

### Data sheet R3-1

# LERX Damper with Demand Regulator and Transmitter

## Model R3: Demand Regulator with Flow Monitor and Transmitter

### Applications for R3 Analogue Demand Regulator

LeanVent LERX damper with Regulator LV71X in control mode R3 contains PID feedback regulator with built-in flowmeter (patent pending) and flow transmitter for Demand control (e.g. CO<sub>2</sub>, °C, %RH, pressure) within desired min. and max. airflow limits as follows:

1. Within min. and max. flow limits regulation after demand setpoint
2. Outside flow limits regulation with min/max values as setpoint.

It is applied to maintain a desired demand value in a zone within specific min. and max. flow limits, and simultaneously balance air volumes in extraction air and supply air plants, in order to minimize total air volumes, energy consumption and noise level in the system.

### 1. Duct coupling and modification

Basic model Ø160/Ø250 can be modified from duct coupling Ø160 to Ø200 or Ø250, and Basic model Ø250/400 can be modified from duct coupling Ø250 to Ø315 or Ø400, as described in Datasheet SRX. Basic coupling model V (with Pull Rings) can be modified to model U (Spiro duct coupling) using connection OTR (Lindab).

### 2. Electric Installation and Initialising.

Connect to power supply (18 VA): 24V DC +-10 % (see back page). The damper will start an initialising procedure few seconds after connection to power supply, in order to confirm stroke length. First it closes completely and then it opens 100 %.

### 3. Start up of Airflow regulator

Check that both measuring hoses from the pressure sensor in Airflow Regulator LV71X are connected to damper inlet and outlet.

Also Check DIP switch setting is in combination R4 (see back page).

Find the voltage (0-10V) which is equivalent to a desired demand value (e.g. 21°C or 1000 ppm CO<sub>2</sub>) on basis of a transmitter curve (0-10V). This voltage (e.g. 5,5V = 55) is applied as setpoint P01.

The Regulator is started with fixed voltage setpoint (0-10V) and with flow limits P20 and P21 as follows:

- a. P01 defines a fixed set point for regulation (0-10V)
  - b. P19 selects direction for regulation (0=down; 1=up)
  - c. P20 and P21 select desired min. and max regulator flow limits.
- The regulator can now be started by switching Terminal T4 on

### 4. Adjustment of Airflow transmitter.

- a. P17 defines the max flow equivalent to 10V transmitter signal
- b. P12 selects between flow (=0) or damper % opening (=1)
- c. P13 selects possible scaling factor (20-200 %) on signal
- d. P14 selects whether transmitter signal shall be inverted
- e. P18 selects signal when damper closes (0=0V; 1=freeze; 2=10V)
- f. P15 and P16 sets transmitter min and max limits in 0,1 V

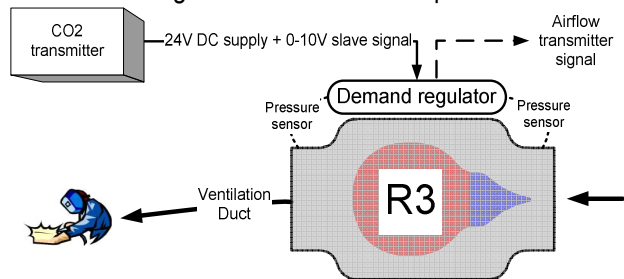
### 5. Adjustment of PID feedback regulator

- a. P02 and P03 sets min. and max. alarm limits in % of setpoint
- b. P06 is P-factor: higher P-value makes faster regulator
- c. P07 is Integral time higher I-value gives higher moderation
- d. P08 is cycle time: higher H-value makes slower regulation
- e. P05 is neutral zone: larger interval can remove fluctuations

