FARM2000 BOILER TROUBLE-SHOOTING GUIDE

(v7 301116)

For STRAW BURNING – See also Supplementary Notes on Motorised Damper Operations at rear of this section

Condition	Probable Cause	Remedy
1. Poor Combustion / Excessive Smoke / Tar Deposits	a. Too much fuel loaded into boiler.	Reduce quantity. See page 27
	b. Excessive moisture in fuel	Change fuel/fuel storage method and/or season fuel for longer period
	c. Poor flame establishment prior to starting fan	Using small amount of kindling, light fire at bottom, front centre of fuel load and allow a good fire to establish using natural draft with small stoker door open. Could take 2 - 3 minutes. If flame does not establish readily, indicates damp fuel.
	d. Poor combustion immediately after fan started (*usually due to excess moisture in fuel*)	Increase fan speed gradually over 5-10 minutes until operating speed is established to prevent excess air "blowing" fire out.
	e. Insufficient Secondary Air	Adjust air diverter plate to increase front secondary air *(i.e. over-fire air)* Ensure rear air spreader not covered by fuel.(HTR boiler models only)
	f. Chimney dirty or partially blocked	Inspect and clean chimney
	g. Tubes and flue box not cleaned adequately causing back pressure	Clean tubes 1/week, and flue box every 2 weeks (*with vacuum cleaner or thick glove*)
	h. Damper in flue box not fully open	Ensure it is fully open
	i. Chimney too short or of poor design	Modify chimney layout/Consult FARM2000. See pages 4, 5, 6
	j. Boiler Thermostat set too low	Increase boiler CONTROL thermostat to 82 - 85°C
	k. Fan speed set too low	Increase fan speed
	l. Fan stopped too soon, causing boiler to idle.	Adjust loading frequency and fuel charge to allow fan to run un-interrupted for a minimum of 3 to 4 hours (*depending on boiler model*) after lighting, i.e. sufficient to allow all or most of the fuel to be burned out without stopping.
	m. Boiler too large for heat demand or accumulator too small	Increase accumulator size or reduce amount of fuel loaded
	n. Auxiliary timer incorrectly set, cutting off secondary air prematurely.	See page 20 for typical settings (HTX boiler range only).
2. As above and instability, boiler "panting" and excessive smoke	a. Glowing embers at rear of chamber will ignite all of fuel charge too quickly (*ignition should only be started at front*)	Ensure no glowing embers in boiler when re-loading, especially when using very small pieces of fuel. If however glowing embers are present, then pull them forward to front of chamber. If fire starts at the back, still ensure that good flame is also established at the front before starting the fan.

Condition	**Probable Cause**	**Remedy**
3. cont.	b. Poor flame establishment prior to fan starting	Using small amount of kindling, light fire at bottom, front centre of fuel load and allow a good fire to establish using natural draft, with stoker door open. Could take 2 - 5 minutes. If flame does not establish readily, indicates damp fuel.
	c. Poor combustion immediately after fan started (*usually due to excess moisture in fuel*)	Increase fan speed gradually over 5-10 minutes until operating speed is reached to prevent excess air “blowing” fire out.
	d. Too much fuel loaded in boiler	Reduce fuel load. Top 1/3 of boiler chamber must be left empty to provide sufficient space and dwell time to combust volatile gases.
	e. Fuel pieces too small, e.g. small offcuts, joinery waste, loose straw, woodchip, etc. causing too rapid gasification. Ratio of air space to surface area too high.	Balance fuel loads with larger pieces and load as below. If small pieces are used, stack as below.
	f. Bottom of fuel load too loosely loaded with small pieces. This creates voids at base of fuel resulting in intense primary burn and production of excessive volumes of volatile gases in relation to available secondary air.	Load fuel tighter at the bottom to minimise voids in the fuel stack, adjusting air diverter (as required) to reduce primary air supply.
	g. 2 part base duct has separated or come out of alignment	Join together to prevent air leakage or replace. Clean any ash from beneath base duct sections as necessary to re-align parts.
4. Excessive fuel use	a. Excessive moisture in fuel	Change fuel/fuel storage method and/or season fuel for longer period
	b. Too much fuel loaded into the boiler	Reduce quantities
	c. Main fan timer set too long	Reduce fan running time to prevent fan cooling boiler after fuel charge has burned out.
	d. Inadequate thermostat control of heating system.	Add thermostatic controls and timer (*e.g. night set-back*)
	e. Poor combustion	See above remedies
	f. Primary circulation pump to accumulator not controlled correctly (usually limit/pump thermostat)	Adjust to start circulation at approx. 75°C (*as high as possible, but always lower than the control stat setting*)

