

Introduction to Variable Speed Drives and Soft Starters

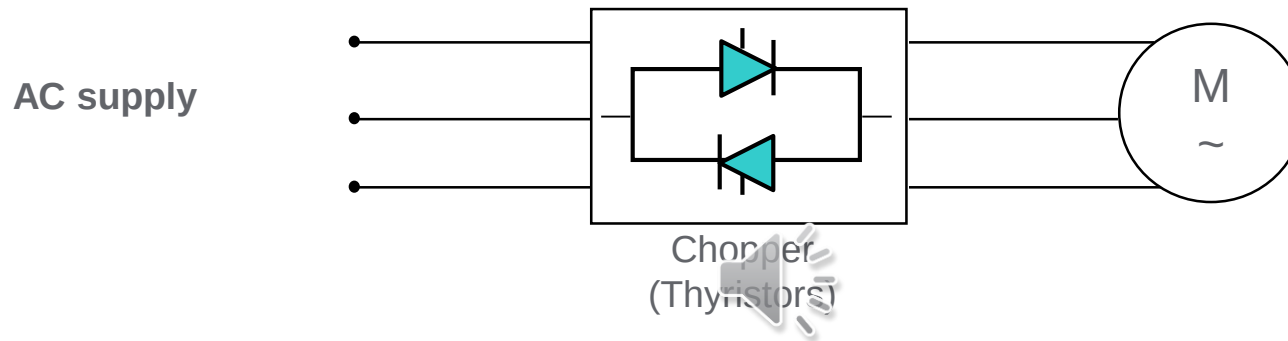
Main advantages

- Controlled starting and stopping
- Speed variation
- Speed or torque regulation
- Embedded application functions
- Communication
- Safety

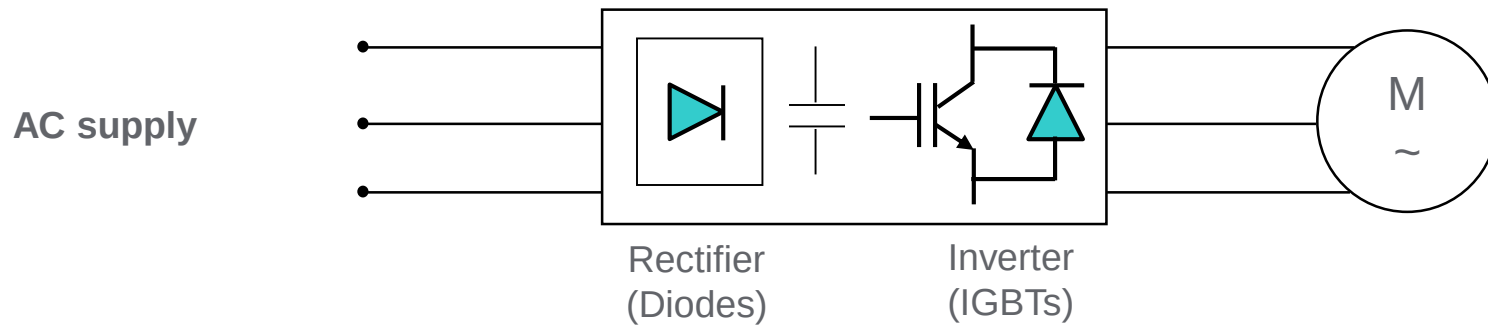


Technologies

Starter



Speed drive



Controlled start and stop

Application:

Glass bottles conveyor

Solution:

