



Vacuum Controller For Rotary Evaporator

Model

VR300S

Instruction Manual

-The First Edition -

This document is the exclusive instruction manual to the vacuum controller VR300S model installed on the RE301 model rotary evaporator. Please use this document together with the instruction manual of the rotary evaporator as for the operating instructions of device.

- Thank you for purchasing " Vacuum Controller, VR 300S" of Yamato Scientific Co., Ltd.
- To use this unit properly, read this "Instruction Manual" thoroughly before using this unit. Keep this instruction manual around this unit for referring at anytime.



WARNING!:

Carefully read and thoroughly understand the important warning items described in this manual before using this unit.

Yamato Scientific Co. LTD.

This paper has been printed on recycled paper.

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1.Contents in the Package

The VR300S vacuum controller is packed separately. Please check the contents in the package before installing the controller to the main body of rotary evaporator.

VR300S			
No.	Name	QTY	Notes
1	VR300S model vacuum controller (main body)	1	
2	Attaching screw	3	M4 tapping screw (2), M4 flat head screw (1)
3	DC 24V power harness	1	
4	Bracket to vacuum controller	1	SUS
5	Instruction manual	1	
6	Warranty card	1	
7	Vacuum hose	1.0m	
8	Teflon vacuum seal	1	


2.Cautions in Using with Safety


Explanation

MEANING OF ILLUSTRATED SYMBOLS

Illustrated Symbols

Various symbols are used in this safety manual in order to use the unit without danger of injury and damage of the unit. A list of problems caused by ignoring the warnings and improper handling is divided as shown below. Be sure that you understand the warnings and cautions in this manual before operating the unit.

 **WARNING!** If the warning is ignored, there is the danger of a problem that may cause a serious accident or even fatality.

 **CAUTION!** If the caution is ignored, there is the danger of a problem that may cause injury/damage to property or the unit itself.

Meaning of Symbols



This symbol indicates items that urge the warning (including the caution). A detailed warning message is shown adjacent to the symbol.



This symbol indicates items that are strictly prohibited. A detailed message is shown adjacent to the symbol with specific actions not to perform.



This symbol indicates items that should be always performed. A detailed message with instructions is shown adjacent to the symbol.

2.Cautions in Using with Safety

Table of Illustrated Symbols

Warning



Warning,
generally



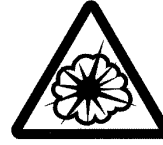
Warning,
high voltage



Warning,
high temperature



Warning,
drive train



Warning,
explosive

Caution



Caution,
generally



Caution,
electrical shock



Caution,
scald



Caution,
no road heating



Caution,
not to drench



Caution,
water only



Caution,
deadly poison



Caution,
water

Prohibit



Prohibit,
generally



Prohibit,
inflammable



Prohibit,
to disassemble



Prohibit,
to touch

Compulsion



Compulsion,
generally



Compulsion,
connect to the
grounding
terminal



Compulsion,
install on a flat
surface



Compulsion,
disconnect the
power plug



Compulsion,
periodical
inspection

2.Cautions in Using with Safety

Fundamental Matters of "WARNING!" and "CAUTION!"

WARNING!

Do not use this unit in an area where there is flammable or explosive gas

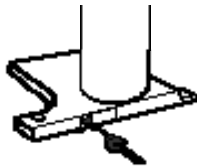
Never use this unit in an area where there is flammable or explosive gas. This unit is not explosion-proof. An arc may be generated when the power switch is turned on or off, and fire/explosion may result. (Refer to page 43 "18. List of Dangerous Materials ".)

Always ground this unit

Always ground this unit on the power equipment side in order to avoid electrical shock due to a power surge.

Plug the power cord securely

Plug the power cord securely into the main unit. If not, overheat or fire disaster may result in.



If a problem occurs

If smoke or strange odor should come out of this unit for some reason, turn off the circuit breaker right away, and then disconnect the power plug. Immediately contact a service technician for inspection. If this procedure is not followed, fire or electrical shock may result. Never perform repair work yourself, since it is dangerous and not recommended.

Do not use the power cord if it is bundled or tangled

Do not use the power cord if it is bundled or tangled. If it is used in this manner, it can overheat and fire may be caused.

Do not process, bend, wring, or stretch the power cord forcibly

Do not process, bend, wring, or stretch the power cord forcibly. Fire or electrical shock may result.

Perform periodic check

Check the device frequently. Do not leave the dust and dirt on the wiring terminals and electrical components. A fire disaster may result in.

Substances that can not be used

Never use explosive substances, flammable substances and substances that include explosive or flammable ingredients in this unit. Explosion or fire may occur. (Refer to page 43 "18. List of Dangerous Materials ".)

Do not disassemble or modify this unit

Do not disassemble or modify this unit. Fire or electrical shock or failure may be caused.

2.Cautions in Using with Safety

Fundamental Matters of "WARNING!" and "CAUTION!"



CAUTION!



During a thunder storm

During a thunderstorm, turn off the power key immediately, then turn off the circuit breaker and the main power. If this procedure is not followed, fire or electrical shock may be caused.



When electric power failure occurs...

The device stops operation when electric power failure occurs. In this case, turn off the breaker for safety. When the power is applied again, if the power switch is turned on, the main unit will go to automatically upper step.

3. Before Using This Unit

Requirements for Installation

WARNING!

1. Always ground this unit



- Be sure to connect the ground wire to the earth conductor or earth terminal to prevent accidents caused by an electric shock.



- Do not connect the earth wire to gas or water pipes. If not, fire disaster may be caused.
- Do not connect the earth wire to the ground for telephone wire or lightning conductor. If not, fire disaster or electric shock may be caused.
- Consult your local electrical contractor for power connecting work.

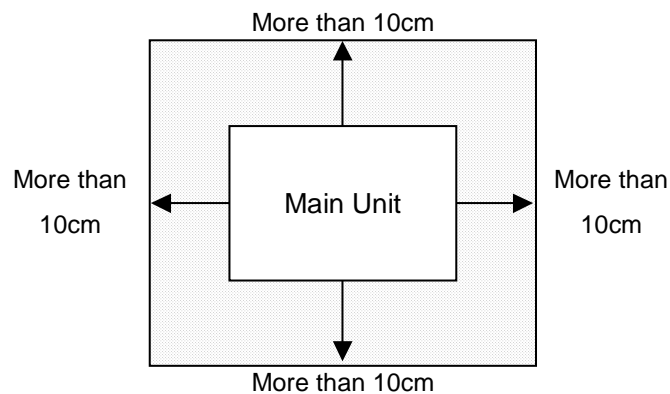
2. Choose a proper place for installation



- Do not install this unit in a place where:
 - ◆ Rough or dirty surface.
 - ◆ Flammable gas or corrosive gas is generated.
 - ◆ Ambient temperature above 35°C.
 - ◆ Ambient temperature fluctuates violently.
 - ◆ There is direct sunlight.
 - ◆ There is excessive humidity and dust.
 - ◆ There is a constant vibration.
 - ◆ Without a ventilation system.
 - ◆ The unstable place of a power supply.



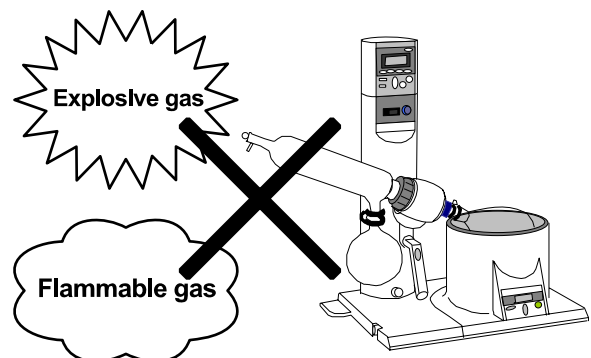
- Make sure that no flammable substances are placed around the devices. Keep space as shown, at least, in the figure below.



3. Do not use this unit in an area where there is flammable or explosive gas



- Never use this unit in an area where there is flammable or explosive gas. This unit is not explosion-proof. An arc may be generated when the power switch is turned ON or OFF, and fire/explosion may result.
- To know about flammable or explosive gas, refer to page 43 "19. List of Dangerous Materials".



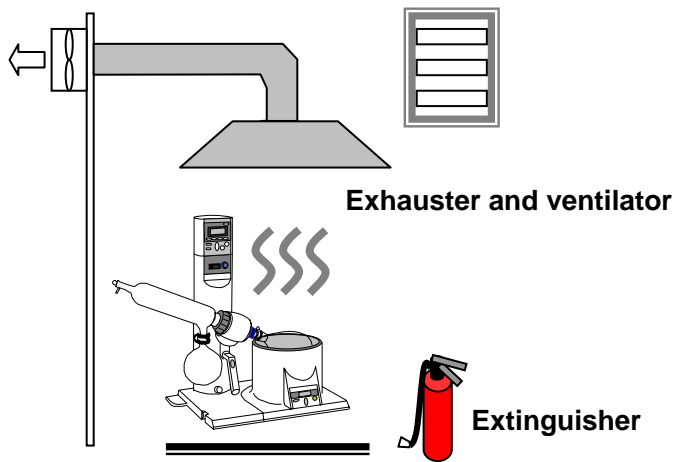
3. Before Using This Unit

Requirements for Installation

4. Install exhauster and ventilator



- Be sure to install an exhauster, ventilator and extinguisher around the device.
The oily smoke of silicone oil generated by heating is flammable and may cause fire disaster. Silicone oil also may generate harmful gas when it reaches a high temperature.



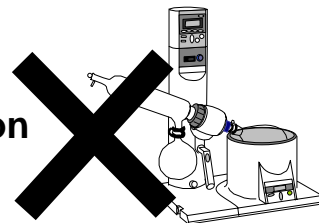
CAUTION!

5. Do not modify



- Modification of this unit is strictly prohibited. This could cause a failure.

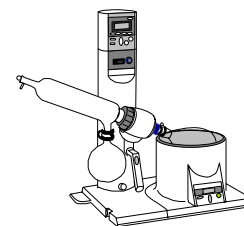
Modification



6. Installation on horizontal surface



- Place this unit as flat a place as possible. If the three rubber feet and adjuster are not in uniform contact with the floor surface, noise or vibration may result. Additionally, the unit may cause a problem or malfunction.



