

THERMOSTAHL POLAND

MULTI-OIL BURNER type MULTIMAX MTX 80 / 180

SERVICE AND INSTALLATION MANUAL



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GENERAL INSTRUCTION MANUAL

The present instruction manual is supplied as an integral component of the appliance, and must be transferred to the user along with the burner. We ask the user to store this manual over the time of use of the burner for reference.

1. General information

This manual is delivered to the user as an integral part of the burner.

A thorough read of the manual shall let the user obtain important information concerning the assembly, use, safety and maintenance of the burner. The burner may be installed only by qualified personnel, in line with the provisions in force, and according to this manual.

Improper installation shall cause injury to persons and material damage, for which the supplier will not be liable. Before commencement of any sort of maintenance or repair work, always shut off the electric power supply by pulling the power supply line plug.

- Make sure that the burner inlet and outlet meshes are not clogged.
- In case of sale of the burner or of the entire appliance, where it is installed, this manual needs to be transferred along, so that the subsequent user or installation specialist could get acquainted with it.
- In case of any changes or amendments to the burner equipment only use original parts provided by the manufacturer.
- The burner may be used exclusively for the purpose, for which it was constructed. Any other sort of use shall be considered contrary to foreseen use, and, accordingly, hazardous. The burner supplied shall not be liable in any way for damage arisen as a result of improper assembly or use and for lack of adherence to this manual.

The MTX 80/180 burners are adapted for operation on waste fuel such as spent oil, engine oil, crankcase oil, hydraulic oil and the synthetic material component - fraction (KTS)

NOTE!

Do not use transformer oil, capacitor oil, petroleum and thinners!

2. IMPORTANT REMARKS CONCERNING BURNERS

- The burner should be installed in an appropriate room with ventilation openings, according to requirements of provisions in force, ensuring a sufficient supply of combustion air.
- Before connecting the burner, make sure that it is adapted to the power supply conditions at hand (electric power, fuel).
- For safety reasons, the burner must be effectively earthed, and the electric power supply line executed according to current regulations.
- Before start-up of the burner and at least once per year, qualified personnel should execute the following activities:
 - a. Determine the amount of fuel supplied in accordance with the burner capacity.
 - b. Check the fuel feed system for tightness and lack of obstructions.
 - c. Determine the amount of air supplied for combustion in such a way so as to achieve a combustion efficiency that would be in accordance with relevant separate provisions.
 - d. Check the operation of the burner concerning the combustion quality so that one avoids the risk of exceeding permitted emission values of air pollutants.
 - e. Make sure that the control and security system operates properly.
 - f. Make sure that the combustion gas ventilation system operates properly.
 - g. Make sure that a copy of the burner instruction manual is available in the burner room.

WARNING! In case of repeating emergency burner shutdowns, do not attempt continued manual start-up procedures. Contact the manufacturer's service department to remove the fault. Non-adherence to this recommendation poses a risk of a grave failure of the entire heating appliance.

BURNER ASSEMBLY PROCEDURE**1. The box contains, beside the burner, the following accessories:**

- burner power supply and control plug (7-pin Euro connector)
- burner mounting flange
- flange sealant made of asbestos-free material
- flange mounting bolts and spacers
- pump set (pump with motor)
- multi-use oil filter
- this instruction manual and warranty card

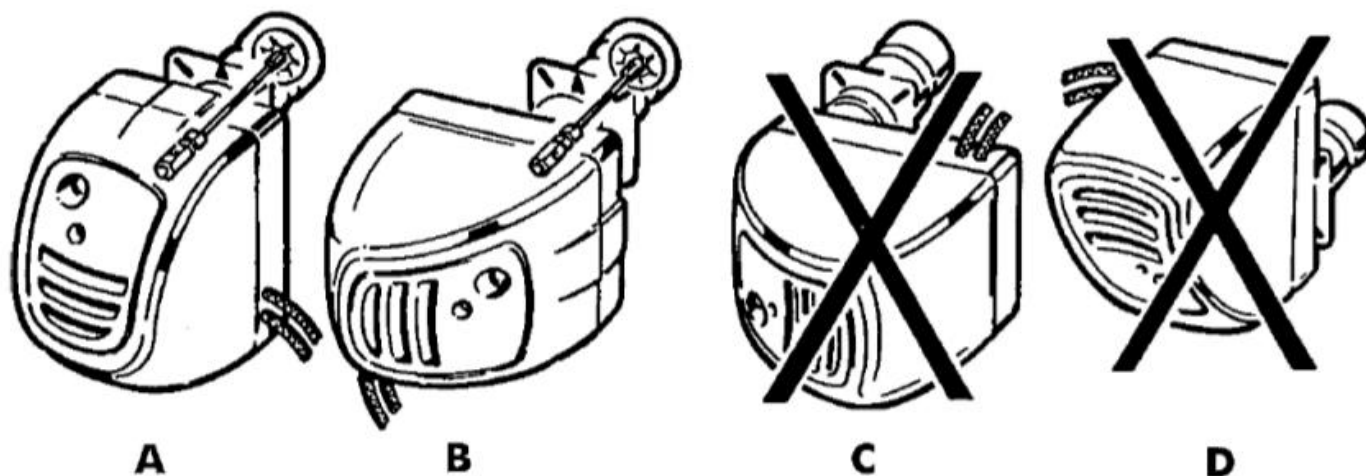
2. Assembly on the heating appliance

The burner needs to be attached to the front face of a boiler or heater using the mounting flange. The flange needs to be affixed partially to the face plate using four screws, not forgetting the sealing spacers (do not tighten screws yet). Put in and lock the burner pipe, twisting the flange. The end of the burner pipe should be found inside the heating appliance. Now, tighten the four flange mounting bolts. Connect the fuel hose line to the fuel supply line (supply part), connect the flexible compressed air hose (not supplied with the burner) to the connector outlet on the lower left side of the burner (DN 7.2 type connection).

