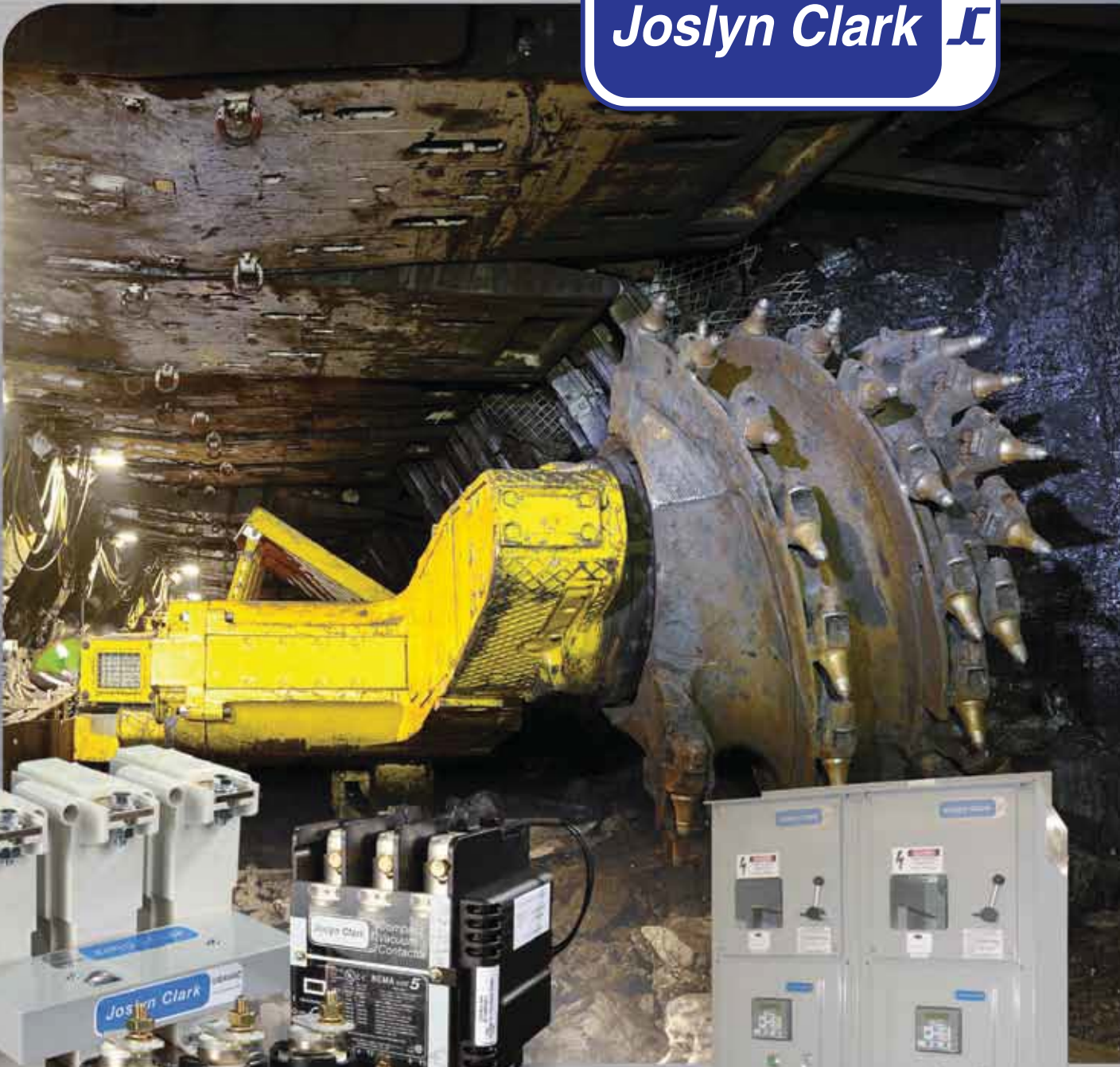


Joslyn Clark 



VACUUM CONTACTOR & STARTER FAMILY

WWW.JOSLYNCLARK.COM

USAVAC® COMPACT INTERNATIONAL AC VACUUM CONTACTOR

International Ratings For World Wide Applications UL Listed CSA certified 600V/660V/1000V/1500V

Joslyn Clark's unique Compact AC Vacuum Contactors & Starters are ideal for tough industrial applications. The compact design provides flexibility for retrofitting to all existing air break contactors, thus enabling an existing application to continue with maintenance cost and down time eliminated.

- The Contactors & Starters are suitable for Worldwide applications and for use with all types of motors including high efficiency IEC motors & NEMA design E motors.
 - NEMA ICS-2 Size 4, 135A, 600V AC – UL508 Listed CSA22.2 certified. NEMA ICS-2 RATED
 - IEC HP/KW rated 200A, 660V/1000V/1500V AC- UL508 Listed CSA22.2 certified IEC 947-4-1.
 - Definite Purpose rated 160A 660V/1000V/1500V AC- UL508 Listed CSA22.2 certified IEC 947-4-1.
- Front accessible
 - Compact
 - Fully phase insulated
 - Long Mechanical life
 - Mounts in any plane
 - Lightweight
 - Quiet
 - Rugged
 - Long electrical life



**Nema Size 4
IEC 200A**

VACUUM INTERRUPTER ADVANTAGES

- Joslyn Clark designed Interrupters insure high quality and reliability
- Transient voltage generation control
- Impervious to harsh environments
- Self adjusting
- High cyclic duty
- Maintenance free
- Enclosed arc



JOSLYN CLARK VACUUM CONTACTOR FEATURES

- Interchangeable with NEMA Air Break contactors & starters.
- Snap on side mounted auxiliaries 2 N.O. and 2 N.C. rated 600V 10 amp. AC & low power. (5V 10mA DC optional).
- ON/OFF indicator – standard.
- International (IEC) or North American (NEMA) terminal markings
- Simplified DC magnet system for reliability. Range rated economized coils.
- NEMA 600V or IEC 1000V rated contactors.
- Class 20 Bi-metallic overload relays.
- Mechanically Interlocked Version available for reversing application

ENGINEERING DATA

Technical Specifications CV Series

Description	NEMA Size 4 600V	200 Amp 1000V	200 Amp 1500V
Cat #	CV 77U030406-*	CV 77U032006-*	CV 77U031615-*
Standard	NEMA 1CS-2 UL508 CSA22.2	IEC 947-4-1 UL508 CSA22.2	NEMA 1CS9-2 1500V IEC 947-4-1 1000V UL508 CSA22.2 1500V
Power Ratings Enclosed			
Insul. & Operating Volt	600 Volts	1000 Volts	1500 Volts
Rated Oper. AC1	135Amps	200 Amps	200 Amps
Rated Oper. AC3	100 HP 460/575V	250 HP 185KW-660V	500 HP 370KW-1500V
Rated Oper. AC4	60 HP 460/575V	175 HP-130KW-660V	315 HP-235KW-1500V
Rated Frequency	50 - 400 Hz		
Making Current	2000 Amps		
Breaking Current	1600 Amps		
Dielectric Strength	6Kv - 1 Min. Interrupter		
Interrupting Current	2.2 KA		
Short Time Current 1 Sec.	5000 A		
Short Time Current 10 Sec	1600 A		
Mechanical Life	1.2 X 10 ⁶		
Elect. Life AC3 Duty	1 X 10 ⁶		
Switching Frequency	600 / Hour (1 Every 6 Sec)		
Withstand Current	10KA50Msec		
Chop Current Max	0.9 A		
Operating Range	-15% + 10% - at Range Voltage		
Inrush Power VA	1200VA 20 ms Duration		
Holding Power VA	12 VA		
Opening Time MS	120ms		
Closing Time MS	20-40ms		
Pick-Up Voltage	80% Cold 85% Hot or less		
Drop-Out Voltage	70% or less		
Recommended CPT	400VA Machine Tool Transformer 5% Regulation at 20%pf		
Applications Ratings			
Mounting Installation	All Planes (Contactor only)		
Altitude	6600 ft. 2000 Meters		
Ambient Storage	-65°F (-54°C) +160°F (71°C)		
Operating	-40°F (-40°C) +122°F (50°C)		
Vibration / Shock	40Hz - 2G. / 30G.		
Weight	13 lbs. 5.9Kg.		

