

# Instruction Sheet

**W22000 Series**

**W35000 Series**

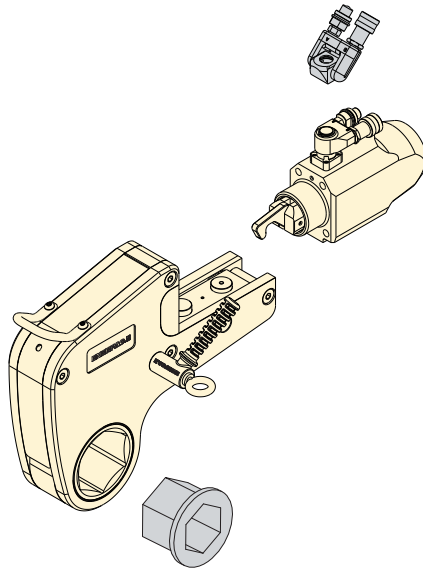
**Hydraulic Torque Wrench**



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# Instruction Sheet

# Torque Wrench W22000 Series W35000 Series



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## 1 Introduction

### Enerpac W-Series

The Enerpac W-series of lightweight hydraulic wrenches have been designed to tighten and loosen nuts and bolts for professional applications. The tool has an interchangeable cassette for which a wide range of sizes are available. The low profile cassette greatly increases access in limited space areas by locating directly around the hex nut itself.

The optional TSP-Pro Series Swivel provides 360 degree X-axis and 160 degree Y-axis rotation for better positioning of the wrench and hoses in confined applications. The integrated reaction foot further enhances the compactness of the tool. The tool easily connects to the range of available Enerpac pumps. Enerpac can supply air, electric or hand operated pumps.

### Delivery instructions

Upon delivery all components must be inspected for damage incurred during shipping. If damage is found the carrier should be notified at once. Shipping damage is not covered by the Enerpac warranty.

### Warranty

- Enerpac guarantees the product only for the purpose for which is intended.
- All Enerpac products are guaranteed against defects in workmanship and materials for as long as you own them.

Any misuse or alteration invalidates the warranty.

- Observe all instructions as laid down in this manual.
- Replace any parts with Enerpac spare parts only.

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## CE Declaration of conformity

Enerpac declares that the W22000 and W35000 Series torque wrenches meet the applicable standards and directives issued by the European Community. For a detailed list refer to the separate certification sheet.

## 2 Safety

Be aware that the operator is fully responsible during the operation of this tool. Enerpac is not responsible for damage or injury caused by misuse of this tool. Under some circumstances additional safety requirements may be required. Contact Enerpac immediately if a potentially hazardous situation arises.

Read this manual carefully and observe all safety precautions.

- Make sure you have completed safety induction training, specific to the work surroundings. The operator should be thoroughly familiar with the controls and the proper use of the tool.
- The operator must be at least 18 years of age.
- Always wear protective headwear, ear protectors, footwear and gloves (at a minimum rigger type gloves) suitable for safe operation of the tool. The protective clothing must not interfere with safe operation of the tool or restrict the ability to communicate with co-workers.
- Make sure your workplace is safe.
- Do not place any part of the body between the reaction foot and the reaction point.
- Do not place any objects between the reaction foot and the reaction point. Keep the hoses away from the reaction points.
- Do not stand in the line of movement

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of the tool when it is in operation. If the tool separates from the nut or bolt during operation it will detach in that direction.

- Tightening and loosening nuts and bolts involves little visible movement. The pressure and loads, however are extreme. Keep your hands away from the fastener being loosened or tightened.
- Make sure that the spanner used to keep the nut or bolt on the opposite end is secured.
- Always use Enerpac pumps and hoses.
- Make sure appropriate guards are always securely in position and free from damage.
- Maximum pressure is 690 bar (10,000 psi). Never apply more pressure to any tool or accessory than the maximum allowable pressure. Refer to the technical data tables for maximum pressure setting.
- Make sure that the ratchet size corresponds to the size of the fastener being loosened or tightened. Failure to do so can result in the tool becoming unstable and can lead to catastrophic failure of the tool.
- Do not abuse or overstress the hoses in any way. Do not bend the hoses excessively.
- Never carry the tool by its hoses.
- Always use Enerpac spare parts.
- Always position the tool for maximum stability. Make sure reaction points are adequate for the forces at work during operation of the tool.
- Be aware that a nut or bolt that breaks off during operation of the tool will become a high velocity projectile.
- Make sure the reaction point is of a suitable shape. For example use an adjacent nut or bolt as a reaction point.
- When the hex ratchet is placed on the

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nut or bolt a gap may exist between the reaction foot and the reaction plate. When the tool is operated the reaction foot and point will make forceful contact. Always make sure the tool is stable.

- Provide adequate support in vertical and inverted applications.
- The maximum torque output of the tool must always exceed the torque required to loosen or tighten the nut or bolt.
- The torque required to loosen a nut is variable and may exceed the torque capacity of the tool. Never operate the tool at above 75 percent of tool maximum torque when loosening a nut or bolt (see section 4.3.2).
- Never operate the tool with a hydraulic supply connection to the advance side only as this may damage the internal parts.
- If the wrench is dropped from a height, have the tool inspected before you operate it again.
- In severe conditions the tool must be cleaned and lubricated more frequently (see section 5).
- Check that the swivel post screws (see 5.2.1) and gland are tight prior to use.
- If oil leakage is evident, replace seals accordingly (see section 5).
- Stop operation immediately if a gap appears between the cylinder locating plate and the drive unit. Have the tool inspected and serviced before you operate it again.
- Make sure to minimize torsional and bending stresses in the tool, the hex ratchet and any accessories.
- Do not strike the tool with a hammer while under a full load. This will invalidate the guarantee.
- Always observe the maintenance instructions.

