TRAINING

2007/2008

DESA Poland Sp. z o.o.

ul. Magazynowa 5A

62-023 Gądki, (PL)

tel: +48 61 (0) 654-40-00, fax: +48 61 (0) 654-40-01

www.masterheaters.eu

Plan :

1. Company’s introduction
2. Channels of distribution
3. Theoretical grounds
4. Assortment
5. Calculation of dehumidifier capacity
6. Comparison BV 70 - Gryp
7. Comparison Master vs Sial vs ITM
8. Warranty period for spare parts
9. Discussion, questions etc.

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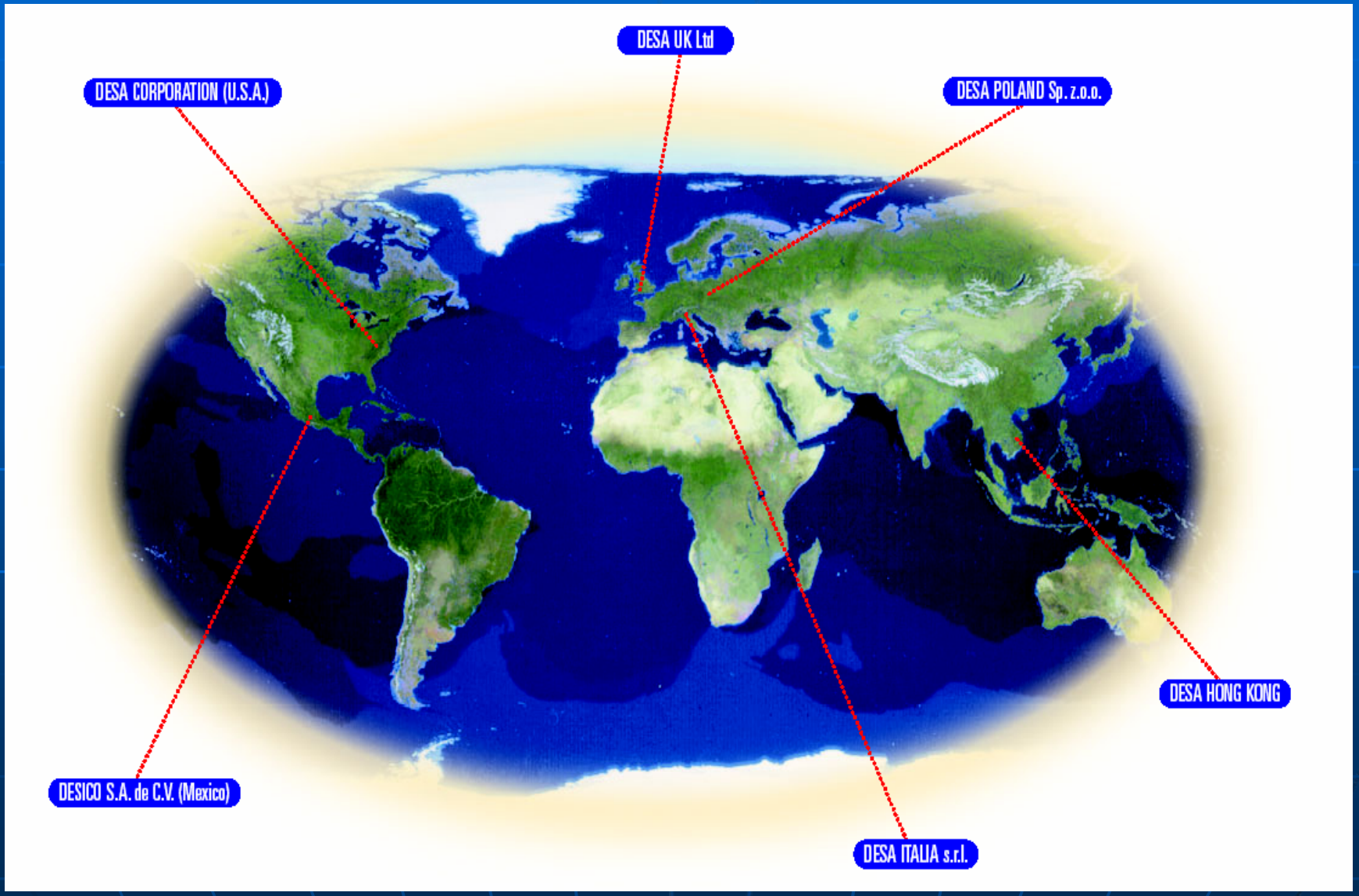

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DESA POLAND sales on all markets of Eastern and Southern Europe :

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Electric heaters – assembling lines

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Electric panels

Measure stand

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STRATEGY

THE COMPANY WANTS
TO DEVELOP THROUGH
THE INTRODUCTION OF NEW PRODUCTS
AND TECHNICAL INNOVATIONS,
SAVING THE LEADER POSITION AS WELL
AS EXPANDING ON NEW MARKETS.

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CHANNELS OF DISTRIBUTION

- Building industry
- Agriculture
- Production Industry
- Households
- Army
- Special events/shows
- Natural disasters

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FUEL CHARACTERISTICS

SOURCES OF ENERGY - PARTITION

- ✓ DIESEL OIL
- ✓ HEATING OIL
- ✓ PROPANE-BUTANE GAS
- ✓ ELECTRIC VOLTAGE
- ✓ BIODIESEL & WASTE OIL

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CALCULATION OF HEAT CAPACITY

Before choosing the heater it is necessary to define minimal heat capacity to heat a given space.

Heat capacity calculation:

$$Q = V \times \Delta T \times k \quad [\text{ kcal/h }]$$

key :

Q	heat capacity (heating demand) [kW, kcal/h]
V	space volume (length, width, height) [m^3]
ΔT	temperature increment - difference between minimum and required temperature inside the building [^oC]
k	coefficient of building isolation

k = 3,0 – 4,0	wooden building or corrugated sheet building, badly isolated
k = 2,0 – 2,9	simple construction, one brick layer
k = 1,0 – 1,9	standard building, double brick layer – medium isolation
k = 0,6 – 09	well isolated building – two brick layers with isolation, new windows

Conversion kcal/h <-> kW

1 kW = 860 kcal/h

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REQUIRED THERMAL POWER TABLE

Q = V x ΔT x k [kcal/h] **Q = kcal/h / 860 [kW]**

12°C			V - volume of area to be heated [m^3]																							
			40	80	120	160	200	240	280	320	360	400	440	480	520	560	600	640	680	720	760	800	840	880	920	960	1000
k - dispersion coefficient	W	0,6	0,3	0,7	1	1	2	2	2	3	3	3	4	4	4	5	5	5	6	6	6	7	7	7	8	8	8
		0,8	0,4	0,9	1	2	2	3	3	4	4	4	5	5	6	6	7	7	8	8	8	9	9	10	10	11	11
		1,0	0,6	1	2	2	3	3	4	4	5	6	6	7	7	8	8	9	9	10	11	11	12	12	13	13	14
	M	1,2	0,7	1	2	3	3	4	5	5	6	7	7	8	9	9	10	11	11	12	13	13	14	15	15	16	17
		1,4	0,8	2	2	3	4	5	5	6	7	8	9	9	10	11	12	13	13	14	15	16	16	17	18	19	20
		1,6	0,9	2	3	4	4	5	6	7	8	9	10	11	12	13	13	14	15	16	17	18	19	20	21	21	22
		1,8	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
	P	2,0	1	2	3	4	6	7	8	9	10	11	12	13	15	16	17	18	19	20	21	22	23	25	26	27	28
		2,2	1	2	4	5	6	7	9	10	11	12	14	15	16	17	18	20	21	22	23	25	26	27	28	29	31
		2,4	1	3	4	5	7	8	9	11	12	13	15	16	17	19	20	21	23	24	25	27	28	29	31	32	33
		2,6	1	3	4	6	7	9	10	12	13	15	16	17	19	20	22	23	25	26	28	29	30	32	33	35	36
		2,8	2	3	5	6	8	9	11	13	14	16	17	19	20	22	23	25	27	28	30	31	33	34	36	38	39
	N	3,0	2	3	5	7	8	10	12	13	15	17	18	20	22	23	25	27	28	30	32	33	35	37	39	40	42
		3,2	2	4	5	7	9	11	13	14	16	18	20	21	23	25	27	29	30	32	34	36	38	39	41	43	45
		3,4	2	4	6	8	9	11	13	15	17	19	21	23	25	27	28	30	32	34	36	38	40	42	44	46	47
		3,6	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50
		3,8	2	4	6	8	11	13	15	17	19	21	23	25	28	30	32	34	36	38	40	42	45	47	49	51	53
		4,0	2	4	7	9	11	13	16	18	20	22	25	27	29	31	33	36	38	40	42	45	47	49	51	54	56

16°C			V - volume of area to be heated [m^3]																							
			40	80	120	160	200	240	280	320	360	400	440	480	520	560	600	640	680	720	760	800	840	880	920	960	1000
k - dispersion coefficient	W	0,6	0,4	0,9	1	2	2	3	3	4	4	4	5	5	6	6	7	7	8	8	8	9	9	10	10	11	11
		0,8	0,6	1	2	2	3	4	4	5	5	6	7	7	8	8	9	10	10	11	11	12	13	13	14	14	15
		1,0	0,7	1	2	3	4	4	5	6	7	7	8	9	10	10	11	12	13	13	14	15	16	16	17	18	19
	M	1,2	0,9	2	3	4	4	5	6	7	8	9	10	11	12	13	13	14	15	16	17	18	19	20	21	21	22
		1,4	1	2	3	4	5	6	7	8	9	10	11	13	14	15	16	17	18	19	20	21	22	23	24	25	26
		1,6	1	2	4	5	6	7	8	10	11	12	13	14	15	17	18	19	20	21	23	24	25	26	27	29	30
		1,8	1	3	4	5	7	8	9	11	12	13	15	16	17	19	20	21	23	24	25	27	28	29	31	32	33
	P	2,0	1	3	4	6	7	9	10	12	13	15	16	18	19	21	22	24	25	27	28	30	31	33	34	36	37
		2,2	2	3	5	7	8	10	11	13	15	16	18	20	21	23	25	26	28	29	31	33	34	36	38	39	41
		2,4	2	4	5	7	9	11	13	14	16	18	20	21	23	25	27	29	30	32	34	36	38	39	41	43	45
		2,6	2	4	6	8	10	12	14	15	17	19	21	23	25	27	29	31	33	35	37	39	41	43	45	46	48
		2,8	2	4	6	8	10	13	15	17	19	21	23	25	27	29	31	33	35	38	40	42	44	46	48	50	52
	N	3,0	2	4	7	9	11	13	16	18	20	22	25	27	29	31	33	36	38	40	42	45	47	49	51	54	56
		3,2	2	5	7	10	12	14	17	19	21	24	26	29	31	33	36	38	40	43	45	48	50	52	55	57	60
		3,4	3	5	8	10	13	15	18	20	23	25	28	30	33	35	38	40	43	46	48	51	53	56	58	61	63
		3,6	3	5	8	11	13	16	19	21	24	27	29	32	35	38	40	43	46	48	51	54	56	59	62	64	67
		3,8	3	6	8	11	14	17	20	23	25	28	31	34	37	40	42	45	48	51	54	57	59	62	65	68	71
		4,0	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60	63	65	68	71	74

20°C			V - volume of area to be heated [m^3]																							
			40	80	120	160	200	240	280	320	360	400	440	480	520	560	600	640	680	720	760	800	840	880	920	960	1000
k - dispersion coefficient	W	0,6	0,6	1	2	2	3	3	4	4	5	6	6	7	7	8	8	9	9	10	11	11	12	12	13	13	14
		0,8	0,7	1	2	3	4	4	5	6	7	7	8	9	10	10	11	12	13	13	14	15	16	16	17	18	19
		1,0	0,9	2	3	4	5	6	7	7	8	9	10	11	12	13	14	15	16	17	18	19	20	20	21	22	23
	M	1,2	1	2	3	4	6	7	8	9	10	11	12	13	15	16	17	18	19	20	21	22	23	25	26	27	28
		1,4	1	3	4	5	7	8	9	10	12	13	14	16	17	18	20	21	22	23	25	26	27	29	30	31	33
		1,6	1	3	4	6	7	9	10	12	13	15	16	18	19	21	22	24	25	27	28	30	31	33	34	36	37
		1,8	2	3	5	7	8	10	12	13	15	17	18	20	22	23	25	27	28	30	32	33	35	37	39	40	42
	P	2,0	2	4	6	7	9	11	13	15	17	19	20	22	24	26	28	30	32	33	35	37	39	41	43	45	47
		2,2	2	4	6	8	10	12	14	16	18	20	23	25	27	29	31	33	35	37	39	41	43	45	47	49	51
		2,4	2	4	7	9	11	13	16	18	20	22	25	27	29	31	33	36	38	40	42	45	47	49	51	54	56
		2,6	2	5	7	10	12	15	17	19	22	24	27	29	31	34	36	39	41	44	46	48	51	53	56	58	60
		2,8	3	5	8	10	13	16	18	21	23	26	29	31	34	36	39	42	44	47	49	52	55	57	60	63	65
	N	3,0	3	6	8	11	14	17	20	22	25	28	31	33	36	39	42	45	47	50	53	56	59	61	64	67	70
		3,2	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60	63	65	68	71	74
		3,4	3	6	9	13	16	19	22	25	28	32	35	38	41	44	47	51	54	57	60	63	66	70	73	76	79
		3,6	3	7	10	13	17	20	23	27	30	33	37	40	44	47	50	54	57	60	64	67	70	74	77	80	84
		3,8	4	7	11	14	18	21	25	28	32	35	39	42	46	49	53	57	60	64	67	71	74	78	81	85	88
		4,0	4	7	11	15	19	22	26	30	33	37	41	45	48	52	56	60	63	67	71	74	78	82	86	89	93

EXAMPLE : for the volume V=1800m^3 coefficiency of k=2,4 and desired temperature increment ΔT=16°C we should apply thermal power of V=1000m^3 and V=800m^3, for the same coefficiency

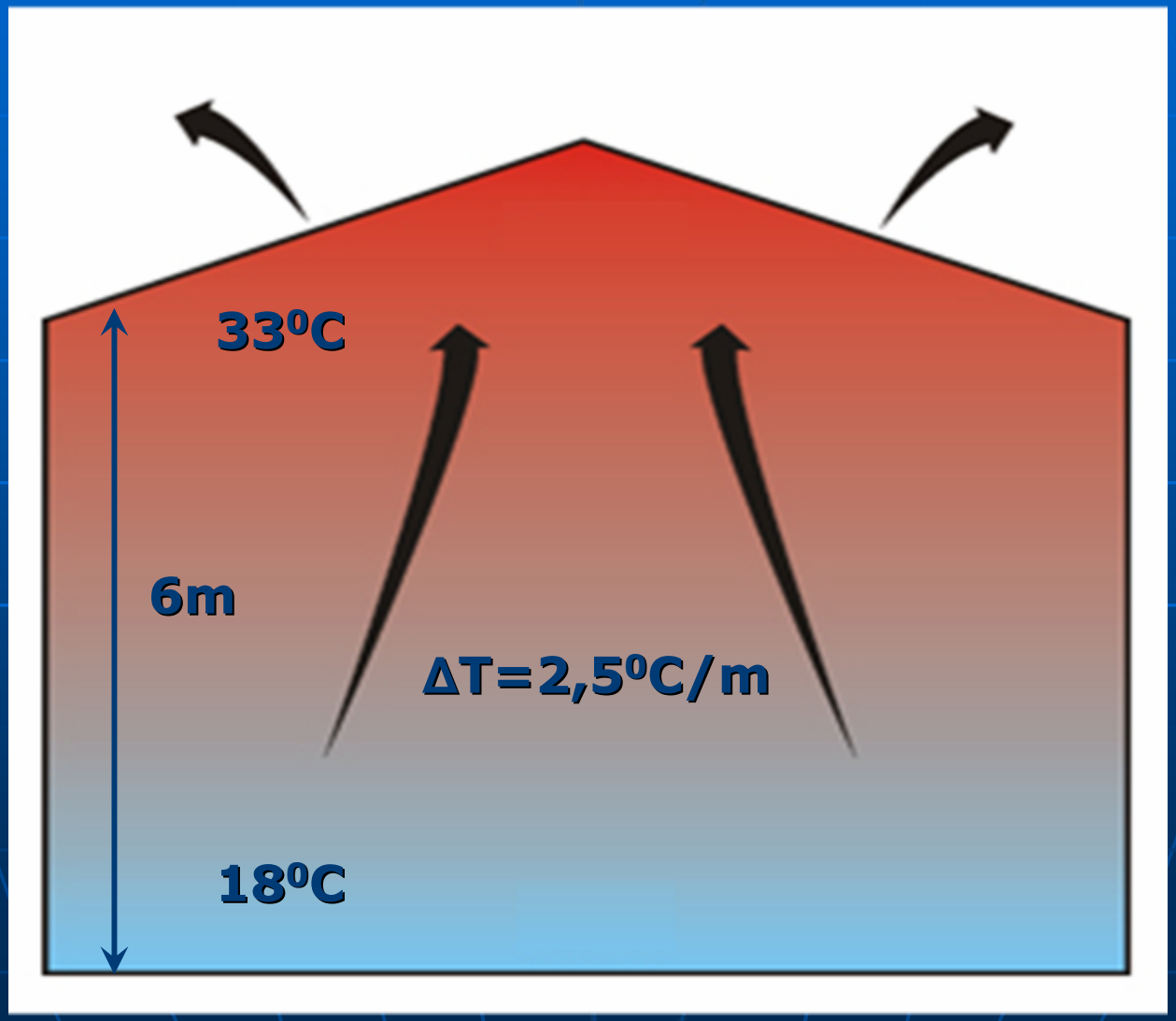
$$Q_{1800} = Q_{1000} + Q_{800}$$

Q - minimum thermal power V -volume of area to be heated ΔT - temperature increment k - dispersion coefficient

Dispersion coefficient description

W - well insulated M - moderetly insulated P - poorly insulated N - non insulated

Temperature range in large buildings (warehouses etc.)



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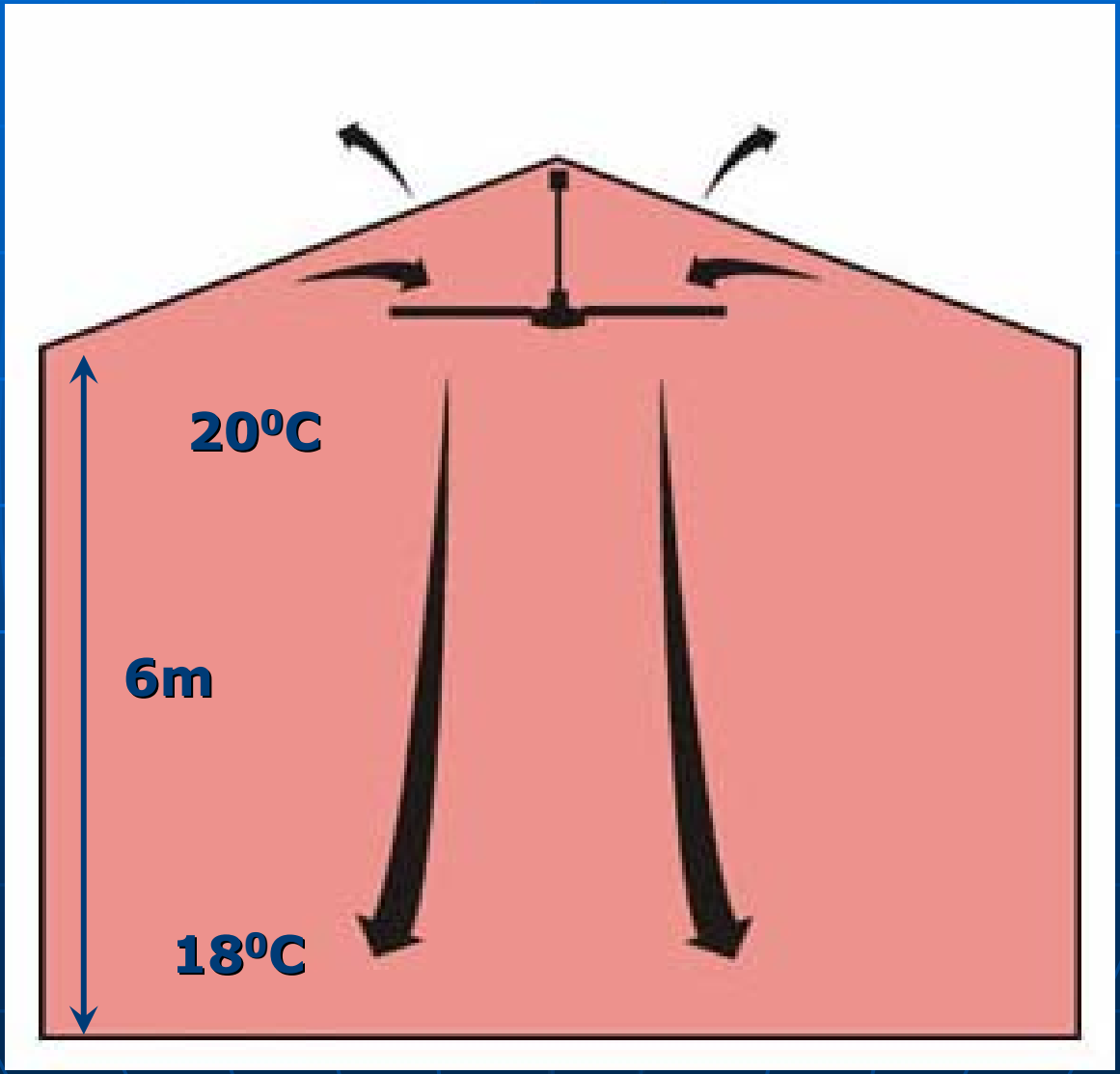
Temperature range after blend fans applicated



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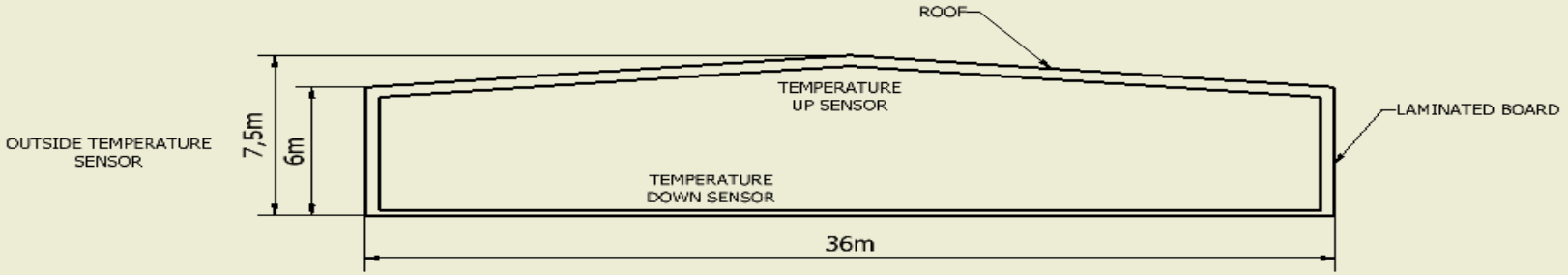
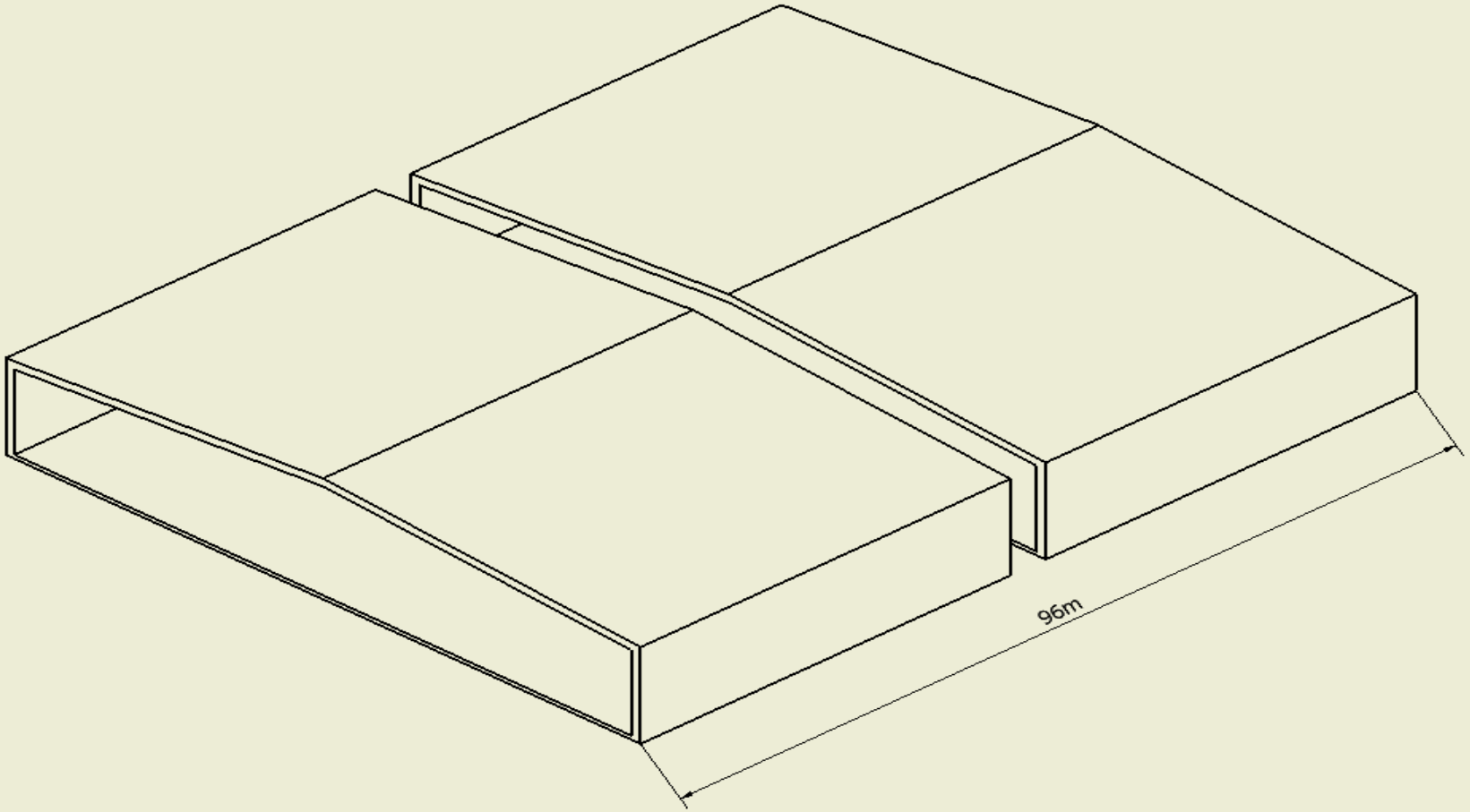
Desa Poland warehouse





Date	Temperature outside		Temperaure inside werehouse			
			up sensor		down sensor	
	T_{MIN}	T_{MAX}	T_{MIN}	T_{MAX}	T_{MIN}	T_{MAX}
2006-01-02	-7,1	6,2	6,8	12,8	6,1	8,2
2006-01-03	-0,5	2,1	7,8	13,2	6,3	8,2
2006-01-05	0,2	7,6	8,0	8,3	6,7	6,9
2006-01-06	-3,4	0,6	7,5	13,5	5,0	8,7
2006-01-09	-9,0	-0,2	5,5	14,5	4,5	9,4
2006-01-10	-8,5	-0,9	5,9	13,9	4,9	8,9
2006-01-11	-7,3	-0,1	5,9	13,6	5,0	9,0
2006-01-12	-6,0	9,4	7,6	12,9	5,8	8,5
2006-01-16	-10,9	3,1	4,6	13,7	3,7	9,1
2006-01-17	-12,0	-1,7	4,2	13,5	2,5	6,5
2006-01-19	-11,9	3,7	7,6	8,0	3,7	3,5
2006-01-20	-9,9	3,1	10,1	9,1	1,7	2,4
2006-01-23	-25,3	-2,8	1,3	11,7	0,4	6,6
2006-01-24	-22,4	-2,7	1,1	10,5	0,0	2,9
2006-01-26	-19,4	-4,1	1,0	9,7	-4,1	2,9
2006-01-27	-17,6	-1,7	1,9	6,4	1,0	3,7
2006-01-30	-18,5	-0,0	1,5	11,6	0,4	4,6

Table with measured temperatures in warehouse (without heating)–

January 2006

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Calculation of heat capacity for Desa's Poland warehouse

$$Q = \frac{V \cdot \Delta T \cdot k}{860} = \frac{20736 \cdot 12 \cdot 1{,}4}{860} = 405{,}1[kW]$$

Q heat capacity (heating demand) [kW, kcal/h]

V space volume (length, width, height) [m³]

ΔT difference between minimum and required temperature inside the building [°C]

k coefficient of building isolation

k = 1,0 – 1,9 standard building, double brick layer – medium isolation

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Comments to result:

ΔT = 12 – average min. temperature in January 3,2°C; for warehousemen 15°C is enough

k = 1,4 look at the table – good isolation in our warehouse

Required capacity is 405 kW

We have two optional applications :

1. 2×BG 200 (220kW)
2. 2×BV 680 (220kW)

We don’t have air ducts so perfect solution for Desa is second option.

Additionally, we can use eight hoses and put hot air in eight different places in warehouse.

We have a reserve of capacity – 2 × 220 kW = 440 kW

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CONDITION 1

Minimum oxygen in the air ≥ 17%

CONDITION 2

... kW x 30 = Minimum fresh air in m^3/h

CONDITION 3

0,003 x ... kW = Minimum ventilation inlet in m^2

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MACHINES

OIL HEATERS

- DIRECT FIRED HEATERS (WITHOUT FLUE EXIT PIPE)
- INDIRECT FIRED HEATERS (WITH FLUE EXIT PIPE)

ELECTRIC HEATERS

GAS HEATERS

DEHUMIDIFIERS

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DIRECT FIRED HEATERS

LOW PRESSURE MODELS

B 35 CED

B 70 CED

B 100 CED

B 150 CED

B 230
B 360

BS 230
BS 360

HIGH PRESSURE MODELS

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MASTER®

BASIC TECHNICAL DATA

model	capacity	air displacement	fuel consumption	tank capacity	thermostat
	[kW] / [kcal/h]	[m^3/h]	[kg/h]	[l]	TH 2
B 35 CED	10 / 8 600	240	0,86	15	TH 2
B 70 CED	20 / 17 200	384	1,7	19	TH 2
B 100 CED	29 / 25 000	720	2,15	43,5	TH 2
B 150 CED	44 / 38 000	852	3,72	43,5	TH 2
B/BS 230	65 / 56 000	1800	3,9	65/ -	TH 5
B/BS 360	105 / 90 300	3300	8,8	105/ -	TH 5

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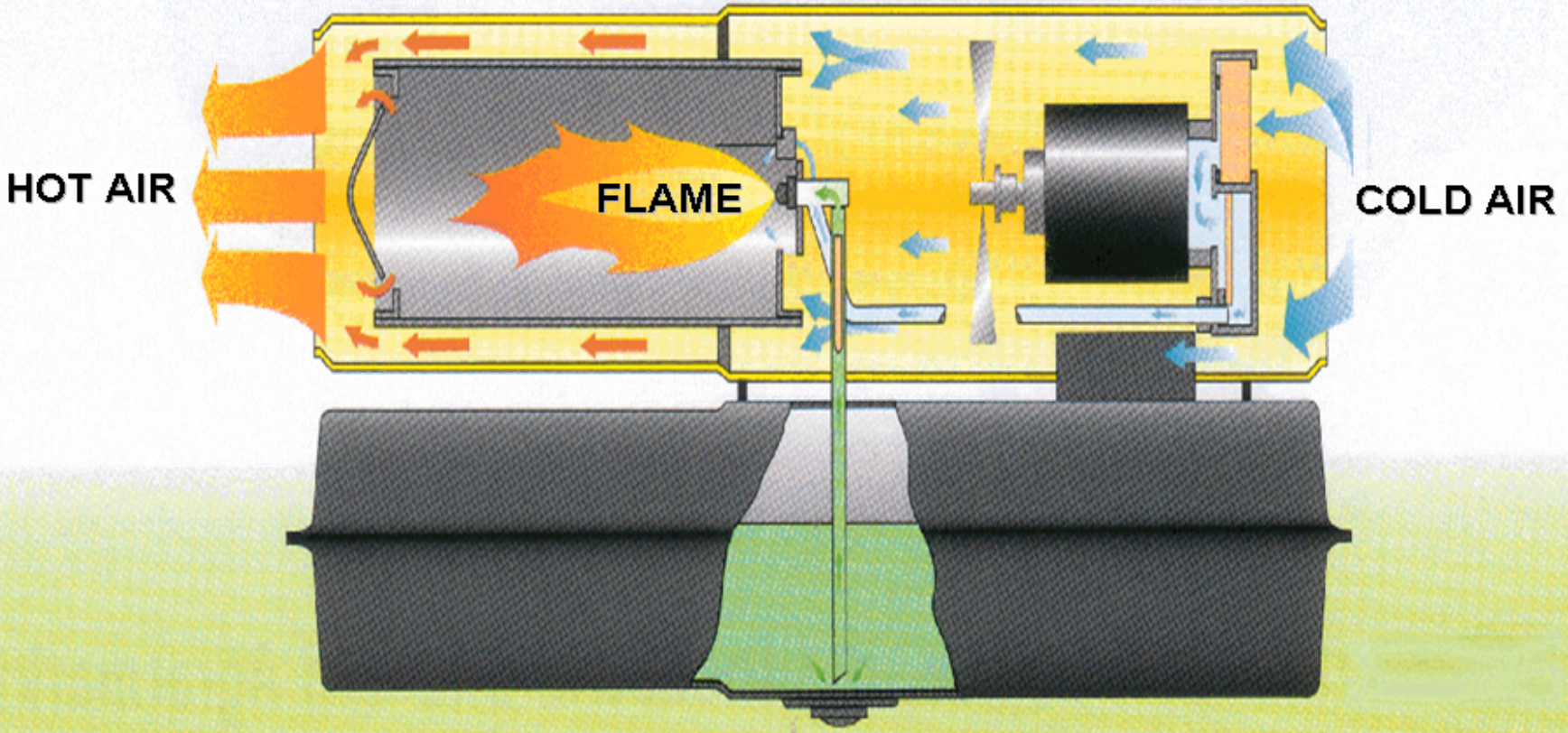
LOW PRESSURE DIRECT HEATERS

MASTER®

COMBUSTION SYSTEM – AIR FLOW



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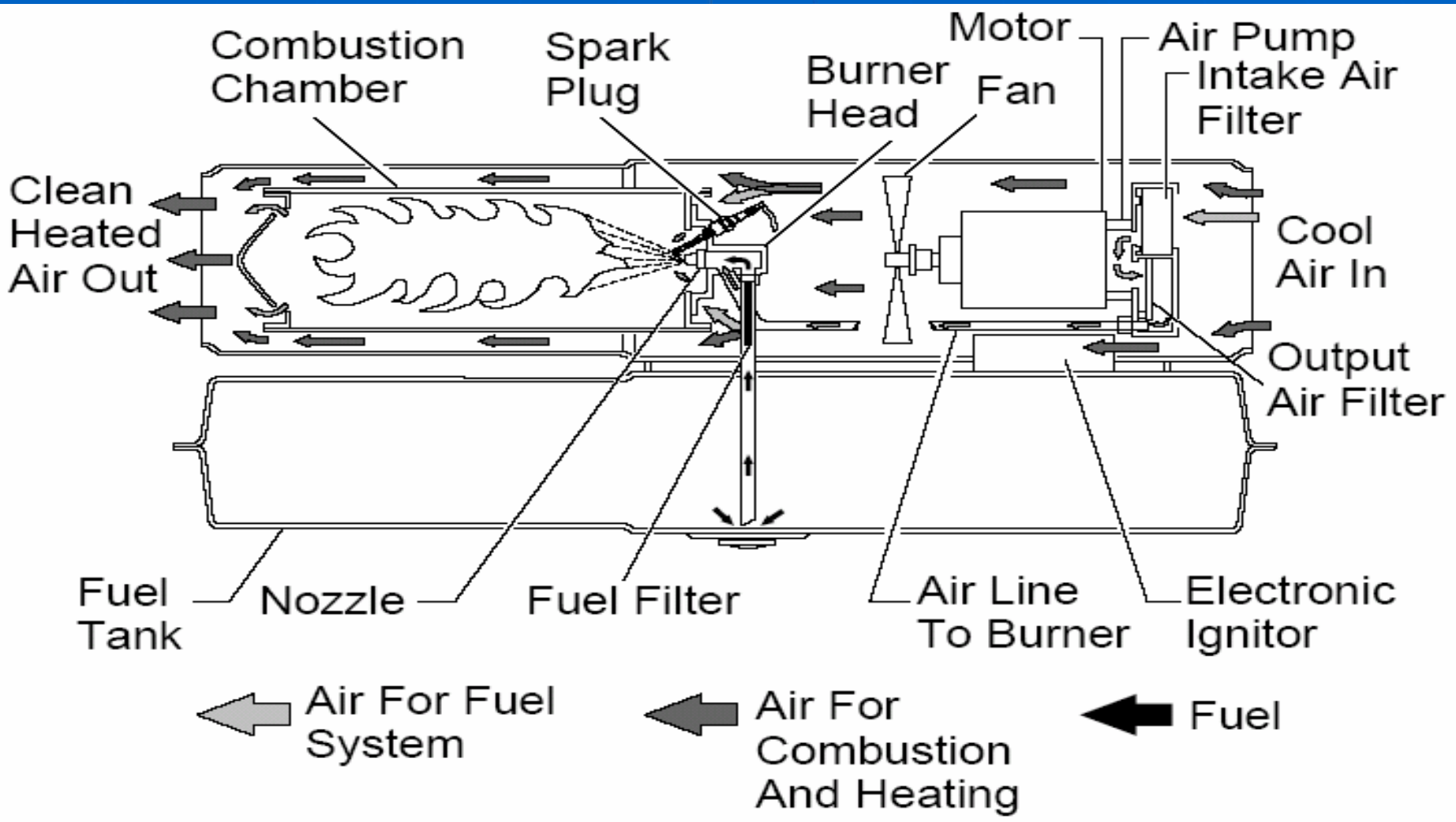
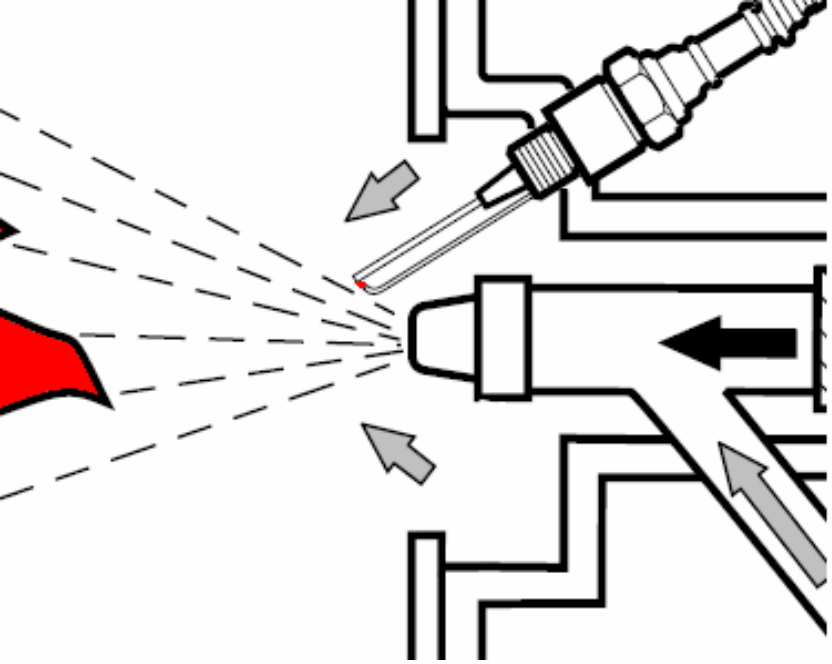
CONSTRUCTION AND OPERATION





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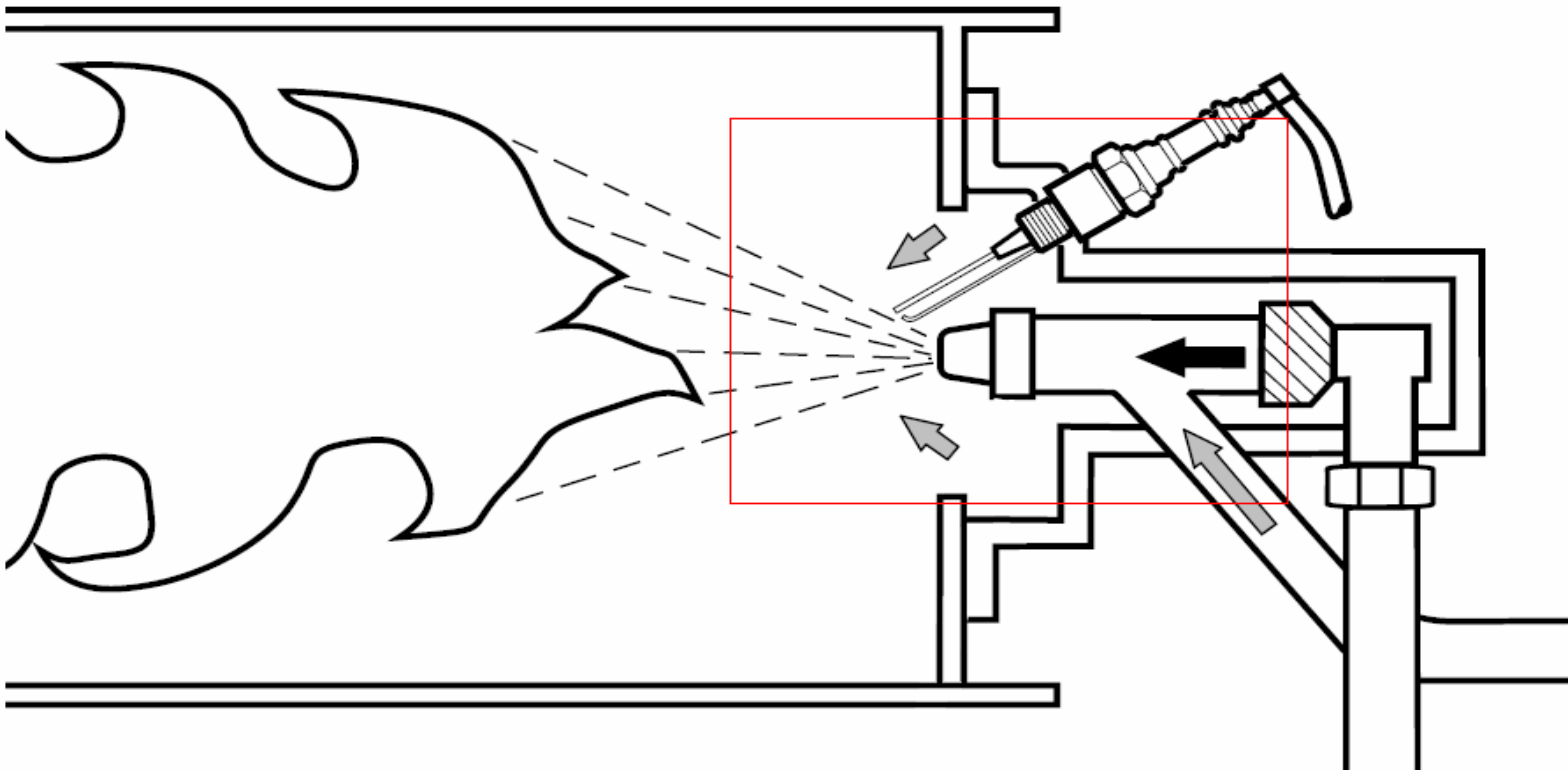

DESA POLAND Sp. z o.o.

