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Drives

HYMAX
Hypoid escalator gear units

Original operation instructions

Escalator gear units – hypoid helical gear units FTHST.1

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1. Introduction

The present operation instructions are part of the scope of supply and should be stored, if possible, near the gear unit where they can easily be accessed. Installation, commissioning and maintenance work may only be performed by qualified personnel who have both read and understood these operation instructions. AUMA Drives shall not be held liable for any damage or failure incurred by non-observance of these instructions.

Escalator gear units have been designed in accordance with recognised standards, directives and safety regulations and correspond to the technical status at the time of printing of these operation instructions. We reserve the right to perform technical alterations on the products.

For further information, please contact the AUMA Drives service department:

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2. Safety instructions

2.1. Intended use

Escalator gear units are designed for the use in escalators. Other applications require explicit (written) approval by the manufacturer.

Machinery Directive 2006/42/EC applies to escalator units. They are partly completed machinery to be installed in an escalator. The required Declaration of Incorporation of Partly Completed Machinery is included in section 14 of these operation instructions. The machine operator or the machine manufacturer must ensure that all legal requirements, directives, guidelines, national regulations and recommendations with respect to assembly, commissioning and operation are met at the place of installation.
Installation, commissioning and maintenance work must be exclusively performed by qualified personnel. Qualified personnel are persons, who, because of their training, experience and position as well as their knowledge of appropriate standards, regulations, health and safety requirements and working conditions, are authorised by the person responsible for the safety of the equipment to perform the required duties and are therefore aware of, and can report, possible hazards. (Definition of qualified employees according to IEC 364)

Intended use includes observance of the operation instructions or observance of the instructions and specifications included. Furthermore, fulfilment of the legal provisions on occupational health and safety and the prevention of accidents, as well as heeding of safety instructions and warning signs attached to the product to avoid both personal injuries and property damage must be ensured.

2.2. Inappropriate or unintended use

Any uses other than those indicated in section 2.1 are either inappropriate or unintended. AUMA Drives shall not assume any liability for personal injuries or property damage incurred from this use.

Inappropriate or unintended use includes among others:

- Upgrading as elevator gear unit
- Use in potentially explosive atmosphere
- Use outside technically and contractually agreed limits (output speeds, power, torques, ambient conditions)

Improper use furthermore includes:

- Operation without grease filling or with lubricants other than those specified as well as operation without mounted air vent
- Opening the gear unit when installed. During the warranty period, gear units may only be opened with prior consent of the manufacturer, otherwise any warranty claim will be void.
- Any modifications on the gear unit and in particular those impairing operational safety and reliability

2.3. Warnings and notes, symbols and their signification

Symbol	Signification
	Indicates safety instructions which have to be observed to avoid personal injuries (injuries, death).
CAUTION!	Indicates safety instructions which have to be observed to avoid damage at the gear unit.
	General instructions, hints.

Table 2.3: Warnings and symbols

2.4. Important instructions, basic duties, warranty and liability

- The escalator manufacturer/operator have to ensure that all specifications and instructions have been read, understood and heeded to:
  - Avert threats to life or physical condition
  - Ensure operational safety of the gear unit and
  - Avoid both installation downtimes and damage to the environment
- The manufacturer of the complete equipment is obliged to include these operation instructions in the operation instructions of the equipment.
- The escalator manufacturer/operation shall be held liable for expert installation (assembly), maintenance and operation of the escalator gear unit. This work may only be performed by qualified and trained personnel.
- Work always has to be performed while the gear unit is switched off and protected against accidental start-up (key switch, sign).
- In case of detected defects as well as for malfunctions such as increased noise levels, oil leakage, rising operating temperature, etc., the gear unit must be shut down immediately. All defects must be remedied before restarting the equipment.
- During the warranty period, the gear units may only be opened with AUMA Drives' prior consent.

- Prior to using the gear unit, the data on the name plate has to be compared with the data of the collateral documents (delivery note, order acknowledgement, test report, etc.) for compliance.
- Welding at the gear unit is not permitted and the gear unit must not be used for protective earth connection.
- Revolving and rotating parts must be protected against accidental contact.
- The escalator manufacturer or escalator operator are responsible for implementing required protective measures on site, such as enclosures, barriers, or personal protective equipment for the staff.
- Under certain operation conditions, the surface temperature of the gear unit may rise up to 110°C. Danger of burns!
- Danger of burns due to hot oil when changing oil.
- Cleaning with a high pressure cleaner is not permitted.
- Spare parts must generally be ordered with AUMA Drives.

Failure to observe the specifications indicated entails complete exclusion of liability and warranty expires. Consequential damage of inappropriate use can include property damage, personal injuries and even death.

3. Technical description

Escalator gear units of FTHST.1 type are hypoid helical gear units They combine the advantages of hypoid and helical gears and are characterised by extremely low noise, high efficiency, utmost reliability and long service life.

Gear units of type FTHST.1 are prepared for installation of customer-specific flanges for direct installation of the brake motor. The motor is mounted using a coupling.

Depending on the escalator configuration, types FTHST provide the option of mounting the drive shaft or the pinion on side A or side B – for more information, refer to the dimension sheets in the appendix (sections 11 to 13).

CAUTION! **Escalator gear units may only be used in the service position shown in the illustration!**
→ Vertical drive shaft, motor above the gear unit!

CAUTION! **Escalator gear units are not self-locking.**

Section 3.1 provides a schematic description of the escalator gear unit design. Major sub-assemblies are designated.

