

TLM transmodul

Gerhard Schubert GmbH

Product data sheet

1. FUNCTIONS

- The transmodul (TM) performs transport tasks. Examples: Products, workpieces, packaging.
- The TM can be used for both pneumatic and further electrical functions.

2. PROPERTIES

a. Operating mode

- The TM runs rail-based and autonomous on a single axis.
- The TM doesn't feature moving cables. Energy and data transfer is contactless. This allows the TM to distinguish itself in use thanks to its low wear and minimum maintenance requirements.
- The drive dynamic is independent of the payload and uses adaptive control electronics in the drive.
- The TM moves without jolting.
- The failure of one TM does not affect the availability of the other TMs on the section (redundancy).
- Possible movement types:
 - *Cycled*
 - *Continuous*
 - *Chain movement: Path control, motion with spacing*
- Because the processes are decoupled, various movement tasks can be combined, e.g. cycled operation / synchronization with another system or robot / accumulation mode: Wait for further process.

b. Energy efficiency

- The TM has a kinetic energy recovery system with integrated return feed of the braking energy. When braking, the braking energy is fed back into the buffer belt. The next acceleration process is subsequently started from the buffer memory.
- Only friction loss and the supply output of the electronics have to be fed in.

3. USE

a. General applications

- Up to 32 of the freely programmable TMs can move on each rail section autonomously.
- There is a turning unit at each end of the rail section.
- The TM carriages automatically return to the other end on the lower track.
- Processing steps for the workpiece/product can be carried out simultaneously on each track, whereby the number and movement of the TMs can vary for each processing step. Packaging machine example: Filling four boxes, erecting two, and closing one.
- The TM carriage can carry individual, interchangeable format attachments. Fixing and indexing bolts secure the respective attachment.
- Add-on elements such as a low or high vacuum pump can be docked via an interface on the basic body of the TM.

b. Specific applications in the packaging industry

- The TM transports the boxes and cartons to be filled.
- Cartons can be erected from flat blanks on the TM.
- Products and boxes can be marked while passing through.

c. Programming

- Programming the transmodul has been reduced to just a few parameters. Only raw data concerning the section length and the size of the size plates has to be entered.
- The program sequence can be defined using stopping and acceleration data.
- The TM calculates all other movements and functions automatically, including spacing checks, accumulation mode, and wait positions before the turning stations. The software calculates the movement profile after ensuring the plausibility of all the information.

4. MINIMUM AND MAXIMUM LIMITS

- Drive output: 1 kW
- Maximum acceleration $5\text{m}/2^{\text{s}}$
- Maximum speed: 4.5 m/s
- Maximum load: 40 kg
- Positioning accuracy: +/- 0.1 mm

5. TECHNICAL LAYOUT

- The TM carriage contains its own control electronics on the basis of the VMS UNI 5 generation from Gerhard Schubert GmbH. This software is a component of the TM hardware. The process can only be programmed and parametrized using the VMS software for the TM.
- The electronics are located in a dedicated electronics box, which is float-mounted in the housing and thus protected from jolts and vibrations.
- Energy is transferred at 20 kHz and 70 A utilizing the induction principle.
- Radio data is transferred via industrial WLAN in the 2.4 GHz range using a leaky cable in the section and two redundant antennas on the vehicle.
- The torque motor is controlled using a servo controller. Adaptive motor control allows the TM to react automatically to any load variation.
- The TM carriage is driven by a pinion-toothed rack system.
- The TM carriage has the following dimensions: Length 600 mm, Width 200 mm, Height 120 mm.
- The housing is milled from an aluminium block.

6. PATENTS, LICENSES, AND TESTS

- The TM is patented with the number 10 2007 059 611.
- The IFA conducted safety testing on it in accordance with DIN 13849 SIL 3 / PL d.
- Its protection against the penetration of foreign bodies and moisture was checked pursuant to IP 65.
- The electromagnetic compatibility (EMC) was tested.
- It holds radio licenses for Europe, the USA, and Australia.



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