CIRCULATION – WORK SYSTEMS

AIR

- Air pump
- Air filters
- Nozzle

ELECTRICAL

- Motor
- Spark
- Transformer
- Photocell

FUEL

- Fuel tank
- Fuel filter
- Fuel lines

COMBUSTION

- Head of burner
- Combustion chamber
- Heat shield
- Afterburner

DESA POLAND Sp. z o.o.
ul. Magazynowa 5A, 62-023 GĄDKI, tel. +48 (0) 61 654 40 00, fax. +48 (0) 61 654 40 01, www.desapoland.pl, e-mail: office@desapoland.pl

Characteristic and advantages:

- Fuel : diesel oil or furnace oil
- Full electronic
- Very big tank
- Low fuel consumption
- Hot air and exhaust gases exit through one way out
- Required good ventilation
- Full automatic control with room thermostat
- Lower sensitivity for voltage changes
- Efficiency almost 100%
- Solid and simple construction
- Outside housing does not heat
- Big airflow
- Easy in use
- Portable

Application :

- Agriculture, industry, construction,
- Stocks, halls, garages, etc..
- Open and half-open spaces
- Very big buildings
- Places where there are no people

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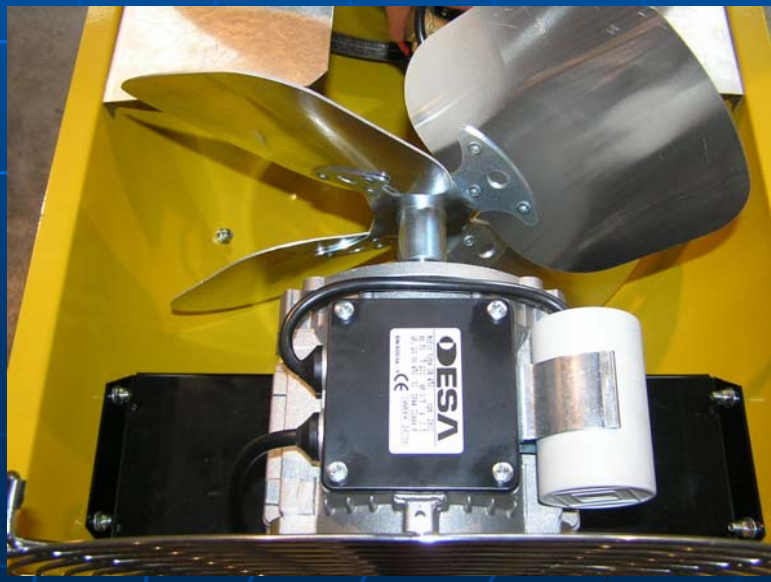
HIGH PRESSURE DIRECT HEATERS



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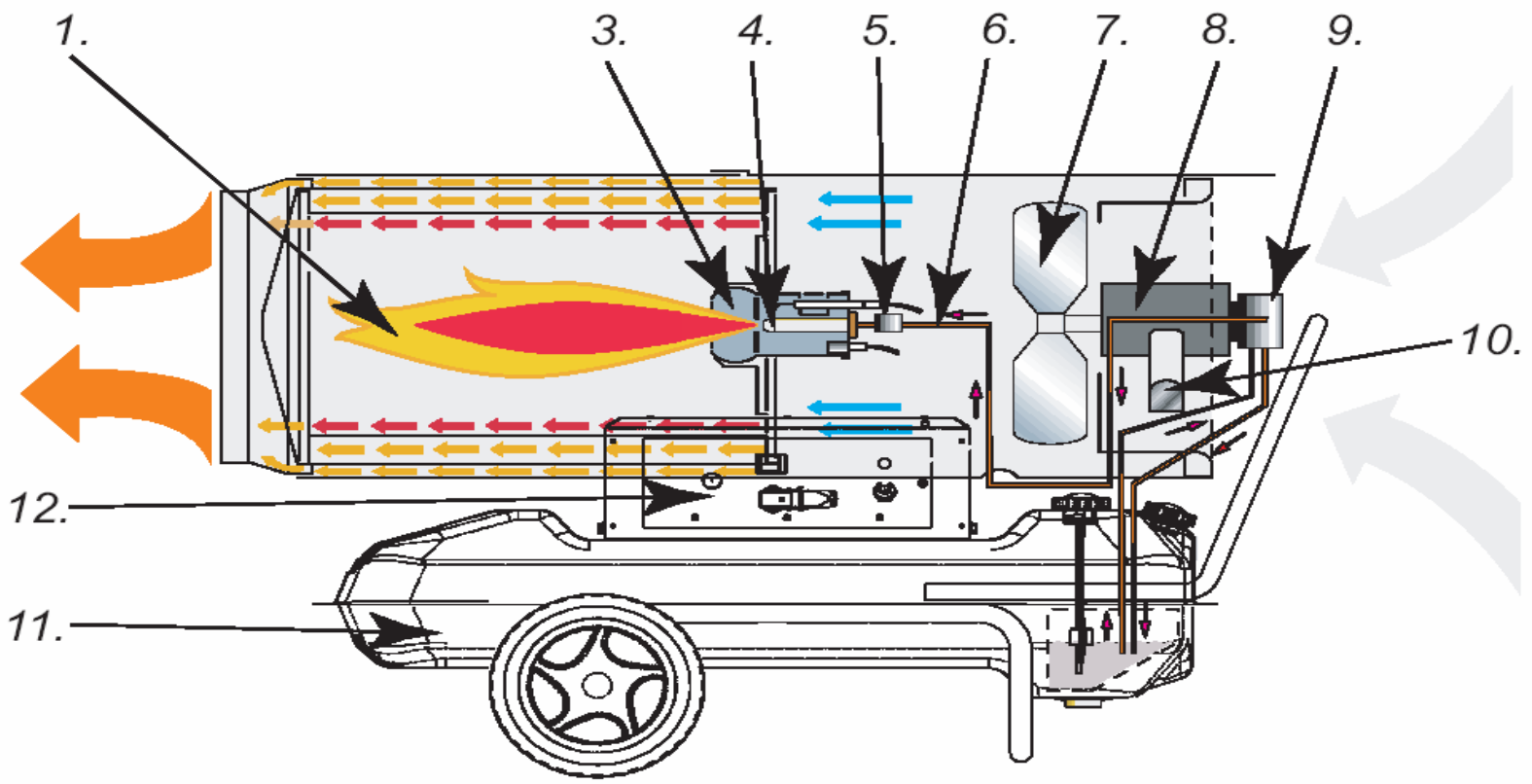

Heater functioning diagram

1. Combustion chamber, ***3.*** Burner, ***4.*** Nozzle, ***5.*** Electric fuel valve
6. Fuel circuit, ***7.*** Fan, ***8.*** Motor, ***9.*** Fuel pump,
10. Cable winding bracket, ***11.*** Fuel tank, ***12.*** Control panel.

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CIRCULATION – WORK SYSTEMS

AIR

- Nozzle
- Fan

ELECTRICAL

- Motor
- Ignition electrodes
- Control box
- Transformer
- Photocell

FUEL

- Fuel pump
- Fuel tank
- Fuel filter
- Fuel pipes

COMBUSTION

- Head of burner
- Combustion chamber
- Heat shields
- Afterburner

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Application :

- Agriculture, industry, construction,
- Stocks, halls, garages, etc..
- Open and half-open spaces
- Very big buildings
- Places where there are no people

Characteristic and advantages:

- Fuel : diesel oil or furnace oil
- Full electronic
- Very big tank
- Low fuel consumption
- Hot air and exhaust gases exit through one way out
- Required good ventilation
- Full automatic control with room thermostat
- Lower sensitivity for voltage changes
- Efficiency almost 100%
- Solid and simple construction

- Outside housing does not heat
- Big airflow
- Easy in use
- Portable

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INDIRECT FIRED HEATERS

BV 70 / BV 77

BV 110

BV 170

BV 290

BV 300

BV 360

BV 460

BV 680

CABINET HEATERS

INDIRECT FIRED HEATERS

Model	Capacity	Air displacement	Fuel consumption	Tank capacity	Thermostat
	[kW] / [kcal/h]	[m^3]	[kg/h]	[dm^3]	TH 5
BV 70	17 / 15 000	550	1,47	40	TH 5
BV 110	33 / 28 000	1800	2,71	65	TH 5
BV/BVS 170	47 / 40 400	1800	3,90	65/ -	TH 5
BV/BVS 290	81 / 70 000	3300	6,80	105/ -	TH 5

MASTER®

NEW BV 77

Max Capacity	20 KW 17.400 Kcal/h
Fuel	Oil
Fuel Consumption	1.67 Kg/h
Autonomy of Operation	21 h
Range Temperature from a distance of 20 cm at 20 °C environment	110 °C
Diameter Flue Tube	120 mm
Air Displacement	550 m^3/h
Voltage/Frequency	230 V / 50 Hz
Energy Consumption	300 W

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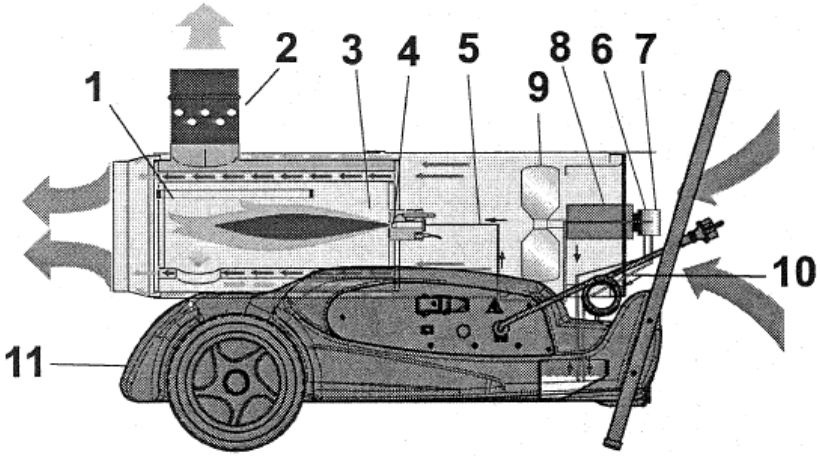
ELECTRIC CONTROL PANEL



Figur 1 - Heater functioning diagram.

1. Combustion chamber, ***2.*** Anti-wind flue connection, ***3.*** Burner, ***4.*** Nozzle, ***5.*** Fuel circuit, ***6.*** Electric fuel valve, ***7.*** Fuel pump, ***8.*** Motor, ***9.*** Fan, ***10.*** Filter, ***11.*** Fuel tank.

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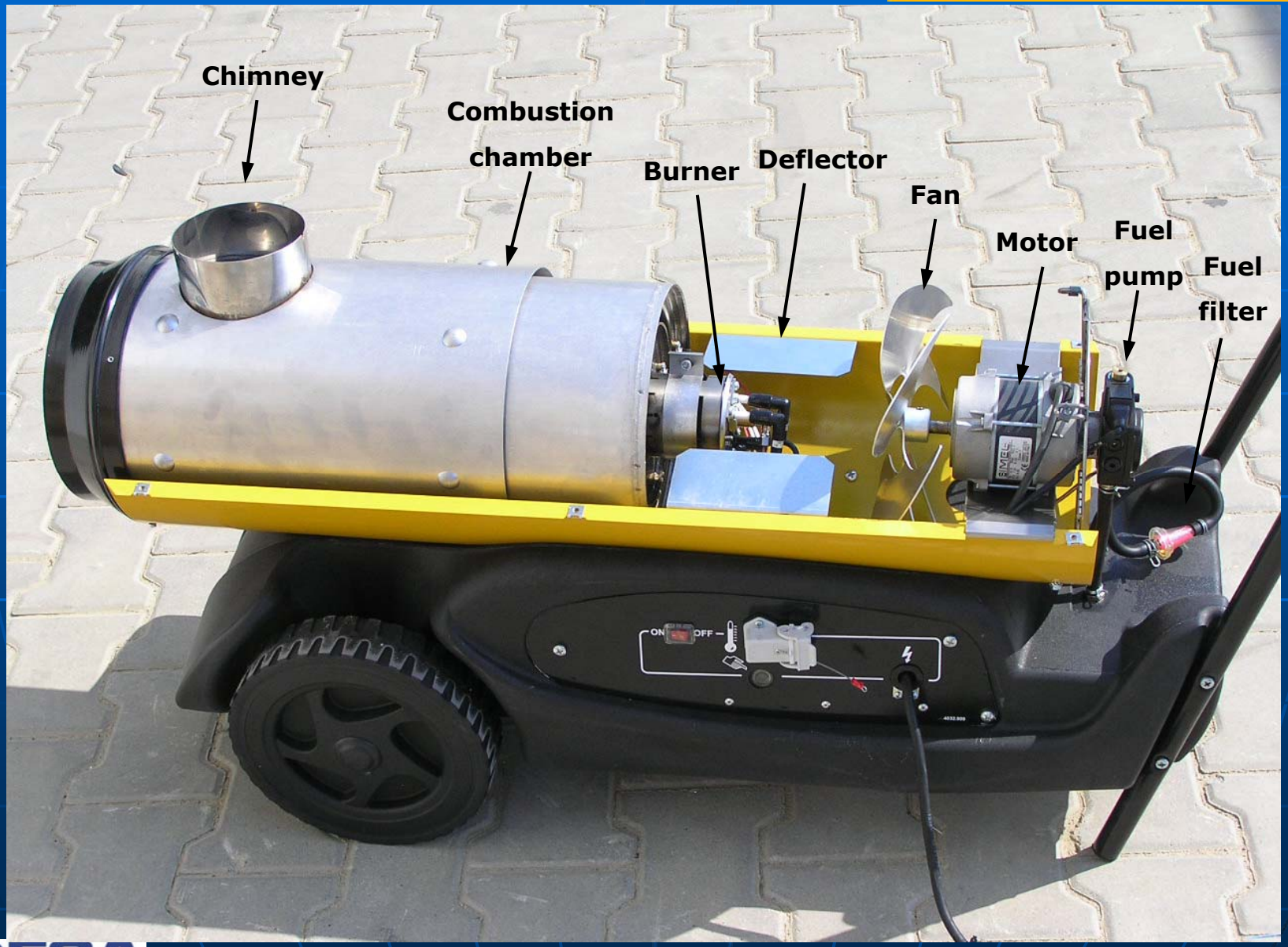

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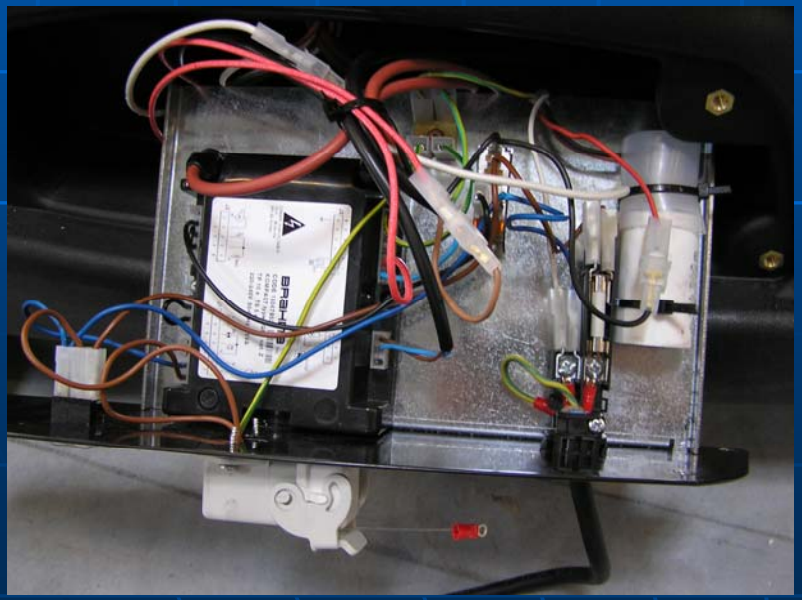

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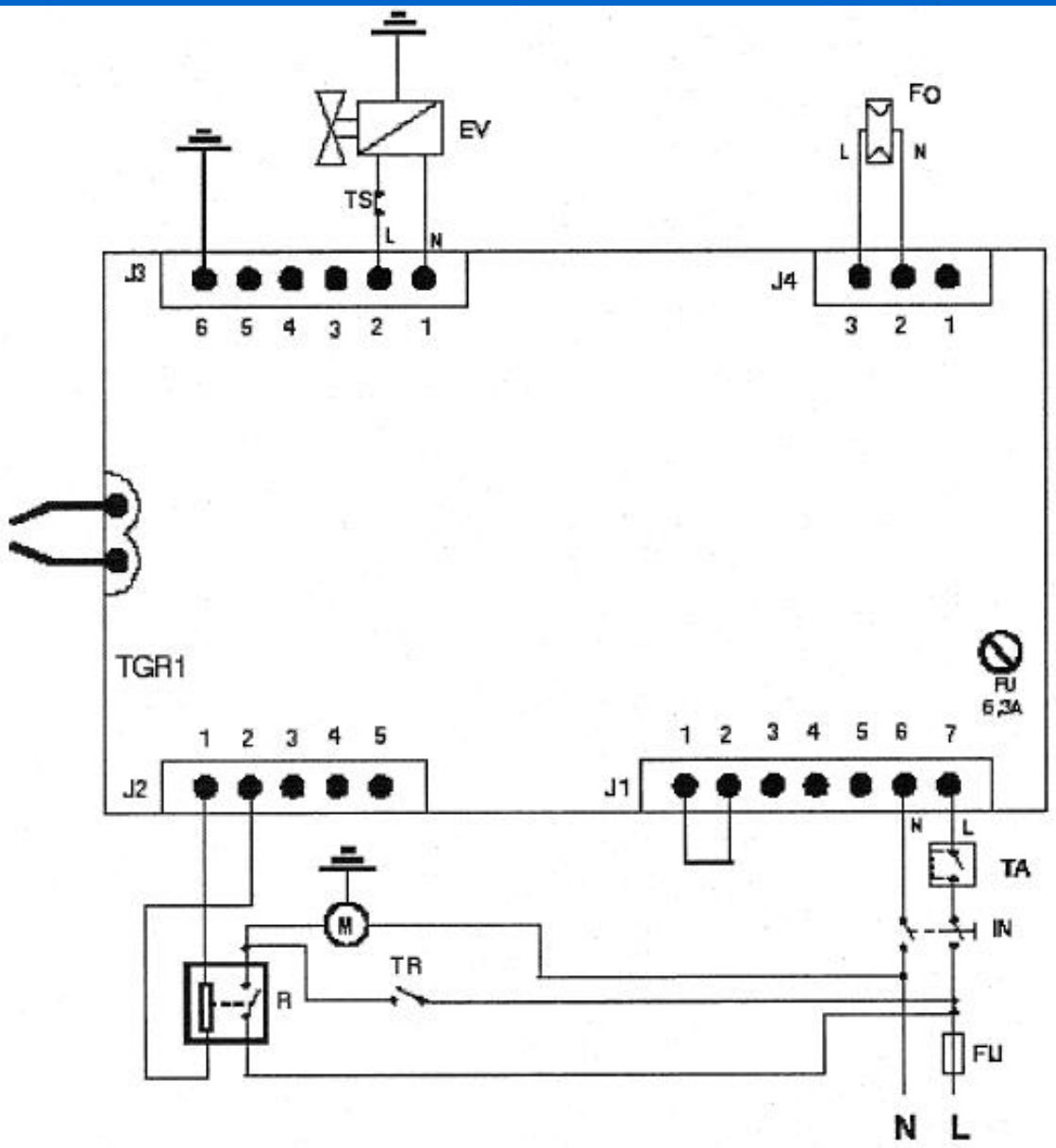

FU – fuse,
EV – electrovalve,
FO – photocell,
M – electric motor,
IN – switch,

TA – thermostat plug,
R – relay,
TGR1 – control box,
TR – cool-off thermostat,
TS – over-heat thermostat

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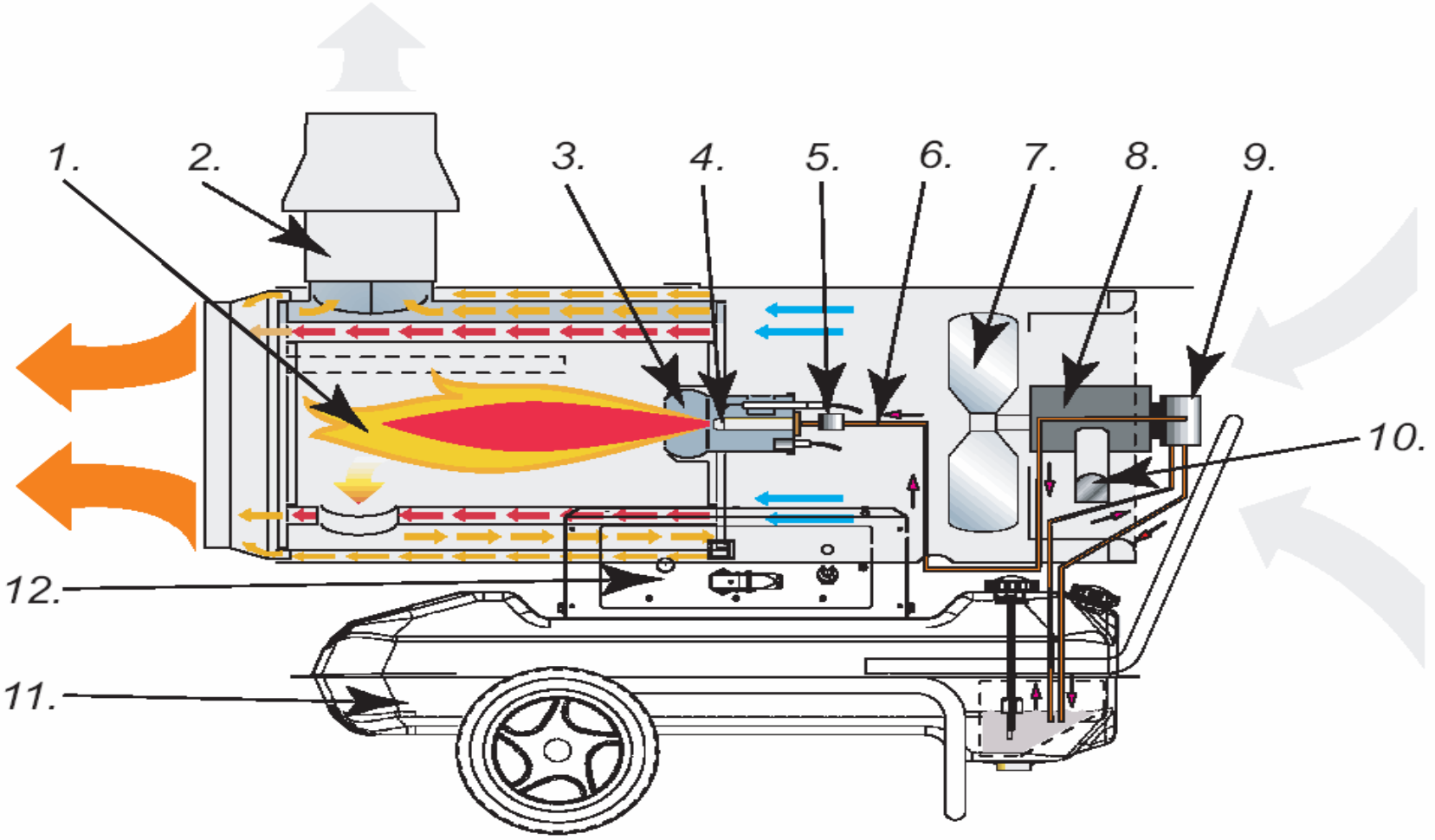

Heater functioning diagram.

1. Combustion chamber, ***2.*** Anti-wind flue connection, ***3.*** Burner, ***4.*** Nozzle, ***5.*** Electric fuel valve, ***6.*** Fuel circuit, ***7.*** Fan, ***8.*** Motor, ***9.*** Fuel pump, ***10.*** Cable winding bracket, ***11.*** Fuel tank, ***12.*** Control panel.

CIRCULATION – WORK SYSTEMS

AIR

- Nozzle
- Fan

ELECTRICAL

- Motor
- Ignition electrodes
- Control box
- Transformer
- Photocell

FUEL

- Fuel pump
- Fuel tank
- Fuel filter
- Fuel pipes

COMBUSTION

- Head of burner
- Combustion chamber
- Heat shields
- Afterburner

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Application:

- Agriculture, construction, industry
- Stocks, halls, garages, etc.
- Open and half-open places
- Big buildings
- Crowded places, where food is stored and heat without exhaust gases is needed

Characteristics:

- Diesel fuel
- Clean, warm air and high efficiency
- Built-in photocell - switch
- Easy in use and service thanks to accessible spare parts
- Outside housing does not heat
- Burning system enables fully clean burning
- Fully automatic control with room thermostat
- Big airflow
- Built-in overheating switch

Comparison BV (old and new)

New

Old

Inclinated tank for easy refueling and better transportation

Zinc coated tank

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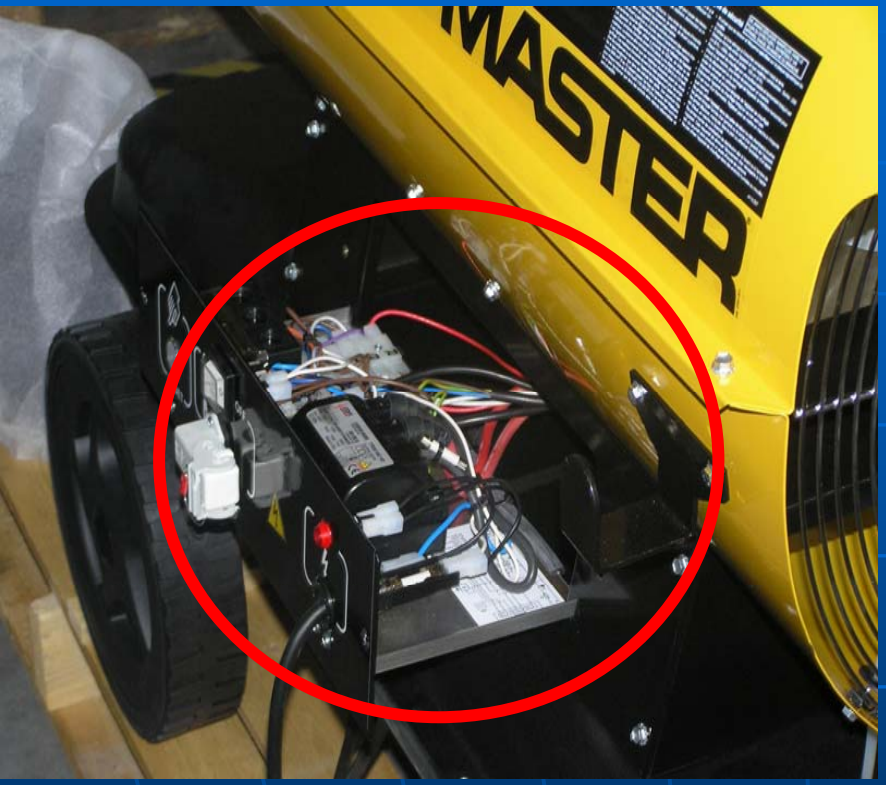
New



Old

Shelf for electric components – perfect solution for servicemen

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MASTER®

Gauge fuel level

Bigger wheels (for better transportation) and already mounted on all models

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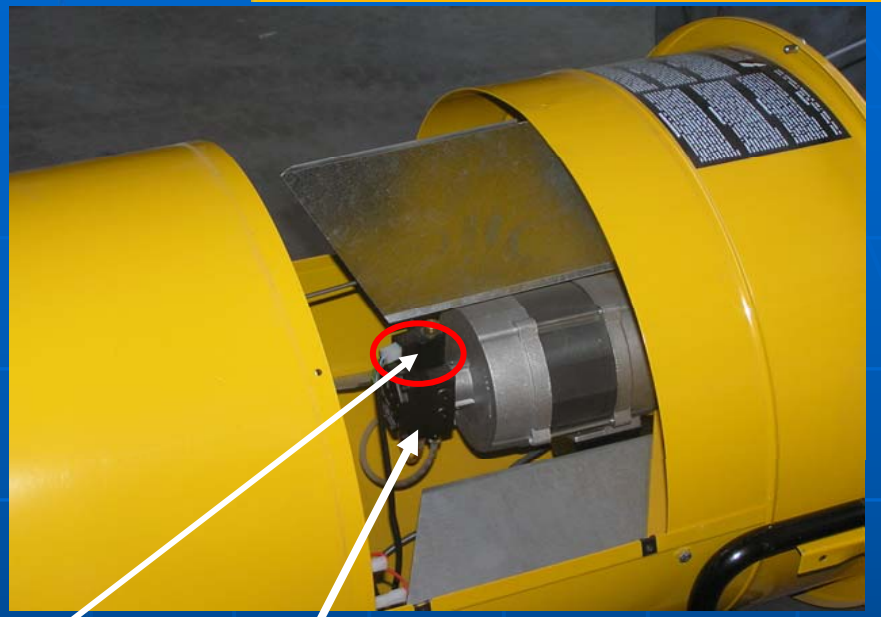

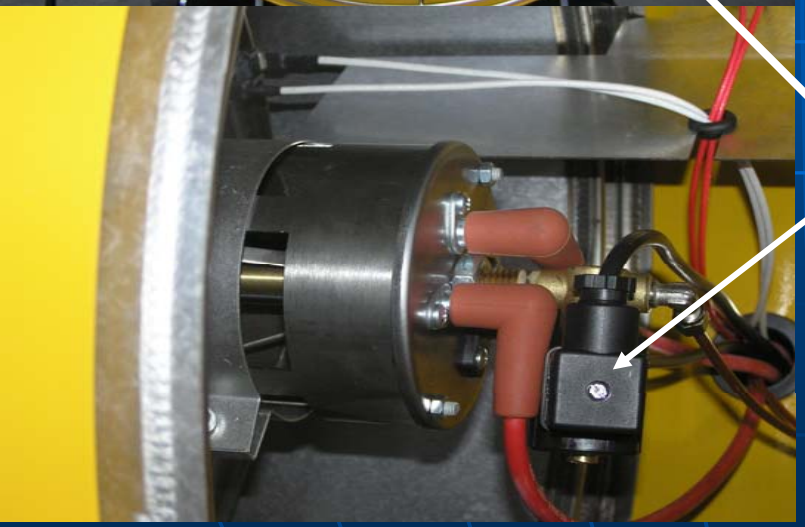

Electro-valve on burnead head

External fuel pump – perfect solution for servicemen

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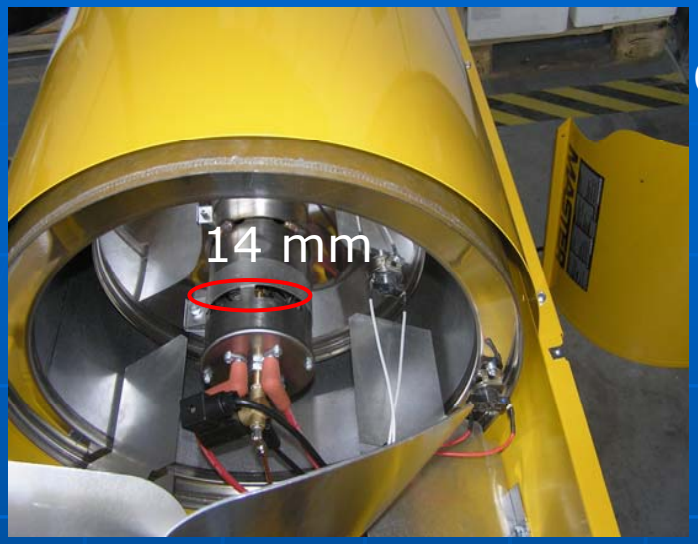
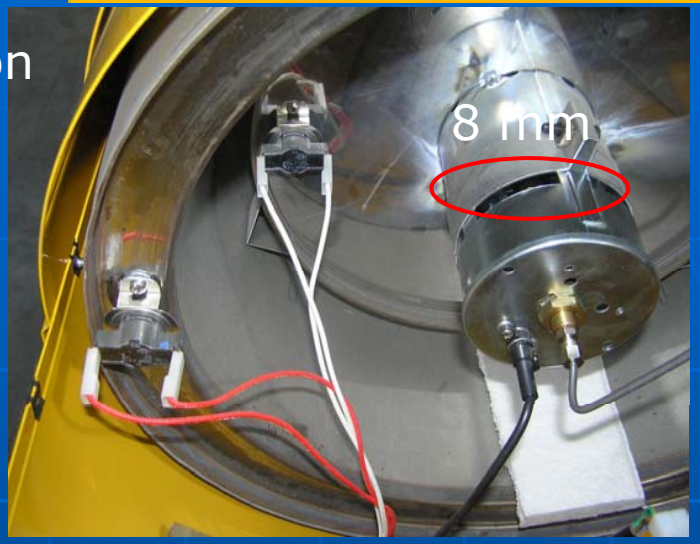


Other size regulation of combustion air shutter



Higher efficency electric motor – smaller rated current

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Temperature conditions for animal houses

- **Birth houses**
  - 20 – 30 minutes before birth 36 – 38 ^{0}C
  - Direct Heaters
- **Piglets**
  - 3,5 month or younger
  - 34 – 36 ^{0}C
  - Indirect heaters
- **Swineries**
  - Before kill
  - 24 – 26 ^{0}C
  - Indirect heaters

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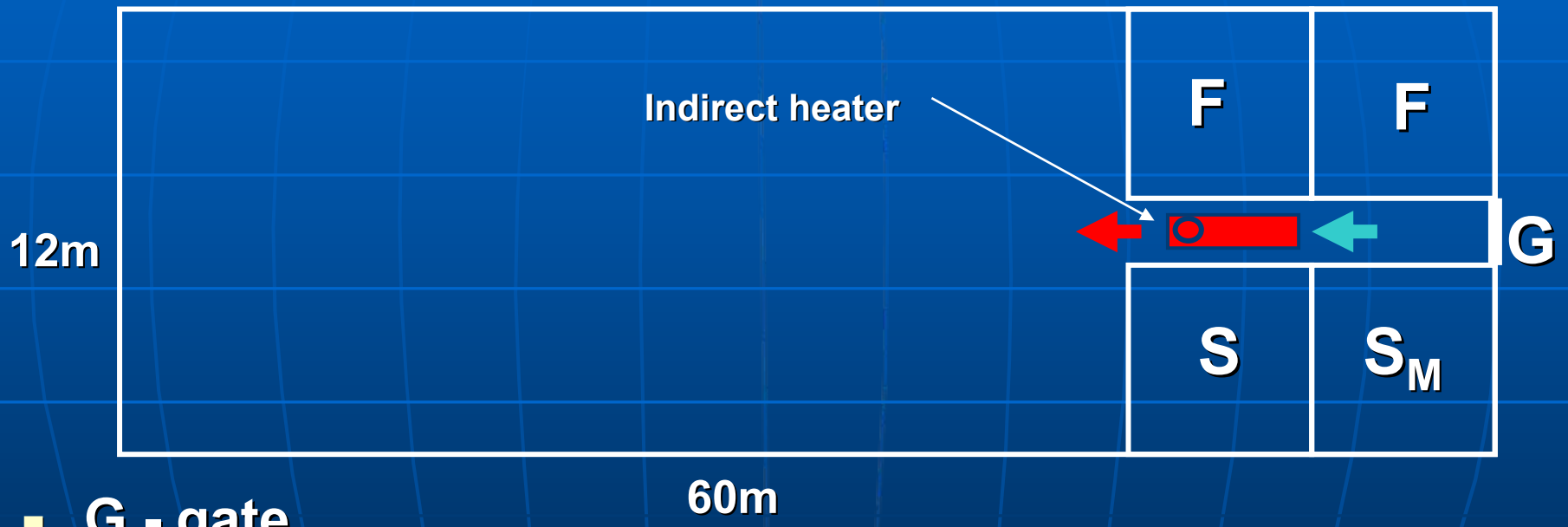
Chickencoops – chickens, ducks, geese, turkeys

Attention!!! – lots of dust and bedding



- G - gate
- F - feeding stuff
- S - store
- S_M - store with medicines

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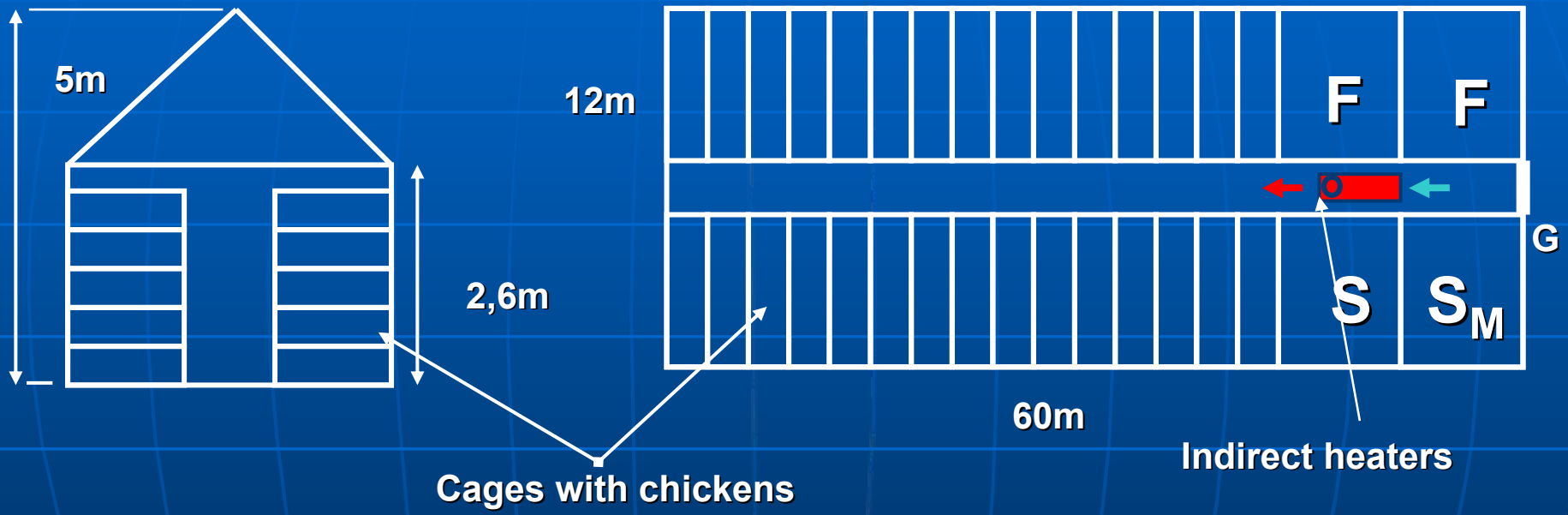
Chickencoops – lay chickens

- **Small dust** (blend fans)



- G - gate
- F - fedding stuff
- S - store
- S_M - store with medicines

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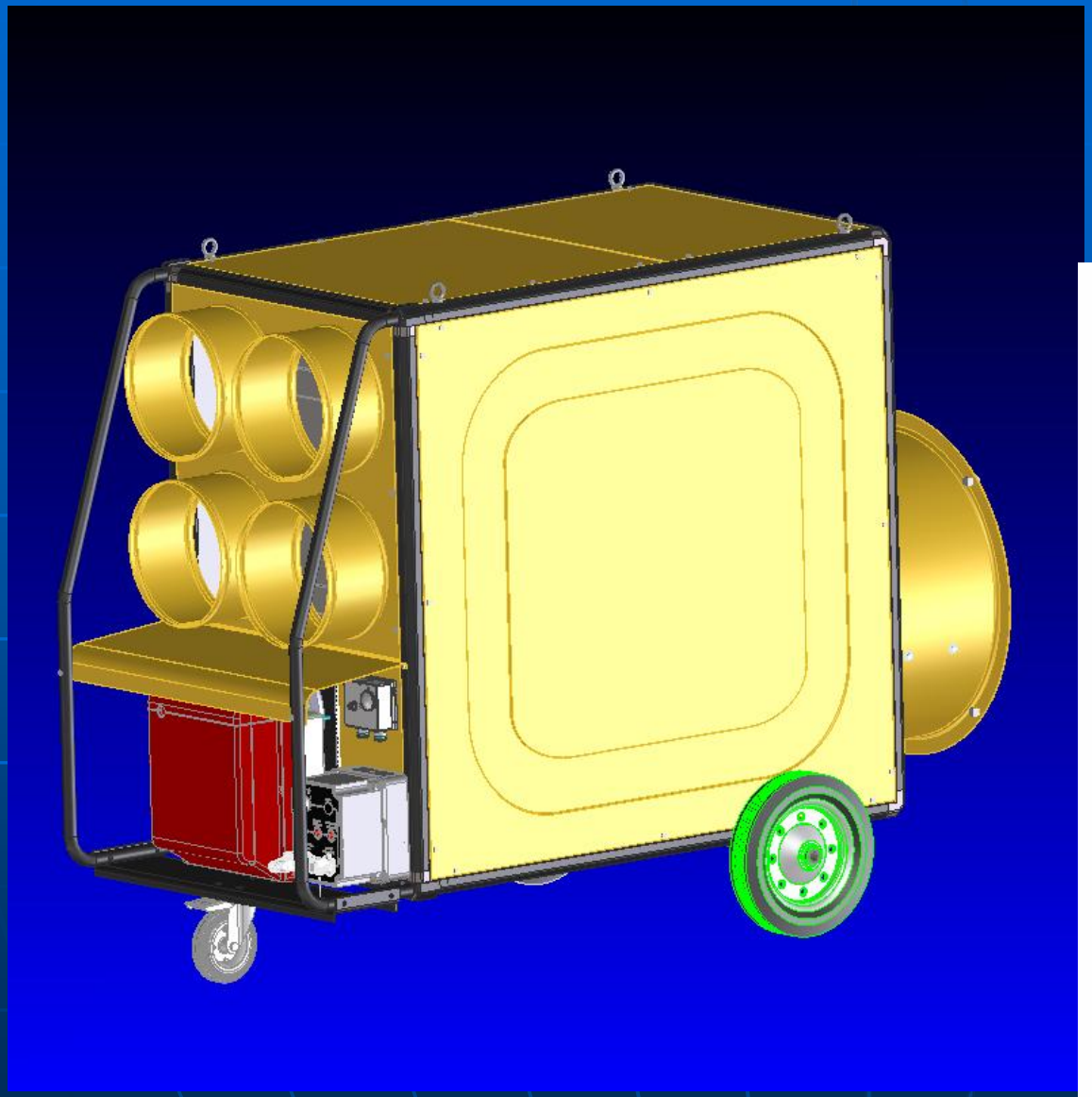
VENTED OIL HEATERS

MASTER®

Model	CAPACITY [kW]	Air displacement [m^3/h]
BV 300	81	5 000
BV 360	105	6 000
BV 460 E	134/115 000	8 000
BV 680E	220/189 200	12 500

MASTER®



BV 470 E CE

4514.000

Max capacity	134 kW
Power supply	230V ~ 50Hz
Ampere	7,2 A
Fuel	diesel
Fuel consumption	10,2 kg/h
Gross weight	215 kg

5 904542 921227 >

IPX4

DESA Made in EU

EUROPE B. V. Roosendaal, Netherlands
ITALIA Srl Pastrengo, Italy
POLAND Sp. z o. o. Poznań, Poland
U.K. Ltd Willington, England

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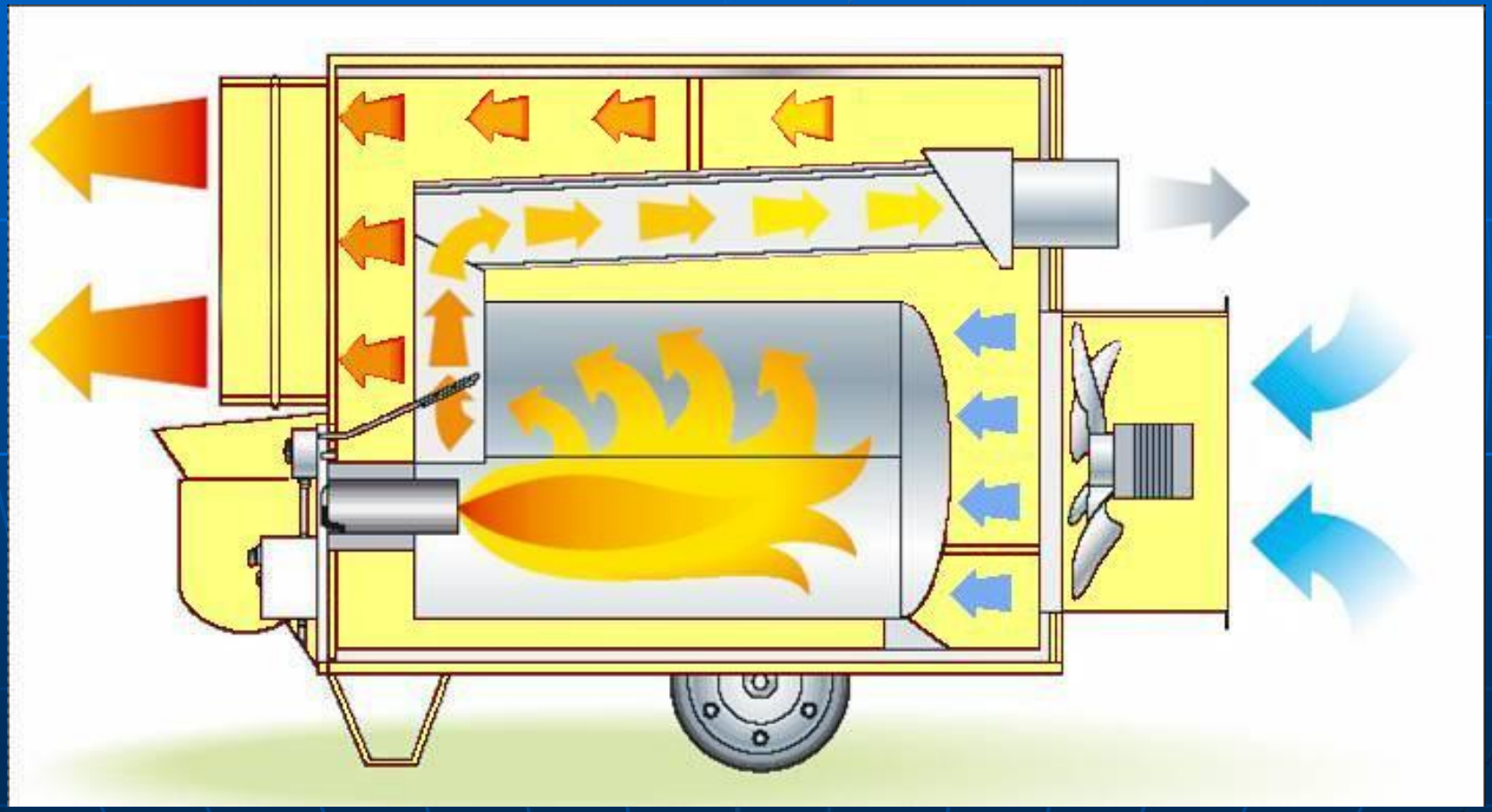
OPERATION AND CONSTRUCTION

