

Amphenol SOCAPEX

# PowerSafe

Derived from MIL-DTL-38999 Series III & EN3645

VG96944 Qualified



# ABOUT AMPHENOL SOCAPEX



## Proven excellence in interconnect solutions

Since **1947**, Amphenol Socapex has prescribed, designed and manufactured reliable and innovative interconnection solutions for **harsh environments**, specializing in standard and customized electrical and fiber optic connectors, contacts, accessories and cabling solutions. Located in the **Mont Blanc** region of France and Pune in India, Amphenol Socapex has a presence in over 100 countries around the world. Amphenol Socapex is part of the international **Amphenol Corporation**.



**1000+** employees



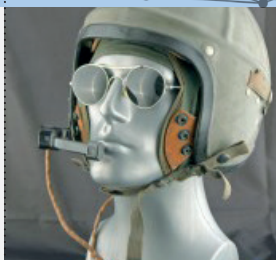
Net Sales 2021: **92 M€**  
72% Export - 28% France



Two facilities :  
**Thyez** (France), **Pune** (India)

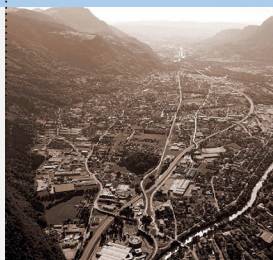
OUR HISTORY

### 1947



- Socapex creation in Suresnes, France
- 1<sup>st</sup> radio connector

### 1956-57



- Manufacturing unit in Cluses (74), France
- Thomson-CSF becomes primary shareholder

### Early 1960's



- 1st board level connectors: HE8
- 1st "licence Bendix" manufactured connectors
- SL Series launch

### 1973



- New factory 13 000 m<sup>2</sup> in Thyez (74) France with 250 people

### 1975



- Production of 38999 connectors

### 2014-2017



Quadrax Contacts



Cable Assembly

- New Cable Assembly workshop
- New Contact Manufacturing workshop

### Today and tomorrow | New technologies



Miniaturization High-speed signals  
 Miniaturization ROHS solutions Power  
 Advanced Materials (composite) Power  
 Fiber optics Rugged Ethernet  
 Power Rugged Ethernet  
 Fiber optics ROHS solutions  
 Miniaturization ROHS solutions

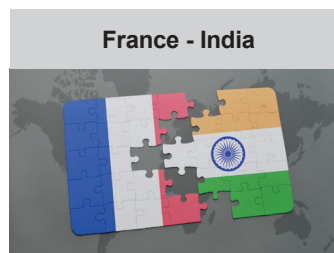
# INTERNATIONAL EXPERTISE



## Our expertise has no boundaries

### Integrated Production in France & India

- **24 000 m<sup>2</sup>** manufacturing capacity on 2 sites
- Design centers in **France** and **India**
- State-of-the-art manufacturing technology



## Our markets



### Military

Communication Systems - Radios - C4ISR /  
Ground vehicles - Vetronics / Marine / Missiles



### Aviation

Commercial & military / Avionics /  
Engines / Landing gear / Actuators

1986

**Amphenol**  
Socapex

- Amphenol becomes primary shareholder

1995-96



- Expanded Beam connector CTOS launch
- Headquarters transferred to Thyez

2004



- RJ Field launch, "Award Electronica"

2005



- Opening of manufacturing site in Pune, India

2010's



- LuxBeam™ and HDAS launch

## Today and tomorrow | Sustainable development



Respect for nature and the environment  
Optimization of natural resources  
Recycling  
Waste Management  
Goodwill  
Optimization of natural resources  
Goodwill  
Respect for nature and the environment  
Waste Management  
Recycling

# PRODUCING FASTER, SMALLER, STRONGER CONNECTORS...



## Technologies & innovation

<p><b>Technological Center</b></p> <p><b>Engineering Laboratory for product testing and qualification, product expertise and metrology</b></p> <ul style="list-style-type: none"> <li>- Mechanical and electrical skills</li> <li>- RF and fiber optics expertise</li> </ul>	<p><b>High-Speed Expertise</b></p> <p><b>Strong expertise in high-speed signals</b></p> <ul style="list-style-type: none"> <li>- 3D EM simulation software &amp; EM models</li> <li>- Time Domain and frequency domain (VNA 20GHz, TDR and eye diagram)</li> </ul>	<p><b>Materials Expertise</b></p> <p><b>Focus on materials expertise and manufacturing techniques to produce faster, smaller and stronger products</b></p> <ul style="list-style-type: none"> <li>- 3D CAD mechanical software, simulation &amp; analysis</li> <li>- Disruptive metal alloys, additive manufacturing</li> </ul>	<p><b>Eco-responsibility</b></p> <p><b>Sustainable environment approach, with pro-active management of regulations (REACH / RoHS / Conflict minerals...)</b></p> <ul style="list-style-type: none"> <li>- New materials development, plating, and suitable processes</li> <li>- Recycling and rational resources consumption</li> </ul>
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## Our workshops

Our workshops located in France & India provide consistent quality adapted to your volume requirements.

- Tooling** : Tools for our different activities : molding, machining, assembly
- Molding** : Solid expertise in thermoplastic elastomer and thermoset molding
- Machining** : Manufacturing of cylindrical shells from 10 to 90 mm in diameter and rectangular shells
- Screw Machining** : Cylindrical production parts up to 10 mm in diameter
- Plating** : Plating with cadmium, nickel, electroless nickel, silver, black zinc nickel, gold
- Assembly** : Connector and harness assembly (electrical & optical)

## Our certifications

<p>Certified Management System</p>	<p>Certified Management System</p>	<p>Certified Management System</p>	<p>Certified Management System</p>
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Product certifications : MIL-DTL38999, EN3645, EN3155, VG

## Our memberships

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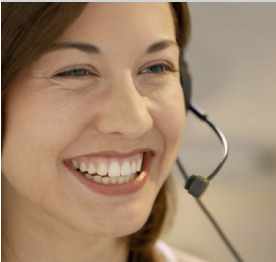




Member of CMG (Connecting Manufacturing Group) Consortium

# DELIVERING GREAT CUSTOMER EXPERIENCE



► We have a strong reputation for helping customers solve their toughest challenges. This approach of serving your needs is ingrained in our company – from our sales team to our product development engineers.





