

**MARK CALFLO**

0661021





# Read this document before installing the appliance

## Warning

Incorrect installation, adjustment, alteration, repair or maintenance work may lead to material damage or injury. All work must be carried out by certified, qualified professionals. If the appliance is not positioned in accordance with the instructions, the warranty shall be rendered void. This appliance is not intended for use by children or persons with a physical, sensory or mental handicap, or who lack the required experience or expertise, unless they are supervised or have been instructed in the use of the appliance by somebody who is responsible for their safety. Children must be supervised to ensure that they do not play with the appliance.

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If the manual refers to an image or table, a number will be shown between square brackets, for example [3]. The number refers to images and tables at the back of the manual with the stated number.

## 1.0 General

### 1.1 Range of application

The make-up air unit can/may be used if 100% outdoor air is required. This system is also referred to as a replacement air system. The heater section of the make-up air unit can be installed as a module in air handling units of various makes. The make-up air unit and the make-up air module are made of sea water resistant aluminium (Almg3).

Air can be efficiently compensated by applying a replacement air system in factories, workshops, slaughterhouses, paint spraying workshops, coating companies, welding shops and there where a strong exhaustion of stale air is present.

An exhaust fan with an electrical connection to the make-up air unit is one of the conditions that must be met when installing an air replacement system.

Adding recirculation air before the burner restriction plates is not allowed because the firing process will be negatively influenced.

#### *Subject to change*

The manufacturer is committed to constantly improving its products and reserves the right to make changes in the specifications without prior notice. The technical details are considered correct but do not form the basis for a contract or warranty. All orders are accepted according to the standard terms of our general sales and delivery conditions (available upon request).

The information in this document is subject to change without notice. The most recent version of this manual is always available at [www.markclimate.com/downloads](http://www.markclimate.com/downloads).

## 1.2 Type of indication

I10	CK	35	B	CB	
I10					Burner capacity
	CK				
		35			Nominal $\Delta T$ air (between 20 and 55 K)
			B		Box burner
			A		Line burner
				CB	System fan supplied by Mark BV
				C	System fan placed externally

All the types of appliance are listed in table [1]. The various types are shown in the rows, and technical information relating to the appliances is shown in the columns. See the key below.

### Key to table [1]

- A Nominal load (upper value)
- B Nominal load (lower value)
- C Nominal power
- D Gas consumption for certain types of gas (15 °) max / min
- D1 Gas pre-pressure for certain types of gas
- D2 Burner pressure difference for certain types of gas
- E Electricity connection
- F Protection class
- G Air capacity (20 °C)
- H Environment temperature min/max
- Electrical power - project-based, see type plate
- Appliance fuse - project-based, see electrical diagram

## 1.3 General warnings

Incorrect installation, adjustment, alteration, maintenance or repair may lead to material or environmental damage and/or injuries. The appliance may therefore only be installed, adapted or converted by a skilled and qualified installer, taking into account national and international regulations. Faulty installation, adjustment, alteration, maintenance activity or repair shall render the warranty void.

### Device

When installing the Calflo, the applicable national and any regional and local regulations (eg regulations of the gas company, building regulations, etc.) must be observed. The installation of the air heater may only take place in a suitable room and at a suitable location, see Chapter 2 Installation.

The system is based on the direct firing of natural gas or propane/butane in the fresh (replacement) airstream. Together with the heated airstream, the flue gases are introduced into the area to be heated. It is, however, necessary that the composition of the mixture of the flue gases and the heated air do not differ much with that of the normal outdoor air.

The system fan for the make-up air unit is equipped with impeller vanes bent backwards. This ensures that the airstream stays virtually constant when there is variable duct pressure and/or contaminated air filters (if applied). Also see page 8 at air pressure switch delta PF.

The fan performance is high because impeller vanes bent backwards are used. This also provides favourable electrical motor power. The system fan can be installed as drawing in or pressing out with regard to the burner.

