



Ferrites and accessories

RM cores
General information

Date: February 2023

RM cores

General information

1 General information

The demand for coil formers with integrated pins for efficient winding gave rise to the development of compact RM (**R**ectangular **M**odular) cores. Furthermore, this design allows high PCB packing densities. RM coil formers and accessories are suited to automatic processing.

During assembly, RM cores are held in place by clamps which engage in recesses in the core base. The various clamping forces defined, which have been verified by TDK Electronics through measurements, are specified in the individual data sheets.

The core dimensions are matched to standard PCB grids. RM 6 means, for example, that the core with coil former fills a square basic area 6×6 modules (1 module $\triangleq 2.54$ mm) = 15.24×15.24 mm². The mainly used core sizes RM 4 through RM 14 are specified in IEC 63093.

2 Applications

- Originally RM cores from Siemens (today TDK Electronics) were essentially designed for two major applications, i.e.
 - very low-loss, highly stable filter inductors and other resonance determining inductors (materials N48, M33 and K1) and
 - low-distortion broadband transmission at low signal modulation (materials T38, T57, N30).

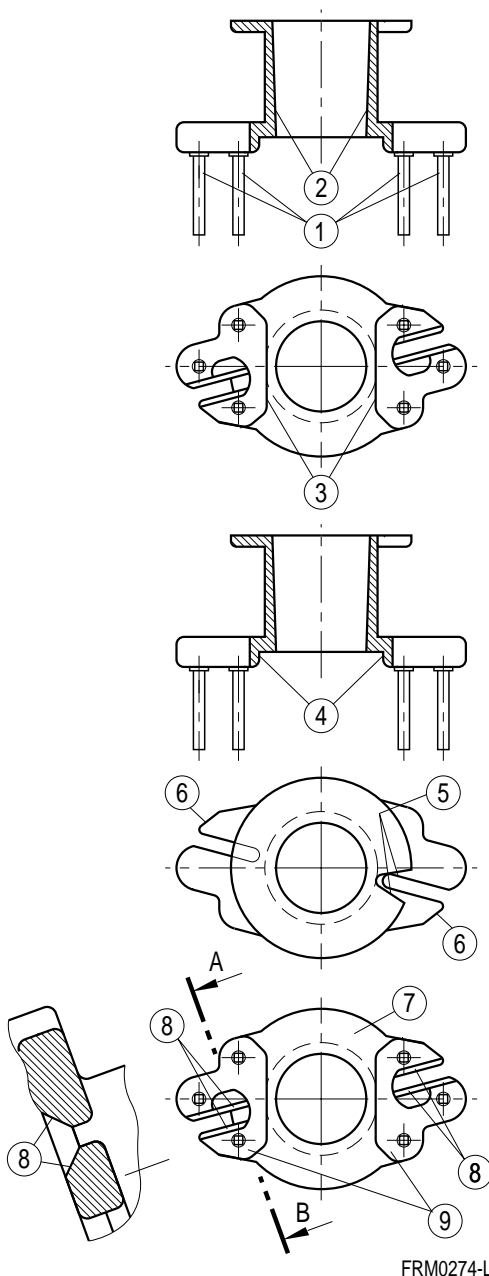
Even today there is still a high demand for RM cores suited to these applications.

- RM cores are increasingly required for power applications. For this purpose our core series made of materials N87, N97, N88, N96, N95, N92, N49 and PC200 (ungapped) is particularly well suited. Matching coil formers with larger pin spacings are available. RM cores without center hole (higher A_L value and greater power capacity) are used for transformer applications.
- Our product range also includes low-profile RM cores, whose significantly reduced overall height makes them suitable for small-signal, interface and matching transformers and also for transformer and energy storage chokes in DC/DC converters with a high pulse rate (materials N87, N49 and PC200). The low-profile types are particularly suited for applications where the winding is printed onto the PCB and the core is fitted to the board from either side.
- In addition to conventional accessories, SMD coil formers are available for RM 4 LP, RM 5 and RM 6.
- RM cores with or without center hole can be supplied in any material on request.
- For power applications, particularly for compact energy storage chokes, we supply the RM 12 and RM 14 cores with optimized, strengthened base thickness.

3 Coil formers for automatic processing

Automated manufacture is gaining more and more importance for the low-cost production of inductive components. The prerequisites are high-performance winding and assembly machines on the one hand, and suitable accessories on the other.

