PRODUCT CATALOG
2018

NOVA®

Indication Warning & Control Applications

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Indication Warning & Control Applications

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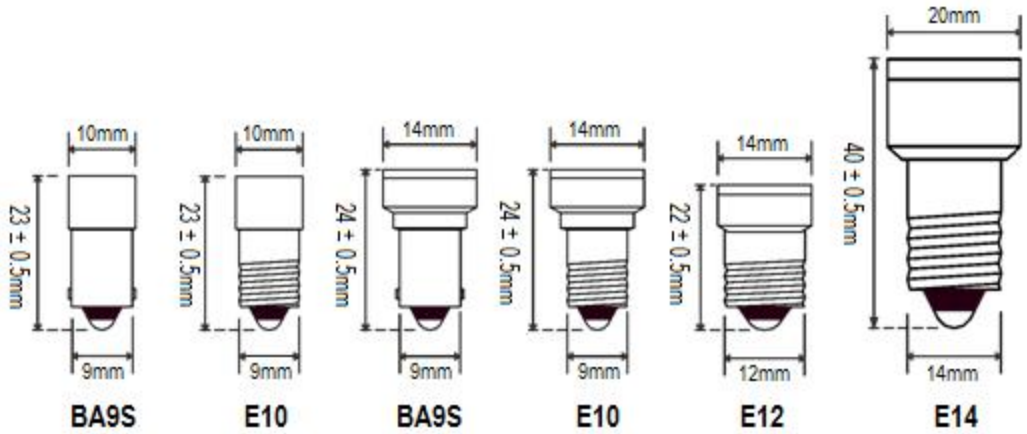
Description

The BA9S and E10 are standard socket of LED bulb, with diameter approx. 9-10mm. multi-chip and latest technology assures bright intensity, shock resistance and long life operation. Meanwhile E12 and E14 (diameter - 12mm. and 14mm.) could be done upon customer requested.

Features

- ✓ Low power consumption
- ✓ Lifetime : more than 30,000 hours
- ✓ Ambient Temperature : -5°C ~ +50°C
- ✓ Insulation : 100 MΩ at DC 500V
- ✓ Selectable input voltage from 24, 48, 70, 110, 125 VAC/DC
- ✓ Operating current less than 10mA

Dimension



Specification

Rated voltage	Emitting color	Operating current (mA)	Wave length (nm)	Luminous intensity (mcd)
AC-DC 24V	White	6.0	459	80
	Sky Blue	6.0	466	70
	Green	6.0	523	80
	Yellow	6.0	596	80
	Amber	6.0	613	80
	Red	6.0	633	90
AC-DC 48V	White	6.0	459	80
	Sky blue	6.0	466	70
	Green	6.0	523	80
	Yellow	6.0	596	80
	Amber	6.0	613	80
	Red	6.0	633	90
AC-DC 70V	White	6.0	459	80
	Sky blue	6.0	466	70
	Green	6.0	523	80
	Yellow	6.0	596	80
	Amber	6.0	613	80
	Red	6.0	633	90
AC-DC 110V	White	3.5	459	50
	Sky blue	3.5	466	45
	Green	3.5	523	50
	Yellow	3.5	596	50
	Amber	3.5	613	50
	Red	3.5	633	65
AC-DC 125V	White	3.5	459	50
	Sky blue	3.5	466	45
	Green	3.5	523	50
	Yellow	3.5	596	50
	Amber	3.5	613	50
	Red	3.5	633	65
AC-DC 220V	White	3.0	459	50
	Sky blue	3.0	466	45
	Green	3.0	523	50
	Yellow	3.0	596	50
	Amber	3.0	613	50
	Red	3.0	633	65

*Other base bulb and voltage rating can be supplied upon request.

Product Coding

NLB-BA9S – R 13 – 10

Socket type

BA9S	Bayonet base 9mm.
E10	Screw-in base 10mm.
E12	Screw-in base 12mm.
E14	Screw-in base 14mm.

Emitting color

W	White
S	Sky blue
G	Green
Y	Yellow
A	Amber
R	Red

Rate voltage of lamp

24	24 VAC/DC
48	48 VAC/DC
70	70 VAC/DC
11	110 VAC/DC
13	125 VAC/DC
22	220 VAC/DC

LED Diameter

10	10mm.
14	14mm.
20	20mm.

Description

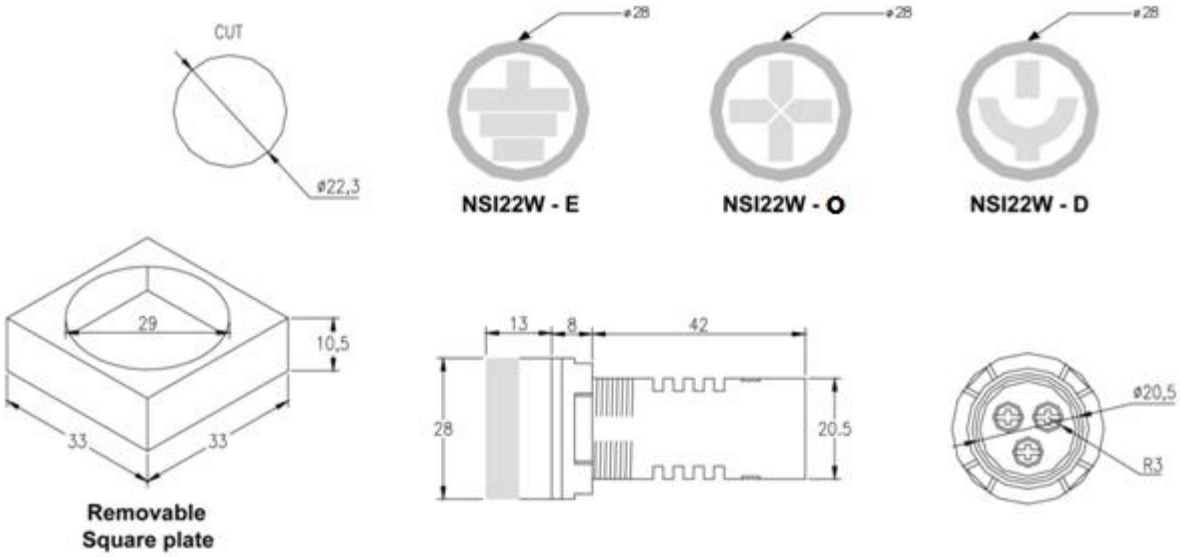
NOVA LED semaphore indicator is used as a states indicator of the circuit breaker, disconnector or earthing switch. The indicator is mounted on the panel with mounting hole diameter 22.3 mm. and operated by two color LED. The two colors are red and green, detail description is as below:

MODEL	Symbol	Connection		Equipment Status	
		X0-X1	X0-X2		
Draw Out		Red		Service	
			Green		Test
Grounding or Earth		Red		Close	
			Green		Open
Operation		Red		Close	
			Green		Open

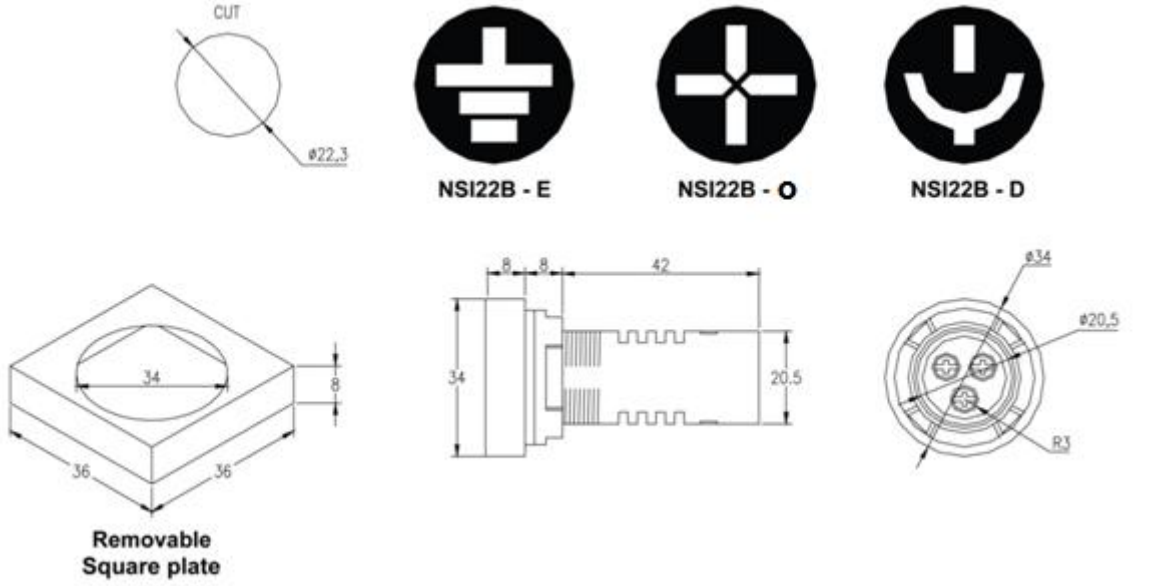
Specification

Type	NSI22
Insulation withstand voltage	10MΩ at DC 500V, AC 1,500V/min
Electrical life time	Above 50,000 hrs.
Operating current	4-6 mA
Power consumptions	0.12W (24Vdc), 0.24W (48Vdc), 0.55W (110Vdc),
	0.625W (125Vdc),1.10W (220Vdc)
Ambient temp.	-5ºC ~ +55ºC
Storage temp.	-20ºC ~ 70ºC
Ambient humidity	45 ~ 85%
Head protection class (front plate)	IP40
Cut out	22.3 mm
Weight	30g.

Dimension



NSI22W (White plate)



NSI22B (Black plate)

Product Coding

NSI22 W E 13

Basic type

Rated voltage*

24	AC-DC 24V
48	AC-DC 48V
11	AC-DC 110V
13	AC-DC 125V
22	AC-DC 220V

*Other rating can be supplied upon request

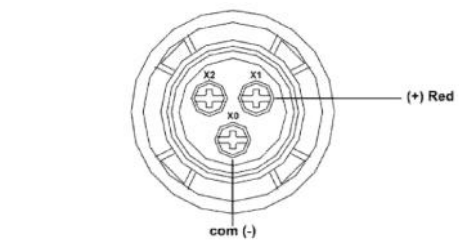
Surface color

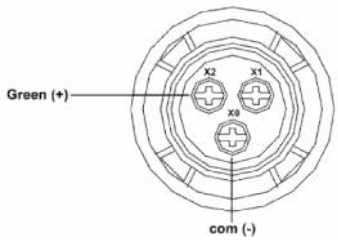
W	White plate
B	Black plate

Working status

D	Draw out status of breaker
E	Grounding or earth of DS
O	Operation status of breaker or DS

Wiring Diagram





- Removable LED (BA9S) type:

Dome lens (Cut out size 22mm.)

Flat lens (Cut out size 22mm.)

- Fixed LED type:

Flat lens (Cut out size 16mm.)

Flat lens (Cut out size 22mm.)

Flat lens (Cut out size 30mm.)

Description

Pilot lights are panel mounted lamp assemblies consisting of the indicator housing, an internal LED lamp, terminal, and a lens. Applications include industrial control panels of all types, equipment indicator panels, status indicators and display lighting. The light source is high brightness pure color LED.

Removable LED (BA9S) type	: Dome lens (cut out size 22mm.)
	: Flat lens (cut out size 22mm.)
Fix LED type	: Flat lens (cut out size 30mm.)
	: Flat lens (cut out size 22mm.)
	: Flat lens (cut out type 16mm.)

Features

- ✓ Unique Lens & bulb uniform body assures bright intensity, shock resistance, and oil tight construction.
- ✓ Full voltage up to 380VAC 50/60 Hz without bulky transformer
- ✓ High brightness LED chip technology with built in current-limiting resistor and zener diode
- ✓ Other voltage rating can be done upon request.

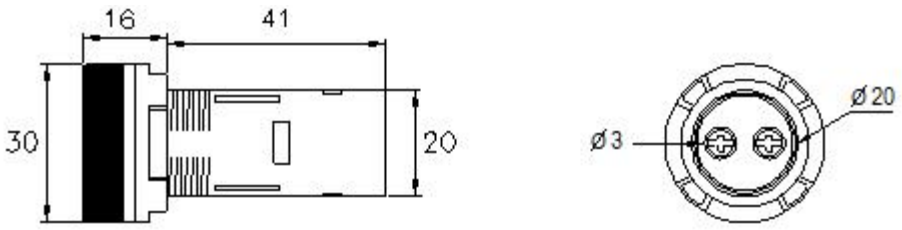
Specification

Conform to standards IEC 60073 (Lamp colors) and IEC 60547

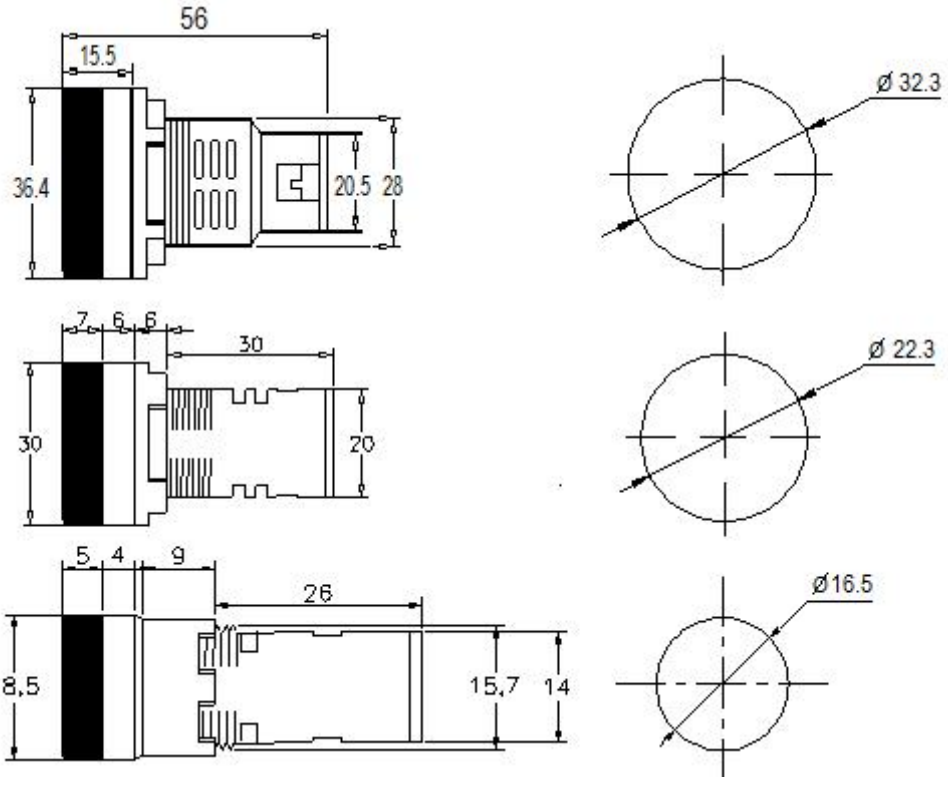
Type	NPL (LED)
Voltage	220 VAC/DC, 125 VAC/DC 110 VAC/DC, 48 VAC/DC 24 VAC/DC, 12 VAC/DC
Current	less than 10mA
Insulation	100 MΩ at DC 500V
Ambient temp.	-5°C ~ +55°C
Storage temp.	-20°C ~ 70°C
Electrical life time	Above 30,000 hrs.
Head protection class	IP40

Dimension

LED (BA9S) removable type



Fix LED type



Ratio 1:1 mm

Product Coding

NPL22 – R13 – LD

Basic type

Cutout

16	16 mm. (Fix LED type)
22	22 mm.
30	30 mm. (Fix LED type)

Lens Color

R	Red
G	Green
Y*	Yellow
W	White
S	Sky blue
O	Orange

*For removable LED type

Lens type

D*	Dome type
None	Flat type

*For removable LED type

Bulb type

L	LED (BA9S), removable
F	Fix LED

Rate voltage of lamp

24	AC–DC 24V
48	AC–DC 48V
11	AC–DC 110V
13	AC–DC 125V
22	AC–DC 220V
38**	AC–DC 380V

**For Fix LED type only

LINE LAMP (NLL)

Description

NOVA NLL series line lamps or status lamps are panel mounted assemblies which are consisting of the indicator housing, an internal LED lamp, terminals (at the rear side), and lens. Applications include industrial control panels of all types, equipment indicating panels, status indicators and display lighting. The light source is from high brightness pure color LED.

Features

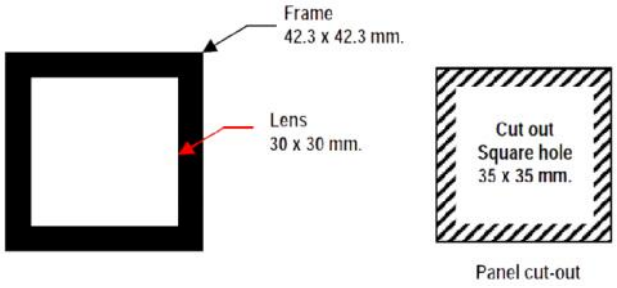
- ✓ Robust , compact and luxurious design
- ✓ Selectable lens shape either square (30 x 30 mm.) or rectangular shape (30 x 60 mm.).
- ✓ High brightness LED chip technology with built in current limiting resistor and zener diode.
- ✓ Various choices of LED illuminating colors such as white, red, green, yellow, amber and sky blue
- ✓ Various input voltages (both AC & DC) for LED indicator

Specification

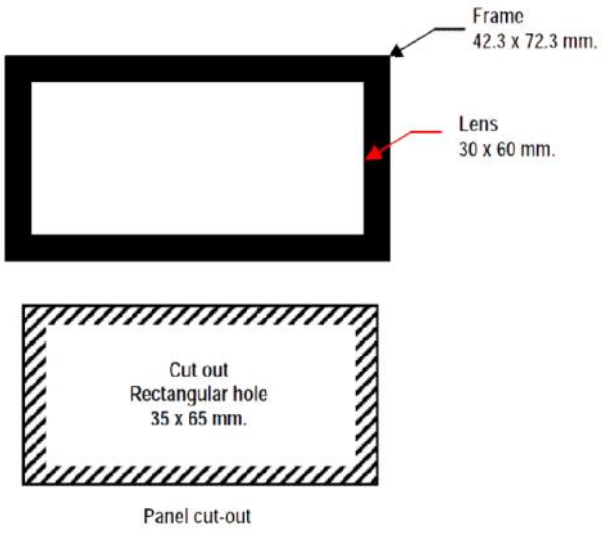
Input voltage for LED lamp	24, 48, 110, 125 and 220 Vac/Vdc
Allowable voltage fluctuation	±10%
AC rated frequency	50/60 Hz
LED illuminating color	White, Red, Green, Yellow, Amber and Sky blue
LED base type	E10
LED power consumption	Below 20 mA.
Insulation resistance	>100 MΩ (DC 500 V. Meg)
Withstand voltage	AC 2,500 V/1 min.
Ambient temperature	-5°C to +55°C
Relative humidity	45 – 85 %
Front protection class	IP40 (Front panel)
Recommended wire size	1.0 – 2.5 mm^2

Dimension

Square lens



Rectangular lens



Product Coding

NLL – 3 R – L 24

Basic type

Dimension

3	Rectangular lens (30 x 30 mm.)
6	Rectangular lens (30 x 60 mm.)

Colors of LED lamp

W	White
R	Red
G	Green
Y	Yellow
A	Amber
S	Sky blue

Input voltage for LED lamp

24	24V AC/DC
48	48V AC/DC
11	110V AC/DC
13	125V AC/DC
22	220V AC/DC

LED lamp with E10 base type

Remark: 2 mounting brackets will be provided with each NLL.

