

AK03-8558-CJ-001-02

No.151208

ULVAC

Dry Pump Power-Saving Attachment

ECO-SHOCK

Instruction Manual

ECO-SHOCK


MODEL : ES10

Read this manual before operation and keep it at your hand for immediate reference

Components Division,
ULVAC, Inc.


Before Use of This Pump


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


| | |
|--|---|
|  WARNING | <p>Read this manual and thoroughly understand safety cautions, specifications and operating procedure before installation, operation, inspection or maintenance of this gauge so that it can be used for a long time.</p> |
|--|---|


Safety Denotations

The following safety denotations are used throughout this manual to call operator's attention for safety.

| | |
|--|--|
|  DANGER | <p>Failure to comply with this involves the possibility of causing impending death or serious personal injury to the operator.</p> |
|--|--|

| | |
|--|--|
|  WARNING | <p>Failure to comply with this involves the possibility of causing death or serious personal injury to the operator.</p> |
|--|--|

| | |
|--|--|
|  CAUTION | <p>Failure to comply with this involves the possibility of a medium degree of personal injury or a serious damage to the equipment or impairing its normal action.</p> |
|--|--|

| | |
|---|---|
|  NOTICE | <p>Failure to comply with this can damage the equipment or impair normal actions.</p> |
|---|---|

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1. GENERAL

1.1 Safety Precautions



WARNING

- a) This attachment cannot be used in an environment where temperature is 35°C or higher.
- b) This attachment cannot be used in a wet environment or an environment in which it may be wetted with water (including condensing environment).
- c) This attachment is designed exclusively for a process or load lock where air or inert gas, such as nitrogen or argon, is used. It cannot be used with a dry pump for pumping gas that may contaminate living environment or for pumping toxic or inflammable gas. If it is used in such an environment, toxic gas or inflammable gas may leak outside, causing serious damage.
- d) This attachment is not pressure-proof. If high pressure is applied in the attachment, it may break down.



CAUTION

- a) This attachment cannot be used for pumps other than a dry pump of which exhaust side can be evacuated. Whether the exhaust side can be evacuated or not should be checked with the user's pump manufacturer.
- b) This attachment cannot be used for a dry pump that is used for pumping gas of which partial pressure is so high that it condense under atmospheric pressure at room temperature (water content, etc.).
- c) This attachment cannot be used for pumps other than a dry pump, such as oil rotary pump or vane type dry pump that generates a considerable amount of dust particles.
- d) The energy saving effect of this attachment will not be achieved if the total flow rate of process gas or purge gas is 15 SLM or more. If purge gas more than required is used, check and adjust the purge gas flow rate. (Refer to 4. OPERATION)
- e) Some dry pumps do not permit optimization of purge gas flow rate because of interlock. For adjustment, refer to the relevant manual for the dry pump.
- f) Use one ECO-SHOCK for one dry pump. If one ECO-SHOCK is used for two or more dry pumps, the energy saving effect cannot be achieved and the performance will be adversely affected.
- g) Do not operate ECO-SHOCK at a pressure in excess of 0.11 MPa (absolute pressure) at the outlet. It may break down.

1.2 Components

This attachment is made up of the basic unit and valve unit.

Change the check valve attached to the exhaust port of your dry pump with the valve unit and connect respective ports to the basic unit. All you do is just start the basic unit, and the power consumption will be reduced by 80% in maximum.

1.3 Accessories

Unpack the case and check the attachment to see if any part is damaged in transit.

Also check accessories against the following list of components.

| Component | Quantity |
|---|----------|
| Basic unit | 1 pc. |
| Valve unit | 1 pc. |
| Power connector | 1 pc. |
| Controlling connector | 1 pc. |
| Connecting tube N2-1-3/8 (O.D. 9.53mm, I.D. 6.99mm), Nitta Corporation | 6 m |
| Instruction manual | 1 copy |

