

| Model Number<br>3122-01A                                                                                                                                                                                                                                            | ROTARY TORQUE, SHAFT-SHAFT, HIGH SPEED, LOW CAPACITANCE |                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                     | Revision NR<br>ECN #:                                                                                                                                                                                                                                                                                                                                                        |              |              |           |               |              |                     |                     |                     |                     |              |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|--------------|-----------|---------------|--------------|---------------------|---------------------|---------------------|---------------------|--------------|
| <b>Performance</b>                                                                                                                                                                                                                                                  |                                                         | <b>ENGLISH</b>                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>SI</b>           | <b>Optional Versions</b> (Optional versions have identical specifications and accessories as listed for standard model except where noted below. More than one option maybe used.)<br><br><b>Notes</b><br>[1] Recommended 10 VAC RMS.<br>[2] FS - Full Scale.<br>[3] Over compensated operating temperature range.<br>[4] Nominal.<br>[5] See 45871 for dimensional drawing. |              |              |           |               |              |                     |                     |                     |                     |              |
| Measurement Range (Full Scale Capacity)                                                                                                                                                                                                                             | 8.85 in-lb                                              | 1 Nm                                                                                                                                                                                                                                                                                                                                                                                                                                                |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Sensitivity (output at rated capacity)                                                                                                                                                                                                                              | 1.5 mV/V                                                | 1.5 mV/V                                                                                                                                                                                                                                                                                                                                                                                                                                            | [4]                 |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Non-Linearity                                                                                                                                                                                                                                                       | ≤0.1 % FS                                               | ≤0.1 % FS                                                                                                                                                                                                                                                                                                                                                                                                                                           | [2]                 |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Hysteresis                                                                                                                                                                                                                                                          | ≤0.1 % FS                                               | ≤0.1 % FS                                                                                                                                                                                                                                                                                                                                                                                                                                           | [2]                 |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Non-Repeatability                                                                                                                                                                                                                                                   | ≤0.05 % FS                                              | ≤0.05 % FS                                                                                                                                                                                                                                                                                                                                                                                                                                          | [2]                 |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| <b>Environmental</b>                                                                                                                                                                                                                                                |                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Overload Limit                                                                                                                                                                                                                                                      | 44 in-lb                                                | 5 Nm                                                                                                                                                                                                                                                                                                                                                                                                                                                |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Temperature Range (Operating)                                                                                                                                                                                                                                       | 0 to 200 °F                                             | -18 to 93 °C                                                                                                                                                                                                                                                                                                                                                                                                                                        |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Temperature Range (Compensated)                                                                                                                                                                                                                                     | 70 to 150 °F                                            | 21 to 66 °C                                                                                                                                                                                                                                                                                                                                                                                                                                         |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Temperature Effect on Output (Maximum)                                                                                                                                                                                                                              | ±0.002 %Reading/°F                                      | ±0.0018 %Reading/°C                                                                                                                                                                                                                                                                                                                                                                                                                                 | [3]                 |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Temperature Effect on Zero Balance (Maximum)                                                                                                                                                                                                                        | ±0.002 %FS/°F                                           | ±0.0018 %FS/°C                                                                                                                                                                                                                                                                                                                                                                                                                                      | [3]                 |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| <b>Electrical</b>                                                                                                                                                                                                                                                   |                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Bridge Resistance                                                                                                                                                                                                                                                   | 350 Ohm                                                 | 350 Ohm                                                                                                                                                                                                                                                                                                                                                                                                                                             |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Excitation Voltage                                                                                                                                                                                                                                                  | 20 VDC or VAC rms                                       | 20 VDC or VAC