To ensure proper operation, the nominal air velocity around the burner must be 15 m/s. To achieve this, a restriction plate has been placed around the burner. If there is a constant air flow and the fan is set up in relation to the burner, the burner can be run without its own fan. This is called a line burner, the speed of which the burner is reached through the opening in the restriction plate. If the air flow is not constant and / or even, the burner is equipped with its own fan. This is called a box burner. The maximum heating of the air must not exceed 55K. This is to prevent the CO<sub>2</sub> content from becoming too high.

#### *Gas supply and gas connection*

Before installation, check whether the local distribution conditions, gas type and pressure and the actual setting of the device match. A tested gas stop valve must be fitted on the inner pipe.

#### **1.4 Think of your safety**

If you smell gas, you must not under any circumstances:

- Ignite an appliance
- Touch electrical switches or telephone from the area in question

Take the following action:

- Switch off the gas and electricity
- Activate the operational emergency plan
- Evacuate the building if necessary

## **2.0 Installation**

### **2.1 Placement device**

Check the device for damage after unpacking. Check the correctness of type/model and electrical voltage. Install the appliance and any accessories with a sufficiently sturdy construction, taking into account the minimum required free space.

### **2.2 Gas connection**

The installation of the gas pipe and gas tap must comply with the applicable local and / or national regulations. The gas tap must be within easy reach from the appliance. When pressing the connection pipe above 360 mbar, this gas tap must be closed. Only apply a gas filter when you have doubts about the contamination. In any case, blow the gas line through the lines before using the appliance. If the appliance has to be converted to a different type of gas than indicated on the plate type, contact the supplier of the appliance. This can advise you which parts must be replaced in order for the appliance to function correctly on the desired type of gas. The conversion of a specific type of gas is not permitted in Belgium.

### **2.4 Electrical connection**

Installation must comply with the relevant local and/or national regulations. Ensure that there is a correct connection group with a mains fuse. The electrical diagram is displayed on the appliance.

**PAY ATTENTION!:**

- The appliance must be adequately earthed. The appliance must be fitted with an isolator switch which interrupts phase and zero (not earth).
- The isolator switch must be accessible at all times.
- Never, under any circumstances, allow the supply to the appliance to be interrupted by other switches. This could result in the appliance overheating.
- Note the direction of rotation of the 3 phases.

## **3.0 Commissioning / decommissioning**

### **3.1 General**

Every device is tested for safety and proper operation before packaging. Here, among other things, the gas pressure and CO<sub>2</sub> are adjusted. However, always check the gas pressure. Never turn improperly on control screws. Do not forget to instruct the user about the correct use and operation of the device and peripherals.

### **3.2 Control actions**

- Switch off the electrical main switch.
- Set the room thermostat to minimum temperature.
- Open the gas stop valve, then carefully bleed the gas lines and check for leakage. Do not use open fire in any case!
- Close the gas valve.
- Check the rotation direction of the fans.
- Open the gas valve, the appliance will now come into operation.
- Check the flame picture of the main burner (clear flame core, evenly burning).

### **3.3 Check the operation of the room thermostat**

The burner will go out at a setting lower than the ambient temperature. At a setting higher than the ambient temperature, the burner is ignited.

### **3.4 Checking the pre-pressure**

The gas pressure must be measured on the gas block in the case of a device that is in operation. The pre-pressure is stated on the nameplate of the appliance. As a check, a measurement of the amount of gas consumed [1] can be made via the gas meter (all other consumers temporarily shut down).

### **3.5 Checking the operation of the device**

Finally, check whether the operation of the appliance can not be influenced by other appliances, local air currents, corrosive or explosive vapors, etc.

Check the master card that is delivered with the device (see example [2]) and complete it if necessary (the measurements refer to the flow sheet that is present in the device).

## 4.0 Maintenance

### 4.1 General

The maintenance of the device must take place at least once a year, if necessary more often. If necessary, ask a qualified installer for maintenance advice. Maintenance may only be carried out by a qualified service technician. When performing maintenance, the device must be taken out of service for a longer period of time. Ensure compliance with all safety regulations.

