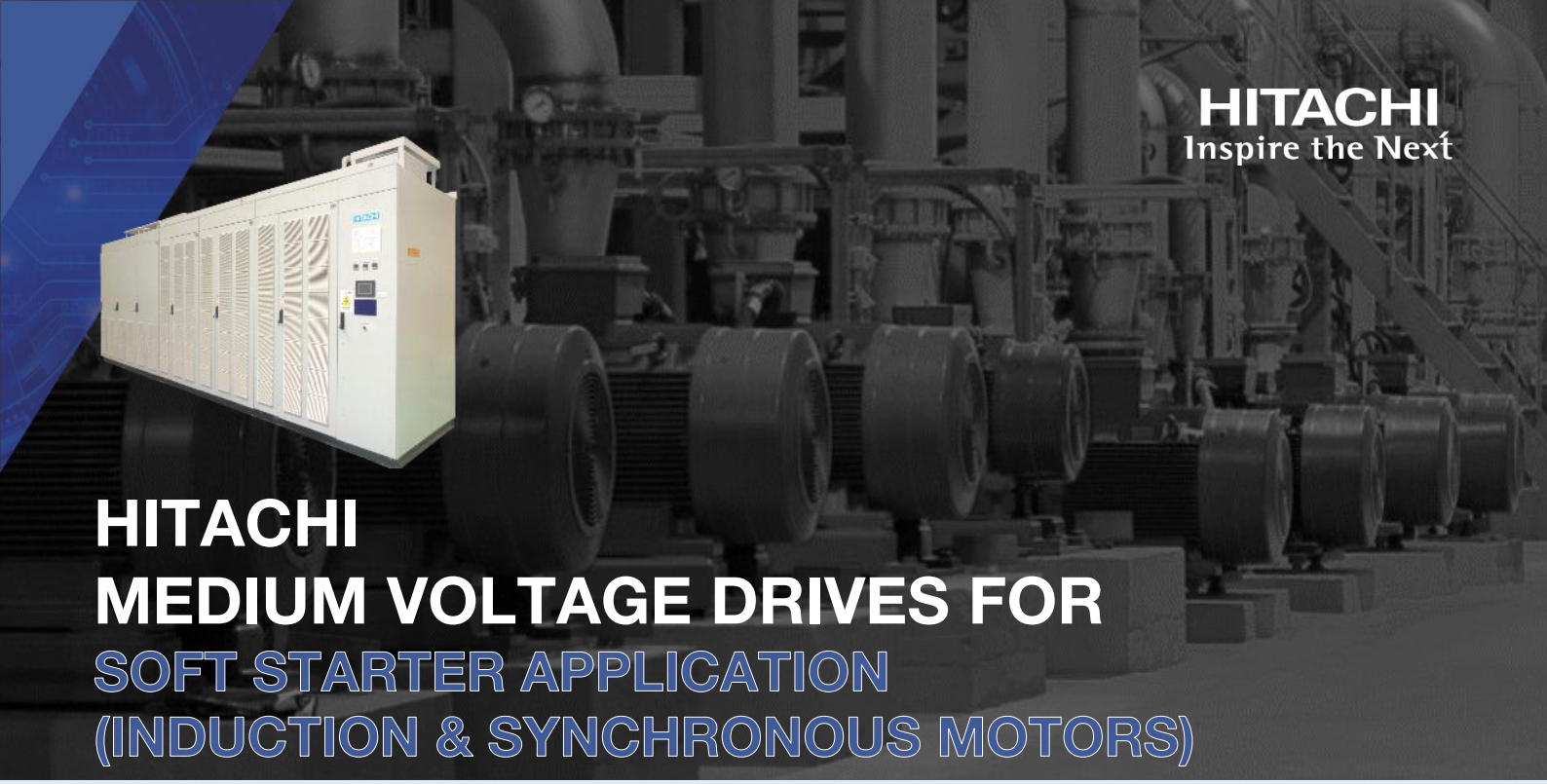

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HITACHI
MEDIUM VOLTAGE DRIVES FOR
SOFT STARTER APPLICATION
(INDUCTION & SYNCHRONOUS MOTORS)

ABOUT HITACHI MEDIUM VOLTAGE VFD SYSTEM

With a vision of “To be recognized as the most trusted Power Electronics Company by supplying superior products and services”, Hitachi Hi-Rel Power Electronics Private Limited has garnered a significant level of trust in Indian power electronics market segment wherein it serves the entire gamut of Industries.

Variable Frequency Drive (VFD) is a type of adjustable speed drive used in electro-mechanical drive systems to control AC motor speed and torque by varying motor input frequency and voltage. VFDs are used in applications ranging from small appliances to the largest of mine mill drives and compressors.

Hitachi Medium Voltage Drives (Variable Frequency Drives – VFDs) represent the most energy efficient means of process control and reflect the best in process control. Hitachi has a proven & rich experience in manufacturing & supplying drives & automation products with complete customized solutions serving various Industries i.e. Power, Steel & Metal, Cement, Oil & Gas, Mining, Sugar, Pulp & Paper, Water & Waste Water, Rubber, Plastic, etc.