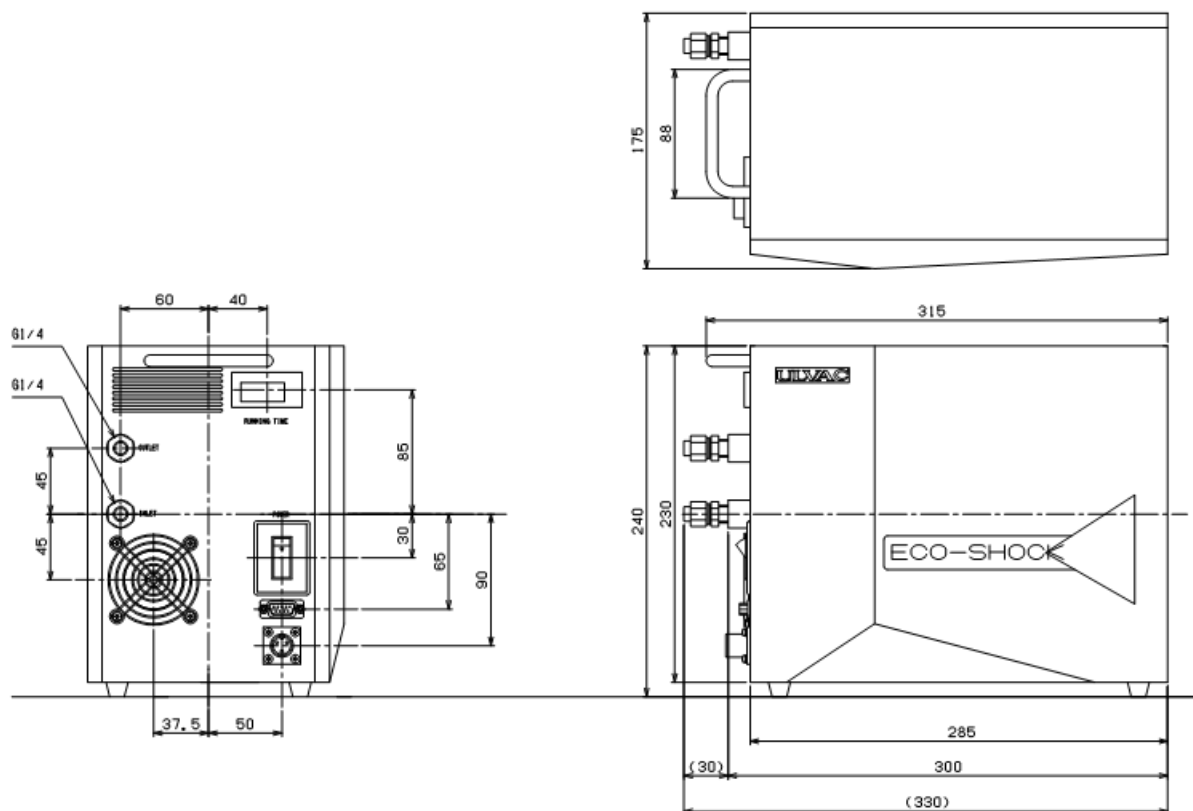
* If any problem is found, contact your local ULVAC representative within a week after receipt of this attachment.

