



Haflinger Technologies™

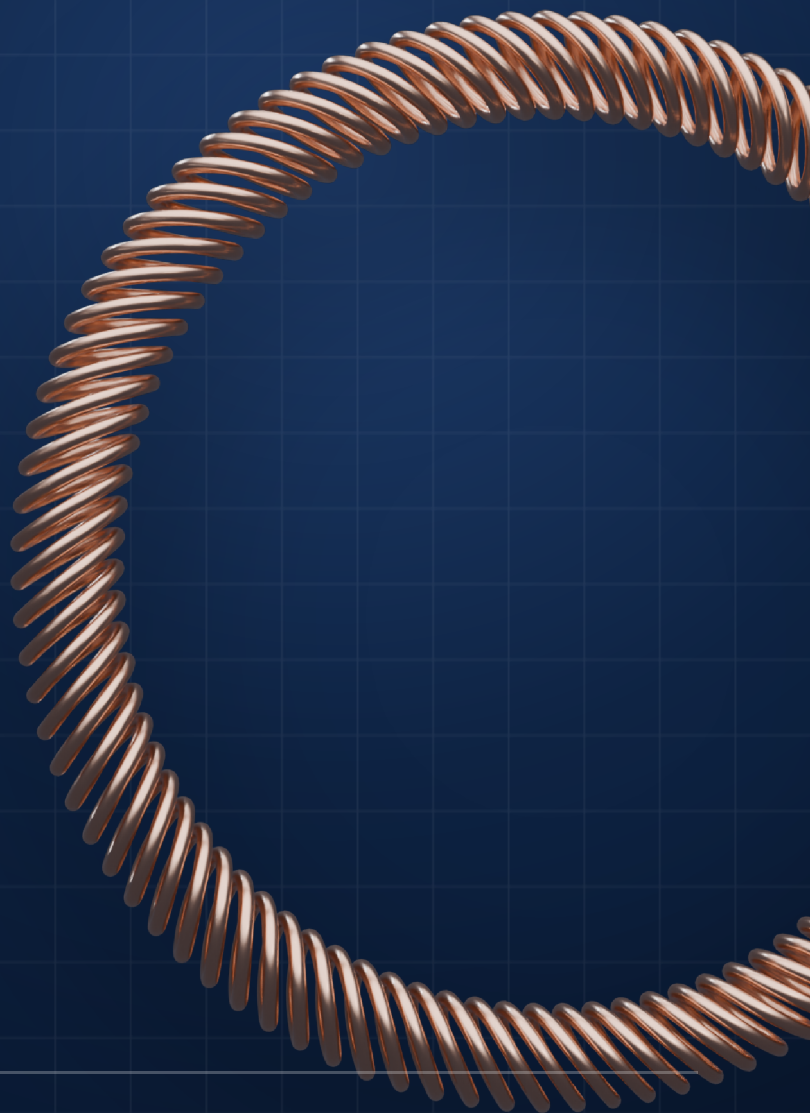
PRODUCT CATALOGUE · 2026

CANTED SPRING CONTACT TECHNOLOGY

— ENGINEERED CANTED SPRING CONTACT SOLUTIONS

CONTROLLED FORCE. RELIABLE CONTACT. COMPACT CONNECTIVITY.

Engineered spring-contact solutions for electrical conductivity, mechanical retention and EMI/RF shielding across demanding industrial applications.



POWER • MOBILITY • INDUSTRIAL • AEROSPACE • MEDICAL • ELECTRONICS

APPLICATION ENGINEERING | TECHNICAL SELECTION | CUSTOM SOLUTIONS HAFLINGER TECHNOLOGIES™

TECHNOLOGY OVERVIEW

What is canted spring contact technology?

Canted spring contact elements are precision-engineered spring components designed to maintain controlled mechanical contact within compact interfaces.

A TECHNOLOGY CAPABILITY

Depending on the configuration, a canted spring can support **electrical current transfer**, **mechanical retention** or **electromagnetic shielding** while accommodating defined dimensional variation within its working range.

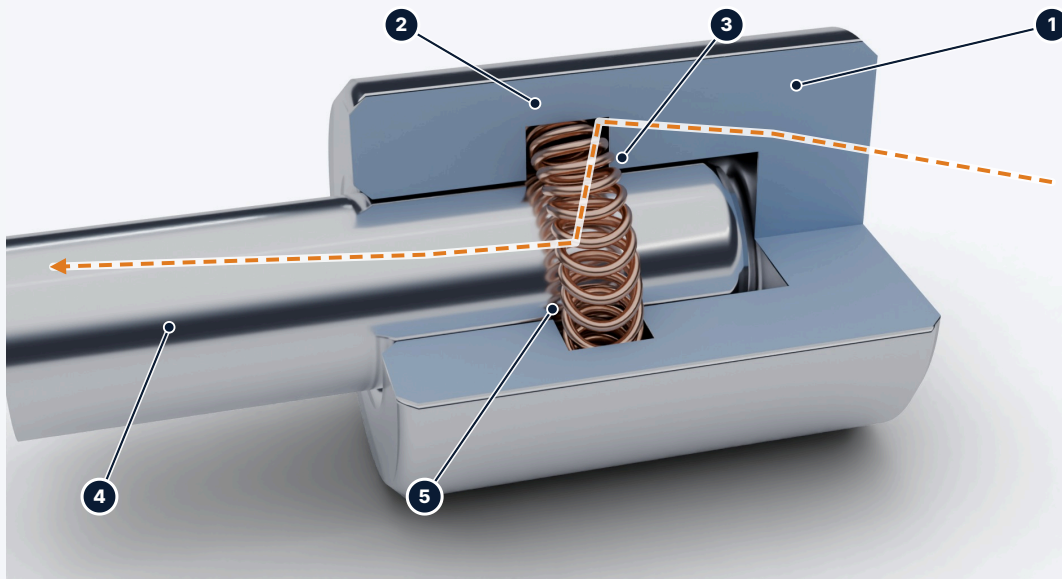
The geometry, material, wire size, spring dimensions and mating interface are selected according to the application.

