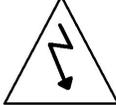


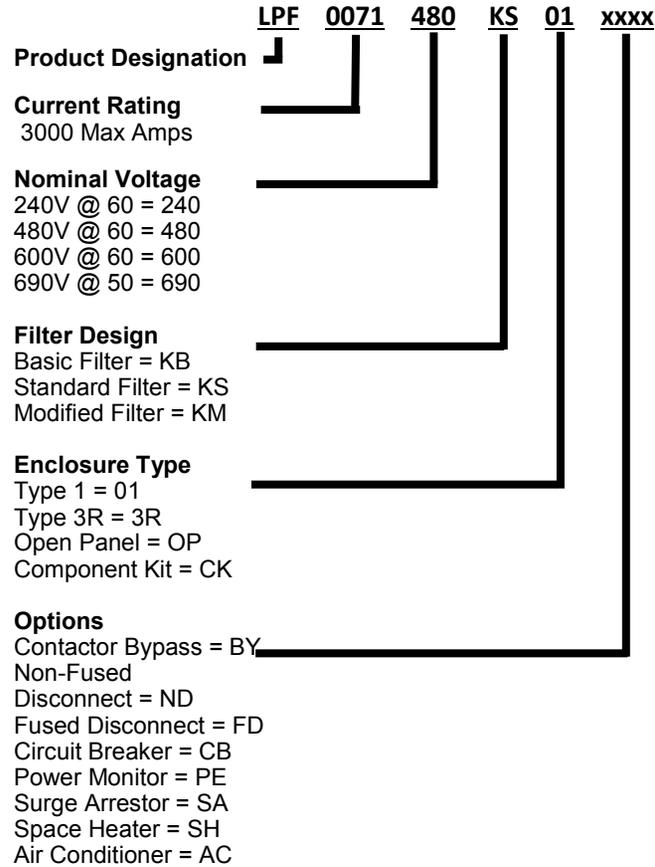
## Warnings & Cautions

<p>WARNING</p> 	<p><b>Dangerous Voltage Warning:</b> Warns of situations where a high voltage can cause serious or fatal injury and/or equipment damage. Provided text suggests ways to avoid danger.</p>
<p>WARNING</p> 	<p><b>Safety Warning:</b> Warns of situations that can cause serious or fatal injury, and/or equipment damage by means other than electrical. Provided text suggests ways to avoid danger.</p>

## General Safety Instructions

<p>WARNING</p> 	<p>Always read and follow Installation Guide instructions. APQ assumes basic knowledge of electricity on the part of the user and is not responsible for improper installation.</p>
<p>WARNING</p> 	<p>Only qualified electricians should carry out the electrical installation and maintenance work on reactors.</p>
<p>WARNING</p> 	<p>All wiring must be in accordance with the National Electrical Code (NEC) and/or all local codes that apply to the installation site.</p>
<p>WARNING</p> 	<p>Disconnect all power prior to working on the filter. Do not attempt to conduct installation or maintenance on powered equipment.</p>
<p>WARNING</p> 	<p>All equipment connected within the circuit must be properly grounded.</p>
<p>WARNING</p> 	<p>Terminals and connected cabling still carry dangerously high voltages when power is applied to the circuit, regardless of motor load.</p>

## Part Number System



## Installation Guide

# LPF Series Solutions

## Types KB & KS



# APQ

Revision Part # LP14 February 14, 2014

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# LPF Low Pass Harmonic Filter Installation Guide

