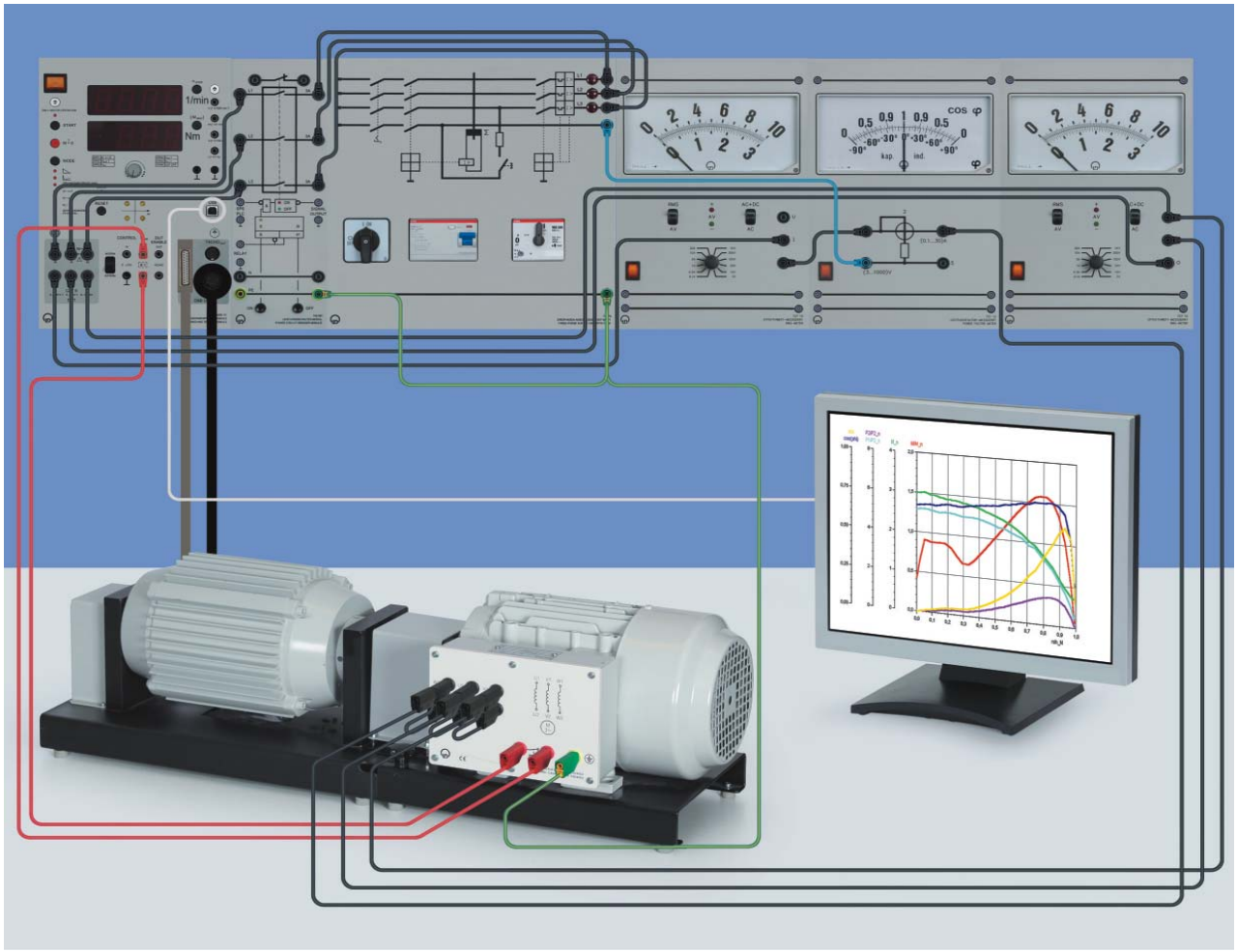
T 10.4.1 Asynchronous Motors

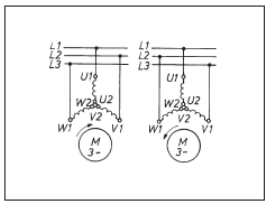


Topics

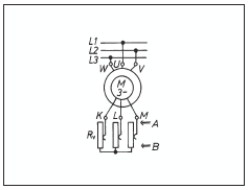
- Design and function
- operating response
- start-up
  - slip-ring rotor
  - deep-bar squirrel-cage motor
  - star/delta switch-on
  - switch-on via starting transformers
  - short-circuit smooth-starting circuit (KUSA)
- braking:
  - braking by reversal
  - DC braking
  - counter-torque lowering circuits
- power balance of the ideal rotating field machines
- power flux
- locus curve (Heyland circle)
- no-load experiment
- short-circuit experiment
- speed-variable asynchronous motors:
  - pole reversing circuit
  - Dahlander circuit
  - speed setting by means of slip
  - regulation
  - slip-ring rotor

T 10.4.1 Asynchronous Motors

The asynchronous machine is the machine of the future! Especially the low-maintenancesquirrel-cage motor with frequency-converter feed continues to make inroads into the application areas of DC and AC machines. With this degree of manipulation the asynchronous machine can be used in all power classes from small washing machine motors up to roller drives. They are characterised by their linear rotation speed/torque responses in the proximity of their nominal operating point as well as its excellent flexibility through constructive measures.



LD DIDACTIC offers the standard slip-ring and squirrel-cage motor models and also special types such as Dahlander motors or motors with separate windings in the 0.3 kW and 1.0 kW power classes. Experiments involving switch-on and start-up as well as runup of these machine are didactically prepared and covered in the experiment literature. The manual or computer-assisted recording of theoperating characteristics and current locus curves are also dealt with. In conjunction with a drive machine (AC pendulum machine 0.3 kW or 1.0 kW) the characteristics can be recorded in the 1st and 3rd operating quadrants for motor operation.



The asynchronous machine with frequencyconverter feed and its operating response is dealt with in greater depth in the topic area “Three-phase Drives” (T 12.4).

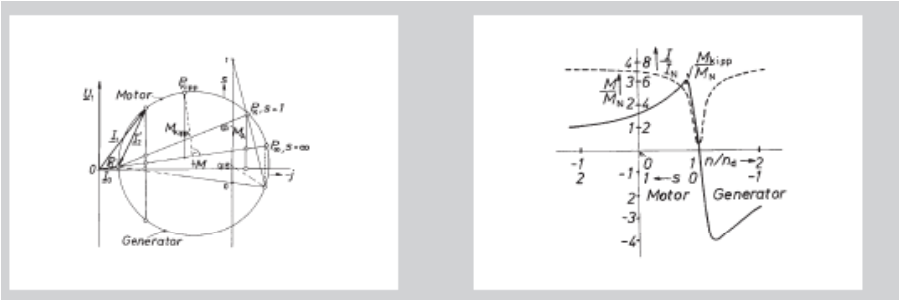


Diagram of the stator current

Torque and current characteristic of an asynchronous machine as a function of the speed