REZNOR®

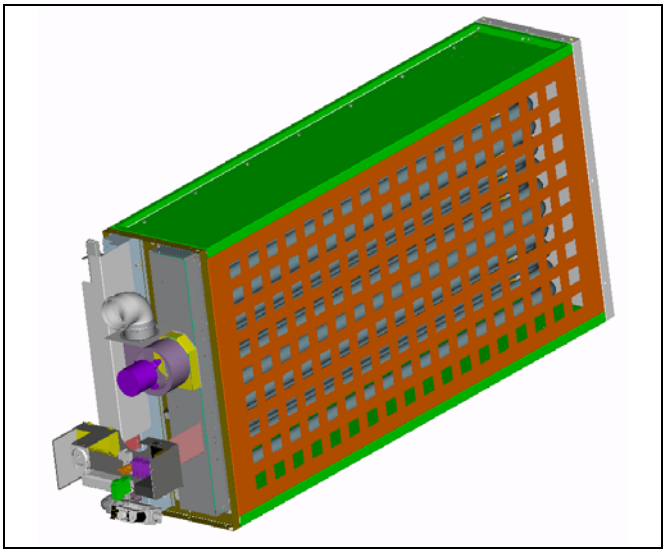
0710RHC8-JLNLEN

Application instructions

RHC 8000(M) RJL
RHC 8000(M) DJL

Jacket-less, Gas-fired, Balanced-flue, Power-vented, Air heater

This document applies when installing into an air handler or as part of an air handling system



These appliances meet the following EC Directives
Dir. 2009/142/EC:GAD
Dir. 2004/108/EC:EMC
Dir. 2006/95/EC:LVD
Dir. 2006/42/EC:MD (annexe II, sub B)

Please read this document carefully prior to commencing building into an air handler

Subject to modifications

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EC Declaration of incorporation

(Directive 2006/42/EC (*annex II, Sub B)*

PROHIBITION TO PUT INTO SERVICE

Reznor Europe N.V.
J & M Sabbestraat 130
B 8930 Menen
Belgium

Herewith declares that:

Power-vented gas-fired air heaters, type:

- **RHC 8000 RJL or DJL series**
- **Models**

8050 06	**8030 06**	**8125M.15**
8075-09	**8045 09**	**8150M.18**
8075 15	**8060 12**	**8175M.21**
8090 18	**8100 12**	**8200M.24**

Are destined to be incorporated in other machines (air-handlers) or to be combined with other machines (air-handling systems), and are for this reason not entirely in compliance with the machinery directive 2006/42/EC).
Proper integration into the air-handling systems is required to comply with the prescribed machinery directive.

Is in conformity with the provisions of the 2009/142/EC (GAD), 2006/95EC (LVD), 2004/108/EC (EMC) directives.

The following harmonised standards have been applied:
EN1020 & EN 60335-1.

E. Dewitte
Approvals and Certifications

Menen 1st March, 2004

INDEX

1.0 DEFINITIONS

1.1 **Jacket-less**:
A gas-fired air heater supplied as a skeleton appliance e.g. without case or cover**.**

1.2 **Module:**
The jacket-less gas-fired air heater.

1.3 **Constructor:**
The undertaking, which builds a module into another casing. e.g. an air handler

1.4 **Appliance;**
The end product of the constructor

1.5 **Compartment**:
The section of an appliance into which the module is installed

1.6 **B22 Appliance**:
An appliance where the air for combustion is taken from within the area where the gas burner is operated.

1.7 **C12 Appliance**:
An appliance where the air for combustion is taken from outdoors via a duct terminating horizontally from the appliance.

1.8 **C32 Appliance**
An appliance where the air for combustion is taken from outdoors via a duct terminating from the appliance vertically.

1.9 **Dew point**:
The condition, when the temperature is such that the water vapour in the combustion products condenses out.

2.0 BASIC INFORMATION

2.1 The instructions contained in this document apply to the models RHC 8000(M) RJL/DJL gas fired fan assisted warm air heaters.

2.2 Models RHC 8000(M) RJL are intended for use in appliances as outdoors (roof top) systems.

Models RHC 8000(M) DJL are intended for use in appliances as indoors and must be used with one of the following flue systems:

B22: Vertically (through the roof) or horizontally (through the wall) flue system.

C12: Horizontal (through the wall) vented balanced flue system.

C32: Vertical (through the roof) vented balanced flue system.

2.3 The gas category for use is II2L3P

2.4 All models may only be used when installed within a closed compartment, e.g. an air handler.

2.5 Dimensions: we refer to the figures 1,2 & 3.
All dimensions are in mm (25.4mm= 1 inch)

2.6 Installations with C12 & C32 combustion systems need to be installed with an appropriate concentric vent terminal as supplied by your distributor.

DANGER
ANY OTHER APPLICATION IS FORBIDDEN AND DANGEROUS. FAILURE TO COMPLY CAN RESULT IN SEVERE PERSONAL INJURY OR DEATH AND OR PROPERTY DAMAGE.
Note: Manufacturer warranties do not apply in such circumstances.

ATTENTION
ONLY RECOGNIZED AIR HANDLER MANUFACTURERS ARE AUTHORIZED TO BUILD-IN THE HEATER MODULE. PLEASE CONTACT YOUR DISTRIBUTOR.

Dimensions

Figure 1 : Side view

Figure 1a: RHC 8000 DJL/RJL (not 8125, 8150, 8175,8200)

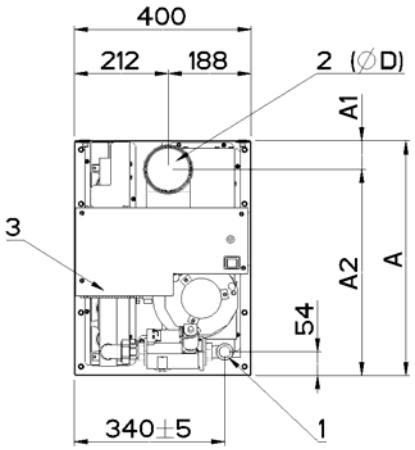

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Figure 1b: RHC 8125M, 8150M, 8175M DJL/RJL

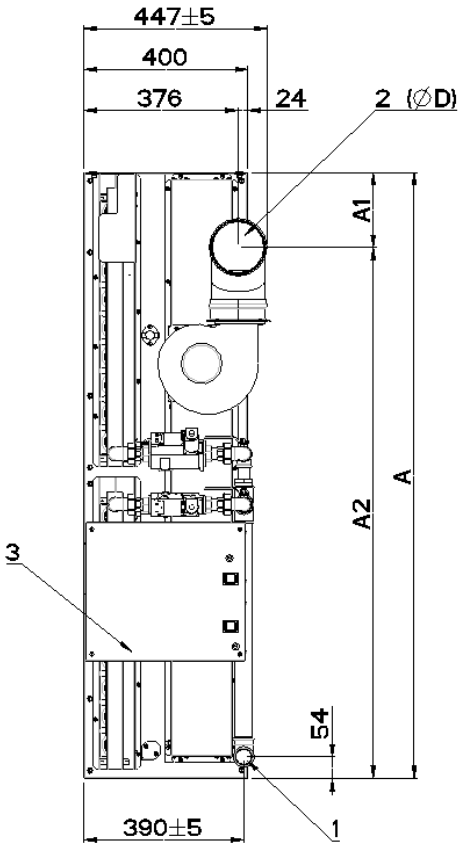

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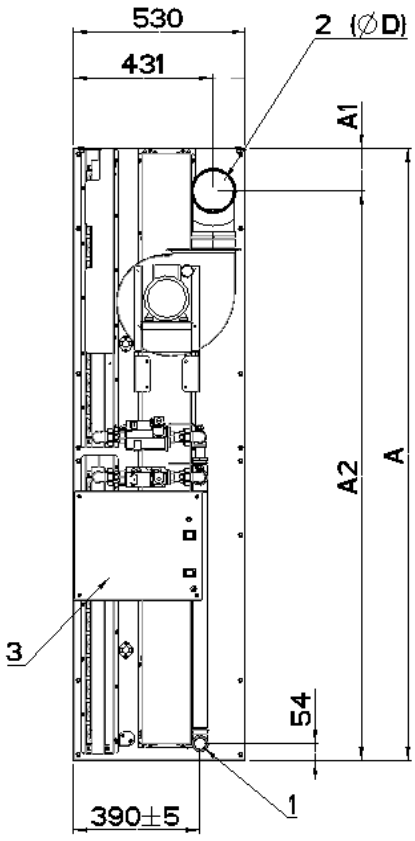
Figure 1c: RHC 8200M DJL/RJL



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1. Gas connection
2. Flue outlet
3. Electrical connection

Figure 2 : Top view

Figure 2a: RHC 8000 DJL/RJL ((not 8125, 8150, 8175,8200)

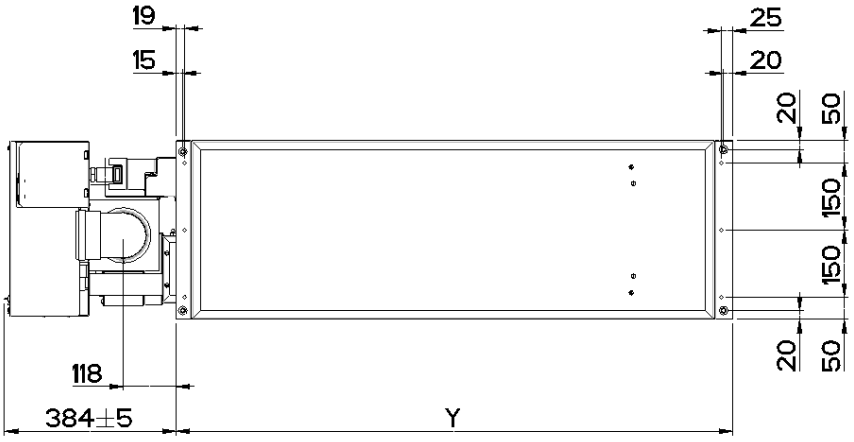

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Figure 2b: RHC 8125M, 8150M, 8175M DJL/RJL

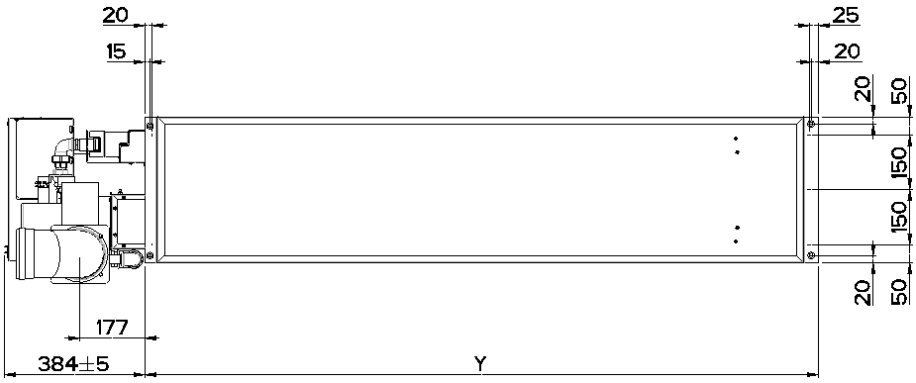

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Figure 2c: RHC 8200M DJL/RJL

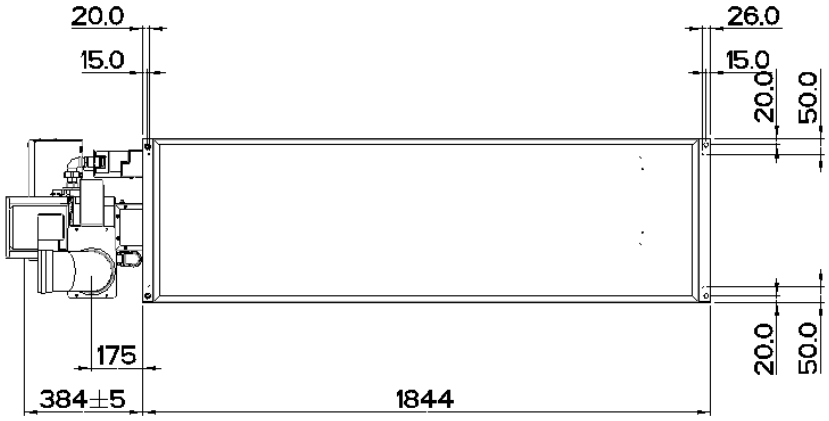

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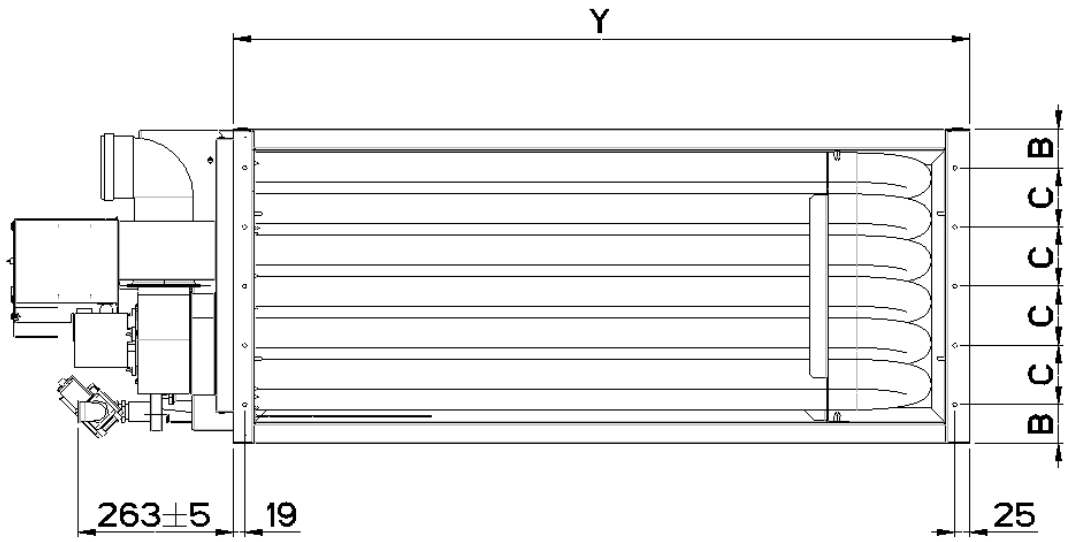
Figure 3a : Front view RHC 8000 DJL/RJL



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Dimensions applicable to models RHC 8000 (not 8125, 8150, 8175,8200) **(see fig. 1a - 2a & 3a)**										
Type	**RHC 8000 DJL/RJL**				**RHC 8000 DJL**			**RHC 8000 RJL**		
	A	**B**	**C**	**Y**	**A1**	**A2**	**D**	**A1**	**A2**	**D**
8030 06	531	66	100	1244	65	466	100	65	466	100
8045 09	741	50	160	1244	85	656	130	160	581	100
8050 06	531	66	100	1844	85	446	130	65	466	100
8060 12	950	125	175	1244	85	865	130	160	790	100
8075 09	741	50	160	1844	85	656	130	160	581	100
8075 15	1160	80	250	1244	85	1075	130	85	1075	130
8090 18	1369	85	300	1244	85	1284	130	85	1284	130
8100 12	950	125	175	1844	85	865	130	160	790	100

