Applicable to the many diverse needs of chemical feeding

Iwaki’s LK series metering pump consists of the worm gear type dual-cam driving section, which is compact yet rigid and reliable. With long and market-proven experience, Iwaki has employed state-of-the-art pump technologies in the development of an ideal type of chemical feeding pump which has advantages such as quality, performance, ease of operation and cost efficiency. The LK series is suitable for many chemical liquid feeding processes used in a wide range of fields, including water treatment, chemicals, fabrics, paper mill, food processing, and medicine.

Various types and materials
The LK series is available to suit each user’s needs in accordance with feeding rate from small to large capacity. Also, material variation has been improved. Selection of the pump material most suitable for the applied liquid is possible with six different types available.

High performance and application-oriented versatile design.
Discharge accuracy (stability) is within ±2% FS. Reliability is considerably enhanced through efforts to improve the linearity of the stroke / discharge ratio as well as the dispersion between stroke. Two types of joints flange and hose joints are standardized for the connections. (LK-F11 to LK-F47) The optimum piping system can be selected.
feeding

- Accurate transfer of strong acid
- Proportional feeding of additive
- Automatic dilution of chemical liquid
- Chemical liquid concentration control
- Automatic process control related to pH
- Replenishing of chemicals
- Accurate quantity coating of coating material
- Liquid sampling
- Accurate quantity spraying
- Metering set-up
- Pressurized transfer or filtering of various types of slurries
Pump heads
Drive from the gear reduction unit is directly transmitted to the diaphragm. This type of metering pump is economical and simple with a high degree of versatility. With the employment of moulded PVC pump-head, and with the new standardization of two types of connections using flanges or hose joints (LK-F11 to LK-F47), not only a saving in parts cost but also improved flexibility of installation has been realized. The three main pump head materials are PVC, stainless steel, or fluororesin. The most suitable type for the application can be selected from a total of six different materials.

Drive component
The heart of the LK series is the dual-cam system driving section with a highly reliable, built-in worm gear type speed reducer. The compact and rigid mechanism is a result of the design goal to achieve maximum wear resistance in continuous operation. In addition to the worm gear which is designed with a considerably large module ratio, the material is aluminium bronze, and a taper roller bearing is used at the end of the worm gear for the efficient transmission of motor power to the pump section. A fully enclosed oil bath lubrication system is employed to permit outdoor installation. The durability in continuous operation over a long period of time is also excellent.

Motor
LK series pumps can be installed with IEC motors.

Stroke adjustment
Accurate and reliable stroke setting is possible with the micrometer type dial of the springback type stroke adjustment mechanism.
## Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Capacity L/min</th>
<th>Max. Pressure MPA</th>
<th>Stroke speed spm</th>
<th>Effective diaphragm dia. mm</th>
<th>Max. stroke length mm</th>
<th>Connection</th>
<th>Motor output (4 Pole)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>50Hz</td>
<td>PVC, PVDF</td>
<td>SUS</td>
<td>50Hz</td>
<td>PVC, PVDF</td>
<td>SUS</td>
<td>PVC</td>
</tr>
<tr>
<td>LK-F11</td>
<td>0.02</td>
<td>1.0</td>
<td>1.5</td>
<td>48</td>
<td>22</td>
<td>1.5</td>
<td>ID4mm (or 5mm) OD9mm</td>
</tr>
<tr>
<td>F21</td>
<td>0.05</td>
<td>1.0</td>
<td>1.5</td>
<td>48</td>
<td>30</td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td>F22</td>
<td>0.10</td>
<td>1.0</td>
<td>1.5</td>
<td>96</td>
<td>30</td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td>F31</td>
<td>0.25</td>
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<td>48</td>
<td>60</td>
<td>2.5</td>
<td></td>
</tr>
<tr>
<td>F32</td>
<td>0.50</td>
<td>1.0</td>
<td>1.5</td>
<td>96</td>
<td>60</td>
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<tr>
<td>F45</td>
<td>0.85</td>
<td>1.0</td>
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<td>48</td>
<td>72</td>
<td>6.0</td>
<td></td>
</tr>
<tr>
<td>F47</td>
<td>1.7</td>
<td>0.8</td>
<td>0.8</td>
<td>96</td>
<td>72</td>
<td>6.0</td>
<td></td>
</tr>
<tr>
<td>F55</td>
<td>2.8</td>
<td>0.5</td>
<td>0.5</td>
<td>48</td>
<td>100</td>
<td>10</td>
<td>DN25 (DIN PN10)</td>
</tr>
<tr>
<td>F57</td>
<td>6.0</td>
<td>0.3</td>
<td>0.3</td>
<td>96</td>
<td>100</td>
<td>10</td>
<td>DN25 (DIN PN10)</td>
</tr>
<tr>
<td>LK-A55</td>
<td>2.8</td>
<td>0.7</td>
<td>0.7</td>
<td>48</td>
<td>100</td>
<td>10</td>
<td>DN25 (DIN PN10)</td>
</tr>
<tr>
<td>A57</td>
<td>6.0</td>
<td>0.5</td>
<td>0.5</td>
<td>96</td>
<td>100</td>
<td>10</td>
<td>DN40 (DIN PN10)</td>
</tr>
<tr>
<td>A65</td>
<td>9.0</td>
<td>0.2</td>
<td>0.2</td>
<td>48</td>
<td>138</td>
<td>17.5</td>
<td>DN40 (DIN PN10)</td>
</tr>
<tr>
<td>LB-B55</td>
<td>9.0</td>
<td>0.5</td>
<td>0.7</td>
<td>48</td>
<td>138</td>
<td>17.5</td>
<td>DN40 (DIN PN10)</td>
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<tr>
<td>B75</td>
<td>13.3</td>
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<td>48</td>
<td>150</td>
<td>20</td>
<td>DN50 (DIN PN10)</td>
</tr>
<tr>
<td>LK-C76</td>
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<td>150</td>
<td>20</td>
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<td>0.3</td>
<td>72</td>
<td>205</td>
<td>20</td>
<td>DN65 (DIN PN10)</td>
</tr>
<tr>
<td>C87</td>
<td>45.0</td>
<td>0.3</td>
<td>0.3</td>
<td>96</td>
<td>205</td>
<td>20</td>
<td></td>
</tr>
</tbody>
</table>