### 4.2 Annual maintenance

- Clean gas filter.
- Replace UV cell and ignition sparking plug.
- Check the gas safety valves for leaks.
- Check the operation of the pressure switches.
- Check the operation of the control and maximum thermostat.
- Clean the burner. Check the gas emanation holes in the throat of the burner.
- A natural gas burner has two rows of holes, 1.8 mm diameter.
- A propane/butane burner has one row of holes, 2.0 mm diameter.
- Blow through the impulse pipeline. The piping must be uncoupled for this!
- Clean the fan impeller.
- Clean the air pressure distribution mesh of the box burner (if applicable).
- Check the V-belts, pulleys and bearings.
- Regularly replace filters (if applicable).

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## 5.0 Description of parts

### 5.1 Flame protection

UV cell: 06 15 006

The burner has been provided with a UV flame protection system as standard.

The UV reader is made of plastic only with a metal lining to avoid static charging in the airstream of the fan. The UV reader is affixed directly on the burner.

Protection class: IP40

Temperature: -20°C to +60°C

Humidity: 95% RH

The life cycle of the UV reader is approximately 10,000 hours with max. 50°C

### 5.2 Flame protection device

Siemens make, type LME 39.100C2: 06 15 065

The automatic gas protection has been tested based on EN 298 and has been CE certified.

The automatic gas protection is pluggable. The housing and base consist of heat-resistant black plastic.

At least one controlled deactivation (short interruption of the flame signal) must be guaranteed per 24 hours from a safety perspective.

The applied automatic gas protection is phase and zero sensitive!

You can remotely reset it if required.

### 5.3 Gas pressure switch

#### 5.3.1 LP: low gas pressure switch.

Combined in the Gas multi-bloc.

A gas pressure switch installed on the gas inlet side of the gas street. This switch has been set to 5 mbar as standard. If the gas supply pressure drops under the specified value, the burner will be switched off. Once the gas pressure has been restored, the make-up air unit must be manually reset.

#### 5.3.2 HP: high gas pressure switch.

Code no. 06 07 625

A gas pressure switch installed in the device section and connected to a delta P switch. The bottom of the membrane is connected to the burner body where the gas pressure governs. The top of the membrane is connected to the inside of the housing behind the restriction plate. The high gas pressure switch will switch the burner off when the burner pressure is too high. Once the cause of the fault has been resolved, you can manually reset the makeup air unit. The adjustment value (HP) high gas pressure switch is  $1.21 \times$  nominal gas pressure difference.

### 5.4 Air pressure switch

#### 5.4.1 When using a line burner.

AP2: air pressure switch.

Code no. 06 07 620

An air pressure switch installed in the equipment side is connected as a delta P switch to monitor air speed over the burner mixing plates. This air speed is attained by positioning an adjustable restriction opening over the burner. The air pressure difference over the restriction plate amounts to 160 Pa nominally.

If the signalled pressure reaches a value below a minimum value of 80 Pa, the burner will be switched off. Once the failure/fault has been restored, the make-up air unit must be manually reset.

Delta P over the restriction plate is 160 Pa.

#### 5.4.2 When using a box burner

Code no. 06 07167

LDT: air pressure switch for monitoring the requested quantity of heating air.

The make-up air unit will be switched off when the quantity of heating air decreases. Once the failure/fault has been restored, the make-up air unit can be reset manually. Adjustment criterion:  $0.5 \times P$  nominal over the restriction plate. P nominal is 160 Pa with a maximum air quantity.

Note: If a make-up air unit is equipped with two V-belt transfers on the system fan (usual with units with multiple air quantities), two LDTs are used.

Switch off pressure: see the commissioning data (annex).

AP2: air pressure switch for monitoring the pressure difference over the burner mixing plates of the box burner. See the section under "When using a line burner" for more information.

Note: The make-up air units with a load (higher heating value) of more than 600 kW are equipped with a box burner with two burner air fans as standard, each provided with one AP2.

Switch off pressure: see the commissioning form.



Delta PF: (code nr. 06 07 602) If a make-up air unit is equipped with an air filter, an air pressure differential switch will always be installed. This switch will switch off the unit if the filter becomes very contaminated. A filter that has been hugely contaminated reduces the demanded air quantity which leads to unwanted failures in the total air regime. Adjustment pressure: delta P 250 Pa above the initial resistance.

