

1 NEXT-R, G, K SERIES GAS UNIT HEATERS

1.1 FLUE GAS EXHAUST CONNECTION

- ▶ Ø 80 mm with gasket, on the rear, at the top (see dimensional diagrams of the appliances).



For R15 and R20 models, it is possible to move the fumes gas outlet connection from the rear position to the top of the unit.

1.2 COMBUSTION AIR INTAKE FITTING

- ▶ Ø 80 mm with gasket, on the rear, at the top (see dimensional diagrams of the appliances).

1.3 INSTALLATION TYPES



The lengths in following Tables are intended for installations where the air and/or flue gas exhaust ducts follow linear paths as shown in the respective Figures. Otherwise, you must proceed with the calculation of the pressure drop (Paragraph 1.4 p. 5).



If ducts other than those supplied by the manufacturer are used, make sure that they are suitable for the unit on which they are installed. In particular, the temperature class of the duct must be appropriate for the operating characteristics of the unit, and must also respect the chemical-physical stability of the system itself.



In any case, use approved ducts according to the type of installation to be made. Upon request, Robur can supply rigid pipes, coaxial ducts and terminals, all of approved type.

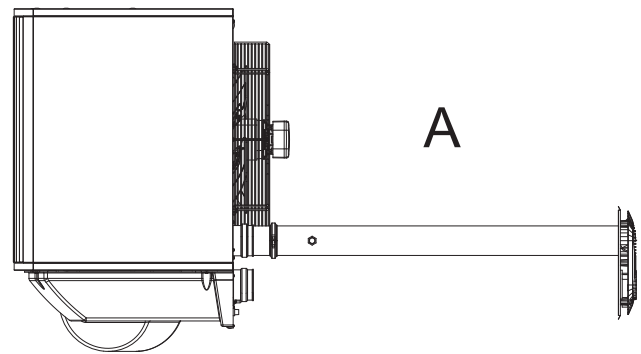


Refer to the relevant Section for more information on available accessories.

Gas unit heaters of the R, G and K series can be installed to one of the following ways.

1.3.1 B23 type installation with wall flue gas exhaust pipe

Figure 1.1 B23 type installation with Ø 80 flue gas exhaust pipe



A View from above

1.3.1.1 G series gas unit heaters

Table 1.1 B23 type maximum allowed length

	Indicative maximum lengths (m)		
	Flue gas exhaust pipe		
	Ø 80	Ø 100	Ø 110
G30	23	30	30
G45	16	30	30
G60	12	30	30
G100	8	28	30

1.3.1.2 K series gas unit heaters

Table 1.2 B23 type maximum allowed length

	Indicative maximum lengths (m)		
	Flue gas exhaust pipe		
	Ø 80	Ø 100	Ø 110
K32	17	30	30
K45	11	30	30
K60	18	30	30
K100	7	22	30

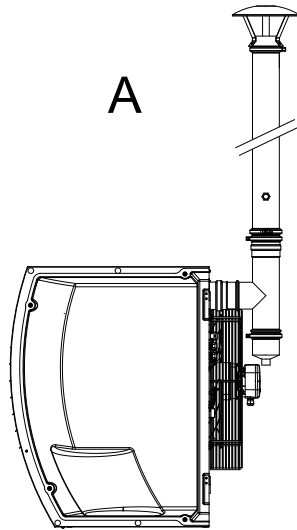
1.3.1.3 Next-R series gas unit heaters

Table 1.3 B23 type maximum allowed length

	Indicative maximum lengths (m)		
	Flue gas exhaust pipe		
	Ø 80	Ø 100	Ø 110
R15	30	30	30
R20	30	30	30
R30	30	30	30
R40	28	30	30
R50	16	30	30
R60	10	30	30
R80	9	30	30

1.3.2 B23 type installation with roof flue gas exhaust pipe

Figure 1.2 B23 type installation with Ø 80 roof flue gas exhaust pipe



A Right side view

1.3.2.1 G series gas unit heaters

Table 1.4 B23 type maximum allowed length with roof flue gas exhaust pipe

	Indicative maximum lengths (m)		
	Flue gas exhaust pipe		
	Ø 80	Ø 100	Ø 110
G30	20	30	30
G45	13	30	30
G60	9	30	30
G100	5	18	28

1.3.2.2 K series gas unit heaters

Table 1.5 B23 type maximum allowed length with roof flue gas exhaust pipe

	Indicative maximum lengths (m)			
	Flue gas exhaust pipe			
	Ø 80	Ø 100	Ø 110	Ø 130
K32	14	30	30	30
K45	8	26	30	30
K60	15	30	30	30
K100	4	13	20	30

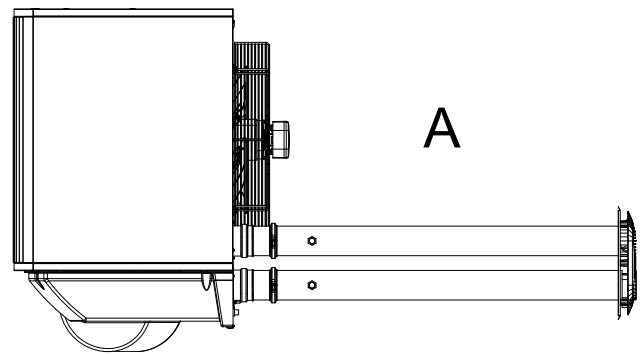
1.3.2.3 Next-R series gas unit heaters

Table 1.6 B23 type maximum allowed length with roof flue gas exhaust pipe

	Indicative maximum lengths (m)		
	Flue gas exhaust pipe		
	Ø 80	Ø 100	Ø 110
R15	30	30	30
R20	30	30	30
R30	30	30	30
R40	25	30	30
R50	13	30	30
R60	7	24	30
R80	6	20	30

1.3.3 C13 type installation with separate ducts

Figure 1.3 C13 type installation with Ø 80 separate ducts



A View from above

1.3.3.1 G series gas unit heaters

Table 1.7 C13 type maximum allowed length with separate ducts

	Indicative maximum lengths (m)					
	Air pipe			Flue gas exhaust pipe		
	Ø 80	Ø 100	Ø 110	Ø 80	Ø 100	Ø 110
G30	17	30	30	17	30	30
G45	12	30	30	12	30	30
G60	9	30	30	9	30	30
G100	6	21	20	6	21	20

1.3.3.2 K series gas unit heaters

Table 1.8 C13 type maximum allowed length with separate ducts

	Indicative maximum lengths (m)							
	Air pipe				Flue gas exhaust pipe			
	Ø 80	Ø 100	Ø 110	Ø 130	Ø 80	Ø 100	Ø 110	Ø 130
K32	12	30	30	30	12	30	30	30
K45	8	25	22	30	8	25	22	30
K60	13	30	30	30	13	30	30	30
K100	5	16	11	25	5	16	11	25

