Vacuum Capacitors

MEIDEN
Quality connecting the next

Made in Japan

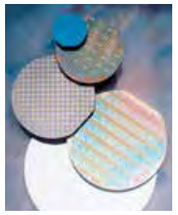
RoHS Compliant

MEIDEN, supplier of advanced vacuum component technologies

Reliable Vacuum Technology Since 1968

For over 50 years, MEIDEN has been producing high-precision vacuum technology.
Our vacuum capacitors are utilized in a wide range of applications, and we work tirelessly to supply the most reliable, cutting-edge vacuum technology on the market.

■Main Applications



Semiconductor Manufacturing Equipment

Vacuum capacitors (VCs) are an integral part of semiconductor manufacturing processes. VCs are used in the impedance matching networks which enable physical vapor deposition (PVD), chemical vapor deposition (CVD) and etching.

Liquid Crystal Display (LCD) Panel Manufacturing Equipment

VCs are a key component of the impedance matching networks of the radio frequency (RF) generators used to manipulate high-current plasma in order to manufacture LCD panels, such as flat screen TVs.

Photovoltaic Cell Manufacturing Equipment

LCD technology is used for the manufacture of photovoltaic power generating panels (solar cells). Here too, VCs are incorporated in the impedance matching network of RF generators for plasma generation.

Broadcasting

VCs are used in communications equipment, transmission systems for short and medium wave broadcasting, aircraft antenna tuners used in harsh environments, and various mobile communications equipment.

Medical Care and Measuring Devices

Vacuum capacitors are used in chemical composition analysis and magnetic resonance imaging (MRI).

Research

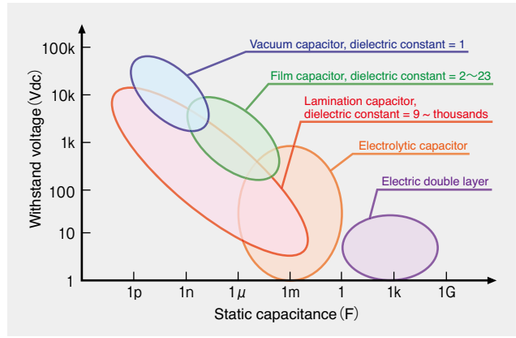
Vacuum capacitors are used in particle accelerators and other fundamental science research facilities.

Wireless charging

Vacuum capacitors are used in wireless charging research facilities of electric vehicles and plug-in hybrid vehicles.

■Features

Vacuum capacitors (VCs) have a significantly lower Equivalent Series Resistance (ESR) than other technologies. Using a high vacuum as the dielectric results in high current and voltage ratings, coupled with low losses, especially when compared to alternative forms of dielectrics. We offer five series of VCs, ranging in capacitance from 1 pF to 6000 pF, with peak voltage tolerance ranging from 3 kVp to 40 kVp. Vacuum capacitors are the optimal choice where high voltage, high current and high frequencies intersect.



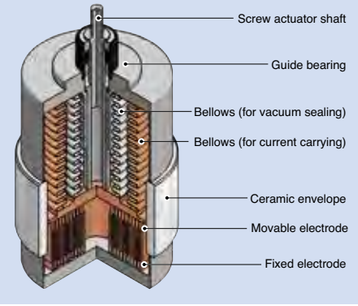
■Structure

Vacuum variable capacitors incorporate movable plate electrodes. The plates move in relation to each other within the vacuum, using precision screw actuators, which provide excellent accuracy and repeatability. The bellows contains the vacuum, allowing motion without the use of seals. Since the bellows also carry current, we have engineered our VCs with a variety of internal structures to choose from, including long-lasting stainless steel bellows or double bellows, to accommodate any current handling and life cycle needs in the industry. This technology is also used in our high-power vacuum contactors and interrupters, which are used in utility power systems, bullet trains and other high-power infrastructure projects.

●Variable Type

VP Series

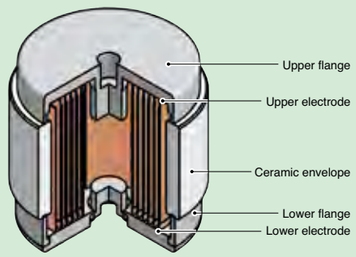
Double bellows



●Fixed Type

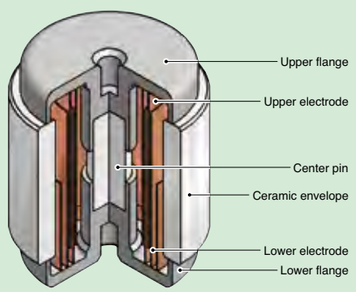
FH Series

Large current type



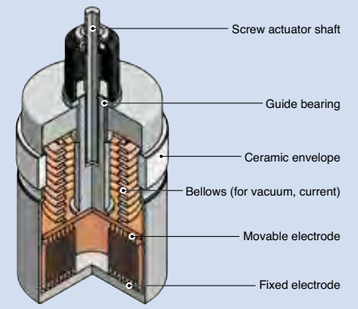
FS・FC Series

Compact type



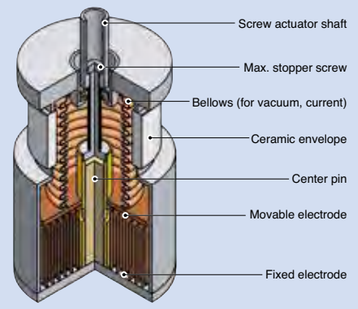
UW Series

Low-loss high-strength bellows



VM Series

The first model



■Product Types

SC□ – □□ □ □ □ □

V : Variable F : Fixed T : Trimmer	Peak test voltage	Capacitance (×100 pF)	Symbol (Series)	Diameter	Type

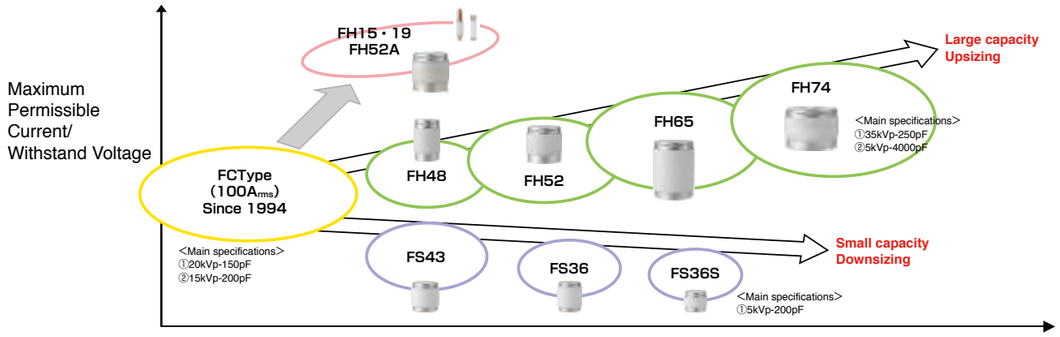
Example: SCV-125P65DW
Variable type, peak test voltage of 12 kVp, capacitance of 500 pF,
VP Series, diameter of 65mm, DW: Identification Symbol for electrode and capacitance

■Customization

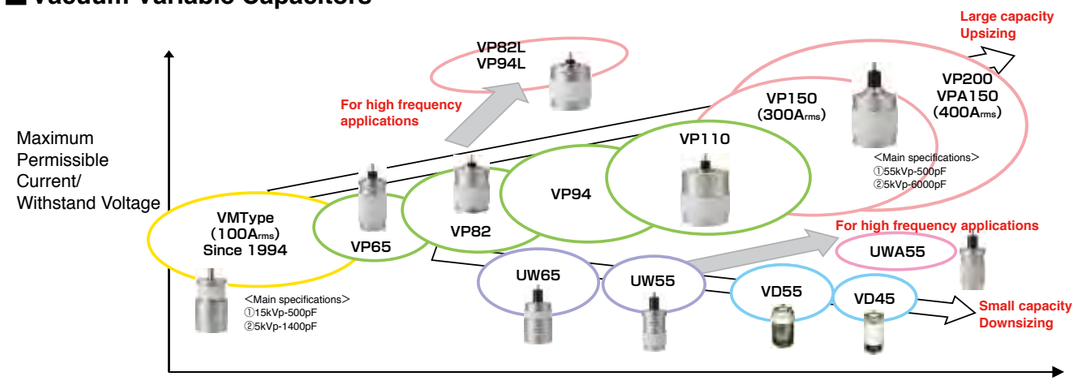
MEIDEN builds a variety of vacuum capacitors to meet the most rigorous specifications. We can accommodate the most demanding technical needs. Please contact us to discuss your unique requirements for component applications. this catalog is a sampling of our full product portfolio.

Product Lineups

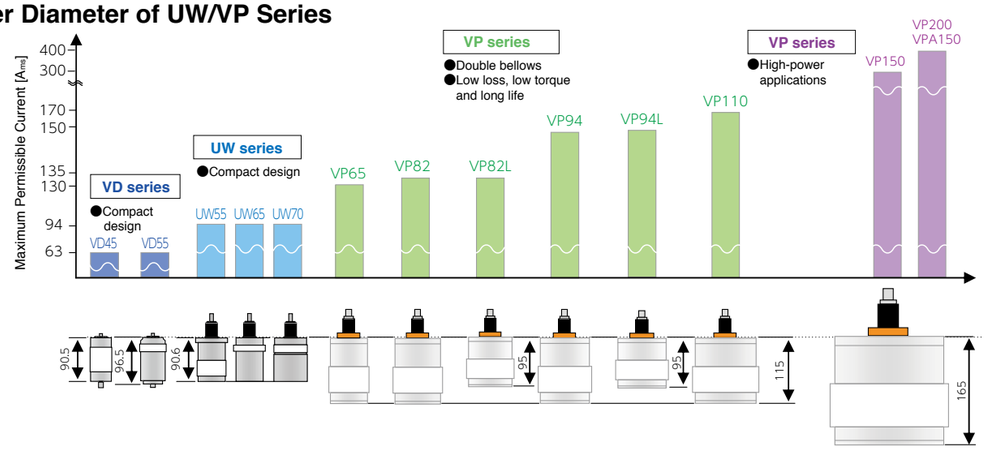
■Vacuum Fixed Capacitors



■Vacuum Variable Capacitors



■Outer Diameter of UW/VP Series



Vacuum Fixed Capacitors

FS Series up to 50 A_{rms} (13.56 MHz)

Designed for low-power applications

■ Features

- **Stainless steel electrodes facilitate high voltage tolerance in a compact form.**
- **Compact design**
- **Robust internal construction**

■ Type

※ Part numbers in are standard and preferred.

Type	Part Number	Capacitance※3 pF	Voltage※1 kVp		Current A_{rms}			Mounting Dimensions mm	Weight kg
			RF Working	Peak Test	13.56 MHz	40 MHz	60 MHz		
FS36S	SCF-51S※2	100	3	5	18	38	34	L30 × ϕ36	~0.2
	SCF-51.1S※2	110	3	5	19	38	34		
	SCF-51.2S※2	120	3	5	21	38	34		
	SCF-51.3S※2	130	3	5	23	38	34		
	SCF-51.4S※2	140	3	5	25	38	34		
	SCF-51.5S※2	150	3	5	27	38	34		
	SCF-52S※2	200	3	5	36	38	34		
FS36	SCF-150.1Z※2	10	9	15	5	15	23	L43× ϕ36	~0.2
	SCF-150.2Z※2	20	9	15	10	31	34		
	SCF-150.25Z※2	25	9	15	13	38	34		
	SCF-200.3Z※2	30	12	20	21	38	34		
	SCF-150.33Z※2	33	9	15	17	38	34		
	SCF-150.4Z※2	40	9	15	21	38	34		
	SCF-150.5Z※2	50	9	15	27	38	34		
	SCF-150.75Z※2	75	9	15	40	38	34		
	SCF-150.8Z※2	80	9	15	43	38	34		
	SCF-150.84Z※2	84	9	15	45	38	34		
	SCF-150.9Z※2	90	9	15	48	38	34		
	SCF-151Z※2	100	9	15	50	38	34		
	SCF-151.2Z※4	120	9	15	50	38	34		
	SCF-151.3Z※4	130	9	15	50	38	34		
	SCF-151.4Z※4	140	9	15	50	38	34		
	SCF-151.5Z※4	150	9	15	50	38	34		
	SCF-151.8Z※4	180	9	15	50	38	34		
	SCF-152Z※4	200	9	15	50	38	34		
	SCF-52.5Z※4	250	3	5	45	38	34		
	SCF-102.5Z※4	250	6	10	50	38	34		
	SCF-53Z※4	300	3	5	50	38	34		
	SCF-103Z※4	300	6	10	50	38	34		
	SCF-53.5Z※4	350	3	5	50	38	34		
	SCF-103.5Z※4	350	6	10	50	38	34		
	SCF-54Z※4	400	3	5	50	38	34		
	SCF-104Z※4	400	6	10	50	38	34		
	SCF-55Z※4	500	3	5	50	38	34		
	SCF-105Z※4	500	6	10	50	38	34		
FS43	SCF-152.2※4	220	9	15	50	38	34	L43 × ϕ43	~0.3
	SCF-152.5※4	250	9	15	50	38	34		
	SCF-153※4	300	9	15	50	38	34		
	SCF-56※4	600	3	5	50	38	34		
	SCF-57※4	700	3	5	50	38	34		
	SCF-58※4	800	3	5	50	38	34		
	SCF-59※4	900	3	5	50	38	34		
	SCF-510※4	1000	3	5	50	38	34		

※1：The unit of "Voltage(kVp)" is "0-peak".
※2：Max current values assume base sink/convection cooling.
※3：Capacitance tolerance: below 50 pF : ±10 %, above 50 pF : ±5 %
※4：Water cooling adds 50W thermal capacity.

FC Series up to 100 A_{rms} (13.56 MHz)

Designed for medium-power applications

■ Features

- **High-current copper electrode**
- **Robust internal construction**

■ Type

Type	Part Number	Capacitance※3 pF	Voltage※1 kVp		Current A_{rms}			Mounting Dimensions mm	Weight kg
			RF Working	Peak Test	13.56 MHz	40 MHz	60 MHz		
FC52	SCF-150.5C※2	50	9	15	27	79	89	L48 × ϕ52.4	~0.4
	SCF-151C※2	100	9	15	54	99	89		
	SCF-151.5C※4	150	9	15	81	99	89		
	SCF-152C※4	200	9	15	100	99	89		
FC52A	SCF-150.5CA※2	50	9	15	27	61	55	L52 × ϕ52.4	~0.6
	SCF-150.8CA※2	80	9	15	43	61	55		
	SCF-150.9CA※2	90	9	15	48	61	55		
	SCF-151CA※2	100	9	15	54	61	55		
	SCF-151.2CA※2	120	9	15	65	61	55		
	SCF-151.5CA※4	150	9	15	80	61	55		
	SCF-151.8CA※4	180	9	15	80	61	55		
	SCF-152.1CA※4	210	9	15	80	61	55		
FC62	SCF-200.1C※2	9	12	20	6	19	28	L50 × ϕ62.4	~0.8
	SCF-200.5C※2	50	12	20	36	76	68		
	SCF-200.75C※2	75	12	20	54	76	68		
	SCF-201C※2	100	12	20	72	76	68		
	SCF-201.5C※4	150	12	20	100	76	68		

※1：The unit of "Voltage(kVp)" is "0-peak".
※2：Max current values assume base sink/convection cooling.
※3：Capacitance tolerance: below 50 pF : ±10 %, above 50 pF : ±5 %
※4：Water cooling adds 50W thermal capacity.