Smooth start and stop with a Soft Starter



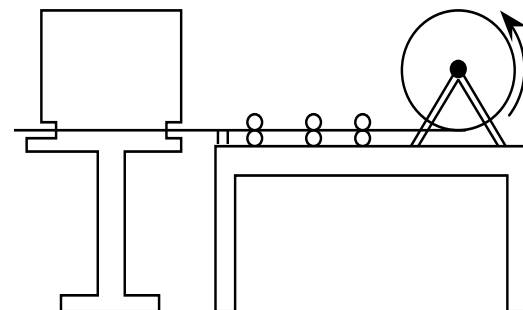
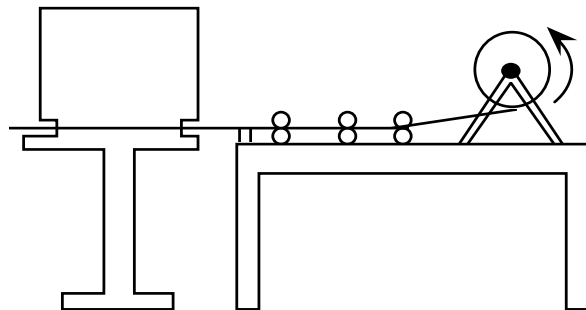
Speed control

Application:

Paper manufacturing

Solution:

Regulate the paper speed using a
Variable Speed Drive



Reduced Investment Costs

- Application: Heavy handling or manufacturing machine with extremely high inrush current at starting causing substantial scattering.
- Solution: Soft starter or Variable Speed drive.

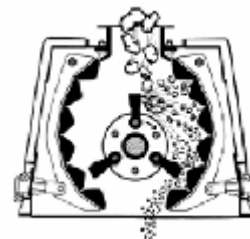
Mine conveyor



Harbor crane

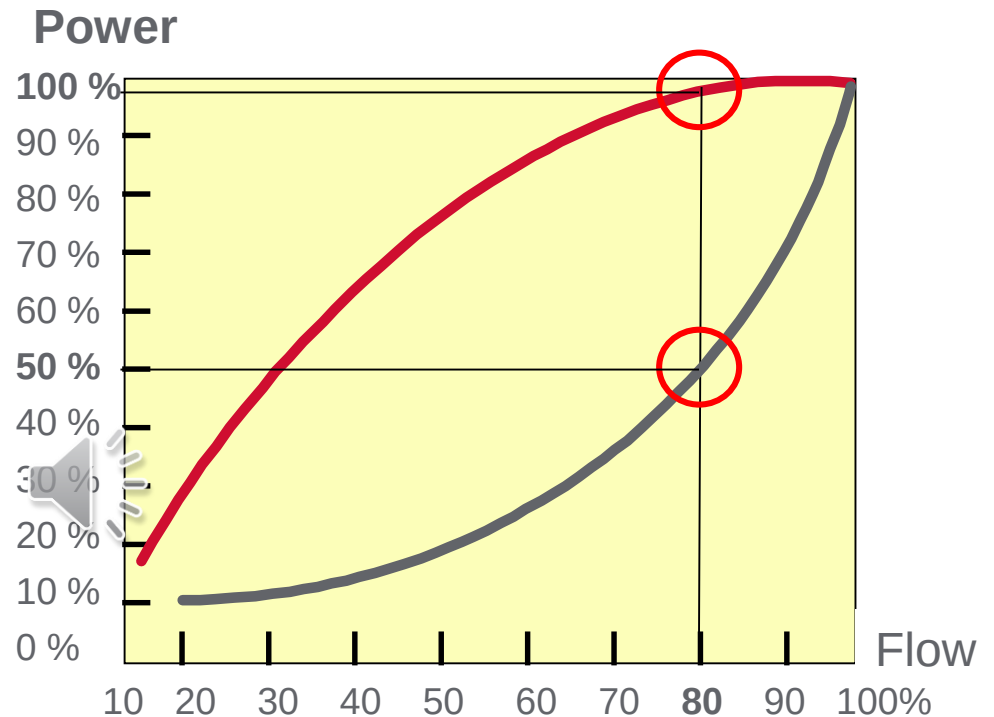


Crushers



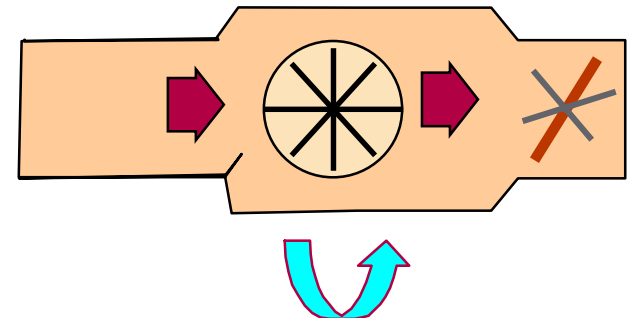
Reduced Operating Costs

- Application: Ventilation
- Solution: flow regulation with Variable Speed Drive.



