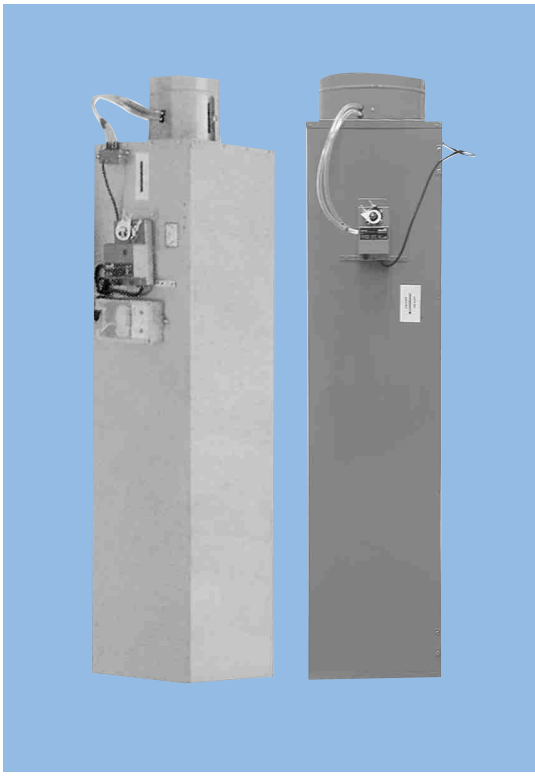
VAV - A (High-speed variable volume flow) Controls For Laboratories and Industrial Applications



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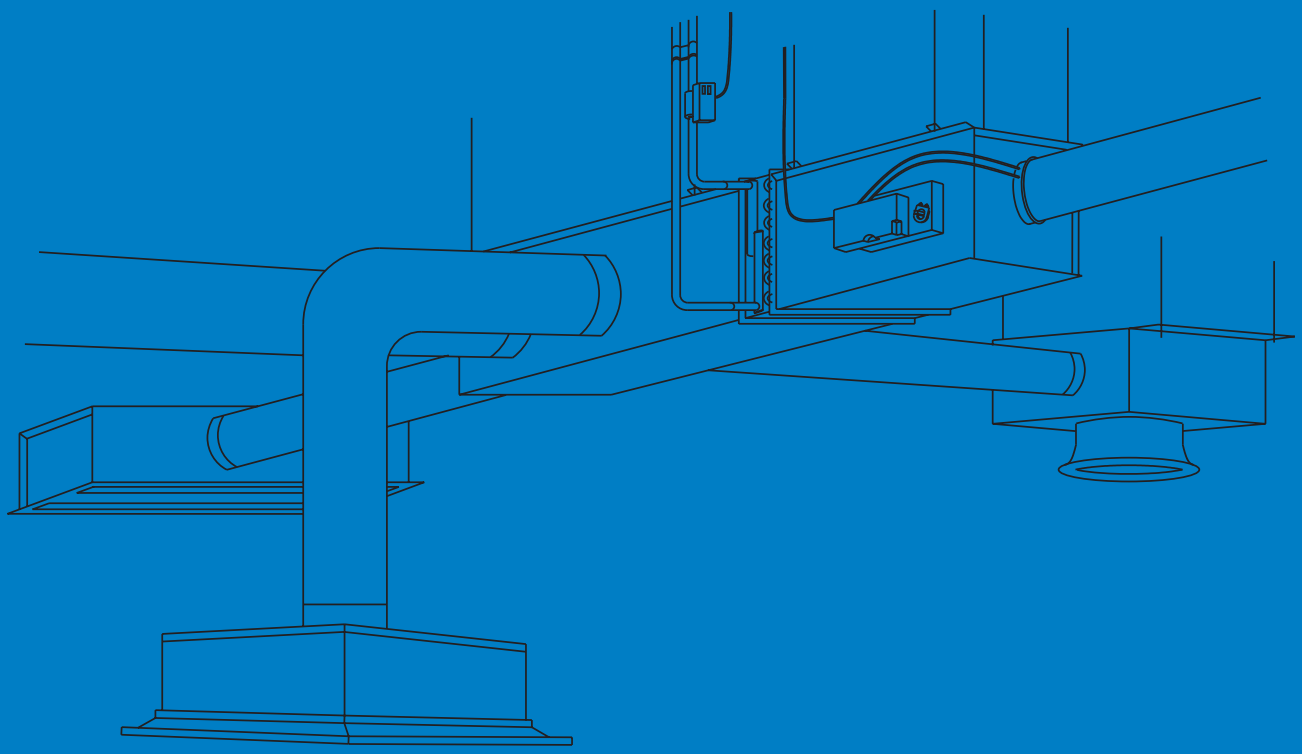

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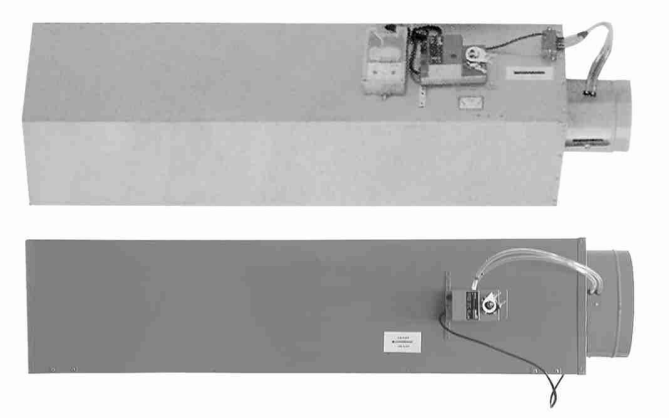
VAV-A (High-speed variable volume flow) Controls For Laboratories and Industrial Applications



Variable volume controls are designed to save energy by reducing the amount of air in Laboratory airflow control such as extracted by a fume cupboard, exhaust hoods and intake air. Extracting less air means less replacement air is needed. It is the heating, cooling and conditioning of this replacement air that uses the majority of energy associated with running a fume cupboard.
As a fume cupboard sash is lowered, the opening area is reduced and less volume of air is required to provide the same velocity of air across the opening. A VAV control monitors the height of the sash or the face velocity and adjusts the extract volume accordingly, using a fast-acting motorised damper or similar.

ELEKTROTEKNIK VAV-A units can supply and install VAV control systems as part of a new fume cupboard / laboratory installation. Equally, we can install VAV controls retrospectively to existing fume cupboards as part of an energy saving exercise.
As well as the controls themselves we offer a number of ancillary items designed to maximise the energy savings VAV control offers, items such as:

1- Keeping a constant and proper face flow rate when the sash position change improve the safety.
2- VAV control system easily adapting to the system change could increase the flexibility of the laboratory.
3- All alarm and monitor function are typical components of VAV system.
4- Auto sash closure devices and reminders.
5- Supply air and room pressure control.

VAV-A High-speed variable volume flow controller Specs:

* High-speed, adaptive control algorithm for precise and stable control
* Control time 3-5 s for a 90° angle
* Suitable for supply air and exhaust air volume flow control in laboratories and clean rooms
* Free programming of system data and retrieval of all actual values
* Monitoring of the customer ventilation system by integrated monitoring of the supply air/exhaust air setpoint that is to be regulated
* Static differential pressure transmitter for continuous measurement of the actual value within the range 3...300 pa (optionally 8...800 pa) with high long-term stability

Laboratory airflow control

The ELEKTROTEKNIK's VAV-A is the unifying element and the core of the laboratory airflow management system. It provides the following functions :

• Air volumes summation
• Laboratory make-up air control
• Temperature control
• Communication with BMS.