Figure 3b: Back side view RHC 8125M, 8150M &8175M DJL/RJL

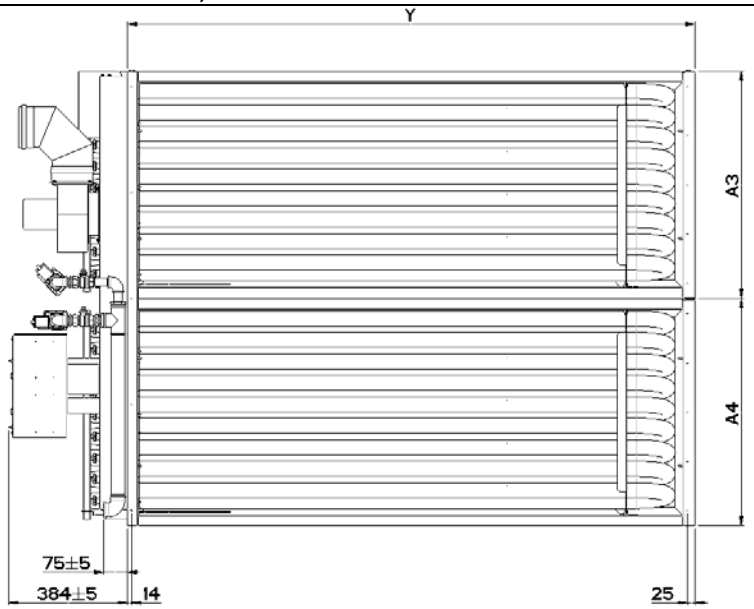

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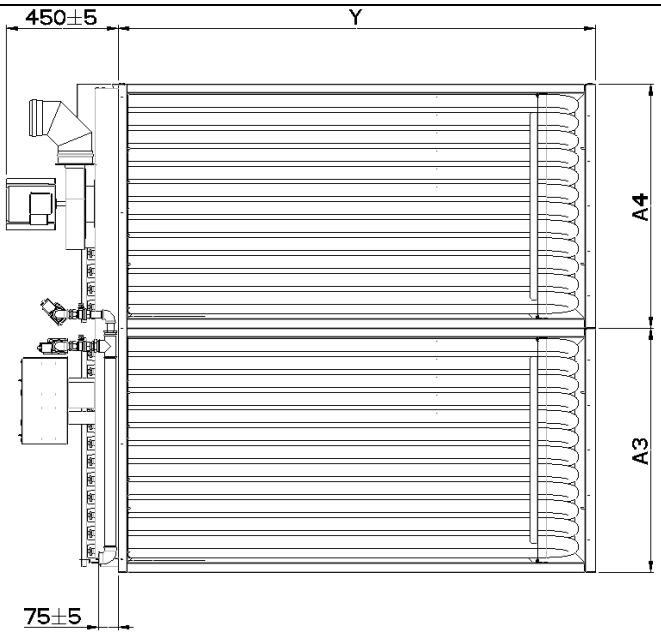
Figure 3c: Back side view RHC 8200M DJL/RJL



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Dimensions applicable to model RHC 8000M
(see fig. 1b/1c –2b/2c & 3b/3c)

Type	RHC 8000 M DJL/RJL					
	A	A1	A2	A3	A4	D
8125M.15	1272	183	1089	741	531	130
8150M.18	1481	183	1298	741	741	130
8175M.21	1691	183	1508	741	950	130
8200M.24	1900	133	1767	950	950	130

Weights (kg) (table 1)

Type		8030 06	8045 09	8050 06	8060 12	8075 09	8075 15	8090 18	8100 12
Unit	kg	60	87	80	120	110	140	160	145
Packaging	kg	16	16	20	16	20	16	16	20
Total	kg	76	103	100	136	130	156	176	165

Type		8125M.15	8150M.18	8175M.21	8200M.24
Unit	kg	200	230	265	305
Packaging	kg	35	35	35	35
Total	kg	235	265	300	340

3.0 PRACTICAL APPLICATION

3.1 Heat exchanger compartment size.

3.1.1 The duct section or air handler compartment must be sized in accordance with the dimensions given in table 2 with reference to figure 4.
Mounting flanges on the modules RHC 8000(M) RJL & DJL allow easy installation.

3.1.2 The heating module may only be fitted as shown in figure 5. Alternative orientation is **not** allowed.

Figure 4 : Compartment dimensions

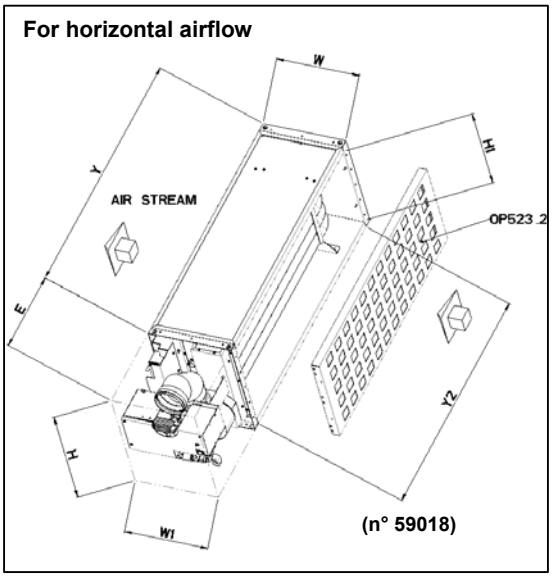
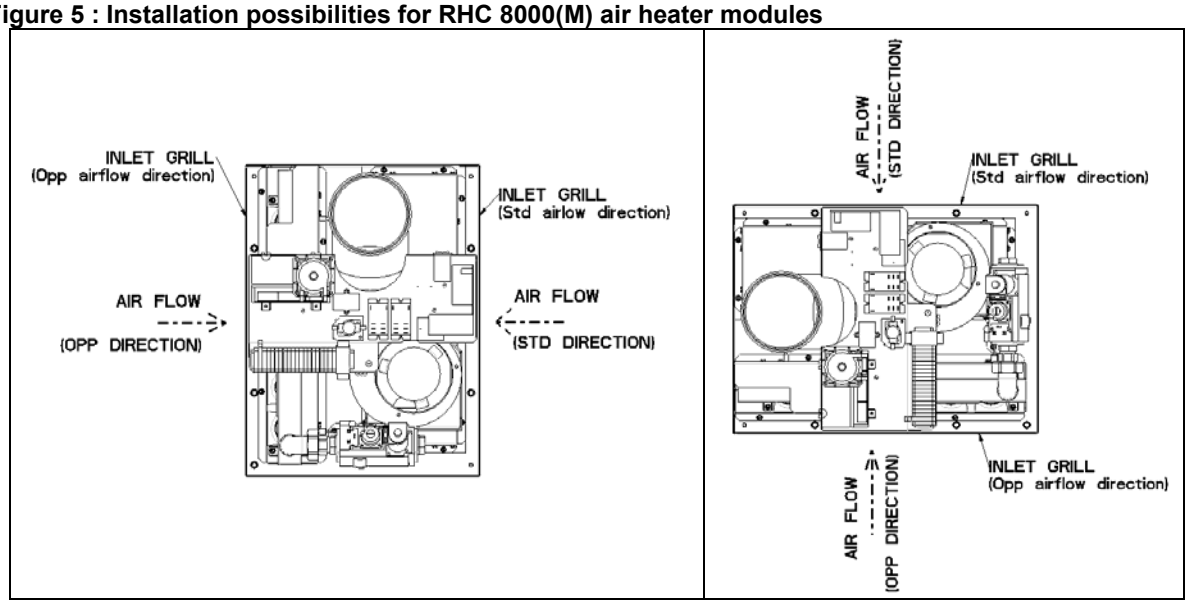


Table 2. Dimensions of enclosures (duct channel) for RHC 8000 heating modules re. fig 4

Model	Duct channel & controls compartment						
	H	H1	Y	Y2	W	W1	E (min)
8030 06	531	461	1244	1170	400	400	400
8045 09	741	671	1244	1170	400	400	400
8050 06	531	461	1844	1770	400	400	400
8060 12	950	880	1244	1170	400	400	400
8075 09	741	671	1844	1770	400	400	400
8075 15	1160	1070	1244	1170	400	400	400
8090 18	1369	1299	1244	1170	400	400	400
8100 12	950	880	1844	1170	400	400	400
8125M.15	1272	1202	1844	1770	400	460	420
8150M 18	1481	1411	1844	1770	400	460	420
8175M.21	1691	1621	1844	1770	400	460	420
8200M.24	1900	1830	1844	1770	530	530	470

(*) The dimension 'E' is applicable for RJL units (outdoors) when dealing with the standard terminal outlet (PN 60 5712 300.with length 300mm. When dimension 'E' is increased, the RJL outlet pipe can be extended to max. length of 1000mm using ⇔100mm, thick wall seamless aluminium pipe or to max. length of 1000mm using ⇔130mm, thick wall seamless aluminium pipe for the 8000M models.

Figure 5 : Installation possibilities for RHC 8000(M) air heater modules



Always ensure that the inlet perforated profile plate (when required) is installed at the air 'inlet' side of the heat exchanger as shown in figure 5.

4.0 LIMITATIONS FOR USE

4.1 Heat exchanger compartment

4.1.1 **Minimum airflow requirement through heat exchanger enclosure :**

RHC 8000(M) RJL & DJL air heaters may be used for either push or pull through air heaters. **The min. airflow duty through the heat exchanger enclosure (see fig. 4 – table 2) must be observed as indicated in table 3.**

Table 3 : Airflow duty

MODEL	V1	V2	Heat output 100% - 1 stage	Heat output 50% - 2 stage	Minimum modulating output
	m³/h	m³/h	kW	kW	kW
8030 06	3750	4400	30.10	14.20	8.50
8045 09	5650	6600	45.50	21.40	12.90
8050 06	6200	7150	50.00	24.00	14.40
8060 12	7500	8750	60.50	28.60	17.10
8075 09	9300	10790	75.00	35.40	21.20
8075 15	9300	11900	74.98	35.27	35.27
8090 18	11200	14300	90.09	43.16	43.16
8100 12	12400	14300	100.00	46.60	28.00

MODEL	V1	V2	Heat output 100% - 1 stage	Heat output low stage (bottom unit)	Minimum modulating output
	m³/h	m³/h	kW	KW	kW
8125M.15	15600	18000	125.42	51.02	25.45
8150M.18	18200	21000	149.79	74.90	36.28
8175M.21	20100	21500	172.48	98.21	47.80
8200M.24	23300	24000	200.00	101.20	50.05

V1 = min. airflow required through enclosure V2 = min. airflow required without perforated plate

Note : The RHC units can be supplied with option 523 (perforated inlet plate at the air inlet side). This perforated plate assures the proper efficiency of the heater in the lower airflow range (below V2 (cfr. table 3)). At higher airflow this perforated plate can be removed thus reducing the pressure drop over the heating section without loss of efficiency (see also section 10).

4.1.2 **Maximum airflow through heat exchanger enclosure**

Special attention must be given to ensure that the temperature rise of the air, passing through the enclosure around the heat exchanger tubes, is high enough to avoid condensation forming within the tubes. This condensation forming could occur by super cooling of the products of combustion. Such condensation can be the source of severe corrosion and damage to tubes or part of the tubes.

Figure 6 indicates the probability of condensation forming within the tubes reference :

- the temperature rise of the air through the enclosure around the tubes (see table 2- fig. 4).
- the inlet air temperature passing over the heat exchanger

In function of the expected minimum inlet air temperature, the minimum required temperature rise (to avoid condensation) must be derived from the chart shown in figure 6.

Example :

- expected minimum inlet temperature = -5°C
- minimum required temperature rise shown on the chart = +13°K

Table 3 indicates the heat output (kW) of the different models.

The maximum allowable airflow [through the enclosure (duct channel) around the tubes] can be calculated as follows :

$$V_{max}\,(m^3/h) = \frac{\text{heat output}\,(kW) \times 1000}{\Delta T_{minimum} \times 0.3423}$$

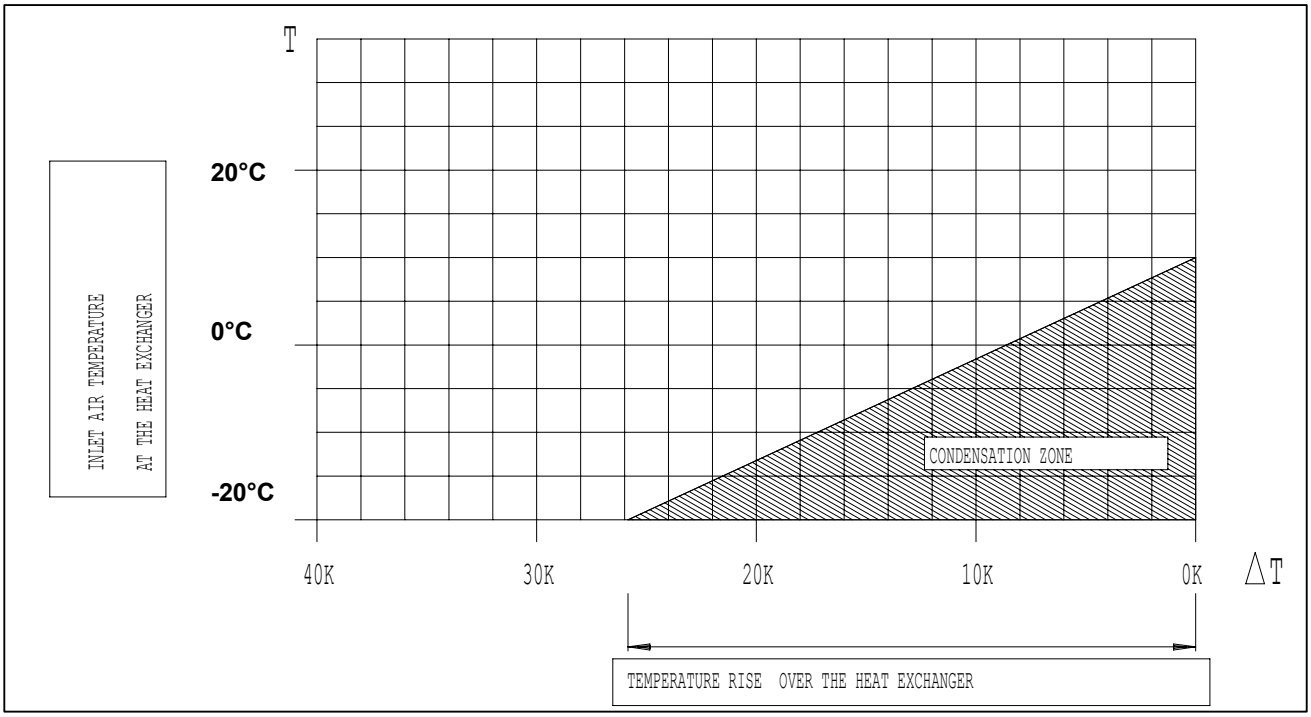
Example :
$<T_{min}$ = 13K (with min. inlet temp. = -5°C)
model 8075 09 at 100% heat output : 75,00kW
results into $V_{max} \approx 16854 m^3/h$

Remark :
For air heaters with the option 2 stage gas valve (50% minimum heat input) or the option modulating gas valve (30% minimum heat input) attention must be given to determine the maximum allowable airflow in function of the appropriate heat input.

Example :
$<T_{min}$ = 13K (with min. inlet temp. = -5°C)
model 8075 09 at 30% modulation (see table 3 'output') : 21.20kW
results into :

$$V_{max} = \frac{21.200\ (kW) \times 1000}{13 \times 0.3423} = 4764\ m^3/h$$

Figure 6 : Dew-point occurrence chart (condensation zone)



Warning
Use of RHC 8000(M) heating modules for purposes other than those described above could result in severe personal injury or death and cause property damage.
The manufacturer warranties are void if departure from the intended use is undertaken.

Warning
This heating module may not be used where the air handler/heating system in which it is installed will be used where, flammable substances/vapours exist or where the atmosphere contains chlorinated or haloginated hydrocarbons, silicones, aluminium oxides, etc.
The manufacturer warranties are void if these restrictions are not observed

4.1.3 **By-pass**
For applications where the air duty exceeds that required to maintain the criteria stated above, a parallel by-pass around the heat exchanger enclosure is required to conduct the excess air.
Such a by-pass should be designed and constructed so that the air flow (m^3/h) across the heat exchanger enclosure it-self maintained between the minimum and maximum figures as mentioned in section 4.1.1 & 4.1.2. The by-pass is shown in figure 13. We refer also to section 11.0.

4.1.4 **Important remark**

The air velocity needs to be equal over the total area of the heat exchanger enclosure so that even distribution is achieved over the entire heat exchanger tube assembly.

Attention :
Special attention is necessary in a push through system. Baffles and or an air-stream diverter(s) may be necessary to ensure an even distribution of the air flow.

Part or the whole of the tubes may become damaged or can be the source of poor combustion if the air velocity as recommended above is not applied.

5.0 BURNER & CONTROLS SECTION

Warning : the control compartment must be 100% sealed and isolated from the other compartments or duct work of the air handler – only combustion air may have access into this compartment

5.1. The following conditions must be observed when applying the heating module with its burner controls.

5.1.1 An enclosure containing RHC 8000(M) heating modules shall be so constructed that it is fully protected against the rigours of the environment in which it is intended to operate.

5.1.2 When applied as an RJL (roof top/outdoor unit) the enclosure into which it is fitted, must comply with protection grade IP 45.

5.1.3 Access to compartments enclosing the burner and its controls must be provided with panels, doors, etc. that are intended to be opened only by the use of a tool (key). Such panels must be designed to ensure that after repeated removal and replacement their integrity is not jeopardised, i.e. seals and insulation etc. remain serviceable.

5.1.4 Openings in 'RJL' units from the outside of the air handler, e.g. gas and electrical services, shall not be larger than to permit a ball of 16 mm diameter to pass with a pressure of 5N.

5.1.5 Dimensions (mm) of control cabinet with reference to figure 4, the dimensions of the control cabinet must be in accordance with table 2.