BV 300 , BV 360, BV 460, BV 680



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CONSTRUCTION OF BV 460 E, BV 680 E HEATERS

HEATERS

- Motor and fan
- Heat exchanger
- Combustion chamber
- Control panel
- Safety thermostats
- Fuel filter

BURNER

- Motor
- Control box
- Fuel pump
- Photocell
- Ignition electrodes
- Nozzle

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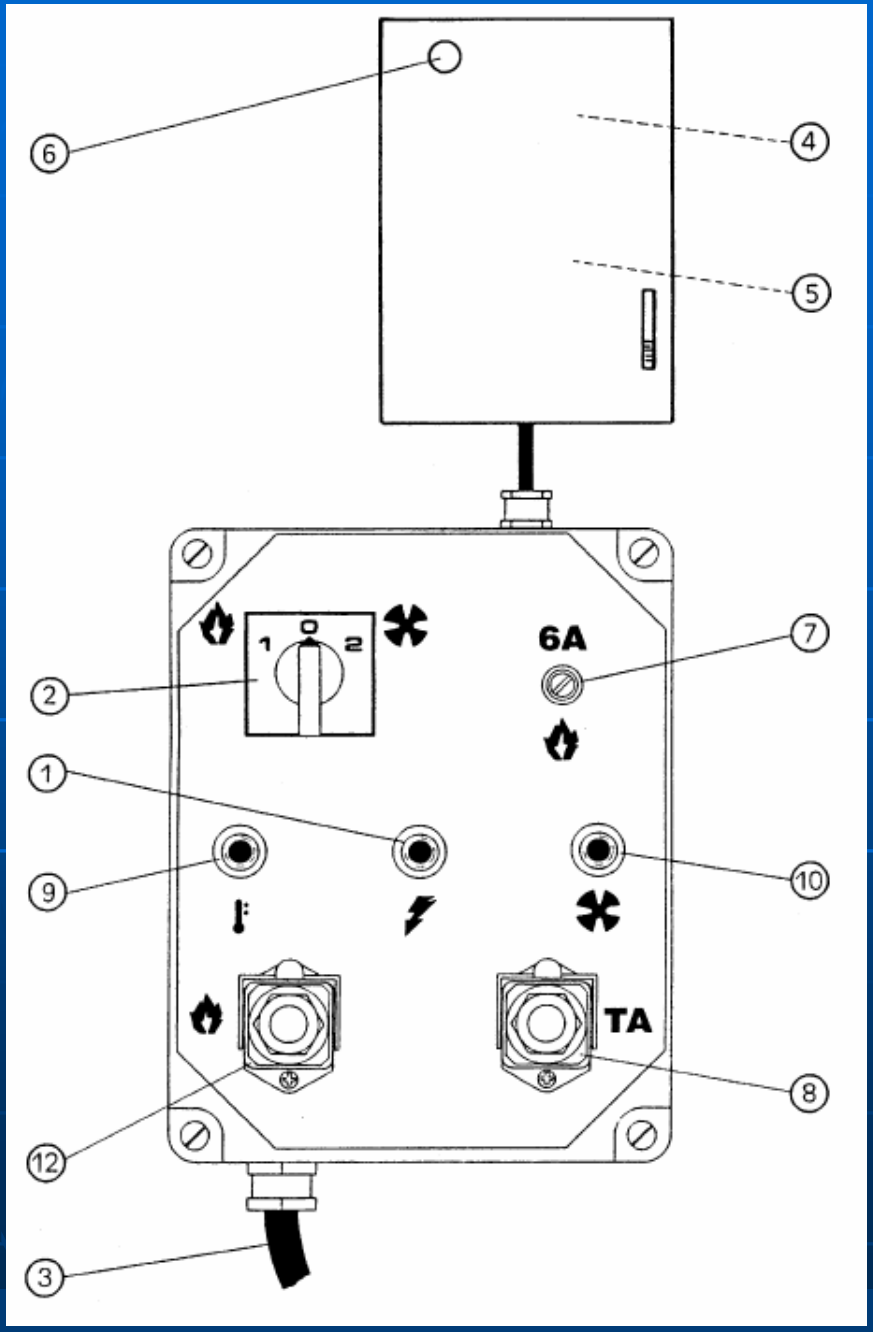
MASTER®

CONTROL BOARD



1 CONTROL LAMP
2 CONTROL KNOB HEAT - STOP - VENTILATION ONLY
3 POWER CORD
4 FAN THERMOSTAT, F
5 OVERHEAT SAFETY THERMOSTAT, L1
6 LIMIT THERMOSTAT WITH MANUAL RESTART, L2
7 BURNER FUSE HOLDER
8 CABLE FASTENER FOR ROOM THERMOSTAT
9 OVERHEAT THERMOSTAT CONTROL LAMP, L2
10 FAN STOP CONTROL LAMP (OVERLOAD)
12 BURNER PLUG

Characteristics:

- ✓ Standard photocell cut-off
- ✓ Overheat and post-ventilation thermostats
- ✓ Possible connection to an optional room thermostat
- ✓ Stainless steel combustion chamber
- ✓ Heat exchanger
- ✓ Durable external painted finish
- ✓ Standard trolley
- ✓ Standard pre-heater
- ✓ Strong and long lasting construction
- ✓ Housing remains cool to the touch
- ✓ Easy maintenance
- ✓ High air flow

MASTER®

GREEN

Model	Capacity	Air displacement	Fuel consumption	Flue tube Ø	Blast opening Ø
	[kW] / [kcal/h]	[m^3]	[kg/h]	[mm]	[mm]
GREEN 70	81 / 70 000	5000	6,8	150	450
GREEN 115	134 / 115 000	8000	11,3	200	600
GREEN 200	220 / 190 000	12 500	18,6	200	700

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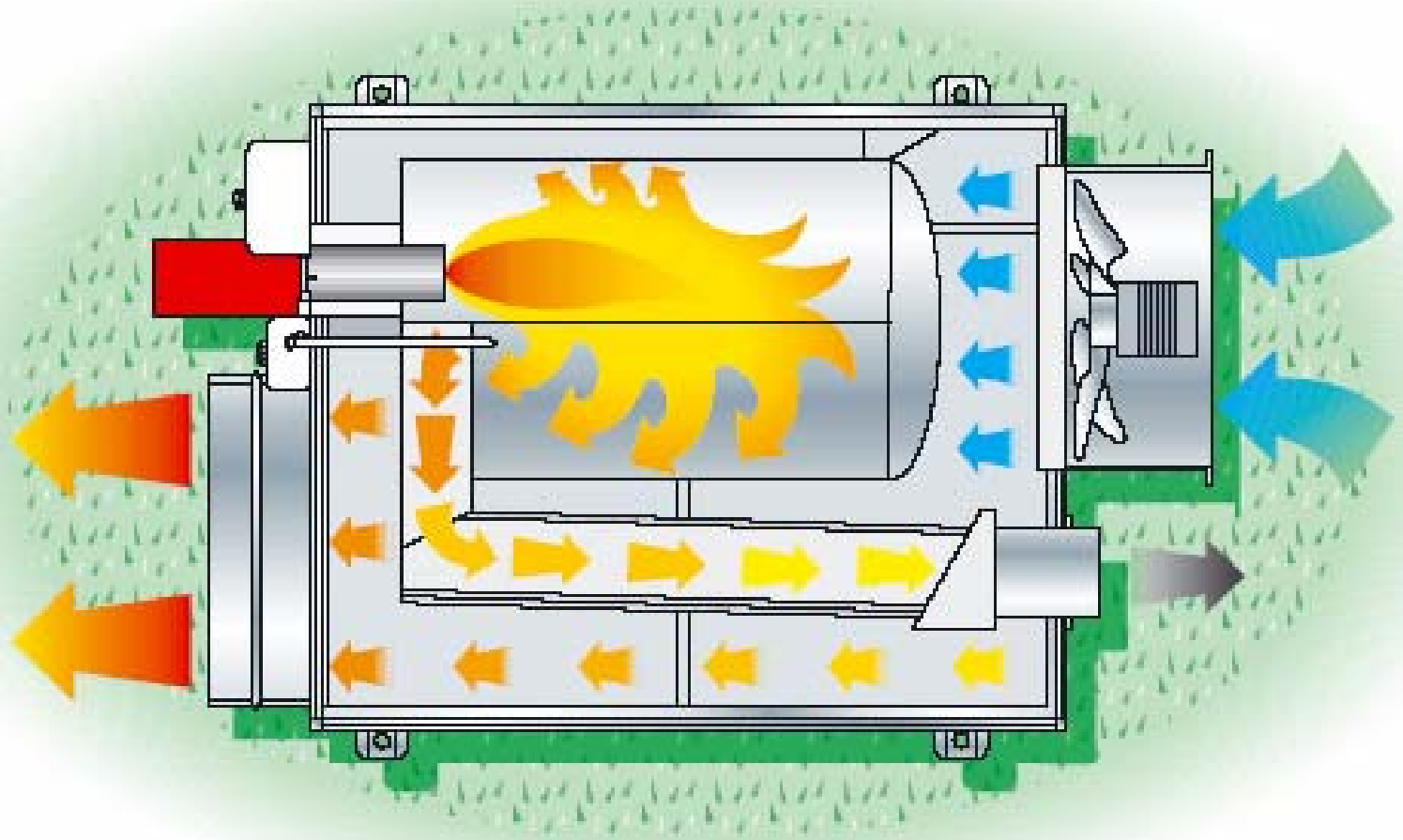
GREEN



Characteristics:

- ✓ Separate oil burner
- ✓ Standard photocell cut off
- ✓ Fan limited thermostat with automatic reset
- ✓ Limited thermostat with manual reset
- ✓ Possible connection to an optional room thermostat
- ✓ Summer-Winter switch for ventilation only
- ✓ Stainless steel combustion chamber
- ✓ Heat exchanger with high efficiency
- ✓ External coated steel frame
- ✓ Natural and LPG gas burner on request

Greenhouses

DESA POLAND Sp. z o.o.
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MASTER®

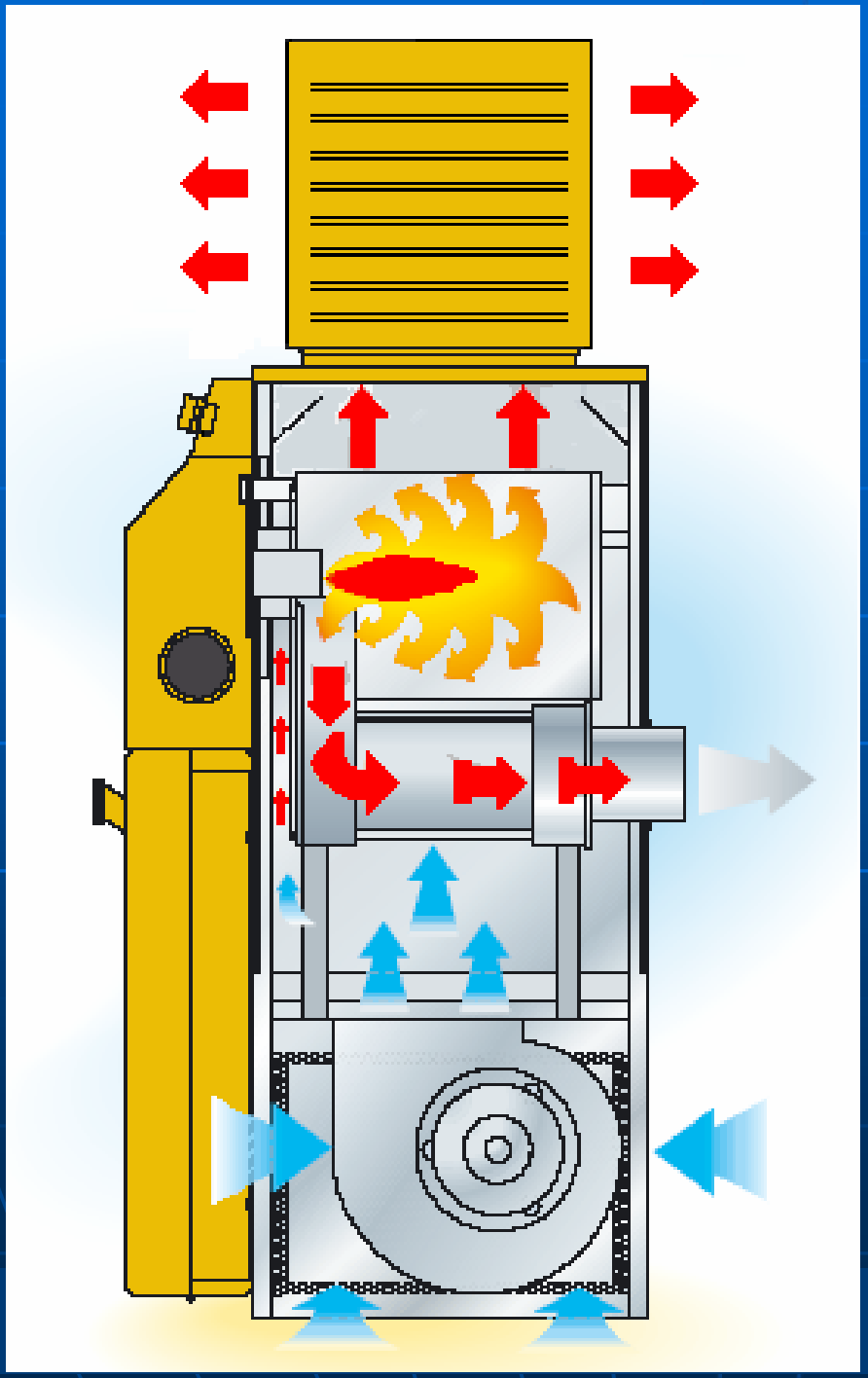
CABINET OIL HEATERS

BF TYPES

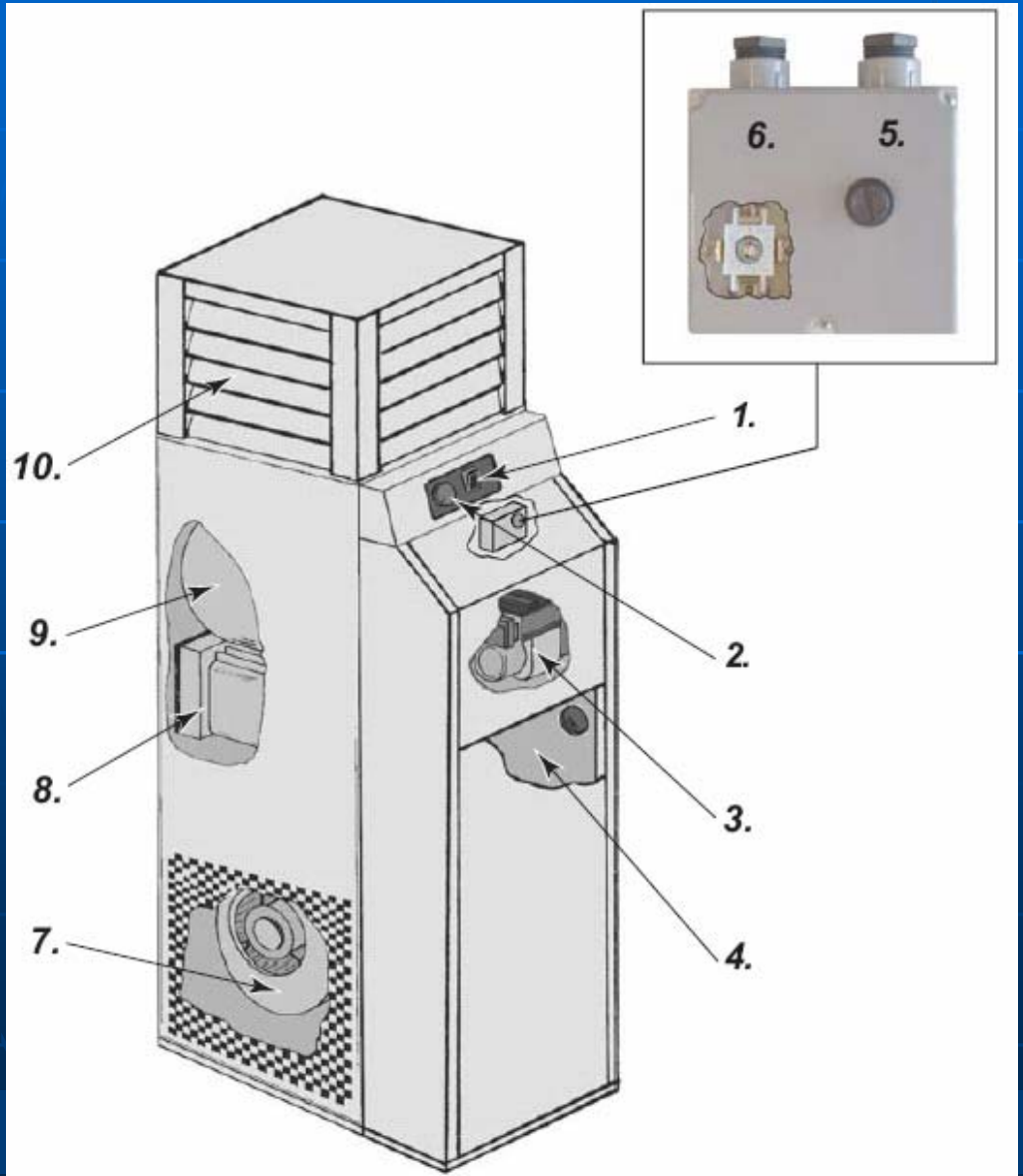
Model	Capacity	Air displacement	Fuel consumption	Tank capacity	Flue tube Ø
	[kW] / [kcal/h]	[m^3]	[kg/h]	[dm^3]	[mm]
BF 30	35 / 29 900	2400	2,9	65	150
BF 60	70 / 60 000	4000	5,9	65	150

MASTER®

OPERATION



CONSTRUCTION



1. MAIN CONTROL KNOB
2. THERMOSTAT
3. BURNER
4. FUEL TANK
5. OVERHEAT THERMOSTAT STB)
6. FAN THERMOSTAT
7. CENTRIFUGAL FAN
8. HEAT EXCHANGER
9. COMBUSTION CHAMBER
10. AIR OUTLET HEAD

CHARACTERISTIC :

MASTER®

- ✓ Separate oil burner
- ✓ Standard photocell cut off
- ✓ Fan Limited thermostat with manual reset
- ✓ Built-in room thermostat
- ✓ Summer-Winter switch for ventilation only
- ✓ Centrifugal fan
- ✓ Standard tank
- ✓ Stainless steel combustion chamber
- ✓ Heat exchanger with high efficiency
- ✓ Standard air-outlet head
- ✓ External Varnished Steel Double Plate
- ✓ High air flow

DESA POLAND Sp. z o.o.
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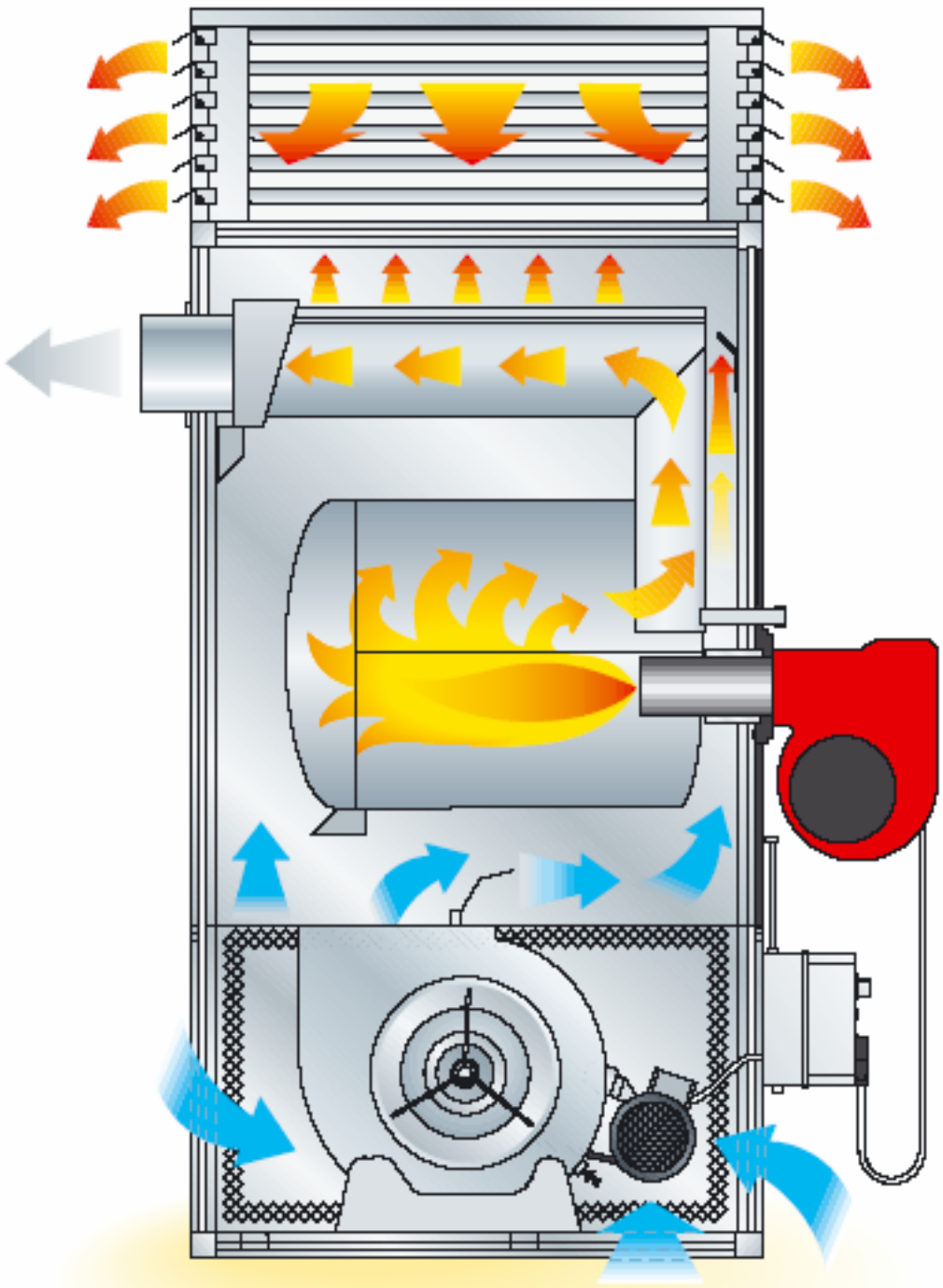
MASTER®

BG 100
BG 150
BG 200

Model	Capacity	Air flow	Fuel consumption	Flue tube Ø
	[kW] / [kcal/h]	[m^3]	[kg/h]	[mm]
BG 100	115 / 99 000	7600	9,7	180
BG 150	175 / 150 000	10 000	14,7	200
BG 200	220 / 190 000	12 500	18,6	200



MASTER®

OPERATION

BI 350
BI 500

MASTER

MASTER®

BI 350
BI 500

Parameters / Model		BI 350	BI 500
Capacity	[kW]	395	587
	[kcal/h]	340 000	505 000
Air displacement	[m³/h]	24 000	38 000
Fuel consumption	[kg/h]	33,5	49,75
Flue tube Ø	[mm]	300	300
Voltage	V / Hz	3 ~ 400 / 50	
Fan	nº	2	2 + 2
Static pressure	Pa	260	300

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ACCESSORIES FOR BI

PROTECTION HOOD FOR THE BURNER

FILTERING PANEL CLEANABLE

HORIZONTAL STRUCTURE ON REQUEST

LIQUID FUEL OR GAS TYPE BURNER

MOVABLE AIR DISTRIBUTING HEAD

MULTIDIRECTIONAL AIR DISTRIBUTING HEAD

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CHARACTERISTIC :

- ✓ Separate burner
- ✓ Standard photocell cut off
- ✓ Fan Limited thermostat with automatic reset
- ✓ Summer-Winter switch for ventilation only
- ✓ Centrifugal fans
- ✓ Stainless steel combustion chamber
- ✓ Stainless steel heat exchanger with high efficiency
- ✓ Steel or aluminum structural frame
- ✓ Stainless steel external body
- ✓ Available with oil, natural or LPG gas burner or without burner
- ✓ Capacity range up to 1.200.000 kcal./h on request

Fuel tank installation in BVS and BS heaters

An external fuel tank should be connected to the heater with two fuel pipes – 0,8mm or 10 mm. One fuel pipe leads fuel to the fuel pump and the second one leads off the surplus of the fuel back to the tank. If the fuel tank is placed higher than the burner, the overflow valve should be installed on the fuel leading pipe to avoid too high pump pressure.

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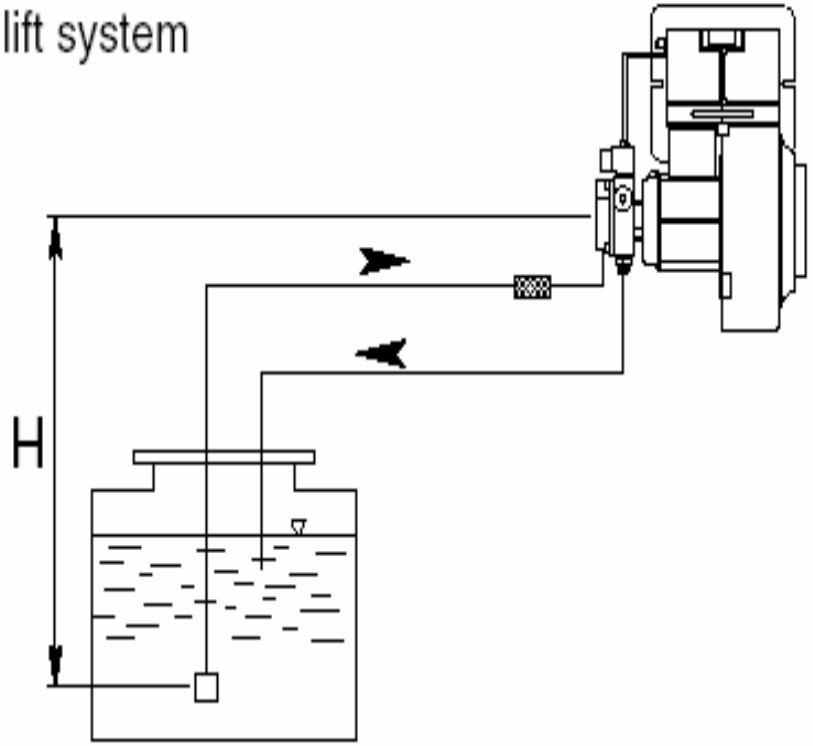
If the fuel tank is placed lower then the burner, the length of fuel pipes is:

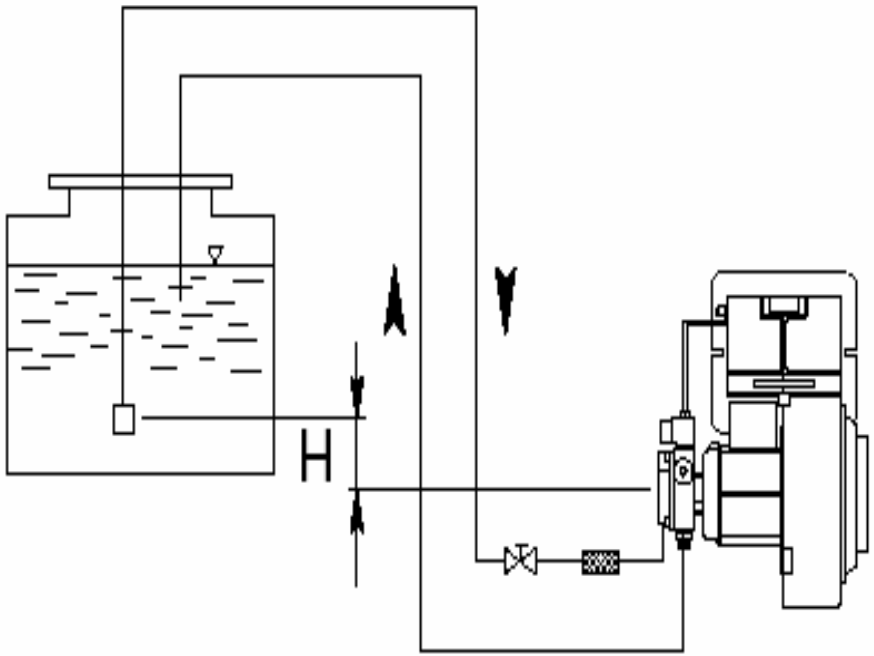
Two-pipe lift system



H (m)	Copper pipe (m)	
	ø 8 mm	ø 10 mm
0,5	23	55
1	21	50
1,5	19	45
2	17	40
2,5	14	34
3	9	28
3,5	4	22

If the fuel tank is placed higher then the burner, the length of fuel pipes is:

Two-pipe siphon feed system



H (m)	Copper pipe (m)	
	ø 8 mm	ø 10 mm
0,5	30	65
1	35	70
1,5	40	75
2	45	80
2,5	50	85
3	55	90
3,5	60	95

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Flexible 7,6m coated tubes

4031.406 - Ø 305 mm – BV 460/680,

4031.402 - Ø 407 mm – BV 110/170 E and BVS 170 E

4031.407 - Ø 610 mm – GREEN 70/115, BV 300/360 E

4031.403 - Ø 510 mm – BV 290 E

4031.411 - Ø 710 mm – GREEN 200

Kit for canalization

4031.909 - Ø 400 – BV 110/170 E and BVS 170 E

4031.910 - Ø 465 – BV 290 E and BVS 290 E

Fuel pre-heater

4031.909 – BV 110/170/290 E, BVS 170/290 E,

B 230/360, BS 230/360

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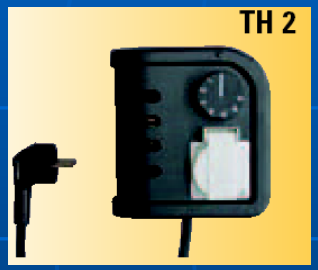
Thermostats

4150.105

BLP 30/50/70/100 E, XL 9 E-S, B 230/360, BS 230/360,
BV 110/170/290 E, BVS 170/290 E



4100.426

B 35/70/100/150

4150.110

BV 300/360/460/680 E, GREEN 70/115/200,
BG 100/150/200,

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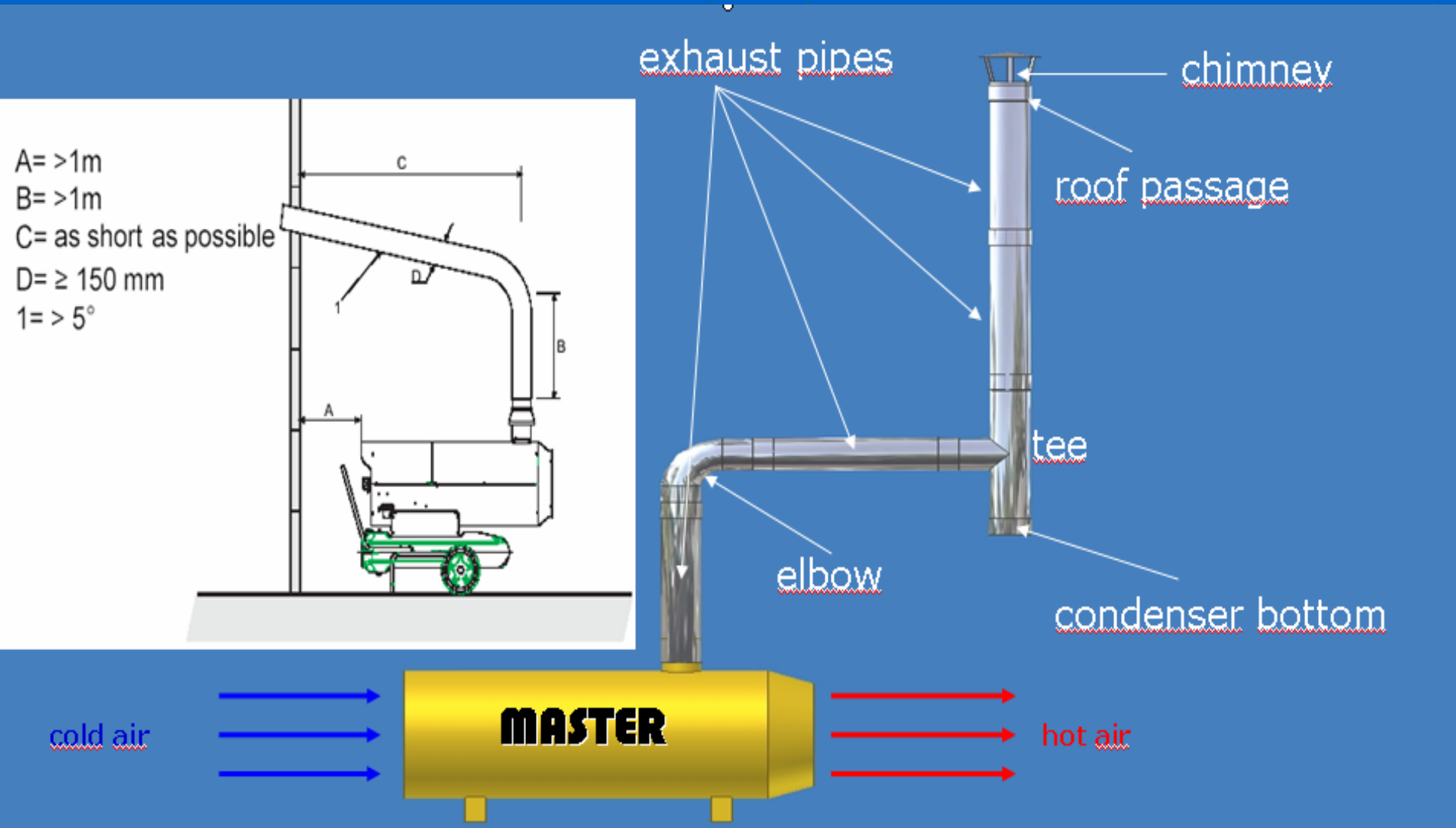
Flue pipes instalation



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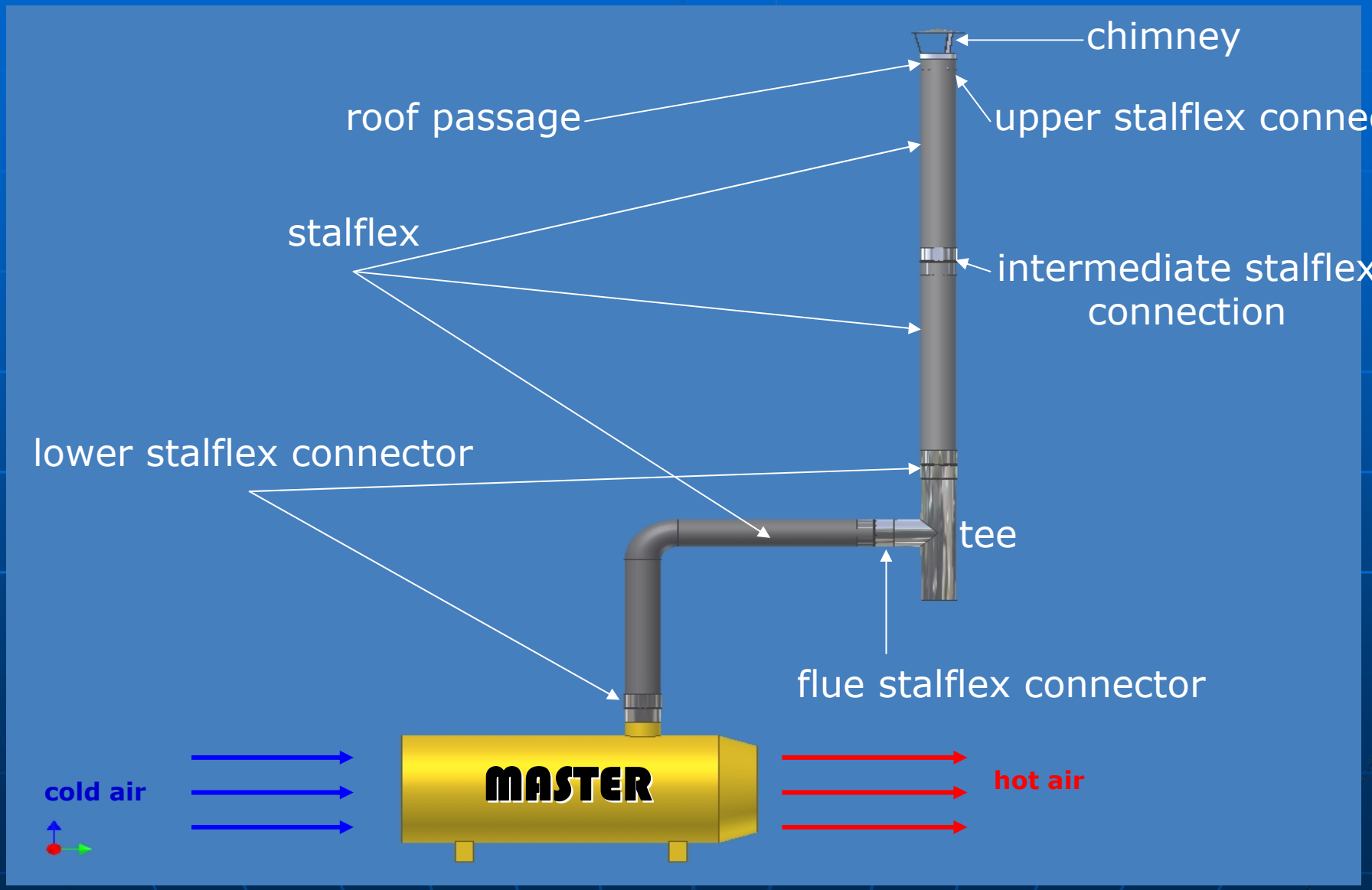
Flue pipes instalation



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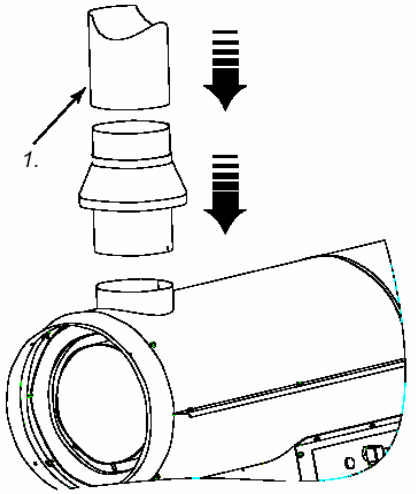
CONNECTION A PIPE TO THE CHIMNEY OF THE HEATER

- minimum length of the pipe before bending is 1 meter
- never bend more than 45°, a bending can be made several times
- when the pipe is through the wall there should be before and after the bend a straight segment of at least 1 meter
- a cap against rain and wind needs to be on top of the pipe
- there is no maximum length when the pipe is going straight up

ALWAYS CONNECT PIPE ON THE ORIGINAL HEATER CHIMNEY!

