HTR Catalogue - Aldinet

COMPANY PROFILE

HI - TECH RESISTORS PVT. LTD.

www.htr-india.com

OUR MISSION

Customer delight in terms of **Quality**, Timely **Delivery** & Value for **Money**

GLOBAL PRESENCE

Manufacturing and R&D Facility

- Manufacturing, research & development facility certified to IATF 16949:2016.
- Stable work force of over 400 multi-skilled and highly trained operators & technicians with an average experience of over 25,000 working hours per person.
- HTR produces 10 million pieces per month.

DNV

MANAGEMENT SYSTEM CERTIFICATE

Certificate no.:
22919-2008-AQ-IND- IATF

Valid:
23 July 2021 – 05 March 2024

IATF Certificate No:
0412949

This is to certify that the management system of

Hi-Tech Resistors Pvt. Ltd.

Plot No. EL-1, MIDC, Hingna Road,Nagpur - 440016, Maharashtra, India

and, if applicable, the remote supporting locations as mentioned in the Appendix accompanying this Certificate

has been found to conform to the Quality Management System standard:

IATF 16949:2016

This certificate is valid for the following scope:

DESIGN, MANUFACTURE OF WIRE WOUND, LOW OHM / CURRENT SENSE, HVAC AND ENGINE COOLING RESISTOR

EXCLUSION: NONE

Place and date:
Katy, TX, 23 July 2021

For the issuing office:
DNV - Business Assurance
1400 Ravello Drive, Katy, TX, 77449-5164, USA

Sherif Mekkawy
Management Representative

DNV

Certificate no.: 22919-2008-AQ-IND- IATF
IATF Certificate No: 0412949
Place and date: Katy, TX, 23 July 2021

Appendix to Certificate

Hi-Tech Resistors Pvt. Ltd.

Remote Support Locations included in the certification are as follows:

Site Name	Site Address	RSL Activities	Certification Body
Hi-Tech Resistors Pvt. Ltd.	Buty Compound, Mount Road Extension, Sadar,Nagpur - 440001, MaharashtraIndia	Marketing	DNV

PPAP
check list as per
AEC Q200 REV D

Detailed PPAP checklist including
Comprehensive Testing and Validation
Plan as per requirements of customer

Manufacturing and R&D Facility

R&D lab and test equipments

(Designed for validation testing as per AEC Q200 REV D)

A) Solderability and Corrosion Precaution

Dry Heat Test over 0°C to 300°C
Damp Heat Test
Plating Thickness Analysis by XRF
Salt Spray chamber

(B) Measurement

Insize ISM PRO Software magnification up to 200X
S.D. Projector

(C) Electrical Testing and Validation

Bank of Transformer
Bank of Power Supply
Surge Simulator – Up to 6KV and 15KV
(as per IEC 61000 – 4 – 5)
Special Purpose Oscilloscope
LCR Test Bridge.
High Voltage Tester
Insulation Tester (Megger)
8.5 Digit Multimeter
ESD Tester

(D) Climate Simulator

Cold Chamber - Ambient Temperature to - 70°C
Humidity Chamber
Climatic Test Chamber - 70°C to +180°C

(E) Mechanical Testing

Elongation Tester (AB/TC/2192)
Vibration Tester (EVG 300)

CONSUMER SEGMENT

Bowers & Wilkins

Marshall AMPLIFICATION

IFB

HAVELLS

PHILIPS

Saeco

SAMSUNG

V ZUG

Panasonic

LAB.GRUPPEN

MC² AUDIO

INDUSTRIAL SEGMENT

AUTOMOBILE SEGMENT

SAMSUNG SDI

motherson sumi systems limited

SPARK MINDA
ASHOK MINDA GROUP

MAHLE
Driven by performance

SANDEN
Delivering Excellence

Air International Thermal Systems
空调国际热能系统

Hero

Mahindra

Fans-tech

BAŞKURT

PEE AAR EXIM

DAEWOO ELECTRONICS

MARUTI

ZF

BMW

TRW

RENAULT

mazda

EICHER

NISSAN

HYUNDAI

TATA

HONDA

Ford

Audi

Lucas-TVS Limited

MEDICAL, AEROSPACE & RAILWAY SEGMENT

GE Healthcare

UTC Aerospace Systems

CAF

Allengers
Passion for excellence

PHILIPS
Healthcare

passion to lead
EPSILON

BOEING

AAL®
Autometers Alliance Ltd

Automotive Applications
Wire Wound Resistors

Ceramic encased resistor for HVAC - rear fan control (single speed)

Instrument Cluster

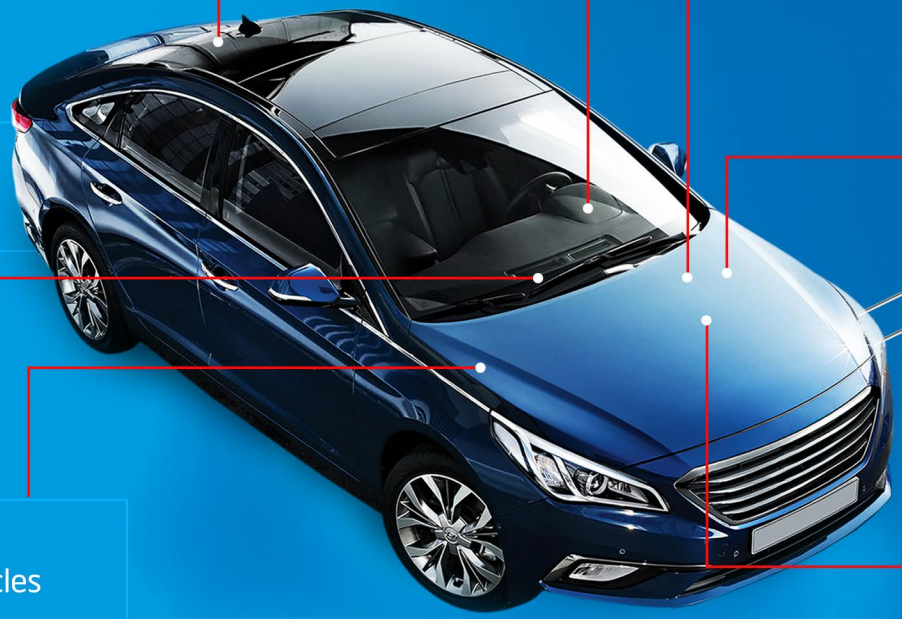
Traction power inverter modules in electric vehicles

