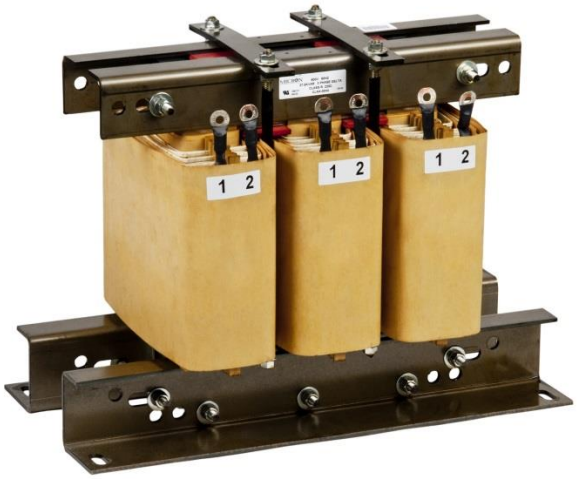
"Made with pride in the USA"

Custom Inductors



Brochure:
Inductor-0315A-English

Supercedes Inductor-1114B-English

Micron Industries Corporation is a manufacturer of control magnetics and custom windings headquartered in Oak Brook IL with manufacturing facilities in Sterling IL. Recently, Micron added specialty inductors and custom wound coils to its growing product portfolio. Micron's initial product, the Imperv**iTRAN**™ brand 600 volt class control transformer, has been the industry standard for the past 25 years. Over the past 20 years Micron has added DIN Rail mount industrial power supplies and converters as well as NEMA 3R transformers.

Oak Brook IL Headquarters

Over a nearly 50 year history as a transformer manufacturer, with nearly 100 years of combined engineering knowhow, Micron has become the control transformer supplier of choice to the majority of the motor control and drive industry. Besides maintaining rapid response inventories on over 250 catalog items, Micron's active SKU file exceeds 4,500 additional part numbers which are available in a maximum of 15 working days.

Sterling IL Manufacturing

Manufacturing Capabilities

Specialty Designs and Coils: Following first-article approval, Micron can provide an average 20 day turn-around on your magnetics needs.

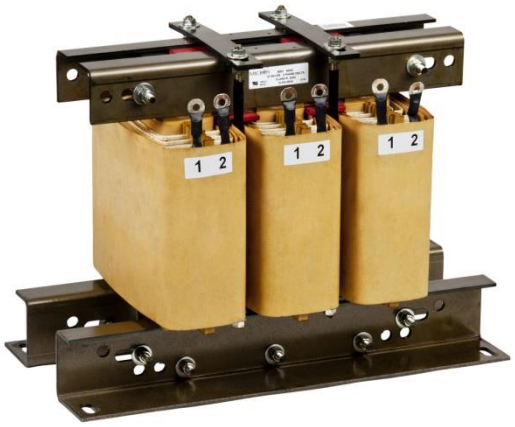
- Custom single and three-phase load bank reactors from 0.25kvar through 150kvar
- Custom three-phase line and load reactors from fractional through 250HP
- Custom three-phase open construction 600 volt class transformers through 150kVA
- Custom Auto Transformers through 500kVA
- Motor starting reactors through 250HP
- Specialty coils both stick and bobbin configurations
- Single-phase 600 volt class chokes built on E-I laminations
- Medium voltage through 10kVA and 14,400 Volts

Need to think outside the box?

Look to the "CLNX Series" to meet the most difficult of low voltage reactor demands!

Whether Kvar, Kva or HP, through 1,000 Volts/200 Amps and from 40 through 600Hz.

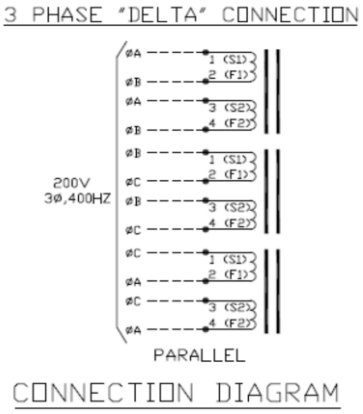
Contact Micron at +1.630.516.1222 or info@micronpower.com to learn more.



