

Appendix A

Glossary of acoustical terms

Glossary

Below are explanations of terms as they are used in the PPG; they are not definitions.

Decibel (dB): a unit of level derived from the logarithm of the ratio between the value of a quantity and a reference value. It is used to describe the level of many different quantities. For sound pressure level the reference quantity is 20 Pa, the threshold of normal hearing is in the region of 0 dB, and 140 dB is the threshold of pain. A change of 1 dB is only perceptible under controlled conditions.

dB(A): decibels measured on a sound level meter incorporating a frequency weighting (A weighting) which differentiates between sounds of different frequency (pitch) in a similar way to the human ear. Measurements in dB(A) broadly agree with people's assessment of loudness. A change of 3 dB(A) is the minimum perceptible under normal conditions, and a change of 10 dB(A) corresponds roughly to halving or doubling the loudness of a sound. The background noise level in a living room may be about 30 dB(A); normal conversation about 60 dB(A) at 1 metre; heavy road traffic about 80 dB(A) at 10 metres; the level near a pneumatic drill about 100 dB(A).

Hertz (Hz): unit of frequency, equal to one cycle per second. Frequency is related to the pitch of a sound.

$L_{A10,T}$: the A weighted level of noise exceeded for 10% of the specified measurement period (T). It gives an indication of the upper limit of fluctuating noise such as that from road traffic. $L_{A10,18h}$ is the arithmetic average of the 18 hourly $L_{A10,1h}$ values from 06.00 to 24.00.

$L_{A90,T}$: the A weighted noise level exceeded for 90% of the specified measurement period (T). In BS 4142: 1990 it is used to define background noise level.

$L_{Aeq,T}$: the equivalent continuous sound level -the sound level of a notionally steady sound having the same energy as a fluctuating sound over a specified measurement period (T). $L_{Aeq,T}$ is used to describe many types of noise and can be measured directly with an integrating sound level meter. It is written as L_{eq} in connection with aircraft noise.

L_{Amax} : the highest A weighted noise level recorded during a noise event. The time weighting used (F or S) should be stated.

Additionally, the term **SPL** refers to the quantity Sound Pressure Level as discussed under **Decibel (dB)** above. This can be either a broad-band quantity including all octave-band figures or can refer to individual octave-bands for instance.

The above text is reproduced in full from PPG24

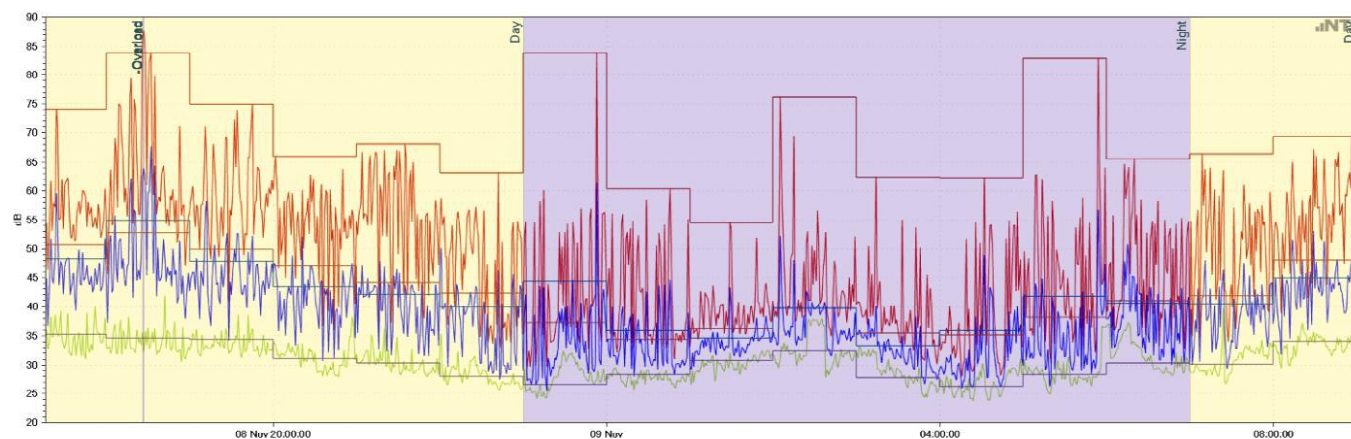
Appendix B

Noise monitoring results obtained at MP-AR

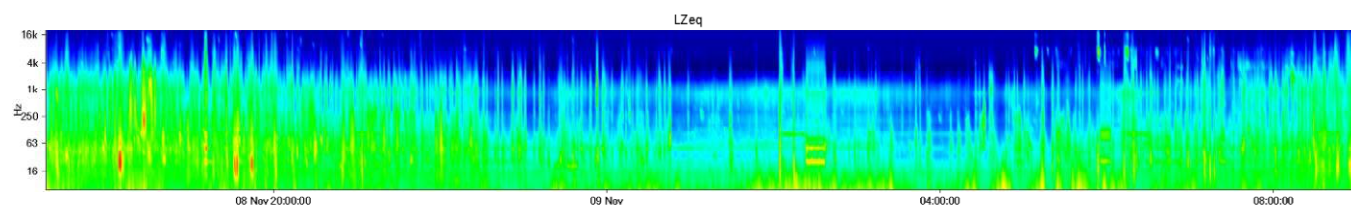
Project Report

Start: 2024-11-08 17:16:18

End: 2024-11-09 09:00:25



— LAeq_dt — LAeq_60' — LAFmax_dt — LAFmax_60' — LAFmin_dt
— LAeq_10.0%_60' — LAeq_90.0%_60'



Results

Type	Start	Duration	LAeq [dB]	LAFmax [dB]	LAeq	
					10.0% [dB]	90.0% [dB]
Recorded	2024-11-08 17:16:18	15:44:07	46.1	87.7		
-Overload (2)		00:00:02	80.9	87.7	81.7	79.8
Project Result		15:44:05	45.7	83.8	44.5	28.8

Markers

Type	Start	Duration	LAeq [dB]	LAFmax [dB]	LAeq	
					10.0% [dB]	90.0% [dB]
Day (2)		07:44:05	48.1	83.8	48.1	30.5
Day	2024-11-08 17:16:18	05:43:40	49.1	83.8	48.7	30.3
Day	2024-11-09 07:00:00	02:00:25	43.3	69.3	45.3	31.0
Night (1)		08:00:00	39.7	83.8	38.2	27.9
Night	2024-11-08 23:00:00	08:00:00	39.7	83.8	38.2	27.9
Unmarked		00:00:00	---	---	---	---

Audit Intervals

Type	Start	Duration	LAeq [dB]	LAFmax [dB]	LAeq	
					10.0% [dB]	90.0% [dB]
60'	2024-11-08 17:00:00	00:43:42	48.3	74.0	50.6	35.2
60'	2024-11-08 18:00:00	00:59:58	54.9	83.8	52.7	34.6
60'	2024-11-08 19:00:00	01:00:00	47.8	74.9	49.9	34.4
60'	2024-11-08 20:00:00	01:00:00	43.3	66.0	46.9	31.1
60'	2024-11-08 21:00:00	01:00:00	42.0	68.0	44.2	30.3
60'	2024-11-08 22:00:00	01:00:00	39.9	63.2	42.2	27.9
60'	2024-11-08 23:00:00	01:00:00	44.4	83.8	37.3	26.6
60'	2024-11-09 00:00:00	01:00:00	35.9	60.4	34.4	28.3
60'	2024-11-09 01:00:00	01:00:00	34.6	54.5	36.2	30.7
60'	2024-11-09 02:00:00	01:00:00	39.6	76.0	39.6	32.4
60'	2024-11-09 03:00:00	01:00:00	33.3	62.4	35.5	27.7
60'	2024-11-09 04:00:00	01:00:00	35.9	62.3	35.1	26.2
60'	2024-11-09 05:00:00	01:00:00	41.7	82.8	38.1	28.3
60'	2024-11-09 06:00:00	01:00:00	40.5	65.5	40.9	30.3
60'	2024-11-09 07:00:00	01:00:00	40.4	66.4	41.8	30.1
60'	2024-11-09 08:00:00	01:00:00	45.0	69.3	48.0	34.1
60'	2024-11-09 09:00:00	00:00:25	44.7	58.1	47.9	35.5

Project Name:
Device Info:
Mic Type:
Mic Sensitivity:
Range:

2024-11-08 SLM_001 - MP-AR - 15m
XL2, SNo. A2A-09159-E0, FW4.71 Type Approved
NTI Audio M2230, SNo. 8321, User calibrated 2024-11-08 17:07, WP30(h)
42.3 mV/Pa
0 - 100 dB

Results

Type	Start	Duration	L _{Aeq} [dB]	L _A F _{max} [dB]	L _{Aeq}	
					10.0%	90.0%
					[dB]	[dB]
Recorded	2024-11-08 17:16:18	15:44:07	46.1	87.7		
-Overload (2)		0:00:02	80.9	87.7	81.7	79.8
Project Result		15:44:05	45.7	83.8	44.5	28.8

Markers

Type	Start	Duration	L _{Aeq} [dB]	L _A F _{max} [dB]	L _{Aeq}	
					10.0%	90.0%
					[dB]	[dB]
Day (2)		7:44:05	48.1	83.8	48.1	30.5
Day	2024-11-08 17:16:18	5:43:40	49.1	83.8	48.7	30.3
Day	2024-11-09 07:00:00	2:00:25	43.3	69.3	45.3	31.0
Night (1)		8:00:00	39.7	83.8	38.2	27.9
Night	2024-11-08 23:00:00	8:00:00	39.7	83.8	38.2	27.9
Unmarked		0:00:00				

Audit Intervals

Type	Start	Duration	L _{Aeq} [dB]	L _A F _{max} [dB]	L _{Aeq}											
					10.0%	90.0%										
					[dB]	[dB]										
15'	2024-11-08 23:00:00	0:15:00	37.3	60.2	35.3	26.0	26	1								
15'	2024-11-08 23:15:00	0:15:00	34.8	52.9	37.1	26.3	26	1								
15'	2024-11-08 23:30:00	0:15:00	37.3	56.9	37.5	30.3	30			1						
15'	2024-11-08 23:45:00	0:15:00	49.8	83.8	39.4	28.1	28				1					
15'	2024-11-09 00:00:00	0:15:00	35.1	56.1	34.4	28.4	28				1					
15'	2024-11-09 00:15:00	0:15:00	36.0	58.5	37.0	28.1	28				1					
15'	2024-11-09 00:30:00	0:15:00	37.1	54.8	35.1	28.7	29					1				
15'	2024-11-09 00:45:00	0:15:00	35.2	60.4	31.9	28.1	28						1			
15'	2024-11-09 01:00:00	0:15:00	32.8	42.5	35.1	29.5	30							1		
15'	2024-11-09 01:15:00	0:15:00	36.1	54.5	36.5	31.0	31								1	
15'	2024-11-09 01:30:00	0:15:00	33.0	40.7	34.7	30.7	31							1		
15'	2024-11-09 01:45:00	0:15:00	35.6	51.9	37.4	32.9	33								1	
15'	2024-11-09 02:00:00	0:15:00	43.0	76.0	38.7	32.9	33									1
15'	2024-11-09 02:15:00	0:15:00	38.4	53.0	40.0	32.9	33									1
15'	2024-11-09 02:30:00	0:15:00	38.2	56.6	40.2	31.0	31								1	
15'	2024-11-09 02:45:00	0:15:00	35.5	52.1	37.1	33.0	33									1
15'	2024-11-09 03:00:00	0:15:00	35.9	62.4	36.8	33.1	33									1
15'	2024-11-09 03:15:00	0:15:00	32.7	44.4	34.8	30.0	30									1
15'	2024-11-09 03:30:00	0:15:00	32.6	55.0	33.5	28.4	28					1				
15'	2024-11-09 03:45:00	0:15:00	30.4	50.1	31.4	26.2	26								1	
15'	2024-11-09 04:00:00	0:15:00	29.5	40.0	31.6	26.8	27			1						
15'	2024-11-09 04:15:00	0:15:00	31.8	54.5	32.5	25.7	26									
15'	2024-11-09 04:30:00	0:15:00	39.7	62.3	40.5	25.8	26									
15'	2024-11-09 04:45:00	0:15:00	35.6	56.4	37.0	28.6	29									
15'	2024-11-09 05:00:00	0:15:00	38.8	62.8	37.1	29.7	30					1				
15'	2024-11-09 05:15:00	0:15:00	35.7	58.3	37.9	26.6	27			1						
15'	2024-11-09 05:30:00	0:15:00	35.5	58.9	36.6	28.3	28									
15'	2024-11-09 05:45:00	0:15:00	46.4	82.8	39.2	28.6	29									
15'	2024-11-09 06:00:00	0:15:00	42.4	64.7	40.6	32.8	33									1
15'	2024-11-09 06:15:00	0:15:00	41.9	65.5	44.2	32.1	32								1	
15'	2024-11-09 06:30:00	0:15:00	37.7	58.2	39.5	29.9	30									
15'	2024-11-09 06:45:00	0:15:00	37.6	55.3	39.5	29.8	30								1	

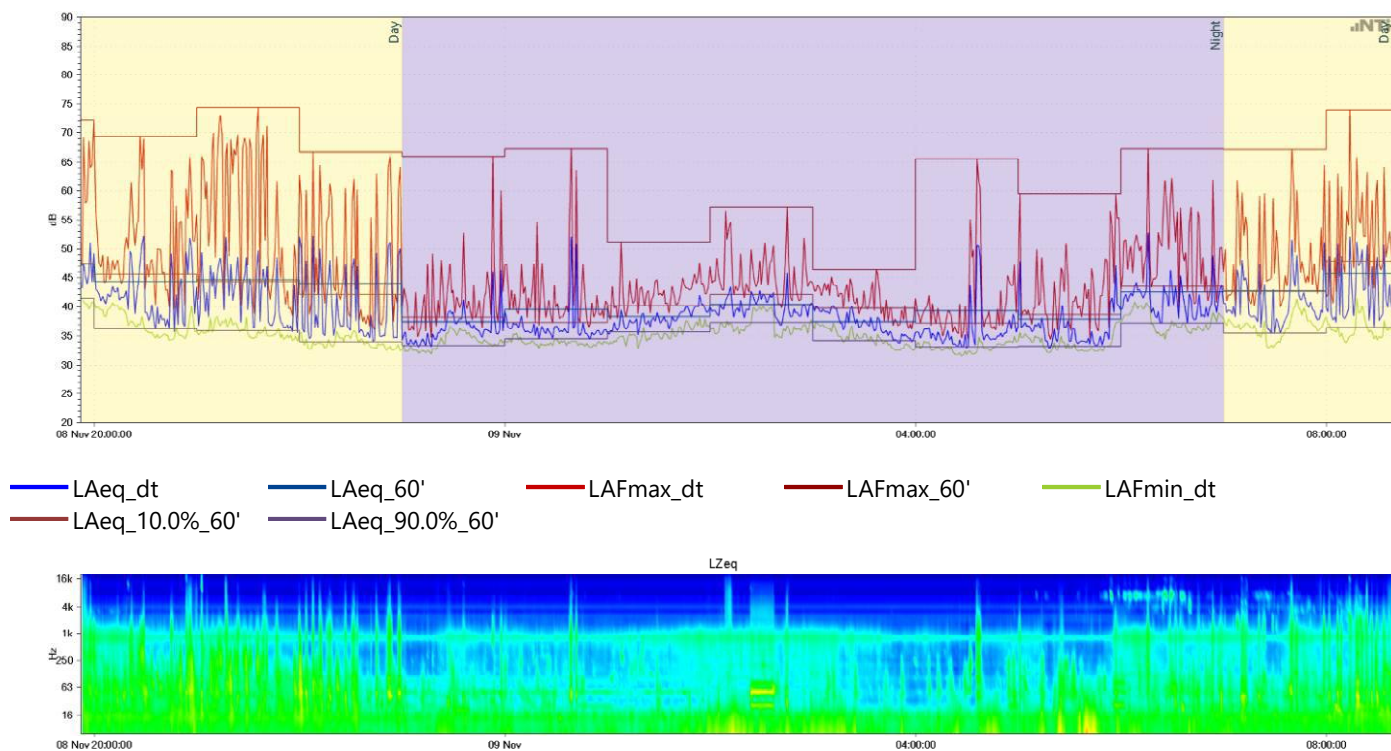
Appendix C

Noise monitoring results obtained at MP-AC

Project Report

Start: 2024-11-08 19:52:42

End: 2024-11-09 08:38:18



Results

Type	Start	Duration	LAeq [dB]	LAFmax [dB]	LAeq	
					10.0% [dB]	90.0% [dB]
Recorded	2024-11-08 19:52:42	12:45:36	41.9	74.3		
Project Result		12:45:36	41.9	74.3	42.1	34.2

Markers

Type	Start	Duration	LAeq [dB]	LAFmax [dB]	LAeq	
					10.0% [dB]	90.0% [dB]
Day (2)		04:45:36	44.3	74.3	44.6	35.1
Day	2024-11-08 19:52:42	03:07:18	44.5	74.3	44.8	34.8
Day	2024-11-09 07:00:00	01:38:18	44.0	73.9	44.3	36.0
Night (1)		08:00:00	39.4	67.2	40.8	33.9
Night	2024-11-08 23:00:00	08:00:00	39.4	67.2	40.8	33.9
Unmarked		00:00:00	---	---	---	---