ABOUT SOFT STARTER APPLICATION

A soft starter is a solid-state device that protects AC electric motors from damage caused by sudden influxes of power by limiting the large initial inrush of current associated with motor start-up. They provide a gentle ramp up to full speed and are used only at start-up (and stop, if equipped).

Soft Starters for motors are commonly used in industrial applications that have a high inertia load that requires a large inrush of current.

Soft Starters enable the AC induction motor to speed up in smaller, resulting in less current drawn than with a traditional motor starter. Due to decreased voltage, torque is also reduced resulting in a soft, or easy start. Soft Starters are used on all types of AC and DC motors.

Soft Starters are a combination of a controller and overload protection.
CONTROLLERS - turns electric current to the motor on and off. A contactor is a controller that is controlled by an electromagnet.

OVERLOAD PROTECTION - protects a motor from drawing too much current and "burning out" from overheating. The overload relay is the motor overload protection used in soft starters. It limits the time the overload current is drawn and protects the motor from overheating.

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CHALLENGE/ISSUES (What are the issues the customer used to face?)

The most important problems that appear during the use of the Soft Starter for induction or synchronous motors is very high starting torque and current peak in higher rating of motors. Due to higher starting current, all the relevant equipment like incomer transformer, power cables and input breakers to be selected on higher rating which can increase overall cost.

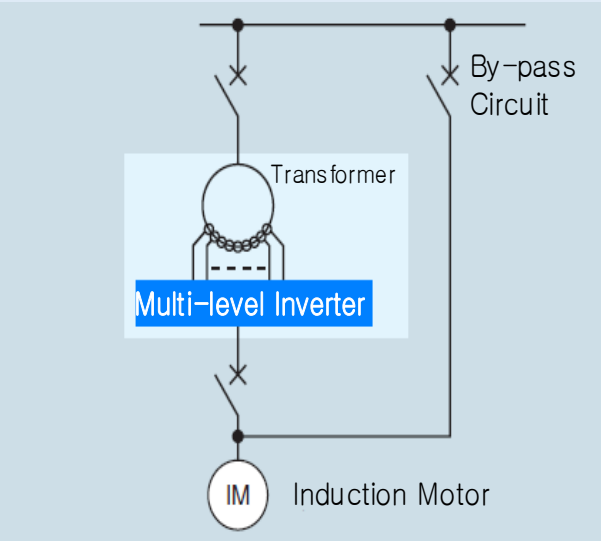
Motor life is reduced after several operations due to heavy inrush current and jerk. Due to heavy jerk, Interface devices like gear box, coupling life also get reduced and need frequent maintenance.

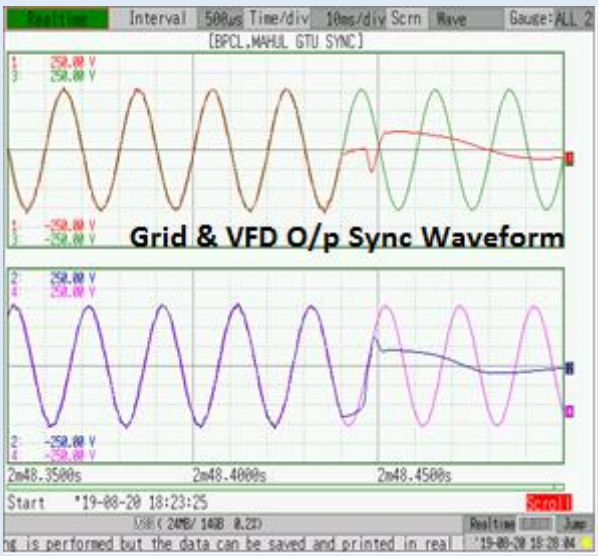
NEED FOR THE SOLUTION (What is the need for utilizing Hitachi Product?)

- To control starting torque and current peak
- For smoother start and operation of Motor
- To reduce jerk during start up
- To avoid voltage dip in input supply during motor start up
- To maintain speed accuracy throughout and during load changes
- To reduce the overall cost of incomer transformer, power cables and input breakers
- To enhance the life of motors
- To reduce unstable and unreliable operation
- To reduce losses of energy consumption
- To stop frequent maintenance of motors
- To stop production downtime

HITACHI SOLUTION (How it helps in solving the Challenges/Issues?)

To overcome the issues faced in DOL operation, VFDs are widely used as soft starters. Below are the advantages of using a VFD.





Hitachi Medium Voltage Variable Frequency Drive offers;

- **Bump-Less Transfer to Grid** - Soft starter can accelerate motor from 0-100% speed and at 100% speed, it automatically synchronises phase angle, frequency and amplitude of output voltage with grid voltage and transfer to grid supply. There is not any kind of electrical as well mechanical jerk on the system and not any kind of process disturbance can observe.

