



Sliding Rheostats



Hardware Reference

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1 General Description

» **Series:** Sliding rheostats come in three series:

- **SN series** for power ratings from 315 W to 2670 W
 - **STV and SQV series** for power ratings from 1500 W to 7000 W
- Higher power ratings are achieved by **assembling several STV or SQV units**.

» **Design:** Sliding rheostats are constructed with:

- One to four ceramic cylinder(s), all identical for a given model. These cylinders are available in 5 sizes (mm): 350 x 40 (315 W) ; 500 x 60 (720 W) ; 600 x 60 (890 W) ; 700 x 100 (1250 W); 800 x 120 (1750 W)
- a wirewound resistor :
 - . made of nichrome or copper-nickel resistance wire for a low TCR (Temperature Coefficient of electrical Resistance) guarantying a very small variation of the ohmic value vs. temperature
 - . cement coated to secure the winding and improve thermal exchanges
- a slider (one per module, synchronized in multiple units assemblies) with an optimized mechanism for smooth motion and high resistance to wear (durability)
- a mechanical enclosure (protection degree IP 20 as a standard)

» **Ohmic Values:**

- **Each rheostat is built at the required ohmic value**, in the range of feasible values for the model

» **Parameters and optional features** depending on the model:

- the slider can be manual, controlled with a sliding knob or a hand wheel, or motorized,
- using various connection diagrams, the product can be wired as a variable load or as a rheostat, and for multiple-unit assemblies, as a single variable load or a rheostat with higher current capability, or as a three-phase load or rheostat,
- terminal types :



or terminal blocks - or other - on request (STV, SQV)

- optional mechanical stops,
- an optional **graded winding** may be done to cover a larger current range (*shown here before coating*):



- an **"Ayrton-Perry" winding** can be made by winding two wires in parallel but opposite directions in order to cancel the magnetic field and to reach very low inductance levels.

This document provides the main technical characteristics of our sliding rheostat models and some examples of special designs.

You can use the technical data to select a model, but you can also describe what you need and we will be pleased to help you choose or define the most appropriate solution for your requirements.

2 Product Selection Guide

2.1 Product selection table

The following matrix shows the different models and circuit diagrams for each series, ranked in column by type of tube and in rows by increasing maximum achievable current (lowest total ohmic values in the range of feasibility) and by number of circuit diagrams. For each model are given:

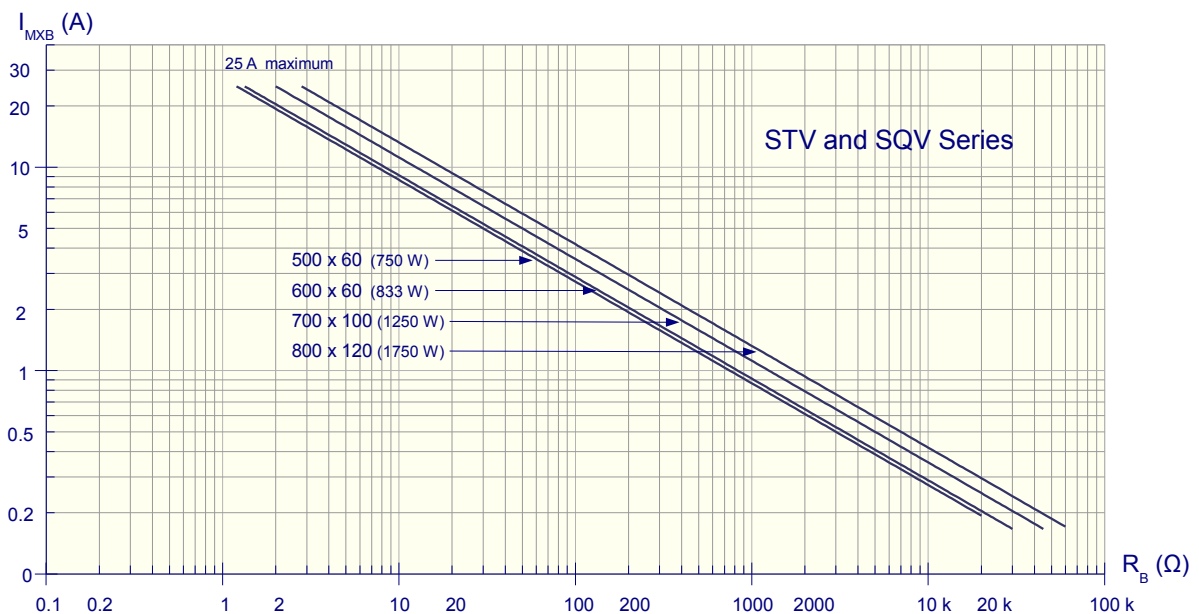
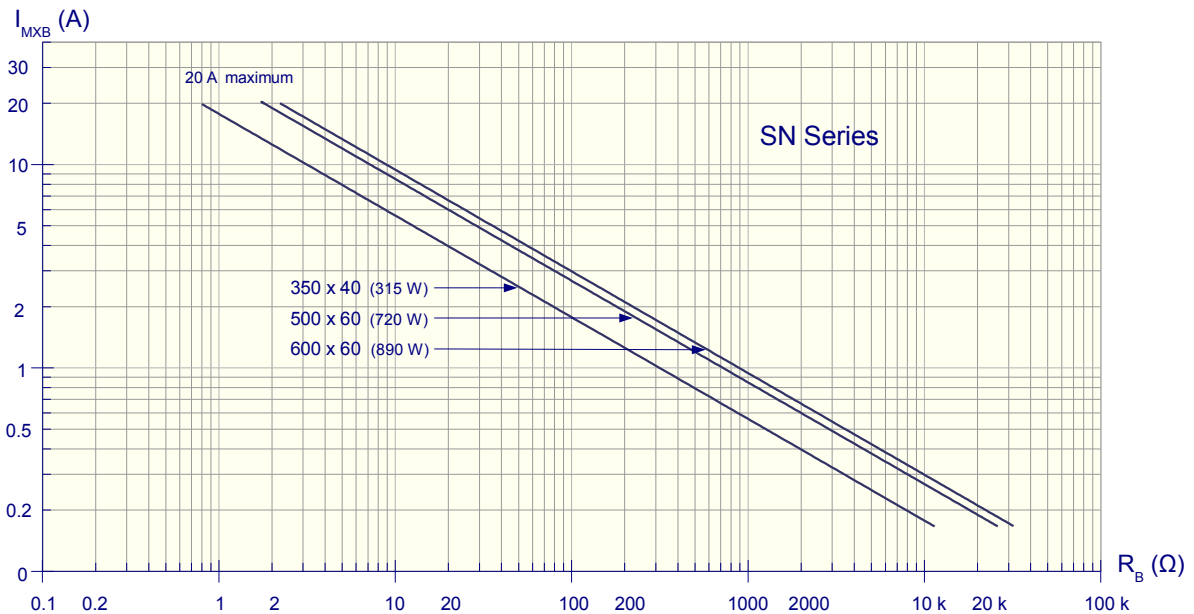
- the connections diagram numbers: S1 pour Connections diagram 1, etc.
- the range of ohmic feasible values (per winding / cylinder)
- the power rating

