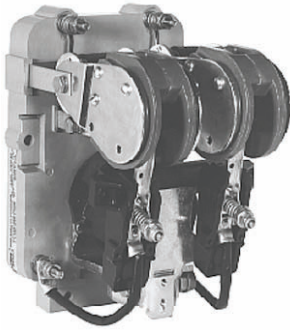


Mill Type Contactors



Contents

Description	Page
Mill Type Contactors	
Catalog Number Selection	446
Product Selection	446
Accessories	447
Options	447
Technical Data and Specifications	447
600V Contactors	448
DPM 1000V Contactor	454
AVD-Contactor	457
D-Contactor	460
Reversing/Assignment Contactor	463

Mill Type Contactors

Product Description

These DC mill type contactors are designed for heavy industry service and are suitable for use on moving machinery. The contactors listed here are for surface mounting on steel panels and front-of-panel wiring. The power stud assembly is mounted on the side of the contactor, rather than as part of a separate mounting kit.

Application Description

- Applications include mining, milling, cranes and transportation
- These contactors utilize DC coils

Note: Be sure to utilize a rectifier module if the only control voltage source available is 120 Vac.

Features

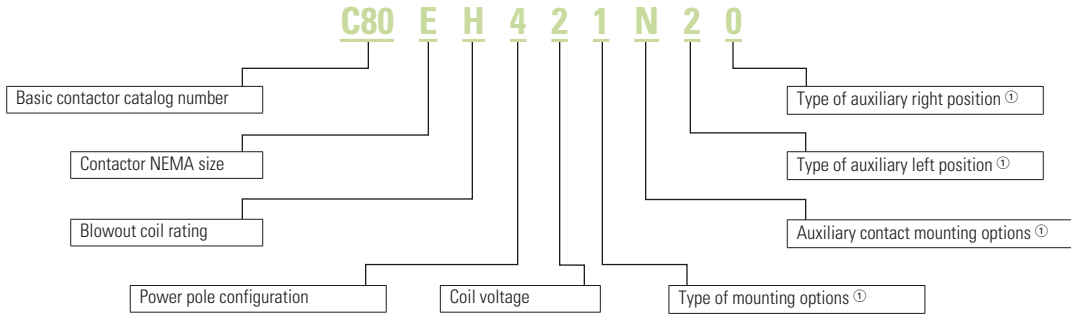
- Forged steel armature levers and magnet frames for superior physical strength
- Self-lubricating bearings
- Long contact life

Standards and Certifications

- CMAA 5.6.6-2
- NEMA ICS3-441, 442, 443
- NEMA ICS2-331.23
- NEMA ICS2-110.05.02
- NEMA ICS2-125.21.02

Catalog Number Selection

DC Mill Type Contactor

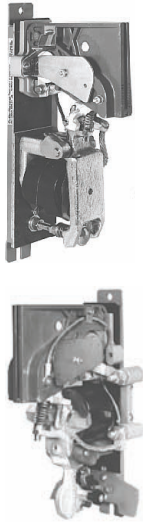


Product Selection

When Ordering Specify

- The catalog number with any required accessories

DC Mill Type Contactors



DC Mill Type Contactors

NEMA Size	Open Type Contactors Number of Poles	Blowout Coil Ampere Rating	230V Coil Catalog Number	100V Coil Catalog Number	Mechanical Interlock Catalog Number
2	1NO	None	C80DX12	C80DX14	C81DDA11
		5	C80DC12	C80DC14	C81DDA11
		25	C80DF12	C80DF14	C81DDA11
		50	C80DG12	C80DG14	C81DDA11
	2NO	None	C80DX22	C80DX24	C81DDA12
		50	C80DG22	C80DG24	C81DDA12
3	1NO	100	C80EH121	C80EH141	C81DEA11
	1NC	100	C80EH421	C80EH441	—
4	1NO	150	C80FJ121	C80FJ141	C81DEA11
	1NC	150	C80FJ421	C80FJ441	—
5	1NO	300	C80GK121	C80GK141	C81DGA11
	1NC	300	C80GK421	C80GK441	—
6	1NO	600	C80JL121	C80JL141	C81DJA11
	1NC	600	C80JL421	C80JL441	—
6A ②	1NO	810	C80KM121	C80KM141	C81DJA11
8	1NO	1350	C80WN121	C80WN141	C81DLA11

Magnet Coil Suffix

DC Coil Voltage	Coil Suffix	DC Coil Voltage	Coil Suffix
115V	1	No Coil	5
230V	2	Special ③	9
100V	4		

Notes

- ① See Page 447 for options.
- ② Not a NEMA size.
- ③ Consult factory.

Accessories

Auxiliary Contacts with Mounting Kit

Mounting Location	Contact Arrangement	Contact Size	Catalog Number
Side	1NO, 1NC	2	C81BAC1
Bottom	1NO, 1NC	2	C81BBC1
		3, 4, 5, 6, 6A	C81BBC2

Rectifier Module

Description	Contact Size	Catalog Number
120 Vac Input, 100 Vdc Output	All	C81EB

Options

Auxiliary Contact Mounting Material Options

Contact Size	Location	Suffix
2	Side	A
2	Bottom, with left hand and right hand option	B
2	Bottom, with left hand or right hand option	C
3-8	Bottom, with left hand and right hand option	B
2-8	None	N

Auxiliary Contact Options per Side

Configuration	Suffix
1NO	1
2NO	2
1NO-1NC	3
1NC	4
2NC	5
None	0

Mounting Kit Options ^①

Description	Suffix
Surface—Front of panel wiring	1
Elevated—Front of panel wiring	3 ^②

Technical Data and Specifications

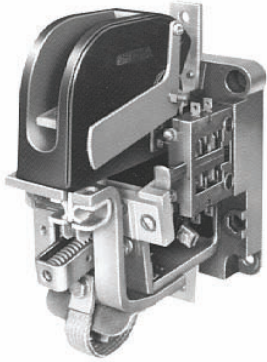
Mill Type Contactors

Description	Specification
Current range	5-1800 amperes
Voltage	115, 230 and 550 Vdc
Mechanical life	20M operations
Electrical life	500K operations

Notes

- ① Solderless lugs available, consult factory.
- ② Not available with Size 2.

600V Contactors



30

Contents

<i>Description</i>	<i>Page</i>
Mill Type Contactors	445
600V Contactors	
Product Selection	449
Accessories	450
Renewal Parts	451
Dimensions	453
DPM 1000V Contactor	454
AVD-Contactor	457
D-Contactor	460
Reversing/Assignment Contactor	463

600V Contactors

Product Description

These DC Contactors are designed to handle rugged DC applications. They provide durable service and easy installation and maintenance.

Application Description

- Applications including mining, milling, cranes and transportation
- These contactors utilize DC coils

Note: Be sure to utilize a rectifier module if the only control voltage source available is 120 Vac.