The new TDK Electronics RM coil formers were developed to meet this demand. These coil formers are not only matched to the versatile concepts of automation, but also offer advantages for manual winding. The essential improvements of the version optimized for automatic processing will be described in the following, taking the example of an RM6 coil former. The consistent utilization of these benefits will in most cases bring about a reduction of production costs for inductors and transformers.



Section A–B

- ① Squared pins or pin squared in the start-of-winding area:
Secure restraint of the ends of the winding even with 2 to 3 winding corners; the winding process is considerably accelerated.
- ② Internal diameter slightly conical and highly accurate:
Easy and fast slipping-on and snug fit on the winding tools.
- ③ Shortened wire guidance slots:
Substantially higher flange breaking strength.
- ④ Almost parallel flanges with minimum radii at the winding cylinder to the flange:
Correct winding layers, more turns, neat and rapid winding.
- ⑤ V-shaped slot in the pinless flange:
Automatic loading and unloading of winding machine possible. Substantially more accurate fixing and arrangement of the coil formers.
- ⑥ Lengthened wire catching nose:
Leads all wires safely into the wire guidance slots, even at high winding speed.
- ⑦ Pinless flange without marking:
Substantially more accurate arrangement of the coil formers for winding and wrapping.
- ⑧ Slot outlet stepped in height:
Owing to the transfer of the wire crossing to the level of the slot, short circuit is prevented when soldering the ends of the winding to the pins.
- ⑨ Insulation web:
Improved insulation between the winding wires and the ferrite core.

RM cores

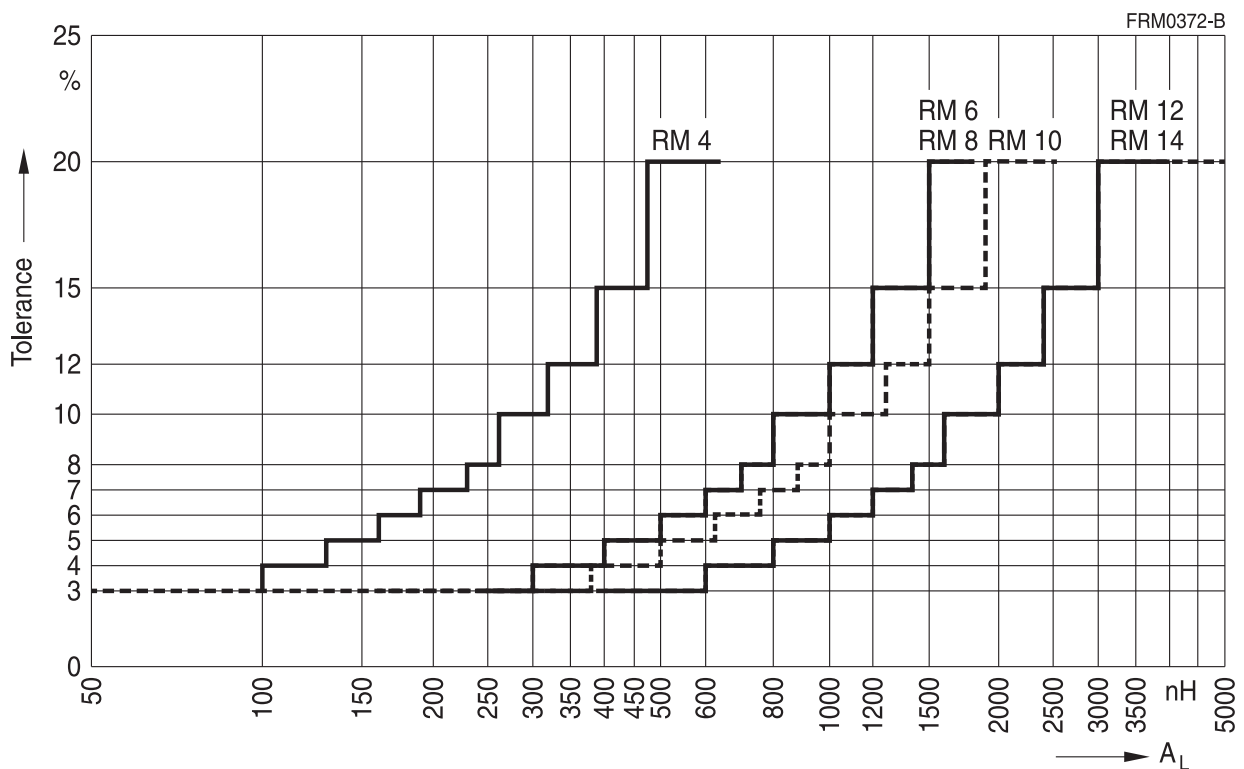
General information

4 Tolerances for RM cores

The A_L value tolerances for RM cores have consequently been defined with consideration of optimized process parameters for all materials with an initial permeability μ_i in the region of 2200 to 10000 as a step function (see figure below).