LERX damper with analogue demand regulator LV71X



R3: Demand regulator with demand setpoint and transmitter



### Parameter table for R3

Par	Headline	Def	Max	Description
P01	Flow setpoint	300	9999	l/s (or m <sup>3</sup> /h)
P02	Min alarm limit	25	0	% of setpoint
P03	Max alarm limit	25	100	% af setpoint
P04	Time delay (sec)	1	3600	Time period bef. Stop
P05	PID reg. window	2	50	Neutral zone (l/s;m <sup>3</sup> /h)
P06	PID reg. Prop. factor	10	50	Regulator speed
P07	PID reg. Integral tim.	100	1000	Regulator moderation
P08	PID reg. H cycle tim.	1	100	Cycle time(100msek)
P12	Transmitter opsæt.	0	1	0=flow and 1=spjæld
P13	Transmitter scaling	100	200	20 to 200 % scaling
P14	Transmitter inverter	0	1	0=yes and 1=no
P15	Transmitter min.	0	100	Min limit in 0,1 V
P16	Transmitter max.	100	100	Max limit in 0,1 V
P17	Transmitter at 10V	1000	9999	Transmitter max flow
P18	Transmit. off-signal	0	2	0=0V;1=freeze; 2=10V
P19	PID reg. Retning	0	1	0=down; 1=up
P20	PID reg. min. flow	0	9999	Desired min. flow
P21	PID reg. max flow	1000	9999	Desired max. flow
P22	Select Flow unit	0	1	0=l/s or 1=m <sup>3</sup> /h
P40	Press (ENTER)+(arrow up)+ENTER)+10sec for <b>Reset</b> to Default			

- Remember Voltage (Volt) is shown without comma (8,5V as 85).
- Actual flow is shown by pressing ESC bottom after setting
- Contact in Terminal T4 starts and stops the controller
- The controller will regulate with min. or max. flow limits as setpoint when the demand regulation (e.g. temperature) exceeds the limits. It returns to demand regulation when demand is within flow limits.

### Data Sheet R4-1

# LERX Damper with Airflow regulator and Transmitter

## Model R4: Airflow Regulator with Flow Monitor and Transmitter

### Applications for R4 Analogue Airflow Regulator

LeanVent LERX damper with Regulator LV71X in control mode R4 contains a PID feedback regulator with built-in flowmeter (patent pending) and flow transmitter for Airflow control (l/s or m<sup>3</sup>/h) within min. and max. airflow limits according to 2 alternative principles:

1. One or two fixed setpoints (P01 and P10) when P09 = 0 or
2. Variable setpoint within flow limits P20 and P21 when P09 = 10V

Alternative 1 is used to maintain one or two different set points (e.g. day and night) and alternative 2 is for variable setpoints within desired min. and max. flow limits, and in the same time balance airflows in extraction air and supply air plants, in order to minimize total air volumes, energy consumption and noise level in the entire system.

### 1. Duct coupling and modification

Basic model Ø160/Ø250 can be modified from duct coupling Ø160 to Ø200 or Ø250, and Basic model Ø250/400 can be modified from duct coupling Ø250 to Ø315 or Ø400, as described in Datasheet SRX. Basic coupling model V (with Pull Rings) can be modified to model U (Spiro duct coupling) using connection OTR (Lindab).

### 2. Electric Installation and Initialising.

Connect to power supply (18 VA): 24V DC +-10 % (see back page). The damper will start an initialising procedure few seconds after connection to power supply, in order to confirm stroke length. First it closes completely and then it opens 100 %.

### 3. Start up of Airflow regulator

Check that both measuring hoses from the pressure sensor in Airflow Regulator LV71X are connected to damper inlet and outlet.

Also Check DIP switch setting is in combination R4 (on back page).

The Regulator is started with fixed or variable setpoint as follows:

- a. P22 selects flow unit in display as l/s (=0) or m<sup>3</sup>/h (=1)
- b. P01 defines a fixed set point for regulation (when P09=0)
- c. P10 is a possible secondary setpoint (when P09=0 and P11=0)
- d. P09 defines the max flow which is equivalent to 10 V input signal
- e. P11 selects setpoint when Terminal T4=off (0=off; 1= setp. P10)
- f. P19 selects direction for regulation (0=down; 1=up)
- g. P20 and P21 select desired min. and max regulator flow limits.

