

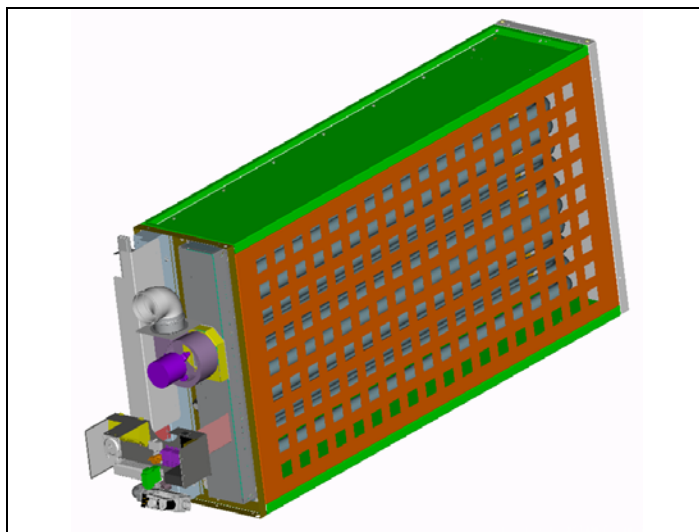
Application instructions

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)

Applies to

Austria, Belarus, Bulgaria, China, Czech Republic, Croatia, Cyprus, Denmark, England, Estonia, Finland, Germany, Greece, Hungary, Iceland, Latvia, Lithuania, Montenegro, New Zealand, Norway, Poland, Romania, Russian Federation, Serbia, Slovakia, Slovenia, South Africa, Spain, Sweden, Turkey, Ukraine

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

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.

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	8225M.18
	807509	8045 09	8150M.18	8250M.20
	8075 15	8060 12	8175M.21	8275M.22
	8090 18	8100 12	8200M.24	8300M.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.

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), 2006/95/EC (LVD) – 2004/108/EC (EMC) directives.

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

E. Dewitte
Approvals and Certifications
Reznor Europe N.V.
J.&M. Sabbestraat 130
B 8930 MENEN

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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, installed at an operational ambient temperature between -15°C and +45°C.

- 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.

Only models RHC 8225M.18 through RHC 8300M.24 are approved for :

Type C52 – horizontal combustion inlet through the wall – vertical combustion outlet through the roof

Type C62 – vertical combustion in- & outlet through the wall with terminal. Table below shows pressures at max. pipe length

RHC	P _{in} (Pa)	P _{out} (Pa)
8225M.18	-78	79
8250M.20	-89	100
8275M.22	-98	113
8300M.24	-110	125

- 2.3 The gas category for use is : see table 10
- 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.

Dimensions

Figure 1 : Control side

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

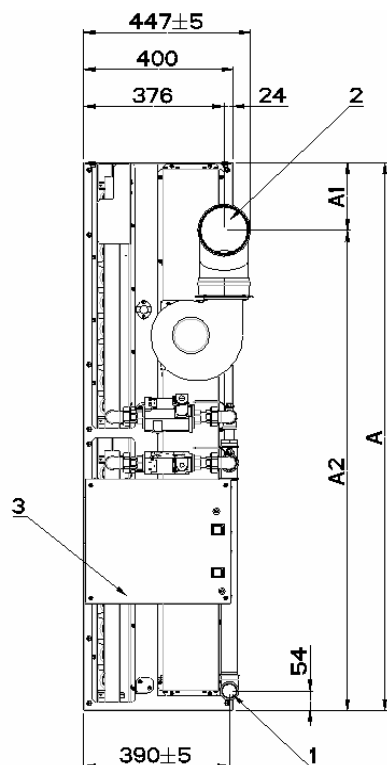


Figure 1b : RHC 8200M DJL/RJL

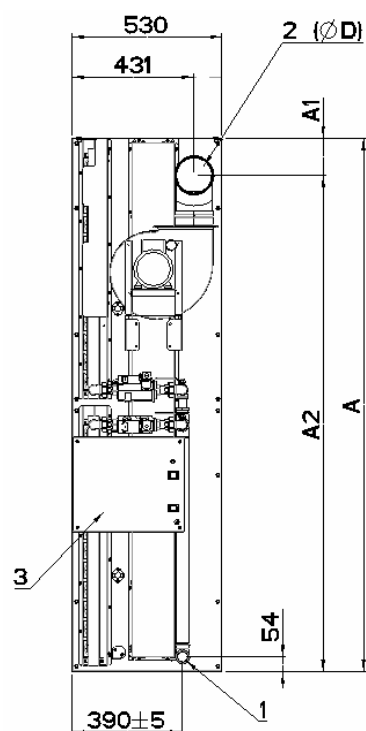


Figure 1c : RHC 8225M, 8250M, 8275M, 8300M DJL/RJL

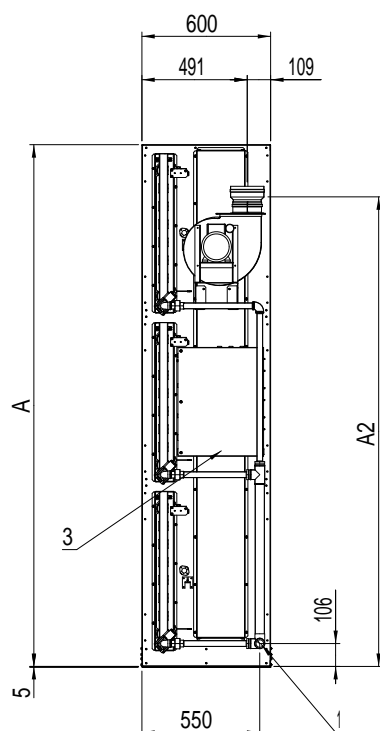
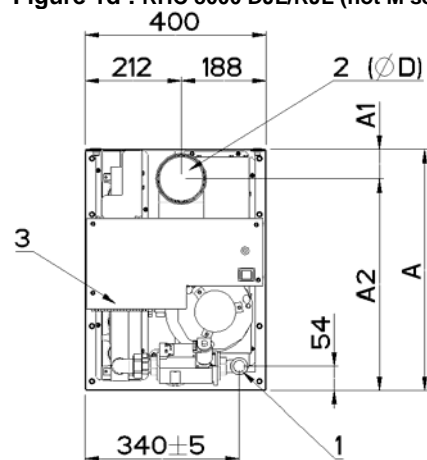


Figure 1d : RHC 8000 DJL/RJL (not M series)



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

	8030 06	8045 09	8050 06	8060 12	8075 09	8075 15	8090 18	8100 12
A	531	741	531	950	741	1160	1369	950
A1	65	85	85	85	85	85	85	85
A2	466	656	446	865	656	1075	1284	865
	8125M 15	8150M 18	8175M 21	8200M 24	8225M.18	8250M.20	8275M.22	8300M.24
A	1272	1481	1691	1900	1912	2078	2244	2410
A1	183	183	183	133	1912	2083	2249	2415
A2	1089	1298	1508	1767	1768	1934	2100	2266

Figure 2 : Top view

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

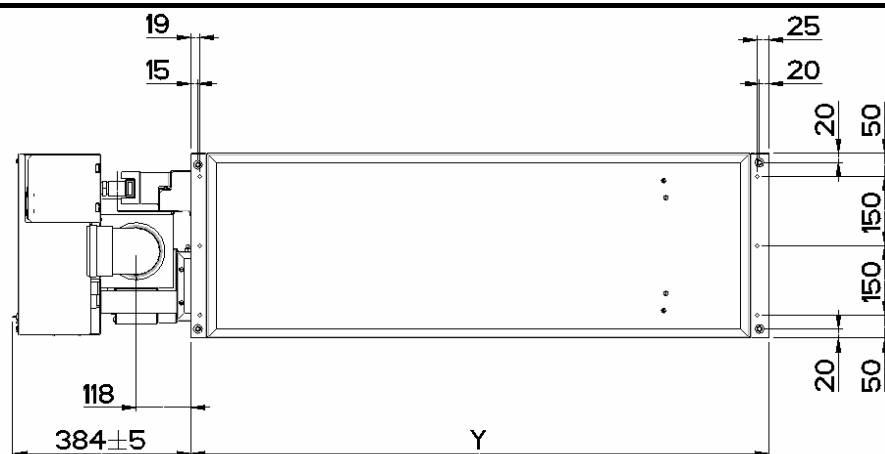


Figure 2b:
RHC 8125M, 8150M,
8175M DJL/RJL

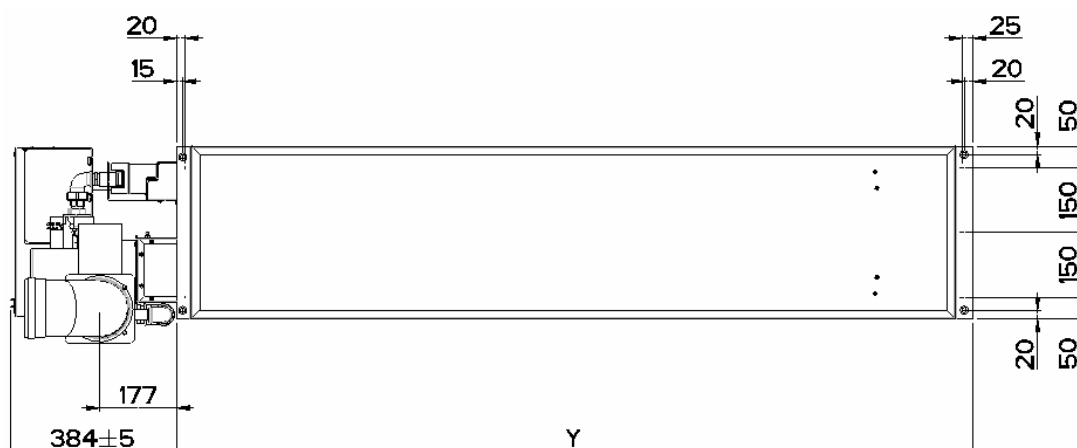


Figure 2c:
RHC 8200M DJL/RJL

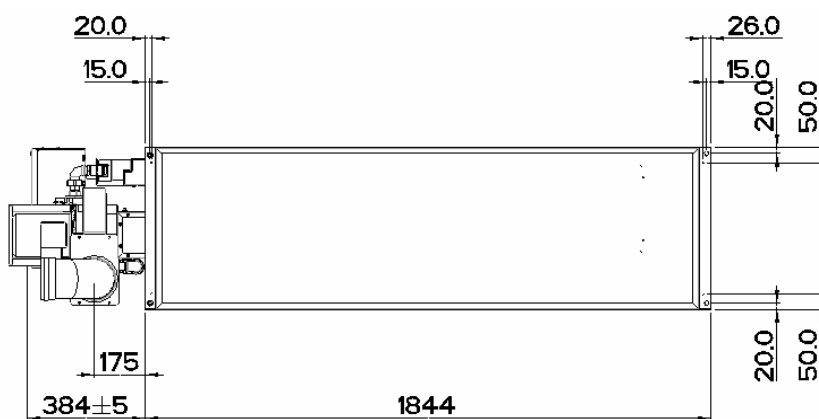
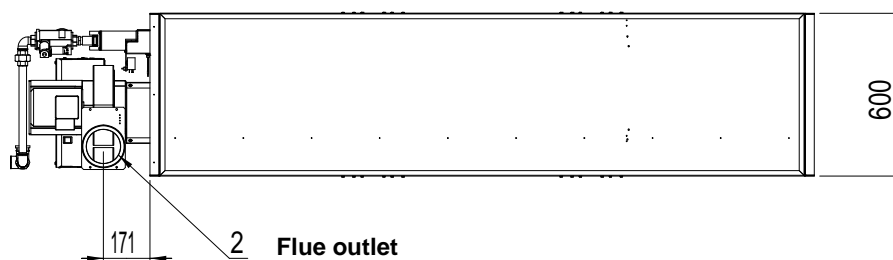


Figure 2d:
RHC 8225M, 8250M,
8275M, 8300M
DJL/RJL



Type	B	C	Y
8030 06	66	100	1244
8045 09	50	160	1244
8050 06	66	100	1844
8060 12	125	175	1244
8075 09	50	160	1844
8075 15	80	250	1244
8090 18	85	300	1244
8100 12	125	175	1844

	Y	A3	A4
8125M.15	1844	741	531
8150M.18	1844	741	741
8175M.21	1844	741	950
8200M.24	1844	950	950

	A1	A3	A4	A5
8225M.18	1917	564	564	564
8250M.20	2083	730	564	564
8275M.22	2249	730	730	564
8300M.24	2415	730	730	730

Weights

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	8225M 18	8250M 20	8275M 22	8300M 24
Unit	kg	200	230	265	305	487	501	516	530
Packaging	kg	35	35	35	35	20	20	20	20
Total	kg	235	265	300	340	507	521	536	550

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

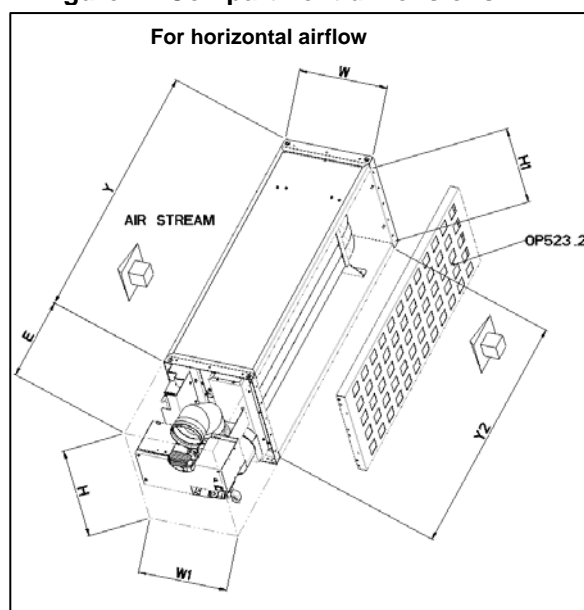
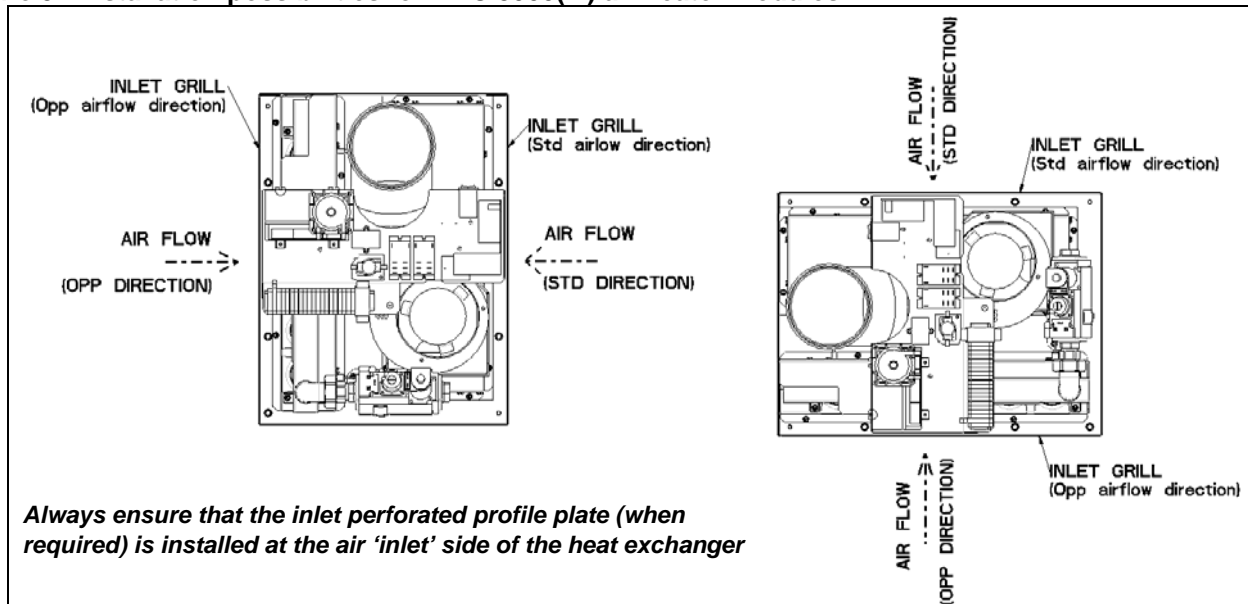


Table 2. Dimensions of enclosures (duct channel) for RHC 8000 heating modules re. fig 4

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
8225M 18	1917	1792	2435	2365	600	600	550
8250M 20	2083	1958	2435	2365	600	600	550
8275M 22	2249	2124	2435	2365	600	600	550
8300M 24	2415	2290	2435	2365	600	600	550

(*) 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 $\varnothing 100$ mm, thick wall seamless aluminium pipe or to max. length of 1000mm using $\varnothing 130$ mm, thick wall seamless aluminium pipe for the 8000M models.

