

# MANUAL FOR INSTALLATION

## M20i • M40i • M80i

Version 1.5 – May 2011

***This manual should be read carefully before the installation commences!***

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The installation of this plant must be made in accordance with the local rules and regulations on the place of installation

Before the plant is placed on its final place it should be inspected carefully for transport damages. Possible damages should be reported to the forwarder.

## **How to assemble the plant**

***You should not fit any parts of the permanent buildings installations onto this plant, as this inconveniences later service and repair work.***

The plant is delivered on 2 Euro pallets and consists of a boiler, a fuel store and a burner tube, which must be assembled before installation.

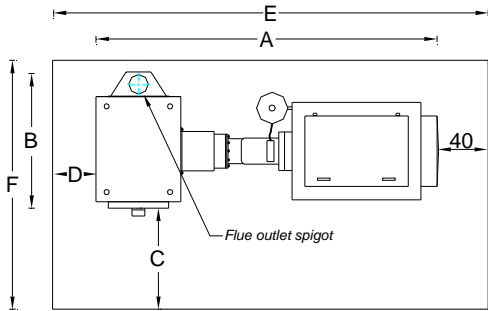
Fuel store can either be type 500/700 litre or type 800/1400 litre.

800/1400 litre fuel store must be sealed in the joint between lower and upper part.

Unscrew the 4 bolts in the joint and the clamp holding the pressure equalising pipe, and then lift the upper parts app. 20mm up. Seal the joint with the included sealing compound. Lift the upper part down again and mount all 48 bolts

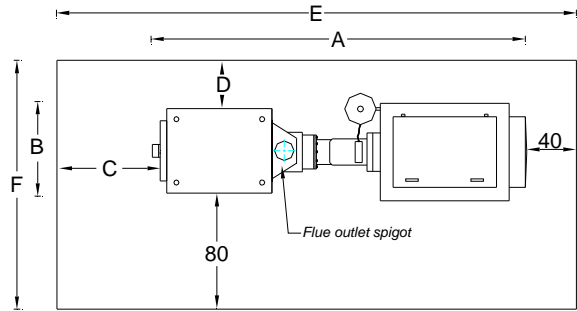
1. The water cooled burner tube is fixed on the fuel store by means of bolts included. The gasket for the flange is under the fuel store lid.
2. The fuel store with the now fitted burner tube is pushed into the pre made hole with flange in the boiler.
3. Before you fixate the fuel store and burner tube to the boiler (with 2 bolts) you must adjust the height of the fuel store by means of the 4 adjustment screws on the legs, so that it is placed horizontal and in a 90 ° angle to the boiler. It is absolutely important, that the water cooled burner tube is horizontal as you otherwise might experience air pockets in the system.  
(By 800 and 1400 litre fuel store, mount wheels under fuel store and adjust height.)
4. The water cooling of the burner tube can now be fitted as shown on **diagram 1. or diagram 1.1, depending on plant layout**. All parts including fittings and circulation pump are in the accessories box included. *(Please note, that the circulation pump is for circulation between boiler and burner tube only)*
5. The combustion fan is fitted on the square stud on the side of the burner tube, no gasket needed.
6. The hose for pressure equalising in the fuel store is fitted on opposite square stud on burner tube
7. The draft regulator, needed by manual heating, is fixed on the top of the boiler in the same side as the door hinges for the combustion room door. The chain is connected to the lower air inlet on the boiler.
8. The plug for power to the boiler is pushed in and secured by a screw. The cable is placed in the tray underneath the plug. Cable W7 is for the circulation pump.
9. Only by 500/700 fuel store: If you want to use a fuel which is likely to build bridges\* in the fuel store you must fit the included chain and the stirrer wings (according to demand). See enclosure 1 in Users manual (\* wood chips, sawdust, wood shavings and the like)

The sketches indicate the recommended minimum distances in the boiler room. The boiler room must be equipped with a ½ to ¾ inch high pressure water tap and a ventilation opening, either as a window or as a ventilation grill



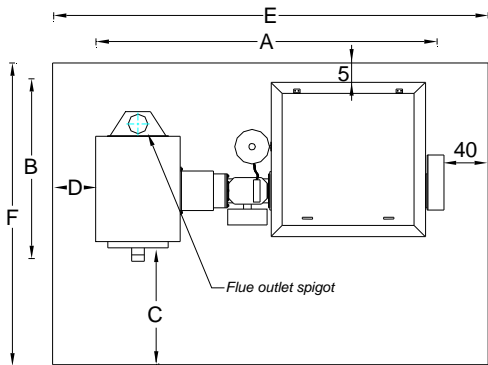
Recommended minimum distances in boiler room (seen from above)  
Stoker inlet on side of boiler with 500 or 700 litre fuel store  
All dimensions in centimetres

	Dimensions		Clearance		Recommended size of boiler room	
	A	B	C	D	E	F
<b>M20i</b>	265	116	120	7	312	220
<b>M40i</b>	290	164	160	10	337	290
<b>M80i</b>	350	171	160	10	397	320



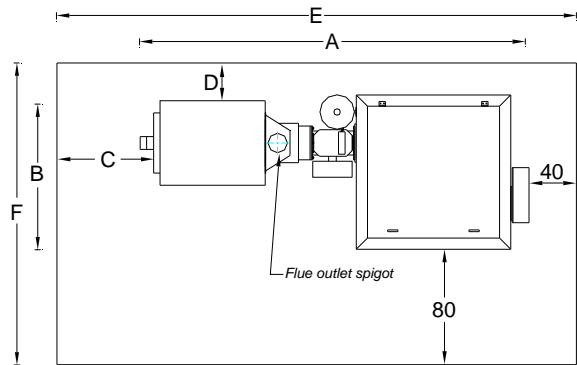
Recommended minimum distances in boiler room (seen from above)  
Stoker inlet on rear of boiler with 500 or 700 litre fuel store.  
All dimensions in centimetres

	Dimensions		Clearance		Recommended size of boiler room	
	A	B	C	D	E	F
<b>M20i</b>	285	77	120	12	445	169
<b>M40i</b>	350	77	160	12	550	169
<b>M80i</b>	380	96	160	10	580	186



Recommended minimum distances in boiler room (seen from above)  
Stoker inlet on side of boiler with 800 or 1400 litre fuel store  
All dimensions in centimetres

	Dimensions		Clearance		Recommended size of boiler room	
	A	B	C	D	E	F
<b>M20i</b>	272	140	120	7	319	254
<b>M40i</b>	297	164	160	10	347	311
<b>M80i</b>	357	171	160	10	407	311



Recommended minimum distances in boiler room (seen from above)  
Stoker inlet on rear of boiler with 800 or 1400 litre fuel store.  
All dimensions in centimetres

	Dimensions		Clearance		Recommended size of boiler room	
	A	B	C	D	E	F
<b>M20i</b>	304	121	120	7	453	208
<b>M40i</b>	371	121	160	10	561	211
<b>M80i</b>	407	133	160	10	591	223

## **Connection to the heating system**

### **See diagram 2**

The boiler must be connected as shown in diagram 2 or as demanded by local statutes. *Further information is in the user manual, section. 7*

The minimum amount of water passing through the boiler must be (see table)

Plant type	Nom. effect [kW]	Min. Amount of water [m <sup>3</sup> /h]
M 20i	29	2,5
M 40i	48	4,1
M 80i	80	6,9

Water returning to the boiler must always be **min. 60°C**

If the above is not adhered to you will risk increased tear of the steel in the boiler, resulting in a shorter life expectation for the plant.