The regulator can now be started by switching Terminal T4 on

### 4. Adjustment of Airflow transmitter.

- a. P17 defines the max flow equivalent to 10V transmitter signal
- b. P12 selects between flow (=0) or damper % opening (=1)
- c. P13 selects possible scaling factor (20-200 %) on signal
- d. P14 selects whether transmitter signal shall be inverted
- e. P18 selects signal when damper closes (0=0V; 1=freeze; 2=10V)
- f. P15 and P16 sets transmitter min and max limits in 0,1 V

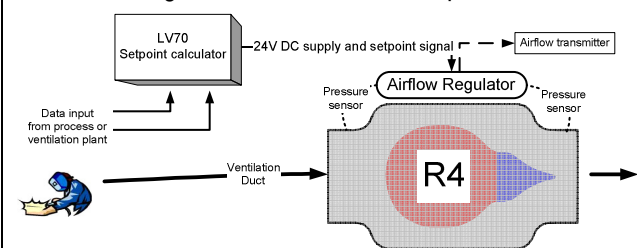
### 5. Adjustment of PID feedback regulator

- a. P02 and P03 sets min. and max. alarm limits in % of setpoint
- b. P06 is P-factor: higher P-value makes faster regulator
- c. P07 is Integral time higher I-value gives higher moderation
- d. P08 is cycle time: higher H-value makes slower regulation
- e. P05 is neutral zone: larger interval can remove fluctuations

LERX damper with analogue airflow regulator LV71X



R4: Airflow regulator with calculated setpoint + transmitter



## Parameter table for R4

Par	Headline	Def	Max	Description
P01	Flow setpoint	300	9999	l/s (or m <sup>3</sup> /h)
P02	Min alarm limit	25	0	% of setpoint
P03	Max alarm limit	25	100	% af setpoint
P04	Time delay (sec)	1	3600	Time period bef. stop
P05	PID reg. window	2	50	Neutral zone (l/s;m <sup>3</sup> /h)
P06	PID reg. Prop. factor	10	50	Regulator speed
P07	PID reg. Integral tim.	100	1000	Regulator moderation
P08	PID reg. H cycle tim.	1	100	Cycle time(100msek)
P09	Input flow at 10V	0	9999	l/s (or m <sup>3</sup> /h) (0=fast)
P10	Secondary setpoint	100	9999	l/s (or m <sup>3</sup> /h)
P11	Setpoint if T4=off	0	1	=0 for off; =1 for P10
P12	Transmitter opsæt.	0	1	0=flow and 1=spjæld
P13	Transmitter scaling	100	200	20 to 200 % scaling
P14	Transmitter inverter	0	1	0=yes and 1=no
P15	Transmitter min.	0	100	Min limit in 0,1 V
P16	Transmitter max.	100	100	Max limit in 0,1 V
P17	Transmitter at 10V	1000	9999	Transmitter max flow
P18	Transmit. off-signal	0	2	0=0V; 1=freeze; 2=10V
P19	PID reg. Retning	0	1	0=down; 1=up
P20	PID reg. min. flow	0	9999	Desired min. flow
P21	PID reg. max flow	1000	9999	Desired max. flow
P22	Select Flow unit	0	1	0=l/s or 1=m <sup>3</sup> /h
P40	Press (ENTER)+(arrow up)+ENTER)+10sec for <b>Reset</b> to Default			

- Remember Voltage (Volt) is shown without comma (8,5V as 85).
- Actual flow is shown by pressing ESC bottom after setting
- Setpoint is shifted between P01 and P10 by means of Terminal T4 when P11=1 and P09=0.

