



## Mounting and Maintenance Instructions

# Linear Motor System FTH Drive

### FTH25 und FTH35

For further information please consult us.

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Annexe to the declaration for the incorporation of an incomplete machine

The requirements of the annexe I of the 2006/42/EC which have been met. The numbers refer to the sections of annexe I:

- 1.1.2 Principles of safety integration
- 1.1.3 Materials and products
- 1.1.5 Design of machinery to facilitate its handling
- 1.3.1 Risk of loss of stability
- 1.5.1 Electricity supply
- 1.5.10 Radiation
- 1.7.2 Warning of residual risks
- 1.7.4.2 Contents of the instructions (in parts)



## 7 Decleraton for the fitting of a partly completed machine

As defined in the Directive 2006/42/EC Annexe II part 1 B

Manufacturer name and address:

Franke GmbH, Obere Bahnstraße 64, D-73431 Aalen, Germany

We hereby declare that the incomplete machine

### Linear motor module, type FTH25A/B and FTH35A/B

meets the essential requirements of the following directive as far as possible with regard to the scope of delivery. (for details about the requirements complied with, see below)

- Machinery Directive 2006/42/EC
- EMC Directive 2004/108/EC

Applied harmonised standards, the references of which have been published in the Official Journal of the European Union:

EN ISO 12100-1, -2 04/2004 Safety of machinery - Basic concepts, general principles for design (applied in parts)

We also declare that the particular technical documents for this incomplete machine have been established acc. to annexe VII part B and we undertake to make them available to the market surveillance authorities via our documentation department upon request.

The commissioning of the incomplete machine must not be effected until the machinery into which this machine component will be incorporated has been declared to be in conformity with the provisions of the EC Machinery Directive and an EC declaration of conformity acc. to annexe II 1 A is available.

The person who signs this declaration is the authorised person concerning the compilation of the technical documents.

This declaration of incorporation was issued in/on/by:

Aalen, 15-07-2010

by procuration

Jörg Egelhaaf (Technical Director)



## 1 Structure and function

The linear motor module FTH Drive is a drive system for industrial machines. It is particularly suitable for exact positioning tasks, e.g. in handling systems.

The linear motor module consists of:

- **Guide component.** The guide component serves as a mechanical guide and as a “stator“ of the linear motor and it includes strong permanent magnets.
- **Carriage.** The carriage serves as a “rotor“ of the linear motor and it runs on track rollers alongside the guide component.
- **Travel measuring system.** The incremental travel measuring system identifies the current position.

The following devices are available as an equipment extension:

- Absolute value travel measuring system
- Limit switch: 2 final position limit switches/1 reference switch (PNP-Ö, PNP-S)
- Control system for triggering the linear motor
- Corrosion resistant raceways and track rollers
- Stop brake, especially for the fitting in vertical position
- Bellow cover
- Cable drag chain made of plastic or metal

### 1.1 Technical Data

Type	FTH25A	FTH25B	FTH35A	FTH35B
Max. speed [m/s]	9	4,5	6	6
Max. acceleration [m/s <sup>2</sup> ]	100	100	100	100
Max. traverse speed [mm]	3625	3530	3536	3361
Weight rail [kg/m]	6	6	17	17
Weight slider [kg]	3	5	9	16
Power continous [N]	61	115	280	560
Power peak [N]	162	323	650	1300
Positioning accuracy [mm/m]	0,02	0,02	0,02	0,02
Run accuracy [mm/m]	0,04	0,04	0,04	0,04
Repeat accuracy (resolution) [mm]	0,02	0,02	0,02	0,02
Input voltage U <sub>dc</sub> [V DC]	310	310	560	560
Continuous current I <sub>nc</sub> [A]	2,1	2,1	2,8	5,7
Peak current I <sub>peak</sub> [A]	6,0	6,0	8,0	16,0
Coil resistance R <sub>U-V</sub> [Ω]	3,8	7,6	7,4	3,7
Coil inductance L <sub>U-V</sub> [mH]	20,4	40,7	55	27



### 2 Safety

#### 2.1 Intended Use

The linear motor module FTH only must be used as a direct drive system for linear positioning of machine components for commercial applications. It must be used in the industrial domain only. The linear motor module FTH is an "incomplete machine" in the sense of the EC machinery directive

2006/42/EC. Commissioning must not be effected until the machinery into which this machine component will be incorporated has been declared to be in conformity with the legal provisions with regard to the safety of persons (particularly conformity with the EC conformity with the machinery directive 2006/42/EC).

