

ULVAC

MODEL
UR-Series
90/180/600/1200/1800

TYPE
DRY VACUUM PUMP
INSTRUCTION MANUAL

*Read this manual before using this pump and
keep it hand for immediate reference.*

Components Division,
ULVAC, Inc

Before Use

This instruction manual provides methods for proper handling and maintenance of UR products. This manual consists of specification, installation, operation and maintenance, and each of section includes important information with which potential hazards can be avoided. It is essential to understand these methods described in this manual concerning the Specification, Operation and Maintenance.

Before to use this device, you are expected to receive a general safety-training course regarded as effective by the government of your country. Also, personnel who will involve these products should have licensed concerning electricity, mechanics, cargo handling and vacuum.

This manual might change for the improvement, the specification change of the product, and the improvement of easiness to use.

When you have some ambiguities concerning the operation, please contact with your local ULVAC service center and ask for the matter. Refer to 5.3 Servicing.

For Safety Use

-This UR series models are maintenance free except when to connect with the host equipment, or disconnect from it, and to regulate N2 gas flow at the time of operation. Overhaul or repair work is performed at ULVAC. When any trouble occurs, please contact with your local ULVAC service center (please refer to the ULVAC address list at the end of this manual).

- The interlock system and control system of the UR series pumps are expected to be connected with the host equipment.
- The UR series pumps are integrated into a host machine or are located close to the host machine (not more than 3m of travel to the next EMO button).
- Connect the power line of the UR series with the EMO system of the host equipment.
- The gas which can be exhausted with this UR series pump, it provides for inert gas(Air,N2,Ar).
- Do not exhaust other gases (toxicity gas, combustion gas, corrosion gas, and explosiveness gas).
- Set up this UR series pump at ventilated room.
- These products are manufactured to conform with laws applied at the time of the preparation of this manual. When the applied laws are revised in the future, the legality of these products will not be ensured.
- If the host equipment of these products does not conform to the same laws, or if the products are modified, then the performance and safety of these products should not be insured. ULVAC should not have a responsibility in such a case.
- Personnel who have no record of formal safety training course regarded by your government (safety for electricity, cargo handling, etc) should not operate these products. Operator should have finished these-safety training course.
- Installation and operation of these products should be performed according to the applicable local safety codes and laws (e.g. fire fighting law, electric installation code, etc).
- Before starting installation or removal work of this products, shut off all the energy sources (electricity, compressed air, cooling water, etc.).

Safety Denotation

For this manual and for warning denotation of UR series models, technical terms are defined according to the hazardous levels, with which workers should understand the rules to be followed.

- Articles attached with these denotations, describe countermeasures for potential hazards.

**DANGER**

: Failure to comply with this instruction involves the possibility of impending death or serious personal injury.

**WARNING**

: Failure to comply with this instruction involves the possibility of death or serious personal injury.

**CAUTION**

: Failure to comply with this instruction involves the possibility of a medium degree of personal injury or serious damage to the equipment.



: Matter for which attention is necessary for using pump.



: Because this work has the danger of the electric shock, it is necessary to train the protection against electrical hazard.








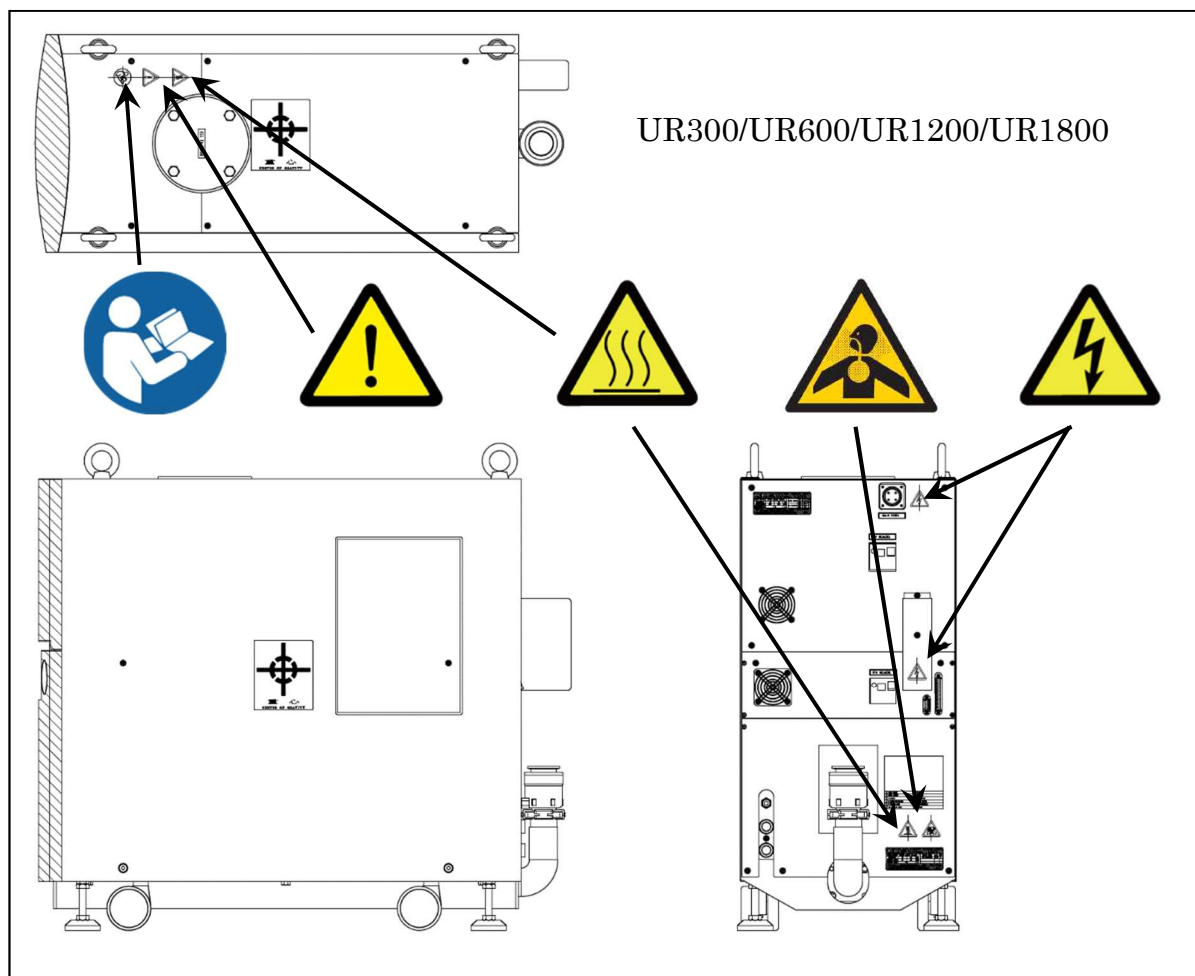
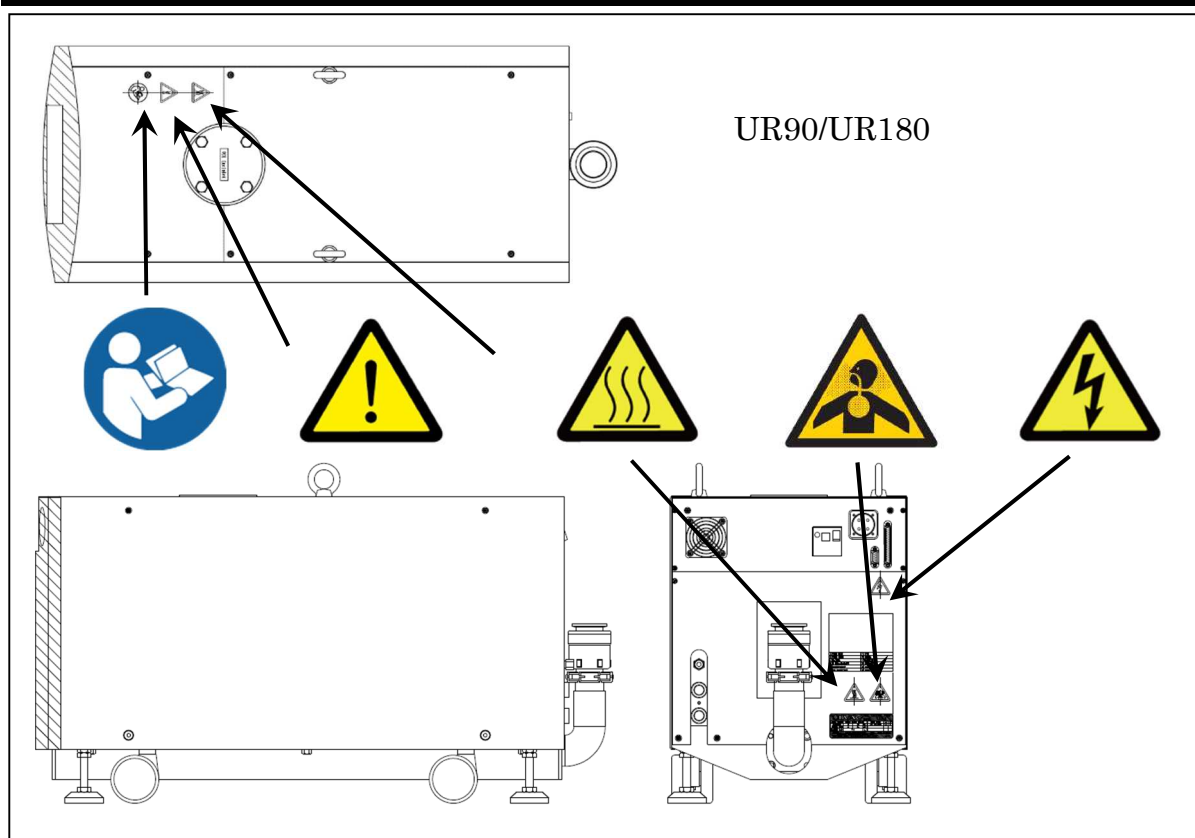
: Because this work has the danger of the burn, it is necessary to confirm the temperature of the pump has fallen.

Warning Label

Warning labels are attached on the warning locations in this system.


Be sure to check them before starting operation of the Pump.

1		Before use, read through the instruction manual and fully understand its contents.
2		• You may get an electric shock in the area around a portion with this warning label. Before maintenance or wiring, be sure to turn off the primary power supply. • Be sure to close the lid of the terminal box before operating this unit. Never open it during operation.
3		During operation or for a while after operation stops, do not touch the unit as each portion is at a very high temperature. - If a human body touches the unit, it may get burned.
4		Long term storage of the Vacuum pump without operation might possibly cause trouble in operation caused by rust if you kept the Pump long time without operating it, ask a closest Service Center for the check. Indoor Use Only
5		• There is a serious risk of injury due to suction. • Sufficient purging gas system • Wear appropriate protective equipment and clothing




The method for the evasion of danger according to the work item is shown.
And the dangerous action, which should not be done, is shown.


Installation and Storage Requirements

<div style="text-align: center;">  <div style="background-color: orange; color: black; padding: 2px 5px; display: inline-block;">WARNING</div> </div>
<ul style="list-style-type: none"> ● This product is packed in the wooden crate. Please request dismantlement to a special trader. ● Please guide equipment with the glove made of the skin, and the use of an appropriate dismantlement tool to those who dismantle it. ● When taking out the pump from wood frame, or lift it, instruct workers that the product should be hung by a crane at the pump top hook, then move it. ● Only licensed worker can perform cargo handling or operate the lording machines. ● When handling is performed improperly or unpack tools are improperly maintained, there will be possibilities of falling down or topple of the pump, so no person should be underside of the pump.


Transit

<div style="text-align: center;">  <div style="background-color: orange; color: black; padding: 2px 5px; display: inline-block;">WARNING</div> </div>
<ul style="list-style-type: none"> ● Although this pump is provided with casters, do not move it a long distance using these casters. ● If you move this pump in such a way, the load exceeds the safety criterion. You could hurt your waist.


Earthquake Resistant Measures

<div style="text-align: center;">  <div style="background-color: orange; color: black; padding: 2px 5px; display: inline-block;">WARNING</div> </div>
<ul style="list-style-type: none"> ● To provide earthquake resistance, the pump should be tightly fixed according to the diagram below. If it is loosely installed, then the pump could topple or move and will produce damages for peripheral devices. ● Piping for vacuum, cooling water, nitrogen, and wiring, should be constructed so that they can absorb vibration and should not produce damages on piping or run off within defined vibration level.


Piping for inlet-outlet ports <Installation>

<div style="text-align: center;">  <div style="background-color: orange; color: black; padding: 2px 5px; display: inline-block;">WARNING</div> </div>
<ul style="list-style-type: none"> ● Before start work, ensure that all hazardous energies are shut off. Refer to 2.1 For Safety Use.



Nitrogen Gas Piping <Installation>

<div style="text-align: center;">  <div style="background-color: orange; color: black; padding: 2px 5px; display: inline-block;">WARNING</div> </div>
<ul style="list-style-type: none"> ● Before start work, ensure that all hazardous energies are shut off. Refer to 2.1 For Safety Use. ● Use the supplied nuts and ferrule for piping work.



Cooling Water Piping <Installation>

<div style="text-align: center;">  <div style="background-color: orange; color: black; padding: 2px 5px; display: inline-block;">WARNING</div> </div>
<ul style="list-style-type: none"> ● Before start work, ensure that all hazardous energies are shut off. Refer to 2.1 For Safety Use.



Power wiring <Installation>

 
<ul style="list-style-type: none"> ● Before start work, ensure that all hazardous energies are shut off. Refer to 2.1 For Safety Use. ● Wiring work should be performed by licensed workers. ● Use the supplied connectors only. If other connectors are used, the first ground contact may fail, and raise the possibility of electrical shocks.



Stop

 
<ul style="list-style-type: none"> ● The pump is very hot during operation and for some time after it stops. Contact with it may cause burn. Feed cooling water for about one hour after the pump is shut down. Never remove the external panel until the pump cools down. ● Contact with electric parts, wiring or others in the panel may cause electric shock. Never run the pump with the external panel removed. ● Suction and the exhaust pipe are 70°C or more. Remove the protection cover after about one hour after the pump is shut down.



Power wiring <Detaching>

 
<ul style="list-style-type: none"> ● There is danger of the electric shock when the breaker (MCB1) is turning on (SEMI S2-0200 type4). Please cut off the power supply surely before it detaches it.

Cooling water <Detaching>

 
<ul style="list-style-type: none"> ● Because cooling water in the pump boils when the collaboration of cooling water is removed immediately after the stop of the pump and pressure rises the sensor and piping might be damaged. Please supply cooling water until the temperature of the pump falls. ● The pump is very hot during operation and for some time after it stops. Contact with it may cause burn. Feed cooling water for about one hour after the pump shut down. ● Close the cooling water supply valve (HWSV). After the valve is closed, tag 「CLOSE」 sign on the grip. ● Through visual flow gauge (HWFM: e.g. flow sight) on the host equipment ensure that flow is shutoff. ● When compress air is supplied from cooling water inlet, the measurement part of the sensor might be damaged. Please supply compress air from cooling water outlet.

Nitrogen Gas <Detaching>

 
<ul style="list-style-type: none"> ● Close the nitrogen gas supply valve (HPSV) on the host equipment. After the valve is closed, tag 「CLOSE」 sign on the grip. ● Gas will still remain in the host equipment piping. Place pressure gauge on the host equipment nitrogen supply source (halfway of the piping to the pump), and ensure that the pressure has already down within atmospheric pressure.

Suction and exhaust gases <Detaching>**WARNING**

- Remove the piping according to the manual provided for the host equipment.
- Suction and exhaust pipe is very hot for some time after pump stop. Remove the protection cover after about one hour after the pump is shut down.
- Completely close the inlet and outlet ports with using closing flange.

Shipping**WARNING**

- Although this pump is provided with casters, do not move it a long distance using these casters.
- If you move this pump in such a way, the load to move the pump exceeds the safety criterion. You could hurt your waist.

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1. Specification

Design concept

This UR series models are designed to perform vacuum pumping for electronic devices (such as semiconductor and LCD) manufacturing equipment. Consequently, the interlocking system and control system of this UR series are assumed to be built-in to the host equipment.

UR series can be used generally in the following processes:

- Chamber vacuum pumping in sputtering or vapor deposit processes in which only inert gases (nitrogen or argon) are used.
- Vacuum pumping for chambers where devices are set or taking out (air pumping).
- Other general vacuum pumping (low hazardous level gases: gases no toxicity, no inflammable, no corrosive and no explosive).

Performance and Configuration

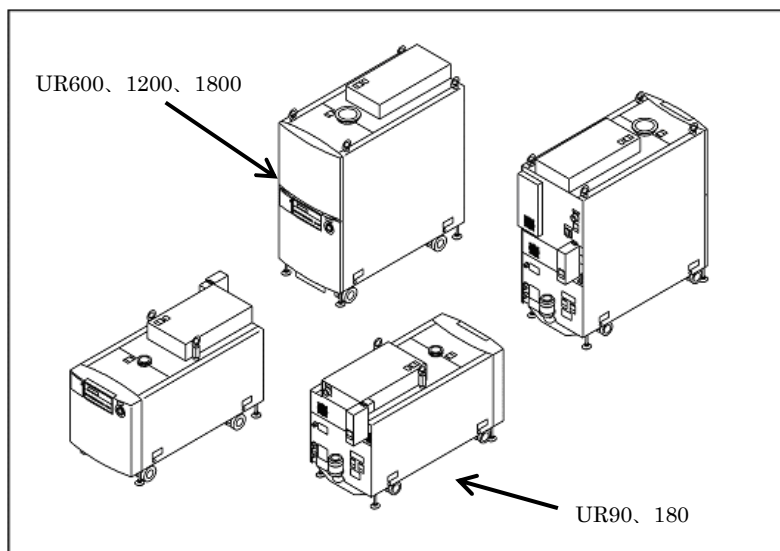
UR series have a performance of vacuum pumping in pressure regions from atmospheric pressure through medium vacuum pressure (about 5Pa). And UR series have six variations of speed to support various equipment.

UR90 and UR180 are composed of the primary dry vacuum pump unit.

UR600, UR1200 and UR1800 are a composition in which the booster pump is added to the upside of UR90, and UR180.

As for this manual, important information to use these products safely has been described.

Please read before it uses it.



1.1 Overall Configuration

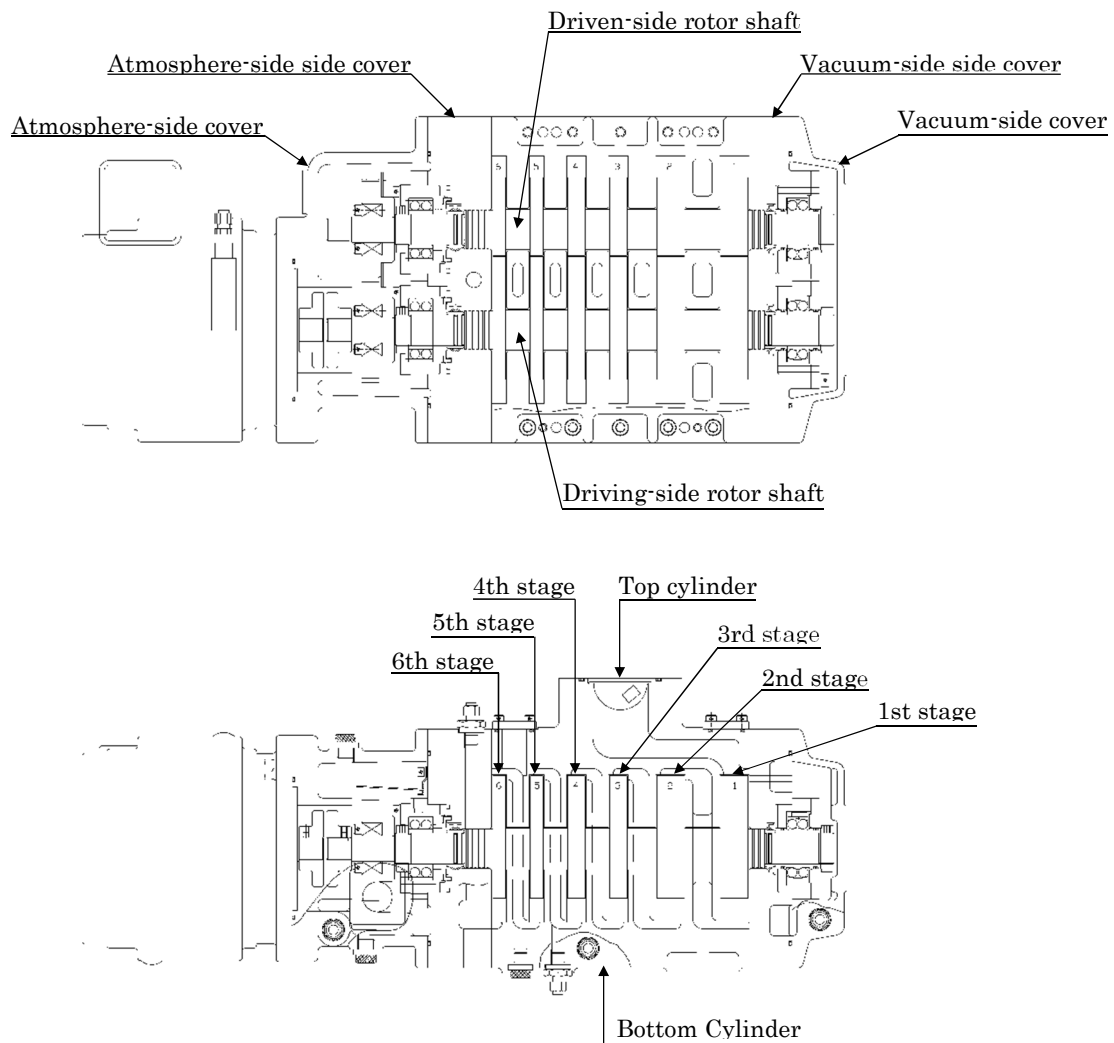
1.1.1 Pump Structure

As for a primary pump, the root rotor of six pairs queues up in the series. Casing space is gradually reduced toward the outlet. The booster pump is composed of the root rotor of big capacity by one stage.

The two rotors are positioned with a small allowance gap and rotate in opposite directions without contact with each other. Gases is introduced from the top of casing and pass through toward the bottom of it, then spew out from the outlet port.

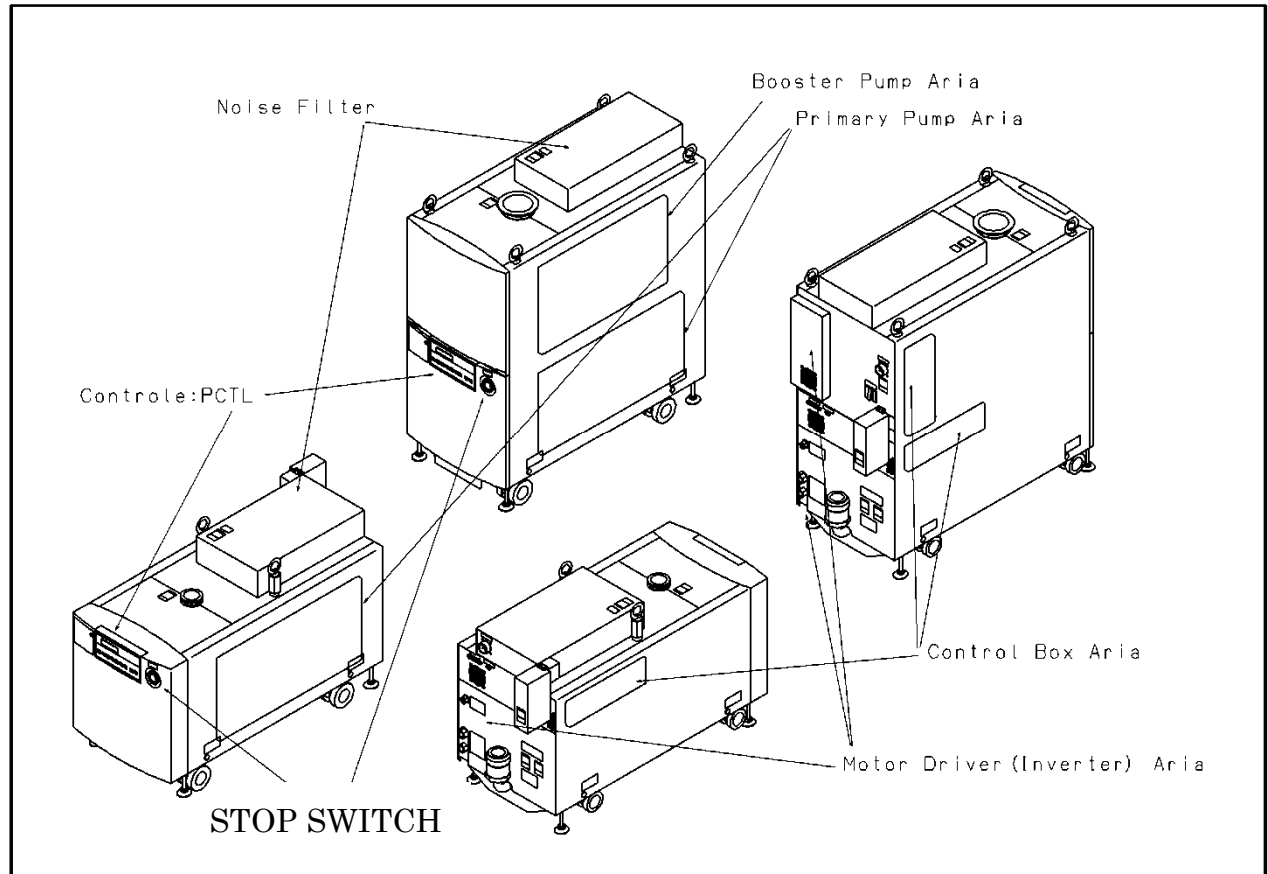
The aluminum alloy casting is used for the main parts which compose the pump. And the aluminum surface is treated with a special process.

Canned motor is used to drive the rotors. This can eliminate the shaft seal construction, this improved the reliability of the device.



The pump is completely clad with panels.

The main body of the pump and electrical equipment, the sensor, the N2 adjustment equipment, and the cooling water piping, etc. which drive it are laid out in the package.



1.1.2 System Flow

N₂, cooling water and power supply is required.