Power Rating

Voltage	Motor HP/KW AC3	
	135A	200A
208	40/30	50/37
220/240	50/37	75/59
380/400	----	100/75
415/440	----	125/93
460	100/75	150/110
500	----	190/140
575/600	100/75	200/150
660/690	----	250/185
1000	----	300/225
1500	----	500/370
Three Phase Transformer Load KVA		
Voltage	150A	200A
208	54	72
220/240	57	55
380/400	99	135
415/440	108	152
460/500	119	173
575/600	130	207
660	171	225
1000	260	346
1500	390	519
Three Phase Capacitor Load KVAR		
Voltage	150A	200A
208	40	54
220/240	43	62
380/400	74	104
415/440	81	114
460	90	127
575/600	115	156
1000	195	260
1500	292	390

Options

- Lug Kit 2/0 250mcm (3 per kit) Cat.# KVC4-2

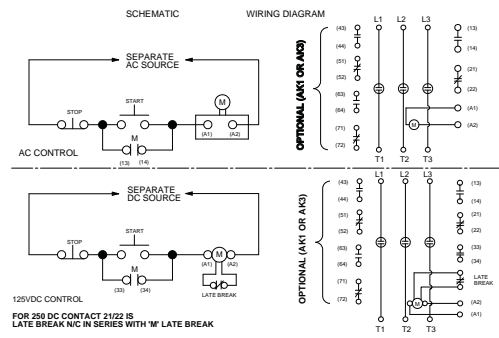
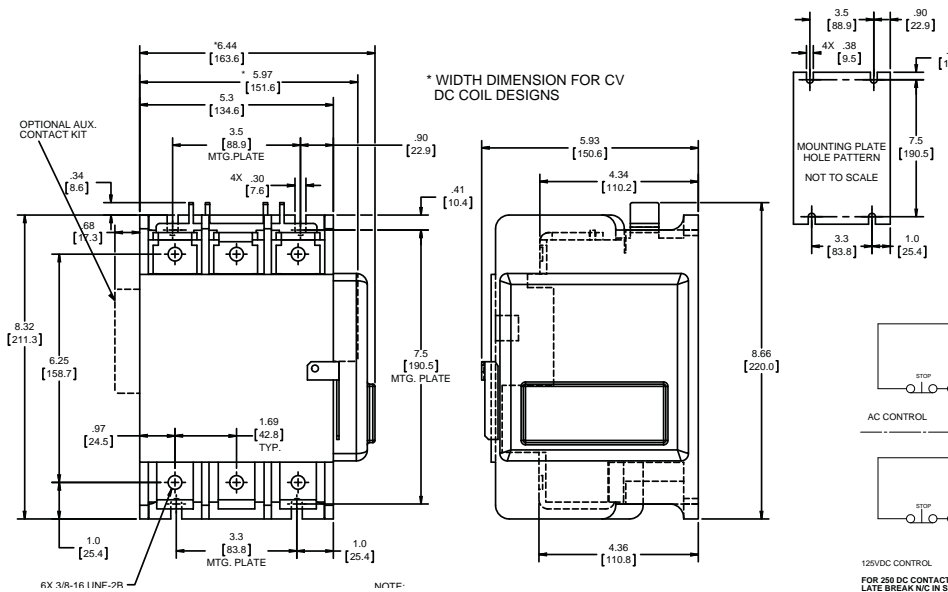
Auxiliary Contact Kits

- 2NO. 2NC 600V. 10A ac. Cat.# AK1
- 2NO. 2NC 5V.10mA dc. Cat.# AK3

Only 1 Kit can be added for total of 3 N/O 3 N/C contacts (1 N/O 1N/C is standard).

Coils

Description	Hz.	Cat. Suffix
110/120V	50/60Hz.	-76
220/240V	50/60Hz.	-26
380/415V	50/60Hz.	-38
440/480V	50/60Hz.	-46
125V DC		-125
250V DC		-250



USAVAC® COMPACT INTERNATIONAL AC VACUUM CONTACTOR

International Ratings For World Wide Applications UL Listed CSA certified 600V/660V/1000V/1500V

Joslyn Clark's unique Compact AC Vacuum Contactors & Starters are ideal for tough industrial applications. The compact design provides flexibility for retrofitting to all existing air break contactors, thus enabling an existing application to continue with maintenance cost and down time eliminated.

- The Contactors & Starters are suitable for Worldwide applications and for use with all types of motors including high efficiency IEC motors & NEMA design E motors.
- NEMA ICS-2 Size 5, 270A, 600V AC – UL508 Listed CSA22.2 certified IEC 947-4-1. NEMA ICS-2 V Rated
- IEC HP/KW rated 400A, 660V/1000V/1500V AC- UL508 Listed CSA22.2 certified IEC 947-4-1.
- Definite Purpose rated 400A 660V/1000V/1500V AC- UL508 Listed CSA22.2 certified IEC 947-4-1.

- Front accessible
- Compact
- Fully phase insulated
- Long Mechanical life
- Mounts in any plane
- Lightweight
- Quiet
- Rugged
- Long electrical life



**Nema Size 5
IEC 400A**

VACUUM INTERRUPTER ADVANTAGES

- Joslyn Clark designed Interrupters insure high quality and reliability
- Transient voltage generation control
- Impervious to harsh environments
- Self adjusting
- High cyclic duty
- Maintenance free
- Enclosed arc



JOSLYN CLARK VACUUM CONTACTOR FEATURES

- Interchangeable with NEMA Air Break contactors & starters via universal mounting plate.
- Snap on side mounted auxiliaries standard 2 N.O. and 2 N.C. rated 600V 10 amp. AC & low power. (5V 10mA DC optional).
- ON/OFF indicator – standard.
- International (IEC) or North American (NEMA) terminal markings IEC version with metric hardware. Simplified DC magnet system for reliability. Range rated economized coils.
- NEMA 600V or IEC 1000V rated starters.
- Class 10 or 20 Bi-metallic overload relays.
- Mechanically Interlocked Version available for reversing application

ENGINEERING DATA

CV Series Technical Specifications

Description	NEMA Size 5 600V CV 77U030506-*	400 Amp 1000V CV 77U034A06-*	400 Amp 1500V CV 77U034A15-*
Cat #	CV 77U030506-*	CV 77U034A06-*	CV 77U034A15-*
Standard	NEMA 1CS-2 UL508 CSA22.2	IEC 947-4-1 1000V UL508 CSA22.2	IEC 947-4-1 1000V NEMA 1CS-2 UL508 CSA22.2 1500V
Power Ratings Enclosed			
Insul. & Operating Volt	600 Volts	1000 Volts	1500 Volts
Rated Oper. AC1	270 Amps	400 Amps	400 Amps
Rated Oper. AC3	200 HP 460/575V	500 HP 370KW-660V	850 HP 650KW-1500V
Rated Oper. AC4	120 HP 460/575V	300 HP-260KW-660V	650 HP-570KW-1500V
Rated Frequency	50 - 400 Hz		
Making Current	4000 Amps		
Breaking Current	3200 Amps		
Dielectric Strength	6Kv - 1 Min. Interruptor		
Interrupting Current	4.6 KA		
Short Time Current 1 Sec.	7000 A		
Short Time Current 10 Sec	3200 A		
Mechanical Life	1.2 X 10 ⁶		
Elect. Life AC3 Duty	1 X 10 ⁶		
Switching Frequency	v600/Hour (1 Every 6 Sec)		
Withstand Current	18KA 50 MSec		
Chop Current Max	0.9 A		
Operating Range	-15% + 10% - over Range Voltage		
Inrush Power VA	1100VA 120 ms Duration		
Holding Power VA	10-12 VA		
Opening Time MS	160ms		
Closing Time MS	20-40ms		
Pick-Up Voltage	80% Cold 85% Hot or less		
Drop-Out Voltage	70% or less		
Recommended CPT	500VA Machine Tool Transformer 5% Regulation at 20%pf		
Applications Ratings			
Mounting Installation	All Planes (Contactor only)		
Altitude	6600 ft. 2000 Meters		
Ambient Storage	-65°F (-54°C) +160°F (71°C)		
Operating	-40°F (-40°C) +122°F (50°C)		
Vibration / Shock	40Hz - 2G. / 30G.		
Weight	26 lbs. 11.8 Kg.		

