	mm	In.	mm	In.	mm		
250 Volt RHF, Fusible, RHU Non-Fusible Switches											
30	2, 3	10 ³ / ₁₆	259	7 ⁷ / ₁₆	189	4 ¹ / ₂	122	7 ⁷ / ₃₂	181 11	½, ¾, 1, 1¼, 1½, 2	¾, 1, 1¼, 1½, 2
60	2, 3	16 ³ / ₁₆	414	8 ³ / ₁₆	220	5 ¹ / ₁₆	144	8 ⁹ / ₃₂	210 17	½, ¾, 1, 1¼, 1½, 2	¾, 1, 1¼, 1½, 2
100	2, 3	20 ²³ / ₆₄	521	10 ³ / ₁₆	267	7 ⁷ / ₁₆	192	10 ³ / ₆₄	255 39	1, 1¼, 1½, 2	¾, 1, 1¼, 1½, 2
200	2, 3	27 ² / ₁₆	694	13 ³ / ₁₆	342	8 ⁷ / ₁₆	221	11 ² / ₆₄	288 68	1½, 2, 2½, 3	2, 2½, 3
400	2, 3	42 ³ / ₁₆	1076	23 ³ / ₃₂	588	12 ¹ / ₃₂	318	17 ² / ₆₄	440 210	.....	.....
600	2, 3	48 ³ / ₁₆	1222	23 ³ / ₃₂	588	12 ¹ / ₃₂	318	17 ¹ / ₆₄	440 265	.....	.....
800	2, 3	47 ²³ / ₃₂ ①	1212 ①	39 ¹ / ₁₆	1008	12 ¹ / ₆₄	311	17 ⁷ / ₃₂	439 435	.....	.....
1200	2, 3	57 ¹ / ₃₂ ②	1457 ②	42 ¹ / ₁₆	1084	12 ¹ / ₆₄	311	17 ⁷ / ₃₂	439 515	.....	.....
600 Volt RHF Fusible, RHU Non-Fusible Switches											
30	2, 3	16 ³ / ₁₆	414	8 ³ / ₁₆	220	5 ¹ / ₁₆	144	8 ⁹ / ₃₂	210 17	½, ¾, 1, 1¼, 1½, 2	¾, 1, 1¼, 1½, 2
60	2, 3	16 ³ / ₁₆	414	8 ³ / ₁₆	220	5 ¹ / ₁₆	144	8 ⁹ / ₃₂	210 17	½, ¾, 1, 1¼, 1½, 2	¾, 1, 1¼, 1½, 2
100	2, 3	20 ²³ / ₆₄	521	10 ³ / ₁₆	267	7 ⁷ / ₁₆	192	10 ³ / ₆₄	255 39	1, 1¼, 1½, 2	¾, 1, 1¼, 1½, 2
200	2, 3	27 ² / ₁₆	694	13 ³ / ₁₆	342	8 ⁷ / ₁₆	221	11 ² / ₆₄	288 68	1½, 2, 2½, 3	2, 2½, 3
400	2, 3	42 ³ / ₁₆	1076	23 ³ / ₃₂	588	12 ¹ / ₃₂	318	17 ² / ₆₄	440 230	.....	.....
600	2, 3	48 ³ / ₁₆	1222	23 ³ / ₃₂	588	12 ¹ / ₃₂	318	17 ² / ₆₄	440 295	.....	.....
800	2, 3	47 ²³ / ₃₂ ①	1212 ①	39 ¹ / ₁₆	1008	12 ¹ / ₆₄	311	17 ⁷ / ₃₂	439 435	.....	.....
1200	2, 3	57 ¹ / ₃₂ ②	1457 ②	42 ¹ / ₁₆	1084	12 ¹ / ₆₄	311	17 ⁷ / ₃₂	439 515	.....	.....

