7.0 VARIATORS
The Series N mechanical variators consist of sizes 003, 005, 010 and 020 with power ranges of 0.18 kW to 1.5 kW are constructed from aluminum. Larger sizes are made from cast iron.

FEATURES
1. Aluminum construction of housing benefits weight reduction for more convenient applications and transportation.
2. The simple design allows both foot or flange mounting to standard unit, reducing stocking levels and allowing quick delivery.
3. The closed input flange is an integral part of the variator casing for easy installation and prevents possibility of oil leaks.
4. IEC B5 motor connections available as standard.
5. The magnetic breather plug maintains clean lubricant and extends maintenance intervals.
6. The oil bath operation provides high efficiency for noiseless, vibration-free running.
7. The unit can operate in both directions, input and output shafts rotate in same direction.
9. Hand wheel can be fitted to both sides of control box for convenient installation.

7.1 OPERATING PRINCIPLE
The mechanical variator is based on an epicyclic transmission for variable ratios. The motor rotates the solar rings (5-6) which rotate the satellites (8). In turn, these are in contact with the fixed outer ring (7) and external mobile ring (9). The satellites rotate around their axes while simultaneously originate the rotation of the satellite carrier (output shaft). When the rolling contact point of the outer rings (7) (9) is near the center of satellites (8) the output speed will reduce: the output shaft will rotate more slowly thus increasing the output torque value.

WARNING
Speed adjustment is only possible when variator is running, never adjust speed while variator is stationary. This will result in damage to the variator.
### 7.2 DESIGNATION

<table>
<thead>
<tr>
<th>Type</th>
<th>Size</th>
<th>Output Shaft Diameter (mm)</th>
<th>Output Flange Diameter (mm)</th>
<th>IEC Motor Adaptor</th>
<th>Mounting Position</th>
<th>Speed Control Box Position</th>
<th>Motor Power</th>
<th>No. of Poles</th>
<th>Motor Version</th>
<th>Voltage</th>
<th>Frequency</th>
<th>Terminal Box Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>NF</td>
<td>030</td>
<td>AU28</td>
<td>F250</td>
<td>100B5</td>
<td>B5</td>
<td>SA</td>
<td>2.2kW</td>
<td>4</td>
<td>B5</td>
<td>230/400</td>
<td>50Hz</td>
<td>MA</td>
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</table>

N
NM 005
NF 010
020
030
050
075
100
See Tables
See Tables
See Tables

The above table depicts details required for the designation of different products.

### 7.3 TECHNICAL DATA

<table>
<thead>
<tr>
<th>Type</th>
<th>( P_1 ) [kW]</th>
<th>Poles</th>
<th>IEC Motor Adaptor</th>
<th>( n_{2 \text{ max}} ) ([\text{min}^{-1}])</th>
<th>( n_{2 \text{ min}} ) ([\text{min}^{-1}])</th>
<th>( T_{2 \text{ min}} ) ([\text{Nm}])</th>
<th>( T_{2 \text{ max}} ) ([\text{Nm}])</th>
</tr>
</thead>
<tbody>
<tr>
<td>N003</td>
<td>0.25</td>
<td>4</td>
<td>63 B5</td>
<td>950</td>
<td>190</td>
<td>1.9</td>
<td>3.8</td>
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<td></td>
<td>0.37</td>
<td>2</td>
<td>63 B5</td>
<td>1900</td>
<td>380</td>
<td>1.5</td>
<td>3</td>
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<tr>
<td>N005</td>
<td>0.37</td>
<td>4</td>
<td>71 B5</td>
<td>1000</td>
<td>167</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>0.75</td>
<td>2</td>
<td>71 B5</td>
<td>2000</td>
<td>333</td>
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<td>6</td>
</tr>
<tr>
<td>N010</td>
<td>0.75</td>
<td>4</td>
<td>80 B5</td>
<td>1000</td>
<td>167</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>1.5</td>
<td>2</td>
<td>80 B5</td>
<td>2000</td>
<td>333</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
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<tr>
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<td>54</td>
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<tr>
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</tbody>
</table>

Symbols:
- \( P_1 \) [kW] Motor Power
- Poles Number of Poles
- \( n_{2 \text{ max}} \) \([\text{min}^{-1}]\) Max output speed of variator
- \( n_{2 \text{ min}} \) \([\text{min}^{-1}]\) Min output speed of variator
- \( T_{2 \text{ min}} \) \([\text{Nm}]\) Min output torque
- \( T_{2 \text{ max}} \) \([\text{Nm}]\) Max output torque
The following diagrams show the performance for output torque in relation to input power and input speed $n_1$ (min$^{-1}$).

**Diagram A** shows the indicative value of efficiency in relation to output speed $n_2$ expressed in min$^{-1}$. **Diagram B** shows the percentage of motor output power utilized.

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**Diagram A**

- Efficiency ranges from 70% to 90%.
- Output speed varies from 150 to 1500 min$^{-1}$.
- Input power levels are indicated for different efficiency levels.

**Diagram B**

- Motor loading percentage ranges from 0% to 100%.
- Output speed varies from 150 to 1500 min$^{-1}$.
- Input power levels are indicated for different motor loading percentage.

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American Metric Corporation
7.4 LUBRICATION
The variators are supplied complete with lubricant type IP DEXRON FLUID II. It is important to have the correct level of lubrication for the final mounting position chosen. Ensure the oil can be seen through the oil level plug to allow the filling up if necessary.

7.5 MOUNTING POSITIONS

7.6 TERMINAL BOX AND SPEED CONTROL BOX POSITION

7.7 DIMENSIONS

<table>
<thead>
<tr>
<th>TYPE</th>
<th>A</th>
<th>B</th>
<th>B1</th>
<th>C1</th>
<th>D</th>
<th>E</th>
<th>F1</th>
<th>G1</th>
<th>H1</th>
<th>H2</th>
<th>I</th>
<th>J</th>
<th>L1</th>
<th>M1</th>
<th>N1</th>
<th>N2</th>
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<th>Q</th>
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<td>264</td>
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<td>177</td>
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</tbody>
</table>

MA, MB, MC, MD
Terminal Box Position

SA, SB, SC, SD
Speed Control Box Position

Weight kg