



## Cartridge Valves Technical Information

Coils  
Quick reference

<b>D08</b>	Specifications .....	22.6
	Amp Junior Timer.....	22.6
	Deutsch .....	22.6
	DIN 43650 .....	22.7
	Lead wires .....	22.7
	MetriPak 150 Type 1 .....	22.7
	Spade .....	22.8
<b>D10</b>	Specifications .....	22.9
	Deutsch .....	22.9
	DIN 43650 .....	22.10
	Lead wires .....	22.10
	MetriPak 150 Type 1 .....	22.10
	Dual Spade .....	22.11
<b>D14E</b>	Specifications .....	22.12
	Amp Jr. ....	22.12
	Deutsch .....	22.12
	DIN 43650 .....	22.13
	Lead wires .....	22.13
	Metripak 150, type 1 .....	22.13
	MetriPak 150, Type 2 .....	22.14
	Dual Spade .....	22.14
<b>D14E(35W)</b>	Specifications .....	22.15
	Amp Jr. ....	22.15
	Amp SuperSeal 1.5/MetriPak 150 Type 1 .....	22.15
	Deutsch .....	22.16
	DIN 43650 .....	22.16
	Lead wires .....	22.16
<b>M13</b>	Specifications .....	22.17
	Amp Jr. ....	22.17
	Amp SuperSeal 1.5/MetriPak 150 Type 1 .....	22.18
	Deutsch .....	22.18
	Deutsch w/diode.....	22.18
	ISO 4400 (DIN 43650).....	22.19
	Lead wires .....	22.19
	Lead wires w/diode .....	22.19
	MetriPak 150, Type 2 .....	22.20
	Spade .....	22.20
	Weather pack (female) .....	22.20
	Weather pack (male) .....	22.21
	Weather pack (male) w/diode .....	22.21

<b>M16</b>	Specifications .....	22.22
	Amp Jr. ....	22.22
	Amp SuperSeal 1.5/MetriPak 150 Type 1 .....	22.23
	Deutsch .....	22.23
	Deutsch w/diode.....	22.23
	ISO 4400 (DIN 43650).....	22.24
	Lead wires .....	22.24
	Lead wires w/diode .....	22.24
	MetriPak 150, Type 2 .....	22.25
	Spade .....	22.25
	Weather pack (female) .....	22.25
	Weather pack (male).....	22.26
	Weather pack (male) w/diode .....	22.26
<b>M19</b>	Specifications .....	22.27
	Amp SuperSeal 1.5/MetriPak 150 Type 1 .....	22.27
	ISO 4400 (DIN 43650).....	22.27
	Lead wires .....	22.28
<b>M19P</b>	Specifications .....	22.29
	Deutsch .....	22.29
	ISO 4400 (DIN 43650).....	22.29
	Lead wires .....	22.30
<b>PD03</b>	Specifications .....	22.31
	DIN 43650 .....	22.31
	Deutsch .....	22.32
	Lead wires .....	22.32
<b>PD05</b>	Specifications .....	22.33
	ISO 4400 (DIN 43650).....	22.33
	Duetsch connector on lead wires .....	22.33
	Lead wires .....	22.34
<b>R13</b>	Specifications .....	22.35
	Amp SuperSeal 1.5/MertiPak 150 Type 1 .....	22.35
	Amp SuperSeal 1.5/MertiPak 150 Type 1 w/diode.....	22.35
	Deutsch .....	22.36
	Deutsch w/diode.....	22.36
	Lead wires .....	22.36
	Lead wires w/diode .....	22.37
	MetriPak 150, type 2.....	22.37
	MetriPak 150, type 2 w/diode.....	22.37



# Cartridge Valves Technical Information

## Coils Quick reference



### R16

Specifications .....	22.38
Amp SuperSeal 1.5/MetriPak 150 Type 1 .....	22.38
Amp SuperSeal 1.5/MetriPak 150 Type 1 w/diode .....	22.38
Deutsch .....	22.39
Deutsch w/diode .....	22.39
Lead wires .....	22.39
Lead wires w/diode .....	22.40
MetriPak 150, type 2 .....	22.40
MetriPak 150, type 2 w/diode .....	22.40

Coils  
Quick reference



### COIL TERMINATION SPECIFICATIONS

Code	Termination	Specifications
<b>A</b>	DIN 43650	DIN 43650A/ISO 4400 standard electrical connector
<b>AJ</b>	Amp Junior	Integral to coil
<b>AMJ</b>	Amp Junior	Integral to coil
<b>AMS</b>	Amp SuperSeal 1.5 (also conforms to MetriPak 150 Type 1)	Integral to coil; mating connector is Delphi-Packard Part Number 12052641
<b>AS</b>	Amp SuperSeal 1.5 (also conforms to MetriPak 150 Type 1)	Integral to coil; mating connector is Delphi-Packard Part Number 12052641
<b>C</b>	Conduit	Two 18 AWG wires, 457 mm [18 in] long with 1/2-14 NPT internal thread for conduit
<b>DE</b>	Deutsch	Integral to coil; mating connector is Deutsch IPD (Industrial Products Division) Part Number DT06-2S
<b>DED</b>	Deutsch with diode	Integral to coil; mating connector is Deutsch IPD (Industrial Products Division) Part Number DT06-2S
<b>DN</b>	DIN 43650	DIN 43650A / ISO 4400 standard electrical connector
<b>DP</b>	Dual Post	Two No. 8-32UNC screw terminals 9.5 mm [0.375 in] long
<b>DT04</b>	Deutsch	Integral to coil; mating connector is Deutsch IPD (Industrial Products Division) Part Number DT06-2S
<b>E1</b>	DIN 43650	DIN 43650A / ISO 4400 standard electrical connector
<b>E2</b>	DIN 43650 with diode	DIN 43650A / ISO 4400 standard electrical connector
<b>E3</b>	Amp Junior	Integral to coil
<b>E4</b>	Amp Junior with diode	Integral to coil
<b>E5</b>	DIN 43650 with rectifier	DIN 43650A / ISO 4400 standard electrical connector
<b>E8</b>	Lead wires	Two 18 AWG wires, 457 mm [18 in] long
<b>E9</b>	Lead wires with diode	Two 18 AWG wires, 457 mm [18 in] long
<b>E10</b>	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
<b>E11</b>	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

**COIL TERMINATION  
 SPECIFICATIONS  
 (continued)**

Code	Termination	Specifications
<b>E12</b>	Deutsch	Integral to coil; mating connector is Deutsch IPD (Industrial Products Division) Part Number DT06-2S
<b>E13</b>	Deutsch with diode	Integral to coil; mating connector is Deutsch IPD (Industrial Products Division) Part Number DT06-2S
<b>FL &amp; FL600</b>	Flying leads	Two 18 AWG wires, 600 mm [24 in] long
<b>FLD</b>	Flying leads with diode	Two 18 AWG wires, 600 mm [24 in] long
<b>H</b>	DIN 43650	DIN 43650A / ISO 4400 standard electrical connector
<b>L</b>	Lead Wires	Two 18 AWG wires, 457 mm [18 in] long
<b>M2</b>	Metri-Pak 150 Type 1 (also conforms to Amp SuperSeal 1.5)	Integral to coil; mating connector is Delphi-Packard Part Number 12052641
<b>M3</b>	Metri-Pak 150 Type 2	Integral to coil; mating connector is Delphi-Packard Part Number 12040753
<b>S</b>	Dual Spade	Two 6.35 mm [0.25 in] wide Type 1B spade terminals per SAE J858A
<b>S1</b>	Single Spade	One 6.35 mm [0.25 in] wide Type 1B spade terminal per SAE J858A with internal ground
<b>SP</b>	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
<b>WPF</b>	Weatherpack Female	On 150 mm [6 in] lead wires; mating connector is Delphi-Packard Part Number 12010973
<b>WPM</b>	Weatherpack Male	On 150 mm [6 in] lead wires; mating connector is Delphi-Packard Part Number 12015792
<b>WPM D</b>	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**

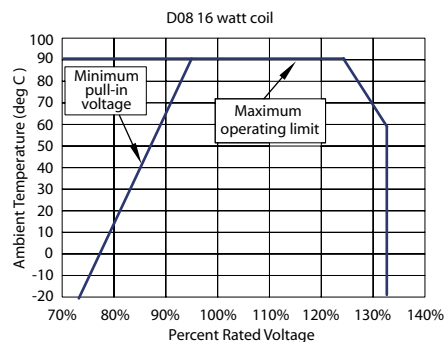
Sauer-Danfoss solenoid valves are PLUS+1™ compliant. PLUS+1 compliance means our coils are directly compatible with the PLUS+1 machine control architecture. Adding solenoid valves to your application using PLUS+1 GUIDE software is as easy as *drag-and-drop*. Software development that used to take months can now be done in just a few hours. For more information on PLUS+1 GUIDE, visit [www.sauer-danfoss.com/plus1](http://www.sauer-danfoss.com/plus1). The table below details available GUIDE function blocks for controlling Sauer-Danfoss solenoid valves.