Ceramic type resistor for HVAC - 3 speed fan control

Reduction of RFI during electrical discharge of petrol engines

Alternators

Ceramic type resistor for engine cooling



Automotive Applications
Shunt Resistors

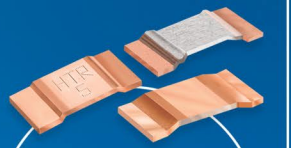
HBR

HIR

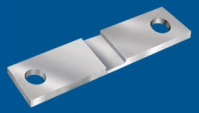
RSR

E.V. Battery Charger

Custom Built Load Banks

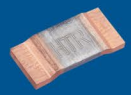


BLDC Motor Controller for HVAC Blower



HEB
Size 8420 / 8518

HEE
Size 5930



HTE
Size 2512 / 1206

OP

HEW

BR

HRE
Size 4026

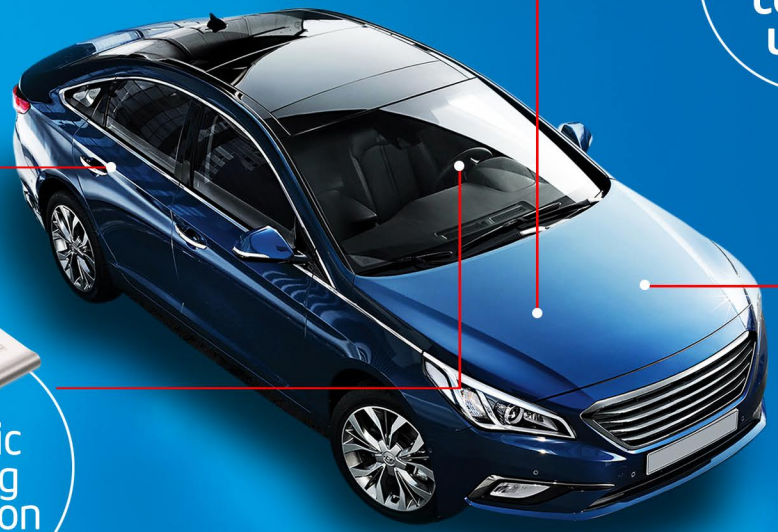
HSE
Size 3920

HOS
Size 4512

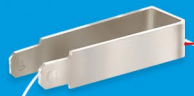
Diesel engine control units.

HHE
Size 3820

HBE
Size 2725



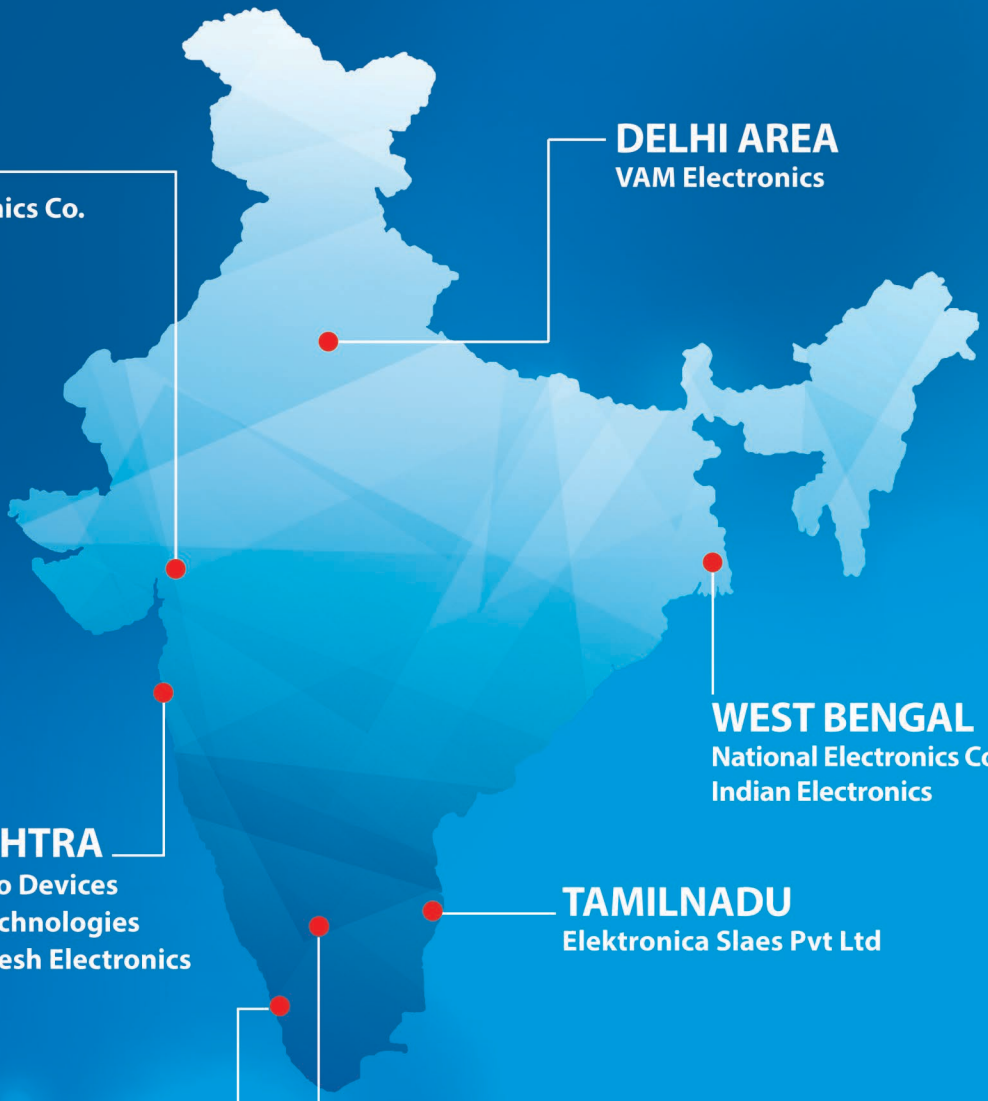
Battery Management System.
BMS for electric / hybrid cars and electric scooters



Elctronic window lift application

Elctronic steering application

Distributors
INDIA



GUJARAT
Global Electronics Co.

DELHI AREA
VAM Electronics

WEST BENGAL
National Electronics Corporation
Indian Electronics

MAHARASHTRA
Multitek Electro Devices
Electromark Technologies
Stockiest- Ramesh Electronics

TAMILNADU
Elektronica Slaes Pvt Ltd

KERALA
Roni Electronics

KARNATAKA
IBS Electronics
Swift Electrocomp Solutions Pvt Ltd

Distributors
WORLDWIDE

AUSTRALIA
Arrow Electronics

AUSTRIA
AEK Gmbh

BELGIUM
Heynen NV

FINLAND
Elgood Oy

GERMANY
Weltron Elektronik GmbH
WDI AG
Weltronic GmbH

HONGKONG
IBS Tech Int'l HK Ltd

ISRAEL
Trust Electronics Ltd.

ITALY
MOS SRL

MALAYSIA
Acumen Components Sdn Bhd

NETHERLANDS
Heynen BV

NEW ZEALAND
Arrow Electronics

PEOPLES REPUBLIC OF CHINA
IBS Technology Shenzhen Ltd.,

PHILIPPINES
IBS Electronics Inc

ROK-SOUTH KOREA
SUYU ELECTRONICS INTERNATIONAL TRADING

SLOVENIA
IC ELEKTRONIKA D. O. O

SOUTH AFRICA
Hi-Q Electronics Pty Ltd.,
JOHANNESBURG AREA -
Hi-Q Electronics Pty Ltd.

SPAIN
Aldinet Group

SWEDEN
TS Connect AB

SWITZERLAND
Vibratec AG

TAIWAN
MME Technology Co., Ltd.

TURKEY
Can Ticaret Ve Electronik San. Ltd. Sti.

UKRAINE
Integral Ltd.

UNITED KINGDOM
Eurocap International Ltd.
VTM (UK) Ltd.
Distributed Micro Technology Ltd.

USA
IBS Electronics, Inc.

"Charity destroys. Work builds."

Baba Amte

Magsaysay, Gandhi Peace Prize, Templeton award & Padma Vibhushan award winner.

