

# ARITERM

*For a sustainable future*

## DIRECTIONS FOR INSTALLATION AND USE

PX22



*kmp*



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## ■ Description

The KMP stoker is designed to be installed in a boiler and is to be fired with wooden pellets. The attached screw feeds pellets from a barrel or similar, alternatively a separate storage bin that might be filled from the outside, either from a barrel or a sack or trough a hose from a truck by means of compressed air.

The integrated electronics controls the stoker with a special temperature sensor, which is mounted on the boiler, and starts and stops the stoker. The output is automatically adjusted with regard to the boiler temperature.

The control panel has a display and adjustment dial (see fig. 3):

- The display shows the operating mode and the current boiler temperature. Explanatory text scrolls through the display every 5 seconds.
- The adjustment dial is used by pressing or turning.
- Turn it to scroll through the menu or change the value when adjusting.
- Pushing once makes a selection or saves in the menu.

Example: Power the burner. Pressing once causes the panel to ask "Start?". Pressing again means that you confirm the question and the burner starts. If you turn one increment clockwise instead you jump in the main menu and come to "Start T". Turn further to access the respective "Stop T", "Usermenu" and "Back".

Start T: You set the desired start temperature here.

Stop T: You set the desired stop temperature here.

Usermenu: The other time and temperature settings are adjusted here.

To make more advanced settings one must have the code "SetCode".

Other menu steps are shown in section "Startup and settings".

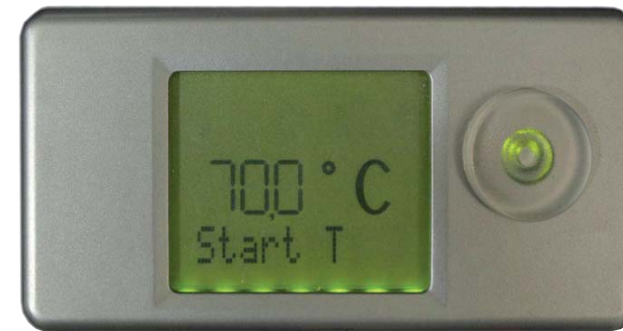


Fig. 3

The burner is lit using a hot air element when the boiler temperature falls below the temperature selected in the main menu. The starting procedure is made automatically in several steps in order to achieve a quick and virtually smokeless startup. In case the ignition fails the procedure is repeated once or, if needed, twice.

When the boiler temperature has increased 2-5°C the output is reduced to half power, to stop when the desired temperature is reached (80-85°C). After a short cooling period the burner stops, and restarts automatically when the temperature has dropped to the set temperature again.

## ■ Fitting

The PX22 stoker is to be mounted to one of the boiler hatches. The best place is often where the oil burner normally goes, but if there is not sufficient room for the ashes, the hatch for the wood can be a good alternative. Always use the supplied docking flange, as this facilitates removing the burner for cleaning. A swing arm for the burner to place on the door is available as an accessory (part no. 1306).

**Note!** Contact your local chimney sweeper when installing the stoker

### ■ Fitting the stoker

1. Decide where to put the stoker. If the hatch can be opened with the stoker in situ, this is to be preferred.

**Note!** The electric supply is to be automatically shut of when the hatch is opened.

2. Make a 155 mm diameter hole in the hatch. Seal off using glass fibre rope or a similar high temperature gasket. Mount and fasten the burner, using the screw on the top of the mounting flange.

**Note!** The hatchet has to be well insulated.

3. All hatches and valves have to be airtight in order to not allow undue draught into the boiler.
4. After mounting the stoker and sealing the boiler it's time for the screw feeder.

**Note!** When feeding directly to the burner, the standard feeder (maximum length 2,3 m) is to be used. Preferably it should be hung from the ceiling. Before connecting feeder and stoker; see section Start och adjustment.

### Important!

- The flue valve, if any, must be kept fully open at all times.
- All hatchets and flue pipes must be airtight.

This is particularly important if the chimney is tight or there is a low draught for any other reason. Otherwise there is a risk of smoke going backwards during startup, especially if the stoker is not properly adjusted.

### ■ Screw feeder

Allways observe the following:

- The feeder inlet opening is not to be less than 100 mm from the bottom 150 mm from the nearest side wall of the storage bin.
- The feeder has to be inclined between 40° and 50° from horizontal.
- Attach the feeder thoughtly to keep it from working its' way into the storage bin!
- The external auger's outlets must not open directly above the pellet burner's inlet, they must be offset away from each other so that the hose swings out of the way if it burns off.

### ■ Temperature sensor

The temperature sensor is to be placed in a submerged tube, alternatively high up on the boiler top beneath the insulation. If there is not a suitable fastening point the sensor can be glued directly to the metal using an epoxi resin. Note that the sensor has to be attached directly to the metal to ensure a stable and exact temperature regulation.

### ■ Boiler room and safety

There has to be an inlet aperture to allow air being drawn in to the room from the outside. The valve's free surface must correspond to at least the chimney's cross-section area.

