# **TOSHIBA** Leading Innovation >>>

# ▲ Safety Cautions

- Read the entire "Instruction Manual" carefully for important information about safety, handling, installation, operation, maintenance, and parts replacements.
- This equipment is designed and built in accordance with applicable safety standard in effect on the date of manufacture. Unauthorized modifications will void warranty and can result in severe injury, death and property damage. Do not make any modifications to the equipment.
- Only qualified persons are to install, operate or service this equipment according to all applicable codes and established safety practices.
- Use only genuine Toshiba replacement parts and accessories. Improper components could cause the equipment malfunction.
- Do not install this equipment in areas where unusual service conditions exist. Using this equipment in other than usual service conditions can result in equipment failure.
- Do not exceed the ratings specified on the equipment nameplate or system accessories. Underrated equipment can fail during operation causing fire, explosion, severe injury, death, and property damage.



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• The data given in this catalog are subject to change without notice.





# HIGH-VOLTAGE VACUUM CONTACTORS AND VACUUM COMBINATION UNITS

# NEW SERIES HIGH-VOLTAGE VACUUM CONTACTORS AND VACUUM COMBINATION UNITS

Since the introduction of the first Vacuum Interrupter in 1962, Toshiba has been continuously improving and developing Vacuum Technology.

Over 180 thousands Toshiba Vacuum Contactors and Combination Units have been installed, providing reliable services in wide variety of applications worldwide.

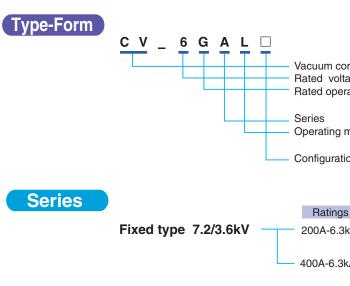
Consistent with its dedication to the most advanced vacuum technology, Toshiba offers new series of High-voltage vacuum contactors and Vacuum Combination Units with fuses. By adopting an electronics controlled circuit and being designed compactly to ensure reliability, handling ease and safety, the new series of High-voltage Vacuum Contactors and Vacuum Combination Units with fuses are suitable for Motor starters, Transformer feeders and Capacitor switching applications.

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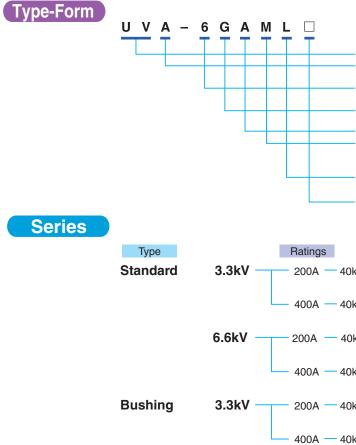
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# **VACUUM CONTACTORS**



\* Note : Other ratings are available, refer to catalog KSP-E2412.

# **VACUUM COMBINATION UNITS**



6.6kV \_\_\_\_\_ 200A \_\_ 40

— 400A — 40

# **FEATURES**

1

### **Compact and Lightweight**

Compact and slim design contactors can be applied to either two-tier motor starters or slim starters per IEC 60470(2000). The Contactors CV-6GA and CV-6HA have the same outline and mounting dimensions, as well as dual voltage ratings (3.6/7.2kV).

### allent Brecking Deutermones

**Excellent Breaking Performance** Since the higher interrupting capacity and short-time withstand capability, Toshiba Vacuum Contactors are appropriate to fuse combination for large capacity load, and to high-speed breaking.

### No Surge Protection Required

Special main contact materials minimize chopping current. No surge suppressor/arrester is required except for special applications.

### **Conformity to Industrial Standard**

Conforming to international standards such as IEC, BS, AS and JEM, being certified by class NK and TÜV Toshiba Vacuum Contactors can be used widely all over the world.

#### Low Power Consumption

The control device adopts an IC circuit, the control voltage either AC or DC can be easily changed by switches in the electronic circuit board without changing the coil and/or other parts. Since the economizing resistors are eliminated, the power consumption in holding condition has been reduced.

ontactor age rational current	7.2/3.6kV G : 200A H : 400A		
mechanism on	No symbol : Sta	tched type	
6		Standard	Special
kA Non-	latched type	CV-6GA	
Latc	hed type	CV-6GAL	
kA <u>Non</u>	latched type	CV-6HA	CV-6HA-2
Latc	hed type	CV-6HAL	CV-6HAL-2



Conco	
<ul> <li>Rated operational voltage</li> </ul>	3 : 3.3kV 6 : 6.6kV
<ul> <li>Rated operational current</li> </ul>	G : 200A H : 400A
- Series	11.400A
<ul> <li>Draw-out/in mechanism</li> </ul>	No symbol : Fixed type M : Manual type D : Handle type
<ul> <li>Operating mechanism</li> </ul>	No symbol : Non-latched type L : Latched type
-	1 : Bushing type

Configuration

Vacuum combination unit

		Manual type	Handle type	Fixed type
0kA 🔡 I	Non-latched	UVA-3GAM	UVA-3GAD	UVA-3GA
L_ 1	Latched	UVA-3GAML	UVA-3GADL	UVA-3GAI
0kA	Non-latched	UVA-3HAM	UVA-3HAD	UVA-3HA
L 1	Latched	UVA-3HAML	UVA-3HADL	UVA-3HAL
0kA	Non-latched	UVA-6GAM	UVA-6GAD	UVA-6GA
L I	Latched	UVA-6GAML	UVA-6GADL	UVA-6GAI
0kA	Non-latched	UVA-6HAM	UVA-6HAD	UVA-6HA
L I	Latched	UVA-6HAML	UVA-6HADL	UVA-6HAL
0kA I	Non-latched	UVA-3GAM1	UVA-3GAD1	
L I	Latched	UVA-3GAML1	UVA-3GADL1	
0kA	Non-latched	UVA-3HAM1	UVA-3HAD1	
L I	Latched	UVA-3HAML1	UVA-3HADL1	
0kA	Non-latched	UVA-6GAM1	UVA-6GAD1	
L I	Latched	UVA-6GAML1	UVA-6GADL1	
0kA ——	Non-latched	UVA-6HAM1	UVA-6HAD1	
L I	Latched	UVA-6HAML1	UVA-6HADL1	