CAUTION :
Alterations to the burner and/or its controls, any other electrical apparatus supplied as part of the heating module or changing of the settings as supplied is strictly forbidden. To do so is in contravention of the E.C. gas appliance directive.

5.1.6 Thermal insulation used in the construction of a heating module enclosure shall maintain its insulating properties under the influence of heat mechanical stress and ageing, it shall be non- combustible and resistant against vermin. Ensure that any insulation is securely fixed and will not obstruct combustion air pathways.
Asbestos or materials containing asbestos may not be used.
All materials used in association with RHC 8000 modules must be in accordance with the combustibility requirements of ISO 1182.

5.1.7 Where appliances containing RHC 8000(M) DJL modules are intended to be suspended at a height of 1,8 m above floor level, doors, panels etc. intended to be removed for servicing shall be provided with hinges, or restraining devices to prevent falling from above during servicing. Access panels must be readily capable of correct and easy removal and assembly, this feature is particularly appropriate to square dimensioned elements.

NOTE:
Provision must be made to view the burner to ensure its operation under normal operating conditions. Viewing ports may be necessary. Ensure no flammable substances are in the immediate environment of the heating module.

6.0 GAS CONNECTION
(Rc ¾" or Rc 1 ¼")

Attention : All RHC 8000M units are designed for a Rc 1 ¼" gas connection – all RHC 8000 units are designed for a Rc ¾" gas connection!

6.1.1 National requirements and regulations for the installation of gas must be respected for all countries into which the appliance is delivered. Gas connections may only be carried out by appropriately qualified persons.

6.1.2 Clearances around connections shall be adequate so as to afford access to allow the use of tools to connect and disconnect the gas service connections.

6.1.3 Threads used for gas pipes and fittings shall comply with ISO 7.1.

6.1.4 Copper pipes and fittings may not be used. Solder which has a melting point of less than 450^{o} C neither solder or alloys containing cadmium shall not be used.

6.1.5 All gas services to the heating module shall be equipped with an isolation tap which shall be of the 90^{o} turn type and shall be provided with a positive stop and it should be fitted adjacent to the heating module.
Such taps when installed in a vertical position shall be such that in the event of a falling handle the valve will be in the closed condition, the open and closed positing shall be readily distinguishable. The valve shall be easy to operate when required.

Attention : all passages for gas pipes, etc to the control department must be completely sealed !

7.0 ELECTRICAL EQUIPMENT

Warning : Ensure that when installing electrical wiring or cables no contact is made with the burner, heat exchanger or flue arrangement.
Cables or wires must be securely fixed so that they cannot move. To protect supply cables as good as possible we recommend to install them at the left side of the control compartment.

7.1.1 The RHC 8000(M) heating module has been fully tested prior to leaving the manufacturer. The constructor shall not make changes to the wiring supplied with the module. Electrical connections may only be made using the terminals provided and strictly in accordance with wiring diagram provided with the module.

7.1.2 RHC 8000(M) electrical controls **are** phase sensitive 230V 1N 50 Hz. The appliance must be **earthed** after the installation has been completed and earth continuity test must be carried out.

7.1.3 The electrical equipment of the module complies with the requirements of: EN 60335-1, EN60730-1 and EN61058-1 or to relevant amendments. The constructor must also comply with these requirements when fitting the module.

7.1.4 The protection of jacket less appliances conforms to protection code IP 20. The constructor must ensure that protection accordingly to at least IP 45 is fulfilled and mark his data/rating plate accordingly.

NOTE: IP 45 provides:
a) Personal protection against contact with electrical components within the construction;
b) Degree of protection within the construction against ingress of water;

7.1.5 The constructor shall test and inspect fully the total appliance prior to supply including the following:
a) Earth continuity (re: CENELEC 289)
b) Di-electric strain (re: CENELEC 289)
c) Function of all electrical components and securities and operational inspection
d) Heat input and test for good and clean combustion
e) Auxiliary equipment to be supplied as part of the appliance
f) Soundness of the total gas circuit

Attention : all passages for gas pipes, etc. to the control compartment must be completely sealed !

8.0 COMBUSTION SYSTEM RHC 8000(M) RJL 'OUTDOOR'

8.1.1 Inlets for combustion air and flue outlets shall be so designed so that when an appliance is finally installed their termination shall be at least 500mm above deck/ground level.

8.1.2. The heating modules are delivered with all parts necessary for the construction of the jacket so that combustion can take place safely and in line with the Gas Appliance Directive.

Included with the heating module RHC 8000 (except for 8075 15 & 8090 18) are :
- Dia 100 terminal outlet (length 300mm) (PN°60 50712 300)
- 90° elbow with sealing ring (dia 100) (PN 60 50733 100)
- Flue outlet combustion sealing ring (dia 100) (PN 06 22786 104)
- Combustion air inlet protection grill (PN 90 79050)
- Gas tube sealing ring (PN 06 22783 125)

Included with the heating module RHC 8075 15 & 8090 18 are :
- Dia 130 terminal outlet (length 282mm) (PN°60 50712 130282)
- 90° elbow with sealing ring (dia 130) (PN 60 50733 130)
- Flue outlet combustion sealing ring (dia 130) (PN 06 22786 134)
- Combustion air inlet protection grill (PN 90 79344 07 for 8075 15 & PN 90 79344 09 for 8090 18))
- Gas tube sealing ring (PN 06 22783 125)

Included with the heating module RHC 8000M are :
- Dia 130 terminal outlet (length 282mm) (PN°60 50712 130282)
- 90° elbow with sealing ring (dia 130) (PN 60 50733 130)
- Flue outlet combustion sealing ring (dia 130) (PN 06 22786 134)
- Combustion air inlet protection grill (PNs 90 79344 10 for 8125M, 90 79344 14 for 8150M, 90 79344 12 for 8175M & 90 79344 08 for 8200M)
- Gas tube sealing ring (PN 06 22783 054)

The 90° elbow, sealing ring, terminal and the combustion air inlet protection grill must be installed according to figure 7.

All sealings must be correctly placed in the tubes to avoid flowing back of combustion products to the burner.
As indicated, the combustion air inlet protection grill must be integrated in the side panel of the controls compartment. The dimensions of the required opening in this side panel and its position relative to the mounting flange of the RHC 8000(M) RJL heat exchanger enclosure are indicated in figure 8 & 9.

The air inlet protection grill must be installed in a level plane and horizontally centred.
The minimum and maximum distances between the axis of the flue outlet pipe and the top of the combustion inlet grill are 250mm and 400mm.

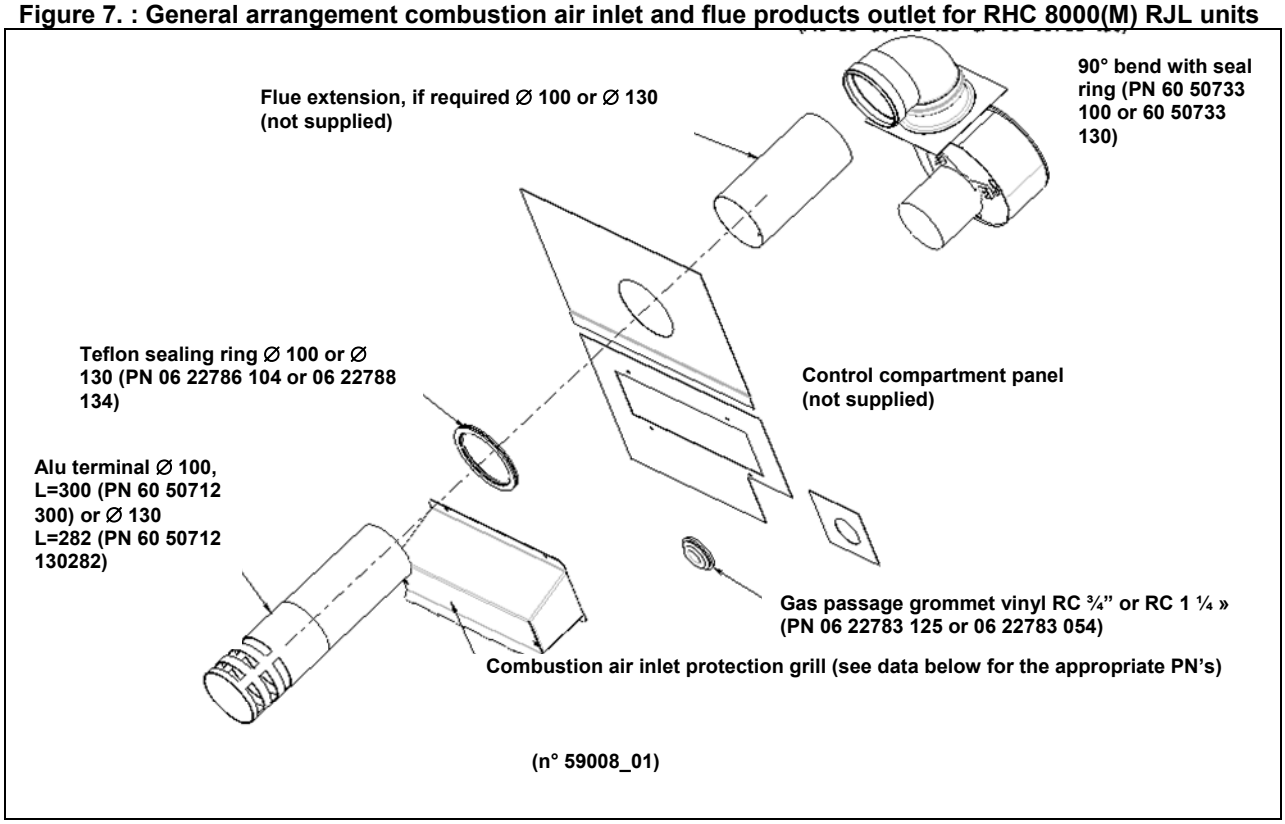
Ensure the combustion inlet grill at the control door panel is completely sealed to prevent ingress of water.

It is forbidden to use the combustion inlet grill as passage for cables or gas supplies. Ensure the inlet grill openings are not obstructed.

Make sure the installation of the combustion inlet grill is securely fixed.

The outlet combustion-sealing ring (dia 100 = PN 06 22786 104, dia 130 = PN 06 22786 134) must be installed in the fixed outlet panel of the air handler in a hole with respectively dia 112mm or dia 142mm. This hole must be located in the axis of the 90° flue outlet elbow with a sealing ring of the RHC 8000(M) RJL (see drawing figure 9). The sealing ring fits for 1mm thick panels.

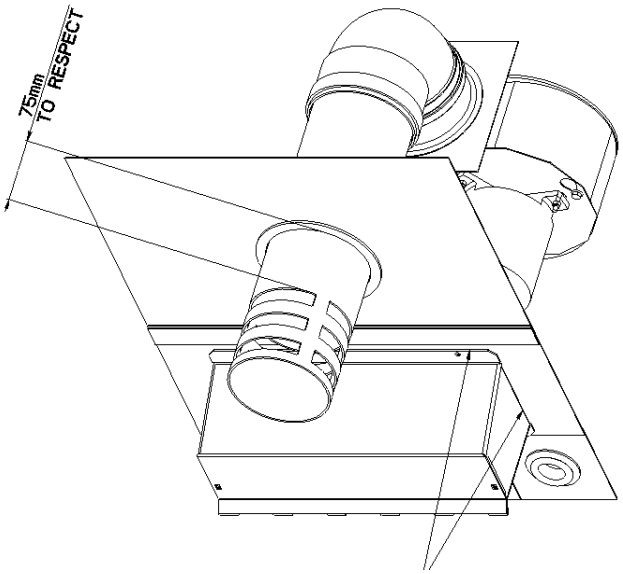
Figure 7. : General arrangement combustion air inlet and flue products outlet for RHC 8000(M) RJL units



Combustion air inlet protection grill			
Type	**PN**	**Type**	**PN**
8125M	**90 79344 10**	**8075 15**	**90 79344 10**
8150M	**90 79344 14**	**8090 18**	**90 79344 10**
8175M	**90 79344 12**		
8200M	**90 79344 08**		
All others	**90 79050 (1)**		

(1) No restriction on air inlet

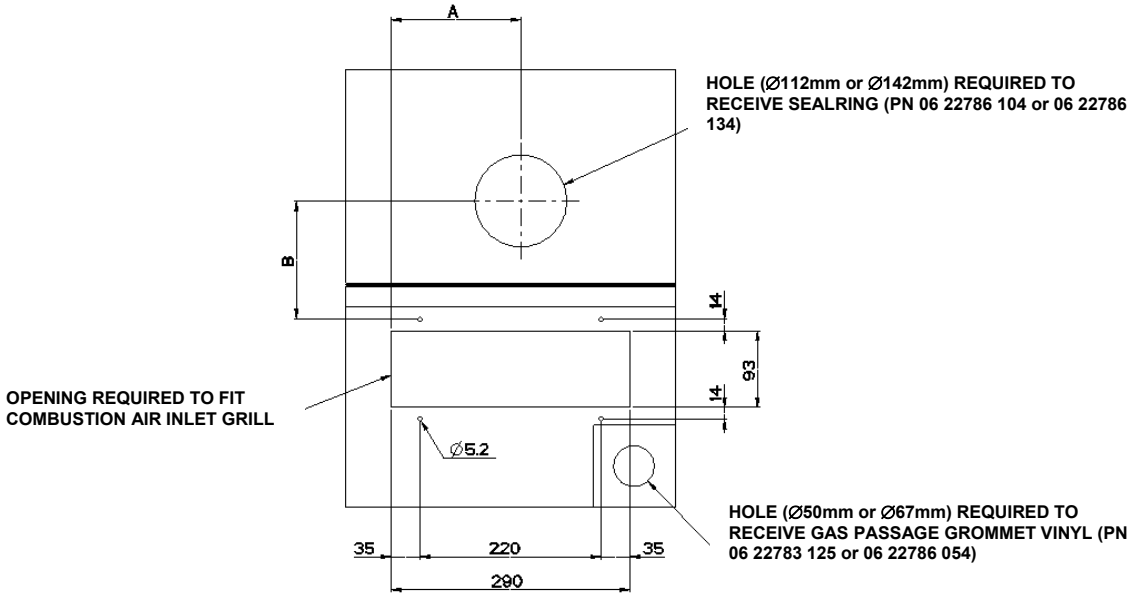
Figure 8



ASSURE THE SEALING OF THE COMBUSTION AIR INLET GRILL TO THE CONTROLS COMPARTMENT SIDE PANEL IS WATERTIGHT

(n° 59008_03)

Figure 9: Controls compartment (side) panel for RHC 8000(M) RJL units



(n° 59008_02)

Type	A (mm)	B (mm)	
RHC 8075 15	158	778	
RHC 8090 18	158	807	
Others	158	225 (1)	405 (2)
RHC 8125M	158	225 (1)	405 (2)
RHC 8150M	322	225 (1)	405 (2)
RHC 8175M	322	225 (1)	405 (2)
RHC 8200M	322	580	

(1) = minimum
(2) = maximum

8.1.3 The terminal outlet (PN 60 50712 300) of thick wall aluminium pipe supplied must be fitted in a horizontal plane and be placed so as to fit exactly between the elbow on the combustion fan and the outlet terminal hole with sealing ring.

If required this terminal outlet must be cut to length in order to respect the dimension 75.0mm (fig. 8).
However, when the depth of the control compartment exceeds the value E indicated in table 2, a seamless duct ∅100 or ∅130 of thick wall aluminium and a sealing ring are to be used to extend the length of the terminal outlet (PN 60 50712 300). The absolute maximum allowable extension to the protection cap (standard length 300mm) is 700mm.

8.1.4 Attention must be given to properly seal the controls compartment from the enclosure for the main air stream (duct channel).
This sealing should be appropriate to avoid any leakage of air from controls compartment into the duct channel and vice versa.

NOTE: FLUE ARRANGEMENTS OTHER THAN THOSE DESCRIBED AND SUPPLIED WITH THE HEATING MODULE ARE NOT PERMITTED

8.1.5 A gas service inlet (PVC) sealing ring is also provided for the appliance for size Rc 3/4 or size Rc 5/4.
The hole size required for the seal ring in the casing is 50 or 75 mm diameter. The provided sealing ring fits for 1mm thick panels.
All cables and wires passing through the casing of the burner/controls section should be via strain relief bushings.
It is recommended that sealing is accomplished by the use of the sealed ring type.
Connections between the burner module controls compartment must be effectively sealed from the appliance air-stream so the pressure within the compartment remains neutral.