**A hot air boiler must not retrieve the hot air from the boiler room as this can cause a vacuum!**

It's important that the room is clean and free from dirt and dust to prevent fire. Combustable materials shall not be cept at a distance closer than 1,5 meters from the stoker. Chemicals are not to be stored in the boiler room, because of fire hazards and possible damage of the chimney due to acid fumes.

**The door to the boiler room must be kept shut!**

Ensure that there is enough space around the burner so that servicing and maintenance can be carried out easily. There must be enough room to lift the burner out and rake out ash into a non-flammable container. This is made easier by using the Swing arm accessory.

### ■ Pellet hopper and pellet transportation

Ariterm has several different solutions for bulk and weekly supplies as well as transportation augers. Each model is designed to work with Ariterm burners, and provide the best possible conditions for trouble-free operation. The burner's function is not guaranteed in combination with other solutions. For long distances between hoppers and burners a horizontal auger transporter is available that can be combined to create very long lengths.

### ■ Is the boiler suitable

The PX22 stoker can successfully be installed in virtually any boiler on the market. It's important that the combustion room is big enough to accommodate the flame without it touching any watercooled areas. There also has to be ample room for the ashes produced by the stoker. The flue tubes has to be sufficiently big not to be blocked by ashes.

Wood boilers have the advantage of being roomy inside, and is often easier to clean, but most oil boilers are also suitable for PX22. If the stoker is to be installed in a combined wood and oil boiler, first find out if there is a big difference in stated output between oil and wood. If the difference is less than 10 kW the stoker should be placed in the wood hatchet if it can be opened with the stoker in situ.

Small kitchen boilers are often too small to be suitable.

Installation in a boiler with high output (>40 kW) can result in too low flue temperature (see section Chimney).

**Keep an alternative source of energy (electricity, wood or oil) in parallel with the pellet stoker.**

### ■ The combustion chamber

Clearance between the top of the stoker and the inside of the combustion chamber is to be minimum 50 mm, and at least 200 mm in front of the aperture.

An adapter plate with an extension is optional extra (the burner need not slide into the flange completely). Minimum clearance beneath the stoker is depending on the type of boiler, there has to be space for ashes generated during at least one week of operation.

### ■ The Chimney

The burner must be installed in such a way that variations in the draft conditions do not affect the burner's performance. This is most easily achieved by installing a correctly dimensioned draft inhibitor.

If the flue gas temperature is too low there is a risk of condensation, which may cause seizing or frost erosion of the upper part of the chimney.

Try to attain a flue temperature of minimum 180°C after the boiler. A more accurate method is to measure the temperature circa one metre down from the top of the chimney. If temperature exceeds 60°C there is little risk of condensation.

If lower temperature, measures have to be taken. Also look for signs of dampness in the lower parts of the chimney. If so, the flue gas temperature has to be risen.

If there is only a small amount of moisture in the upper part, installation of a draught pass might be sufficient. Alternatively the stoker can be run only in full power mode.

If large amounts of moisture appears, installation of a stainless steel insert tube is the best solution.

If the draught in the chimney (burner recently stopped) is greater than 20 Pa, you have to install a draught pass. This should be set to 12-15 Pa.

## ■ Electric installation

All electric connections on the stoker and screw feeder have fast action connectors as below

1. Power supply, fuses 2 x 3.15 AT
2. To feeder auger
3. Connector temperature sensors
4. Hose connection compressed air cleaning (Option)
5. Connector I/O
6. Control solenoid valve and compressor for compressed air cleaning (Option)

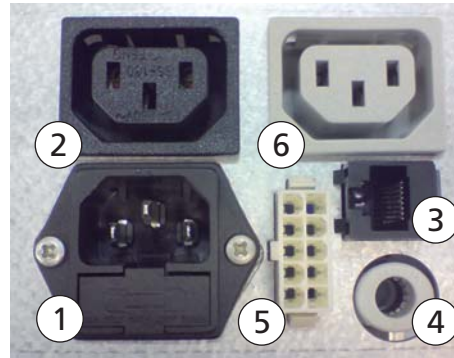


Fig. 2 Connectors on the stoker.

The yellow cover has to be removed before the cords can be disconnected from the stoker.

**NOTE!** Old manual reset cut-out thermostats can cause problems.

These shall be removed and replaced by new.

All connections are to be made with the enclosed cables and connectors.