WARNING!

It is forbidden to install the burner in a manner different than that presented in fig. 1.

Fig. 1



3. Electrical connection

The burner connector is factory made in the form of one socket on the burner housing. The burner is supplied with a seven-pin male Euro type connector for the socket.

THE CONTROL AND POWER SUPPLY SOCKET for the burner is found on the burner housing, on its right side.

In the diagram (fig. 2), the individual connections have been marked, together with plug symbols, enabling service personnel to execute the connection of the burner with the service cable.

Euro socket plug	L1 *	Burner power supply at 230 V / 50 Hz
	PE *	PE protective wire
	N *	Burner working zero
	T1 *	Signal to external thermostat
	T2 *	Signal from external thermostat
	S3 *	External burner flaw indicator
	B4 *	Fuel pump power supply

Fig. 2.

WARNING! The burner needs to be protected by a S191 B10 overvoltage safety fuse.

4. Fuel line connection

For the **MTX 80 / 180** units - use an oil-resistant soft rubber hose with an inner diameter of at least 16 mm or copper piping of the same diameter to create the fuel line

For the **MTX 80 / 180 KTS** units - use soft or hard copper piping with an inner diameter of at least 16 mm to create the fuel line.

Avoid the formation of "siphons", in which air could collect. It is best to design the layout of the fuel line from the pump to the burner in such a way that it exhibits a steady rise, protecting the system from air collecting in the line.

In case of supplying the burner with the synthetic material component fraction, the fuel system, filter and pump must be thermally secured in a manner permitting the heating of the fuel system up to +40 °C (+/- 5 °C). Use a cable or heating mat with a control thermostat as the heating unit.

Suggested diameters of the fuel lines on the pumping side:

- 16 mm for line lengths up to 15 m
- 18 mm for line lengths upwards of 15 m

REQUIRED SUCTION LINE PARAMETERS

WARNING! In order for the pump system to function properly, it is necessary to create a return line for the fuel from the oil pump. The overflow (return) pipe diameter needs to be not less than the suction side pipe. the fuel return system is connected to the pump at the spot marked in fig. 5, page 8, item 6.

Limitations concerning the length of the suction line and the raising height of the sucked oil.

- The height of the initial (suction) filter from the bottom to the fuel pump should not exceed $H = 3$ m.
- The total length of the suction line may not exceed $L = 5$ m (from pump to suction unit of floater).
- The suction line should be made of a pipe with a diameter of 16 mm.

The manufacturer suggests using oil-resistant rubber hoses, copper piping or alu-pex piping with an inner diameter of 16 mm. In case of synthetic material component fraction fuels, use insulated soft or hard copper.

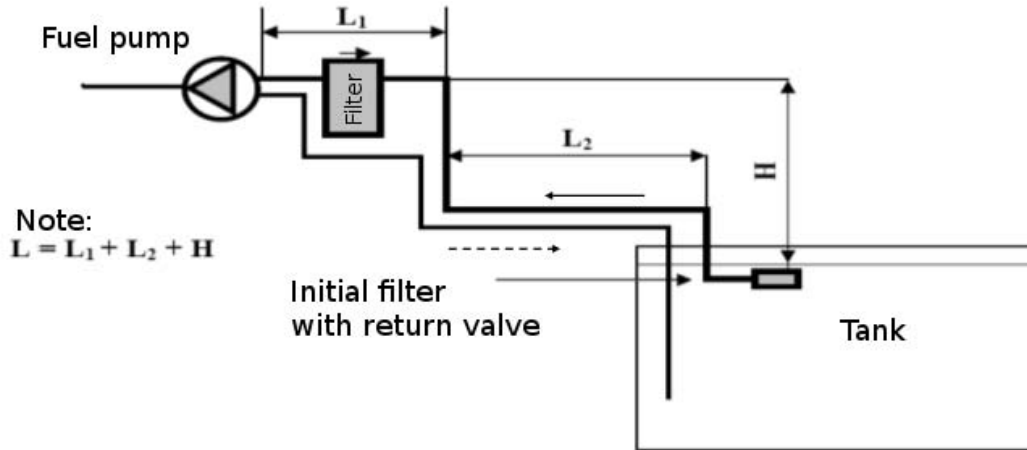


Fig. 3

5. Connecting the compressed air line

In order to function properly, the burner requires compressed air. To prevent the burner from operating without a compressed air supply, the burner has a pressure sensor cutting the fuel pump power supply. Lack of pressure in the compressed air circuit will cause the fuel pump to be disconnected.

The compressed air line is connected to the burner using a flexible line terminating in a female DN quick connector with a shutoff valve. Remember that the burner has its own reduction valve for the compressed air line and that the maximum pressure on the valve inlet cannot exceed 8 bar.