THE IDEA IN ONE LINE

The coils of a canted spring lean at an angle. Squeezed between two surfaces, they tilt further rather than shortening along their own axis, and every coil presses on both surfaces.

WHAT THE ENGINEER CONTROLS

- Wire material, wire diameter and surface finish
- Coil width, coil height, pitch and cant angle
- Ring or straight-length form · groove (gland) geometry



1 Housing · mating surface A (section)

2 Gland / groove

3 Canted spring ring

4 Pin · mating surface B

5 Contact zone: coils on pin

----- Electrical path

FIG. 2.1 Original Haflinger 3D render, quarter-section. A canted spring ring seated in the housing groove is compressed radially by the pin; every coil contacts both groove and pin.

SPRING

Inclined coils form many independent contact points.

GLAND

A groove locates the spring and sets its working deflection.

INTERFACE

Shaft, bore or plate surfaces complete the contact.

3-in-1

One element type, three possible functions: **electrical contact**, **mechanical retention** and **EMI / RF shielding**. Each one can be the main design goal, or several can be combined in the same interface.

THE ENGINEERING PRINCIPLE

Why canted springs?

A conventional compression spring pushes back harder the further it is compressed. A canted spring is loaded across its inclined coils, so its force can be designed to stay within a controlled band over a defined compression range.

CONVENTIONAL HELICAL SPRING



Loaded along its axis — force rises in proportion to compression.

CANTED SPRING CONTACT



Loaded across inclined coils — coils deflect by tilting; each coil is a contact point.

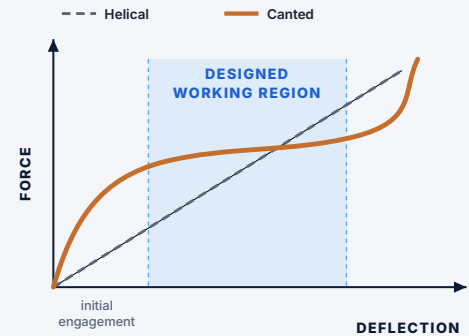


FIG. 3.1 Original Haflinger 3D renders and diagram. **Conceptual illustration — actual force-deflection characteristics depend on spring design.** No numerical values implied.

DIMENSIONAL TOLERANCE

A working range of deflection can help compensate for machining tolerance in bores, shafts and grooves.

THERMAL EXPANSION

As parts grow or shrink with temperature, the spring can help maintain contact force within its designed range.

CONTROLLED CONTACT FORCE

Force is set by geometry and material, so it can be tuned to the interface rather than accepted as a by-product.

SURFACE VARIATION

Many independent coils can follow minor surface waviness and roughness better than a single rigid contact face.

MECHANICAL MOVEMENT

Rotating, sliding or reciprocating interfaces can be considered where wear and duty are validated.

MISALIGNMENT

Radial offset and angular misalignment can be tolerated within the designed range — not beyond it.

A TECHNOLOGY CAPABILITY

Statements on this page describe general behaviour of the technology. Achievable force band, deflection range and tolerance compensation are specific to each spring design.

CORE FUNCTIONS

Three functions. One engineered contact element.

A TECHNOLOGY CAPABILITY

01

Electrical contact

Multi-point conductive contact for compact electrical interfaces. Each coil touching both mating surfaces forms a parallel current path.

Current capability is not universal. It depends on material, wire diameter, spring dimensions, contact geometry, ambient and operating temperature, interface design and duty cycle, and is established by calculation and confirmed by application testing.

POTENTIAL BENEFITS

- Current transfer
- Multiple contact points
- Compact packaging
- Controlled contact force
- Potential for stable contact resistance
- Application-specific current capability

02

Mechanical retention

Controlled mechanical force for retention, latching, locking, controlled insertion, controlled disengagement and dynamic interfaces.

Spring geometry and groove shape can be selected to achieve application-specific force behaviour.

POTENTIAL BENEFITS

- Defined insertion and removal behaviour
- Latching or locking via groove design
- Holding without separate fasteners in selected designs
- Suitable for static or dynamic duty where validated

03

EMI / RF shielding

Conductive spring elements can help maintain electrical continuity around an interface and support EMI/RF shielding designs.

Shielding effectiveness depends on the complete enclosure design. No attenuation values are published without test data.

POTENTIAL BENEFITS

- Electronic housings
- Shielded connectors
- Equipment enclosures
- RF interfaces
- Electrical cabinets
- Communications equipment

FUNCTION 01

Electrical contact solutions

Where electrical current must pass reliably through a compact or movable interface, spring-contact technology can provide multiple conductive contact points while maintaining controlled contact force.