*GUIDE function blocks*

<b>On-off</b>	10106088
<b>On-off-on</b>	10106102
<b>Two-way proportional</b>	10106103
<b>Three-way proportional</b>	10106104

**SPECIFICATIONS**

- Duty cycle rating: 100%
- Magnet wire insulation: Class H (180C)
- Ambient temperature: -30 to 60 °C [-22 to 140 °F]
- Diodes are available; contact your Sauer-Danfoss representative.
- Environmental protection: IP65
- Input voltage tolerance: ± 10%
- All AC coils are internally rectified



P103 948E

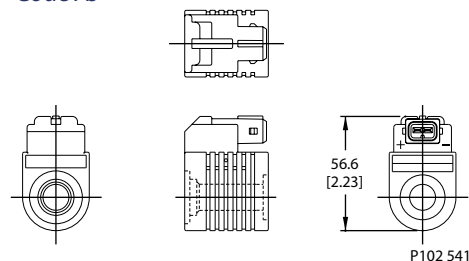
**ELECTRICAL SPECIFICATIONS**

*16 watt coils*

Voltage (V)	10 VDC	12 VDC	20 VDC	24 VDC	110 VAC	220 VAC
Resistance (Ohms) @ 20 °C [72 °F]	6.3	9	25	36	900	3600
Current draw (A) at 25 °C [77 °F]	1.6	1.33	0.8	0.67	0.13	0.07
Color	Green	Grey	Blue	Black	Black	Black

**TERMINALS**

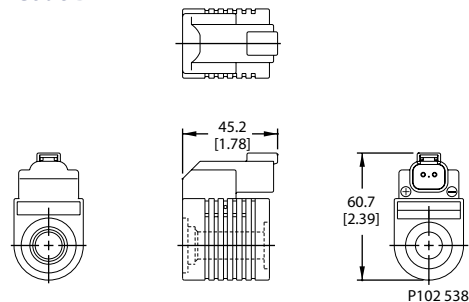
*Amp Junior Timer Code AJ*



*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

*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

mm [in]

Coils  
D08



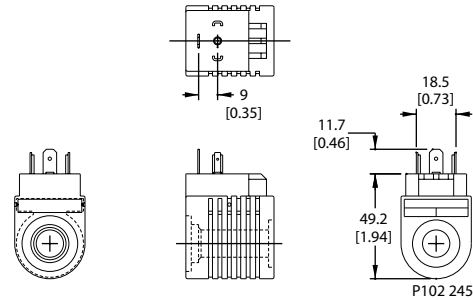
# Cartridge Valves Technical Information

## Coils D08



### TERMINALS (continued)

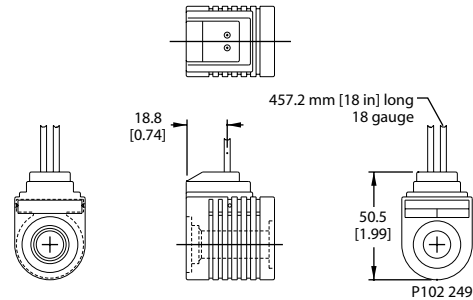
#### DIN 43650 Code H



#### 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

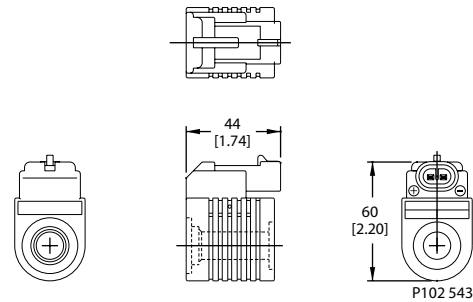
#### Lead wires Code L



#### 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

mm [in]

Coils



Cartridge Valves Technical Information

Coils  
D08



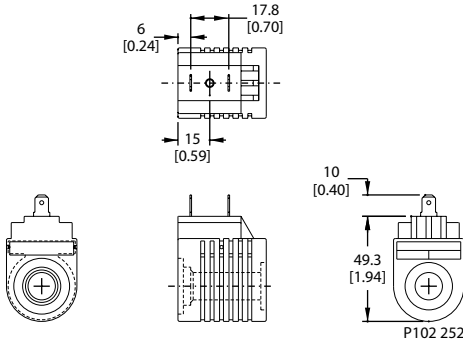
Coils

**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



mm [in]





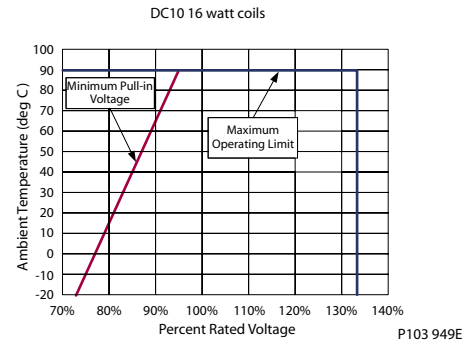
# Cartridge Valves Technical Information

## Coils D10



### SPECIFICATIONS

- Duty cycle rating: 100%
- Magnet wire insulation: Class H (180C)
- Ambient temperature: -30 to 60 °C [-22 to 140 °F]
- Diodes are available; contact your Sauer-Danfoss representative.
- Environmental protection: IP65
- Input voltage tolerance: ± 10%
- All AC coils are internally rectified



Coils  
D10

### ELECTRICAL SPECIFICATIONS

#### 16 watt coils

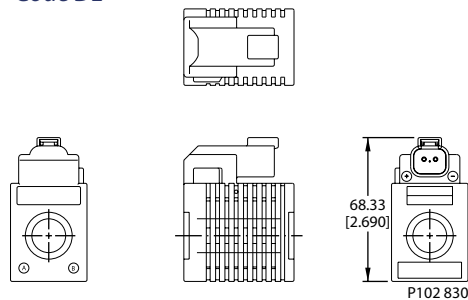
Voltage (V)	10 VDC	12 VDC	20 VDC	24 VDC	110 VAC	220 VAC
Resistance (Ohms) @ 20 °C [72 °F]	6.3	9	25	36	900	3600
Current draw (A) at 25 °C [77 °F]	1.6	1.33	0.8	0.67	0.13	0.07
Color	Green	Grey	Blue	Black	Black	Black

#### 30 watt coils

Voltage (V)	10 VDC	12 VDC	20 VDC	24 VDC	110 VAC	220 VAC
Resistance (Ohms) @ 20 °C [72 °F]	3.3	4.8	13	19	480	1920
Current draw (A) at 25 °C [77 °F]	3	2.5	1.5	1.25	0.25	0.13
Color	Green	Grey	Blue	Black	Black	Black

### TERMINALS

#### Deutsch Code DE



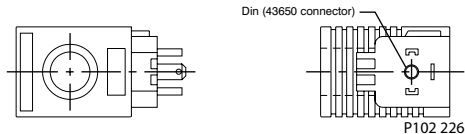
#### Part numbers

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

mm [in]

**TERMINALS**  
**(continued)**

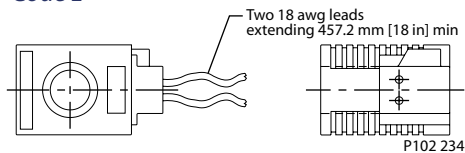
*DIN 43650*  
*Code H*



*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

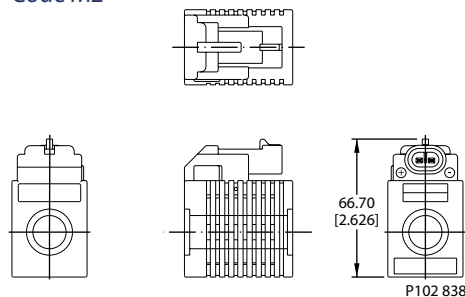
*Lead wires*  
*Code L*



*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



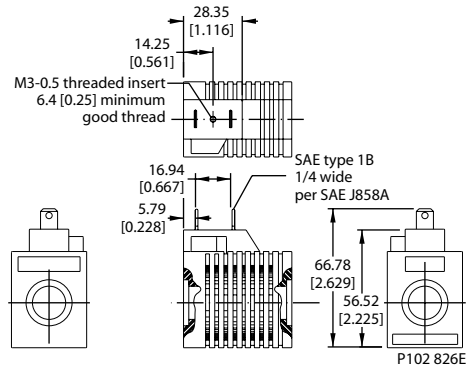
# Cartridge Valves Technical Information