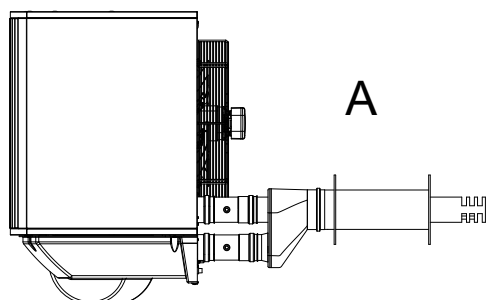
1.3.3.3 Next-R series gas unit heaters

Table 1.9 C13 type maximum allowed length with separate ducts

	Indicative maximum lengths (m)					
	Air pipe			Flue gas exhaust pipe		
	Ø 80	Ø 100	Ø 110	Ø 80	Ø 100	Ø 110
R15	30	30	30	30	30	30
R20	30	30	30	30	30	30
R30	25	30	30	25	30	30
R40	19	30	30	19	30	30
R50	10	30	30	10	30	30
R60	7	22	30	7	22	30
R80	6	20	26	6	20	26

1.3.4 C13 type installation with wall coaxial terminal

Figure 1.4 C13 type installation with wall coaxial terminal and Ø 80 ducts



A View from above

1.3.4.1 G series gas unit heaters

Table 1.10 C13 type maximum allowed length with 80/125 wall coaxial terminal and Ø 80 ducts

Indicative maximum lengths (m)		
	Air pipe	Flue gas exhaust pipe
G30	11	11
G45	7	7
G60	4	4
G100	2	2

Table 1.11 C13 type maximum allowed length with 130/180 wall coaxial terminal

Indicative maximum lengths (m)				
	Air pipe		Flue gas exhaust pipe	
	Ø 80	Ø 130	Ø 80	Ø 130
G30	13	30	13	30
G45	9	30	9	30
G60	6	30	6	30
G100	4	30	4	30

1.3.4.2 K series gas unit heaters

Table 1.12 C13 type maximum allowed length with 80/125 wall coaxial terminal and Ø 80 ducts

Indicative maximum lengths (m)		
	Air pipe	Flue gas exhaust pipe
K32	6	6
K45	2	2
K60	7	7
K100	-	-

Table 1.13 C13 type maximum allowed length with 130/180 wall coaxial terminal

Indicative maximum lengths (m)				
	Air pipe		Flue gas exhaust pipe	
	Ø 80	Ø 130	Ø 80	Ø 130
K32	8	30	8	30
K45	4	30	4	30
K60	10	30	10	30
K100	2	25	2	25

1.3.4.3 Next-R series gas unit heaters

Table 1.14 C13 type maximum allowed length with 80/125 wall coaxial terminal and Ø 80 ducts

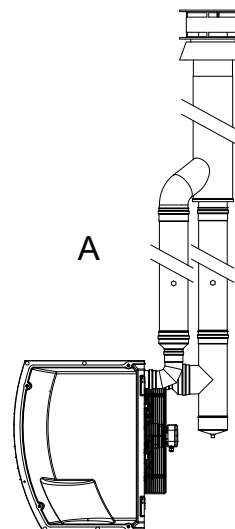
Indicative maximum lengths (m)		
	Air pipe	Flue gas exhaust pipe
R15	30	30
R20	30	30
R30	22	22
R40	16	16
R50	8	8
R60	-	-
R80	-	-

Table 1.15 C13 type maximum allowed length with 130/180 wall coaxial terminal

Indicative maximum lengths (m)				
	Air pipe		Flue gas exhaust pipe	
	Ø 80	Ø 130	Ø 80	Ø 130
R15	30	30	30	30
R20	30	30	30	30
R30	24	30	24	30
R40	18	30	18	30
R50	9	30	9	30
R60	6	30	6	30
R80	5	30	5	30

1.3.5 C33 type installation with roof coaxial terminal

Figure 1.5 C33 type installation with roof coaxial terminal



A Right side view

1.3.5.1 G series gas unit heaters

Table 1.16 C33 type maximum allowed length with 80/125 roof coaxial terminal and Ø 80 ducts

Indicative maximum lengths (m)		
	Air pipe	Flue gas exhaust pipe
G30	8	8
G45	3	3
G60	-	-
G100	-	-

Table 1.17 C33 type maximum allowed length with 100/150 roof coaxial terminal

	Indicative maximum lengths (m)			
	Air pipe		Flue gas exhaust pipe	
	Ø 80	Ø 100	Ø 80	Ø 100
G30	11	30	11	30
G45	7	26	7	26
G60	4	17	4	17
G100	1	8	1	8

Table 1.18 C33 type maximum allowed length with 130/210 roof coaxial terminal

	Indicative maximum lengths (m)					
	Air pipe			Flue gas exhaust pipe		
	Ø 80	Ø 110	Ø 130	Ø 80	Ø 110	Ø 130
G30	13	30	30	13	30	30
G45	9	30	30	9	30	30
G60	5	30	30	5	30	30
G100	2	22	30	2	22	30

1.3.5.2 K series gas unit heaters

Table 1.19 C33 type maximum allowed length with 80/125 roof coaxial terminal and Ø 80 ducts

	Indicative maximum lengths (m)	
	Air pipe	Flue gas exhaust pipe
K32	3	3
K45	-	-
K60	3	3
K100	-	-

Table 1.20 C33 type maximum allowed length with 100/150 roof coaxial terminal

	Indicative maximum lengths (m)			
	Air pipe		Flue gas exhaust pipe	
	Ø 80	Ø 100	Ø 80	Ø 100
K32	7	26	7	26
K45	2	12	2	12
K60	7	27	7	27
K100	-	2	-	2

Table 1.21 C33 type maximum allowed length with 130/210 roof coaxial terminal

	Indicative maximum lengths (m)					
	Air pipe			Flue gas exhaust pipe		
	Ø 80	Ø 110	Ø 130	Ø 80	Ø 110	Ø 130
K32	9	30	30	9	30	30
K45	4	30	30	4	30	30
K60	9	30	30	9	30	30
K100	1	14	30	1	14	30

1.3.5.3 Next-R series gas unit heaters

Table 1.22 C33 type maximum allowed length with 80/125 roof coaxial terminal and Ø 80 ducts

	Indicative maximum lengths (m)	
	Air pipe	Flue gas exhaust pipe
R15	30	30
R20	30	30
R30	18	18
R40	12	12
R50	3	3
R60	-	-