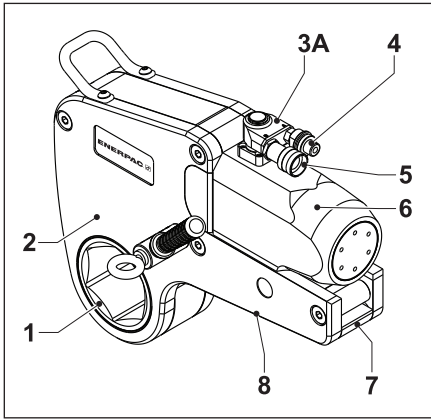


Fig. A

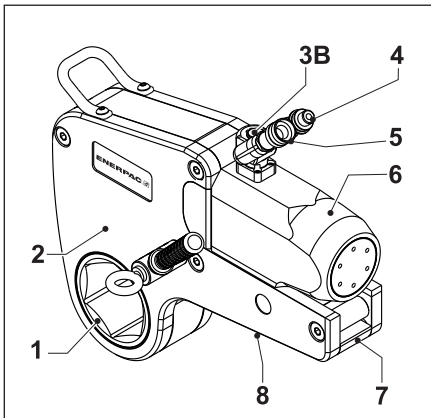


Fig. B

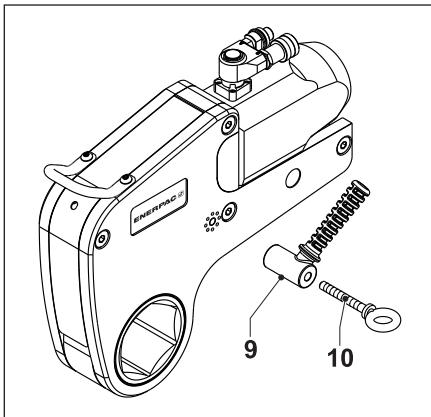


Fig. C

### 3 Assembly and adjustments


#### 3.1 Overview and features (fig. A or B)

- 1 Hexagon ratchet
- 2 Cassette
- 3A Swivel coupling or
- 3B TSP-Pro swivel coupling (optional)
- 4 Advance hose connection
- 5 Return hose connection
- 6 Hydraulic drive unit
- 7 Cassette release lever
- 8 Reaction foot

#### 3.2 To attach the positioning handle (fig. C)


- Secure the positioning handle (9) with eye-bolt (10). Tighten hand tight.

#### 3.3 Changing the cassette

 Make sure to depressurize and disconnect the tool from the hydraulic supply first.

##### 3.3.1 To remove cassette (fig. D & E)

- Make sure the piston is fully retracted.
- Place the tool on a workbench or support it using a hoist.

 Hydraulic drive unit will disengage from cassette in the following steps. Be sure that cassette is supported so it does not drop.

- Pull the cassette release lever (7) outwards.
- Remove the hydraulic drive unit (6) from the cassette (2).

##### 3.3.2 To attach cassette (fig. D & E)

- Make sure the retract link (11) aligns with the slot (13) in the crank. Rotate the piston rod if necessary.
- Pull the release lever (7) outwards.
- Push the spigot (12) into the cylinder locating plate (14).

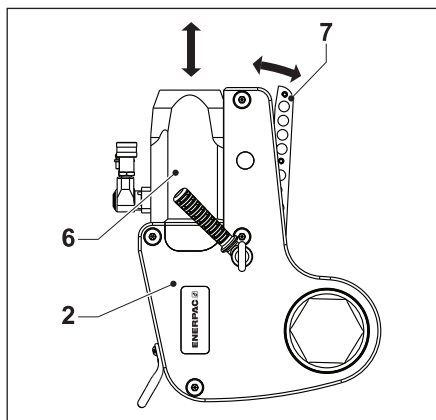


Fig. D

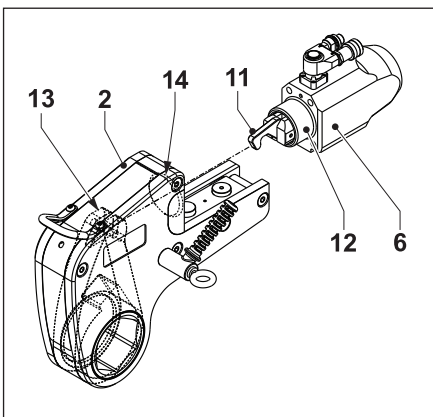


Fig. E

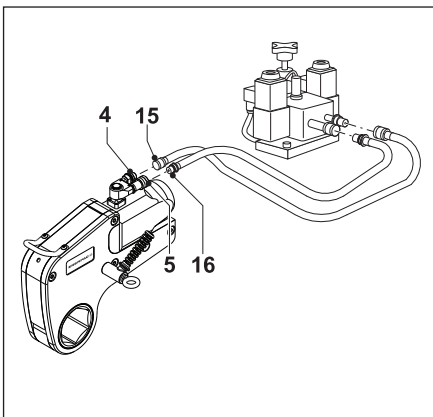


Fig. F

- Push the release lever (7) back into the cassette (2). Make sure the ball detent clicks into place.



Do not operate the tool if the cassette release lever is not fully closed.

### 3.4 To connect the hoses (fig. F)



Make sure all accessories meet the pressure requirements.

Make sure the quick connect couplings are securely attached before operating the tool.

The tool is fitted with male and female quick-connect couplings. Use Enerpac twin safety hoses only. Refer to the table below:

| Enerpac hose model number | Description                     |
|---------------------------|---------------------------------|
| THQ-706T                  | Two hoses, 6 m (19.5 feet) long |
| THQ-712T                  | Two hoses, 12 m (39 feet) long  |

- Remove the hose dust caps.
- Connect the hose with the female coupling (15) to the advance coupling (4).
- Pull the sleeve on the female coupling of the hose over the advance coupling.
- Tighten the sleeve.
- Connect the hose with the male coupling (16) into the return coupling (5).
- Pull the sleeve on the return coupling over the male coupling of the hose.
- Tighten the sleeve.
- Fit the hoses to the pump. Refer to the pump instruction manual.

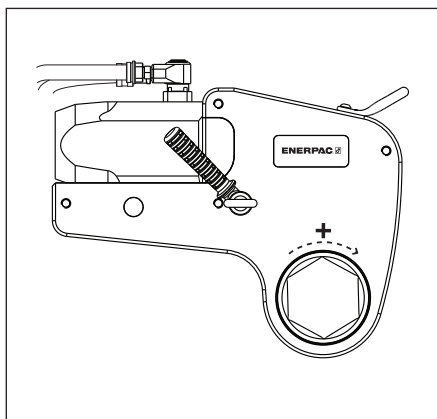


Fig. G

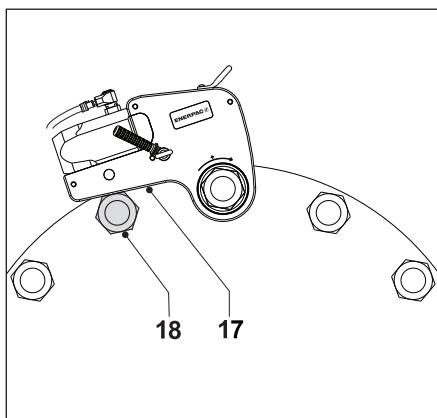


Fig. H

## 4 Operation

### 4.1 Prior to operation


- Make sure the nut or bolt to be fastened is clean and free of dust.
- Make sure the nut or bolt runs correctly on the thread.
- Make sure that the threads and the bearing surface are liberally coated with the correct lubricant or anti-seizure compound.
- Make sure that the spanner used to keep the nut or bolt on the opposite end in place, is of the correct size and that there is an adequate abutment surface. Ensure that the spanner is secured.
- Contact Enerpac if a suitable reaction point is not available.


### 4.2 To set the torque

Adjust the pressure on the pump as necessary to set the torque.