Nitrogen gas system

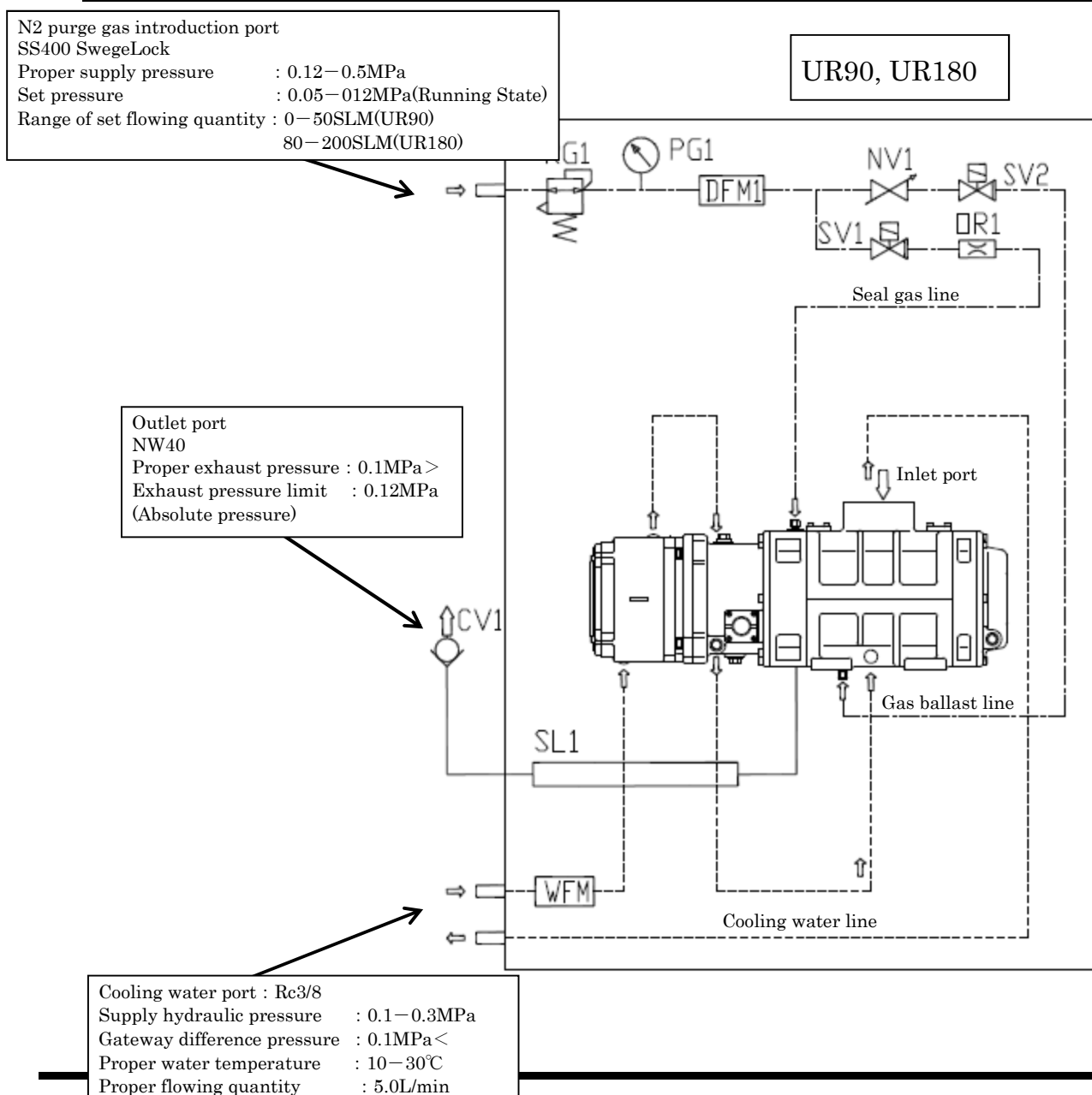
Nitrogen gas flows in two lines in the pump, one for the shaft seal and the other for gas ballast (attenuation).

The shaft seal prevents lubricating oil from entering the pump casing.

Gas ballast gas is fed to the pump casing to reduce corrosion by corrosive gas and accumulation of reactive products, or to reduce liquefaction during the compression and pressurization process of the pump after sucking the condensable gas. If you do not exhaust these gases, you do not need to run gas ballast gas.

Cooling water system

Cooling water flows from the cooling water inlet port to the flow meter, motor, pump body, and cooling water outlet port in that order to cool the pump.

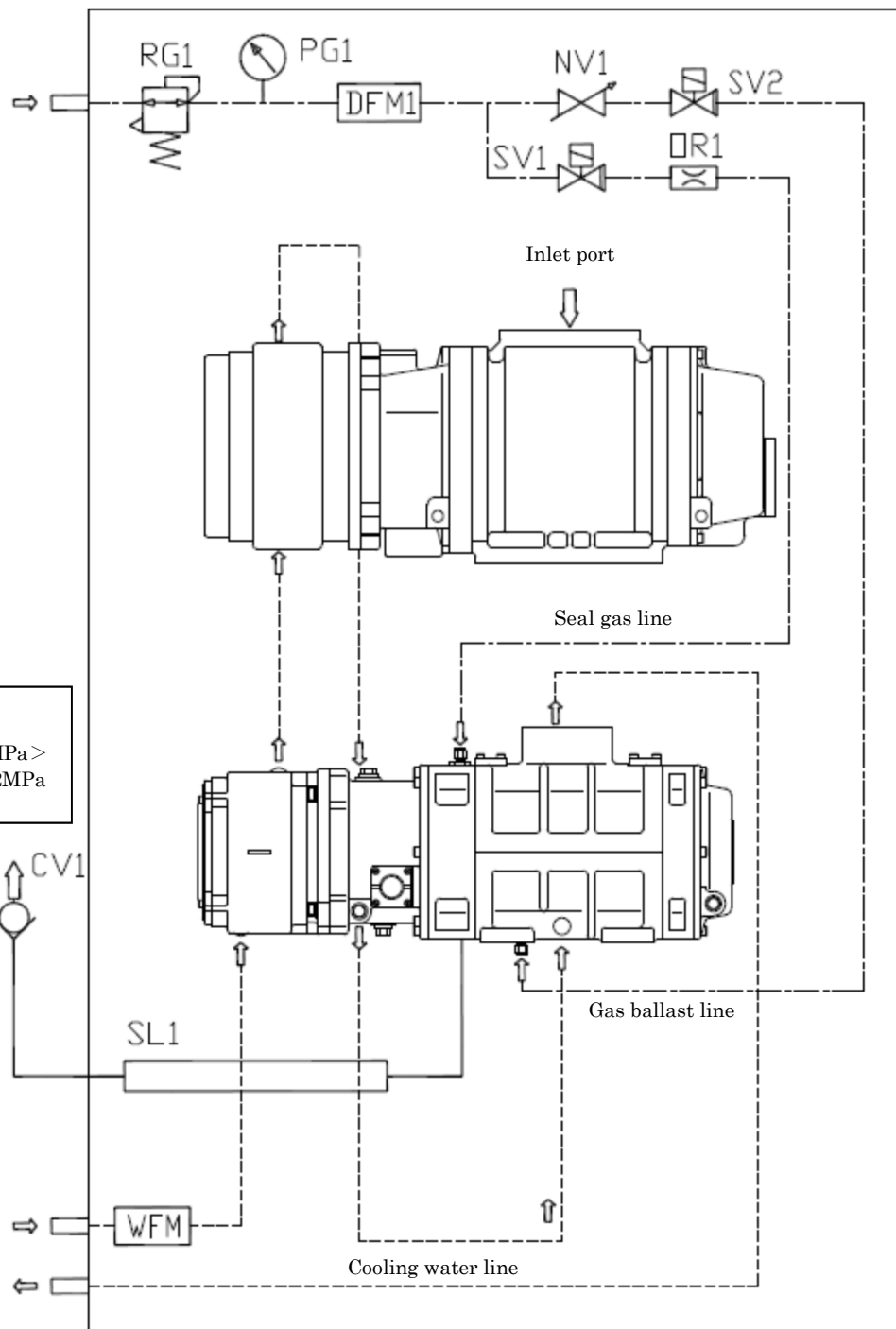


UR600, UR1200, UR1800

N2 purge gas introduction port
 SS400 SwegeLock
 Proper supply pressure : 0.12–0.5MPa
 Set pressure : 0.05–0.12MPa(Running State)
 Range of set flowing quantity : 0–50SLM(UR600,UR1200)
 80–200SLM(UR1800)

Outlet port
 NW40
 Proper exhaust pressure : 0.1MPa >
 Exhaust pressure limit : 0.12MPa
 (Absolute pressure)

Cooling water port : Rc3/8
 Supply hydraulic pressure : 0.1–0.3MPa
 Gateway difference pressure : 0.1MPa <
 Proper water temperature : 10–30°C
 Proper flowing quantity : 5.0L/min



Electrical system has two lines of power line and control line.

A sensor is mounted in the system, which is constantly monitoring operation.

When the sensor detected abnormal situation, it will activates buzzer, LED and remote control to output warning signal.

You can operate the pump using pendant controller for local operation (LOCAL), or using electric signal through the remote controller for remote control (LEMOTE).

Electrical system
<ul style="list-style-type: none">• Power line <p>Wiring is arranged from the power connector to the motor through the breaker (with thermal relay), allowing the motor to be protected by the pump alone.</p>
<ul style="list-style-type: none">• Control line <p>The pump monitors the cooling water flow rate, nitrogen gas flow rate, electric current value, and pump temperature at all times and gives alarm in two steps if any trouble occurs.</p>
<ul style="list-style-type: none">• When WARNING is displayed <p>In case of WARNING alarm, pump operation is continued. If the pump is stopped when the WARNING alarm is given, the alarm is held. The alarm can be reset by pressing the RESET switch. (The buzzer sound can be stopped with the BZ MUTE switch.)</p>
<ul style="list-style-type: none">• When ALARM is displayed <p>If the cause of WARNING alarm is not eliminated, the pump will be shut down automatically. The ALARM is held even when the pump is shut down. The alarm can be reset with the RESET switch. (The buzzer sound can be stopped with the BZ MUTE switch).</p>

1.2 Specifications for utilities

Specification

Spec \ Model		UR90	UR180	UR600	UR1200	UR1800
Booster Pump		...		PRC-006A	PRC-012A	PRC-018A
Primary Pump		UR90	UR180	UR90	UR90	UR180
Maximum pumping speed (m3/hr)		90	180	600	1200	1800
Maximum inlet pressure (Pa)		Atmospheric pressure or 200Pa ¹⁾				
Ultimate pressure (Pa)		5.0 ²⁾		0.67 ²⁾		
Maximum exhaust pressure		Atmospheric pressure				
Inlet diameter	Standard	VG80	VG80	VG80	VG100	VG150
	CE	NW50	NW50	NW80	NW100	NW100
Outlet diameter		NW40				
Lubricating oil Grease	PRC	...		BARRIERTA J60F		
		1.5L	1.9L	1.9L
	UR	FORBLIN YL VAC 25/6				
		BARIERTA J100F, J100FE				
		0.9L	1.5L	0.9L	0.9L	1.5L
		BARIERTA JFE552HV				
Weight (kg)		30.0g	37.4g	30.0g	30.0g	37.4g
Weight (kg)		245kg	335kg	370kg	420kg	545kg

Utility Requirements

Power			3 相 : 200 VAC、 50/60 Hz : 220 VAC、 60 Hz				
Current ³⁾	Model name		UR90	UR180	UR600	UR1200	UR1800
	At max load (A)		15.3	26.3	17.3	22.4	34.9
	At ultimate pressure (A)		14.7	24.8	16.4	18.9	29.2
Cooling water	Supply pressure (MPa)		0.1 to 0.3				
	In/out difference pressure (MPa)		0.1				
	Flow rate (L/min)		5.0				
	Supply water temperature (°C)		10 to 30 ⁴⁾				
Nitrogen gas	Supply pressure(MPa: gauge pressure)		0.12 to 0.5				
	Regulated pressure (MPa: gauge pressure)		0.05 to 0.12 (Regulated pressure in pump)				
	Flow rate	Shaft seal (SLM)	5				
		Gas ballast (SLM)	0~50	80~200	0~50	0~50	80~200

1) Maximum inlet pressure of UR600, UR1200 and UR1800 is 200Pa. Other models are atmospheric pressure.

2) The ultimate pressure is a value when the gas ballast gas is 0 SLM.

3) The current at the maximum load of UR600/1200/1800 has described the maximum current in the use-pressure range(Atmospheric pressure to 200 Pa).

4) Not condensing.

5) The flow rate of shaft seal gas is 5SLM fixation.

Chemical matters used in this pump**Primary pump**

- Pump oil BARRIERTA J100 FLUIDE, J100 FLUIDE E (NOK KLUBER)
- Bearing grease BARRIERTA JFE552HV (NOK KLUBER)

Booster pump (UR600, UR1200, UR1800)

- Pump oil BARRIERTA J60 FLUIDE (NOK KLUBER)

Above oils are used for bearing lubrication. UR series requires no oil supply for maintenance. We will replace the oil at the time of in-house overhaul. The reclaimed oil is legally dumped by qualified traders.

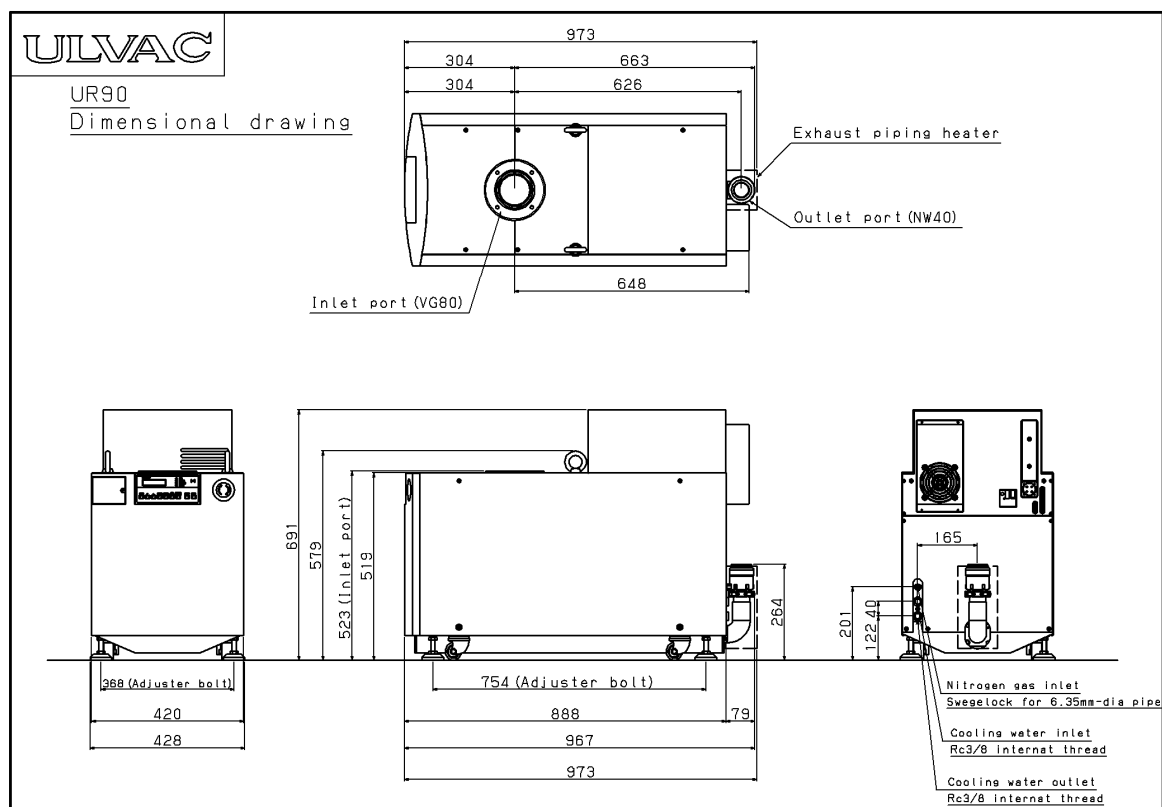
These oils are chemically stable, but when it is heated (burned), it will generate toxic gases. Do not burn these oils. The oils should be reclaimed and legally dumped by qualified traders.

Make sure to keep in compliance with the laws and regulations established by the local governments to dispose the Vacuum pump. You should ask the dedicated disposal agency for the disposal particularly if the Pump has exhausted any toxic gas.

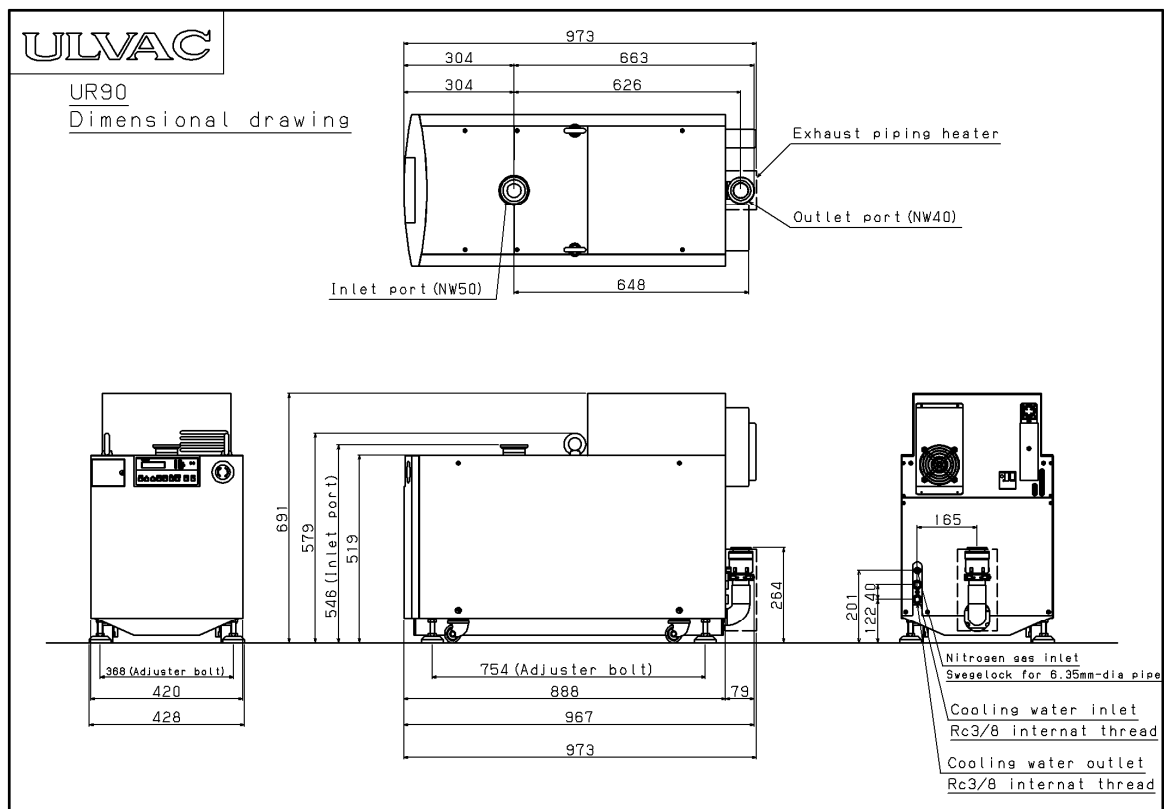
Note that you are requested to bear the cost and charges relating to the disposal.

