**E SERIES**

**EP**
- Pump: Plunger
- Motor: 2200~3700 W/AC
- Flow rate: 12~28.8 ℓ/min
- Maximum Pressure: 7.0 MPa

**ET · ES**
- Pump: Trochoid™
- Motor: 750~1500 W/AC
- Flow rate: 12~28.8 ℓ/min
- Maximum Pressure: 2.0 MPa

**C SERIES**

**CT**
- Pump: Trochoid™
- Motor: 750~1500 W/AC
- Flow rate: 12~28.8 ℓ/min
- Maximum Pressure: 2.0 MPa

**CI**
- Pump: Impeller
- Motor: 1500~3700 W/AC
- Flow rate: 150~300 ℓ/min
- Total pump head: 40~65 m
What is NOP Coolant Unit?
FEATURES OF NOP COOLANT UNIT 3

E Series: for High-to-medium Pressure
EP: Plunger-type High-pressure Coolant Unit
Model Numbering System 9
Features of EP 11
ET·ES: Trochoid™-type Medium-pressure Coolant Unit
Model Numbering System 13
Features of ET·ES 15

Line-type
EP Sample System Layout 19
ET, ES Sample System Layout 21

C Series: for Medium-to-low Pressure
CT: Trochoid-type Medium-pressure Coolant Unit
Model Numbering System 25
Features of CT 27
CI: Large flow Low-pressure Coolant Unit
Model Numbering System 29
Features of CI 31

TAZUNA™
TAZUNA™ (A Fluid Control System that Cuts Annual Power Consumption by Up to 61%) 35

Specification Tables for All Series
E and C Series 39

NOP Coolant Unit User’s Instruction Manual (Abstract)
NOP Coolant Unit User’s Instruction Manual (Abstract) 41

Be sure to read instruction manual provided with the product before use.

NOP coolant unit is compliant with the RoHS Directive and Reach Regulation.
Various components of the coolant unit are all combined in one. NOP coolant unit greatly expands the working space and offers an easy-to-work and efficient environment.

 Proposal by NOP Coolant Unit (except CI)

Conventional high/medium pressure coolant unit

- NO Supply Pump
- NO Cyclone Filter
- NO In-line Filter
- NO Clean Tank

Less space required, less maintenance work, and less hassle in swarf recovery.

What is NOP coolant unit?

Feature 1

- Less space required,
Various components of the coolant unit are all combined in one. NOP coolant unit greatly expands the working space and offers an easy-to-work and efficient environment.

- **Feature 1** Less space required

**Conventional high/medium pressure coolant unit**

- Screen Filter
- Coolant Tank
- Supply Pump
- Cyclone Filter
- In-line Filter
- Clean Tank
- High to Medium Pressure Pump
- Machining Center

**Proposal by NOP Coolant Unit (except CI)**

- Screen Filter
- Coolant Tank
- Supply Pump
- Cyclone Filter
- In-line Filter
- Clean Tank
- Machining Center

**What is NOP coolant unit?**

**Feature 1** Less space required

1. NO Supply Pump
2. NO Cyclone Filter
3. NO In-line Filter
4. NO Clean Tank

**NOP COOLANT UNIT EP**

W269 x H753 x D269

**Conventional coolant unit**

W1100 x H1270 x D850
NOP coolant unit can achieve substantial reduction in filter maintenance with compact design which ensures clog-free filtration system, by automatically washing away swarf sticking to the filter.

Our special Turbulence™ design generates turbulence around the surface of filter with 2 wing-shaped vanes rotating around filter and can wash away swarf from filter surface continuously.
What is NOP coolant unit?

Feature 3  Less hassle in swarf recovery

Swarf recovery is simple!
NOP coolant unit separates and ejects swarf in lumps.

NOP coolant unit cleans the coolant, but that is not all. It also collects cumbersome swarf. It ejects separated swarf from the contaminant drain port to the bucket.

Swarf recovery is incomparably simpler than the conventional system.

※ The Contaminant drain port discharges coolant thickened with swarf.

Samples of swarf collection

1 Bucket type

2 Magnet separator type

3 Drum filter type
Element Model

NOP® COOLANT UNIT

with Built-in Turbulence™ Filter
Plunger-type,
All-in-one High-pressure Coolant unit

Turbulence™ filter
Special turbulence cleans the filter automatically, rendering the filter clog free.

Plunger pump/ 7.0 MPa - 3.0 MPa
Piston action pushes fluid at high to medium pressure.

Compatible with the TAZUNA™ fluid control system (software)
TAZUNA reduces the electric power cost further by approximately 20%.
The pressure and flow rate are automatically adjusted.

■ Model Numbering System

TOP—YTH ① ② - ③ E VD ④ ⑤

① Motor capacity
2200: 2.2 kW
3700: 3.7 kW

② Motor type*1
Standard motor
A3: AC 200/200/220/230 V 50/60/60 Hz
3 phase electric induction motor (IE3) with CE marking

Local motor
AE: supplied by NOP Deutschland (Germany)
AF: supplied by NOP Taiwan
AJ: supplied by NOP Asia (China)
AK: supplied by NOP India

③ Flow rate
P008: Plunger pump, 8 cc/rev
P010: Plunger pump, 10 cc/rev
P014: Plunger pump, 14 cc/rev
P016: Plunger pump, 16 cc/rev

Filtering method
E: Turbulence™ filter type

④ Relief valve
VD: External return type

Relief pressure setting*2
70 : 7.0 MPa
60 : 6.0 MPa
35 : 3.5 MPa
30 : 3.0 MPa

⑤ Filtering performance
B : 50 µm*3
C : 20 µm*4

*1 For further details about the local motor, please contact our overseas branch or subsidiaries.
*2 Refer to page 39 for the compatible model for each relief pressure setting.
*3 Please consult us if you use straight oils as they can only be used in limited conditions.
*4 20 µm filter is not applicable to straight oils.

■ Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Item</th>
<th>Motor capacity (kW)</th>
<th>Flow rate (l/min) 50 Hz / 60 Hz</th>
<th>Maximum pressure (MPa) 50 Hz / 60 Hz</th>
<th>Approximate weight (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>YTH2200A3-P008EVD**</td>
<td></td>
<td>2.2</td>
<td>12.0 / 14.4</td>
<td>7.0 / 7.0</td>
<td>53</td>
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<td>7.0 / 6.0</td>
<td></td>
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<td>YTH2200A3-P016EVD**</td>
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<tr>
<td>YTH3700A3-P014EVD**</td>
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<td>21.0 / 25.2</td>
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<tr>
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<td></td>
<td>24.0 / 28.8</td>
<td>7.0 / 6.0</td>
<td></td>
</tr>
</tbody>
</table>

* ④ Relief pressure setting
### Dimensional Drawing (Typical / Motor type : A3)

<table>
<thead>
<tr>
<th>Model</th>
<th>L</th>
<th>H</th>
<th>M</th>
<th>(\phi D)</th>
<th>(\theta^{(\circ)})</th>
<th>TB</th>
</tr>
</thead>
<tbody>
<tr>
<td>YTH2200A3-P008EVD</td>
<td>753.3</td>
<td>433</td>
<td>311</td>
<td>202</td>
<td>45</td>
<td>168</td>
</tr>
<tr>
<td>YTH2200A3-P010EVD</td>
<td>753.3</td>
<td>433</td>
<td>311</td>
<td>202</td>
<td>45</td>
<td>168</td>
</tr>
<tr>
<td>YTH2200A3-P016EVD</td>
<td>753.3</td>
<td>433</td>
<td>311</td>
<td>202</td>
<td>45</td>
<td>168</td>
</tr>
<tr>
<td>YTH3700A3-P014EVD</td>
<td>768.3</td>
<td>448</td>
<td>326</td>
<td>243</td>
<td>45</td>
<td>187</td>
</tr>
<tr>
<td>YTH3700A3-P016EVD</td>
<td>768.3</td>
<td>448</td>
<td>326</td>
<td>243</td>
<td>45</td>
<td>187</td>
</tr>
</tbody>
</table>

Features of EP

Turbulence™ Filter

Our special Turbulence™ design generates turbulence around the surface of filter with 2 wing-shaped vanes rotating around filter and can wash away swarf from filter surface continuously.

High efficiency plunger pump

- Compatible fluid type
  - Water-soluble cutting fluids (Please consult us if you use straight oils)
  - Not for lubricant oils or fuel oils (Flammable)
  - Not for clear water, demineralized water, aqueous solutions and viscous fluids without rust-preventive property, corrosive fluids, solvents, and any cutting fluids that contain active sulfur

- Relief valve is built into the unit

Filtration performance (Nominal value)

<table>
<thead>
<tr>
<th>Suction strainer</th>
<th>3 mm (Solids larger than this must be removed from the tank)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filter</td>
<td>20 µm, 50 µm</td>
</tr>
</tbody>
</table>

* Please consult us if you use straight oils.
A Sample System Layout

■ Performance Curves

Water-soluble coolant (general performance)
Oil used: JIS K2241, Type A3 solution containing 2% water-soluble cutting fluid

50 Hz

P-Q Curve

Required Power

60 Hz

P-Q Curve

Required Power
**ET·ES**

Received the "2015 JSME Excellent Product Award"

**Trochoid™-type,**

**All-in-one Medium-pressure Coolant unit**

**Turbulence™ filter**

Special turbulence cleans the filter automatically, rendering the filter clog free.

**Trochoid™ pump/ 2.0 MPa, 1.5 MPa**

A rotor turning in a trochoïdal curve generates pressure to suck and discharge fluid. This is an extremely efficient self-priming pump.

**Compatible with the TAZUNA™ fluid control system (software)**

TAZUNA reduces the electric power cost further by approximately 20%.

The pressure and flow rate are automatically adjusted.

### Model Numbering System

**TOP—YTH 1 2 - 3 E VD 4 5**

<table>
<thead>
<tr>
<th>1 Motor capacity</th>
<th>750: 0.75 kW</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1500: 1.5 kW</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2 Motor type*1</th>
<th>Standard motor</th>
<th>Local motor</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A3: AC 200/200/220/230 V 50/60/60/60 Hz 3 phase electric induction motor (IE3) with CE marking</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AE: supplied by NOP Deutschland (Germany)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AF: supplied by NOP Taiwan</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AJ: supplied by NOP Asia (China)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AK: supplied by NOP India</td>
<td></td>
</tr>
</tbody>
</table>

| 3 Rotor capacity | T208: Trochoid™ pump, 8 cc/rev |
|                 | T216: Trochoid™ pump, 16 cc/rev |
|                 | S208: Trochoid™ pump, 8 cc/rev*2 |
|                 | S216: Trochoid™ pump, 16 cc/rev*2 |

<table>
<thead>
<tr>
<th>Filtering method</th>
<th>E: Turbulence™ filter type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relief valve</td>
<td>VD: External return type</td>
</tr>
</tbody>
</table>

| 4 Relief pressure setting*2 | 20 : 2.0 MPa |
|----------------------------| 15 : 1.5 MPa |

| 5 Filtering performance | B : 50 μm |
|-------------------------| C : 20 μm*4 |

*1 For further details about the local motor, please contact our overseas branch or subsidiaries.