The VAV-A is a room controller that makes it possible both to control the temperature and the airflow in ΔP (pressure/vacuum control) or in ΔQ (airflow control). It carries out the summation of airflows, the air change rate and the temperature control. The VAV-S includes a differential pressure sensor, which makes it possible to control the make-up air.

The VAV-A's can communicate with any BMS.

The VAV-A is made up of the following elements :

• Electronics that include the computer, the differential pressure sensor, the input/output modules and the terminal boards.
• A motorised damper, made out of galvanised steel, equipped with a differential pressure measurement sensor that measures the airflows.
• A module for displaying the temperature, airflow rates, alarms and set values.

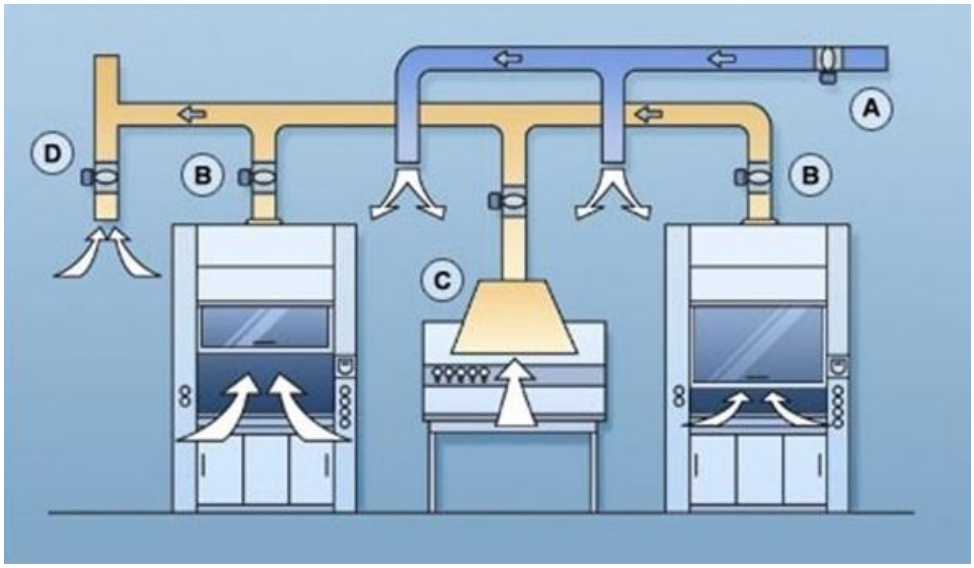
When the air change rate requires it, a VAV-A's, complementary exhaust regulator, controlled by the VAV-A, is added to the network in order to very finely tune the make-up air.

Operating Principle

The principle of the VAV (Variable Air Volume) system in the laboratory consists in continuously adjusting the air exhaust and delivery rates in order to ensure containment in an optimum manner.

The different elements are managed by means of the following equipment :

Fume cupboards :
Exhaust hoods :
Laboratory :
Complementary exhaust :



A-Variable airflow air delivery regulator
B- Variable airflow fume cupboard exhaust, as a function of the opening of the sash
C- Variable airflow hood exhaust, 2 to 3 airflows
D-Complementary back up exhaust, which controls the air circulation rate

Fume cupboards :
Each fume cupboard is equipped with a VAV-A, face velocity and airflow management control system, which operates autonomous. The face velocity control maintains constant the air velocity at the fume cupboard sash, independently of its opening height and the pressure in the ductwork, by managing the exhaust airflow.

Laboratory :
The fume cupboards airflow values are collected and transmitted to the VAV-A . The VAV-A is at the very heart of the airflow control of the laboratory. It controls the make-up air, the temperature, the transmission of alarms and, if necessary, the complementary exhaust which ensures the air change rate, if the summation of all the fume cupboards extracted air volume is insufficient.

All the informations concerning the airflow, alarms and commands are transmitted from the different units to the VAV-A. Communication with the BMS is ensured via an external network.

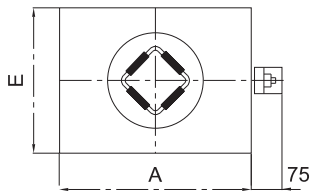
Outside air compensates the extracted air in real time, while assuring the depression of the premises. The safety of the premises depends on this balance.

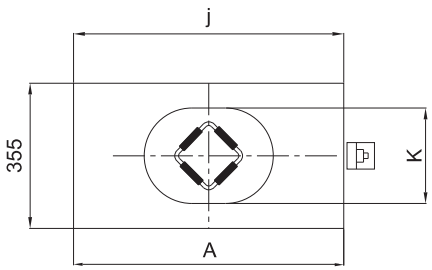
The VAV technique, which brings into play complex regulation loops, enables the energy consumption to be finely tuned to the actual requirements of the laboratory and thus to achieve very significant energy savings. The control system is therefore of key importance.

VAV-A (High-speed variable volume flow) Controls For Laboratories and Industrial Applications

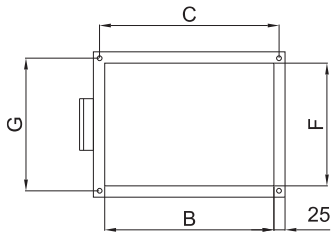
TECHNICAL DETAILS

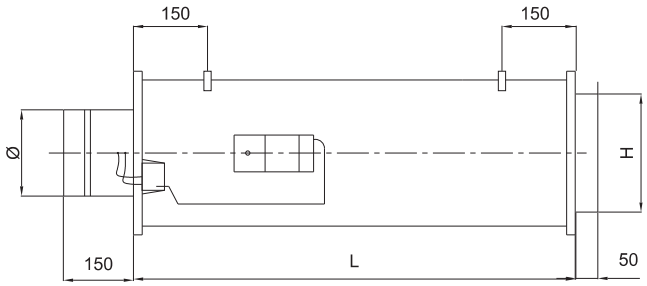
Left side view

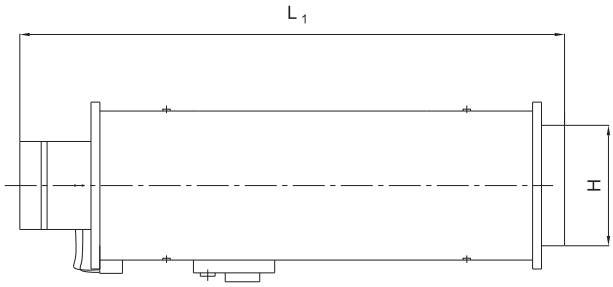




Right side view







Size	Air Volume (m3/h)		A	B	C	ØD	E	F
	Min.	Max.						
125	50	500	250	200	220	123	255	200
160	100	1000	300	250	170	158	255	200
200	140	1400	400	400	420	198	255	200
250	225	2250	450	400	420	248	355	300
315	360	3600	650	600	620	313	355	300
355	450	4500	750	700	720	353	355	300
400	600	6000	900	850	870	398	355	300

Si e	G	H	J	K	L	L1
125	220	200	-	-	1200	1400
160	220	200	-	-	1200	1400
200	220	200	-	-	1200	1400
250	320	300	-	-	1500	1700
315	320	300	-	-	1500	1700
355	320	300	384	298	1800	2000
400	320	300	455	298	1800	2000