## A partner you can trust

<p><b>Customer Proximity</b></p> 	<p><b>Design Expertise</b></p> 	<p><b>Quality Commitment</b></p> 	<p><b>On Time Delivery Performance</b></p> 	<p><b>Compliance manager</b></p> 
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## Buy our solutions

You can access our solutions through our global network of sales offices or through our distributors.

### Field Sales Team :

-  12 in France
-  15 in Europe
-  100+ in North America and rest of the world.
-  5 Business Development Managers supporting local sales force Europe, North America and the rest of the world

-  **Technical Support & Multilingual Customer Service :**  
15 people

### Worldwide Distribution Network :

Including qualified distributors (QPL approved) for assembling : MIL-DTL-38999, PT/451/VG95328 & Fiber Optics connectors



# POWERSAFE / VG96944 - GENERAL CHARACTERISTICS

Power connector qualified VG96944 and designed for user safety

## Description

PowerSafe connectors are derived from MIL-DTL-38999 Series III connectors and dedicated to high power supply in harsh environments. These connectors provide the user with, the highest user safety, shielding effectiveness & environmental performances. PowerSafe connectors follow the European standard for power equipment DIN EN 61984 (former VDE 0627).



## Markets

- C5ISR - Battlefield Communication
- Ground Vehicles
- Military Avionics
- Missile Avionics
- Navy
- Harsh Industrial Environment



## Applications

- Power connectors deployed on the field (drums)
- Electrical power generator



C5ISR



Military  
Aerospace



Ground  
Vehicle



Navy



Industrial

# POWERSAFE / VG96944 - GENERAL CHARACTERISTICS

Power connector qualified VG96944 and designed for user safety

## Main features

### TWO INSERTS TYPES WITH DIFFERENT CHARACTERISTICS

- “E4/E6” inserts – up to 200°C & CTI (Comperative Tracking Index) <100

Available in Amphenol Proprietary designations only

- “V4/V6” inserts – VG96944 compliant – up to 150°C & CTI between 175 & 400 (Material Group IIIa)

Available in VG designations & Amphenol Proprietary ones

**FIRST MATE/LAST BREAK:** one earth contact directly linked to the shell, stays in place even in case of overheats.

**LAST MATE/FIRST BREAK:** one pilot contact with a breaking capacity (brings the information to a relay to turn on/off the power).

These features protects the user even if the connectors are mated or unmated. Amphenol recommends to connect / disconnect connector when unloaded.

**IP28 WHEN UNMATED, IP68 WHEN MATED**

### HIGH ROBUSTNESS AND EXCELLENT ENVIRONMENTAL PERFORMANCES.

#### SEVERAL MATERIALS & PLATING

- Aluminum (Olive drab Cadmium, Nickel, Black Zinc Nickel, Tin Zinc platings)
- Marine Bronze
- Stainless steel (Passivated, Nickel plated upon request)

**EMI/RFI PROTECTION :** Shell to shell bottoming and grounding fingers on the plug shell

#### ACCESSORIES:

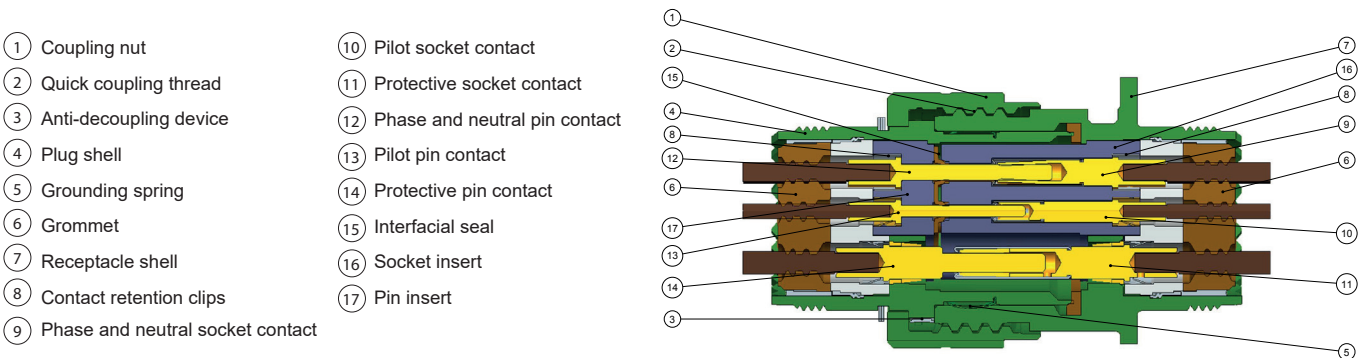
- Caps: compatible with MIL-DTL-38999 Series III caps.
- Backshells: compatible with AS85049 backshells for MIL-DTL-38999 Series III connectors, VG95319-1011G, as well as TV35 & TVNSA backshells.

Same panel drilling as standard MIL-DTL-38999 Series III connectors.

## Added benefits

- PowerSafe is compliant with **IP2X Electrical Safety standard**, which guarantees touch-proof protection of live parts.
- Qualified according the most stringent standard **VG96944** (applicable to Aluminum with Olive Drab Cadmium or Tin Zinc finish and Marine Bronze versions only).
- Safety use design following **DIN EN-61984 (former VDE 0627)**.