R80	-	-
-----	---	---

Table 1.23 C33 type maximum allowed length with 100/150 roof coaxial terminal

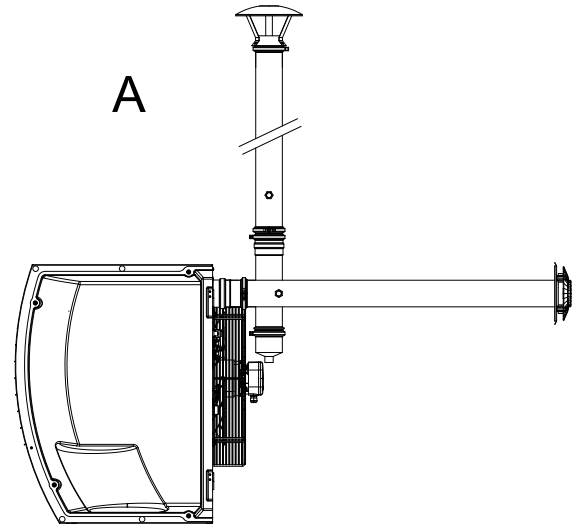
	Indicative maximum lengths (m)			
	Air pipe		Flue gas exhaust pipe	
	Ø 80	Ø 100	Ø 80	Ø 100
R15	30	30	30	30
R20	30	30	30	30
R30	19	30	19	30
R40	14	30	14	30
R50	5	21	5	21
R60	1	10	1	10
R80	-	1	-	1

Table 1.24 C33 type maximum allowed length with 130/210 roof coaxial terminal

	Indicative maximum lengths (m)					
	Air pipe			Flue gas exhaust pipe		
	Ø 80	Ø 110	Ø 130	Ø 80	Ø 110	Ø 130
R15	30	30	30	30	30	30
R20	30	30	30	30	30	30
R30	21	30	30	21	30	30
R40	15	30	30	15	30	30
R50	7	30	30	7	30	30
R60	3	26	30	3	26	30
R80	2	21	30	2	21	30

1.3.6 C53 type installation with separate ducts

Figure 1.6 C53 type installation with Ø 80 separate ducts



A Right side view

1.3.6.1 G series gas unit heaters

Table 1.25 C53 type maximum allowed length with separate ducts

	Indicative maximum lengths (m)			
	Air pipe	Flue gas exhaust pipe		
		Ø 80	Ø 100	Ø 110
G30	1	19	30	30
G45	1	13	30	30
G60	1	9	30	30
G100	1	5	24	30

1.3.6.2 K series gas unit heaters

Table 1.26 C53 type maximum allowed length with separate ducts

	Indicative maximum lengths (m)			
	Air pipe	Flue gas exhaust pipe		
		Ø 80	Ø 100	Ø 110
K32	1	14	30	30
K45	1	8	30	30
K60	1	15	30	30
K100	1	3	19	30

1.3.6.3 Next-R series gas unit heaters

Table 1.27 C53 type maximum allowed length with separate ducts

	Indicative maximum lengths (m)			
	Air pipe	Flue gas exhaust pipe		
		Ø 80	Ø 100	Ø 110
R15	1	30	30	30
R20	1	30	30	30
R30	1	30	30	30
R40	1	24	30	30
R50	1	12	30	30
R60	1	7	29	30
R80	1	6	26	30

1.4 SIZING AND INSTALLING COMBUSTION AIR/EXHAUST FUMES DUCTS

In order to dimension the duct system, the total pressure drop of the system must be calculated.

The total allowed pressure drop in the flue gas exhaust system depends on the unit model (Tables 1.36 p. 8, 1.28 p. 6 and 1.32 p. 7).

The pressure drops of the flue and air pipes available as Robur optional are shown in Tables 1.37 p. 8, 1.29 p. 6 and 1.33 p. 7.

Tables 1.38 p. 8, 1.30 p. 6 and 1.34 p. 7 shows the pressure drops for Ø 100 flue and air pipes in aluminium, available on the market.

The pressure drops of the coaxial pipes available as Robur optional are shown in Tables 1.39 p. 8, 1.31 p. 6 and 1.35 p. 7.

Resistance from the separate terminals are negligible since they are very low.

When designing, it must be checked that the total pressure drop of the piping system is lower than the maximum pressure drop allowed for the unit (Tables 1.36 p. 8, 1.28 p. 6 and 1.32 p. 7). An example of how to calculate pressure drops is given in Paragraph 1.5 p. 8.

The maximum lengths of air and flue gas exhaust pipes, depending on the type of installation, are shown in tables under the installation type figures, described in Paragraph 1.3 p. 1.



The above lengths are intended to be approximate values for standard installations where the air and flue gas exhaust ducts follow linear paths as shown in the respective figures. Otherwise, you must proceed with the calculation of the pressure drop (Paragraph 1.5 p. 8): installation will be permitted if the total pressure drop is lower than the maximum admissible pressure drop (Tables 1.36 p. 8, 1.28 p. 6 and 1.32 p. 7).



The Ø 80, 110 and 130 pipes available as Robur optional are made of stainless steel, while the Ø 100 adapters

available as Robur optional are made of aluminium.



If horizontal flue gas exhaust pipes having lengths above 1 m are installed, the flue gas exhaust pipe must be mounted with a downward slope of 2 to 3 cm each 1-m length (Figure 1.7 p. 5), to prevent condensate drops entering the unit.

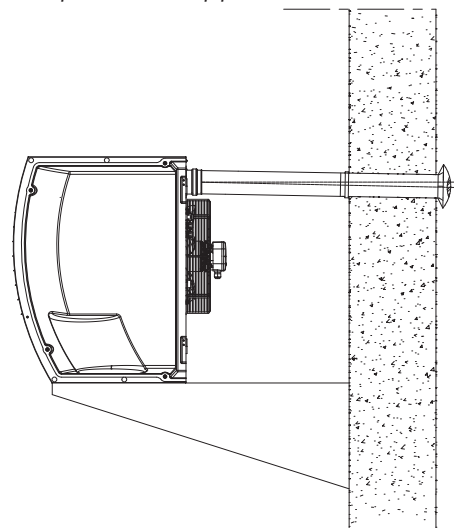


If vertical flue gas exhaust pipes longer than 1,5 m are installed, at the base of the vertically mounted flue gas exhaust pipe a T-shaped piece must be fitted to collect the condensate, to prevent any condensate drops from entering the gas unit heater (Figure 1.2 p. 2).



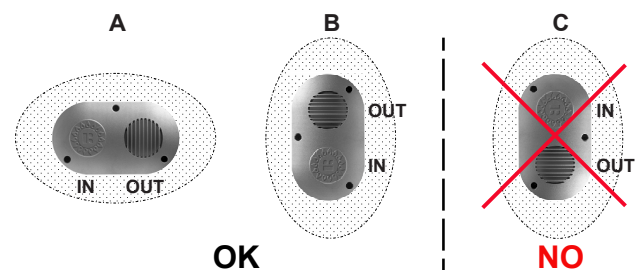
For each 45° elbow an increment of 1,2 m in length should be added.

Figure 1.7 Slope of horizontal pipes



For proper installation of the wall external terminals for the flue gas exhaust and combustion air intake, follow the details given in Figure 1.8 p. 5.