⊙ For Unfused Switch: 42³/₁₆ In., 1072 mm.⊙ For Unfused Switch: 49²³/₃₂ In., 1268 mm.

EEMAC 4 Watertight Stainless Steel, EEMAC 12 Dust-Tight Industrial

Amp. Rating	No. of Poles	Dimension								Approx. Wt. Lbs.
		A		B		C		D		
		In.	mm	In.	mm	In.	mm	In.	mm	
250 Volt WHF Fusible, WHU Non-Fusible Switches										
30	2, 3	10 ¹ / ₁₆	271	7 ⁷ / ₁₆	189	4 ² / ₃₂	118	6 ⁸ / ₁₆	176	11
60	2, 3	16 ⁷ / ₁₆	417	8 ^{7/₁₆}	225	5 ⁵ / ₁₆	142	8 ¹ / ₁₆	211	17
100	2, 3	22 ¹ / ₁₆	579	10 ² / ₁₆	275	7 ³ / ₁₆	191	10 ¹ / ₁₆	254	38
200	2, 3	28 ¹ / ₁₆	735	13 ³ / ₁₆	350	8 ⁴ / ₁₆	221	11 ² / ₁₆	290	61
400	2, 3	44 ³ / ₃₂	1124	23 ³ / ₃₂	588	12 ¹ / ₁₆	315	17 ² / ₁₆	443	206
600	2, 3	50 ¹ / ₃₂	1270	23 ³ / ₃₂	588	12 ¹ / ₁₆	315	17 ² / ₁₆	443	262
600 Volt WHF Fusible, WHU Non-Fusible Switches										
30	2, 3	16 ⁷ / ₁₆	417	8 ^{7/₁₆}	225	5 ⁵ / ₁₆	142	8 ¹ / ₁₆	211	17
60	2, 3	16 ⁷ / ₁₆	417	8 ^{7/₁₆}	225	5 ⁵ / ₁₆	142	8 ¹ / ₁₆	211	17
100	2, 3	22 ¹ / ₁₆	579	10 ² / ₁₆	295	7 ³ / ₁₆	191	10 ¹ / ₁₆	254	39
200	2, 3	28 ¹ / ₁₆	735	13 ³ / ₁₆	350	8 ⁴ / ₁₆	221	11 ² / ₁₆	290	64
400	2, 3	44 ³ / ₃₂	1124	23 ³ / ₃₂	588	12 ¹ / ₁₆	315	17 ² / ₁₆	443	226
600	2, 3	50 ¹ / ₃₂	1270	23 ³ / ₃₂	588	12 ¹ / ₁₆	315	17 ² / ₁₆	443	291
250 Volt JHF Fusible, JHU Non-Fusible Switches										
30	2, 3	13 ¹ / ₁₆	347	7 ¹ / ₁₆	192	4 ² / ₃₂	118	6 ⁸ / ₁₆	176	11
60	2, 3	19 ⁷ / ₁₆	493	8 ¹ / ₁₆	227	5 ⁵ / ₁₆	142	8 ¹ / ₁₆	211	17
100	2, 3	26 ¹ / ₁₆	681	10 ² / ₁₆	277	7 ³ / ₁₆	191	10 ¹ / ₁₆	254	38
200	2, 3	32 ¹ / ₁₆	837	13 ³ / ₁₆	352	8 ⁴ / ₁₆	221	11 ² / ₁₆	290	61
400	2, 3	44 ³ / ₃₂	1124	23 ³ / ₃₂	588	12 ¹ / ₁₆	315	17 ² / ₁₆	443	206
600	2, 3	50 ¹ / ₃₂	1270	23 ³ / ₃₂	588	12 ¹ / ₁₆	315	17 ² / ₁₆	443	262
600 Volt JHF Fusible, JHU Non-Fusible Switches										
30	2, 3	19 ⁷ / ₁₆	493	8 ¹ / ₁₆	227	5 ⁵ / ₁₆	142	8 ¹ / ₁₆	211	17
60	2, 3	19 ⁷ / ₁₆	493	8 ¹ / ₁₆	227	5 ⁵ / ₁₆	142	8 ¹ / ₁₆	211	17
100	2, 3	26 ¹ / ₁₆	681	10 ² / ₁₆	277	7 ³ / ₁₆	191	10 ¹ / ₁₆	254	39
200	2, 3	32 ¹ / ₁₆	837	13 ³ / ₁₆	352	8 ⁴ / ₁₆	221	11 ² / ₁₆	290	64
400	2, 3	44 ³ / ₃₂	1124	23 ³ / ₃₂	588	12 ¹ / ₁₆	315	17 ² / ₁₆	443	226
600	2, 3	50 ¹ / ₃₂	1270	23 ³ / ₃₂	588	12 ¹ / ₁₆	315	17 ² / ₁₆	443	291

