

Comatrol

RESPONSIVENESS IN MOTION

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Coils

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CL - Coils
 Quick Reference

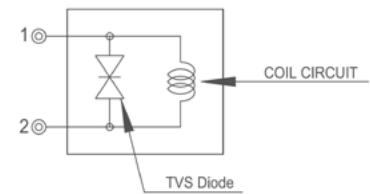
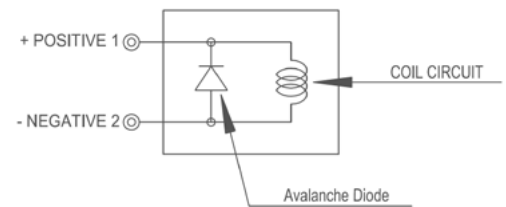
Coils	Valve Tube Outer Diameter	Coil Type	Wattage	Diode	10 VDC	12 VDC	20 VDC	24 VDC	110 / 220 VAC
D08	0.500 inch	Standard	16		X	X	X	X	Internally Rectified
D10	0.625 inch	Standard	16 & 30		X	X	X	X	Internally Rectified
M13	13 mm	Standard	20	Unidirectional	X	X	X	X	External Rectifier Needed
M16	16 mm	Standard	26	Unidirectional	X	X	X	X	External Rectifier Needed
M19	19 mm	Standard	33	Unidirectional		X		X	External Rectifier Needed
D14E	0.875 inch	Robust	30		X	X	X	X	
D14E (35W)	0.875 inch	Robust	35			X		X	
R13	13 mm	Robust	16	Bi-directional	X	X	X	X	
R16	16 mm	Robust	20	Bi-directional	X	X	X	X	
H16	16mm	Robust	29	Bi-directional		X		X	
M19P	19 mm (proportional)	Robust	22			X		X	



COIL TERMINATION SPECIFICATIONS

Comatrol coils can be ordered with fully encapsulated diodes. Diodes are used in electrical circuits to protect delicate downstream electronic components from power surges originating from the coil. Comatrol standard coils employ uni-directional, polarity diodes. This means the installer must be careful not to reverse the “+” and “-” terminals. If this should happen, the electrical current will destroy the diode and render the coil unusable. Comatrol coils have a “1” and “2” molded in the connector for proper identification of the poles. If AC coils are used, external rectification is required (except D08 and D10, which are internally rectified).

Comatrol Robust Coils R13, R16 and H16 employ bi-directional, transient voltage suppression diodes. Like standard coils, the diode is fully encapsulated in the plastic covering of the coil. Unlike standard coil diodes, bi-directional diodes are non-polarity dependent. Making electrical connections with Robust Coils is extremely easy because there is no danger of reversing the polarity.



Code	Termination	Specifications
A	DIN 43650	DIN 43650A/ISO 4400 standard electrical connector (includes connector for cartridge valves only)
AJ	Amp Junior	Integral to coil
AS	Amp SuperSeal 1.5 (also conforms to MetriPak 150 Type 1)	Integral to coil; mating connector is Delphi-Packard Part Number 12052641
C	Conduit	Two 18 AWG wires, 457 mm [18 in] long with 1/2-14 NPT internal thread for conduit
DE	Deutsch	Integral to coil; mating connector is Deutsch IPD (Industrial Products Division) Part Number DT06-2S
DED	Deutsch with diode	Integral to coil; mating connector is Deutsch IPD (Industrial Products Division) Part Number DT06-2S
DN	DIN 43650	DIN 43650A / ISO 4400 standard electrical connector
DN1	DIN 43650	“DN” with connector (for cartridge valves only)
DP	Dual Post	Two No. 8-32UNC screw terminals 9.5 mm [0.375 in] long
DT04	Deutsch	Integral to coil; mating connector is Deutsch IPD (Industrial Products Division) Part Number DT06-2S
E1	DIN 43650	DIN 43650A / ISO 4400 standard electrical connector
E2	DIN 43650 with diode	DIN 43650A / ISO 4400 standard electrical connector
E3	Amp Junior	Integral to coil
E4	Amp Junior with diode	Integral to coil
E5	DIN 43650 with rectifier	DIN 43650A / ISO 4400 standard electrical connector
E8	Lead wires	Two 18 AWG wires, 457 mm [18 in] long

COIL TERMINATION SPECIFICATIONS (continued)

Code	Termination	Specifications
E9	Lead wires with diode	Two 18 AWG wires, 457 mm [18 in] long
E10	Deutsch (on leads)	On two 18 AWG lead wires, 203 mm [8 in] long with protective braid; mating connector is Deutsch IPD (Industrial Products Division) Part Number DT06-2S
E11	Deutsch (on leads) with diode	On two 18 AWG lead wires, 203 mm [8 in] long with protective braid; mating connector is Deutsch IPD (Industrial Products Division) Part Number DT06-2S
E12	Deutsch	Integral to coil; mating connector is Deutsch IPD (Industrial Products Division) Part Number DT06-2S
E13	Deutsch with diode	Integral to coil; mating connector is Deutsch IPD (Industrial Products Division) Part Number DT06-2S
FL & FL600	Flying leads	Two 18 AWG wires, 600 mm [24 in] long
FLD	Flying leads with diode	Two 18 AWG wires, 600 mm [24 in] long
H	DIN 43650	DIN 43650A / ISO 4400 standard electrical connector
L	Lead Wires	Two 18 AWG wires, 457 mm [18 in] long
M2	Metri-Pak 150 Type 1 (also conforms to Amp SuperSeal 1.5)	Integral to coil; mating connector is Delphi-Packard Part Number 12052641
M3	Metri-Pak 150 Type 2	Integral to coil; mating connector is Delphi-Packard Part Number 12040753
S	Dual Spade	Two 6.35 mm [0.25 in] wide Type 1B spade terminals per SAE J858A
S1	Single Spade	One 6.35 mm [0.25 in] wide Type 1B spade terminal per SAE J858A with internal ground
SP	Dual Spade (M13 & M16 coils)	Two 6.35 mm [0.25 in] wide Type 1B spade terminals per SAE J858A
	Single Post (D08 & D10 coils)	One No. 8-32UNC Screw Terminals 9.5 mm [0.375 in] long with internal ground
WPF	Weatherpack Female	On 150 mm [6 in] lead wires; mating connector is Delphi-Packard Part Number 12010973
WPM	Weatherpack Male	On 150 mm [6 in] lead wires; mating connector is Delphi-Packard Part Number 12015792
WPMD	Weatherpack Male with diode	On 150 mm [6 in] lead wires; mating connector is Delphi-Packard Part Number 12015792

Not all connectors available with all coils. Consult individual coil data sheets for details.

PLUS+1™ COMPLIANT

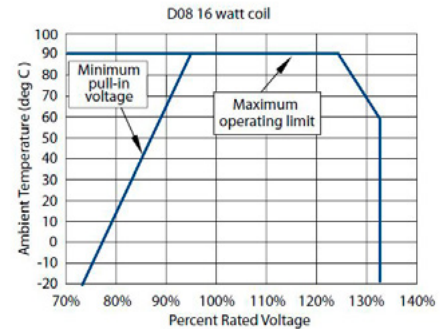
Comatrol solenoid valves are PLUS+1™ compliant. PLUS+1 compliance means our coils are directly compatible with the PLUS+1 machine control architecture. Adding solenoid valves to your application using PLUS+1 GUIDE software is as easy as *drag-and-drop*. Software development that used to take months can now be done in just a few hours. For more information on PLUS+1 GUIDE, visit www.comatrol.com or www.powersolutions.danfoss.com/Products/MobileElectronics/PLUS1Compliance. The table below details available GUIDE function blocks for controlling Comatrol coils.

GUIDE function blocks

On-off	10106088
On-off-on	10106102
Two-way proportional	10106103
Three-way proportional	10106104

SPECIFICATIONS

- Duty cycle rating: 100% at 133% of rated voltage
- Magnet wire insulation: (200°C)
- Ambient temperature: -30 to 60 °C [-22 to 140 °F]
- Diodes are available; contact your Comatrol representative.
- Environmental protection: IP65
- All AC coils are internally rectified



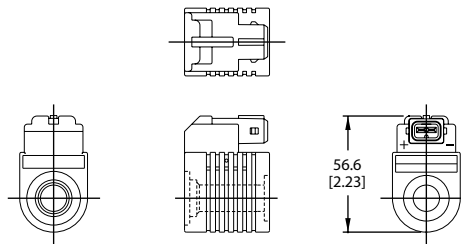
ELECTRICAL SPECIFICATIONS

16 watt coils

Voltage (V)	10 VDC	12 VDC	20 VDC	24 VDC	110 VAC	220 VAC
Resistance (Ohms) @ 20 °C [68 °F]	6.3	9	25	36	900	3600
Current draw (A) @ 20 °C [68 °F]	1.6	1.33	0.8	0.67	0.13	0.07
Color	Green	Grey	Blue	Black	Black	Black

TERMINALS

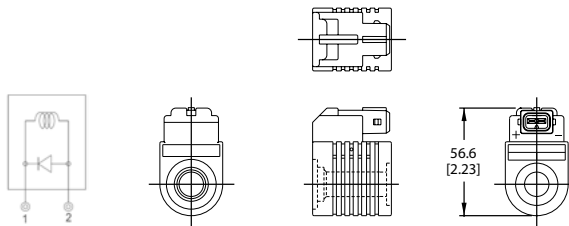
Amp Junior Timer
Code AJ



Part numbers

Voltage (V)	Power (W)	Part Number
10 VDC	16	D08-16W-10D-AJ
12 VDC	16	D08-16W-12D-AJ
20 VDC	16	D08-16W-20D-AJ
24 VDC	16	D08-16W-24D-AJ

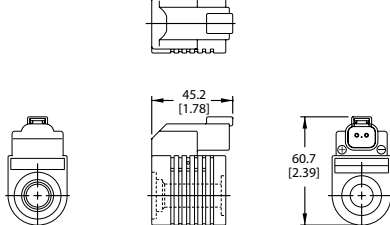
Amp Junior Timer
Code AJD



Part numbers

Voltage (V)	Power (W)	Part Number
10 VDC	16	D08-16W-10D-AJD
12 VDC	16	D08-16W-12D-AJD
20 VDC	16	D08-16W-20D-AJD
24 VDC	16	D08-16W-24D-AJD

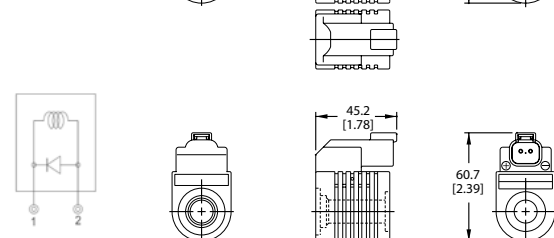
Deutsch
Code DE



Part numbers

Voltage (V)	Power (W)	Part Number
10 VDC	16	D08-16W-10D-DE
12 VDC	16	D08-16W-12D-DE
20 VDC	16	D08-16W-20D-DE
24 VDC	16	D08-16W-24D-DE

Deutsch
Code DED

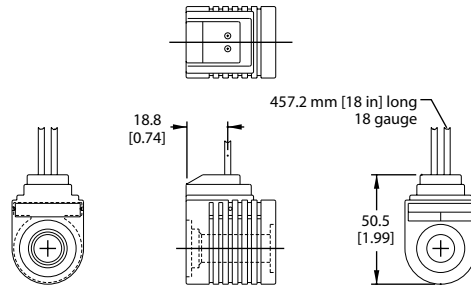


Part numbers

Voltage (V)	Power (W)	Part Number
10 VDC	16	D08-16W-10D-DED
12 VDC	16	D08-16W-12D-DED
20 VDC	16	D08-16W-20D-DED
24 VDC	16	D08-16W-24D-DED

TERMINALS
 (continued)