### **5.5 Protection against overheating**

Code nr. 06 29 318

MT/LT: maximum/limit thermostat with a capillary length of approximately 3000 mm. When the limit temperature (LT) is exceeded, the regulating signal of the burner will be interrupted and the burner load is forced to the initial load. If the exiting air temperature again reaches a value below the set value of the limit temperature, the regulating signal to the burner will again be released.

If the limit thermostat does not switch sufficiently and, therefore, the air temperature continues to rise, the unit will be switched off by the maximum thermostat (MT). The make-up air unit can again be put into operation by: first manually unlocking the maximum thermostat (MT) (installed in the equipment section of the unit) and, next, resetting the unit.

LT adjustment range: 20 - 70°C

MT adjustment range: 70 - 120°C

See the commissioning data (annex) for information on the set values.

The minimum allowed ambient temperature for the maximum/limit thermostat amounts to approximately -20 °C.

### **5.6 Access door protection**

ESD: door switch, code nr. 06 31 135.

Key for door switch: 06 31 136

All access doors that may disrupt the correct operation of the burner have a limit switch. The make-up air unit will be switched off if an access door is opened during operation. This also offers protection against touching moving parts. The make-up air unit can again become operational after the doors have been closed.

### **5.7 Gas regulation fittings**

#### *5.7.1 Gas multi-bloc*

The make-up air unit is equipped with a Gas multi-bloc as standard. This gas block meets the EN 161 Class A, EN 88 Class A and EN 1854 standards. The maximum gas inlet pressure is 360 mbar and the gas control pressure can vary between 4 mbar and 20 mbar.

Ambient temperature for natural gas application: -15°C to + 70°C.

Ambient temperature for propane/butane application : 0°C to + 70°C

If a lower ambient temperature is expected for propane and butane, the Gas multi-bloc used will not comply as standard! Consult your supplier if this is the case.

The Gas multi-bloc consists of the following components:

- Fine filter
- Gas pressure switch (min. gas pressure)
- Safety valve (SV 1)
- Gas pressure regulator
- Safety valve (SV 2)

There are various options to measure the gas inlet pressure and gas control pressure on the Gas-multi-bloc. The breather hole under the membrane of the pressure regulator of the gas block is connected to the housing of the make-up air unit (after the restriction plates) to safeguard a constant gas control pressure.

See the diagram to regulate the Gas multi bloc.

Flanges are used to install the gas block.

Note: never replace loose components of the Gas multi-bloc in connection with possible gas leaks (erroneous installation of components).

#### *5.7.2 Modulating gas control valve (a butterfly valve)*

A butterfly valve is used with a mounted modulating servomotor to ensure a large gas technical regulating range is possible.

The butterfly valve has been dimensioned in such a way that the maximum regulating range of the burner can be obtained. Butterfly valves are selected with specific gas passage openings for the different gas types (natural gas and propane/butane).

### **5.8 Modulating servomotor**

Code nr. 06 21 845.

The butterfly valve available in the gas street is controlled by a 24-volt modulating servomotor. The servomotor operates on a 2-10-volt signal.

The servomotor is programmed at the factory by the Mark service engineers. It is necessary to set a larger gas quantity during burner start-up. This starting position is monitored by an auxiliary switch ESI (Code no. 06 31 124) and will prevent a too high initial gas capacity.

The maximum allowed initial load of the burner is 120 kW.

The servomotor will be sent to the required position based on the heat demand after the burner is fired.

Servomotor.

Code nr. 06 21 845

Auxiliary switch.

Code nr. 06 31 124

Installed servomotor linked to the butterfly valve.

### **5.9 Ignition**

An ignition sparking plug (code No. 06 25 315) has been installed in the burner's end plate. The burner will be ignited directly in the throat of the burner. A separate ignition burner is not required. A powerful ignition transformer (7500-volt; code No. 06 25 102) is used to ensure that the ignition of the gas is made possible under all conditions.

Since the unit draws in 100% outdoor air, this air may have a high humidity level. The ignition transformer has, therefore, been produced to an IP65 protection level. The ignition cable has been kept short to ensure that as little voltage as possible is lost.

An electric network filter has been included in the ignition circuit due to EMC reasons. This will strongly reduce electrical radiation to the immediate environment.