# **VACUUM CONTACTORS**

## **RATINGS AND SPECIFICATIONS**

	Туре			С	V	
From		Standard	6GA	6HA	6GAL	6HAL
From		Upper front terminal	_	6HA-2	_	6HAL-2
Operating Mechanism		Non-L	Non-Latched Latched		ched	
Rated Voltage (Ur)				3.6/7	.2kV	
Rated Operational Cu	rrent ( <i>l</i> e)		200A	400A	200A	400A
Thermal Current ( <i>I</i> th)			300A	450A	300A	450A
Rated Frequency			50/6	0Hz		
Rated Short-time With	stand Cur	rent ( <i>I</i> k)	6300A- 1s	6300A- 2s	6300A- 1s	6300A- 2s
Rated peak Withstand	I Current (I	þ)		15.	3kA	
Short-circuit Making a (Duty)	nd Breakir	ng Current		630 O" - 3min "Co"		II
Making Current (100ti	mes) AC4		2000A	4000A	2000A	4000A
Breaking Current (25t	imes) AC4		1600A	3200A	1600A	3200A
Withstand Overload C	urrent		1200A-30s	2400A-30s	1200A-30s	2400A-30s
6 times of <i>l</i> e - 30s	6		4000A-4s	4000A-12s	4000A-4s	4000A-12s
15 times of <i>l</i> e - 1s	\$		6300A-1s	6300A-2s	6300A-1s	6300A-2s
Coordination with Cur	rent-limitin	g Fuses	Pros	spective Short-c	ircuit Current 4	l0kA
Cut-off Current (Peak)			55kA	85kA	55kA	85kA
Rated	Power Frequency Withstand Voltage			22kV-1	min. *1	
Insulation Level			60kV			
Switching frequency (AC3)		1200 op. cycles/hr 300 op. cycles/hr			cvcles/hr	
		Mechanical Life	2.5mill. 0.25mill		-	
Endurance		Electrical Life (AC3)	0.25mill. 0.25mill.			imill.
		Closing	100-110, 115-120, 200-220, 230-240VAC/100-110, 200-220VD			
Rated Control Voltage		Tripping	24	4, 32, 48, 100-1	10, 200-220VD	C
Allowable Control Volt	age Fluctu	ation	85%	to 110% of the	rated control vo	ltage
Operating Current		Closing		4.5A (	Peak)	C C
(at 100V)		Holding/Tripping	0.1A (A	verage)	4.0A	(Peak)
Closing Time				65 - 8	30ms	
Opening Time				20 - 3	30ms	
		Contact arrangement	3NO-3NC 2NO-2NC			-2NC
		Operational voltage	Max. 480V, Min. 48V			
Ratings of Auxiliary C	ontact	Thermal Current		1(	A	
		AC Capacity		700VA (	PF. 0.35)	
		DC Capacity		60W (L/F	150ms)	
		Installation		Floor Mount Vei	tical Installation	ı
		Altitude		1000m	or lower	
Application Condition		Ambient air temperature		-5 to	40°C	
Application Condition		Relative humidity		45 to	85%	
		Vibration		Max. 20	)Hz 1G	
		Shock		Max.	30G	
		Motor (kW)	750/1500	1500/3000	750/1500	1500/3000
Maximum Load		Transformer (kVA)	1000/2000	2000/4000	1000/2000	2000/4000
		Capacitor (kvar)	1000/2000	2000/2000	1000/2000	2000/2000
Weight			19.0kg	19.5kg	19.5kg	20.0kg
Standard				IEC6047		
*2				JEM116	7 (1990)	
1 · Special withstand voltage	(32k)/-1min)	will be supplied by request				

\*1 : Special withstand voltage (32kV-1min.) will be supplied by request. \*2 : CE marking can be available by request.