7. Choose a correct power distribution board or receptacle



- Choose a correct power distribution board or receptacle that meets the unit's rated electric capacity.

Electric capacity: RE301: 1.5A at AC100V to AC240V

Electric capacity for RE main unit (except water bath or oil bath) and vacuum controller. The water bath or oil bath uses the other power source. The electric capacity of 12.5A and 6.5A are required for the BM500/BO400 and BM510/BO410 models respectively.

NOTE)

The device adopts the free power system for AC100V to AC240V. The RE main unit includes the switching power source, the secondary power source of which is driven with DC24V. Do not connect the lines that share the power source, or do not place the appliances that generate noise around the device. A malfunction may occur on the device.

3. Before Using This Unit

Requirements for Installation

8. Before/after installing



- It may cause injury to a person if this unit falls down or moves by the earthquake and the impact. etc.. To prevent, take measures that the unit cannot fall down, and not install to busy place.
- Be sure to install an exhauster, ventilator and extinguisher around the device.

9. Handling of power code



- Do not entangle the power cord. This will cause overheating and possibly a fire.
- Do not bend or twist the power cord, or apply excessive tension to it. This may cause a fire and electrical shock.
- Do not lay the power cord under a desk or chair, and do not allow it to be pinched in order to prevent it from being damaged and to avoid a fire or electrical shock.
- Keep the power cord away from any heating equipment such as a room heater. The cord's insulation may melt and cause a fire or electrical shock.



- If the power cord becomes damaged (wiring exposed, breakage, etc.), immediately turn off the power at the rear of this unit and shut off the main supply power. Then contact your nearest dealer for replacement of the power cord. Leaving it may cause a fire or electrical shock.
- Connect the power plug to the receptacle which is supplied appropriate power and voltage.

10. Precautions for use of sample including organic solvent



- Note the followings when using the sample which includes organic solvent.
 - ❖ A Teflon diaphragm model vacuum pump is recommended.
 - ❖ It recommend a regular exchange because Teflon control solenoid valve are consumables supplies though they are the specifications that it does corrosion-inhibiting easily to the solvent.

4.Outside Appearance

Main Unit

Front view



Control panel

Rear view



Leak and control solenoid valve

End connection of condenser

End connection of vacuum pump

Rating nameplate

DC power supply connector

5. Installation Method

Connection between RE301 main unit and vacuum controller VR300S

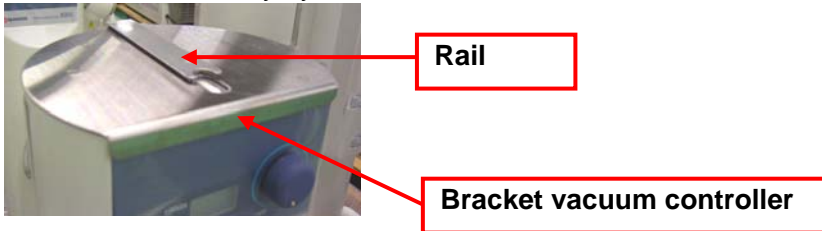
1) Fixation of VR vacuum controller

Unpack the device and install it at level area.

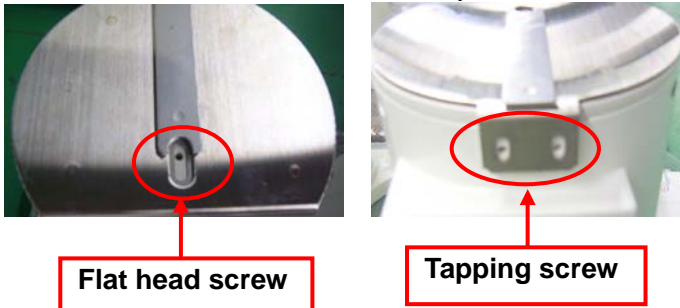
- ① Tear the seal from screw hole of RE main body,



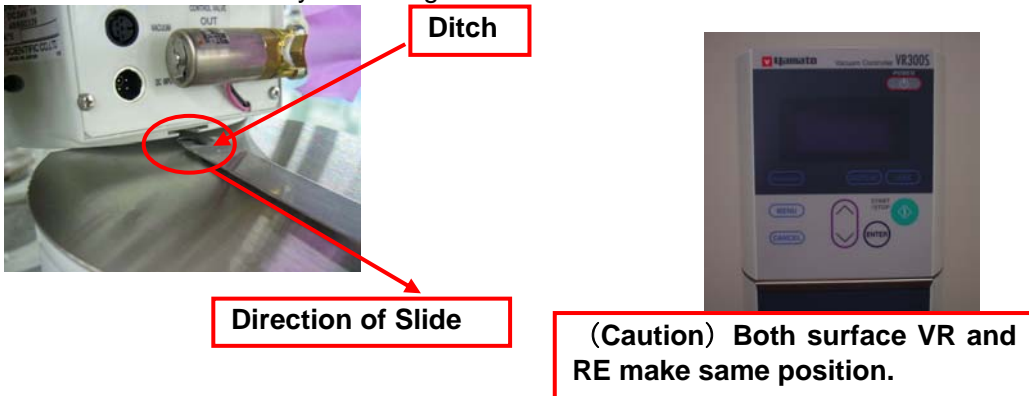
- ② Cover RE main body by the Bracket vacuum controller.



- ③ Fix the Bracket vacuum controller by flat head screw (M4) and tapping screw(M4).



- ④ Slide the VR main body that fixing ditch of VR with the rail of Bracket vacuum.



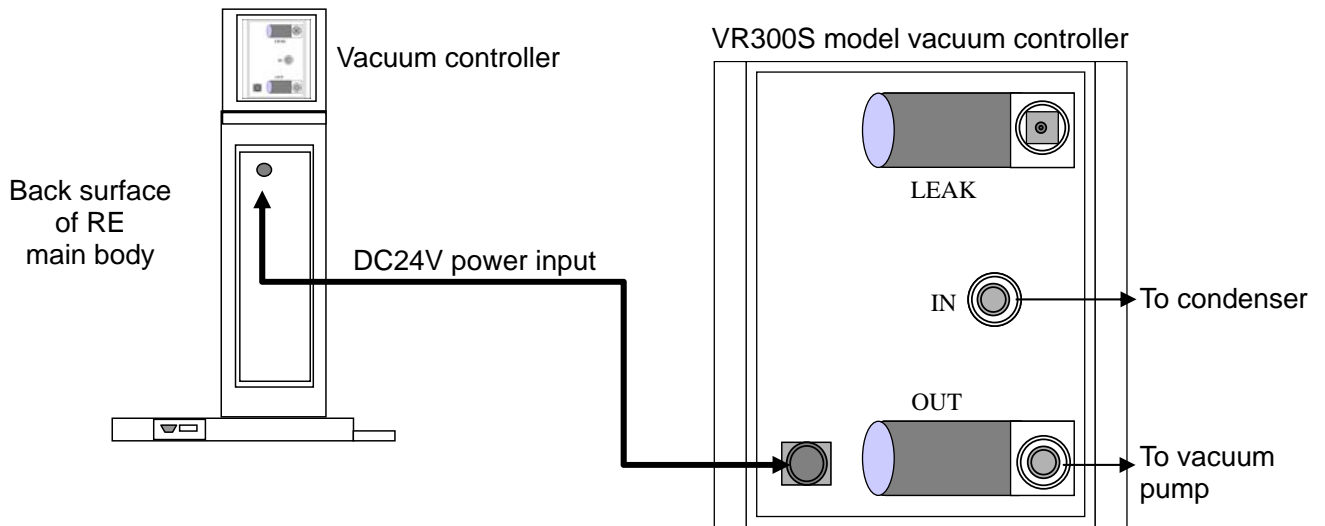
※ When there are detached, do the above procedure from 4 to 1.

5. Installation Method

Connection between RE301 main unit and vacuum controller VR300S

2) Connection between VR300S vacuum controller and RE301 main unit

Connect the lead wire with a DC24V power harness attached to the vacuum controller to the connector.



Connect the vacuum hose to the IN and OUT nipples on the back surface of vacuum controller.

The outer diameter of IN and OUT nipples on the terminal area of vacuum pump are 10mm.

Use the vacuum hose with inner diameter of 6mm.

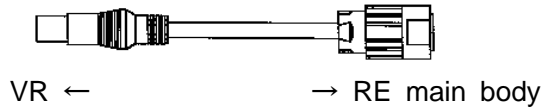
5. Installation Method

Harness connection

Use the exclusive harness to connect the respective harness.

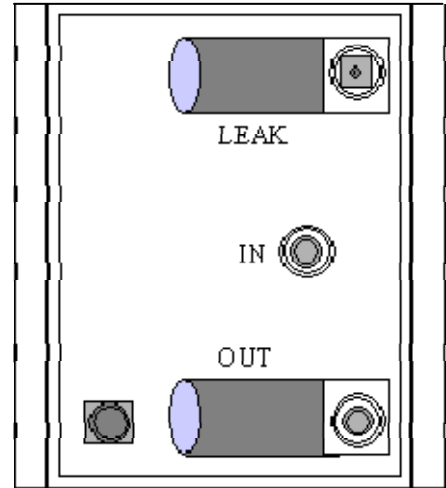
1) DC24V power harness

This harness supplies the DC24V power from the RE main body to the VR model vacuum controller and TA300 model evaporating temperature indicator.



