From the Desk of Managing Director

Developing Understanding

A shop owner placed a sign above his door that said: “Puppies For Sale”

Signs like this always have a way of attracting young children, and to no surprise, a boy saw the sign, approached the owner and asked about the price.

Upon receiving the answer, the little boy pulled out some change from his pocket and asked the shop owner “Can I please look at them?”

The shop owner smiled and whistled. Out of the kennel tiny puppies came out.

One puppy was lagging considerably behind. Immediately the little boy singled out the lagging, limping puppy and said, “What’s wrong with that little puppy?”

The shop owner explained that the veterinarian had examined the little puppy and had discovered it didn’t have a hip socket. It would always limp. It would always be lame.

The little boy became excited. “That is the puppy that I want to buy.”

The shop owner said, “No, you don’t buy that little dog. If you really want him, I’ll just give him to you.”

The little boy got quite upset. He looked straight into the store owner’s eyes, pointing his finger, and said; “I don’t want you to give him to me. That little puppy is worth every bit as much as all the other puppies and I’ll pay full price.”

The shop owner countered, “You really don’t need to buy this little puppy. He is never going to be able to run and jump and play with you like the other puppies.”

To his surprise, the little boy reached down and rolled up his pant to reveal a badly twisted, crippled left leg supported by a big metal brace. He looked up at the shop owner and softly replied, “Well, I don’t run so well myself, and the little puppy will need someone who understands!”

Piyush Patel (M.D.)
TRAINING CALENDAR

<table>
<thead>
<tr>
<th>YEAR</th>
<th>MONTH</th>
<th>DATE</th>
<th>DAYS</th>
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<tr>
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<td>25-26</td>
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<td>23-24</td>
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<td>AUGUST</td>
<td>20-21</td>
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<td>SEPTEMBER</td>
<td>24-25</td>
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<td>22-23</td>
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<td>21-22</td>
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<td>18-19</td>
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<tr>
<td>2022</td>
<td>MARCH</td>
<td>25-26</td>
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Product training module:

- About Amtech
- VFD and AC Motor fundamentals
- Physical familiarity of VFD and Soft Starter
- Understanding the specifications, different models, selecting the proper rating and options provided for VFD and Soft Starter

Installation and Commissioning of VFD and Soft Starter
- Understanding of different applications of VFD and Soft Starter
- Trouble shooting of VFD and Soft Starter
- Drive support software Axpert-Communicator™ for PC

Product Portfolio:

- AXPERT-EAZY® SERIES VFD
  - 0.75...2100 kW (1...2815 HP)
  - 380...480 V, 500...600 V & 601...690 V

- AXPERT-VT240S SERIES VFD
  - 0.37...37 kW (0.5...50 HP)
  - 200...240 V & 380...480 V

- AXPERT-OPTI TORQUE SERIES SOFT STARTER
  - 15...1065 A, 3.7...1000 kW (5...1340 HP)
  - 200...690 V

- AXPERT-HIVERT SERIES MVD
  - 200...12500 kW (270...16750 HP)
  - 3.3 kV, 4.16 kV, 6.6 kV & 11 kV

- ENGINEERED SYSTEMS
  - Customized as per requirements

- AXPERT- iSine Series Active Harmonic Filter
  - 400...600 V
  - 60...300 A, >300 A connect in parallel

- AXPERT- iSine Series Active Front-end Converter
  - 400...690 V
  - 45...2100 kVA

- AXPERT- iSine Series STATCON
  - 400...600 V, up to 12000 kVA

- AXPERT-OPTI POWER SERIES POWER CONTROLLER
  - 20...1200 A, 7...1400 kW
  - 200...690 V
Out of the two configurations of harmonic filters viz. Passive Harmonic Filter and Active Harmonic Filter, performance of Passive Harmonic Filters is limited by changes in input supply frequency and variations in load characteristics. Also one module of PHF can take care of only one harmonic frequency. It performs well under stable load and line conditions and is comparatively less costly.

Active Harmonic Filters are capable of providing mitigation of harmonics throughout the operating frequency spectrum, are more effective, efficient, accurate and much more superior to Passive Harmonic Filter with a single AHF module taking care of all harmonic frequencies. The only limitation is that they are comparatively costlier as compared with Passive Harmonic Filter counterparts.

Passive Harmonic Filters are less costlier but they suffer from a serious disadvantage of being bulky and have poor frequency response. A Passive Harmonic Filter can not provide uniform response to all harmonic frequency signals and also there are chances of malfunctioning due to resonance.

