YASKAWA introduces Low Harmonics Regenerative Matrix Converter U1000 drive with inbuilt regenerative unit. It is successfully installed in Sugar centrifuge at Baramati Agro Pvt Ltd, Maharashtra, India.

**Application Overview:** What is Centrifuge machine?

The basic function of the Centrifugal machines is to separate the crystals in the massecuite from the surrounding molasses or syrup by centrifugal force. The Raw sugar is then sent to dryers or refining unit according to the type of desired product and packing section. In Sugar Industry, Centrifuge has very important role in the Complete Sugar manufacturing process. Sugar Centrifuge machine operates in three different modes in one cycle of operation lasting three minutes.

✓ **Charging:** In this cycle, massecuite is poured into the basket which is running at nominal charging speed. Other processes are also carried out during this period like Screen wash, Syrup separator, etc.
Spinning: - In this cycle, basket is accelerated to reach set spinning speed and run for approx. 30-45 secs depending upon process requirements. Actual sugar formation takes place during this period.

Discharging: - In this cycle, motor decelerates quickly to zero speed for discharging the sugar and cleaning operations. During this deceleration phase significant regeneration is observed.

Challenges:-
- The existing centrifuge at Baramati Agro had old DC Motor & Drive based System.
- There were frequent failures of existing DC drive and maintenance of DC motor was very costly with time consuming.
- Moreover any breakdown during peak crushing season led to tremendous loss of production.
- There was an urgent need to overhaul the existing electrical system to reduce maintenance costs and eliminate downtime.

Solution:-
During the Centrifuge process, the motor can be required to go through several rapid speed changes and overhauling condition, thereby creating huge amount of regenerative energy. YASKAWA U1000 matrix drive can be operated in both motoring as well as regenerative mode without any additional accessories.
Unlike conventional drives, the U1000 creates a variable output by switching directly from the input power, which improves efficiency and reduces power loss. Regenerative energy is put back onto the grid without introducing high levels of low frequency current which reduces transformer heating and allow it to operate more efficiently with an even higher overall load.

Benefits:
- Harmonic Current Distortion Rate 5% or less (IEEE 519) & True Power Factor of 0.98 or higher
- Low Maintenance as compared to legacy systems & Easy installation process reduces commissioning time.
- Reduce energy demand with power regeneration without any additional hardware with simple 3 wire power input to drive and 3 wire power output to Motor.
- Higher efficiency and reliability due to minimal component Loss.
- Compact size reducing the panel foot print and installation place.