According to Danish laws and regulations this boiler must be connected to a system with "open" expansion tank. Please check you local regulations

### **General**

The expansion tank must be able to contain at least 4 % of the total amount of water in the heating system. Should the plant be installed with an accumulation tank, then the expansion tank must be able to contain at least 8 % of the total amount of water in the heating system.

The boiler must be in non blockage connection to the expansion tank (You must not be able to block the pipe between)

Should the open expansion tank be placed in a not frost safe place, the tank itself must be protected against frost. The circulation to the tank must be controlled by a thermostatic valve or similar in order to secure, that the boiler water is getting minimum access to oxygen.

## **Connection of the sprinkler**

The sprinkler system on the fuel store must be under constant water pressure from a ½ inch tap with a safety faucet and be connected to the dirt collector under the pressure tank.

Please make sure, that pipes / hoses are free of dirt or metal shavings.

You must test the system, when it has come under pressure.

The easiest way to test the sprinkler system is to unscrew the hose from the thermostatic valve to the auger channel. Then press the red cap under the valve to activate it

After testing the sprinkler system it is important to check that the valve is closing properly! (Dirt ore the like, in the valve seat, can prevent this)

*By an extended auger channel (750 mm) we deliver the sprinkler system separately. The sprinkler including pressure tank must be fitted on the wall next to the auger channel.*

## **Connection of the safety heat exchanger (Quenching coil)**

*(Only for boilers provided with safety heat exchanger)*

The boiler has a build-in safety heat exchanger which cools the boiler in case of pump failure or the like. The system will be activated if the water temperature in the boiler exceeds 95°C.

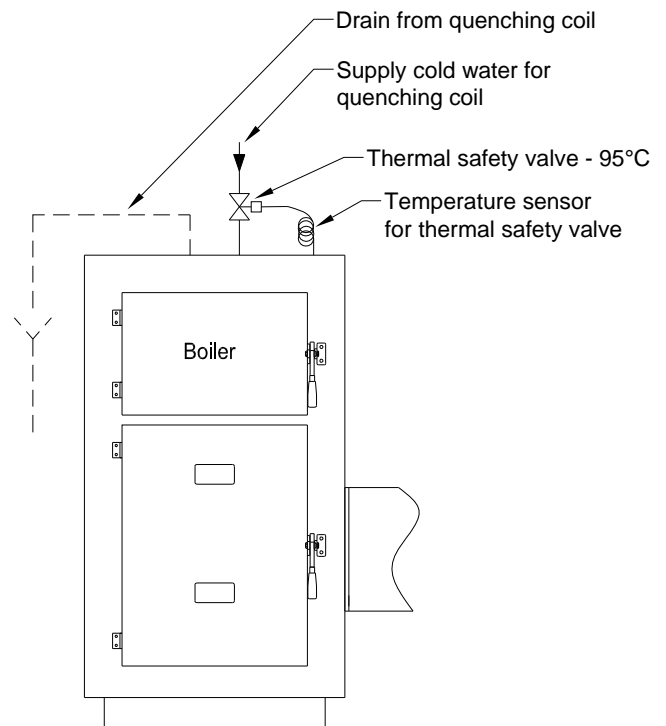
The thermal safety valve must be connected to constant water pressure from a G $\frac{3}{4}$ "/22mm pipe. The water pressure must be minimum 2 bar and the temperature maximum 15°C. There must be no shutoff valves on the pipe supplying the valve.

Flush the pipes before connecting to the thermal safety valve. Dirt or metal shavings can cause the valve to malfunction.

The return drain from the safety heat exchanger G $\frac{3}{4}$ " must be connected to a drain.

The pipe used to connect to the drain must have a sufficient size to avoid the emergence of backpressure.

After installation the system must be tested to ensure free passage through the safety heat exchanger. The thermal safety valve can be manually activated by pressing the red cap.



## **Connection to the chimney**

**See diagram 3**

*Further information is in the user manual, section. 7*

In order to get a good heating economy and to avoid smoke problems you must connect the boiler to a suitable chimney. The boiler should be placed as close to the chimney as possible.

Should the chimney be too unsuitable or under difficult draft conditions you might have to install a flue fan.

It is in general recommended to install a draft stabilizer (See diagram 3)  
*A chimney with unstable draft can cause unstable running conditions of the plant.*

**It is important that the flue pipe is insulated with a 30mm fire resistant mat, to avoid that the flue gasses are condensing in it.**

Recommended chimney dimensions.

Plant type	Max. effect, input	Flue outlet on boiler	Free opening in chimney	Height of chimney
M20i	34 kW.	Ø 155 mm	Ø 160-180 mm	5-6 metre
M40i	55 kW.	Ø 187 mm	Ø 180-200 mm	5-8 metre
M80i	92 kW.	Ø 215 mm	Ø 200-250 mm	6-8 metre

## **Connection of the external auger**

*(Only for plants provided with automatic fill in)*

**See diagram no 4**

The connection must be made with a flexible hose. The auger must not support on the stoker unit and vibrations from the auger must not be transmitted to the stoker unit.

In case the plant is connected to a silo placed at the loft above you should also use a flexible hose, which must be emptied after each filling. The hole through the ceiling must be made fire-proof.

## **Connection to the electrical net**

**See diagram no 5 / 5.1**

The boiler can be built for either 400V 3 phase or 230V single phase connection.

**Check boiler data plate for electrical connection.**

In Denmark the installation must be made by an authorised electrician. Here too we ask you to check your local regulations

### **Electrical supply for the stoker plant:**

There should be a specific switch for this plant only

### **Electrical supply for the internal circulation pump:**

The internal circulation pump (placed under the burner tube) is to be connected to cable no. W7

*The pump must not be started before filled with water, as this might damage it.*

### **Setting of the internal circulation pump:**

The pump must be set to run in a fixed step. It must not run in Auto mode!

Boiler	Pump step
M20i	I
M40i	I
M80i	II

## **Extended auger channel**

If you request an extended auger channel, we supply the control as a separate unit to be fitted on the wall above the auger channel, in the boiler room.