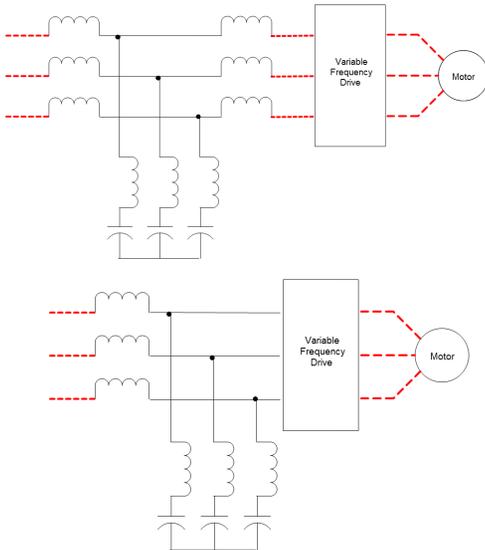
## Product Application

Our standard Low Pass Harmonic Filters (Type KS, KB) offer three stages of filtering that nearly eliminate the harmonics commonly produced by three phase equipment using six pulse rectifiers. Our LPF filter is intended for adjustable speed drives, uninterruptible power supplies, and other rectifier controls, with any source impedance.

## Operation

APQ LPF Series Solution is a three stage engineered product. The first stage is designed to isolate the filter from other harmonic sources on the connected system while preventing system resonance. The second stage provides the precise amount of impedance to minimize harmonics produced by the load and reduces the burden placed upon the third stage. The third stage absorbs the remaining harmonics after the first and second stages have reduced the harmonic content of the load.

## Typical Wiring Diagrams



## Installation Checklist

- Refer to APQ General Installation Manual for further guidance in installing this product.
- Ensure all local and national installation standards are followed.
- Consult local Authority having jurisdiction for specific requirements
- APQ LPF devices are factory inspected and delivered fully assembled, unless otherwise noted.

1. Select and Install the device in a suitable location.
2. LPF products are installed on the supply side of a rectifying device.
3. Remove all power to the rectifier and connect feeder input to LPF input terminals typically marked U, V, W.
4. Connect LPF output terminals, typically marked X, Y, Z, to rectifying device terminals.
5. Properly ground the equipment.
6. Inspect other factory connections and bolts as they may have come loose during shipment.

## Troubleshooting

Symptom	Problem/Solution
Filter Output is not nearly sinusoidal	<p>Filter is not connected properly. Check all wiring and confirm the orientation of the input and output terminals.</p> <p>At light or no load, the LPF may not function effectively.</p> <p>Check the capacitor bank for loose or disconnected terminals or failed capacitors. Check Capacitance between phases to confirm.</p>
Low output Voltage	Check capacitor bank.
Excessive noise	Check the setting of the VFD to ensure that matches with the selected filter.
Signs of Reactor Overheating	Check the setting of the VFD to ensure that it still matches with the selected filter.

## Specification

Voltage: Up To 690V  
 Voltage Drop: 7.5% at Motor Full Load  
 Full Load Current: As Selected  
 Fundamental Frequency: 5 Hz to 60 Hz  
 Switching Frequency: As Selected  
 Service Factor: 1.0  
 Operating Temp: 120° C over ambient 40° C  
 Humidity: 95%  
 Altitude: 1000 Meters  
 Enclosure Rating: As Selected

Depending on the application and options, APQ uses various control or power device components such as fuse bases, distribution blocks, and contactors. For details and specifications of these components and detailed reactor or capacitor specifications, please contact your APQ representative.

## General Maintenance

APQ LPF Series Solutions are considered self contained and require minimal maintenance. Refer to APQ General Installation Manual for further guidance on maintenance activities. Maintenance should be performed by qualified personnel. Failure to properly maintain an LPF Series Solution will void the Manufacturer's Warranty.

- Inspect the area surrounding the device. Make sure that the front of the louvers are free of obstacles that may block airflow.
- Inspect the louvers and ensure that it is clear of debris. Replace filters as needed.
- Inspect terminal connections and retighten as needed. Reactors naturally vibrate and may cause connections to loosen during prolonged operation.
- Inspect capacitor cells. Capacitors are designed with an internal pressure switch to protect the capacitor. Failed capacitors will bulge at the top to indicate failure.
- Inspect the entire unit for signs of overheating.