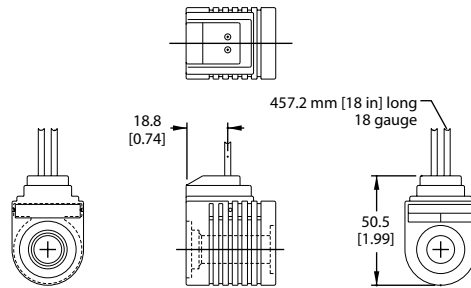
DIN 43650
 Code H



Part numbers

Voltage (V)	Power (W)	Part Number
10 VDC	16	D08-16W-10D-H
12 VDC	16	D08-16W-12D-H
20 VDC	16	D08-16W-20D-H
24 VDC	16	D08-16W-24D-H
110 VAC	16	D08-16W-120A-H
220 VAC	16	D08-16W-240A-H

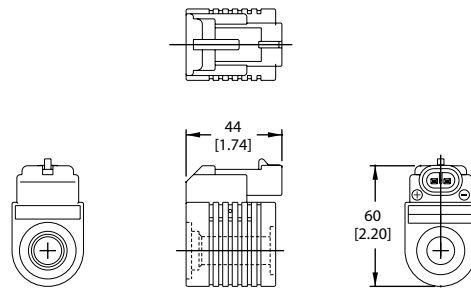
Lead wires
 Code L



Part numbers

Voltage (V)	Power (W)	Part Number
10 VDC	16	D08-16W-10D-L
12 VDC	16	D08-16W-12D-L
20 VDC	16	D08-16W-20D-L
24 VDC	16	D08-16W-24D-L

MetriPak 150 Type 1
 Code M2

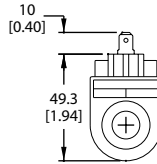
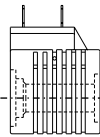
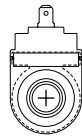
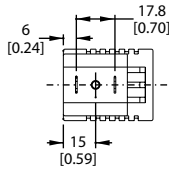


Part numbers

Voltage (V)	Power (W)	Part Number
10 VDC	16	D08-16W-10D-M2
12 VDC	16	D08-16W-12D-M2
20 VDC	16	D08-16W-20D-M2
24 VDC	16	D08-16W-24D-M2

TERMINALS
 (continued)

Spade
 Code S

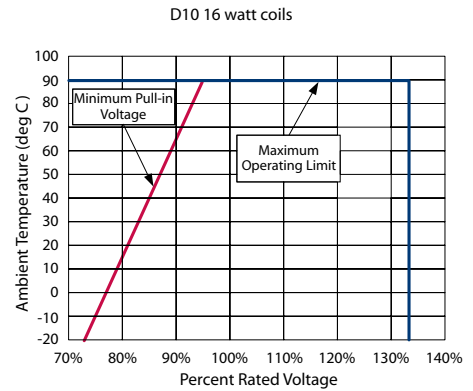


Part numbers

Voltage (V)	Power (W)	Part Number
10 VDC	16	D08-16W-10D-S
12 VDC	16	D08-16W-12D-S
20 VDC	16	D08-16W-20D-S
24 VDC	16	D08-16W-24D-S

SPECIFICATIONS

- Duty cycle rating: 100% at 133% of rated voltage
- Magnet wire insulation: (200°C)
- Ambient temperature: -30 to 90 °C [-22 to 194 °F]
- Diodes are available; contact your Comatrol representative.
- Environmental protection: IP65
- All AC coils are internally rectified



ELECTRICAL SPECIFICATIONS

16 watt coils

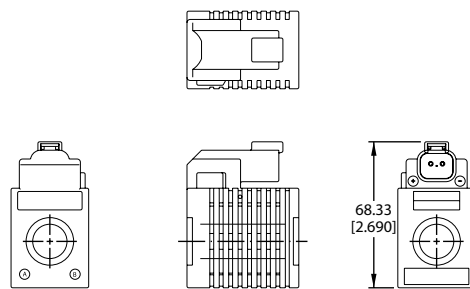
Voltage (V)	10 VDC	12 VDC	20 VDC	24 VDC	110 VAC	220 VAC
Resistance (Ohms) @ 20 °C [68 °F]	6.3	9	25	36	900	3600
Current draw (A) at 25 °C [68 °F]	1.6	1.33	0.8	0.67	0.13	0.07
Color	Green	Grey	Blue	Black	Black	Black

30 watt coils

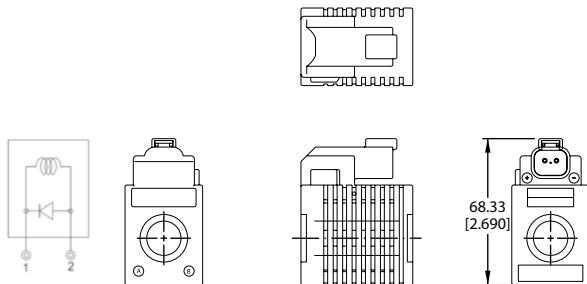
Voltage (V)	10 VDC	12 VDC	20 VDC	24 VDC	110 VAC	220 VAC
Resistance (Ohms) @ 20 °C [68 °F]	3.3	4.8	13	19	480	1920
Current draw (A) @ 20 °C [68 °F]	3	2.5	1.5	1.25	0.25	0.13
Color	Green	Grey	Blue	Black	Black	Black

TERMINALS

Deutsch
 Code DE



Deutsch w/diode
 Code DED



Part numbers

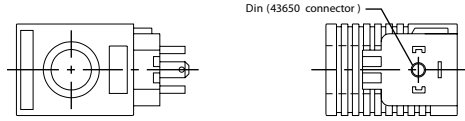
Voltage (V)	Power (W)	Part Number
10 VDC	16	D10-16W-10D-DE
12 VDC	16	D10-16W-12D-DE
20 VDC	16	D10-16W-20D-DE
24 VDC	16	D10-16W-24D-DE
10 VDC	30	D10-30W-10D-DE
12 VDC	30	D10-30W-12D-DE
20 VDC	30	D10-30W-20D-DE
24 VDC	30	D10-30W-24D-DE

Part numbers

Voltage (V)	Power (W)	Part Number
10 VDC	16	D10-16W-10D-DED
12 VDC	16	D10-16W-12D-DED
20 VDC	16	D10-16W-20D-DED
24 VDC	16	D10-16W-24D-DED
10 VDC	30	D10-30W-10D-DED
12 VDC	30	D10-30W-12D-DED
20 VDC	30	D10-30W-20D-DED
24 VDC	30	D10-30W-24D-DED

TERMINALS
 (continued)

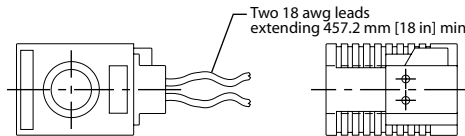
DIN 43650
 Code H



Part numbers

Voltage (V)	Power (W)	Part Number
10 VDC	16	D10-16W-10D-H
12 VDC	16	D10-16W-12D-H
20 VDC	16	D10-16W-20D-H
24 VDC	16	D10-16W-24D-H
110 VAC	16	D10-16W-120A-H
220 VAC	16	D10-16W-240A-H
10 VDC	30	D10-30W-10D-H
12 VDC	30	D10-30W-12D-H
20 VDC	30	D10-30W-20D-H
24 VDC	30	D10-30W-24D-H
110 VAC	30	D10-30W-120A-H
220 VAC	30	D10-30W-240A-H

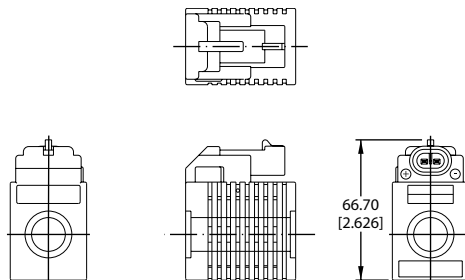
Lead wires
 Code L



Part numbers

Voltage (V)	Power (W)	Part Number
10 VDC	16	D10-16W-10D-L
12 VDC	16	D10-16W-12D-L
20 VDC	16	D10-16W-20D-L
24 VDC	16	D10-16W-24D-L
10 VDC	30	D10-30W-10D-L
12 VDC	30	D10-30W-12D-L
20 VDC	30	D10-30W-20D-L
24 VDC	30	D10-30W-24D-L

MetriPak 150 Type 1
 Code M2



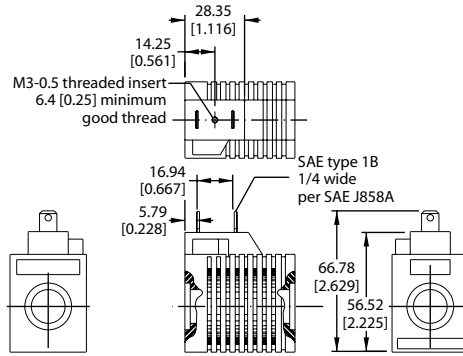
Part numbers

Voltage (V)	Power (W)	Part Number
10 VDC	16	D10-16W-10D-M2
12 VDC	16	D10-16W-12D-M2
20 VDC	16	D10-16W-20D-M2
24 VDC	16	D10-16W-24D-M2
10 VDC	30	D10-30W-10D-M2
12 VDC	30	D10-30W-12D-M2
20 VDC	30	D10-30W-20D-M2
24 VDC	30	D10-30W-24D-M2

CL - Coils
 D10

**TERMINALS
 (continued)**

Dual Spade
 Code S

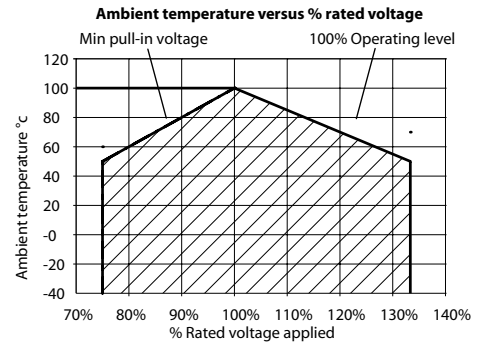


Part numbers

Voltage (V)	Power (W)	Part Number
10 VDC	16	D10-16W-10D-S
12 VDC	16	D10-16W-12D-S
20 VDC	16	D10-16W-20D-S
24 VDC	16	D10-16W-24D-S
10 VDC	30	D10-30W-10D-S
12 VDC	30	D10-30W-12D-S
20 VDC	30	D10-30W-20D-S
24 VDC	30	D10-30W-24D-S

SPECIFICATIONS

- Duty cycle rating: 100% at 133% of rated voltage and 50°C [122°F]
- Magnet wire insulation: (200°C)
- Ambient temperature: -40 to 50 °C [-40 to 112 °F]
- Diodes are available; contact your Comatrol representative.
- Environmental protection:
 IP69K: DE and L connectors
 IP67: AJ, M2, and M3 connectors
 IP65: all other connectors



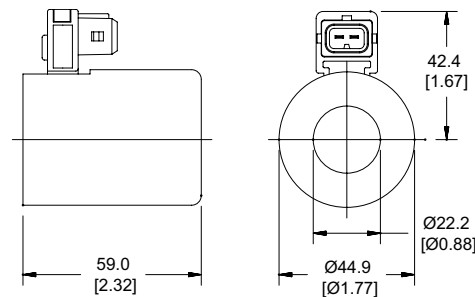
ELECTRICAL SPECIFICATIONS

30 watt coils

Voltage (V)	10 VDC	12 VDC	20 VDC	24 VDC
Resistance (Ohms) @ 20 °C [68 °F]	3.3	4.8	13	19
Current draw (A) @ 20 °C [68 °F]	3	2.5	1.5	1.25
Color	Green	Gray	Blue	Yellow