*2 ES is wear resistant type for hard and abrasive materials.

*3 See page 39 for compatible model for each relief pressure setting.

*4 20 μm filter is not applicable to straight oils.

### Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Item</th>
<th>Motor capacity (kW)</th>
<th>Flow rate (ℓ/min) 50 Hz / 60 Hz</th>
<th>Maximum pressure (MPa)</th>
<th>Approximate weight (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>YTH750A3-T208EVD**</td>
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<td>0.75</td>
<td>12.0 / 14.4</td>
<td>1.5 / 1.5</td>
<td>34</td>
</tr>
<tr>
<td>YTH1500A3-T216EVD**</td>
<td></td>
<td>1.5</td>
<td>24.0 / 28.2</td>
<td>2.0 / 2.0</td>
<td>39</td>
</tr>
<tr>
<td>YTH750A3-S208EVD**</td>
<td></td>
<td>0.75</td>
<td>12.0 / 14.4</td>
<td>1.5 / 1.5</td>
<td>34</td>
</tr>
<tr>
<td>YTH1500A3-S216EVD**</td>
<td></td>
<td>1.5</td>
<td>24.0 / 28.2</td>
<td>2.0 / 2.0</td>
<td>39</td>
</tr>
</tbody>
</table>

*4 Relief pressure setting, 5 Filtering performance
Trochoid™-type, All-in-one Medium-pressure Coolant unit

A rotor turning in a trochoidal curve generates pressure to suck and discharge fluid. This is an extremely efficient self-priming pump.

Turbulence™ filter
Special turbulence cleans the filter automatically, rendering the filter clog free.

Compatible with the TAZUNA™ fluid control system (software)
TAZUNA reduces the electric power cost further by approximately 20%. The pressure and flow rate are automatically adjusted.

Received the “2015 JSME Excellent Product Award”

Model Numbering System

<table>
<thead>
<tr>
<th>Model</th>
<th>L</th>
<th>B</th>
<th>C</th>
<th>W</th>
<th>Q</th>
<th>H</th>
<th>M</th>
<th>φD</th>
<th>θ(°)</th>
<th>TB</th>
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</thead>
<tbody>
<tr>
<td>YTH750A3-T208EVD**</td>
<td>638.8</td>
<td>274.8</td>
<td>93.5</td>
<td>214.8</td>
<td>20</td>
<td>364</td>
<td>253.5</td>
<td>170</td>
<td>30</td>
<td>151</td>
</tr>
<tr>
<td>YTH1500A3-T216EVD***</td>
<td>678.3</td>
<td>294.8</td>
<td>113.5</td>
<td>234.8</td>
<td>40</td>
<td>383.5</td>
<td>273</td>
<td>202</td>
<td>45</td>
<td>168</td>
</tr>
<tr>
<td>YTH750A3-S208EVD**</td>
<td>638.8</td>
<td>274.8</td>
<td>93.5</td>
<td>214.8</td>
<td>20</td>
<td>364</td>
<td>253.5</td>
<td>170</td>
<td>30</td>
<td>151</td>
</tr>
<tr>
<td>YTH1500A3-S216EVD***</td>
<td>678.3</td>
<td>294.8</td>
<td>113.5</td>
<td>234.8</td>
<td>40</td>
<td>383.5</td>
<td>273</td>
<td>202</td>
<td>45</td>
<td>168</td>
</tr>
</tbody>
</table>

* Drawings in PDF Drawings can be downloaded from NOP coolant unit website http://coolant-unit.nopgroup.com/en/
**An All-in-one, Medium Pressure Coolant Unit**

All components of a coolant system are consolidated into a single unit. No in-line and suction filters are required. The use of NOP coolant unit reduces the required space to about 1/20th by volume of that occupied by a conventional coolant system. The saved space expands the available plant space, resulting in a higher production efficiency.

- Maximum operating pressure: 2.0 MPa
- Maximum flow rate: 28.8 liters/min
- No suction filter is required
- No in-line filter is required
- No clean tank is required
- No transfer pump is required on the coolant tank end
- No plumbing is required to interconnect various components

**Turbulence™ Filter**

Our special Turbulence™ design generates turbulence around the surface of filter with 2 wing-shaped vanes rotating around filter and can wash away swarf from filter surface continuously.

**High efficiency Trochoid™ pump**

- Compatible fluid type
  - Water-soluble cutting fluids, straight oils
  - 20 μm element is applicable to fluids with kinematic viscosity of 15 mm²/s or less, 50 μm element is applicable to fluids with kinematic viscosity of 32 mm²/s or less (Maximum kinematic viscosity : 32 mm²/s or less)
  - Not for lubricant oils or fuel oils
  - Not for clear water, demineralised water, aqueous solutions and viscous fluids without rust-preventive property, corrosive fluids, solvents

- Relief valve is built into the unit

**Filtration performance (Nominal value)**

<table>
<thead>
<tr>
<th>Component</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suction strainer</td>
<td>3 mm (Solids larger than this must be removed from the tank)</td>
</tr>
<tr>
<td>Filter</td>
<td>20 μm, 50 μm</td>
</tr>
</tbody>
</table>

※Please consult us if you use straight oils as it can be used in limited conditions.
A Sample System Layout

ES type (Wear resistance)

For its special wear resistant structure, ES type can be installed on coolant tanks of machines which are machining materials which generate hard and abrasive swarf.

- Balance plate
  Pump generates inner pressure to press the balance plate toward the Trochoid rotor side, which helps in reducing the clearance created due to wear and thereby minimize the pressure drop, ensuring desired performance for a longer time

- Shaft and bearing reinforcement
  Improved wear resistance by employing sprayed ceramic on shaft bearing area and usage of ceramic bearing

- Double seal & cartridge system
  Seal Area is reinforced to prevent leakage and Cartridge system ensures ease of replacement
Performance Curves of ET

Water-soluble coolant (general performance)
Oil used: JIS K2241, Type A3 solution containing 2% water-soluble cutting fluid

50 Hz

60 Hz

Spindle Oil (general performance)
Oil used: ISO VG2 equivalent

50 Hz

60 Hz
Performance Curves of ES

Water-soluble coolant (general performance)
Oil used: JIS K2241, Type A3 solution containing 2% water-soluble cutting fluid

50 Hz

60 Hz

Spindle Oil (general performance)
Oil used: ISO VG2 equivalent

50 Hz

60 Hz
Alteration of the tank cover is no longer necessary, ensuring easy retrofit of through-coolant system.

**NOP coolant unit external type**

This self-priming external type NOP coolant unit could supply high-to-medium pressure coolant from a distant place by using extended pipes and hoses. Alteration of the tank cover is no longer necessary, ensuring easy retrofit of through-coolant system.

**Compatible models**

E series EP, ET, ES

*Please refer to previous pages for further specifications on each model above.

### A Sample System Layout  EP Line Type

**Coolant liquid which contains swarf**

**To machine tool**

**Coolant Tank**

**Pump side view from arrow A direction**

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description</th>
<th>Qty</th>
<th>Hose size</th>
<th>Screw size</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Suction strainer</td>
<td>1</td>
<td>-</td>
<td>R1/4</td>
</tr>
<tr>
<td>2</td>
<td>Suction hose</td>
<td>1</td>
<td>Ø1/2 – Ø1/4</td>
<td>R1-1/4</td>
</tr>
<tr>
<td>3</td>
<td>Contaminant drain hose</td>
<td>1</td>
<td>Ø1/2 – Ø1/4</td>
<td>R1-1/4</td>
</tr>
<tr>
<td>4</td>
<td>Drain tube</td>
<td>1</td>
<td>R1/4</td>
<td>R1B</td>
</tr>
<tr>
<td>5</td>
<td>Hose clamp (Ø1/2)</td>
<td>2</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>6</td>
<td>Hose clamp (Ø1/2)</td>
<td>2</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>7</td>
<td>Tube fitting (Ø1/2)</td>
<td>1</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>8</td>
<td>Spare hose for air bleeding</td>
<td>1</td>
<td>Ø1/2 – Ø1/4</td>
<td>R1/2</td>
</tr>
<tr>
<td>9</td>
<td>Hose nipple (Ø1/4)</td>
<td>1</td>
<td>R1/2</td>
<td>R1/2</td>
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<tr>
<td>10</td>
<td>Female connector (Ø1/4)</td>
<td>1</td>
<td>R1/2</td>
<td>R1/2</td>
</tr>
</tbody>
</table>

**Accessories**

- Set up a screen filter to ensure that pump doesn’t directly suck foreign objects larger than the perforations in strainer. Secure the strainer to the tank to prevent air suction.
- Lower the hose below the liquid level as illustrated below to ensure that air doesn’t enter the system. Do not let the hose end be submerged in water.
- Release the liquid from contaminant drain port in open atmosphere. Do not restrict the flow to 20% of strainer’s capacity. Secure the strainer to the tank to prevent air suction.
- Set up a screen filter to ensure that pump doesn’t directly suck foreign objects larger than the perforations in strainer.
- The hose should be as short as possible with minimum number of bends.
- Make sure the hose-end is not in contact with liquid surface.
- To ensure the hose-end is not in contact with liquid surface.
- Make sure you keep the hose below the liquid surface level to ensure air does not enter the system.
- The hose should be as short as possible with minimum number of bends.
- Release the liquid from contaminant drain port in open atmosphere. Do not restrict the flow to 20% of strainer’s capacity.
- Secure the strainer to the tank to prevent air suction.
- Set up a screen filter to ensure that pump doesn’t directly suck foreign objects larger than the perforations in strainer. Secure the strainer to the tank to prevent air suction.
- Lower the hose below the liquid level as illustrated below to ensure that air doesn’t enter the system. Do not let the hose end be submerged in water.
- Release the liquid from contaminant drain port in open atmosphere. Do not restrict the flow to 20% of strainer’s capacity.
- Secure the strainer to the tank to prevent air suction.
- Set up a screen filter to ensure that pump doesn’t directly suck foreign objects larger than the perforations in strainer. Secure the strainer to the tank to prevent air suction.
- Lower the hose below the liquid level as illustrated below to ensure that air doesn’t enter the system. Do not let the hose end be submerged in water.
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- Set up a screen filter to ensure that pump doesn’t directly suck foreign objects larger than the perforations in strainer. Secure the strainer to the tank to prevent air suction.
- Lower the hose below the liquid level as illustrated below to ensure that air doesn’t enter the system. Do not let the hose end be submerged in water.
- Release the liquid from contaminant drain port in open atmosphere. Do not restrict the flow to 20% of strainer’s capacity.
- Secure the strainer to the tank to prevent air suction.
Alteration of the tank cover is no longer necessary, ensuring easy retrofit of through-coolant system.

This self-priming external type NOP coolant unit could supply high-to-medium pressure coolant from

Please refer to previous pages for further specifications on each model above.