1.4 Specifications

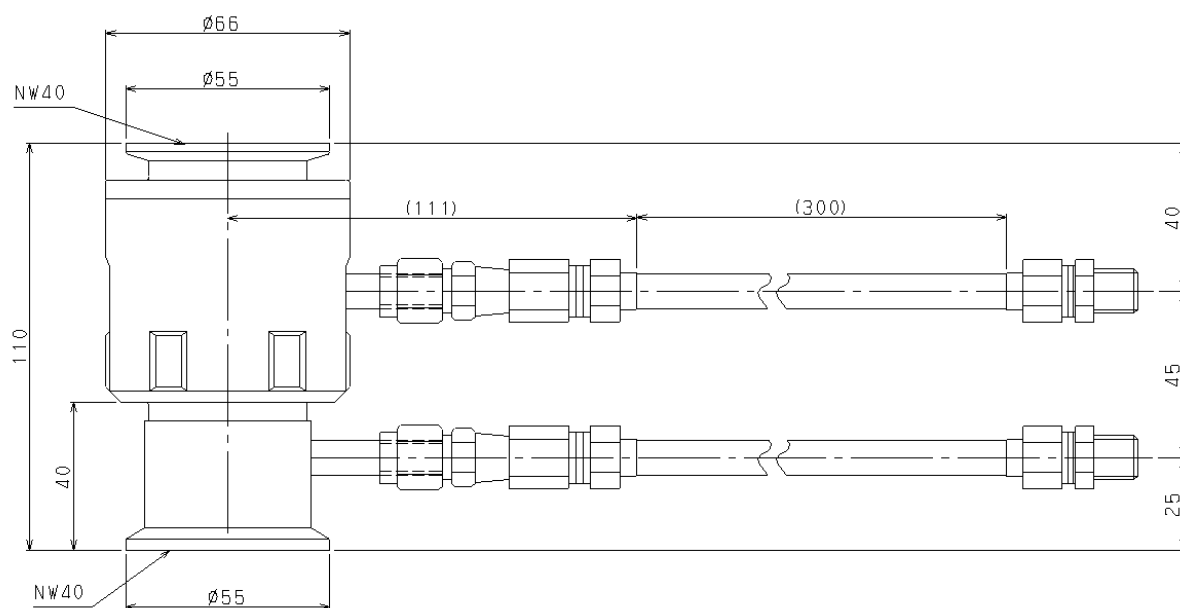
| Model | | ES10 |
|---------|------------------------|---|
| Power | Specifications | 100 to 220VAC single phase, 50/60Hz (automatically changed over) |
| | Maximum apparent power | 250 VA |
| | Power consumption | 65 W (Process gas plus dry pump purge gas 0.0SLM) |
| | Connector | Receptacle : CE05-2A10SL-3PC-B Compatible connector : CE05-6A10SL-3SC-B-BSS) Manufacturer : Dai-Ichi Electronics |
| Control | Input | Remote start/stop (contact 24 VDC) Provide a no-voltage contact with a contact capacity of 2.0 A or less Close : Start Open : Stop |
| | Output | Overcurrent alarm output (contact no voltage) Contact capacity : 24 VDC, 1.0 A |
| | Connector | Receptacle : 17JE-13090-02(D1) Compatible connector : 17JE-23090(D8A) Manufacturer : Dai-Ichi Electronics |
| | Operation | Manual start switch |
| | Display | Run time is displayed on LCD |
| Overall | Dimensions | Basic unit : 175 × 310 × 240 mm Valve unit : $\phi 70 \times 110$ mm (NW40) |
| | Weight | Basic unit : 9.2 kg, Valve unit : 800 g |
| | Connecting port | Basic unit : G1/4 (Inlet, Outlet) Valve unit : $\phi 9.52$, BA tube (Inlet, Outlet) |
| | Piping | Length 3.0 m or less, $\phi 9.52$ mm or more |

1.5 Outline Drawing

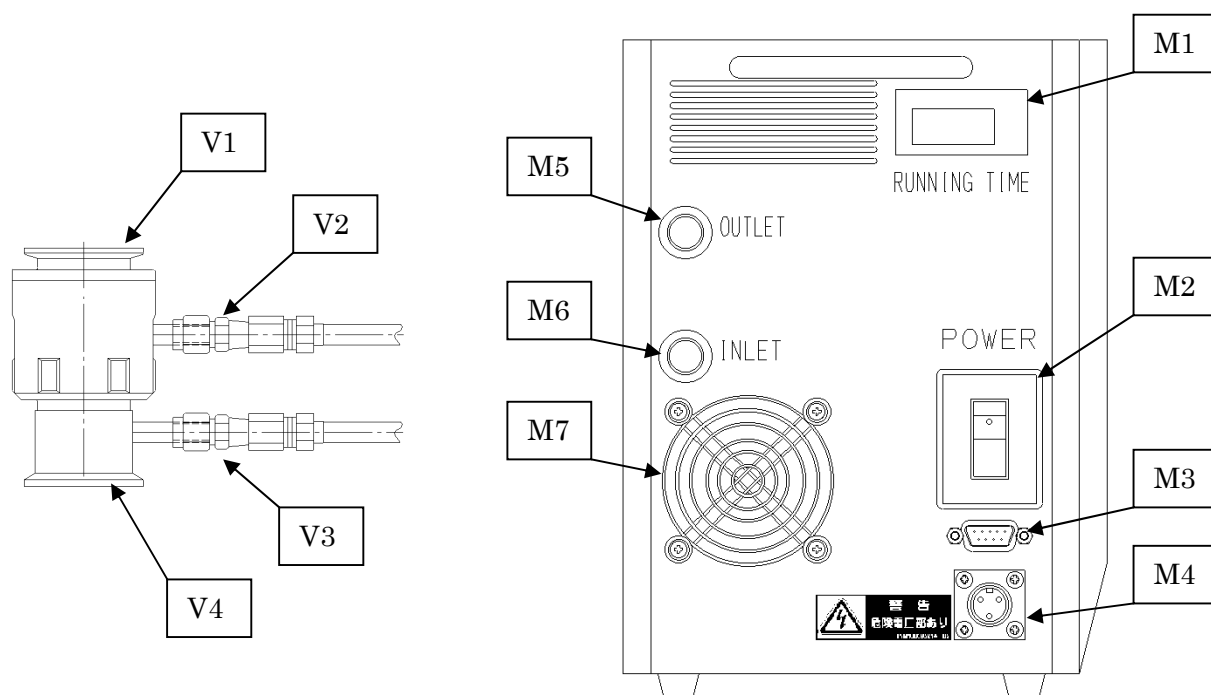
[Basic unit]