FH Series up to 172 A_{rms} (13.56 MHz)

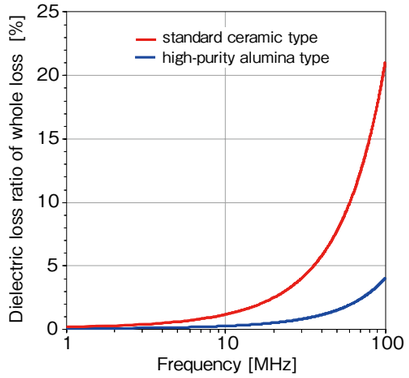
Designed for high power applications

■ Features

●High voltage tolerance

We offer a variety of different capacitors covering peak test voltages of 25 kVp, 30 kVp, and 35 kVp

■ Low-Loss with High-Purity Alumina Ceramic



Dielectric loss of ceramic envelope

Dielectric losses of ceramic envelope

Vacuum capacitor has resistance losses and dielectric as heat losses.

High purity alumina ceramics exhibit reduced low dielectric losses and is recommended for applications requiring higher power at frequencies over 40MHz.

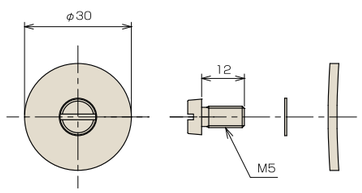
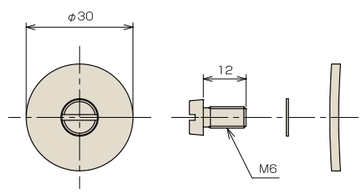
Standard Ceramic Type (FH52WR)

High Purity Alumina Ceramic Type (FHA52WR)

■ Optional

●Mounting kit

Screws and washer sets commonly used in installation

Applicable models	FH48C	FH52WR, FHA52WR, FH65C, FH74WR
Mounting kit	IK-0 	IK-1 

●Fine-tuning Option (Trimmer Capacitors)

The capacitance can be adjusted by ±5%.

The capacitance is half of the value listed on the right.

Available Type: FHA52WR

Example: (For SCF-152HA52WR)

Type: SCT-151HA52WR, Adjustable Range: 95pF ~ 105pF

■ Type

※ Part numbers in ▭ are standard and preferred.

Type	Part Number	Capacitance※3 pF	Voltage※1 kVp		Current A_{rms}			Mounting Dimensions mm	Weight kg
			RF Working	Peak Test	13.56 MHz	40 MHz	60 MHz		
FH48C	SCF-300.25H48C※2	25	18	30	27	79	99	L73 × ϕ48	~0.5
	SCF-300.5H48C※2	50	18	30	54	110	99		
	SCF-300.75H48C※2	75	18	30	81	110	99		
	SCF-301H48C※5	100	18	30	108	110	99		
	SCF-351H48C※5	100	21	35	126	110	99		
	SCF-251.25H48C※5	125	15	25	112	110	99		
	SCF-251.5H48C※5	150	15	25	135	110	99		
	SCF-251.75H48C※5	175	15	25	145	110	99		
	SCF-252H48C※5	200	15	25	145	110	99		
FH52WR	SCF-151H52WR※5	100※4	9	15	54	99	89	L52 × ϕ52.4	~0.6
	SCF-201H52WR※5	100※4	12	20	72	99	89		
	SCF-151.5H52WR※5	150※4	9	15	81	99	89		
	SCF-152H52WR※5	200※4	9	15	108	99	89		
	SCF-202H52WR※5	200※4	12	20	130	99	89		
	SCF-152.1H52WR※5	210※4	9	15	113	99	89		
	SCF-152.5H52WR※5	250※4	9	15	130	99	89		
	SCF-153H52WR※5	300※4	9	15	130	99	89		
	SCF-153.5H52WR※5	350※4	9	15	130	99	89		
	SCF-153.7H52WR※5	370※4	9	15	130	99	89		
	SCF-124H52WR※5	400※4	7.2	12	130	99	89		
	SCF-124.5H52WR※5	450※4	7.2	12	130	99	89		
	SCF-125H52WR※5	500※4	7.2	12	130	99	89		
	SCF-155H52WR※5	500※4	9	15	130	99	89		
	SCF-105.5H52WR※5	550※4	6	10	130	99	89		
	SCF-56H52WR※5	600※4	3	5	108	99	89		
	SCF-106H52WR※5	600※4	6	10	130	99	89		
	SCF-106.5H52WR※5	650※4	6	10	130	99	89		
	SCF-107H52WR※5	700※4	6	10	130	99	89		
	SCF-107.5H52WR※5	750※4	6	10	130	99	89		
	SCF-510H52WR※5	1000※4	3	5	130	99	89		
	SCF-810H52WR※5	1000※4	4.8	8	130	99	89		
	SCF-512.5H52WR※5	1250※4	3	5	130	99	89		
	SCF-315H52WR※5	1500※4	1.8	3	130	99	89		
	SCF-515H52WR※5	1500※4	3	5	130	99	89		
	SCF-317.5H52WR※5	1750※4	1.8	3	130	99	89		
	SCF-320H52WR※5	2000※4	1.8	3	130	99	89		
FHA52WR	SCF-151HA52WR※5	100※4	9	15	54	99	89	L52 × ϕ52.4	~0.6
	SCF-151.5HA52WR※5	150※4	9	15	81	99	89		
	SCF-152HA52WR※5	200※4	9	15	108	99	89		
	SCF-153HA52WR※5	300※4	9	15	130	99	89		
	SCF-125HA52WR※5	500※4	7.2	12	130	99	89		
	SCF-510HA52WR※5	1000※4	3	5	130	99	89		
FH65C	SCF-350.25H65C※2	25	21	35	31	93	118	L87 × ϕ65	~0.9
	SCF-350.5H65C※2	50	21	35	63	131	118		
	SCF-351H65C※5	100※4	21	35	126	131	118		
	SCF-351.5H65C※5	150	21	35	172	131	118		
	SCF-351.75H65C※5	175	21	35	172	131	118		
	SCF-352H65C※5	200	21	35	172	131	118		
	SCF-352.5H65C※5	250	21	35	172	131	118		
	SCF-253H65C※5	300	15	25	172	131	118		
	SCF-253.5H65C※5	350	15	25	172	131	118		
FH74WR	SCF-1010H74WR※5	1000	6	10	140	106	96	L52 × ϕ74	~1.0
	SCF-520H74WR※5	2000	3	5	121	92	83		
	SCF-530H74WR※5	3000	3	5	121	92	83		
	SCF-540H74WR※5	4000	3	5	121	92	83		

※1：The unit of "Voltage(kVp)" is "0-peak".
※2：Max current values assume base sink/convection cooling.
※3：Capacitance tolerance: below 50 pF : ±10 %, above 50 pF : ±5 %
※4：We can accommodate high capacitance tolerance (±3% or below) requirements.
※5：Water cooling adds 50W thermal capacity.

Vacuum Variable Capacitors

VD Series up to 80 A_{rms} (13.56 MHz)

Designed for low-power applications

■ Features

- **Compact design**
- **Shortened mounting length**

■ Motor Specifications

Item	VD
Torque	≦0.15Nm(≦15cNm)
Turns	10(±0.5)Turns
Motor axis diameter	ϕ5mm

■ Life Expectancy

Parts	Working Range	VD
Screw	50%	1,200 x10^3cyc
Bellows	75%	40 x10^3cyc
	100%	10 x10^3cyc

※Life expectancy is based on our standard working conditions: (rotation speed: 600rpm, acceleration: 4.5rmp/ms, temperature: 25°C, humidity: 40-85% RH).

■ Type

Type	Part Number	Capacitance pF		Voltage※1 kVp		Current※2 A_{rms}			Mounting Dimensions mm	Weight kg
		Min.	Max.	RF Working	Peak Test	13.56 MHz	40 MHz	60 MHz		
VD45	SCV-56.5D45W	15	650	3	5	70	53	48	L115 × ϕ45	0.4
VD55	SCV-55D55W	35	500	3	5	40	30	27	L115 × ϕ55	~0.6
	SCV-85D55W	35	500	4.8	8	80	61	55		
	SCV-110D55W	40	1000	0.6	1	36	30	27		
	SCV-410D55W	40	1000	2.4	4	80	61	55		
	SCV-115D55W	45	1500	0.6	1	40	30	27		
	SCV-315D55W	45	1500	1.8	3	80	61	55		

※1:The unit of "Voltage(kVp)" is "0-peak".
※2:Max current values assume base sink/convection cooling.

VC-36LI Series up to 50 A_{rms} (13.56 MHz)

Designed for low-power applications

■ Features

- **Compact design**
- **Shortened mounting length**

■ Motor Specifications

Item	VC-36LID
Torque	≦0.15Nm(≦15cNm)
Turns	11.1(±0.5)Turns
Motor axis diameter	ϕ5mm

■ Life Expectancy

Parts	Working Range	VC-36LID
Screw	50%	1,080 x10^3cyc
Bellows	75%	40 x10^3cyc
	100%	10 x10^3cyc

※Life expectancy is based on our standard working conditions: (rotation speed: 600rpm, acceleration: 4.5rmp/ms, temperature: 25°C, humidity: 40-85% RH).

■ Type

Type	Part Number	Capacitance pF		Voltage※1 kVp		Current※2 A_{rms}			Mounting Dimensions mm	Weight kg
		Min.	Max.	RF Working	Peak Test	13.56 MHz	40 MHz	60 MHz		
VC-36LID	SCV-50.5C36LID	6	50	3	5	9	27	40	L90.6 × ϕ36	0.3

※1:The unit of "Voltage(kVp)" is "0-peak".
※2:Max current values assume base sink/convection cooling.

UW Series up to 94 A_{rms} (at 13.56 MHz)

Designed for low-power applications

■ Features

●Low-loss / high-strength bellows

Copper-coated stainless steel increases current-handling capability.

●Wide tuning range

Capacitance from 3 pF to 2,000 pF

●High purity alumina ceramics

Low-loss ceramics (UWA55 type)

●High durability screw actuator technology

Diamond-like carbon (DLC) coating extends life and reduces friction

■ Shaft and Drive Connection Profiles

We support flat (D-shaped), slit, pin drive and other coupling configurations.

UW-C shaft option number

SCV −□□□ H □□ UW-C （※）

※ Please contact your sales representative for shaft configuration ordering specifics.
Example) SCV-125H65UW-C(S1)

■ Types of shaft

Option Number	Shape	Shape Illustration
None	Two flat (standard)	Φ 6.35mm 
S1	Round	Φ 6.35mm 
S6	Two flat + slit	Φ 6.35mm 
S17	With pin	Φ 6.35mm 

■ Optional

●Ball screw actuators

Meiden has adopted a ball screw for variable capacitance to overcome overload conditions such as high speed/ high acceleration reverse matching, same range continuous operation, micro-motion and hunting oscillation. They provide vastly superior life expectancy, exhibiting near-zero friction for high-speed and high-acceleration/ deceleration functions.
The UW series is available with small ball screw profiles to meet size constraints and extend life.

UW-B Optional Ball Screw

■ Motor Specifications

Item	UW-C	UW-B (Ball Screw)
Torque	≦0.18Nm(≦18cNm)	≦0.15Nm(≦15cNm)
Turns	10.5(±0.5)Turns	9.5($^{+0.5}_{0}$)Turns
Motor axis diameter	ϕ6.35mm	ϕ12.7mm

■ Life Expectancy

Parts	Working Range	UW-C	UW-B (Ball Screw)
Screw	50%	2,380 x10^3cyc	5,260 x10^3cyc
Bellows	75%	60 x10^3cyc	60 x10^3cyc
	100%	20 x10^3cyc	20 x10^3cyc

※Life expectancy is based on our standard working conditions: (rotation speed: 600rpm, acceleration: 4.5rmp/ms, temperature: 25°C, humidity: 40-85% RH).

■ Type

※ Part numbers in are standard and preferred.

Type	Part Number	Capacitance pF		Voltage※1 kVp		Current※2 A_{rms}			Mounting Dimensions mm	Weight kg
		Min.	Max.	RF Working	Peak Test	13.56 MHz	40 MHz	60 MHz		
UWA55	SCV-150.6HA55UW-C	3	60	9	15	32	71	64	L133.5 × ϕ55	~0.7
	SCV-150.75HA55UW-C	5	75	9	15	40	71	64		
UW55	SCV-200.5FH55UW-C※3	6	50	12	20	36	71	64	L133.5 × ϕ55	~0.7
	SCV-151H55UW-C※3	10	100	9	15	54	71	64		
	SCV-201H55UW-C※3	10	100	12	20	72	71	64		
	SCV-151.5FH55UW-C※3	7	150	9	15	81	71	64		
	SCV-152.5H55UW-C※3	25	250	9	15	94	71	64		
	SCV-83.5FH55UW-C※3	7	350	4.8	8	94	71	64		
	SCV-55FH55UW-C※3	7	500	3	5	90	71	64		
	SCV-85H55UW-C※3	35	500	4.8	8	94	71	64		
	SCV-310H55UW-C※3	35	1000	1.8	3	94	71	64		
	SCV-510H55UW-C※3	35	1000	3	5	94	71	64		
	SCV-415H55UW-C	150	1500	2.4	4	94	71	64		
UW65	SCV-125H65UW-C※3	50	500	7.2	12	94	71	64	L133.5 × ϕ65	~0.9
	SCV-155H65UW-C※3	50	500	9	15	94	71	64		
	SCV-810H65UW-C※3	100	1000	4.8	8	94	71	64		
	SCV-1010H65UW-C※3	100	1000	6	10	94	71	64		
	SCV-415H65UW-C※3	150	1500	2.4	4	94	71	64		
	SCV-515H65UW-C※3	150	1500	3	5	94	71	64		
	SCV-320H65UW-C※3	200	2000	1.8	3	94	71	64		
UW70	SCV-320H70UW-C※3	200	2000	1.8	3	94	71	64	L133.5 × ϕ70	~1.0
	SCV-715H70UW-C※3	150	1500	4.2	7	94	71	64		
UW82	SCV-158FH82UW-C※3	50	800	9	15	94	71	64	L133.5× ϕ82	1.3

※1：The unit of "Voltage(kVp)" is "0-peak".
※2：Max current values assume base sink/convection cooling.
※3：UW-B type is available.

VC-82HE Series up to 140 A_{rms} (at 13.56 MHz)

Designed for medium-power applications

■ Features

●Double bellows with special copper alloy
Designed for high current applications, double bellows system provides highest current capacity and extended durability while exhibiting low actuation torque

●Reinforced actuator screw system
Coated with long-life diamond-like carbon (DLC)

■ Optional

●Ball screw actuators

C82HE Optional Ball Screw

■ Motor Specifications

Item	SCV-103.3C82HEW-AADG-J	SCV-202C82HE-AAFG-B	SCV-250.8C82HE-AADG-F	SCV-251C82HE-B3 (Ball Screw)
Torque	≦0.18Nm(≦18cNm)	≦0.18Nm(≦18cNm)	≦0.18Nm(≦18cNm)	≦0.15Nm(≦15cNm)
Turns	12(±0.5)Turns	10.5(±0.5)Turns	13.5(±0.5)Turns	10(±0.5)Turns
Motor axis diameter	ϕ12.7mm	ϕ12.7mm	ϕ12.7mm	ϕ12.7mm

■ Life Expectancy

Parts	Working Range	SCV-103.3C82HEW-AADG-J	SCV-202C82HE-AAFG-B	SCV-250.8C82HE-AADG-F	SCV-251C82HE-B3 (Ball Screw)
Screw	50%	2,920 x10^3cyc	3,330 x10^3cyc	2,590 x10^3cyc	7,000 x10^3cyc
Bellows	75%	500 x10^3cyc	500 x10^3cyc	500 x10^3cyc	500 x10^3cyc
	100%	50 x10^3cyc	50 x10^3cyc	50 x10^3cyc	50 x10^3cyc

※Life expectancy is based on our standard working conditions: (rotation speed: 600rpm, acceleration: 4.5rmp/ms, temperature: 25°C, humidity: 40-85% RH).