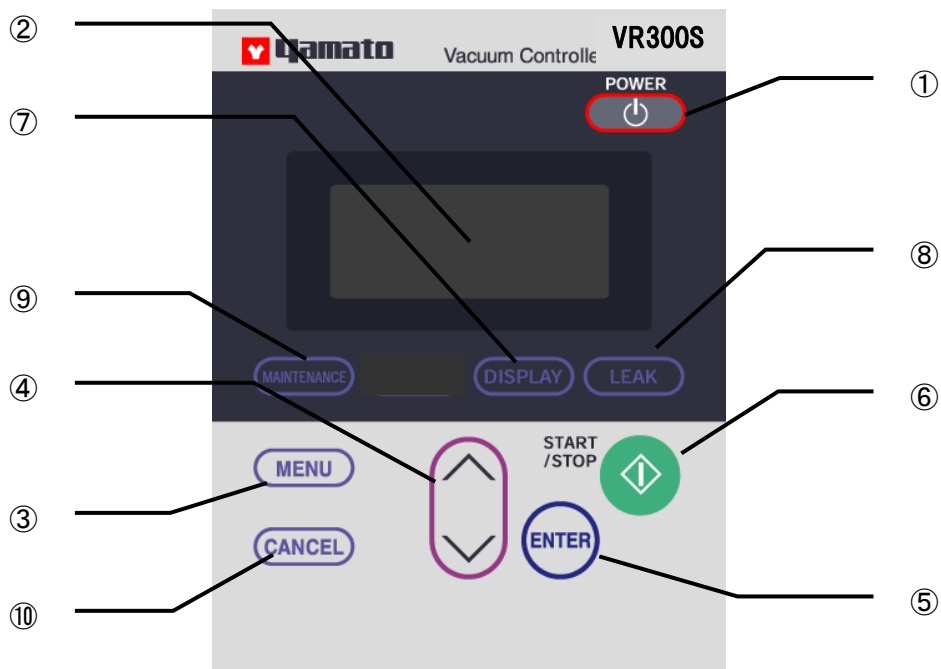
2) Power cord

The power cord attached to the RE main body is plugged into the connector on the back surface of main body to connect to the power receptacle.



6. Control Panel

Explanation of Control Panel

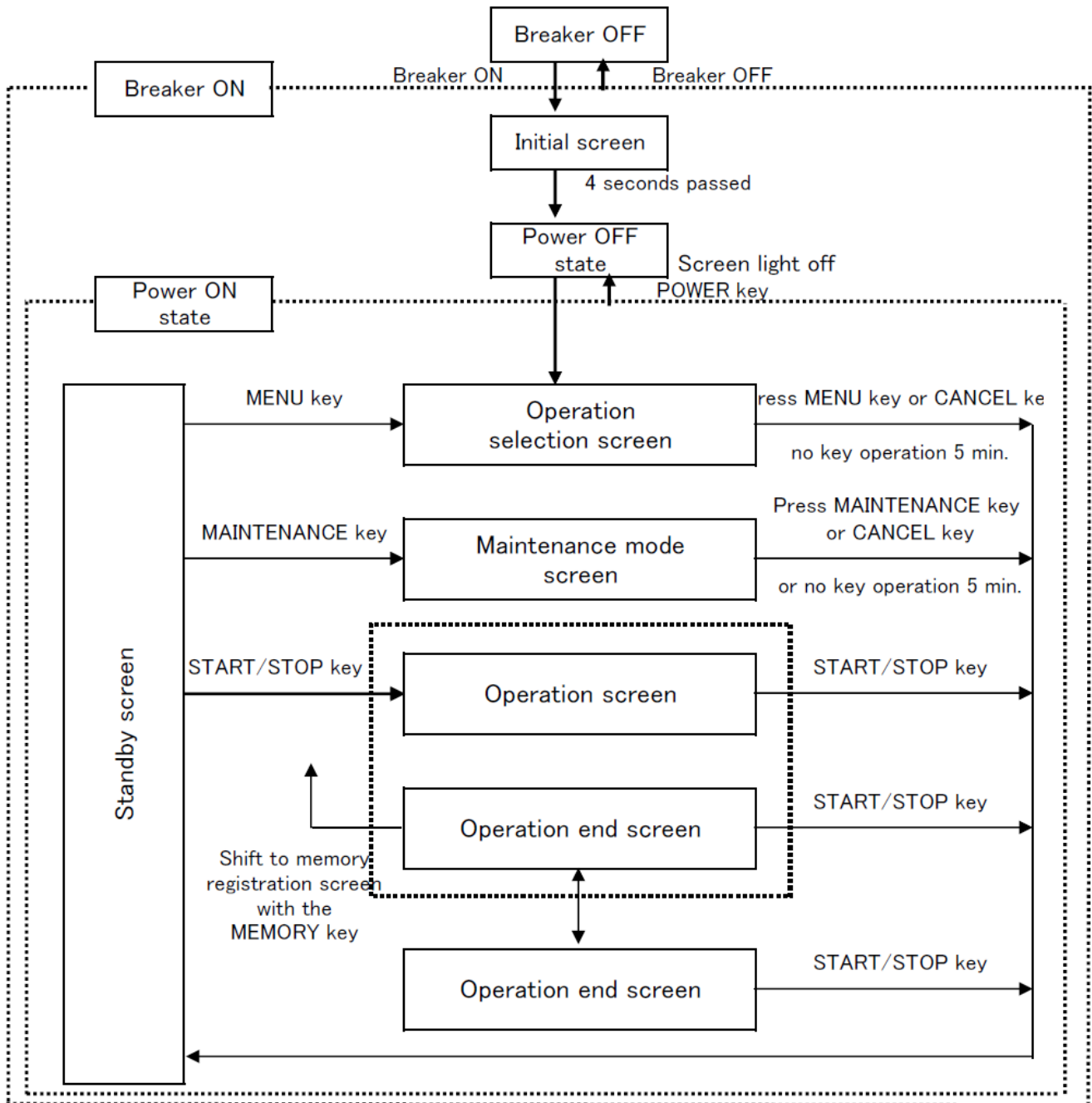


No.	Name	Function
①	POWER key	Turns on/off the vacuum controller.
②	LCD screen	Displays the information about setting and operation of device in Kanji or alphabetical characters.
③	MENU key	Used to select the operation mode.
④	Up/down key	Changes the preset value and setting items.
⑤	ENTER key	Determines the setting value and setting items after they are changed.
⑥	START/STOP key	Starts/stops the operation.
⑦	DISPLAY key	Shifts the LCD screen or changes the display style.
⑧	LEAK key	Controls the vacuum pressure during operation. The leak valve is opened while this key is pressed.
⑨	MAINTENANCE key	Used to specify the details of operation and display, or to check the error log.
⑩	CANCEL key	Cancels the incorrect input.

7.Operation Method

Basic Operation

Flow for Basic Operation



7.Operation Method

Operational Function

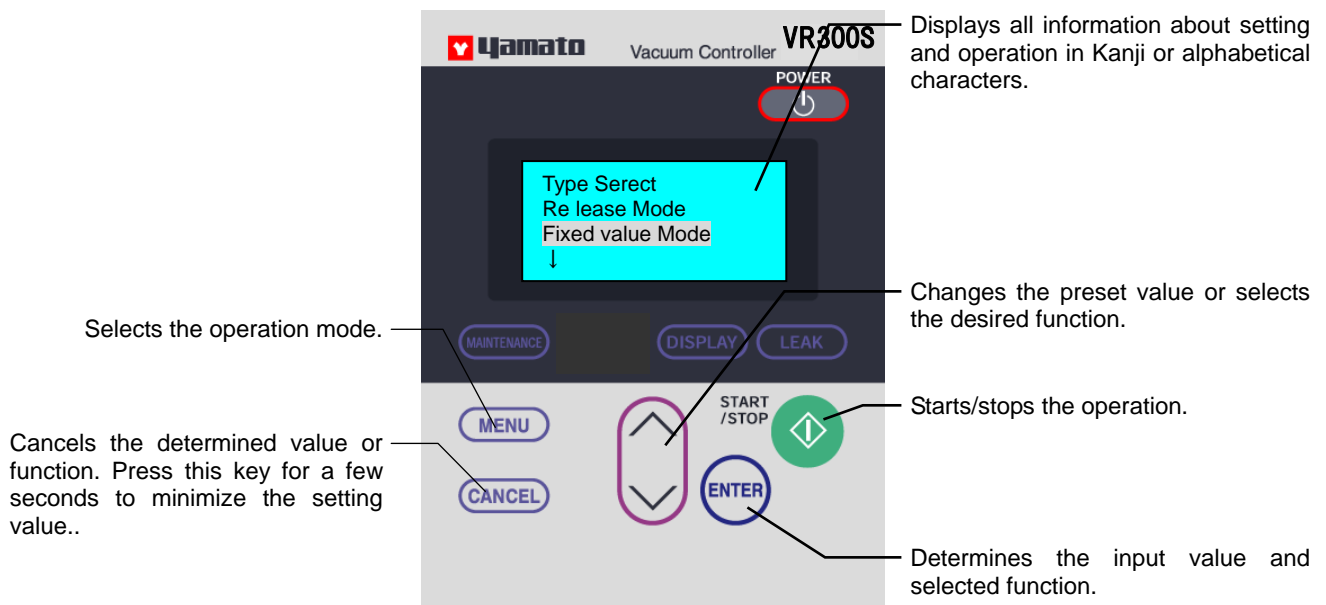
No.	Operation Mode	VR300S
1	Free operation	○
2	Fixed temperature operation	○*
3	Fixed temperature timer operation	○*
4	Descending operation	○*
5	Descending timer operation	○*

1. Free operation	Select this mode when the operation does not require the vacuum controller or when canceling the operation mode which requires it. In the free operation mode, the control solenoid valve remains open and vacuum control is not performed.
2. Fixed temperature operation	Select this mode when performing continuous operation with the preset vacuum pressure.
3. Fixed temperature timer operation	Select this mode when stopping the fixed temperature operation automatically at the preset time. The setting range of fixed temperature timer is 1 to 999 (unit: minute).
4. Descending operation	Select this mode when gradually lowering the degree of vacuum to the operating vacuum pressure.
5. Descending timer operation	Select this mode when stopping the descending operation automatically at the preset time. The setting range of descending timer is 1 to 99 (unit: minute). The setting range of fixed temperature timer is 1 to 999 (unit: minute).