NOVALINE TYPE NF & NU EEMAC I HEAVY DUTY



		Amp. Rating	No. of Poles	Dimension								Approx. Wt. Lbs.	Conduit Sizes, Inches
				A		B		C		D			
Type	Volts			In.	mm	In.	mm	In.	mm	In.	mm		
NF	250	30/60	2, 3	15	381	8 7/8	226	7 3/4	197	9 1/2	241	13	1/2, 3/4, 1, 1 1/4, 1 1/2
NU	600	30/60	2, 3	15	381	8 7/8	226	7 3/4	197	9 1/2	241	13	"
NF	600	30/60	2, 3	17 1/2	445	8 7/8	226	7 3/4	197	9 1/2	241	30	"
NF & NU	250/600	100	2, 3	21 3/8	543	8 7/8	226	7 3/4	197	9 1/2	241	32	1/2, 3/4, 1 1/4, 1 1/2, 2
NF & NU	250/600	200	2, 3	29 1/2	749	12 7/8	327	8 3/4	222	9 1/4	235	50	1/2, 3/4, 1 1/4, 1 1/2, 2, 2 1/2, 3

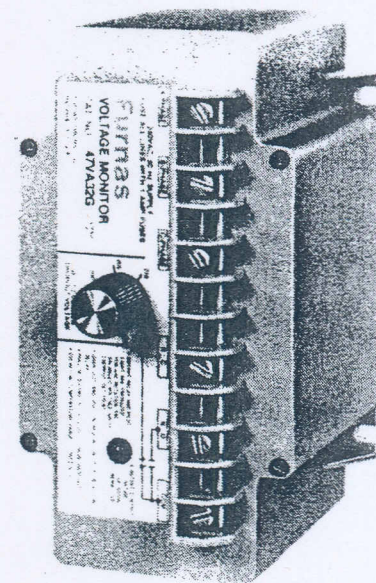
CLASS 47Supersedes Issue of
Jan., 1983**3 PHASE VOLTAGE MONITORS
UNDER VOLTAGE — PHASE PROTECTION RELAY**

47-B1

Descriptive
April 1, 1983**THREE PHASE RATING**

Specification	208V 60 Hz	240V 60 Hz	380V 50 Hz	415V 50 Hz	480V 60 Hz	600V 60 Hz
Operating Voltage (Neutral Not Required)	190-225V	215-250V	330-405V	375-445V	430-500V	525-605V
Drop Out Voltage Range	175-208V	200-235V	300-375V	345-415V	400-470V	495-575V
Pull In Sequence A - B - C	A - B - C	A - B - C	A - B - C	A - B - C	A - B - C	A - B - C
Pull In - Drop Out Differential	15V	15V	30V	30V	30V	30V
Pull In Delay (Typ.)	6 sec.	6 sec.	6 sec.	6 sec.	6 sec.	6 sec.
Drop Out Delay (Typ.)	6 sec.	6 sec.	6 sec.	6 sec.	6 sec.	6 sec.
Set Point Repeatability @ 25°C	2%	2%	2%	2%	2%	2%
Dial Calibration	5%	5%	5%	5%	5%	5%
Transient Protection	10,000V	10,000V	10,000V	10,000V	10,000V	10,000V
Operating Temperature	-20 to +70° C.	-20 to +70° C.	-20 to +70° C.	-20 to +70° C.	-20 to +70° C.	-20 to +70° C.
Pilot Light	L.E.D.	L.E.D.	L.E.D.	L.E.D.	L.E.D.	L.E.D.
Relay Output Contact	SPDT	SPDT	SPDT	SPDT	SPDT	SPDT