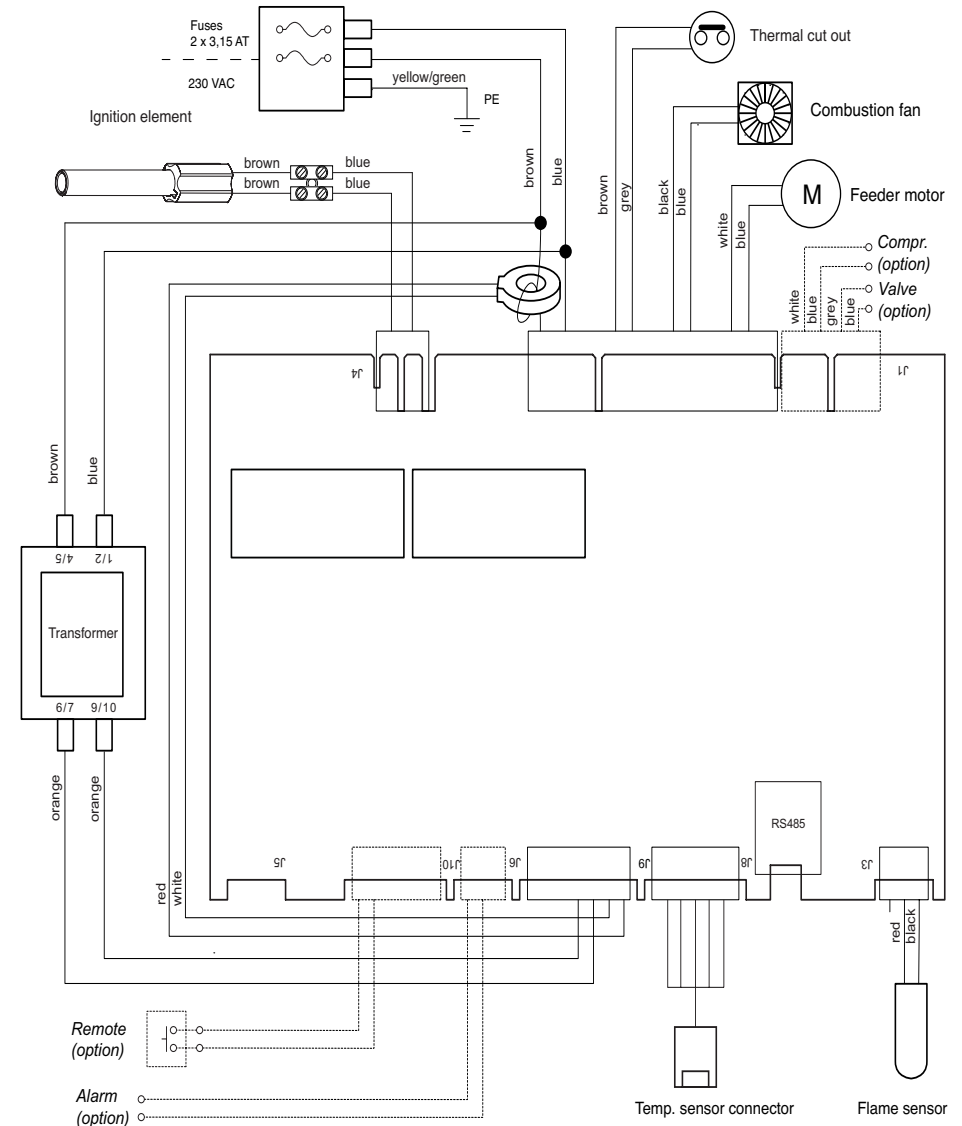
**NOTE!** The stoker has to be connected to the mains on a manual reset cut-out thermostat on the boiler. This must be carried out by an authorised engineer.

The bulb of the cut-out thermostat has to be immersed in the boiler water or otherwise located on the boiler where a quick action is guaranteed in case of overheating.

If there is no thermostat on the boiler, an external one has to be installed (optional extra).

**NOTE!** If a non-standard feeder motor of more than 300 watts is being used, an intermediate relay has to be used.

## ■ Electric circuit diagram



## ■ Start and setting

### ■ First start

The burner has default settings from the factory when delivered. It must be adjusted upon first startup. Usually, the burner must be used with two output modes (high and low), but the low output mode can be easily deselected or a third power stage used (MIN).