Series	Maximum achievable current (A)	Number of circuits	Type of the tubes for the rheostat				
			340 x 40	500 x 60	600 X 60	700 x 100	800 x 120
SN	20	1	SN(V) S1, S2 0.8 Ω to 11.5 KΩ 315 W	SN(V) S1, S2 1.8 Ω to 26 KΩ 720 W	SN(V) S1, S2 2.2 Ω to 32 KΩ 890 W		
		2		SND(V) S1, S2 1.8 Ω to 26 KΩ 2 x 720 W	SND(V) S1, S2 2.2 Ω to 32 KΩ 2 x 890 W		
		3		SNT(V) S1, S2 1.8 Ω to 26 KΩ 3 x 720 W	SNT(V) S1, S2 2.2 Ω to 32 KΩ 3 x 890 W		
	40	1		SND(V) S3, S4 0.9 Ω to 13 KΩ 1440 W	SND(V) S3, S4 1.1 Ω to 16 KΩ 1780 W		
	60	1		SNT(V) S3, S4 0.6 Ω to 8.7 KΩ 2160 W	SNT(V) S3, S4 0.8 Ω to 10.6 KΩ 2670 W		
ST	25	3 - star connected		STV1 S1 0.74 Ω to 20 KΩ 3 x 500 W	STV2 S1 1.2 Ω to 30 KΩ 3 x 835 W	STV3 S1 1.9 Ω to 45 KΩ 3 x 1250 W	STV4 S1 2.6 Ω to 60 KΩ 3 x 1750 W
		3		STV1 S2, S3 0.74 Ω to 20 KΩ 3 x 500 W	STV2 S2, S3 1.2 Ω to 30 KΩ 3 x 835 W	STV3 S2, S3 1.9 Ω to 45 KΩ 3 x 1250 W	STV4 S2, S3 2.6 Ω to 60 KΩ 3 x 1750 W
SQ	25	4		SQV1 S7, S8 0.74 Ω to 20 KΩ 4 x 500 W	SQV2 S7, S8 1.2 Ω to 30 KΩ 4 x 835 W	SQV2 S7, S8 1.9 Ω to 45 KΩ 4 x 1250 W	SQV2 S7, S8 2.6 Ω to 60 KΩ 4 x 1750 W
	50	1		SQV1 S4 0.74 Ω to 20 KΩ 2000 W	SQV2 S4 1.2 Ω to 30 KΩ 3330 W	SQV2 S4 1.9 Ω to 45 KΩ 5000 W	SQV2 S4 2.6 Ω to 60 KΩ 7000 W
	100	1		SQV1 S5, S6 0.19 Ω to 5 KΩ 2000 W	SQV2 S5, S6 0.3 Ω to 7.5 KΩ 3330 W	SQV2 S5, S6 0.45 Ω to 11 KΩ 5000 W	SQV2 S5, S6 0.65 Ω to 15 KΩ 7000 W

The identification code of a product takes into account its particular definition (type or tube, wiring diagram, ohmic value, etc.) according to the description given on page 12 (SN Series) or 18 (STV and SQV Series).

