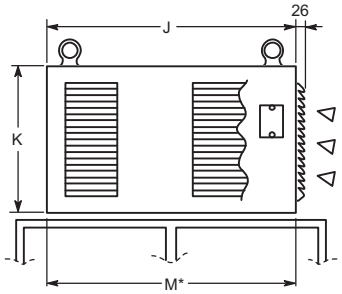
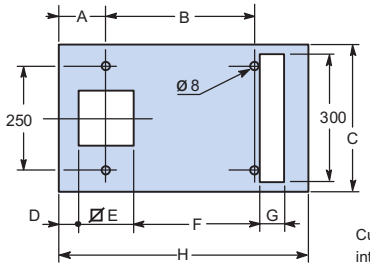
Cooling unit
Mechanical control

Top-mounting models, ref. NSYCU760W230VR-NSYCU1050W230VR-NSYCU1460W230VR



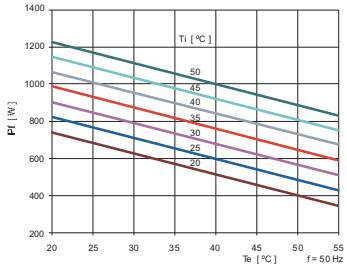


Cut-out template for top mounting without intermediate frame.

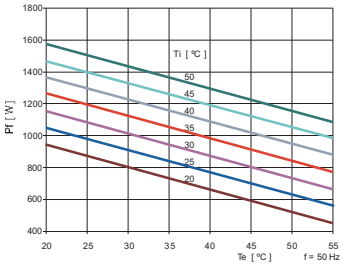
A	B	C	D	E	F	G	H	J	K	M	Reference
108	350	350	40	136	292	80	600	600	340	600	**NSYCU760W230VR**
118	420	400	45	180	328	90	700	700	400	700	**NSYCU1050W230VR**
118	420	400	45	180	328	90	700	700	400	700	**NSYCU1460W230VR**

Curves

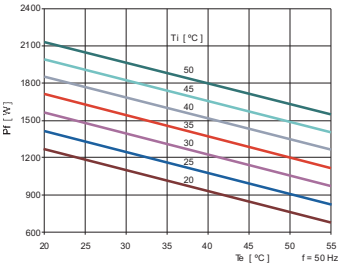
NSYCU760W230VR 50 Hz



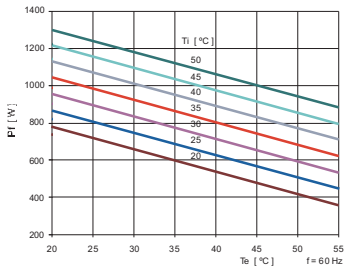
NSYCU1050W230VR 50 Hz



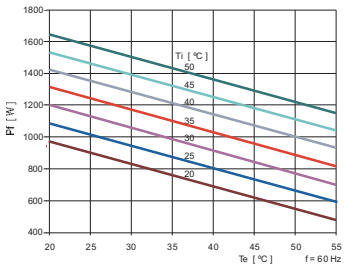
NSYCU1460W230VR 50 Hz



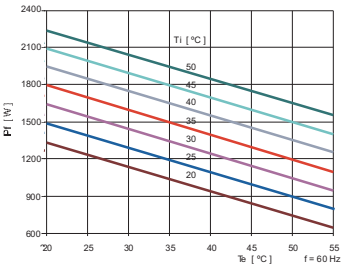
NSYCU760W230VR 60 Hz



NSYCU1050W230VR 60 Hz



NSYCU1460W230VR 60 Hz



Cooling unit
Mechanical control

NSYCU1650W230VR

Top-mounting

Cooling units for electrical switchboards

- Respect for the environment by using environmentally friendly gas R134a (HFC).
- Automatic evaporation of condensation water.
- Cooling power from 760 W to 3100 W.

General characteristics

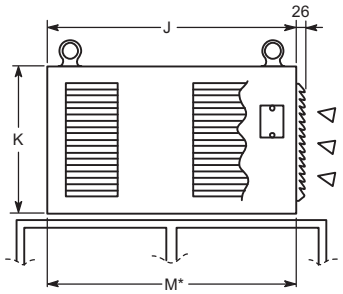
- The temperature setting can be adjusted from +20 to +50 °C.
- They are equipped as standard with an automatically reset pressure gauge and a switching thermostat which, when it detects a value greater than the safe pressure value, stops the compressor and the external fan.
- The internal and external air circuits are independent. A protection rating of IP 54 is guaranteed between the outside and the inside of the enclosure.
- The fan of the internal circuit permanently guarantees prevention against hot spots as well as improved thermal dissipation inside the enclosure.
- The devices are equipped with switches for reporting an alarm.
- System for automatic recovery and evaporation of condensates.
- RAL 7035 colour for the standard offer.
- Units in RAL 7032 as option, please contact us.
- Stainless-steel version and other voltages on demand.

Reference	NSYCU1650W230VR	NSYCU2000W400VR
Voltage	230 V; 50/60 Hz	3 × 440 V; 50 Hz / 3 × 440 V; 60 Hz
Cooling power (50/60 Hz) according to EN 14511 L35-L35 L35-L50	 1650/1700 W (5631/5802 Btu/h) 1300/1400 W (4438/4779 Btu/h)	 2000/2100 W (6826/7169 Btu/h) 1600/1700 W (5462/5803 Btu/h)
Dimensions Height Width Depth	 430 mm 700 mm 400 mm	
Intensity Starting current Rated current	 16.1/18.5 A 4.2/4.5 A	 6.8/7.9 A 2.1/2.5 A
Power consumption absorbed L35-L35 L35-L50	 800/920 W 920/1100 W	 1200/1400 W 1400/1700 W
Energy efficiency ratio (EER) L35-L35	 2.1/2.0	 1.7/1.5
Control type	Thermostat	
Temperature setting range	+20...+50 °C	
Maximum outside temperature	55 °C	
Noise level	67 dB	69 dB
Air flow of the internal circuit of the external circuit	 550/600 m^3/h 620/680 m^3/h	
Type of zero-potential alarm	Inverter contact	
Weight of unit	47 kg	60 kg
Cooling gas type	R134a (1.0 kg)	
IP (IEC 60529) On the internal circuit On the external circuit	 54 34	
External circuit filter	Yes	
Assembly	On top	
Thermal protection recommended (fuse melt curve)	T6A	T3A

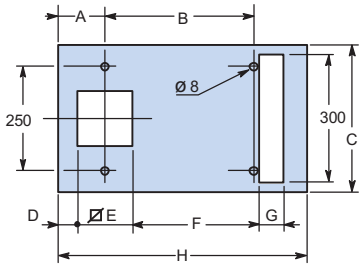
8

Cooling unit
Mechanical control

Top-mounting model, ref. NSYCU1650W230VR-NSYCU2000W400VR



* Maximum dimensions of the intermediate frame.

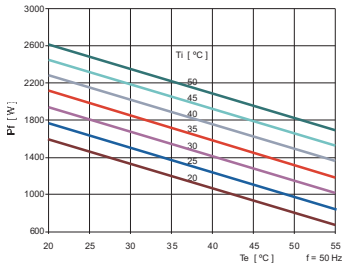


Cut-out template for top mounting without intermediate frame.

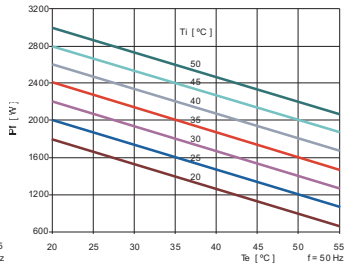
Reference	A	B	C	D	E	F	G	H	J	K	M
NSYCU1650W230VR	118	420	400	45	180	328	90	700	700	430	700
NSYCU2000W400VR	118	420	400	45	180	328	90	700	700	430	700

Curves

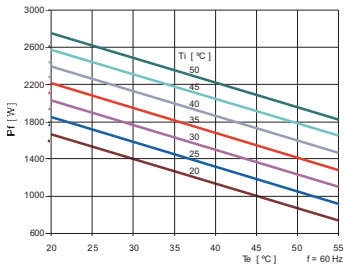
NSYCU1650W230VR 50 Hz



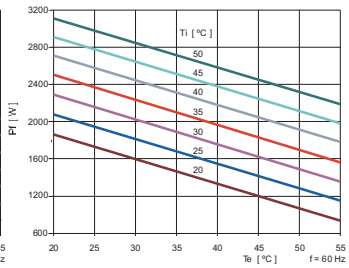
NSYCU2000W400VR 50 Hz



NSYCU1650W230VR 60 Hz



NSYCU2000W400VR 60 Hz



Cooling unit
Mechanical control

NSYCU3100W400VR

Top-mounting

Cooling units for electrical switchboards

- Respect for the environment by using environmentally friendly gas R134a (HFC).
- Automatic evaporation of condensation water.
- Cooling power from 760 W to 3100 W.

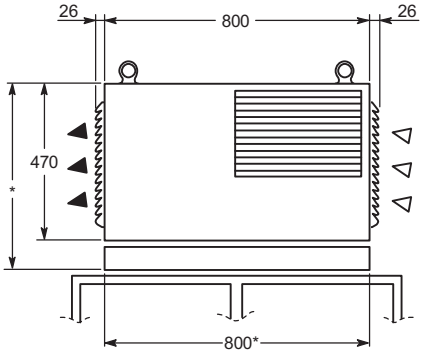
General characteristics

- The temperature setting can be adjusted from +20 to +50 °C.
- They are equipped as standard with an automatically reset pressure gauge and a switching thermostat which, when it detects a value greater than the safe pressure value, stops the compressor and the external fan.
- The internal and external air circuits are independent. A protection rating of IP 54 is guaranteed between the outside and the inside of the enclosure.
- The fan of the internal circuit permanently guarantees prevention against hot spots as well as improved thermal dissipation inside the enclosure.
- The devices are equipped with switches for reporting an alarm.
- System for automatic recovery and evaporation of condensates.
- RAL 7035 colour for the standard offer.
- Units in RAL 7032 as option, please contact us.
- Stainless-steel version and other voltages on demand.

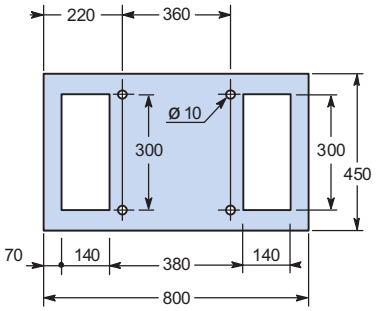
Reference	NSYCU2450W400VR	NSYCU3100W400VR
Voltage	3 × 440 V; 50 Hz / 3 × 440 V; 60 Hz	3 × 440 V; 50 Hz / 3 × 440 V; 60 Hz
Cooling power (50/60 Hz) according to EN 14511 L35-L35 L35-L50	 2450/2600 W (8362/8876 Btu/h) 2000/2100 W (6828/7169 Btu/h)	 3100/3300 W (10580/11266 Btu/h) 2500/2600 W (8532/8876 Btu/h)
Dimensions Height Width Depth	 470 mm 800 mm 450 mm	
Intensity Starting current Rated current	 8.4/10.1 A 2.6/3.2 A	 9.6/11.3 A 3.0/3.5 A
Power consumption absorbed L35-L35 L35-L50	 1500/1800 W 1800/2100 W	 1700/2000 W 2000/2300 W
Energy efficiency ratio (EER) L35-L35	 1.6/1.5	 1.8/1.7
Control type	Thermostat	
Temperature setting range	+20...+50 °C	
Maximum outside temperature	55 °C	
Noise level	69 dB	
Air flow of the internal circuit of the external circuit	 750/820 m^3/h 1200/1310 m^3/h	
Type of zero-potential alarm	Inverter contact	
Weight of unit	65 kg	
Cooling gas type	R134a (1.5 kg)	R134a (1.7 kg)
IP (IEC 60529) On the internal circuit On the external circuit	 IP 54 IP 34	
External circuit filter	Yes	
Assembly	On top	
Thermal protection recommended (fuse melt curve)	T4A	

Cooling unit
Mechanical control

Top-mounting model, ref. NSYCU2450W400VR-NSYCU3100W400VR



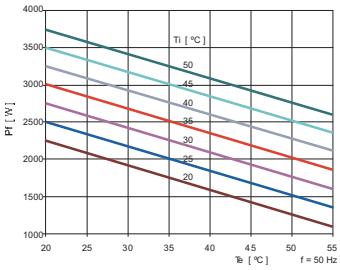
* Maximum dimensions of the intermediate frame.



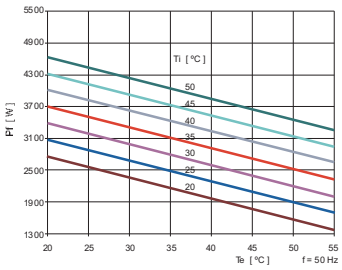
Cut-out template.

Curves

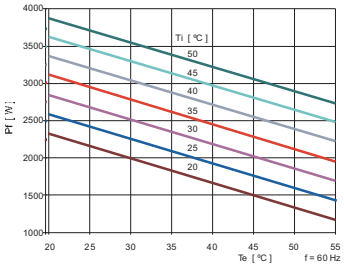
NSYCU2450W400VR 50 Hz



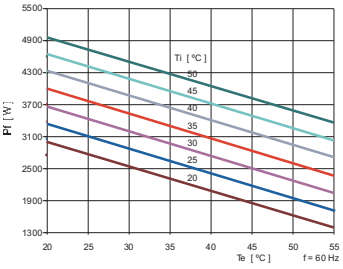
NSYCU3100W400VR 50 Hz



NSYCU2450W400VR 60 Hz



NSYCU3100W400VR 60 Hz



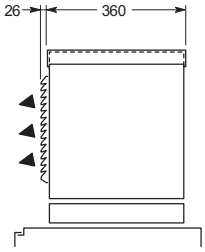
8

Cooling unit
Accessories

Intermediate frame

- Frame allowing the top-mounting unit ref. **NSYCU760W230VR** mounted on enclosures with a width of 600 and a depth of 400 mm.

Description	Reference
Intermediate frame	**NSYCUAI**



Spare filter

- Filter with a density of 32 kg/m² and a thickness of 13 mm, for all the side-mounting and top-mounting units.
- To be ordered in multiples of 24 filters.

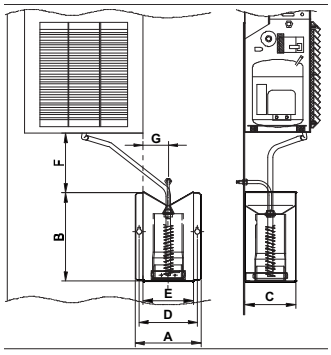
Description	Reference
Spare filter	**NSYCEAF**

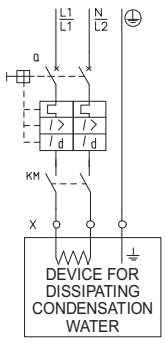
Device for dissipating condensation water (external installation)

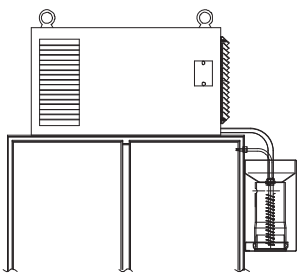
- Device for dissipating condensation water (external installation) allowing the evacuation of condensation water from the internal battery (evaporator).
- Supplied with stainless-steel support.
- Power supply:

	Voltage	Starting current	Thermal protection recommended	Evaporation capacity	Resistance type
Operating voltage ±10%	230 V~	2.9 A	T 3 A	200 cl/h	PTC
	115 V~	5.8 A	T 6 A		

Description	Reference
Heat sink	**NSYCUAD**







8

Selection tools

www.schneider-electric.com

Our international site allows you to access all the Schneider Electric products in just two clicks with direct links to:

- A complete library of technical documents, catalogues, FAQs brochures, etc.
- Certificates.
- 2D & 3D drawings.
- Selection Guides from the e-catalogue.
- Product discovery sites.

You may also find illustrated overviews, news to which you can subscribe, a list of country contacts and more useful information.

