



**RCW Dryers**

**Manual for Use and Maintenance**

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## **Introduction**

Dear Customer,

We congratulate you on the purchase of the dryer manufactured by *Mepu Oy*.

Already during the past 25 years our dryers have proved to be effective and reliable machines in operation. To ensure your safe working conditions and a cost-saving use of the dryer it is necessary that you are familiar with its technical facilities and operation. Therefore, please read these operation instructions carefully before placing the dryer in service.

Good know-how, correct regulations, scheduled maintenance and regular cleaning ensure both your personal safety and the reliability of the dryer under varying working conditions.

Nevertheless, during the season it is always possible that there might appear a malfunction, or there might be a sudden requirement for some spare parts, or some other unexpected failure can appear. These problems might need extra help. Contact first your local dealer who can give you the best possible help during harvest season. Local dealer also provides good after sales service effectively and quickly in customer own language. Do not hesitate to contact their service.

**Dealer's unresolved problems, contacts our service:**

**Tel. international +358-(0)2-2754444 / Service**

**Fax international +358-(0)2-2563361**

**service@mepu.com**

## Warranty and conditions

You are a very important person to us. We very much like to know – even after the warranty period of one year – if you are satisfied with your dryer and with our service. Your opinion will be treated confidentially by us, and is taken into consideration when developing our machines and service.

Therefore, would you kindly return the certificate of guarantee back to us upon receipt of the dryer.

- The period of warranty for the dryer in agricultural production is one (1) year. The period of warranty for the heat exchanger and the burner chamber of the furnace are exceptionally three (3) years, (excluding the burner, one (1) year guarantee). The warranty period becomes valid by the delivery date.
- The warranty applies to the faults due to the manufacture and the used materials. Defect components will be repaired or changed to new ones. In the event that it is found out that the fault is not within the scope of the warranty, the actual costs will be charged to the customer.
- Repair under warranty does not exceed the period of warranty.
- **The warranty does not cover the following things:** indirect loss or damage, financial deficit therefrom, loss of profit, freight costs, travel expenses, machine downtime, modifications of the original structure, or any other financial loss.
- **The warranty does not cover premature wear or damage of the components due to non-compliance with maintenance procedures.**



**Before each repair it is necessary to agree with the manufacturer on the things belonging to the scope of the warranty and on possible costs.**

## 1. Important for users



### **Risk of falling down**

After the grain bin installation, mount the ladders, the safety cage and the handrails at the top. Pay special attention to your safe working conditions when you are on the roof, a wet or frozen roof provides a hazardous risk.



### **Switch off the power supply in the following situations:**

- By opening the cover plates for maintenance and adjustments
- By cleaning the lower part of the elevator or the auger ducts
- By tightening the elevator chain or tensioning the conveyor V-belts
- By entering the grain bin for adjusting the spreader
- By opening the oil burner for maintenance



### **Fire hazard. Clean the dryer and its environment**

- The discharge pipes from the pre-cleaner and from the bottom aspirator must be conducted far enough away from the dryer. Preferably, the pipes can be collected together and arrange them to conduct through a cyclone to a waste container. The supply air needed for the furnace must absolutely be clean.
- The air coming out through the air extraction cases contains humidity and dust. Therefore, this air must be led far enough away from the dryer to avoid the mixture with the supply air to the furnace.
- In the event that the outgoing air will be mixed up with the incoming air, the drying efficiency is considerably decreased.
- Every 100 hour it is necessary to control the inner bottom of the furnace, and in this connection the air extraction cases as well. They all must be clean. Furthermore, at the end of each drying process you should open the emptying lever located at the rear of the dryer between the feeder and the elevator.



### **Risk of leaking oil**

After having adjusted the oil burner pressure, the shut-off valve of the pressure gauge must be closed. If you leave the valve open, the pressure gauge may be damaged and the oil can leak out. The oil ducts between the oil tank and the oil burner must be protected against damages in the way that this precaution does not hinder you to move freely around the dryer.



### **Adequate lighting**

The drying process is seasonal, evenings and nights in late summer months are getting dark. Pay attention to your safe working conditions and arrange an extra lighting, if needed.



### **Filling and emptying the dryer**

By filling and emptying the dryer, make sure that there is no risk for unauthorized persons from the moving tractor-trailer combination, or danger of injury due to crushing between the trailer and the filling hopper.



### **Fire extinguisher**

During the period of operation there must always be a fire extinguisher available close by the dryer we recommend; 12 kg. Make clear the fire safety requirements for own country and follow them. Manufacturer is not responsible if neglected local government regulations.



### **Operation instructions**

Read carefully the instructions given in this manual before start to install and use your dryer.

## 2. Basic knowledge of drying the grain

The preservation of the harvested grain depends on its humidity percentage rate and its storage temperature. Due to the geographic location, in Scandinavia and in the northern hemisphere the humidity percentage rate after threshing varies between 15 - 45%, and as a function of the available humidity, the preservation requires provisions. When drying the grain using only natural drying methods, without using any auxiliary devices for drying, it is not possible in the North to achieve such a humidity percentage rate which would be low enough. During the harvest season the humidity outside amounts to approx. 80 - 90%. It is necessary to treat the grain with varied procedures to ensure its preservation. These procedures are different methods to dry the grain and in small quantities the freezing as well.

The drying method in grain dryers bases on the air blow. A strong air flow circulates in the drying section drying the grain, and the humid air is conducted outwards. It is possible to accelerate this process by rising the temperature of the grain to be dried. The homogeneity can be increased by circulating and cooling the grain during the drying process.