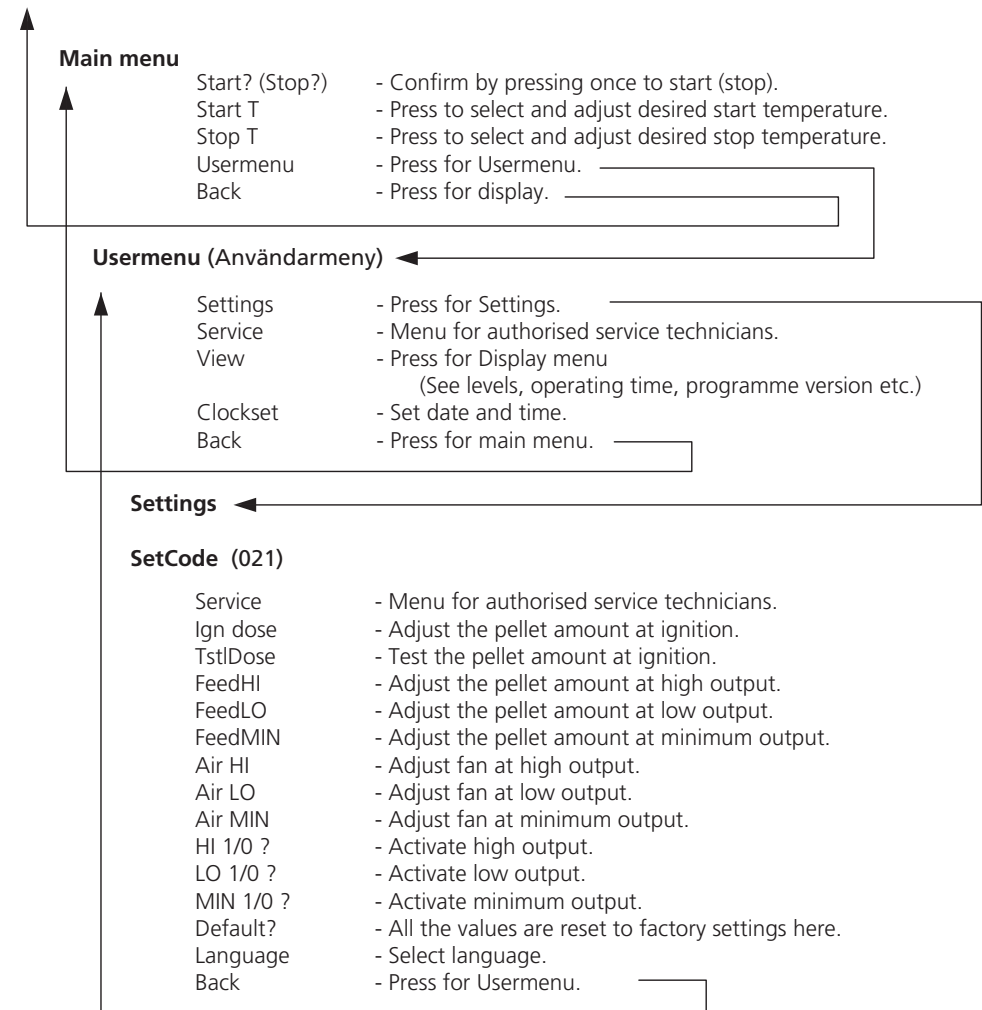
If installed in a large or highly effective boiler giving low flue temperature (less than 180°C), the stoker should be run in full power mode only. Thus condensation in the chimney can be avoided. Note that a chimney equipped with an insert tube can withstand a certain amount of condensation without risk. If in doubt, contact a chimney sweeper.

### ■ Setting air and fuel levels

1. Fill the auger transporter with pellets before connecting it to the burner by connecting the auger motor's cable directly to the burner's connection cable. Allow it to run for a few minutes after it has been filled.
2. Set the starter dose (amount of pellets at ignition):  
Adjust "Ign dose" in the Settings menu. Suitable dose is 3 - 4 dl.
3. Setting the fuel amount (output) for operation in high output mode: Start the burner and wait 5 minutes after it has engaged high output mode ("Hi Power" appears in the display). Adjust "Feed HI" in the Settings menu until combustion is approved.
4. Setting the fuel amount (output) for operation in low output mode:  
Deactivate high output mode by setting "HI 1/0?" to 000.  
The burner automatically switches to low output mode "LO Power".  
Adjust "Feed LO" in the Settings menu until combustion is approved.  
Do not forget to activate the desired output mode again.
5. If the output is to be adjusted, first change the combustion air "Air HI" and "Air LO", then the fuel amount by repeating steps 3 and 4.

### ■ Pellets quality

The burner can handle most types of clean wood pellets, however, 6 or 8 mm pellets are recommended. The quality of the pellets must be Group 1 acc. to Swedish standard SS187120.



Flame Indicated



Firing element Activated



Feeder motor Activated



Combustion fan Activated



Fault function Indicated



Burner in operation

## ■ Storage tank

### ■ Using a storage tank

The larger water volume achieved with a storage tank makes the stoker running in longer intervals, thus giving higher efficiency.

However, the cost of installing a new storage tank is normally not profitable due to the extremely high thermal efficiency of the KMP stoker.

### ■ Installation on a boiler system using a storage tank

If there is a calorifier or a shunt valve in the boiler, the temperature sensor should always be attached directly to the boiler, preferably in an immersed tube. When the boiler and the tank are in direct-cycle, the water temperature should not be below 60°C when the stoker starts, otherwise condensation may lead to corrosion of the boiler body.

If the calorifier and shunt valve is situated in the tank, the temperature sensor can alternatively be placed on the tank, this leading to longer running intervals, thus minimizing the number of starts and stops.

