

HM 365

Universal drive and brake unit



Learning objectives/experiments

- asynchronous motor as a drive or brake unit in connection with one of the accessories
 - ▶ torque measurement
 - ▶ speed measurement

Description

- **base module of the GUNT-FEM-Line**
- **asynchronous motor with frequency converter and precise adjustment of the drive and brake torque**
- **connection of HM 365 and the driving or driven machine with a V-belt drive**
- **setting up a complete test stand with various accessories**

HM 365 is the base module of the GUNT-FEMLine, on which students can carry out experiments on fluid machinery. This equipment series covers five training courses on water and oil pumps, turbines, and systems engineering and engine technologies.

The complete experimental setup includes the base module HM 365, the fluid energy machine to be investigated and, where needed, a supply unit or a

test stand. The fluid energy machine under investigation is connected to the HM 365 base module via a belt drive. Fasteners connect the HM 365 and the trainer to the accessories.

The main function of HM 365 is to provide the drive or brake power necessary to study the selected driving or driven machine. This power is generated by an air-cooled asynchronous motor with a frequency converter. The asynchronous motor operates as a generator or a motor, as required. As a generator, it acts as a brake on the fluid energy machine, in this case motors or turbines, and diverts the energy. As a motor, it powers the fluid energy machine under investigation, e.g. pumps or compressors.

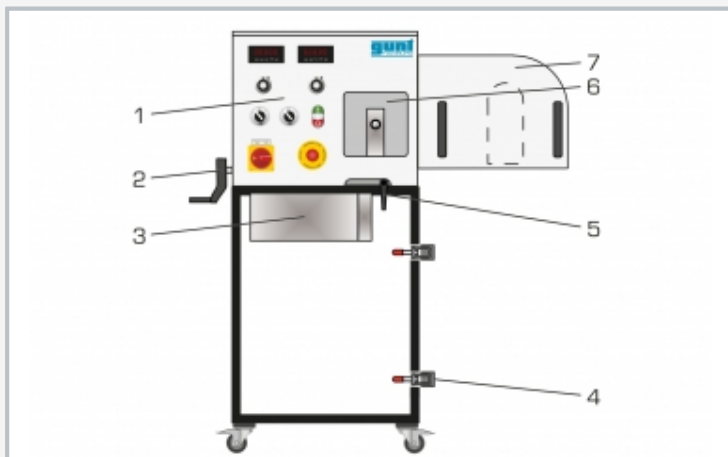
The energy that is created during the braking process in generator mode is converted into heat at a load resistor. The drive and/or brake torque can be

adjusted precisely. It is measured with a force sensor. For this purpose, the asynchronous motor is suspended as a pendulum. The motor can be moved to tension the V-belt.

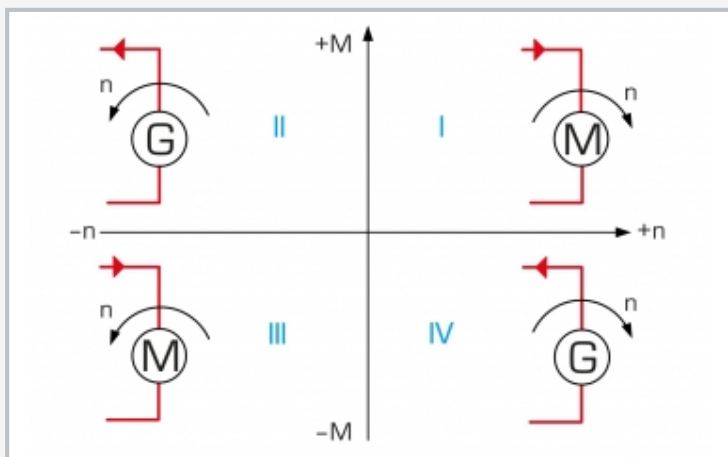
HM 365 is fitted with digital displays for speed and torque. Data between the base module and the accessories are exchanged through a data cable. The measured values can be transmitted simultaneously via USB directly to a PC. Each of the individual accessories is delivered with specific evaluation software.

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1 display and control elements, 2 spindle tensioning device for V-belt, 3 load resistor, 4 fastener, 5 clamping lever for tensioning device, 6 transparent maintenance flap, 7 protective hood for V-belt



Representation of 4-quadrant operation in speed/torque diagram: I motor operation, clockwise rotation (drive), II generator operation, anticlockwise rotation (brake), III motor operation, anticlockwise rotation (drive), IV generator operation, clockwise rotation (brake); red line: energy flow, M torque, n speed



Example of a complete experimental setup: HM 365.45 axial-flow pump, connected to HM 365 universal drive and brake unit

Specification

- [1] drive and brake unit used for studying different driving or driven machines
- [2] asynchronous motor with frequency converter allows 4-quadrant operation: generator or motor mode
- [3] asynchronous motor with pendulum suspension, torque measurement via lever arm and force sensor
- [4] optical sensor for recording the speed
- [5] data exchange between base module and accessories through data cable
- [6] measured values for speed and torque are digitally displayed on the device

Technical data

Asynchronous motor with frequency converter

- power: 2200W
- max. speed: approx. 3000min⁻¹
- max. torque: approx. 12Nm

V-belt operation

- length of V-belt: 1157mm, 1180mm, 1250mm
- type of V-belt: SPA
- diameter of V-belt pulley: 125mm

Resistive load: 72Ω, 2400W

Measuring ranges

- torque: ±15Nm
- speed: 0...5000min⁻¹

400V, 50Hz, 3 phases

400V, 60Hz, 3 phases

230V, 60Hz, 3 phases

UL/CSA optional

LxWxH: 1000x800x1250mm

Weight: approx. 125kg

Scope of delivery

- 1 base module
- 1 set of accessories
- 1 manual

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Optional accessories

Water pump training

070.36545	HM 365.45	Axial-flow pump
070.36510	HM 365.10	Supply unit for water pumps
070.36511	HM 365.11	Centrifugal pump, standard design
070.36512	HM 365.12	Centrifugal pump, self-priming
070.36513	HM 365.13	Centrifugal pump, multistage
070.36514	HM 365.14	Centrifugal pumps, series and parallel connected
070.36515	HM 365.15	Side channel pump
070.36516	HM 365.16	Lobe pump
070.36517	HM 365.17	Reciprocating piston pump
070.36518	HM 365.18	Gear pump
070.36519	HM 365.19	Vane pump

Oil pump training

070.36520	HM 365.20	Oil pump supply unit
070.36521	HM 365.21	Screw pump
070.36522	HM 365.22	External gear pump
070.36523	HM 365.23	Vane pump
070.36524	HM 365.24	Internal gear pump

Turbine training

070.36532	HM 365.32	Turbine supply unit
070.36531	HM 365.31	Pelton and Francis turbine

Internal combustion engine training

063.15900	CT 159	Modular test stand for single-cylinder engines, 2,2kW
063.15000	CT 150	Four-stroke petrol engine for CT 159
063.15100	CT 151	Four-stroke diesel engine for CT 159
063.15200	CT 152	Four-stroke petrol engine with variable compression for CT 159
063.15300	CT 153	Two-stroke petrol engine for CT 159

Systems engineering training

061.16500	ET 165	Refrigeration system with open compressor
061.51300	ET 513	Single-stage piston compressor
061.81300	ET 813	Two-cylinder steam engine