CHILLER UNIT
- OIL CHILLER
- WATER CHILLER
- COOLANT CHILLER

HIGH PRESSURE COOLANT SYSTEM
- SUB TANK TYPE
- VESSEL TYPE
- MCF

MF SERIES

MAGNETIC FILTERING SYSTEM

UTILITY CABINET SYSTEM

AUTOMATIC FILTERING SYSTEM

OIL SEPARATOR

HIGH PRESSURE COOLANT PUMP
To do our best so our customers can do theirs.

We, kemtech, will step toward the customers with products that can realize the value more that expected by the customers.

**MANAGEMENT PHILOSOPHY**
Based on honesty and trust, we will help our customers realize lasting value so we can help society have the brightest future possible.

How

With passion, a healthy work ethic, and understanding our customers as our foundation, we
- shall create a corporate culture that allows us to adapt to any changing business environment;
- shall become a strong company that grows with our customers by meeting their concerns with the latest technology and or after service care.

**VISION**
To do our best as market leaders so our customers can do theirs.

**OUR CORE SPIRIT**
To challenge the world with passion so as to create enhanced value for ourselves and our customers.

**MISSION STATEMENT**
Kemtech is focused on continuously changing so as to create enhanced value for all in a relentlessly predictable way so that our customers through constant cooperation are visibly happy, and completely satisfied.
COMPANY HISTORY

1992. 04  Jesung Corporation was established
1995. 02  Oil chiller was developed, sales started
1997. 01  High-pressure cutting fluid device was developed, its sales started
1999. 01  Factory moved
(Ulsan Hyoomoon apartment type factory)
06  Coolant chiller was developed, sales started
2001. 09  Water chiller was developed, sales started
12  Design rights registration for cutting fluid filter
2002. 03  CE certification for oil chiller
2003. 05  Patent registration for cutting fluid filter device
12  Design rights registration for high-pressure cutting fluid device
2004. 06  Factory expanded (total 2,000㎡)
2006. 01  Amalgamated as an integrated corporation
Kemtech Co., Ltd
07  Oil chiller is export to Japan's Okuma started
2007. 01  ISO 9001 certification obtained
07  Oils separator was developed, sales started
2008. 07  Utility cabinets for machining center were developed
09  Opened a research institute in Ulsan Convergence
Scientific Technology Center
11  Registered patent for an oil separation device
2009. 05  Developed a magnetic filter
06  Developed an automatic filter
07  Registered utility model for an oil skimmer
2010. 01  HYDAC Filter, Nominated as the agent representing
Korea for high pressure pump of SKF
### Description of Cooling Cycle

**Refrigeration cycle**

It is divided into compression process, condensation process, expansion process and evaporation process. Compressor, condenser, expansion valve and evaporator exist at each process.

**Compressor**

It increases pressure by compressing refrigerant vapor to allow the refrigerant vapor (low temperature, low pressure, gas) to evaporate from the evaporator for it to easily condense. The refrigerant cycles inside the cooling device, through repeated evaporation and condensation processes, delivers heat from low temperature to high temperature.

**Condenser**

It is a heat exchanger that cools and liquefies refrigerant vapor (high temperature, high pressure, gas) that obtains cycling power from the compressor. High temperature refrigerant exchanges heat with air through the fan and refrigerant with high temperature, high pressure and gaseous state is condensed to medium temperature and high pressure liquid state by passing through the condenser.

**Expansion Valve**

It controls refrigerant fluid flow during cooling cycle and lowers pressure and temperature to facilitate heat absorbing process through fluid evaporation by supplying refrigerant fluid to the evaporator. At the same time, it controls and supplies the adequate refrigerant fluid flow by responding to a change in refrigeration load.

**Evaporator**

As a heat exchanger that performs cooling process at the cooling device, it is a device that makes low temperature and low pressure refrigerant fluid supplied to the evaporator exchange heat with cooling target material (oil, water or cutting fluid). Refrigerant fluid required in cooling is supplied through the expansion valve and evaporated vapor is supplied to the compressor.

Through the repetition of this cycle, the fluid inhaled to the chiller and discharged is maintained and managed at a temperature that a user desires.
Description of Chiller Model Symbols

1. Unit Type
   - OC: Oil chiller (for cooling the main spindle & lubricant, hydraulic fluid)
   - WC: Water chiller (for cooling high frequency main spindle & semiconductor equipment, medical apparatus)
   - CC: Coolant chiller (for cooling the cutting fluid used in cutting & grinding)

2. Division of capacity
   - 030 : 700/900kcal/HR
   - 050 : 1,500/1,700kcal/HR
   - 075 : 2,500/2,700kcal/HR
   - 110 : 3,500/3,700kcal/HR
   - 150 : 4,800/5,300kcal/HR
   - 220 : 7,200/7,500kcal/HR

3. Temperature Control Method
   - A: Body temperature synchronized control (analog method)
   - D: Fixed (setting) temperature control (digital method)
   - L: LCD Digital Temperature Control

4. P: Cycle Pump Attachment Type

5. H: Heater Attachment Type

6. T: Sub tank Attachment Type

7. Heat Exchanger Type
   - S: Direct submerging type
   - No marking: Evaporator built-in type

8. Attachment Type
   - C: Roller attachment type
   - Non-specified: BOLT Assembly Type (See Drawing)

9. Option
   - 1: Sub tank level check function
   - 2: Chiller cycle pump pressure detection function
   - 3: Discharged fluid flow rate control function
   - 4: Special voltage specification (380/440[Vac])
   - 5: Customer requested exterior dimension
   - 6: Length of temperature detection sensor

Key Application Examples

- **Application field**
  - Factory machine: machining center, CNC lathe, grinder, dedicated machine tool and NC electrical discharge machine
  - Industrial machine: molding machine, press

- **Application examples in machine tool**
  - Fluid pressure hydraulic fluid (PFOC)
    - Fire prevention of hydraulic fluid
    - Stable operation of hydraulic system
  - Oil chiller (PFOC)
    - Fluid temperature management of gear box
    - Spindle
      - Heat displacement minimization
      - Heat displacement inhibition
  - Water chiller (PFWC)
    - Heat displacement minimization
    - Temperature management of built-in high speed
  - Cutting fluid chiller (PFCC)
    - Cutting fluid temperature management
    - Processing material processing rate management

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kemtech 04 05
### Special Features

- **High accuracy temperature control oil chiller**
- Environmentally-friendly refrigerant R407C used in all units
- Durability & stability achieved
  - Applying 3 Phase Rotary Compressor to overall models
- High accuracy control achieved (±0.5°C), on/off control
- LCD Digital Controller Mounted (Korean/English Supported)
- All units CE (European Conformity) mark certified
- Compact size allowing the installation of integrated machine tool type
- Embodying low-noise system by applying low-noise pump exclusive for oil cooler
- Supporting the function to be indicated in Korean and English- Easy maintenance and control
- Responding to user requested items through a large model lineup, various product development and design capability