9.0 COMBUSTION SYSTEM RHC 8000(M) DJL 'INDOOR'

9.1.1 The DJL Modules are provided with flue outlets sized as per table 4:

Table 4 : Flue sizes

DJL	Flue Ø (mm)
8030 06	100
8045 09 8050 06 8060 12 8075 09 8075 15 8090 18 8100 12	130
8125M.15 8150M.18 8175M.21 8200M.24	130

9.1.2 If the DJL model is to be installed as a room sealed type C12 or C32 appliance, the burner and controls cabinet must be sealed so as to ensure air leakage does not exceed that stated in table 5.

9.1.3 The heating modules are delivered with all parts necessary to properly seal the combustion circuit.
Included with the heating module are:
- 90° elbow with sealing ring
  PN 60 50733 130 (dia 130) or PN 60 50733 100 (dia 100)
- gas tube sealing ring
  (PN 06 22783 125) (3/4") or PN 06 22783 054 (1 ¼")
- 2 'teflon' sealing rings
  PN 06 22786 134 (dia 130) or PN 06 22786 104 (dia 100)

As shown in figure 11a these sealing rings must be fitted in the outer casing to properly seal around the combustion air inlet pipe and the flue outlet pipe. The centre distance between the pipes must be respected as per table 6 and the flue outlet must always be above the combustion air inlet.
Figure 11b indicates the hole size required (as shown in table 6) in the outer casing and the position of these holes relative to the mounting flange of the RHC 8000(M) DJL heating module.

9.1.4 The combustion air inlet duct must not pass through the cabinet panel by more than 50 mm.

9.1.5 When the DJL model is to be used as a type B22 appliance i.e. combustion air being taken from the space to be heated, a protection grille complying with IP 20 must be installed at the inlet point of the cabinet (see figure 10).

9.1.6 Attention must be given to properly seal the mounting flange of the heating module.

9.1.7 A gas service inlet (PVC) sealing ring is also provided for the appliance for size Rc 3/4 or 5/4). The hole size required for this seal ring in the casing is Ø 50mm or Ø 75mm.
All cables and wires passing through the casing of the burner/controls section should be via strain relief bushings. It is recommended that sealing is accomplished by the use of the sealed ring type. Connections between the burner module controls compartment must be effectively sealed from the appliance air-stream so the pressure within the compartment remains neutral.

9.1.8 A viewing port for the purpose of ascertaining the operation of the burner should be included. The viewing port may be located behind a door or panel provided that when the door or panel is opened the combustion circuit remains in its **"sealed"** condition so that burner operation is not upset.

Table 5 : Maximum cabinet air leakage rates

DJL	Heat input KW (gcv)	Allowed leakage m^3/h @ 50Pa
8030 06	37.00	18.50
8045 09	56.00	25.00
8050 06	62.00	25.00
8060 12	74.00	25.00
8075 09	91.50	25.00
8075 15	91.45	25.00
8090 18	109.88	25.00
8100 12	120.00	25.00
8125M.15	153.47	25.00
8150M.18	182.91	25.00
8175M.21	211.76	25.00
8200M.24	244.17	25.00

Table 6 :
Centre distances combustion air inlet flue outlet

Model	Connection Ø (mm)	Centre distance B (mm)	Cabinet hole size required for sealing ring (mm)
8030 06	100	140	112
8045 09	130	225	142
8050 06	130	225	142
8060 12	130	225	142
8075 09	130	225	142
8075 15	130	225	142
8090 18	130	225	142
8100 12	130	225	142
8125M.15	130	225	142
8150M.18	130	225	142
8175M.21	130	225	142
8200M.24	130	225	142

Figure 10: Arrangement for class B22 appliance & gas service inlet

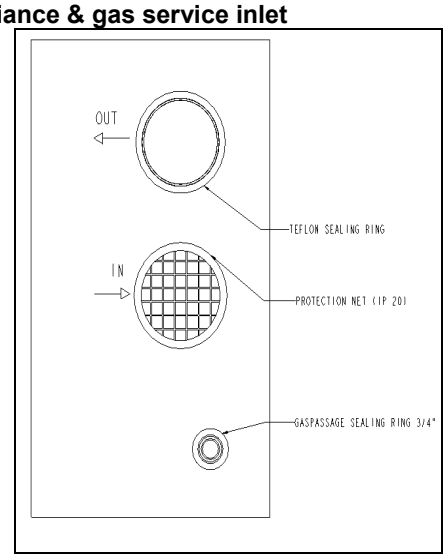
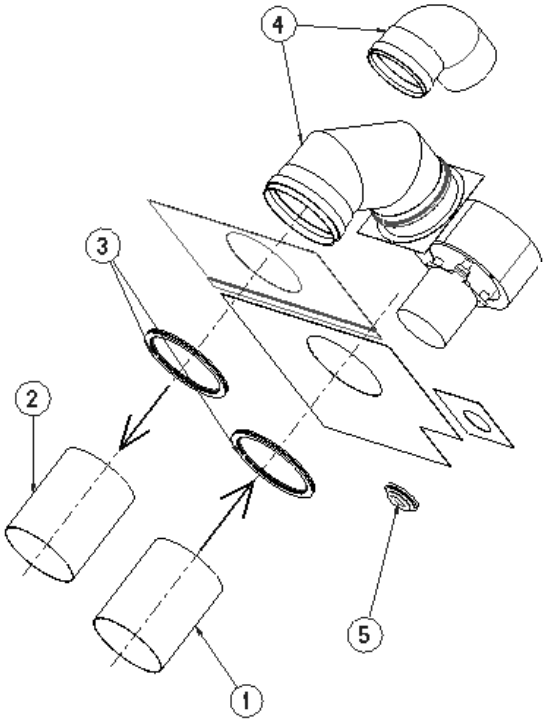


Figure 11a : Combustion air inlet - outlet dimension requirements

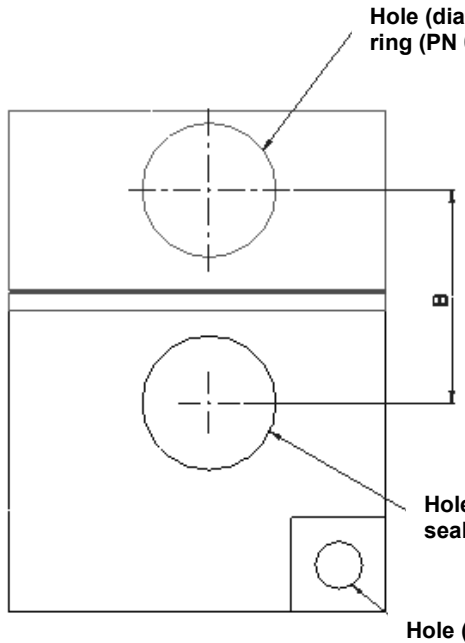


1	Combustion air inlet pipe	*
2	Flue outlet pipe	*
3	Teflon sealing ring	
4	90° bend	
5	Gas passage grommet vinly Rc ¾" or Rc 1 ¼"(PN 06 22783 125 or 06 22783 054)	

* Not delivered with the unit

(n° 59002_01)

Figure 11b : Combustion air inlet - outlet dimension requirements



Dimension B is given in table 6

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ATTENTION:
POOR COMBUSTION LEADING TO A HAZARDOUS SITUATION CAN RESULT FROM EITHER POSITIVE OR NEGATIVE PRESSURES WITHIN THE COMBUSTION CIRCUIT.

10.0 PRESSURE LOSS THROUGH HEATING MODULE

10.1 The charts below indicate the pressure drop over the heating module versus the air flow volume through the heat exchanger enclosure (see fig. 4 and table 2).

10.2 The temperature rise (ΔT) shown is for 100% heat output.

Figure 12a :

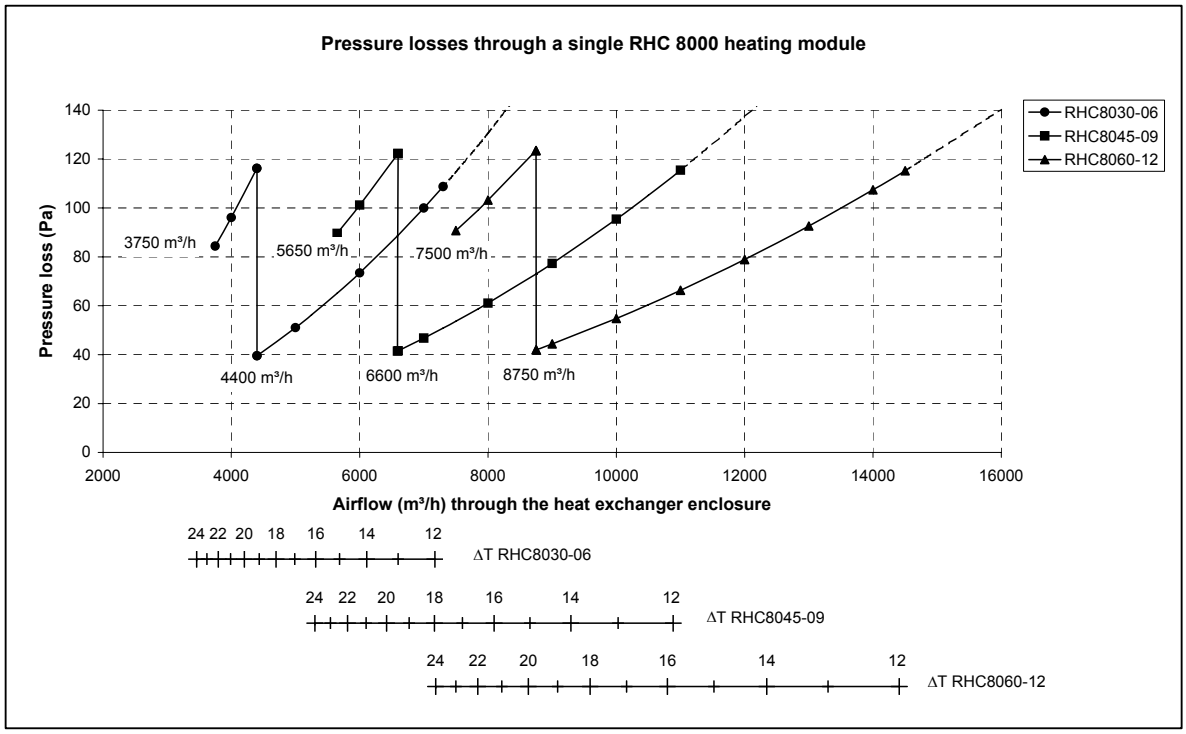


Figure 12b :

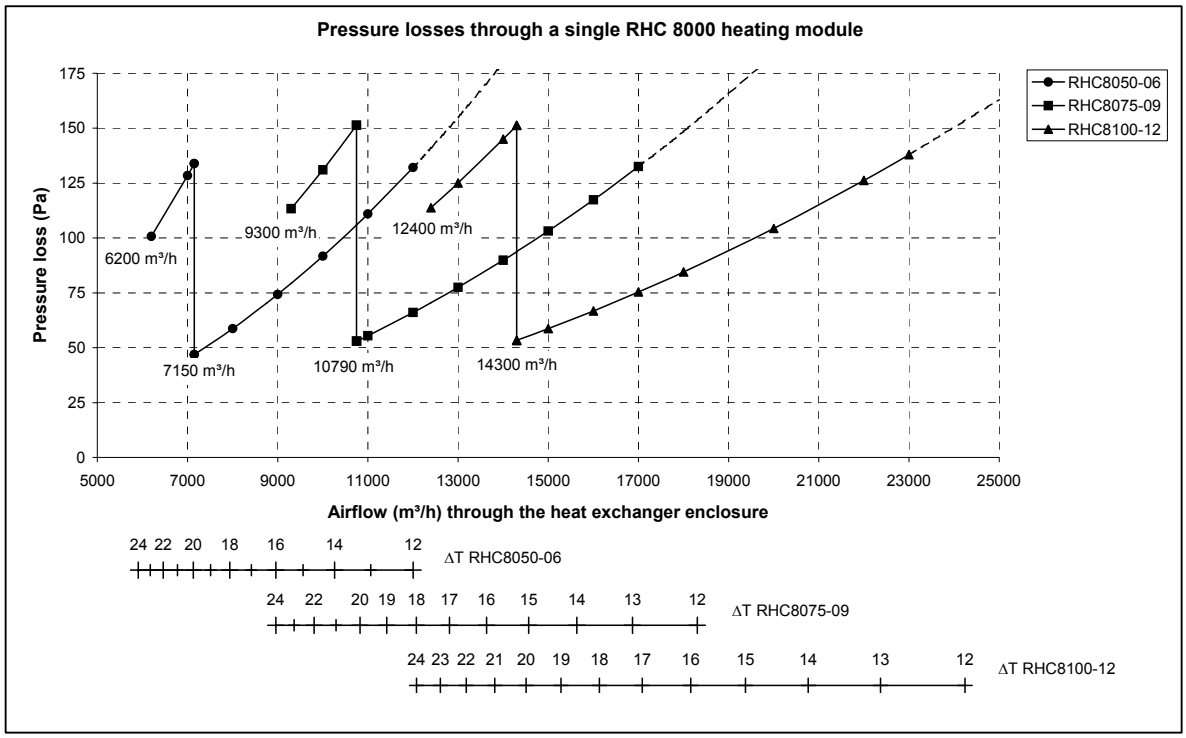


Figure 12c :

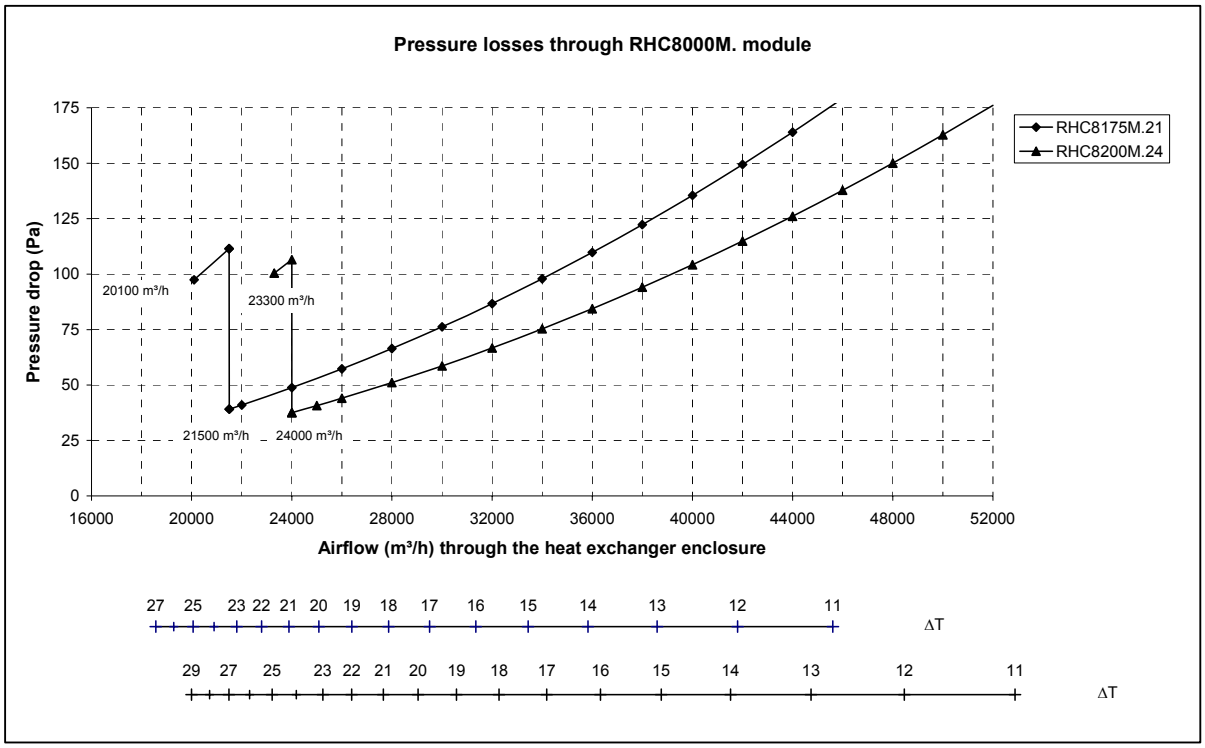


Figure 12d :