#### 4.3.1 To tighten a nut or bolt (fig. G & H)

- Position the tool on the nut or bolt with the clockwise (+) side facing upwards.
- Position the reaction foot (17) against a suitable reaction point (18). The reaction point will counteract the force caused by operating the tool.
- Start the pump.
- Operate the pump until the nut or bolt has been tightened to the required torque.
- Stop the pump immediately after work has finished.

 Stop operation immediately if a gap appears between the cylinder locating plate and the drive unit.

 Do not strike the tool with a hammer while under a full load.



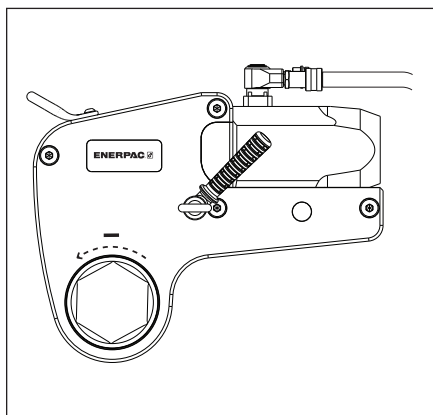


Fig. I

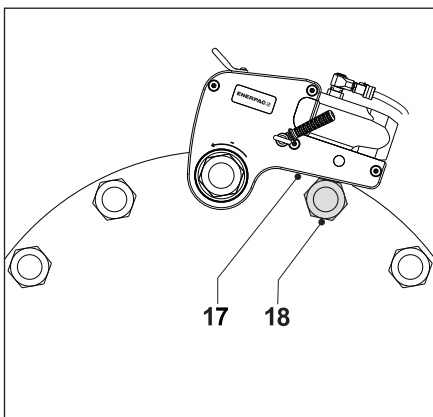


Fig. J

#### 4.3.2 To loosen a nut or bolt (fig. I & J)

- Apply penetrating oil to the threads. Allow the oil to soak.
- Position the tool on the nut or bolt with the anti-clockwise (-) side facing upwards.
- Position the reaction foot (17) against a suitable reaction point (18). The reaction point will counteract the force caused by operating the tool.
- Start the pump.
- Operate pump until nut (bolt) is loose.



If the nut or bolt will be re-used avoid excess load when loosening.

- Be aware that when loosening a nut or bolt more torque is usually required than when tightening.
- Humidity corrosion (rust) requires up to twice the torque required for tightening.
- Sea water and chemical corrosion requires up to two and a half times the torque required for tightening.
- Heat corrosion requires up to three times the torque required for tightening.



Be aware that when loosening a nut or bolt shock loading can occur. Do not apply more than 75% of the wrench's maximum torque when loosening nuts or bolts.

## 5 Maintenance and troubleshooting

**!** Preventative maintenance can be carried out by the user. Full maintenance must be carried out by an approved and authorized technician appointed by Enerpac. Recommended service intervals are:

- a) 3 months – Heavy Duty use
- b) 6 months – Normal use
- c) 12 months – Infrequent use

- Non destructive testing must be carried out if the tool has been used under severe conditions.

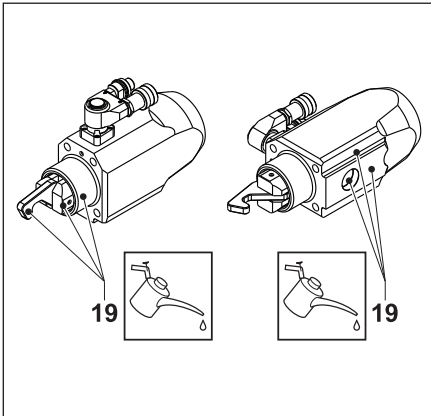


Fig. K

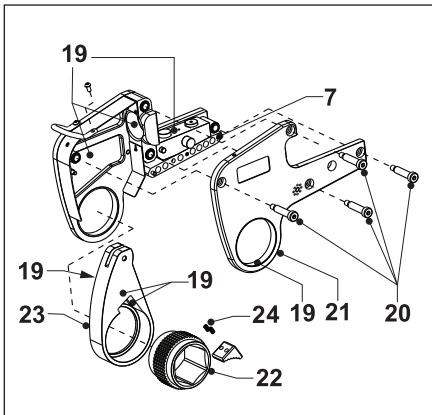


Fig. L

### 5.1 Preventative maintenance (fig. K & L)

#### 5.1.1 The hydraulic drive unit

- Check tightness of swivel post retaining screws (see 5.2.1) and gland.
- Pressurize the drive unit to maximum pressure (Advance and Retract), and check for any signs of leakage.
- Any damaged components or seals must be replaced.
- Dry all components and apply a thin coat of molybdenum disulphide as indicated (19).

**i** Molybdenum disulphide is available from Enerpac.

#### 5.1.2 The cassette

- Remove the cassette from the drive unit.
- Remove the screws (20). Lift and remove the sideplates (21).
- Remove the hex ratchet (22), spring loaded drive shoe (23), and compression springs (24).
- Clean all exposed components with a mild solvent.
- Inspect all parts for damage.
- Dry all components. Apply a thin coat of molybdenum disulphide as indicated (19).

**!** Do not apply any lubricant to the ratchet or drive shoe teeth.

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## 5.2 Full maintenance

### 5.2.1 The hydraulic drive unit

- Remove the circlip from the swivel coupling.
- Remove the couplings.
- Remove the swivel-coupling block from the drive unit.
- Remove the swivel post by removing the swivel post retaining screws.
- Remove all 'O' rings from the swivel post.
- Carefully hold the cylinder body to unscrew the cylinder gland.
- Hold the two flat sides of the piston rod with a spanner. The rod is located at the spigot.
- Remove the button head cap screw from the piston.
- Remove the piston rod from the cylinder spigot end.
- Remove the piston from the cylinder gland end, using a suitable drift.
- Clean all exposed components with a mild solvent.
- Inspect all parts for damage.
- Carry out non destructive testing by magnetic particle inspection on the following components:
  - Cylinder
  - Piston rod
- Apply a small amount of Loctite 243 to the threads of the piston retaining screw before reassembly.
- Apply a small amount of Loctite 243 to the threaded holes in the drive unit. Assemble the swivel post and tighten the degreased swivel post retaining screws (M5 screws) to 10,2 Nm.

- Reverse the procedure to reassemble
- Pressurize the assembled drive unit to max pressure (Advance and Retract), and check for any signs of leakage.



When reassembling the drive unit make sure that the piston rod is inserted through the cylinder spigot end.

When reassembling the drive unit make sure that the piston is inserted through the gland end. Tap the piston gently into place against the piston rod.

### 5.2.2 The cassette

- Strip down and clean all exposed components with a mild solvent.
- Drift out the roll pin holding the cylinder retaining pin, and remove.
- Inspect all parts for damage.
- Carry out non destructive testing by magnetic particle inspection on the following components:
  - Sideplates
  - Locating plate
  - Pin retainer
  - Reaction foot
  - Crank
  - Ratchet
  - Drive shoe
  - Cylinder retaining pin
  - Spacer retaining pin
- Dry all components. Apply a thin coat of molybdenum disulphide as indicated (19).