7.Operation Method

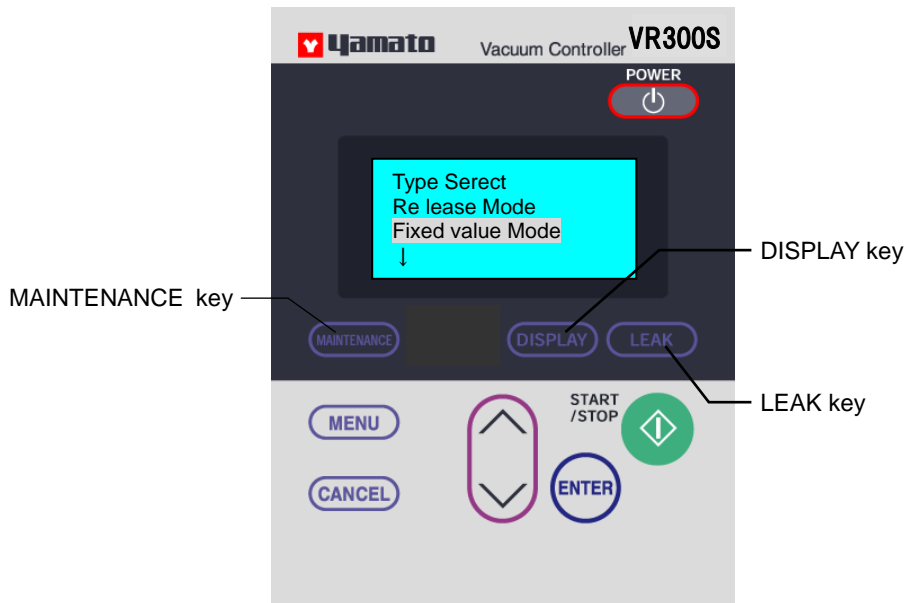
Key Functions and Operations

LCD display	It displays all information about setting and operation of the device. They are displayed in Kanji/Katakana or alphabetical characters, switchable using the display switching function.
MENU key	This key selects the operation mode. The eight operation modes listed in the previous page are displayed. The operation menu varies depending on the mode selected. Press the MENU key. Select the desired operation menu with the ▽ key. Press the ENTER key to display the condition setting screen of respective operation menu.
△▽ (up/down) keys	This key changes the preset value or selects the desired function.
ENTER key	This key determines the input value and selected function.
CANCEL key	This key cancels the determined value or function. Press this key for few seconds to minimize the setting value.
START/STOP key	This key starts the operation. It stops the operation when pressed again.



7.Operation Method

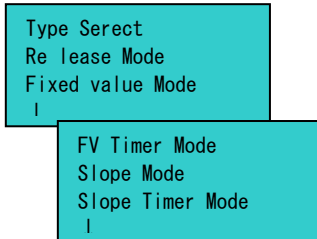
Key Functions and Operations



LEAK key

The leak solenoid valve is opened to increase the low degree of vacuum while this key is pressed during operation.

DISPLAY key



This key shifts the LCD screen or changes the display at operation to the graphic style.

Move the digit with the DISPLAY key or $\Delta \nabla$ key to check the preset value or indicated value at the setting of value or operation.

Press this key for few seconds to graphic display the operational state during operation or on the operation completion screen. The display changes to the graphic display and the process under operation blinks. The current measured pressure and measured steam temperature are also displayed on the screen.

Key Functions and Operations

MAINTENANCE key

```
Type Select
Release Mode
Fixed value Mode
↓
```

Operation mode selection

```
Fixed Value Mode
Data Type
Yamato No.1
↓
```

Standby

```
Maintenance Mode
Roter Switching
Juck Switching
↓
```

Maintenance mode

```
Pressure CAL
**hPa
AFTER **0hPa
BEFORE**0hPa
```

This key specifies the various sub functions of the vacuum controller. The kind of functions settable varies depending on the model of vacuum controller. Press the MAINTENANCE key on the standby screen to go into this mode. Select the setting item with the Δ / ∇ keys and then press the ENTER key to determine it.

Vacuum pressure offset function

This function corrects the indicated value of vacuum pressure in increments of 1 Pa if it differs from the actual vacuum pressure. Input the correct pressure with the Δ / ∇ key and then press the ENTER key.

```
Press Switching
0. P-3000S
1. P-8300
```

Pressure sensor switching function

The parameter should be changed when using the optional pressure sensor for the use of solvent (P-8300).
0: P-3000S(standard sensor) 1: P-8300 (optional sensor)
Select the type of sensor with the Δ / ∇ key and then press the ENTER key.

```
Vapor Select
0. OFF
1. ON
```

Presence/absence of evaporating temperature sensor (for VR601/801 model only)

This function specifies the presence or absence of evaporating temperature sensor. Set "0" (absent) when evaporating temperature sensor is not used. Usually "1" (present) is set here.
Select "0" or "1" with the Δ / ∇ key and then press the ENTER key.

```
Key Sound
0. OFF
1. ON
```

Presence/absence of key buzzer sound

This function specifies the presence or absence of key buzzer sound.
0: No key buzzer sound 1: Key buzzer sound ("1" is set at factory shipment)
Select "0" or "1" with the Δ / ∇ key and then press the ENTER key.

```
Time Up Sound
0. OFF
1. ON
```

Presence/absence of time up sound

This function mutes the buzzer sound at the end of timer operation or automatic operation.
0: No time up sound 1: Time up sound ("1" is set at factory shipment)
Select "0" or "1" with the Δ / ∇ key and then press the ENTER key.

```
Key Lock
0. OFF
1. ON
```

Keylock function

Only the MAINTENANCE key is operable after the keylock is selected during the operation.
0: OFF ("0" is set at factory shipment) 1: ON
Select "0" or "1" with the Δ / ∇ key and then press the ENTER key.

```
Language
0. JAPANESE
1. ENGLISH
```

Language choice function

This function selects the language used in the LCD display.
0: JAPANESE 1: ENGLISH
Select "0" or "1" with the Δ / ∇ key and then press the ENTER key.

Key Functions and Operations

Err' s career
No.01
Vevor Sensor err
*hour ago

Error log

This function displays up to 20 errors occurred in the past, including the error No., error content and time of occurrence.

Select the error No. with the Δ ∇ keys. The latest error is displayed first. Press the ENTER key to return to the MAINTENANCE screen.

Addition Time
***hour

Accumulated time

This function displays the operating hours (accumulated current-carrying time to the controller).

Press the ENTER key to return to the MAINTENANCE screen.

Slope Cycle
x x s

Slope cycle setting

This function sets up the time of period to decompression at Descending operation/Descending timer operation.

The decompression value of the every slope periodic is calculated from the set pressure and the FV time.

Start MV
x x %

Main valve output

The rate of main valve output ON (Open)/OFF (Close) to the slope cycle is set up. If you set up Slope cycle is 10 sec and Start MV is 40.0%, the main valve open 4 sec and close 6 sec.

It is 100% at Free operation nevertheless any set up.

Standby Screen/Operation Mode Selection Screen

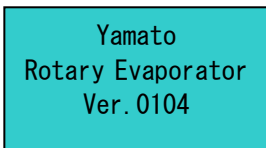
Standby screen display

Select the MEMU key on the operation selection screen after power-on to go into the standby screen.
An error is displayed on the screen if occurred.

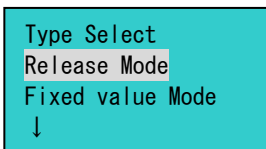


- Power OFF state. The screen displays nothing.

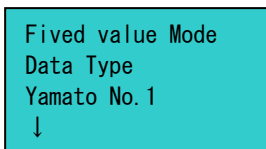
↓ Power ON



- The initial screen is displayed and becomes extinct automatically after 4 seconds.
Turn on the power supply of the vacuum controller.



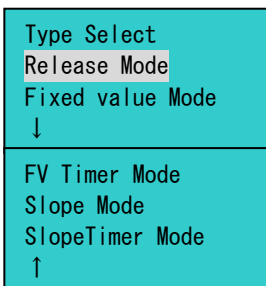
- The operation mode selection screen is displayed.
Push the MENU key or CANCEL key.



- The standby screen of operation mode used previously is displayed.
The display of operation mode, name, pressure and temperature varies depending on the model or settings.
Use the DISPLAY key to advance the screen.
The START/STOP key can start/stop the operation.

Operation mode selection screen

Select each operation mode at the operation mode selection screen.



Select the operation menu with the Δ / ∇ keys.

The LCD screen consists of four-line display in one page. The arrow (↓) on the screen indicates that it has the next screen.

Operation Setting Screen

Press down the ENTER key on the operation selection screen to go into the operation setting screen. Operating conditions of respective operation menu can be set here.

Note: Free operation has no setting items. The screen changes to the standby screen.

Selection example	Description/operation
<pre>SlopeTimer Mode YAMATO No.1 Press **hPa ↓</pre>	<ul style="list-style-type: none"> • The selected operation mode is displayed. • Press the ENTER key to go into the setting screen of data operation when fixed temperature, fixed temperature timer, descending, or descending timer operation is selected. Determine if data operation is performed or not with the ENTER key. When "1" (ON) is selected, the vacuum pressure during operation is automatically set by the automatic calculating system. • Press the ENTER key on the registered name display screen to display the name setting screen. Register the name with the $\Delta\nabla$ and ENTER key. Press the ENTER key for few seconds to return to the setting screen. • Specify the operating pressure with the $\Delta\nabla$ keys
<pre>Hys Press **hPa Slope ***hPa Slope Time *m ↓</pre>	<ul style="list-style-type: none"> • Set the ON/OFF width of the control solenoid valve (pressure hysteresis) in operating pressure with the $\Delta\nabla$ keys. • Set the pressure at the start of descending operation with the $\Delta\nabla$ keys. • Set the duration from the start of descending to the completion with the $\Delta\nabla$ keys
<pre>FV Time *m ↑</pre>	<ul style="list-style-type: none"> • Set the duration of fixed temperature operation at timer operation with the $\Delta\nabla$ keys.

Name Registration

On the VR model vacuum controller, a specific name can be registered to the operating condition created.

Available characters for name registration

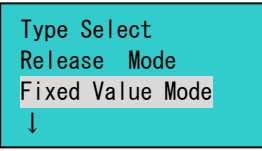
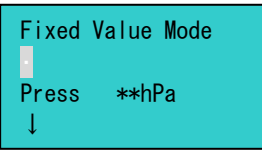
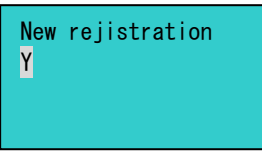
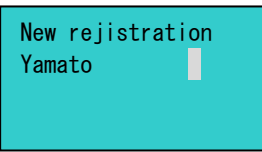
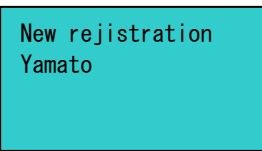
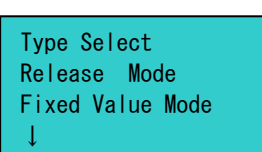
Use the following characters to register the name.