# **VACUUM COMBINATION UNITS**

## **RATINGS AND SPECIFICATIONS**

	Туре			U	VA	
	Non-Latche	Manual type	3GAM	3HAM	6GAM	6HAM
<b>F</b>	Non-Latche	Handle type	3GAD	3HAD	6GAD	6HAD
Form	Latched	Manual type	3GAML	<b>3HAML</b>	6GAML	6HAML
	Latched	Handle type	3GADL	<b>3HADL</b>	6GADL	6HADL
Rated Insulation Voltage			3.6	3kV	7.2	2kV
Rated Operational Volta	age		3.3	3kV	6.6	6kV
Rated Operational Current			200A	400A	200A	400A
Rated Frequency				50/6	60Hz	
Rated Interrupting Curr	ent (With power Fuse	es)		40	)kA	
Rated	Power Frequency W	/ithstand Voltage	16kV-	1min.	22kV	-1min.
Insulation Level	Impulse Withstand	Voltage	45	kV	60	)kV
	Closing		100-110V, 115-	120, 200-220, 23	80-240VAC/100-1	10,200-220VD
Rated Control Voltage	Tripping			100-110V, 2	200-220VDC	
Allowable Control Voltag	ge Fluctuation		85%	to 110% of the	rated control vo	oltage
Operating Current Closing			4.5A	(Peak)		
(at AC100V)	Holding/Tripping		0.1A(A	verage Holding	) / 4.0A(Peak T	ripping)
Closing Time				65 -	80ms	
Opening Time			20 - 30ms			
Contact arrangement Operational voltage		Non-Latched 3NO-2NC, Latched 2NO-2NC				
		Max. 480V, Min. 48V				
Ratings of Auxiliary Col	ntact Thermal cur	rent	10A			
	AC capacity			700VA(	PF. 0.35)	
	DC capacity			60W(L/F	R 150ms)	
	Installation		Floor Mount Installation			
	Altitude		1000m or lower			
Application Condition	Ambient air	temperature	-5 to 40°C			
Application Condition	Relative hur	nidity	45 to 85%			
	Vibration		Max. 20Hz 1G			
	Shock			Max	. 30G	
Connection Method			Main and Earthing circuit ; Automatic connection Control circuit ; Manual plug connection			
Position			2 Positions "Connected" and "Disconnected"			d"
Shutter Provision				Insulation sh	utter provided	
Control Wire (color and	size)			Yellow,	1.25mm <sup>2</sup>	
	Motor (kW)		750	1500	1500	3000
Maximum load	Transformer	(kVA)	1000	2000	2000	4000
	Capacitor (k	var)	1000	2000	2000	2000
Approx, Weight	Withdrawab	e portion	70kg	70kg	75kg	75kg
Approx, worgin	Total		90kg	90kg	95kg	95kg
Standard				IECe	60470	
Standard				JEM122	25 (1986)	



# **VACUUM CONTACTORS**

## APPLICATION AND SELECTION

### **OPERATING COIL EXCITATION**



Mainly applied to frequent switching operation such as motor.

Mainly applied to non-frequent switching operation and/or to the important load which require to be contact closed even by power loss.

### **PROTECTION COORDINATION**

The protection coordination with upper/lower stream relay shall be evaluated by considering total system and load characteristics

The single-phase protection shall be performed which may be occurred by power fuses.

(Apply 2E-relay or fuse blown detection which is provided on combination unit as standard.)

### **APPLICATION GUIDE TO SURGE**

No surge protection is required except for special application, however the insulation coordination shall be evaluated by following table.

Load	Protection	Notice
Rotating Machine	Not required	<ul> <li>The surge suppressor shall be installed for machine rated at 55kW or below, and/or be subject to inching operation.</li> <li>The surge suppressor shall be installed between starting contactor and autotransformer for machine started by autotransformer.</li> <li>The suppressor shall be installed for machine which has inferior insulation.</li> </ul>
Dry-type Transformer	Not required	The surge arrester shall be installed for transformer rated at 150kVA or below and exciting inrush is interrupted.
Oil-immersed Transformer	Not required	The installation of suppressor and insulation coordination shall be evaluated when the low surge level apparatus are connected on secondary circuit of transformer.
Capacitor	Not required	Refer to the clause for capacitor application.

• The surge suppressor is composed of capacitor and series resistor, and is one of the most excellent protection mediums. The device features suppression as well as a decrease of surge generation. Particularly being free from limitation on the number of operating times, this device is suitable for protecting motors and transformer required performing frequent operations.

• The surge arrester has no effect of suppressing the surge generation, this suppresses overvoltage to within a fixed level.

## NOTICE FOR APPLICATION

### **CAPACITOR APPLICATION**

• The current limiting fuses shall be combined for capacitor switching application.

• The series reactor shall be connected, especially back-to-back application.

Service life of capacitor switching

The switching, opening and closing, of capacitor produces severe condition for contactor, such as high frequency inrush current and interpole recovery voltage higher than twice of normal voltage. The criteria of maximum number of capacitor switching are shown in the figure below. The vacuum interrupters should be replaced when the number of switching operations reached to point shown in figure.

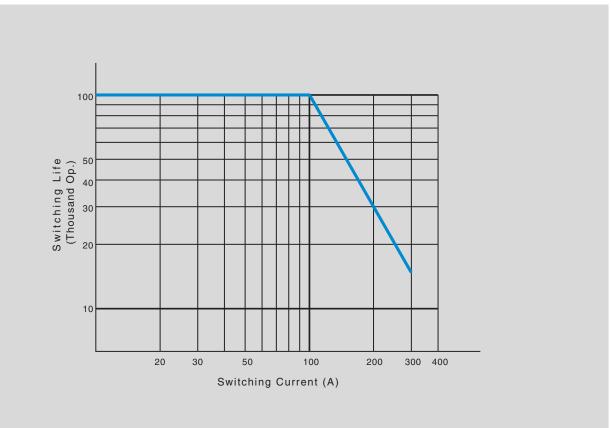


Fig. 1 Capacitor Switching Life (with 6% reactor)

### **TERMINAL CONNECTION**

Either terminals, upper or lower, can be used for power or load side on contactor. The upper terminals shall be connected to power side on combination unit for the protection coordination.

### **CONTROL TRANSFORMER**

The contactor can be operated with following burden of control transformer.