■ Type

Type	Part Number	Capacitance pF		Voltage※1 kVp		Current※2 A_{rms}			Mounting Dimensions mm	Weight kg
		Min.	Max.	RF Working	Peak Test	13.56 MHz	40 MHz	60 MHz		
VC-82HE	SCV-103.3C82HEW-AADG-J※3	30	330	6	10	119	106	96	L132 × ϕ82	1.5
	SCV-202C82HE-AAFG-B※3	12	200	12	20	140	106	96		
	SCV-250.8C82HE-AADG-F※3	10	80	15	25	72	106	96		
	SCV-251C82HE-B3	12	100	15	25	90	106	96		

※1：The unit of "Voltage(kVp)" is "0-peak".
※2：Max current values assume base sink/convection cooling.
※3：Ball screw type（C82HE-B）is available for these models.

VP Series up to 170 A_{rms} (at 13.56 MHz)

Designed for medium/ high-power applications

■ Features

●Double bellows with special copper alloy
Designed for high current applications, the dual bellows system provides the highest current capacity and extended durability while exhibiting low actuation torque.

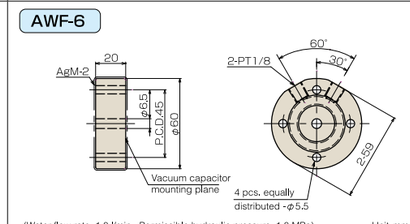
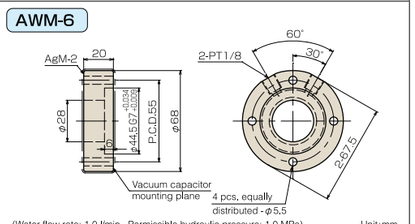
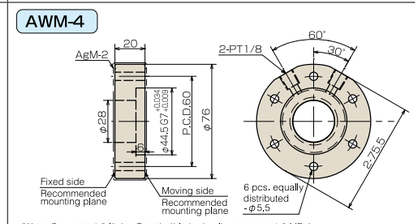
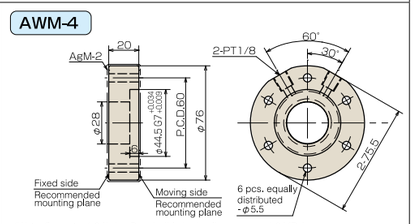
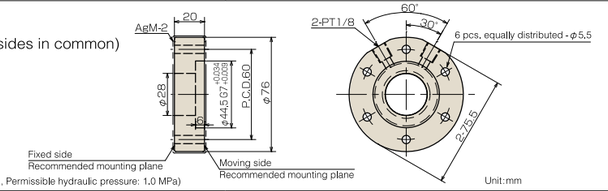
●Reinforced actuator screw system
Coated with long-life diamond-like carbon (DLC)

■ Optional

●Ball screw actuators

VH-B Optional Ball Screw

●Water-cooling flanges

Types	Fixed Side	Moving Side
VP65	AWF-6  (Water flow rate: 1.0 l/min., Permissible hydraulic pressure: 1.0 MPa) Unit:mm	AWM-6  (Water flow rate: 1.0 l/min., Permissible hydraulic pressure: 1.0 MPa) Unit:mm
VP82 VP82L VP94L	AWM-4  (Water flow rate: 1.0 l/min., Permissible hydraulic pressure: 1.0 MPa) Unit:mm	AWM-4  (Water flow rate: 1.0 l/min., Permissible hydraulic pressure: 1.0 MPa) Unit:mm
VP94 VP110 VP132	AWM-4 (Fixed and moving sides in common)  (Water flow rate: 1.0 l/min., Permissible hydraulic pressure: 1.0 MPa) Unit:mm	

VP Series up to170 A_{rms} (13.56 MHz)

■ Motor Specifications

Item	Other than VP82L,VP94L	VP82L・VP94L	Other than VP82L-B,VP94L-B (Ball Screw)	VP82L-B,VP94L-B (Ball Screw)
Torque	≦0.18Nm(≦18cNm)	≦0.18Nm(≦18cNm)	≦0.12Nm(≦12cNm)	≦0.12Nm(≦12cNm)
Turns	14(±0.5)Turns	10.5(±0.5)Turns	14(±0.5)Turns	10(±0.5)Turns
Motor axis diameter	ϕ6.35mm	ϕ6.35mm	ϕ12.7mm	ϕ12.7mm

■ Life Expectancy

Parts	Working Range	Other than VP82L,VP94L	VP82L・VP94L	Other than VP82L-B,VP94L-B (Ball Screw)	VP82L-B,VP94L-B (Ball Screw)
Screw	50%	2,500 x10^3cyc	3,330 x10^3cyc	5,000 x10^3cyc	6,670 x10^3cyc
Bellows	75%	500 x10^3cyc	500 x10^3cyc	500 x10^3cyc	500 x10^3cyc
	100%	50 x10^3cyc	50 x10^3cyc	50 x10^3cyc	50 x10^3cyc

※Life expectancy is based on our standard working conditions: (rotation speed: 600rpm, acceleration: 4.5rmp/ms, temperature: 25°C, humidity: 40-85% RH).

■ Type

※ Part numbers in are standard and preferred.

Type	Part Number	Capacitance pF		Voltage※1 kVp		Current※2 A_{rms}			Mounting Dimensions mm	Weight kg
		Min.	Max.	RF Working	Peak Test	13.56 MHz	40 MHz	60 MHz		
VP65	SCV-151P65	10	100	9	15	54	99	89	L154 × ϕ65	~1.2
	SCV-201P65	10	100	12	20	72	99	89		
	SCV-152P65C	5.5	200	9	15	108	99	89		
	SCV-202P65	15	200	12	20	130	99	89		
	SCV-152.5P65	15	250	9	15	130	99	89		
	SCV-202.5P65	15	250	12	20	130	99	89		
	SCV-104P65FW	6	400	6	10	130	99	89		
	SCV-124P65FW	6	400	7.2	12	130	99	89		
	SCV-7.55P65FW	6	500	4.5	7.5	130	99	89		
	SCV-105P65FW	6	500	6	10	130	99	89		
	SCV-125P65DW	10	500	7.2	12	130	99	89		~1.3
	SCV-155P65DW	10	500	9	15	130	99	89		
	SCV-310P65FW	6	1000	1.8	3	108	99	89		~1.2
	SCV-410P65FW	6	1000	2.4	4	130	99	89		
	SCV-510P65W	20	1000	3	5	130	99	89		~1.3
	SCV-810P65W	20	1000	4.8	8	130	99	89		
	SCV-315P65DW	10	1500	1.8	3	130	99	89		
	SCV-415P65DW	10	1500	2.4	4	130	99	89		
VP70	SCV-155P70W	15	500	9	15	140	106	96	L154 × ϕ70	~1.5
	SCV-515P70W	35	1500	3	5	140	106	96		
VP82	SCV-202P82	20	200	12	20	140	106	96	L154 × ϕ82	~1.9
	SCV-155P82W	20	500	9	15	140	106	96		
	SCV-205P82W	20	500	12	20	140	106	96		
	SCV-1010P82W	25	1000	6	10	140	106	96		
	SCV-515P82W	25	1500	3	5	140	106	96		
	SCV-520P82W	25	2000	3	5	140	106	96		
VP82L	SCV-200.5P82L	12	50	12	20	36	106	96	L125 × ϕ82	~1.6
	SCV-250.8P82L	11	80	15	25	72	106	96		
	SCV-201P82L	12	100	12	20	72	106	96		
	SCV-251P82L	12	100	15	25	90	106	96		
	SCV-201.5P82L	12	150	12	20	108	106	96		
	SCV-202P82L	12	200	12	20	140	106	96		
	SCV-202.2P82L	12	220	12	20	140	106	96		
	SCV-103.5P82LW	15	350	6	10	126	106	96		
	SCV-84P82LW	15	400	4.8	8	115	106	96		
VP94	SCV-202.5P94	25	250	12	20	150	114	103	L154 × ϕ94	~2.3
	SCV-155P94	25	500	9	15	150	114	103		
	SCV-158P94DW	50	800	9	15	150	114	103		
	SCV-515P94	30	1500	3	5	150	114	103		
	SCV-520P94W	30	2000	3	5	150	114	103		
	SCV-523P94W	45	2300	3	5	150	114	103		
VP94L	SCV-251P94L	14	100	15	25	90	125	113	L125 × ϕ94	~1.8
	SCV-202.2P94L	14	220	12	20	159	125	113		
	SCV-153.5P94LW	15	350	9	15	165	125	113		

※1：The unit of "Voltage(kVp)" is "0-peak".
※2：Max current values assume base sink/convection cooling.
※Ball screw type（VH-B）is available for all above models.

■ Type

※ Part numbers in are standard and preferred.

Type	Part Number	Capacitance pF		Voltage※1 kVp		Current※2 A_{rms}			Mounting Dimensions mm	Weight kg
		Min.	Max.	RF Working	Peak Test	13.56 MHz	40 MHz	60 MHz		
VP110	SCV-350.3P110	8	30	21	35	37	111	117	L154 × ϕ110	~3.0
	SCV-351P110	20	100	21	35	126	129	117		
	SCV-201.5P110C	11	150	12	20	108	129	117		
	SCV-251.5P110C	11	150	15	25	135	129	117		
	SCV-302P110	25	200	18	30	170	129	117		
	SCV-202.5P110C	13	245	12	20	170	129	117		
	SCV-252.5P110C	13	245	15	25	170	129	117		
	SCV-253.5P110	35	350	15	25	170	129	117		
	SCV-205P110	40	500	12	20	170	129	117		
	SCV-255P110	40	500	15	25	170	129	117		
	SCV-158P110FW	15	800	9	15	170	129	117		
	SCV-1510P110W	40	1000	9	15	170	129	117		
	SCV-1015P110W	40	1500	6	10	170	129	117		
	SCV-520P110W	40	2000	3	5	170	129	117		
	SCV-820P110W	40	2000	4.8	8	170	129	117		
	SCV-325P110FW	15	2500	1.8	3	170	129	117		
	SCV-340P110W	45	4000	1.8	3	170	129	117		
VP132	New SCV-2013P132DW	40	1300	12	20	170	129	117	L154 × ϕ132	3.8
	SCV-2015P132DW	40	1500	12	20	170	129	117		

※1：The unit of "Voltage(kVp)" is "0-peak".
※2：Max current values assume base sink/convection cooling.

VP Series (VP150 type) up to 400 A_{rms} (13.56 MHz)

Designed for high-power applications

■ Features

- **Internal water-cooling bellows/ actuator structure, large aperture/ high-current copper alloy bellows**
- **Low losses**
- **Reinforced actuator screw system**
  Coated with long-life diamond-like carbon (DLC)

■ Motor Specifications

Item	VP150・VPA150・VP200
Torque	≦0.70Nm(≦70cNm)
Turns	14(±0.5)Turns
Motor axis diameter	ϕ6.35mm

■ Life Expectancy

Parts	Working Range	VP150・VPA150・VP200
Screw	50%	2,500 x10^3cyc
Bellows	75%	500 x10^3cyc
	100%	50 x10^3cyc

※Life expectancy is based on our standard working conditions: (rotation speed: 600rpm, acceleration: 4.5rmp/ms, temperature: 25°C, humidity: 40-85% RH).

■ Type

Type	Part Number	Capacitance pF		Voltage※1 kVp		Current※2 A_{rms}			Mounting Dimensions mm	Weight kg
		Min.	Max.	RF Working	Peak Test	13.56 MHz	40 MHz	60 MHz		
VP150	SCV-405P150	40	500	24	40	300	228	206	L265 × ϕ150	6.6
	SCV-2010P150W	50	1000	12	20	300	228	206		7.7
	SCV-1525P150W	40	2500	9	15	300	228	206		
	SCV-560P150W	60	6000	3	5	300	228	206		
VPA150	SCV-1525PA150W	40	2500	9	15	400	305	275		
VP200	SCV-555P200	40	500	33	55	400	305	275	L265×ϕ200	13.4

※1：The unit of "Voltage(kVp)" is "0-peak".
※2：Water cooling adds 700W thermal capacity
※Ball screw type (VH-B) is available for all above models.

VM / VT Series up to 100 A_{rms} (13.56 MHz)

VM Series

VT Series

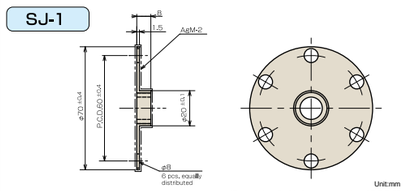
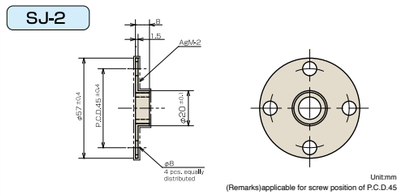
■ Features

- **Low losses / high-strength bellows**
- **High-strength / special screw drive**
- **Robust internal construction**

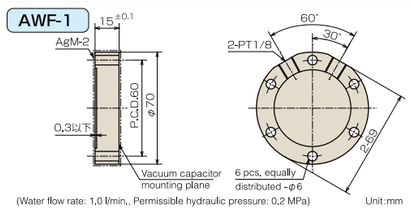
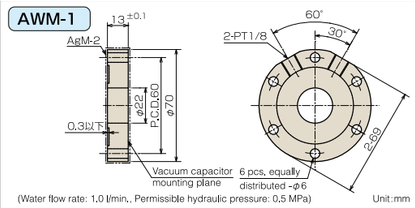
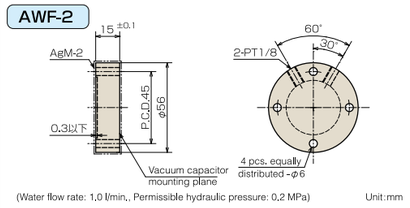
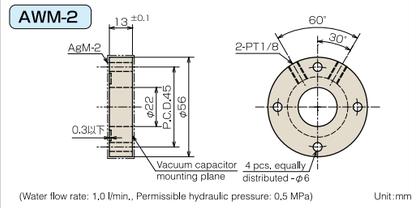
■ Options

● Guide bearing

Guide bearings increase radial load tolerance of the actuator system

Part Number	Guide Bearing
SCV-510M, SCV-514M, SCV-155M, SCV-520M, SCV-1010, SCV-204, SCV-1010G, SCV-1014G, SCV-205G	SJ-1  Unit:mm (Remarks)applicable for screw position of P.C.D.60
SCV-55, SCV-7.55, SCV-151, SCV-152, SCV-152.5, SCV-155G	SJ-2  Unit:mm (Remarks)applicable for screw position of P.C.D.45

● Water-cooled flanges

Part Number	Fixed Side	Moving Side
SCV-510M, SCV-514M, SCV-155M, SCV-520M, SCV-1010, SCV-204, SCV-1010G, SCV-1014G, SCV-205G	AWF-1  (Water flow rate: 1,0 l/min., Permissible hydraulic pressure: 0,2 MPa) Unit:mm	AWM-1  (Water flow rate: 1,0 l/min., Permissible hydraulic pressure: 0,5 MPa) Unit:mm
SCV-55, SCV-7.55, SCV-151, SCV-152, SCV-152.5, SCV-155G	AWF-2  (Water flow rate: 1,0 l/min., Permissible hydraulic pressure: 0,2 MPa) Unit:mm	AWM-2  (Water flow rate: 1,0 l/min., Permissible hydraulic pressure: 0,5 MPa) Unit:mm

■ Motor Specifications

Item	VM Series		VT Series	
	Type1-4	Type5・6	Type1・2	Type3
Torque	≦0.245Nm(≦24.5cNm)	≦0.196Nm(≦19.6cNm)	≦0.196Nm(≦19.6cNm)	≦0.176Nm(≦17.6cNm)
Turns	12(±1)Turns	5.5(±0.5)Turns	10.5(±0.5)Turns	6(±0.5)Turns
Motor axis diameter	ϕ12.7mm	ϕ12.7mm	ϕ12.7mm	ϕ12.7mm

■ Life Expectancy

Parts	Working Range	VM Series		VT Series	
		Type1-4	Type5・6	Type1・2	Type3
Screw	50%	1,000 x10^3cyc	2,180 x10^3cyc	1,140 x10^3cyc	2,000 x10^3cyc
Bellows	75%	40 x10^3cyc	40 x10^3cyc	40 x10^3cyc	40 x10^3cyc
	100%	10 x10^3cyc	10 x10^3cyc	10 x10^3cyc	10 x10^3cyc

※Life expectancy is based on our standard working conditions: (rotation speed: 600rpm, acceleration: 4.5rmp/ms, temperature: 25°C, humidity: 40-85% RH).