2.2 Maximum Current

- Maximum current:** The current in each winding (= for each tube) must not exceed the value I_{MXB} at which the rheostat is at its maximum power P_{MXB} , otherwise the product could be damaged. If R_B is the total ohmic value of the resistance wire for one tube, I_{MXB} is defined by $P_{MXB} = R_B \times I_{MXB}^2$. The diagrams below show the curves of maximum acceptable current per winding vs. the total ohmic value of the winding. The maximum acceptable current for the rheostat depends on the internal wiring diagram of the product: Please refer to the tables describing the different wiring diagrams.



Precautions of use

Precautions must be taken to avoid exceeding the maximum allowed current value, especially when the rheostat is used as a variable load: the low ohmic value at the end of the slider travel may cause high currents. This is usually done with a serial **current limiting resistor**, which can be either an external resistor or a built-in resistor as part of the resistance winding which is kept away from the slider's travel by a mechanical stop.

3 SN Series (SN and SNV)

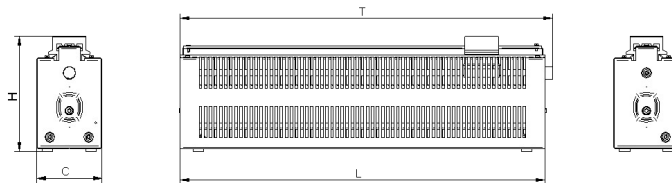
3.1 Models SN and SNV:

- » **Design** : these models have only one ceramic cylinder (one circuit); they differ in:
 - the size of the cylinder: 350 x 40 or 500 x 60 or 600 x 60 mm
 - the use of a sliding knob (SN) or a hand wheel (SNV – not possible with a 350 x 40 mm cylinder)
- » **Specifications:**

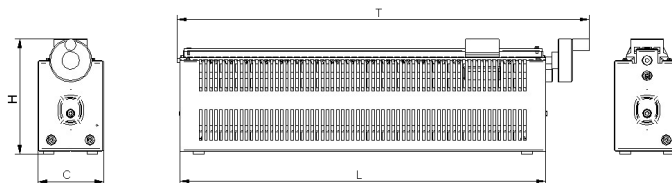
Features	Units	Type of ceramic cylinder		
		350 x 40	500 x 60	600 x 60
Power rating P_{MX}	W	315	720	890
Range of feasible ohmic values R_B per winding	Ω	0.8 to 11 500	1.8 to 26 000	2.2 to 32 000
Maximum current per winding I_{MXB}^1	A	$\sqrt{315/R_B}$	$\sqrt{720/R_B}$	$\sqrt{890/R_B}$
Height (H)	mm	135	161	161
Width (C)	mm	72	92	92
Length of the enclosure (L)	mm	362	512	612
Overall length (T), SN models	mm	372	523	623
Overall length (T), SNV models	mm	-	577	677
Average weight ²	kg	2	3.3	3.7

1: See curves and precautions of use on page 5.
 2: Weight value depends on the type of wire and the ohmic value of the rheostat.

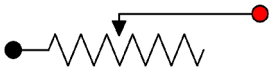
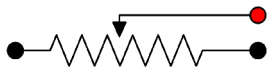
- » **Dimensions:**
- SN models with sliding knob



- SNV models with hand wheel



» **Connections diagrams:**

Diagram number	Connections diagrams	Function (variable load or rheostat) and current
1		Variable load: 2 terminals $R_T = R_B$ and $I_{MAX} = I_{MXB}$
2		Rheostat: 3 terminals $R_T = R_B$ and $I_{MAX} = I_{MXB}$

» **Parameters** for ordering a standard model:

- ohmic value,
- sliding knob or hand wheel (hand wheel not possible with a 350 x 40 mm cylinder),
- 4 mm mounting receptacles or safety sockets,
- connections diagram.

» **Optional features:**

- mechanical stop,
- graded winding,
- "Ayrton-Perry" winding.



Model SNE350x40

3.2 Models SND and SNDV:

- ◆ **Design:** these models are constructed of 3 wirewound ceramic cylinders. They differ in:
 - the size of the cylinders: 500 x 60 or 600 x 60
 - a sliding knob (SND models) or a hand wheel (SNDV models) for driving the slider

- ◆ **Specifications:**

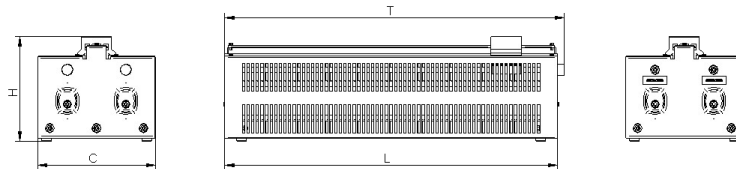
Features	Units	Type of ceramic cylinder	
		500 x 60	600 x 60
Power rating P_{MX}	W	1440	1780
Range of feasible ohmic values R_B per winding	Ω	1.8 to 26 000	2.2 to 32 000
Maximum current per winding I_{MXB}^1	A	$\sqrt{720/R_B}$	$\sqrt{890/R_B}$
Height (H)	mm	161	161
Width (C)	mm	182	182
Length of the enclosure (L)	mm	512	612
Overall length (T), SND models	mm	523	623
Overall length (T), SNDV models	mm	577	677
Average weight ²	kg	7.2	7.9

1: See curves and precautions of use on page 5.