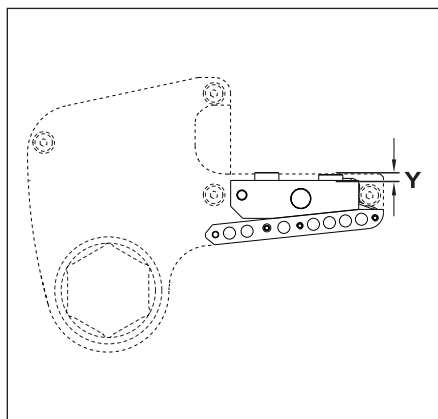


Fig. M

- As a check, refer to figure M and the tables below for the correct height of the drive unit retaining pin (Y).

#### Pin Height - W22000 Series

| (fig. M, dimension "Y") |            |
|-------------------------|------------|
| Metric                  | Imperial   |
| 7,5 mm                  | 0.296 inch |

#### Pin Height - W35000 Series

| (fig. M, dimension "Y") |            |
|-------------------------|------------|
| Metric                  | Imperial   |
| 7,0 mm                  | 0.276 inch |

- Reverse the procedure to reassemble the tool.

## 5.3 Troubleshooting

### 5.3.1 Drive Unit

| Symptom                              | Cause   | Remedy                                     |
|--------------------------------------|---|--|
| Cylinder does not advance or retract | Quick-connect coupling is damaged                       | Replace the coupling                       |
|                                      | Quick-connect coupling is not connected                 | Reconnect the hoses and couplings securely |
|                                      | Dirt in the direction control valve on the pumping unit | Disassemble the unit and clean the valve   |
| Cylinder does not build up pressure  | Piston seal leaks                                       | Replace the seals                          |
|                                      | Pump does not build pressure                            | Adjust the pressure                        |
|                                      | Pump is defective                                       | Refer to the pump manual                   |
| Cylinder leaks                       | Seal failure  | Replace the cylinder seals                 |
| Cylinder operates backwards          | Connections are reversed                                | Reconnect the hoses                        |

### 5.3.2 Cassette

| Symptom                                  | Cause  | Remedy   |
|--|--|--|
| Ratchet returns on retract stroke        | Broken drive shoe                                  | Replace the drive shoe   |
| Ratchet does not take successive strokes | Defective drive shoe                               | Replace the drive shoe   |
|  | Lubricant on the ratchet and/or drive shoe splines | Disassemble the cassette and remove the lubricant from splines |

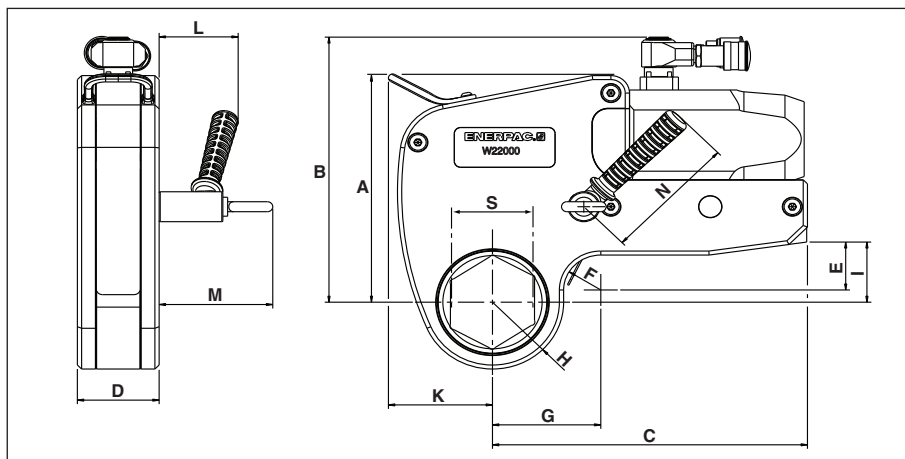


Fig. N

## 6 Technical specifications - W22000 Series

### 6.1 W22000 Series - Capacities and dimensions (fig. N)

|                            |               |                   |                   |
|----------------------------|---------------|-------------------|-------------------|
| Cassette capacity*         |               | mm                | 75 - 135          |
|                            |               | inch              | 2 15/16 - 5 3/8   |
| Maximum operating pressure |               | bar               | 690               |
|                            |               | psi               | 10,000            |
| Max. torque                | at 690 bar    | Nm                | 30.506            |
|                            | at 10,000 psi | Ft.lbs            | 22,500            |
| Min. torque                |               | Nm                | 3.051             |
|                            |               | Ft.lbs            | 2,250             |
| Dimensions                 | A             | mm (inch)         | 227,2 (8.94)      |
|                            | B             | mm (inch)         | 265,7 (10.46)     |
|                            | C             | mm (inch)         | 296,6 (11.68)     |
|                            | D             | mm (inch)         | 77,0 (3.03)       |
|                            | E             | mm (inch)         | 48,0 (1.89)       |
|                            | F             | mm (inch)         | 35,0 (1.38)       |
|                            | G             | - - -             | (see Section 6.2) |
|                            | H             | - - -             | (see Section 6.2) |
|                            | I             | mm (inch)         | 60,3 (2.37)       |
|                            | K             | mm (inch)         | 98,0 (3.86)       |
|                            | L             | mm (inch)         | 74,4 (2.93)       |
| M                          | mm (inch)     | 107,0 (4.21)      |                   |
| N                          | mm (inch)     | 127,6 (5.02)      |                   |
| S                          | - - -         | (see Section 6.2) |                   |
| Weight of Drive Unit       |               | kg (lbs)          | 7,7 (16.98)       |

\* **Important:** Hexagon reducer inserts (if used) must meet minimum wall thickness requirements. Refer to Section 6.2 for additional information. Consult your Enerpac distributor regarding the availability of inserts for your cassette model.