## Data Sheet R5-1

# LERX Damper with Pressure regulator and Transmitter

## Model R5: Pressure Regulator with Pressure Monitor and Transmitter

### Applications for R5 Analogue Pressure Regulator

LeanVent LERX damper (patent pending) with Regulator LV71X in control mode R5 contains a PID feedback pressure regulator with pressure sensor and transmitter, for fixed or variable setpoints:

1. One or two **fixed** setpoints (P01 and P10) when P09 = 0 or
2. **Variable** setpoint with 0-10V input and max pressure P09 = 10V

Alternative 1 is used to maintain one or two different set points (e.g. day and night) and Alternative 2 is for variable setpoint based on a 0-10V input signal and max pressure P09. The damper position transmitter (when P12 = 1) is applied for master/slave balance of extraction air and supply air plants, in order to minimize total air volumes, energy consumption and noise level in the entire system.

### 1. Duct coupling and modification

Basic model Ø160/Ø250 can be modified from duct coupling Ø160 to Ø200 or Ø250, and Basic model Ø250/400 can be modified from duct coupling Ø250 to Ø315 or Ø400, as described in Datasheet SRX. Basic coupling model V (with Pull Rings) can be modified to model U (Spiro duct coupling) using connection OTR (Lindab).

### 2. Electric Installation and Initialising.

Connect to power supply (18 VA): **24V DC** +/-10 % (see back page). The damper will start an initialising procedure few seconds after connection to power supply, in order to confirm stroke length. First it closes completely and then it opens 100 %.

### 3. Start up of Airflow regulator

Check that one measuring hose (+ or -) from the pressure sensor in Airflow Regulator LV71X is connected to a suitable measuring point on the ventilation duct or damper, while the other hose is open.

Also Check DIP switch setting is in combination R5 (on back page).

The Regulator is started with fixed or variable setpoint as follows:

- a. P01 defines a fixed set point for regulation (when P09=0)
- b. P10 is a possible secondary setpoint (when P09=0 and P11=0)
- c. P09 defines the max pressure equivalent to 10 V input signal
- d. P11 selects setpoint when Terminal T4=off (0=off; 1= setp. P10)
- e. P19 selects direction for regulation (0=down; 1=up)

The regulator can now be started by switching Terminal T4 on

### 4. Adjustment of Pressure transmitter.

- a. P17 defines max pressure equivalent to 10V transmitter signal
- b. P12 selects between flow (=0) or damper % opening (=1)
- c. P13 selects possible scaling factor (20-200 %) on signal
- d. P14 selects whether transmitter signal shall be inverted
- e. P18 selects signal when damper closes (0=0V; 1=freeze; 2=10V)
- f. P15 and P16 sets transmitter min and max limits in 0,1 V

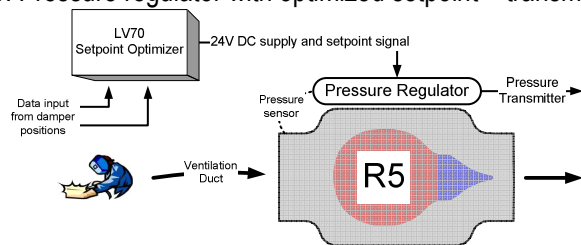
### 5. Adjustment of PID feedback regulator

- a. P02 and P03 sets min. and max. alarm limits in % of setpoint
- b. P06 is P-factor: higher P-value makes faster regulator
- c. P07 is Integral time higher I-value gives higher moderation
- d. P08 is cycle time: higher H-value makes slower regulation
- e. P05 is neutral zone: larger interval can remove fluctuations