### 5.10 Air filters

Code no. 05 15 018 (dimensions 480 x 480) and code no. 05 15 016 (dimensions 480 x 240).

The make-up air unit can be equipped with air filters if required or desired.

The risk of freezing of any used filter is present since the unit only draws in outdoor air. We recommend installing a high temperature filter after the burner.

This will ensure that freezing is not possible and that a reliable situation can be guaranteed.

HT-G4 filter element technical data

Average gravimetric performance	%	:	95
Average atmospheric performance	%	:	30-40
Approach velocity	m/sec	:	1,2
Initial resistance	Pa	:	75 at (max.) 1000 m <sup>3</sup> /h per filter element.
Recommended final resistance	Pa	:	325
Max. operating temperature	°C	:	200
Filter class (EN779)	G4		

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#### Filters

If standard high temperature filters cannot be used, an alternative can be offered in consultation with the project expert or the manufacturer.

### 5.11 Drip tray

The make-up air unit can be equipped with a drip tray on the air inlet side to ensure that no unwanted rainwater can be drawn into the unit housing.

The drip tray is provided in plastic as standard.

Efficiency will increase the greater the approach velocity of the air becomes. The maximum dimensioned air speed amounts to approximately 6 m/s.

Consult the graph for pressure loss and efficiency to obtain the other data.

### 5.12 Outdoor air grill

The air intake side can be equipped with a rain cover if required which has an outdoor air grill. The approach velocity of the air may not be higher than 2.5 m/second net because of the risk that water is drawn into the unit. A rain cover with mesh and/or a drip tray is installed as standard.

### 5.13 Louver

To counteract a thermal draught from the heated area, you can install a louver with a servomotor.

The servomotor will be provided with a limit switch. First the louver will be opened during the start-up of the unit. The limit switch will be switched when this has been opened by more than 90%. The valve is positioned after for outdoor units and the valve is positioned on the inlet side of the unit for indoor units. This will ensure that condensation cannot be formed and/or can only be formed to a limited extent during a standstill period.

### 5.14 Summer/winter thermostat

Code no. 06 29 028.

A summer/winter thermostat has been installed as standard on the air inlet side. This thermostat switches the burner off if the drawn in air is above the set value and will switch the burner on again when the air temperature drops. The required configuration will be based on the specific project in hand.

## 6.0 Troubleshooting

Problem	Cause
Burner does not start up	<ul style="list-style-type: none"> <li>• Air pressure switch is not in the rest position.</li> <li>• Fan/motor is not put into operation (thermal switch off).</li> <li>• Automatic ignition control faulty.</li> <li>• Auxiliary relay faulty.</li> <li>• Louver servomotor faulty (if installed).</li> <li>• Exhaust fan(s) are not switched on.</li> <li>• Summer/winter thermostat connection is disconnected (if installed).</li> <li>• Time switch faulty or switched off (if installed).</li> <li>• Supply air pressure switch is not in rest position (only for the box burner).</li> <li>• Inspection doors/panels are not closed properly.</li> </ul>
Gas pressure is too low	<ul style="list-style-type: none"> <li>• Gas valve is closed.</li> <li>• Gas pressure switch faulty.</li> <li>• Gas filter is contaminated.</li> <li>• Gas prepressure is too low.</li> </ul>
Gas pressure is too high	<ul style="list-style-type: none"> <li>• Gas pressure regulator faulty.</li> <li>• Gas pressure regulator configuration failing.</li> <li>• Gas pressure switch (HP) configuration failing.</li> <li>• Gas pressure switch (HP) faulty.</li> </ul>
Outlet temperature is too high	<ul style="list-style-type: none"> <li>• Insufficient air displacement.</li> <li>• V-belts slip.</li> <li>• Air filter is contaminated (if installed).</li> <li>• Limit thermostat faulty.</li> <li>• Maximum thermostat faulty or failing.</li> <li>• Temperature control faulty.</li> <li>• Gas control valve servomotor faulty.</li> </ul>
Burner air pressure faulty	<ul style="list-style-type: none"> <li>• Air intake grill/drip tray is clogged (freeze up).</li> <li>• Measuring pipework to the pressure differential switch is clogged or broken off.</li> <li>• Air pressure switch faulty or failing.</li> <li>• Restriction opening around the burner is incorrect.</li> </ul>
Fan motor thermal switch off	<ul style="list-style-type: none"> <li>• Counterpressure too slight in the air duct system.</li> <li>• Fan/motor bearing faulty.</li> <li>• Fan impeller turns with difficulty.</li> <li>• Restriction opening around the burner is incorrect.</li> </ul>
Starting position ESI faulty	<ul style="list-style-type: none"> <li>• Servomotor gas control valve faulty.</li> <li>• Limit switch faulty or failing.</li> <li>• Servomotor turning direction is incorrect.</li> </ul>
Burner faulty before ignition transformer receives power	<ul style="list-style-type: none"> <li>• UV cell is virtually obsolete and reaches the conductive state too early due to the increased testing voltage of the automatic ignition control. (Replace UV cell.)</li> <li>• Humidity around or in the UV cell.</li> </ul>