■ Type

VM Series

Type	Part Number	Capacitance pF		Voltage※1 kVp		Current※2 A_{rms}			Mounting Dimensions mm	Weight kg
		Min.	Max.	RF Working	Peak Test	13.56 MHz	40 MHz	60 MHz		
Type1	SCV-150.5	10	50	9	15	27	76	68	L140 × ϕ60.4	1.0
	SCV-151	10	100	9	15	54	76	68		
	SCV-152	12	200	9	15	100	76	68		
	SCV-155G	25	500	9	15	90	68	62		
Type2	SCV-152.5	30	250	9	15	100	76	68	L140 × ϕ62.4	1.0
	SCV-7.55	30	500	4.5	7.5	100	76	68		
	SCV-55	30	500	3	5	90	76	68		
Type3	SCV-155M	50	500	9	15	100	76	68	L140 × ϕ73	1.3
	SCV-510M	50	1000	3	5	100	76	68		1.4
	SCV-514M	90	1400	3	5	100	76	68		
	SCV-205G	50	500	12	20	90	68	62		1.3
	SCV-1010G	50	1000	6	10	90	68	62		1.4
	SCV-1014G	90	1400	6	10	90	68	62		
Type4	SCV-204	80	450	12	20	100	76	68	L140 × ϕ89	1.8
	SCV-1010	80	1000	6	10	100	76	68		
	SCV-520M	85	2000	3	5	100	76	68		1.9
Type5	SCV-201.7G	45	170	12	20	90	68	62	L100 × ϕ63	0.8
	SCV-104G	60	450	6	10	90	68	62		
Type6	SCV-300.2G	6	20	18	30	21	63	62	L100 × ϕ60.4	0.8
	SCV-250.3G	6	30	15	25	27	68	62		
	SCV-250.8G	10	80	15	25	72	68	62		

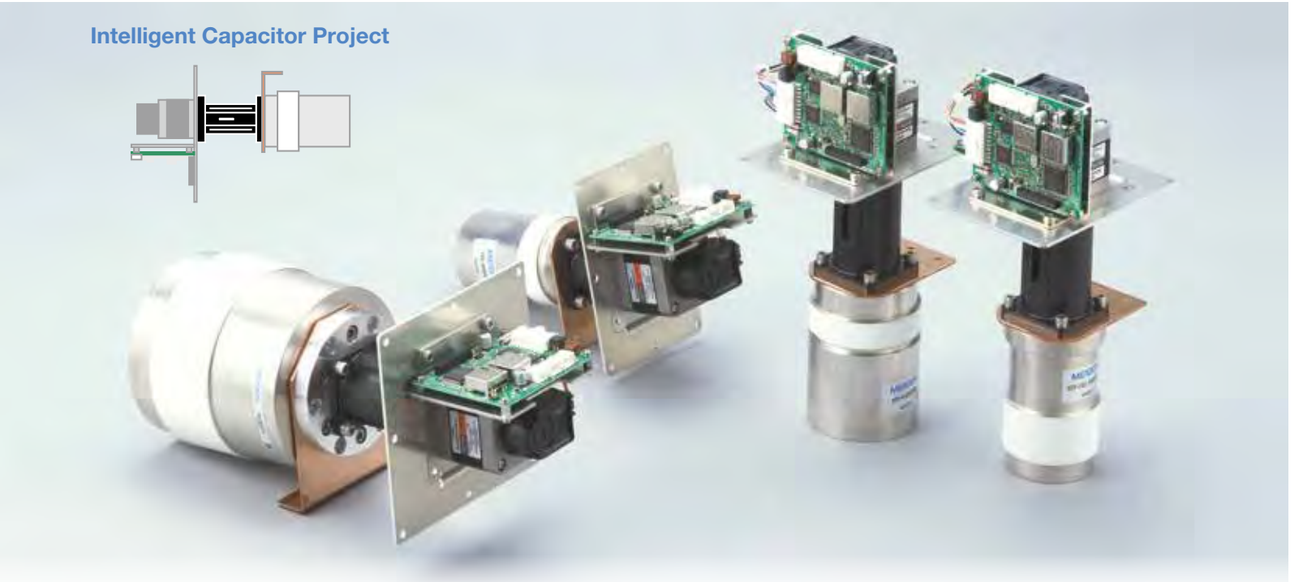
※1 : The unit of "Voltage(kVp)" is "0-peak".
※2 : Max current values assume base sink/convection cooling.

VT Series

Type	Part Number	Capacitance pF		Voltage※1 kVp		Current※2 A_{rms}			Mounting Dimensions mm	Weight kg
		Min.	Max.	RF Working	Peak Test	13.56 MHz	40 MHz	60 MHz		
Type1	SCV-151GT	20	100	9	15	54	61	55	L130 × ϕ52.4	0.7
	SCV-152.5GT	25	250	9	15	80	61	55		
	SCV-155GT	70	500	9	15	80	61	55		
	SCV-510GT	70	1000	3	5	80	61	55		
Type2	SCV-515GT	70	1500	3	5	80	61	55	L130 × ϕ60	0.9
Type3	SCV-150.75GTB	5	75	9	15	40	61	55	L107 × ϕ52.4	0.8
	SCV-53GTB	10	330	3	5	59	61	55		

※1 : The unit of "Voltage(kVp)" is "0-peak".
※2 : Max current values assume base sink/convection cooling.

Auto-Tuning Vacuum Capacitors



An auto-tuning function can be installed on all MEIDEN vacuum variable capacitors.

■ Product Description

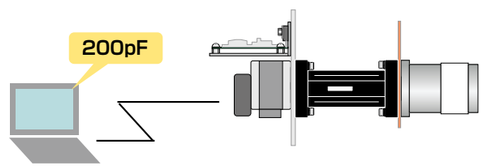
Based on our decades of experience engineering top-quality VCs, we have developed an auto-tuning function, which modularizes all of the controls necessary for controlling the electrostatic capacity of a vacuum variable capacitor. To enable the auto-tuning of our vacuum capacitors, we have fitted them with high-quality, long-lasting stepper motors, and encoders which couple adapters and controllers.
Simple serial commands can be used to control complicated impedance matching circuits. It is the best product for incorporating VCs into high-frequency plasma matching circuits and RF power supply circuits.
The devices auto-initialize at system startup and come with a factory position to C curve maps.
Your system does not need to reinitialize when additional devices are installed.
An example of the auto-tuning function in action: the stepper motor's operation is constantly monitored by an optical encoder. The encoder detects the whether the motor becomes out of sync, and the auto-tuning function automatically returns it to the correct electrostatic capacity.
The controllers are equipped for RS232C and RS485 and can be chain-configured for up to 4 and 16 devices, respectively.
Please contact us about EtherCAT compatibility.

■ Features

● High voltage tolerance and reliability

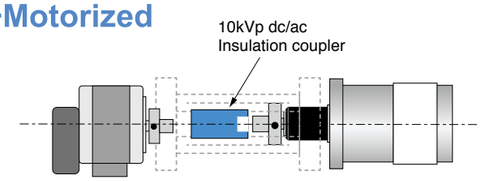
Robust composite insulation tube and 10kVp coupler meet composite requirements concerning structural robustness, high withstand voltage, alignment accuracy, and heat resistance.

+Auto Varable Capacitor



Serial communication (RS485)

+Motorized

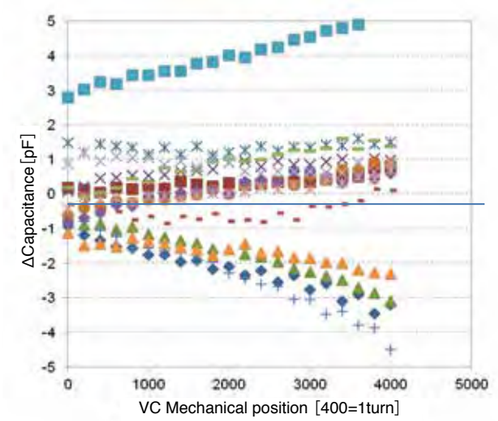


● High-precision

MEIDEN performs High Accelerated Stress Screening (HASS) tests to measure capacitance, and calibrates every auto-tuning vacuum capacitor before shipment, optimizing the capacitance tolerance up to ±0.5%.

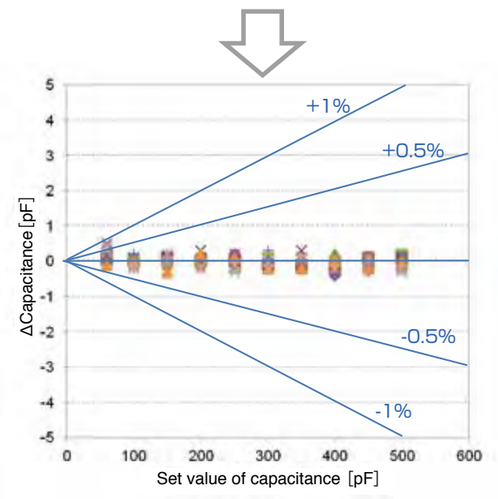
(1) Mechanical tuning precision

Screw-turn position and capacitance tolerance for SCV-125H65UW (N=14)



(2) Auto-tuning

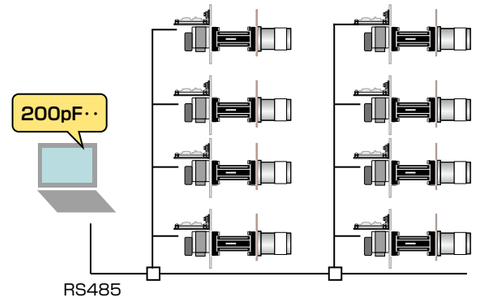
Capacitance tolerance for auto-tuning vacuum capacitors



● Network building

You can build a network of motorized vacuum capacitors (RS485: up to 16 units, RS232C: up to 4 units) with one serial line from one controller and control their respective capacitances.

+Network Build a network of vacuum capacitors (up to 16 units)



● Common Specifications

See below for common specifications of serial communications and motor control:

Power	DC 24 V（1 A）
Motor Speed	240 rpm（Max.360 rpm）
Motor Resolution	400 Step / Turn
Coupler Withstand Voltage	10 kVp（AC）
Interface	RS485 / RS232C / Ether CAT（Select 1 type）
Communication Speed	9600 bps（RS485 / RS232C）

Technical Information (Operational Precautions and Characteristic Explanations)

1. Withstand Voltage

Withstand voltage is determined by the following three factors:

（1）Degree of vacuum
（2）Distance between electrodes (gap)
（3）Electrode conditioning

（1）Degree of vacuum

Withstand voltage remains constant if degree of vacuum is less than 0.1 Pa (See Figure 1).

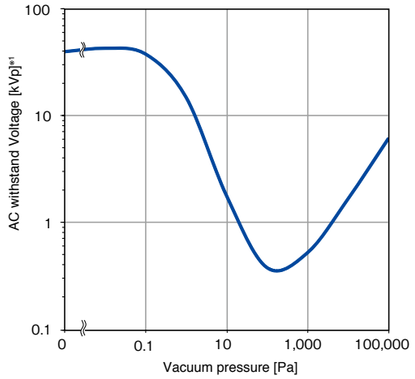


Figure 1.

※1.The unit of "Voltage(kVp)" is "0-peak".

（2）Distance between electrodes

Withstand voltage is proportional to the distance between electrodes (gap).

（3）Electrode conditioning

Figure 2 shows “distance between electrodes-withstand voltage” characteristics. It is not possible to obtain high withstand voltage like behavior. ① (before conditioning) by simply placing electrodes in vacuum. High withstand voltage requires conditioning, which is to apply high working voltage and repeat low current flashover multiple times performed in our HASS testing. ② Exhibited withstand voltage characteristics after conditioning during production HASS/ conditioning. ③ display post conditioning withstand voltage. Please note that instant discharge may occur after reaching ② and ③ by conditioning.
Conditioned peak voltage tolerance degrades over time.

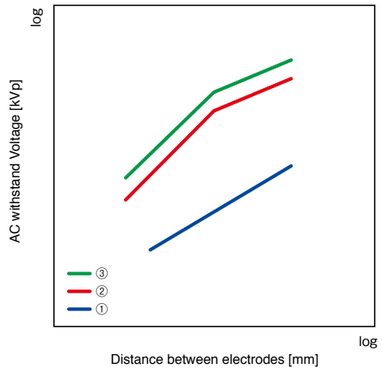


Figure 2.

2. Peak Test Voltage

This refers to a limit value of dielectric breakdown voltage between electrodes (Figure 3. ①). Before shipment, MEIDEN tests vacuum capacitors to confirm that no dielectric breakdown occurs when the rated voltage is applied for the specified time (one minute).

3. RF Working Voltage

This refers to the rated voltage which can be applied continuously. The RF working voltage is set at 60 % of the peak test voltage (Figure 3. ②).
An instant discharge can occur even below than RF working voltage.

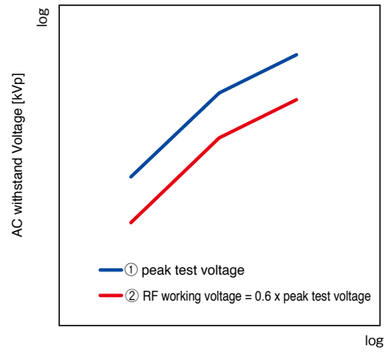


Figure 3

※1.Instant discharge : A discharge which is self recoverable and does not reach dielectric breakdown.
※In case DC voltage is applied with RF voltage, DC plus RF voltage shall be within RF working voltage, and DC voltage shall not exceed 50% of RF working voltage.

4. Maximum Permissible Current

（1）Maximum Permissible Current
Maximum permissible current is continuous current which may not exceed permissible surface temperature (silver plating: 125°C, without silver plating: 80°C) when the surrounding temperature is 25 °C. The maximum permissible current is limited by electrical heating. Especially, at higher frequencies, the maximum permissible current decreases with a greater loss due to skin effect. It is defined within following three ranges. The cooling condition differs by series, so please confirm the specifications separately.