*Check cable length before you decide where to place the control*

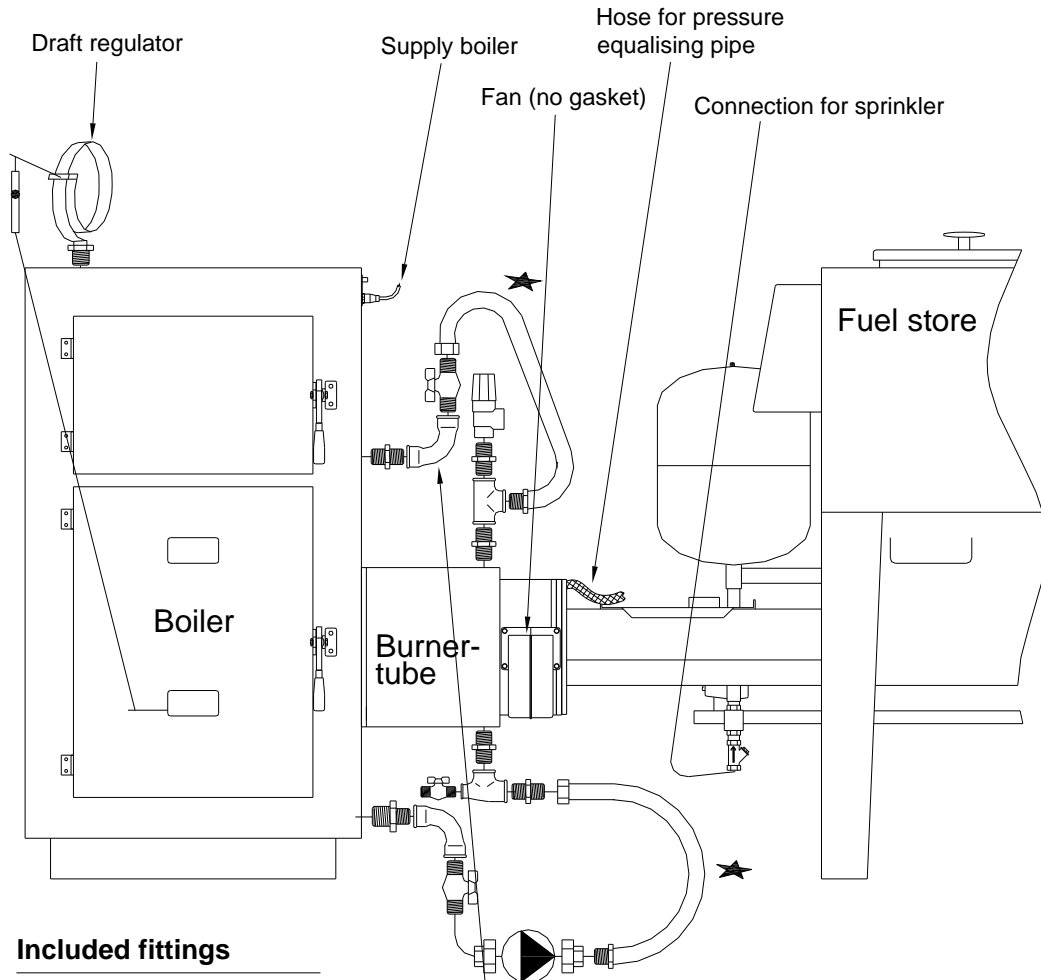
## **Connection of start – stop signal for external auger:**

*(Only for plants provided with automatic fill in)*

**See diagram no 6**

The motor protection relay (contact) for the external auger must be supplied with a start – stop signal from the controlling unit of the plant, which is placed in a plastic box at the side of the fuel valve, on top of the fuel store.

## Diagram 1 - How to fit the water cooled burner tube by plants with stoker placed at the side of the boiler



### Included fittings

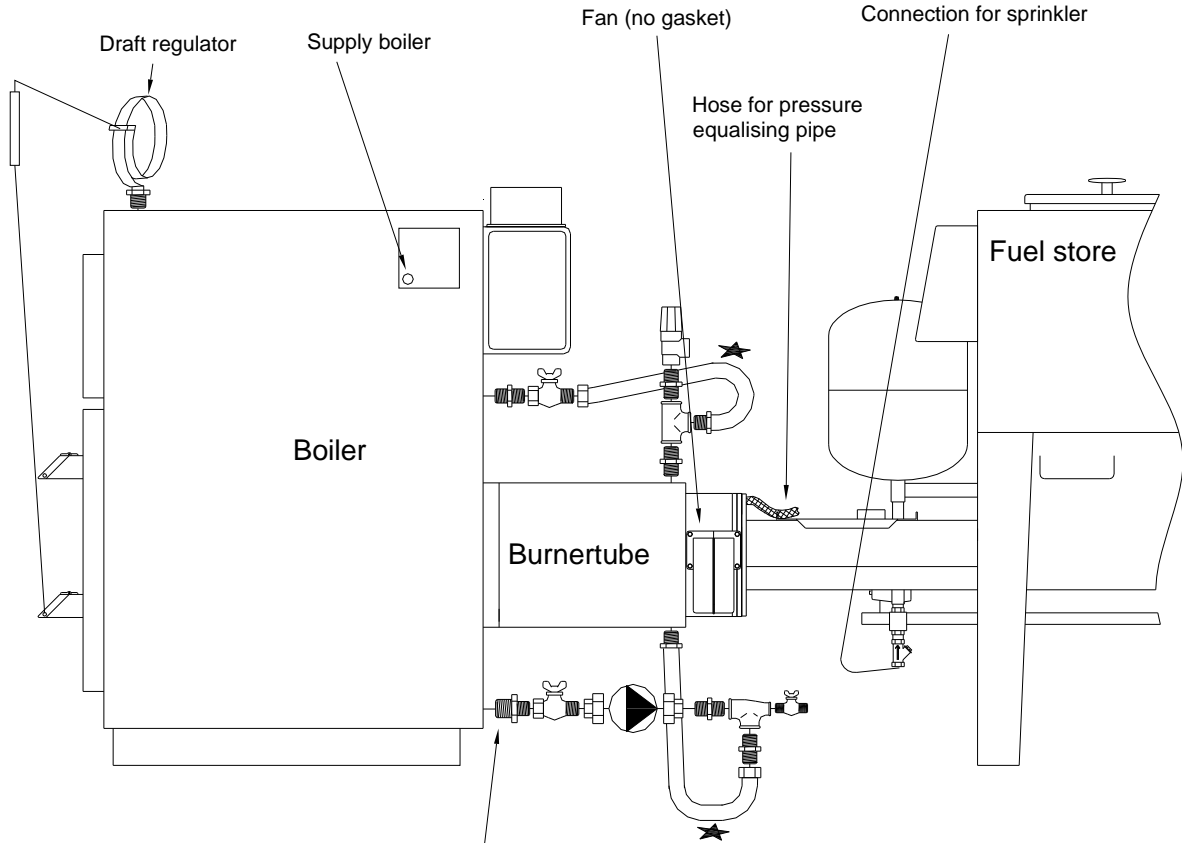
- 2 pcs. 3/4" hose
- 1 pcs. 3/4" safety valve
- 2 pcs. 3/4" shutoff valve
- 1 pcs. 1/2" shutoff valve
- 1 pcs. circulation pump
- 5 pcs. 3/4" hexagon nipple
- 1 pcs. 3/4" 3/4" 1/2" tee
- 1 pcs. 1" 3/4" hexagon nipple
- 1 pcs. 3/4" tee
- 2 pcs. 3/4" elbow
- 2 pcs. 3/4" union joint for pump