Features

- Sturdy glass polyester base on MD and ME
- Knife edge bearings that guarantee precise operation and minimal wear
- High contact pressure
- Vacuum impregnated magnetic coil

Benefits

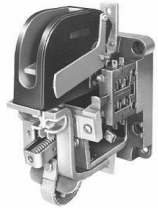
- Able to mount on steel or panels of any material for maximum flexibility
- Front or rear mounting available for convenient installation and maintenance
- Rapid arc quenching to ensure long life
- Easily accessible contact tips to remove and replace

Product Selection

When Ordering Specify

- Catalog number with appropriate coil suffix
- Any required accessories

600V Contactor



600V Contactors

Size	Open 8 Hour Ampere Rating	Contact Arrangement	Provisions for Interlocks		Magnet Coil Voltage	Catalog Number
			Mechanical	Electrical		
Front Connected						
0	10	1NO	Yes	4	125 Vdc ^①	ME010C
		2NO				ME020C
		1NO, 1NC				ME011C
		1NC				ME001C
1	25	1NO	Yes	4	125 Vdc ^①	ME110C
		2NO				ME120C
		1NO, 1NC				ME111C
		1NC				ME101C
2	50	1NO	Yes	4	125 Vdc ^①	ME210C
		2NO				ME220C
		1NO, 1NC				ME211C
		1NC				ME201C
3	100	1NO	Yes	4	125 Vdc ^①	ME310C
		2NO				ME320C
		1NO, 1NC				ME311C
		1NC				ME301C
4	150	1NO	Yes	4	125 Vdc ^①	ME410C
		2NO				ME420C
		1NO, 1NC				ME411C
		1NC				ME401C
5	300	1NO	Yes	2	125 Vdc ^①	MD510C
		1NC	No	2		MD501C
6	600	1NO	Yes	2	125 Vdc ^①	MD610C
		1NC	No	2		MD601C
7	900	1NO	Yes	2	125 Vdc ^①	MD710C
		1NC	No	2		MD701C
8	1350	1NO	Yes	3	125 Vdc ^①	MD810C
9	2500	1NO	Yes	3	125 Vdc ^①	MD910C
Rear Connected						
0-4	10-150	—	—	—	—	ME ^②
5	300	1NO	Yes	2	125 Vdc ^①	MR510C
		1NC	No	2		MR501C
6	600	1NO	Yes	2	125 Vdc ^①	MR610C
		1NC	No	2		MR601C
7	900	1NO	Yes	2	125 Vdc ^①	MR710C
		1NC	No	2		MR701C
8	1350	1NO	Yes	2 ^③	125 Vdc ^①	MR810C
9	2500	1NO	Yes	2 ^③	125 Vdc ^①	MR910C

Notes

- ^① Other coil voltages available, see **Page 451**. Substitute suffix code of desired voltage for last digit in listed catalog number. Example: ME010B.
- ^② For 10–150A rear connected contactors, order front connected ME contactor above and rear connection kit, catalog number 2184A10G08, (field installed only). See **Page 451**.
- ^③ Requires panel drilling.

Accessories

Auxiliary Contacts (Electrical Interlocks)—For Field Installation Only ^①

Auxiliary Contact Type	Application	Contact Arrangement ^②	Number of Auxiliary Contacts	Auxiliary Contacts Factory Installed ^① Catalog Number	Auxiliary Contacts Unmounted Replacement Only Catalog Number	Mounting and Operating Hardware for New Applications Catalog Number
L46	ME01 only	NO-FC	1	11A8713G10	11A8713G10	None required
		NC-FC		11A8713G09	11A8713G09	None required
	ME10 only	NC-FC-OB	1	487B878G01	487B878G01	None required
	ME10, ME11, ME20, ME30, ME31, ME40 and ME41	NO-FC	1	11A8713G09	11A8713G09	None required
		NC-FC		11A8713G10	11A8713G10	None required
L66	ME10, ME11, ME20, ME30, ME31, ME40 and ME41	DB-FC-L	1	659C301G04	659C301G04	None required
		DB-FC-R		659C301G05	659C301G05	None required
	ME10 Only	DB-FC-L-OB	1	487B878G06	487B878G06	None required
		DB-FC-R-OB		487B878G07	487B878G07	None required
L64	MD/MR501, MD/MR601 and MD/MR701	NO-NC	1	843D943G04	843D943G04	2087A63G02
		2NO		843D943G05	843D943G05	2087A63G03
		2NC		843D943G06	843D943G06	2087A63G03
	MD/MR510, MD/MR610-710 MD/MR810, MD/MR910	NO-NC		843D943G04	843D943G04	2087A63G04
		2NO		843D943G05	843D943G05	2087A63G17
		2NC		843D943G06	843D943G06	2087A63G05
						2087A63G06
Added to existing L64 interlocks	MD810	4NO to 4NC	2	Order (2) L64	Order (2) L64	2087A63G07
		6NO to 6NC	3	Order (3) L64	Order (3) L64	2087A63G07
	MD910	4NO to 4NC	2	Order (2) L64	Order (2) L64	2087A63G08
		6NO to 6NC	3	Order (3) L64	Order (3) L64	2087A63G08
	MD810-910	2NO to 2NC	1 ^③	Order (1) L64	Order (1) L64	2087A63G08
		4NO to 4NC	2 ^③	Order (2) L64	Order (2) L64	2087A63G09
		2NO to 2NC	1 ^④	Order (1) L64	Order (1) L64	2087A63G10

Standard Magnet Coil Suffix

Voltage	Suffix Code
65 Vdc (ME Size 0-4 only)	A
115 Vdc	B
125 Vdc	C
230 Vdc	D
250 Vdc	E
550 Vdc	F
Other	G

Notes

- ① For factory installed electrical interlocks, consult factory.
- ② NO = Normally Open, NC = Normally Closed, DB = Delayed Break, FC = Front Connected, L = Left Hand, R = Right Hand, OB = Outboard (for single-pole, Size 2 frame).
- ③ With one interlock mounted.
- ④ With two interlocks mounted.

Rear Connector Kit for ME Contactors ①

Catalog Number
2184A10G08

Accessory Option

Description
Rectifier for AC Operation
Order by description

Mechanical Interlocks, Unmounted

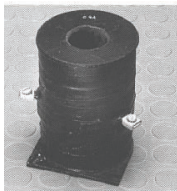
Type	Contactor		Contacts	Catalog Number
	Type	Size		
M-25	ME	All	1NO, 1NO + 1NC	878D400G01
M-25	ME	All	2NO, 2NO + 1NC	878D401G01
M-27	MD	5	1NO	25A1669G01
M-27	MD	6-7	1NO	25A1670G01
M-27	MD	8-9	1NO	25A1671G01

Renewal Parts

Sizes 5-9 M and MD Series

MD 510 Coil Part No. 45A5515G11

MD 510 Coil



Coils

Voltage	M and MD 501 Part Number	Sym Wiring	M and MD 510 Part Number	Sym Wiring	M and MD 610/710 Part Number	Sym Wiring
65V	N/A	—	45A5515G11	—	—	—
90/92V	N/A	—	45A5515G23	—	30B4377G17	—
115V	30B4375G04	—	45A5515G01	—	30B4377G04	—
125V	30B4375G24	—	45A5515G07	—	30B4377G10	—
230V	30B4375G05	—	45A5515G04	—	30B4377G05	—
250V	30B4375G12	—	45A5515G12	—	30B4377G07	—
550V	30B4375G06	—	45A5515G05	—	30B4377G08	—

Voltage	M and MD 601/701 Part Number	Sym Wiring	M and MD 810 Part Number	Sym Wiring	M and MD 910 Part Number	Sym Wiring
92V	—	—	435A928G01	②	435A930G01	—
115V	30B4377G23	②	435A929G01	②	L483507G01	②
115V	30B4377G01	③	L482211G01	③	L483507G01	③
125V	30B4377G24	②	435A966G01	②	435A967G01	②
125V	30B4377G13	③	—	—	—	—
230V	30B4377G01	②	L482211G01	②	L483507G01	③
230V	30B4377G02	③	—	—	—	—
250V	30B4377G13	②	334P064G01	②	L549720G01	③
250V	30B4377G08	③	—	—	—	—
550V	30B4377G25	②	L482213G01	③	L483508G01	—
550V	30B4377G03	③	—	—	—	—
600V	—	—	N/A	—	L548879G01	—

Voltage	M and MD 810R Part Number	Sym Wiring	Resistor Part Number	Sym Wiring	Resistor Mounting	Sym Wiring
115V	N/A	—	N/A	—	N/A	—
230V	L482211G01	②	57D1336G10	④	57D1340G02	—
550V	N/A	②	57D1336G12	⑤	57D1340G02	—

Notes

- ① Field installation only.
- ② Two coils connected in series.
- ③ Two coils connected in parallel.
- ④ Two resistors connected in parallel.
- ⑤ Resistors connected in series.

