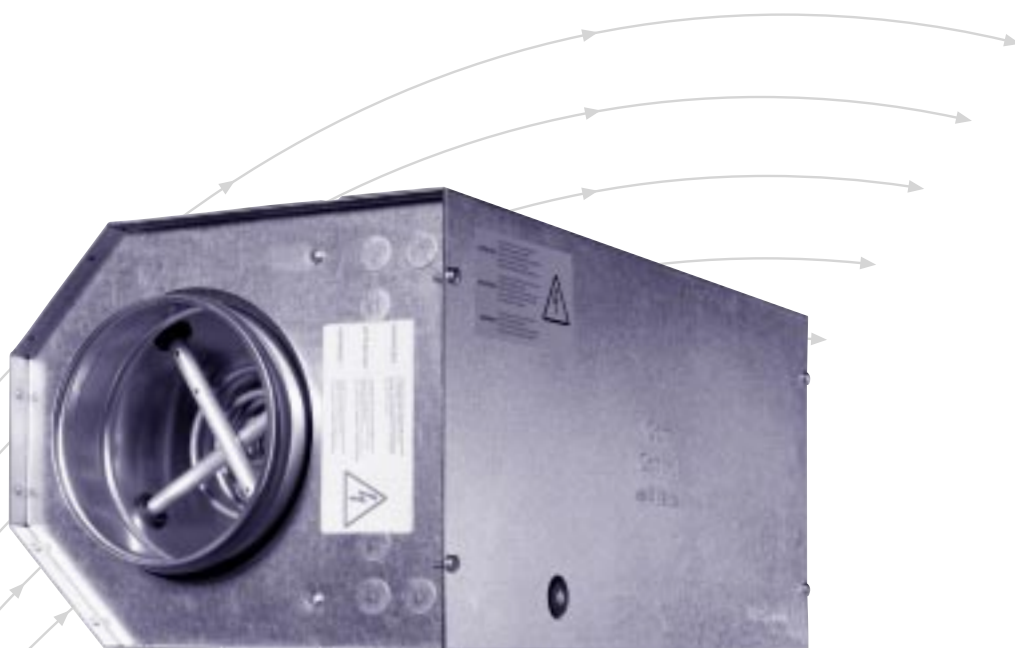


# COMCONTROL®

Comfort volume flow controller  
for ships and hotels  
Series TVRC



## TROX® TECHNİK

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**TVRC** (Duct module)



**Room control unit** (Cabin module, optional)

Siemens RXC 10

Belimo CR 24



## Area of application

The COMCONTROL® Comfort Controller TVRC (duct module) with electric air heater can be used in conjunction with the optional room control unit (cabin module) equipped with an integrated temperature sensor and a temperature controller, or in combination with a central management system. The system is specially designed for variable flow rate control in ship cabins or hotel rooms.

As in luxury suites or ship cabins, high levels of comfort have priority, correspondingly high requirements have been placed on the system:

- Adjustment and control of the individual room temperature.
- Reduced operation when windows or doors are open.
- Easy to use “Boost” function with increased flow rate for quick warming up or cooling down.
- Various operating modes (comfort, boost and other operating systems in conjunction with ship management system or building management system BMS, Siemens version).
- Monitoring and energy management by means of the building/ship management system (Siemens version).
- LONMARK®-compliant bus communication (optional, Siemens version).

## Description

### Flow rate control

The flow rate is measured according to the dynamic differential pressure principle. The  $\Delta p_w$  differential pressure on the differential pressure sensor of the TVRC is measured by the dynamic pressure transducer in the electronic compact flow rate controller. The measurement range is set to suit the unit size during factory calibration, so that 100 % (10 VDC) always corresponds to the unit nominal flow rate ( $\dot{V}_{nom}$ ). The flow rate control is in turn controlled by connecting the cabin module.

### Duct temperature control

Through the measurement and control of the air outlet temperature within the unit, a high level of comfort is achieved.