### Technical Data - Oil Chiller

<table>
<thead>
<tr>
<th>Classification</th>
<th>Unit</th>
<th>PFOC030</th>
<th>PFOC050</th>
<th>PFOC075</th>
<th>PFOC110</th>
<th>PFOC150</th>
<th>PFOC220</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal cooling capacity 50/60 [Hz] kcal/Hr</td>
<td>800/900</td>
<td>1500/1700</td>
<td>2500/2700</td>
<td>3500/3700</td>
<td>4900/5300</td>
<td>7200/7500</td>
<td></td>
</tr>
<tr>
<td>Compressor kW</td>
<td>0.3</td>
<td>0.5</td>
<td>0.75</td>
<td>1.1</td>
<td>1.5</td>
<td>2.2</td>
<td></td>
</tr>
<tr>
<td>Motor Pump kW</td>
<td>0.2</td>
<td>0.2</td>
<td>0.4</td>
<td>0.75</td>
<td>0.75</td>
<td>0.75</td>
<td></td>
</tr>
<tr>
<td>Fan kW</td>
<td>0.1</td>
<td>0.1</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td></td>
</tr>
<tr>
<td>Pump discharged fluid flow rate L/min</td>
<td>11/14</td>
<td>11/14</td>
<td>23/27</td>
<td>28/34</td>
<td>28/34</td>
<td>40/46</td>
<td></td>
</tr>
<tr>
<td>Temperature control method</td>
<td>Synchronized fixed</td>
<td>°C</td>
<td>-9.9 ~ +9.9</td>
<td>5 ~ 50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature range used (inlet fluid temperature)</td>
<td>°C</td>
<td>5 ~ 50</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage specification Vac</td>
<td>3 Phase 200/220[VAC] 50/60[Hz]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Circuit breaker installation capacity A</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>Refrigerant</td>
<td>R407 / R-22 / R134a</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Viscosity of oil used cSt</td>
<td>2 ~ 200(below ISO VG 32)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pipe standard Inlet/Outlet inch</td>
<td>Rc ¼” / Rc ½”</td>
<td>Rc 1” / Rc 1”</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exterior dimension W x H x D mm</td>
<td>Refer to the exterior diagram.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*Oil tank capacity &amp;</td>
<td>35</td>
<td>35</td>
<td>40</td>
<td>85</td>
<td>85</td>
<td>85</td>
<td></td>
</tr>
<tr>
<td>Weight kg</td>
<td>65(95)</td>
<td>65(95)</td>
<td>80(120)</td>
<td>90(175)</td>
<td>100(185)</td>
<td>100(245)</td>
<td></td>
</tr>
<tr>
<td>Safety protection mechanism</td>
<td>High - Low pressure detector, excess current detector for motor protection, circuit breaker, reverse phase detector, thermal for compressor protection</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes:
1. (*) denotes the weight including liquid weight inside the tank.
2. The above specification is subject to change according to circumstances within the company.
3. Rc is the ISO standard name for PT female screw.
4. *indicates option.

[www.kemtech.co.kr](http://www.kemtech.co.kr)
Special Features

- As a sub tank built-in type, installation and use is possible regardless of machine tool manufacture
- Environmentally-friendly refrigerant R407C applied in all units
- Durability & stability achieved
- Applying 3 Phase Rotary Compressor to overall models
- Realizing improvement in cooling water temperature control (±0.5°C)
- LCD Digital Controller Mounted (Supporting Korean and English)
- All units CE (European Conformity) mark certified
- Various specification options available such as heater, cycle pump, coolant, level check, fluid flow rate check and operation hour setting
- Supporting the function to be indicated in Korean and English
- Easy maintenance and control
- Responding to user requested items with a large model lineup, various product development and design capability

Technical Data - Water Chiller

<table>
<thead>
<tr>
<th>Classification</th>
<th>Unit</th>
<th>PFWC030</th>
<th>PFWC050</th>
<th>PFWC075</th>
<th>PFWC110</th>
<th>PFWC150</th>
<th>PFWC220</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal cooling capacity</td>
<td>kcal/Hr</td>
<td>800/900</td>
<td>1500/1700</td>
<td>2500/2700</td>
<td>3500/3700</td>
<td>7200/7500</td>
<td>7200/7500</td>
</tr>
<tr>
<td>Compressor</td>
<td>kW</td>
<td>0.3</td>
<td>0.5</td>
<td>0.75</td>
<td>1.1</td>
<td>2.2</td>
<td>2.2</td>
</tr>
<tr>
<td>Motor</td>
<td>kW</td>
<td>0.33</td>
<td>0.33</td>
<td>0.33</td>
<td>0.33</td>
<td>0.25</td>
<td>0.75</td>
</tr>
<tr>
<td>Pump</td>
<td>kW</td>
<td>0.1</td>
<td>0.1</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td>Fan</td>
<td>kW</td>
<td>0.1</td>
<td>0.1</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td>Pump discharged fluid flow rate</td>
<td>g/min</td>
<td>10</td>
<td>10</td>
<td>42</td>
<td>42</td>
<td>80</td>
<td>40/46</td>
</tr>
<tr>
<td>Temperature control method</td>
<td>°C</td>
<td>-9.9 ~ +9.9</td>
<td>5 ~ 50</td>
<td>5 ~ 50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature range used</td>
<td>°C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage specification</td>
<td>Vac</td>
<td>3 Phase 200/220[VAC] 50/60[Hz]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Circuit breaker installation capacity</td>
<td>A</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>25</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>Refrigerant</td>
<td></td>
<td>R407 / R-22</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Viscosity of oil used</td>
<td>cSt</td>
<td>Distilled water + antifreezing liquid (50%:50%), industrial water (Note 2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pipe standard</td>
<td>Inch</td>
<td>Rc ¾” / Rc ¾”</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exterior dimension</td>
<td>mm</td>
<td>W × H × D</td>
<td>Refer to the exterior diagram.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oil tank capacity</td>
<td>g</td>
<td>10</td>
<td>10</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>45</td>
</tr>
<tr>
<td>Weight</td>
<td>kg</td>
<td>60(70)</td>
<td>65(75)</td>
<td>80(120)</td>
<td>120(160)</td>
<td>(160)</td>
<td>150(195)</td>
</tr>
<tr>
<td>Safety protection mechanism</td>
<td></td>
<td>High - Low pressure detector, excess current detector for motor protection, circuit breaker, reverse phase detector, thermal for compressor protection *Level S/W *Flow S/W</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes:
1. ( ) denotes the weight including liquid weight inside the tank.
2. Be sure to consult with us in advance when you use industrial water
3. The above specification is subject to change according to circumstances within the company.
4. °C is the ISO standard name for PT female screw.
5. * indicates option.
### Special Features

- As a sub tank integrated type, installation and use is possible regardless of machine tool manufacturer
- Environmentally-friendly refrigerant R407C applied in all units
- Durability & stability achieved
- Applying 3 Phase Rotary Compressor to overall models
- High accuracy achieved (±0.5°C) for coolant temperature control
- LCD Digital Controller Mounted (Supporting Korean and English)
- All units CE (European Conformity) mark certified
- Various specification options available such as heater, cycle pump, coolant, level check, fluid flow rate check and operation hour setting
- Supporting the function to be indicated in Korean and English-Easy maintenance and control
- Responding to user requested items with rich model lineup, various product development and design capability