---

**Dimensional Drawing  EP Line Type**

(Typical / Motor type : A3)

![Dimensional Drawing](image)

<table>
<thead>
<tr>
<th>Model</th>
<th>L</th>
<th>M</th>
<th>φD</th>
<th>θ(°)</th>
<th>TB</th>
</tr>
</thead>
<tbody>
<tr>
<td>YTH2200A3-P008EVD70*L</td>
<td>873</td>
<td>311</td>
<td>202</td>
<td>135</td>
<td>168</td>
</tr>
<tr>
<td>YTH2200A3-P010EVD**L</td>
<td>873</td>
<td>311</td>
<td>202</td>
<td>135</td>
<td>168</td>
</tr>
<tr>
<td>YTH2200A3-P016EVD***L</td>
<td>873</td>
<td>311</td>
<td>202</td>
<td>135</td>
<td>168</td>
</tr>
<tr>
<td>YTH3700A3-P014EVD70**L</td>
<td>888</td>
<td>326</td>
<td>243</td>
<td>135</td>
<td>187</td>
</tr>
<tr>
<td>YTH3700A3-P016EVD***L</td>
<td>888</td>
<td>326</td>
<td>243</td>
<td>135</td>
<td>187</td>
</tr>
</tbody>
</table>

A Sample System Layout  ET · ES Line Type

**Item No.** | **Description** | **Qty.** | **Hose size** | **Screw size** | **Note**
--- | --- | --- | --- | --- | ---
1 | Suction strainer | 1 | — | R1-1/4 | Set up a screen filter to ensure that the pump doesn’t directly suck objects larger than the perforations of the strainer. Secure the strainer to the tank to prevent air suction.
2 | Suction hose | 1 | Ø22×Ø41 | R1-1/4 | The hose should be as short as possible with minimum number of bends.
3 | Contaminant drain hose | 1 | Ø19×Ø26 | R1/2 | Lower the hose below the liquid level as illustrated below to ensure that any air doesn’t enter the system.
4 | Relief valve · discharge hose | 1 | Ø12×Ø18 | R1/4 | To prevent back generation, make sure that the hose-end is dipped into the liquid.
5 | Drain hose | 1 | Ø12×Ø18 | R1/4 | To prevent back generation, make sure that the hose-end is dipped into the liquid.
6 | Hose clamp (Ø12) | 2 | — | — | Tighten the hose clamp securely to prevent leakage.
7 | Hose clamp (Ø12) | 2 | — | — | Tighten the hose clamp securely to prevent leakage.
8 | Hose clamp (Ø12) | 2 | — | — | Tighten the hose clamp securely to prevent leakage.
9 | Spare hose for air bleeding | 1 | Ø19×Ø26 | R1/2 | Use this hose when performing air bleeding on the first run, that necessary until the pump has primed itself.
10 | Hose nipple (Ø41) | 2 | — | R1/2 | Use this hose when performing air bleeding on the first run, that necessary until the pump has primed itself.
11 | Female coupler (NPS FK) | 2 | — | R1/2 | Use this hose when performing air bleeding on the first run, that necessary until the pump has primed itself.

**Diagram Notes**
- **Contaminant drain port**
- **Drain port**
- **Outlet port**
- **Relief valve · discharge hose**
- **Drain hose**
- **Suction strainer**
- **Suction hose**
- **Contaminant drain hose**
- **Relief valve**
- **Drain valve**
- **Outlet port**
- **Relief valve discharge hose**
- **Drain port**
- **Bucket**
- **Swarf**
- **Screen filter #18**
- **Dirty coolant liquid returned from machine tool.**
- **Check valve (Non-return valve)**
- **0.05 — 0.1 MPa**
- **High-pressure hose is not included with the product. Please purchase it separately. (A hose larger than R1 1/2 in diameter is recommended)**

**Accessories**
- **Check valve (Non-return valve)**
- **Outlet port**
- **Relief valve · discharge hose**
- **Drain valve**
- **Outlet port**
- **To machine tool**
- **To tank**
- **Screen filter #18**
- **41**
- **19**
- **12**
- **1/2**
- **Rc 1/2**
- **Rc 3/4**
- **0.05 — 0.1 MPa**

**Notes**
- Make sure you keep the hose below the liquid surface level to ensure that air does not enter the system.
- It is also imperative that it be located far enough from the pump suction area.
- Release the liquid from the contaminant drain port in open atmosphere (Do not put the port-end underwater).
- The hose should be as short as possible with minimum number of bends.
- Tighten the hose clamp securely to prevent leakage.
- Use this hose when performing air bleeding on the first run, that necessary until the pump has primed itself.
- Use this hose when performing air bleeding on the first run, that necessary until the pump has primed itself.
- Use this hose when performing air bleeding on the first run, that necessary until the pump has primed itself.

**Diagram Instructions**
- Make sure the hose-end is not in contact with liquid surface.
- Make sure you keep the hose below the liquid surface level to ensure that air does not enter the system.
- Suction strainer is set up to ensure that the pump doesn’t directly suck objects larger than the perforations of the strainer.
- Secure the strainer to the tank to prevent air suction.
- The hose should be as short as possible with minimum number of bends.
- Lower the hose below the liquid level as illustrated below to ensure that any air doesn’t enter the system.
- To prevent back generation, make sure that the hose-end is dipped into the liquid.
- Use this hose when performing air bleeding on the first run, that necessary until the pump has primed itself.
- Use this hose when performing air bleeding on the first run, that necessary until the pump has primed itself.
- Use this hose when performing air bleeding on the first run, that necessary until the pump has primed itself.
- High-pressure hose is not included with the product. Please purchase it separately. (A hose larger than R1 1/2 in diameter is recommended.)

**Diagram Elements**
- **Pump side view from arrow A direction**
- **Bucket**
- **Swarf**
- **Screen filter #18**
- **Dirty coolant liquid returned from machine tool.**
- **Check valve (Non-return valve)**
- **Outlet port**
- **Relief valve · discharge hose**
- **Drain valve**
- **Outlet port**
- **To machine tool**
- **To tank**
- **Screen filter #18**
- **41**
- **19**
- **12**
- **1/2**
- **Rc 1/2**
- **Rc 3/4**
- **0.05 — 0.1 MPa**

**Diagram Legends**
- **L**
- **B**
- **H**
- **M**
- **YTH750A3-T208EVD15**
- **YTH1500A3-S216EVD**
- **YTH750A3-S208EVD15**
- **YTH1500A3-T216EVD**
### Dimensional Drawing  ET·ES Line Type
(Typical / Motor type : A3)

<table>
<thead>
<tr>
<th>Model</th>
<th>L</th>
<th>B</th>
<th>H</th>
<th>M</th>
<th>φD</th>
<th>θ (°)</th>
<th>TB</th>
</tr>
</thead>
<tbody>
<tr>
<td>YTH750A3-T208EVD15×L</td>
<td>756</td>
<td>392</td>
<td>364</td>
<td>253.5</td>
<td>170</td>
<td>30</td>
<td>151</td>
</tr>
<tr>
<td>YTH1500A3-T216EVD×L</td>
<td>775.5</td>
<td>392</td>
<td>364</td>
<td>253.5</td>
<td>170</td>
<td>30</td>
<td>151</td>
</tr>
<tr>
<td>YTH750A3-S208EVD15×L</td>
<td>756</td>
<td>392</td>
<td>364</td>
<td>253.5</td>
<td>170</td>
<td>30</td>
<td>151</td>
</tr>
<tr>
<td>YTH1500A3-S216EVD×L</td>
<td>823.5</td>
<td>440</td>
<td>364</td>
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<td>30</td>
<td>151</td>
</tr>
</tbody>
</table>

Cyclone Model with Built-in Cyclone Filter
Cyclone Model

C Series

COOLANT UNIT

with Built-in Cyclone Filter
CT

Trochoid™-type
Medium-pressure Coolant Unit

Double-cyclone filter
Two layers of double cyclones (one large cyclone and six small cyclones) remove swarf from the coolant fluid.

Trochoid™ pump/ 2.0 MPa, 1.5 MPa
A rotor turning in a trochoidal curve generates pressure to suck and discharge fluid. This is an extremely efficient self-priming pump.

Compatible with the TAZUNA™ fluid control system (software)
TAZUNA™ reduces the electric power cost further by approximately 20%. The pressure and flow rate are automatically adjusted.

■ Model Numbering System

TOP—YTH ① ② - ③ C VD ④

1. Motor capacity
   750: 0.75 kW
   1500: 1.5 kW

2. Motor type*  
   Standard motor
   A3: AC 200/200/220/230 V 50/60/60/60 Hz 3 phase electric induction motor (IE3) with CE marking
   Local motor
   AE: supplied by NOP Deutschland (Germany)
   AF: supplied by NOP Taiwan
   AJ: supplied by NOP Asia (China)
   AK: supplied by NOP India

3. Rotor capacity
   T208: Trochoid™ pump, 8 cc/rev
   T216: Trochoid™ pump, 16 cc/rev

4. Filtering method
   C: Double-cyclone type
   VD: External return type

5. Relief valve
   20 : 2.0 MPa
   15 : 1.5 MPa

* For further details about the local motor, please contact our overseas branch or subsidiaries.

■ Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Item</th>
<th>Motor capacity (kW)</th>
<th>Flow rate (ℓ/min) 50 Hz / 60 Hz</th>
<th>Maximum pressure (MPa)</th>
<th>Approximate weight (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>YTH750A3-T208CVD*</td>
<td></td>
<td>0.75</td>
<td>12.0 / 14.4</td>
<td>2.0</td>
<td>34</td>
</tr>
<tr>
<td>YTH1500A3-T216CVD*</td>
<td></td>
<td>1.5</td>
<td>24.0 / 28.8</td>
<td>2.0</td>
<td>39</td>
</tr>
</tbody>
</table>

* ④Relief pressure setting
**Dimensional Drawing** (Typical / Motor type: A3)

- **Inlet port**: (Perforated metal)
- **Return pipe**
- **Vent**
- **Relief valve**
- **Outlet port**: Rc 3/4
- **Contaminant drain port**: Rc 1/2

### Specifications (mm)

<table>
<thead>
<tr>
<th>Model</th>
<th>L</th>
<th>B</th>
<th>C</th>
<th>W</th>
<th>Q</th>
<th>H</th>
<th>M</th>
<th>φD</th>
<th>θ(°)</th>
<th>TB</th>
</tr>
</thead>
<tbody>
<tr>
<td>YTH750A3-T208CVD**</td>
<td>599.7</td>
<td>235.7</td>
<td>206.7</td>
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<td>151</td>
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<td>YTH1500A3-T216CVD**</td>
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<td>255.7</td>
<td>226.7</td>
<td>195.7</td>
<td>40</td>
<td>383.5</td>
<td>273</td>
<td>202</td>
<td>45</td>
<td>168</td>
</tr>
</tbody>
</table>

Features of CT

All-in-one Medium-pressure Coolant Pump

All components of a coolant system are consolidated into a single unit. By simply replacing a conventional medium-pressure pump with CT, the occupied space could be reduced to 1/20th by volume. The saved space expands the available plant space, resulting in a higher production efficiency.

