Manual-Assembly instructions

MAFA Transport auger type 152mm HD

Read the instructions carefully before starting work!

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Manual_Transport_auger_152mm HD_ENG	100-65	2024-11-18	5	44

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1 Preface

This manual is written by MAFA in Ängelholm AB and is primarily intended for the installer and user of the conveyor auger. It is important that the assembly instructions and the manual are read through before assembly and use and that the safety and handling instructions are followed. If the instructions are followed, it ensures correct and safe use of the product and a long service life.
Save the manual for future use.
We welcome feedback on this assembly instruction manual to improve our work!
Thank you for choosing a product from MAFA i Ängelholm AB. We hope that you will be satisfied with your choice and that the product meets your requirements and expectations.
Good luck!

2 Product description

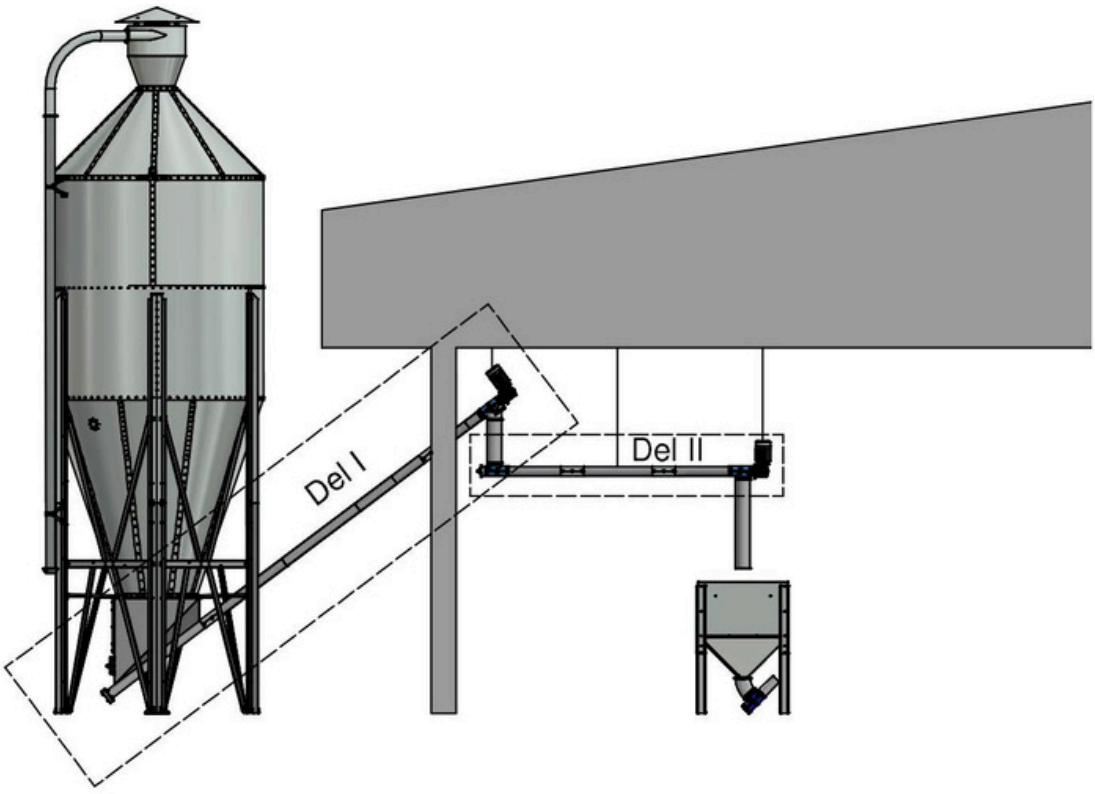
MAFA Conveyor Auger 152mmHD is intended for transporting dry bulk materials in grain or pellet form, as well as wood pellets. Recommended pellet size is diameter 6-8mm, however the pellets must not exceed 9-10mm.

The conveyor auger consists of an outer tube, auger spiral and pinion gear motor.
A motor with a gear drives the auger that moves the material from inlet to outlet.
Power and speed are adapted to the desired capacity.

The electric motor is manufactured in enclosure class IP55. This means that the motors can be installed in adusty and humid environment, even outdoors. However, it is recommended that a rain cover be installed so that water cannot penetrate via the shafts and fans.

The conveyor auger is equipped with abearing at the inlet end, which can be equipped with arotation guard for extra safety.

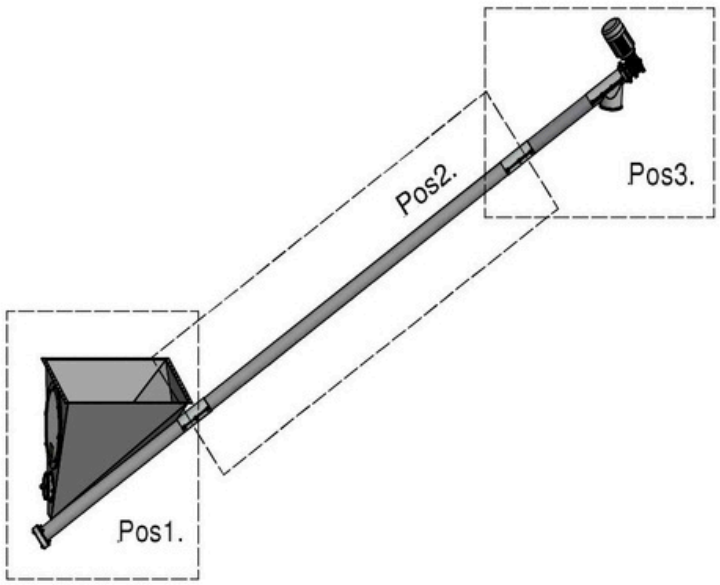
The picture shows an example of a auger arrangement and is divided into two parts. One part for output from the silo, where the inlet is a auger box (part I) and one part for further transport (part II).



Part I

The conveyor auger consists of at least one inlet (auger box) + one outlet section. In between, it can be expanded with extension sections.

The material flow for this variant of auger with an extension part is as follows: Material is fed to the conveyor auger through the inlet (screw box) (pos1). The material is transported in the auger tube (pos. 2) by means of the rotating auger to the outlet (pos. 3). There the material falls out by itself or is thrown out if there is an ejector on the auger.



The conveyor auger can be connected to a auger box which then functions as an inlet. To avoid the risk of injury, the auger box must be firmly mounted under a closed silo or similar. Otherwise, it must be fitted with a protective grid with small openings so that fingers cannot reach either the auger or the agitator if one is used, SS-EN13857.

The standard conveyor auger is mounted at the bottom of the auger box. At the other end, i.e. at the outlet side, the auger is driven by a motor with gear. The power and gear ratio of the motor are adapted to the desired capacity. Mafa recommends pulling operation.

The inlet has a auger with a reduced pitch on the spiral as standard (normally half pitch). Mafa has awide range of auger parts and auger boxes in its range. The type is selected depending on the application.

The auger follows the slope of the pipe in the auger box.

The outlet consists of two halves that clamp around the opening on the inlet and outlet section and is equipped with an edge for connecting apipe or hose.

Part II

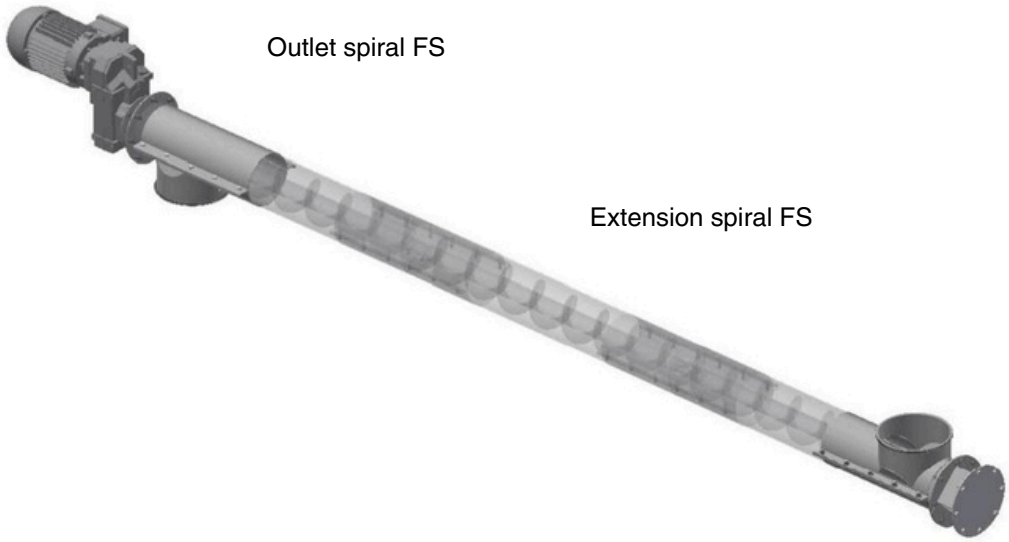
The conveyor auger consists of at least 2sections. An Inlet section and an Outlet section. In between, it can be expanded with Extension sections.

The material flow for this variant of screw with an extension part is as follows:
Material is fed to the screw through the inlet (pos1).
The material is transported in the screw tube (pos. 2) by means of the rotating screw to the outlet (pos. 3).
There the material falls out by itself or is thrown out if there is an ejector on the screw.

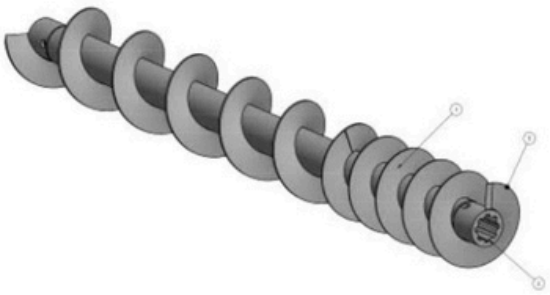
At the end of the inlet section, the auger is mounted. At the other end, at the outlet section, the auger is driven by a motor with agear. The power and gear ratio of the motor are adjusted to the desired capacity. MAFA recommends pulling operation.

The inlet and outlet consist of two halves that are clamped around the opening on the inlet and outlet section. These are provided with arim for connecting apipe or hose.

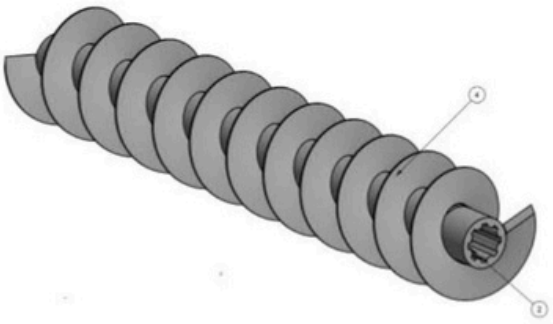
The structure of the conveyor auger



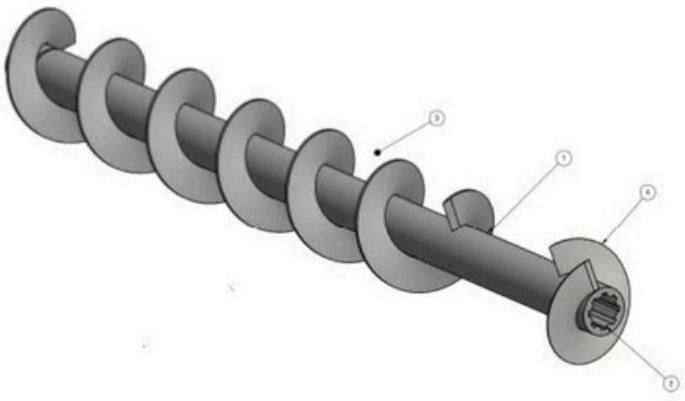
NOTE! Inlet spiral HS should always be used for fuel pellets.



Art no. 6065 1 minlet spiral HS



Art no. 6066 0.65 m spiral HS for auger box



Art no. 6067 1m auger spiral for outlet FS

2.1 Product data

	MAFA 152mmHD
Motor power spur gear motor/worm gear motor 3-phase	≤3kW
Outer diameter of outer tube	152.4mm
Outer diameter of screw spiral	121mm
Outer diameter of center tube in auger	50.8mm
Wall thickness of center pipe	3.0mm
Pitch auger spiral, full	120mm
Pitch helix, reduced	60mm
Diameter of spigot	Spline shaft
Inlet and outlet connections	RK/ OK200
Max auger length	9 m
Max climb	45°
Recommended pellet size	6-8mm
Noise level (at normal production and material in the auger)	85 dB(A)*

* The noise level varies with the filling level and the type of material being transported.
* The actual sound level depends on degree of filling and what kind of material that is transported.

2.2 Capacity

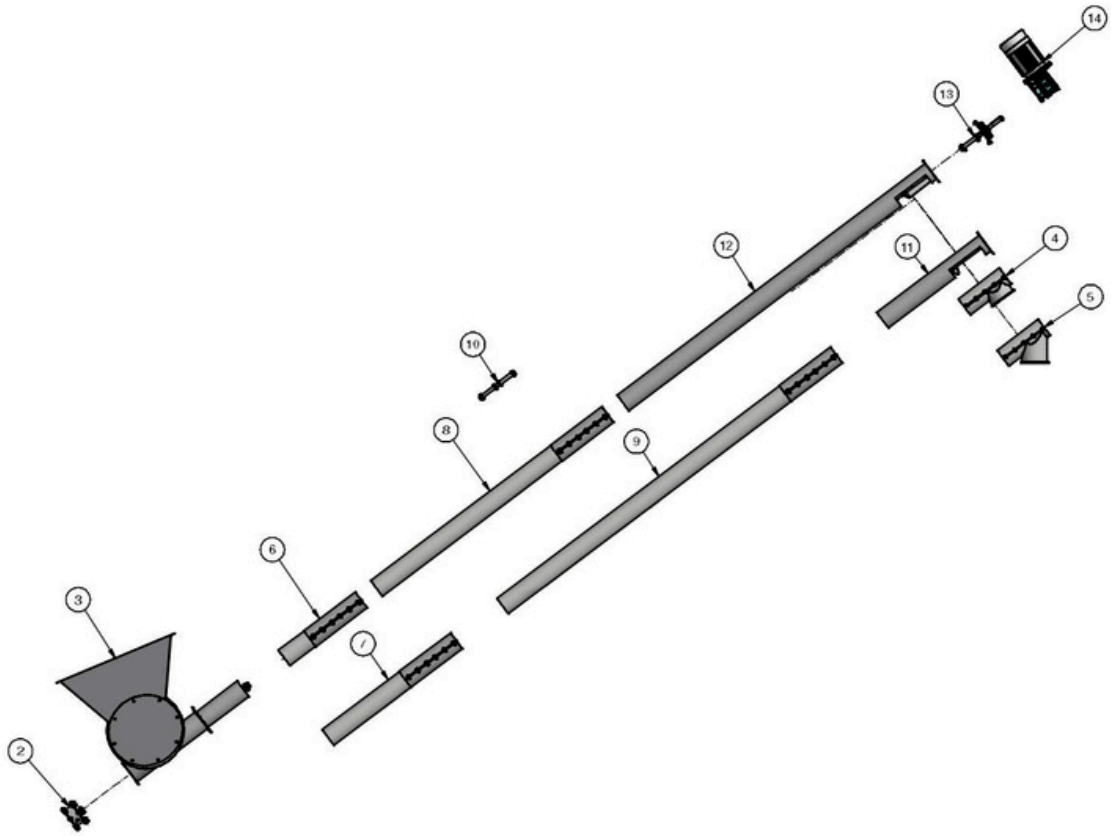
NOTE: Measured capacities are for guidance only. Large variations in capacity may occur depending on the nature of the material. The capacity for wood pellets is based on tests and measurements as well as theoretical calculations made on a auger box with half pitch in the inlet.
Wood pellets (Volumetric weight 0.65)

Wooden pellets

	0° slope	**45° inclination**
RPM	kg/h	kg/h
12	372	279
21	651	488
33	930	698
46	1426	1070
64	1984	1488
86	2666	2000
143	4433	3325
219	6789	5092

2.3 Overview 152mm auger

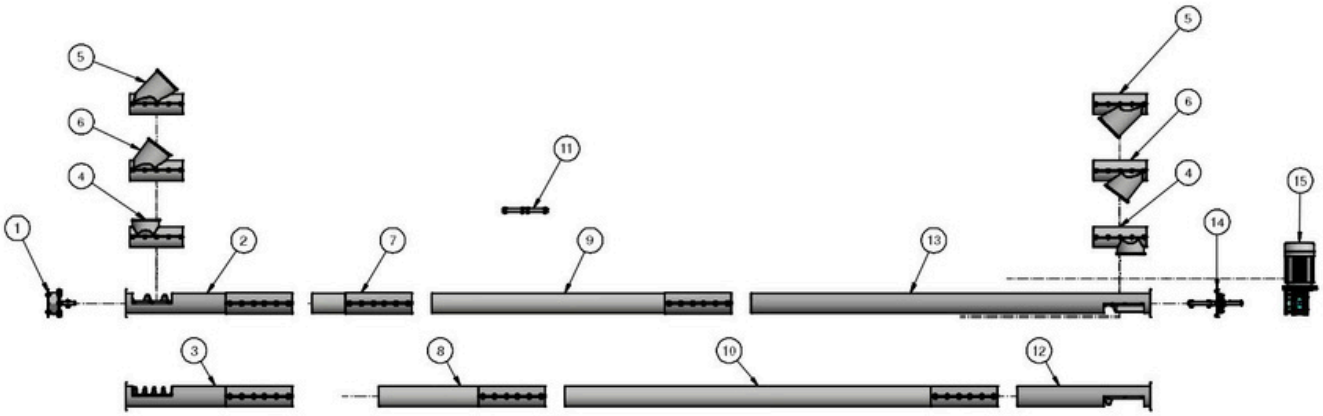
2.3.1 Output from auger box 152mm HD



The picture shows a schematic of the different parts of the conveyor auger.