Over 20 percent of HTR workforce is specially abled. And smiling.

At HTR, we believe in offering employment opportunities to the specially abled
who not only perform their duties well but also hold their heads high.
At HTR we train our staff to ensure that they produce nothing but the best.

THANK **YOU!**

www.htr-india.com

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e-mail : info@htr-india.com (India Sales) | sales@htr-india.com (International Sales)

www.htr-india.com

PRODUCT CATALOGUE
2022-23

HI - TECH RESISTORS PVT. LTD.
AN IATF 16949:2016 CERTIFIED COMPANY

INDEX

Detailed datasheets in PDF format for all HTR product series available in the 'PRODUCT' section of **www.htr-india.com**

AEC-Q200 QUALIFIED

RoHS COMPLIANT

WIRE WOUND RESISTORS
SILICONE / CEMENT COATED

VHIA

Power rating : 0.5W to 25W
Resistance range : R01 to 120K
Tolerances available : 1% - 10%
Applications : Industrial, telecommunication and consumer electronics.
Features :
- UL approved flame retardant coating.
- Non-inductive type available.
- Impulse resistors as per IEC 61000-4-5.
- Copper clad steel wire terminations for reduced temperature on PCB.

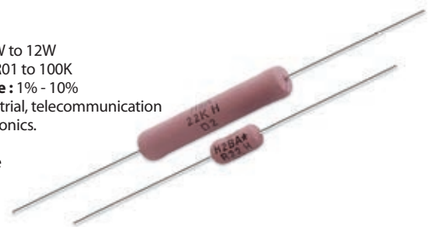
HIA

Power rating : 0.5W to 25W
Resistance range : R01 to 120K
Tolerances available : 1% - 10%
Applications : Industrial, telecommunication and consumer electronics.
Features:
- UL approved flame retardant coating
- Industrial Grade - MIL sizes
- Non-inductive type available.
- Impulse resistors as per IEC 61000-4-5

FRS

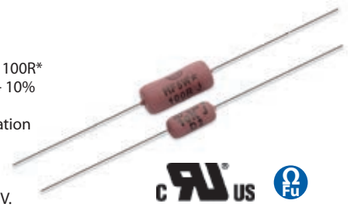
Power rating : 1W to 5W
Resistance range : 10R to 100R*
Tolerance available : 1% - 10%
Applications :
Consumer, telecommunication and industrial electronics.
Features :
- UL 1412 approved.
- Safety fusing at 220/240 V.
- Tailor made fusing options available.

HTA



Power rating : 0.75W to 12W
Resistance range : R01 to 100K
Tolerances available : 1% - 10%
Applications : Industrial, telecommunication and consumer electronics.
Features :
- UL approved flame retardant coating.
- Non-inductive type available.
- Impulse resistors as per IEC 61000-4-5.
- Industrial grade-JSS/IEC sizes.

HFW



Power rating : 1W to 5W
Resistance range : 10R to 100R*
Tolerance available : 1% - 10%
Applications :
Consumer, telecommunication and industrial electronics.
Features :
- UL 1412 approved.
- Safety fusing at 110/120 V.

Note * Higher resistance values available. Please enquire - info@htr-india.com
Tolerance less than 1% available on request.

HAA

Power rating : 1W to 5W
Resistance range : R01 to 12K
Tolerances available : 1% - 10%
Applications : Miniature sizes for automotive sector.
Features :
- UL approved flame retardant coating.
- Industrial grade • Non-inductive type available.
- Impulse resistors as per IEC 61000-4-5.

RSR

Power Rating : 40W to 600W
Resistance range : R05 to 20R
Tolerances Available : 5% - 10%
Applications :
- High power dissipation & impulse handling capability.
- High voltage bleeder resistor in power supplies. • Load bank resistors.

Features : • Edge wound resistive strip for reduced surface temperature.
- High dissipation & very low ohmic values available.
- UL approved flame retardant coating.
- Radial terminals for Amp 187 & Amp 250 connectors available.
- Choice of anti-rust stainless steel terminations.

HFP

Power rating : 2.5W to 8W
Resistance range : R10 to 56K
Tolerances available : 5% - 10%
Applications :
Commercial & industrial electonics.
Features :
- Fiber Glass core.
- PCB pluggable style with different terminations and stand off heights available.
- UL approved flame retardant coating.

HFO

Power rating : 40W to 125W
Resistance range : R10 to 33K
Tolerance available : 5% - 10%
Applications :
Suitable for panel mounting.
Features :
- Flat, oval shape to facilitate panel mounting with screws.
- Non-inductive type available.
- Impulse type resistors as per IEC 61000-4-5.

HIR

Power Rating : 10W to 600W
Resistance range : R22 to 120K
Tolerances Available : 5% - 10%
Applications :
- High power dissipation & impulse handling capability.
- Load bank resistors.
- High voltage bleeder resistor in power supplies.

Features :
- UL approved flame retardant coating.
- Radial terminals for Amp 187 & Amp 250 connectors available.
- Choice of anti-rust stainless steel terminations.

HFOM

Power rating : 40W to 125W
Resistance range : R10 to 33K
Tolerance available : 5% - 10%
Applications :
Suitable for panel mounting.
Features :
- Flat, oval shape to facilitate panel mounting with screws.
- Non-inductive type available.
- Impulse type resistors as per IEC 61000-4-5.

HFA

Power Rating : 1W to 10W
Resistance range : R10 to 51K
Tolerances Available : 5% - 10%
Applications : Low cost solution for consumer electronics.
Features :
- Fiber glass core.
- UL approved flame retardant coating.

HSR

Power Rating : 8.25W, 11W & 20W
Resistance range : 10K to 120K
Tolerances Available : 1% - 10%
Applications :
Capacitor charging and discharging resistors.
Features :
- Wire wound symmetry resistors.
- UL approved flame retardant coating.
- Stainless steel terminals for direct mounting on capacitors.

HIP

Power Rating : 3W to 10W
Resistance range : R01 to 90K
Tolerances Available : 1% -10%
Applications :
Commercial and industrial electronics.
Features :
- Ceramic core.
- PCB pluggable style.
- UL approved flame retardant coating.

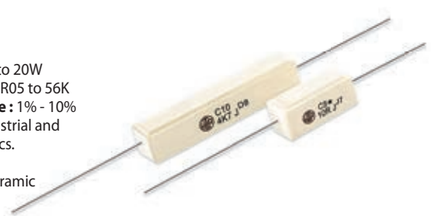
HSRC

Power rating : 11W, 20W & 25W
Resistance range : 10K to 110K
Tolerance available : 1% - 10%
Applications :
Capacitor charging & discharging resistors.
Features :
- Wire wound symmetry resistors.
- Ceramic encased resistors for greater heat dissipation.
- Stainless steel terminals for direct mounting on capacitors.
- Customised solutions available upto 40W.

WIRE WOUND RESISTORS
CERAMIC ENCASED

HCA

Power rating : 1W to 20W
Resistance range : R05 to 56K
Tolerance available : 1% - 10%
Applications : Industrial and consumer electronics.
Features:
- Fibre glass and ceramic core available.
- Ceramic encased for high degree of insulation & low surface temperature.
- Impulse types available.
- Non inductive type available.