Burner hydraulic diagram

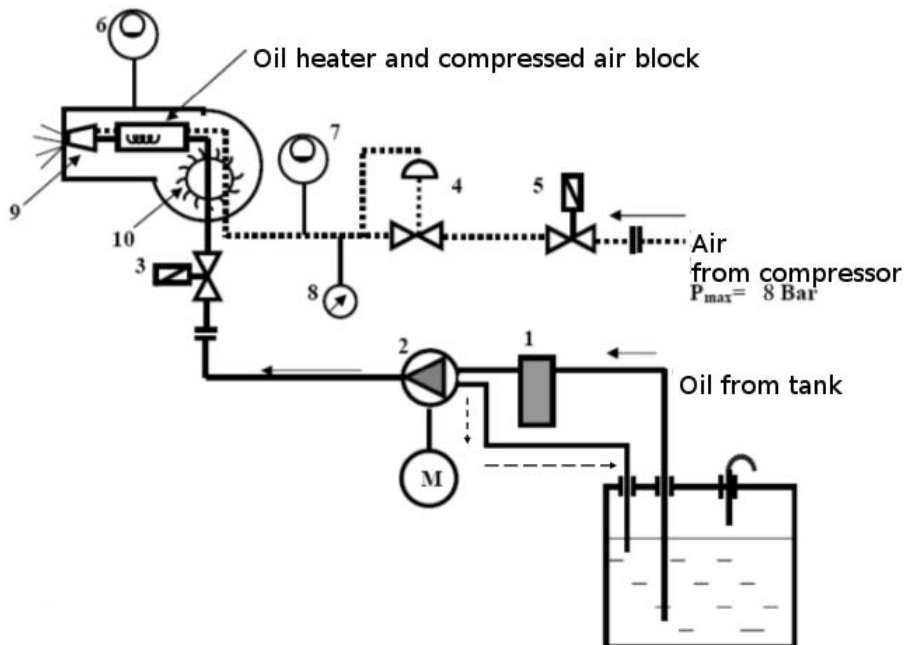


Fig. 4

Designations in image:

1. Oil filter
2. Fuel pump with motor
3. Oil solenoid valve
4. Spray air pressure reducer
5. Air solenoid valve
6. Differential pressure switch (turbine operation sensor)
7. Air pressure switch (spray air minimum pressure sensor).
8. Air pressure manometer
9. Spray nozzle
10. Burner fan providing combustion air

Single line fuel pump connection diagram

Fig. 5

1. Oil pump
2. Precision decontamination filter
3. Connectors (available for purchase separately at ThermoStahl).
4. Suction floater with return valve (available for purchase separately at ThermoStahl).
5. Burner unit
6. Pump overflow (excess fuel return to tank).

Warning! When installing the oil filter, note the fuel flow as marked with arrows on the filter cover top side.

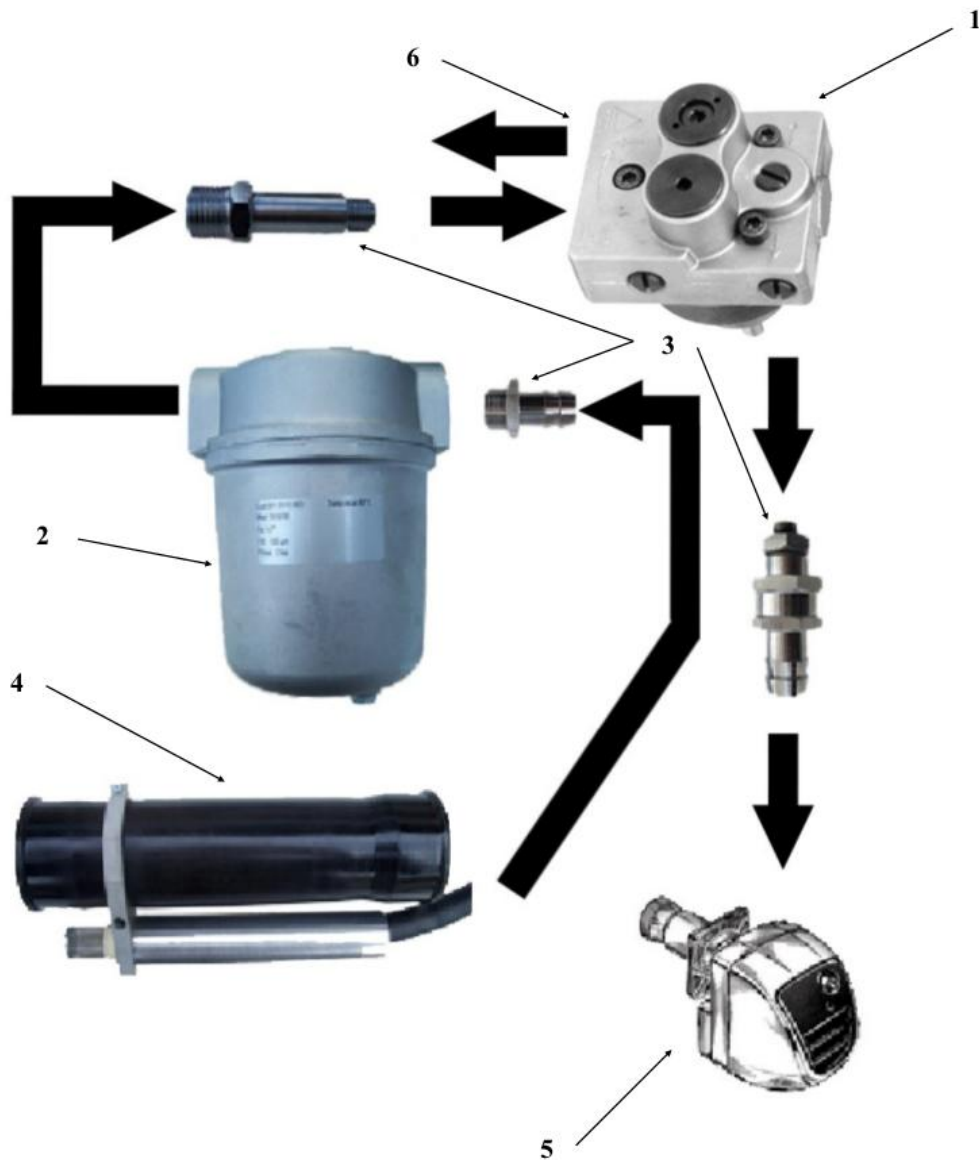
Single line fuel pump connection diagram for the MTX-180 KTS unit

Fig. 5

1. Oil pump
2. Precision decontamination filter
3. Connectors (available for purchase separately at ThermoStahl).
4. Suction floater with return valve (available for purchase separately at ThermoStahl).
5. Burner unit
6. Pump overflow (excess fuel return to tank).

Warning! When installing the oil filter, note the fuel flow as marked with arrows on the filter cover top side.