Pos	**Model MAFA 152mm HD Description**	**Item no.**
2	End flange end bearing, adapted for speed monitor; ball bearings	6680
	End flange with end bearing, adapted for speed monitor; ball bearings and seals. Speed monitor IFM DI602A + cable	8880
		4931 +4932
3	Auger box 152mm HD, different variants available	
4	Inlet and outlet RK/OK200, 90gr metal, FZV	6383
5	Inlet and outlet RK/OK200, 53gr metal (37gr box), FZV	6384
	Inlet and outlet RK/OK200, 45gr metal, FZV	6385
6	0.5m Auger extension incl. bolt set and spigot	8274S
7	1m Auger extension incl. bolt set and spigot	8275S
8	2m Auger extension incl. bolt set and spigot	8276S
9	3m Auger extension incl. bolt set and spigot	8277S
10	Joint spigot incl. screw and nut	5822
11	1m Outlet extension 152mm HD	8272S
12	3m Outlet extension 152mm HD Drive pin set 152mm HD for pin gear motor	8273S
13	Spur gear motor/worm gear motor, different variants of power and speed are available	5826
14		
	Splice sleeve	8159

2.3.2 Auger for further transport 152mm



The picture shows aschematic of the different parts of the conveyor auger.

		Model MAFA 152mm HD
Pos	**Description**	**Item no.**
1	End flange end bearing, adapted for speed monitor; ball bearings	6680
	End flange with end bearing, adapted for speed monitor; ball bearings and seals	8880
	Speed monitor IFM DI602A +cable	4931 + 4932
2	1m Inlet extension with spiral, normal pitch (FS)	8270S
3	1m Inlet extension with spiral, Reduced pitch (HS)	8271S
4	Inlet and outlet RK/OK200, 90gr metal, FZV	6383
5	Inlet and outlet RK/OK200, 45gr metal, FZV	6385
6	Inlet and outlet RK/OK200, 53gr metal, (37gr box) FZV	6384
7	0.5m Auger extension, incl. bolt set and spigot 1m Auger	8274S
8	1m Auger extension, incl. bolt set and spigot	8275S
9	2m Auger extension, incl. bolt set and spigot	8276S
10	3m Auger extension, incl. bolt set and spigot	8277S
11	Spigot incl. screw and nut	5822
12	1m Outlet extension 152mm HD	8272S
13	3m Outlet extension 152mm HD	8273S
14	Drive pin set 152mm HD for spur gear motor	5826
15	Spur gear motor/worm gear motor, different variants available	
	Splice sleeve	8159

3 Safety instructions, warnings, warranty

3.1 Disclaimer

The information and instructions given here and the products described apply to
MAFA reserves the right to make design changes and is not responsible for any printing errors.

3.2 Warranty

The supplier guarantees that this product is free from defects upon delivery. Defects that occur during transport or installation must be reported to the carrier or supplier immediately.
Warranty is included according to current delivery terms.
The warranty does not cover costs for downtime and work during outages, nor damage due to force majeure.

3.2.1 Conditions for the warranty to apply

- MAFA 152 mm HD conveyor auger is only intended for transporting dry bulk materials in grain or pellet form and fuel pellets. Recommended pellet diameter 6-8 mm, however, the pellets must not exceed 9-10 mm. The supplier assumes no responsibility for safety and function if the system is used in any other way.
- The transport auger must be correctly installed. No interventions may be made on the product.
- The user must ensure that the equipment is installed by authorized personnel.
- The user is responsible for the operation of the facility and is obliged to meet the transport needs of materials in an alternative way in the event of any operational disruption. In such cases, MAFA assumes no liability or costs.
- To obtain the longest service life and to meet safety requirements, it is important to follow the manual.
- In the event of any errors, contact your dealer or MAFA in Ängelholm AB immediately.
  When making acomplaint, the type of product, date of purchase and order/invoice number must always be stated.
- If awarranty issue arises, the manufacturer must always be contacted. Costs for troubleshooting will be reimbursed. not unless an agreement has been made with the supplier/manufacturer before the work begins.

3.3 Safety regulations

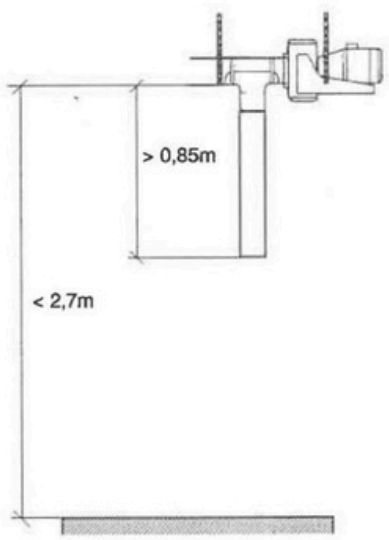
3.3.1 General

- It is the user's responsibility to ensure that local and national regulations, directives and laws are complied with. This product must not be used under any circumstances if it is damaged or if the person intending to use the product does not understand or have knowledge of how to handle it. Please contact MAFA in Ängelholm AB for more information or questions.
- Smoking or taking any action that could cause open flames, dangerous sparks or anything else that could ignite dust in the area around the auger is prohibited. This applies especially around the inlet and outlet and when the auger is in operation.
- Use gloves to reduce the risk of cuts.
- Use hearing protection when there is arisk of loud noise.
- Due to the weight of the product, more than one person may be required to lift it or lifting equipment may be used.
- The inlet and outlet of the conveyor auger must be part of a closed system or must openings be covered by protection, e.g. protective grilles, designed according to SS EN13857.
- Removable guards must be designed so that they cannot be removed without tools.

• The user is responsible for ensuring that self-made containers and inlet funnels meet safety standards so that it is not possible to access the auger spiral or other rotating parts.

• To reduce the risk of damage at open inlets and outlets with adiameter <120mm, at least 850 mm should be hose or pipe must be installed. For open inlets and outlets with a diameter >120mm, at least 1200 mm of hose or pipe must be installed.

• The hose must not be compressed and must be secured with, for example, hose clamps, so that it cannot be dismantled without tools.



3.3.2 Installation and use

• The electrical installation of the system must be carried out by aqualified electrician in accordance with SS-EN 60204-1.

• The auger system must be equipped with an emergency stop.

• Each motor must be equipped with a lockable work switch that is installed in an easily accessible place next to the electric motor.

• When installing a conveyor auger, ensure that it is suspended and braced so that there is no risk of the auger falling down. When installing a conveyor auger for emptying a silo, ensure that it is braced so that any load is not absorbed by the silo. Otherwise, there is a risk of damage to the auger box and conveyor auger.

3.3.3 Repair and service

• Before starting any inspection or repair, ensure that there is no possibility of starting the the conveyor auger. This is especially important if the control system is not located in direct proximity to the workplace. Make sure that all work switches that affect parts of the conveyor auger are turned off and locked.

• The circuit breaker must be turned off and locked if work is to be carried out on the system. The main power must always be disconnected when working on the system.

• The motors must be kept free of dust.

Prohibition of fire, sparking

Unauthorized persons are not allowed to use the product.

Warning about toxic substances

Warning for explosive atmospheres

Warning rotating auger!

Warning rotating shaft!

4. Assembly, general

Read the Assembly Instructions carefully and identify all details and plan before starting work.

4.1 Tools

The following tools are needed to install the auger:

- various Allen keys
- block wrenches, socket wrenches 13mm (for M8), 16.17mm (for M10), 24 mm (for M16)
- Chisel, to center the parts
- Lockable welding pliers, to fix the parts.
- Copper paste to lubricate the drive pin before mounting it against the gear
- Various tools for attaching suspensions to the building/substrate and for electrical connection
- possibly a drill with various drills

4.2 Planning

What affects function and operation:

- Length of auger
- Tilt on auger
- Auger running time and speed
- Pellet quality and size

What should you consider:

- Make sure the suspension is strong enough
- Avoid wood pellet sizes >8mm
- Avoid long augers, maximum length according to table
- Different types of inlet-outlet are available. Choose the one that gives the best results.
- Avoid empty running of the auger
- Avoid pulse operation of the auger
- Make sure the downpipes have asteep slope >45 degrees to reduce the risk of hanging.
- If 2 or more augers are connected, the feeding auger must not have a higher capacity than the counter taking.
- Use a quick auger for an intermediate container and a short auger for any dosing.

Tips for difficult cases:

- Divide the auger into several augers.

There are different approaches to installing a conveyor auger. Below are 2 suggestions. Choose the method that works best for the current situation.

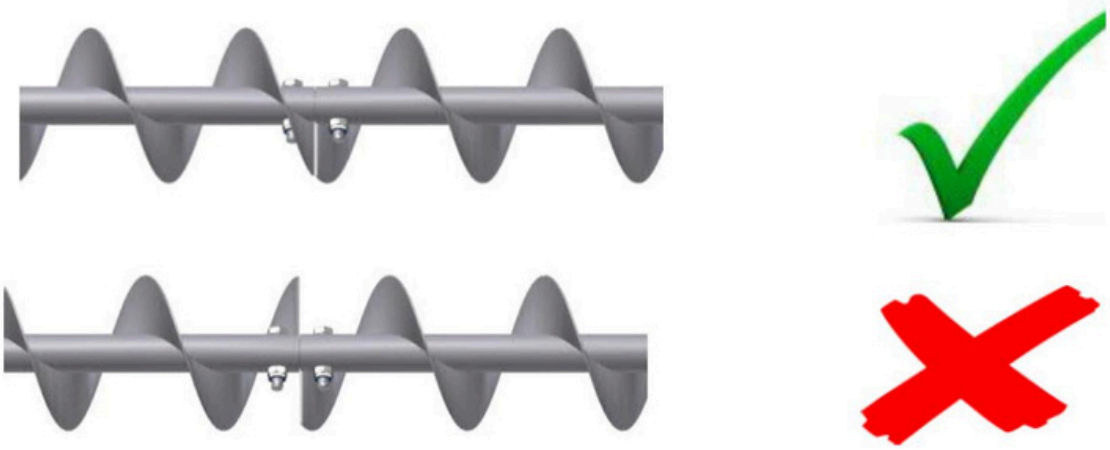
- Assemble the auger on the ground and lift the entire auger up in one piece.
- If the auger is long and heavy or if there is limited space, it may be easier to assemble it piece by piece and join the parts together one by one. Start at the inlet end. A self-locking pliers, such as a welding pliers, can be very helpful in holding the auger parts in place while assembling the auger and pipe parts.

4.3 Assembly instructions for transport auger 152mm HD

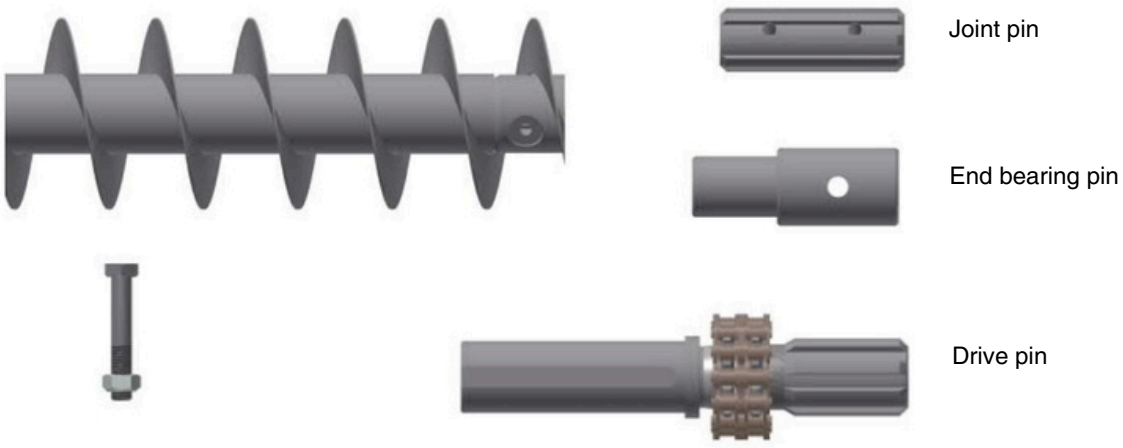
Assembly of auger spirals

NOTE! When joining the auger spirals, it is very important that the spiral does not wrap around. See image below. If the spiral is mounted upside down, the auger will move much more heavily. The risk is that this will increase the load on the auger, or that the motor will not be able to start the auger and the motor protection will trip.

NOTE! Do not use force when installing the joint pin, drive pin and end bearing pin. If necessary, file the edges. three.

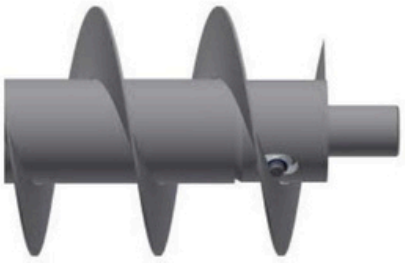


Plan the assembly so that the parts are assembled in the correct order, in asafe manner. Keep in mind that the weight of the parts can be high!



4.4 Fitting inlet extensions

• Place the end bearing pin in place and secure it with an M8x50 bolt and nut. The bolt only ensures that the pin is secured to the auger. Do the same with the joint pin at the other end.
NOTE: Do not use force when installing the splined pin. If necessary, file the edges.



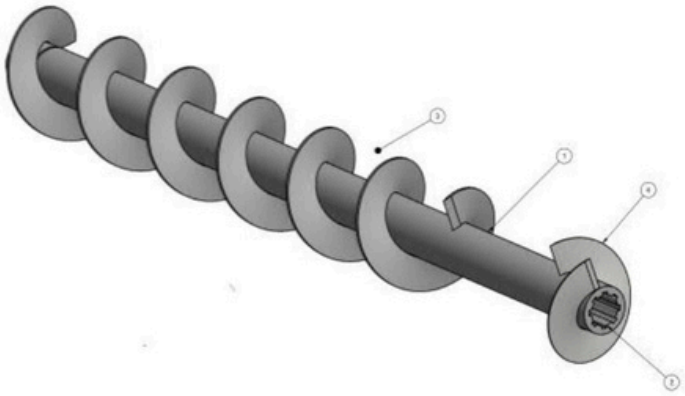
End bearing side

4.5 Mounting auger extensions

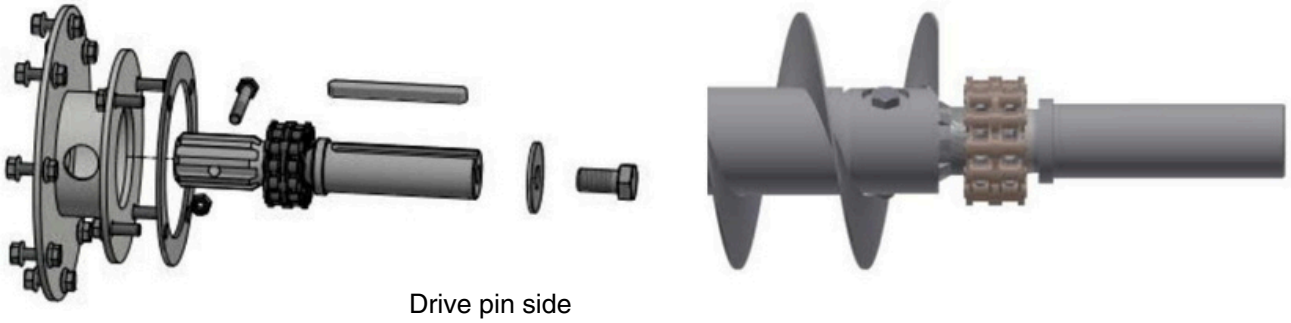
• Install the spigot at one end and secure it with an M8x50 screw with nut.
NOTE: Do not use force when installing the splined pin. If necessary, file the edges.

4.6 Fitting outlet extensions

• The characteristic of an outlet auger is that the spiral pauses at the outlet and that
There is an ejector blade mounted closest to the engine.



Thread the drive pin's tapered end through the adapter before threading it into the outlet side of the outlet auger. Secure the drive pin with an M8x50 bolt and nut.
If a spigot is installed in the inlet extension and in the extensions, there is no need to install a spigot on the outlet extension. NOTE: Do not use force when installing the splined pin. If necessary, file the edges.