1. Ø 150 mm



code	description	suitable for models
4013.263	Exhaust pipe 1m, 120mm	BV 70
4013.243	Exhaust pipe 1m, 150mm	BV 80 / BV 100 / 110 / 160 / 170 / 280 / 290, BVS 170 / 290, BF 30 / 60, GREEN 70
4013.245	Exhaust pipe 1m, 200mm	GREEN 115 / 200, BV 460 / 680
4515.974	Exhaust pipe 0,5m, 120mm	BV 70
4515.975	Exhaust pipe 0,5m, 150mm	BV 80 / BV 100 / 110 / 160 / 170 / 280 / 290, BVS 170 / 290, BF 30 / 60, GREEN 70
4515.976	Exhaust pipe 0,5m, 200mm	GREEN 115 / 200, BV 460 / 680
4013.261	Elbow 87^0, 120mm	BV 70
4013.247	Elbow 87^0, 150mm	BV 80 / BV 100 / 110 / 160 / 170 / 280 / 290, BVS 170 / 290, BF 30 / 60, GREEN 70
4013.248	Elbow 87^0, 200mm	GREEN 115 / 200, BV 460 / 680
4515.977	Adjustable elbow $0\text{-}90^0$, 120mm	BV 70
4515.950	Adjustable elbow $0\text{-}90^0$, 150mm	BV 80 / BV 100 / 110 / 160 / 170 / 280 / 290, BVS 170 / 290, BF 30 / 60, GREEN 70
4515.951	Adjustable elbow $0\text{-}90^0$, 200mm	GREEN 115 / 200, BV 460 / 680
4515.988	Condenser bottom 120mm	BV 70
4515.952	Condenser bottom 150mm	BV 80 / BV 100 / 110 / 160 / 170 / 280 / 290, BVS 170 / 290, BF 30 / 60, GREEN 70
4515.953	Condenser bottom 200mm	GREEN 115 / 200, BV 460 / 680
4515.978	Tee 87^0, 120mm	BV 70
4515.954	Tee 87^0, 150mm	BV 80 / BV 100 / 110 / 160 / 170 / 280 / 290, BVS 170 / 290, BF 30 / 60, GREEN 70
4515.955	Tee 87^0, 200mm	GREEN 115 / 200, BV 460 / 680
4515.979	Roof passage 120mm	BV 70
4515.956	Roof passage 150mm	BV 80 / BV 100 / 110 / 160 / 170 / 280 / 290, BVS 170 / 290, BF 30 / 60, GREEN 70
4515.957	Roof passage 200mm	GREEN 115 / 200, BV 460 / 680
4013.262	Chimney 120mm	BV 70
4013.249	Chimney 150mm	BV 80 / BV 100 / 110 / 160 / 170 / 280 / 290, BVS 170 / 290, BF 30 / 60, GREEN 70
4013.250	Chimney 200mm	GREEN 115 / 200, BV 460 / 680

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4515.980	Stalflex 1,5m, 120mm	BV 70
4515.981	Stalflex 6m, 120mm	BV 70
4515.982	Stalflex 9m, 120mm	BV 70
4515.983	Stalflex 12m, 120mm	BV 70
4515.958	Stalflex 1,5m, 150mm	BV 80 / BV 100 / 110 / 160 / 170 / 280 / 290, BVS 170 / 290, BF 30 / 60, GREEN 70
4515.959	Stalflex 6m, 150mm	BV 80 / BV 100 / 110 / 160 / 170 / 280 / 290, BVS 170 / 290, BF 30 / 60, GREEN 70
4515.960	Stalflex 9m, 150mm	BV 80 / BV 100 / 110 / 160 / 170 / 280 / 290, BVS 170 / 290, BF 30 / 60, GREEN 70
4515.961	Stalflex 12m, 150mm	BV 80 / BV 100 / 110 / 160 / 170 / 280 / 290, BVS 170 / 290, BF 30 / 60, GREEN 70
4515.962	Stalflex 1,5m, 200mm	GREEN 115 / 200, BV 460 / 680
4515.963	Stalflex 6m, 200mm	GREEN 115 / 200, BV 460 / 680
4515.964	Stalflex 9m, 200mm	GREEN 115 / 200, BV 460 / 680
4515.965	Stalflex 12m, 200mm	GREEN 115 / 200, BV 460 / 680
4515.984	Lower stalflex connector 120mm	BV 70
4515.985	Upper stalflex connector 120mm	BV 70
4515.986	Intermediate stalflex connector 120mm	BV 70
4515.987	Flue stalflex connector 120mm	BV 70
4515.966	Lower stalflex connector 150mm	BV 80 / BV 100 / 110 / 160 / 170 / 280 / 290, BVS 170 / 290, BF 30 / 60, GREEN 70
4515.967	Upper stalflex connector 150mm	BV 80 / BV 100 / 110 / 160 / 170 / 280 / 290, BVS 170 / 290, BF 30 / 60, GREEN 70
4515.968	Intermediate stalflex connector 150mm	BV 80 / BV 100 / 110 / 160 / 170 / 280 / 290, BVS 170 / 290, BF 30 / 60, GREEN 70
4515.969	Flue stalflex connector 150mm	BV 80 / BV 100 / 110 / 160 / 170 / 280 / 290, BVS 170 / 290, BF 30 / 60, GREEN 70
4515.970	Lower stalflex connector 200mm	GREEN 115 / 200, BV 460 / 680
4515.971	Upper stalflex connector 200mm	GREEN 115 / 200, BV 460 / 680
4515.972	Intermediate stalflex connector 200mm	GREEN 115 / 200, BV 460 / 680
4515.973	Flue stalflex connector 200mm	GREEN 115 / 200, BV 460 / 680

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chimney

roof passage

elbow

adjustable elbow

condenser bottom

exhaust pipe

stalflex

MASTER®

tee

stalflex connector

DESA POLAND Sp. z o.o.
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INFRARED OIL HEATER – XL9 E

FEATURES		XL9 E-S	XL9 E
Capacity	kW	29/43	43
Fuel	-	kerosene/diesel	
Fuel consumption	kg / h	3,2	
Energy consumption	A	0,7	0,6
Voltage	V / Hz	230 / 50	
Dimension (I×w×ht	cm)	120 x 70,5 x 101	
Weight	kg	64	62

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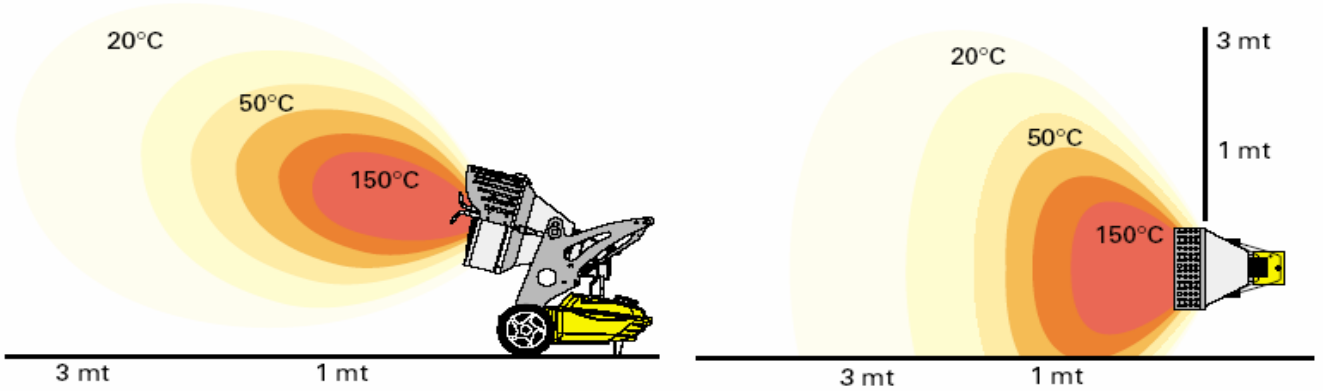
Comparison of heating systems

- Heat from infrared oil heater



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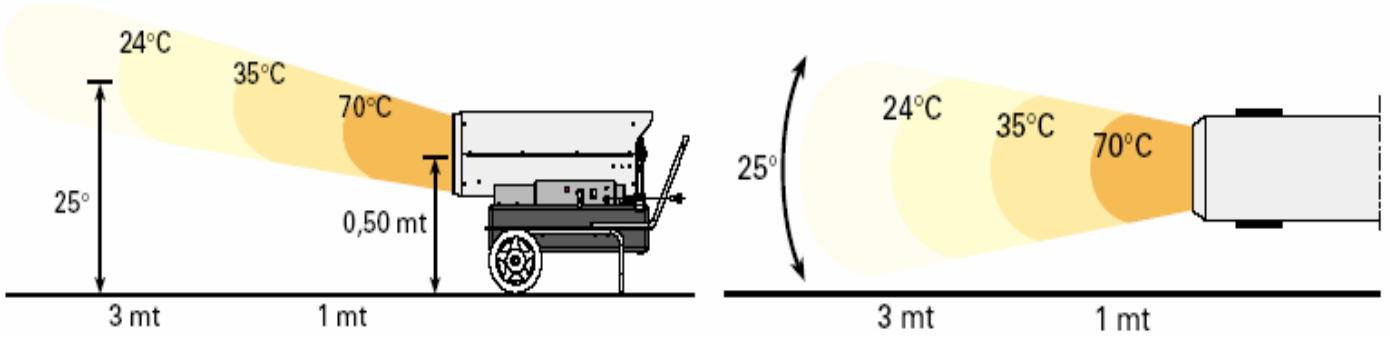
Comparison of heating systems

- Heat from direct heater



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Characteristics:

- Radiant heating
- No air flow
- Low noise
- Flame control
- Possible connection to an optional room thermostat
- Post-ventilation
- Combustion chamber made of ceramic fibre
- Standard oil level indicator
- Strong and long lasting construction
- Easy maintance with European standard components
- Direction adjustable/Reclining

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Application – hangar –
- heating employees during work

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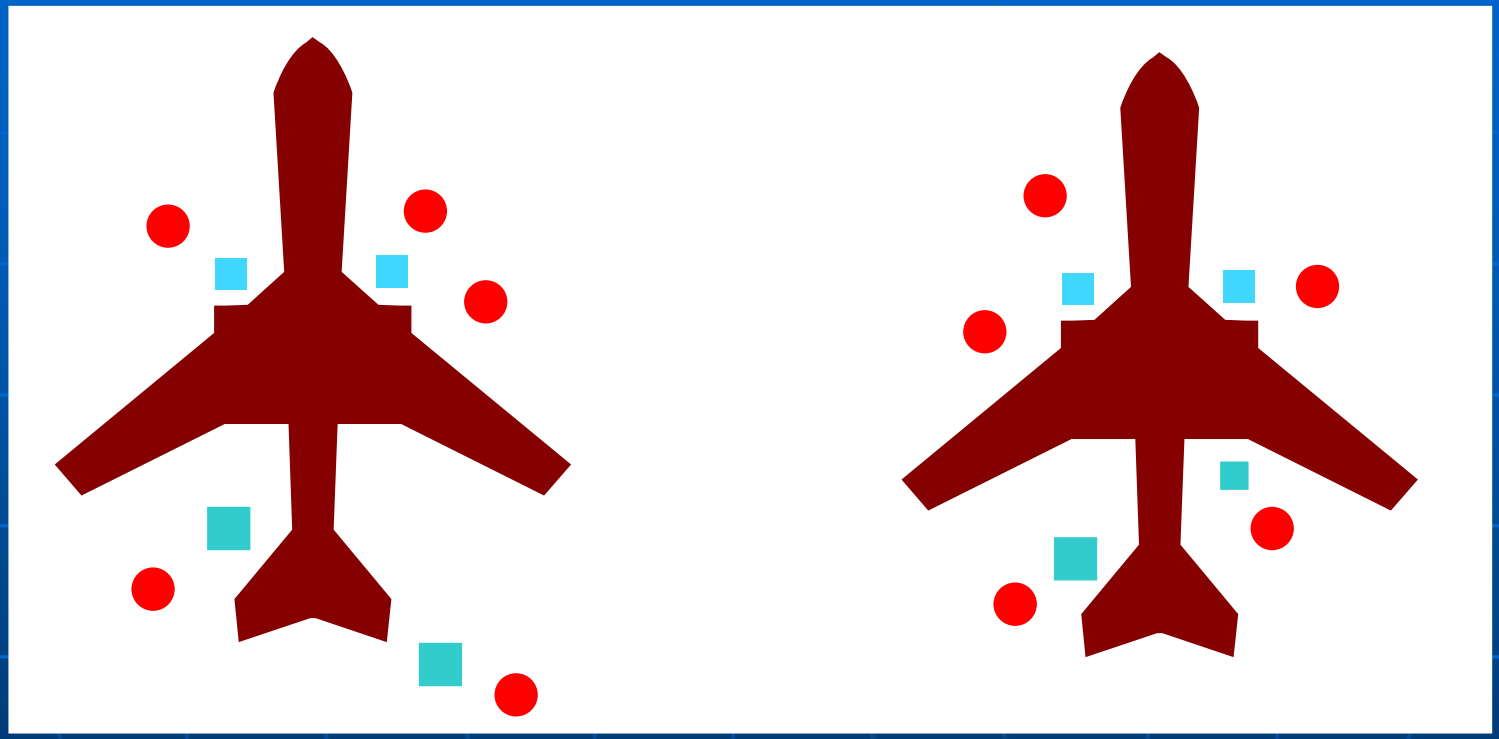

- XL 9 E-S

- workers

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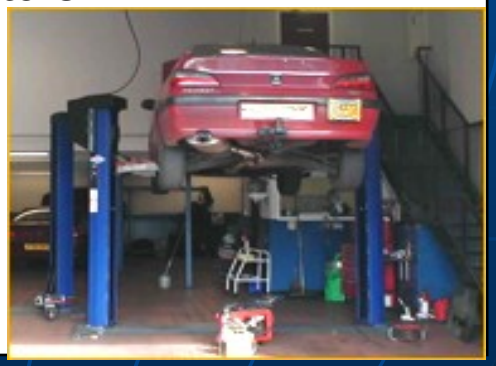
Application:

- Agriculture, condtruction, industry
- Stocks, halls, garages etc.
- Open and half-open places,
- Heating outdoor concerts and entertaiments
- Heating film teams
- Defrosting (for example rail-coach)
- For drying
- Hardening lacquered coating
- Point heating
- Tents heating
- In all others places when we can’t use indirects heaters.



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UNIVERSAL OIL HEATERS

MASTER®

WA 29

WA 41

WA 59

Model	Capacity (min /max)	Fuel consumption	Air displacement	Tank capacity	Flue tube ø
	[kW]	[kg/h]	[m3/h]	[l]	[mm]
WA 29A	19 / 29	2-3	1 000	50	130
WA 41	24 / 41	2.5-4.3	3 000	55	130
WA 59	36 / 59	3.8-6.2	3 000	55	180

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CONSTRUCTION AND OPERATION

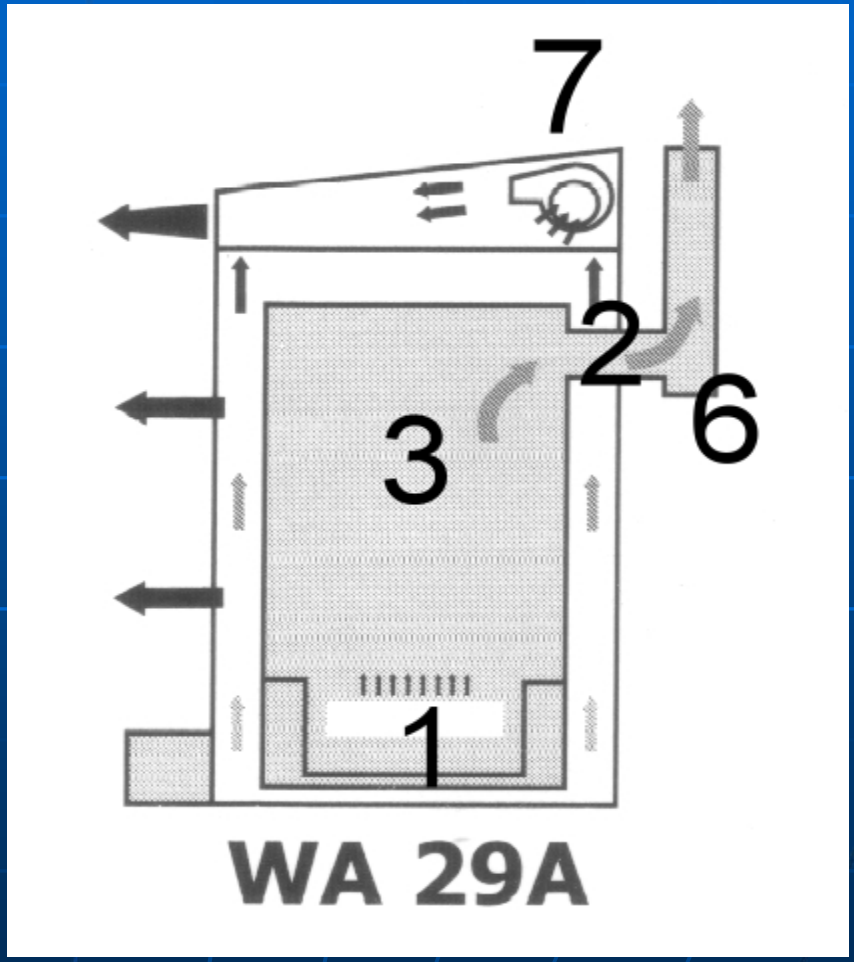
1 – burner

2 – exhaust gas exit

3 – heat exchanger

6 – chimney draught (flue draft) stabilizer

7 – centrifugal radial fan



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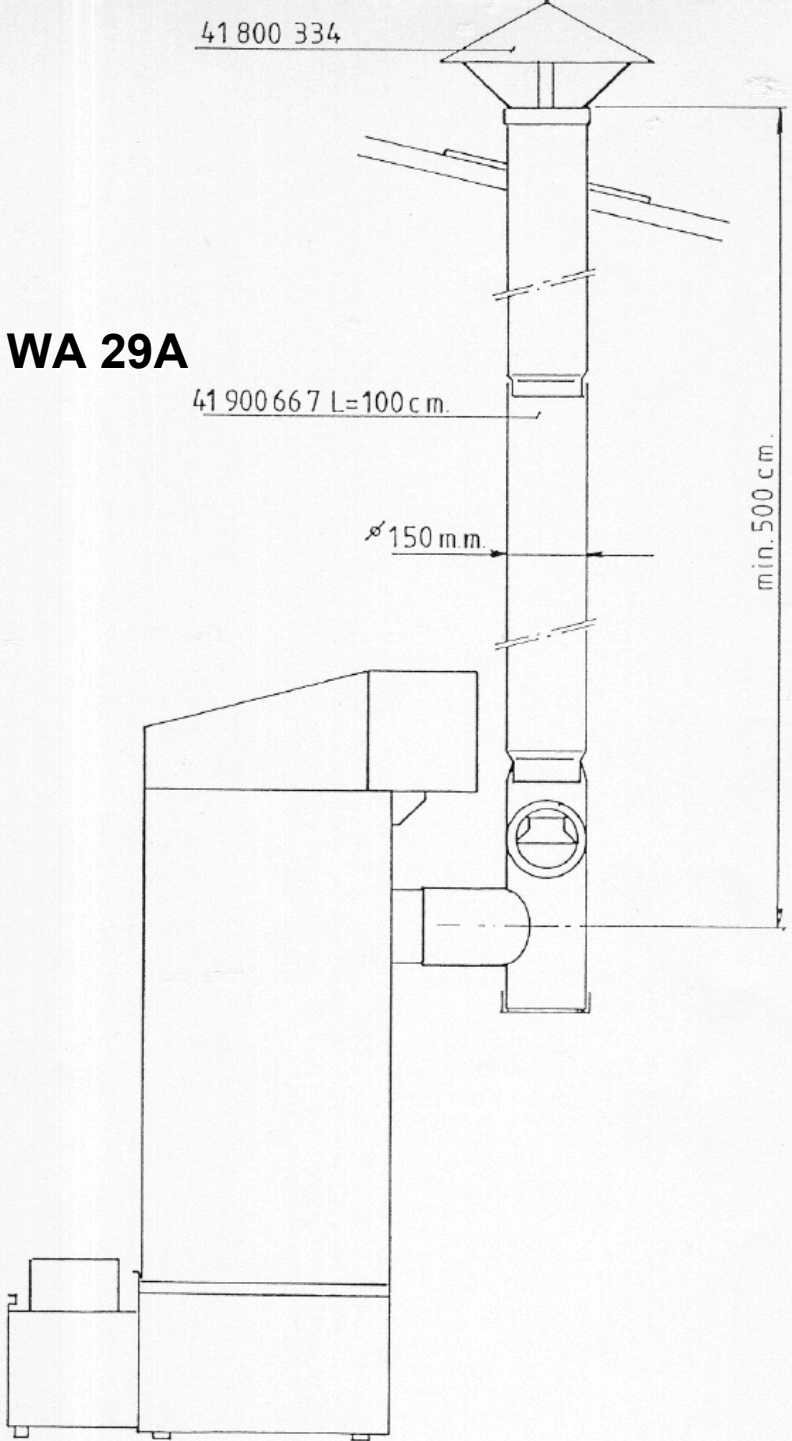
Application :

- industry - heating and frost protection of halls, stocks and warehouses
- car industry - heating of garage workshops and body preparation areas
- agriculture - heating workshops
- administration buildings

Characteristic and advantages :

- Economy – cheap fuel
- No smell during heating
- High efficiency
- Temp. regulator (High/low capacity regulator)
- Built-in burner
- Thermostat of pump control
- Overheat security thermostat.
- Flame failure security thermostat
- Oil overflow security system
- Built-in overflow protection for burner dish
- Inside fuel tank – capacity for one day



WA 29A

FLUE PIPE INSTALLATION

minimum diameter of flue pipe: 150mm

minimum flue height: 5 m or 6 m

all pipes should be vertical if pos-si-ble, keep horizontal pipes to the abso-lute minimum

avoid bends in the flue installation if possible

GAS HEATERS

- BLP 15 M
- BLP 30 M
- BLP 50 M
- BLP 70 M

- BLP 30 E
- BLP 50 E
- BLP 70 E
- BLP 100 E

MASTER®

Model	Capacity max [kW] / [kcal/h]	Capacity min [kW] / [kcal/h]	Ignition	Fuel consumption [kg/h]	Air displacement [m^3/h]
BLP 15 M	15 / 12 900	11 / 9 460	piezo	1,07	300
BLP 30 M	30 / 25 800	16 / 13 760	piezo	2,14	1000
BLP 50 M	46 / 39 560	31 / 26 660	piezo	3,29	1450
BLP 70 M	69 / 59 340	39 / 33 540	piezo	4,95	2300
BLP 30 E	30 / 25 800	16 / 13 760	electronic	2,14	1000
BLP 50 E	46 / 39 560	31 / 26 660	electronic	3,29	1450
BLP 70 E	69 / 59 340	39 / 33 540	electronic	4,95	2300
BLP 100 E	96,5 / 83 000	32,2 / 28 000	electronic	7,5	3260

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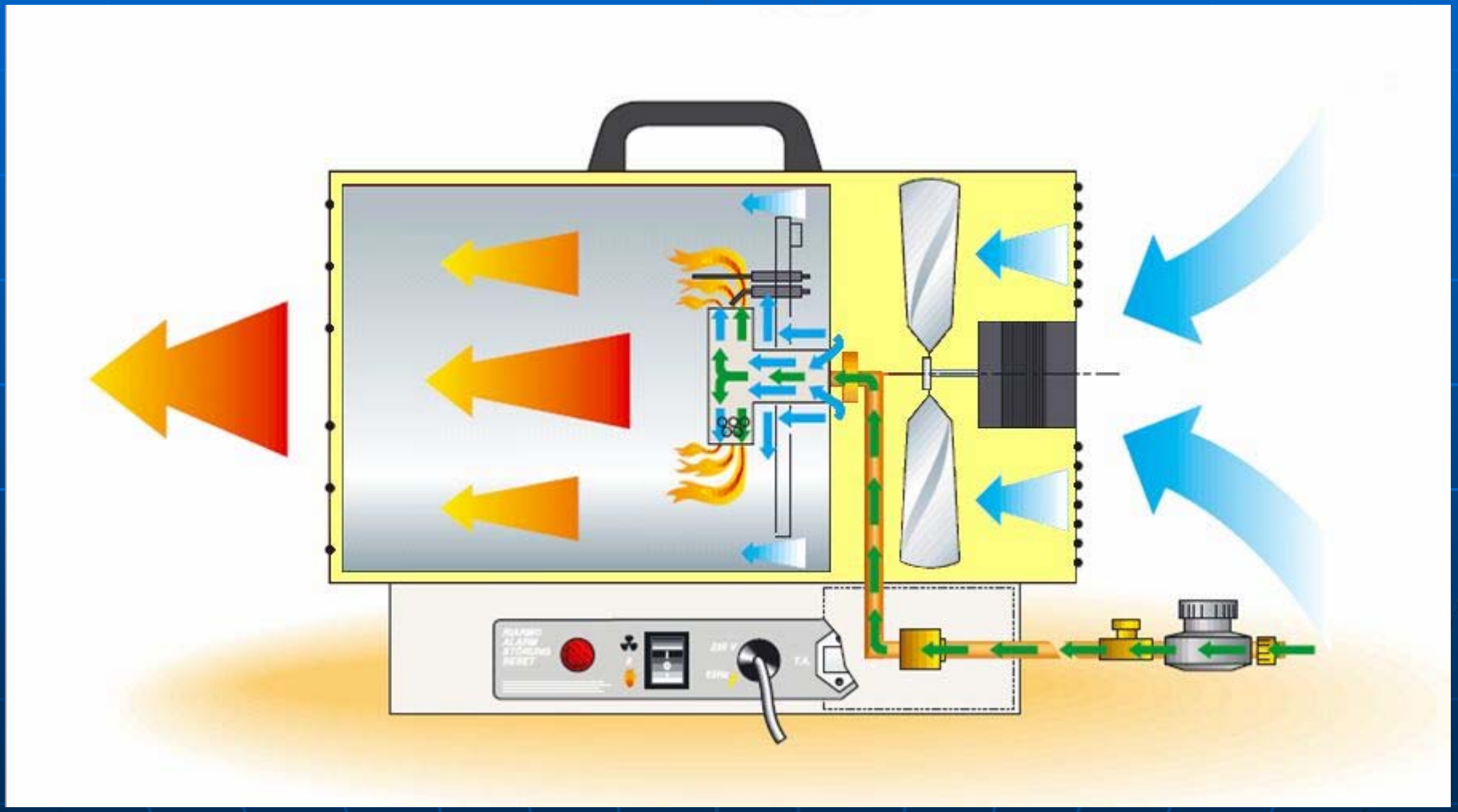
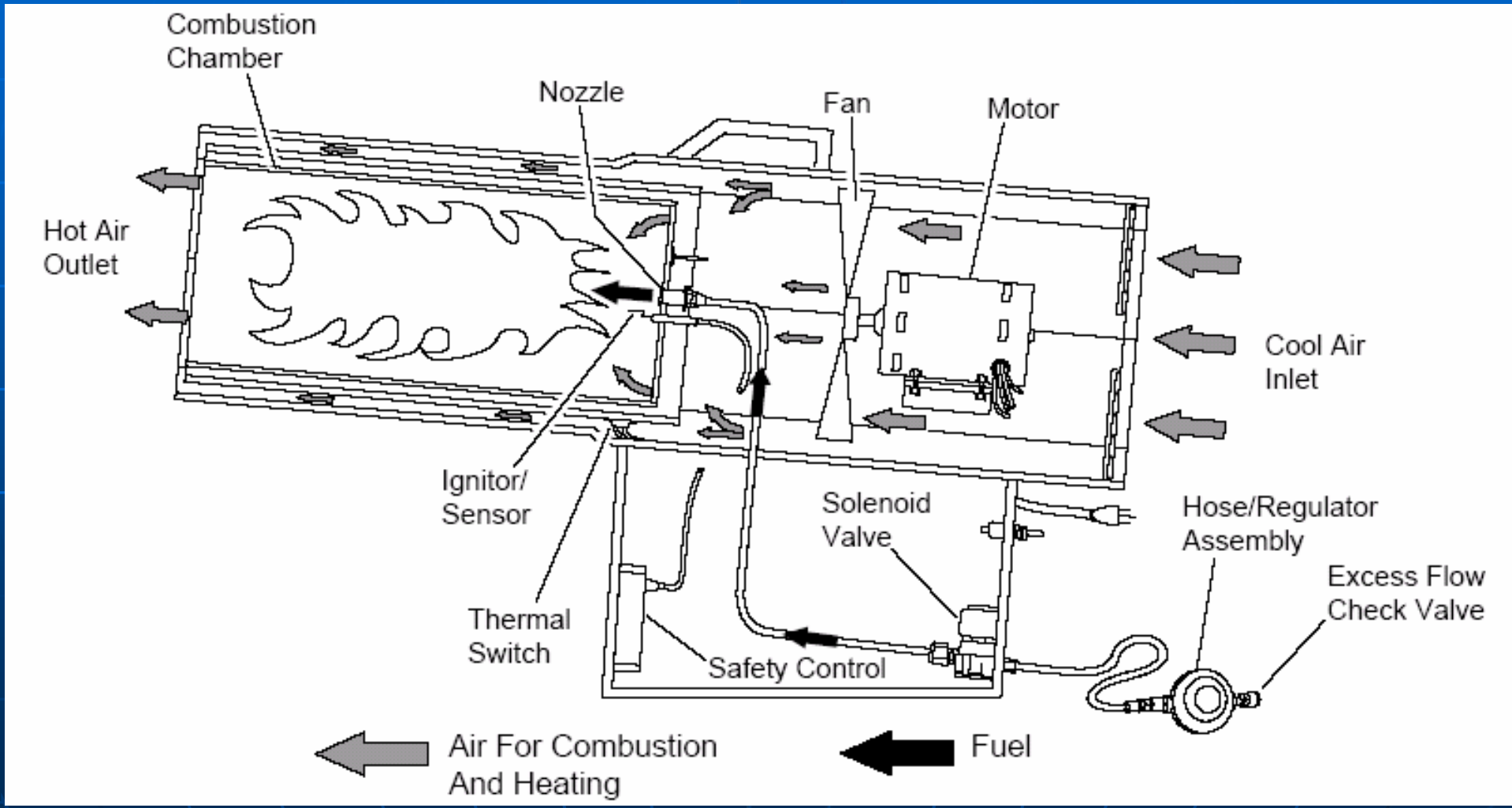
OPERATION



CONSTRUCTION AND OPERATION



Securities :

✓ Electromagnetic valve – stops gas delivery when there is no voltage

✓ Additional under-pressure valve on the reducer (reducing valve) – stops gas delivery in case of hose

✓ Overheating thermostat – switches off device when it is overheated

✓ Thermocouple – when flame distinguish turns off gas delivery

Application :

➢ Agriculture, building, industry

➢ Stocks, halls, warehouses, garages, workshops

➢ Greenhouses – burning oxygen, production of CO_2

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Characteristics:

- Possible to connect several bottles
- Low gas consumption, economical in use
- Clean burning
- Possibility to regulate capacity from 60 to 100%
- Use of thermostat in model E
- Efficiency almost 100%
- Easy in service
- Portable

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Why do we use gas heaters !?!

Methane

$CH_4 + 2O_2 \rightarrow CO_2 + 2\ H_20$

Propane

$C_3\ H_8 + 5O_2 \rightarrow 3\ CO_2 + 4\ H_2\ O$

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Important accesories

Gas Glue – usefull in gas heaters – gas connections

Temperature range -55°C to 150°C

Compatible with norm DIN 54454

4515.903 – spare part code

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Coupling set to gas heaters

Connector – **4515.902**

Gas tube – **4515.901**

REMEMBER!!!

10 kW of heater capacity = 10 kg of gas

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ELECTRIC FAN HEATERS

B 2 EPA

B 3 SEPA

B 3,3 EPA

B 5 EPA

B 9 EPA

B 15 EPA

B 22 EPA

Model		B 2 EPA	B 3 SEPA	B 3,3 EPA	B 5 EPA
Capacity	kW	1-2	1,45-2,9	1,65-3,3	2,5-5
	Kcal/h	860 – 1720	1250 - 2500	1433 – 2866	2150 - 4300
Switch pos.1		Off			
Switch pos.2		Fan			
Switch pos.3	kW	1	1,45	1,65	2,5
Switch pos.4	kW	2	2,9	3,3	5
Max current consumption	A	8,7	12,6	14,5	3×7,2
Voltage	V/Hz	230 / 50	230 / 50	230 / 50	400 / 50
Air displacement	m^3/h	120	120	510	510
Temperature range	^0C	5-35	5-35	5-35	5-35
Internal protection	IPX4				

Securities :

- overheating thermostat
- cooling thermostat

Model		B 9 EPA	B 15 EPA	B 22 EPA
Capacity	kW	4,5-9	7-15	11-22
	Kcal/h	3870 - 7740	6450-12900	9460-18920
Switch pos.1		off		
Switch pos.2		fan		
Switch pos.3	kW	4,5	7,5	11
Switch pos.4	kW	9	15	22
Max current consumption	A	3×13	3×22	3×32
Voltage	V/Hz	400 / 50	400 / 50	400 / 50
Air displacement	m^3/h	800	1700	2200
Temperature range	^0C	5-35	5-35	5-35
Internal protection	IPX4			

Securities :

- overheating thermostat
- cooling thermostat

OPERATION

Axial-flow fan sucks the air from the back side of a heater and directs it towards thermoelements. The air warms up at the thermoelements and blows out in front of the heater.

Safeties :

- Overheat thermostat
- Cool-off thermostat

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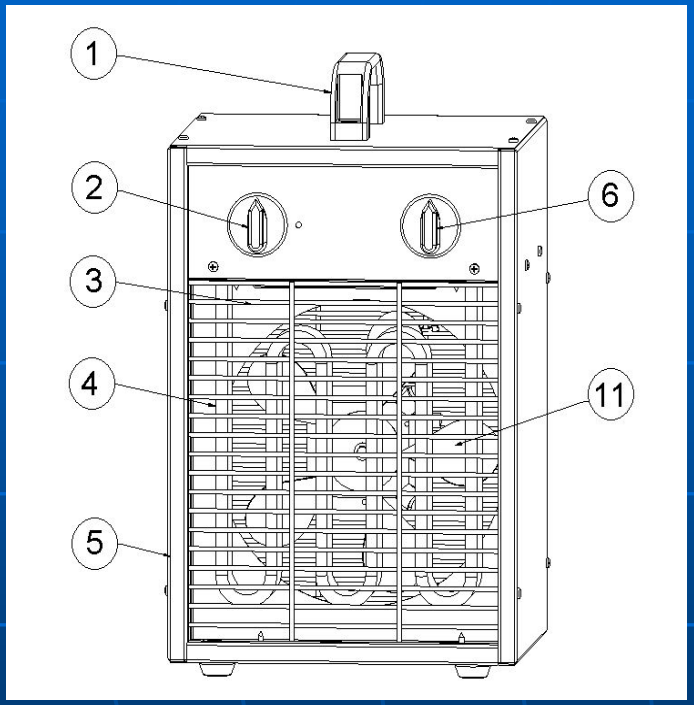
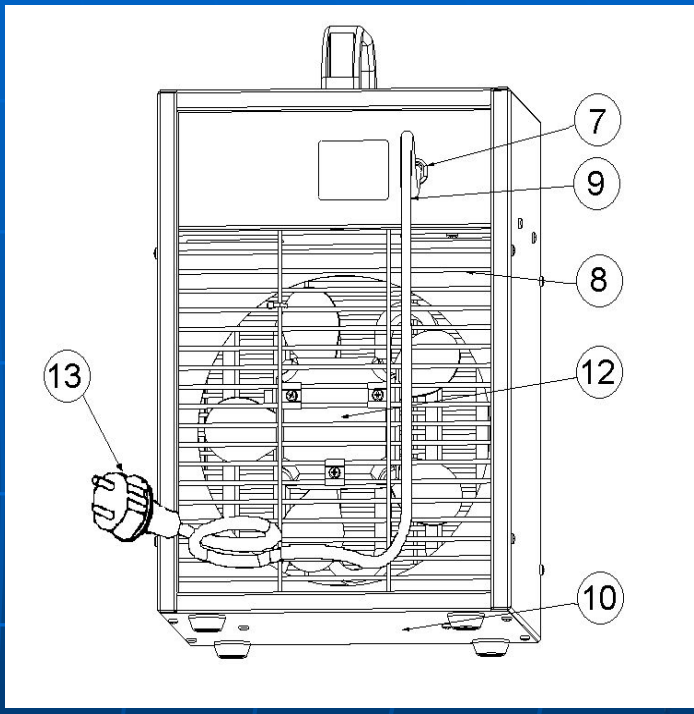
B 2 EPA i B 3,3 EPA



FRONT

1. LIFTING EYE
2. THERMOSTAT
3. FRONT PROTECTIVE GRID
4. HEATING ELEMENT
5. CASING
6. SWITCH
7. CABLE PENETRATION
8. BACK PROTECTIVE GRID
9. POWER CORD
10. BASE FOOT
11. FAN
12. MOTOR
13. PLUG



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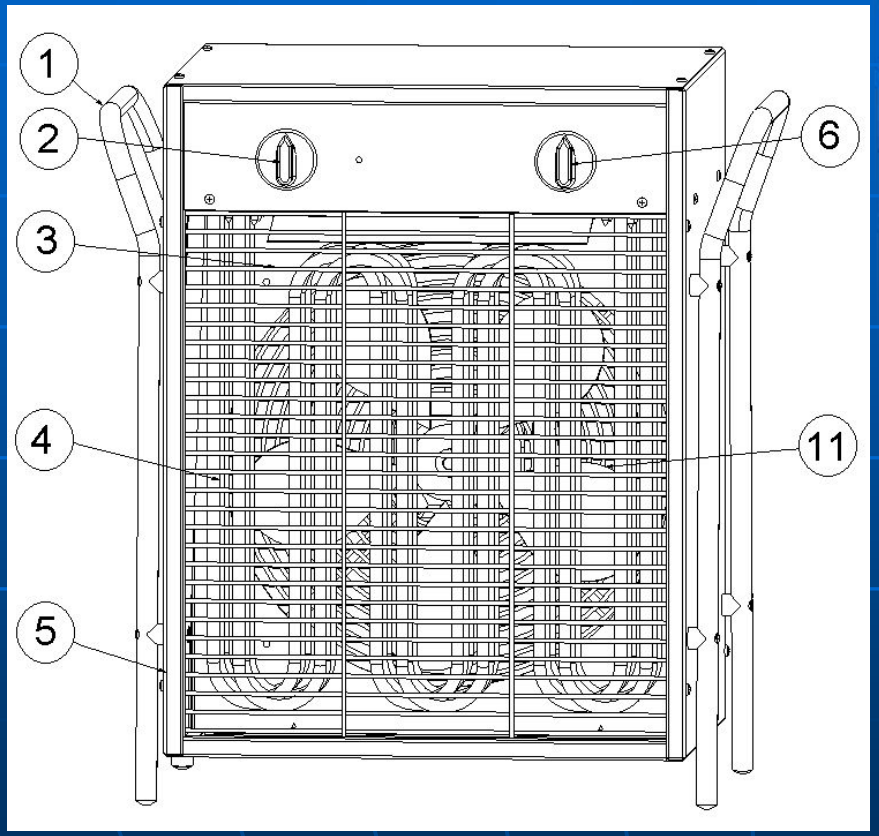
B 15 EPA i B 22 EPA



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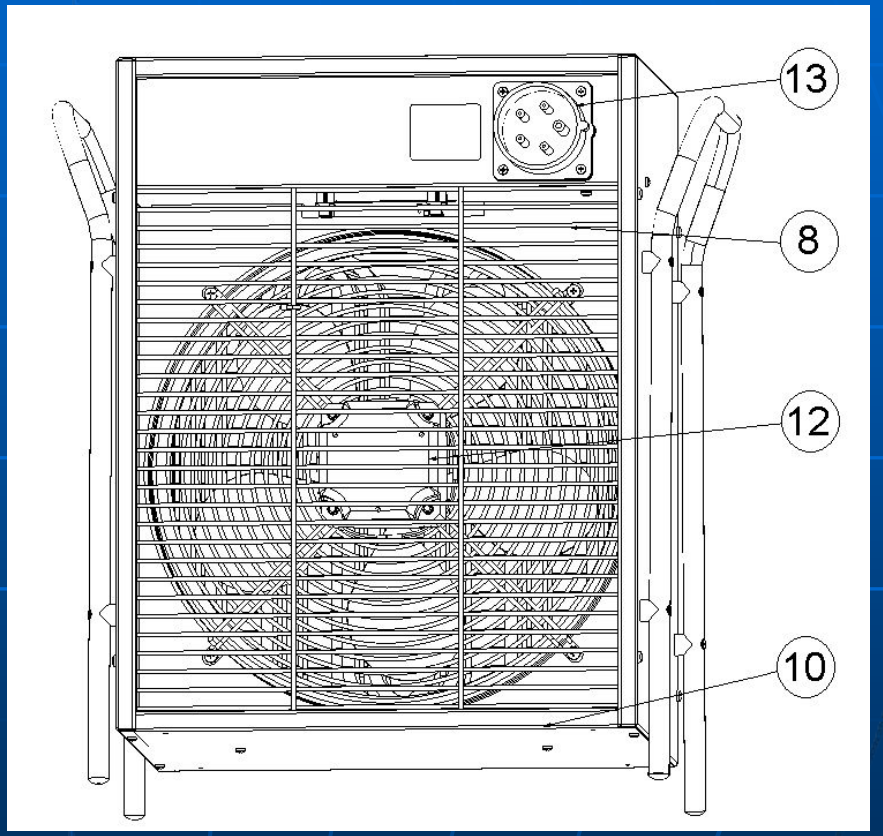

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MASTER®

Application:

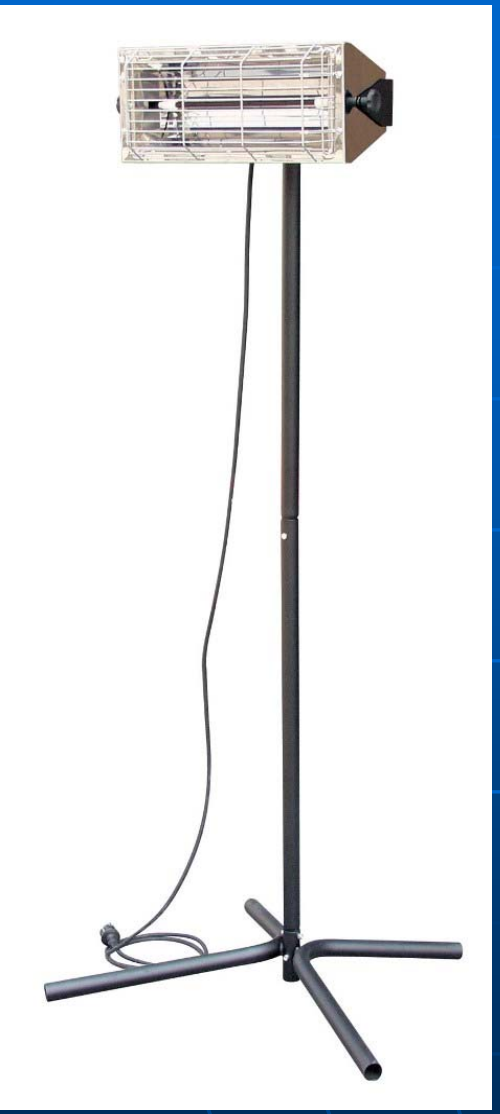
- Agriculture, construction, industry in rather small areas
- Stocks, offices, shops, garages, private sector
- Closed areas
- For drying

Characteristic :

- 100% efficiency, easy in use, service not necessary
- Quiet, without smell, clean heat
- For badly ventilated areas
- Built-in thermostat and overheating switch
- Heat regulator
- No problems with fuel
- Long-life, all elements are of stainless steel
- Easy to transport
- Easy to use and service

MASTER®

INFRARED ELECTRIC HEATERS



HALL 1500

HALL 3000

HALL 3000 C

TS 3 A

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CHARACTERISTICS :

- Easy in use and maintenance
- Radiant heating
- Instant heat
- No oxygen consumption
- No air flow, no dust, no fumes, no odours, no humidity
- Low noise
- 100% Efficiency
- Variable heat settings
- Also for room with low ventilation
- Optional accessories: stand for HALL 1500

APPLICATION:

- Agriculture, construction, industry in rather small areas
- Stocks, offices, shops, garages, cellars, warehouses, private sector
- Closed environments
- Recommended for painters, plasterers, tile setters, plumbers, etc.
- For maximum drying efficiency use with a dehumidifier

Infrared electric and fan electric heaters

MASTER®

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DEHUMIDIFIERS

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AIR DEHUMIDIFIERS

MASTER®

DESA

Removes humidity from the air
Prevents the formation of mildew

Application:

- home, garages, cellars
- libraries, archives
- rooms with electronic equipment
- while painting and renovation

Description:

- light and small
- active carbon filter prevents build-up bacteria
- machine shuts off automatically
- can be fitted with an outer water tank

Specifications:

Model	DH 711	DH 721
Capacity (RT 30°C, RH 80%)	10 l/24h	20 l/24h
Operating rate	5-35 °C	5-35 °C
Air displacement	130 m³/h	240 m³/h
Refrigerant	R134a	R134a
Water tank capacity	2,5 l	4,7 l
Voltage	230/50 V/Hz	230/50 V/Hz
Power consumption	200 W	350 W
Dimensions	27 x 33 x 50 cm	30,5 x 33,5 x 58 cm

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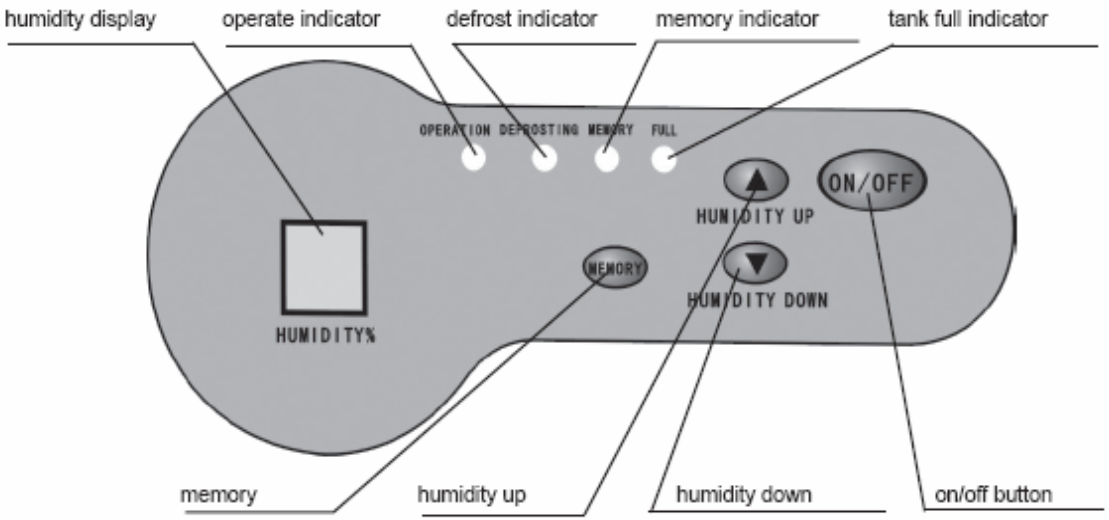
e-mail: office@desapoland.pl

NEW

MASTER®

Model		DH 751
Dehumidifier capacity (30°C / 80% HR)	l/24h	46,7
Operation range – temperature	°C	5 ÷ 35
Operation range – humidity	%	20 ÷ 90
Air flow	m³/h	350
Refrigerant name	-	R407c
Charge refrigerant	g	370
Freezing pressure (max)	MPa	2,5
Steaming pressure (max)	Mpa	1,0
Water tank capacity	l	5,7
Rated power input	W	900
Rated currant input	A	4,2
Electrical supply	V/Hz	220 ÷ 240 / ~50
Noise level	dB(A)	≤52
Size	mm	495 x 375 x 825
Net weight	kg	30



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Model	Capacity l/24h 80% (30°C)	Air displacement m³/h	Temperature range °C	Humidity range %	Condensate tank capacity
DH 41 H	40,6	450	5-40	40 – 95	8
DH 40	40	400	3-40	40 – 100	11

MASTER DH 41 H

MASTER DH 40

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DH 41 H vs DH 40

DH 41 – additional thermoelement inside dehumidifier (working in temperature range 5-15 degrees)– better operation of refrigerant system.

DH 40 – without thermoelement.

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Defrosting via air flow
and thermoelement.

Defrosting via hot
gases - electrovalve.

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DH 41 has control lamp responsible for signalization of defrosting procedure..

DH 40 is without defrosting control lamp.