- Maximum operating pressure: 2.0 MPa
- Maximum flow rate: 28.8 liters/min
- No suction filter is required
- No clean tank is required
- Applicable only to continuous running
- No transfer pump is required on the coolant tank end
- No plumbing is required to interconnect various components

High-efficiency Trochoid™ Pump

CT employs a Trochoid™ pump which excels in fluid control efficiency. The double-cyclone system sorts out swarf and enables direct connection to the coolant tank.

- Compatible fluid type
  - Water-soluble cutting fluids
  - Not for straight oils, lubricant oils or fuel oils
  - Not for clear water, demineralised water, aqueous solutions and viscous fluids without rust-preventive property, corrosive fluids, and solvents
- Relief valve is built into the unit

Double-cyclone Filter

A proprietary double-cyclone system removes swarf*. The first cyclone removes larger debris, while the second cyclones remove smaller particles. The line-filter cleaning cycle is extended by 24 times.

*Swarf larger than 20 μm can be removed (When using water-soluble coolant fluid).

Filtration performance (Nominal value)

<table>
<thead>
<tr>
<th>Suction strainer</th>
<th>3 mm (Solids larger than this must be removed from the tank)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filter</td>
<td>Water-soluble coolant fluid</td>
</tr>
<tr>
<td></td>
<td>50 μm: 95% (Specific weight 2.7)</td>
</tr>
<tr>
<td></td>
<td>100 μm: 99.9% (Specific weight 2.7)</td>
</tr>
</tbody>
</table>

*The filtration performance above can only be achieved when running the pump continuously. (Intermittent running is not allowed)
### A Sample System Layout

Unload valve (Solenoid Valve)
As CI is not allowed to run intermittently, bypass the coolant while the pump is unloaded.
The relief valve inside the pump is not designed to be used for unloading.

Check valve 0.05～0.1 MPa
(Non-return valve)

To machine tool

Screen filter #18

Separator/conveyor, etc

Contaminant drain port Rc 1/2

Drain piping:
- Lifting height <1 m
- Length (horizontal) <3 m

Dirty coolant liquid returned from machine tool.

The contaminant drain line must be submerged underwater to ensure air doesn’t enter the system.

---

### Performance Curves

#### Water-soluble coolant (general performance)

Oil used: JIS K2241, Type A3 solution containing 2% water-soluble cutting fluid

**CT208**

**CT216**

### 50 Hz

**P-Q Curve**

<table>
<thead>
<tr>
<th>Flow rate (l/min)</th>
<th>Pressure (MPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>0</td>
</tr>
<tr>
<td>25</td>
<td>0.5</td>
</tr>
<tr>
<td>20</td>
<td>1.0</td>
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<tr>
<td>15</td>
<td>1.5</td>
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<tr>
<td>10</td>
<td>2.0</td>
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<tr>
<td>5</td>
<td>2.5</td>
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<table>
<thead>
<tr>
<th>Pump shaft power (kW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
</tr>
<tr>
<td>1.0</td>
</tr>
<tr>
<td>1.5</td>
</tr>
<tr>
<td>2.0</td>
</tr>
<tr>
<td>2.5</td>
</tr>
</tbody>
</table>

### 60 Hz

**P-Q Curve**

<table>
<thead>
<tr>
<th>Flow rate (l/min)</th>
<th>Pressure (MPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>0</td>
</tr>
<tr>
<td>25</td>
<td>0.5</td>
</tr>
<tr>
<td>20</td>
<td>1.0</td>
</tr>
<tr>
<td>15</td>
<td>1.5</td>
</tr>
<tr>
<td>10</td>
<td>2.0</td>
</tr>
<tr>
<td>5</td>
<td>2.5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pump shaft power (kW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
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<tr>
<td>1.0</td>
</tr>
<tr>
<td>1.5</td>
</tr>
<tr>
<td>2.0</td>
</tr>
<tr>
<td>2.5</td>
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</tbody>
</table>
CI

Large-flow Low-pressure Coolant Unit

Cyclone filter
The cyclone system sorts out swarf from the coolant fluid.

Impeller pump
Centrifugal mechanism generates pressure to supply a large flow coolant. This is a large flow transfer pump.

■ Model Numbering System

TOP—YTH ① ② - ③ C

① Motor capacity
1500: 1.5 kW
3700: 3.7 kW

② Motor type
AC: AC 200/200/220/230 V
50/60/60/60 Hz
3 phase electric induction motor (IE3) with CE marking

③ Flow rate*
50 Hz I155: Impeller pump (5 stages/150 ℓ)
60 Hz I152: Impeller pump (2 stages/150 ℓ)
50 Hz I305: Impeller pump (5 stages/300 ℓ)
60 Hz I302: Impeller pump (2 stages/300 ℓ)

Filtering method
C: cyclone type

* I155, I305 are not applicable to 60 Hz

■ Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Item</th>
<th>Motor capacity (kW)</th>
<th>Flow rate (ℓ/min)</th>
<th>Total pump head (m)</th>
<th>Approximate weight (kg)</th>
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</thead>
<tbody>
<tr>
<td>50 Hz</td>
<td>YTH1500AC-I155C</td>
<td>1.5</td>
<td>150</td>
<td>55</td>
<td>43</td>
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<tr>
<td>60 Hz</td>
<td>YTH1500AC-I152C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50 Hz</td>
<td>YTH3700AC-I305C</td>
<td>3.7</td>
<td>300</td>
<td>55</td>
<td>70</td>
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<tr>
<td>60 Hz</td>
<td>YTH3700AC-I302C</td>
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<td></td>
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<td>69</td>
</tr>
</tbody>
</table>
Large-flow Low-pressure Coolant Unit

- Cyclone filter: The cyclone system sorts out swarf from the coolant fluid.
- Impeller pump: Centrifugal mechanism generates pressure to supply a large flow coolant.
- This is a large flow transfer pump.

Dimensional Drawing (Typical / Motor type: A3)

- Motor capacity
  - 1500: 1.5 kW
  - 3700: 3.7 kW
- Motor type
  - 50/60/60/60 Hz
- 3 phase electric induction motor (IE3) with CE marking

Filtering method
- I155: Impeller pump (5 stages/150/2113)
- I152: Impeller pump (2 stages/150/2113)
- I305: Impeller pump (5 stages/300/2113)
- I302: Impeller pump (2 stages/300/2113)

Model Numbering System

<table>
<thead>
<tr>
<th>Model</th>
<th>Item</th>
<th>Motor capacity</th>
<th>Flow rate*</th>
<th>Total pump head</th>
<th>Approximate weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>YTH1500AC-I155C</td>
<td>50 Hz</td>
<td>150</td>
<td>1.5</td>
<td>40</td>
<td>55</td>
</tr>
<tr>
<td>YTH1500AC-I152C</td>
<td>60 Hz</td>
<td>150</td>
<td>1.5</td>
<td>43</td>
<td>50</td>
</tr>
<tr>
<td>YTH3700AC-I305C</td>
<td>50 Hz</td>
<td>300</td>
<td>3.7</td>
<td>48</td>
<td>72</td>
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<tr>
<td>YTH3700AC-I302C</td>
<td>60 Hz</td>
<td>300</td>
<td>3.7</td>
<td>69</td>
<td>70</td>
</tr>
</tbody>
</table>

- *I155 and I305 are not applicable to 60 Hz

Inlet port (Perforated metal): 
- 150 L: P.C.D.160
- 300 L: P.C.D.200

Outlet port:
- 150 L: Rc1 1/2
- 300 L: Rc2

Contaminant drain port:
- 150 L: Rc 3/4
- 300 L: Rc 3/4

Contaminant drain port:
- 150 L: Rc 3/8
- 300 L: Rc 3/8

Minimum liquid level:
- 150 L: 728
- 300 L: 902

4 holes 9 mm DIA drill through:
- P.C.D.160
- P.C.D.200

Drain port:
- 150 L: Rc 3/8
- 300 L: Rc 3/8

Minimum liquid level:
- 150 L: 80.5
- 300 L: 90.5

Direction of rotation:
- 90°

COOLANT UNIT  Features of CI

Large-flow Low-pressure Coolant Unit

This is a model corresponding to large flow and low pressure with cyclone filter. CI’s compact design enables to retrofit the existing tank easily. The large-flow also ensures high efficiency in swarf removal, which substantially reduces troubles around the tank, such as dimensional deviation of workpieces, clogged plumbing due to excessive swarf accumulation.

- **Total pump head**: 40-65 m
- **Maximum flow rate**: CI 15*C: 150 ℓ/min  
  CI 30*C: 300 ℓ/min

Application examples

**Plan-A  To transfer coolant to an isolated clean tank**

CI transfers cleaned coolant from a coolant tank to an isolated clean tank. A plate filter is no longer necessary between the tanks so the users can be free from the plate filter cleaning. CI can also reduce maintenance of coolant with its built-in cyclone system which can separate swarf from the coolant and discharge from contaminant drain port, so swarf can be simply collected with a bucket.
Plan-B  For tank cleaning (1)

CI can be an excellent tank cleaner by creating a flow circulation with outlet flow, that allows CI to stir up sediment on the tank floor and eliminate swarf effectively.

Plan-C  For tank cleaning (2)

CI supplies cleaned coolant directly to nozzles in a machine tool. While the machine is not in operation, CI can also eliminate swarf very effectively just by routing the outlet line back to the tank with a switching valve and agitate the coolant vigorously.

[CI can play 3 different roles]

- Coolant transfer: Cleaned coolant is supplied at all times, decreasing the risks of swarf cloggings, damaged workpieces or tools and total machine stoppage time can be reduced.
- Reduction in tank maintenance: It can effectively collect swarf in a coolant tank.
- Agitation of coolant: Proper coolant agitation with CI can delay growth of anaerobic bacteria in a coolant.
This unique reversed cyclone system enables to separate clean coolant and dirty coolant. Dirty coolant is pushed up through side surface of cyclone filter by centrifugal force and discharged with swarf. Clean coolant are collected to center of cyclone filter and boosted up by multiple-stage impellers.

CI adopts impeller pump whose design is best suited for supplying large quantity of coolant and capable of boosting up pressure with its multiple stage impellers.