3.1. Aufbau

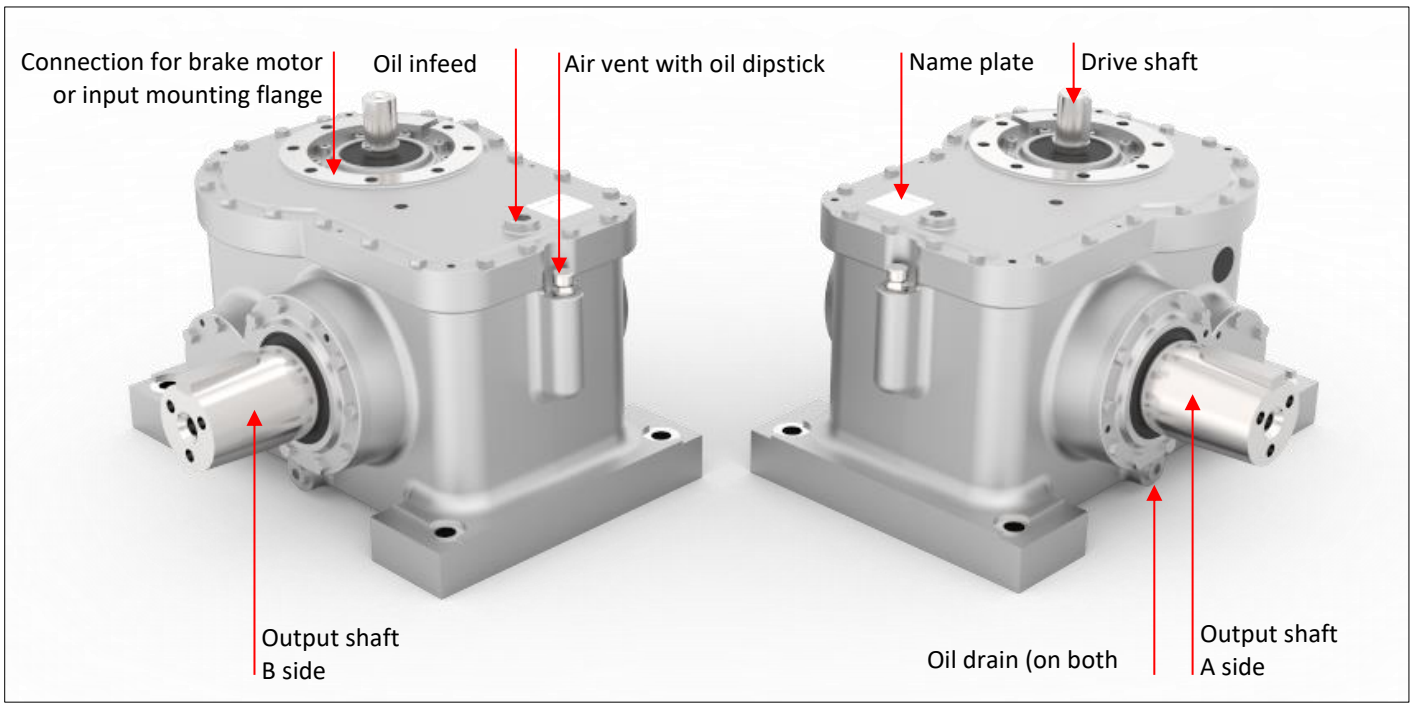


Figure 3.1-1: Design of basic version, FTHST168.1 as an example

In addition to the standard versions, installation-specific equipment is available as an option. This includes motor flange, pinion, oil heater and monitoring equipment such as acceleration or vibration sensors as well as oil temperature sensors.

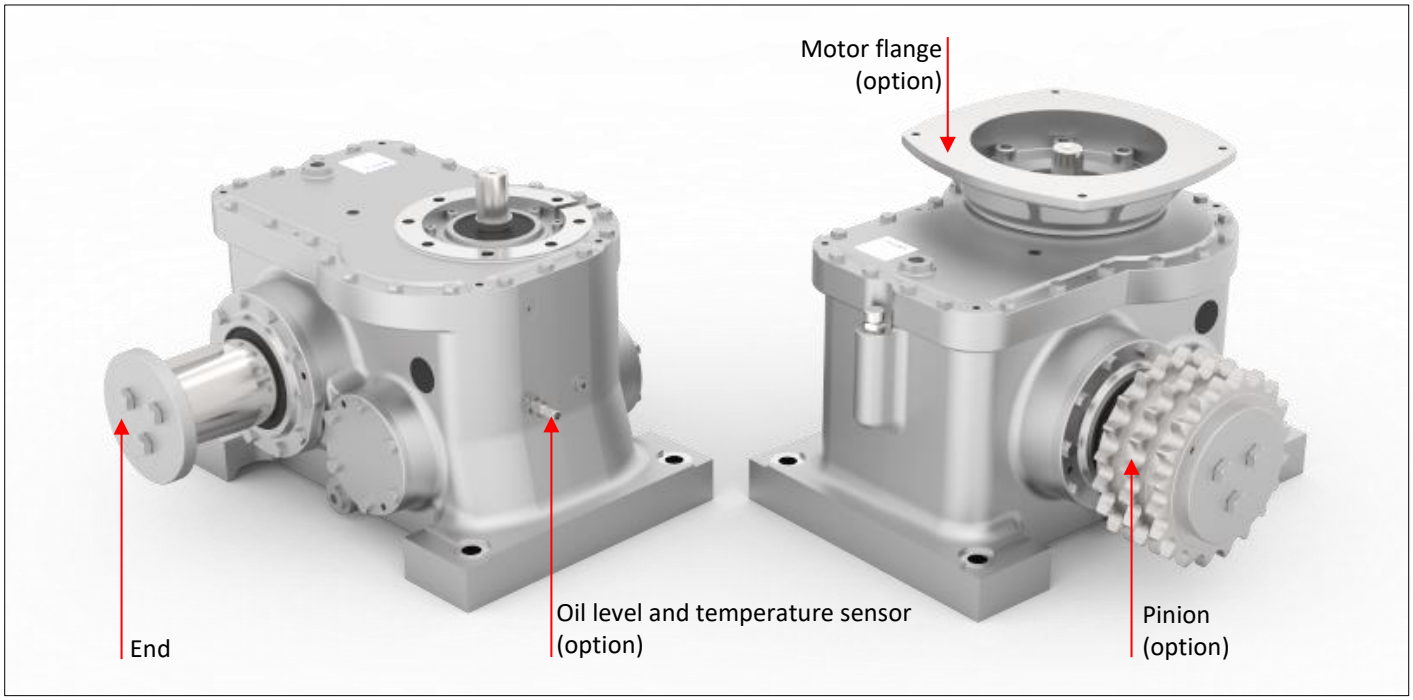
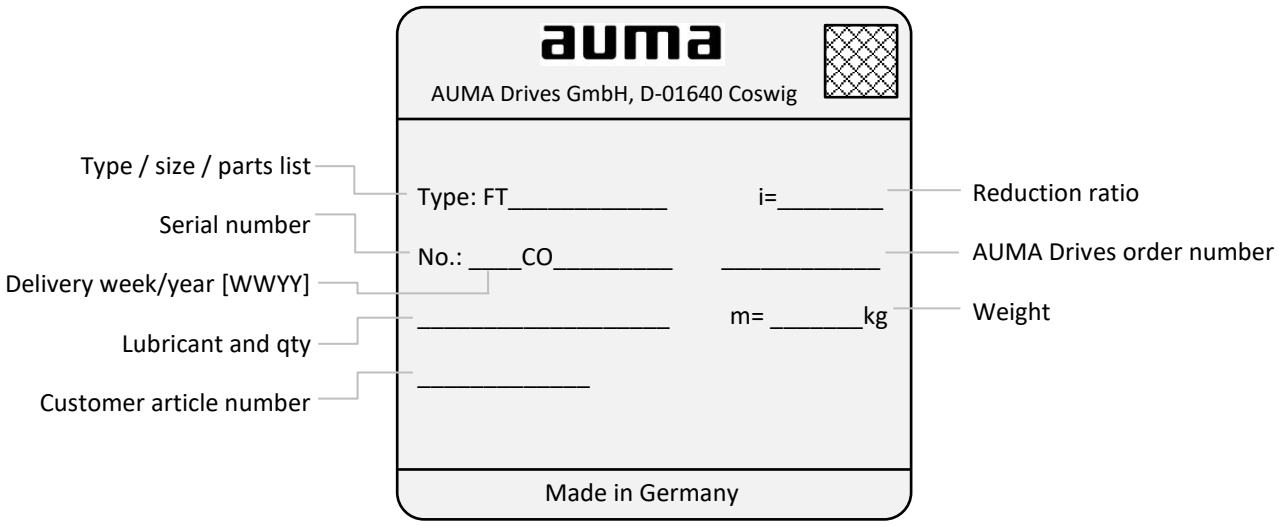


Figure 3.1-2: Mounting options, example of FTHST168.1

3.2. Name plate

The following data is provided on the name plate attached to the gear unit.



3.3. Technical data

3.3.1. Dimensions

For the dimension sheets, refer to the appendix (sections 11 to 13) of these operation instructions.