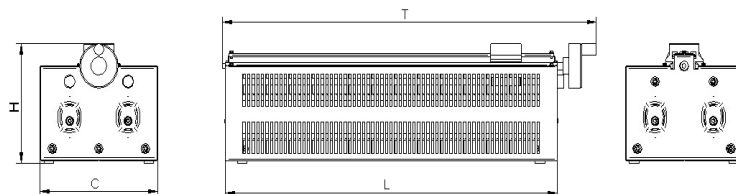
2: Weight value depends on the type of wire and the ohmic value of the rheostat.

- ◆ **Dimensions :**

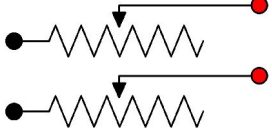
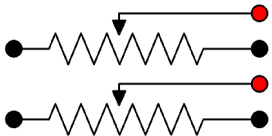
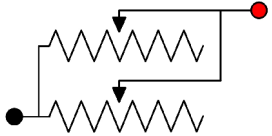
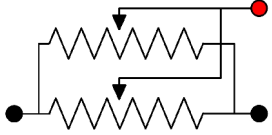
- SND models with sliding knob



- SNDV model with hand wheel



» **Connections diagrams:**

Diagram number	Connections diagrams	Function (variable load or rheostat) and current
1		<p>Dual variable load: 2 x 2 terminals</p> <p>$R_T = R_B$ and $I_{MAX} = I_{MXB}$ for each load</p>
2		<p>Dual rheostat: 2 x 3 terminals</p> <p>$R_T = R_B$ and $I_{MAX} = I_{MXB}$ for each circuit</p>
3		<p>Single variable load: 2 terminals</p> <p>$R_T = R_B / 2$ and $I_{MAX} = 2 \times I_{MXB}$</p>
4		<p>Single rheostat: 3 terminals</p> <p>$R_T = R_B / 2$ and $I_{MAX} = 2 \times I_{MXB}$</p>

» **Parameters** for ordering a standard model:

- ohmic value,
- sliding knob or hand wheel,
- 4 mm mounting receptacles or safety sockets,
- connections diagram.

» **Optional features:**

- mechanical stop,
- graded winding,
- "Ayrton-Perry" winding,
- special connections diagrams (example: one of the wirewound cylinders used as a current limiting resistor, etc.).



Model SNDVI

3.3 Models SNT and SNTV:

- ◆ **Design** : these models are constructed of 3 wirewound ceramic cylinders. They differ in:
 - the size of the cylinders : 500 x 60 or 600 x 60
 - a sliding knob (SNT models) or a hand wheel (SNTV models) to control the slider

◆ **Specifications:**

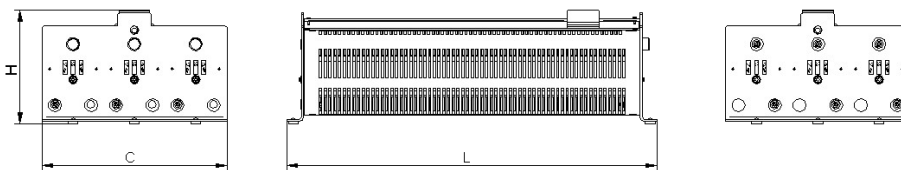
Features	Units	Type of ceramic cylinder	
		500 x 60	600 x 60
Power rating P_{MX}	W	2160	2670
Range of feasible ohmic values R_B per winding	Ω	1.8 to 26 000	2.2 to 32 000
Maximum current per winding I_{MXB}^1	A	$\sqrt{720/R_B}$	$\sqrt{890/R_B}$
Height (H)	mm	170	170
Width (C)	mm	277	277
Length of the enclosure (L)	mm	554	654
Overall length (T), SNT models	mm	554	654
Overall length (T'), SNTV models	mm	594	694
Average weight ²	kg	11.5	12.1

1: See curves and precautions of use on page 5.

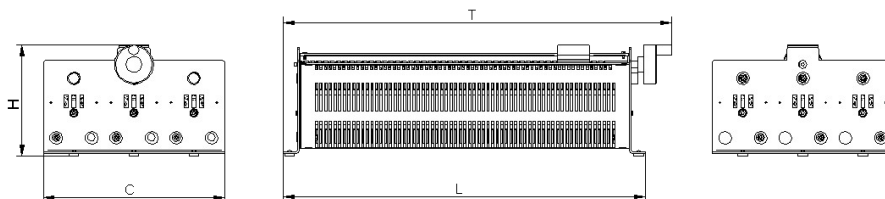
2: Weight value depends on the type of wire and the ohmic value of the rheostat.