<p>The burner does not ignite (burner faulty)</p>	<ul style="list-style-type: none"> <li>• Ignition transformer faulty.</li> <li>• Sparking plug and/or sparking plug cable is moist or contaminated.</li> <li>• Gas emanation holes in the throat of the burner are clogged.</li> <li>• Gas supply piping is clogged.</li> <li>• Hairline cracks in or contamination of the porcelain of the ignition sparking plug or in the lead-through pin when using a burner module in a third party housing.</li> <li>• Main gas valve faulty.</li> <li>• Limit switch initial position of the gas control valve is not closed.</li> <li>• Electrical connection faulty.</li> <li>• Automatic ignition control faulty.</li> <li>• The difference in pressure throughout the burner is too small.</li> </ul>
<p>Burner fires a short time (burner faulty)</p>	<ul style="list-style-type: none"> <li>• UV signal is too low due to dust or greasy deposit in the UV tube or UV lamp.</li> <li>• The initial gas capacity is too small.</li> <li>• Minimum capacity of the burner is too small.</li> <li>• Electrical connection faulty.</li> </ul>
<p>Problem: Flame faulty during operation</p>	<p>UV signal is too low due to the age of the UV lamp. (Replace the lamp.)</p>
<p>Burner does not attain the maximum capacity</p>	<ul style="list-style-type: none"> <li>• Limit thermostat faulty (servomotor gas control valve in minimum position or oscillating).</li> <li>• Temperature sensor for the controller faulty.</li> <li>• Servomotor of the gas control valve faulty.</li> <li>• Temperature controller failing.</li> <li>• Insufficient gas pressure.</li> </ul>

Type			55	110	165	220	275	330	385	440	495	550	660	770
A		kW	71	142	213	284	356	427	498	569	640	712	854	996
B		kW	64	128	192	256	320	384	448	512	576	640	768	896
C		kW	64	128	192	256	320	384	448	512	576	640	768	896
D	G25	m³/h	7,9	15,8	23,6	31,5	39,4	47,3	55,1	63	70,9	78,8	94,5	110,3
D1		mBar	20	20	20	20	20	20	20	20	20	20	20	20
D2		mBar	7,0	7,0	7,0	7,0	7,0	7,0	7,0	7,0	7,0	8,6	12,5	16,9
D	G25.3	m³/h	7,7	15,4	23,1	30,8	38,5	46,2	53,9	61,6	69,3	77,0	92,4	107,8
D1		mBar	25	25	25	25	25	25	25	25	25	25	25	25
D2		mBar	6,4	6,4	6,4	6,4	6,4	6,4	6,4	6,4	6,4	7,9	11,4	15,5
D	G20	m³/h	6,8	13,5	20,3	27,1	33,9	40,6	47,4	54,2	60,9	67,7	81,3	94,8
D1		mBar	20	20	20	20	20	20	20	20	20	20	20	20
D2		mBar	4,7	4,7	4,7	4,7	4,7	4,7	4,7	4,7	4,7	5,8	8,4	11,3
D	G30	m³/h	5,1	10,1	15,2	20,2	25,3	30,3	35,4	40,4	45,5	50,5	60,6	70,7
D1		mBar	50 / 29	50 / 29	50 / 29	50 / 29	50 / 29	50 / 29	50 / 29	50 / 29	50 / 29	50 / 29	50 / 29	50 / 29
D2		mBar	3,8	3,8	3,8	3,8	3,8	3,8	3,8	3,8	3,8	4,7	6,8	9,2
D	G31	m³/h	5,0	9,9	14,9	19,9	24,8	29,8	34,8	39,7	44,7	49,7	59,6	69,5
D1		mBar	50 / 37	50 / 37	50 / 37	50 / 37	50 / 37	50 / 37	50 / 37	50 / 37	50 / 37	50 / 37	50 / 37	50 / 37
D2		mBar	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	6,1	8,9	12,1
E		V/Hz	3~400V50Hz											
F		IP	44											
G	35K	m³/h	5430	10870	16300	21740	27170	32600	38040	43470	48900	54340	65200	76080
	55K	m³/h	3500	7020	10450	14130	17510	20800	24350	27820	31210	34730	41680	48700
H	G20/G25	°C	-15 - 40											
	G30/G31	°C	0 - 40											