There are some basic rules which must be observed in order not to impair some characteristics of the grain, like its germination and baking properties. The most important things to be controlled are the temperature of the grain, the actual recirculation rate and the achieved air flow rating. These parameters vary due to different grain types, and the best temperature values can be found out from practical experience. Some dryer specific things contribute to estimate the right values.

### **Estimated drying air temperatures:**

Seed grain	50 ... 60°C
Food grain	60 ... 70°C
Feed grain	up to ... 80°C

### **Recommended grain temperature:**

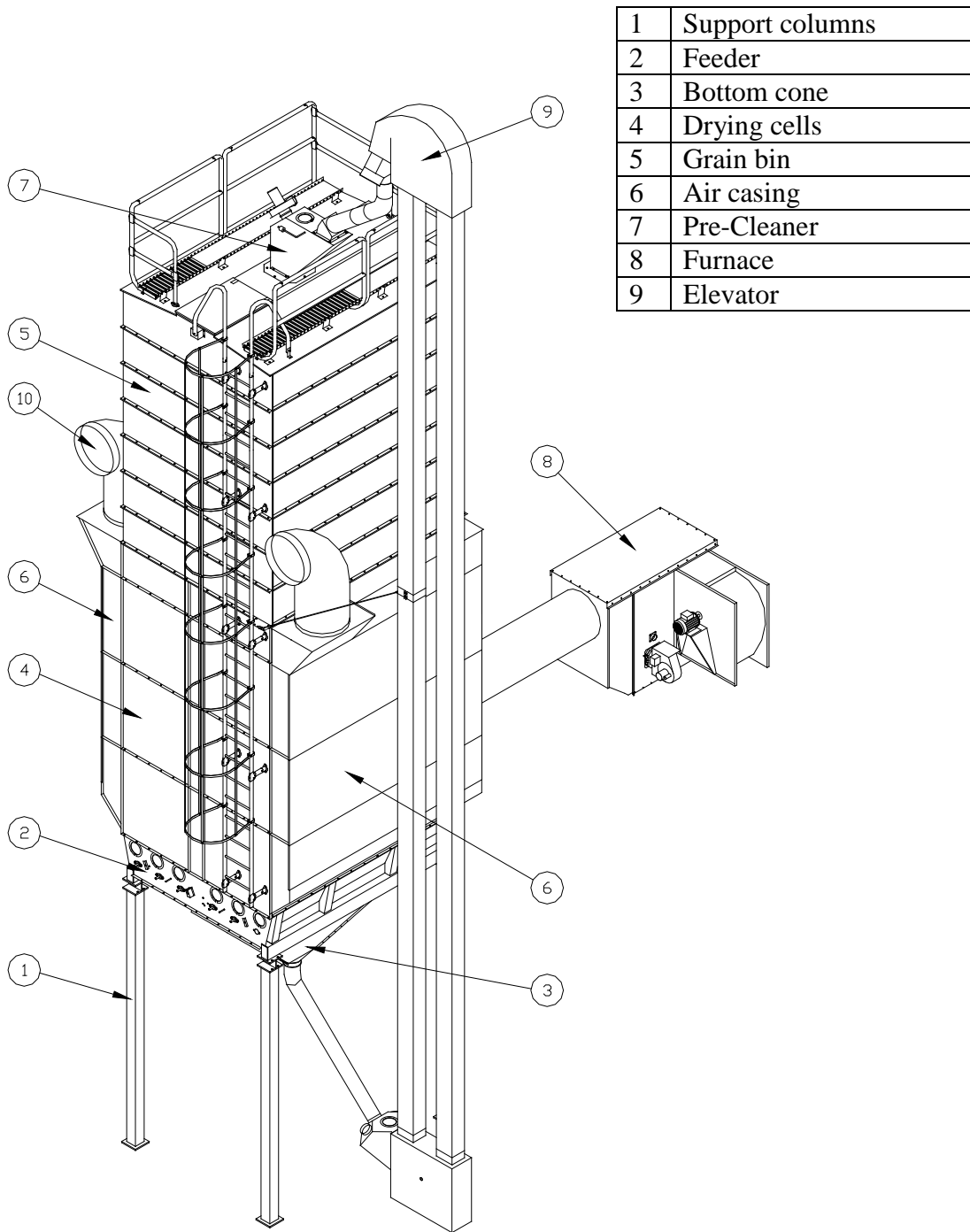
Not over + 45°C. Otherwise, there is the possibility to have an influence on the germination of the grain.

By drying with heat convection, you must pay attention to the proper circulation process and to the cooling of the grain to be dried, in order to avoid a possible overheating of some parts of the grain batch.

Further information available e.g. via *MTT (Agrifood Research Finland)*.

### 3. Technical specification

#### 3.1. Standard equipment



##### 3.1.1. Frame

The frame consists of four support columns. These support columns are mounted to the feeding device using bolt joints. The support columns must be welded or anchored to the foundation. The support columns will be supported by crosswise supports.



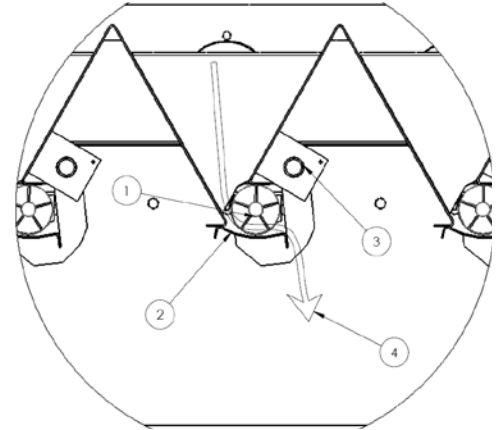
**The foundation must be level.**



### 3.1.2. Feeder

The grain will be evenly filled (4) to the base cone by rotating feeding rollers. The feeding rollers are under-feed (1). At both ends of the feeder there are hatches, which can be opened for cleaning of the feeding rollers. The shafts are at both ends equipped with ball bearings, with nylon slide bearings in the middle. Below each feeding roller there is a bottom outlet (2), which will be opened by means of a shaft (3), functioning like a hinge, by emptying the dryer.