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



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
	m ³ /h	m ³ /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	36.00	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	47.00	28.00
MODEL	V1	V2	Heat output 100% - 1 stage	Heat output low stage (bottom unit)	Minimum modulating output
	m ³ /h	m ³ /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
8225M.18	22800	33600	221.70	73.80	36.00
8250M.20	25200	37200	246.40	73.80	35.50
8275M.22	27600	40800	271.20	74.50	36.20
8300M.24	29700	43800	295.90	99.90	48.60

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 :

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

Example :

<T_{min} = 13K (with min. inlet temp. = -5°C)

model 8075 09 at 100% heat output : 75,00kW
results into V_{max} ≈ 16854m³/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.

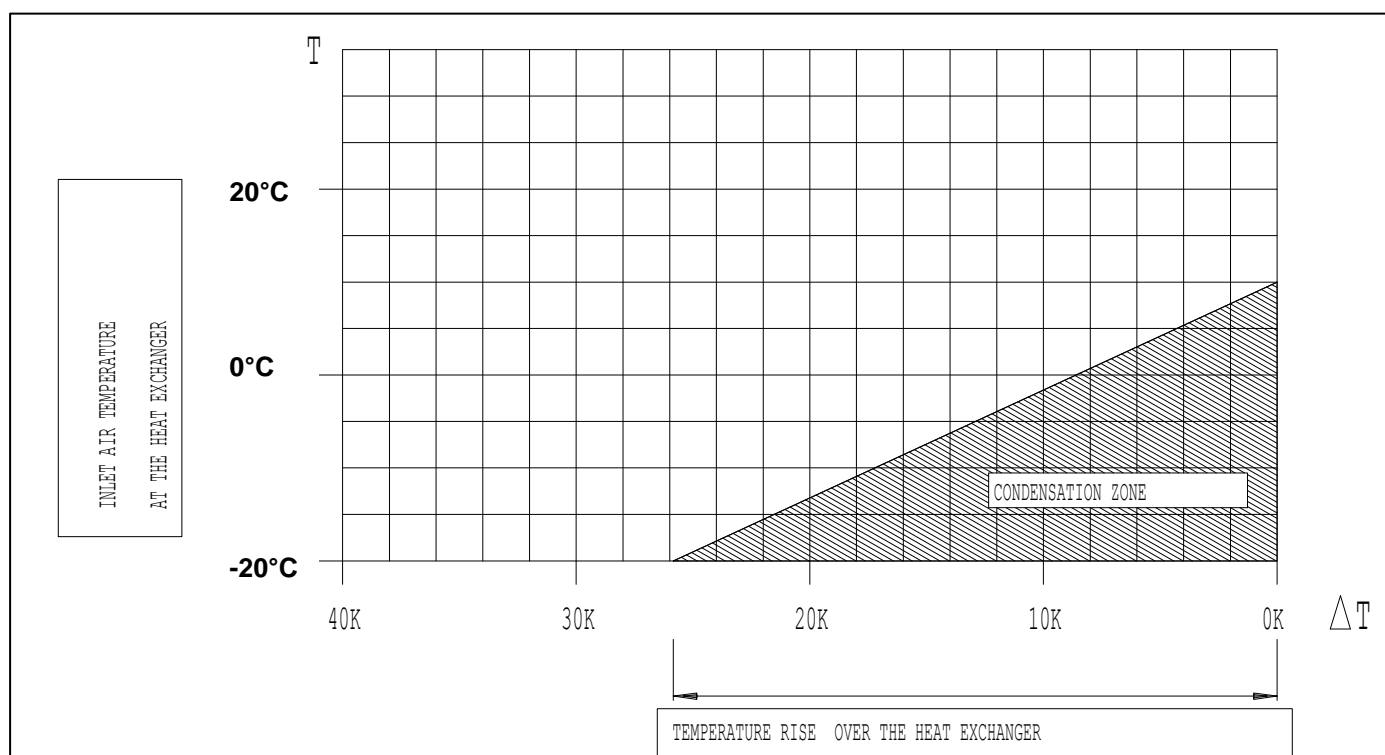
Example :

<T_{min} = 13K (with min. inlet temp. = -5°C)

model 8075 09 at 30% modulation (see table 3 'output') : 21.20kW
results into :

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

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.

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 halogenated 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 (m³/h) across the heat exchanger enclosure itself 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.

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° 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° 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;
 - 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 CIRCUIT 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 :

- Ø 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 (cfr table A, p. 13)
- Gas tube sealing ring (PN 06 22783 125)

Included with the heating module RHC 8075 15 & 8090 18 are :

- Ø 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 (cfr table A, p 13)
- Gas tube sealing ring (PN 06 22783 125)

Included with the heating module RHC 8000M are :

- Ø 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 (cfr. table A, p 13)
- 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) 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

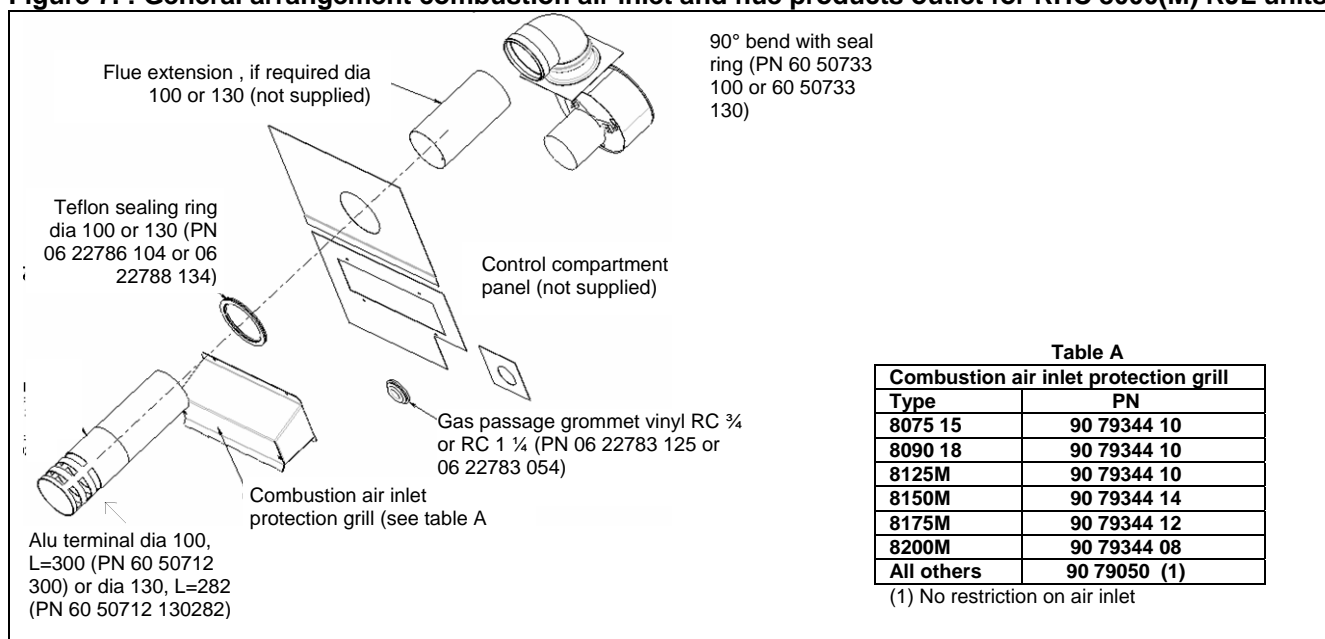


Figure 8

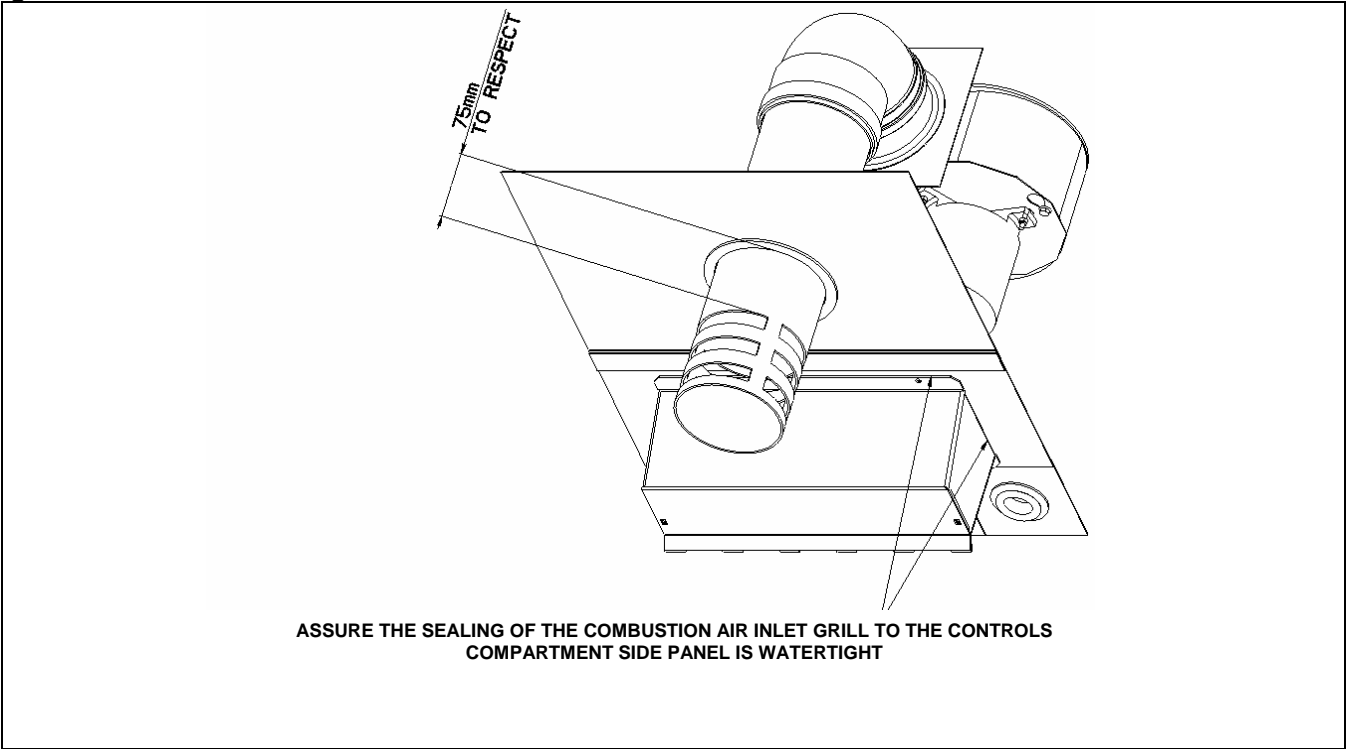
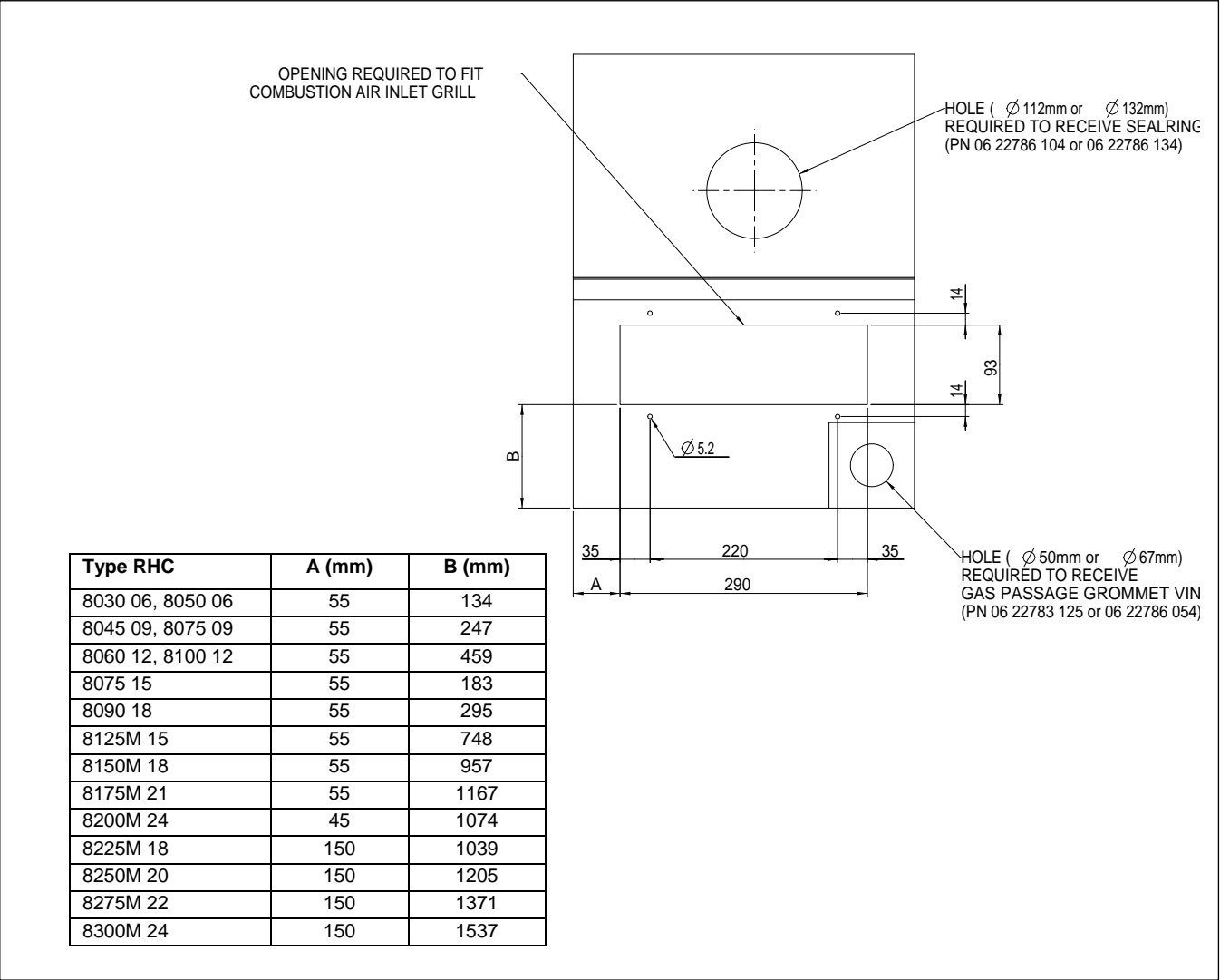


Figure 9: Controls compartment (side) panel for RHC 8000(M) RJL units



- 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 Ø100 or Ø130 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	Socket size (dia mm)
8030 06	100
8045 09 / 8050 06 / 8060 12 8075 09 8075 15 / 8090 18 8100 12 / 8125M.15 8150M.18 8175M.21 & 8200M.24	130
8225M 18 / 8250M 20 / 8275M 22 / 8300 M 24	150

- 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)
- Adapter piece PN 60 20153 (dia 150)
- 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) - PN 06 22786 104 (dia 100) or PN 06 22786 154 (dia 150)

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
8225M.18	270.37	
8250M.20	300.55	
8275M.22	330.74	
8300M.24	360.93	

**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
8225M.18	150	225	162
8250M.20	150	225	162
8275M.22	150	225	162
8300M.24	150	225	162