No.	Character	No.	Character	No.	Character	No.	Character
1	(Space)	41	d	81	ツ	121	°
2	0	42	e	82	テ	122	。
3	1	43	f	83	ト	123	、
4	2	44	g	84	ナ	124	!
5	3	45	h	85	ニ	125	”
6	4	46	i	86	ヌ	126	#
7	5	47	j	87	ネ	127	\$
8	6	48	k	88	ノ	128	%
9	7	49	l	89	ハ	129	&
10	8	50	m	90	ヒ	130	'
11	9	51	n	91	フ	131	(
12	A	52	o	92	ヘ	132)
13	B	53	p	93	ホ	133	*
14	C	54	q	94	マ	134	+
15	D	55	r	95	ミ	135	,
16	E	56	s	96	ム	136	-
17	F	57	t	97	メ	137	.
18	G	58	u	98	モ	138	/
19	H	59	v	99	ヤ	139	:
20	I	60	w	100	ユ	140	;
21	J	61	x	101	ヨ	141	<
22	K	62	y	102	ラ	142	>
23	L	63	z	103	リ	143	=
24	M	64	ア	104	ル	144	?
25	N	65	イ	105	レ	145	@
26	O	66	ウ	106	ロ	146	[
27	P	67	エ	107	ワ	147]
28	Q	68	オ	108	ヲ	148	¥
29	R	69	カ	109	ン	149	^
30	S	70	キ	110	ア	150	_
31	T	71	ク	111	イ	151	`
32	U	72	ケ	112	ウ	152	{
33	V	73	コ	113	エ	153	}
34	W	74	サ	114	オ	154	
35	X	75	シ	115	ヤ	155	~
36	Y	76	ス	116	ユ	156	「
37	Z	77	セ	117	ヨ	157	」
38	a	78	ソ	118	ッ	158	•
39	b	79	タ	119	ー		
40	c	80	チ	120	°		

Name Registration

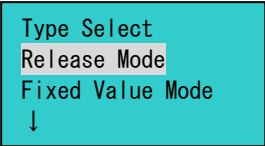
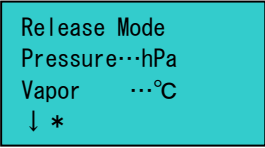
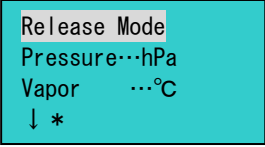
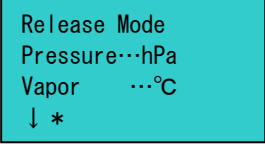
Name Registrations Procedures

Start name registration on the setting screen of operation mode used. Up to 16 one-byte characters (refer to the previous page) can be input to register the name.

Screen	Procedures
	<p>① Select the desired operation mode on the operation selection screen.</p>
<p>↓ ENTER key</p>	
	<p>② Press the ENTER key to go into the setting screen. ③ Select the name entry field with the Δ/∇ keys.</p>
<p>↓ Δ/∇ key</p>	
	<p>④ Press the ENTER key to go into the name registration screen. ⑤ Specify the first character with the Δ/∇ keys. ⑥ Press the ENTER key to determine the first character. The screen shifts to the next character entry.</p>
<p>↓ ENTER key</p>	
	<p>⑦ Repeat the steps ③ and ④ to create the name. ⑧ Up to 16 one-byte characters (refer to the previous page) can be input. Press the ENTER key to skip the entry field where a character is not input. Press the ENTER key for few second when determining the name in the middle of input. The screen returns to the setting screen.</p>
<p>↓ Δ/∇ key</p>	
	<p>⑨ The screen returns to the screen for the first character if the ENTER key is pressed on the entry field for 16th character.</p>
<p>↓ ENTER key for few seconds</p>	
	<p>⑩ Press the ENTER key for few seconds to return to the setting screen.</p>

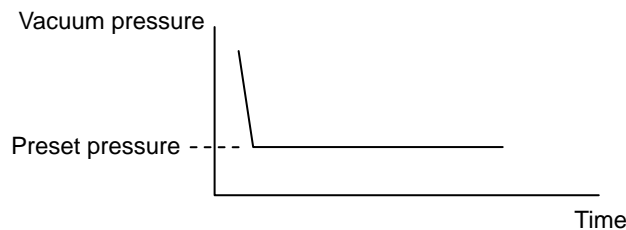
Free Operation

This operation mode does not require the vacuum controller. In this mode, the control solenoid valve on the vacuum controller always remains open.

Screen	Procedures
 <p>Type Select Release Mode Fixed Value Mode ↓</p>	<p>① Select the free operation on the setting screen with the Δ/∇ keys, and then press the ENTER key.</p>
 <p>Release Mode Pressure···hPa Vapor ···°C ↓ *</p>	<p>② The screen changes to the free operation standby screen. ❖ When the optional cooling temperature sensor is connected, the cooling temperature (°C) is displayed.</p>
 <p>Release Mode Pressure···hPa Vapor ···°C ↓ *</p>	<p>③ Press the START/STOP key to start the operation. The operation name currently operated blinks. ❖ When the optional cooling temperature sensor is connected, the cooling temperature (°C) is displayed.</p>
 <p>Release Mode Pressure···hPa Vapor ···°C ↓ *</p>	<p>④ Press the START/STOP key to stop the operation. The screen changes to the free operation standby screen. ❖ When the optional cooling temperature sensor is connected, the cooling temperature (°C) is displayed.</p>

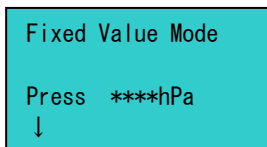
Fixed Temperature Operation

In this operation mode, the device performs continuous operation with the preset vacuum pressure.

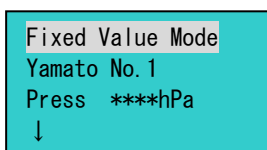


Screen	Procedures
<div style="border: 1px solid black; background-color: #00b09b; color: white; padding: 5px;"> Type Select Release Mode Fixed Value Mode ↓ </div> <p style="text-align: center;">↓ ENTER key</p> <div style="border: 1px solid black; background-color: #00b09b; color: white; padding: 5px;"> Press ****hPa Hys. Press **hPa ↑ </div>	<ol style="list-style-type: none"> ① Select the fixed temperature operation on the setting screen with the $\Delta\nabla$ keys, and then press the ENTER key.. ② The screen changes to the setting screen. Press the $\Delta\nabla$ keys or DISPLAY key to advance the screen.
<div style="border: 1px solid black; background-color: #00b09b; color: white; padding: 5px;"> Fixed Value Mode Press ****hPa ↓ </div> <p style="text-align: center;">↓ START/STOP key</p> <div style="border: 1px solid black; background-color: #00b09b; color: white; padding: 5px;"> Fixed Value Mode Yamato No. 1 Press ****hPa ↓ </div> <p style="text-align: center;">↓ START/STOP key</p> <div style="border: 1px solid black; background-color: #00b09b; color: white; padding: 5px;"> Fixed Value Mode Press ****hPa ↓ </div>	<ol style="list-style-type: none"> ③ Set the operating vacuum pressure. ENTER → change the pressure with $\Delta\nabla$ → ENTER ④ Determine the ON/OFF width of solenoid valve at fixed temperature operation. ENTER → change the pressure with $\Delta\nabla$ → ENTER The measured evaporating temperature is displayed.

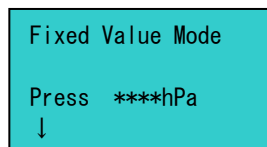
Operation start/stop



↓ START/STOP key



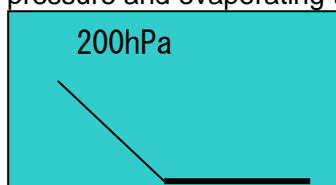
↓ START/STOP key



- ① Press the START/STOP key. The device goes into the selected operation mode and the operation name to be performed blinks. The device then starts operation.
Press the $\Delta\nabla$ keys or DISPLAY key to advance the screen.
Current pressure and current evaporation temperature are displayed.
- ② Press the START/STOP key to stop the operation.
Press the MENU key on the standby screen to change the operation menu.

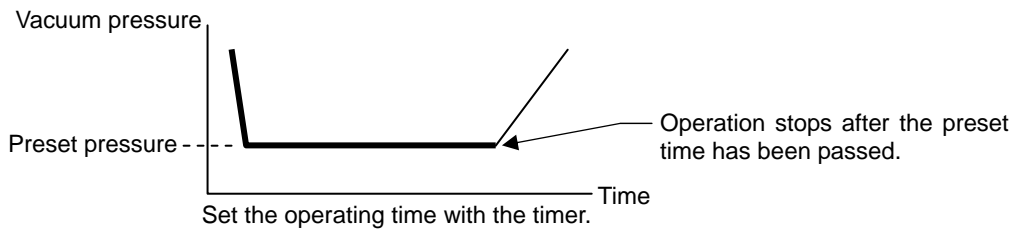
Screen switching during the operation

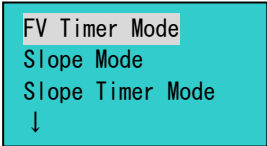
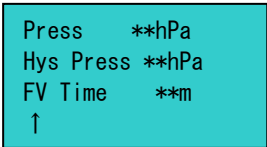
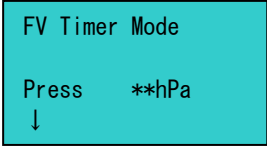
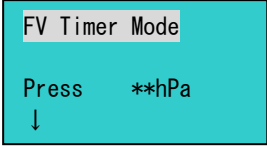
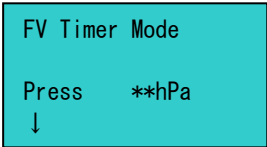
Parameter indication can be switched to the Graphic indication by pushing a DISPLAY key for several seconds during the operation. It is indicated on the screen the process of present operation on and off, pressure and evaporating temperature are indicated at present.