Audit Intervals

Type	Start	Duration	LAeq [dB]	LAFmax [dB]	LAeq	
					10.0% [dB]	90.0% [dB]
60'	2024-11-08 19:00:00	00:07:18	47.3	72.1	47.4	41.4
60'	2024-11-08 20:00:00	01:00:00	44.3	69.3	45.5	36.2
60'	2024-11-08 21:00:00	01:00:00	44.6	74.3	44.3	35.9
60'	2024-11-08 22:00:00	01:00:00	43.9	66.7	42.0	34.0
60'	2024-11-08 23:00:00	01:00:00	37.4	65.9	38.1	33.3
60'	2024-11-09 00:00:00	01:00:00	39.4	67.2	37.3	34.5
60'	2024-11-09 01:00:00	01:00:00	38.2	51.1	40.1	35.7
60'	2024-11-09 02:00:00	01:00:00	40.3	57.2	42.0	37.3
60'	2024-11-09 03:00:00	01:00:00	37.4	46.3	39.7	34.2
60'	2024-11-09 04:00:00	01:00:00	39.2	65.5	37.2	33.1
60'	2024-11-09 05:00:00	01:00:00	37.8	59.5	38.6	33.2
60'	2024-11-09 06:00:00	01:00:00	42.4	67.2	43.4	37.2
60'	2024-11-09 07:00:00	01:00:00	42.6	67.1	42.6	35.5
60'	2024-11-09 08:00:00	00:38:18	45.6	73.9	47.8	36.4

Project Name:

2024-11-08_SLM_001 - 15m

Device Info:

XL2, SNo. A2A-11063-E0, FW4.71, Type Approved

Mic Type:

NTI Audio M2230, SNo. 5819, User calibrated 2024-11-08 19:28, WP30(h)

Mic Sensitivity:

36.5 mV/Pa

Range:

0 - 100 dB

Results

Type	Start	Duration	LAeq [dB]	LAfmax [dB]	LAeq	
					10.0%	90.0%
			[dB]	[dB]	[dB]	[dB]
Recorded	2024-11-08 19:52:42	12:45:36	41.9	74.3	42.1	34.2
Project Result		12:45:36	41.9	74.3		

Markers

Type	Start	Duration	LAeq [dB]	LAfmax [dB]	LAeq	
					10.0%	90.0%
			[dB]	[dB]	[dB]	[dB]
Day (2)		4:45:36	44.3	74.3	44.6	35.1
Day	2024-11-08 19:52:42	3:07:18	44.5	74.3	44.8	34.8
Day	2024-11-09 07:00:00	1:38:18	44.0	73.9	44.3	36.0
Night (1)		8:00:00	39.4	67.2	40.8	33.9
Night	2024-11-08 23:00:00	8:00:00	39.4	67.2	40.8	33.9
Unmarked		0:00:00				

Audit Intervals

Type	Start	Duration	LAeq [dB]	LAfmax [dB]	LAeq	
					10.0%	90.0%
			[dB]	[dB]	[dB]	[dB]
15'	2024-11-08 23:00:00	0:15:00	34.2	47.4	35.2	33.0
15'	2024-11-08 23:15:00	0:15:00	36.6	49.1	38.9	33.4
15'	2024-11-08 23:30:00	0:15:00	37.5	52.7	38.3	35.8
15'	2024-11-08 23:45:00	0:15:00	39.6	65.9	37.7	34.6
15'	2024-11-09 00:00:00	0:15:00	36.7	47.4	37.7	34.9
15'	2024-11-09 00:15:00	0:15:00	35.9	54.6	37.1	34.3
15'	2024-11-09 00:30:00	0:15:00	43.5	67.2	37.5	34.7
15'	2024-11-09 00:45:00	0:15:00	35.6	47.3	36.7	34.3
15'	2024-11-09 01:00:00	0:15:00	36.9	51.1	38.0	35.1
15'	2024-11-09 01:15:00	0:15:00	37.6	44.8	39.4	35.6
15'	2024-11-09 01:30:00	0:15:00	38.0	44.9	39.3	36.2
15'	2024-11-09 01:45:00	0:15:00	39.8	47.6	41.2	37.9
15'	2024-11-09 02:00:00	0:15:00	40.2	56.5	41.9	37.6
15'	2024-11-09 02:15:00	0:15:00	40.6	49.8	42.2	37.9
15'	2024-11-09 02:30:00	0:15:00	40.9	57.2	42.6	36.6
15'	2024-11-09 02:45:00	0:15:00	39.3	51.9	40.9	37.4
15'	2024-11-09 03:00:00	0:15:00	39.3	45.1	40.7	37.9
15'	2024-11-09 03:15:00	0:15:00	37.7	44.8	39.6	35.7
15'	2024-11-09 03:30:00	0:15:00	36.6	46.3	38.2	34.9
15'	2024-11-09 03:45:00	0:15:00	34.7	41.4	35.7	33.5
15'	2024-11-09 04:00:00	0:15:00	35.4	41.9	36.7	33.9
15'	2024-11-09 04:15:00	0:15:00	34.1	40.4	35.4	32.6
15'	2024-11-09 04:30:00	0:15:00	43.7	65.5	43.2	33.0
15'	2024-11-09 04:45:00	0:15:00	36.1	47.2	38.0	34.4
15'	2024-11-09 05:00:00	0:15:00	39.2	59.5	38.0	35.4
15'	2024-11-09 05:15:00	0:15:00	36.1	50.8	38.1	33.0
15'	2024-11-09 05:30:00	0:15:00	34.5	46.5	36.1	33.2
15'	2024-11-09 05:45:00	0:15:00	39.6	59.4	39.8	33.2
15'	2024-11-09 06:00:00	0:15:00	42.2	52.4	43.9	39.9
15'	2024-11-09 06:15:00	0:15:00	44.1	67.2	43.9	36.5
15'	2024-11-09 06:30:00	0:15:00	40.9	57.1	43.0	37.1
15'	2024-11-09 06:45:00	0:15:00	41.9	61.9	42.4	37.6

Appendix D

Laundry ventilation system

TRANSMITTAL FORM

TO: **Jenner Construction**

PROJECT: **1873 Gravesend**

FOR THE ATTENTION OF: **Steve Restall**

SUBMITTAL NO: **1873 -HCL-ZZ-XX-TS-M-0116**

DATE: **05/08/24**

REV: P01

Please find enclosed the following:

Drawings ☐ Samples ☐ Specifications ☒ Technical submittal ☒

Change Order ☐ Other ☐

Please find attached for your comments/approval manufacturers Information and technical data associated with the:

Kitchen Ventilation Equipment

- ☒ FOR APPROVAL
- ☐ FOR MANUFACTURE/CONSTRUCTION
- ☐ RESUBMIT COPIES FOR APPROVAL

- ☒ AS REQUESTED
- ☐ RETURNED FOR CORRECTIONS
- ☐ APPROVED AS NOTED

- ☒ FOR YOUR COMMENTS
- ☐ FOR YOUR INFORMATION
- ☐ SUBMIT COPIES FOR DISTRIBUTION

PREPARED BY:

Adam Hill

FOR HARNISS CONTRACTING LTD

Please acknowledge safe receipt of the above-mentioned transmittal(s) with your comments/approval by signing below:

Acknowledgement required no later than: **19/08/24**

REMARKS

.....

.....

.....

.....

SIGNED BY:
(CLIENT)

DATE:

Prio Circular Duct Fans

Quiet and compact mixed-flow fan

- Available with AC and EC motors for 50 and 60Hz
- Easy to install
- Sound and energy optimized impellers

[Find more details in our online catalogue](#)



Flexibility

The prio fans are intended to use for **supply** or **extract** air, designed to be installed in **any position**. This ensures that the fans can be used in a variety of **commercial** and **domestic** applications.

Reliability

The unit's **airtight casing** and corrosion resistance allows to use indoors and in damp areas. The combination of a **reliable** casing and motor construction ensures to minimize the need for maintenance of the fans and allows **long continuous operation**.

Performance

The **sound optimized** impellers together with **high efficient** external rotor motors are designed to ensure high-level performance to **minimize power consumption** and **maximize efficiency**.

Accessories

Prio fan can be selected together with variety types of **accessories** as fast clamps, heaters, filters, dampers, etc.

Certifications



Green Ventilation



Ecodesign (ErP) compliant

Features

Construction

Casing made out of special composite material or sheet metal, is fully airtight class C according to EN12237. The Fans are equipped with an external **terminal box with** protection class **IP44**.

Impeller

Prio fans have aerodynamically optimized impellers and guide vanes. These are from lightweight, hard-wearing fiberglass reinforced **polyamide**, dynamically **balanced** and paired with corresponding external rotor motors.

Motor

Depending on the type, prio fans are equipped with **AC** or **EC** external rotor motor. Motors are suitable for **50Hz** and **60Hz**.

Motor protection

Fans with **AC** motors have an **integrated** thermal protection with manual (electrical) reset.

Fans with **EC** motors have an **integrated** electronic **thermal protection** including **locked-rotor protection** and **soft-start**.

Control

EC motors with **built-in potentiometer** to adjust working point can be also controlled by external **signal 0-10V**.

AC motors can be controlled by **5-step** or **stepless** speed regulator.

Installation

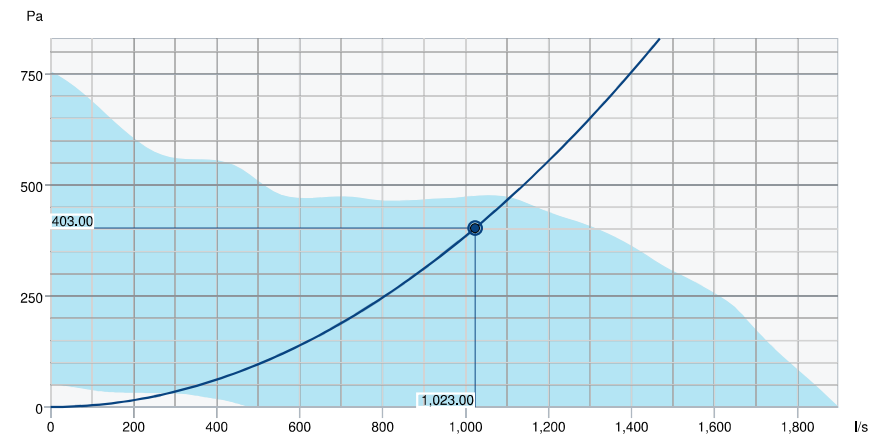
Prio fans can be installed in any position **indoor** and in **damp areas**. Spigot with 25 mm length is perfectly designed to connect circular duct by **fast clamps preventing vibration** to the duct.

Technical parameters

Nominal data		
Voltage (nominal)	400	V
Frequency	50; 60	Hz
Phases	3~	
Input power	1,168	W
Input power kW	1.168	kW
Input current	1.8	A
Impeller speed	2,038	rpm
Air flow	max 1.897	m³/s
Temperature of transported air	max 55	°C
Max temperature of transported air, when speed controlled	55	°C
Sound data		
Sound pressure level at 3m (20m² Sabin)	59	dB(A)
Protection/Classification		
Enclosure class, motor	IP44	
Insulation class	F	
Data according to ErP		
ErP ready	ErP 2018	
Dimensions and weights		
Duct dimension; Circular, inlet	400	mm
Duct dimension; Circular, outlet	400	mm
Weight	13.26	kg
Others		
Duct connection type	Circular	
Motor type	EC	

Performance

Performance curve



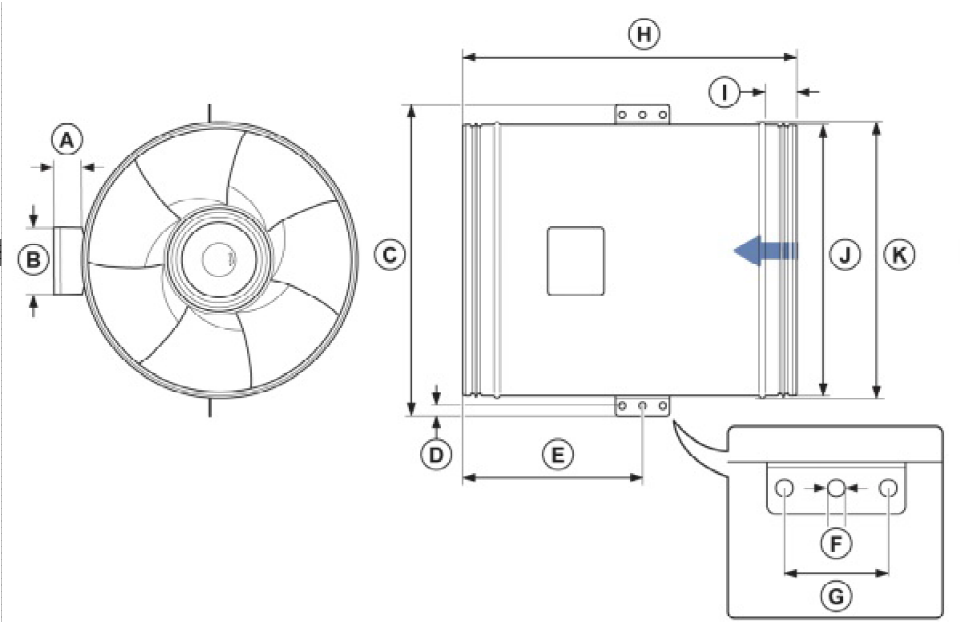
Hydraulic data	
Required air flow	1,023.00 l/s
Required static pressure	403 Pa
Working air flow	1,023.00 l/s
Working static pressure	403 Pa
Air density	1.204 kg/m³
Power	738.3 W
Fan control - RPM	1,949 rpm
Current	1.16 A
SFP	0.722 kW/m³/s
Control voltage	9.1 V
Supply voltage	400 V

Sound power level		63	125	250	500	1k	2k	4k	8k	Total
Inlet	dB(A)	55	67	70	76	78	75	69	60	82
Outlet	dB(A)	56	62	74	77	78	75	69	60	83
Surrounding	dB(A)	27	39	54	61	59	56	52	37	65
Sound pressure level at 3m (20m² Sabine)	dB(A)	-	-	-	-	-	-	-	-	58
Sound pressure level at 3m free field	dB(A)	-	-	-	-	-	-	-	-	44

Ecodesign

Product		
Trade name	Systemair	
Product name	prio 400 EC 3~	
Ecodesign 327		
Manufacturer	Systemair Sweden AB, Industrivägen 3, Skinnskatteberg, Sweden	
Type	prio 400 EC 3~	
Year of manufacture	See name plate of the fan	
Air flow qv	1.1383	m³/s
Efficiency category	total	
Efficiency grade N	75.1	
Efficiency grade target N	58	
Speed (rpm) n	5,028	rpm
Pressure increase total psf	511	Pa
Power consumption Ped	880	W
Overall efficiency	68.4	%
Overall efficiency target	51.3	%
Variable speed drive	Yes	
Additional components	Components used to calculate the energy efficiency that are not apparent from the measurement category are detailed in the CE declaration.	
Maintenance	Information on installation, operation and mainenance is provided in the operating instructions.	
Recycling / disposal	Information on recycling and disposal is provided in the operating instructions.	

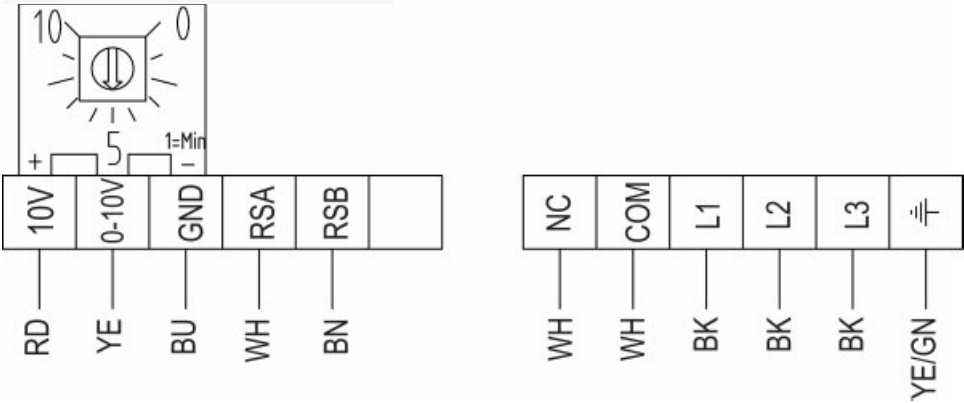
Dimension



A	B	ØC	D	E	ØF	G	H	I	ØJ	ØK
45	100	459	15	266	10	60	493	45	399	407

Wiring

RD	Red
YE	Yellow
BU	Blue
WH	White
GN	Green
BN	Brown
BK	Black



Accessories

- CXE/AVC Modbus (37256)
- EC-Basic-CO2 and temperature (24808)
- EC-Basic-T temperature (24805)
- EC-Selector (9908)
- EC-Vent Room Unit (3018)
- MTV-1/010 Controller 0..10V+ (30650)
- REV-5POL/05-7,5kW R/Y (33979)
- Step switch S-5EC, 0-10V (76738)
- VKK-400 Back draft damper (1629)
- Presence detector/IR24-P (6995)
- CB 400-12,0 400V/3 Duct heater (5393)
- CB 400-9,0 400V/3 Duct heater (5392)
- CBMF 400-9,0 400V/3 Duct heater (12511)
- FFR 400 Filter cassette (1783)
- FK 400 Fast clamp (1615)
- RSK-400 Back draft dmp. (9973)
- VBC 400-3 Water heating batt (9845)
- BMS Trickle & Boost Switch (120363)
- DMD-C Pressure controller (15793)
- EC-Basic-H humidity (24807)
- EC-Basic-U universal 0-10V (24806)
- EC-Vent control board (3115)
- MTP 10, 10K, Speed control (32731)
- Potentiometer MTP 20, 0-10V (310220)
- SG 400 Protection guard (5613)
- Step switch S-5EC-2, 0-10V (449084)
- HR1 Room Humidistat (215150)
- RT 0-30 Room Thermostat (5151)
- CB 400-6,0 400V/2 Duct heater (5391)
- CBM 400-9,0 400V/3 Duct heater (5487)
- CWK 400-3-2,5 Duct cooler,circ (30026)
- FGR 400 Filter cassette (1823)
- LDC 400-900 Silencer (5198)
- VBC 400-2 Water heating batt (5462)
- VBF 400 Water heating battery (1736)
- VK-40 Louvre shutter (5643)

Documents

- INSTALLATION__OPERATION_AND_MAINTENANCE_INSTRUCTION_K__KV__PRIO__EN_010.PDF
- MODBUS LITE V5.01 parameter specification.pdf
- COMMISSIONING_RECORD_FANS__EN.PDF

Prio Circular Duct Fans

Quiet and compact mixed-flow fan

- Available with AC and EC motors for 50 and 60Hz
- Easy to install
- Sound and energy optimized impellers

[Find more details in our online catalogue](#)



Flexibility

The prio fans are intended to use for **supply** or **extract** air, designed to be installed in **any position**. This ensures that the fans can be used in a variety of **commercial** and **domestic** applications.