Power Rating

Voltage	Motor HP/KW AC3	
	270A	400A
208	40/56	100/75
220/240	100/75	150/112
380/415	----	250/187
460	200/150	300/220
575/600	200/150	400/300
660/690	----	450/336
1000	----	700/520
1500	----	850/650

Three Phase Transformer Load KVA		
Voltage	270A	400A
208	108	144
220/240	114	110
380/400	198	270
415/440	216	304
460/500	238	346
575/600	260	414
660	342	450
1000	520	692
1500	780	1038

Three Phase Capacitor Load KVAR		
Voltage	270A	400A
208	80	108
220/240	86	124
380/400	148	208
415/440	162	228
460	180	254
575/600	230	312
1000	390	520
1500	584	780

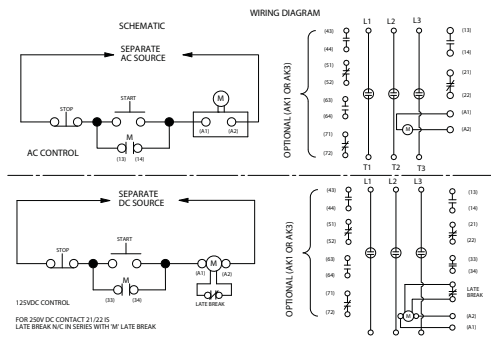
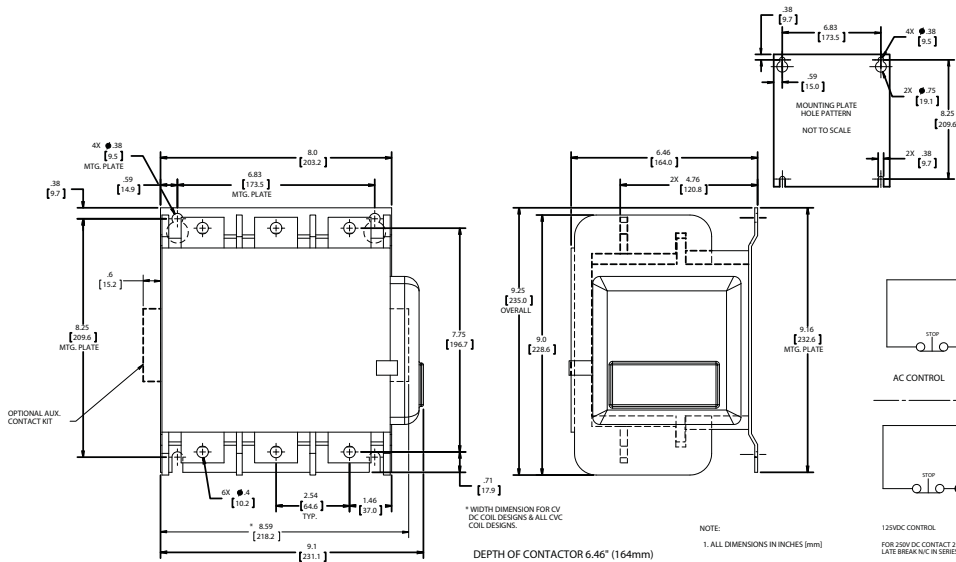
Options

• Lug Kit 2#6 300mcm (3 per kit) Auxilliary ContactKits	Cat.# KVC5-2
• 2NO. 2 NC 600V. 10A ac.	Cat.# AK1
• 2NO. 2 NC 5V.10mA dc.	Cat.# AK3

Only 1 Kit can be added for total of 3
N/O 3 N/C contacts

Coils

Description	Hz.	Cat.Suffix
110/120V	50/60Hz.	-76
220/240V	50/60Hz.	-26
380/415V	50/60Hz.	-38
440/480V	50/60Hz.	-46
125V DC		-125
250V DC		-250



800.390.6405

Joslyn Clark **JC**

USAVAC® COMPACT INTERNATIONAL AC VACUUM CONTACTOR

International Ratings For World Wide Applications UL Listed CSA certified 600V/660V/1000V/1500V

Joslyn Clark's unique Compact AC Vacuum Contactors & Starters are ideal for tough industrial applications. The compact design provides flexibility for retrofitting to all existing air break contactors, thus enabling an existing application to continue with maintenance cost and down time eliminated.

- The Contactors & Starters are suitable for Worldwide applications and for use with all types of motors including high efficiency IEC motors & NEMA design E motors.
- NEMA ICS-2 Size 6, 540 A, 600V AC – UL508 Listed CSA22.2 certified IEC 947-4-1.
- IEC HP/KW rated 600A, 660V AC – UL508 Listed CSA22.2 certified IEC 947-4-1.
- Definite Purpose rated 600A 1500V AC – UL508 Listed CSA22.2 certified IEC 947-4-1.

- Front accessible
- Compact
- Fully phase insulated
- Long Mechanical life
- Mounts in any plane
- Lightweight
- Quiet
- Rugged
- Long electrical life



**Nema Size 6
IEC 600A**

VACUUM INTERRUPTER ADVANTAGES

- Joslyn Clark designed Interrupters insure high quality and reliability
- Transient voltage generation control
- Impervious to harsh environments
- Self adjusting
- High cyclic duty
- Maintenance free
- Enclosed arc



JOSLYN CLARK VACUUM CONTACTOR FEATURES

- Interchangeable with NEMA Air Break contactors & starters via universal mounting plate.
- Snap on side mounted auxiliaries standard 2 N.O. and 2 N.C. rated 600V 10 amp. AC & low power. (5V 10mA DC optional).
- ON/OFF indicator – standard.
- International (IEC) or North American (NEMA) terminal markings IEC version with metric hardware. Simplified DC magnet system for reliability. Simplified DC magnet system for reliability. Range rated economized coils.
- NEMA 600V or IEC 1000V rated starters.
- Class 10 or 20 Bi-metallic overload relays.
- Mechanically Interlocked Version available for reversing application