VAV-A (High-speed variable volume flow) Controls For Laboratories and Industrial Applications

Sound Pressure Level

Sound Pressure Level Caused by Air (Supply Air)

Size	q_v	p_s= 100 Pa (L_w)								p_s= 200 Pa (L_w)							
	m^3/h	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	NR	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	NR
		dB								dB							
125	200	37	33	24	18	<	<	<	15	40	35	25	20	16	<	<	18
	300	40	36	27	22	17	<	<	18	42	38	30	24	19	15	<	20
	400	44	39	31	26	20	<	<	21	46	41	34	28	22	17	15	23
	500	46	42	35	30	24	<	<	24	48	44	38	31	25	18	15	26
	m^3/h	125	250	500	1000	2000	4000	8000	NR	125	250	500	1000	2000	4000	8000	NR
160	200	37	33	26	18	<	<	<	15	41	35	27	20	17	16	<	17
	400	38	33	29	20	<	<	<	17	41	35	30	26	17	<	<	18
	600	45	39	35	27	18	<	<	23	48	41	36	29	21	18	18	24
	800	51	44	40	30	25	17	15	28	53	46	41	32	26	21	20	29
	m^3/h	125	250	500	1000	2000	4000	8000	NR	125	250	500	1000	2000	4000	8000	NR
200	600	39	33	28	24	16	15	18	17	41	35	28	26	18	16	18	18
	800	43	34	31	22	17	15	18	18	44	37	33	27	20	17	20	20
	1000	46	40	35	27	19	16	19	22	48	41	36	29	21	18	20	22
	1400	52	45	41	31	25	18	20	28	54	47	42	33	26	22	22	29
	m^3/h	125	250	500	1000	2000	4000	8000	NR	125	250	500	1000	2000	4000	8000	NR
250	1400	46	38	31	26	19	16	20	20	50	41	35	29	22	20	25	23
	1600	47	42	35	28	22	18	21	23	50	44	38	32	26	25	25	25
	1800	50	44	35	28	22	19	21	26	52	46	39	32	26	25	28	28
	2000	53	46	39	31	25	21	23	27	54	46	40	33	28	26	28	28
	2400	56	50	43	37	30	25	26	32	57	51	45	38	32	29	31	33
	m^3/h	125	250	500	1000	2000	4000	8000	NR	125	250	500	1000	2000	4000	8000	NR
315	1200	45	37	29	23	16	15	<	18	48	41	32	25	20	20	18	22
	1800	45	38	31	25	19	15	18	20	48	42	33	27	23	20	21	24
	2400	48	41	34	27	22	20	19	24	51	45	37	30	27	24	23	28
	3000	52	46	36	30	25	18	18	28	54	48	42	34	30	28	29	31
	3600	55	49	40	34	28	21	21	31	57	51	46	37	34	32	31	33
	m^3/h	125	250	500	1000	2000	4000	8000	NR	125	250	500	1000	2000	4000	8000	NR
355	1500	45	38	29	24	19	17	15	20	48	42	32	26	23	22	20	24
	2000	49	37	28	25	20	17	15	23	52	43	33	27	25	23	21	26
	2600	52	40	31	26	22	20	19	27	55	44	33	28	26	25	25	30
	3600	55	43	33	29	25	22	21	30	57	48	36	32	30	27	27	32
	4500	57	50	38	34	29	20	20	33	59	53	40	36	34	30	29	36
	m^3/h	125	250	500	1000	2000	4000	8000	NR	125	250	500	1000	2000	4000	8000	NR
400	2600	47	36	26	24	20	17	<	21	50	41	32	26	24	23	22	23
	3600	53	41	32	26	23	20	20	27	56	46	34	29	26	25	25	31
	4500	54	44	34	30	25	23	22	28	57	48	37	32	29	27	27	32
	6000	57	51	38	35	31	24	23	34	60	54	40	37	35	30	30	37

VAV-A (High-speed variable volume flow) Controls For Laboratories and Industrial Applications

Sound Pressure Level

Sound Pressure Level Caused by Air (Supply Air)

Size	q_v	p_s= 500 Pa (L_w)								p_s= 750 Pa (L_w)							
	m^3/h	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	NR	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	NR
		dB								dB							
125	200	43	39	30	25	22	20	17	21	44	43	32	26	22	20	19	26
	300	47	41	34	26	23	19	18	24	48	44	35	28	24	20	18	27
	400	50	45	38	32	26	22	20	27	51	47	40	33	27	24	22	30
	500	53	48	42	36	28	23	21	31	54	50	44	37	30	25	22	33
	m^3/h	125	250	500	1000	2000	4000	8000	NR	125	250	500	1000	2000	4000	8000	NR
160	200	43	40	31	22	22	21	19	22	43	40	32	24	21	22	21	22
	400	45	40	33	27	22	23	20	22	46	41	36	29	24	23	24	25
	600	53	45	40	35	29	26	25	28	54	47	42	37	31	27	28	30
	800	58	50	46	38	32	28	30	34	58	52	47	39	34	28	31	35
	m^3/h	125	250	500	1000	2000	4000	8000	NR	125	250	500	1000	2000	4000	8000	NR
200	600	47	40	36	30	23	20	25	24	49	43	38	32	24	23	27	26
	800	49	44	40	33	27	20	23	28	50	46	42	36	29	24	27	30
	1000	55	46	44	35	28	22	24	32	56	49	44	38	30	27	28	32
	1400	59	53	48	39	31	29	31	36	60	55	49	41	34	29	32	38
	m^3/h	125	250	500	1000	2000	4000	8000	NR	125	250	500	1000	2000	4000	8000	NR
250	1400	55	46	42	37	29	29	31	31	55	48	42	38	34	33	33	31
	1600	55	47	42	37	30	29	33	30	55	49	44	39	35	33	34	32
	1800	56	49	43	39	33	31	35	32	57	52	45	40	36	34	38	35
	2000	58	52	44	40	34	33	36	35	59	54	47	42	37	36	39	37
	2400	60	55	48	42	36	36	38	38	61	55	50	44	42	39	39	38
	m^3/h	125	250	500	1000	2000	4000	8000	NR	125	250	500	1000	2000	4000	8000	NR
315	1200	52	45	35	31	27	26	25	27	54	47	37	34	29	28	27	30
	1800	53	46	38	31	28	28	30	29	56	50	41	36	32	32	34	33
	2400	56	50	42	36	33	31	30	33	58	52	45	39	35	34	34	35
	3000	59	54	47	39	36	34	33	37	61	56	49	42	38	37	36	39
	3600	62	57	50	40	39	37	37	40	64	60	51	44	41	39	39	43
	m^3/h	125	250	500	1000	2000	4000	8000	NR	125	250	500	1000	2000	4000	8000	NR
355	1500	55	48	36	31	29	30	28	30	58	51	38	33	32	31	30	33
	2000	49	37	28	25	20	17	15	23	52	43	33	27	25	23	21	26
	2600	61	52	40	34	30	29	28	35	63	54	44	37	32	31	30	38
	3600	62	55	44	38	34	30	29	38	64	58	48	40	36	32	32	41
	4500	66	60	51	43	40	37	38	44	67	61	54	45	42	38	40	45
	m^3/h	125	250	500	1000	2000	4000	8000	NR	125	250	500	1000	2000	4000	8000	NR
400	2600	57	49	38	31	29	28	27	32	58	52	40	33	30	29	28	33
	3600	62	53	40	35	32	28	27	37	63	55	44	37	32	29	28	39
	4500	63	53	44	39	33	29	29	38	64	58	47	40	35	32	32	40
	6000	65	59	50	43	40	36	36	42	67	60	51	44	42	37	37	43