Active Harmonic Filters can provide compensation for harmonics over a wide range of frequencies and can adapt to any type of load. Their conditioning capacity is limited. The devices used being static sensitive, AHF requires accurate protections.

In order to optimize the advantages and reduce limitations of both the configurations, a third type of harmonic filter namely Hybrid Harmonic Filter is put to use. Hybrid Harmonic Filter is that combination of both Active & Passive Harmonic Filters which combine the performance advantages of both active and passive harmonic filters and are not only cost effective as compared with Active Harmonic Filters but possess better frequency characteristics than Passive Harmonic Filters.

Hybrid harmonic filter provides solutions in situations where the passive harmonic filters can be used reliably for static loads of an electrical installation and a smaller active filter can be used to mitigate harmonics generated by the other variable loads. This solution can be both cost and application effective.

In a situation, where PHF is already being used but is not fit enough to take care of extra harmonics, a small AHF can be used along with already existing PHF to take care of entire harmonic spectrum. Alternately where AHF is already being used and requirement of filtering extra additional harmonics arises, a small PHF can be used instead of changing the entire rating of AHF to take care of the entire harmonic spectrum. A right mix of PHF & AHF provides much better filtering as compared with stand alone PHF or AHF.

The Hybrid Harmonic Filters can be used as cost effective solution in applications where non linear loads are used, distortion is to be reduced to acceptable level, PF correction is required and Operation Over a wide range of harmonic frequencies is desired.

Please contact Amtech Electronics India Ltd. for your requirements of Harmonic Filters.
**APPLICATION CASE STUDY**

**TITLE: ENERGY SAVING IN ID FAN**

**DOC. NO. CS-300**

**Industry** : Sugar
**Application** : ID Fan
**Motor rating** : AC Induction Motor, 3-Phase
  - **kW** : 90
  - **Volt** : 415
  - **RPM** : 1472
  - **Hz** : 50
  - **Amp** : 151

**Previous system** : Motor was running on Star Delta Starter.
**Problem observed** :
1) High maintenance cost.
2) Energy losses due to flow control by damper.

**Present system** : Axpert-Eazy, 90 kW Variable Frequency Drive used.

<table>
<thead>
<tr>
<th>Previous system (Without drive)</th>
<th>Present system (With drive)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>kW (Consumption)</strong></td>
<td><strong>Damper Position</strong></td>
</tr>
<tr>
<td>79 kW</td>
<td>90 % Open</td>
</tr>
<tr>
<td>67 kW</td>
<td>100 % Open</td>
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</tbody>
</table>

**System block diagram**:

- 3-PHASE, 415V, AC SUPPLY
- AXPERT-EAZY 90 kW
- INDUCTION MOTOR 90 kW, 151 A, 3-PHASE
- ID FAN

**Merits of new system** :
1. Easy & smooth operation.
2. Energy saving due to flow control by Variable Frequency Drive.

**Economical analysis** :
- Energy consumption without VFD - P1 = 79 kW
- Energy consumption with VFD - P2 = 67 kW
- Energy saving per day ((P1 - P2) x 24) = 288 Units
- Saving per day @ Rs. 8/- Unit = Rs. 2,304/-
- Saving per crushing season (Approx. 150 Days) = Rs. 3,45,600

Payback Period Approximately One Crushing Season
**External Tracking:**
The DECS allows for excitation redundancy by providing external tracking and transfer provisions between DECS controllers.

The secondary DECS can be configured to track the primary DECS setpoint. Proper redundant excitation system design allows for removal of the failed system.

**External Tracking and Transfer Between DECS-150:**
For critical applications, a second DECS can provide backup excitation control. The DECS allows for excitation system redundancy by providing external tracking and transfer provisions between DECS units. The secondary DECS operating modes can be programmed to track the primary DECS operating mode. Proper, redundant excitation system design allows for removal of the failed system. Periodic testing of the backup system must be performed to ensure that it is operational and can be put into service without warning.

**Communication Setting for External tracking:**
CAN2 communication port used to communicate with a second DECS-150 for external tracking.

Fallowing are the three terminal in DECS-150

Terminals are,

1. High
2. Low
3. GND

A second DECS-150 connects to these above terminals for the purpose of set point tracking.

**Auto Tracking Screen:**

**Advantage:**
- Hot redundant system – If master DECS failed during live condition with load than backup controller will take all the load (all the parameter) itself automatically.
- Prevent tripping from Excitation system side
- Trouble free running
- Less risk of both AVR failure i.e. Master and backup AVR failure.
- Cost reduction because of two controller feed in single enclosure.
In sugar plant Cane receiving and unloading, is the initial step of producing raw sugar from sugar cane where fork type grabbing cranes are used for unloading sugar cane from open trolley. The operation requires flexibility of movement of raw materials and speed of operation.

