**Direct Operated Type Solenoid Operated Proportional Throttle Valve**

### Features
- These proportional throttle directional control valves perform spool position feedback control by directly driving the spool with the proportional solenoid and detecting the displacement with the differential transformer.
- Combining the valve with a pressure compensation valve and the dedicated driver achieves highly accurate proportional flow rate control.
- Highly accurate proportional flow rate control with meter-in control at port P or meter-out control at port T can be realized by stacking the LEMS valves in combination with the dedicated reduction type pressure compensation valve (MGS) under the solenoid valve.

### Nomenclature
- **Gasket mount type**
  - LEM: Solenoid operated proportional throttle valve
  - LEMT: Back pressure type solenoid operated proportional throttle valve

- **Connections**
  - G: Gasket mount type

- **Nominal diameter**
  - 02: ¼ <Applicable only to the model designation LEM>
  - 03: ⅜
  - 04: ½ <Applicable only to the model designation LEMT>

  **Note:**
  - *1 Specifications with SOL.a apply only to nominal diameter 02 (¼).
  - *2 DIN connector mounting at the left side applies only to nominal diameter 03 (⅜).
  - *3 The option code II applies only to LEMT-G03.

- **Spool type**
  - F: Spring offset type
  - All ports blocked when neutral

- **Design No.**
  - (The design No. is subject to change)

- **Option code I**
  - No designation: With SOL.b (flow P → B)
  - G: With SOL.a (flow P → A) *1
  - L: DIN connector mounting position, left side *2

- **Option code II *3**
  - No designation: Without ports L and X
  - LX: With ports L and X

- **Stacking type**

- **Model No.**
  - LEMS: Stacking type solenoid operated proportional throttle valve

- **Nominal diameter**
  - 02: ¼
  - 03: ⅜

- **Control port**
  - P: Port P *4
  - T: Port T

  **Note:**
  - *4 Applicable only to nominal diameter 02 (¼)

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Specifications

<table>
<thead>
<tr>
<th>Model code</th>
<th>Nominal diameter</th>
<th>Maximum operating pressure MPa (kgf/cm²)</th>
<th>Rated flow rate *5 L/min</th>
<th>Port permissible back pressure MPa (kgf/cm²)</th>
<th>Hysteresis, resolution, repeatability</th>
<th>Coil resistance (20°C) Ω</th>
<th>Current at start of flow (Nominal) mA</th>
<th>Current at rated flow (Nominal) mA</th>
</tr>
</thead>
<tbody>
<tr>
<td>LEM -G02-F-20</td>
<td>¼</td>
<td>21 (210)</td>
<td>25</td>
<td>2.5 (25)</td>
<td>No greater than 1% of rated input voltage</td>
<td>26</td>
<td>300</td>
<td>700</td>
</tr>
<tr>
<td>LEM -G03-F-20</td>
<td>⅜</td>
<td>50</td>
<td>130</td>
<td>21 (210)</td>
<td>13</td>
<td>500</td>
<td>1540</td>
<td></td>
</tr>
<tr>
<td>LEMT-G03-F-20</td>
<td>¼</td>
<td>25</td>
<td>2.5 (25)</td>
<td>26</td>
<td>300</td>
<td>700</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LEMT-G04-F-20</td>
<td>⅜</td>
<td>25</td>
<td>2.5 (25)</td>
<td>26</td>
<td>300</td>
<td>700</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LEMS-02T -30</td>
<td>⅜</td>
<td>16 (160)</td>
<td>50</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: *5 The rated flow rate indicates the values when the valve is used in combination with a pressure compensation valve (differential pressure: 0.6 MPa {6 kgf/cm²}).

Applicable driver model code

<table>
<thead>
<tr>
<th>Valve model code</th>
<th>Applicable driver</th>
</tr>
</thead>
<tbody>
<tr>
<td>LEM-G**, LEMT-G03, LEMS-**</td>
<td>KF-5-10</td>
</tr>
<tr>
<td>LEMT-G04</td>
<td>KFH-5-10</td>
</tr>
</tbody>
</table>

(AC 100, 200, 220 V) (Common for 50 and 60 Hz)

Sub-plate model code

- The sub-plate is not provided with the valve. Order it separately as required by specifying the model code given in the table below.