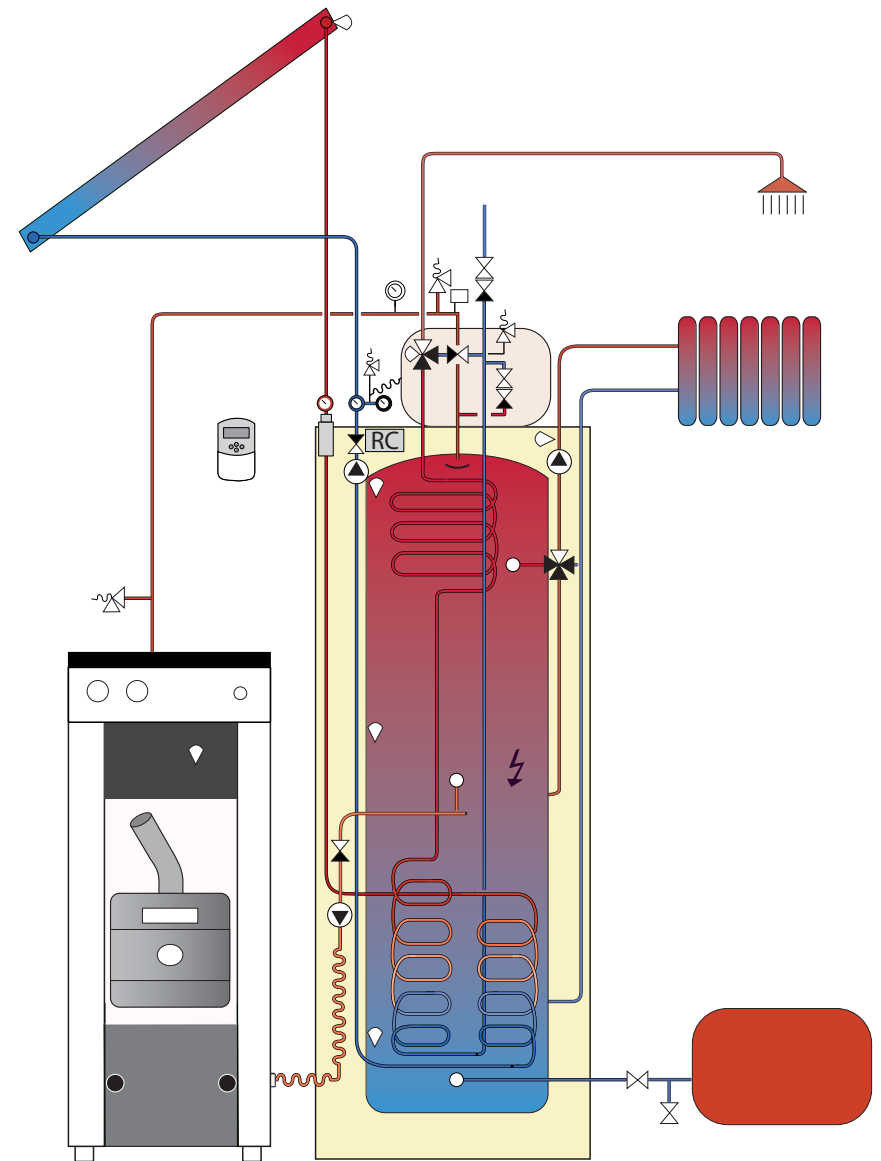
### ■ Placing the temperature sensor on the tank

If the temperature sensor is to be placed on the storage tank, the charging pump system must have capacity enough to cool the boiler off sufficiently.

Boiler temperature must not exceed 95°C before the tank temperature is about 80°C (recommended temperature) and the stoker stops.

### ■ The cut-out thermostat must always be attached to the boiler!

Two temperature sensors can be used with PX22. Simply connect two sensors via our junction box (accessories, art.no 1599) to the burner's temp. sensor connector. Then an authorised installer adjusts the start, stop and alarm temp. in the Service menu.



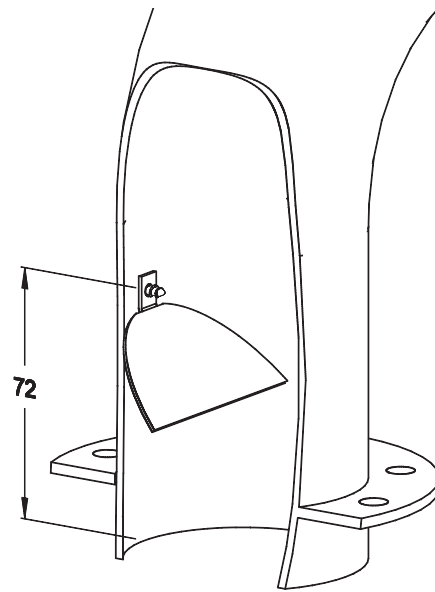
Boiler with PX22 and accumulator tank with solar panels.

## ■ PELLET STOKER KMP PX22

### ■ Pellet retarder - feeder pipe

When the pellets are extremely hard and/or the hose to the feeder pipe is unusually long the pellets occasionally fall out of the burner. To prevent this you could mount the pellet retarder.

Unscrew the screw in the front of the feeder pipe. The pellet retarder mounts with a screw from the outside. (RXS 4,2 x 9,5).



### ■ Maintenance

The stoker is cleaned by raking out the ashes inside, which **must be done once a week during the cold season**. Otherwise a cleaning every other week is sufficient. At these occasions the boiler also should be rinsed from ashes.

Ashes and soot inside the boiler can set back the efficiency dramatically.

**Note!** If the boiler previously has been fired with wood there's a risk of soot and tar getting loose and choke up the flue pipes and even the chimney. Check and rinse if needed when rinsing the stoker for the first two months after installation.

The burner must be dismantled at least four times per year.

The outer and inner burner tubes should be separated and cleaned from sintered ashes. Dismantle by loosening four screws on the front of the stoker.

Note that all cables have to be unplugged before removing the cover.

The local chimney sweep sweeps the chimney once or twice a year – this is usually notified at least a week beforehand. Ensure that the burner is switched off in good time prior to the visit so that the burner and boiler have time to cool down.