3.3.2. Gear unit weight

Size	Gear unit weight [kg] [1]
FTHST156.1	150
FTHST168.1	188
FTHST182.1	230

Table 3.3.2: Gear unit weight

[1] incl. oil

3.3.3. Lubricant

Escalator gear units are lubricated by splash lubrication, i.e. the roller bearings are automatically supplied with oil. Unless agreed otherwise, the gear units are supplied with oil filling when leaving the factory.

We exclusively use CLP-PG oils (according to DIN 51517-part 3). These fully synthetic oils (polyglycols) have outstanding temperature-viscosity behaviour and excellent characteristics with regard to corrosion protection, resistance to ageing and wear reduction. For ambient temperatures between –10 °C and +40 °C, oils of ISO viscosity class VG220 must be used. For other ambient conditions, a suitable lubricant has to be selected by AUMA Drives.

The table below lists lubricants by different manufacturers. The lubricant used is indicated on the name plate.

Marking according to DIN 51517-3 and DIN 51519	Klüber	ARAL	Shell	Mobil	Bechem	Castrol
CLP PG ISO VG 320	Klübersynth GH 6-320 [1]	Degol GS 320	Tivela S320	Glygoyle 320	Berusynth EP 320	Optiflex A 320

Table 3.3.3-1: Lubricants standard

[1] Factory

CAUTION! **AUMA Drives shall not assume any warranty for the perfect suitability of all listed lubricants.**

Mixing oils of various types and manufacturers is not permissible. Mineral oils in particular must not be used. Refer to the name plate for the lubricant used.

It the gear units are filled with oil by the customer, at least purity level 15/13/10 in accordance with ISO 11171 must be ensure by suitable filtration.

CAUTION! **The table below shows the required oil quantities. These values are reference values. The filling level (of the cooled down oil) within the gear unit, defined by markings (max. and min.) on the oil dipstick is relevant - refer to figure 3.3.3**.

Size	Oil qty. [l]
FTHST156.1	11.0
FTHST168.1	12.5
FTHST182.1	16.0

Table 3.3.3-2: Lubricant quantity

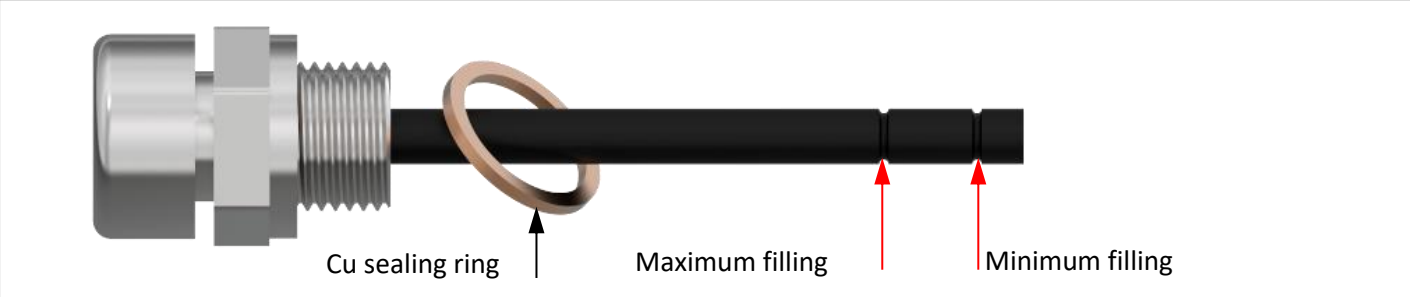


Figure3.3.3: Air vent with oil dipstick

4. Delivery, transport, handling & storage

Prior to delivery, all escalator gear units are subjected to final inspection and leave AUMA Drives in perfect condition and suitably packaged according to their destination. Upon receipt, the delivery has to be inspected for completeness and possible transport damage. Notify the forwarding company or the customer service of AUMA Drives of any possible defects. Commissioning the gear unit might not be permitted.

Gear units must be stored and transported in service position at all times (refer to note in section 3 and dimension sheet in the appendix). The air vent is enclosed with the delivery and must be mounted prior to commissioning (also refer to section 6 "Commissioning“)!

Only use lifting appliances and load suspension equipment with sufficient bearing capacity for transport! For the overall weight of the gear unit, refer to the name plate. Reference values can also be found in section 3.3.2. **The load is borne by respectively four suitable eye bolts. Ensure that they have been firmly screwed to the housing. The threads illustrated in figure 4 are to be used for transport.**

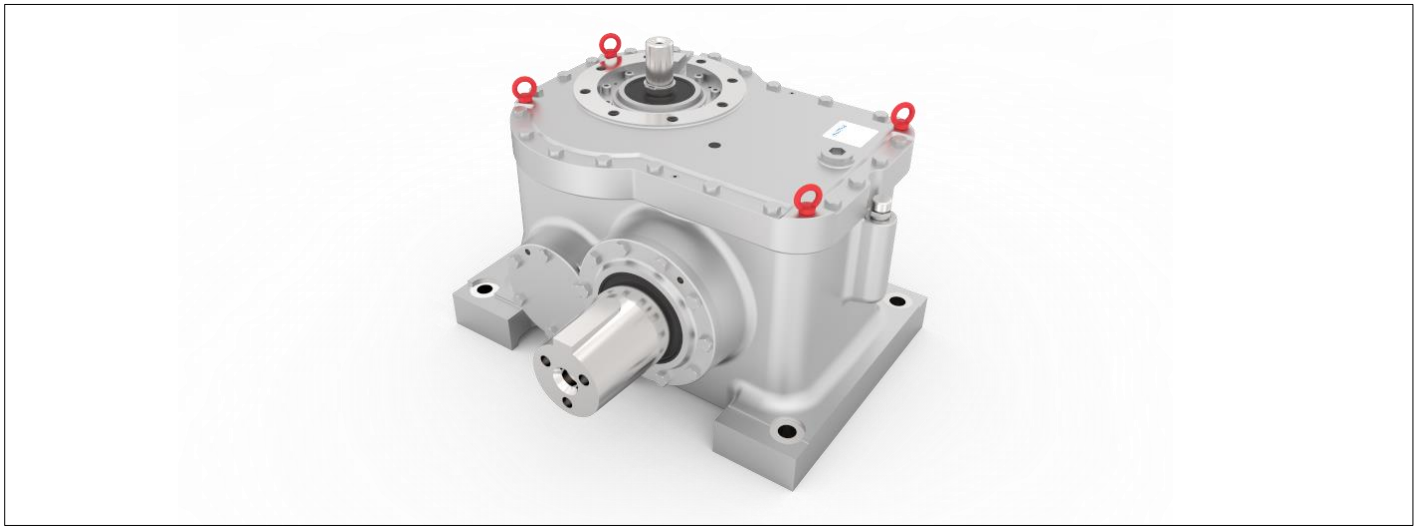


Figure 4: Lashing points

Size	Transport eye bolts
FTHST156.1	4x M10
FTHST168.1	4x M10
FTHST182.1	4x M10

Table 4: Transport eye bolts

CAUTION! **Handle and transport with care to prevent damage. Hits and blows to the shaft ends might cause damage within the gear unit.**

The gear units may only be stored in closed rooms at even temperature. Avoid exposure to direct sunlight. Relative humidity must not exceed 70 %.

Gear units must be stored on levelled base plates, protected against vibration, and must not be stacked on top of each other.

Unless agreed otherwise, escalator gear units are supplied with oil filling in the factory (long-term lubrication, inner parts are provided with protection for 36 months). If initial oil filling is not provided by AUMA Drives, the inner parts are protected with a short-term corrosion protection, sufficient for 6-month storage/transport.

