Flow measuring unit-rectangular FRA

Description

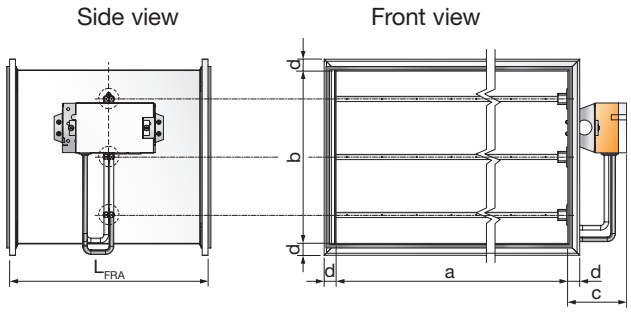
FRA is a measuring unit with a measuring cross, which is used for measuring volume flow in rectangular ducts.

FRA is equipped with a Belimo VRD3, which provides an output signal that is proportional to the volume flow.

The FRA needs a certain distance of straight duct before the unit and this has to be observed to obtain a stable and accurate air flow regulation.

- Requires minimal initial pressure (<20 Pa at V_{nom}).
- Output signal indicates actual volumeflow.

Dimensions



NB! Different flange types are available, see order code and dimension table below.
a and b dimensions, see order code.

Dimension table

Flange type	d	L_{FRA}	c
	mm		
LS	20	341	102
RJFP20	20	341	
RJFP30	30	342	
RJFP40	40	343	

Table 1. FRA flange types and dimensions.

Installation
Using LS-profile. Installation instruction, please go to Asembly instruction, Rectangular air duct systems, LS-profile.

Using RJFP-profiles. Installation instruction, please go to to Lindab rectangular duct systems, RJFP.

You can find general information about air duct systems, theory calculations following this link.

Order code - FRA

Product	FRA	aaa x bbb	VRD3	dddd

Type
FRA

Dimension
Min. : a x b = 300 x 100 mm
Max. : a + b ≤ 2400 mm
and a ≤ 1500 mm

Motor type
VRD3 (Standard)

Flange type

LS	
RJFP 20	(Standard All sizes)
RJFP 30	When a or b > 800
RJFP 40	On request

Example: FRA-500x200-VRD3-RJFP 20

Flow measuring unit-rectangular FRA

Technical data

Settings

V_{nom} indicates the measuring range for the actuator. A standard FRA is calibrated to a V_{nom} of 7 m/s according to the table 3.

In special cases the FRA can be set to a higher V_{nom}, e.g. 10 m/s.

The output signal from VRD3 is linear between 2 -10 V which corresponds to a flow between 0 and V_{nom} .

Air flows corresponding to air velocities below 1.2 m/s will result in a 2 V signal.

Technical data

Volume flow measurement

The accuracy of volume flow measurement depends on the flow conditions in front of the measuring cross. It is preferable to have a long straight duct section in front of the measuring point, according to the table below.

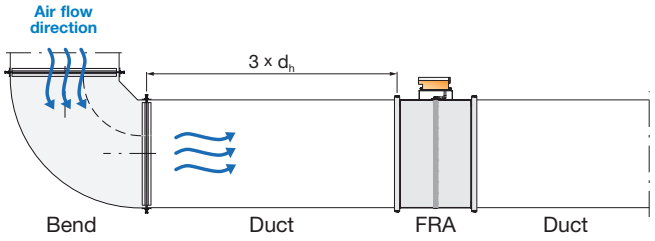
If these recommendations are not followed, it will cause an unstable flow measurement and therefore higher inaccuracy in the regulation of the required air flow.

Components	Recommended straight duct before unit
Bend	3 x d_h *
Tee-piece	4 x d_h *
Damper	6 x d_h *

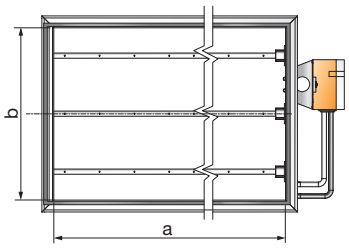
Table 2. FRA and recommended straight duct before unit.

d_h* is the hydralical diameter for a rectangular duct (and FRA), d_h can be calculated by using FRA dimension a and b:

$$d_h * = 2 \times a \times b / (a + b)$$



Example above showing top view of recommended straight duct distance between duct bend and a FRA.



Front view of FRA and dimension a and b.

Flow measuring unit-rectangular FRA

Technical data

FRA_{nom} Flow and measuring limit

Size [mm] a x b		Measuring limit = 1 [m/s]		(Standard) V_{nom} = 7 [m/s]		V_{nom} = 10 [m/s]	
		[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]
300	200	216	60	1512	420	2160	600
400	200	288	80	2016	560	2880	800
	300	432	120	3024	840	4320	1200
500	200	360	100	2520	700	3600	1000
	300	540	150	3780	1050	5400	1500
	400	720	200	5040	1400	7200	2000
	500	900	250	6300	1750	9000	2500
600	200	432	120	3024	840	4320	1200
	300	648	180	4536	1260	6480	1800
	400	864	240	6048	1680	8640	2400
	500	1080	300	7560	2100	10800	3000
800	200	576	160	4032	1120	5760	1600
	300	864	240	6048	1680	8640	2400
	400	1152	320	8064	2240	11520	3200
	500	1440	400	10080	2800	14400	4000
1000	300	1080	300	7560	2100	10800	3000
	400	1440	400	10080	2800	14400	4000
	500	1800	500	12600	3500	18000	5000
	600	2160	600	15120	4200	21600	6000

Table 3. FRA_{nom} flow and measuring limit.