[Valve unit]



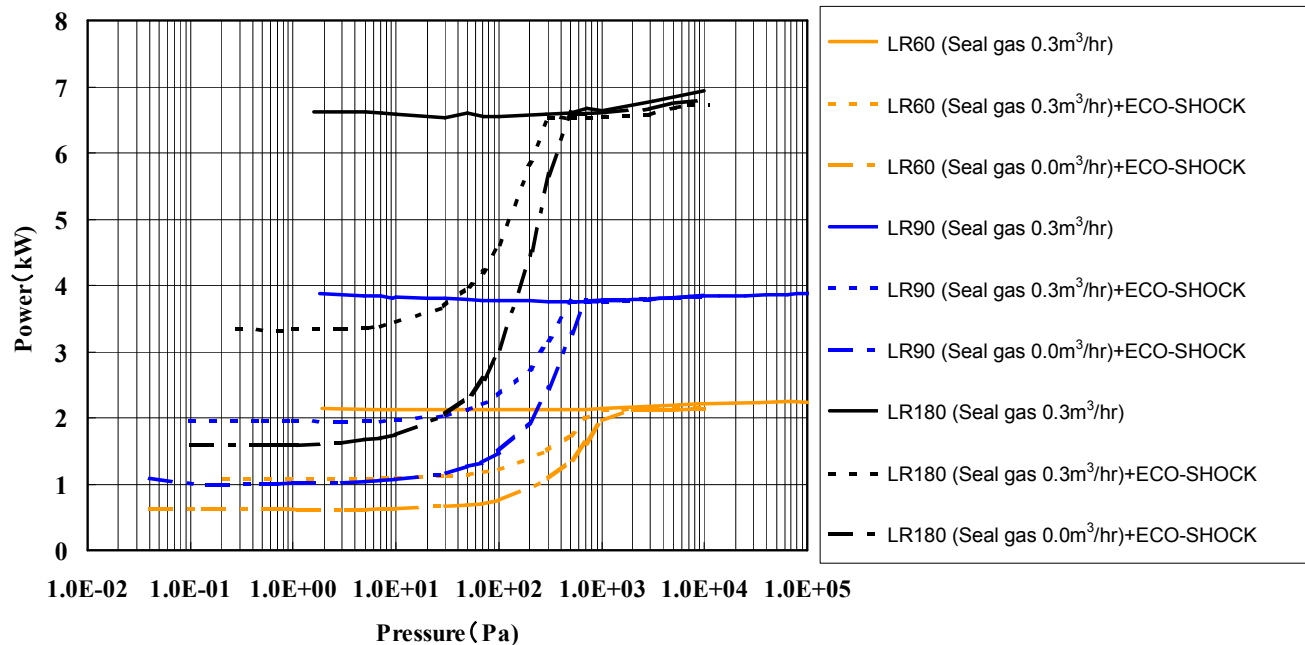
1.6 Operation Panel



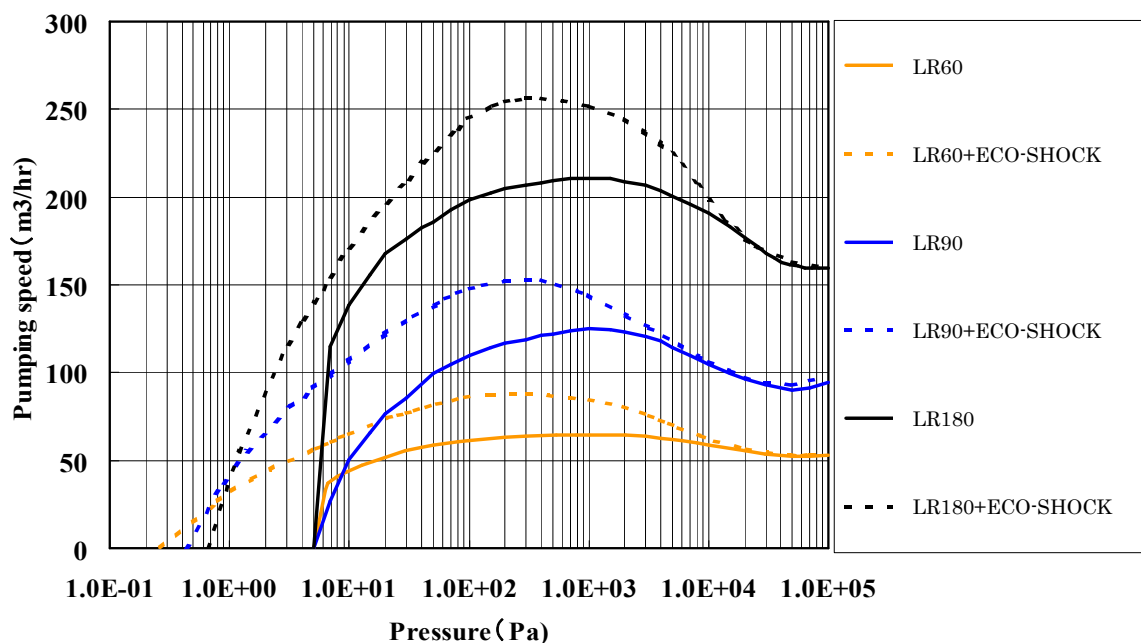
| No. | Component | Function |
|------------|--|---|
| Basic unit | | |
| M1 | Time counter | Displays running time. |
| M2 | Start (power) switch | Starts the system. |
| M3 | Control connector | For remote start (interlocked action with pump) and output of alarm signal. |
| M4 | Power connector | Connect power. |
| M5 | Valve unit connecting port (OUTLET) | Connect this to valve unit upper port. |
| M6 | Valve unit connecting port (INLET) | Connect this to valve unit lower port. |
| M7 | Internal cooling fan | Cools internal parts (suction type) . |
| Valve unit | | |
| V1 | Exhaust line connecting port (duct side) | Connect this to the duct side of the exhaust line. |
| V2 | Upper port | Connect this to the M5 port in the basic unit. |
| V3 | Lower port | Connect this to the M6 port in the basic unit. |
| V4 | Exhaust line connecting port (pump side) | Connect this to the pump side of the exhaust line. |

1.7 The following installed example of effect

[Power consumption]



[Influence on pump performance]



CAUTION

Opening extent of pressure adjustment valve etc. of the device might have to be adjusted by improving pumping speed and ultimate pressure.

2. INSTLLATION

2.1 Installation and Storage Conditions


2.1.1 Installation

Meet the following conditions in installation and storage of this attachment.

| Item | Condition |
|---|--|
| Temperature, humidity (during storage) | -30 to 60°C, relative humidity not more than 95% |
| Temperature, humidity (during operation) | 5 to 35°C, relative humidity not more than 95% |
| Altitude | Not more than 1000m |
| External vibration | Not more than 0.5G |


* Not condensing


2.1.2 Other conditions

| | |
|--|--|
|  CAUTION | <p>This attachment must be installed or stored indoors. It cannot be used outdoors (where no measures are taken against rain, wind and dust).</p> <p>Do not place anything on this attachment.</p> <p>Do not install this attachment sideways.</p> |
|--|--|

2.2 Installation


Read 1.1 Safety Precautions again before installation.