1.3 Dimensional Drawings

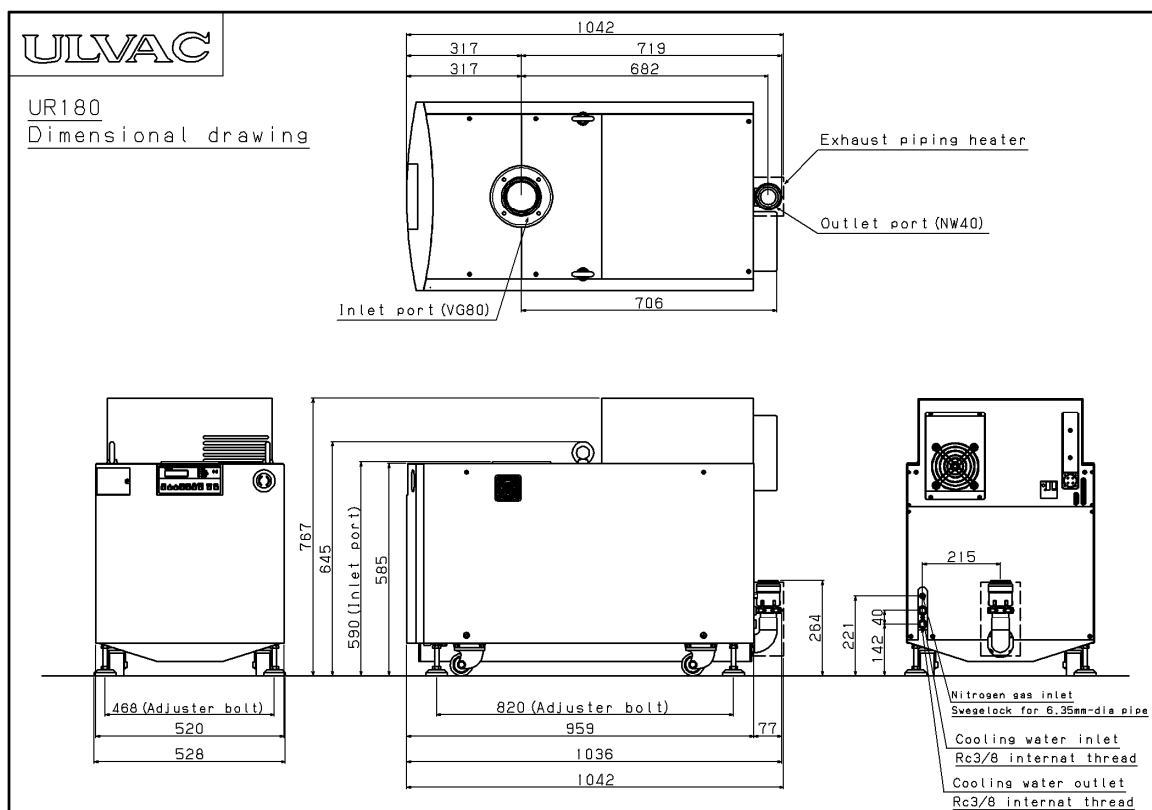
Standard type



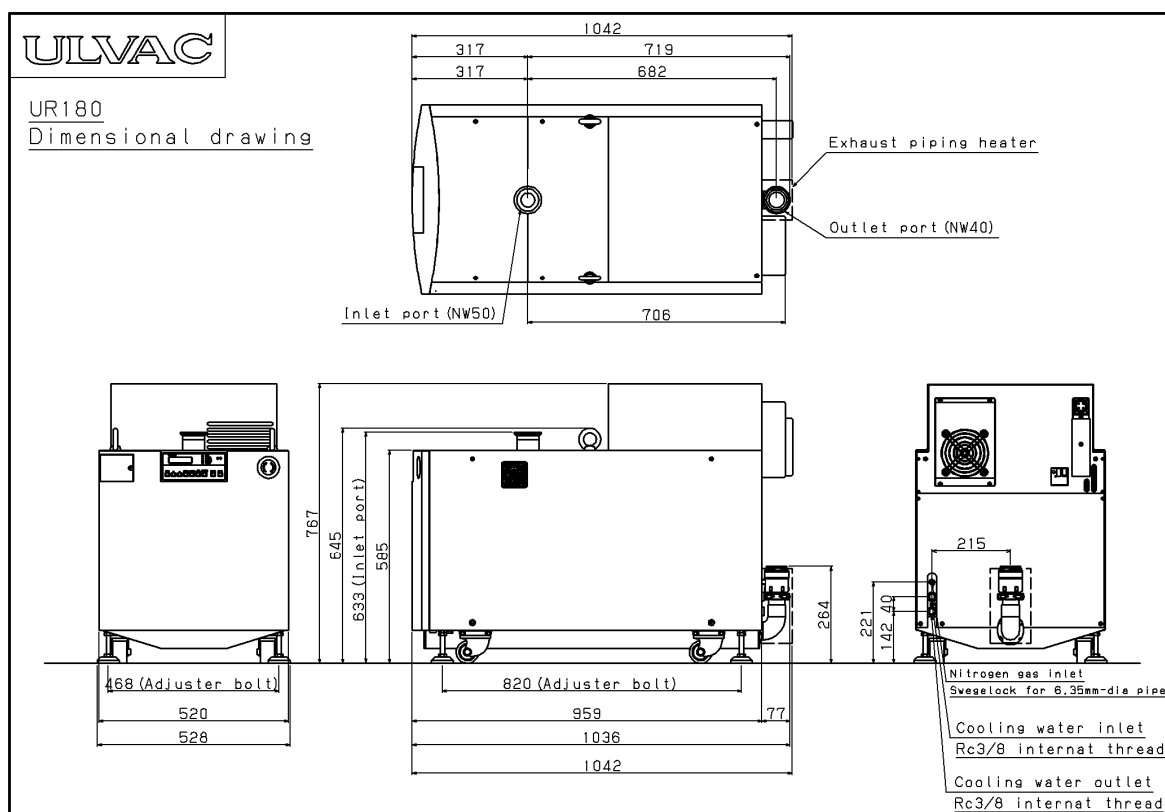
CE type



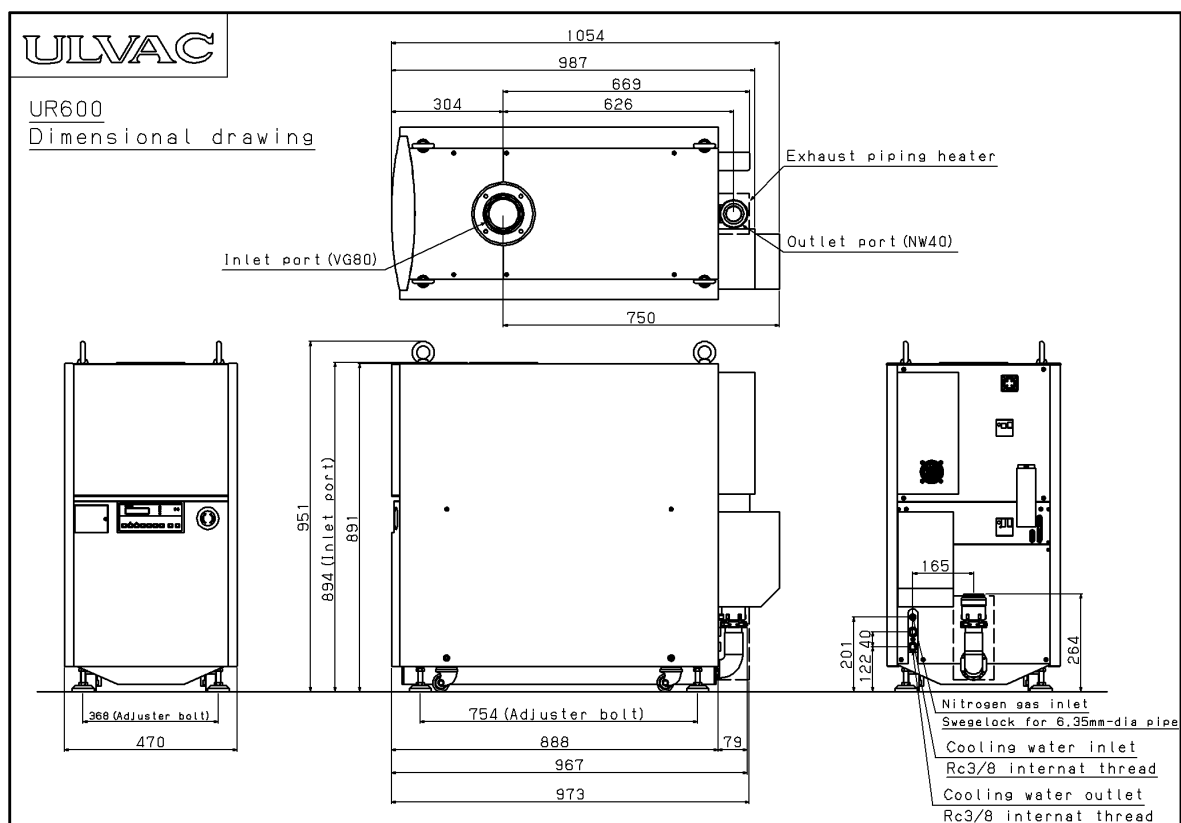
Standard type



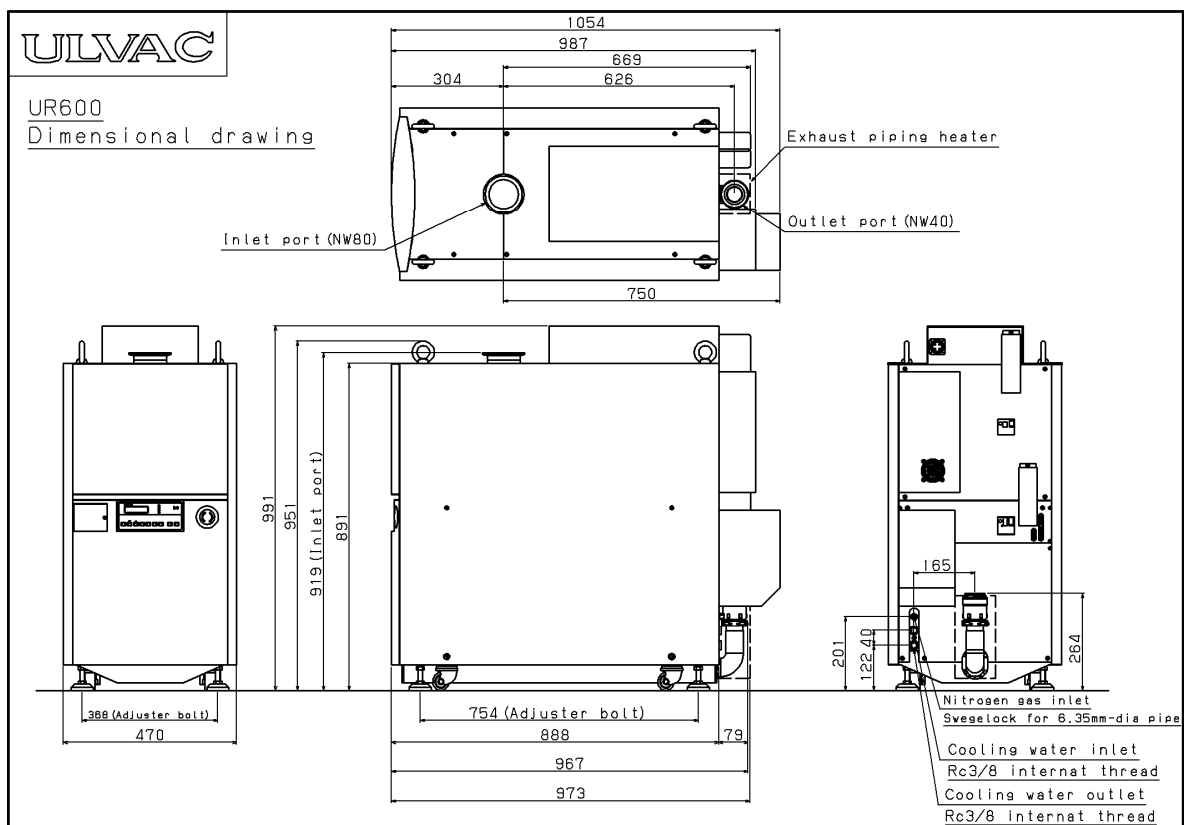
CE type



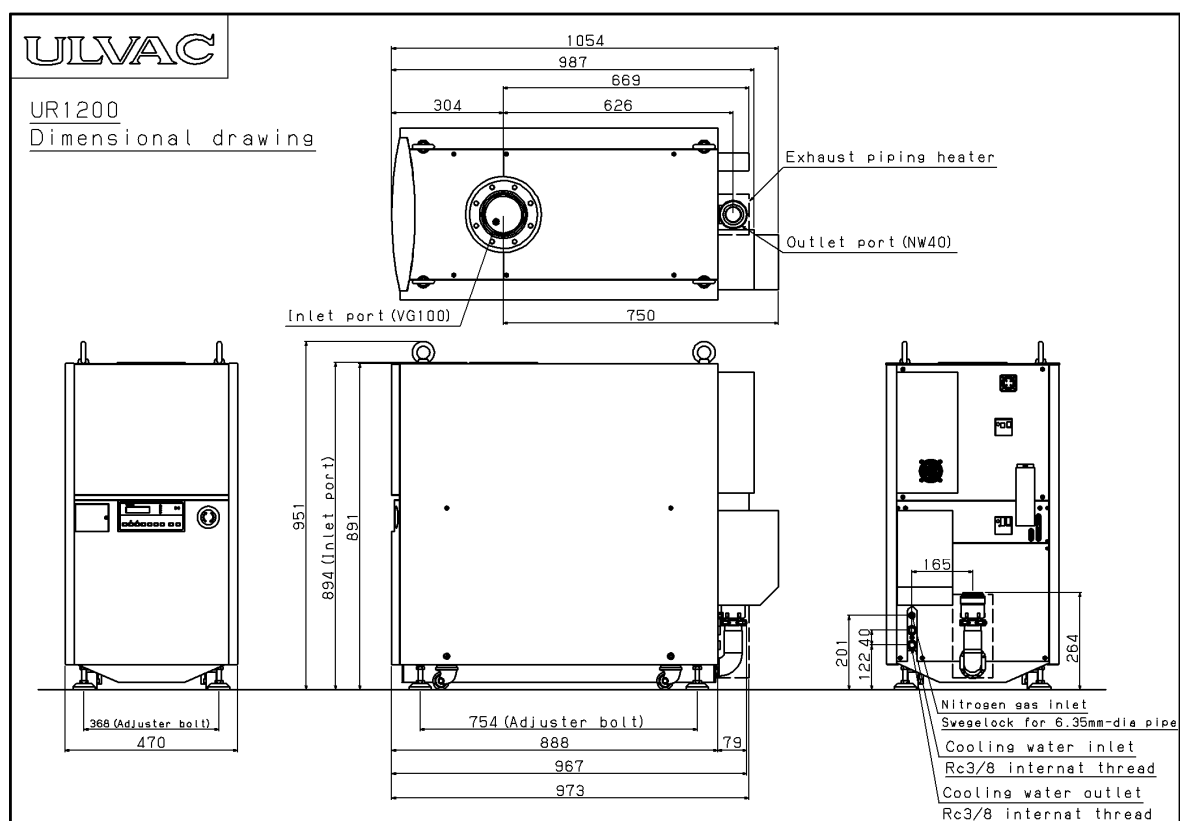
Standard type



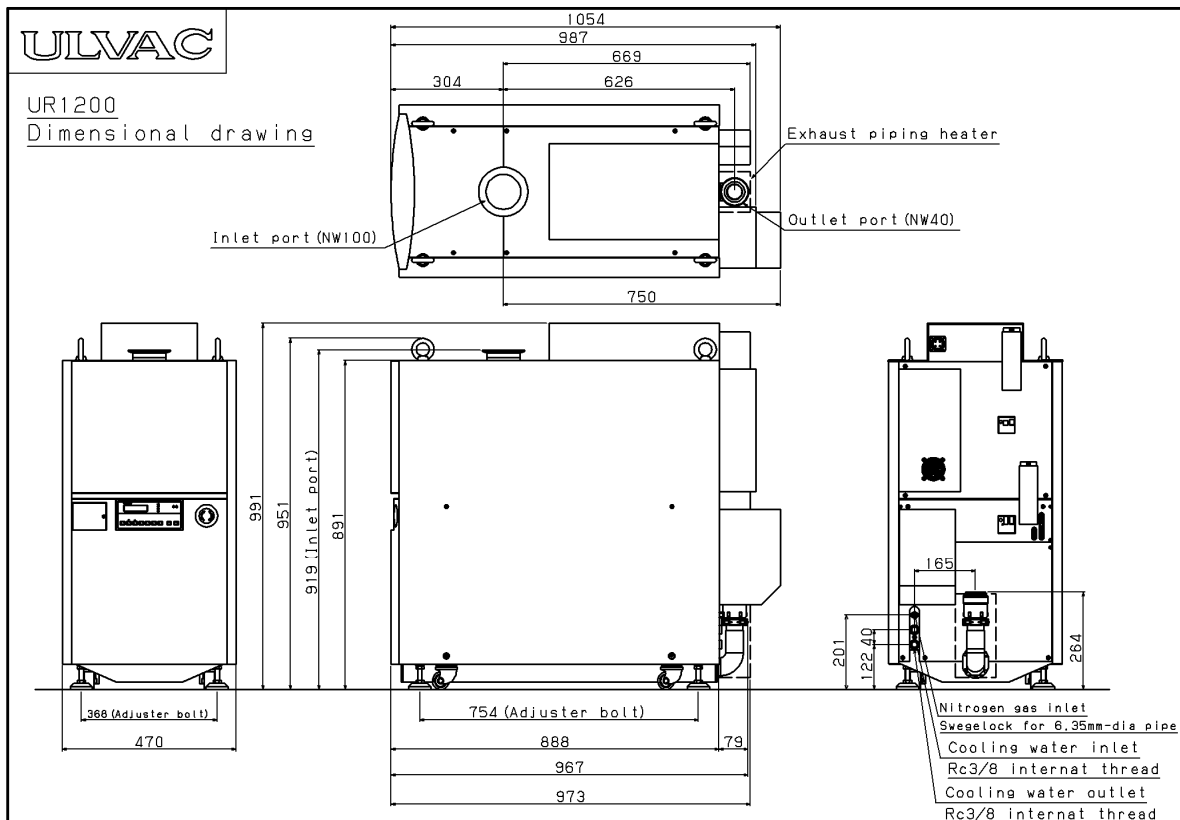
CE type



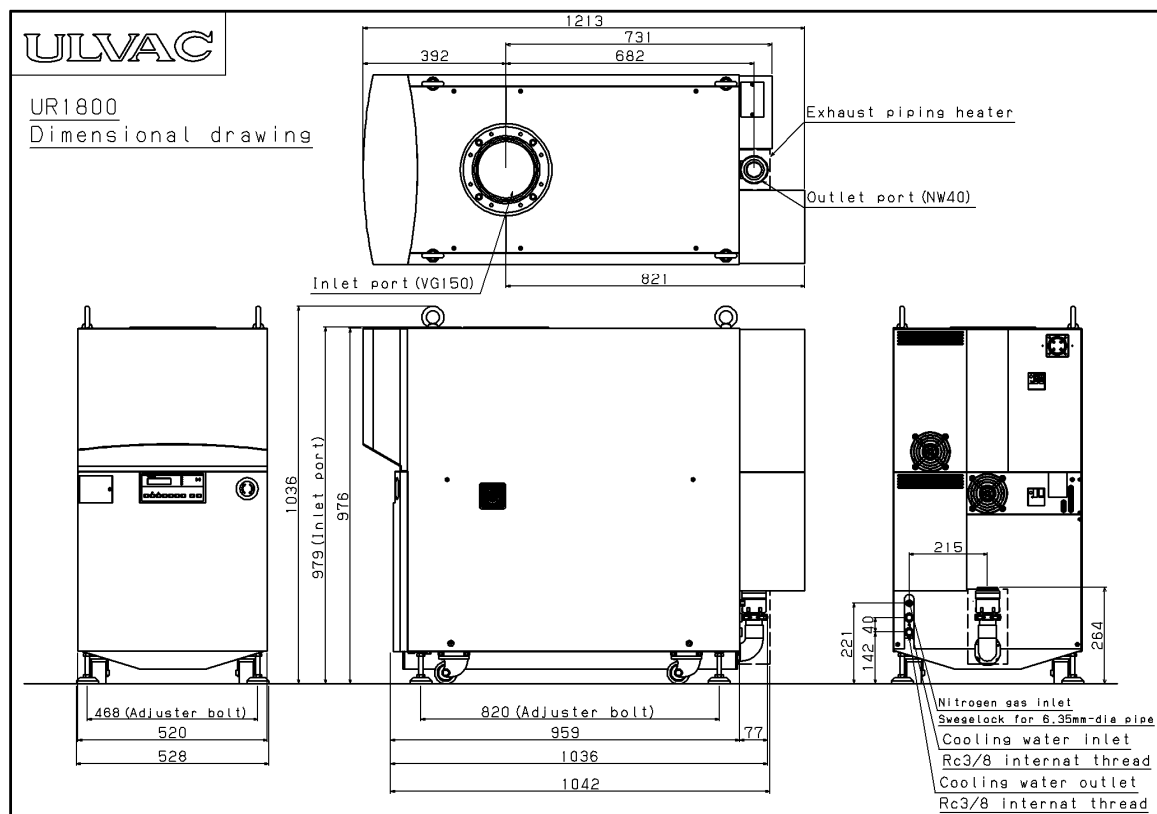
Standard type



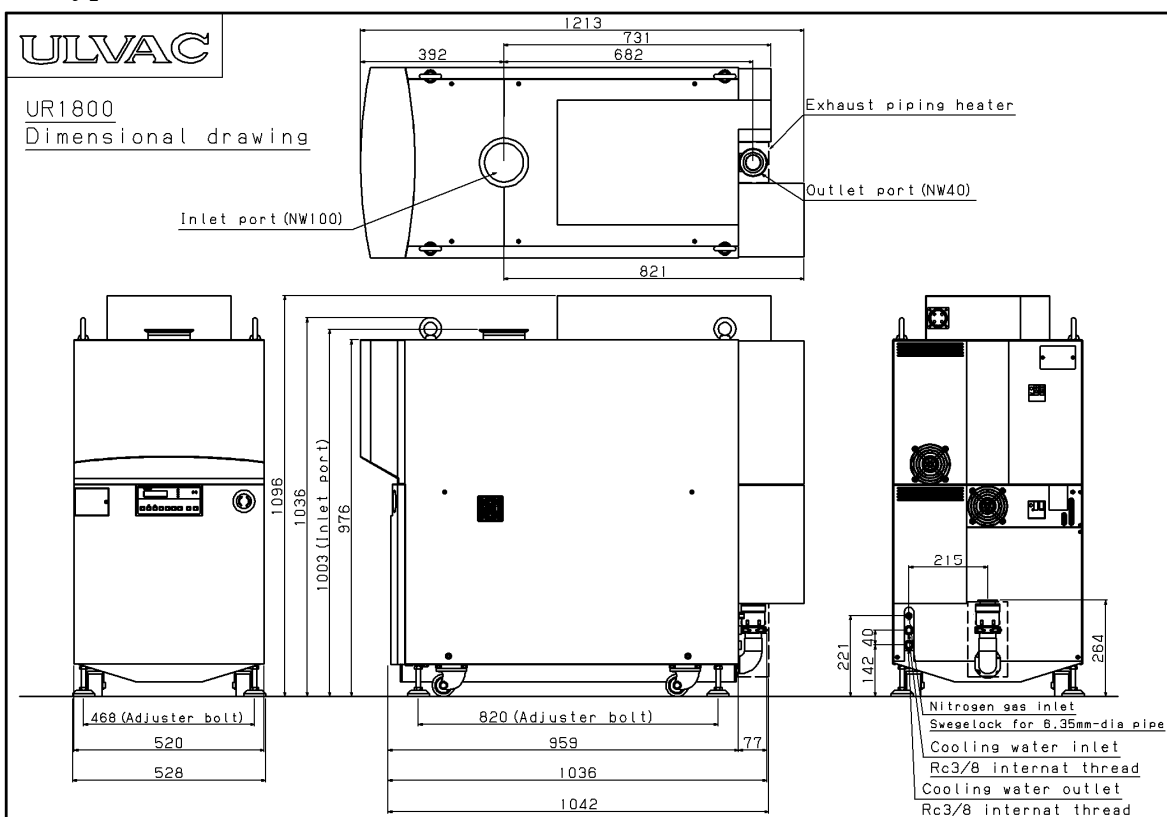
CE type



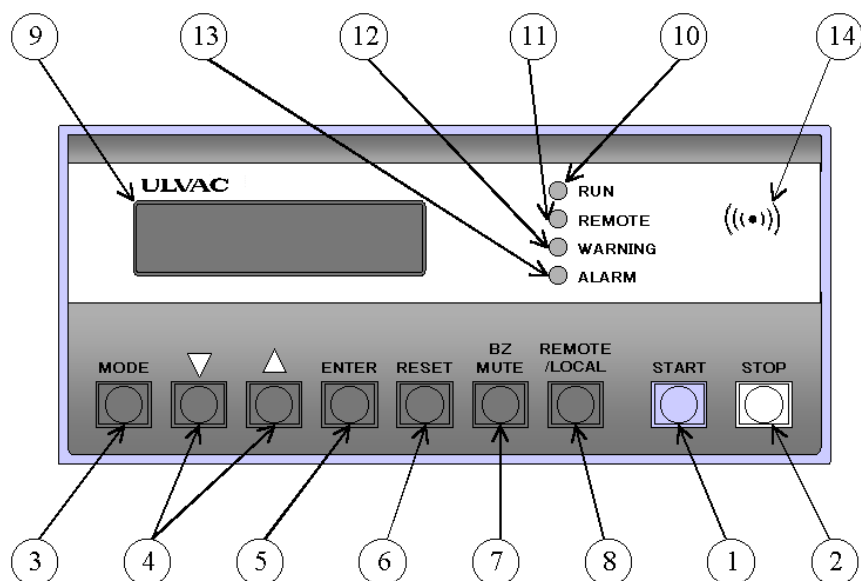
Standard type



CE type



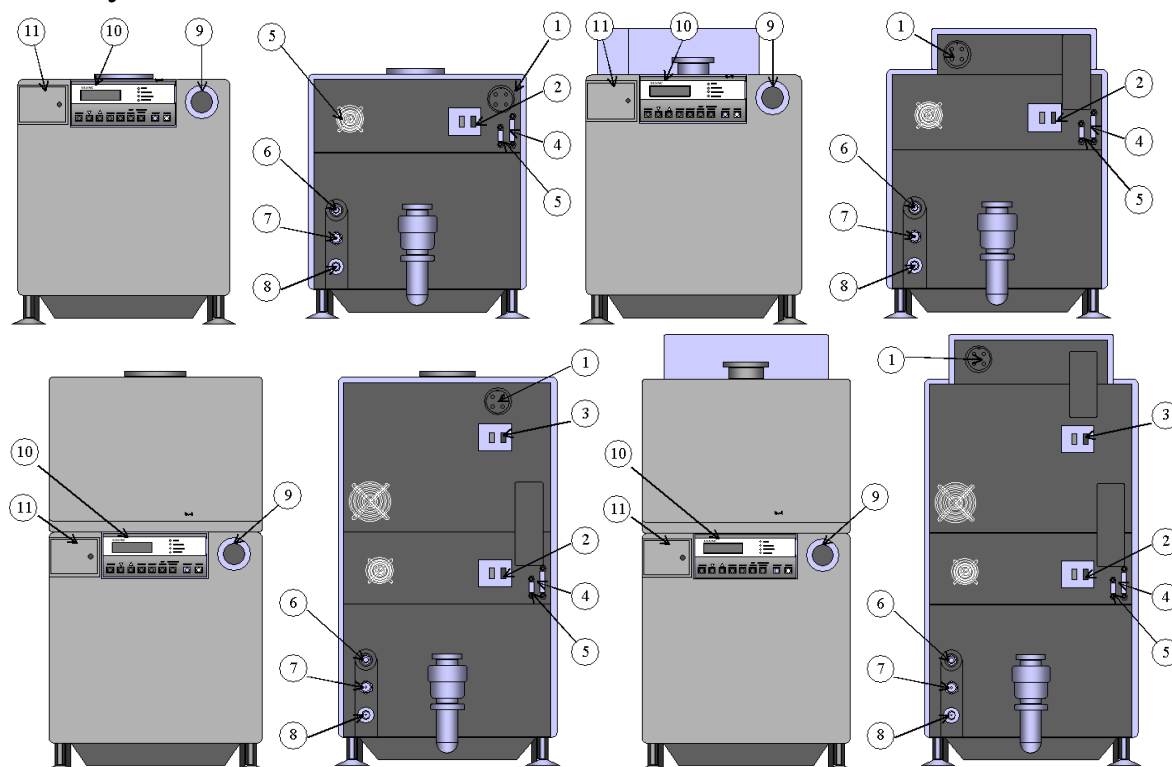
1.4 Description of Controller



No.	Control	Sign	Function
1	START switch	START	Starts the pump.
2	STOP switch	STOP	Stops the pump.
3	MODE switch	MODE	Selects a setting item.
4	Input change switch	▽ △	Changes over the set value. Changes the selected content of setting.
5	ENTER switch	ENTER	Determines the selected item and setting.
6	RESET switch	RESET	Resets the alarm.
7	BZ MUTE switch	BZ MUTE	Stops buzzer sound.
8	REMOTE/LOCAL switch	REMOTE / LOCAL	Changes over the REMOTE/LOCAL mode.
9	Display	LCD	Displays the current status with characters.
10	RUN lamp	LED1 (green)	The lamp lights when the pump starts.
11	REMOTE lamp	LED2 (green)	The lamp lights when the pump is running in the REMOTE mode.
12	WARNING lamp	LED3 (orange)	The lamp lights when WARNING is given.
13	ALARM lamp	LED4 (red)	The lamp lights when ALARM is given.
14	Buzzer	BZ	The buzzer sounds in case of WARNING or ALARM.

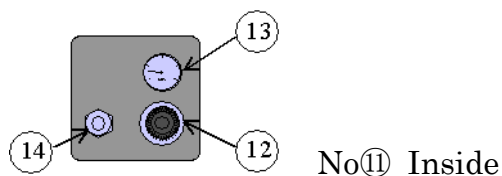
When any trouble occurs, LED3 (orange : No12) and LED4 (red : No13) on the controller will light and warning buzzer sounds. Detailed information will be indicated on the LCD

1.5 Utility Panel



Standard type

CE type

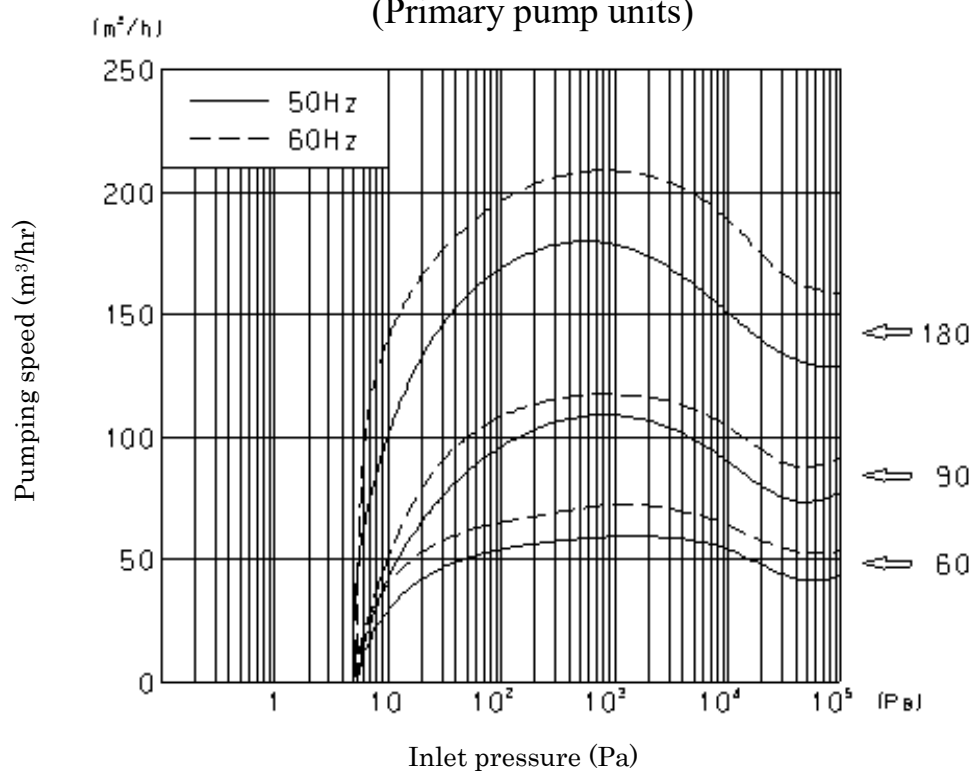


No.	Controls	Sign	Functions
1	POWER	CNI1	Applies 200VAC power.
2	BREAKER SWITCH (DRP)	MCB1	Turns ON/OFF the power.
3	BREAKER SWITCH (MBP)	MCB2	Turns ON/OFF the power.
4	REMOTE CONTROL	CNI2	Used for remote operation and signal input/output.
5	RS232C	CNI3	Used for connection with the computer.
6	N2 INLET	---	Nitrogen gas inlet port.
7	WATER INLET	---	Cooling water inlet port (Rc3/8).
8	WATER OUTLET	---	Cooling water outlet port (Rc3/8).
9	STOP SWITCH	---	Used for stop of the pump.
10	CONTROLLER	PCTL	Used for operation of the pump.
11	CONTROL PANEL	---	Regulates nitrogen gas flow rate.
12	N2 PRESS. REGULATOR	RG1	Regulates the secondary pressure of nitrogen gas.
13	N2 PRESS. GAUGE	PG1	Displays the secondary pressure of nitrogen gas.
14	GAS BALLAST VALVE	NV1	Regulates the flow rate of gas ballast gas.