### Room temperature control

The cabin module (optional) measures the current room temperature and enables the required target temperature to be set. Using the Boost button, the room user can demand an increased flow rate for warming up or cooling down the cabin quickly.

# Construction · Dimensions · Technical Data

## Constructional features

### Casing

- Circular inlet spigot suitable for ducts to DIN 24145 or DIN 13180 with groove for lip seal
- Optionally with raised edges, including piece adapters and locking collars
- Casing air leakage rate complies with DIN EN 1751, class B

### Flow rate control

- Only suitable for supply air
- Differential pressure range 20 to 1000 Pa
- Very close control accuracy for the flow rate settings, even under unfavourable upstream conditions
- Independent of orientation
- The control damper mechanism of the VAV controller is maintenance free
- Operating temperature range: from 0 °C to 50 °C

### Electric air heater

- Heater element made of stainless steel 1.4541
- 230 VAC single-phase

### Triple safety circuit

- Flow monitoring  
Shut down of the air heater below a factory-set flow rate, e.g. 10 % of  $V_{nom}$
- Electronic temperature limiting
- Independent safety temperature limiter (90 °C), can be manually reset using the button

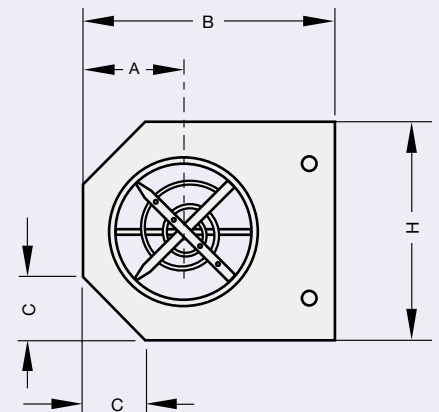
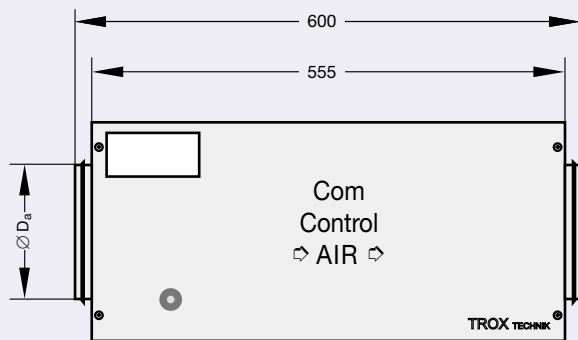
### Materials

- Casing made of galvanised sheet steel
- Plastic plain bearings
- Control damper blade made of steel sheet
- Sensor tubes in aluminium

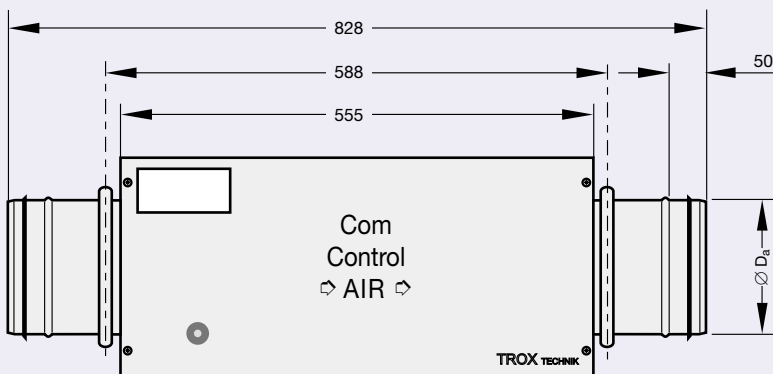
### Performed tests

- EMV test in accordance with the 89/336/EEC guideline
- Conformity test according to EN 60335-1:2003
- High-voltage tests, isolation measurements, air humidity and temperature test according to DNV-standard Nr. 2.4, section 3.8.3