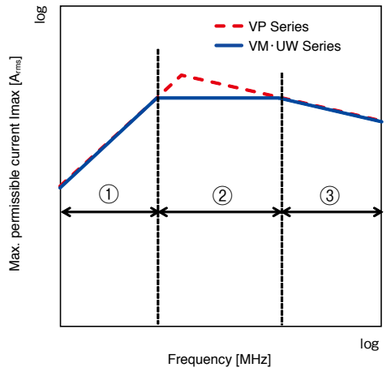


Figure 4

① Range limited by RF working voltage: $I=2\pi f C V_{RFrms}$
(f: frequency, c: capacitance, V_{RFrms}: rms value of RF working voltage)
② Range limited by the maximum permissible temperature: $I=I_{RF}$
(I_{RF}: RF permissible current)
Because copper coated bellows are adopted in the VM / VT / UW series capacitors, there are some limits that exist within this range. This does not apply to the VH series capacitors in which special copper bellows for current carrying are adopted.
③ Range limited by the skin effect: $I=I_{RF}(f_{RF}/f)^{1/4}$
I_{RF}: RF permissible current, (f_{RF}: 13.56 MHz)

（2）Derating by Temperature
Maximum Permissible Current is detemined by the permissible surface temperature of vacuum capacitor, therefore if the surrounding temperature is higher, the permissible current is derated and lower.

$$I(Ta) = Imax\sqrt{\frac{Tmax\text{-}Ta}{Tmax\text{-}25}}$$

Ta	Surrounding Temperature
Tmax	Permissible Temperature
I Ta	Permissible Current
Imax	Max. Permissible Current

The below table illustrates the derating of permissible current when the permissible surface temperature is 125°C.

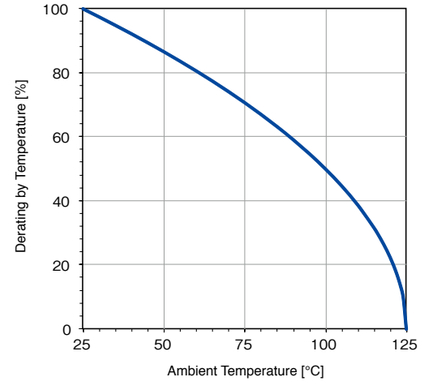


Figure 5

（3）Max. Permissible Current and Cooling
Maximum permissible current of respective types against cooling capacity is shown below.

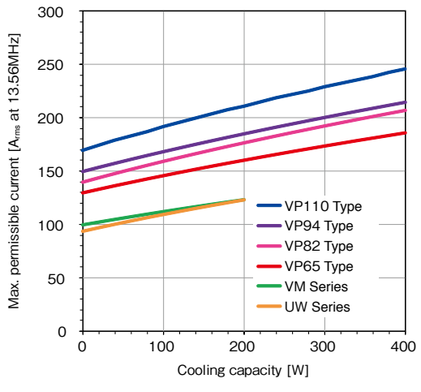


Figure 6

※MEIDEN standard cooling capacity of water-cooled flange is 100 W each and a maximum of 200 W (water-cooled flange on both fixed and moving sides) for one vacuum capacitor

5. DC Leakage Current

The expected value for DC leakage current is “less than 10μA” when 60 % of the peak test voltage is applied in DC. It shall be measured at the maximum capacitance position. The measured value varies according to storage duration and energization.

6. Capacitance tolerance and adjustment

（1）Capacitance tolerance for vacuum fixed capacitors: under 50 pF: ±10 %, above 50 pF: ±5 %. The higher tolerance version is available for some of them. Capacitance linearity for vacuum variable capacitors: under 50 pF: ±10 %, above 50 pF: ±5 %.
（2）Vacuum variable capacitors can be adjusted to any capacitance within the specified range by turning the actuator screw shaft. Capacitance decreases with rightward (clockwise) rotation of the shaft and can be adjusted to the minimum capacitance in the end-stop position. Although two capacitance range end-stops are incorporated into every vacuum variable capacitor, the motor should not collide with the maximum capacitance end-stop unless specified. Repeated hard collisions with the end-stop may impair the screw. The UW, VP and C82HE series do not incorporate maximum capacitance end-stops. If the screw shaft is turned beyond the maximum position, the shaft will become pushed up, which may damage the capacitor or surrounding equipment.
The permissible collision torque at the minimum capacitance end-stop is as follows:

UW series：0.4 N･m	VP series：0.4 N･m
VM series：0.4 N･m	VT series：0.4 N･m

※High frequency of hard stops at high speed may damage the screw.

7. Equivalent Circuit of Vacuum Capacitor

Figure 7 shows equivalent circuit of a vacuum capacitor. "Cs" is capacitance. Other circuit elements are parasitic in a vacuum capacitor. The equivalent series resistance (ESR) of vacuum capacitors is generally several mΩ to dozens of mΩ. The equivalent series inductance (ESL) determines self-resonance frequency and Cs. ESL of vacuum capacitor is generally several nH to dozens of nH. The parasitic capacitance (Cp) of the ceramic envelope and The equivalent parasitic resistance (EPR) combine to represent leakage current. Cp and EPR have small influence and thus can be ignored when using of vacuum capacitor.

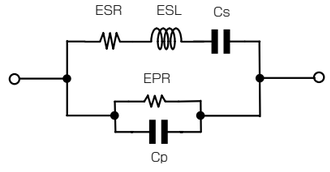


Figure 7 Equivalent circuit of vacuum capacitor

8. Self-resonance Frequency and ESL

Figure 8 shows capacitance characteristics of ESL and self-resonance frequency for UW and VP series.
VP series double bellows exhibits low ESL. UW series single bellows (for compact size), reduces ESL by exhibiting larger aperture bellows than MEIDEN standard models. Self-resonance frequency of vacuum capacitors: f0 is calculated with the following formula using ESL and Cs:

$$f_0 = \frac{1}{2\pi\sqrt{ESL\ Cs}}$$

Resonance frequency f_ℓ of circuit of vacuum capacitor is calculated with the following formula using external circuit inductance L_c:

$$f_l = \frac{1}{2\pi\sqrt{(ESL + L_c)Cs}}$$

In case of ESL << L_c, L_c dominates.

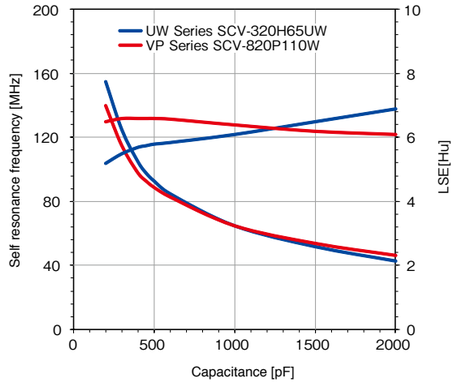


Figure 8

9. ESR of Vacuum Capacitor

Figure 9 shows ESR-Frequency characteristics of the UW and VP series. The VP series, using double bellows, achieves an extremely low ESR. In case due to vacuum variable capacitors, the primary ESR factor is resistance by the skin effect of the bellows. Therefore, ESR is dependent on frequency.
MEIDEN provides ESR at 13.56 MHz. For your use at f [MHz], please calculate ESR_f according to the following formula (which is applied for f > 13.56 MHz):

$$ESR_f = ESR\sqrt{\frac{f}{13.56}}$$

Heat generation within vacuum capacitors is due primarily to resistance loss Ploss [W] of ESR. High-frequency current carried is Irf [A_{rms}], and connection resistance to the circuit current source as Resistance Current (R_c). R_c heat can be approximately derived from the following formula:

$$P_{loss} = (ESR_f + R_c)\ (I_{rf})^2$$

R_c is dependent on installation issues, but is approximately 2-10 mΩ.

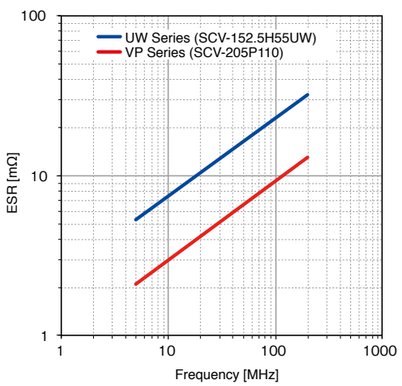


Figure 9

10. Torque

The torque of vacuum variable capacitors is primarily determined by (1)-(5):

(1) Vacuum differential pressure
(2) Spring force of bellows
(3) Weight of moving-side electrode part
(4) Screw efficiency (diameter, reed etc.)
(5) Frictional force of the sliding part
(combination of the shaft, the bolt and the lubricant agent)

Figure 10 shows initial characteristics at 30 rpm at standard rotating position and torque. Note the torque shown is negative for the VH-B/ UW-B option in the CCW (counterclockwise) direction. This means that the screw will turn without the application of external force.
The screw actuator shaft can be turned at will, according to wear condition. To stop the shaft from turning, use the turning stopper mechanism.

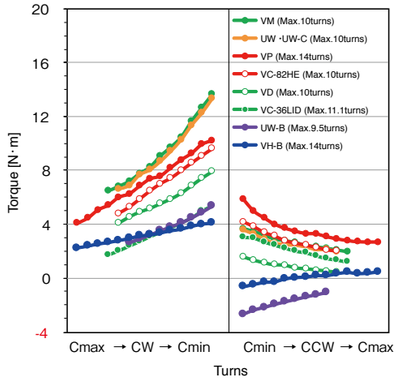


Figure 10

11. Life Expectancy

The life expectancy of vacuum variable capacitors is primarily determined by: (1) and (2):

（1） Bellows
（2） Screw system

（1） Bellows

The bellows' life cycles, depicted below, are greatly affected by the working range and temperature.

※0.5 % fracture data

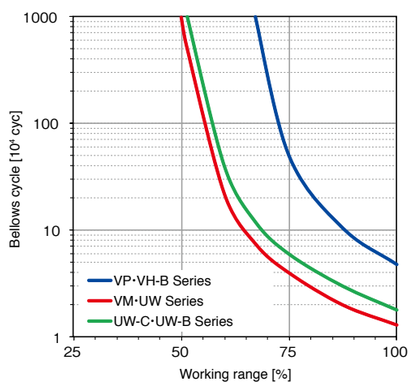


Figure 11

The bellows' life cycles are affected by temperature shown as below. The expected bellows temperature is 300 °C, at the maximum permissible current , when the surface temperature is 125 °C.

※0.5 % fracture data

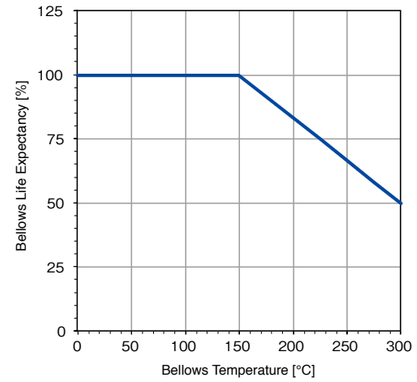


Figure 12

（2） Screw system

The capacitance adjustment screw life is determined by the total number of turns and that of reverse turns, (one turn each way represents a two-turn cycle), each of which is greatly affected by temperature and reverse turn acceleration. The working turns of respective types are depicted below:

Screw life by total turns (million turns)

VH-B option	UW-B option	VP Series	UW-C Type	VM Series
70	50	35	25	12

Test condition: （Turn speed: 600 rpm, acceleration: 4.5 rpm/ms
Temperature: 25°C Humidity: 40 ～ 85%RH）
※VH-B: ball screw option
UW-B: ball screw option
UW-C: special coated screw type

Screw life is affected by working condition, especially by temperature and acceleration, depicted below:

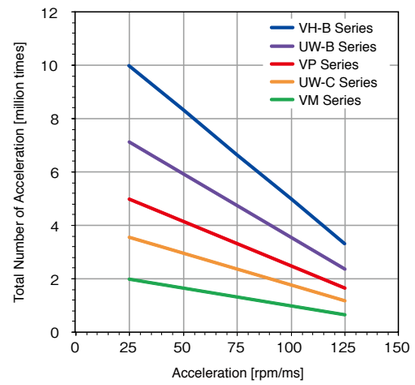


Figure 13

NOTE ①

Engineer the capacitor range such that it does not exceed the total number of turns. Exceeding any/all of the conditions below may result in exponential decrease in life expectancy.
・High acceleration (greater than 30 rpm/ms)
・Dither (less than several degrees)
・High-speed (greater than 600 rpm)

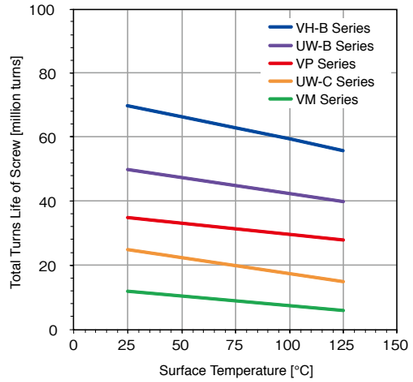


Figure 14

NOTE ②

Other than for DLC coating types, re-greasing is recommended after every 200,000 cycles (re-greasing: applying a coating of grease uniformly over the entire screw surface). The entire working range must be re-greased or life and/or performance may be reduced.

（3） Life of Vacuum Variable Capacitor

As per (1) and (2), the vacuum variable capacitor life cycle is shown below:

VH・VP series

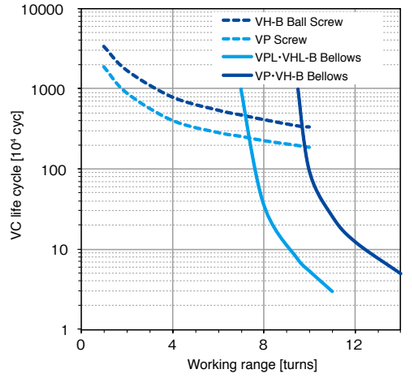


Figure 15

VM, UW series

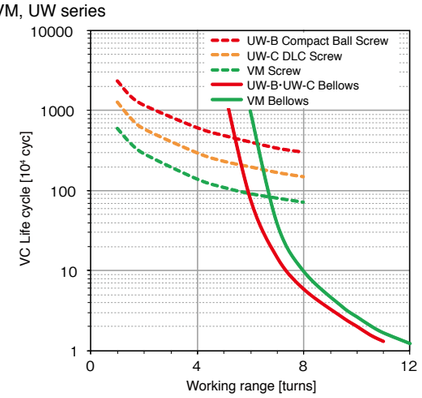


Figure 16

⚠ Handling Precautions

1. Transportation and Storage

(1) Vacuum capacitors are structurally sensitive to external shocks. The capacitors are designed to withstand impact accelerations up to 294 m/s² and vibration up to 98 m/s². Care should be taken not to drop, bang or expose the part to shock exceeding what would normally be considered safe for a standard filament light bulb.
(2) Vacuum capacitors should be shipped and stored in a vertical position. As shipped from the factory, VM, VT and VD series vacuum variable capacitors should be shipped with their capacitance set to the maximum position, with the others set to the minimum position.
(3) Please contact MEIDEN immediately should there be any abnormal appearance of the capacitor upon delivery. In this case, please keep the capacitor's packaging for return shipping.
(4) When stored for over four months, the vacuum capacitor withstand voltage should be confirmed prior to use.
(5) The storage environment should be between 10~40°C with a relative humidity (non-condensing) of between 40~80%.

1. Before Mounting Vacuum Capacitors

(1) Vacuum capacitors are structurally sensitive to external shocks. Prior to installation, the capacitance and withstand voltage should be re-tested and the capacitor checked for external damage.
(2) Finger prints and other contamination can cause flashovers of the ceramics, wipe the ceramic with cloth (dry, or soaked in alcohol). DO NOT USE solvents containing chlorine (e.g.; trichloroethane).
(3) Inspect all attaching components and structures for contamination and clean as above.