The 5-bladed roll feeder is designed to function without any disturbance, even by feeding wet grain. A homogenous drying process in all circumstances is ensured by sharp angled feeding cones. The feeder is well sealed. Therefore, it is possible to dry even very small seeds, like turnip rape. On the opposite side of the chain transmission of the feeding rollers there is a mechanism for opening and closing the bottom outlets. The bottom outlets can be opened and closed by shafts.



**Do not close the bottom outlets before emptying the dryer (danger of damage).**

The feeder is frequency controlled, this means that the feed rate is infinitely adjustable from the electrical cabinet. The feeder is driven by a gear motor, the transmission to the feeding shafts through pinions and a chain. If you take away the cover protecting the chain transmission, remember to switch the main switch to the 0-position.

### 3.1.3. Base cone

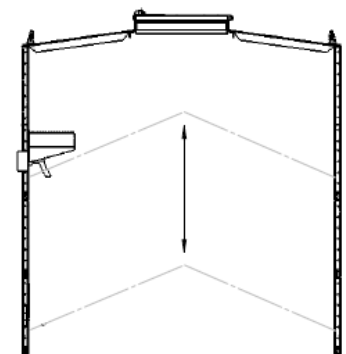
The base cone is situated under the feeder. This base cone collects all the grain coming from the feeder and directs it to the pipeline. The base cone is equipped with a service hatch, for cleaning the base cone and for maintaining the feeder.

### 3.1.4. Drying cells

The drying cells are provided with numerous air brushes. All grain will be evenly dried, thanks to the air supply to the range, located between the air drying brushes. From this the humidity is extracted outwards to the air extraction case. The most effective drying process can be achieved by using a high temperature and a high air flow rate. Concerning the capacity, the air flow rate and the sizes, the best possible combination can be built by choosing the right amount of drying cells and grain ranges.

### 3.1.5. Grain bin

Wet grain is swelling by heating. By continuing with the drying process, the volume of the grain considerably diminishes. The grain bin is designed to optimize the operation perfectly in all circumstances. The spacious grain bin is acting as a buffer to equalize the varieties in the grain flow rate resulting from the pre-cleaning and the drying processes.



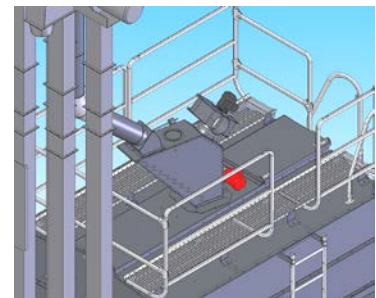
Handrails and a platform include as standard in the scope of the delivery. They will be fitted to the upper part of the bin. A rotating filling level sensor is delivered as standard. As soon as the bin is full filled, the filling process is shut off by the filling level sensor. The manhole on the roof acts as an access door, required e.g. for adjustments of the spreader unit or for cleaning of the bin.

#### 3.1.6. Extractor case

The humidity coming from the drying cells is collected by the air extractor case, located on the side of the dryer. The humid air is extracted by the fans. The conduit is equipped with a thermostat, for controlling the extracted air temperature. The display of the thermostat is fitted in the electrical cabinet.

#### 3.1.7. Pre-cleaner

The elevator carries the grain through the spreader unit to the pre-cleaner. The pre-cleaner is equipped with an independent motor, with a sloped surface and with tries. The replacement air to the pre-cleaner is taken from the grain bin and through a replacement air flap of the pre-cleaner. The capacity of the pre-cleaner is adjusted by opening and closing the air regulating plate.



#### 3.1.8. Furnace

Each dryer is delivered with an effective and strong furnace. The output range: 210 – 500 kW. Fan power/air flow: 4,0 – 11 kW / 14000 – 24500 m<sup>3</sup>/h.

The oil burner flame burns in the middle of the cylindrical core. There is a constant heat convection to vertical finned heat exchangers. The combustion chamber is of fire-proof steel. The heat convection is uniform and efficient, thanks to the vertical finned heat exchangers. Thus, a good efficiency ratio and a strong durability of the furnace are ensured.

#### 3.1.9. Elevators and their alignment

All RCW dryers are delivered with one elevator. The elevator size depends on the model of the RCW dryer, and what the customer requires for.

The elevator is provided with a rotation control, fitted in the lower part of the elevator. The back stop of the elevator is mounted in the upper part of the elevator, to the driven shaft.

When setting-up outside, the elevator must be aligned with support plates and straps, fixed to the bolt joints of the cells.

#### 3.1.10. Air extraction fans

All RCW models are delivered with axial fans. The fans will be fastened to the air extraction case.

## 4. Mounting and putting in operation

If you use the dryer in a covered place, pay special attention to the sufficient air flow. The air to the main air fan must be taken from the outside air. Otherwise, the place of use can be the most suitable place for performing the drying process. Make sure that there is enough space for driving and turning when filling and emptying the dryer. Furthermore, observe dust and noise emissions as well. Take always contact beforehand to the municipal building inspection and the fire department.

### 4.1. Mounting

Mounting instructions are delivered separately together with this manual.

### 4.2. Electricity

Only an authorized electrician may perform the electrical installation of the machinery. The electrical diagrams and the manual for the electrical cabinet are delivered together with the machinery. These documents are attached inside the electrical cabinet. More detailed information of the electrical components is available in the manual for the electrical cabinet.