## Concept

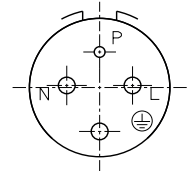
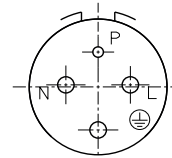
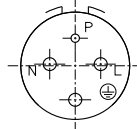
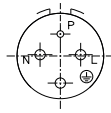


# POWERSAFE / VG96944 - LAYOUTS & ELECTRICAL CHARACTERISTICS

Amphenol **PowerSafe** range offers 6 contact arrangements to fit all your power needs, with single-phase & three-phase layouts, and a choice of 2 insert materials for each layout depending on the need :

- **V4 / V6** inserts : developed according to VG96944 standard with a material less impacted by the disconnection under load. Able to withstand a maximum temperature of 150°C & have a CTI between 175 & 400 (Material Group IIIa)
- **E4 / E6** inserts : using the same material than our 38999 series connectors and able to withstand a temperature up to 200°C

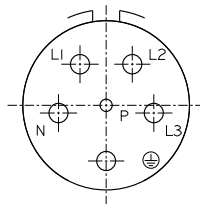
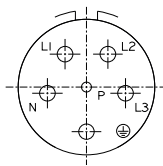
## Single-Phase Layouts



VG insert	13-V4	15-V4	21-V4	23-V4
Proprietary insert	13-E4	15-E4	21-E4	23-E4
Pilot contact (P)	1 Size 20	1 Size 16	1 Size 16	1 Size 16
Phase & neutral (N & L)	2 Size 16	2 Size 12	2 Size 6	2 Size 4
Protective contact (PE)	1 Size 16	1 Size 12	1 Size 6	1 Size 4

Contact Arrangements	Pilot contact - P		Phase, Neutral and Protective contact - N, L & PE		Test voltage AC *
	Contact rating	Operating Voltage AC or DC	Contact rating	Operating Voltage AC or DC	
13-V4 / 13-E4	0,5 A	60 V	16 A	250 V	1500 V
15-V4 / 15-E4	0,5 A	60 V	25 A	500 V	2500 V
21-V4 / 21-E4	0,5 A	60 V	63 A	500 V	2500 V
23-V4 / 23-E4	0,5 A	60 V	100 A	500 V	2500 V

## Three-Phase Layouts



VG insert	17-V6	25-V6
Proprietary insert	17-E6	25-E6
Pilot contact	1 Size 16	1 Size 16
Phase & neutral	4 Size 12	4 Size 6
Protective contact	1 Size 12	1 Size 6

Contact Arrangements	Pilot contact - P		Phase, Neutral and Protective contact - N, L1, L2, L3 & PE		Test voltage AC *
	Contact rating	Operating Voltage AC or DC	Contact rating	Operating Voltage AC or DC	
17-V6 / 17-E6	0,5 A	60 V	25 A	500 V	2500 V
25-V6 / 25-E6	0,5 A	60 V	63 A	500 V	2500 V

\*Note : Test voltage in mated condition for Phase, Protective and Neutral pin & socket contacts, and Pilot pin contacts. Test voltage in unmated condition for Pilot socket contact only



## POWERSAFE / VG96944 - CHARACTERISTICS

### Environmental characteristics

	Connectors with Proprietary inserts E4 / E6	Connectors with VG96944 compliant inserts V4 / V6
<b>Temperature</b>	-65 to +175°C (Olive drab cadmium, Black zinc nickel plating) -65 to + 200°C (Nickel plating, Marine Bronze, Stainless steel)	-65 to +150°C (all materials and platings)
<b>Salt spray exposure</b>	48h for Nickel plated Aluminum 500h for Olive drab cadmium, Black zinc nickel, Marine Bronze and Stainless steel	Test level 2 : 5% NaCl. 2h salt spray exposure and 22h storage in humid air repeated during 5 cycles
<b>Sealing</b>	IP28: - Finger test for socket contacts and socket inserts - Pressure water tight (48h, under 2m water)	IP28: - Finger test for socket contacts and socket inserts - Pressure water tight (48h, under 2m water)

### Mechanical characteristics

	Connectors with Proprietary inserts E4 / E6	Connectors with VG96944 compliant inserts V4 / V6
<b>Durability</b>	500 mating cycles	500 mating cycles
<b>Shocks</b>	-	Half-sine, 500 m/s <sup>2</sup> , 11 ms
<b>Sine vibrations</b>	60g from -55 +175°C (Olive drab cadmium) / + 200°C (Nickel)	-
<b>Random vibrations</b>	Per EIA-364-28	Per VG95319-2 (Spectrum 5 Hz to 500 Hz)
<b>Insert material</b>	Thermoplastic insert Silicone rubber grommet and interfacial seal	Thermoplastic insert Silicone rubber grommet and interfacial seal
<b>Insulator material Comparative Tracking Index</b>	<100V	<400V
<b>Contacts</b>	Crimp, removable contacts Gold plating for pilot contact and silver plating for protective, phase and neutral contacts	Crimp, removable contacts Gold plating for pilot contact and silver plating for protective, phase and neutral contacts
<b>Protective contact Resistance</b>	≤100 mΩ	≤100 mΩ

### Contact retention force

Contact Size	20	16	12	6	4
<b>Maximum load (N)</b>	67	111	111	111	150

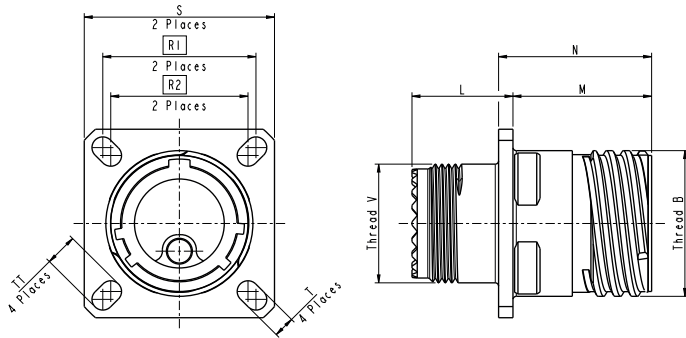
# POWERSAFE / VG96944 - OVERALL DIMENSIONS - RECEPTACLES

## Square flange receptacle



See part how to order page 22

AMPHENOL	VG
TVP00RW***	VG96944-04A**A
TVP00ZN***	
TVP00TZ***	VG96944-04A**J
TVPS00RF***	
TVPS00RB***	VG96944-04A**B
TVPS00RK***	