2. Mounting Vacuum Capacitors

(1) When installing capacitors be sure not to apply tangential load greater than 1225N·cm. In particular, when supporting VVC on both fixed and moving sides, mounting fittings on either side should be made of a soft material and / or flexible structure in order to protect the capacitors from bending due to thermal expansion and/or external stresses.
(2) In motorized applications, use a flexible coupling to prevent the lateral load on the capacitance adjustment shaft. When using an inflexible coupling, a central misalignment of up to 0.2 mm is permissible in most models. A greater misalignment may result dramatically shortened life expectancy and irregular rotation. In case a belt or gear is used to connect the vacuum capacitor and motor, a mechanism such as a bearing shall be applied to prevent lateral load.
(3) When an optional guide bearing is used for VM series, it is delivered attached to the capacitors with two screws (diagonal to each other) in an optimal position of alignment. DO NOT loosen or remove the bearing assembly.
(4) Should you elect to devise your own guide bearing, be aware that misalignment of a maximum of ±1mm may exist between the capacitance adjustment screw and the fixed side mounting screw taps.
(5) Use torque settings less than the maximum specs of each screw types. On the fixed and moving sides, it is 242 cNm for the M6 type, 147 cNm for the M5 type, and 71.6 cNm for the M4 type. If the screw is turned using force, it damages the screw parts, or vacuum capacitor by putting stress on the flange. If the screw is turned using force, it damages the screw parts, or vacuum capacitor by putting stress on the flange.

4. Using Vacuum Capacitors

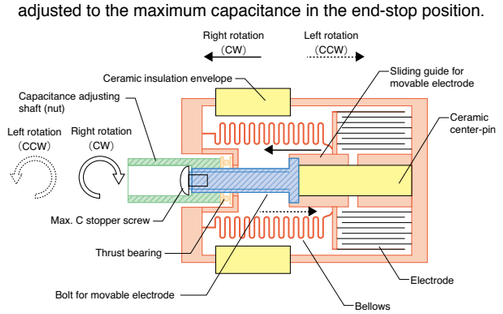
(1) The maximum allowable vibration level of the capacitors is 98m/s². Greater vibration levels will damage the capacitors.
(2) When the surface temperature of the capacitor exceeds 125°C, an abnormally high current may result. Water-cooling flanges should be considered in high heat/high-power applications.
(3) Metal objects near the sides of the VC may result in flashover. Sufficient insulation distance shall be maintained between metal object and the VC.
(4) Do not use the capacitors in environments where corrosive gases (particularly sulfur and chlorine) or dust may exist. The surface of the capacitors may become discolored, or in some cases the properties or life of the capacitors may be affected.
(5) Do not over rotate the actuator CCW after reaching the maximum capacitance position (as in positioning). Especially for the UW, VP and C82HE series, the shaft may become pushed up and damage the capacitor or surrounding equipment.
(6) Should a vacuum variable capacitor be used under high temperatures (over 75°C), or if the capacitance is left unchanged, the actuator torque may increase above specifications because of lubricant excretion due to vacuum or gravity-induced pressure. To distribute the lubricant, it is recommended that the capacitance adjustment screw be rotated across the entire capacitance range once every 200 hours.

5. Using VM, VT, FC and FS Series

(1) A small thump or tick may accompany and end stop-collision by the ceramic center pin (internal component of the cap). Orientation can affect minor noises made by the pin. These noises should be of no consequence.
(2) A squeaky sound may be generated when the ceramic center pin slides in its guide. There are no problems created by the noise. Different rotation speeds may cause sound to change in pitch and loudness, there is no effect on life expectancy or performance.

6. Using VM Series

(1) VM Series are vacuum variable capacitors with a center guide pin structure. Capacitance decreases with rightward (clockwise) rotation of the shaft and can be adjusted to he minimum capacitance in the end-stop position. Likewise, capacitance increases with leftward (counterclockwise) rotation and can be adjusted to the maximum capacitance in the end-stop position.



(2) If the capacitor is misaligned with an actuating motor, noise may occur and/or the actuator shaft may be pulled out. Such problems are caused by the lateral stress to the center pin due to misalignment.

7. Withstand Voltage Test

(1) Depending on the withstand voltage tester, qualified vacuum capacitors may also be judged as failing. Please contact us for individualized testing methods. As general test procedure, refer (2)-(5).
(2) Before conducting the withstand voltage test, check visually if there is any dirt or condensation on the ceramic envelope. If there is, wipe with a dry cloth or a cloth soaked in alcohol and dry completely.
(3) Put in a current limit resistor (about 500kΩ is recommended) in a series, not to damage the vacuum capacitor by the flashover current caused by the withstand voltage test.
(4) Set the current limit of withstand voltage tester to maximum.
(5) Refer following procedure for AC withstand voltage test(50/60 Hz).

【Upon delivery】
① Discharge the vacuum capacitor by shorting the two electrodes.
② Check that the capacitor has not shorted. If it is a variable capacitor, be sure to check it at its maximum capacitance setting.
③ Increase the voltage gradually from 0 to 60% of the peak test voltage of the capacitor. (Continue for one minute). During the voltage increase, an instant discharge can be permissible.
④ After reaching to 60 % of peak test voltage, hold the voltage for 1 minute. If no flashover or instant discharge is observed, the capacitor has passed the test.

【Stored over 4 months or before use】
① Discharge the vacuum capacitor by shorting the two electrodes.
② Check that the capacitor is not short.(If it is variable capacitor, set the capacitor to the maximum capacitance position.)
③ Increase the applied voltage gradually from 0 to 60% of the peak test voltage of the capacitor. (Continue for one minute). Rapid voltage increase may cause flashover or instant discharge.
④ After reaching 60 % of peak test voltage, continue to apply this level of voltage for one minute. If no more than one flashover or instant discharge occurs, the capacitor is functioning normally.

(6) Withstand voltage test is recommended in every 4 to 6 month during storage.
(7) After holding stock over 1 year, in case the voltage can not be increased to the peak test voltage, conditioning work is required at our factory. In such cases, please contact us. (Any related costs shall be born by the customer.)

8. Warranty

(1) The warranty period is 12 months after shipping from the MEIDEN factory.
(2) Warranty Conditions
① Within the warranty period, if any defect or failure is found on MEIDEN products, we will replace or fix the returned vacuum capactor in free of charge. The replacement work shall be the responsibility of the customer. In the following cases, MEIDEN products shall be not covered under warranty.
- Any defect or failure which is caused by use under conditions which are not mentioned in the catalog, technical documents, specification sheet or data sheet.
- Any defect or failure which is caused by not following “Handling Precautions” written in the catalog.
- Any defect or failure which is not predictable by science or existing technology level at the time of proposal.
- Any defect or failure due to use under conditions which MEIDEN has not warranted.

② Warranty is limited by (2)- ① , and any claims of liability for damages beyond MEIDEN’s products (THE DAMAGES OF CUSTOMER’S PRODUCT OR EQUIPMENT, LOSS OF PROFITS, BUSINESS INTERRUPTION, OR LOSS OF BUSINESS, INCURRED BY THE OTHER PARTY) are excluded.

(3) Our product is designed and manufactured as a general-purpose product for general industries, and the specific conditions of use with relation to your products, facility system, using environment etc. are not taken into consideration. Please evaluate in advance and use our product in your responsibly under all circumstances.

9. Product Investigation

(1) If any product investigation is required regarding defects or failure, please contact us. In any such case, costs related to transportation shall be born by customer.
The followings are investigation items
- Vacuum Fixed Capacitor
  General : Shipping Test, X-ray etc.
  Disassemble: Visual check for electrodes
- Vacuum Variable Capacitor
  General : Shipping Test, X-ray etc.
  Disassemble: Visual check for electrodes and screws.

(2) After receipt of the report, please inform us of how you would like us to handle the investigated product. If not informed, we will dispose it after six months of storage.
(3) If the investigated product is not covered under warranty conditions mentioned above, MEDIEN has right to charge an investigation fee.

10. Technical Information

(1) This catalog contains only a portion of the technical information available. MEIDEN publishes technical data sheets to provide the dimensional outlines (drawings), frequency-current characteristics, and tuner turns-capacitance characteristics of all vacuum capacitors.
(2) In your consideration of purchasing MEIDEN Vacuum Capacitors, please contact your sales representative for current data sheets as they do change over time and we reserve the right to update them as needed.

Vacuum Fixed Capacitors

	Type	Part Number	C_{min} - C_{max} pF	Capacitance Tolerance				Voltage kVp		Current A_{rms}			Mounting Dimensions		Weight kg	Options
				±10%	±5%	±2%	±1%	RF Working	Peak Test	13.56 MHz	40 MHz	60 MHz	Total Length (Mounting Length) mm	Diameter mm		
New		SCF-150.03	3			○	○	9	15	1	4	6	60	ϕ19	0.1	
		SCF-50.03H15CA	3	○				3	5	0	1	2	66	ϕ15.5	0.1	
		SCF-50.09H15CA	8.5	○				3	5	1	2	2	66	ϕ15.5	0.1	
	FC62	SCF-200.1C	9	○				12	20	6	19	28	50	ϕ62.4	0.8	
○	FS36	SCF-150.1Z	10	○				9	15	5	15	23	43	ϕ36	0.6	
	FS36	SCF-150.2Z	20	○				9	15	10	31	34	43	ϕ36	0.6	
	FS36	SCF-150.25Z	25	○				9	15	13	38	34 ○	43	ϕ36	0.6	
	FH48C	SCF-300.25H48C	25	○				18	30	27	79	99	73	ϕ48	0.5	IK-0
	FH65C	SCF-350.25H65C	25	○				21	35	31	93	118	87	ϕ65	0.8	IK-1
	FS36	SCF-200.3Z	30	○				12	20	21	38	34	43	ϕ36	0.6	
	FS36	SCF-150.33Z	33	○				9	15	17	38	34	43	ϕ36	0.6	
	FS36	SCF-150.4Z	40	○				9	15	21	38	34	43	ϕ36	0.6	
○	FS36	SCF-150.5Z	50	○				9	15	27	38	34	43	ϕ36	0.6	
	FC52	SCF-150.5C	50	○				9	15	27	79	89	48	ϕ52.4	0.4	
	FC52A	SCF-150.5CA	50	○				9	15	27	61	55	52	ϕ52.4	0.6	
	FC62	SCF-200.5C	50	○				12	20	36	76	68	50	ϕ62.4	0.8	
	FH48C	SCF-300.5H48C	50	○				18	30	54	110	99	73	ϕ48	0.5	IK-0
	FH65C	SCF-350.5H65C	50	○				21	35	63	131	118	87	ϕ65	0.8	IK-1
	FS36	SCF-150.75Z	75		○			9	15	40	38	34	43	ϕ36	0.6	
	FC62	SCF-200.75C	75		○			12	20	54	76	68	50	ϕ62.4	0.8	
	FH48C	SCF-300.75H48C	75		○			18	30	81	110	99	73	ϕ48	0.5	IK-0
	FS36	SCF-150.8Z	80		○			9	15	43	38	34	43	ϕ36	0.6	
	FC52A	SCF-150.8CA	80		○			9	15	43	61	55	52	ϕ52.4	0.6	
	FS36	SCF-150.84Z	84		○			9	15	45	38	34	43	ϕ36	0.6	
	FS36	SCF-150.9Z	90		○			9	15	48	38	34	43	ϕ36	0.6	
	FC52A	SCF-150.9CA	90		○			9	15	48	61	55	52	ϕ52.4	0.6	
○	FS36S	SCF-51S	100		○			3	5	18	38	34	30	ϕ36	0.5	
○	FS36	SCF-151Z	100		○			9	15	50	38	34	43	ϕ36	0.6	
	FC52	SCF-151C	100		○			9	15	54	99	89	48	ϕ52.4	0.4	
	FC52A	SCF-151CA	100		○			9	15	54	61	55	52	ϕ52.4	0.6	
	FH52WR	SCF-151H52WR	100		○	○	○	9	15	54	99	89	52	ϕ52.4	0.6	IK-1
	FHA52WR	SCF-151HA52WR	100		○			9	15	54	99	89	52	ϕ52.4	0.6	IK-1
	FH52WR	SCF-201H52WR	100		○	○	○	12	20	72	99	89	52	ϕ52.4	0.6	IK-1
	FC62	SCF-201C	100		○			12	20	72	76	68	50	ϕ62.4	0.8	
○	FH48C	SCF-301H48C	100		○			18	30	108	110	99	73	ϕ48	0.5	IK-0
	FH48C	SCF-351H48C	100		○			21	35	126	110	99	73	ϕ48	0.5	IK-0
○	FH65C	SCF-351H65C	100		○	○	○	21	35	126	131	118	87	ϕ65	0.8	IK-1
		SCF-351K	102		○			21	35	129	114	103	75	ϕ128	3.3	
	FS36S	SCF-51.1S	110		○			3	5	19	38	34	30	ϕ36	0.5	
	FS36S	SCF-51.2S	120		○			3	5	21	38	34	30	ϕ36	0.5	
	FS36	SCF-151.2Z	120		○			9	15	50	38	34	43	ϕ36	0.6	
	FC52A	SCF-151.2CA	120		○			9	15	65	61	55	52	ϕ52.4	0.6	
	FH48C	SCF-251.25H48C	125		○			15	25	112	110	99	73	ϕ48	0.5	IK-0
	FS36S	SCF-51.3S	130		○			3	5	23	38	34	30	ϕ36	0.5	
	FS36	SCF-151.3Z	130		○			9	15	50	38	34	43	ϕ36	0.6	
	FS36S	SCF-51.4S	140		○			3	5	25	38	34	30	ϕ36	0.5	
	FS36	SCF-151.4Z	140		○			9	15	50	38	34	43	ϕ36	0.6	
○	FS36S	SCF-51.5S	150		○			3	5	27	38	34	30	ϕ36	0.5	
	FS36	SCF-151.5Z	150		○			9	15	50	38	34	43	ϕ36	0.6	
	FC52	SCF-151.5C	150		○			9	15	81	99	89	48	ϕ52.4	0.4	
	FC52A	SCF-151.5CA	150		○			9	15	80	61	55	52	ϕ52.4	0.6	
	FH52WR	SCF-151.5H52WR	150		○	○	○	9	15	81	99	89	52	ϕ52.4	0.6	IK-1
	FHA52WR	SCF-151.5HA52WR	150		○			9	15	81	99	89	52	ϕ52.4	0.6	IK-1
	FC62	SCF-201.5C	150		○			12	20	100	76	68	50	ϕ62.4	0.8	
	FH48C	SCF-251.5H48C	150		○			15	25	135	110	99	73	ϕ48	0.5	IK-0
○	FH65C	SCF-351.5H65C	150		○			21	35	172	131	118	87	ϕ65	0.8	IK-1
○	FH48C	SCF-251.75H48C	175		○			15	25	145	110	99	73	ϕ48	0.5	IK-0
	FH65C	SCF-351.75H65C	175		○			21	35	172	131	118	87	ϕ65	0.8	IK-1
	FS36	SCF-151.8Z	180		○			9	15	50	38	34	43	ϕ36	0.6	
	FC52A	SCF-151.8CA	180		○			9	15	80	61	55	52	ϕ52.4	0.6	
○	FS36S	SCF-52S	200		○			3	5	36	38	34	30	ϕ36	0.5	
○	FS36	SCF-152Z	200		○			9	15	50	38	34	43	ϕ36	0.6	
	FC52	SCF-152C	200		○			9	15	108	99	89	48	ϕ52.4	0.4	
	FH52WR	SCF-152H52WR	200		○	○	○	9	15	108	99	89	52	ϕ52.4	0.6	IK-1

