Hydraulic Power Sources

Power Sources to help you get your job done

- Electric Pumps
- Air Pumps
- Air Boosters
- Hydraulic Wand Booster
- Hydraulic Intensifier
- Manual Pumps

Stocked and Distributed by Norman Equipment Company 800-323-2710
Safety Feature

- Operator must have both hands on the pendant to operate the pump

High-Capacity Air Pump: Designed for Continuous Operation

WAP-Series

- Heavy-duty, air-driven pumps are well suited for use in production applications.
Choosing a Pump

Factors to consider when choosing a pump

- Technology preference (Electric, Air, Manual, or Hydraulic)
- Continuous connection vs. pallet coupling
- Single-acting vs. double-acting circuit
- Programmable vs. manual operations
- Are there sequence valves
- Expected duty cycle
- Size constraints
- Required oil volume
- Mobile vs. fixed pump
- Is there an accumulator

Select your pump options

Reservoir size
Choose a reservoir size that holds enough oil to fill all of your lines, manifolds and cylinders, with enough reserve for future needs. Each Enerpac cylinder has an oil capacity listed on its product page, and each power unit has a reservoir capacity listed.

Valve type
Directional valves allow you control over what portion of the circuit receives oil. Valves can be operated manually, by electric solenoid or by air pilot pressure. Multiple valves can be used with one power unit to control multiple circuits.

Accessories
For increased automation, electric pumps can be outfitted with additional accessories, including pressure switches, level switches, and control pendants. These options can either be factory installed or added to an existing power unit in the future.

Contact Enerpac!
ENERPAC can help specify the correct power source for your application. Contact us at +1 800 433 2766 or http://www.enerpac.com/en-us/contact-us.
Whether you need to run your parts once a day or 24 hours a day, Enerpac has the power source option to help you get the job done.

With a wide variety of models and accessories to choose from, Enerpac power units are easily the most versatile and reliable in the industry.

ZW-Class electric pumps are designed for use in the harshest manufacturing environments. The pumps provide reliable and durable performance in a wide variety of configurations.

**Select Your Power Source**

<table>
<thead>
<tr>
<th>ELECTRIC PUMPS</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>WU-Series</td>
<td>WE-Series</td>
<td>ZW-Series</td>
</tr>
<tr>
<td>Economy Electric</td>
<td>Submerged</td>
<td>Durable, Full Featured</td>
</tr>
<tr>
<td>GOOD</td>
<td>BETTER</td>
<td>BEST</td>
</tr>
<tr>
<td>Duty Cycle Durability: Intermittent-Low</td>
<td>Intermittent-Moderate</td>
<td>Intermittent-Heavy</td>
</tr>
<tr>
<td>Oil Flow: 20 in³/min</td>
<td>40 in³/min</td>
<td>40-120 in³/min</td>
</tr>
<tr>
<td>Pressure: 5000 psi max.</td>
<td>5000 psi max.</td>
<td>5000 psi max.</td>
</tr>
<tr>
<td>Motor: 0.5 hp</td>
<td>0.5 hp</td>
<td>1.0-1.5 hp</td>
</tr>
<tr>
<td>Reservoir: 0.5-1 gal</td>
<td>1.5 gal</td>
<td>2-10 gal</td>
</tr>
<tr>
<td>Pump: two stage</td>
<td>two stage submerged</td>
<td>two stage</td>
</tr>
</tbody>
</table>

**Control Options Electric Pumps:**

- Manual Valve: ✓ ✓ ✓
- Wired Pendant: ✓ ✓ ✓
- 2-Hand No-tie Down Pendant: ✓ ✓ ✓
- Pressure Switch: ✓ (Standard) ✓ ✓
- Selectable Control Programs: ✓ ✓ ✓
- Portability: ✓ ✓ ✓
- Circuit/Cylinder: Single Acting Single Acting Double Acting Double Acting
- Configurable: ✓ ✓ ✓

**Electric Pump Design Options:**

- None
- Pressure switch (Y/N)
- Direction valve type
- Voltage
- Heat Exchanger
- 3 flow options
- Pressure/level sensing
- Direction valve type & operation
- Reservoir size
- Voltage
- Manifold options
- Heat exchanger
- Roll bars
- Foot switch & more

For further details, see Enerpac’s E215 Workholding catalog.
ZW-Series Electric Pump Common Options