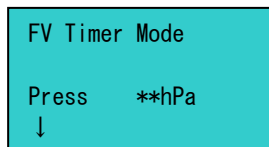
Fixed Temperature Timer Operation

This operation mode performs continuous operation with the preset vacuum pressure and automatically stops at the preset time.

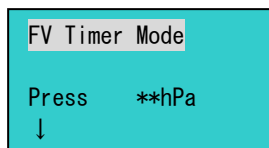


Screen	Procedures
 <p>↓ ENTER key</p>	<ol style="list-style-type: none"> Select the fixed temperature timer operation on the setting screen with the Δ/∇ keys, and then press the ENTER key. The screen changes to the setting screen. Press the Δ/∇ keys or DISPLAY key to advance the screen. Set the operating vacuum pressure. ENTER → change the pressure with Δ/∇ → ENTER Determine the ON/OFF width of solenoid valve at fixed temperature operation. ENTER → change the pressure with Δ/∇ → ENTER Input the time for fixed temperature operation. (The remaining time is displayed during operation.)
	
 <p>↓ START/STOP key</p>	
 <p>↓ START/STOP key</p>	
	

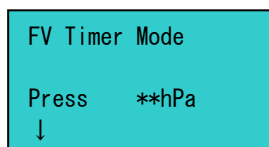
Operation start/stop



↓ START/STOP key



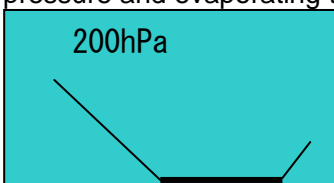
↓ START/STOP key



- Press the START/STOP key. The device goes into the selected operation mode and the operation name to be performed blinks. The device then starts operation. Press the Δ / ∇ keys or DISPLAY key to advance the screen. Current pressure, current evaporation temperature and remaining time are displayed.
- Press the START/STOP key to stop the operation. Press the MENU key on the standby screen to change the operation menu.

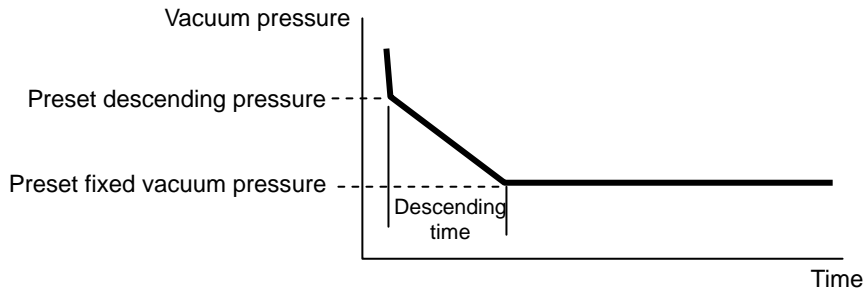
Screen switching during the operation

Parameter indication can be switched to the Graphic indication by pushing a DISPLAY key for several seconds during the operation. It is indicated on the screen the process of present operation on and off, pressure and evaporating temperature are indicated at present.



Descending Operation Procedures

In this mode, the vacuum pressure descends gradually to the preset fixed vacuum pressure to prevent the bumping.



Screen	Procedures
<div style="border: 1px solid black; padding: 5px; background-color: #e0f2f1;"> FV Timer Mode Slope Mode Slope Timer Mode ↓ </div> <p>↓ ENTER key</p>	<ol style="list-style-type: none"> ① Select the descending operation on the setting screen with the $\Delta\nabla$ keys, and then press the ENTER key. ② The screen changes to the setting screen. Press the $\Delta\nabla$ keys or DISPLAY key to advance the screen. ③ Set the operating vacuum pressure. ENTER → change the pressure with $\Delta\nabla$ → ENTER ④ Determine the ON/OFF width of solenoid valve at fixed temperature operation. ENTER → change the pressure with $\Delta\nabla$ → ENTER ⑤ Set the vacuum pressure at the start of descending. ⑥ Input the descending time. The measured evaporating temperature is displayed.
<div style="border: 1px solid black; padding: 5px; background-color: #e0f2f1;"> Press ****hPa Hys Press****hPa Slope Press**hPa ↓ </div>	
<div style="border: 1px solid black; padding: 5px; background-color: #e0f2f1;"> Slope Time **m ↑ </div>	

Operation start/stop

Slope Mode

 Press ****hPa
 ↓

↓ START/STOP key

Slope Mode

 Press ****hPa
 ↓

↓ START/STOP key

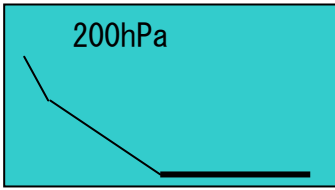
Slope Mode

 Press ****hPa
 ↓

- ① Press the START/STOP key. The device goes into the selected operation mode and the operation name to be performed blinks. The device then starts operation.
Press the $\Delta\nabla$ keys or DISPLAY key to advance the screen.
Current pressure, current evaporation temperature and remaining time are displayed.
- ② Press the START/STOP key to stop the operation.
Press the MENU key on the standby screen to change the operation menu.

Screen switching during the operation

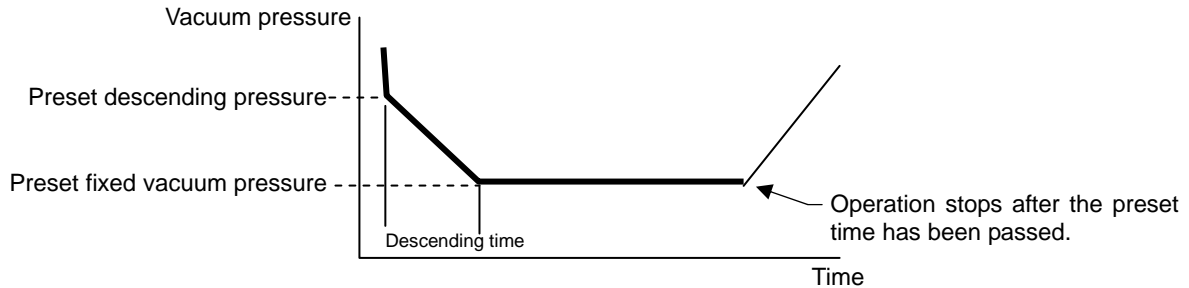
Parameter indication can be switched to the Graphic indication by pushing a DISPLAY key for several seconds during the operation. It is indicated on the screen the process of present operation on and off, pressure and evaporating temperature are indicated at present.



* The mixture solvent can operation.

Descending Timer Operation Procedures

In this mode, the timer function is added to the descending operation to automatically stop the operation at the preset time.



Screen	Procedures
<div style="border: 1px solid black; background-color: #e0f2f1; padding: 5px;"> FV Timer Mode Slope Mode Slope Timer Mode ↓ </div> <p>↓ ENTER key</p>	<ol style="list-style-type: none"> ① Select the descending operation on the setting screen with the $\Delta\nabla$ keys, and then press the ENTER key. ② The screen changes to the setting screen. Press the $\Delta\nabla$ keys or DISPLAY key to advance the screen.
<div style="border: 1px solid black; background-color: #e0f2f1; padding: 5px;"> Press ***hPa Hys Press **hPa Slope ***hPa ↓ </div>	
<div style="border: 1px solid black; background-color: #e0f2f1; padding: 5px;"> Slope Time**°C FV Time **m ↓ </div>	
	<ol style="list-style-type: none"> ③ Set the operating vacuum pressure. ENTER → change the pressure with $\Delta\nabla$ → ENTER ④ Determine the ON/OFF width of solenoid valve at fixed temperature operation. ENTER → change the pressure with $\Delta\nabla$ → ENTER ⑤ Set the vacuum pressure at the start of descending. ⑥ Input the descending time. ⑦ Set the fixed temperature operating time. The measured evaporating temperature is displayed.

Operation start/stop

Slope Timer Mode

 Yamato No.1
 ↓

↓ START/STOP key

Slope Timer Mode

 Press ***hPa
 ↓

↓ START/STOP key

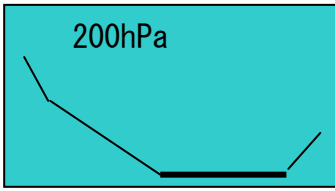
Slope Timer Mode

 Press ***hPa
 ↓

- ① Press the START/STOP key. The device goes into the selected operation mode and the operation name to be performed blinks. The device then starts operation.
Press the $\Delta\nabla$ keys or DISPLAY key to advance the screen.
Current pressure, current evaporation temperature and remaining time are displayed.
- ② Press the START/STOP key to stop the operation.
Press the MENU key on the standby screen to change the operation menu.

Screen switching during the operation

Parameter indication can be switched to the Graphic indication by pushing a DISPLAY key for several seconds during the operation. It is indicated on the screen the process of present operation on and off, pressure and evaporating temperature are indicated at present.



* The mixture solvent can operation.

9.Exchange procedure of Pressure Sensor

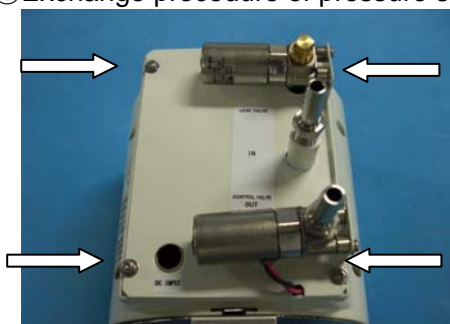
Pressure sensor for organic solvent

There is a sensor manufactured by SUS for the organic solvent except for the standard specification. Confer to the nearest store, our company office or Customer Service Center in the case of pressure sensor exchange.

Input of compensation value is necessary to adapt it to the sensor replaced when the pressure sensor was replaced.

Compensation value is mentioned in the data seat attached to the sensor.

① Exchange procedure of pressure sensor



- (1) Remove all the cables, and remove the rear fixed screw of four vacuum controller with a plus driver after you turned off the power.

Caution : Pull out of the main unit power supply code from the power supply plug surely.