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

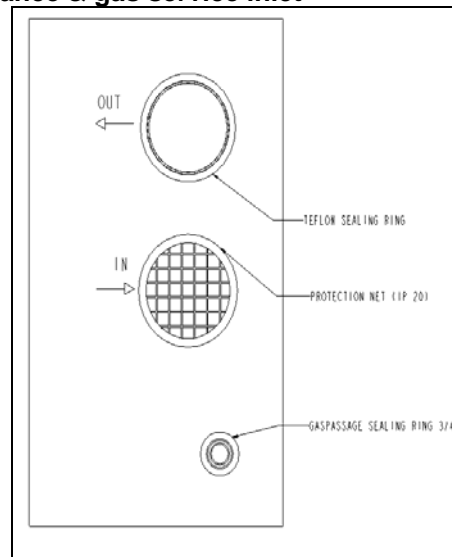


Figure 11a : Combustion air inlet - outlet dimension requirements

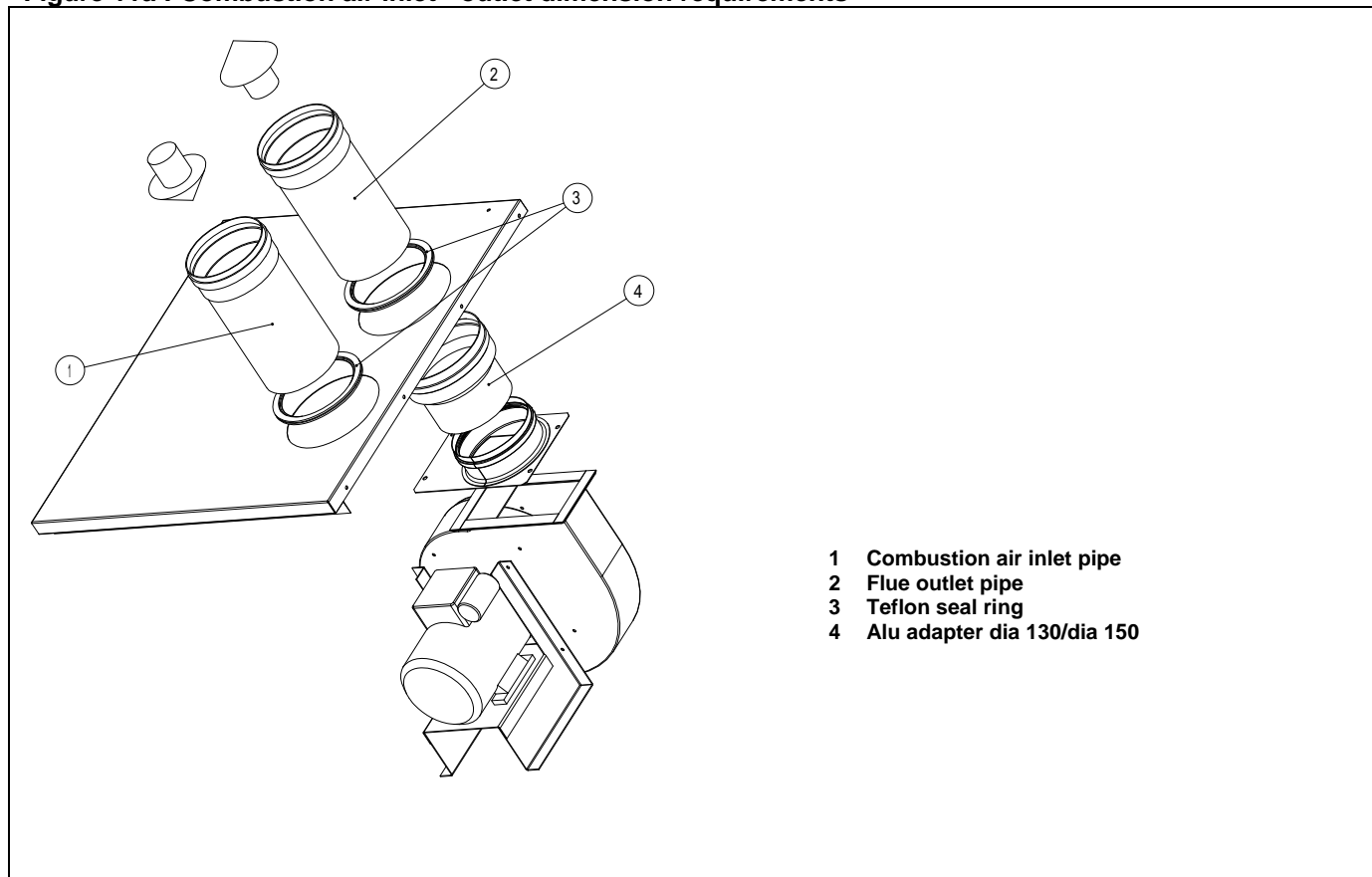
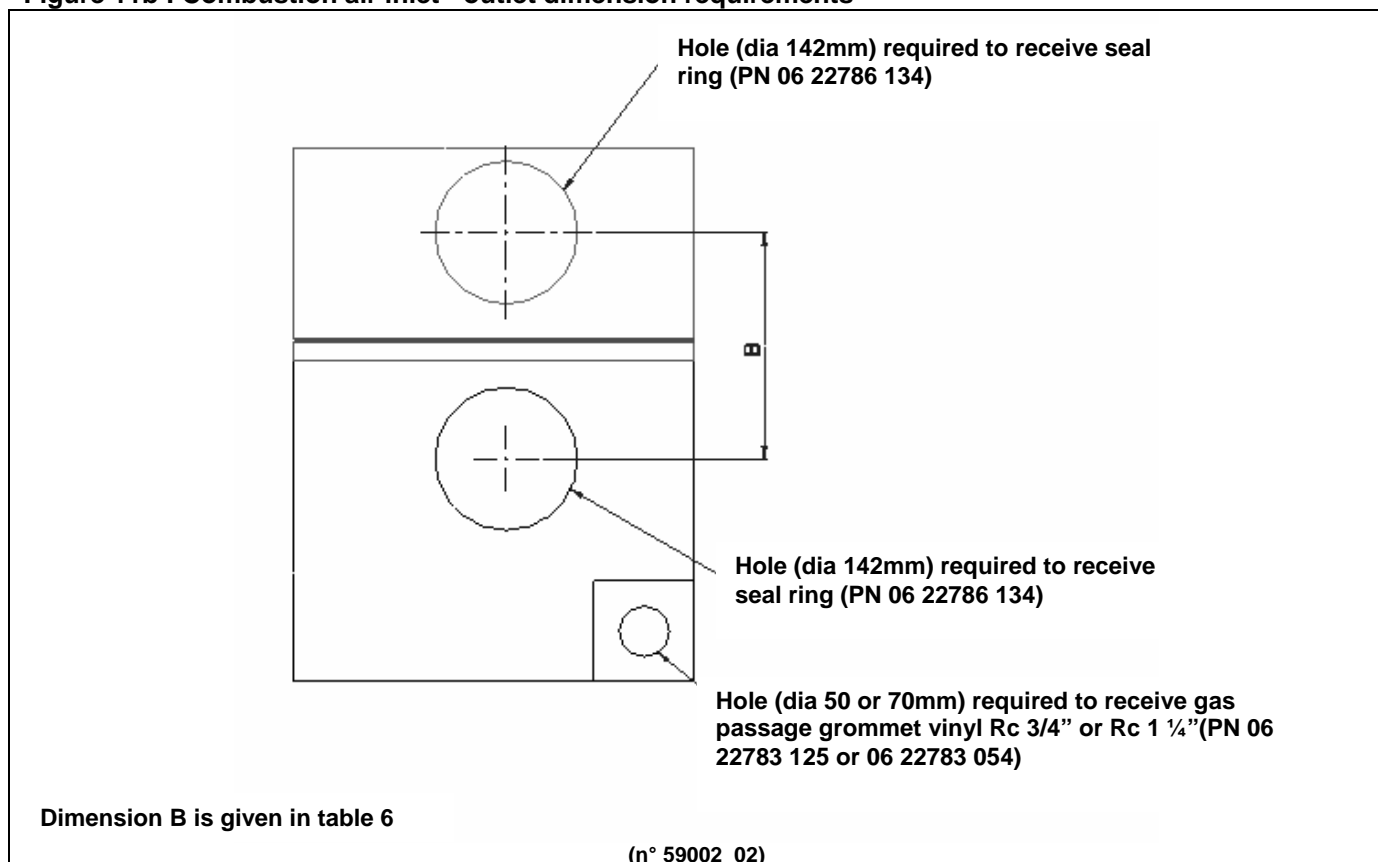


Figure 11b : Combustion air inlet - outlet dimension requirements



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 ("T) shown is for 100% heat output.

Figure 12a :

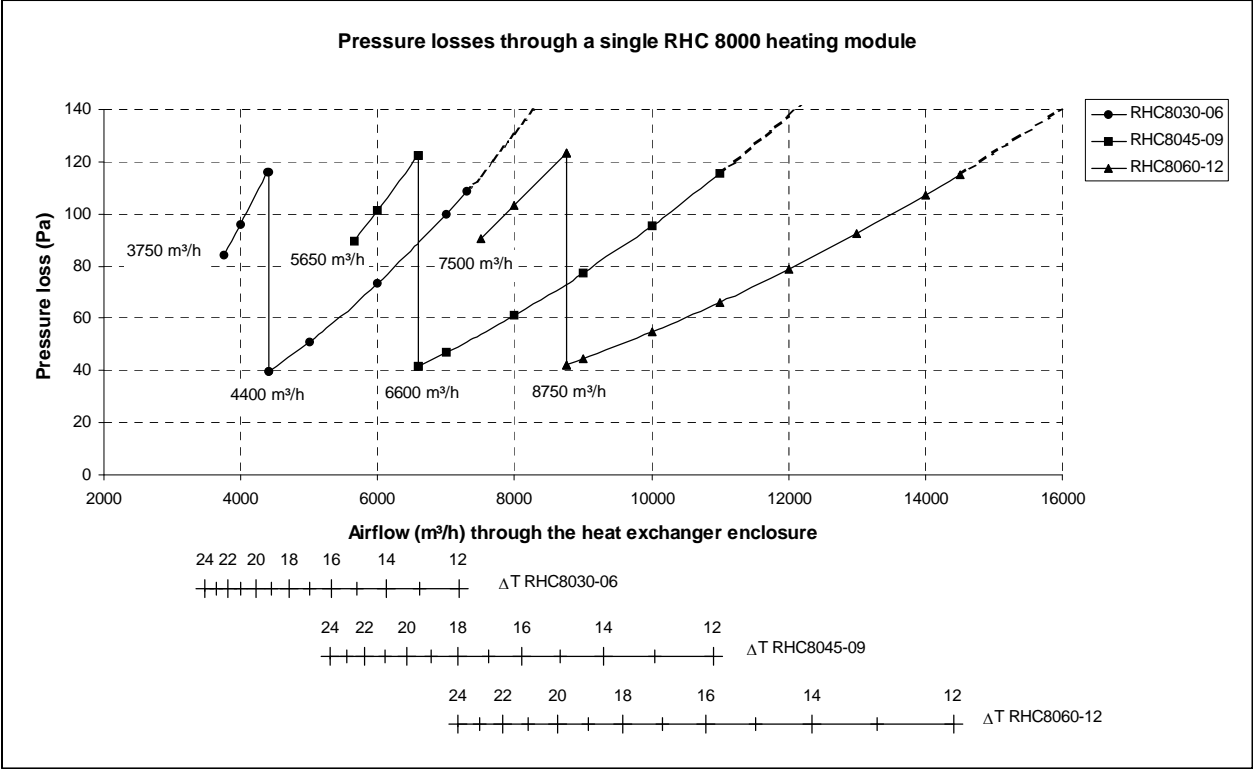


Figure 12b :

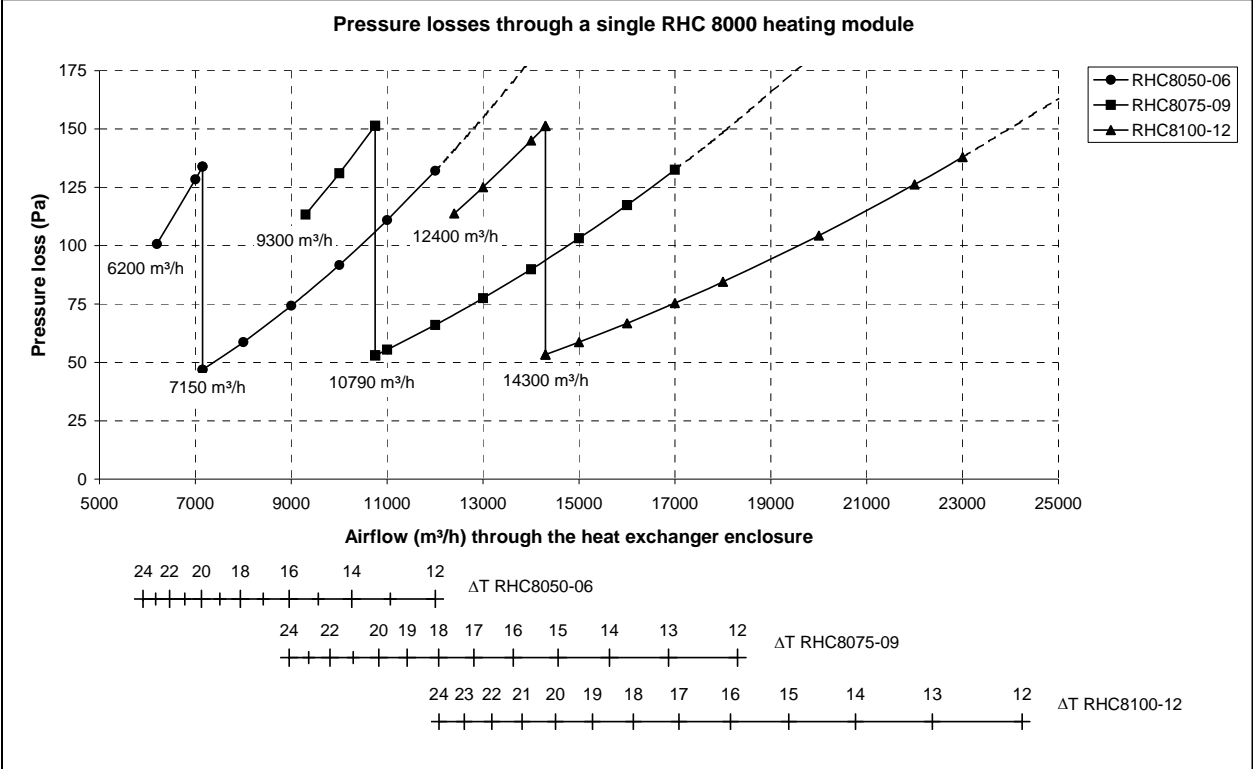


Figure 12c :

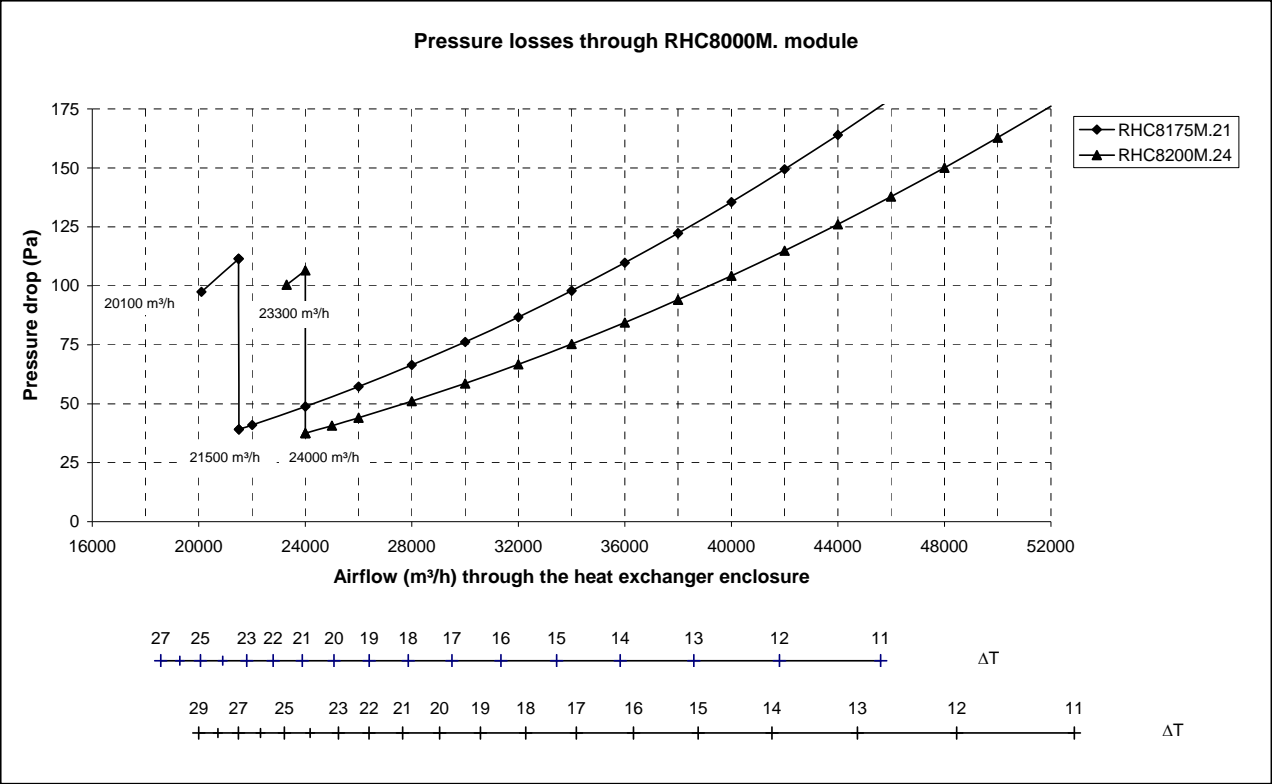


Figure 12d :