| | |
|--|--|
|  WARNING | <p>Before installation, shut down the dry pump on which this attachment is to be installed and turn off the power breaker.</p> |
|--|--|

| | |
|---|---|
|  NOTICE | <p>Before installation, check the space where the basic unit and the valve unit are to be installed and the position of the piping that connects the two units.</p> |
|---|---|


2.2.1 Preliminary operation

- (1) With the installation position being determined, prepare a tube of the required length and connectors.
- (2) Connect the connecting tube to the upper and lower ports in the valve unit and the valve unit connecting port in the basic unit. If the user selects the connecting piping and connecting connector, use of piping 7.5 mm or more in inside diameter and 2 m or less in length is recommended.

| | |
|---|--|
|  NOTICE | <p>If the connecting connector is to be replaced, use sealing material that can maintain a leak rate of 10^{-3} Pam³/sec or less for the screw fastening part.</p> |
|---|--|


2.2.2 Installing the valve unit


- (1) Verify that the power to the dry pump is shut off and remove the check valve from the exhaust side. (The valve unit has a function equivalent to that of the check valve.)
- (2) Install the valve unit in such a way that the direction of the arrow on the valve unit surface is the same as that of the gas exhaust direction.


| | |
|--|--|
|  CAUTION | <p>Be careful not to drop a foreign object into the piping or valve unit.</p> <p>Fix the piping with a support so that load is not applied directly to the valve unit.</p> <p>Always install the valve unit in such a way that gas flows in the direction of arrow on the surface. If it is installed in the reverse direction, energy saving effect cannot be achieved.</p> |
|--|--|

2.2.3 Installing the basic unit

Install the basic unit horizontally in a predetermined position as shown on the external dimensional drawing.

| | |
|--|--|
|  WARNING | Install the basic unit horizontally on the floor, as shown on the dimensional drawing. If it is installed sideways or vertically, components may be damaged. |
|--|--|


| | |
|--|--|
|  WARNING | Provide a space of more than 10 cm in front of the internal cooling fan. If the attachment is run with the vent hole in the internal cooling fan closed, the internal components may be damaged. |
|--|--|


| | |
|--|--|
|  CAUTION | Do not install the attachment in a passageway or on an unstable table. If the operator touches it, it may fall off and the operator may fall down. |
|--|--|

2.2.4 Tubing


Connect tubes to the tubing connectors as follows.

- Connect the valve unit upper port V2 and the valve unit connecting port in the basic unit (OUTLET).
- Connect the valve unit lower port V1 and the valve unit connecting port in the basic unit (INLET).

| | |
|---|---|
|  NOTICE | When fixing the tube to the connector, fix the connector body using a spanner and fasten the nut using a spanner. If only the nut is fastened without fixing the basic unit, the connector and seal material of the basic unit will be damaged, causing vacuum leak. If there is a leak, the original performance may not be obtained. |
|---|---|

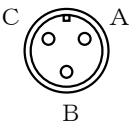
| | |
|---|--|
|  NOTICE | Use Tubes as thick and short as possible. Use of tubes 7.5 mm in inside diameter and within 2 m in length is recommended. If the tubes smaller in diameter and greater in length are used, the pressure range in which energy saving effect can be achieved may be smaller. |
|---|--|

2.2.5 Electrical wiring


| | |
|--|---|
|  WARNING | <p>Do not feed power until wiring is completed.</p> <p>Wiring arrangement must be conducted by qualified persons.</p> <p>Before making wiring arrangement, verify that the start switch and primary power breaker are turned off and set the lock key of the breaker ON switch.</p> |
|--|---|

2.2.5.1 Power wiring

Make power wiring arrangement according to the following connector table.

