**Overview**
This electric control panel is used for UE and U type motor driven grease pump. It enables comfortable use of centralized lubricating system, and also plays a role in saving labor in a plant because of automatic operation.

**Characteristics of electric control panel**
This control panel is equipped with operation and alarm system

1. **Operation**
The pump is automatically started with a timer and stops automatically when lubricating is completed. Manual interruption is also allowed during automatic operation.

2. **Warning**
   In the case shown below, the system is in alarm condition, and trouble display lamp turns on and the pump stops.
   1. "Lubricating time extension"
      When the operating time of lubrication is extended.
      a. When the pump sucks in air.
      b. When safety valve is opened for some reason.
      c. When lubricant is leaking from piping or distributing valve.
      d. When the change over valve malfunctions.
      e. When the pump is significantly worn by long service.
      f. When the pressure switch or PV-2E type pressure control valve malfunctions.
   2. "Empty tank"
      When lubricant in the tank is exhausted.
   3. "Overload"
      When operation is overloaded.
      a. When the motor is overloaded.
      b. When the motor operates in single phase.
   Alarm is issued generally in three cases above classified.

**Specification**
The following three types are available in standard depending on the purpose of use. Special design will also be manufactured by request.

<table>
<thead>
<tr>
<th>Type symbol</th>
<th>Power source</th>
<th>Function (all indoor dustproof type)</th>
<th>Applicable pump</th>
</tr>
</thead>
<tbody>
<tr>
<td>E F — 3</td>
<td>AC 200/220V</td>
<td>The pump starts at each preset time of timer, and stops automatically when lubrication is completed. In the case of trouble, the three types &quot;lubrication time extension&quot; &quot;empty tank&quot; &quot;overload&quot; and &quot;high pressure trouble&quot; are displayed comprehensively. The pump can be started as desired with the operation switch, irrespective of pause timer.</td>
<td>UEC—108AL (N) P (Mechatronics integration type)</td>
</tr>
<tr>
<td>E F — 3 T</td>
<td>AC 400/440V (Transformer incorporated)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E F — 4</td>
<td>AC 200/220V</td>
<td>The same as above except that &quot;lubrication time extension&quot; &quot;empty tank&quot; &quot;overload&quot; and &quot;high pressure trouble&quot; are displayed individually.</td>
<td>UEC—108AL (N) UEC—225AL (N) (Mechatronics integration type)</td>
</tr>
<tr>
<td>E F — 4 T</td>
<td>AC 400/440V (Transformer incorporated)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E A — 5</td>
<td>AC 200/220V</td>
<td>The pump starts at each preset time of timer, and stops automatically when lubrication is completed. In the case of trouble, the three types &quot;lubrication time extension&quot; &quot;empty tank&quot; &quot;overload&quot; and &quot;high pressure trouble&quot; are displayed individually. The pump can be started as desired with the operation switch, irrespective of pause timer.</td>
<td>U—25AL (E.N) U—30AL (E.N) U—40AL (E.N) U—45AL (E.N) (Wall type)</td>
</tr>
<tr>
<td>E A — 5 T</td>
<td>AC 400/440V (Transformer incorporated)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Memo**
Electric control panel is for automatic operation on the site in standard. Remote operation and remote display are also available. As for a type containing automatic refilling circuit by BA type barrel pump (EN type) or a type containing automatic refilling circuit by Bulk tank system (EH type), contact us for document.
Operation of electric control panel

Cycle of automatic operation can be simply illustrated as follows:

- Automatic control diagram of UE series

**Electric control panel**

[Diagram showing the process]

- **Pump pause**
  System timer actuates, pump starts in X hours, and signal timer starts operation.

- **In trouble**
  When operation is not completed in Y hours (signal timer actuates) and when tank is empty or operation is overloaded, the trouble display lamp turns on and the pump stops.

- **Pump operation**
  Lubricant, passing through the hydraulic switch valve, is discharged to line 1. When lubrication is completed, pressure rises, and hydraulic switch valve limit switch actuates, in Y hours in total.

- **Pump operation**
  Lubricant, passing through the hydraulic switch valve, is discharged to line 2. When lubrication is completed, pressure rises, and hydraulic switch valve limit switch actuates, in Y hours in total.

- **Power switch ON**

**Centralized lubricating system**

- **Pump operation**
  Lubricant, passing through solenoid operated valve, is discharged to line 1. When lubrication is completed, pressure rises, then pressure switch or pressure control valve limit switch is actuated, and solenoid operated valve is disenergized, in Y hours in total.