## Coils D10



### TERMINALS (continued)

### Dual Spade Code S



### Part numbers

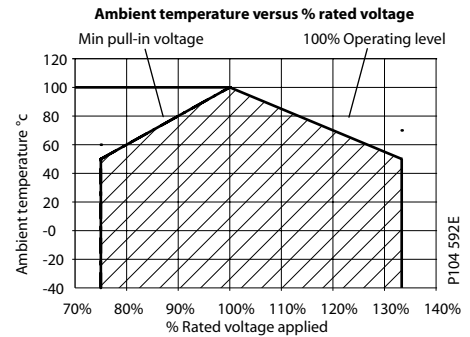
Voltage (V)	Power (W)	Part Number
10 VDC	16	D10-16W-10D-SD
12 VDC	16	D10-16W-12D-SD
20 VDC	16	D10-16W-20D-SD
24 VDC	16	D10-16W-24D-SD
10 VDC	30	D10-30W-10D-SD
12 VDC	30	D10-30W-12D-SD
20 VDC	30	D10-30W-20D-SD
24 VDC	30	D10-30W-24D-SD

Coils

mm [in]

## SPECIFICATIONS

- Duty cycle rating: 100% at 133% of rated voltage and 70°C [158°F]
- Magnet wire insulation: Class H (200°C)
- Ambient temperature: -40 to 70 °C [-40 to 158 °F]
- Diodes are available; contact your Sauer-Danfoss representative.
- Environmental protection: IP69K (AJ, DE, and M2 connectors), IP65 (all other connectors)
- Input voltage tolerance:  $\pm 10\%$

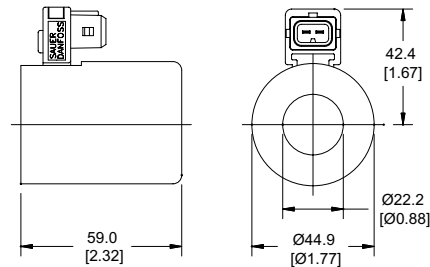


## ELECTRICAL SPECIFICATIONS

## 30 watt coils

Voltage (V)	10 VDC	12 VDC	20 VDC	24 VDC
Resistance (Ohms) @ 20 °C [72 °F]	3.3	4.8	13	19
Current draw (A) at 25 °C [77 °F]	3	2.5	1.5	1.25
Color	Green	Gray	Blue	Yellow

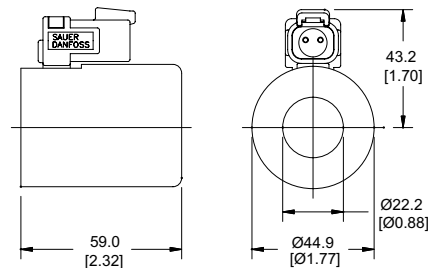
## TERMINALS

Amp Jr.  
Code AJ

P103 215

## 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

P103 216

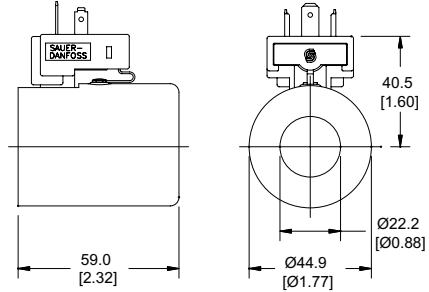
## Part numbers

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

mm [in]

**TERMINALS**  
**(continued)**

*DIN 43650*  
*Code H*

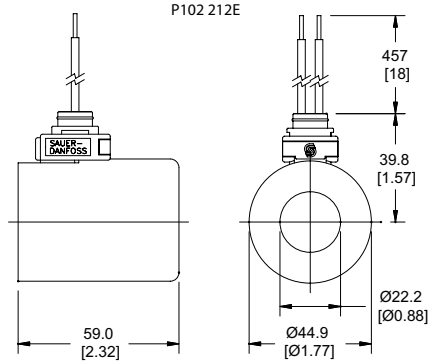


P102 203E

*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

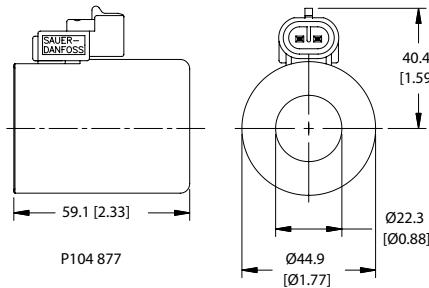
*Lead wires*  
*Code L*



*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

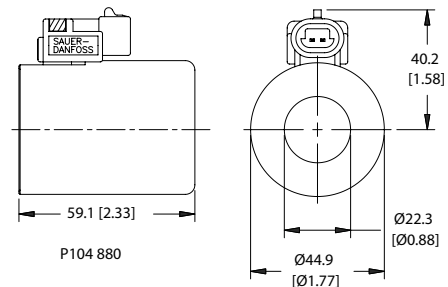
*Metripak 150, type 1*  
*Code M2*



*Part numbers*

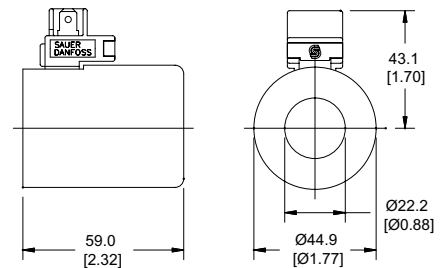
Voltage (V)	Power (W)	Part Number
10 VDC	30	D14E-30W-10D-M2
12 VDC	30	D14E-30W-12D-M2
20 VDC	30	D14E-30W-20D-M2
24 VDC	30	D14E-30W-24D-M2

mm [in]

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

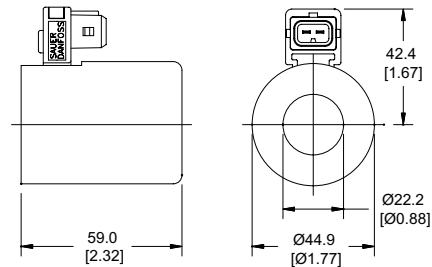
P102 841E

**SPECIFICATIONS**

- Magnet wire insulation: Class H (200°C)
- Maximum continuous current 1.8 A (at 12 V) 0.9 A (at 24 V)
- Ambient temperature: -40 to 70 °C [-40 to 158 °F]
- Environmental protection: IP69K (AJ, DE, and AS connectors), IP65 (all other connectors)
- Input voltage tolerance:  $\pm 10\%$

**ELECTRICAL SPECIFICATIONS**
*35 watt coils*

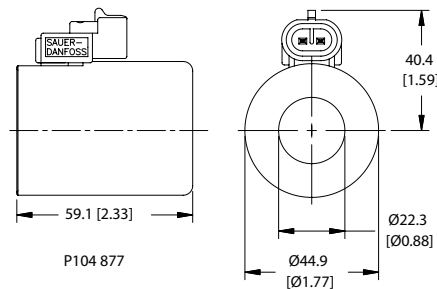
Voltage (V)	12 VDC	24 VDC
Resistance (Ohms) @ 20 °C [72 °F]	4.1	17
Current draw (A) at 25 °C [77 °F]	1.8	0.9
Color	Gray	Yellow

**TERMINALS**
*Amp Jr.  
Code AJ*


P103 215

*Part numbers*

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

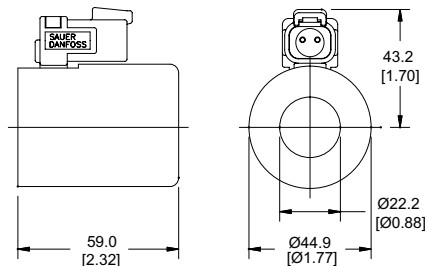
*Amp SuperSeal 1.5/MetriPak 150 Type 1  
Code AS*


P104 877

*Part numbers*

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

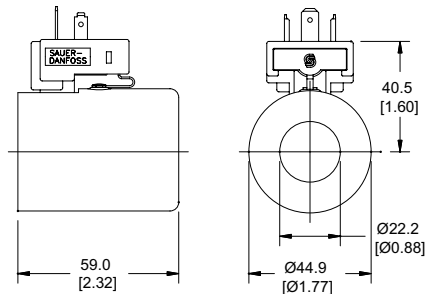
mm [in]