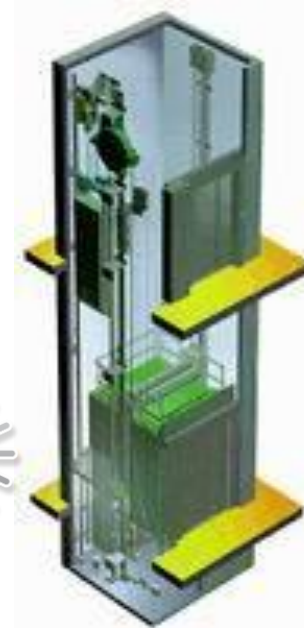
■ Output air valves

■ Variable speed drive



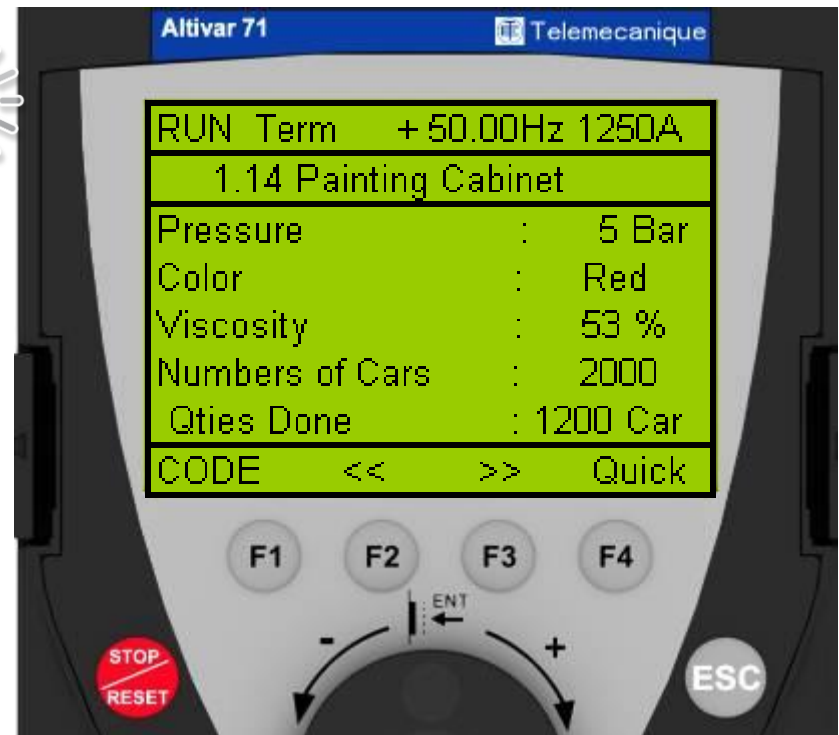
Comfort - Accuracy

- Application: Lift requiring certain degree of comfort.
- Solution: Variable Speed Drive the most suitable solution to control speed and positioning



