

## Data Sheet

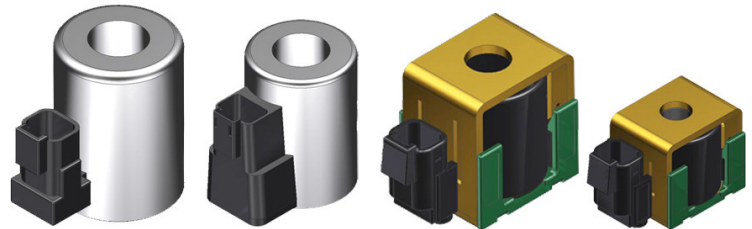
# Robust Coils

## D14E, M19P, R16, R13



Danfoss robust coils are specifically designed for harsh operating environments. Compared to standard coils, they have higher tolerances to temperature extremes, voltage spikes, and water ingress due to power spray, or immersion in water, snow or mud. Typical applications include asphalt machinery, agricultural equipment with chemical and power wash exposure, snow plows and salt-spreader machines, or any application when applying the valves in a hot engine compartment.

Featuring a very compact design, robust coils are smaller than several competing manufacturer's coils, providing more space for other components on the application. In addition, the smaller footprint makes it possible to fit more cartridge valves closer together in the vehicle HIC (Hydraulic Integrated Circuit).



### Features

- Four frame sizes - R13, R16, M19P & D14E - providing a Robust Coil option for over 75% of our Solenoid and Proportional Cartridge Valves
- All Robust Coils meet our major OEMs's most stringent requirements for off-highway vehicles
- No O-ring seal is required around coils
- IP69K Environmental Rating for majority of connector options
  - DEUTSCH, Amp SuperSeal, Metri-Pack 150 Type 2 and Lead Wires
- PLUS+1<sup>®</sup> Compliant
  - All coils are designed for installation on machines that utilize Danfoss Power Solutions PLUS+1<sup>®</sup> hardware, ensuring they are compliant out of the box.
- 4 different DC voltages: 10, 12, 20, 24 VDC (color coded for easy voltage identification)
- Directly interchangeable with the Standard Coils M13 and M16
  - Can field retrofit from Standard to Robust (ensure there is enough spacing between valves)
  - Change to metal nut and remove O-rings
- Available with bi-directional diodes
  - Protects system's electronics against voltage spikes from the coil
  - Non-polarity dependent, simple installation
- Compact design
  - R16: Manifold length reduced by 7 mm (0.28 in) per valve compared to other manufacturer's coils when valves are side by side
- Available on the PSV10-34 proportional directional valves and PPR09-POD proportional pressure reducing valve

### R13 and R16

- Robust option for Danfoss Solenoid Valves and some Proportional Valves
- Available for 08, 09 and 10 size solenoid or proportional valves
- Available for SVP12, SVP16, and SVP20 solenoid valves

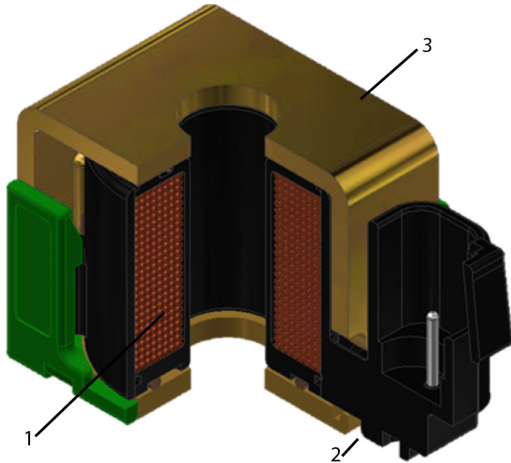
### M19P and D14E

- Standard Robust Coils for Danfoss Proportional Valves
- Proportional Flow Control, Proportional Pressure Relieving and Proportional Pressure Reducing Valves
- IP69K Environmental Rating for DEUTSCH connector

When the R13 and R16 Robust Coils were designed and tested, the existing M19P and D14E coils were also tested and passed the Robust Coil extreme test requirements.