Figure 1.8 Wall terminal position



- IN combustion air intake
- OUT flue gas exhaust
- A recommended position (OK)
- B allowed position (OK)
- C position NOT allowed (NO)

1.4.1 G series gas unit heaters

Table 1.28 Data for the calculation of the air/fumes system with pipes found on the market

				G30	G45	G60	G100
Installation data							
Flue temperature	Nominal heat input	G20	°C	85,0	95,0		85,0
Fumes flow rate	Nominal heat input	G20	kg/h	51	76	102	155
CO₂ percentage in fumes	Nominal heat input	G20	%	8,8	9,1	8,9	9,5
Flue gas exhaust	residual head		Pa	65	100	120	200

Table 1.29 Data for the calculation of the air/fumes system with Ø 80/110/130 pipes available as optional

				G30	G45	G60	G100
Flue gas exhaust pressure drop							
Ø 80 mm	Pipe	1 m	Pa	2,8	5,9	9,3	22,4
	Elbow	90°	Pa	3,6	7,8	12,7	31,6
	Tee		Pa	8,5	17,7	27,9	67,2
Ø 110 mm	Pipe	1 m	Pa	0,6	1,2	1,9	4,6
	Elbow	90°	Pa	1,0	2,2	3,5	8,6
	Tee		Pa	1,8	3,7	5,8	13,8
Ø 130 mm	Pipe	1 m	Pa	0,3	0,5	0,9	2,0
	Elbow	90°	Pa	0,5	1,1	1,8	4,4
	Tee		Pa	0,8	1,6	2,6	6,1
Air intake pressure drop							
Ø 80 mm	Pipe	1 m	Pa	1,0	2,0	3,2	7,5
	Elbow	90°	Pa	1,4	3,0	4,9	12,3
	Tee		Pa	2,9	6,1	9,5	22,6
Ø 110 mm	Pipe	1 m	Pa	0,2	0,4	0,7	1,6
	Elbow	90°	Pa	0,4	0,8	1,4	3,4
	Tee		Pa	0,6	1,3	2,0	4,7
Ø 130 mm	Pipe	1 m	Pa	0,1	0,2	0,3	0,7
	Elbow	90°	Pa	0,2	0,4	0,7	1,7
	Tee		Pa	0,3	0,6	0,9	2,1

Table 1.30 Data for the calculation of the air/fumes system with Ø 100 pipes

				G30	G45	G60	G100
Flue gas exhaust pressure drop							
Ø 100 mm	Pipe	1 m	Pa	0,9	1,9	3,0	7,1
	Elbow	90°	Pa	1,4	3,1	4,9	12,3
	Tee		Pa	2,8	5,7	9,0	21,2
Air intake pressure drop							
Ø 100 mm	Pipe	1 m	Pa	0,3	0,7	1,0	2,4
	Elbow	90°	Pa	0,5	1,2	2,0	4,9
	Tee		Pa	1,0	2,0	3,1	7,3

Table 1.31 Data for the calculation of the air/fumes system with coaxial pipes available as optional

				G30	G45	G60	G100
Coaxial exhaust pipe pressure drop							
Ø 80/125 mm	wall	Pa	21,2	40,3	60,8	132,4	
	roof	Pa	23,8	50,5	-	-	
Ø 130/180 mm	wall (1)	Pa	14,0	22,4	31,2	60,8	
Ø 100/150 mm	roof	Pa	9,7	21,3	35,3	90,5	
Ø 130/210 mm	roof	Pa	3,6	7,8	12,7	31,6	

(1) Can be used only with OSTF009 support bracket

1.4.2 K series gas unit heaters

Table 1.32 Data for the calculation of the air/fumes system with pipes found on the market

				K32	K45	K60	K100
Installation data							
Flue temperature	Nominal heat input	G20	°C	185,0	180,0	200,0	195,0
Fumes flow rate	Nominal heat input	G20	kg/h	59	76	110	167
CO₂ percentage in fumes	Nominal heat input	G20	%	8,7	9,5	8,6	9,5
Flue gas exhaust	residual head		Pa	50	60	160	

Table 1.33 Data for the calculation of the air/fumes system with Ø 80/110/130 pipes available as optional

				K32	K45	K60	K100
Flue gas exhaust pressure drop							
Ø 80 mm	Pipe	1 m	Pa	2,8	5,2	8,7	22,5
	Elbow	90°	Pa	3,8	7,4	12,6	34,2
	Tee		Pa	8,4	15,7	26,0	67,6
Ø 110 mm	Pipe	1 m	Pa	0,6	1,1	1,8	4,6
	Elbow	90°	Pa	1,1	2,0	3,5	9,4
	Tee		Pa	1,8	3,3	5,4	13,9
Ø 130 mm	Pipe	1 m	Pa	0,3	0,5	0,8	2,0
	Elbow	90°	Pa	0,5	1,0	1,8	4,8
	Tee		Pa	0,8	1,5	2,4	6,1
Air intake pressure drop							
Ø 80 mm	Pipe	1 m	Pa	1,1	2,0	3,3	8,6
	Elbow	90°	Pa	1,6	3,0	5,2	14,1
	Tee		Pa	3,3	6,1	10,0	25,8
Ø 110 mm	Pipe	1 m	Pa	0,2	0,4	0,7	1,8
	Elbow	90°	Pa	0,5	0,8	1,4	3,9
	Tee		Pa	0,7	1,3	2,1	5,4
Ø 130 mm	Pipe	1 m	Pa	0,1	0,2	0,3	0,8
	Elbow	90°	Pa	0,2	0,4	0,7	2,0
	Tee		Pa	0,3	0,6	0,9	2,4

Table 1.34 Data for the calculation of the air/fumes system with Ø 100 pipes

				K32	K45	K60	K100
Flue gas exhaust pressure drop							
Ø 100 mm	Pipe	1 m	Pa	0,9	1,7	2,8	7,1
	Elbow	90°	Pa	1,5	2,9	5,0	13,3
	Tee		Pa	2,8	5,1	8,4	21,3
Air intake pressure drop							
Ø 100 mm	Pipe	1 m	Pa	0,4	0,7	1,1	2,8
	Elbow	90°	Pa	0,6	1,2	2,1	5,6
	Tee		Pa	1,1	2,0	3,3	8,3

Table 1.35 Data for the calculation of the air/fumes system with coaxial pipes available as optional

				K32	K45	K60	K100
Coaxial exhaust pipe pressure drop							
Ø 80/125 mm	wall	Pa		23,0	40,1	64,7	-
	roof	Pa		26,5	-	87,6	-
Ø 130/180 mm	wall (1)	Pa		15,3	23,4	34,5	74,0
Ø 100/150 mm	roof	Pa		10,7	21,4	37,9	104,8
Ø 130/210 mm	roof	Pa		4,0	7,8	13,5	36,2

(1) Can be used only with OSTF009 support bracket

1.4.3 Next-R series gas unit heaters

Table 1.36 Data for the calculation of the air/fumes system with pipes found on the market

				R15	R20	R30	R40	R50	R60	R80
Installation data										
Flue temperature	Nominal heat input	G20	°C	210,0	200,0	218,0	195,0	196,0	180,0	220,0
Fumes flow rate	Nominal heat input	G20	kg/h	27	35	48	65	83	116	142
CO₂ percentage in fumes	Nominal heat input	G20	%	9,3	9,2	9,0	9,2		9,4	9,3
Flue gas exhaust	residual head			70			90	80	100	130