### ■ Safety systems

The PX22 stoker meets all current safety regulations and standards.

There are two separate safety systems to avoid fire and hot gases going backwards: a sloping stainless steel tube for the pellet feeder, and a cut-out thermostat on the tube. These safety systems are independent of the electronic control system and therefore cannot be disturbed by outer causes as for instance lightning.

A third safety component is the flame sensor, which indicates whether the fuel level in the burner rises to a non-permitted level, or if cleaning is not carried out and the burner pipe has too high a level of residual products.

In this case, the display shows in which operating mode the flame stopped being indicated and stops as follows:

- ErrStart - Operational stoppage at ignition.
- ErrLow - Operational stoppage in low output mode.
- ErrHigh - Operational stoppage in high output mode.
- GOutStrt - Flame indicated at ignition but not in operation.

### ■ Resetting cut-out thermostat

The burner has overheat protection on the fall pipe, which deploys at 75°C. If it deploys, Errsafe appears in the display.

1. Disconnect the cords from the burner.
2. Unscrew the two screws from the cut-out thermostat protective cover, remove cover.
3. Push button on cut-out thermostat until it clicks.
4. Reassemble the protective cover.

## NOTE!

All work as described in the following text must be done by a qualified person.

### ■ Changing the ignition element

1. Remove the burner cover by removing the two nuts and screws that hold the cover in place and then pull the cover backwards.
2. Remove the two screws at the side of the bottom and fold the bottom plate down.
3. Disconnect the firing element's cables from their terminals (2 x blue).
4. Remove the two screws on the bottom, under the stoker.
5. Remove the screw that holds the element and pull out the element from its pipe.
6. Replace the element.
7. Refit in reverse order.
8. Ensure that the firing element is slid forward towards the inner pipe.

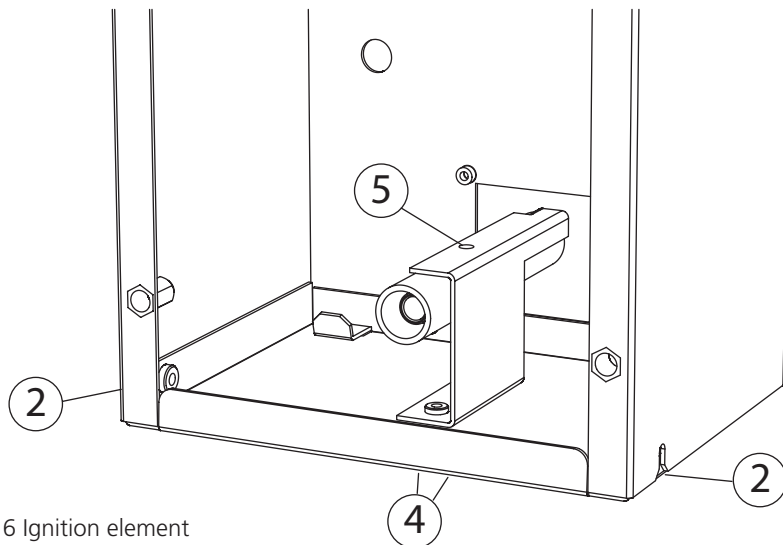


Fig. 6 Ignition element

### ■ Changing light sensor

1. Disconnect all three cables on the stoker.
2. Remove the burner cover by removing the two nuts and screws and pull the cover back.
3. Disconnect the edge connector from the control circuit board and pull out the sensor from its hole to the right of the fan.
4. Push the new sensor into the hole until it gets stuck. Be sure to align it perpendicular to the surface. Connect the edge connector and reinstall the burner cover.