	Type	Part Number	C_{min} - C_{max} pF	Capacitance Tolerance				Voltage kVp		Current A_{rms}			Mounting Dimensions		Weight kg	Options
				±10%	±5%	±2%	±1%	RF Working	Peak Test	13.56 MHz	40 MHz	60 MHz	Total Length (Mounting Length) mm	Diameter mm		
	FHA52WR	SCF-152HA52WR	200		○			9	15	108	99	89	52	ϕ52.4	0.6	IK-1
	FH52WR	SCF-202H52WR	200		○	○	○	12	20	130	99	89	52	ϕ52.4	0.6	IK-1
○	FH48C	SCF-252H48C	200		○			15	25	145	110	99	73	ϕ48	0.5	IK-0
○	FH65C	SCF-352H65C	200		○			21	35	172	131	118	87	ϕ65	0.8	IK-1
	FC52A	SCF-152.1CA	210		○			9	15	80	61	55	52	ϕ52.4	0.6	
	FH52WR	SCF-152.1H52WR	210		○	○	○	9	15	113	99	89	52	ϕ52.4	0.6	IK-1
	FS43	SCF-152.2	220		○			9	15	50	38	34	43	ϕ43	0.8	
		SCF-352.2K	220		○			21	35	150	114	103	75	ϕ128	3.3	
	FS36	SCF-52.5Z	250		○			3	5	45	38	34	43	ϕ36	0.6	
	FS36	SCF-102.5Z	250		○			6	10	50	38	34	43	ϕ36	0.6	
	FS43	SCF-152.5	250		○			9	15	50	38	34	43	ϕ43	0.8	
	FH52WR	SCF-152.5H52WR	250		○	○	○	9	15	130	99	89	52	ϕ52.4	0.6	IK-1
○	FH65C	SCF-352.5H65C	250		○			21	35	172	131	118	87	ϕ65	0.8	IK-1
New		SCF-402.5K	250		○			24	40	150	114	103	95	ϕ128	4.4	
○	FS36	SCF-53Z	300		○			3	5	50	38	34	43	ϕ36	0.6	
	FS36	SCF-103Z	300		○			6	10	50	38	34	43	ϕ36	0.6	
	FS43	SCF-153	300		○			9	15	50	38	34	43	ϕ43	0.8	
○	FH52WR	SCF-153H52WR	300		○	○	○	9	15	130	99	89	52	ϕ52.4	0.6	IK-1
	FHA52WR	SCF-153HA52WR	300		○			9	15	130	99	89	52	ϕ52.4	0.6	IK-1
	FH65C	SCF-253H65C	300		○			15	25	172	131	118	87	ϕ65	0.9	IK-1
	FS36	SCF-53.5Z	350		○			3	5	50	38	34	43	ϕ36	0.6	
	FS36	SCF-103.5Z	350		○			6	10	50	38	34	43	ϕ36	0.6	
	FH52WR	SCF-153.5H52WR	350		○	○	○	9	15	130	99	89	52	ϕ52.4	0.6	IK-1
	FH65C	SCF-253.5H65C	350		○			15	25	172	131	118	87	ϕ65	0.9	IK-1
		SCF-353.7K	368		○			21	35	150	114	103	75	ϕ128	3.3	
	FH52WR	SCF-153.7H52WR	370		○	○	○	9	15	130	99	89	52	ϕ52.4	0.6	IK-1
○	FS36	SCF-54Z	400		○			3	5	50	38	34	43	ϕ36	0.6	
	FS36	SCF-104Z	400		○			6	10	50	38	34	43	ϕ36	0.6	
	FH52WR	SCF-124H52WR	400		○	○	○	7.2	12	130	99	89	52	ϕ52.4	0.6	IK-1
	FH52WR	SCF-124.5H52WR	450		○	○	○	7.2	12	130	99	89	52	ϕ52.4	0.6	IK-1
○	FS36	SCF-55Z	500		○			3	5	50	38	34	43	ϕ36	0.6	
	FS36	SCF-105Z	500		○			6	10	50	38	34	43	ϕ36	0.6	
○	FH52WR	SCF-125H52WR	500		○	○	○	7.2	12	130	99	89	52	ϕ52.4	0.6	IK-1
	FHA52WR	SCF-125HA52WR	500		○			7.2	12	130	99	89	52	ϕ52.4	0.6	IK-1
	FH52WR	SCF-155H52WR	500		○	○	○	9	15	130	99	89	52	ϕ52.4	0.6	IK-1
	FH52WR	SCF-105.5H52WR	550		○	○	○	6	10	130	99	89	52	ϕ52.4	0.6	IK-1
○	FS43	SCF-56	600		○			3	5	50	38	34	43	ϕ43	0.8	
	FH52WR	SCF-56H52WR	600		○	○	○	3	5	108	99	89	52	ϕ52.4	0.6	IK-1
	FH52WR	SCF-106H52WR	600		○	○	○	6	10	130	99	89	52	ϕ52.4	0.6	IK-1
	FH52WR	SCF-106.5H52WR	650		○	○	○	6	10	130	99	89	52	ϕ52.4	0.6	IK-1
○	FS43	SCF-57	700		○			3	5	50	38	34	43	ϕ43	0.8	
	FH52WR	SCF-107H52WR	700		○	○	○	6	10	130	99	89	52	ϕ52.4	0.6	IK-1
○	FH52WR	SCF-107.5H52WR	750		○	○	○	6	10	130	99	89	52	ϕ52.4	0.6	IK-1
○	FS43	SCF-58	800		○			3	5	50	38	34	43	ϕ43	0.8	
○	FS43	SCF-59	900		○			3	5	50	38	34	43	ϕ43	0.8	
○	FS43	SCF-510	1000		○			3	5	50	38	34	43	ϕ43	0.8	
	FH52WR	SCF-510H52WR	1000		○	○	○	3	5	130	99	89	52	ϕ52.4	0.6	IK-1
	FHA52WR	SCF-510HA52WR	1000		○			3	5	130	99	89	52	ϕ52.4	0.6	IK-1
○	FH52WR	SCF-810H52WR	1000		○	○	○	4.8	8	130	99	89	52	ϕ52.4	0.6	IK-1
	FH74WR	SCF-1010H74WR	1000		○			6	10	140	106	96	52	ϕ74	0.8	IK-1
	FH52WR	SCF-512.5H52WR	1250		○	○	○	3	5	130	99	89	52	ϕ52.4	0.6	IK-1
○	FH52WR	SCF-315H52WR	1500		○	○	○	1.8	3	130	99	89	52	ϕ52.4	0.6	IK-1
	FH52WR	SCF-515H52WR	1500		○	○	○	3	5	130	99	89	52	ϕ52.4	0.6	IK-1
	FH52WR	SCF-317.5H52WR	1750		○	○	○	1.8	3	130	99	89	52	ϕ52.4	0.6	IK-1
○	FH52WR	SCF-320H52WR	2000		○	○	○	1.8	3	130	99	89	52	ϕ52.4	0.6	IK-1
	FH74WR	SCF-520H74WR	2000		○			3	5	121	92	83	52	ϕ74	0.8	IK-1
	FH74WR	SCF-530H74WR	3000		○			3	5	121	92	83	52	ϕ74	0.9	IK-1
	FH74WR	SCF-540H74WR	4000		○			3	5	121	92	83	52	ϕ74	1.0	IK-1
	FH74WR	SCF-520H74WR	2000		○			3	5	121	92	83	52	ϕ74	0.8	IK-1
	FH74WR	SCF-530H74WR	3000		○			3	5	121	92	83	52	ϕ74	0.9	IK-1
	FH74WR	SCF-540H74WR	4000		○			3	5	121	92	83	52	ϕ74	1.0	IK-1

※○ standard and preferred.

Vacuum Variable Capacitors

	Type	Part Number	C_{min} - C_{max} pF		Capacitance Tolerance		Voltage kVp		Current A_{rms}			Tuner Turns	Tuner Operating Torque N·cm	Mounting dimensions			Weight kg	Options				
			Min	Max	±10%	±5%	RF Working	Peak Test	13.56 MHz	40 MHz	60 MHz			Total Length mm	Mounting Length mm	Outer Diameter mm		Guide Screw	Water-cooled Fixed Side	Water-cooled Moving Side	Ball Screw	NP (Low Current)
	VM-Type6	SCV-300.2G	6	20	○		18	30	21	63	62	5.5±0.5	19.6	100	80	φ60.4	0.8					
	VM-Type6	SCV-250.3G	6	30	○		15	25	27	68	62	5.5±0.5	19.6	100	80	φ60.4	0.8					
	VP110	SCV-350.3P110	8	30	○		21	35	37	111	117	14.3±0.2	18	154	115	φ110	2.6		AWM-4	AWM-4	○	
New	VC-36LID	SCV-50.5C36LID	6	50		○	3	5	9	26	39	11.1±0.5	15	90.5	72.1	φ36	0.3					
	VM-Type1	SCV-150.5	10	50		○	9	15	27	76	68	12±1	24.5	140	115	φ60.4	1.0					
	UW55	SCV-200.5FH55UW-C	6	50		○	12	20	36	71	64	10.5±0.2	18	133.5	90.6	φ55	0.7				○	
	VP82L	SCV-200.5P82L	12	50		○	12	20	36	106	96	10.8±0.2	18	125	95	φ82	1.6		AWM-4	AWM-5	○	
	UWA55	SCV-150.6HA55UW-C	3	60		○	9	15	32	71	64	10.5±0.2	18	133.5	90.6	φ55	0.7					
	VT-Type3	SCV-150.75GTB	5	75		○	9	15	40	61	55	6±1	17.6	107	85	φ52.4	0.8					
	UWA55	SCV-150.75HA55UW-C	5	75		○	9	15	40	71	64	10.5±0.2	18	133.5	90.6	φ55	0.7					
	VM-Type6	SCV-250.8G	10	80		○	15	25	72	68	62	5.5±0.5	19.6	100	80	φ60.4	0.8					
	VP82L	SCV-250.8P82L	11	80		○	15	25	72	106	96	10.8±0.2	18	125	95	φ82	1.6		AWM-4	AWM-5	○	
	VC-82HE	SCV-250.8C82HE-AADG-F	10	80		○	15	25	72	106	96	14±0.5	18	132	101	φ82	1.5				○	
	VT-Type1	SCV-151GT	20	100		○	9	15	54	61	55	10.5±0.5	19.6	130	108	φ52.4	0.7					
○	UW55	SCV-151H55UW-C	10	100		○	9	15	54	71	64	10.5±0.2	18	133.5	90.6	φ55	0.7				○	○
	VM-Type1	SCV-151	10	100		○	9	15	54	76	68	12±1	24.5	140	115	φ60.4	1.0	SJ-2	AWF-2	AWM-2		
	VP65	SCV-151P65	10	100		○	9	15	54	99	89	14.3±0.2	18	154	115	φ65	1.2		AWF-6	AWM-6	○	
	UW55	SCV-201H55UW-C	10	100		○	12	20	72	71	64	10.5±0.2	18	133.5	90.6	φ55	0.7				○	
	VP65	SCV-201P65	10	100		○	12	20	72	99	89	14.3±0.2	18	154	115	φ65	1.2		AWF-6	AWM-6	○	
	VP82L	SCV-201P82L	12	100		○	12	20	72	106	96	10.8±0.2	18	125	95	φ82	1.6		AWM-4	AWM-5	○	
	VP82L	SCV-251P82L	12	100		○	15	25	90	106	96	10.8±0.2	18	125	95	φ82	1.6		AWM-4	AWM-5	○	
	VC-82HE	SCV-251C82HE-B3	12	100		○	15	25	90	106	96	7.8~8.3	15	132	101	φ82	1.5				○	
	VP94L	SCV-251P94L	14	100		○	15	25	90	125	113	10.8±0.2	18	125	95	φ94	1.8		AWM-4	AWM-5	○	
	VP110	SCV-351P110	20	100		○	21	35	126	129	117	14.3±0.2	18	154	115	φ110	2.6		AWM-4	AWM-4	○	
	UW55	SCV-151.5FH55UW-C	7	150		○	9	15	81	71	64	10.5±0.2	18	133.5	90.6	φ55	0.7				○	
	VP82L	SCV-201.5P82L	12	150		○	12	20	108	106	96	10.8±0.2	18	125	95	φ82	1.6		AWM-4	AWM-5	○	
	VP110	SCV-201.5P110C	11	150		○	12	20	108	129	117	14.3±0.2	18	154	115	φ110	2.6		AWM-4	AWM-4	○	
	VP110	SCV-251.5P110C	11	150		○	15	25	135	129	117	14.3±0.2	18	154	115	φ110	2.6		AWM-4	AWM-4	○	
	VM-Type5	SCV-201.7G	45	170		○	12	20	90	68	62	5.5±0.5	19.6	100	80	φ63	0.8					
	VM-Type1	SCV-152	12	200		○	9	15	100	76	68	12±1	24.5	140	115	φ60.4	1.0	SJ-2	AWF-2	AWM-2		
	VP65	SCV-152P65C	5.5	200		○	9	15	108	99	89	14.3±0.2	18	154	115	φ65	1.2		AWF-6	AWM-6	○	
	VP65	SCV-202P65	15	200		○	12	20	130	99	89	14.3±0.2	18	154	115	φ65	1.2		AWF-6	AWM-6	○	
	VP82L	SCV-202P82L	12	200		○	12	20	140	106	96	10.8±0.2	18	125	95	φ82	1.6		AWM-4	AWM-5	○	
	VP82	SCV-202P82	20	200		○	12	20	140	106	96	14.3±0.2	18	154	115	φ82	1.8		AWM-4	AWM-5	○	
	VC-82HE	SCV-202C82HE-AAFG-B	12	200		○	12	20	140	106	96	10.5±0.5	18	132	101	φ82	1.5				○	
	VP110	SCV-302P110	25	200		○	18	30	170	129	117	14.3±0.2	18	154	115	φ110	2.6		AWM-4	AWM-4	○	
	VP82L	SCV-202.2P82L	12	220		○	12	20	140	106	96	10.8±0.2	18	125	95	φ82	1.6		AWM-4	AWM-5	○	
	VP94L	SCV-202.2P94L	14	220		○	12	20	159	125	113	10.8±0.2	18	125	95	φ94	1.8		AWM-4	AWM-5	○	
	VP110	SCV-202.5P110C	13	245		○	12	20	170	129	117	14.3±0.2	18	154	115	φ110	2.6		AWM-4	AWM-4	○	
	VP110	SCV-252.5P110C	13	245		○	15	25	170	129	117	14.3±0.2	18	154	115	φ110	2.6		AWM-4	AWM-4	○	
	VT-Type1	SCV-152.5GT	25	250		○	9	15	80	61	55	10.5±0.5	19.6	130	108	φ52.4	0.7					
○	UW55	SCV-152.5H55UW-C	25	250		○	9	15	94	71	64	10.5±0.2	18	133.5	90.6	φ55	0.7				○	○
	VM-Type2	SCV-152.5	30	250		○	9	15	100	76	68	12±1	24.5	140	115	φ62.4	1.0	SJ-2	AWF-2	AWM-2		
	VP65	SCV-152.5P65	15	250		○	9	15	130	99	89	14.3±0.2	18	154	115	φ65	1.2		AWF-6	AWM-6	○	
○	VP65	SCV-202.5P65	15	250		○	12	20	130	99	89	14.3±0.2	18	154	115	φ65	1.2		AWF-6	AWM-6	○	
	VP94	SCV-202.5P94	25	250		○	12	20	150	114	103	14.3±0.2	18	154	115	φ94	2.1		AWM-4	AWM-4	○	
	VT-Type3	SCV-53GTB	10	330		○	3	5	59	61	55	6±1	17.6	107	85	φ52.4	0.8					
	VC-82HE	SCV-103.3C82HEW-AADG-J	30	330		○	6	10	119	106	96	12±0.5	18	132	101	φ82	1.5				○	
	UW55	SCV-83.5FH55UW-C	7	350		○	4.8	8	94	71	64	10.5±0.2	18	133.5	90.6	φ55	0.7				○	
	VP82L	SCV-103.5P82LW	15	350		○	6	10	126	106	96	10.8±0.2	18	125	95	φ82	1.6		AWM-4	AWM-5	○	
	VP94L	SCV-153.5P94L	15	350		○	9	15	165	125	113	10.8±0.2	18	125	95	φ94	1.8		AWM-4	AWM-5	○	
	VP110	SCV-253.5P110	35	350		○	15	25	170	129	117	14.3±0.2	18	154	115	φ110	2.6		AWM-4	AWM-4	○	
	VP82L	SCV-84P82LW	15	400		○	4.8	8	115	106	96	10.8±0.2	18	125	95	φ82	1.6		AWM-4	AWM-5	○	
	VP65	SCV-104P65FW	6	400		○	6	10	130	99	89	14.3±0.2	18	154	115	φ65	1.2		AWF-6	AWM-6	○	
	VP65	SCV-124P65FW	6	400		○	7.2	12	130	99	89	14.3±0.2	18	154	115	φ65	1.2		AWF-6	AWM-6	○	
	VM-Type5	SCV-104G	60	450		○	6	10	90	68	62	5.5±0.5	19.6	100	80	φ63	0.8					
	VM-Type4	SCV-204	80	450		○	12	20	100	76	68	12±1	24.5	140	115	φ89	1.8					
	VD55	SCV-55D55W	35	500		○	3	5	40	30	27	10±0.5	15	115	96.5	φ55	0.6					
	UW55	SCV-55FH55UW-C	7	500		○	3	5	90	71	64	10.5±0.2	18	133.5	90.6	φ55	0.7				○	
	VM-Type2	SCV-55	30	500		○	3	5	90	76	68	12±1	24.5	140	115	φ62.4	1.0	SJ-2	AWF-2	AWM-2		
	VM-Type2	SCV-7.55	30	500		○	4.5	7.5	100	76	68	12±1	24.5	140	115	φ62.4	1.0	SJ-2	AWF-2	AWM-2		
	VP65	SCV-7.55P65FW	6	500		○	4.5	7.5	130	99	89	14.3±0.2	18	154	115	φ65	1.2		AWF-6	AWM-6	○	
○	UW55	SCV-85H55UW-C	35	500		○	4.8	8	94	71	64	10.5±0.2	18	133.5	90.6	φ55	0.7				○	○
	VD55	SCV-85D55W	35	500		○	4.8	8	80	61	55	10±0.5	15	115	96.5	φ55	0.6					
	VP65	SCV-105P65FW	6	500		○	6	10	130	99	89	14.3±0.2	18	154	115	φ65	1.2		AWF-6	AWM-6	○	
		SCV-105M82W	40	500		○	6	10	77	58	53	15±0.5	18	132	100	φ82	1.9					
○	UW65	SCV-125H65UW-C	50	500		○	7.2	12	94	71	64	10.5±0.2	18	133.5	90.6	φ65	0.9				○	○
○	VP65	SCV-125P65DW	10	500		○	7.2	12	130	99	89	14.3±0.2	18	154	115	φ65	1.3		AWF-6	AWM-6	○	