VAV-A (High-speed variable volume flow) Controls For Laboratories and Industrial Applications

Sound Pressure Level

Sound Pressure Caused by Unit Body (Supply Air)

Size	q_v	p_s= 100 Pa (L_w)								p_s= 200 Pa (L_w)							
	m^3/h	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	NR	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	NR
		dB								dB							
125	200	41	34	23	17	15	<	<	15	45	35	25	18	15	15	<	18
	300	44	38	27	21	16	15	<a	20	47	38	30	22	17	20	18	21
	400	47	40	30	25	18	19	<	22	51	41	34	26	20	23	20	25
	500	51	43	36	29	21	19	16	25	53	44	38	30	23	24	20	27
	m^3/h	125	250	500	1000	2000	4000	8000	NR	125	250	500	1000	2000	4000	8000	NR
160	200	37	35	26	20	20	16	<	16	41	37	28	23	25	21	15	20
	400	39	35	27	21	23	19	15	17	40	35	29	28	24	20	17	20
	600	45	40	34	28	26	21	20	22	48	41	36	31	29	23	22	24
	800	49	44	40	32	30	20	19	27	52	46	42	34	33	26	24	30
	m^3/h	125	250	500	1000	2000	4000	8000	NR	125	250	500	1000	2000	4000	8000	NR
200	600	43	38	30	29	25	22	21	20	46	40	31	32	28	24	22	23
	800	46	40	34	28	25	21	21	22	49	42	35	32	29	24	24	24
	1000	50	44	38	31	28	23	22	25	53	46	39	35	31	26	25	28
	1400	56	49	42	36	35	24	23	31	59	52	44	39	35	28	26	35
	m^3/h	125	250	500	1000	2000	4000	8000	NR	125	250	500	1000	2000	4000	8000	NR
250	1400	45	39	34	29	23	18	16	22	50	42	38	33	26	22	23	26
	1600	47	42	37	32	25	23	20	25	50	45	41	36	30	27	25	28
	1800	49	44	39	33	27	25	23	26	52	47	43	36	30	27	27	31
	2000	51	46	41	36	28	26	24	29	53	48	42	38	32	28	28	30
	2400	55	50	45	42	33	28	26	34	57	53	47	43	36	32	30	36
	m^3/h	125	250	500	1000	2000	4000	8000	NR	125	250	500	1000	2000	4000	8000	NR
315	1200	45	38	31	28	22	19	17	20	48	42	34	30	25	22	28	24
	1800	47	40	33	30	25	22	21	22	48	43	35	32	28	22	21	26
	2400	49	45	36	33	29	26	23	26	51	46	39	35	33	26	23	28
	3000	52	48	39	35	31	27	26	30	54	49	44	39	35	30	28	32
	3600	53	50	42	39	34	30	28	32	57	52	48	42	39	34	31	36
	m^3/h	125	250	500	1000	2000	4000	8000	NR	125	250	500	1000	2000	4000	8000	NR
355	1500	46	37	32	27	22	19	19	20	47	40	33	28	26	22	20	22
	2000	50	39	34	29	24	22	20	23	51	41	35	30	28	24	22	26
	2600	53	41	34	30	29	25	22	26	54	43	35	31	29	26	24	28
	3600	56	46	37	34	31	26	24	28	56	47	38	35	33	28	26	31
	4500	57	51	40	38	34	30	27	33	58	52	42	39	36	31	28	35
	m^3/h	125	250	500	1000	2000	4000	8000	NR	125	250	500	1000	2000	4000	8000	NR
400	2600	48	35	29	27	24	20	18	22	49	39	33	28	27	23	22	23
	3600	54	43	35	29	28	25	24	28	55	44	35	31	29	26	24	29
	4500	53	47	37	34	30	27	25	29	56	47	39	35	32	28	26	31
	6000	57	52	42	39	36	32	29	35	59	53	42	40	37	31	28	36

VAV-A (High-speed variable volume flow) Controls For Laboratories and Industrial Applications

Sound Pressure Level

Sound Pressure Caused by nit Body (Supply Air)

Size	q_v	p_s= 500 Pa (L_w)								p_s= 750 Pa (L_w)							
	m^3/h	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	NR	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	NR
		dB								dB							
125	200	48	39	34	30	25	26	22	23	49	42	36	31	28	25	25	24
	300	52	41	38	31	26	25	23	26	53	45	41	33	30	25	25	29
	400	55	45	42	37	29	28	25	29	56	47	44	41	34	28	27	29
	500	58	48	46	41	31	29	26	34	60	50	47	42	37	30	28	33
	m^3/h	125	250	500	1000	2000	4000	8000	NR	125	250	500	1000	2000	4000	8000	NR
160	200	44	41	32	29	27	27	23	22	45	42	34	30	30	29	25	23
	400	45	40	33	29	30	28	24	22	47	41	36	31	31	30	27	24
	600	53	45	41	37	37	31	29	28	53	46	42	40	38	32	30	32
	800	58	50	47	40	40	33	33	35	58	51	47	43	41	37	34	36
	m^3/h	125	250	500	1000	2000	4000	8000	NR	125	250	500	1000	2000	4000	8000	NR
200	600	52	45	39	36	33	27	29	28	53	47	41	40	34	30	30	32
	800	54	49	43	39	37	28	28	32	54	50	44	42	37	33	32	32
	1000	60	51	47	41	35	30	29	35	61	53	47	43	37	35	34	35
	1400	63	58	51	44	41	36	36	41	64	59	51	46	42	37	35	41
	m^3/h	125	250	500	1000	2000	4000	8000	NR	125	250	500	1000	2000	4000	8000	NR
250	1400	55	47	45	41	33	31	30	33	56	49	46	48	36	33	33	34
	1600	55	48	45	41	34	31	31	33	56	49	47	42	37	34	33	35
	1800	56	50	47	44	37	34	34	36	56	52	48	44	38	35	35	36
	2000	58	53	47	43	38	33	33	36	58	54	49	45	40	39	37	37
	2400	60	57	52	47	40	39	38	40	61	57	53	49	45	42	39	41
	m^3/h	125	250	500	1000	2000	4000	8000	NR	125	250	500	1000	2000	4000	8000	NR
315	1200	52	46	37	36	32	28	25	27	53	47	39	38	35	31	30	30
	1800	43	47	40	36	33	30	30	29	56	50	43	40	38	34	33	33
	2400	56	51	44	41	35	33	30	34	60	56	47	46	42	37	35	37
	3000	59	55	49	44	41	35	33	38	62	58	51	47	43	39	37	39
	3600	62	58	52	45	44	39	37	41	64	60	53	48	46	41	39	43
	m^3/h	125	250	500	1000	2000	4000	8000	NR	125	250	500	1000	2000	4000	8000	NR
355	1500	54	47	37	33	31	29	25	29	56	49	41	35	32	30	27	31
	2000	57	49	40	35	32	30	26	32	59	52	45	37	34	32	28	34
	2600	60	52	42	37	33	30	27	36	61	54	49	40	36	32	28	37
	3600	61	55	46	41	34	31	28	38	62	57	52	44	39	34	32	40
	4500	63	58	51	45	42	36	34	41	64	59	54	47	43	37	36	42
	m^3/h	125	250	500	1000	2000	4000	8000	NR	125	250	500	1000	2000	4000	8000	NR
400	2600	57	48	40	33	31	27	24	32	56	50	43	35	32	30	25	33
	3600	62	52	42	38	34	27	25	37	61	54	47	40	35	28	26	37
	4500	63	52	46	42	34	30	28	38	62	57	50	44	38	34	34	40
	6000	64	58	52	45	42	35	32	41	64	58	51	46	43	42	38	41

Control Units

Technical data sheet

227CS-024-08-V

Actuator without spring return for flow- or pressure control with GUAC

Description

Actuator for adjusting air dampers of 90° angle of rotation to be used in HVAC installations.