Other voltages and frequencies available.

**NEMA PILOT CONTACT RATINGS**

NEMA Rating Designation	Volts	Amps		Continuous Amps	Volt Amps	
		Make	Break		Make	Break
C300 AC 50/60 Hz.	120	15	1.50	2.5	1800	180
	240	7.5	0.75	2.5	1800	180

GENERAL OPERATION

The voltage monitor is a voltage and phase sensing relay which helps protect machinery and equipment against low voltage, voltage unbalance, loss of phase, and phase reversal. The voltage monitor will not pull in if any of the above fault conditions exists, or if they occur during operation; the voltage monitor will drop out. It will automatically pull in (reset) after it has dropped out provided the fault condition is corrected and all other requirements for pick up are met.

LOW VOLTAGE

The voltage monitor will pull in after a time delay if all three phase voltages are at least 15 volts higher than the dial set trip voltage for either the 208 V or 240 V unit and 30 volts higher for the 380 V, 480 V, or 600 V unit. (The voltage monitor must be manually reset when the dialed drop out voltage differential is less than the pull in/drop out voltage differential.) The voltage monitor will drop out after a time delay when all three phase voltages drop below the dial set drop out voltage.

The voltage monitor will drop out in the same manner as previously described if all three phase voltages drop just below the dial set drop-out voltage for longer than 4 seconds and then return to their original value. The unit will drop out instantaneously if all three voltages are momentarily interrupted or turned off.

The pull in/drop out voltage differential and time delays have been designed into the voltage monitor to prevent chattering, rapid recycling, and nuisance drop out caused by momentary transient voltage drops that can occur during motor starting.

VOLTAGE UNBALANCE

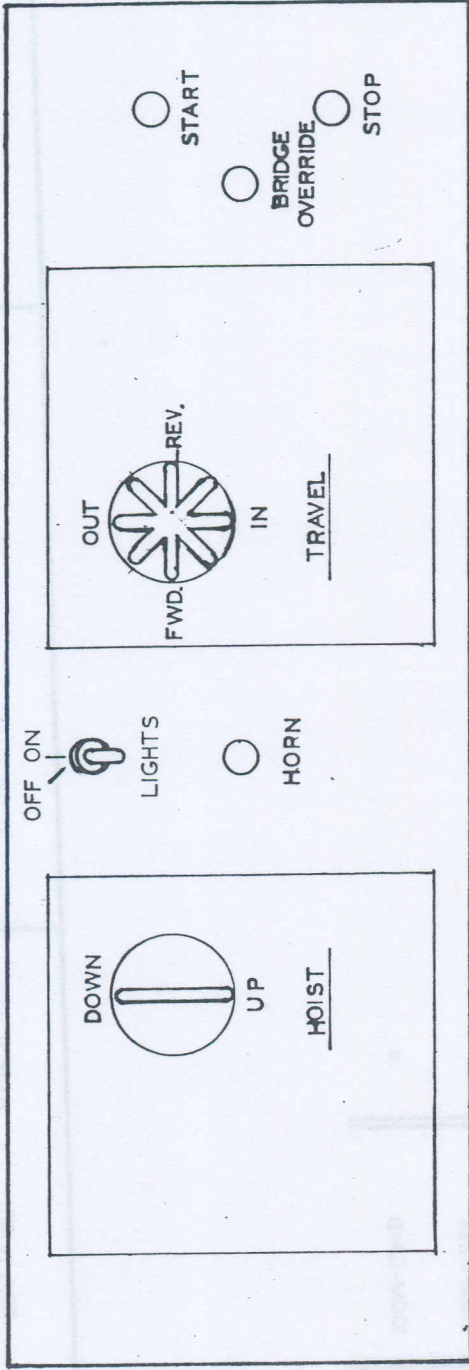
The voltage monitor will drop out in cases where the voltage unbalance is created by a phase voltage drop. The dialed voltage setting must be the same as the system operating voltage. The voltage monitor will drop out when any phase is 5% low.