MINIATURE BUZZER (NBZ)

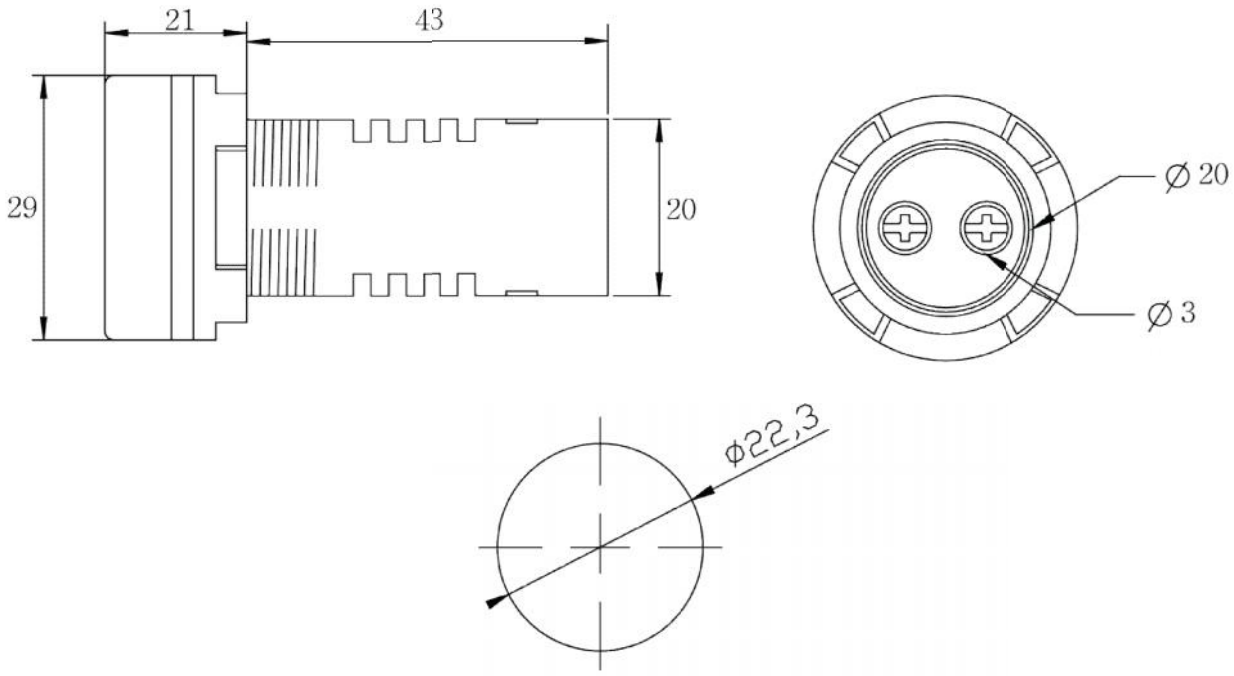
Description

The miniature buzzer is used for general purpose alarm and warning applications. Usually it is used in cubicle or control boxes for wide application such as power distribution boards, LV. switchgear, MV. switchgear, Panel boards/Switchboards as well as in controller box of production machine and so on.

Features

- ✓ Small size/light weight and 5 cm. depth in panel.
- ✓ ∅ 22 mm. buzzer is intermittent sounding and flashing.
- ✓ Sound volume is 80 dB. at 10 cm.
- ✓ Both AC and DC type can be supplied with wide range of voltage.
- ✓ Ambient temperature -5°C to +55°C
- ✓ Head protection class : IP20
- ✓ Weight 22g

Dimension



Ratio 1:1 mm

Product Coding

NBZ – 130

Basic type

Rated voltage

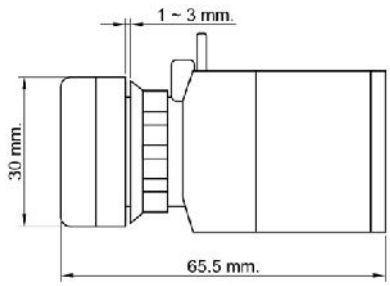
024	24V AC/DC
048	48V AC/DC
110	110V AC/DC
130	125V AC/DC
220	220V AC/DC

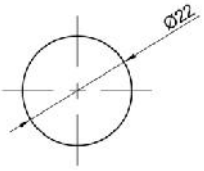
(cut out Size 30mm.) (cut out Size 22mm.)

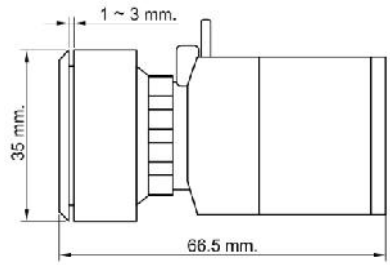
Specification

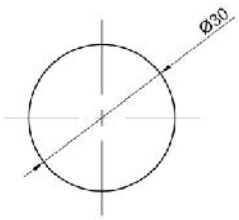
Insulation withstand voltage	10MΩ at DC 500V AC 1,500V/min.
Mechanical life time	3 x 10^6
Electrical life time	12 x 10^5
Ambient temperature	-5°C ~ +55°C
Storage temperature	-20°C ~ 70°C
Ambient humidity	45 ~ 85%
Head protection class	IP54
Cut out	22.3 mm. / 30.3mm.

Cut Out Dimension









Product Coding

NPB22 – R13 – A11

Basic type

Cutout

22	22 mm.
30	30 mm.

Button color

R	Red
B	Black
G	Green
Y	Yellow
W	White
S	Sky blue

Number of contacts

11	1NO/1NC
20	2NO
02	2NC
22	2NO/2NC

Function operate

A	Alternate
M	Momentary
T	Turn to release

Rated voltage (with lamp)

None	Without lamp
24	AC-DC 24V
48	AC-DC 48V
11	AC-DC 110V
13	AC-DC 125V
22	AC-DC 220V

Button type

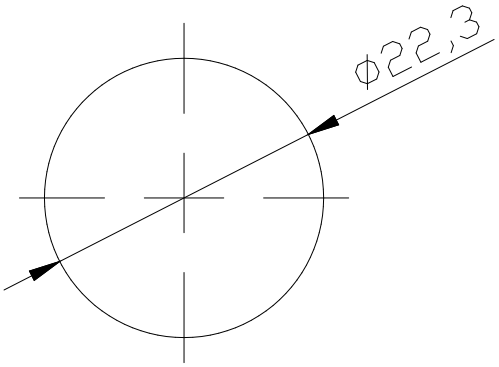
FL	Flat
EM	Emergency*

*Note: Emergency push button has red color only. The emergency stop push button comply with IEC 60204, IEC 60947 and EC 60073. They are designed with a positive mechanical movement sequence. The push button latches when pressed and is reset by turning it in a clockwise direction.

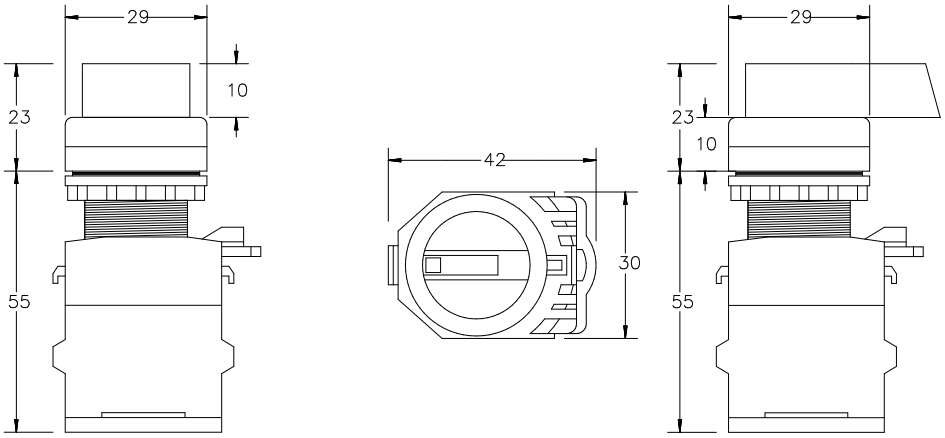
Specification

Insulation withstand voltage	10MΩ at DC 500V AC 1,500V/min.
Mechanical life time	3 x 10^5
Electrical life time	12 x 10^5
Ambient temperature	-5°C ~ +55°C
Storage temperature	-20°C ~ 70°C
Ambient humidity	45 ~ 85%
Head protection class	IP54
Cut out	22.3 mm.

Cut out dimension



Ratio 1:1 mm.



Short handle

Long handle

Ratio 1:1 mm.

Product Coding

NSS22 – 2 L – 11

Basic type

Working step

2	2 Steps
3	3 Steps

Number of contacts

11	1NO/1NC
20	2NO
02	2NC
22	2NO/2NC

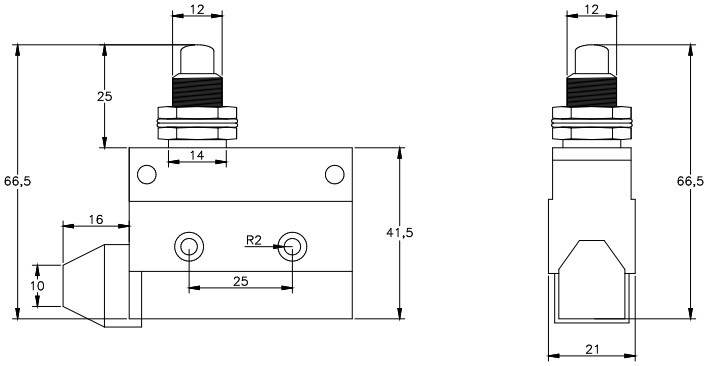
Handle type

L	Long
S	Short

Specification

Operating Frequency	Mechanical : 240 ops/min Electrical : 20 ops/min
Service Life	Mechanically : 1.0x10^6 (operations) Electrically : 5x10^6 (operations)
Rated Voltage/Current	15A at 250VAC
Rated Insulation Voltage	600VAC
Operating Temperature	-20° to +80ºC (-4° to 176ºF)
Dielectric Strength	2500VAC 50/60Hz (For 1 min)
Degree of Protection	IP63

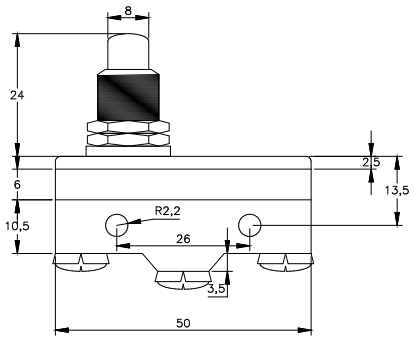
Dimension

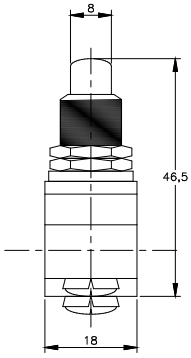


NLS – DS

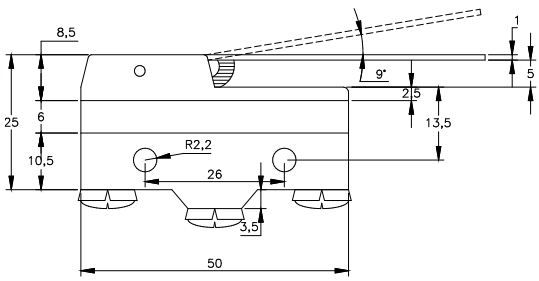
Ratio 1:1 mm.

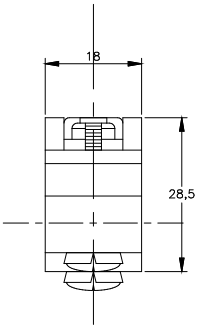
Dimension



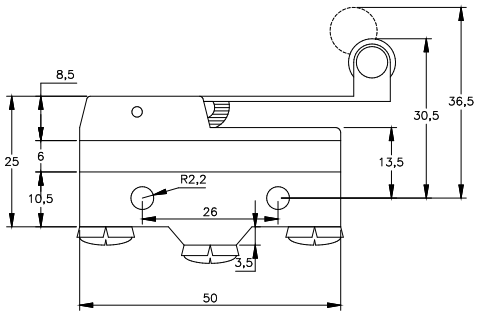


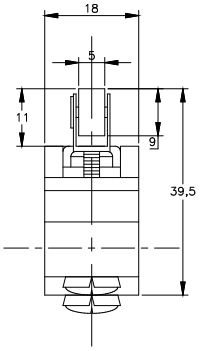
NLZ – 15GQ – B





NLZ – 15GW – B

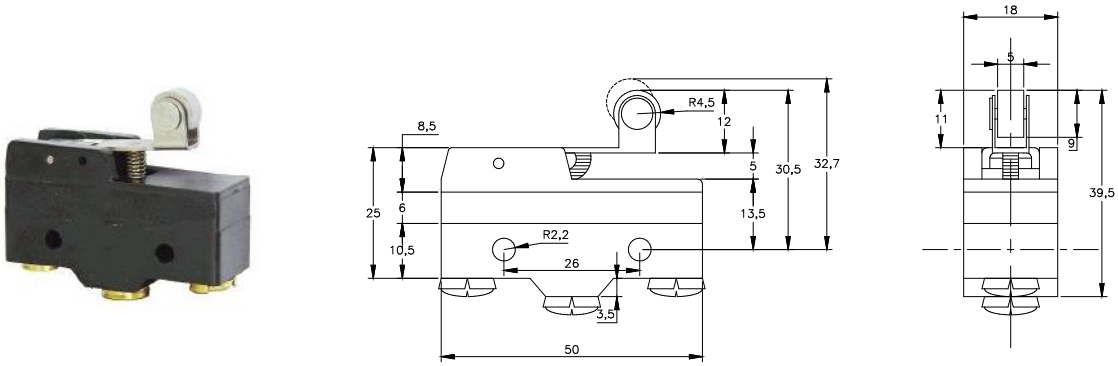




NLZ – 15GW2 – B

Ratio 1:1 mm.

Dimension



NLZ – 15GW22 – B

Ratio 1:1 mm.

Definitions of Operating Characteristics

OF	Operating Force	PT	Pre travel
RF	Releasing Force	MD	Movement Differential
OT	Over travel	OP	Operating position

Type	NLS-DS	NLZ-15GQ-B	NLZ-15GW-B	NLZ-15GW2-B	NLZ-15GW22-B
OF_{max}	600g	350g	100g	200g	130g
RF_{min}	100g	114g	14g	42g	21g
PT_{max}	2.0mm	0.4mm	10.0mm	2.7mm	7.1mm
OT_{min}	6.0mm	5.5mm	5.6mm	2.4mm	4.0mm
MD_{max}	0.8mm	0.05mm	2.0mm	0.8mm	1.6mm
FP_{max}	-	-	28.2mm	32.9mm	36.5mm
OP	21.8±1.2mm	19.0±0.8mm	19.0±0.8mm	30.2±0.4mm	30.2±0.8mm

Description

NOVA CAM SWITCHES series NCS have been developed to the latest achievements in the field of switching devices through the application of high quality insulation material and contacts made from silver alloys. Their advantages are high making and breaking capacities, electrical and mechanical endurance and small dimensions. The rotary cam switches are intended for multiple switching operations in main circuit as well as in auxiliary circuits.

NOVA NCS series rotary cam switches have five current ratings: 10A, 20A, 25A, 32A, and 63A. All ratings has the finger proof terminal. The series comply with IEC 60947-3, IEC 60947-5-1.

NOVA NCS series mainly applies to 600Vac and below voltage (240Vac/50 Hz) as well as DC circuit. Typical applications are breaking and closing, change-over of circuit, selector switches (for example: Auto-Manual), control switch of switchgear / control gear and control switch of instruments.

Application

The NCS series cam switches can be used for virtually all purposes which classified by utilization as the following:

- ✓ Motor switches - these switches are designed for direct-online starting and stopping of single phase and three phase motors, which also come out as star-delta switches, reversing switches, pole-change over motor switches.
- ✓ Selector switches and multi-step switches - e.g. Voltmeter selector switches, Ammeter selector switches and etc. for transformers and welding apparatuses.
- ✓ Cut-Off switches or ON-OFF switches in auxiliary circuits - these switches are assembled in compliance with the switching programmer according to preference : switches for control, signaling and measuring circuits.
- ✓ Control switches with spring return - pull to operate and etc.

CAM SWITCH (NCS)

NOVA Cam switches can have up to 15 layers (30 contacts) in maximum. In principle all sizes and designs of cam switches can be arranged with four different angles of rotation. Suitable to the application of stop mechanism with 90°, 60°, 45°, 30° at uniform distribution of a full circle, maximum 4, 6, 8 or 12 switch positions are possible.

The switches can be used at the ambient temperature from -5°C to +55°C and storage temperature from -20°C to +70°C

Specification

Conforming to the standards IEC 60947-3 and IEC 60947-5-1

Front protection class : IP40, Live part: IP20

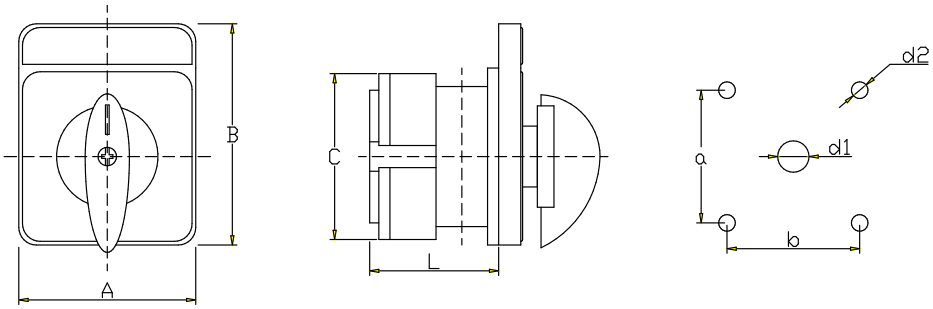
Contact material : Ag Ni10 (90% silver + 10% Nickel)

Description			NCS – 10	NCS – 20	NCS – 25	NCS – 32	NCS – 63
Rated insulation voltage U_i		V	690	690	690	690	690
Rated thermal current I_{th}		A	10	20	25	32	63
Rated operational current I_e							
AC – 21A, AC – 22A (240/440V)		A	10/10	20/20	25/25	32/32	63/63
AC – 23A	(240/440V)	A	7.5/7.5	15/15	22/22	30/30	57/57
AC – 2	(240/440V)	A	7.5/7.5	15/15	22/22	30/30	57/57
AC – 3	(240/440V)	A	5.5/5.5	11/11	15/15	22/22	36/36
AC – 4	(240/440V)	A	1.75/1.75	3.5/3.5	6.5/6.5	11/11	15/15
AC – 15	(240/440V)	A	2.5/2.5	5/4	8/5	14/6	28/12
Power rating							
AC – 23A (380V-440V) / (220V-240V)		kW	3/1.8	7.5/3.7	11/5.5	15/7.5	30/10
AC – 2	(380V-440V) / (220V-240V)	kW	3.7/2.5	7.5/3.7	11/5.5	15/7.5	30/18.5
AC – 3	(380V-440V) / (220V-240V)	kW	2.2/1.5	5.5/3	7.5/3.7	11/5.5	18.5/6
AC – 4	(380V-440V) / (220V-240V)	kW	0.55/0.37	1.5/1.5	3/2.2	5.5/3	7.5/2.4
Rated Impulse Withstand Voltage U_{imp}		kV	6	6	6	6	6
DC Switching Capacity							
Resistive loads	Voltage						
T = 1 ms	24	A	10	20	25	32	63
	48	A	6	12	20	25	40
	60	A	2.5	4.5	7.5	10	27
	110	A	0.7	1	1.5	2	-
Inductive loads	Voltage						
T = 50 ms	24	A	6	12	20	25	40
	48	A	1	2	3	3	20
	60	A	0.7	1	1.5	1.5	15
	110	A	0.3	0.4	0.5	0.5	3.5

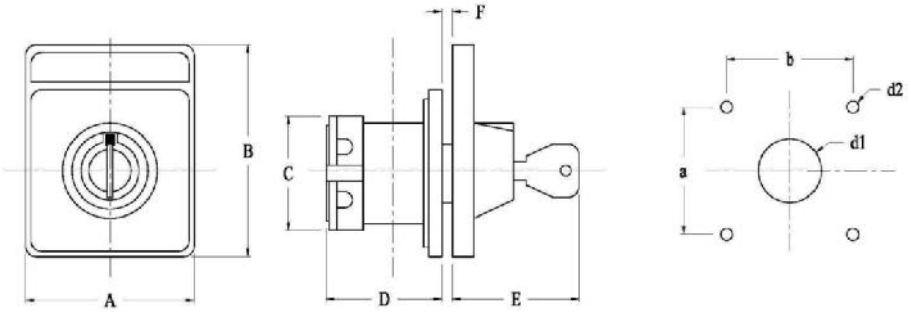
Remark : The power under AC-23A, AC-2, AC-3, AC-4 are in three phase/three pole and the divider represents the power under single phase/two pole.

Mechanical life without load : 10 x 10^4 times, operation frequency is 120 times/h.
Mechanical life with load : 3 x 10^4 times, operation frequency is 120 times/h.