LERX damper with analogue pressure regulator LV71X



R5: Pressure regulator with optimized setpoint + transmitter



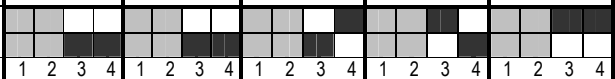
## Parameter Table for R5

Par	Headline	Def	Max	Description
P01	Pressure setpoint	300	9999	Setpoint value in Pa
P02	Min alarm limit	25	0	% of setpoint
P03	Max alarm limit	25	100	% af setpoint
P04	Time delay (sec)	1	3600	Time period bef. stop
P05	PID reg. window	2	50	Neutral zone in Pa
P06	PID reg. Prop. factor	10	50	Regulator speed
P07	PID reg. Integral tim.	100	1000	Regulator moderation
P08	PID reg. H cycle tim.	1	100	Cycle time(100msek)
P09	Input flow at 10V	0	9999	l/s (or m³/h) (0=fast)
P10	Secondary setpoint	100	9999	Sec. setpoint in Pa.
P11	Setpoint if T4=off	0	1	=0 for off; =1 for P10
P12	Transmitter opsæt.	0	1	0=pressure/ 1=damper
P13	Transmitter scaling	100	200	20 to 200 % scaling
P14	Transmitter inverter	0	1	0=yes and 1=no
P15	Transmitter min.	0	100	Min limit in 0,1 V
P16	Transmitter max.	100	100	Max limit in 0,1 V
P17	Transmitter at 10V	1000	9999	Transmitter max flow
P18	Transmit. off-signal	0	2	0=0V; 1=freeze; 2=10V
P19	PID reg. Retning	0	1	0=down; 1=up
P40	Press (ENTER)+(arrow up)+ENTER)+10sec for <b>Reset</b> to Default			

- Remember Voltage (Volt) is shown without comma ( 8,5V as 85).
- Actual pressure is shown by pressing ESC bottom after setting
- Setpoint pressure is shifted between P01 and P10 by means of Terminal T4 when P11=1 and P09=0.

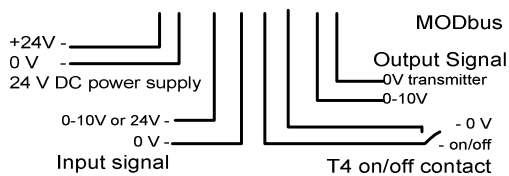
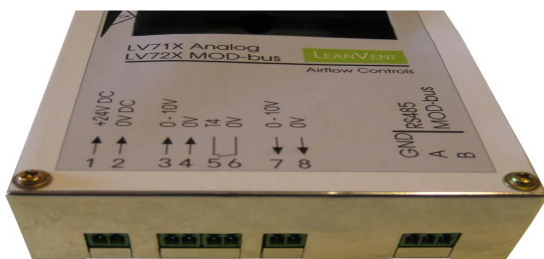