TERMINALS

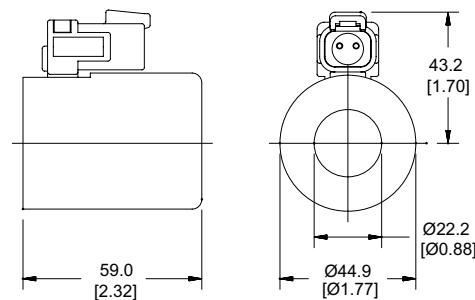
Amp Jr.
 Code AJ



Part numbers

Voltage (V)	Power (W)	Part Number
10 VDC	30	D14E-30W-10D-AJ
12 VDC	30	D14E-30W-12D-AJ
20 VDC	30	D14E-30W-20D-AJ
24 VDC	30	D14E-30W-24D-AJ

Deutsch
 Code DE

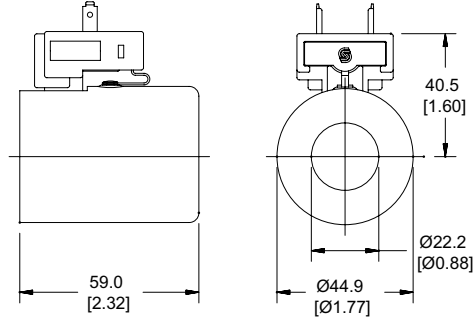


Part numbers

Voltage (V)	Power (W)	Part Number
10 VDC	30	D14E-30W-10D-DE
12 VDC	30	D14E-30W-12D-DE
20 VDC	30	D14E-30W-20D-DE
24 VDC	30	D14E-30W-24D-DE

TERMINALS
 (continued)

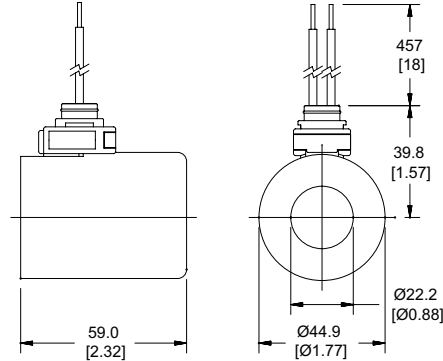
DIN 43650
 Code H



Part numbers

Voltage (V)	Power (W)	Part Number
10 VDC	30	D14E-30W-10D-H
12 VDC	30	D14E-30W-12D-H
20 VDC	30	D14E-30W-20D-H
24 VDC	30	D14E-30W-24D-H

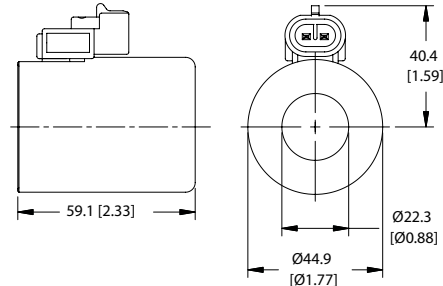
Lead wires
 Code L



Part numbers

Voltage (V)	Power (W)	Part Number
10 VDC	30	D14E-30W-10D-L
12 VDC	30	D14E-30W-12D-L
20 VDC	30	D14E-30W-20D-L
24 VDC	30	D14E-30W-24D-L

Metripak 150, type 1
 Code M2

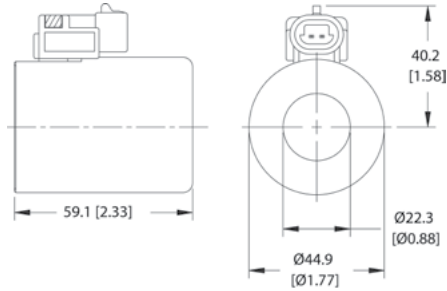


Part numbers

Voltage (V)	Power (W)	Part Number
10 VDC	30	D14E-30W-10D-M2
12 VDC	30	D14E-30W-12D-M2
20 VDC	30	D14E-30W-20D-M2
24 VDC	30	D14E-30W-24D-M2

TERMINALS
 (continued)

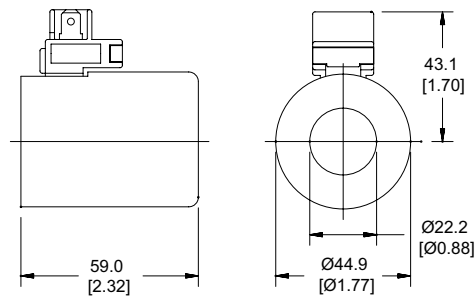
MetriPak 150, Type 2
 Code M3



Part numbers

Voltage (V)	Power (W)	Part Number
10 VDC	30	D14E-30W-10D-M3
12 VDC	30	D14E-30W-12D-M3
20 VDC	30	D14E-30W-20D-M3
24 VDC	30	D14E-30W-24D-M3

Dual Spade
 Code S



Part numbers

Voltage (V)	Power (W)	Part Number
10 VDC	30	D14E-30W-10D-S
12 VDC	30	D14E-30W-12D-S
20 VDC	30	D14E-30W-20D-S
24 VDC	30	D14E-30W-24D-S

SPECIFICATIONS

- Magnet wire insulation: (200°C)
- Maximum continuous current 1.8 A (at 12 V) 0.9 A (at 24 V)
- Ambient temperature: -40 to 50 °C [-40 to 122 °F]
- Environmental protection:
 IP69K: DE and FL connectors
 IP67: AJ and AS connectors
 IP65: all other connectors
- Used primarily on proportional valves

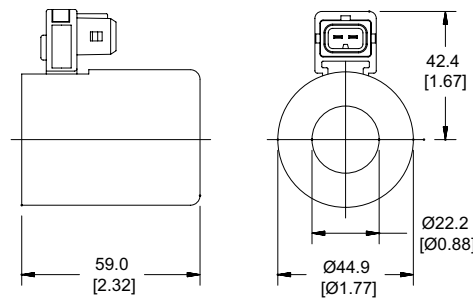
ELECTRICAL SPECIFICATIONS

35 watt coils

Voltage (V)	12 VDC	24 VDC
Resistance (Ohms) @ 20 °C [68 °F]	4.1	17
Current draw (A) @ 20 °C [68 °F]	1.8	0.9
Color	Gray	Yellow

TERMINALS

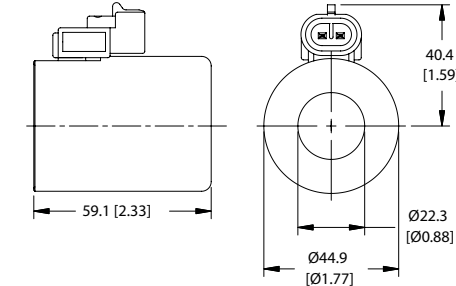
Amp Jr.
 Code AJ



Part numbers

Voltage (V)	Power (W)	Part Number
12 VDC	35	D14E-12D-1.8A-AJ
24 VDC	35	D14E-24D-0.9A-AJ

Amp SuperSeal 1.5/MetriPak 150 Type 1
 Code AS



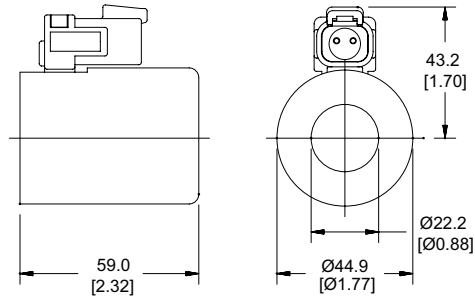
Part numbers

Voltage (V)	Power (W)	Part Number
12 VDC	35	D14E-12D-1.8A-AS
24 VDC	35	D14E-24D-0.9A-AS

CL - Coils
 D14E (35W)

TERMINALS
 (continued)

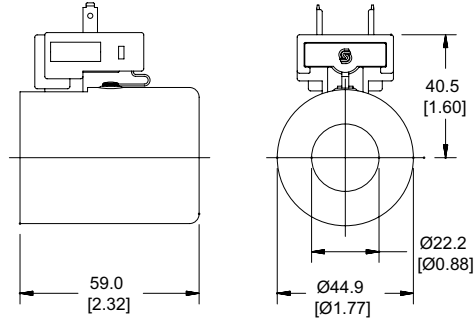
Deutsch
 Code DE



Part numbers

Voltage (V)	Power (W)	Part Number
12 VDC	35	D14E-12D-1.8A-DE
24 VDC	35	D14E-24D-0.9A-DE

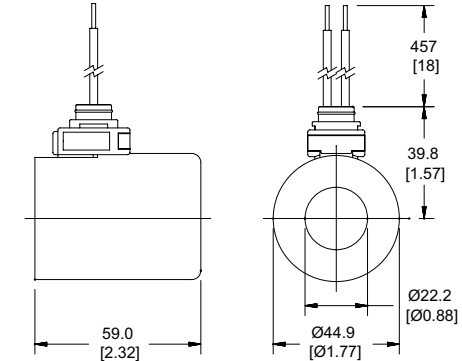
DIN 43650
 Code DN



Part numbers

Voltage (V)	Power (W)	Part Number
12 VDC	35	D14E-12D-1.8A-DN
24 VDC	35	D14E-24D-0.9A-DN

Lead wires
 Code FL



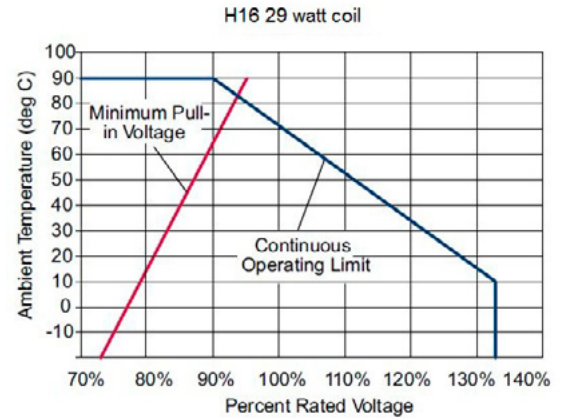
Part numbers

Voltage (V)	Power (W)	Part Number
12 VDC	35	D14E-12D-1.8A-FL
24 VDC	35	D14E-24D-0.9A-FL

CL - Coils
 D14E (35W)

SPECIFICATIONS

- Duty cycle: 100% at 115% of rated voltage at 40°C [104°F]
- Magnet wire insulation: (200°C)
- Ambient temperature range: -20 to 40 °C [-4 to 104 °F]
- Environmental protection rating: IP69K: AS, DE, FL and M3
- Input voltage range: 85% to 115% of rated voltage
- Optional bi-directional transient voltage suppression diodes: Non polarity dependent, 51 volt nominal breakdown voltage
- Weight: 0.34 kg [0.75 lb]



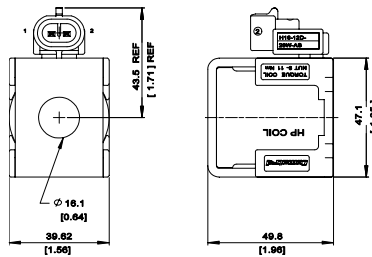
ELECTRICAL SPECIFICATIONS

29 watt coils

Voltage (V)	12 VDC	24 VDC
Resistance (Ohms) @ 20 °C [68 °F]	4.8	19.8
Current draw (A) @ 20 °C [68 °F]	2.48	1.21

TERMINALS

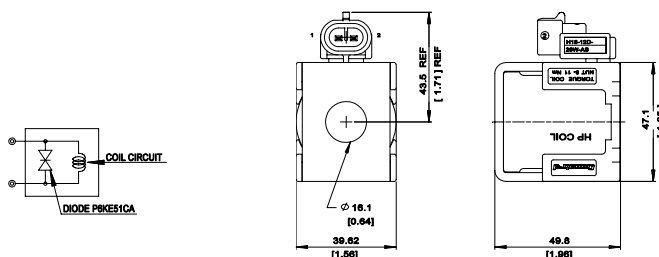
Amp SuperSeal 1.5/MetriPak 150 Type 1 Code AS



Part numbers

Voltage (V)	Resistance (Ohm)	Part Number
12	4.8	H16-12D-29W-AS
24	19.8	H16-24D-29W-AS