- **Pump operation**
  Lubricant, passing through solenoid operated valve, is discharged to line 2. When lubrication is completed, pressure rises, then pressure switch or pressure control valve limit switch is actuated, and solenoid operated valve is disenergized, in Y hours in total.

**X** : Operation interval of pump

**Y** : Lubrication check
Electric control panel

EF type (mechatronics integration) control panel

Development connection diagram EF-3T (when equipped with transformer)

Development connection diagram EF-4T (when equipped with transformer)
1. Specification
It controls UE series electric grease pump. The pump operates automatically after any desired pause, and stops automatically when lubrication is completed. Further, alarm is issued for every trouble. When the power source is AC200/220V, use EF-4 type. When the power source is AC400/440V, use EF-4T type. If you need remote operation, contact us for pertinent information.

2. Operation
Set the signal timer (timer 62G for detecting lubricating time extension) double the calculated pump operation time until lubrication is completed. When setting the time, set the maximum graduation in advance, then operate the pump actually, and measure the time until hydraulic reversing valve (33G) completes switching for reliable operation. Then, set the system timer (timer 2G for setting operation interval) at the time for pausing, and turn on the power switch (circuit breaker 8G), then the power source display lamp 30GA (white) turns on. Then, turn on the control circuit protector (8C) and turn on the operation switch (CS), then the pause display lamp 30GC (green) turns on, and system timer 2G starts counting time.

When preset pause time has elapsed, the system timer 2G switches in, the pause display lamp 30GS (green) turns off, the operation display lamp 30GB (red) turns on, and the pump is started. The signal timer 62G also starts counting time at the same time. In normal operation, lubrication to each lubricating point is completed before the signal timer 62G switches in, and the hydraulic reversing valve limit switch 33G switches to stop the pump. When the pump has stopped, the system timer 2G is actuated, and repeats pause and operation. Desired lubrication is enabled at any time by starting the operation switch, while system timer 2G is reset even when counting time. When stopping the system, turn off the operation switch.

3. Trouble
There are three types of alarm available, i.e. "lubrication time extension" "empty tank" and "overload". Alarm is issued in each case, and each display lamp turns on according to the cause and the pump stops automatically.

Note) As for EF-3(T) type, the three kinds of cause are displayed comprehensively by "trouble". For "lubricating time extension", repair piping leakage and pump trouble; For "empty tank", refill grease or oil; For "overload", eliminate the cause and push the reset lever of thermal relay 49G; turn off the operation switch (CS) once and then turn on again, then the display lamp turns off and system is reset to original pause state.

### Description of operation [EF-4T]

<table>
<thead>
<tr>
<th>Operation device</th>
<th>Application</th>
<th>Operation</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>8G</td>
<td>Circuit breaker</td>
<td>ON—OFF</td>
<td>ON—OFF of main power</td>
</tr>
<tr>
<td>8C</td>
<td>Circuit protector</td>
<td>ON—OFF</td>
<td>ON—OFF of control circuit</td>
</tr>
<tr>
<td>CS</td>
<td>Operation switch</td>
<td>Switching</td>
<td>Off/On/Start</td>
</tr>
<tr>
<td>2G</td>
<td>System timer</td>
<td>Variable</td>
<td>Setting of operation interval</td>
</tr>
<tr>
<td>62G</td>
<td>Signal timer</td>
<td>Variable</td>
<td>Check of lubricating time</td>
</tr>
</tbody>
</table>

NOTE) The setting range of system timer is 300 hours at the maximum, except that the setting range of EF-3 and 3T is 60 hours at the maximum.
**Electric control panel**

**EA type (wall type) control panel**

### Dimension drawing EA-5T (when equipped with transformer)

![Dimension drawing EA-5T](image)

- **External dimension**
- **Parts layout**
- **Control panel terminal**
- **Pressure control valve connection procedure for end system**

<table>
<thead>
<tr>
<th>Number</th>
<th>Symbol</th>
<th>Character on nameplate</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td>Centralized lubricating system control panel</td>
</tr>
<tr>
<td>1</td>
<td>30GA</td>
<td>Power source</td>
</tr>
<tr>
<td>2</td>
<td>30GS</td>
<td>Pause</td>
</tr>
<tr>
<td>3</td>
<td>30GB</td>
<td>Operation</td>
</tr>
<tr>
<td>4</td>
<td>30GF1</td>
<td>Lubrication time extension</td>
</tr>
<tr>
<td>5</td>
<td>30GF2</td>
<td>Empty tank</td>
</tr>
<tr>
<td>6</td>
<td>30GF3</td>
<td>Overload</td>
</tr>
<tr>
<td>7</td>
<td>3–88G</td>
<td>Desired operation</td>
</tr>
<tr>
<td>8</td>
<td>3–30GF</td>
<td>Trouble reset</td>
</tr>
</tbody>
</table>

The portion of ________ is within our scope.