Type Form (Contactor)	Control Transformer	VT
CV-6GA(L), 6HA(L)	400VA or more	100VA 10P10

# **VACUUM CONTACTORS**

## OUTLINE DIMENSIONS

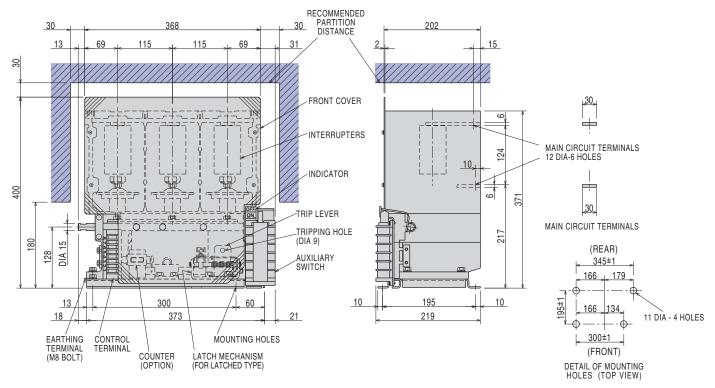


Fig. 2 Types CV-6GA(L)/CV-6HA(L)

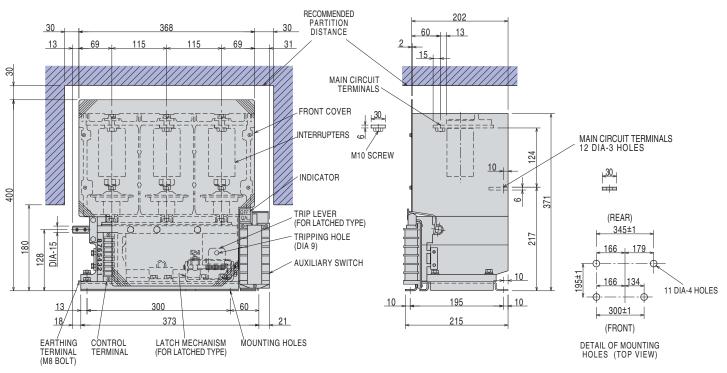


Fig. 3 Types CV-6HA(L)–2

## OPERATING CIRCUITS

## Non-latched type High-Voltage Vacuum Contactors

The typical operating circuit is shown in Fig. 4 indicating type CV-6GA/6HA contactor.

Make sure to use the "NO" contacts of quick operating relay (4) self-holding circuit. Do not use the "NO" auxiliary contacts of vacuum contactor, this may cause the welding of main contacts when the start (ON) button is pushed incompletely. (refer to the marked 1 in figure) Make sure to switch the closing coil on DC side. Should the coil be switched on AC side, a discharging circuit will be formed by rectifiers against coil, resulting in prolonged opening time and lowered breaking performance. (refer to the marked 2 in figure)

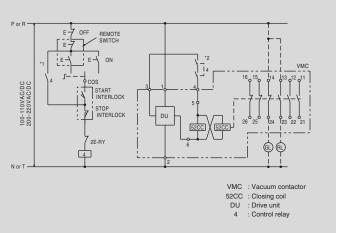
## Latched type High-Voltage Vacuum Contactors

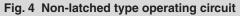
The typical operating circuit is shown in Fig. 5 specifying type CV-6GAL/6HAL contactor.

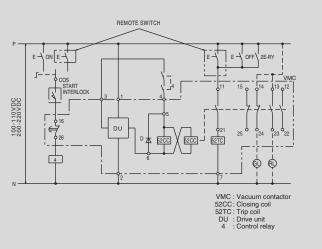
The electrical trip free circuit must be furnished in control circuit. (outside of contactor)

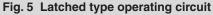
A stable DC power source such as battery is recommended for control circuit. If the DC power source is not available, employ the AC closing and capacitor trip device for tripping.

Make sure to use the "NO" auxiliary contacts (11-21) of vacuum contactor in trip circuit, and "NC" auxiliary contacts (16-26) of vacuum contactor for control relay circuit.









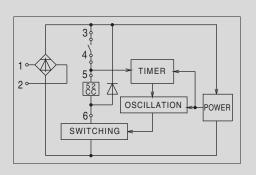
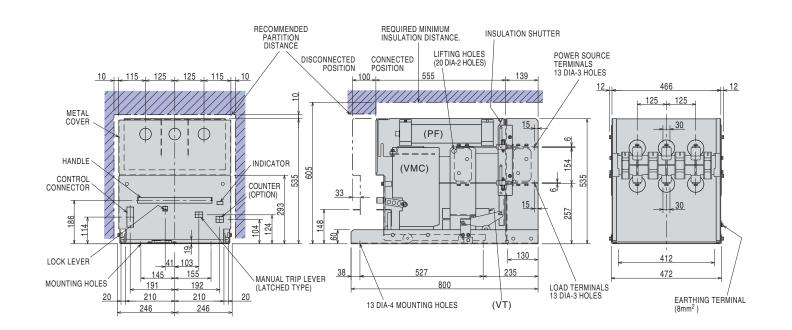


Fig. 6 Configuration of Drive -Unit

# **VACUUM COMBINATION UNITS**

## OUTLINE DIMENSIONS



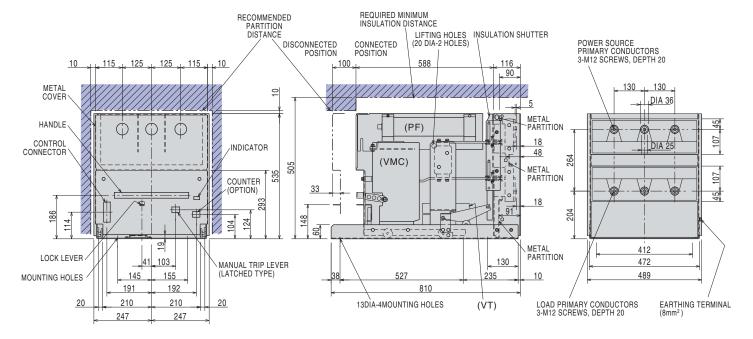
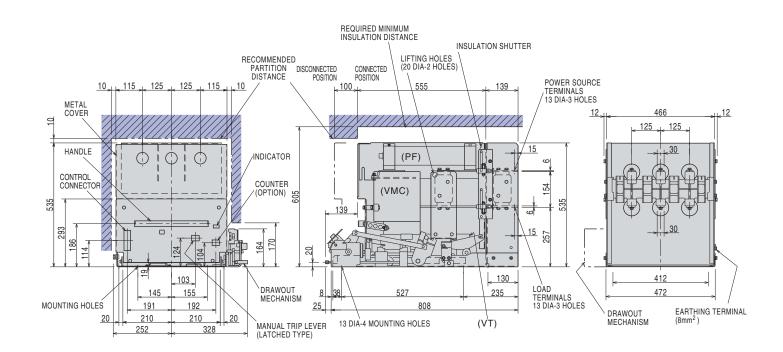