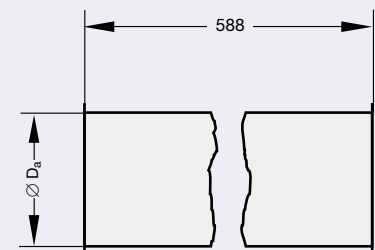
### TVRC, construction with lip seal



### TVRC, construction with raised edges, piece adapters and quick locking collars



### Cable duct for maintenance



### Dimensions in mm

Size	Ø D <sub>a</sub>	A	B	C	H
125	124	145	310	80	260
160	159	125	310	80	260
200	199	145	350	90	300

### Weight in kg

Size	TVRC		Cable duct
	Construction with lip seal	Construction with piece adapters	
125	9.6	10.9	2.0
160	10.1	11.7	2.4
200	11.2	13.3	3.0

# Technical Data

Supply voltage: 230 VAC, 50/60 Hz  
 Safety class: I  
 Protection level: IP40  
 Ambient temperature: 0 °C to 50 °C

Technical data with inlet temperature $t_e = 16\text{ °C}$								
Size	$\dot{V}_{\text{cold}}$		$\dot{V}_{\text{hot}}$		$\Delta \dot{V}$ in $\pm\%$	$\Delta p_{g\text{ min}}$ in Pa	$I_{\text{nom}}$ in A	$Q_{\text{el}}$ in W
	in l/s	in m <sup>3</sup> /h	in l/s	in m <sup>3</sup> /h				
125	20	72	20	72	> 20	20	3.93	900
	30	108	30	108	9	30		
	45	162	45	162	8	35		
	60	216	60	216	7	40		
	75	270	75	270	7	50		
	90	324	90	324	7	75		
	105	378	1)	1)	6	90		
	120 <sup>2)</sup>	432	1)	1)	5	110		
160	30	108	30	108	> 20	20	8.74	2000
	50	180	50	180	9	30		
	75	270	75	270	8	35		
	100	360	100	360	7	40		
	125	450	125	450	7	50		
	150	540	150	540	7	75		
	175	630	175	630	6	90		
	200 <sup>2)</sup>	720	1)	1)	5	110		
200	50	180	50	180	> 20	20	8.74	2000
	80	288	80	288	9	30		
	120	432	120	432	8	35		
	160	576	160	576	7	40		
	200	720	1)	1)	7	50		
	240	864	1)	1)	7	75		
	280	1008	1)	1)	6	90		
	320 <sup>2)</sup>	1152	1)	1)	5	110		

1) Not advisable, thus the outlet temperature  $t_a \geq 25\text{ °C}$  is guaranteed

2) =  $\dot{V}_{\text{nom}}$

# Function Schematic Diagram · Operation

## Function principle

The function unit comprises the duct module (TVRC) with the optional cabin module (finished solution).

Heating and flow rate setpoints are forwarded from the cabin module or the external management system to the duct module.

The TVRC unit controls the required room temperature with the aid of the flow rate and the duct temperature.