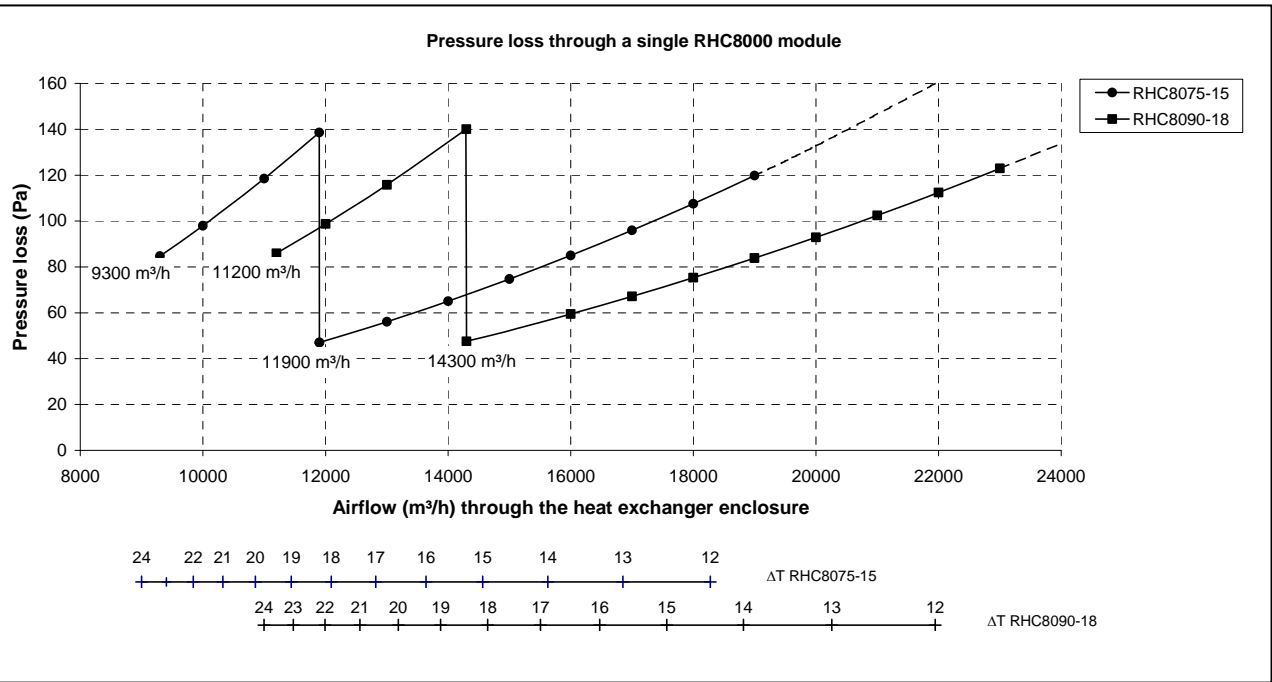


Figure 12e :

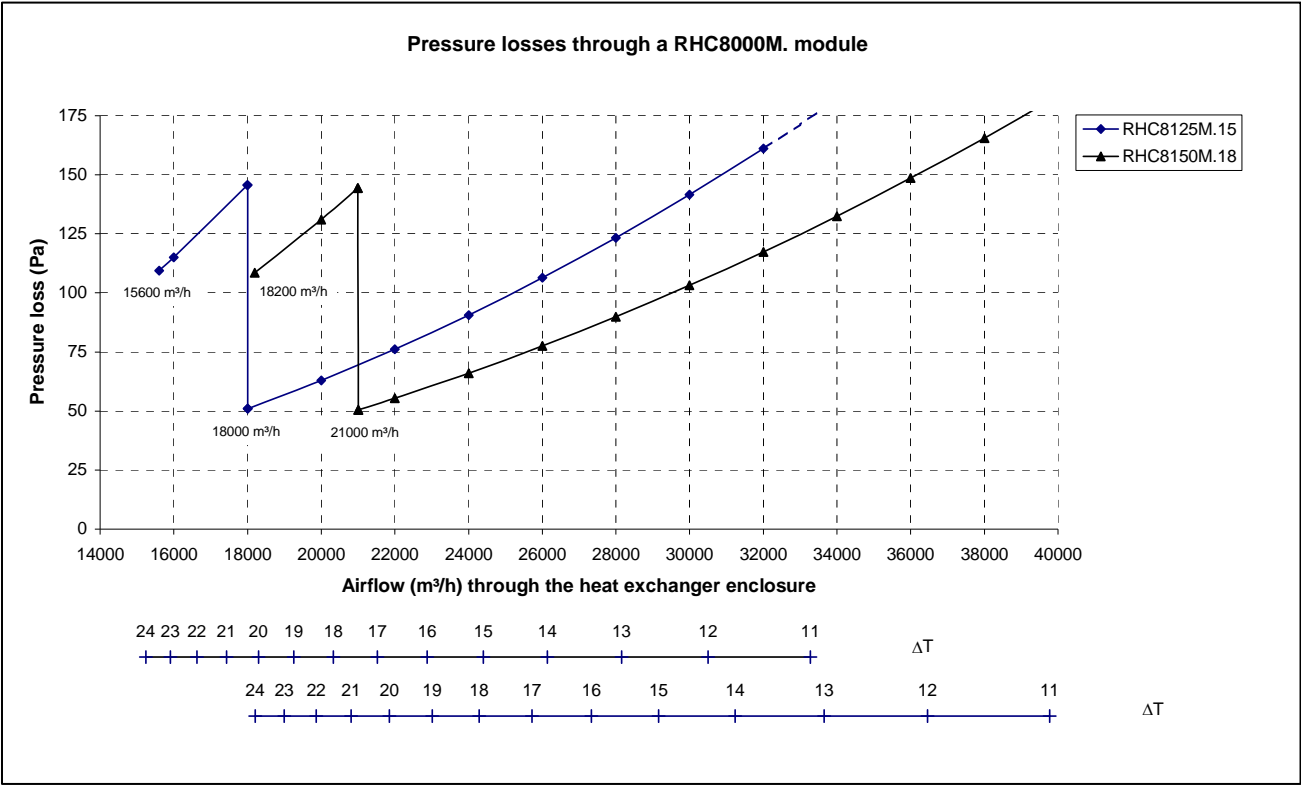


Figure 12f

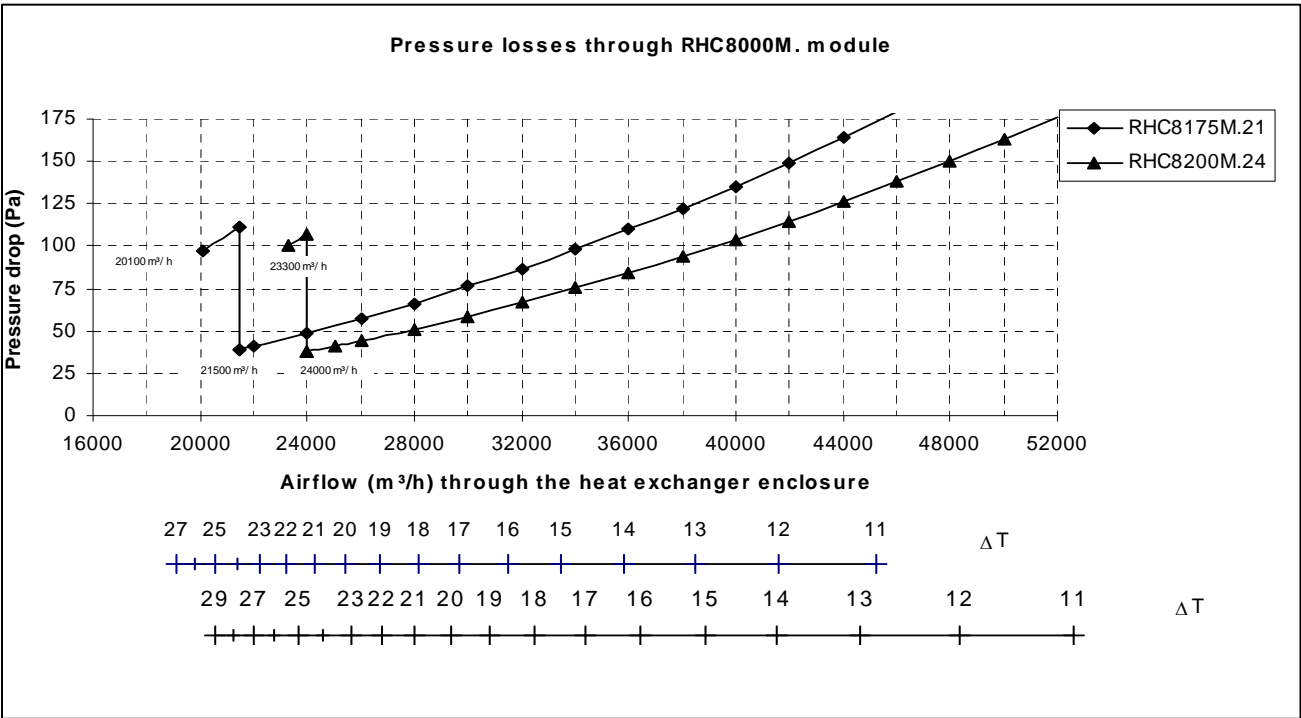


Figure 12g

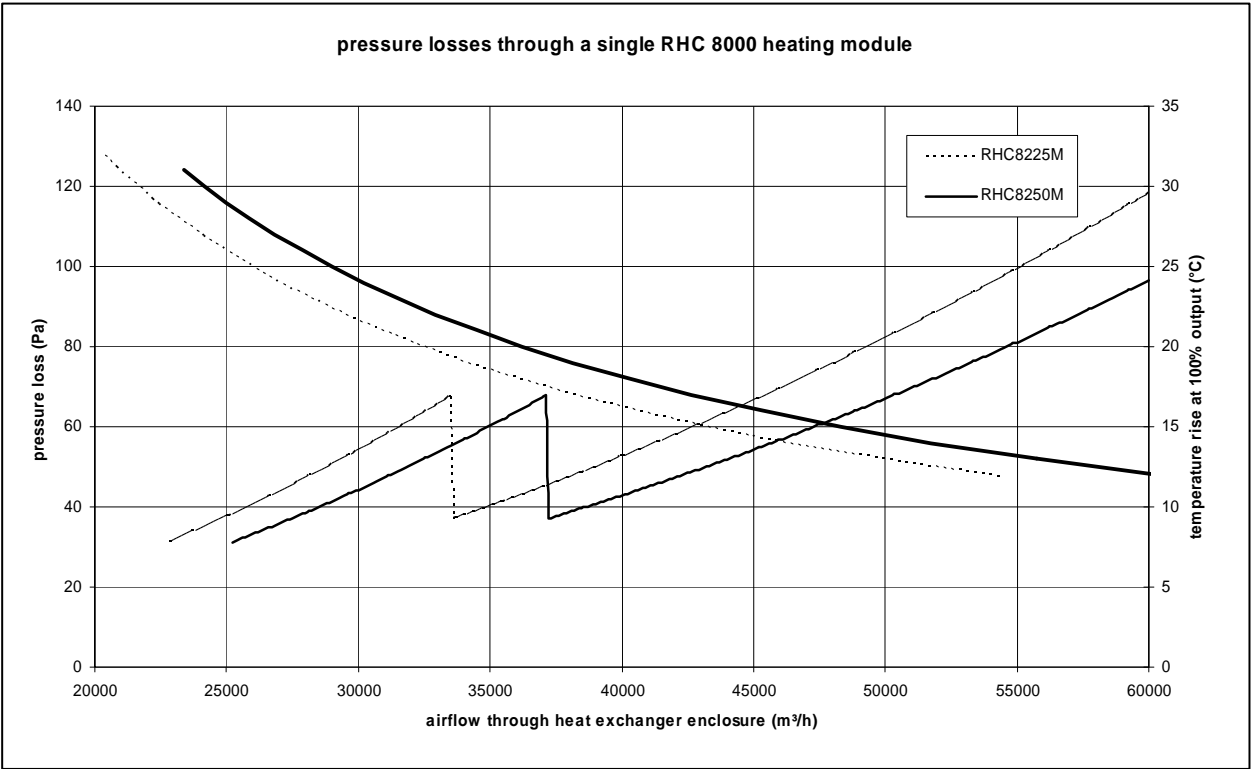
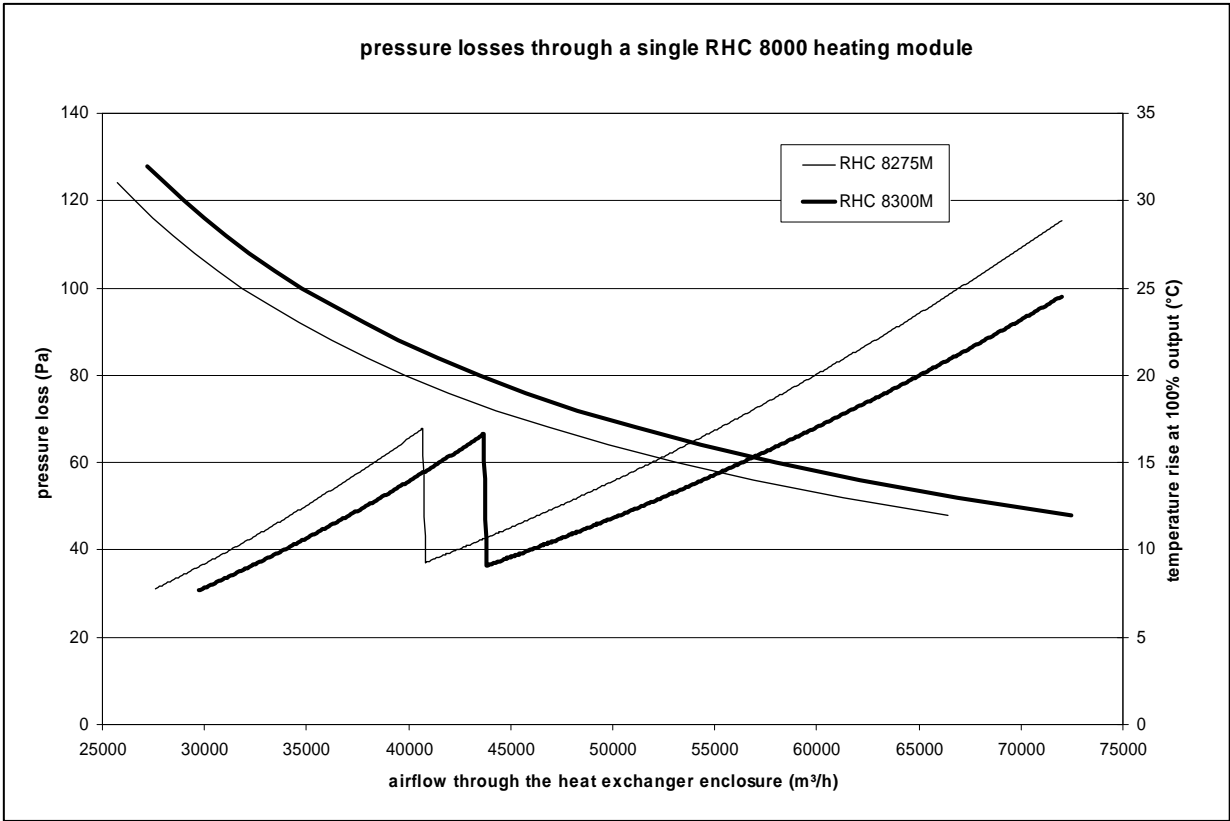


Figure 12h



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
8225M.18	22800	33600
8250M.20	25200	37200
8275M.22	27600	40800
8300M.24	29700	43800

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) 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).

a) By-pass besides heat exchanger :

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
8125M.15	1132	100. ⁰⁰	-500. ⁰⁰
8150M.18	1342	83. ⁷⁰	-521. ⁸⁰
8175M.21	1551	88. ⁷⁰	-539. ⁵⁰
8200M.24	1760	78. ¹⁰	-515. ⁶⁰
8225M.18	1790	81. ⁴⁰	-769. ²⁰
8250M.20	1925	75. ⁴⁰	-789. ²⁰
8275M.22	2065	69. ⁷⁰	-794. ³⁰
8300M.24	2200	65. ⁸⁰	-800. ⁷⁰

$$\triangleright \text{Dimension C (mm)} = R1 \times V_{tot} + R2$$

b) By-pass on top of heat exchanger :

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
8125M.15	1770	67. ³⁰	-329. ⁸⁰
8150M.18	1770	71. ⁴⁰	-421. ⁴⁰
8175M.21	1770	78. ¹⁰	-462. ⁵⁰
8200M.24	1770	80. ⁶⁰	-531. ⁵⁰
8225M.18	2360	61. ⁰⁰	-569. ⁴⁰
8250M.20	2360	60. ⁹⁰	-629. ⁴⁰
8275M.22	2360	60. ⁸⁰	-689. ⁴⁰
8300M.24	2360	61. ⁷⁰	-750. ⁶⁰

$$\triangleright \text{Dimension A (mm)} = R1 \times V_{tot} + R2$$

B) Example :**RHC 8075 09 RJL**with :

- total air flow = $5.0 \text{ m}^3/\text{s} = 18000 \text{ m}^3/\text{h}$
- by-pass besides heat exchanger

Result :

- dimension B = 670.50 mm
- dimension X = 400 mm (see fig. 13)
- R1 = 174.40
- R2 = -514.10
- dimension C = $174.40 \times 5.00 - 514.10$

► C = 357.90 mm **Note**

In this case $2.99 \text{ m}^3/\text{s}$ ($= 10750 \text{ m}^3/\text{h}$) flows through the heat exchanger enclosure.