Table 1.37 Data for the calculation of the air/fumes system with Ø 80/110/130 pipes available as optional

				R15	R20	R30	R40	R50	R60	R80
Flue gas exhaust pressure drop										
Ø 80 mm	Pipe	1 m	Pa	0,7	1,0	1,9	3,2	5,0	9,2	13,4
	Elbow	90°	Pa	0,9	1,5	2,8	5,0	8,0	15,4	22,7
	Tee		Pa	2,0	3,1	5,6	9,6	15,0	27,7	40,3
Ø 110 mm	Pipe	1 m	Pa	0,1	0,2	0,4	0,7	1,1	1,9	2,8
	Elbow	90°	Pa	0,3	0,4	0,8	1,4	2,2	4,3	6,3
	Tee		Pa	0,4	0,7	1,2	2,1	3,2	5,8	8,4
Ø 130 mm	Pipe	1 m	Pa	0,1		0,2	0,3	0,5	0,9	1,2
	Elbow	90°	Pa	0,1	0,2	0,4	0,7	1,1	2,2	3,2
	Tee		Pa	0,2	0,3	0,5	0,9	1,4	2,6	3,7
Air intake pressure drop										
Ø 80 mm	Pipe	1 m	Pa	0,3	0,5	0,9	1,5	2,4	4,4	6,3
	Elbow	90°	Pa	0,4	0,7	1,2	2,2	3,6	6,9	10,2
	Tee		Pa	1,0	1,5	2,6	4,5	7,1	13,1	19,0
Ø 110 mm	Pipe	1 m	Pa	0,1		0,2	0,3	0,5	0,9	1,3
	Elbow	90°	Pa	0,1	0,2	0,3	0,6	1,0	1,9	2,8
	Tee		Pa	0,2	0,3	0,6	1,0	1,5	2,7	3,9
Ø 130 mm	Pipe	1 m	Pa	0,1				0,2	0,4	0,6
	Elbow	90°	Pa	0,1		0,2	0,3	0,5	1,0	1,4
	Tee		Pa	0,1		0,3	0,4	0,7	1,2	1,8

Table 1.38 Data for the calculation of the air/fumes system with Ø 100 pipes

				R15	R20	R30	R40	R50	R60	R80
Flue gas exhaust pressure drop										
Ø 100 mm	Pipe	1 m	Pa	0,2	0,4	0,6	1,1	1,6	3,0	4,3
	Elbow	90°	Pa	0,4	0,6	1,1	2,0	3,2	6,1	9,0
	Tee		Pa	0,7	1,1	1,9	3,2	4,9	9,0	12,9
Air intake pressure drop										
Ø 100 mm	Pipe	1 m	Pa	0,1	0,2	0,3	0,5	0,8	1,4	2,0
	Elbow	90°	Pa	0,2	0,3	0,5	0,9	1,4	2,7	4,0
	Tee		Pa	0,3	0,5	0,9	1,5	2,3	4,3	6,1

Table 1.39 Data for the calculation of the air/fumes system with coaxial pipes available as optional

				R15	R20	R30	R40	R50	R60	R80
Coaxial exhaust pipe pressure drop										
Ø 80/125 mm	wall	Pa	5,9	6,4	8,0	11,7	17,5	-		
	roof	Pa	6,2	8,1	11,0	20,4	37,0	-		
Ø 130/180 mm	wall (1)	Pa	1,2	1,4	1,6	2,0	3,0	6,4	12,0	
Ø 100/150 mm	roof	Pa	2,6	3,3	9,0	12,0	19,0	38,6	70,0	
Ø 130/210 mm	roof	Pa	0,9	1,2	3,3	4,3	6,7	13,2	23,5	

(1) Can be used only with OSTF009 support bracket

1.5 EXAMPLE OF CALCULATION

Let's assume to install a R60 in C13 type installation (Figure 1.3 p. 2). The air/fumes system will be realized with Ø 80 separate pipes in the following way:

- ▶ 7 m of Ø 80 flue gas exhaust pipe
- ▶ 1 90° Ø 80 elbow on the flue gas exhaust pipe
- ▶ 6 m of Ø 80 air pipe

It is therefore possible to proceed with the verification,

remembering that the maximum allowed pressure drop is 100 Pa (see Table 1.36 p. 8).

- ▶ Ø 80 flue gas exhaust pipe
7 m x 9,2 Pa/m = 64,4 Pa
- ▶ 90° elbow
1 x 15,4 Pa = 15,4 Pa
- ▶ Ø 80 air pipe
6 m x 4,4 Pa/m = 26,4 Pa
- Total pressure drop = 106,2 Pa

Total pressure drop of the piping system is greater than the maximum allowed pressure drop (100 Pa), therefore the installation is not allowed.

The installation can be done if one of the following steps is taken:

- ▶ Reduce the length of the air/fumes pipes.
- ▶ Increase pipe diameter, e.g. by using Ø 110. In this case the total pressure drop would be:

$$7 \text{ m} \times 1,9 \text{ Pa/m} = 13,3 \text{ Pa}$$

$$1 \times 4,3 \text{ Pa} = 4,3 \text{ Pa}$$

$$6 \text{ m} \times 0,9 \text{ Pa/m} = 5,4 \text{ Pa}$$

$$\text{Total pressure drop} = 23,0 \text{ Pa}$$

which is therefore compatible with the maximum allowed pressure drop.

1.6 INSTALLATION EXAMPLES

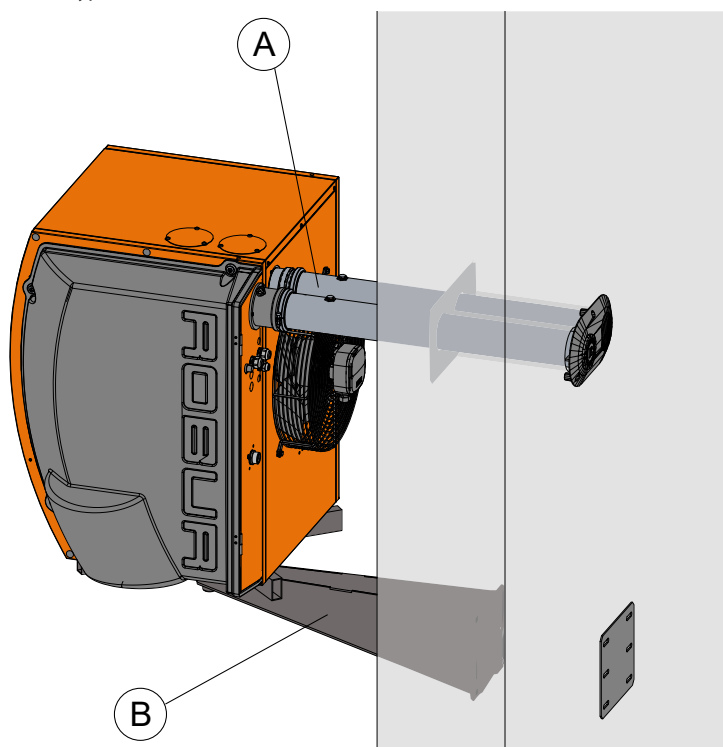


The Figures below show some examples of installation of the R30 gas unit heaters with details of the accessories needed to carry out the type of installation shown. In any case, it is necessary to verify that the total pressure drop

of the air/flue system is lower than the residual head of the flue gas exhaust (Table 1.36 p. 8), as specified in Paragraph 1.5 p. 8.

