

По вопросам продаж и поддержки обращайтесь:

Алматы (7273)495-231	Казань (843)206-01-48	Новокузнецк (3843)20-46-81	Смоленск (4812)29-41-54
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Россия (495)268-04-70	Киргизия (996)312-96-26-47	Казахстан (7172)727-132	

Customized Stainless Steel Braking Resistor



CAPABILITIES

- **Low power:** load bank, overvoltage limiter, crowbar, precharge, dynamic braking
- **Medium power:** braking (tramways, subways, rolling mills), inrush current limiter, static load bank
- **High power:** braking (locomotive, high speed train, haul mining trucks), control of high power motors, power generator load bank

STANDARD ELECTRICAL SPECIFICATIONS RANGE OVERVIEW

MODEL	RATED POWER W	COOLING
Low power	1K to 20K	Natural
Medium power	10K to 400K	Natural or forced
High power	1M to 5M	Forced

DESCRIPTION

Vishay MCB has established an expertise in the field of high and very high power resistors. We support the traction markets, including railway, haul mining trucks and naval, motor power control, power generators.

These examples are representative of our main markets.

Our range of products is not limited to these models.

Please do not hesitate to contact us for further details about your application.

PERFORMANCE FROM DESIGN TO SERVICE

Our product range utilizes standardized and modular elements, combined into tailored systems, optionally including cooling systems.

This ensures:

- faster design, qualification, production
- ultimate reliability, the vast majority of key components are broadly utilized and proven in the field
- a guaranty of long time availability, service, and spares
- competitiveness through a scale economy

From your specification, Vishay MCB will provide a solution which is both technically and economically optimized.

THERMAL YIELD

The design, achieved through an extensive utilization of computer assisted design of mechanical and thermal models grants high thermal performances.

STABILITY / LOW MAINTENANCE COST

Vishay MCB's metal resistors do not require any specific maintenance.

Periodic inspection and cleaning is what it takes.

RELIABILITY

Stabilized processes including:

- electric welding of resistive elements and connections
- resistive elements stamping without restriction of the electrical path

The way mechanical parts are secured:

- expansion focused and controlled
- fixation on cold areas

High grade materials selection: ensure reliability and ruggedness in the most severe conditions.

Customer Special Ribwound Resistor (CS61), Wirewound Resistors, Industrial Power, Tubular, Fixed, Adjustable, RBEF, RBSF, RBEA, RBSA


**RoHS
COMPLIANT**
CAPABILITIES

- Customer special design options include
 - Electrical: Tolerance, wattage, resistance, dielectric withstanding voltage, surge ability, temperature coefficient
 - Mechanical: Overall dimensions, mounting type, and configuration, insulation
 - Connection: Wire leads, connectors, terminal type, size, set-in, and material

GLOBAL PART NUMBER INFORMATION

Global Part Numbering example: CS610300R3000B1234 (CS61 300 W 0.3 Ω Bulk 1234)

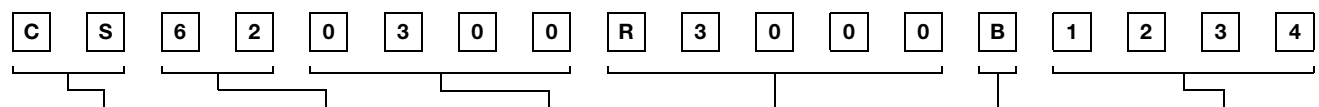
C	S	6	1	0	3	0	0	R	3	0	0	0	B	1	2	3	4
MODEL (2 digits)		TYPE (2 digits)		SIZE (4 digit)				VALUE (5 digits)					PACKAGING (1 digit)	SPECIAL (4 digits)			
CS		61 = Ribwound		Sample Sizes: K = Thousand 0300 = 300 W 19K5 = 19.5 kW				Sample Sizes: L = mΩ R = Decimal K = Thousand 5L000 = 0.005 Ω R1500 = 0.15 Ω 1K500 = 1.5 kΩ resultant wattage					B = Bulk	Allowable range: 0000 to ZZZZ alphanumeric 1234 = Internal customer drawing number			

Customer Special Roundwire Resistor (CS62), Wirewound Resistors, Industrial Power, Tubular, Fixed, Adjustable, RDEF, RDSF, RDEA, RDSA