Fig. 7 Types UVA-3GAM(L)/UVA-3HAM(L) UVA-6GAM(L)/UVA-6HAM(L)



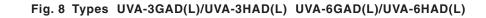


Fig. 9 Types UVA-3GAM(L)1/UVA-3HAM(L)1 UVA-6GAM(L)1/UVA-6HAM(L)1

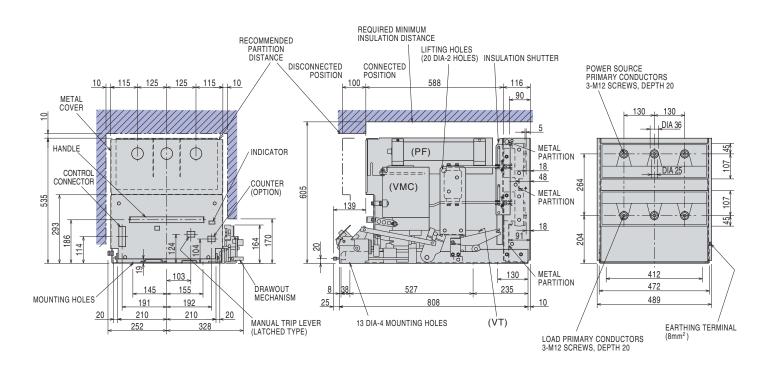
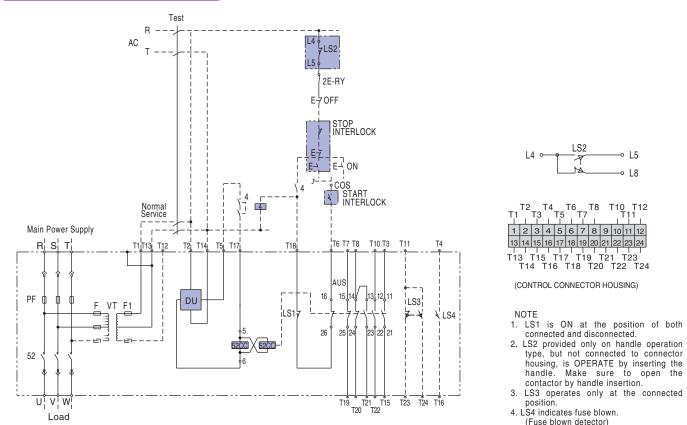


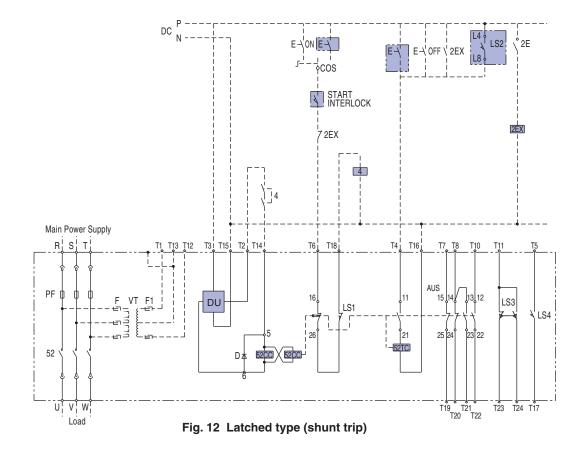
Fig. 10 Types UVA-3GAD(L)1/UVA-3HAD(L)1 UVA-6GAD(L)1/UVA-6HAD(L)1

# VACUUM COMBINATION UNITS

## **OPERATING CIRCUITS**



#### Fig. 11 Non-latched type (AC operation)



## INTERLOCKS

T6 T8 T10 T12 T7 T11

Τ5

The electrical and mechanical interlocks are provided on Combination unit as described below to prevent misoperation and to ensure high safety.

- The unit can not be withdrawn from the "CONNECTED" position, while the contactor is "ON".
- The unit can not be inserted into the "CONNECTED" position, while the contactor is "ON".
- The contactor can not be closed, unless the unit is either in the "CONNECTED" or "DISCONNECTED" position.
- ◎ The cubicle door can not be opened, unless the unit is in the "DISCONNECTED" position. (note)
- ◎ The unit can not be inserted into the "CONNECTED" position, unless the cubicle door is closed. (note)
- ◎ The operating handle can not be extracted, unless the unit is either in the "CONNECTED" or "DISCONNECTED" position.
- ◎ The contactor is "OFF" by inserting the operating handle. (Refer to Notes on page 11.)
- © The unit can be padlocked at the "CONNECTED" and "DISCONNECTED" position.

(Note) The front door must be adjusted when the interlocks are employed.