LOSS OF PHASE

The voltage monitor will not pull in if all three phases are not present or it will drop out after a time delay if a phase loss occurs during operation. The voltage monitor senses a lost phase by monitoring the voltage drop on the lost phase. In some applications a lightly loaded motor may regenerate sufficient voltage on a lost phase to keep the voltage monitor from dropping out.

PHASE REVERSAL

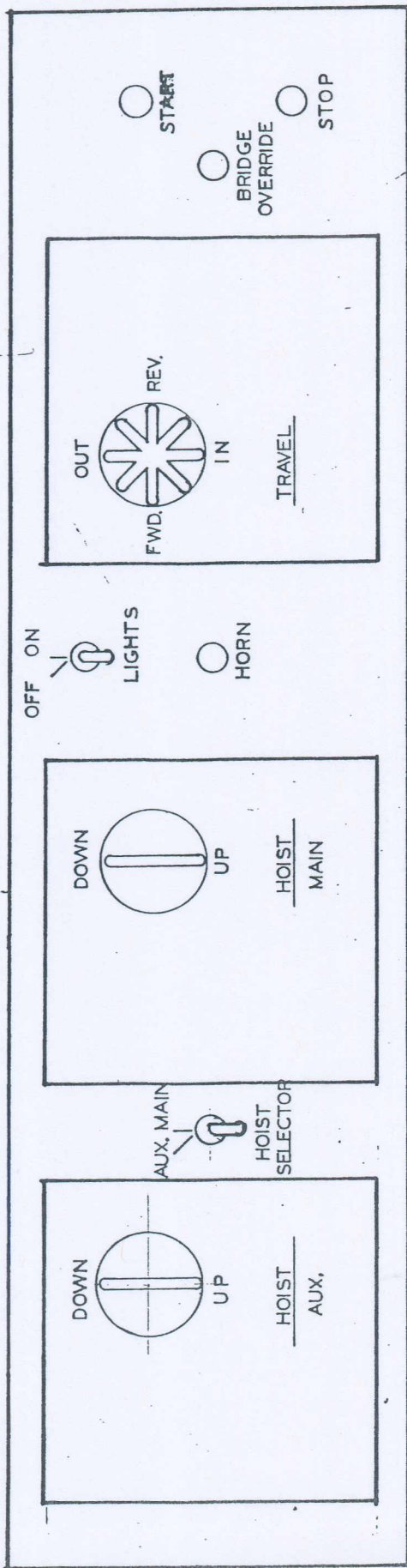
The voltage monitor will pull in after a time delay only if it senses the proper phase sequence: A-B-C to terminals A-B-C respectively. The voltage monitor will drop out after a time delay if a phase reversal occurs during operation.