**RoHS
COMPLIANT**
CAPABILITIES

- Customer special design options include
 - Electrical: Tolerance, wattage, resistance, dielectric withstanding voltage, surge ability, temperature coefficient
 - Mechanical: Overall dimensions, mounting type, and configuration, insulation
 - Connection: Wire leads, connectors, terminal type, size, set-in, and material

GLOBAL PART NUMBER INFORMATION

 Global Part Numbering example: **CS620300R3000B1234** (CS62 300 W 0.3 Ω Bulk 1234)


MODEL (2 digits)	TYPE (2 digits)	SIZE (4 digit)	VALUE (5 digits)	PACKAGING (1 digit)	SPECIAL (4 digits)
CS	62 = Roundwire	Sample Sizes: K = Thousand 0300 = 300 W 19K5 = 19.5 kW	Sample Sizes: L = mΩ R = Decimal K = Thousand 5L000 = 0.005 Ω R1500 = 0.15 Ω 1K500 = 1.5 kΩ resultant wattage	B = Bulk	Allowable range: 0000 to ZZZZ alphanumeric 1234 = Internal customer drawing number

Customer Special Edgewound Resistor (CS63), Wirewound Resistors, Industrial Power, Tubular, Fixed, Adjustable, EDG, EDGF, EDGU


**RoHS
COMPLIANT**
CAPABILITIES

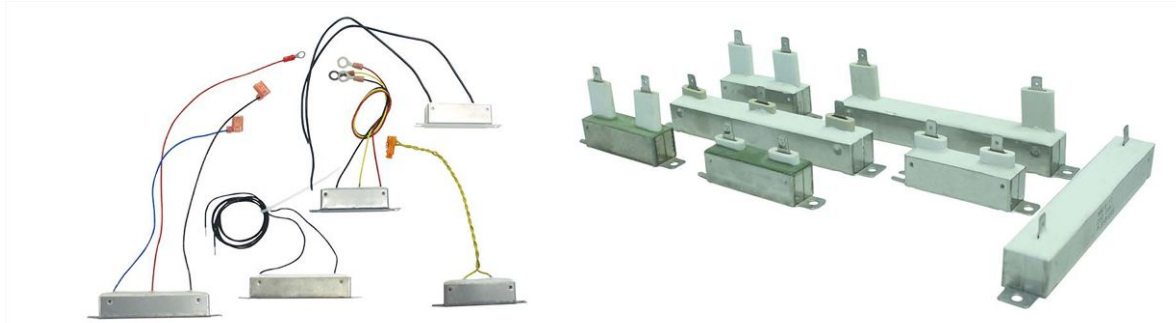
- Customer special design options include
 - Electrical: Tolerance, wattage, resistance, dielectric withstanding voltage, surge ability, temperature coefficient
 - Mechanical: Overall dimensions, mounting type, and configuration, insulation
 - Connection: Wire leads, connectors, terminal type, size, set-in, and material

GLOBAL PART NUMBER INFORMATION

Global Part Numbering example: CS630300R3000B1234 (CS62 300 W 0.3 Ω Bulk 1234)

C	S	6	3	0	3	0	0	R	3	0	0	0	B	1	2	3	4
MODEL (2 digits)		TYPE (2 digits)		SIZE (4 digit)				VALUE (5 digits)					PACKAGING (1 digit)	SPECIAL (4 digits)			
CS		63 = Edge power		Sample Sizes: K = Thousand 0300 = 300 W 19K5 = 19.5 kW				Sample Sizes: L = mΩ R = Decimal K = Thousand 5L000 = 0.005 Ω R1500 = 0.15 Ω 1K500 = 1.5 kΩ resultant wattage					B = Bulk	Allowable range: 0000 to ZZZZ alphanumeric 1234 = Internal customer drawing number			

Customer Special Metal Case Resistor (CS65), Wirewound Resistors, Industrial Power, Tubular, Metal Case, MCR, MCRL


**RoHS
COMPLIANT**
CAPABILITIES

- Customer special design options include
 - Electrical: Tolerance, wattage, resistance, dielectric withstanding voltage, surge ability, temperature coefficient
 - Mechanical: Overall dimensions, mounting type, and configuration, insulation
 - Connection: Wire leads, connectors, terminal type, size, set-in, and material

GLOBAL PART NUMBER INFORMATION

 Global Part Numbering example: **CS650300R3000B1234** (CS62 300 W 0.3 Ω Bulk 1234)