**Mounting accessories and cables for the electrical installation are not delivered with the dryer.**

#### 4.2.1. Electrical cabinet

The electrical cabinet must be installed to such a place that it is nearly impossible to damage it in the normal course of use (this means, e.g. not above the filling container).



**It is not allowed to install any electrical components to the electrical cabinet of the dryer which belong to the electrical installation of the premises itself. These electrical components must be installed to a separate electrical center.**

#### 4.2.2. Electrical installation

The connected power required for the machinery is mentioned in the electrical diagrams. Based on this, the electrician can choose the right feeder cable. The motor sizes mentioned in the electrical diagrams are the maximum values of the appropriate motor outputs. By dimensioning the motor cables, the motor size must be checked from the delivery. These kinds of motors are the motors of the elevators and the fans, the motors in the conveyor system and the motor of the pre-cleaner. An underdimensioned cable may heat, and in this way may cause a hazard or malfunctions. Observe also the different motor connections and shielded cables required for various frequency controllers. The electrician can find the electrical diagrams inside the electrical cabinet. The sensors for monitoring the temperature and other sensors are fitted to the electrical cabinet.

#### 4.2.3. Putting in operation

Before taking into use, control the motor circuit breakers in the control cabinet and the rotation directions of the motors. The correct function of each individual device must always be controlled. There is an arrow marked in the fan; this arrow shows the rotation direction of the fan. The correct function of the thermostats must always be controlled.



**Before controlling the rotation direction of the elevator, the electrician must disconnect the back stop of the elevator. The rotation direction of the oil burner fan must always be controlled.**

### 4.3. Fuel connections

Stationery dryers are delivered without oil and gas pipelines. The customer bears the responsibility for oil and gas connections to a supply system or to a container. The connection of the oil and gas burner to the fuel supply system may be performed only by an authorized fitter. Further information for the burner and its installation is available in the burner rating plate and in the burner manual, which is included in the documents of the dryer.

After the connections to the electrical and to the oil supply at site, the furnace of the dryer is fully ready-for-use. Before using the dryer, control as follows:

- The oil duct connection is correct (arrows in the oil pump indicate the correct flow direction).
- The oil filter is in an upright position, and the flow direction is correct.
- The valves in the oil container are open.
- The furnace explosion and sweep doors are closed.
- The flue duct complies with the regulations. The flue duct is steadily fixed to the dryer.



**Observe the connection pressure when connecting the gas burner to the gas supply system.**

### 4.4. Furnace

The furnace must be placed in the way that no any dust will get into it during the drying process. There must be enough space also on the sides of the furnace for maintenance, when required. The instructions for the arrangement of the furnace and the flue ducts given by the local fire and rescue services must always be obeyed.

#### 4.4.1. Furnaces, oil burners, nozzles

Furnace	Oil burner	Nozzle I-stage	Nozzle II-stage
210	Oilon KP 26	4 gal	
210	Oilon KP 26 H	4 gal	2 gal
250	Oilon KP 26 H	4 gal	2 gal
300	Oilon KP 26 H	5 gal	2 gal
400	Oilon KP 50 H	6 gal	3 gal
500	Oilon KP 50 H	8,5 gal	4 gal

#### 4.4.2. Adjusting the furnace temperature

If the drying air temperature exceeds the limit value set in the oil burner thermostat, the oil burner shuts down. The oil burner is reactivated when the temperature has fallen by 2 - 4°C.

In the furnace equipped with a two-stage oil burner (KP 26 H or KP 50 H) the thermostat has two set values, one for a single output and one for a double output. Observe that the set value of the single output must be higher than that of the double output. The intension is that the oil burner during the drying process never extinguishes. The meaning with the double output is to compensate ambient temperature varieties.

The set value of the overheat control thermostat is slightly higher than the set value of the oil burner thermostat, thus ensuring that the furnace temperature is not rising too high. At the end of the cooling phase the fan thermostat stops the furnace fan only when the furnace temperature has fallen below the set value of the fan thermostat.

The displays of the thermostats are situating in different places, depending on the type of the electrical cabinet.

#### 4.4.3. Set values of thermostats

Thermostat	Type	Set value °C
Fan thermostat	Capillary	50
Burner thermostat 1-stage	Digital	90
Burner thermostat 2-stage	Digital	80
Overheat control thermostat	Capillary	120

## 5. Drying process

### 5.1. Grain filling and transferring to the dryer

The grain to be dried will be loaded into the filling hopper, and therefrom to the bucket elevator. The grain is conveyed up above the grain buffer bin of the dryer. From the elevator the grain flows through the distributor to the pre-cleaner. Therefrom the grain is transferred to the spreader. Owing to the spreader, the grain bin is filled uniformly. At the beginning of the heating process the grain is swelling. Therefore, you must observe at the filling process that there is enough space in the bin. In order to facilitate the filling process the grain bin is provided with a filling level sensor.

Prior to starting the filling process, check that there is enough space for the trailer to unload the grain. Build an obstacle for the trailer to avoid damaging the filling hopper. Before start to fill, control as follows:

- The distributor at the top of the elevator is in the correct position.
- The bottom outlets must be closed.
- The inspection hatches must be closed.
- The supply air baffle of the pre-cleaner is in the correct position to avoid the grain directing to the husk/beard discharge pipe. Adjust and control the pre-cleaner during the drying process so that it is functioning in a correct way.

### 5.2. Grain drying

Simultaneously when starting the drying process, the grain feeding unit mounted in the lower part of the grain bin starts to function. A certain amount of the grain will be transferred to the base cone. From this base cone the grain flows to the elevator. The grain circulates through the pre-cleaner back to the grain bin. The extracted air temperature is controlled by the sensor mounted in the air outlet conduit. By reaching the set value, the drying process is shut off by the automation system. The cooling phase starts hereafter.