Condition	Probable Cause	Remedy
4. cont.	g. Insufficient level of insulation on pipework & accumulator.	
5. Boiler overheats	a. Open vent and cold feed incorrect.	Check with the installer against FARM2000 diagrams
	b. Air-locks in plumbing system.	Check with the installer against FARM2000 diagrams (*there must be nowhere where air can get trapped*)
	c. Inadequate heat leak.	Check with the installer against FARM2000 diagrams including the accumulator
	d. Limit/pump thermostat set too high (out 2)	With accumulator, usually set at 75°C. When operates as override (*when no accumulator*) set to 90°C provided other control available
	e. Fan damper jammed open (non accumulator system).	(not relevant on HTR boilers)
	f. Air leaking through boiler door seals.	Renew seals every 2-3 years or as required
	g. Boiler oversized for heat load	Add accumulator and / or reduce fuel loading
	h. Control thermostat set too high.(out 1)	Recommended setting 80-85°C
	i. Pump inadequate or in wrong position	Contact heating engineer
	j. Poor water circulation/air lock	Check system, bleed radiators or consult heating engineer
6. Base duct distorts or bends (usual operating life 3 - 6 years)	a. Not being adequately air cooled due to prolonged idling, i.e. fan not running.	Make sure all fuel is burned through without interruption (see boiler operation)
	b. No longer correctly positioned, air nozzle on door does not locate in base duct when door closed	Re-position base duct with entry gate just forward of stops in bottom of boiler chamber
	c. Door nozzle does not locate into duct.	Raise rear of base duct using a brick or similar to align entry gate at front of base duct with air nozzle on door. Ensure 2 part base ducts are correctly joined.

SUPPLEMENTARY NOTES REF MOTORISED DAMPER – FOR USE WITH STRAW		
Condition	**Probable Cause**	**Remedy**
7. Poor Flame establishment	a. Straw not dry enough	Use straw max. 17% moisture content
	b. Straw bale too far from door	Move bale closer to door
	c. Soft start period too short or too long	Adjust to suit
	d. Soft start fan speed setting too low	Increase if necessary
8. Excessive Smoke at start * Spark emissions from chimney at start	a. Straw not dry enough	Use straw max. 17% moisture content
	b. Bale too close to door *	Move bale further back; add turbulators
	c. Soft start speed too high *	Reduce soft start speed
	d. Soft start period too short *	Increase length of time for soft start; Usually set between 2-5 minutes, but can be increased
	e. Bale has ignited from rear *	Ensure no fire / glowing embers in chamber when loading with fresh bale
	f. Damper control has not been set / re-set * correctly i.e. no damper delay, thereby creating primary air at start or too soon. Should be all / mainly secondary air to start	See settings on page 25
9. Excessive smoke most of the combustion cycle	a. Straw not dry enough	Use straw max. 17% moisture content
	b. Bales too dense	Use lower density bales
	c. Fan damper moving too quickly from Stage 1 to Stage 3	Check settings and gradually increase time on the “DAMPER OFF TIME” setting
	d. Main fan speed (after Soft Start) set too high	Reduce fan speed
	e. Damper start delay period too short	Increase “DAMPER START DELAY” setting