- **Compatible fluid type**
  - Water-soluble cutting fluids, straight oils with kinematic viscosity of 22 mm²/s or less
  - Not for lubricant oils or fuel oils
  - Not for clear water, demineralised water, aqueous solutions and viscous fluids which do not offer rust-protection, corrosive fluids and solvents

### Impeller Pump

<table>
<thead>
<tr>
<th>Component</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contaminant drain port</td>
<td>Rc 3/4</td>
</tr>
<tr>
<td>Drain piping:</td>
<td>Lifting height &lt; 1 m</td>
</tr>
<tr>
<td></td>
<td>Length (horizontal) &lt; 3 m</td>
</tr>
<tr>
<td>Contaminant drain pipe</td>
<td></td>
</tr>
<tr>
<td>Contaminant drain port</td>
<td></td>
</tr>
<tr>
<td>Rigid coupling</td>
<td></td>
</tr>
<tr>
<td>Coolant outlet port</td>
<td></td>
</tr>
<tr>
<td>Pressure impeller</td>
<td></td>
</tr>
<tr>
<td>Suction pipe</td>
<td></td>
</tr>
<tr>
<td>Cyclone</td>
<td></td>
</tr>
<tr>
<td>Venting impeller</td>
<td></td>
</tr>
<tr>
<td>Inlet port</td>
<td></td>
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</tbody>
</table>

### Filtration performance (Nominal value)

<table>
<thead>
<tr>
<th>Component</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suction strainer</td>
<td>3 mm (Solids larger than this must be removed from the tank)</td>
</tr>
<tr>
<td>Cyclone filter</td>
<td>Water soluble coolant 100 μm: 99.9% (Specific weight 2.7)</td>
</tr>
<tr>
<td></td>
<td>Straight oil 100 μm: ≤80% (Specific weight 2.7)</td>
</tr>
</tbody>
</table>
A Sample System Layout

Performance Curves

Water-soluble coolant (general performance)

Oil used: JIS K2241, Type A3 solution containing 2% water-soluble cutting fluid

50 Hz

Q-H Curve

Required Power

60 Hz

Q-H Curve

Required Power
A Fluid Control System

It Reduces Annual Electric Cost by Up to 61%

The use of NOP coolant unit cuts the annual electric power cost by about 41%. Additional savings of about 20% would be achieved, or a total of 61%, through the use of the TAZUNA™ fluid control system.

Trimming the production costs is a way to improve your competitiveness. The saving impact will be greater in a plant with a multiple of machining center operating. Reduction in power consumption enables trimming of CO2 and is an effective measure against global warming.
A Fluid Control System That Reduces Annual Electric Power Cost by Up to 61%

The use of NOP coolant unit cuts the annual electric power cost by about 41%. Additional savings of about 20% would be achieved, or a total of 61%, through the use of the TAZUNA™ fluid control system.Trimming the production costs is a way to improve your competitiveness. The saving impact will be greater in a plant with a multiple of machining center operating. Reduction in power consumption enables trimming of CO₂ and is an effective measure against global warming.

Comparison of Annual Electric Power Bills

- Conventional centrifugal pump: Electric power cost ¥61,260
- NOP coolant unit - EP: Electric power cost ¥36,140 (41% Reduction)
- NOP coolant unit - EP + TAZUNA: Electric power cost ¥23,900 (61% Reduction)

Power Consumption Graph on a Test Operation

- Operating cycle: total 80 seconds cycle
  - Unload (0MPa) 20 sec.
  - Through-coolant (1.1 MPa) 20 sec.
  - Unload (0MPa) 20 sec.
  - Through-coolant (1.1 MPa) 20 sec.
- The energy-saving effect will vary due to the difference in machining pressures and drill diameters.
- The calculation is based on operation 8 hours/day, 365 days/year, and the electric power billed at ¥20/kWh.
TAZUNA™ Fluid control System (Software)

TAZUNA™ is an automatic fluid control system (software) developed by NOP. The system uses a pressure sensor to identify the drill diameter being used by the machining center. It continuously controls the NOP coolant unit, adjusting the pressure and flow rate instantaneously according to the drill movement. The absence of unneeded pressure means no extra pressure is wasted through the relief valve. The power consumption is greatly reduced while maintaining machining accuracy.

A sample system layout

Features of TAZUNA™

- **Additional savings in energy**
  TAZUNA™ adjusts the motor within the NOP coolant unit to an optimum speed for the drill diameter in use, so that significant energy savings and CO₂ reduction can be achieved.

- **Improving machining accuracy**
  The system is compatible with any drill diameter. Automatic control of the pressure to an optimal value stabilizes the machining accuracy.

- **No initial settings required**
  As an automatic drill identification system is pre-installed, the system is ready to use. No initial setting and other cumbersome programming (for different drills) are required on the machining end.

- **Warning function**
  Intelligent System alarms user in advance of upcoming performance deterioration of the pump, so that corrective action can be taken and production-loss can be reduced.

- **Constant pressure control**
  Regardless of drill hole diameters or numbers, coolant is automatically supplied at constant pressure by fixed pressure setting.

- **Compact and low cost**
  The circuit board is a compact and low-cost single card, complete with required interface.
Automatic Drill Identification System

The system senses the pressure to identify the drill hole diameter. It then selects an optimum machining pressure for the hole diameter by reference to its database. The machining pressure may be fine adjusted to suit different work and cutting fluids. The user’s own database may also be stored independently.

A Flowchart for the Automatic Drill Identification System

1. In the unload status (While machining is stopped), the system runs at the designated speed in the chip removal mode.
2. Following a coolant on input, the speed changes to the drill-identification speed, and identifies the drill hole diameter.
3. The system controls the rotational speed so as to give an optimum machining pressure and flow rate for the drill-hole diameter as identified. (The system continuously controls the rotational speed to give an optimum machining pressure and flow rate during the machining of work.)
4. On completion of the drilling, the system returns to the unload status.

A Sample Installation

The system may be customized to suite the user.

Control for a constant pressure and flow rate: The pressure and flow rate are controlled at a constant value regardless of the fluid temperature and deterioration by feeding back the pressure and flow rate signals.

Servo quantitative control: The rotational angle and displacement are sensed for quantitative position control by feeding back the potentiometer signals.

Electro-magnetic proportional control valve: An analog output is linked to an electro-magnetic proportional valve for control of the pressure at an optimum value.
### Specifications for pump proper

<table>
<thead>
<tr>
<th>Pump model</th>
<th>P008</th>
<th>P010</th>
<th>P014</th>
<th>P016</th>
<th>T208</th>
<th>T216</th>
<th>S208</th>
<th>S216</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 Hz / 60 Hz</td>
<td>12.0 / 14.4</td>
<td>15.0 / 18.0</td>
<td>21.0 / 25.2</td>
<td>24.0 / 28.8</td>
<td>12.0 / 14.4</td>
<td>24.0 / 28.8</td>
<td>12.0 / 14.4</td>
<td>24.0 / 28.8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Compatible fluid</th>
<th>Water-soluble coolant fluid / Straight oil</th>
<th>Water-soluble coolant fluid / Straight oil</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Liquid temperature range (°C)</th>
<th>-5 ~ 60</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Rotational speed (r/min)</th>
<th>1500 / 1800</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Maximum pressure (MPa)</th>
<th>7.0 / 7.0</th>
<th>7.0 / 7.0</th>
<th>7.0 / 7.0</th>
<th>7.0 / 7.0</th>
<th>7.0 / 7.0</th>
<th>7.0 / 7.0</th>
<th>7.0 / 7.0</th>
<th>7.0 / 7.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total pump head (m)</td>
<td>15 (20 μm)</td>
<td>32 (50 μm)</td>
<td>15 (20 μm)</td>
<td>32 (50 μm)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Filter type</th>
<th>Wire screen filter</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Contaminant drain port</th>
<th>20 μm / 50 μm</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Remarks</th>
<th>Install a plate filter of #18 or finer mesh on the suction end of the tank.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Painted color of the pump section</th>
<th>Flat black (Approximately Munsell N1.0)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Approximate weight (kg)</th>
<th>20</th>
</tr>
</thead>
</table>

### Relief valve specifications

<table>
<thead>
<tr>
<th>Type</th>
<th>External return type</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Relief pressure setting (MPa)</th>
<th>7.0, 7.0</th>
<th>7.0, 7.0</th>
<th>7.0, 7.0</th>
<th>7.0, 7.0</th>
<th>3.5 / 3.0 (2.2 kW)</th>
<th>7.0 / 6.0 (3.7 kW)</th>
<th>1.5 / 1.5</th>
<th>2.0 / 2.0</th>
</tr>
</thead>
</table>

### Motor specifications

<table>
<thead>
<tr>
<th>Model No.</th>
<th>2200A3</th>
<th>3700A3</th>
<th>2200A3</th>
<th>3700A3</th>
<th>750A3</th>
<th>1500A3</th>
<th>750A3</th>
<th>1500A3</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Specifications</th>
<th>3-phase, squirrel-cage induction motor, totally enclosed, external fan, flange-mounting configuration</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Output (kW)</th>
<th>2.2</th>
<th>3.7</th>
<th>2.2, 3.7</th>
<th>0.75</th>
<th>1.5</th>
<th>0.75</th>
<th>1.5</th>
</tr>
</thead>
</table>

|-------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|

<table>
<thead>
<tr>
<th>Frequency (Hz)</th>
<th>50 / 60 / 60 / 60</th>
<th>50 / 60 / 60 / 60</th>
<th>50 / 60 / 60 / 60</th>
<th>50 / 60 / 60 / 60</th>
<th>50 / 60 / 60 / 60</th>
<th>50 / 60 / 60 / 60</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Rotational speed (r/min)</th>
<th>1460 / 1755 / 1765 / 1770</th>
<th>1460 / 1755 / 1765 / 1770</th>
<th>1460 / 1755 / 1765 / 1770</th>
<th>1460 / 1755 / 1765 / 1770</th>
<th>1460 / 1755 / 1765 / 1770</th>
<th>1460 / 1755 / 1765 / 1770</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Rating</th>
<th>S1</th>
</tr>
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</table>

|-------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|

<table>
<thead>
<tr>
<th>Number of phases</th>
<th>3</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Number of poles</th>
<th>4P</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Insulation class</th>
<th>F</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Approximate weight (kg)</th>
<th>33</th>
<th>42</th>
<th>33, 42</th>
<th>18</th>
<th>23</th>
<th>18</th>
<th>23</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Protection rating</th>
<th>IP55</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Efficiency class</th>
<th>IE3</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Compliance CE</th>
<th>○</th>
</tr>
</thead>
</table>
### Specification Tables for All Series

#### CT

**Medium pressure**
- Double-cyclone filter
- Trochoid™ pump: 2.0 MPa, 1.5 MPa
- Compatible with the TAZUNA™ fluid control system (software)