The circulation rate through the pre-cleaner during the drying process should be approx. once per hour. Owing to the efficient drying process, the weight of a grain cube is increasing, and at the same time the drying capacity will be improved. The husk/beard/debris discharge pipes (from the pre-cleaner) must lead out (through a cyclone) to a husk collecting box.

Prior to starting the drying process, control as follows:

- The air intake in the furnace must be clean.
- The replacement air flap must be adjusted by opening it, when drying the not full grain batches.
- Check that the burner switch and the burner maintenance switch are in the correct position.
- The safety net of the discharge cone of the main air fans must be controlled; clean if needed.

The drying process is started by turning on the main air fan. The oil burner starts only after some delay. Control the correct function of the dryer.

The feeder is pre-set at the factory, and is functioning accordingly during the whole drying process.

The function of the pre-cleaner must be controlled all the time. It must be adjusted, if needed; please see Pre-cleaning. The drying process continues until the function of the oil burner is shut off by the sensor controlling the extracted air temperature. Hereafter, the cooling phase

starts, and this phase lasts the pre-set time. At the moment when the main air fan stops, the drying phase (cooling) is finished. In case of power failure during the drying process, the process continues automatically as soon as the power is supplied.



**The humidity content of each specific batch must be controlled before emptying the dryer.**

### **5.3. Emptying after the drying process**

After cooling the bottom outlets of the feeder will be opened. The grain flows through the base cone to the elevator.

After emptying the cleanness of the grain bin, the drying cells and the conduits must be checked. In the case that there will be a different kind of grain to be dried (e.g. seed grain); the clean-up must be performed carefully. The lower part of the elevator and the cleanness of the bottom outlets must be checked as well.

### **5.4. Function of the furnace**

If the drying air temperature exceeds the limit value (approx. +80°C) set in the oil burner thermostat, the oil burner shuts down. The oil burner is reactivated when the temperature has fallen by 2 – 4°C. The pilot light of the two-stage oil burner is controlled direct from the display of the electrical cabinet. The set value must be 4 – 8°C lower than that of the set value of the oil burner thermostat.

The set value of the overheat control thermostat is approx. 110°C, and is slightly higher than the set value of the oil burner thermostat, thus ensuring that the furnace temperature is not rising too high. When the overheat control thermostat is activated, it stops the whole unit, but leaves the main air fan on. The unit is activated automatically, when the temperature has fallen below the set value of the fan thermostat (approx. + 50°C).

By shutting down the drying, or when the furnace for some reason remains still warm (e.g. during a trial run), the fan thermostat keeps the fans on until the furnace temperature has fallen below + 50°C.

#### **5.4.1. Adjustment of the furnace**

The following two facts have a significant influence on how cost-saving the drying process is: firstly, the furnace must be clean, and secondly, the burning process shall not develop any soot. Therefore, read carefully the installation instructions for the oil burner before taking the furnace in use. The oil burner adjustment must always be controlled by an oil burner fitter, in order to keep the burning as clean as possible and to diminish the oil consumption. The warranty presumes the service performed once a year by a qualified fitter.

For further information, please visit <http://www.oljylammitys.fi/jasenliikkeit/>, where you find the *Oilon* service companies.

### **5.5. Air flow rate**

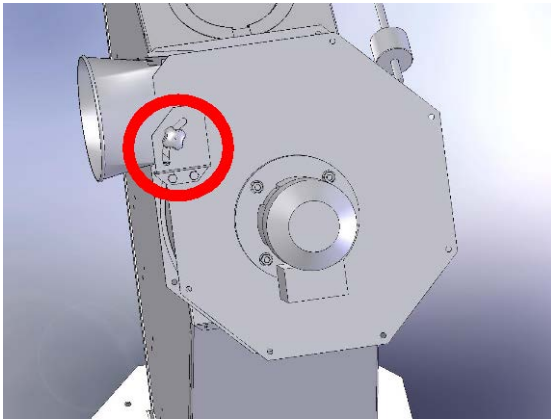
The air flow rate can be adjusted by means of the air baffle fitted on the air intake of the furnace fan. This baffle will be turned to be more closed, which position reduces the air flow rate. It is not recommended to turn the baffle entirely closed, unless the grain batch is very small, or if the material to be dried is very lightweight.



## 5.6. Setting of the pre-cleaner

### 5.6.1. Adjusting the pre-cleaner fan

Adjust the fan, and simultaneously, control the result. Open the baffle so that you hear the grain to flow to the pre-cleaner. Close somewhat the baffle and leave it in this position. Control the cleaning result in order to avoid the grain directing to the discharge pipe.



### 5.6.2. Setting of the spreader plate of the pre-cleaner

The function of the spreader plate is to spread the grain as wide as possible on the pre-cleaner tries, thus ensuring the best possible cleaning efficiency. In the correct adjustment of the spreader plate it is swinging slightly during the filling and drying processes. If the spreader plate is set too heavy, as a consequence hereof can be the pre-cleaner blocking. Whereas, if the spreader plate is set too light, the grain flow is not uniform, resulting in a poor cleaning efficiency.

When adjusting, observe that if you move the weight towards the shaft, the spreader plate gets lighter, and in the opposite situation, the pressure in the spreader plate increases.





## 5.7. Drying of turnip rape and peas

When turnip rape and seed grain are dried, the drying temperature should not be too high. When feed grain is dried, the temperature can be higher. The required temperature can be adjusted by adjusting the air intake and the oil pressure of the furnace. The drying process with low temperatures requires that the nozzle size will be changed to a smaller one. The drying air flow rate should be diminished also when the dryer is full filled, if the grain flies from the drying cell to the air extraction case. In this case, please call the oil burner service company.