The entire process of unloading sugar cane involves three axis motion namely Long Travel, Cross Travel and Pick & Drop through Hoist. The hoist has a mechanical arm to drop down to the cane carrier and is operated by hydraulics through remote station. The conventional mechanism of unloading the sugar cane uses either Raw Mains Supply or DOL Starter. This system has serious drawbacks.

Three different motors, one each for Long Travel, Short Travel & Hoist are used for the three movements. The most challenging and difficult motion is hoist operation where the motor operates around 600 times per hour, that is one operation takes 6 seconds for completion. Due to this heavy duty operation, motor burns frequently and contacts of the contactor gets damaged.

Each time, the motor driving the hoist operates, it draws high in rush starting current of the order of 7 to 8 times the nominal operating current. The frequent On/Off operation puts lot of burden on the driving motor and the motor does not get adequate time for cooling. This generates excessive heat within the winding of the motor and often motor gets damaged due to insufficient time available for cooling. Also heavy inrush current during each on/off operation results in arc generation in the contactor and the contacts get welded and the mechanical brakes fail frequently.

Replacement of such damaged motor/contactor/brake is a herculean task and consumes at least 5 to 6 hours. In a season motor invariably fails 4 to 5 times. Also the failure of vital parts result in interruption of not only the unloading process but also of subsequent processes of sugar production. Frequent break down/maintenance results in huge expenditure and puts undue stress on maintenance/production people.

Feeding sugar canes at a very fast rate in open environment with heavy vibrations pause big challenge and calls for highly efficient and robust equipment.

Amtech has a vast experience in vertical transportation applications like passenger lift/crane/hoist where precise position control is required and offers a solution specifically engineered for cane unloader application using High Performance Next Generation Industrial Grade Axpert-Eazy+ VFD System.

The system takes care of Forward and Reverse motion (LT & CT) and Up/Down motion for Hoist in a very smooth and precise manner. While picking the cane from the truck and dropping in to the cane carrier, small amount of energy regeneration takes place for which dynamic braking resistors are provided to dissipate this regenerative energy.

**Features:**

- Smooth start/stop of motor
- Advance current limit function ensures starting current less than rated current
- Crane control function for precise and smooth operation
- Close-loop brake control for low wear and tear of mechanical brake
- Electronic braking system to handle regenerative energy
- Robust design suitable for 50 °C ambient temperature.
- State-of-the-art conformal coating on all printed wiring boards complying to 3C3 environment
- Factory built solution meeting global safety and quality standards
- Low loss, High efficiency Industrial Grade product
- Full motor protection including single phasing
- Optional DOL bypass to run the equipment in emergency
- Proven solutions performing globally since 2005
- Remote control of all movements.

**Benefits:**

<table>
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<tr>
<th>Energy Saving</th>
<th>Use of VFD ensures energy saving can be up to 15%</th>
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<tbody>
<tr>
<td>Pay Back Period</td>
<td>Within 2 Crushing seasons, money spent can be recovered.</td>
</tr>
<tr>
<td>Low Maintenance</td>
<td>Very negligible wear &amp; tear of mechanical brake hence maintenance cost is less</td>
</tr>
<tr>
<td>Smooth Operation</td>
<td>VFD starts &amp; stops smoothly, hence no mechanical jerks</td>
</tr>
<tr>
<td>Cost Saving</td>
<td>Almost zero motor failure results in saving of rewinding / replacement cost.</td>
</tr>
<tr>
<td>Up Time</td>
<td>99%</td>
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</table>
TO WHOM SO EVER IT MAY CONCERN

Date 29.04.2021

M/s Amtech Electronics (I) Ltd. has supplied the following variable frequency drives to Bajaj Hindusthan Sugar Ltd., Barkhera, Pilibhit, U.P.

1. VFD for ID fan drive of Boiler (AXPERT EAZY+ AMT -0660A-4) 1 No. in 2018
2. VFD for drive of Injection Pump (AXPERT EAZY+ AMT -0660A-4) 1 No. in 2019
3. VFD for drive of F D Fan of Boiler (AXPERT EAZY+ AMT -0115A-4) 1 No. in 2019

All above Variable Frequency Drives are working well till date. Performance is satisfactory and energy savings are achieved as per our expectation.

Amtech Electronics (I) Ltd., has given good support during installation of all above VFD’s.

For Bajaj Hindusthan Sugar Ltd., Barkhera

SUKHWANT SINGH
GENERAL MANAGER (ENGINEERING)