## 6.2 Cassette capacities - W22000 Series

### 6.2.1 Metric system table (See fig. N for dimensions S, G and H)

| Cassette Model | (S)<br>mm | (G)<br>mm | (H)<br>mm | Weight<br>kg |
|----------------|-----------|-----------|-----------|--------------|
| W22215         | 75        | 102       | 67,0      | 22,1         |
| W22300         | 77        | 102       | 67,0      | 22,0         |
| W22301         | 78        | 102       | 67,0      | 21,9         |
| W22302         | 80        | 102       | 67,0      | 21,7         |
| W22303         | 81        | 107,5     | 72,5      | 22,9         |
| W22304         | 83        | 107,5     | 72,5      | 22,8         |
| W22305         | 84        | 107,5     | 72,5      | 22,6         |
| W22085M        | 85        | 107,5     | 72,5      | 22,6         |
| W22306         | 86        | 107,5     | 72,5      | 22,5         |
| W22308         | 89        | 107,5     | 72,5      | 22,2         |
| W22090M        | 90        | 113       | 78        | 23,5         |
| W22309         | 91        | 113       | 78        | 23,4         |
| W22310         | 92        | 113       | 78        | 23,3         |
| W22311         | 94        | 113       | 78        | 23,1         |
| W22312         | 95        | 113       | 78        | 23,1         |
| W22313         | 97        | 113       | 78        | 22,8         |
| W22314         | 99        | 113       | 78        | 22,6         |
| W22315         | 100       | 120       | 85        | 24,3         |
| W22400         | 102       | 120       | 85        | 24,1         |
| W22402         | 105       | 120       | 85        | 23,8         |
| W22404         | 108       | 120       | 85        | 23,4         |
| W22405         | 110       | 125       | 90        | 24,6         |
| W22406         | 111       | 125       | 90        | 24,5         |
| W22407         | 113       | 125       | 90        | 24,3         |
| W22115M        | 115       | 125       | 90        | 24,1         |
| W22412         | 120       | 130       | 95        | 24,7         |
| W22123M        | 123       | 130       | 95        | 24,4         |
| W22414         | 124       | 130       | 95        | 24,3         |
| W22500         | 127       | 130       | 95        | 23,8         |
| W22502         | 130       | 135       | 100       | 25,0         |
| W22506         | 135       | 135       | 100       | 23,9         |

| Cassette Model  | Required minimum wall thickness of hexagon reducer insert: |
|-----------------|--|
| W22205 - W22404 | 9,2 mm   |
| W22405 - W22506 | 7,75 mm  |

**Important:** If wall thickness is less than shown in the table above, the insert may experience reduced component life. Consult your Enerpac distributor regarding the availability of inserts for your cassette model.

### 6.2.2 Imperial system table (See fig. N for dimensions S, G and H)

| Cassette Model | (S)<br>inch                     | (G)<br>inch | (H)<br>inch | Weight<br>lbs |
|----------------|---------------------------------|-------------|-------------|---------------|
| W22215         | 2 <sup>15</sup> / <sub>16</sub> | 4.02        | 2.64        | 48.7          |
| W22300         | 3                               | 4.02        | 2.64        | 48.4          |
| W22301         | 3 <sup>1</sup> / <sub>16</sub>  | 4.02        | 2.64        | 48.2          |
| W22302         | 3 <sup>1</sup> / <sub>8</sub>   | 4.02        | 2.64        | 47.8          |
| W22303         | 3 <sup>3</sup> / <sub>16</sub>  | 4.23        | 2.85        | 50.6          |
| W22304         | 3 <sup>1</sup> / <sub>4</sub>   | 4.23        | 2.85        | 50.2          |
| W22305         | 3 <sup>5</sup> / <sub>16</sub>  | 4.23        | 2.85        | 49.9          |
| W22306         | 3 <sup>3</sup> / <sub>8</sub>   | 4.23        | 2.85        | 49.7          |
| W22307         | 3 <sup>7</sup> / <sub>16</sub>  | 4.23        | 2.85        | 50.3          |
| W22308         | 3 <sup>1</sup> / <sub>2</sub>   | 4.23        | 2.85        | 48.9          |
| W22309         | 3 <sup>9</sup> / <sub>16</sub>  | 4.45        | 3.07        | 51.6          |
| W22310         | 3 <sup>5</sup> / <sub>8</sub>   | 4.45        | 3.07        | 51.3          |
| W22311         | 3 <sup>11</sup> / <sub>16</sub> | 4.45        | 3.07        | 50.9          |
| W22312         | 3 <sup>3</sup> / <sub>4</sub>   | 4.45        | 3.07        | 50.6          |
| W22313         | 3 <sup>13</sup> / <sub>16</sub> | 4.45        | 3.07        | 50.2          |
| W22314         | 3 <sup>7</sup> / <sub>8</sub>   | 4.45        | 3.07        | 49.8          |
| W22315         | 3 <sup>15</sup> / <sub>16</sub> | 4.72        | 3.35        | 53.6          |
| W22400         | 4                               | 4.72        | 3.35        | 53.2          |
| W22401         | 4 <sup>1</sup> / <sub>16</sub>  | 4.72        | 3.35        | 52.8          |
| W22402         | 4 <sup>1</sup> / <sub>8</sub>   | 4.72        | 3.35        | 52.4          |
| W22403         | 4 <sup>3</sup> / <sub>16</sub>  | 4.72        | 3.35        | 52.1          |
| W22404         | 4 <sup>1</sup> / <sub>4</sub>   | 4.72        | 3.35        | 51.5          |
| W22405         | 4 <sup>5</sup> / <sub>16</sub>  | 4.92        | 3.54        | 54.3          |
| W22406         | 4 <sup>3</sup> / <sub>8</sub>   | 4.92        | 3.54        | 53.9          |
| W22407         | 4 <sup>7</sup> / <sub>8</sub>   | 4.92        | 3.54        | 53.5          |
| W22408         | 4 <sup>1</sup> / <sub>2</sub>   | 4.92        | 3.54        | 53.1          |
| W22409         | 4 <sup>9</sup> / <sub>16</sub>  | 4.92        | 3.54        | 52.6          |
| W22410         | 4 <sup>5</sup> / <sub>8</sub>   | 4.92        | 3.54        | 52.0          |
| W22412         | 4 <sup>3</sup> / <sub>4</sub>   | 5.12        | 3.74        | 54.5          |
| W22414         | 4 <sup>7</sup> / <sub>8</sub>   | 5.12        | 3.74        | 53.6          |
| W22500         | 5                               | 5.12        | 3.74        | 52.4          |
| W22502         | 5 <sup>1</sup> / <sub>8</sub>   | 5.31        | 3.94        | 55.1          |
| W22503         | 5 <sup>3</sup> / <sub>16</sub>  | 5.31        | 3.94        | 54.7          |
| W22504         | 5 <sup>1</sup> / <sub>4</sub>   | 5.31        | 3.94        | 54.1          |
| W22506         | 5 <sup>3</sup> / <sub>8</sub>   | 5.31        | 3.94        | 52.8          |

| Cassette Model  | Required minimum wall thickness of hexagon reducer insert: |
|-----------------|--|
| W22205 - W22404 | 0.36 inch  |
| W22405 - W22506 | 0.31 inch  |

**Important:** If wall thickness is less than shown in the table above, the insert may experience reduced component life. Consult your Enerpac distributor regarding the availability of inserts for your cassette model.