ENGINEERING DATA

Technical Specifications CV Series

Description	NEMA Size 6 600V	600 Amp 1000V	600 Amp 1500V
Cat #	CV 77U030606-*	CV 77U036A06-*	CV 77U036A15-*
Standard	NEMA 1CS-2 UL508 CSA22.2	IEC 947-4-1 NEMA 1CS-2-9 UL508 CSA22.2	IEC 947-4-1 1000V NEMA 1CS-2-9 UL508 CSA22.2 1500V
Power Ratings Enclosed			
Insul. & Operating Volt	600 Volts	1000 Volts	1500 Volts
Rated Oper. AC1	540 Amps	600 Amps	600 Amps
Rated Oper. AC3	400 HP 460/575V	750 HP 550KW-660V	1200 HP 900KW-1500V
Rated Oper. AC4	250 HP 460/575V	525 HP-390KW-660V	950 HP-700KW-1500V
Rated Frequency	50 - 400 Hz		
Making Current	6000 Amps		
Breaking Current	4800 Amps		
Dielectric Strength	6Kv - 1 Min. Interruptor		
Interrupting Current	6 KA		
Short Time Current 1 Sec.	9000 A		
Short Time Current 10 Sec	4800 A		
Mechanical Life	.75 X 10 ⁶		
Elect. Life AC3 Duty	.5 X 10 ⁶		
Switching Frequency	300/Hour (1 Every 12 Sec)		
Withstand Current	30KA 50 MSec		
Chop Current Max	0.9 A		
Operating Range	-15% + 10% - over Range Voltage		
Inrush Power VA	1600VA 120 ms Duration		
Holding Power VA	10-12.5 VA		
Opening Time MS	160ms		
Closing Time MS	20-40ms		
Pick-Up Voltage	80% Cold 85% Hot or less		
Drop-Out Voltage	70% or less		
Recommended CPT	500VA Machine Tool Transformer 5% Regulation at 20%pf		
Applications Ratings			
Mounting Installation	All Planes (Contactor only)		
Altitude	6600 ft. 2000 Meters		
Ambient Storage	-65°F (-54°C) +160°F (71°C)		
Operating	-40°F (-40°C) +122°F (50°C)		
Vibration / Shock	40Hz - 2G. / 30G.		
Weight	28 lbs. 12.7 Kg.		

Power Rating

Voltage	Motor HP/KW AC3	
	540A	600A
208	150/112	200/150
220/240	200/150	2000/150
380/415	----	250/187
460	400/300	500/350
575/600	400/300	600/450
660/690	----	650/485
1000	----	1000/750
1500	----	1200/900
Three Phase Transformer Load KVA		
Voltage	540A	600A
208	194	216
220/240	224	250
380/400	396	415
415/440	432	450
460/500	476	519
575/600	520	620
660	617	685
1000	1040	1384
1500	1560	2076
Three Phase Capacitor Load KVAR		
Voltage	540A	600A
208	160	173
220/240	172	200
380/400	296	332
415/440	324	366
460	360	382
575/600	460	500
1000	780	830
1500	1168	1250

Options

- Lug Kit 2#6 600mcm 3 lugs per kit Cat.# KVC6-2

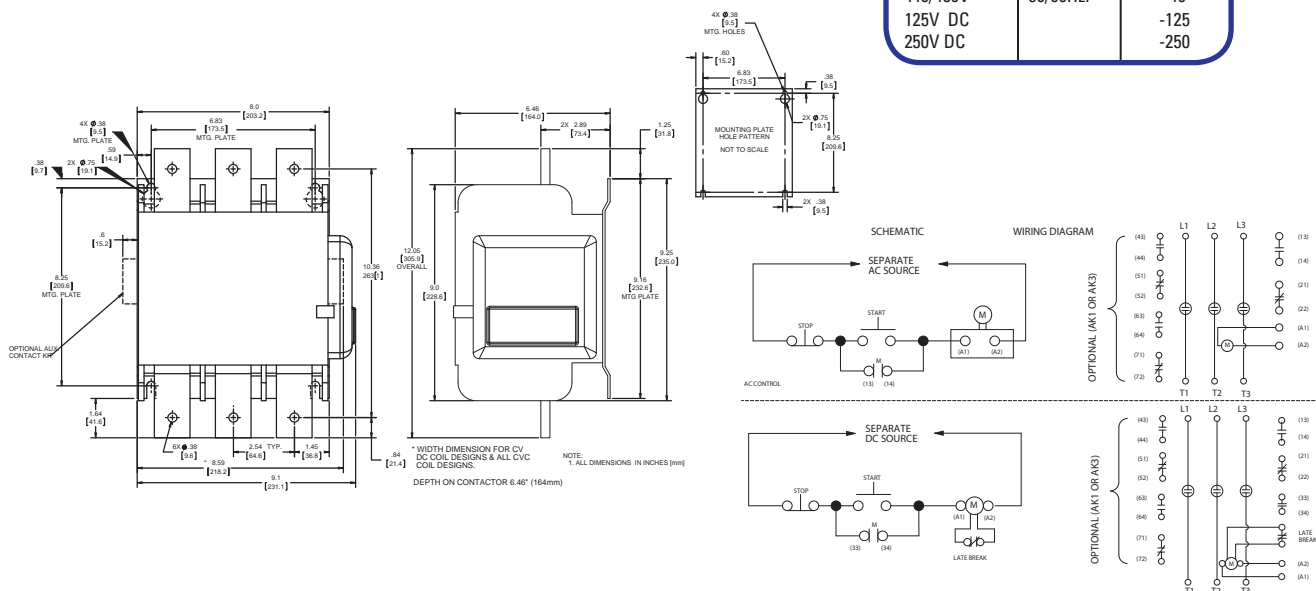
Auxiliary Contact Kits

- 2NO. 2 NC 600V. 10A ac. Cat.# AK1
- 2NO. 2 NC 5V.10mA dc. Cat.# AK3

Only 1 Kit can be added for total of 3 N/O 3 N/C contacts (1 N/O 1 N/C Standard)

Coils

Description	Hz.	Cat.Suffix
110/120V	50/60Hz.	-76
220/240V	50/60Hz.	-26
380/415V	50/60Hz.	-38
440/480V	50/60Hz.	-46
125V DC		-125
250V DC		-250



800.390.6405

Joslyn Clark **JC**

USAVAC® VACUUM INTERRUPTERS AND CONTACTORS

Joslyn Clark, the Motor Control Specialists, offer a range of rugged American made USAVAC vacuum Contactors for heavy industrial applications. Unlike conventional devices these USAVAC Vacuum Contactors enclose the power contacts within a vacuum chamber. This sophisticated technology results in the following advantages.

- Impervious to harsh environments
- Enclosed arc in vacuum chamber
- Compact size and lightweight
- Quiet Operation
- Low Maintenance
- Long Life
- Simplified modular construction
- Fully phase insulated



All materials used in the manufacture of Joslyn Clark interrupters are subject to extensive and consistent chemical analytical testing. Specially selected materials are used such as high alumina ceramics for high temperature processing and degassing. Contact materials are selected for transient voltage generation control.

Cleanliness is an essential ingredient. All Joslyn Clark assemblies are performed in a clean room environment. Final degassing is performed in a one step process at high temperatures to obtain a high degree of vacuum. 100% of Joslyn Clark interrupters are tested mechanically and electrically to ensure vacuum integrity. All interrupters are held for a period of time and retested before being installed in contactors and shipped to the customer.

Joslyn Clark USAVAC family of vacuum contactors offer a variety of contactors and starters for motor, transformer, and capacitor switching. They comply with National NEMA, NEC, UL, and International CSA standards.



LOW & MEDIUM VOLTAGE CONTACTOR REPLACEMENT PARTS

LOW VOLTAGE CONTACTORS

- Front Accessible
- Mounts in any plane
- Fully phase insulated
- Rugged modular construction
- Compact and lightweight (12 lbs.)
- Quiet operation
- Self-adjusting power contacts
- Energy efficient control module
- Tamper resistant and dust protected auxiliary switches

MEDIUM VOLTAGE CONTACTORS

- Front accessible
- Panel mount or table mount
- Field selectable power terminal positions
- Fully phase insulated, BIL 60 KV.
- Lightweight, rugged, and compact (48 lbs.)
- Low maintenance
- Self-adjusting power contacts

The modular design of Joslyn Clark Vacuum Contactors facilitates quick and easy maintenance in order to reduce machine down time.



LOW VOLTAGE FEATURES

The Joslyn Clark USAVAC low voltage vacuum contactors and starters are ideal for applications from 200V to 3600V, and motor ratings for 50 to 500 Hp at 460 volts. Contactors and starters are available open or enclosed in Type 1, 3R, 4 & 12 enclosures for non-combination, combination and reduced voltage applications.