rms                                                                                                                                                                                                                                                                                                                                                                                                                                   | [1]                 |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Insulation Resistance                                                                                                                                                                                                                                               | >5 GOhm                                                 | >5 GOhm                                                                                                                                                                                                                                                                                                                                                                                                                                             |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Zero Balance                                                                                                                                                                                                                                                        | ≤2 % FS                                                 | ≤2 % FS                                                                                                                                                                                                                                                                                                                                                                                                                                             | [2]                 |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Bridge Current (at 5 VAC)                                                                                                                                                                                                                                           | 50 mA                                                   | 50 mA                                                                                                                                                                                                                                                                                                                                                                                                                                               |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| <b>Physical</b>                                                                                                                                                                                                                                                     |                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Size (Shaft Length x Housing Length x Housing Height)                                                                                                                                                                                                               | 6.50 in x 3.44 in x 3.50 in                             | 165.1 mm x 87.4 mm x 88.9 mm                                                                                                                                                                                                                                                                                                                                                                                                                        | [5]                 |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Weight                                                                                                                                                                                                                                                              | 2 lb                                                    | 0.9 Kg                                                                                                                                                                                                                                                                                                                                                                                                                                              |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Mounting                                                                                                                                                                                                                                                            | Keyed Shaft                                             | Keyed Shaft                                                                                                                                                                                                                                                                                                                                                                                                                                         |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Sensing Element                                                                                                                                                                                                                                                     | Strain Gage                                             | Strain Gage                                                                                                                                                                                                                                                                                                                                                                                                                                         |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Housing Material                                                                                                                                                                                                                                                    | Aluminum                                                | Aluminum                                                                                                                                                                                                                                                                                                                                                                                                                                            |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Shaft Material                                                                                                                                                                                                                                                      | Stainless Steel                                         | Stainless Steel                                                                                                                                                                                                                                                                                                                                                                                                                                     |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Electrical Connector                                                                                                                                                                                                                                                | PT02H-8-4P                                              | PT02H-8-4P                                                                                                                                                                                                                                                                                                                                                                                                                                          |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Torsional Stiffness                                                                                                                                                                                                                                                 | 400 in-lb/radian                                        | 400 in-lb/radian                                                                                                                                                                                                                                                                                                                                                                                                                                    |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Rotating Inertia                                                                                                                                                                                                                                                    | 0.42 in-lb/sec2                                         | 0.42 in-lb/sec2                                                                                                                                                                                                                                                                                                                                                                                                                                     |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Maximum Speed                                                                                                                                                                                                                                                       | 10000 RPM                                               | 10000 RPM                                                                                                                                                                                                                                                                                                                                                                                                                                           |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| <p><i>All specifications are at room temperature unless otherwise specified.</i></p> <p>In the interest of constant product improvement, we reserve the right to change specifications without notice.</p> <p>ICP® is a registered trademark of PCB group, Inc.</p> |                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