ME Series

Kits

Description	One NO Pole		Two NO Poles		One NC Pole		One NO/NC Pole	
	Qty.	Part Number	Qty.	Part Number	Qty.	Part Number	Qty.	Part Number
Contact kit	1	2184A10G14	2	2184A10G14	1	2184A10G14	2	2184A10G14
Arc box 10/25/50A	1	2184A10G09	2	2184A10G09	1	2184A10G09	2	2184A10G09
Arc box 100/150A	1	2184A10G10	2	2184A10G10	1	2184A10G10	2	2184A10G10
Shunt kit	1	2184A10G21	1	2184A20G16	1	2084A01G07	1	2184A11G07
Armature kit	1	2184A10G19	1	2184A20G15	1	2084A01G06	1	2184A11G06
Blowout Assembly								
10A	1	2184A10G15	1	2184A20G11	1	2184A10G15	2	2184A10G15
25A	1	2184A10G16	1	2184A20G12	1	2184A10G16	2	2184A10G16
50A	1	2184A10G17	1	2184A20G13	1	2184A10G17	2	2184A10G17
110/150A	1	2184A10G18	1	2184A20G14	1	2184A10G18	2	2184A10G18
Rear conn. kit	1	2184A10G08	1	2184A10G08	1	2184A10G08	1	2184A10G08

Coils

Voltage	Operating Coils		Holding Coils (Lower)—1N0-1NC Contactors Only ①	
	10/25/50/100/150 Ampere Sizes	Part Number	10/25/50 Ampere Sizes	100/150 Ampere Sizes
65V		30B4376G06	44A6366G10	30B4376G27
90/92V		30B4376G25	44A6366G12	427C048G16
115V		30B4376G07	44A6366G13	30B4376G01
125V		30B4376G08	44A6366G19	30B4376G26
230/240V		30B4376G09	44A6366G15	30B4376G02
250V		30B4376G10	44A6366G23	30B4376G17
500V		30B4376G14	N/A	N/A
550V		30B4376G11	44A6366G18	30B4376G03

Sizes 5–9 MR and MD Series

Contact Kit
Part No. 26D2610G15



Contact Kit

Type MR and MD ②	Current Part Number	Obsolete Part Number
501/501R	26D2610G22	(1745058)
510	26D2610G15	(1745051)
601/701	26D2610G24	(1745060)
610/710	26D2610G16	(1745052)
810	26D2610G18	(1745054)
910	26D2610G20	(1745056)

Notes

- ① If lower coils are required, order separately.
- ② MR = rear connected; MD = front connected.

Shunt
Part No. 25A1650G02



Shunt Kit

Type MR and MD ①	Current Part Number	Obsolete Part Number
501/501R	25A1650G02	(1486952)
510	25A1641G02	N/A
601	25A1666G03	(1486925)
610	25A1654G03	(1486811)
701	25A1666G04	(1486920)
710	25A1654G04	(1486872)
810/810R	25A1693G02	(1490271)
910	45A1425G02	(1747587)

Arc Box
Part No. 25A1646G01



Arc Box Kit

Type MR and MD ①	Current Part Number	Obsolete Part Number
501/510	25A1646G01	(1486651)
601/610, 701/710	25A1662G01	(1486654)
810/910	25A1677G05	N/A

Armature Kit
Part No. 25A1640G05



Armature Kit

Type MR and MD ①	Current Part Number
501/501R	25A1649G05
510	25A1640G05
601/701	25A1667G03
610/710	25A1655G04
810/810R	25A1694G05
910	38A2269G02

Blowout Coil Kit
Part No. 25A1644G05



Blowout Coil Assembly Kit

Type MR ①	Current Part Number	Type MD ①	Current Part Number
M501/501R	25A1644G05	MD501/501R	857D505G05
M601/610	25A1659G05	MD601/610	857D506G08
M701/710	25A1660G03	MD701/710	857D516G05
M810/810R	25A1698G03	MD810/810R	857D508G07
M910	38A2273G02	MD910	857D509G04

Dimensions

Approximate Dimensions in Inches (mm)

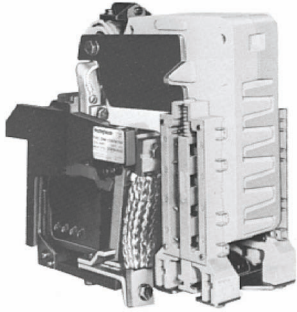
600V Contactors

Contactor Size	Contact Arrangement	Width	Height	Depth	Shipping Weight Lbs (kg)
Front Connected					
0-2	1NO	3.18 (80.8)	7.56 (192.0)	6.81 (173.0)	8.0 (3.6)
	2NO	5.53 (140.5)	6.75 (171.5)	6.81 (173.0)	10.0 (4.5)
	1NO, 1NC	3.67 (93.2)	12.44 (316.0)	6.81 (173.0)	12.0 (5.4)
	1NC	3.67 (93.2)	9.57 (243.1)	6.81 (173.0)	10.0 (4.5)
3-4	1NO	3.18 (80.8)	7.78 (197.6)	6.81 (173.0)	8.0 (3.6)
	2NO	5.53 (140.5)	7.44 (189.0)	6.81 (173.0)	10.0 (4.5)
	1NO, 1NC	3.67 (93.2)	12.88 (327.2)	6.81 (173.0)	12.0 (5.4)
	1NC	3.67 (93.2)	9.69 (246.1)	6.81 (173.0)	10.0 (4.5)
5	1NO	5.50 (139.7)	13.00 (330.2)	12.00 (304.8)	34.0 (15.4)
	1NC	5.88 (149.4)	16.19 (411.2)	12.00 (304.8)	45.0 (20.4)
6	1NO	6.63 (168.4)	16.81 (427.0)	14.38 (365.3)	71.0 (32.2)
	1NC	9.95 (252.7)	20.38 (517.7)	14.75 (374.7)	103.0 (46.8)
7	1NO	6.63 (168.4)	16.81 (427.0)	14.38 (365.3)	76.0 (34.5)
	1NC	9.95 (252.7)	20.38 (517.7)	14.75 (374.7)	110.0 (49.9)
8	1NO	11.00 (279.4)	21.00 (533.4)	17.00 (431.8)	151.0 (68.6)
9	1NO	11.00 (279.4)	21.00 (533.4)	19.00 (482.6)	188.0 (85.4)
Rear Connected					
5	1NO	7.00 (177.8)	17.00 (431.8)	12.50 (317.5)	34.0 (15.4)
	1NC	7.00 (177.8)	20.00 (508.0)	10.50 (266.7)	45.0 (20.4)
6	1NO	6.75 (171.5)	21.00 (533.4)	13.00 (330.2)	71.0 (32.2)
	1NC	9.50 (241.3)	24.00 (609.6)	13.00 (330.2)	103.0 (46.8)
7	1NO	6.75 (171.5)	21.00 (533.4)	13.00 (330.2)	76.0 (34.5)
	1NC	9.50 (241.3)	24.00 (609.6)	13.00 (330.2)	110.0 (49.9)
8	1NO	9.50 (241.3)	24.00 (609.6)	15.00 (381.0)	151.0 (68.6)
9	1NO	9.50 (241.3)	24.00 (609.6)	17.00 (431.8)	220.0 (99.9)

Note

① MR = rear connected; MD = front connected.

DPM 1000V Contactor



30

Contents

<i>Description</i>	<i>Page</i>
Mill Type Contactors	445
600V Contactors	448
DPM 1000V Contactor	
Product Selection	455
Accessories	455
Renewal Parts	455
Technical Data and Specifications	456
Dimensions	456
AVD-Contactor	457
D-Contactor	460
Reversing/Assignment Contactor	463

DPM 1000V Contactor

Product Description

The DPM 1000 Vdc Definite Purpose Contactor has been designed to meet severe environmental and vibration conditions found in your worst applications. The contactor is of unit construction, assembled on a molded insulated base, providing maximum performance in minimum space.