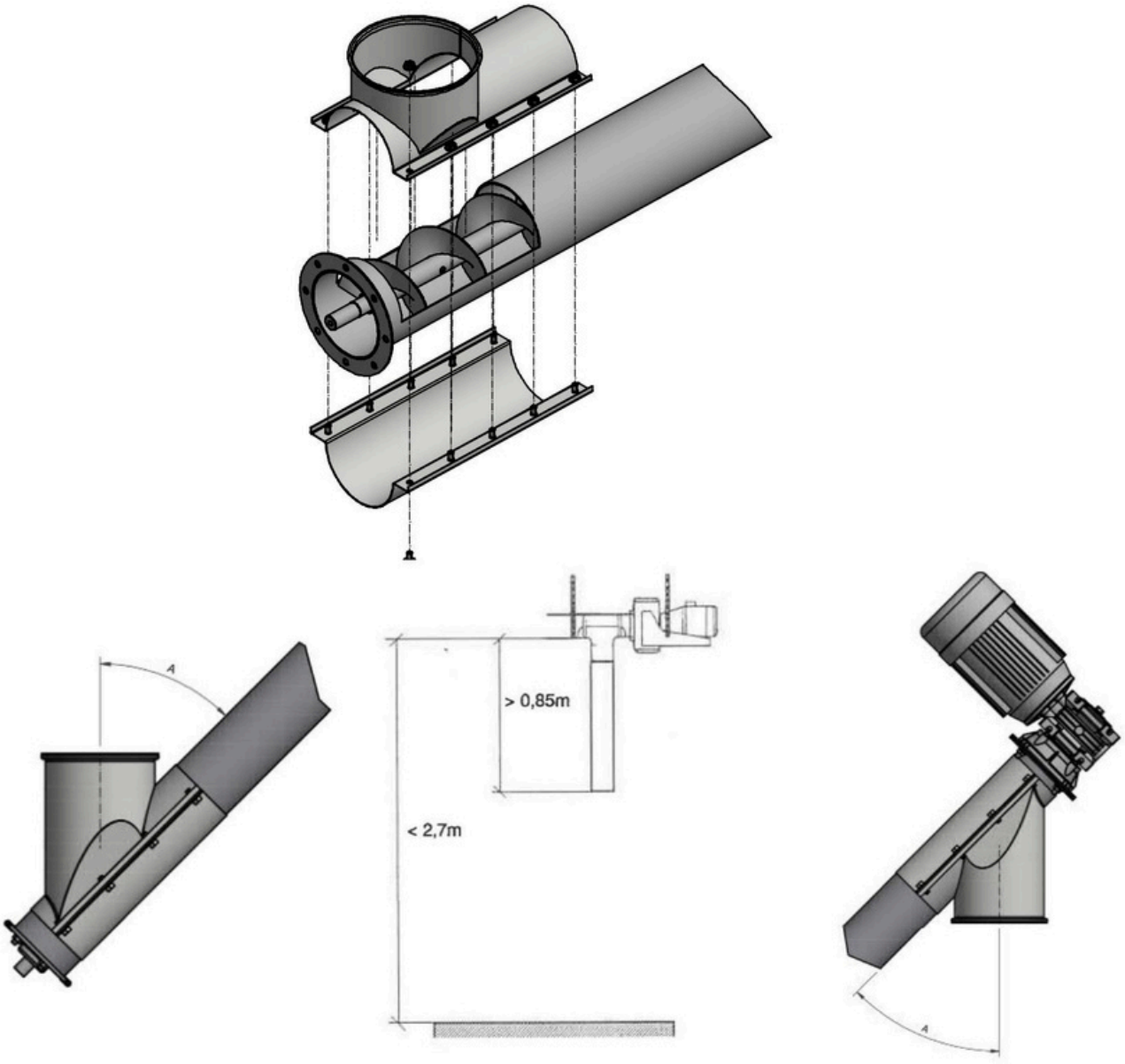


Drive pin side

4.7 Installation Inlet and outlet

The inlet and outlet consist of two halves that are clamped around the auger tube. Place the inlet and outlet part so that it fits over the cutout in the outer tube. NOTE: When installing, make sure that there are no gaps between the inlet and outlet and the cutout in the pipe. Apply sealant between the pipe flanges to minimize the risk of water entering the auger or reduce the risk of dust.

The image below shows an example of inlet-outlet.
For correct assembly of a 90° inlet and outlet, ensure that the side with the shortest distance to the center is closest to the end of the pipe.
For other angled inlets and outlets, the angle A between the auger and outlet should be 45° or 53° depending on the desired inclination of the auger. For a 37gr auger box, a 53gr outlet can be used if you want the outlet to be directed vertically, straight down.



Important!
To reduce the risk of crushing injuries at open inlets and outlets, there are requirements for protection according to SS-EN ISO 13857.

Openings with a diameter <120mm require a safety distance of at least 850mm. For open inlets and outlets with larger openings >120mm, asafety distance of at least 1200 mm applies. A hose or pipe can be mounted on the outlets. These must be secured with, for example, hose clamps, so that they cannot be dismantled without tools. The hose must not be compressible.

4.8 Mounting of spur gear motor/worm gear motor

Keep in mind that

- When delivered, the gears are filled with the correct amount of oil and therefore do not require any additional topping up.
- The spur gear motor/worm gear motor must not be placed in acorrosive environment that is harmful to the components.
- See picture below for mounting position.
- Check that the shaft on which the gear is to be mounted is clean and free of damage.
- Make sure that the surface to which the gear is to be screwed is flat and free of damage.
- Check that the machine shaft and the gear shaft are aligned so that no harmful forces affect the products.
- If the gear unit is equipped with an air plug, make sure that the seal of the plug is removed.
- Before connecting electricity to the motor, always check the cover of the electric motor's junction box to see how the electrical cable should be connected.
- Check the motor rating plate to see what value the motor protection should be set to.
- The gearmotor should be fitted with a rain cover so that water cannot penetrate via the shaft journal or fan axis.

Depending on whether the entire assembly is done with the augers lying flat or if the auger is tilted, it may be important to consider the following before loosening the self-locking pliers. **There may be arisk of crushing if fingers and arms are not watched.** The auger will want to fall back to its original position when you release the welding gun.

When mounting the drive pin to the outlet auger, it is easier if the auger is first pulled out of the outer tube about 15 cm and locked in place with self-locking pliers. Thread the splined end of the drive pin through the adapter before threading it into the outlet side of the outlet auger. Secure the drive pin with an M8x50 bolt and nut.
NOTE: The adapter should be placed with the hole facing down.

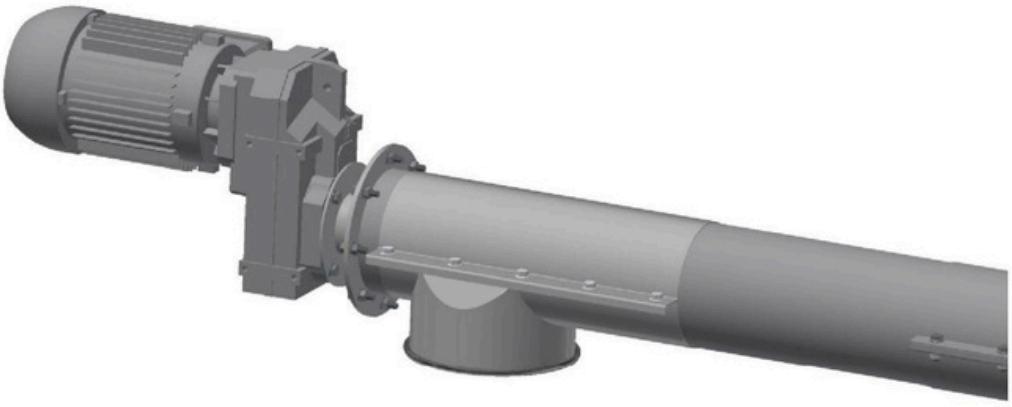
Loosen the pliers and connect the entire motor package to the pipe flange and screw it in place with 8M8x25 screws.

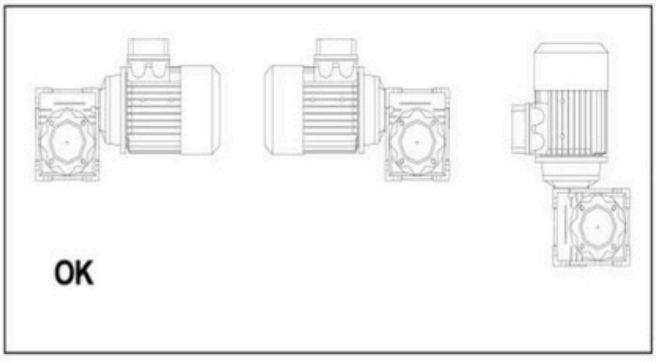
- Mount the spur gear motor/worm gear motor on the drive shaft.

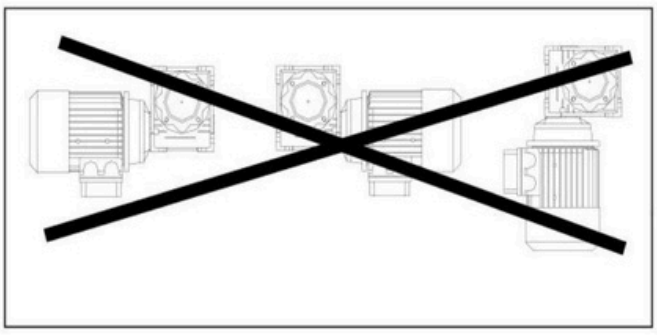
NOTE! When installing, the gear should slide easily on the shaft. No force must be used that could damage the gear. See picture below for mounting position. Screw this to the adapter with 4 screws. Rotate the screw so that the keyways are in the correct position and install the key, or install the key on the pin before threading the motor on. It is agood idea to apply some copper paste to the shaft before installing the motor. Attach the pin to the motor by screwing in a screw with a washer into the end of the pin.

Art no. 5826 Drive pin set

Drive pin side.
Spur gear motor shown. Unit
is mounted with the motor over the
gear as shown in the pictures.







4.8.1 Connecting the electric motor

All electrical installation must be carried out by qualified personnel and in accordance with national rules and regulations.

• Before connecting electricity to the motor, always check the cover of the electric motor's junction box to see how the electrical

The cable should be connected.

• Check the motor rating plate to see what value the motor protection should be set to.

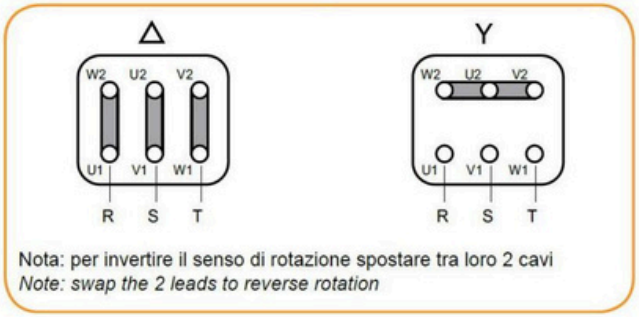
• All electrical installation must be carried out in accordance with national regulations and standards.

• All motors must be preceded by a lockable work switch

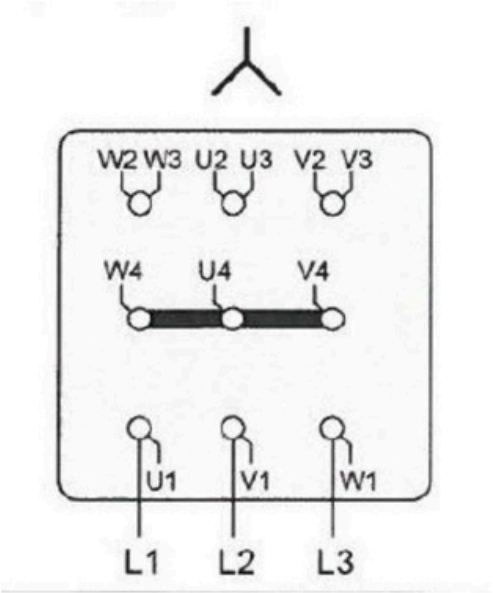
Electric motor with worm gear BEVI

3-phase

<= 3kW 230/V	**< =3kW 400 V**
>3 kW 400 V	**> 3kW 690 V**



Electric motor with pinion gear WATT



Screw connection Screw connection

Connection of 3-phase current 400/690V is carried out as follows:

brown to L1

black to L2

gray to L3

Motor protection setting (indicative)

Motor size / Engine size Engine size / Engine power	0.25 kW	0.55 kW	0.75 kW	1.1 kW	1.5 kW	2.2 kW	3.0 kW
Engine protection / Engine guard Motor protection / Motorschutzschalter	1.0A	1.6A	1.8A	2.8A	3.7A	5.0A	6.5A

NOTE! The table is for guidance only. Always check the motor nameplate for the correct motor protection setting.

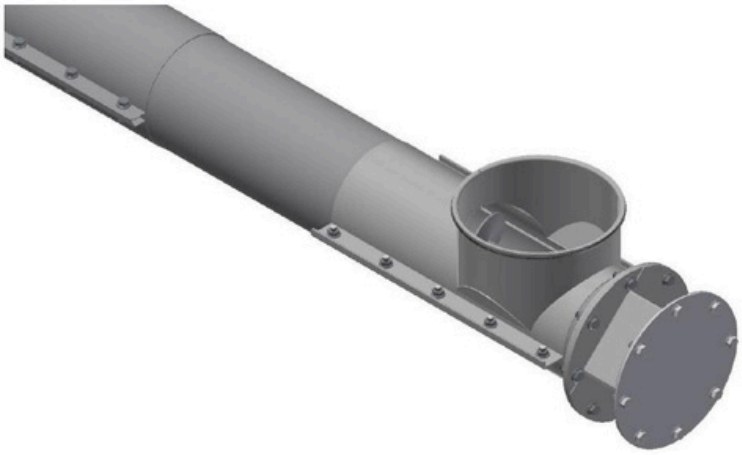
4.9 Auger and end bearing side

• End bearing. Thread the plate with end bearing onto the end bearing pin. Screw the plate to the outer tube flange with 8M8x25 screws and nuts. Lock the shaft to the bearing with an M10 screw and awasher.

Screw 1M8 nut onto each of the long screws that are attached to the end bearing plate. The flange on the nut should be facing outwards. Put the cap in place and check that it seals satisfactorily against the end bearing plate.
Secure the cover with 2M8 screws.
Orient the bearing housing so that the gap is pointing downwards towards the ground. The dimension is shown in the same picture as for the attachment of the bearing plate. This way, no material or water can accumulate in the bearing housing.

If the optional speed monitor is to be installed, the following applies: Install a flag against the end bearing pin with a screw and washer. See exploded view of end bearing, chapter 9.

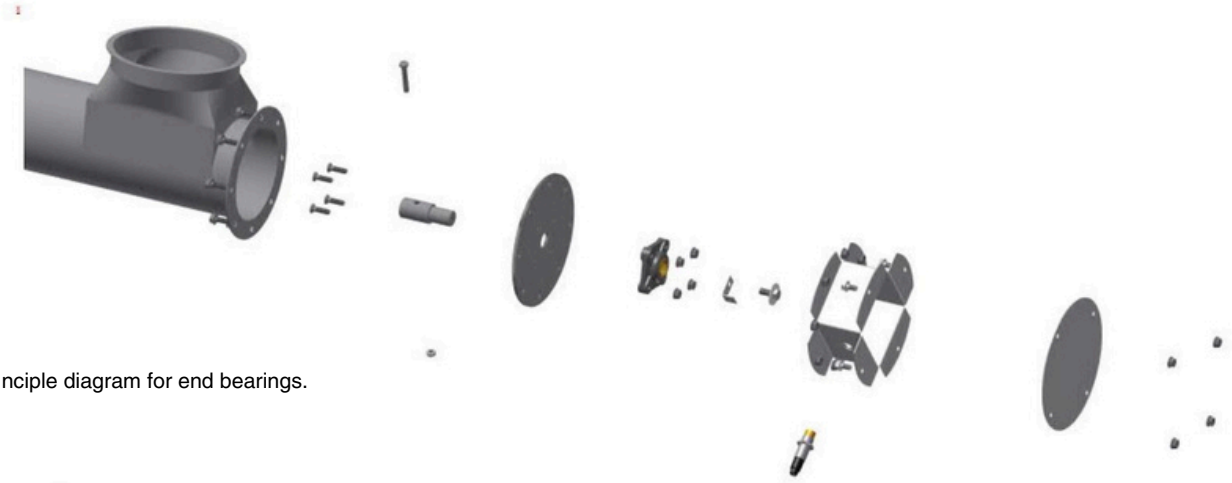
Mount the sensor in the housing. Adjust for optimal distance between sensor and flag.
NOTE: Make sure that the flag does not touch the sensor when moving the auger.



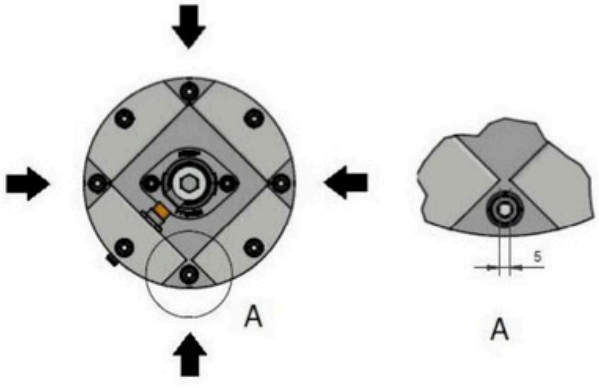
Inlet side

End bearing cover for protection of the end bearing

Speed monitor mounted on the end bearing



Principle diagram for end bearings.



Location of the speed monitor.
Distance to flag is adjusted.