The remaining $2.01 \text{ m}^3/\text{s}$ ($= 7250 \text{ m}^3/\text{h}$) flows through the by-pass duct

$(5.00 \text{ m}^3/\text{s} - 2.99 \text{ m}^3/\text{s} = 2.01 \text{ m}^3/\text{s})$

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 = $2.99 \text{ m}^3/\text{s}$ ($10750 \text{ m}^3/\text{h}$)
- 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) (m^3/s) |
| V _{tot} | = | Total air flow (m^3/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 :

$$V_{HS} = \frac{V_{tot}}{\frac{x_2}{x_1} \times \left(\frac{V_{tot}}{V_2} - 1 \right) + 1}$$

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 : $5 \text{ m}^3/\text{s}$ ($18000 \text{ m}^3/\text{h}$)
- Expected min. inlet temperature : -5°C
- Recommended max. dim C = 357.90 mm (see above 1B)
- Dimension X = 400 mm
- Applied by-pass dim. C = 200 mm

Then :

- x1 = 357.90 mm
- x2 = 200 mm
- V_{tot} = $5 \text{ m}^3/\text{s}$
- V2 = $2.99 \text{ m}^3/\text{s}$ ($10750 \text{ m}^3/\text{h}$) (see table 7)

Result :

$$V_{HS} = \frac{5.00}{\frac{200}{357.90} \times \left(\frac{5.00}{2.99} - 1 \right) + 1} = 3.63 \text{ m}^3/\text{s} \text{ (13068 m}^3/\text{h)}$$

Consequently, $3.63 \text{ m}^3/\text{s}$ ($13068 \text{ m}^3/\text{h}$) flows through the heat exchanger enclosure and the remaining $1.37 \text{ m}^3/\text{s}$ ($= 4932 \text{ m}^3/\text{h}$) ($= 5.00 \text{ m}^3/\text{s} - 3.63 \text{ m}^3/\text{s}$) flows through the by-pass channel.

From section 4.1.2 the maximum allowable airflow through the heating module enclosure is $16850 \text{ m}^3/\text{h}$ (for this example).

We notice the $13068 \text{ m}^3/\text{h}$ 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 exchanger enclosure to determine the total pressure drop. (@ $13068 \text{ m}^3/\text{h}$)

Result : 75 Pa (approx)

Figure 13a

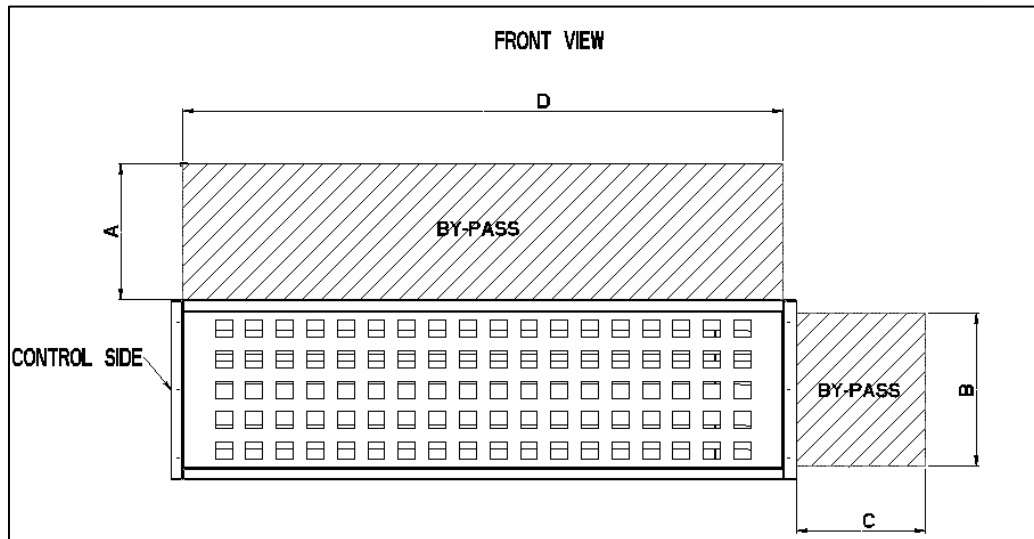
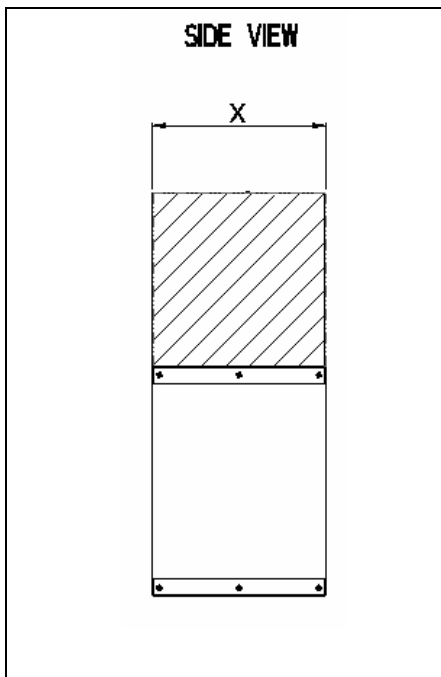


Figure 13b



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.

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.

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
2x 8225M.18	29000	33600
2x 8250M.20	32200	37200
2x 8275M.22	35400	40800
2x 8300M.24	38700	43800
V1 = min. airflow required through heat exchanger enclosure V2 = min. airflow required without perforated 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
3x 8225M.18	39500
3x 8250M.20	44300
3x 8275M.22	57700
3x 8300M.24	63000
V1 = min. airflow required through heat exchanger enclosure	