★ *Elbows and valves are to be placed horizontal, to avoid airpockets in the hoses!*

By M40 is included a 3/4" connection sleeve



## Diagram 1.1 - How to fit the water cooled burner tube by plants with stoker placed at the rear end of the boiler



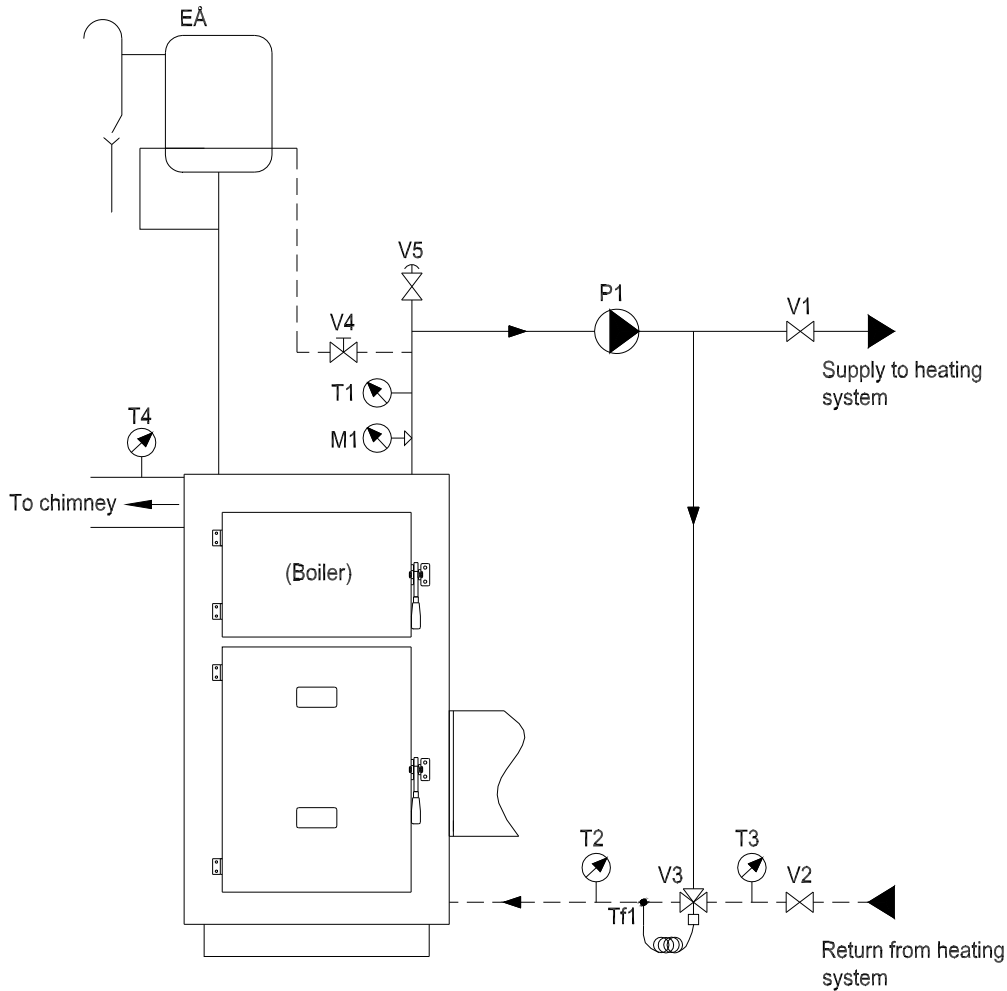
### Included fittings

- 2 pcs. 3/4" hose
- 1 pcs. 3/4" safety valve
- 1 pcs. circulation pump
- 2 pcs. 3/4" union joint, for pump
- 2 pcs. 3/4" shutoff valve
- 1 pcs. 1/2" shutoff valve
- 5 pcs. 3/4" hexagon nipple
- 1 pcs. 3/4" tee
- 1 pcs. 3/4" x 3/4" x 1/2" tee
- 1 pcs. 3/4" plug

★ *Elbows and valves are to be placed horizontal, to avoid airpockets in the hoses!*

- M20: 3/4" x 1" hexagon nipple
- M40: 3/4" x 1 1/2" hexagon nipple
- M80: 3/4" x 2" connection nipple + 3/4" hexagon nipple