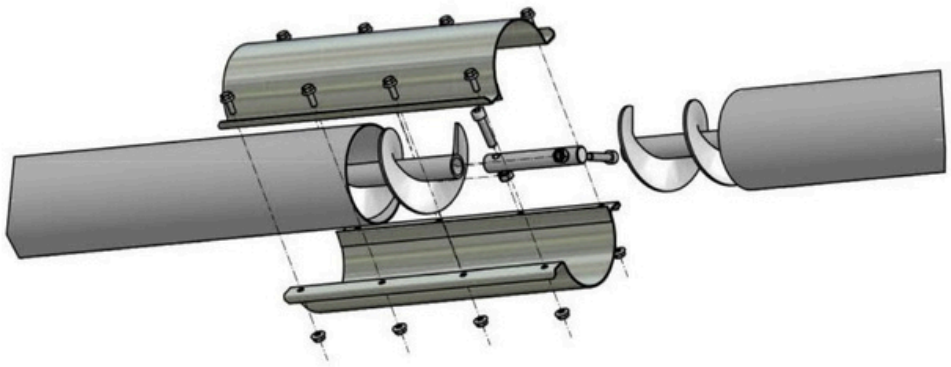
4.10 Assembly of outer tubes

The outer pipes are joined with a joint sleeve. The joint sleeve consists of 2 halves
that are screwed together with a screw and nut.

Fit the outer tubes as tightly together as possible and ensure that the tubes are aligned. Otherwise, the auger risks hitting the inside of the pipes and going heavy, resulting in increased wear and, in the worst case, failure.

Make sure that the cutout in the outer pipe is directed in the direction where the inlet or outlet will end up.

There is a sealing plate on each half of the joint sleeve. Place the joint sleeves so that the sealing plates end up on each side of the pipe. Place the joint sleeve so that the center is over the pipe joint. Apply sealant between the joint sleeve and the pipe to minimize the risk of water entering the auger or to reduce the risk of dust. Tighten the auger connections evenly all around so that the pipes cannot split.

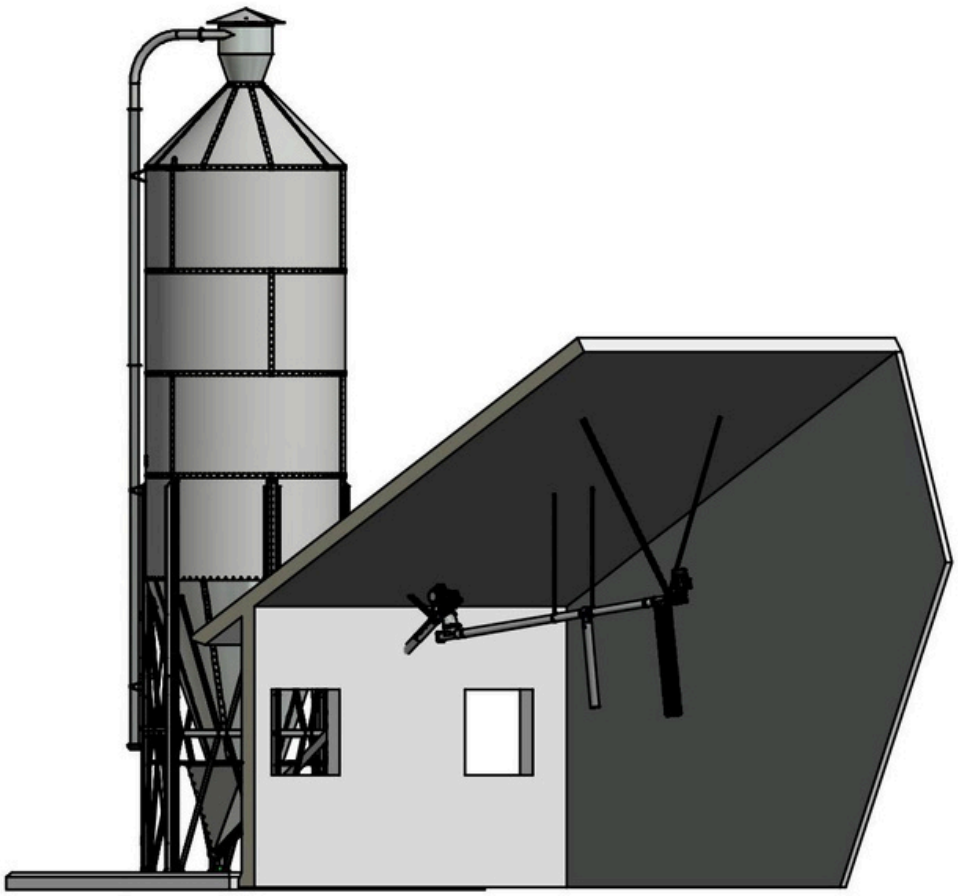


NOTE! It is important to use sealant in the joints between the outer tubes of the auger to make the auger tight.

4.11 Auger suspension

In order for the conveyor auger to function optimally, both in terms of capacity and mechanically, it is important that it is assembled and fixed properly. Follow the assembly instructions for locking the joints so that they fix the auger both horizontally and vertically.

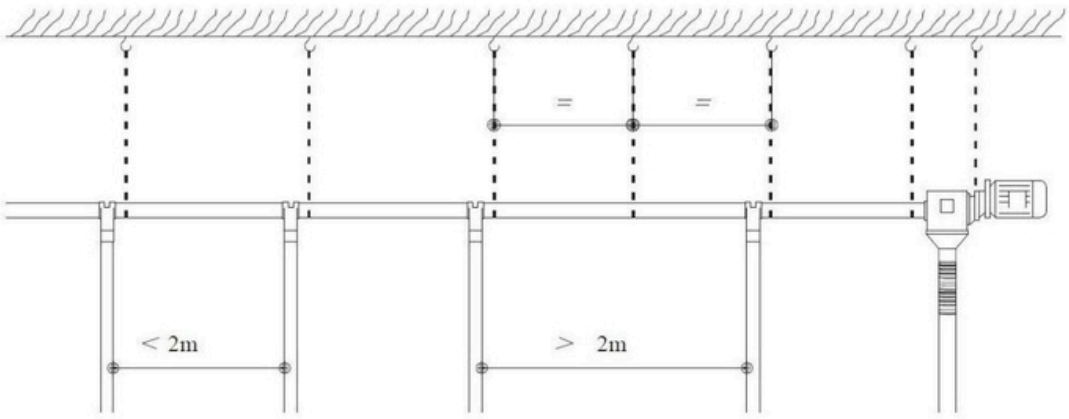
Generally, for auger, you should hang and brace along the auger and at the motor end.
Mafa offers a standard range of suspension parts that fit both the auger and the drive unit.
These are recommended to get a good end result.

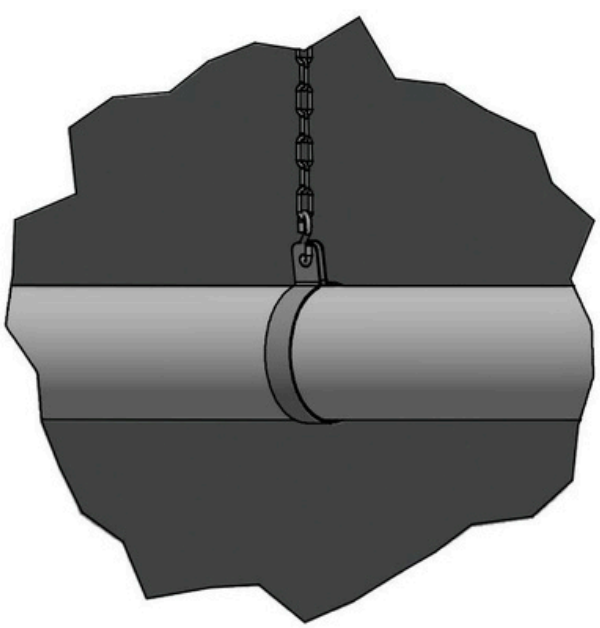


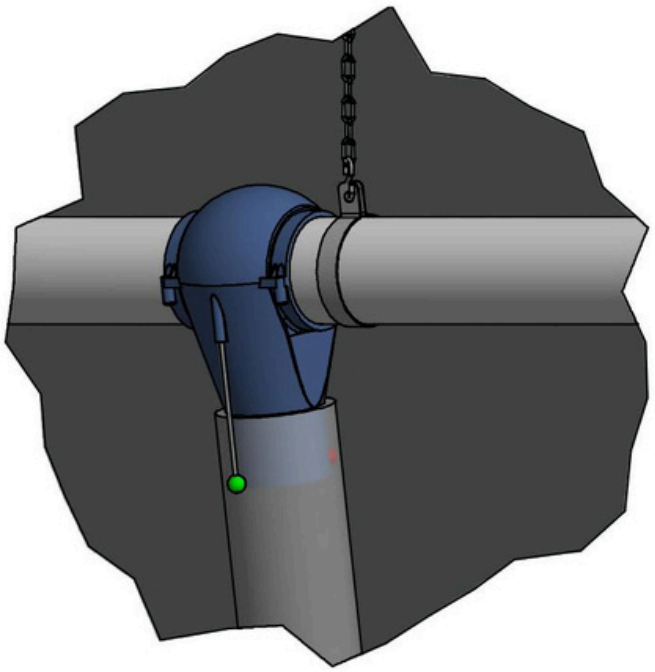
4.11.1 Suspension along the auger

The auger should have a suspension at least every three meters to ensure a stable suspension. To make the suspension even more stable and reduce the risk of oscillation, the bracing should be done with double suspensions with an angle of approximately 30° between them. See picture “Suspension engine end”. This is especially important if there is a large distance between the auger and the attachment point. If the auger tends to hang down between the suspension points, the distance between the suspensions must be reduced.

If the screw is equipped with intermediate outlets (mainly applies to Flex screws), extra fasteners should be placed next to each outlet according to the instructions below.
For distances <2m between outlets, asuspension must be provided for each outlet.
For distances >2m, there should also be an extra suspension in the middle.
Suspension can be astraight pendulum and depending on the size of the screw, Mafa recommends either an angle profile, chain or wire.



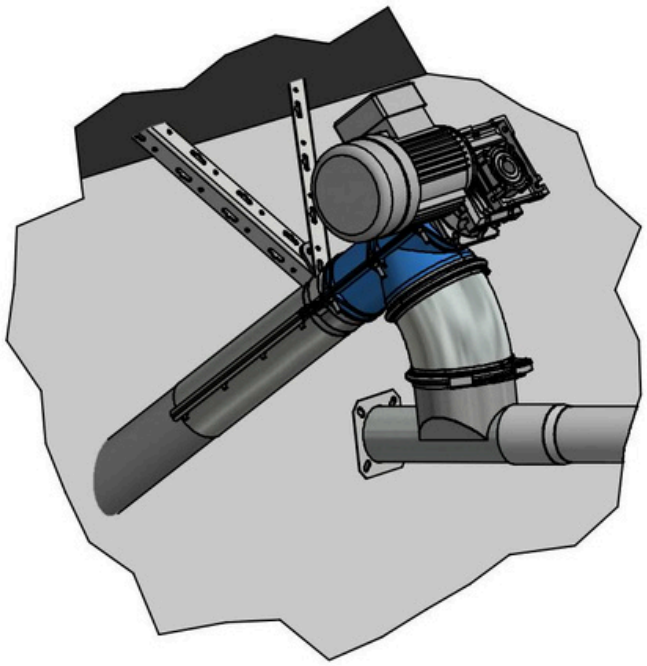


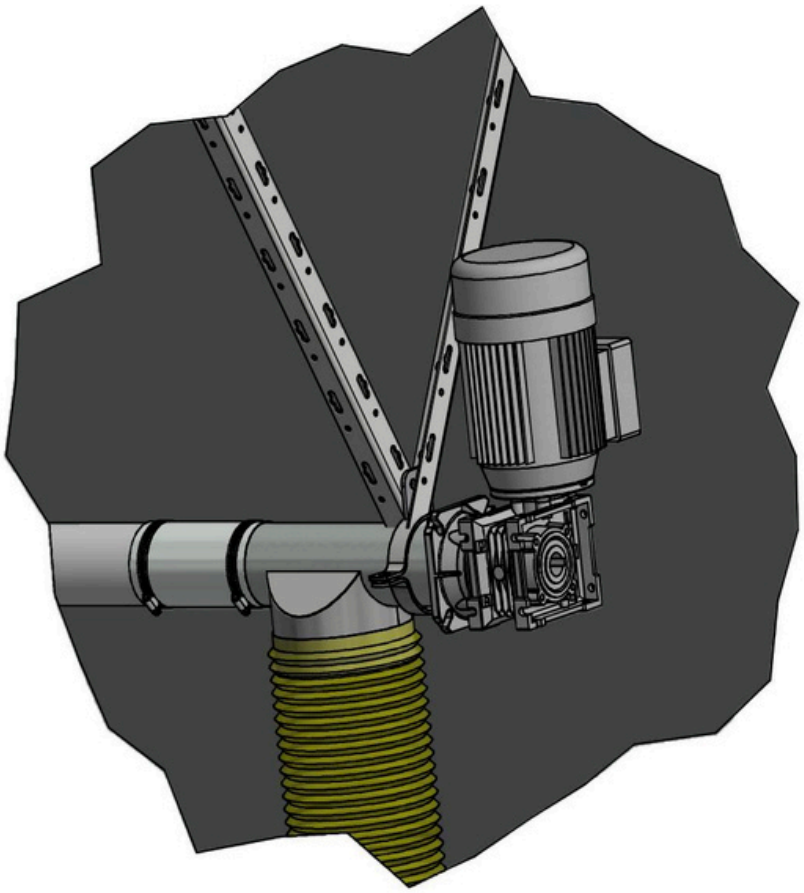


4.11.2 Suspension of the motor end

The drive end should be secured so that it cannot rotate. A good way to do this is to use 2 angle irons suspended from the ceiling at an angle. The angle between the bars should be 60 degrees and centered over the auger.

Mounting at an angle provides better stability than with just a vertical mount. Please note that mounting directly to the engine is not recommended as it makes servicing more difficult. Instead, Mafa recommends using a pipe bracket and bracket placed next to the outlet, see picture.





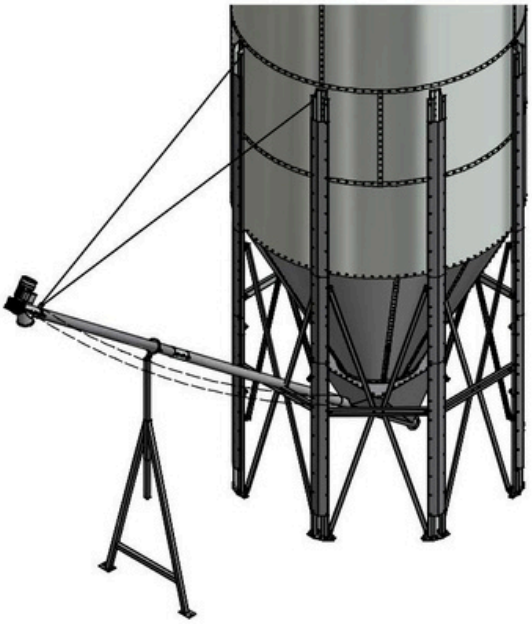
4.11.3 Suspension of, for example, an unloading auger

For unloading augers 6 m and longer it is important to brace the middle as well, otherwise the auger risks bending. Attachment can be done in different ways, either from the ground or with braces up against the silo legs. It may be necessary to drill extra holes in the leg profiles for attaching double wires.

NOTE! It is very important for the function that the bracing is done carefully and that you ensure that the screw is mounted/ attached completely straight. If there are angular deviations in the joints or at the connection to the auger box, there is agreat risk that the auger will be heavy and there is a risk that it will break.

Tip!

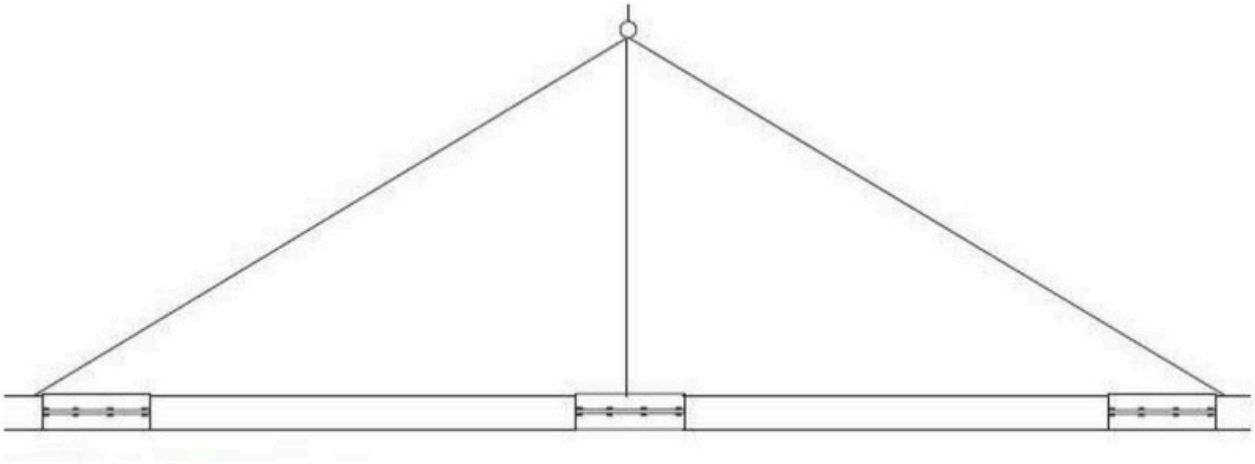
- In cases where there are long distances to the attachment points, it is advantageous to use wires and swing down to the augers.
- Mafa does not recommend placing the auger on the floor or similar as this may be uneven and difficult to clean.
- It may be easier to divide the auger if you place the pipe brackets in the middle of the outer pipes instead of at the joints.