- 1.5 KV, 3 Phase, 320 Ampere Vacuum Starter, U.L. listed, CSA approved, rated 250 Hp, 460V, and 800 Hp. 1500V.
- 1.5 KV, 3 Phase, 320 Vacuum Reversing Contactors, rated 250 Hp, 460 V, and 800 Hp, 1500V.
- 1.5 KV, 3 Phase, 600 Ampere Vacuum Contactors, rated 500 Hp, 460V, and 1600 Hp. 1500V.

The Joslyn Clark USAVAC low voltage vacuum contactors and starters incorporate many useful features to insure ease of maintenance, versatility, and reliability. A three phase contactor contains ten basic parts. The contactor can be assembled or dismantled without the use of any tools.

The control module contains the coil and auxiliary contacts wired to a terminal block and is easily removed for checking or immediate replacement. The phase assembly and the control module are the only two replacement parts. The phase assembly is a vacuum interrupter containing the power switching contacts.



ENGINEERING DATA

Vacuum Contactor & Starter Ratings 200V-3600V

Standards NEMA ICS 2-1988, UL 508 (1.5KV), CSA 22.2 (1.5KV), IEC 158-1, BS 547-1

	160A	320A	600A	1000A
Cat No. 3 Pole				
1.5KV	VC77U03415	VC77U03515	VC77U03615	SVC77U031015
3.6KV	VC77U03436	VC77U03536	VC77U03636	SVC77U031036
Power Ratings				
Rated Insulating and Operational Voltage	1500/3600 ¹			
Rated Operational Current	160	320	600	1000
Rated Frequency	50/400Hz-			
Making Current	1600	3200	6000	6000
Breaking Current	1600	3200	6000	6000
Dielectric Strength/BIL	6KV-1 min. / 45KV. 1.2 X 50 Micro/Sec.			
Interrupting Current	4400	5000	6000	6000
Withstand Current	30KA-3Hz			
Short Time Current				
1 Sec.	5000	7000	9000	11000
2 Sec.	2000	5000	7000	9000
Mechanical Life				
Electrical Life at Rated Current - AC3 Duty	2 x 10 ⁶			
Switching Frequency	1 x 10 ⁶			
Chop Current	600/hr every 6 seconds			
Max	.9A			
Control Ratings				
Description	160/320A	60A	1000A	
Rated Control Voltage	120/240V 50/400Hz			
Allowable Fluctuation	+10% of rated -25% voltage			
Closing Power VA/Duration	950VA/17MS	1900VA/17MS	2850VA/17MS	
Holding Power	9VA	18VA	27VA	
Opening Time Ave.	90 MS at 60Hz			
Closing Time Ave.	17 MS at 60Hz			
Pick-Up Voltage	90V			
Drop-Out Voltage	70% or less			
Recommended Control Transformer	When Required 250VA	When Required 500VA	When Required 750VA	
Applications Ratings				
Installation Altitude without Derating	All Planes (Contactor only) Up to 6600 ft. (2000m)			
Ambient	-65°F (-54°C) +160°F (71°C)			
Storage Operating	-40°F (-40°C) +135°F (57°C)			
Vibration/Shock	40Hz - 2G/30G			
Weight 160/320A	12lbs. (5.45kg.)	24lbs. (11kg.)	36lbs. (16.36kg.)	
Dimensions	8 7/8" x 7 1/16 x 7 7/8" 225 x 189 x 200mm	17 7/8" x 7 1/16 x 7 7/8" 450 x 189 x 200mm	26 5/8" x 7 1/16 x 7 7/8" 676 x 189 x 200mm	

Technical Specifications

Open Type
USA VAC Contactor 320 AMP

Accessories & Options:

- Mechanical Interlocked contactors available.
- Vacuum starters in combination and non-combination forms are available in NEMA 1, 3, and 12 enclosures on.
- Terminal Lug Kits are available.
- Suppressor Kits are available.

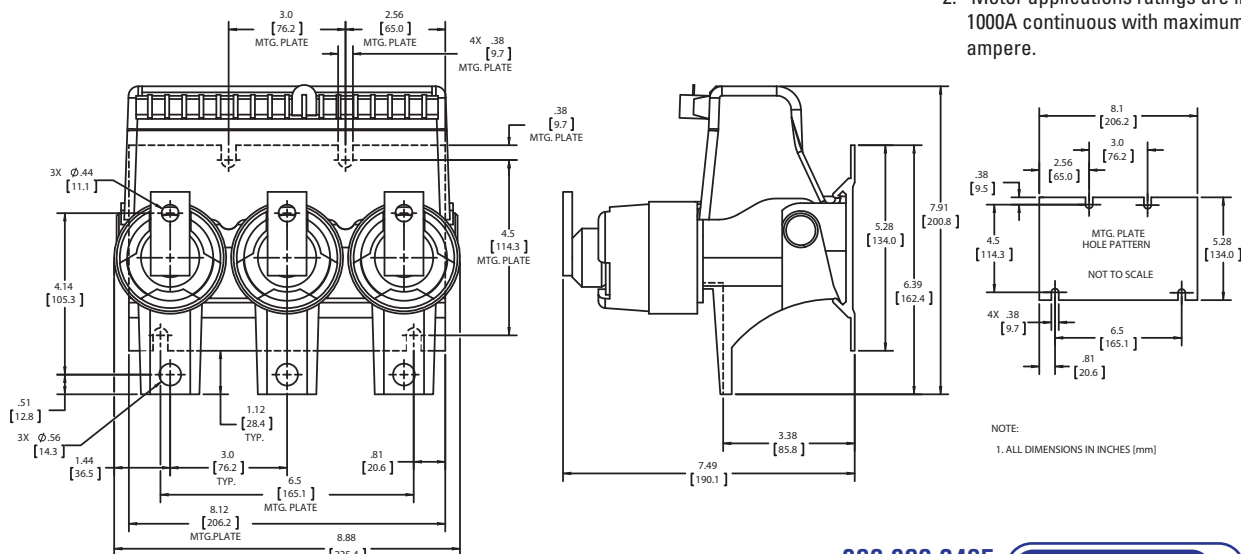
For KW Rating Multiply HP Ratings by .746 (example: 100HP x .746 = 75KW)

Power Application Ratings

Volts	Motor HP			
	160A	320A	600A	1000A
230	60	125	200	-----
460	125	250	500	-----
1000	300	600	1200	----- ²
1500	420	850	1600	-----
2300	600	1250	2400	-----
3300	960	1920	3700	-----
Volts	Transformer Load KVA			
	160A	320A	600A	1000A
230	66	133	250	415
460	127	255	500	746
1000	277	554	1000	1730
1500	415	850	1500	2600
2300	665	1330	2500	4150
3300	910	1820	3400	5700
Volts	Capacitor Load KVAR			
	160A	320A	600A	1000A
230	50	100	180	310
460	95	190	360	595
1000	205	415	750	1300
1500	310	620	1125	1450
2300	500	1000	1875	3110
3300	700	1365	2550	4275

Note:

- 3600V model has a B.I.L. rating of 45KV and an interrupt rating of 4000A.
- Motor applications ratings are limited to 1000A continuous with maximum LRC of 6000 ampere.



800.390.6405

USAVAC® MEDIUM VOLTAGE

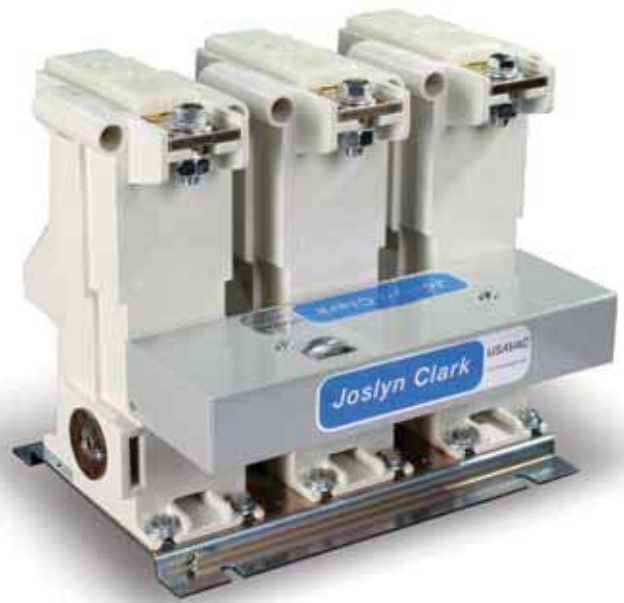
The Joslyn Clark USAVAC medium voltage vacuum contactors are ideal for applications for 2300V to 7200V. Current ratings of 200, 400, and 600 Ampere, and motor ratings up to 7000 Hp at 6600V are available.