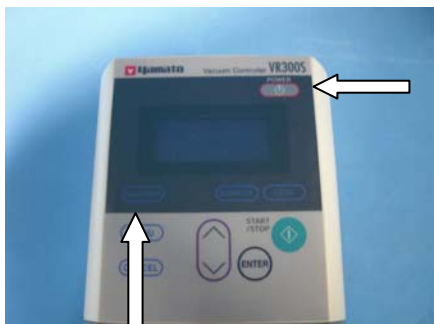
- (2) Remove the pressure sensor connection connector quietly from the circuit board. Don't pull it forcefully, and don't twist it.
- (3) Remove the silicone tube of the pressure sensor connection.
- (4) Pressure sensor for exchange is connected and returned to before operation.



Standard sensor



SUS sensor for Organic solvent



MAINTENANCE key

- (5) Main unit power supply is turned on after a cables are connected.
- (6) Vacuum controller power supply is turned on, and compensation values are input from the MAINTENANCE key.

9.Exchange procedure of Pressure Sensor

Pressure sensor for organic solvent

②Input of compensation value

```

Press Switching
O. P-3000S
1. P-8300
    
```

(1) Press Switching is chosen from the MAINTENANCE key. The kind of the pressure sensor is chosen and decided with ENTER key.

- 0. P-3000S : Standard sensor
- 1. P-8300 : SUS sensor for organic solvent

```

Pressure Adjust
Pressure CAL X1
Pressure CAL Y1
↓
    
```

(2) Push and hold MAINTENANCE key for four seconds. The screen change on the Pressure Adjustment screen

(3) The compensation value is input based on the data seat attached to sensor for exchange. The parameter must input for points of X1, Y1, X2, Y2.

(4) The input of the compensation value.

c.f.

[DATA SHEET]			
ZERO :	-0.01	mV	
SPAN :	94.24	mV	
@	98.1	kPa	
	25°C	1,500mA	

X1 : The value(mV) of ZERO is input.

Y1 : The value of 0hPa is input.(It is the fixed value which was common to both sensors 0hPa.)

X2 : The value(mV) of SPAN is input.

Y2 : Translate kPa to hPa, and input 981hPa.
(It is the fixed value which was common to both sensors 981hPa.)

```

Pressure Adjust
Pressure CAL X1
Pressure CAL Y1
↓
    
```

①Pressure CAL X1 is chosen from the Δ / ∇ keys and decided with ENTER key.

```

Pressure CAL X1
-0.01mV
    
```

②The value(mV) of ZERO is input. (-0.01mV in this case)

```

Pressure Adjust
Pressure CAL X1
Pressure CAL Y1
1
    
```

③Screen changes when an ENTER key is pushed. Pressure CAL Y1 is chosen from the Δ / ∇ keys and decided with ENTER key

```

Pressure CAL Y1
0 hPa
    
```

④The value(mV) of 0hPa is input.

9.Exchange procedure of Pressure Sensor

Pressure sensor for organic solvent

Pressure Adjust
Pressure CAL X2
Pressure CAL Y2
↑

- ⑤ Screen changes when an ENTER key is pushed.
Pressure CAL X2 is chosen from the Δ / ∇ keys and decided with ENTER key.

Pressure CAL X1
94.24mV

- ⑥ The value(mV) of SPAN is input. (94.24mV in this case)

Pressure Adjust
Pressure CAL X2
Pressure CAL Y2
↑

- ⑦ Screen changes when an ENTER key is pushed.
Pressure CAL Y2 is chosen from the Δ / ∇ keys and decided with ENTER key.

Pressure CAL Y2
981hPa

- ⑧ The value(mV) of 981hPa is input.

Caution : Teflon control solenoid valve


When it has an organic solvent used extensively, an optional pressure sensor for organic solvent and Teflon control solenoid valve for organic solvent are suggested to use.

Ask to the nearest store, our company office or Customer Service Center.


10. Handling Precautions

WARNING!


Substances that cannot be used

-  Never use explosive substances, flammable substances and substances that include explosive or flammable ingredients in this unit. Explosion or fire may occur. (Refer to page 43 "18. List of Dangerous Materials ".)

If a problem occurs


-  If smoke or strange odor should come out of this unit for some reason, turn off the power key right away, and then turn off the circuit breaker and the main power. Immediately contact a service technician for inspection. If this procedure is not followed, fire or electrical shock may result. Never perform repair work yourself, since it is dangerous and not recommended.

Do not disassemble or modify this unit


-  Do not disassemble or modify this unit. Fire or electrical shock or failure may be caused.

CAUTION!

During a thunder storm

-  During a thunderstorm, turn off the power switch immediately, then turn off the main power. If this procedure is not followed, fire or electrical shock may be caused.

Recovery after power failure

-  Turn off the power switch when a power failure occurs to avoid unmanned operation.

11.Maintenance Method

Daily Inspection and Maintenance

For the safety use of this unit, please perform the daily inspection and maintenance without fail. Using the city water to this unit might attach dirt. Do inspect and maintain this point while performing daily inspection and maintenance.

WARNING!

- Be sure to disconnect the power cord during inspection or maintenance of device.
- Do not disassemble the device.

CAUTION!

- Wipe the dirt with soft cloth wrung out with mild detergent. Do not use benzene, thinner or cleanser, or do not scrub it with a scrubbing brush. Deformation, deterioration or discoloration may result in.

For any questions, contact the dealer who you purchased this unit from, or the nearest sales division in our company.

12. Long storage and disposal

When not using this unit for long term / When disposing

CAUTION!

When not using this unit for long term...

- Turn off the power and disconnect the power cord.

WARNING!

When disposing...

- Keep out of reach of children.

Environmental protection should be considered

We request you to disassemble this unit as possible and recycle the reusable parts considering to the environmental protection. The feature components of this unit and materials used are listed below.

Component Name	Material
Exterior Parts	
Outer covering	Aluminum printed coating, ABS resin
Electrical Parts	
Switches, Relay	Composite of resin, copper and other
Circuit boards	Composite of glass fiber and other
Power cord	Composite of resin coating, copper, nickel and other
Wiring material	Composite of flame-resistant vinyl, copper and nickel
Sticker	Resin material

13.In the Event of Failure...

Safety Device and Error Code

Turn off the power and disconnect the plug immediately if the device dropped into the liquid, or if the liquid leaks into the device. There is a danger of electric shock if the power is turned on after the device is dried. In this case, please call the service department of our company.

Error Code:

Check the error code and stop the operation immediately.

Error	Cause/Solution	Screen
Abnormality at power failure	The display appears at the recovery after power failure. The device stops operation. Cancel the error with the CANCEL key.	Power failure CANCEL to Clear
Abnormality in rotor	An abnormality occurs in the rotor of RE main body. The device stops when this error occurs. Cancel the error by restoring the breaker.	Rotar err Breaker Reset CANCEL to BuzOFF
Abnormality in jack	An abnormality occurs in the jack (lifter) of RE main body. The device stops when this error occurs. Cancel the error by restoring the breaker.	Juck err Breaker Reset CANCEL to BuzOFF
Abnormality in pressure sensor	The display appears when the measured pressure is in the outside of measurement range, or when the pressure sensor is defective. The device stops when this error occurs. Cancel the error by restoring the breaker. Repair the board or replace the pressure sensor if the error can not be canceled.	Pressure err Confirm Sensor Breaker Reset CANCEL to BuzOFF
Leak abnormality	The display appears when the vacuum pressure does not increase after 10 seconds has passed since the LEAK key is pressed. The device stops operation after one minute from the error display. It automatically returns if the error is cancelled within one minute. Check the vacuum route and cancel the error by pressing the START/STOP key.	Leak err Confirm Route STR/STP to Clear CANCEL to BuzOFF
Abnormality in start pressure	The display appears when the measured pressure does not lower below the preset pressure after ten minutes has passed since the start of operation. The device stops operation after one minute from the error display. It automatically returns if the error is cancelled within one minute. Check the vacuum route and cancel the error by pressing the START/STOP key.	Pressure err Confirm Pomp STR/STP to Clear CANCEL to BuzOFF
Pressure abnormality	The display appears in the fixed temperature, fixed temperature timer, descending, or descending timer operation after one minute has passed since the measured pressure goes outside the range of preset pressure \pm hysteresis. It also appears in the automatic operation mode after one minute has passed since the measured pressure goes outside the range of preset pressure (the pressure value at the preset temperature) \pm hysteresis. The device stops operation after one minute from the error display. It automatically returns if the error is cancelled within one minute. Check the vacuum route and cancel the error by pressing the START/STOP key. The display appears when the temperature has not reached the auto operation temperature after ten minutes passed since the start or end of operation. Display only Auto return	Pressure err Confirm Route STR/STP to Clear CANCEL to BuzOFF

13.In the Event of Failure...

Trouble Shooting

Phenomenon	Check point
Overload on rotor motor?	<ul style="list-style-type: none">• If the rotor stops due to the overload on the rotor motor, turn off the power for about 30 minutes to cool inside the motor. Remove the cause of overheat and reduce the overload.
Device does not start after turning on the power switch.	<ul style="list-style-type: none">• Check if the power source is turned to on.• Check if the power cable is securely plugged.• Check if a power failure occurs.

In the case if the error other than listed above occurred, turn off the power switch and primary power source immediately. Contact the shop of your purchase or nearest Yamato Scientific Service Office.

14. After Sales Service and Warranty

When requesting a repair

When requesting a repair

If any trouble occurs, immediately stop operation, turn the ELB off, pull out the power plug and contact your dealer or our sales office.

Information necessary for requesting a repair

- Model name of the product
 - Serial number
 - Date(y/m/d) of purchase
 - Description of trouble (as in detail as possible)
- } See the warranty card or the nameplate on the unit.
} See the section "Names and Function of Parts"

Be sure to indicate the warranty card to our service representative.

Warranty card (attached separately)

- Your dealer or one of our sales offices will hand you a warranty card. Please fill necessary data such as "dealer name, date of purchase, etc" and store at a safe place.
- Warranty period is one full year from the date of purchase. Repair service for free is available according to the conditions written on the warranty card.
- For repairs after the warranty period consult your dealer or one of our sales office. Paid repair service is available on your request when the product's functionality can be maintained by repair.