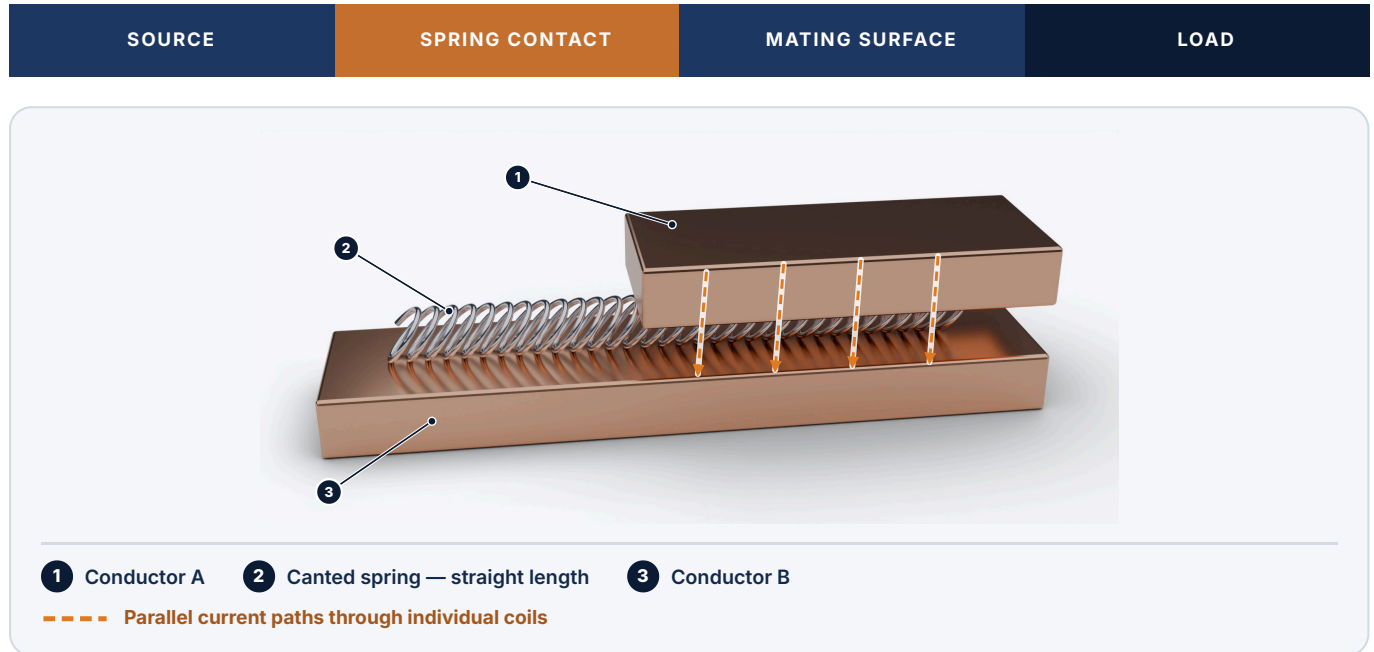


FIG. Original Haflinger 3D render. A straight canted spring between two copper conductors (upper conductor shortened to show the coils).
5.1 Every coil bridges both surfaces, so current divides into many parallel paths.

A TECHNOLOGY CAPABILITY

MULTI-POINT CONTACT

Many coils share the electrical load instead of relying on a single contact face.

CURRENT TRANSFER

Suited to static plug-in joints and to moving interfaces where wear is validated.

CONTROLLED CONTACT FORCE

Normal force is designed into the spring rather than set by assembly tightness.

COMPACT PACKAGING

A thin annular groove can replace bulkier finger or clamp arrangements in selected designs.

THERMAL / DIMENSIONAL COMPENSATION

Working deflection can help compensate for expansion and tolerance stack-up.

APPLICATION-SPECIFIC DESIGN

Material, plating and geometry are chosen for the current, duty and environment.

WHAT SETS CURRENT CAPABILITY

Wire material & conductivity

Wire diameter

Ring diameter

Number of coils in contact

Plating

Ambient temperature

Permissible temperature rise

Short-circuit duration

Duty cycle

Mating-surface finish

C VERIFIED PRODUCT SPECIFICATION

APPLICATION-SPECIFIC — SUBJECT TO ENGINEERING VALIDATION. No Haflinger-approved datasheet values are published in this edition. Current, short-circuit and contact-resistance values are established per design.

FUNCTION 02

Mechanical retention & connector force

Canted spring geometry can be engineered to create controlled engagement and disengagement forces — from a light, smooth push-fit to a firm latch that holds until deliberately released.

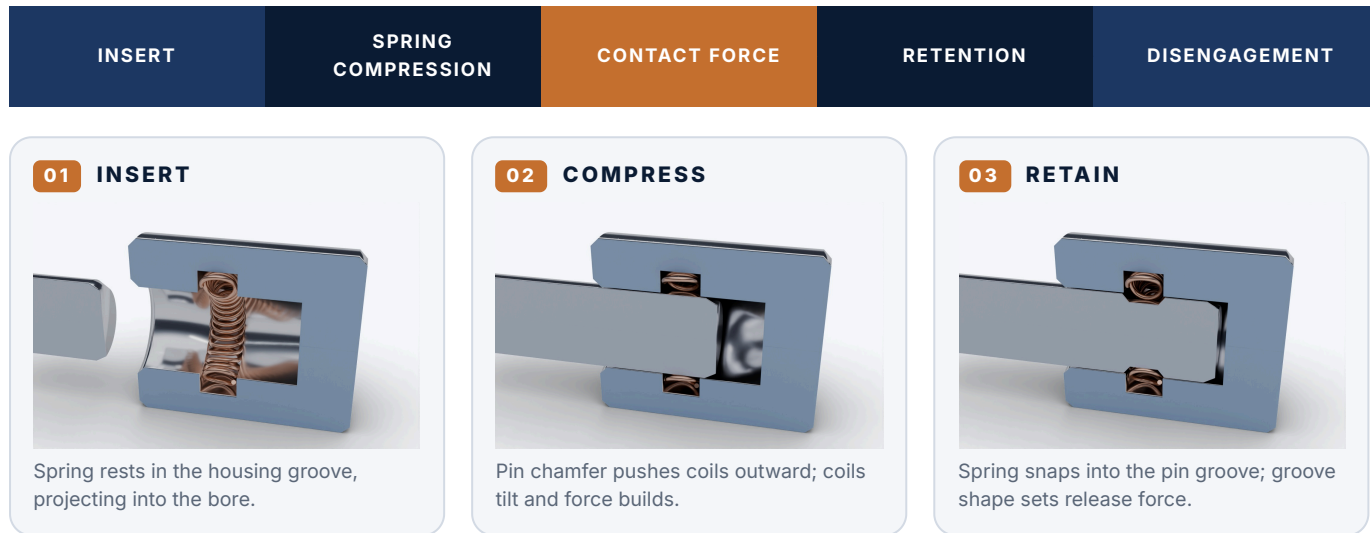


FIG. 6.1 Original Haflinger 3D renders, quarter-section. Housing-mounted spring engaging a pin with a latching groove.

A TECHNOLOGY CAPABILITY

Force behaviour by design

The relationship between insertion and removal force is set mainly by groove shape, spring cant direction and the profile of the mating part.

ARRANGEMENT	TYPICAL INTENT
Holding	Friction-style retention; part can be withdrawn with steady pull
Latching	Defined, repeatable release force; serviceable
Locking	Release only by disassembly or a release feature

Force values are application-specific and established by design and test.