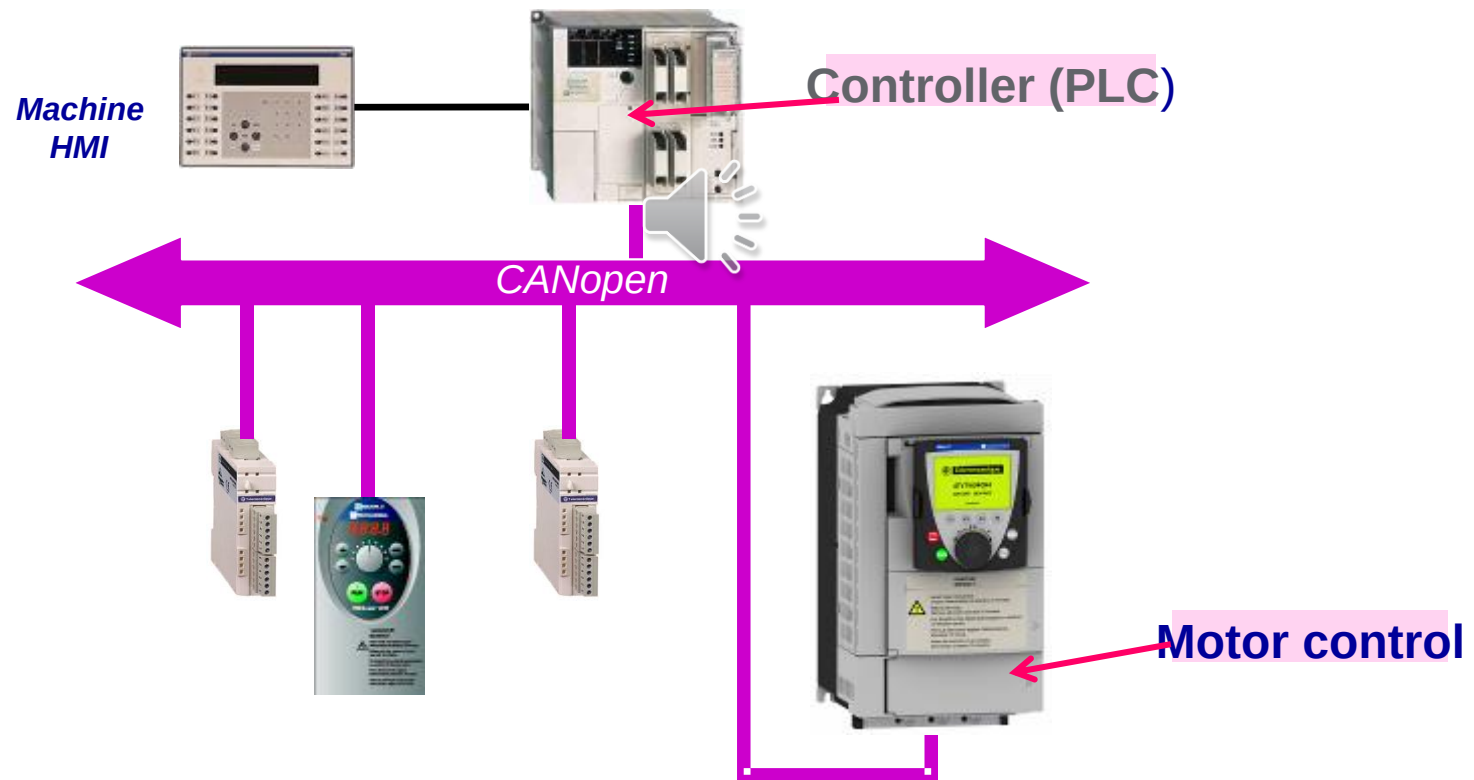
User interface

- Application: Machine with speed variation necessitating local start/stop, adjustment and monitoring
- Solution: Variable Speed Drive with evolved user interface



Communication

- VSD and Soft Starters are also communicating devices



Variable Speed Drive Structure

Main objective of VSD

- A wide range of speed
- Good torque performances
- Constant acceleration
- Motor deceleration controlled