Pump set electric connection

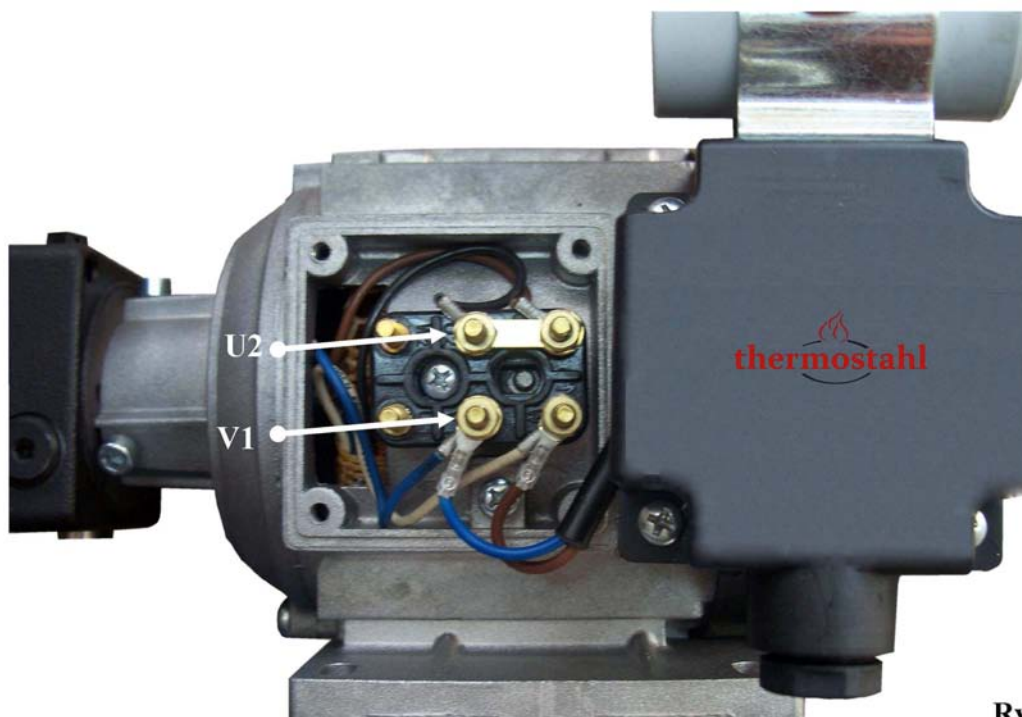


Fig. 6

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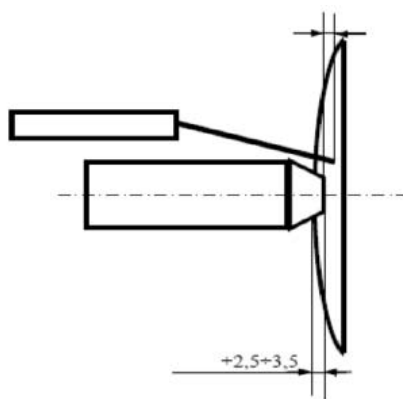
The pump motor is powered directly from the MTX burner Euro plug (see page 5, fig. 2).

Euro socket plug

L1 *	
PE *	
N *	U2 pin on motor
T1 *	
T2 *	
S3 *	
B4 *	V1 pin on motor

ADJUSTMENT OF NOZZLE AND IGNITION ELECTRODE ARRANGEMENT WITH RESPECT TO RISER PLATE:

1. The mutual arrangement of ignition electrodes, the fuel nozzle and the riser plate all influence markedly the correct ignition and combustion of the fuel-air mix. This arrangement should on the one hand prevent the plate and electrodes from being covered by the sprayed mix, and on the other hand the core of the electric arc should be found, during flame initiation, at the mix combustion point. The change in the plate location within the burner influences the shape and size of the flame in the combustion chamber.



The ends of the electrodes should protrude by about 6-7 mm in front of the nozzle

NOTE! The nozzle head should extend with respect to the plate base by approx. 2.5-3.5 mm.

Fig. 7

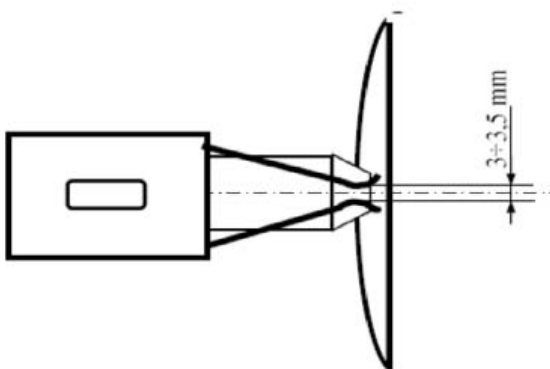


Fig. 8

BURNER INSTRUCTION MANUAL

1. Initial adjustment and configuration before burner start-up

Before commencing start-up of the burner, execute an initial adjustment of the burner. This entails:

- deaeration of the fuel system
- nozzle fuel spray air pressure adjustment
- air throttle opening adjustment
- The burner should be connected to an electric power supply for at least five minutes before its initiation to achieve the correct heater block temperature.

Setting the oil pressure on the reducer:

Following the set-up of the fuel system according to recommendations from the receding chapter item 4, page 5, the fuel line should be deaerated. For this purpose, use an external thermostat, in the room or on the boiler, to start up the burner and wait until the start-up phase is initiated. Following the conclusion of the ventilation phase, the air solenoid valve will open and the oil pump will start working. At this point, take out the photoresistor from its socket, found above the air pressure reducer, and allow it to be hit by light, simulating the flame, so as to maintain the operation of the burner and the fuel pump. When the fuel pump actuates, wait until fuel is visible at the end of the fuel line (the system should be disconnected from the flexible fuel hose at the burner).