- **Torque Motor** **8 Nm**
- **Nominal Voltage** **24 VAC/DC**
- **Control** **6 ± 4 VDC (of GUAC)**
- **Damper size** **up to approx. 1,6 m²**
- **Damper coupling** **Clamp**
  ◊ 8-12 mm / Ø 8-16 mm

Technical data

Nominal voltage	Nominal voltage	24 VAC/DC
	Nominal voltage range	19...29 VAC/DC
	Power consuption Motor (Motion)	12,0 W
	Power consuption Standby (end position)	5,5 W
	Wire sizing	16,0 VA
	Control	6 ± 4 VDC (of GUAC)
	Position feedback	-
	Auxiliary switch	-
	Contact load	-
	Switching point	-
	Connection Motor	-
	Connection Auxiliary switch	-
	Connection Position feedback	-
	Connection GUAC	Cable 1000 mm with Phoenix connector
Functional data	Torque Motor	>8 Nm
	Synchronised speed	-
	Direction of rotation	switchable by GUAC with GUIV
	Manual override	Gearing latch disengaged with pushbutton, self-resetting
	Angle of rotation	0°... max. 95° can be limited with adjustable mechanical end stop min 20°.
	Running time Motor	3...5 s / 90°
	Sound power level Motor	< 45 dB(A)
	Damper coupling	Clamp ◊ 8-12 mm / Ø 8-16 mm
	Position indication	mechanical with pointer
	Service life	>60'000 cycles (0° - 95° - 0°)

Technical data

Safety	Protection class	III (low voltage safety current)
	Degree of protection	IP54 (Cable downwards)
	EMC	CE (2004/108/EG)
	LVD	CE (2006/95/EG)
	RoHS	CE (2011/65/EU)
	Mode of operation	Typ 1 (EN 60730-1)
	Rated impulse voltage	0,8 kV (EN 60730-1)
	Control pollution degree	3 (EN 60730-1)
	Ambient temperature Normal operation	-30°...+50°
	Storage temperature	-30°...+80°
	Ambient humidity	5...95% r.F., non- condensating (EN 60730-1)
	Maintenance	maintenance free
Dimensions/ Weight	Dimensions	115 x 65 x 89 mm
	Weight	ca. 530 g

Operating mode / Properties

Operating mode

Through connecting the power supply to BU+BN (1+2) with a standard signal Y to BK (3) of 6 ± 4 VDC (GUAC), moves the actuator to its specified position. The actual damper position 0…100% is provided as a feedback signal U.

The actuator is overload-proof, requires no limit switches and automatically stops when the end stop is reached.

Direct mounting

Simple direct mounting on the damper spindle with a universal spindle clamp, supplied with an anti-rotation strap to prevent the actuator from rotating.

Direct connection (GUAC)

Simple direct mounting to the actuator used by Phoenix - plug - connection.

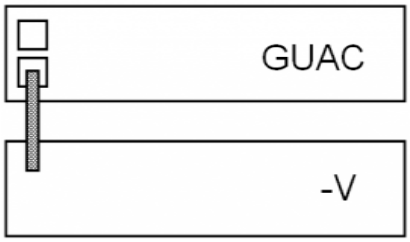
assembly (GUAC)

Easily attach with mounting tabs on the device.

Manual override

Manual override is possible with the self-resetting pushbutton (the gearing latch remains disengaged as long as the pushbutton is pressed)