HCV

With bracket
Power rating : 7W to 20W
Resistance range : R05 to 56K
Tolerance available : 1% - 10%
Applications : Industrial & consumer electronics.
Features :
- High stability vertical mounting bracket available.
- Fibre glass and ceramic core available.
- Ceramic encased for high degree of insulation and low surface temperature.
- Impulse types available.
- Non inductive type available.

HCW

Power rating : 1W to 20W
Resistance range : R05 to 56K
Tolerance available : 1% - 10%
Applications : Industrial and consumer electronics.
Features : • Ceramic core.
- Ceramic encased for high degree of insulation & low surface temperature.
- Impulse types available.
- Non inductive type available.
- Copper clad steel wire terminations for reduced temperature on PCB.
- Low TCR options available.

HSVF

Power rating : 5W & 7W
Resistance range : R10 to 47K
Tolerance available : 5% & 10%
Applications :
- Industrial.
- Power and Energy.
- Consumer & Electronics.

Features :
- Pulse version available.
- Superior Power Vs Fusing ratio.

FRC

Power rating : 1W to 3W
Resistance range : 10R to 750R
Tolerance available : 3% - 10%
Applications : Industrial & consumer electronics.
Features :
- Safety fusing at 110/120V & 220/240V.
- Tailor made fusing options available.
- Ceramic encased for high degree of insulation and low surface temperature.

HCP

Power rating : 3W to 20W
Resistance range : R10 to 56K
Tolerance available : 5% - 10%
Applications :
Commercial and industrial electronics.
Features :
- Fibre glass and ceramic core available.
- Ceramic encased for high power dissipation.
- PCB pluggable style with different terminations and stand off heights available.

HEA

Power rating : 1W to 17W
Resistance range : R025 to 82K
Tolerance available : 1% - 10%
Applications : Industrial and consumer electronics.
Features :
- Fibre glass & ceramic core available.
- Ceramic encased for high degree of insulation & low surface temperature.
- Impulse types available.
- Non inductive type available.

HCL

Power rating : 10W to 40W
Resistance range : R10 to 68K
Tolerance available : 5% - 10%
Applications :
Commercial and industrial electronics.
Features :
- Fibre glass & ceramic core available.
- Ceramic encased for high power dissipation.
- Radial terminations for Amp 187 & Amp 250 connectors available.
- Available with mounting bracket which also serves as heat sink.

HSV

Power rating : 4W to 17W
Resistance range : R04 to 82K
Tolerance available : 1% - 10%
Applications :
- Space saving, vertical mounting resistors.
- Consumer and industrial applications.

Features :
- Choice of fibre glass or ceramic core.
- Choice of mounting pillars for additional stability.
- Non inductive type available.

HMW

Power rating : 5W & 9W
Resistance range : R18 to 18K
Tolerance available : 1 % - 10%
Applications :
Commercial and industrial electronics.
Features :
- Flat vertical mounting type-PCB pluggable style.
- Ceramic and fibre glass core available.
- Impulse types available.
- Non inductive types available.

HSVA/HSVAU

Power rating : 4W to 17W
Resistance range : R04 to 82K
Tolerance available : 1% - 10%
Applications :
- Both axial & space saving vertical mounting resistors.
- Consumer and industrial applications.

Features :
- Choice of fibre glass or ceramic core.
- Dual purpose mounting in HSVAU series is an useful inventory reducer for broad line distributor.

HMV

Power rating : 2.5W to 15W
Resistance range : R04 to 36K
Tolerance available : 1% - 10%
Applications : Industrial & consumer electronics.
Features :
- Flat vertical mounting type.
- Ceramic and fibre glass core available.
- Ceramic legs for greater stability also act as heat sink.
- Impulse types available.
- Non inductive types available.
- PCB space saving resistor.

LOW OHM/CURRENT SENSE SHUNT RESISTORS

CERAMIC ENCASED

AEC-Q200 QUALIFIED

RoHS COMPLIANT

RL

Power rating : 0.5W to 10W
Resistance range : R0015 to R80
Tolerance available : 0.5% - 10%
Applications : • Current sensing in applications which include switching and linear power supplies, instruments & power amplifiers.
Features :
- Alloy ribbon element in cylindrical ceramic body.
- **Superior alternative to replace moulded device of identical size.**
- Negligible inductance • Highly thermal efficient power to size ratio • Low TCR.

HMVL

Alloy Ribbon Element/
Flat Vertical Mounting
Power rating : 2.5W to 15W
Resistance range : R004 to R20
Tolerance available : 0.5% - 10%
Applications :
- Current sensing
- Industrial and consumer electronics.

Features :
- Flat vertical mounting type • Negligible inductance • PCB space saving resistor • Ceramic legs for greater stability also act as heat sink.

HCAL

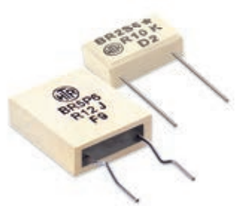
Power rating : 1W to 20W
Resistance range : R002 to R20
Tolerance available : 0.5% - 10%
Applications :
- Current sensing for industrial and power conditioning applications.

Features :
- Alloy ribbon element
- Ceramic encased for greater heat dissipation and thermal stability.
- Low TCR • Negligible inductance.

BR

Slim Type, Metal Plate/
Preformed resistance strip
Power rating : 2W to 10W
Resistance range : R01 to 1R8
Tolerance available : 3% - 10%
Applications :
- Reduces switching distortion at high frequency • Audio amplifier.

Features:
- Negligible inductance
- Twin style available.
- PCB pluggable with option of various pitch and stand off heights.



HEAL

Power rating : 2.5W to 12W
Resistance range : R0025 to R20
Tolerance available : 0.5% - 10%
Applications :
- Current sensing for industrial and power conditioning applications.

Features :
- Alloy ribbon element in square profile ceramic tube.
- Ceramic encased for greater heat dissipation and thermal stability.
- Low TCR • Negligible inductance.

LOW OHM/CURRENT SENSE SHUNT RESISTORS

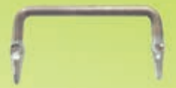
OPEN FRAME

AEC-Q200 QUALIFIED

RoHS COMPLIANT

HOW

Power rating : 2W, 3W & 6W
Resistance range : R002 to R03
Tolerance available : 1% - 10%
Applications : Usage in switching, Linear power supplies, Instruments, Regulators and other modern current sensing circuits.
Features :
• Open frame PCB mounting • Negligible inductance



HEW

Power rating : 1W to 5W
Resistance range : R0025 to R10
Tolerance available : 1% - 10%
Applications : Usage in switching, linear power supplies, instruments, regulators & other modern current sensing circuits.
Features : • Open frame PCB mounting radial type.
- Edge welding for reduced PCB footprint.
- Negligible inductance • Very low TCR available.

OF

Power rating : 1W to 10W
Resistance range : R001 to R10
Tolerance available : 1% - 10%
Applications :
Usage in switching, linear power supplies, instruments, regulators & other modern current sensing circuits.
Features :
- Open frame PCB mounting radial type.
- Monolithic construction for superior stability.
- Negligible inductance.
- Very low TCR available.

OA

Power rating : 1W to 3W
Resistance range : R003 to R10
Tolerance available : 1% - 10%
Applications :
Usage in switching, linear power supplies, instruments, regulators and other modern current sensing circuits.
Features :
- Open frame axial type.
- Negligible inductance.
- Low TCR.