### 5.7.1. Turnip rape

First, before starting off with the drying process, it is necessary to carry out four basic adjustments:

- The feeding rate in the feeder unit must be reduced by adjusting the rotation speed of the motor.
- A smaller nozzle must be mounted to the oil burner. Or the switch of the oil burner must be turned to the 1-position. In this case only the 1-stage in the oil burner is on, i.e. only half of the oil burner capacity is used.
- The air flow rate must be reduced by opening the replacement air flap.
- The baffle of the pre-cleaner must be entirely closed, this means, the adjustment to the slightest cleaning position.

### 5.7.2. Peas

The best way to dry peas is to mix peas with oats at the ratio of 1:1. Otherwise, you can use the adjustments as described here above. It is also possible to dry peas without any mixture, but depending on the threshing area, it would be best to conduct the heated air beforehand to peas for approx. 3 – 4 hours, but without circulating the air. As soon as the outer surface of the peas seems to be dry, you can start off with the feeding process.

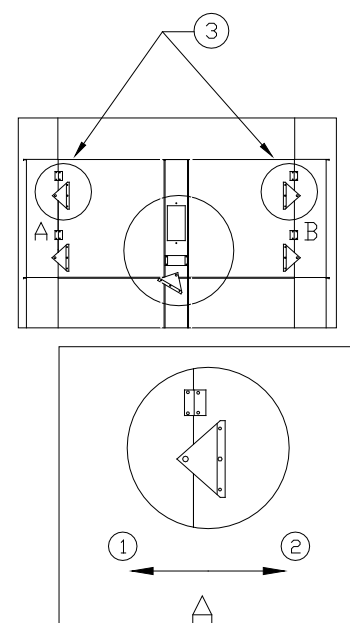
## 5.8. Drying of not full grain batches

When the grain batch is not full, there is a risk that during the drying process the topmost air brushes will open in the grain bin. Some amount of warm air can escape through these open brush beams. There is a risk that this escaping air delivers some amount of the grain in the drying cells. Therefore, for drying the not full grain batches the dryer is fitted with shut-off flaps (3).

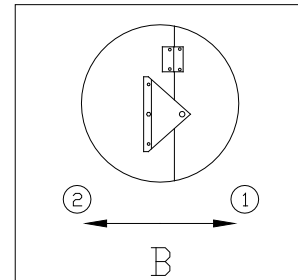
By drying the not full grain batches, proceed as follows:

- The shut-off flaps must be closed (2).
- The supply air intake in the furnace must be somewhat closed in order to reduce the air flow rate.

After the drying process, remember to open (1) these shut-off flaps.



For ensuring the cost-saving use of the dryer, it would be good, if the batches were full. Therefore, it would be good, if a smaller wet grain batch could be air-dried in the dryer in the way that it is circulated in the dryer when the fans are turned on. In this way the grain batch cannot be perished or get cloddy in the dryer. When there is more grain in the dryer, the full grain batch will be dried in the usual way, and at the same time you can save energy. The wet grain can also be dried beforehand in fresh grain silos.



## 6. Maintenance and cleaning

### 6.1. General information

For achieving good results, it is of vital importance that the function of the dryer is reliable. Malfunctions, which may occur, can bear even big risks. Hazardous situations can be avoided by performing a correct maintenance.

Maintenance and cleaning can be divided in three periods:

1. Test run before taking in use.
2. Autumn maintenance, lubrications and cleaning immediately after the season.
3. Inspections and lubrications during the season.



**Before starting to maintenance the dryer, switch off the main switch to the 0-position.**

### 6.2. Cleaning

Those surfaces which are not naturally cleaned by the grain flow must be cleaned by a scraper or a brush. Inspect and clean also the inner surfaces of the feeder unit and the feeding rollers. There is normally no need to clean inside the drying cells. The air extraction cases must be cleaned. Control at the same time that there are no husks/beards in the warm air channel between the furnace and the dryer. Finally, make sure that loose layers (husks/beards) are not left in the drying cells or in the base cone. You can get husks/beards out of the drying cells by blowing for some minutes, using the full capacity of the fan. The air intake of the pre-cleaner must be cleaned.

### 6.3. Elevator and grain spouts

Clean the lower and the upper parts of the elevator. The grain spouts must be checked carefully in order to find out possible leakages and wear-out failures. In connection with the autumn maintenance it is good to determine, if the grain spouts need extensions, or if some other modifications are required, because then you remember well the situation.

### 6.4. Base cone

Control the inner surfaces of the base cone, and if required, clean through the opened inspection hatch. Inspect the bottom aspirator and clean, if required.

### 6.5. Feeder

#### 6.5.1. Cleaning of the feeder outlets

The outlets and in particular the edges of the outlets must be cleaned carefully, and at the same time after the season checked that the outlets can fully be closed. The easiest way to clean is to use a scraper to the surfaces. For cleaning you must have an access to the base cone. It is important to remember that the outlets must be fully open, and that the power must be switched off from the main switch. When the outlets are fully open, it is possible to clean them manually from the base cone. Through the inspection hatches of the feeder can be checked that there are no husks/beards left in the brush channel.

#### 6.5.2. Checking the tightness of the bottom outlets

It is possible to check through the base cone that the bottom outlets are well sealed. If you observe that one outlet is open, this outlet must be adjusted. It is advisable to control the other end of the outlet as well, in order to check that the outlet is not twisted. If you see that there is the same clearance at the opposite end also, the bottom outlet is straight and in the same way

open at both ends. If the bottom outlet is twisted, you must call the fitter. You must pay attention to the cleaning of the bottom outlets, for preventing them from twisting. It is necessary to control that the bottom outlets are clean when changing to other grain species.