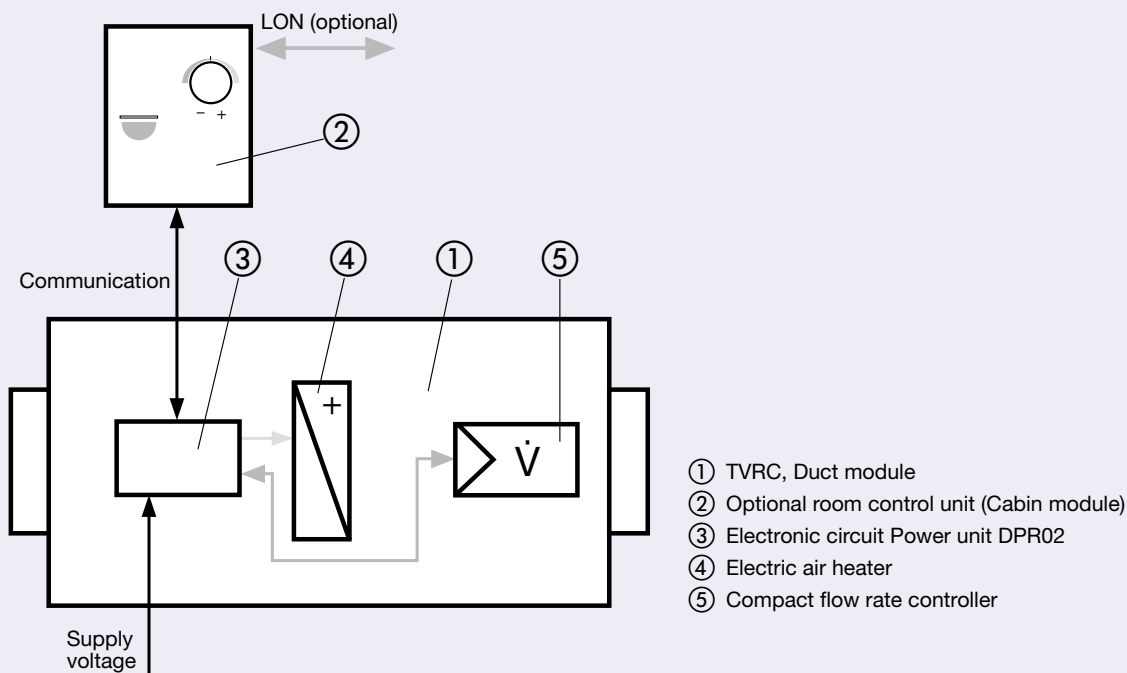
A triple safety circuit prevents the unit from overheating.

## Cabin module operation (optional)

The cabin module is operated by the room user and is fitted to the wall. Apart from the controls, it also contains the room temperature controller with the room sensor.

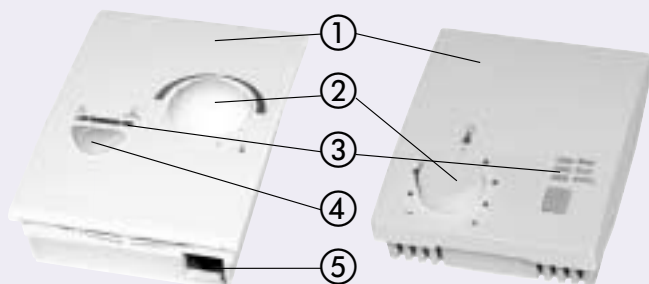
A service socket (LON interface, Siemens version) enables the experienced service personnel to connect a computer for setting parameters.

### Function schematic diagram



### Cabin module (optional)

Siemens RXC 10 LON or stand-alone operating mode      Belimo CR 24 Stand-alone operating mode



- ① Cabin module with integrated room temperature sensor
- ② Rotary switch for stepless value adjustment
- ③ Display Comfort-/Boost mode
- ④ Switch button Comfort-/Boost mode
- ⑤ Service connector (LON)

## Control strategy

The primary control function is the maintenance of the required room temperature at the stipulated flow rate. When the required room temperature is exceeded, the cold flow rate is increased; when the temperature drops below the required room temperature, the electric heater is used for additional heating and the flow rate increased, if necessary.

The room user can select the required room temperature on the cabin module and, using the "Boost" button, demand an increased flow rate for warming up or cooling down the cabin quickly. When window or door contacts are triggered, a switch is made to the protective mode.

Along with the room temperature, the air outlet temperature is also measured to obtain a very high level of comfort. The electrical air heater is therefore controlled using a room temperature supply air cascade controller.