OW

Power rating : 1W, 1.2W & 1.5W
Resistance range : R015 - R16
Tolerance available : 5% and 10%
Applications :
Usage in switching,
linear power supplies, instrumentation & other modern current sensing circuits.
Features :
- Open frame PCB mounting (wire type).
- Monolithic construction.
- Negligible inductance.

OP

Power rating : 0.5W to 5W
Resistance range : R0015 to R10
Tolerance available : 1% - 10%
Applications :
Usage in switching,
linear power supplies, instruments, regulators & other modern current sensing circuits.
Features :
- Open frame PCB mounting radial type.
- Negligible inductance.
- Low TCR.

OFSC

Power rating : 5W & 10W
Resistance range :
For 5W - R00012 to R002 ,
For 10W - R0004 to R003
Tolerance available : 1% - 10%
Applications :
Highly accurate current sensing applications in automotive & industrial electronics.
Features :
- Four terminals for highly accurate current sensing applications.
- UL approved flame retardant coating.
- Increased lead diameter for high current handling capability.

LOW OHM / CURRENT SENSE RESISTORS

ELECTRON BEAM WELDED

AEC-Q200 QUALIFIED

RoHS COMPLIANT

HBE

Power rating : 2W to 7W
Package size : 2726
Resistance range : R0002 to R005
Tolerances available : ± 1% (0.5% and other tolerance available on request)
Applications:
- Current sensing for power hybrid applications.
- Automotive applications that require high current capability.
- Frequency convertors
- Power modules.

Features:
- 5W constant power in R0005.
- 4 terminal connections for exceptionally accurate measurement.
- Excellent long term stability due to nature of construction.

HRE

Power rating : 2W, 3W, 4W and 5W
Package size : 4026
Resistance range : R0002 to R005
Tolerances available : ± 1% (0.5% and other tolerance available on request)
Applications:
- Current sensor for power hybrid applications.
- High current applications for automotive market.
- Frequency convertors
- Power modules.

Features:
- 5W constant power possible in R0002.
- Constant current carrying capability upto 160 amp (R0002).
- Sturdy copper connectors.
- Maximum solder temperature upto 350°C for 30 seconds.

HSE

Power rating : 2W to 5W
Package size : 3920
Resistance range : R0000 to R005
Tolerances available : ± 1% (0.5% and other tolerance available on request)
Applications :
- Accurate current sensing for power hybrid applications.
- Automotive applications that require high current capability.
- Frequency convertors
- Power modules.

Features :
- 5W constant power.
- Capable of carrying current upto 160 amp (R0002) on continuous basis.
- Sturdy copper connectors
- Excellent long term stability.

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HEB

Power rating : 6W to 50W
Package size : 6315/6918/6018/5216 7036/5520/8518/8420
Resistance range : R00003 to R001
Tolerances available : ±5%, ±1% and ±0.5%
Applications:
- Current sensor for EBM (Electronic Battery Management) in motorcars, trucks, forklifts, hybrid & electric vehicles.
- Current sensing in bus bars.
- Current sensing in welding equipments.

Features:
- Upto 15W permanent power in free air.
- Continuous current load upto 350 A (0.1 mΩ).
- High pulse power rating
- Max. fastening torque 12 Nm.

HBM

Power rating : 2W, 3W & 5W
Package size : 1216
Resistance range : R0003 to R003
Tolerances available : 1% to 5%
Applications:
- Current sensor for power hybrid applications.
- Automotove applicatinos that require high current capability.
- Frequency convertors
- Power Modules.

Features:
- 5W constant power possible in R0005.
- 4 terminal connections for exceptionally accurate measurement.
- Excellent long term stability due to nature of construction.

HVE

Power rating : 5W
Package size : 5515
Resistance range : R0001 to R0005
Tolerances available : 1% to 10%
Applications:
- Designed for precision energy meter applications.
- Current sensing in bus bar • Current sensing in welding equipments.
- Current sensing in battery chargers.

Features:
- Upto 5W perment power in free air.
- High pulse power rating (1KW for 0.1 Sec - Single pulse).
- Punched component of Electron Beam Welded Copper / Manganina Copper / Cupper Strip (Cu Mn 12 Ni).

HEE

Power rating : 4W to 10W
Package size : 5930
Resistance range : R0001 to R002
Tolerances available :
± 1% (0.5% & other tolerance available on request)
Applications:
- Accurate current sensing for power hybrid applications.
- Suitable for welding on bus bars.
- High current applications for automotive market.
- Frequency convertors • Power Modules.

Features:
- 10W constant power possible in R0002.
- Capable of carrying current upto 225 amp (R0002) on continuous basis.
- Sturdy copper connectors
- Excellent long term stability.
- Maximum solder temperature upto 350°C for 30 seconds.

HOS

Power rating : 2W, 3W & 5W
Package size : 4512/4524
Resistance range : R001 to R05
Tolerances available :
±5%, ±3%, ±2%, ±1%
Applications:
- Current sensor for Power hybrid applications.
- In the automotive sector for high current applications.
- Where reduced temperature is required on the PCB.

Features :
- Reduced PCB heating due to open air flow design.
- Flexible nature of termination design for thermal expansion.

HHE

Power rating : 5W
Package size : 3820
Resistance range : R0003 to R002
Tolerances available : ± 1% (0.5% and other tolerance available on request)
Applications :
- Power tools due to nature of physical construction.
- High current applications for the automotive sector .
- Frequency convertors
- Power modules.

Features :
- 5W constant power possible in R0003.
- Constant current carrying capability upto 120 amp (R0003).
- Sturdy copper connectors.
- Excellent long term stability.

HTE

Power rating : 1W, 1.5W, 2W & 3W
Package size : 2512/1206
Resistance range : R000 to R01
Tolerances available :
± 1% (0.5% & other tolerance available on request)
Applications:
- Sensor of current for Power hybrid applications.
- Automotive sector for high current applications.
- Frequency convertor/Power modules.

Features :
- Excellent long term stability.
- Ideal for mounting on DCB/IMS substrates.
- High temperature application due to nature of design.

SURFACE MOUNT (SMD) RESISTORS

AEC-Q200 QUALIFIED

RoHS COMPLIANT

HCAS/HCALS

Power rating : 2W & 3W
Package size : 4527/6927
Resistance range : R001 to 5K6
Tolerances available : 1% - 10%
Features :
- Wire Wound and Alloy Ribbon element options.
- Ceramic encased for greater heat dissipation & thermal stability.
- Package size 2W - 4527, 3W - 6927.
- Tape and reel packing for pick & place machine.
- Fusible type available.
- Non inductive type available.
- Impulse resistors as per IEC 61000-4-5.

HSVAS/HSVALS

Power rating : 4W & 5W
Resistance range : R003 to 16K
Tolerances available : 1% - 10%
Features :
- Wire wound and alloy ribbon element options.
- Ceramic encased for greater heat dissipation and thermal stability.
- Fusible type available.
- Non inductive type available.
- Impulse resistors as per IEC 61000-4-5.

HIAS

Power rating : 1W to 5W
Resistance range : R01 to 22K
Tolerances available : 1% - 10%
Applications : Fills the gap for melf and surface mount resistors in applications which are too severe for film resistors.
Features :
- Wire wound with multiple SMD mounting configurations.
- UL approved flame retardant coating
- Non inductive types available.
- Impulse resistors as per IEC 61000-4-5.
- 1W and 2W – MELF type
- Tape & reel packing for pick & place machine.