# Technical Data and parameter Setting for R1-R5


Controller and Transmitter mode (DIP switch):				R1	R2	R3	R4	R5			
Par No.	Parameter settings:	Max. Pressure	Max. Flow	On/off Control	Slave Control	Demand Regulator	Airflow Regulator	Pressure Regulator			
				Default	Default	Default	Default	Default			
P1	Airflow/Press./Volt setpoint (l/s;m³/h; Pa, 0.1V)	1000	9999	-	-	50	300	100			
P2	Minimum alarm limit (% of setpoint)			-	-	25	25	25			
P3	Maximum alarm limit (% of setpoint)	100	100	-	-	25	25	25			
P4	Time delay before shut-down (sec)	3600	3600	-	-	1	1	1			
P5	Regulator neutral window (l/s or m³/h or Pa)	50	50	-	-	2	2	2			
P6	Regulator Proportional band P-Factor (speed)	50	50	-	-	5	10	10			
P7	Regulator Integral I-time (moderation)	1000	1000	-	-	20	100	100			
P8	Regulator cycle H-time (100 msec.)	100	100	-	-	1	1	1			
P9	Max value for Input Flow/press at 10V; 0=fixed	1000	9999	-	-	-	0	0			
P10	Secondary setpoint when T4 is off (if P11=1)	1000	9999	-	-	20	100	50			
P11	Select setpoint when T4 is off (0=stop; 1= P10)	1	1	-	-	0	0	0			
P12	Transmitter mode (0=press./flow; 1= position)	1	1	0	0	0	0	0			
P13	Transmitter scale (20% – 200%)	200	200	100	100	100	100	100			
P14	Transmitter signal is Inverted (0=no; 1=yes)	1	1	0	0	0	0	0			
P15	Transmitter min signal limit (0,1V)	0	0	0	0	0	0	0			
P16	Transmitter max signal limit (0,1V)	100	100	100	100	100	100	100			
P17	Transmitter max value at 10 V signal	1000	9999	1000	1000	1000	1000	1000			
P18	Transmitter off-signal (0=0V; 1=freeze; 2=10V)	2	2	0	0	0	0	0			
P19	PID Regulator direction (0=down; 1=up)	1	1	-	-	0	0	0			
P20	Airflow Regulator minimum limit (l/s or m³/h)	-	9999	0	0	0	0	-			
P21	Airflow Regulator maximum limit (l/s or m³/h)	-	9999	9999	9999	9999	9999	-			
P22	Select airflow unit (0=l/s; 1= m³/h)	-	1	0	0	0	0	-			
P23	Select Input signal scaling (%)	-	200	100	100	-	-	-			
P24	Input signal minimum limit (0,1V)	-	100	0	0	-	-	-			
P25	Input signal maximum limit (0,1V)	-	100	100	100	-	-	-			
P40	Reset all parameters to Default	-	-	Reset of all parameters to Factory Default values							
FV71X Controller + Transmitter modes:				R1	R2	R3	R4	R5			
DIP switch settings in "config 2"											

Remember: Voltage values are shown without a comma (",")

## Electrical plugs and connectors



## Other Technical Data:

DIP switch settings in R4:		Config1	Config2
		1. Size	5. Model
		2. Size	6. Model
		3. Size	7. R-mode
		4. Model	8. R-mode

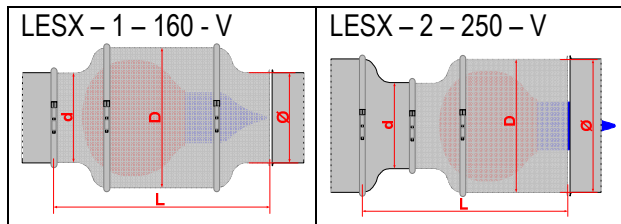
Dimensions: L \* W \* H = 125 \* 105 \* 33 mm  
 Power supply: 24V DC +/- 10% ; Min. 15 VA  
 Pressure range: 0 – 1000 Pa  
 Temperature range: 0° - +40° C  
 Enclosure class: IP 30  
 EMC tested: EN61000-6 and LVD tested: EN60730  
 Alarm signal: Flashing display

# Product Code and Technical Data

## 1. Product Code and Program

Product Program in version X is shown opposite.  
The dimensions (mm) are as follows:

- Ø: Coupling diameter
- d: Contraction diameter
- D: Casing diameter
- L: Total Damper length between connecting ducts
- H: Height of Casing inclusive airflow controller LV71X



## 2. Technical Data for Series Ø160-200-250

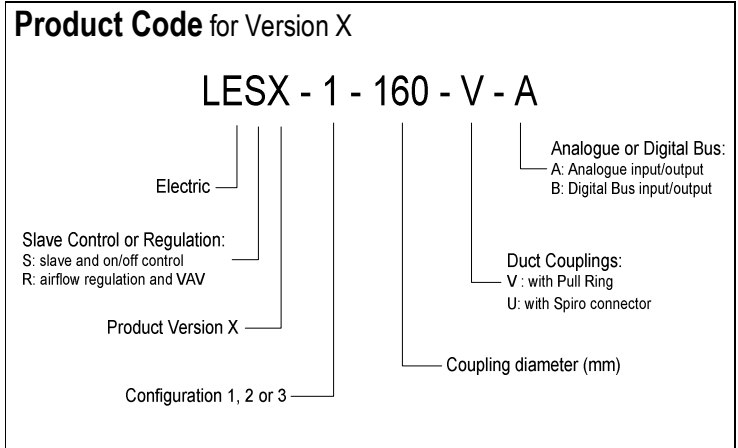
This series have Casing diameter D = 250 mm.  
Opening time for 80% airflow: 2 sec  
Opening time for 100% airflow: 4 sec  
Closing time from 100% opening: 4 sec.  
Pressure range: 0 – 3000 Pa