Example of assembly of 6 m transport auger from silo where support is only mounted at the end. Problems have a risen with motor protection tripping due to the auger running heavy. Extra bracing must be mounted in the middle of the auger to keep it straight and avoid risk of failure.

4.11.4 Suspension of the unloading auger

When handling longer lengths, the auger should be lifted at least 3lifting points to avoid breakage in the auger.



5 Care instructions

MAFA conveyor auger 152mm HD requires little maintenance if the installation has been done according to instructions. Conveyor augers should not be run without material as this causes increased wear and higher noise levels.

5.1 Commissioning

When delivered, the auger spiral has a rough surface and is oiled to prevent rust during storage and transport. This makes the spiral rough, which is why the auger runs more heavily until the spiral has been polished. Therefore, run the auger with a reduced load at first, i.e. do not fill the entire silo or container immediately. Test the system with a smaller amount. Then run through 50 –100 kg of material before the system is finally put into operation.

Keep in mind that

Before starting the system and filling it with material, check that:

- The spur gear motor/worm gear motor is mounted correctly. If the gear unit is equipped with an air plug, make sure that the seal of the air plug is removed. This is usually equipped with a red label.
- The transport auger is hung up and braced in a satisfactory manner and that the pipes are in line with each other.
- All auger connections are tightened.
- The motor protection is set correctly
- All connections are screwed in place

Start up the system and check

- that the conveyor screw has the correct direction of rotation
- after any faults that may be caused by incorrect assembly, such as vibrations, leaks, unusual sound etc.

5.2 During operation

- Retighten all auger connections approximately one month after commissioning.
- It is recommended to follow the instructions below routinely every month and at least once a year to do a more thorough review. Preferably in connection with asilo inspection.
- Always turn off and lock the main switch before working on the system.

Verify

- suspensions and bracing
- end bearing
- noise, vibrations
- leakage at the gearbox, especially at the shaft seals and cover caps.
- clean the outside of the spur gear motor/worm gear motor and remove any dust accumulations. Make sure that motors, gears and electrical equipment are not covered with dust. Remove these with, for example, a vacuum cleaner or compressed air. NOTE! Never flush with water.
- Always reassemble any removed guards before starting the screw.
- Replace damaged or worn parts immediately

5.3 Service/repair

When errors or deficiencies are discovered, it is important that these are corrected as soon as possible to avoid subsequent errors occurring.
Locate what is broken and needs to be replaced/repaired.

5.3.1 Replacing the complete spur gear motor/worm gear motor

• Check that the new motor has the same designations as the old one. • Note which direction the motor fan rotates before you disconnect the electrical cables.
•NOTE! Note which terminal each cable is mounted on.
•Loosen the auger connections and pull the spur gear motor/worm gear motor off the shaft. You may need to use, for example, 2 chisels to carefully pry between the gear and the machine. NOTE! Pry carefully.
• Install a new spur gear motor/worm gear motor in reverse order. Apply copper paste to the shaft to facilitate future disassembly.
• Finish by checking that all auger connections are tight and that the electrical cables are correctly installed. •
Test drive and make sure that all fasteners are tight and that the motor spins in the correct direction.

Spur gear motor
The gears are delivered filled with oil type ISO VG 220 in accordance with the label on the gear and ready to use. For example Shell Omala Oil 220.
Gearboxes of the model series H, A, F, Kin sizes 40, 50, 55, 60, 65 are maintenance-free, oil change is not necessary.
For these types there is no air plug included, there is no oil drain/fill or level plug.
For more information about volume, please contact the supplier.

Worm gear motor
The gears are delivered filled with oil type ISO VG 320 and ready to use. For example Shell Tivela Oil SC320.
For more information about volume, please contact the supplier.

Dismantling the worm gear on a worm gear motor.
• Loosen the auger connection between the gear and the motor, normally 4 screws.
• Pull the worm gear off the motor shaft. There are two types of couplings between the worm gear and the motor. One is that the gear and the motor are fitted with claw couplings that fit together during assembly. The other means that the worm gear is fitted with aso-called hollow shaft. When mounting the gear on the motor, the hollow shaft is threaded onto the motor shaft. Here it is recommended to apply, for example, copper paste to facilitate any future disassembly.
• Screw the worm gear to the electric motor.

5.3.2 Transport auger

• Dismantle the spur gear motor/worm gear motor and any end bearing.
• Make sure that the transport auger is well suspended so that there is no risk of it falling down during the actual work.
• Make sure that the working position is stable.
• Pull out the broken spiral. Replace the broken part and reassemble.

6. Troubleshooting

Wrong	Cause	Measure
The transport auger does not work	The auger is blocked.	Clean the auger.
	The motor is not receiving voltage.	Check that the motor has voltage.
The auger starts, but only runs for ashort time then breaks the motor protection	The auger motor is not connected correctly	Check the connections according to the connection instructions
	The material is too impure	Remove the worst dirt from the material
	The material is too moist.	Dry or change material and clean the auger
	The motor is running in the wrong direction.	Change direction of rotation
Auger runs slowly, draws high current	Stop in the inlet	Clean
	Auger not straight mounted	Align the auger so it is straight.
The auger moves too slowly and stops.	The auger in the inlet has the wrong pitch	Install auger in inlet with smaller pitch

7 Spare parts list 152mm HD

7.1 Drive side Art. no. Designation	Rated current NOTE: For guidance only
6083 Spur gear motor 12 rpm 0.25kW 3-phase	1.0A
6085 Spur gear motor 21 rpm 0.55kW 3-phase	1.6A
6084 Spur gear motor 33 rpm 0.75kW 3-phase	1.8A
6079 Spur gear motor 46 rpm 0.75kW 3-phase	1.8A
6084 Spur gear motor 33 rpm 0.75kW 3-phase	1.8A
6078 Spur gear motor 64 rpm 1.1kW 3-phase	2.8A
6077 Spur gear motor 86 rpm 1.5kW 3-phase	3.7A
6076 Spur gear motor 143 rpm 2.2W 3-phase	5.0A
6075 Spur gear motor 219 rpm 3.0kW 3-phase	6.5A

5826 Drive pinion set 152mm HD for Pinion gear motor (with chain and spline shaft)

Art. no. Description	Rated current NOTE: For guidance only
1388 Worm gear motor 0.75kW 70 rpm, FRS 70, 3-phase	1.9 A
6456 Worm gear motor 1.1kW 50 rpm, FRS 70, 3-phase	2.6 A
1392 Worm gear motor 1.1kW 70 rpm, FRS 70, 3-phase	2.6 A
1389 Worm gear motor 1.1kW 90 rpm, FRS 70, 3-phase	2.6 A
1390 Worm gear motor 1.5kW 140 rpm, FRS 70, 3-phase	3.7 A
1391 Worm gear motor 1.5kW 200 rpm, FRS 70, 3-phase	3.7 A

6676 Drive pinion set 152mm HD for Worm gear motor (with chain and spline shaft)

7.2 Bearing side

Art. no. Description

6680 End plate 152mm HD with ball bearings and pin complete, for speed monitor; Ball bearings
8880 End plate 152mm HD with ball bearings and pin complete, for speed monitor; Ball bearings and seals
6530 Bearings, Ball bearings SKF YAT 205-2F
8842 Radial seal (included in 8880) 2 pcs required/end plate

4932 Cable for speed monitor, 2m
4931 Speed monitor DI602A M18

7.3 Extensions

Art. No Description

5822 Joint pin set 152mm HD complete (splines)

Outlet part: 6067 Spiral outlet 152mm HD FS 1.0m 6068 Spiral outlet 152mm HD FS 3.0m

Inlet part:

6066 Auger spiral in auger box 152mm HD HS 0.699m
6064 Spiral inlet 152mm HD FS 1.0m
6065 Spiral inlet 152mm HD HS 1.0m

Extensions:

6069 Spiral extension 152mm HD FS 0.5m
6070 Spiral extension 152mm HD FS 1.0m
6071 Spiral extension 152mm HD FS 2.0m
6072 Spiral extension 152mm HD FS 3.0m

FS =Full rise on the spiral (approx. 120mm)
HS =Half pitch of the spiral (approx. 60mm)

8154 Outer pipe In/outlet extension 152mm 1.0m
8155 Outer pipe In/outlet extension 152mm 3.0m
8150 Outer tube auger extension 152mm 0.5m
8151 Outer tube auger extension 152mm 1.0m
8152 Outer tube auger extension 152mm 2.0m
8153 Outer tube auger extension 152mm 3.0m

8 Operating instructions speed monitor type DI602A

8.1 Frequency switch type DI602A

Operating instructions (safety applications according to ATEX), instructions for safe use in potentially explosive atmospheres

8.2 Function and characteristics

• Use in potentially explosive atmospheres according to classification II 3D (group II, category 3D, operating equipment for dust atmospheres). The requirements of the standards EN60079-0 and EN60079-31 are met.
• Marking (see equipment or technical data sheet) II 3D Ex tc T80°C Dc IP67 U
• Approved ambient temperature for the application (when used according to regulations): Ta: -20 °C...+50 °C

8.3 Installation/commissioning

The units may only be installed, connected and put into operation by authorized personnel. The authorized personnel must be familiar with the various protection classes, regulations and ordinances that apply to operating equipment in potentially explosive atmospheres.
Check that the classification (see “Marking” above and the marking on the sensor) corresponds to the intended use.

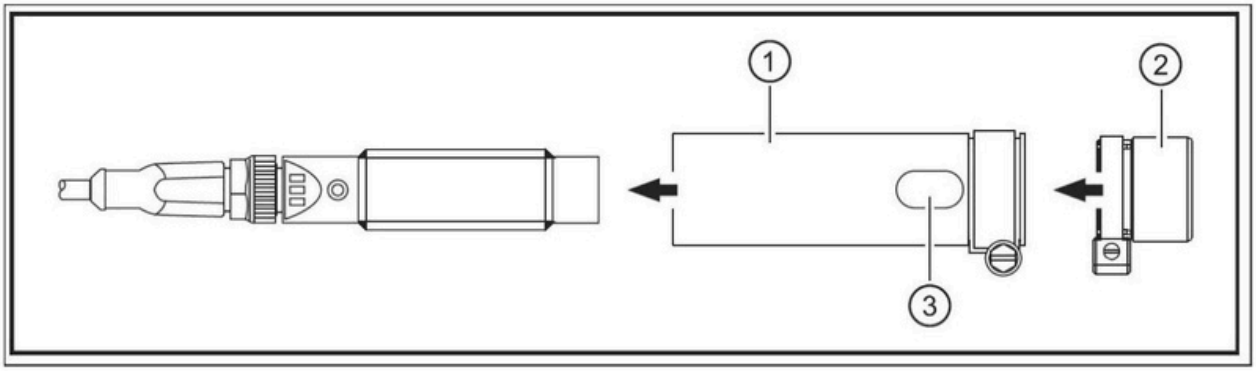
8.4 Assembly instructions

• Observe applicable national regulations and rules as well as applicable installation regulations.
• Avoid static charging on plastic equipment and cables.
• To prevent electrostatic charging –clean the device only with adamp cloth. Avoid rubbing with non-conductive materials.
• Metallic parts (contact housings, fasteners, protective covers, etc.) must be integrated into the potential equalization to avoid electrostatic charging.
• Do not install the equipment in dusty areas.
• Avoid dust deposits on the equipment.
• Take measures to protect equipment and cables from damage.
• Electrical connection and electrical data are indicated on the equipment label or in the technical data sheet.
• Avoid getting the contact area dirty. Screw the connector into a clean environment.
• Avoid exposing the sensor to direct UV radiation (sunlight). Mount the sensor in a protected location.
• M12 screw connections may only be opened and closed in sufficiently clean environments.

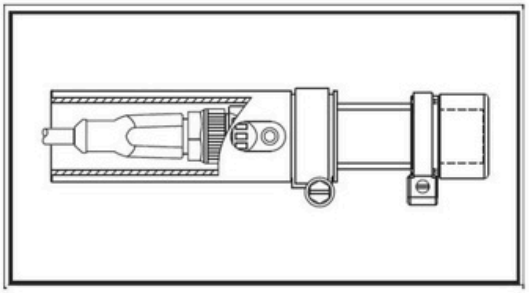
8.5 Special conditions for safe operation

• The sensors, in combination with the included impact protection for the contact and sensor, have been tested with an impact energy of 4 joules according to table 8 in EN60079-0 for group II and can withstand lower mechanical risks.

• The sensors may only be used with the supplied impact protection for the connector and sensor.
•Only use the EVC490 or EVC491 connection connectors from ifm.
•Position the impact protection for the connector (1) so that the equipment's indicators and pushbuttons are clearly visible through the opening (3).



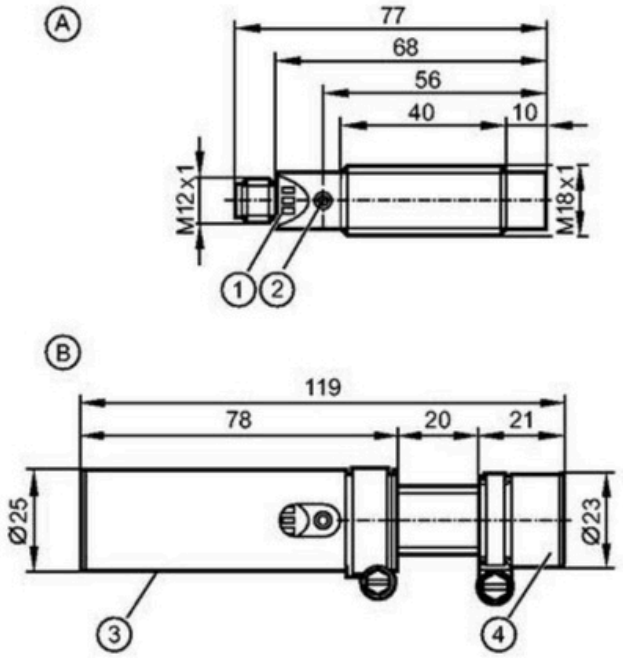
8.6 Structure: 1:
Impact protection for connector
Tightening torque for clamping screw: <= 3 Nm 2: Impact protection for sensor
Tightening torque for clamping screw: <= 1 Nm 3: Opening for indicators and pushbuttons • Do not remove the plug while the power is on.



8.7 Service/maintenance

No modifications may be made to the equipment. No repairs may be made. Contact the manufacturer if any faults occur.
If required, technical data sheets and EU manufacturer declarations for the sensors can be ordered from the manufacturer. In such cases, please state the article number.

Measurement instructions:



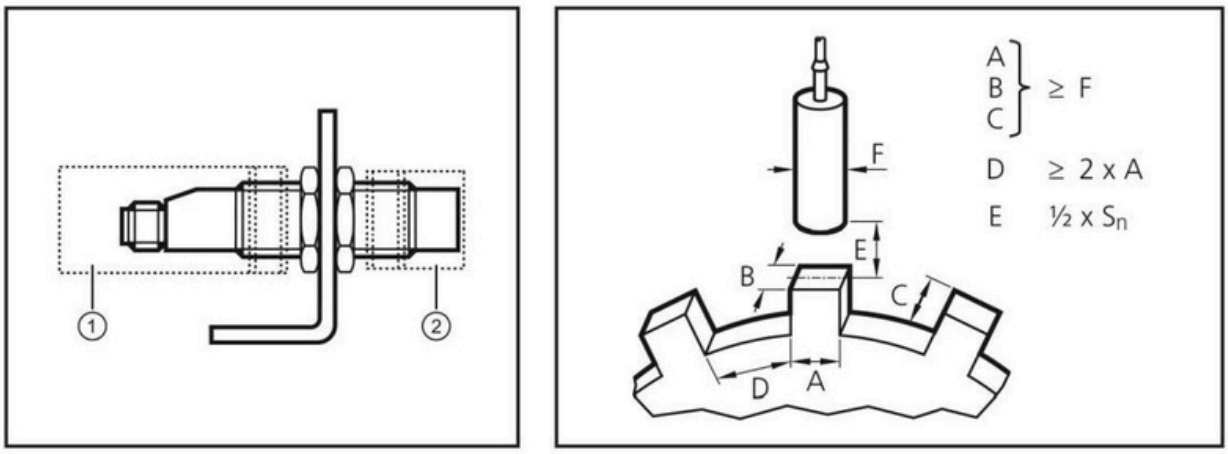
8.8 Safety instructions

Follow the instructions for safe use in potentially explosive environments:
Operating instructions (relevant section on explosion protection) for speed monitor according to EU Directive 94/9/EC Annex VIII (ATEX) Group II, Equipment Category 3D.
If no operating instructions (relevant section on explosion protection) or EC declaration of conformity in the language of the EU country of use are included, these can be ordered from the dealer (see delivery note) or the manufacturer (see front page/back page).
The installation of the device must be carried out by aqualified electrician. Observe the national and international regulations that apply to the connection of electrical equipment.

8.9 Function and characteristics

The device detects without contact when aset speed is exceeded and signals this with aswitching signal. The pulse output enables external evaluation of the damping pulses.
* Sensing distance, see nameplate.