The portion of ________ is out of our scope.

### Development connection diagram EA-5T (when equipped with transformer)

![Development connection diagram EA-5T](image)

- **Motor**
- **Solenoid operated valve**
- **System timer**
- **Electromagnetic switch**
- **Operation**
- **Operation relay**
- **Pressure switch**
- **Auxiliary operation relay**
- **Signal timer**
- **Latching relay**
- **Empty tank**
- **Overload**

Paint color (both inside and outside): 5Y 7/1

Box protection structure: Indoor dustproof structure

Mass: Approx 30 kg
### Description of operation [EA-5(T)]

1. Specification
   
   It controls U series motor driven grease pump. After any desired pause time has elapsed, the pump starts operation automatically, and stops automatically when lubrication is completed. Further, EA-5(T) issues an alarm for every trouble.

   When the power source is AC200/220V, use EA-5 type. When the power source is AC400/440V, use EA-5T type. If you need remote operation, contact us for pertinent information.

2. Operation
   
   Set the signal timer (timer 62G for detecting lubricating time extension) double the calculated pump operation time until lubrication is completed. Then, set the system timer (timer 2G for setting pause interval) at the time desired for pausing, and turn on (circuit breaker 8G) for power in the panel, then the power display lamp 30GA (white) turns on.

   Check that the power display lamp is on, and turn on the solenoid operated valve circuit protector 8S and the operation circuit protector 8C, then the display lamp 30GS (green) turns on and the system timer 2G switch starts counting time. When preset pause time has elapsed, the system timer 2G switches in and pause display lamp turns off, operation display lamp 30GB (red) turns on. As soon as the pump operates, the solenoid operated valve (SOLa) is energized and 62G starts counting time. In normal operation, before the signal timer 62G switches in, lubrication of each lubricating point on line 1 side is completed, and the pressure rises abruptly. When the pressure reaches switching pressure, the pressure switch (loop type/lance type) or the limit switch of pressure control valve (end type) operates, the solenoid operated switch valve (SOLa) is demagnetized, and pressure is released, when the pump stops. When the system timer 2G has passed the preset pause time, the pump operates, the solenoid operated valve (SOLb) is energized, grease is supplied to line 2 side, and the pressure of line rises. When the pressure reaches switching pressure, the solenoid operated valve (SOLb) is demagnetized and pressure is released, as well as the pump stops and returns to its original pause state. It is repeated automatically.

   When stopping the system, turn off the circuit protector 8C.

   Lubrication is enabled at any time by the desired operation pushbutton switch 3-88G (red), while the system timer 2G returns to preset status even when counting time.

3. Trouble
   
   There are three types of alarm available, i.e. "lubrication time extension" "empty tank" and "overload". Alarm is issued in each case, and each display lamp turns on according to the cause and the pump stops automatically.

   For "lubricating time extension", repair piping leakage and pump trouble; For "empty tank", refill grease or oil; For "overload", eliminate the cause and push the reset lever of thermal relay 49G: when the trouble is reset, push the pushbutton switch 3-30GF (yellow), then the trouble display lamp turns off and unit returns to the original pause state.

### Description of function of operation device

<table>
<thead>
<tr>
<th>Operation device</th>
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<th>Operation</th>
<th>Function</th>
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<td><strong>Function</strong></td>
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<td>8G</td>
<td>Circuit breaker</td>
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<td>ON—OFF</td>
</tr>
<tr>
<td>8S</td>
<td>Circuit protector</td>
<td>Electromagnetic circuit</td>
<td>ON—OFF</td>
</tr>
<tr>
<td>8C</td>
<td>Circuit protector</td>
<td>Control circuit</td>
<td>ON—OFF</td>
</tr>
<tr>
<td>3 - 88G</td>
<td>Pushbutton switch</td>
<td>Desired operation</td>
<td>Push</td>
</tr>
<tr>
<td>3 - 30GF</td>
<td>Pushbutton switch</td>
<td>Trouble reset</td>
<td>Push</td>
</tr>
<tr>
<td>2G</td>
<td>System timer</td>
<td>Operation interval</td>
<td>Variable</td>
</tr>
<tr>
<td>62G</td>
<td>Signal timer</td>
<td>Lubrication check</td>
<td>Variable</td>
</tr>
</tbody>
</table>

**NOTE:** System timer setting range is 300 hours at the maximum.