TERMINALS  
(continued)Deutsch  
Code DE

P103 216

## Part numbers

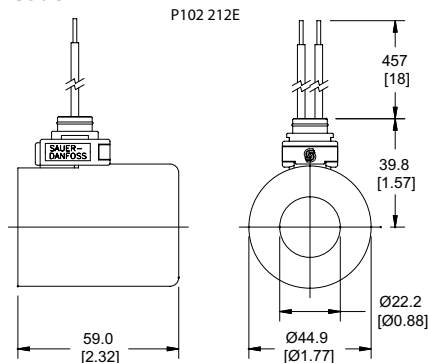
Voltage (V)	Power (W)	Part Number
12 VDC	35	D14E-12D-1.8A-DE
24 VDC	35	D14E-24D-0.9A-DE

DIN 43650  
Code DN

P102 203E

## Part numbers

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

Lead wires  
Code FL

P102 212E

## Part numbers

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





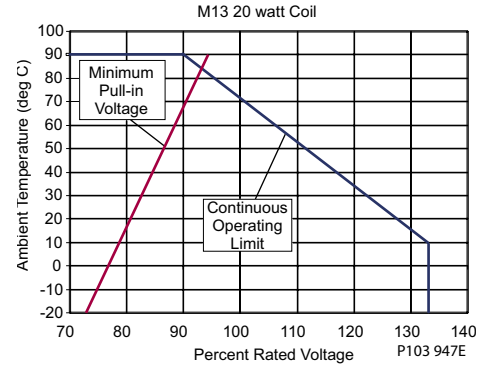
# Cartridge Valves Technical Information

## Coils M13



### SPECIFICATIONS

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



Coils  
M13

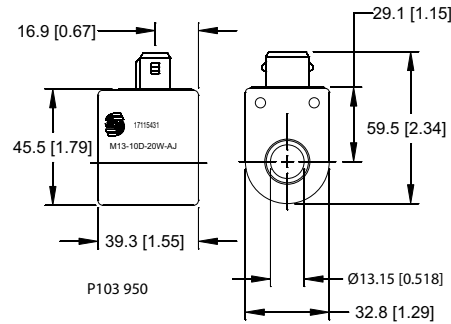
### ELECTRICAL SPECIFICATIONS

#### 20 watt coils

Voltage (V)	10 VDC	12 VDC	20 VDC	24 VDC
Resistance (Ohms) @ 20 °C [72 °F]	5	7.2	20	29
Current draw (A) at 25 °C [77 °F]	2	1.67	1	0.83

### TERMINALS

#### Amp Jr. Code AJ



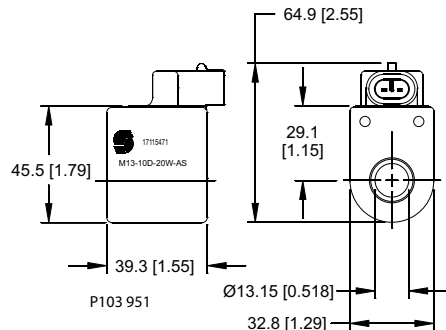
#### Part numbers

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

mm [in]

**TERMINALS**  
**(continued)**

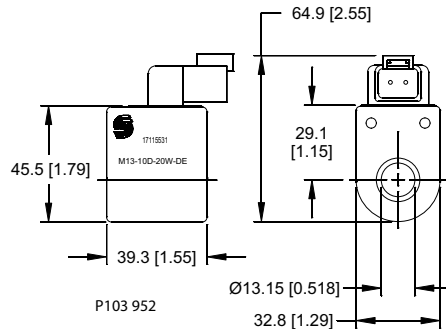
*Amp SuperSeal 1.5/MetriPak 150 Type 1*  
*Code AS*



*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

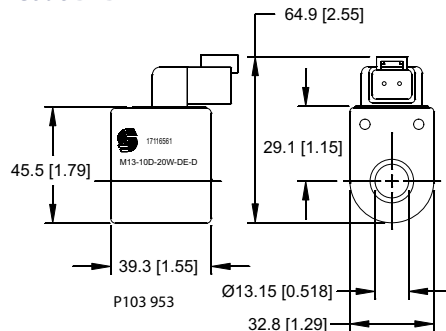
*Deutsch*  
*Code DE*



*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*



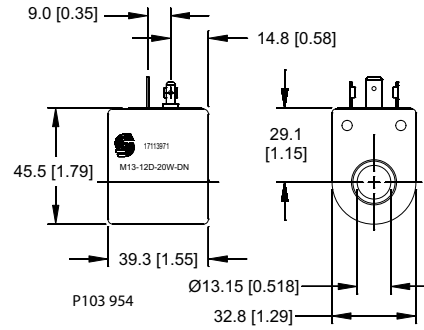
*Part numbers*

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

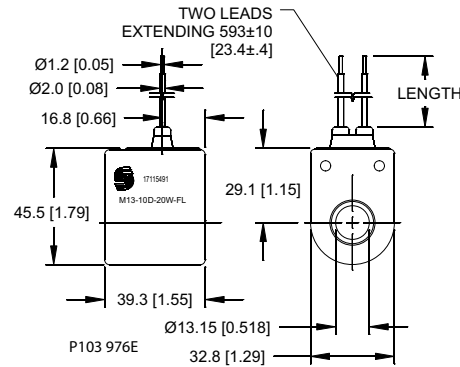


Part numbers

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

Lead wires

Code FL

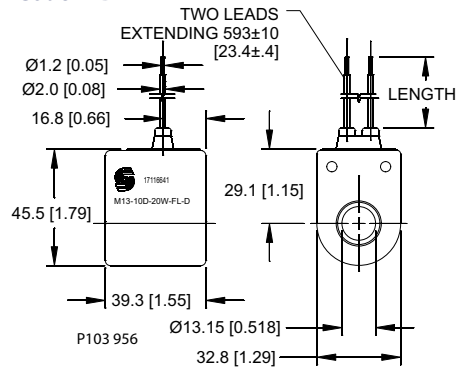


Part numbers

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

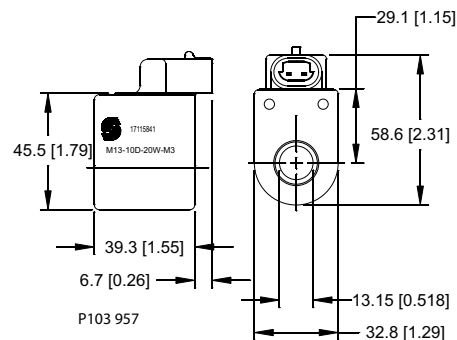
Voltage (V)	Power (W)	Part Number
10 VDC	20	M13-10D-20W-FLD
12 VDC	20	M13-12D-20W-FLD
20 VDC	20	M13-20D-20W-FLD
24 VDC	20	M13-24D-20W-FLD

mm [in]

Coils

**TERMINALS**  
**(continued)**

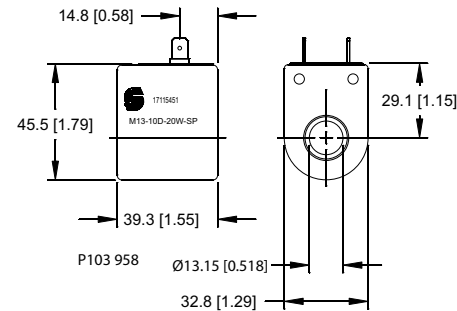
*MetriPak 150, Type 2*  
*Code M3*



*Part numbers*

Voltage (V)	Power (W)	Part Number
10 VDC	20	M13-10D-20W-M3
12 VDC	20	M13-12D-20W-M3
20 VDC	20	M13-20D-20W-M3
24 VDC	20	M13-24D-20W-M3