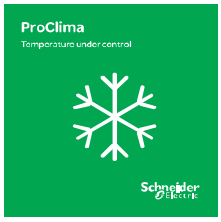
Our software suite

Spacial.pro

Spacial.pro allows you to make switchboard proposals based on the standard Spacial offer. A full project with several sets of switchboards is quoted in minutes, with automatic creation of the Bill of Material and 2D drawings for front/side views.

ProClima

Calculate the right choice for your thermal management requirements, according to the environment and the electrical/electronic devices installed inside the enclosure.



Spacial.ref Thalassa.ref

These digital rules allow you to select the best components from the current extensive product range without the risk of any mistakes, since product and accessory selection take place automatically, saving you time and money.

Cooling unit
Electronic control

NSYCUE1400W230L

Side-mounting

General characteristics

- Main components: a high-temperature compressor, two fans installed on a removable support, two exchange cassettes, an environmentally friendly refrigerant fluid HFC R134a, an electronic controller and a device for evaporating condensates (treated against corrosion) for side-mounting and top-mounting models.
- The temperature setting can be adjusted from +20 to +50 ºC (pre-set and recommended temperature: 35 °C).
- The internal and external air circuits are independent. A protection rating of IP 54 is guaranteed between the outside and the inside of the enclosure.
- The fan of the internal circuit permanently guarantees prevention against hot spots as well as improved thermal dissipation inside the enclosure.

Electronic control by microprocessor allows:

– Setting temperature adjustment.
– Door switch management.
– Respect for the following operating parameters:
Minimum operating time of the compressor.
Minimum stand-by time of the compressor.
– Switching on the compressor with setting temperature +1 ºC.
– Switching off the compressor with setting temperature –5 ºC.
– Alarm management.
– Alarm reset by "confirmation" (manual reset).
– RAL 7035 colour for the standard offer.

- Units in RAL 7032 as option, please contact us.
- Stainless-steel version and other voltages on demand.

Conditions of use

- They can be used with ambient temperatures ranging from +20 to +50 °C.
- The optional filter is required for installation in the following environments: intensive welding, hot forging, textile fibres, powdery chemicals, rubber processing and other harsh environments.
- The air conditioner is equipped with two handles making it easier to transport.
- The air conditioner is equipped with a quick-fixing device. A simple screw-nut-cage assembly allows the device to be locked from the outside.
- The electrical connection is by plug-in connectors, included with the unit.
- Do not obstruct, even partially, the external air suction and backflow orifices.
- The device must be installed more than 30 cm from the walls and more than 10 cm from the floor.

Cooling unit
Electronic control

Reference	NSYCUE1100W230L	NSYCUE1400W230L	NSYCUE1400W400L	NSYCUE1800W400L
Voltage	230 V; 50/60 Hz		3 × 400 V; 50 Hz / 3 × 440 V; 60 Hz	
Cooling power (50/60 Hz) according to EN 14511 L35-L35 L35-L50	1100/1200 W (3755/4097 Btu/h) 880/930 W (3004/3175 Btu/h)	1400/1500 W (4780/5121 Btu/h) 1200/1300 W (4097/4438 Btu/h)	1400/1500 W (4780/5121 Btu/h) 1200/1300 W (4097/4438 Btu/h)	1800/1900 W (6145/6485 Btu/h) 1400/1500 W (4780/5121 Btu/h)
Dimensions Height Width Depth	1,010 mm 400 mm 240 mm			
Intensity Starting current Rated current	12.1/13.9 A 3.2/3.7 A	18.1/22.2 A 4.8/5.8 A	3.7/4.3 A 1.2/1.4 A	5.3/6.3 A 1.8/2.1 A
Power cunsumption absorbed L35-L35 L35-L50	600/690 W 690/790 W	900/1,100 W 1100/1300 W	700/810 W 810/930 W	1000/1200 W 1200/1400 W
Energy efficiency ratio (EER) L35-L35	1.8/1.7	1.6/1.4	2.0/1.9	1.8/1.7
Control type	Electronic controller			
Temperature setting range	+20...+50 °C			
Maximum outside temperature	55 °C			
Noise level	62 dB (A)	64 dB (A)	66 dB (A)	69 dB (A)
Air flow of the internal circuit of the external circuit	 575/600 m^3/h 860/900 m^3/h	 860/900 m^3/h 860/900 m^3/h	 860/900 m^3/h 860/900 m^3/h	 885/900 m^3/h 1050/1160 m^3/h
Type of zero-potential alarm	Inverter contact			
Weight of unit	45 kg	46 kg	47 kg	50 kg
Cooling gas type	R134a (0.85 kg)	R134a (0.85 kg)	R134a (0.85 kg)	R134a (0.85 kg)
IP (IEC 60529) On the internal circuit On the external circuit	 54 34			
External circuit filter	Option			
Assembly	Side			
Thermal protection recommended (fuse melt curve)	T6A	T8A	T2A	T3A

Cooling unit
Electronic control

NSYCUE1400W230R

Top-mounting

General characteristics

- Main components: a high-temperature compressor, two fans installed on a removable support, two exchange cassettes, an environmentally friendly refrigerant fluid HFC R134a, an electronic controller and a device for evaporating condensates (treated against corrosion) for side-mounting and top-mounting models.
- The temperature setting can be adjusted from +20 to +50 ºC (pre-set and recommended temperature: 35 °C).
- The internal and external air circuits are independent. A protection rating of IP 54 is guaranteed between the outside and the inside of the enclosure on which the air conditioner is installed.
- The fan of the internal circuit permanently guarantees prevention against hot spots as well as improved thermal dissipation inside the enclosure.

Electronic control by microprocessor allows:

– Setting temperature adjustment.
– Door switch management.
– Respect for the following operating parameters:
Minimum operating time of the compressor.
Minimum stand-by time of the compressor.
– Switching on the compressor with setting temperature +1 ºC.
– Switching off the compressor with setting temperature –5 ºC.
– Alarm management.
– Alarm reset by "confirmation" (manual reset).
– RAL 7035 colour for the standard offer.

- Units in RAL 7032 as option, please contact us.
- Stainless-steel version and other voltages on demand.

Conditions of use

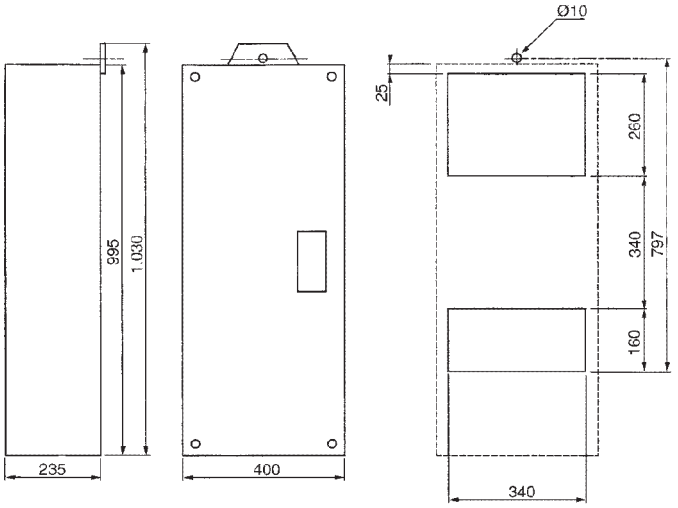
- They can be used with ambient temperatures ranging from +20 to +55 °C.
- The optional filter is required for installation in the following environments: intensive welding, hot forging, textile fibres, powdery chemicals, rubber processing and other harsh environments.
- The air conditioner is equipped with two handles making it easier to transport.
- The air conditioner is equipped with a quick-fixing device. A simple screw-nut-cage assembly allows the device to be locked from the outside.
- The electrical connection is by plug-in connectors, included with the unit.
- Do not obstruct, even partially, the external air suction and backflow orifices.
- The device must be installed more than 30 cm from the walls and more than 10 cm from the floor.

Cooling unit
Electronic control

Reference	NSYCUE1400W230R	NSYCUE1800W400R
Voltage	230 V; 50/60 Hz	3 × 400 V; 50 Hz / 3 × 440 V; 60 Hz
Cooling power (50/60 Hz) according to EN 14511 L35-L35 L35-L50	 1400/1500 W (4780/5121 Btu/h) 1200/1300 W (4097/4438 Btu/h)	 1800/1900 W (6145/6485 Btu/h) 1400/1500 W (4780/5121 Btu/h)
Dimensions Height Width Depth	 415 mm 750 mm 412 mm	
Intensity Starting current Rated current	 18.1/22.2 A 4.8/5.8 A	 5.3/6.3 A 1.8/2.1 A
Power consumption absorbed L35-L35 L35-L50	 900/1,100 W 1100/1300 W	 1000/1200 W 1200/1400 W
Energy efficiency ratio (EER) L35-L35	 1.6/1.4	 1.8/1.7
Control type	Electronic controller	
Temperature setting range	+20...+50 °C	
Maximum outside temperature	55 °C	
Noise level	64 dB (A)	69 dB (A)
Air flow of the internal circuit of the external circuit	 860/900 m^3/h 860/900 m^3/h	 885/900 m^3/h 1050/1160 m^3/h
Type of zero-potential alarm	Inverter contact	
Weight of unit	48 kg	50 kg
Cooling gas type	R134a (0.95 kg)	R134a (0.95 kg)
IP (IEC 60529) On the internal circuit On the external circuit	 54 34	
External circuit filter	Option	
Assembly	On top	
Thermal protection recommended (fuse melt curve)	T8A	T3A

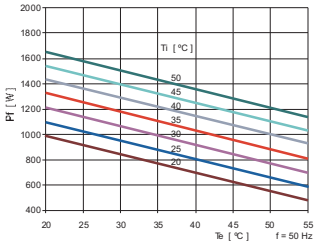
Cooling unit
Electronic control

Cut-out template for side mounting

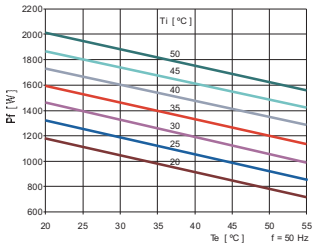


Curves

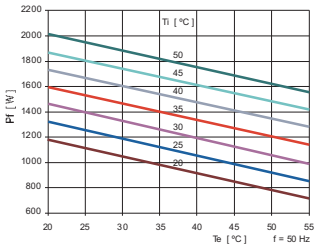
NSYCUE1100W230L 50 Hz



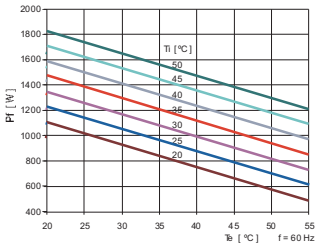
NSYCUE1400W230L 50 Hz



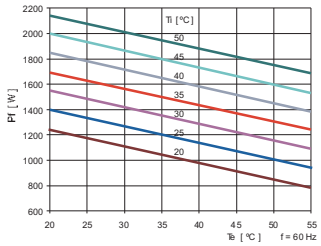
NSYCUE1400W400L 50 Hz



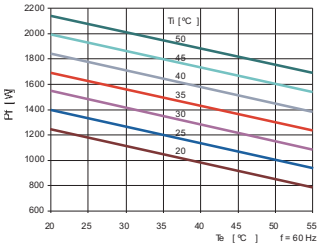
NSYCUE1100W230L 60 Hz



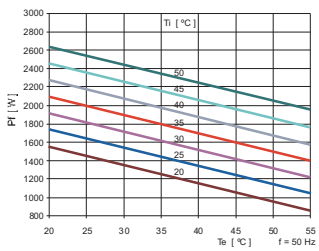
NSYCUE1400W230L 60 Hz



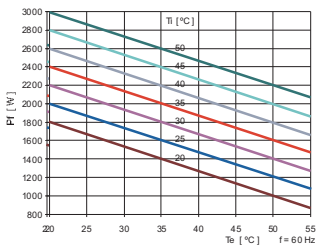
NSYCUE1400W400L 60 Hz



NSYCUE1800W400L 50 Hz



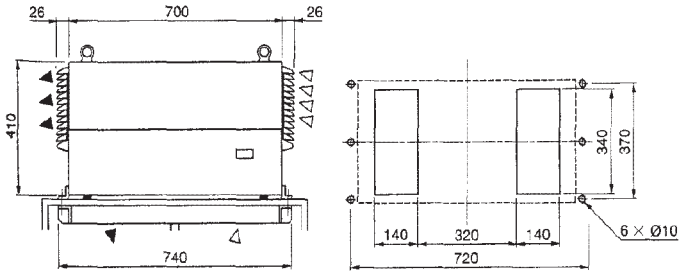
NSYCUE1800W400L 60 Hz



8

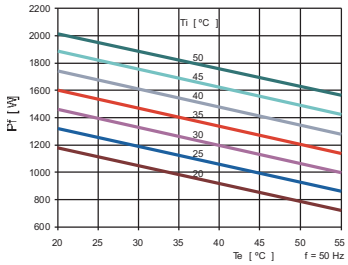
Cooling unit
Electronic control

Cut-out template for top mounting

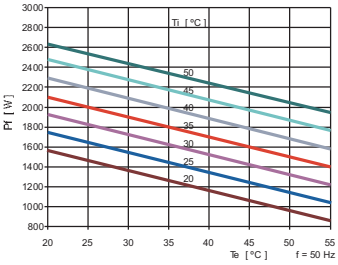


Curves

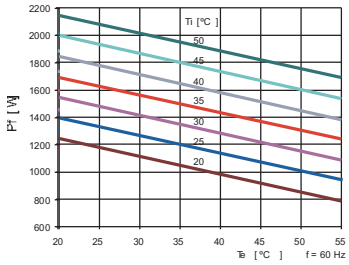
NSYCUE1400W230R 50 Hz



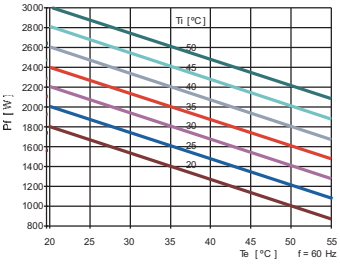
NSYCUE1800W400R 50 Hz



NSYCUE1400W230R 60 Hz



NSYCUE1800W400R 60 Hz



8

Cooling unit
Accessories

NSYCUART

NSYCUALF

Filter device

- Kit for additional filter required to protect the side-mounting or top-mounting units in a harsh environment.
- Filter clogging detection kit.
- Spare filter (density 32 kg/m^3, thickness 13 mm).
- Kit for quick cleaning of the exchanger cassette to guarantee a good thermal exchange (contains a tray, an drain pipe and a bottle of grease remover).

Pack.	Description	Mounting model	Reference
1	Additional filter kit	Side	**NSYCUALT**
1	Additional filter kit	Top	**NSYCUART**
1	Flush-mounting kit	Side and top	**NSYCUAE**
5	Spare filter	Side	**NSYCUALF**
6	Spare filter	Top	**NSYCUARF**
1	Cleaning kit	Side	**NSYCUALN**

Cut-out side panels

- Set of two Spacial panels (one solid panel and one pre-cut panel).
- Allows instant installation of side-mounting cooling units.
- RAL 7035 grey paint.

For Spacial SF wall-mounting enclosures (mm)		Panel reference
Height	Depth	
1800	600	**NSY2SPC186**
1800	800	**NSY2SPC188**
2000	600	**NSY2SPC206**
2000	800	**NSY2SPC208**

Only 17 references for 66 combinations

1000 to 2700W

115, 230 & 400V

IP 55

Environ-mentally friendly

Easy maintenance

It can withstand external temperatures of up to 55°C

1 Flush
2 Semi-flush
3 Surface

8

Cooling unit
SLIM electronic control

NSYCUB1100W230S

SLIM

- Range of cooling powers from 1100 W to 2700 W.
- 3 installation options: surface, partial flush and flush.
- Versions in RAL 7035 and stainless steel.
- Electronic thermostat with control option (precision of ±1 °C). Option of installing a display as an accessory.
- Minimal depth of 162 mm in every model.
- Internal IP 55 (enclosure side) maintains the IP of the enclosure up to IP 55.
- The unit is controlled by 3 commands:

– Thermostat value.
– Signal of an anomaly (sudden disconnection, incorrect phase installation, filter blocked with dirt, high compressor temperature, high enclosure temperature).
– Door open switch signal.