B TARGET APPLICATION

Where it is applied

- Push-pull connectors
- Snap-fit interfaces
- Quick disconnects
- Removable modules
- Machine interfaces
- Serviceable components
- General mechanical retention

FUNCTION 03

EMI / RF shielding & grounding

A conductive spring element can maintain electrical continuity between mating conductive structures and can therefore be integrated into shielding and grounding architectures.

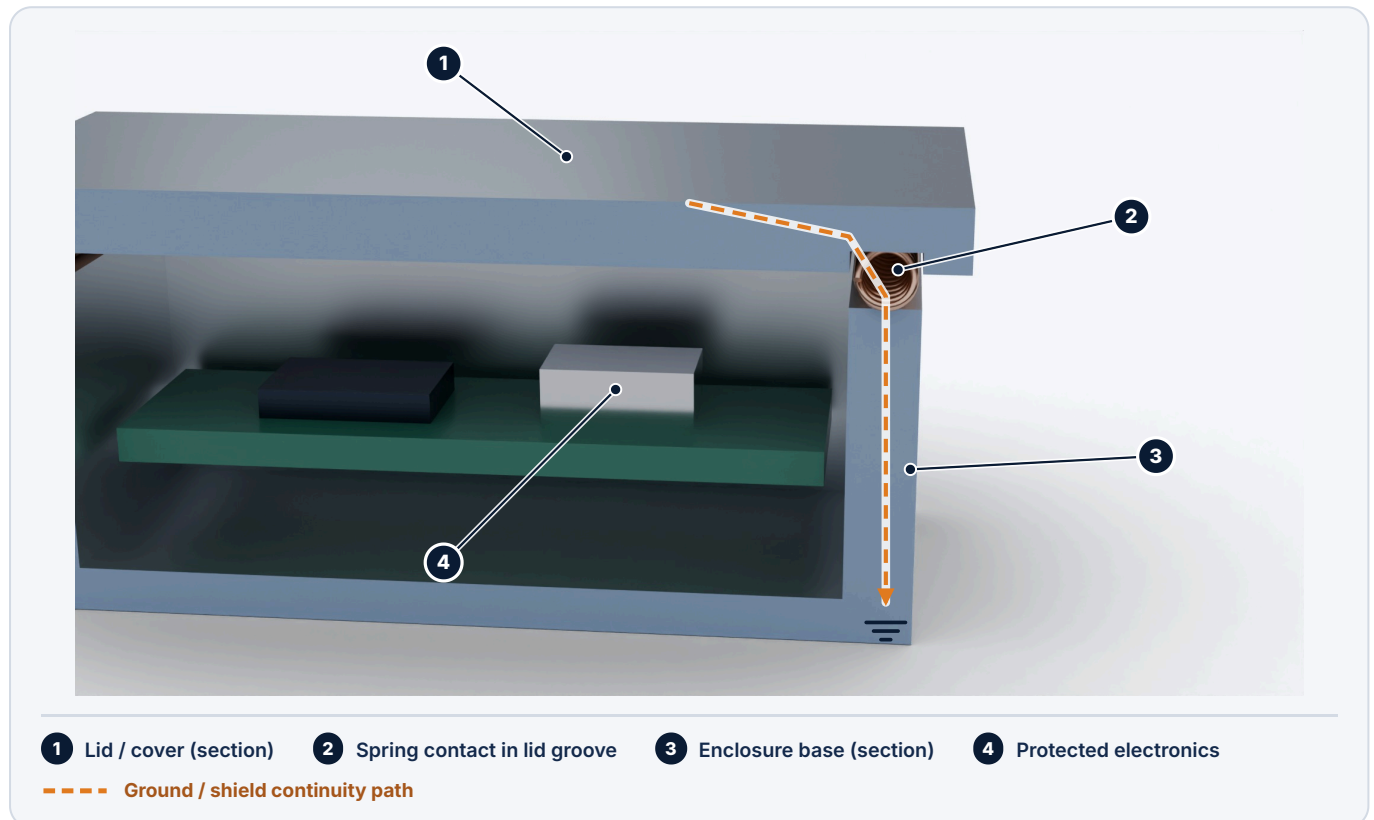


FIG. 7.1 Original Haflinger 3D render, section through an enclosure. A straight canted spring in the lid groove bridges lid and base along the full seam.

ENCLOSURE	SPRING CONTACT	GROUND PATH	SHIELD CONTINUITY
-----------	----------------	-------------	-------------------

A TECHNOLOGY CAPABILITY

Why a spring at the seam

Joints, covers and removable panels are typical weak points in a shielded enclosure. A spring that keeps many contact points along the seam can help close those gaps while tolerating flatness variation and repeated opening.

Ring forms suit round connector shells and rotating joints; straight lengths suit panel and door seams.

B TARGET APPLICATION

Potential applications

- Electronic enclosures
- Communication systems
- Rack equipment
- Industrial electronics
- Instrumentation
- Power electronics
- RF-sensitive systems
- Shielded connector shells

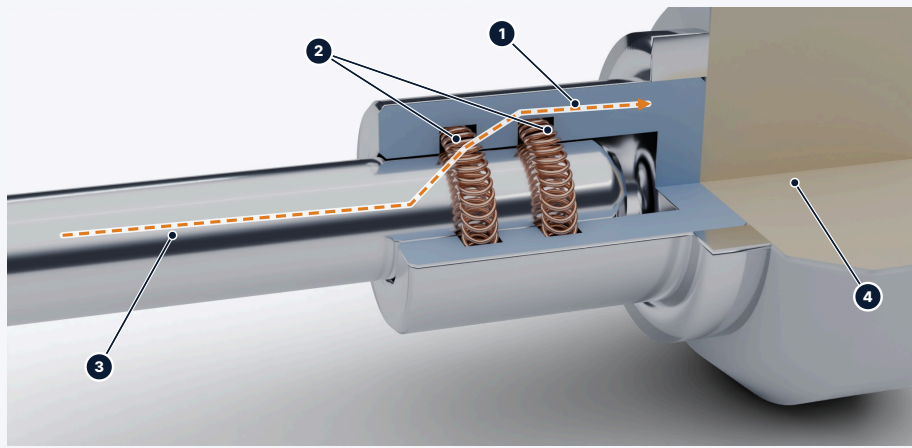
C VERIFIED PRODUCT SPECIFICATION

APPLICATION-SPECIFIC — SUBJECT TO ENGINEERING VALIDATION. No Haflinger-approved datasheet values are published in this edition. Shielding effectiveness is a property of the complete enclosure and is confirmed by test.