**Three Capacity Options**

<table>
<thead>
<tr>
<th>ZW3-Series</th>
<th>ZW4-Series</th>
<th>ZW5-Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output oil flow at 5000 psi 40 in³/min.</td>
<td>Output oil flow at 5000 psi 60 in³/min.</td>
<td>Output oil flow at 5000 psi 120 in³/min.</td>
</tr>
</tbody>
</table>

**Custom build your pump**

**This is how a ZW series Model number is built:**

<table>
<thead>
<tr>
<th>Product Type</th>
<th>Motor Type</th>
<th>Flow Group</th>
<th>Valve Type</th>
<th>Usable Oil Capacity</th>
<th>Valve Operation</th>
<th>Voltage</th>
<th>Options</th>
<th>Manifold Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>Z</td>
<td>W</td>
<td>4</td>
<td>0</td>
<td>20</td>
<td>H</td>
<td>G</td>
<td>FG</td>
<td>01</td>
</tr>
</tbody>
</table>

1. **Product type**
   - **Z** = Z-Class Pump
2. **Motor type**
   - **W** = Workholding Electric
3. **Flow group**
   - **3** = 40 in³/min
   - **4** = 60 in³/min
   - **5** = 120 in³/min
4. **Valve type**
   - **0** = No valve or valve manifold
   - **2** = 3-way, 2-position, manual valve
   - **3** = 3-way, 3-position, manual valve
   - **4** = 4-way, 3-position, manual or solenoid valve
   - **6** = 3-way, 3-position, tandem center w/P.O. check (manual only)
   - **8** = 4-way, 3-position, tandem center w/P.O. check (manual only)
5. **Usable oil capacity**
   - **8** = 8 Liters (2 gallon)
   - **10** = 10 Liters (2.5 gallon)
   - **20** = 20 Liters (5 gallon)
   - **40** = 40 Liters (10 gallon)
6. **Valve operation**
   - **D** = Solenoid valve (pallet coupling) with pendant and LCD (valve type 4)
   - **F** = Solenoid valve (continuous connection) with pendant and LCD (valve type 4)
   - **G** = Valve manifold without LCD (valve type 0)
   - **H** = Valve manifold with LCD (valve type 0)
   - **L** = Manual valve with LCD (without pendant, valve type 2, 3, 4, 6 or 8)
   - **M** = Manual valve without LCD (valve type 2, 3, 4, 6 or 8)
   - **N** = No valve, without LCD (valve type 0)
   - **W** = No valve with LCD (valve type 0)
7. **Power supply**
   - **Single Phase**
     - **B** = 115V, 1 ph, 50-60 Hz
     - **E** = 208-240V, 1 ph, 50-60 Hz
     - **I** = 208-240V, 1 ph, 50-60 Hz
     - **Three Phase**
       - **M** = 190-200V, 3 ph, 50/60 Hz
       - **G** = 208-240V, 3 ph, 50/60 Hz
       - **W** = 380-415V, 3 ph, 50/60 Hz
       - **K** = 440V, 3 ph, 50/60 Hz
       - **J** = 460-480V, 3 ph, 50/60 Hz
       - **R** = 575V, 3 ph, 50/60 Hz
8. **Options**
   - **F** = Return line filter, 25 micron
   - **G** = 0-6000 psi pressure gauge, 2½”
   - **H** = Heat exchanger
   - **L** = Level/temperature switch
   - **N** = No handles (lifting eyes only)
   - **P** = Pressure switch
   - **R** = Roll bars
   - **S** = Single stage
   - **T** = Pressure transducer
   - **U** = Foot switch
   - **X** = Two Hand No-Tie Down Pendant
9. **Manifold options**
   - **01** = Pressure & tank porting manifold
   - **11** = Single station DO3
   - **12** = VP series manifold
   - **13** = Single station CETOP
   - **21** = 2 station DO3
   - **22** = 2 station CETOP
   - **41** = 4 station DO3
   - **42** = 4 station CETOP

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**Example**

The ZWS810LG-FT is a 120 in³/min, 2-stage pump with a manual 4-way, 3 position tandem center valve, integrated P.O. check, LCD electrical box, 2.5 gallon reservoir, 208-240 volt 3-phase motor, return line filter and pressure transducer.