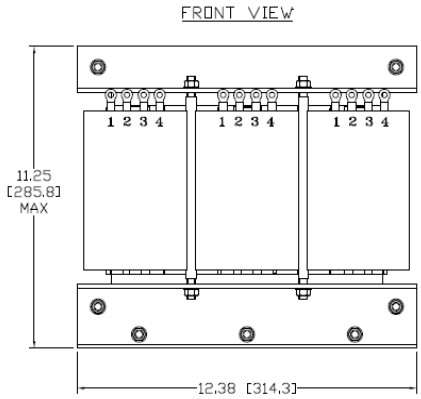
UL Recognized System

UL/CSA Applied for

Connection Example:



Drawing Example:



	Design Limits					
Product	kVA	kvar	HP	Volts	Amps	Frequency
Load Bank Reactor		≤ 150		≤ 1,000	≤ 200	40 - 600
Line/Load Reactor			≤ 250	≤ 1,000	≤ 200	40 - 600
Isolation	≤ 150			≤ 1,000	≤ 200	40 - 600
Auto Transformer	≤ 500			≤ 1,000	≤ 200	40 - 600
Medium Voltage	≤ 10			≤14,400	≤ 85	50 - 60

Do you have a specification that just cannot be met by "catalog" designs? Micron's user-centric design philosophy allows you to determine what works best for you. Either by choosing a product built to match industry standards or by choosing to work with our engineering staff and design to meet your individual OEM needs.

Overview: Do I need a reactor, inductor or a choke? What is the difference? The answer is that they all perform a similar function; their main objective is to reduce the effects of generated harmonics, limit high frequency voltage transients, add reactance to neutralize the effects of capacitive loads or to limit current or voltage.

APPLICATIONS:
Special purpose reactors are built to meet a customer's specific need. Reactors have been built since the early 1920's to limit the current draw when starting a motor they are now most commonly built as line or load reactors typically used in conjunction with variable or adjustable frequency drives, as load bank reactors to add a reactive element to load simulation or to protect capacitor banks.

Line and Load Reactors have been used for many years to solve voltage and harmonics problems in variable speed drive installations. The desired characteristic of a reactor is inductance, "the opposition to a rapid change in current flow". VFDs draw current from the power line in sharp pulses causing harmonic current to flow. The current is drawn in sharp pulses because the input diodes only conduct current at the peak of the voltage waveform in order to keep the capacitors fully charged. The use of line reactors in series with incoming line power helped to solve typical problems on the input (line side) of variable frequency drives (VFD) and SCR controllers.

- Drive nuisance tripping
- Voltage notch reduction (for SCR controllers)
- Increase capacitor life
- Harmonic attenuation
- Improve drive's true power factor
- Low cost substitutes for 1:1 isolation transformers

The introduction of **Harmonic Compensated** Reactors in the late 1980's offered a product that was suitable for use on either the input or output of a variable speed drive. Harmonic compensation meant the reactor was designed to handle the harmonic spectrum and high frequency carrier waves which are typical on the output side of a variable speed drive.
Now that reactors could be used on the output of a VFD, many more application problems could be solved.

- Motor temperature rise
- Motor winding degradation
- Motor noise
- Motor efficiency
- VFD short circuit protection

DC Link Reactors/Chokes and Swinging Chokes are designed to be connected after the input diodes in the VFD power circuit and impede current flow not voltage. Although DC reactors and chokes cannot protect those diodes from transient damage, they can help eliminate nuisance faults due to excessive voltage drops in the drive which can occur if a line reactor is used where the incoming power line regularly dips in voltage. Often a combination of a lower impedance reactor plus a choke provides the best solution to harmonic attenuation with minimal voltage drop.

- Single or two coil construction is typically 1.5X less expensive than three coil reactors.
- Reduction of bus ripple inside a partially loaded VFD
- Will not cause voltage drop at drive thereby reducing nuisance tripping when line voltage is already low.

Load Bank Reactors are used in conjunction with back-up power generators which need to be exercised on a regular basis. Performing this function without or with little load may lead to a phenomenon called "wetstacking" which shortens the life of the diesel engine that runs the generator. Wetstacking is the build-up of unburned fuel in the diesel's exhaust system. This fuel eventually turns into a sludge of tar and carbon deposits on the valves. To counter this, a load bank, which simulates the actual load, is connected to the generator during the exercise period. Load banks historically where designed around resistors. Circuits containing purely resistive loads have a power factor of 1 (unity). Although purely capacitive loads generate a power factor of greater than 1.0; actual circuits containing inductive or capacitive elements, electric motors, solenoid valves, lamp ballasts, and others, in total, often have a power factor below 1.0. Most commercial loads are made up of all three load types, inductive, capacitive and reactive. Many specifications and local codes demand that load testing be performed at less than unity power factor, typically 0.8p.f. lagging. To achieve this, the load bank is designed to include both resistive and reactive elements. This combination provides a true test of the actual rating and simulates a "real world" load. These reactors are typically installed in commercial load banks used to simulate a large overall load such as that of a data center, hospital, school, stadium or municipal building. The load bank is often specifically built to reflect the exact electrical characteristics, resistive, capacitive and reactive of the facility in question. The load bank manufacturer is provided with information pertaining to