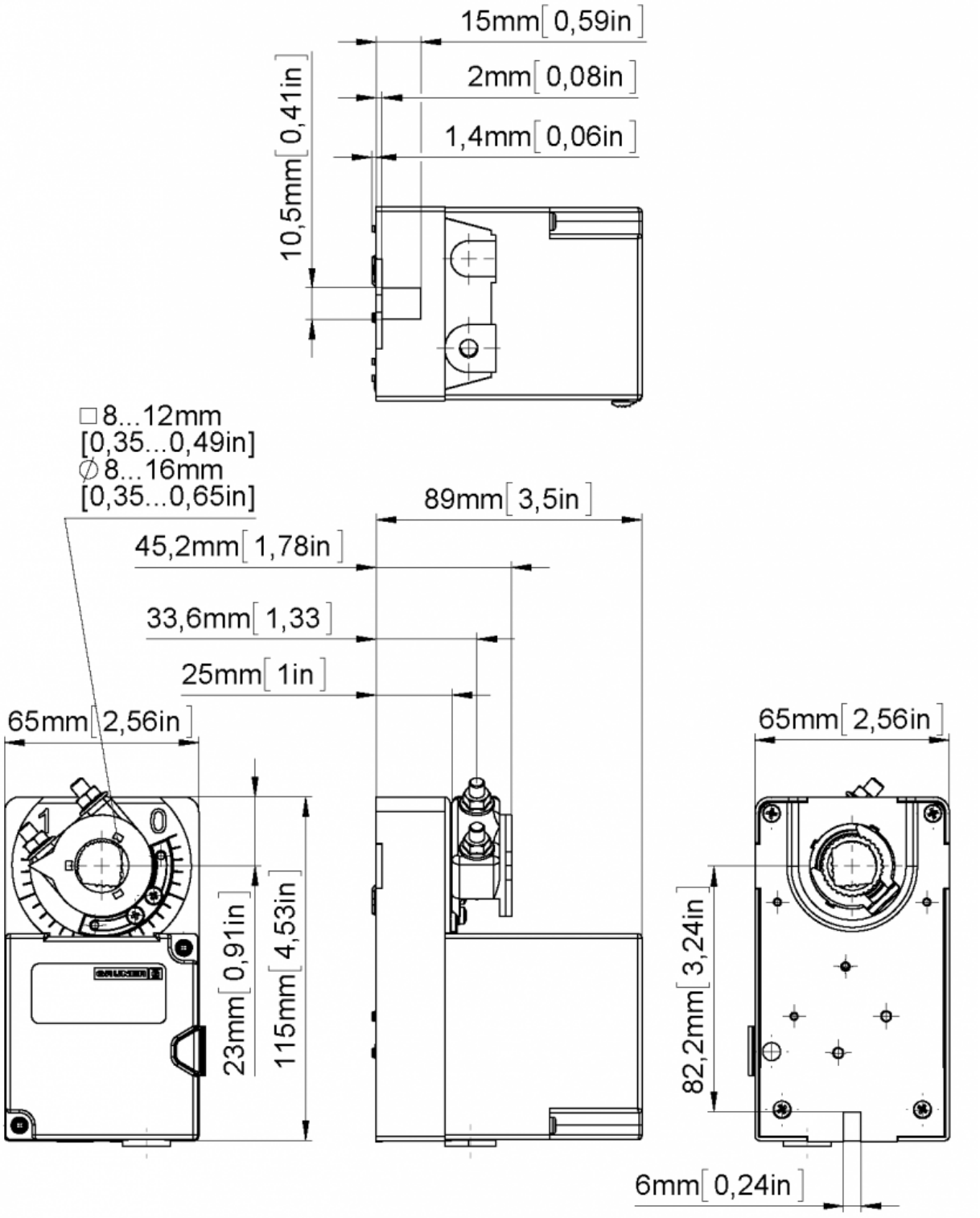
Connection / Safety remarks

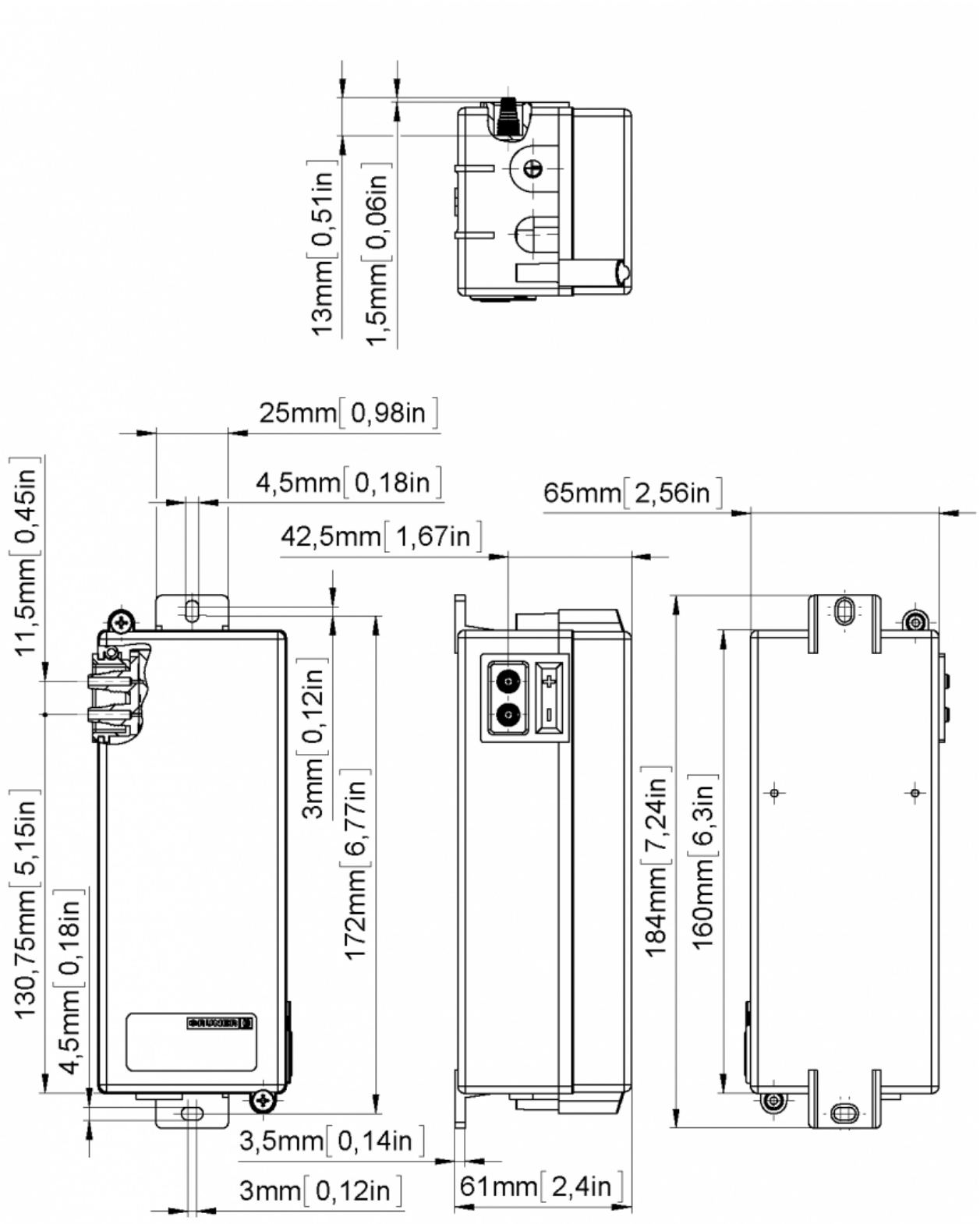


Safety remarks

-Connect via safety isolation transformer
-The actuator is not allowed to be used outside the specified field of application, especially in airplanes.
-In may only be installed by suitably trained personnel. Any legal regulations or regulations issued by authorities must be observed during assembly.
-The device may only be opened at the manufacturer´s site.
-When calculating the required torque, the specifications supplied by the damper manufacturers (cross- section, design, installation site), and the air flow conditions must be observed.
-The actuator is not allowed to be disposed of as household refuse. All locally valid regulations and requirements must be observed.

Technical drawing




13mm[0,51in]
1,5mm[0,06in]
25mm[0,98in]
4,5mm[0,18in]
65mm[2,56in]
42,5mm[1,67in]
11,5mm[0,45in]
3mm[0,12in]
130,75mm[5,15in]
172mm[6,77in]
184mm[7,24in]
160mm[6,3in]
4,5mm[0,18in]
3,5mm[0,14in]
3mm[0,12in]
61mm[2,4in]

Technical data sheet

GUAC-D3

Dynamic volume controller

Description

GUAC - to be used for flow control in conjunction with actuators.

- **Nominal Voltage** **24 VAC/DC**
- **Control** **0(2)..10 V**
- **Pressure sensor** **0...300 Pa**
- **Communication** **PP-Bus**
- **Connection of actuator** **Phoenix-type connection**
- **attachment** **slot 4,5 x 3 mm**

Technical data

Nominal voltage		
	Nominal voltage	24 VAC/DC
	Nominal voltage range	19...29 VAC/DC
	Power consumption (without motor)	0,6 W
	Dimensions (without motor)	1,2 VA
	Control	0(2)...10 VDC / Ri > 50 kΩ 0(4)...20 mA / Rext.= 500 Ω
	Position feedback	0(2)...10 VDC, max 0,5 mA
	Communication	PP-Bus, 1200 Baud, max. 15 VDC
	Priority control	closed / Vmin / Vmittlere / Vmax / open
	connecting drive	Phoenix-connector with 1000 mm cable
	connecting GUAC	Terminal Block for 4 x 0.75 mm ²
	Connection GUIV	via diagnostic connector and Feedback signal U / PP
Functional data		
	attachment	Fastening tabs on the device Slot 4.5 x 3 mm
	Volume flow regulation	
	Vnom	OEM-specific value, suitably VAV box type
	Vmax	0...100% von Vnom
	Vmin	0...100% von Vnom
	Vmiddle	0...100% von Vnom
	Vconst	0...100% von Vnom
	Differential pressure sensor	
	Operating pressure	0...300 Pa
	Breaking pressure	1 bar
	Media	0...70°C / 5...95% Damper air, noncondensing

Technical data

	Characteristic	OEM-specific value and pressure transducer adapted
	Mounting position	independent of position
	material	ULtem
	Pressure connection	Tube clip inside Ø 4-6 mm
Safety		
	Protection class	III (low voltage safety current)
	Degree of protection	IP 42
	EMC	CE (2004/108/EG)
	LVD	CE (2006/95/EG)
	RoHS	CE (2011/65/EU)
	Mode of operation	Typ 1 (EN 60730-1)
	Rated impulse voltage	0,8 kV (EN 60730-1)
	Control pollution degree	3 (EN 60730-1)
	Ambient temperature Normal operation	0°C...+50°C
	Storage temperature	-20°C...+80°C
	Ambient humidity	5...95% r.F., noncondensing (EN 60730-1)
	Maintenance	maintenance free
Dimensions/ Weight		
	Dimensions	184 x 65 x 61 mm
	Weight	375 g

Operating mode / Properties

Operating mode

Through connecting the power supply to BU+BN (1+2) and a reference signal Y to BK (3) of 0(2)…10VDC, turns the connected drive on the specified volume flow. The current flow in% of V Nom is rated as a feedback signal U GY (4) as provided as a result signal for other actuators, this analog signal can be communicated by PP bus.