◆ **Dimensions:**

- SNT models with sliding knob



- SNTV models with hand wheels



» **Connections diagrams:**

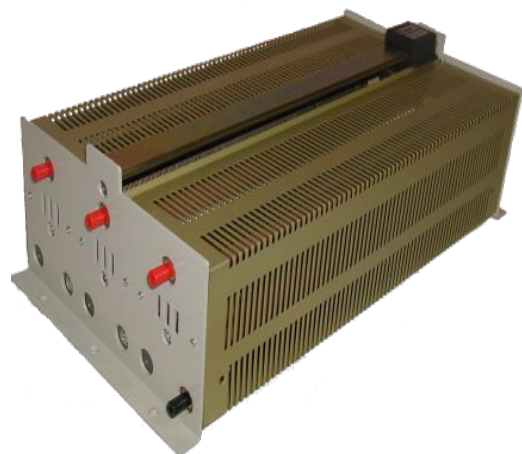
Diagram number	Connections diagrams	Function (variable load or rheostat) and current
1		<p>Triple variable load: 3 x 2 terminals</p> <p>$R_T = R_B$ and $I_{MAX} = I_{MXB}$ for each load</p>
2		<p>Triple variable rheostat: 3 x 3 terminals</p> <p>$R_T = R_B$ and $I_{MAX} = I_{MXB}$ for each circuit</p>
3		<p>Single variable load: 2 terminals</p> <p>$R_T = R_B / 3$ and $I_{MAX} = 3 \times I_{MXB}$</p>
4		<p>Single rheostat: 3 terminals</p> <p>$R_T = R_B / 3$ and $I_{MAX} = 3 \times I_{MXB}$</p>

» **Parameters** for ordering a standard model:

- ohmic value
- sliding knob (SNT) or hand wheel (SNTV),
- 4 mm mounting receptacles or safety sockets,
- Connections diagram number.

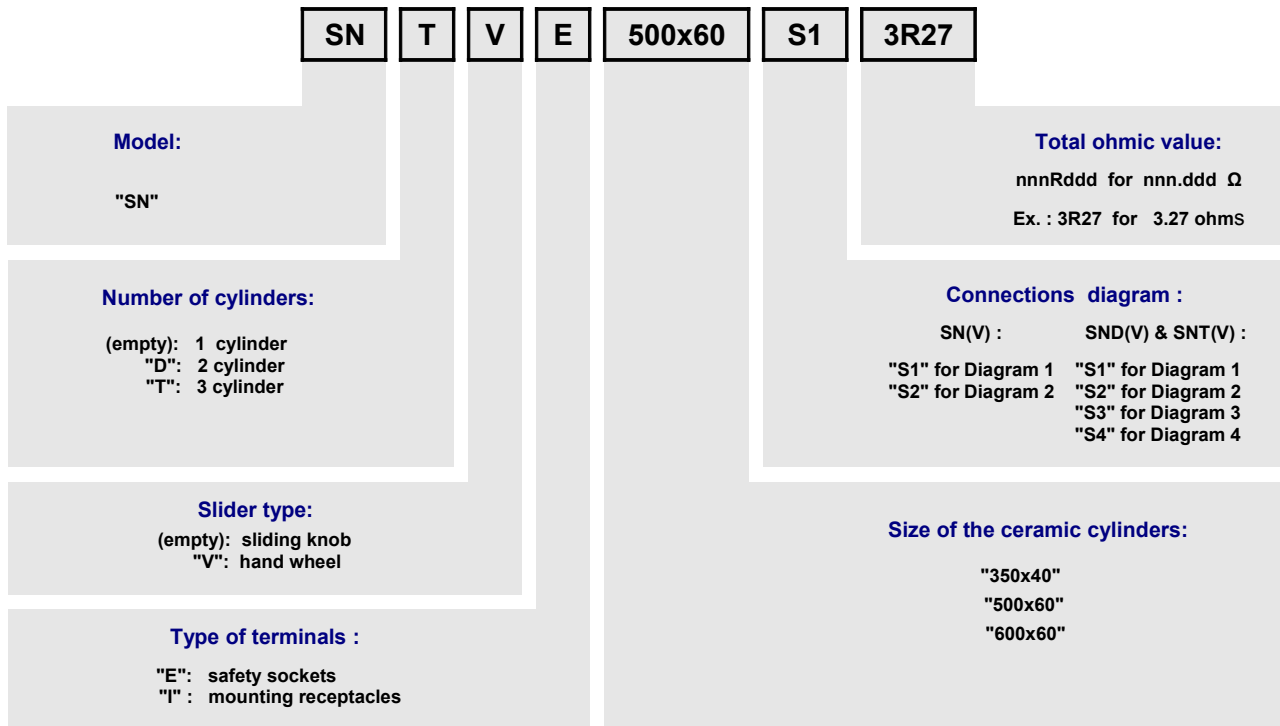
» **Optional features:**

- mechanical stop,
- graded winding,
- "Ayrton-Perry" winding,
- special connections diagrams (example : one of the wirewound cylinders used as a current limiting resistor, etc.).



Model SNT1500x60

3.4 Product Identification Code



The identification code above is followed:

- when ordering from the list of the optional features which are not described in the code,
- internally, from a special code if the product cannot be considered as a standard model.