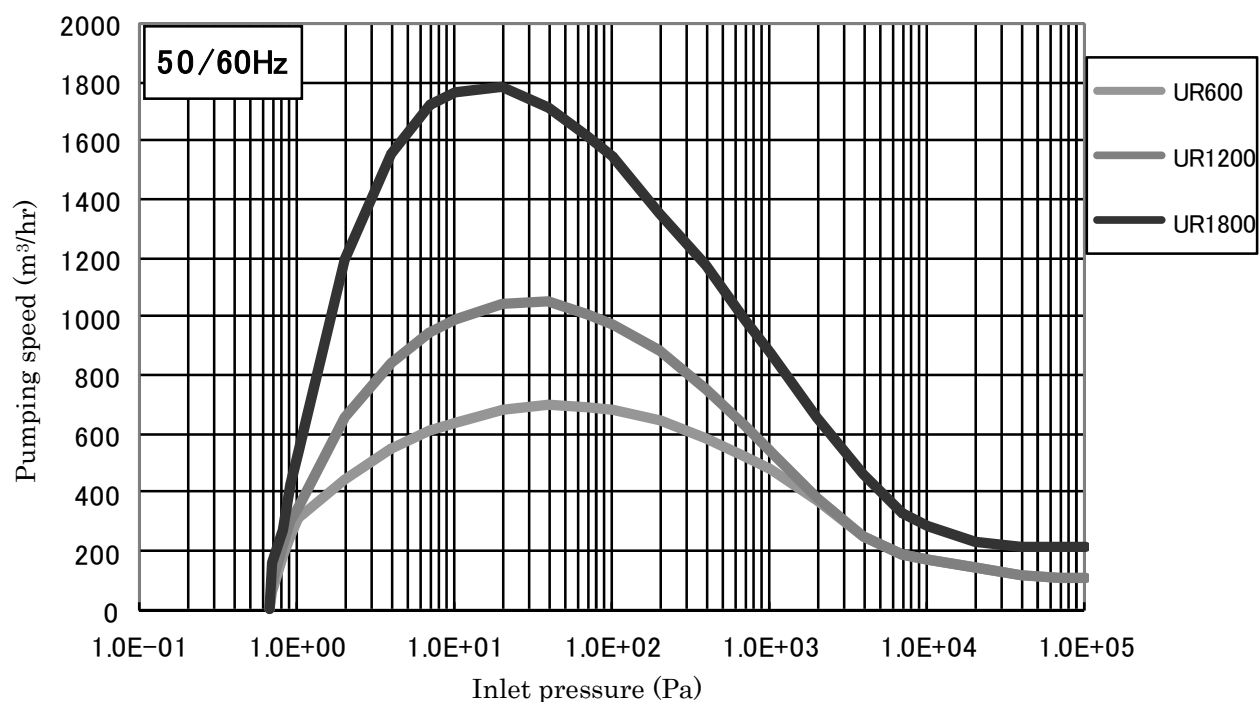
* Refer to the System chart

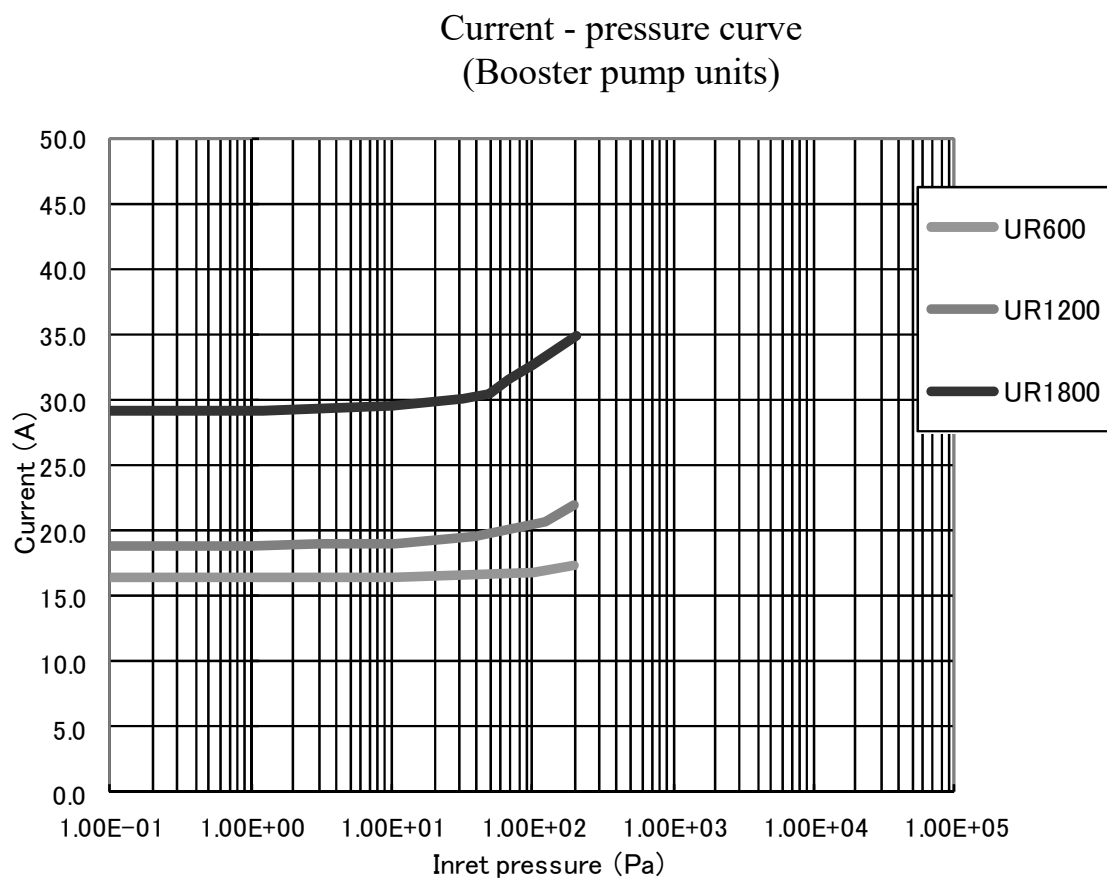
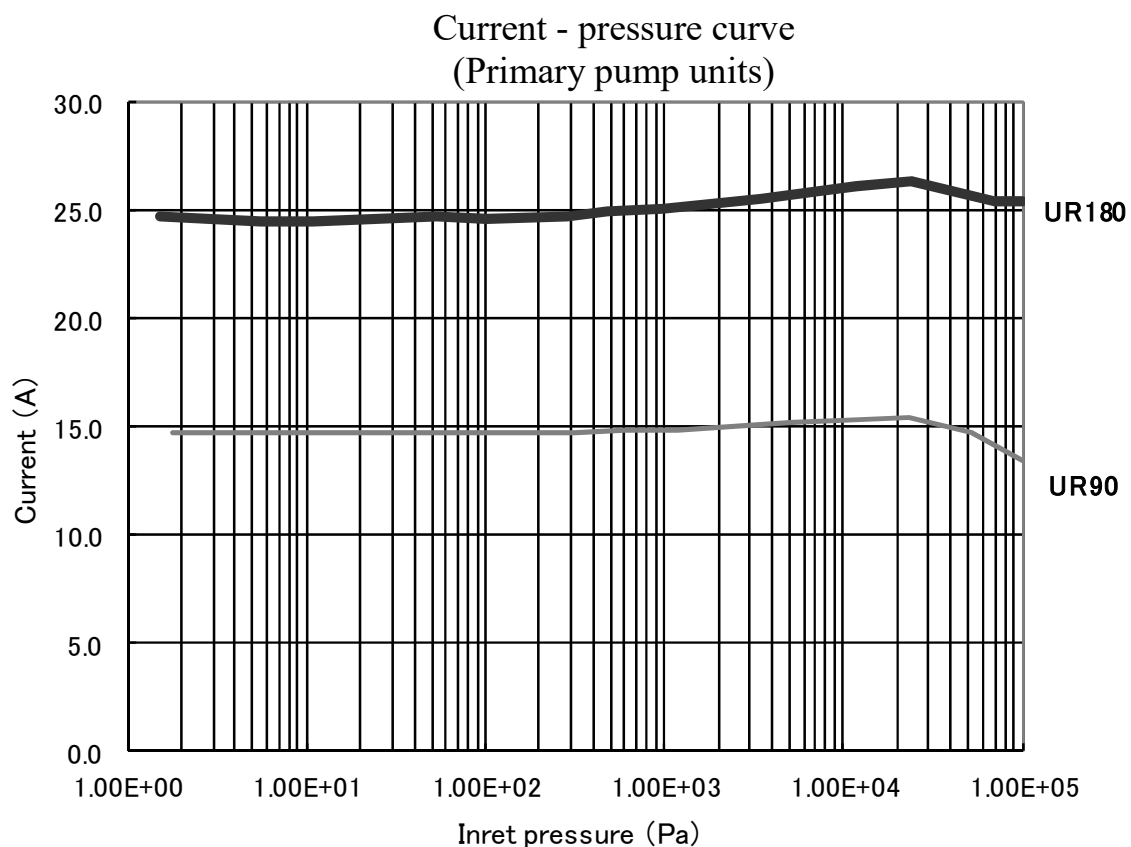
1.6 Performance Curve

Pumping speed curve
(Primary pump units)



Pumping speed curve
(Booster pump units)





2. Installation

2.1 For Safety Use

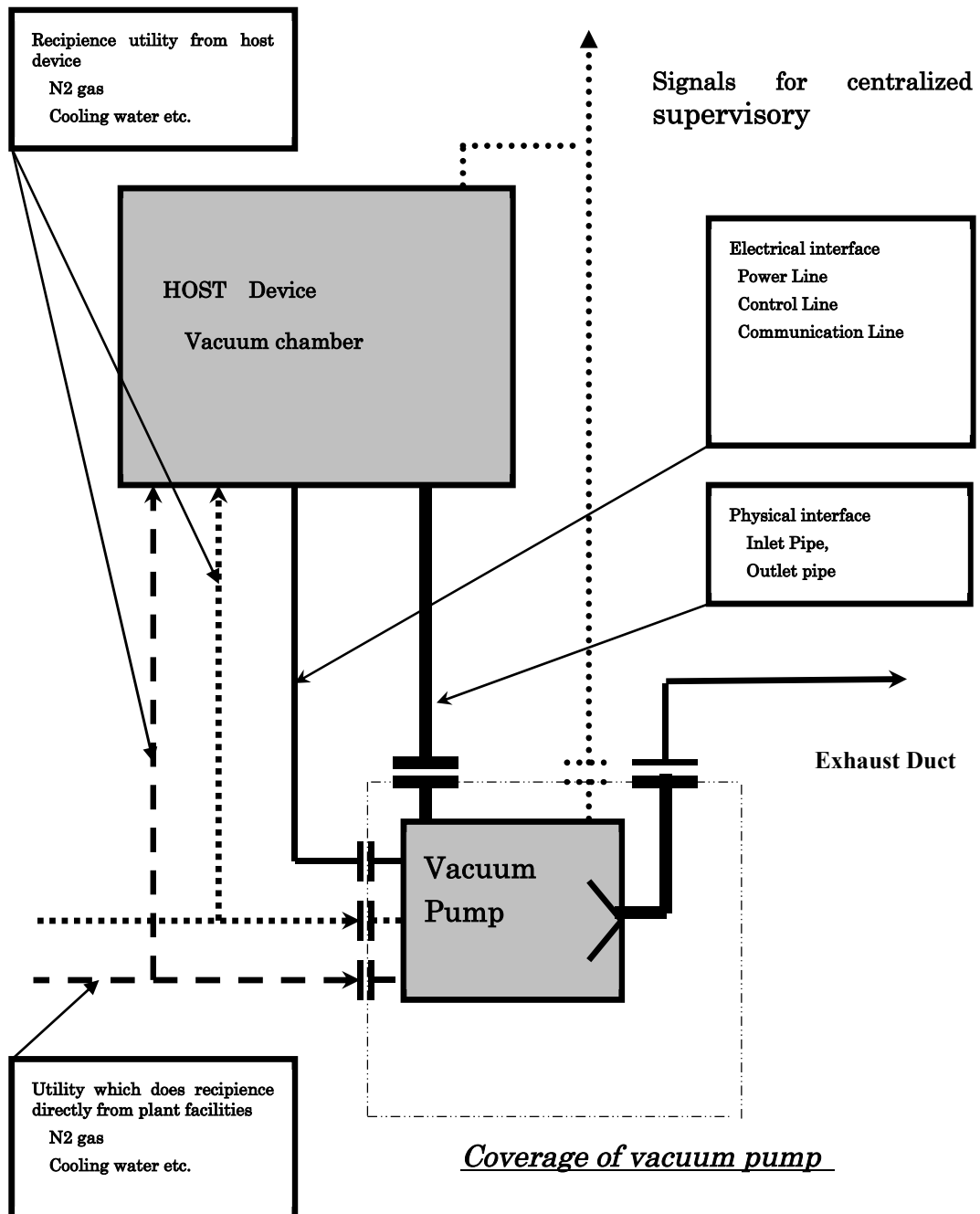


-This UR series models are maintenance free except when to connect with the host equipment, or disconnect from it, and to regulate N₂ gas flow at the time of operation. Overhaul or repair work is performed at ULVAC. When any trouble occurs, please contact with your local ULVAC service center (please refer to the ULVAC address list at the end of this manual).

- The interlock system and control system of the UR series pumps are expected to be connected with the host equipment.
- The UR series pumps are integrated into a host machine or are located close to the host machine (not more than 3m of travel to the next EMO button).
- Connect the power line of the UR series with the EMO system of the host equipment.
- The gas which can be exhausted with this UR series pump, it provides for inert gas(Air,N₂,Ar).
- Do not exhaust other gases (toxicity gas, combustion gas, corrosion gas, and explosiveness gas).
- Set up this UR series pump at ventilated room.
- These products are manufactured to conform with laws applied at the time of the preparation of this manual. When the applied laws are revised in the future, the legality of these products will not be ensured.
- If the host equipment of these products does not conform to the same laws, or if the products are modified, then the performance and safety of these products should not be insured. ULVAC should not have a responsibility in such a case.
- Personnel who have no record of formal safety training course regarded by your government (safety for electricity, cargo handling, etc) should not operate these products. Operator should have finished these-safety training course.
- Installation and operation of these products should be performed according to the applicable local safety codes and laws (e.g. fire fighting law, electric installation code, etc).
- Before starting installation or removal work of this products, shut off all the energy sources (electricity, compressed air, cooling water, etc.).

Following are description concerning with potential hazards and the method to avoid these hazards:

Location of vacuum pump in host device



It is assumed that the pump stops suddenly when the interlock of the host device does not synchronize with the interlock of the facility. It is necessary to manage utility to give preventive measures. Do not use the utility not managed.

Power Wiring

- This UR series pump is locked out in intercepting cooling water, the N₂ gas, and the power line. Give the system which can lock out on the host equipment.
- Material selection, installation and operation of wiring should be done according to the rules and codes applied in your country (e.g. fire fighting law, electric installation code, etc).
- For serious situations such as abnormal current or voltage, the products are provided with safety devices (e.g. noise filter) with which these abnormal situation can be avoided. To release the leaking current securely, the power wiring (cable terminal of the host equipment) should be directly connected to the terminal board (breaker).
- Though these products are provided with breaker (MCB1, MCB2 (UR600, UR1200, UR1800)), inner wiring from power connector through the breaker (MCB1, MCB2) is keeping hot. To completely shutoff the electricity, provide a breaker (M/D: AIC 10kAV or above) to the host equipment.
- Heater (AC200V) is installed in the exhaust pipe. Obtain the protection cover according to “finger safe” which are the rule and the law concerning safety in the country.
- When to perform installation or removal of these products, the power should be shutoff completely according to the following diagram.

**CAUTION**

Current value at the maximum load is shown in the following.

Please select the electric wire, which the electric wire specification can be allowed referring to current at the maximum load.

Please confirm that the size of the electric wire is a size of the electric wire, which the connector can be allowed.

UR90, UR180

Power		3 phase : 200 VAC, 50/60 Hz : 220 VAC, 60 Hz	
Current (A)	Model name	UR90	UR180
	At maximum load 200VAC 60Hz	15.3	26.3
Size of recommended electric wire		10AWG	10AWG

UR600, UR1200, UR1800

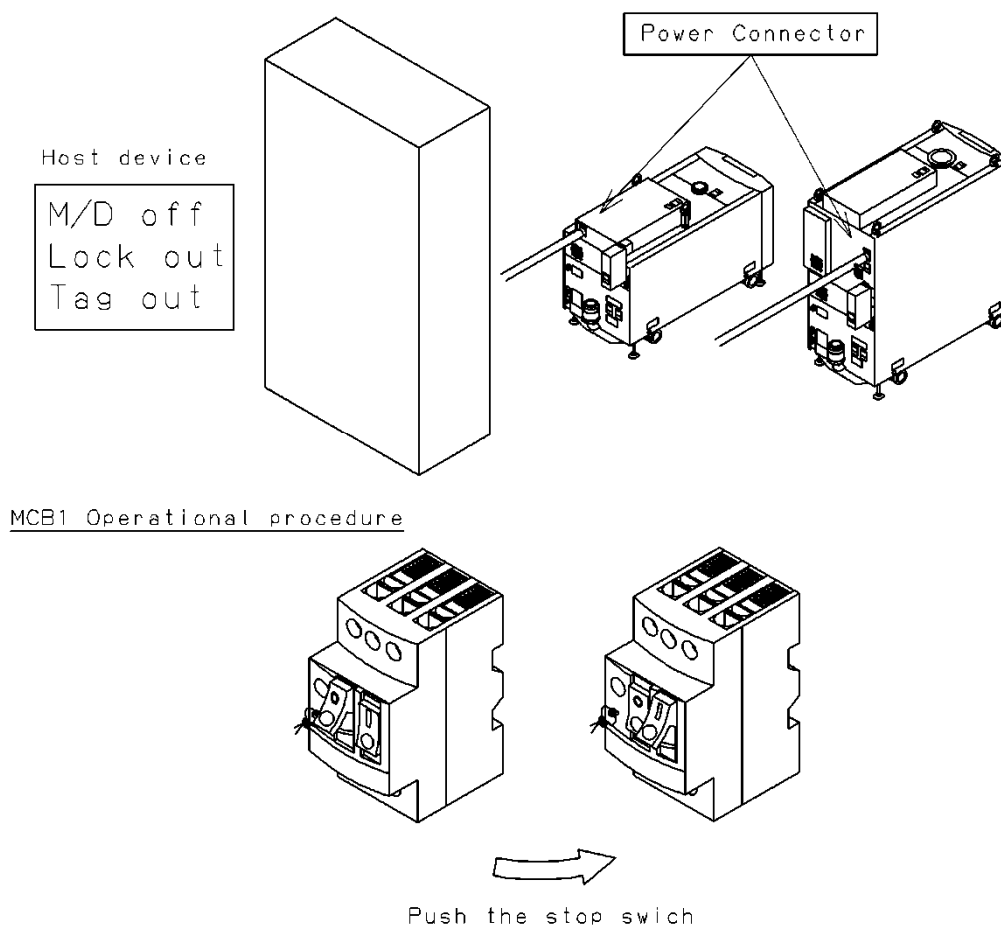
Power		3 phase : 200 VAC, 50/60 Hz : 220 VAC, 60 Hz		
Current (A)	Model name	UR600	UR1200	UR1800
	At maximum load 200VAC 60Hz	17.3	22.4	34.9
Size of recommended electric wire		10AWG	10AWG	6AWG



<< Possible electric shock hazard>>

If you have no record of electrical safety training course you should not perform the operation.

1. Shut off the breaker (MCB1, MCB2 (UR600, UR1200, UR1800)) of the pump.
2. Ensure that LCD of the controller (PCTL) is off.
3. Shutoff the breaker (M/D) of the host equipment.
4. Make lockout and tag-out according to the host equipment instruction manual.
5. Through current indication lamp, which may be provided in the host equipment, ensure that wire is not alive.
6. Remove power connector.

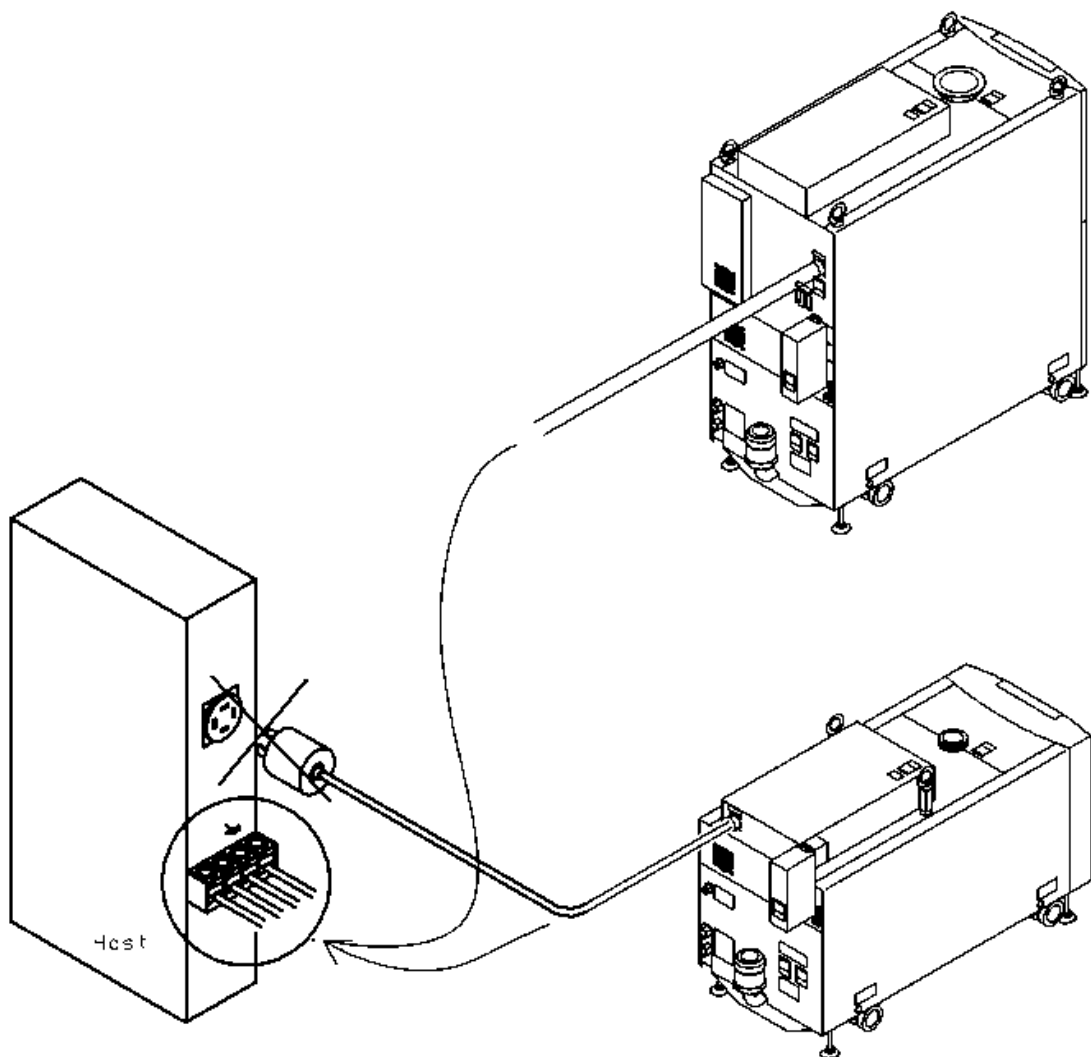


- The noise filters etc. are used to maintain the tolerance to the electrical noise to these products. The electrical noise (current) is leaked from the noise filter to the ground line. Therefore, a certain earth of the ground line is necessary.
- These products are classified with the "High Leakage Current" product, and the plug connections etc. are prohibited.
- Please fix the power line wiring directly to the terminal or the breaker, etc.



<< Possible electric shock hazard>>

If you have no record of electrical safety training course you should not perform the operation.



Cooling water

- UR series models use cooling water. The products are designed and tested as leakage free for the conditions defined. Nevertheless, for conditions which departed from the criteria (e.g. abnormal high water pressure), may produce leakage. In that case, the leakage will continue unless water supply from the host equipment is shut off. Electric devices or wiring should not be arranged at the bottom of the pump or on the floor around it.
- When the leakage occurs at the position of supply side from the pump mounted flow sensor (WFM), the sensor will warn the leakage. But, if the decrease of the cooling water head level does not reach the warning level, the sensor cannot detect the leakage.
- Place water leakage sensor on the floor at the pump bottom, and connect it to the host equipment interlock system. When a water leakage is detected, close the cooling water valve (HWSV) at once. After the valve is closed, tag a **CLOSED** sign on the grip.
- Fix a flow gage (HWF: e.g. flow sight) on the host equipment and make it possible to check if the cooling water is flowing.
- A drain port is provided at the bottom of base. This port should be connected with reliable drain outlet in case of a water leakage. The drainage requires adequate level difference.
- When to perform a work, there will be possibility of water leakage. Fix valves which compatible with the host equipment piping connector at the cooling water inlet-outlet.

Nitrogen gas

- UR series models use nitrogen gas. The products are designed as leakage proof devices and tested under the conditions defined. Nevertheless, for conditions departed from the criteria (e.g. abnormal high gas pressure), there may be gas leakage.
- Set up this UR series pump at ventilated room.
- Fix valve (HPSV) to shut off nitrogen gas supply.
- When to remove this products from the host equipment, close the nitrogen gas supply valve (HPSV) on the host equipment. After the valve is close, tag a **CLOSED** sign on the grip.
- There will be remaining gas in the host equipment piping. Fix a pressure gauge on the host equipment nitrogen supply source (midpoint of the piping to the pump), and then ensure that the pressure is reduced to the atmospheric pressure. When to perform work, if the internal gas pressure is high, the piping will be abruptly removed and injury could occur.

Suction and exhaust gases.

- ULVAC specifies gases which can be exhausted by the pump. When the pump is used to exhaust other gases (e.g. toxic gas, combustible gas, corrosive gas and explosive gas), there could be serious accidents. These gases should not be applied to the pump.

High temperature surfaces

- The temperature of the intake pipe and the exhaust pipe becomes 70°C or more. Set up the protection cover when the connection of the piping of the intake and the exhaust ends.
- Moreover, the protection cover is preparatory by the option.
- UR series models are designed to prevent any hazard which caused by heat. However, when the temperature of the gas is extremely high, then the surface of the device could be high temperature. Warning labels are attached at the positions where the temperature could result a serious injury.



<< High temperature surface >>

Be careful of the high temperature surface near this label (intake and exhaust outlet...).

Controlling wiring (power supply group units included)

- Be careful not to insert things into the fan louver.
- A protection circuit should be mounted in the host equipment so that the connector pins of the remote connector not receive voltage higher than 24Vdc.

EMC

- EMC performance of these products can be obtained under the conditions prescribed by the EMC instruction. The performance does not be guaranteed under unstable environment exceeding this standard level. To keep the EMC performance, use sealed cable and separate the products from components which generate noises (e.g. power switch, inverter, etc.), then check the noise level (conduction and emission) coming from host equipment is within criterion.

EMO

- EMO should be established as a total system including the host equipment with which this UR series models will be installed (if only a pump unit suspends it's operation, the total system could be hazardous). Pump suspension matter should be incorporated with the host equipment EMO sequence of the total system, to shut off the power.

2.2 Installation and Storage Requirements

2.2.1 Unpack

UR series models are packed in wood frames. Unpack work should be performed by expert trades.

**WARNIN**

- This product is packed in the wooden crate. Please request dismantlement to a special trader.
- Please guide equipment with the glove made of the skin, and the use of an appropriate dismantlement tool to those who dismantle it.
- When taking out the pump from wood frame, or lift it, instruct workers that the product should be hung by a crane at the pump top hook, then move it.
- Only licensed worker can perform cargo handling or operate the lording machines.
- When handling is performed improperly or unpack tools are improperly maintained, there will be possibilities of falling down or topple of the pump, so no person should be underside of the pump.

**CAUTION**

- Instruct the workers to wear leather gloves and use proper tool to avoid injuries caused wood frame debris and nails.
- Do not tilt the pump by more than 10° .

Upon receipt of this products, make sure that the products is the correct model you ordered and that it is free from damage in transit.

List of Accessories

Description	Q'ty
Nitrogen inlet joint	1 pc.
Power connector	1 pc.
Remote operation connector	1 pc.
RS-232C/RS-485 communication connector	1 pc.
Quick Manual	1 copy

**CAUTION**

: If there are some problems, please contact with our office within one-week period.

2.2.2 Transit

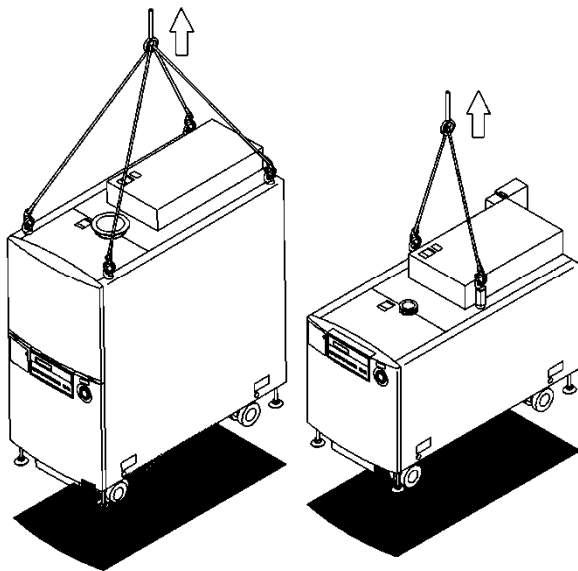
**WARNING**

: Although this pump is provided with casters, do not move it a long distance using these casters. If you move this pump in such a way, the load exceeds the safety criterion. You could hurt your waist.

When to transit the pump, you should use loading machines (e.g. moving crane) and hang it, or load and fix the pump on a pallet, then transit it by pallet truck.