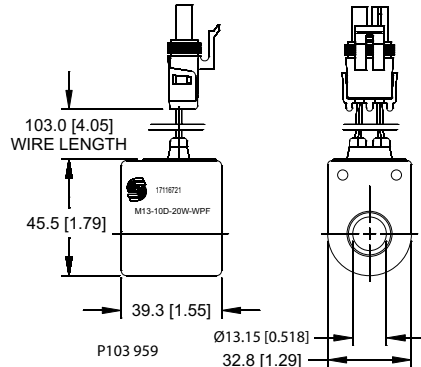
*Spade*  
*Code SP*



*Part numbers*

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

*Weather pack (female)*  
*Code WPF*

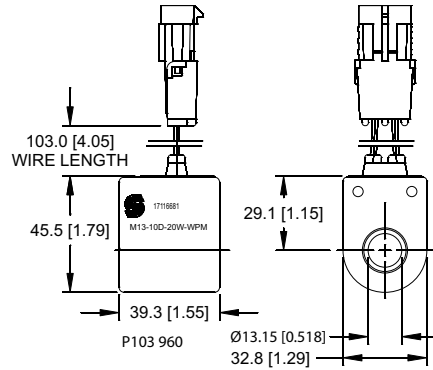


*Part numbers*

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

**TERMINALS**  
**(continued)**

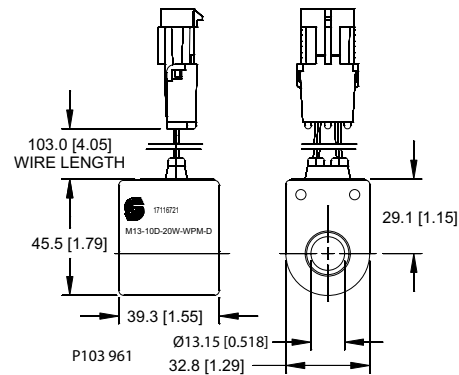
*Weather pack (male)*  
Code WPM



*Part numbers*

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

*Weather pack (male) w/diode*  
Code WPMD

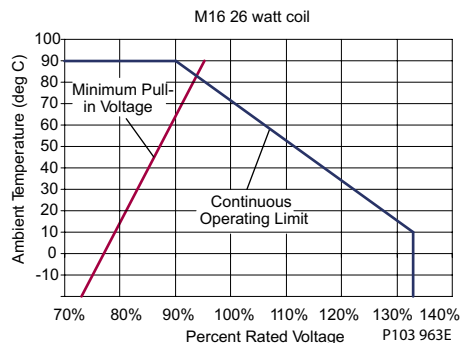


*Part numbers*

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

**SPECIFICATIONS**

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



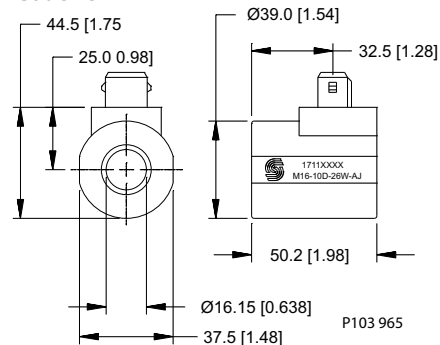
**ELECTRICAL SPECIFICATIONS**

*26 watt coils*

Voltage (V)	10 VDC	12 VDC	20 VDC	24 VDC
Resistance (Ohms) @ 20 °C [72 °F]	4	5.6	15	22
Current draw (A) at 25 °C [77 °F]	2.5	2.14	1.33	1.1

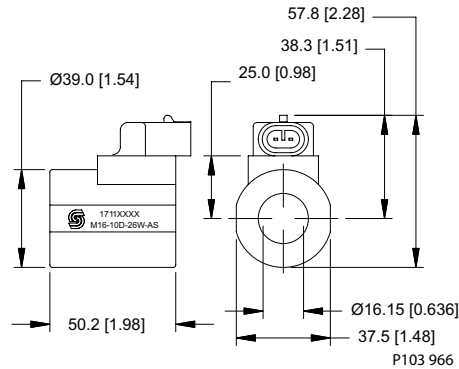
**TERMINALS**

*Amp Jr.  
Code AJ*



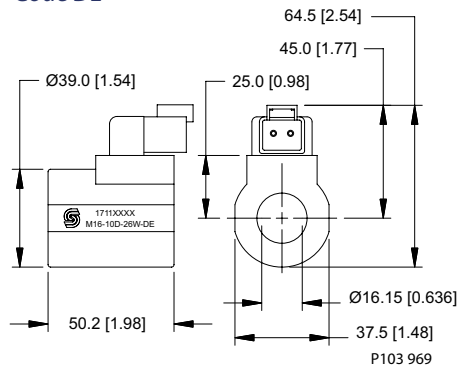
*Part numbers*

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

TERMINALS  
(continued)Amp SuperSeal 1.5/MetriPak 150 Type 1  
Code AS

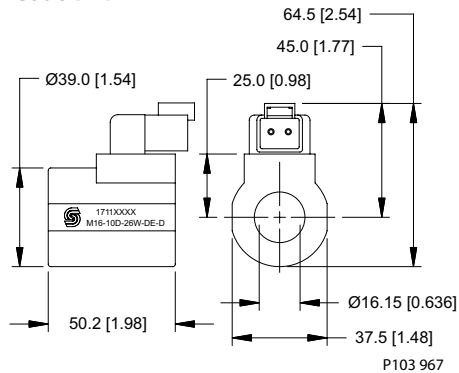
## Part numbers

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

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

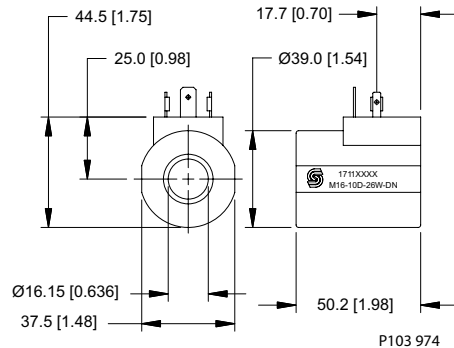
## Part numbers

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

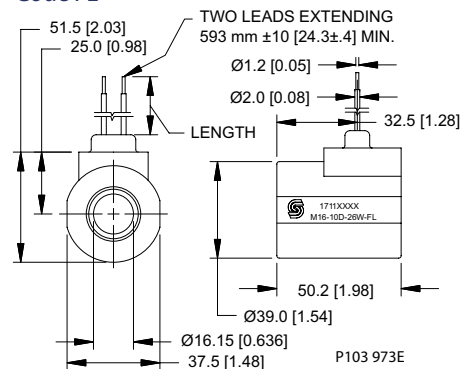


## Part numbers

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

## Lead wires

## Code FL

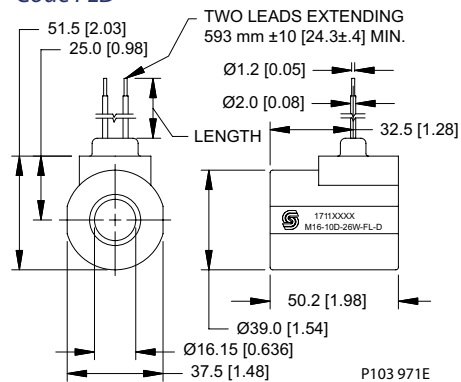


## Part numbers

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

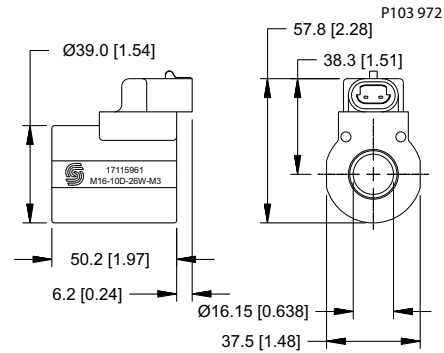
## Code FLD



## Part numbers

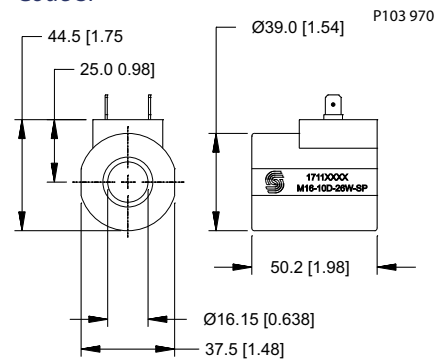
Voltage (V)	Power (W)	Part Number
10 VDC	26	M16-10D-26W-FLD
12 VDC	26	M16-12D-26W-FLD
20 VDC	26	M16-20D-26W-FLD
24 VDC	26	M16-24D-26W-FLD



TERMINALS  
(continued)MetriPak 150, Type 2  
Code M3

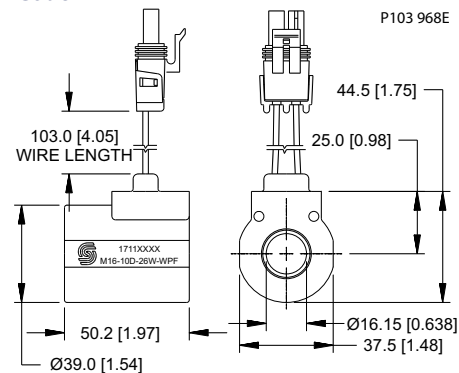
## Part numbers

Voltage (V)	Power (W)	Part Number
10 VDC	26	M16-10D-26W-M3
12 VDC	26	M16-12D-26W-M3
20 VDC	26	M16-20D-26W-M3
24 VDC	26	M16-24D-26W-M3