Along with the emerging fuel, air collected in the empty fuel system will come out. Continue the deaeration procedure until oil emerges from the oil line without any air bubbles. This action serves the precision deaeration and flushing of the fuel line.

After the oil line is deaerated and flushed, shut off the burner with the thermostat, replace the photoresistor in its socket, and connect the burner flexible hose permanently to the oil line; afterwards restart the burner. During this activity, note the fuel pressure value. The oil pressure can be adjusted only when the motor is running. The assembly setting should be 0.5 bar.

MTX 80 Delevan nozzle type SN 30609-7
MTX 180 Delevan nozzle type SN 30609-11

Air pressure setting for spraying oil in the nozzle

The air pressure is factory set to 1.0 bar. This pressure value allows ignition of the mix during the first start-up of the burner. Due to various pressure values in existing compressed air installations, following start-up of the burner, adjust the air pressure to an appropriate value. For burners operating at a capacity of 40-80 kW, set a value of 1.0 bar, for a power value of 80-180 kW, set 1.2 bar.

Air throttle adjustment for mix combustion

This adjustment procedure is done using the adjustment throttle found in the front part of the burner, under the flame pipe. This is a shield with a division on it. At the zero position, the secondary air groove is closed. At position '16', the groove is opened completely. For the first start-up of the burner, set the arrow at position '3', referring to the division marked by the throttle. Following start-up of the burner and preheating of the combustion chamber, readjust the setting.

WARNING! The composition of the exhaust gas emitted to the atmosphere should be checked twice each heating season or every one thousand hours of burner operation.

Adjustment of thermostats in the heater block

On the burner there are three thermostats, controlling the temperature of the heater block units. If one would remove the burner housing, three thermostat plates become clearly visible on the left side. From the top:

- the **first** thermostat controls the temperature of the nozzle rod (it is factory set to 60 °C)
- the **second** thermostat controls the value for the main fuel heating block (factory set to 60 °C)
- the **third** thermostat locks out the motor if the temperature of the main oil heating block does not reach the minimum temperature (normally set to a value of 50-55 °C).

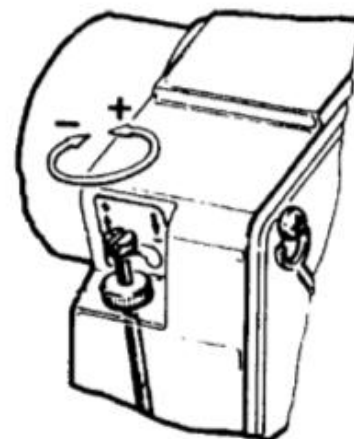
WARNING! The thermostat settings are adjusted using a flat head screwdriver.

Temperature values for waste fuel types (spent oil):
First - 60 °C (for the KTS-F model: 40 °C)
Second - 60 °C (for the KTS-F model: 40 °C)
Third - 55 °C (for the KTS-F model: 35 °C)

Adjustment of the air outflow throttle flap

Using the provided adjustment screw, as shown in fig. 9, one can increase or decrease the secondary air choke level. It is not recommended to change the factory setting, as this may throw the operation of the burner out of balance and increase the emission of pollutants into the air.

Fig. 9.



Burner periodic inspections

The MTX 80 and MTX 180 burners are devices foreseen for continuous operation throughout the entire year, and do not require daily maintenance. However, due to normal wear of burner components, it is recommended to have service personnel maintain the appliances at least once per year before the start of the heating period. In case of burners operating all year long without a seasonal brake, service the burner following up to 2500 hours of operation. The fuel system requires maintenance in terms of cleaning of filters found in the fuel tank and the precision cleaning filter placed just upstream from the pump. The filter cleaning frequency depends on the type of fuel used for combustion. For light fuel oil (i. e. Ekoterm and similar), this time may be extended to several heating seasons. The manufacturer, despite this, recommends cleaning of filters before each heating period. In case of use of waste fuel, mineral oils or plant oils, filter cleaning is recommended every 700 hours of operation. Note the condition of used plant oils, whether they do not contain excess solids, as these shall cause the filter cleaning periods to shorten drastically. It is recommended to place a vacuum meter on the fuel filter clean side to control the filter cleanliness on a continuous basis, and will allow one to prevent emergency burner shutdowns due to lack of fuel. Vacuum meters of appropriate types may be purchased from the burner sales network or directly from the manufacturer, Thermostahl Poland.

The usual maintenance procedures for the burner also entail checking the combustion chamber condition in the device, in which the burner operates. The combustion chamber condition lets one determine, whether the mix combustion process runs correctly. A wet combustion chamber and dark colouring of the walls all point to bad combustion of the mix, while a dry chamber with a beige hue covering it indicates a correct combustion process.

Emergency conditions:

Symptoms	Causes	Remedies
The burner does not start up, no indication of fault	Burner automatic unit failed	Replace burner automatic unit
	No power supply on burner plug	Replace fuse or damaged pins
The fan does not turn during the start-up cycle	Burner automatic unit failed	Replace
	Motor capacitor or fan motor damaged	
The fan turns, the burner locks in the deaeration phase	Burner automatic unit or photoresistor failed	Replace
	Photoresistor wiring faulty	
No fuel ignition following the start-up cycle, no electric arc	No ignition transformer power supply, transformer damaged, ignition wires broken or shorted, damage to insulation or contamination of electrodes, wrong electrode arrangement	Replace
		Adjust electrodes, fig. 5 and 6
	Low spray air pressure, below 0.7 bar	Adjust air pressure downstream from the reducer valve per instruction manual - see page 9