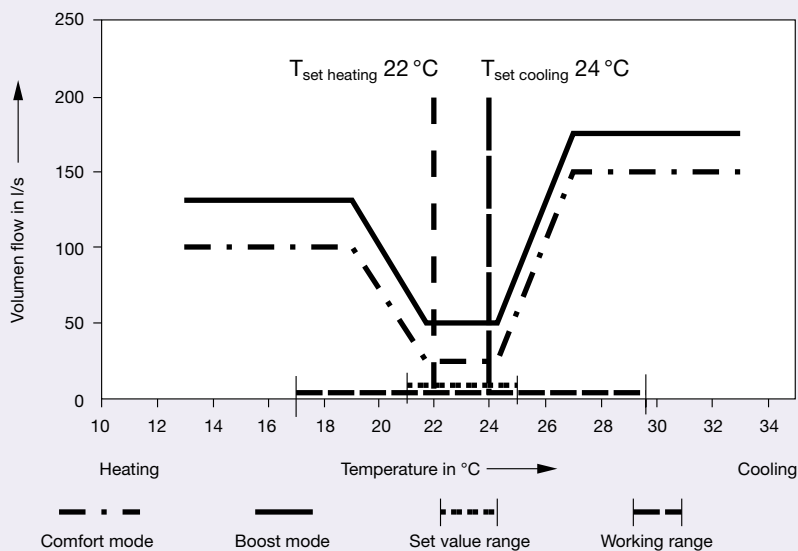
All parameters necessary for the flow rate and temperature control are entered in the factory. Specific adjustments can be made using the LON software (Siemens version).

## Special functions (Siemens version)

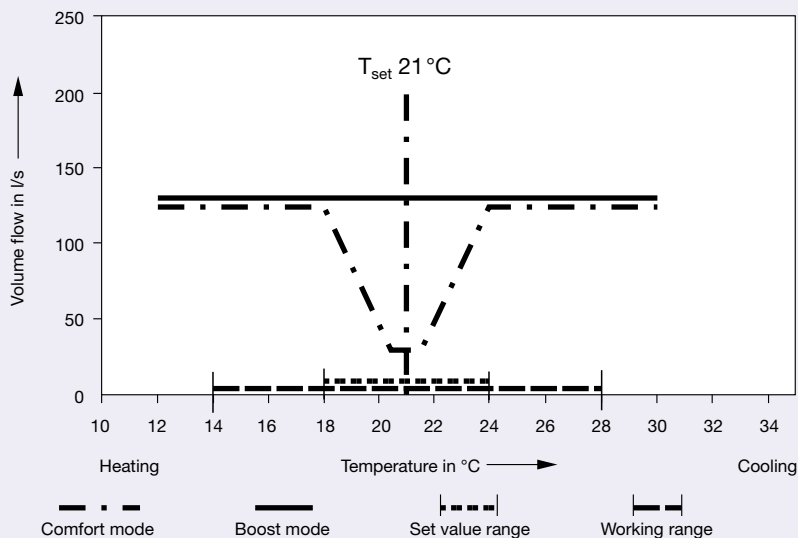
Further special functions for safety and energy management can be used from the control centre:

forced ventilation, quick warm up, night cooling, air flushing, etc.

**Flow rate as a function of the temperature difference  $T_{\text{Room}} - T_{\text{Set}}$   
with optional cabin module RXC 10 (Siemens version)**



**with optional cabin module CR24 (Belimo version)**



# Nomenclature · Acoustic Data

## Nomenclature

$f_m$	in Hz: Octave band centre frequency
$L_w$	in dB: Sound power level of the air-regenerated noise in the room (low pressure) side ducting
$L_{w1}$	in dB: Sound power level of the case-radiated noise
$L_{pA}$	in dB(A): A-weighted sound pressure level of the air-regenerated noise, assuming reflection attenuation and 8 dB/oct. room attenuation
$L_{pA1}$	in dB(A): A-weighted sound pressure level of case-radiated noise, assuming 8 dB/oct. room attenuation
$\Delta p_g$	in Pa: Total pressure differential
$\Delta p_{g \min}$	in Pa: Minimum total pressure differential
$\dot{V}$	in l/s or m <sup>3</sup> /h: Flow rate

$\Delta \dot{V}$	in $\pm$ %: Increased tolerance must be taken into account in the case of direct connection behind obstructions/bends in ductwork
NC	: Limit curve met by the sound pressure spectrum, reflection attenuation as well as room attenuation of 8 dB/oct. taken into account
$\dot{Q}_{el}$	in kW: Electrical performance of air heater

All sound power levels are based on 1 pW, all sound pressure levels on 20  $\mu$ Pa.