Reliability

The unit's **airtight casing** and corrosion resistance allows to use indoors and in damp areas. The combination of a **reliable** casing and motor construction ensures to minimize the need for maintenance of the fans and allows **long continuous operation**.

Performance

The **sound optimized** impellers together with **high efficient** external rotor motors are designed to ensure high-level performance to **minimize power consumption** and **maximize efficiency**.

Accessories

Prio fan can be selected together with variety types of **accessories** as fast clamps, heaters, filters, dampers, etc.

Certifications



Green Ventilation



Ecodesign (ErP) compliant

Features

Construction

Casing made out of special composite material or sheet metal, is fully airtight class C according to EN12237. The Fans are equipped with an external **terminal box with** protection class **IP44**.

Impeller

Prio fans have aerodynamically optimized impellers and guide vanes. These are from lightweight, hard-wearing fiberglass reinforced **polyamide**, dynamically **balanced** and paired with corresponding external rotor motors.

Motor

Depending on the type, prio fans are equipped with **AC** or **EC** external rotor motor. Motors are suitable for **50Hz** and **60Hz**.

Motor protection

Fans with **AC** motors have an **integrated** thermal protection with manual (electrical) reset.

Fans with **EC** motors have an **integrated** electronic **thermal protection** including **locked-rotor protection** and **soft-start**.

Control

EC motors with **built-in potentiometer** to adjust working point can be also controlled by external **signal 0-10V**.

AC motors can be controlled by **5-step** or **stepless** speed regulator.

Installation

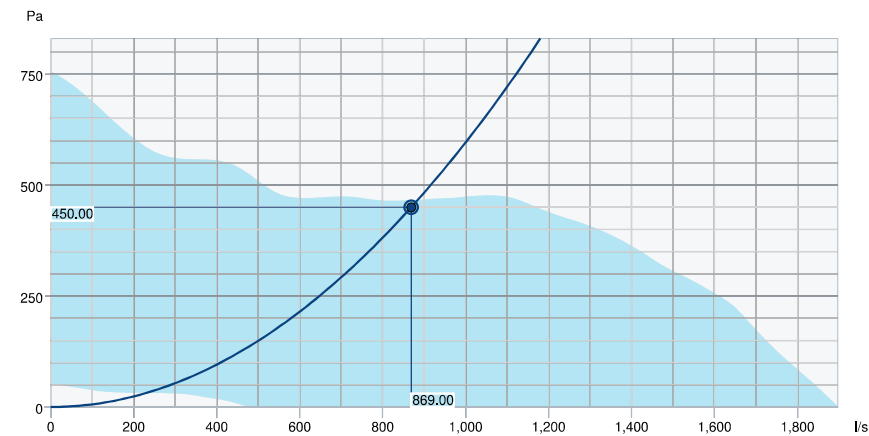
Prio fans can be installed in any position **indoor** and in **damp areas**. Spigot with 25 mm length is perfectly designed to connect circular duct by **fast clamps preventing vibration** to the duct.

Technical parameters

Nominal data		
Voltage (nominal)	400	V
Frequency	50; 60	Hz
Phases	3~	
Input power	1,168	W
Input power kW	1.168	kW
Input current	1.8	A
Impeller speed	2,038	rpm
Air flow	max 1.897	m³/s
Temperature of transported air	max 55	°C
Max temperature of transported air, when speed controlled	55	°C
Sound data		
Sound pressure level at 3m (20m² Sabin)	59	dB(A)
Protection/Classification		
Enclosure class, motor	IP44	
Insulation class	F	
Data according to ErP		
ErP ready	ErP 2018	
Dimensions and weights		
Duct dimension; Circular, inlet	400	mm
Duct dimension; Circular, outlet	400	mm
Weight	13.26	kg
Others		
Duct connection type	Circular	
Motor type	EC	

Performance

Performance curve



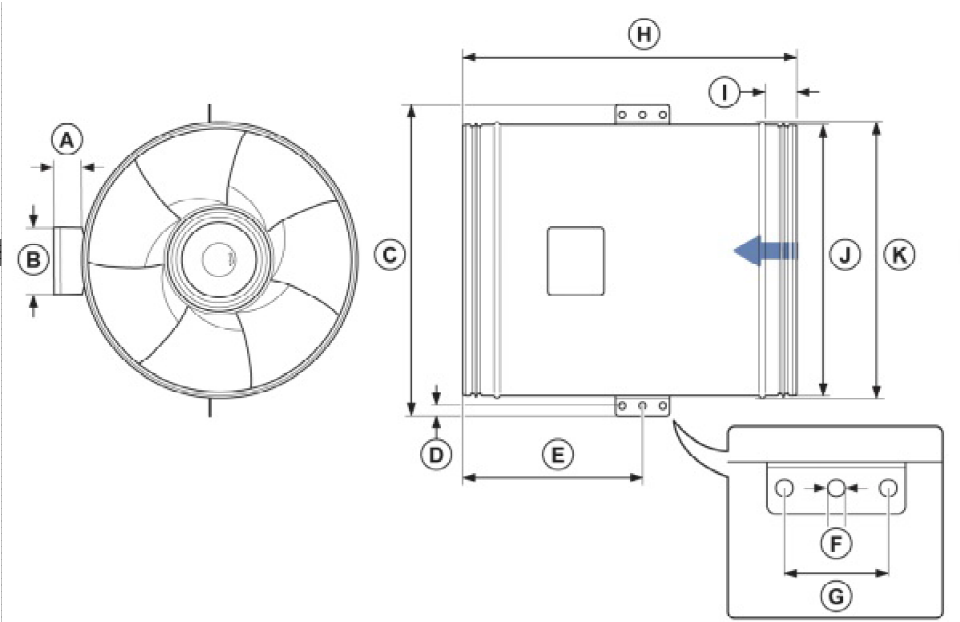
Hydraulic data	
Required air flow	869.00 l/s
Required static pressure	450 Pa
Working air flow	869.00 l/s
Working static pressure	450 Pa
Air density	1.204 kg/m³
Power	782.0 W
Fan control - RPM	2,055 rpm
Current	1.22 A
SFP	0.900 kW/m³/s
Control voltage	9.8 V
Supply voltage	400 V

Sound power level		63	125	250	500	1k	2k	4k	8k	Total
Inlet	dB(A)	56	68	71	77	79	77	70	62	83
Outlet	dB(A)	58	64	75	79	80	76	71	62	84
Surrounding	dB(A)	29	39	56	62	60	58	54	39	66
Sound pressure level at 3m (20m² Sabine)	dB(A)	-	-	-	-	-	-	-	-	59
Sound pressure level at 3m free field	dB(A)	-	-	-	-	-	-	-	-	45

Ecodesign

Product		
Trade name	Systemair	
Product name	prio 400 EC 3~	
Ecodesign 327		
Manufacturer	Systemair Sweden AB, Industrivägen 3, Skinnskatteberg, Sweden	
Type	prio 400 EC 3~	
Year of manufacture	See name plate of the fan	
Air flow qv	1.1383	m³/s
Efficiency category	total	
Efficiency grade N	75.1	
Efficiency grade target N	58	
Speed (rpm) n	5,028	rpm
Pressure increase total psf	511	Pa
Power consumption Ped	880	W
Overall efficiency	68.4	%
Overall efficiency target	51.3	%
Variable speed drive	Yes	
Additional components	Components used to calculate the energy efficiency that are not apparent from the measurement category are detailed in the CE declaration.	
Maintenance	Information on installation, operation and mainenance is provided in the operating instructions.	
Recycling / disposal	Information on recycling and disposal is provided in the operating instructions.	

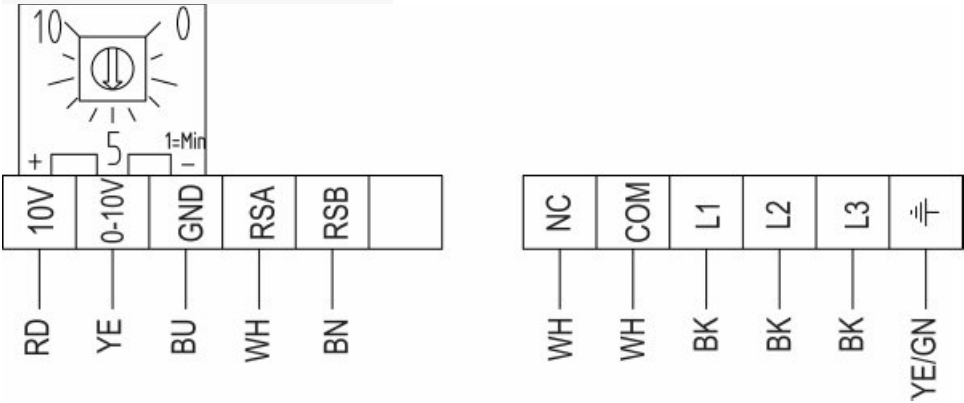
Dimension



A	B	ØC	D	E	ØF	G	H	I	ØJ	ØK
45	100	459	15	266	10	60	493	45	399	407

Wiring

RD	Red
YE	Yellow
BU	Blue
WH	White
GN	Green
BN	Brown
BK	Black



Accessories

- CXE/AVC Modbus (37256)
- EC-Basic-CO2 and temperature (24808)
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- MTV-1/010 Controller 0..10V+ (30650)
- REV-5POL/05-7,5kW R/Y (33979)
- Step switch S-5EC, 0-10V (76738)
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Documents

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- MODBUS LITE V5.01 parameter specification.pdf
- COMMISSIONING_RECORD_FANS__EN.PDF

S-5EC Output selectors

[Find more details in our online catalogue](#)



Step switch S-5EC-2, 0-10V

10VDC, IP54, 5 steps

5-step switch (10V/0-10V) with on/off function for surface mounting

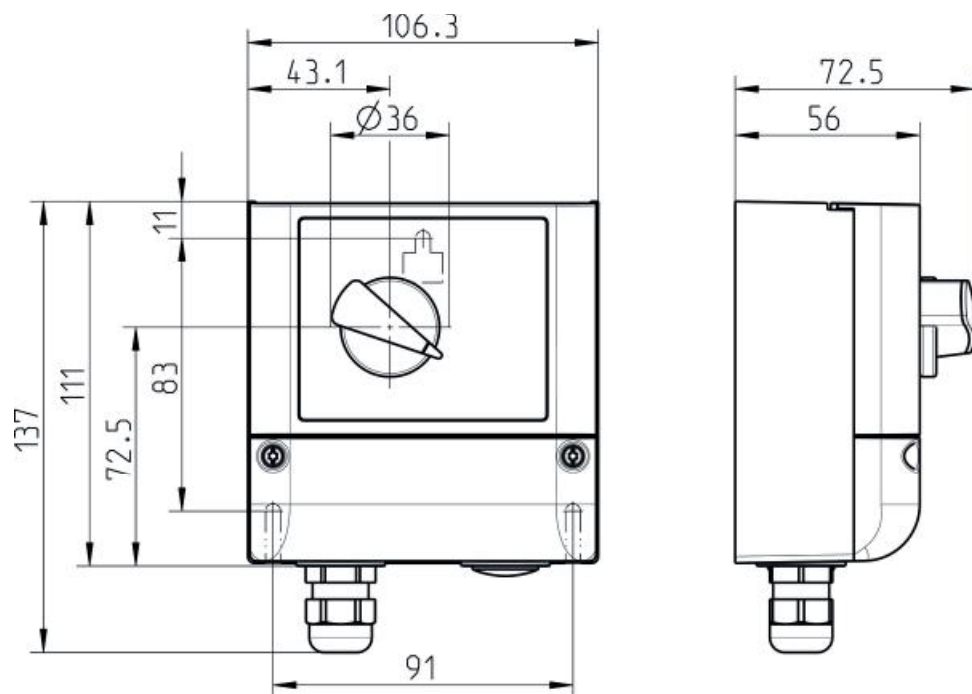
For direct control of EC fans or frequency converters via a 0-10V control input (DC). Including LED for status indication and an additional potentiometer for offset adjustment.

...

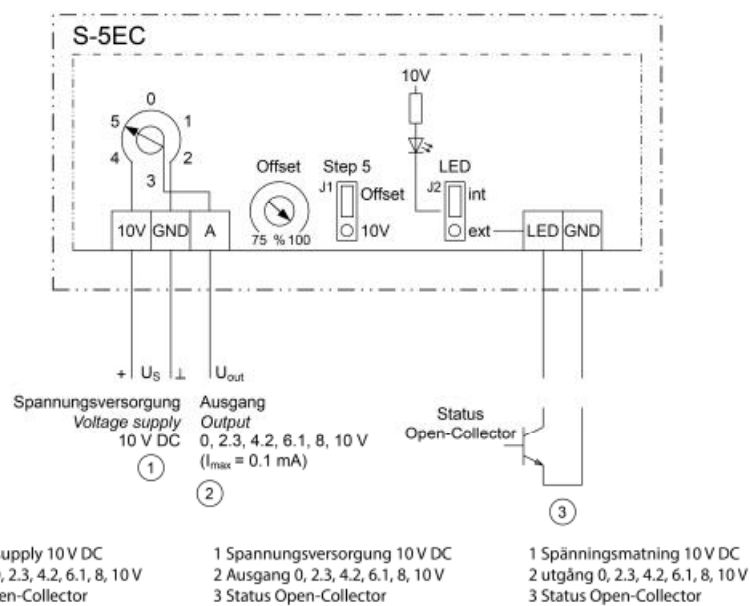
Technical parameters

Nominal data		
Voltage (nominal)	10	V
Protection/Classification		
Enclosure class	IP54	
Controller and Sensors		
Permitted humidity, non-condensing	0 to 85	%RH
Ambient and duct temperature		
Permitted ambient temperature	max 70	°C
Dimensions and weights		
Weight	0.4	kg

Dimension



Wiring



Documents

- L-BAL-E265-ENG
- UKCA Declaration of conformity_005



Item	System Reference	Code	Suffix	DWG	L1	L2/ID	W	H	Vol m³/s	PD Pa	Wt kg	No. Off.	Performance, dB								
					mm	mm							63	125	250	500	1k	2k	4k	8k	
1	ATT205 KITCHEN EXHAUST	SL	GM	A02G	900		450	450	0.93	24	35	1	IL	6	9	14	18	22	16	14	9
2	ATT118 KITCHEN EXTRACT	SL	GM	A02G	1500		500	450	0.93	29	55	1	IL	10	17	22	27	28	23	20	12
3	ATT117 KITCHEN INTAKE	SL	G	A02G	900		450	450	0.79	17	35	1	IL	5	9	16	22	29	23	19	11
4	ATT013 KITCHEN SUPPLY	SL	G	A02G	1500		500	400	0.79	26	52	1	IL	9	16	25	33	37	31	26	15
5	ATT 115 LAUNDRY INLET	PL	G	A13G	600	400			0.56	5	13	1	IL	2	3	6	15	19	14	13	10
6	ATT116 LAUNDRY SUPPLY	PLP	G	A13G	1200	400			0.56	15	34	1	IL	5	13	21	33	35	35	34	27

NOTES

LABEL WITH ITEM NO. & SYSTEM REF.

IL = INSERTION LOSS (dB)

G - SELF FINISH PRE-GALVANISED STEEL CONSTRUCTION.
M - MELINEX ENCAPSULATED INFILL.

DATA SHEET A02g

RECTANGULAR ATTENUATOR

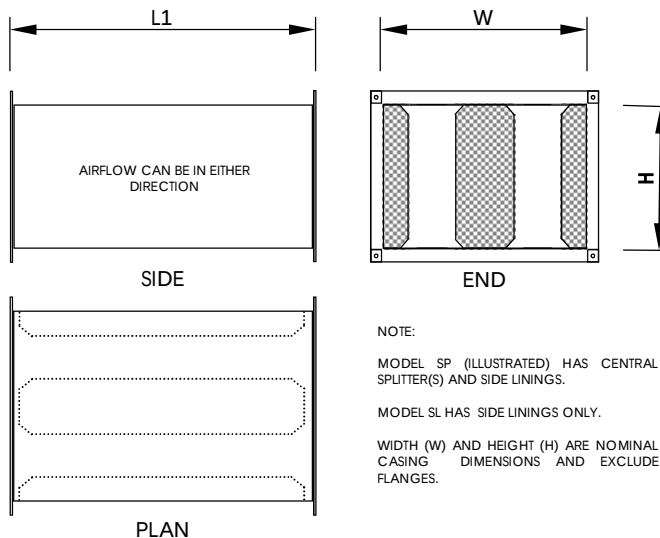
FLANGED

MODEL SP / MODEL SL



THIS IS NOT A STAND ALONE DOCUMENT AND UNLESS REFERRED TO IN A DATED EQUIPMENT SCHEDULE IS SUBJECT TO REVISION WITHOUT NOTICE.

DIMENSIONS



SPECIFICATION

ATTENUATORS ARE CONSTRUCTED IN ACCORDANCE WITH DW 144 SPECIFICATION FOR MEDIUM PRESSURE (CLASS B) DUCTWORK.

CASES ARE STIFFENED AND FITTED WITH PROPRIETARY FLANGES.

MODEL SP - HAS SOUND ABSORBENT SPLITTERS ARRANGED VERTICALLY WITHIN THE CASING TO FORM A SERIES OF CENTRAL ELEMENTS AND SIDE LININGS.

MODEL SL - HAS SOUND ABSORBENT SPLITTERS ARRANGED VERTICALLY WITHIN THE CASING TO FORM SIDE LININGS ONLY.