P.S. : no perforated air inlet plate required

Pressure drop for 2 units in series

Figure 14a

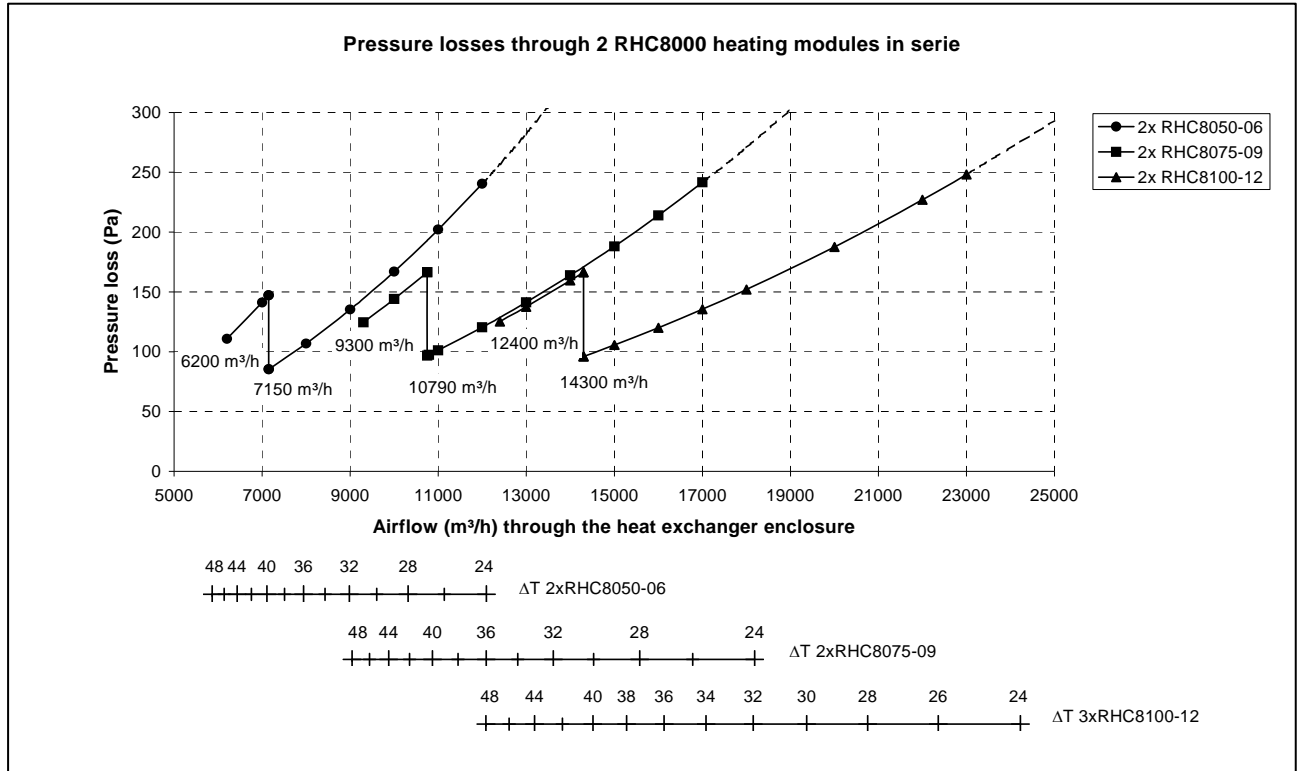


Figure 14b

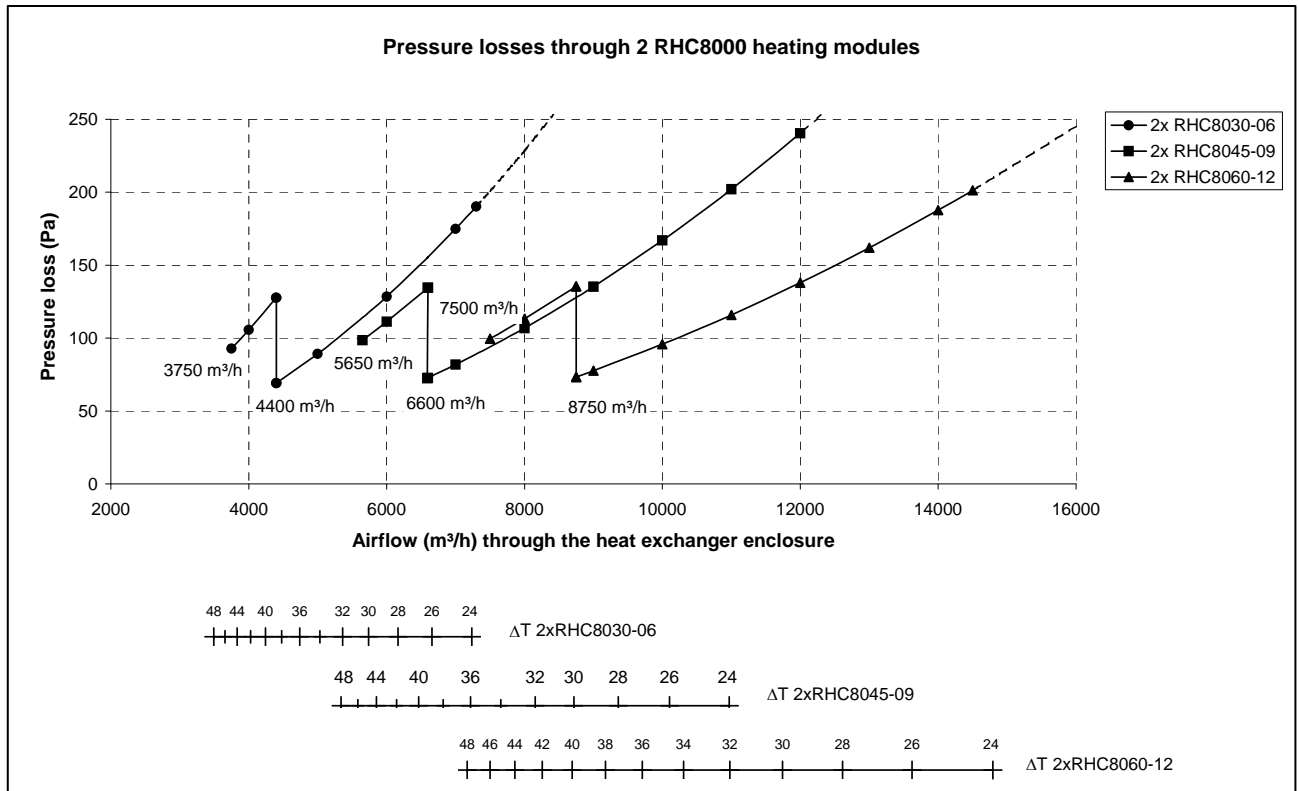


Figure 14c

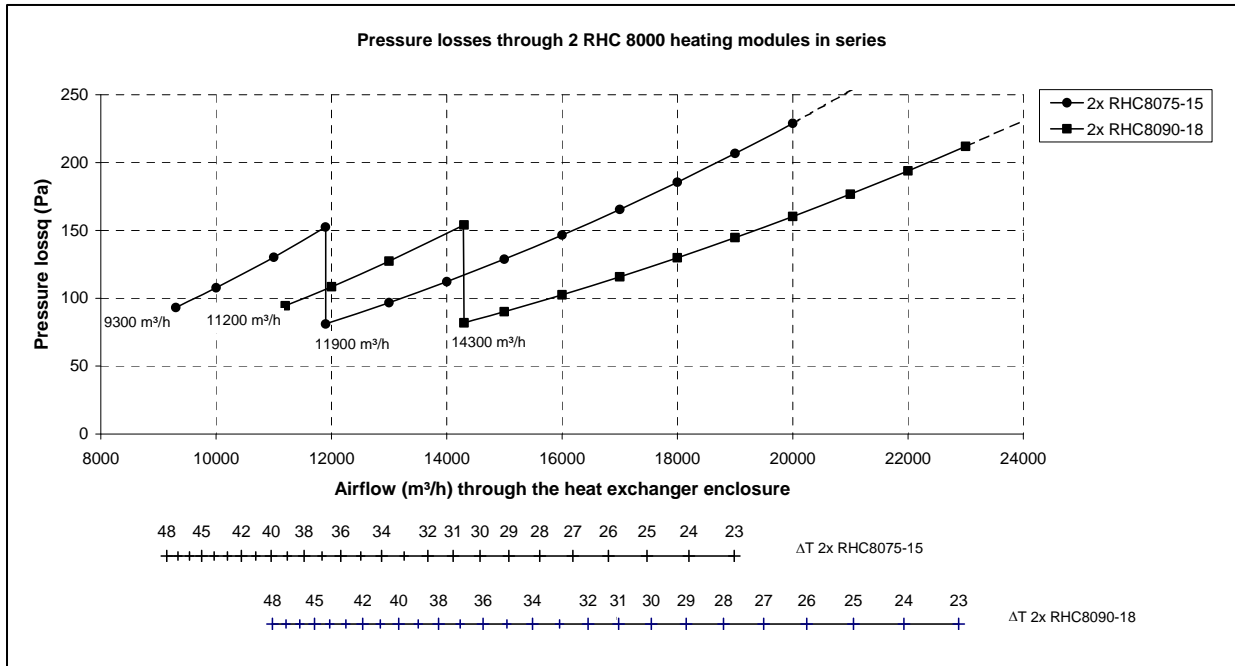


Figure 14d

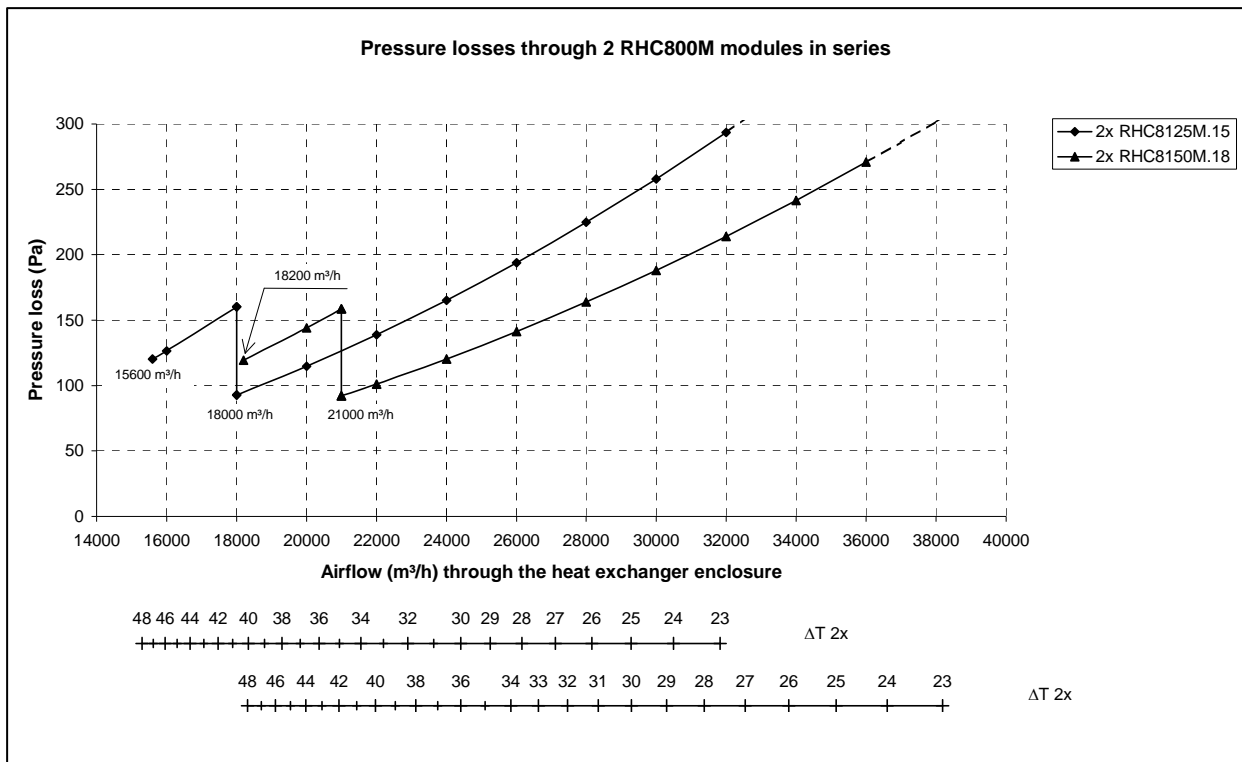


Figure 14e

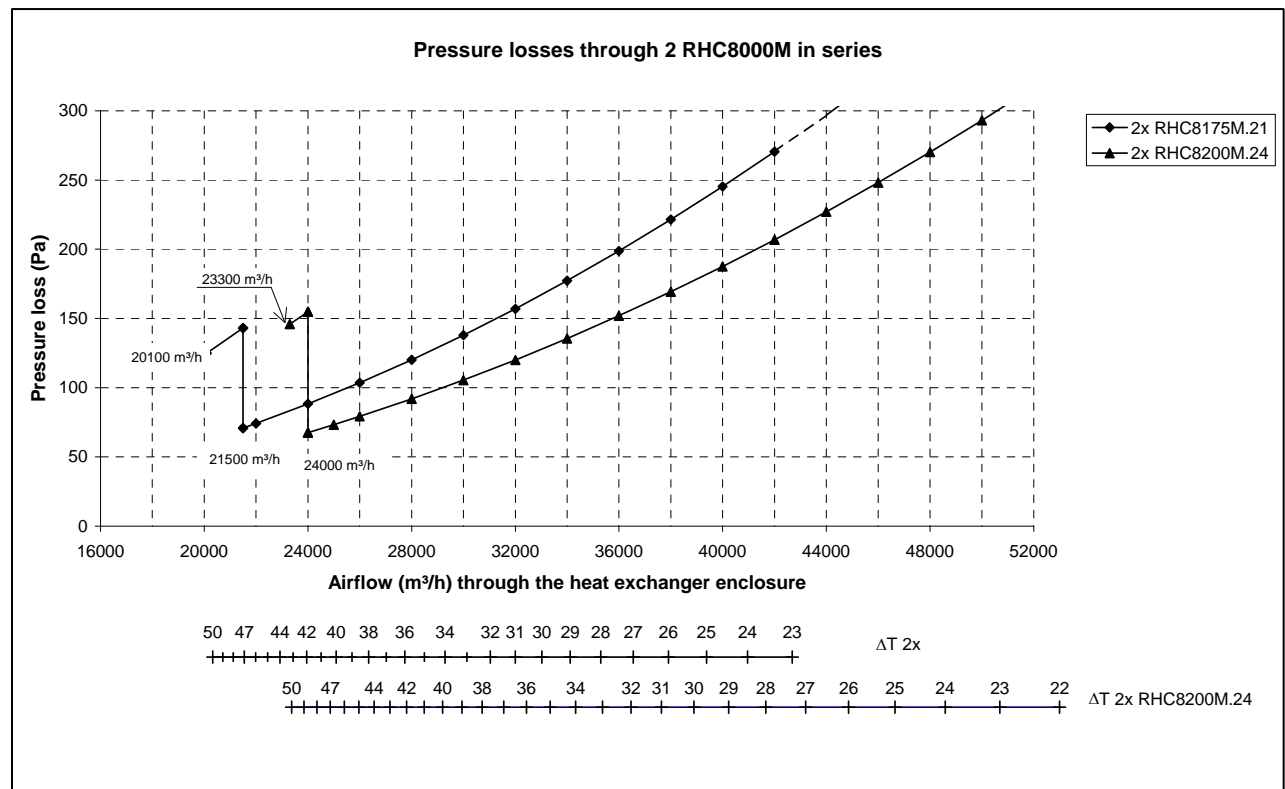


Figure 14f

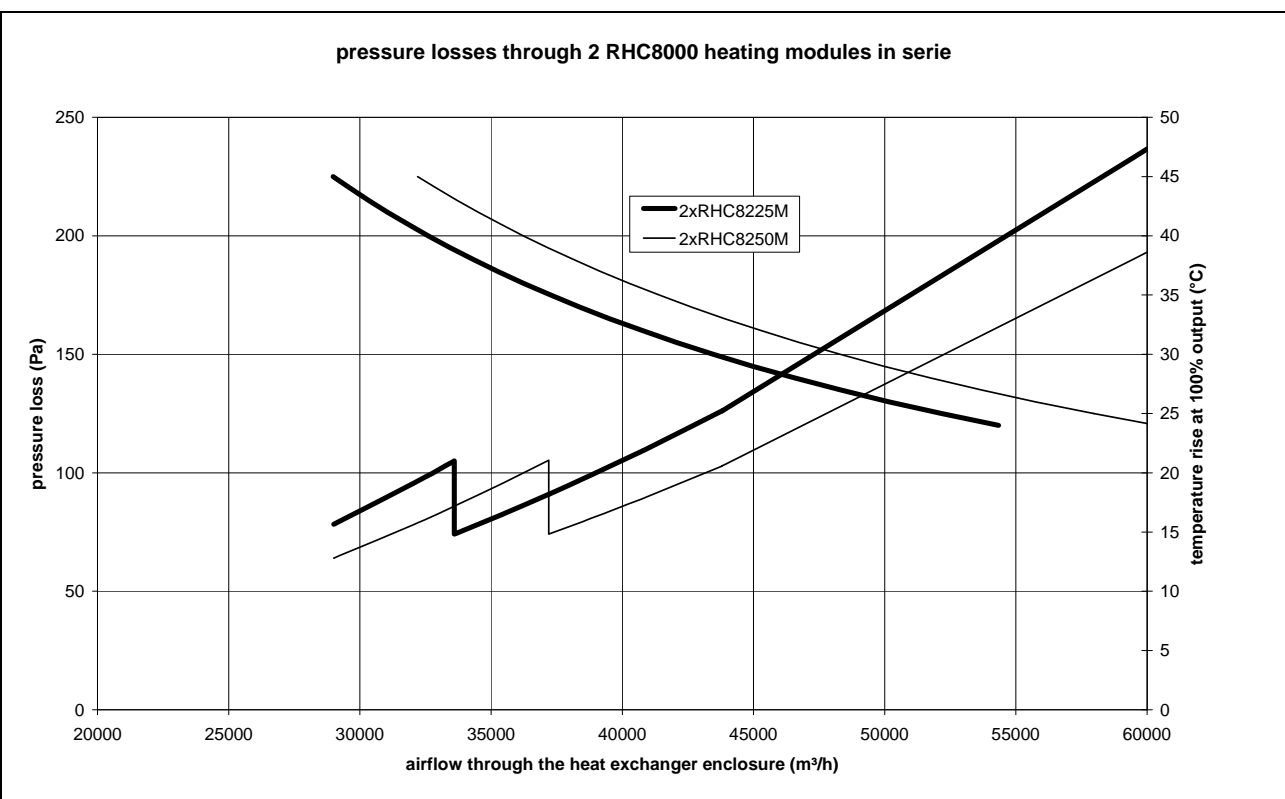
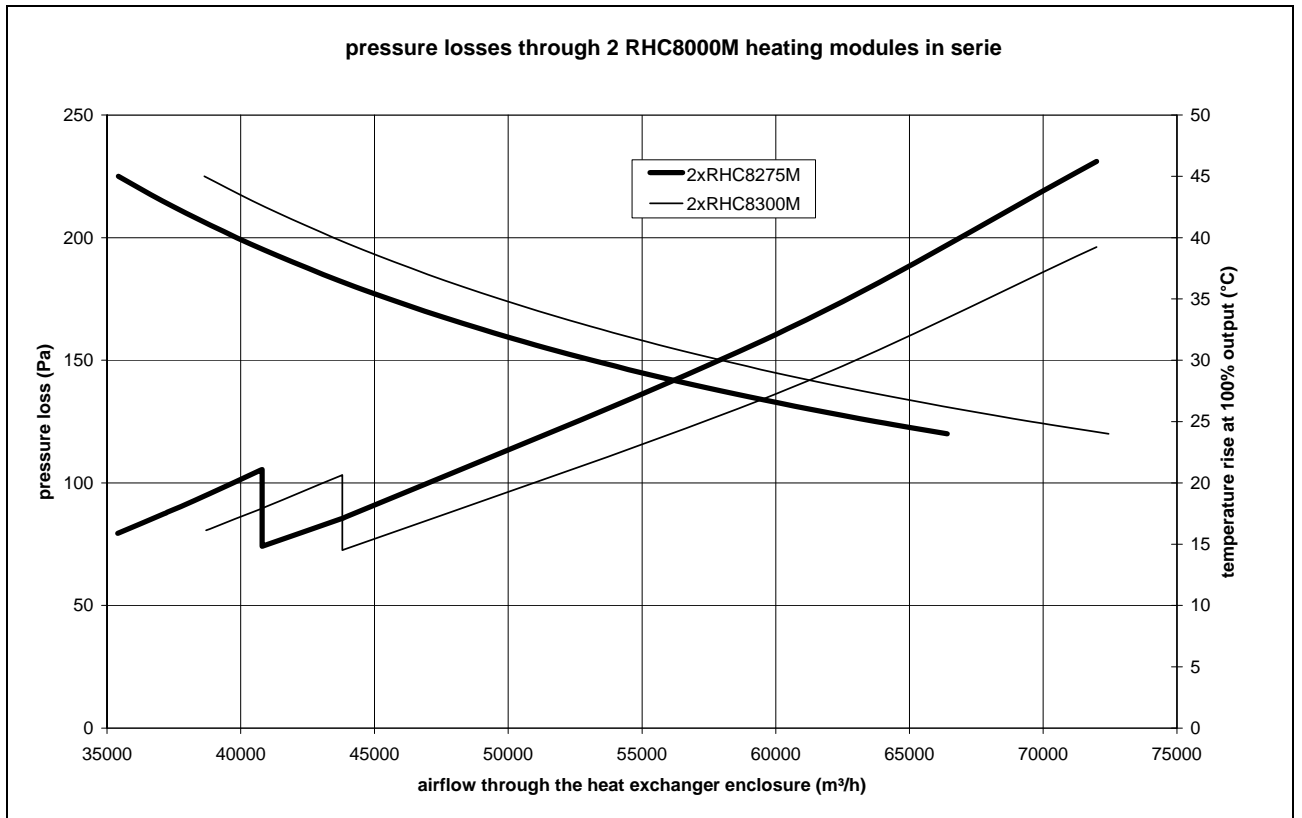