### Technical Data - Coolant Chiller

<table>
<thead>
<tr>
<th>Classification</th>
<th>Unit</th>
<th>PFCC075</th>
<th>PFCC110</th>
<th>PFCC150</th>
<th>PFCC220</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal cooling capacity 50/60 [Hz]</td>
<td>kcal/Hr</td>
<td>2500/2700</td>
<td>3500/3700</td>
<td>4900/5300</td>
<td>7200/7500</td>
</tr>
<tr>
<td>Compressor</td>
<td>kW</td>
<td>0.75</td>
<td>1.1</td>
<td>1.5</td>
<td>2.3</td>
</tr>
<tr>
<td>Motor</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pump</td>
<td>kW</td>
<td>0.18</td>
<td>0.18</td>
<td>0.18</td>
<td>0.18</td>
</tr>
<tr>
<td>Fan</td>
<td>kW</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td>*Pump discharged fluid flow rate</td>
<td>ℓ/min</td>
<td>70</td>
<td>70</td>
<td>70</td>
<td>70</td>
</tr>
<tr>
<td>Temperature control method</td>
<td></td>
<td>Synchronized</td>
<td>-9.9 ~ +9.9</td>
<td>5 ~ 50</td>
<td></td>
</tr>
<tr>
<td>Temperature range used (inlet fluid temperature)</td>
<td>℃</td>
<td>5 ~ 50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage specification</td>
<td>Vac</td>
<td>3 Phase 200/220[VAC] 50/60[Hz]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*Heater capacity (optional)</td>
<td>kW</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Circuit breaker installation capacity</td>
<td>A</td>
<td>15</td>
<td>25</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>Refrigerant</td>
<td></td>
<td>R407 / R-22</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Application liquid to be cooled</td>
<td></td>
<td>Water-soluble &amp; water-insoluble, cutting fluid, grinding oil (NOTE 3)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pipe standard</td>
<td></td>
<td>Rc 3/4&quot;</td>
<td>Rc 1&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inlet/Outlet</td>
<td>inch</td>
<td></td>
<td>2&quot; HOSE NIPPLE</td>
<td>3&quot; HOSE NIPPLE</td>
<td></td>
</tr>
<tr>
<td>Exterior dimension</td>
<td>W × H × D</td>
<td>mm</td>
<td>Refer to the exterior diagram.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oil tank capacity</td>
<td>ℓ</td>
<td>85</td>
<td>120</td>
<td>120</td>
<td>180</td>
</tr>
<tr>
<td>Weight</td>
<td>kg</td>
<td>100(185)</td>
<td>130(250)</td>
<td>130(250)</td>
<td>150(330)</td>
</tr>
</tbody>
</table>

**Note:**
1. ( ) denotes the weight including liquid weight inside the tank.
2. The above specification is subject to change according to circumstances within the company.
3. Be sure to consult with us in advance when you use industrial polishing oil.
4. For water-insoluble cutting fluid, viscosity should be less than 30 cSt.
5. Rc is the ISO standard name for PT female screw.
6. *indicates option.
### PFCC Series

**Direct Submerging Type**

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>D</th>
<th>H</th>
<th>S1</th>
<th>A</th>
<th>A1</th>
<th>B</th>
<th>B1</th>
</tr>
</thead>
<tbody>
<tr>
<td>PFCC075</td>
<td>382</td>
<td>273</td>
<td>ø28</td>
<td>500</td>
<td>440</td>
<td>384</td>
<td>486</td>
</tr>
<tr>
<td>PFCC110/150</td>
<td>440</td>
<td>319</td>
<td>ø22</td>
<td>480</td>
<td>480</td>
<td>440</td>
<td>319</td>
</tr>
<tr>
<td>PFCC220</td>
<td>448</td>
<td>288</td>
<td>ø34</td>
<td>480</td>
<td>480</td>
<td>440</td>
<td>319</td>
</tr>
</tbody>
</table>

**Processing Dimensional Map for Mounting Main Body**

---

**Sub Tank Type**

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
</tr>
</thead>
<tbody>
<tr>
<td>PFCC075</td>
<td>736</td>
<td>709</td>
<td>1440</td>
<td>Rc3/4&quot;</td>
<td>Rc2&quot;</td>
<td>ø28</td>
</tr>
<tr>
<td>PFCC110/150</td>
<td>708</td>
<td>800</td>
<td>1440</td>
<td>Rc3/4&quot;</td>
<td>Rc3&quot;</td>
<td>ø22</td>
</tr>
<tr>
<td>PFCC220</td>
<td>708</td>
<td>800</td>
<td>1636</td>
<td>Rc3/4&quot;</td>
<td>Rc3&quot;</td>
<td>ø34</td>
</tr>
</tbody>
</table>
Necessity of High Pressure Coolant

Recent interest on high pressure fluid grew as machine tools tend to become high speed and high precision. Low pressure (below 14kgf/in²) cutting fluid is blocked by the vapor barriers created by machine tool’s cutting speed. It loses cutting fluid function before it enters the cutting zone because of evaporation. On the other hand, high pressure (over 20kgf/in²) cutting fluid can reach the cutting zone to achieve the following:

1. Smooth lubrication and cooling effect
2. Improvement in cutting capability
3. Improvement in tool lifetime by removing the phenomenon of chip re-cutting
4. Improvement in cutting surface roughness
5. Smooth chip removal effect
6. Deburring effect
7. Smooth cutting and cutting capability improvement in special processes such as deep hole processing and difficult-to-cut material processing

In case 70kgf/in² high pressure cutting fluid is used in the cutting of difficult-to-cut materials, the tool manufacturer test shows the following results compared with the use of common cutting fluid.

1. 20% reduction in cycle time because of an improvement in cutting speed and feed
2. 50% improvement in tool lifetime

Hole Processing (Drilling, Boring and etc.)

- Low Pressure Cutting Fluid / Flood Coolant
  - Cutting fluid cannot reach a processing point and almost not cutting fluid is supplied to the tool.
  - Peck cycle is used because chip discharge is difficult.
  - Re-cutting often occurs because thread like chip surrounds the tool and tool holder.

- High Pressure Cutting Fluid / Through Tool Coolant
  - Cutting fluid is supplied to a processing point at the highest pressure.
  - Chip is discharged effectively from a deep hole by reflected pressure and cutting fluid.
  - The drill can perform more difficult processing therefore reducing work hour. The tool’s lifetime is significantly increased compared with the use of low pressure cutting fluid.

Turning

- High Pressure Coolant
  - Highly reduced heat zone is created through the direct spray of cutting fluid to a processing point.
  - Cutting hydraulic wedge effect can be produced depending on the usage. Wearing of the tool is reduced by cooling the contact zone between chip and tool.
  - Cutting chip into small pieces increases chip discharging capability. This prevents re-cutting by chip and increases tool lifetime.
Application

- Machining Center

  - Main spindle - Tool penetration
    - Vertical machining center
    - Horizontal machining center
    - Tapping center
    - Gun drilling M/C
    - Boring M/C, special purpose machines

- CNC Lathe / Automatic lathe

  - Application - Tool
    - Difficult-to-cut material processing
    - Low carbon steel processing
    - Steel material processing on a vertical lathe
HIGH PRESSURE COOLANT SYSTEM

Sub Tank Type (PFF70-15 / PFF70-25 / PFF70-25S)

As a product that has a cutting fluid tank, automatic operation is possible using the machine body and interface and independent operation is also made possible.