- A minimum height of 1800 mm and width of 800 mm (door) or 600 mm (side panel) is required to install a SLIM cooling unit in a Spacial enclosure.

General characteristics

- Desired internal temperature adjustable from +20 to +50 °C.
- Maximum ambient temperature: +55 ºC.
- All the units have, in standard version, a pressure gauge with automatic reset. If the high pressure exceeds the safe value (in the high-pressure circuit) the pressure gauge acts by cutting off the power supply to the compressor and the external fan.
- External and internal air circuits separated with IP 55. The fan of the internal circuit operates permanently, preventing the appearance of hot spots in the installation.
- Equipped with alarm relay activated by the pressostat in the high-pressure circuit.
- Respect for the environment using environmentally friendly gas R134a (HFC).

Modular version:
1 bloc + 1 cover

	NSYCUB1100W230S
Dimensions (mm)	
Height	1580
Width (according to installation type)	460 (surface) or 495 (partial flush or flush)
Depth	162
Control type	electronic with control without display (display optional)
Unit control	thermostat+alarm+door closed
Temperature setting range	+20…+50 ºC
Maximum outside temperature	+55 ºC
Type of zero-potential alarm	Inverter contact
Cooling gas type	R134a
IP (IEC 60529)	
On the internal circuit	55
On the external circuit	34
External circuit filter	No (please consult us for aggressive environments)
Mounting model (the correct cover needs to be ordered)	surface, partial flush or flush
Available cover versions	RAL 7035 and stainless steel (please consult us for RAL 7032)
Certifications / marking	UL in process and CE

Modular version: Always order one SLIM cooling unit reference plus one cover reference.

Cooling unit
SLIM electronic control

Reference	NSYCUB1100W230S	NSYCUB1100W400S	NSYCUB1100W115S
	1100 W	1100 W	1100 W
Voltage	230 V 50/60 Hz	3 × 400 V 50 Hz/3 × 460V 60 Hz	115 V 50/60 Hz
Power according to EN14511 L35-35 L35-L50	 1100 W/1200 W (3754/4095 Btu/h) 850 W/900 W (2900/3071 Btu/h)	 1100 W/1200 W (3754/4095 Btu/h) 850 W/900 W (2900/3071 Btu/h)	 1100 W/1200 W (3754/4095 Btu/h) 850 W/900 W (2900/3071 Btu/h)
Intensity Starting current Rated current	 11/13.5 A 2.9/3.5 A	 8.5/10.5 A 2.2/2.3 A	 22/27A 5.8/7 A
Power consumption absorbed L35-L35 L50-L35	 600/710 W 710/850 W	 0.87/0.92 KW 0.99/1.1 KW	 0.6/0.71 KW 0.71/0.85 KW
Energy efficiency ratio (EER) L35-L35	 1.8/1.7	 1.3/1.3	 1.8/1.7
Noise level	67 dB (A)	67 dB (A)	67 dB (A)
Air flow of the internal circuit of the external circuit	 570/620 m^3/h 860/900 m^3/h	 570/620 m^3/h 860/900 m^3/h	 570/620 m^3/h 860/900 m^3/h
Weight of unit	46 kg	42 kg	46 kg
Thermal protection recommended (fuse melt curve)	 T4A	 T6A	 T8A

Reference	NSYCUB1500W230S	NSYCUB1500W400S	NSYCUB1500W115S
	1500 W	1500 W	1500 W
Voltage	230 V 50/60 Hz	3 × 400 V 50Hz/3 × 460V 60Hz	115 V 50/60 Hz
Power according to EN14511 L35-35 L35-L50	 1600/1700 W (5459/5800 Btu/h) 1300/1400 W (4436/4777 Btu/h)	 1500/1600 W (5118/5459 Btu/h) 1200/1300 W (4094/4435 Btu/h)	 1600/1700 W (5459/5800 Btu/h) 1300/1400 W (4436/4777 Btu/h)
Intensity Starting current Rated current	 16.7/19.2 A 4.4/5.1 A	 7.2/9.0 A 2.4/3.0 A	 33.4/38.4 A 8.8/10.2 A
Power consumption absorbed L35-L35 L50-L35	 830/950 W 950/1100 W	 1,300/1,500 W 1500/1 800 W	 0.83/0.95 KW 0.95/1.1 KW
Energy efficiency ratio (EER) L35-L35	 1.9/1.8	 1.2/1.1	 1.9/1.8
Noise level	69 dB (A)	67 dB (A)	69 dB (A)
Air flow of the internal circuit of the external circuit	 860/900 m^3/h 885/990 m^3/h	 860/900 m^3/h 885/990 m^3/h	 885/990 m^3/h 886/990 m^3/h
Weight of unit	49 kg	50 kg	49 kg
Thermal protection recommended (fuse melt curve)	 T6A	 T4A	 T4A

SLIM covers			
	Surface-mounting	Partial flush-mounting	Flush-mounting
RAL 7035	**NSYCUCL**	**NSYCUCH**	**NSYCUCF**
Stainless-steel	**NSYCUCLX**	**NSYCUCHX**	**NSYCUCFX**

Modular version: Always order one SLIM cooling unit reference plus one cover reference.

Cooling unit
SLIM electronic control

Reference	NSYCUB2200W230S	NSYCUB2200W400S	NSYCUB2200W115S
	2200 W	2200 W	2200 W
Voltage	230 V 50/60 Hz	3 × 400 V 50 Hz/3 × 460 V 60 Hz	115 V 50/60 Hz
Power according to EN14511 L35-35 L35-L50	 2200 W/2400 W (7507/8189 Btu/h) 1800 W/2000 W (6142/6824 Btu/h)	 2200 W/2400 W (7507/8189 Btu/h) 1800 W/2000 W (6142/6824 Btu/h)	 2200 W/2400 W (7507/8189 Btu/h) 1800 W/2000 W (6142/6824 Btu/h)
Intensity Starting current Rated current	 22.2/26.2 A 5.8/6.9 A	 7.9/9.5 A 2.6/3.2 A	 44.4/52.4A 11.6/13.8 A
Power consumption absorbed L35-L35 L50-L35	 1100/1300 W 1300/1500 W	 1500/1800 W 1800/2100 W	 1.1/1.3 KW 1.3/1.5 KW
Energy efficiency ratio (EER) L35-L35	 2/1.8	 1.5/1.3	 2/1.8
Noise level	67 dB (A)	69 dB (A)	67 dB (A)
Air flow of the internal circuit of the external circuit	 860/900 m^3/h 885/990 m^3/h	 885/990 m^3/h 885/990 m^3/h	 885/990 m^3/h 886/990 m^3/h
Weight of unit	50 kg	54 kg	50 kg
Thermal protection recommended (fuse melt curve)	 T8A	 T4A	 T16A

Reference	NSYCUB2700W230S	NSYCUB2700W400S
	2700 W	2700 W
Voltage	230 V 50/60 Hz	3 × 400 V 50Hz/3 × 460V 60Hz
Power according to EN14511 L35-35 L35-L50	 2700 W/2900 W (9218/9901 Btu/h) 2200 W/2400 W (7511/8194 Btu/h)	 2700 W/2900 W (9218/9901 Btu/h) 2200 W/2400 W (7511/8194 Btu/h)
Intensity Starting current Rated current	 24.8/28.2 A 6.4/6.7 A	 9/10.6 A 3/3.5 A
Power consumption absorbed L35-L35 L50-L35	 1200/1400 W 1400/1700 W	 1700/2000 W 2000/2300 W
Energy efficiency ratio (EER) L35-L35	 2.3/2.1	 1.6/1.5
Noise level	69 dB (A)	69 dB (A)
Air flow of the internal circuit of the external circuit	 1050/1160 m^3/h 1200/1340 m^3/h	 1050/1160 m^3/h 1200/1340 m^3/h
Weight of unit	57 kg	60 kg
Thermal protection recommended (fuse melt curve)	 T8A	 T4A

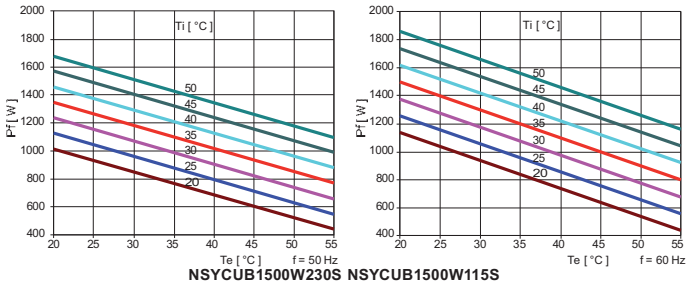
SLIM covers			
	Surface-mounting	Partial flush-mounting	Flush-mounting
RAL 7035	**NSYCUCL**	**NSYCUCH**	**NSYCUCF**
Stainless-steel	**NSYCUCLX**	**NSYCUCHX**	**NSYCUCFX**

Modular version: Always order one SLIM cooling unit reference plus one cover reference.

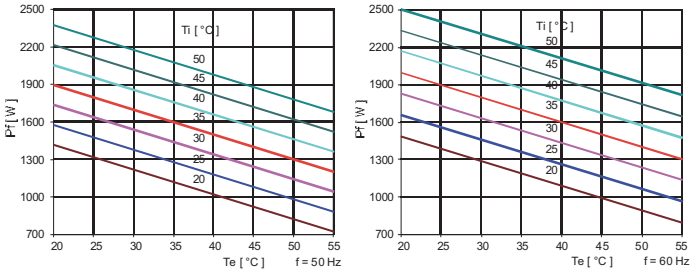
Cooling unit
SLIM electronic control

Curves

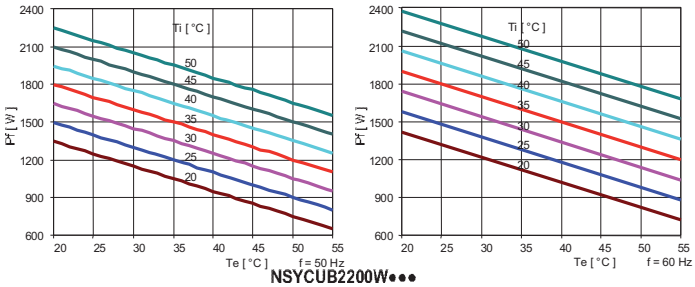
NSYCUB1100W•••



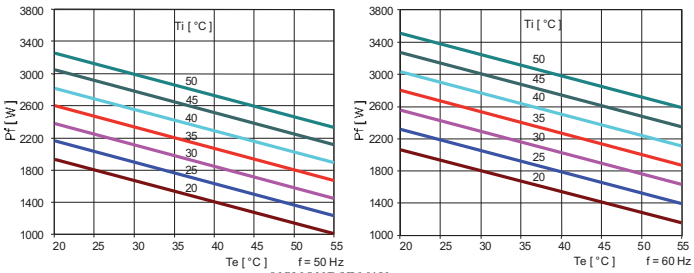
NSYCUB1500W230S NSYCUB1500W115S



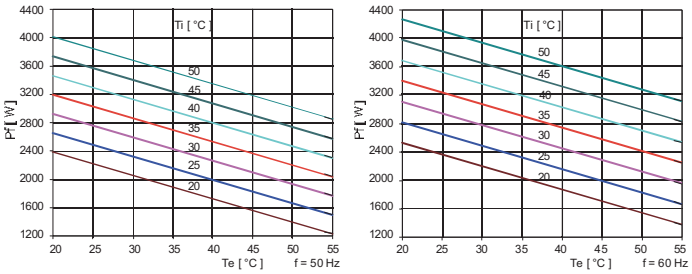
NSYCUB1500W400S



NSYCUB2200W•••



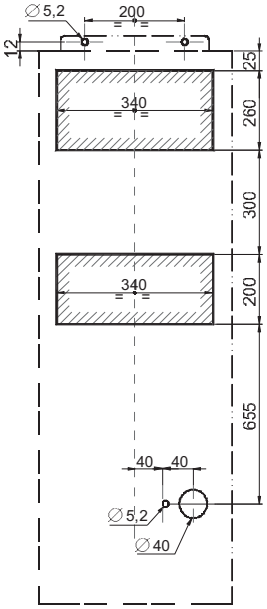
NSYCUB2700W•••



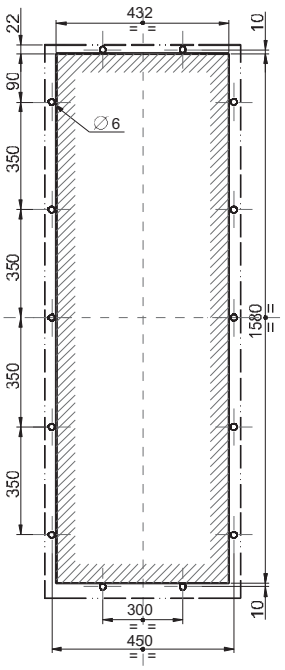
8

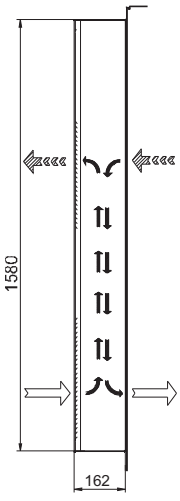
Cooling unit
SLIM electronic control

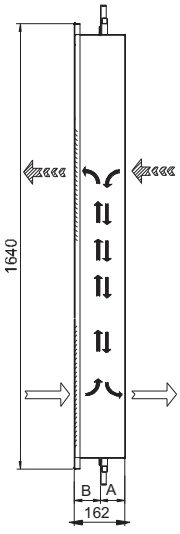
Template for surface mounting

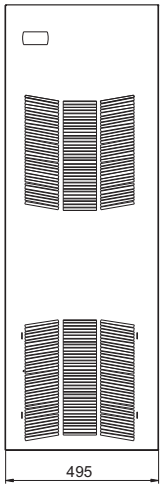


Template for flush-mounting and partial flush-mounting









Version	Flush-mounting	Partial flush-mounting and surface-mounting
A = inside the enclosure	141 mm	81 mm
B = outside the enclosure	21 mm	81 mm

8

Cooling unit
SLIM accessories

Device for dissipating condensation water (internal installation)

- Device for dissipating condensation water (internal installation) allowing the evacuation of condensation water from the internal battery (evaporator).

	Voltage	Starting current	Thermal protection recommended	Evaporation capacity	Resistance type
Operating voltage ±10%	230 V~	2.9 A	T 3 A	200 cl/h	PTC
	115 V~	5.8 A	T 6 A		

Description	Reference
Heat sink	**NSYCUASD**

Electronic display

Enables control of the thermostat and displays the temperature inside the enclosure. The display is supplied with a connection cable and a metal plate for inserting the display in the cover of the cooling unit. No prior programming is required.

Description	Reference
Display	**NSYCUAY**

Insulated resistance heaters
Introduction

The resistance heaters prevent the formation of condensation and guarantee the ideal temperature for the correct operation of the electronic components in the enclosure.

Large range of power levels

- 2 versions: by natural convection and with fan.
- AC or DC power supply.
- 7 power levels, from 10 W to 550 W.

Innovating design

Covered with plastic to prevent direct contact with the aluminium radiator.

Easy installation and connection

- Reduced dimensions.
- Quick electric connection by terminal board.
- No maintenance required.
- Direct clipping onto a 35-mm DIN rail.

Safety

- The protection prevents direct contact with the aluminium radiator.
- Electric protection device with terminal block cover.
- Equipped with a PTC-type heater.
- Surface temperature lower than 70 °C.

High thermal efficiency

- The configuration of the aluminium profile produces a "chimney" effect: high natural convection.
- Low power consumption thanks to self-control of the PTC-type heater.

Models with fan

- The heaters equipped with a fan ensure circulation of the air and a uniform temperature inside the enclosure.
- High-flow, silent fan.

Certifications

- CE marking.
- Range compliant with UL and VDE.

Aluminium resistance heaters
Introduction

The resistance heaters prevent the formation of condensation and guarantee the ideal temperature for the correct operation of the electronic components in the enclosure.