ITEM	PART NO.	MANUFACTURER
LIGHTS	100M-CA1A	SYLVANIA
HORN	100M-A14A	SYLVANIA
START	100M-A23A	SYLVANIA
STOP	100M-B12A	SYLVANIA
BRIDGE OVERRIDE	100M-A21A	SYLVANIA

10 & 15 TONNE CABS

CONTROL PANEL LAYOUT

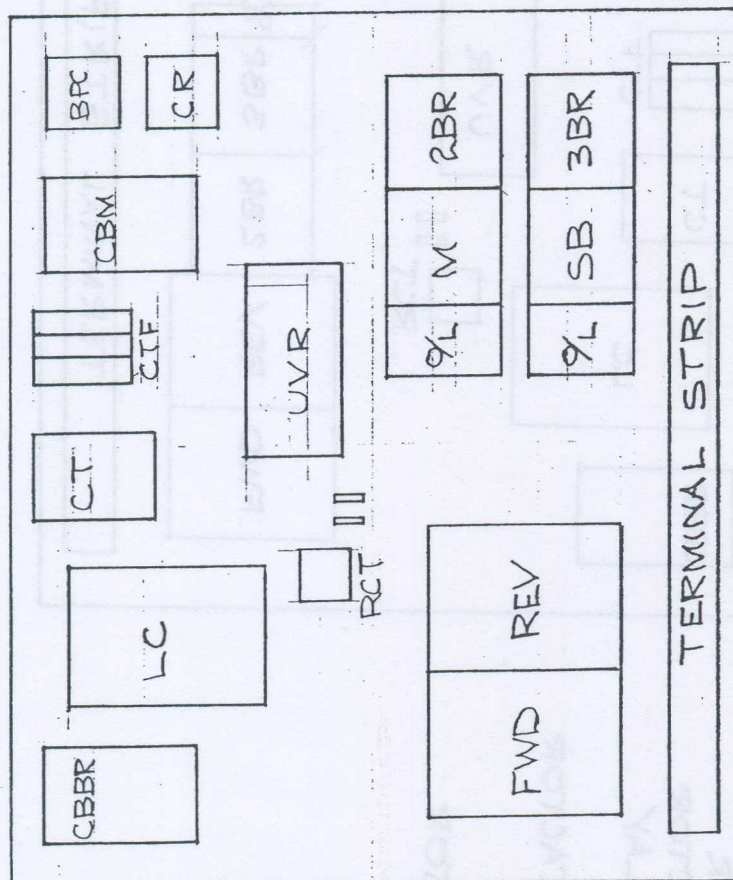


ITEM	PART NO.	MANUFACTURER
LIGHTS	100M-CA1A	SYLVANIA
HORN	100M-A14A	"
START	100M-A23A	"
STOP	100M-B12A	"
BRIDGE OVERRIDE	100M-A21A	"
HOIST SELECTOR	100M-CA1B	"