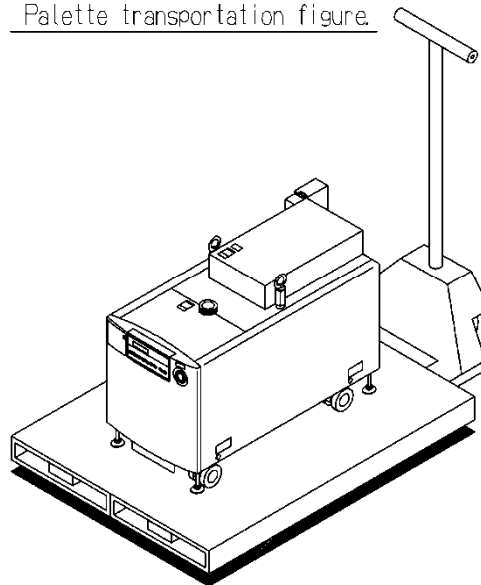
**CAUTION**

- Do not tilt the pump by more than 10° .
- Pallet truck should not directly be placed under the pump base bottom. This could topple the pump.



Crane hanging figure.

Palette transportation figure.



2.2.3 Environmental Requirements for Installation

Following installation and storage requirements should be met.

Storage and installation requirements

Description	Requirement
Temperature and humidity (for storage)	- 30 - 60° C, less than 95%RH
Temperature and humidity (for operation)	5 - 40° C, less than 95%RH
Above sea level	Not exceeding 1000m
Outside vibration	Not exceeding 0.5G

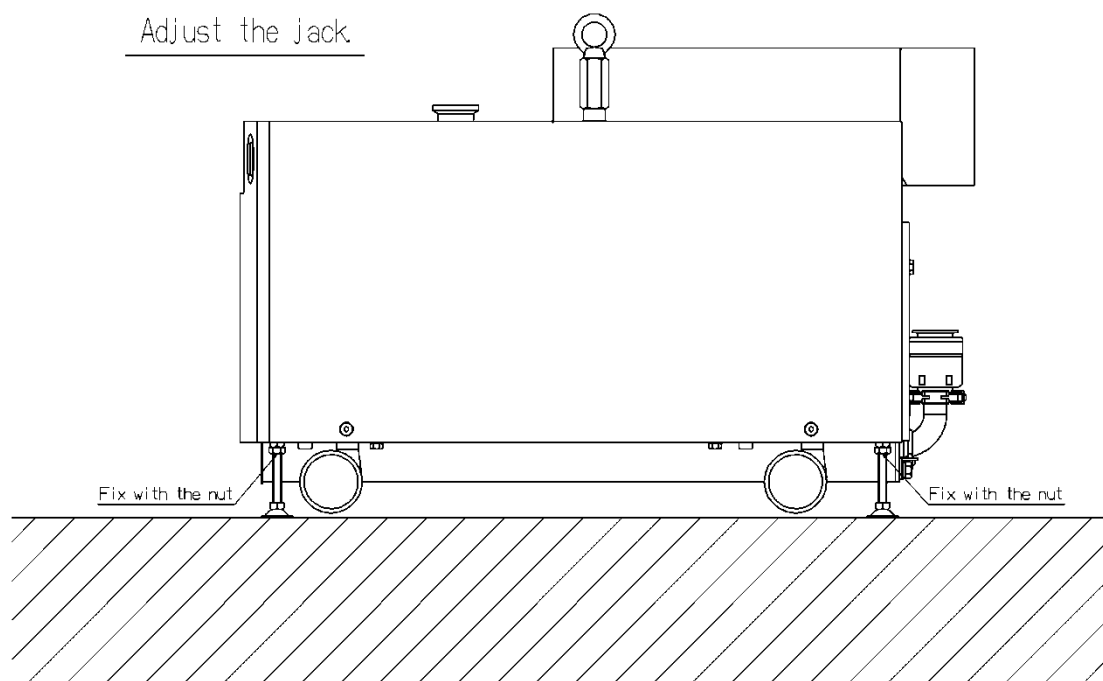
* Not condensing

2.2.4 Other Requirements



CAUTION

- Set up and keep this UR series pump at ventilated room.
- Before storage, drain the pump. If water is remaining in the pump, it will be freezing at a low temperature (below 0°C) and may damage the components.
- Do not lay two pumps one on the other nor lay the pump on its side during storage.
- After moving the pump to the place of installation, adjust the jack to set it in a horizontal position (adjustable range is + 10 mm).
- Do not tilt the pump by more than 10° when moving it.

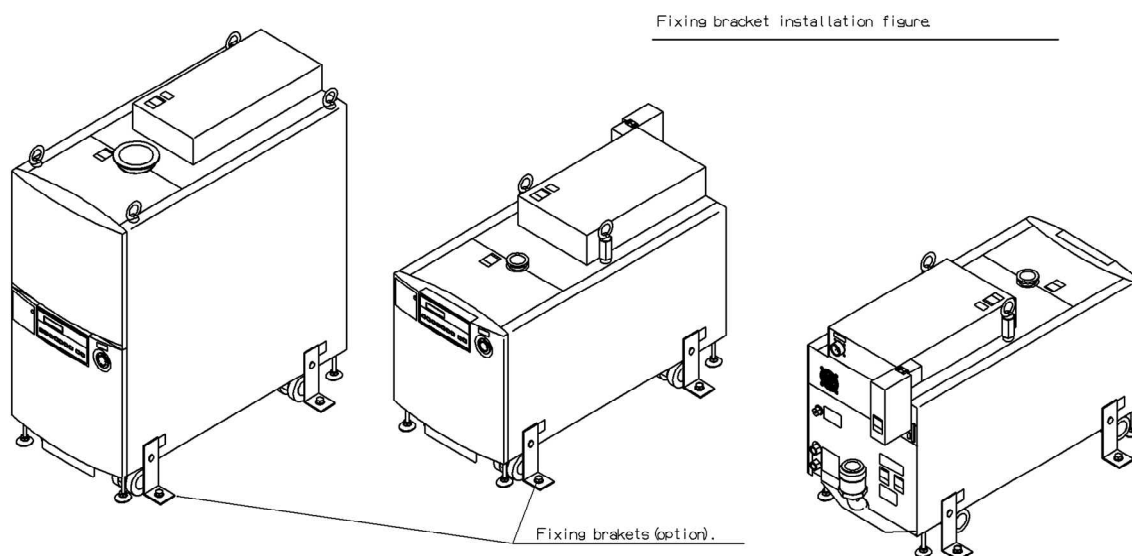


2.2.5 Earthquake Resistant Measures



WARNING

- To provide earthquake resistance, the pump should be tightly fixed according to the diagram below. If it is loosely installed, then the pump could topple or move and will produce damages for peripheral devices.
- Piping for vacuum, cooling water, nitrogen, and wiring, should be constructed so that they can absorb vibration and should not produce damages on piping or run off within defined vibration level.

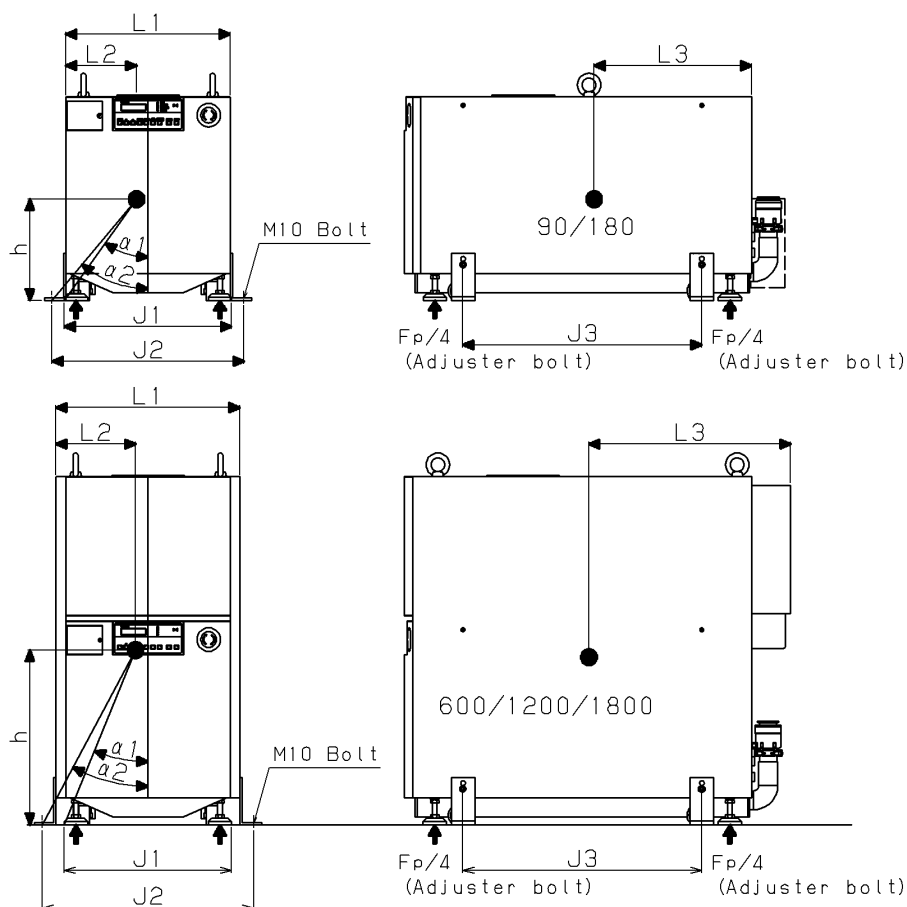


Earthquake-proof strength was examined based on the demands postulated of 1997 version United States union construction standard (UBC).

Please refer to the next table for a fall moment, the horizontal load, and the center of gravity position.

Antiearthquake procedures

		unit	UR90	UR180	UR600	UR1200	UR1800
The maximum width on surface of projection which falls easily	L1	mm	420	520	470	470	520
Short distance from fulcrum on surface of projection which falls easily to center of gravity position	L2	mm	180	222	205	200	223
The distance from rear panel to center of gravity position	L3	mm	403	465	529	517	661
Height from floor side to center of gravity position	h	mm	258	307	488	580	606
Weight of device	Wp	kg	245	335	370	420	545
Horizontal pressure(Adjuster) $F_p = 0.94 * W_p$	$F_p/4$	kg	57.6	78.7	87.0	98.7	128.1
$0.94 * h \geq 0.85 * L_2$			OK	OK	OK	OK	OK
Fall power $R = (W_p * (0.94h - 0.85L_2)) / (2 * L_1)$	R	kg	26.1	32.2	111.9	167.6	199.3
Shearing power of anchor bolt (M10)	τ		1537	1537	1537	1537	1537
$F_p < \tau$			OK	OK	OK	OK	OK
Tensility of anchor bolt(M10)	σ		2300	2300	2300	2300	2300
$R < \sigma$			OK	OK	OK	OK	OK
Jack interval	J1	mm	428	528	428	428	528
Earthquake-proof Bracket interval	J3	mm	610	655	610	610	655
Fall angle	$\alpha 1$	deg	39.7	40.7	23.7	20.3	23.5
Earthquake-proof Bracket interval	J2	mm	490	590	540	540	590
Fall angle	$\alpha 2$	deg	43.5	43.9	29.0	25.0	25.9
$\alpha > 15 \text{deg}$			OK	OK	OK	OK	OK



2.3 Piping

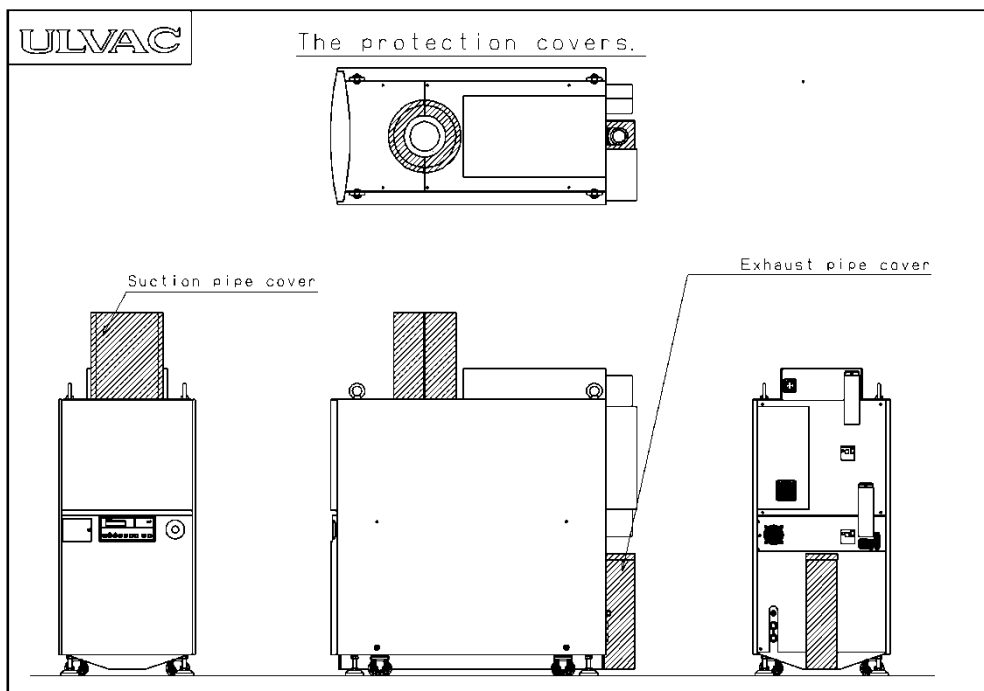
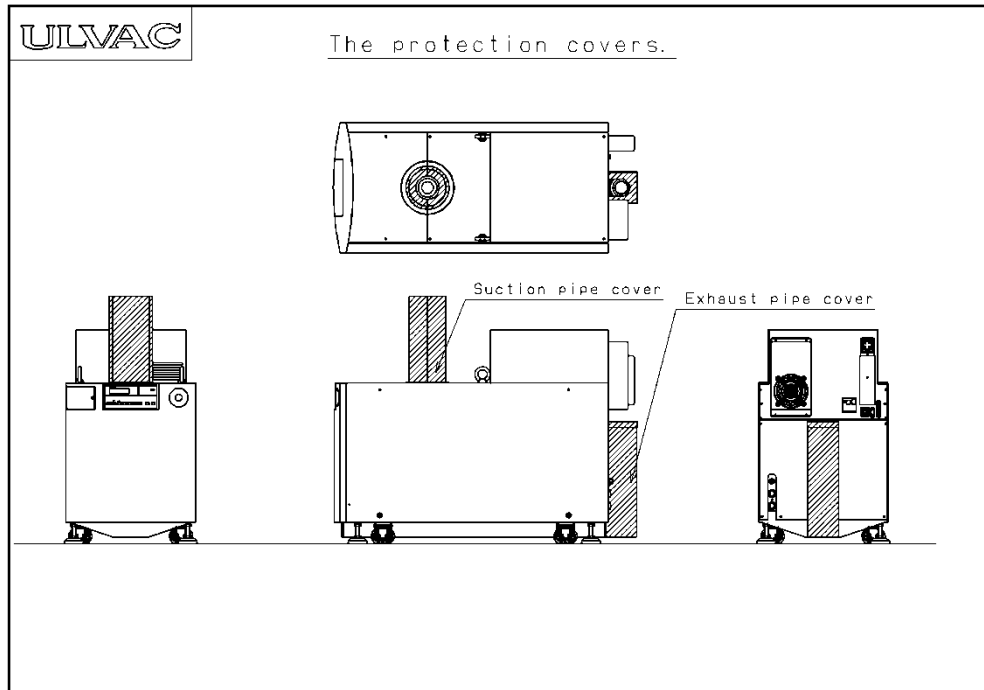
2.3.1 Piping for inlet-outlet ports

**WARNING**

: Before start work, ensure that all hazardous energies are shut off. Refer to **2.1 For Safety Use**.

**CAUTION**

- UR series has installed flange for keeping on the suction entrance flange. The suction entrance mesh has not been installed. Please do not remove flange for keeping until the time of connected work of piping to prevent the foreign body fall in the pump.
- When connecting piping, be careful not to drop foreign matter (e.g. bolt) into the inlet/outlet port of the pump. If something was dropped into these port, then the pump should be disassembled to removed the matter from the pump, so contact with the your local service center.
- The pump flange should not be loaded directly (refer to 2.4.5 Earthquake Resistance Measures).
- Be careful not to damage the gasket surface. After the completion of the piping work, perform gas leak test for the whole system.
- If thin metal piping, bellows or the likes are used, the pulsing stream of gas in piping may produce pipe resonance, and the sound could exceed the work environment sound criteria if the piping, bellows or the like are made with thin metal wall. Provide material of adequate thickness.
- The temperature of the intake pipe and the exhaust pipe becomes 70°C or more. Set up the protection cover when the connection of the piping of the intake and the exhaust ends.
- When the pump is driven, AC200V is energized to the exhaust pipe heater. Obtain the protection cover so that the hand should not touch the heater part after connecting the exhaust pipe.
- Moreover, the protection cover is preparatory by the option.



- - Installation protection cover to the exhaust heating element.
 - - Specification for Connection : refer to **1.3 Dimensional Drawings**.
 - - Compatible Piping : Use pipe materials which compatible with your local rules and laws concerning to safety.
- Piping should not produce rust. Heat resistance performance should be more than 100° C.

2.3.2 Nitrogen Gas Piping



WARNING

: Before start work, ensure that all hazardous energies are shut off. Refer to **2.1 For Safety Use**.

: Use the supplied nuts and ferrule for piping work.

■ - Connection Requirements

UR90, UR600, UR1200 : Swage-lock for 6.35mm-diameter pipe

UR180, UR1800 : Swage-lock for 9.52mm-diameter pipe

■ - Proper Piping

UR90, UR600, UR1200 : Use SUS pipe of outside diameter of 6.35mm-diameter with more than 0.9MPa pressure proof joints.

100°C or more in heatproof temperature.

UR180, UR1800 : Use SUS pipe of outside diameter of 9.52mm-diameter with more than 0.9MPa pressure proof joints.

100°C or more in heatproof temperature.

Nitrogen gas	Model		UR90,UR600,UR1200	UR180,UR1200
	Supply gas pressure (MPa: reading on gauge)		0.12 to 0.5	
	Regulated pressure (MPa: reading on gauge)		0.05 to 0.12 (Regulated pressure in pump)	
	Flow rate	Shaft seal (SLM)	0 to 5	
		Gas ballast (SLM)	0 to 50	80 to 200

2.3.3 Cooling Water Piping


WARNING

: Before start work, ensure that all hazardous energies are shut off. Refer to **2.1 For Safety Use**.


CAUTION

- If two or more pumps are used, connect them in parallel, if connected serial, then the cooling performance will be reduced and resulted a failure.

- Do not mistake the cooling water inlet and outlet.
- If cooling water contains much scale or impurities, filter it with a filter in the fore stage.
- It is difficult to accomplish an adequate flow rate when water supply source is far distant from drain outlet, or piping level is uneven (the drain outlet level is higher than that of the pump).

In this case, improve the piping arrangement, or use larger sized pipe, or increase the water pressure within specified pressure scope.

- Only stainless steel pipe is used for cooling water piping of the dry pumps. Please note that troubles because of following causes shall be paid service, due to choked pipe and drop of cooling efficiency by deposition and accumulation of impurities (water stain, microorganism, metal powder and metal ion).
- Do not use any metal pipe other than stainless steel pipe in the cooling water system (including host side). Ions could be merged into water, if metal pipe such as copper and zinc are included is used. Cooling water flow rate could be decreased because merged ion accumulates and adheres to the inner wall of the pipe.
- It is recommended to use water which does not include any impurities (e.g. industrial water. See table below). Keep in mind not to use poor quality of water because metal ion could be included in cooling water even inlet side of cooling water is clean. Water stain such as calcium carbonate could be accumulated in cooling water system depending on water quality and it could made cooling efficiency low. In addition, there could be cooling water leakage because of corrosion from the inner wall of water pipe by chlorine ion.
- The pump could be damaged if it continuously runs with cooling water flow rate lower than specified amount. Make sure to keep specified flow rate.

[Reference]Standard Water Quality of Industrial Water

Turbidity mg/L	pH —	Alkalinity CaCO ₃ mg/L	Hardness Mg, CaCO ₃ mg/L	Evaporation residue mg/L	Chlorine ion Cl ⁻ mg/L	Iron Fe mg/L	Manganese Mn mg/L
20 max.	6.5–8.0	75 max.	120 max.	250 max.	80 max.	0.3 max.	0.2 max.

Established by: Japan Industrial Water Association

- - Connector Requirement : Connector port Rc3/8 female
- - Compatible piping : Joint and pipe should have water pressure resistance of more than 0.9Mpa, and heat resistance of more than 100°C.

Cooling water	Supply pressure (MPa)	0.1 to 0.3
	Inlet-outlet pressure difference (MPa)	0.1
	Flow rate (L/min)	5.0
	Supply temperature	10 to 30 1)

1) Not condensing

2.4 Wiring

2.4.1 Power wiring

Object model: UR90, UR180

: UR600, UR1200, UR1800



WARNING

: Before start work, ensure that all hazardous energies are shut off. Refer to **2.1 For Safety Use**.

Wiring work should be performed by licensed workers.

Use the supplied connectors only. If other connectors are used, the first ground contact may fail, and raise the possibility of electrical shocks.

Pin assignment	
Pin No.	Specification
A	R phase
B	S phase
C	T phase
D	PE/GND

Specifications

Pump model (UR Series commonness)	UR90	UR 180	UR 600	UR 1200	UR 1800
Connector regulation	MIL-DTL-5015				
Receptacle	22-22 / Male				32-17 / Male
Insert array / Contact type	22-22 / Female				32-17 / Female
Compatible plug	22-22 / Female				32-17 / Female
Compatible wire size	Maximum 10AWG/4 Conductors Outside diameter of insulation coating ϕ 4.5mm				Maximum 6AWG/4 Conductors Outside diameter of insulation coating ϕ 7.0mm
Rated current (50/60 Hz)	46A				80 A



CAUTION

- Use wire compatible with your local safety codes (e.g. UL, TUV compatible).

- Wiring work should be performed according to your local wiring codes (rules). To ensure safety from direct contact, cable should be fixed firmly, or cable rack should be provided.

- Wire for the cable according to regulations of NEC Article 400.

2.4.2 Wiring for remote control

Pin assignment				
Pin No.	I/O	Item	Specifications	
1	IN	External interlock	CLOSE: Normal	OPEN: External interlock stop
2				
3	IN	Pump start	CLOSE: Run	OPEN: Stop
4	IN	Remote emergency shutdown	CLOSE: Normal	OPEN: Emergency shutdown
5	IN	Alarm reset	CLOSE: Reset	
6	IN	WATING MODE	CLOSE: Standby run	OPEN: Normal run
7	IN	Seal gas valve	CLOSE: Valve open	OPEN: Valve close
8				
9	OUT	DRP start check	CLOSE: Running	OPEN: At stop
10	OUT	MBP start check	CLOSE: Running	OPEN: At stop
11	OUT	REMOTE/LOCAL status check	CLOSE: Remote	OPEN: Local
12	OUT	Emergency shutdown status check	CLOSE: Normal	OPEN: At emergency stop
13	OUT	WATING MODE check	CLOSE: In standby run	OPEN: In normal run
14	OUT	Ready check	CLOSE: Ready	OPEN: Under preparation
15	OUT	Alarms in a batch	CLOSE: Normal	OPEN: Alarm
16	OUT	Warnings in a batch	CLOSE: Normal	OPEN: Warning
17				
18				
19	OUT	OUT 9 - 16 COM		
20	IN	IN 1 COM		
21				
22	IN	IN 3-7 COM		
23				
24	OUT	Purge gas warning	CLOSE: Normal	OPEN: Warning
25	OUT	Cooling water warning	CLOSE: Normal	OPEN: Warning
26	OUT	DRP temperature warning	CLOSE: Normal	OPEN: Warning
27	OUT	MBP temperature warning ¹⁾	CLOSE: Normal	OPEN: Warning
28	OUT	DRP current value alarm	CLOSE: Normal	OPEN: Alarm
29	OUT	DRP current value warning	CLOSE: Normal	OPEN: Warning
30	OUT	MBP current value alarm	CLOSE: Normal	OPEN: Alarm
31	OUT	MBP current value warning	CLOSE: Normal	OPEN: Warning
32	OUT	Pumping pressure alarm ¹⁾	CLOSE: Normal	OPEN: Alarm
33	OUT	Pumping pressure warning ¹⁾	CLOSE: Normal	OPEN: Warning
34	OUT	System error	CLOSE: Normal	OPEN: Alarm
35				
36				
37	OUT	OUT 24 - 34 COM		

1) Do not use it in the UR series.

2) Do not connect to PIN No. 2, 8, 17, 18, 21, 23, 35, 36.

. Specifications

Pump side connector	D-sub 37pin female
Compatible connector	D-sub 37pin male
Compatible wire size	AWG #22 Use the shielded cable.

- Before start the work, ensure that all hazardous energies are shutoff. Refer to the Section 2.1 For safety Use.
- Wiring work should be performed by licensed worker.
- If the external interlock function is not used (used when an interlock with equipment other than a system in which the pump is installed is activated), connect 1 and 20 by a jumper wire or if the remote emergency stops function (only AC line is shut down) is not used, connect 4 and 22 by a jumper wire. If this wiring is not connected between these pins, the pump will recognize it as an external interlock command or an emergency shutdown command and will not start. (Refer to Fig.1)
- A voltage of 24VDC is applied to the input system on the pump side. Prepare a no-voltage contact.

The pump side of the output is a no-voltage contact. Use the pump within the following specified range.

Operable voltage : Less than 24 VDC, contact capacity : 50mA (per one contact)

OUT-COM is commonly using the N-COM; hence connect the same power of 0Vdc. If positive electric potential is put, the contact point will be open and may result a failure. (Refer to Fig.2)

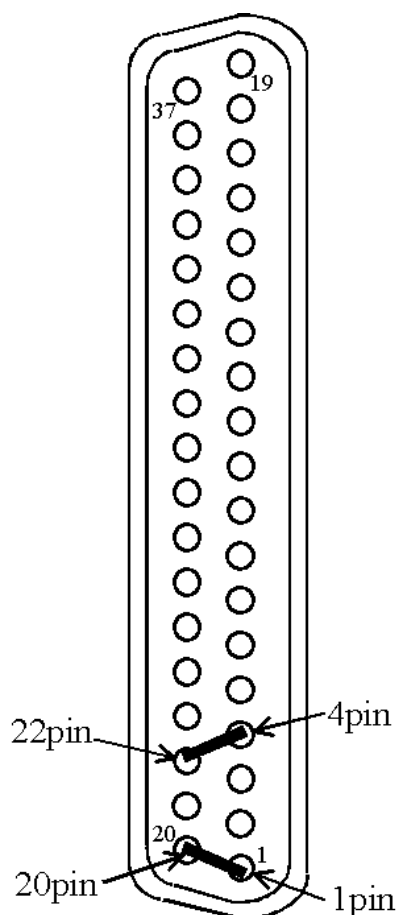


Fig.1 Example of short-circuit line.

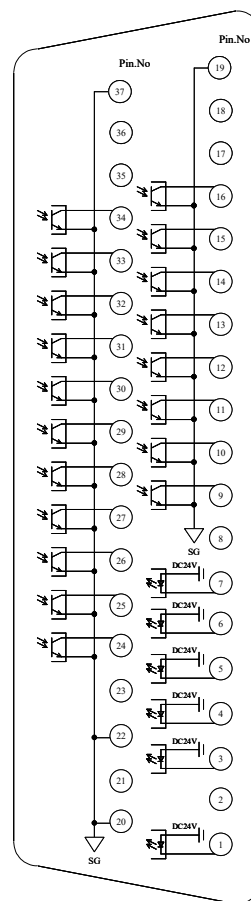


Fig.2 Circuit in base

- When the current between a signal pin and GND terminal flows more than 0.1mA, It may cause the circuit the malfunction. Ensure that it flows equal or less than 0.1mA.