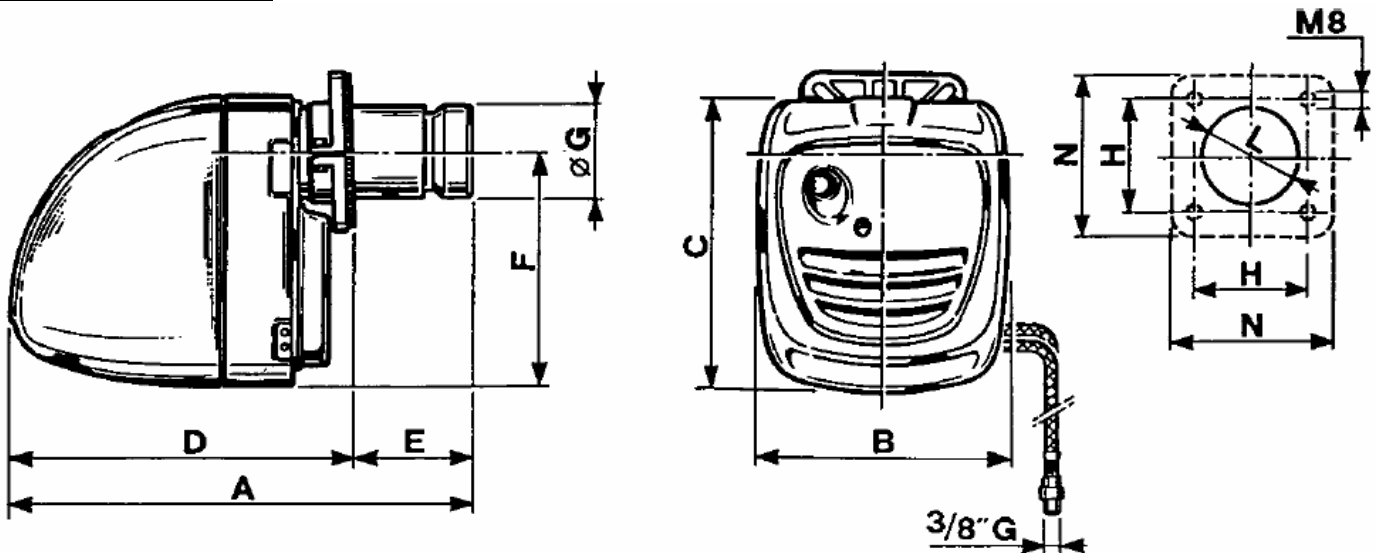
No fuel ignition following the start-up cycle with electric arc (no fuel in nozzle, fuel pump does not operate)	No pressure in compressed air system (compressor failure, closed ball shutoff valve)	Check compressed air line
	Air solenoid valve fault	Replace
No fuel ignition following the start-up cycle with electric arc (no fuel on nozzle, fuel pump operates)	No fuel in tank	Check fuel level
	Clogged general cleaning or precision cleaning filter	Check and clean fuel filters
	Suction line contains air	Deaerate the fuel pump, locate the leak and remove
	Oil solenoid valve fault	Replace solenoid valve
	Nozzle clogged	Screw out and clean the nozzle
	Oil line in heater block clogged	Service burner
	Pump fault	Replace
No fuel ignition following the start-up cycle with electric arc (fuel is sprayed into combustion chamber)	Non-combustible substance in fuel (i. e. water, coolant or brake fluid)	Check fuel
	Bad configuration or contamination of ignition electrodes	Adjust
	Too low oil temperature on nozzle exit	Check and replace 'TC' thermostat
	Air-fuel mix ratio wrong	Adjust burner
Mix ignites and detonates	Air-fuel mix ratio wrong, wrong arrangement or contamination of ignition electrodes	Adjust the burner, check whether the fuel does not contain petrol, thinners and other easily combustible or explosive substances
Burner works in impulses (flame disappears, unit restarts)	Clogged fuel system, fuel lines contain air	Clean, deaerate, tighten or replace components of the fuel system
Following start-up and ignition, burner shutdown and repeated start-up attempts	Too weak signal from photoresistor	Clean or replace photoresistor
	Bad burner adjustment Too little air (smoking flame) Too much spray air (flame is extinguished)	Adjust burner, check CO and CO ₂ levels
	Too much combustion air (separation of flame from plate)	Clean or replace nozzle, or clean the plate
	Irregular flame shape	

WARNING!