Square escutcheon plate plus rectangle plate is added for M1 and M2, shall be used for Model NCS20 and NCS25.
For NCS32 and NCS63 should be M2, and M3 only



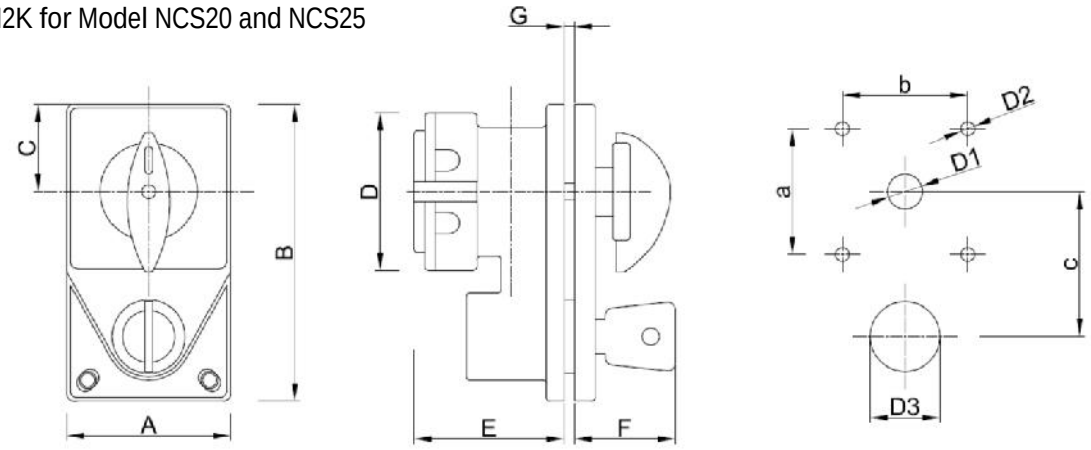
Model	Escutcheon plate	Dimension (mm.)				Installation (mm.)			
		A	B	C	L	a	b	d1	d2
NCS - 20	M1	48	48	43	22+9.6n	36	36	Ø8.5	Ø4.5
	M1 with rectangle plate	48	60	43	22+9.6n	36	36	Ø8.5	Ø4.5
	M2	64	64	43	25+9.6n	48	48	Ø10	Ø4.5
	M2 with rectangle plate	64	80	43	25+9.6n	48	48	Ø10	Ø4.5
NCS - 25	M1	48	48	45.2	23+12.8n	36	36	Ø8.5	Ø4.5
	M1 with rectangle plate	48	60	45.2	23+12.8n	36	36	Ø8.5	Ø4.5
	M2	64	64	45.2	26.5+12.8n	48	48	Ø10	Ø4.5
	M2 with rectangle plate	64	80	45.2	26.5+12.8n	48	48	Ø10	Ø4.5
NCS - 32	M2	64	64	58	26.5+12.8n	48	48	Ø10	Ø4.5
	M2 with rectangle plate	64	80	58	26.5+12.8n	48	48	Ø10	Ø4.5
NCS - 63	M2	64	64	66	26.5+12.8n	48	48	Ø10	Ø4.5
	M2 with rectangle plate	64	80	66	26.5+12.8n	48	48	Ø10	Ø4.5
	M3	88	88	66	31+21.5n	68	68	Ø13	Ø6.0



Model	Escutcheon plate	Dimension (mm.)						Installation (mm.)			
		A	B	C	D	E	F	a	b	d1	d2
NCS-20	M1	48	48	43	40+9.6n	40	1-4	36	36	Ø24	Ø4.5
	M2	64	64	43	35+9.6n	48	1-4	48	48	Ø24	Ø4.5
	M2 with rectangle plate	64	80	43	35+9.6n	48	1-4	48	48	Ø24	Ø4.5
NCS-25	M1	48	48	45.2	23+12.8n	40	1-4	36	36	Ø24	Ø4.5
	M2	64	64	45.2	34.4+12.8n	48	1-4	48	48	Ø24	Ø4.5
	M2 with rectangle plate	64	80	45.2	34.4+12.8n	48	1-4	48	48	Ø24	Ø4.5

Remark : n for number of layers

M2K for Model NCS20 and NCS25



Description	Escutcheon plate	Dimension (mm.)							Installation (mm.)					
		A	B	C	D	E	F	G	a	b	c	d1	d2	d3
NCS-20	M1K	48	85	25	45	34+9.6n	29	1-4	36	36	41.5	Ø10	Ø4	Ø20
NCS-25	M1K	48	85	25	47.2	34+12.8n	29	1-4	36	36	41.5	Ø10	Ø4	Ø20

Remark: n for number of layers

Description	Escutcheon plate	Dimension (mm.)							Installation (mm.)					
		A	B	C	D	E	F	G	a	b	c	d1	d2	d3
NCS-20	M2K	64	129	32	45	34+9.6n	29	1-4	36	36	41.5	Ø10	Ø4	Ø20
NCS-25	M2K	64	129	32	47.2	34+12.8n	29	1-4	36	36	41.5	Ø10	Ø4	Ø20

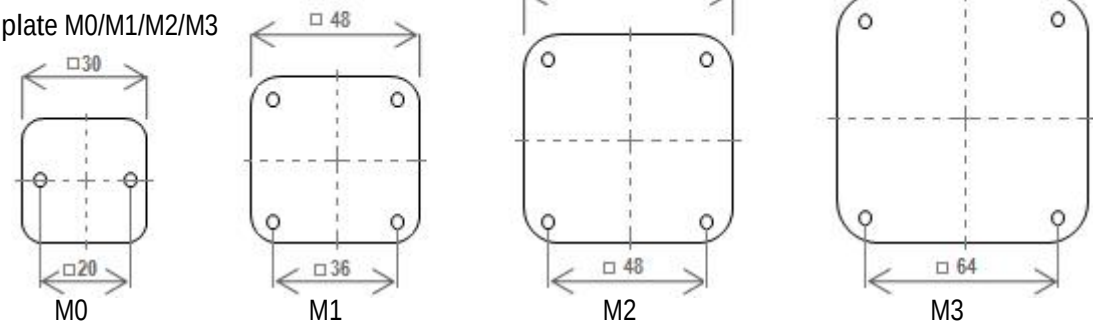
Remark : n for number of layers

Type of handle

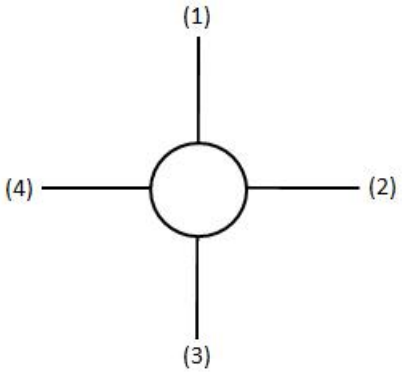
Type B	Type F	Type I	Type L
			
Type O	**Type P**	**Type R**	**Type S**
			

Remark : Handle type S, L and O for escutcheon plate size M2 only and Key handle is available for size M1, M2 and M1K, M2K
Handle type I is available for size MO, M1, M2 and M3
Handle type P is available for size M2 and M3

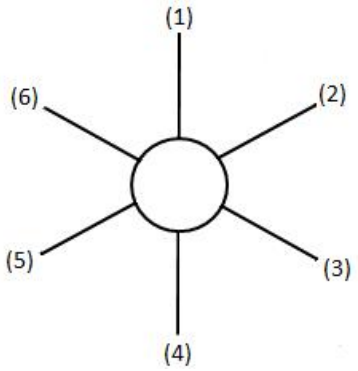
Escutcheon plate M0/M1/M2/M3



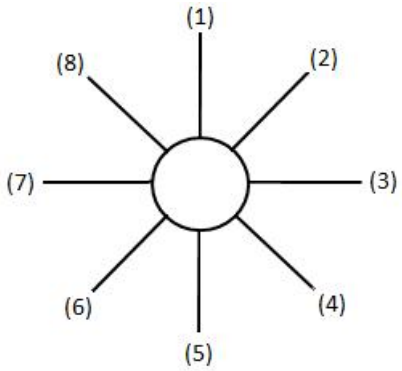
Operating Position Diagram of Limited Movement Type:



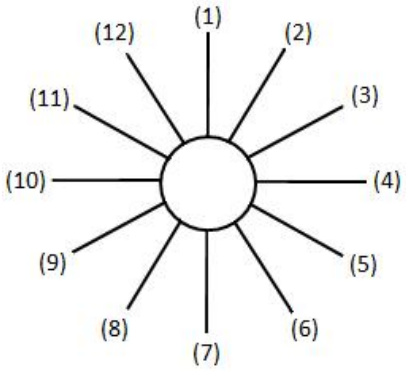
4 step



6 step

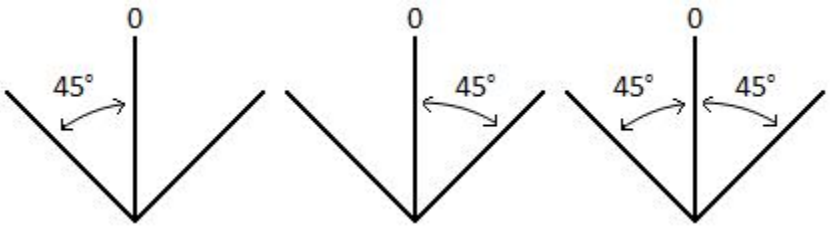


8 step



12 step

Operating Position Diagram of Spring Return Type:



L to R R to L L / R to C

Application

Ammeter selector switch

Size	M0 30x30mm
	M1 48x48mm / 48x64mm (with name plate)
	M2 64x64mm / 64x80mm (with name plate)
Rated current	10A / 20A / 25A / 32A / 63A
Voltage	Rated impulse withstand voltage : 6KV
	Rated insulation voltage : 690VAC
Wire size	2 x 0.5 - 2.5 mm / 14 AWG
Terminal Lug	Fork terminal

Voltmeter selector switch

Size	M0 30x30mm
	M1 48x48mm / 48x64mm (with name plate)
	M2 64x64mm / 64x80mm (with name plate)
Rated current	10A / 20A / 25A / 32A / 63A
Voltage	Rated impulse withstand voltage : 6KV
	Rated insulation voltage : 690VAC
Wire size	2 x 0.5 - 2.5 mm / 14 AWG
Terminal Lug	Fork terminal

Circuit breaker control switch

Pull and turn / Push and turn

Size	M2 64x64mm / 64x80mm (with name plate)
Rated current	20A / 25A / 32A
Voltage	Rated impulse withstand voltage : 6KV
	Rated insulation voltage : 690VAC
Wire size	2 x 0.5 - 2.5 mm / 14 AWG
Terminal Lug	Fork terminal

Circuit breaker control switch

Pull to lockout

Size	M2 64x64mm / 64x80mm (with name plate)
Rated current	20A / 25A / 32A
Voltage	Rated impulse withstand voltage : 6KV
	Rated insulation voltage : 690VAC
Wire size	2 x 0.5 - 2.5 mm / 14 AWG
Terminal Lug	Fork terminal

Changeover switch

Limited movement

Size	M0 30x30mm
	M1 48x48mm / 48x64mm (with name plate)
	M2 64x64mm / 64x80mm (with name plate)
	M3 88x88mm
Rated current	10A / 20A / 25A / 32A / 63A
Voltage	Rated impulse withstand voltage : 6KV
	Rated insulation voltage : 690VAC
Wire size	2 x 0.5 - 2.5 mm / 14 AWG
Terminal Lug	Fork terminal

Changeover switch M2

Type (O) handle for M2 only

Size	M2 64x64mm / 64x80mm (with name plate)
Rated current	20A / 25A / 32A / 63A
Voltage	Rated impulse withstand voltage : 6KV
	Rated insulation voltage : 690VAC
Wire size	2 x 0.5 - 2.5 mm / 14 AWG
Terminal Lug	Fork terminal

Changeover switch M2

Type (S) handle for M2 only

Size	M2 64x64mm / 64x80mm (with name plate)
Rated current	20A / 25A / 32A / 63A
Voltage	Rated impulse withstand voltage : 6KV
	Rated insulation voltage : 690VAC
Wire size	2 x 0.5 - 2.5 mm / 14 AWG
Terminal Lug	Fork terminal

Key changeover switch M1, M2

Lock and removable

Size	M1 48x48mm / 48x64mm (with name plate)
	M2 64x64mm / 64x80mm (with name plate)
Rated current	20A / 25A / 32A / 63A
Voltage	Rated impulse withstand voltage : 6KV
	Rated insulation voltage : 690VAC
Wire size	2 x 0.5 - 2.5 mm / 14 AWG
Terminal Lug	Fork terminal

Key changeover switch M2K

Lock and removable

Size	M2K 48x85mm
Rated current	20A / 25A / 32A
Voltage	Rated impulse withstand voltage : 6KV
	Rated insulation voltage : 690VAC
Wire size	2 x 0.5 - 2.5 mm / 14 AWG
Terminal Lug	Fork terminal

Padlock Changeover switch

Push and turn / Push for padlock

Size	M1 48x48mm / 48x64mm (with name plate)
Rated current	20A / 25A / 32A
Voltage	Rated impulse withstand voltage : 6KV
	Rated insulation voltage : 690VAC
Wire size	2 x 0.5 - 2.5 mm / 14 AWG
Terminal Lug	Fork terminal

Discrepancy control switch

Circuit breaker type

Size	Square 48x48mm
Rated current	20A / 25A / 32A
Voltage	Rated impulse withstand voltage : 6KV
	Rated insulation voltage : 690VAC
Wire size	2 x 0.5 - 2.5 mm / 14 AWG
Terminal Lug	Fork terminal

Discrepancy control switch

Disconnector switch type

Size	Round Ø 52 mm
Rated current	20A / 25A / 32A
Voltage	Rated impulse withstand voltage : 6KV
	Rated insulation voltage : 690VAC
Wire size	2 x 0.5 - 2.5 mm / 14 AWG
Terminal Lug	Fork terminal

CAM SWITCH (NCS)

Open close switch

Spring return / Limited movement

Size	M0 30x30mm
	M1 48x48mm / 48x64mm (with name plate)
	M2 64x64mm / 64x80mm (with name plate)
	M3 88x88mm
Rated current	10A / 20A / 25A / 32A / 63A
Voltage	Rated impulse withstand voltage : 6KV
	Rated insulation voltage : 690VAC
Wire size	2 x 0.5 - 2.5 mm / 14 AWG
Terminal Lug	Fork terminal

DISCREPANCY SWITCH (NDCS)

Description

NDCS discrepancy switches are used to control & monitor the circuit breaker and disconnecting switches. Also display their circuit state in mimic panels and illuminated mimic diagrams. When it lights up that means the position of the discrepancy switch does not match with the pre-assigned circuit breaker. The luminous source is from high brightness LED lamp with Yellow color.

Features

- ✓ Robust, durable, compact and luxurious design
- ✓ Provide both round and square installation flanges
- ✓ 2 point switching type (by pushing and turning to right or left side)
- ✓ High brightness LED chip technology with built in current limiting resistor and zener diode.
- ✓ Various input voltages (both AC & DC) for LED indicator
- ✓ Flash light could be supplied as an option

Specification

Conforming to standards IEC 60947-3 and IEC 60947-5-1

Description			NDCS – 20	NDCS – 25	NDCS – 32
Rated insulation voltage U_i		V	690	690	690
Rated thermal current I_{th}		A	20	25	32
Rated operational current I_e					
AC – 21A, AC – 22A		A	20	25	32
AC – 23A		A	15	22	30
AC – 2		A	15	22	30
AC – 3		A	11	15	22
AC – 4		A	3.5	6.5	11
AC – 15 (220V-240V)		A	5	8	14
Power rating					
AC – 23A (380V-440V) / (220V-240)		kW	7.5/3.7	11/5.5	15/7.5
AC – 2 (380V-440V) / (220V-240)		kW	7.5/3.7	11/5.5	15/7.5
AC – 3 (380V-440V) / (220V-240)		kW	5.5/3	7.5/3.7	11/5.5
AC – 4 (380V-440V) / (220V-240)		kW	1.5/1.5	3/2.2	5.5/3
Rated Impulse Withstand Voltage U_{imp}		kV	6	6	6
DC Switching Capacity					
Resistive loads	Voltage				
T = 1 ms	24	A	20	25	32
	48	A	12	20	25
	60	A	4.5	7.5	10
	110	A	1	1.5	2
	220	A	0.4	0.5	0.5
Inductive loads	Voltage				
T = 50 ms	24	A	12	20	25
	48	A	2	3	3
	60	A	1	1.5	1.5
	110	A	0.4	0.5	0.5
	220 (2 Contacts in series)	A	0.4	0.5	0.5

Remark : The power under AC-23A, AC-3, AC-4 are in three phase/three pole and the divider represents the power under single phase/two pole.

Mechanical life

Mechanical life without load : 60 x 10^4 times, operation frequency is 120 times/h.

Mechanical life with load : 20 x 10^4 times under AC-15. 6 x 10^4 times under DC-13, operation frequency is 300 times/h

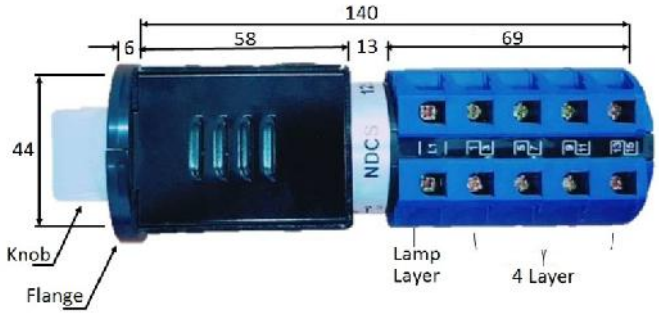
DISCREPANCY SWITCH (NDCS)

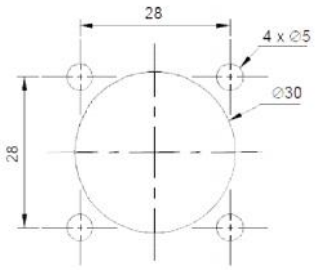
NDCS-20 / NDCS-25

Rated insulation voltage	690V
AC rated frequency	50/60 Hz
Rated thermal current	20A / 25A / 32A
DC Switching capacity 1 contact (T = 1 ms ,T = 50 ms) @110VDC	(1.0A / 0.4A) / (1.5A / 0.5A) / (2A / 0.5A)
Input voltages for LED lamp	24, 48, 110, 125 and 220 V AC/DC (±10%)
Mechanical durability	100,000 operations up
Electrical durability	500,000 operations up
Ambient temperature	-5°C to + 55°C
Storage temperature	-20°C to +70°C
Switching operations	2 point switching (by pushing and turning to right or left side)
Conductor size	0.5 – 4 mm².

Dimension

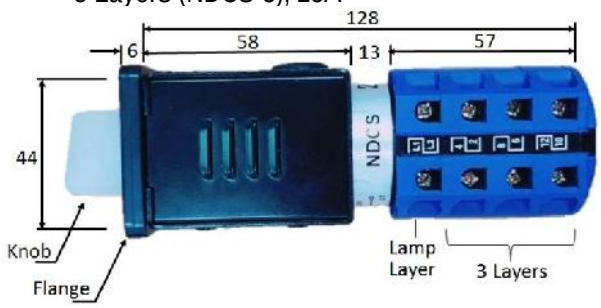
4 Layers (NDCS-4), 25A

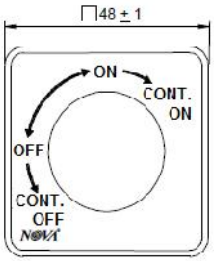




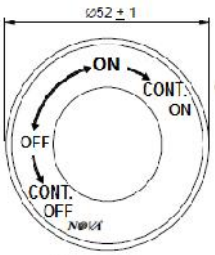
Mounting holes

3 Layers (NDCS-3), 25A



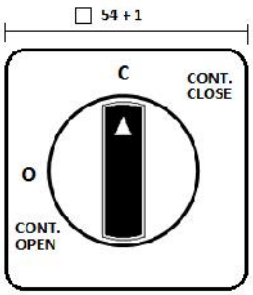


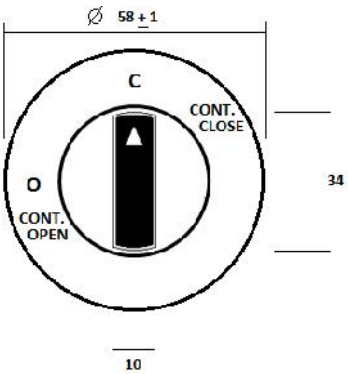
Square flange
Code "S"

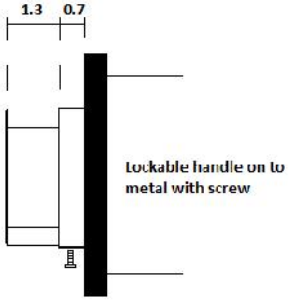


Round flange
Code "R"

Lockable handle/ bigger knob

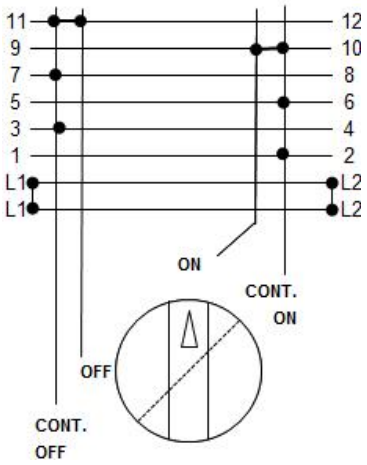




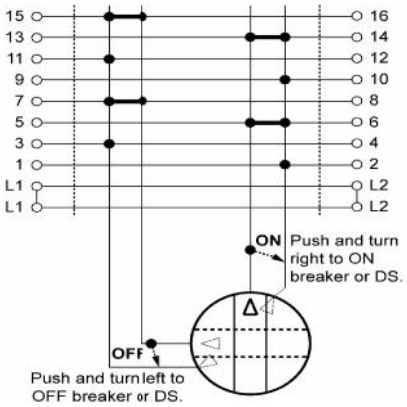


Wiring Diagram

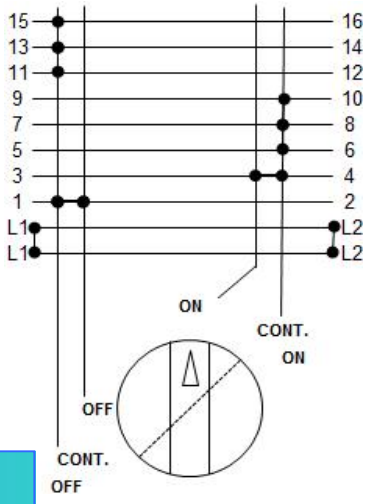
NDCS-3 Layer



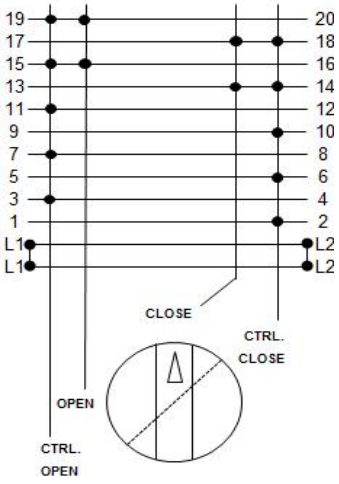
NDCS-4 Layer Type A



NDCS-4 Layer Type B



NDCS-5 Layer



Product Coding

NDCS 20– 4 – 24 – S F

Basic type

Rating

20	20A
25	25A
32	32A

Flash light (option)

N/A	Normal LED
F	Flash light LED

Number of layer

3	3 Layer*
4	4 Layer*
5	5 Layer*

*One more layer for LED lamp will be added.