|                                                                                                                                                                                                                                                                     |                                                         | <table border="1"> <tr> <td>Entered: BLS</td><td>Engineer: PE</td><td>Sales: JC</td><td>Approved: BLS</td><td>Spec Number:</td></tr> <tr> <td>Date:<br/>04/01/2010</td><td>Date:<br/>04/01/2010</td><td>Date:<br/>04/01/2010</td><td>Date:<br/>04/01/2010</td><td><b>45864</b></td></tr> </table>                                                                                                                                                   |                     |                                                                                                                                                                                                                                                                                                                                                                              | Entered: BLS | Engineer: PE | Sales: JC | Approved: BLS | Spec Number: | Date:<br>04/01/2010 | Date:<br>04/01/2010 | Date:<br>04/01/2010 | Date:<br>04/01/2010 | <b>45864</b> |
| Entered: BLS                                                                                                                                                                                                                                                        | Engineer: PE                                            | Sales: JC                                                                                                                                                                                                                                                                                                                                                                                                                                           | Approved: BLS       | Spec Number:                                                                                                                                                                                                                                                                                                                                                                 |              |              |           |               |              |                     |                     |                     |                     |              |
| Date:<br>04/01/2010                                                                                                                                                                                                                                                 | Date:<br>04/01/2010                                     | Date:<br>04/01/2010                                                                                                                                                                                                                                                                                                                                                                                                                                 | Date:<br>04/01/2010 | <b>45864</b>                                                                                                                                                                                                                                                                                                                                                                 |              |              |           |               |              |                     |                     |                     |                     |              |
|                                                                                                                                                                                                                                                                     |                                                         |  <p>Company: PCB Load &amp; Torque, Inc.<br/> Address: 24350 Indoplex Circle<br/> Farmington Hills, MI 48335<br/> UNITED STATES<br/> Phone: 866-684-7107<br/> Fax: 716-684-0987<br/> E-mail: <a href="mailto:ltinfo@pcbloadtorque.com">ltinfo@pcbloadtorque.com</a><br/> Web site: <a href="http://www.pcbloadtorque.com">http://www.pcbloadtorque.com</a></p> |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |

| Model Number<br>3122-02A                                                                                                                                                                                                                                                                                                                                                                                                                                                              | ROTARY TORQUE, SHAFT-SHAFT, HIGH SPEED, LOW CAPACITANCE |                                 |                     | Revision NR<br>ECN #:                                                                                                                                                                                                                                                                                                                                                        |              |              |           |               |              |                     |                     |                     |                     |              |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|---------------------------------|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|--------------|-----------|---------------|--------------|---------------------|---------------------|---------------------|---------------------|--------------|
| <b>Performance</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                         | <b>ENGLISH</b>                  | <b>SI</b>           | <b>Optional Versions</b> (Optional versions have identical specifications and accessories as listed for standard model except where noted below. More than one option maybe used.)<br><br><b>Notes</b><br>[1] Recommended 10 VAC RMS.<br>[2] FS - Full Scale.<br>[3] Over compensated operating temperature range.<br>[4] Nominal.<br>[5] See 45871 for dimensional drawing. |              |              |           |               |              |                     |                     |                     |                     |              |
| Measurement Range (Full Scale Capacity)                                                                                                                                                                                                                                                                                                                                                                                                                                               | 17.7 in-lb                                              | 2 Nm                            |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Sensitivity (output at rated capacity)                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1.5 mV/V                                                | 1.5 mV/V                        | [4]                 |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Non-Linearity                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ≤0.1 % FS                                               | ≤0.1 % FS                       | [2]                 |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Hysteresis                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | ≤0.1 % FS                                               | ≤0.1 % FS                       | [2]                 |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Non-Repeatability                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | ≤0.05 % FS                                              | ≤0.05 % FS                      | [2]                 |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| <b>Environmental</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                         |                                 |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Overload Limit                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 71 in-lb                                                | 8 Nm                            |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Temperature Range (Operating)                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 0 to 200 °F                                             | -18 to 93 °C                    |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Temperature Range (Compensated)                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 70 to 150 °F                                            | 21 to 66 °C                     |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Temperature Effect on Output (Maximum)                                                                                                                                                                                                                                                                                                                                                                                                                                                | ±0.002<br>%Reading/°F                                   | ±0.0018 %Reading/°C             | [3]                 |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Temperature Effect on Zero Balance (Maximum)                                                                                                                                                                                                                                                                                                                                                                                                                                          | ±0.002 %FS/°F                                           | ±0.0018 %FS/°C                  | [3]                 |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| <b>Electrical</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                         |                                 |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Bridge Resistance                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 350 Ohm                                                 | 350 Ohm                         |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Excitation Voltage                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 20 VDC or VAC<br>rms                                    | 20 VDC or VAC rms               | [1]                 |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Insulation Resistance                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | >5 GOhm                                                 | >5 GOhm                         |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Zero Balance                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | ≤2 % FS                                                 | ≤2 % FS                         | [2]                 |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Bridge Current (at 5 VAC)                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 50 mA                                                   | 50 mA                           |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| <b>Physical</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                         |                                 |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Size (Shaft Length x Housing Length x<br>Housing Height)                                                                                                                                                                                                                                                                                                                                                                                                                              | 6.50 in x 3.44 in x<br>3.50 in                          | 165.1 mm x 87.4 mm<br>x 88.9 mm | [5]                 |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Weight                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2 lb                                                    | 0.9 Kg                          |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Mounting                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Keyed Shaft                                             | Keyed Shaft                     |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Sensing Element                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Strain Gage                                             | Strain Gage                     |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Housing Material                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Aluminum                                                | Aluminum                        |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Shaft Material                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Stainless Steel                                         | Stainless Steel                 |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Electrical Connector                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | PT02H-8-4P                                              | PT02H-8-4P                      |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Torsional Stiffness                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 1.1 kin-lb/radian                                       | 1.1 kin-lb/radian               |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Rotating Inertia                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 0.42 in-lb/sec2                                         | 0.42 in-lb/sec2                 |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Maximum Speed                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 10000 RPM                                               | 10000 RPM                       |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| <p><i>All specifications are at room temperature unless otherwise specified.</i></p> <p>In the interest of constant product improvement, we reserve the right to change specifications without notice.</p> <p>ICP® is a registered trademark of PCB group, Inc.</p>                                                                                                                                                                                                                   |                                                         |                                 |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| <table border="1"> <tr> <td>Entered: BLS</td><td>Engineer: PE</td><td>Sales: JC</td><td>Approved: BLS</td><td>Spec Number:</td></tr> <tr> <td>Date:<br/>04/01/2010</td><td>Date:<br/>04/01/2010</td><td>Date:<br/>04/01/2010</td><td>Date:<br/>04/01/2010</td><td><b>45865</b></td></tr> </table>                                                                                                                                                                                     |                                                         |                                 |                     |                                                                                                                                                                                                                                                                                                                                                                              | Entered: BLS | Engineer: PE | Sales: JC | Approved: BLS | Spec Number: | Date:<br>04/01/2010 | Date:<br>04/01/2010 | Date:<br>04/01/2010 | Date:<br>04/01/2010 | <b>45865</b> |
| Entered: BLS                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Engineer: PE                                            | Sales: JC                       | Approved: BLS       | Spec Number:                                                                                                                                                                                                                                                                                                                                                                 |              |              |           |               |              |                     |                     |                     |                     |              |
| Date:<br>04/01/2010                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Date:<br>04/01/2010                                     | Date:<br>04/01/2010             | Date:<br>04/01/2010 | <b>45865</b>                                                                                                                                                                                                                                                                                                                                                                 |              |              |           |               |              |                     |                     |                     |                     |              |
| <div>  <div> <p>Company: PCB Load &amp; Torque, Inc.</p> <p>Address: 24350 Indoplex Circle<br/>Farmington Hills, MI 48335<br/>UNITED STATES</p> <p>Phone: 866-684-7107</p> <p>Fax: 716-684-0987</p> <p>E-mail: <a href="mailto:ltinfo@pcbloadtorque.com">ltinfo@pcbloadtorque.com</a></p> <p>Web site: <a href="http://www.pcbloadtorque.com">http://www.pcbloadtorque.com</a></p> </div> </div> |                                                         |                                 |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |

| Model Number<br>3122-03A                                                                                                                                                                                                                                                                                                                                                                                                                                                              | ROTARY TORQUE, SHAFT-SHAFT, HIGH SPEED, LOW CAPACITANCE |                                 |                     | Revision NR<br>ECN #:                                                                                                                                                                                                                                                                                                                                                        |              |              |           |               |              |                     |                     |                     |                     |              |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|---------------------------------|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|--------------|-----------|---------------|--------------|---------------------|---------------------|---------------------|---------------------|--------------|
| <b>Performance</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                         | <b>ENGLISH</b>                  | <b>SI</b>           | <b>Optional Versions</b> (Optional versions have identical specifications and accessories as listed for standard model except where noted below. More than one option maybe used.)<br><br><b>Notes</b><br>[1] Recommended 10 VAC RMS.<br>[2] FS - Full Scale.<br>[3] Over compensated operating temperature range.<br>[4] Nominal.<br>[5] See 45871 for dimensional drawing. |              |              |           |               |              |                     |                     |                     |                     |              |
| Measurement Range (Full Scale Capacity)                                                                                                                                                                                                                                                                                                                                                                                                                                               | 50 in-lb                                                | 5.7 Nm                          |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Sensitivity (output at rated capacity)                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1.5 mV/V                                                | 1.5 mV/V                        | [4]                 |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Non-Linearity                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ≤0.1 % FS                                               | ≤0.1 % FS                       | [2]                 |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Hysteresis                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | ≤0.1 % FS                                               | ≤0.1 % FS                       | [2]                 |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Non-Repeatability                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | ≤0.05 % FS                                              | ≤0.05 % FS                      | [2]                 |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| <b>Environmental</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                         |                                 |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Overload Limit                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 133 in-lb                                               | 15 Nm                           |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Temperature Range (Operating)                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 0 to 200 °F                                             | -18 to 93 °C                    |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Temperature Range (Compensated)                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 70 to 150 °F                                            | 21 to 66 °C                     |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Temperature Effect on Output (Maximum)                                                                                                                                                                                                                                                                                                                                                                                                                                                | ±0.002<br>%Reading/°F                                   | ±0.0018 %Reading/°C             | [3]                 |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Temperature Effect on Zero Balance (Maximum)                                                                                                                                                                                                                                                                                                                                                                                                                                          | ±0.002 %FS/°F                                           | ±0.0018 %FS/°C                  | [3]                 |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| <b>Electrical</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                         |                                 |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Bridge Resistance                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 350 Ohm                                                 | 350 Ohm                         |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Excitation