<table>
<thead>
<tr>
<th>Specifications</th>
<th>Unit</th>
<th>PFF70-25</th>
<th>PFF70-15</th>
<th>PFF70-25S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluid flow rate (Discharge + Bypass)</td>
<td>l/min</td>
<td>25</td>
<td>13</td>
<td>25</td>
</tr>
<tr>
<td>Motor</td>
<td>kW</td>
<td>5.5</td>
<td>3.7</td>
<td>5.5</td>
</tr>
<tr>
<td>Voltage specification/3 phases</td>
<td>VAC</td>
<td>220/440</td>
<td>220/440</td>
<td></td>
</tr>
<tr>
<td>Current value</td>
<td>A</td>
<td>19/9.3</td>
<td>12.9 / 6.5</td>
<td>19 / 9.3</td>
</tr>
<tr>
<td>Frequency</td>
<td>Hz</td>
<td>50 / 60</td>
<td>50 / 60</td>
<td></td>
</tr>
<tr>
<td>Inlet pipe standard</td>
<td>inch</td>
<td>Rc 1</td>
<td>Rc 1</td>
<td></td>
</tr>
<tr>
<td>Outlet pipe standard</td>
<td>inch</td>
<td>R 1/2</td>
<td>R 1/2</td>
<td></td>
</tr>
<tr>
<td>Maximum pressure used</td>
<td>Bar</td>
<td>70</td>
<td>70</td>
<td></td>
</tr>
<tr>
<td>Standard orifice diameter</td>
<td>ø (mm)</td>
<td>2.5</td>
<td>1.5</td>
<td>2.5</td>
</tr>
<tr>
<td>The number of filters</td>
<td>EA</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Filter accuracy</td>
<td>µm</td>
<td>10, 25, 50</td>
<td>10, 25, 50</td>
<td></td>
</tr>
<tr>
<td>Tank capacity</td>
<td>Liter</td>
<td>140</td>
<td>180</td>
<td></td>
</tr>
<tr>
<td>Exterior size</td>
<td>W×L×H</td>
<td>550×1150×1600</td>
<td>600×1200×1280</td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>kg</td>
<td>327</td>
<td>272</td>
<td></td>
</tr>
<tr>
<td>Standard color</td>
<td>Light Gray</td>
<td>Light Gray</td>
<td>Light Gray</td>
<td></td>
</tr>
</tbody>
</table>

- Consult with our company for special voltage specifications.
- The above specifications are subject to change according to circumstances of the company.
- The maximum pressure is based on the standard orifice.
- R is the ISO standard name for male screw, and Rc for female screw.
- Flow means the outlet flow at the maximum pressure.

Dual Vessel Type (PF70-20DF / PF70-30DF)

When the differential pressure sensor notifies the replacement period of the bag element in the dual vessel type, conversion to a different vessel is made using the level and then the bag element can be replaced without stopping the machine.

<table>
<thead>
<tr>
<th>Specifications</th>
<th>Unit</th>
<th>PF70-20DF</th>
<th>PF70-30DF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluid flow rate (Discharge + Bypass)</td>
<td>l/min</td>
<td>17</td>
<td>25</td>
</tr>
<tr>
<td>Motor</td>
<td>kW</td>
<td>3.7</td>
<td>5.5</td>
</tr>
<tr>
<td>Voltage specification/3 phases</td>
<td>VAC</td>
<td>3PH 220VAC</td>
<td></td>
</tr>
<tr>
<td>Current value</td>
<td>A</td>
<td>15.5/14.1</td>
<td>23/21.1</td>
</tr>
<tr>
<td>Frequency</td>
<td>Hz</td>
<td>50 / 60</td>
<td></td>
</tr>
<tr>
<td>Inlet pipe standard</td>
<td>inch</td>
<td>Rc 3/4</td>
<td></td>
</tr>
<tr>
<td>Outlet pipe standard</td>
<td>inch</td>
<td>R 1/2</td>
<td></td>
</tr>
<tr>
<td>Maximum pressure used</td>
<td>Bar</td>
<td>70</td>
<td></td>
</tr>
<tr>
<td>Standard orifice diameter</td>
<td>ø (mm)</td>
<td>2.0</td>
<td>2.46</td>
</tr>
<tr>
<td>The number of filters</td>
<td>EA</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Filter accuracy</td>
<td>µm</td>
<td>5, 10, 25, 50, 100</td>
<td></td>
</tr>
<tr>
<td>Exterior size</td>
<td>W×L×H</td>
<td>700×940×1340</td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>kg</td>
<td>285</td>
<td>300</td>
</tr>
<tr>
<td>Standard color</td>
<td>Light Gray</td>
<td>Light Gray</td>
<td></td>
</tr>
</tbody>
</table>

- Please consult our company for special voltage specifications.
- The above specifications are subject to change according to customer’s circumstances.
- The maximum pressure is based on the standard orifice.
- R is the ISO standard name for male screw, and Rc for female screw.
- Flow means the outlet flow at the maximum pressure.
Single Vessel Type (PF70-15SF / PF30-20SF / PF20-20SF / PF15-30SF)

It includes one vessel and the big element replacement period can be figured out using the differential pressure sensor.

<table>
<thead>
<tr>
<th>Specifications</th>
<th>Unit</th>
<th>PF70-15SF</th>
<th>PF30-20SF</th>
<th>PF20-20SF</th>
<th>PF15-30SF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluid flow rate (Discharge + Bypass)</td>
<td>ℓ /min</td>
<td>14</td>
<td>13</td>
<td>13</td>
<td>25</td>
</tr>
<tr>
<td>Motor</td>
<td>kW</td>
<td>3.7</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Voltage specification / 3 phases</td>
<td>VAC</td>
<td>220-380-440</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current value (50/60Hz)</td>
<td>A</td>
<td>11/10</td>
<td>7.7/7</td>
<td>7.7/7</td>
<td>7.7/7</td>
</tr>
<tr>
<td>Frequency</td>
<td>Hz</td>
<td>50</td>
<td>50 / 60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inlet pipe standard</td>
<td>inch</td>
<td>Rc 3/4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outlet pipe standard</td>
<td>inch</td>
<td>R 3/8&quot;</td>
<td>R 1/2&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum pressure used</td>
<td>Bar</td>
<td>70</td>
<td>30</td>
<td>20</td>
<td>15</td>
</tr>
<tr>
<td>Standard orifice diameter</td>
<td>φ (mm)</td>
<td>1.5</td>
<td>1.5</td>
<td>2.0</td>
<td>2.46</td>
</tr>
<tr>
<td>The number of filters</td>
<td>EA</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Filter accuracy</td>
<td>μm</td>
<td>5, 10, 25, 50, 100</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exterior size</td>
<td>W x L x H</td>
<td>360 x 800 x 1355</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>kg</td>
<td>110</td>
<td>105</td>
<td>105</td>
<td>105</td>
</tr>
<tr>
<td>Standard color</td>
<td></td>
<td>Light Gray</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Consult with our company for special voltage specifications.
- The above specifications are subject to change according to customer’s circumstances.
- The maximum pressure is based on the standard orifice.
- R is the ISO standard name for male screw, and Rc for female screw.
- Flow means the outlet flow at the maximum pressure.