**Diagram 2 – Connection to the heating system**

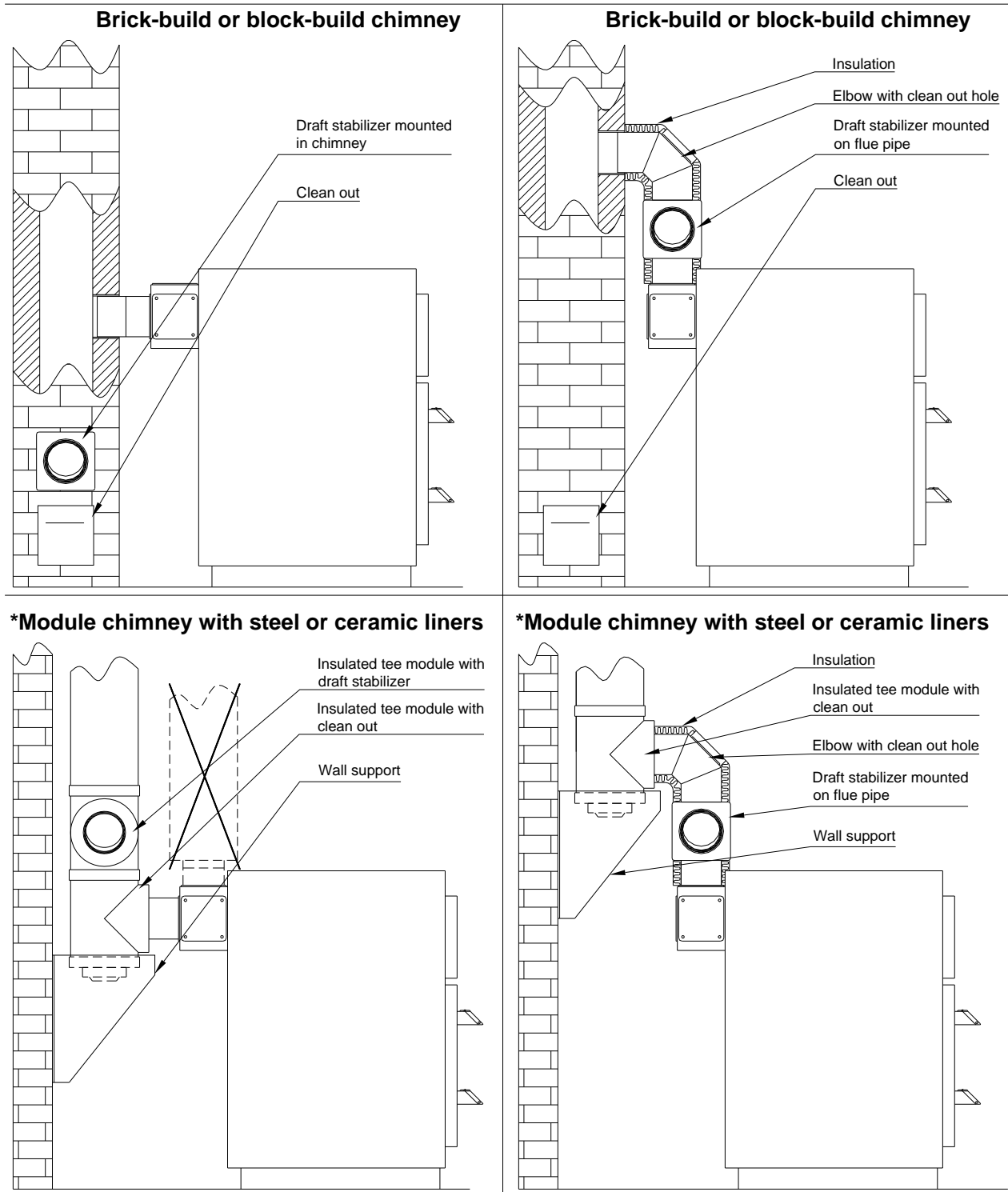


	Open expansion vessel	EÅ	
	shutoff valve	V1-V2	shutoff valves on supply and return, in the boiler room. More can be installed if needed.
	3 way thermostat controlled mixing valve (shunt valve)	V3	Boiler shunt valve secure that the return water to the boiler always is over 60°C.
	Manuel regulation valve (return valve)	V4	To protect open expansion vessel against frost Can be thermostatic return valve
	Airing	V5	Airing, possible automatic, placed where needed.
	Thermometer	T1-T4	Thermometer for supply, water return before and after shunt valve and for flue temperature
	Temperature sensor	TF1	Temperature sensor to regulate shunt valve.
	Manometer	M1	Manometer for boiler pressure.
	Pump	P1	Circulation pump for heating system

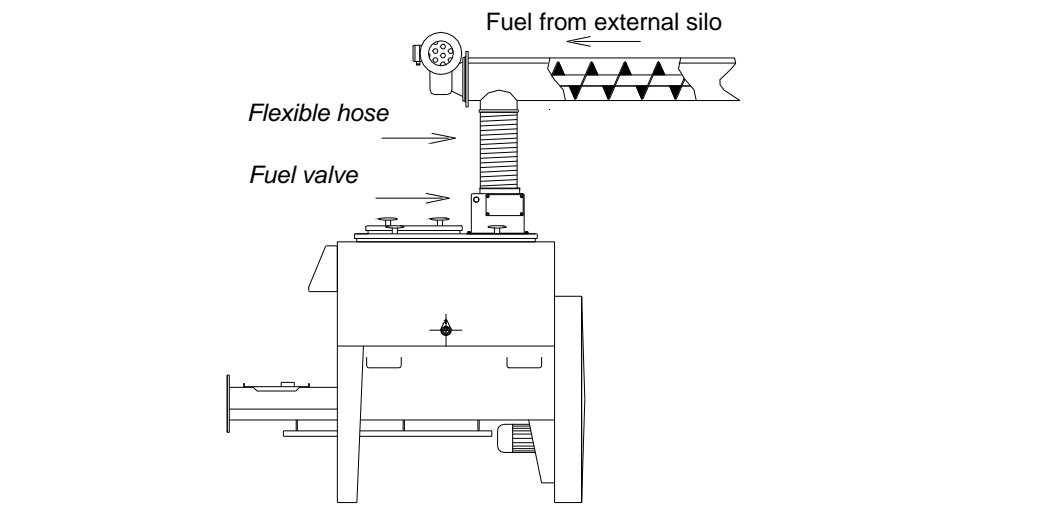
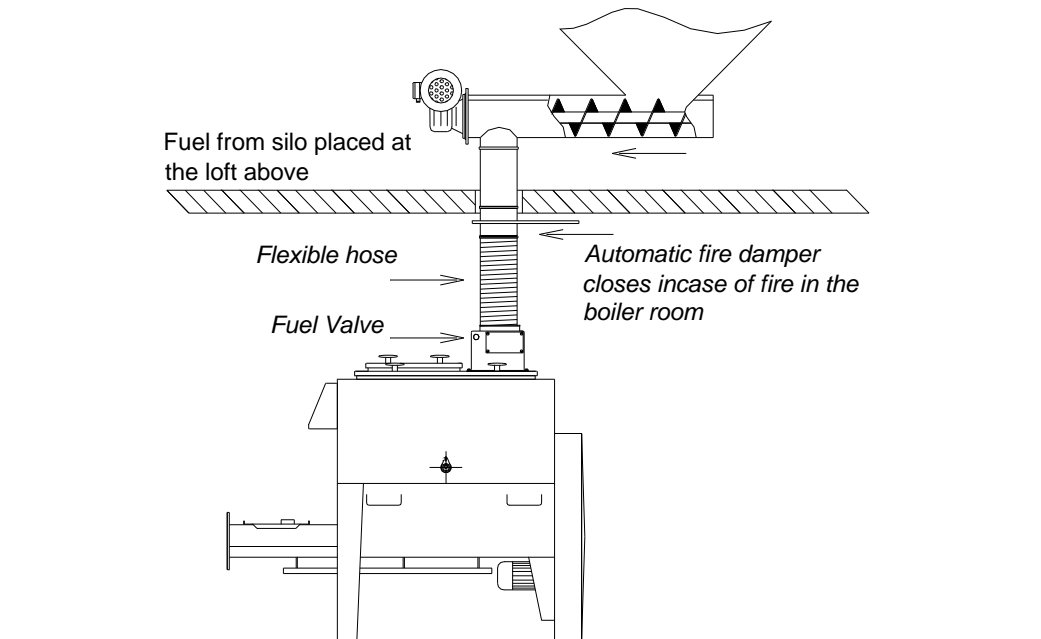
**DIAGRAM 2**

**Diagram 3 – Connect to the chimney**

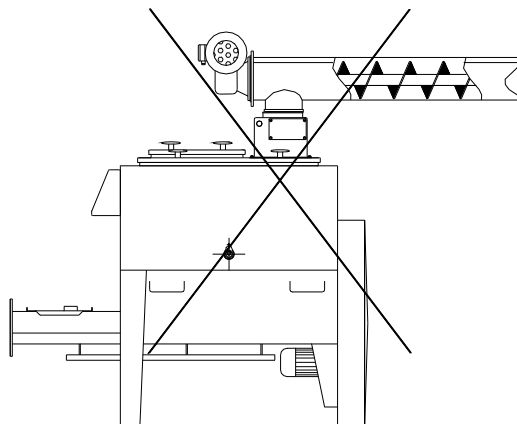
**\* Prefabricated module chimneys should not be placed on top of the flue outlet, as this allows rainwater or possible condense water to run directly down into the heat exchanger of the boiler, where it will cause corrosion !**