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**Control Options**

- Control pump & valves remotely
- Two hand no-tie down

**Sensor Options**

- Pressure switch and pressure transducer

**Other Options**

- Heat exchanger
- Roll cage
- Skid bar
- Oil filter kit

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*1 Options should be specified in alphabetical order.
*2 Unless specified, all pumps are supplied with reservoir handles.
*3 115 volt pumps are supplied with CE and CSA approved 15 amp plug for intermittent use. 20 A circuit recommended for frequent full pressure use.
*4 These options require LCD electrical package.
*5 Pressure gauge not available on pump models with pressure transducer. Pressure transducer provides digital pressure readout on LCD display.
*6 Pressure switch option is only used as input to a customer control. It is not used with the LCD electrical package.
Air Driven Pumps

Air power sources

Enerpac air hydraulic pumps are designed for high efficiency, proven reliability and enhanced productivity. High pressure hydraulic air driven pumps are ideal for delivering compact air over hydraulic. Constructed for safety, durability and the delivery of higher oil flow, these hydraulic power units provide high quality performance.

Select Your Power Source

<table>
<thead>
<tr>
<th></th>
<th>PA-Series</th>
<th>Turbo II-Series</th>
<th>DuroTech-Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duty Cycle Durability:</td>
<td>Intermittent-Low</td>
<td>Intermittent-Moderate</td>
<td>Intermittent-Heavy</td>
</tr>
<tr>
<td>Oil Flow:</td>
<td>60-120 in³/min</td>
<td>180 in³/min</td>
<td>252-612 in³/min</td>
</tr>
<tr>
<td>Pressure:</td>
<td>3000-5000 psi max.</td>
<td>5000 psi max.</td>
<td>1920-5280 psi max.</td>
</tr>
<tr>
<td>Reservoir:</td>
<td>36.6 in³</td>
<td>70-462 in³</td>
<td>415 in³</td>
</tr>
<tr>
<td>Air Consumption</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inlet Pressure:</td>
<td>12 scfm</td>
<td>12 scfm</td>
<td>20-24 scfm</td>
</tr>
<tr>
<td></td>
<td>60-100 psi</td>
<td>50-125 psi</td>
<td>30-120 psi</td>
</tr>
<tr>
<td>Hydraulic to Air Ratio:</td>
<td>38:1 to 63:1</td>
<td>45:1 to 60:1</td>
<td>16:1 to 65:1</td>
</tr>
</tbody>
</table>

Control Options Air Pumps:

- Manual valve: ✔ ✔ ✔
- Air Pendant: ✔ *
- Foot Treadle: ✔ ✔
- Solenoid Directional Valve: ✔ ✔ ✔
- Portability: ✔ ✔ ✔
- Circuit/Cylinder: Single Acting Single Acting Double Acting

Air Driven Pump Features:

- Patented air saver design
- Reduced noise level to 80 dBA
- Built-in 3-way, 2-position valve for advance & retract operation
- 28 standard configurations
- Air saver piston
- Reduced noise level to 75 dBA
- Heavy-duty air driven pump well suited for production applications
- 3 Standard configurations
- Lower noise level
- Includes built-in filter regulator

For further details, see Enerpac’s E215 Workholding catalog.

* Custom product
To control and regulate air supply

**VA-42 Manual operated air valve 5-way, 2-position**
- For control of boosters
- Viton seals standard

**VAS-42 Solenoid operated air valve 5-way, 2-position**
- For control of pump and boosters air supply
- Viton seals standard
- Solenoid: 120 VAC, 50/60 Hz
  Amperage: inrush .11 Amps, holding .07 Amps
- Maximum cycle rate: 600 cycles per minute

**VR-3 Rapid exhaust valve**
- Enables booster to advance and retract faster
- Instantly exhaust air supply from booster to atmosphere

**V-19 Air check valve**
- Prevent rapid drop of air pressure to the booster in the event of sudden loss of input air

**RFL-102 Regulator-Filter-Lubricator**
- Regulates air pressure
- Filter air input
- Lubricates air motors with a fine oil vapor mist
- Maximum air flow 48 scfm

**HV-1000A Air pilot holding valve**
- Holds fluid under pressure offering independent control of different branches of the same fixture
- Valve can control the pilot air and the booster in sequence
- Max. oil flow 305 in³/min
- Works with the VA-42 four-way air valve and a booster

**QE-375 Muffler**
- Use with VR-3 or VAS/VA-42
- Reduces noise level of exhaust air from pump

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**Product selection**

<table>
<thead>
<tr>
<th>Maximum pressure psi</th>
<th>Model number</th>
</tr>
</thead>
<tbody>
<tr>
<td>▼ Air valves</td>
<td></td>
</tr>
<tr>
<td>30-150</td>
<td>VA-42</td>
</tr>
<tr>
<td>30-150</td>
<td>VAS-42</td>
</tr>
<tr>
<td>0-100</td>
<td>VR-3</td>
</tr>
<tr>
<td>0-100</td>
<td>V-19</td>
</tr>
<tr>
<td>▼ Holding Valve</td>
<td>HV-1000A*</td>
</tr>
<tr>
<td>0-100</td>
<td></td>
</tr>
<tr>
<td>▼ Accessories</td>
<td>RFL-102</td>
</tr>
<tr>
<td>0-125</td>
<td></td>
</tr>
<tr>
<td>0-125</td>
<td>QE-375</td>
</tr>
</tbody>
</table>

* Maximum hydraulic pressure: 3000 psi.