Vessel Filter (MCF)

Since the differential pressure sensor is attached, the replacement period of the bag element can be automatically detected. (Interface with the machine body is possible)

<table>
<thead>
<tr>
<th>Specifications</th>
<th>Unit</th>
<th>MCF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluid flow rate</td>
<td>ℓ /min</td>
<td>100</td>
</tr>
<tr>
<td>Inlet pipe standard</td>
<td>inch</td>
<td>Rc 3/4</td>
</tr>
<tr>
<td>Outlet pipe standard</td>
<td>inch</td>
<td>Rc 3/4</td>
</tr>
<tr>
<td>Maximum pressure used</td>
<td>Bar</td>
<td>0~20</td>
</tr>
<tr>
<td>The number of filters</td>
<td>EA</td>
<td>Single/Dual</td>
</tr>
<tr>
<td>Filter accuracy</td>
<td>μm</td>
<td>5, 10, 25, 50</td>
</tr>
<tr>
<td>Weight</td>
<td>kg</td>
<td>38</td>
</tr>
<tr>
<td>Standard color</td>
<td></td>
<td>Light Gray / Dark Gray</td>
</tr>
</tbody>
</table>

- R is the ISO standard name for male screw, and Rc for female screw.
For processing problem, chip blocking in automation process, etc. you can solve them by using high-pressure cutting oil now!

Low-pressure cutting oil (14 kgf/㎠) is not able to pass through cutting heat curtain that take place from high-speed rotation processing being evaporated before reaching cutting area, which may not serve its proper function as a cutting oil.

Especially for CNC lathe and automatic lathe requiring high-precision, processing of the materials difficult to cut, complex processing, high-speed processing for multi-product, it is necessary to use high-pressure cutting oil now!

- **Improvement in chip-treatment capacity**
  - High pressure cutting oil system enables smooth chip treatment in complex processing of the materials difficult to cut and automation process. Especially high-pressure cutting oil exceeding 70 kgf/㎠ is effective in cutting the chips and discharging them.

- **Improvement in cutting speed**
  - Improved in general steel material and the materials difficult to cut by 20%

- **Improvement in tool life**
  - Improved in the process from rough grinding to finish grinding by 50%

## Advantage of MF Series High Pressure Coolant System

- **Hole Processing / Through Tool Coolant**
  - Supplying cutting oil to the point for processing at maximum pressure
  - Discharging chips effectively through the hole in the processing of the material difficult to cut
  - Extending tool life and improving cutting condition in the processing of deeper hole with diameter to be grinded

- **Turning / High Pressure Coolant**
  - Directly spraying cutting oil at the processing area so as to reduce the occurrence of thermal zone in large scale
  - It enables to generate wedge effect by the pressure of cutting oil, and reduce wear of tool by cooling the contact area between chip and tool
  - Improving the discharge of chip by cutting chips into small pieces so as to prevent re-cutting by chip, and subsequently improving roughness and enhancing the life of tool

www.kemtech.co.kr
Characteristic of MF Series High Pressure Coolant System

Safety and Convenience
- Adopting Sub Tank (Clean Tank) and Level Switch for continuous use in smooth manner
- Applying low-noise high-pressure pump with high durability
- Attaching Solenoid Valve for reasonable use of cutting oil
- Ergonomically designed construction

Continuous Use
- Dual type filter attached enables its conversion into stand by filter through conversion lever manipulation when replacing filter; Filter replacement without the suspension of machinery/system enables continuous use of machinery and automation.
- Sensor is attached, which automatically marks the time for filter replacement.
- Function of filter automatic-conversion; Option of Discharge Port Sol. Valve (Max. 8 Ports) can be selected

Application of MF Series High Pressure Coolant System

CNC Lathe/Automatic Lathe
- Improving processing speed in precise and complex processing of the material difficult to cut
- Discharging chips smoothly in the processing of gun drill for small diameter
- Separating and discharging chips easily from material, chuck or automated device in narrow space so as to enable automation process such as Bar Feeder.
- Adopting the specification proper for CNC lathe and automatic lathe for convenient use

Wedge effect by cutting oil pressure

Small-type Machining Center, Tapping Center
- Filtering & high pressure coolant system at economic price that is suitable for small type machining center, tapping center
- In the case of using the machinery in cell form in continuous processing or automated line, it enables continuous operation without the stoppage of machinery or line
- Suitable for the general process for Steel, Al, etc. (Drilling, Milling, Tapping, etc.)
- In the case there are many fine chips in magnetic property such as casting process, etc. it would be efficient with magnetic filter used for pre-filter.
- In the process having many fine chips, the effect may be reduced.
### Technical Data - MF Series

<table>
<thead>
<tr>
<th>Specifications</th>
<th>Unit</th>
<th>PFMF 30-20</th>
<th>PFMF 70-15</th>
<th>PFMF 120-10</th>
<th>PFMF 200-10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. Outlet Pressure</td>
<td>kgf/㎠</td>
<td>30</td>
<td>70</td>
<td>120</td>
<td>200</td>
</tr>
<tr>
<td>Flow (Discharge + Bypass)</td>
<td>LPM</td>
<td>13</td>
<td>14</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Motor</td>
<td>KW</td>
<td>1.5</td>
<td>4.0</td>
<td>4.0</td>
<td>7.5</td>
</tr>
<tr>
<td>Voltage Specification/3 Phase</td>
<td>VAC</td>
<td>220 / 380</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current Value</td>
<td>A</td>
<td>7.0 / 4.0</td>
<td>14.6 / 8.4</td>
<td>14.6 / 8.4</td>
<td>28 / 15.5</td>
</tr>
<tr>
<td>Frequency</td>
<td>Hz</td>
<td>50 / 60</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inlet Side Piping Specification</td>
<td>inch</td>
<td>Rc 1/2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outlet Side Piping Specification</td>
<td>inch</td>
<td>Rc 3/8 JIS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overflow Piping Specification</td>
<td>inch</td>
<td>Rc 1-1/2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. Operating Pressure</td>
<td>Bar</td>
<td>30</td>
<td>70</td>
<td>120</td>
<td>200</td>
</tr>
<tr>
<td>Standard Orifice Diameter</td>
<td>φ (mm)</td>
<td>1.5</td>
<td>1.5</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Max. SOL Quantity Attached</td>
<td>EA</td>
<td>4/8</td>
<td>4/8</td>
<td>4/8</td>
<td>3</td>
</tr>
<tr>
<td>Quantity of Filter</td>
<td>EA</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grade of Filter</td>
<td>μm</td>
<td>10, 25, 50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tank Capacity</td>
<td>Liter</td>
<td>80</td>
<td></td>
<td>90</td>
<td></td>
</tr>
<tr>
<td>External Size</td>
<td>W × D × H</td>
<td>1030×580×1340</td>
<td></td>
<td>1070×580×1420</td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>kg</td>
<td>160</td>
<td>173</td>
<td>173</td>
<td>190</td>
</tr>
<tr>
<td>Standard Color</td>
<td>Light Gray</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Flow means the flow at maximum pressure.
- Max. pressure is based on Standard Orifice.
- Be sure to consult with us for special voltage specification.
- The above-mentioned specification is subject to change depending on the company’s circumstance.
- R and Rc mean the codes of ISO standard for PT male screw and PT female screw respectively.
I Magnetic Filtering System

It adopts rare earth magnet (Nd-Fe-B Magnet) that is high magnetic permanent magnet having extremely high coercive force and residual induction compared with the material of permanent magnet developed so far. For the processing of the part material having magnetic property or its washing process;

- It addresses filtering of chip up to 98%
- It even filters and separate fine chip or sludge in 5μm.

This system incorporates;
1. Magnet filter that separates fine chips with 12,000 gauss
2. Sludge conveyor that separately collects sludge for sedimentation and separation
3. Bag filter that separates non-magnetic material that pass through magnetic filter
4. High-pressure cutting oil device that stores clean fluid and then let it out in proper pressure through high pressure pump.