RLS

Power rating : 1.5W to 5W
Resistance range : R0015 to R39
Tolerances available : 1% - 10%
Applications :
Current sensing in applications which include switching and linear power supplies, instruments and power amplifiers.
Features :
- Alloy ribbon element in cylindrical ceramic body
- **Superior alternative to replace moulded device of identical size.**
- Negligible inductance
- Highly thermal efficient power to size ratio.
- Any resistance value possible within resistance range given.
- Low TCR.

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RoHS COMPLIANT

AUTOMOTIVE RESISTIVE DEVICES

CUSTOMISED AUTOMOTIVE RESISTIVE DEVICES

HANS

Resistance range : 1K to 10K
Tolerances available : 5% - 20%
Applications : Automotive
Features :
- NOISE SUPPRESSOR RESISTORS
- Noise suppressor wire wound resistor
- Reduces RFI during electrical discharges on petrol engines in cars and in scooters/motorcycles.
- ROHS compliant.

HANS C

Resistance range : 1K to 10K
Tolerances available : 5% - 20%
Applications : Automotive
Features :
- NOISE SUPPRESSOR RESISTORS
- Noise suppressor wire wound resistor
- Reduces RFI during electrical discharges on petrol engines in cars and in scooters/motorcycles.
- ROHS compliant.

HANS S

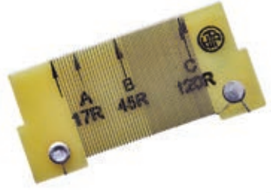
Resistance range : 1K to 10K
Tolerances available : 5% - 20%
Applications : Automotive
Features :
- NOISE SUPPRESSOR RESISTORS
- Noise suppressor wire wound resistor
- Reduces RFI during electrical discharges on petrol engines in cars and in scooters/motorcycles.
- ROHS compliant.

For Power window applications.

For Electronic braking and steering applications.

Customised resistive devices for engine cooling systems.

Fuel guage application



CUSTOMISED AUTOMOTIVE RESISTIVE DEVICES

HVAC APPLICATIONS

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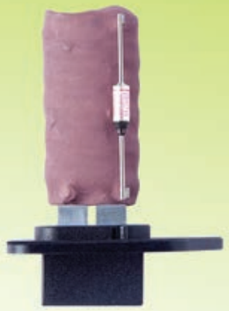

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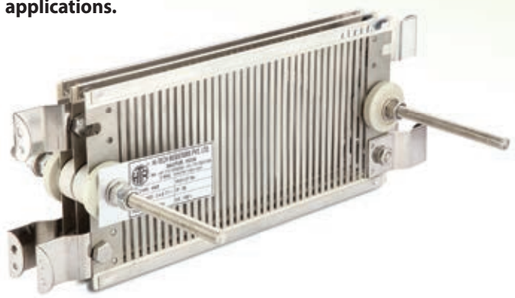
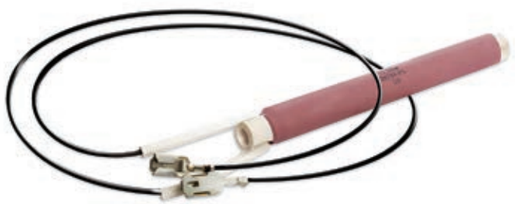
CUSTOMISED RESISTIVE DEVICES

INDUSTRIAL APPLICATIONS

For windpower applications.



Load Banks resistors



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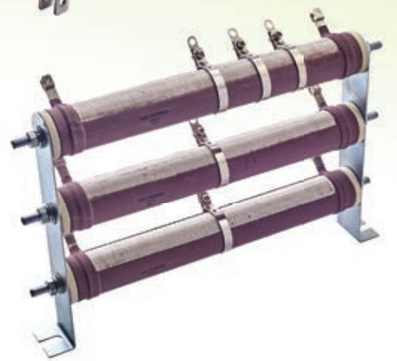
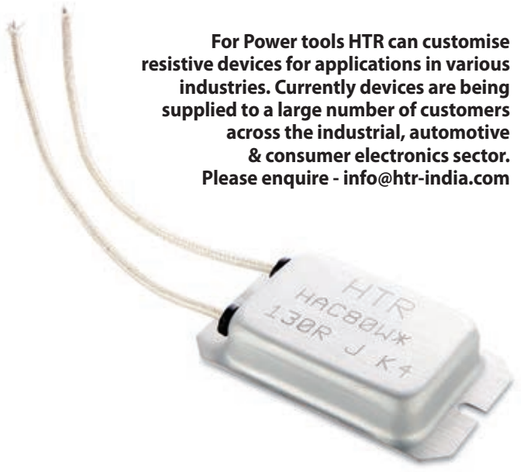
Ressistor fitted with cables for bimetallic switch



For Power tools HTR can customise resistive devices for applications in various industries. Currently devices are being supplied to a large number of customers across the industrial, automotive & consumer electronics sector. Please enquire - info@htr-india.com



CERTIFICATION : IATF 16949 : 2016

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DNV

MANAGEMENT SYSTEM CERTIFICATE

Certificate no.:
22919-2008-AQ-IND- IATF

Valid:
23 July 2021 – 05 March 2024

IATF Certificate No:
0412949

This is to certify that the management system of

Hi-Tech Resistors Pvt. Ltd.

Plot No. EL-1, MIDC, Hingna Road,Nagpur - 440016, Maharashtra, India

and, if applicable, the remote supporting locations as mentioned in the Appendix accompanying this Certificate

has been found to conform to the Quality Management System standard:

IATF 16949:2016

This certificate is valid for the following scope:

DESIGN, MANUFACTURE OF WIRE WOUND, LOW OHM / CURRENT SENSE, HVAC AND ENGINE COOLING RESISTOR

EXCLUSION: NONE

Place and date:
Katy, TX, 23 July 2021

For the issuing office:
DNV - Business Assurance
1400 Ravello Drive, Katy, TX, 77449-5164, USA

Sherif Mekkawy
Management Representative

Lack of fulfilment of conditions as set out in the Certification Agreement may render this Certificate invalid.
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DISTRIBUTORS- INDIA