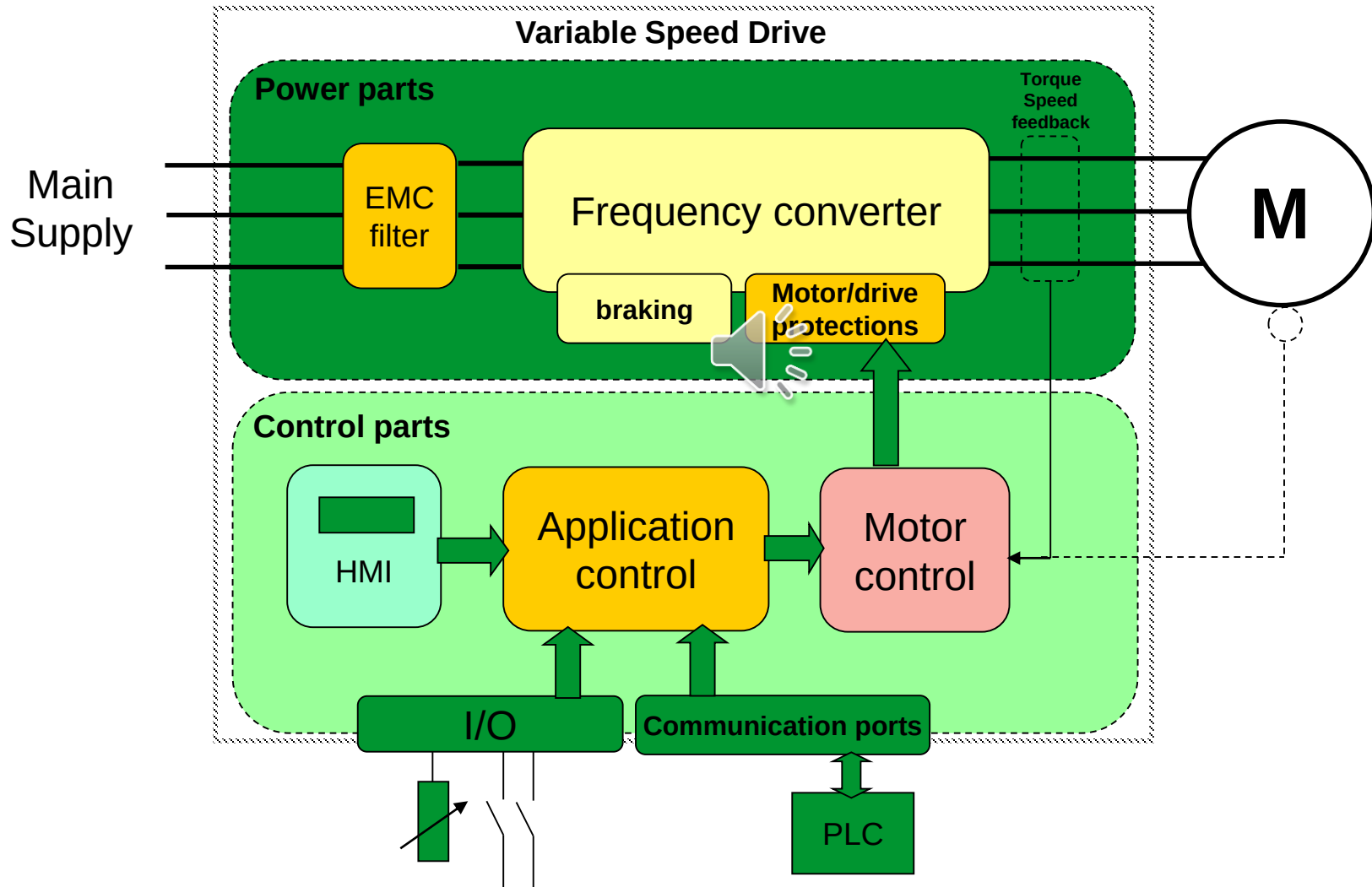


Basic principle

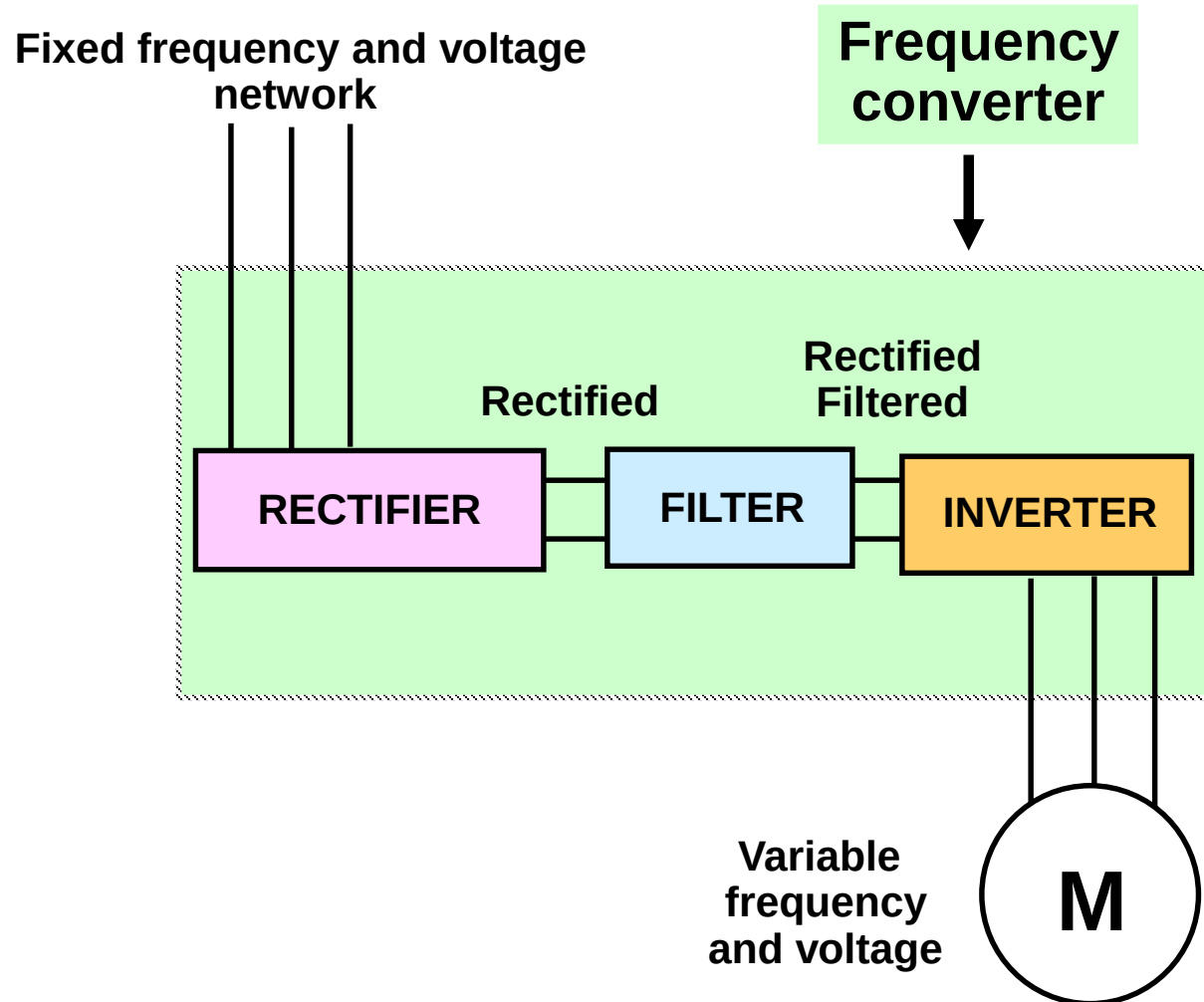
- ✓ VSD should generate from the network a tunable voltage and frequency.
- ✓ Direct conversion AC-AC is difficult
- ✓ Use AC- DC- AC converter is easier
- ✓ Speed drive = frequency converter for AC motors.