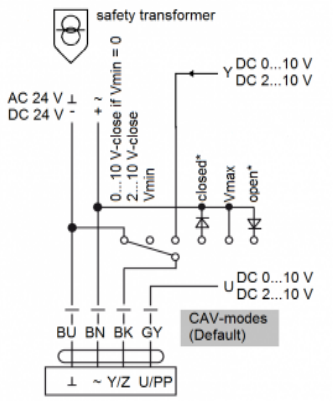
With a simple circuit with AC* / DC- signals to terminal Y to BK (3) different CAV-modes* in the form of override controls are feasible.

Direct connection

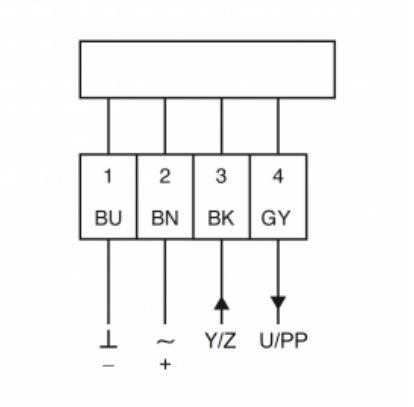
Simple direct mounting to the actuator used by Phoenix - plug - connection.

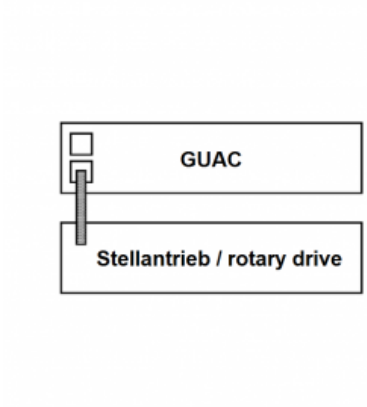
assembly

Easily attach with mounting tabs on the device.



Connection / Safety remarks





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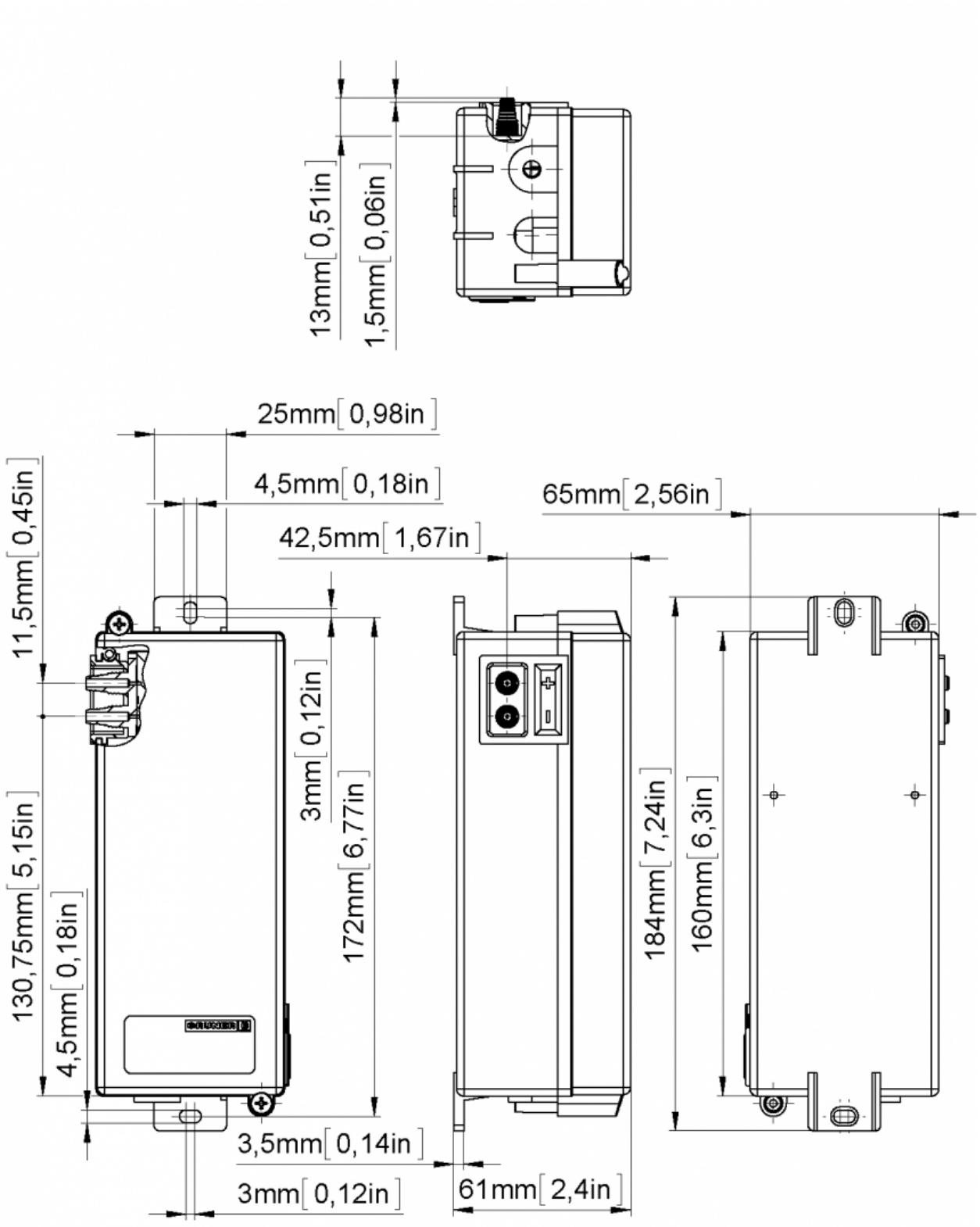
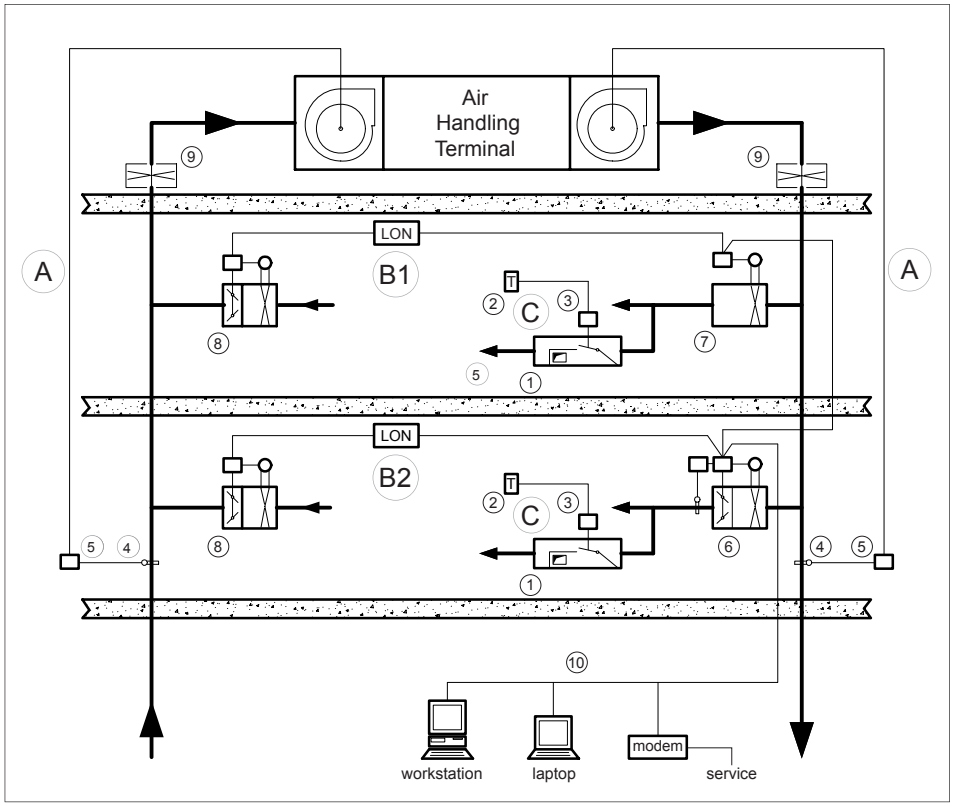
-The device may only be opened at the manufacturer´s site.
-When calculating the required torque, the specifications supplied by the damper manufacturers (cross- section, design, installation site), and the air flow conditions must be observed.
-The actuator is not allowed to be disposed of as household refuse. All locally valid regulations and requirements must be observed.