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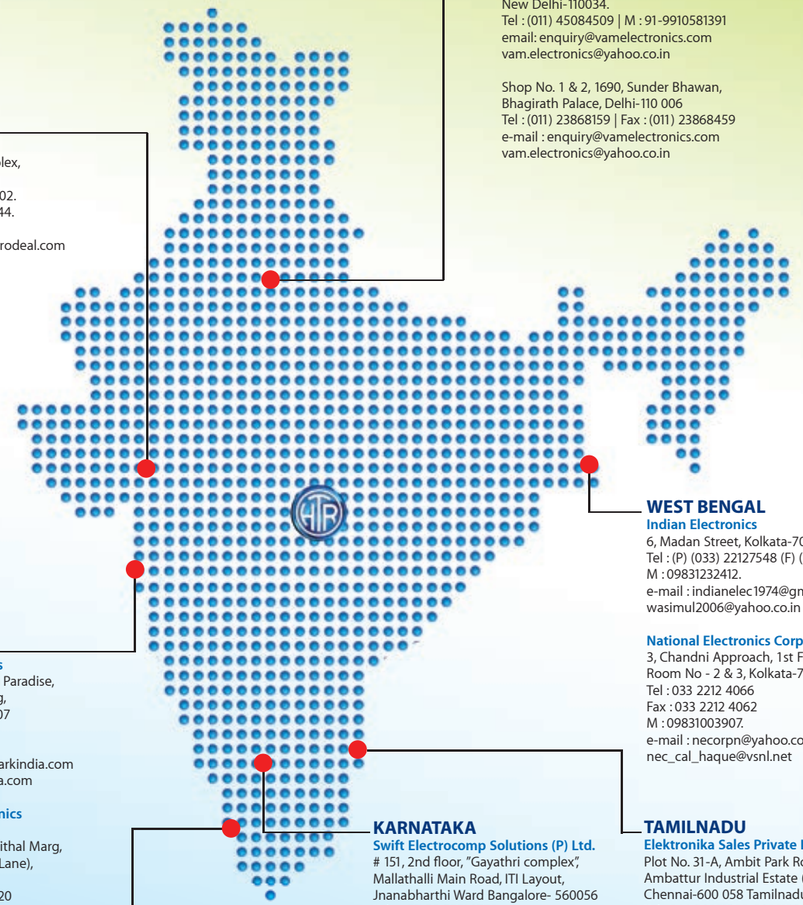

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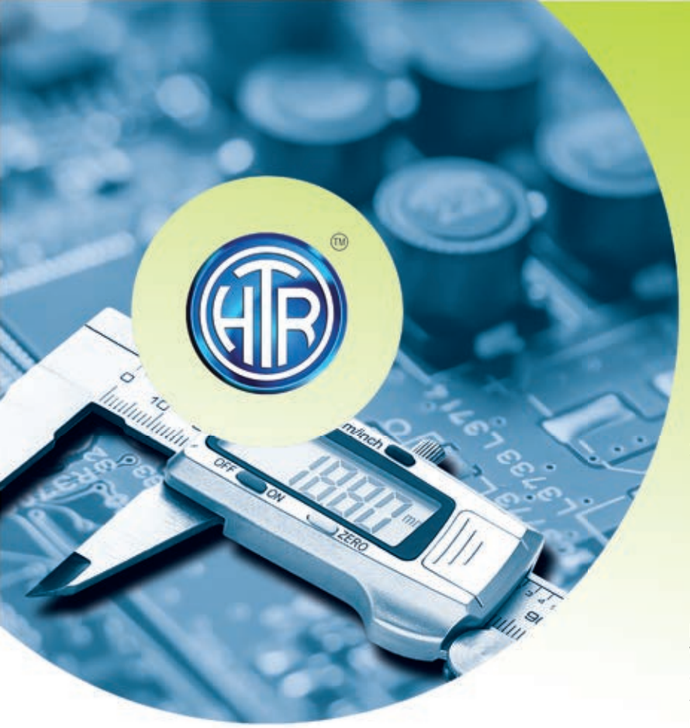


AEC-Q200 QUALIFIED
RoHS COMPLIANT

APPLICATION / DESIGN NOTES ON SELECTION OF WIRE WOUND RESISTORS

BASICS

Simply put, a resistor is an electronic component connected into an electrical circuit to insert a specific resistance. Resistance is measured in ohms and as per ohms law, the current through the resistor will be directly proportional to the voltage across it and inversely proportional to the resistance. As the current flows through the resistor, heat is produced which makes the temperature of the resistor to rise above the ambient temperature.

Now whether a particular resistor can be used in a specific electrical circuit is its ability to dissipate the heat generated without physical deterioration and within the temperature limits of that particular circuit.

Resistors are rated to dissipate a given wattage without exceeding the declared **"hot spot"** temperature. This is largely determined by the size and materials used in the construction of the resistor and this is called **"Free Air Watt Rating"** or **"Full Rating"** or **"Maximum Power Rating".**

In some cases the conditions actually encountered deviate from the standard conditions and affect the temperature rise which determines whether that particular resistor can be used or not in a particular application.

SELECTION PROCESS – Stepwise Guide

1. **Decide the resistance value required**
   The following formulae derived from Ohms law can be used for this purpose –
   $R = V/I$ or $I = V/R$ or $V = I \times R$ where,
   (R is resistance in ohms, V is voltage in volts and I is current in Amperes)

2. **Decide the watts (Power) to be dissipated by the resistor**
   $W = I^2 \times R$ or $W = V \times I$ or $W = V^2/R$ where,
   (W is Power Rating / Wattage in watts,
   I is current in Amperes,
   R is resistance in ohms and
   V is Voltage in volts.)

Note:
Whilst the power rating in watts can be theoretically determined as above, a note of caution is now introduced – It is important that the actual current that will be drawn is used in the determination of the power rating / wattage of the resistor. Small increases in current or voltage e.g. 20% translate into 44% increase in the power rating / wattage required to dissipate the increased current / voltage within temperature rise limitations. At this point it is also worth mentioning that the designer should also make allowance for the maximum possible line voltage.

3. **Decide the correct physical size ("watt size") based on the following parameters – watts, volts, temperature that can be permitted in the particular circuit and mounting consideration.**

The wattage rating of a resistor as established under specified standard conditions is defined as **"Free Air Watt Rating" (Maximum Power Rating).**

The following method is broadly used to determine **"Free Air Watt Rating"** based on the methods followed by "National Electrical Manufacturers Association" – USA (NEMA), "Underwriters Laboratories Inc." (UL) and US MIL – R26 – US Military Specification for wirewound resistors.

In US MIL – R26, there are mainly 2 broad characteristics of resistor types – characteristic 'V' and characteristic 'U'. Characteristic 'V' resistors are required not to exceed a maximum operating temperature of 350°C, which corresponds to a maximum temperature rise of 325°C at ambient temperature 25°C.

Characteristic 'U' resistors are required not to exceed a maximum operating temperature of 275°C, which corresponds to a maximum temperature rise of 250°C with ambient temperature 25°C. The temperature is normally measured on the body of the resistor, suspended in free still air space with unrestricted circulation of air.

When current passes through a resistor, heat is generated and the temperature stabilizes when the sum of heat loss (by termination conduction, radiation and convection) equals the heat input rate (created by passing current proportional to wattage).

By rule of thumb, the larger the resistor, hence greater the area for heat dissipation, the lower the temperature rise. Having said this, it must be admitted that certain other factors such as thermal conductivity of the ceramic core, type and gauge of resistance wire selected and the heat-sink effect of the type of mounting all influence the selection of a resistor to be considered having "acceptable service life".

Further consideration must be given in case the resistor will be operated in elevated ambient temperatures higher than 25°C or 30°C, the power rating must be derated as per the derating curve provided with each HTR series data sheet.

For the design engineer's general guidance, we give below the temperature rise that is generally observed on silicon coated axial resistors (ambient temperature of 30°C) at Maximum Power Rating / Free Air Rating.

Maximum Power Rating (30°C ambient)	▲ Temperature Rise on Body of Resistor	▲ Temperature Rise on Termination of Resistor
1 W	50°C to 80°C	35°C
2 W	60°C to 90°C	37°C
3 W	65°C to 95°C	42°C
4 W	80°C to 110°C	45°C
5 W	100°C to 130°C	45°C
6 W	105°C to 135°C	46°C
7 W	125°C to 155°C	50°C
10 W	140°C to 170°C	50°C
15 W	155°C to 185°C	52°C

▲ **Absolute temperature can be arrived at after adding the prevalent ambient temperature at time of test to the temperature rise figures provided above.**
These figures merely serve as a guide to a design engineer and must be verified in actual practical conditions by the design engineer before selection and use of a particular resistor.