1.6.1 C13 type installation with OSRC006

Figure 1.9 C13 type installation with OSRC006



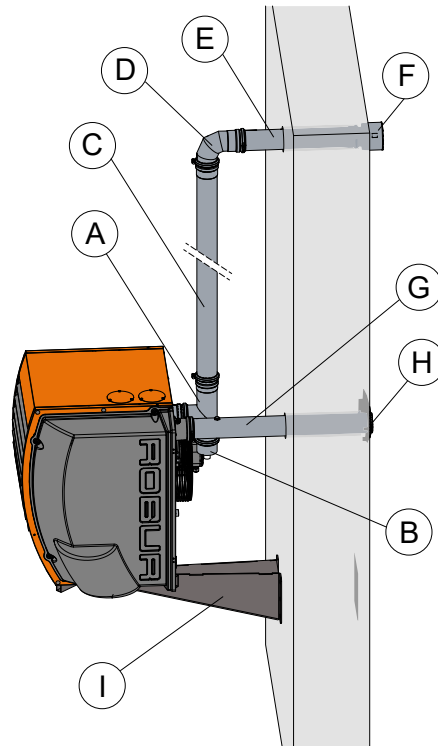
For details of the components to be used to make this type of installation please refer to Table 1.40 p. 9.

Table 1.40 Accessories required for installation type C13

	Code	Quantity	Description	Notes
A	OSCR006	1	Split pipe flue gas exhaust Ø 80 mm	For further details refer to the Section C01.03
B	See Table "Revolving wall support brackets" in Section C01.05.	1	Revolving wall support bracket	For further details refer to the Section C01.05

1.6.2 C13 type installation with separate ducts

Figure 1.10 C13 type installation



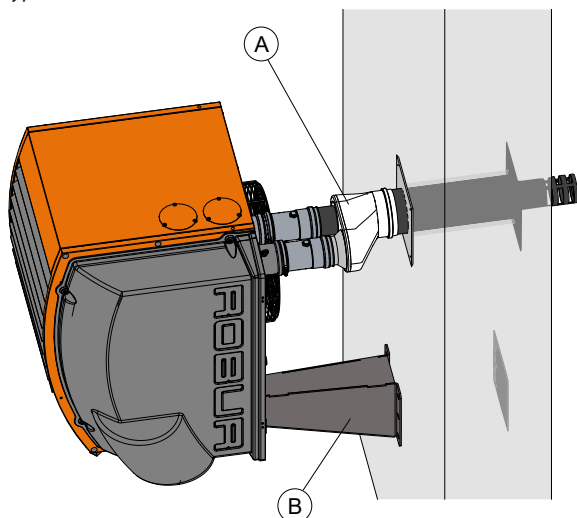
For details of the components to be used to make this type of installation please refer to Table 1.41 p. 10.

Table 1.41 Accessories required for installation type C13

	Code	Quantity	Description	Notes
A	ORCC002	1	T connector Ø 80 mm	For further details refer to the Section C01.03
B	OTPP002	1	Cap for T connector Ø 80 mm	
C	OTBO009	1 or more	Ø 80 mm pipe, length 1 m	
D	OCRV007	1	Elbow 90° Ø 80 mm	
E	OTBO008	1	Ø 80 mm pipe, length 0,5 m	
F	O12141320	1	Wall terminal Ø 80 mm	
G	OTBO020	1	Ø 80 mm pipe, length 1 m, with flue gas analysis socket	For further details refer to the Section C01.05
H	OTRM005	1	Double die-cast wall mounted terminal	
I	See Table "Revolving wall support brackets" in Section C01.05.	1	Revolving wall support bracket	

1.6.3 C13 type installation with OSRC007

Figure 1.11 C13 type installation with OSRC007



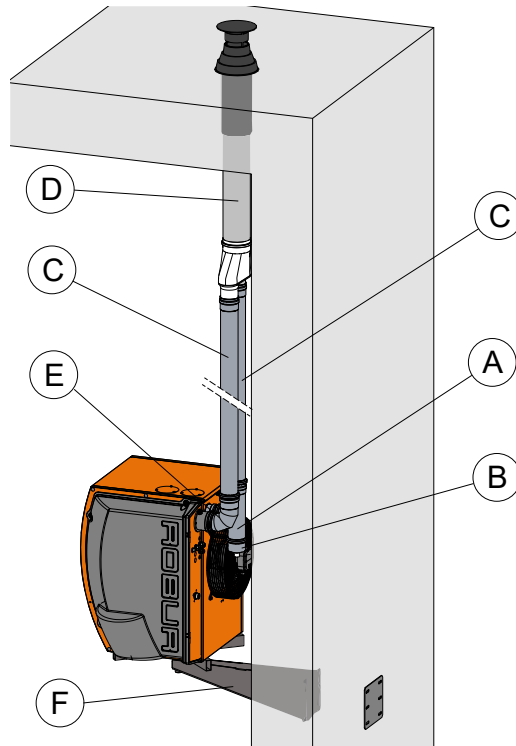
For details of the components to be used to make this type of installation please refer to Table 1.42 p. 11.

Table 1.42 Accessories required for installation type C13

	Code	Quantity	Description	Notes
A	OSCR007	1	Wall coaxial flue gas exhaust Ø 80/125 mm	For further details refer to the Section C01.03
B	See Table "Revolving wall support brackets" in Section C01.05.	1	Revolving wall support bracket	For further details refer to the Section C01.05

1.6.4 C33 type installation with OSCR008

Figure 1.12 C33 type installation with OSCR008



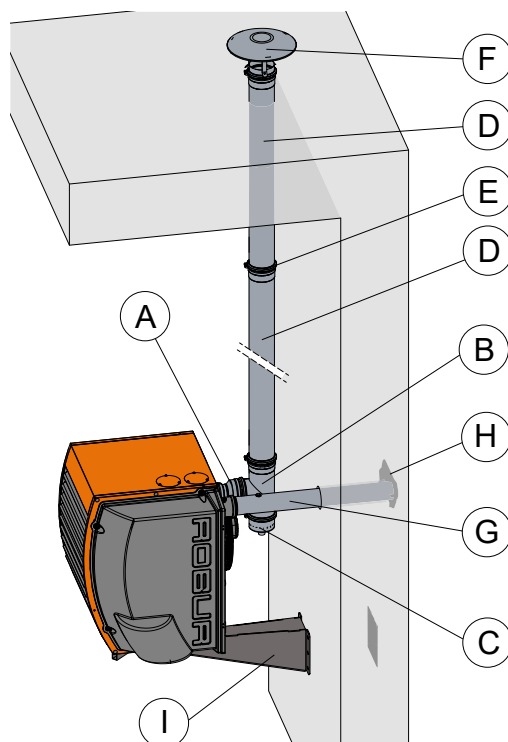
For details of the components to be used to make this type of installation please refer to Table 1.43 p. 12.