SPLITTERS AND SIDE LININGS CONTAIN A SOUND ABSORBENT INFILL THAT IS ENCAPSULATED WITH GLASS CLOTH AND PLAIN/PERFORATED STEEL.

SPLITTERS HAVE AERODYNAMIC FAIRINGS AT EACH END.

NOTES

THIS DATA SHEET IS TO BE READ IN CONJUNCTION WITH THE EQUIPMENT SCHEDULE.

LARGER ATTENUATORS WILL BE OF MODULAR CONSTRUCTION FOR EASE OF HANDLING AND MAY BE SPLIT ON THE LENGTH, WIDTH, HEIGHT OR COMBINATION THEREOF (SEE DATA SHEET A09 FOR DETAILS).

ATTENUATORS WILL BE SUPPLIED WITHOUT SUPPORT STEELWORK, BRACKETS, FIXINGS, GASKET, MASTIC OR OTHER SUCH ITEMS, UNLESS OTHERWISE STATED.

IT IS THE INSTALLERS RESPONSIBILITY TO PROVIDE THE FLANGE SEAL TO THE CONNECTING DUCT.

INSERTION LOSS, PRESSURE LOSS AND FLOW NOISE ARE DERIVED FROM TESTS CARRIED OUT IN ACCORDANCE WITH ISO 7235 AND MAY VARY DEPENDING ON INSTALLED CONDITIONS.

MANUFACTURING DIMENSIONAL TOLERANCE < 1.0 %.

SUFFIX

THE SUFFIX TO THE ATTENUATOR MODEL DEFINES THE MATERIAL OF FABRICATION AND ANY ADDITIONAL FEATURES OR SPECIAL CONSTRUCTIONAL DETAILS.

G - PRE-GALVANISED STEEL CONSTRUCTION.

S - GRADE 316 STAINLESS STEEL CONSTRUCTION.

H1 - HIGH TEMPERATURE APPLICATION (2 HOUR/300°C).

D - DOUBLE SKIN CASING (CASING SIZE W+50 x H+50).

C - HIGH PRESSURE APPLICATION (DW 144, CLASS C).

K - PROTECTIVE PAINT FINISH TO VISIBLE INTERNAL METAL SURFACES.

J - SPLITTERS AND/OR SIDE LININGS ARRANGED HORIZONTALLY.

M - MELINEX ENCAPSULATED INFILL.

Z(***) - MODULAR CONSTRUCTION (SEE DATA SHEET A09 FOR DETAILS).

X - SPECIAL CONSTRUCTION, REFER TO EQUIPMENT SCHEDULE FOR DETAILS.

FLANGE DETAILS

ATTENUATORS ARE FITTED WITH 30 mm PROFILE FLANGES COMPLYING WITH DW144 AND DW/TM1.

STANDARD SIZES

LENGTH (L1) - 600, 900, 1200, 1500, 1800, 2100, 2400, 2700, & 3000 mm.

WIDTH (W) - ANY DIMENSION ABOVE 149 mm.

HEIGHT (H) - ANY DIMENSION ABOVE 99 mm.

ALL ATTENUATORS ARE MADE TO ORDER.

NON STANDARD ATTENUATORS ARE AVAILABLE.

WEIGHT

WEIGHTS ARE GIVEN ON THE EQUIPMENT SCHEDULE.

MODULAR CONSTRUCTION

ATTENUATORS MANUFACTURED IN ONE SECTION WILL HAVE NO "Z" SUFFIX IN THE CODE.

WHEN ATTENUATORS ARE SUPPLIED IN MODULAR FORM, THE ACTUAL NUMBER OF SECTIONS IN THE LENGTH, WIDTH AND HEIGHT DEFINED BY THE "Z" SUFFIX. REFER TO DATA SHEET A09 FOR DETAILS.

Z

#

#

#

A "Z" SUFFIX IN THE ATTENUATOR CODE DENOTES THAT THE ATTENUATOR WILL BE SUPPLIED IN MODULES.

NUMBER OF MODULES IN LENGTH.

NUMBER OF MODULES IN WIDTH.

NUMBER OF MODULES IN HEIGHT.

DATA SHEET A13G

CIRCULAR ATTENUATOR

SPIGOT CONNECTION

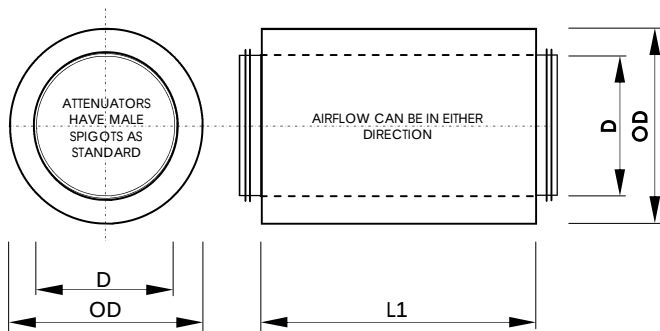
MODEL PL (WITHOUT POD)

MODEL PLP (WITH POD)



THIS IS NOT A STAND ALONE DOCUMENT AND UNLESS REFERRED TO IN A DATED EQUIPMENT SCHEDULE IS SUBJECT TO REVISION WITHOUT NOTICE.

DIMENSIONS



NOMINAL DIAMETER (D)

BETWEEN 100 - 500 mm
ABOVE 500 mm

MAX OUTSIDE DIAMETER (OD)

D + 110 mm.
D + 170 mm.

LENGTH (L1) IS NOMINAL CASING DIMENSION, EXCLUDING SPIGOTS.

SPECIFICATION

ATTENUATORS ARE CONSTRUCTED IN ACCORDANCE WITH DW 144 SPECIFICATION FOR MEDIUM PRESSURE (CLASS B) DUCTWORK.

CASES ARE STIFFENED AND FITTED WITH MALE SPIGOTS WITH INTEGRAL SEALS.

SOUND ABSORBENT INFILL IS ENCAPSULATED WITH GLASS CLOTH AND PERFORATED STEEL.

CENTRAL PODS (TYPE PLP) HAVE AERODYNAMIC FAIRINGS AT EACH END.

NOTES

THIS DATA SHEET IS TO BE READ IN CONJUNCTION WITH THE EQUIPMENT SCHEDULE.

EXCESSIVELY LARGE OR HEAVY ATTENUATORS MAY BE MANUFACTURED IN MATING SECTIONS FOR EASE OF HANDLING.

ATTENUATORS WILL BE SUPPLIED WITHOUT SUPPORT STEELWORK, BRACKETS, FIXINGS, GASKET, MASTIC OR OTHER SUCH ITEMS, UNLESS OTHERWISE STATED.

IT IS THE INSTALLERS RESPONSIBILITY TO SEAL THE ATTENUATOR TO THE CONNECTING DUCT.

INSERTION LOSS, PESSION LOSS AND FLOW NOISE DATA ARE DERIVED FROM TESTS CARRIED OUT IN ACCORDANCE WITH ISO 7235 AND MAY VARY DEPENDING ON INSTALLED CONDITIONS.

MANUFACTURING DIMENSIONAL TOLERANCE < 1.0 %.

WEIGHT

WEIGHTS ARE GIVEN ON THE EQUIPMENT SCHEDULE.

SUFFIX

THE SUFFIX TO THE ATTENUATOR MODEL DEFINES THE MATERIAL OF FABRICATION AND ANY ADDITIONAL FEATURES OR SPECIAL CONSTRUCTIONAL DETAILS.

G - PRE-GALVANISED STEEL CONSTRUCTION.

S - GRADE 316 STAINLESS STEEL CONSTRUCTION.

H1 - HIGH TEMPERATURE APPLICATION (2 HOUR/300°C).

C - HIGH PRESSURE APPLICATION (DW 144, CLASS C).

K - PROTECTIVE PAINT FINISH TO VISIBLE INTERNAL METAL SURFACES.

M - MELINEX ENCAPSULATED INFILL.

X - SPECIAL CONSTRUCTION, REFER TO EQUIPMENT SCHEDULE FOR DETAILS.

FLANGE DETAILS

ATTENUATORS ARE FITTED WITH MALE SPIGOTS AS STANDARD.

STANDARD SIZES

DIAMETER(D) - 100, 125, 150, 160, 180, 200, 250, 300, 315, 355, 400, 450, 500, 560 & 630 mm.

LENGTH (L1) - 600, 900, 1200, 1500, 1800, 2100, 2400, 2700 & 3000 mm.

ALL ATTENUATORS ARE MADE TO ORDER.

NON STANDARD SIZES AVAILABLE.

Appendix E

Laundry ventilation system

TRANSMITTAL FORM

TO: **Jenner Construction**

PROJECT: **1873 Gravesend**

FOR THE ATTENTION OF: **Steve Restall**

SUBMITTAL NO: **1873 -HCL-ZZ-XX-TS-M-0117**

DATE: **05/08/2024**

REV: P01

Please find enclosed the following:

Drawings ☐ Samples ☐ Specifications ☒ Technical submittal ☒

Change Order ☐ Other ☐

Please find attached for your comments/approval manufacturers Information and technical data associated with the:

Laundry Ventilation Equipment

☒ **FOR APPROVAL**

☐ **FOR MANUFACTURE/CONSTRUCTION**

☐ **RESUBMIT COPIES FOR APPROVAL**

☒ **AS REQUESTED**

☐ **RETURNED FOR CORRECTIONS**

☐ **APPROVED AS NOTED**

☒ **FOR YOUR COMMENTS**

☐ **FOR YOUR INFORMATION**

☐ **SUBMIT COPIES FOR DISTRIBUTION**

PREPARED BY:

Adam Hill

FOR HARNISS CONTRACTING LTD

Please acknowledge safe receipt of the above-mentioned transmittal(s) with your comments/approval by signing below:

Acknowledgement required no later than: **19/08/24**

REMARKS

.....

.....

.....

.....

SIGNED BY:
(CLIENT)

DATE:

PRIO Circular Duct Fans

Quiet and compact mixed-flow fan

- Available with AC and EC motors for 50 and 60Hz
- Easy to install
- Sound and energy optimized impellers

[Find more details in our online catalogue](#)



Flexibility

The prio fans are intended to use for **supply** or **extract** air, designed to be installed in **any position**. This ensures that the fans can be used in a variety of **commercial** and **domestic** applications.

Reliability

The unit's **airtight casing** and corrosion resistance allows to use indoors and in damp areas. The combination of a **reliable** casing and motor construction ensures to minimize the need for maintenance of the fans and allows **long continuous operation**.

Performance

The **sound optimized** impellers together with **high efficient** external rotor motors are designed to ensure high-level performance to **minimize power consumption** and **maximize efficiency**.

Accessories

Prio fan can be selected together with variety types of **accessories** as fast clamps, heaters, filters, dampers, etc.

Certifications



Features

Construction

Casing made out of special composite material or sheet metal, is fully airtight class C according to EN12237. The Fans are equipped with an external **terminal box with** protection class **IP44**.

Impeller

Prio fans have aerodynamically optimized impellers and guide vanes. These are from lightweight, hard-wearing fiberglass reinforced **polyamide**, dynamically **balanced** and paired with corresponding external rotor motors.

Motor

Depending on the type, prio fans are equipped with **AC** or **EC** external rotor motor. Motors are suitable for **50Hz** and **60Hz**.

Motor protection

Fans with **AC** motors have an **integrated** thermal protection with manual (electrical) reset.

Fans with **EC** motors have an **integrated** electronic **thermal protection** including **locked-rotor protection** and **soft-start**.

For **size 315 – 500** an external motor protection is needed.

Control

EC motors with **built-in potentiometer** to adjust working point can be also controlled by external **signal 0-10V**.

AC motors can be controlled by **5-step** or **stepless** speed regulator.

Installation

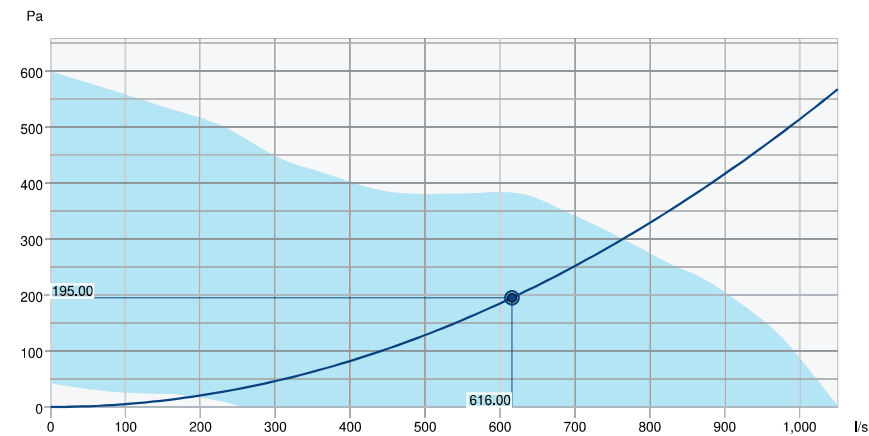
Prio fans can be installed in any position **indoor** and in **damp areas**. Spigot with 25 mm length is perfectly designed to connect circular duct by **fast clamps preventing vibration** to the duct.

Technical parameters

Nominal data		
Voltage (nominal)	230	V
Frequency	60; 50	Hz
Phases	1~	
Input power	528	W
Input power kW	0.528	kW
Input current	2.32	A
Impeller speed	2,446	rpm
Air flow	max 1.051	m³/s
Temperature of transported air	max 55	°C
Max temperature of transported air, when speed controlled	55	°C
Sound data		
Sound pressure level at 3m (20m² Sabin)	56	dB(A)
Protection/Classification		
Enclosure class, motor	IP54	
Insulation class	F	
Data according to ErP		
ErP ready	ErP 2018	
Dimensions and weights		
Duct dimension; Circular, inlet	315	mm
Duct dimension; Circular, outlet	315	mm
Weight	8.52	kg
Others		
Duct connection type	Circular	
Motor type	EC	

Performance

Performance curve



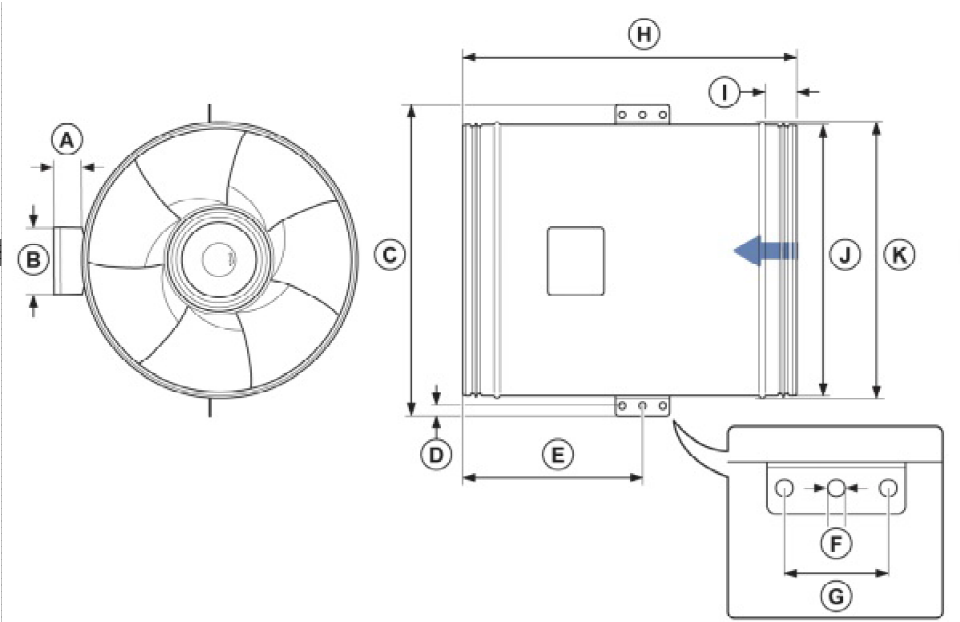
Hydraulic data	
Required air flow	616.00 l/s
Required static pressure	195 Pa
Working air flow	616.00 l/s
Working static pressure	195 Pa
Air density	1.204 kg/m³
Power	250.7 W
Fan control - RPM	2,006 rpm
Current	1.12 A
SFP	0.407 kW/m³/s
Control voltage	7.8 V
Supply voltage	230 V

Sound power level		63	125	250	500	1k	2k	4k	8k	Total
Inlet	dB(A)	46	63	65	71	74	70	63	53	77
Outlet	dB(A)	53	55	67	69	72	69	62	52	76
Surrounding	dB(A)	10	31	45	52	52	47	43	29	56
Sound pressure level at 3m (20m² Sabine)	dB(A)	-	-	-	-	-	-	-	-	49
Sound pressure level at 3m free field	dB(A)	-	-	-	-	-	-	-	-	35

Ecodesign

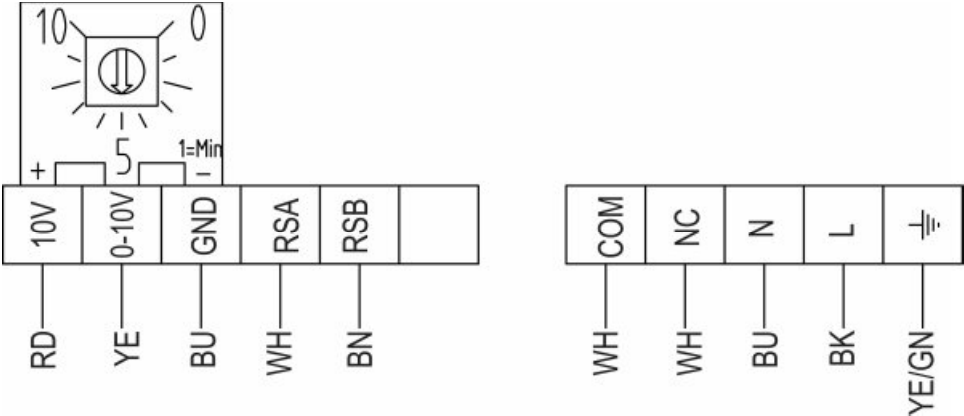
Product		
Trade name	Systemair	
Product name	prio 315 EC	
Ecodesign 327		
Manufacturer	Systemair Sweden AB, Industrivägen 3, Skinnskatteberg, Sweden	
Type	prio 315 EC	
Year of manufacture	See name plate of the fan	
Air flow qv	0.631	m³/s
Efficiency category	total	
Efficiency grade N	70.8	
Efficiency grade target N	58	
Speed (rpm) n	2,501	rpm
Pressure increase total psf	418	Pa
Power consumption Ped	441	W
Overall efficiency	62.3	%
Overall efficiency target	49.4	%
Variable speed drive	Yes	
Additional components	Components used to calculate the energy efficiency that are not apparent from the measurement category are detailed in the CE declaration.	
Maintenance	Information on installation, operation and mainenance is provided in the operating instructions.	
Recycling / disposal	Information on recycling and disposal is provided in the operating instructions.	