All noise levels determined in a reverberation chamber. The sound power data was determined and corrected according to DIN EN ISO 5135, February 1999.

Air-regenerated noise																																
Size	$\dot{V}$		$\Delta p_g = 100$ Pa										$\Delta p_g = 250$ Pa										$\Delta p_g = 500$ Pa									
			$L_w$ in dB										$L_w$ in dB										$L_w$ in dB									
			$f_m$ in Hz										$f_m$ in Hz										$f_m$ in Hz									
mm	l/s	m <sup>3</sup> /h	63	125	250	500	1000	2000	4000	8000	$L_{pA1}$ in dB(A)	NC	63	125	250	500	1000	2000	4000	8000	$L_{pA}$ in dB(A)	NC	63	125	250	500	1000	2000	4000	8000	$L_{pA}$ in dB(A)	NC
125	15	54	59	41	39	38	36	26	17	16	29	25	60	47	43	42	44	40	32	25	37	33	60	52	47	46	48	47	48	39	45	42
	30	108	59	53	49	45	41	32	24	20	35	30	61	56	52	50	50	46	38	31	44	39	62	56	54	52	53	52	49	42	49	44
	60	216	61	60	56	50	44	36	28	22	39	33	65	65	63	57	53	47	41	36	48	43	66	66	66	62	60	57	52	47	55	50
	90	324	61	61	61	57	50	40	34	27	45	41	69	69	66	61	56	49	43	38	50	45	70	73	72	66	63	59	53	49	58	52
	120	432	62	58	67	63	57	47	39	29	51	47	71	70	69	65	60	52	46	41	54	50	71	76	74	69	64	60	54	50	59	54
160	25	90	61	43	43	45	39	29	22	16	34	28	60	49	44	47	47	42	35	26	41	37	59	48	46	50	50	47	45	37	45	40
	50	180	61	54	50	46	43	37	35	27	38	33	60	58	56	54	53	47	45	35	47	43	62	61	59	58	61	57	53	45	55	51
	100	360	62	59	55	50	48	42	37	29	42	38	66	66	63	57	55	51	50	40	51	45	67	68	69	64	62	60	58	51	58	52
	150	540	67	63	62	56	52	46	41	30	47	42	70	69	66	60	58	54	52	43	53	48	72	73	71	66	63	61	60	52	60	54
	200	720	62	58	63	62	56	47	39	31	51	47	72	71	68	65	62	57	53	46	57	52	77	78	74	69	67	64	63	56	63	57
200	40	144	54	45	45	45	41	36	33	20	37	31	53	48	47	51	53	49	43	33	47	43	55	49	47	50	55	54	51	43	51	46
	80	288	55	53	48	44	42	40	26	39	34	55	56	55	51	52	51	49	38	49	43	55	57	58	56	60	60	57	49	57	53	
	160	576	60	58	53	49	45	43	40	28	42	35	64	64	60	56	53	53	52	41	51	46	66	67	66	62	60	61	61	52	59	54
	235	846	63	63	60	55	51	46	42	31	47	42	67	69	64	60	57	55	54	43	54	48	70	74	69	64	62	62	62	53	60	56
	315	1134	62	64	64	62	56	50	43	35	52	47	70	71	68	64	60	56	53	45	56	51	73	77	72	68	64	63	63	54	62	57