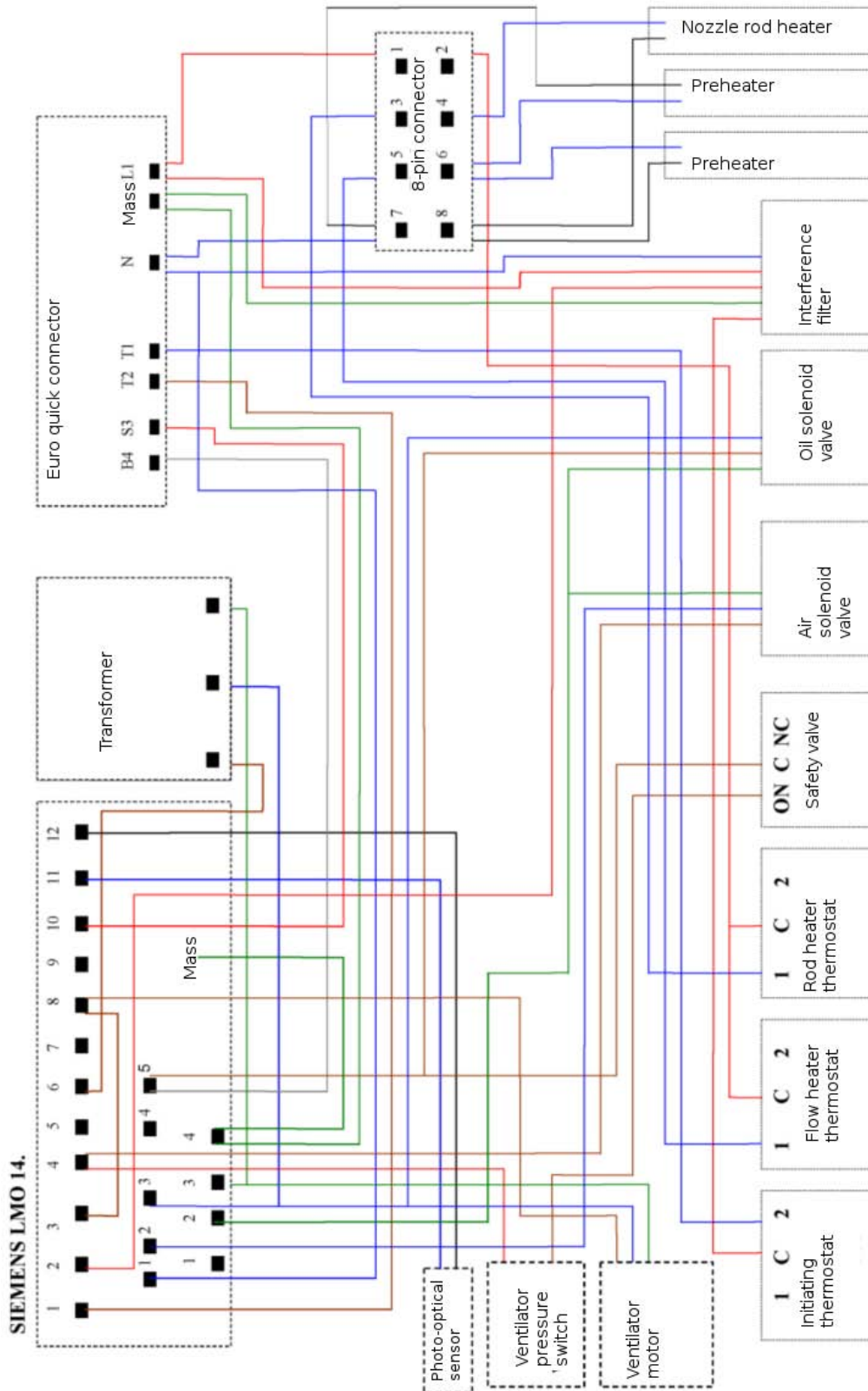
Finding and repairing faults of the burner is very important for the health and life of the users. Always strictly adhere to occupational health and safety rules. The burner, following repairs, must be completely functional, checked and absolutely safe. In case of doubts, submit the burner to the manufacturer for appraisal and repair.

Technical specifications:

Type		MTX 80	MTX 180 / MTX KTS
Burner power - min.	kW	40	80
Burner power - max.	kW	80	220 / 290
Burner power - min.	kcal/h	34400	68800
Burner power - max.	kcal/h	68800	189200 / 249400
Max. fuel consumption (continuous operation)	l/h	8	22.8 / 28.6
Power supply	V/Hz	230/50	230/50
Fuel connection		insulated line 1/4", length 1100 mm, 3/8" connector	
Motor ventilator - 2869 rpm	W	185	185
Capacitor	µF	6.3	6.3
Ignition transformer	kV	10	10
	mA	30	30
Weight	kg	17.5	17.8
Protection type		differential, photo-optical, thermal valves	differential, photo-optical, thermal valves
Heating block heater	W	300	2 x 300
Fuel rod heater	W	300	300
Packaging dimensions	mm	430 x 360 x 770	430 x 360 x 770