Note 1: The capacity is the value when maximum discharge pressure is applied (with pure water at room temperature).
Note 2: PVC/PVDF hose connection is available only with LK-F11 to LK-F22 (Order-based production).

- Standard accessory: A siphon preventing valve, strainer, and 4m PVC tube is furnished to hose connection type of LK-F11 to LK-F45/CH or WH. A base is furnished to all LK-A, LK-B and LK-C models.
- Frequency control is applicable. For details, please contact us.

## Materials

### Type

<table>
<thead>
<tr>
<th>Application</th>
<th>VC</th>
<th>VH</th>
<th>VS4</th>
<th>TC</th>
<th>S6</th>
<th>S4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acids</td>
<td>11 to 87</td>
<td>11 to 87</td>
<td>65 to 87</td>
<td>11 to 65</td>
<td>11 to 87</td>
<td>65 to 87</td>
</tr>
<tr>
<td>Alkalis</td>
<td>11 to 57</td>
<td>11 to 57</td>
<td>65 to 87</td>
<td>11 to 65</td>
<td>11 to 57</td>
<td>65 to 87</td>
</tr>
<tr>
<td>Strong acids</td>
<td>11 to 65</td>
<td>11 to 65</td>
<td>65 to 87</td>
<td>11 to 57</td>
<td>65 to 87</td>
<td>65 to 87</td>
</tr>
<tr>
<td>Solvents</td>
<td>11 to 87</td>
<td>11 to 87</td>
<td>65 to 87</td>
<td>11 to 65</td>
<td>11 to 87</td>
<td>65 to 87</td>
</tr>
</tbody>
</table>

#### Part

- **Pump head**: PVC, PVC, PVC, PVDF, SUS316, SCS13
- **Valve**: CE, HC, SUS304, CE, HC, SUS304
- **Valve seat Type 11 to 32**: FKM, EPDM, –, FKM, SUS316, –
- **Valve seat Type 45 to 87**: PVC, PVC, PVC, PVDF, SUS316, SUS304
- **O ring**: FKM, EPDM, –, FKM, –, –
- **Valve gasket**: PTFE, –, PTFE

### Liquid temp. range

<table>
<thead>
<tr>
<th>VC</th>
<th>VH</th>
<th>VS4</th>
<th>TC</th>
<th>S6</th>
<th>S4</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 50°C</td>
<td>0 - 80°C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* : Liquid temp. range is varied by handling chemical. Please contact us.