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- **Suitable for Synchronous Motors -** Hitachi MVD as a soft starter can be used in induction as well as large rating synchronous motors. Normal Soft starter is not suitable for synchronous motor because we could not synch rotor and stator speed at required speed easily. But Hitachi VFD can control used for synchronous motors also. Same model can used for brushless as well brush type synchronous motors.
- **AVR/Exciter Controller -** For Synchronous motors, exciter/AVR i is controlled by VFD only.
- **Lower Investment -** Lower capital equipment, spare parts and maintenance cost.
- **System Reliability** - Reduced downtime because DOL operation need frequent maintenance while VFDs and motors require very little maintenance. This enables more production, lower maintenance expense, and improved productivity.
- **Smooth & Accurate Process Control -** Smooth start up allowing the most optimum plant flow balance to be obtained.
- **Cost Reduction** - Lower energy costs because of reduced size selection of transformer, cable and breakers.
- **Smooth Start -** As electric motor is controlled by VFD, motor will start accelerate slowly and reached to 100% speed and smoothly transfer to grid.

BENEFITS OF USING HITACHI MV DRIVE IN SOFT STARTER APPLICATION

- **For Smooth Start -** As electric motor is controlled by VFD, motor will start accelerate slowly and reached to 100% speed and smoothly transfer to grid.
- **Reduce Capex Cost -** Using soft starter, all the relevant equipment like incomer transformer, power cable and breaker capacity is reduced compared to DOL start and overall costing will have reduced a lot.
- **Reduced Component Degradation -** Since the motor will be accelerate smoothly by soft starter, starting electrical as well mechanical jerk will be very less. Hence all the mechanical devices like gear box, coupling, motor shaft etc life will be increased.
- **Less Maintenance -** Since there is very less mechanical wear and tear, maintenance is also not frequently required.

HITACHI MEDIUM VOLTAGE DRIVES FOR SOFT STARTER APPLICATION

HIVECTOL-HVI-E Series Medium Voltage Multi-Level Drives

Range: Up to 14,700 kVA (3.3 kV to 11 kV)

- Patented Design - Increases Reliability
  - Pre-Charging (Reduces charging inrush current of the transformer to less than its rated current)
  - Cyclic Switching of the Cells (Achieves equal utilization of each cell at any operating speed)
- State-of-the-Art Technology
- Tailored to your Specific Application Requirements
- Long Term Technical Services and Spares Support
- Suitable for Indian Ambient Condition
- Input Harmonics Meets IEEE - 519 - 1992
- Output Waveform - Motor Friendly
- Best for High Starting Torque
- High Efficiency (Typical 97% efficiency including input Dry type transformer)
- Auto Restart
- User Friendly
- Easy to Maintain

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ABOUT HITACHI HI-REL POWER ELECTRONICS PRIVATE LIMITED

Founded & established in 1983 as Hi-Rel Electronics Pvt. Ltd., which later on in year 2015 had become the 100% subsidiary company of Hitachi, Japan which is one of the Global fortune 500 companies with a new name as Hitachi Hi-Rel Power Electronics Private Limited, which is being recognized as one of the pioneers in power electronics domain. Hitachi Hi-Rel, today, is a leading manufacturer of Industrial UPS, IT & Infra UPS, Medium & Low Voltage Variable Frequency Drives, Grid Tied Solar Inverters, Air Compressors and Railway Inverters.

Hitachi Hi-Rel has state-of-the art manufacturing facility at Sanand near Ahmedabad in Gujarat-India. Hitachi Hi-Rel is helping a wide array of industries and organizations to meet the mission critical demands through technologically superior, low polluting and innovative products Solutions and continue to offer world class power electronics products, value added services & customized solutions.

With a vision of “To be recognized as the most trusted Power Electronics Company by supplying superior products and services”, Hitachi Hi-Rel has garnered a significant level of trust in Indian power electronics market segment wherein it serves the entire gamut of Industries, particularly in mission critical applications for Refineries, Petro-Chemicals, Power Generation, Steel & Metals, and Process Industries as well as Critical Data Processing Applications. Besides offering greater energy efficiency & lower carbon footprint, each of the company product streams bears the hallmark of excellence with company accreditations. Hitachi Hi-Rel is an ISO 9001:2015, ISO 14001:2015 & ISO 45001:2008 certified company having export house status. Hitachi Hi-Rel sales network & service infrastructure expands out to the world & with this network, we have made strong inroad in Global markets like South East Asia, Middle East, Africa and Brazil. Also, with a presence of strategically located skilled service engineers in India helps us to score high in terms of customer expectations on service deliverables & uptime of the product.

With expertise, experience and an efficient product line, Hitachi Hi-Rel will always try to be your power electronics partner. When you choose to do business with Hitachi Hi-Rel, you are partnering with a company who cares.

FOR MORE INFORMATION

To know more about Hitachi Hi-Rel Power Electronics Private Limited and its offered products and solutions, please visit www.hitachi-hirel.com

You may also share your requirements at https://www.hitachi-hirel.com/inquiry to receive the phone call or Hitachi product information email from our authorized sales representative of your region.