8.10 Assembly



1: Shock protection (contact)
2: Shock protection (sensor)

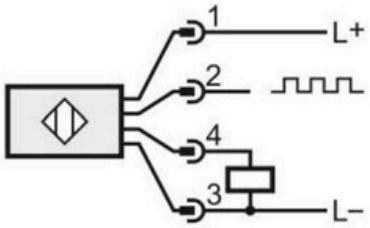
In potentially explosive environments, operation of the equipment is only permitted with the enclosed impact protection (1) and (2).
* Attach the unit with amounting bracket and secure it with the supplied nuts so that it does not come loose.

* Observe the distances above for flawless operation.

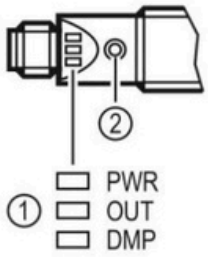
Not build-in.

8.11 Electrical connection

1. L+
2. Pulse output (pulse sequence corresponds to damping frequency)
3. L-
4. Switching output (adjustable)



8.12 Indications and pushbuttons

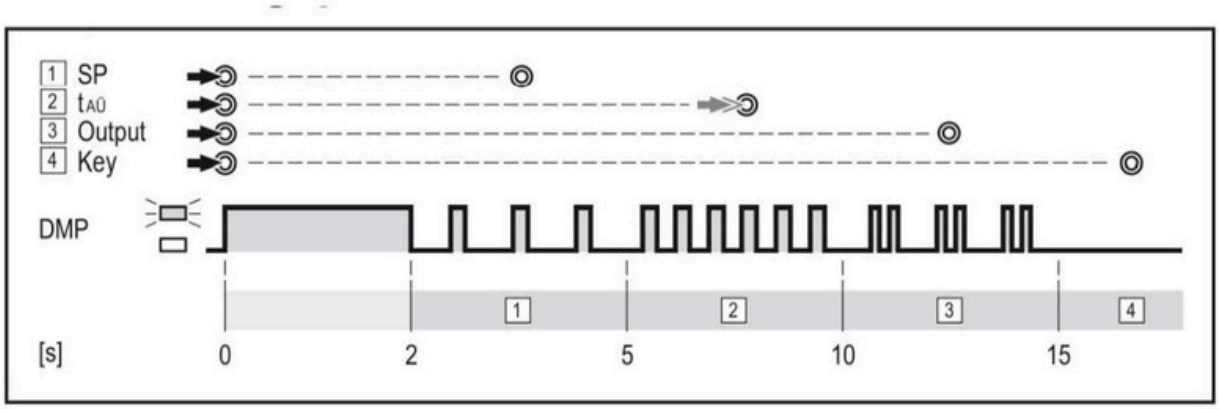
Indikering	Lysdiod		Status	Betydelse
	PWR	Grön	TILL	Anslutningsspänning ok
	OUT	Gul	TILL	Utgång kopplad
	DMP	Grön	Puls	Dämpningsimpuls
			1 Hz 2 Hz dubbelflash	Tidsram inom inställningsproceduren (→ 8 Inställningsprocedur)
	OUT + DMP	Gul Grön	blinkar omväxlande	Inställningar låsta eller eller parameterövertag inte möjligt

1: LEDs
2: Push button

8.13 Adjustable parameters

Parameter		Värdeområde	Förinställning referensvärde
SP	Kopplingspunkt (= referensvärde x 0,8)	3...6000 imp/min	100 imp/min
$t_{AÜ}$	Startfördröjning	0...15 s	10 s
Output	Utgångsfunktion	Slutare/öppnare	Slutare (utgång sluten när varvtal > kopplingspunkt)
Key	Låsning	Till/Från	Från

8.14 Setup procedure



= Press the button and hold it down
=The settings are saved when the button is released
=Release the button and press X times (0 times =0s, 1time =1s, etc.)

The setting procedure is divided into time frames of approximately 3 and 5 seconds. The time frames are indicated by different flashing frequencies on the DMP LED. Within a time frame, the setting is saved by releasing the button.

*Press the button with a pointed object (e.g. a ballpoint pen).

Tidsram	Inställning	Hur man sparar
1	Inlärning av kopplingspunkt	Släpp knappen
2	Inställning av Startfördröjning	Släpp knappen Tryck på knappen n gånger, vänta 5 s efter senaste knapptryck
3	Omkoppling av utgångsfunktion (slutare – öppnare, öppnare – slutare)	Släpp knappen
4	Låsning eller upplåsning av inställningarna	Släpp knappen

8.15

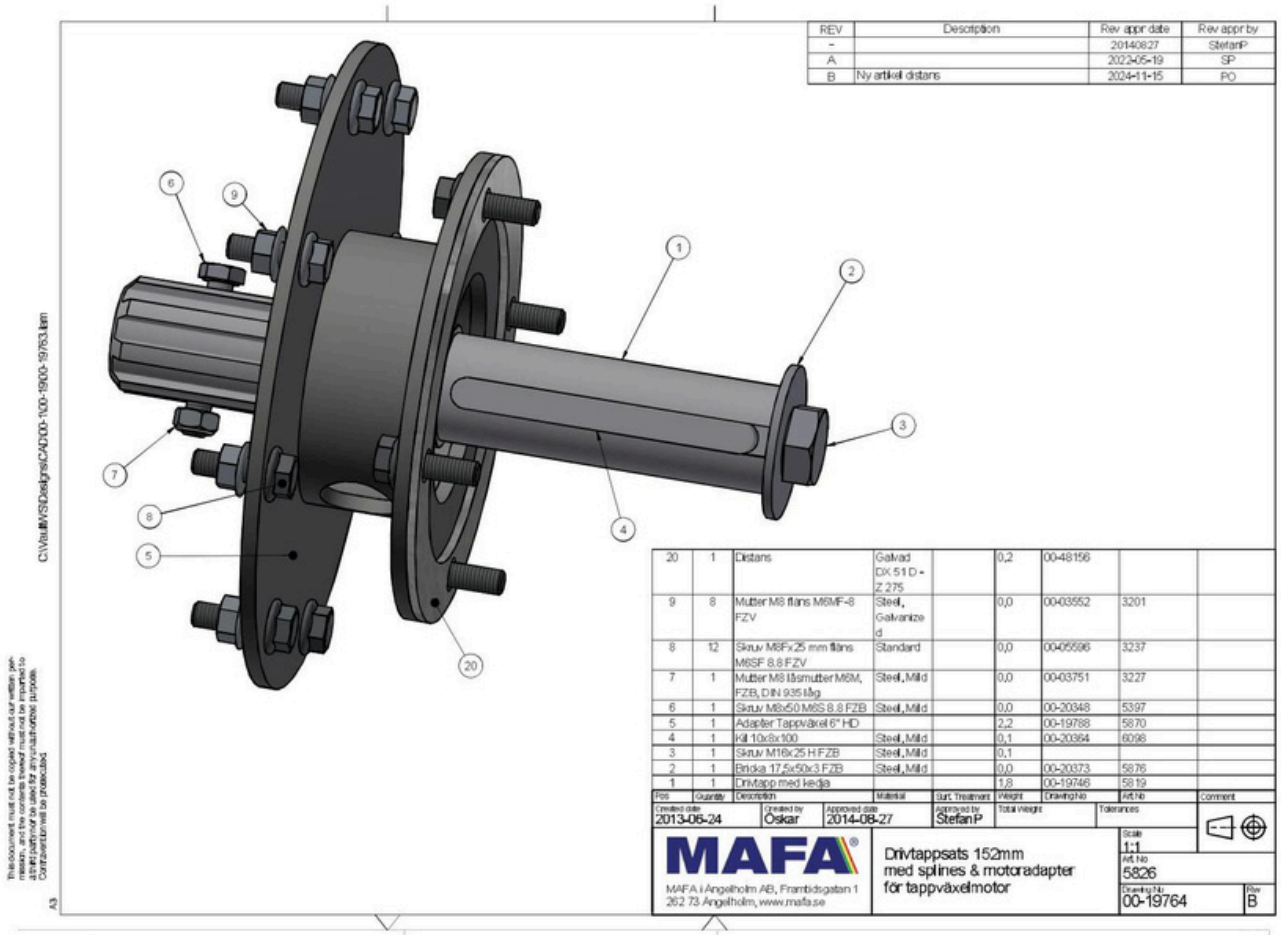
Operation Operation is maintenance-free. Please note the following for correct operation:

* Keep the sensor surface and void space free from metal deposits and interfering particles.

* Devices that emit high electric fields (e.g. radio communication equipment) must not be used in the immediate vicinity of the speed monitor.

9 Drawings

Article 5826 drive pin side



REV	Description	Rev appr date	Rev appr by
-		20140827	StefanP
A		2022-05-19	SP
B	Ny artikel distans	2024-11-15	PO

Pos	Quantity	Description	Material	Surf. Treatment	Weight	Drawing No	Art.No	Comment
20	1	Distans	Galvad DX 51 D + Z 275		0,2	00-48156		
9	8	Mutter M8 fläns M8MF-8 FZV	Steel, Galvanized		0,0	00-03552	3201	
8	12	Skruv M8Fx25 mm fläns M8SF 8.8 FZV	Standard		0,0	00-05596	3237	
7	1	Mutter M8 låsmutter M8M, FZB, DIN 935 låg	Steel, Mild		0,0	00-03751	3227	
6	1	Skruv M8x50 M8S 8.8 FZB	Steel, Mild		0,0	00-20348	5397	
5	1	Adapter Tappväxel 6" HD			2,2	00-19788	5870	
4	1	Kil 10x8x100	Steel, Mild		0,1	00-20364	6098	
3	1	Skruv M16x25 H FZB	Steel, Mild		0,1			
2	1	Bricka 17,5x50x3 FZB	Steel, Mild		0,0	00-20373	5876	
1	1	Drivtapp med kedja			1,8	00-19746	5819	

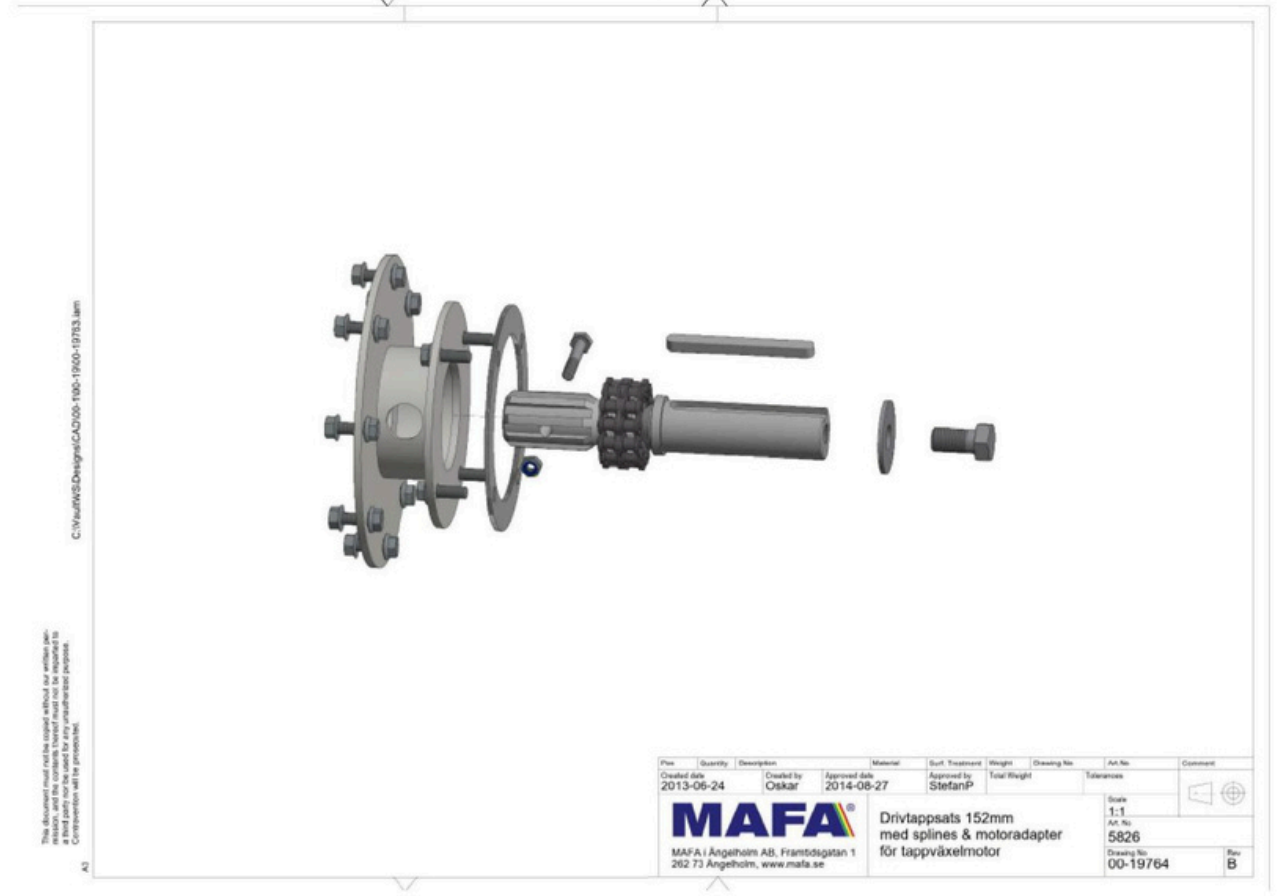
Created date 2013-06-24 | Created by Oskar | Approved date 2014-08-27 | Approved by StefanP | Total Weight | Tolerances

MAFA

MAFA i Ängelholm AB, Framtidsgatan 1
262 73 Ängelholm, www.mafa.se

Drivtappsats 152mm
med splines & motoradapter
för tappväxelmotor

Scale 1:1 | Art. No 5826 | Drawing No 00-19764 | Rev B



Created date 2013-06-24 | Created by Oskar | Approved date 2014-08-27 | Approved by StefanP | Total Weight | Tolerances