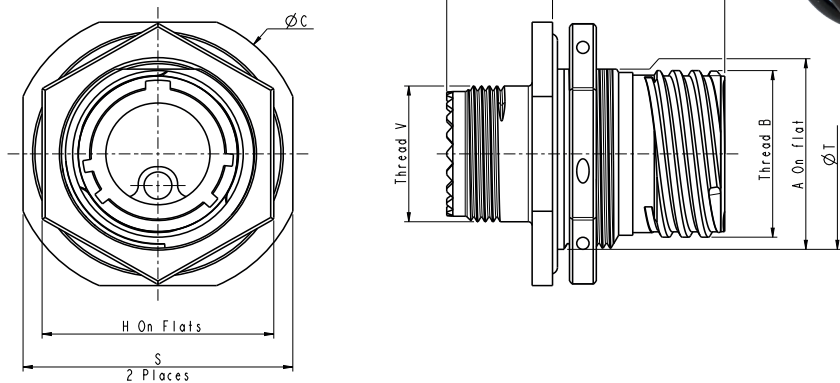
Shell size	B thread Class 2A (inches)	L Max (mm)	M Max (mm)	N +0.13 0 (mm)	R1 (mm)	R2 (mm)	S ±0.3 (mm)	T ±0.2 (mm)	TT ±0.2 (mm)	V thread (metric)
13	.875	15.5	20.9	22.99	23.01	20.62	28.6	3.25	4.93	M18x1-6g
15	1.0000	15.5	23.3	25.49	24.61	23.01	31.0	3.25	4.39	M22x1-6g
17	1.1875	15.6	23.4	25.49	26.97	24.61	33.3	3.25	4.93	M25x1-6g
21	1.3750	17.5	24.6	27.49	31.75	29.36	39.7	3.25	4.93	M31x1-6g
23	1.5000	20.7	24.6	27.49	34.93	31.75	42.9	3.91	4.93	M34x1-6g
25	1.625	20.7	24.6	27.49	38.10	34.93	46.0	3.91	6.15	M37x1-6g

## Jam nut receptacle



See part how to order page 22

AMPHENOL	VG
TV07RW**	VG96944-04B**A
TV07ZN**	
TV07TZ**	VG96944-04B**J
TVS07RF**	
TVS07RB**	VG96944-04B**B
TVS07RK**	



Shell size	B thread Class 2A (inches)	A +0.1 -0.15 (mm)	C Max (mm)	K Max (mm)	P Max (mm)	H Hex 0 -0.1 (mm)	S +/-0.4 (mm)	T (mm)	V thread (metric)	Hex nut max torque (N.m)
13	.875	23.82	38.4	22.5	13.7	30	34.9	25.20 - 25.50	M18x1-6g	20
15	1.0000	26.97	41.6	25.0	14.1	34	38.1	28.30 - 28.60	M22x1-6g	
17	1.1875	30.15	44.8	25.0	14.1	36	41.3	31.80 - 31.95	M25x1-6g	30
21	1.3750	36.50	25.7	27.0	18.5	46	49.2	37.97 - 37.80	M31x1-6g	
23	1.5000	39.67	55.9	27.0	18.5	46	52.4	41.00 - 41.30	M34x1-6g	40
25	1.625	42.85	59.0	27.0	18.5	50	55.6	44.20 - 44.5	M37x1-6g	

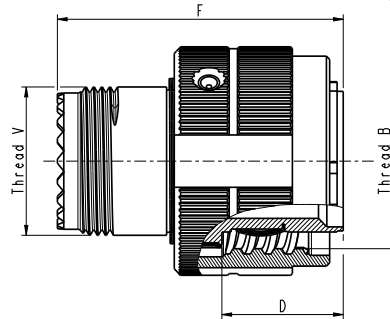
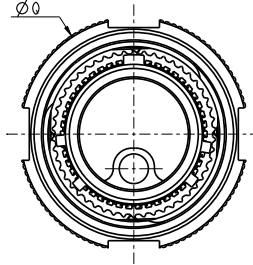
All dimensions are given for information only and are in mm, except as otherwise specified | \*in mm: 1mm=0.03937 inch

# POWERSAFE / VG96944 - OVERALL DIMENSIONS - PLUG

## Straight plug

See part how to order page 22

AMPHENOL	MILITARY
TV06RW**	VG96944-04C**A
TV06ZN**	
TV06TZ**	VG96944-04C**J
TVS06RF**	
TVS06RB**	VG96944-04C**B
TVS06RK**	



Conforms to CECC 75.201.002 (coupling nut for arctic gloves)

Shell size	B thread Class 2B (inches)	Q Max (mm)	F Max (mm)	D (mm)	V thread (metric)
13	.875	29.4	35.5	15.01	M18x1-6g
15	1.0000	32.5	38.0	17.51	M22x1-6g
17	1.1875	35.7	38.0	17.51	M25x1-6g
21	1.3750	38.5	44.4	19.51	M31x1-6g
23	1.5000	44.9	46.0	19.51	M34x1-6g
25	1.625	48.0	46.0	19.51	M37x1-6g

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# POWERSAFE / VG96944 - JAM NUT REDUCED FLANGE RECEPTACLE

Reduced flange receptacle are derived from 38999 series III Jam nut receptacles and dedicated for applications where size & weight are criticals, offering un smaller footprint and higher contact density

## Main features

- For Jam nut receptacle (TV07/TVS07).
- Higher density on panel: **41% average footprint surface reduction.**
- Lighter: **20% average lighter than standard 38999**
- Mates with standard **PowerSafe** plug and caps.
- Matches the **PowerSafe** performances.
- Improved design of the o'ring groove allowing the o'ring to stay in place.



MATED PAIR

RECEPTACLE FRONT FACE

Standard  
TV\*07\*\*\*

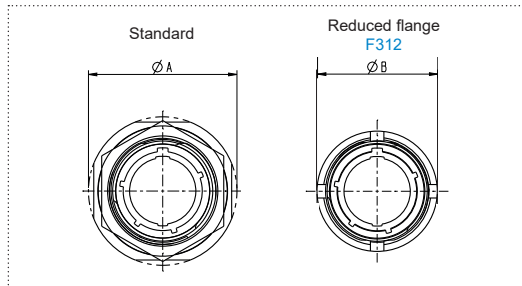


Jam nut  
Reduced flange  
TV\*07\*\*\*F312



## Footprint savings

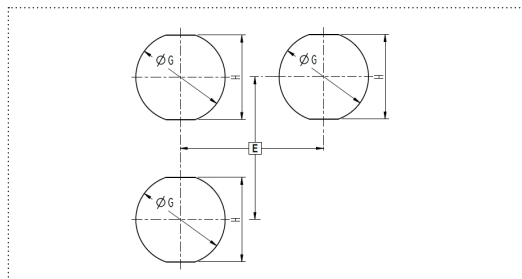
Average 41% footprint reduction:



