Electronic Pulse Meters

For use with petroleum-based lubricants only.

1500 psi (10.3 MPa, 103 bar) Maximum Working Pressure

EFC (Electronic Fluid Commander):
Model No. 223655, Series C, Replacement Pulse Module
Model No. 236763, Series A, Pulse Module and Meter (pints, quarts, gallons)
Model No. 236764, Series A, Pulse Module and Meter (liters)

Horizon™:
Model No. 239367, Series A, Replacement Pulse Module
Model No. 238618, Series A, Pulse Module and Meter (pints, quarts, gallons, liters)

Important Safety Instructions
Read all warnings and instructions in this manual.
Save these instructions.
**WARNING**

To reduce the risk of serious injury, including electric shock or splashing fluid in the eyes or on the skin, always follow this procedure before servicing any part of the metering system and before checking for loose or shorted wires.

1. Turn off the control, and unplug it.
2. Shut off the power to the pump(s).
3. Relieve the fluid pressure.

**CAUTION**

To avoid damaging the electronic components of the pulse meter module (1)
- Do not lay anything on the module.
- Be sure the open side of the pulse module faces up if you lay it down.
- Do not twist or force parts. Align parts properly as instructed.

**NOTE:** All pulse meters are bi-directional.

**To Install or Remove the Complete Pulse Meter**

1. Observe the Warning and Caution above.
2. Disconnect the cable from the pulse module, taking note of the wiring polarity.
3. Remove the old pulse meter and install the new one, observing the original wiring polarity.

**To Replace the Electronic Pulse Module**

4. Observe the Warning and Caution at left.
5. If you are replacing the pulse module, disconnect the cable, taking note of the wiring polarity.
6. Remove the screws, and lift off the pulse module.
7. Install a new pulse module (1). Align the notch on the side of the pulse module with the notch on the side of the metering unit. Use the new screws and torque them oppositely and evenly to 3 to 5 in-lb (0.34 to 0.57 N.m). See Fig. NO TAG.
8. Connect the pulse module wires to the cable, observing the original wiring polarity.

**To Verify the Accuracy of a Pulse Meter Module**

1. Use a clean, calibrated container. If using a single container, be sure to clean it after each dispense.
2. Have pump air pressure at the lowest possible setting for dispensing fluid.
3. Put the tip of the nozzle at the bottom of the calibrated container.
4. If the tip of the dispense valve does not reach the bottom of the calibrated container, use a length of plastic tubing over the tip of the nozzle to ensure liquid enters the container from the bottom.
5. Trigger the gun slowly so the fluid immediately covers the tip of the dispense valve.
6. Dispense 1 quart of fluid according to the metered display on the dispense valve.
7. Allow product to sit for 20 minutes, then compare the actual, physical measurement in the calibrated container to the measurement displayed on the meter.

**NOTE:** The procedure above will determine if the meter is accurately dispensing the product and minimize testing errors. Some variance may occur depending on the viscosity of the fluid. If this procedure determines that the meter is not accurate, recalibrate the meter as described in the service manual or replace the meter or the electronics as necessary.
**Parts**

**Electronic Pulse Meter – EFC**  
*Model 236763, Series A*

*Measures in pints, quarts, or gallons*

1.  223655  Electronic Pulse Module  
2.  *  Metering Unit  
    *(cannot be ordered separately)  

**Electronic Pulse Meter – EFC**  
*Model 236764, Series A*

*Measures in liters*

1.  223655  Electronic Pulse Module  
2.  *  Metering Unit  
    *(cannot be ordered separately)  

**Electronic Pulse Meter – Horizon**  
*Model 238618, Series A*

*Measures in pints, quarts, gallons, or liters*

1.  239367  Electronic Pulse Module, Horizon  
2.  *  Metering Unit  
    *(cannot be ordered separately)  

**Replacement screws included**

Torque oppositely and evenly to 3 to 5 in-lb  
*(0.34 to 0.57 N.m)*

**Wire Color**  
**Function**

<table>
<thead>
<tr>
<th>Wire Color</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>Power</td>
</tr>
<tr>
<td>Black</td>
<td>Ground</td>
</tr>
</tbody>
</table>

**NOTE:** 238618 Electronic Pulse Meter may be used in place of 236763, but do not use the white wire.
### Technical Data