Application Description

This rugged device was designed for applications such as railway equipment, offshore drilling, mining, off-road vehicles, marine, etc.

Features

- Power circuit insulating barriers are molded from glass-polyester materials having high arc and track resisting qualities
- The DPM is designed to mount directly on a channel or angle frame, but may be adapted for mounting on a flat metal or insulated panel
- Available with or without an overcurrent latching mechanism to prevent opening under heavy overload currents. When the line current returns to normal, the overcurrent latch disengages

Benefits

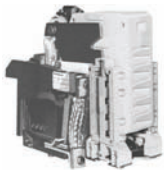
- Saves panel space by locating the arc chute vents on the front of the unit. This eliminates the need for arcing clearance above the contactor
- All vital parts are removable from the front without having to disconnect line or load connections, allowing for easy maintenance
- Safety is a must. The mechanical interlock prevents the contactor from closing when the arc box has been removed or when it is not installed properly

Product Selection

When Ordering Specify

- Catalog number of contactor and any required accessories

1000 Vdc Contactor



1000 Vdc Contactors

Coil Operating Voltage	Over-Current Latch	Catalog Number
28 Vdc	Without	2120A07G01
	With	2120A07G02
36 Vdc	Without	2120A07G03
	With	2120A07G04
55 Vdc	Without	2120A07G05
	With	2120A07G06

Coil Operating Voltage	Over-Current Latch	Catalog Number
74 Vdc	Without	2120A07G09
	With	2120A07G10
110 Vdc	Without	2120A07G13
	With	2120A07G14
600 Vdc	Without	2120A07G31
	With	2120A07G32

Accessories

Extra L-67 Auxiliary Contacts—Order Separately

Contact Combination Provided by One Auxiliary Contact Assembly

Normally Open	Normally Closed	Factory Installed Catalog Number	Field Installed Kit Catalog Number
0	4	2087A40G01	2087A40G11
1	3	2087A40G02	2087A40G12
2	2	2087A40G03	2087A40G13
3	1	2087A40G04	2087A40G14
4	0	2087A40G05	2087A40G15
Interlock mounting		—	6479D96G01

Mechanical Interlock Kit

Description	Catalog Number
Mechanical Horizontal Interlock Kit Includes mounting instructions and mounting hardware ①	1954D13G01

Renewal Parts

DPM Contactor

Description	Catalog Number
Contact Kit	2131A94G10
Arc Box	2131A94G03
Shunt	3534C86G01
Coils	
28 Vdc	2114A92G04
36 Vdc	2114A92G05
55 Vdc	2114A92G06
74 Vdc	2114A92G09
110/115 Vdc	2114A92G14
125 Vdc	2114A92G15
275 Vdc	2114A92G16
600 Vdc	2114A92G20

Note

① When interlock kit is installed, only one L-67 auxiliary contact can be mounted on each DPM contactor.

30.7

Definite Purpose Contactors and Starters

Direct Current Contactors

Technical Data and Specifications

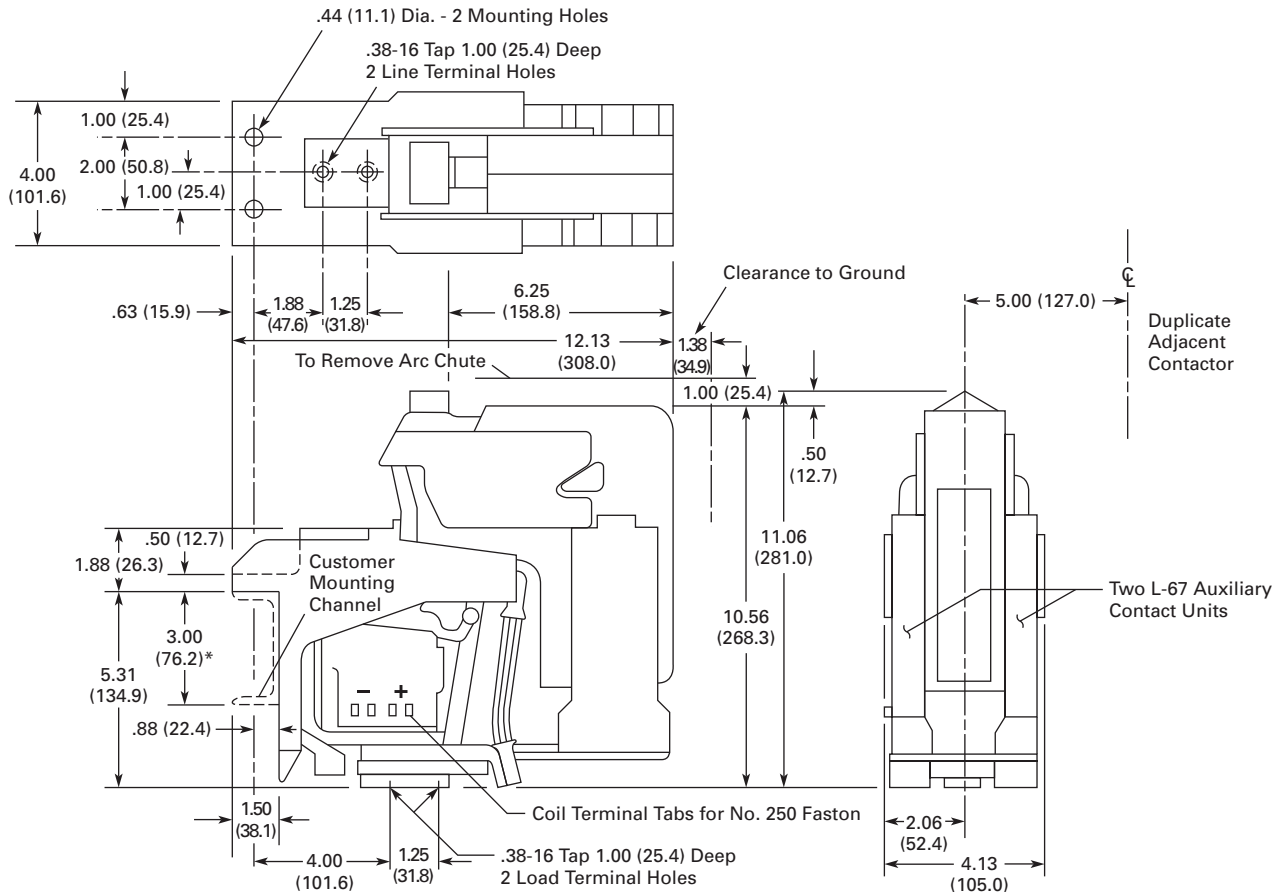
DPM Contactor

Description	Specification
Line voltage	1000 Vdc
Continuous current rating	
Carrying and interrupting capacity	1250A
Operating coil	
Duty rating	Continuous
Operation	Will operate at 80–110% of rated voltage
Insulation between power circuit and operating coil	Rated 1000 Vdc
Arcing and creepage distances	Meet or exceed NEMA standards for 1000V equipment
Blowout coil	Rated for continuous duty

Dimensions

Approximate Dimensions in Inches (mm)

DPM Contactor



*This dimension must not be exceeded or flashover may occur.

Width	Height	Depth	Shipping Weight Lbs (kg)
4.13 (105)	11.06 (280.9)	12.12 (307.8)	30.5 (13.8)

AVD-Contactor



AVD-Contactor

Product Description

The AVD-Contactor is a single-pole normally open, load break, bi-directional definite purpose DC contactor. The device is rated at 1400 amps continuous and is capable of switching up to 2000 Vdc loads.

Application Description

The AVD-Contactor was designed for the demanding environmental requirements of locomotive, rapid transit and off highway vehicle applications. This device is also applied in high horsepower DC drive applications including process lines and off shore oil drilling rigs.