C	S	6	5	0	3	0	0	R	3	0	0	0	B	1	2	3	4
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MODEL (2 digits)	TYPE (2 digits)	SIZE (4 digit)	VALUE (5 digits)	PACKAGING (1 digit)	SPECIAL (4 digits)
CS	65 = Metal case	Sample Sizes: K = Thousand 0300 = 300 W 19K5 = 19.5 kW	Sample Sizes: L = mΩ R = Decimal K = Thousand 5L000 = 0.005 Ω R1500 = 0.15 Ω 1K500 = 1.5 kΩ resultant wattage	B = Bulk	Allowable range: 0000 to ZZZZ alphanumeric 1234 = Internal customer drawing number

Customer Special Oval Resistor (CS66), Wirewound Resistors, Industrial Power, Tubular, Oval, Flat, OVSF


RoHS
COMPLIANT

CAPABILITIES

- Customer special design options include
 - Electrical: Tolerance, wattage, resistance, dielectric withstanding voltage, surge ability, temperature coefficient
 - Mechanical: Overall dimensions, mounting type, and configuration, insulation
 - Connection: Wire leads, connectors, terminal type, size, set-in, and material

GLOBAL PART NUMBER INFORMATION

Global Part Numbering example: CS660300R3000B1234 (CS62 300 W 0.3 Ω Bulk 1234)

C	S	6	6	0	3	0	0	R	3	0	0	0	B	1	2	3	4
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MODEL (2 digits)	TYPE (2 digits)	SIZE (4 digit)	VALUE (5 digits)	PACKAGING (1 digit)	SPECIAL (4 digits)
CS	66 = Oval	Sample Sizes: K = Thousand 0300 = 300 W 19K5 = 19.5 kW	Sample Sizes: L = mΩ R = Decimal K = Thousand 5L000 = 0.005 Ω R1500 = 0.15 Ω 1K500 = 1.5 kΩ resultant wattage	B = Bulk	Allowable range: 0000 to ZZZZ alphanumeric 1234 = Internal customer drawing number

Customer Special Resistors Mounted on Frames (CSFR), Wirewound Resistors, Industrial Power, Tubular, Fixed, Adjustable, Frame Mounted, EDG, RD, RB



RoHS
COMPLIANT

CAPABILITIES

- Customer special design options include
 - Electrical: Tolerance, wattage, resistance, dielectric withstanding voltage, surge ability, temperature coefficient
 - Mechanical: Overall dimensions, mounting type, and configuration, insulation
 - Connection: Wire leads, connectors, terminal type, size, set-in, and material

GLOBAL PART NUMBER INFORMATION

Global Part Numbering example: CSFR0300R3000B1234 (CS62 300 W 0.3 Ω Bulk 1234)

C	S	F	R	0	3	0	0	R	3	0	0	0	B	1	2	3	4
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MODEL (2 digits)	TYPE (2 digits)	SIZE (4 digit)	VALUE (5 digits)	PACKAGING (1 digit)	SPECIAL (4 digits)
CS	FR = Frame	Sample Sizes: K = Thousand 0300 = 300 W 19K5 = 19.5 kW	Sample Sizes: L = mΩ R = Decimal K = Thousand 5L000 = 0.005 Ω R1500 = 0.15 Ω 1K500 = 1.5 kΩ resultant wattage	B = Bulk	Allowable range: 0000 to ZZZZ alphanumeric 1234 = Internal customer drawing number

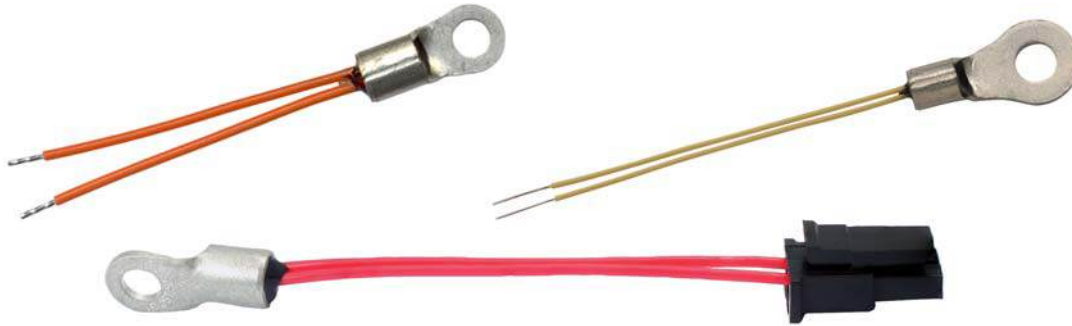
Customer Special Resistors in Enclosures (CSPR), Wirewound Resistors, Industrial Power, Tubular, Fixed, Adjustable, Enclosure, EDG, RD, RB