4 STV and SQV Series

4.1 Design:

These models are constructed with:

- 3 (STV) or 4 (SQV) wirewound cylinders with 4 cylinder sizes:
 - 500 x 60 for P = 500 W, with a feasible ohmic value per winding between 0.74 Ω and 20 kΩ,
 - 600 x 60 for P = 833 W, with a feasible ohmic value per winding between 1.2 Ω and 30 kΩ,
 - 700 x 100 for P = 1250 W, with a feasible ohmic value per winding between 1.9 Ω and 45 kΩ,
 - 800 x 120 for P = 1750 W, with a feasible ohmic value per winding between 2.6 Ω and 60 kΩ.
- hand operated (hand wheel) or motor driven slider
- connections by safety sockets up to 36 Amps, by M6 or M8 terminal block or by copper bar terminals with bolts and nuts for higher currents, and by screw connection terminal blocks on motorized models.
- 2 types of mechanical structure:
 - IP20 enclosure as a standard
 - IP00 frame for integration in an equipment
- 8 possible connections diagrams (3 for STV, 5 for SQV)

4.2 Electrical specifications :

» **Specifications :**

Model	Units	STV1	STV2	STV3	STV4
Size of the ceramic cylinders	-	500 x 60	600 x 60	700 x 100	800 x 120
Number of cylinders / windings	-	3	3	3	3
Power rating P _{MX}	W	1500	2500	3750	5250
Range of feasible ohmic values R_B per winding	Ω	0.74 to 20,000	1.2 to 30,000	1.9 to 45,000	2.6 to 60,000
Maximum current per winding I _{MXB} ¹	A	$\sqrt{500/R_B}$	$\sqrt{833/R_B}$	$\sqrt{1250/R_B}$	$\sqrt{1750/R_B}$
Model	Units	SQV1	SQV2	SQV3	SQV4
Size of the ceramic cylinders	-	500 x 60	600 x 60	700 x 100	800 x 120
Number of cylinders / windings	-	4	4	4	4
Power rating P _{MX}	W	2000	3330	5000	7000
Range of feasible ohmic values R_B per winding	Ω	0.74 to 20,000	1.2 to 30,000	1.9 to 45,000	2.6 to 60,000
Maximum current per winding I _{MXB} ¹	A	$\sqrt{500/R_B}$	$\sqrt{833/R_B}$	$\sqrt{1250/R_B}$	$\sqrt{1750/R_B}$

1: See curves and precautions of use on page 5.

◆ Connections diagrams

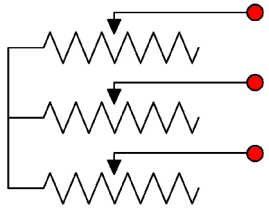
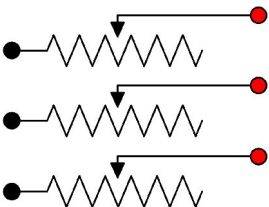
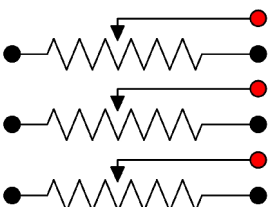
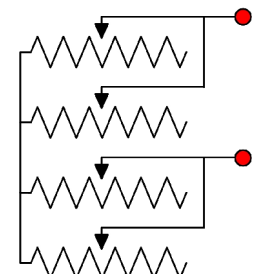
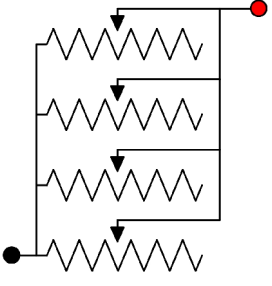
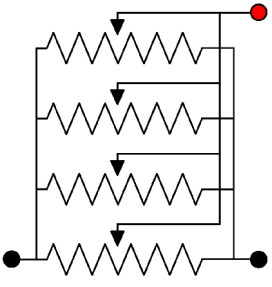
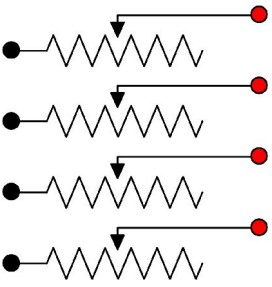
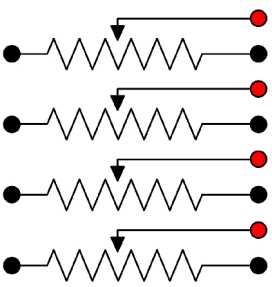
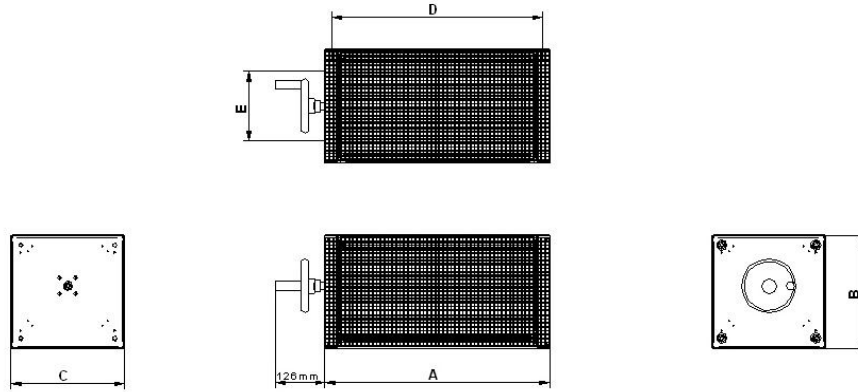
Diagram number	Connections diagrams	Function (variable load or rheostat) and current
<p>STV Connections diagram 1</p>		<p>Star connected three-phase single variable load: 3 terminals $R_T = R_B$ and $I_{MAX} = I_{MXB}$ for each phase</p>
<p>STV Connections diagram 2</p>		<p>Triple variable load: 3 x 2 terminals $R_T = R_B$ and $I_{MAX} = I_{MXB}$ for each load</p>
<p>STV Connections diagram 3</p>		<p>Triple rheostat: 3 x 3 terminals $R_T = R_B$ and $I_{MAX} = I_{MXB}$ for each circuit</p>
<p>SQV Connections diagram 4</p>		<p>Single variable load: 2 terminals $R_T = R_B$ and $I_{MAX} = 2 \times I_{MXB}$</p>