Free shaft ends and metallic, uncoated (flange) surfaces are also provided with 6-month protection. For longer storage periods, we recommend verifying the inner and outer status of the gear unit and applying a new corrosion protection layer if required. Storage periods start with receipt of delivery.

CAUTION! **The corrosion protection can be removed using common cleaning agents. The cleaning agent must not come into contact with radial seals!**

Ensure sufficient ventilation while removing the corrosion protection agent. Due to potentially explosive atmospheres, open fire is not permitted.

The outer coating (top coat based on polyurethane) is resistant to weak chemicals such as oils, resistant to mechanical impacts and temperature resistant up to 150 °C. Damage to the coating of the outer parts leads to failure of the corrosion protection and has to be touched up immediately. Sand blasting of the gear unit is not permitted.

5. Assembly

5.1. Gear unit assembly

The safety instructions in section 2 must be observed.

The following conditions must be met for installing the escalator gear unit:

- These operation instructions were completely read and understood by the assembly personnel.
- Suitable lifting devices are available in sufficient quantity.
- The data on the name plate and the application must correspond to the contractually agreed values (reduction ratio, output speed, etc.).
- The gear unit must not be damaged.
- Unless agreed otherwise, the ambient temperature must be between –10 °C and +40 °C.
- The environment of the installation site must be free of chemicals, acids, gases, etc.
- The gear unit must not be exposed to heat accumulation and waste heat from other devices.
- Mount the air vent at the provided position (refer to section 6 "Commissioning").
- Air vent including oil dipstick and oil draining screw plug must be freely accessible for maintenance work when installed.
- The corrosion protection agent must be removed from shaft ends and mounting faces (flanges).
- Machine frame:
  The base must be designed for the weights and torques so that no additional loads resulting from distortion or twisting can act on the gear unit. Ensure that all mounting faces are flush on the machine frame. Non-observance might cause damage on and within the gear unit.

CAUTION! Escalator gear units of type FTHST.1 may only be mounted in the intended service position (vertical drive shaft, motor above the gear unit). **Use screws and nuts to fasten gear units via <u>all</u> through bores within the gear unit base to the machine frame.** We recommend applying the property classes and tightening torques indicated in table 5.1.

Size	Number and thread size of fastening screws	Required property class	Tightening torque [Nm] (refer also to section 9)
FTHST156.1	4x M20	10.9	615
FTHST168.1	4x M20	10.9	615
FTHST182.1	4x M20	10.9	615

Table 5.1: Gear unit: Fastening screws and tightening torques

Welding at the gear unit is not permitted and the gear unit must not be used for protective earth connection!

5.2. Mounting the brake motor

The motor is mounted using flange and coupling. The following property classes and tightening torques have to be applied for fastening:

Size	Number and thread size of fastening screws	Required property class	Tightening torque [Nm] (refer also to section 9)
FTHST156.1	8x M16	8.8 (10.9)	214 (314)
FTHST168.1	8x M16	8.8 (10.9)	214 (314)
FTHST182.1	8x M16	8.8 (10.9)	214 (314)

Table 5.2: Motor: Fastening screws and tightening torques

CAUTION! **Do not apply hammer blows for assembly. This might damage the splines, roller bearings and the shafts.** Heed operation instructions of the motor manufacturer for electrical connection!

5.3. Mounting the pinion

After removing the corrosion protection agent and cleaning the output shaft, a suitable anti-seizing compound (e.g. Gleitmo 800 by Fuchs) is applied to both the shaft and the hub of the pinion. The pinion is then pressed on the shaft using the mounting fixture (refer to fig. 5.3). Finally, the washer is mounted. For the tightening torque of the screws, refer to table 5.3. Secure screw using thread locking adhesive (e.g. Loctite 2701).

CAUTION! For **size FTHST 156.1, the pinion should be mounted when hot** (≤120°C; wear heat-resistant gloves!), to ensure the **self-locking pressfit at cylindrical** (instead of conical) **output drive shaft**! Finally, the washer is mounted. For the tightening torque of the screws, refer to table 5.3. Secure screw using thread locking adhesive (e.g. Loctite 2701).

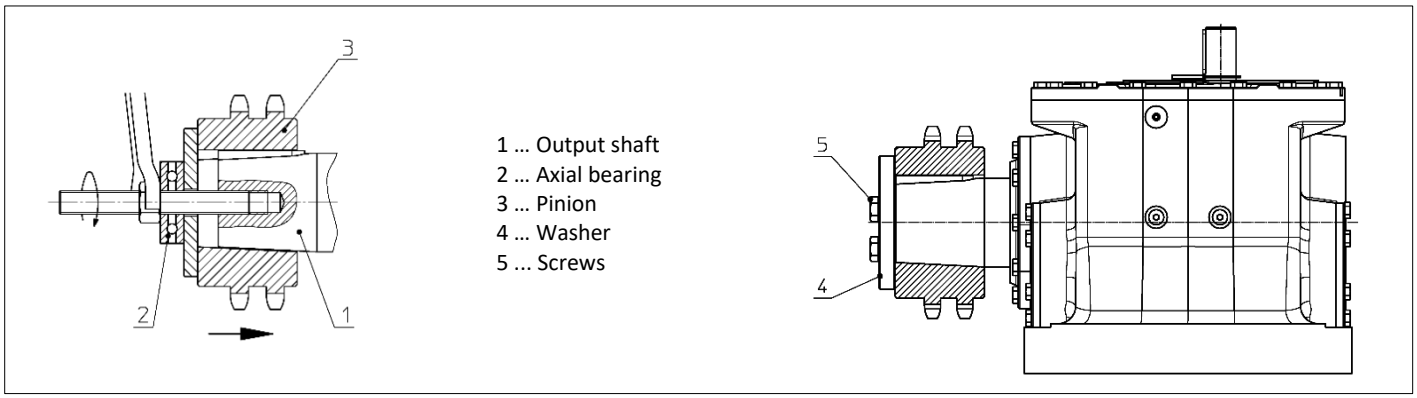


Figure 5.3: Pinion assembly for sizes FTHST168.1 and FTHST 182.1 by means of pressing/fitting

Size	Width across flats s of screws [mm]	Number and thread size of the screws	Required property class	Tightening torque [Nm] (refer also to section 9)
FTHST156.1	30	1x M20	8.8 (10.9)	431 (615)
FTHST168.1	24	3x M16	8.8 (10.9)	214 (314)
FTHST182.1	24	3x M16	8.8 (10.9)	214 (314)

Table 5.3: Screws and tightening torques of pinion

5.3.1. Permissible effective direction of radial force at the output shaft

CAUTION!

Radial forces F_R resulting from the torque must not exceed the limit values indicated in table 5.3.1 with regard to the effective direction. Deviating values can result in damage to bearing and shaft. Additional axial forces acting upon the output shaft are not permissible.