Contents

Description	Page
Mill Type Contactors	445
600V Contactors	448
DPM 1000V Contactor	454
AVD-Contactor	
Product Selection	458
Accessories	458
Renewal Parts	458
Technical Data and Specifications	459
Dimensions	459
D-Contactor	460
Reversing/Assignment Contactor	463

Features

- Bi-directional interrupting capability
- 2000 Vdc switching in a compact design due to arc chute
- Any combination of up to four isolated NO or NC auxiliary contacts
- Panel mount design
- Continuous duty operating coil
- Continuous duty blow out coil

30.7

Definite Purpose Contactors and Starters

Direct Current Contactors

Product Selection

When Ordering—Contact Technical Resource Center

- Product specification: The AVD-contactor is a definite purpose DC contactor
- Please consult our Technical Resource Center for catalog numbers of other device configurations and application assistance

30

1400A Contactor

AVD-Contactor



Device Type	Auxiliary Contact Configuration	Coil Voltage	Catalog Number
1400A contactor	3NO/1NC	28	6702ED667-4
		37	6702ED667-5
		74	6702ED667-6
		100	6702ED667-3
		230	6702ED667-7

Accessories

Auxiliary Contacts

Contact Configuration	Terminal Configuration	Catalog Number
1NO/1NC	Fast-on	10-3519-5
2NO	Fast-on	10-3519-6
2NC	Fast-on	10-3519-7
1NO/1NC	Screw type	10-6817
2NO	Screw type	10-6817-2
2NC	Screw type	10-6817-3

Renewal Parts

Contacts

Description	Quantity Required per Contactor	Catalog Number
Stationary contact	1	23-7253
Movable contact	2	23-7255

Technical Data and Specifications

ADV-Contactor

Description	Specification
Current carrying capability at 55°C	1400A continuous
Electrical creepage and clearance distances	Up to 2000 Vdc applications
Mechanical life	2 million operations
Operating coil voltages (DC)	28, 37, 74, 100, 230 (others available)

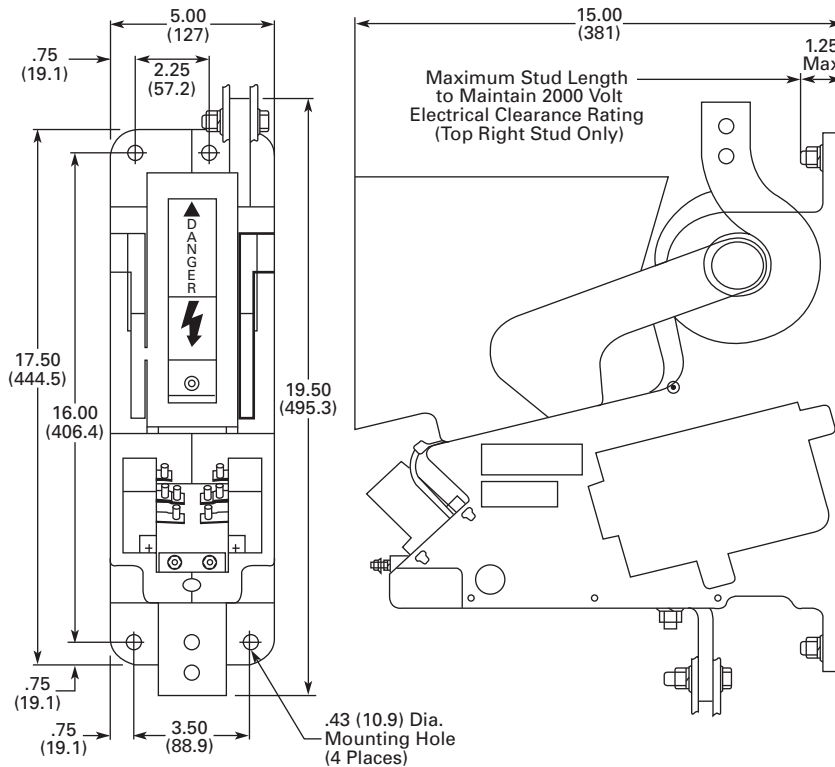
Operating Coil Characteristics

Coil Voltage	Current Draw at Nominal Voltage (±5% at 20°C)	Catalog Number
28	1.87	9-3004-2
37	1.58	9-3004-3
74	0.79	9-3004-1
100	0.62	9-3004-5
230	0.25	9-3004-4

Dimensions

Approximate Dimensions in Inches (mm)

ADV-Contactor



Width	Height	Depth	Shipping Weight Lbs (kg)
15.0 (381.0)	19.5 (495.3)	5.0 (127.0)	70 (31.8)

Arc Clearances

Front	Top	Sides
2 (51)	2 (51)	1 (25)

D-Contactor



30

D-Contactor

Product Description

The D-Contactor is a single-pole normally open, load break, bi-directional definite purpose DC contactor. Two devices are available rated at 1800A and 3000A at 750 Vdc.

Application Description

The D-Contactor was designed for the demanding environmental requirements of locomotive, rapid transit and off highway vehicle applications. This device is also widely applied in high horsepower DC drive applications including process lines and off shore oil drilling rigs.

Contents

Description	Page
Mill Type Contactors	445
600V Contactors	448
DPM 1000V Contactor	454
AVD-Contactor	457
D-Contactor	
Product Selection	461
Accessories	461
Renewal Parts	461
Technical Data and Specifications	462
Dimensions	462
Reversing/Assignment Contactor	463

Features

- Bi-directional interrupting capability
- Compact design due to intermittent duty blowout coil and arc interruption circuit (not suitable for extremely high duty cycle or jogging applications)
- Any combination of up to eight isolated NO or NC auxiliary contacts
- Channel/angle frame mounting standard, optional panel mount kit available
- Continuous duty operating coil
- Screw type or fast-on control terminals

Product Selection

When Ordering—Contact Technical Resource Center

- Product specification: The D-contactor is a definite purpose DC contactor
- Please consult our Technical Resource Center for catalog numbers of other device configurations and application assistance

1800A Contactor



D-Contactor

Device Type	Auxiliary Contact Configuration	Coil Voltage	Catalog Number
1800A contactor	3NO/1NC	74 Vdc	6702ED584
	3NO/1NC	100 Vdc	6702ED663
	2NO/2NC	115 Vdc	6702ED584-2
	3NO/1NC	74 Vdc	6702ED587-2
	2NO/2NC	100 Vdc	6702ED668
	3NO/1NC	115 Vdc	6702ED587-4

Accessories

Auxiliary Contacts

Contact Configuration	Terminal Configuration	Catalog Number
1NO/1NC	Fast-on	10-3519-5
2NO	Fast-on	10-3519-6
2NC	Fast-on	10-3519-7
1NO/1NC	Screw type	10-6817
2NO	Screw type	10-6817-2
2NC	Screw type	10-6817-3

Panel Mounting Kit

Description	Catalog Number
Panel mounting kit	99-3842

Renewal Parts

Contact Kits

Device Rating	Main Contact Configuration	Contacts	Catalog Number
1800A	2-Main	Main contacts	6-497
1800A	2-Main	Arcing contacts	23-5449
3000A	4-Main	Main contacts	6-496
3000A	4-Main	Arcing contacts	23-5448

Technical Data and Specifications

D-Contactor

Description	Specification
Current carrying capability at 55°C	1800A and 3000A continuous
Resistive interrupt rating	5000A 750 Vdc
Electrical creepage and clearance distances	Up to 1500 Vdc applications
Mechanical life	2 million operations
Operating coil voltages (DC)	12, 24, 32, 48, 74, 100, 115, 230 (others available)