Figure 14g



PRESSURE DROP FOR 3 UNITS IN SERIES

Figure 14h

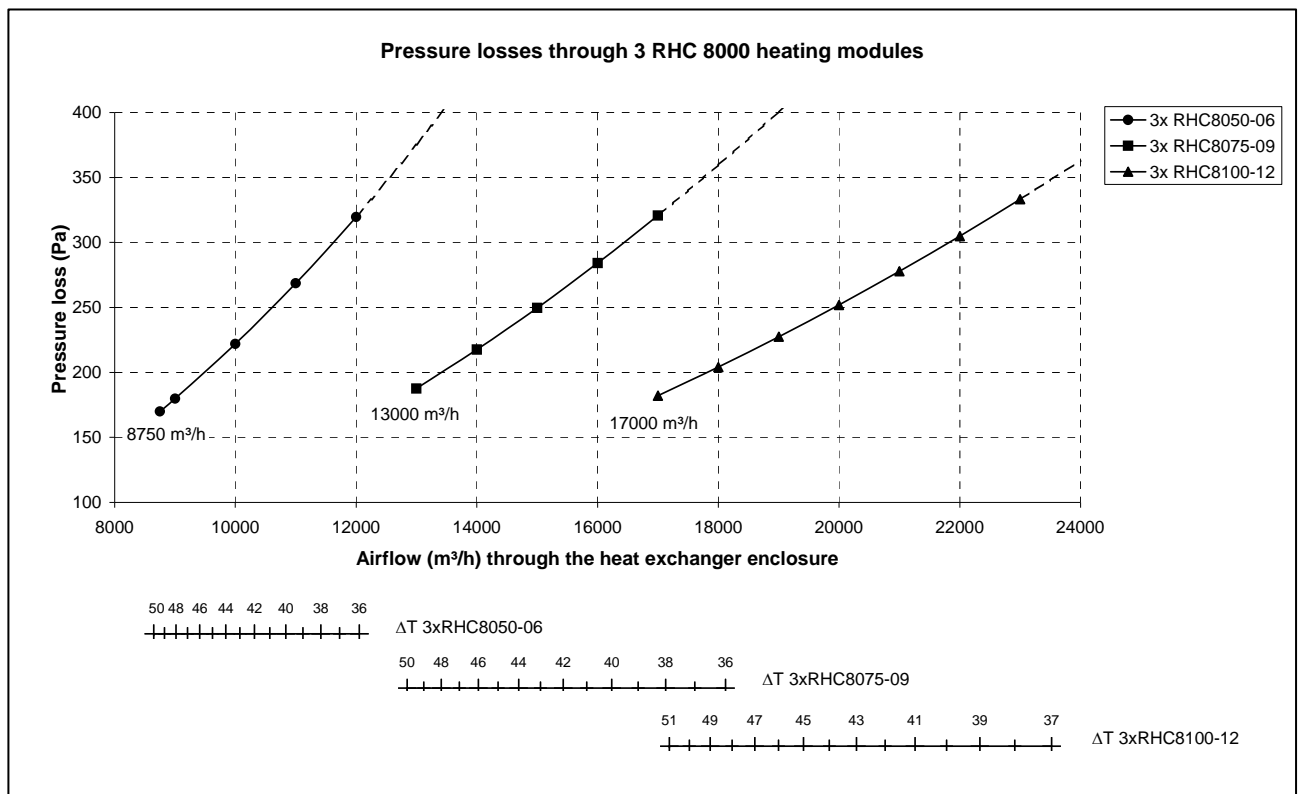


Figure 14i

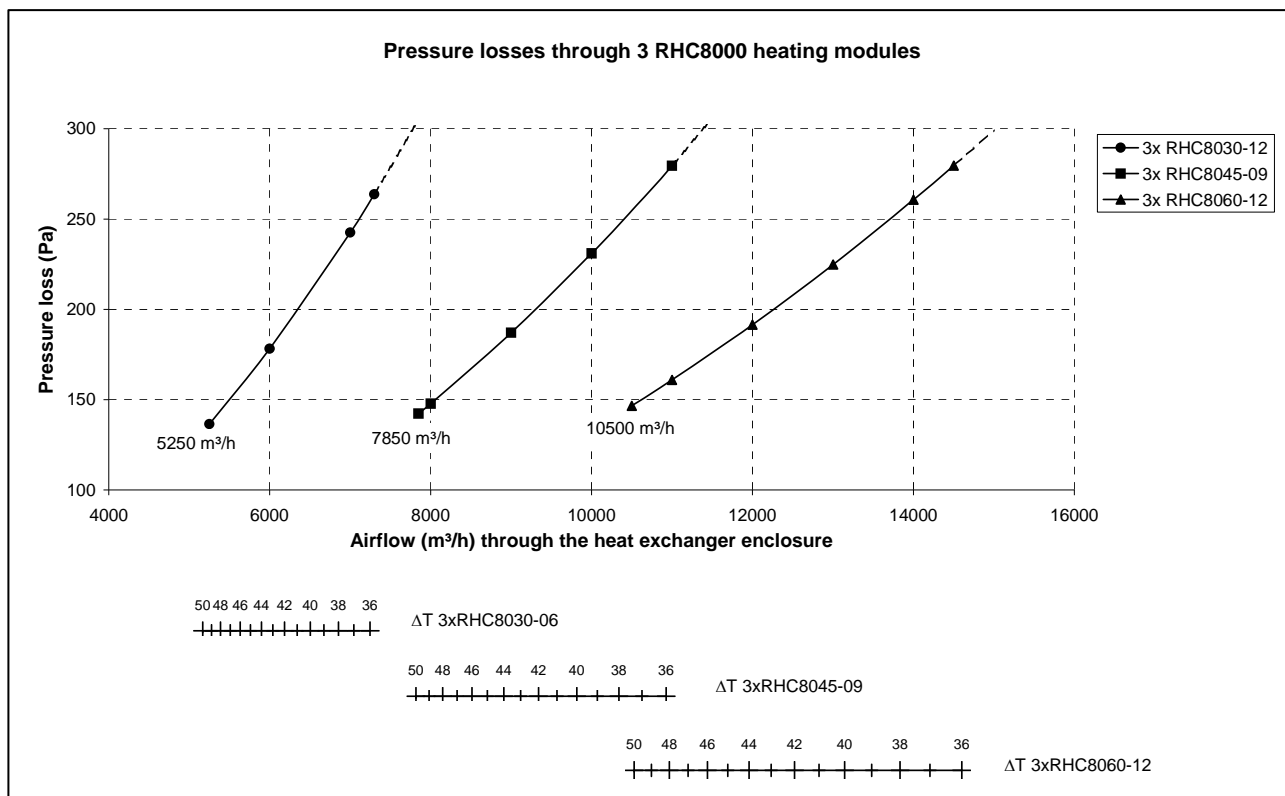


Figure 14j

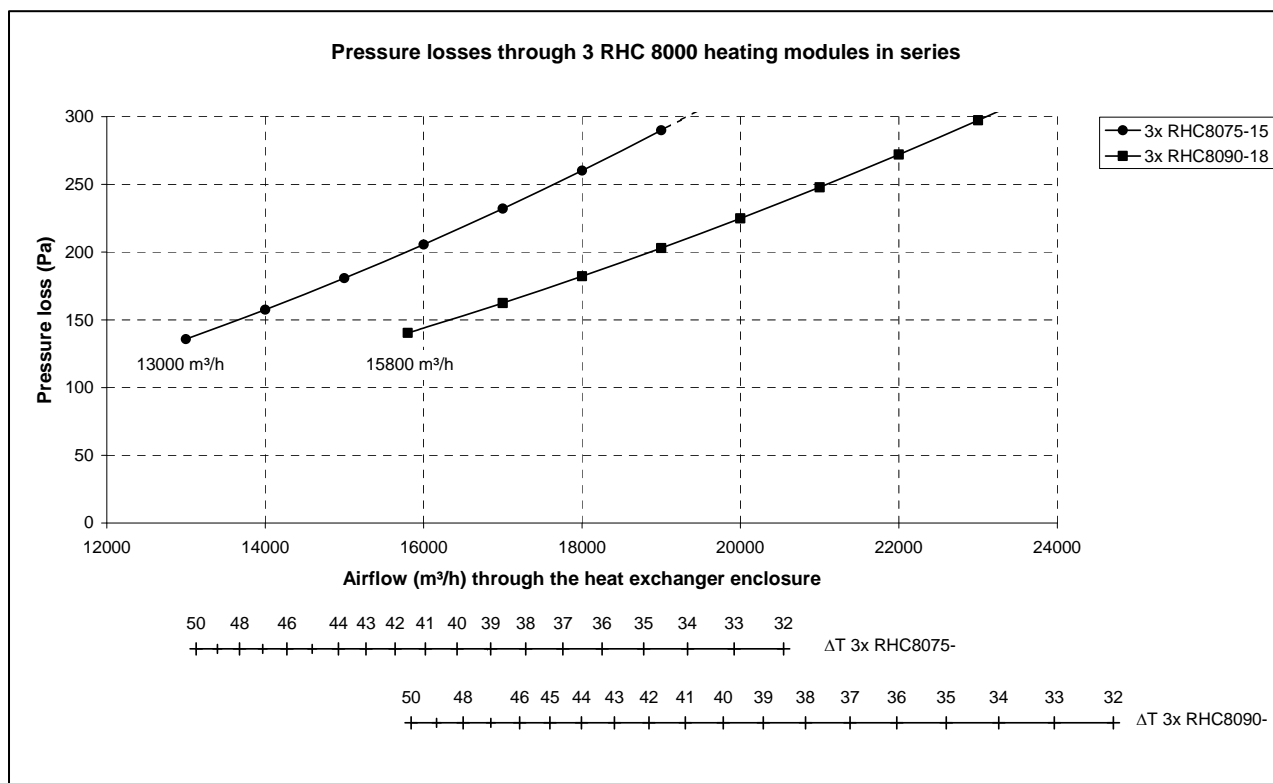


Figure 14k

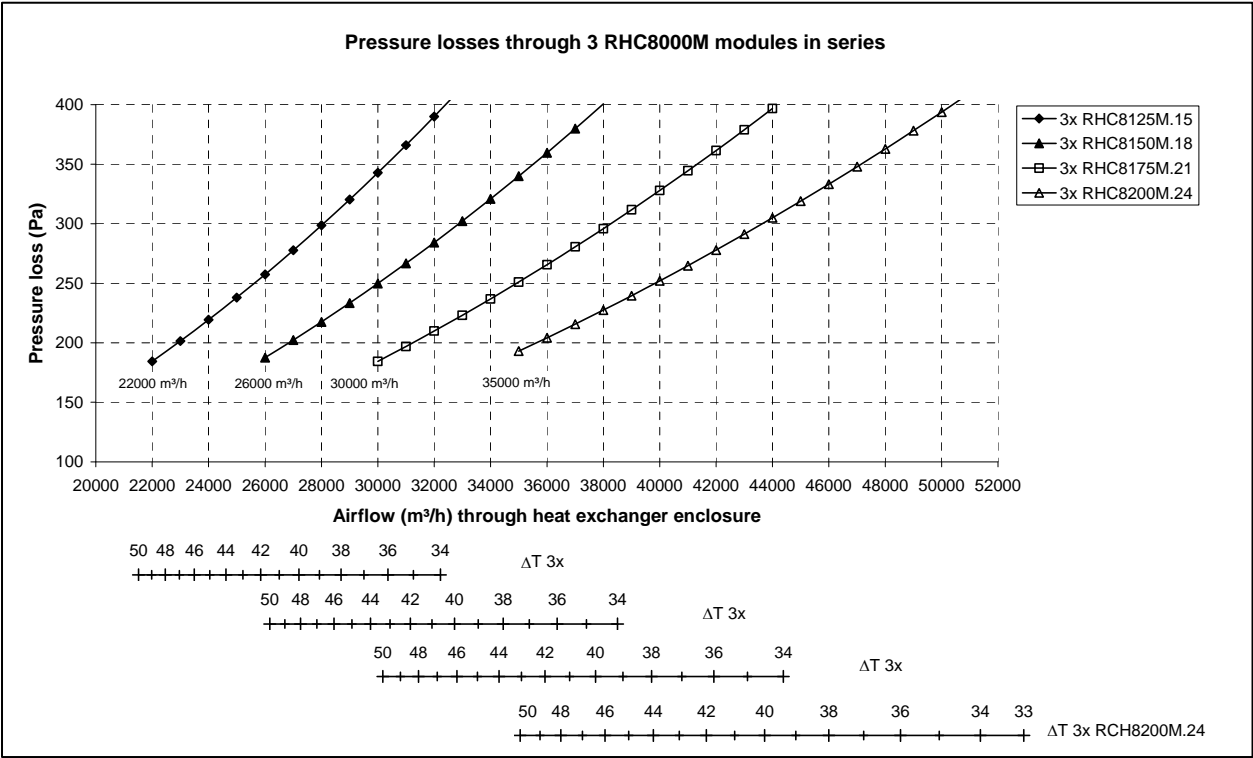


Figure 14l

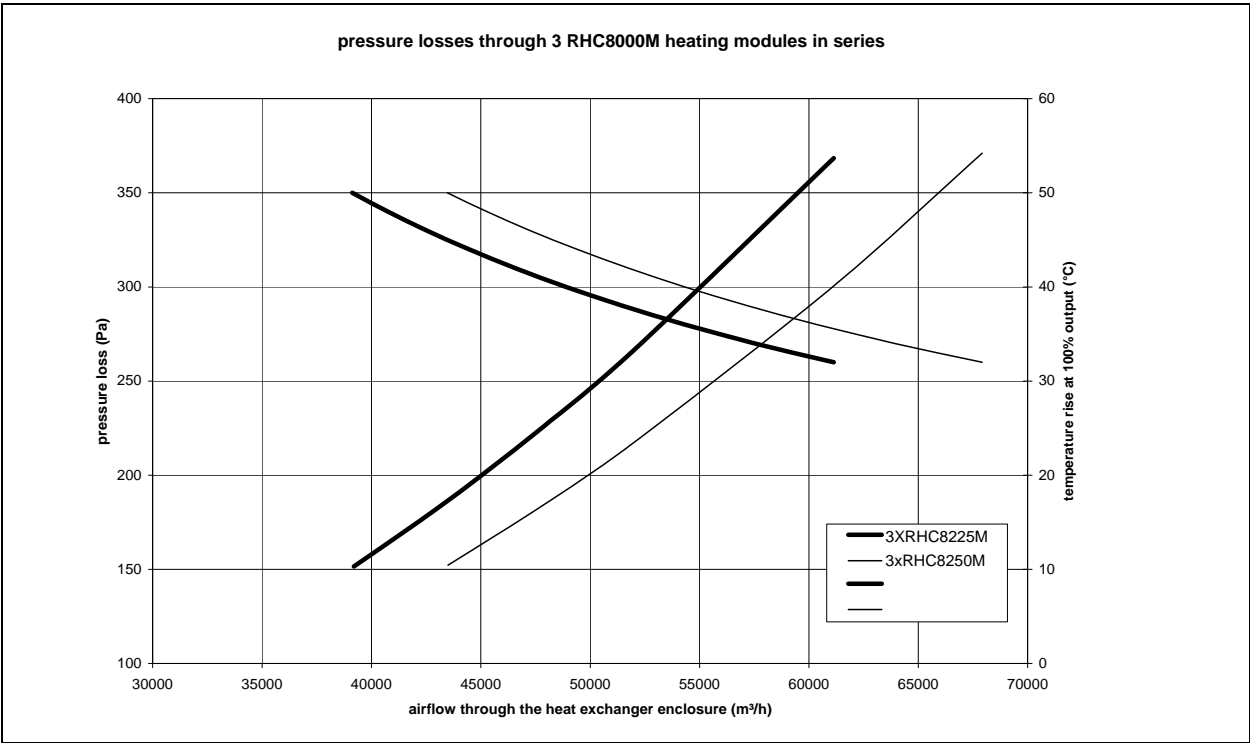
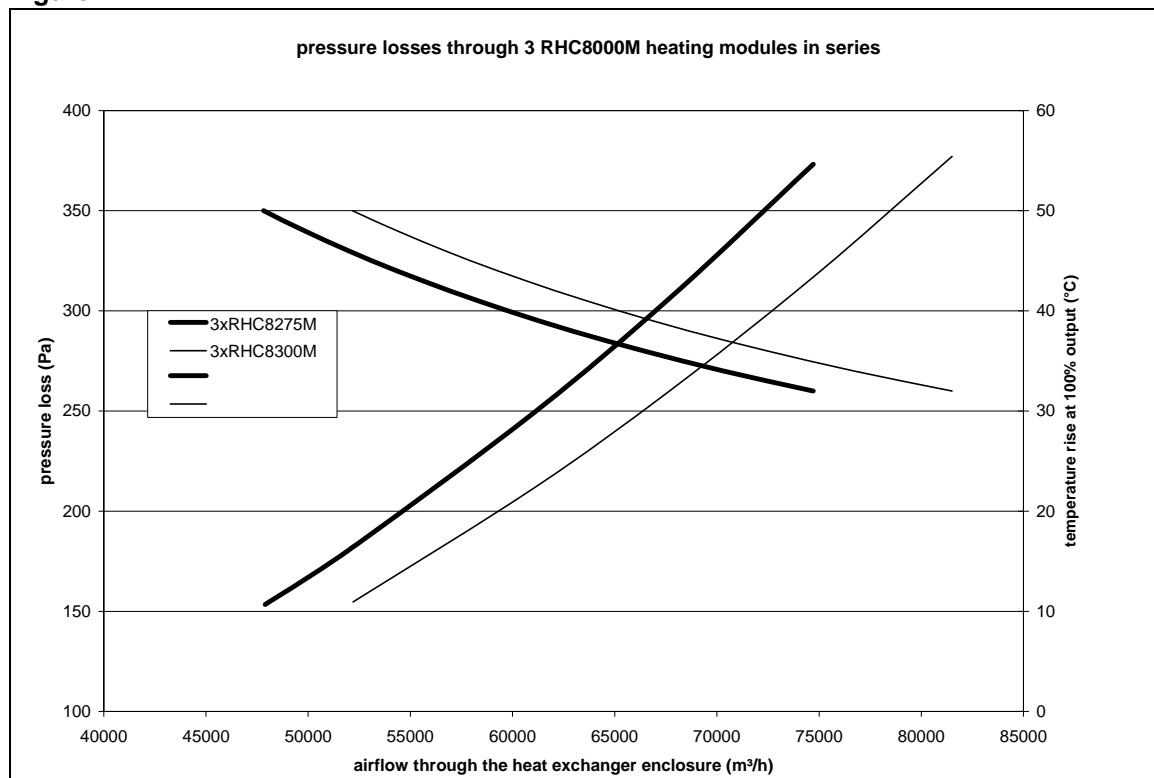


Figure 14m



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
8125M.15	1132	74. ¹⁰	-365. ⁷⁰
8150M.18	1342	62. ⁵⁰	-356. ³⁰
8175M.21	1551	62. ⁵⁰	-368. ⁸⁰
8200M.24	1760	58. ⁸⁰	-388. ²⁰
8225M.18	1790	55. ⁶⁷	-514. ⁴⁴
8250M.20	1925	53. ¹⁹	-551. ⁴⁷
8275M.22	2065	49. ⁰³	-556. ⁵¹
8300M.24	2200	46. ⁵⁵	-567. ⁴⁷

► **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
8125M.15	1770	50. ⁰⁰	-245. ⁰⁰
8150M.18	1770	50. ⁰⁰	-285. ⁰⁰
8175M.21	1770	58. ³⁰	-350. ⁰⁰
8200M.24	1770	60. ⁶⁰	-400. ⁰⁰
8225M.18	2360	42. ⁸³	-394. ⁵⁷
8250M.20	2360	42. ⁵⁵	-434. ⁵⁷
8275M.22	2360	43. ²¹	-489. ⁵⁷
8300M.24	2360	43. ⁵⁹	-530. ⁴⁴

► **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
8125M.15	1132	51. ⁷⁰	-306. ⁰⁰
8150M.18	1342	44. ⁹⁰	-321. ²⁰
8175M.21	1551	43. ⁸⁰	-396. ⁹⁰
8200M.24	1760	34. ¹⁰	-326. ¹⁰
8225M.18	1790	27. ⁷⁸	-302. ⁷⁸
8250M.20	1925	25. ⁷⁴	-318. ³⁸
8275M.22	2065	19. ⁸⁹	-315. ³⁴
8300M.24	2200	18. ⁷⁵	-327. ⁵⁰

► **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
8125M.15	1770	35. ⁷⁰	-210. ⁷⁰
8150M.18	1770	36. ⁶⁰	-262. ⁸⁰
8175M.21	1770	35. ⁷⁰	-292. ⁹⁰
8200M.24	1770	35. ⁷⁰	-346. ⁴⁰
8225M.18	2360	20. ⁸³	-225. ⁰⁰
8250M.20	2360	20. ⁵⁵	-248. ⁹⁷
8275M.22	2360	17. ⁴⁴	-277. ³³
8300M.24	2360	17. ⁴⁴	-303. ⁴⁹

► **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)

x₁ = Recommended by-pass (dim
A or C) (as calculated in section 11.1).

x₂ = Applied by-pass dim. (mm)

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

$$V_{HS} = \frac{V_{tot}}{\frac{x_2}{x_1} \times \left(\frac{V_{tot}}{V_2} - 1 \right) + 1}$$

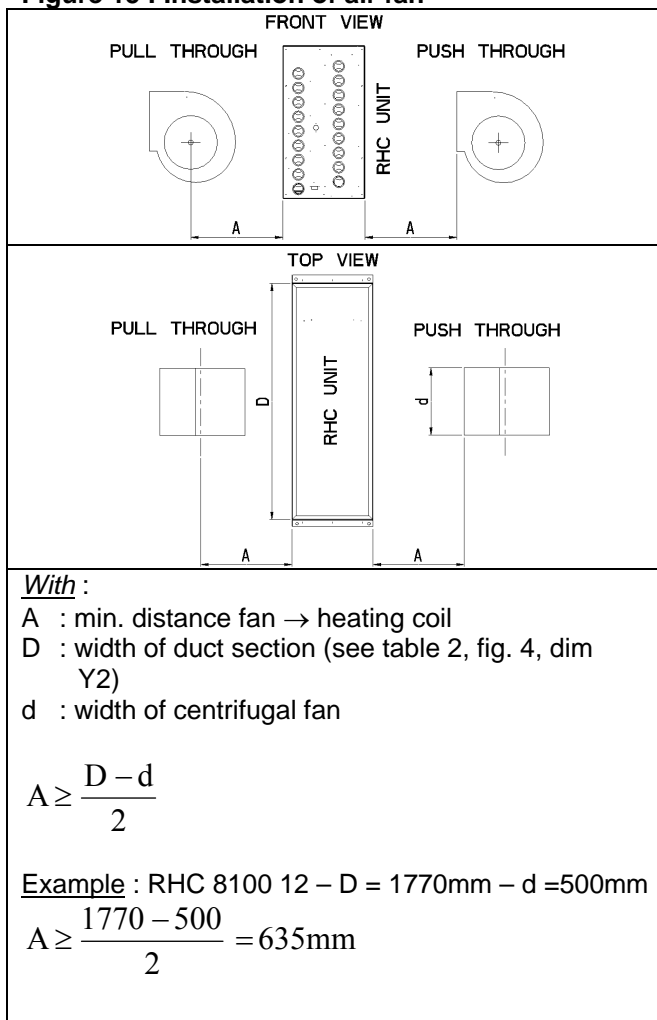
As explained above, the air flow V_{HS} through the heat exchanger enclosure must be used in figure 12 to extract the correct total pressure drop over the RHC module with by-pass.

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 recommended to follow the installation method as described in figure 15.

Figure 15 : Installation of air fan



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.