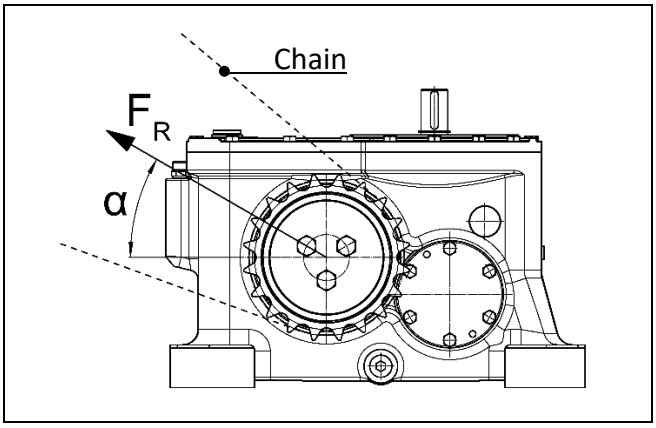


Figure5.3.1: Radial forces and effective direction of chain

Size	Permissible Effective direction α [°]
FTHST156.1	30 … 60
FTHST168.1	30 … 60
FTHST182.1	30 … 60

Table 5.3.1: Permissive effective direction of radial forces

6. Commissioning

The safety instructions in section 2 must be observed.

Commissioning of the gear unit is only permitted once the escalator manufacturer/operator have integrated the gear unit in the escalator and after confirming the safety of the system put on the market. This must be ensured while heeding and complying with the national regulations and product specific directives valid in the country of destination (and affixing the CE mark on the escalator).

CAUTION! **Prior to commissioning, the following steps have to be performed:**

- Mount the air vent at the provided position (refer to section 3 and dimension sheets in appendix). For this, remove the transport screw plug and fasten the air vent according to tightening torque specified in table 8.1.1.
- Check oil filling level → section 8.1.18.1.2
- Check oil quality → section 8.1.2 8.1.2
- Check screw tightening torques:
  - Mounting gear unit to base → section 5.1
  - Mounting of motor → section 5.2
  - Mounting of pinion → section 5.3

Screws which must not be reused due to damage and wear have to be replaced by new ones of the same property class and type.

7. Operation, malfunctions, causes, remedies

Gear units must be monitored during operation. Special attention should be paid to unusual running noise, increased service temperatures and possible oil leakage.

CAUTION! **In case of irregularities and when eliminating malfunctions, the gear unit must be shut down immediately and the safety instructions of section 2.4 have to be observed. Protect equipment against accidental start-up.**

During the warranty period, maintenance work may exclusively be carried out by AUMA Drives. If malfunctions occurring at a later date cannot be located or the effort required for repair would be excessive, please contact the AUMA service technicians.

Escalator gear units of FTHST.1 type range are not self-locking. When bleeding all brakes installed within the drive system, the escalator may automatically start depending on the load.

Fault	Possible causes	Remedy
Unusual running noise/vibration	• Damage to splines or bearing • Changed bearing backlash • Oil level too low	• Contact AUMA Drives Service • Contact AUMA Drives Service • Refill oil and check gear unit for leakage
Unusual blows/vibration	• Defective motor coupling • Gear support worked loose	• Replace coupling • Tighten fastening screws according to table 5.1
Increased operating temperature	• Heat accumulation and /or waste heat from other devices • Oil level too low • Outdated/contaminated oil	• Contact AUMA Drives Service • Check oil level at room temperature and correct in accordance with section 3.3.3, if applicable • Change oil
Oil leaks at gear unit	• Damaged radial seals • Clogged air vent	• In case of major lubricant leakage: Replace radial seal. *In case of very small quantities, it might only be a so-called pseudo leakage caused by the grease applied to the radial seals during assembly. In this case, the leaked lubricant should be wiped off and the affected radial seal should be closely monitored.* • Clean air vent (refer to table 8)
#Oil leakage at air vent (oil infeed)	• Incorrect service position • Oil level too high • Wrong lubricant (foam formation)	• Correct service position in accordance with sections 3 and 3.1 • Check oil level at room temperature and correct in accordance with section 3.3.3, if applicable • Change oil, refer to section 8.1.3
Oil leaks at screw plugs (oil drain)	• Screw plugs not properly fastened	• Check radial seals and tighten screw plugs according to table 8.1.2 8.1.3

Table 7: Malfunctions, causes, remedy

8. Servicing and maintenance

The stipulated inspection intervals (table 8) mentioned above are part of the conditions of warranty.

All service work may only be performed by qualified and trained personnel.

Work on the gear unit always has to be performed while the gear unit is switched off and protected against accidental start-up (key switch, sign).

CAUTION!

Only use original spare parts by AUMA Drives for repair and maintenance tasks; otherwise a safe function of the gear unit cannot be guaranteed. All warranty and liability claims are void if the maintenance work has not been carried out appropriately or if unapproved spare parts have been used.

Actions	Maintenance interval	Remarks/notes
Check gear temperature	Every 3 months	Max. permissible temperature at housing: 110°C In case of higher temperatures, refer to section 7.
Check running noise	Every 3 months	In case of changes, refer to section7.
Check gear unit for leak tightness	Every 3 months	
Check oil level	Every 3 months	Refer to sections 8.1.1 *As an option, AUMA Drives offers an oil level sensor for electronic oil filling monitoring.*
Check oil status	After 10,000 and 20.000 operation hours	Refer to section 8.1.28.1.28.1.3
Oil change	Depending on the oil quality (test interval 10,000 hours). However, after 30,000 hours of operation or 60 months.	Refer to sections 8.1.2 and 8.1.3
Visual inspection of painting	Every 3 months	Damage to the coating of the outer gear unit parts leads to failure of the corrosion protection and has to be touched up immediately.
Clean air vent	Every 3 months	Clean unscrewed air vent with petroleum ether and dry or blow with compressed air. Ensure sufficient ventilation (explosion hazard)!
Clean gear unit	Every 12 months	Excessive water pressure and concentrated cleaning agents are not permitted for eliminating possible contamination.
Check fastening screws for tight fit	Every 12 months	Refer to table 5.1

Table 8: Corrective action and intervals

8.1. Description of maintenance work

All service work may only be performed once the gear unit has cooled down. Heat resistant gloves must imperatively be worn to avoid burns!

8.1.1. Check oil level

Remove air vent with oil dipstick (refer to section 3.1), unscrew and wipe remaining oil off the oil dipstick. The oil level can only be read off again, once the air vent has been completely screwed in and removed again (refer to section 3.3.3). Correct oil level in case of deviations (refer to section 8.1.3 step 5) & 6.).

Exclusively use lubricant of the same type (refer to name plate!) for refilling. Mixing oils of various types and manufacturers is not permissible (for selection, refer to table 3.3.3-1). Mineral oils in particular must not be used.

Finally, the air vent has to be screwed in again, refer to table 8.1.1 for the required tightening torque. Replace damaged sealing rings.

After long-term operation under full load, the oil level might slightly exceed the permissible maximum. In this case, oil must not be drained!

Size	Tightening torque of the air vent [Nm]	Width s of hexagon socket of the screw plug at the oil drain [mm]	Tightening torque of screw plug at the oil drain [Nm] (refer also to section 9)
FTHST156.1	34	12	60
FTHST168.1	34	12	60
FTHST182.1	34	12	60

Table 8.1.1: Tightening torques of screw plugs, oil drain and air vent valve

8.1.2. Check oil quality

Check the oil quality with regard to colour and for the quality of solid particles or contamination contained. A small quantity of lubricant is applied to a white base surface and assessed by means of the images for comparison in table 8.1.2. If required, change oil (refer to section 8.1.3). If shiny metallic abrasion can be detected in the lubricant, check the gear unit for possible damage to splines or bearings prior to the required oil change.