Dimension



A	B	C	D	E	ØF	G	H	I	ØJ	ØK
45	100	375	15	205	10	60	407	45	314	322

Wiring



RD	Red
YE	Yellow
BU	Blue
WH	White
GN	Green
BN	Brown
BK	Black

Accessories

- CXE/AVC Modbus (37256)
- EC-Basic-CO2 and temperature (24808)
- EC-Basic-T temperature (24805)
- EC-Selector (9908)
- EC-Vent Room Unit (3018)
- MTV-1/010 Controller 0..10V+ (30650)
- Pressure controller PCA 1000D2 (76739)
- SG 315 Protection guard (5611)
- Step switch S-5EC-2, 0-10V (449084)
- CB 315-6,0 400V/2 Duct heater (5374)
- Presence detector/IR24-P (6995)
- CB 315-12,0 400V/3 Duct heater (5387)
- CB 315-9,0 400V/3 Duct heater (5375)
- CBMF 315-9,0 400V/3 Duct heater (12354)
- FFR 315 Filter cassette (1779)
- FK 315 Fast clamp (1613)
- RSK-315 Back draft damper (5604)
- VBC 315-3 Water heating batt (9844)
- VK-30 Louvre shutter (5641)
- DMD-C Pressure controller (15793)
- EC-Basic-H humidity (24807)
- EC-Basic-U universal 0-10V (24806)
- EC-Vent control board (3115)
- MTP 10, 10K, Speed control (32731)
- Potentiometer MTP 20, 0-10V (310220)
- REV-3POL/03-7,5kW R/Y (33978)
- Step switch S-5EC, 0-10V (76738)
- VKK-315 Back draft damper (1628)
- HR1 Room Humidistat (215150)
- RT 0-30 Room Thermostat (5151)
- CB 315-3,0 230V/1 Duct heater (5386)
- CBM 315-9,0 400V/3 Duct heater (5485)
- CWK 315-3-2,5 Duct cooler,circ (30025)
- FGR 315 Filter cassette (1818)
- LDC 315-900 Silencer (5197)
- VBC 315-2 Water heating batt (5461)
- VBF 315 Water heating battery (1734)
- BMS Trickle & Boost Switch (120363)

Documents

- INSTALLATION__OPERATION_AND_MAINTENANCE_INSTRUCTION_K__KV__PRIO__EN_010.PDF
- MODBUS LITE V5.01 parameter specification.pdf
- COMMISSIONING_RECORD_FANS__EN.PDF



PRIO Circular Duct Fans

Quiet and compact mixed-flow fan

- Available with AC and EC motors for 50 and 60Hz
- Easy to install
- Sound and energy optimized impellers

[Find more details in our online catalogue](#)

Flexibility

The prio fans are intended to use for **supply** or **extract** air, designed to be installed in **any position**. This ensures that the fans can be used in a variety of **commercial** and **domestic** applications.

Reliability

The unit's **airtight casing** and corrosion resistance allows to use indoors and in damp areas. The combination of a **reliable** casing and motor construction ensures to minimize the need for maintenance of the fans and allows long **continuous operation**.

Performance

The **sound optimized** impellers together with **high efficient** external rotor motors are designed to ensure high-level performance to **minimize power consumption** and **maximize efficiency**.

Accessories

Prio fan can be selected together with variety types of **accessories** as fast clamps, heaters, filters, dampers, etc.

Certifications



Features

Construction

Casing made out of special composite material or sheet metal, is fully airtight class C according to EN12237.
The Fans are equipped with an external **terminal box with** protection class **IP44**.

Impeller

Prio fans have aerodynamically optimized impellers and guide vanes. These are from lightweight, hard-wearing fiberglass reinforced **polyamide**, dynamically **balanced** and paired with corresponding external rotor motors.

Motor

Depending on the type, prio fans are equipped with **AC** or **EC** external rotor motor. Motors are suitable for **50Hz** and **60Hz**.

Motor protection

Fans with **AC** motors have an **integrated** thermal protection with manual (electrical) reset.

Fans with **EC** motors have an **integrated** electronic **thermal protection** including **locked-rotor protection** and **soft-start**.

For **size 315 – 500** an external motor protection is needed.

Control

EC motors with **built-in potentiometer** to adjust working point can be also controlled by external **signal 0-10V**.

AC motors can be controlled by **5-step** or **stepless** speed regulator.

Installation

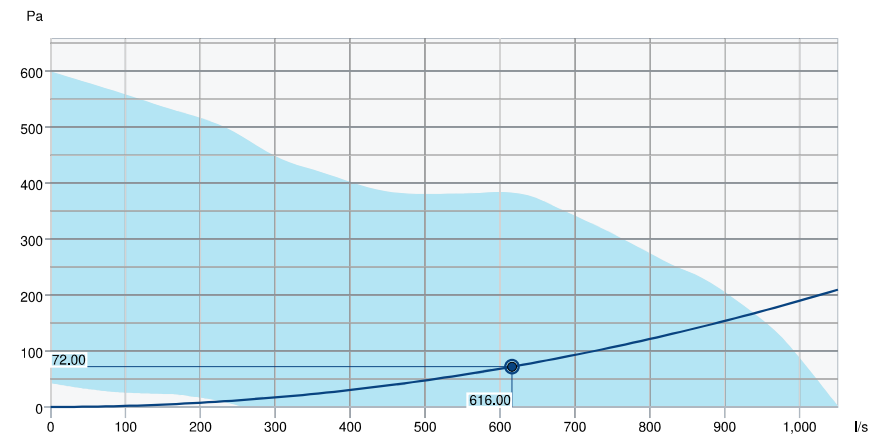
Prio fans can be installed in any position **indoor** and in **damp areas**. Spigot with 25 mm length is perfectly designed to connect circular duct by **fast clamps preventing vibration** to the duct.

Technical parameters

Nominal data		
Voltage (nominal)	230	V
Frequency	60; 50	Hz
Phases	1~	
Input power	528	W
Input power kW	0.528	kW
Input current	2.32	A
Impeller speed	2,446	rpm
Air flow	max 1.051	m³/s
Temperature of transported air	max 55	°C
Max temperature of transported air, when speed controlled	55	°C
Sound data		
Sound pressure level at 3m (20m² Sabin)	56	dB(A)
Protection/Classification		
Enclosure class, motor	IP54	
Insulation class	F	
Data according to ErP		
ErP ready	ErP 2018	
Dimensions and weights		
Duct dimension; Circular, inlet	315	mm
Duct dimension; Circular, outlet	315	mm
Weight	8.52	kg
Others		
Duct connection type	Circular	
Motor type	EC	

Performance

Performance curve



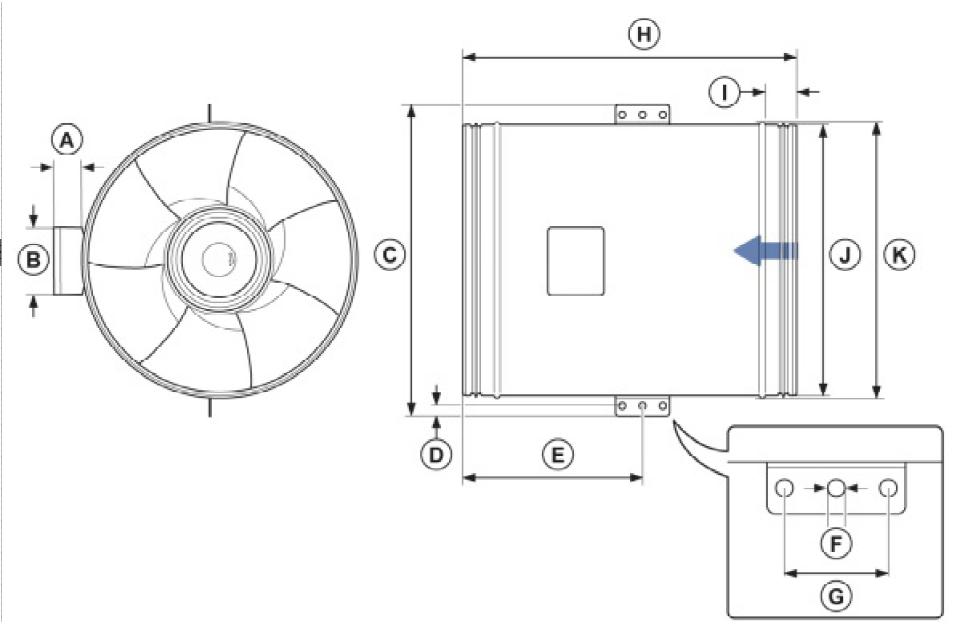
Hydraulic data	
Required air flow	616.00 l/s
Required static pressure	72 Pa
Working air flow	616.00 l/s
Working static pressure	72 Pa
Air density	1.204 kg/m³
Power	151.9 W
Fan control - RPM	1,678 rpm
Current	0.70 A
SFP	0.247 kW/m³/s
Control voltage	6.5 V
Supply voltage	230 V

Sound power level		63	125	250	500	1k	2k	4k	8k	Total
Inlet	dB(A)	45	56	60	66	69	64	56	45	72
Outlet	dB(A)	50	49	60	65	67	63	55	44	71
Surrounding	dB(A)	<10	23	37	48	47	41	35	20	51
Sound pressure level at 3m (20m² Sabine)	dB(A)	-	-	-	-	-	-	-	-	44
Sound pressure level at 3m free field	dB(A)	-	-	-	-	-	-	-	-	30

Ecodesign

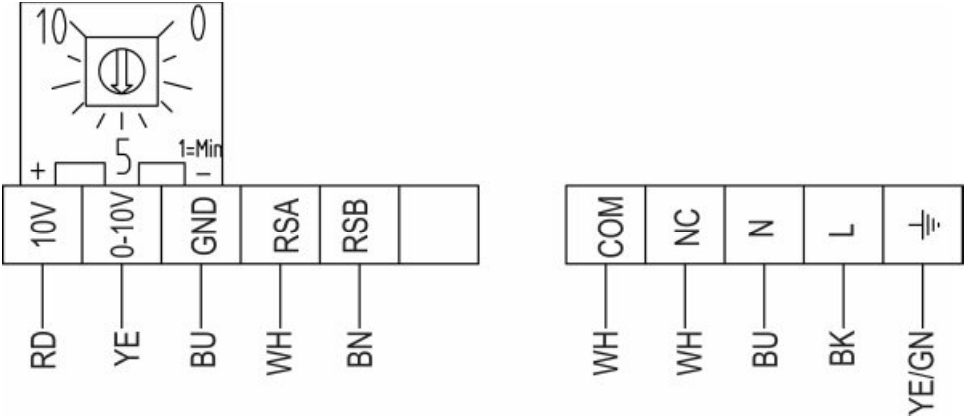
Product		
Trade name	Systemair	
Product name	prio 315 EC	
Ecodesign 327		
Manufacturer	Systemair Sweden AB, Industrivägen 3, Skinnskatteberg, Sweden	
Type	prio 315 EC	
Year of manufacture	See name plate of the fan	
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Efficiency grade N	70.8	
Efficiency grade target N	58	
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Documents

- INSTALLATION__OPERATION_AND_MAINTENANCE_INSTRUCTION_K__KV__PRIO__EN_010.PDF
- MODBUS LITE V5.01 parameter specification.pdf
- COMMISSIONING_RECORD_FANS__EN.PDF



Item	System Reference	Code	Suffix	DWG	L1	L2/ID	W	H	Vol m³/s	PD Pa	Wt kg	No. Off.	Performance, dB								
					mm	mm							63	125	250	500	1k	2k	4k	8k	
1	ATT205 KITCHEN EXHAUST	SL	GM	A02G	900		450	450	0.93	24	35	1	IL	6	9	14	18	22	16	14	9
2	ATT118 KITCHEN EXTRACT	SL	GM	A02G	1500		500	450	0.93	29	55	1	IL	10	17	22	27	28	23	20	12
3	ATT117 KITCHEN INTAKE	SL	G	A02G	900		450	450	0.79	17	35	1	IL	5	9	16	22	29	23	19	11
4	ATT013 KITCHEN SUPPLY	SL	G	A02G	1500		500	400	0.79	26	52	1	IL	9	16	25	33	37	31	26	15
5	ATT 115 LAUNDRY INLET	PL	G	A13G	600	400			0.56	5	13	1	IL	2	3	6	15	19	14	13	10
6	ATT116 LAUNDRY SUPPLY	PLP	G	A13G	1200	400			0.56	15	34	1	IL	5	13	21	33	35	35	34	27

NOTES

LABEL WITH ITEM NO. & SYSTEM REF.

IL = INSERTION LOSS (dB)

G - SELF FINISH PRE-GALVANISED STEEL CONSTRUCTION.
M - MELINEX ENCAPSULATED INFILL.

DATA SHEET A02g

RECTANGULAR ATTENUATOR

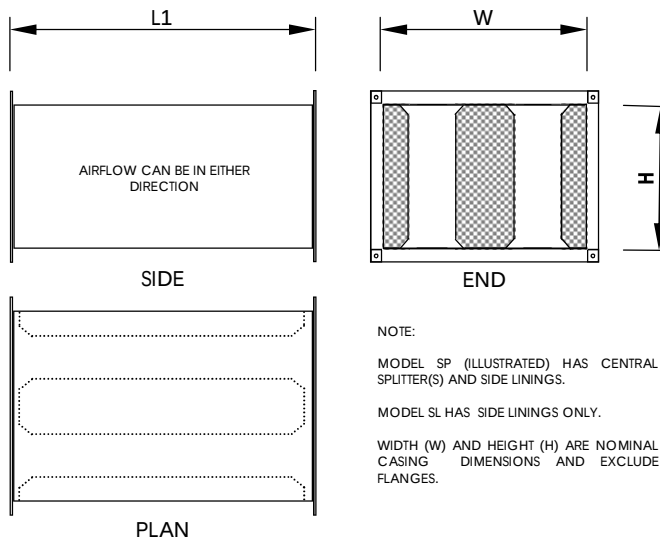
FLANGED

MODEL SP / MODEL SL



THIS IS NOT A STAND ALONE DOCUMENT AND UNLESS REFERRED TO IN A DATED EQUIPMENT SCHEDULE IS SUBJECT TO REVISION WITHOUT NOTICE.

DIMENSIONS



SPECIFICATION

ATTENUATORS ARE CONSTRUCTED IN ACCORDANCE WITH DW 144 SPECIFICATION FOR MEDIUM PRESSURE (CLASS B) DUCTWORK.

CASES ARE STIFFENED AND FITTED WITH PROPRIETARY FLANGES.

MODEL SP - HAS SOUND ABSORBENT SPLITTERS ARRANGED VERTICALLY WITHIN THE CASING TO FORM A SERIES OF CENTRAL ELEMENTS AND SIDE LININGS.

MODEL SL - HAS SOUND ABSORBENT SPLITTERS ARRANGED VERTICALLY WITHIN THE CASING TO FORM SIDE LININGS ONLY.

SPLITTERS AND SIDE LININGS CONTAIN A SOUND ABSORBENT INFILL THAT IS ENCAPSULATED WITH GLASS CLOTH AND PLAIN/PERFORATED STEEL.

SPLITTERS HAVE AERODYNAMIC FAIRINGS AT EACH END.

NOTES

THIS DATA SHEET IS TO BE READ IN CONJUNCTION WITH THE EQUIPMENT SCHEDULE.

LARGER ATTENUATORS WILL BE OF MODULAR CONSTRUCTION FOR EASE OF HANDLING AND MAY BE SPLIT ON THE LENGTH, WIDTH, HEIGHT OR COMBINATION THEREOF (SEE DATA SHEET A09 FOR DETAILS).

ATTENUATORS WILL BE SUPPLIED WITHOUT SUPPORT STEELWORK, BRACKETS, FIXINGS, GASKET, MASTIC OR OTHER SUCH ITEMS, UNLESS OTHERWISE STATED.

IT IS THE INSTALLERS RESPONSIBILITY TO PROVIDE THE FLANGE SEAL TO THE CONNECTING DUCT.

INSERTION LOSS, PRESSURE LOSS AND FLOW NOISE ARE DERIVED FROM TESTS CARRIED OUT IN ACCORDANCE WITH ISO 7235 AND MAY VARY DEPENDING ON INSTALLED CONDITIONS.

MANUFACTURING DIMENSIONAL TOLERANCE < 1.0 %.

SUFFIX

THE SUFFIX TO THE ATTENUATOR MODEL DEFINES THE MATERIAL OF FABRICATION AND ANY ADDITIONAL FEATURES OR SPECIAL CONSTRUCTIONAL DETAILS.

G - PRE-GALVANISED STEEL CONSTRUCTION.

S - GRADE 316 STAINLESS STEEL CONSTRUCTION.

H1 - HIGH TEMPERATURE APPLICATION (2 HOUR/300°C).

D - DOUBLE SKIN CASING (CASING SIZE W+50 x H+50).

C - HIGH PRESSURE APPLICATION (DW 144, CLASS C).

K - PROTECTIVE PAINT FINISH TO VISIBLE INTERNAL METAL SURFACES.