- 7200V, 600 Ampere, 3 phase vacuum contactor with In-Line Power Terminals
- 400 Ampere, 3 phase vacuum contactor with alternative line terminal position enabling line and load termination to be on same side of contactor. Ideal for dropout starter designs. Can be easily converted.

The Joslyn Clark USAVAC medium voltage vacuum contactors and starters offer many unique features to create easy maintenance, dependability and versatility. NEMA type E2 starters are available in Type 1, 3R and 12 enclosures. The modular design allows for a simplified assembly and easy inspection, utilizing minimum parts.

The control module contains the coil and 2 N.O. and 2 N.C. auxiliary contacts. It is easily removed for inspection or replacement. A factory set half shell phase assembly and replacement control module are the only replacement parts.

The Joslyn Clark family of low and medium voltage vacuum contactors and starters are available in combination and non-combination enclosures. Controllers are available for across the line, reduced voltage, reversing, and non-reversing arrangements. Enclosures are available in Types 1, 3R, 4 and 12.



ENGINEERING DATA

Vacuum Contactor & Starter Ratings

Standard - NEMA ICS 2-324, UL 347, CSA 22.2, IEC 470, BS 775

Description		200A	400A	600	1200
Catalog Number & 2.5KV		MVC77U032A25	MVC77U031A25	MVC77U036A25	SVC77U031225
Rated Voltage	5.0KV	MVC77U032A50	MVC77U034A50	MVC77U036A50	SVC77U031250
	7.2KV	MVC77U032A72	MVC77U034A72	MVC77U036A72	SVC77U031272

Power Ratings					
Operational Rated Current		200A	400A	600A	800/1200A
Operational Rated Frequency HZ		50/60	50/60	50/60	50/60
E1 Interrupt Rating	2.5KV	20 MVA Equivalent to 4.62 KA			-----
MVA & KA Values	5.0KV	40 MVA Equivalent to 4.62 KA			-----
Contactor Only	7.2KV	60 MVA Equivalent to 4.81 KA			-----
E2 Fuse Coordination	Rating	400 MVA 45.7 KA RMS			-----
MVA & KA	5.0KV	38R max. fuse size			-----
Withstand KA	5.0KV	57.8 KA - Peak, 38R - Fuse			-----
Short Time Current	1 Sec. KA	6	7	9	12
	5 Sec. KA	4	5	6	9
	15 Sec. KA	2	2.6	3	6
Switching Frequency		300/Hr			
Elec. Life at Rated Current		.6 x 10 ⁶	.40 x 10 ⁶	.250 x 10 ⁶	.250 x 10 ⁶
Mechanical Life		.75 x 10 ⁶			
Dielectric Strength		20KV 1 min.			
Impulse withstand B.I.L.		1.2 x 50 us 60KV			
Chopping Current Max.		.9A			
Control Ratings AC&DC					
Rated Control Voltage		120/240V 50/60Hz AC or 125/250V DC			
Allowable Fluctuation		+10-15%		+10-20%	
Closing Power VA/Duration		650VA/45MS		1300VA/45MS	
Holding Power		7VA AC .47A DC		14VA AC .924A DC	
Opening Time Ave.		90 MS at 60Hz			
Closing Time Ave.		40 MS at 60 Hz			
Pick up Voltage	Min.	102V or less			
Drop Out Voltage	Ave.	70% or less			
Recommended Control Trans.		(AC Only)	300VA	600VA	
Application Conditions					
Standard	Current	Continuous AC/DC 10A/5A			
Auxiliary	Voltage	600V Max. - 48V Min. NEMA A600 (AC) P600 (DC)			
Contact	AC	Make/Break 7200VA/720VA			
Ratings	DC	Make/Break 125/250V 138VA 300/600V 138VA			
Additional	Current	Continuous AC/DC 10A/2.5A			
Auxiliary Contact	Voltage	600V Max. - 48 Min. NEMA A600 (AC) Q300 (DC)			
Relay Ratings	AC	Make/Break 7200VA/720VA			
	DC	Make/Break 125/250V/69VA			
Weight		48 lbs.		96 lbs.	

Technical Specifications

CSA 5KV. 400A

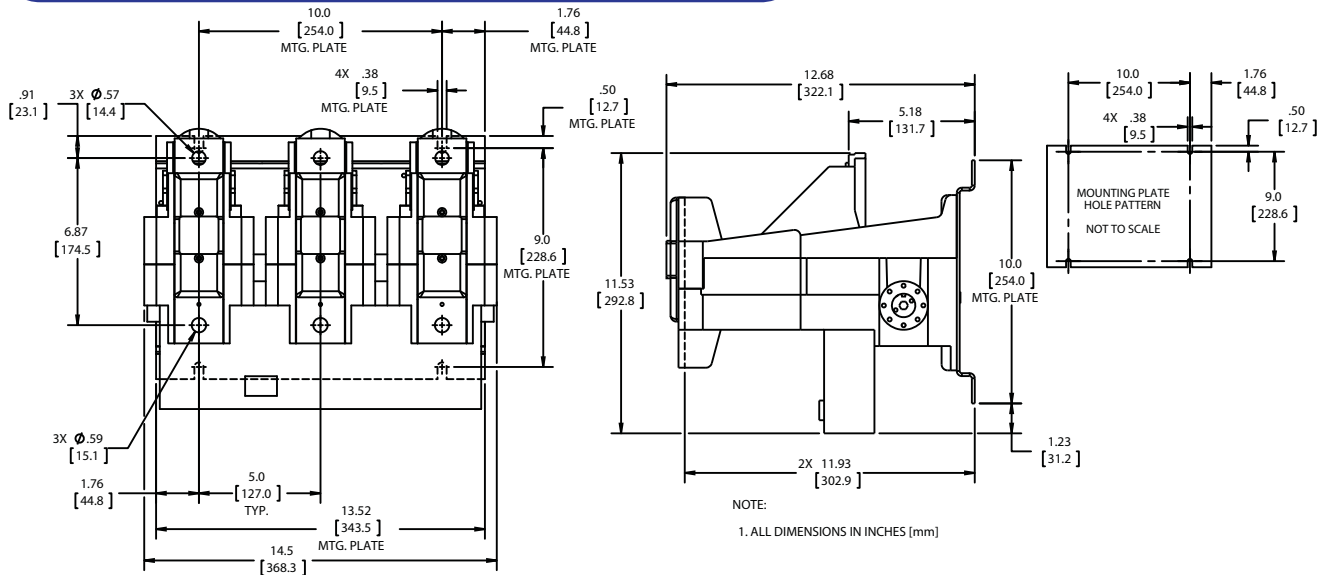
UL Recognized 5KV 500A 7.2KV 400A

Power Application Ratings

Voltage KV		2.5	3.3	4.16	6.6
Motor Type	Current	Motor HP			
.8 P.F. Ind. or Syn Motor	200A	900	1250	1500	2500
1.0 P.F. Syn Motor	200A	1000	1500	1750	2750
.8 P.F. Ind. or Syn Motor	400A	1750	2250	3500	5000
1.0 P.F. Syn Motor	400A	2000	2500	3500	5250
.8 P.F. Ind. or Syn Motor	600A	2250	3250	4500	6750
1.0 P.F. Syn Motor	600A	2250	3500	4750	7000
.8 P.F. Ind. or Syn Motor	800A	2750	4000	5500	8000
Transformer Load KVA					
Three Phase Transformer	200A	750	1000	1500	2000
	400A	1500	2000	3000	4000
	600A	2500	3000	4250	6000
	800A	2750	3750	5250	7500
	1200A	4100	5000	7000	10000
Capacitor Load KVAR					
Three Phase Capacitor	200A	550	750	1050	1500
	400A	1125	1500	2250	3000
	600A	1650	2250	3375	4500
	800A	2200	2900	4500	5000
	1200A	2750	3750	5625	7500

Accessories & Options:

- 2, 4, & 5 Pole contactors, consult factory.
- Mechanically interlocked contactors available.
- Medium voltage starters available in non-drawout designs in NEMA 12 & 3 enclosures, consult factory.
- Terminal Lug Kits available.