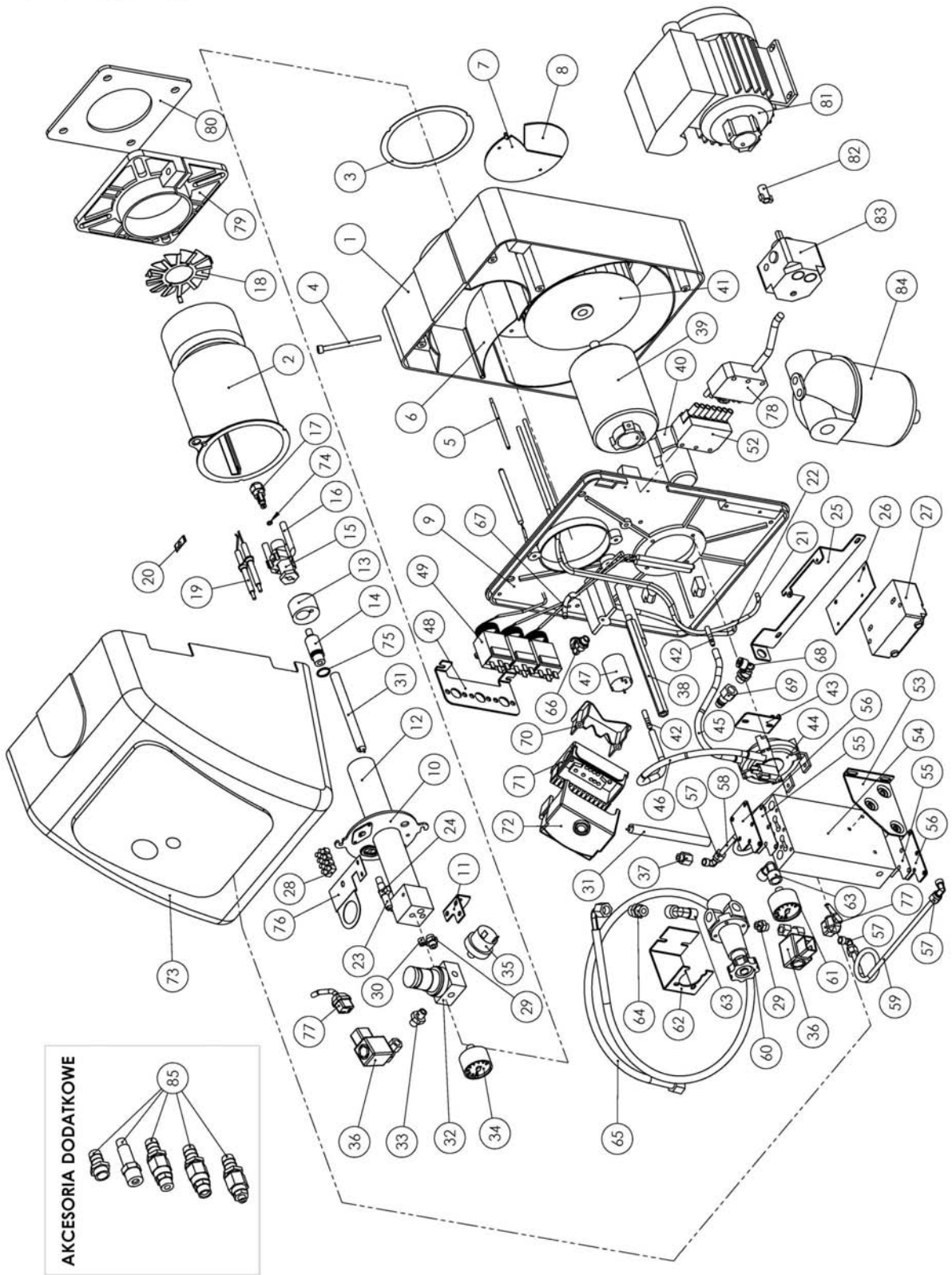
Burner dimensions

MODEL	A	B	C	D	E		F	ØG	H		ØL	N
					min	max			min	max		
MTX 80 MTX 180	550	275	340	400	80	150	240	114	110	150	120	180



MTX 80/180 burner electric system connection diagram

MTX 80 / 180



NO.	COMPONENT NAME	CATALOGUE NUMBER	COUNT
1	Body	002.25	1
2	Flame pipe	002.26	1
3	Flame pipe seal	002.27	1
4	Adjustment screw	002.28	1
5	Throttle axis	002.29	1
6	Air throttle	002.30	1
7	Lower air flap set	002.24	1
8	Upper air flap set	002.24	1
9	Partition plate	002.31	1
10	Burner partition cover	002.32	1
11	Nozzle rod grip	002.19	1
12	Nozzle rod	002.10	1
13	Nozzle rod head	002.09	1
14	Nozzle base connector	002.08	1
15	Nozzle base	002.07	1
16	Electrode and plate base	012.25	1
17	Delavan fuel nozzle 30609-05	123.05	1
17	Delavan fuel nozzle 30609-07	123.07	1
17	Delavan fuel nozzle 30609-11	123.11	1
18	Riser plate	002.23	1
19	Ignition electrode	012.24	1
20	Electrode depressing unit	012.26	1
21	HV cable set	002.33	1
22	HV cable set	002.33	1
23	Photocell	012.34	1
24	Photocell clamp	012.27	1
25	Transformer and solenoid valve grip	002.20	1
26	Transformer base	012.35	1
27	Transformer	002.36	1
28	Electric connector	002.37	1
29	Straight nipple 1/8" x 1/4"	123.16	2
30	Nozzle rod cap	002.38	1
31	Heater cartridge	002.04	2
32	Air pressure reducer	123.04	1
33	Straight nipple 1/8" x 1/4"	123.16	1
34	Air pressure gauge	123.10	1
35	Air pressure sensor	002.02	1
36	Solenoid valve	123.02	2
37	Reduction connector 1.8" GW-GZ	123.17	1
38	Housing support	002.39	1
39	Fan motor	002.40	1
40	Capacitor	002.41	1
41	Fan	002.42	1
42	Air connector, diameter 6	002.43	2
43	Differential pressure switch grip	002.22	1
44	Differential pressure switch	002.05	1

NO.	COMPONENT NAME	CATALOGUE NUMBER	COUNT
45	Differential pressure switch pipe	002.44	1
46	Differential pressure switch pipe	002.44	1
47	LC interference filter	002.45	1
48	Thermostat grip	002.17	1
49	Control thermostat	123.01	1
50	Control thermostat	123.01	1
51	Control thermostat	123.01	1
52	Euro socket	123.18	1
53	Oil heater grip	002.18	1
54	Heating block	002.11	1
55	Heating block cover seal	002.46	2
56	Heating block cover	002.12	2
57	Angular oil connector	123.15	4
58	Short fuel line section	002.47	1
59	Long fuel line section	002.48	1
60	Fuel pressure reducer	002.06	1
61	Fuel pressure gauge	002.03	1
62	Fuel pressure reducer grip	123.12	1
63	1.4" GW-GZ elbow	002.49	2
64	1/4" straight connector	002.50	1
65	Reinforced fuel line	123.19	1
66	1.8" air connector	002.16	1
67	Air supply line	002.51	1
68	1.4" air connector	002.15	1
69	DN air connector	002.14	1
70	Automatic unit spacer	002.51	1
71	El. automatic unit base	123.20	1
72	Siemens control unit	012.28	1
73	Housing	002.52	1
74	Nozzle seal	123.21	1
75	Nozzle base connector seal	002.53	1
76	8-pin electric connector grip	002.21	1
77	Solenoid valve power supply cord	123.03	2
78	Euro plug	123.22	1
79	Burner mounting flange	002.54	1
80	Mounting flange seal	002.55	1
81	Fuel pump motor	002.13	1
82	Overload clutch	123.23	1
83	Fuel pump	012.29	1
84	Fuel filter	123.24	1
85	Fuel system connector set*	002.56	1

* The fuel line connector set permits the connection of a fuel system using a flexible hose of a diameter of 16 mm.

The diagram curve describes approximate values of pressure in the combustion chamber, proportional to the burner achieved capacity values. The values from the diagram were measured on a test bed system. Start-up resistance and burner resistance is dependent on the combustion chamber design, exhaust gas ventilation type and start-up load.

Precise values may in this regard be calculated for a particular installation only based on values from experience.