Diagram number	Connections diagrams	Function (variable load or rheostat) and current
<p>SQV Connections diagram 5</p>		<p>Single variable load: 2 terminals $R_T = R_B / 4$ and $I_{MAX} = 4 \times I_{MXB}$</p>
<p>SQV Connections diagram 6</p>		<p>Single rheostat: 3 terminals $R_T = R_B / 4$ and $I_{MAX} = 4 \times I_{MXB}$</p>
<p>SQV Connections diagram 7</p>		<p>4 variable loads: 4 x 2 terminals $R_T = R_B$ and $I_{MAX} = I_{MXB}$ for each load</p>
<p>SQV Connections diagram 8</p>		<p>4 rheostats: 4 x 3 terminals $R_T = R_B$ and $I_{MAX} = I_{MXB}$ for each circuit</p>

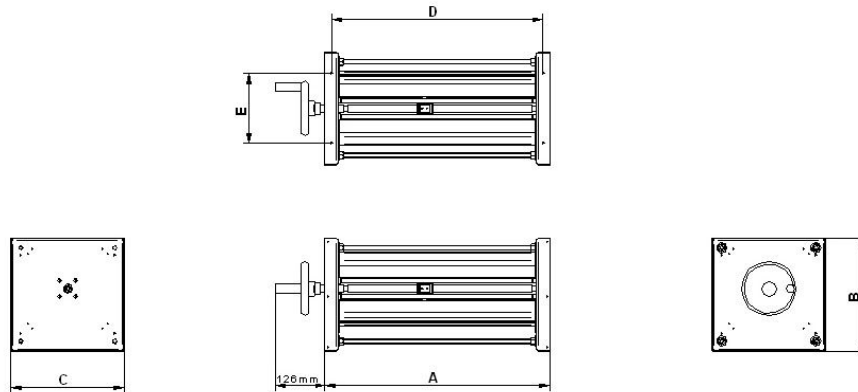
4.3 Dimensions and Weight:

♦ **Types of mechanical structures:**

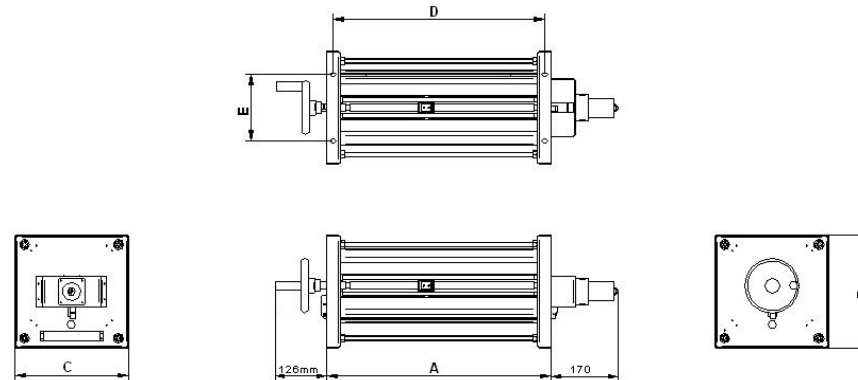
- IP20 enclosure [\[standard\]](#)



- IP00 bar frame [\[optional\]](#)



- IP00 bar frame with motorization (*with foldable hand wheel*) [\[optional\]](#)



» **Dimensions and weight:**

Model	Units	STV1 / SQV1	STV2/ SQV2	STV3 / SQV3	STV4 / SQV4
Length (A)	mm	574	674	784	884
Hight (B)	mm	290	362	410	460
Width (C)	mm	290	387	420	480
Distance between screw holes (D)	mm	540	640	748	848
Distance between screw holes (E)	mm	170	280	330	380

Model	Units	STV1	STV2	STV3	STV4
Average weight ¹ with an IP20 enclosure	kg	18	30	36	47
Average weight ¹ with an IP00 enclosure	kg	15	27	32	42

Model	Units	SQV1	SQV2	SQV3	SQV4
Average weight ¹ with an IP20 enclosure	kg	20	34	40	52
Average weight ¹ with an IP00 enclosure	kg	17	31	36	47

1: Weight value depends on the type of wire and the ohmic value of the rheostat.

Note: The dimensions given above take into account terminal connections by safety sockets, mounted as a standard on the rear panel for currents up to 36 Amps. For currents above 36 Amps, terminal blocks are used ; they are located in a plastic housing fixed on the rear panel, this modifying the overall dimensions.