Table 1.43 Accessories required for installation type C33

	Code	Quantity	Description	Notes
A	ORCC002	1	T connector Ø 80 mm	For further details refer to the Section C01.03
B	OTPP002	1	Cap for T connector Ø 80 mm	
C	OTBO009	2 or more	Ø 80 mm pipe, length 1 m	
D	OSCR008	1	Roof coaxial flue gas exhaust Ø 80/125 mm	
E	OCRV007	1	Elbow 90° Ø 80 mm	
F	See Table "Revolving wall support brackets" in Section C01.05.	1	Revolving wall support bracket	For further details refer to the Section C01.05

1.6.5 C53 type installation

Figure 1.13 C53 type installation



For details of the components to be used to make this type of installation please refer to Table 1.44 p. 13.

Table 1.44 Accessories required for installation type C53

	Code	Quantity	Description	Notes
A	ODTT003	1	Adapter Ø 80/110 mm	For further details refer to the Section C01.03
B	ORCC000	1	T connector Ø 110 mm	
C	OTPP000	1	Cap for T connector Ø 110 mm	
D	OTBO001	2 or more	Ø 110 mm pipe, length 1 m	
E	OFSC000	as many as OTBO001 pipes	Clamp Ø 110 mm	
F	OTRM000	1	Roof terminal Ø 110 mm	
G	OTBO020	1	Ø 80 mm pipe, length 1 m, with flue gas analysis socket	
H	OTRM005	1	Double die-cast wall mounted terminal	
I	See Table "Revolving wall support brackets" in Section C01.05.	1	Revolving wall support bracket	

1.7 VERTICAL DOWNFLOW GAS UNIT HEATERS

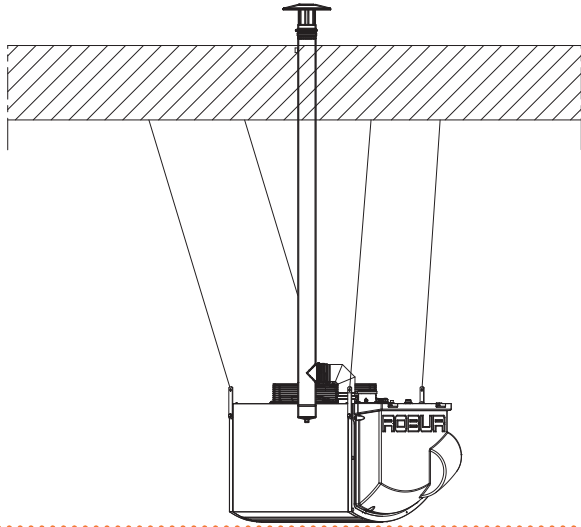


For vertical downflow gas unit heaters, at the base of the vertically mounted flue gas exhaust pipe a T-shaped piece must be fitted to collect the condensate, to prevent any condensate drops from reaching the blower (Figure 1.14 p. 14).



Pay attention to the collection and the proper conveying of the condensate drain.

Figure 1.14 Example of a vertical downflow gas unit heater installation



2 M, M C SERIES GAS UNI HEATERS

2.1 FLUE GAS EXHAUST CONNECTION

- ▶ Ø 110 mm, on the rear, at the top (see dimensional diagrams of the appliances).

2.2 COMBUSTION AIR INTAKE FITTING

- ▶ Ø 130 mm, on the rear, at the top (see dimensional diagrams of the appliances).

2.3 INSTALLATION TYPES

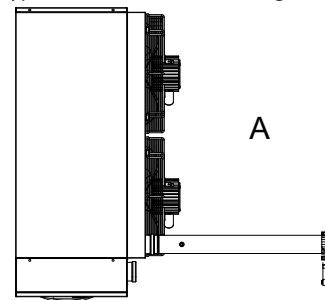
i If ducts other than those supplied by the manufacturer are used, make sure that they are suitable for the unit on which they are installed. In particular, the temperature class of the duct must be appropriate for the operating characteristics of the unit, and must also respect the chemical-physical stability of the system itself.

📝 In any case, use approved ducts according to the type of installation to be made. Upon request, Robur can supply rigid pipes, coaxial ducts and terminals, all of approved type.

Gas unit heaters of the M and M C series can be installed to one of the following ways.

2.3.1 B22 type installation with wall flue gas exhaust pipe

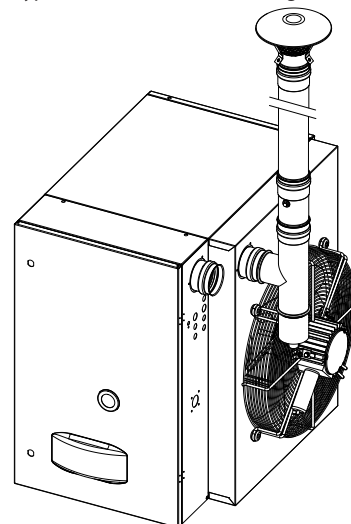
Figure 2.1 B22 type installation with wall flue gas exhaust pipe



A View from above

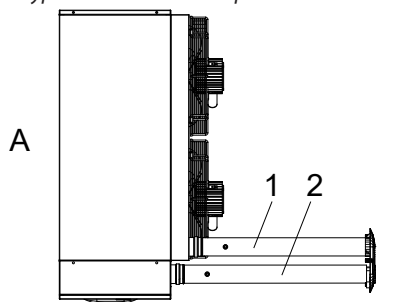
2.3.2 B22 type installation with roof flue gas exhaust pipe

Figure 2.2 B22 type installation with roof flue gas exhaust pipe



2.3.3 C12 type installation with separate ducts

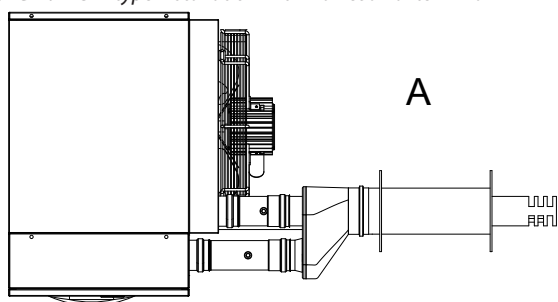
Figure 2.3 C12 type installation with separate ducts