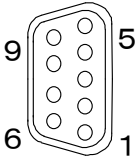
|  | No. | I/O | Item | Specifications |
|--|-----|-----|----------------|---|
| | A | L | Power | 100-220VAC, single phase |
| | B | N | Power | 100-220VAC, single phase (neutral line) |
| | C | GND | Ground (earth) | |

| | |
|-------------------------------------|-----------------------|
| Connector manufacturer | Dai-Ichi Electronics |
| Receptacle P/N | CE05-2A10SL-3PC-B |
| Compatible plug (straight type) P/N | CE05-6A10SL-3SC-B-BSS |
| Compatible wire size | AWG #16 |


| | |
|--|--|
|  WARNING | <p>Connect the ground wire and ground it.</p> <p>.Verify that the welded joint is completely molten and that the insulation covering is free from any problem like damage of wiring. Also select a wire rod according to the location where wiring is to be arranged.</p> <p>Do not lay the wiring in a passageway or a place where temperature is high.</p> |
|--|--|


2.2.5.2 Control wiring

The control wiring is used for interlocking an external device and control.


|  | Pin assignment | | |
|---|----------------|-------------------|------------------------------------|
| | No. | Item | Remarks |
| | 1 | Remote start stop | OPEN : Stop, CLOSE : Start (0V DC) |
| | 2 | | Normally closed |
| | 3 | | Normally closed |
| | 4 | | Normally closed |
| | 5 | Alarm output | CLOSE : Normal, OPEN : Alarm |
| | 6 | 1-COM | |
| | 7 | | Normally closed |
| | 8 | | Normally closed |
| | 9 | 5-COM | |

| | |
|--------------------------|-------------------------------|
| Connector manufacturer | Dai-Ichi Electronics |
| Connector P/N | 17JE-13090-02 (D1) connector |
| Compatible connector P/N | 17JE-23090-02 (D8A) connector |
| Compatible wire size | AWG #20 |

| | |
|--|---|
|  WARNING | <p>Pins 1 and 6 are energized with a d.c. voltage from the basic unit. Provide a no-voltage contact.</p> <p>Operating voltage : 24 VDC, operating current : 100 mA</p> <p>Pins 5 and 9 are no-voltage contacts. Use them within the following range.</p> <p>Operable voltage : 24 VDC or less, contact capacity : 1 A</p> |
|--|---|

| | |
|---|--|
|  NOTICE | <p>If remote start/stop is not used, attach the supplied controlling connector to the basic unit to short it (by a jumper). If this wiring is not arranged, the attachment will not start, recognizing it as wait for input of remote operation.</p> |
|---|--|

3. OPERATION

| | |
|--|---|
|  WARNING | <p>Check again to make sure that installation has been made properly according to Section 2.</p> <p>Make sure that the dry pump to which this attachment has been installed starts with no problem.</p> |
|--|---|

3.1 Preparation for Operating

- (1) Please confirm the connection of piping and wiring about this pump and a dry pump.
- (2) Turn on the MCCB where it is on the utility at the primary side.
- (3) Confirm the dry pump operating conditions

| | | |
|-----------------------|-----------------------|---|
| Purge gas Consumption | Total 5.0 SLM or less | <p>Deposition of film does not occur in a process in which this attachment can be used. It requires nothing except seal gas, as a rule, though it depends on the model of your pump and operating conditions.</p> <p>Seal gas : Gas flowing between lubricating chamber and rotor chamber. Minimum consumption varies with model of a dry pump.</p> |
|-----------------------|-----------------------|---|


- (4) Start the dry pump.


3.2 Manual Operation

- (1) Attach the jumper connector with connecting between 1 and 6 pins.
- (2) Connect electric cable to this attachment, and provide electricity.
- (3) Turn on the start switch on this attachment. The switch is lighted.

3.3 Remote Operation

- (1) Attach the control connector with proper connecting.
- (2) Connect electric cable to this attachment, and provide electricity.
- (3) Turn on the start switch on the basic unit. The switch is lighted.
- (4) The attachment can be started / stopped by switching the controlling connector across pins 1 and 6

| | |
|--|--|
|  CAUTION | <p>If the consumption of purge gas is changed, the current operating conditions may change. Before changing it, verify that the attachment can be used with no problem even if the amount of purge gas is changed.</p> |
|--|--|

| | |
|---|--|
|  NOTICE | <p>If the attachment is operated in the manual mode only, install the controlling connector (pins 1 – 6 by jumper) before operation. If pins 1 and 6 are not connected by a jumper, the attachment will not start, recognizing it as remote operation.</p> |
|---|--|

4. INSPECTION AND MAINTENANCE

4.1 Inspection


Periodically verify that the start switch on the basic unit is turned on (light is on). Also periodically check the current or power values of the dry pump during idling. If these values are the same as before this attachment was installed, it is suspected that it is not operating properly.