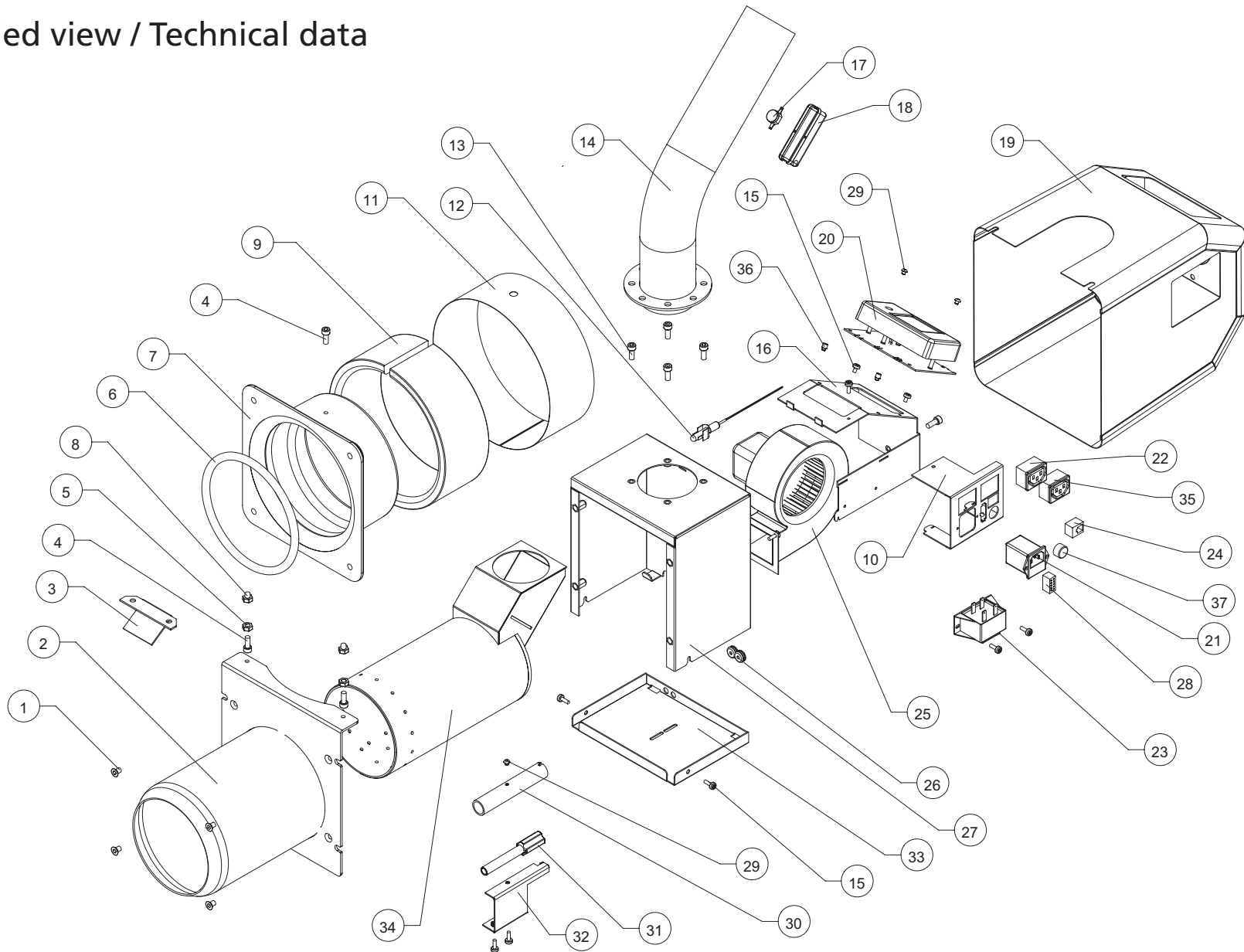
## NOTE!

**When an ignition failure occurs, don't open the hatch until the combustion chamber is properly ventilated!**

## ■ Troubleshooting and repair

Fault	Cause	What to do
The burner stops	<ul style="list-style-type: none"> <li>The burner and/or boiler need(s) sweeping.</li> </ul>	Clean the burner and boiler.
The burner stops, Fault code ErrSafe	<ul style="list-style-type: none"> <li>The burner has overheated.</li> </ul>	Clean the burner and boiler. Reset the fall pipe's overheat protection.
The burner stops, Fault code ErrStart	<ul style="list-style-type: none"> <li>The burner has not lit.</li> </ul>	Check the pellet supply and the starter dose "Ign dose".
The burner stops, Fault code ErrLow	<ul style="list-style-type: none"> <li>The burner has gone out in low output mode.</li> </ul>	Check the pellet supply and the "Feed LO" and "Air LO" settings.
The burner stops, Fault code ErrHigh	<ul style="list-style-type: none"> <li>The burner has gone out in high output mode.</li> </ul>	Check the pellet supply and the "Feed HI" and "Air Su" settings.
The burner stops, Fault code GOutStrt	<ul style="list-style-type: none"> <li>The burner lit but then went out during pre-operation.</li> </ul>	Check the pellet supply and the "Feed SU" and "Air Su" settings. (ServCode)
The burner stops, Fault code ErrorIgn	<ul style="list-style-type: none"> <li>The firing element is not drawing any power.</li> </ul>	Check the connections to the firing element (120 - 145 Ohm) or replace the firing element.
The burner stops, Fault code TempSENS	<ul style="list-style-type: none"> <li>The control circuit board has no contact with the temp. sensor.</li> </ul>	The temperature sensor circuit may be broken by the external thermostat or switch. If not, check the connections to the temp. sensor or replace
The burner stops from time to time and without any visible cause.	<ul style="list-style-type: none"> <li>May be due to too large or strong variations in vacuum in the chimney, or fuel feed fault.</li> </ul>	Contact your authorised installer for overhauling and any installation of draft inhibitors.