Remark : Other number of layers can be made upon request.

Input voltage for LED lamp

24	24V AC/DC
48	48V AC/DC
11	110V AC/DC
13	125V AC/DC
22	120V AC/DC

Shape of flange

S	Square
R	Round

THERMOSTAT (NTH)

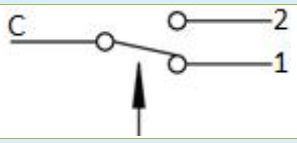
Description

Capillary thermostats are designed for accurate and reliable temperature control for domestic appliances and industrial equipments. NOVA thermostat (NTH type) is an economic and reliable instrument, widely used in relay & control panel, switchgear cubicle, main distribution board, control boxes, laboratory instrument and others. When it is in use, usually it should be combined with other products such as an electric fan or space heater.

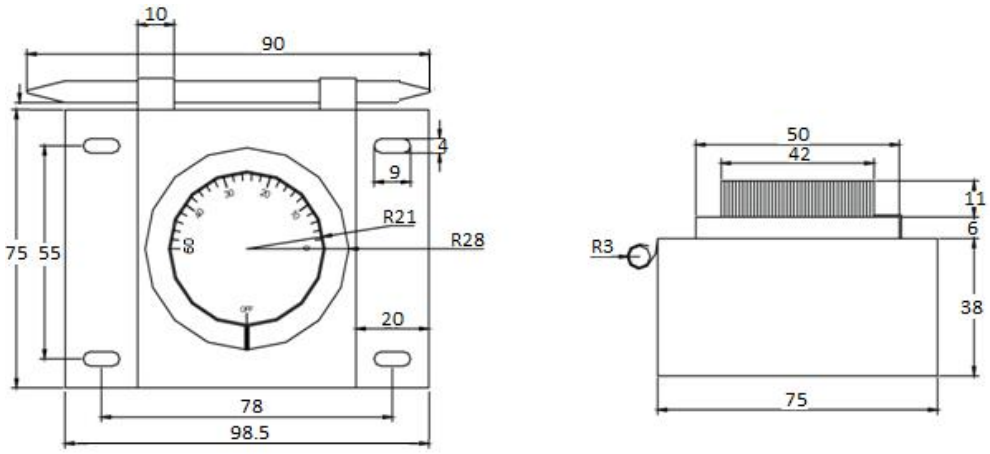
The assembly of the thermostats consisted by a capillary tube, sensing bulb and diaphragm (phial) filled with liquid (which sensitive to the ambient temperature) and fixed in the polycarbonate housing and switch base. A black polycarbonate knob with white scale marking is provided to set the desired temperature. The complete set of NOVA thermostat (NTH type) is rugged and modern design. The box of the thermostat is made of zinc-coated steel, painted with epoxy resin black color.

This instrument keeps constant within the differential temperature. It is intended to use for preventing of moisture content which may be occurred in the switchboard, control panel, switchgear cubicle, small control boxes etc. The setting ranges are started from 0˚C to 60˚C (error: +2 ~ 5˚C) with one change over contact (braking capacity: 16A at 220Vac ±10%) for controlling or command purpose.

Specification

Temperature range	0 - 60°C
Differential	2 - 5°C
Contact resistance	<50mΩ
Dielectric strength	AC 2,000V/1min
Insulation resistance	≥100MΩ
Life cycle	>100,000 cycles
Max. switching capacity	16A/220Vac ±10% 3A (24-125Vdc), 380W
Head protection class	IP40
S.P.D.T (change over contact)	
S.P.S.T (normally open contact)	

Dimension



Product coding

NTH – 1C – S

Basic type

Contact type

1C	1CO
1N	1NO

Mounting type

S	Surface mounted
D	Din-rail mounted

ELECTRONIC THERMOSTAT (NTH02)

Description

Electronic thermostats are designed for accurate and reliable temperature control for domestic appliances and industrial equipments. NOVA Electronic thermostat (NTH02) is an economic and reliable instrument, widely used in relay & control panel, switchgear cubicle, main distribution board, control boxes, laboratory instruments and others. When it is in use, usually it should be combined with other products such as an electric fan or space heater.

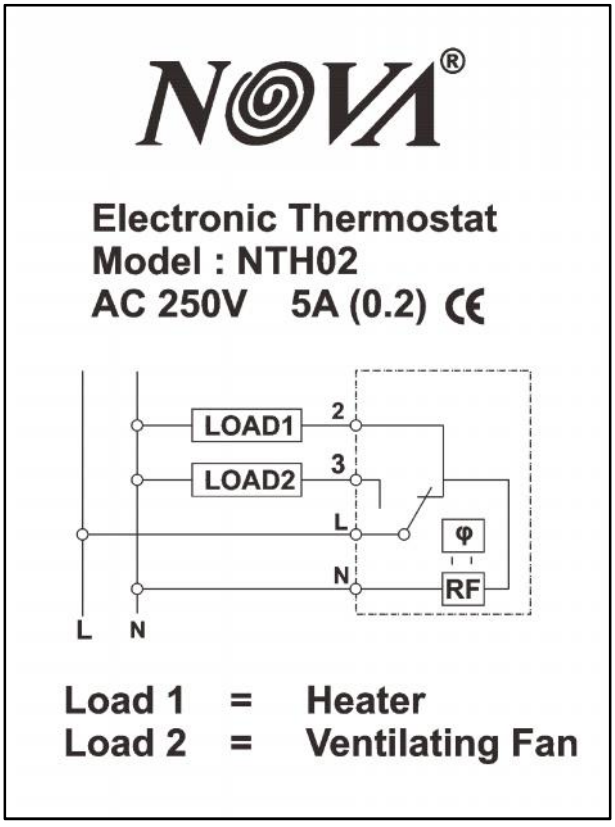
The complete set of NOVA electronic thermostat (NTH02) is rugged and modern design. The thermostat is made of polycarbonate housing with a black polycarbonate knob, also marking scale is provided to set the desired temperature.

This instrument keeps constant within the differential temperature. It is intended to use for preventing of moisture content which may be occurred in the switchboard, control panel, switchgear cubicle, small control boxes etc. The setting ranges are started from -20˚C to 60˚C (error: +2 ~ 5˚C) with one change over contact (breaking capacity : 16A at 220Vac ±10%) for controlling or command purpose.

Specification

Temperature range adj.	-20 to + 60°C
Differential	2 - 5°C
Contact resistance	<50mΩ
Dielectric strength	AC 2,000V/1min
Insulation resistance	≥100MΩ
Life cycle	>100,000 cycles
Max. switching capacity	16A/220Vac ±10% 3A (24-125Vdc), 380W
Mounting	Clip for 35mm. DIN rail, EN50022
Casing	Plastic according to UL94 V-O, light grey
Degree of protection	IP20
Dimension	67 x 50 x 38 mm.
Weight	Approx. 60 g.

Wiring Diagram



HYGROSTAT (NMH)

Description

The electromechanical hygrostat NMH is designed to control enclosure humidity so that the dew point is raised when the critical relative humidity of 65% is exceeded. In this way condensation and corrosion is effectively prevented. Application is for cabinets of electrical distribution, control panel, switchgear and control gear, cabinets of industrial automation.

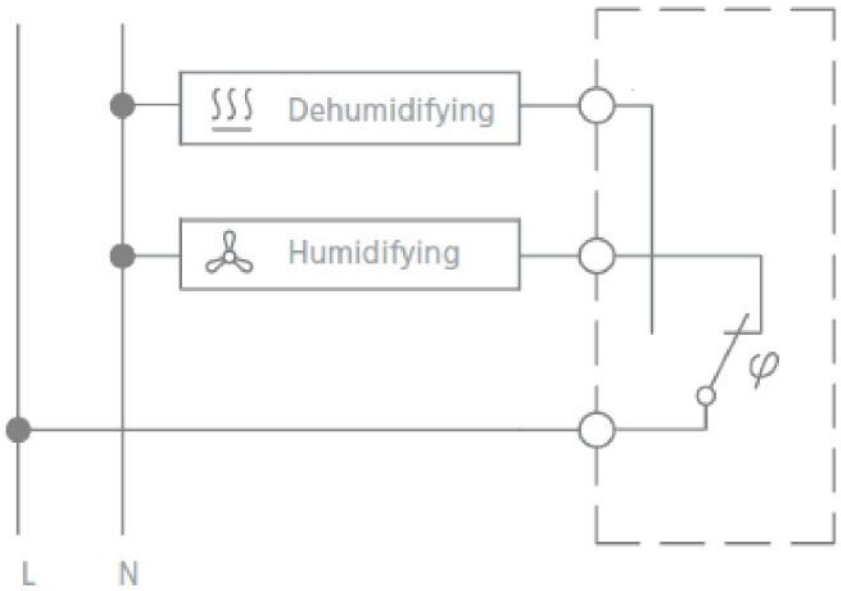
Features

- ✓ Adjustable relative humidity
- ✓ Change-over contact high switching capacity
- ✓ Easily accessible terminals
- ✓ Clip fixing for 35mm. Din rail
- ✓ Protection class IP20

Specification

Type model	NMH
Switch difference	4% RH (±3% tolerance)
RH range	35% - 95%
Contact type	change – over contact
Contact resistance	<10mΩ
Service life	>100,000 cycles
Max. switching capacity	250VAC, 5A DC 20W (24 – 75VDC)
Connection	3-pole terminal for 2.5mm^2 clamping torque 0.5Nm max.: rigid wire 2.5mm^2 Stranded wire (with wire end ferrule) 1.5mm^2
Mounting	Clip for 35mm DIN rail, EN50022
Casing	Plastic according to UL94 V-O, light grey
Dimension	67 x 50 x 38 mm.
Weight	Approx. 60 g.
Operating /Storage temperature	0 to 60°C (+32 to 140°F)/-20 to +80°C (-4 to +176°F)
Protection class	IP20

Wiring Diagram



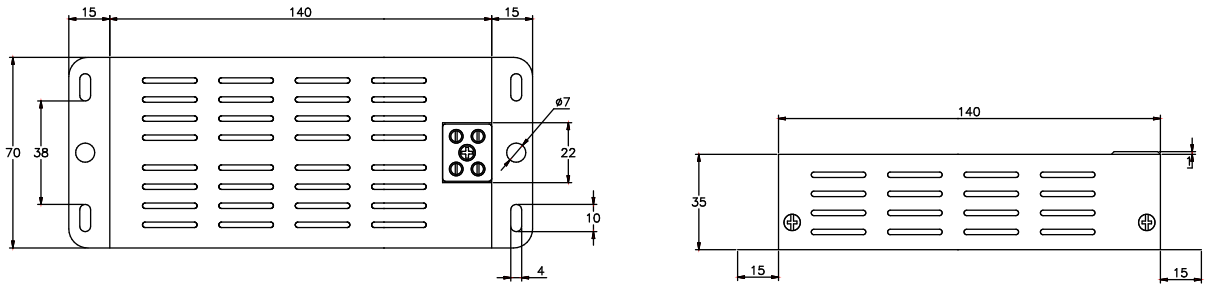
Description

NOVA space heater is an economical and reliable source of heat, widely used in the control panel, switchgear cubicle, main distribution board, control boxes etc. When it is in use, normally it should be combined with other products such as electric fan, thermostat or hygrostat.

Heat element is a mica strip heater and the flat resistance ribbon generates heat over a broad area. Installation of the space heater should be at the bottom part of the cubicle or the lowest part of the control panel to get the best result of the heater.

The complete set of NOVA space heater is rugged and modern design to fulfill the function of heating. The body of the heater is made of zinc-coated steel and painted with epoxy black color.

Dimension



Note: Tolerance = +/- 2 mm.

Product Coding

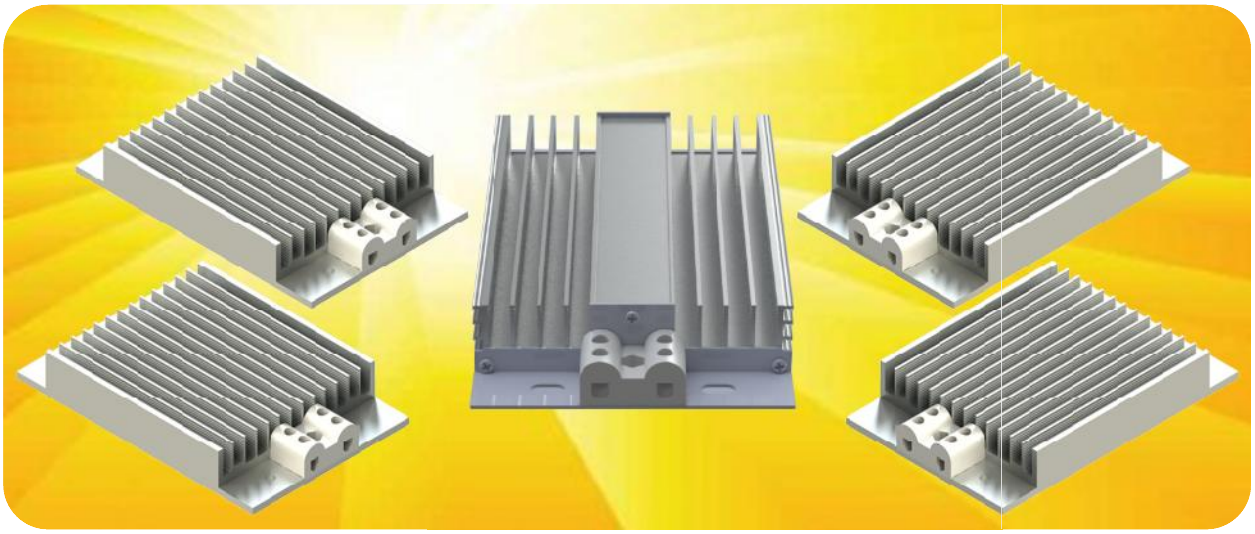
NSH01 – 050

Basic type

Power consumption

050	50W 220Vac ±10%
060	60W 220Vac ±10%
100	100W 220Vac ±10%

*other rated can be supplied on request.



Description

NOVA Space heater is an economical and reliable source of heat, widely used in the control panel, switchgear cubicle, main distribution board, control boxes and etc. When it is in use, normally it should be combined with other products such as electric fan, thermostat or hygrostat. Heat element is a mica strip heater and the flat resistance ribbon generates heat over a broad area. To get the best result of the heater, the space heater shall be install at the bottom side of the cubicle or the lowest part of the control panel.

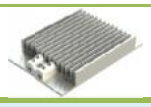
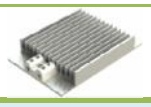
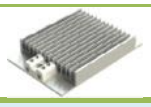
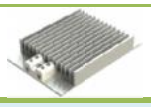
The NSH02 series space heater is rugged and modern design to fulfill the function of heating. The body of the heater is made of aluminum which forming in heat sink style for better heat dissipation.

Features

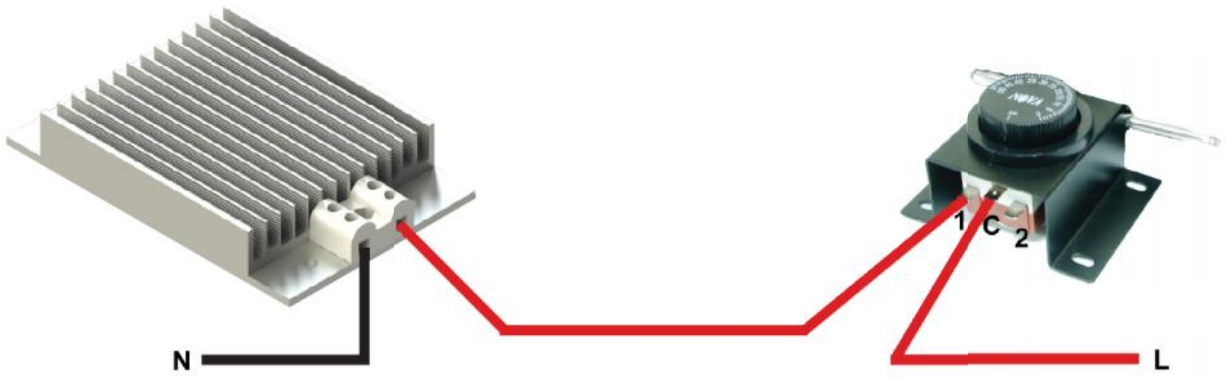
- ✓ Flexible thin, lightweight heater enable wide range of application and contributes to size and weight saving.
- ✓ Construction provides temperature capability between 100°C to 300°C
- ✓ Good transfer temperature.
- ✓ Corrosion resistance
- ✓ Supply voltage range 195 Vac – 245 Vac
- ✓ Insulation resistance >500MΩ
- ✓ Resistance tolerance ±10%
- ✓ Dielectric strength 2,000 Vac
- ✓ Life span >5,000 hrs

SPACE HEATER (NSH02)

Specification

					
Model	NSH02 - 050	NSH02 - 060	NSH02 - 100	NSH02 - 150	NSH02 - 500
Power (W)	50	60	100	150	500
Resistance (Ω)	968	806	484	322	97
Working temp. (Max.15 min)	90°C	100°C	145°C	180°C	300°C
Dimension (L x W x H) ; mm.	155 x 100 x 23.5	155 x 100 x 23.5	155 x 100 x 23.5	155 x 100 x 23.5	200 x 105 x 26.5

Application



Wiring sample

Product Coding

NSH02 – 050

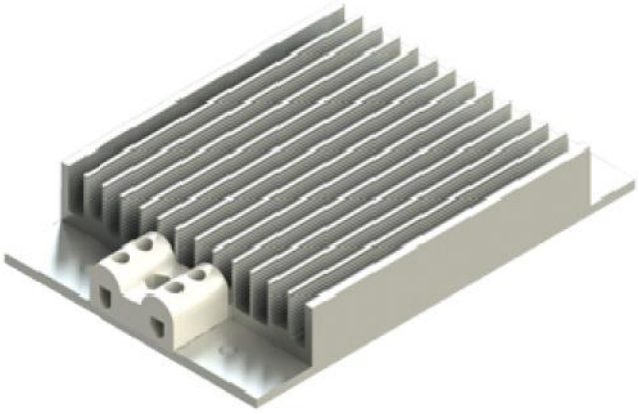
Basic type

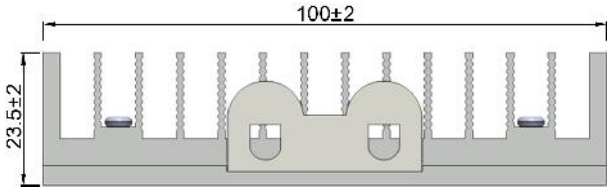
Power consumption

050	50W 220Vac ±10%
060	60W 220Vac ±10%
100	100W 220Vac ±10%
150	150W 220Vac ±10%
500	500W 220Vac ±10%

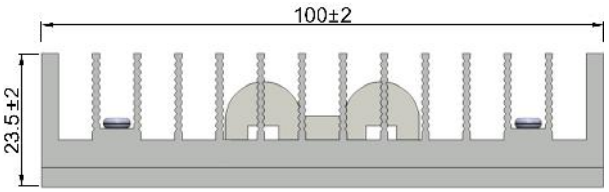
Dimension

- Model (A) (50W – 150W)