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### 6.3 Torque settings - W22000 Series

#### 6.3.1 Metric system pressure/torque table - W22000 Series

| Pump pressure (bar) | Torque (Nm) | Pump pressure (bar) | Torque (Nm) |
|---------------------|-------------|---------------------|-------------|
| 69                  | 3.051       | 386                 | 17,068      |
| 83                  | 3.670       | 400                 | 17,687      |
| 97                  | 3.670       | 414                 | 18,306      |
| 110                 | 4.864       | 428                 | 18,925      |
| 124                 | 5.483       | 441                 | 19,500      |
| 138                 | 6.102       | 455                 | 20,119      |
| 152                 | 6.721       | 469                 | 20,738      |
| 166                 | 7.340       | 483                 | 21,357      |
| 179                 | 7.915       | 497                 | 21,976      |
| 193                 | 8.534       | 510                 | 22,551      |
| 207                 | 9.153       | 524                 | 23,170      |
| 221                 | 9.772       | 538                 | 23,789      |
| 234                 | 10.347      | 552                 | 24,408      |
| 248                 | 10.966      | 566                 | 25,027      |
| 262                 | 11.585      | 579                 | 25,602      |
| 276                 | 12.204      | 593                 | 26,221      |
| 290                 | 12.823      | 607                 | 26,840      |
| 303                 | 13.398      | 621                 | 27,459      |
| 317                 | 14.017      | 634                 | 28,034      |
| 331                 | 14.636      | 648                 | 28,653      |
| 345                 | 15.255      | 662                 | 29,272      |
| 359                 | 15.874      | 676                 | 29,891      |
| 372                 | 16.449      | 690                 | 30,510      |

To set the torque, adjust the pump pressure according to the following calculation:

$$\text{Pump pressure} = \text{Desired Torque} \div \text{Torque Factor}$$

| Torque Factor (metric system) |        |
|-------------------------------|--------|
| W22000 Series                 | 44,217 |



**6.3.2 Imperial system pressure/torque table - W22000 Series**

| Pump pressure (psi) | Torque (Ft.lbs) | Pump pressure (psi) | Torque (Ft.lbs) |
|---------------------|-----------------|---------------------|-----------------|
| 1,000               | 2,250           | 5,600               | 12,600          |
| 1,200               | 2,700           | 5,800               | 13,050          |
| 1,400               | 3,150           | 6,000               | 13,500          |
| 1,600               | 3,600           | 6,200               | 13,950          |
| 1,800               | 4,050           | 6,400               | 14,400          |
| 2,000               | 4,500           | 6,600               | 14,850          |
| 2,200               | 4,950           | 6,800               | 15,300          |
| 2,400               | 5,400           | 7,000               | 15,750          |
| 2,600               | 5,850           | 7,200               | 16,200          |
| 2,800               | 6,300           | 7,400               | 16,650          |
| 3,000               | 6,750           | 7,600               | 17,100          |
| 3,200               | 7,200           | 7,800               | 17,550          |
| 3,400               | 7,650           | 8,000               | 18,000          |
| 3,600               | 8,100           | 8,200               | 18,450          |
| 3,800               | 8,550           | 8,400               | 18,900          |
| 4,000               | 9,000           | 8,600               | 19,350          |
| 4,200               | 9,450           | 8,800               | 19,800          |
| 4,400               | 9,900           | 9,000               | 20,250          |
| 4,600               | 10,350          | 9,200               | 20,700          |
| 4,800               | 10,800          | 9,400               | 21,150          |
| 5,000               | 11,250          | 9,600               | 21,600          |
| 5,200               | 11,700          | 9,800               | 22,050          |
| 5,400               | 12,150          | 10,000              | 22,500          |

To set the torque, adjust the pump pressure according to the following calculation:

$$\text{Pump pressure} = \text{Desired torque} \div \text{Torque Factor}$$

| Torque Factor (imperial system) |      |
|---------------------------------|------|
| W22000 Series                   | 2.25 |



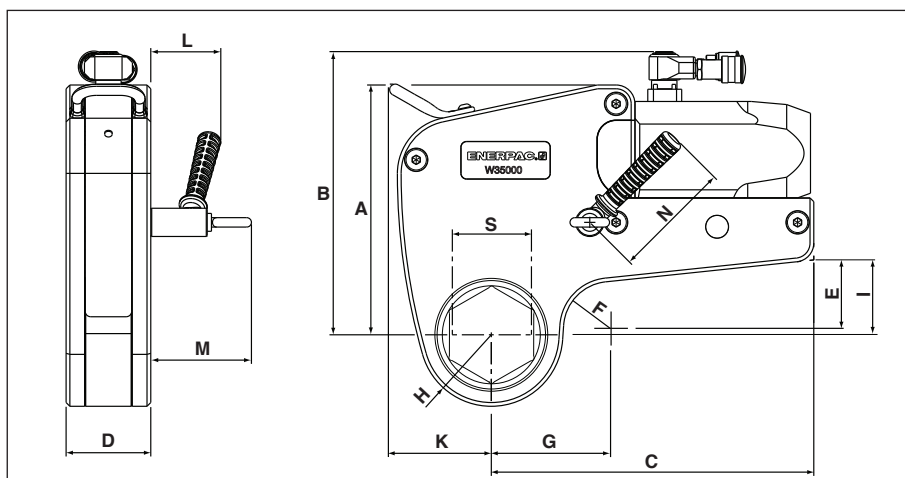


Fig. O

## 7 Technical specifications - W35000 Series

### 7.1 W35000 Series - Capacities and dimensions (fig. O)

|                            |               |                   |                   |
|----------------------------|---------------|-------------------|-------------------|
| Cassette capacity*         | mm            | 80 - 155          |                   |
|                            | inch          | 3 1/8 - 6 1/8     |                   |
| Maximum operating pressure | bar           | 690               |                   |
|                            | psi           | 10,000            |                   |
| Max. torque                | at 690 bar    | Nm 47.453         |                   |
|                            | at 10,000 psi | Ft.lbs 35,000     |                   |
| Min. torque                |               | Nm 4.745          |                   |
|                            |               | Ft.lbs 3,500      |                   |
| Dimensions                 | A             | mm (inch)         | 268 (10.54)       |
|                            | B             | mm (inch)         | 303 (11.94)       |
|                            | C             | mm (inch)         | 345 (13.60)       |
|                            | D             | mm (inch)         | 91 (3.57)         |
|                            | E             | ---               | (see Section 6.2) |
|                            | F             | mm (inch)         | 50 (1.98)         |
|                            | G             | ---               | (see Section 6.2) |
|                            | H             | ---               | (see Section 6.2) |
|                            | I             | mm (inch)         | 79,5 (3.13)       |
|                            | K             | mm (inch)         | 108 (4.2)         |
|                            | L             | mm (inch)         | 74,4 (2.93)       |
|                            | M             | mm (inch)         | 107 (4.21)        |
|                            | N             | mm (inch)         | 127 (5.00)        |
| S                          | ---           | (see Section 7.2) |                   |
| Weight of Drive Unit       | kg (lbs)      | 12 (26.4)         |                   |

\* **Important:** Hexagon reducer inserts (if used) must meet minimum wall thickness requirements. Refer to Section 7.2 for additional information. Consult your Enerpac distributor regarding the availability of inserts for your cassette model.