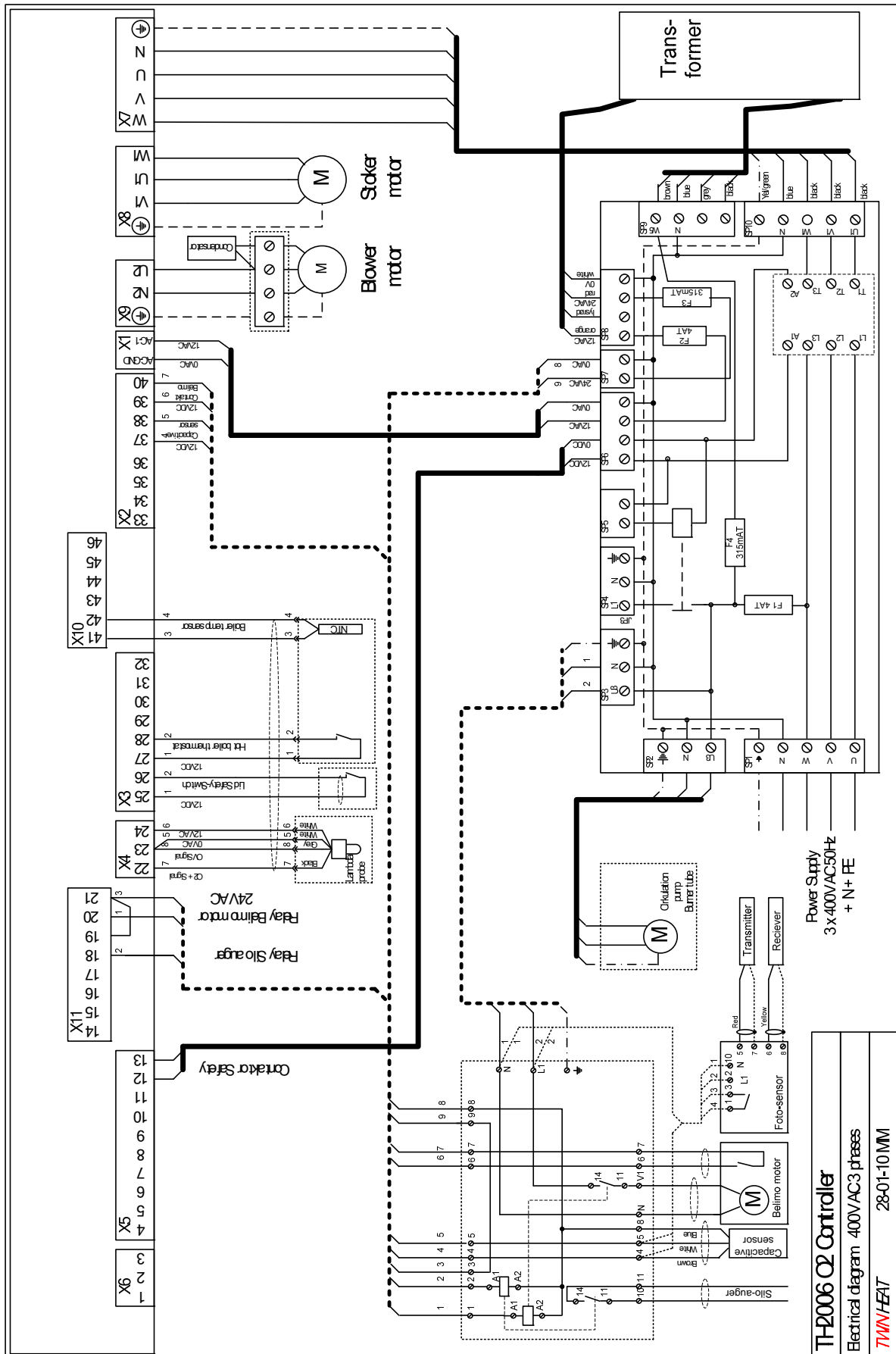
## Diagram 4 – Connection of the external auger (only for plants provided with automatic fill in)



The auger must not support on the stoker unit and vibrations from the auger must not be transmitted to the stoker unit.