Size	Standard PowerSafe ØA <sub>MAX</sub> (mm)	PowerSafe Reduced flange (F312) ØB <sub>MAX</sub> (mm)	Ø Reduction
13	38.4	28.1	46%
15	41.6	32.1	40%
17	44.8	36.1	35%
21	52.7	41.1	39%
23	55.9	44.1	38%
25	59	48.1	34%

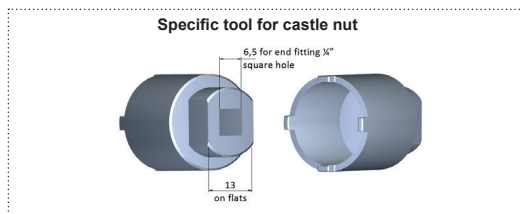
All others dimensions remains the same in standard or reduced flange (lengths, threads, etc.).  
See page 10 for all other Jam nut receptacle dimensions

## Panel hole dimensions



Size	E recommended	ØG +0.1 0	H +0.1 0
13	31.4	23	22.3
15	34.5	27	25.5
17	37.7	31	30.3
21	43.7	36	35.1
23	46.9	39	38.3
25	51.0	43	41.5

## Tooling



Size	Tool reference
13	809683
15	809684
17	809685
21	809687
23	809688
25	809689

All dimensions are given for information only and are in mm, except as otherwise specified | \*in mm: 1mm=0.03937 inch

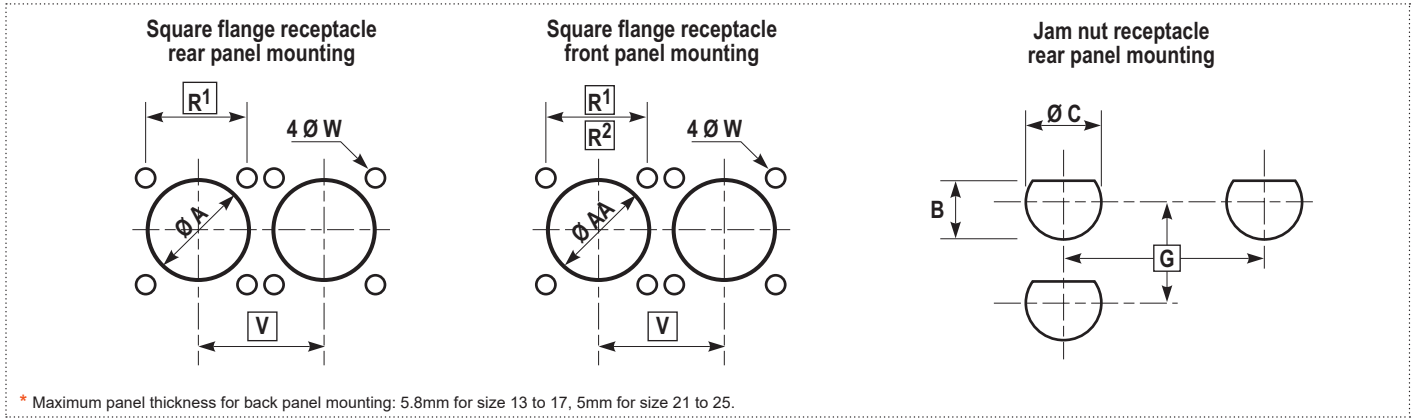
# POWERSAFE / VG96944 - KEYWAY & PANEL HOLE DIMENSIONS

## Keyway polarization

A plug with a given rotation letter will mate with a receptacle with the same rotation letter. The angles for a given connector are the same whether it contains pins or sockets. Minor keys stay fixed, master key rotates. Keyway identification letter is (Blank) for Normal, A, B, C or D.

Size	Position of the major key					RECEPTACLE (front face shown)	PLUG (front face shown)
	NORMAL BLANK	A	B	C	D		
13	100	80	68	132	120		
15	100	79	66	134	121		
17	100	82	70	130	118		
21	100	82	70	130	118		
23	100	85	74	126	115		
25	100	85	74	126	115		

## Panel hole dimensions



Shell size	R <sup>1</sup> (mm)	R <sup>2</sup> (mm)	V Mini (mm)	ØA Min (mm)	ØAA Min (mm)	ØW ±0.13 (mm)	G Mini (mm)	ØC +0.25 0 (mm)	B 0 -0.25 (mm)
13	23.01	20.62	30.20	23.42	19.05	3.25	36.00	25.65	24.26
15	24.61	23.01	33.30	26.59	23.01	3.25	39.60	28.83	27.56
17	26.97	24.61	36.50	30.96	25.81	3.25	43.30	32.01	30.73
21	31.75	29.36	42.50	36.12	32.16	3.25	50.60	38.35	37.08
23	34.93	31.75	45.70	39.29	34.93	3.81	54.20	41.53	40.26
25	38.10	34.93	48.80	42.47	37.69	3.81	59.70	44.70	43.43

All dimensions are given for information only and are in mm, except as otherwise specified | \*in mm: 1mm=0.03937 inch

Due to technical modifications, all information provided is subject to change without prior notice  
Designed by Amphenol Socapex

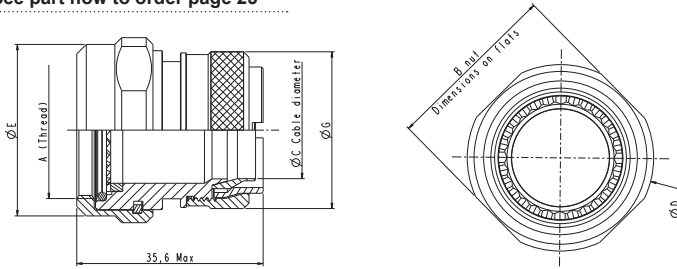
# POWERSAFE / VG96944 - BACKSHELLS

## TV NSA Backshells

These backshells ensure the shielding by clamping the braid with a screwing system. The free inner ring avoids twisting of the braid during screwing (double conus style).