	Type	Part Number	C_{min} - C_{max} pF		Capacitance Tolerance		Voltage kVp		Current A_{rms}			Tuner Turns	Tuner Operating Torque N·cm	Mounting dimensions			Weight kg	Options				
			Min	Max	±10%	±5%	RF Working	Peak Test	13.56 MHz	40 MHz	60 MHz			Total Length mm	Mounting Length mm	Outer Diameter mm		Guide Screw	Water-cooled Fixed Side	Water-cooled Moving Side	Ball Screw	NP (Low Current)
	VT-Type1	SCV-155GT	70	500		○	9	15	80	61	55	10.5±0.5	19.6	130	108	φ52.4	0.7					
	VM-Type1	SCV-155G	25	500		○	9	15	90	68	62	12±1	24.5	140	115	φ60.4	1.0	SJ-2	AWF-2	AWM-2		
	UW65	SCV-155H65UW-C	50	500		○	9	15	94	71	64	10.5±0.2	18	133.5	90.6	φ65	0.9				○	
	VP65	SCV-155P65DW	10	500		○	9	15	130	99	89	14.3±0.2	18	154	115	φ65	1.3		AWF-6	AWM-6	○	
	VP70	SCV-155P70W	15	500		○	9	15	140	106	96	14.3±0.2	18	154	115	φ70	1.3				○	
	VM-Type3	SCV-155M	50	500		○	9	15	100	76	68	12±1	24.5	140	115	φ73	1.3	SJ-1	AWF-1	AWM-1		
○	VP82	SCV-155P82W	20	500		○	9	15	140	106	96	14.3±0.2	18	154	115	φ82	1.8		AWM-4	AWM-5	○	
	VP94	SCV-155P94	25	500		○	9	15	150	114	103	14.3±0.2	18	154	115	φ94	2.1		AWM-4	AWM-4	○	
	VM-Type3	SCV-205G	50	500		○	12	20	90	68	62	12±1	24.5	140	115	φ73	1.3	SJ-1	AWF-1	AWM-1		
	VP82	SCV-205P82W	20	500		○	12	20	140	106	96	14.3±0.2	18	154	115	φ82	1.8		AWM-4	AWM-5	○	
	VP110	SCV-205P110	40	500		○	12	20	170	129	117	14.3±0.2	18	154	115	φ110	2.6		AWM-4	AWM-4	○	
○	VP110	SCV-255P110	40	500		○	15	25	170	129	117	14.3±0.2	18	154	115	φ110	2.6		AWM-4	AWM-4	○	
	VP150	SCV-405P150	40	500		○	24	40	300	228	206	16.6±0.2	70	265	165	φ150	6.6					
	VP200	SCV-555P200	40	500		○	33	55	400	305	275	16.6±0.2	70	265	165	φ200	7.7					
	VD45	SCV-56.5D45W	15	650		○	3	5	70	53	48	10±0.5	15	115	96.5	φ45	0.4					
	UW82	SCV-158FH82UW-C	50	800		○	9	15	94	71	64	10±0.5	18	133.5	90.6	φ82	1.3				○	
	VP94	SCV-158P94DW	50	800		○	9	15	150	114	103	14.3±0.2	18	154	115	φ94	2.1		AWM-4	AWM-4	○	
	VP110	SCV-158P110FW	15	800		○	9	15	170	129	117	14.3±0.2	18	154	115	φ110	2.8		AWM-4	AWM-4	○	
	VD55	SCV-110D55W	40	1000		○	0.6	1	36	30	27	10±0.5	15	115	96.5	φ55	0.6					
	UW55	SCV-310H55UW-C	35	1000		○	1.8	3	94	71	64	10.5±0.2	18	133.5	90.6	φ55	0.7				○	○
	VP65	SCV-310P65FW	6	1000		○	1.8	3	108	99	89	14.3±0.2	18	154	115	φ65	1.2		AWF-6	AWM-6	○	
	VD55	SCV-410D55W	40	1000		○	2.4	4	80	61	55	10±0.5	15	115	96.5	φ55	0.6					
	VP65	SCV-410P65FW	6	1000		○	2.4	4	130	99	89	14.3±0.2	18	154	115	φ65	1.2		AWF-6	AWM-6	○	
	VT-Type1	SCV-510GT	70	1000		○	3	5	80	61	55	10.5±0.5	19.6	130	108	φ52.4	0.7					
○	UW55	SCV-510H55UW-C	35	1000		○	3	5	94	71	64	10.5±0.2	18	133.5	90.6	φ55	0.7				○	
○	VP65	SCV-510P65W	20	1000		○	3	5	130	99	89	14.3±0.2	18	154	115	φ65	1.3		AWF-6	AWM-6	○	
	VM-Type3	SCV-510M	50	1000		○	3	5	100	76	68	12±1	24.5	140	115	φ73	1.4	SJ-1	AWF-1	AWM-1		
		SCV-510M82W	50	1000		○	3	5	80	61	55	10.5±0.5	18	132	100	φ82	1.9					
○	UW65	SCV-810H65UW-C	100	1000		○	4.8	8	94	71	64	10.5±0.2	18	133.5	90.6	φ65	0.9				○	
	VP65	SCV-810P65W	20	1000		○	4.8	8	130	99	89	14.3±0.2	18	154	115	φ65	1.3		AWF-6	AWM-6	○	
	UW65	SCV-1010H65UW-C	100	1000		○	6	10	94	71	64	10.5±0.2	18	133.5	90.6	φ65	0.9				○	
	VM-Type3	SCV-1010G	50	1000		○	6	10	90	68	62	12±1	24.5	140	115	φ73	1.4	SJ-1	AWF-1	AWM-1		
	VM-Type4	SCV-1010	80	1000		○	6	10	100	76	68	12±1	24.5	140	115	φ89	1.8					
○	VP82	SCV-1010P82W	25	1000		○	6	10	140	106	96	14.3±0.2	18	154	115	φ82	1.8		AWM-4	AWM-5	○	
○	VP110	SCV-1510P110W	40	1000		○	9	15	170	129	117	14.3±0.2	18	154	115	φ110	2.8		AWM-4	AWM-4	○	
	VP150	SCV-2010P150W	50	1000		○	12	20	300	228	206	16.6±0.2	70	265	165	φ150	7.7					
New	VP132	SCV-2013P132DW	40	1300		○	12	20	170	129	117	14.3±0.2	18	154	115	φ132	3.8		AWM-4	AWM-4	○	
	VM-Type3	SCV-514M	90	1400		○	3	5	100	76	68	12±1	24.5	140	115	φ73	1.4	SJ-1	AWF-1	AWM-1		
	VM-Type3	SCV-1014G	90	1400		○	6	10	90	68	62	12±1	24.5	140	115	φ73	1.4	SJ-1	AWF-1	AWM-1		
	VD55	SCV-115D55W	45	1500		○	0.6	1	40	30	27	10±0.5	15	115	96.5	φ55	0.6					
	VD55	SCV-315D55W	45	1500		○	1.8	3	80	61	55	10±0.5	15	115	96.5	φ55	0.6					
	VP65	SCV-315P65DW	10	1500		○	1.8	3	130	99	89	14.3±0.2	18	154	115	φ65	1.3		AWF-6	AWM-6	○	
	UW55	SCV-415H55UW-C	150	1500		○	2.4	4	94	71	64	10.5±0.2	18	133.5	90.6	φ55	0.7					
○	UW65	SCV-415H65UW-C	150	1500		○	2.4	4	94	71	64	10.5±0.2	18	133.5	90.6	φ65	0.9				○	○
	VP65	SCV-415P65DW	10	1500		○	2.4	4	130	99	89	14.3±0.2	18	154	115	φ65	1.3		AWF-6	AWM-6	○	
	VT-Type2	SCV-515GT	70	1500		○	3	5	80	61	55	10.5±0.5	19.6	130	108	φ60	0.9					
	UW65	SCV-515H65UW-C	150	1500		○	3	5	94	71	64	10.5±0.2	18	133.5	90.6	φ65	0.9				○	
	VP70	SCV-515P70W	35	1500		○	3	5	140	106	96	14.3±0.2	18	154	115	φ70	1.5				○	
	VP82	SCV-515P82W	25	1500		○	3	5	140	106	96	14.3±0.2	18	154	115	φ82	1.8		AWM-4	AWM-5	○	
	VP94	SCV-515P94	30	1500		○	3	5	150	114	103	14.3±0.2	18	154	115	φ94	2.1		AWM-4	AWM-4	○	
	UW70	SCV-715H70UW-C	150	1500		○	4.2	7	94	71	64	10.5±0.2	18	133.5	90.6	φ70	1.0				○	
	VP110	SCV-1015P110W	40	1500		○	6	10	170	129	117	14.3±0.2	18	154	115	φ110	2.8		AWM-4	AWM-4	○	
	VP132	SCV-2015P132DW	40	1500		○	12	20	170	129	117	14.3±0.2	18	154	115	φ132	3.8		AWM-4	AWM-4	○	
○	UW65	SCV-320H65UW-C	200	2000		○	1.8	3	94	71	64	10.5±0.2	18	133.5	90.6	φ65	0.9				○	
	UW70	SCV-320H70UW-C	200	2000		○	1.8	3	94	71	64	10.5±0.2	18	133.5	90.6	φ70	1.0				○	
	VM-Type4	SCV-520M	85	2000		○	3	5	100	76	68	12±1	24.5	140	115	φ89	1.9	SJ-1	AWF-1	AWM-1		
○	VP82	SCV-520P82W	25	2000		○	3	5	140	106	96	14.3±0.2	18	154	115	φ82	1.9		AWM-4	AWM-5	○	
		SCV-520C82PW	80	2000		○	3	5	140	106	96	17.5±0.5	18	130.1	98.1	φ82	1.9					
	VP94	SCV-520P94W	30	2000		○	3	5	150	114	103	14.3±0.2	18	154	115	φ94	2.1		AWM-4	AWM-4	○	
	VP110	SCV-520P110	40	2000		○	3	5	170	129	117	14.3±0.2	18	154	115	φ110	2.9		AWM-4	AWM-4	○	
○	VP110	SCV-820P110W	40	2000		○	4.8	8	170	129	117	14.3±0.2	18	154	115	φ110	2.9		AWM-4	AWM-4	○	
	VP94	SCV-523P94W	45	2300		○	3	5	150	114	103	14.3±0.2	18	154	115	φ94	2.3		AWM-4	AWM-4	○	
	VP110	SCV-325P110FW	15	2500		○	1.8	3	170	129	117	14.3±0.2	18	154	115	φ110	2.9		AWM-4	AWM-4	○	
	VP150	SCV-1525P150W	40	2500		○	9	15	300	228	206	16.6±0.2	70	265	165	φ150	7.7					
	VPA150	SCV-1525PA150W	40	2500		○	9	15	400	305	275	16.6±0.2	70	265	165	φ150	7.7					
	VP110	SCV-340P110W	45	4000		○	1.8	3	170	129	117	14.3±0.2	18	154	115	φ110	3.0		AWM-4	AWM-4	○	
	VP150	SCV-560P150W	60	6000		○	3	5	300	228	206	16.6±0.2	70	265	165	φ150	7.7					

※○ standard and preferred.

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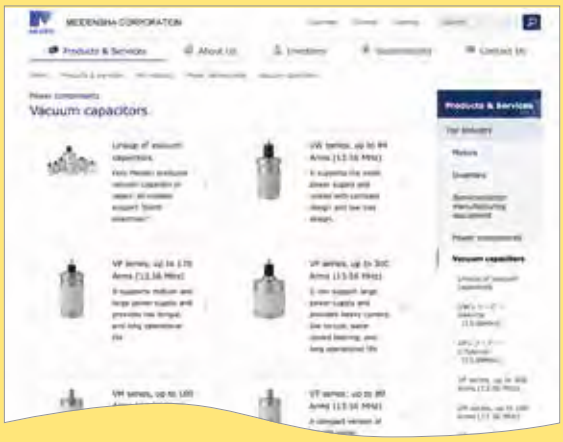

For more information, please visit our website:

http://www.meidensha.com/products/industry/prod_03/prod_03_08/index.html

MEIDEN

MEIDENSHA CORPORATION

ThinkPark Tower, 2-1-1, Osaki, Shinagawa-ku, Tokyo, 141-6029 Japan

www.meidensha.com

Safety Precautions

Prior to using our products, please read through the relevant instruction manuals and related materials.

In the case of applications in facilities where fatal injuries are anticipated as a result of product failure, malfunction, and/or misoperation, or where the occurrence of serious losses is predicted, it is recommended to take adequate measures separately by installing, for example, proper safety devices.

Agents and distributors for our products

In regard to queries about these products, please contact the Industrial Component Business Unit specified below.

● Vacuum Device Sales Section Industrial Component Business Unit : ThinkPark Tower 2-1-1 Osaki, Shinagawa-ku, Tokyo 141-6029 Japan
Phone: +81-3-6420-7679, FAX: +81-3-5745-3058

■ Due to our commitment to continually improving the function and performance of our products, specifications are subject to change without prior notice.
■ The nameplates for marking the product types and logos shown in this catalog may differ from the actual ones.

VEGETABLE OIL INK

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