Technical drawing



Example: VAV system with “BMS®” control



1. *VAV terminal*
2. *Room thermostat*
3. *VAV controller*
4. *Duct static pressure sensor*
5. *Fan speed controller (VFD)*
6. *Air flow measuring and pressure control station*
7. *Air flow measuring station*
8. *Air flow measuring and control station*
9. *Air flow measuring station*
10. *Building Management System (BMS)*

Control description
This type of control is used to prevent air fl owing from one room to another. The reason for this can be that the air in one of the rooms is
polluted or too hot or too cold.
The pressure in both rooms can be controlled by a difference between supply and return air. Positive (over) pressure is created when the supply air volume is more than the return or exhaust air volume. Negative (under) pressure is created more air is exhausted than supplied.

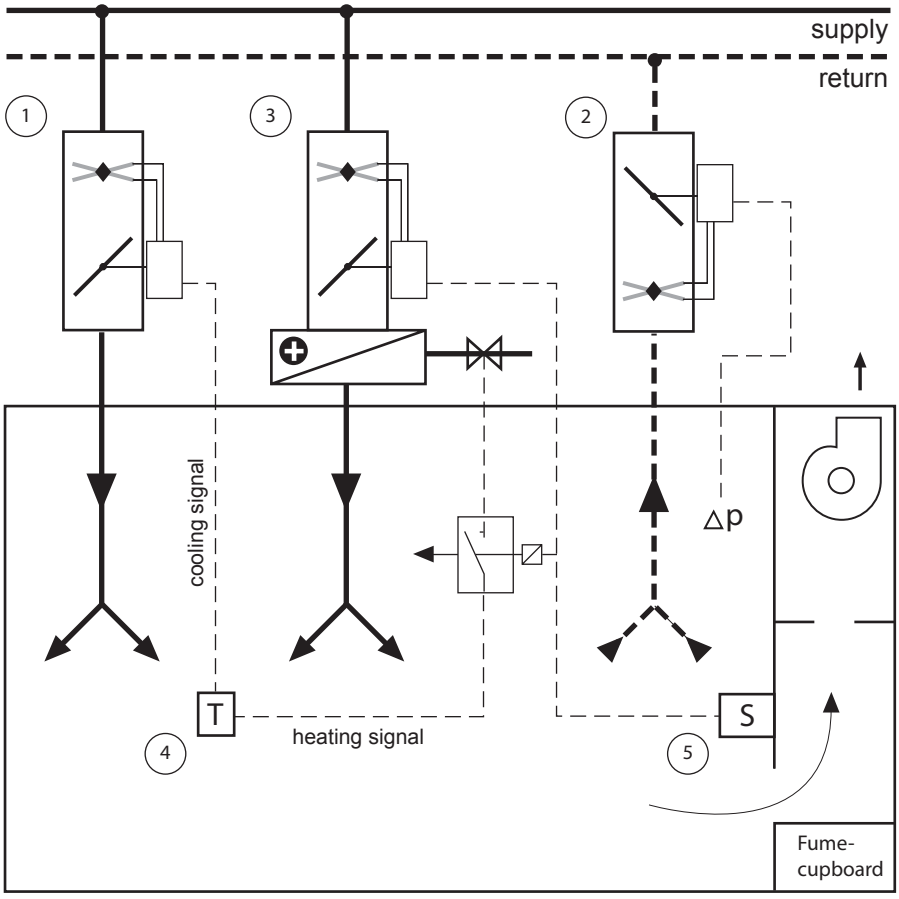
The “ELEKTROTEKNIK BMS CONTROL ” system combines these loops
to give maximum energy savings under all load conditions.

A. Speed control of central AHU:
The supply fan is controlled to keep the required pressure in the riser(s) to a minimum value but still allowing the system to maintain the design room conditions.
The extract fan can be controlled by equalising supply and extract air fl ows to give the required
under / over pressure in the building.

B. “ELEKTROTEKNIK BMS CONTROL”, supply and return air balancing,
with or without pressure control
B1. without pressure control:
The supply airfl ow is constantly measured and
the extract air fl ow is matched or controlled to give the required under/over pressure per fl oor
or zone.
B2. with pressure control:
The supply duct pressure is controlled to the minimum value that still allows the VAV terminals in this zone to maintain the design room conditions.

C. Room temperature control:
A VAV terminal controls the air volume to the room, depending on the cooling or heating load
required thus saving energy consumption.

Example: Room pressure control for laboratory with fume-cupboard



Reference list:

1. VAV-A terminal for room temperature control:
2. Pressure control station with airflow measuring sensor:
3. VAV-A terminal with integral reheat coil for room temperature control:
4. Room thermostat or room temperature sensor
5. Fan speed switch for fume-cupboard

Control description

Under normal conditions (fume-cupboard switched off), the room temperature is controlled by the VAV-A controller (1) and room pressure is kept at the required value with pressure control station (2).
When the fume-cupboard is switched on, the supply air must be raised or exhaust air must be lowered, in order to keep the room pressure at the required value. When the airflow, extracted by the fume-cupboard, is to high to be compensated by the pressure controller (2) an additional VAV-A terminal (3) is necessary to compensate the high extract air volume.
To prevent under cooling the room/laboratory with the high (primary) supply air volume the additional VAV-A controller can be equipped with a reheat coil.

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