<table>
<thead>
<tr>
<th>Model code</th>
<th>Nominal diameter</th>
<th>Connection port diameter</th>
<th>Mass kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>JS-01M02</td>
<td>¼</td>
<td>Rc¼</td>
<td>0.64</td>
</tr>
<tr>
<td>JS-02M03</td>
<td>⅜</td>
<td>Rc⅜</td>
<td>2.3</td>
</tr>
<tr>
<td>JS-03M</td>
<td>⅜</td>
<td>Rc⅜</td>
<td>2.5</td>
</tr>
<tr>
<td>JS-03M04</td>
<td>⅜</td>
<td>Rc⅜</td>
<td>2.2</td>
</tr>
</tbody>
</table>

Refer to Page S-8 for the dimensions of the sub-plate.

Handling

- Directly connect the tank and drain piping to the tank without merging it with other tank piping.
- Do not touch the zero adjusting screw of the differential transformer since it is factory adjusted.
- Use this valve in combination with a pressure compensation valve. Order a pressure compensation valve separately by referring to the table below as necessary.

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Hexagon socket head cap bolt</th>
<th>Number</th>
<th>Tightening torque N·m (kgf·cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LEM-G02</td>
<td>M5 × 45</td>
<td>4</td>
<td>5 to 8 (50 to 80)</td>
</tr>
<tr>
<td>LEM(T)-G03</td>
<td>M6 × 35</td>
<td>4</td>
<td>10 to 13 (100 to 130)</td>
</tr>
<tr>
<td>LEMT-G04</td>
<td>M6 × 50</td>
<td>2</td>
<td>10 to 13 (100 to 130)</td>
</tr>
<tr>
<td>LEMS-02P</td>
<td>M10 × 55</td>
<td>4</td>
<td>59 to 62 (590 to 620)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Bypass type pressure compensation valve</th>
<th>Reduction type pressure compensation valve</th>
</tr>
</thead>
<tbody>
<tr>
<td>LEM-G**</td>
<td>MUV12AL6S MUL12AL6N-358</td>
<td>MDM12AL6N</td>
</tr>
<tr>
<td>LEMT-G03</td>
<td>MUV16AL6S MUL16AL6N-347 MUL12ALN-561</td>
<td>MDM16AL6N</td>
</tr>
<tr>
<td>LEMT-G04</td>
<td>MUV12AL6S MUL12AL6N-358</td>
<td>MDM12AL6N</td>
</tr>
<tr>
<td>LEMS-02P</td>
<td>–</td>
<td>MGS-02P-20-** (Stacking type)</td>
</tr>
<tr>
<td>LEMS-02T</td>
<td>–</td>
<td>MGS-02T-20-** (Stacking type)</td>
</tr>
<tr>
<td>LEMS-03T</td>
<td>–</td>
<td>MGS-03T-10-** (Stacking type)</td>
</tr>
</tbody>
</table>
Performance curves (viscosity: 32 mm²/s {cSt})

Input voltage - Flow rate characteristics

LEM-G02

LEM(T)-G03

LEMT-G04

Frequency response characteristics

LEMx-(G)02

Flow rate fluctuation: 12 ± 1.25 L/min

LEMx-(G)03

Flow rate fluctuation: 25 ± 2.5 L/min

LEMT-G04

Flow rate fluctuation: 65 ± 5 L/min

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External dimension diagram

**LEM-G02**

DIN connector socket
Hirschmann: GDM2011
Connector for differential transformer
SNS-1605PCF (from Sanwa Denki Kogyo)

Air bleeding screw
(3 locations)
Socket for hex key: 2.5

Mounting face (conforming standard)
ISO 4401-03-02-0-05

- Option code I: G

**LEM-G03**

Connector for differential transformer
SNS-1605PCF (from Sanwa Denki Kogyo)

DIN connector socket
Hirschmann: GDM2011

Air bleeding screw
(3 locations)
Socket for hex key: 2.5

Mounting face (conforming standard)
ISO 4401-05-04-0-05

- Option code I: L
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External dimension diagram