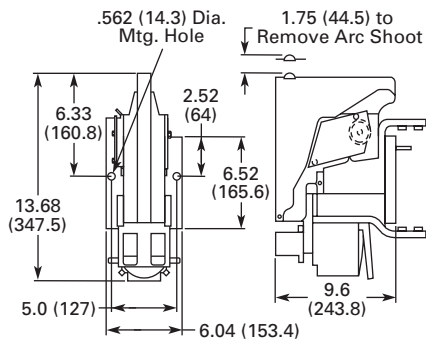
Operating Coil Characteristics

Coil Voltage	Current Draw at Nominal Voltage (±7.5% at 20°C)	Catalog Number
12	3.96	9-1688-15
24	2.00	9-1688-7
32	1.44	9-1688-9
48	1.00	9-1688-12
74	0.97	9-2064-3
100	0.45	9-1688-8
115	0.37	9-1688-2
230	0.20	9-1688-1

Dimensions

Approximate Dimensions in Inches (mm)

D-Contactor

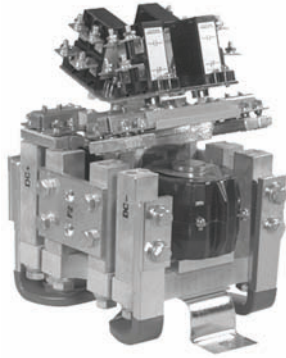


Width	Height	Depth	Shipping Weight Lbs (kg)
9.6 (243.8)	13.68 (347.5)	6.04 (153.4)	43 (19.5)

Arc Clearances

Type of Load	750V		
	Front	Top	Sides
Resistive	4 (102)	2 (51)	3 (76)
Inductive	7 (178)	4 (102)	3 (76)

Reversing/Assignment Contactor



Contents

<i>Description</i>	<i>Page</i>
Mill Type Contactors	445
600V Contactors	448
DPM 1000V Contactor	454
AVD-Contactor	457
D-Contactor	460
Reversing/Assignment Contactor	
Product Selection	464
Accessories	464
Renewal Parts	464
Technical Data and Specifications	465
Dimensions	465

Reversing/Assignment Contactor

Product Description

The Reversing/Assignment Contactor is a two-pole, double-throw non-load break definite purpose DC contactor. A three-position center-off and a two-position magnetically-latched configuration is available. The device is rated for 1100A, 1000 Vdc. The Reversing Contactor includes cross over bus bars for DC motor reversing applications; the Assignment Contactor omits the cross over bus bars for motor assignment applications. (See **Page 465**.)

Application Description

The Reversing/Assignment Contactor was designed for the demanding environmental requirements of off highway vehicle applications. This device is also widely utilized with high horsepower DC drives for DC motor reversing and drive assignment applications.

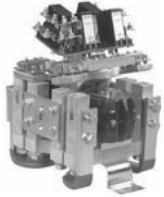
Features

- Bi-directional current carrying capability (non-load break)
- Can replace four single-pole contactors in DC motor reversing applications
- Can replace two or four single-pole contactors in DC motor assignment applications
- Any combination of up to eight isolated NO or NC auxiliary contacts
- Panel mount design
- Continuous duty operating coil
- Screw type or fast-on control terminals

Product Selection**When Ordering—Contact Technical Resource Center**

- Product specification: The Reversing/assignment contactor is a definite purpose DC contactor
- Please consult our Technical Resource Center for catalog numbers of other device configurations and application assistance

30

1000V Contactor**Reversing/Assignment Contactor (Three-Position, Center OFF)**

Device Type	Auxiliary Contact Configuration	Coil Voltage	Catalog Number
Reverser	8NO	74	6702ED615
	4NO/4NC	125	6702ED621-2
		250	6702ED622
Assignment	4NO/4NC	74	6702ED664-2
		125	6702ED621
		250	6702ED664-6

Accessories**Auxiliary Contacts**

Contact Configuration	Terminal Configuration	Catalog Number
1NO/1NC	Fast-on	10-3519-5
2NO	Fast-on	10-3519-6
2NC	Fast-on	10-3519-7
1NO/1NC	Screw type	10-6817
2NO	Screw type	10-6817-2
2NC	Screw type	10-6817-3

Renewal Parts**Contact Kits**

Device	Configuration	Catalog Number
Reversing/assignment	Three-position	6-602
Reversing/assignment upgrade kit ^①	Three-position	6-602-3
Magnetic latched reversing/assignment	Two-position	6-602-5

Note

- ^① The 6-602-3 contact kit will upgrade the three-position, reversing/assignment device from the original design that incorporated a leaf spring contact structure to the present design that incorporates a coil spring contact structure. The 6-602 contact kit can then be used after the device has been upgraded for subsequent contact replacement.

Technical Data and Specifications

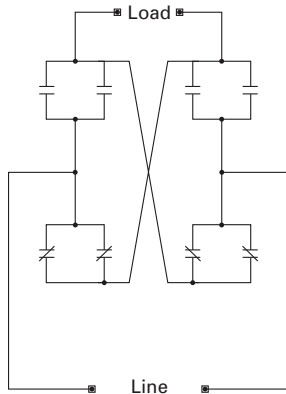
Reversing/Assignment Contactor

Description	Specification
Current carrying capability at 55°C	1100A continuous
Electrical creepage and clearance distances	For 1000 Vdc applications
Mechanical life	1 million operations
Operating coil voltages (DC)	24, 28, 36, 74, 110, 125, 250 (others available)

Operating Coil Characteristics

Coil Voltage	Current Draw at Nominal Voltage (±7.5% at 20°C)	Catalog Number
24	1.60	9-1903-9
28	1.30	9-1903-1
36	1.06	9-1903-3
74	0.49	9-1903-7
110	0.33	9-1903-6
125	0.33	9-1903-4
250	0.17	9-1903-8

Reversing Contactor Schematic Diagram

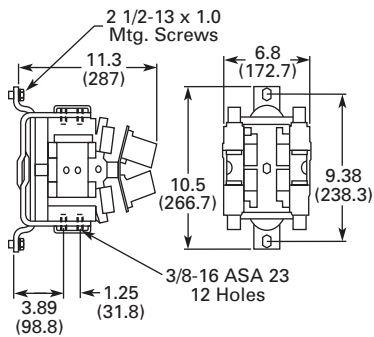


The reversing contactor includes the cross over bus bars for DC motor reversing applications. The assignment contactor omits the cross over bus bars for motor assignment applications.

Dimensions

Approximate Dimensions in Inches (mm)

Reversing Contactor



Width	Height	Depth	Shipping Weight Lbs (kg)
11.3 (287)	10.5 (266.7)	6.8 (172.7)	45 (20.4)

Index

A

Able, 4
above, 5, 10
AC, 7
accessible, 4
Accessories, 1, 3-4, 6, 10-11, 13-14, 16-17, 19-20
accessories, 2, 5, 11
Accessory, 7
adapted, 10
Added, 6
AdjacentTo, 12
ADV, 15
after, 20
All, 3, 7, 10
allowing, 10
also, 13, 16, 19
Ampere, 2, 5, 8
amperes, 3
amps, 13
an, 10
and, 1-21
angle, 10, 16
Any, 5, 13, 16, 19
any, 2, 4, 11
Application, 1, 4, 6, 10, 13, 16, 19
application, 14, 17, 20
Applications, 1, 4, 6
applications, 4, 10, 13, 15-16, 18-19, 21
applied, 13, 16
appropriate, 5
Approximate, 9, 12, 15, 21

April, 1-21
Arc, 8-9, 11-12, 15, 18
arc, 4, 10, 13, 16
Arcing, 12, 17
arcing, 10
are, 1, 4, 8, 10, 16
Armature, 8-9
armature, 1
Arrangement, 3, 5-6, 9
as, 1, 10
ASA, 21
assembled, 10
Assembly, 8-9, 11
assembly, 1
Assignment, 1, 4, 10, 13, 16, 19-21
assignment, 19-21
assistance, 14, 17, 20
at, 1-21
Auxiliary, 2-3, 6, 11-12, 14, 17, 20
auxiliary, 2, 11, 13, 16, 19
Available, 10
available, 1, 3-5, 15-16, 18-19, 21
AVD, 1, 4, 10, 13-14, 16, 19