Amp SuperSeal 1.5/MetriPak 150 Type 1 w/Diode Bi-Directional Code ASDB

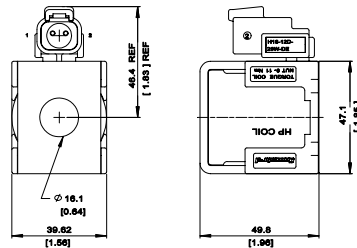


Part numbers

Voltage (V)	Resistance (Ohm)	Part Number
12	4.8	H16-12D-29W-AS-DB
24	19.8	H16-24D-29W-AS-DB

TERMINALS
(continued)

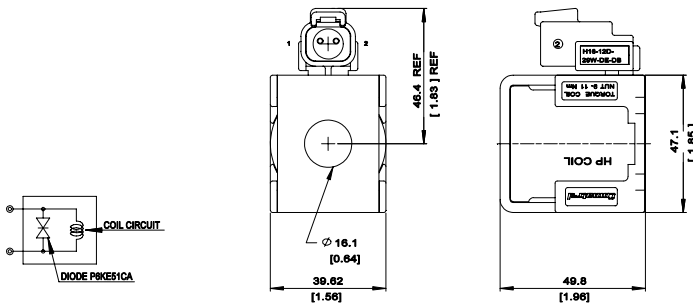
Deutsch
Code DE



Part numbers

Voltage (V)	Resistance (Ohm)	Part Number
12	4.8	H16-12D-29W-DE
24	19.8	H16-24D-29W-DE

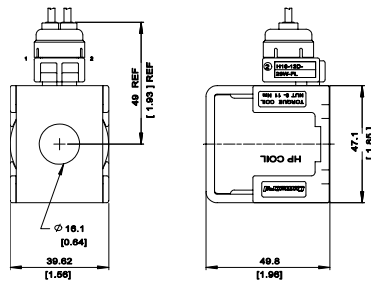
Deutsch w/Diode, Bi-Directional
Code DEDB



Part numbers

Voltage (V)	Resistance (Ohm)	Part Number
12	4.8	H16-12D-29W-DE-DB
24	19.8	H16-24D-29W-DE-DB

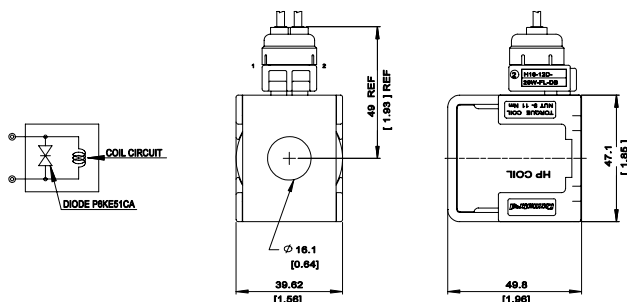
Lead wires
Code FL



Part numbers

Voltage (V)	Resistance (Ohm)	Part Number
12	4.8	H16-12D-29W-FL
24	19.8	H16-24D-29W-FL

Lead wires w/Diode, Bi-Directional
Code FLDB

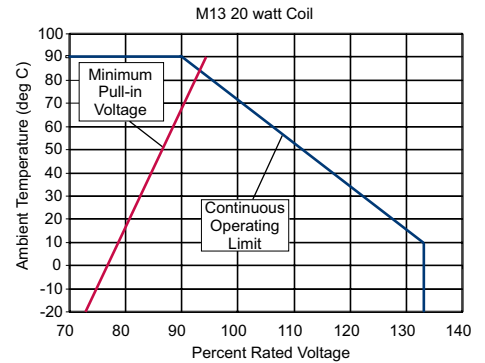


Part numbers

Voltage (V)	Resistance (Ohm)	Part Number
12	4.8	H16-12D-29W-FL-DB
24	19.8	H16-24D-29W-FL-DB

SPECIFICATIONS

- Duty cycle: 100% at 115% of rated voltage at 40°C [104°F]
- Magnet wire insulation: (200°C)
- Ambient temperature range: -20 to 40 °C [-4 to 104 °F]
- Environmental protection rating:
 IP69K: DE
 IP67: AJ , AS, and M3 term
 IP65: FL and DN
- Input voltage range: 85% to 115% of rated voltage
- Temperature rise at 115% of rated voltage: 130°C [266°F] above ambient
- AC coils require external rectifier
- Weight: 0.2 kg [0.44 lb]



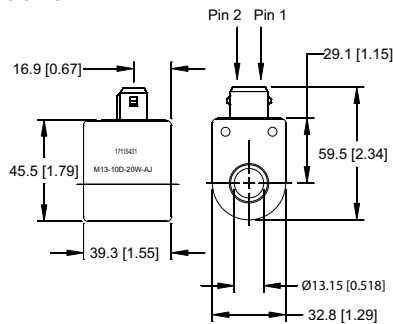
ELECTRICAL SPECIFICATIONS

20 watt coils

Voltage (V)	10 VDC	12 VDC	20 VDC	24 VDC	110 VAC	220 VAC
Resistance (Ohms) @ 20 °C [68 °F]	5	7.2	20	29	530	2306
Current draw (A) @ 20 °C [68 °F]	2	1.67	1	0.83	0.18	0.085

TERMINALS

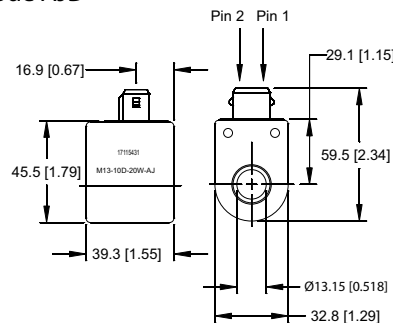
Amp Jr.
 Code AJ



Part numbers

Voltage (V)	Power (W)	Part Number
10 VDC	20	M13-10D-20W-AJ
12 VDC	20	M13-12D-20W-AJ
20 VDC	20	M13-20D-20W-AJ
24 VDC	20	M13-24D-20W-AJ

Amp Jr. w/diode
 Code AJD

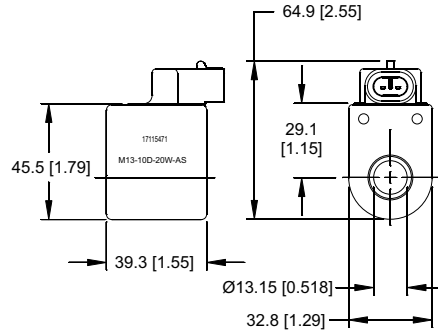


Part numbers

Voltage (V)	Power (W)	Part Number
10 VDC	20	M13-10D-20W-AJD
12 VDC	20	M13-12D-20W-AJD
20 VDC	20	M13-20D-20W-AJD
24 VDC	20	M13-24D-20W-AJD

TERMINALS
(continued)

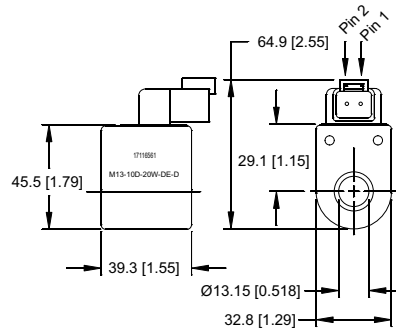
Amp SuperSeal 1.5/MetriPak 150 Type 1
Code AS



Part numbers

Voltage (V)	Power (W)	Part Number
10 VDC	20	M13-10D-20W-AS
12 VDC	20	M13-12D-20W-AS
20 VDC	20	M13-20D-20W-AS
24 VDC	20	M13-24D-20W-AS

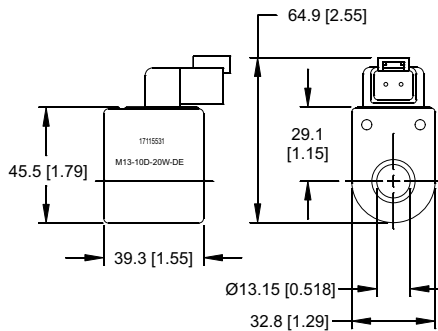
Amp SuperSeal 1.5/MetriPak 150 Type 1 w/diode
Code ASD



Part numbers

Voltage (V)	Power (W)	Part Number
10 VDC	20	M13-10D-20W-ASD
12 VDC	20	M13-12D-20W-ASD
20 VDC	20	M13-20D-20W-ASD
24 VDC	20	M13-24D-20W-ASD

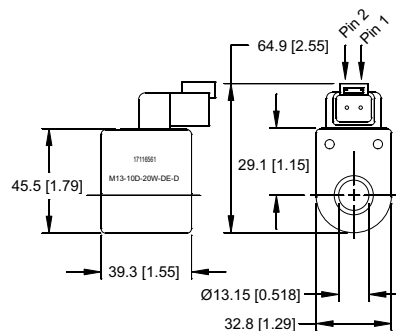
Deutsch
Code DE



Part numbers

Voltage (V)	Power (W)	Part Number
10 VDC	20	M13-10D-20W-DE
12 VDC	20	M13-12D-20W-DE
20 VDC	20	M13-20D-20W-DE
24 VDC	20	M13-24D-20W-DE

Deutsch w/diode
Code DED



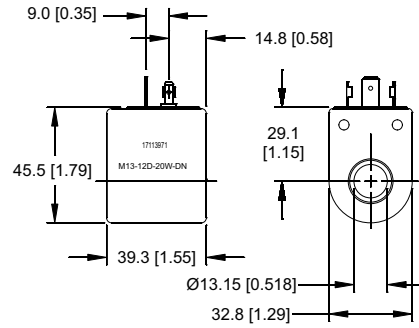
Part numbers

Voltage (V)	Power (W)	Part Number
10 VDC	20	M13-10D-20W-DED
12 VDC	20	M13-12D-20W-DED
20 VDC	20	M13-20D-20W-DED
24 VDC	20	M13-24D-20W-DED

TERMINALS
(continued)

ISO 4400 (DIN 43650)

Code DN



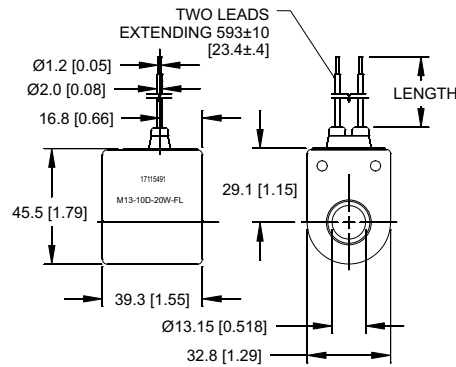
Part numbers

Voltage (V)	Power (W)	Part Number
10 VDC	20	M13-10D-20W-DN
12 VDC	20	M13-12D-20W-DN
20 VDC	20	M13-20D-20W-DN
24 VDC	20	M13-24D-20W-DN
110 VAC*	18.5	M13-110A-18.5W-DN
220 VAC*	17	M13-220A-17W-DN

*External rectifier needed

Lead wires

Code FL

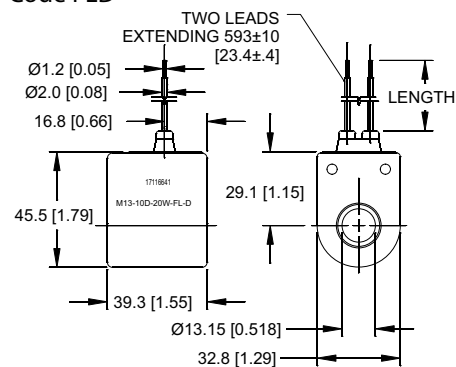


Part numbers

Voltage (V)	Power (W)	Part Number
10 VDC	20	M13-10D-20W-FL
12 VDC	20	M13-12D-20W-FL
20 VDC	20	M13-20D-20W-FL
24 VDC	20	M13-24D-20W-FL