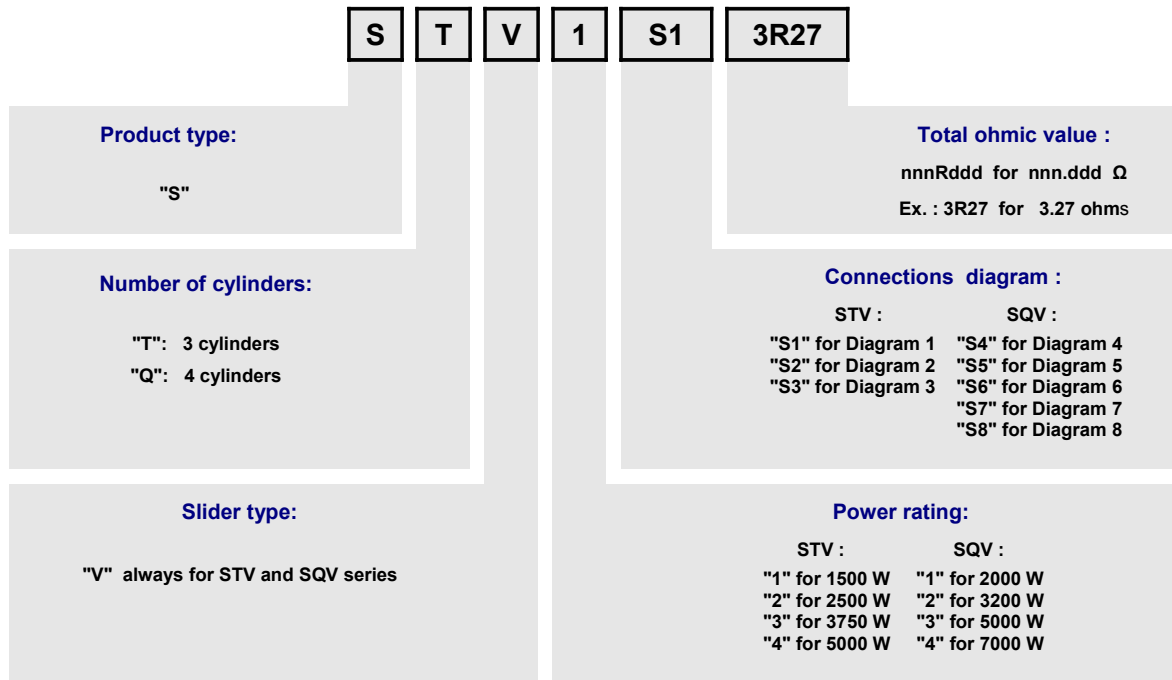
» **Optional features:**

- IP00 frame,
- motorized slider,
- graded winding,
- “Ayrton-Perry” winding,
- current limiting resistor,
- omni-directional casters,
- 1 or 2 carrying handles.



SQV1 Model with casters and handle

4.4 Product Identification Code



The identification code above is followed :

- when ordering from the list of the optional features which are not described in the code,
- internally, from a special code if the product cannot be considered as a standard model.

5 Special Designs

We can build special models on request using the technology and the components from our standard models, thus benefiting from their time-tested performance, solidity, quality and durability.

Examples of special designs:

1 to 50A Rheostat, 30 to 40 V_{DC}

- allows a continuous tuning of the current from 1 to 50 A under 30 to 40 V_{DC}
- graded winding
- hand wheel controlled slider
- slider position indicator displayed on the front panel
- portable housing, ingress protection IP20
- 2 fixed casters, 2 braked omni-directional casters
- one carrying handles
- dimensions : 900 x 360 x h750 mm



Model : SQV2S5-44RD137

5 to 350 A Three-phase Rheostat

- three-phase rheostat
- current setting from 5 to 350 A under a continuous voltage of 14 V_{DC}
- synchronized sliders driven by a common motor in an external enclosure, with a plastic drive-shaft
- pneumatic end-of-stroke sensors
- slider position given by a potentiometer output
- IP20 enclosure
- dimensions: 760 x 1200 x h750 mm



Model : BVN5-35A-2R8ET1442

Three-phase rheostat 0.28 to 3A under 115/200 V_{AC} 400Hz

- three-phase rheostat
- allow current tuning from 0.28 to 3 A under a voltage of 115/200 V_{AC} 400Hz
- tuning operated either by hand (hand wheel) or by motor
- push buttons on the front panel for controlling the forward and backward motion of the slider
- portable housing, ingress protection IP20
- 2 fixed casters, 2 braked omni-directional casters
- one carrying handle
- dimensions: 1050 x 600 x h1300 mm

*Model: STV2S6-411RD119***Triple Rheostat 7 kW**

- set of 3 independent rheostats
- rheostat 1: R_{MAX} = 4 Ω P_{MAX} = 7 kW
- rheostat 2: R_{MAX} = 4 Ω P_{MAX} = 7 kW
- rheostat 3: R_{MAX} = 10 Ω P_{MAX} = 7 kW
- hand wheels for tuning the ohmic value of each rheostat
- portable housing, ingress protection IP20
- 2 fixed casters, 2 braked omni-directional casters
- 2 carrying handles
- dimensions: 900 x 600 x h1700 mm

*Model: SQV4S6-2XAR-10RD114***COUDOINT**

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