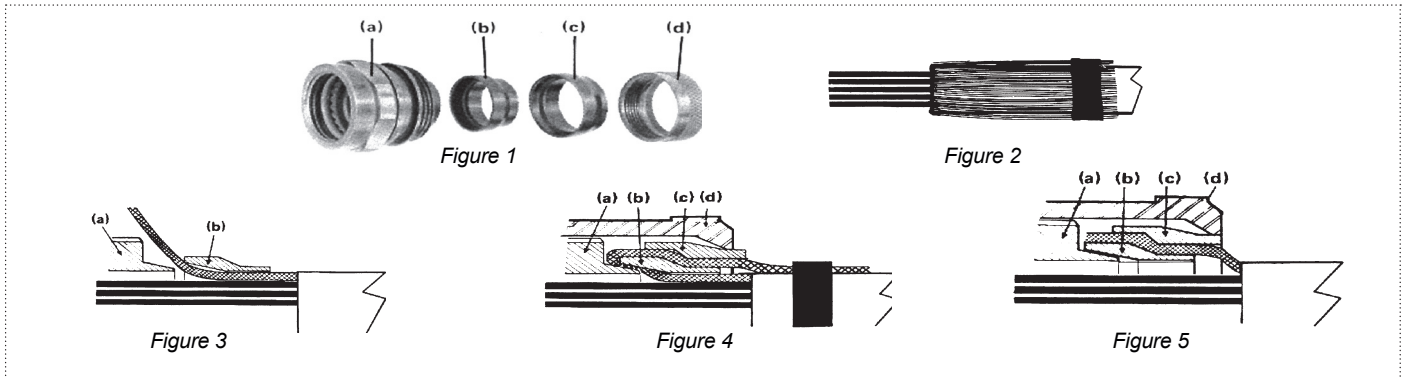
See part how to order page 23



Shell size	A Thread Metric	B max	Ø C max	Ø D max	Ø E max	Ø G max
13	M18 x 1.0-6H	26	12.7	28.1	21.2	22.6
15	M22 x 1.0-6H	29	14.8	31.1	25.1	25.8
17	M25 x 1.0-6H	32	17.9	34.1	28.1	29.0
21	M31 x 1.0-6H	39	23.1	41.1	34.1	35.2
23	M34 x 1.0-6H	42	26.2	44.1	36.9	38.4
25	M37 x 1.0-6H	45	28.8	49.1	39.9	41.5

Use Straight Shrink Boots 202K121-12 (size 13), 202K132-12 (size 15 and 17), 202K153-12 (size 21, 23 and 25) and S1255 Adhesive

### TV NSA Installation instructions



1. Prepare the cable for termination process and slide the items onto the cable in the order shown on figure 1.
2. Screw the backshell at the rear of the connector. The best performance in time of the system « connector + rear accessory » consists in applying the torque value to screw then unscrew, to apply the torque value & screw a second time, then to unscrew and finally screw the torque value a third time.
3. Fold back the braid on the outer jacket and fix it (figure 2)
4. Install the braid as shown on figures 3 and 4: Release the braid and cover the backshell (a) and the connector's shell. Slide the first ring (b) over the braid. Fold back the braid on the ring (b) and slide the second ring (c) over the braid and the first ring (b). Screw the last ring (d) at the rear of the backshell. If necessary, fix the extra braid on the outer jacket of the cable. If this installation (double folding of the braid) is not possible, refer to figure 5: Slide the first ring (b). Release the braid and cover the backshell (a) and the connector's shell. Cut the braid as shown. Slide the second ring (c) over the braid and the first ring (b). Screw the last ring at the rear of the backshell.
5. Then, Install the heat-shrink moulded piece.



## VG95319 Backshells

These backshells are suitable for PowerSafe connectors and ensure the shielding by clamping the braid with a screwing system (single conus style).

Shell size	Backshell VG Standard	Shrink boot	Adhesive	Micro Clamping Band	or	Standard Clamping Band	Tool for Micro Band	Tool for Standard Band
13	VG95319-1011G012A	VG95343T06B001A	VG95343T15A001	895693		072952	809985	809952
15	VG95319-1011G004A	VG95343T06B003A						
17	VG95319-1011G005A	VG95343T06B004A	895700					
21	VG95319-1011G008A	VG95343T06B005A						
23	VG95319-1011G009A	VG95343T06C010A						
25	VG95319-1011G010A							

Use Straight Shrink Boots 202K121-12 (size 13), 202K132-12 (size 15 and 17), 202K153-12 (size 21, 23 and 25) and S1255 Adhesive

All dimensions are given for information only and are in mm, except as otherwise specified | \*in mm: 1mm=0.03937 inch

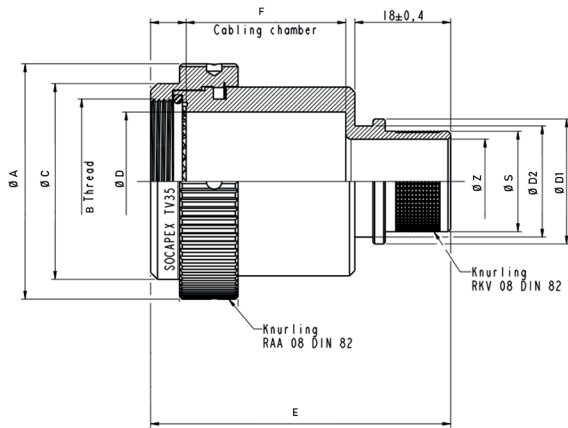
# POWERSAFE / VG96944 - BACKSHELLS



## TV35 Backshells

TV35 and TVB35 band backshells provide a full 360° shield termination with a quick, easy and cost effective cabling process. They are available with different cabling chamber lengths and exit diameters. The use of replaceable bands facilitates future maintenance or reparability. Sealing is ensured by straight or right angled heat shrink moulded piece at the rear of backshell.