B

BAC, 3
barriers, 10
bars, 19, 21
base, 4, 10

Basic, 2
BBC, 3
Be, 1, 4
be, 10-12, 20
bearings, 1, 4
been, 10, 20
Benefits, 4, 10
between, 12
Bi, 13, 16, 19
bi, 13, 16
blow, 13
Blowout, 2, 8-9
blowout, 16
Bottom, 3
Box, 9, 11
box, 8, 10
Break, 6
break, 13, 16, 19
bus, 19, 21
but, 10
by, 7, 10-11

C

CA, 1-21
call, 1-21
Can, 19
can, 11, 20
capability, 13, 15-16, 18-19, 21
capable, 13
capacity, 12
Carrying, 12
carrying, 15, 18-19, 21
Catalog, 1-3, 5-7, 11, 14-15, 17-18, 20-21
catalog, 2, 5, 14, 17, 20
Center, 14, 17, 20
center, 19
Certifications, 1
Channel, 12, 16
channel, 10
Characteristics, 15, 18, 21
Chute, 12
chute, 10, 13
circuit, 10, 12, 16
Clearance, 12, 15
clearance, 10, 15, 18, 21
Clearances, 15, 18
Closed, 6, 11
closing, 10
CMAA, 1
Code, 6
code, 5
Coil, 2, 5-7, 9, 11-12, 14-15, 17-18, 20-21
coil, 2, 4-5, 12-13, 15-16, 18-21
Coils, 7-8, 11
coils, 1, 4, 7-8
com, 1-21
Combination, 11
combination, 13, 16, 19
Compact, 16
compact, 13
conditions, 10
Configuration, 3, 14, 17, 20
configuration, 2, 19
configurations, 14, 17, 20
conn, 8
Connected, 5-6, 9
connected, 5, 7-9
connection, 5
connections, 10
Connector, 7
construction, 10
Consult, 2
consult, 3, 6, 14, 17, 20
Contact, 3, 5-6, 8-9, 11-12, 14, 17, 20
contact, 1-2, 4, 11, 14, 20
Contactor, 1-5, 7, 9-21
contactor, 1-2, 5, 10-11, 13-14, 16-17, 19-21
contactorcontactor, 10
Contactors, 1-21
contactors, 1, 4-5, 19
Contacts, 3, 6-7, 11, 14, 17, 20
contacts, 13, 16-17, 19
Contents, 1, 4, 10, 13, 16, 19
Continuous, 12-13, 16, 19
continuous, 12-13, 15, 18, 21
Control, 1-21
control, 1, 4, 16, 19
convenient, 4
cranes, 1, 4
creepage, 12, 15, 18, 21
cross, 19, 21
Current, 1-21
current, 10, 12, 19
currents, 10
Customer, 12
cycle, 16

D

Data, 1, 3, 10, 12-13, 15-16, 18-19, 21
DB, 6
DC, 1-2, 4, 13-21
DDA, 2
DEA, 2
Deep, 12
Definite, 1-21
definite, 13-14, 16-17, 19-20
Delayed, 6
Delivery, 1-21
demanding, 13, 16, 19
Depth, 9, 12, 15, 18, 21
Description, 1, 3-4, 7-8, 10-19, 21
description, 7
design, 13, 16, 19-20
designed, 1, 4, 10, 13, 16, 19
desired, 5
Device, 14, 17, 20
device, 10, 13-14, 16-17, 19-20
devices, 16
DF, 2
DG, 2
DGA, 2
Dia, 12, 15, 18
Diagram, 21
digit, 5
dimension, 12
Dimensions, 4, 9-10, 12-13, 15-16, 18-19, 21
DimensionsApproximate, 18
Direct, 1-21
directional, 13, 16, 19
directly, 10
disconnect, 10
disengages, 10
distances, 12, 15, 18, 21
DJA, 2
DLA, 2
double, 19
DPM, 1, 4, 10-13, 16, 19
Draw, 15, 18, 21
drilling, 5, 10, 13, 16
drive, 13, 16, 19
drives, 19
due, 13, 16
Duplicate, 12
durable, 4
Duty, 12
duty, 12-13, 16, 19

DX, 2

E

each, 11
Easily, 4
easy, 4, 10
eaton, 1-21
EB, 3
ED, 14, 17, 20
edge, 4
EH, 2
eighoil, 16
eight, 19
Electrical, 3, 5-6, 15, 18, 21
electrical, 6
Elevated, 3
eliminates, 10
ensure, 4
environmental, 10, 13, 16, 19
equipment, 10
equipmentBlowout, 12
er, 1, 4
etc, 10
Example, 5
exceed, 12
exceeded, 12
existing, 6
Extra, 11
extremely, 16

F

Factory, 6, 11
factory, 2-3, 6
Fast, 14, 17, 20
fast, 16, 19
Faston, 12
FC, 6
Features, 1, 4, 10, 13, 16, 19
Field, 6-7, 11
field, 5
FJ, 2
flashover, 12

flat, 10
flexibility, 4
For, 1-21
for, 1-2, 4-7, 10, 12-14, 16-17, 19-21
Forged, 1
found, 10
four, 13, 19
frame, 6, 10, 16
frames, 1
from, 10, 20
Front, 3-6, 9, 15, 18
front, 1, 5, 8-10

G

GK, 2
glass, 4, 10
Ground, 12
guarantee, 4

H

Hand, 6
hand, 3
handle, 4
Hardware, 6
hardware, 11
has, 10, 20
having, 10
heavy, 1, 10
Height, 9, 12, 15, 18, 21
here, 1
High, 4
high, 10, 13, 16, 19
highway, 13, 16, 19
Holding, 8
Hole, 15, 18
Holes, 12, 21
Horizontal, 11
horsepower, 13, 16, 19
Hour, 5

I

ICS, 1
If, 8
if, 1, 4
Immediate, 1-21
impregnated, 4
in, 5, 7, 9-10, 12-13, 15-16, 18-19, 21
Inches, 9, 12, 15, 18, 21
include, 1
Includes, 11
includes, 19, 21
including, 4, 13, 16
incorporated, 20
incorporates, 20
Inductive, 18
industry, 1
Input, 3
Installation, 6
installation, 4, 7
Installed, 6, 11
installed, 5-6, 10-11
instructions, 11
insulated, 10
insulating, 10
Insulation, 12
Interlock, 2, 11
interlock, 6, 10-11
Interlocks, 5-7
interlocks, 6
intermittent, 16
interrupt, 18
interrupting, 12-13, 16
interruption, 16
is, 1, 4, 10-11, 13-14, 16-17, 19-20
isolated, 13, 16, 19
it, 10

J

JL, 2
jogging, 16

K

kg, 9, 12, 15, 18, 21
Kit, 3, 7-9, 11, 17
kit, 1, 5, 8, 11, 16-17, 20
Kits, 8, 17, 20
KM, 2
KMParts, 1-21
Knife, 4

L

last, 5
Latch, 11
latch, 10
latched, 19-20
latching, 10
Lbs, 9, 12, 15, 18, 21
leaf, 20
Left, 6
left, 2-3
Length, 15
levers, 1
life, 1, 3-4, 15, 18, 21
Line, 12, 21
line, 10
lines, 13, 16
listed, 1, 5
Load, 12, 18, 21
load, 10, 13, 16, 19
loads, 13
locating, 10
Location, 3
locomotive, 13, 16
Long, 1
long, 4
Lower, 8
lower, 8
lubricating, 1
lugs, 3