Lead wires w/diode

Code FLD



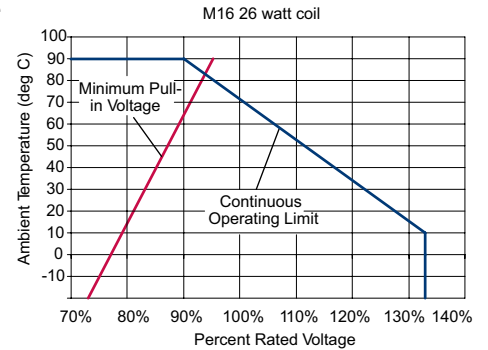
Part numbers

Voltage (V)	Power (W)	Part Number
10 VDC	20	M13-10D-20W-FLD
12 VDC	20	M13-12D-20W-FLD
20 VDC	20	M13-20D-20W-FLD
24 VDC	20	M13-24D-20W-FLD

CL - Coils
M13

SPECIFICATIONS

- Duty cycle: 100% at 115% of rated voltage at 40°C [104°F]
- Magnet wire insulation: (200°C)
- Ambient temperature range: -20 to 40 °C [-4 to 104 °F]
- Environmental protection rating:
 IP69K: DE
 IP67: AJ , AS, and M3 term
 IP65: FL and DN
- Input voltage range: 85% to 115% of rated voltage
- Temperature rise at 115% of rated voltage: 130°C [266°F] above ambient
- AC coils require external rectifier
- Weight: 0.24 kg [0.53 lb]



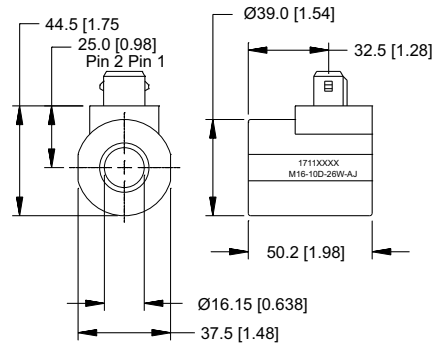
ELECTRICAL SPECIFICATIONS

26 watt coils

Voltage (V)	10 VDC	12 VDC	20 VDC	24 VDC	110 VAC	220 VAC
Resistance (Ohms) @ 20 °C [68 °F]	4	5.6	15	22	420	1600
Current draw (A) @ 20 °C [68 °F]	2.5	2.14	1.33	1.1	0.27	0.12

TERMINALS

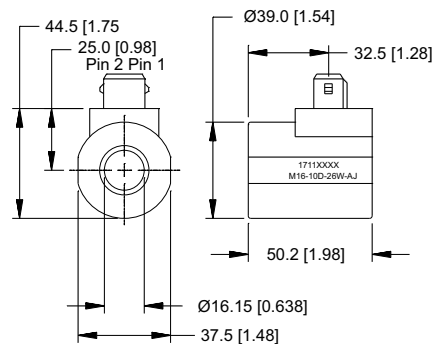
Amp Jr.
 Code AJ



Part numbers

Voltage (V)	Power (W)	Part Number
10 VDC	26	M16-10D-26W-AJ
12 VDC	26	M16-12D-26W-AJ
20 VDC	26	M16-20D-26W-AJ
24 VDC	26	M16-24D-26W-AJ

Amp Jr. w/diode
 Code AJD

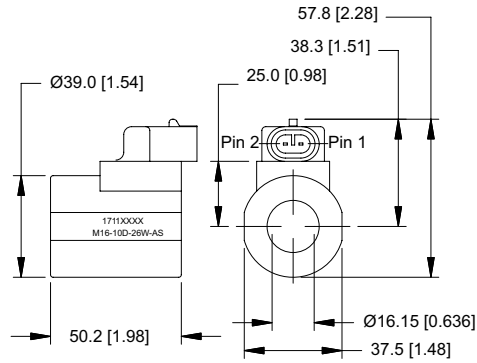


Part numbers

Voltage (V)	Power (W)	Part Number
10 VDC	26	M16-10D-26W-AJD
12 VDC	26	M16-12D-26W-AJD
20 VDC	26	M16-20D-26W-AJD
24 VDC	26	M16-24D-26W-AJD

TERMINALS
(continued)

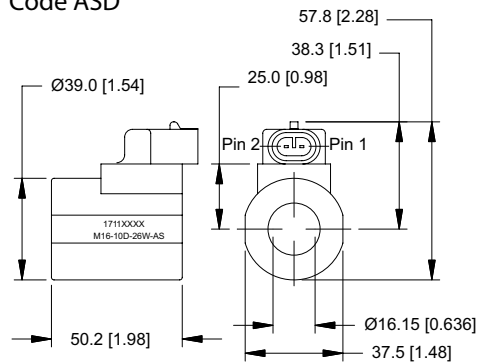
Amp SuperSeal 1.5/MetriPak 150 Type 1
Code AS



Part numbers

Voltage (V)	Power (W)	Part Number
10 VDC	26	M16-10D-26W-AS
12 VDC	26	M16-12D-26W-AS
20 VDC	26	M16-20D-26W-AS
24 VDC	26	M16-24D-26W-AS

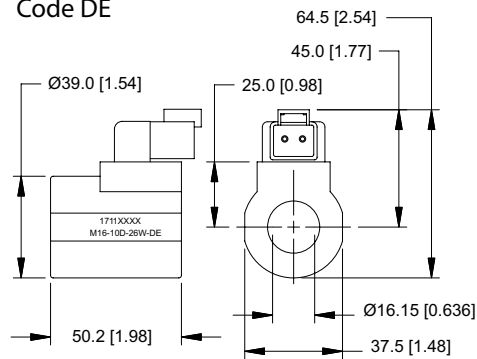
Amp SuperSeal 1.5/MetriPak 150 Type 1 w/diode
Code ASD



Part numbers

Voltage (V)	Power (W)	Part Number
10 VDC	26	M16-10D-26W-ASD
12 VDC	26	M16-12D-26W-ASD
20 VDC	26	M16-20D-26W-ASD
24 VDC	26	M16-24D-26W-ASD

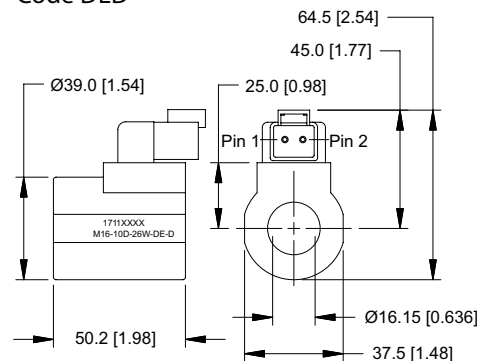
Deutsch
Code DE



Part numbers

Voltage (V)	Power (W)	Part Number
10 VDC	26	M16-10D-26W-DE
12 VDC	26	M16-12D-26W-DE
20 VDC	26	M16-20D-26W-DE
24 VDC	26	M16-24D-26W-DE

Deutsch w/diode
Code DED

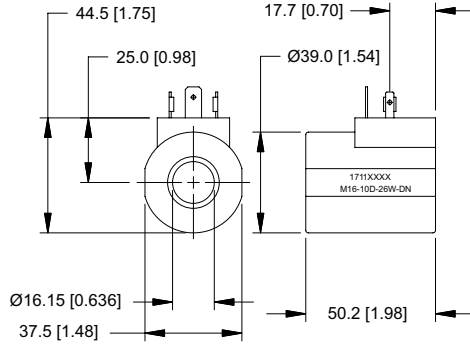


Part numbers

Voltage (V)	Power (W)	Part Number
10 VDC	26	M16-10D-26W-DED
12 VDC	26	M16-12D-26W-DED
20 VDC	26	M16-20D-26W-DED
24 VDC	26	M16-24D-26W-DED

TERMINALS
(continued)

ISO 4400 (DIN 43650)
Code DN

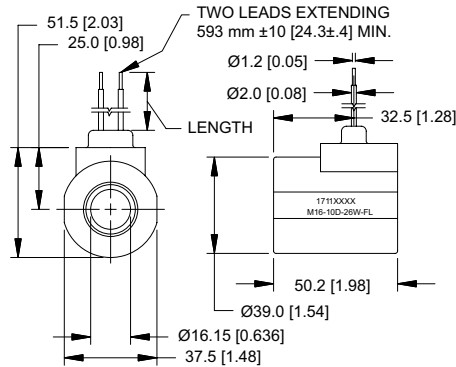


Part numbers

Voltage (V)	Power (W)	Part Number
10 VDC	26	M16-10D-26W-DN
12 VDC	26	M16-12D-26W-DN
20 VDC	26	M16-20D-26W-DN
24 VDC	26	M16-24D-26W-DN
110 VAC*	22	M16-110A-22W-DN
220 VAC*	20	M16-220A-20W-DN

*External rectifier needed

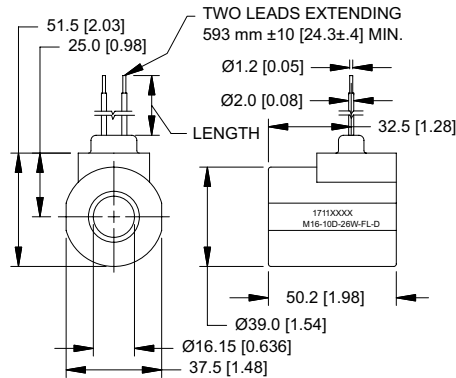
Lead wires
Code FL



Part numbers

Voltage (V)	Power (W)	Part Number
10 VDC	26	M16-10D-26W-FL
12 VDC	26	M16-12D-26W-FL
20 VDC	26	M16-20D-26W-FL
24 VDC	26	M16-24D-26W-FL

Lead wires w/diode
Code FLD

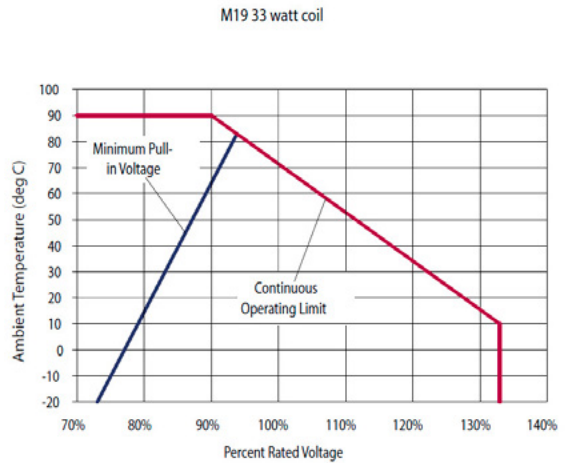


Part numbers

Voltage (V)	Power (W)	Part Number
10 VDC	26	M16-10D-26W-FLD
12 VDC	26	M16-12D-26W-FLD
20 VDC	26	M16-20D-26W-FLD
24 VDC	26	M16-24D-26W-FLD

SPECIFICATIONS

- Duty cycle: 100% at 115% of rated voltage at 40°C [104° F]
- Magnet wire insulation: (200° C)
- Ambient temperature range: -20° to 40° C [-4° to 104° F]
- Environmental protection rating: IP65 (DN &FL), IP67 (AJ, AJD), IP69K (DE, DED)
- Input voltage range: 85% to 115% of rated voltage
- Temperature rise at 115% of rated voltage: 130° C [266° F] above ambient temperature
- Weight: 0.37 kg [0.82 lb]
- AC Coils require external rectifier



CL - Coils
 M19

ELECTRICAL SPECIFICATIONS

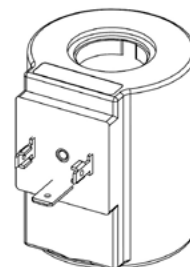
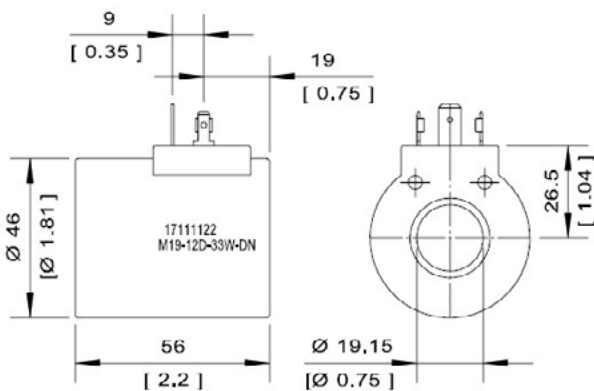
Voltage	12 VDC	24 VDC	110 VAC	220 VAC
Resistance (Ohms) @ 20° C [68F]	4.4	17	287	1190
Current draw (A) at 25° C [68° F]	2.76	1.38	0.337	0.163