NEW	OK	OIL CHANGE!	UNUSABLE
			
Oil colour Clear to light yellow	Oil colour Light yellow to yellow	Oil colour Brown to dark brown	Oil colour Dark brown to black

Table 8.1.2: Comparative values for oil colour

8.1.3. Oil change

Oil change has to be performed shortly after shut-down while still **at service temperature** (housing surface is hand warm). Otherwise complete draining cannot be ensured due to lack of viscosity.

1. Place suitable collecting basin underneath the oil draining screw plug. For oil quantities, refer to section 3.3.3.
2. Unscrew oil draining screw plug and oil filling screw.
3. Drain oil completely. If required, rinse gear unit with low-viscosity (and compatible) oil.
4. Seal oil drain: Tighten oil draining screw plug and sealing ring with tightening torque according to table 8.1.1.
5. Refill new oil (refer to section 3.3.3) up to required filling level (refer to section 8.1.1 "Oil level monitoring“).
6. Seal oil infeed with screw plug fastened with tightening torque of table 8.1.3.
7. Contain spilled oil using a suitable agent and dispose of used oil according to national regulations.

Size	Width across flats s of the hexagon socket of the oil filling screw plug [mm]	Tightening torque of the oil filling screw plug [Nm] (refer also to section 9)
FTHST156.1	17	100
FTHST168.1	17	100
FTHST182.1	17	100

Table 8.1.3: Tightening torques of oil filling screw plug

8.2. Spare parts

CAUTION!

Only use original spare parts by AUMA Drives for maintenance work! We will not assume any liability or warranty for damage incurred when using other spare parts than provided by AUMA Drives. Furthermore, use of such products might impair both characteristics and operational reliability as well as safety of the gear unit. Please indicate the order number or serial number of the gear unit (refer to name plate) when ordering spare parts.

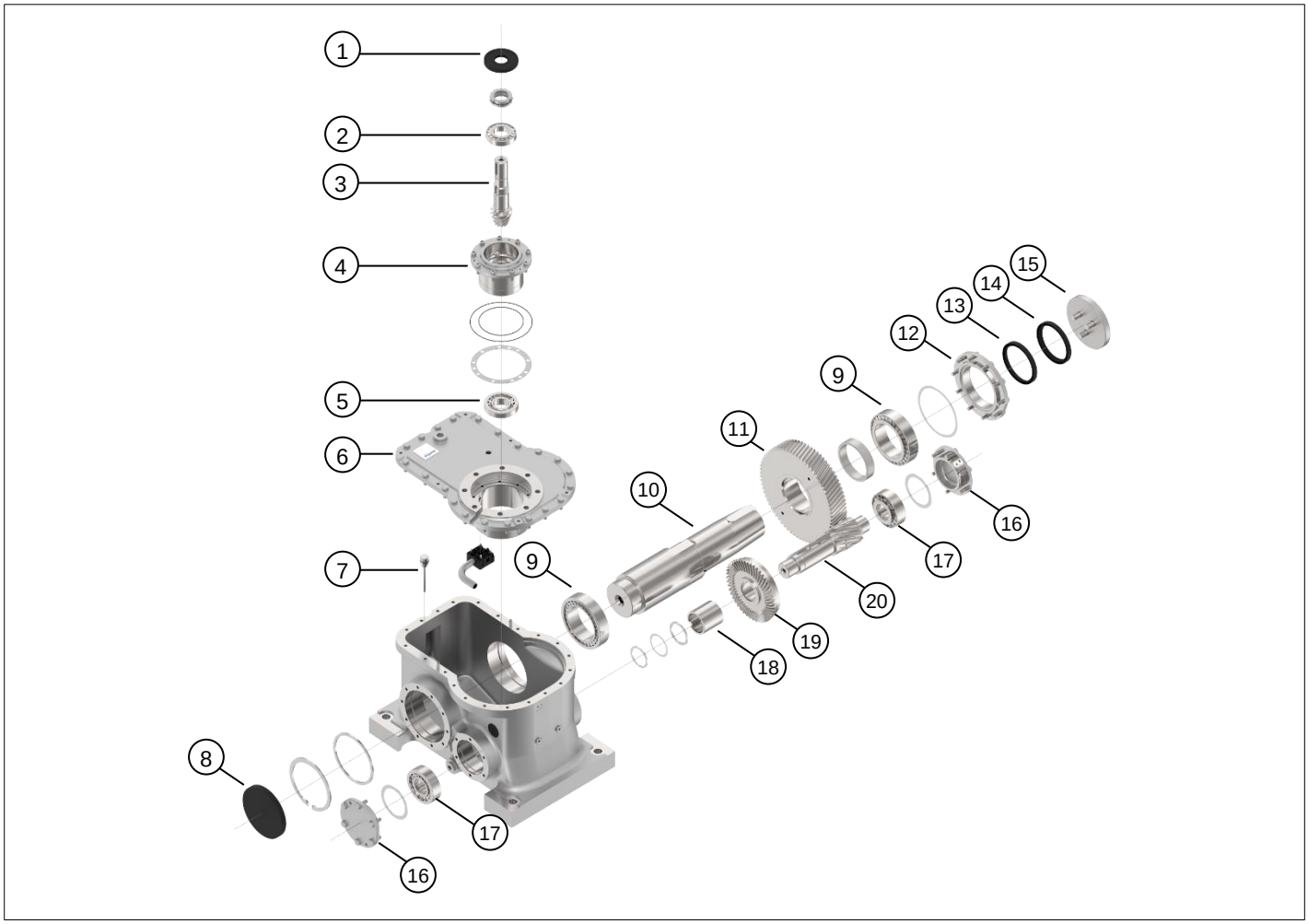


Figure 8.2: Exploded view (FTHST168.1 as example)

No.	Spare part designation		FTHST156.1	FTHST168.1	FTHST182.1
1	Radial seal	DIN 3760	D005.059	D005.059	D005.087
	Gamma ring		K013.003	K013.003	K013.004
2	Tapered roller bearing	DIN 720	D005.290	D005.290	D051.934
3	Hypoid pinion shaft				
4	Drive bearing cover				
5	Tapered roller bearing	DIN 720	D051.867	D051.867	D005.086
6	Housing cover				
7	Air vent with oil dipstick				
8	Sealing cap		K050.733	K012.836	K051.759
9	Tapered roller bearing	DIN 720	D052.816	D050.971	D052.357
10	Output shaft				
11	Helical gear				
12	Bearing cover of output drive				

Table 8.2: Wear parts

To be continued on following

13	Radial seal	DIN 3760	D004.859	D050.162	D004.521
14	Radial seal	DIN 3760	D005.376	D005.315	D004.665
15	Washer				
16	Bearing cover of hypoid wheel				
17	Tapered roller bearing	DIN 720	D005.368	D004.830	D005.339
18	Spacer ring				
19	Hypoid wheel				
20	Helical gear pinion shaft				
21	Motor flange (not represented)				

Table (continued)8.2: Wear parts

9. Screw tightening torques

9.1. Coarse pitch thread screws

Fastening screw	Tightening torque [Nm]		
	8.8	**10.9**	**12.9**
M4	3.1	4.5	5.25
M5	6.1	9	10.4
M6	11	15	18
M8	25	37	43
M10	51	75	87
M12	87	128	150
M16	214	314	365
M20	431	615	710
M24	742	1,057	1,220
M30	1,489	2,121	2,450
M36	2,594	3,695	4,280