Case-radiated noise																																
Size	$\dot{V}$		$\Delta p_g = 100$ Pa										$\Delta p_g = 250$ Pa										$\Delta p_g = 500$ Pa									
			$L_{w1}$ in dB										$L_{w1}$ in dB										$L_{w1}$ in dB									
			$f_m$ in Hz										$f_m$ in Hz										$f_m$ in Hz									
mm	l/s	m <sup>3</sup> /h	63	125	250	500	1000	2000	4000	8000	$L_{pA1}$ in dB(A)	NC	63	125	250	500	1000	2000	4000	8000	$L_{pA1}$ in dB(A)	NC	63	125	250	500	1000	2000	4000	8000	$L_{pA1}$ in dB(A)	NC
125	15	54	33	25	21	20	20	22	22	20	20	17	35	26	25	25	27	31	29	31	29	27	34	28	29	31	32	40	38	42	37	37
	30	108	35	26	22	21	21	26	19	20	22	18	36	27	26	27	29	35	31	31	31	28	34	29	31	33	35	42	39	42	39	37
	60	216	34	31	29	26	25	28	20	21	24	21	34	34	34	34	35	40	33	31	36	33	35	36	37	39	42	49	42	42	44	41
	90	324	34	29	39	32	28	28	17	21	27	20	36	36	41	37	36	42	35	31	37	34	36	41	44	44	46	52	45	42	47	44
	120	432	36	30	43	37	33	32	22	21	32	25	34	37	47	42	38	42	36	31	39	35	36	44	48	46	46	52	45	43	47	45
160	25	90	38	26	24	23	23	21	20	20	21	16	37	27	25	27	29	30	28	25	27	22	35	30	28	30	32	35	37	40	35	36
	50	180	34	29	26	29	29	28	26	20	26	21	35	33	32	34	36	36	37	30	35	31	34	38	37	39	42	43	44	42	42	38
	100	360	37	35	32	30	31	30	27	22	28	23	36	39	38	39	39	40	40	32	38	35	37	44	46	48	48	48	50	43	47	44
	150	540	36	37	40	35	35	31	26	23	31	26	38	45	44	42	42	43	43	36	41	37	38	47	48	48	48	49	50	44	47	44
	200	720	36	40	44	43	40	35	30	28	37	30	38	46	47	44	43	42	41	36	41	36	42	52	51	50	48	49	51	45	48	45
200	40	144	37	24	22	24	23	23	18	<	21	16	37	27	27	32	35	35	32	27	33	28	38	31	31	37	39	42	41	38	39	35
	80	288	40	36	28	29	30	33	29	20	29	26	37	34	33	35	38	40	37	31	36	32	37	34	36	40	45	47	46	43	44	40
	160	576	39	36	32	29	33	35	29	21	31	27	41	42	37	37	39	43	40	34	39	36	43	44	43	44	47	50	49	45	47	43
	235	846	40	40	41	35	34	32	27	21	31	25	46	47	44	41	42	45	42	35	42	38	48	50	48	47	48	52	51	46	49	45
	315	1134	44	43	46	41	41	37	31	25	37	31	47	48	47	44	44	45	42	36	43	38	52	52	51	49	50	53	52	47	50	46

< indicates values below 15

# Order Details

## Specification text

COMCONTROL® Comfort Controller TVRC with circular connecting spigots and sealing system, optional with raised edges and piece adapter for quick locking collars, for variable flow rate systems, for supply air. Consists of a casing with a control damper, an averaging differential pressure sensor, an integral electric air heater and the factory fitted and wired control components. Equipped with duct temperature control circuit, safety temperature limiter and flow monitoring. Parameters are set in the factory using standard or project-specific values. Triple safety circuit for preventing overheating (if the flow rate is too low).

Optional operator terminal (cabin module) with integrated room temperature controller for selecting the required room temperature and activating the boost function (quick heating or cooling), LON or stand-alone operating mode. Later changes of parameters are possible.

The electric air heater is controlled using a room temperature supply air cascade controller.

As standard with additional acoustic cladding, comprising 40 mm mineral wool and outer cover made of 1 mm galvanised sheet steel for reducing the case-radiated noise.