Resistance heaters equipped with a PTC-type sensor

The resistance heaters for electrical and electronic enclosures are equipped with PTC-type heating devices (Positive Temperature Coefficient). Thanks to these heaters:

- The surface temperature stabilises at 75 °C when the ambient temperature is –5 °C.
- Power consumption is reduced.

Improved convection

The design of the profile of the resistance heaters produces a "chimney" effect, leading to increased natural convection and maintaining an even temperature inside the enclosure.

Quick fixing

The resistance heaters are fixed by means of fixing clips to a 35-mm DIN rail.

Connection cables

The 10 and 20 W heaters are equipped with a 2 × 0.75 × 300 mm power cord.

Connection terminal boards

Heaters with a power of more than 20 W are equipped with a connection terminal board.

Large range of power levels

8 power levels, from 10 W to 400 W.

Models with fan

Models of 250 to 400 W with fan.

Resistance heaters
Applications

Conditions of use

- The resistance heaters are controlled by a thermostat or a hygrostat.
- The enclosure must be sealed to prevent the entry of air from the outside.

Dew point temperature

The dew point temperature is the minimum temperature that can be reached before condensation begins to form.
Example:
Ambient temperature = 25 °C.
Relative humidity = 50 %.
A temperature of more than 14 °C must be guaranteed inside the enclosure.

Relative humidity (%)	Ambient temperature (°C)							
	20	25	3 0	35	40	45	50	55
40	6	11	15	19	24	28	33	37
50	9	14	19	23	28	32	37	41
60	12	17	21	26	31	36	40	45
70	14	19	24	29	34	38	43	48
80	16	21	26	31	36	41	46	51
90	18	23	28	33	38	43	48	53
100	20	25	30	35	40	45	50	55

Installation tips

- Install several heaters according to the desired power level at the bottom of the enclosure.
- Respect a safety area of at least 10 cm around the device.
- Do not install any bulky devices above the heater, since this could reduce the effect of natural convection.
- Do not install any components that are particularly sensitive to heat directly above a heater.
- If several heaters are used, they must be installed in parallel. Serial installation is not an option.
- The heater must be installed vertically to ensure optimum convection.

Resistance heaters
Selection guide

Insulated resistance heaters

Power (W)	Voltage (V)	Connection type Terminal block	Reference
10	12-24 DC	•	**NSYCR10WU1C**
10	110-250 AC	•	**NSYCR10WU2C**
21	12-24 DC	•	**NSYCR20WU1C**
21	110-250 AC	•	**NSYCR20WU2C**
55	12-24 DC	•	**NSYCR50WU1C**
55	110-250 AC	•	**NSYCR50WU2C**
55	270-420 AC	•	**NSYCR50WU3C**
100	12-24 DC	•	**NSYCR100WU1C**
100	110-250 AC	•	**NSYCR100WU2C**
100	270-420 AC	•	**NSYCR100WU3C**
147	12-24 DC	•	**NSYCR150WU1C**
147	110-250 AC	•	**NSYCR150WU2C**

Resistance heaters
Selection guide

Insulated resistance heater with fan

Power (W)	Voltage (V)	Connection type Terminal block	Reference
177	230 AC	•	NSYCR170W230VVC

NSYCR350W230VTVC

Thermofans

Power (W)	Voltage (V)	Connection type Terminal block	Reference
350	230 AC	•	NSYCR350W230VTVC
400/550	120 AC	•	NSYCRP1W120VTVC
400/550	230 AC	•	NSYCRP1W230VTVC

Resistance heaters

Power (W)	Voltage (V)	Connection type		Reference
		Terminal block	Cable	
10	12-24 DC		•	NSYCR10WU1
10	110-250 AC		•	NSYCR10WU2
20	12-24 DC		•	NSYCR20WU1
20	110-250 AC		•	NSYCR20WU2
20	270-420 AC	•		NSYCR20WU3
55	12-24 DC	•		NSYCR55WU1
55	110-250 AC	•		NSYCR55WU2
55	270-420 AC	•		NSYCR55WU3
90	12-24 DC	•		NSYCR100WU1
90	110-250 AC	•		NSYCR100WU2
90	270-420 AC	•		NSYCR100WU3
150	12-24 DC	•		NSYCR150WU1
150	110-250 AC	•		NSYCR150WU2
150	270-420 AC	•		NSYCR150WU3

NSYCRS200W230V

Resistance heaters with fan

Power (W)	Voltage (V)	Connection type Terminal block	Reference
250	115 AC	•	NSYCR250W115VV
250	230 AC	•	NSYCR250W230VV
400	115 AC	•	NSYCR400W115VV
400	230 AC	•	NSYCR400W230VV
200	115 AC	•	NSYCRS200W115V
200	230 AC	•	NSYCRS200W230V

NSYCRAFD

NSYCRAF

Fixing accessories

Description	Reference
Set of 5 studs	NSYCRAF
Set of 5 studs and DIN rail	NSYCRAFD

Insulated resistance heaters

Insulated resistance heater 10 W and 20 W

General characteristics

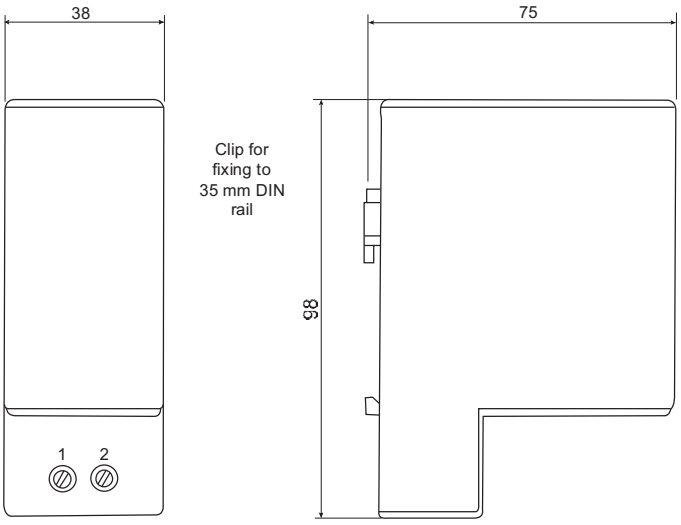
- Compact resistance heater preventing the formation of condensation or frost.
- Designed to ensure good natural convection and high thermal efficiency.
- Compact design with reduced dimensions.
- Extruded aluminium body.
- Covered with a UL94 V0 plastic cover, light grey, to avoid direct contact with the heating elements.
- Surface temperature limited to 70 °C.
- Equipped with a power cable.
- Double insulated.
- Range with PTC technology.
- Quick fixing by clip on a 35-mm DIN rail.
- UL and VDE certifications. CE marking.

Conditions of use

- The heaters must be installed with a thermal controller (see selection table on pages **8/94** and **8/95**) to control the temperature or the humidity inside the enclosure.
- The enclosure must be sealed to prevent the entry of air from the outside.
- An electrical protection device must be installed on the supply side of the unit.

Specifications	Reference			
	NSYCR10WU2C	NSYCR10WU1C	NSYCR20WU2C	NSYCR20WU1C
Power at 0 °C	10 W		20 W	
Voltage	110-250 V AC	12-24 V DC	110-250 V AC	12-24 V DC
Technology	PTC			
Surface temperature	<70 °C, except for the top protection grille			
Electric connection	2 poles, 2.5 mm²			
Mounting	Quick by clip on a 35-mm DIN rail.			
Cover	UL94 V0 plastic			
Operating position	Vertical			
Operating temperature	–40...+70 °C –10...+158 °F			
IP protection rating	IP 20 class II (double insulated)			
Certifications	VDE and UL			

Dimensions



Insulated resistance heaters

Insulated resistance heater 55 W - 100 W - 147 W

General characteristics

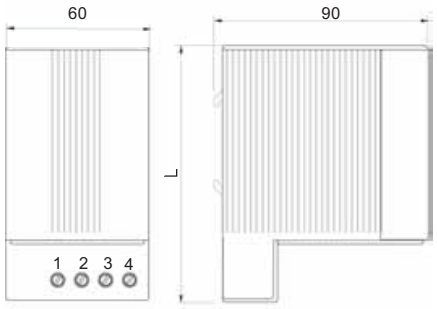
- Compact resistance heater preventing the formation of condensation or frost.
- Designed to ensure good natural convection and high thermal efficiency.
- Compact design with reduced dimensions.
- Extruded aluminium body.
- Covered with a UL94 V0 plastic cover, light grey, to avoid direct contact with the heating elements.
- Surface temperature limited to < 70 °C.
- Equipped with quick-connection terminals: 2.5 mm².
- Double insulated.
- Range with PTC technology.
- Quick fixing by clip on a 35-mm DIN rail.
- UL and VDE certifications. CE marking.

Conditions of use

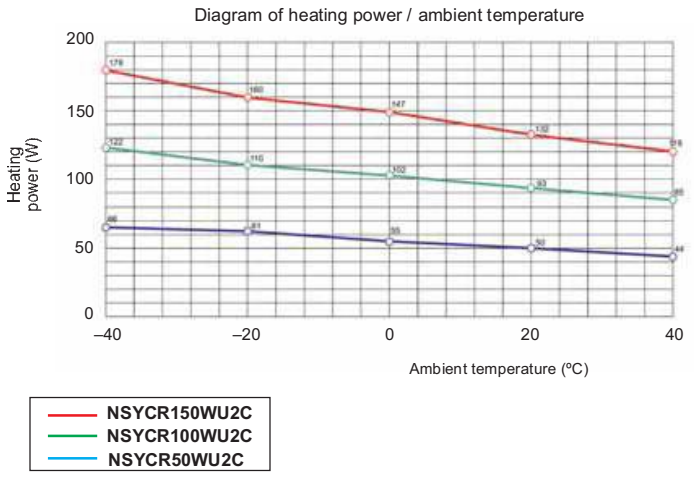
- The heaters must be installed with a thermal controller (see selection table on pages **8/94** and **8/95**) to control the temperature or the humidity inside the enclosure.
- The enclosure must be sealed to prevent the entry of air from the outside.
- An electrical protection device must be installed on the supply side of the unit.

Specifications	Reference							
	NSYCR50WU2C	NSYCR50WU1C	NSYCR50WU3C	NSYCR100WU2C	NSYCR100WU1C	NSYCR100WU3C	NSYCR150WU2C	NSYCR150WU1C
Power at 0 °C	55 W			100 W			147 W	
Voltage	110-250 V AC	12-24 V DC	270-420 V AC	110-250 V AC	12-24 V DC	270-420 V AC	110-250 V AC	12-24 V DC
Technology	PTC							
Surface temperature	<70 °C, except for the top protection grille							
Electric connection	4 poles, 2.5 mm²							
Mounting	By clip on 35-mm DIN rail							
Cover	UL94 V0 plastic							
Operating position	Vertical							
Operating temperature	–40...+70 °C –10...+158 °F							
IP protection rating	IP 20 class II (double insulated)							
Certifications	VDE and UL							
Height (H)	110 mm			150 mm				

Dimensions



Performance diagram



8

Insulated ventilated resistance heaters

177 W

General characteristics

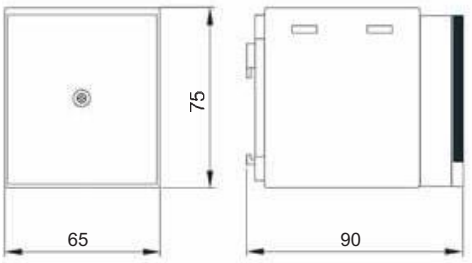
- Compact resistance heater preventing the formation of condensation or frost.
- Equipped with an axial fan for uniform heating inside the enclosure.
- Compact design with reduced dimensions.
- Extruded aluminium body.
- Covered with a UL94 V0 plastic cover, light grey, to avoid direct contact with the heating elements (PTC).
- Surface temperature limited to 50 °C.
- Equipped with quick-connection terminals: 2.5 mm².
- Double insulated.
- Range with PTC technology.
- Quick fixing by clip on a 35-mm DIN rail.
- UL and VDE certifications. CE marking.

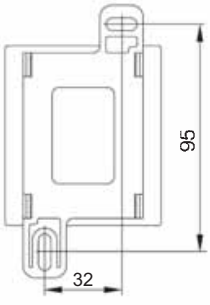
Conditions of use

- The heaters must be installed with a thermal controller (see selection table on pages **8/94** and **8/95**) to control the temperature or the humidity inside the enclosure.
- The enclosure must be sealed to prevent the entry of air from the outside.
- An electrical protection device must be installed on the supply side of the unit.

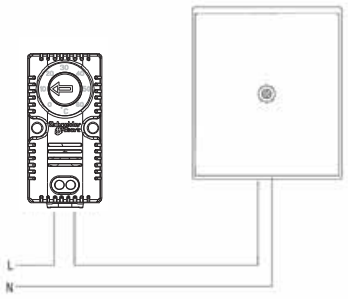
Specifications	Reference
	NSYCR170W230VVC
Power at 0 °C	177 W
Voltage	230 V AC; 50-60 Hz
Technology	PTC
Surface temperature	Max. 50 °C in the enclosure, 100 °C on the top protection grille (for an ambient temperature of 20 °C / 68 °F)
Service life	40,000 h at 40 °C
Air flow	13.8 m³/h
Electric connection	2 poles 2.5 mm²
Mounting	By clip on 35-mm DIN rail
Cover	UL94 V0 plastic
Operating position	Vertical
Operating temperature	–40...+70 °C –10...+158 °F
IP protection rating	IP 20 class II (double insulated)
Certifications	VDE and UL

Dimensions





NSYCR170W230VVC



Aluminium resistance heaters

General characteristics

- Extruded aluminium body.
- Surface temperature limited to 75 °C when the ambient temperature is –5 °C.
- Heaters equipped with a power cable with a length of 500 mm with silicon insulation, or with a connection terminal block.

Conditions of use

- The heaters must be installed with a thermal controller (see selection table on pages **8/94** and **8/95**) to control the temperature or the humidity inside the enclosure.
- The enclosure must be sealed to prevent the entry of air from the outside.
- An electrical protection device must be installed on the supply side of the unit.

Aluminium resistance heaters

- Range of resistance heaters from 10 to 400 W, heating the electrical switchboard to prevent the formation of condensation.

Power (W)	Voltage (V)	Connection type		Reference
		Terminal block	Power cord	
10	12-24 DC		•	**NSYCR10WU1**
10	110-250 AC		•	**NSYCR10WU2**
20	12-24 DC		•	**NSYCR20WU1**
20	110-250 AC		•	**NSYCR20WU2**
20	270-420 AC	•		**NSYCR20WU3**
55	12-24 DC	•		**NSYCR55WU1**
55	110-250 AC	•		**NSYCR55WU2**
55	270-420 AC	•		**NSYCR55WU3**
90	12-24 DC	•		**NSYCR100WU1**
90	110-250 AC	•		**NSYCR100WU2**
90	270-420 AC	•		**NSYCR100WU3**
150	12-24 DC	•		**NSYCR150WU1**
150	110-250 AC	•		**NSYCR150WU2**
150	270-420 AC	•		**NSYCR150WU3**

NSYCRS200W230V

Resistive heaters with fan

- The presence of a fan guarantees perfect uniformity of the temperature inside the electrical switchboard.
- The heaters must be installed with a thermal controller (see selection table on pages **8/94** and **8/95**) to control the temperature or the humidity inside the enclosure.

Power (W)	Voltage (V)	Connection type Terminal block	Reference
250	115 AC	•	**NSYCR250W115VV**
250	230 AC	•	**NSYCR250W230VV**
400	115 AC	•	**NSYCR400W115VV**
400	230 AC	•	**NSYCR400W230VV**
200	115 AC	•	**NSYCRS200W115V**
200	230 AC	•	**NSYCRS200W230V**

Aluminium resistance heaters

NSYCR350W230VTVC

NSYCRP1W230VTVC

Thermofan

- Combination of a resistance heater and an axial motor to ensure uniform heating of the enclosure.
- Fixing by clip on a DIN rail.
- Thermostat adjustable from 0...+60 °C.
- Visual operation indicator.