Minimum holding period of repair parts

The minimum holding period of repair parts for this product is seven years after end of production.

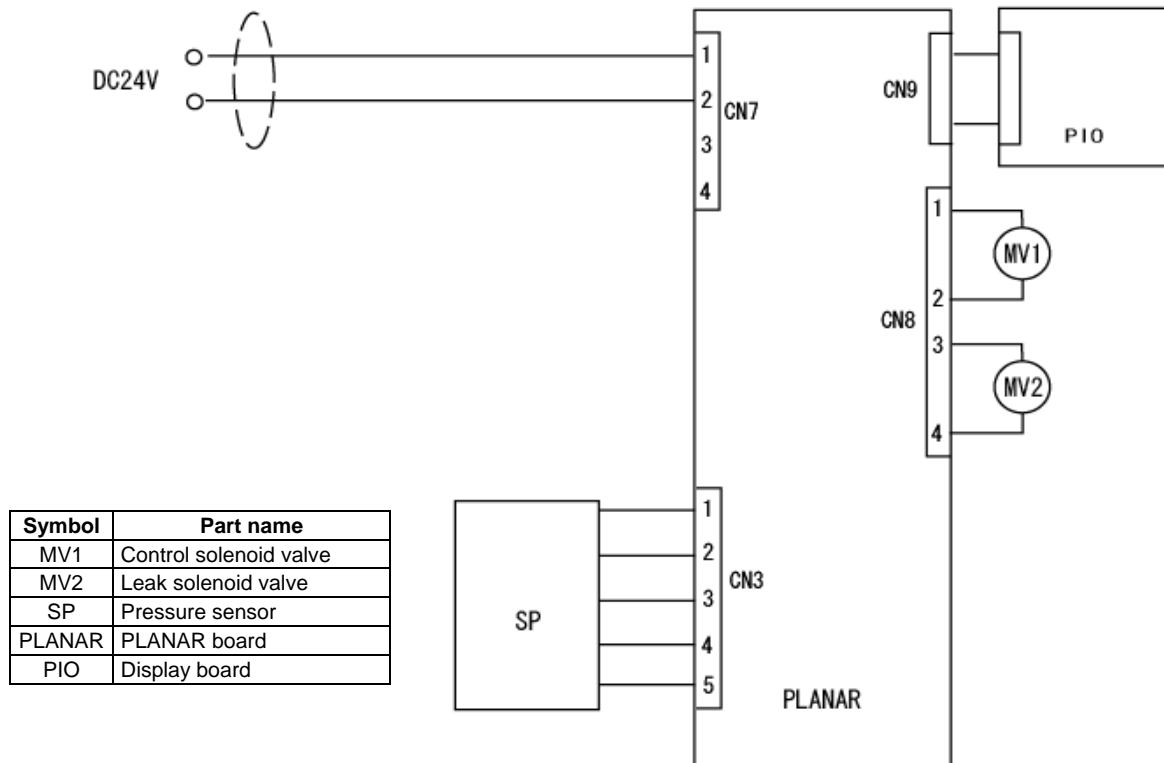
Repair parts here refer to parts necessary for maintaining performance of the product.

15. Specifications

Model	VR300S
Display	LCD display (Japanese/English characters)
Setting method	Keying
Outer covering	ABS resin, coating finish
Rating	DC24V 1A or less
Setting range of vacuum degree	0~981hPa
Measurement range of vacuum degree	0~1033hPa
Resolution of vacuum degree	1 hPa
Setting range of hysteresis	1~50hPa
Indicated resolution of evaporating temperature	—
Indicated resolution of cooling water temperature	—
Operational function	Fixed temperature, Fixed temperature timer, Descending, Descending timer
Setting range of timer	Fixed temperature timer: 1 to 999 hours, descending timer: 1 to 99 hours
Memory function	—
Data operation	—
Safety feature	Refer to "13. In the Event of Failure".
Interlocking function	—

16.Wiring Diagram

VR300S



17.Replacement Parts Table

Common parts for VR300S

Part Name	Code No.	Specification	Manufacturer
Control/leak solenoid valve *	LT00034615	VDW21-5G-1-01-L-X133	SMC
Display board	LT00013601	VR300/600/800 display board	Yamato Scientific
Pressure sensor for organic solvent *	LT00015313	P-8300-102A-10 Teflon case and harness attached	Yamato Scientific
DC power cable	LT00015073	VR300-42000	Yamato Scientific
VR300 control board	LT00013822	VR300 control board	Yamato Scientific

Optional parts

Part Name	Code No.	Specification	Manufacturer
Cooling water temperature sensor	LT00015315	Pt100 Ω Teflon lead wire for platinum resistor bulb/ glass protective tube	Yamato Scientific

Main unit related consumable part

Part Name	Code No.	Specification	Manufacturer
Teflon vacuum seal *	ORE7042000	ORE70-42000	Yamato Scientific
Vacuum hose	LT00016675	1.0m	ARAMU

* It is an article of consumption.

Caution:

Note the followings when using the sample which includes organic solvent.

It recommend a regular exchange because Teflon control solenoid valve are consumables supplies though they are the specifications that it does corrosion-inhibiting easily to the solvent.

18. List of Dangerous Materials



Never use explosive substances, flammable substances and substances that include explosive or flammable ingredients in this unit.

EXPLOSIVE

EXPLOSIVE:	Ethylene glycol dinitrate (nitro glycol), Glycerin trinitrate (nitroglycerine), Cellulose nitrate (nitrocellulose), and other explosive nitrate esters
	Trinitrobenzene, Trinitrotoluene, Trinitrophenol (picric acid), and other explosive nitro compounds
	Acetyl hidroperoxide (peracetic acid), Methyl ethyl ketone peroxide, Benzyl peroxide, and other organic peroxides

FLAMMABLE

IGNITING:	Lithium (metal), Potassium (metal), Sodium (metal), Yellow phosphorus, Phosphorus sulfide, Red phosphorus, Celluloid compounds, Calcium carbide, Lime phosphate, Magnesium (powder), Aluminum (powder), Powder of metals other than magnesium and aluminum, Sodium hydrosulfite
OXIDIZING:	Potassium chlorate, Sodium chlorate, Ammonium chlorate, and other chlorate
	Potassium perchlorate, Sodium perchlorate, Ammonium perchlorate, and other perchlorate
	Potassium peroxide, Sodium peroxide, Barium peroxide, and other inorganic peroxide
	Potassium nitrate, Sodium nitrate, Ammonium nitrate, and other nitrate
	Sodium chlorite and other chlorites
	Calcium hypochlorite and other hypochlorites
INFLAMMABLE LIQUID:	Ethyl ether, Gasoline, Acetaldehyde, Propylene chloride, Carbon disulfide, and other flammable substances having a flash point of lower than -30°C
	Normal hexane, ethylene oxide, acetone, benzene, methyl ethyl ketone, and other flammable substances having a flash point of -30°C or higher but lower than 0°C
	Methanol, Ethanol, Xylene, Pentyl acetate (amyl acetate), and other flammable substances having a flash point of 0°C or higher but lower than 30°C
	Kerosene, Light oil (gas oil), Oil of turpentine, Isopentyl alcohol (isoamyl alcohol), Acetic acid, and other flammable substances having a flash point of 30°C or higher but lower than 65°C
FLAMMABLE GAS:	Hydrogen, Acetylene, Ethylene, Methane, Propane, Butane, and other flammable substances which assume a gaseous state at 15°C and 1 atm

(Source: Appendix Table 1 of Article 6 of the Industrial Safety and Health Order in Japan)

19. Standard Installation Manual

* Install the unit according the procedure described below (check options and special specifications separately).

Model	Serial number	Date	Person in charge of installation (company name)	Person in charge of installation	Judgment

No.	Item	Method	Reference operation manual	Judgment
Specifications				
1	Accessories	Check the quantities of accessories with the quantities shown in the Accessory column.	15.Specification	P.40
2	Installation	<ul style="list-style-type: none"> Visually check the surrounding area. Caution: Be careful about surrounding environment.	3.Before Using This Unit "2. Choose a proper place for installation"	P.6
		<ul style="list-style-type: none"> Keep space. 		
Operation				
1	Power voltage	<ul style="list-style-type: none"> Using a tester, measure the voltage of the voltage used by the customer (distribution board, outlet, etc.). Measure the voltage during operation (the voltage must be within the standard). Caution: When a unit is to be connected to the plug or breaker, use one that conforms to the standard.	3.Before Using This Unit "1. Always ground this unit"	P.6
			3.Before Using This Unit "7. Choose a correct power distribution board or receptacle"	P.7
			15.Specification	P.40
2	Start of operation	<ul style="list-style-type: none"> Start operation. 	8.Operation	P.20
			10.Handling Precautions	P. 34
Description				
1	Description of operation	Explain the operation of each unit to the customer according to this Operation Manual.	All	
2	Error code	Explain error codes and the procedure for resetting them to the customer according to this Operation Manual.	13.In the Event of Failure...	P.37
3	Maintenance inspection	Explain the operation of each unit to the customer according to this Operation Manual.	11.Maintenance Method	P.35
4	Completion of installation Information to be entered	<ul style="list-style-type: none"> Enter the date of installation and the name of the person in charge of installation on the face plate on the unit. Enter necessary information on the guarantee, and pass it to the customer. Explain the after-sale service route to the customer. 	14.After Sales Service and Warranty	P. 39

Limited liability

Be sure to use the unit strictly following the handling and operating instructions in this operating instruction.

Yamato Scientific Co.,Ltd. Assumes no responsibility for an accident or a malfunction caused by use of this product in any way not specified in this operating instruction.

Never attempt to perform matters prohibited in this operation instruction. Otherwise, an unexpected accident may result.

Notice

- Descriptions in this operating instruction are subject to change without notice.
- We will replace a manual with a missing page or paging disorder.

Instruction Manual for

**Vacuum Controller
Model VR300S**

Feb. 28, 2010

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Yamato Scientific Co., Ltd.

2-1-6 Nihonbashi Honcho, Chuo-ku,
Tokyo, 103-8432, Japan

<http://www.yamato-net.co.jp>