### Typical chemicals

- **VC**: Sulfuric acid, Hydrochloric acid, Sodium hypochlorite
- **VS4**: Caustic soda, Coagulant, Calcium hydroxide (low density)
- **TC**: Concentrated sulfuric acid, Hydrofluoric acid, Mixed acid
- **S6, S4**: Organic solvent, Paper making chemicals

### Material symbols

- **VC**: Sulfuric acid, Hydrochloric acid, Sodium hypochlorite
- **VS4**: Caustic soda, Coagulant, Calcium hydroxide (low density)
- **TC**: Concentrated sulfuric acid, Hydrofluoric acid, Mixed acid
- **S6, S4**: Organic solvent, Paper making chemicals
- **Materical symbols**: Stainess-steel cast equivalent to SUS304
- **CE**: Ceramic
- **FKM**: Fluoro rubber
- **HC**: Hastelloy C276
Identification

LK - F 32 VC T

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Series name</td>
<td>LK series: Mechanical driven diaphragm type</td>
</tr>
<tr>
<td>2 Drive section</td>
<td>F: 0.25kW, A: 0.37kW, B: 0.75kW, C: 1.5kW</td>
</tr>
</tbody>
</table>
| 3 Type No. | First digit: Diaphragm (pump head size)  
| 4 Material symbol | Refer to the material table (ex. VC, VH, VS4, TC, S6, S4) |
| 5 Connection | None: Flange (‘JIS’ or others), T: Flange (‘DIN’), H: Hose |

Dimensions in mm

Dimensions and configurations may be changed without prior notice for the purpose of product improvement.
Be sure to carry out installation work with the most recent and detailed drawings which are available upon request.
The dimensions may differ with the type of motor installed.

Note: All illustrations above show ‘PVC’ type. The suction flange made of SUS is straight.

LK-F11 to LK-F57

<table>
<thead>
<tr>
<th>Model</th>
<th>Hose type</th>
<th>Flange type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PVC</td>
<td>PVC</td>
</tr>
<tr>
<td></td>
<td>L</td>
<td>a</td>
</tr>
<tr>
<td>LK-1</td>
<td>275</td>
<td>146</td>
</tr>
<tr>
<td>2</td>
<td>275</td>
<td>164</td>
</tr>
<tr>
<td>3</td>
<td>277</td>
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<tr>
<td>4</td>
<td>281</td>
<td>243</td>
</tr>
<tr>
<td>5</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Note: Connection size LK-1, LK-2 ø4 ø9 and LK-3, LK-4 ø12 x ø18.
For information of TC type, please contact IWAKI or nearest distributor.

LK-A55 to LK-C87

<table>
<thead>
<tr>
<th>Mode</th>
<th>PVC</th>
<th>SUS</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>L</td>
<td>a</td>
<td>b</td>
</tr>
<tr>
<td>LK-A5</td>
<td>476</td>
<td>325</td>
<td>29</td>
</tr>
<tr>
<td>A5</td>
<td>323</td>
<td>599</td>
<td>108</td>
</tr>
<tr>
<td>B5</td>
<td>395</td>
<td>599</td>
<td>90</td>
</tr>
<tr>
<td>B5</td>
<td>599</td>
<td>600</td>
<td>90</td>
</tr>
<tr>
<td>C7</td>
<td>599</td>
<td>600</td>
<td>90</td>
</tr>
<tr>
<td>C8</td>
<td>596</td>
<td>647</td>
<td>114</td>
</tr>
</tbody>
</table>

Note: These dimensions are common between PVC pump head and SUS pump head.
For information of TC type, please contact IWAKI or nearest distributor.
Optional accessories

### Siphon preventing valve
- **Type:** Relief valve and back pressure valve
- **Material:** PVC type
- **Connection:** PVC, FRP, EPDM

### Air chamber
- **Material:** PVC, A type, PVC, N type, SUS, A type, SUS, A type
- **Body Model:**
  - A-1V-P-S: 1.0
  - A-2V-L-S: 2.0
  - A-3V-L-S: 3.0
  - A-25-V-L-S: 1.0
  - A-35-V-L-S: 3.0
  - A-3P-L-12-S: 0.5
  - A-3G-L-12-S: 0.3
  - A-3H-L-12-S: 0.5
  - A-3S-L-12-S: 0.5
  - A-3F-L-12-S: 0.5
  - A-3G-L-12-S: 0.3
  - A-3F-L-12-S: 0.5
  - A-3G-L-12-S: 0.3
  - A-3H-L-12-S: 0.5
  - A-3S-L-12-S: 0.5

### Relief valve and back pressure valve
- **Material:** PVC type
- **Body Model:**
  - RV-1P-14H: 1.0
  - RV-1P-12H: 1.0
  - RV-1P-1S: 1.0
  - RV-1P-25S: 1.0
  - RV-1P-35S: 3.0
  - RV-1P-31S: 3.0
  - RV-1P-26: 7.8
  - RV-1B-25: 7.4
  - RV-1S-25: 2.5
  - RV-1V-25: 2.5
  - RV-1V-15: 2.0
  - RV-1S-15: 2.0
  - RV-1V-15: 2.0
  - RV-1V-25: 2.5
  - RV-1S-25: 2.5
  - RV-1S-15: 2.0