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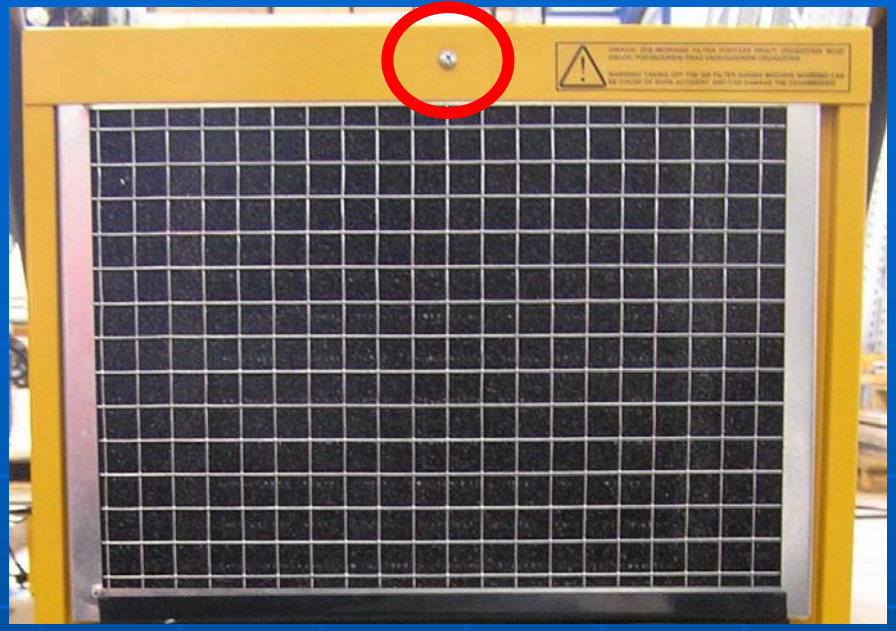
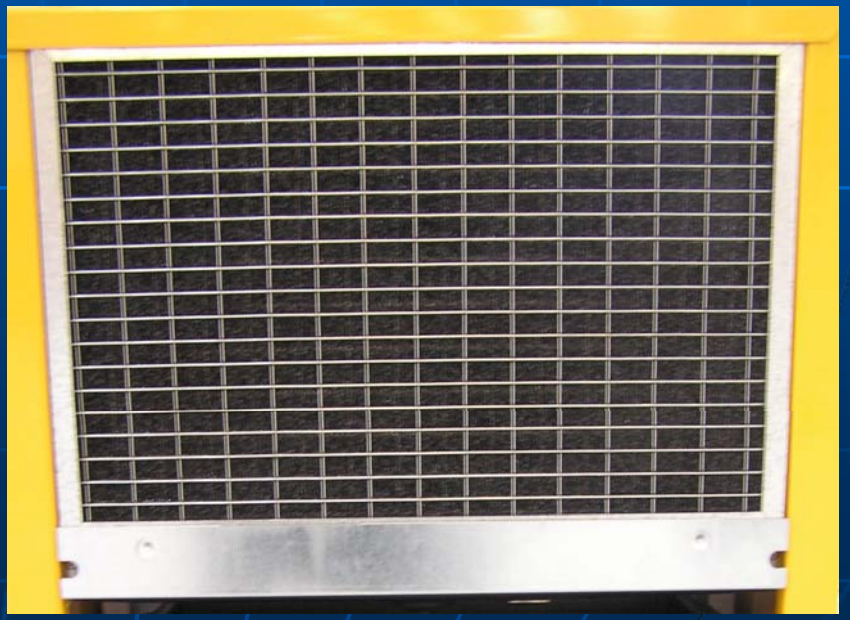


DH 41 has fixing screw of air filter

DH 40 doesn’t have fixing screw of air filter



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DH 41 has double switch position:

-standard dehumidifying mode;

-dehumidifying with thermoelement

DH 40 doesn’t have possibility to choose dehumidifying mode with thermoelement

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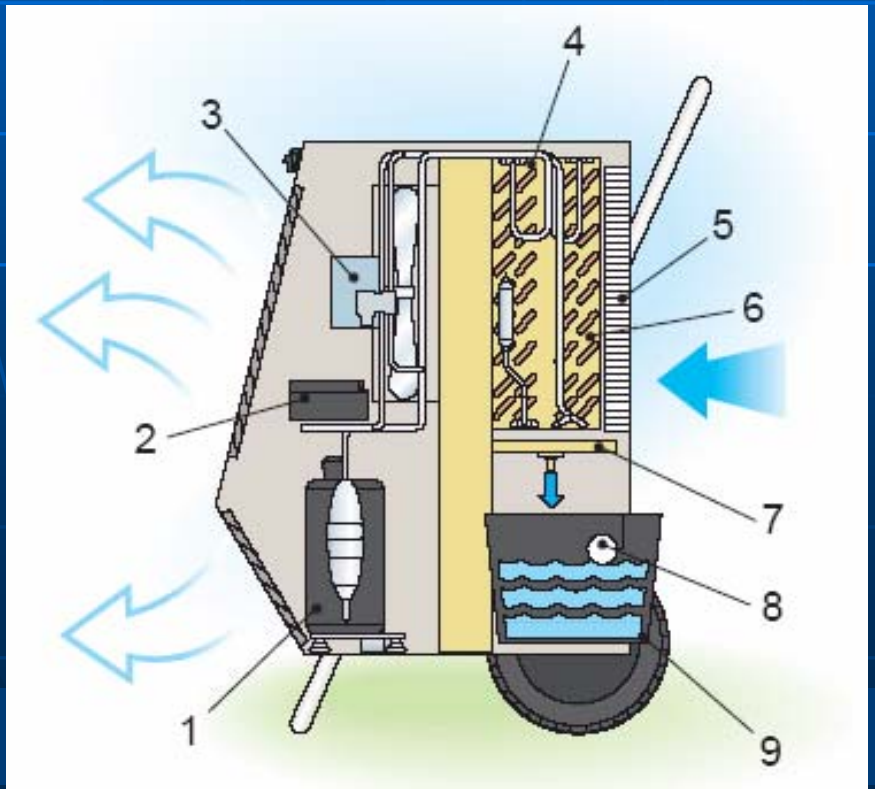
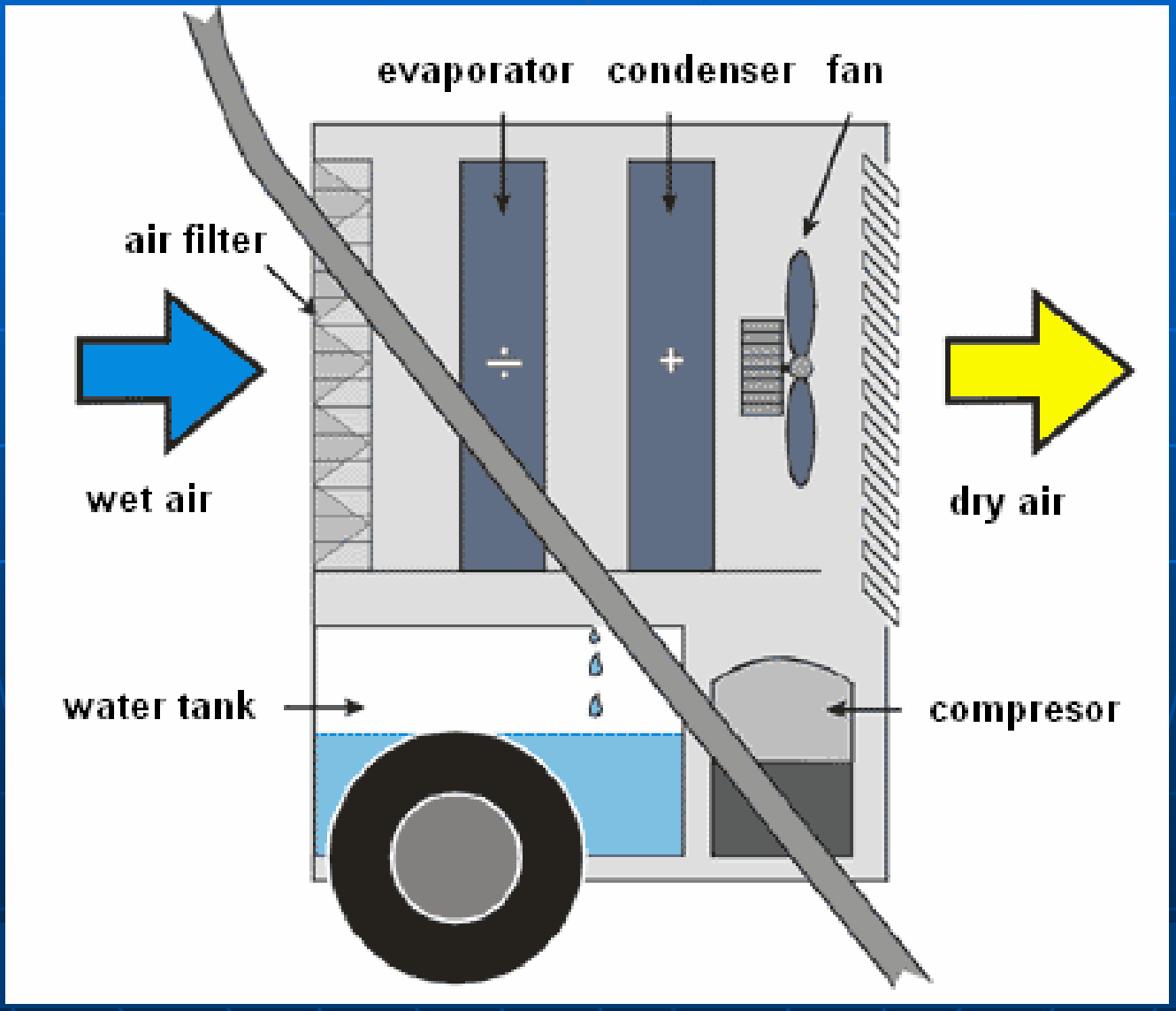
Model	Capacity l/24h 80% (30°C)	Air displacement m³/h	Temperature range °C	Humidity range %	Condensate tank capacity
DH 25	22	250	3 – 40	40 - 100	5
DH 55	52	650			11
DH 80	80	900			---



1. Rotary hermetic compressor
2. Regulation element (valve)
3. Fan
4. Condenser
5. Air filter
6. Evaporator
7. Connecting pipe
8. Float
9. Condensate tank

OPERATION


evaporator
condenser
fan
air filter
wet air
dry air
water tank
compresor

Application :

- Basements, stocks
- Libraries, archives, galleries
- Houses, building sites, parcels
- Objects where food is kept
- During catastrophes, such as floods

Characteristic:

- Quiet
- Low price, low energy consumption
- Easy in use and service
- Portable with massive wheels
- Possible to remove water
- Fully automatic

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CAPACITY CALCULATION – short formula

CONDITION OF EFFECTIVE DEHUMIDIFYING:

DEHUMIDIFIER should provide about 2 rates of air change per hour

V_{vent} = area x 2

area = lenght x width x height [m^3]

V_{went} – dehumidifier airflow [m^3/h]

ATTENTION!!!

To fast dehumidifying process can damage the walls

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Dehumidifiers

Humidity increment in volume with small swimming pool

Data:

Room volume:K =5×8×2,5= 100 m³

Room parameters: t_i = 26ºC , φ_i = 60%

Water surface : 18 m^2 (3×6)

Water temperature: 28ºC

Air change coefficent: n = 2 exchange/h

Quantity of people: m = 5

Quiet water

Humidity increments in volume:

Peoples:

W_1 = m × w [g/h]

m – quantity of people

w – single humidity increment [g/h]

W_1 = 5 × 163 = 815 [g/h] = 0,815 [kg/h]

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Activity	Temperature [°C]					
	15	18	20	23	26	29
Rest in sit	26	33	40	58	70	98
Rest in stand	31	42	54	72	91	122
Office work, light work	42	56	72	95	117	147
Stand work, low activity, light work	67	89	110	142	163	200
Stand work, high activity, light work	88	110	128	163	191	227
Sit work in factory, light work	109	135	154	196	226	260
Mechanic, painter, medium work	130	160	182	226	256	300
Restaurant service, very high activity, hard work	168	204	230	274	298	337
Dancing people, very hard work	255	307	342	386	412	460

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Water tank:

$W_2 = \sigma \times A \times (x'' - x)$ [kg/h]

A - surface water tank [m^2]

x" - humidity content in air in water temperature [kg/kg] – Molier's diagram **28°C, φ_k = 100%**

x – humidity content in inside air t_i = 26ºC , φ_i = 60%

σ - mass coefficient

σ = 10 for quiet water, swimming pools in house holds

σ = 20 for medium water movement, indoor swimming pools

σ = 30 for hard water movement, swimming pools with artificial wave

$W_2 = 10 \times 18 \times (0{,}024 - 0{,}0125) = 180 \times 0{,}0115 = 2{,}07$ [kg/h]

Ventilation:

$W_3 = K \times \rho \times n \times (x_z - x_w)$ [g/h]

K – room volume [m^3]

ρ - air density [kg/ m^3]

n - air change coefficent [exchange/h]

x_z - humidity content in outside air [g/kg] t_o = 25ºC , φ_o = 70%

x_w - humidity content in inside air [g/kg] t_i = 26ºC , φ_i = 60%

$W_3 = 100 \times 1{,}2 \times 2 \times (0{,}0137 - 0{,}0125) = 0{,}288$ kg/h = 288 g/h

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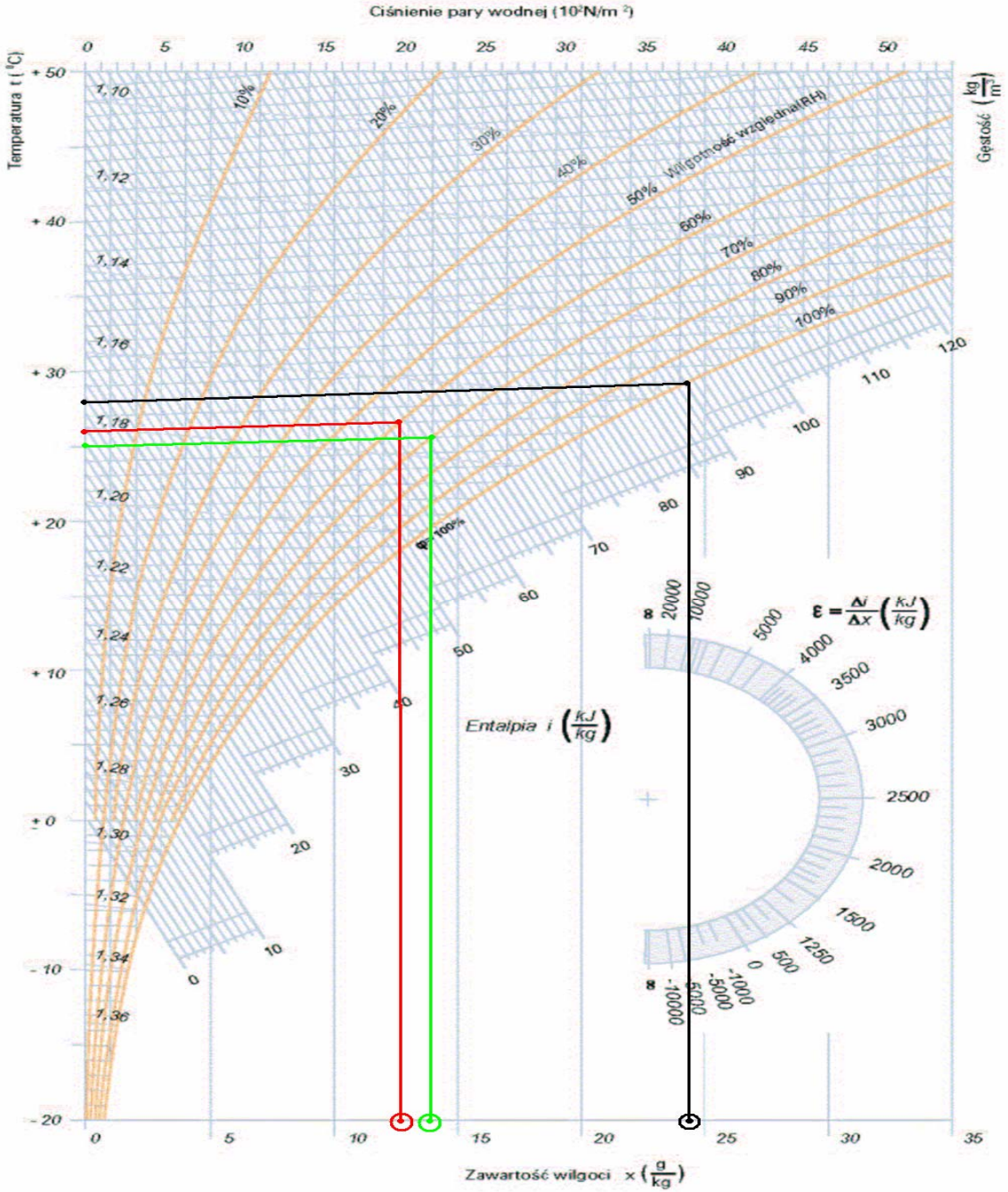
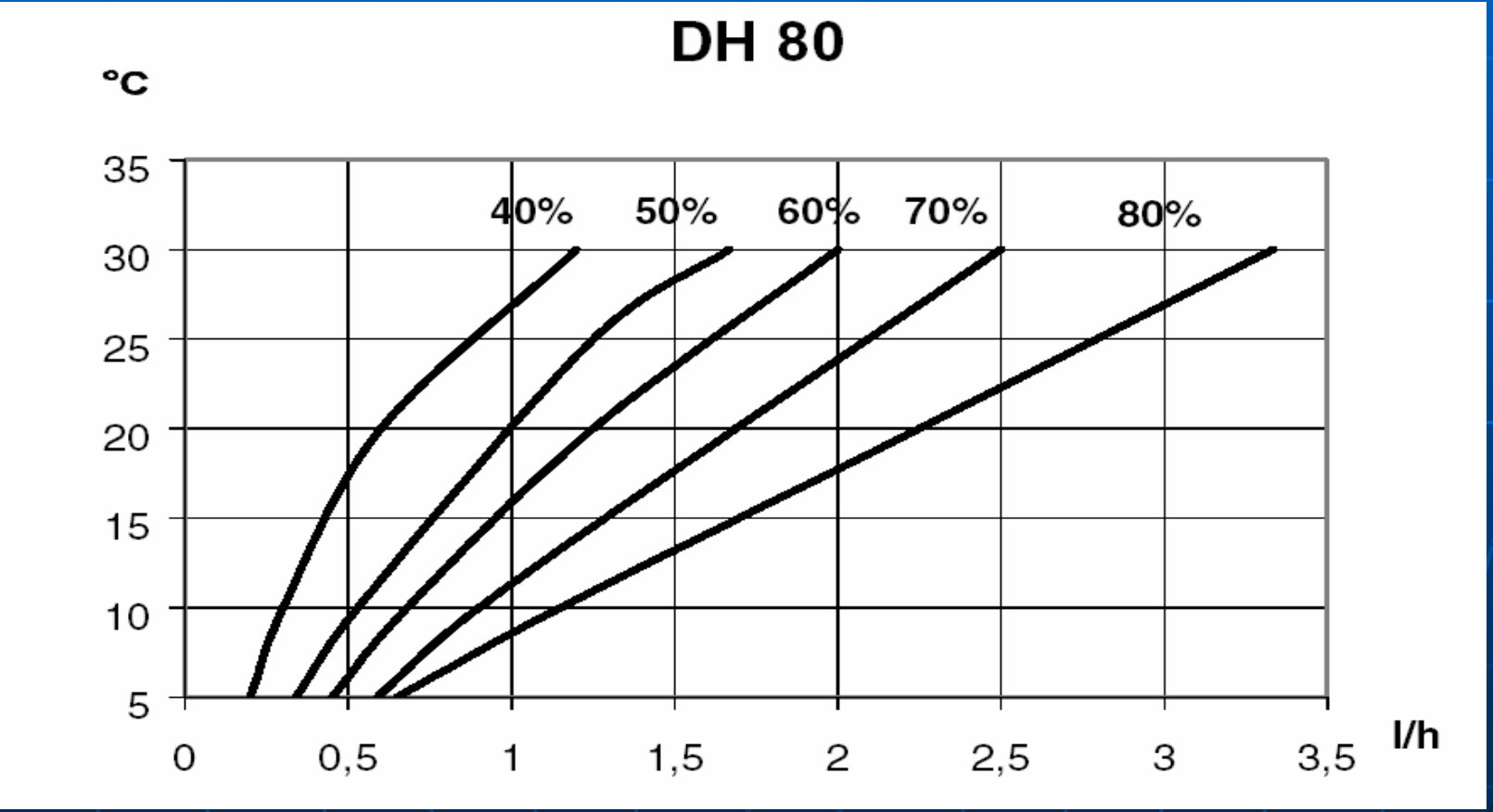


MASTER®

office@desapoland.pl

Required dehumidifier capacity

$W = W_1 + W_2 + W_3 = 0{,}815 + 2{,}07 + 0{,}288 = 3{,}173$ [kg/h]



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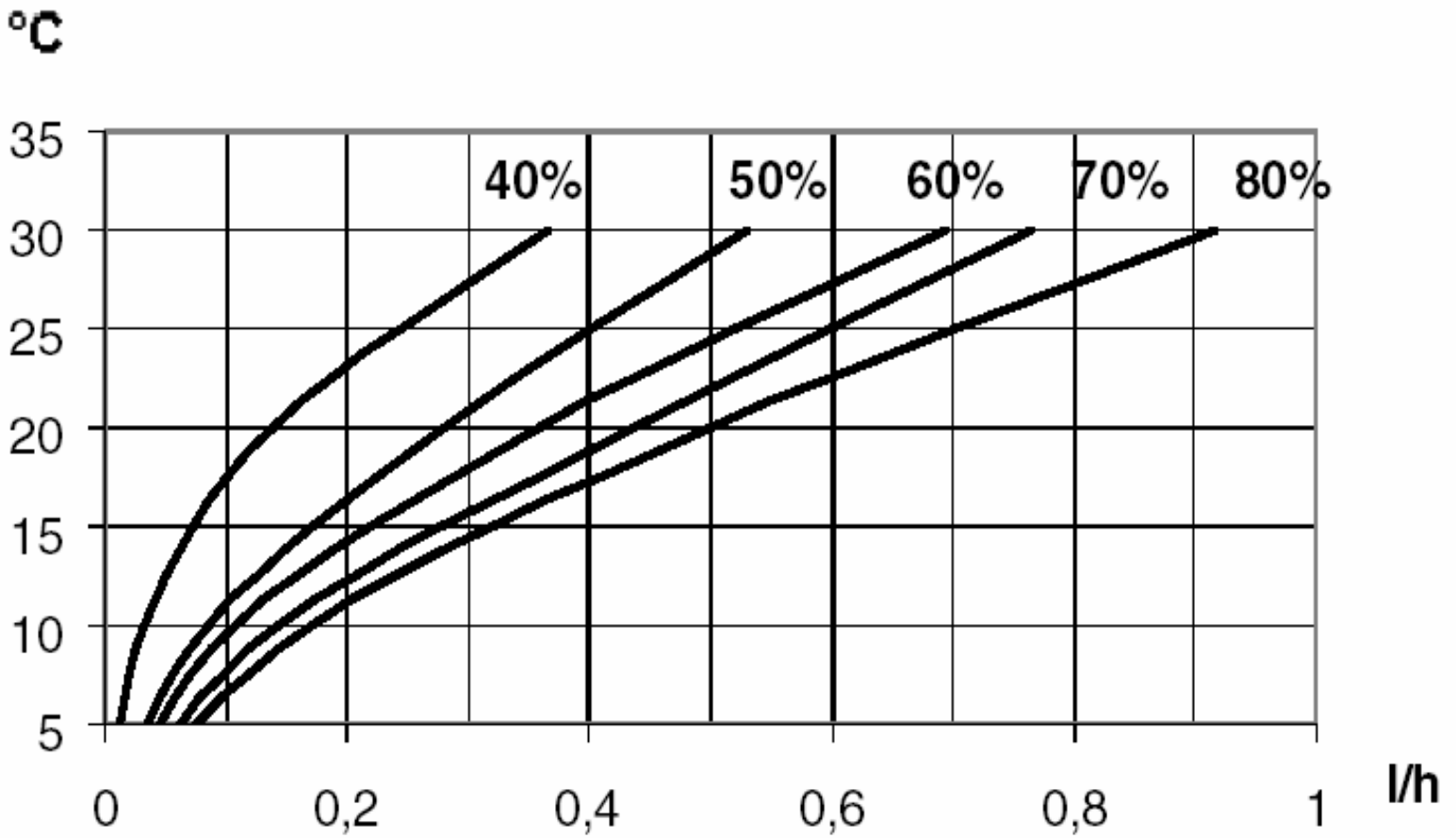
DH 25



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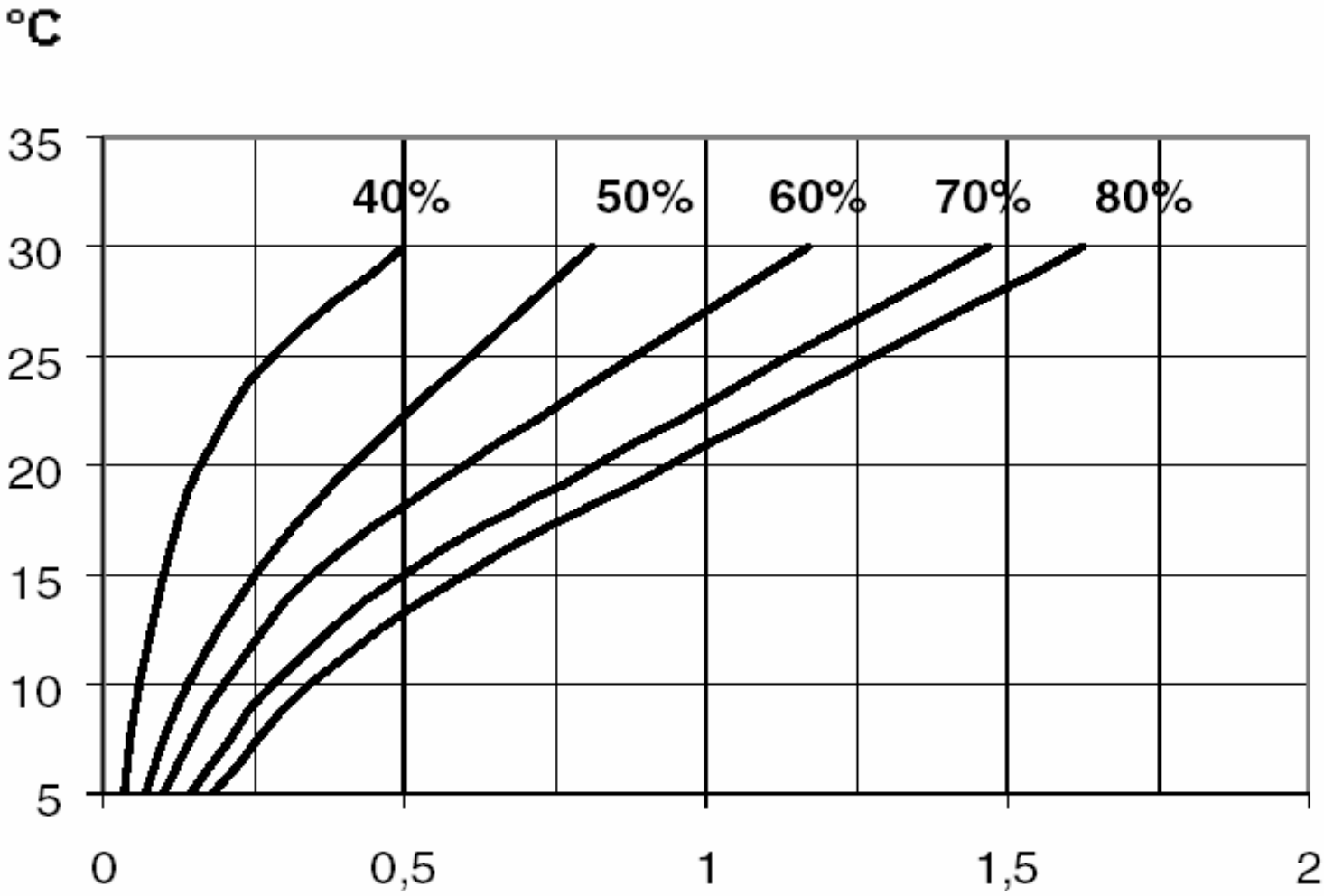
DH 40



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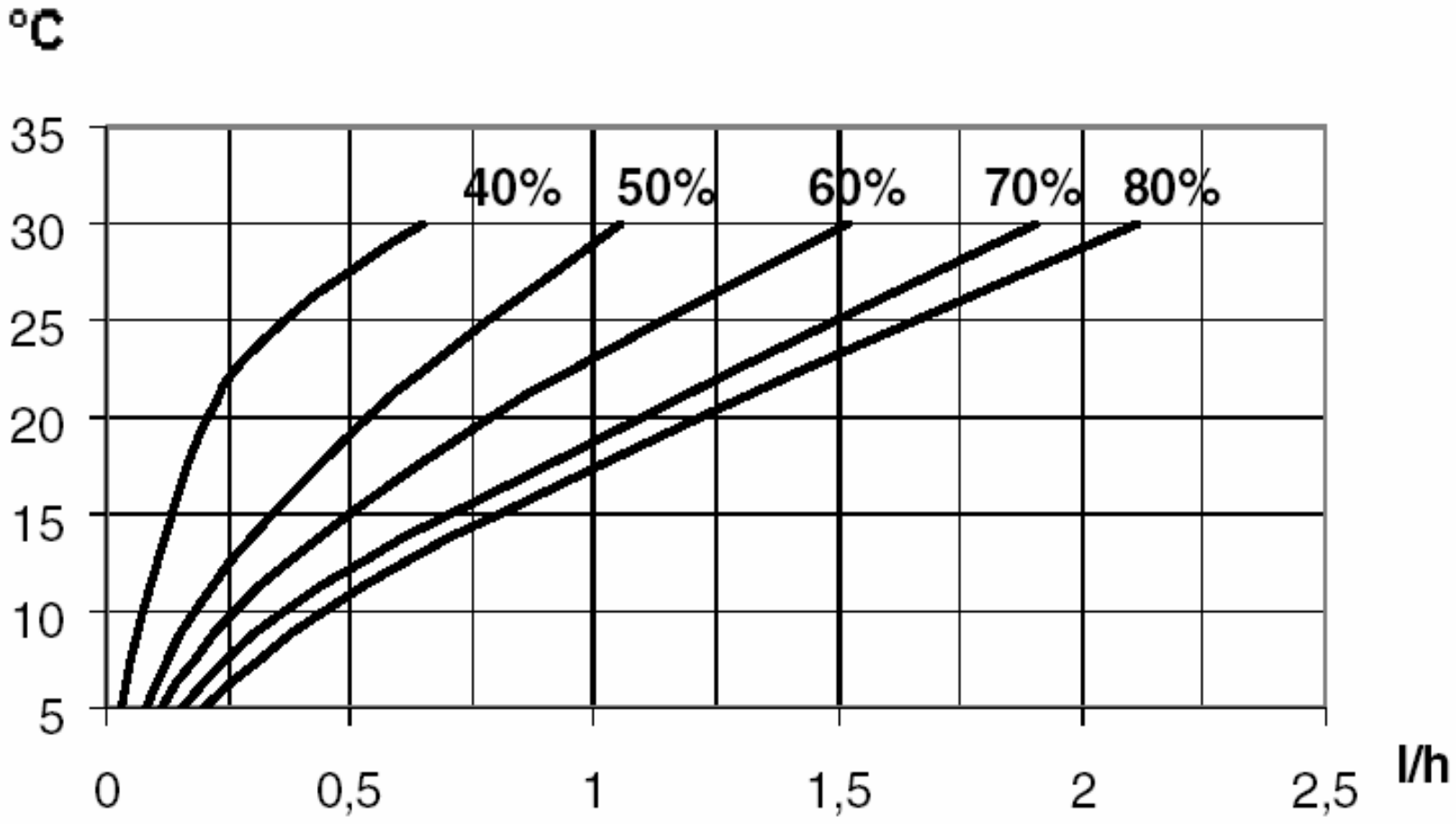
DH 55



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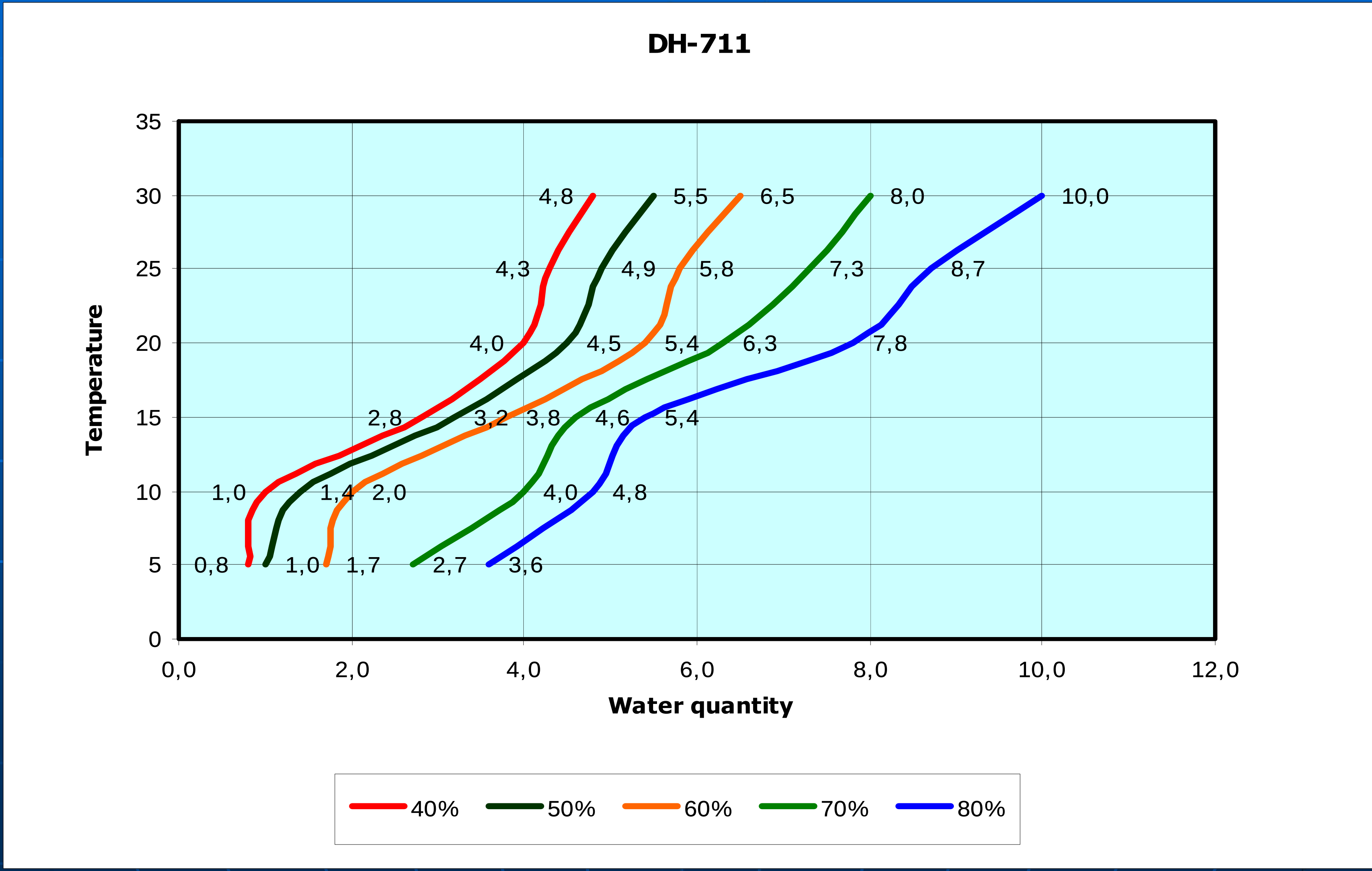
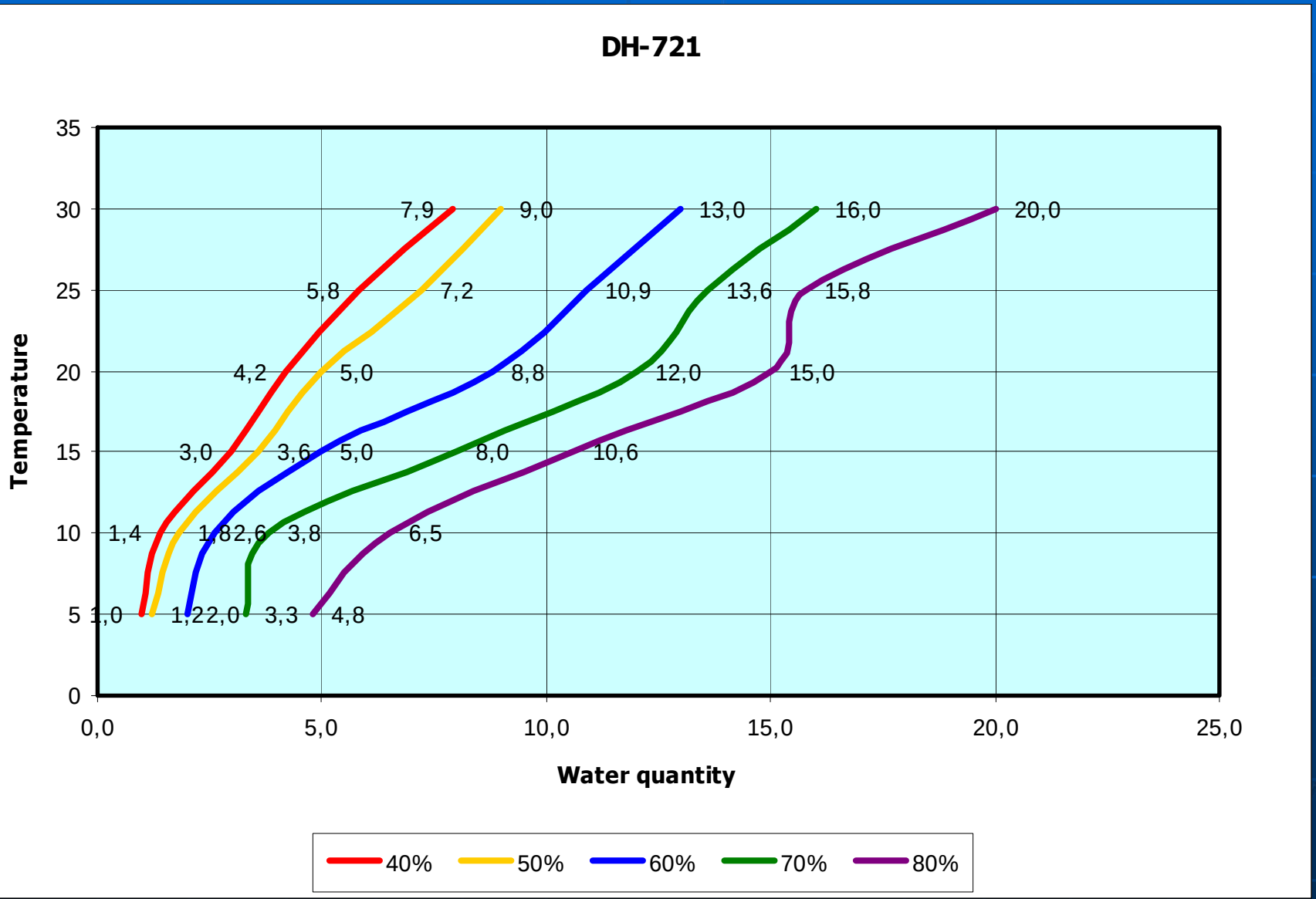

DH-711
Temperature
Water quantity
0
5
10
15
20
25
30
35
0,0
2,0
4,0
6,0
8,0
10,0
12,0
4,8
5,5
6,5
8,0
10,0
4,3
4,9
5,8
7,3
8,7
4,0
4,5
5,4
6,3
7,8
2,8
3,2
3,8
4,6
5,4
1,0
1,4
2,0
4,0
4,8
0,8
1,0
1,7
2,7
3,6
40%
50%
60%
70%
80%



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Comparison Master-Sial

GRYP

BV 70

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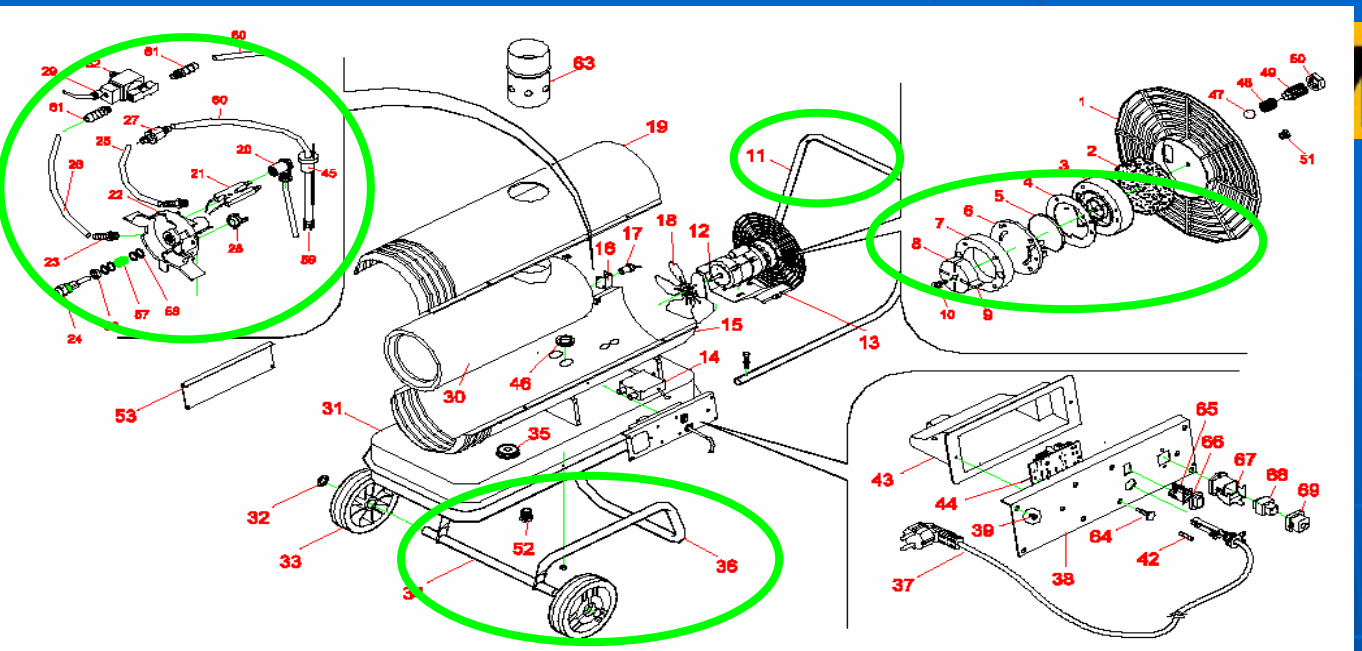

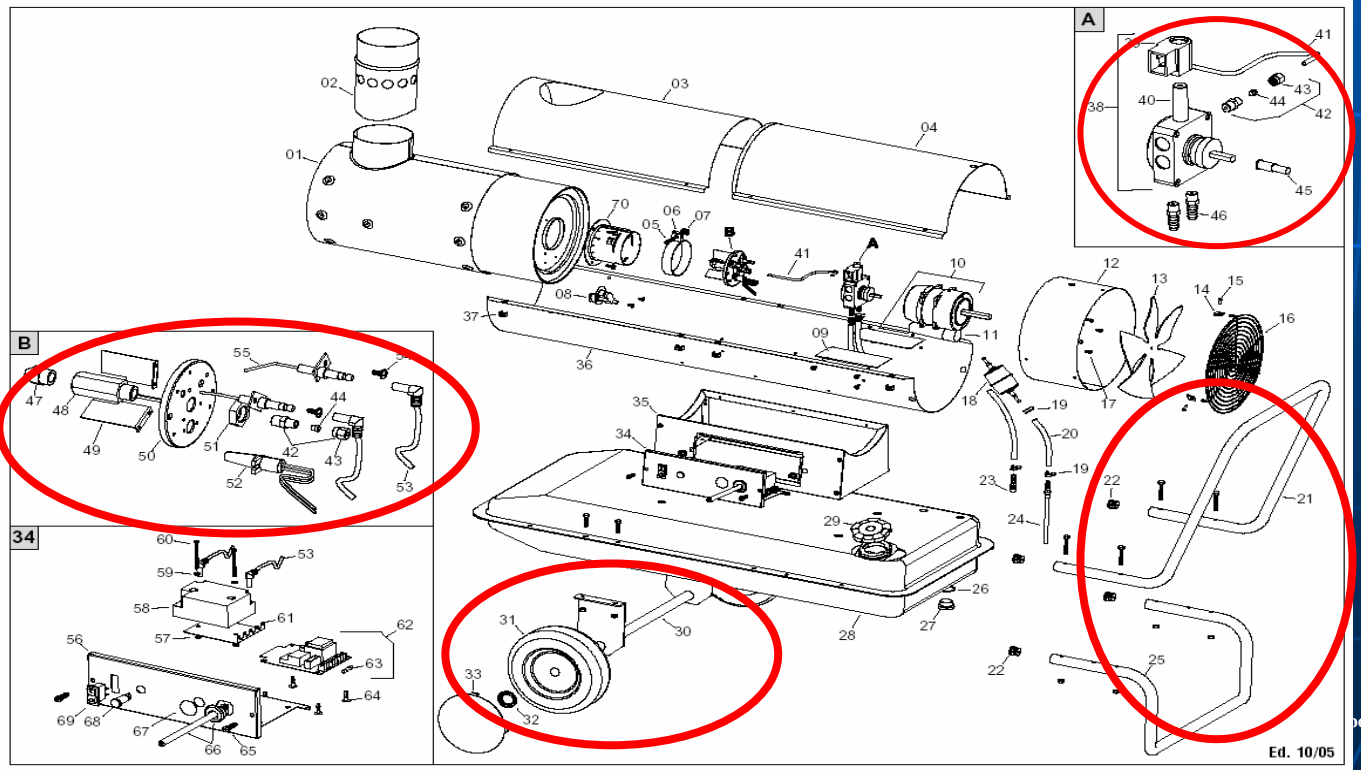

MASTER®

Gryp 15AP

MASTER BV 70

BV 70	Sial GRYP 15
High pressure burn system	Low pressure burn system
Oil pump	Air pump (erasure, sensitive for contact with water – swell)
Possible to connect outside fuel tank	Not possible to connect outside fuel tank
Better wheels, handles – assembly not needed	Necessary assembly (needed two persons) of wheels and handles, (poor quality)

Model	Capacity	Air displacement	Fuel consumption	Tank capacity
	[kW] / [kcal/h]	[m^3]	[l/h]	[dm^3]
BV 70 E	17 / 15 000	550	1,69	40
GRYP 15AP	14,5 / 12 500	650	1,48	30
BV 110 E	33 / 25 000	1800	3,1	65
GRYP 25AP	26 / 22 400	800	2,59	46

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Comparison BLP 30 vs SIAL KID 30 and ITM GRISOU 25