## 3. Technical Data for Series Ø250-315-400

This series have Casing diameter D = 400 mm  
Opening time for 80% airflow: 3 sec  
Opening time for 100% airflow: 6 sec  
Closing time from 100% opening: 6 sec.  
Pressure range: 0- 1500 Pa

## 4. Other Technical Data:

Number of operation cycles: Over **500.000 cycles** when operated according to specifications in manuals.  
Power supply: 24V DC +/-10% and min. 18W  
Enclosure Class: IP54  
Damper Tightness: C3  
Permitted airflow temperature:.... -10°C - +40°C  
Permitted airflow humidity:..... 0% - 80% RH  
Permitted storage temperature: : -20°C - +80°C  
Weights of series Ø160-200-250: 5,0 kg  
Weights of series Ø250-315-400: 9,0 kg  
EMC tested  
CE tested



## Analogue Product Program

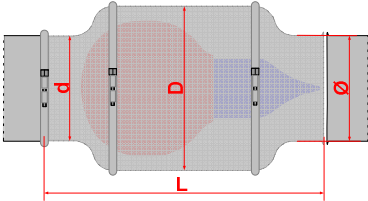
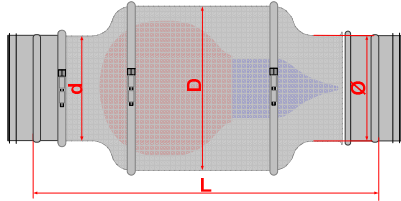
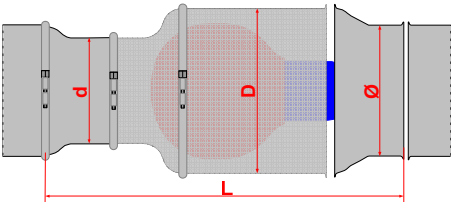
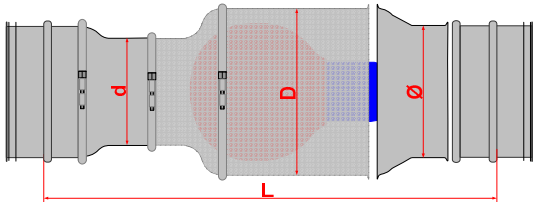
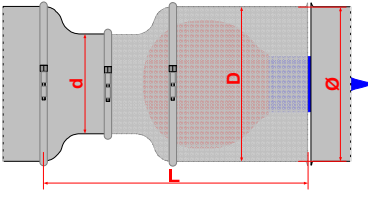
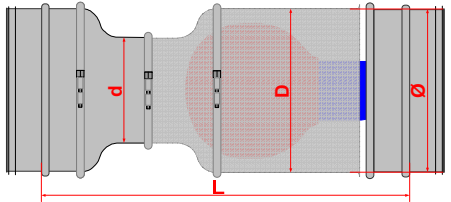
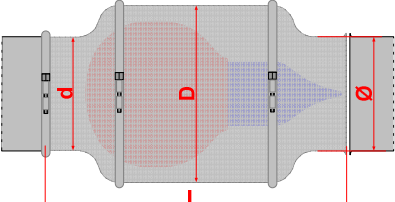
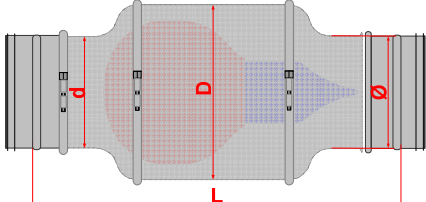
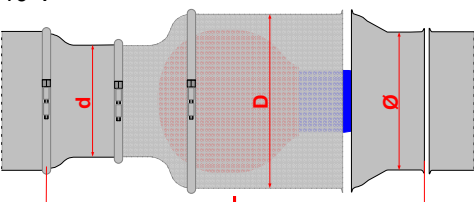
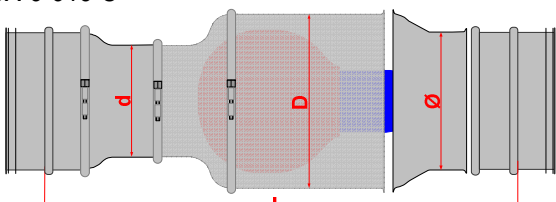
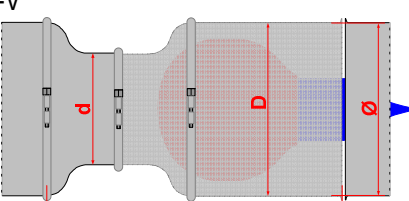
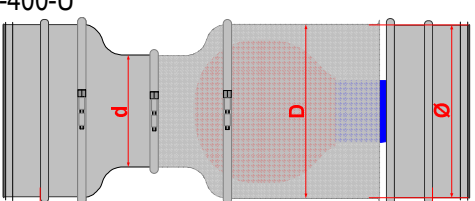
All dimensions in mm. See Product drawings next page (12).