TERMINALS

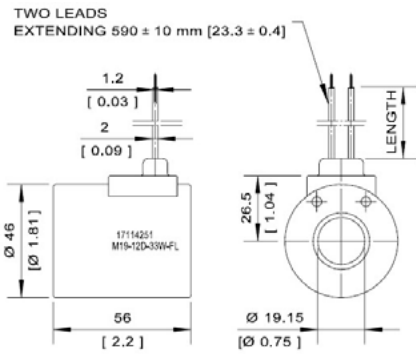
ISO 4400 (DIN 43650)
 Code DN

Voltage	Power (W)	Part Number
12VDC	33	M19-12D-33W-DN
24VDC	33	M19-24D-33W-DN
110VAC*	33	M19-110RA-33W-DN
220VAC*	33	M19-220RA-33W-DN

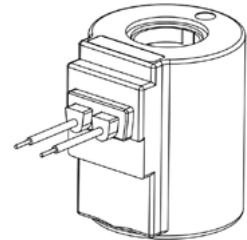
* External rectifier needed



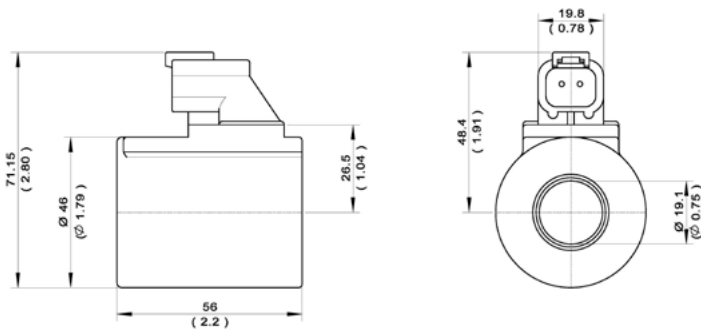
**LEAD WIRES
CODE FL**



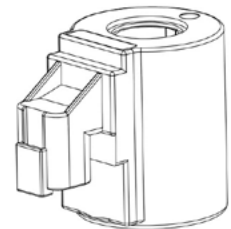
Voltage	Power (W)	Part Number
12VDC	33	M19-12D-33W-AJ
24VDC	33	M19-24D-33W-AJ



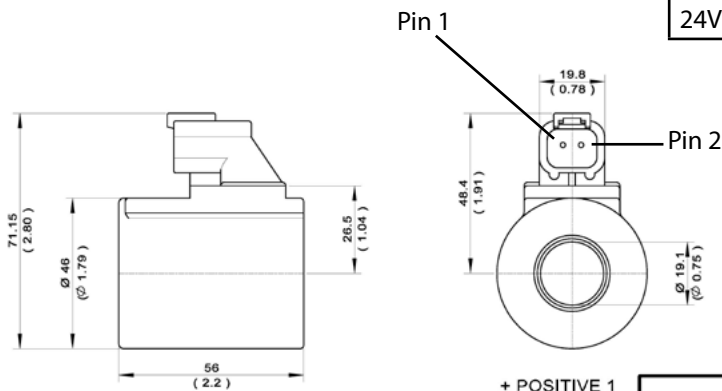
**DEUTSCH
CODE DE**



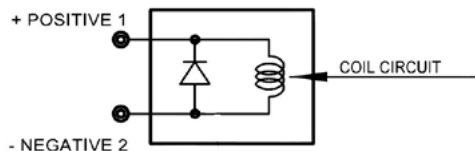
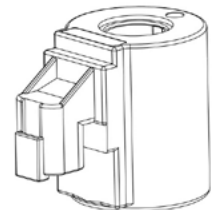
Voltage (V)	Power (W)	Part Number
12VDC	33	M19-12D-33W-DE
24VDC	33	M19-24D-33W-DE



**DEUTSCH WITH DIODE
CODE DED**



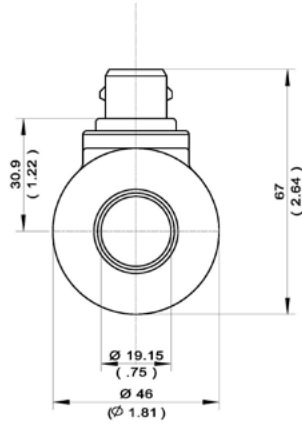
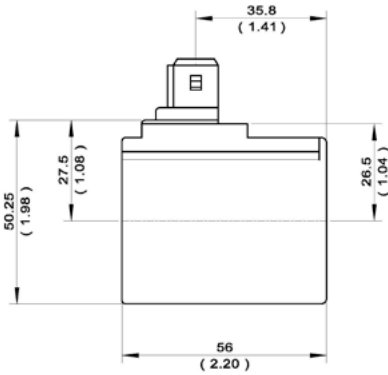
Voltage (V)	Power (W)	Part Number
12VDC	33	M19-12D-33W-DED
24VDC	33	M19-24D-33W-DED



CL - Coils
M19

**AMP JR.
 CODE AJ**

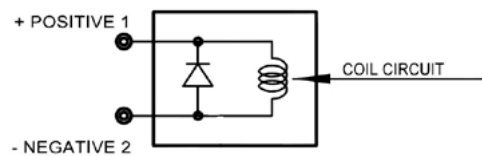
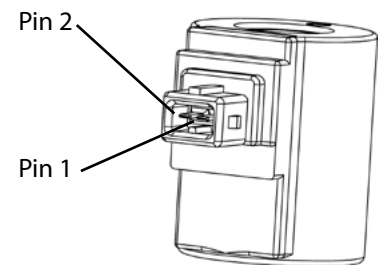
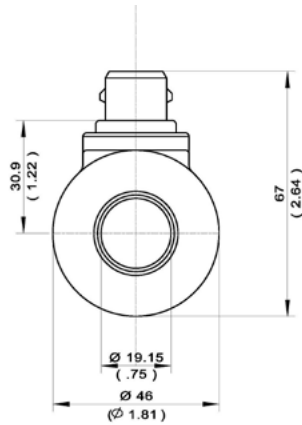
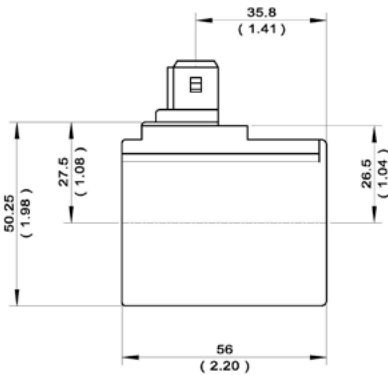
Voltage (V)	Power (W)	Part Number
12VDC	33	M19-12D-33W-AJ
24VDC	33	M19-24D-33W-AJ



CL - Coils
 M19

**AMP JR. WITH DIODE
 CODE AJD**

Voltage (V)	Power (W)	Part Number
12VDC	33	M19-12D-33W-AJD
24VDC	33	M19-24D-33W-AJD



SPECIFICATIONS

- Magnet wire insulation: (200°C)
- Duty cycle rating: 100%
- Maximum continuous current 1.8 A (at 12 V) 0.9 A (at 24 V)
- Ambient temperature range: -20 to 40 °C [-4 to 104 °F]
- Environmental protection: IP69K (DE connector), IP65 (all other connectors)
- Weight: 0.37 kg [0.82 lb]
- Used primarily on proportional valves

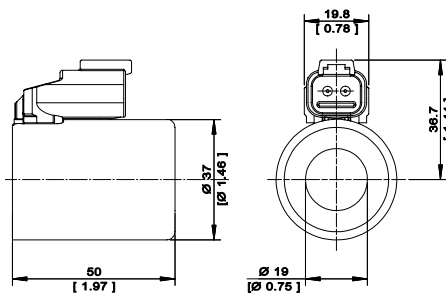
ELECTRICAL SPECIFICATIONS

22 watt coils

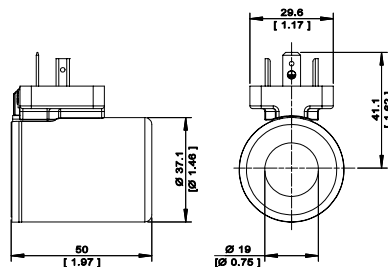
Voltage (V)	12 VDC	24 VDC
Resistance (Ohms) @ 20 °C [68 °F]	3.7	16
Current draw (A) @ 20 °C [68 °F]	1.8	0.9

TERMINALS

Deutsch
 Code DE



ISO 4400 (DIN 43650)
 Code DN



Part numbers

Voltage (V)	Resistance (Ohm)	Part Number
12 VDC	3.7	M19P-12D-1.8A-DE
12L VDC (IS2)	7.2	M19P-12D-1.1A-DE
24 VDC	15.5	M19P-24D-0.9A-DE
24 L VDC (IS2)	28.8	M19P-24D-0.55A-DE

(IS2) Used with PRV10-IS2 and PRV12-IS2 proportional relief valves

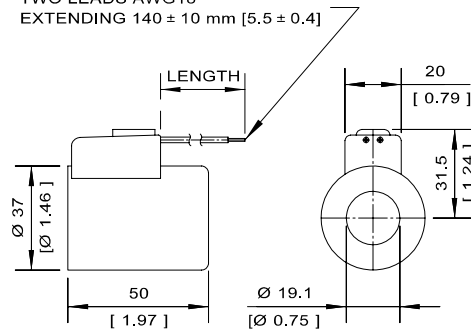
Part numbers

Voltage (V)	Resistance (Ohm)	Part Number
12 VDC	3.7	M19P-12D-1.8A-DN
24 VDC	15.5	M19P-24D-0.9A-DN

TERMINALS
 (continued)

Lead wires
 Code FL

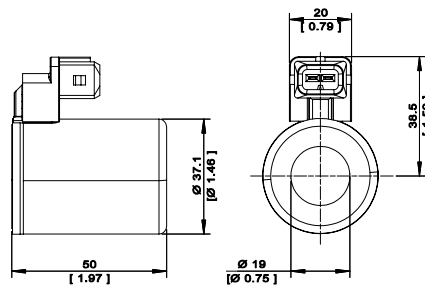
TWO LEADS AWG18
 EXTENDING 140 ± 10 mm [5.5 ± 0.4]



Part numbers

Voltage (V)	Resistance (Ohms @ 20C (72F))	Power (W)	Part Number
12 VDC	3.7	22	M19P-12D-1.8A-FL
24 VDC	16	22	M19P-24D-0.9A-FL

Amp Jr.
 Code AJ



Part numbers

Voltage (V)	Resistance (Ohm)	Part Number
12 DC	3.7	M19P-12D-1.8A-AJ
24 DC	15.5	M16-24D-0.9A-AJ

SPECIFICATIONS

- Duty cycle rating: 100%
- Magnet wire insulation: (200°C)
- Ambient temperature: -30 to 50 °C [-22 to 122 °F]
- Diodes are available; contact your Comatrol representative.
- Environmental protection: IP67 (E12 connector), IP65 (all other connectors)
- Input voltage tolerance: ± 10%