Voltage                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 20 VDC or VAC<br>rms                                    | 20 VDC or VAC rms               | [1]                 |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Insulation Resistance                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | >5 GOhm                                                 | >5 GOhm                         |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Zero Balance                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | ≤2 % FS                                                 | ≤2 % FS                         | [2]                 |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Bridge Current (at 5 VAC)                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 50 mA                                                   | 50 mA                           |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| <b>Physical</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                         |                                 |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Size (Shaft Length x Housing Length x<br>Housing Height)                                                                                                                                                                                                                                                                                                                                                                                                                              | 6.50 in x 3.44 in x<br>3.50 in                          | 165.1 mm x 87.4 mm<br>x 88.9 mm | [5]                 |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Weight                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2 lb                                                    | 0.9 Kg                          |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Mounting                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Keyed Shaft                                             | Keyed Shaft                     |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Sensing Element                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Strain Gage                                             | Strain Gage                     |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Housing Material                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Aluminum                                                | Aluminum                        |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Shaft Material                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Stainless Steel                                         | Stainless Steel                 |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Electrical Connector                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | PT02H-8-4P                                              | PT02H-8-4P                      |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Torsional Stiffness                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 4.4 kin-lb/radian                                       | 4.4 kin-lb/radian               |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Rotating Inertia                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 0.42 in-lb/sec2                                         | 0.42 in-lb/sec2                 |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Maximum Speed                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 10000 RPM                                               | 10000 RPM                       |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| <p><i>All specifications are at room temperature unless otherwise specified.</i></p> <p>In the interest of constant product improvement, we reserve the right to change specifications without notice.</p> <p>ICP® is a registered trademark of PCB group, Inc.</p>                                                                                                                                                                                                                   |                                                         |                                 |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| <table border="1"> <tr> <td>Entered: BLS</td><td>Engineer: PE</td><td>Sales: JC</td><td>Approved: BLS</td><td>Spec Number:</td></tr> <tr> <td>Date:<br/>04/01/2010</td><td>Date:<br/>04/01/2010</td><td>Date:<br/>04/01/2010</td><td>Date:<br/>04/01/2010</td><td><b>45866</b></td></tr> </table>                                                                                                                                                                                     |                                                         |                                 |                     |                                                                                                                                                                                                                                                                                                                                                                              | Entered: BLS | Engineer: PE | Sales: JC | Approved: BLS | Spec Number: | Date:<br>04/01/2010 | Date:<br>04/01/2010 | Date:<br>04/01/2010 | Date:<br>04/01/2010 | <b>45866</b> |
| Entered: BLS                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Engineer: PE                                            | Sales: JC                       | Approved: BLS       | Spec Number:                                                                                                                                                                                                                                                                                                                                                                 |              |              |           |               |              |                     |                     |                     |                     |              |
| Date:<br>04/01/2010                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Date:<br>04/01/2010                                     | Date:<br>04/01/2010             | Date:<br>04/01/2010 | <b>45866</b>                                                                                                                                                                                                                                                                                                                                                                 |              |              |           |               |              |                     |                     |                     |                     |              |
| <div>  <div> <p>Company: PCB Load &amp; Torque, Inc.</p> <p>Address: 24350 Indoplex Circle<br/>Farmington Hills, MI 48335<br/>UNITED STATES</p> <p>Phone: 866-684-7107</p> <p>Fax: 716-684-0987</p> <p>E-mail: <a href="mailto:ltinfo@pcbloadtorque.com">ltinfo@pcbloadtorque.com</a></p> <p>Web site: <a href="http://www.pcbloadtorque.com">http://www.pcbloadtorque.com</a></p> </div> </div> |                                                         |                                 |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |

| Model Number<br>3122-04A                                                                                                                                                                                                                                            | ROTARY TORQUE, SHAFT-SHAFT, HIGH SPEED, LOW CAPACITANCE |                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                     | Revision NR<br>ECN #:                                                                                                                                                                                                                                                                                                                                                        |              |              |           |               |              |                     |                     |                     |                     |              |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|--------------|-----------|---------------|--------------|---------------------|---------------------|---------------------|---------------------|--------------|
| <b>Performance</b>                                                                                                                                                                                                                                                  |                                                         | <b>ENGLISH</b>                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>SI</b>           | <b>Optional Versions</b> (Optional versions have identical specifications and accessories as listed for standard model except where noted below. More than one option maybe used.)<br><br><b>Notes</b><br>[1] Recommended 10 VAC RMS.<br>[2] FS - Full Scale.<br>[3] Over compensated operating temperature range.<br>[4] Nominal.<br>[5] See 45871 for dimensional drawing. |              |              |           |               |              |                     |                     |                     |                     |              |
| Measurement Range (Full Scale Capacity)                                                                                                                                                                                                                             | 88.5 in-lb                                              | 10 Nm                                                                                                                                                                                                                                                                                                                                                                                                                                               |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Sensitivity (output at rated capacity)                                                                                                                                                                                                                              | 1.5 mV/V                                                | 1.5 mV/V                                                                                                                                                                                                                                                                                                                                                                                                                                            | [4]                 |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Non-Linearity                                                                                                                                                                                                                                                       | ≤0.1 % FS                                               | ≤0.1 % FS                                                                                                                                                                                                                                                                                                                                                                                                                                           | [2]                 |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Hysteresis                                                                                                                                                                                                                                                          | ≤0.1 % FS                                               | ≤0.1 % FS                                                                                                                                                                                                                                                                                                                                                                                                                                           | [2]                 |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Non-Repeatability                                                                                                                                                                                                                                                   | ≤0.05 % FS                                              | ≤0.05 % FS                                                                                                                                                                                                                                                                                                                                                                                                                                          | [2]                 |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| <b>Environmental</b>                                                                                                                                                                                                                                                |                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Overload Limit                                                                                                                                                                                                                                                      | 177 in-lb                                               | 20 Nm                                                                                                                                                                                                                                                                                                                                                                                                                                               |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Temperature Range (Operating)                                                                                                                                                                                                                                       | 0 to 200 °F                                             | -18 to 93 °C                                                                                                                                                                                                                                                                                                                                                                                                                                        |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Temperature Range (Compensated)                                                                                                                                                                                                                                     | 70 to 150 °F                                            | 21 to 66 °C                                                                                                                                                                                                                                                                                                                                                                                                                                         |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Temperature Effect on Output (Maximum)                                                                                                                                                                                                                              | ±0.002<br>%Reading/°F                                   | ±0.0018 %Reading/°C                                                                                                                                                                                                                                                                                                                                                                                                                                 | [3]                 |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Temperature Effect on Zero Balance (Maximum)                                                                                                                                                                                                                        | ±0.002 %FS/°F                                           | ±0.0018 %FS/°C                                                                                                                                                                                                                                                                                                                                                                                                                                      | [3]                 |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| <b>Electrical</b>                                                                                                                                                                                                                                                   |                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Bridge Resistance                                                                                                                                                                                                                                                   | 350 Ohm                                                 | 350 Ohm                                                                                                                                                                                                                                                                                                                                                                                                                                             |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Excitation Voltage                                                                                                                                                                                                                                                  | 20 VDC or VAC<br>rms                                    | 20 VDC or VAC rms                                                                                                                                                                                                                                                                                                                                                                                                                                   | [1]                 |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Insulation Resistance                                                                                                                                                                                                                                               | >5 GOhm                                                 | >5 GOhm                                                                                                                                                                                                                                                                                                                                                                                                                                             |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Zero Balance                                                                                                                                                                                                                                                        | ≤2 % FS                                                 | ≤2 % FS                                                                                                                                                                                                                                                                                                                                                                                                                                             | [2]                 |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Bridge Current (at 5 VAC)                                                                                                                                                                                                                                           | 50 mA                                                   | 50 mA                                                                                                                                                                                                                                                                                                                                                                                                                                               |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| <b>Physical</b>                                                                                                                                                                                                                                                     |                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Size (Shaft Length x Housing Length x<br>Housing Height)                                                                                                                                                                                                            | 6.50 in x 3.44 in x<br>3.50 in                          | 165.1 mm x 87.4 mm<br>x 88.9 mm                                                                                                                                                                                                                                                                                                                                                                                                                     | [5]                 |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Weight                                                                                                                                                                                                                                                              | 2 lb                                                    | 0.9 Kg                                                                                                                                                                                                                                                                                                                                                                                                                                              |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Mounting                                                                                                                                                                                                                                                            | Keyed Shaft                                             | Keyed Shaft                                                                                                                                                                                                                                                                                                                                                                                                                                         |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Sensing Element                                                                                                                                                                                                                                                     | Strain Gage                                             | Strain Gage                                                                                                                                                                                                                                                                                                                                                                                                                                         |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Housing Material                                                                                                                                                                                                                                                    | Aluminum                                                | Aluminum                                                                                                                                                                                                                                                                                                                                                                                                                                            |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Shaft Material                                                                                                                                                                                                                                                      | Stainless Steel                                         | Stainless Steel                                                                                                                                                                                                                                                                                                                                                                                                                                     |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Electrical Connector                                                                                                                                                                                                                                                | PT02H-8-4P                                              | PT02H-8-4P                                                                                                                                                                                                                                                                                                                                                                                                                                          |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Torsional Stiffness                                                                                                                                                                                                                                                 | 12.4 kin-lb/radian                                      | 12.4 kin-lb/radian                                                                                                                                                                                                                                                                                                                                                                                                                                  |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Rotating Inertia                                                                                                                                                                                                                                                    | 0.42 in-lb/sec2                                         | 0.42 in-lb/sec2                                                                                                                                                                                                                                                                                                                                                                                                                                     |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| Maximum Speed                                                                                                                                                                                                                                                       | 10000 RPM                                               | 10000 RPM                                                                                                                                                                                                                                                                                                                                                                                                                                           |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
| <p><i>All specifications are at room temperature unless otherwise specified.</i></p> <p>In the interest of constant product improvement, we reserve the right to change specifications without notice.</p> <p>ICP® is a registered trademark of PCB group, Inc.</p> |                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |
|                                                                                                                                                                                                                                                                     |                                                         | <table border="1"> <tr> <td>Entered: BLS</td><td>Engineer: PE</td><td>Sales: JC</td><td>Approved: BLS</td><td>Spec Number:</td></tr> <tr> <td>Date:<br/>04/01/2010</td><td>Date:<br/>04/01/2010</td><td>Date:<br/>04/01/2010</td><td>Date:<br/>04/01/2010</td><td><b>45867</b></td></tr> </table>                                                                                                                                                   |                     |                                                                                                                                                                                                                                                                                                                                                                              | Entered: BLS | Engineer: PE | Sales: JC | Approved: BLS | Spec Number: | Date:<br>04/01/2010 | Date:<br>04/01/2010 | Date:<br>04/01/2010 | Date:<br>04/01/2010 | <b>45867</b> |
| Entered: BLS                                                                                                                                                                                                                                                        | Engineer: PE                                            | Sales: JC                                                                                                                                                                                                                                                                                                                                                                                                                                           | Approved: BLS       | Spec Number:                                                                                                                                                                                                                                                                                                                                                                 |              |              |           |               |              |                     |                     |                     |                     |              |
| Date:<br>04/01/2010                                                                                                                                                                                                                                                 | Date:<br>04/01/2010                                     | Date:<br>04/01/2010                                                                                                                                                                                                                                                                                                                                                                                                                                 | Date:<br>04/01/2010 | <b>45867</b>                                                                                                                                                                                                                                                                                                                                                                 |              |              |           |               |              |                     |                     |                     |                     |              |
|                                                                                                                                                                                                                                                                     |                                                         |  <p>Company: PCB Load &amp; Torque, Inc.<br/> Address: 24350 Indoplex Circle<br/> Farmington Hills, MI 48335<br/> UNITED STATES<br/> Phone: 866-684-7107<br/> Fax: 716-684-0987<br/> E-mail: <a href="mailto:ltinfo@pcbloadtorque.com">ltinfo@pcbloadtorque.com</a><br/> Web site: <a href="http://www.pcbloadtorque.com">http://www.pcbloadtorque.com</a></p> |                     |                                                                                                                                                                                                                                                                                                                                                                              |              |              |           |               |              |                     |                     |                     |                     |              |