In addition, each unit built in modular type can be used independently.

II Effect of Magnet Filtering System

1. When it is used for pre-filtering, it reduces the number of bag, paper and cartridge filter being used and minimizes the time of machinery and device being suspended, and finally improves the operation ratio.

2. It is used for the next process of Paper Filter, Bag, or Cartridge Filter, which is suitable for fine chip filtering, and improves durability and reliability for the function of machinery.

3. It requires almost no consumable parts. It reduces the use of consumable filter resulting in cost saving and the increase of cutting oil life and cleaning cycle of tank as well.

4. It requires small area for installation, and can be maintained in easy and simple manner.

5. It provides a variety of options, and enables separate discharge of the chips used, and connection with high-pressure cutting oil system.
Characteristic, Advantage and Application of Magnet Filtering System

■ Characteristic/Advantage

1. It requires rare consumable parts and is almost maintenance-free. It improves operation ratio by reducing the stoppage of machinery due to frequent filter replacement.
2. Its compact size enables to be installed even in a small space.
3. It enables automatic backwashing of filter.
4. It doesn’t require any separate tank or pump when installed at the line.
5. It remarkably reduces maintenance of pump, valve, slid, cover, spindle used in the machine or device improving the reliability for the system.
6. Quality of filtering is excellent. - Max. 5μm
7. Magnetic filter is solely adopted, it may not provide perfect filtering function.
   - This system ensures to provide its filtering up to 98%.

■ Application

Magnetic filter can be used in the process that adopts chips with magnetic property.
1. With filter being in use, it doesn’t cause change in the property of cutting oil.
2. When it is used for pre-filtering, chip can be filtered up to 98%, resulting in epoch-making increase in the life of paper, bag or cartridge filter.
3. It may filter fine chips when used in the next process of paper, bag, or cartridge filter preventing the phenomenon that chips are accumulated on inside of machinery or part, etc., finally reducing the requirement of maintenance.
4. It extends life of cutting oil and cleaning cycle of tank as well, while saving the cost
5. Backwashed sludge can be discharged through sludge conveyor (option) in the form of chip separated from moisture.
6. Clean fluid filtered can be stored in a separate tank and used in connection with high pressure cutting oil system through high pressure pump. High pressure cutting oil system with 20 bar up enhances productivity up to approx. 30% and increases life of tool by twice depending on its usage.

- Independent use of magnetic filter may result in incomplete filtering.
- Connection of cartridge filter at front and rear parts may improve filtering effect or reduce the use of consumables, resulting in improvement of operation ratio and saving of the cost
### Technical Data - Magnetic Filtering System

<table>
<thead>
<tr>
<th>Specifications</th>
<th>Unit</th>
<th>PROMAG-45</th>
<th>PROMAG-100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow Rate (Max.)</td>
<td>ℓ /min</td>
<td>45</td>
<td>100</td>
</tr>
<tr>
<td>Magnetic power</td>
<td>Gauss</td>
<td>12,000</td>
<td>12,000</td>
</tr>
<tr>
<td>Filtering Level (Max.)</td>
<td>%</td>
<td>98</td>
<td>98</td>
</tr>
<tr>
<td>Filtering Degree (Max.)</td>
<td>μm</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Solenoid Valve Power Source</td>
<td>V</td>
<td>DC24</td>
<td>DC24</td>
</tr>
<tr>
<td>Max. Operating Pressure</td>
<td>MPa(kg./cm²)</td>
<td>0.7 (7)</td>
<td>0.7 (7)</td>
</tr>
<tr>
<td>Static Test Pressure</td>
<td>MPa(kg./cm²)</td>
<td>1.0 (10)</td>
<td>1.0 (10)</td>
</tr>
<tr>
<td>Max. Operating Temperature</td>
<td>°C</td>
<td>75</td>
<td>75</td>
</tr>
<tr>
<td>Air Pressure</td>
<td>Min. Pressure</td>
<td>MPa(kg./cm²)</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Max. Pressure</td>
<td>MPa(kg./cm²)</td>
<td>8</td>
</tr>
</tbody>
</table>

### Modular of Magnetic Filtering System

- **Magnetic Filter (Pre filter)**
- **Magnetic Filter+Sludge conveyor (Pre filtering system)**
- **Magnetic Filtering System (Filtering+High pressure coolant)**
Examples of Magnet Filtering System Application

Gear Grinding M/C & Tool Specification

<table>
<thead>
<tr>
<th>Specification</th>
<th>Ceramic(A120N3600)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shape</td>
<td></td>
</tr>
<tr>
<td>Main Components</td>
<td>Aluminium oxide + Ceramic 30%</td>
</tr>
<tr>
<td>Heat Treatment</td>
<td>- Sintering treatment at the temperature of 1450°C or less</td>
</tr>
<tr>
<td>Characteristic</td>
<td>- Heat-resistant, Wear-resistant, High-strength</td>
</tr>
<tr>
<td></td>
<td>- Weak brightness, High-metal affinity</td>
</tr>
<tr>
<td></td>
<td>- Weak in impact and vibration</td>
</tr>
<tr>
<td></td>
<td>- Excessive heat generation during processing time (Melt-particles, less processing)</td>
</tr>
<tr>
<td></td>
<td>- Excessive falls of particles</td>
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</table>

Chip filtered through paper filter

Evaluation of magnetic force of magnet

Pumping in Clean Tank
Separate Discharge of Chip

Clean tank of the cutting oil filtered through paper filter (right)

Data of analysis for the components of chip discharged through magnetic filter and the feature of chip expanded

Data of analysis for the components of chip
- Fe: 64.5%
- Cr: 55.3%
- Cr: 1.2%
PROFLUID
MAGNETIC FILTERING SYSTEM

External Figure of PROMAG-45MCT

External Figure of Magnetic Filter

External Figure of Sludge Conveyor

<table>
<thead>
<tr>
<th>MODEL No.</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
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<tr>
<td>PROMAG-45</td>
<td>493</td>
<td>139</td>
<td>ø50.8</td>
<td>155</td>
<td>195</td>
<td>150</td>
<td>180</td>
<td>3/4&quot;</td>
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<td>PROMAG-100</td>
<td>579</td>
<td>210</td>
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<td>220</td>
<td>150</td>
<td>210</td>
<td>1-1/4</td>
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<tr>
<th>MODEL No.</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
</tr>
</thead>
<tbody>
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<td>PROMAG-45</td>
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<td>570</td>
<td>345</td>
<td>225</td>
<td>310</td>
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<td>313</td>
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<tr>
<td>PROMAG-100</td>
<td>759</td>
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<td>650</td>
<td>375</td>
<td>275</td>
<td>480</td>
<td>170</td>
<td>513</td>
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Utility Cabinet

Utility Cabinet is the system incorporated in one cabinet that supplies the entire utilities used for the machinery to meet the requirement of milling machinery manufacturer.

- Joint design enables to reduce the design period of machinery,
- It ensures reduction of the time for production and reliability of components by modular system and specialization.