#### CI

**Large flow Lowpressure**
- Cyclone filter
- Impeller pump: 40~65 m (Total pump head)

### Specifications

<table>
<thead>
<tr>
<th>Series name</th>
<th>C Series</th>
<th>CT</th>
<th>C Series</th>
<th>CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specifications</td>
<td>(Specification: Double cyclone filter + Trochoid™ pump)</td>
<td>(Specification: Cyclone filter + Impeller pump)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Pump model</strong></td>
<td>T208</td>
<td>T216</td>
<td>I155</td>
<td>I152</td>
</tr>
<tr>
<td>Pump model</td>
<td>50 Hz / 60 Hz</td>
<td>50 Hz / 60 Hz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flow rate (lit/min)</td>
<td>12.0 / 14.4</td>
<td>24.0 / 28.8</td>
<td>150 (Maximum)</td>
<td>300 (Maximum)</td>
</tr>
<tr>
<td>Compatible fluid</td>
<td>Water-soluble coolant fluid</td>
<td>Water-soluble coolant fluid / Straight oil</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum allowable viscosity (mm²/s)</td>
<td>22</td>
<td>22</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liquid temperature range (°C)</td>
<td>-5~60</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rotational speed (r/min)</td>
<td>1500 / 1800</td>
<td>3000</td>
<td>3600</td>
<td>3000</td>
</tr>
<tr>
<td>Maximum pressure (MPa)</td>
<td>2.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total pump head (m)</td>
<td>Cyclone x 2 stages</td>
<td>Cyclone x 1 stage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Filtration performance (Nominal value)</td>
<td>100 μm: 99.9%, 50 μm: 95%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contaminant drain port flow rate (lit/min)</td>
<td>30~40 (Pressure 0.02 MPa)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Remarks</td>
<td>Install a plate filter of #18 or finer mesh on the suction end of the tank.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Painted color of the pump section</td>
<td>Flat black (Approximately Munsell N1.0)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approximate weight (kg)</td>
<td>16</td>
<td>23</td>
<td>34</td>
<td>33</td>
</tr>
</tbody>
</table>

### Relief valve specifications

<table>
<thead>
<tr>
<th>Type</th>
<th>External return type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relief pressure setting (MPa)</td>
<td>2.0, 1.5</td>
</tr>
</tbody>
</table>

### Motor specifications

<table>
<thead>
<tr>
<th>Model No.</th>
<th>750A3</th>
<th>1500A3</th>
<th>1500AC</th>
<th>3700AC</th>
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<tbody>
<tr>
<td>Specifications</td>
<td>3-phase, squirrel-cage induction motor, totally enclosed, external fan, flange-mounting configuration</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output (kW)</td>
<td>0.75</td>
<td>1.5</td>
<td>1.5</td>
<td>3.7</td>
</tr>
<tr>
<td>Frequency (Hz)</td>
<td>50/60/60/60</td>
<td>50/60/60/60</td>
<td>50/60/60/60</td>
<td>50/60/60/60</td>
</tr>
<tr>
<td>Rotational speed (r/min)</td>
<td>1440/1730/1745/1745</td>
<td>1445/1740/1750/1755</td>
<td>2890/3460/3485/3495</td>
<td>2910/3490/3515/3525</td>
</tr>
<tr>
<td>Rating</td>
<td>S1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current (A)</td>
<td>3.80/3.40/3.40/3.40</td>
<td>6.80/6.40/6.00/6.00</td>
<td>6.00/5.80/5.40/5.20</td>
<td>13.6/13.2/12.2/11.8</td>
</tr>
<tr>
<td>Number of phases</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of poles</td>
<td>4P</td>
<td>2P</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insulation class</td>
<td>F</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approximate weight (kg)</td>
<td>18</td>
<td>23</td>
<td>20</td>
<td>36</td>
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<tr>
<td>Protection rating</td>
<td>IP55</td>
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<tr>
<td>Efficiency class</td>
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<td></td>
</tr>
<tr>
<td>Compliance CE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Please contact us if you need more information about motor specifications.*
Be sure to understand the safety counter measures and strictly follow the precautions and operating instructions stated in this manual for safe operation.

When you see the following symbols and titles in this manual, be alert to the potential for personal injury or property damage. This manual uses the following symbols and titles to identify the risks and danger levels.

- **Danger:** Failure to follow instructions will result in death or serious personal injury.
- **Warning:** Failure to follow instructions can result in death or personal injury.
- **Caution:** Failure to follow instructions can result in personal injury or pump and other equipment damage.

### Safety precautions

**Safety devices**
- Equip motor with an “Earth-Leakage Circuit Breaker (ELCB)” or overload protection equipment without fail.
- Check the motor name plate for the ratings, and set up and operate the motor within the specified ratings.
- Follow all the technical standards applicable to electrical facilities.
  
  **Caution:** Failure to use “Earth-Leakage Circuit Breakers (ELCB)” and overload protection equipment could result in damage to the equipment or motor burnout.
- To avoid pump damage, install a flow monitor, pressure sensor, or such other devices in the pump’s outlet line to detect dry running.
- The oil seal and packings cannot be used indefinitely.
- To avoid pump damage, install a flow monitor, pressure sensor, or such other devices in the pump’s outlet line to detect dry running.
- The oil seal and packings cannot be used indefinitely.
- Install the pump in a safe location, or provide protective cover or device to prevent personal injury or equipment damage caused by an accidental oil leak.

**Safety measures**
- Keep children or other people incapable of judging risks away from the pumps.
- Protective equipment should be installed to prevent fingers, hands or other objects from getting caught in the rotating or moving parts.
  
  **Warning:** Getting your fingers, hands or articles caught in the rotating or moving parts may cause unexpected injury.
- Do not touch the pump or motor during or immediately after the operations.
  
  **Warning:** Heat will build up in the motor and pump while in operation. Contact with motor by hand may cause burns.
  
  **Danger:** Do not operate the pump in a place having a risk of explosion or a place with highly concentrated dust. Do not place a flammable liquid or article around the motor. It may cause an explosion or fire.

### Pump installation

**Place of installation**
- **Caution:** NOP coolant unit is limited to indoor use only.
- **Caution:** Make sure to use the predefined parts of suspension fittings whenever you lift up the pump. Check the position of suspension fittings from the drawing.
- **Caution:** Mounting pump in a wrong orientation will damage the motor. Install the pump unit in an upright position.
- **Caution:** Mounting on an unlevel surface or forcible installation in which the installation holes are not in exact alignment may damage the pump.
- **Caution:** Do not install EP, ET, ES or CT in locations where pump may suck tramp oil on the liquid surface or foam is generated. Installation in such locations may cause cavitation which damages the pump.

**Recommended layout for EP, ET, ES, C Series CT**
- For safe and efficient operation of NOP coolant unit, The recommended pump piping layout are as illustrated below. In particular, piping for air-bleeding in the pump’s outlet line.

**Figure 1:** Pump mounting hole patterns
- **E Series EP**
- **E Series ET/ES, C Series CT**

**Figure 2:** Required clearances around the pump
- (For illustration purposes only.)

**Table:** Dimensions

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>C1</th>
<th>C2</th>
<th>C3</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
</tr>
<tr>
<td><strong>C1</strong></td>
<td>D+30</td>
<td>200</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td><strong>C2</strong></td>
<td>200</td>
<td>500</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td><strong>C3</strong></td>
<td>50</td>
<td>50</td>
<td>50</td>
<td></td>
</tr>
</tbody>
</table>

*For illustration purposes only.*
Performance and pressure drop, and the pump will be damaged.

All foreign objects larger than the perforations of the inlet port must be pre-filtered.

If mounting the pump on the middle flange (φ140 PCD), drain piping (Rc 3/8) must be installed to ensure that the drain liquid will return to the tank.

**Filters**
- **Caution:** A pre-filtration device such as a plate (screen-type) filter must be inserted to ensure that the large objects do not clog the pump inlet. The recommended filter mesh size is 18 (about 1mm sieve size).

All foreign objects larger than the perforations of the inlet port must be pre-filtered. If higher filtration accuracy is required than shown in Table 1, install in-line filter in the outlet line.

### Performance of built-in filter

#### Table 1: Filtration performance

<table>
<thead>
<tr>
<th>E Series EP, ET, ES</th>
<th>CI 150 ℓ</th>
<th>≥ 60 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>CI 350 ℓ</td>
<td>≥ 80.5 mm</td>
<td></td>
</tr>
</tbody>
</table>

### Position of pump inlet port

Pump is to be mounted in the tank maintained more than 1 mm from the tank bottom.

If sediments of sludge, swarf or other material larger than 3mm may accumulate at the tank bottom, provide a sufficient clearance to ensure that the pump doesn’t suck the sediments directly.

The pump must be installed in a position higher than instructed in Figure 4. If installed lower than Figure 4, air may be drawn up into the system, resulting in abnormal noise, impairing turbulence filter performance and pressure drop, and the pump will be damaged.

**Rc 3/8 drain piping (This section only applies to CI)**

If mounting the pump on the middle flange (φ140 PCD), drain piping (Rc 3/8) must be installed to ensure that the drain liquid will return to the tank.

### Table 2: Contaminant drain port performance (for reference only)

<table>
<thead>
<tr>
<th>Model</th>
<th>Flow rate</th>
<th>Discharge pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>E Series EP, ET, ES</td>
<td>20-40 L/min</td>
<td>0.02 MPa</td>
</tr>
<tr>
<td>C Series CT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C Series CI</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Contaminant drain port

- **Caution:** The diameter of piping in the contaminant drain line must be equal size or larger than the port diameter. The contaminant drain line must be no higher than 1 meter from the tank bottom vertically, and no longer than 3 meters horizontally. It should be as short and straight as possible with minumum number of bends (PVC hose is recommended for piping). Failure to follow and apply will result in discharge failure and may lead to pipe clogging or pump damage.

### Table 3: Maximum permissible torque by pipe size

<table>
<thead>
<tr>
<th>Pipe size (Rc)</th>
<th>1/2</th>
<th>3/4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Torque (N.m)</td>
<td>25</td>
<td>30</td>
</tr>
</tbody>
</table>

### Outlet port

- **Caution:** The diameter of a pipe connected to outlet port must be a pressure resistant type and as large as the port diameter.
- **Caution:** If a valve is to be inserted in the contaminant drain line, choose a gate type. A ball type will reduce the port diameter and may result in contaminant discharge failure and damage the pump.

### Piping for the pump

#### Torque applied on pipe connection

(The maximum torques permissible for pipe connections to NOP coolant unit are shown in the table that follows: )

The maximum torques permissible for pipe connections to NOP coolant unit are shown in the table that follows: )

<table>
<thead>
<tr>
<th>Pipe size (Rc)</th>
<th>1-1/2</th>
<th>1/2</th>
<th>3/4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Torque (N.m)</td>
<td>150</td>
<td>60</td>
<td>30</td>
</tr>
</tbody>
</table>

### Connecting the pipes

- **Caution:** Tightening pipes above the specified torque value (listed in Table 3) may cause damage to the port.

- **Caution:** Excessive use of thread-sealant tape on pipe thread or use of a liquid type sealant will reduce the friction resistance and may result in over-torque and the port damage.
Periodical inspections
- Installation of a stop valve, union joints, and such other fittings are also recommended for easy maintenance.
- Some high-pressure hoses may have a smaller inside diameter. Check the hoses not only for outside diameter but also for inside diameter as well before use.
- It is recommended to install an air vent valve in the outlet line to prevent potential startup troubles.

Pipes and pipe joints
- All pipes must be cleaned thoroughly before connected to the pump. Some pipes may have dust from storage or threading chips remaining inside. Be sure to flush out all pipes to ensure that they are thoroughly clean before use.

Caution: Incomplete flushing may result in the pump and connecting equipment failure.

Caution: Do not attempt to flush out the pipes after connecting to the pump.