Pin No.7 Seal gas valve (SEAL GAS VALVE)

Only the seal gas valve can be opened/closed in the run mode 1 (mode in which nitrogen gas is not used). When a large amount of water content is pumped for a specific time in a CRYO pump regenerating process, give a command that feeds seal gas from this terminal only in the process time zone to suppress rusting due to water content permeating to the bearing.

Pin No.9, 10 DRP start check , MBP start check

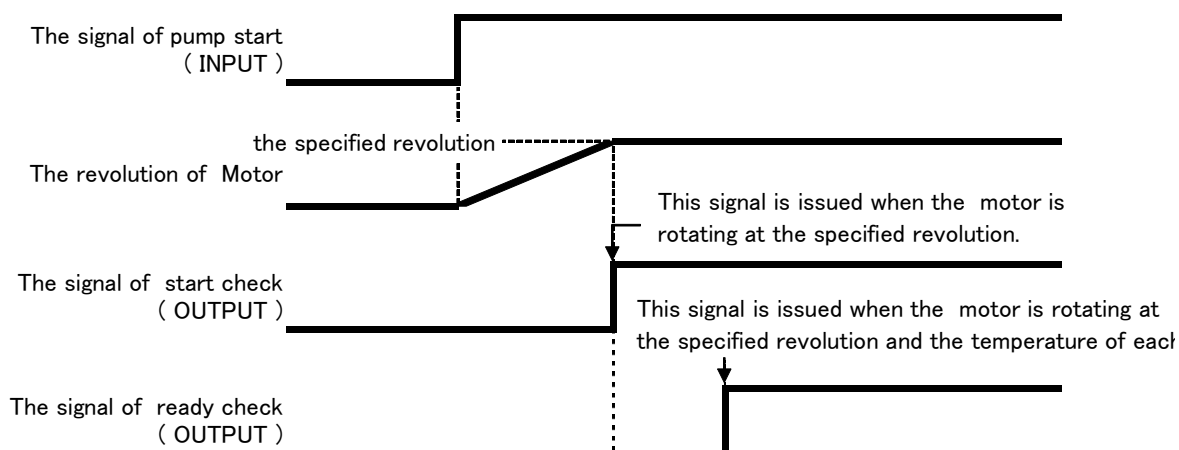
No.9 and No.10 is terminal that gives notice that each pump is ready for pumping. Can change the timing that sends this signal.

Pin No.14 Ready status check (READY)

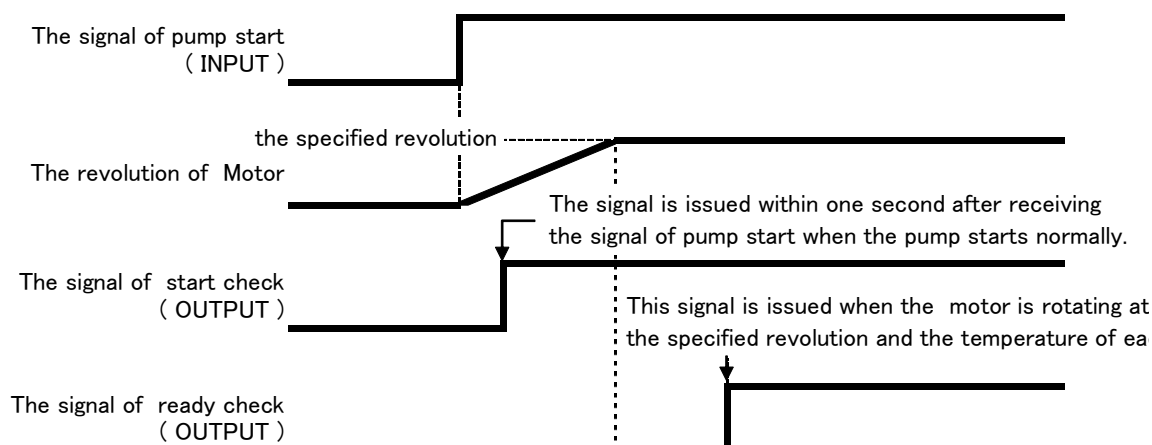
Terminal that gives notice that the pump is ready for pumping. This signal is issued by confirming that the pump is rotating at the specified revolution and that the temperature of each part being measured reaches the preset temperature.

For the run mode, refer to "3.3 How to Confirm Pump Run Status". If the pump is used to pump only air or inert gas, seal gas is not always necessary, but it is to be noted that air contains moisture that induces corrosion. ULVAC recommends use of seal gas. (Mode is set to run mode 3 as standard.)

Case 1. 『SET-UP 1』⇒『start up mode』⇒『1』

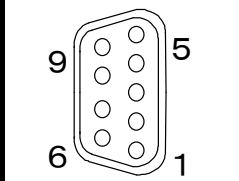


Case 2. 『SET-UP 1』⇒『start up mode』⇒『2』



2.4.3 Communication

Used when operating the pump using a personal computer or checking the operation history. Contact your local ULVAC service center for the communication functions.

	Pin assignment		Communication specifications		
	No.	Item	Signal format	RS-232C/RS485	
	1	FG (Frame GND)	Baud rate	9600 bps	
	2	RS-232C RxD	Bit Configuration	Start	1 bit
	3	RS-232C TxD		Data	8 bits
	4	RS-485 B(-)		Parity	EVN
	5	GND		Stop	1 bit
	6	RS-485 A(+)	Data Configuration		BCD code
	7			Terminator	CR code
	8	RS-485 Terminator			
	9	RS-485 Terminator			

Specifications

Pump side connector	D-sub 9pin female
Compatible connector	D-sub 9pin male
Compatible wire size	AWG #22

List of communication commands : Please refer to attached material in the end of a book for the communication command and the connection of the communication connector.(c. Supplementation of the communication system).

Command	I/O	Contents	Supplement
A0	out	System status read-out	Microcomputer status
A1	in	Stop command	
A2	in	Start command	
A3	out	Status read-out	Pump status (normal or abnormal)
A5	Out	Valve status read-out	Seal gas valve. Gas ballast gas valve. Option valve.
A8	In	Remote/local selection	
A9	In	Alarm reset	
B1	OUT	Display read-out at start	Pump status by item
B2	OUT	Alarm log read-out	Alarm log up to 30 cases in the past ¹⁾
B3	OUT	Warning read-out	
B4	OUT	Alarm read-out	
B8	OUT	Run log read-out	Run status at every 30 seconds for the past one week
B9	OUT	Current status read-out	Loads current run status in a batch
C5	IN	Baud rate setting	
C6	IN	RS485 address setting	
D0	OUT	Model read-out	
D2	OUT	Serial No. Read-out	
D4	OUT	Clock read-out	

1) Run log

It records every minute between 30 minutes after the pump starts. And after the pump stops, run log of one minute is recorded.

Run log is recorded every minute when warning occurs.

When alarm occurs after 30 minutes pass by starting the pump, run log is recorded 16 minutes from 15 minutes before alarm occurs to 1 minute after alarm occurs.



CAUTION

Noting when communicating by RS-485.

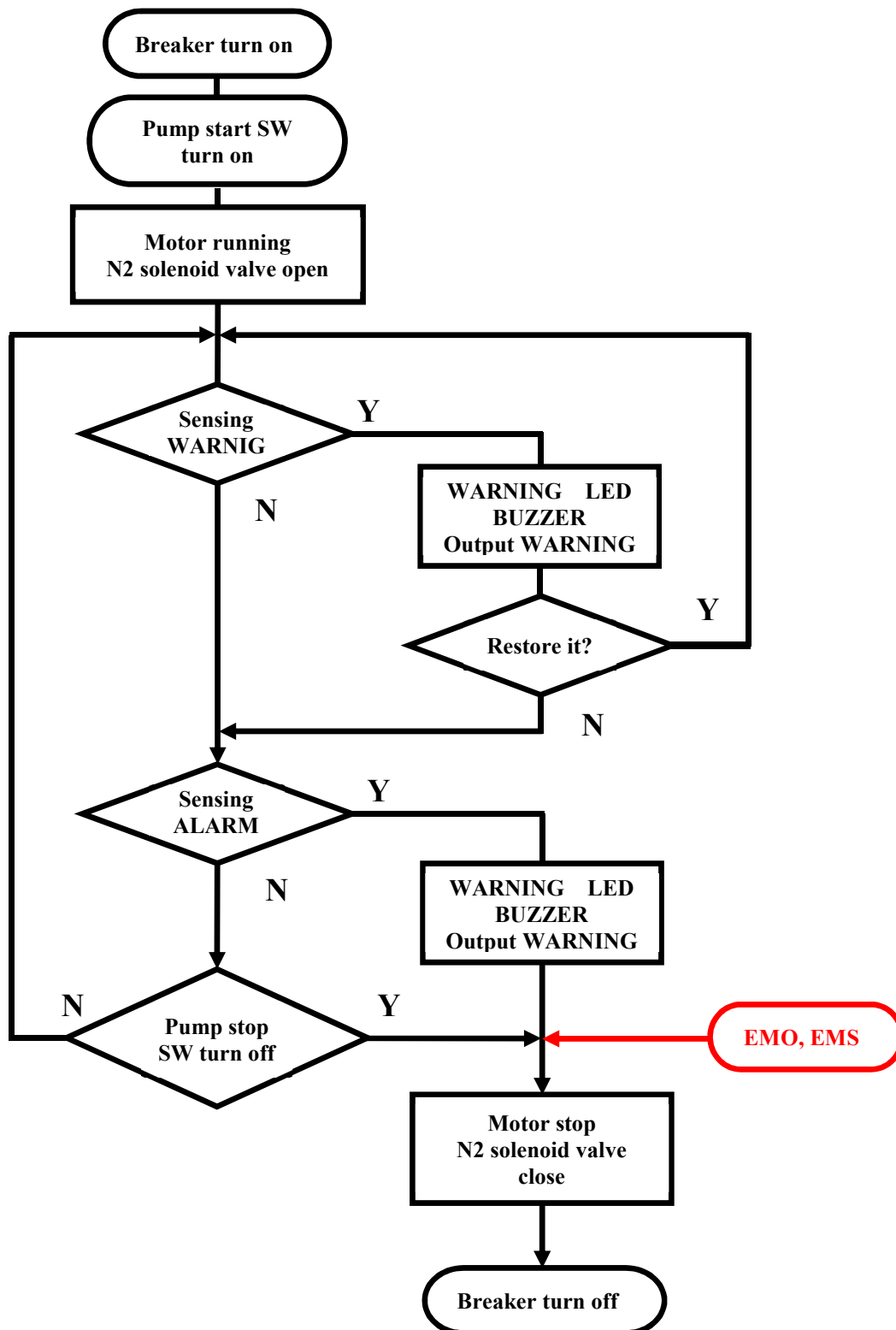
● Please input the 3 digits of “ : n n” before the command when you order the command from the host side.

\therefore n n [Command name] * The command is the same as the RS-232C communication.
colon address command

● The response code from the pump side is the same as the RS-232C communication.

3. Operation Procedure

3.1 Flowchart for operation



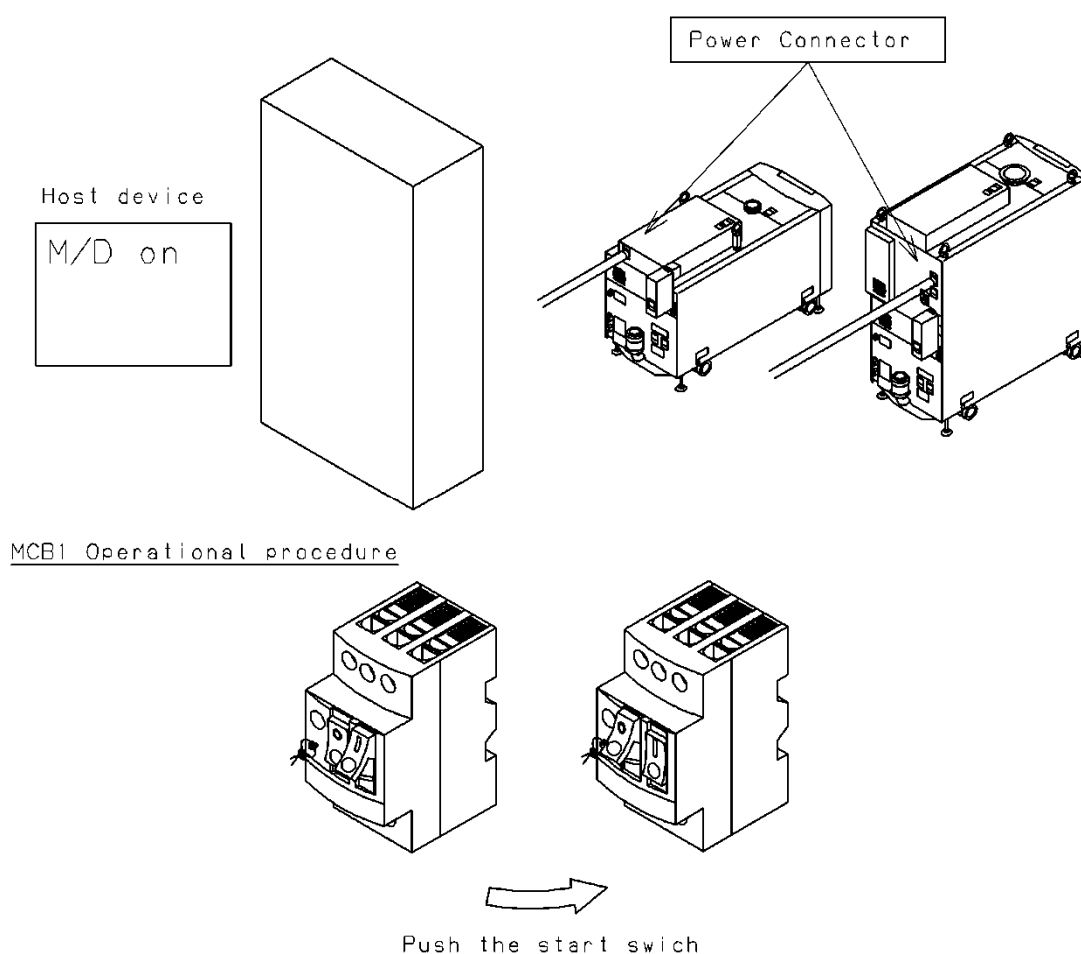
3.2 Prior Operation

1. Ensure that all the piping and wiring works are completed.
2. Open the cooling water valve, and ensure that no water leakage is observed.
3. Turn the nitrogen regulator fully counterclockwise, and open supply valve, and ensure that no nitrogen gas leakage is observed.
4. Turn ON the host equipment breaker (M/D).
5. Turn ON the breaker (MCB1, MCB2 (UR600, UR1200, UR1800)) on the pump.




CAUTION

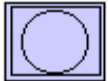

- "Initialize" is displayed for initialization and operation cannot be performed immediately after the breaker is turned ON. Perform the following operation after verifying that "Waiting" appears about 30 seconds later.



3.3 Selecting LOCAL (manual)/REMOTE

<p>(a) Local (manual) operation</p> <p>Mode for manual start and stop of the pump</p> <p>(b) Remote operation</p> <p>Mode for starting and stopping the pump by switch operation on the system.</p> <p>The run mode is selected with the REMOTE/LOCAL switch on the controller.</p>	<p>Switch to use</p> <p>REMOTE /LOCAL</p> 
---	---

3.4 Start and Stop

LOCAL operation		
Run	1. [CONDITION /STAND-BY] or status is displayed on the controller display.	<p>Switch to use</p> <p>START</p> 
	2. Press the [START] switch on the controller.	
	3. The pump starts and the [RUN] lamp on the controller lights.	
	4. [CONDITION / RUNNING] or status is displayed on the controller display.	
Stop	1. Press the [STOP] switch on the controller.	<p>STOP</p> 
	2. The pump stops and the [RUN] lamp on the controller goes off.	
	3. [CONDITION /STAND-BY] or status is displayed on the controller display.	

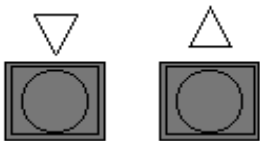
REMOTE operation	
Run	Turn on Pump start signal. The pump starts.
Stop	Turn off Pump start signal. The pump stops.

3.5 Checking the Pump Run Status

This pump is equipped with multiple sensors, allowing the pump status to be checked on LCD.

<Operation>

(example)

Operation	Controller display
1. Turn ON the breaker.	CONDITION / STAND-BY
2. Start the pump.	CONDITION / Running
3. Display an item to check using [▽] or [△] switch. 	N2 Purge Flow 4.3 SLM ↓ Water Flow 3.0 L/min ↓ DRP Pump TEMP 55°C

If an item selected last is left as it is for one minute or more, the subsequent display during pump start will be that item.

List of monitor items (standard specification)

Display item	Display content	Unit of display
CONDITION	Displays the pump run status.	-
N2 Purge Gas	Displays the N ₂ purge gas (seal, ballast) flow rate.	SLM
WATER FLOW	Displays cooling water flow rate.	L/min
EX. PRESS.	Displays the pressure of exhaust pipe.	M Pa
MBP revolution	Displays the booster pump run frequency	rpm
DRP CURRENT	Displays the motor input current of primary pump.	A
MBP CURRENT	Displays the motor input current of booster pump.	A
DRP PUMP TEMP	Displays primary pump temperature.	°C
MBP PUMP TEMP	Displays booster pump temperature.	°C
EX. PIPE TEMP	Displays exhaust pipe temperature.	°C
MODE	Displays the pump run mode.	-
OPTION VALVE	Displays the state of the option valve.	-
Auto Purge Time	Displays the setting time of the auto purge-function.	Sec
CONTACT	Displays the setting-output of the contact function. (A or B contact)	-
Running Time	Displays integrated pump run hours.	Hr
Time	Displays the current time and date.	yy/mm/dd /time
LANGUAGE	Displays the selected language.(Japanese or English)	-

3.6 Set item change.

- There are two kinds of set items when you change the set item with the pump of UR sires.
- 『SET-UP 1』 is not protected by the password, and set value can be changed according to the specification.
- 『SET-UP 2』 is protected by the password, and set value can not be changed because it is related to the performance of the pump.

Method of changing set value.

- ① A set item of the table below is managed by 『SET-UP 1』. 『SET-UP 1』 is displayed in LCD by pressing [MODE]. 『SET-UP 1』 can be selected by pressing [ENTER].
- ② The change item is displayed in LCD by pressing [Δ],[▽]. The change item can be selected by pressing [ENTER].
- ③ A set value is changed pressing [Δ],[▽].The change of a set value ends when fixing it pressing [ENTER].
- ④ Display the Pump Run Status in LCD by pressing [MODE] when the change of a set value ends.

Set item managed by 『SET-UP 1』	
1	『CONTACT』
2	『Time』
3	『LANGUAGE』
4	『RS BAUD』
5	『RS485 ADDRESS』
6	『START CHECK』





CAUTION

Set item managed by 『SET-UP 2』 is protected by the password. The customer cannot change the setting. When you want to change these set values after purchase the product, please contact with your local service center.

Set item managed by 『SET-UP 2』			
1	『N2 Purge Gas』	13	『MBP CURRENT ALM』
2	『OP N2 Purge Gas』	14	『BOX option 1』
3	『WATER FLOW』	15	『BOX option 2』
4	『EX.PRESS. WARN』	16	『DRP PUMP TEMP.』
5	『EX.PRESS. ALM』	17	『MBP PUMP TEMP.』
6	『DRP revolution』	18	『EX.PIPE TEMP.』
7	『MBP revolution』	19	『OPTION TEMP.』
8	『option 1』	20	『BOX OP. SWITCH』
9	『option 2』	21	『MODE』
10	『DRP CURRENT WARN』	22	『OPTION VALVE』
11	『DRP CURRENT ALM』	23	『Auto Purge Time』
12	『MBP CURRENT WARN』	24	『Running Time』

Run Mode

The pump can be run in the following modes.

Mode 1	Both seal gas and gas ballast gas are not used.
Mode 2	Seal gas is used, but gas ballast gas is not used. (The solenoid valve opens when the pump starts.)
Mode 3	Both seal gas and gas ballast gas are used. (The solenoid valve opens when the pump starts.)
Mode M	Manually controls the seal gas valve and gas ballast gas valve.
In the Mode M, the seal gas valve and gas ballast valve can be controlled as follows.	
The gas ballast gas valve (SV2) can be opened/closed by pressing [▽] and [BZ.MUTE] switches on the controller simultaneously.	
The seal gas valve (SV1) can be opened/closed by pressing [△] and [BZ.MUTE] switches on the controller simultaneously.	

About optional specifications

- * The personal computer used for this pump permits control of multiple functions to cope with a variety of applications. Items displayed differ depending on the additional functions. Refer to the list of set items for individual functions.

3.7 List of set items



CAUTION

: **WARNING** indicates that the pump is approaching the limit of operation. But at this moment, the pump is still running. "ALARM" tells that the pump has exceeded the limit of operation and, simultaneously with it, the pump will stop automatically.

Pump temperature and motor power settings differ from model to model.

	Name	Alarm set value	Higher/lower limit alarm	Warning time	Alarm time	Monitor range
1	N2 purge gas	0.5 SLM	Lower limit alarm	5 sec fixed	180 sec	5 sec after run to run stop
2	OP_N2 purge gas	0.0 SLM	Lower limit alarm	5 sec fixed	0 sec	5 sec after run to run stop
3	Cooling water	4.0 L/min	Lower limit alarm	5 sec fixed	180 sec	5 sec after run to run stop
4	Pumping pressure WARNING	0.120 MPa	Higher limit alarm fixed	10 sec		5 sec after run to run stop
5	Pumping pressure ALARM	0.130 MPa	Higher limit alarm fixed		2 sec	5 sec after run to run stop
6	DRP_INV frequency	Intermediate revolution 2999 rpm, rated revolution 3000 rpm				
7	MBP_INV frequency	Intermediate revolution 0000 rpm, rated revolution 0000 rpm				
8	Analog input spare 1 (10V)	0 V	Lower limit alarm	5 sec fixed	0 sec	5 sec after run to run stop
9	Analog input spare 2 (10 V)	0 V	Lower limit alarm	5 sec fixed	0 sec	5 sec after run to run stop
10	DRP current WARNING	13.6A	Higher alarm fixed	10 sec		15 min after run to run stop
11	DRP current ALARM	15.6A	Higher limit alarm fixed		10 sec	3 min after run to run stop
12	MBP current WARNING	0.0 A	Higher limit alarm fixed	10 sec		5 sec after run to run stop
13	MBP current ALARM	0.0 A	Higher limit alarm fixed		10 sec	5 sec after run to run stop
14	BOX analog input spare 1 (10 V)	0 V	Lower limit alarm	5 sec fixed	0 sec	5 sec after run to run stop
15	BOX analog input spare 2 (10 V)	0 V	Lower limit alarm	5 sec fixed	0 sec	5 sec after run to run stop
16	DRP temperature	Higher limit 130°C Ready 90°C Heater control 0°C		5 sec fixed	180 sec	5 sec after run to run stop
17	MBP temperature	Higher limit 0°C Ready 0°C Heater control 0°C		5 sec fixed	0 sec	5 sec after run to run stop
18	Exhaust pipe temperature	Higher limit 120°C Ready 0°C Heater control 100°C		5 sec fixed	180 sec	5 sec after run to run stop
19	Option temperature	Higher limit 136°C Ready 0°C Heater control 120°C		5 sec fixed	180 sec	5 sec after run to run stop
20	Spare switch on box	B contact open alarm fixed		5 sec fixed	0 sec	5 sec after run to run stop
21	Run mode	3				
22	Optional valve	None				
23	Auto purge time	600 sec				
24	A/B contact	B contact				
25	English/Japanese	English				
26	Baud rate setting	9600 bps				
27	RS485 address setting	00				
28	Start check	1				

MODEL No.21 UR180

	Name	Alarm set value	Higher/lower limit alarm	Warning time	Alarm time	Monitor range
1	N2 purge gas	5 SLM	Lower limit alarm	5 sec fixed	180 sec	5 sec after run to run stop
2	OP_N2 purge gas	0.0 SLM	Lower limit alarm	5 sec fixed	0 sec	5 sec after run to run stop
3	Cooling water	4.0 L/min	Lower limit alarm	5 sec fixed	180 sec	5 sec after run to run stop
4	Pumping pressure WARNING	0.120 MPa	Higher limit alarm fixed	10 sec		5 sec after run to run stop
5	Pumping pressure ALARM	0.130 MPa	Higher limit alarm fixed		2 sec	5 sec after run to run stop
6	DRP_INV frequency	Intermediate revolution 2999 rpm, rated revolution 3000 rpm				
7	MBP_INV frequency	Intermediate revolution 0000 rpm, rated revolution 0000 rpm				
8	Analog input spare 1 (10V)	0 V	Lower limit alarm	5 sec fixed	0 sec	5 sec after run to run stop
9	Analog input spare 2 (10 V)	0 V	Lower limit alarm	5 sec fixed	0 sec	5 sec after run to run stop
10	DRP current WARNING	21.0A	Higher alarm fixed	10 sec		15 min after run to run stop
11	DRP current ALARM	22.0A	Higher limit alarm fixed		10 sec	3 min after run to run stop
12	MBP current WARNING	0.0 A	Higher limit alarm fixed	10 sec		5 sec after run to run stop
13	MBP current ALARM	0.0 A	Higher limit alarm fixed		10 sec	5 sec after run to run stop
14	BOX analog input spare 1 (10 V)	0 V	Lower limit alarm	5 sec fixed	0 sec	5 sec after run to run stop
15	BOX analog input spare 2 (10 V)	0 V	Lower limit alarm	5 sec fixed	0 sec	5 sec after run to run stop
16	DRP temperature	Higher limit 162°C Ready 120°C Heater control 0°C		5 sec fixed	180 sec	5 sec after run to run stop
17	MBP temperature	Higher limit 0°C Ready 0°C Heater control 0°C		5 sec fixed	0 sec	5 sec after run to run stop
18	Exhaust pipe temperature	Higher limit 150°C Ready 0°C Heater control 130°C		5 sec fixed	180 sec	5 sec after run to run stop
19	Option temperature	Higher limit 145°C Ready 0°C Heater control 115°C		5 sec fixed	180 sec	5 sec after run to run stop
20	Spare switch on box	B contact open alarm fixed		5 sec fixed	0 sec	5 sec after run to run stop
21	Run mode	3				
22	Optional valve	None				
23	Auto purge time	0 sec				
24	A/B contact	B contact				
25	English/Japanese	English				
26	Baud rate setting	9600 bps				
27	RS485 address setting	00				
28	Start check	1				