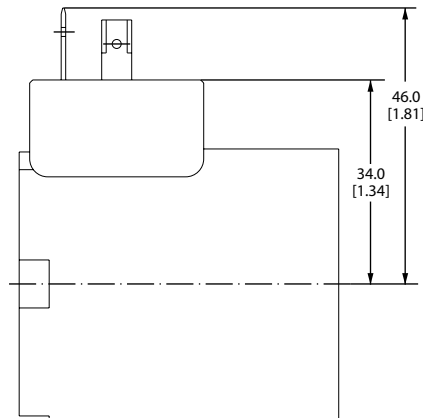
ELECTRICAL SPECIFICATIONS

40 watt coils

Voltage (V)	12 VDC	24 VDC
Resistance (Ohms) @ 20 °C [68 °F]	3.6	14

TERMINALS

DIN 43650
 Code E1

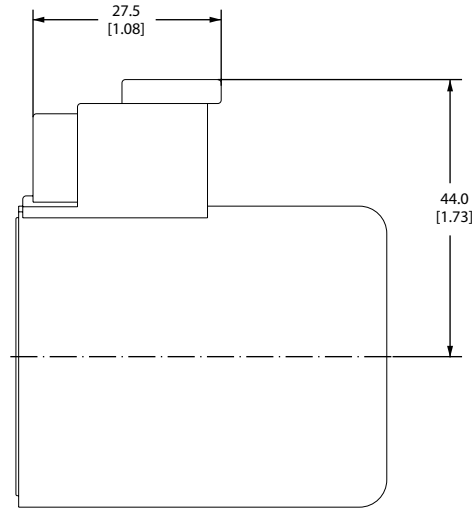


Part numbers

Voltage (V)	Power (W)	Part Number
12 VDC	40	158-8063
24 VDC	40	158-8065

TERMINALS
 (continued)

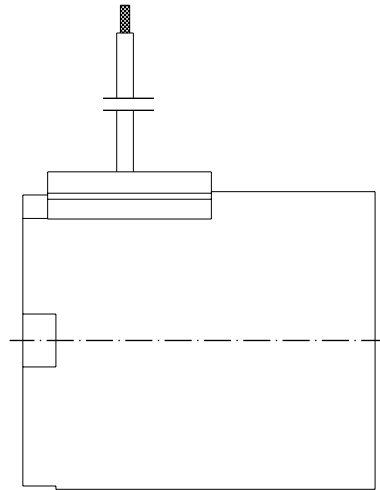
Deutsch
 Code E12



Part numbers

Voltage (V)	Power (W)	Part Number
12 VDC	40	158-8067
24 VDC	40	11079667

Lead wires
 Code E8



Part numbers

Voltage (V)	Power (W)	Part Number
12 VDC	40	158-8090
24 VDC	40	158-8091

CL - Coils
 PDCV03

SPECIFICATIONS

- Duty cycle rating: 100% at 100% of rated current at 50°C [122 ° F]
- Magnet wire insulation: (200°C)
 Ambient temperature: -20 to +50 C [-4 to +122 deg F]
- Environmental protection: IP65
- Weight: 0.45kg [1.0 lb]

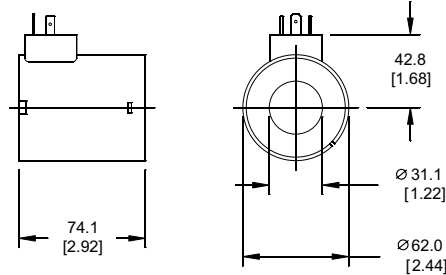
ELECTRICAL SPECIFICATIONS

30 watt coils

Voltage (V)	12 VDC	24 VDC
Resistance (Ohms) @ 20 °C [68 °F]	2.3	13
Current draw (A) @ 20 °C [68 °F]	2.5	1.25

TERMINALS

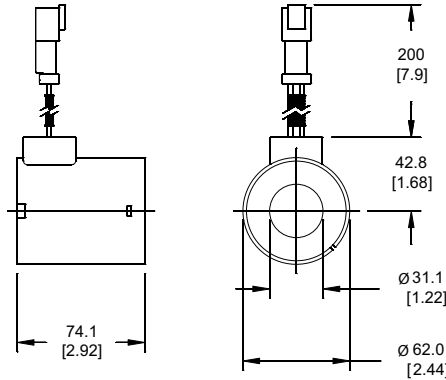
ISO 4400 (DIN 43650)
 Code E1



Part numbers

Voltage (V)	Power (W)	Part Number
12 VDC	30	158-8096
24 VDC	30	158-8097

Duetsch connector on lead wires
 Code E10

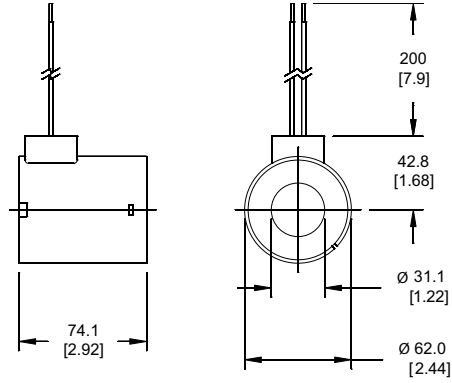


Part numbers

Voltage (V)	Power (W)	Part Number
12 VDC	30	Consult factory
24 VDC	30	Consult factory

TERMINALS
 (continued)

Lead wires
 Code E8

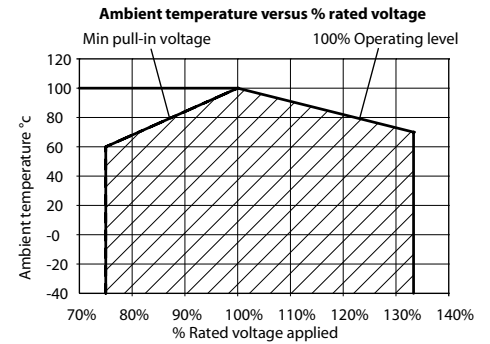


Part numbers

Voltage (V)	Power (W)	Part Number
12 VDC	30	158-8092
24 VDC	30	158-8093

SPECIFICATIONS

- Duty cycle: 100% at 133% of rated voltage and 70°C [158°F]
- Magnet wire insulation: (200°C)
- Ambient temperature range: -40 to +70 °C [-40 to 158 °F]
- Environmental rating:
 IP69K: AS, DE, FL and M3
- Input voltage range: 75% to 133% of rated voltage
- Optional bi-directional, transient voltage suppression diodes: Non polarity dependent, 51 volt nominal breakdown voltage.
- Weight: 0.22 kg [0.49 lb]



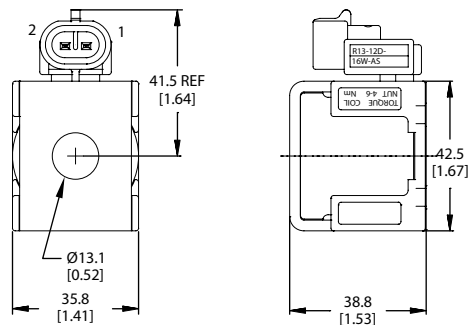
ELECTRICAL SPECIFICATIONS

16 watt coils

Voltage (V)	10 VDC	12 VDC	20 VDC	24 VDC
Resistance (Ohms) @ 20 °C [68 °F]	6.2	9	25	36
Current draw (A) @ 20 °C [68 °F]	1.62	1.34	0.81	0.67
Color	Green	Gray	Blue	Yellow

TERMINALS

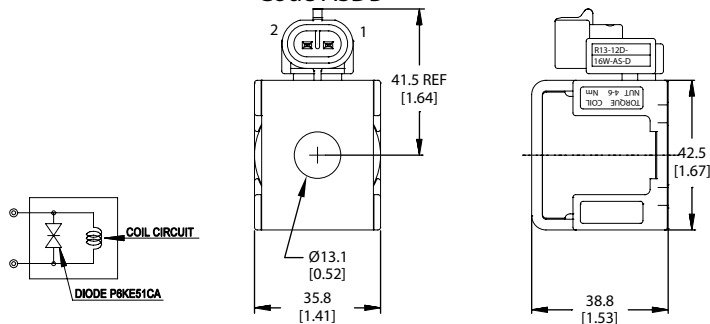
Amp SuperSeal 1.5/MetriPak 150 Type 1
 Code AS



Part numbers

Voltage (V)	Power (W)	Part Number
10 VDC	16	R13-10D-16W-AS
12 VDC	16	R13-12D-16W-AS
20 VDC	16	R13-20D-16W-AS
24 VDC	16	R13-24D-16W-AS

Amp SuperSeal 1.5/MetriPak 150 Type 1
 w/Diode Bi-Directional
 Code ASDB

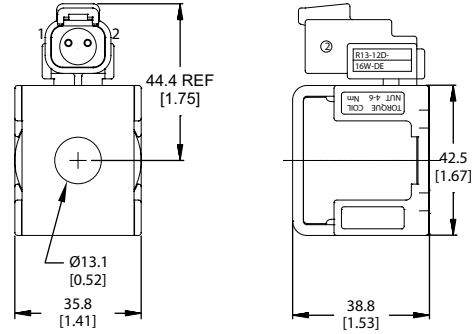


Part numbers

Voltage (V)	Power (W)	Part Number
10 VDC	16	R13-10D-16W-ASDB
12 VDC	16	R13-12D-16W-ASDB
20 VDC	16	R13-20D-16W-ASDB
24 VDC	16	R13-24D-16W-ASDB

TERMINALS
(continued)

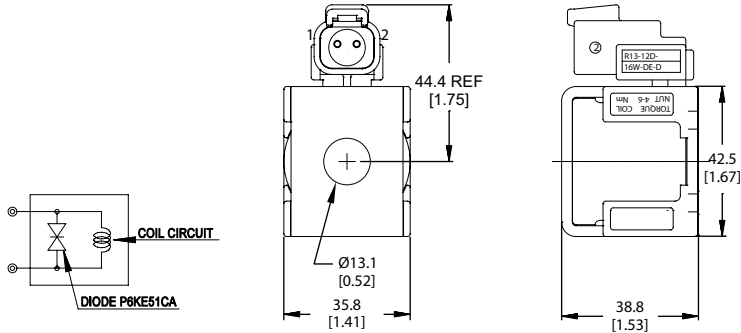
Deutsch
Code DE



Part numbers

Voltage (V)	Power (W)	Part Number
10 VDC	16	R13-10D-16W-DE
12 VDC	16	R13-12D-16W-DE
20 VDC	16	R13-20D-16W-DE
24 VDC	16	R13-24D-16W-DE

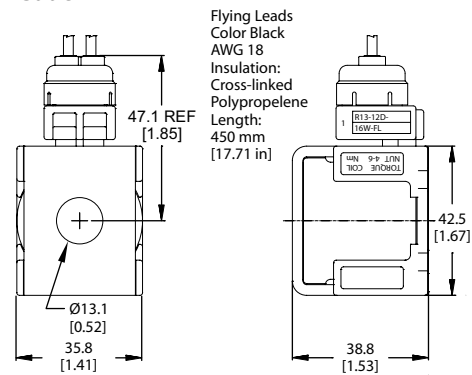
Deutsch w/Diode, Bi-Directional
Code DEDB



Part numbers

Voltage (V)	Power (W)	Part Number
10 VDC	16	R13-10D-16W-DEDB
12 VDC	16	R13-12D-16W-DEDB
20 VDC	16	R13-20D-16W-DEDB
24 VDC	16	R13-24D-16W-DEDB

Lead wires
Code FL

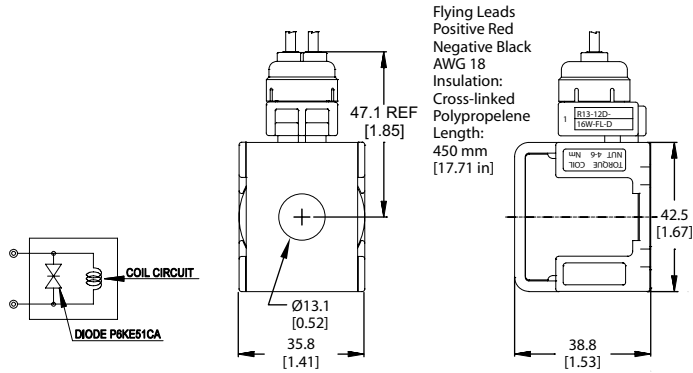


Part numbers

Voltage (V)	Power (W)	Part Number
10 VDC	16	R13-10D-16W-FL
12 VDC	16	R13-12D-16W-FL
20 VDC	16	R13-20D-16W-FL
24 VDC	16	R13-24D-16W-FL