Power (W)	Voltage (V)	Connection type Terminal block	Reference
350	230 AC	•	**NSYCR350W230VTVC**
400/550	120 AC	•	**NSYCRP1W120VTVC**
400/550	230 AC	•	**NSYCRP1W230VTVC**

NSYCRAFD

NSYCRAF

Fixing accessories

Description	Reference
Set of 5 studs	**NSYCRAF**
Set of 5 studs and DIN rail	**NSYCRAFD**

Thermal control
Overview

Adjustable thermostats

- NO (blue button) with normally open contact to control the starting of a fan when the temperature exceeds the displayed maximum value.
- NC (red button) with normally closed contact to control the stopping of a resistance heater when the temperature exceeds the displayed value.
- Large range of temperature control.
- Small dimensions.
- Easily accessible terminals.
- High connection power.
- 4 types of fixings (novelty).

Double-adjustable thermostat

- Double temperature control with a resistance heater and a fan with separate operation.
- Red button: with normally closed contact (NC) for controlling the resistance heaters.
- Blue button: with normally open contact (NO) for controlling the fans.
- A double thermostat with separate adjustments and operations within the same device.
- Easily accessible terminals.
- Different installation methods.

The new quick-fixing systems:

- On 35-mm DIN rail.

- On Spacial upright.

- On cross-rail.

- On mounting plate.

Thermal control
Overview

Thermostat with NO/NC contact

- NO/NC inverter for controlling the resistance heaters or the fans.
- Switching by means of two NO/NC contacts.
- Easily accessible terminals.
- High connection power.
- 4 types of quick-fixing systems.
- Versions in °C and °F.

Electronic thermostat with LCD screen

- Three thermostats for different input voltages (9-30 V, 110-127 V, 220-240 V).
- Operating temperature: 0 °C…+50 °C.
- Simple programming.
- Option of installing an external sensor, ref. **NSYCCAST** for remotely reading the temperature (operating temperature: –30 °C…+80 °C).
- Ventilation and heating function (2 separate relays).
- High switching power.
- Hysteresis: 2 K (+/–0.1 K).
- 7 different operating modes.
- Additional operating mode with 1 external sensor: Reads and compares the internal and external temperatures in order to control the ventilation, heating or the alarm.
- Temperature adjustment range: +5 °C…+50 °C.

Electronic hygrotherms

- Electronic hygrotherms for different input voltages (9-30 V, 110-127 V, 220-240 V).
- Operating temperature: 0 °C…+ 50 °C.
- Option of installing an external sensor, ref. **NSYCCAST** for remotely reading the temperature (operating temperature: –30 °C…+80 °C).
- Simple programming.
- 3 different operating modes.
- High switching power.
- T hysteresis: 2 K (+/–0.1 K).
- RH hysteresis: 3%.
- Temperature adjustment range: +5 °C…+50 °C.
- Humidity adjustment range: 20%…80%.

Electronic hygrostat

- Electronic hygrostat for different input voltages (110-240 V).
- Operating temperature: 0 °C…+50 °C.
- Simple programming.
- 2 different operating modes.
- High switching power.
- RH hysteresis: 3%.
- Humidity adjustment range: 20%...80% RH.

Thermal control
Selection guide mechanical version

Control temperature

Control a resistance heater or an alarm


NC thermostat

Setting range	Display	Contact	Application	Control element	Interrupting capacity (resistive load)	Reference
0...+60 °C	°C	O	Heat	Bimetal	30 W DC 120 V AC; 15 A 250 V AC; 10 A	**NSYCCOTHC**
+32...+140 °F	°F					**NSYCCOTHCF**

Control a fan or an alarm


NO thermostat

Setting range	Display	Contact	Application	Control element	Interrupting capacity (resistive load)	Reference
0...+60 °C	°C	NO	Ventilate	Bimetal	30 W DC 120 V AC; 15 A 250 V AC; 10 A	**NSYCCOTHO**
+32...+140 °F	°F					**NSYCCOTHOF**

Control a resistance heater and a fan


Double thermostat

Setting range	Display	Contact	Application	Control element	Interrupting capacity (resistive load)	Reference
0…+60 °C	°C	NC + NO	Heat / Ventilate	Bimetal	30 W DC 120 V AC; 15 A 250 V AC; 10 A	**NSYCCOTHD**
+32…+140 °F	°F					**NSYCCOTHDF**

Control a resistance heater or a fan


Thermostat with inverse contact

Setting range	Display	Contact	Application	Control element	Interrupting capacity (resistive load)	Reference
0…+60 °C	°C	Inverse	Heat or ventilate	Bimetal	Closing: 30 W DC 250 V AC; 5 A Opening: 30 W DC 250 V AC; 10 A	**NSYCCOTHI**
+32…+140 °F	°F					**NSYCCOTHIF**

Thermal control
Selection guide electronic version

Control temperature

Control a resistance heater or a fan


Electronic thermostat

Setting range	Display	Power input	Application	Control element	No. of relays	Interrupting capacity (resistive load)	Reference
+5 °C…+50 °C	°C or °F	9-30 V AC/DC	Heat or ventilate	Electronic	2	8 (5) A 230 V AC 5 A 30 V DC	NSYCCOTH30VID
		110-127 V AC					NSYCCOTH120VID
		220-240 V AC					NSYCCOTH230VID

7 different operating modes.
Option of installing one or two external sensors.

Control temperature and relative humidity


Electronic hygrotherm

Setting range	Display	Power input	Application	Control element	No. of relays	Interrupting capacity (resistive load)	Reference
+5 °C…+50 °C	°C or °F	9-30 V AC/DC	Heat or ventilate	Electronic	2	8 (5) A 230 V AC 5 A 30 V DC	NSYCCOHYT30VID
		110-127 V AC					NSYCCOHYT120VID
		220-240 V AC					NSYCCOHYT230VID

3 different operating modes.
Option of installing an external sensor.

Control relative humidity


Electronic hygrostat

Setting range	Display	Power input	Application	Control element	No. of relays	Interrupting capacity (resistive load)	Reference
20%…80%	% RH	110-240 V AC	Heat or ventilate	Electronic	2	8 (5) A 230 V AC 5 A 30 V DC	NSYCCOHY230VID

2 different operating modes.

PTC external temperature sensor (double insulation)


Temperature sensor

- Length: 3 metres.
- Several types of fixings (on DIN rail, on Spacial SF profile, on VDI cross-rail, on mounting plate).
- Sensor operation or reading range: -30 °C…+80 °C.
- Protection rating: IP 67.

Reference
NSYCCAST

Thermostat installation tips:
The thermostat should be installed at the top of the enclosure (the hottest place).
See the various operating modes of each thermostat to choose the one that best meets your needs.

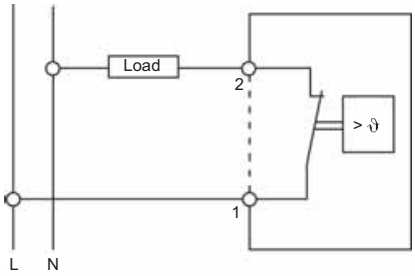
Hygrostat installation tips:
The hygrostat should be installed at the bottom of the enclosure.
60% RH is the optimum value in the enclosure.

Thermal control
Thermostat with NC contact

- Thermostat with NC contact to control the stopping of a resistance heater when the temperature exceeds the displayed value.
- This considerably lengthens the service life of the resistance heaters since they are used less frequently.
- Protection rating: IP 20.
- PC plastic material, self-extinguishing according to standard UL94 V0.
- Temperature adjustment range: 0…+60 °C
- Connection: four 2.5-mm² terminals.
- Multiple fixing systems.
- UL certification.

Display	Max. command I.	Reference
°C	10 A 250 V	**NSYCCOTHC**
°F	10 A 250 V	**NSYCCOTHCF**

Technical features	
Sensor element	Bimetal
Contact	NC, forced rupture
Contact resistance	< 10 m Ω
Service life	> 100000 cycles
Switching capacity	250 V AC; 10 A (resistive load) 120 V AC; 15 A (resistive load) 250 V AC/120 V AC 2 A (inductive load cos ϕ = 0.6) 30 W DC
Connection	Four 2.5-mm² terminals
Mounting	By clip on 35-mm DIN rail
Enclosure	UL94 V0 plastic, light grey
Dimensions	60 × 33 × 43 mm
Weight	40 g
Mounting position	Indifferent
Operating temperature	–20...+80 °C (–4...+176 °F)
Protection rating	IP 20
Hysteresis	7 °K
Temperature setting range	0...+60 °C



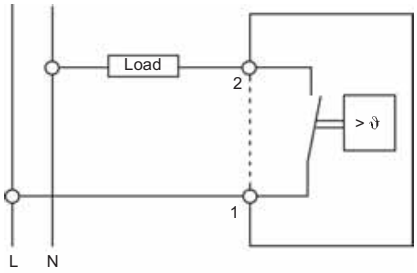
Load = resistance

Thermal control
Thermostat with NO contact

- Thermostat with NO contact to control the starting up of a fan when the temperature exceeds the displayed maximum value.
- It can control the temperature inside the enclosure by only starting up the fan when necessary, thus increasing the service life of the fan and reducing the clogging of the filter.
- Protection rating: IP 20.
- PC plastic material, self-extinguishing according to standard UL94 V0.
- Temperature setting range: 0...+60 °C
- Connection: four 2.5-mm^2 terminals.
- Multiple fixing systems.
- UL certification.

Display	Max. command I.	Reference
°C	10 A 250 V	**NSYCCOTHO**
°F	10 A 250 V	**NSYCCOTHOF**

Technical features	
Sensor element	Bimetal
Contact	NO, forced rupture
Contact resistance	< 10 m Ω
Service life	> 100000 cycles
Switching capacity	250 V AC; 10 A (resistive load) 120 V AC; 15 A (resistive load) 250 V AC/120 V AC 2 A (inductive load cos ϕ = 0.6) 30 W DC
Connection	Four 2.5 mm^2 terminals
Mounting	Clip on 35-mm DIN rail
Enclosure	UL94 V0 plastic, light grey
Dimensions	60 × 33 × 43 mm
Weight	40 g
Mounting position	Indifferent
Operating temperature	–20...+80 °C (–4...+176 °F)
Protection rating	IP 20
Hysteresis	7 °K
Temperature adjustment	0...+60 °C



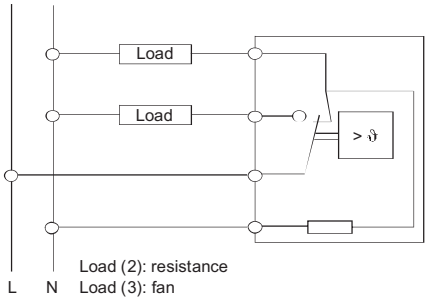
Load = fan

Thermal control
Thermostat with NO/NC contact

- Thermostat (contact adapted to control fans, resistance heaters, ventilation drawers, heat exchangers, etc).
- Signals and controls the temperature inside the enclosure.
- Fixing on a DIN rail.
- Protection rating: IP 20.
- PC plastic material, self-extinguishing according to standard UL94 V0.
- Temperature setting range: 0…+60 °C.
- Connection: four 2.5-mm² terminals.

Display	Max. command I.	Reference
°C	(NO) 5 A (NC) 10 A	**NSYCCOTHI**
°F		**NSYCCOTHIF**

Technical features	
Sensor element	Bimetal
Contact	Inverse, forced rupture
Contact resistance	< 10 m Ω
Service life	> 100000 cycles
Switching capacity	250 V AC; 10 A (resistive load)
Maximum interrupting capacity with direct current	250 V AC 4 A (inductive load cos ϕ = 0.6) 30 W DC
Connection	Four 2.5-mm⁴ terminals
Mounting	By clip on 35-mm DIN rail
Enclosure	UL94 V0 plastic, light grey
Dimensions	67 × 50 × 44 mm
Weight	100 g
Mounting position	Indifferent
Operating temperature	–20...+80 °C (–4...+176 °F)
Protection rating	IP 20
Hysteresis	7 °K
Temperature setting range	+5...+60 °C

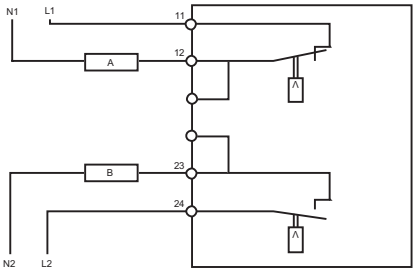


Thermal control
Double thermostat

- Double thermostat: two thermostats in a single device with separate adjustment and operation.
  - Red button: with normally closed contact (NC) for controlling the resistance heaters.
  - Blue button: with normally open contact (NO) for controlling the fans, signalling systems or alarms.
- This thermostat can control the activation of a fan and a heater controlling the temperature independently.
- PC plastic material, self-extinguishing according to standard UL94 V0.
- Multiple fixing systems.
- UL certification.

Display	Max. command I.	Reference
°C	(NO) 5 A (NC) 10 A	**NSYCCOTHD**
°F		**NSYCCOTHDF**

Technical features	
Sensor element	Bimetal
Contact	NO / NC, forced rupture
Contact resistance	< 10 m Ω
Service life	> 100000 cycles
Switching capacity	250 V AC; 10 A (resistive load) 120 V AC; 15 A (resistive load) 250 V AC/120 V AC 2 A (inductive load cos ϕ = 0.6) 30 W DC
Connection	Four 2.5-mm² terminals
Mounting	Clip on 35-mm DIN rail
Enclosure	UL94 V0 plastic, light grey
Dimensions	60 × 33 × 43 mm
Weight	40 g
Mounting position	Indifferent
Operating temperature	–20...+80 °C (–4...+176 °F)
Protection rating	IP 20
Hysteresis	7 °K
Temperature setting range	0...+60 °C



Thermal control

Electronic thermostat with LCD screen

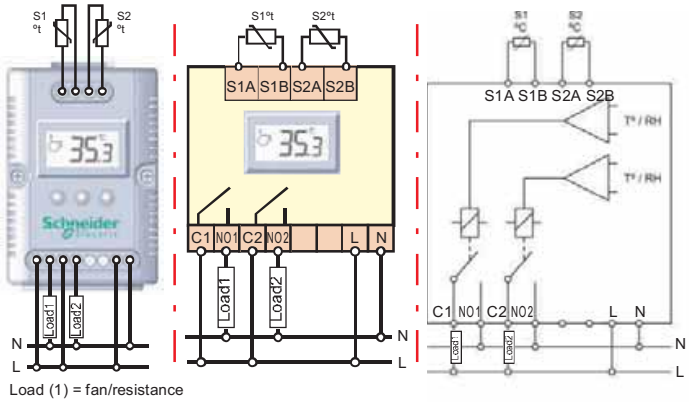
- Electronic temperature controller.
- Input voltages: 9-30 V, 110-127 V and 220-240 V.
- Thermostats with 2 independent switching relays (ventilation / heating function).
- Thermostat precision: +/–1.5 °C.
- Option of installing external PTC sensors, ref. **NSYCCAST**, for remote reading (L = 3 m).
- PC plastic material, self-extinguishing according to standard UL94 V0.
- Option of displaying degrees Celsius °C or Fahrenheit °F in the same thermostat.

Display	Voltage	Type of current	Max. command intensity	Reference
°C or °F	9-30 V	AC DC	8 (5) A 230 V AC / 5 A 30 V DC	**NSYCCOTH30VID**
	110-127 V	AC		**NSYCCOTH120VID**
	220-240 V			**NSYCCOTH230VID**

Technical features	
Operating temperature	0 °C…+50 °C
Temperature setting range	+5 °C…+50 °C
Hysteresis	Programmed 2 °K
Internal sensor element	Internal temperature sensor
Connection	2 × 2.5 mm² (input voltage) + 2 relays (2 × 2.5 mm² + 2 × 2.5 mm²)
Contact	Free with zero potential
Mounting	4 different methods: by DIN rail, Spacial SF profile, on VDI cross-rail or on mounting plate
Enclosure	UL94-V0 plastic, light grey
Certification	UL / UR

7 different operating modes in the same thermostat	
1	Ventilation (the addition of an external sensor inhibits the inner sensor and the reading is that of the external sensor) (activate 1st relay)
2	Heating (activate 2nd relay)
3	Ventilation / Heating (2 relays)
4	Double ventilation (2 relays)
5	Double heating (2 relays)
6	Comparison function (1 or 2 external sensors required). Compares the readings from the external sensor and the internal sensor in order to start up a fan or a heating element
7	Readings of max./min. temperature.