CONTROL PANEL LAYOUT

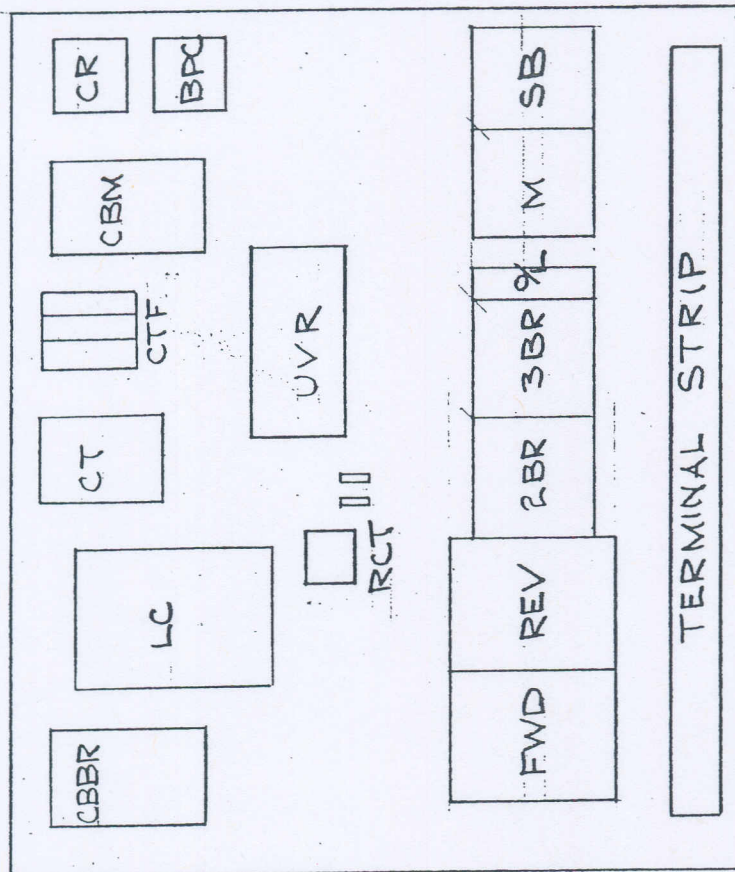
15/3 TONNE CAB

CBBR - BRIDGE CIRCUIT BREAKER (30A)
 LC - MAINLINE CONTACTOR (SIZE 3)
 CT - CONTROL TRANSFORMER (500VA)
 CT - " FUSES (4A)
 CBM - LIGHT CIRCUIT BREAKER
 BPC - LIMIT SWITCH CONTACTOR
 CR - OVERRIDE CONTACTOR
 RCT - RECTIFIER
 UVR - UNDER VOLTAGE RELAY
 M - LIGHT CONTACTOR
 2BR - 2ND SPEED CONTACTOR
 3BR - 3RD "
 SB - SAFETY BRAKE CONTACTOR
 FWD/REV CONTACTOR



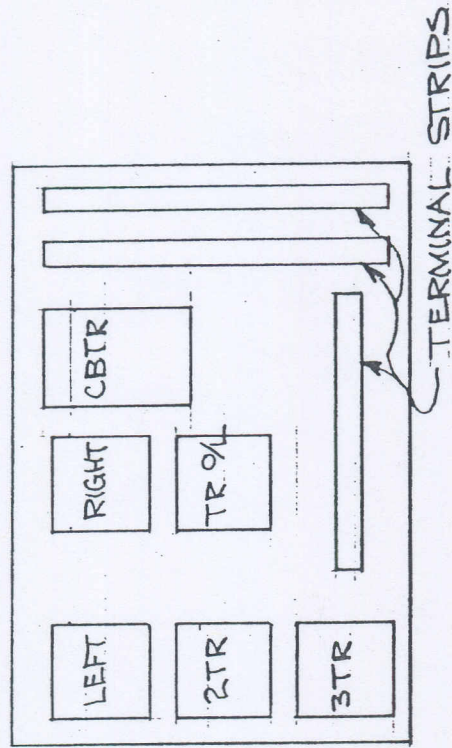
13.6 tonne BRIDGE
 PANEL LAYOUT

CBBR - BRIDGE CIRCUIT BREAKER (30A)
 LC - MAINLINE CONTACTOR (SIZE 3)
 CT - CONTROL TRANSFORMER (500VA)
 CTF - " FUSES (4A)
 CBM - LIGHT CIRCUIT BREAKER
 CR - OVERRIDE CONTACTOR
 BPC - LIMIT SWITCH CONTACTOR
 UVR - UNDER VOLTAGE RELAY
 RCT - RECTIFIER
 SB - SAFETY BRAKE CONTACTOR
 M - LIGHT CONTACTOR
 %L - OVER LOADS
 3BR - 3RD SPEED CONTACTOR
 2BR - 2ND SPEED
 FWD/REV. CONTACTOR



9.1 tonne BRIDGE
 PANEL LAYOUT

CBTR - TROLLEY CIRCUIT BREAKER (15A)
 LEFT/RIGHT - REVERSING CONTACTORS
 2TR - 2ND SPEED CONTACTOR
 3TR - 3RD " "
 TR 9% - TROLLEY OVERLOADS



9.1 & 13.6 TROLLEY PANEL

LAYOUT