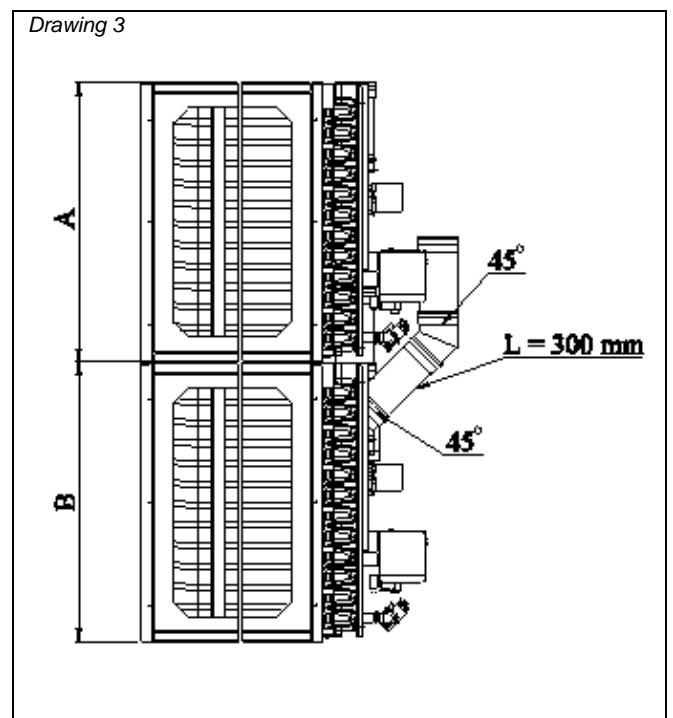
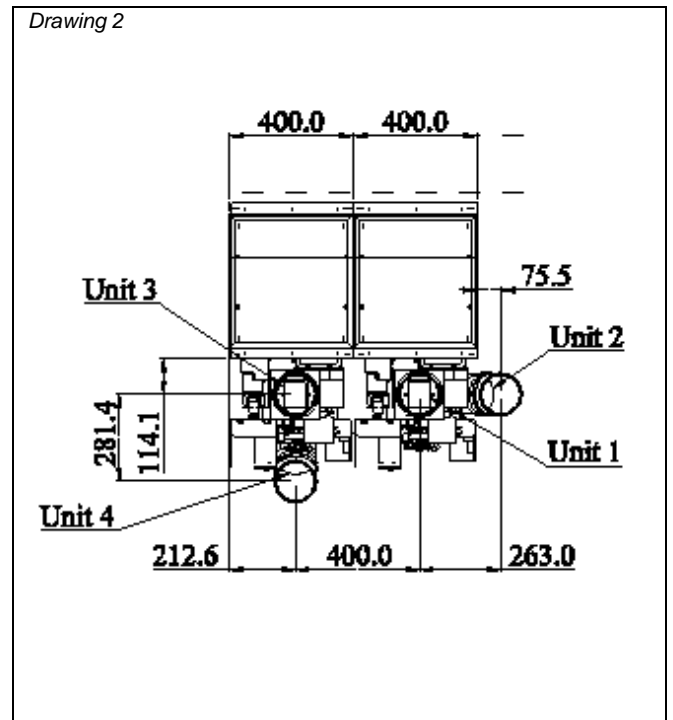
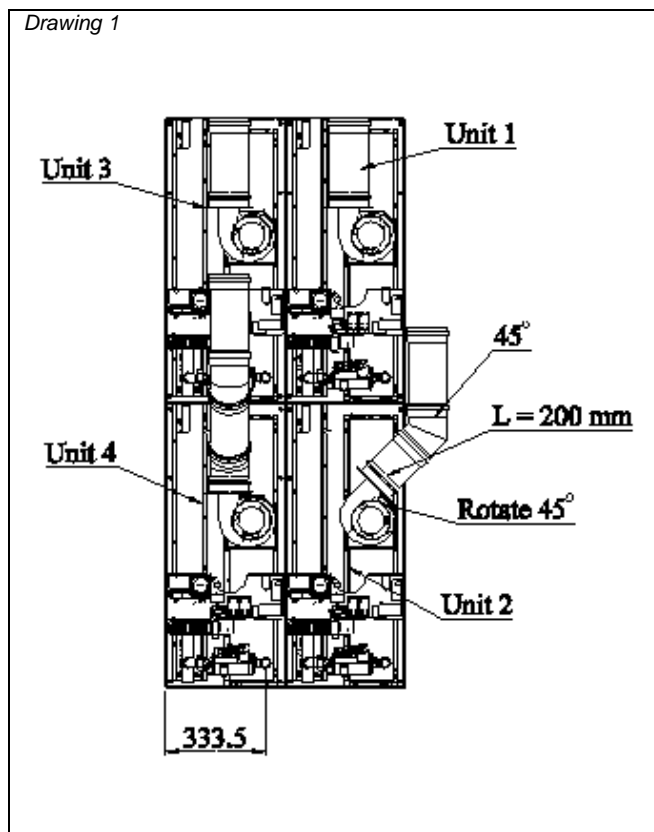
- * turn the combustion ventilator housing of unit 2, with 45° to the right (see fig. 16, drw. 1, units 1 & 2).
- * remove motor and wheel of the combustion fan.
- * unscrew the 3 fixation screws fixing the motor fixation plate with the venter housing.
- * turn the housing 45° to the right and use the 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



15.0 TECHNICAL DATA

Table 9 - Model RHC 8000(M) Specifications

Model	Heat input		Heat output kW	Gas rate ³		Power Consumption kW	Heat output 50% 2 stage kW	Minimum modulating output kW
	kW gros ¹	kW net ²		G20	G31			
				m³/h	kg/h			
8030 06	37.00	33.40	30.39	3.53	2.64	0.153	14.20	14.20
8045 09	56.00	50.40	45.91	5.34	4.00	0.153	21.40	21.40
8050 06	62.00	55.88	50.91	5.92	4.43	0.153	24.00	24.00
8060 12	74.60	67.20	61.35	7.12	5.33	0.153	28.60	28.60
8075 09	91.50	82.40	75.73	8.73	6.61	0.153	35.40	35.40
8075 15	91.45	82.40	74.98	8.72	6.43	0.153	35.27	35.27
8090 18	109.88	99.00	90.09	10.48	7.72	0.153	43.16	43.16
8100 12	120.00	108.40	99.94	11.45	8.57	0.153	46.60	46.60
Model	Heat input		Heat output kW	Gas rate ³		Power Consumption kW	Heat output low stage bottom unit kW	Minimum modulating output kW
	kW gros ¹	kW net ²		G20	G31			
				m³/h	kg/h			
8125M.15	153.47	138.28	126.39	14.63	10.78	0.282	51.02	25.45 (*)
8150M.18	182.91	164.80	150.46	17.44	12.85	0.282	74.90	36.28 (*)
8175M.21	211.76	190.80	174.20	20.19	14.88	0.282	98.21	47.80 (*)
8200M.24	244.20	220.00	200.40	23.28	17.16	0.655	101.20	50.05 (*)
8225M.18	270.37	243.60	222.41	25.78	19.00	0.840	70.09	34.67 (**)
8250M.20	300.55	270.80	247.24	28.66	21.12	0.840	96.47	36.36 (**)
8275M.22	330.74	298.00	271.78	31.53	23.24	0.840	96.47	35.79 (**)
8300M.24	360.93	325.20	295.93	34.41	25.36	0.840	96.47	46.52 (**)

(*) 4 stage burner or 2x GM44 needed to get the minimum output

(**) 6 stage burner or 3x GM44 needed to get the minimum output

1. GCV (Hs)
2. NCV (Hi)
3. Natural gas G20 gross calorific value 10.48 kWh/m³ @ 15 °C, 1013.25 mbar
Butane gas G30 gross calorific value 13.7 kWh/kg
Propane gas G31 gross calorific value 14.0 kWh/kg

Table 10 – Gas categories

Country	Gas category
Austria	II2H3P
Belarus	II2H3+
Bulgaria	I2H or I3B/P
China	II2H3+
Czech republic	II2H3+
Croatia	II2H3P
Cyprus	II2H3+
Denmark	II2H3 B/P
England	II2H3+
Estonia	II2H3+
England	II2H3+
Finland	II2H3 B/P
Germany	I2ELL
Greece	II2H3+
Hungary	II2HS3P
Iceland	II2H3+
Latvia	II2H3+

Country	Gas category
Lithuania	II2H3+
Montenegro	II2H3+
New Zealand	II2H3+
Norway	II2H3 B/P
Poland	II2E3P
Portugal	II2H3+
Romania	II2H3P
Russian Federation	I2H or I3P
Serbia	II2H3+
Slovakia	II2H3+
Slovenia	II2H3+
South Africa	II2H3+
Spain	II2H3+
Sweden	II2H3 B/P
Turkey	II2H3+
Ukraine	I2H or I3P

Table 11 :Injector size and burner pressure for RHC 8000 appliances

Belarus, China, Croatia, Czech Republic, Cyprus, England, Estonia, Greece, Iceland, Latvia, Lithuania, Montenegro, New Zealand, Portugal, Serbia, Slovenia, Slovakia, South Africa, Spain , Turkey

		Model	8030 06	8045 09	8050 06	8060 12	8075 09	8075 15	8090 18	8100 12
Nat. Gas G20	Injector	quantity	6	9	6	12	9	15	18	12
	Injector size	mm	2,40	2,40	3,00	2,40	3,00	2,40	2,40	3,00
		marking	240	240	300	240	300	240	240	300
	Burner pressure (1)	mbar	6,90	6,90	6,90	6,90	6,90	6,77	7,26	6,90
	Inlet pressure	mbar	20							
Prop. Gas G31	Injector	quantity	6	9	6	12	9	15	18	12
	Injector size	mm	1,25	1,25	1,55	1,25	1,55	1,25	1,25	1,55
		marking	125	125	155	125	155	125	125	155
	Burner pressure (1)	mbar	36,50	35,70	34,90	35,50	34,50	35,20	33,30	33,30
	Inlet pressure	mbar	37							

Romania, Poland

		Model	8030 06	8045 09	8050 06	8060 12	8075 09	8075 15	8090 18	8100 12
Nat. Gas G20	Injector	quantity	6	9	6	12	9	15	18	12
	Injector size	mm	2,40	2,40	3,00	2,40	3,00	2,40	2,40	3,00
		marking	240	240	300	240	300	240	240	300
	Burner pressure (1)	mbar	6,90	6,90	6,90	6,90	6,90	6,77	7,26	6,90
	Inlet pressure	mbar	20							
Prop. Gas G31	Injector	quantity	6	9	6	12	9	15	18	12
	Injector size	mm	1,30	1,30	1,65	1,30	1,65	1,30	1,30	1,65
		marking	130	130	165	130	165	130	130	165
	Burner pressure (1)	mbar	28,70	28,00	28,00	27,90	27,80	28,34	27,30	26,80
	Inlet pressure	mbar	30							

Germany,Hungary, Russian Federation, Ukraine, Austria

		Model	8030 06	8045 09	8050 06	8060 12	8075 09	8075 15	8090 18	8100 12
Nat. Gas G20	Injector	quantity	6	9	6	12	9	15	18	12
	Injector size	mm	2,40	2,40	3,00	2,40	3,00	2,40	2,40	3,00
		marking	240	240	300	240	300	240	240	300
	Burner pressure (1)	mbar	6,90	6,90	6,90	6,90	6,90	6,77	7,26	6,90
	Inlet pressure	mbar	20(*)							
Prop. Gas G31	Injector	quantity	6	9	6	12	9	15	18	12
	Injector size	mm	1,25	1,25	1,55	1,25	1,55	1,25	1,25	1,55
		marking	125	125	155	125	155	125	125	155
	Burner pressure (1)	mbar	36,50	35,70	34,90	35,50	34,50	35,20	33,30	33,30
	Inlet pressure	mbar	50							

(*) : Inlet pressure for Hungary = 25mbar

Bulgaria, Denmark, Finland, Norway, Sweden

		Model	8030 06	8045 09	8050 06	8060 12	8075 09	8075 15	8090 18	8100 12
Nat. Gas G20	Injector	quantity	6	9	6	12	9	15	18	12
	Injector size	mm	2,40	2,40	3,00	2,40	3,00	2,40	2,40	3,00
		marking	240	240	300	240	300	240	240	300
	Burner pressure (1)	mbar	6,90	6,90	6,90	6,90	6,90	6,77	7,26	6,90
	Inlet pressure	mbar	20							
Prop. Gas G31	Injector	quantity	6	9	6	12	9	15	18	12
	Injector size	mm	1,20	1,25	1,55	1,25	1,55	1,25	1,25	1,55
		marking	120	125	155	125	155	125	125	155
	Burner pressure (1)	mbar	29,50	28,70	27,90	28,50	27,50	26,64	25,20	26,30
	Inlet pressure	mbar	30							

(1) : with open service door

Table 12 :Injector size and burner pressure for RHC 8000M appliances

Belarus, China, Croatia, Czech Republic, Cyprus, England, Estonia, Greece, Iceland, Latvia, Lithuania, Montenegro, New Zealand, Portugal, Serbia, Slovenia, Slovakia, South Africa, Spain , Turkey

		Model	8125M15	8150M18	8175M21	8200M24	8225M18	8250M20	8275M22	8300M24
Nat. Gas G20	Injector	quantity	15	18	21	24	18	20	22	24
	Injector size	mm	3,00	3,00	3,00	3,00	3,50	3,50	3,50	3,50
		marking	300	300	300	300	350	350	350	350
	Burner pressure (1)	mbar	2x7,10	2x7,30	2x7,70	2x7,70	3x8,45	3x8,40	3x8,50	3x8,40
	Inlet pressure	mbar	20							
Prop. Gas G31	Injector	quantity	15	18	21	24	18	20	22	24
	Injector size	mm	1,55	1,55	1,55	1,55	1,90	1,90	1,90	1,90
		marking	155	155	155	155	190	190	190	190
	Burner pressure (1)	mbar	2x35,40	2x34,80	2x34,70	2x33,70	3x34,50	3x34,50	3x34,50	3x34,50
	Inlet pressure	mbar	37							

Romania, Poland

		Model	8125M15	8150M18	8175M21	8200M24	8225M18	8250M20	8275M22	8300M24
Nat. Gas G20	Injector	quantity	15	18	21	24	18	20	22	24
	Injector size	mm	3,00	3,00	3,00	3,00	3,50	3,50	3,50	3,50
		marking	300	300	300	300	350	350	350	350
	Burner pressure (1)	mbar	2x7,10	2x7,30	2x7,70	2x7,70	3x8,45	3x8,40	3x8,50	3x8,40
	Inlet pressure	mbar	20							
Prop. Gas G31	Injector	quantity	15	18	21	24	18	20	22	24
	Injector size	mm	1,65	1,65	1,65	1,65	---	---	---	---
		marking	165	165	165	165	---	---	---	---
	Burner pressure (1)	mbar	2x28,40	2x27,80	2x27,70	2x27,00	---	---	---	---
	Inlet pressure	mbar	30							

Germany, Hungary, Russian Federation, Ukraine, Austria

		Model	8125M15	8150M18	8175M21	8200M24	8225M18	8250M20	8275M22	8300M24
Nat. Gas G20	Injector	quantity	15	18	21	24	18	20	22	24
	Injector size	mm	3,00	3,00	3,00	3,00	3,50	3,50	3,50	3,50
		marking	300	300	300	300	350	350	350	350
	Burner pressure (1)	mbar	2x7,10	2x7,30	2x7,70	2x7,70	3x8,45	3x8,40	3x8,50	3x8,40
	Inlet pressure	mbar	20(*)							
Prop. Gas G31	Injector	quantity	15	18	21	24	18	20	22	24
	Injector size	mm	1,55	1,55	1,55	1,55	1,90	1,90	1,90	1,90
		marking	155	155	155	155	190	190	190	190
	Burner pressure (1)	mbar	2x35,40	2x34,80	2x34,70	2x33,70	3x34,50	3x34,50	3x34,50	3x34,50
	Inlet pressure	mbar	50							

(*) : Inlet pressure for Hungary = 25mbar

Bulgaria, Denmark, Finland, Norway, Sweden

		Model	8125M15	8150M18	8175M21	8200M24	8225M18	8250M20	8275M22	8300M24
Nat. Gas G20	Injector	quantity	15	18	21	24	18	20	22	24
	Injector size	mm	3,00	3,00	3,00	3,00	3,50	3,50	3,50	3,50
		marking	300	300	300	300	350	350	350	350
	Burner pressure (1)	mbar	2x7,10	2x7,30	2x7,70	2x7,70	3x8,45	3x8,40	3x8,50	3x8,40
	Inlet pressure	mbar	20							
Prop. Gas G31	Injector	quantity	15	18	21	24	18	20	22	24
	Injector size	mm	1,55	1,55	1,55	1,55	1,90	1,90	1,90	1,90
		marking	155	155	155	155	190	190	190	190
	Burner pressure (1)	mbar	2x27,75	2x27,28	2x27,20	2x26,41	3x27,04	3x27,04	3x27,04	3x27,04
	Inlet pressure	mbar	30							

(1) : with open service door