**RoHS
COMPLIANT**
CAPABILITIES

- Customer special design options include
 - Electrical: Tolerance, wattage, resistance, dielectric withstanding voltage, surge ability, temperature coefficient
 - Mechanical: Overall dimensions, mounting type, and configuration, insulation
 - Connection: Wire leads, connectors, terminal type, size, set-in, and material

GLOBAL PART NUMBER INFORMATION																	
Global Part Numbering example: CSPR0300R3000B1234 (CS62 300 W 0.3 Ω Bulk 1234)																	
C	S	P	R	0	3	0	0	R	3	0	0	0	B	1	2	3	4
MODEL (2 digits)	TYPE (2 digits)		SIZE (4 digit)				VALUE (5 digits)				PACKAGING (1 digit)	SPECIAL (4 digits)					
CS	PR = PRO		Sample Sizes: K = Thousand 0300 = 300 W 19K5 = 19.5 kW				Sample Sizes: L = mΩ R = Decimal K = Thousand 5L000 = 0.005 Ω R1500 = 0.15 Ω 1K500 = 1.5 kΩ resultant wattage				B = Bulk	Allowable range: 0000 to ZZZZ alphanumeric 1234 = Internal customer drawing number					

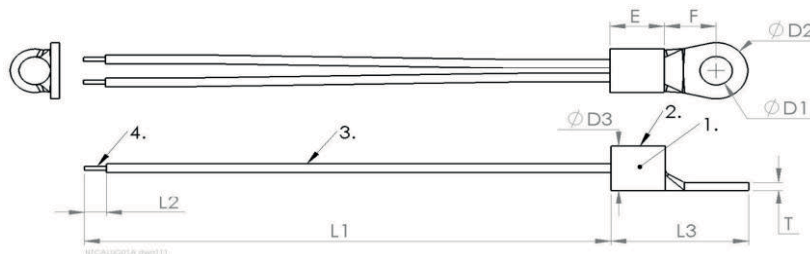
Custom Capabilities NTC LUG Ring Tongue



CAPABILITIES

- For different screw sizes, M2 to M8
- For different screw sizes, STUD#1 to #5/16
- Cables cross sections AWG#24 down to AWG#32
- Different cable lengths available
- Various RT tables (electrical curves)
- Standard connectors available
- **AEC-Q200 qualified available**
- **UL certifications available**
- **Minimum breakdown voltages 500 V_{AC} up to 3 000 V_{AC}**
- Insulated cables or non insulated wires
- Copper or nickel conductors, tin or silver plated
- Specific designs for high temperature operation for example 150 °C long term
- Designs for minimum breakdown voltage and insulation resistance
- 5 kV impulse voltage available (IEC 61800-5-1)

MECHANICAL OUTLINE



Notes

1. NTC Thermistor
2. Ring tongue, tin plated copper
3. Insulated cables or naked conductors
4. Cable insulation stripping or optional connector

CHARACTERISTICS

- **High voltage 500 V_{AC} to 3000 V_{AC}**
- Temperature range -40 °C to +105 °C (PVC)
- Temperature range -55 °C to +150 °C (others)

UL certified RT curves:

- $R_{25} = 5K \ B_{25/85} = 3984K \pm 0.5 \ %$
- $R_{25} = 10K \ B_{25/85} = 3435K \pm 1 \ %$
- $R_{25} = 10K \ B_{25/85} = 3984K \pm 0.5 \ %$

Custom Capabilities Position Sensors and Variable Resistors



CAPABILITIES

- Spring return systems (one direction: end stroke / both directions: middle position)
- Integrated switches (as an additional cup) electrically phased with other cups
- Anti-back lash gears mounted on shafts
- Output options: wires soldered on turrets
 - Thermo sleeves (covering turrets and wires)
 - Gold contacts crimped on end of wires
 - Connectors (upon customers' requests)
- Any special shaft machining upon request
- Custom molded housings possibly with integrated connectors
- Special electrical laws
- Additional filters integrated in cables
- Locking mechanical systems at zero position
- Special electronics interfaces (hall effect position sensors)
- Rotational position sensors without shaft (cable actuated)
- High torques
- PCB mounting and custom terminations