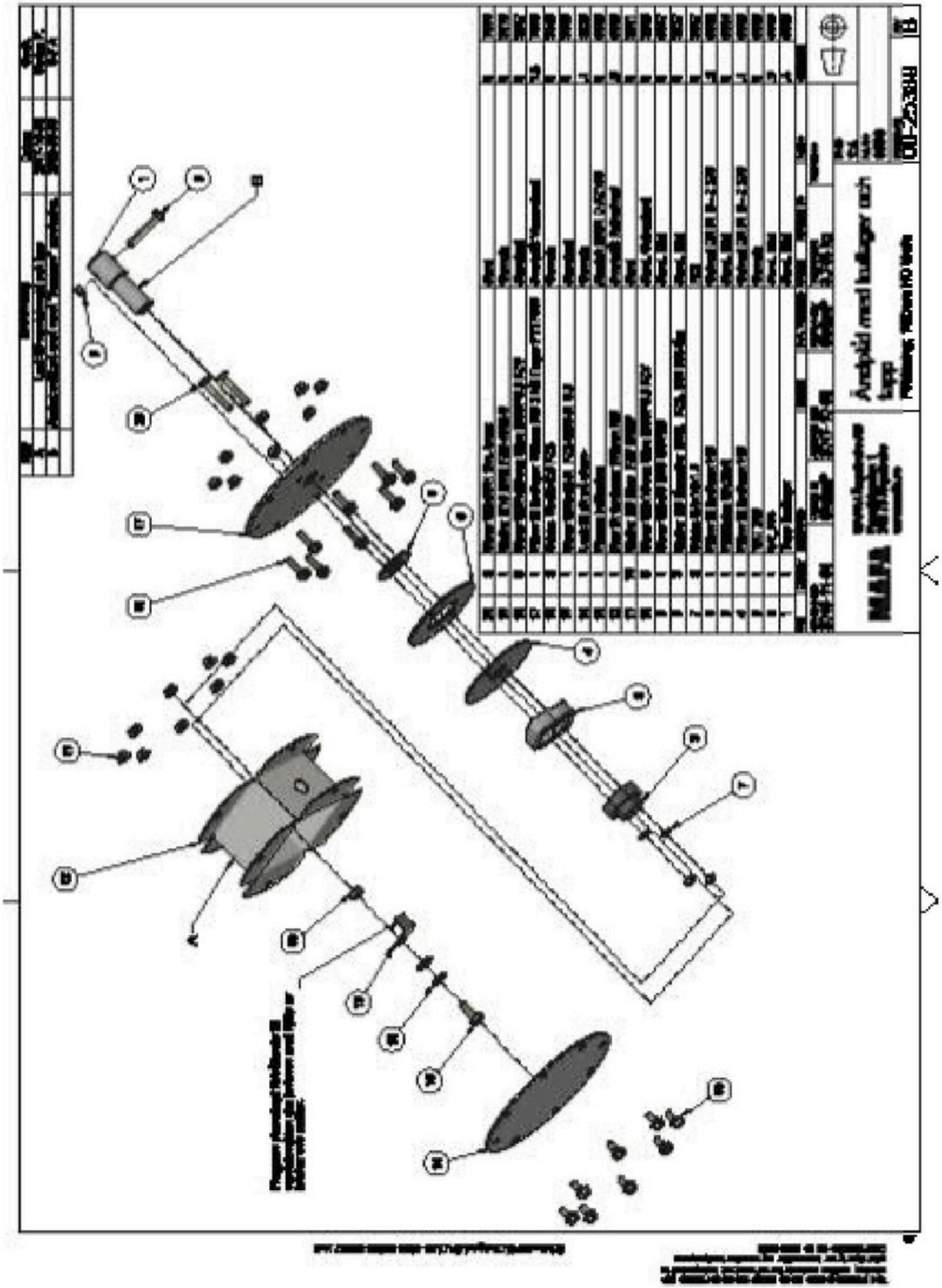
MAFA

MAFA i Ängelholm AB, Framtidsgatan 1
262 73 Ängelholm, www.mafa.se

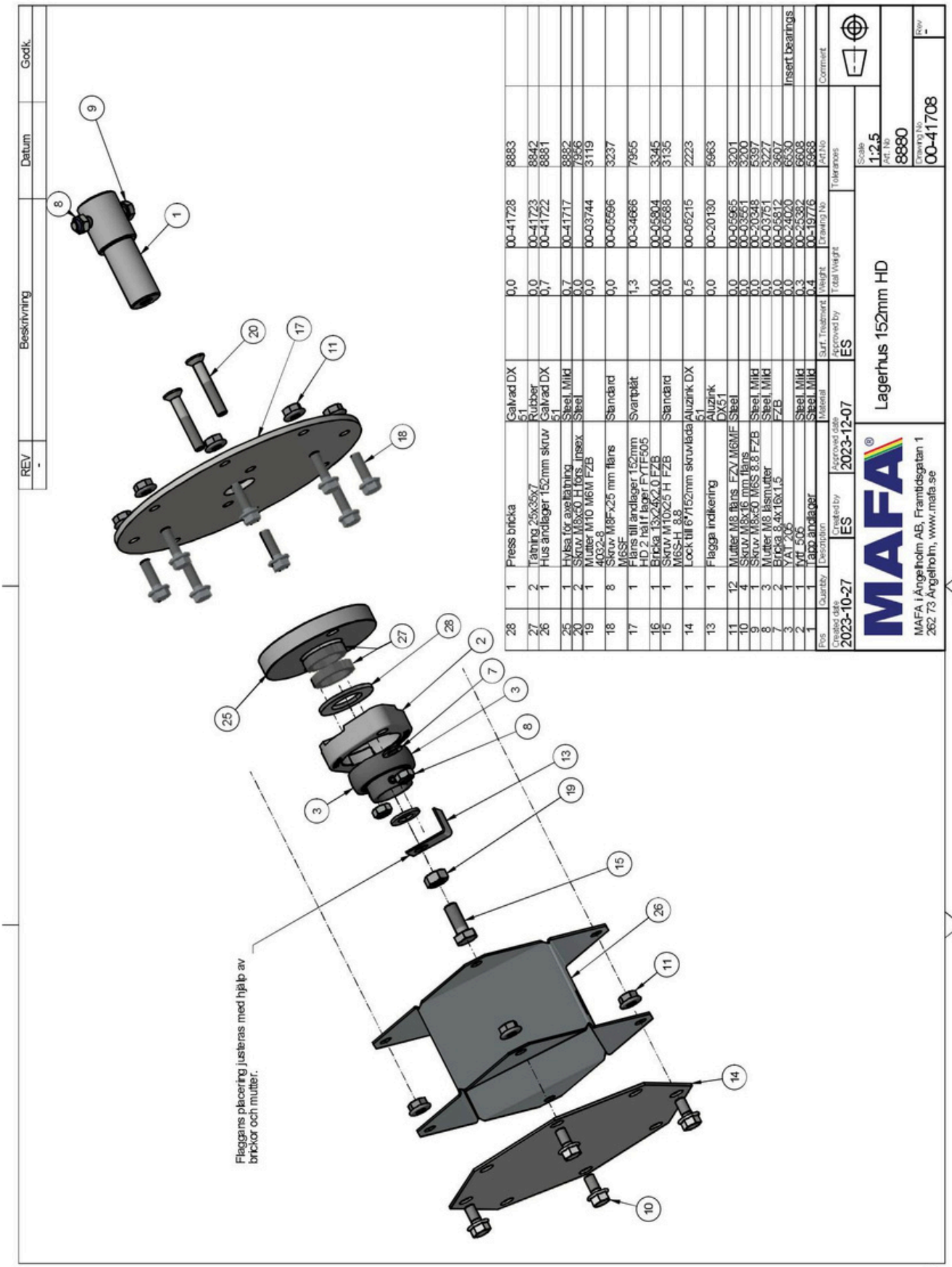
Drivtappsats 152mm
med splines & motoradapter
för tappväxelmotor

Scale 1:1 | Art. No 5826 | Drawing No 00-19764 | Rev B

Article 6680 end bearing side with ball bearings



Article 8880 end bearing side with ball bearings and seals

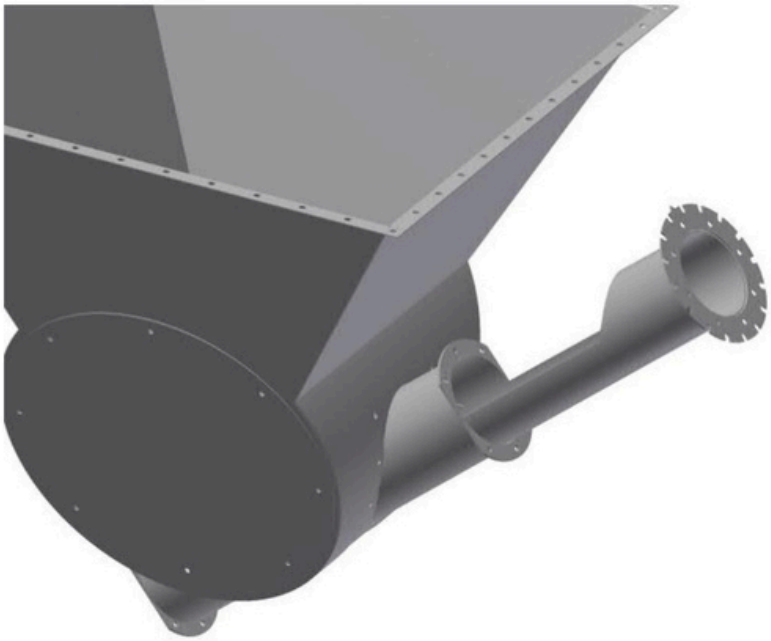


Pos	Quantity	Description	Material	Surf. Treatment	Weight	Drawing No	Art No	Comment
28	1	Press bricka	Galvad DX 51		0,0	00-41728	8883	
27	2	Tätning 25x35x7	Rubber		0,0	00-41723	8842	
26	1	Hus andlager 152mm skruv	Galvad DX 51		0,7	00-41722	8881	
25	1	Hylsa för axeltätning	Steel, Mild		0,7	00-41717	8882	
20	2	Skruv M8x50 H förs. insex	Steel		0,0		7956	
19	1	Mutter M10 M6M FZB 4032-8			0,0	00-03744	3119	
18	8	Skruv M8Fx25 mm fläns M6SF	Standard		0,0	00-05696	3237	
17	1	Fläns till andlager 152mm HD 2 halflager FTF505	Svartplåt		1,3	00-34666	7955	
16	1	Bricka 13x24x2,0 FZB	Standard		0,0	00-05804	3345	
15	1	Skruv M10x25 H FZB M6S-H 8.8	Standard		0,0	00-05688	3135	
14	1	Lock till 6"/152mm skruvlåda	Aluzink DX 51		0,5	00-05215	2223	
13	1	Flagga inriktning	Aluzink DX51		0,0	00-20130	6963	
11	12	Mutter M8 fläns FZV M6MF	Steel		0,0	00-05965	3201	
10	4	Skruv M8x16 mm fläns			0,0	00-03661	3200	
9	1	Skruv M8x20 M6S 8.8 FZB	Steel, Mild		0,0	00-20348	5397	
8	3	Mutter M8 låsmutter	Steel, Mild		0,0	00-43751	3227	
7	2	Bricka 8,4x16x1,5	FZB		0,0	00-05812	3807	
3	1	YAT 206			0,0	00-24020	6530	Insert bearings
2	1	YAT 506	Steel, Mild		0,3	00-25382	6608	
1	1	Tapp andlager	Steel, Mild		0,4	00-19776	6868	

10 Accessories

To connect the conveyor auger to asilo, there are different types of auger boxes and transitions.
There are also a number of different containers that can be used for, for example, intermediate storage.
To mount the transport augers, there are various accessories such as suspension material, supports and posts.

Auger box 0-45o type A20, A20HD



The outlet part of the writing box is adjustable 0-45o and equipped with arotatable outlet part.

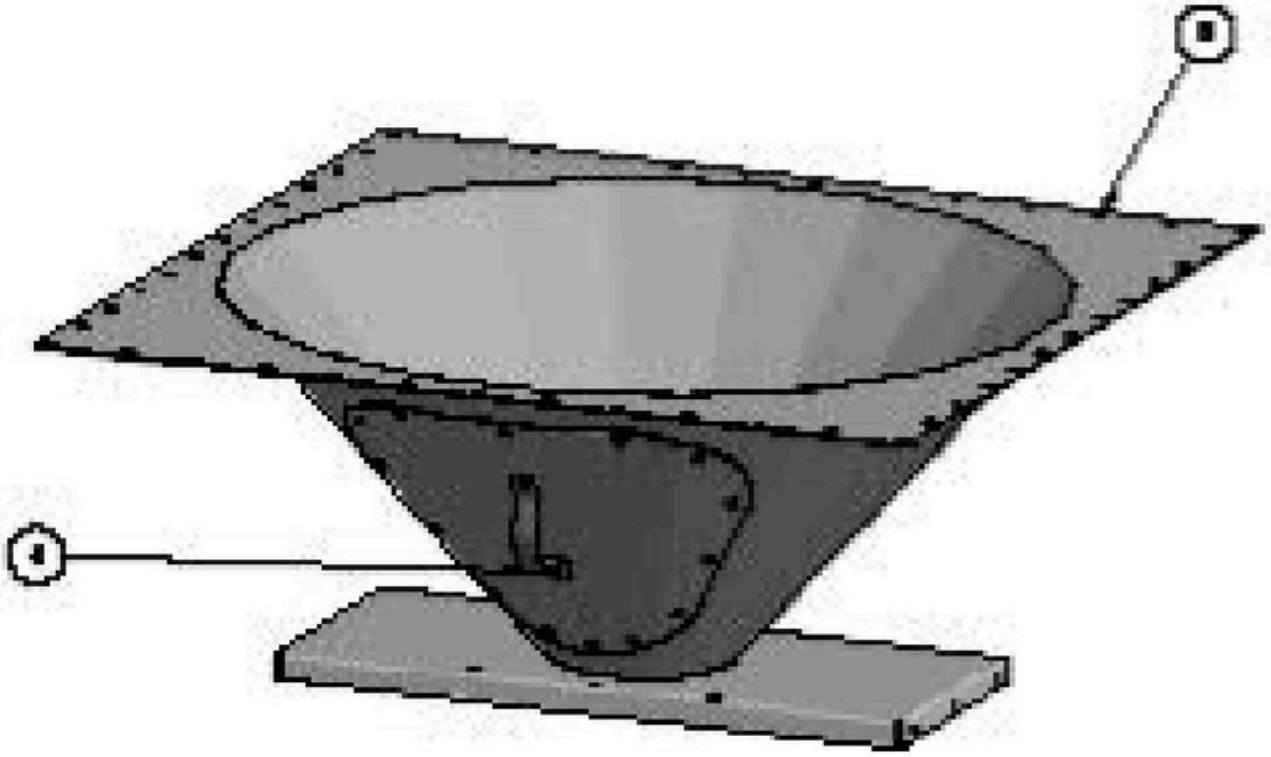
Art no. 5533-30 This special tool is used to turn the outlet part so that the inlet to the auger can be closed, which makes the outlet part act as adamper. When servicing the auger, the outlet part is completely closed, whereby the auger part can be pulled out without the material flowing out.

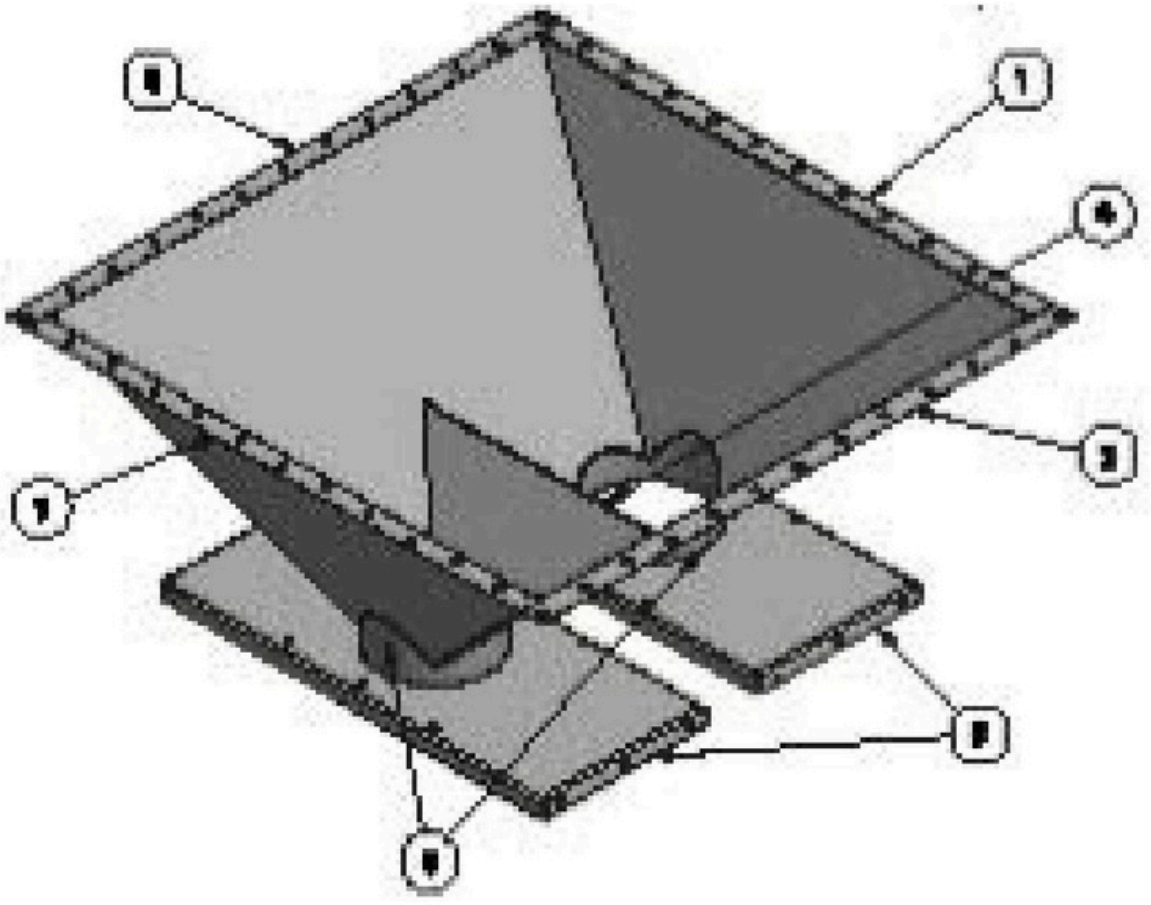
The auger box outlet is adjusted to the desired angle for screwdriving. The sheet metal strip is then **cut** as stick up inside the screw box with a jigsaw or angle grinder.

See picture on the right after cutting.