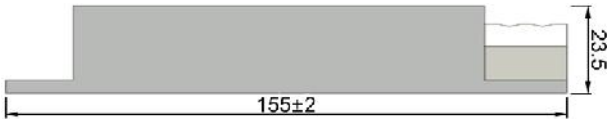




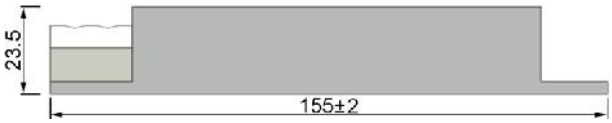
Front view



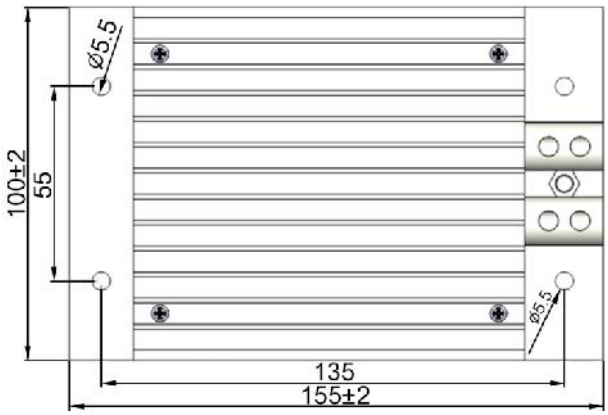
Rear view



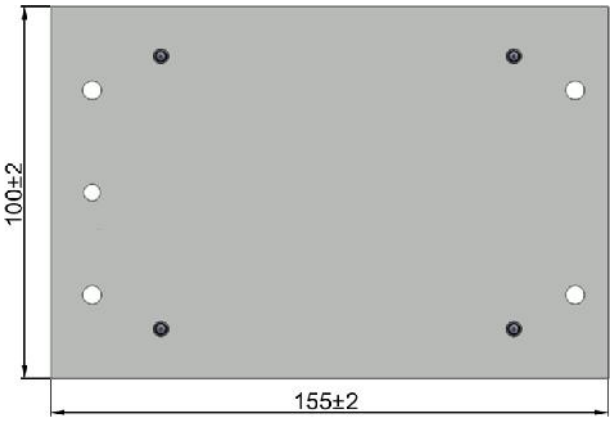
Left view



Right view



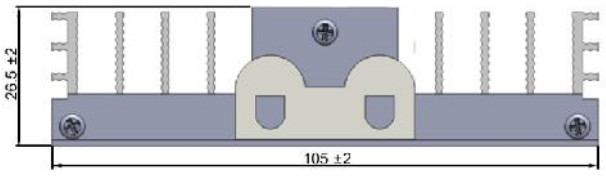
Top view



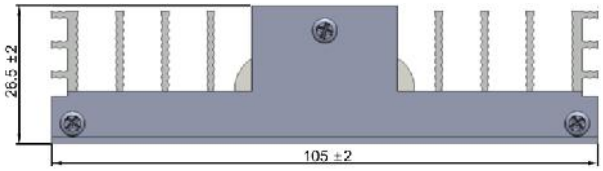
Bottom view

Dimension

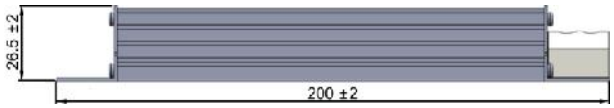
- Model (B) (500W)



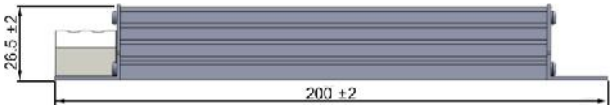
Front view



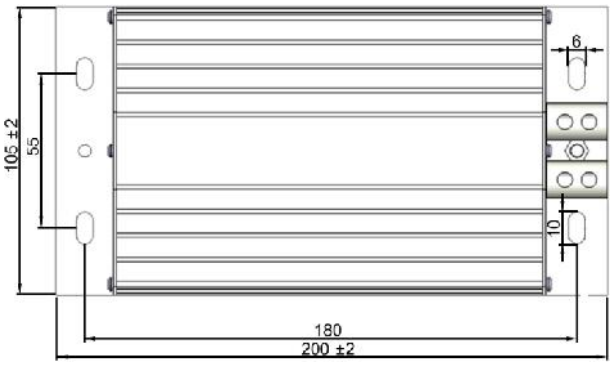
Rear view



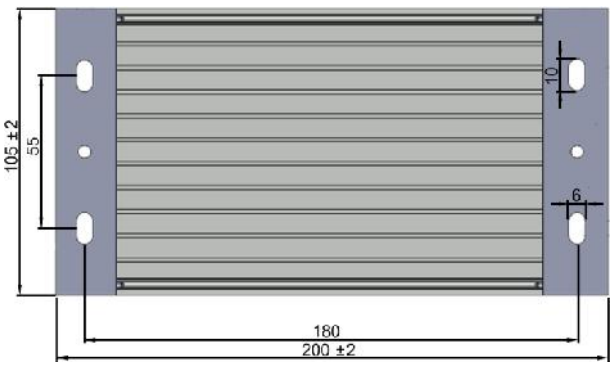
Left view



Right view



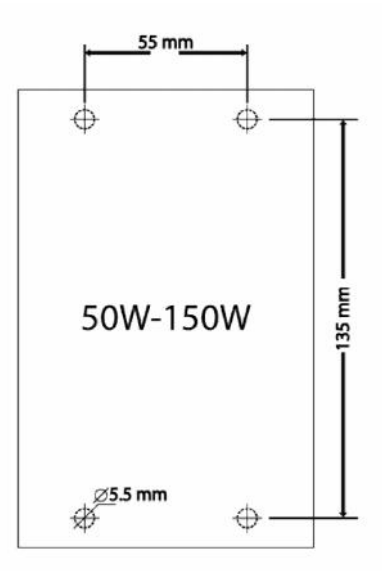
Top view

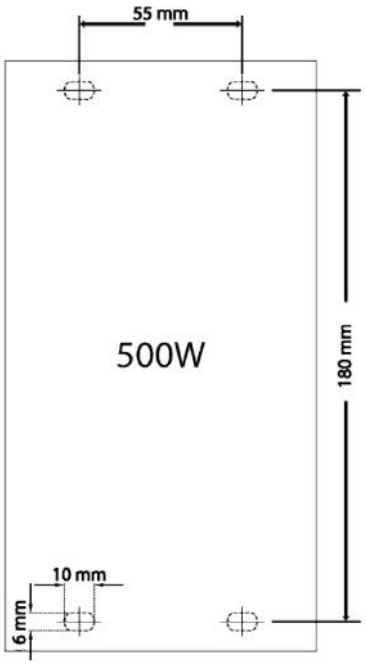


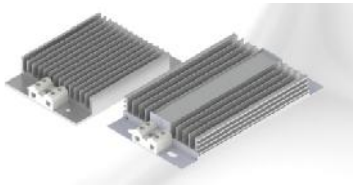
Bottom view

Cutout

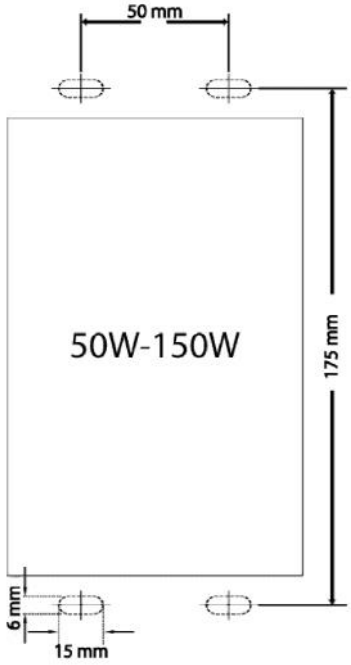
Without stand

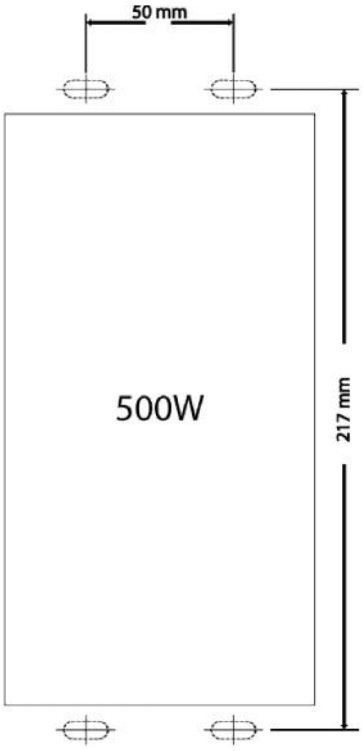


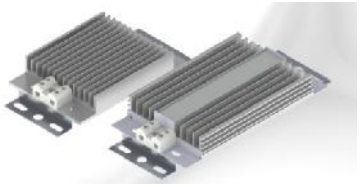




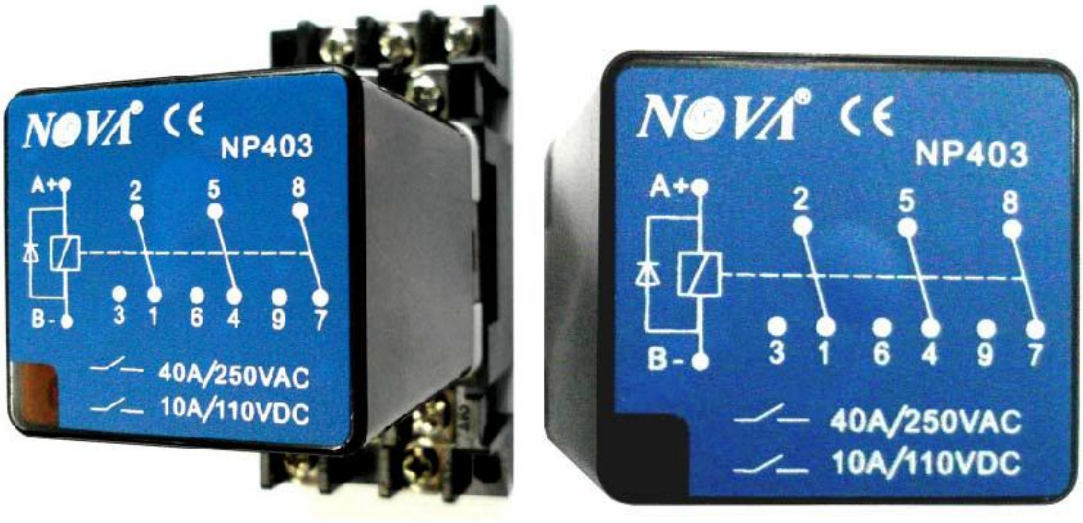
With stand







INDUSTRIAL POWER RELAY (NP403)



Description

Industrial power relay of NOVA NP403 series enable the high switching capacity up to 40A, high contact force, minimum bouncing time, low power consumption with various choices of selectable coil voltage. Also their high degree of protection (IP50) ensures the reliable operation in tropical and/or salty ambient air condition.

These NP403 relays are an alternative choice which can be widely implemented to the power control circuit in industrial sector, electrical equipments, power stations, substations, railway and industrial plants etc.

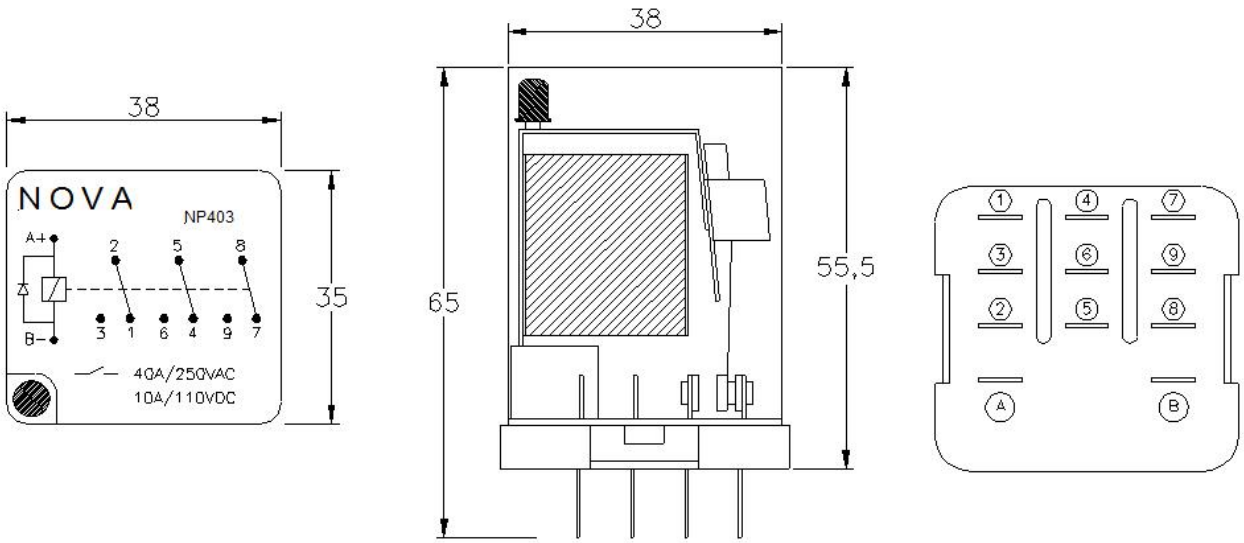
Features

- ✓ Compact size and light weight
- ✓ Plug-in relay module
- ✓ 3 change-over contacts
- ✓ High contact load (40A at 250VAC or 10A at 110VDC)
- ✓ LED status indicator
- ✓ AC or DC coil
- ✓ DC type with back EMF diode protection
- ✓ Silver alloy contact material
- ✓ According to IEC 255, IEC 67-1, VDE 0435 part 201

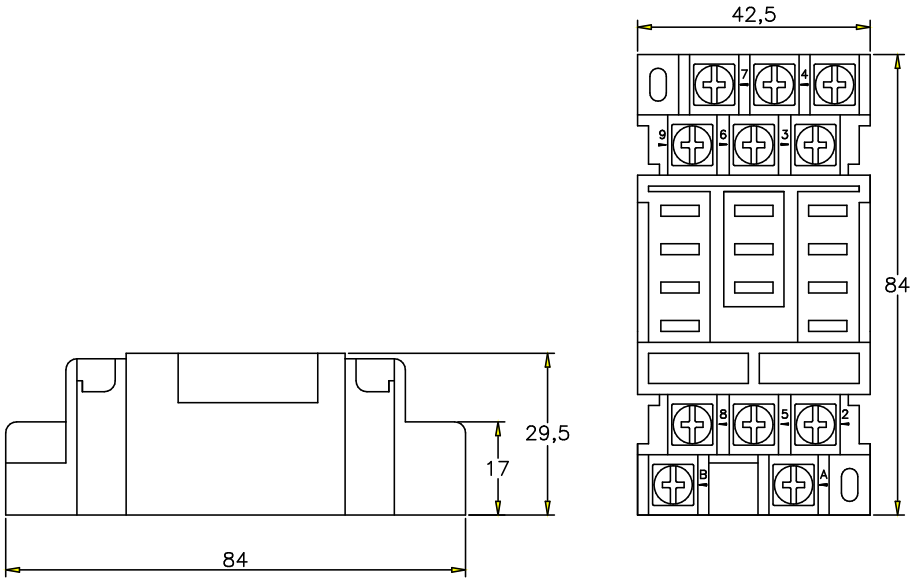
Specification

Type of model NP403	
Coil nominal voltage	12 to 220V AC/DC
Coil nominal power	AC 4.0VA DC 2.6W
Contact capacity	AC 40A at 250V DC 10A at 110V
Contact resistance	Max 50mΩ
Max. switching power	10,000VA / 1,120W
Insulation resistance	> 1,000MΩ at 500VDC
Dielectric strength between open contacts	2,000VAC, 1 min.
Dielectric strength between coil & contacts	1,500VAC, 1 min.
Electrical service life	10^5 times
Mechanical service life	10^7 times
Pick-up time	20 ms max. for basic type 9 ms max. for rapid type
Drop-out time	15 ms max. for basic type 9 ms max. for rapid type
Operating temperature	-40 to +60°C
Ambient humidity	35 ~ 80% RH
Dimension	40W x 37L x 67H mm.
Weight	125 g.
Socket type	11 pins

Dimension



Socket Dimension



Product Coding

NP 40 3 – D 110

NP	Basic type
NPR	Rapid type

Contact rating 40A

3 Output contacts

Rated voltage

012	12V
024	24V
048	48V
110	110V
125	125V
220	220V

Coil voltage type

D	DC
A	AC 50/60Hz

TIMER RELAY (H3CR)

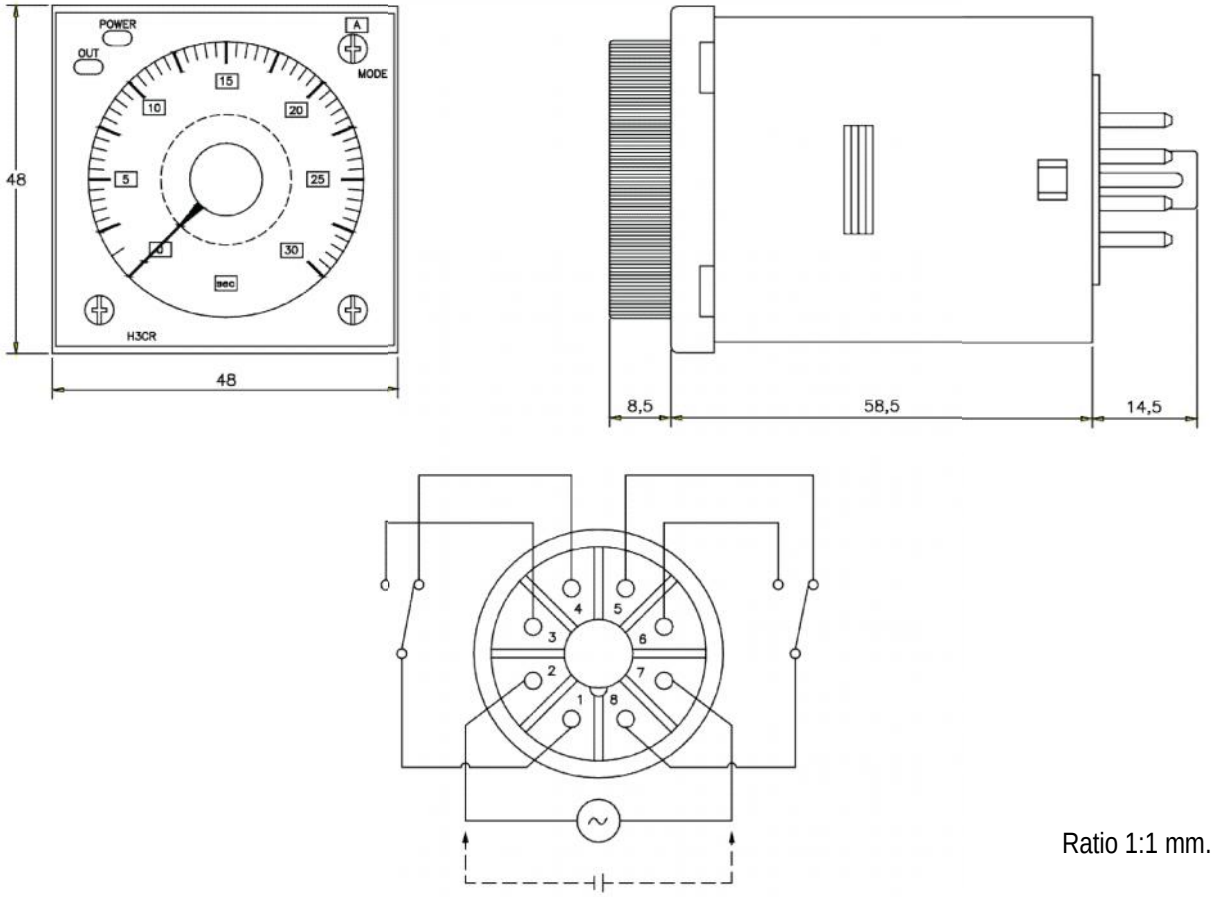
Features

- ✓ Field-selectable time ranges from 0.05 second to 300 hours.
- ✓ Use for delay timing, ON-delay and OFF-delay.
- ✓ Wide input voltage ranges model from 24 to 240Vac/dc, fit most applications and reduce spare part inventories.
- ✓ Timing functions : signal ON-delay (A), ON-OFF interval (B2), OFF-delay (E), Pulse Trigger (J)
- ✓ Timer LED indicators : POWER ON (green) flickers during operation, OUT (red) on when normally open contact is closed.
- ✓ Short (80mm.) panel mounting depth with socket allows for more space-efficient control panel design.