#### 2.2 Inadmissible use

In case of use in vertical position, no endangerment must arise for persons who are working below the linear motor system (even at fault clearance or at maintenance work). If such dangers arise, a stop brake must be fitted for the use in vertical position (available as an accessory).

Alternatively, the user can take another action in order to avoid unexpected movements in a reliable way (e. g. supports or mechanical locking in any position).

The following applications are inadmissible:

Use with loads which do not meet the static safety of the system classified 4 –

This can cause damage and danger due to breakage of parts.

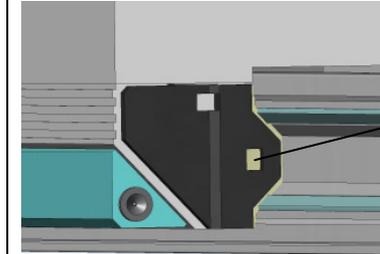
- Outdoor use – This can cause damage and danger due to short-circuit.
- Use of the standard version in connection with corrosive media or water – use the corrosion resistant version in such case
- Use in explosive atmosphere – this can cause fire and explosion.
- Use of the (optional) stop brake as a service brake – This can cause damage at the linear motor system and the failure of the stop brake.
- Use of the linear motor system for the maintenance of a safety function (e. g. the holding up of parts below which work shall be effected).



Every 5000 km of service life

Grease the wiper felt at the roller shoes:

Add oil of the type Mobil DTE20 or comparable to the felt pads with a grease gun.



Wiper felt in the roller shoe. Add the oil with the gun to the felts here.

Have all other work effected by the manufacturer or an authorised service company of the manufacturer only. This applies particularly for the exchange of the track rollers and the adjustment of the guide.



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### 5 Notes for operation

The strong permanent magnets attract magnetic parts or particles which are in the proximity of the linear motor module FTH. If such parts accumulate on the guide component, they can block and damage the carriage. During operation, you must assure that loose parts or particles cannot accumulate on the guide component.

During operation, you must assure safely and reliably that no person can access the moving parts. Observe the valid legal provisions and the applicable technical codes (cf. 2.3 Sources of danger).

### 6 Maintenance

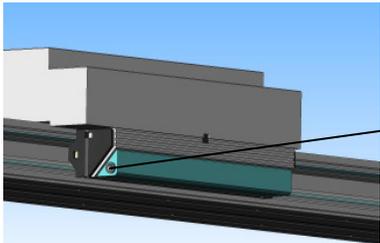


#### Warning

Unexpected movements of the carriage may cause injury to persons.  
→ Before starting maintenance work, you must assure that the carriage cannot move (switch off the energy supply, provide a support or apply the brake at fitting in vertical position).

→

#### 6.1 Maintenance schedule

Intervall	Activity
Every 5000 km of service life	<p>Relubrication of the track rollers:</p> <p>Fill up grease of the type Shell Retinax LX2 or comparable at the hopper lubricating nipples with a grease gun quantity:</p> <p>FTH35: DIN 3405 D1 AØ6, 5g je Rollenschuh FTH25: DIN 3405 D1 AØ4, 3g je Rollenschuh</p>  <p>Flat type lubricating nipple for the relubrication of the track rollers.</p>



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### 2.3 Sources of danger



#### Warning

Due to the movements of the carriage in the guide component, there is a danger of crushing and crashing.

→ The user must assure that during the operation intervention or access by persons is excluded.



#### Warning

In case of use in vertical position, after shutdown and especially in case of failure of the energy supply, there is a danger of falling with regard to the carriage.

→ The user must assure that no persons are endangered by unexpected movements. Franke recommends using a stop brake (optional).



#### Warning

If two carriages are used on a guide component there is a danger of crushing between the carriages as well. In case of collisions, parts may be damaged, destroyed or ejected.

→ The user must assure that no danger for persons arises from possible collisions. This can be achieved, for example, by amply dimensioned shock absorbers at the carriages



#### Attention

Strong permanent magnets are fitted into the guide component. The magnets attract tools and may cause slight injuries in case of incautious handling of the tools.

→ Do not work with sharp-edged or pointed magnetic tools in the immediate proximity of the raceway.



#### Warning

In case of a small distance (lower than 200 mm), the magnetic field of the permanent magnets can interfere with sensitive devices or destroy them. This applies especially for implanted electro-medical devices (such as cardiac pacemakers),

→ The user must indicate these dangers in such a way that these instructions are still perceived from safe distance (e. g. by warning signs). The access to the installation site by persons with implanted electromedical devices must be interdicted.





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### Attention

In continuous operation, the surface of the carriage may reach temperatures of more than 60 °C. In case of a longer contact with the skin (more than 1 sec), burns are possible.