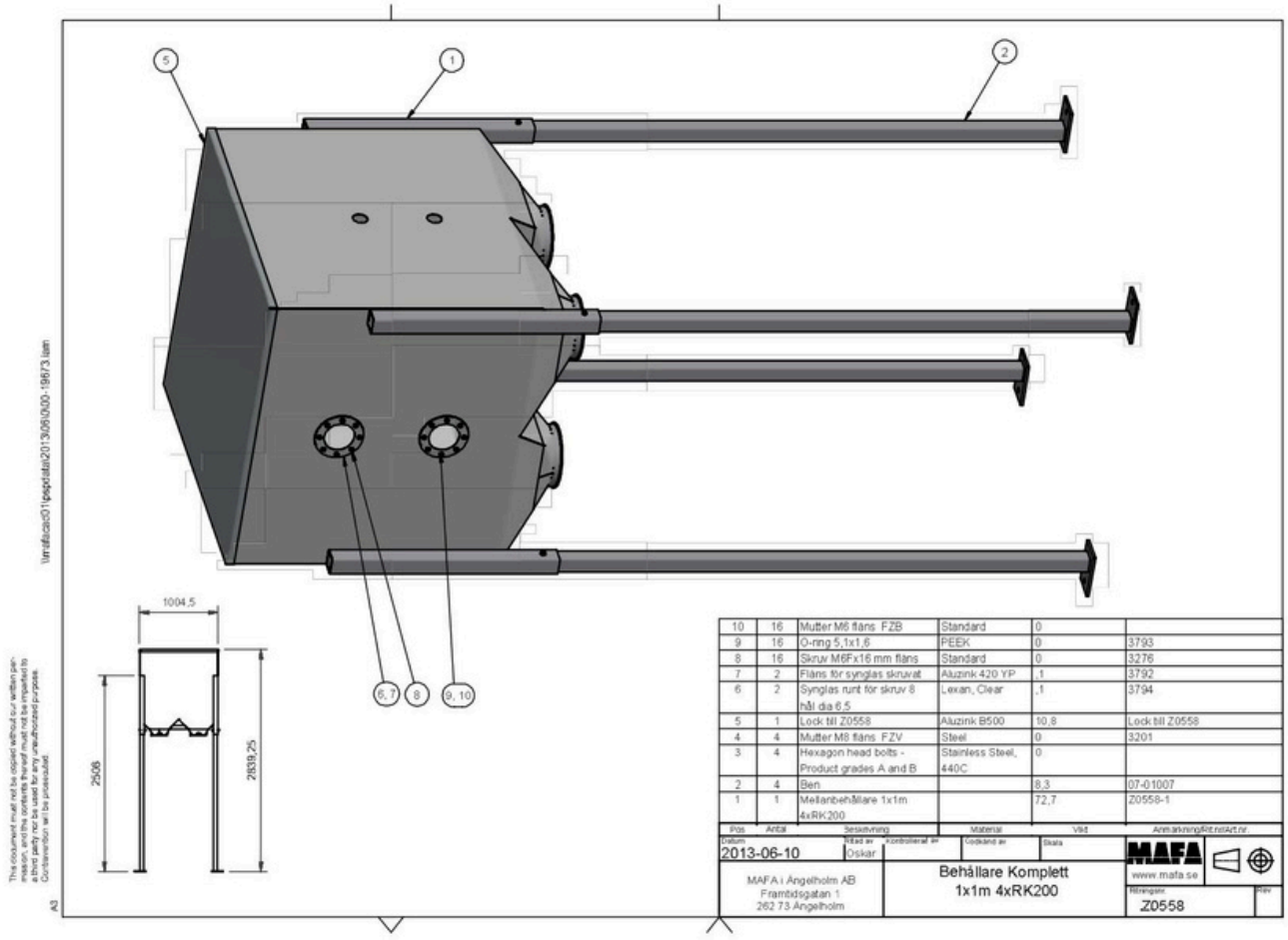
Transition from silo to auger

Transition from silo collar to 1auger, 6780, and Transition from silo collar to 2 augers, 7840, are equipped with adamper plate over the inlet to the auger. Below this transition there are adaptations to different types of inlets in the conveyor auger, e.g. roller edge RK160 or RK200.





Article Z0558 complete container



Pos	Antal	Benämning	Material	Vikt	Anmärkning/Rit.nr/Art.nr
10	16	Mutter M6 fläns FZB	Standard	0	
9	16	O-ring 5,1x1,6	PEEK	0	3793
8	16	Skruv M6Fx16 mm fläns	Standard	0	3276
7	2	Fläns för synglas skruvat	Aluzink 420 YP	,1	3792
6	2	Synglas runt för skruv 8 hål dia 6,5	Lexan, Clear	,1	3794
5	1	Lock till Z0558	Aluzink B500	10,8	Lock till Z0558
4	4	Mutter M8 fläns FZV	Steel	0	3201
3	4	Hexagon head bolts - Product grades A and B	Stainless Steel, 440C	0	
2	4	Ben		8,3	07-01007
1	1	Mellanbehållare 1x1m 4xRK200		72,7	Z0558-1

Datum 2013-06-10 | Ritad av Oskar | Kontrollerad av | Godkänd av | Skala

MAFA i Ängelholm AB
Framtidsgatan 1
262 73 Ängelholm

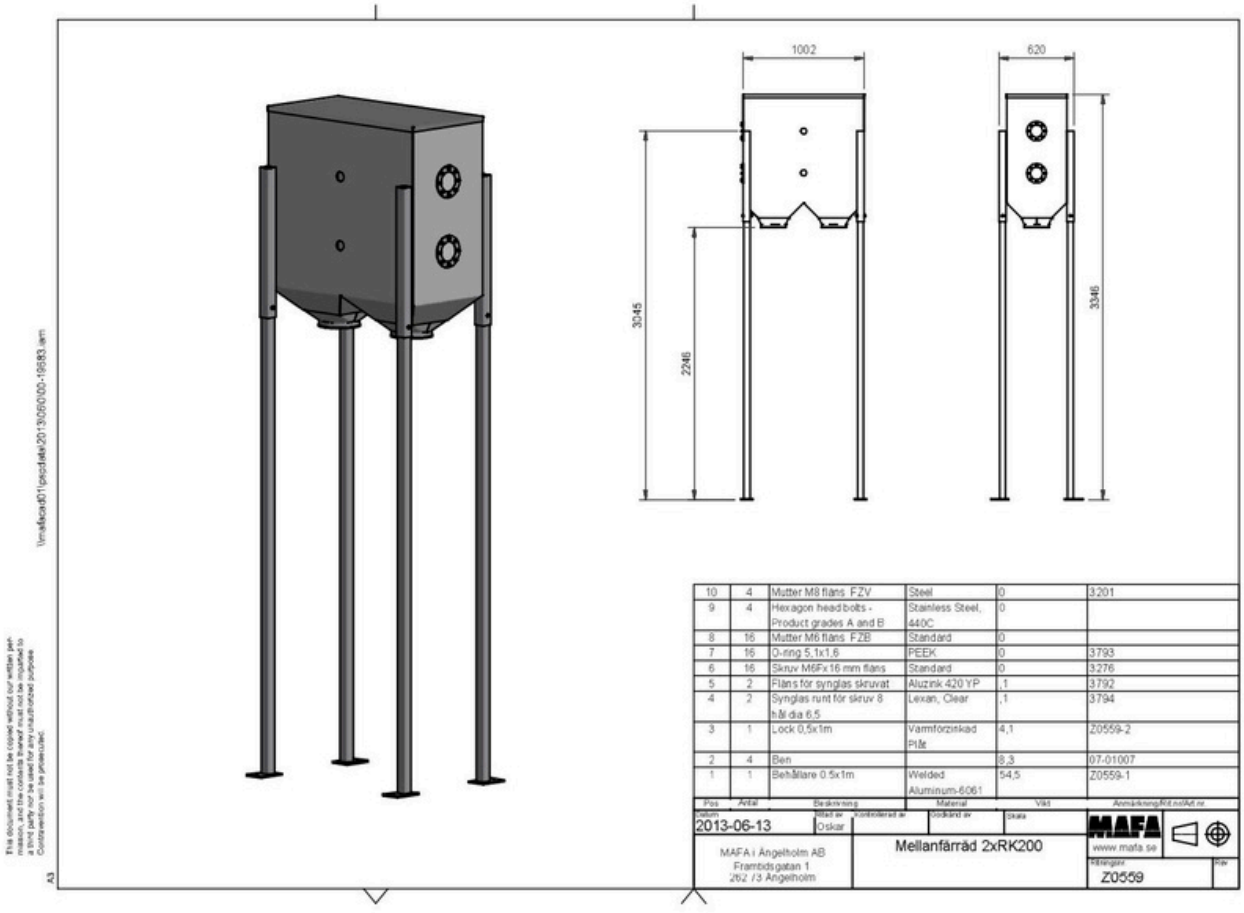
Behållare Komplett
1x1m 4xRK200

www.mafa.se

Ritningsnr Z0558 | Rev

A3

Article Z0559 intermediate storage



Pos	Antal	Benämning	Material	Vikt	Anmärkning/Rit.nr/Art.nr
10	4	Mutter M8 fläns FZV	Steel	0	3201
9	4	Hexagon head bolts - Product grades A and B	Stainless Steel, 440C	0	
8	16	Mutter M6 fläns FZB	Standard	0	
7	16	O-ring 5,1x1,6	PEEK	0	3793
6	16	Skruv M6Fx16 mm fläns	Standard	0	3276
5	2	Fläns för synglas skruvat	Aluzink 420 YP	,1	3792
4	2	Synglas runt för skruv 8 hål dia 6,5	Lexan, Clear	,1	3794
3	1	Lock 0,5x1m	Varmförzinkad Plåt	4,1	Z0559-2
2	4	Ben		8,3	07-01007
1	1	Behållare 0,5x1m	Welded Aluminum-6061	54,5	Z0559-1

Datum 2013-06-13 | Ritad av Oskar | Kontrollerad av | Godkänd av | Skala

MAFA i Ängelholm AB
Framtidsgatan 1
262 73 Ängelholm

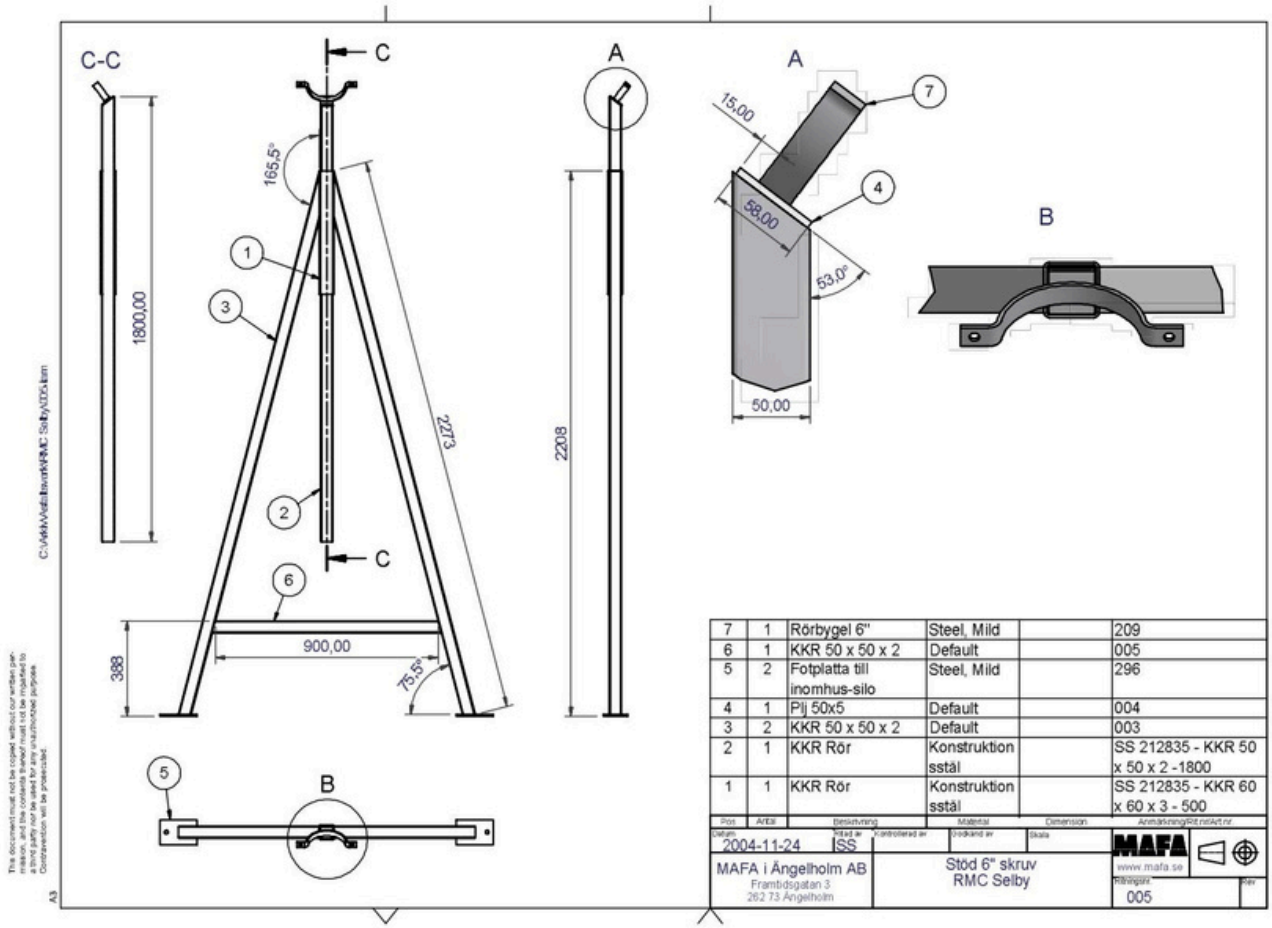
Mellanfärråd 2xRK200

www.mafa.se

Ritningsnr Z0559 | Rev

A3

Article 339 support for auger



Pos	Antal	Beskrivning	Material	Dimension	Anmärkning/Rit.nr/Art.nr
7	1	Rörbygel 6"	Steel, Mild		209
6	1	KKR 50 x 50 x 2	Default		005
5	2	Fotplatta till inomhus-silo	Steel, Mild		296
4	1	Plj 50x5	Default		004
3	2	KKR 50 x 50 x 2	Default		003
2	1	KKR Rör	Konstruktionsstål		SS 212835 - KKR 50 x 50 x 2 -1800
1	1	KKR Rör	Konstruktionsstål		SS 212835 - KKR 60 x 60 x 3 - 500

Datum	Ritad av	Kontrollerad av	Godkänd av	Skala
2004-11-24	SS			

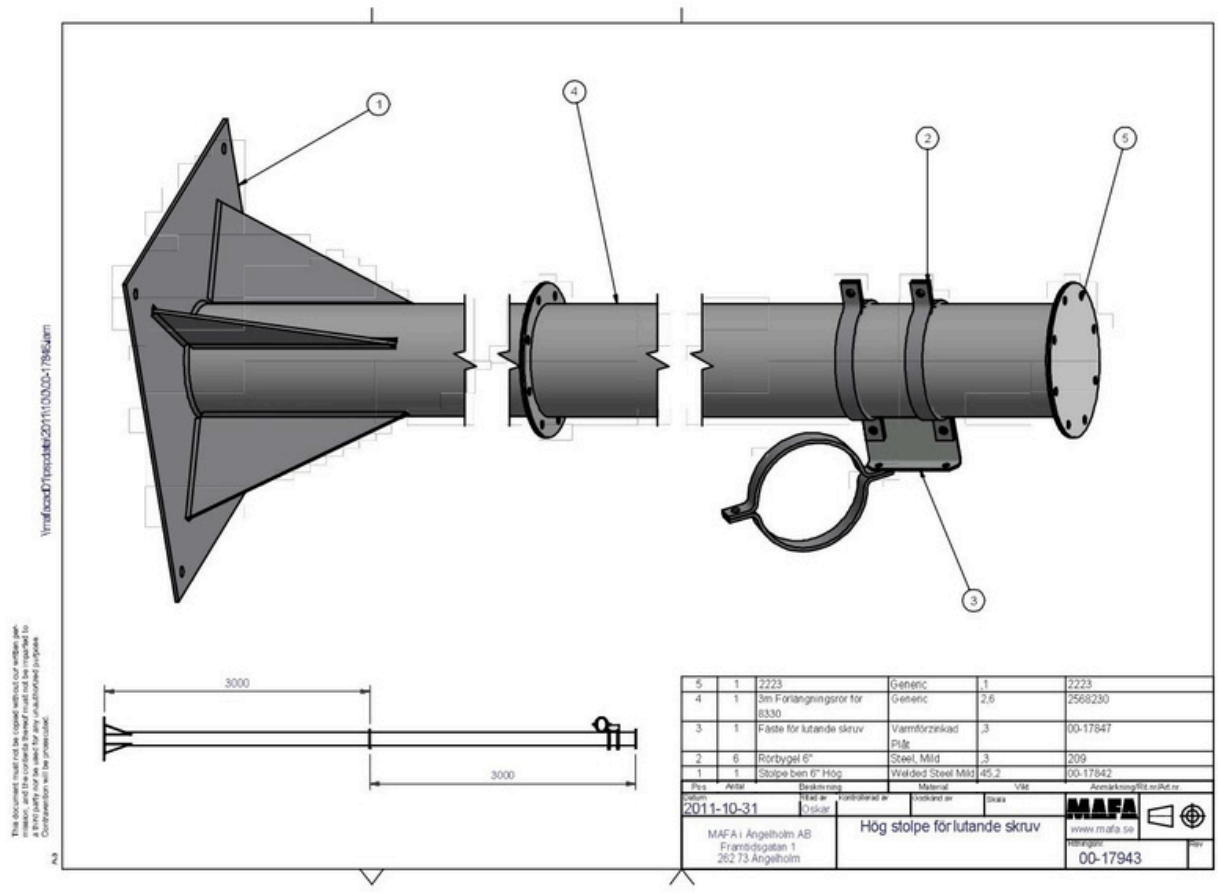
MAFA i Ängelholm AB
Framtidsgatan 3
262 73 Ängelholm

Stöd 6" skruv
RMC Selby

MAFA
www.mafa.se

Ritningsnr: 005 Rev

Article Z0455 single support or Z0457 double support for auger



Pos	Antal	Beskrivning	Material	Vikt	Anmärkning/Rit.nr/Art.nr
5	1	2223	Generic	,1	2223
4	1	3m Förlängningsrör för 8330	Generic	2,6	2568230
3	1	Fäste för lutande skruv	Varmförzinkad Plåt	,3	00-17847
2	6	Rörbygel 6"	Steel, Mild	,3	209
1	1	Stolpe ben 6" Hög	Welded Steel Mild	45,2	00-17842

Datum	Ritad av	Kontrollerad av	Godkänd av	Skala
2011-10-31	Oskar			

MAFA i Ängelholm AB
Framtidsgatan 1
262 73 Ängelholm

Hög stolpe för lutande skruv

MAFA
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Ritningsnr: 00-17943 Rev

Framtidsgatan 1, 262 73 Ängelholm, Sweden Tel +46 431 44 52 60
e-mail: info@mafa.se Internet:www.mafa.se