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**Important**

Valving help
See Basic System Set-up and Valve information in our “Yellow Pages”.

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Air valves
Enerpac’s line of directional air valves and accessories complete your workholding system. Used to control air operated hydraulic units, they increase your productivity and efficiency.

**Application**
VA-series directional air valves provide either manual or electric control to air operated hydraulic units. Accessories such as rapid exhaust, check valves, silencers and regulators complete the air control system.

- Accessory valves provide greater safety and more efficient clamping cycles
- Recommended for use with all air powered units
- Directional valves to control booster and pump air supply
- Remote air valve permits either hand or foot operation

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www.enerpacwh.com
Air hydraulic boosters are ideal where low volume, single-acting circuits are used.

### Product selection

<table>
<thead>
<tr>
<th>Oil pressure</th>
<th>Oil volume per stroke</th>
<th>Air to oil pressure ratio</th>
<th>Model number</th>
<th>Air consumption per cycle</th>
<th>Air piston diameter</th>
<th>Hydraulic piston diameter</th>
<th>Hydraulic stroke</th>
<th>Air operating pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>at 75 psi</td>
<td>at 100 psi</td>
<td>in³</td>
<td>ft³ at 85 psi air</td>
<td>in</td>
<td>in</td>
<td>in</td>
<td>psi</td>
<td>lbs</td>
</tr>
<tr>
<td>1200</td>
<td>1600</td>
<td>18.0</td>
<td>1:16</td>
<td>AHB-17</td>
<td>2.2</td>
<td>8.00</td>
<td>2.00</td>
<td>5.71</td>
</tr>
<tr>
<td>2550</td>
<td>3460</td>
<td>8.5</td>
<td>1:34</td>
<td>AHB-34</td>
<td>2.2</td>
<td>8.00</td>
<td>1.38</td>
<td>5.71</td>
</tr>
<tr>
<td>3450</td>
<td>4600</td>
<td>6.1</td>
<td>1:46</td>
<td>AHB-46</td>
<td>2.2</td>
<td>8.00</td>
<td>1.18</td>
<td>5.71</td>
</tr>
<tr>
<td>4800</td>
<td>–</td>
<td>4.5</td>
<td>1:64</td>
<td>AHB-66</td>
<td>2.2</td>
<td>8.00</td>
<td>1.00</td>
<td>5.71</td>
</tr>
<tr>
<td>▼ B series</td>
<td>2250</td>
<td>3000</td>
<td>6.2</td>
<td>1:30</td>
<td>B-3005</td>
<td>.95</td>
<td>7.10</td>
<td>1.22</td>
</tr>
<tr>
<td>3750</td>
<td>5000</td>
<td>3.7</td>
<td>1:50</td>
<td>B-5003</td>
<td>.95</td>
<td>7.10</td>
<td>.94</td>
<td>5.20</td>
</tr>
</tbody>
</table>

1) One cycle = advance + retract stroke.

Note: Seal material: Buna-N, Polyurethane.

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**Options**

- Air valves
- Regulator-filter-lubricator
- Fittings

**Important**

Boosters can provide high oil flow rates based on the volume of incoming air.
Do not exceed the flow rate requirements of the components being used.

For vertical mounting of booster, an elbow fitting is recommended for the oil reservoir.

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For further details, see Enerpac’s Workholding catalog.
B, RA-series

Activator wand and booster

Contamination resistant closed hydraulic system

- No-leak palletized system, eliminates oil loss at connection point
- Closed design prevents machining chips and coolant from entering the hydraulic circuit
- Booster can be mounted in either horizontal or vertical position for flexible fixture design

Hydraulic system schematics

The Activator Wand RA-1061 is placed into the receiver booster B-81 or B-171. The mechanical transfer of force from the activator wand plunger to the booster piston provides oil flow to the system.