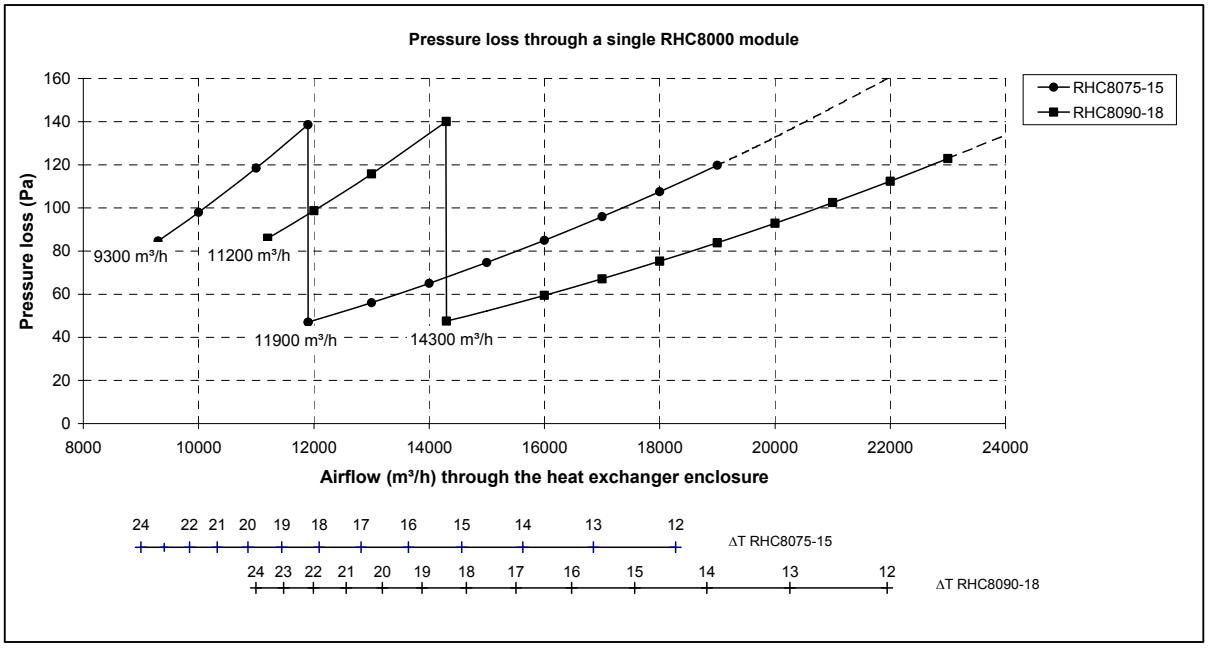


Figure 12e :

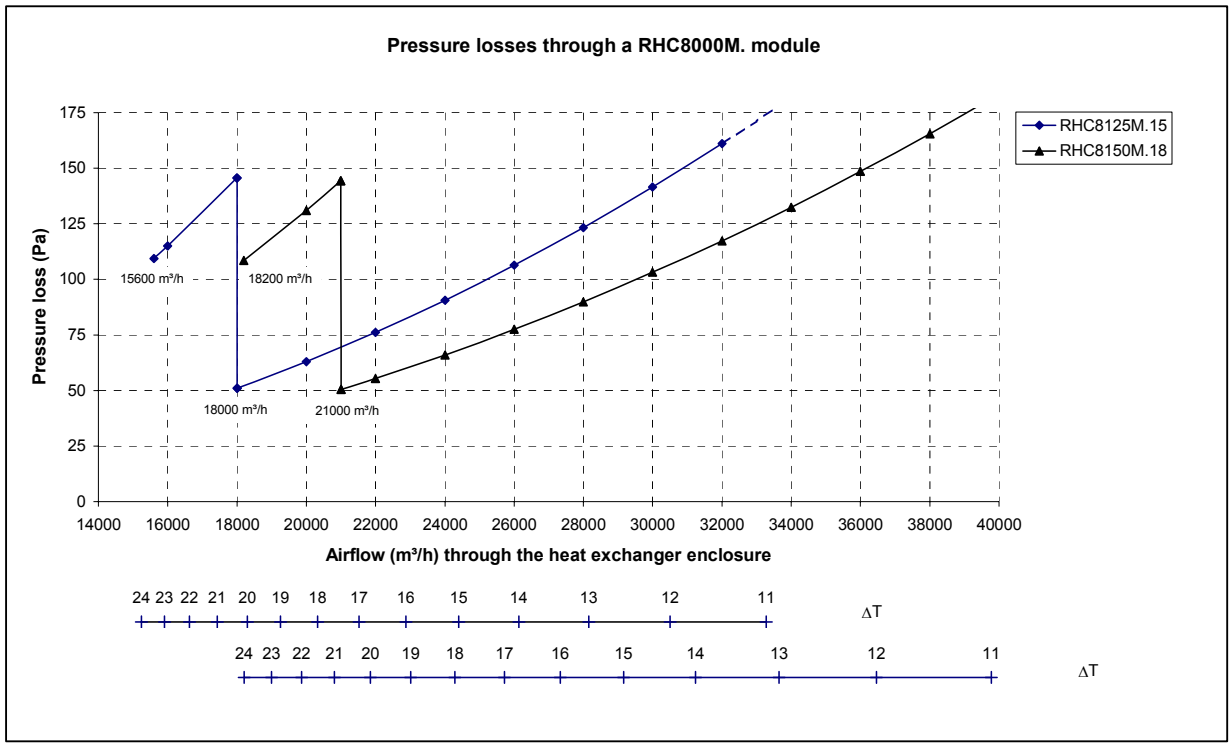
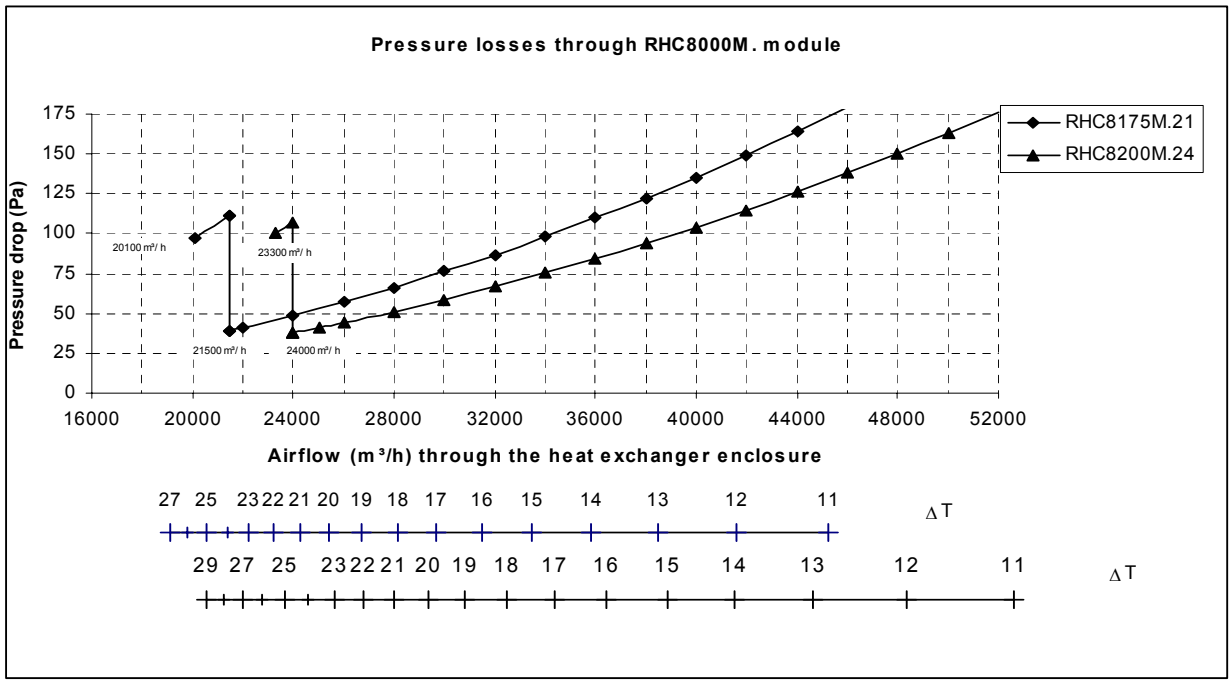


Figure 12f



11.0 HEATING SECTION WITH BY-PASS CHANNEL

11.1 By-pass requirements

11.1.1 Referring to section 4.1.3, a by-pass duct in parallel with the heat exchanger enclosure might be required.

11.1.2 Such by-pass duct might also be required to reduce the pressure loss over the heating section, particularly at higher air flows.

11.1.3 When a by-pass duct is applied, a portion of the total airflow is guided through the by-pass duct and the remaining airflow is guided through the heat exchanger enclosure.

11.1.4 The by-pass duct dimensions must be properly determined in order to ensure that the airflow through the heat exchanger enclosure always meets the minimum airflow requirements as mentioned in table 7

Table 7

Model	V1 (m^3)	V2 (m^3)
8030 06	3750	4400
8045 09	5650	6600
8050 06	6200	7150
8060 12	7500	8750
8075 09	9300	10790
8075 15	9300	11900
8090 18	11200	14300
8100 12	12400	14300
8125M.15	15600	18000
8150M.18	18200	21000
8175M.21	20100	21500
8200M.24	23300	24000

V1 = min. airflow required through heat exchanger enclosure
V2 = minimum airflow required without perforated inlet plate

11.2 Calculation of recommended maximum by-pass (not applicable for 8000M models)

11.2.1 This calculation is applicable for total airflow conditions above V2 (table 7).

11.2.2 Consequently, the perforated inlet plate must NOT be installed and must not be applied in combination with the by-pass as determined by the calculation method underneath.

A) <u>The by-pass can either be mounted on top of the heat exchanger or besides the heat exchanger as shown in figure 13</u>

The recommended maximum by-pass dimensions for a given air flow (V_{tot}) can be calculated as follows : (V_{tot} is the air flow expressed in m^3/s).

a) <u>By-pass besides heat exchanger</u> :

Model	dim. B (mm)	factor R1	factor R2
8030 06	461	$295.^{00}$	$-350.^{60}$
8045 09	671	$196.^{80}$	$-354.^{10}$
8050 06	461	$272.^{30}$	$-532.^{80}$
8060 12	880	$146.^{30}$	$-346.^{00}$
8075 09	671	$174.^{40}$	$-514.^{10}$
8075 15	1090	$112.^{50}$	$-357.^{50}$
8090 18	1299	$93.^{00}$	$-362.^{40}$
8100 12	880	$129.^{90}$	$-508.^{00}$

Dimension C (mm) = R1 x V_{tot} + R2

b) <u>By-pass on top of heat exchanger</u> :

Model	dim. D (mm)	factor R1	factor R2
8030 06	1170	$117.^{70}$	$-141.^{30}$
8045 09	1170	$112.^{00}$	$-200.^{00}$
8050 06	1770	$70.^{90}$	$-138.^{80}$
8060 12	1170	$111.^{10}$	$-265.^{10}$
8075 09	1770	$66.^{10}$	$-194.^{90}$
8075 15	1170	$105.^{80}$	$-345.^{70}$
8090 18	1170	$104.^{80}$	$-412.^{70}$
8100 12	1770	$64.^{60}$	$-252.^{70}$

Dimension A (mm) = R1 x V_{tot} + R2

B) <u>Example</u> :

RHC 8075 09 RJL
<u>with</u> :
- total air flow = $5.0 m^3/s$ = $18000 m^3/h$
- by-pass besides heat exchanger

<u>Result</u> :
- dimension B = $670.^{50}$mm
- dimension X = 400mm (see fig. 13)
- R1 = $174.^{40}$
- R2 = $-514.^{10}$
- dimension C = $174.^{40}.5 \times 5.^{00} - 514.^{10}$

C = $357.^{90}$mm

Note
In this case 2.^{99}m³/s (= 10750m³/h) flows through the heat exchanger enclosure.
The remaining 2.^{01}m³/s (=7250m³/h) flows through the by-pass duct
(5.^{00}m³/s – 2.^{99}m³/s = 2.^{01}m³/s)

C) Pressure loss :
In this case the total pressure loss over the RHC module with by-pass can be extracted from figure 12. The airflow through the heat exchanger enclosure must be applied to determine the total pressure drop.

Example :
- Airflow through the heat exchanger enclosure = 2.^{99} m³/s (10750 m³/h)
- Total pressure drop = 50 Pa (approx.).

11.3 Calculation of alternative by-pass dimension

Due to space restrictions it may not be possible to use the above mentioned maximum dimension by-pass.
In this case a smaller by-pass can be applied. Obviously, this smaller by-pass will result in higher portion of the total air flow through the heat exchanger enclosure and consequently in a higher total pressure drop

A) To calculate this air flow through the heat exchanger enclosure, following interpolation rule should be applied :

With :

V2	=	Recommended air flow (Table 7) (m³/s)
V_{tot}	=	Total air flow (m³/s)
x_1	=	Recommended by-pass (dim A or C) (as calculated in section 11.1).
x_2	=	Applied by-pass dim. (mm)

Then V_{HS} (air flow through heat exchanger enclosure can be calculated as :

$$V_{HS} = \frac{V_{tot}}{\frac{x_2}{x_1} \times \left(\frac{V_{tot}}{V2} - 1 \right) + 1}$$

As explained above, the air flow V_{HS} through the heat exchanger enclosure must be used in figure 12 to extract the correct total pressure drop over the RHC module with by-pass.

The air flow V_{HS} may not exceed the maximum airflow allowed according to section 4.1.2 to avoid super cooling of the flue gases.

B) Example .

RHC 8075 09 RJL
with :
- Total air flow : 5m³/s (18000m³/h)
- Expected min. inlet temperature : -5°C
- Recommended max. dim C = 357.^{90}mm (see above 1B)
- Dimension X = 400mm
- Applied by-pass dim. C = 200mm

Then :
x1 = 357.^{90}mm
x2 = 200mm
Vtot = 5m³/s
V2 = 2.^{99}m³/s (10750m³/h) (see table 7)

Result :

$$V_{HS} = \frac{5.^{00}}{\frac{200}{357.^{90}} \times \left(\frac{5.^{00}}{2.^{99}} - 1 \right) + 1} = 3.^{63} m^3/s \ (13068 m^3/h)$$

Consequently, 3.^{63}m³/s (13068 m³/h) flows through the heat exchanger enclosure and the remaining 1.^{37}m³/s (=4932m³/h) (= 5.^{00}m³/s – 3.^{63}m³/s) flows through the by-pass channel.

From section 4.1.2 the maximum allowable airflow through the heating module enclosure is 16850 m³/h (for this example).
We notice the 13068 m³/h is still below this maximum allowable figure. Consequently there is no probability of condensation forming within the tubes.

C) Pressure drop :

The total pressure drop can be derived from figure 12. Use the air flow through the heat exhanger enclosure to determine the total pressure drop. (@13068 m³/h)

Result : 75Pa (approx)

Figure 13a :