Caution: Test the pipes for air tightness before installing the pump.

Caution: Inspect all valves, cocks, joints and the like before installation. Avoid using any component that has a small port or a cavity in the casting. Failure to follow and apply will result in contaminant discharge failure and may cause pipe clogging or pump damage.

Electric wiring
- Electric wiring must be carried out by qualified personnel.

Warning: Ensure the power is disconnected prior to do any wiring work. Also take measures to avoid accidental power-on.

Warning: Connect the motor in accordance with the motor wiring diagram or the User’s Instruction Manual to prevent fire and electrical shock.

Warning: Ground the equipment properly to prevent fire and electrical shock. Also take measures to avoid accidental power-on.

Caution: Ensure the power is disconnected prior to performing maintenance work or inspections. Also take measure to prevent accidental power-on.

Warranty
- NOP coolant unit is warranted to be free from defects in workmanship and materials for one year after the delivery to customer’s designated location, or 5000 hours of operation, whichever occurs first.
- The warranty does not cover troubles resulting from operation beyond the specifications or other external causes.
- The product warranty is applicable only to operation within the product specifications and in accordance with this User’s Instruction Manual.
- The warranty does not cover, and consequently we will not be responsible for, any disassembly, alteration made to a product by the customer.
- The warranty will not cover pump troubles arising out of any causes which are not the responsibilities of, or are not attributable to Nippon Oil Pump Co., Ltd., including disasters and the troubles caused by other than the subject pump.
- The warranty covers the particular product as delivered. We are not responsible in anyway whatsoever for secondary loss arising out of a problem with a product that we have delivered.

For operating a pump
- Start-up checklist
  - Is the tank filled with liquid up to, or over the specified level? (See Fig.4)
  - Are the inlet, outlet and drain ports unblocked?
  - Check for loose pipe connections.
  - On the initial startup, turn the pump on and off quickly to ensure that the motor is running in the correct direction.

Caution: Do not reverse the pump rotation. Continuous reverse rotation may damage oil seals and the liquid may be ejected, resulting in an serious accident.

Caution: Ensure the pump is correctly connected.

Caution: Never run the pump dry for 10 seconds or longer. If the pump fails to prime, stop the motor.

Caution: If pump is not discharging on initial run, perform air bleeding in the outlet line.

Caution: Be sure to perform air bleeding if a check valve of which the pressure resistance is above 0.05 MPa is installed in the outlet line. No coolant may be discharged till the trapped air is fully released.

Inspections
- Daily start-up inspections
  - Check for liquid leakage, abnormal sound, and heating.

Caution: If an abnormal phenomenon is discovered, stop the pump immediately and check for the defective areas. (See P.45 Trouble shooting guide)

Periodical inspections
- Periodical inspection must be performed at least once a year.
  - Outlet flow rate, pressure
  - Flow rate of contaminant drain port (Guideline ≤ 20 L/min)
  - Clogging of contaminant drain port

Caution: If pump runs over the maximum pressure while in operation, lower the relief pressure setting or provide by-passing circuit to avoid over-pressurization. Running pump over the maximum pressure may cause motor burnout or damage to the pump.

Caution: If a pump has to be restarted after the long-term storage check it immediately and check for the defective areas.

Warning: Check the direction of the factory-installed motor rotation indicated on the nameplate which is attached to the motor frame or terminal box and connect the motor accordingly.

The factory-installed special motor (a 3-phase type) is designed to rotate counter-clockwise when viewed from the suction side (bottom), if wired as illustrated in the table below.

Figure 6: Motor wiring diagram
(For illustration purposes only)

For selecting a pump
- Operating method
  - E series is most suitable for intermittent operation. Please check operating method. Continuous operation is also permitted.
  - C series must be limited to continuous operation. Minimize the number of ON/OFF cycles if intermittent operation is unavoidable. (Intermittent operation on CT is strictly forbidden)

Required flow rate
- Check your requirements in accordance with the catalogs, drawings, or other materials.

Note: The discharge rate is subject to the type, temperature, and pressure of the liquid.

Selecting with an adequate margin of outlet pressure and flow rate is recommended.

Required pressure
- Check your requirements in accordance with the catalogs, drawings and other materials.

Note: The pump must be run within the maximum pump operating pressure and the motor output rating.

Relief valve pressure setting (Not applicable to C)
- The relief valve is to be set at the cracking pressure as a factory default.

Notes: The relief valve setting must be within the maximum pump operating pressure and the motor output rating.

Caution: If pump runs over the maximum pressure while in operation, lower the relief pressure setting or provide by-passing circuit to avoid over-pressurization. Running pump over the maximum pressure may cause motor burnout or damage to the pump.

Caution: Inspect all valves, cocks, joints and the like before installation. Avoid using any component that has a small port or a cavity in the casting. Failure to follow and apply will result in contaminant discharge failure and may cause pipe clogging or pump damage.

Caution: Do not reverse the pump rotation. Continuous reverse rotation may damage oil seals and the liquid may be ejected, resulting in an serious accident.

Caution: Never run the pump dry for 10 seconds or longer. If the pump fails to prime, stop the motor.

Caution: If pump is not discharging on initial run, perform air bleeding in the outlet line.

Caution: Be sure to perform air bleeding if a check valve of which the pressure resistance is above 0.05 MPa is installed in the outlet line. No coolant may be discharged till the trapped air is fully released.

Caution: If a pump has to be restarted after the long-term storage check it immediately and check for the defective areas.

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For selecting a pump
- Operating method
  - E series is most suitable for intermittent operation. Please check operating method. Continuous operation is also permitted.
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Required flow rate
- Check your requirements in accordance with the catalogs, drawings, or other materials.

Note: The discharge rate is subject to the type, temperature, and pressure of the liquid.

Selecting with an adequate margin of outlet pressure and flow rate is recommended.

Required pressure
- Check your requirements in accordance with the catalogs, drawings and other materials.

Note: The pump must be run within the maximum pump operating pressure and the motor output rating.

Relief valve pressure setting (Not applicable to C)
- The relief valve is to be set at the cracking pressure as a factory default.

Notes: The relief valve setting must be within the maximum pump operating pressure and the motor output rating.

Caution: If pump runs over the maximum pressure while in operation, lower the relief pressure setting or provide by-passing circuit to avoid over-pressurization. Running pump over the maximum pressure may cause motor burnout or damage to the pump.
Caution: If you use E series or C series CT, make sure that the end of return pipe is dipped under the surface of liquid at all times. Releasing it above the liquid surface may cause foam and abnormal sounds.

Caution: Do not run E series or C series CT with the relief valve fully opened, provide by-passing circuit to release pressure if necessary.

Caution: C series CI can not run against a closed outlet. It will result in pump or motor damage.

Select a pumped liquid.

Use of liquid which doesn’t offer lubricity, rust protection (such as tap water) or contains corrosive substances (such as a cutting fluid that contains active sulfur) will damage the pump. Using liquids beyond the specified viscosity range may cause filter clogging or motor overload which can result in pump damage, motor burnout, performance decrease, liquid leaks. Follow the specified viscosity range and coolant types as follows:

E series ET, ES
- Water-soluble coolant or straight oil of 32 mm²/s or less viscosity. (20 μm element is compatible with liquid of 15 mm²/s or less viscosity, 50 μm element is compatible with liquid of 32 mm²/s or less viscosity)
- Water-soluble coolant of 15 mm²/s or less viscosity. Please consult us if you use straight oils on EP.

C series CT
- Water-soluble coolant of 22 mm²/s or less viscosity.
- Water-soluble coolant or straight oil of 22 mm²/s or less viscosity.

Caution: Use of liquid with higher viscosity on CI will not just cause a performance decrease in cyclone filter, but also increase motor output.

Note: Low winter temperatures must be taken into account as the viscosity will increase with temperature.

Caution: The seals of NOP coolant unit are made of fluoro carbon rubber. Check in advance with the liquid manufacturer (or distributor) for the compatibility with the material of seals. Use of incompatible liquid will cause liquid leakage.

Warning: The pump cannot be used for volatile liquids like gasoline, nor fuel oils like kerosene. They may explode or cause fire.

Operating ambient temperatures
- The permissible ambient temperature range is between -10°C and 40°C.

Caution: Operation over the range specified in the foregoing may cause motor burnout, pump damage and severe accident. It can also significantly shorten the pump service life and cause a performance loss or liquid leakage.

Temperature range of the pumped liquid
- The permissible temperature range for the liquid is between -5°C and 60°C.
- When start-up, keep the temperature gap between the liquid and ambient temperature within 40°C.

Warning: Pumping high temperature liquid may result in personal burns or a damaged pump or liquid leak.

Caution: Running the pump beyond the specified range temperature may cause decrease in performance or liquid leaks which can result in shortening the pump service life significantly.

Compatible work materials

Caution: Machining hard work materials, such as Inconel, Titan, Tungsten, may shorten the pump service life significantly, and result in pump performance decrease or liquid leakage. ET, EP and CT is compatible with work materials of up to HV 300 and ES and CI is up to HV 600.

Caution: Machining work materials containing Si of over 6%, such as Aluminum Die Cast (ADC), Ductile on EPET or CT, may shorten the pump service life significantly, and result in pump performance decrease or liquid leakage.

Caution: Machining work materials, such as special hardened steel, carbon fiber, glass fiber containing materials, carbon materials, may shorten the pump service life significantly, and result in pump performance decrease or liquid leakage.

Caution: Running EP, ET, ES and CT in the tank liquid which contains a large amount of grind stones or abrasive grains may shorten the pump service life significantly, and result in pump performance decrease or liquid leakage.

Caution: Machining work materials, such as coating film, resin may not just cause a significant loss in performance of turbulence filter, cyclone filter or impeller but also clog the element.

Tool hole diameters

Caution: Using a tool with an oil hole smaller than 0.3 mm or less diameter may cause clogging with swarf.

For selecting a motor

Required power for the pump
- Select a motor with adequate power margin with reference to the performance curve of the pump on the catalog.
- The power required by the pump will vary depending on pressure, flow rate and viscosity of the oil.
- More power is required if the viscosity of the liquid increases.

Note: Low winter temperatures must be taken into account when selecting a motor as the viscosity will increase with temperature.

Power supply voltage and frequency

Caution: Applying incorrect supply voltage or frequency may lead to motor burnout, abnormal pressure or abnormal flow.

Caution: Connect the pump with appropriate power supply frequency according to the specification of each model. Connection with wrong frequency may lead to motor burnout, abnormal pressure or abnormal flow.

Caution: Operation at a slow speed or a high speed may cause pump malfunction.

Suction performance

NOP coolant unit is a self-priming pump, however the performance will be reduced by the resistance in the inlet area or suction of air. Pay attention to the tank liquid surface level and clogging of the inlet port (perforated metals).

Caution: The excess resistance in the outlet line will impair the suction performance.

Caution: Entry of air from the inlet port will cause cavitation inside the pump, which damages the pump or decreases turbulence filter performance and the element may get clogged as a result. (If using CI, it will decrease suction performance.)