- The number of motors and their function
- The type and quantity of lamps
- UPS systems
- The local power quality

Based on this, a load bank is designed to be used in conjunction with the facilities emergency generator. Each time the generator is exercised, the load bank simulates the exact facility load so that there is no danger of interrupting the power to the facility itself. Load banks can also be built as portable units with controls to allow variation of load characteristics.

Micron has over 100 active basic load bank reactor designs. We excel at providing a quality product with precise balanced inductance in all three phases and specialize in taking the basic designs and customizing the impedance, Q-factor, frequency, mounting or connection methodology to meet the customer's specific requirements.

Capacitor Bank Detuning Reactors: It has been stated that the electrical power to industrial networks has become as polluted as our worst air. This is due to the increasing application of non-linear electrical loads such as VFDs, frequency converters and rectifiers with the effect multiplied by the ever growing number of consumers. The outcome is unusually high levels of harmonic distortion, not only resulting in unnecessary losses from transmission lines, but also in non-calculable resonances between network inductances and power factor correction capacitors. Modern thin film capacitors are particularly sensitive to harmonic distortion. This promotes premature aging as caused by:

- The induced resonance between inductances of the network and power capacitors causes excessive capacitor heating.
- Harmonic currents over and above the fundamental load result in voltage drops across the capacitor elements which then may exceed the design voltage of the capacitor.
- Excessive harmonic currents can overload the internal connections between the cables and the capacitor film.

The use of detuned filter circuits has proved to be a reliable and safe way of avoiding premature failure in power factor correction equipment. A detuning reactor is connected in series with each capacitor and forms a rejection filter with a resonance frequency that is far away from the harmonic frequencies present in the network.
The purpose of the rejection filter is to prevent the resonance between the inductive impedance resulting from the line, supply transformer and capacitors installed to compensate the power factor.

Motor Starting Reactors and Autotransformers: Although not as common since the advent of solid state reduced voltage starters and market priced VFDs, starting reactors have variable taps designed to add impedance between line and motor effectively reducing the starting voltage and current to the motor terminals. When properly sized to horsepower, voltage rating and necessary starting torque, a reactor starting system will allow enough current to pass to allow the motor to overcome starting torque and smoothly come up to speed in three to four seconds. The typical current then required would be 2X running current as opposed as much as 7X for across-the-line systems. Similarly, starting autotransformers contain taps which transform line voltage down to a desired starting voltage for the motor, although not as smoothly as a reactor start system. Depending on the application, both methods provide an inexpensive method to reduce voltage drop when starting large industrial motors.

Medium Voltage: From 750VA through 10kVA to meet power, control circuit or metering accuracy applications.

Special Applications for custom inductors abound in the industrial environment. From reducing total harmonic distortion within a drive system to increasing the life of capacitor banks, you can rely on Micron's engineering expertise to design a product that suits **your** exact needs!

THE MICRON PRODUCT CATALOG PORTFOLIO

Control Transformers: The Impervi**TRAN**™ product offering is available from 25VA through 5,000VA in any 600 volt class voltage combination. All designs meet UL, cUL, CSA or EN61558-2-2 and can be built in 105°C, 130°C or 180°C designs.

Power Supplies and Converters: The ***DIN***ergy™ product offering encompasses power supplies from 18 watt single phase through 960 watt three-phase in the most popular industrial output voltages. The majority also operate as converters with 120 VDC input capability.

NEMA 3R Products: Micron can furnish virtually all combinations of 600 volt class single and three-phase catalog designs both as encapsulated and ventilated. Included in this selection are transformers capable of providing voltage adjustments as buck-boost designs.

NOW WITH THE ADDITION OF CUSTOM INDUCTORS TO OUR MANUFACTURING CAPABILITY

LET MICRON PROVIDE YOUR NEXT MAGNETICS NEED

Courtesy of Steven Engineering, Inc. - (800) 258-9200 - sales@steveneng.com - www.stevenengineering.com

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