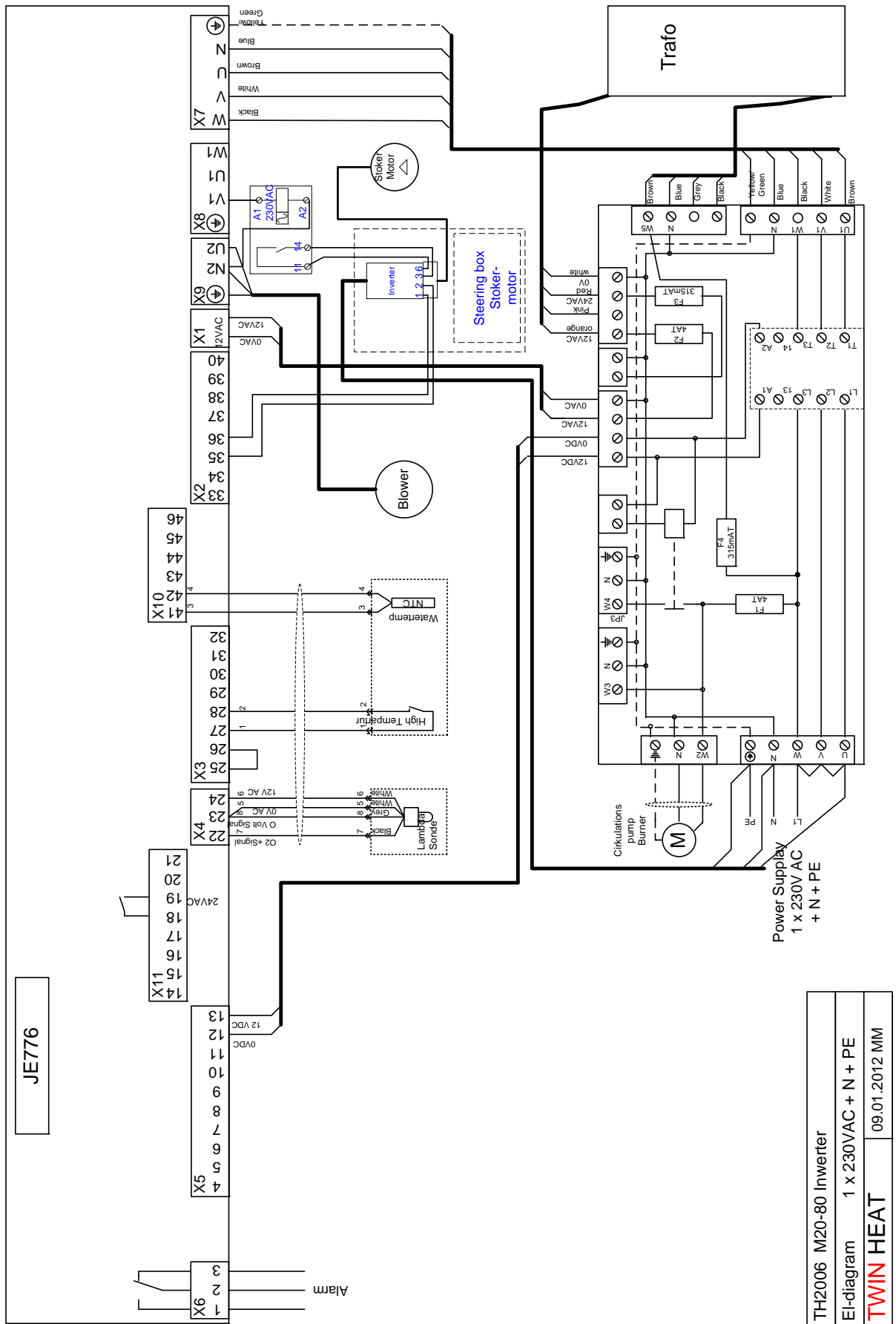


## Diagram 5 – Electrical diagram 400V – 3 phase 500&700 fuel store



### DIAGRAM 5

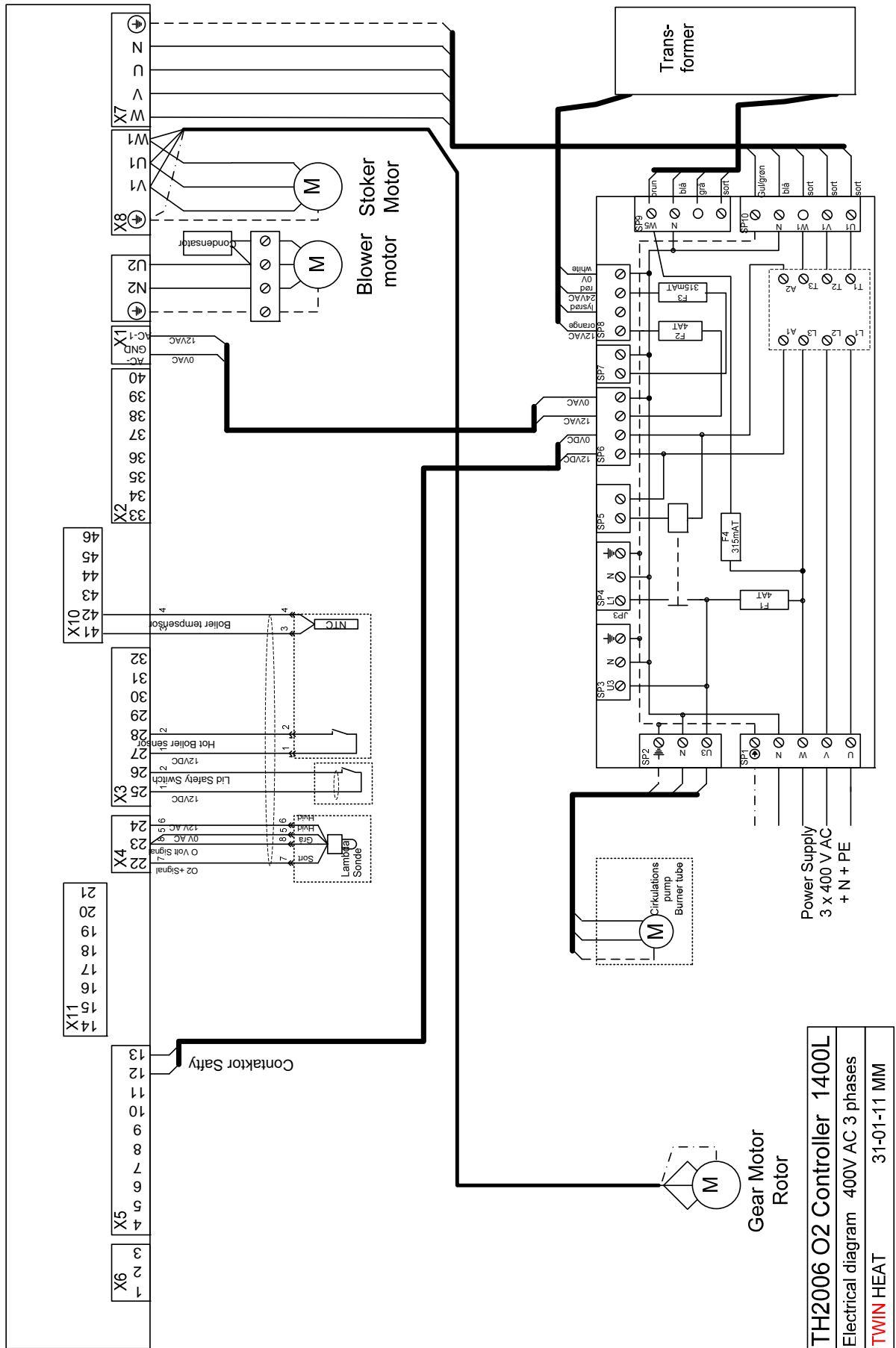
**Diagram 5.1 – Electrical diagram 230V – 1 phase 500&700 fuel store**



TH2006 M20-80 Inverter
EI-diagram 1 x 230VAC + N + PE
<b>TWIN HEAT</b> 09.01.2012 MM