The thermostat automatically detects any connected sensors.



Load (1) = fan/resistance
Load (2) = fan/resistance/alarm

8

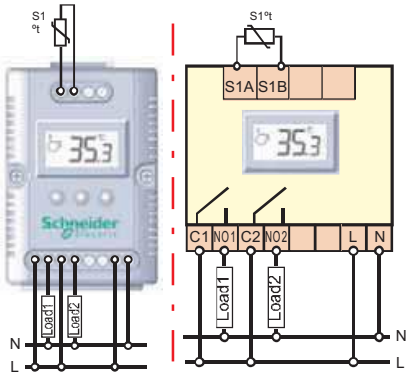
Thermal control

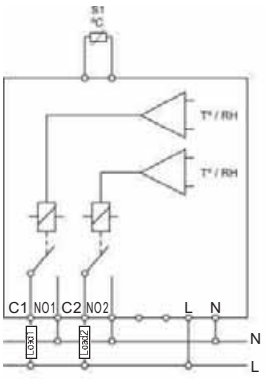
Electronic hygrotherm with LCD screen

- Electronic temperature and humidity controller.
- Input voltages: 9-30 V, 110-127 V and 220-240 V.
- Hygrotherm with 2 independent switching relays (ventilation / heating function).
- Thermostat precision: +/–1.5 °C.
- Hygrostat precision: +/–5% RH, relative humidity.
- Option of installing external PTC sensors, ref. **NSYCCAST**, for remote reading (L = 3 m).
- PC plastic material, self-extinguishing according to standard UL94 V0.
- Option of displaying the temperature in degrees Celsius °C or Fahrenheit °F.

Display	Voltage	Type of current	Max. command intensity	Reference
°C or °F % RH	9-30 V	AC DC	8 (5) A 230 V AC / 5 A 30 V DC	**NSYCCOHYT30VID**
	110-127 V	AC		**NSYCCOHYT120VID**
	220-240 V			**NSYCCOHYT230VID**

Technical features	
Operating temperature	0 °C…+50 °C
Temperature setting range	+5 °C…+50 °C
Humidity setting range	20%…80%
RH hysteresis	3%
Connection	2 × 2.5 mm² (input voltage) + 2 relays (2 × 2.5 mm² + 2 × 2.5 mm²)
Contact	Free with zero potential
Mounting	4 different methods: by DIN rail, Spacial SF profile, on VDI cross-rail or on mounting plate
Enclosure	UL94-V0 plastic, light grey
Certification	UL / UR





Load (1) = fan/resistance
Load (2) = fan/resistance/alarm

Operating modes

Mode 1	Relay 1	Relay 2
Controlled device	**Fan**	**Resistance heater**
Measured variables	Temperature	Temp. (T) and humidity (RH)
Control type	Avoid high temperatures	Avoid low temperatures

Mode 2	Relay 1	Relay 2
Controlled device	**Resistance heater**	**Alarm by switching**
Measured variables	Control of the dew point	Temperature and humidity
Control type	Avoid high humidity	High humidity or temperature alert

Mode 3	Relay 1	Relay 2
Controlled device	**Fan**	**Resistance heater**
Measured variables	External temperature - Internal temperature*	Temperature (T) and humidity (RH)
Control type	Heating by ventilation	Avoid low temperatures

*Comparison mode in relay 2: an external sensor is required for the comparison function (Text - Tint).
Example of mode 3: Decides whether the external temperature is favourable and controls the ventilation (Relay 1) or heating (Relay 2).
Advantage of mode 3: Energy efficiency. Option of efficiently heating the enclosure by ventilation (using hot external air) before bringing the resistance heater into operation. The thermostat automatically detects any connected sensors.

8

Thermal control
Electronic hygrostat with LCD screen

- Electronic humidity controller.
- Input voltages: 110-240 V.
- Precision: +/- 5% RH, relative humidity.
- Hygrostat with 2 independent switching relays (ventilation / heating function).
- PC plastic material, self-extinguishing according to standard UL94 V0.
- 2 operating modes for RH %: relative humidity control and dew point control.

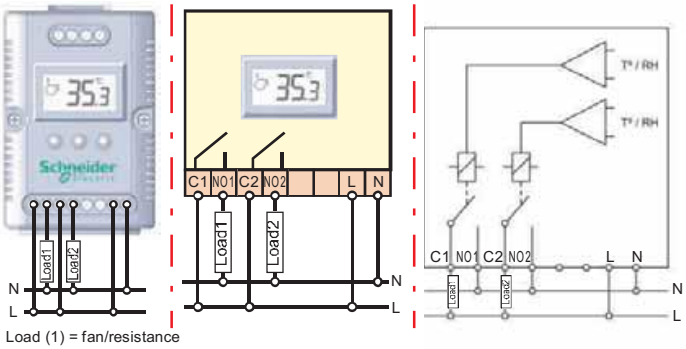
Display	Voltage	Type of current	Max. command intensity	Reference
% RH	110-240 V	AC	8 (5) A 230 V AC / 5 A 30 V DC	**NSYCCOHY230VID**

Technical features	
Humidity setting range	20%...80%
RH hysteresis	3%
Internal sensor element	Internal humidity sensor
Connection	2 × 2.5 mm² (input voltage) + 1 relay (2 × 2.5 mm²)
Contact	Free with zero potential
Mounting	4 different methods: by DIN rail, Spacial SF profile, on VDI cross-rail or on mounting plate
Enclosure	UL94-V0 plastic, light grey
Certification	UL / UR

Operating modes

Mode 1	Relay 1	Relay 2
Controlled device	**Resistance**	**-**
Measured variables	Humidity	-
Control type	Dehumidify RH (%)	-

Mode 2	Relay 1	Relay 2
Controlled device	**Resistance**	**Alarm by switching or resistance**
Measured variables	Humidity	Humidity
Control type	Dehumidify RH (%)	High humidity warning



Load (1) = fan/resistance
Load (2) = fan/resistance/alarm

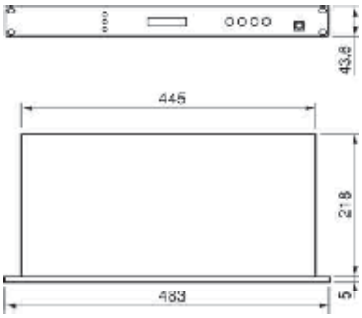
8

Thermal control

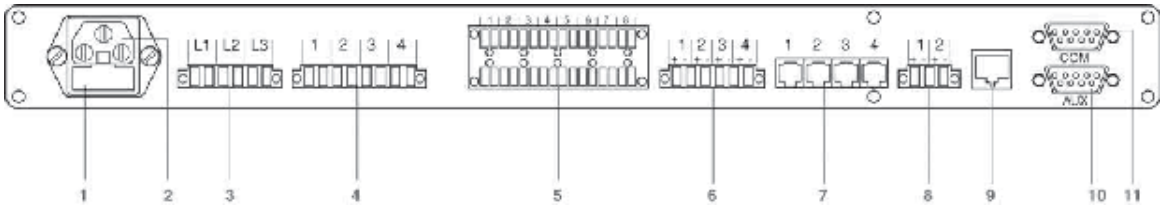
- The enclosure monitor checks and protects all the equipment in the distribution, network and server racks as well as their environment.
- Ambient parameters and operating states can be measured using various sensors and several inputs.
- Signalling and display: on the unit, serial interface, Ethernet network.
- Digital inputs and switching outputs enable permanent monitoring and adapted actions.

Reference
NSY11950

Possibilities for connection to the enclosure monitor:
– 4 sensors ref. **NSY11951**, **NSY11952** and/or **NSY11953**.
– 4 sensors ref. **NSY11954** or **NSY11956**.
– 8 insulated digital inputs (free potential).
– 2 digital inputs.
– 1 series input used for monitoring devices with a communication protocol.

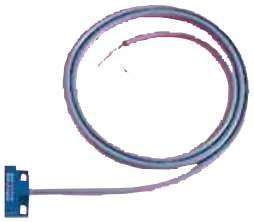


Connections and cabling diagram



1 Contact pin circuit breaker.
2 Connection to the network.
3 Connection of phase surveillance.
4 Digital switching outputs.
5 Digital inputs (ref. **NSY11955** and **NSY11958**).
6 Alarm inputs (ref. **NSY11954** and **NSY11956**).
7 Connection of a sensor, references **NSY11951**, **NSY11952** and **NSY11953**.
8 Connection of uninterruptible power supply.
9 Connection to Ethernet network RJ45.
10 Series interface for external devices.
11 Series interface for connection to a terminal.

Thermal control



Door contact

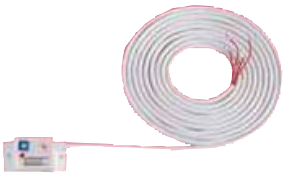
- Monitors door access by means of a magnetic sensor that reacts to any material conducting magnetic flow.
- Length of cable supplied: 4 m.
- Maximum cable length: 20 m.
- Supplied with fixings.

Reference
NSY11955

Smoke detector

- Visible smoke detector with VdS approval for rapid fire detection, even with light smoke.
- Usable in temperature range from –20 to +60 °C.
- Length of cable supplied: 4 m.
- Maximum cable length: 20 m.
- Supplied with fixings.

Reference
NSY11954



Vibration sensor

- Detects movements and vibrations of varying intensity.
- Adjustable sensitivity.
- Length of cable supplied: 4 m.
- Maximum cable length: 20 m.
- Supplied with fixings.

Reference
NSY11956

Movement sensor

- Indicates movements in the area by infrared system.
- Adjustable sensitivity.
- Anti-sabotage protection
- Length of cable supplied: 4 m.
- Maximum cable length: 20 m.
- Supplied with fixings.

Reference
NSY11958

Thermal control
Sensors

Water sensor

- Detects all liquids that conduct electricity.
- Sensor covered in araldite, 100% sealed.
- Usable in temperature range from –20 to +60 °C.
- Length of cable supplied: 5 m.
- Dimensions: 70 × 50 × 39 mm.

Weight (kg)	Reference
0.400	**NSY11957**

Extension cables

- 4 strand cable for sensors.
- Four lengths available: 5, 10, 15 and 20 metres.
- RJ11 connections.

Length (m)	Reference
5	**NSY11959**
10	**NSY11960**
15	**NSY11961**
20	**NSY11962**

Temperature sensor

- Temperature value range: 0° ... +60°.
- Measurement accuracy: ± 1 °C.
- Length of cable supplied: 4 m.
- Maximum cable length: 20 m.
- Supplied with fixings.

Reference
NSY11951

Humidity sensor

- Humidity value range: 10 ... 90% relative humidity between 0° and +60°.
- Measurement accuracy: ± 3% relative humidity.
- Length of cable supplied: 4 m.
- Maximum cable length: 20 m.
- Supplied with fixings.

Reference
NSY11952

Thermal control
Sensors

Combined temperature/humidity sensor

- Combines temperature and air humidity sensor functions.
- Temperature value range: 0° ... +60°.
- Measurement accuracy: ± 1 °C.
- Humidity value range: 10 ... 90% relative humidity between 0° and +60°.
- Measurement accuracy: ± 3% relative humidity.
- Length of cable supplied: 4 m.
- Maximum cable length: 20 m.
- Supplied with fixings.

Reference
NSY11953

Selection tools

www.schneider-electric.com

Our international site allows you to access all the Schneider Electric products in just two clicks with direct links to:

- A complete library of technical documents, catalogues, FAQs brochures, etc.
- Certificates.
- 2D & 3D drawings.
- Selection Guides from the e-catalogue.
- Product discovery sites.

You may also find illustrated overviews, news to which you can subscribe, a list of country contacts and more useful information.

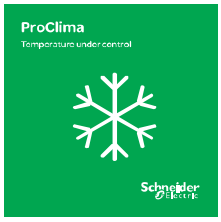
Our software suite

Spacial.pro

Spacial.pro allows you to make switchboard proposals based on the standard Spacial offer. A full project with several sets of switchboards is quoted in minutes, with automatic creation of the Bill of Material and 2D drawings for front/side views.

ProClima

Calculate the right choice for your thermal management requirements, according to the environment and the electrical/electronic devices installed inside the enclosure.



Spacial.ref Thalassa.ref

These digital rules allow you to select the best components from the current extensive product range without the risk of any mistakes, since product and accessory selection take place automatically, saving you time and money.

Thermal balance
Thermal management system

The miniaturisation of components, the generalisation of electronics and the appearance of new electronically powered products have made temperature management into a need which must necessarily be considered when designing electrical and/or electronic switchboards, in the same way as the protection rating.
Reliability and the search for lower breakdown rates are two determining factors in process industries, where the cost per hour is extremely high. The smallest failure can instantly result in considerable losses. The service life of the components also depends on the temperature and humidity conditions inside the enclosure.
The ideal values are +25…+35 °C for the temperature and 60 % for the relative humidity (RH).
Various solutions to these problems have been put forward. They will be chosen according to environmental conditions, the type of components in the electrical switchboard, and their cost.
In certain cases, all it takes it to oversize the enclosures or use fans. In other cases, when the temperature is higher, it becomes necessary to install air-water exchangers or air coolers operating according to the principle of refrigeration (cooling units). We offer you a range of solutions that adapt to every possible scenario: from the enclosure itself to ventilation systems, resistances or exchangers, and even cooling units.

Natural dissipation

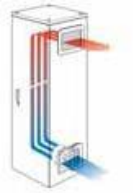
Through the walls of the enclosure

The use of a larger enclosure can, in certain cases, solve your heating problem.

Airing

Natural ventilation

The addition of fresh air from the outside through ventilation louvres improves the dissipation of heat by natural convection. However, this solution can only be used to dissipate small power levels and in environments with a small amount of dust.



Ventilating

Circulation

Air circulation inside the enclosure with the help of a fan makes it possible to guarantee an even temperature, avoiding hot spots that can damage certain components.

Forced ventilation

The fans are designed to evacuate a considerable amount of heat coming from the components of the electrical switchboards. The service life of the latter is considerably extended, thus guaranteeing the long life and correct operation of the installation.
The fans can only be used if the ambient temperature is at least 5 °C lower than the desired temperature inside the enclosure.
They offer an efficient solution, one that is easy to implement and maintain, which is also inexpensive, to the problem of temperature increases in the electrical switchboards. Thanks to their standard IP 54 (IP 55 with accessories) they are suitable for use in industrial and tertiary sectors.

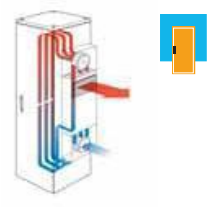
Heating

Resistance heaters

Resistance heaters can be used for two reasons:
- To reheat the electrical switchboard when the ambient temperature is too low for the correct operation of the components.
- To prevent the formation of condensation.

The second phenomenon can cause short-circuits, premature oxidation of the contacts, corrosion of metal parts and, in particular, of the enclosure, a considerable reduction in the service life of the electrical and electronic components.
Condensation occurs when the temperature suddenly drops below the dew point temperature. To avoid this, it is simply necessary to maintain the temperature inside the enclosure at a few degrees above the ambient temperature of the environment.
Thanks to their design, the heaters encourage natural convection and guarantee quick and even heating within the enclosure.

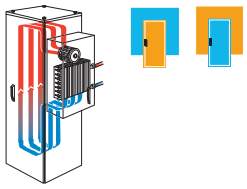
Thermal balance
Thermal management system



Cooling

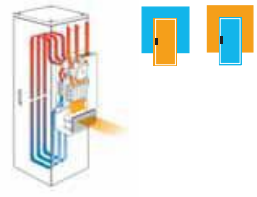
Air-air exchangers

Air-air exchangers are devices that combine efficiency and simplicity. The hot air flows of the enclosure and the cold of the surrounding environment, created by two fans, circulate on either side of hermetic separation walls, preventing the penetration of dust or moisture in the enclosure. The hot air from the switchboard reheats these walls, which in turn are cooled by the fresh air from outside. The transfer always takes place from the hotter side to the cooler side. This is why these devices can only be used if the ambient temperature is at least 5 ºC lower than the desired temperature inside the enclosure.
The aluminium exchange cassette forms the core of the system. This element can be cleaned easily by simply removing it. In addition, the permanent operation of the internal fan prevents the appearance of hot spots in the electrical switchboard. The temperature regulation system integrated in the unit turns the external circuit fan on and off.