Parts Position Draw-out Position	Interlock Position	Shaft Position	Arm Position	Name Plate for ON-OFF Indicator	
Disconnected Position	"A"	"B"	"D"	OFF	"B"
Connected Position	"B"	"C"	"E"	ON	"C"

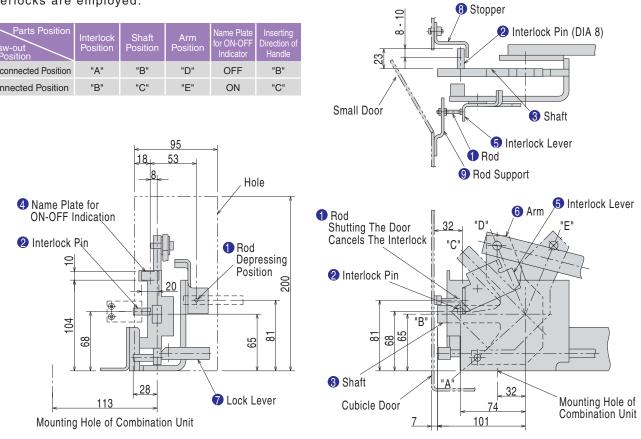


Fig. 13 Withdraw mechanism and hole for handle operation type

#### How to furnish the front door with interlocks

When performing interlocks between the handle operation type unit and front door, conduct the design by adopting following steps, referring to Fig. 13.

© Preparation of small door

Provide the front door with a small door for handle operation. (approx. size 95X200)

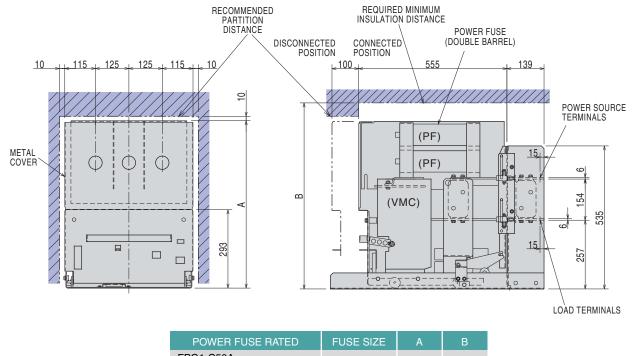
- OInterlock to prevent door opening at connected position The interlock pin in the connected position is at "B" position. Attach a stopper for the interlock pin to door so that the interlock pin can be clasped and the door can not be opened. The stopper may be installed with screws for emergency door open by removing screws.
- OInterlock to prevent handle operation at door opening Provide a rod on door side for interlock lever release and adjust the length of rod.
- OProvide the small hole (approx. 12X22) at location of ON-OFF indication for confirmation of unit position.

#### Symbol marked O indicate for handle operation type

# **SPECIAL PRODUCTS**

## OUTLINE DIMENSIONS

## **Double Barrel Fuses**



FPG1-C50A FPG1-C60A	50DIA	575	645	
FPC3-M250A / C175A	85DIA	627	697	

Fig. 14 Types UVA-3GAM(L)/UVA-3HAM(L) UVA-6GAM(L)/UVA-6HAM(L)

## **Earthing Switch**

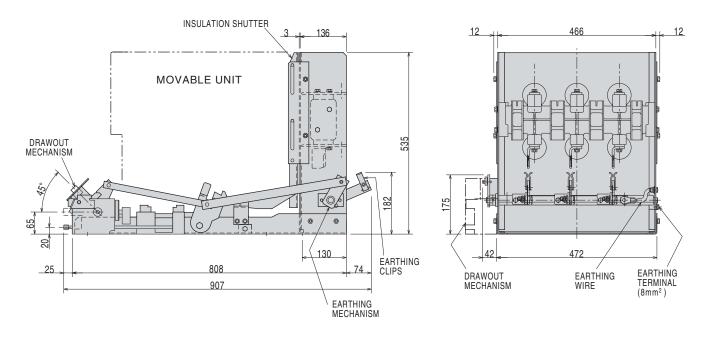


Fig. 15 Earthing Switch Configuration

## **OUTLINE DIMENSIONS**

## **Fused Contactors**

	Non-latched type	UVA-3GA	UVA-3HA	UVA-6GA	UVA-6HA
Type Form	Latched type	UVA-3GAL	UVA-3HAL	UVA-6GAL	UVA-6HAL
Rated operational voltage (kV)		3.3		6.6	
Rated operational current (A)		200 400		200 400	
Rated interrupting current (kA)		40		40	

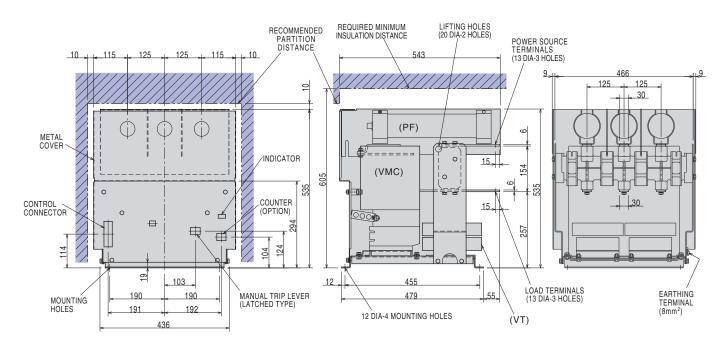


Fig. 16 Types UVA-3GA(L)/UVA-3HA(L) UVA-6GA(L)/UVA-6HA(L)

# **MODIFICATION**

### $\mathsf{O}: \mathsf{Provided} \text{ as Standard } \triangle: \mathsf{Option} \text{ upon request}$

		Contactor	Combination Units				
Name of parts	Name of parts		Manual type	Handle type	Fixed type	Remarks	
Counter		Δ	Δ	Δ	Δ	Option	
Position switch	LS3	-	0	0	—	Connected position (1NO-1NC)	
Position Switch	LS7	-	$\triangle$	Δ	—	Disconnected position (1NO)	
Blown fuse detector	LS4	_	0	0	0	1NO	
VT (1unit)		_	0	0	$\bigtriangleup$	Provided only on Non-latched	
Additional VT		_	Δ	Δ	Δ	Max. 2VT	
Insulation barrier		-	Δ	Δ	-	Partition between power and load terminals	
Insulation fuse barrier		-	$\bigtriangleup$	Δ	Δ	For the earthing side	
Shutter padlock provision		_	$\bigtriangleup$	$\bigtriangleup$	_	Padlock not provided	
Position padlock provision		_	$\bigtriangleup$	$\bigtriangleup$	_	Padlock not provided	
Earthing switch		_	—	$\bigtriangleup$	_	For load side cable	