4. Decide the actual resistor to be used - based on **actual** practical considerations.
   Having determined the Wattage / Free Air watt rating on theoretical basis, the designer must now take the following factors into account when deciding on the actual resistor to be used in the application, as all these factors will influence the temperature rise :
   a. The influence of Ambient Temperature - All the components of an electronic circuit have their own limitations as to the maximum temperature at which they can reliably function.
   The temperature that the component rises to in service is the sum of the ambient temperature plus the temperature rise due to heat dissipated by each component during operation. Some devices can tolerate elevated temperatures whilst others cannot.
   Wire wound resistors can operate fairly reliably at reasonably elevated temperatures, so in order to ensure that the heat generated by the resistor is minimized, the designer may move to a higher power rating from the theoretical calculation to minimize the temperature rise and minimize the effects of heating on other devices which are heat sensitive in the circuit.
   b. The design of the Enclosure - The walls of the enclosure form a thermal barrier, preventing heat from escaping and preventing the outside air from entering and providing cooling. Hence, due care must be given to the optimum design / orientation of the ventilation openings of the enclosure.
   c. Spacing - In case due to design limitations, if heat generating components are bunched together, they will show a higher temperature rise due to heat received by radiation from each other. Therefore it is prudent if at all possible that the designer tries to prevent bunching of heat generating components and if this is not possible, moves to a higher power rating to minimize temperature rise.
   d. Surges - In certain applications for e.g. typically motor controllers, the resistors do encounter surge conditions which if not properly managed and taken into account at the time of designing the resistor, will lead to resistor failure.
   A **"Surge"** occurs over such a short period of time, in the case of capacitor charge / discharge < 1 msec and in the case of motor start-up < 0.5 sec, that the substrate plays no role in heat dissipation and the energy must be completely absorbed by the resistive element itself. Please refer to the section **"Pulse/Surge Capability of Resistors"** on our website in the design notes section.
   Hence surge conditions, if any must be taken into consideration at this stage to determine the correct resistor for that application.
   e. Forced Air Circulation - In cases where the apparatus in which the resistor is mounted is heat sensitive or for certain reasons resistor used is of a lower than optimum wattage for that particular application, forced air circulation removes more heat in a shorter time than natural convection and is advised in the circumstances enumerated above.
   f. Derating - It is always advisable that a resistor should be derated and not operated at its actual power rating for long term reliability.
   Suitable derating also contributes greatly to the minimization of "Drift Underload" phenomena observed in change in resistance value when a resistor is in operation.
   g. Higher Resistance Value - In order to achieve higher resistance values, the diameter of the resistance wire wound on the substrate is a very fine gauge, sometimes as little as 0.016mm, hence for maximum reliability it is suggested that the designer opts for a higher power rating if size is not a constraint in order to reduce the temperature rise.
   h. High Frequency Circuit - Wire wound resistors may be effectively used in circuits with frequency upto 50KHz when non inductively wound by the 'Aryton-Perry' method of winding.

For further details on this subject, please refer to the section **"Wire wounds and their limitations when used in a high frequency circuit"** in the **"Design notes"** section of the website under **"Guide to optimum utilization & mounting of resistors".**

HTR RESISTOR FINDER (MOBILE APP & DESKTOP)

HTR Resistor Finder is a pioneering handy tool from HTR for design engineers and purchase executives in various industries that use Power Resistors. It is a quick fix tool for teachers/students searching for standard resistive devices. It is also a window to newly introduced cutting edge resistive devices.

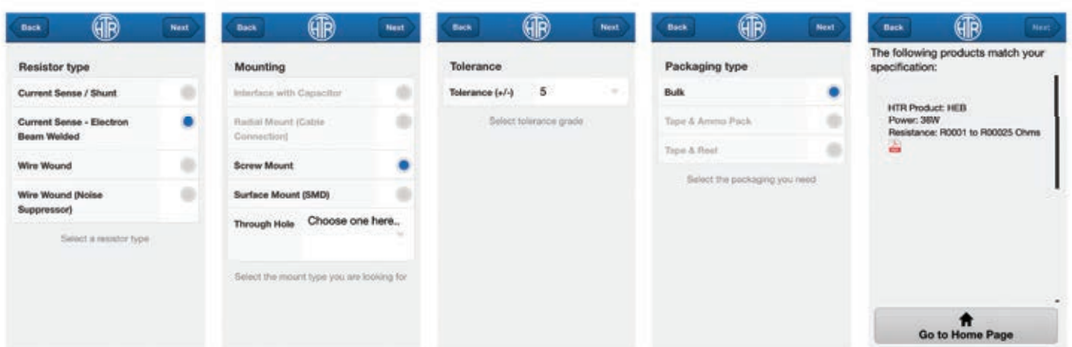
The application eases your search for resistors by categorizing search specifications into two kinds:

1. Find resistor by parameters
2. Find a replacement resistor

1. Find resistor by parameter:

The search for an appropriate resistor is facilitated by choice of resistor type, mount type, the required tolerance grade and the packaging type in subsequent screens.

Once the parameters are selected on subsequent screens, the required resistor type, its datasheet summary and web link are displayed on the screen.

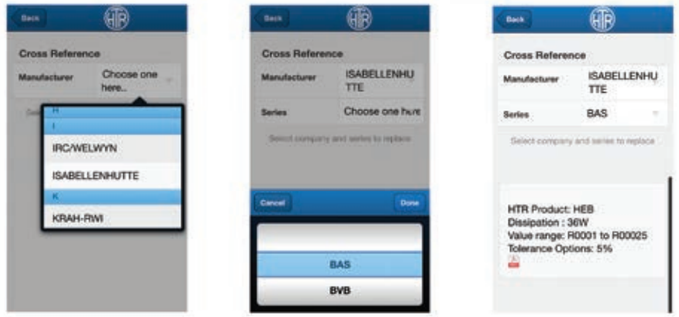


2. Find a replacement resistor:

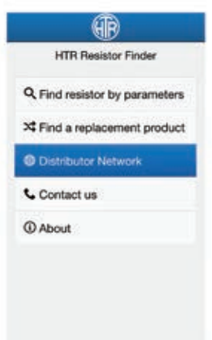
The application also caters to the need for finding an HTR equivalent of a product by another manufacturer. It assists you by offering a wide range of world's leading manufacturers to choose from.

The subsequent screens prompts for selection of a resistor series for which the replacement is needed.

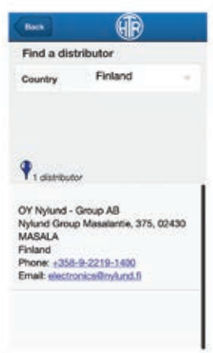
The equivalent HTR series, it's datasheet summary and web link appear immediately thereafter.



3. Distributor Network:



Apart from these effortless methods to find the required product, the application also helps to find HTR distributors from across the globe.



Categorized on the basis of countries, it gives you options of all countries where HTR distributors are located.
Upon selection, it presents a list of distributors in that country.