## 7.2 Cassette capacities - W35000 Series

### 7.2.1 Metric system table (See fig. O for dimensions S, E, G and H)

| Cassette Model | (S)<br>mm | (E)<br>mm | (G)<br>mm | (H)<br>mm | Weight<br>kg |
|----------------|-----------|-----------|-----------|-----------|--------------|
| W35302         | 80        | 73,0      | 126,75    | 76,0      | 32,8         |
| W35303         | 81        | 73,0      | 126,75    | 76,0      | 32,7         |
| W35304         | 83        | 73,0      | 126,75    | 76,0      | 32,5         |
| W35305         | 84        | 73,0      | 126,75    | 76,0      | 32,4         |
| W35085M        | 85        | 73,0      | 126,75    | 76,0      | 32,3         |
| W35306         | 86        | 73,0      | 126,75    | 76,0      | 32,2         |
| W35308         | 89        | 73,0      | 126,75    | 76,0      | 32,0         |
| W35090M        | 90        | 72,4      | 132,5     | 81,5      | 33,5         |
| W35309         | 91        | 72,4      | 132,5     | 81,5      | 33,4         |
| W35310         | 92        | 72,4      | 132,5     | 81,5      | 33,3         |
| W35311         | 94        | 72,4      | 132,5     | 81,5      | 33,1         |
| W35312         | 95        | 72,4      | 132,5     | 81,5      | 32,9         |
| W35313         | 97        | 72,4      | 132,5     | 81,5      | 32,7         |
| W35314         | 99        | 72,4      | 132,5     | 81,5      | 32,4         |
| W35315         | 100       | 71,9      | 137,0     | 87,0      | 34,1         |
| W35400         | 102       | 71,9      | 137,0     | 87,0      | 33,9         |
| W35402         | 105       | 71,9      | 137,0     | 87,0      | 33,5         |
| W35404         | 108       | 71,9      | 137,0     | 87,0      | 33,0         |
| W35405         | 110       | 71,3      | 143,0     | 93,0      | 34,9         |
| W35406         | 111       | 71,3      | 143,0     | 93,0      | 34,7         |
| W35407         | 113       | 71,3      | 143,0     | 93,0      | 34,5         |
| W35115M        | 115       | 71,3      | 143,0     | 93,0      | 34,2         |
| W35412         | 120       | 70,7      | 148,5     | 98,5      | 35,6         |
| W35123M        | 123       | 70,7      | 148,5     | 98,5      | 35,0         |
| W35414         | 124       | 70,7      | 148,5     | 98,5      | 34,9         |
| W35500         | 127       | 70,7      | 148,5     | 98,5      | 34,3         |
| W35502         | 130       | 70,2      | 153,0     | 103,0     | 35,8         |
| W35506         | 135       | 70,2      | 153,0     | 103,0     | 34,6         |
| W35508         | 140       | 69,6      | 158,5     | 108,5     | 36,2         |
| W35509         | 141       | 69,6      | 158,5     | 108,5     | 36,0         |
| W35510         | 143       | 69,6      | 158,5     | 108,5     | 35,6         |
| W35512         | 145       | 69,6      | 158,5     | 108,5     | 34,9         |
| W35514         | 150       | 69,1      | 164,0     | 114,0     | 36,7         |
| W35151M        | 151       | 69,1      | 164,0     | 114,0     | 36,5         |
| W35600         | 153       | 69,1      | 164,0     | 114,0     | 36,1         |
| W35602         | 155       | 69,1      | 164,0     | 114,0     | 35,3         |

| Cassette Model | Required minimum wall thickness of hexagon reducer insert: |
|----------------|--|
| W35302 - 35404 | 14,50 mm   |
| W35405 - 35602 | 12,00 mm   |

**Important:** If wall thickness is less than shown in the table above, the insert may experience reduced component life. Consult your Enerpac distributor regarding the availability of inserts for your cassette model.

| 7.2.2 Imperial system table (See fig. O for dimensions S, E, G and H) |             |             |             |             | Weight<br>lbs |
|---|-------------|-------------|-------------|-------------|---------------|
| Cassette<br>Model   | (S)<br>inch | (E)<br>inch | (G)<br>inch | (H)<br>inch |               |
| W35302  | 3 1/8       | 2.87        | 4.99        | 2.99        | 72.3          |
| W35303  | 3 3/16      | 2.87        | 4.99        | 2.99        | 72.1          |
| W35304  | 3 1/4       | 2.87        | 4.99        | 2.99        | 71.7          |
| W35305  | 3 5/16      | 2.87        | 4.99        | 2.99        | 71.4          |
| W35306  | 3 3/8       | 2.87        | 4.99        | 2.99        | 71.0          |
| W35307  | 3 7/16      | 2.87        | 4.99        | 2.99        | 70.5          |
| W35308  | 3 1/2       | 2.87        | 4.99        | 2.99        | 70.1          |
| W35309  | 3 9/16      | 2.85        | 5.22        | 3.21        | 71.4          |
| W35310  | 3 5/8       | 2.85        | 5.22        | 3.21        | 73.4          |
| W35311  | 3 11/16     | 2.85        | 5.22        | 3.21        | 73.0          |
| W35312  | 3 3/4       | 2.85        | 5.22        | 3.21        | 72.5          |
| W35313  | 3 13/16     | 2.85        | 5.22        | 3.21        | 72.1          |
| W35314  | 3 7/8       | 2.85        | 5.22        | 3.21        | 71.4          |
| W35315  | 3 15/16     | 2.83        | 5.39        | 3.42        | 70.8          |
| W35400  | 4           | 2.83        | 5.39        | 3.42        | 74.7          |
| W35401  | 4 1/16      | 2.83        | 5.39        | 3.42        | 74.3          |
| W35402  | 4 1/8       | 2.83        | 5.39        | 3.42        | 73.9          |
| W35403  | 4 3/16      | 2.83        | 5.39        | 3.42        | 73.4          |
| W35404  | 4 1/4       | 2.83        | 5.39        | 3.42        | 72.8          |
| W35405  | 4 5/16      | 2.81        | 5.63        | 3.66        | 76.9          |
| W35406  | 4 3/8       | 2.81        | 5.63        | 3.66        | 76.5          |
| W35407  | 4 7/16      | 2.81        | 5.63        | 3.66        | 76.1          |
| W35408  | 4 1/2       | 2.81        | 5.63        | 3.66        | 75.6          |
| W35409  | 4 9/16      | 2.81        | 5.63        | 3.66        | 75.2          |
| W35410  | 4 5/8       | 2.81        | 5.63        | 3.66        | 74.5          |
| W35412  | 4 3/4       | 2.78        | 5.85        | 3.88        | 78.5          |
| W35414  | 4 7/8       | 2.78        | 5.85        | 3.88        | 76.9          |
| W35500  | 5           | 2.78        | 5.85        | 3.88        | 75.6          |
| W35502  | 5 1/8       | 2.76        | 6.02        | 4.05        | 78.9          |
| W35503  | 5 3/16      | 2.76        | 6.02        | 4.05        | 78.5          |
| W35504  | 5 1/4       | 2.76        | 6.02        | 4.05        | 77.6          |
| W35506  | 5 3/8       | 2.76        | 6.02        | 4.05        | 76.3          |
| W35508  | 5 1/2       | 2.74        | 6.24        | 4.27        | 79.8          |
| W35509  | 5 9/16      | 2.74        | 6.24        | 4.27        | 79.4          |
| W35510  | 5 5/8       | 2.74        | 6.24        | 4.27        | 78.5          |
| W35512  | 5 3/4       | 2.74        | 6.24        | 4.27        | 76.9          |
| W35514  | 5 7/8       | 2.72        | 6.46        | 4.49        | 80.9          |
| W35600  | 6           | 2.72        | 6.46        | 4.49        | 79.6          |
| W35602  | 6 1/8       | 2.72        | 6.46        | 4.49        | 77.8          |