Spade  
Code SP

## Part numbers

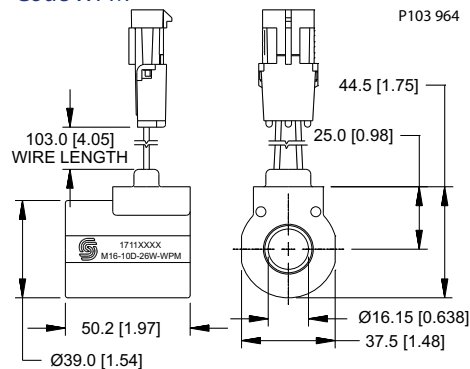
Voltage (V)	Power (W)	Part Number
10 VDC	26	M16-10D-26W-SP
12 VDC	26	M16-12D-26W-SP
20 VDC	26	M16-20D-26W-SP
24 VDC	26	M16-24D-26W-SP

Weather pack (female)  
Code WPF

## Part numbers

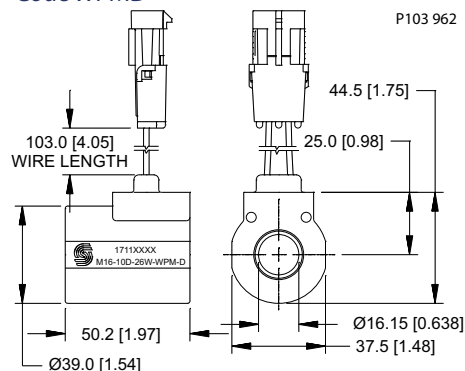
Voltage (V)	Power (W)	Part Number
10 VDC	26	M16-10D-26W-WPF
12 VDC	26	M16-12D-26W-WPF
20 VDC	26	M16-20D-26W-WPF
24 VDC	26	M16-24D-26W-WPF

mm [in]

TERMINALS  
(continued)Weather pack (male)  
Code WPM

## Part numbers

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

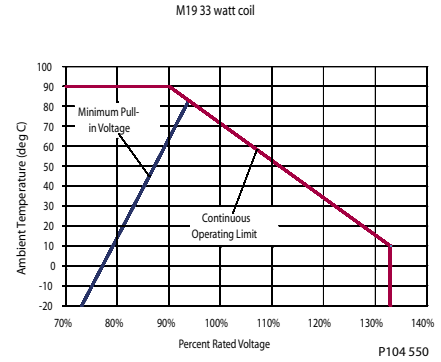
Weather pack (male) w/diode  
Code WPMD

## Part numbers

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

**SPECIFICATIONS**

- Duty cycle: 100% at 115% of rated voltage at 40°C [104°F]
- Magnet wire insulation: Class H (200C)
- Ambient temperature range: -20 to 40 °C [-4 to 104 °F]
- Environmental protection rating: IP65
- 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]



Coils  
M19

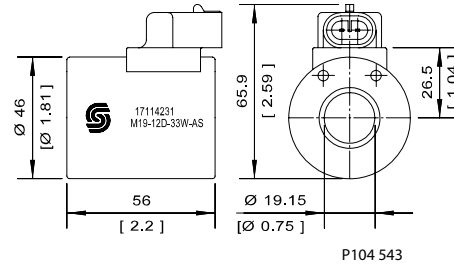
**ELECTRICAL SPECIFICATIONS**

33 watt coils

<b>Voltage (V)</b>	12 VDC	24 VDC
<b>Resistance (Ohms) @ 20 °C [72 °F]</b>	4.4	17
<b>Current draw (A) at 25 °C [77 °F]</b>	2.76	1.38

**TERMINALS**

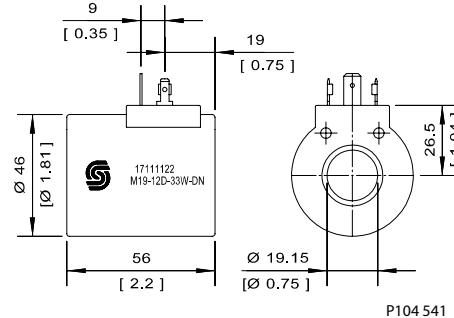
Amp SuperSeal 1.5/MetriPak 150 Type 1  
Code AS



Part numbers

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

ISO 4400 (DIN 43650)  
Code DN



Part numbers

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

mm [in]



# Cartridge Valves Technical Information

## Coils M19



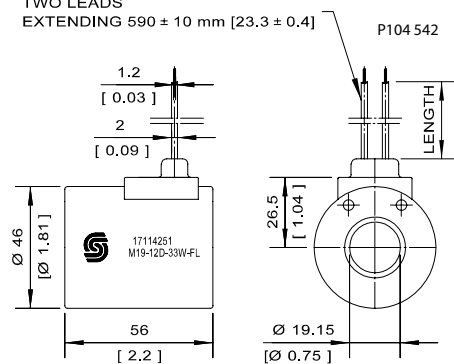
Coils

### TERMINALS (continued)

#### Lead wires

##### Code FL

TWO LEADS  
EXTENDING 590 ± 10 mm [23.3 ± 0.4]



#### Part numbers

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

mm [in]

## SPECIFICATIONS

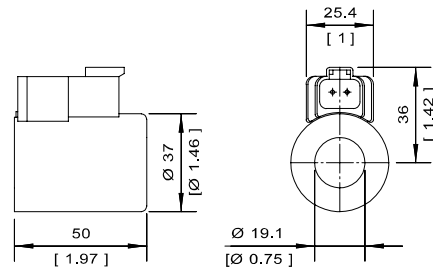
- Magnet wire insulation: Class H (200C)
- Duty cycle rating: 100%
- Maximum continuous current 1.8 A (at 12 V) 0.9 A (at 24 V)
- Ambient temperature range: -20 to 40 °C [-4 to 104 °F]
- Environmental protection: IP69K (DE connector), IP65 (all other connectors)
- Weight: 0.37 kg [0.82 lb]

## ELECTRICAL SPECIFICATIONS

## 22 watt coils

Voltage (V)	12 VDC	24 VDC
Resistance (Ohms) @ 20 °C [72 °F]	3.7	16
Current draw (A) at 25 °C [77 °F]	1.8	0.9

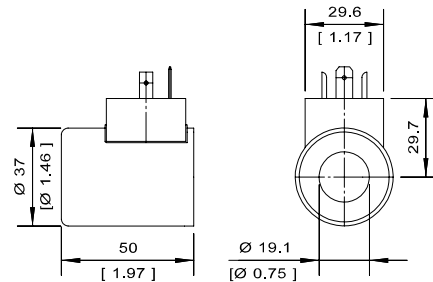
## TERMINALS

Deutsch  
Code DE

P104 546

## Part numbers

Voltage (V)	Power (W)	Part Number
12 VDC	22	M19P-12D-1.8A-DE
24 VDC	22	M19P-24D-0.9A-DE

ISO 4400 (DIN 43650)  
Code DN

P104 544

## Part numbers

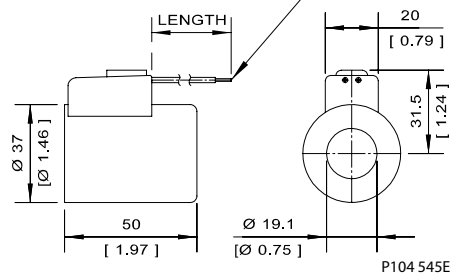
Voltage (V)	Power (W)	Part Number
12 VDC	22	M19P-12D-1.8A-DN
24 VDC	22	M19P-24D-0.9A-DN

**TERMINALS**  
**(continued)**

*Lead wires*

*Code FL*

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



*Part numbers*

Voltage (V)	Power (W)	Part Number
12 VDC	22	M19P-12D-1.8A-FL
24 VDC	22	M19P-24D-0.9A-FL