APPLICATION · ENERGY

Power transmission & distribution

Compact conductive interfaces for switchgear, breakers, disconnectors and busbar joints, where current transfer and controlled contact force must coexist.



- 1** Fixed contact (section) **2** Spring contact rings in grooves **3** Moving contact rod **4** Insulator / bushing
 - - - - Current transfer

FIG. 8.1 Original Haflinger 3D concept, quarter-section. Moving contact rod engaging a fixed contact fitted with two canted spring contact rings.

B TARGET APPLICATION

APPLICATION MESSAGE

Power equipment requires reliable electrical interfaces under mechanical, thermal and environmental variation. Canted spring contacts can be engineered for compact conductive interfaces where controlled contact force and current transfer are important — subject to system design and validation.

POTENTIAL EQUIPMENT

- ☐ Gas-insulated switchgear (GIS)
- ☐ Air-insulated switchgear (AIS)
- ☐ Medium-voltage switchgear
- ☐ High-voltage switchgear
- ☐ Circuit breakers
- ☐ Disconnectors
- ☐ Ring main units
- ☐ Current transformers
- ☐ Cable accessories
- ☐ High-current busbar interfaces
- ☐ Grounding / earthing contact interfaces

DESIGN CONSIDERATIONS

- ☐ Rated and short-time current
- ☐ Temperature-rise limits
- ☐ Insulating gas or air
- ☐ Switching-device operations
- ☐ Plating compatibility
- ☐ Contact-surface finish

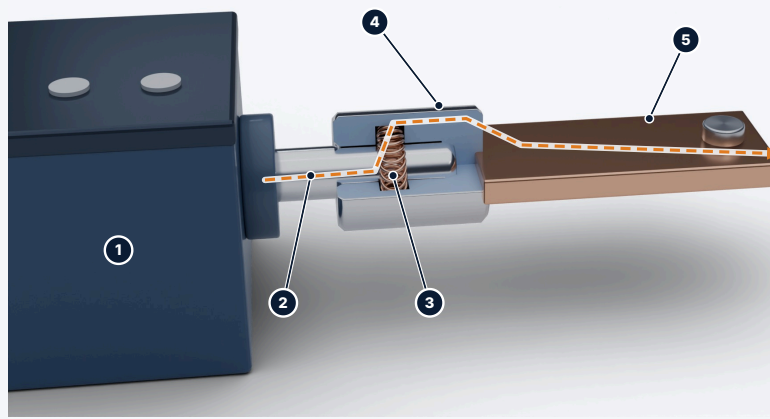
C VERIFIED PRODUCT SPECIFICATION

APPLICATION-SPECIFIC — SUBJECT TO ENGINEERING VALIDATION. No Haflinger-approved datasheet values are published in this edition. No voltage or current rating is claimed for any Haflinger product on this page.

APPLICATION · ELECTRIFICATION

EV · battery · charging & energy storage

High-current, serviceable interfaces for battery modules, swapping stations, charging hardware and stationary storage.



- 1 Battery module 2 Terminal pin 3 Canted spring contact ring 4 Socket (section) 5 Busbar / cable lug
- Current path

FIG. 9.1 Original Haflinger 3D concept, quarter-section socket. Module terminal pin mated into a socket fitted with a canted spring contact ring, feeding a copper busbar.

COMPACT

HIGH CONTACT COUNT

SERVICEABLE

CONTROLLED FORCE

ENGINEERED FOR CURRENT TRANSFER

B TARGET APPLICATION

POTENTIAL APPLICATIONS

- Charging connectors
- Battery connectors
- Battery-swapping connectors
- High-current power interfaces
- Energy-storage systems
- Power distribution modules
- Battery management interfaces
- Charging infrastructure
- Data-centre power systems

WHY IT FITS

Battery and charging interfaces combine high current, frequent or automated mating, vibration and tight packaging. A spring contact can combine electrical contact and controlled mating force in one groove.

C VERIFIED PRODUCT SPECIFICATION

APPLICATION-SPECIFIC — SUBJECT TO ENGINEERING VALIDATION. No Haflinger-approved datasheet values are published in this edition. Current ratings are not published; capability is defined per connector design.

APPLICATION · MOBILITY

Automotive & e-mobility

Compact, repeatable power and signal interfaces for electrified vehicles, where vibration, heat and space all matter.