ADDITIONAL CUSTOM EXAMPLES

P11L; P11S, P11A



P16, PA16
P16S, PA16S



PE30
P30L



Model 351 HE



Model 981 HE



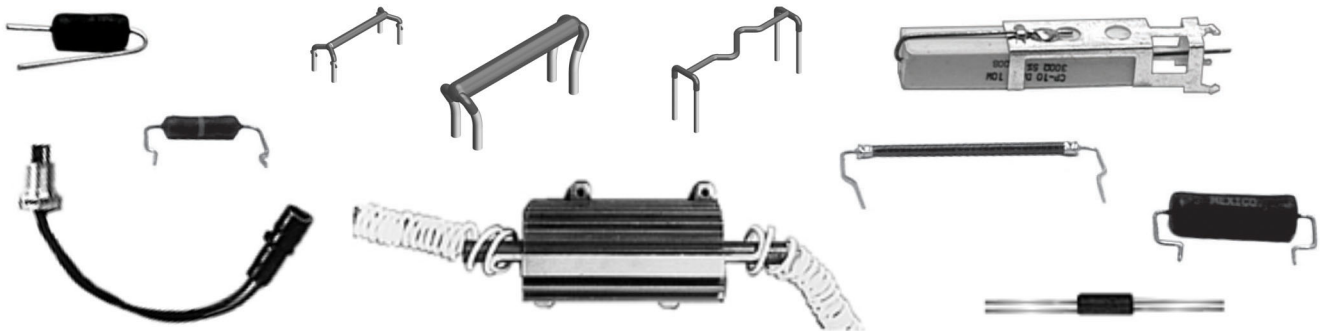
A1260HE



Series KIT LMF



Custom Capabilities Lead Formed, High Powered, Tab Terminations, Quick Connect Wirewound Resistors



CAPABILITIES

- Lead formed products
- Chassis mounts, circuit board mounting
- Heaters
- High TCR
- Quick connect, solder tab terminals
- Fusible types
- Current sensing
- High pulse capabilities
- Lightning surge / power cross capabilities

LEAD FORMED PRODUCTS

A variety of standard lead forms are available for use where auto-insertion is not available or practical. Forms vary from simple right angle lead bends, vertical hair pin bends, to lock in styles that lock into the circuit board. This provides for a positive stand-off while holding the part securely in place during further handling.

HIGH POWERED RESISTORS TAB TYPE TERMINATIONS CHASSIS, HEATSINK MOUNT

High power, low cost, ceramic- or metal-cased resistors are available in a range of wattage ratings and termination styles. From 20 W to 65 W (even more with proper heatsinks), these resistors can be supplied with quick connects or solder tab terminals. Brackets are available for mounting directly to a chassis or heatsink, or for vertical mounting if limited board space is available.

WIREWOUND OPTIONS

Construction

Heat sink, silicone coated, epoxy or silicone molded (single or multi-element), clip mounted or fireproof inorganic construction.

Leads

Radial and axial type, special materials and dimensions, spaded, threaded, insulated, quick connect, solder tab, printed circuit, ferrule.

Matching

By pairs or sets for TCR, tolerance or ratio.

Special Types

Extended low or high resistance range, low reactance, special wire alloys, very low or high TCR, high stability, special tolerances, tapped, watercooled, temperature sensitive, inductive.

Pre-Conditioning

Power aging, temperature cycling, temperature and power, short-time overload, thermal shock, X-ray, temperature aging.



Shunts

Low value, 4-terminal resistors built to customer specifications or designed by our engineers to meet your current sensing requirements.

Fuse Resistors

Our hybrid components designed to act as an ordinary resistor under normal circuit conditions, and as a fuse under fault conditions. Vishay Dale offers a variety of physical sizes and basic styles. Each application should be referred to Vishay Dale for an individual design to ensure optimum performance in any particular circuit.

For prompt attention to your special resistor requirements, contact Vishay per the e-mail address at the bottom of the page. The photo below illustrates only a few of the many special purpose wirewound resistors built by the Vishay Dale special products section of the wirewound division.

Full-time engineers assigned to this section draw on the industry's largest file of non-standard resistor design and production information. Often, in a matter of minutes, these engineers determine a fast, practical route to the production of your non-standard part.



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