# **ACCESSORIES PROVIDED AS STANDARD**

#### O : Supplied -: Not supplied

	Contactor	Cor	nbination I	Jnits		
Name of parts	CV	Manual type	Handle type	Fixed type	Remarks	
Wipe gauge	0	0	0	0	For checking contact wear	
Trip rod	0	0	0	0	For latched type only	
Connector housing and pins as loose parts	_	0	0	0	Crimping tool No.720725-1 Tyco Electronics AMP. CO.	

### Wipe gauge

The wipe gauge can be used for checking contact wear of vacuum interrupters. Refer to the instruction manual for using this gauge.

### • Trip rod

The trip rod may be used for manual tripping for latched contactor and combination unit, however this operation shall be maintenance purpose or emergency case only.

### • Connector housing and pins as loose parts

These parts are for the connection of control circuit in combination unit.

Wipe gauge		 	
	t 0.5		<sup>58</sup>
		120	
			1
Trip rod			



Housing (Pins)

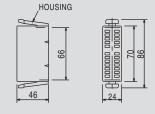
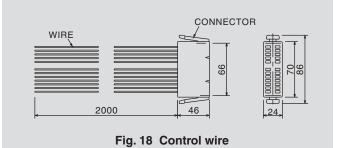


Fig. 17 Standard accessories

# **OPTIONAL ACCESSORIES UPON REQUEST**

 $\triangle$  : Supplied – : Not supplied

		Contactor	Combination Units					
Name of pa	arts	CV	Manual type	Handle type	Fixed type	Remarks		
Control wire		-	Δ	Δ	Δ	With plug (2mm <sup>2</sup> X 2m)		
Control test wire		-	Δ	Δ	$\triangle$	With plug and socket (2mm <sup>2</sup> X 2m)		
Operating handle		-	—	$\triangle$	—	For Handle type		
<b>A</b>	LC9	Δ	Δ	$\bigtriangleup$	$\bigtriangleup$	For	100/110VAC for 100-110V coil	
Capacitor trip device	LC10	Δ	Δ	$\triangle$	$\triangle$	Latched	200/220VAC for 200-220V coil	
	CIT-10Q	Δ	Δ	$\triangle$	$\triangle$	type	100/200VAC for 100-110V coil	
CR Surge suppresso	r	Δ	Δ	$\triangle$	$\triangle$	NV60K30	04T1 (See Page 5)	
Mechanical interlock		Δ	—	—	—	(See Fig. 20)		



### • Capacitor trip device

The capacitor trip device will be used for latched contactor when DC power source is not available. The device charges from AC power, and supplies DC power to the trip coil at trip command. The alarm contact is provided on CIT-10Q.

### Mechanical interlock

The mechanical interlock shall be used in the reversing starter to prevent mechanically from closing the forward and reverse contactors simultaneously. The following vertical pitch interlocks are available for CV-6 series contactors.

Vertical pitch 450mm and 550mm

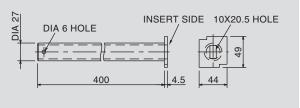


Fig. 19 Operating handle

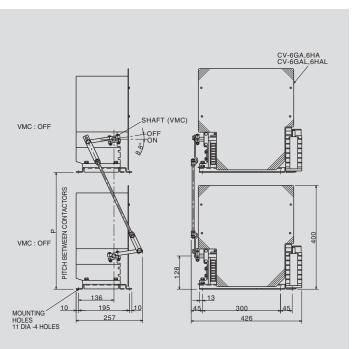


Fig. 20 Outline of mechanical interlock

# **FUSE SELECTION**

#### Motor application

	3.3	kV			6.6kV			
P	ower fuse	Vacuum	Standard value	Applicable motor	Standard value	Vacuum	Power fus	e
Current (A)	Туре	Contactor (A)	of load current (A)	(kW)	of load current (A)	Contactor (A)	Туре	Current (A)
			10~11.7	37~45	4.8~5.6			
M25			13.8	55	6.6			
IVI25			18.8	75	9.1			
			22.1	90	10.5			M25
	FPC3-3X25N		26.7	110	12.8		FPG1-6X75N	IVIZ J
M50	11 00-07201	32.5 132	132	15.1		FPGI-0X/SN		
		200	38.5	160	18.4		FPC3-6X75N	M50 M150
			48	200	23.7	200		
M100			74.1	315	36.9			
			92.1	400	46.1			
M200	FPC3-3G25N		102.6	450	51.3			
101200	1100000251		140.9	630	70.6			
			171.9	750	82.1			
M250			178	800	89			
	FPC3-3X25N		195.1	900	97.6			
M300	11 00 0/2014	400	216.2	1000	108.1		FPC3-6G75N	M200
M350			267	1250	134.4			
111000			320.3	1500	160.2			
				1750	194		FPC3-6X75N	M250
				2000	217	400	400	
				2500	270	400	FPC3-6H75N	M400
				3000	322			111400

Notes 1. Full-load current represents the average value of Toshiba Motors (2, 4, 6 poles). Check the motor characteristics. 2. The standard for power fuse selection is : full-load current x 6, 5 second-2 times.