J - SPLITTERS AND/OR SIDE LININGS ARRANGED HORIZONTALLY.

M - MELINEX ENCAPSULATED INFILL.

Z(***) - MODULAR CONSTRUCTION (SEE DATA SHEET A09 FOR DETAILS).

X - SPECIAL CONSTRUCTION, REFER TO EQUIPMENT SCHEDULE FOR DETAILS.

FLANGE DETAILS

ATTENUATORS ARE FITTED WITH 30 mm PROFILE FLANGES COMPLYING WITH DW144 AND DW/TM1.

STANDARD SIZES

LENGTH (L1) - 600, 900, 1200, 1500, 1800, 2100, 2400, 2700, & 3000 mm.

WIDTH (W) - ANY DIMENSION ABOVE 149 mm.

HEIGHT (H) - ANY DIMENSION ABOVE 99 mm.

ALL ATTENUATORS ARE MADE TO ORDER.

NON STANDARD ATTENUATORS ARE AVAILABLE.

WEIGHT

WEIGHTS ARE GIVEN ON THE EQUIPMENT SCHEDULE.

MODULAR CONSTRUCTION

ATTENUATORS MANUFACTURED IN ONE SECTION WILL HAVE NO "Z" SUFFIX IN THE CODE.

WHEN ATTENUATORS ARE SUPPLIED IN MODULAR FORM, THE ACTUAL NUMBER OF SECTIONS IN THE LENGTH, WIDTH AND HEIGHT DEFINED BY THE "Z" SUFFIX. REFER TO DATA SHEET A09 FOR DETAILS.

Z

#

#

#

A "Z" SUFFIX IN THE ATTENUATOR CODE DENOTES THAT THE ATTENUATOR WILL BE SUPPLIED IN MODULES.

NUMBER OF MODULES IN LENGTH.

NUMBER OF MODULES IN WIDTH.

NUMBER OF MODULES IN HEIGHT.

DATA SHEET A13G

CIRCULAR ATTENUATOR

SPIGOT CONNECTION

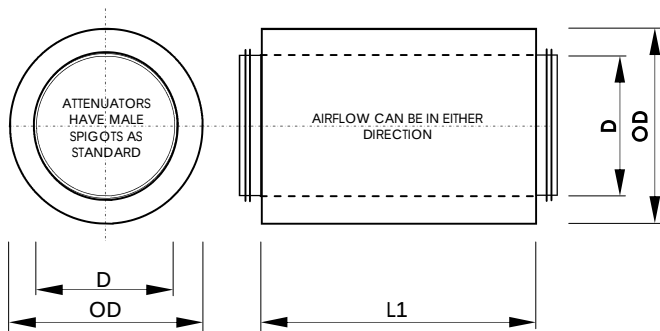
MODEL PL (WITHOUT POD)

MODEL PLP (WITH POD)



THIS IS NOT A STAND ALONE DOCUMENT AND UNLESS REFERRED TO IN A DATED EQUIPMENT SCHEDULE IS SUBJECT TO REVISION WITHOUT NOTICE.

DIMENSIONS



NOMINAL DIAMETER (D)

BETWEEN 100 - 500 mm
ABOVE 500 mm

MAX OUTSIDE DIAMETER (OD)

D + 110 mm.
D + 170 mm.

LENGTH (L1) IS NOMINAL CASING DIMENSION, EXCLUDING SPIGOTS.

SPECIFICATION

ATTENUATORS ARE CONSTRUCTED IN ACCORDANCE WITH DW 144 SPECIFICATION FOR MEDIUM PRESSURE (CLASS B) DUCTWORK.

CASES ARE STIFFENED AND FITTED WITH MALE SPIGOTS WITH INTEGRAL SEALS.

SOUND ABSORBENT INFILL IS ENCAPSULATED WITH GLASS CLOTH AND PERFORATED STEEL.

CENTRAL PODS (TYPE PLP) HAVE AERODYNAMIC FAIRINGS AT EACH END.

NOTES

THIS DATA SHEET IS TO BE READ IN CONJUNCTION WITH THE EQUIPMENT SCHEDULE.

EXCESSIVELY LARGE OR HEAVY ATTENUATORS MAY BE MANUFACTURED IN MATING SECTIONS FOR EASE OF HANDLING.

ATTENUATORS WILL BE SUPPLIED WITHOUT SUPPORT STEELWORK, BRACKETS, FIXINGS, GASKET, MASTIC OR OTHER SUCH ITEMS, UNLESS OTHERWISE STATED.

IT IS THE INSTALLERS RESPONSIBILITY TO SEAL THE ATTENUATOR TO THE CONNECTING DUCT.

INSERTION LOSS, PESSION LOSS AND FLOW NOISE DATA ARE DERIVED FROM TESTS CARRIED OUT IN ACCORDANCE WITH ISO 7235 AND MAY VARY DEPENDING ON INSTALLED CONDITIONS.

MANUFACTURING DIMENSIONAL TOLERANCE < 1.0 %.

WEIGHT

WEIGHTS ARE GIVEN ON THE EQUIPMENT SCHEDULE.

SUFFIX

THE SUFFIX TO THE ATTENUATOR MODEL DEFINES THE MATERIAL OF FABRICATION AND ANY ADDITIONAL FEATURES OR SPECIAL CONSTRUCTIONAL DETAILS.

G - PRE-GALVANISED STEEL CONSTRUCTION.

S - GRADE 316 STAINLESS STEEL CONSTRUCTION.

H1 - HIGH TEMPERATURE APPLICATION (2 HOUR/300°C).

C - HIGH PRESSURE APPLICATION (DW 144, CLASS C).

K - PROTECTIVE PAINT FINISH TO VISIBLE INTERNAL METAL SURFACES.

M - MELINEX ENCAPSULATED INFILL.

X - SPECIAL CONSTRUCTION, REFER TO EQUIPMENT SCHEDULE FOR DETAILS.

FLANGE DETAILS

ATTENUATORS ARE FITTED WITH MALE SPIGOTS AS STANDARD.

STANDARD SIZES

DIAMETER(D) - 100, 125, 150, 160, 180, 200, 250, 300, 315, 355, 400, 450, 500, 560 & 630 mm.

LENGTH (L1) - 600, 900, 1200, 1500, 1800, 2100, 2400, 2700 & 3000 mm.

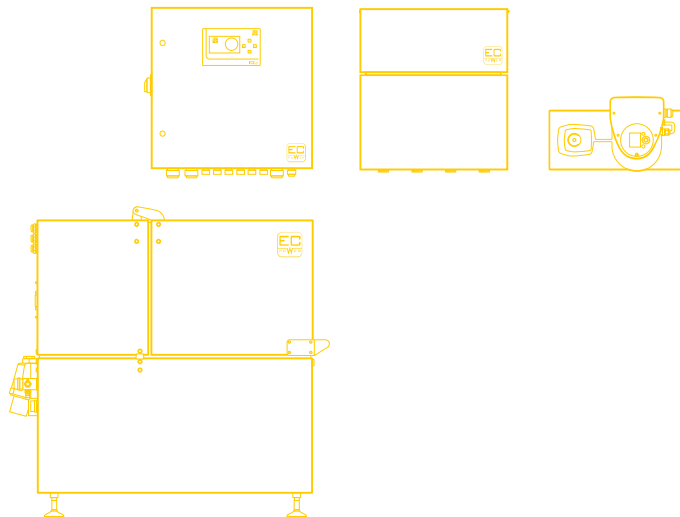
ALL ATTENUATORS ARE MADE TO ORDER.

NON STANDARD SIZES AVAILABLE.

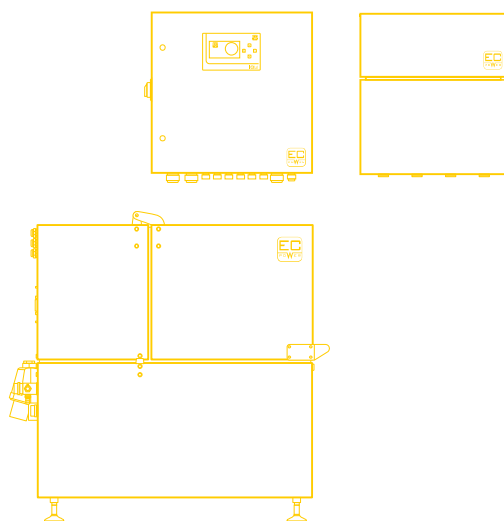
Appendix F

CHP Unit

A+++



A+++



XRGI[®] 20

TECHNICAL DATA

TECHNICAL DATA FOR THE XRGI® 20

Product data sheet in accordance with Regulation (EU) No. 811/2013; 813/2013, Dated 26.09.2019



The XRGI® is a combined heat and power plant (CHP) that works on the principle of cogeneration.

An XRGI® system consists of three main components – the Power Unit, Q-Heat Distributor and the iQ-Control Panel.

In addition, you can also extend your XRGI® system with a storage tank with a capacity of 500, 800 or 1,000 litres for optimum operation.

ORDERING DATA

Supplier's name or trademark	EC POWER	
Supplier's model identifier	XRGI® 20 without condensing technology¹	XRGI® 20 with condensing technology¹
Article number	X200001	X200001+K000105
Modules	Power Unit, iQ20-Control Panel, Q80-Heat Distributor	Power Unit, iQ20-Control Panel, Q80-Heat Distributor + Condensing and exhaust gas heat exchanger BW8+

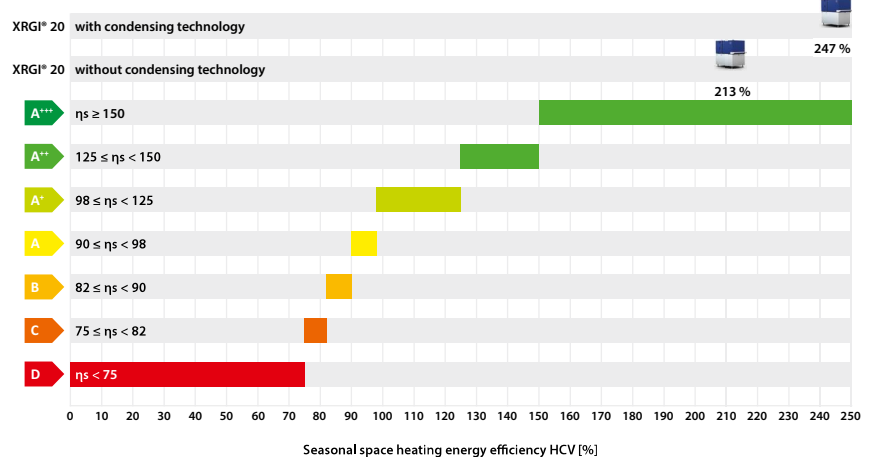
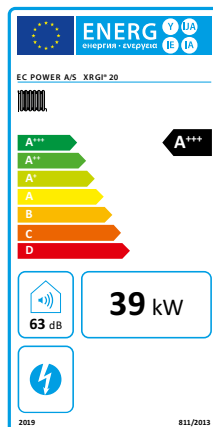
ErP-LABEL DATA²

Seasonal space heating energy efficiency class	A+++	A+++
Rated heat output P_{rated}	39 kW	45 kW
Seasonal space heating energy efficiency; HCV ³ η_s	213 %	247 %
Sound power level, indoors L_{WA}	63 dB	63 dB
Electrical efficiency; in accordance with heating value LCV ³ η_{el} CHP100+SUP 0	33 %	33 %
All special precautions to be taken during assembly, installation or service	Refer to Commissioning and Service Manual	Refer to Commissioning and Service Manual

¹ Return temperatures as per EN 50465 2015 7.6.1: Without condensing technology 47 °C, with condensing technology 30 °C.

² The values were rounded in accordance with the requirements governing product data sheets by Regulation (EU) No. 811/2013; 813/2013.

³ HCV = higher calorific value, LCV = lower calorific value



OUTPUT

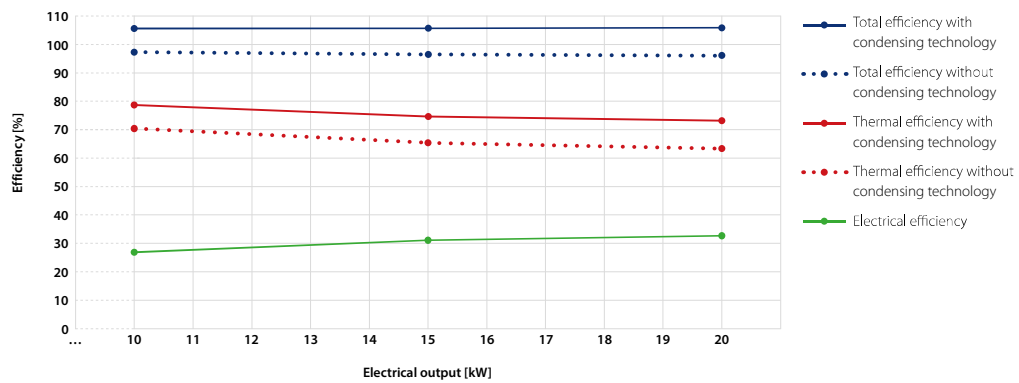
XRGi® system		XRGi® 20 without condensing technology ¹			XRGi® 20 with condensing technology ¹		
Power modulation*		50 %	75 %	100 %	50 %	75 %	100 %
Electrical output, modulating*	kW	10.0	15.0	20.0	10.0	15.0	20.0
Thermal output, modulating*	kW	26.1	31.4	38.7	29.3	35.9	44.7
Power consumption, gas in accordance with LCV ²	kW	37.1	48.1	61.1	37.1	48.1	61.1
Electrical own demand, production	kW	0.078	0.078	0.078	0.083	0.082	0.081
Electrical own demand, stand-by	kW	0.025			0.025		

EFFICIENCIES & OPERATING PARAMETERS

Power modulation*			50 %	75 %	100 %	50 %	75 %	100 %
Electrical efficiency	in accordance with LCV ²	%	26.9	31.1	32.7	26.9	31.1	32.7
Thermal efficiency	in accordance with LCV ²	%	70.4	65.4	63.4	78.8	74.6	73.2
Total efficiency	in accordance with LCV ²	%	97.3	96.5	96.1	105.7	105.7	105.9
Seasonal space heating energy efficiency in operating mode ^{3,4}	η_{son}	%	217			251		

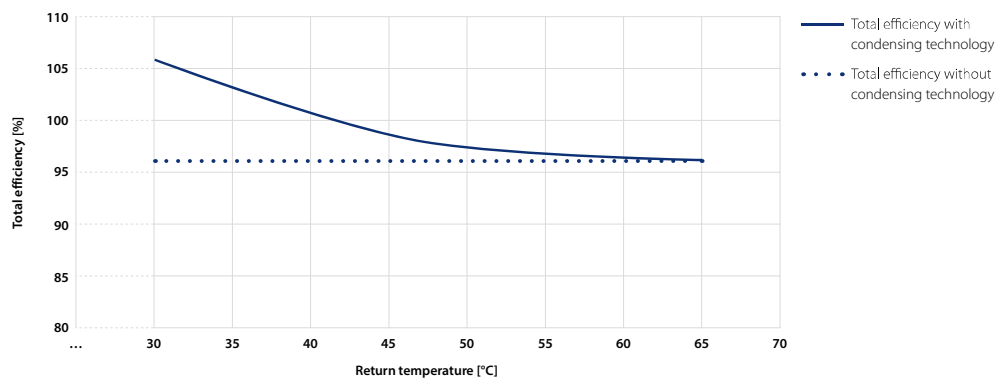
POWER MODULATION

Continuous modulation of 10 – 20 kW in power-controlled mode



TOTAL EFFICIENCY AT FULL LOAD

XRGi® 20 total efficiency / return temperature



* Continuous modulation in power-controlled mode

¹ Return temperatures as per EN 50465 2015 7.6.1: Without condensing technology 47 °C, with condensing technology 30 °C.

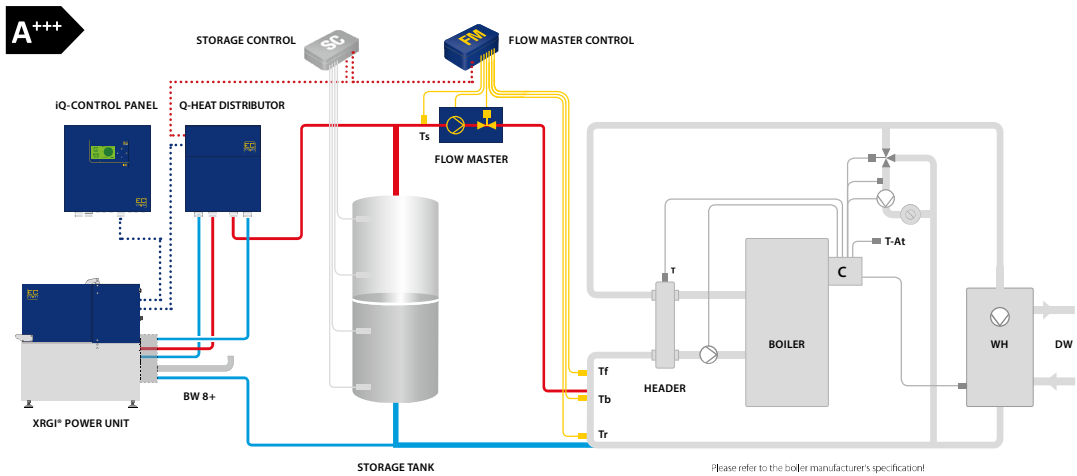
² LCV = lower calorific value

³ These values are based on independent, certified and authorised inspection bodies. Test reports are available upon request.

⁴ Efficiency at rated heat output as per the delegated Commission Regulation (EU) No. 811/2013; 813/2013

HYDRAULIC
INTEGRATION

Principle circuit diagram: Series circuit with injection – boiler with header



More principle circuit diagrams and information can be found in the EC POWER „Hydraulic Solutions“.