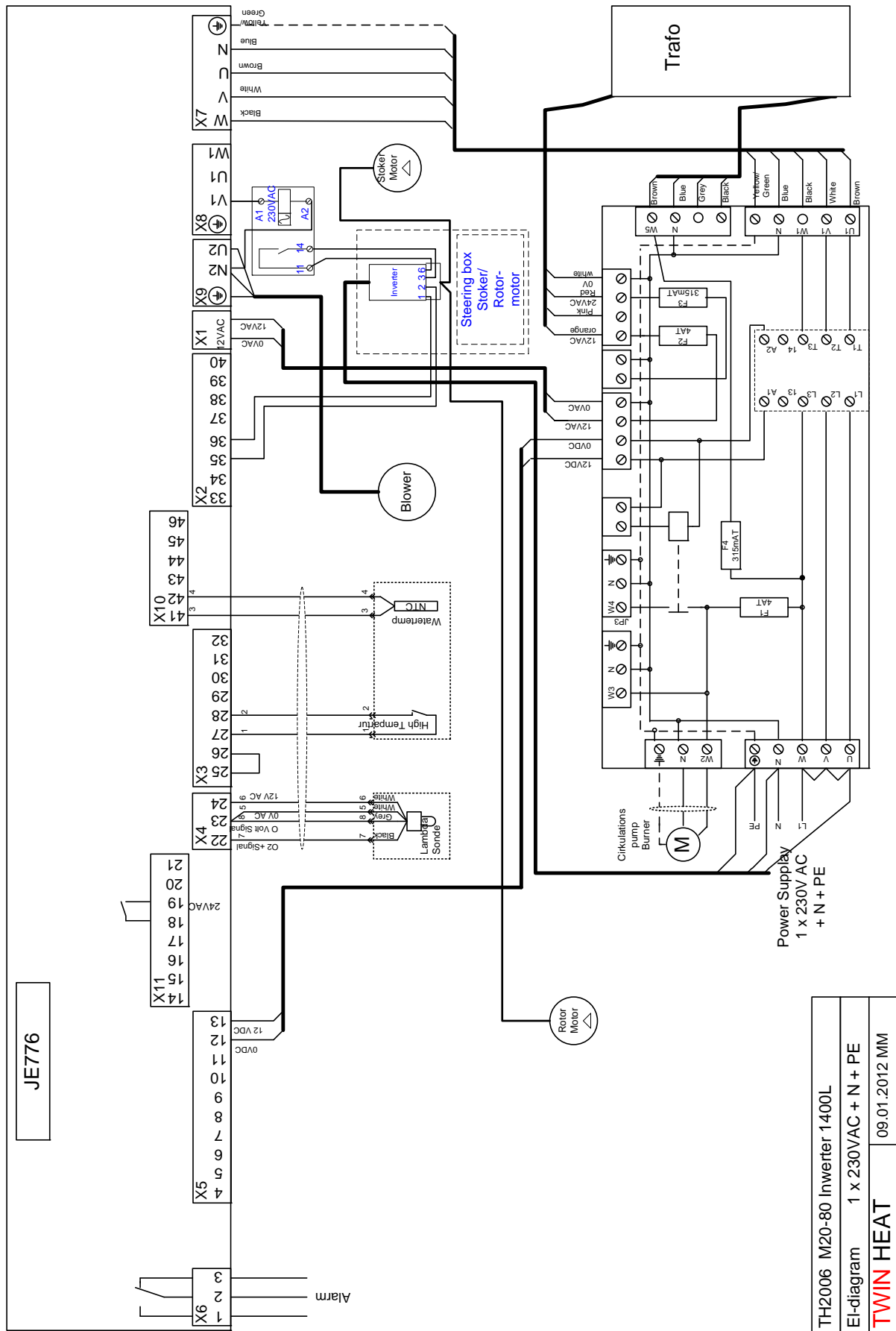
**DIAGRAM 5.1**

**Diagram 5.2 – Electrical diagram 400V – 3 phase 1400 fuel store**



**DIAGRAM 5.2**

**Diagram 5.3 – Electrical diagram 230V – 1 phase 1400 fuel store**

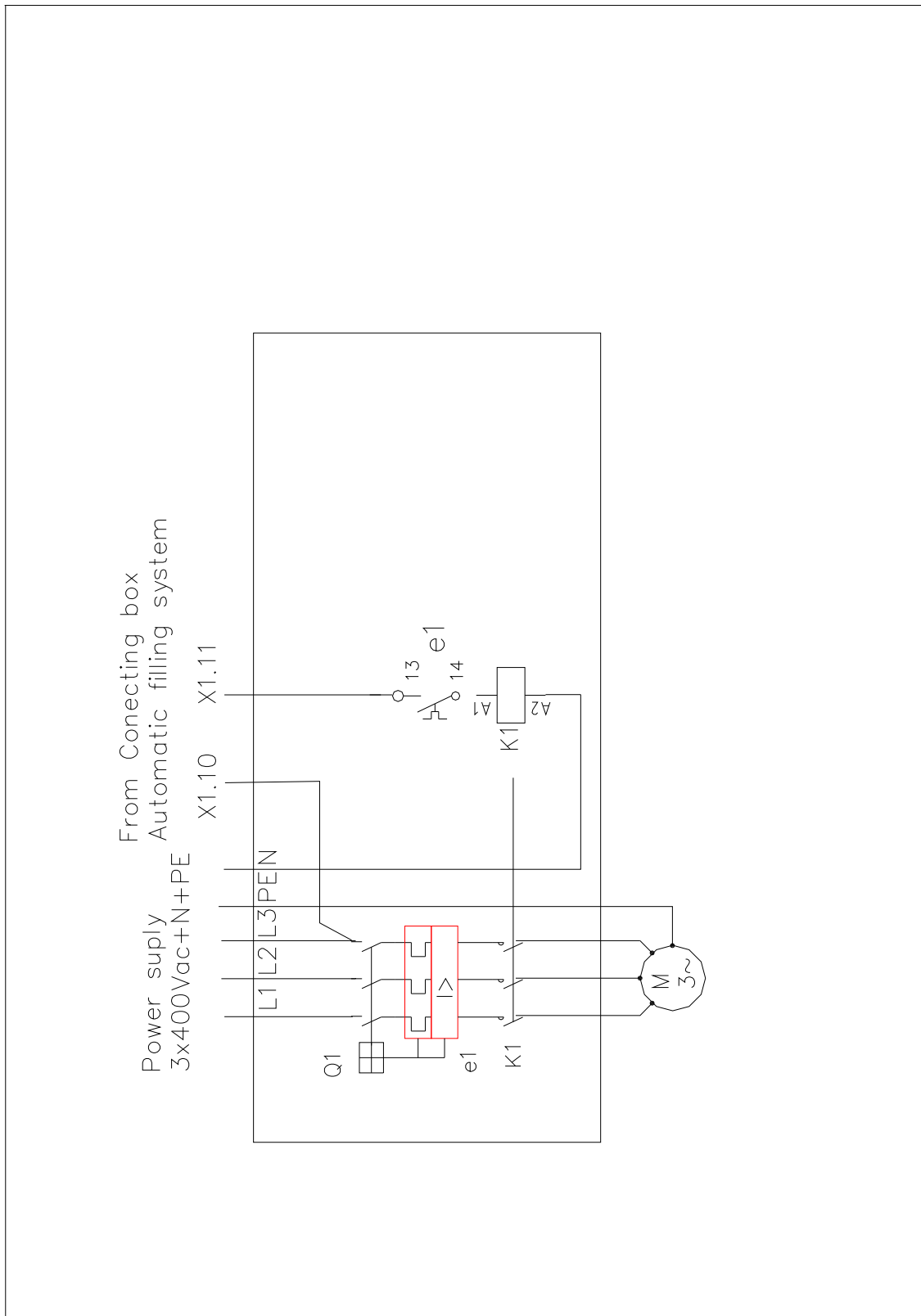


**DIAGRAM 5.3**



**Diagram 6 – Electrical diagram, Start – stop signal for external auger**

(Only for plants provided with automatic fill in)



Automatic filling system	 Nørrevangen 7, DK-9631 Gedsted, Tlf. 98 64 52 22	Electrical diagram
Dato: 02.08.2006		Automatic filling system
Init: AaS		Contactor siloauger