■ Exploded view / Technical data



## ■ Component parts

No.	Part no.	Designation	No.	Part no.	Designation
1.	8152	Screw MF6S M6 x 12 untr.	27.	1492	Sweep rear cover PX22
2.	1157	Outer pipe PX2X	28.	1593	Terminal housing 10 pin VAL-U-LOK
3.	1341	Carriage plate PX21	29.	1620	Screw K6S M4 x 4
4.	8117	Screw MLC6S M6 x 16 untr.	30.	1570	Firing element pipe PTC
5.	8148	Nut M6M M6 FZB	31.	1574	Firing element PTC
6.	2585	Gasket rope 10 mm black coated	32.	1567	Firing bracket PTC
7.	1150	Docking flange PX2X	33.	1491	Bottom Rear cover PX22
8.	8231	Dome nut M6 FZB	34.	1158	Inner pipe PX2X
9.	3120	Insulation	35.	8322	Apparatus outlet grey
10.	1493	Connector plate PX22	36.	1188	Holder for firing element
11.	1151	Plate for docking flange PX2X	37.	1610	Plastic plug 15.9 hole
12.	1451	Flame detector for burner Cc05			
13.	8133S	crew MLC6S M6 x 10 untr			
14.	1288	Fall pipe with flange PX2X			
15.	1566	Spacer screw Steel M4x5 Px22			
16.	1490	Electrical bracket PX22			
17.	1133	Overheat protection fall pipe			
18.	1156	Chute OH PX2X			
19.	1555	Burner cover PX22, stainless			
20.	1586	Control circuit board PX22 connection			
21.	8352	Apparatus inlet with net filter			
22.	8112	Apparatus outlet black			
23.	1182	Trafo PX2X			
24.	1452	Internal wiring temp. sensor Px			
25.	1245	Fan PX2X			
26.	8113	Rubber grommet 3.5/7/12			

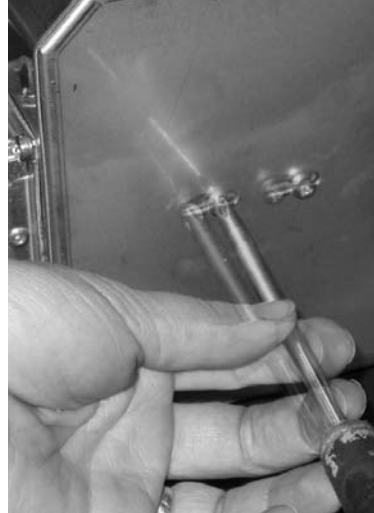
## ■ Technical data

Dimensions outside boiler (b x h x d).. 220 x 250 x 300 mm  
 Dimensions inside boiler (Ø x l)..... Ø156 x 200 mm  
 Efficiency .....circa 95%  
 Output high output mode..... 20 kW  
 Output low output mode.....approx. 10 kW  
 Voltage..... 230 VAC  
 Power consumption (mean under power)..... 40 W  
 Weight ..... 12 kg

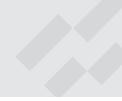
## ■ Accessories and fittings

- 1309 Overheat cut-out thermostat KMP
- 1407 Suspension chain
- 2424 Ash cyclone for sucking out ash
- 1290 Micro pellet storage
- 1265 Flue thermometer
- 1373 Pellet storage 300 l
- 1201 Draft regulator TIGEX with flange
- 8108 Glass fibre gasket Ø15 mm
- 1369 Fall hose diameter 70 mm/m
- 1386 Adapter for pellet hose 70-66
- 1012 Feedo pellet feeders
- 1392 Depo feed chute
- 1029 Aero compressed air cleaning
- 1599 Junction box (Accumulator tank control)

■ Assemble description



- 1 Slacken off the screws holding the inner pipe.
- 2 Chose a suitable position for the feeder tube and fix it by means of the attached screws.  
CAUTION: the lower edge of the pipe must enter the inlet hole of the inner tube.
- 3 Place the cut out-thermostat in the open stainless steel box, fasten the box to the feeder tube with the two screws, the metal side of the thermostat facing towards the tube.
- 4 Undo the two screws on the bottom side of the burner. Push them forward in the slots until the ignition element touches the inner tube. Tighten the screws.  
The burner is now ready for installation.



## ■ Warranty

For warranty issues Ariterm Sweden AB refers to our local Distributor.

## ■ PELLET STOKER KMP PX22

### ■ Declaration of conformity

**DECLARATION OF CONFORMITY**  
according to the EMC Directive 89/336/EEC and the EC Low Voltage Directive 73/23/EEC,  
including amendments by the CE marking Directive 93/68/EEC

Type of equipment: Pellet stoker/burner  
Brand name: KMP  
Type: PX22  
Manufacturer's name: Ariterm Sweden AB  
Address: Flottijvägen 15  
SE39241 Kalmar  
Sweden  
Telephone: +46 480 44 28 50  
Telefax: +46 480 44 28 59

The following harmonized standards or technical specifications (designations) which comply with good engineering practice in Safety matters in force within the EEA have been applied:

EN55014, EN61000-4-2, -3, 4, -5, -6 Level 2, Emission and immunity by electromagnetic disturbances.

EN60335-1:1994, Safety of household and similar appliances - Part 1: General requirements.

EN15270:2007, Pellet burners for small heating boilers.

The product is manufactured under a production control system that ensures compliance between the manufactured products and the technical documentation.

The product is CE-marked in 2009.

By signing this document, the undersigned declares as manufacturer that the equipment concerned complies with the requirements stated above.

Kalmar 2009-09-17



Staffan Lundegårdh  
General Manager, Ariterm Sweden AB

If these instructions are not followed during installation, operation and maintenance, the obligations of Ariterm Sweden AB under the warranty regulations are no longer binding. Ariterm reserve the right to alter any details and specifications without prior notice.



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