<table>
<thead>
<tr>
<th>Category</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical input voltage</td>
<td>15 V maximum</td>
</tr>
<tr>
<td>Current loop output</td>
<td><strong>Models 236763, 236764:</strong> 4 milliamps OFF 10 milliamps ON</td>
</tr>
<tr>
<td>Voltage loop output</td>
<td><strong>Model 238618:</strong> 0 V OFF, 15 V maximum ON</td>
</tr>
</tbody>
</table>
| Wiring gauge required          | **Models 236763, 236764:** Up to 200 ft (61 m), 18 AWG 2 Wire 90 Volt 201–500 ft (61.3–152.4 m), 16 AWG 2 Wire 90 Volt 501–1000 ft (152.7–305 m), 14 AWG 2 Wire 90 Volt  
**Model 238618:** Up to 50 ft (15.3 m), 18 AWG Shielded 3 Cable |
| Maximum fluid flow (see Pressure Drop Chart) | 12 gpm (45.6 lpm) maximum                                           |
| Maximum operating pressure     | 1500 psi (10.3 MPa, 103 bar)                                         |
| Inlet/Outlet                    | 1/2 npt                                                             |

### Pressure Drop Chart

#### Pulse Meter Pressure Loss

(Flow Rate – gpm)

<table>
<thead>
<tr>
<th>Crankcase Viscosity</th>
<th>Gear Viscosity</th>
<th>ISO No.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
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</thead>
<tbody>
<tr>
<td>5w</td>
<td>——</td>
<td>22</td>
<td>4</td>
<td>8</td>
<td>14</td>
<td>19</td>
<td>25</td>
<td>32</td>
<td>37</td>
<td>43</td>
<td>51</td>
<td>58</td>
<td>66</td>
<td>74</td>
</tr>
<tr>
<td>10w</td>
<td>——</td>
<td>32</td>
<td>6</td>
<td>12</td>
<td>20</td>
<td>28</td>
<td>36</td>
<td>46</td>
<td>54</td>
<td>63</td>
<td>74</td>
<td>85</td>
<td>96</td>
<td>108</td>
</tr>
<tr>
<td>ATF</td>
<td>——</td>
<td>7</td>
<td>15</td>
<td>25</td>
<td>35</td>
<td>45</td>
<td>57</td>
<td>67</td>
<td>79</td>
<td>92</td>
<td>106</td>
<td>120</td>
<td>135</td>
<td></td>
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<tr>
<td>Hyd.</td>
<td>——</td>
<td>46</td>
<td>9</td>
<td>17</td>
<td>29</td>
<td>40</td>
<td>52</td>
<td>66</td>
<td>78</td>
<td>91</td>
<td>106</td>
<td>122</td>
<td>138</td>
<td>155</td>
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<tr>
<td>20w</td>
<td>——</td>
<td>68</td>
<td>13</td>
<td>25</td>
<td>42</td>
<td>59</td>
<td>76</td>
<td>100</td>
<td>115</td>
<td>134</td>
<td>157</td>
<td>181</td>
<td>204</td>
<td>229</td>
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<tr>
<td>30w</td>
<td>——</td>
<td>100</td>
<td>19</td>
<td>37</td>
<td>62</td>
<td>87</td>
<td>112</td>
<td>144</td>
<td>169</td>
<td>197</td>
<td>231</td>
<td>266</td>
<td>300</td>
<td>337</td>
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<tr>
<td>40w</td>
<td>——</td>
<td>150</td>
<td>28</td>
<td>56</td>
<td>94</td>
<td>131</td>
<td>169</td>
<td>216</td>
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<td>295</td>
<td>347</td>
<td>398</td>
<td>450</td>
<td>506</td>
</tr>
<tr>
<td>50w</td>
<td>90w</td>
<td>220</td>
<td>41</td>
<td>82</td>
<td>137</td>
<td>192</td>
<td>247</td>
<td>316</td>
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<td>433</td>
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<tr>
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<td>460</td>
<td>540</td>
<td>630</td>
<td>740</td>
<td>850</td>
<td>960</td>
<td>1080</td>
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<tr>
<td>——</td>
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<td>86</td>
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<td>287</td>
<td>402</td>
<td>517</td>
<td>661</td>
<td>776</td>
<td>906</td>
<td>1064</td>
<td>1222</td>
<td>1380</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The above table indicates the actual pressure drop through the bare meter at 70°F. The shaded area indicates a flow rate for a given fluid that may not be a good choice for a cost effective system.
Graco promises all equipment manufactured by Graco and bearing its name to be free from defects in material and workmanship on the date of sale to the original purchaser for use. With the exception of any special, extended, or limited warranty published by Graco, Graco will, for a period of twelve months from the date of sale, repair or replace any part of the equipment determined by Graco to be defective. This warranty applies only when the equipment is installed, operated and maintained in accordance with Graco’s written recommendations.

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612–378–3590 Fax

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Graco Headquarters: Minneapolis
International Offices: Belgium, Korea, China, Japan

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