#### Transformer application

	3.3kV				6.6kV				
P	ower fuse	Vacuum	Standard value	Applicable transformer	Standard value	Vacuum	Power fus	Power fuse	
Current (A)	Туре	Contactor (A)	of load current (A)	(kVA)	of load current (A)	Contactor (A)	Туре	Current (A)	
			5.3	30	2.7				
T20			8.8	50	4.4				
120			13.2	75	6.6			T20	
	FPG1-6X75N		17.5	100	8.8			120	
T30	FFGT-0X75N		26.3	150	13.2				
T50			35	200	17.5		FPG1-6X75N		
T60			200	43.8	250	21.9		11 61 5/15/1	T30
T75			54.5	300	26.3	200		150	
T150	FPC3-3X25N		70	400	35	200		T50	
1150	1100-07201		87.5	500	43.8				
T225	FPC3-3G25N		109	600	54.5			T75	
1225	11 00 00201		131.2	750	65.7				
M250			175	1000	87.5		FPC3-6X75N	T175	
M300	FPC3-3X25N		218.7	(1250)	109.4		FPC3-6G75N	T225	
T350	FF03-3A25IN	400	263	1500	131.2		1100/00/30	1225	
2 X M250			350	2000	175		FPC3-6X75N	M250	
				2500	218.7				
				3000	263	400	FPC3-6H75N	T400	
				4000	350				

Notes 1. The standard for power fuse selection is : full-load current x 10, 0.1 second. 2. 2 X M □ : double barrel/phase.

#### Capacitor application (with series reactor)

	3.3k	٨V			6.6kV					
Po	ower fuse	Vacuum	Standard value	Applicable	Standard value	value Vacuum Power f		use		
Current (A)	Туре	Contactor (A)	of load current (A)	capacitor (kvar)	of load current (A)	Contactor (A)	Туре	Current (A)		
			5.3	30	2.7					
C15			8.8	50	4.4			C15		
			13.2	75	6.6			015		
C40			17.5	100	8.8					
040	FPG1-6X75N		26.3	150	13.2					
C50	FPG1-0X/SN		35	200	17.5			C40		
C60		200	43.8	250	21.9	200	FPG1-6X75N	040		
2 X C50			55.6	300	28					
0 X C60					74.2	400	37	200		C50
2 X C60			93	500	46.4			C60		
0150	FPC3-3G25N		111	600	55.6			2 X C50		
C150	FPC3-3G25N		148	800	74.2					
C175			185	1000	97			2 X C60		
C200			232	1250	116			C150		
C275	FPC3-3X25N	400	278	1500	139		FPC3-6X75N	0175		
2 X C175			372	2000	185			C175		

Notes 1. The standard for power fuse selection is : full-load current X 5, 0.1 second.

2. 2 X C 🗆 : double barrel/phase.

# High Voltage Vacuum Combination Units Specification

P/O No. : Inquiry No. :

Quantity :

Use this sheet for confirmation on each rating and specification

Туре			IVA			
Rated operat	ional voltage	□ 6	: 6.6kV	□ 3 : 3.3	kV	
Rated operat		à : 200A	□ H : 400	AC		
Series			Α			
Draw-out/in n		I : Manual type		: Hand type		
Operating me	echanism	N	o symbol Ion Latche ype		: Latche type	
Rated interru	pting current		OkA (with p	ower fus	e)	
	Non Latched type	-	rating volta			
Rated control	Latched	Clos	ing voltage	9		
voltage	type	Tripp	ing voltag	e		
	Refer to Fuse se	electio	n table. Qi	iantity (se	et No ) s	
	□ Three-phase		□ Single-			
			 T20	T30	T40	
	FPG1 (3.3/6.6k)	V)	C15	C20	C25	
	, , , , , , , , , , , , , , , , , , ,	,	_	_	_	
	Quantity (set No	D.)	M25	M50	M10	
Power fuse			T50	T100	T150	
selection	FPC3 (3.3kV)		C40	C75	C10	
	Quantity (set No	o.)	M150	M200	M25	
		-	T175	T225	-	
	FPC3 (6.6kV)		C100	C150	C17	
	Quantity (set No	o.)				
	•				3	
VT						
	LS3		t required	nonition o		
Limit switch	LS3 LS7	Connected position swit				
LIMIT SWITCH	LS7 LS4	<ul> <li>Disconnected position sv</li> <li>Blown fuse detector</li> </ul>				
	L34					
Standard accessories			Insulation barrier between fuse Insulation fixing barrier Insulation shutter Connector housing and pins as			
Options			<ul> <li>Counter</li> <li>Insulation barrier (Partition to a last on the second secon</li></ul>			
Accessories		🗆 Pl	ease refer	to page 1	6 to sp	
		1				

D	Designation and type form								
dle	]—	□ 1 Bushing type							
ned	-								
	□ 6.3k	A (withou	it power fu	ise)					
	C/DC100-1 hers (spec	10V		AC/DC200-22	20V				
	C/DC100-1			AC/DC200-22	20V				
	hers (spec		V)						
	C100-110\			DC200-220V					
	hers (spec Il be scribe	-	V)	)					
	thout powe			).					
)	T50	T60	T75						
5 5	C40	C50	C60	2 x C50	2 X C60				
	M25	M40	M50	2 × 000	2 / 000				
0	1012.5	10140	WI30						
0	M200	M250	M300	M350	2 X M250				
0	T225	<u> </u>		T350					
	C150	C175	C200	C275	2 X C175				
50	0130	0173	0200	0213	270175				
0	M400								
'5	T400								
	- 1400								
_	_								
300	/110V		□ 3300/22	201/					
	/110V		6600/22						
Othe	rs (specify	<u>ن ۱</u>	V)						
			be : standa						
h			pe : option						
		UVA ty	be : standa	ard					
es	S								
s loc	s loose parts								
between power and load terminals) e earth (Phase to earth)									
cal	cable								
peci	pecify the quantities each								