### List of relief valve
- **Body Model:**
  - RV-1P-14H: 1.0
  - RV-1P-12H: 1.0
  - RV-1P-1S: 1.0
  - RV-1P-25S: 1.0
  - RV-1P-35S: 3.0
  - RV-1P-31S: 3.0
  - RV-1P-26: 7.8
  - RV-1B-25: 7.4
  - RV-1S-25: 2.5
  - RV-1V-25: 2.5
  - RV-1V-15: 2.0
  - RV-1S-15: 2.0

### List of back pressure valve
- **Body Model:**
  - BV-1P-14H: 0.05 - 1.0
  - BV-1P-12H: 0.05 - 1.0
  - BV-1P-1S: 0.05 - 1.0
  - BV-1P-25S: 0.05 - 1.0
  - BV-1P-35S: 0.05 - 1.0
  - BV-1P-31S: 0.05 - 1.0
  - BV-1P-26: 0.03 - 1.0
  - BV-1P-25: 0.03 - 1.0
  - BV-1P-35S: 0.03 - 1.0
  - BV-1P-25S: 0.03 - 1.0
  - BV-1P-31S: 0.03 - 1.0
  - BV-1P-26: 0.02 - 2.0
  - BV-1P-25: 0.02 - 2.0
  - BV-1P-35S: 0.02 - 2.0

### Materials of O-rings:
- **CR** for 10V / 20V and **FKM** for 10V2 / 20V2
- **Symbol for material of O-ring (“Y” for FKM, “E” for EPDM)**

Note: The weight is the value of the product only. (The weight of liquid applied is not included.)
Note2: Rigid PVC chamber may detach with ultraviolet ray or the applied chemical liquid over a long period of time. The chamber should be replaced every three years to guarantee safety.
Points to be observed in pump installation and piping

Iwaki metering pump LK series are reciprocating pumps employing the eccentric cam system. Reciprocating pumps generate pulsation in the suction and discharge piping. Special consideration, (different from the ordinary centrifugal pumps), should be given to this point when planning the pump installation and piping.

• Prevention of pipe vibration
  **Discharge side inertial resistance Pid < 0.1MPa**
  - Pid : Inertial resistance on discharge side

Inertial resistance means the pulsed impact force generated by the flow just upon entering discharge stroke. It is a phenomenon particular to a reciprocating pump which is generated as a result of the sudden application of acceleration to the liquid in the discharge piping. The condition *Pid < 0.1MPa* is given above as an approximate standard. If Pid becomes 0.1MPa or higher, vibration on the pipe is generated. So measures should be taken to cope with the influence of vibration on the pump, too.

**Measures**
1. Install pulsation prevention device (air chamber).
2. Enlarge the diameter and shorten the length of the discharge piping.

• Prevention of overfeeding
  **Pump differential pressure > Inertial resistance Pi**
  - The larger one of the suction side or the discharge side

Overfeeding means excessive flow of the liquid due to abnormal functioning of the check valve caused by pulsation of the liquid in the piping. Check carefully in case the differential pressure is low and in case the flow is too long even with the differential pressure value at 0.03MPa.

**Measures**
1. Install air chamber.
2. Install back pressure valve

• Prevention of suction failure
  **NPSHa > NPSHr**
  - Or Pfs : whichever is the larger.
  (NPSH : Net positive suction head)

If NPSHa is not sufficient, the pump may be damaged by the flow-break or cavitation generated under such conditions.

- NPSHa : Absolute NPSH (MPa)
- NPSHr : Required NPSH (value particular to the pump) (MPa)
- Pa : Absolute pressure onto the tank liquid surface (MPa)
- PV : Liquid vapour pressure (MPa)
- Pfs : Pressure caused by the height of the suction side (MPa)
  (Flooded suction : +, Negative suction : -)
- Pis : Inertial resistance on the suction side (MPa)
- Pfs : Piping resistance on the suction side (MPa)

\[
P_{\text{NPSHa}} = P_a - P_{\text{PV}} \pm P_{\text{Phs}} - P_{\text{Pis}} \text{ (MPa)}
\]

\[
P_{\text{NPSHr}} = P_{\text{Pa}} - P_{\text{PV}} \pm P_{\text{Phs}} - P_{\text{Pis}} \text{ (MPa)}
\]

**Measures**
- Install back pressure valve
- Select a suitable pump according to the value of NPSHr and NPSHa.