**Units that can be constructed**

- Hydraulic Unit (Tank & Manifold assembly)
- Pneumatic System (with Air purge & Measuring system)
- Lubrication (Guide way & Spindle bearing)
- Coolant System (Centralized or Independent, Sub Tank System)
- Coolant Filtering (Automatic Filtering System & Cartridge filter)
- High-pressure cutting oil system (20, 30, 60 bar or more)
- Chiller system (Spindle, Index table Cooling & Hyd’ tank, Electric box cooling)

**DESIGN is kemtech**

- A variety of machining center
- CNC Lathe
- Diverse exclusive machines and automated design
- Mechanical and electronic design

**Specialized production in a variety of units and agency activity**

- Pioneer in the production of high-pressure cutting oil system
- Specialized production in chiller
- Automatic Filter: Hydac / Mahle
- High-pressure Pump: SKF / Sumitomo
Major Design Points in the Utility of Machinery

- **Design of the system for supplying and filtering high-pressure cutting oil**
  - Cutting oil can be supplied through independent, centralized and sub tank, etc. It requires clear information on pre-filtering, pressure and flow-rate in each process.
  - Sudden On/Off and change in direction of high pressure cutting oil may result in water hammer causing vibration to piping or machinery.
    - Piping design in consideration of water hammer
    - Design that avoids the blockade of flow path caused by sudden operation from jig / fixture (Locating pad, etc.)
  - High pressure cutting oil pump in operation
    - It requires meeting the filtering degree required by the pump and the standard of chip contents
    - When the inlet pressure and back pressure exceeds the required level, it may result in reduction of pump life, especially the damage to seal.
  - Degree of filtering of cutting oil should be selected depending on the operation condition of the machinery, which must considers;
    - Degree required by mechanical seal of spindle and rotary joint
    - Degree required by the devices in operation such as blockade in flow path inside the machinery, solenoid V/V, etc.
    - Degree required in consideration of processing work
    - Waching of reference surface and seat of the work where coolant is used to be checked.
- **Selection of Filter**
  - To be selected properly for its usage (Degree/flow required, Processing work, whether it has magnetic property or not, Contents of material)
  - Maintenance that enables automation or continuous use, Cartridge replacement, Reduction in throw away parts)
  - Size of pressure required to be let in,
  - Method of drain or back flushing, and method of separating chip from sludge

- **Design of Air Pressure Circuit (Safety)**
  - Safety for compression should be ensured.
    - Preventing safety accident in supply system due to careless construction of the removal of residual pressure (OHSA Regulation)
    - Constructing the soft start-up circuit that interrupts low-speed supply or interrupts supply and then supply metal materials
  - Degree of filtering of each element, Countermeasure of contamination prevention
    - In the case of compressed air that is supplied to Air Purge, Lubrication (Oil-mist, Oil-air), Linear Scale, etc., it requires a countermeasure against contamination and the degree suitable of filtering.
    - It requires pressure setting suitable for component element and such can be checked so as to interrupt trouble in advance
  - **Air Purge**
    - It requires checking if proper pressure exists in each component element, and reviewing piping length, drainage method, etc.
Design of Lubrication System

- It requires using small volume of oil so as to reduce contamination by cutting oil and create clean environment that has rare mist.
- Requiring compressed air at least exceeding 4 bar with dry and clean condition of 5% or less
- System suitable for the rpm of spindle to be selected (Grease, Oil mist, Oil-air)

Selection of lubrication oil
- Oil with viscosity suitable for the load required by the machinery.
- When any lubrication oil that generates sediments is used for the purpose of solving other problems, it may reduce the life of the elements such as bearing, etc. due to its disturbance of flow or the particles.

Operation of lubrication oil to be checked
- It requires applying proper sensor to check the flow of lubrication oil for the safe use of spindle and guide that are the core parts of machinery.
- Sensor can serve its proper function when the size of pipe diameter and separation distance is met.

Design and Construction of Chiller System

Chiller plays the role of minimizing thermal displacement that takes place in the parts comprising the machinery and then improving preciseness of machinery and durability of its components by matching the temperature of machinery generated during the operation of the machinery with the external air environment of the machinery if possible.

- Exact data of each component element is very important for the design of Chiller.
  - Magnitude of heat generated by the unit such as spindle, index table, etc.,
  - Pressure, flow, etc. of the pump motor used in hydraulic tank, and coolant system become important functions in the design of chiller. It is important to select proper specification that doesn’t exceed the application if possible.
- Most of the causes of unusual noise from chiller unit take place in the pump, especially from the reason that the piping diameter connected with spindle is too small. Proper sized pipe improves energy efficiency and chiller efficiency as well.
- Fluid adopted in the chiller is used for closed circuit, but it may show the reduction in its function because of filtering problem caused by the phenomenon that fine chips discharged from the machinery or various lubrication oils are mixed resulting in cohesion. Therefore, it requires the filtering at the level of approx. 10μm.
- Chiller is not the product the cause of disorder for which can be easily found and immediate action can be taken.
  - It requires design and production that can minimize the cause of disorder
  - It should be designed so to easily separate and disassemble the unit from the main body of machinery when it is out of order, which may reduce the time for maintenance and improve the operation ratio of machinery.
- Depending on its method of construction, residual thermal source used through the chiller unit can be used for the purpose of reducing the heat of hydraulic unit or electric panel.
Automatic Filtering System is the product that conducts high-precision filtering granting high operation ratio and continuity with its characteristic that enables to replace filter or maintenance without stopping the operation of equipment of machinery.

### Effect of Automatic Filtering System

1. Reducing the time for stoppage of machinery or equipment due to the replacement of filter
2. Reduction of maintenance cost
3. Extending the life of fluid
4. Improving the reliability against the function of machinery and equipment
5. Saving the management cost by using the filter in semi-permanent manner
6. Protecting the operator from environmental pollution caused by the operation of machinery and equipment
7. Improving productivity and surface roughness of the processed goods

### Main Application of Automatic Filtering System

Industrial field that requires continuity or resource recycling:
1. Device of filtering cutting oil and lubrication oil in metal processing machinery (milling machine)
   - Especially for automobile industry
2. Purification of consumables in the marine transportation fields such as engine oil, fuel, etc.
3. Purification of washing oils of automobile and parts
4. Manufacture of lubrication agent, oil, glue, adhesive, etc.
5. Purification and manufacturing of mixed material, chocolate, bakery batter, fruit juice pulp, etc. or any other fluids
6. Leports, farming, environmental fields
### Check Sheet to Select Automatic Filter

Followings are to be checked to select proper filtering system.

- Filtering subject material:
- Operation Pressure (Inlet): bar
- Flow-rate: l/min, m/h
- Degree of Required Filtering: µm
- Degree of Filtering Immediately Before: µm, mm
- Use of compressed air: bar
- Power source (Power-Control): V/Hz, V/DC, AC
- Temperature used for filter: °C (Temperature for fluid to be controlled at boiling point or less)
- Filter System Operation: Single Filter, Dual Filter, Automatic Filter, etc.
- Filter element: To be disposed of after its usage, Recycling available, Semi-permanent use
- Bag, Wire(Triangular) mesh, Top mesh, Fleece-Reinforced SUS
- Type of cutting (washing) oil: Coolant Emulsion (>8 mm²/sec), Cutting (>30 mm²/sec), Oil (>100 mm²/sec)
- Whether filter replacement is available during the operation of machinery: Impossible (Line, Continuous Operation), Cycle Application, Stoppage during operation
- Whether cutting (washing) oil is hazardous or not: hazardous, non-hazardous
- Silicone-family anti-foamer is used
- Reproduction of Bacteria, etc.
- Whether supply pump is in need or not: No need, User’s supply, Kemtech’s supply, etc.