	Capacity max	Capacity min	Ignition	Fuel consumption	Air displacement
Model	[kW] / [kcal/h]			[kg/h]	[m^3/h]
BLP 30 M	30 / 25 800	16 / 13 760	piezo	2,14	1000
GRISOU 25 - ITM	27 / 23 200	15,14 / 13 020	piezo	1,94	650
KID 30 A - SIAL	31,2 / 26 800	12,4 / 10 700	piezo	2,46	750

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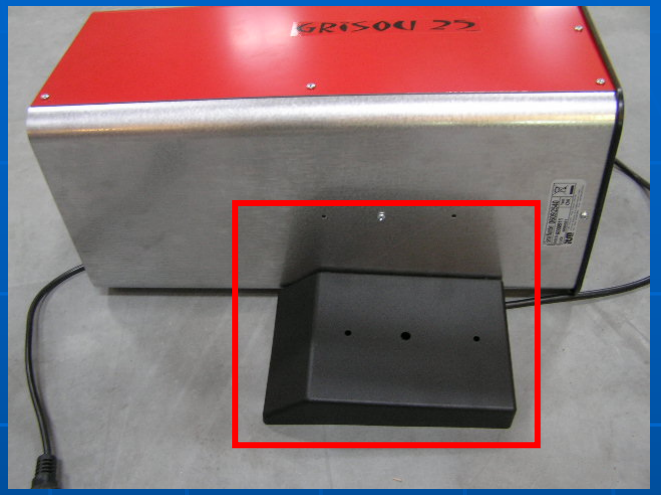
BLP 30 M vs GRISOU 25



Master has already mounted handle and plastic bottom

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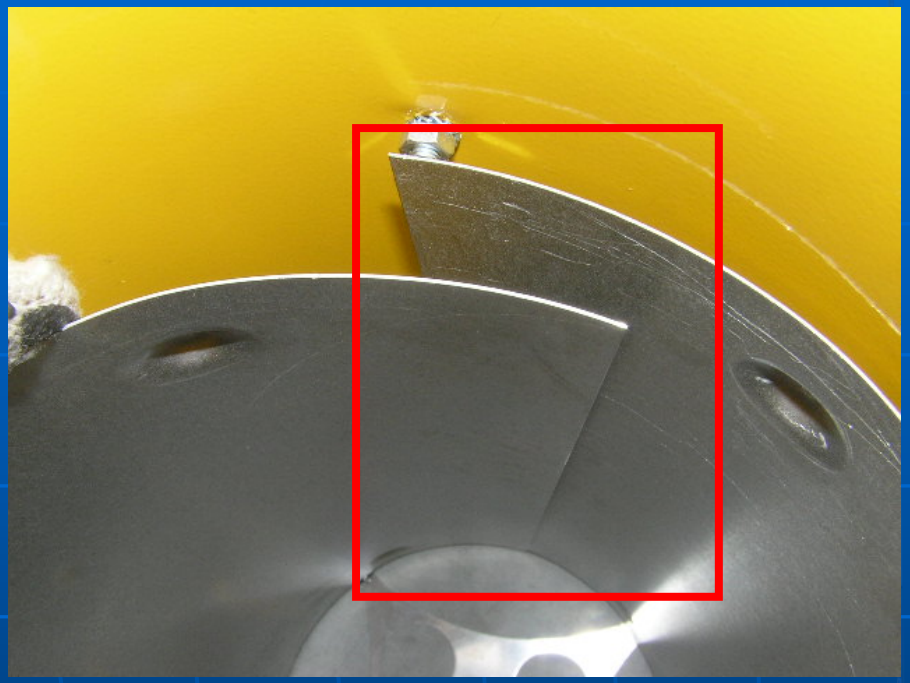
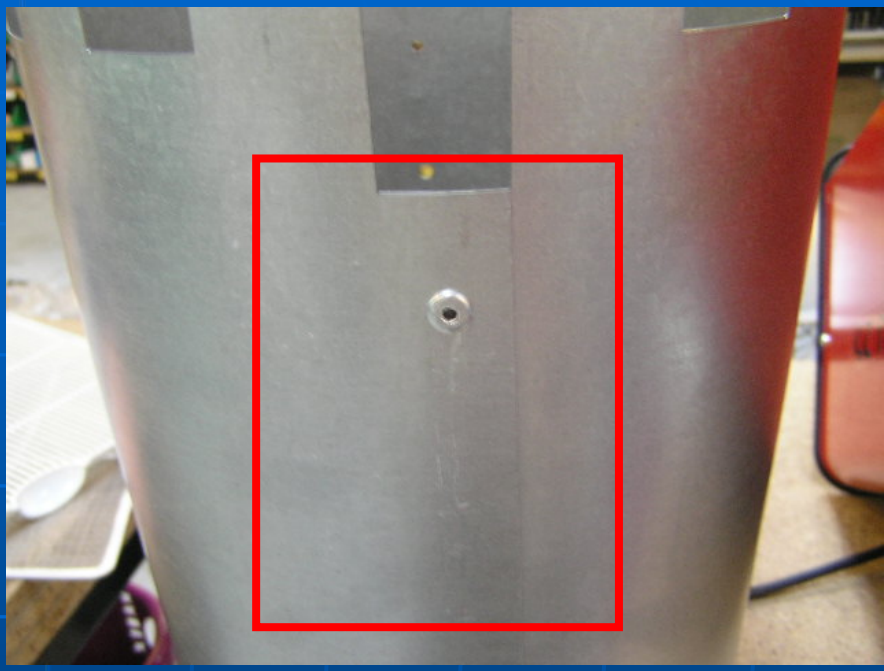
ul. Magazynowa 5A, 62-023 GĄDKI, tel. +48 (0) 61 654 40 00, fax. +48 (0) 61 654 40 01, www.desapoland.pl, e-mail: office@desapoland.pl





Master do not have a combustion chamber mounted on rivets – more practical – better for service

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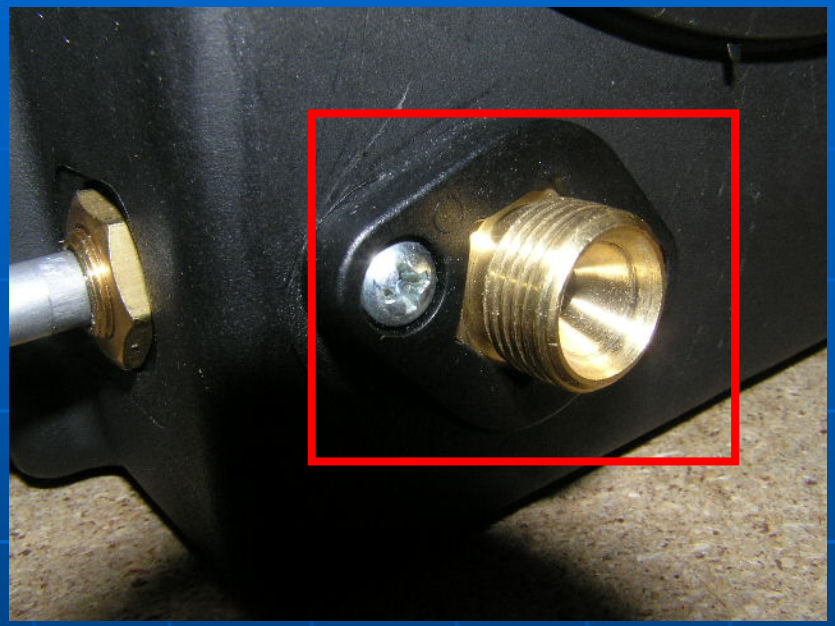

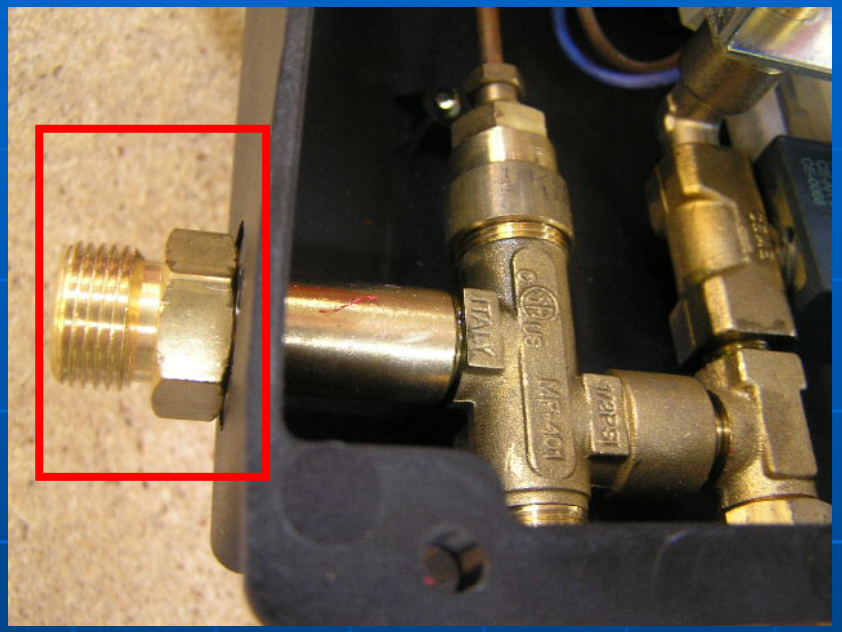

Master has additional protection on gas inlet nozzle

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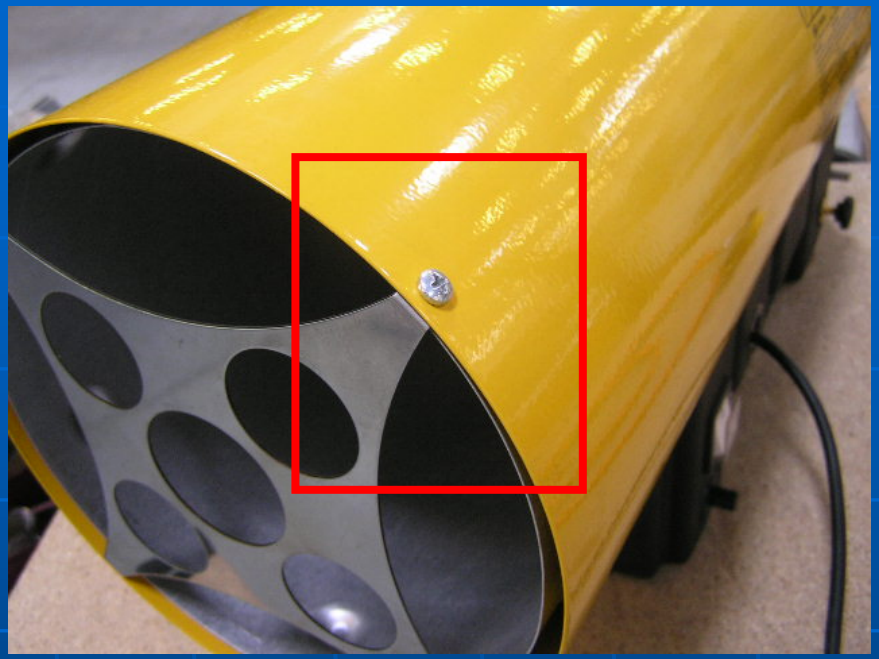

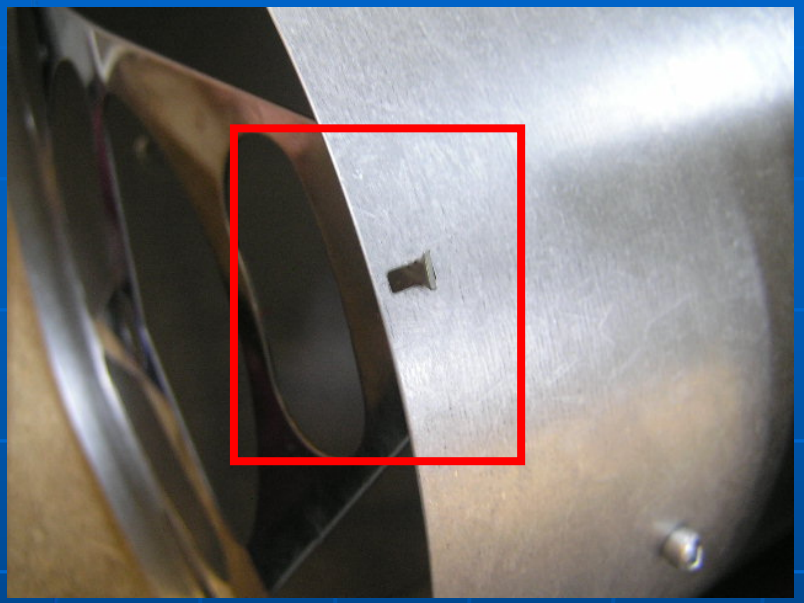

Master has more practical fixing of outlet grid (on screws)

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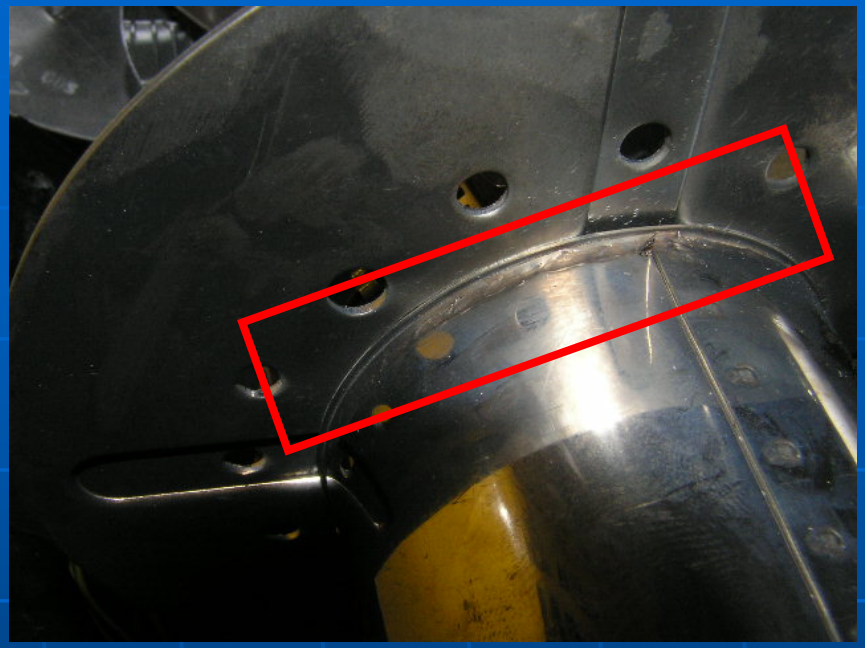

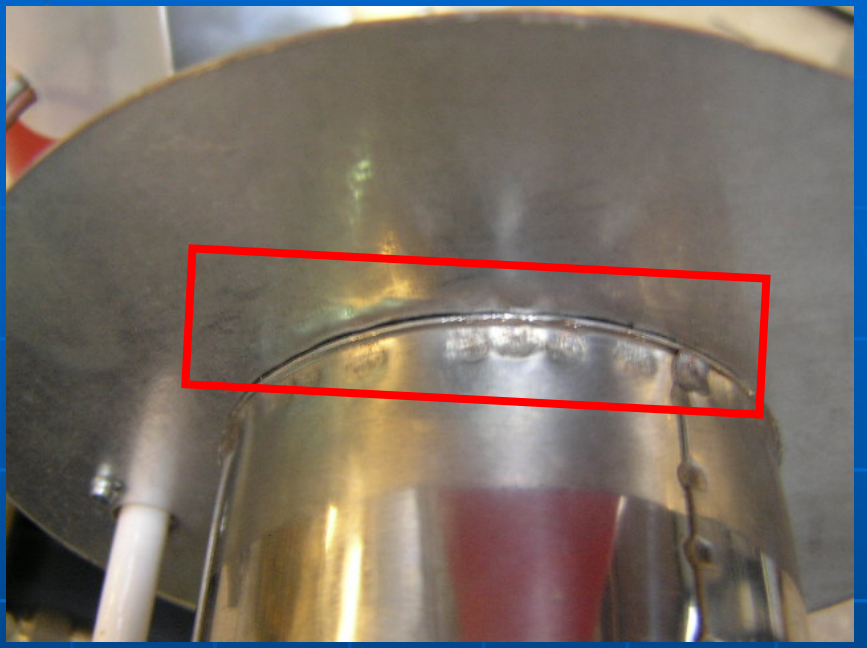

Master has better quality of welding on the gas burner

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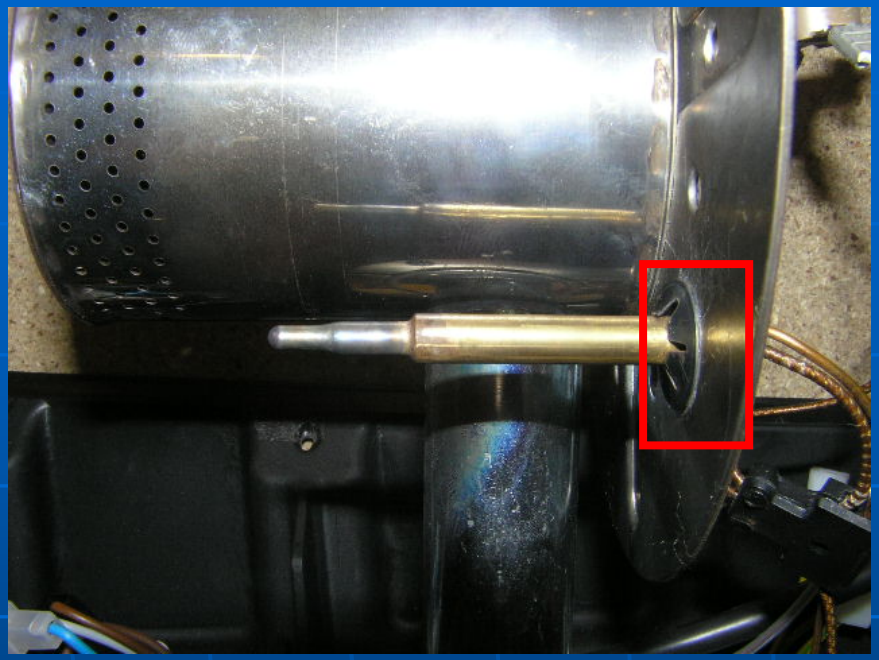

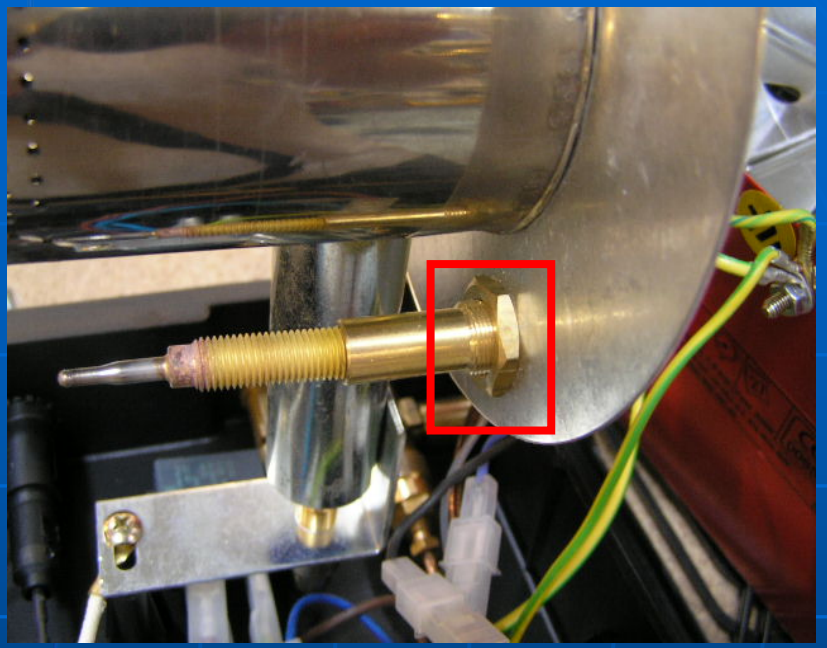

Master has simpler fixing of interrupted thermocouple – solution better for service

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ul. Magazynowa 5A, 62-023 GĄDKI, tel. +48 (0) 61 654 40 00, fax. +48 (0) 61 654 40 01, www.desapoland.pl, e-mail: office@desapoland.pl

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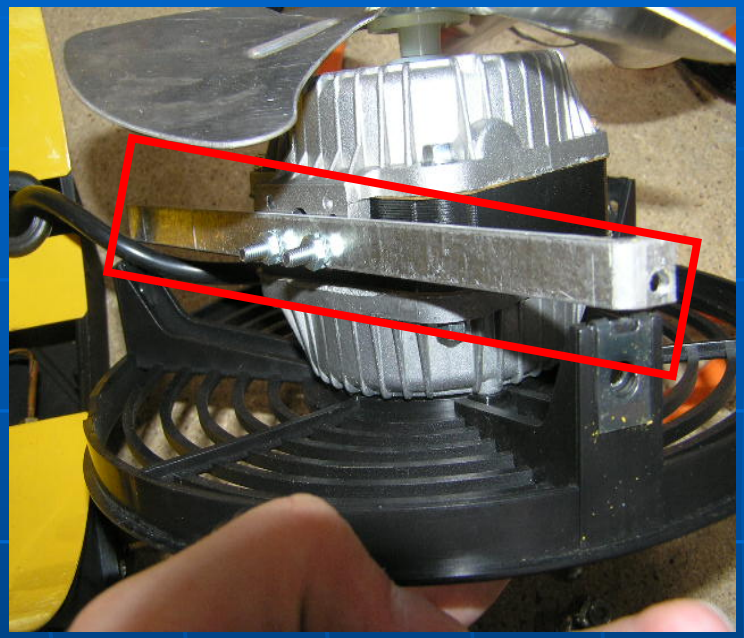

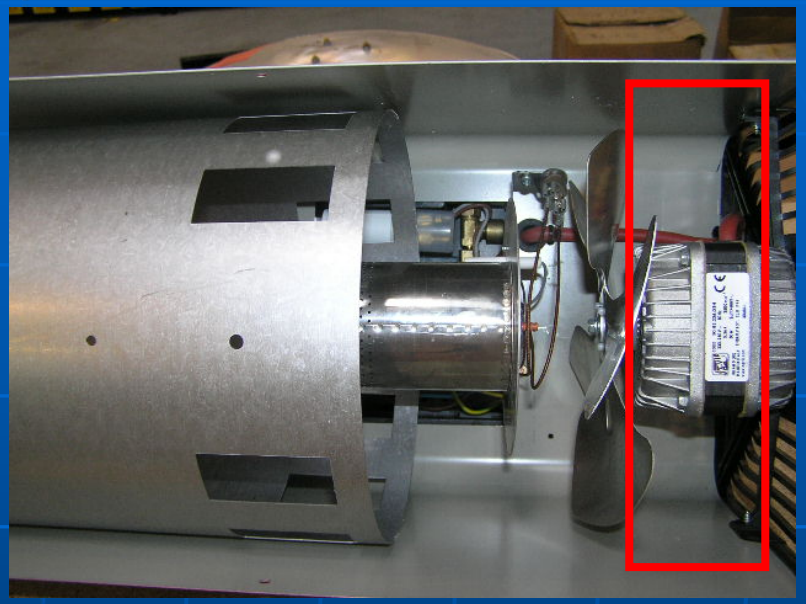

Master has extra metal frame for fixing of electric motor

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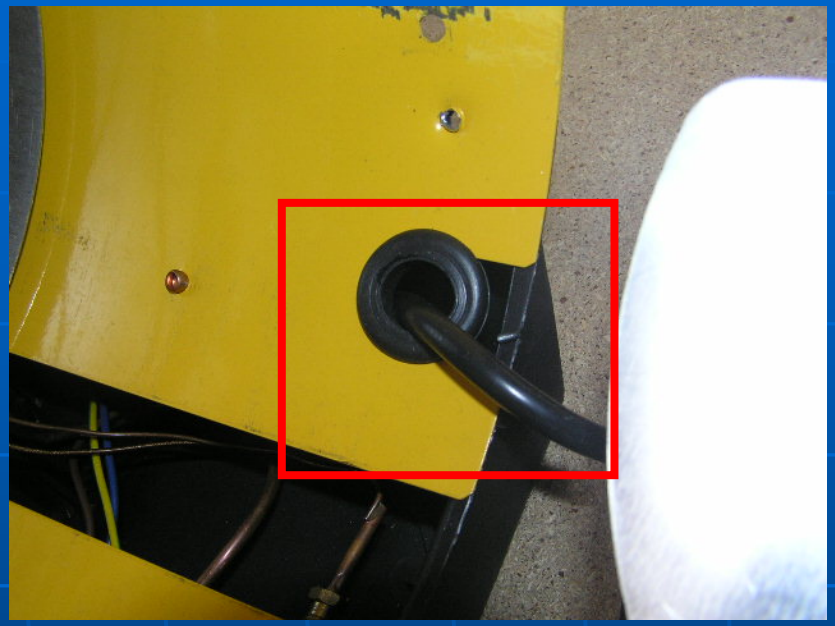

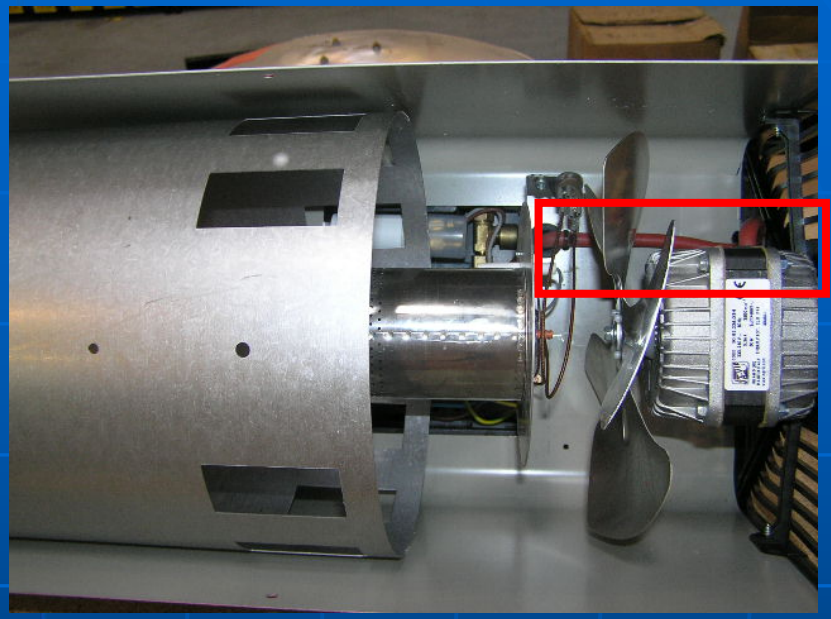

Master has shorter lenght of power cord for electric motor – lesser risk of mechanical damage for that element

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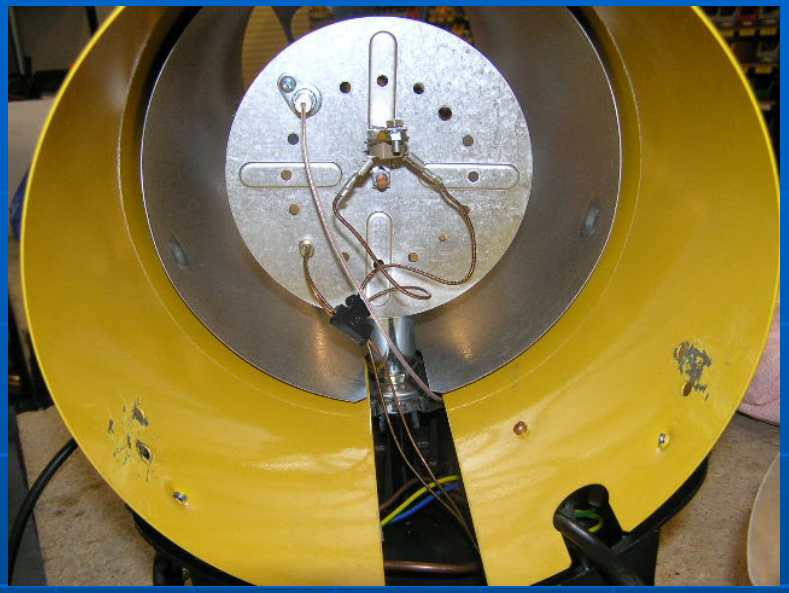

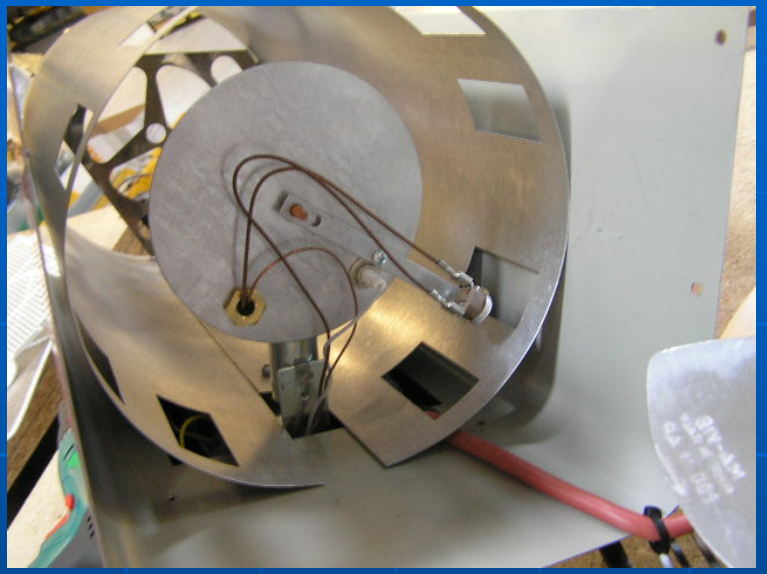

Master has only one cover, Grisou has cover from two parts – our solution is more suitable for service

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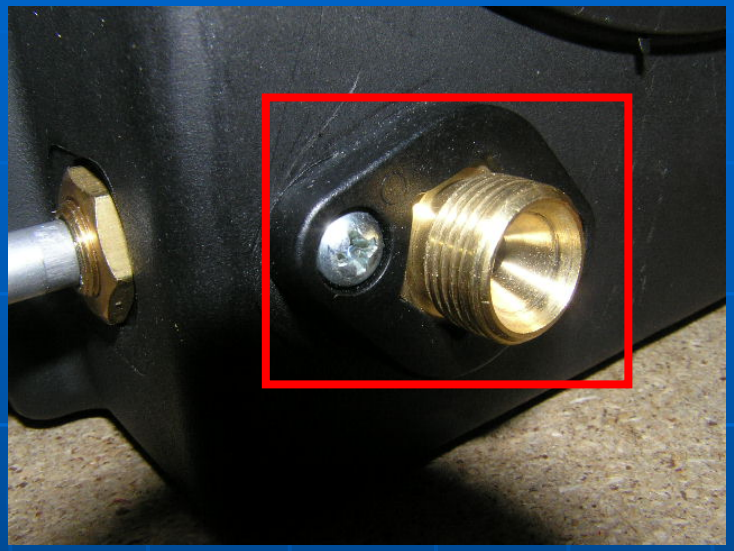
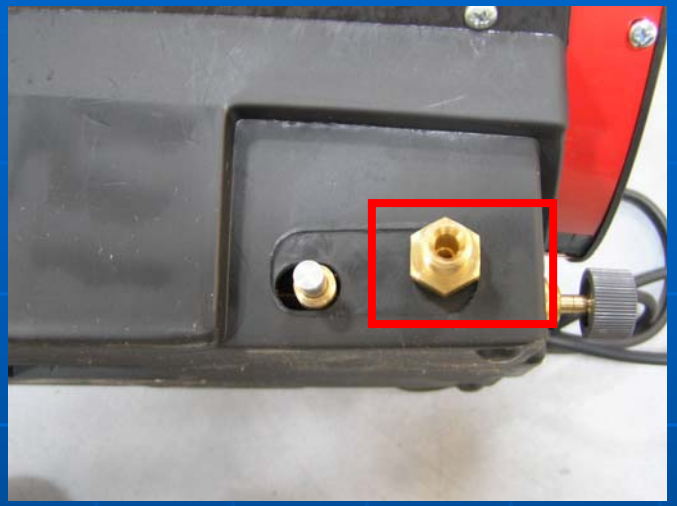
BLP 30 M vs KID 30





Master has additional protection on gas inlet nozzle

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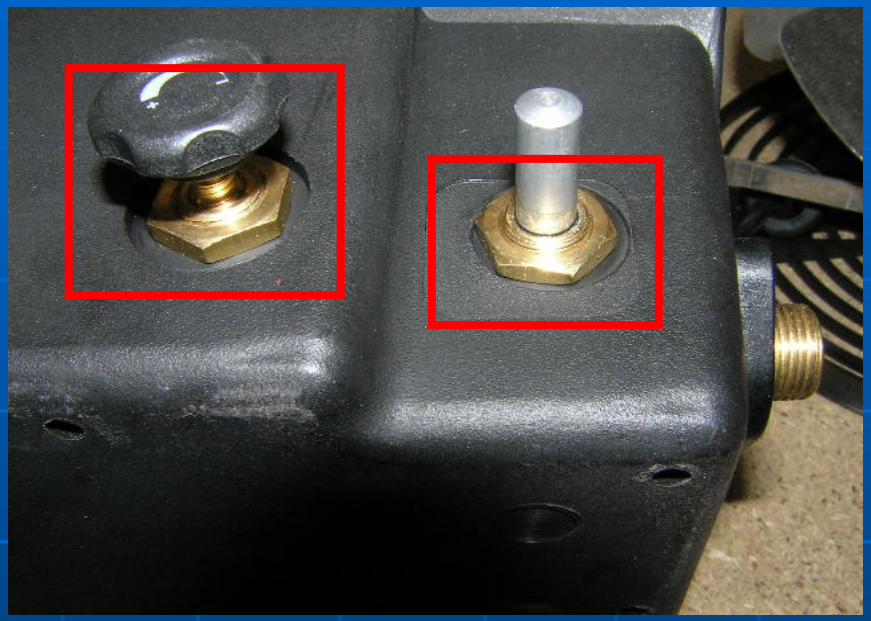

Master has additional nuts on gas cock and safety valve – for better fixing

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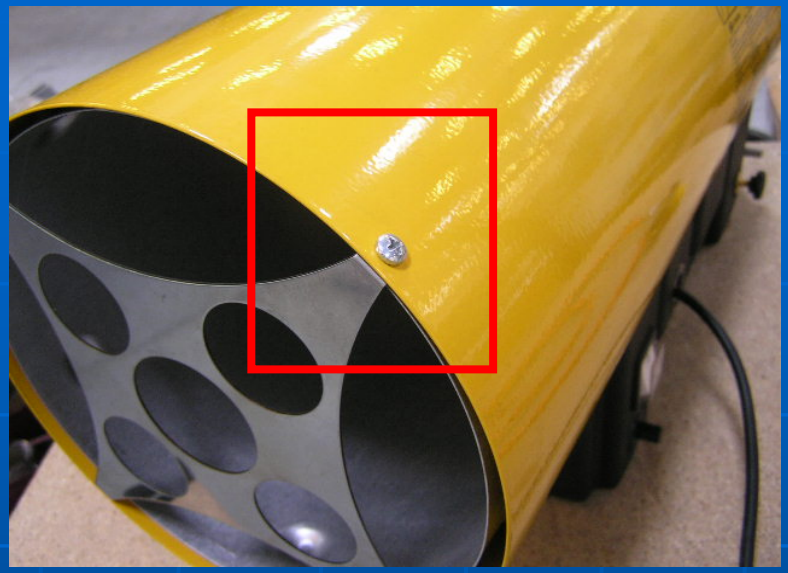
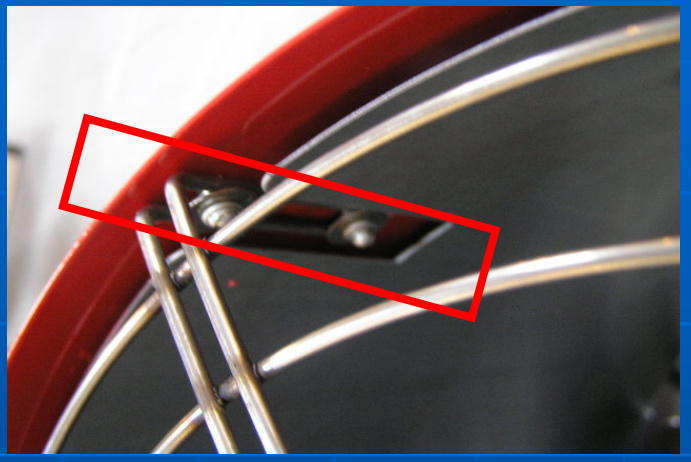
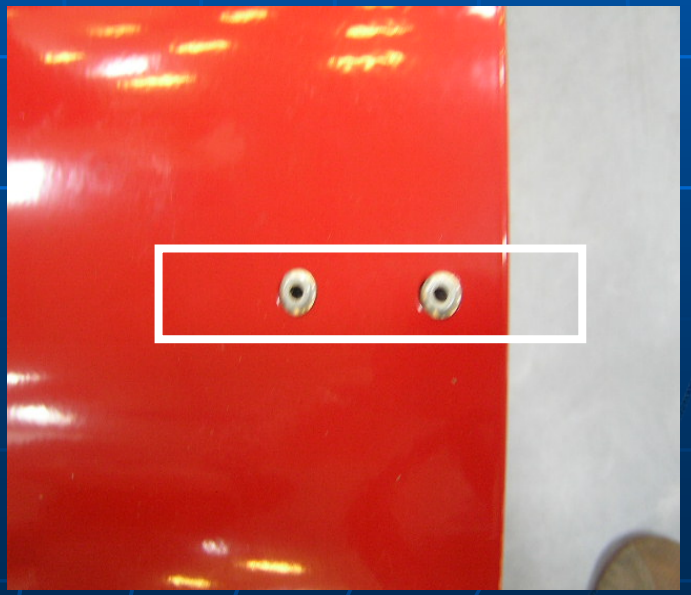




Master has more practical fixing of outlet grid (on screws) witout rivets – servicemen can easy disconnect it.



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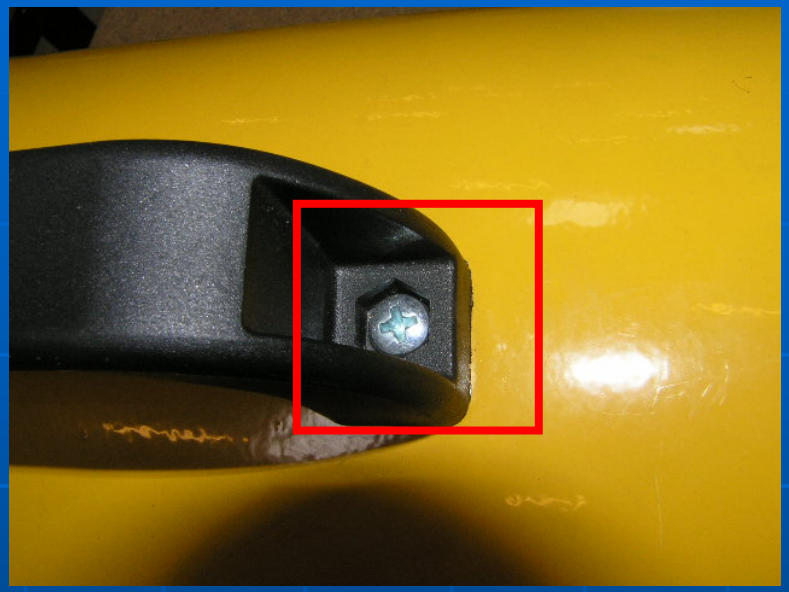

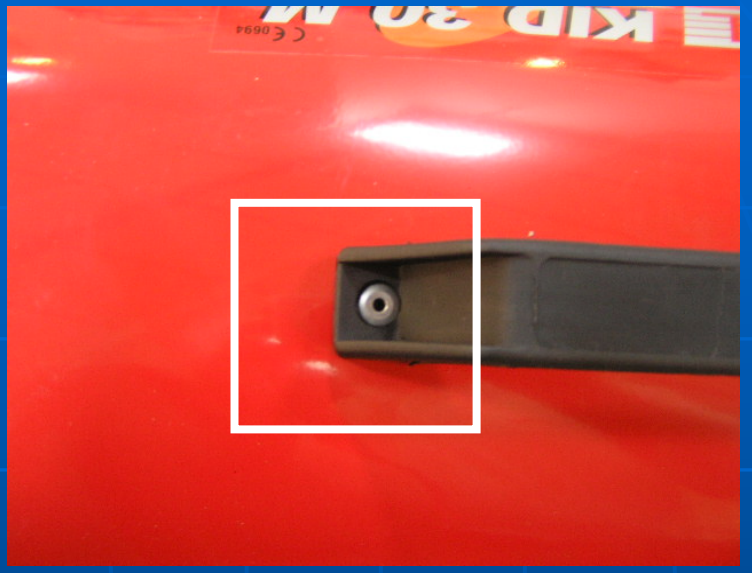

Master has plastic handle mounted on screws not on rivets – more practical

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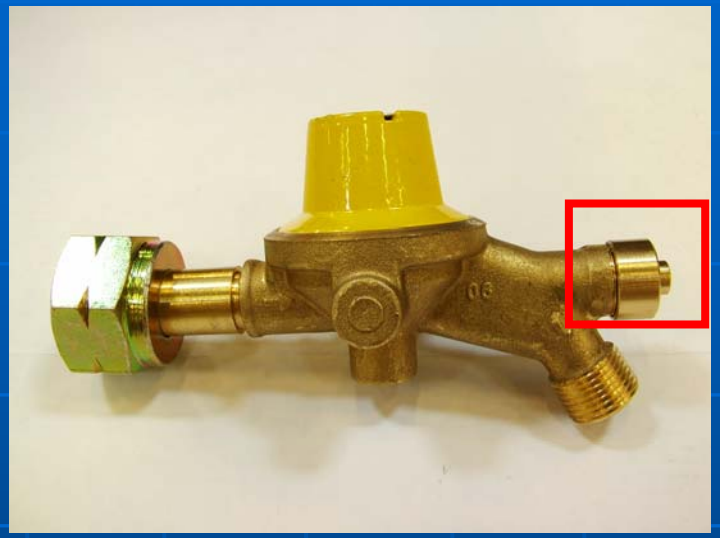

Master has additional under-pressure valve on the reducer (reducing valve) – stops gas delivery in case of broken hose

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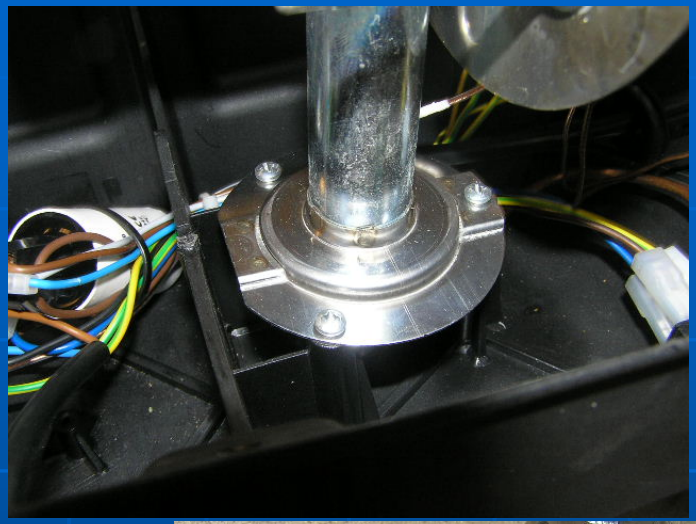

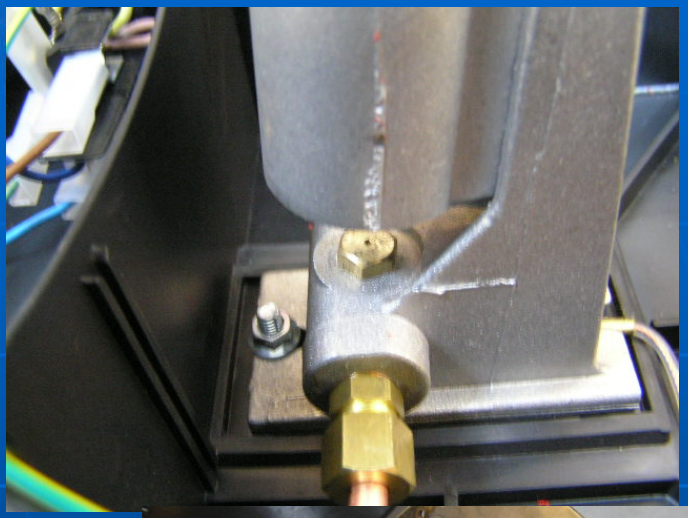

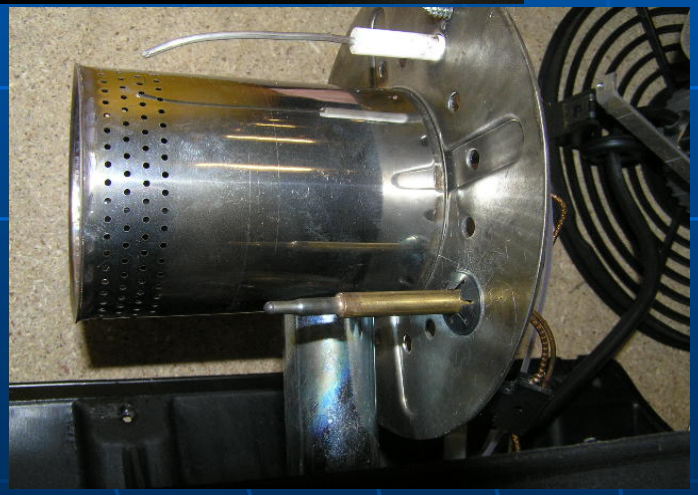

Master has simpler costruction of gas burner – easier service

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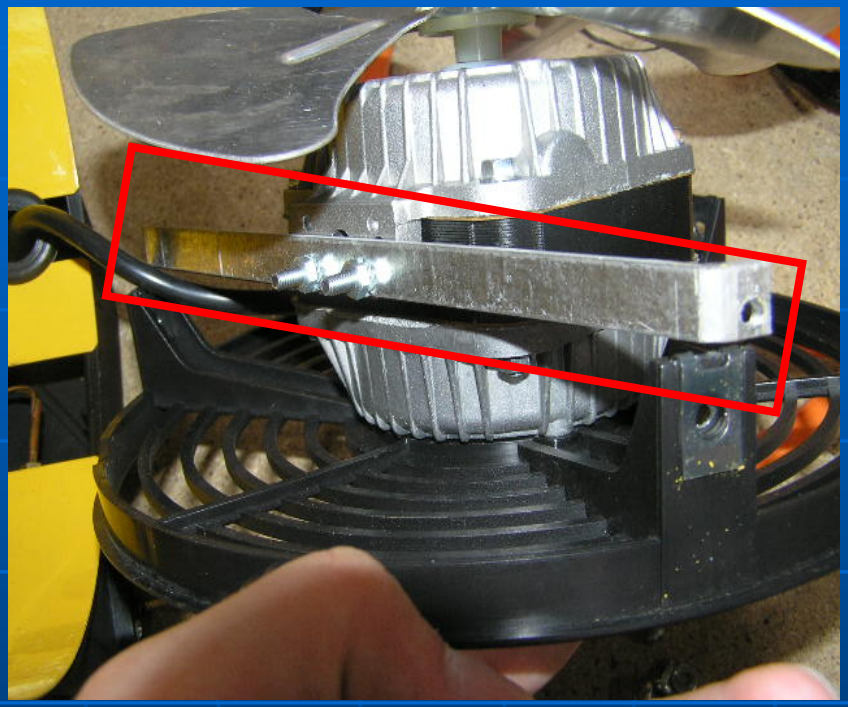

Master has extra metal frame for fixing electric motor

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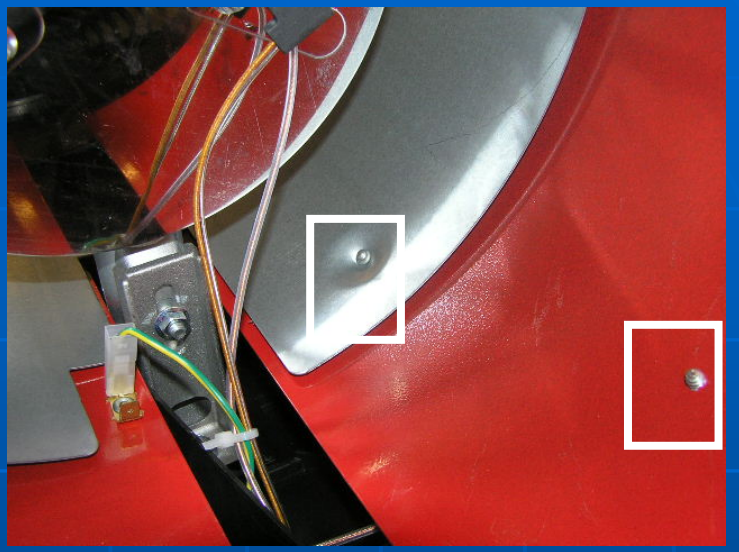
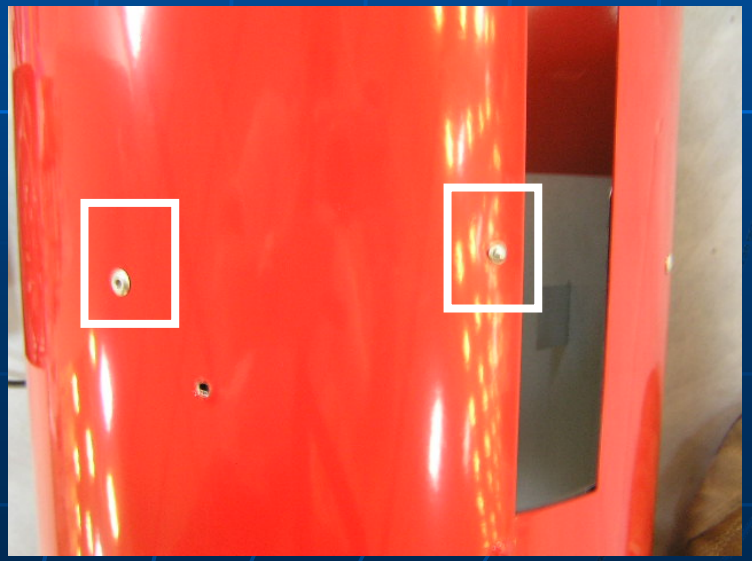


Master do not use rivets for fixing combustion chamber and cover.