→ The user must advise of these dangers (e. g. by a warning sign).

### 2.4 Protective Actions

In case of overcharge, failure of the energy supply or programming errors, the carriage may strike one of the limit stops with a high speed. In order to avoid damage on the carriage in such a case, the final stops are equipped with amply dimensioned pads. These pads are designed for the maximum service load.

The pads must be neither removed nor used as service stop positions or supports (e. g. in case of use in vertical position).

On the linear motor system the following danger signals are provided.



The danger signals always must be kept in a readable condition. If this is impossible due to the fitting situation, the user must fix equivalent signs at a suitable position, so that even at a safe distance endangered persons are informed about the dangers.

### 2.5 Qualification of the personell

Only trained specialists (e. g. industrial mechanics, locksmiths, mechatronic engineers) may effect the assembly and the maintenance of linear motor modules FTH.

Only trained electricity specialists (e. g.. electricians, mechatronic engineers) may effect the electrical connection and the commissioning of the linear motor modules FTH.

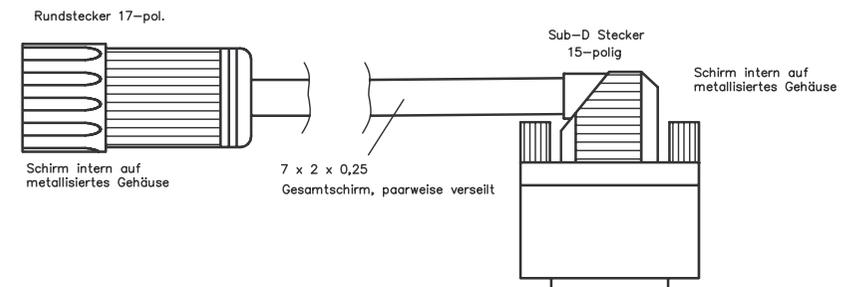
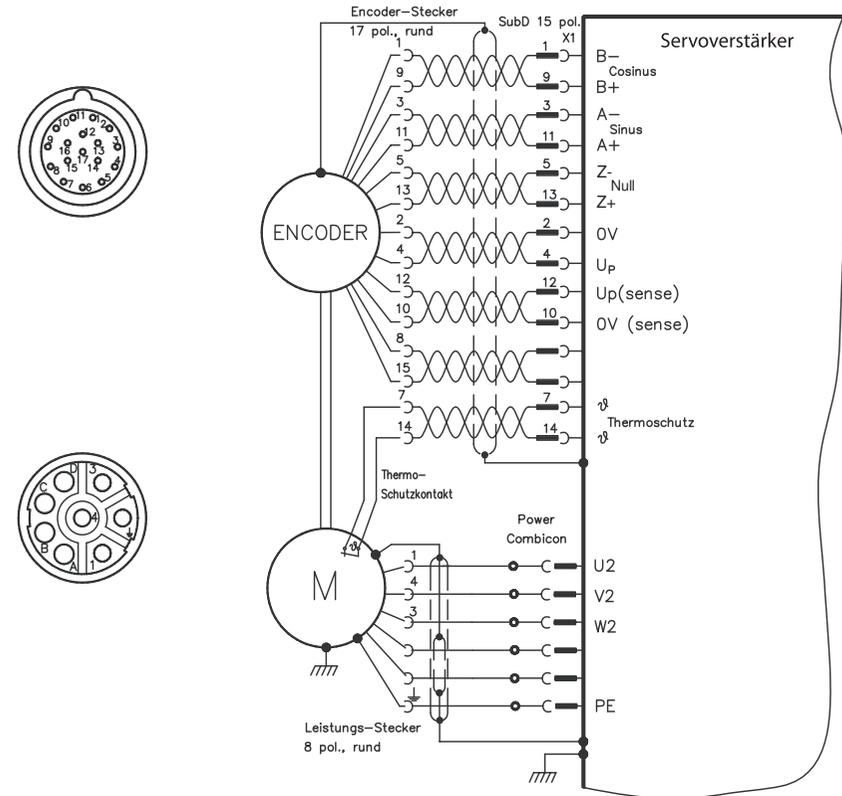
## 3 Transport

Depending on the length of the guide component, the weight of the linear motor module FTH may exceed 30 kg (FTH35A at more than 2.1 m of length; FTH35B at more than 1.4 m of length). In such a case two persons are necessary for the lifting and the transport of the linear motor module FTH.



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### 4.4 Electrical connection





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- Tighten slightly the fixing screws at first. Check the linearity and then tighten fixing screws evenly. The torque must be appropriate for the screw diameter and the screw-in depth (see section 4.3).