FULL VOLTAGE NON REVERSING & REVERSING MOTOR STARTERS



**UL 347 LISTED
CSA 2-22 APPROVED**

- Free Standing, Single High Compact Vacuum Starter in NEMA 12 Enclosures. Designed to comply with NEMA1CS2-324 Class E 2 controller.
- Features Offered:
- Fault Make, Load break visible blade disconnect switch with automatic grounding arm.
- Grounded metal isolation between LV and Medium Voltage Compartments.
- Maintenance free Joslyn Clark Vacuum Contactors.
- Suitably rated current limiting power fuses with striker pins and 3 phase trip bar.
- C.P.T. provided with 2 primary and 1 secondary fuse, 120V secondary.

Ampere Rating	Maximum HP Ratings	NEMA 12 Catalog No.
2300V VACUUM STARTERS With Fused Load Break Disconnect		
160*	125	MVS18TA31A25A-T236
160*	150	MVS18TA31A25B-T236
160*	250	MVS18TA31A25C-T236
160*	350	MVS18TA31A25D-T236
160*	500	MVS18TA31A25E-T236
160*	600	MVS18TA31A25F-T236
200	750	MVS18TA32A25A-T236
200	1000	MVS18TA32A25B-T236
320*	1250	MVS18TA33A25A-T236
400	1500	MVS18TA34A25A-T236
600	2250	MVS18TA36A25A-T236

Ampere Rating	Maximum HP Ratings	NEMA 12 Catalog No.
4160V VACUUM STARTERS With Fused Load Break Disconnect		
200	200	MVS18TA32A50A-T416
200	350	MVS18TA32A50B-T416
200	400	MVS18TA32A50C-T416
200	500	MVS18TA32A50D-T416
200	600	MVS18TA32A50E-T416
200	750	MVS18TA32A50F-T416
200	1000	MVS18TA32A50G-T416
200	1250	MVS18TA32A50H-T416
200	1500	MVS18TA32A50J-T416
400	3000	MVS18TA34A50A-T416
600	4500	MVS18TA36A50A-T416

Ampere Rating	Maximum HP Ratings	NEMA 12 Catalog No.
6600V VACUUM STARTERS With Fused Load Break Disconnect		
200	350	MVS18TA32A72A-T666
200	500	MVS18TA32A72B-T666
200	750	MVS18TA32A72C-T666
200	1000	MVS18TA32A72D-T666
200	1500	MVS18TA32A72E-T666
200	2000	MVS18TA32A72F-T666
200	2500	MVS18TA32A72G-T666
400	3500	MVS18TA34A72A-T666
400	5000	MVS18TA34A72B-T666
600	6750	MVS18TA36A72A-T666

NOTE: For Reversing Applications change 4th and 5th digit of cat # from 18 to 38.
 For Inching or Plugging Duty Refer to Factory.
 For Latched Contactors change "MVS" to "MVSL" - - Specify Trip Coil Voltage.
 * These Starters have 45KV BIL Rating if 60KV Required use 200A or 400A Rated Starters.
 For NEMA 3R Rating Change 6th Digit from "T" to "R".

MEDIUM VOLTAGE FEEDER SECTION

- Free standing, single high compact transformer/feeder capacitor feeder controller to comply with NEMA1CS2-324.
- Fault Make, Load break visible blade disconnect switch with automatic grounding arm.
- Grounded metal isolation between LV and Medium Voltage Compartments.
- Maintenance free Joslyn Clark Vacuum Contactors.
- Suitably rated current limiting power fuses with striker pins and 3 phase trip bar.
- C.P.T. provided with 2 primary and 1 secondary fuses, 120V secondary.



Ampere Rating	KVA Ratings	KVAR Rating	Catalog No.
2300V			
VACUUM STARTERS With Fused Load Break Disconnect			
200 AMP	750	550	MVF18TA32A25-T236
400 AMP	1500	1125	MVF18TA34A25-T236
600 AMP	2500	1650	MVF18TA36A25-T236
800 AMP	2750	2200	MVF18TA38A25-T236
1200 AMP	4100	2750	MVF18TA312A25-T236

Ampere Rating	KVA Ratings	KVAR Rating	Catalog No.
4160V			
VACUUM STARTERS With Fused Load Break Disconnect			
200 AMP	1500	1050	MVF18TA32A50-T416
400 AMP	3000	2250	MVF18TA34A50-T416
600 AMP	4250	3375	MVF18TA36A50-T416
800 AMP	5250	4500	MVF18TA38A50-T416
1200 AMP	700	5625	MVF18TA312A50-T416

Ampere Rating	KVA Ratings	KVAR Rating	Catalog No.
7200V			
VACUUM STARTERS With Fused Load Break Disconnect			
200 AMP	2000	1500	MVF18TA32A72-T666
400 AMP	4000	3000	MVF18TA34A72-T666
600 AMP	6000	4500	MVF18TA36A72-T666
800 AMP	7500	5000	MVF18TA38A72-T666

- Transformer ratings assume 100% continuous rating for operation at overload ratings Consult Factory
- For latched contactors change "MVF" to "MVFL" specify trip coil voltage.

REDUCED VOLTAGE AUTO TRANSFORMERS

Designed for automatic starting of Squirrel Cage Motors when the starting current or torque must be reduced. Joslyn Clark Reduced Voltage Auto Transformer Starters incorporate equipment exactly as the full voltage starters, with the additional following equipment

- 1- Free Standing Cubicle Containing:
 - 1- 3 Pole Starting Vacuum Contactor
 - 1- 3 Pole Shorting Vacuum Contactor
 - 1- Set of Mechanical Interlocks
 - 1- 3-Coil Auto -Transformer with 50-65-80% taps.
 - 1- Incomplete Sequence Timer

NON REVERSING CLOSED TRANSITION
UL 347 LISTED
CSA 2-22 APPROVED



2300V RVAT Starters With Fused Motor Load Break Disconnect

Max HP	Cat # NEMA 12	Max HP	Cat # NEMA 12
*100	MVS83TA31A25A-T236	*1250	MVS83TA33A25F-T236
*200	MVS83TA31A25B-T236	1500	MVS83TA34A25G-T236
*400	MVS83TA31A25C-T236	1750	MVS83TA36A25H-T236
*900	MVS83TA33A25D-T236	2000	MVS83TA36A25J-T236
*1000	MVS83TA33A25E-T236	2250	MVS83TA36A25K-T236

4160V RVAT Starters With Fused Motor Load Break Disconnect

100	MVS83TA32A50A-T416	2000	MVS83TA34A50J-T416
200	MVS83TA32A50B-T416	2250	MVS83TA34A50K-T416
400	MVS83TA32A50C-T416	2500	MVS83TA34A50L-T416
900	MVS83TA32A50D-T416	3000	MVS83TA34A50M-T416
1000	MVS83TA32A50E-T416	3500	MVS83TA36A50N-T416
1250	MVS83TA32A50F-T416	4000	MVS83TA36A50P-T416
1500	MVS83TA32A50G-T416	4500	MVS83TA36A50R-T416
1750	MVS83TA34A50H-T416		