Table 9.1: Tightening torques for standard thread screws

9.2. Screw plugs

Screw plug St		Tightening torque [Nm]	Screw plug St		Tightening torque [Nm]
Metric fine thread in accordance with DIN 13	Pipe threads in accordance with EN ISO 228		Metric fine thread in accordance with DIN 13	Pipe threads in accordance with EN ISO 228	
M10 x 1.0	-	10	–	G 1/2	60
–	G 1/8 A	10	M22 x 1.5	-	60
M12 x 1.5	-	20	M26 x 1.5	-	70
–	G 1/4 A	26	M27 x 2.0	-	85
M14 x 1.5	-	30	–	G 3/4 A	85
M16 x 1.5	-	34	M33 x 2.0	-	130
–	G 3/8 A	34	–	G 1 A	130
M18 x 1.5	-	42	M48 x 1.5	G 1 1/2 A	150
M20 x 1.5	-	50	M60 x 2.0	G 2 A	170

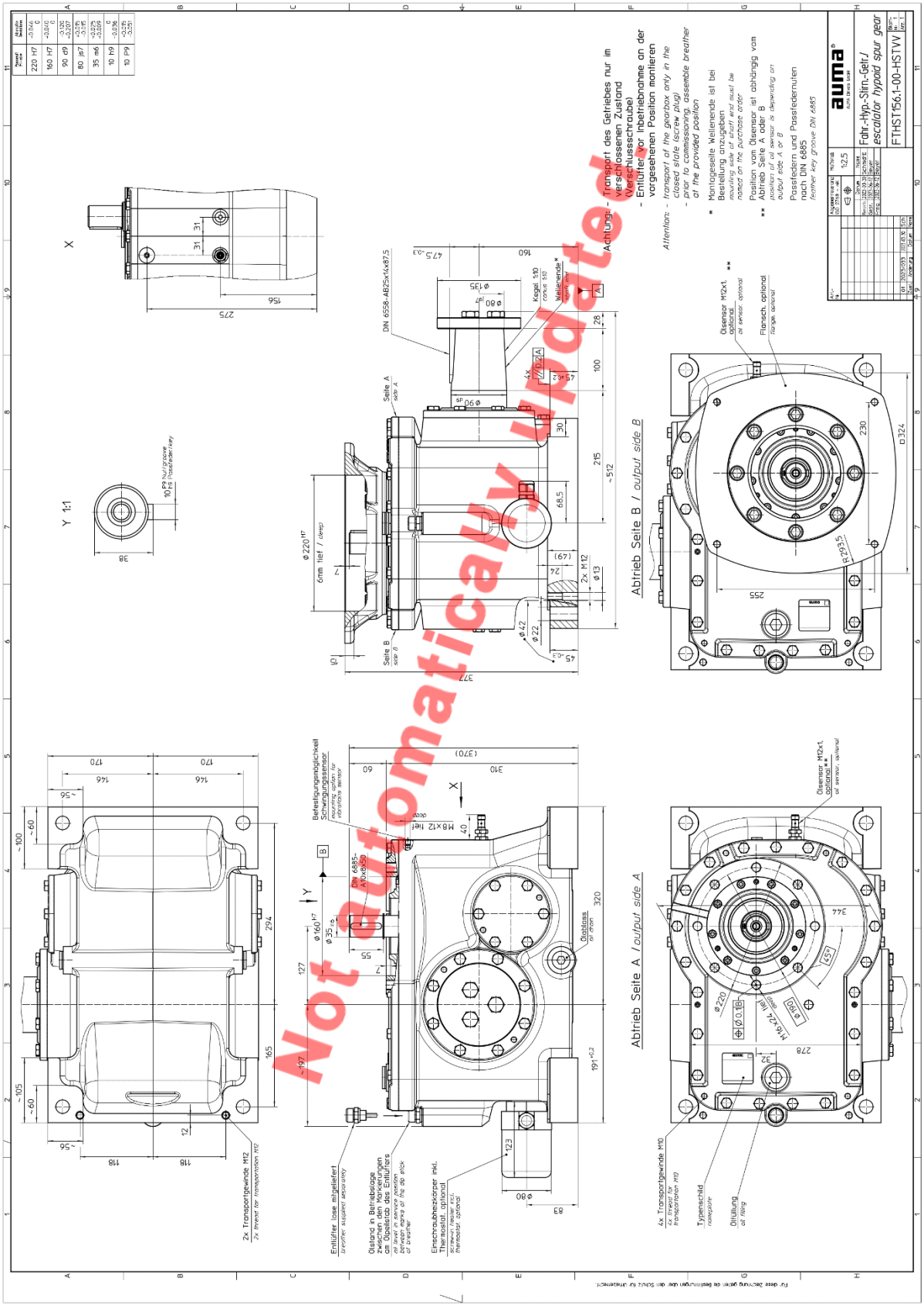
Table 9.2: Tightening torques for screw plugs

10.Disposal

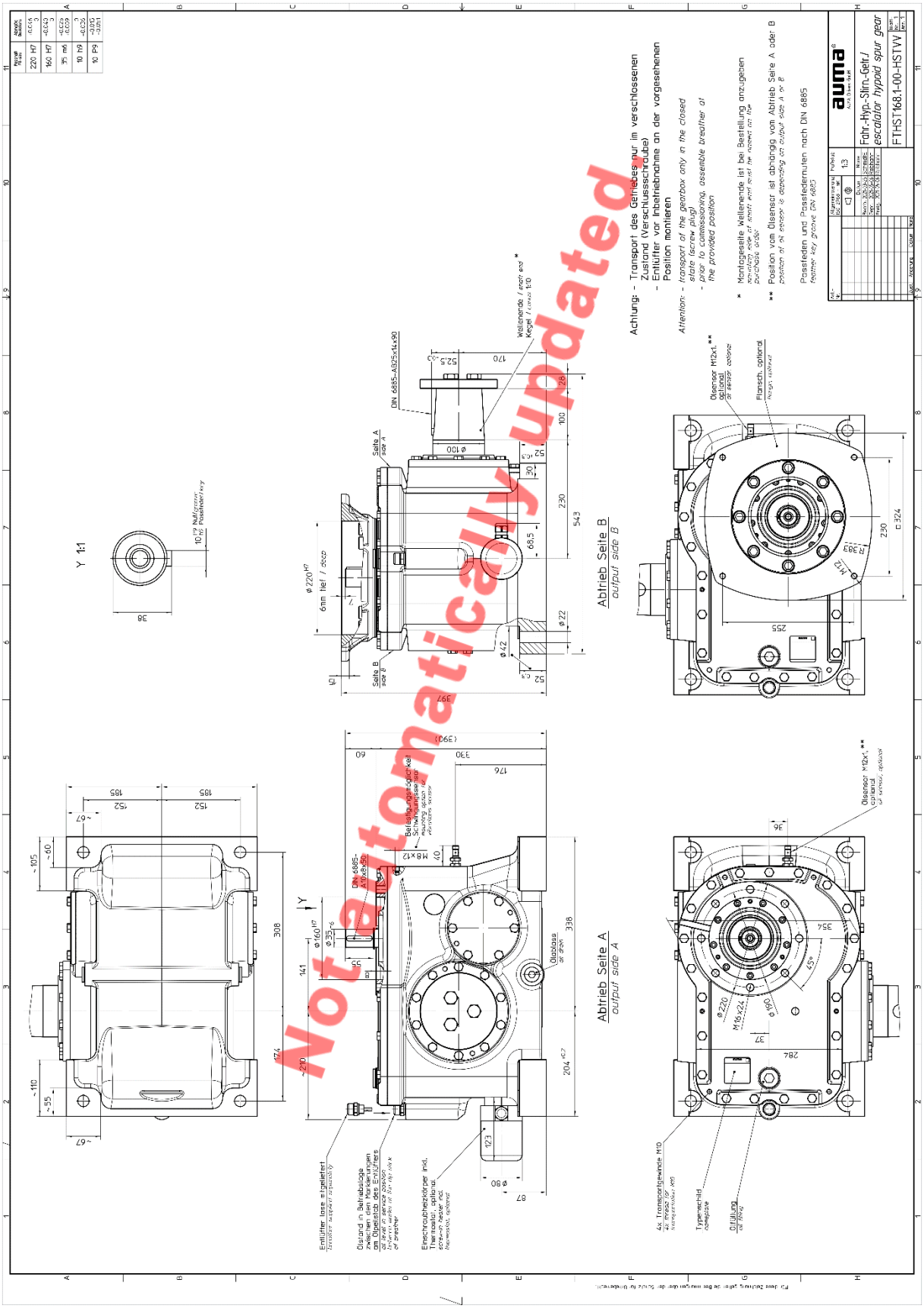
Our gear units have a long service life. However, they have to be replaced at one point in time. Individual components have to be disposed of as follows:

- Housing parts, hypoid and helical gear, shafts as well as roller bearings are steel scrap
- Parts made of cast iron are also to be handled as scrap steel in case there is no separate collection.
- Greases and oils are hazardous to water and must not be released into the environment. They have to be collected and disposed of according to the relevant environmental provisions (national regulations for waste disposal).

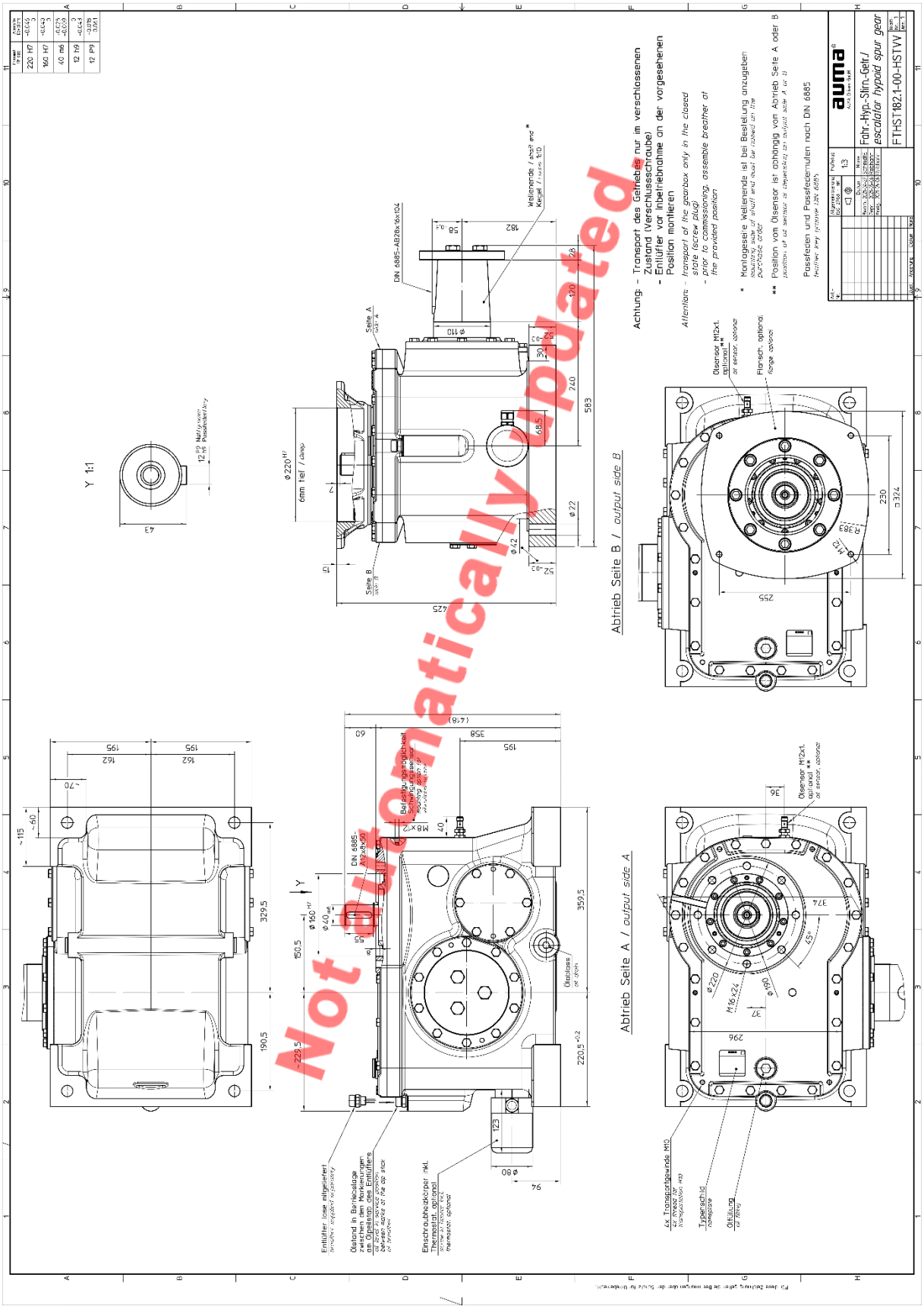
11. Appendix I: Dimension sheet FTHST156.1



12. Appendix II: Dimension sheet FTHST168.1



13. Appendix III: Dimension sheet FTHST182.1



14. Appendix IV: Declaration of Incorporation

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Fax +49 3523 74 675
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Drives

EC Declaration of Incorporation

according to EC machinery directive 2006/42/EC dated 17 May 2006, appendix II B

The manufacturer

AUMA Drives GmbH
Grenzstraße 5
D-01640 Coswig/ Germany

declare herewith that the above mentioned gear units comply in their conception and design as well as in the versions distributed with the basic requirements for safety and health of the EC Directive 2006/42/EC, considering particularly appendix 1, paragraphs 1.1.2, 1.1.3, 1.1.5, 1.3.1, 1.3.7, 1.7.1., 1.7.3, 1.7.4.

With regard to the partly finished machine, the manufacturer commits to submitting the documents to the competent national authority via electronic transmission upon reasonable request. The relevant technical documentation pertaining to the partly completed machinery described in Annex VII, part B has been prepared.

The partly finished machine must not be put into service until the machinery into which the AUMA Drives unit is to be incorporated has been declared in conformity with the provisions of the EC Directive (2006/42/EC).

Description of the partly finished machinery:

Worm gear units
Spur gear units
Worm-spur gear units
Spur-worm gear units
Double worm gear units
Slewing gear units
Screw jacks
Cross-helical gears
Bevel gearboxes
Planetary gears
Hypoid gear units
Hypoid- helical gear units

Applied harmonised standards:

DIN EN ISO 12100:2011 Safety of machinery
General principles for design - Risk assessment and risk reduction

Authorised person for technical documentation:

Michael Eleser, Grenzstraße 5, D-01640 Coswig

Coswig	2022-02-07	
Ort	**Date**	**Markus Weber, Managing Director**

Y050.082/EN

This declaration does not contain any guarantees. The safety instructions in product documentation supplied with the devices must be observed. Non-concerted modification of the device components voids this declaration.

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