Specification

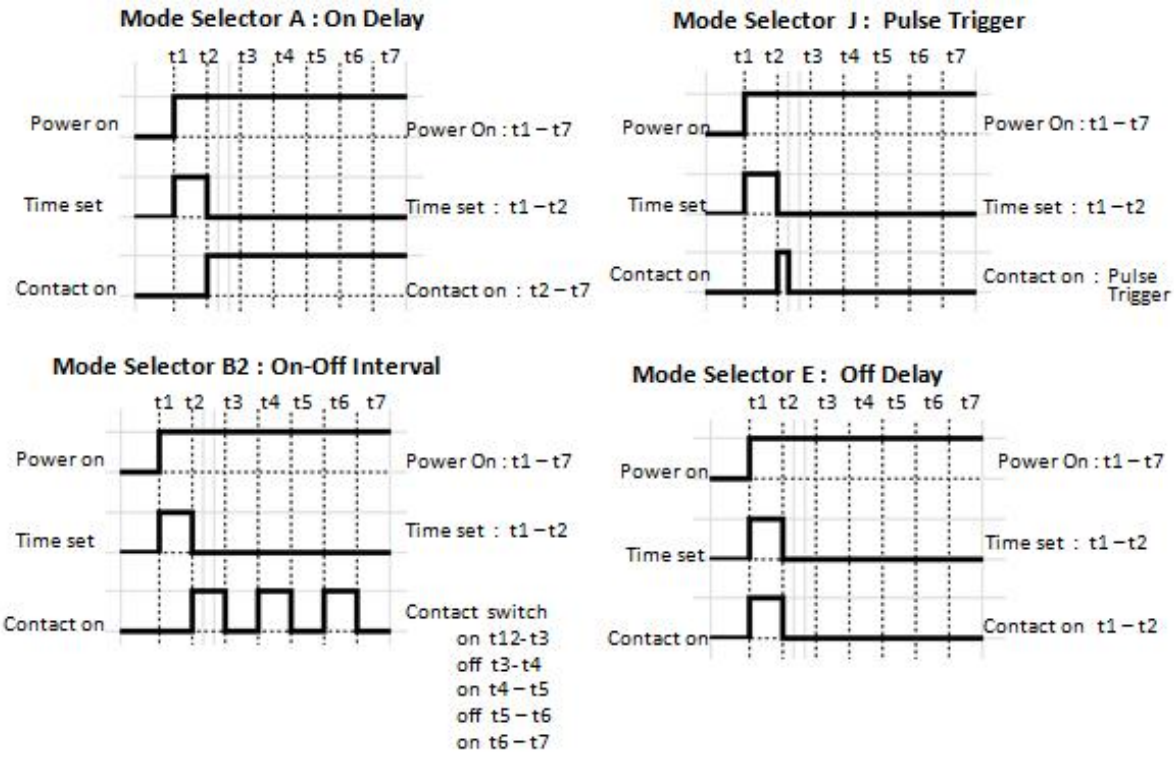
Type model	H3CR
Supply voltage (Un)	24~240V AC/DC
Operating voltage	±10%
Time setting range	0.2 Sec. to 300 hrs.
Control output	DPDT relay type
Contact rating	5a @ 250Vac
Repeat accuracy	Max ±0.5%
Dielectric strength	1,500Vac for 1 minute
Operating temperature	-25˚C to +70˚C
Protection type	IP40

Dimension



Ratio 1:1 mm.

Time - chart



TIMER SWITCH (NTS)

Features

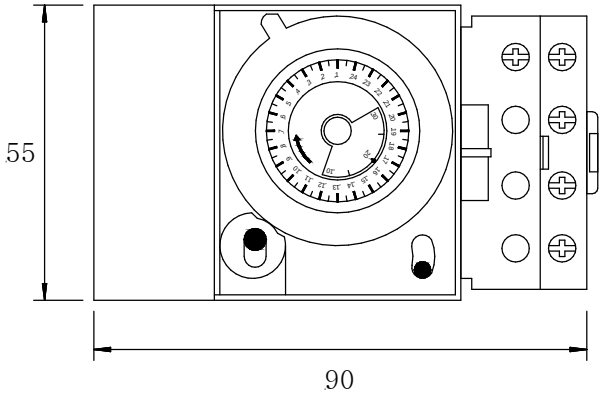
- ✓ Time switch with power reserve
- ✓ Nominal rated voltage at 230V ±10%
- ✓ 24 hour dial with 30 min. segment
- ✓ Manual over ride ON/OFF switching
- ✓ Permanent ON/OFF switching
- ✓ Snap on fixing for 35mm. din rail (EN50022)

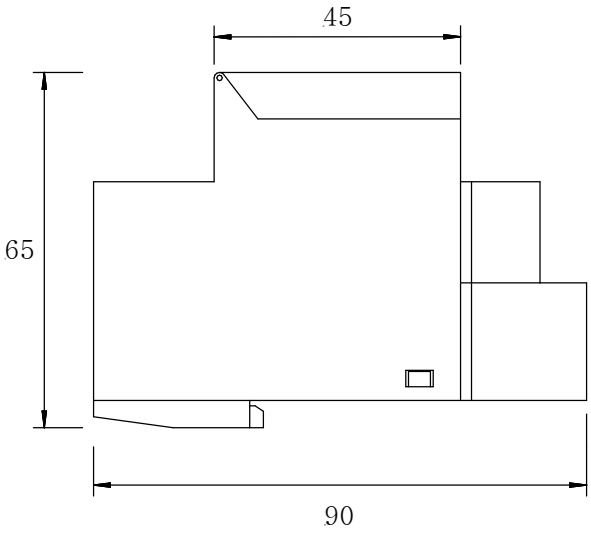
Specification

Type model	NTS – 24HR
Program dial	24 hrs
Program interval	30 min.
Set up time	48 times
Supply failure reserve	150 hrs
Operating voltage	220 ~ 250Vac (45 ~ 60Hz)
Contact capacity	16A/250Vac
Power consumption	1.5W
Dimension	110W x 66.5H x 52.5D (mm.)

Output contact	1 Changeover
Motor load (cosθ = 0.7)	220V, 1500W
Electric – filament lamp load	12a
Contact resistance	≤50mΩ
Insulation resistance	≥100MΩ
Electric life time	10^7 times
Mechanical life time	10^5 times
Operating temperature	-10 ~ +55°C
Weight	190 g.

Dimension





Ratio 1:1 mm.

Description

The NOVA led service lamp (ultra - brightness led) is use for lighting the control cubicle and all kinds of switchgear cubicles. Long span of input supply voltage for both AC and DC supply. Resistant to high temperatures, high efficiency of power saving and environmental friendly. Suitable for ceiling and wall installation.

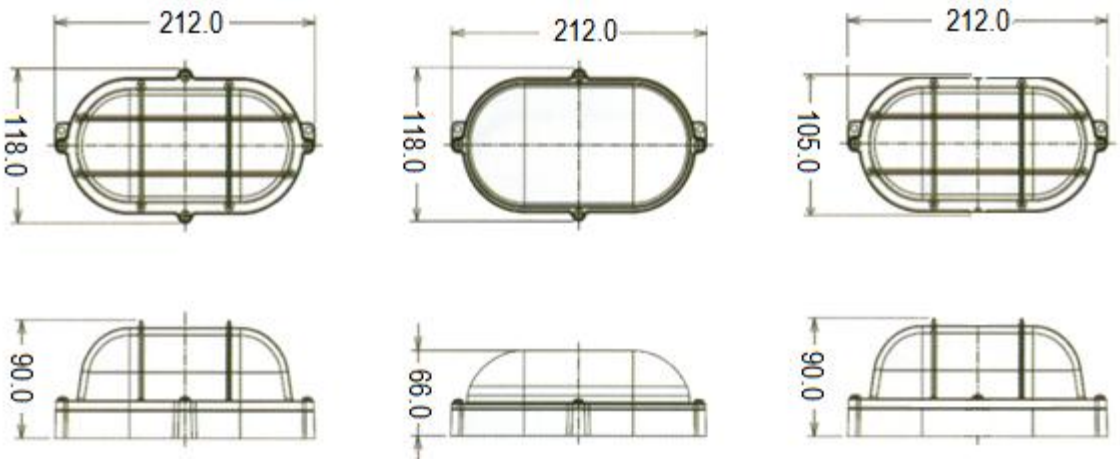
Features

- ✓ LED chip Epistar SMD2835
- ✓ Hi - Bright luminous efficacy 85 lm/Watt
- ✓ Correlated color temperature 6,000k (Day Light)
- ✓ Color rendering >75RA
- ✓ Supply voltage input 85 ~ 265VAC (50/60Hz) or 120 ~ 365VDC
- ✓ Power consumption 7 watt
- ✓ Luminous flux 600 lumen
- ✓ Power factor >0.5
- ✓ Beam angle 120°
- ✓ Protection degree IP65
- ✓ No UV / IR and no mercury & lead
- ✓ Replace compact fluorescent 10 watt or incandescent 40 watt
- ✓ Life span 25,000 hrs

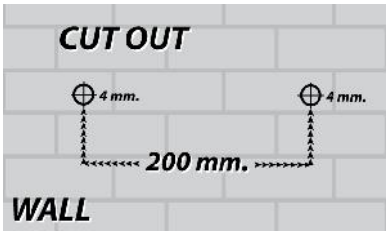
Specification

Model	NSL - LO (PGC)	NSL - LO (PCC)	NSL - OL (PGC)	
Voltage (Vac)	85V ~ 265V (50/60Hz)			
Power (Watt)	7W	7W	11W (CFL)	40W (Incandescent)
Luminous Flux (lm)	600lm	600lm	570lm	420lm
Replacement	Compact fluorescent 10 watt or incandescent 40 watt		N/A	
Cover	Protection glass cover	Polycarbonate cover	Protection glass cover	
Dimension (L x W x H)	212 mm x 118 mm x 90 mm	212 mm x 118 mm x 66 mm	212mm x105 mm x90 mm	
Weight	645 g.	280 g.	510 g.	

Dimension



NSL - LO (PGC) NSL - LO (PCC) NSL - OL (PGC)



Product Coding

NSL - LO - PGC

Basic type

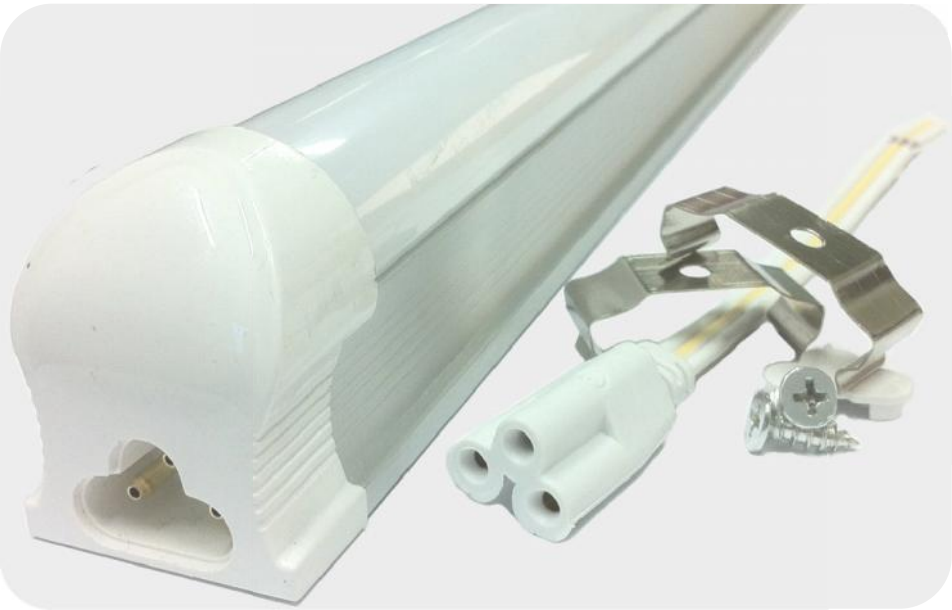
Lamp type

OL	Oval Lamp
LO	LED Oval lamp

Material

PGC	Protection glass cover
PCC	Polycarbonate cover

INTEGRATED LED TUBE (NIT8)



Description

The NOVA integrated tube T8 (NIT8 series) (ultra - brightness led) is use for lighting the control cubicle and all kinds of switchgear cubicles, long span of input supply voltage for both AC and DC supply. Resistant to high temperatures, high efficiency of power saving and environmental friendly. Suitable for ceiling, wall installation and general walkway.

Features

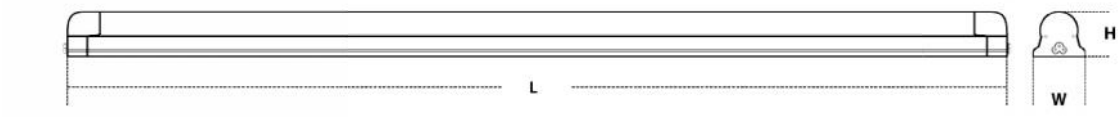
- ✓ LED chip Epistar SMD2835
- ✓ Hi-Bright luminous efficacy 80 lm/Watt
- ✓ Correlated color temperature 6,500k (Day Light)
- ✓ Color rendering >75RA
- ✓ Supply voltage input 130 ~ 265VAC (50/60Hz) or 185 ~ 365VDC
- ✓ Power factor >0.5
- ✓ Beam angle 125°
- ✓ Protection degree IP33
- ✓ No UV / IR and no mercury & lead
- ✓ Replace compact fluorescent 9 ~ 36 watt or incandescent 40 ~ 150 watt
- ✓ Life span 25,000 hrs

Specification

Model	NIT8 - 30	NIT8 - 60	NIT8 - 120
Voltage (Vac)	130V ~ 265V (50/60Hz)		
Power (Watt)	5W	9W	18W
Luminous Flux (lm)	400lm	720lm	1440lm
Replacement	Compact fluorescent 9 ~ 36 watt or incandescent 40 ~ 150 watt		
Housing	Aluminum + PC		
Cover	Polycarbonate Frosted		
Dimension (L x W x H)	317 x 31 x 38 mm.	592 x 31 x 38 mm.	1202 x 31 x 38 mm.
Weight	66 g.	107 g.	184 g.

Dimension

External



Internal

Product Coding

NIT8 – 30

Basic type

Rate size / power

30	30 cm / 5 watt
60	60 cm / 9 watt
120	120 cm / 18 watt

Description

Specifications are in accordance with UL94V-O (flame retardancy), DIN 43700 (dimensions), DIN 43802 and DIN 43701 (pointer and scale), VDE 410, IEC 51, UL 94 and EN 60051.

Accuracy :
Most instruments are calibrated to a class index (CI) of 1.5 as standard although certain instruments can be calibrated to a CI of 1.0 on request. A CI of 1.5 signifies an error of up to ±1.5% of full scale.

Magnetic field :
All the devices keep their accuracy under the influence of an external magnetic field with a value ≤0.5mT.

Voltage influence :
Maximum additional error is not more than ±1.5% indication for ±1.5% voltage variation.

Frequency influence :
For variations from nominal of ±10% the maximum addition error is ±0.5% of indication.

Power factor influence :
For variations between unity and 1.5 lag and lead at any power factor up to half scale, the maximum additional error is ±0.5% of full scale deflection. Between unity and zero p.f. lag or lead the maximum additional error is ±1.0% of full scale deflection.

Temperature influence :
Maximum additional error is ±0.05% per °C.

Operating temperature range :
-25°C to +55°C (unless otherwise specified)

Relative humidity :
Standard 90% RH for 4 days. The accuracy class is stable within an interval from 25 to 95% non-condensed relative humidity.

Dielectric level :
2kV (RMS) for one minute between movement and case and between terminals which are electrically isolated.

Ingress protection :
IP52 (case) in accordance with IEC529

Permanent overloads :
Voltage circuits : 1.2Un
Current circuit : 1.2In (1.5In for moving iron)

Short-time overloads :
Voltage circuits : 2Un for 5s
Current circuit : 5In for 30s
: 10In for 5s

Full scale deflection angle :
Quadrant scale : 90°
Long scale : 240°
Synchroscope : 360°

Case material :
96mm : Polycarbonate in black
144mm : Polycarbonate in black

Mounting position :
Standard operating position is vertical (unless otherwise specified).

Insulation :
Insulation reference voltage 0.6kV

Safety

N	Test voltage of 500V
P	Test voltage above 500V (e.g. 2kV)

Principal units and their main multiples

kA	Kiloampere
A	Ampere
mA	Milliampere
µA	Microampere
kV	Kilovolt
V	Volt
mV	Millivolt
µV	Microvolt
MW	Megawatt
kW	Kilowatt
W	Watt
Mvar	Megavar
kvar	Kilovar
Var	Var
MHz	Megahertz
kHz	Kilohertz
Hz	Hertz
MΩ	Megaohm
kΩ	Kiloohm
Ω	Ohm
mΩ	Milliohm

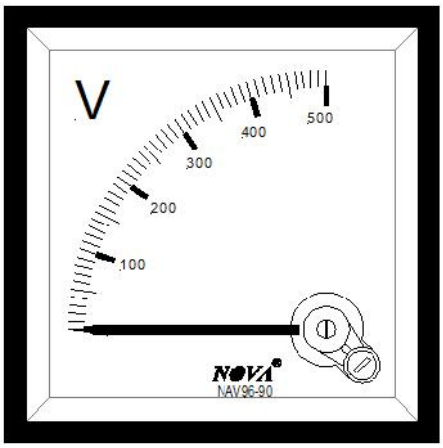
Symbols for marking instruments and accessories

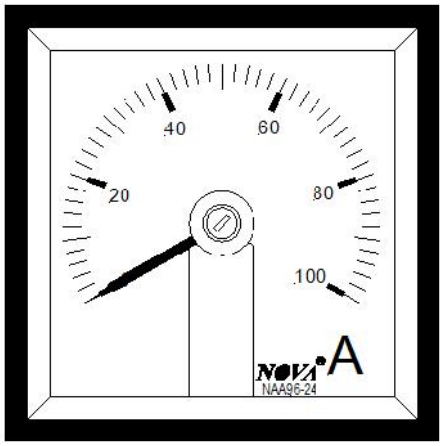
Normal operating position of the panel meter is vertical. The position is marked on the scale and the meters are correspondingly calibrated.

F	Vertically
G	Horizontally
Y∝°	At an angle (e.g. 60° regarding the horizontal position)

Significance of symbols

B	Measuring system with a moving coil
C	Measuring system with a moving coil and rectifier
A	Measuring system with a moving iron
E	Bimetal measuring system
D	Electronic device in a measuring circuit
Z	Externally positioned electronic device
W	Vibrating measuring system
Q	Warning : see application instructions
^	DC
H	AC
J	DC and AC
K	3 phase 3 wire system with balanced load
[	3 phase 4 wire system with balanced load
\	3 phase 3 wire system with unbalanced load
T	3 phase 4 wire system with unbalanced load
1,5	Accuracy class 1.5
1,0	Accuracy class 1.0





Moving coil ammeters and voltmeters

Moving coil instruments are suitable for a wide range of AC and DC application, particularly for remote indication when use with a suitable transducer (0..1mA or 4..20mAdc). Rectified instruments are available for AC applications and have a long burden. Scales are linear and can be drawn to suit customer specification together with any chosen title.

Type reference Moving coil	Model	Range		Burden (VA)
		Min.	Max.	
96 x 96 mm.				
90° Ammeter	NDA96-90	50µAdc	50Adc	
	NAA96-90	1mAac	5Aac	1.5(X/1A)
240° Ammeter	NDA96-24	50µAdc	50Adc	2.5(X/5A)
	NAA96-24	1mAac	5Aac	
90° Voltmeter	NDV96-90	60mVdc	500Vdc	
	NAV96-90	5Vac	500Vac	2.0
240° Voltmeter	NDV96-24	60mVdc	500Vdc	
	NAV96-24	5Vac	500Vac	

Frequency :

AC rectifier instruments are calibrated on a sinusoidal wave form at 50Hz. but are suitable for use without significant error on any frequency from 20Hz. To 10kHz. (2.5kHz. when internal CT is used).

Overload ratings :

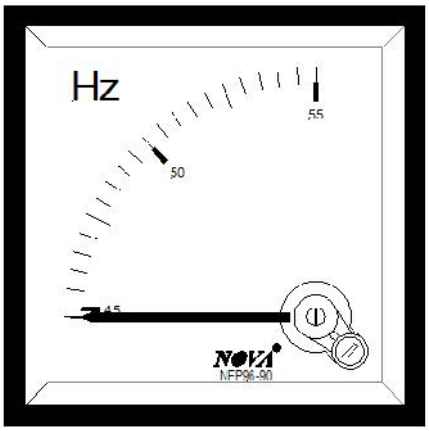
AC and DC Ammeters
1.2 x rated current continuously
10 x rated current for 5s
AC and DC Voltmeters
1.2 x rated voltage continuously
2 x rated voltage for 5s

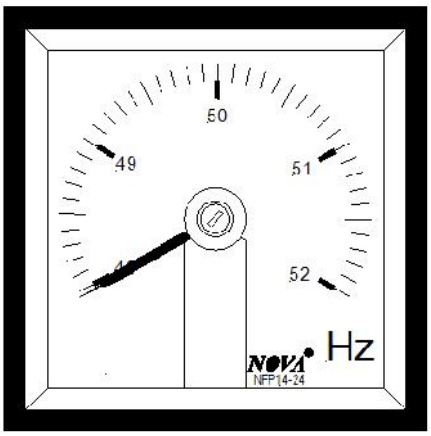
Accuracy :

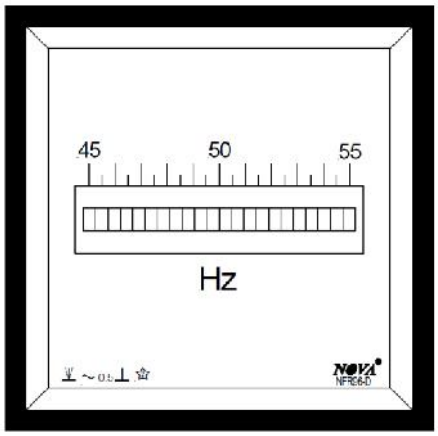
AC and DC Ammeters
Class index 1.5
Class index 1.0 available
AC and DC Voltmeters
Class index 1.5
Class index 1.0 available

Information required with order :

Type reference and model
Details of required scale and any optional features
Details of required electrical rating or input transformer ratio
Example : Moving coil, NDA96-24
Input 4..20mA, Scale 0..200A







Moving Coil Frequency Meters

Instruments for local indication are usually supplied as self-contained units in sizes 96mm. and 144mm. Each instrument incorporates a moving coil movement driven by an internally mounted static circuit.