Air-water exchangers

Air-water exchangers operate on the same principle as air-air exchangers. Fresh air from the outside is replaced with cold water supplied by a network installed on the industrial site. This change of fluid makes it possible to evacuate much larger amounts of heat and, possibly, to reduce the temperature in the enclosure below the temperature of the ambient air.
Temperature control in the enclosure is carried out by modulating the water flow. The water circuit is protected by a shut-off device: your electrical installation is safe.



Cooling units

Cooling units can be used in the harshest environments, where the temperature can reach 55 ºC. These devices are especially recommended when the desired temperature inside the enclosure must be lower than the ambient temperature or when a large amount of heat needs to be evacuated. As in the case of the exchangers, they do not affect the IP of the switchboard.
The filter, placed at the inlet of the external air circuit, allows it to operate even when the ambient air is charged with dust or oil particles. Easily replaceable and quite inexpensive, this device guarantees the efficiency of the device throughout its service life. These devices control the temperature inside the enclosure and include an alarm function for signalling operational anomalies.

The ambient temperature is lower than the desired temperature inside the enclosure.

The ambient temperature is higher than the desired temperature inside the enclosure.

The ProClima calculation software, available on our webiste, is an indispensable tool for the selection of a thermal auxiliary.

Thermal balance
Thermal management system

Method of determining the thermal solution

The heat balance, which consists of comparing the power released by the devices with the power exchanged spontaneously through the wall of the enclosure, allows us to calculate the internal temperature obtained in the enclosure, with no thermal accessories, and thus to determine whether it is necessary to install any, bearing in mind the desired internal and external temperatures.
Below we have presented a simple method for implementing this choice.

1 Characteristics of the enclosure

H = Height W = Width D = Depth

Position of the enclosure	Location according to IEC 890 ratio	Formula for calculating S (m^2)
	Accessible from every side	S = 1.8 × H × (W + D) + 1.4 × W × D
	Placed against a wall	S = 1.4 × W × (H + D) × 1.8 × D × H
	On the end when suited	S = 1.4 × D × (H + W) + 1.8 × W × H
	On the end when suited, placed against a wall	S = 1.4 × H × (W + D) + 1.4 × W × D
	In the middle when suited	S = 1.8 × W × H + 1.4 × W × D + D × H
	In the middle when suited, placed against a wall	S = 1.4 × W × (H + D) + D × H
	In the middle when suited, placed against a wall with the top covered	S = 1.4 × W × H + 0.7 × W × D + D × H

S = m^2

Example
Spacial reference **NSYSF20840**
H = 2000
W = 800
D = 400
Installation method:
Suitable enclosure placed against a wall.

S = 4.13 m^2

2 Thermal power dissipated by the operational components

Calculated as the sum of the power dissipated by each of the installed components.
If these are not known, use the ProClima software and page **8/115**, which shows the average values.

Pd = W

Assume that the switchgear dissipates 800 W

Pd = 800 W

3 Characteristics of the environment air

Maximum ambient temperature
Minimum ambient temperature
Average relative humidity
Dew point temperature. Calculation of resistance heater power.

Te_{max} = °C
Te_{min} = °C
RH = %
Tr = °C

The temperature conditions are as follows:

Te_{max} = 35 °C
Te_{min} = 15 °C
RH = 70 %
Tr = 29 °C

4 Average desired internal temperatures

They are defined by the nature of the components and the characteristics of the environment air.
Maximum internal temperature
Minimum internal temperature
(maximum value between the dew point temperature and the minimum operating temperature of the devices)

Ts_{max} = °C
Ts_{min} = °C

Ts_{max} = 40 °C
Ts_{min} = 29 °C

5 Final temperature inside the enclosure with no thermal system

Max. internal temperature: $Ti\ max = \frac{Pd}{KxS} + Te\ max$

Min. internal temperature: $Ti\ min = \frac{Pd}{KxS} + Te\ min$

or
K = 5.5 W/m^2/°C for an enclosure made of painted sheet steel
K = 3.5 W/m^2/°C for a polyester enclosure
K = 3.7 W/m^2/°C for a stainless-steel enclosure
K = 12 W/m^2/°C for an aluminium enclosure

Ti_{max} = °C
Ti_{min} = °C

Ti_{max} = 70 °C
Ti_{min} = 50 °C

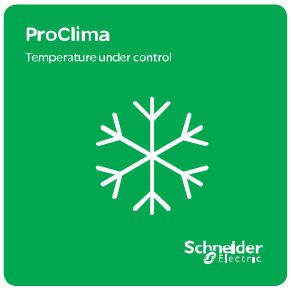
Thermal balance
Thermal management system

6 Determining the type of thermal device and its power: Psyst

If Ts min < Ti min	If Ts min > Ti min	If Ts max < Ti max	If Ts max > Ti max
No need for a thermal system; a circulation fan may be used to even out the temperature.	Need for a thermal system: resistance heater 1/ Permanent operation of the switchboard **Psyst = K × S (Ts_{min} – Te_{min}) – Pd** 2/ Discontinuous operation **Psyst = K × S (Ts_{min} – Te_{min})**	Need for a thermal system: ventilation, fan, exchanger, cooling unit. **Psyst = Pd – K × S (Ts_{max} – Te_{max})** **Psyst = 800 – 5.5 × 4.13 × (40 – 35)** **~ 690 W**	No need for a thermal system; a circulation fan may be used to even out the temperature.

	Temperature conditions	Solution	Advantages	Constraints
CIRCULATING	Avoid hot spots.	Install circulation fans in the enclosure.	Highly economical solution requiring no maintenance, easy to install; Installation IP conserved.	The amount of heat evacuated is relatively low.
COOLING	Final temperature Ts max desired in the enclosure at least 5 °C higher than the ambient temperature Te max. **Ts max ≥ Te max + 5 °C**	Oversize the enclosure or the wall-mounting enclosure.	Economical solution requiring no maintenance, easy to install; Installation IP conserved.	The amount of heat evacuated is relatively low, larger dimensions.
		Install ventilation louvres.	Highly economical solution requiring no maintenance, easy to install.	The amount of heat evacuated is low, it depends on the layout of the components, reduced IP (entry of dust).
		Install fans for introducing fresh air. $D = \frac{Psyst}{(Ts\ max - Te\ max)} \times 3.1\ m^3/h$	Economical solution, easy to install; large amount of heat evacuated; possible temperature control.	Regular filter maintenance. IP slightly reduced.
		Use an air-air exchanger. $q = \frac{Psyst}{(Ts\ max - Te\ max)} wk$	Easy to install; IP conserved during installation; temperature control as standard; easy maintenance.	Regular filter maintenance.
	Final temperature Ts max desired in the enclosure lower than the ambient temperature Te max +5 °C. **Ts max ≥ Te max +5 °C**	Use a cooling unit.	Easy to install; allows the evacuation of large amounts of heat, even when the ambient temperature is high, IP conserved during installation, temperature control.	Regular filter maintenance, cannot be used beyond an ambient temperature of 55 °C.
		Use an air-water exchanger.	Easy to install; allows the evacuation of large amounts of heat, even when the ambient temperature is high, IP conserved during installation, temperature control, no filter to maintain.	Needs a water circuit; consumption if supplied by the water mains.
HEATING	Outside temperature lower than the lowest acceptable ambient temperature for the switchgear.	Heat using a resistance heater.	Economical, reliable; see temperature in the table.	Energy consumption; space taken up in the enclosure.
	Risk of condensation.	Heat using a resistance heater in order to maintain the temperature beyond the dew point temperature.	Economical, reliable; the humidity in the switchboard can be regulated.	Energy consumption; space taken up in the enclosure.

Software
ProClima



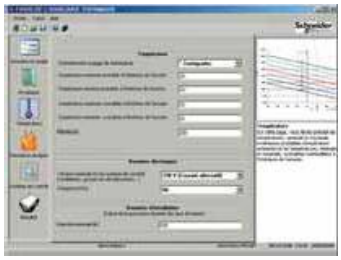
New ProClima software

- Software package for calculating and selecting the thermal accessories required for enclosures containing electrical and electronic equipment.
- Performs the calculations described on pages **8/112** and **8/113**, as well as the corrected surfaces, according to the dimensions of the enclosure and its position in relation to the walls.
- Available for download on our homepage.

Data entry

The following steps must be followed to conduct this study:

1
Enter the project and customer data (optional).



2
Enter the internal and external temperature data for the enclosure (compulsory).

3
Enter the electrical data for the installation (voltage, rating, etc.) (compulsory).

4
Determine the power dissipated by the electrical equipment inside the enclosure (compulsory).
If this value is not known, the software can calculate it:
- Based on the electrical or electronic switchgear that make up the switchboard (type and number),
- Based on a temperature reading.

Software
ProClima

Results

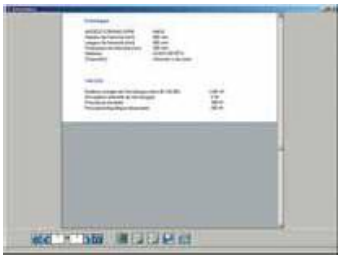
Summary of the heat balance

The software offers to print the project summary containing the calculation values, the results obtained and the thermal accessories recommended for maintaining the internal temperature of the enclosure in the specified conditions.
In addition, the summary specifies the power, characteristics and reference of the device, as well as any related accessories.

5
Select the enclosure and the installation method (compulsory).

6
Select the thermal management system (fans, exchangers, etc.) (compulsory).

7
View and print the project summary.



Example of calculation and selection

Data

- **Enclosure data**
  Height: 2000 mm
  Width: 800 mm
  Depth: 500 mm

- **Location:** Placed on the wall

- **Material:** Painted sheet-steel enclosure

- **Thermal power dissipated by the operational components**
  Pd: 950 W

- **Information on temperature and the environment:**

Maximum desired temperature inside the enclosure	Te_{max} : 25 °C
Minimum desired temperature inside the enclosure	Te_{min} : 25 °C
Maximum temperature dissipated in the enclosure	Te_{max} : 35 °C
Minimum temperature dissipated in the enclosure	Te_{min} : 25 °C

Environment: Low pollution and low dust level

Selection and calculation:

The desired maximum temperature inside (Ts_{max}) the enclosure is 10 ºC higher than the maximum value expected for the outside (Ti_{max}).
It is possible to cool the enclosure using the filtered ventilation systems.

Calculation of the required fan:

Usage formulas:
Psis = $Pd - k \times S \times (Ts_{max} - Te_{max})$
Flow = $f \times Psis / (Td_{max} - Te_{max})$

Pd: Thermal power dissipated by the operational components
S = 1.4 × W × (H + D) + 1.8 × D × H = 4.6 m². According to standard IEC 890

K = Constant defined by the material used to manufacture the enclosure

K = 5.5 W/m² × °C for a solid sheet-steel enclosure
K = 3.5 W/m² × °C for a polyester enclosure
K = 3.7 W/m² × °C for a stainless-steel enclosure

In order to make the calculation, it is necessary to know the height above sea level of the installation location:
Height above sea level: 800 m
f = Coefficient relating to the height above sea level (value)

0 to 100 m f = 3.1	500 to 750 m f = 3.4
100 to 250 m f = 3.2	750 to 1000 m f = 3.5
250 to 500 m f = 3.3	.....

Our example:

Psis = 950 – 5.5 × 4.6 × (35 – 25) = 497 W
Flow rate = 3.5 × 697 / (35 – 25) = 244 m³/h
Selection from the fan quick-selection table
1 fan with standard filter ref. NSYCVF300M230PF + 1 grille with standard filter ref. NSYCAG223LPF + 1 thermostat ref. NSYCCOTHO enable a flow rate of 302 m³/h
The minimum outside temperature is lower than the desired minimum temperature inside the enclosure.
It is necessary to install resistance heaters:

Calculation of the useful resistance heater

Usage formula
W = $k \times S \times (Ts_{min} - Te_{min})$

Our example:

W = 5.5 × 4.6 (15 – 10) = 127 W

Selection from the selection guide of the resistance heaters.
1 resistance heater ref. NSYCR150WU2C + 1 thermostat ref. NSYCCOTHC

Help table to calculate corrected surfaces

Spacial wall-mounting enclosures

Installation mode									
H (mm)	W (mm)	D (mm)	1	2	3	4	5	6	7
300	200	150	0.23	0.21	0.21	0.19	0.20	0.17	0.15
300	250	150	0.28	0.24	0.25	0.22	0.23	0.20	0.18
300	300	150	0.31	0.27	0.29	0.25	0.27	0.23	0.20
300	300	200	0.35	0.32	0.33	0.29	0.31	0.27	0.23
300	400	150	0.38	0.33	0.36	0.32	0.35	0.30	0.26
300	400	200	0.41	0.39	0.41	0.36	0.39	0.34	0.28
400	300	150	0.39	0.34	0.36	0.32	0.34	0.29	0.26
400	300	200	0.44	0.40	0.41	0.36	0.38	0.33	0.29
400	400	200	0.54	0.48	0.51	0.45	0.48	0.42	0.36
400	600	200	0.74	0.65	0.71	0.62	0.68	0.58	0.50
400	600	250	0.82	0.73	0.78	0.69	0.74	0.65	0.54
500	300	200	0.53	0.47	0.49	0.43	0.45	0.39	0.35
500	400	200	0.65	0.57	0.61	0.53	0.57	0.49	0.44
500	400	250	0.73	0.65	0.68	0.60	0.63	0.55	0.48
500	500	200	0.77	0.67	0.73	0.63	0.69	0.59	0.52
500	500	250	0.85	0.75	0.80	0.70	0.75	0.65	0.56
600	400	200	0.76	0.66	0.71	0.62	0.66	0.57	0.51
600	400	250	0.84	0.75	0.78	0.69	0.72	0.63	0.56
600	500	250	1.02	0.87	0.93	0.81	0.87	0.75	0.66
600	600	200	1.03	0.89	0.98	0.84	0.94	0.79	0.71
600	600	250	1.13	0.98	1.07	0.92	1.01	0.86	0.76
600	600	300	1.22	1.08	1.15	1.01	1.08	0.94	0.81
600	600	400	1.42	1.27	1.32	1.18	1.22	1.08	0.91
600	800	300	1.52	1.33	1.45	1.26	1.38	1.19	1.02
700	500	250	1.12	0.98	1.05	0.91	0.98	0.84	0.75
800	600	200	1.32	1.13	1.26	1.06	1.19	1.00	0.92
800	600	250	1.43	1.24	1.35	1.16	1.27	1.08	0.98
800	600	300	1.55	1.36	1.45	1.26	1.36	1.16	1.04
800	600	400	1.78	1.58	1.65	1.46	1.52	1.33	1.16
800	800	250	1.79	1.54	1.71	1.46	1.63	1.38	1.24
800	800	300	1.92	1.66	1.82	1.57	1.73	1.47	1.30
800	1000	300	2.29	1.97	2.20	1.88	2.10	1.78	1.57
800	1200	300	2.50	2.28	2.57	2.18	2.47	2.09	1.84
1000	600	250	1.74	1.50	1.64	1.40	1.54	1.30	1.19
1000	600	300	2.04	1.63	1.75	1.51	1.63	1.39	1.27
1000	600	400	2.14	1.90	1.98	1.74	1.82	1.58	1.41
1000	800	250	2.17	1.85	2.07	1.75	1.97	1.65	1.51
1000	800	300	2.32	2.00	2.20	1.88	2.08	1.76	1.59
1000	800	400	2.61	2.29	2.45	2.13	2.29	1.97	1.74
1000	1000	300	2.76	2.36	2.64	2.24	2.52	2.12	1.91
1000	1200	300	3.20	2.72	3.08	2.60	2.96	2.48	2.23
1000	1200	400	3.44	3.07	3.39	2.91	3.23	2.75	2.42
1200	600	300	2.45	1.91	2.05	1.76	1.91	1.62	1.49
1200	600	400	2.83	2.21	2.30	2.02	2.11	1.82	1.66
1200	800	300	2.71	2.33	2.57	2.18	2.42	2.04	1.87
1200	800	400	3.04	2.66	2.85	2.46	2.66	2.27	2.05
1200	1000	300	3.23	2.75	3.08	2.60	2.94	2.46	2.25
1200	1000	400	3.70	3.10	3.39	2.91	3.20	2.72	2.44
1200	1200	300	3.74	3.17	3.60	3.02	3.46	2.88	2.63
1400	1000	300	3.86	3.14	3.53	2.97	3.36	2.80	2.59

	Installation mode
1	Accessible from every side
2	Placed against a wall
3	On the end when suited
4	On the end when suited, placed against a wall
5	In the middle when suited
6	In the middle when suited, placed against a wall
7	In the middle when suited, placed against a wall, closed covered top

The surfaces are given in m^2.