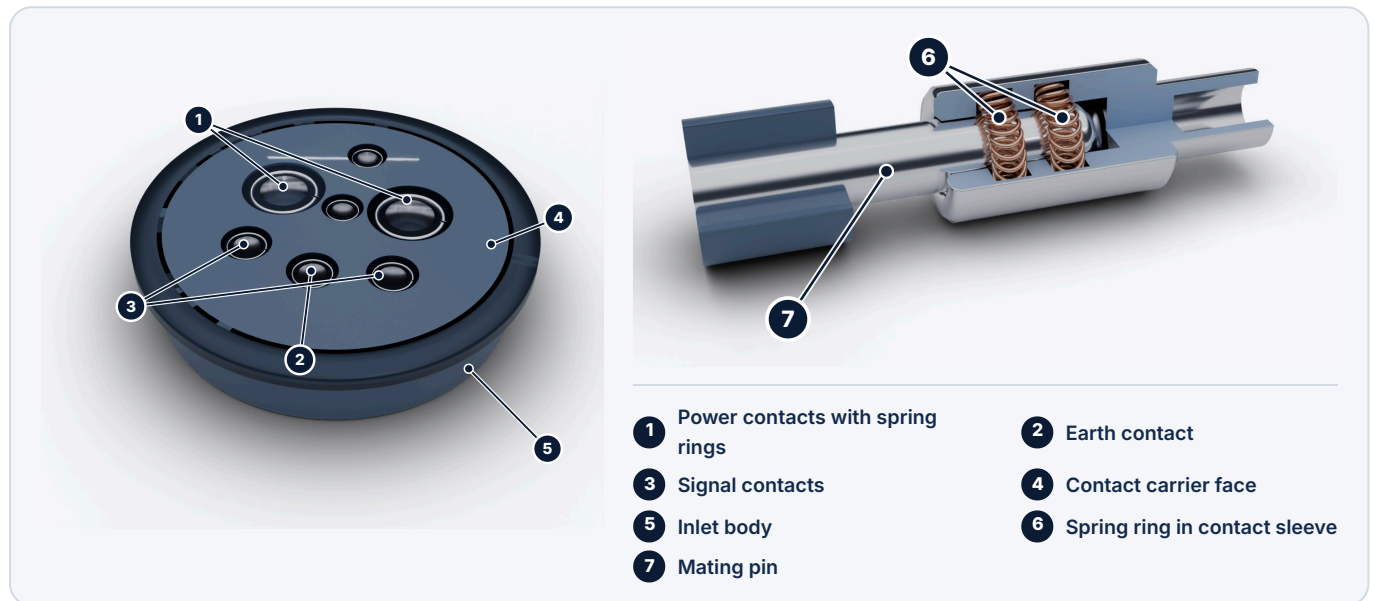


FIG. 10.1 Original Haflinger 3D concept. Generic inlet face — not representing any charging standard — and section through one power contact.

B TARGET APPLICATION

POTENTIAL APPLICATIONS

- High-power electrical connectors
- EV battery connections
- Charging interfaces
- Power electronics
- Removable modules
- Sensor / electronics interfaces
- EMI shielding
- Service connectors

Spring contact technology can support compact, repeatable electrical and mechanical interfaces where vibration, thermal cycling and packaging constraints are important.

QUALIFICATION NOTE

Automotive programmes typically require component-level qualification to OEM and industry standards. Haflinger does not claim any automotive qualification for products in this catalogue; qualification scope is agreed per programme.

VIBRATION

Multiple coils in contact can help keep the electrical path closed under vibration, subject to validation.

THERMAL CYCLING

Working deflection can help absorb dimensional change between dissimilar materials.

PACKAGING

A slim groove-mounted element supports compact connector bodies.

C VERIFIED PRODUCT SPECIFICATION

APPLICATION-SPECIFIC — SUBJECT TO ENGINEERING VALIDATION. No Haflinger-approved datasheet values are published in this edition.

APPLICATION · INDUSTRY

Industrial automation & robotics

Docking, tool-change and modular-machine interfaces that must connect power and signals the same way, every time.

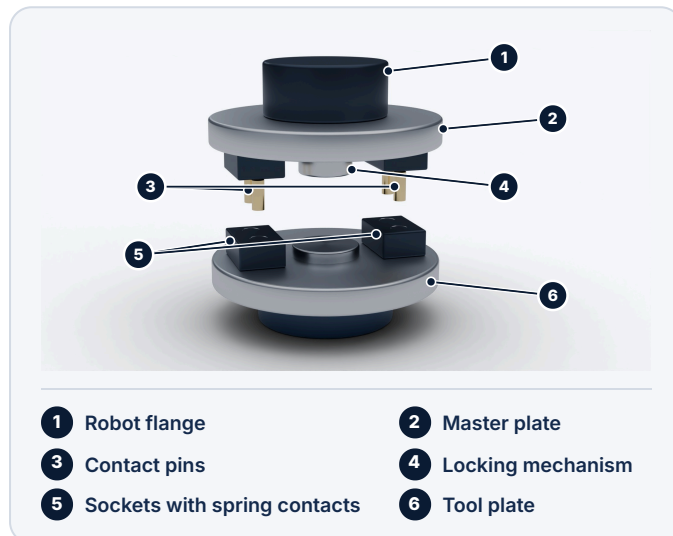


FIG. 11.1 Original Haflinger 3D concept. Master and tool plates shown separated before docking; spring contacts in the tool-side sockets complete power and signal paths as the lock engages.

B TARGET APPLICATION

POTENTIAL APPLICATIONS

- ☐ Robotic tool changers
- ☐ Automatic docking systems
- ☐ Modular machine interfaces
- ☐ Sensor interfaces
- ☐ Servo / power connectors
- ☐ Test fixtures
- ☐ Automated production equipment
- ☐ Removable industrial modules

WHY IT FITS

Docking interfaces must connect power and signals repeatably, often with small positioning errors. A spring contact can provide controlled contact force and conduction in one compact element.

A TECHNOLOGY CAPABILITY

REPEATABLE FORCE

Force is designed into the spring for a consistent mating feel and contact load.

ELECTRICAL + MECHANICAL

One element can conduct and hold, simplifying docking.

COMPACT DESIGN

Groove-mounted contacts help shrink module footprint.

REPEATED MATING

Suitability for frequent cycling is established by validation.

FEWER PARTS

Reduced component count is possible in selected architectures.

OFFSET TOLERANCE

Working range can help absorb small docking errors.

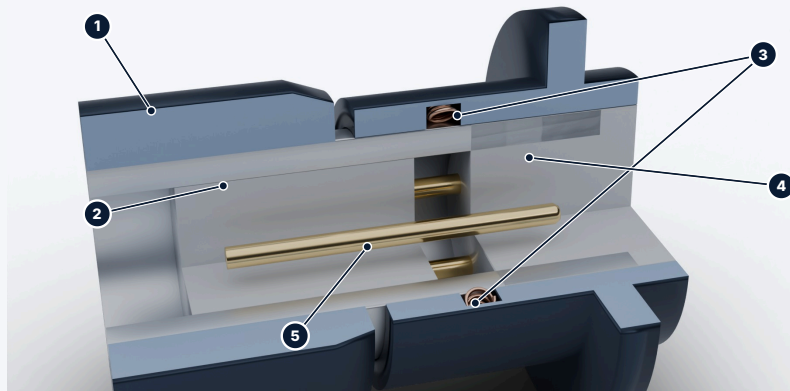
C VERIFIED PRODUCT SPECIFICATION

APPLICATION-SPECIFIC — SUBJECT TO ENGINEERING VALIDATION. No Haflinger-approved datasheet values are published in this edition. No cycle-life figure is claimed.