Caution: Inlet port cleaning must be performed on a regular basis, continuous use of clogged inlet will cause abnormal noise, vibration, discharge failure, which result in the pump damage.

Backwashing (See P.45 “Troubleshooting guide”)

If the pump discharge or intake rate of E series (element type) is reduced, the turbulence filter is possibly clogged. In that case, clogged filter can be cleaned by backwashing and filter performance will be restored. Follow the procedure shown below for backwashing.

① Set up a washing tank and pour in some (guideline: 10 L) clean coolant.
② Turn the coupler toward the direction of washing tank.
③ Change connections between terminal U and V, and run the pump in reverse and let the pump suck the clean coolant from the washing tank for 5 seconds to backwash (This process can be repeated several times)
④ After backwashing is completed, return the coupler toward the direction of machine tool.
⑤ Restore the original terminal connections and run the pump in the normal rotation.

Caution: Backwashing will not recover filtration performance of a pump completely. Constant filter clogging suggests the possibility of operating the pump beyond the specifications. In particular, be careful not to allow tramp oil and foam to be mixed in the coolant tank.

If you experience no oil discharge, a high pitched sound, or such other abnormal phenomena soon after the installation, check the troubleshooting guide on the next page.

If you cannot find out the cause of trouble, consult us or a dealer.
### Troubleshooting guide

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Possible causes</th>
<th>Check methods</th>
<th>Possible remedies</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>No discharge from outlet port.</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insufficient flow or pressure.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Abnormal noise.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Motor failure</strong></td>
<td>Are wires at motor loose or disconnected? Do operation test for motor individually.</td>
<td>Repair or replace motor.</td>
<td></td>
</tr>
<tr>
<td><strong>Motor is wired incorrectly or disconnected.</strong></td>
<td>Are wires at motor loose or disconnected? Check direction of rotation.</td>
<td>-Rewire motor in a correct rotation indicated on label.</td>
<td></td>
</tr>
<tr>
<td><strong>Coupling is damaged.</strong></td>
<td>Check connected area between pump and motor.</td>
<td>Replace coupling.</td>
<td></td>
</tr>
<tr>
<td><strong>Insufficient liquid level</strong></td>
<td>Check liquid level in the tank</td>
<td>-Add enough liquid -Control liquid level with level sensor.</td>
<td></td>
</tr>
<tr>
<td><strong>Inlet port is clogged.</strong></td>
<td>Check the inlet port for clogging.</td>
<td>-Periodical cleaning on and around inlet port. -Insert a plate filter prior to the inlet port as a pre-filtration.*</td>
<td></td>
</tr>
<tr>
<td><strong>Turbulence filter is clogged.</strong></td>
<td>-Does pump deliver liquid from contaminant drain port? -Is there abnormal noise? -Is there tramp oil?</td>
<td>-Perform backwashing. (See P.44 “Backwashing”.) -Take measures to prevent suction of air or tramp oil.*</td>
<td></td>
</tr>
<tr>
<td><strong>Impellor is clogged with swarf.</strong></td>
<td>Check for impeller clogging and damage</td>
<td>-Remove swarf -Repair or replace pump</td>
<td></td>
</tr>
<tr>
<td><strong>Air drawn into pump or pipes.</strong></td>
<td>After long term storage or immediately after replacing coolant liquid, pump often doesn’t discharge due to air inside the pump.</td>
<td>Perform air-bleeding on pump or piping. Perform air-bleeding in front of check valve if the one is installed in outlet line.</td>
<td></td>
</tr>
<tr>
<td><strong>Cavitation, Aeration.</strong></td>
<td>Is pump sucking foam or air?</td>
<td>-Take measures to prevent suction of air or tramp oil. (ex. Change pump location, use partition or anti-foaming agent)</td>
<td></td>
</tr>
<tr>
<td><strong>Pipes connected to outlet port is too large.</strong></td>
<td>Is inlet discharge flow rate sufficient?</td>
<td>-Use smaller pipes.</td>
<td></td>
</tr>
<tr>
<td><strong>Relief valve pressure setting.</strong></td>
<td>Does pressure build up when tightening the relief valve’s pressure control screw?</td>
<td>Tighten up the relief valve’s pressure control screw to the required level.</td>
<td></td>
</tr>
<tr>
<td><strong>Relief valve fixing.</strong></td>
<td>Does pressure not build up when tightening the relief valve’s pressure control screw?</td>
<td>-Repair or replace relief valve. -Remove tramp oil.</td>
<td></td>
</tr>
<tr>
<td><strong>No discharge from contaminant drain port piping is too long or too high.</strong></td>
<td>Take off a pipe from the contaminant drain port and check if liquid is properly being delivered or not</td>
<td>Piping must be no higher than 1m from the tank bottom vertically, and no longer than 3m horizontally.</td>
<td></td>
</tr>
<tr>
<td><strong>Clogging of contaminant drain port.</strong></td>
<td>Check the clogged area in the pipe line.</td>
<td>-Clean inside the pipe periodically. -Minimize the number of bends in piping -Use larger pipe.</td>
<td></td>
</tr>
<tr>
<td><strong>Clogging or failure of suction impeller</strong></td>
<td>Check the suction impeller for clogging or damage.</td>
<td>-Remove accumulated swarf. -Repair or replace pump.</td>
<td></td>
</tr>
<tr>
<td><strong>Liquid leaks.</strong></td>
<td>Does liquid leak from near the coupling connected area?</td>
<td>Repair or replace pump.</td>
<td></td>
</tr>
<tr>
<td><strong>Oil seal deterioration or damage.</strong></td>
<td>Does liquid leak from connected area?</td>
<td>Repair or replace pump.</td>
<td></td>
</tr>
<tr>
<td><strong>Packing deterioration or damage.</strong></td>
<td>Does liquid leak from connected area?</td>
<td>Repair or replace pump.</td>
<td></td>
</tr>
<tr>
<td><strong>Breaker or thermal trips out.</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Motor failure.</strong></td>
<td>Check motor wiring. Does motor start?</td>
<td>-Rewire motor. -Repair or replace motor</td>
<td></td>
</tr>
<tr>
<td><strong>Wiring errors.</strong></td>
<td>Are motor output rating and liquid viscosity adequate?</td>
<td>-Use motor with higher output rating. -Use pump with lower capacity. -Lower the pressure setting. -Change the coolant types.</td>
<td></td>
</tr>
<tr>
<td><strong>Overloading.</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Coolant type is incompatible.</strong></td>
<td>Is motor rotating? Are liquid viscosity and lubricity adequate? Is there abnormal noise?</td>
<td>-Repair or replace pump. -Change the types of coolant you use.</td>
<td></td>
</tr>
<tr>
<td><strong>(Viscosity is too high or insufficient lubricity.)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Pump failure</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### NOP Coolant Unit Material Compatibility Tables

- Compatibility of material may vary depending on individual tank conditions, such as tank maintenance status, shapes of work materials.
- The information below is for reference only. Please consult us for further details.

<table>
<thead>
<tr>
<th>Material</th>
<th>Number (Typical)</th>
<th>Hardness (HV)</th>
<th>EP</th>
<th>ES</th>
<th>ET</th>
<th>CT</th>
<th>CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carbon steel</td>
<td>S45C</td>
<td>120—269</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Chromium steel</td>
<td>SCR435</td>
<td>255—321</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Chromium molybdenum steel</td>
<td>SCM445</td>
<td>302—415</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Nickel-chromium steel</td>
<td>SNC815</td>
<td>302—415</td>
<td>×</td>
<td>✓</td>
<td>×</td>
<td>×</td>
<td>✓</td>
</tr>
<tr>
<td>Carbon tool steel</td>
<td>SK95 (SK4)</td>
<td>203—286</td>
<td>✓</td>
<td>✓</td>
<td>×</td>
<td>×</td>
<td>✓</td>
</tr>
<tr>
<td>High speed tool steel</td>
<td>SKH56</td>
<td>722</td>
<td>×</td>
<td>✓</td>
<td>×</td>
<td>×</td>
<td>✓</td>
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<tr>
<td>Alloy tool steel</td>
<td>SKT6</td>
<td>512—580</td>
<td>×</td>
<td>✓</td>
<td>×</td>
<td>×</td>
<td>✓</td>
</tr>
<tr>
<td>High carbon chromium bearing steel</td>
<td>SUJ5</td>
<td>222—512</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Spring steel</td>
<td>SUP10</td>
<td>363—429</td>
<td>×</td>
<td>✓</td>
<td>×</td>
<td>×</td>
<td>✓</td>
</tr>
<tr>
<td>Aluminum alloy</td>
<td>2000,7000series</td>
<td>45—130</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Aluminium alloy for die-casting</td>
<td>ADC14</td>
<td>120</td>
<td>×</td>
<td>✓</td>
<td>×</td>
<td>×</td>
<td>✓</td>
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<tr>
<td>Brass</td>
<td>C2801P</td>
<td>80—150</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Chromium copper</td>
<td>SCR435</td>
<td>255—321</td>
<td>✓</td>
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<td>✓</td>
<td>✓</td>
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<tr>
<td>Gray cast iron</td>
<td>FC250</td>
<td>160—285</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Ductile cast iron</td>
<td>FCD800</td>
<td>160—300</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Austenitic stainless steel</td>
<td>SUS304</td>
<td>≥ 200</td>
<td>✓</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Ferritic stainless steel</td>
<td>SUS430</td>
<td>183</td>
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<td>✓</td>
<td>✓</td>
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<td>✓</td>
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<tr>
<td>Martensitic stainless steel</td>
<td>SUS440C</td>
<td>≥ 615</td>
<td>×</td>
<td>✓</td>
<td>×</td>
<td>×</td>
<td>✓</td>
</tr>
<tr>
<td>Titanium alloy steel</td>
<td>TP340</td>
<td>110—320</td>
<td>×</td>
<td>✓</td>
<td>×</td>
<td>×</td>
<td>✓</td>
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<tr>
<td>Inconel</td>
<td>Alloy 625</td>
<td>400—859</td>
<td>×</td>
<td>✓</td>
<td>×</td>
<td>×</td>
<td>✓</td>
</tr>
<tr>
<td>Tungsten steel</td>
<td>100—350</td>
<td></td>
<td>×</td>
<td>✓</td>
<td>×</td>
<td>×</td>
<td>✓</td>
</tr>
<tr>
<td>Heat-resistant alloy (For aero-engine)</td>
<td>M152</td>
<td>300</td>
<td>×</td>
<td>✓</td>
<td>×</td>
<td>×</td>
<td>✓</td>
</tr>
<tr>
<td>Non-Metal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ceramic</td>
<td></td>
<td>2350</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>△</td>
</tr>
<tr>
<td>Abrasive grain</td>
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Scan the QR code for more technical data.

Safety notice: For safe operation of our products, please peruse the User’s Instruction Manual provided with the product.

Nippon Oil Pump Co., Ltd.

For further information:
Tel.: +81-3-6402-4041
Fax: +81-3-3436-1777

Your dealer:

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