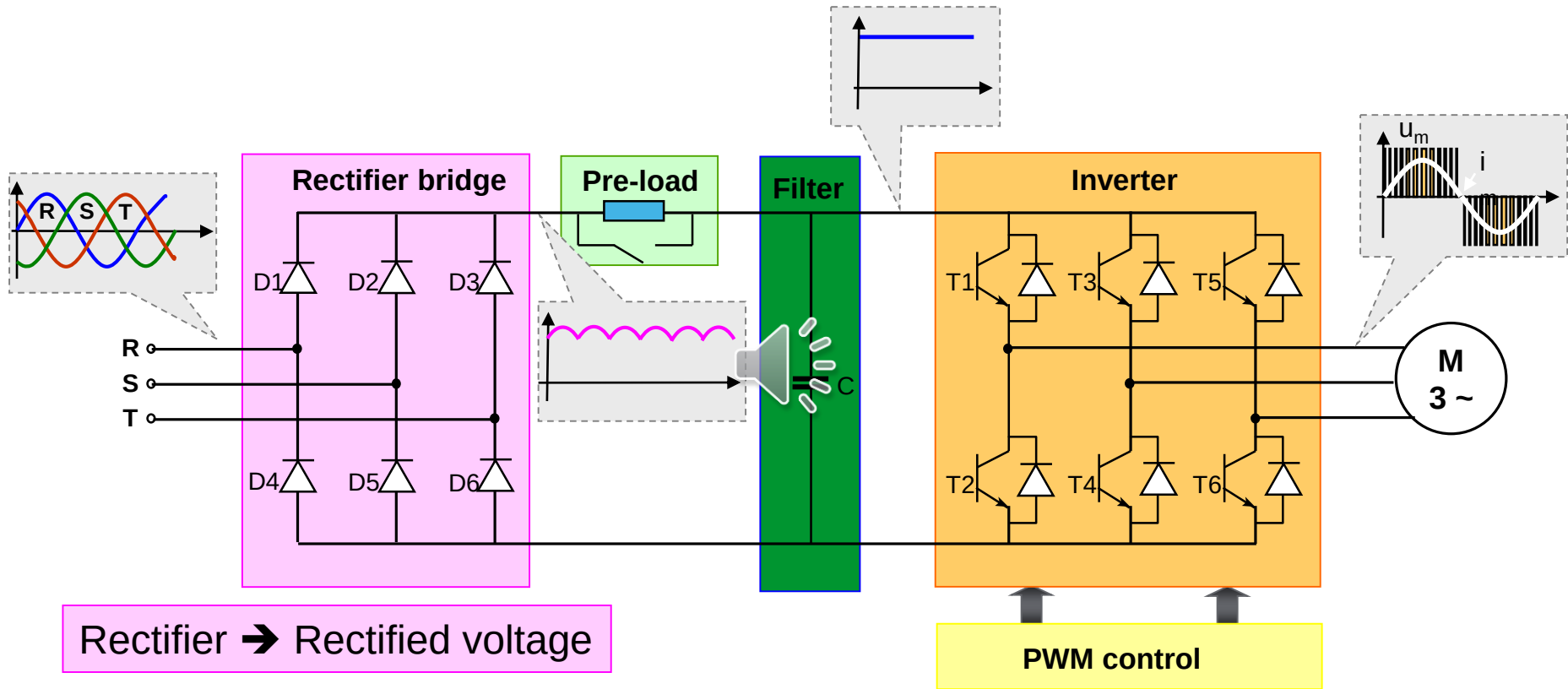
Speed drive structure



Power part structure



Speed drive structure



Rectifier → Rectified voltage

Filter → Smooth voltage

Inverter → Production of AC 3-phase supply varied in frequency and voltage

Speed Drive Assessment

- Advantages:

- Makes the AC motors very performing
- Energy saving
- Reduction of motor starting current peaks
- Allows downsize of the power supply
- Takes care of the mechanical parts
- Increases life of the motor
- Compensation for certain network faults



- Drawback:

- The frequency converter is generator of interference and harmonics



Questions & Answers