NOTE:

If products from other companies are used in the system in addition to EC Power products, EC POWER assumes no liability for the accuracy of the energy efficiency class calculation for the entire system.

XRGi® system		XRGi® 20 without condensing technology ¹	XRGi® 20 with condensing technology ¹
Flow temperature, constant	°C	~ 85	~ 85
Return temperature, variable	°C	5-75	5-75

FUELS

Natural gas (all qualities), propane, butane	yes	yes
--	-----	-----

EXHAUST GAS

Power modulation		50 %	75 %	100 %	50 %	75 %	100 %
Max. exhaust gas temperature	°C	-	-	120	-	-	90
Condensate	kg/h	-	-	-	4.0	4.7	5.9
Emissions (Test data at max. output)	CO < 50	15			26		
	NOx, pond, HCV ^{2,3} < 240	19			10		

SOUND

Sound pressure level at a distance of up to 1 m (based on surroundings)	dB(A)	49
--	-------	----

POWER
CONNECTION

Voltage, 3 phases + N + Earth	V	400
Frequency	Hz	50

SERVICE

Service interval (operating hours)	Hours	6,000
------------------------------------	-------	-------

DIMENSIONS
AND WEIGHT

		XRGi® 20 Power Unit	Q80-Heat Distributor	iQ20-Control Panel
Dimensions, W x H x D	mm	750 x 1,170 x 1,120	550 x 600 x 295	600 x 600 x 210
Footprint	m ²	0.84	wall mounted	wall mounted
Weight	kg	680	44	40

* Continuous modulation in power-controlled mode
¹ Return temperatures as per EN 50465 2015 7.6.1: Without condensing technology 47 °C, with condensing technology 30 °C.
² as per the delegated Commission Regulation (EU) No. 811/2013; 813/2013
³ HCV = higher calorific value
Deviations in values depend on the ambient and operating conditions, tolerance +/- 5 %.
Subject to technical modifications, deviations from design and errors.

TECHNICAL DATA FOR THE XRG1® 20 WITH FLOW MASTER

(Temperature control, Class II = 2 %)

Product data sheet in accordance with Regulation (EU) No. 811/2013; 813/2013, Dated 26.09.2019



Q80 iQ20 FM



Figure shows FM type 350



The Flow Master including Flow Master Control regulates the supply of heat from the XRG1® and from the storage tank to the consumer network. This technology enables a significantly higher heat output to be temporarily made available to the consumer side. This allows peaks of heat demand to be handled by the XRG1®, thereby extending its service life and increasing electricity production.

The 4 models can deliver a heat output of 50, 150, 250 or 350 at a ΔT of 20 K.

ORDERING DATA

Supplier's name or trademark	EC POWER			
Supplier's model identifier	XRG1 [®] 20 without condensing technology ¹		XRG1 [®] 20 with condensing technology ¹	
Article number	X200001		X200001+K000105	
Modules	Power Unit, iQ20-Control Panel, Q80-Heat Distributor		Power Unit, iQ20-Control Panel, Q80-Heat Distributor + Condensing and exhaust gas heat exchanger BW8+	
Supplier's model identifier	Flow Master including Flow Master Control			
FM-type (Temperature control, Class II = 2 %)	FM 50	FM 150	FM 250	FM 350
Article number	17D1130	17D1131	17D1132	17D1133

ErP-LABEL DATA²

Seasonal space heating energy efficiency class of package	A+++	
Seasonal space heating energy efficiency of package	215 %	249 %

¹ Return temperatures as per EN 50465 2015 7.6.1: Without condensing technology 47 °C, with condensing technology 30 °C.
² The values were rounded in accordance with the requirements governing product data sheets by Regulation (EU) No. 811/2013.

Seasonal space heating energy efficiency of the space heater with cogeneration	1	213 %
Temperature control	Class I = 1 %, Class II = 2 %, Class III = 1,5 %, Class IV = 2 %, Class V = 3 %, Class VI = 4 %, Class VII = 3,5 %, Class VIII = 5 %,	2
From fiche of temperature control		+ 2 %
Supplementary boiler	Seasonal space heating energy efficiency in %	
From fiche of boiler	('I' - 'I') x 'II' =	3
Solar contribution (From fiche of solar device)	Collector size (in m²) Tank volume (in m³) Collector efficiency (in %) Tank rating A* = 0,95, A = 0,91, B = 0,86, C = 0,83, D-G = 0,81	4
('III' x + 'IV' x) x 0,7 x (/ 100) x =		5
Seasonal space heating energy efficiency of package		215 %
Seasonal space heating energy efficiency class of package	G F E D C B A A+ A++ A+++	
	< 30 % ≥ 30 % ≥ 34 % ≥ 36 % ≥ 75 % ≥ 82 % ≥ 90 % ≥ 98 % ≥ 125 % ≥ 150 %	

The energy efficiency of the package of products provided for in this fiche may not correspond to its actual energy efficiency once installed in a building, as this efficiency is influenced by further factors such as heat loss in the distribution system and the dimensioning of the products in relation to building size and characteristics.



WWW.ECPOWER.EU



XRGI[®] 20

TECHNICAL DATA

Sound engineering office
A.Pfeifer, Dipl.-Ing.

Consulting
Research

Expertise
development

Measurement
planning

Birkenweg 6, 35630 Ehringshausen
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Internet: www.ibpfeifer.de

Ehringshausen, 08.12.2017

Registered in the list of authorized persons
for sound insulation acc. § 4 para. 1
NBVO at the Hesse Chamber of Engineers

machine acoustics
Room and building acoustics
Immissionsschutz
vibration technology

Result report No. 3815-4

Content: Metrological determination of the sound pressure level
and calculation of the sound power level
on the CHP Power Unit XRG1 20

Client: EC POWER A / S
Samsoevej 25
DK-8382 Hinnerup

Note: This measurement report consists of 13 pages.

sound Technical office Pfeifer

A.Piper

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1.	Summary	3
2	Task	3
3.	Measuring instruments used	3
4.	Weathering when measuring the mouth of the exhaust pipe.	4
5.	Basics	4
6.	Execution and evaluation of the measurements	4
7.	Name and data of the tested Power Unit	5
8.	Measuring points and measuring methods	5
8.1	Exhaust pipe	5
8.2	Power Unit	6
9.	Foreign noise	8
9.1	Mouth of the exhaust pipe	8
9.2	Power Unit	8
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10.1	Mouth of the exhaust pipe	9
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11.	Statements of accuracy	12
11.1	Mouth of the exhaust pipe	12
11.2	Power Unit	12
12.	Measurements	12
12.1	Mean values of measuring points, sound pressure level of the mouth of exhaust pipe	13
12.2	Measurements envelope surface method Power Unit	13

1. Summary

It was at the Power Unit with the name

XRGI 20

Sound level measurements performed.

The following sound sources were determined:

- Exhaust pipe with silencer integrated in the capsule
- CHP Power Unit (measuring surface sound pressure level at 1 m distance) with

Sound enclosure

The measurements led to the following results:

	Sound power level / dB (A)
Mouth exhaust pipe	73,1
CHP Power Unit	62,2

Table 1: Summary XRGI 20.

2. Task

The CHP is equipped with a soundproof capsule. The aim of the measurements is

To determine the following characteristics of the sound emission by Engineering method:

- Sound power level of the chimney outlet
- Sound power level of the Power Unit with soundproofing capsule

3. Used measuring instruments

For the measurements and the evaluation of the measurements, the following devices used:

Device	Type	Manufacturer	Serial no.	calibrated to
Detailer's sound level meter	SVAN 945A	Svantec	6439	2017
Microphone Preamplifier	SV 11	Svantec	5863	2017
Free Field Microphone	40AN	G.R.A.S.	42885	2017
Acoustic Calibrator	4231	B & K	2463682	2017
Precision measuring device for Temperature, humidity and airspeed	Therm 2285-2 B	AMR	921445	

Tab. 2: Measuring instruments.

The measuring chain of the devices used was before and after the measurements respectively checked. No deviations were found.

There were no indications of errors in the measuring chains.

4. Weathering when measuring the mouth of the exhaust pipe

Temperature: 15 ° C, relative humidity 86%, coverage 100%.

5. Basics

DIN ISO 3744: 2011-02 Determination of sound power and sound energy levels
of noise sources from sound pressure measurements -
Engineering method the accuracy class 2 for a im
Substantial free sound field over a reflective
Level of February 2011

DIN 45635-47: 1985-06 Noise measurement on machines; Airborne noise,
Enveloping surface method; chimneys

6. Execution and evaluation of the measurements

The measurements of the sound power level of the mouth of the exhaust pipe
were carried out on 08.11.2017 at the factory in Hinnerup in the outdoor area.

The measurements of the sound power level of the Power Unit were made on 09.11.2017
in the anechoic room at DELTA - a part of FORCE Technology, Agro Food

Park 13, DK-8200 performed. It is a room-in-room construction.

The results are in the relevant frequency range of 25 Hz-10 kHz in specified third-octave bandwidth.

The operating condition has been set: nominal load 20 kW_{el}.

7. Name and data of the tested module

There were identical but different Power Units used for the two measurements.

Tab. 3: Technical data and dimensions of the modules.

Power Unit type	XRGI 20
Dimensions (L * W * H)	750 * 1170 * 1120 mm
Operating weight approx.	750 kg
Electric power	20 kW _{el}
Heat output	38.7 kW _{th}
Engine type	4-stroke gas Otto suction engine
Serial no. (Exhaust gas measurement)	0517000242
Serial no. (Module measurement)	0517000239
Year of construction (exhaust gas measurement)	2017
Year of manufacture (module measurement)	2017

8. Measuring points and measuring methods

8.1 Exhaust pipe

It was determined the sound pressure level, which over the mouth of the Exhaust pipe is radiated to the environment.

The sound power level was determined according to DIN 45635 Part 47.

Excerpt from DIN 45635, part 47, chap. 5.4 Measuring surface, position and number of Measuring points:

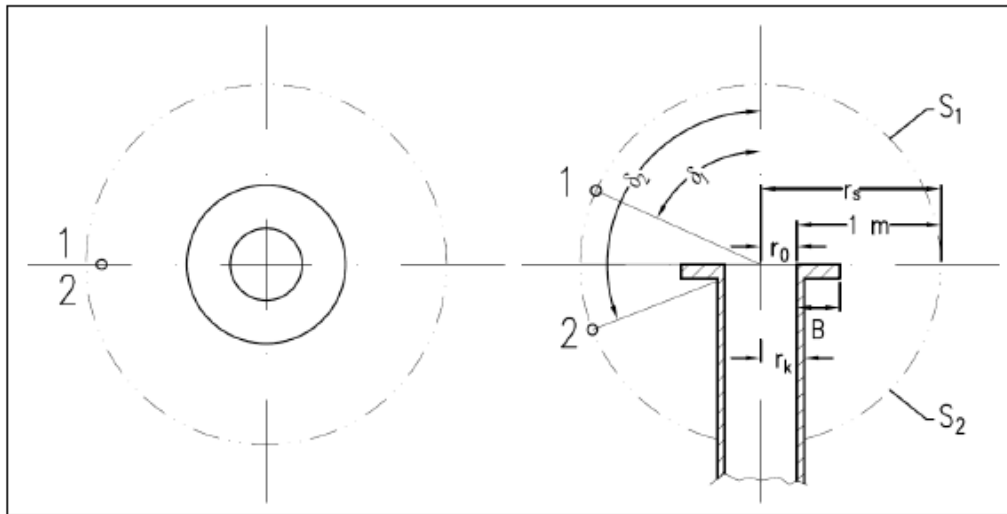


Fig. 1: Top view and side view of the chimney and the measuring points.

Where:

$$S_1 = 2 \pi r_s^2$$

$$S_2 = 2 \pi r_s \sqrt{r_s^2 - r_k^2} \quad \text{mit } r_s = r_0 + 1 \text{ m}$$

$$70^\circ \leq \delta_1 \leq 80^\circ$$

$$100^\circ \leq \delta_2 \leq 110^\circ$$

The measurements took place outdoors. The module will normally operate with an exhaust pipe with diameter DN 60. The diameter of the exhaust pipe during the measurement was DN 80. The exhaust pipe was led up to the edge of the building to 2 m above the flat roof.

8.2 Power Unit

The sound power level was determined by means of Engineering method according to DIN EN ISO 3744. The measuring surface sound pressure level was measured at the following measuring points.

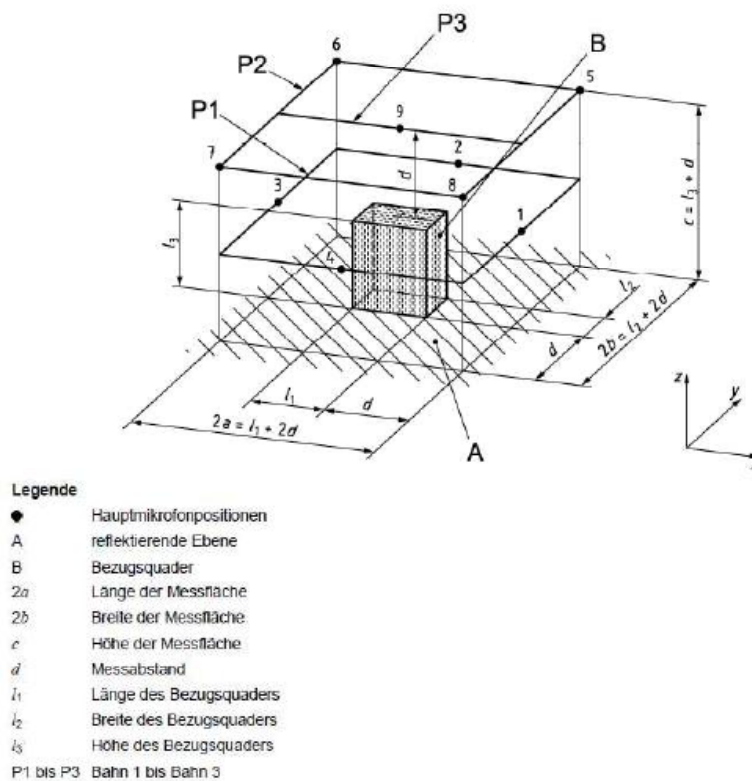


Bild C.7 — Beispiel für eine Messfläche mit Mikrofonpositionen und -bahnen bei einer kleinen Maschine (mit den Abmessungen $l_1 \leq d$, $l_2 \leq d$, $l_3 \leq 2d$)

Fig. 2: Site plan of the measuring points.

The measuring distance was $d = 1.2$ m.

Tab. 4: Power Unit dimensions.

Length	1.12	m
Width	0.75	m
Height	1.20	m

The dimensions of the envelope are:

Tab. 5: Envelope dimensions.

Long sides	16,9	m^2
Front and back	15.1	m^2
Top	11.1	m^2
Total	43.1	m^2
Area measure L_s	16.3	dB

9. Foreign noise

9.1 Mouth of the exhaust pipe

The noise level was due to fluctuating traffic noise in the Environment given. For the evaluation of the constant sound of the Mouth of the exhaust pipe quiet phases were used.

To increase the noise margin to at least $\Delta L = 10$ dB, was measured at a distance of 0.5 m from the edge of the exhaust pipe.

9.2 Power Unit

The external noise level was $\Delta L > 15$ dB below the noise to be measured.

10. Evaluation

10.1 Mouth of the exhaust pipe

Tab. 6: Sound power level exhaust pipe XRG1 20.

Frequency [Hz]	Sound Power Level L _{WA} / dB (A)
Frequenz [Hz]	Schallleistungs- pegel L _{WA} / dB(A)
25	17,7
31,5	22,3
40	28,2
50	52,3
63	39,3
80	41,9
100	49,8
125	43,8
160	45,7
200	54,3
250	60,9
315	60,1
400	53,7
500	47,2
630	61,7
800	63,8
1000	65,6
1250	62,6
1600	59,7
2000	67,2
2500	60,9
3150	54,4
4000	41,4
5000	34,7
Summe	73,1

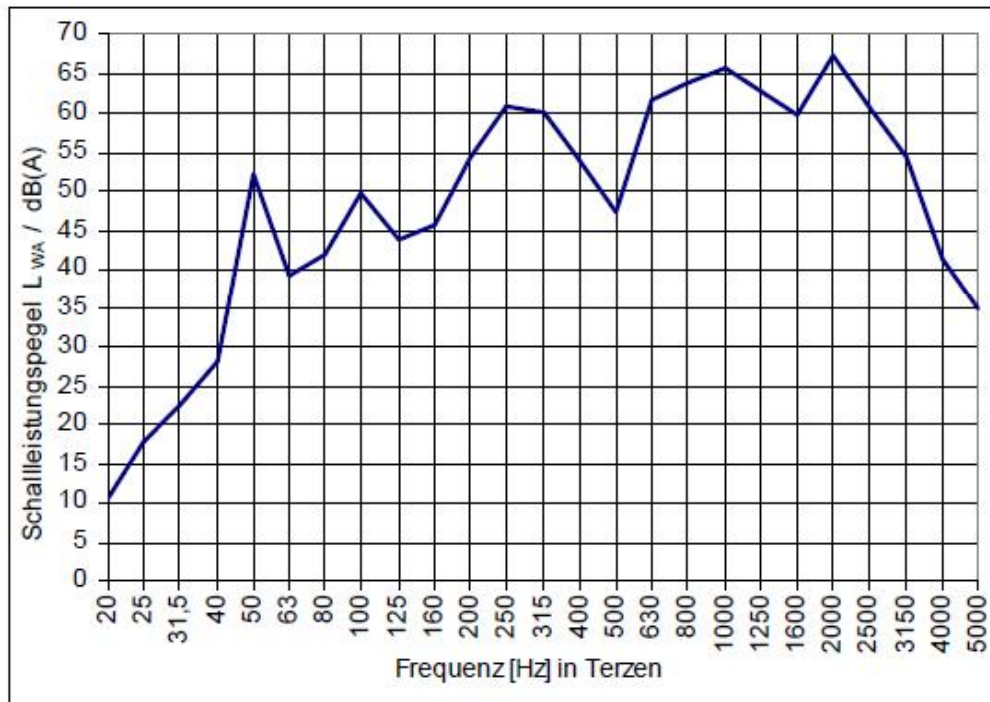


Fig. 3: Sound power level of the mouth of the XRG1 20 exhaust pipe.