Casing air leakage complies with DIN EN 1751, class II B. Differential pressure range 20 to 1000 Pa.

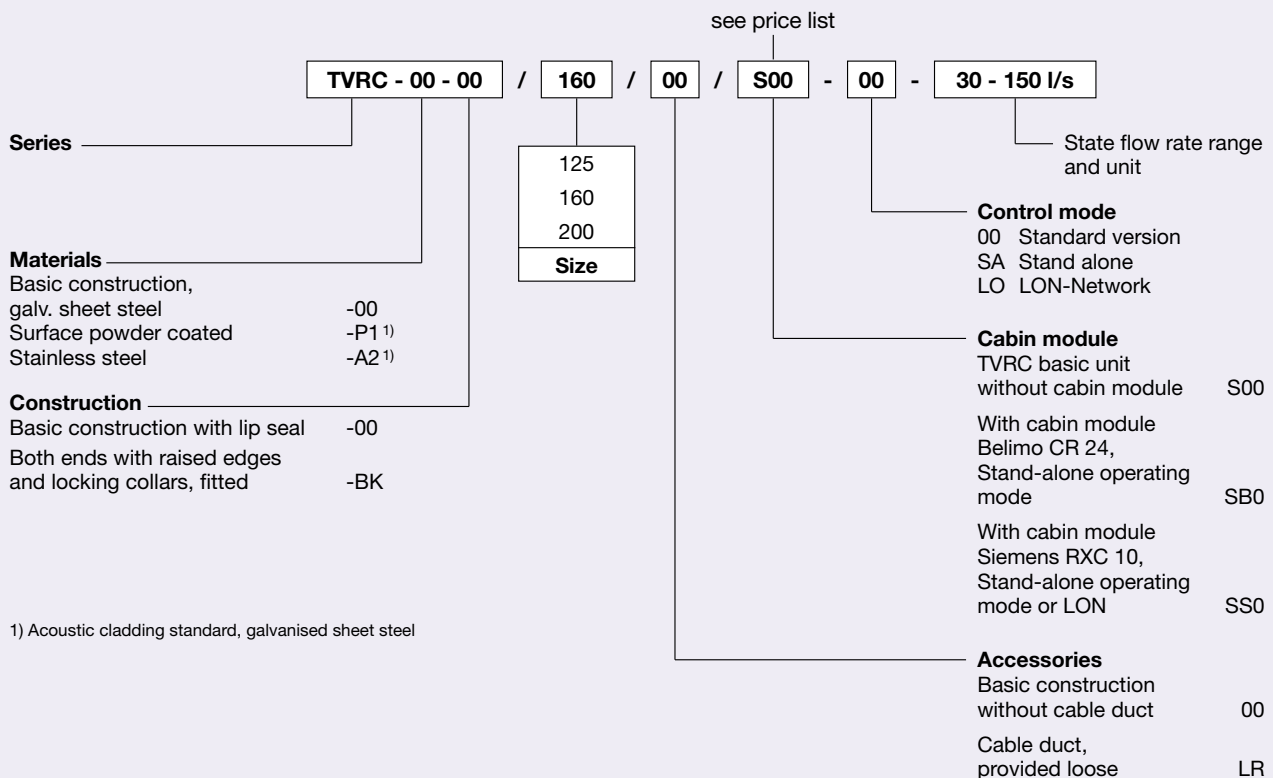
### Performed tests:

EMV test in accordance with the 89/336/EEC guideline; Conformity test according to EN 60335-1:2003; High-voltage tests, isolation measurements, air humidity and temperature test according to DNV-standard Nr. 2.4, section 3.8.3.

### Materials:

Casing and attachments are made of galvanised sheet steel, the damper blade is made of galvanised sheet steel, sensor tubes in aluminium, plastic plain bearings.

## Order code



## Order example

Make: TROX  
 Series: TVRC - 00 - 00 / 160 / 00 / S00 - 00 - 30 - 150 l/s