See part how to order page 23



Shell size	B Thread Metric	Ø A max	Ø C	Ø D
13	M18 x 1.0-6H	31.80	25.00	13.80
15	M22 x 1.0-6H	35.00	28.00	16.30
17	M25 x 1.0-6H	38.10	30.80	20.10
21	M31 x 1.0-6H	44.30	36.90	26.00
23	M34 x 1.0-6H	47.20	39.80	29.28
25	M37 x 1.0-6H	50.00	43.00	32.45

Shell size	E max mm	Cabling chamber length F <sup>±0,1</sup> mm	Z rear side diameter coding										
			08	10	12	14	16	20	24	28	32	36	
13	36	10	■	■	■	■	■	■	■				
	46	20			■	■	■	■					
	56	30			■	■	■	■					
15	36	10		■	■	■	■	■	■	■			
	46	20			■	■	■	■	■	■			
	56	30			■	■	■	■	■	■			
17	36	10			■	■	■	■	■	■			
	46	20			■	■	■	■	■	■			
	51	25			■								
21	56	30						■	■	■			
	36	10					■	■	■	■			
	46	20				■	■	■	■	■			
23	56	30						■	■	■			
	36	10						■	■	■	■		
	46	20						■	■	■	■		
25	56	30							■	■	■	■	
	36	10							■	■	■	■	■
	46	20							■	■	■	■	■
Z Coding			08	10	12	14	16	20	24	28	32	36	
ØZ			6.30	7.90	9.40	11	12.60	15.80	19	22.10	25.30	28.80	
ØS MIN			9.40	11.10	14.10	14.10	15.70	18.90	22	25.20	28.40	31.50	
ØS MAX			9.50	11.2	14.30 0	14.30	15.90	19.10	22.20	25.40	28.60	31.80	
ØD1 ±0,1			14.00	17.10	17.10	18.70	20.30	23.50	26.70	29.80	33	36.20	
ØD2 ±0,1			11.40	14.50	14.50	16.10	17.70	20.90	23.10	26.20	29.40	32.60	

Use Straight Shrink Boots 202K121-12 (size 13), 202K132-12 (size 15 and 17), 202K153-12 (size 21, 23 and 25) and S1255 Adhesive.

All dimensions are given for information only and are in mm, except as otherwise specified | \*in mm: 1mm=0.03937 inch

# POWERSAFE / VG96944 - PROTECTIVE CAPS

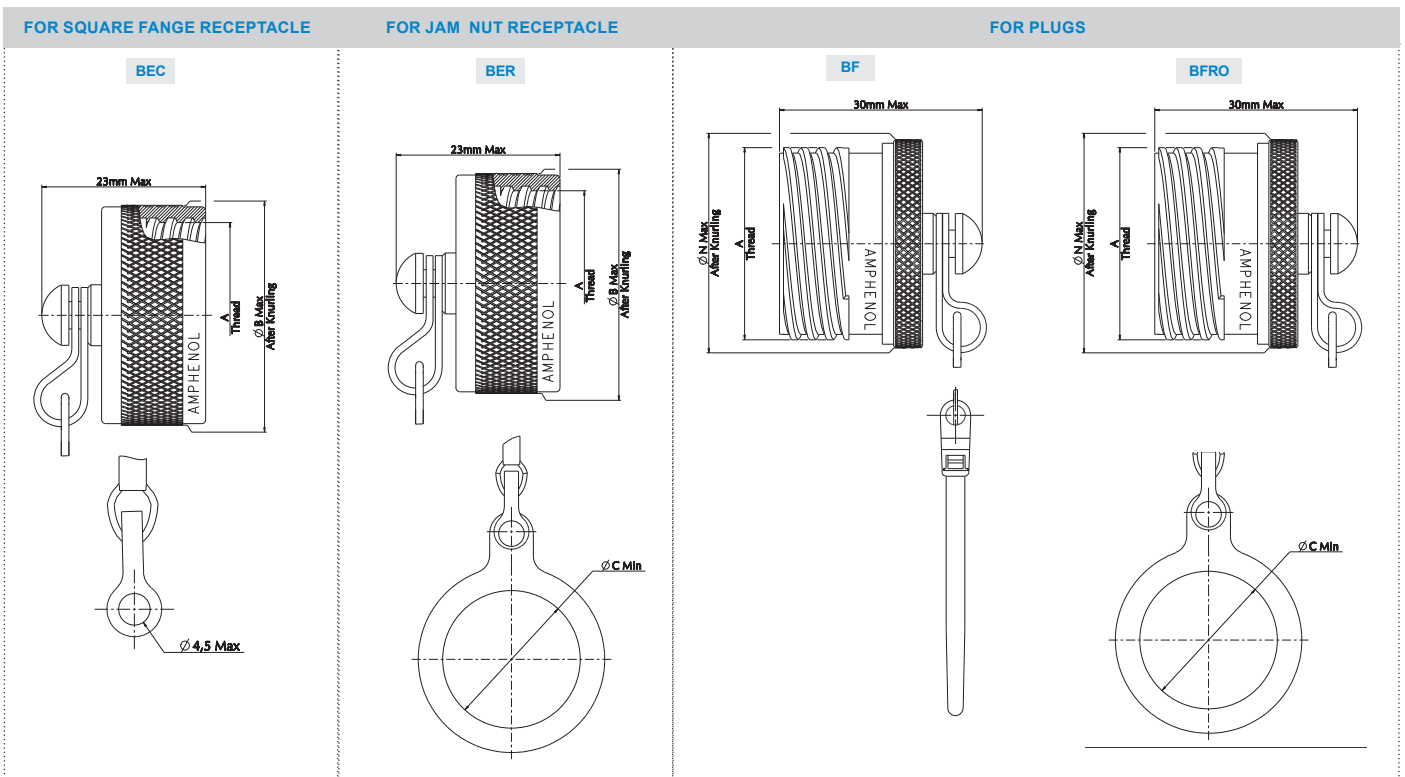
## Main features

- Available for Plugs, Jam nut and Square receptacles
- IP 68 (permanent sealing)
- Protection against dust, water and moisture
- EMI function
- Nylon cord, stainless steel rope or metallic chain



## Overall dimensions

See part how to order page 24



Shell size	A thread .1P-.3L-TS Class 2A (External) Class 2B (Internal) (inches)	ØB Max (After Knurling)	ØC Min	ØN Max
13	.875	25.75	25.15	24.30
15	1.0000	28.90	29.92	27.40
17	1.1875	33.80	32.00	30.60
21	1.3750	38.60	38.25	36.40
23	1.5000	41.70	42.62	39.70
25	1.625	44.90	44.45	42.80