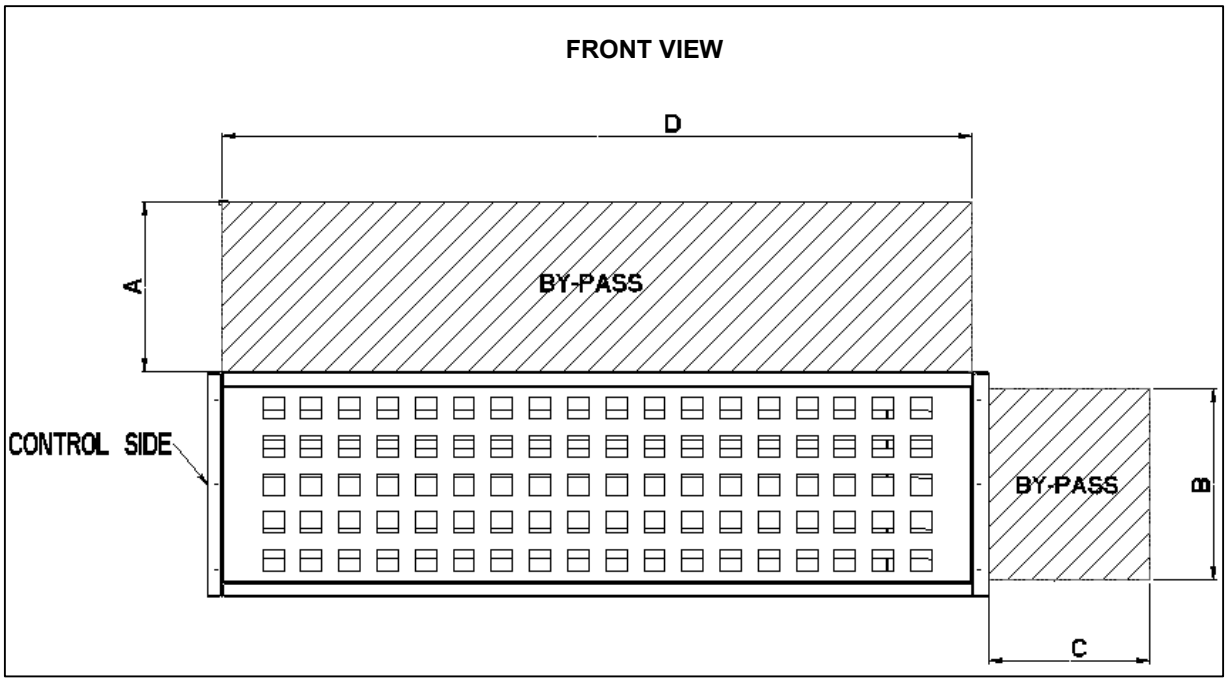
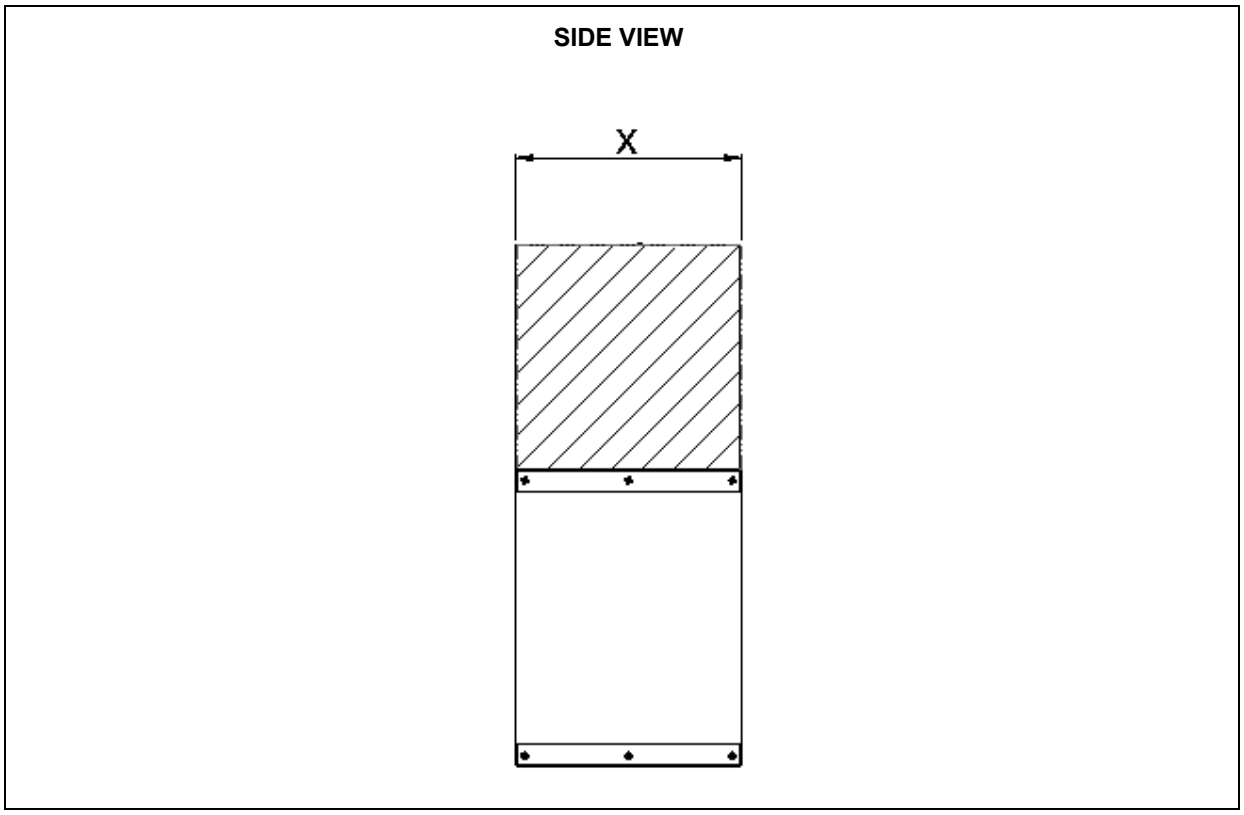


Figure 13b :



12.0 INSTALLATION OF RHC UNITS IN SERIES

12.1 General

12.1.1 Two or three RHC units can be installed in series. Units can be bolted together using the pre-punched holes in the duct flanges (see fig. 3 for dimensions B and C). Apply a sealant between two units in order to avoid air leakage.

12.1.2 Each individual unit requires its own combustion circuit as described in sections 8.0 & 9.0.

12.1.3 Instructions concerning the burner and controls section (see section 5.0) must be followed. The controls sections of the 2 or 3 units in series can be combined, resulting in one enclosure.

12.1.4 Perforated inlet plates :

a) 2 units in series :

*At higher airflow conditions (above V2) (table 8a) the perforated inlet plates are NOT required and both must be removed.

*For airflow conditions below V2, the RHC unit at the air inlet side must still have a perforated inlet plate. The perforated plate of the second unit must be removed.

b) 3 units in series :

With 3 units in series, the perforated inlet plates are NOT required. Consequently, all 3 perforated inlet plates must be removed.

12.2 Limitations for use

12.2.1 Minimum airflow requirement through heat exchanger enclosure : For RHC units, installed in series, the minimum airflow duty through the heat exchanger enclosure (see fig. 4 – table 1) must be observed as indicated in table 8a & 8b.

12.2.2 Maximum airflow through heat exchanger enclosure : The recommendations as described in section 4.1.2 are applicable for RHC units when installed in series. Checking the possibility of condensation forming within the tubes must be done (heating section by heating section), taking into account the expected minimum inlet temperature and the heat output conditions for each individual heating section.

Table 8a
Minimum airflow requirements for 2 RHC units in series :

Model	V1 (m^3/h)	V2 (m^3/h)
2x 8030 06	3750	4400
2x 8045 09	5650	6600
2x 8050 06	6200	7150
2x 8060 12	7500	8750
2x 8075 09	9300	10790
2x 8075 15	9300	11900
2x 8090 18	11200	14300
2x 8100 12	12400	14300
2x 8125M.15	15600	18000
2x 8150M.18	18200	21000
2x 8175M.21	20100	21500
2x 8200M.24	23300	24000

V1 = min. airflow required through heat exchanger enclosure
V2 = min. airflow required without per-forated inlet plate

Table 8b
Minimum airflow requirements for 3 RHC units in series :

Model	V1 (m^3/h)
3x 8030 06	5250
3x 8045 09	7850
3x 8050 06	8750
3x 8060 12	10500
3x 8075 09	13000
3x 8075 15	13000
3x 8090 18	15800
3x 8100 09	17000
3x 8125M.15	22000
3x 8150M.18	26000
3x 8175M.21	30000
3x 8200M.24	35000

V1 = min. airflow required through heat exchanger enclosure

P.S. : no perforated air inlet plate required

12.3 Pressure loss through multiple heating modules

12.3.1 The charts below (figures 14) indicate the pressure loss over the heating module versus the total air volume through the heat exchanger enclosure (see figure 4 and table 2)

The temperature rise as shown is for 100% heat output.