10.2 Power Unit

Tab. 7: Measuring surface sound pressure level (measuring distance 1.2 m),
Ambient correction and sound power level XRG1 20.

Frequency [Hz]	Measuring surface Sound Pressure Level L_{pf} / dB (A)	Environmental correction K_2 / dB	Sound power level L_{WA} / dB (A)
Frequenz [Hz]	Messflächen- Schalldruckpegel L_{pf} / dB(A)	Umgebungs-korrektur K_2 / dB	Schallleistungs- pegel L_{WA} / dB(A)
25	9,9	4,0	22,2
31,5	-4,5	3,9	7,9
40	15,9	4,0	28,2
50	40,3	3,9	52,7
63	31,3	4,0	43,7
80	29,8	3,8	42,3
100	33,7	4,0	46,0
125	29,9	3,9	42,3
160	35,8	3,9	48,3
200	34,5	3,0	47,8
250	36,7	2,8	50,3
315	39,7	2,4	53,6
400	35,0	2,0	49,3
500	35,1	2,0	49,5
630	36,8	1,6	51,5
800	37,6	1,7	52,3
1000	35,7	1,5	50,5
1250	31,4	1,4	46,4
1600	33,7	1,7	48,4
2000	31,8	1,6	46,6
2500	31,0	1,1	46,2
3150	31,3	1,2	46,5
4000	28,1	1,3	43,2
5000	27,3	1,3	42,3
6300	24,2	1,1	39,5
8000	24,9	1,3	40,0
10000	21,2	1,9	35,7
Summe	48,3		62,2

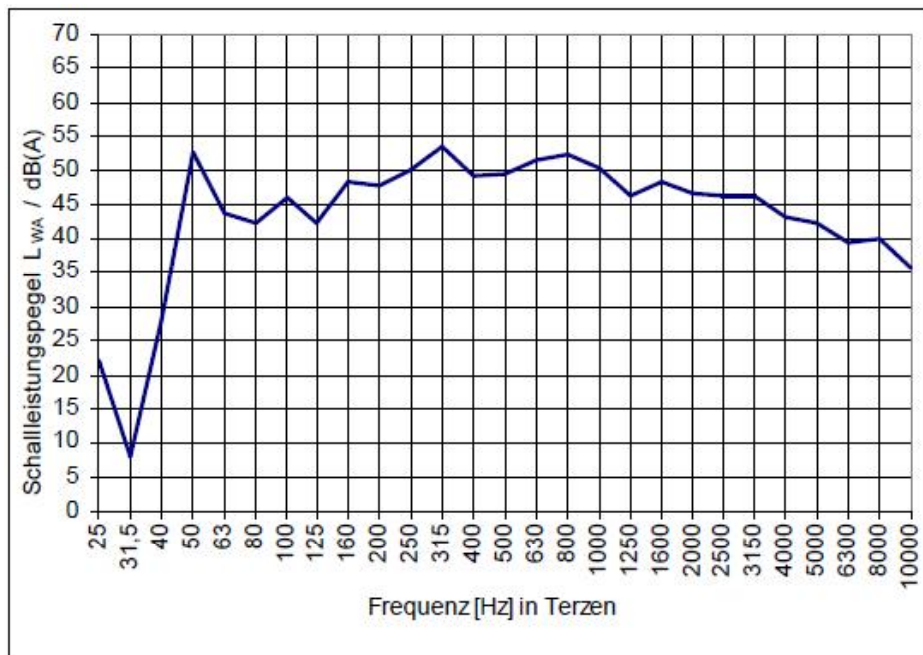


Fig. 4: Sound power level of the Power Unit XRGI 20.

11. Statements of accuracy

11.1 Mouth of the exhaust pipe

Due to the constancy of the operating conditions, according to chapter 8 the above mentioned standard estimated the uncertainty of the measurement results by ± 2 dB.

11.2 Power Unit

The typical upper limit of the comparison standard deviation of the method σ_{R0} is used for noise sources whose level-determining energy components in the frequency range 400-5,000 Hz, in the table H1 of the above mentioned Standard given with $\sigma_{R0} = 1.5$ dB.

12. Readings

12.1 Mean values of measuring points, sound pressure level at mouth of exhaust pipe

The following table shows the measuring surface sound pressure levels. These are energy mean values L_{Aeq} / dB (A).

Average
measuring points
1 and 2

Frequency [Hz]

Mittelwert Messpunkte 1 und 2		Frequenz [Hz]																								
		25	31,5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	Summe
		12,1	16,7	22,5	46,6	33,7	36,2	44,2	38,2	40,1	48,7	55,3	54,4	48,1	41,6	56,0	58,2	60,0	57,0	54,1	61,6	55,2	48,7	35,8	29,1	67,4

12.2 Measurements envelope surface Power Unit

The following table shows the measurement surface sound pressure levels (measurement distance 1.2 m, L_{Aeq} / dB (A)).

Measuring
point No.

Frequency [Hz]

Messpunkt	Frequenz [Hz]																											Summe
	Nr.	25	31,5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	
1	8.8	-8.7	19.4	42.8	37.9	26.9	34.7	25.3	35.9	33.7	31.9	38.5	33.8	34.0	33.2	35.0	29.4	27.7	27.4	31.2	29.9	27.9	23.0	21.4	20.4	19.2	14.1	47.8
2	14.1	-0.3	16.5	43.7	32.3	28.3	31.3	32.8	37.2	35.2	40.5	44.2	40.3	40.4	42.8	43.5	41.4	37.3	39.9	35.8	33.2	36.8	33.0	34.0	28.3	29.3	24.3	52.7
3	9.5	-6.5	20.2	43.3	31.0	32.4	32.9	35.0	36.9	34.0	37.7	39.0	37.0	36.7	37.3	33.6	34.3	29.2	31.8	32.1	31.4	29.0	27.3	25.2	24.0	25.4	21.2	49.0
4	9.5	-3.7	15.4	39.9	30.9	29.3	33.3	29.5	35.4	34.0	36.2	39.2	34.5	34.7	36.3	37.2	35.2	31.0	33.2	31.4	30.6	30.9	27.7	26.8	23.8	24.5	20.8	47.8
5	9.8	-5.6	9.5	32.2	27.0	31.6	35.3	27.7	33.0	33.6	35.4	37.1	30.5	33.0	36.5	38.0	36.7	30.9	33.8	33.7	32.5	31.4	29.3	26.3	25.0	24.8	21.5	47.0
6	10.4	-6.9	4.5	31.4	27.2	26.7	32.8	26.6	34.5	36.1	34.1	40.8	32.4	34.3	35.8	39.4	36.6	33.0	33.6	31.3	32.8	33.0	28.9	25.9	26.0	27.2	22.1	47.7
7	2.3	-4.0	12.0	37.7	16.5	24.9	30.7	27.8	34.7	32.7	36.6	38.6	30.0	32.2	31.3	30.5	28.7	25.0	28.9	28.0	29.7	27.3	26.7	24.4	23.3	23.2	22.6	45.5
8	1.9	-5.8	15.6	34.5	24.1	31.7	36.2	27.4	34.2	34.6	37.0	32.2	30.2	28.0	28.8	29.6	28.3	25.7	27.6	27.7	26.9	26.9	22.7	21.3	20.3	21.3	21.7	44.6
9	11.1	-4.4	10.5	40.6	27.1	30.2	33.5	25.6	38.2	35.3	35.6	39.1	33.8	31.1	32.2	33.3	32.8	27.4	30.0	28.2	28.2	26.1	24.3	20.4	18.5	17.7	12.7	47.0

Appendix G

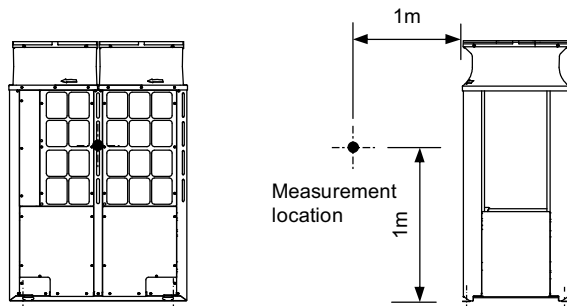
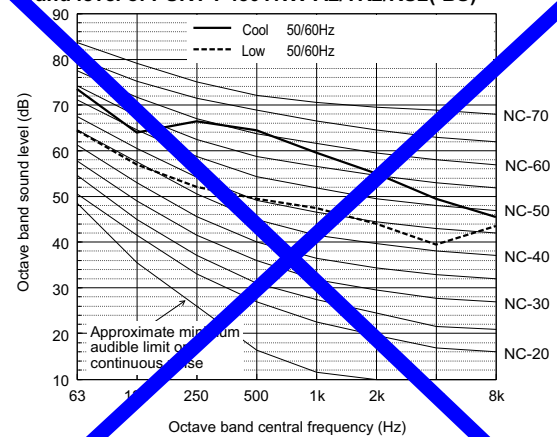
VRF Condenser

1. SPECIFICATIONS

R2-Series

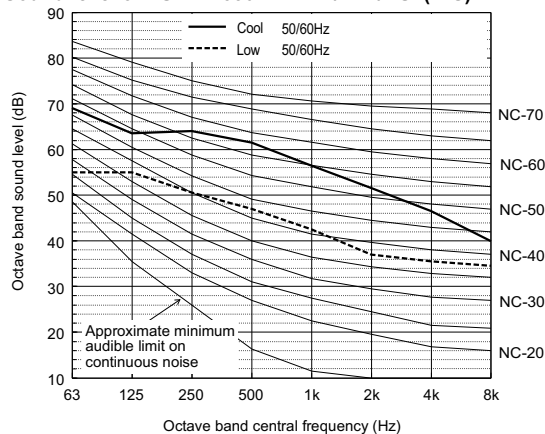
Model			PURY-P350YNW-A2/TR2/RU2 (-BS)					
Power source			3-phase 4-wire 380-400-415 V 50/60 Hz					
Cooling capacity		*1	kW	40.0				
			BTU/h	136,500				
		Power input	kW	14.92				
		Current input	A	25.1-23.9-23.0				
		EER	kW/kW	2.68				
		SEER	kW/kW	5.98				
Temp. range of cooling	*4	Indoor	W.B.	15.0~24.0°C (59~75°F)				
		Outdoor	D.B.	-5.0~52.0°C (23~126°F)				
Heating capacity (Max)		*2	kW	45.0				
			BTU/h	153,500				
		Power input	kW	13.88				
		Current input	A	23.4-22.2-21.4				
		COP	kW/kW	3.24				
		(Nominal)	*3	kW	40.0			
				BTU/h	136,500			
			Power input	kW	10.89			
			Current input	A	18.3-17.4-16.8			
			COP	kW/kW	3.67			
			SCOP	kW/kW	3.53			
			Temp. range of heating	*4	Indoor	D.B.	15.0~27.0°C (59~81°F)	
					Outdoor	W.B.	-20.0~15.5°C (-4~60°F)	
Indoor unit connectable		Total capacity		50~150% of outdoor unit capacity				
		Model/Quantity		P10~P250, M20~M140/1~35				
Sound pressure level (measured in anechoic room) *5, 6			dB <A>		62.5/64.0			
Sound power level (measured in anechoic room) *5			dB <A>		81/83			
Refrigerant piping diameter		High pressure		mm (in.)				
		Low pressure		mm (in.)				
FAN		Type x Quantity		Propeller fan x 2				
		Air flow rate		m³/min				
				L/s				
				cfm				
		Control, Driving mechanism		Inverter-control, Direct-driven by motor				
		Motor output		kW				
		External static press.		0 Pa (0 mmH₂O)				
Compressor		Type x Quantity		Inverter scroll hermetic compressor x 1				
		Starting method		Inverter				
		Motor output		kW				
		Case heater		kW				
		Lubricant		MEL32				
External finish			Pre-coated galvanized steel sheets (+powder coating for -BS type)					
			<MUNSELL 5Y 8/1 or similar>					
External dimension H x W x D		mm		1,858 (1,798 without legs) x 1,240 x 740				
		in.		73-3/16 (70-13/16 without legs) x 48-7/8 x 29-3/16				
Protection devices		High pressure protection		High pressure sensor, High pressure switch at 4.15 MPa (601 psi)				
		Inverter circuit (COMP./FAN)		Over-heat protection, Over-current protection				
		Compressor		-				
		Fan motor		-				
Refrigerant		Type x original charge		R410A x 8.0 kg (18 lbs)				
		Control		Indoor LEV and BC controller				
Net weight		kg (lbs)		269 (594)				
Heat exchanger			Salt-resistant cross fin & copper tube					
HIC circuit (HIC: Heat Inter-Changer)			-					
Defrosting method			Auto-defrost mode (Reversed refrigerant cycle)					
Drawing		External		WKB94C4WE				
		Wiring		WKE94L191				
Standard attachment		Document		Installation Manual				
		Accessory		-				
Optional parts			Joint: CMY-Y102SS-G2, CMY-Y102LS-G2, CMY-R160-J1 BC controller: CMB-M104, 106, 108, 1012, 1016V-J1 Main BC controller: CMB-M108, 1012, 1016V-JA1, CMB-P1016V-KA1 Sub BC controller: CMB-M104, 108V-KB1					
Remarks			Details on foundation work, duct work, insulation work, electrical wiring, power source switch, and other items shall be referred to the Installation Manual. Due to continuing improvement, above specifications may be subject to change without notice.					

Notes:		Unit converter
1. Nominal cooling conditions (subject to JIS B8615-2) Indoor: 27°CDB./19°CWB. (81°FDB./66°FWB.), Outdoor: 35°CDB./24°CWB. (95°FDB./75°FWB.) Pipe length: 7.5 m (24-9/16 ft.), Level difference: 0 m (0 ft.)		BTU/h = kW x 3,412
2. Nominal heating conditions (subject to JIS B8615-2) Indoor: 20°CDB. (68°FDB.), Outdoor: 7°CDB./6°CWB. (45°FDB./43°FWB.) Pipe length: 7.5 m (24-9/16 ft.), Level difference: 0 m (0 ft.)		cfm = m ³ /min x 35.31
3. Nominal heating conditions (subject to JIS B8615-2) Indoor: 20°CDB. (68°FDB.), Outdoor: 7°CDB./6°CWB. (45°FDB./43°FWB.) Pipe length: 7.5 m (24-9/16 ft.), Level difference: 0 m (0 ft.) Eurovent registered		lbs = kg/0.4536
4. -10 °CDB. (14 °FDB.)/-11 °CWB. (12 °FWB.) to 21 °CDB. (70 °FDB.)/15.5 °CWB. (60 °FWB.) with cooling/heating mixed operation.		
5. Cooling mode/Heating mode		
6. The sound pressure level measured by the conventional method in JIS for reference purpose.		
7. External static pressure option is available (30 Pa, 60 Pa, 80 Pa/3.1 mmH ₂ O, 6.1 mmH ₂ O, 8.2 mmH ₂ O). Consult your dealer about the specification when setting External static pressure option.		*Above specification data is subject to rounding variation.

Measurement condition
PURY-P350, 400, 450YNW-A2/TR2/RU2(-BS)

Sound level of PURY-P450YNW-A2/TR2/RU2(-BS)


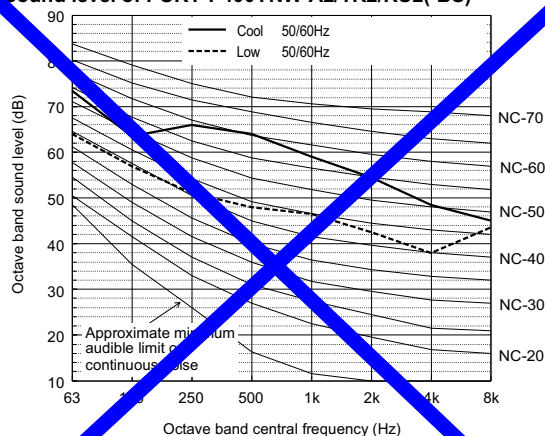
		63	125	250	500	1k	2k	4k	8k	A
Standard Cooling	50/60Hz	73.5	64.0	66.5	64.5	59.5	55.0	49.5	45.5	53.5
Low noise mode	50/60Hz	64.5	57.0	52.0	49.5	47.5	44.0	39.5	43.5	53.5

When Low noise mode is set, the A/C system's capacity is limited. The system could return to normal operation from Low noise mode automatically in the case that the operation condition is severe.

Sound level of PURY-P350YNW-A2/TR2/RU2(-BS)


		63	125	250	500	1k	2k	4k	8k	A
Standard Cooling	50/60Hz	69.0	63.5	64.0	61.5	56.5	51.5	46.5	40.0	62.5
Low noise mode	50/60Hz	55.0	55.0	50.5	47.0	42.5	37.0	35.5	34.5	49.0

When Low noise mode is set, the A/C system's capacity is limited. The system could return to normal operation from Low noise mode automatically in the case that the operation condition is severe.

Sound level of PURY-P400YNW-A2/TR2/RU2(-BS)


		63	125	250	500	1k	2k	4k	8k	A
Standard Cooling	50/60Hz	73.5	63.5	66.0	64.0	59.0	54.5	48.5	45.0	65.0
Low noise mode	50/60Hz	64.0	57.0	51.0	48.0	46.5	42.5	38.0	43.5	53.0

When Low noise mode is set, the A/C system's capacity is limited. The system could return to normal operation from Low noise mode automatically in the case that the operation condition is severe.

- Depending on the operation conditions, the unit generates noise caused by valve actuation, refrigerant flow, and pressure changes when operating normally. Please consider to avoid location where quietness is required. For BC controller, it is recommended to be installed in places such as ceilings of corridor, rest rooms and plant rooms. The sound pressure level measured by the conventional method in JIS for reference purpose.