| Cassette Model | Required minimum wall thickness of hexagon reducer insert: |
|----------------|--|
| W35302 - 35404 | 0.57 inch  |
| W35405 - 35602 | 0.48 inch  |

**Important:** If wall thickness is less than shown in the table above, the insert may experience reduced component life. Consult your Enerpac distributor regarding the availability of inserts for your cassette model.

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### 7.3 Torque settings

#### 7.3.1 Metric system pressure/torque table - W35000 Series

| Pump pressure (bar) | Torque (Nm) | Pump pressure (bar) | Torque (Nm) |
|---------------------|-------------|---------------------|-------------|
| 69                  | 4.745       | 386                 | 26.546      |
| 83                  | 5.708       | 400                 | 27.509      |
| 97                  | 6.671       | 414                 | 28.472      |
| 110                 | 7.565       | 428                 | 29.434      |
| 124                 | 8.528       | 441                 | 30.328      |
| 138                 | 9.491       | 455                 | 31.291      |
| 152                 | 10.453      | 469                 | 32.254      |
| 166                 | 11.416      | 483                 | 33.217      |
| 179                 | 12.310      | 497                 | 34.180      |
| 193                 | 13.273      | 510                 | 35.074      |
| 207                 | 14.236      | 524                 | 36.037      |
| 221                 | 15.199      | 538                 | 36.999      |
| 234                 | 16.093      | 552                 | 37.962      |
| 248                 | 17.055      | 566                 | 38.925      |
| 262                 | 18.018      | 579                 | 39.819      |
| 276                 | 18.981      | 593                 | 40.782      |
| 290                 | 19.944      | 607                 | 41.745      |
| 303                 | 20.838      | 621                 | 42.707      |
| 317                 | 21.801      | 634                 | 43.601      |
| 331                 | 22.764      | 648                 | 44.564      |
| 345                 | 23.726      | 662                 | 45.527      |
| 359                 | 24.689      | 676                 | 46.490      |
| 372                 | 25.583      | 690                 | 47.453      |

To set the torque, adjust the pump pressure according to the following calculation:

$$\text{Pump pressure} = \text{Desired Torque} \div \text{Torque Factor}$$

| Torque Factor (metric system) |        |
|-------------------------------|--------|
| W35000 Series                 | 68.772 |

### 7.3.2 Imperial system pressure/torque table - W35000 Series

| Pump pressure (psi) | Torque (Ft.lbs) | Pump pressure (psi) | Torque (Ft.lbs) |
|---------------------|-----------------|---------------------|-----------------|
| 1,000               | 3,500           | 5,600               | 19,600          |
| 1,200               | 4,200           | 5,800               | 20,300          |
| 1,400               | 4,900           | 6,000               | 21,000          |
| 1,600               | 5,600           | 6,200               | 21,700          |
| 1,800               | 6,300           | 6,400               | 22,400          |
| 2,000               | 7,000           | 6,600               | 23,100          |
| 2,200               | 7,700           | 6,800               | 23,800          |
| 2,400               | 8,400           | 7,000               | 24,500          |
| 2,600               | 9,100           | 7,200               | 25,200          |
| 2,800               | 9,800           | 7,400               | 25,900          |
| 3,000               | 10,500          | 7,600               | 26,600          |
| 3,200               | 11,200          | 7,800               | 27,300          |
| 3,400               | 11,900          | 8,000               | 28,000          |
| 3,600               | 12,600          | 8,200               | 28,700          |
| 3,800               | 13,300          | 8,400               | 29,400          |
| 4,000               | 14,000          | 8,600               | 30,100          |
| 4,200               | 14,700          | 8,800               | 30,800          |
| 4,400               | 15,400          | 9,000               | 31,500          |
| 4,600               | 16,100          | 9,200               | 32,200          |
| 4,800               | 16,800          | 9,400               | 32,900          |
| 5,000               | 17,500          | 9,600               | 33,600          |
| 5,200               | 18,200          | 9,800               | 34,300          |
| 5,400               | 18,900          | 10,000              | 35,000          |

To set the torque, adjust the pump pressure according to the following calculation:

$$\text{Pump pressure} = \text{Desired torque} \div \text{Torque Factor}$$

| Torque Factor (imperial system) |     |
|---------------------------------|-----|
| W35000 Series                   | 3.5 |

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## 8 Replacement parts and recommended tools

### 8.1 To order replacement parts

For replacement parts information, refer to the Enerpac repair parts sheet for your wrench model. Repair parts sheets are available on the internet at [www.enerpac.com](http://www.enerpac.com).

Have the following information ready when ordering replacement parts:

- Wrench model and serial numbers (for both drive unit and cassette).
- Approximate date of purchase.
- Part number and description of each part being ordered.

### 8.2 Recommended tool kit for W22000 Series

- 7/8" A/F spanner
- 3/4" A/F spanner
- 5/8" spanner
- Circlip pliers
- Seal extraction tool
- 1-11/16" A/F spanner
- ø 5 mm x 6 mm LG x 45 mm PCD pin spanner
- 10 mm A/F Allen key
- 6 mm A/F Allen key
- 4 mm A/F Allen key
- 2,5 mm A/F Allen key
- 3 mm Terminal screwdriver

**Notes:**

A/F = Across Flats

PCD = Pitch Circle Diameter

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### 8.3 Recommended tool kit for W35000 Series

- 7/8" A/F spanner
- 3/4" A/F spanner
- 5/8" spanner
- Circlip pliers
- Seal extraction tool
- 2" A/F spanner
- ø 5 mm x 6 mm LG x 50 mm PCD pin spanner
- 10 mm A/F Allen key
- 8 mm A/F Allen key
- 4 mm A/F Allen key
- 2,5 mm A/F Allen key
- 3 mm Terminal screwdriver

**Notes:**

A/F = Across Flats

PCD = Pitch Circle Diameter









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