TERMINALS
 (continued)

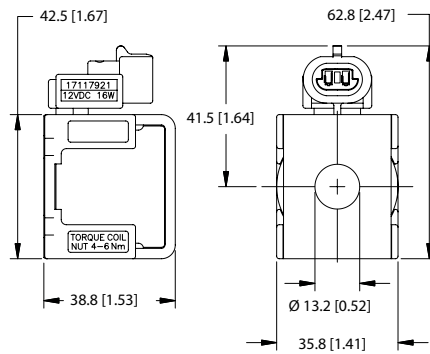
Lead wires w/Diode, Bi-Directional
 Code FLDB



Part numbers

Voltage (V)	Power (W)	Part Number
10 VDC	16	R13-10D-16W-FLDB
12 VDC	16	R13-12D-16W-FLDB
20 VDC	16	R13-20D-16W-FLDB
24 VDC	16	R13-24D-16W-FLDB

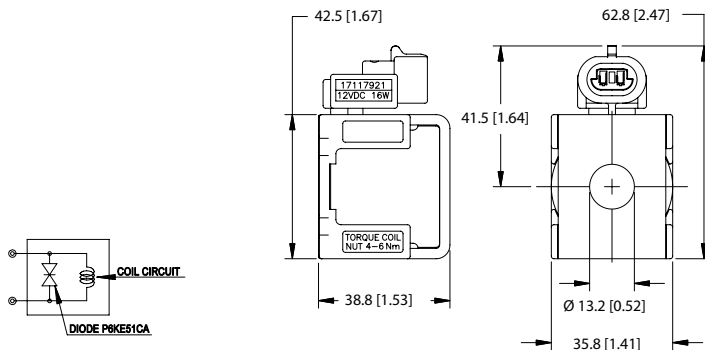
MetriPak 150, type 2
 Code M3



Part numbers

Voltage (V)	Power (W)	Part Number
10 VDC	16	R13-10D-16W-M3
12 VDC	16	R13-12D-16W-M3
20 VDC	16	R13-20D-16W-M3
24 VDC	16	R13-24D-16W-M3

MetriPak 150, type 2 w/Diode
 Bi-Directional
 Code M3DB

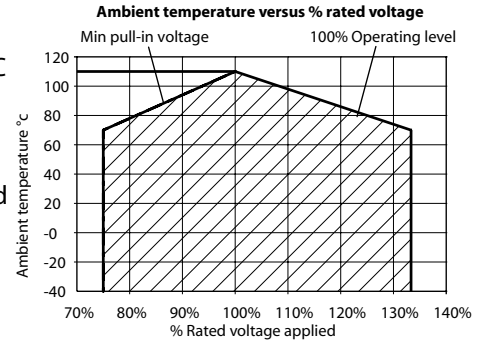


Part numbers

Voltage (V)	Power (W)	Part Number
10 VDC	16	R13-10D-16W-M3DB
12 VDC	16	R13-12D-16W-M3DB
20 VDC	16	R13-20D-16W-M3DB
24 VDC	16	R13-24D-16W-M3DB

SPECIFICATIONS

- Duty cycle: 100% at 133% of rated voltage and 70°C [158°F]
- Magnet wire insulation: (200°C)
- Ambient temperature range: -40 to +70 °C [-40 to 158 °F]
- Environmental rating: IP69K: AS, DE, FL and M3
- Input voltage range: 75% to 133% of rated voltage
- Optional bi-directional transient voltage suppression diodes: Non polarity dependent, 51 volt nominal breakdown voltage
- Weight: 0.34 kg [0.75 lb]



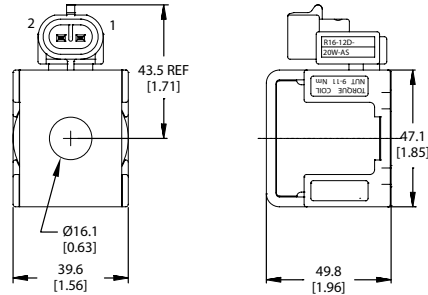
ELECTRICAL SPECIFICATIONS

20 watt coils

Voltage (V)	10 VDC	12 VDC	20 VDC	24 VDC
Resistance (Ohms) @ 20 °C [68 °F]	4.8	6.9	20	28
Current draw (A) @ 20 °C [68 °F]	2.08	1.74	1.01	0.85
Color	Green	Gray	Blue	Yellow

TERMINALS

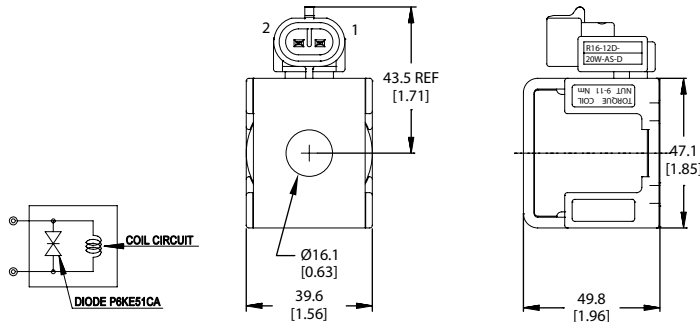
Amp SuperSeal 1.5/MetriPak 150 Type 1
Code AS



Part numbers

Voltage (V)	Power (W)	Part Number
10 VDC	20	R16-10D-20W-AS
12 VDC	20	R16-12D-20W-AS
20 VDC	20	R16-20D-20W-AS
24 VDC	20	R16-24D-20W-AS

Amp SuperSeal 1.5/MetriPak 150 Type 1
w/Diode, Bi-Directional
Code ASDB

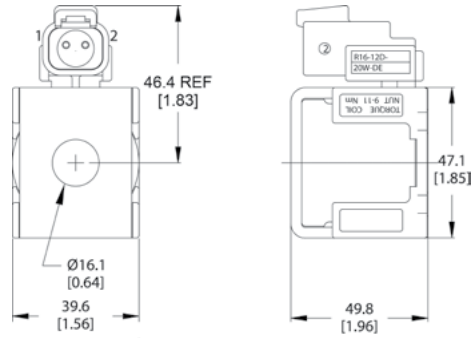


Part numbers

Voltage (V)	Power (W)	Part Number
10 VDC	20	R16-10D-20W-ASDB
12 VDC	20	R16-12D-20W-ASDB
20 VDC	20	R16-20D-20W-ASDB
24 VDC	20	R16-24D-20W-ASDB

TERMINALS
 (continued)

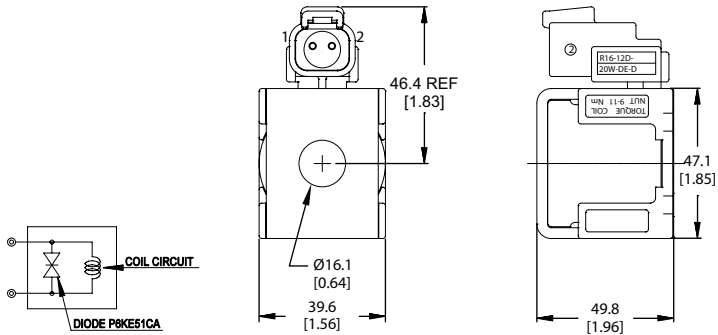
Deutsch
 Code DE



Part numbers

Voltage (V)	Power (W)	Part Number
10 VDC	20	R16-10D-20W-DE
12 VDC	20	R16-12D-20W-DE
20 VDC	20	R16-20D-20W-DE
24 VDC	20	R16-24D-20W-DE

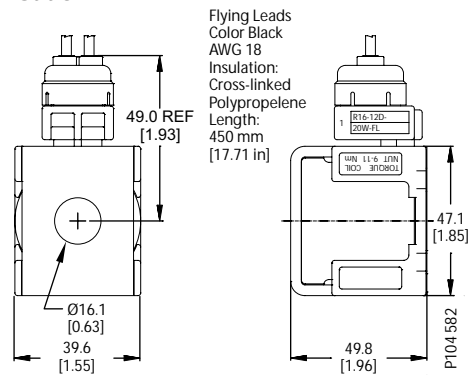
Deutsch w/diode Bi-Directional
 Code DEDB



Part numbers

Voltage (V)	Power (W)	Part Number
10 VDC	20	R16-10D-20W-DEDB
12 VDC	20	R16-12D-20W-DEDB
20 VDC	20	R16-20D-20W-DEDB
24 VDC	20	R16-24D-20W-DEDB

Lead wires
 Code FL

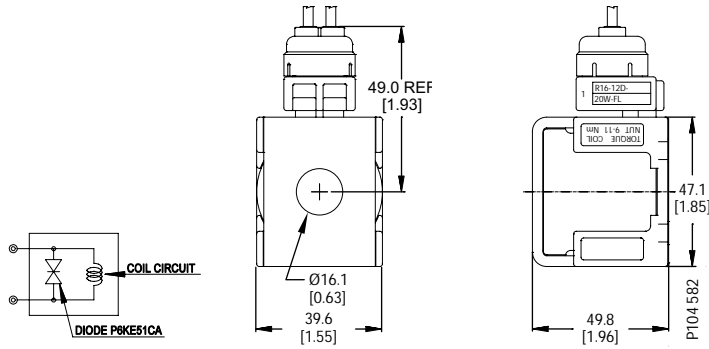


Part numbers

Voltage (V)	Power (W)	Part Number
10 VDC	20	R16-10D-20W-FL
12 VDC	20	R16-12D-20W-FL
20 VDC	20	R16-20D-20W-FL
24 VDC	20	R16-24D-20W-FL

TERMINALS
(continued)

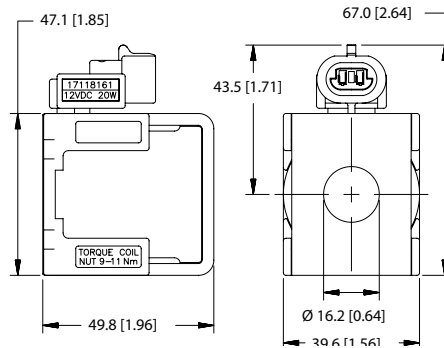
Lead wires w/diode
Code FLDB



Part numbers

Voltage (V)	Power (W)	Part Number
10 VDC	20	R16-10D-20W-FLDB
12 VDC	20	R16-12D-20W-FLDB
20 VDC	20	R16-20D-20W-FLDB
24 VDC	20	R16-24D-20W-FLDB

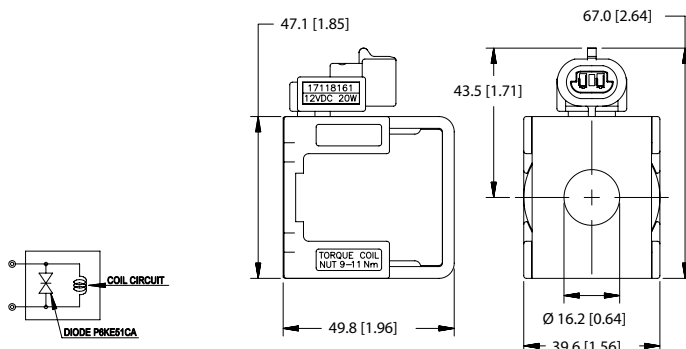
MetriPak 150, type 2
Code M3



Part numbers

Voltage (V)	Power (W)	Part Number
10 VDC	20	R16-10D-20W-M3
12 VDC	20	R16-12D-20W-M3
20 VDC	20	R16-20D-20W-M3
24 VDC	20	R16-24D-20W-M3

MetriPak 150, type 2 w/diode
Bi-Directional
Code M3DB



Part numbers

Voltage (V)	Power (W)	Part Number
10 VDC	20	R16-10D-20W-M3DB
12 VDC	20	R16-12D-20W-M3DB
20 VDC	20	R16-20D-20W-M3DB
24 VDC	20	R16-24D-20W-M3DB