Model No. 30 UR600

	Name	Alarm set value	Higher/lower limit alarm	Warning time	Alarm time	Monitor range
1	N2 purge gas	0.5 SLM	Lower limit alarm	5 sec fixed	180 sec	5 sec after run to run stop
2	OP_N2 purge gas	0.0 SLM	Lower limit alarm	5 sec fixed	0 sec	5 sec after run to run stop
3	Cooling water	4.0 L/min	Lower limit alarm	5 sec fixed	180 sec	5 sec after run to run stop
4	Pumping pressure WARNING	0.120 MPa	Higher limit alarm fixed	10 sec		5 sec after run to run stop
5	Pumping pressure ALARM	0.130 MPa	Higher limit alarm fixed		2 sec	5 sec after run to run stop
6	DRP_INV frequency	Intermediate revolution 2999 rpm, rated revolution 3000 rpm				
7	MBP_INV frequency	Intermediate revolution 3599 rpm, rated revolution 3600 rpm				
8	Analog input spare 1 (10V)	0 V	Lower limit alarm	5 sec fixed	0 sec	5 sec after run to run stop
9	Analog input spare 2 (10 V)	0 V	Lower limit alarm	5 sec fixed	0 sec	5 sec after run to run stop
10	DRP current WARNING	13.6A	Higher limit alarm fixed	10 sec		15 min after run to run stop
11	DRP current ALARM	15.6A	Higher limit alarm fixed		10 sec	3 min after run to run stop
12	MBP current WARNING	9.0 A	Higher limit alarm fixed	10 sec		5 sec after run to run stop
13	MBP current alarm	10.0 A	Higher limit alarm fixed		10 sec	5 sec after run to run stop
14	BOX analog input spare 1 (10 V)	0 V	Lower limit alarm	5 sec fixed	0 sec	5 sec after run to run stop
15	BOX analog input spare 2 (10 V)	0 V	Lower limit alarm	5 sec fixed	0 sec	5 sec after run to run stop
16	DRP temperature	Higher limit 130°C Ready 90°C Heater control 0°C		5 sec fixed	180 sec	5 sec after run to run stop
17	MBP temperature	Higher limit 140°C Ready 85°C Heater control 90°C		5 sec fixed	180 sec	5 sec after run to run stop
18	Exhaust pipe temperature	Higher limit 120°C Ready 0°C Heater control 100°C		5 sec fixed	180 sec	5 sec after run to run stop
19	Option temperature	Higher limit 136°C Ready 0°C Heater control 126°C		5 sec fixed	180 sec	5 sec after run to run stop
20	Spare switch on box	B contact open alarm fixed		5 sec fixed	0 sec	5 sec after run to run stop
21	Run mode	3				
22	Optional valve	None				
23	Auto purge time	600 sec				
24	A/B contact	B contact				
25	English/Japanese	English				
26	Baud rate setting	9600 bps				
27	RS485 address setting	00				
28	Start check	1				

Model No. 23 UR1200

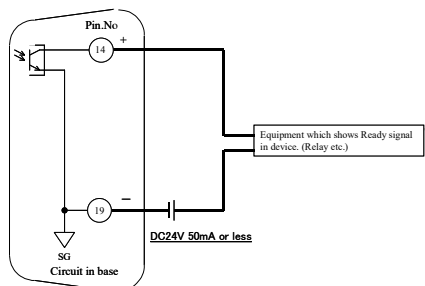
	Name	Alarm set value	Higher/lower limit alarm	Warning time	Alarm time	Monitor range
1	N2 purge gas	0.5 SLM	Lower limit alarm	5 sec fixed	180 sec	5 sec after run to run stop
2	OP_N2 purge gas	0.0 SLM	Lower limit alarm	5 sec fixed	0 sec	5 sec after run to run stop
3	Cooling water	4.0 L/min	Lower limit alarm	5 sec fixed	180 sec	5 sec after run to run stop
4	Pumping pressure WARNING	0.120 MPa	Higher limit alarm fixed	10 sec		5 sec after run to run stop
5	Pumping pressure ALARM	0.130 MPa	Higher limit alarm fixed		2 sec	5 sec after run to run stop
6	DRP_INV frequency	Intermediate revolution 2999 rpm, rated revolution 3000 rpm				
7	MBP_INV frequency	Intermediate revolution 3599 rpm, rated revolution 3600 rpm				
8	Analog input spare 1 (10V)	0 V	Lower limit alarm	5 sec fixed	0 sec	5 sec after run to run stop
9	Analog input spare 2 (10 V)	0 V	Lower limit alarm	5 sec fixed	0 sec	5 sec after run to run stop
10	DRP current WARNING	13.6A	Higher alarm fixed	10 sec		15 min after run to run stop
11	DRP current ALARM	15.6A	Higher limit alarm fixed		10 sec	3 min after run to run stop
12	MBP current WARNING	13.6 A	Higher limit alarm fixed	10 sec		5 sec after run to run stop
13	MBP current alarm	15.6 A	Higher limit alarm fixed		10 sec	5 sec after run to run stop
14	BOX analog input spare 1 (10 V)	0 V	Lower limit alarm	5 sec fixed	0 sec	5 sec after run to run stop
15	BOX analog input spare 2 (10 V)	0 V	Lower limit alarm	5 sec fixed	0 sec	5 sec after run to run stop
16	DRP temperature	Higher limit 130°C Ready 90°C Heater control 0°C		5 sec fixed	180 sec	5 sec after run to run stop
17	MBP temperature	Higher limit 140°C Ready 85°C Heater control 90°C		5 sec fixed	180 sec	5 sec after run to run stop
18	Exhaust pipe temperature	Higher limit 120°C Ready 0°C Heater control 100°C		5 sec fixed	180 sec	5 sec after run to run stop
19	Option temperature	Higher limit 136°C Ready 0°C Heater control 126°C		5 sec fixed	180 sec	5 sec after run to run stop
20	Spare switch on box	B contact open alarm fixed		5 sec fixed	0 sec	5 sec after run to run stop
21	Run mode	3				
22	Optional valve	None				
23	Auto purge time	600 sec				
24	A/B contact	B contact				
25	English/Japanese	English				
26	Baud rate setting	9600 bps				
27	RS485 address setting	00				
28	Start check	1				

Model No. 24 UR1800

	Name	Alarm set value	Higher/lower limit alarm	Warning time	Alarm time	Monitor range
1	N2 purge gas	5 SLM	Lower limit alarm	5 sec fixed	180 sec	5 sec after run to run stop
2	OP_N2 purge gas	0.0 SLM	Lower limit alarm	5 sec fixed	0 sec	5 sec after run to run stop
3	Cooling water	4.0 L/min	Lower limit alarm	5 sec fixed	180 sec	5 sec after run to run stop
4	Pumping pressure WARNING	0.120 MPa	Higher limit alarm fixed	10 sec		5 sec after run to run stop
5	Pumping pressure ALARM	0.130 MPa	Higher limit alarm fixed		2 sec	5 sec after run to run stop
6	DRP_INV frequency	Intermediate revolution 2999 rpm, rated revolution 3000 rpm				
7	MBP_INV frequency	Intermediate revolution 3599 rpm, rated revolution 3600 rpm				
8	Analog input spare 1 (10V)	0 V	Lower limit alarm	5 sec fixed	0 sec	5 sec after run to run stop
9	Analog input spare 2 (10 V)	0 V	Lower limit alarm	5 sec fixed	0 sec	5 sec after run to run stop
10	DRP current WARNING	21.0A	Higher alarm fixed	10 sec		15 min after run to run stop
11	DRP current ALARM	22.0A	Higher limit alarm fixed		10 sec	3 min after run to run stop
12	MBP current WARNING	21.0A	Higher limit alarm fixed	10 sec		5 sec after run to run stop
13	MBP current ALARM	22.0A	Higher limit alarm fixed		10 sec	5 sec after run to run stop
14	BOX analog input spare 1 (10 V)	0 V	Lower limit alarm	5 sec fixed	0 sec	5 sec after run to run stop
15	BOX analog input spare 2 (10 V)	0 V	Lower limit alarm	5 sec fixed	0 sec	5 sec after run to run stop
16	DRP temperature	Higher limit 162°C Ready 120°C Heater control 0°C		5 sec fixed	180 sec	5 sec after run to run stop
17	MBP temperature	Higher limit 140°C Ready 85°C Heater control 90°C		5 sec fixed	180 sec	5 sec after run to run stop
18	Exhaust pipe temperature	Higher limit 150°C Ready 0°C Heater control 130°C		5 sec fixed	180 sec	5 sec after run to run stop
19	Option temperature	Higher limit 145°C Ready 0°C Heater control 115°C		5 sec fixed	180 sec	5 sec after run to run stop
20	Spare switch on box	B contact open alarm fixed		5 sec fixed	0 sec	5 sec after run to run stop
21	Run mode	3				
22	Optional valve	None				
23	Auto purge time	0 sec				
24	A/B contact	B contact				
25	English/Japanese	English				
26	Baud rate setting	9600 bps				
27	RS485 address setting	00				
28	Start check	1				

Explanation of Set Items

- (1) The list above shows the default values of standard settings.
- (2) This pump gives the following two types of WARNING and ALARM signal.
 - (a) When the number of set value is one and the pump is to be stopped at a certain time
 The pump displays "N₂ Purge Gas" if DRP N₂ purges gas becomes lower than the WARNING set value of 0.5L/min and this condition continues for more than the WARNING set time of 5.0 sec. If the purge gas flow rate is not corrected and the ALARM set time has passed 180 seconds, ALARM will be given and the pump will stop automatically. The same applies to "N₂ FLOW OPTION", "WATER FLOW" and "DRP PUMP TEMP".
 Also set items include flow rate set value and set time.
 - (b) When values can be set individually to WARNING and ALARM
 The pump gives "DRP CURRENT" WARNING if the motor power has exceeded the WARNING set value of 13.5A (HR90) and this condition continues for more than WARNING set time of 10 sec. If the ALARM set value of 15.5A (HR90) is exceeded for the ALARM set time of 10 seconds, ALARM will be given and the pump will stop automatically. Set items include four: WARNING set value and set time and ALARM set value and set time.
- (3) If the alarm set value is 0, the item will not be monitored.
- (4) In the item of temperature, the initial set value (H) is the alarm set value. The next set value (R) is the READY signal set value when temperature rise is completed. The third set value is used when controlling the heater using this input. Temperature is controlled within the range of set temperature $\pm 3^{\circ}\text{C}$.
- (5) Auto purge delays the time of closing the N₂ purge gas valve when stopping the pump. Enter delay time.
- (6) Set the baud rate according to the equipment connected when RS485/232C is used. The baud rate is 9600bps as standard, but it can be changed to 2400bps or 4800bps if required.
- (7) The address is the No. of the branch-wired pump when RS485/232C is used. Up to maximum 16 can be branched.
- (8) Start check sets a timing to issue the signal of start check. In the case of 1, the signal of start check is issued by confirming that the pump is rotating at the specified revolution. In the case of 2, the signal of start check is issued one second later when start switch of the controller is pushed. In addition, when intermediate revolution and rated revolution are same (DRP_INV frequency / MBP_INV frequency), the signal of start check is issued one second later when start switch of the controller is pushed regardless of start check = 1 or 2.



Example of using Ready signal.

- When the temperature of the pump is low, and the process is done, the process gas is cooled in the pump.
- Driving the pump because a sublime material adheres in the pump according to the kind of the gas might become impossible. Please confirm Ready signal of the temperature of the pump to avoid such trouble.
- Ready signal is Pin.14 of (2.4.2 Wiring for remote control)
- If the temperature of the pump rises up to the preset temperature, Pin.No14 and No19 close.
- The temperature of Ready signal of each model of has been decided. However, the object model becomes only UR series.

3.8 Preliminary Operation (Setting of Utilities)

Setting of secondary utilities (pump side) should be done after starting the pump.



CAUTION

- The maximum exhaust pressure is 0.10 MPa (absolute pressure). In excess of this, the seal members may be damaged or overheated, resulting in trouble. Installation of a pressure gauge that can monitor the exhaust pressure is recommended.
- Always use the pump with the check valve installed. Otherwise, exhaust-side gas may back-stream abruptly when the pump is stopped and may damage the drive control system of the pump.
- Before starting the pump, check the primary utility setting. Until all the utility setting is fulfilled, the pump cannot start because the safety circuit activates.
- If valve is fixed at the downstream of the outlet port, then check the valve is opened.

Start the pump

3.8.1 Setting of Nitrogen Gas Pressure

Open the valve on the supply side to apply nitrogen gas pressure.

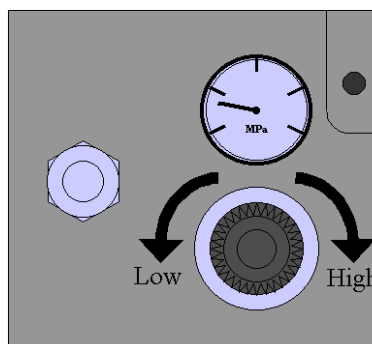
The regulator is factory locked. Pull the knob until it clicks to unlock it and regulate the pressure on the pump side to 0.05 to 0.12 MPa (gauge pressure).



CAUTION

If pressure is increased to above 0.9 MPa, the solenoid valve in the pump will be disabled. Regulate the flow rate after the pump has started. Refer to 『1.2 Specifications for utilities』 for the flow rate and pressure setting conditions.

Nitrogen gas pressure varies with consumption. Re-regulate the secondary pressure to the specified value of 0.05 – 0.12MPa after regulate it for consumption.



3.8.2 Setting the seal gas flow rate

The seal gas flow rate is controlled by a fixed orifice. Gas flows at a rate of 5.0 SLM within the range of 0.05 to 0.1 MPa. Regulation is not required.

3.8.3 Setting the gas ballast gas flow rate (in mode 3)

After the pump has started, set the gas ballast gas flow rate according to the process.

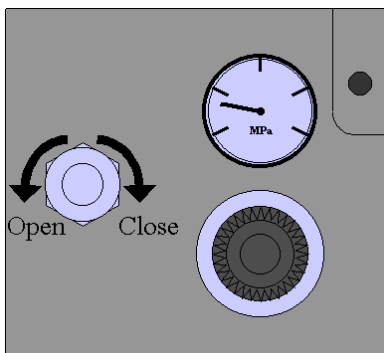


CAUTION

- If gas ballast gas is fed, the ultimate pressure will be higher (about 10 Pa at 45 SLM).

Please pour the gas ballast of 80SLM or more always for UR180 and UR1800.

For the adjustment, use the gas ballast gas-regulating valve on the front panel.



3.8.4 Setting the cooling water flow rate



CAUTION

- If the pump is operated for a long time with insufficient cooling water, the pump may fail. Always feed cooling water at the prescribed flow rate.

- Regulate the cooling water flow rate to 5.0 L/min or more using the primary pressure or cooling water flow rate control valve in the system.

3.9 Operation

Please contact with your nearest service center in order to avoid occurring an alarm or a failure, if the pump can be used under following conditions.



CAUTION

- Don't use the pump under a continuous heavy load (e.g. a slow pumping) for a long time in a tact operation. In this case, the pump may be broken down due to a heavy load. The pump was designed in order to evacuate a closed vacuum chamber without a leak.

- Don't use the pump under a continuous heavy load for more than one minute at a start-up. If the pump cannot reach the stationary rotational frequency within one minute at a start-up, the pump will be stopped due to working a protection circuit of an inverter. An alarm of "MBP Power E alarm" is displayed in the controller, and the pump will be stopped.

3.10 Stop

Stop the pump.

**WARNING**

- The pump is very hot during operation and for some time after it stops. Contact with it may cause burn. Feed cooling water for about one hour after the pump is shut down. Never remove the external panel until the pump cools down.
- Contact with electric parts, wiring or others in the panel may cause electric shock. Never run the pump with the external panel removed.
- Suction and the exhaust pipe are 70°C or more. Remove the protection cover after about one hour after the pump is shut down.

3.11 Self-Diagnostic Function

The operating state is always monitored for the monitor items mentioned earlier.
When abnormality occurs

Operation	Controller display
0. Normal Operation	CONDITION/Running
1. If pump operation is continued without meeting the requirements, WARNING will be given on LCD and as remote signal.	Pump temperature High – WARNING
2. If the condition in (1) continues for a certain length of time or if the operation limit value is reached, ALARM will be given on LCD and as remote signal. Pump automatically stops.	Pump temperature High – ALARM

The WARNING LED on the controller will light and the buzzer will sound if any trouble occurs. (The pump is running in this state.)

If the pump is stopped when the WARNING signal is given, the signal will be held even after stop.

When the pump stops automatically, the ALARM signal will be held even after the stop.

To reset these signals, press the RESET switch after the pump has stopped.

ALARM signal will not be given when the pump is at stop.

If two or more troubles occur during operation, * will be displayed at extreme end of the item. In this case, other items can be checked by pressing [Δ] or [▽] key.

The absolute value of the item for which alarm is given can be checked by pressing the [MODE] key when the item is displayed on the alarm display screen.

3.12 Logging Function

- Records the time items of ALARMS and WARNINGS were given up to maximum 100 events.
- When the [MODE] switch is pressed, **SITUATION RECORD DATA** is displayed.
- Pressing the [▽] or [Δ] switch displays the items in occurrence order.
- Can be checked during run.

Display example	Cooling water low<ALM>0101071435
Display content	Stopped due to low cooling water flow rate at 2:35 pm on January 7, 2001.

4. Inspection And Maintenance

4.1 Inspection

- Periodically check (it is recommended to check once a day) the controller or the remote operation output to see if any alarming signal is output.

Also check the log data to see if any alarming data is reported.

If alarming signal is displayed, take steps according to the **TROUBLE SHOOTING**.

- When the pump is contaminated, wipe out it with a dry rag.

4.2 Maintenance

- These UR products are maintenance free except when to connect with the host equipment, or disconnect from it, and to regulate N₂ gas flow at the time of operation. Overhaul or repair work is performed at ULVAC. When any trouble occurs, please contact with your local ULVAC service center (please refer to the ULVAC address list at the end of this manual).

< Maintenance period >

It is recommended to overhaul the pump once a year.

The bearing on the vacuum side uses grease for lubrication. Replace the bearing once a year, as rule, though the frequency changes with use and application of the pump. It is important to maintain the performance (safety is included) and keep the programmed production. (However, the exchange period is different depending on use conditions)

When overhauling it, parts for which the exchange is necessary.

Part name	Model name	Part name	Model name
Bearing	All models	Power lock	All models
O-ring	All models	Coupling spider	All models
Teflon seal	All models	Bearing of motor	All models
Axis receiving turn stop	All models	Vacuum pump oil	All models
Labyrinth ring	All models		

Parts for which exchange is necessary every two years.

Part name	Model name	Part name	Model name
Pressure sensor	All models	Bearing case	All models

Parts for which exchange is necessary every three years.

Part name	Model name	Part name	Model name
Solid-state relay	All models	Pressure diameter for purge gas	All models
Cooling fan	All models	Inverter	All models
Ball	All models	Seal sleeve	All models
Compression spring	All models		

Parts for which exchange is necessary every five years.

Part name	Model name	Part name	Model name
Breaker	All models	Switching power supply	All models
Magnetic contact	All models	Controller	All models
Cooling water sensor	All models	Exhaust piping heater	All models
Flow sensor for purge gas	All models	Mantle heater	UR 600,1200,1800
Current sensor	All models	Cylinder ¹⁾	All models
Solenoid-controlled valve	All models	Rotor shaft ¹⁾	All models
Thermo-couple	All models	Rubber vibration isolator	All models
Control base	All models		

1)When the size is measured, and the warp is confirmed, they are the exchanges. When overhaul is required, please contact with your local ULVAC service center. All overhaul will be performed at the ULVAC.

< Removal procedure >

Power wiring



WARNING

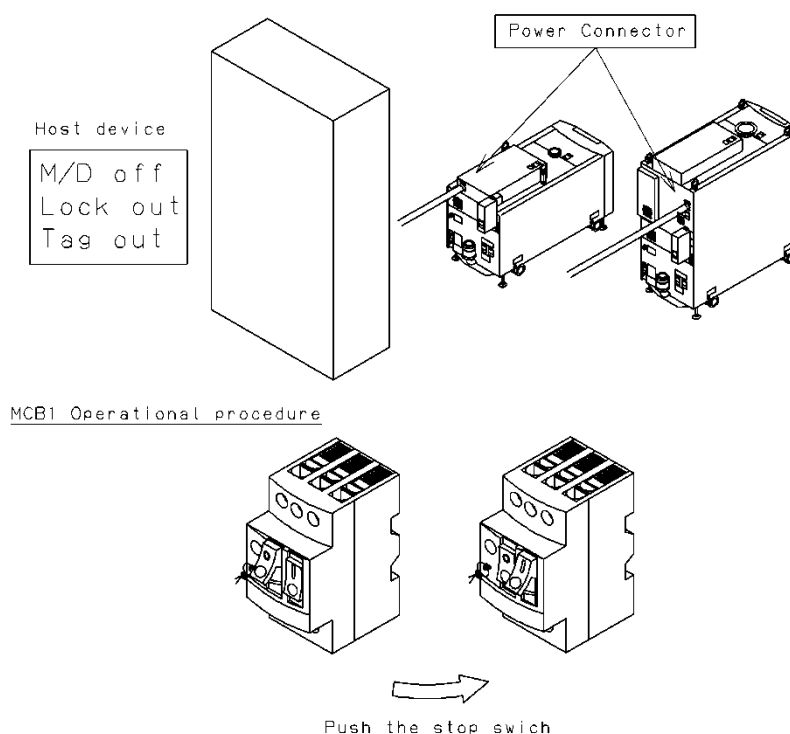
: Shutoff the power securely according to the diagram below before starting installation or removal work.



<< Electric shock is possible >>

You should not operate this system unless you have electrical safety training course record.

1. Shut off the breaker (MCB1, MCB2 (UR600, UR1200, UR1800)) of the pump.
2. Ensure that LCD of the controller (PCTL) is off.
3. Shutoff the breaker (M/D) of the host equipment.
4. Make lockout and tag-out according to the host equipment instruction manual.
5. Through current indication lamp which may be provided in the host equipment, ensure that wire is not alive.
6. Remove power connector.



Cooling water



WARNING

- Because cooling water in the pump boils when the collaboration of cooling water is removed immediately after the stop of the pump and pressure rises the sensor and piping might be damaged. Please supply cooling water until the temperature of the pump falls.
- The pump is very hot during operation and for some time after it stop. Contact with it may cause burn. Feed cooling water for about one hour after the pump shut down.
- Close the cooling water supply valve (HWSV). After the valve is closed, tag **CLOSE** sign on the grip.
- Through visual flow gauge (HWFV: e.g. flow sight) on the host equipment ensure that flow is shutoff.

Remove piping

Please do the following work when you drain cooling water from the pump.

- 1) Compress air is introduced from 『Cooling water outlet』 of the pump.
- 2) Work ends if compress air is exhausted from 『Cooling water inlet』 .



WARNING

When compress air is introduced from 『Cooling water inlet』 ,the cooling water sensor might be damaged by the load of compress air. Therefore, please introduce compress air from 『Cooling water outlet』 .

Nitrogen Gas



WARNING

- Close the nitrogen gas supply valve(HPSV) on the host equipment. After the valve is closed, tag **CLOSE** sign on the grip.
- Gas will still remain in the host equipment piping. Place pressure gauge on the host equipment nitrogen supply source (halfway of the piping to the pump), and ensure that the pressure has already down within atmospheric pressure.

Remove piping.

Suction and exhaust gases



<< High temperature surface >>

Be careful of the high temperature surface near this label (intake and exhaust outlet...).



WARNING

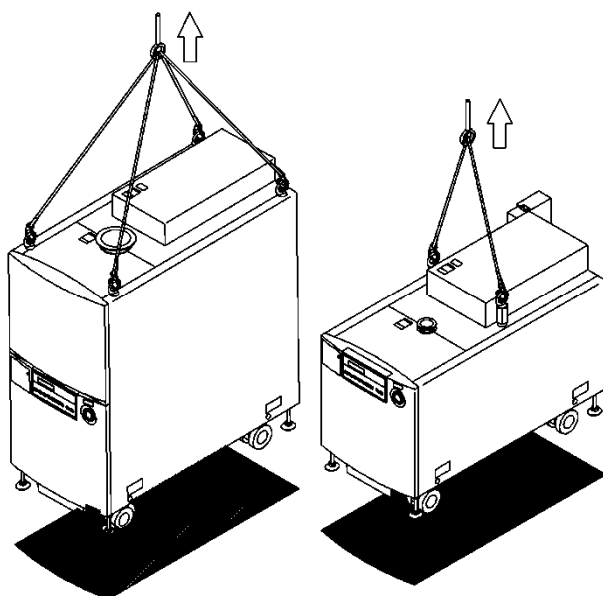
- Remove the piping according to the manual provided for the host equipment.
- Suction and exhaust pipe is very hot for some time after pump stop. Remove the protection cover after about one hour after the pump is shut down.
- Completely close the inlet and outlet ports with using closing flange

Shipping



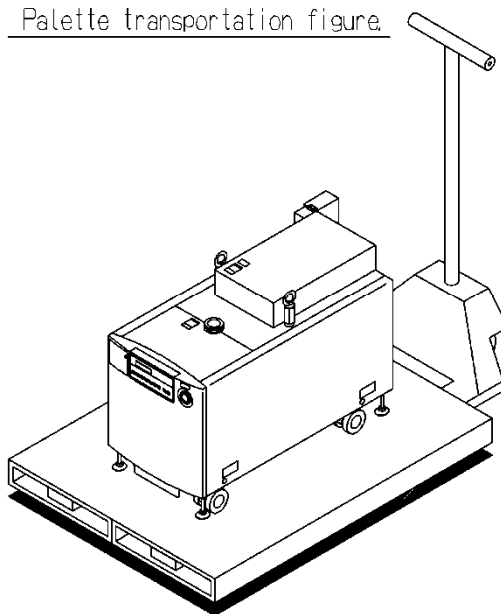
WARNING

: Although this pump is provided with casters, do not move it a long distance using these casters. If you move this pump in such a way, the load to move the pump exceeds the safety criterion. You could hurt your waist.



Crane hanging figure.

Palette transportation figure.



When to transit the pump, you should use loading machines (e.g. moving crane) and hang it, or load and fix the pump on a pallet, then transit it by pallet truck.



CAUTION

: Do not tilt the pump by more than 10° .

Pallet truck should not directly be placed under the pump base bottom. This could topple the pump.

4.3 TROUBLESHOOTING

4.3.1 Major Troubles

Symptom	Cause	Corrective action
Power cannot be applied.	Power is not supplied.	Supply power.
	Incorrect wiring of connector	Correctly make wiring connection. (Refer to 2.6.1 Power wiring)
	Leak in pump	Disassemble and repair pump.
No indication on display	Breaker is not turned on.	Turn on breaker.
	Failure of instrumentation	Replace instrumentation.
Controller can not activates the Pump.	LOCAL mode is not selected.	Press REMOTE/LOCAL switch on controller.
	STOP SWITCH is turned on.	Turn off STOP SWITCH.
	"EMERGENCY STOP" is displayed.	Emergency stop pin of remote operation connector is not shorted. (Refer to 2.6.2 Wiring for remote control)
	"INTERLOCK" is displayed.	External interlock pin of remote operation connector is not shorted.
	Failure of instrumentation	Replace instrumentation.
Pump does not start by remote operation.	REMOTE mode is not selected.	Press REMOTE/LOCAL selector switch on controller.
	Failure of instrumentation	Replace instrumentation.
Unusual sound is heard from pump.	Panel is vibrating	Contact with service center Check by ULVAC personnel
	Exhaust sound	Sound may be high due to resonance in the piping when gas is being fed. Use a pipe with a thicker wall to suppress the sound.
	Failure of the pump	Contact with service center Check by ULVAC personnel
	Backing pressure rise	Check the exhaust piping.
	Leakage at inlet port	Check the piping. Repair the trouble.
Pressure does not lower.	Intake port wire netting is clogged.	Check the piping at the upstream of the PUMP.
	Pump operating temperature is not static.	Measure again one hour later. The ultimate pressure in the "Specifications" is the value directly above the pump.
The temperature does not increase.	Booster pump operating temperature is not static.	Operating for one hour. Turn on the bimetal switch because the bimetal switch has been turned off when the temperature does not increase after of the temperature error.
	Exhaust pipe operating temperature is not static.	Operating for one house. Exchange the mantle heater because the temperature fuse has been cut when the temperature does not increase after of the temperature error.