Pressure drop for 2 units in series

Figure 14a

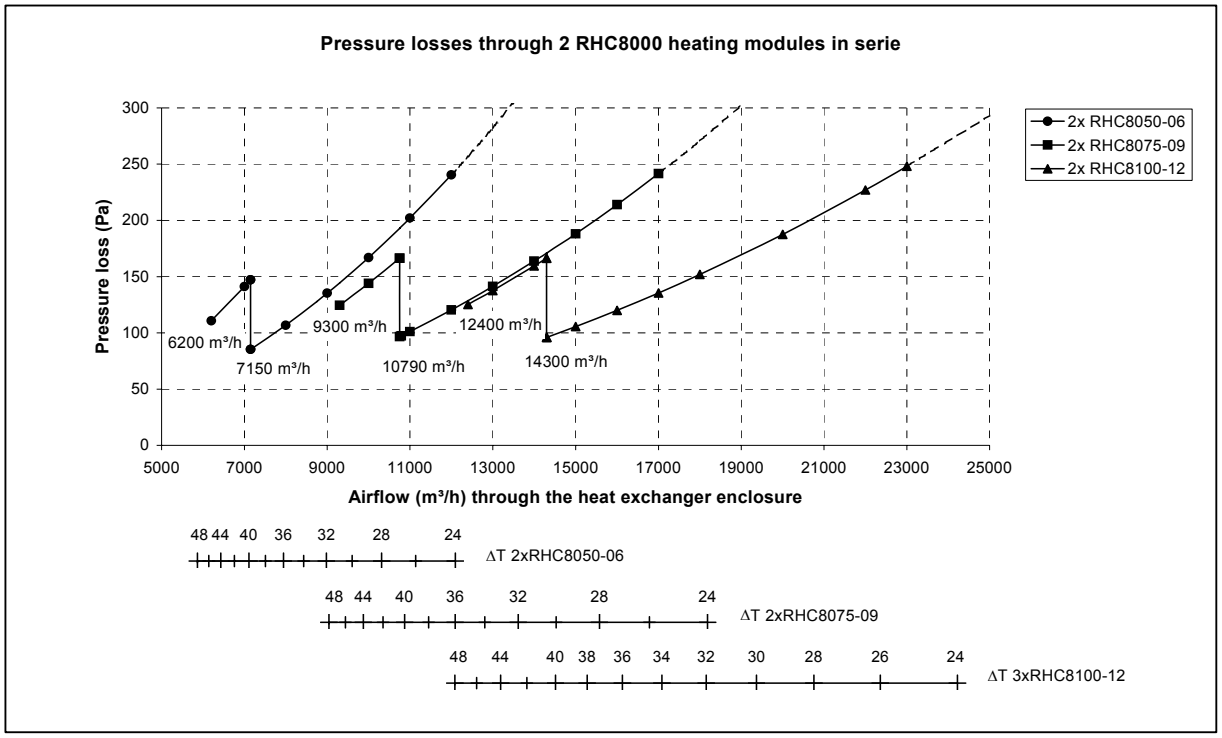


Figure 14b

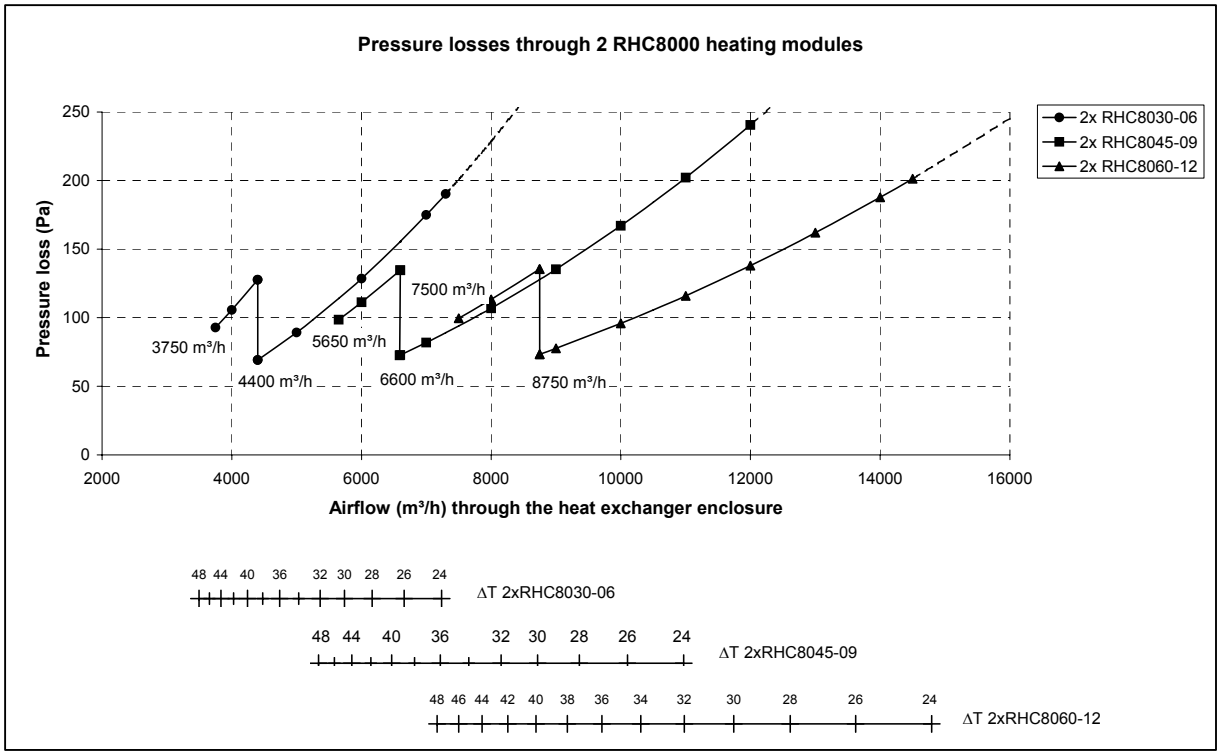


Figure 14c

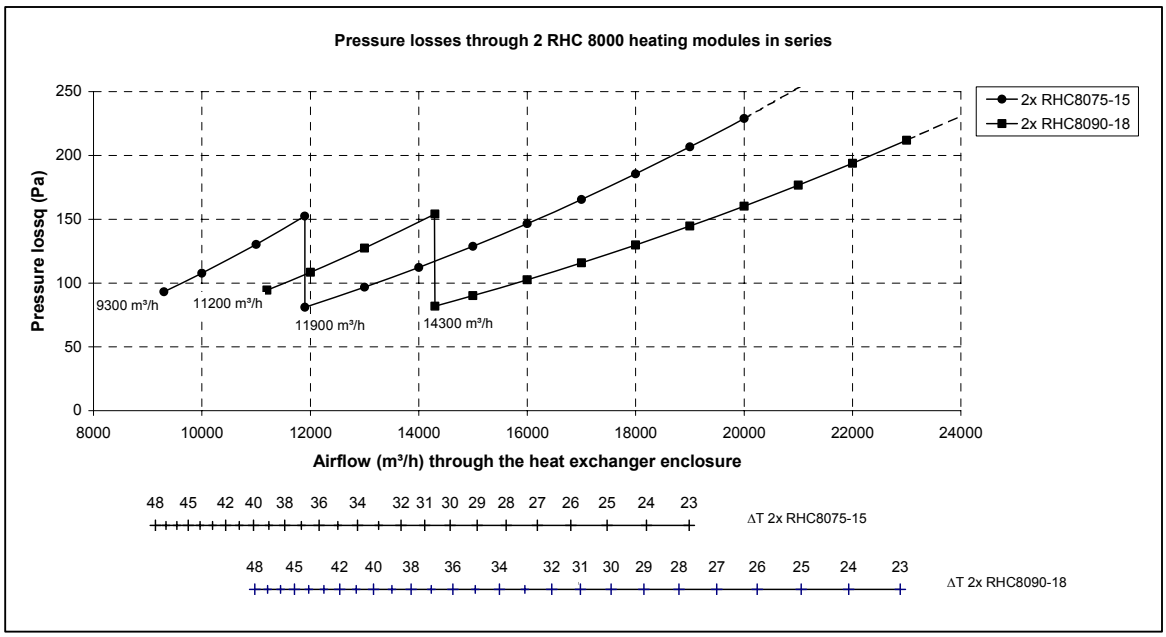


Figure 14d

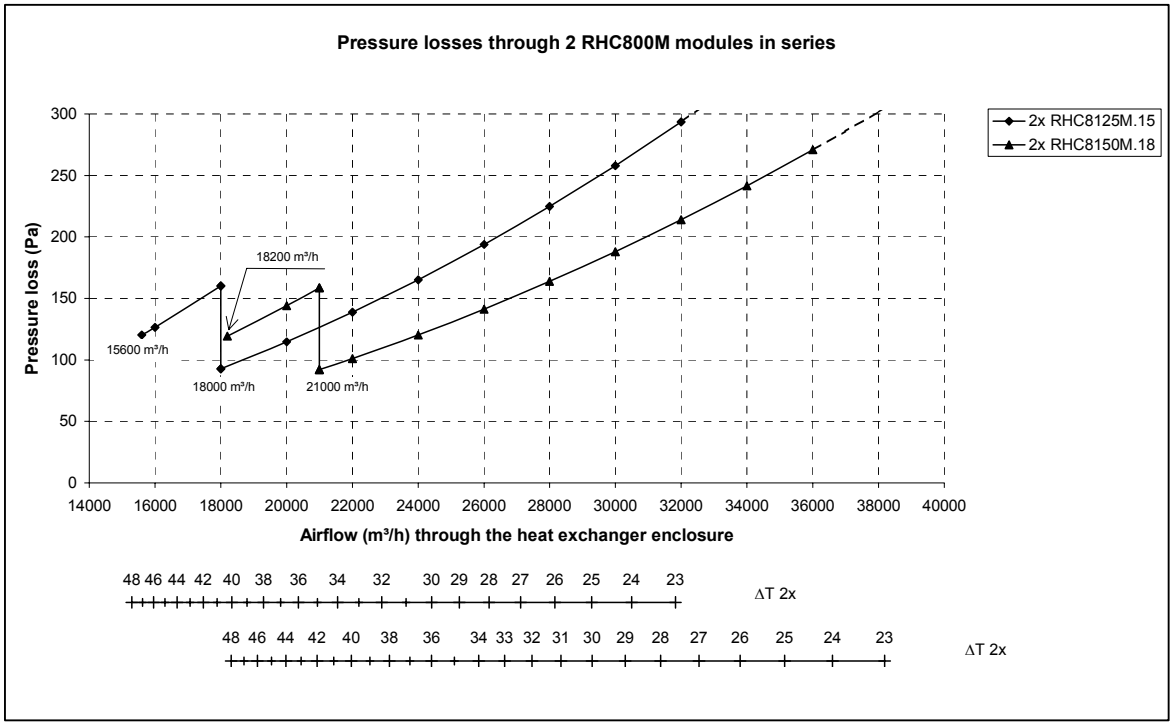
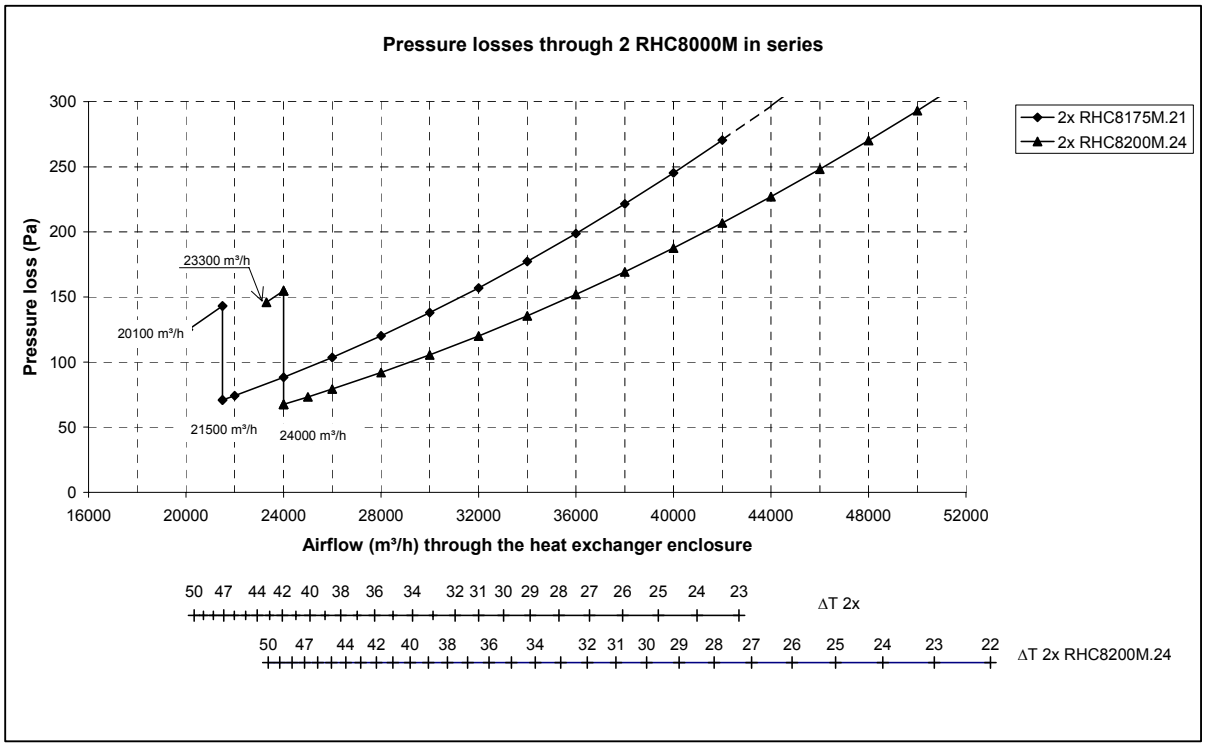


Figure 14e



PRESSURE DROP FOR 3 UNITS IN SERIES

Figure 14f

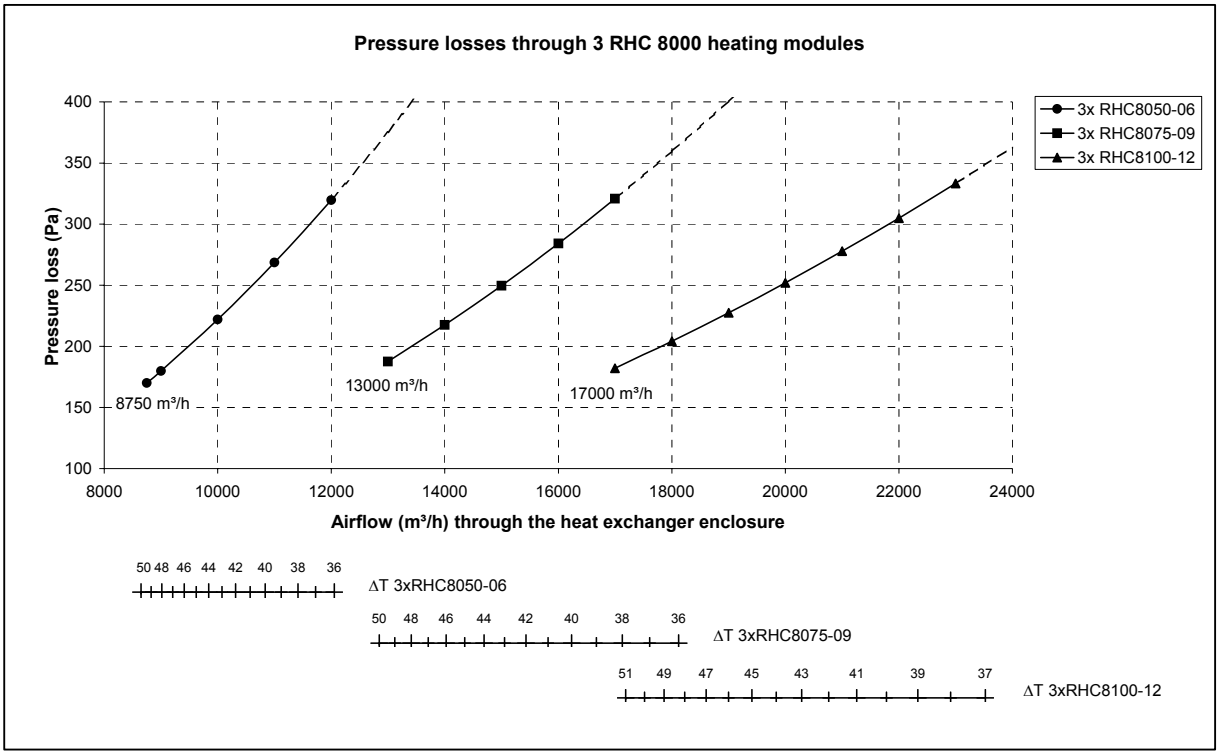


Figure 14g

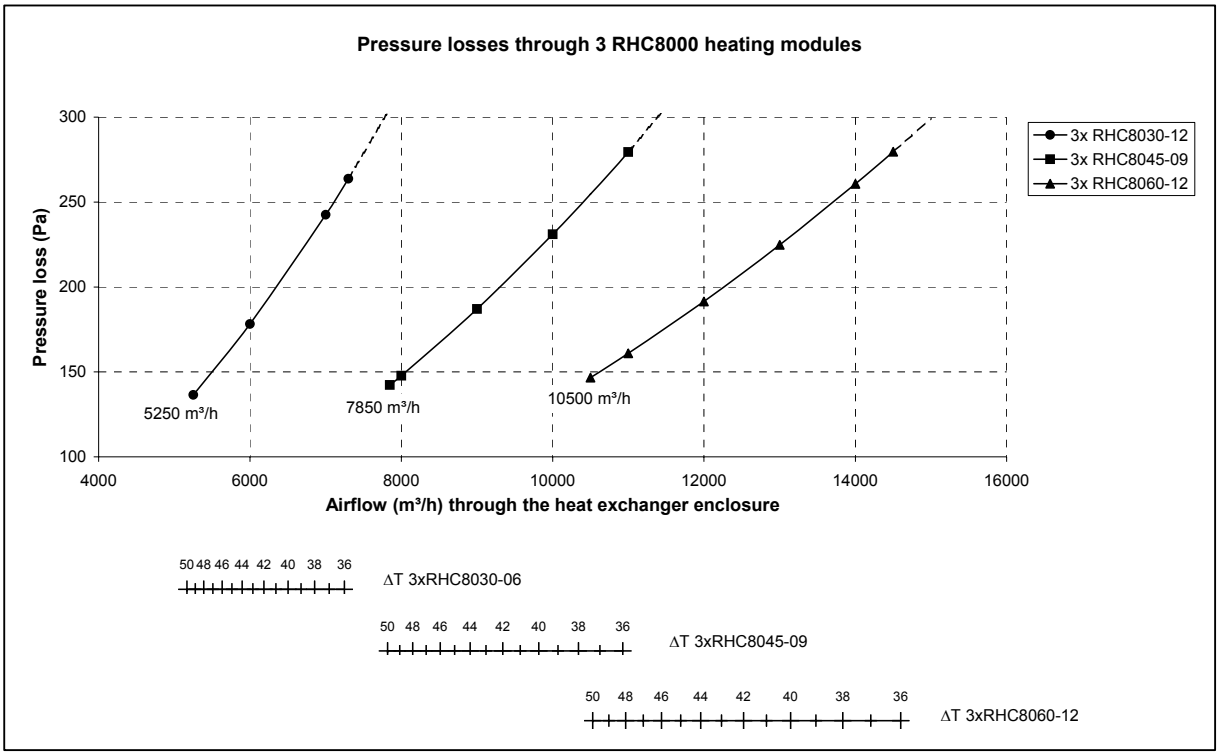


Figure 14h

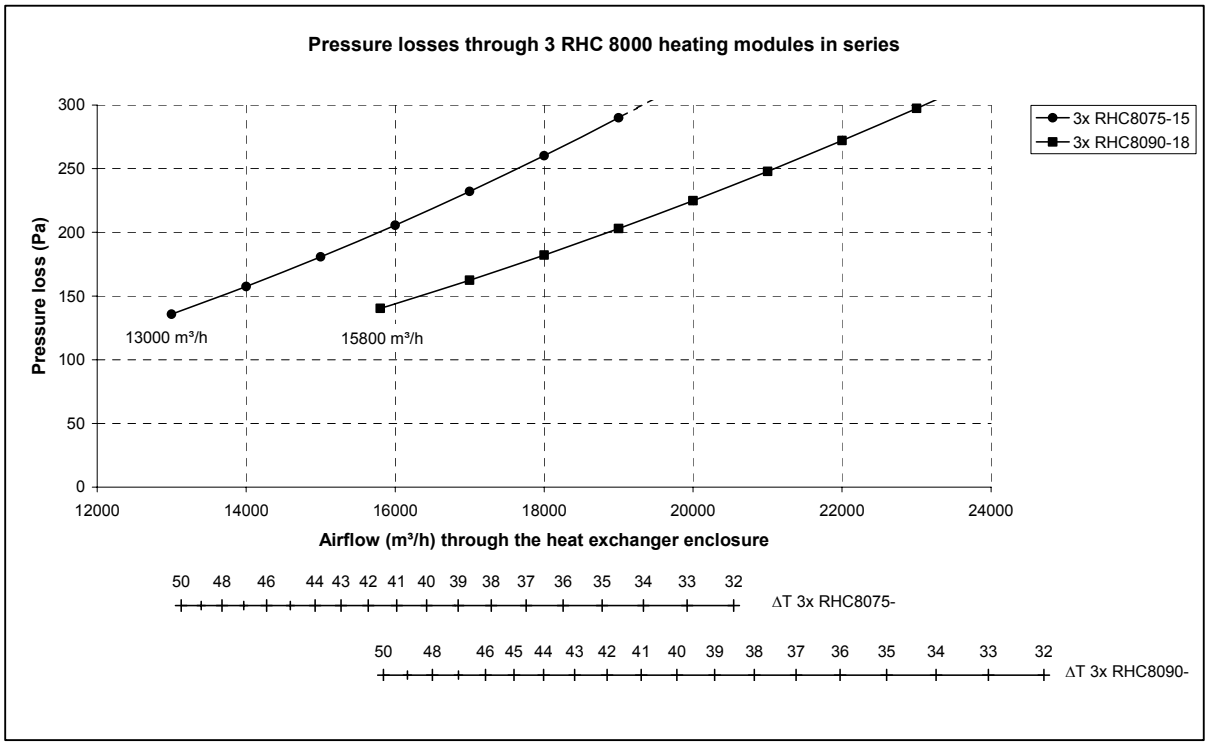
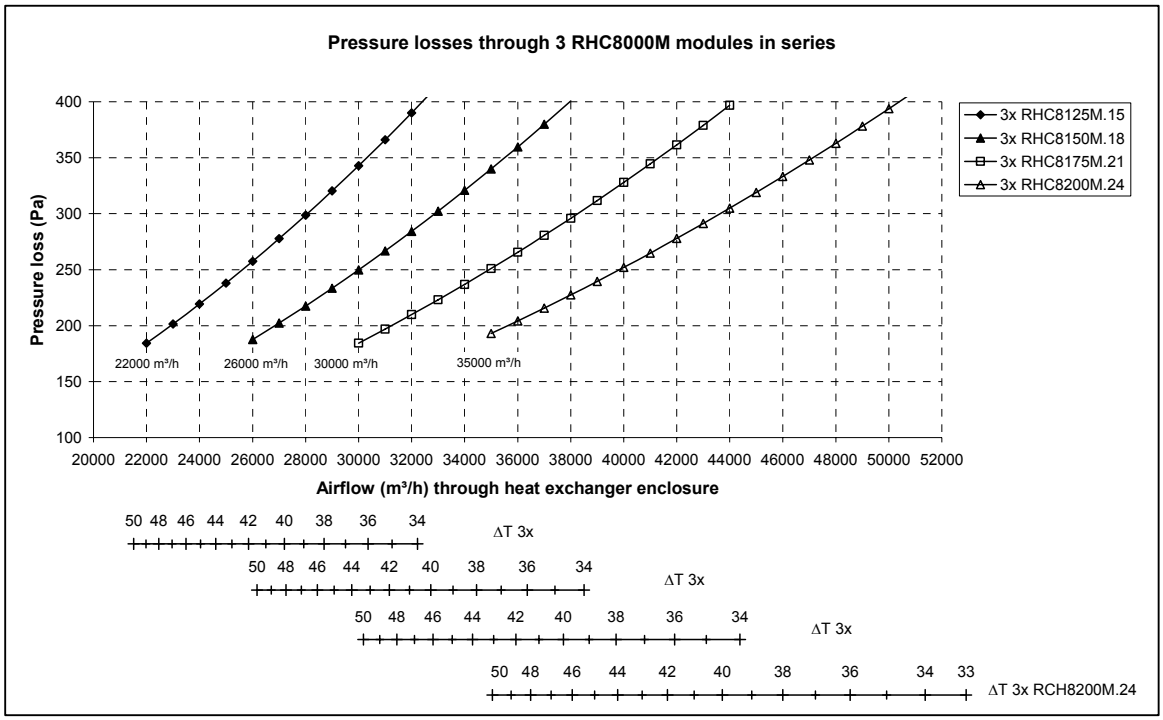


Figure 14i


Pressure losses through 3 RHC8000M modules in series
Pressure loss (Pa)
400
350
300
250
200
150
100
20000 22000 24000 26000 28000 30000 32000 34000 36000 38000 40000 42000 44000 46000 48000 50000 52000
Airflow (m³/h) through heat exchanger enclosure
3x RHC8125M.15
3x RHC8150M.18
3x RHC8175M.21
3x RHC8200M.24
22000 m³/h
26000 m³/h
30000 m³/h
35000 m³/h
50 48 46 44 42 40 38 36 34
ΔT 3x
50 48 46 44 42 40 38 36 34
ΔT 3x
50 48 46 44 42 40 38 36 34
ΔT 3x
50 48 46 44 42 40 38 36 34 33
ΔT 3x RCH8200M.24

12.4 Multiple heating sections in series with by-pass channels (not applicable for RHC 8000M models)

12.4.1 By-pass requirements :

* Referring to section 4.1.3, a by-pass duct in parallel with the heat exchanger enclosure might be required.
* Such by-pass duct might also be required to reduce the pressure loss over the heating section, particularly at higher airflows.
* When a by-pass duct is applied, a portion of the total airflow is guided through the by-pass duct and the remaining airflow is guided through the heat exchanger enclosure.
* The by-pass duct dimensions must be properly determined in order to ensure that the airflow through the heat exchanger enclosure always meets the minimum airflow requirements as mentioned in table 8.