## SPECIFICATIONS

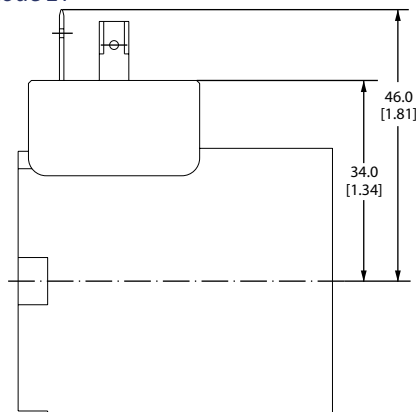
- Duty cycle rating: 100%
- Magnet wire insulation: Class H (180C)
- Ambient temperature: -30 to 50 °C [-22 to 122 °F]
- Diodes are available; contact your Sauer-Danfoss representative.
- Environmental protection: IP67 (E12 connector), IP65 (all other connectors)
- Input voltage tolerance:  $\pm 10\%$

## ELECTRICAL SPECIFICATIONS

## 40 watt coils

Voltage (V)	12 VDC	24 VDC
Resistance (Ohms) @ 20 °C [72 °F]	3.6	14

## TERMINALS

DIN 43650  
Code E1

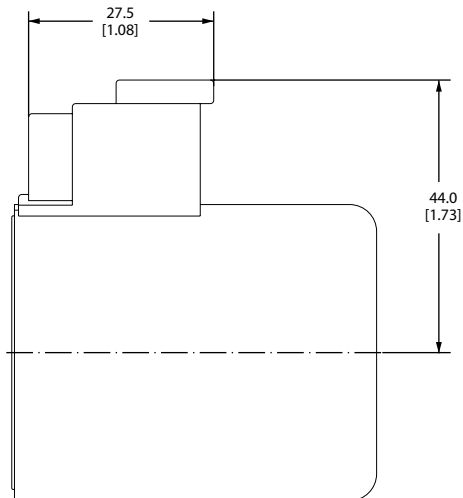
P102 859

## Part numbers

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

**TERMINALS**  
**(continued)**

Deutsch  
Code E12

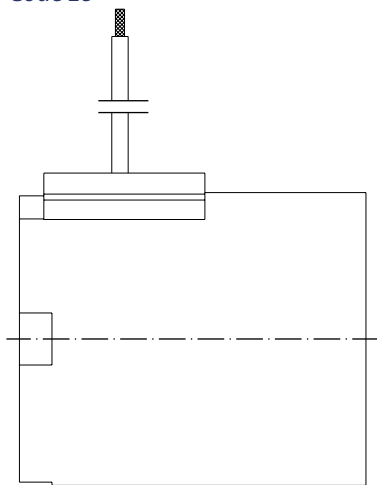


P102 857

Part numbers

Voltage (V)	Power (W)	Part Number
12 VDC	40	158-8067
24 VDC	40	158-8069

Lead wires  
Code E8



P102 860

Part numbers

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



## SPECIFICATIONS

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

## ELECTRICAL SPECIFICATIONS

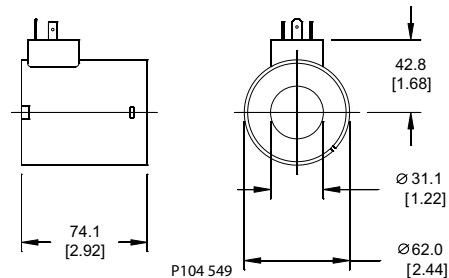
## 30 watt coils

Voltage (V)	12 VDC	24 VDC
Resistance (Ohms) @ 20 °C [72 °F]	2.3	13
Current draw (A) at 25 °C [77 °F]	2.5	1.25

## TERMINALS

## ISO 4400 (DIN 43650)

## Code E1

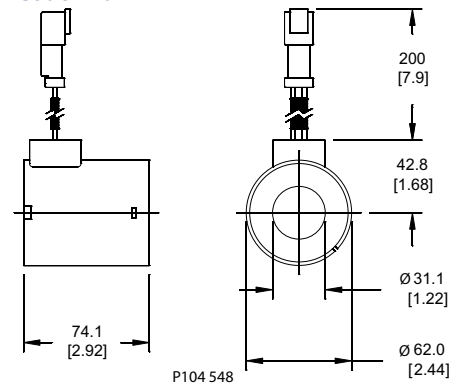


## Part numbers

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

mm [in]



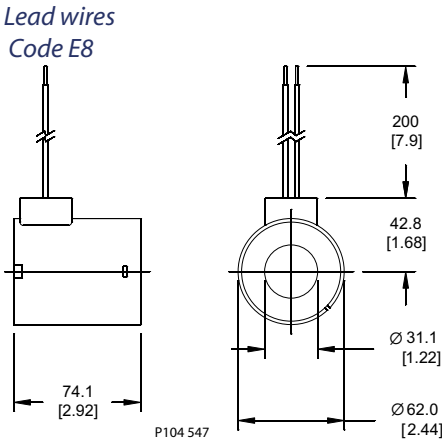
# Cartridge Valves Technical Information

## Coils PD05



Coils

### TERMINALS (continued)

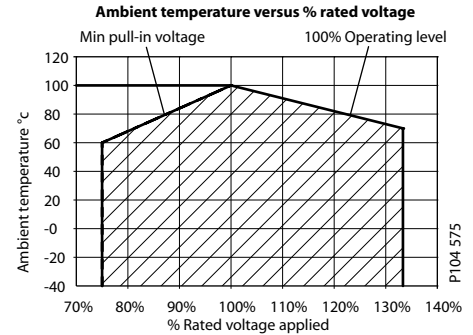


### Part numbers

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: Class H (200°C)
- Ambient temperature range: -40 to +70 °C [-40 to 158 °F]
- Environmental rating: IP69K
- Input voltage range: 75% to 133% of rated voltage
- Weight: 0.22 kg [0.49 lb]



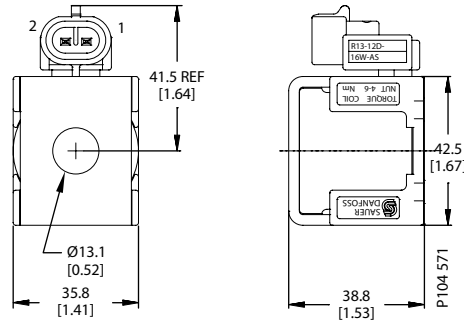
**ELECTRICAL SPECIFICATIONS**

*16 watt coils*

<b>Voltage (V)</b>	10 VDC	12 VDC	20 VDC	24 VDC
<b>Resistance (Ohms) @ 20 °C [72 °F]</b>	6.2	9	25	36
<b>Current draw (A) at 25 °C [77 °F]</b>	1.62	1.34	0.81	0.67
<b>Color</b>	Green	Gray	Blue	Yellow

**TERMINALS**

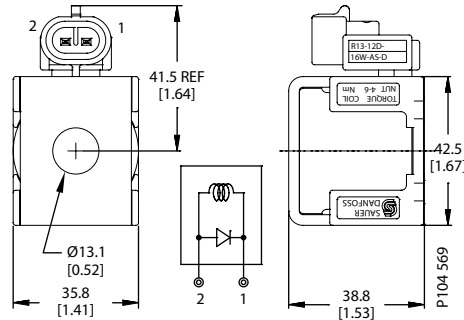
*Amp SuperSeal 1.5/MertiPak 150 Type 1 Code AS*



*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/MertiPak 150 Type 1 w/diode Code ASD*



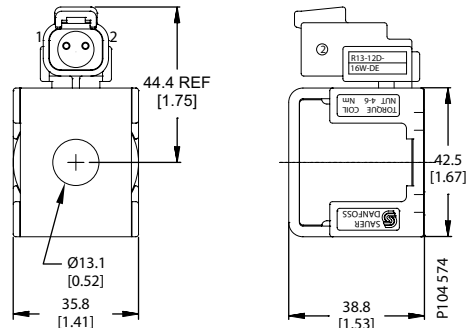
*Part numbers*

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

mm [in]