4.3.2 In Case of Alarm Signal

Display	Symptom	Cause	Corrective action
N ₂ PURGE GAS LOW ALARM	Purge gas flow rate low	Flow rate regulating valve is closed.	Open the flow rate- regulating valve.
		Insufficient difference pressure at inlet/outlet ports	Increase supply pressure from host equipment.
		Insufficient supply of gas	Increase supply of gas.
		Clogged piping	If the trouble is in the pump, contact with service center. Repair by ULVAC
		Leak in joint	
		Failure of instrument	Contact with service center, repair by ULVAC,
WATER FLOW LOW ALARM	Cooling water flow rate low	Flow rate regulating valve is closed.	Open the flow rate- regulating valve.
		Insufficient difference pressure at inlet/outlet ports	Increase supply pressure from host equipment.
		Insufficient supply of gas	Increase supply of gas from host equipment.
		Clogged piping	If the trouble is in the pump, contact with service center. Repair by ULVAC
		Leak in joint	
		Failure of instrument	Contact with service center. Repair by ULVAC
DRP/MBP PUMP TEMP HIGH ALARM	Abnormal increase of pump temperature	Environment temperature is high.	Lower the environment temperature.
		Insufficient cooling water	Open the flow rate- regulating valve.
		Failure of instrument	Contact with service center. Repair by ULVAC
		Increase of backing pressure	Clean and wash the exhaust pipe.
		The inlet pressure is high. (only booster pump units of UR series.)	Usual pressure is operating the range that is from the ultimate pressure to 200Pa.
Exhaust TEMP HIGH ALARM	Abnormal increase of exhaust pipe temperature	Environment temperature is high.	Lower the environment temperature.
		Exhaust pressure is high. (>0.13Mpa)	Clean and wash the exhaust pipe. (Reverse-valve)
DRP/MBP PUMP, Exhaust, Option TEMP E ALARM	Failure of temperature sensor	Disconnection of the sensor wiring, contact of the connector, PC board portion bad connection.	Contact with service center. Repair by ULVAC

Display	Symptom	Cause	Corrective action
DRP/MBP CURRENT HIGH ALARM	Overload of motor	Increase of backing pressure	Clean and wash piping at downstream of pump
		Failure of instrument	Contact with service center. Repair by ULVAC
		Rotation disabled by foreign substance	
		Rotation disabled by low flow rate	
		Rotation disabled by damaged bearing	
DRP CURRENT E ALARM	Cut-off of the electromagnetic switch	Malfunction of the electromagnetic switch	Contact with service center. Repair by ULVAC
		Failure of disconnection and instrumentation products	
MBP CURRENT E ALARM	Inverter alarm activation	Breaker not turned.	Turn on the breaker.
		By the high load operation at startup, does not reach the steady rotation within the specified time.	Avoid exhaust immediately after start-up.
		Failure of disconnection and instrumentation products	Contact with service center. Repair by ULVAC
RS232C ERROR	Communication error between controller and main PC	Disturbance of the transmitted signal due to noise, etc.	Improvement of the device side noise environment Strengthening of the grounding line
		ROM/RAM data destroyed by static electricity, etc.	Contact with service center. Repair by ULVAC
		Failure of instrument	
		Controllers and PC software version is not compatible.	
SYSTEM ERROR	PC program out of control Control power output low	Watch dog circuit actuated	Turn off power and turn it on again.
		Low output of control power in pump	Contact with service center. Repair by ULVAC
		Short-circuit of 24VDC line	
		Short terminal of program down-load JP1 misconnection	
OPPOSITE TURN	Abnormally of the main PC	Failure of the PC board program.	Contact with service center. Repair by ULVAC

5.WARRANTY TERMS

This product is shipped after strict internal inspection. If you find any manufacturing defects, accidents during the transportation, or other defects attributed to our responsibility, please contact our Components Division at headquarters or the nearest sales office or agency. The repair/replacement is free of charge.

5.1 Warranty Product

- (1) Dry Vacuum Pump UR-Series 90/180/600/1200/1800

5.2 Warranty Period

- (1) Domestic: 1 year from the date of delivery
- (2) Direct export: 1 year from the date of B/L

5.3 Warranty Coverage

- (1) Warranty coverage and disclaimer

The warranty covers the pump only. In the event of failures and accidents related to exhaust of air or nitrogen which are attributed to our defects in design or manufacturing, the product is repaired free of charge within 1 year from the date of delivery.

Any failures attributed to the following cause are not covered by the warranty and charged even within the warranty period.

- Failures and defects due to exhaust of gas other than air or nitrogen, or materials
- Failures and defects attributed to consumables
- If the product is used with a power supply other than that with power supply voltage and frequency you ordered.
- Failures and defects caused by natural disasters including fire, wind and flood, earthquake and thunderbolt, and unavoidable disasters including war
- Failures and defects caused by careless handling or misuse
- Products modified/disassembled/repared without our permission
- Failures and defects under an abnormal environment (strong electromagnetic field, radiation environment, high temperature, high humidity, inflammable gas atmosphere, corrosive gas atmosphere, dust)
- Failures and defects due to noise
- Product failure or indirect damage to your company in the event of a claim by a third party to us on violation of patents
- When our engineers judge that the failures or defects are caused under the conditions of use inappropriate to this product

5.4 How to Respond

(1) Domestic:

An alternative is delivered or the product is sent back to us or the nearest our service center for repair. If it is necessary to respond on site, contact our Components Division, or the nearest sales office or agency for assistance.

(2) Direct export:

An alternative is delivered or the product is sent back to us or the nearest our service center for repair. The return cost shall be borne by the customer.

5.5 Others

(1) If there are individual contracts and memorandum related to specifications in addition to this document, the contents in those documents prevail.

(2) Please let us know if you export this product from Japan and take necessary procedures according to the provisions of export-related laws and regulations, such as foreign exchange laws and foreign trade laws.

(3) For any questions and consultation on this product, check the model/serial number and then contact the nearest sales office or agency, or our Components Division.

https://www.ulvac.co.jp/support_info/

(4) Note that the contents in this document is subject to change without prior notice.

Attached material

b. About the exchange of FUSE (CE Type)

These fuses are set up for the protection of EMI filter (NF31, NF32). The necessity for changing this fuse is not caused usually. Controller's LCD disappears when this fuse cuts, and the pump stops.

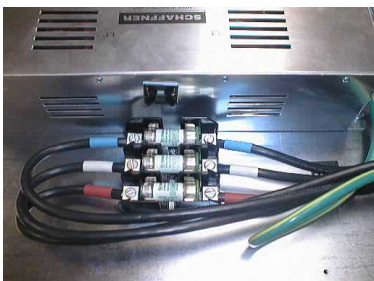



The replacement procedure of the fuse has been described based on the demand item in UL3101. **Please never do the clearing work independently. Please contact the nearby service center when the exchange is necessary.**



<< Electric shock is possible >>

Never exchange it.

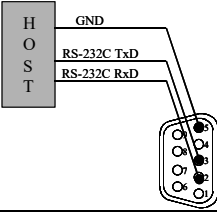
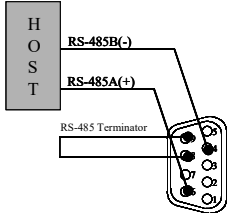
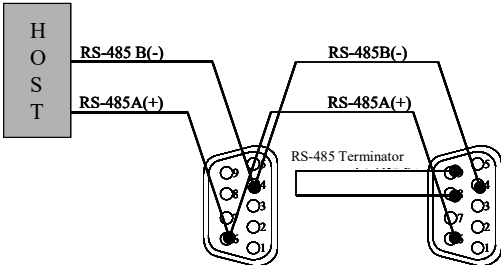
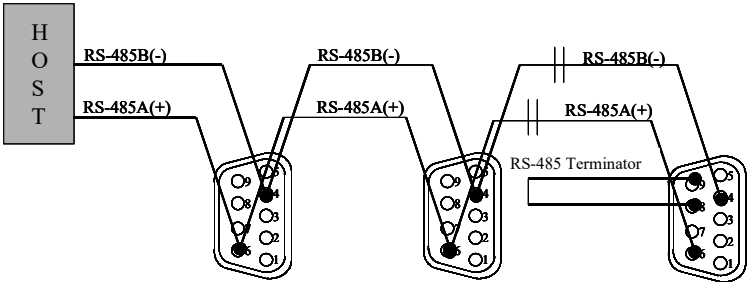
0. Please sever the pump from the power supply surely. Reference"4.2 maintenance: Power Wiring

	
1. An upper panel is removed.	3. Please exchange all (three pieces) fuse sat the same time.
	
2. The fuse is changed.	4. An upper panel is set up.

PUMP	Use Fuse			
Model	Capacity of fuse	Number	Maker	Model
UR90	30	3	Little Fuse	CCMR 030.
UR180	35	3	Little Fuse	CCMR 035.
UR600	50	3	Little Fuse	CCMR 050.
UR1200	50	3	Little Fuse	CCMR 050.
UR1800	60	3	Little Fuse	CCMR 060.

c. Communication system supplementation.

c-1 Communication connector connection chart.

<p>When communicating by RS-232C.</p> <p>Pin assignment</p> <table> <tr> <th>Pin No</th> <th>Item</th> </tr> <tr> <td>2:</td> <td>RS-232C RxD</td> </tr> <tr> <td>3:</td> <td>RS-232C TxD</td> </tr> <tr> <td>5:</td> <td>GND</td> </tr> </table>	Pin No	Item	2:	RS-232C RxD	3:	RS-232C TxD	5:	GND			
Pin No	Item										
2:	RS-232C RxD										
3:	RS-232C TxD										
5:	GND										
<p>When communicating by RS-485.</p> <p>Pin assignment</p> <table> <tr> <th>Pin No</th> <th>Item</th> </tr> <tr> <td>4:</td> <td>RS-485 B(-)</td> </tr> <tr> <td>6:</td> <td>RS-485 A(+)</td> </tr> <tr> <td>8:</td> <td>RS-485 Terminator</td> </tr> <tr> <td>9:</td> <td>RS-485 Terminator</td> </tr> </table>	Pin No	Item	4:	RS-485 B(-)	6:	RS-485 A(+)	8:	RS-485 Terminator	9:	RS-485 Terminator	<p>In case of one.</p>  <p>Pump address [:01]</p>
Pin No	Item										
4:	RS-485 B(-)										
6:	RS-485 A(+)										
8:	RS-485 Terminator										
9:	RS-485 Terminator										
<p>At tow connection.</p>	 <p>Pump address [:01] [:02]</p>										
<p>At nn connection.</p>	 <p>Pump address [:01] [:02] [:nn]</p>										



CAUTION

Noting when communicating by RS-485.

- For the pump connected at the end, RS-485 terminator (between 8-9) is short-circuited.
- It is necessary to set the address to the pump when communicating by RS-485.
Please contact the service center when it is not set.
- Please input the 3 digits of “ : n n” before the command when you order the command from the host side.

: n n [Command name] *The command is the same as the RS-232C communication.

colon address command

c-2 Communication command.

Command name: SVI-3 valves status read-out.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46																
A5x3																																																													
Host side																																																													
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46																
A5x3																																																													
Pump side																																																													
(Response) The bit x represents the following status.																																																													
<table><tr><td>b0</td><td>Manual operation</td></tr><tr><td>b1</td><td>SV1 0n</td></tr><tr><td>b2</td><td>SV2 0n</td></tr><tr><td>b3</td><td>SV3 0n</td></tr><tr><td>b4</td><td>(4 ways HI)</td></tr><tr><td>b5</td><td>(4 ways HI)</td></tr><tr><td>b6</td><td>(4 ways Low)</td></tr><tr><td>b7</td><td>(4 ways Low)</td></tr></table>																																														b0	Manual operation	b1	SV1 0n	b2	SV2 0n	b3	SV3 0n	b4	(4 ways HI)	b5	(4 ways HI)	b6	(4 ways Low)	b7	(4 ways Low)
b0	Manual operation																																																												
b1	SV1 0n																																																												
b2	SV2 0n																																																												
b3	SV3 0n																																																												
b4	(4 ways HI)																																																												
b5	(4 ways HI)																																																												
b6	(4 ways Low)																																																												
b7	(4 ways Low)																																																												


Command name : Local/remote selection.	
Host side	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45
	ABR
Pump side	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45
	OKR

(Response) LOCAL/REMOTE is changed over each time a signal is sent.

Command name : Alarm reset.	
1	2
3	4
5	6
7	8
9	10
11	12
13	14
15	16
17	18
19	20
21	22
23	24
25	26
27	28
29	30
31	32
33	34
35	36
37	38
39	40
41	42
43	44
45	46
Host side	
1	2
3	4
5	6
7	8
9	10
11	12
13	14
15	16
17	18
19	20
21	22
23	24
25	26
27	28
29	30
31	32
33	34
35	36
37	38
39	40
41	42
43	44
45	46
Pump side	
1	2
3	4
5	6
7	8
9	10
11	12
13	14
15	16
17	18
19	20
21	22
23	24
25	26
27	28
29	30
31	32
33	34
35	36
37	38
39	40
41	42
43	44
45	46
Pump side	
OK	
Pump side	
Pump stop	
CAUTION : Do not send it when pump is running.	

Communication specifications.	
• Signal format	: RS-232C
• Transfer system	: Start-stop synchronous system
• Baud rate	: 9600 bps
• Bit configuration	: Start 1 bit
	: Data 8 bit
	: Parity EVN
	: Stop 1 bit
• Data configuration	: JIS code
	: Terminator CR code

SP : Space code
CR : Carriage return code
The figure data is a B00 code. However, B8 and the B9 command are excluded.
RS-485 command adds " : nn" ahead of RS-232C command.
The response of RS-485 command is the same as RS-232C command.

承認	検査	設計	型	図		TITLE New PDR-C commands - Part 1 -
				SCALE		
					DATE	
MFG						DWG
NO						NO

Command name: System start/stop status readout.																																														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	
A	D	3																																												
Host side																																														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	
A	D	3																																												
Pump side																																														
(Response)																																														
x = 0 : At stop x = 1 : Reverse-rotation x = 2 : At emergency stop x = 3 : Interlocked x = 4 : Alarm generated x = 5 : At start x = 6 : Running x = 7 : Stop-operation beginning x = 8 : Underline x = 9 : RAM clear EIO																																														

[illegible]

Command name: Start																																														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46
Host side	A2																																													
Pipe side (response)	OK																																													
	OK																																													
	NG																																													
CAUTION : Does not start when alarm is activated																																														

Command name: Status read-out																																															
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46		
Host side																																															
A3[R]																																															
The bit x represents the following status.																																															
b0 At start																b4 Alarm																															
b1 Multiple alarms occur																b5 Pressure SW																															
b2 REMOTE																b6 Multiple warnings occur																															
b3 Warning																b7 (Always Hi)																															
Pump side																																															
A5[x][R]																																															

Command name: EEP-ROM read-out		completion		read-out	
1	2	3	4	5	6
7	8	9	10	11	12
13	14	15	16	17	18
19	20	21	22	23	24
25	26	27	28	29	30
31	32	33	34	35	36
37	38	39	40	41	42
43	44	45	46		
Host side					
A4:xx					
Pump side					
A4:xx					
(Response) x < y is complete					

Host side	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46				
	B	1	h	i	n	k	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Pump side (Response)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46				
	B	1	h	i	n	k	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x

n.n : Sensor number. x x x x : Instruction value of sensor.

Sensor number table.		Sensor name	
01	N2	purge gas.	
02	OPINZ	purge gas.	
03	Cooling	water.	
04	Exhaust	pressure	
05	DRP	INV frequency	
06	MBP	INV frequency	
07	Option spare 1.		
08	Option spare 2.		
09	DRP	current.	

Host side	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
	C1 PR																																												
Pump side	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
(Response)	OK PR																																												
	OK or NG																																												

Host side	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46
	C2PR																																													
Pump side (Response)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46
	OKPR																																													
	OK or NG																																													

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46
Host side	C41P																																													
Pump side	Q41P																																													
(Response)																																														

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46
Host side	C5B4A3D2x3																																													
Pump side	0x3x																																													
(Response)	x=0: 9600bps x=1: 19200bps x=2: 38400bps x=3: 48000bps																																													

Host side	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46
	C6405n.in																																													
Pump side	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46
(Response)	Ok																																													
	nn:00~99																																													

Host side	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46
	C79.1PR																																													
Pump side	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46
Response	OKPR																																													

承認 機 図 設 計 部	製 図	ULVAC		TITLE
		SCALE	:	New PDR-C commands - Part 2 -
		DATE		
MFG No.				DWG No.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46

Host side	B5nnnnX
-----------	---------

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46

Dump side B5nnnnxxxxxx

Response)
 n n n : Set content number: XXXX : Set value;

Set content number table.

No.	Set content.
0.32	N2 purge gas warning value
0.33	OP N2 purge gas warning value
0.34	Cooling water warning value
0.35	Exhaust pressure warning value
0.36	Exhaust pressure alarm value
0.37	DPB INV intermediate frequency
0.38	PMB INV intermediats frequency
0.39	Option spare 1 warning value
0.40	Option spare 2 warning value.
0.41	DRP current warning value
0.42	DRP current alarm value
0.43	MGP current warning value
0.44	MGP current alarm value
0.45	Warning value spare 1 in BOX
0.46	Warning value spare 2 in BOX
0.47	DRP temperature upper bound warning value.
0.48	MGP temperature upper bound warning value.
0.49	Exhaust pipe temperature upper bound warning value.
0.50	Option temperature upper bound warning value.

No.	Set content
052	NO pipe as bound pair value comparison setting
053	DP1/DP2 as bound pair value comparison setting
054	Cooling water bound pair value comparison setting
055	
056	
057	DRP INV rated frequency
058	MFP INV rated frequency
059	Option spare 1 bound pair value comparison setting
060	Option spare 2 bound pair value comparison setting
061	
062	
063	
064	
065	Bound pair value comparison setting spare 1 in BOX
066	Bound pair value comparison setting spare 2 in BOX
067	DRP temperature READY temperature
068	MFP temperature READY temperature
069	Exhaust pipe temperature READY temperature
070	Option temperature READY temperature

0001 : Upper bound comparison.
0000 : Lower bound comparison.

Command name: Writing the content of the set.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46

	Bonn xxxxxR
-test side	Bonn xxxxxR

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46

OK3P
pump side

XXXXX: Set value.


Response: OK or NG

Attention] Please use only the number which exists in the set table.

The number which does not exist in the set table is used internally.

When the number which does not exist in the set table is written, the operation is not guaranteed.

Moreover, it does not return in ON / OFF of the power supply because DATA is recorded in EEPROM when written.

承認	機	図	設計	製	図
<div style="display: flex; justify-content: space-between; align-items: center;"> <div>  </div> <div> <div style="border: 1px solid black; padding: 2px;">SCALE</div> <div style="border: 1px solid black; padding: 2px;">DATE</div> </div> <div> <div style="border: 1px solid black; padding: 2px;">:</div> <div style="border: 1px solid black; padding: 2px;">.</div> <div style="border: 1px solid black; padding: 2px;">.</div> </div> </div>					
TITLE					
New PDR-C commands					
- Part 3 -					
DWG No.					
MFG No.					

[illegible]

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95

yy/mm/dd/hh/mm/ss is a year/month/day/hour/minute/second.

xx is a sensor number (When the sensor number is 35 or more, data from the 19th byte to the 68th byte becomes irregular data.)

see shows warning by 01 and the alarm is shown by 02.

kk shows the low alarm by 00, the high alarm is shown by 01, and other warning is shown by 02.

uuuu is an instruction value when warning is generated.

In the absence of data, signal is sent back with "0" entered at the 5th byte, "CR" entered at the 6th byte.

aaa is a model number. ⚠

Please disregard it because data from 37th to 68th byte is CPU internal data.

Sensor number table.		
01	Sensor name	
01	N2 purge gas.	10 MBP current.
02	OP N2 purge gas.	11 Spare 1 in BOX.
03	Cooling water.	12 Spare 2 in BOX.
04	Exhaust pressure.	13 DRP temperature.
05	DRP INV frequency.	14 MBP temperature.
06	MBP INV frequency.	15 Exhaust pipe temperature.
07	Option spare 1.	16 Option temperature.
08	Option spare 2.	17 Spare switch in BOX.

Command name: Warning read-out.

test site	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
test site	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100

ump side
B3hnp3xxeekkkuuu00

(Response) Set "nn" at 00 to 17 (00 is the first data).

in the absence of data signal is sent back with "0" entered at the 5th byte "CR" entered at the 6th byte

Command name: Alarm read-out.

set size

B8hnp0xeekkkuuuuf

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

urn side

(Response) Set "nn" at 00 to 17 (00 is the first data)

xx/ee/kk/uuu is the same as alarm log read-out.

In the absence of data, signal is sent back with "0" entered at the 5th byte, "CR" entered at the 6th byte.

SP : Space code.

CR : Carriage return code.

承認	検	図	設計	製	図	TITLE			New PDR-C commands - Part 4 - \triangle
						ULVAC			
MFG	No.	DWG	No.	No.	No.	SCALE	:		
						DATE	.	.	

Command name: Run log read-out.

Host side

BBnW

Pump side (Response)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525
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water: pressure, INV	current, INV	temperature, EXHAUST PIPE	Run mode.	LCPU I/O port data.
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<p>OP N2 purge gas.</p> <p>Option spare 2.</p> <p>Option spare 1.</p> <p>N2 source gas.</p>	<p>Conservation of energy.</p> <p>temperature.</p>	<p>01 : Run mode 1.</p> <p>02 : Run mode 2.</p>	<p>Lower side three bytes of running time 99999.9 (BIN data).</p> <p>Upper side three bytes of running time 99999.9 (BIN data).</p>
---	--	---	---

03 : Run mode 3.
 04 : Run mode manual.

MPP temperature.

00 : OFF
 01 : ON

Scale 1 in BOX

Scale 2 in BOX

A/B contact
 A contact.

<p>Dep temperature.</p>	<p>Error graph.</p> <p>00 : it is not 0 : it is 1 : it is</p>	<p>State.</p> <p>It is the same as the</p>	<p>01 : Contact</p>
<p>where z in DOV.</p>			<p>Demetriou / 1998</p>

- Data is BIN data excluding the clock data (Data, Time).

- The A/D data of the sensor is the same as the data displayed by remote control (It is not necessary to calculate).

It is the same as the A3 command response.

Command name: Current status read-out.

Host side	Bohr
1	2
2	3
3	4
4	5
5	6
6	7
7	8
8	9
9	10
10	11
11	12
12	13
13	14
14	15
15	16
16	17
17	18
18	19
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20	21
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Response is the same as run log read-out.

承 認 機 設 計 製 図				TITLE	
				New PDR-C commands	
				- Part 5 -	
MFG No.				SCALE	DWG No.
				DATE	

Command name:Clock writing (Correction).	
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46	
Host side	D53y7mmiddhhmmdd
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46	
Pump side	Dk3k
(Response)	'yy/mm/dd/hh/mm' is a year/month/day/hour/minute.

Command name:	
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Command name:																																													
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Host side																																													
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Dump side (Response)																																													

Command name: Model read-out																																													
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Host side																																													
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Dump side																																													
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Response																																													

Command name: Model writing																																												
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Host side																																												
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Command name: Production number read-out.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46
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lost side

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P2hnhnhnhnhnhnhnhnh																																													

Pump side
(Response)

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P2hnhnhnhnhnhnhnhnh																																													


"nnnnnnnnnn" is a production number.

<u>Command name:State read-out</u>					
1	2	3	4	5	6
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13	14	15	16	17	18
19	20	21	22	23	24
25	26	27	28	29	30
31	32	33	34	35	36
37	38	39	40	41	42
43	44	45	46		
<u>-lost side</u>					
D	S	t	r	i	n
s	e	d	a	m	p
e	c	k			
<u>Pump side</u>					
R	e	s	p	a	n
s	e				
'nnnnnnnn' is a production number.					

Command name: Clock read-out.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46
D4437																																													
Host side																																													
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D4437																																													
Pump side																																													
(Response)																																													

“y1/mm/dd/hh/mm” is a year/month/day/hour/minute.

承 認 機 図 設 計 製 図		TITLE	
		New PDR-C commands - Part 6 -	
MFG	DWG	SCALE	
		DATE	



This mark is applied to the electronic information product sold in the People's Republic of China. The figure at the center of the mark is the validity date of environmental protection. This product does not influence the environment, the human body and the property during the period reckoning the manufacturing date as long as the caution for safe use regarding the products are observed.
*The environmental protection validity date is not the product warranty period.

Table1. Making format for names and contents of hazardous substances or elements

Name of parts	Hazardous substances or elements					
	Pb	Hg	Cd	Cr ⁶⁺	PBB	PBDE
Body	○	○	○	○	○	○
Panel	○	○	○	○	○	○
Base	○	○	○	○	○	○
Electrical Parts	○	○	○	○	○	○

○: indicating that content of the hazardous substance or element in all homogeneous materials of the part does not exceed the requirements for concentration limits specified by SJ/T11363-2006.
×: indicating that content of the hazardous substance or element in, at least one kind of, homogeneous materials of the part exceeds the requirements for concentration limits specified by SJ/T11363-2006. Producer may further explain the technical excuse to the items marked with "X" perspecific conditions here.

ULVAC Components / Certificate of Decontamination

This is a certificate of decontamination for repair and inspection request of ULVAC Components. All material must be certified as decontaminated and this certificate must be submitted to your closest local ULVAC service center or sales office prior to shipment.

Please consult with your closest local ULVAC service center or sales office if our components are used with toxic gases or contaminated with reactive products or substances produced by reaction.

Product model:

Model:

Serial No.:

Application:

Remarks:

Contaminant (Check an applicable box.)

- ☐ I guarantee that above returned item(s) is not contaminated with harmful substances.
- ☐ Above returned item(s) is contaminated with the following harmful substances.

	Name of contaminant (molecular formula)	Characteristics
1		
2		
3		
4		
5		

To: ULVAC

Attn:

Date: / / (YYYY/MM/DD)

Your company

Division

Contact

Phone

Fax

E-mail

Please pack returned item(s) carefully before shipment. Any accident occurred during transportation to us **and during disassembly** caused by contaminant is under your responsibility. It is also to be understood that ULVAC may decline to repair returned item(s) depending on the type of contaminant and degree of contamination, and return it to you.

To be filled in by ULVAC		
Request for SDS: Yes/No		
ULVAC job No.		

株式会社アルバック
規格品事業部
<https://showcase.ulvac.co.jp/ja/>

製品情報・サービス拠点・お問い合わせはこちらから



showcase.ulvac.co.jp

株式会社アルバック
規格品事業部
〒253-8543
神奈川県茅ヶ崎市萩園 2 5 0 0
TEL:0467-89-2261

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規格品事業部 東日本営業部 横浜支店
〒223-0059
神奈川県横浜市港北区北新横浜 1 - 1 0 - 4
TEL:045-533-0205

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〒532-0003
大阪府大阪市淀川区宮原 3 - 3 - 3 1 上村ニッセイビル5F
TEL:06-6397-2286

ULVAC ,Inc.
Components Division
<https://showcase.ulvac.co.jp/en/>

Please contact us for products, Service Base or other Inquiries from here.



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