12.4.2 Calculation of recommended maximum by-pass :

* This calculation is applicable for total airflow conditions above V2 (table 8).
* Consequently, the perforated inlet plate must NOT be installed and must not be applied in combination with the by-pass as determined by the calculation method underneath.

The by-pass can either be mounted on top of the heat exchanger or besides the heat exchanger as shown in figure 13.
The recommended maximum by-pass dimensions for a given air flow (V_{tot}) can be calculated as follows : (V_{tot} is the air flow expressed in m³/s).

FOR 2 UNITS IN SERIES

a) By-pass besides heat exchanger :

Model	dim. B (mm)	factor R1	factor R2
8030 06	461	$255.^{50}$	$-268.^{00}$
8045 09	671	$150.^{40}$	$-270.^{70}$
8050 06	461	$199.^{10}$	$-383.^{50}$
8060 12	880	$111.^{90}$	$-264.^{70}$
8075 09	671	$126.^{60}$	$-386.^{20}$
8075 15	1090	$85.^{60}$	$-276.^{70}$
8090 18	1299	$72.^{70}$	$-285.^{50}$
8100 12	880	$97.^{20}$	$-377.^{00}$

Dimension C (mm) = R1 x V_{tot} + R2

b) By-pass on top of heat exchanger :

Model	dim. D (mm)	factor R1	factor R2
8030 06	1170	$90.^{00}$	$-108.^{10}$
8045 09	1170	$85.^{60}$	$-152.^{90}$
8050 06	1770	$51.^{90}$	$-202.^{50}$
8060 12	1170	$84.^{90}$	$-99.^{90}$
8075 09	1770	$48.^{00}$	$-138.^{80}$
8075 15	1170	$79.^{70}$	$-267.^{70}$
8090 18	1170	$80.^{70}$	$-316.^{90}$
8100 12	1770	$48.^{80}$	$-190.^{90}$

Dimension A (mm) = R1 x V_{tot} + R2

FOR 3 UNITS IN SERIES

a) By-pass besides heat exchanger :

Model	dim. B (mm)	factor R1	factor R2
8030 06	461	$200.^{50}$	$-288.^{10}$
8045 09	671	$109.^{80}$	$-236.^{40}$
8050 06	461	$145.^{10}$	$-348.^{10}$
8060 12	880	$81.^{50}$	$-234.^{50}$
8075 09	671	$92.^{30}$	$-399.^{00}$
8075 15	1090	$67.^{40}$	$-285.^{50}$
8090 18	1299	$56.^{70}$	$-246.^{80}$
8100 12	880	$72.^{60}$	$-338.^{90}$

Dimension C (mm) = R1 x V_{tot} + R2

b) By-pass on top of heat exchanger :

Model	dim. D (mm)	factor R1	factor R2
8030 06	1170	$79.^{20}$	$-114.^{00}$
8045 09	1170	$76.^{50}$	$-164.^{70}$
8050 06	1770	$38.^{30}$	$-92.^{20}$
8060 12	1170	$74.^{40}$	$-214.^{30}$
8075 09	1770	$35.^{40}$	$-125.^{70}$
8075 15	1170	$63.^{30}$	$-225.^{60}$
8090 18	1170	$62.^{90}$	$-274.^{10}$
8100 12	1770	$36.^{10}$	$-168.^{50}$

Dimension A (mm) = R1 x V_{tot} + R2

12.4.3 Calculation of alternative by-pass dimension:

Due to space restrictions it may not be possible to use the above mentioned maximum dimension by-pass. In this case a smaller by-pass can be applied. Obviously, this smaller by-pass will result in a higher portion of the total airflow through the heat exchanger enclosure and consequently in a higher total pressure drop

To calculate this air flow through the heat exchanger enclosure, following inter-polation rule should be applied :

With :

V2 = Recommended air flow (Table 7) (m³/s)
V_{tot} = Total air flow (m³/s)
x_1 = Recommended by-pass (dim A or C) (as calculated in section 11.1).
x_2 = Applied by-pass dim. (mm)

Then V_{HS} (air flow through heat exchanger enclosure can be calculated as :

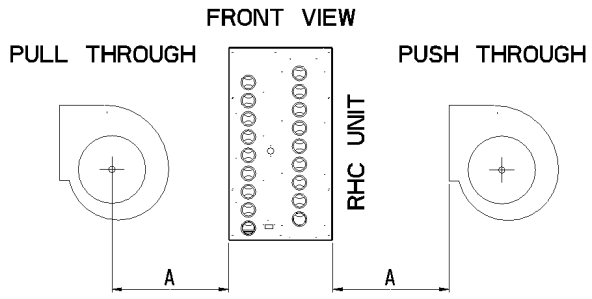
$$V_{HS} = \frac{V_{tot}}{\frac{x_2}{x_1} \times \left(\frac{V_{tot}}{V2} - 1 \right) + 1}$$

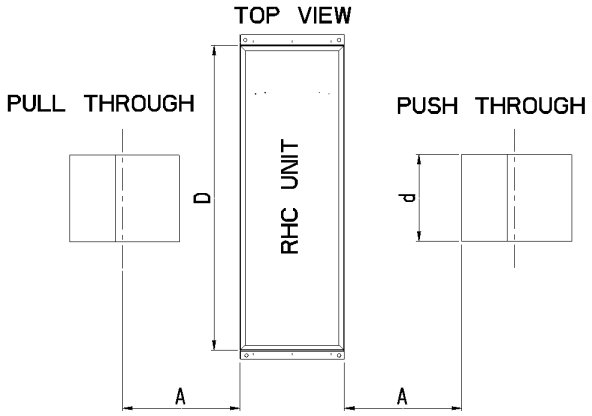
As explained above, the air flow V_{HS} through the heat exchanger enclosure must be used in figure 12 to extract the correct total pressure drop over the RHC module with by-pass.
The air flow V_{HS} may not exceed the maximum airflow allowed according to section 4.1.2 to avoid super cooling of the flue gases.

13.0 Installation of air fan in respect of RHC heating coil

To ensure a fluent air distribution over the RHC heating coil, it is strongly recommen-ded to follow the installation method as described in figure 15.

Figure 15 : Installation of air fan





With :

A : min. distance fan → heating coil
D : width of duct section (see table 2, fig. 4, dim Y2)
d : width of centrifugal fan

$$A \geq \frac{D - d}{2}$$

Example :

RHC 8100 12
D = 1770 mm
d = 500mm

$$A \geq \frac{1770 - 500}{2} = 635\text{mm}$$

14.0 INSTALLATION OF MULTIPLE RHC…. DJL UNITS WITH VERTICAL FLUE OUTLET (not applicable for RHC 8000M models)

14.1 Attention : remove the 90° elbow (mounted on the flue combustion ventilator). This applies to all models.

14.2 Mounting possibilities

14.2.1 2 units in series
(see fig. 16, drw. 1, units 1 & 3)
The vertical flue can directly be mounted on the collar of the combustion ventilator. Refer to drw. 2, units 1 & 3 for the correct positioning of the flue pipe passages with sealing rings.

14.2.2. 2 units in parallel (one on top of the other)
Attention : this configuration can only be realised with the units 8045 09/8075 09/8060 12 & 8100 12 installed as underframe.

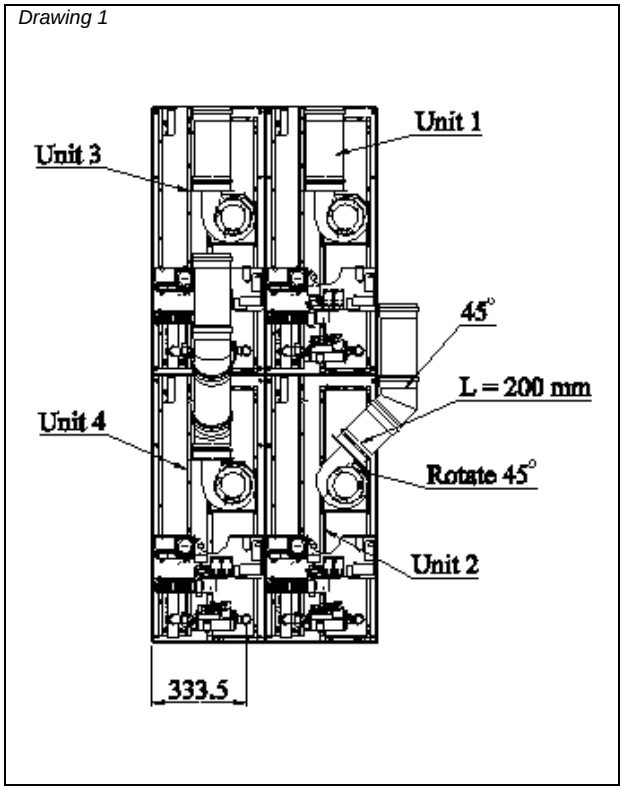
* turn the combustion ventilator housing of unit 2, with 45° to the right (see fig. 16, drw. 1, units 1 & 2).
* remove motor and wheel of the combustion fan.
* unscrew the 3 fixation screws fixing the motor fixation plate with the venter housing.
* turn the housing 45° to the right and use the 3 remaining fixation holes in the blower mounting plate to fix the housing properly.
* install on the collar of the combustion ventilator outlet a pipe with dia 130mm and 200mm length and a 45° elbow, both made of thick wall aluminium..
* now unit 2 is ready for mounting the vertical flue pipe. For safety reasons it is recommended to provide the vertical flue pipe with proper insulation inside the cabinet. We refer to drw. 2, units 1 and 2 for the positioning of the flue pipe passages with sealing ring.

14.2.3 2 units in series & 2 units in parallel (4 units in total)

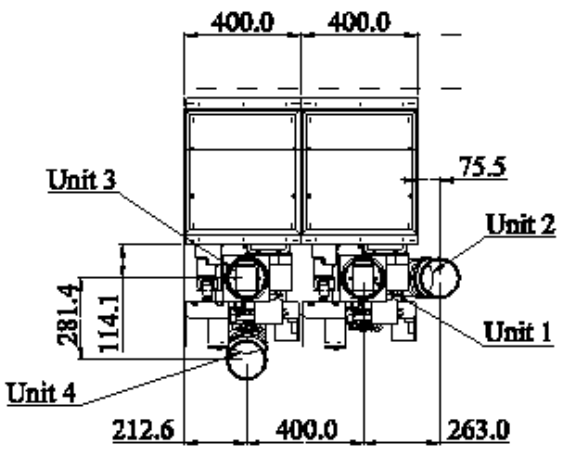
* *units 1 & 3* : follow the same steps as described in section 14.2.1
* *unit 2 :* follow the same steps as described in section 14.2.2
* *unit 4* : proceed as follow (see drw 3):
  Install on the collar of the combustion ventilator outlet a 45° bend of thick wall aluminium
  Then, mount on this bend a thick wall alu pipe with a length of 300mm and dia 130mm.
  Install finally a thick wall alu elbow of 45° on this pipe
* After carrying out the above-described instructions, it becomes possible to provide the 4 units with a vertical flue pipe.
* Inside the cabinets, it is recommended to provide the vertical flue pipes of the units 2 & 4 with proper insulation.
* We refer to drawing 2 for the positioning of the flue pipe passages with sealing rings

Figure 16

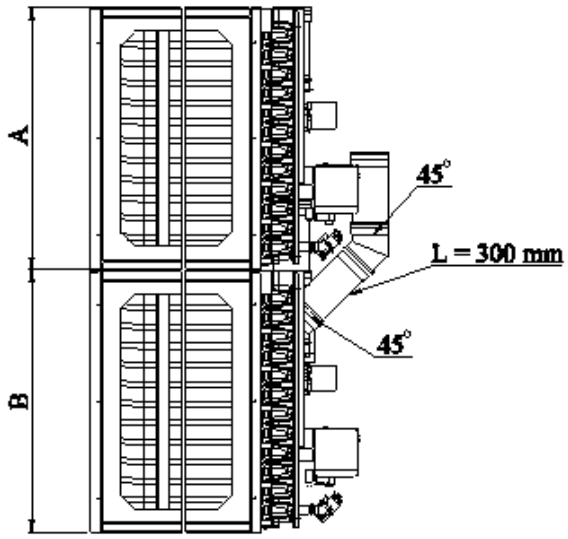
Drawing 1



Drawing 2



Drawing 3



15.0 TECHNICAL DATA

Table 9 - Model RHC 8000(M) Specifications

Model	Heat input		Heat output	Gas rate [3]		Power Consumption	Heat output 50% 2 stage	Minimum modulating output
				G25	G31			
	kW gros[1]	kW net[2]	kW	m³/h	kg/h	kW	kW	kW
8030 06	**37.00**	**33.40**	**30.10**	**4.11**	**2.64**	**0.153**	**14.20**	**8.50**
8045 09	**56.00**	**50.40**	**45.50**	**6.21**	**4.00**	**0.153**	**21.40**	**12.90**
8050 06	**62.00**	**55.88**	**50.00**	**6.88**	**4.43**	**0.153**	**24.00**	**14.40**
8060 12	**74.60**	**67.20**	**60.50**	**8.28**	**5.33**	**0.153**	**28.60**	**17.10**
8075 09	**91.50**	**82.40**	**75.00**	**10.15**	**6.61**	**0.153**	**35.40**	**21.20**
8075 15	**91.45**	**82.40**	**74.98**	**10.14**	**6.43**	**0.282**	**35.27**	**35.27**
8090 18	**109.88**	**99.00**	**90.09**	**12.16**	**7.72**	**0.282**	**43.16**	**43.16**
8100 12	**120.00**	**108.40**	**100.00**	**13.32**	**8.57**	**0.153**	**46.60**	**28.00**

Model	Heat input		Heat output	Gas rate [3]		Power Consumption	Heat output low stage bottom unit	Minimum modulating output
				G25	G31			
	kW gros[1]	kW net[2]	kW	m³/h	kg/h	kW	kW	kW
8125M.15	**153.47**	**138.28**	**125.42**	**17.02**	**10.78**	**0.282**	**51.02**	**25.45**
8150M.18	**182.91**	**164.80**	**149.97**	**20.28**	**12.85**	**0.282**	**74.90**	**36.28**
8175M.21	**211.76**	**190.80**	**172.48**	**23.48**	**14.88**	**0.282**	**98.21**	**47.80**
8200M.24	**244.20**	**220.00**	**200.00**	**27.08**	**17.16**	**0.96**	**101.20**	**50.05**

1. GCV (Hs)
2. NCV (Hi)
3. Natural gas G25 gross calorific value 9,01 kWh/m³ @ 15 °C, 1013. mbar
   Butane gas G30 gross calorific value 13.7 kWh/kg
   Propane gas G31 gross calorific value 14.0 kWh/kg

Table 10 Injector size and burner pressure
G25 natural gas - inlet pressure = 25 mbar

Model	Quantity	Injector size		Burner pressure (mbar) (1)
		mm	marking	
8030 06	**6**	**2.40**	**240**	**9.80**
8045 09	**9**	**2.40**	**240**	**9.80**
8050 06	**6**	**3.00**	**300**	**10.20**
8060 12	**12**	**2.40**	**240**	**10.20**
8075 09	**9**	**3.00**	**300**	**10.20**
8075 15	**15**	**2.40**	**240**	**10.20**
8090 18	**18**	**2.40**	**240**	**10.60**
8100 12	**12**	**3.00**	**300**	**10.20**
8125M.15	**15**	**3.00**	**300**	**2x 10.10**
8150M.18	**18**	**3.00**	**300**	**2x 10.90**
8175M.21	**21**	**3.00**	**300**	**2x 11.60**
8200M.24	**24**	**3.00**	**300**	**2x 12.00**

Table 11 : Injector size and burner pressure
G31 propane - inlet pressure = 30mbar

Model	Quantity	Injector size		Burner pressure (mbar) (1)
		mm	marking	
8030 06	**6**	**1.30**	**130**	**28.70**
8045 09	**9**	**1.30**	**130**	**28.00**
8050 06	**6**	**1.65**	**165**	**28.00**
8060 12	**12**	**1.30**	**130**	**27.90**
8075 09	**9**	**1.65**	**165**	**27.80**
8075 15	**15**	**1.30**	**130**	**28.34**
8090 18	**18**	**1.30**	**130**	**27.30**
8100 12	**12**	**1.65**	**165**	**26.80**
8125M.15	**15**	**1.65**	**165**	**28.40**
8150M.18	**18**	**1.65**	**165**	**27.80**
8175M.21	**21**	**1.65**	**165**	**27.70**
8200M.24	**24**	**1.55**	**155**	**27.00**

(1) with open service door