By adjusting the bottom outlets, you must remember that you cannot adjust just one outlet. If one of the outlets is slightly open, you must adjust the other outlets at the same time. The only exception is the last outlet. The adjustment of the bottom outlets is started with running all the outlets closed, and with opening all rigging screws. First, the rigging screw which is nearest to the opening mechanism is adjusted; the second outlet is adjusted by means of this rigging screw. You can proceed in this way, and the last rigging screw which will be adjusted is situated farthest away from the opening mechanism.



**By entering the base cone, be sure that there is no any grain left in the dryer.**

There is a gear motor fitted in the transmission of the feeder. The power of this gear motor is 0,75 kW. The secondary shaft has 28,5 rpm. It is not possible to control or change the oil amount in the gear box.

- You must inspect once a year that the gear is not leaking.
- Clean the gear motor from dust and dirt.
- Lubricate the chains and the arms.
- Check and tighten the transmission chain, if required.
- The bearings of the feed shaft must be lubricated after the period of operation.
- Lubricate carefully in order not to damage the shaft seals.

## 6.6. Furnace

The furnace must be cleaned and swept immediately after the period of operation. There is an explosion/sweep door on the front wall. The cleaning hatches are fitted in the lower part of the furnace; these hatches can be opened by means of the screws. Prior to starting the drying period, control that the inner base of the furnace has no husks/beards or dust. Use the exhauster, if needed.

The furnace must be swept at least once a year. It is not allowed to use other cleaning agents than those which can be added to the fuel oil on the recommendation of the seller.

Before filling the first batch to be dried, a test run must always be conducted. Proceed as follows: Start the dryer, together with the oil burner, and close somewhat the supply air intake. Let the temperature rise until the oil burner thermostat shuts off the function of the oil burner. In this way you can control the correct function of the thermostats, and at the same time all impurities will be burned off.

The explosion door will be opened for winter months. It is advisable to cover the air intake on the front side of the furnace for the winter. Fill the oil tank with oil before the winter.

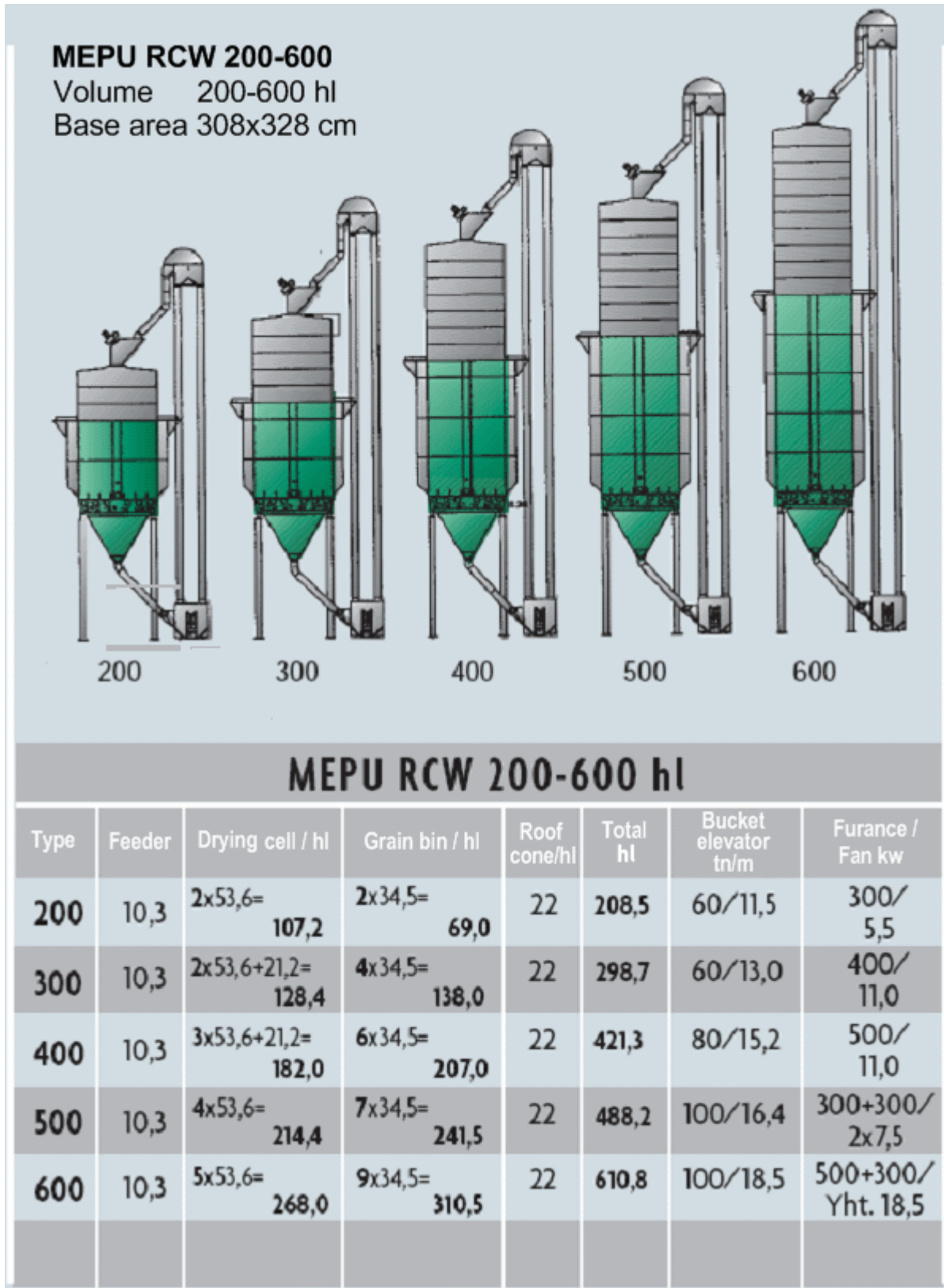
## 7. Troubleshooting

As follows there are listed some situations when disturbances might occur concerning the automation, and the fault diagnostics for these problems. Check the reason for the fault and the remedy for it. If the proposed remedy does not solve the problem, call the respective service company or the manufacturer for advice.