APPLICATION · HIGH RELIABILITY

Aerospace • defence • high-reliability systems

Rugged, compact interfaces for demanding environments, evaluated program by program.



- 1 Receptacle shell 2 Plug shell 3 Shell-to-shell spring contact 4 Insulating insert 5 Contact

FIG. 12.1 Original Haflinger 3D concept, quarter-section. A canted spring ring in the receptacle groove bears on the plug shell, supporting shell-to-shell continuity.

B TARGET APPLICATION

TARGET APPLICATIONS

- Avionics connectors
- Ruggedised electronics
- Satellite systems
- Power distribution
- EMI shielding
- Quick-disconnect interfaces
- Instrumentation

WHY ENGINEERS CONSIDER IT

High-reliability systems need interfaces that keep contact under shock, vibration and wide temperature swings, often in very little space, and may also need shell-to-shell continuity for shielding.

PROGRAM CONSIDERATIONS

- Material and finish compliance
- Outgassing / vacuum (space)
- Shock, vibration and thermal-cycle testing
- Traceability and documentation

Application suitability, environmental qualification and material compliance must be evaluated for the specific program.

These are target applications. Haflinger products are not represented as aerospace-qualified, defence-qualified or flight-certified.

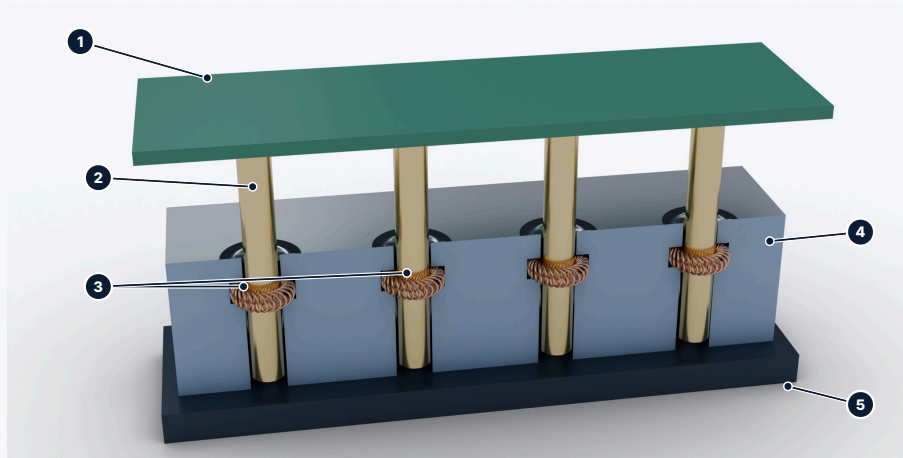
C VERIFIED PRODUCT SPECIFICATION

APPLICATION-SPECIFIC — SUBJECT TO ENGINEERING VALIDATION. No Haflinger-approved datasheet values are published in this edition.

APPLICATION · INSTRUMENTATION

Medical • test & measurement • instrumentation

Compact, repeatable contacts for instruments, handpieces, fixtures and measurement interfaces.



- 1 Device / module under test 2 Interchangeable pin 3 Spring contacts 4 Fixture block (section) 5 Base plate

FIG. 13.1 Original Haflinger 3D concept, section through a fixture block. Interchangeable pins held by canted spring contacts for repeated mating with the unit under test.

B TARGET APPLICATION

Medical

- Diagnostic equipment
- Surgical instruments
- Removable modules
- Instrumentation interfaces
- Compact electrical contacts

Important: medical applications require product-specific material, biocompatibility, sterilisation and regulatory evaluation. No medical-device compliance is claimed for products in this catalogue.

B TARGET APPLICATION

Test & measurement

- Test fixtures
- Burn-in equipment
- Instrumentation
- Repeated-contact interfaces
- Measurement connectors

Fixtures benefit from interchangeable contacts with consistent force, so worn pins can be replaced without reworking the fixture body.

CONSISTENT CONTACT

Designed spring force supports repeatable contact from cycle to cycle.

SERVICEABLE

Pins and modules can be exchanged without disturbing the interface.

COMPACT

Small ring sizes suit dense instrument and handpiece layouts.

C VERIFIED PRODUCT SPECIFICATION

APPLICATION-SPECIFIC — SUBJECT TO ENGINEERING VALIDATION. No Haflinger-approved datasheet values are published in this edition.

MARKETS

Target industries

Established / documented application areas for canted spring technology in industry literature

Target / emerging application areas

01 Power transmission & distribution	02 Energy storage & renewable energy	03 EV & charging	04 Automotive
05 Industrial automation	06 Robotics	07 Aerospace & defence	08 Rail & transportation
09 Electronics & power electronics	10 Medical & diagnostic equipment	11 Test & measurement	12 Communications / EMI shielding

Classification reflects use of the technology across industry, not Haflinger customer installations. No customer installations are implied.