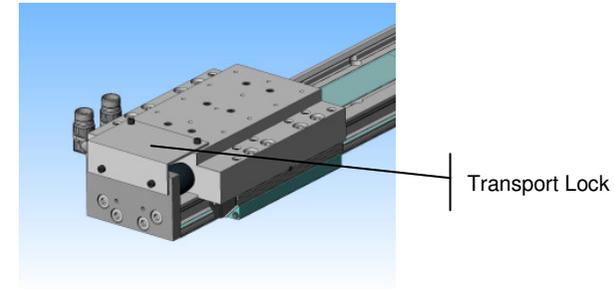
### 4.3 Tightening torques for screws

M6	Quality 8.8	8,5 Nm
M8	Quality 8.8	21,0 Nm
M10	Quality 8.8	41,0 Nm



## Mounting and Maintenance Linear Motor System FTH Drive

Effect the transport and the storage of the linear motor module FTH in the original packaging. The removal of the transport locks must be effected after the transport only because they avoid unexpected movements of the carriage due to weight shifting.



Use lifting devices with a sufficient bearing capacity, especially if the linear motor module FTH must be installed overhead.

For attaching use the ropes or the belts. Put them around the limit stops. Joint the ropes or the belts at the attachment point of the lifting device. Do not use chains because they might damage the linear motor module FTH. Never use the fastening bores at the linear motor module FTH for attaching the lifting devices. Do not attach the linear motor module FTH at the carriage. Both facts can cause damages on the linear motor system.

At transport with the fork lift, protect the linear motor module FTH against tilting. The centre of gravity is at the end at which the carriage is fixed by the transport locks.

### 3.1 Removing the Transport Lock

- Protect the carriage such that it cannot move unexpectedly.
- Unscrew the four socket head screws with a 4 mm/5 mm Allen key.
- Remove the transport locks and keep them for further later transport.



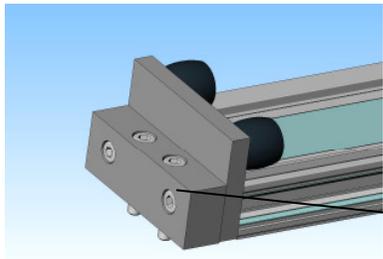
## 4 Mounting, Installation

### 4.1 Fastening

#### 4.1.1 Fastening from Front (FTH25/35)

The linear motor module FTH must be fixed at both ends.

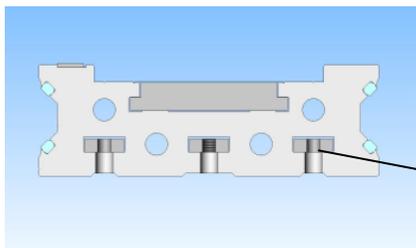
- Guide components up to 1 m of length must be screw on the face side at least.



Fastening screws on the face side

- Longer guide components must be screwed from the upper or the lower side with a distance of 100 mm. In case of fixation from the lower side, use at least two fixing elements every 100 mm.
- The guide component must not be installed in a self-supporting way. Assure a sufficient stiffness of the substructure.
- The maximum admissible tolerance with regard to the linearity of the substructure is 0.3 mm/m.

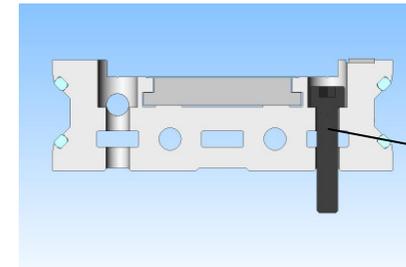
#### 4.1.2 Fastening with flat material (FTH25/35)



Flat material 5x15 with M6

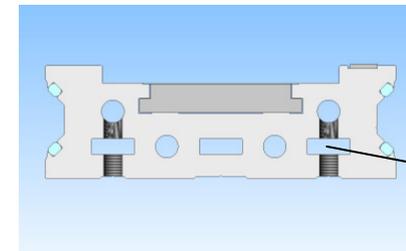


#### 4.1.3 Fastening from above (FTH35)



M8 screws with a distance of 100mm

#### 4.1.4 Befestigung from below



M8 screws with a distance of 100mm

### 4.2 Assembly sequence



#### Warning

When the transport locks have been removed, the carriage may move unexpectedly. Thereof results a danger of crushing and crashing.

- Remove the transport locks as late as possible and protect the carriage afterwards against unexpected movements. This is particularly important if the linear motor module FTH is assembled in vertical position.

- Clean and check the bearing surface for damages. Do not assemble damaged components.