LEMT-G03

Connectors for differential transformer
SNS-1605PCF (from Sanwa Denki Kogyo)
DIN connector socket
Hirschmann: GDM2011
Air bleeding screw
(3 locations)
Socket for hex key: 2.5

Option code II: LX

Mounting face (conforming standard)
ISO 4401-05-05-0-05

LEMT-G04

DIN connector socket
Hirschmann: GDM2011
Air bleeding screw
(3 locations)
Socket for hex key: 2.5

Connector for differential transformer
SNS-1605PCF (from Sanwa Denki Kogyo)
External dimension diagram

LEMS-02P(T)

Guide to the DIN connector and differential transformer option codes

DIN connector socket
Hirschmann: GDM2011
Connector for differential transformer
SNS-1605PCF
(from Sanwa Denki Kogyo)

Air bleeding screw (3 locations)
Socket for hex key: 2.5

With LEMS-02P

With LEMS-02T

With LEMS-02T

Mounting face (conforming standard)
ISO 4401-03-02-0-05

LEMS-03T

DIN connector socket
Hirschmann: GDM2011
Connector for differential transformer
SNS-1605PCF
(from Sanwa Denki Kogyo)

Air bleeding screw (3 locations)
Socket for hex key: 2.5

Mounting face (conforming standard)
ISO 4401-05-04-0-05
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Sectional structural diagram

LEM-G02

Sealing part table

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Name</th>
<th>Quantity</th>
<th>Part specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>O-ring</td>
<td>4</td>
<td>JIS B 2401 1B P9</td>
</tr>
<tr>
<td>14</td>
<td>O-ring</td>
<td>2</td>
<td>AS568-121 (NBR, Hs90)</td>
</tr>
</tbody>
</table>

LEM-G03

Sealing part table

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Name</th>
<th>Quantity</th>
<th>Part specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>O-ring</td>
<td>5</td>
<td>JIS B 2401 1B P12</td>
</tr>
<tr>
<td>14</td>
<td>O-ring</td>
<td>2</td>
<td>AS568-121 (NBR, Hs90)</td>
</tr>
</tbody>
</table>

LEMT-G03

Sealing part table

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Name</th>
<th>Quantity</th>
<th>Part specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>O-ring</td>
<td>5</td>
<td>AS568-014 (NBR, Hs90)</td>
</tr>
<tr>
<td>13</td>
<td>O-ring</td>
<td>2</td>
<td>JIS B 2401 1B P9</td>
</tr>
<tr>
<td>14</td>
<td>O-ring</td>
<td>1</td>
<td>AS568-008 (NBR, Hs90)</td>
</tr>
<tr>
<td>15</td>
<td>O-ring</td>
<td>2</td>
<td>AS568-121 (NBR, Hs90)</td>
</tr>
</tbody>
</table>
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Sectional structural diagram

**LEMT-G04**

![LEMT-G04 Diagram]

**LEMS-02P(T)**

![LEMS-02P(T) Diagram]

**LEMS-03T**

![LEMS-03T Diagram]

Sealing part table

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<tbody>
<tr>
<td>14</td>
<td>O-ring</td>
<td>4</td>
<td>JIS B 2401 1B P22</td>
</tr>
<tr>
<td>15</td>
<td>O-ring</td>
<td>2</td>
<td>JIS B 2401 1B P9</td>
</tr>
<tr>
<td>16</td>
<td>O-ring</td>
<td>1</td>
<td>AS568-021 (NBR, Hs90)</td>
</tr>
<tr>
<td>17</td>
<td>O-ring</td>
<td>1</td>
<td>JIS B 2401 1B P44</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Name</th>
<th>Quantity</th>
<th>Part specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>O-ring</td>
<td>4</td>
<td>JIS B 2401 1B P9</td>
</tr>
<tr>
<td>13</td>
<td>O-ring</td>
<td>1</td>
<td>JIS B 2401 1B P7</td>
</tr>
<tr>
<td>14</td>
<td>O-ring</td>
<td>2</td>
<td>AS568-121 (NBR, Hs90)</td>
</tr>
</tbody>
</table>

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