TECHNICAL COMPARISON

Canted spring vs other contact types — a qualitative view

ATTRIBUTE	CANTED SPRING CONTACT	CONVENTIONAL PIN CONTACT	LEAF CONTACT	POGO-TYPE CONTACT
Contact mechanism	Inclined coils deflect; each coil is a contact point POTENTIAL ADVANTAGE	Pin in slotted or solid socket; interference fit APPLICATION-DEPENDENT	Stamped cantilever beam pressing a pad APPLICATION-DEPENDENT	Plunger driven by internal helical spring APPLICATION-DEPENDENT
Compliance	Wide working deflection relative to size POTENTIAL ADVANTAGE	Limited; set by socket finger deflection DESIGN CONSIDERATION	Moderate, mainly one direction APPLICATION-DEPENDENT	Axial stroke defined by plunger travel APPLICATION-DEPENDENT
Tolerance compensation	Radial / axial within designed range POTENTIAL ADVANTAGE	Needs close tolerances DESIGN CONSIDERATION	One axis, within beam travel APPLICATION-DEPENDENT	Axial only APPLICATION-DEPENDENT
Packaging	Thin annular groove POTENTIAL ADVANTAGE	Compact for low pin counts APPLICATION-DEPENDENT	Flat; suits PCB and sheet parts APPLICATION-DEPENDENT	Needs axial length for barrel DESIGN CONSIDERATION
Retention potential	Holding, latching or locking by groove design POTENTIAL ADVANTAGE	Friction from socket fit APPLICATION-DEPENDENT	Detent features possible APPLICATION-DEPENDENT	Not inherent; needs separate latch DESIGN CONSIDERATION
Electrical contact	Multi-point; capability per design APPLICATION-DEPENDENT	Per design APPLICATION-DEPENDENT	Per design APPLICATION-DEPENDENT	Typically signal / test duty; per design APPLICATION-DEPENDENT
EMI shielding potential	Continuous perimeter contact possible POTENTIAL ADVANTAGE	Not a shielding element DESIGN CONSIDERATION	Finger-stock gaskets widely used APPLICATION-DEPENDENT	Limited DESIGN CONSIDERATION
Customisation	Wire, material, geometry, ring or length POTENTIAL ADVANTAGE	Geometry and plating APPLICATION-DEPENDENT	Stamping tooling per design DESIGN CONSIDERATION	Stroke, force, tip shape APPLICATION-DEPENDENT

Conceptual comparison for early-stage selection. No contact type is universally better; the right choice depends on the interface, duty and environment.

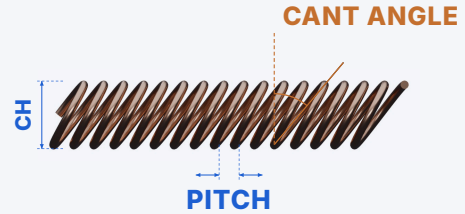
SELECTION

Engineered around your interface

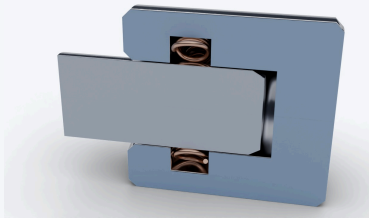
CROSS-SECTION · END VIEW



SIDE VIEW · STRAIGHT LENGTH



HOUSING-MOUNTED



Groove in the housing bore; spring runs on the shaft.

PISTON-MOUNTED



Groove on the shaft; spring runs in the bore.

FIG. 15.1 Original Haflinger 3D renders. Principal spring parameters, and housing-mounted versus piston-mounted groove (gland) installation.

WIRE MATERIALS

- Zirconium copper
- Other copper alloys
- Stainless steel
- Other application-specific spring materials

Copper alloys favour conductivity; steels favour spring force and temperature resistance.

SURFACE / PLATING OPTIONS

- Silver
- Gold
- Nickel
- Tin
- Application-specific coatings

Selected for contact resistance, wear, corrosion and compatibility with the mating plating.

CONFIGURATION

- Spring rings
- Straight lengths
- Housing-mounted
- Piston-mounted
- Dedicated connector arrangements

TYPICAL ENGINEERING PARAMETERS

Inner diameter

Outer diameter

Wire diameter

Coil width

Coil height

Pitch / spacing

Working deflection

Groove / gland dimensions

Insertion force

Removal force

Retention force

Current requirement

Temperature range

Mating cycles

Environmental exposure

Parameters are defined together with the customer for each interface. Dimensions and material options are indicative unless identified as a Haflinger-approved product specification.

VERIFIED PRODUCT SPECIFICATION

APPLICATION-SPECIFIC — SUBJECT TO ENGINEERING VALIDATION. No Haflinger-approved datasheet values are published in this edition. Dimensional ranges, force data and temperature limits will be published once supplier data is approved.

WORKING WITH HAFLINGER

From application requirement to contact solution

01	02	03	04	05	06	07
UNDERSTAND	DEFINE	SELECT	ENGINEER	PROTOTYPE	QUALIFY	SUPPLY
Equipment & application	Mechanical + electrical requirements	Material, geometry & configuration	Spring / contact interface	Sample / validation	Application-specific testing	Production / repeat orders

APPLICATION ENGINEERING ENQUIRY			Fill what you know — no field is mandatory
CUSTOMER Company _____ Contact _____ Email _____ Phone _____ Project _____	APPLICATION Equipment _____ Industry _____ Application _____ Function: elec / mech / EMI _____	ELECTRICAL Voltage _____ Continuous current _____ Peak current _____ Short-circuit current _____ Frequency _____ Contact resistance target _____	
MECHANICAL Contact diameter _____ Available space _____ Groove / gland dims _____ Insertion force _____ Removal force _____ Retention force _____ Mating cycles _____ Static / dynamic _____	ENVIRONMENT Operating temperature _____ Ambient temperature _____ Humidity _____ Vibration _____ Corrosive environment _____	MATERIAL · DRAWINGS Spring material _____ Plating / coating _____ Drawing attached _____ CAD attached _____ Existing contact sample _____	

Product performance depends on the selected spring geometry, material, surface treatment, mating interface, operating environment and duty conditions. Electrical current capacity, contact resistance, force characteristics, temperature capability and mechanical life must be established and validated for the specific application. Dimensions and material options shown in this catalogue are indicative unless identified as a Haflinger-approved product specification.

CANTED SPRING CONTACT TECHNOLOGY

Your Application. Our Engineering Connection.

Send us your interface drawing and operating conditions — our engineers will propose a spring, gland and material concept for validation.

[TALK TO OUR ENGINEERS →](#)
[SEND YOUR APPLICATION](#)


Haflinger Technologies™

HAFLINGER TECHNOLOGIES PVT. LTD.

1105, 11th Floor, ACE Homes,
Kasarvadavali, G.B. Road,
Thane West, Maharashtra 400615, India

www.haflingertech.com