**TERMINALS**  
(continued)

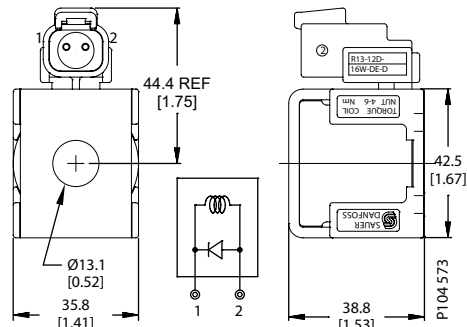
*Deutsch*  
Code DE



*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

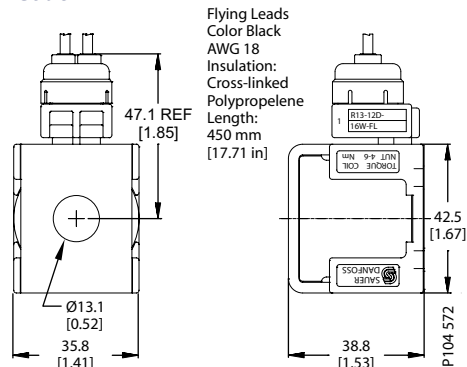
*Deutsch w/diode*  
Code DED



*Part numbers*

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

*Lead wires*  
Code FL

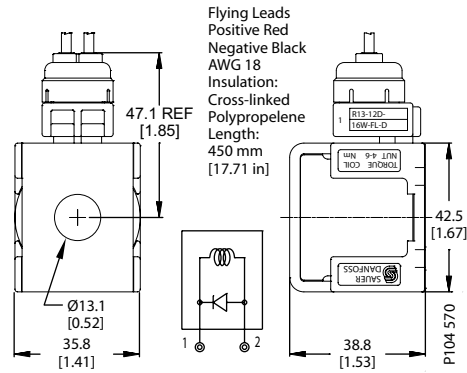


*Part numbers*

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*  
*Code FLD*

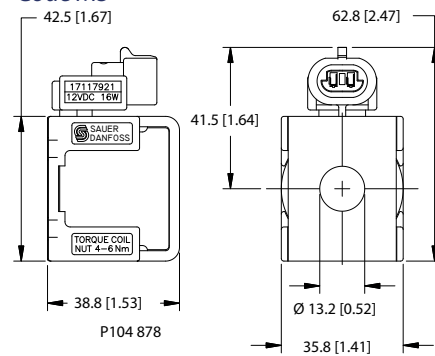


*Part numbers*

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

Coils

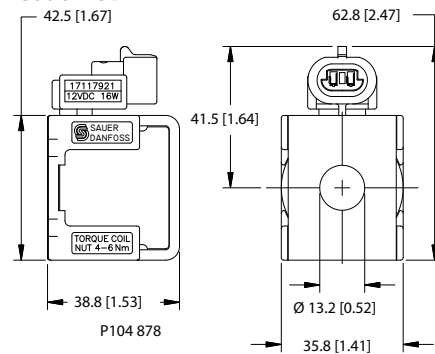
*MetriPak 150, type 2*  
*Code M3*



*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*  
*Code M3D*



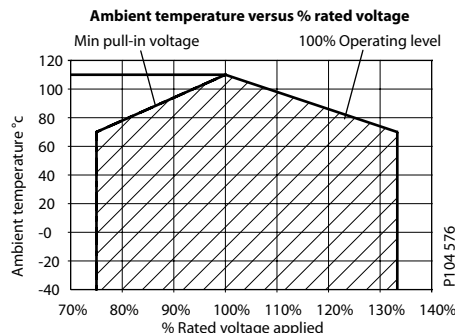
*Part numbers*

Voltage (V)	Power (W)	Part Number
-------------	-----------	-------------

mm [in]

**SPECIFICATIONS**

- Duty cycle: 100% at 133% of rated voltage and 70°C [158°F]
- Magnet wire insulation: Class H (200°C)
- Ambient temperature range: -40 to +70 °C [-40 to 158 °F]
- Environmental rating: IP69K
- Input voltage range: 75% to 133% of rated voltage
- Weight: 0.34 kg [0.75 lb]



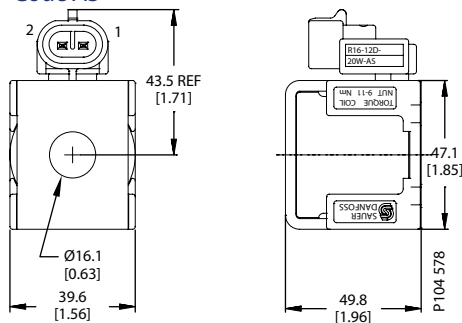
**ELECTRICAL SPECIFICATIONS**

*20 watt coils*

<b>Voltage (V)</b>	10 VDC	12 VDC	20 VDC	24 VDC
<b>Resistance (Ohms) @ 20 °C [72 °F]</b>	4.8	6.9	20	28
<b>Current draw (A) at 25 °C [77 °F]</b>	2.08	1.74	1.01	0.85
<b>Color</b>	Green	Gray	Blue	Yellow

**TERMINALS**

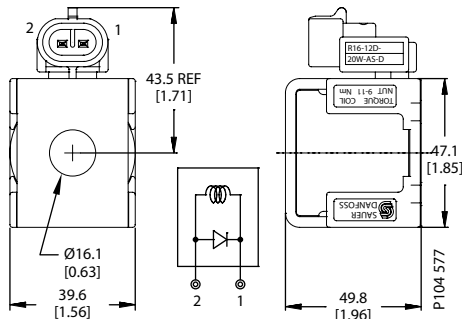
*Amp SuperSeal 1.5/MetriPak 150 Type 1 Code AS*



*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 Code ASD*



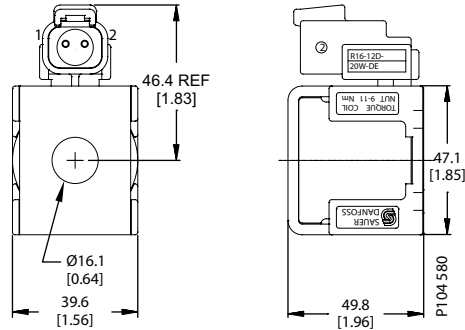
*Part numbers*

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

mm [in]

**TERMINALS**  
**(continued)**

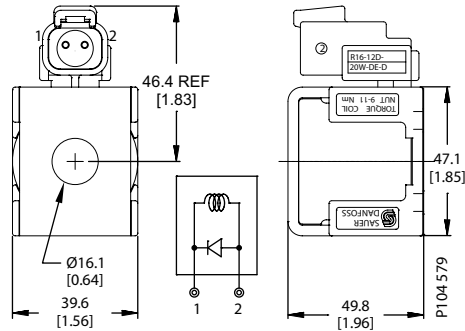
Deutsch  
Code DE



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

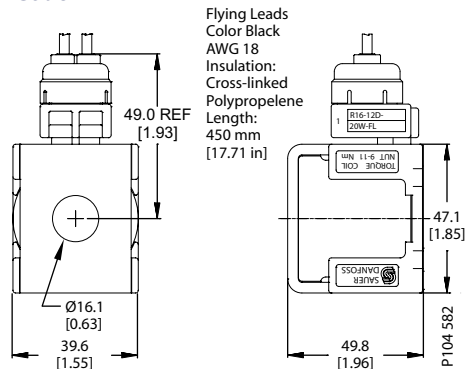
Deutsch w/diode  
Code DED



Part numbers

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

Lead wires  
Code FL



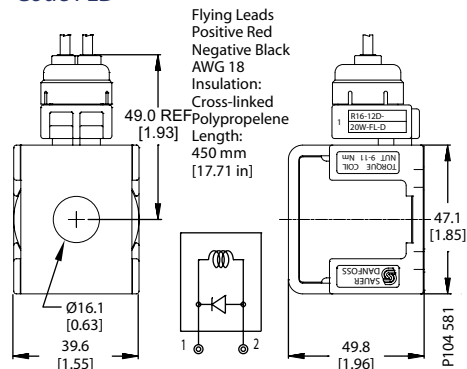
Part numbers

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

mm [in]

**TERMINALS**  
**(continued)**

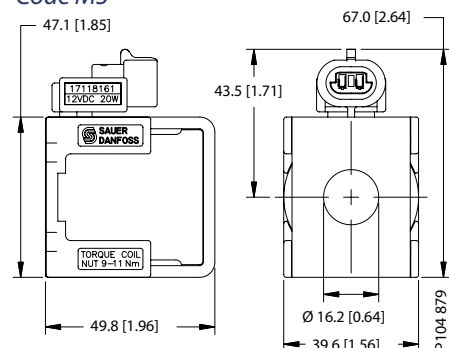
*Lead wires w/diode*  
*Code FLD*



*Part numbers*

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

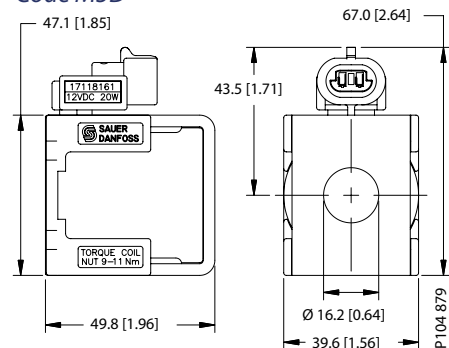
*MetriPak 150, type 2*  
*Code M3*



*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*  
*Code M3D*



*Part numbers*

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