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Comparison B 150 CED vs SIAL GRYP 40 and ITM

model	capacity	air displacement	fuel consumption	tank capacity
	[kW] / [kcal/h]	[m^3/h]	[l/h]	[l]
B 150 CED	44 / 38 000	852	about 4,2	43,5
GRYP 40 – SIAL	43 / 37 00	1050	4,25	46
MIZAR 15 - ITM (don't have low pressure models with higher capacity)	16,5 / 14 200	500	about 1,6	20

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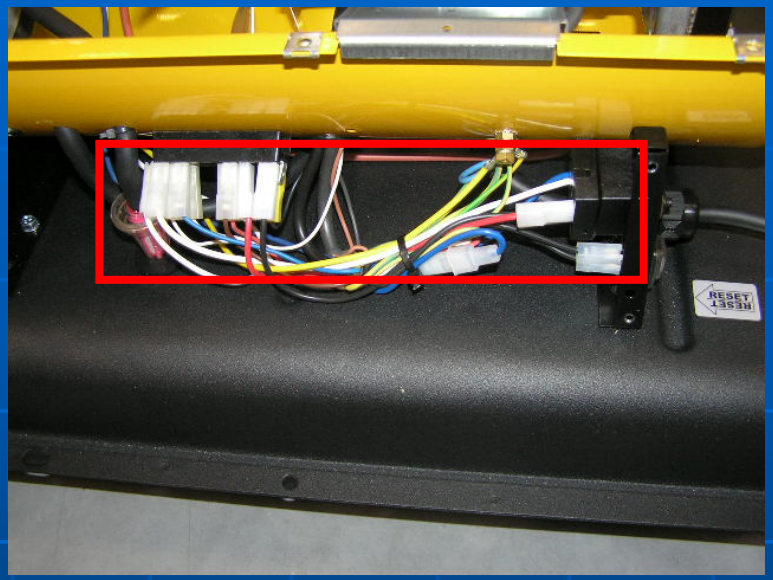
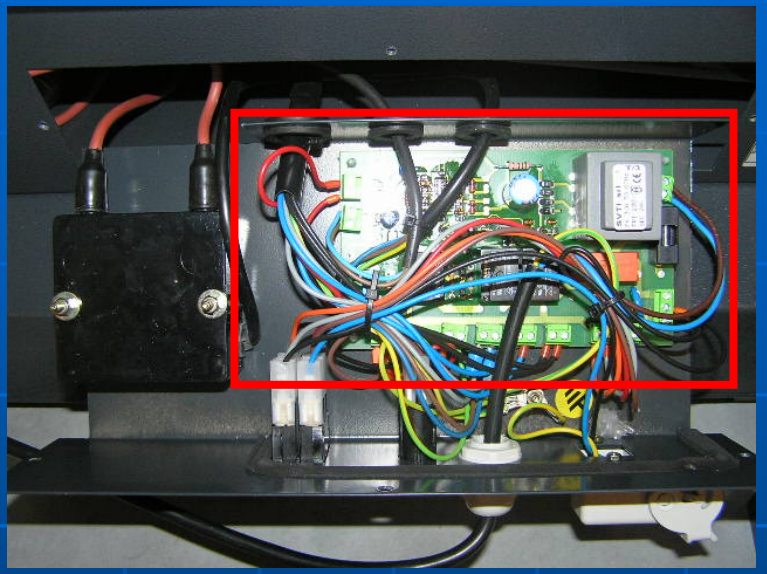
B 150 CED vs MIZAR 15





Master doesn't have pc board – less risk of failures because of not stable voltage

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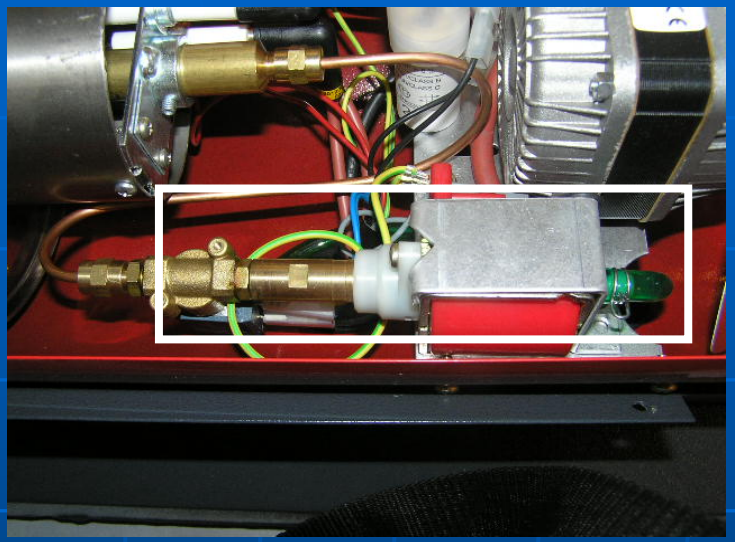

Master has graphite air pump, better solution than electric pump with electrovalve – it can work even on smaller pressure and servicemen can easily repair it – possibility of temporary solutions.

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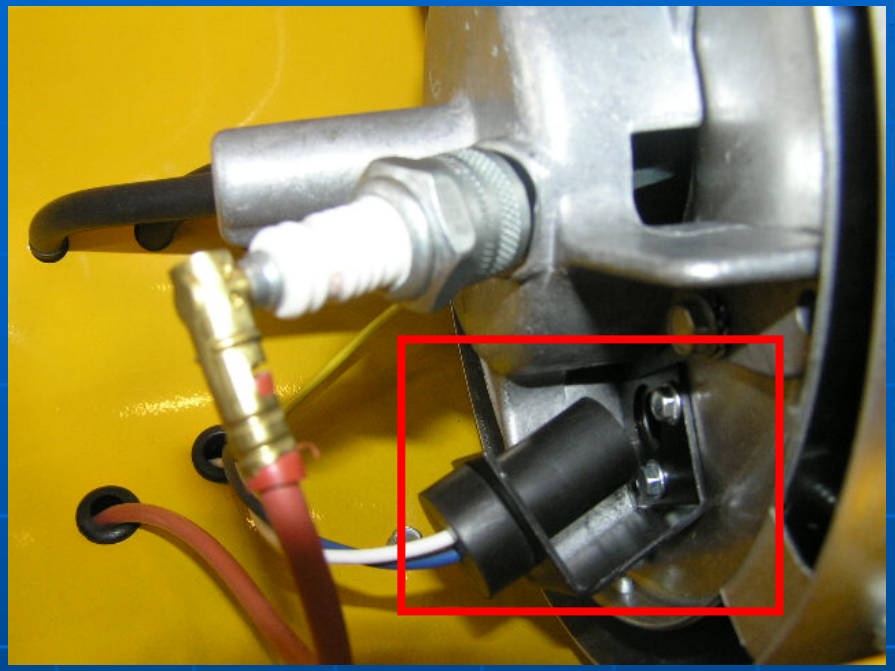

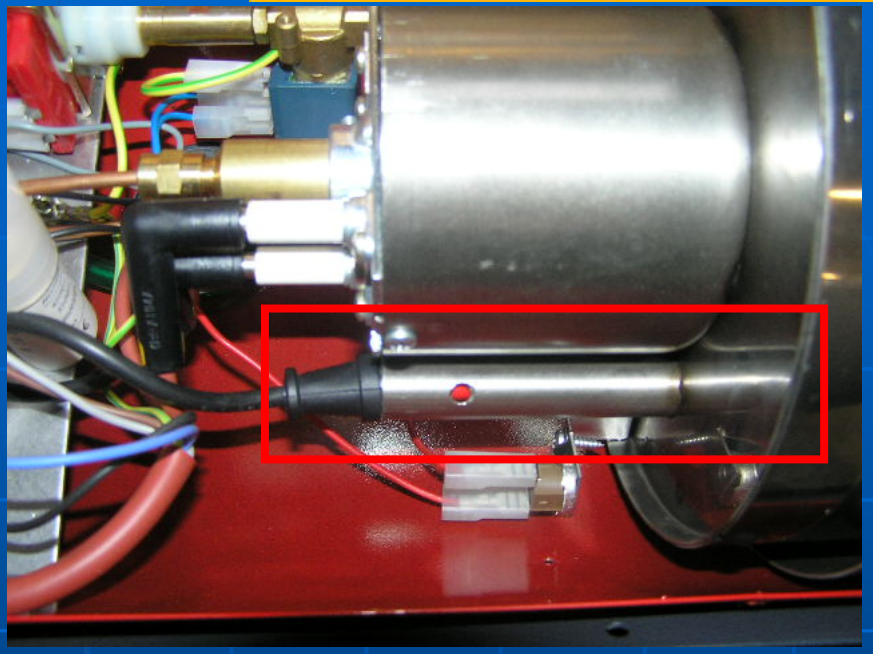

Master has less complicated solution with photocell

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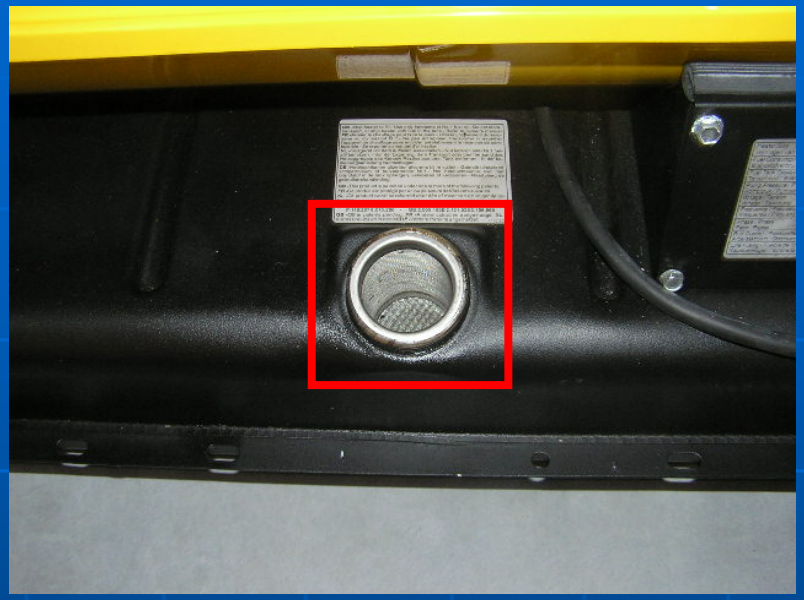

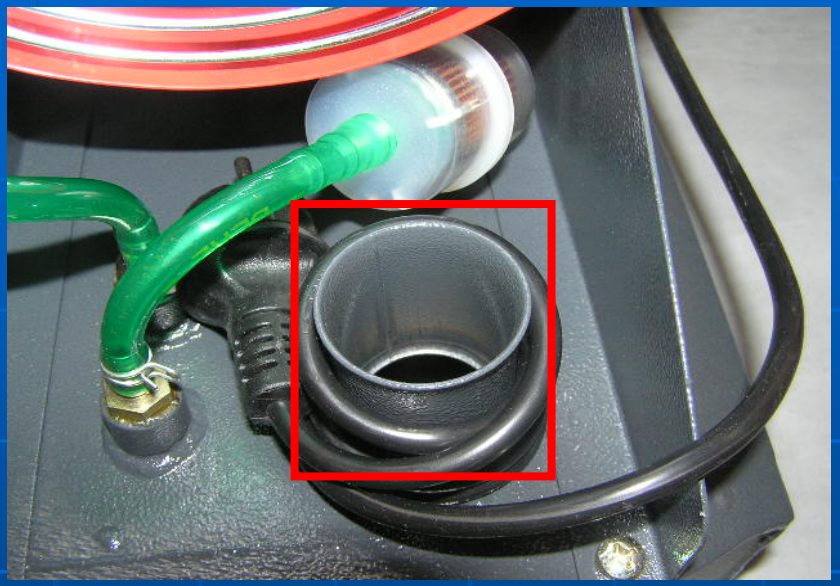

Master has fuel filter at the fuel inlet – first posibility to eliminate impurity of fuel

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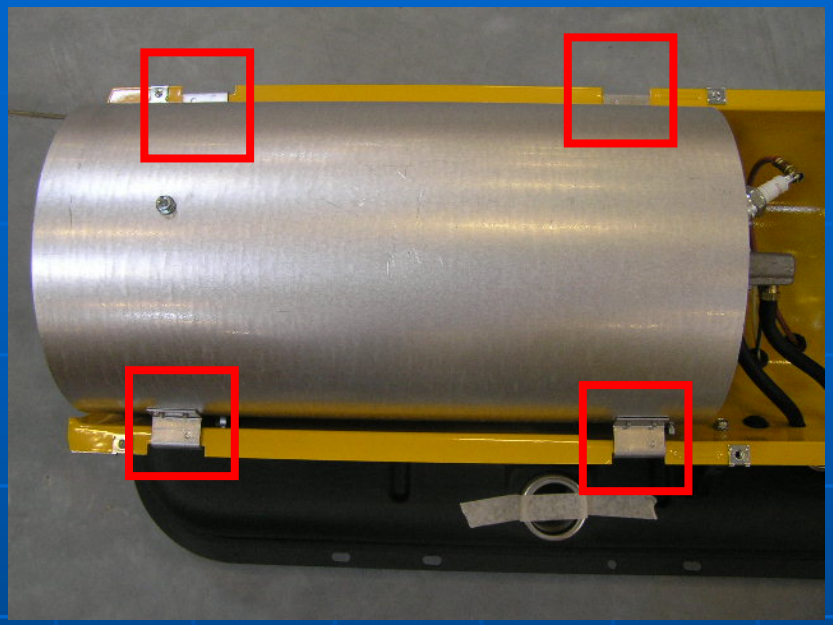

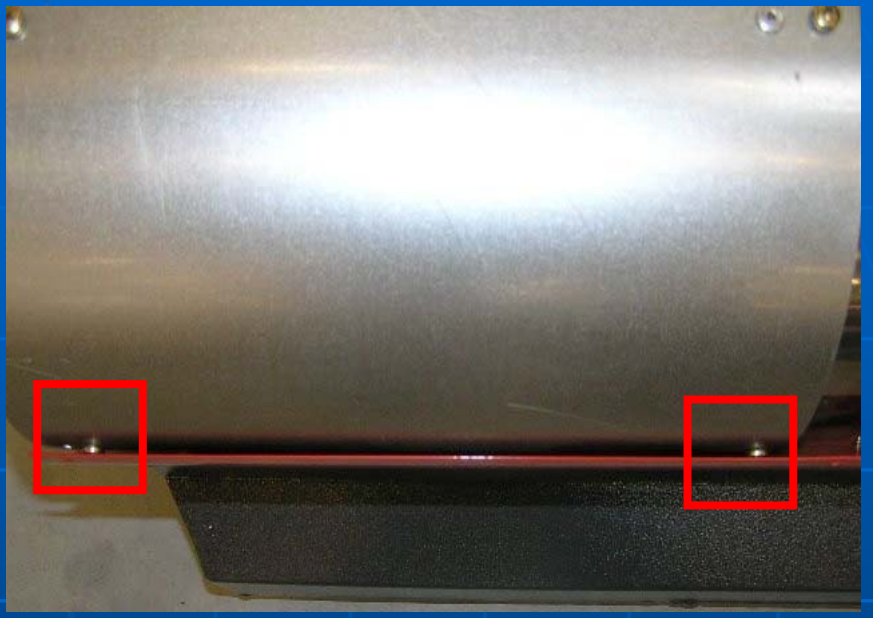

Master has more practical solution with fixing of combustion chamber to the cover – without screws.

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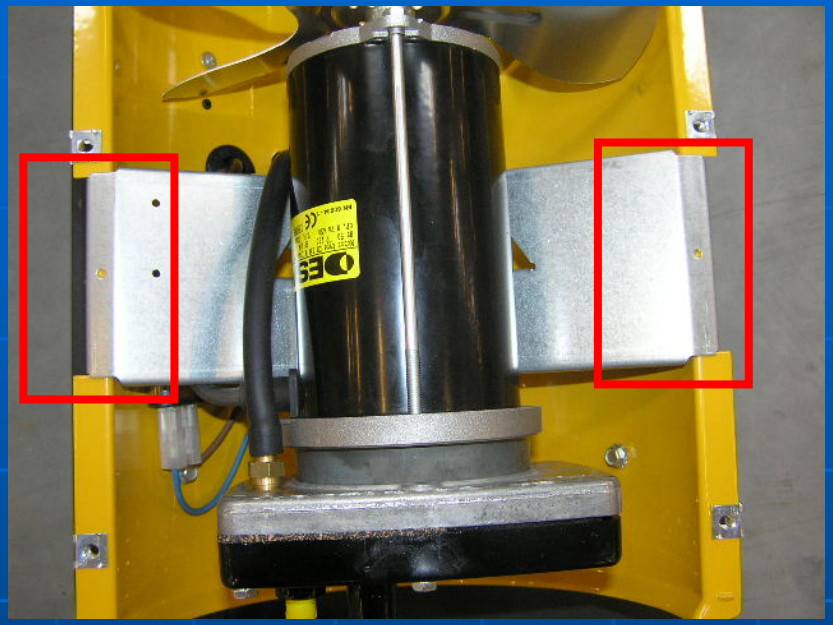

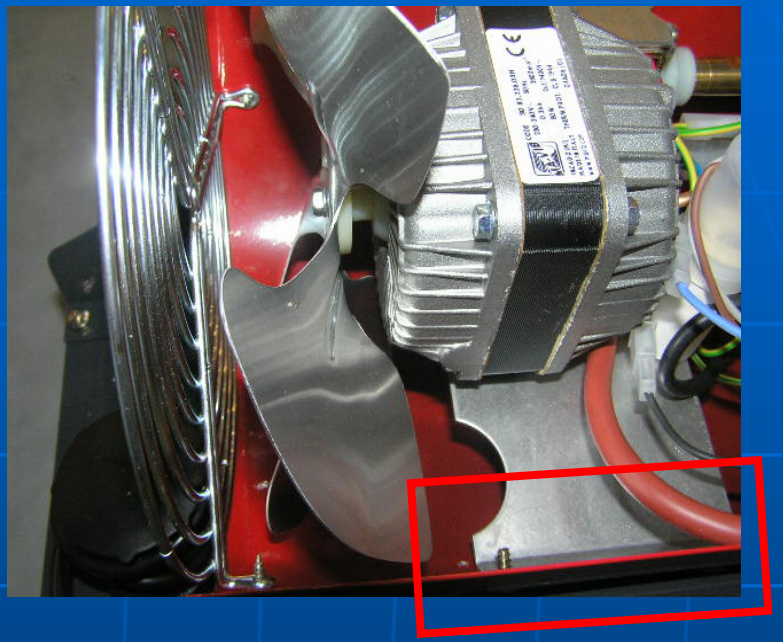

Master has more practical solution with fixing of electric motor to the cover – without screws.

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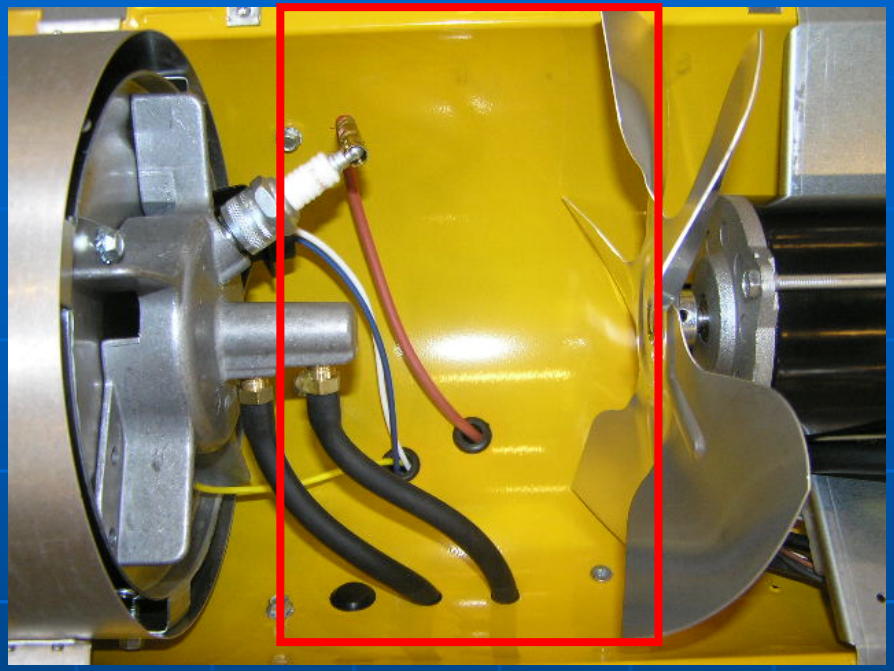
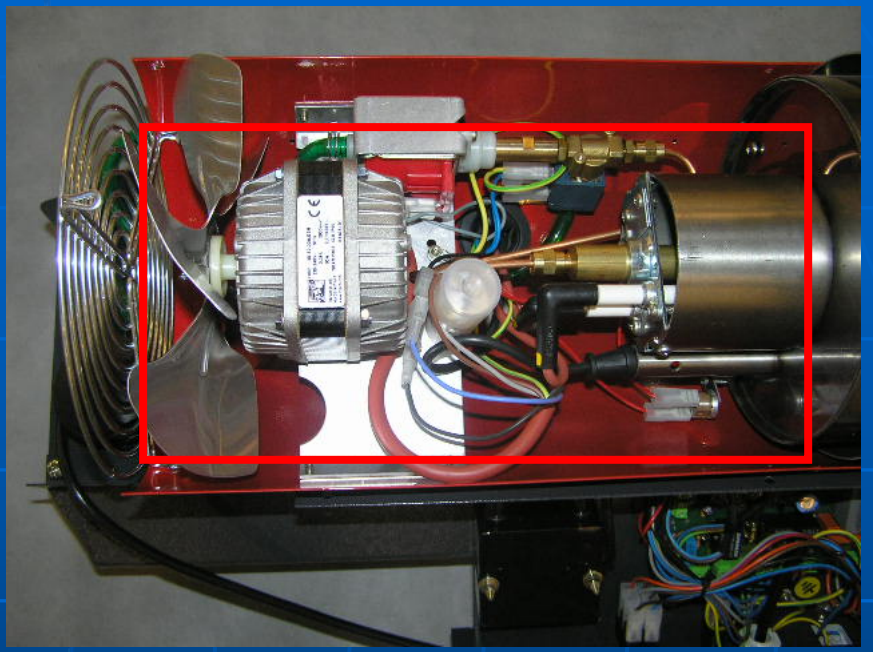
ul. Magazynowa 5A, 62-023 GĄDKI, tel. +48 (0) 61 654 40 00, fax. +48 (0) 61 654 40 01, www.desapoland.pl, e-mail: office@desapoland.pl

MASTER®





Master has more space inside heater – better solution for repairing

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ul. Magazynowa 5A, 62-023 GĄDKI, tel. +48 (0) 61 654 40 00, fax. +48 (0) 61 654 40 01, www.desapoland.pl, e-mail: office@desapoland.pl

B 150 CED vs GRYP 40

Master has separate: cover for air pump and fan guard. In GRYP cover for pump and fan guard are the same element.

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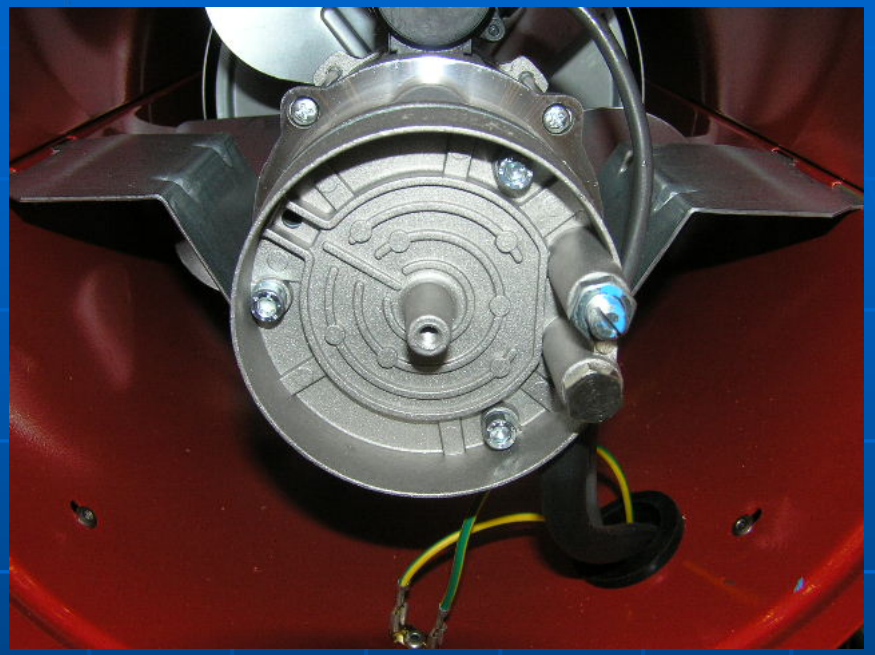

View of air pumps after put-off fan guard

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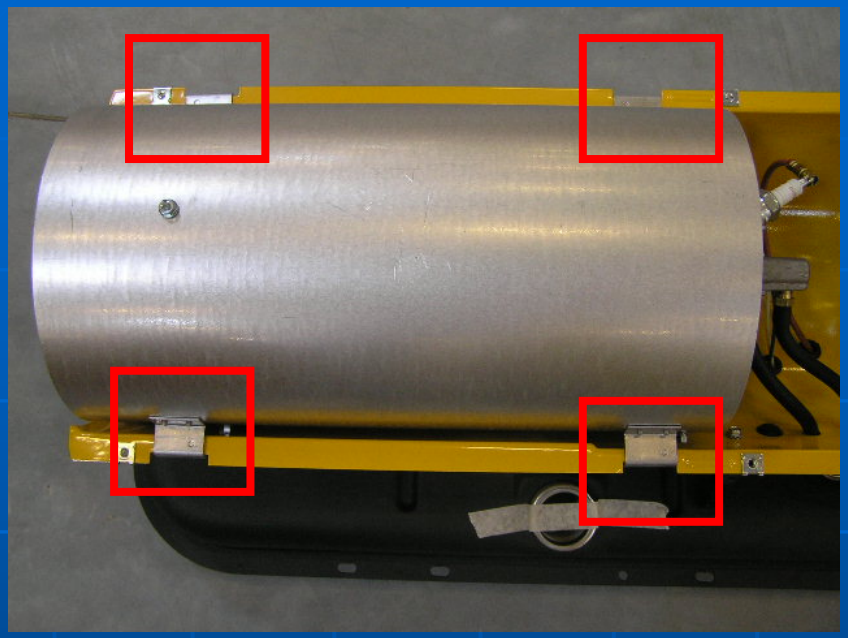
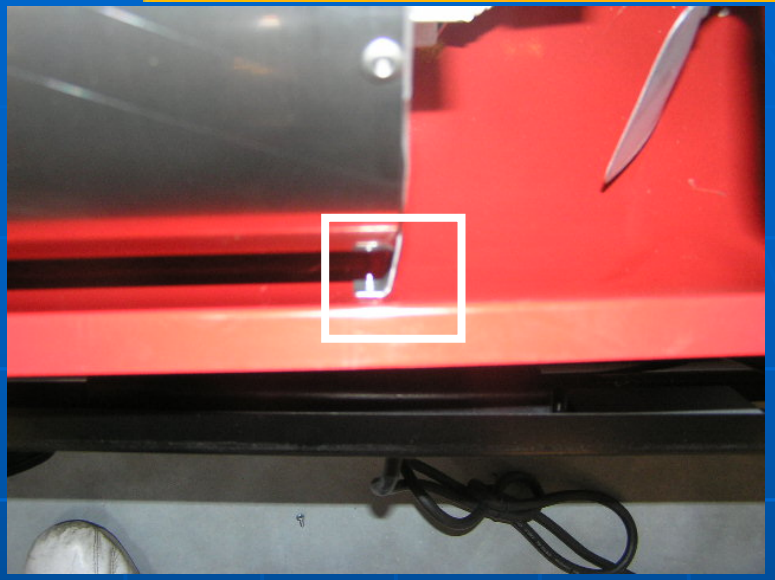
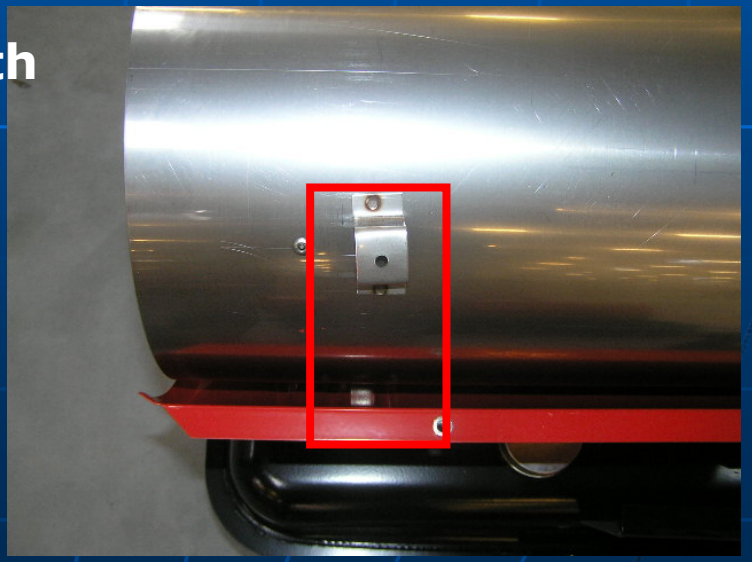




Master has more practical solution with fixing of combustion chamber to the cover – without screws.



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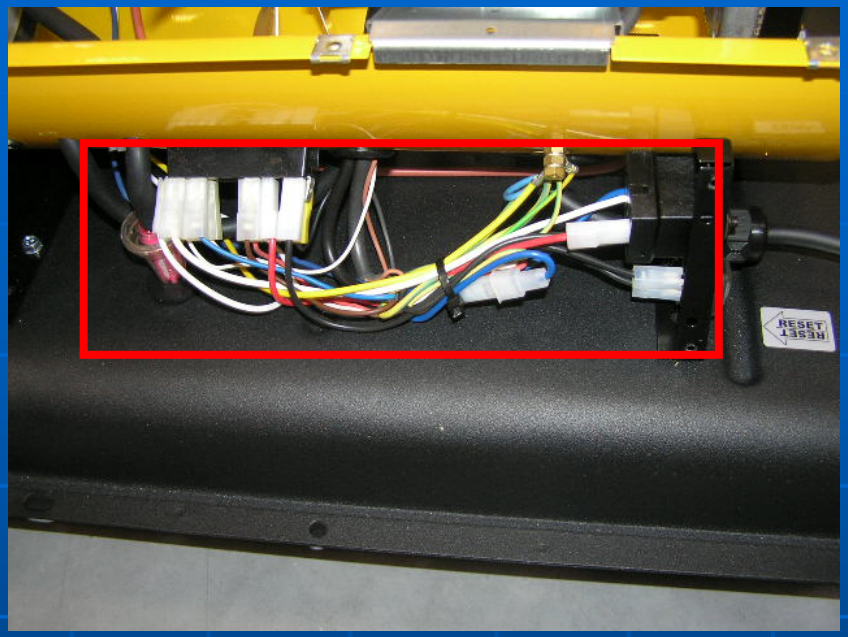

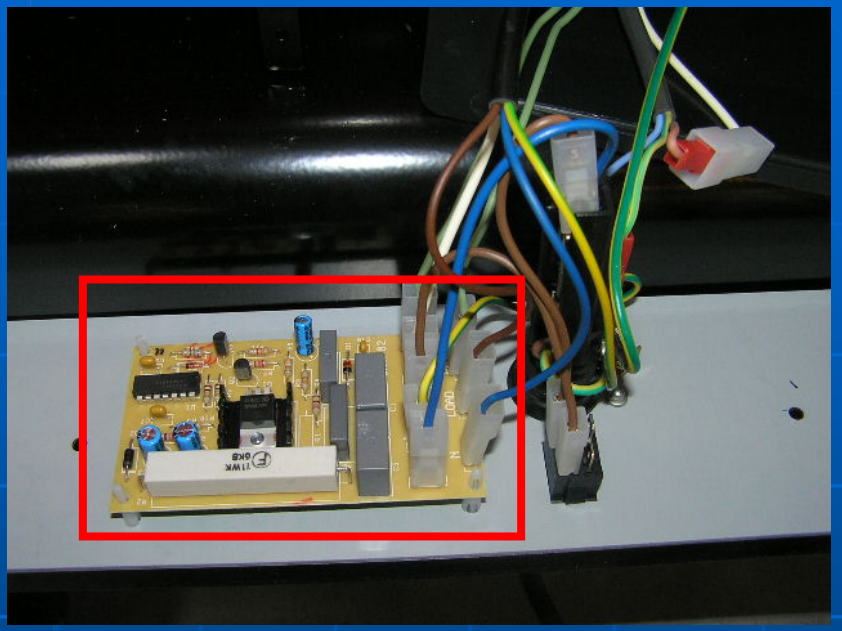

Master doesn’t have a pc board – less risc of failures cause of problems with voltage

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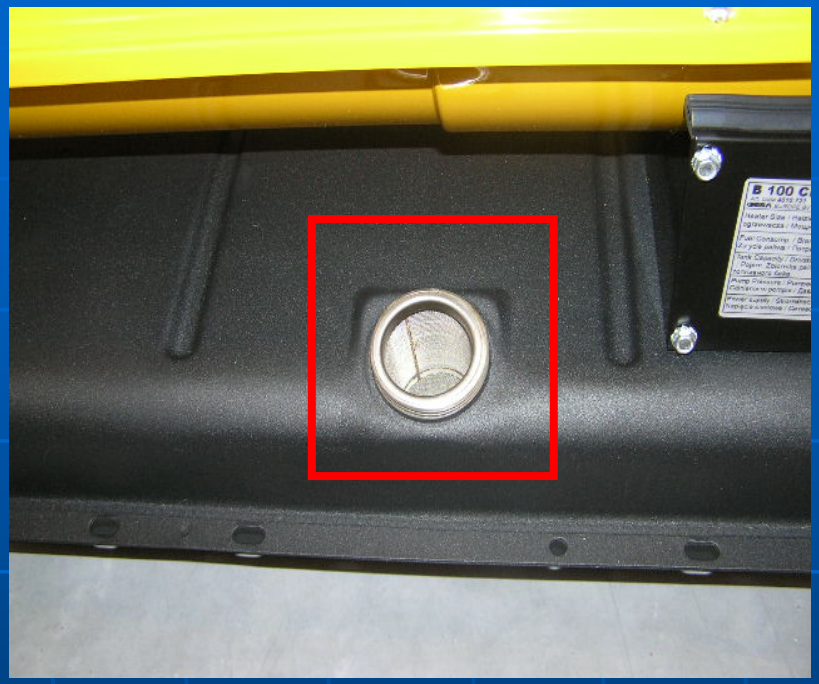
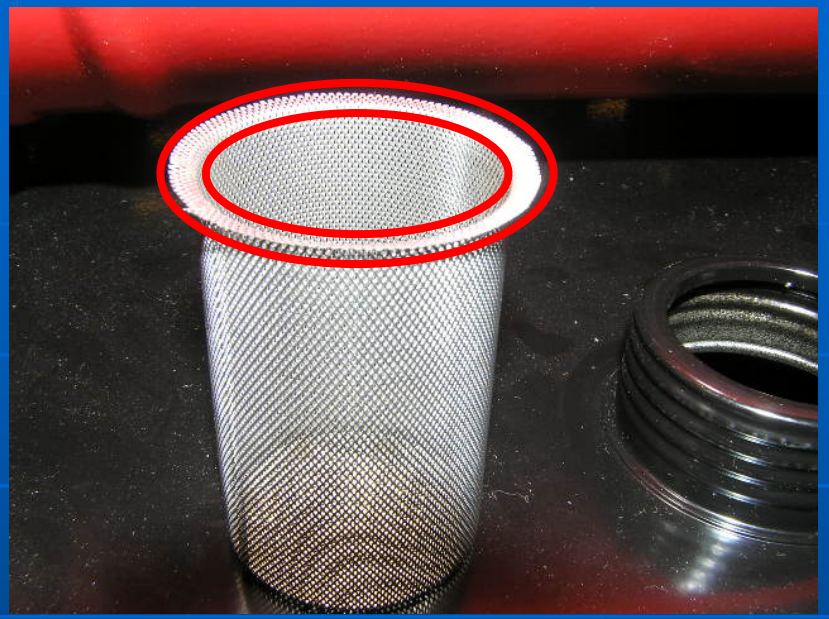


Master has more functional fuel inlet (more space)

DESA POLAND Sp. z o.o.
ul. Magazynowa 5A, 62-023 GĄDKI, tel. +48 (0) 61 654 40 00, fax. +48 (0) 61 654 40 01, www.desapoland.pl, e-mail: office@desapoland.pl



Master has better quality of performance of filter neck screen

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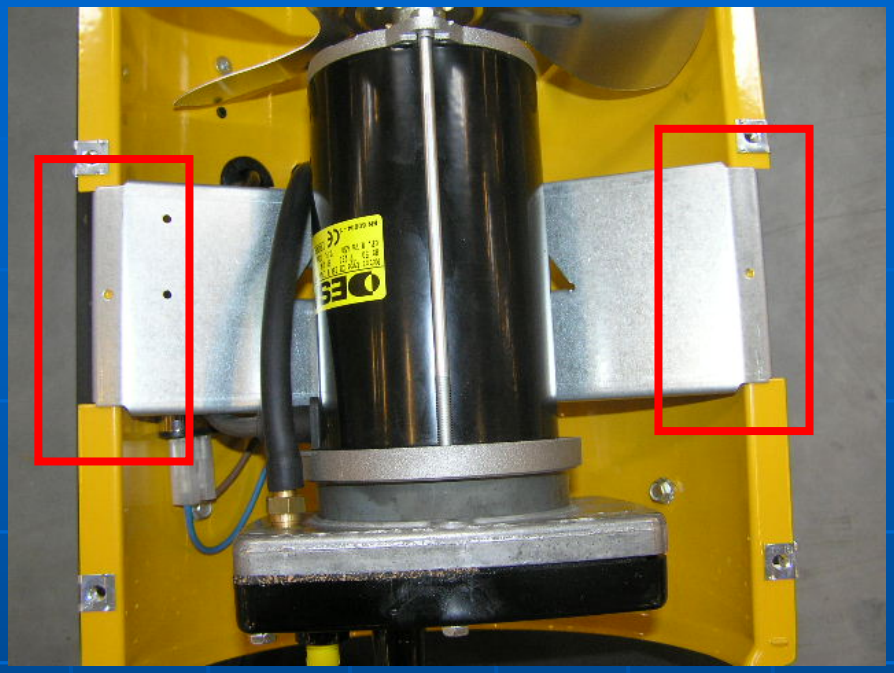

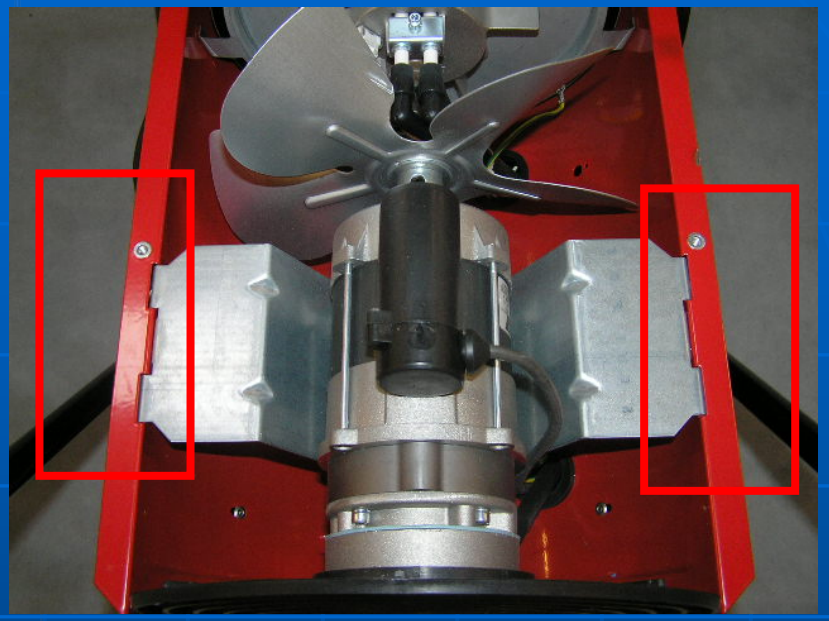

Master has more practical solution with fixing of electric motor to the cover – without screws.

