Energy savings translate directly to the bottom line
MAKRO Philippines reaches energy savings of up to 36% after installing Danfoss ADAP-KOOL® Drives (AKD) into their air conditioning system.

MAKRO, Davao, Philippines

Electrical costs are the biggest expenses on MAKRO Philippines’ financial statement. After the Philippine government has approved an increased electrical power rate MAKRO SUCAT could see the company's profits being eaten up by the energy expenses.

Well acquainted with Danfoss’ reputation for supplying energy saving solutions MAKRO SUCAT contacted Danfoss for advice on how and where they could optimize the store’s HVAC and refrigeration installations.

This resulted in a pilot project, where energy saving ADAP-KOOL® Drives (AKD) were installed in the Air Conditioning system and integrated with the existing ADAP-KOOL® refrigeration system, which now controls 67 evaporators and two AKDs for regulating condenser fan speed.
Application 1: AKD on the condenser fans on both Freezer and Chiller system

A full feature (EKC414A and EKC531D1) ADAP KOOL system was installed in the refrigeration system. AKDs were also installed in the HVAC air handling unit, condenser water pump, chilled water pump, and cooling tower fan motor.

Installing, testing, commissioning and energy measurement
Despite the tight schedule and on-going store operation, the installation, testing, commissioning, and energy measurement of the 11-units of ADAP-KOOL® Drives (AKD) were achieved and submitted in April 2005. We were advised that installation could only be done after store hours due to on-going store operations and should be finished in one week. No major problems encountered during the installation.

Energy (kw/hr) measurement was done for One (1) week without PID control, and the following week with PID control.

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APPLICATION 2: AKD on the HVAC system: AHU motors, chilled & condenser water pumps, cooling tower fans

1. Air Handling Unit (AHU) – composed of three units of AKD 5102 for the three fan motor supplying conditioned air to the whole store
2. Chilled Water Pump (CHWP) – composed of three units of AKD 2881 for three of the 15Kw motor pumps.
3. Condenser Water Pump (CWP) – composed of three units of AKD 2881 for the three of 15Kw motor pumps.
Cooling Tower Fans (CTF) – composed of two units of AKD 2880 for two of the 5.5Kw motor fans.

During the test period the power consumption (KWH) of the centralized Air conditioning system was recorded daily by the AKDs and were compared from March 8 to 14, 2005 without AKD Control) and March 15-21, 2005 (with AKD control).

Achieved energy savings
MAKRO expected 15% reduction but we were able to deliver 36% energy reduction on all of their motors within the HVAC system connected with AKD. Previously they used to assign their Maintenance Engineer to shut-off or turn-on the HVAC system at a specified time schedule to save energy. In addition, for customer is very convenient to monitor the whole system through the AK system.

Overall, Marko is very satisfied with the 36% energy savings on the air conditioning system aside from the 20% energy savings on the refrigeration system.

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<thead>
<tr>
<th></th>
<th>without AKD</th>
<th>with AKD</th>
<th>Reduction</th>
</tr>
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<tbody>
<tr>
<td>Power consumption</td>
<td>15.761,00</td>
<td>10.147,54</td>
<td>36%</td>
</tr>
<tr>
<td>Actual Ave Load</td>
<td>143,43</td>
<td>94,35</td>
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With these developments, MAKRO PHILIPPINES will implement the full featured ADAP-KOOL® system including AKD on the HVAC as standard in all seven branches in the PHILIPPINES.