Product selection

<table>
<thead>
<tr>
<th>Pressure ratio</th>
<th>Oil flow ratio</th>
<th>Oil volume per stroke</th>
<th>Stroke</th>
<th>Model number</th>
<th>Effective area</th>
<th>Operating pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>2:1</td>
<td>1.75:1</td>
<td>8.10</td>
<td>2.04</td>
<td>B-81</td>
<td>3.98</td>
<td>400-5000</td>
</tr>
<tr>
<td>2:1</td>
<td>1.75:1</td>
<td>17.10</td>
<td>4.30</td>
<td>B-171</td>
<td>3.98</td>
<td>400-5000</td>
</tr>
</tbody>
</table>

A manually placed Wand and Booster system is used to clamp the castings in this machining fixture.
High flow units intensify low inlet oil pressure to high outlet pressure

- Internal bypass valving enables high output flow rates
- Wide range of intensification ratios allows for adapting to various operating pressure requirements
- Compact and self-contained design allows for ease of installation
- Includes dump valve eliminating the need for an external pilot check valve
- Select fit of all internal components provides long operating life

Intensifier principle

- When oil is supplied to the inlet (IN) port it flows freely past the check valves (CV) and the dump valve to the cylinder and advances it.
- As the inlet pressure increases the oscillating pump (OP) automatically increases the outlet pressure by the chosen intensification.
- Once the maximum pressure is reached, the pump frequency lowers and balances at the maximum pressure.

For further details, see Enerpac’s E215 Workholding catalog.
**P, SP series**

**Manual pumps**

Exclusively from Enerpac

...to power single-acting cylinders

- Internal pressure relief valve (except SP-621) prevents over-pressurization
- Two speed operation reduces handle strokes by as much as 78% over single speed pumps
- Low handle effort minimizes operator fatigue
- Compact size – enables easy conversion of manual fixtures to hydraulic power

### Options

**Fittings**

**Hoses**

**Hydraulic oil**

**Important**

P-141, P-142 and P-202 are designed for a maximum operating pressure of 10,000 psi.

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### Product selection

<table>
<thead>
<tr>
<th>Maximum hydraulic pressure</th>
<th>Usable oil capacity</th>
<th>Model number</th>
<th>Pressure rating</th>
<th>Oil volume per stroke</th>
<th>Piston stroke</th>
<th>Maximum handle effort</th>
<th>Dimensions (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>psi</td>
<td>in³</td>
<td></td>
<td>1st stage psi</td>
<td>2nd stage psi</td>
<td>1st stage in³</td>
<td>2nd stage in³</td>
<td>lbs A</td>
</tr>
<tr>
<td>描</td>
<td></td>
<td>描</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Single speed</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3000</td>
<td>6.2</td>
<td>SP-621</td>
<td>–</td>
<td>3000</td>
<td>–</td>
<td>–</td>
<td>60(1)</td>
</tr>
<tr>
<td>3000</td>
<td>50</td>
<td>P-51</td>
<td>–</td>
<td>3000</td>
<td>–</td>
<td>–</td>
<td>61</td>
</tr>
<tr>
<td>10,000</td>
<td>20</td>
<td>P-141</td>
<td>–</td>
<td>10,000</td>
<td>–</td>
<td>–</td>
<td>72</td>
</tr>
<tr>
<td><strong>Two speed</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5000</td>
<td>20</td>
<td>P-142</td>
<td>200</td>
<td>10,000</td>
<td>.221</td>
<td>.055</td>
<td>.50</td>
</tr>
<tr>
<td>5000</td>
<td>20</td>
<td>P-142-5000</td>
<td>200</td>
<td>5,000</td>
<td>.221</td>
<td>.055</td>
<td>.50</td>
</tr>
<tr>
<td>10,000</td>
<td>55</td>
<td>P-202</td>
<td>200</td>
<td>10,000</td>
<td>.221</td>
<td>.055</td>
<td>.50</td>
</tr>
</tbody>
</table>

1) Handle travel of SP-621 is 2.50 inches; 25 handle rotations displace 6.2 in³ of oil.

2) Handle effort on SP-621 is 60 ft.lbs at 3000 psi.
For a complete range of quality Workholding products come visit us at www.enerpacwh.com

Enerpac is proud to introduce a new way to view Workholding products and download CAD files. From the Enerpac website you are able to quickly locate the right product for your specific application and move to our download site to select from over 2,000 3D CAD files.

The shopping cart format makes downloading multiple files for transfer to your computer fast and easy.

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Norman Equipment Company 800-323-2710