A View from above
 1 Flue gas exhaust
 2 Combustion air inlet

2.3.4 C12 type installation with wall coaxial terminal

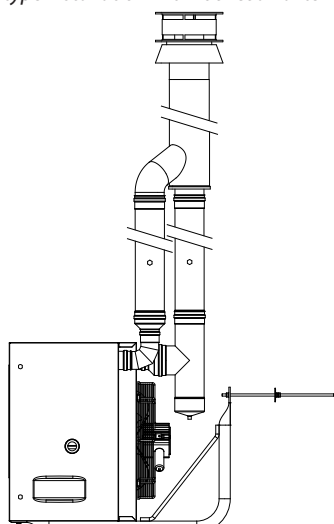
Figure 2.4 C12 type installation with wall coaxial terminal



A View from above

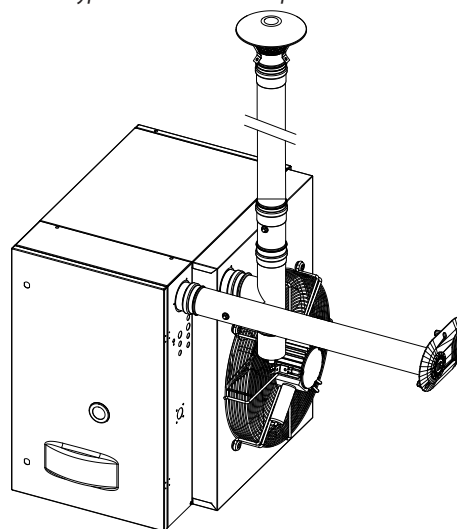
2.3.5 C32 type installation with roof coaxial terminal

Figure 2.5 C32 type installation with roof coaxial terminal



2.3.6 C62 type installation with separate ducts

Figure 2.6 C62 type installation with separate ducts



2.4 SIZING AND INSTALLING COMBUSTION AIR/EXHAUST FUMES DUCTS

In order to dimension the duct system, the total pressure drop of the system must be calculated.

The total permissible pressure drop in the pipe system depends on the model of the instrument and any diaphragm fitted (Table 2.1 p. 15).

The pressure drops of the flue and air pipes available as Robur optional are shown in Table 2.2 p. 16.

The pressure drops of the coaxial pipes available as Robur optional are shown in Table 2.2 p. 16.

Resistance from the separate terminals are negligible since they are very low.

In the design phase it is necessary to verify that the sum of the pressure drops of the pipe system used is lower than the maximum pressure drop allowed by the device (Table 2.1 p. 15). The 2.5 p. 16 Section provides an example of how to calculate the pressure drop.

Table 2.1 Permissible pressure drop depending on model and mounted diaphragm

	Air diaphragm		Fumes diaphragm		Admissible pressure drop (Pa)	
	Height (mm)	Code	Height (mm)	Code	maximum	Minimum
M20, M20 C	----	----	60	019	40	----
M25	----	----	----	----	30	12
	----	----	45	012	16	----
M30, M30 C	84	007	----	----	35	23
	84	007	55	013	25	----

	Air diaphragm		Fumes diaphragm		Admissible pressure drop (Pa)	
	Height (mm)	Code	Height (mm)	Code	maximum	Minimum
M35, M36	----	----	----	----	42	25
	----	----	40	014	24	10
	----	----	50	020	12	----
M40	----	----	----	----	30	19
	----	----	35	026	19	----
M50	----	----	----	----	27	8
	----	----	35	026	8	----
M60, M60 C	----	----	----	----	69	45
	----	----	45	012	46	22
	----	----	55	013	21	----

Table 2.2 Pressure drop for air and flue pipes and coaxial exhausts

				M20	M20 C	M25	M30	M30 C	M35	M36	M40	M50	M60	M60 C
Flue gas exhaust pressure drop														
Ø 110 mm	Pipe	1 m	Pa	0,4	0,6	0,7	1,7	1,3	1,7	2,3	3,8			
	Elbow	90°	Pa	0,7	1,3	1,4	3,7	2,8	3,7	5,1	8,6			
	Tee		Pa	1,1	1,9	2,0	5,1	4,0	5,1	6,9	11,3			
Ø 130 mm	Pipe	1 m	Pa	0,2		0,3	0,8	0,6	0,8	1,0	1,7			
	Elbow	90°	Pa	0,4	0,6	0,7	1,9	1,5	1,9	2,6	4,3			
	Tee		Pa	0,5	0,8	0,9	2,3	1,8	2,3	3,1	5,0			
Air intake pressure drop														
Ø 130 mm	Pipe	1 m	Pa	0,1		0,2	0,4	0,2	0,4	0,5	0,7			
	Elbow	90°	Pa	0,2	0,3	0,4	0,9	0,5	0,9	1,2	1,8			
	Tee		Pa	0,3	0,4	0,5	1,1	0,7	1,2	1,5	2,2			
Coaxial exhaust pipe pressure drop														
Ø 130/180 mm	wall (1)		Pa	2,0	3,7	4,4	9,3	7,4	9,3	13,2	24,9			
Ø 130/210 mm	roof		Pa	2,2	4,3	4,9	10,6	8,2	10,6	14,5	29,4			

(1) Can be used only with OSTF009 support bracket



If horizontal flue gas exhaust pipes having lengths above 1 m are installed, the flue gas exhaust pipe must be mounted with a downward slope of 2 to 3 cm each 1-m length (Figure 1.7 p. 5), to prevent condensate drops entering the unit.



In the case of installations of vertical flue pipes longer than 1.5 m, to prevent any drops of condensation entering the generator, it is necessary to provide a Tee element on the base of the vertical flue pipe to collect any condensation (Figure 2.2 p. 14).

For proper installation of the wall external terminals for the flue gas exhaust and combustion air intake, follow the details given in Figure 1.8 p. 5.

2.5 EXAMPLE OF CALCULATION

If a M35 unit equipped with a 50 mm high flue diaphragm is to be installed, the air/flue system will be realized in the following way:

- ▶ 3 metres of Ø 110 flue pipe
- ▶ 2 90° Ø 110 elbows attached to the flue pipe
- ▶ 2 metres of Ø 130 air pipe

It is then possible to proceed with the verification calculation, remembering that the maximum permissible pressure drop is 12 Pa (see Table 2.1 p. 15).

Q.ty Resistance

▶ Ø 110 flue pipe
3 m x 1,7 Pa = 5,1 Pa

▶ 90° curve
2 x 3,7 Pa = 7,4 Pa

▶ Ø 130 air pipe
2 m x 0,8 Pa = 1,6 Pa

Total pressure drop = 14,1 Pa

Total pressure drop of the piping system is greater than the maximum allowed pressure drop (12 Pa), therefore the installation is not allowed.

The installation can be done if one of the following steps is taken:

- ▶ fit a flue diaphragm 40 mm high
- ▶ use the Ø 130 flue pipe
- ▶ reduce the length in metres of the flue duct

In this case the flue diaphragm cannot be removed, as this will result in the total pressure drop of the flue system to be lower than the minimum pressure drop allowed for the unit.



If the total length of the pipe system exceeds 16 metres, it is advisable to contact the technical service Robur by telephone.