[2]

Settings Calflo		
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Name		
Address		
ZIP code		
Place		
Contact person		
Telephone number		
Date		

Location		Hall	
Type		Serie	
Burner		Serie	
Project		Constr. Year	
Code			
Diagram		Diagram	
Diagram		Diagram	

Input (Hi)	( kW )	Power	( kW )
Q gas	( m <sup>3</sup> /hr )	Gas type	--
P static	( Pa )	--	
ΔT	( K )		
Voltage	( V )		
Tranmission			
Motor		Motor	
Fan		Fan	
Belt		Belt	

	Combustion	H mot	M mot	L mot	Rgv mot	Afz 1	Afz 2	
Nominal A								( Amp )
Consumed A								( Amp )

Static pressure	Suction	Exhaust	Total	Input
Measuring point 1 ( Pa )			0,0	0
Measuring point 2 ( Pa )			0,0	

Before starting the burner a gas leak detection must be carried out.  
Measuring points are indicated on the Flow sheet in the unit.

Checked :

MEASUREMENT DATA

Measured position	--	--	--	--	
Q Gas measured					( m <sup>3</sup> /hr )
P gas meter					( mBar )
Correction factor T					
Correction factor P					
Q Gas after correction					( m <sup>3</sup> /hr )
Load ( lower value )	0	0	0	0	( kW )

Measured position	--	--	--	--	Operation	
LD						( mBar )
Burner pressure ( $\Delta P$ ) (measurement 3)						( mBar )
HD (measurement 3)						( mBar )
LD2 flush (measurement 2)						( Pa )
LD2 ( $\Delta P$ ) operation						( Pa )
LD2 ( + )						( Pa )
Ionisation / UV						( $\mu A$ )

Measured position	--	--	--	--	Operation	
LDT High (measurement 1)						( Pa )
LDT Middle						( Pa )
LDT Low						( Pa )
$\Delta P$ Filter (measurement 5)						( Pa )
$\Delta P$ Restriction (measurement 4)						( Pa )
$\Delta P$ Boxing plate (MP 6 - MP 8)						( Pa )
$\Delta P$ Burner plates (measurement 6)						( Pa )
Max thermostat						( °C )
Limitation thermostat						( °C )
Summer / Winter thermostat						



Measured position	--	--	--	--	Operation
T outside					( °C )
T burned air					( °C )
T flue gas					( °C )
CO <sup>2</sup>					( % )
O <sup>2</sup>					( % )
CO					( ppm )
NOX					( ppm )
--					--
Efficiency					( % )
Loss					( % )
Power on Loss	0				( kW )
Specified power	0				( kW )
Load ( lower value)	0				( kW )

Measured position	--	--	--	
T suction				( °C )
T exhaust				( °C )
ΔT measured	0	0	0	( K )
ΔT given	0	0		( K )

	Pb1	dt	rt	Cy 1	HYS 1	Y.1	Y.2
Room							
Supply							

Particularities	





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