The “quantized” A_L step values should preferably be used. They are still available in their respective lower tolerance ranges. Thus a tolerance of $\pm 5\%$ can be determined for a RM 8 made of N87 material for an A_L value of 500 nH.

With this type of tolerance definition, TDK Electronics has defined standard A_L values and the associated tolerance for the first time. Based on initial permeability tolerance can be slightly lower or higher.



Important notes

The following applies to all products named in this publication:

1. Some parts of this publication contain **statements about the suitability of our products for certain areas of application**. These statements are based on our knowledge of typical requirements that are often placed on our products in the areas of application concerned. We nevertheless expressly point out **that such statements cannot be regarded as binding statements about the suitability of our products for a particular customer application**. As a rule, we are either unfamiliar with individual customer applications or less familiar with them than the customers themselves. For these reasons, it is always ultimately incumbent on the customer to check and decide whether a product with the properties described in the product specification is suitable for use in a particular customer application.
2. We also point out that **in individual cases, a malfunction of electronic components or failure before the end of their usual service life cannot be completely ruled out in the current state of the art, even if they are operated as specified**. In customer applications requiring a very high level of operational safety and especially in customer applications in which the malfunction or failure of an electronic component could endanger human life or health (e.g. in accident prevention or life-saving systems), it must therefore be ensured by means of suitable design of the customer application or other action taken by the customer (e.g. installation of protective circuitry or redundancy) that no injury or damage is sustained by third parties in the event of malfunction or failure of an electronic component.
3. **The warnings, cautions and product-specific notes must be observed.**
4. In order to satisfy certain technical requirements, **some of the products described in this publication may contain substances subject to restrictions in certain jurisdictions (e.g. because they are classed as hazardous)**. Useful information on this will be found in our Material Data Sheets on the Internet (www.tdk-electronics.tdk.com/material). Should you have any more detailed questions, please contact our sales offices.
5. We constantly strive to improve our products. Consequently, **the products described in this publication may change from time to time**. The same is true of the corresponding product specifications. Please check therefore to what extent product descriptions and specifications contained in this publication are still applicable before or when you place an order.
We also **reserve the right to discontinue production and delivery of products**. Consequently, we cannot guarantee that all products named in this publication will always be available. The aforementioned does not apply in the case of individual agreements deviating from the foregoing for customer-specific products.
6. Unless otherwise agreed in individual contracts, **all orders are subject to our General Terms and Conditions of Supply**.

7. **Our manufacturing sites serving the automotive business apply the IATF 16949 standard.**
The IATF certifications confirm our compliance with requirements regarding the quality management system in the automotive industry. Referring to customer requirements and customer specific requirements (“CSR”) TDK always has and will continue to have the policy of respecting individual agreements. Even if IATF 16949 may appear to support the acceptance of unilateral requirements, we hereby like to emphasize that **only requirements mutually agreed upon can and will be implemented in our Quality Management System.** For clarification purposes we like to point out that obligations from IATF 16949 shall only become legally binding if individually agreed upon.
8. The trade names EPCOS, CarXield, CeraCharge, CeraDiode, CeraLink, CeraPad, CeraPlas, CSMP, CTVS, DeltaCap, DigiSiMic, ExoCore, FilterCap, FormFit, InsuGate, LeaXield, MiniBlue, MiniCell, MKD, MKK, ModCap, MotorCap, PCC, PhaseCap, PhaseCube, PhaseMod, PhiCap, PowerHap, PQSine, PQvar, SIFERRIT, SIFI, SIKOREL, SilverCap, SIMDAD, SiMic, SIMID, SineFormer, SIOV, ThermoFuse, WindCap, XieldCap are **trademarks registered or pending** in Europe and in other countries. Further information will be found on the Internet at www.tdk-electronics.tdk.com/trademarks.

Release 2022-07