Comprehensive technical literature is online at [www.danfoss.com](http://www.danfoss.com)

**Technical Overview (R13 and R16 only)**



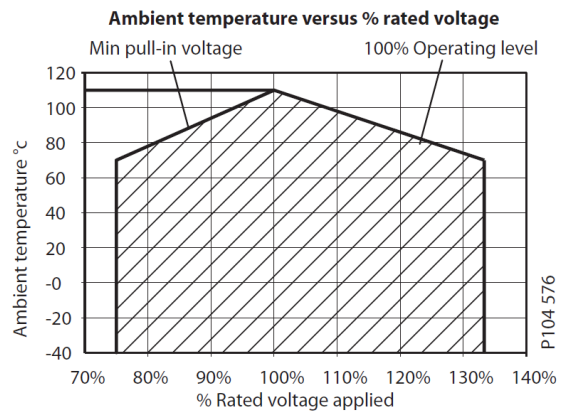
*Highlighted features*

Number	Feature	Description
1	Fully encapsulated windings	The coil is designed with a protective layer of encapsulated plastic. A special molding technique prevents moisture build-up while the plastic is applied.
2	Bi-directional diodes	The bi-directional TVS diode is not polarity dependent and therefore does not require the alignment of the coil terminals during installation, which will reduce the risks in electrical installations.
3	Protective metal casing	The metal exterior casing protects against dramatic temperature changes and physical damage to the coil. Robust coils have passed the drop test, vibration test, and the mechanical shock test.

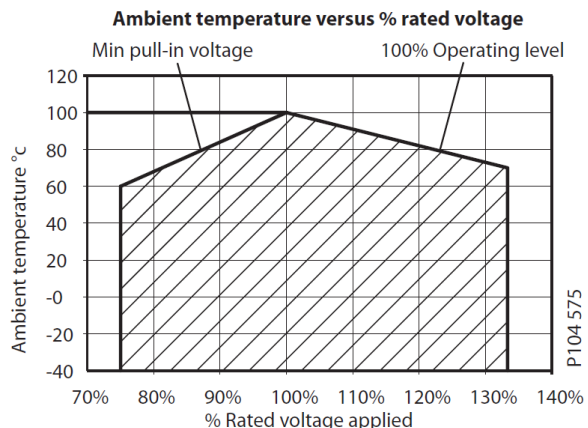
*Additional features*

Feature	Description
Water ingress protection	Robust coils are designed to be highly water and chemical resistant. They have passed comprehensive tests for salt, fog, chemical splash and humidity.
Interchangeable with Standard M13 and M16	Can field retrofit from standard to robust, providing there is adequate space between the valves on the manifold. Add the metal nut and remove the O-rings.
No O-rings needed	For ease of installation, robust coils do not need coil O-rings.
IP69K with integral connectors	Robust coils with DEUTSCH, AMP SuperSeal, Lead Wires and Metri-Pack 150 Type 2 are environmentally rated IP69K.
High input voltage tolerance	Robust coils are rated for 75% to 133% of nominal (see graphs below).

*R13 voltage tolerance*



*R16 voltage tolerance*





## Electrical Specifications

Voltage (V)	Model	10 VDC	12 VDC	20 VDC	24 VDC
Watts (W)	R13	16	16	16	16
	R16	20	20	20	20
Resistance (Ohms) @ 20°C [72°F]	R13	6.2	9	25	36
	R16	4.8	6.9	20	28
Current draw (A) @ 20°C [72°F]	R13	1.62	1.34	0.81	0.67
	R16	2.08	1.74	1.01	0.85
Housing color		Green	Gray	Blue	Yellow

## Ordering information

Example model code (separated by section)

A		B		C		D
R13	-	10D	-	16W	-	DE

A – Robust Coil Size

Code	Description
R13	13 mm inner diameter
R16	16 mm inner diameter

B – Voltage

Code	Description
10D	10 VDC
12D	12 VDC
20D	20 VDC
24D	24 VDC

C – Power

Code	Description
16W	16 Watt (R13 only)
20W	20 Watt (R16 only)

D – Coil Termination

Code	Connector	IP Rating
AS	AMP SuperSeal 1.5	IP69K
DE	DEUTSCH	IP69K
M3	Metri-Pack 150, Type 2	IP69K
FL	Flying Leads	IP69K
ASDB	AMP SuperSeal 1.5 with bi-directional diode	IP69K
DEDB	DEUTSCH with bi-directional diode	IP69K
M3DB	Metri-Pack 150, Type 2 with bi-directional diode	IP69K
FLDB	Flying leads with bi-directional diode	IP69K

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