No	Code	Ø	d	D	L	H
<b>LESX series Ø160-200-250 with D = 250</b>						
411160	LESX-1-160-V	160	160	250	433	-
411161	LESX-1-160-U	160	160	250	503	-
413200	LESX-3-200-V	200	160	250	539	-
413201	LESX-3-200.U	200	160	250	609	-
412250	LESX-2-250-V	250	160	250	433	-
412251	LESX-2-250-U	250	160	250	553	-
<b>LERX series Ø160-200-250 with D = 250</b>						
421160	LERX-1-160-V	160	160	250	433	295
421161	LERX-1-160-U	160	160	250	503	295
423200	LERX-3-200-V	200	160	250	539	295
423201	LERX-3-200.U	200	160	250	609	295
422250	LERX-2-250-V	250	160	250	433	295
422251	LERX-2-250-U	250	160	250	553	295
<b>LESX series Ø250-315-400 with D = 400</b>						
411250	LESX-1-250-V	250	250	400	630	-
411251	LESX-1-250-U	250	250	400	700	-
413315	LESX-3-315-V	315	250	400	735	-
413316	LESX-3-315.U	315	250	400	805	-
412400	LESX-2-400-V	400	250	400	630	-
412401	LESX-2-400-U	400	250	400	700	-
<b>LERX series Ø250-315-400 with D = 400</b>						
421250	LERX-1-250-V	250	250	400	630	445
421251	LERX-1-250-U	250	250	400	700	445
423315	LERX-3-315-V	315	250	400	735	445
423316	LERX-3-315.U	315	250	400	805	445
422400	LERX-2-400-V	400	250	400	630	445
422401	LERX-2-400-U	400	250	400	700	445

# Product Dimensions

## Model LESX -V (with Pull Ring Coupling)

## Model LESX-U (with Spiro Coupling)

<p>LESX-1-160-V</p> 	<p>LESX-1-160-U</p> 
<p>LESX-3-200-U</p> 	<p>LESX-3-200-U</p> 
<p>LESX-2-250-V</p> 	<p>LESX-2-250-U</p> 
<p>LESX-1-250-V</p> 	<p>LESX-1-250-U</p> 
<p>LESX-3-315-V</p> 	<p>LESX-3-315-U</p> 
<p>LESX-2-400-V</p> 	<p>LESX-2-400-U</p> 

Damper Dimensions for model LESX and LERX are shown on Page 11.