Fault	Reason	Remedy
Dryer is spending more oil than before	<ul style="list-style-type: none"> <li>Shut-off flaps of the not full grain batches closed</li> <li>Supply air volume to the furnace too low</li> <li>Oil burner shuts off during drying process.</li> <li>Oil burner not correctly adjusted</li> </ul>	<ul style="list-style-type: none"> <li>Check the shut-off flaps. Open the flaps, if you dry full grain batches.</li> <li>Check the volume. Is it possible that there might be some dirt or husks or obstacles which hinder the air supply to the furnace?</li> <li>Capacity of the oil burner adjusted too high. Call a fitter to adjust the capacity of the oil burner.</li> <li>The fitter must adjust the oil burner.</li> </ul>
Cleaning capacity of the pre-cleaner too low	<ul style="list-style-type: none"> <li>Pre-cleaner wrong adjusted</li> <li>Replacement air holes in the grain bin blocked</li> <li>The rotation direction of the pre-cleaner motor wrong</li> </ul>	<ul style="list-style-type: none"> <li>Check the adjustment of the pre-cleaner.</li> <li>Check that the holes are clean.</li> <li>Check the rotation direction of the pre-cleaner motor.</li> </ul>
Elevator is getting blocked when emptying	<ul style="list-style-type: none"> <li>The shut-off flap of the elevator too open or fully open</li> <li>The grain spout or the conveyor does not convey enough. The unloading angle in the grain spout is not enough sharp.</li> </ul>	<ul style="list-style-type: none"> <li>Close the shut-off flap to approx. the half position.</li> <li>Check and adjust the shut-off flap to match the conveyors or the grain spouts. Check the unloading angle in the grain spouts. The unloading angle for the dry grain must be at the minimum of 30°.</li> </ul>
Grain is drying considerably slowly	<ul style="list-style-type: none"> <li>A not full grain batch. You can see the air brushes of the drying cells in the storage silo.</li> <li>Shut-off flaps of the not full grain batches closed when drying a full batch</li> <li>The blowing air temperature too low</li> </ul>	<ul style="list-style-type: none"> <li>Close somewhat the shut-off flaps of the not full grain batches.</li> <li>Check the position of the shut-off flaps. The shut-off flaps must be in the open position when drying the full grain batches.</li> <li>Check that the temperature is appropriate for the situation. If the furnace does not raise the temperature to be an appropriate one (e.g. drying in the night), shut down somewhat at a time the air supply, in order to get the right temperature.</li> </ul>
During the filling process the dryer has been loaded at a too high level	<ul style="list-style-type: none"> <li>If the grain is too wet, it can build a blockage in the drying cell.</li> <li>The bottom outlets are leaking, and the base cone has been full-filled</li> </ul>	<ul style="list-style-type: none"> <li>Adjust the infeed to a minimum, and try to get the wet grain to start to move only by blowing. You can turn the oil burner off by switching to the 0-position.</li> <li>Empty the dryer, and check that the bottom outlets are not leaking.</li> </ul>

## 8. Technical data

*Mepu Oy* reserves all rights to technical modifications.



## 9. Declaration of Conformity

<p><b>Vaatumuksenmukaisuusvakuutus</b> <b>Declaration of conformity</b> <b>Garanti av motsvarighet</b></p> <p><b>CE</b></p> <p>Laite, Machine, Maskin <i>Kiinteä kuivaamo, Stationary dryer, Stationär torken</i></p> <hr/> <p>Laitteen tyyppimerkintä, Type of machine, Typmärkning <i>RCW, DCR, Agro, Junior</i></p> <hr/> <p>Sarjanumero, Serial number, Serienummer</p> <hr/> <p>Direktiivit, Directives, Direktiv <i>2006/42/EC, 2004/108/EC, 2006/95/EC</i></p> <hr/> <p>Standardit joita on sovellettu (tai niiden osia/kohtia), (part/clauses of) standards that has been used, (delar/paragrafer av) standarder som har använts <i>SFS-EN 292-1, SFS-EN 292-2+A1, SFS-EN 953</i></p> <hr/> <p>Sisäisellä laadunvalvonnalla on varmistettu, että tässä eritelty laite vastaa nykyisten direktiivien ja standardien vaatimuksia. Trough our internal quality control it is ensured that the product which this declaration relates is in conformity with the current directives and standards. Genom inre kvalitetsgranskning försäkras att de produkter som nämns i detta certifikat är i enlighet med de nuvarande direktiv och standarder.</p> <p>Akreditointi yksikkö, Accredited unit, Ackrediterade <i>DNV certification OY, Espoo, Finland</i></p> <hr/> <p>Teknisen tiedoston laatija, Person who is authorized to compile the technical file, Person som är behörig att ställa samman den relevanta tekniska dokumentationen <i>Mepu Oy, Juho Rastas, Mynämäentie 59, 21900 Yläne Finland</i></p> <hr/> <p> Arto Sainio Toimitusjohtaja, Managing Director, Verkställande Direktor Aika ja paikka, Time and place, Tid och platsen, 29.12.2009 Yläne</p> <hr/> <p>Valmistaja, Manufacturer, Tillverkare Mepu Oy Mynämäentie 59 21900 Yläne Finland</p> 
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