For remote indication moving coil instruments can be supplied to operate with transducers (0..1mA or 4..20mAdc)

Type reference pointer type	Model	Class	Burden at 50Hz.
96 x 96mm.			3VA (Max)
90°	NFP96-90	1.5	
240°	NFP96-24	1.5	

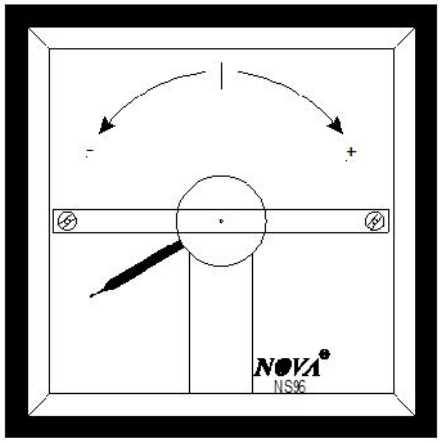
Type reference reed type	Model	Class	Burden at 50Hz.
96mm.	NFR96	0.5	3.6VA (Max)

Standard ranges : 44..55Hz.
45..65Hz.
55..65Hz.
47..53Hz.
57..63Hz.
44..56Hz.
54..66Hz.

Voltage ranges : 100V, 110V, 120V, 220V, 380V, 415V ±15%

Information required with order :
Type reference and model
Details of required scale and any optional features
Details of required electrical rating

Example : Pointer, NFP96-90
Scale 45..55Hz.
Rating 110V



Synchroscopes

A synchroscope indicates the difference in phase angle and frequency between two alternators or between an alternator and a supply system, when it is necessary to operate these in parallel. A zero difference is indicated when the pointer coincides with the synchronising mark and is stationary.

The speed and direction of the pointer shows whether the incoming machine is fast or slow. This is adjusted until the pointer is on the SLOW side of the synchronising mark but moving very slowly in the FAST direction.

The incoming machine circuit can be closed when the pointer coincides with the synchronizing mark. This method avoids imposing a momentary load on the running machine or on the supply system. Although the synchroscope is a single phase instrument, it is use on polyphase systems and it is assumed that the phase relationships correspond. Instruments are available in 96x96mm. and 144x144mm.

Type reference	Model	Burden (VA) at 50Hz.
96 x 96 mm.	NSY96	4.5
144 x 144 mm.	NSY14	4.5

Input voltages : 100V, 110V, 220V, 380V, 415V, 440V. Although the instruments are intended for short period use only, those or 110V and below are continuously rated. Instrument for higher voltages have a rating of 20 minutes.

Overload rating : 1.2 x rated voltage continuously
2 x rated voltage for 5s

Accuracy : Class index 1.5

Voltage influence : For the 10% voltage variation from the nominal value additional error 1 degree electrical.

Frequency influence : Additional error 0.1 degree electrical/ Hz.

Position influence : For ±5% from the required mounting position additional error 0.2 degree electrical.

Temperature influence : 0.03 degree electrical per ˚C

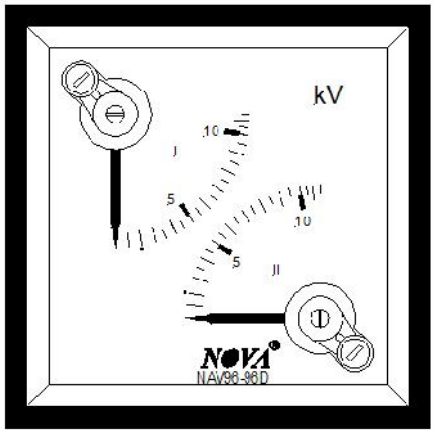
Frequency range : Between 47.5 and 51Hz. For 50Hz. instrument
Between 57.5 and 61Hz. For 60Hz. Instrument

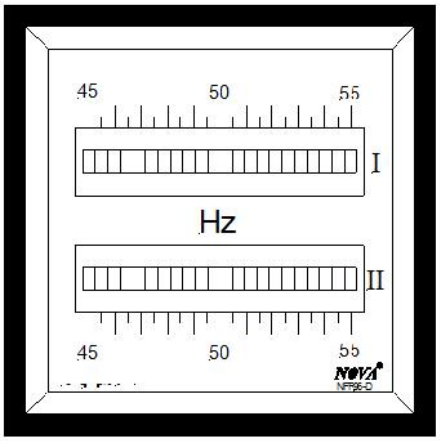
De-energisation : With are or both circuits de-energised, the pointer does not remain within 45 degrees of the synchronizing mark.

Information required with order

Type reference and model
Details of required electrical rating and frequency

Example : 96 x 96mm.,
Model : NSY96
Rating 110V, 50Hz.





Synchronising Instruments

These types of instruments are used in synchronising schemes to ensure that the incoming and running supplies are of the same frequency, phase and voltage prior to connection.

Double Moving Iron Voltmeter Class 1.5

This instrument can be fed either directly or from voltage transformers connected to each of the incoming and running supplies. Two quadrant scale moving iron movements are utilized.

Double Reed Frequency Meter Class 0.5

This instrument differs from the pointer type which the display is given by two rows of vibration reeds with 11 reeds per row.

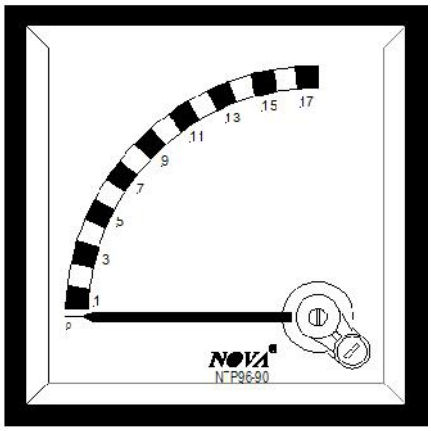
Type reference	Model	Range (V)		Burden (VA)
		Min	Max	
Double moving iron voltmeter				
96 x 96 mm.	NAV96-D	50	400	4
144 x 144 mm.	NAV14-D	50	400	4
Double reed frequency meter				
96 x 96 mm.	NFR96-D	50	400	4.4
144 x 144 mm.	NFR14-D	50	400	4.4

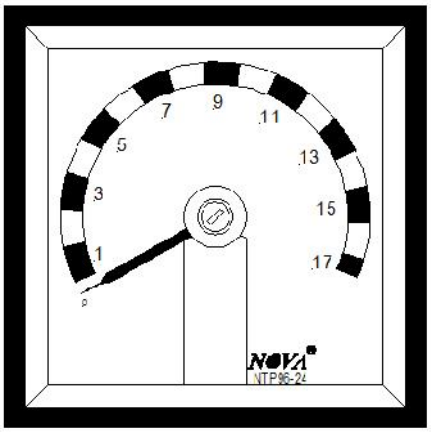
*Note: Tolerance on line voltage supply is ±15%

Information required with order :

Type reference and model
Details of required scale
Details of required electrical rating and frequency

Example : Double reed frequency meter, 96 x 96mm.
Model: NFR96-D
Scale 45..55Hz.
Rating 110V, 50Hz.





Tap Position Meters

Position indicators can be used for many remote monitoring applications. For example, the position of transformer taps, mechanical values or sluice gates can be determined accurately.

Scale marking are kept to a minimum to present a clear pleasing appearance ensuring that the instruments can be read with ease from distance of several feet. An internally mounted static circuit ensure that normal supply variations do not affect the stated accuracy. For remote indication, these instruments can be supplied to operate with transducer (0..1mA or 4..20mA). Instruments are available in 96x96mm. and 144x144mm. cases.

Type reference	Model
96 x 96 mm.	
90°	NTP96-90
240°	NTP96-24
144 x 144 mm.	
90°	NTP14-90
240°	NTP14-24

Supply voltage : 110Vac or 220Vac, 50/60Hz.

Voltage influence :

A static circuit is included which ensures that the effect of ±10% supply voltage variation does not affect the stated accuracy of indication. When the sensing resistor is positioned in some distance away from the indicator, the line impedance can affect the accuracy of indication.

For example, an impedance of 10Ω per line causes an indication error not greater than 0.25% at 2.4kΩ sensing potentiometer.

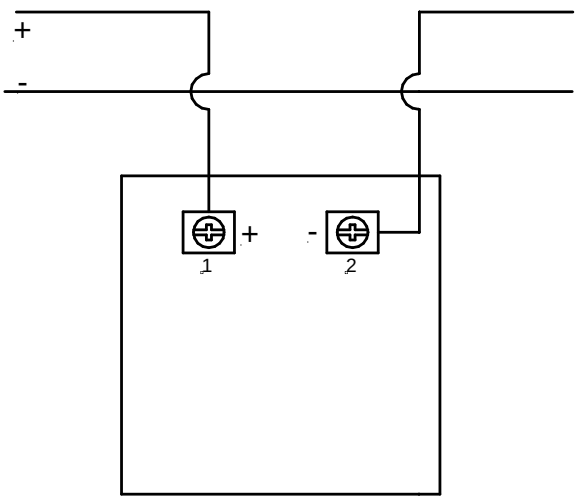
Information required with order :

Type reference and model
Details of required electrical rating and frequency
Number of taps and resistance per tap
Scale required

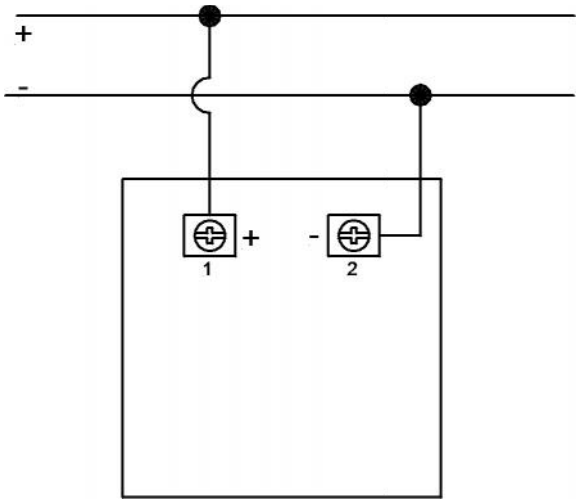
Example : Type reference 90˚, NTP96-90
Rating 110V, 50Hz.
17 taps, 10Ω per tap
Scale 0..17 tap

Connection Diagram

- ✓ Moving Coil AC with Rectifier Ammeters & Voltmeters
- ✓ Moving Coil DC Ammeters & Voltmeters

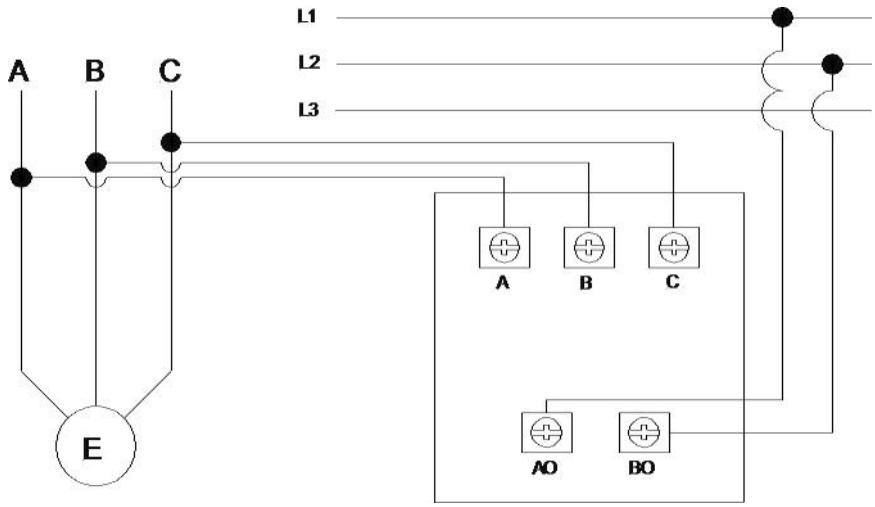


Ammeter



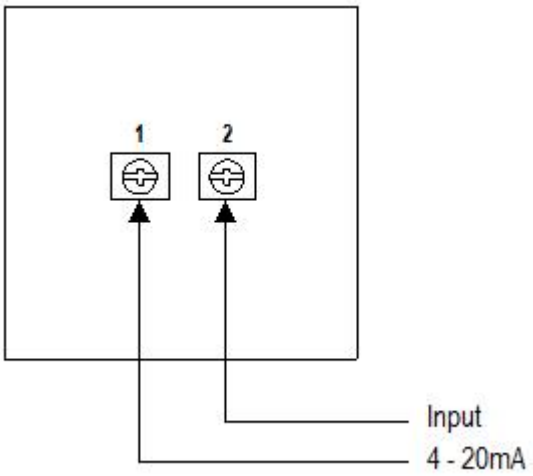
Voltmeter

- ✓ Synchroscope Meter

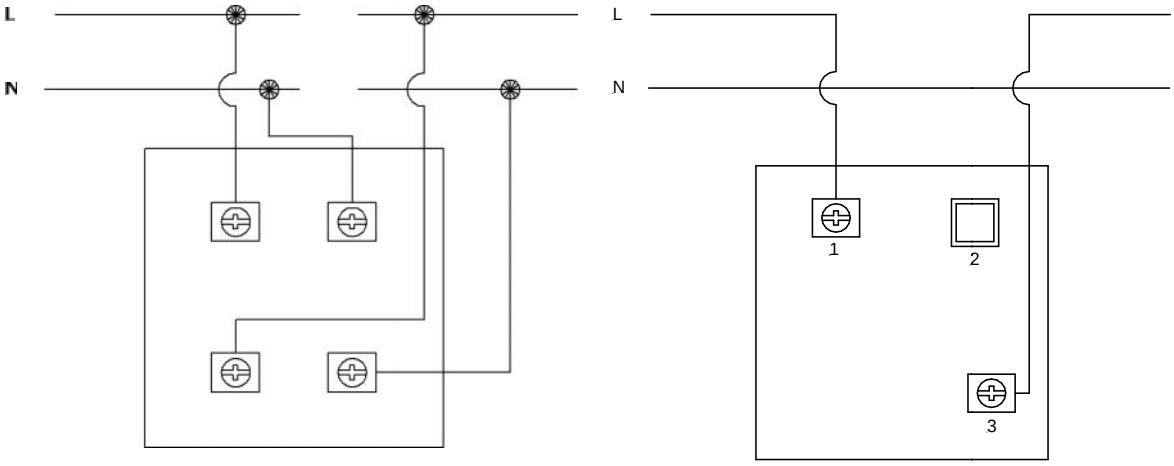


Connection Diagram

✓ Tap position Meters



✓ Frequency Meters



Double Reed Type

Pointer Type

DIGITAL MULTIFUNCTION METER (NDMM)

Description

NOVA Three - Phase Digital Multifunction Meter (NDMM) is use for accurate and reliable measurement of electrical parameters (voltage, current, power, frequency, etc.) for industrial and commercial applications. It has a large multi - line backlit LCD display which enables three parameters to be displayed at the same time.

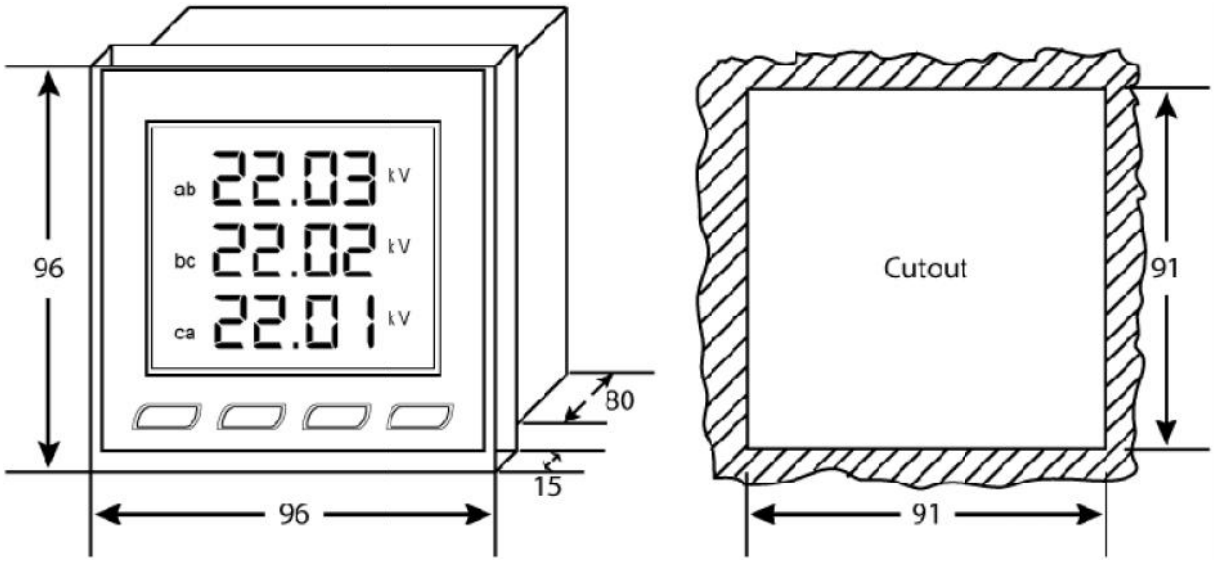
Features

- ✓ Three - line, four - digit display (15H x 7W mm.)
- ✓ High accuracy : Class 0.5S
- ✓ Measurement selection single - phase or three - phase (3P3W or 3P4W)
- ✓ Wide and configurable current range 1 A, 5 A
- ✓ Wide - range of auxiliary power supply, suitable for high - voltage or low - voltage installations
- ✓ Password protection for setup mode
- ✓ System variable Voltage, Current, Power, Energy, Power factor, Frequency
- ✓ Communicate RS485 modbus RTU
- ✓ Energy measurement : kWh and kVarh
- ✓ Aux. Power supply 100 ~ 270 VAC/DC
- ✓ Front dimension 96 x 96 mm. Polycarbonate
- ✓ Operating temp. -10 °C to +55 °C
- ✓ Dielectric strength 2,000 Vac

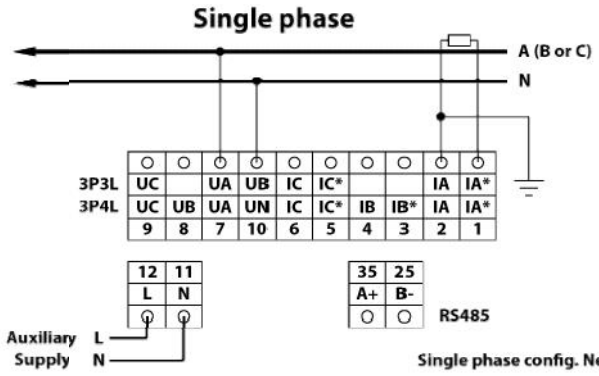
Specification

Connection type	single - phase or three - phase (3P3W or 3P4W)
Measurement accuracy	
Current	±0.1%
Voltage	±0.5%
Active power	±0.5%
Reactive power	±0.5%
Power factor	±0.2%
Frequency	±0.5Hz
Active energy	±0.1% (0 ~ 999999.99 kWh)
Reactive energy	±0.1% (0 ~ 999999.99 kWh)
Accuracy class	0.5S
Display mode	Graphic lattice 7-segment on LCD
Voltage Input	
Rate voltage	100 ~ 415 VAC
Over load	Continuous : 1.2 times, instantaneous 2 times (10 seconds)
Power consumption	< 1 VA (each phase)
Impedance	> 30 kΩ
Current Input	
Rate current	AC 1 A or AC 5 A
Over load	Continuous : 1.2 times, instantaneous 2 times (10 seconds)
Power consumption	< 0.4 VA (each phase)
Impedance	< 20 mΩ
Frequency	50/60 Hz
Electric energy	Bi-directional active / reactive
Auxiliary power supply	100 ~ 270 VAC/DC
Power consumption	< 5 VA
Electric energy pulse	Passive optocoupler collector output, constant: 51200 imp / kWh (kvarh)
Communication interface	RS485 Modbus - RTU protocol (default baud rate : 9600)
Operating Temp.	-10 ~ 55 °C
Storage Temp.	-20 ~ 75 °C
Relative Humidity	≤93%
Dimension (W x H x D)	96 x 96 x 80 mm.
Cut out size	91 x 91 mm

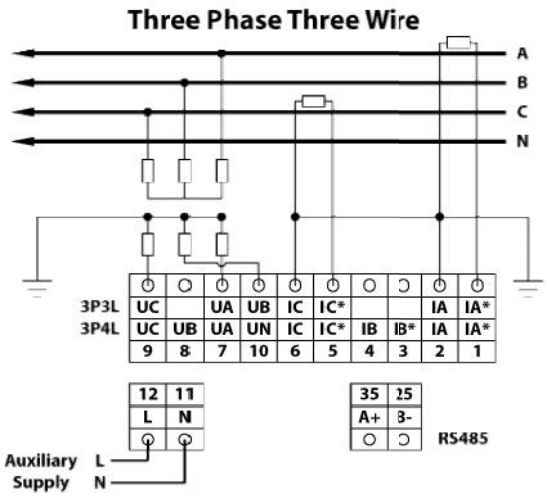
Dimension and cutout

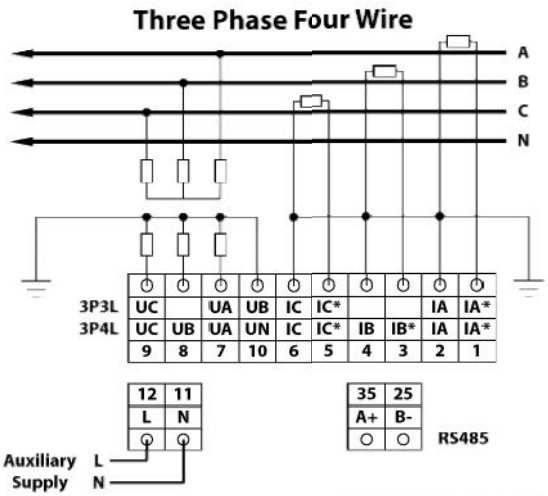


Wiring Diagram



Single phase config. Net.3.4





1, 3, 5 is current input side

Description

NOVA Current transformers are special transformers for the proportional transformation of high currents into direct measurable values. Their construction and physical operating principle enable an electrolytic separation of the primary circuit from the measured circuit, thereby providing a safety mechanism when switching on the measuring appliance in the event of a fault.