Check this attachment to see if any unusual sound is heard or unusual vibration is felt.

If any failure occurs, take corrective actions according to the troubleshooting chart.

4.2 Recommended Maintenance

Overhaul is recommended once every 10,000 hours of operation on the running time counter, as a rule.

| | |
|--|---|
|  WARNING | <p>(1) Please turn off the MCCB before inspection and maintenance of this product. There are some risks, e.g. an electric shock or an unexpected starting.</p> <p>(2) Don't repair and disassemble except a qualified engineer. There are some risks, e.g. a fire, unusual operation.</p> <p>(3) Please turn off the MCCB as soon as possible when the product may be an unusual condition. Please contact with recipient of an order or a nearby service center.</p> |
|--|---|

5. REMOVING AND MOVING

- (1) Turn off the start switch, shut off the power breaker on the switchboard and remove the power and control connectors.
- (2) Shut down the dry pump and vent the valve unit to atmospheric pressure.
- (3) Remove the attachment by reversing the installation procedure.
- (4) If the attachment is not reinstalled immediately after removal, install the originally installed exhaust-side check valve. If the check valve unit has no problem, the dry pump can be used as it is by completely closing the upper and lower ports of the valve unit.
- (5) For transfer over a short distance and in a short time (moving into or out of the clean room), hold the handle. The attachment can be moved in a tilted position with no problem.
- (6) For transfer over a long distance, pack the attachment in a upright position.

6. TROUBLESHOOTING

| Trouble symptom | Check items | Corrective actions |
|---|---|---|
| Power cannot be applied | Power is not supplied. | Supply power |
| | Incorrect wiring of connector | Correct the wiring |
| | Failure of component, such as circuit protector or other | Replace component → Contact ULVAC representative |
| Start switch light does not light | Power is not supplied. | Supply power |
| | LED in switch has burnt out. | Replace switch → Contact ULVAC representative |
| Pump does not start by manual operation | Controlling connector is not connected. | In manual operation, install a connector of which pins 1 and 6 are connected by a jumper. |
| | Failure of component Internal power supply Starting relay, etc. | Replace component → Contact ULVAC representative |
| Pump does not start by remote operation | External switch for control is not actuated | Repair external switch. Check interlock and sequence of actions |
| | | Check interlock and sequence of actions |
| | Failure of component Internal power supply Starting relay, etc. | Replace component → Contact ULVAC representative |
| Unusual sound is heard | Mechanical trouble of internal pressure control unit | Repair pressure control unit → Contact ULVAC representative |
| | Unusual sound from air cooling fan | Replace air cooling fan → Contact ULVAC representative |
| | Exhaust sound | A simmering sound may be heard from valve unit interior, but this is no problem because the sound of the control units just echoing |
| | A popping sound is heard at start of process. | This is the sound of valve unit opening. It is a big sound, but not a failure |
| Basic unit is hot | Failure of air cooling fan | Replace air cooling fan → Contact ULVAC representative |
| | Installation environment temperature is out of warranty range. | Lower atmospheric temperature to within warranty range. |
| Water drops in tube | Water content exhaust volume is in excess of vapor pressure range. | If several cc of water drops are stagnant in the tube at all times, remove water content. |
| | | Prevent sucking water in the basic unit. |

7. WARRANTY

7.1 Warranty Period

If the pump fails in pumping air or nitrogen due to defects in design or workmanship within one year from the date of delivery, ULVAC will correct it free of charge. Troubles imputable to gas other than the above are exempted from warranty.

The scope of warranty is limited to the pump.

Troubles caused by the following are not covered by this warranty.

- Acts of God, such earthquake, fire, etc.
- Special harmful atmosphere
- Operation not in conformity with the operating conditions in the instruction manual.
- Unauthorized modification of the pump.

Peripheral units like dry pump and others are not covered by this warranty.

ULVAC is not liable for indemnification for any expected or anticipated profits of the user or any consequential damage that may be caused by the trouble of this product.

7.2 Maintenance

For maintenance, contact your local ULVAC representative.

7.3 Servicing

For any question or servicing of this pump, contact your local ULVAC representative with its serial number.



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.