6600V RVAT Starter With Fused Motor Load Break Disconnect

1000	MVS83TA32A72E-T666	4000	MVS83TA34A72P-T666
1500	MVS83TA32A72G-T666	5000	MVS83TA34A72S-T666
2000	MVS83TA32A72J-T666	6000	MVS83TA36A72T-T666
2500	MVS83TA32A72L-T666	6750	MVS83TA36A72V-T666
3000	MVS83TA34A72M-T666		

NOTE: For NEMA 3R Replace 6th cat. # digit 'T' with 'R'

* These Starters have 45KV BIL Rating for, 60KV Rating

CONTROLLER MODIFICATIONS

Modifications For Combination USAVAC Medium Voltage Controllers

Description	Enclosed Type NEMA 1, 3R, 12	Change Cat. No. Character Indicated To:	Typical Catalog Number
Cover Controls			
Push Button & Selector Switches			
Hand-Off-Auto Selector Switch		B	
Start-Stop Push Buttons		C	
2 or 3 Position Selector Switch		B	
Forward-Reverse-Stop Push Buttons		C	
Pilot Lights			
With Electrical Interlock:			
Standard Transformer Type, Red Lens		13	
Push-to-Test Transformer Type, Red Lens		14	
Modification 13-14. Lens color. Example: Order (13+15) = Std. Transformer with interlock & color lens Green,			
	Green	N/C	
Example	Blue	N/C	
Pilot Light Red Lens -13	White	N/C	
Pilot Light Green Lens -(13 + 15)	Yellow	N/C	
	Amber	N/C	
	Clear	N/C	
Auxiliary Relays			
Extra 2 N. O. & 2 N. C. Aux. Contacts		21	
Time Relay ON Delay		22	
Time Relay OFF Delay		23	
Time Relay ON Delay & Instantaneous		24	
Time Relay OFF Delay & Instantaneous		25	
Time Relay ON Delay & OFF Delay		23	
Overload Relays			
7777 Electronic Motor Management Relay • (Includes Ground Fault Protection) No RTD Protected		27	
• RM 2000 Motor Monitor (for use with 777 Relay) Option 27		27A	
• 369+ Motor Management Relay Current Only		31A	
• 369+ Motor Management Relay Current & Voltage		31B	
• 469 + Motor Management Relay Drawout Case		30	
• PQM Power Quality Meter		29	
• Transformer Feeder Relay 745 Includes C/TS & P/T's		62	
Lightning Surge Protector		41	
Overhead Bus 800A/Cubicle (24" Length)		47	
Overhead Bus 1200A/Cubicle (24" Length)		48	
Overhead Bus 1600A/Cubicle (24" Length)		49	
* A ground Bus is included in busbar prices.			
Overhead Bus 800A/Cubicle (36" Length) 30 or 36		50	
Overhead Bus 1200A/Cubicle (36" Length) 30 or 36		51	
Overhead Bus 1600A/Cubicle (36" Length) 30 or 36		52	
Incoming & Auxilliary Cubicle Options			
18" Cable Pull Section		54	
24" Cable Pull Section (use with option #29)		55	
400A Incoming Section Unit Unfused		56	
400A Incoming Section Unit Fused		57	
600A Incoming Section Unit Unfused		58	
600A Incoming Section Unit Fused		59	
1200A Incoming Section Unit Unfused		60	
1200A Incoming Section Unit Fused		61	

USAVAC MEDIUM VOLTAGE CONTROLLERS

Specification for Medium Voltage Full Voltage Starters 5KV 400 AMP 3000HP

The Joslyn Clark line of medium vacuum starters incorporate the Joslyn Clark vacuum contactor. The benefits of utilizing the vacuum contactor provide for a compact design that has unique feature and safety benefits providing a simple, safe maintenance-free starter. Technical details of the vacuum contactor are provided in the Joslyn Clark Control Catalog.

In detail the starter comprises of:

- Free standing, single high, compact, non withdrawable starter mounted in a NEMA 12 enclosure. NEMA 3R enclosures are also available. The starters are designed to comply with NEMA ICS2-324 class E2 controllers and to UL 347.
- A Fault Make, Load Break, visible break disconnect switch with automatic grounding arm. The switch is provided with a viewing window mounted in the fixed mounted panel allowing for a visible check that the switch has been opened and the blades grounded. The disconnect switch is interlocked with the front medium voltage access door to ensure access to the medium voltage compartment can only be achieved when the switch has been opened and the blades grounded.
- Isolation between the load break disconnect switch compartment, the medium voltage compartment and grounded metal isolation between the low voltage and medium voltage compartments.
- Suitable rated current limiting power fuses are provided with striker pins, arranged to trip to a 3 phase trip bar, thus preventing the risk of single phasing in the event of one single fuse blowing.
- Three suitable rated current transformers suitable for overload relay protection and wired into a class 20 thermal bimetal ambient compensated overload relay mounted in the low voltage compartment, heater elements are fitted. The relay is manually reset via low voltage compartment.
- One suitably rated Joslyn Clark 3 phase Electrically Held vacuum contactor with 120 volt AC closing coils or Mechanically Latched with 120 VAC closing coils and DC Trip Coil. The contactor is provided with 2 normally open and 2 normally closed auxiliary contact. A mechanically latched contactor is available as an option.
- One CPT provided with two primary fuses and one secondary fuse. The CPT has a 750 VA capacity control voltage. The low voltage fuse will be mounted in the low voltage compartment. The two high voltage primary fuses will be mounted in the medium voltage compartment.

The above starters can be provided and are suitable for reversing applications whereby this specification remains exactly as above but with the addition of:

One additional medium voltage reversing contactor suitably rated 120 volt coils and with two normally open and two normally closed auxiliary contacts. The contactor will be provided with an additional mechanical interlock that will be mechanically and electrically interlocked with the forward contactor.



USAVAC MEDIUM VOLTAGE AUTO TRANSFORMER CONTROLLERS

SPECIFICATION FOR JOSLYN CLARK MEDIUM VOLTAGE, REDUCED VOLTAGE, AUTO TRANSFORMER STARTERS

These starters are designed for automatic starting of squirrel cage motors when starting current or torque must be reduced.

Joslyn Clark reduced voltage auto transformer starters incorporate equipment exactly as the across-the-line starters detailed above with the following additional equipment:

- One additional freestanding cubicle containing one 3 pole starting vacuum contactor.
- One 3 pole shorting vacuum contactor, mechanically interlocked with the "Run" Contactor.
- One 3 coil auto transformer with 50, 65 and 80% taps. The overall dimensions for the reduced voltage auto transformer starter would be 48" wide, 30" deep, 92" high. The second cubicle access door would be interlocked to the main disconnect switch, thus insuring in addition to the normal interlock described above that the right hand medium voltage compartment door cannot be opened until the disconnect switch is in the off position, and grounded thus releasing an interlock which will then allow access to the right hand cubicle to insure access to that compartment only when the incoming power supply has been isolated and grounded.
- One Incomplete Sequence Timer



These starters are also available in the reversing arrangement for reversing applications. The specification will be exactly as above for that medium voltage reduced voltage auto-transformers starters with the addition of two medium voltage contactors with two normally opened, two normally closed auxiliary contacts and mechanical interlock on the forward and reverse contactors.

Line Ups

An optional bus system rated 800-1200 or 1600A can be provided and is mounted overhead. This air insulated tin plated bus system is connected at shipping, splits by a splice bus. Shipping splits are provided every two or three sections (i.e. max 4'-0" or 6'-0" lengths. Shipping sections are moved on pallets suitable for fork truck lifting and shipping channels are provided (loose) for crane handling.

Joslyn Clark 



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