Specification

The products complied with VDE 0414, BS7262 and IEC 185 standard.	
Primary current	30A-5000A
Secondary current	5A or 1A
Standard approval	VDE0414, BS7626, IEC185
Maximum voltage	0.72kV
Frequency	50 - 60Hz
Rated load	5VA - 30VA
Dielectric strength	2kV (1 minute)
Class	0.5, 1.0
Short-time thermal current	50kA
Rated security coefficient	FS5
Ambient temperature	-5 ~ 55°C
Operating humidity	up to 95%

CURRENT TRANSFORMER (NCT)

NOVA measuring current transformer is an encapsulated type which intended to supply to indicative devices, integrated meter and similar apparatus.

They are characterized by their accuracy and for saturating at moderate over current. This effect protects the measuring instruments from possible over current.

Technical Data

Burden is the impedance of the secondary circuit in ohms and power factor. For the measurement or protection relay operating via a current transformer, in order to operate them, the primary current has to induce the power required in the secondary current of the instrument or relay.

This induced power must be equal or higher than the losses in the power line + consumption of the measurement instrument or protection relays.

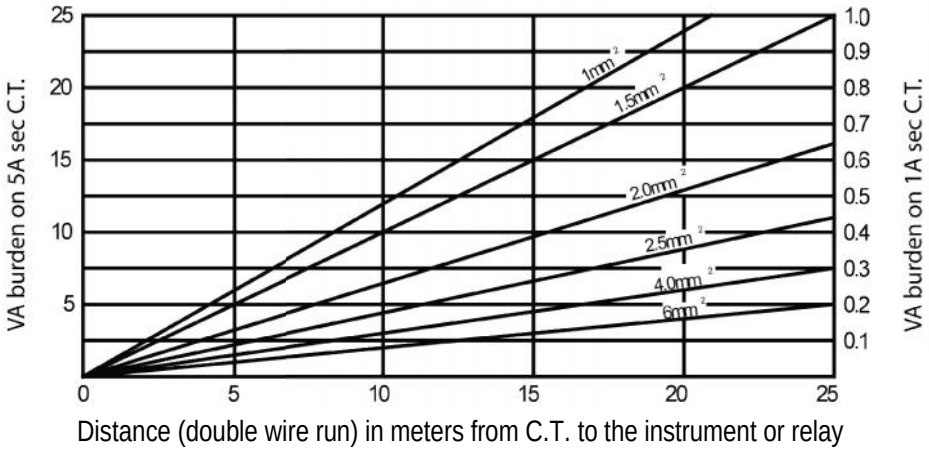
The burden imposed on a current transformer consist mainly of:

- The impedance of wiring cable between current transformer and instruments/relay
- The impedance of the instrument/relay
- The sum of the above constitute the external burden required

Table illustrating some typical instruments and its typical consumption

Instrument	Burden consumed
Moving iron instruments	0.3 – 15VA
Moving coil instruments	0.5VA
Analogue power meter	0.2 – 2.5VA
Maximum demand meter	2.5 – 5.0VA
Digital meter	0.5 – 1.0VA
Energy meter	1.0 – 1.5VA
Recording instruments	2.0 – 5.0VA

Table guide for wiring cable burden



Selection Guide

WINDOWS TYPE				Bar : 30 x 10 mm.
Type	Rated current (A)	Rated power (VA)		Weight (kg)
		Class : 0.5	Class : 1.0	
NCT-30	30/5	-	1	0.38
NCT-30	50/5	-	1	0.38
NCT-30	60/5	-	1	0.38
NCT-30	80/5	1.5	2.5	0.38
NCT-30	100/5	2.5	5	0.38

WINDOWS TYPE				Bar : 40 x 10 mm.
Type	Rated current (A)	Rated power (VA)		Weight (kg)
		Class : 0.5	Class : 1.0	
NCT-40	150/5	5	10	0.40
NCT-40	200/5	5	10	0.40
NCT-40	250/5	5	10	0.40
NCT-40	300/5	5	10	0.40
NCT-40	400/5	5	10	0.40

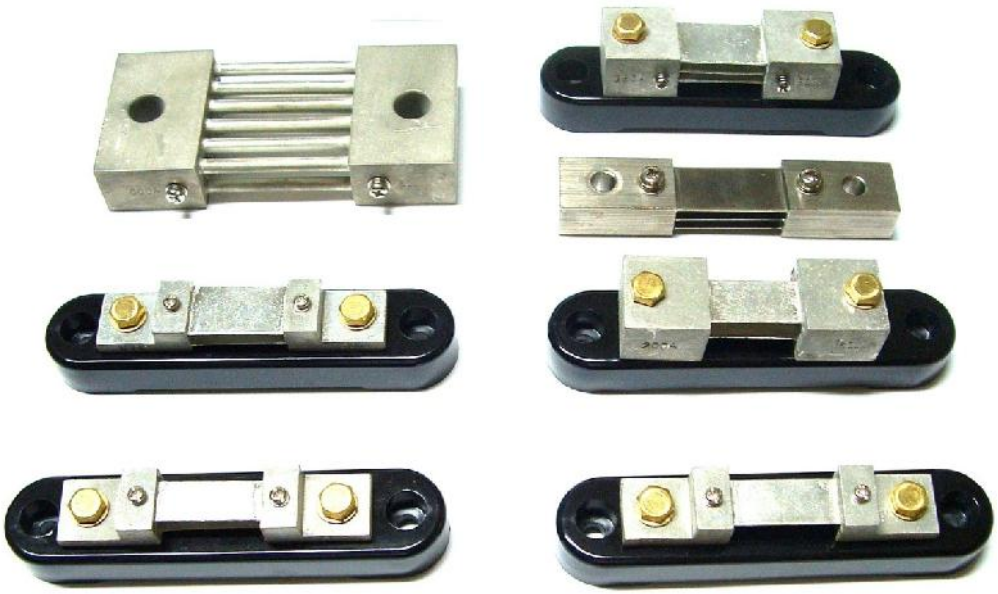
WINDOWS TYPE				Bar : 60 x 20 mm.
Type	Rated current (A)	Rated power (VA)		Weight (kg)
		Class : 0.5	Class : 1.0	
NCT-60	500/5	10	15	0.60
NCT-60	600/5	10	15	0.60
NCT-60	750/5	10	15	0.60
NCT-60	800/5	10	15	0.60
NCT-60	1000/5	10	15	0.60

Selection Guide

WINDOWS TYPE				Bar : 100 x 10 mm. or : 80 x 30 mm.
Type	Rated current (A)	Rated power (VA)		Weight (kg)
		Class : 0.5	Class : 1.0	
NCT-100	1000/5	15	15	0.80
NCT-100	1200/5	15	15	0.94
NCT-100	1500/5	15	15	1.10
NCT-100	2000/5	15	15	1.20
NCT-100	2500/5	15	15	1.40
NCT-100	3000/5	15	15	1.60

WINDOWS TYPE				Bar : 130 x 12 mm. or : 125 x 57 mm
Type	Rated current (A)	Rated power (VA)		Weight (kg)
		Class : 0.5	Class : 1.0	
NCT-125	1500/5	15	30	1.00
NCT-125	2000/5	15	30	1.15
NCT-125	2500/5	15	30	1.45
NCT-125	3000/5	15	30	1.60
NCT-125	4000/5	15	30	1.90
NCT-125	5000/5	15	30	2.20

DC SHUNT (NDS)



Description

Highly accurate manganin resistance dc shunts. When a current is passed through the shunt, a proportional millivolt output is produced. The current flowing through the shunts creates a voltage drop which can be measured with a measuring devices switched on in parallel. By switching on the shunts and the measuring devices in parallel, it is possible to use voltage measurement devices to measure the current or to gain an extension of the measuring facilities of the existing current measuring devices.

Application

Shunts are used for the indirect monitoring of high electrical current. The series shunts accurately measure and convert high DC current into millivolt output. They are made from brass extrusions and high quality manganin resistance wire. The manganin resistance wire is noted for its excellent stability and extremely low temperature coefficient. Production of the shunts complied with the requirements of IEC 51/60051 part8 (1984) and DIN 43703. They are available for currents as high as 4000A and millivolt output as 60mV.

DC SHUNT (NDS)

Features

- ✓ Accuracy class : 0.5
- ✓ Output : 60mV
- ✓ Rated current : 5-4000A
- ✓ Permissible overload : continuous 1.2 x rated current
  5 seconds 5x rated current
- ✓ Operating temp. : -20°C to +70°C
- ✓ Temperature co-efficient : 0.002% per °C between 25°C to 80°C

Product Coding

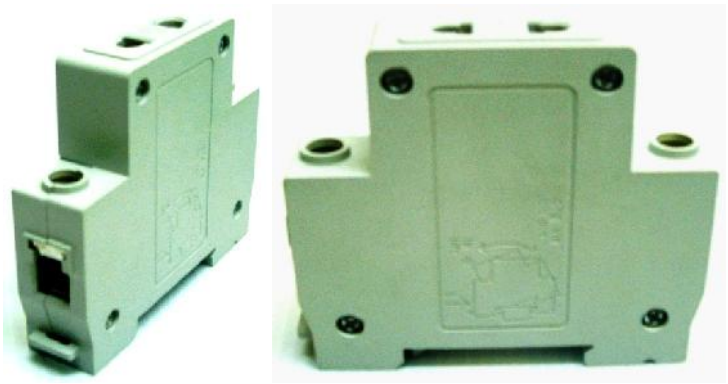
NDS – 060

Basic type

Ratio

005	5A/60mV
060	60A/60mV
100	100A/60mV
150	150A/60mV
200	200A/60mV
250	250A/60mV
400	400A/60mV
600	600A/60mV
4000	4000A/60mV

UNIVERSAL OUT LET (NUO)



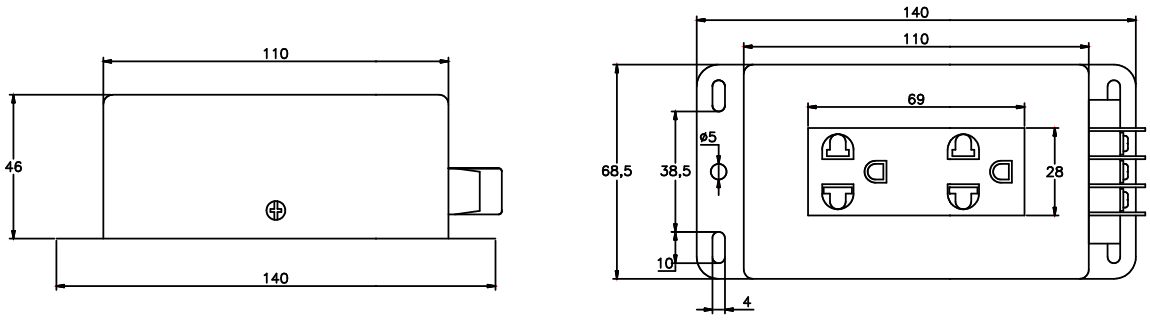
Description

NOVA universal outlet is made of a high impact-resistant thermoplastic face for single outlet and rugged design with metal for double outlet. Ideal for mounting in equipment cabinets where AC power is required, i.e. laptop computers, test equipment, electrical tools, etc.

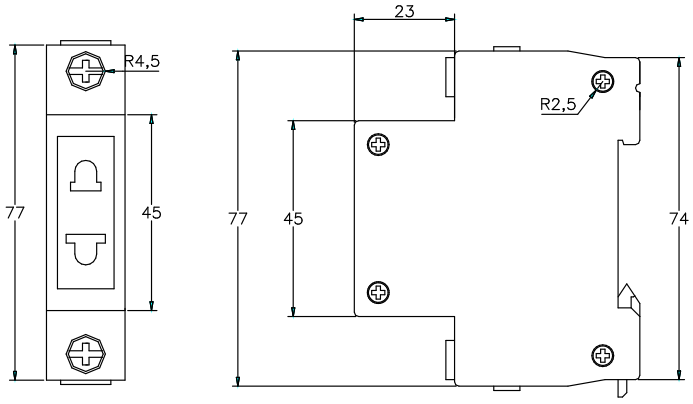
Features

- ✓ Current rating 16A, 250VAC
- ✓ One piece design, easy installation
- ✓ DIN rail & direct mountable
- ✓ Finger safe connections, allow for increased safety during maintenance

Dimension



Model: NUO – D



Model: NUO – S

Ratio 1:1 mm.

ELECTRO MAGNETIC COUNTER (NEC)

Description

NOVA Electro-magnetic counter NEC series was designed to use as the accumulative recorder of the electrical pulse signal in the system. It can equip with the secondary instrument to form the digital display instrument, which is widely use for calculation in various industries such as the petroleum, chemical, textile, machinery, agriculture, food, printing and so on. After the electrical signal input to the counter, it will generate attractive power in the electromagnet, which will make the armature to drive the numerical gear to conduct decimal counting.

Technical Data

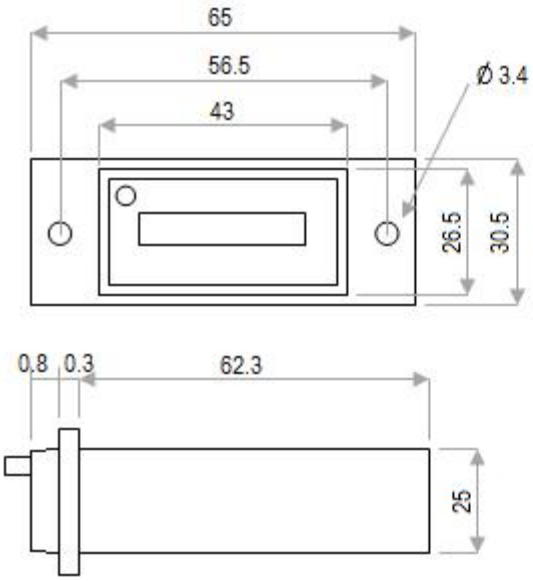
Rated supply voltage	110, 220VAC, 50/60 Hz
	12, 24, 48VDC (specify when order)
Operating voltage range	85% to 110% of rated supply voltage
Power consumption	AC : approx. 3 VA
	DC : approx. 3.5 W
Counter (Count range)	0 to 99999 for 5 digits / 0 to 999999 for 6 digits
Counter (Input mode)	Increment
Display method	Thumbwheel (Half-digit drive system)
Digit	5/6 digits (Model : NEC-5/NEC-6)
Character height	4 mm (White) with zero suppression
Temperature	Operating : –10°C to 60°C
	Storage : –25°C to 70°C
Ambient humidity	Operating : 45% to 85%
Insulation resistance	100 M-Ohm min. (at 500VDC)
Dielectric withstand voltage	1500VAC 50/60 Hz for 1 min
Mechanical Life expectancy	20,000,000 operations min.
Weight	5/6 digits model : approx. 105 g

Dimension

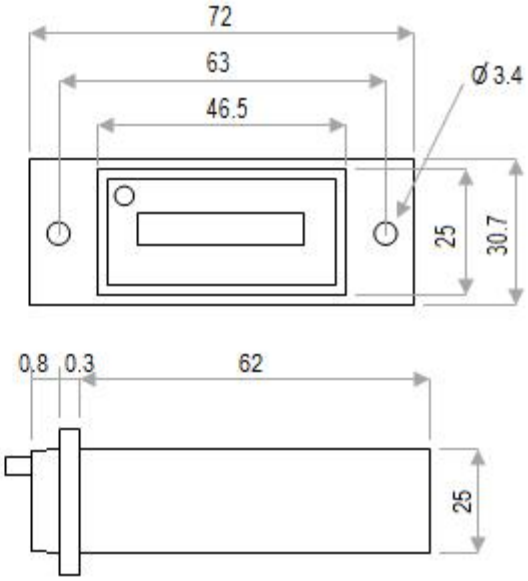
NEC-5-RF (RF-Resettable on Front side)
NEC-5-RR (RR-Resettable on Rear side)
NEC-5-NR (Non-Resettable)

NEC-6-RF (RF-Resettable on Front side)
NEC-6-RR (RR-Resettable on Rear side)
NEC-6-NR (Non-Resettable)

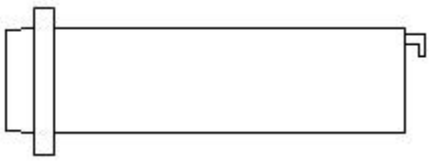
NEC-5



NEC-6



(Non-Resettable)



(Resettable on Rear side)

FUSE DISCONNECTOR (NFD)

Features

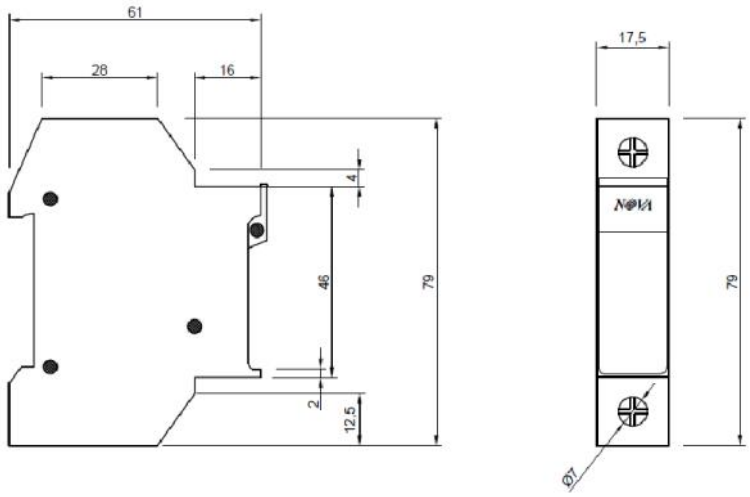
- ✓ Compliance with IEC947-1, IEC947-3 and IEC269
- ✓ Plastic parts are made of material resistant to high temperatures.
- ✓ Mounting on standard DIN 35mm. (EN50 022)
- ✓ It is simply possible to assemble multi pole with some connecting pins.

Specification

TYPE	NFD10	NFD14
Number of poles	1P, 1P+N, 2P, 3P, 3P+N	
Type of current	AC	
Rated operational voltage (Ue)	500V	
Rated insulation voltage (Ui)	600V	
Rated frequency (Hz)	50	
Rated impulse withstand voltage (Uimp)	6kA	
Rated operational current (Ie)	32A	63A
Rated making capacity	75A	150A
Rated breaking capacity	75A	150A
Rated short time withstand current (Icw)	300A	600A
Rated conditional short circuit current	100kA	100kA
Connection	Max. 25mm^2	Max. 35mm^2

Dimension

POLE	DIMENSION (WIDTH)
1 P	17.5
2 P	35
3 P	52.5



Product Coding

NFD 10 – 2P – 04

Basic type

Fuse link size

10	Ø 10 x 38
14	Ø 14 x 51

Number of poles

1P	One pole
1N	One pole + Neutral
2P	Two pole
3P	Three pole
3N	Three pole + Neutral

Fuse rate

02	2A
04	4A
06	6A
10	10A
63	63A

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