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Comparison BV 170 vs SIAL MIRAGE 55 and ITM ANTARES 50

Model	Capacity	Air displacement	Fuel consumption	Tank capacity
	[kW] / [kcal/h]	[m^3]	[kg/h]	[l]
BV 170	47 / 40 400	1800	3,90	65
MIRAGE 55 - SIAL	52,5 / 45 200	2500	4,1	51
STEEL A 500 - ITM	48,5 / 42 000	1900	4	70

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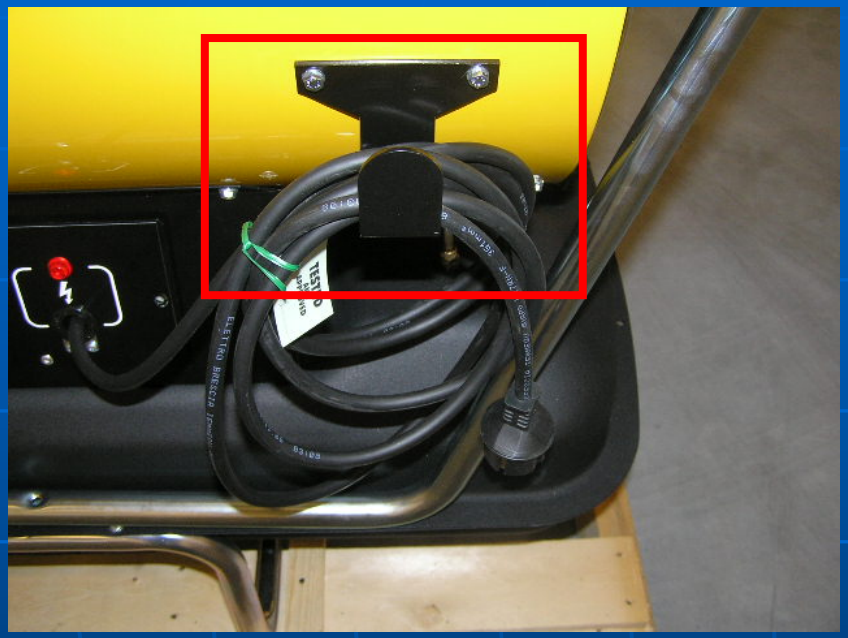
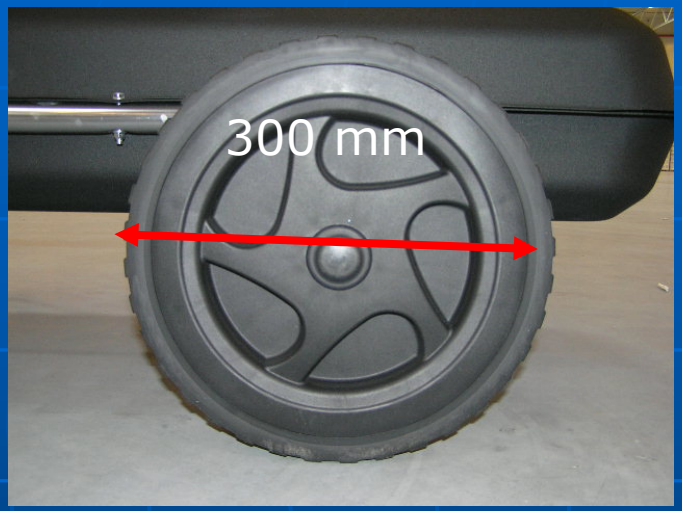
BV 170 vs MIRAGE 55



Master has handle for power cord

DESA POLAND Sp. z o.o.
ul. Magazynowa 5A, 62-023 GĄDKI, tel. +48 (0) 61 654 40 00, fax. +48 (0) 61 654 40 01, www.desapoland.pl, e-mail: office@desapoland.pl



Master has bigger wheel for better transportation

DESA POLAND Sp. z o.o.
ul. Magazynowa 5A, 62-023 GĄDKI, tel. +48 (0) 61 654 40 00, fax. +48 (0) 61 654 40 01, www.desapoland.pl, e-mail: office@desapoland.pl

Inclinated tank for easy refueling and better transportation (heavy point)

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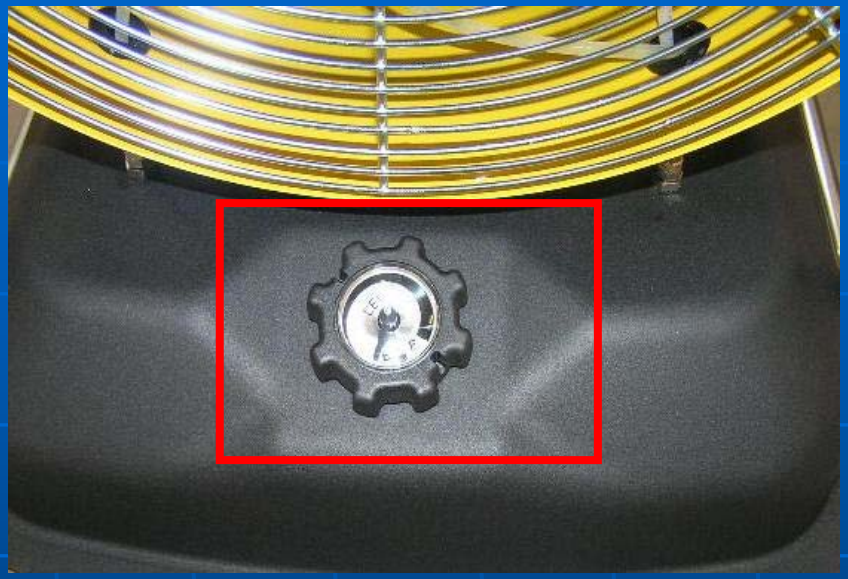

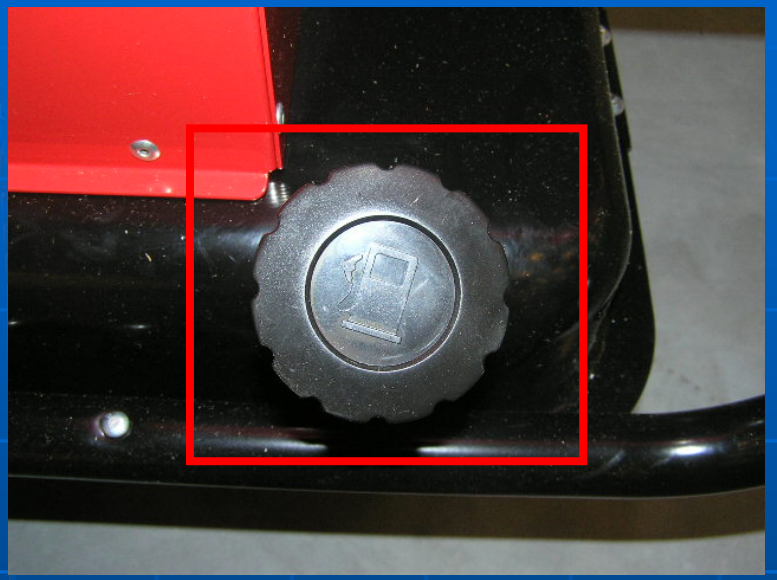

Master has fuel level probe

DESA POLAND Sp. z o.o.
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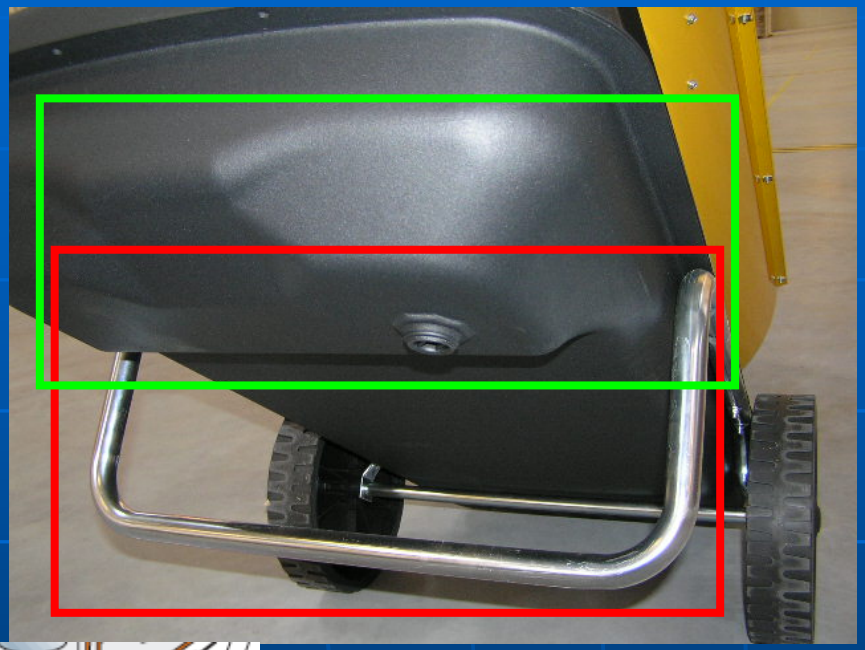

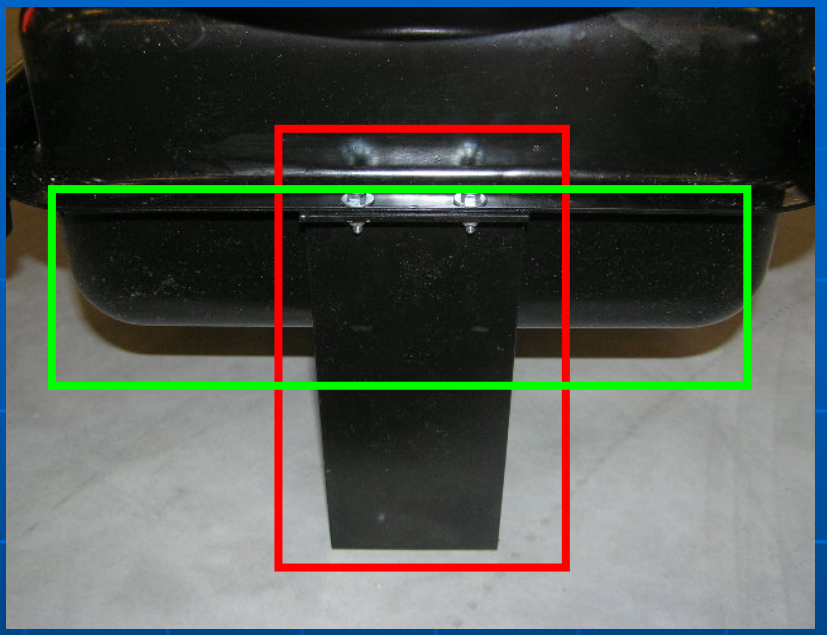

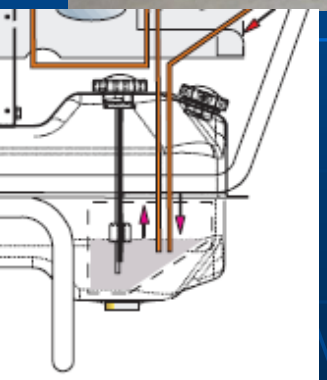

Master has bigger surface of foot frame – more stable.

Master has inclinated down-back side of the tank – better service (cleaning)

DESA POLAND Sp. z o.o.
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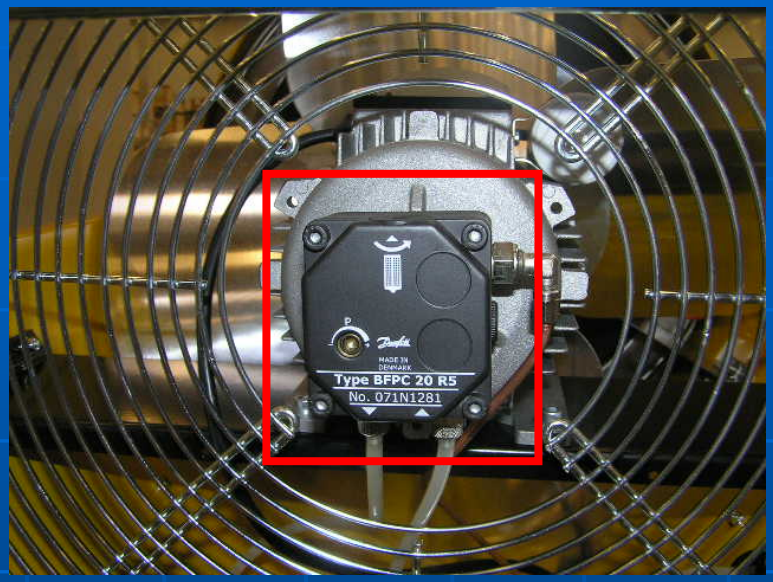

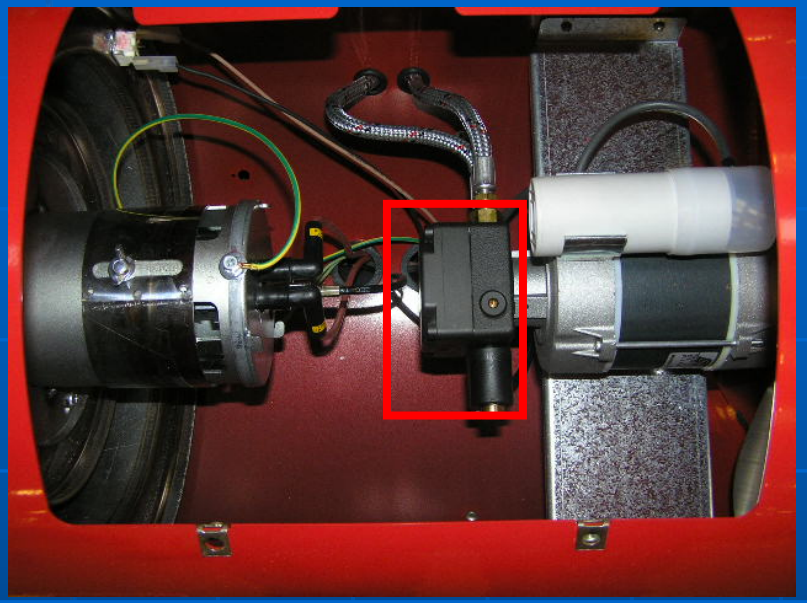

Master has fuel pump outside heater – better solution

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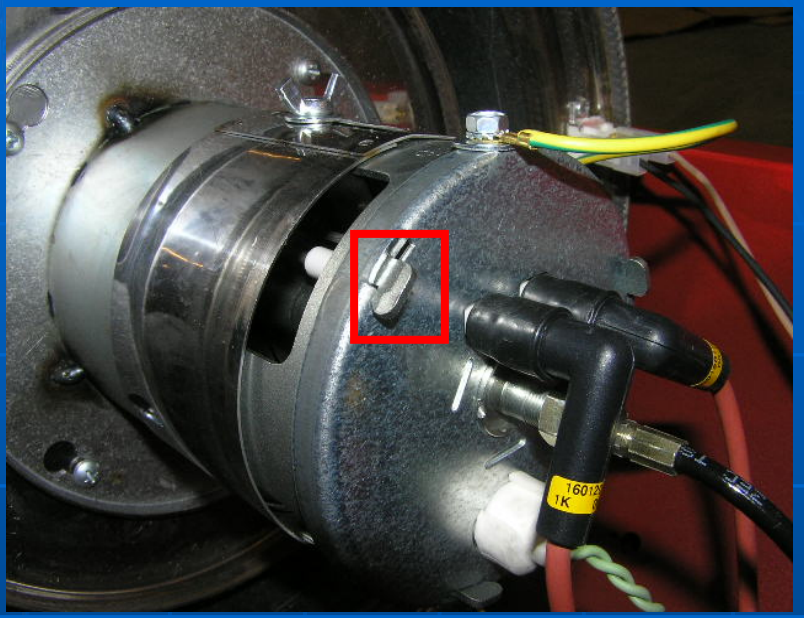

Master has more pratical fixing of burner (screws)

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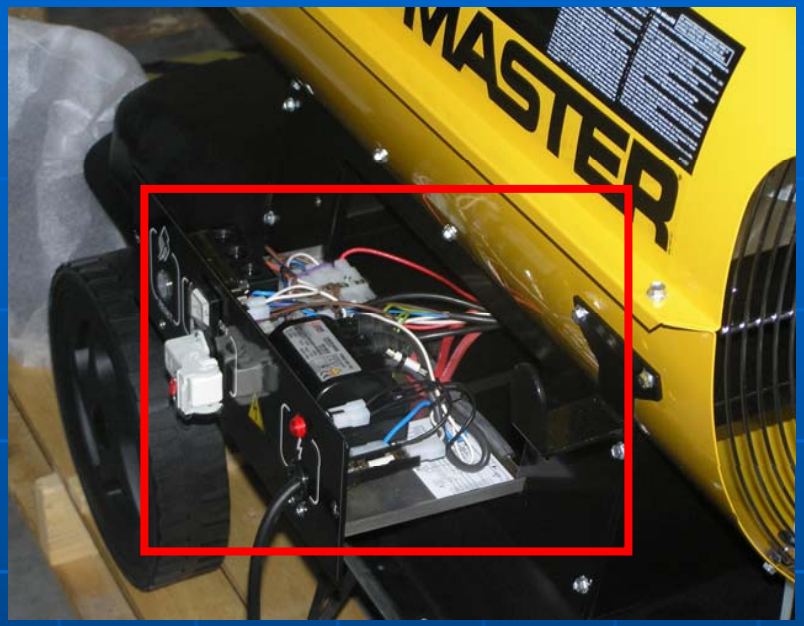
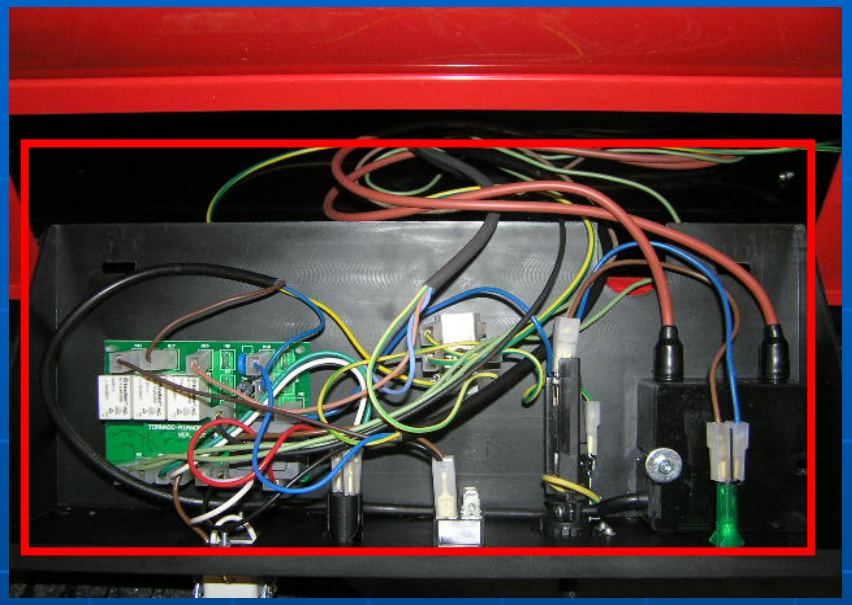
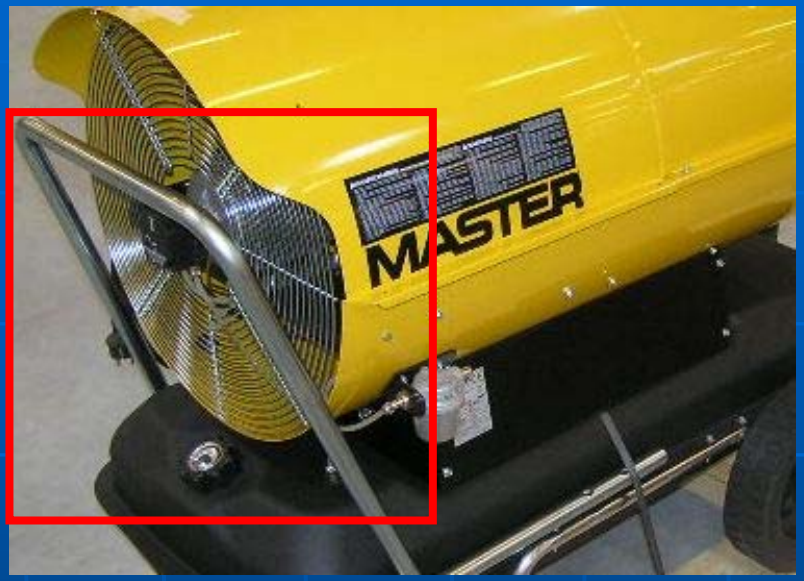
ul. Magazynowa 5A, 62-023 GĄDKI, tel. +48 (0) 61 654 40 00, fax. +48 (0) 61 654 40 01, www.desapoland.pl, e-mail: office@desapoland.pl





Master has shelf for electric components – better for service

DESA POLAND Sp. z o.o.
ul. Magazynowa 5A, 62-023 GĄDKI, tel. +48 (0) 61 654 40 00, fax. +48 (0) 61 654 40 01, www.desapoland.pl, e-mail: office@desapoland.pl



Master has handles at the higher part of heater – more suitable for transportation

DESA POLAND Sp. z o.o.
ul. Magazynowa 5A, 62-023 GĄDKI, tel. +48 (0) 61 654 40 00, fax. +48 (0) 61 654 40 01, www.desapoland.pl, e-mail: office@desapoland.pl

Covers in Master connect on screws not on rivets

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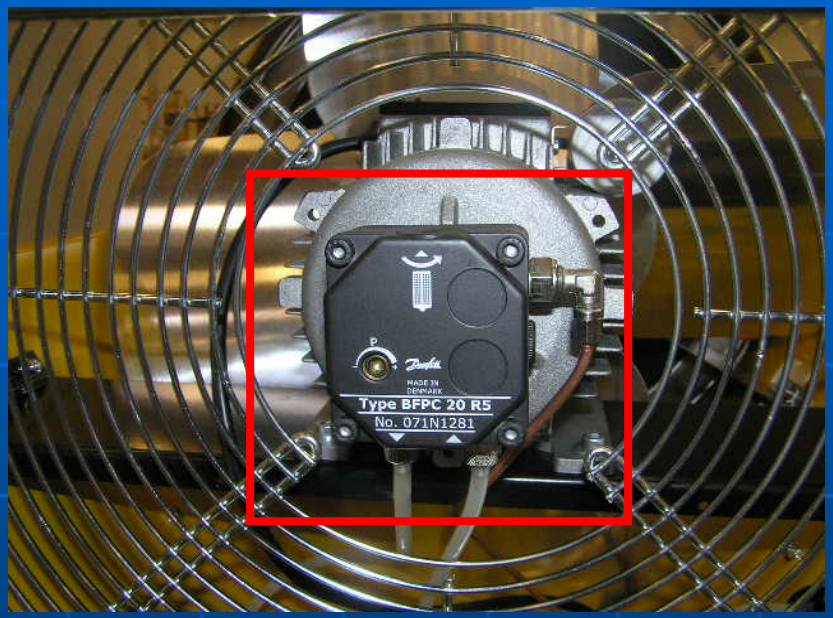
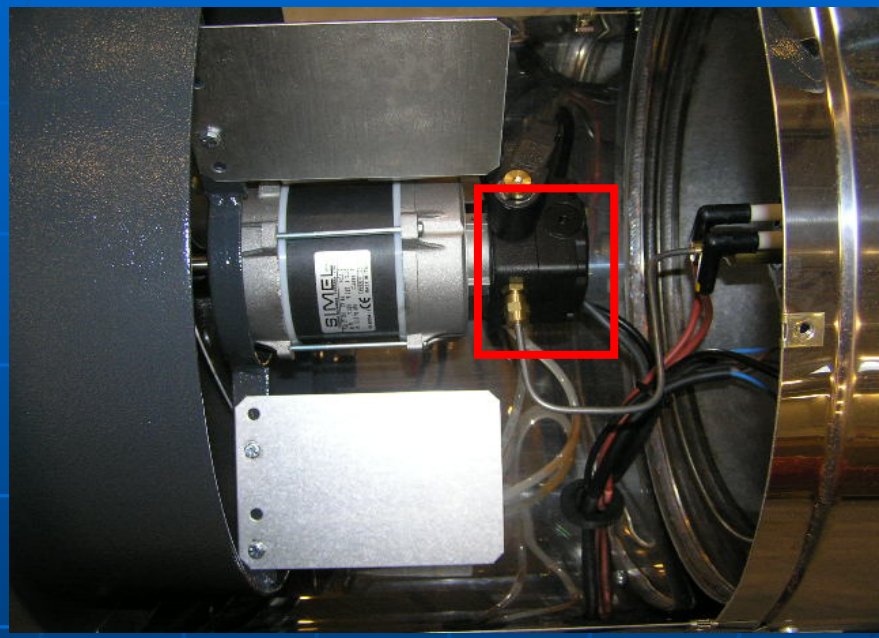
BV 170 vs STEEL A 500





Master has fuel pump outside heater – better solution

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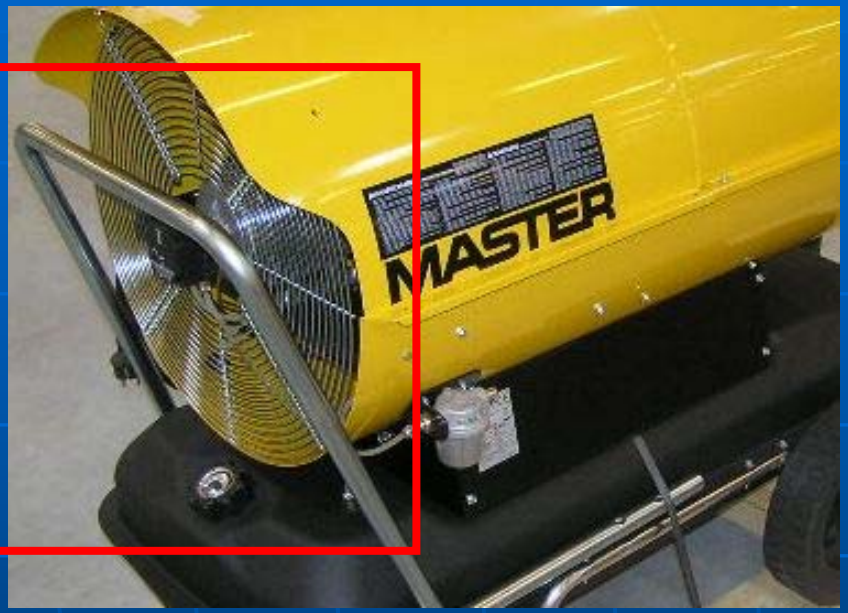

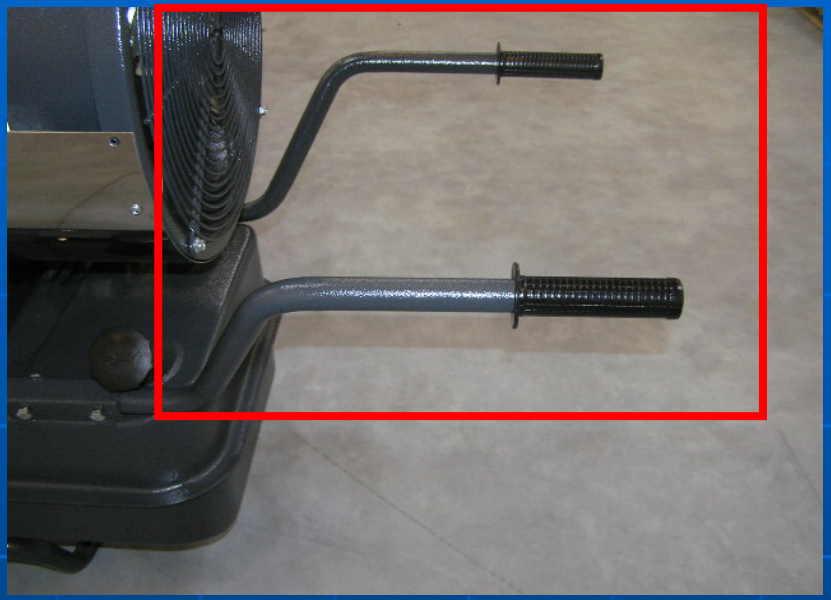

Master has handles at the higher part of heater – more suitable for transportation

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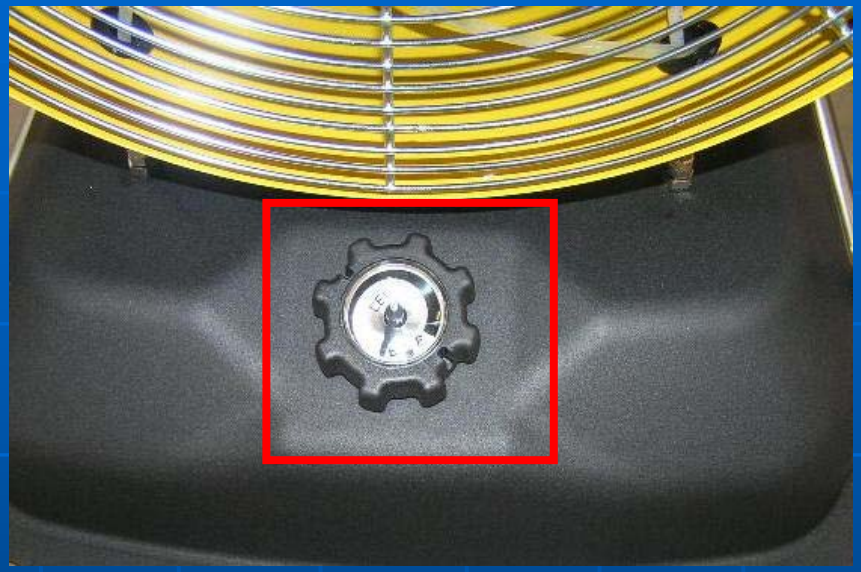

Master has fuel level probe

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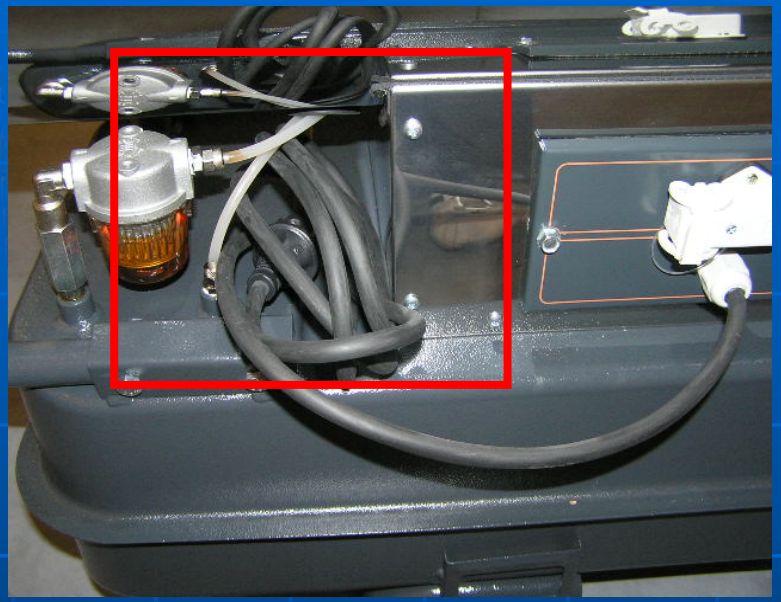

Master has handle for power cord

DESA POLAND Sp. z o.o.
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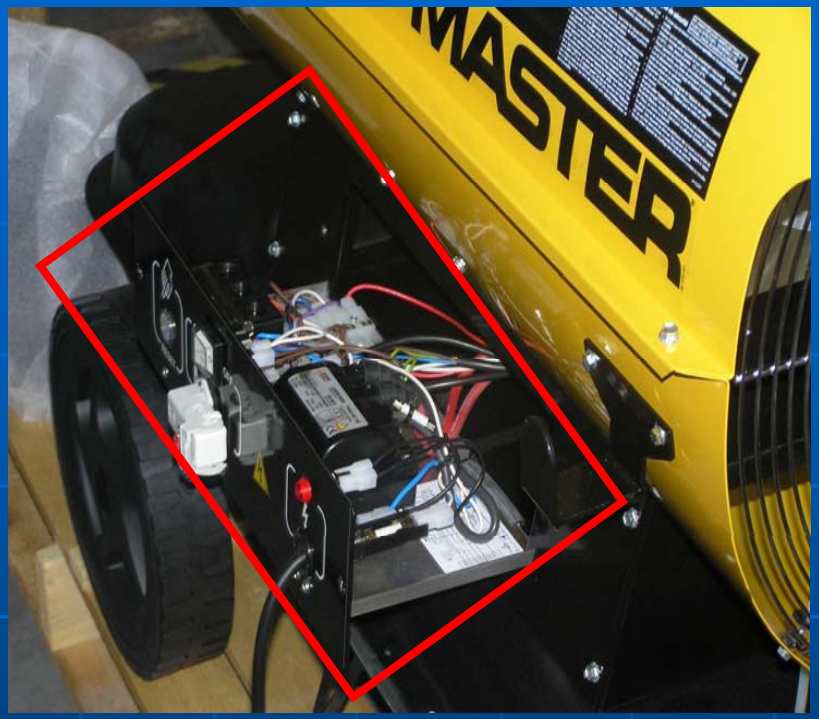

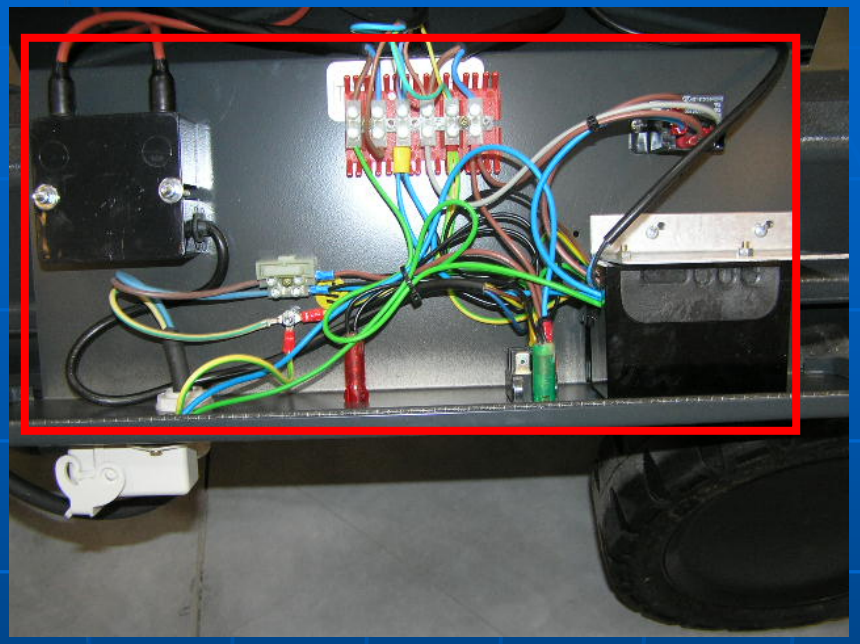

Master has shelf for electric components – better for service

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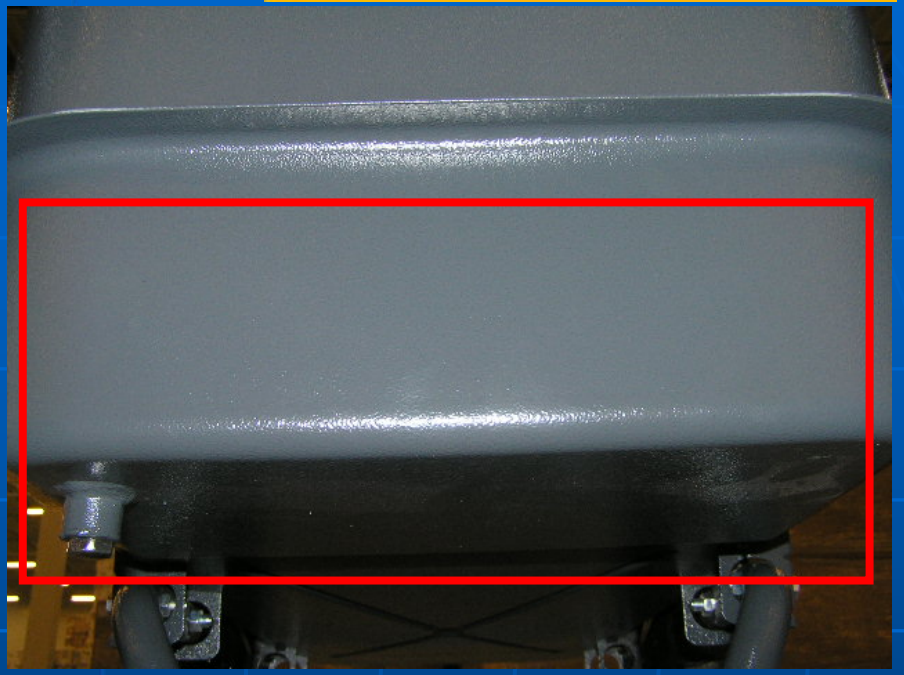

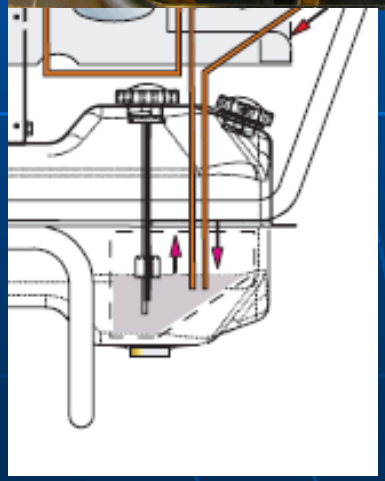

Master has inclinated down-back side of the tank – better service (cleaning)

DESA POLAND Sp. z o.o.
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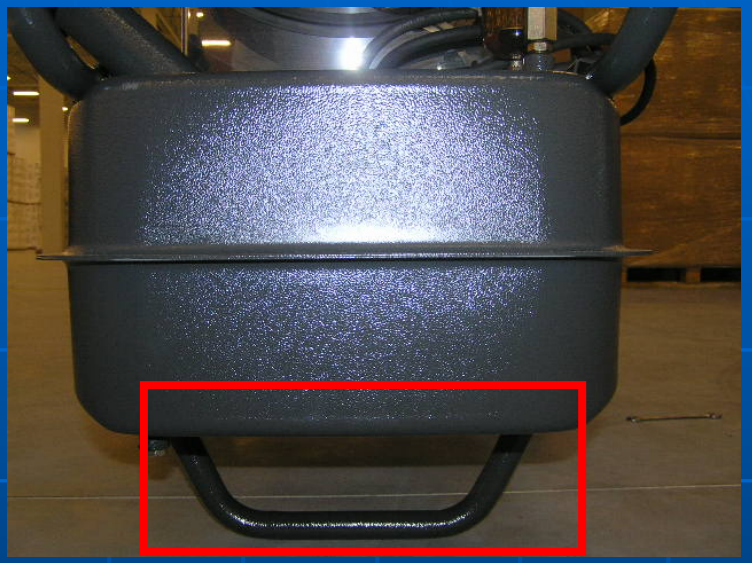

Master has bigger surface of foot frame – more stable.

DESA POLAND Sp. z o.o.
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MASTER®

Inclinated tank for easy refueling and better transportation (heavy point)

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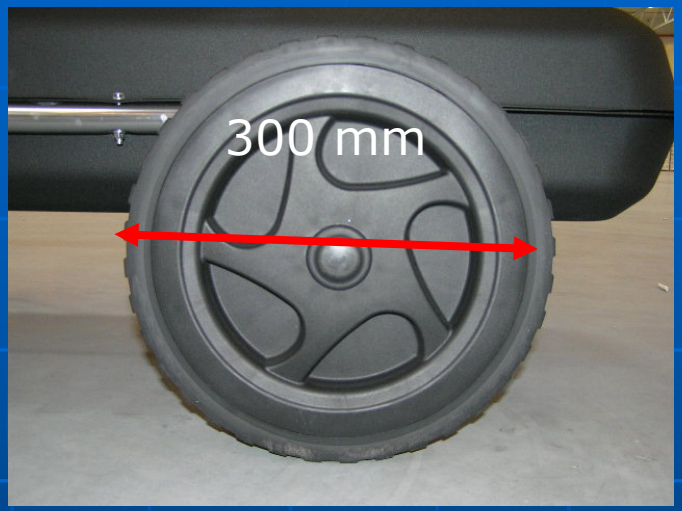

Master has bigger wheel for better transportation

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Warranty time for spare parts

GROUPS	PART NAME	WARRANTY TIME
IGNITION ELEMENTS	igniters	1
	sparks	1
	electrodes	1
ELECTRIC AND ELECTRONIC ELEMENTS	electric motors	12
	transformers	12
	electronic PC boards	12
	relays	12
	wires	12
	terminals	12
	electric sockets	12
	power supply cords	12
	contact	12
	burner automats	12
	photocells	12
	thermocouples	3
	safety thermostats	12
	control thermostats	12
	electro-valves	12
	heating elements-thermo elements	12
	halogen lamp	12
	switches	12
	fuses	12
	electric control lamps	12
	piezo-electric ignitors	12

FUEL, GAS AND COOLING SYSTEMS	**nozzles**	**1**
	fuel pumps	**12**
	fuel filters	**0**
	fuel tubes	**12**
	gas valves	**12**
	gas armature	**12**
	cooling installations	**12**
	compressors	**12**
AIR SYSTEM	**air filters**	**0**
	air pumps	**12**
	fans	**12**
	combustion chambers	**12**
	gas burners	**12**
METAL ELEMENTS	**covers**	**12**
	screws	**12**
	inlet-outlet grills	**12**
	frames	**12**
	body pumps	**12**
	fuel tanks	**12**
	supports	**12**

PLASTIC AND RUBBER ELEMENTS	**handles**	**12**
	wheels	**12**
	sealings	**12**
	inlet grills	**12**
	covers for switches	**12**
	taps	**12**
	pump body	**12**

LEGEND:
mechanical defects are not subject to warranty regulations
warranty period shorter than 12 months

DESA POLAND Sp. z o.o.
ul. Magazynowa 5A, 62-023 GĄDKI, tel. +48 (0) 61 654 40 00, fax. +48 (0) 61 654 40 01, www.desapoland.pl, e-mail: office@desapoland.pl

WARRANTY CLAIM PROTOCOL season 2007/2008 NR.....

DESA Poland Sp. z o.o.

DATE.....

PLEASE KEEP THE COPY OF THE WARRANTY CLAIM AND SEND ORYGINAL TO DESA POLAND SP. Z O.O.

1..... AUTHORISED SERVICE

..... ADDRESS

..... POSTAL CODE CITY

2..... DISTRIBUTOR'S NAME

..... ADDRESS

..... POSTAL CODE CITY

3..... CUSTOMER'S NAME

..... ADDRESS TELEPHONE

4..... MODEL NO/YEAR OF PROD.

5..... PURCHASE DATE

..... SERIAL NO

..... FAILURE DATE

6. REASON CLAIM HANDLED UNDER WARRANTY (short description):

.....

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QTY	PART NO	PART NAME USED FOR WARRANTY	DO NOT FILL

IMPORTANT

1. ALL THE ABOVE ENTRIES ARE OF EQUAL IMPORTANCE AND, IF NOT SHOWN, CLAIM WILL NOT BE CONSIDERED FOR PAYMENT.
2. THE SERVICE POINT IS OBLIGED TO SUBMIT THE WARRANTY CLAIM WITHIN THE PERIOD OF TIM DESCRIBED IN THE AGREEMENT.
3. WARRANTY DOES NOT COVER ACCIDENT, NEGLIGENCE, MISUSE OR ABUSE.
4. NO ALLOWANCE WILL BE MADE FOR DELIVERY OR PICK-UP.
5. A SEPARATE WARRANTY CLAIM MUST BE SUBMITTED FOR EACH PRODUCT REPAIRED.
6. DEFECTIVE PARTS ARE TO BE TAGGED AND HELD TILL CREDITED BY DESA PLUS FOR THE PERIOD OF 6 MONTHS. DO NOT RETURN PARTS TO DESA UNLESS WE DECIDE ELSE.

MASTER®

, e-mail: office@desapoland.pl

REPAIRS UNDER THE GUARANTEE DO NOT INCLUDE :

a) mechanical damages caused by a user,

b) damages due to:

- improper or incompatible with manuals usage, maintance and storage,
- improper or incompatible with manuals installation,
- using improper fuel,
- individual repairs,
- construction changes.

c) parts which worn out during normal usage, for example: **nozzles, filters, electrodes, thermocouples, ignition plugs, igniters, sealings, etc.**

DESA Poland guarantees availability of the parts long time after the production of a given product is stopped.

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THANK YOU FOR YOUR ATTENTION

DESA POLAND Sp. z o.o.
ul. Magazynowa 5A, 62-023 GĄDKI, tel. +48 (0) 61 654 40 00, fax. +48 (0) 61 654 40 01, www.desapoland.pl, e-mail: office@desapoland.pl