### Factors for calculating the flow to pass automatic filter

<table>
<thead>
<tr>
<th>Type of material</th>
<th>steel*</th>
<th>aluminum / magnesium*</th>
<th>grey / nodular-cast iron*</th>
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<tr>
<td>Specific filter surface load</td>
<td>f1</td>
<td>1.0</td>
<td>0.75</td>
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<table>
<thead>
<tr>
<th>Level of separation of chip over the whole process</th>
<th>central filter unit / pre-filter</th>
<th>chip conveyor / slot sieve / magnet</th>
<th>chip conveyor / perforated plate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific filter surface load</td>
<td>f2</td>
<td>&lt;120µm</td>
<td>&lt;2mm</td>
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<td></td>
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<td></td>
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</table>

<table>
<thead>
<tr>
<th>Processing process</th>
<th>Cutting, turning, milling, drilling</th>
<th>grinding*</th>
<th>honing, superfinishing*</th>
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<tbody>
<tr>
<td>Specific filter surface load</td>
<td>f3</td>
<td>1.0</td>
<td>0.6</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Material of filter</th>
</tr>
</thead>
<tbody>
<tr>
<td>wound wire</td>
</tr>
<tr>
<td>triangular, notched &gt; 80µm</td>
</tr>
<tr>
<td>Specific filter surface load</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type of cutting oil, washing oil</th>
<th>coolant emulsion</th>
<th>cutting oil</th>
<th>cooling oil</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific filter surface load</td>
<td>f5</td>
<td>&gt; 8 mm²/sec</td>
<td>&gt; 30 mm²/sec</td>
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</table>

**NOTE:**
1. Floating oil and grease that are let in may badly affect the filtering effect.
2. It requires proper-sized piping and efficient piping to improve filtering effect.
3. Max. passage flow rate by pipes: 400 l/min: 2", 250 l/min: 1 1/2", 100 l/min: 1".
Overview

The particles of contaminants contained in the system influence on the product quality, and even cause damage by wearing the component of the system (bearing, pump, valve, etc.).

Auto Filt RF3/RF4 is self-cleaning system that separates contaminant particles from the fluid. It may greatly increase the reliability of the system and reduce maintenance cost. Slitted tube element in conical shape enables high-efficiency filtering and back flushing. Back flushing takes place from differential pressure that is conducted without any stoppage of filtration process in sequence.

- Principle of Back Flushing : Pressure & Flow Velocity (40m/sec) & Vibration (Pulse)
- Main Field of Application
  1. Washing system
  2. Cutting fluid treatment (coolant)
     - coolant main line
     - Protection of High Pressure Pump
  3. Lubricating / fuel oil system
  4. Water treatment system
For systems with buffer tank
- Backflush with compressed air or clean fluid
- 5μm….200μm

For systems >3-4bar inlet pressure
- Backflush with clean fluid
- 5μm….200μm

Continuous outlet flow
- Backflush with compressed air or clean fluid
- 5μm….200μm

Continuous outlet flow
- Scraper cleaning
- 35μm….200μm

For further details for right selection and use of automatic filter, please refer to the relevant catalog or enquire us to the head office.
The oil separator provided by Profluid can solve all problems caused by tramp oil/tramp solid.

1. Degradation of machine and tool functions and shortening of tool life (clogging of various filters & nozzles)
2. Foul odor and skin disease to workers caused by the formation of various kinds of bacteria
3. Product failure caused by decomposition and rust occurrence
4. The acceleration of industrial waste production increases environmental costs.

The existing method to separate tramp oil by smearing it on the belt or hose has a problem with efficiency and waste oil handling because a large amount of cutting fluid is mixed and separated. Using the fact that specific gravity varies for different liquids to be separated such as water and oil, Profluid’s oil separator uses a principle of the fast speed separation between water and oil through physical dislocation when mixed liquid passes through the filter (media with a large number of pores).

1. The tramp oil along with the cutting fluid is inhaled into the tank using the built-in pump.
2. The cutting fluid inhaled along with the tramp oil passes through the porous filter layer. While the tramp oil passes through the filter that has a large effective specific surface area as line structure without forming inclined surface, particles of the tramp oil are enlarged by speed difference caused by viscous flow and the oil rises to the surface.
3. The floated tramp oil is separated and discharged using specific gravity difference between water and oil.
Water and oil are separated by the principle of physical dislocation and specific gravity difference using the porous filter. It operates by supplying air using the air diaphragm pump without an extra electrical device.

The capability of separating only tramp oil without mixing cutting fluid is superior. Since the oil skimmer that inhales oil is compact, it can be used in a standard cutting fluid tank used by a machine company or an existing machine in use without the need for extra modification.

Using the pump in dual mode, it is constructed to filter tramp sludge as well as tramp oil. The filter is washable and reusable. Also, an alarm function that notifies the cleaning period of the filter by the differential pressure sensor is available.

FLOW DIAGRAM

**Special Features of Oil Separator**

- **Superior Separation Capability**
  - The capability of separating only tramp oil without mixing cutting fluid is superior.

- **Compact Oil Skimmer**
  - Since the oil skimmer that inhales oil is compact, it can be used in a standard cutting fluid tank used by a machine company or an existing machine in use without the need for extra modification.

- **Separation by Physical Dislocation and Specific Gravity Difference**
  - Water and oil are separated by the principle of physical dislocation and specific gravity difference using the porous filter.

- **Structure without Electrical Device**
  - It operates by supplying air using the air diaphragm pump without an extra electrical device.

- **Filtering Function of Tramp Sludge**
  - Using the pump in dual mode, it is constructed to filter tramp sludge as well as tramp oil. The filter is washable and reusable. Also, an alarm function that notifies the cleaning period of the filter by the differential pressure sensor is available.
Oil Separator Component Name

- **Air Pump**
- **Air Regulator**
- **In Line Filter**
- **Vessel Type Filter**
- **Oil Pan & Caster**
- **Tramp Oil Drain**
- **Handle**
- **Filter Exchange Alarm**

**Media**

**Oil Skimmer**

**In Line Filter (Standard)**

**Vessel Filter**

**Picture of Separating at the Oil Separator**

**Tank**
## SPECIFICATION

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<th>PFOS-40C</th>
<th>PFOS-40F</th>
<th>PFOS-40CF</th>
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<td></td>
<td>Oil pan &amp; Caster</td>
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<tr>
<td>Use classification</td>
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<tr>
<td>Fluid state</td>
<td>Tramp Oil</td>
<td>Tramp Oil + Tramp Sludge</td>
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<td>Portability</td>
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<td>Portable type</td>
<td>–</td>
<td>Portable type</td>
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<td>Recommended processing capacity</td>
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<td>Allowed temperature for use</td>
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<td>Pressure</td>
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<td>Inline Filter</td>
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<td></td>
<td>Vessel Filter</td>
<td>100 mesh Bag Filter, SUS</td>
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<td>Floating Skimmer</td>
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<td></td>
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</tr>
<tr>
<td>Size</td>
<td></td>
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<td>Patent application certification</td>
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<td>Fixed area adjustment height</td>
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<td>35kg</td>
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### Vessel Filter Type

![Vessel Filter Type Diagram]

### Inline Filter Type

![Inline Filter Type Diagram]