M

machinery, 1
Magnet, 2, 5-6
magnet, 1
Magnetic, 20
magnetic, 4
magnetically, 19
Main, 17
Maintain, 15
maintenance, 4, 10
marine, 10
Material, 3
material, 4
materials, 10
Max, 15
Maximum, 15
maximum, 4, 10
may, 10, 12
MD, 4-9
ME, 4-8
Mechanical, 2-3, 5, 7, 11, 15, 18, 21
mechanical, 10
mechanism, 10
Meet, 12
meet, 10
metal, 10
Mill, 1-4, 10, 13, 16, 19
mill, 1
milling, 1, 4
million, 15, 18, 21
minimal, 4
minimum, 10
mining, 1, 4, 10
mm, 9, 12, 15, 18, 21
Module, 3
module, 1, 4
molded, 10
Motor, 1-21
motor, 19, 21
mount, 4, 10, 13, 16, 19
mounted, 1, 6, 11
Mounting, 3, 6-7, 12, 15, 17
mounting, 1-2, 4, 10-11, 16-17
Movable, 14
moving, 1
MR, 5-6, 8-9
Mtg, 18, 21
must, 10, 12

N

NC, 2-3, 5-9, 13-14, 16-17, 19-20
need, 10
NEMA, 1-2, 12
New, 6
NO, 2-3, 5-9, 13-14, 16-17, 19-20
No, 2, 5, 7-9, 12
Nominal, 15, 18, 21
non, 19
None, 2-3, 6
normal, 10
Normally, 6, 11
normally, 13, 16
Not, 2-3
not, 10, 12, 16
Note, 1, 4, 9, 11, 20
Notes, 2-3, 5-8
Number, 1-3, 5-9, 11, 14-15, 17-18, 20-21
number, 2, 5, 11
numbers, 14, 17, 20

O

OB, 6
Obsolete, 8-9
occur, 12
of, 1-6, 10-14, 16-20
OFF, 20
off, 10, 13, 16, 19
offshore, 10
oil, 13
olt, 15
omits, 19, 21
on, 1, 4, 10-11, 14, 16-17, 19-20
One, 8, 11
one, 6, 11
Only, 6, 8, 15
only, 1, 4-7, 11
Open, 2, 5-6, 11
open, 13, 16
opening, 10
operate, 12
Operating, 6, 8, 11-12, 15, 18, 21
operating, 12-13, 16, 19
Operation, 7, 12

operation, 4
operations, 3, 15, 18, 21
Option, 7
option, 3
optional, 16
Options, 1, 3
options, 2
or, 1-21
Order, 6-7, 11
order, 5, 8
Ordering, 2, 5, 11, 14, 17, 20
original, 20
Other, 5-6
other, 14, 17, 20
others, 15, 18, 21
our, 14, 17, 20
out, 13
Outboard, 6
Output, 3
Over, 11
over, 19, 21
overcurrent, 10
overload, 10

P

Page, 1-2, 4-5, 10, 13, 16, 19
Panel, 13, 17, 19
panel, 1, 3, 5, 10, 16
panels, 1, 4
parallel, 7
Part, 7-9
part, 1
Parts, 4, 7, 10-11, 13-14, 16-17, 19-20
parts, 10
per, 3, 14
performance, 10
physical, 1
Places, 15
Please, 14, 17, 20
Pole, 8
pole, 2, 6, 13, 16, 19
Poles, 2, 8
polyester, 4, 10
Position, 20
position, 2, 19-20
Power, 2, 10
power, 1, 12

precise, 4
present, 20
pressure, 4
prevent, 10
prevents, 10
process, 13, 16
Product, 1-2, 4-5, 10-11, 13-14, 16-17, 19-20
properly, 10
Protection, 1-21
provide, 4
Provided, 11
providing, 10
Provisions, 5
Purpose, 1-21
purpose, 13-14, 16-17, 19-20

Q

Qty, 8
qualities, 10
Quantity, 14
quenching, 4

R

railway, 10
range, 3
Rapid, 4
rapid, 13, 16
Rated, 12
rated, 12-13, 16, 19
rather, 1
Rating, 2, 5, 15, 17
rating, 2, 12, 18
Rear, 5, 7-9
rear, 4-5, 8-9
rectifi, 1, 4
Rectifier, 3, 7
removable, 10
Remove, 12, 18
remove, 4
removed, 10
Renewal, 4, 7, 10-11, 13-14, 16-17, 19-20
replace, 4, 19

Replacement, 6
replacement, 20
Required, 14
required, 2, 5-6, 8, 11
requiredME, 6
requirements, 13, 16, 19
Requires, 5
resisting, 10
Resistive, 18
Resistor, 7
Resistors, 7
resistors, 7
Resource, 14, 17, 20
returns, 10
Reverser, 20
Reversing, 1, 4, 10, 13, 16, 19-21
reversing, 19-21
Right, 6, 15
right, 2-3
rigs, 13, 16
road, 10
rugged, 4, 10

S

Safety, 10
Saves, 10
Schematic, 21
Screw, 14, 16-17, 19-20
Screws, 21
See, 2, 5, 19
see, 5
Selection, 1-2, 4-5, 10-11, 13-14, 16-17, 19-20
Self, 1
separate, 1
Separately, 11
separately, 8
Series, 7-8
series, 7
service, 1, 4
severe, 10
Shipping, 9, 12, 15, 18, 21
Shoot, 18
shore, 13, 16
Shunt, 8-9, 11
Side, 3
side, 1
Sides, 15, 18

single, 6, 13, 16, 19
Size, 2-3, 5-7, 9
size, 2
Sizes, 7-8
Solderless, 3
source, 1, 4
space, 10
Special, 2
Specification, 3, 12, 15, 18, 21
specification, 14, 17, 20
Specifications, 1, 3, 10, 12-13, 15-16, 18-19, 21
Specify, 2, 5, 11
spring, 20
Standard, 6
standard, 16
Standards, 1
standards, 12
Starters, 1-21
Stationary, 14
steel, 1, 4
strength, 1
structure, 20
Stud, 15
stud, 1
Sturdy, 4
subsequent, 20
Substitute, 5
such, 10
Suffix, 2-3, 6
suffix, 5
suitable, 1, 16
superior, 1
Support, 1-21
sure, 1, 4
Surface, 3
surface, 1
switching, 13
Sym, 7

T

Tabs, 12
Tap, 12
Tech, 1-21
Technical, 1, 3, 10, 12-21
Terminal, 12, 14, 17
TerminalConfiguration, 20
terminals, 16, 19

than, 1
that, 4, 20
The, 1-2, 10, 13-14, 16-17, 19-21
the, 1, 4, 10, 13, 16, 19-21
then, 20
These, 1, 4
They, 4
This, 10, 12-13, 16, 19
Three, 20
three, 19-20
throw, 19
tips, 4
to, 1, 4, 6, 10, 12-13, 15-16, 18-20
Top, 15, 18
track, 10
transit, 13, 16
transportation, 1, 4
Two, 7-8, 12, 16, 20
two, 6, 19
Type, 1-4, 6-10, 13-14, 16-20
type, 1, 14, 16-17, 19-20

U

under, 10
unit, 10
Units, 12
Unmounted, 6-7
Up, 15, 18
up, 13, 16, 19
upgrade, 20
upgraded, 20
use, 1
used, 20
utilize, 1, 4
utilized, 19

V

Vac, 1, 3-4
Vacuum, 4
Vdc, 3, 5-6, 10-13, 15-19, 21
vehicle, 13, 16, 19
vehicles, 10

■ Index

vents, 10
vibration, 10
vital, 10
Voltage, 2-3, 5-8, 11, 14-15, 17-18, 20-21
voltage, 1-2, 4-5, 12
voltages, 5, 15, 18, 21
Volume, 1-21

W

was, 10, 13, 16, 19
wear, 4
Weight, 9, 15, 18, 21
WeightWidth, 12
When, 2, 5, 10-11, 14, 17, 20
when, 10
widely, 16, 19
Width, 9, 15, 18, 21
Will, 12
will, 20
Wiring, 7
wiring, 1, 3
With, 6, 11
with, 2-3, 5, 10, 19
Without, 11
without, 10
WN, 2
worst, 10
www, 1-21

Y

Yes, 5
your, 10