Use ProClima to save time and find the best solution!

8

Help table to calculate corrected surfaces

THALASSA wall-mounting enclosures

H (mm)	W (mm)	D (mm)	Installation mode						
			1	2	3	4	5	6	7
310	215	160	0.26	0.23	0.24	0.21	0.22	0.19	0.17
307	255	164	0.29	0.26	0.27	0.24	0.25	0.22	0.19
430	330	200	0.50	0.45	0.47	0.41	0.43	0.38	0.33
530	430	200	0.72	0.63	0.68	0.59	0.64	0.55	0.49
645	435	250	0.95	0.84	0.88	0.77	0.82	0.71	0.63
745	535	300	1.34	1.19	1.26	1.10	1.17	1.01	0.89
845	635	300	1.69	1.47	1.59	1.37	1.49	1.27	1.14
1055	850	350	2.70	2.34	2.55	2.19	2.40	2.04	1.83

THALASSA floor-standing enclosures

H (mm)	W (mm)	D (mm)	Installation mode						
			1	2	3	4	5	6	7
500	500	320	0.96	0.86	0.90	0.80	0.83	0.73	0.62
500	750	320	1.30	1.15	1.24	1.09	1.17	1.02	0.85
500	1000	320	1.64	1.44	1.57	1.37	1.51	1.31	1.08
500	1250	320	1.97	1.72	1.91	1.66	1.85	1.60	1.32
750	500	320	1.33	1.18	1.24	1.09	1.14	0.99	0.88
750	750	320	1.78	1.56	1.68	1.46	1.59	1.36	1.20
750	1000	320	2.23	1.93	2.13	1.83	2.04	1.74	1.51
750	1250	320	2.68	2.30	2.58	2.21	2.49	2.11	1.83
1000	500	320	1.70	1.50	1.57	1.37	1.44	1.24	1.13
1000	750	320	2.26	1.96	2.13	1.83	2.01	1.71	1.54
1000	1000	320	2.82	2.42	2.70	2.30	2.57	2.17	1.94
1000	1250	320	3.39	2.89	3.26	2.76	3.13	2.63	2.35
1250	500	320	2.07	1.82	1.91	1.66	1.75	1.50	1.39
1250	750	320	2.74	2.37	2.58	2.21	2.42	2.05	1.88
1250	1000	320	3.42	2.92	3.26	2.76	3.10	2.60	2.37
1250	1250	320	4.09	3.47	3.93	3.31	3.77	3.15	2.87
1500	500	320	2.44	2.14	2.25	1.95	2.05	1.75	1.64
1500	750	320	3.23	2.78	3.03	2.58	2.84	2.39	2.22
1500	1000	320	4.01	3.41	3.82	3.22	3.63	3.03	2.80
1500	1250	320	4.80	4.05	4.61	3.86	4.42	3.67	3.39
500	500	420	1.12	1.02	1.04	0.94	0.95	0.85	0.71
500	750	420	1.49	1.34	1.41	1.26	1.33	1.18	0.96
500	1000	420	1.87	1.67	1.78	1.58	1.70	1.50	1.20
500	1250	420	2.24	1.99	2.15	1.90	2.07	1.82	1.45
750	500	420	1.54	1.39	1.41	1.26	1.28	1.13	0.99
750	750	420	2.02	1.80	1.89	1.67	1.77	1.54	1.32
750	1000	420	2.51	2.21	2.38	2.08	2.25	1.95	1.66
750	1250	420	2.99	2.61	2.86	2.49	2.74	2.36	2.00
1000	500	420	1.95	1.75	1.78	1.58	1.61	1.41	1.27
1000	750	420	2.55	2.25	2.38	2.08	2.21	1.91	1.69
1000	1000	420	3.14	2.74	2.98	2.58	2.81	2.41	2.11
1000	1250	420	3.74	3.24	3.57	3.07	3.41	2.91	2.54
1250	500	420	2.36	2.11	2.15	1.90	1.94	1.69	1.55
1250	750	420	3.07	2.70	2.86	2.49	2.65	2.28	2.06
1250	1000	420	3.78	3.28	3.57	3.07	3.36	2.86	2.57
1250	1250	420	4.49	3.87	4.28	3.66	4.07	3.45	3.08
1500	500	420	2.78	2.48	2.53	2.23	2.27	1.97	1.83
1500	750	420	3.60	3.15	3.35	2.90	3.10	2.65	2.43
1500	1000	420	4.42	3.82	4.17	3.57	3.92	3.32	3.02
1500	1250	420	5.24	4.49	4.99	4.24	4.74	3.99	3.62

Help table to calculate corrected surfaces

Spacial floor-standing enclosures

H (mm)	W (mm)	D (mm)	Installation mode						
			1	2	3	4	5	6	7
1200	800	300	2.71	2.33	2.57	2.18	2.42	2.04	1.87
1200	1000	300	3.23	2.75	3.08	2.60	2.94	2.46	2.25
1200	1200	400	4.13	3.55	3.94	3.36	3.74	3.17	2.83
1400	600	300	2.52	2.18	2.35	2.02	2.18	1.85	1.72
1400	600	400	2.86	2.52	2.63	2.30	2.41	2.07	1.90
1400	800	300	3.11	2.66	2.94	2.49	2.77	2.32	2.16
1400	800	400	3.47	3.02	3.25	2.80	3.02	2.58	2.35
1400	1000	400	4.09	3.53	3.86	3.30	3.64	3.08	2.80
1400	1200	400	4.70	4.03	4.48	3.81	4.26	3.58	3.25
1600	600	300	2.84	2.46	2.65	2.27	2.46	2.08	1.95
1600	600	400	3.22	2.83	2.96	2.58	2.70	2.32	2.15
1600	800	300	3.50	2.99	3.31	2.80	3.12	2.61	2.44
1600	800	400	3.90	3.39	3.65	3.14	3.39	2.88	2.66
1600	1000	300	4.16	3.52	3.97	3.33	3.78	3.14	2.93
1600	1000	400	4.59	3.95	4.34	3.70	4.08	3.44	3.16
1600	1200	300	4.82	4.06	4.63	3.86	4.44	3.67	3.42
1600	1200	400	5.28	4.51	5.02	4.26	4.77	4.00	3.66
1800	600	300	3.17	2.74	2.95	2.52	2.74	2.30	2.18
1800	600	400	3.58	3.14	3.29	2.86	3.00	2.57	2.40
1800	600	500	3.98	3.55	3.62	3.19	3.26	2.83	2.62
1800	800	300	3.90	3.32	3.68	3.11	3.47	2.89	2.72
1800	800	400	4.34	3.76	4.05	3.47	3.76	3.18	2.96
1800	800	500	4.77	4.20	4.41	3.84	4.05	3.48	3.20
1800	800	600	5.21	4.63	4.78	4.20	4.34	3.77	3.43
1800	1000	400	5.10	4.38	4.81	4.09	4.52	3.80	3.52
1800	1000	500	5.56	4.84	5.20	4.48	4.84	4.12	3.77
1800	1200	400	5.86	4.99	5.57	4.70	5.28	4.42	4.08
1800	1200	500	6.35	5.48	5.99	5.12	5.63	4.76	4.34
1800	1600	400	7.38	6.22	7.09	5.94	6.80	5.65	5.20
1800	1600	500	7.92	6.77	7.56	6.41	7.20	6.05	5.49
2000	600	300	3.49	3.01	3.25	2.77	3.01	2.53	2.41
2000	600	400	3.94	3.46	3.62	3.14	3.30	2.82	2.65
2000	600	500	4.38	3.90	3.98	3.50	3.58	3.10	2.89
2000	800	300	4.30	3.66	4.06	3.42	3.82	3.18	3.01
2000	800	400	4.77	4.13	4.45	3.81	4.13	3.49	3.26
2000	800	500	5.24	4.60	4.84	4.20	4.44	3.80	3.52
2000	800	600	5.71	5.07	5.23	4.59	4.75	4.11	3.78
2000	1000	400	5.60	4.80	5.28	4.48	4.96	4.16	3.88
2000	1000	500	6.10	5.30	5.70	4.90	5.30	4.50	4.15
2000	1200	400	6.43	5.47	6.11	5.15	5.79	4.83	4.50
2000	1200	500	6.96	6.00	6.56	5.60	6.16	5.20	4.78
2000	1200	600	7.49	6.53	7.01	6.05	6.53	5.57	5.06
2000	1600	400	8.10	6.82	7.78	6.50	7.46	6.18	5.73
2000	1600	500	8.68	7.40	8.28	7.00	7.88	6.60	6.04
2000	1600	600	9.26	7.98	8.78	7.50	8.30	7.02	6.35

	Installation mode
1	Accessible from every side
2	Placed against a wall
3	On the end when suited
4	On the end when suited, placed against a wall
5	In the middle when suited
6	In the middle when suited, placed against a wall
7	In the middle when suited, placed against a wall, closed covered top

The surfaces are given in m^2.

Use ProClima to save time and find the best solution!

Help table to calculate corrected surfaces

Spacial suitable enclosures

H (mm)	W (mm)	D (mm)	Installation mode						
			1	2	3	4	5	6	7
1200	600	400	2.50	2.21	2.30	2.02	2.11	1.82	1.66
1200	600	600	3.10	2.81	2.81	2.52	2.52	2.23	1.98
1200	800	400	3.04	2.66	2.85	2.46	2.66	2.27	2.05
1200	800	600	3.70	3.31	3.41	3.02	3.12	2.74	2.40
1400	600	400	2.86	2.52	2.63	2.30	2.41	2.07	1.90
1400	800	400	3.47	3.02	3.25	2.80	3.02	2.58	2.35
1600	600	600	3.96	3.58	3.58	3.19	3.19	2.81	2.56
1600	600	800	4.70	4.32	4.19	3.81	3.68	3.30	2.96
1600	800	600	4.70	4.19	4.32	3.81	3.94	3.42	3.09
1600	800	800	5.50	4.99	4.99	4.48	4.48	3.97	3.52
1800	400	400	2.82	2.53	2.53	2.24	2.24	1.95	1.84
1800	400	500	3.20	2.91	2.84	2.55	2.48	2.19	2.05
1800	400	600	3.58	3.29	3.14	2.86	2.71	2.42	2.26
1800	600	400	3.58	3.14	3.29	2.86	3.00	2.57	2.40
1800	600	500	3.98	3.55	3.62	3.19	3.26	2.83	2.62
1800	600	600	4.39	3.96	3.96	3.53	3.53	3.10	2.84
1800	600	800	5.21	4.78	4.63	4.20	4.06	3.62	3.29
1800	800	400	4.34	3.76	4.05	3.47	3.76	3.18	2.96
1800	800	500	4.77	4.20	4.41	3.84	4.05	3.48	3.20
1800	800	600	5.21	4.63	4.78	4.20	4.34	3.77	3.43
1800	1000	400	5.10	4.38	4.81	4.09	4.52	3.80	3.52
1800	1000	500	5.56	4.84	5.20	4.48	4.84	4.12	3.77
1800	1000	600	6.02	5.30	5.59	4.87	5.16	4.44	4.02
1800	1200	400	5.86	4.99	5.57	4.70	5.28	4.42	4.08
1800	1200	500	6.35	5.48	5.99	5.12	5.63	4.76	4.34
1800	1200	600	6.84	5.98	6.41	5.54	5.98	5.11	4.61
2000	300	500	3.09	2.85	2.69	2.45	2.29	2.05	1.95
2000	300	600	3.49	3.25	3.01	2.77	2.53	2.29	2.17
2000	400	400	3.10	2.78	2.78	2.46	2.46	2.14	2.03
2000	400	500	3.52	3.20	3.12	2.80	2.72	2.40	2.26
2000	400	600	3.94	3.62	3.46	3.14	2.98	2.66	2.49
2000	400	800	4.77	4.45	4.13	3.81	3.49	3.17	2.94
2000	600	400	3.94	3.46	3.62	3.14	3.30	2.82	2.65
2000	600	500	4.38	3.90	3.98	3.50	3.58	3.10	2.89
2000	600	600	4.82	4.34	4.34	3.86	3.86	3.38	3.13
2000	600	800	5.71	5.23	5.07	4.59	4.43	3.95	3.62
2000	800	400	4.77	4.13	4.45	3.81	4.13	3.49	3.26
2000	800	500	5.24	4.60	4.84	4.20	4.44	3.80	3.52
2000	800	600	5.71	5.07	5.23	4.59	4.75	4.11	3.78
2000	800	800	6.66	6.02	6.02	5.38	5.38	4.74	4.29
2000	1000	400	5.60	4.80	5.28	4.48	4.96	4.16	3.88
2000	1000	500	6.10	5.30	5.70	4.90	5.30	4.50	4.15
2000	1000	600	6.60	5.80	6.12	5.32	5.64	4.84	4.42
2000	1000	800	7.60	6.80	6.96	6.16	6.32	5.52	4.96
2000	1200	400	6.43	5.47	6.11	5.15	5.79	4.83	4.50
2000	1200	500	6.96	6.00	6.56	5.60	6.16	5.20	4.78
2000	1200	600	7.49	6.53	7.01	6.05	6.53	5.57	5.06
2000	1200	800	8.54	7.58	7.90	6.94	7.26	6.30	5.63
2000	1600	400	8.10	6.82	7.78	6.50	7.46	6.18	5.73
2000	1600	500	8.68	7.40	8.28	7.00	7.88	6.60	6.04
2000	1600	600	9.26	7.98	8.78	7.50	8.30	7.02	6.35
2200	400	600	4.30	3.94	3.77	3.42	3.24	2.89	2.72
2200	600	600	5.26	4.73	4.73	4.20	4.20	3.67	3.42
2200	600	800	6.22	5.69	5.51	4.98	4.81	4.28	3.94
2200	800	600	6.22	5.51	5.69	4.98	5.16	4.46	4.12
2200	800	800	7.23	6.53	6.53	5.82	5.82	5.12	4.67
2200	1000	600	7.18	6.30	6.65	5.77	6.12	5.24	4.82
2200	1200	600	8.14	7.08	7.61	6.55	7.08	6.02	5.52
2200	1200	800	9.26	8.21	8.56	7.50	7.86	6.80	6.13

Selection tools

www.schneider-electric.com

Our international site allows you to access all the Schneider Electric products in just two clicks with direct links to:

- A complete library of technical documents, catalogues, FAQs brochures, etc.
- Certificates.
- 2D & 3D drawings.
- Selection Guides from the e-catalogue.
- Product discovery sites.

You may also find illustrated overviews, news to which you can subscribe, a list of country contacts and more useful information.

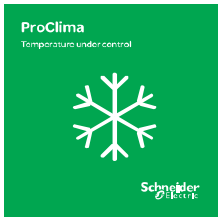
Our software suite

Spacial.pro

Spacial.pro allows you to make switchboard proposals based on the standard Spacial offer. A full project with several sets of switchboards is quoted in minutes, with automatic creation of the Bill of Material and 2D drawings for front/side views.

ProClima

Calculate the right choice for your thermal management requirements, according to the environment and the electrical/electronic devices installed inside the enclosure.



Spacial.ref Thalassa.ref

These digital rules allow you to select the best components from the current extensive product range without the risk of any mistakes, since product and accessory selection take place automatically, saving you time and money.