## Nylon cord, Chain and Stainless Steel Rope length

Cap type	Attachement length
BEC/BER for receptacle	127 (+13 / -7)
BF/BFRO for plug	160±5

All dimensions are given for information only and are in mm, except as otherwise specified | \*in mm: 1mm=0.03937 inch

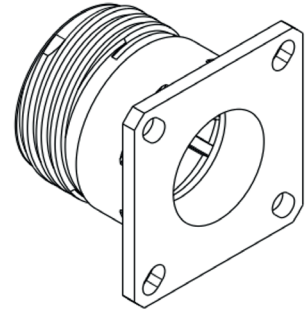
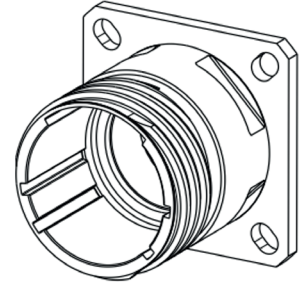
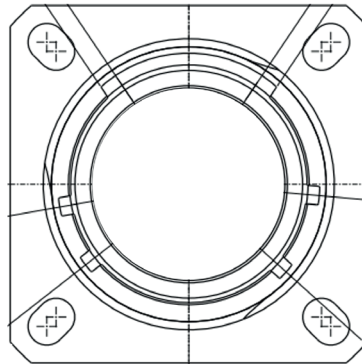
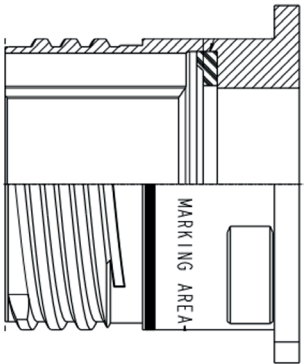


# POWERSAFE / VG96944 - DUMMY RECEPTACLES

- Dedicated to **PowerSafe**
- Universal coding : Compatible with all Keyway polarizations
- Can be used as a backshell tightening tool
- Same dimensions and Panel holes than a standard Square Flange Receptacle (see page 10).



See part how to order page 24



All dimensions are given for information only and are in mm, except as otherwise specified | \*in mm: 1mm=0.03937 inch

Due to technical modifications, all information provided is subject to change without prior notice  
Designed by Amphenol Socapex

# POWERSAFE / VG96944 - CONTACTS & TOOLING

Contact type	Size	Contacts		AWG	Section mm <sup>2</sup>	dia over insulator		Crimping tools			Insertion tools			Removal tools		
		Proprietary Part Number				Min	Max	Tools	Positioner	Selector position	Plastic (Color)	Metallic		Plastic (Color)	Metallic	
		Pin	Socket									Straight type	Angle type		Straight type	Angle type
13-V4 13-E4	Pilot	20	600665 600892	20 22 24	0,61 0,38 0,24	1,02	2,11			3 2 1	M81969/14-10 (red / orange)	809817	M81969/8-05	M81969/14-10 (red / orange)	809847	M81969/8-06
	Phase Neutral	16	600666 600676	14 16 18	1,94 1,23 0,96	1,65	2,77	M22520/1-01	M22520/1-04	6 6 5	M81969/14-03 (blue / white)	809816	M81969/8-07	M81969/14-03 (blue / white)	809846	M81969/8-08
	Protective		600667 600677	20	0,61					4	/			/		
15-V4 15-E4	Pilot	16	600660 600894	16 18 20	1,23 0,96 0,61	1,65	2,77			6 5 4	M81969/14-03 (blue / white)	809816	M81969/8-07	M81969/14-03 (blue / white)	809846	M81969/8-08
	Phase Neutral	12	600661 600671	12 14	2,98 1,94	2,46	3,61	M22520/1-01	M22520/1-04	8 7	M81969/14-04 (yellow / white)	/	M81969/8-09	M81969/14-04 (yellow / white)	/	M81969/8-10
	Protective		600662 600672						/	/						
17-V6 17-E6	Pilot	16	600660 600894	16 18 20	1,23 0,96 0,61	1,65	2,77			6 5 4	M81969/14-03 (blue / white)	809816	M81969/8-07	M81969/14-03 (blue / white)	809846	M81969/8-08
	Phase Neutral	12	600661 600671	12 14	2,98 1,94	2,46	3,61	M22520/1-01	M22520/1-04	8 7	M81969/14-04 (yellow / white)	/	M81969/8-09	M81969/14-04 (yellow / white)	/	M81969/8-10
	Protective		600662 600672						/	/						
21-V4 21-E4	Pilot	16	600660 600894	16 18 20	1,23 0,96 0,61	1,65	2,77	M22520/1-01	M22520/1-04	6 5 4	M81969/14-03 (blue / white)	/	/	M81969/14-03 (blue / white)	/	/
	Phase Neutral	6	600663 600673	6	13,61	7,3	8,1	809947 + 809908 (hex crimp) or		/	/	/	/	/	/	809696
	Protective		600664 600674					M22520/23-01 + 809697 (pin) M22520/23-03 + 809690 (socket)		/	/	/	/	/	/	
23-V4 23-E4	Pilot	16	600660 600894	16 18 20	1,23 0,96 0,61	1,65	2,77	M22520/1-01	M22520/1-04	6 5 4	M81969/14-03 (blue / white)	/	/	M81969/14-03 (blue / white)	/	/
	Phase Neutral	4	612514 612516	4	21,2			M22520/23-01	M22520/23-04	/	/	/	/	/	809943	/
	Protective		612513 612515													
25-V6 25-E6	Pilot	16	600660 600894	16 18 20	1,23 0,96 0,61	1,65	2,77	M22520/1-01	M22520/1-04	6 5 4	M81969/14-03 (blue / white)	/	/	M81969/14-03 (blue / white)	/	/
	Phase Neutral	6	600663 600673	6	13,61	7,3	8,1	809947 + 809908 (hex crimp) or		/	/	/	/	/	/	809696
	Protective		600664 600674					M22520/23-01 + 809697 (pin) M22520/23-03 + 809690 (socket)		/	/	/	/	/	/	

## CRIMPING TOOLS

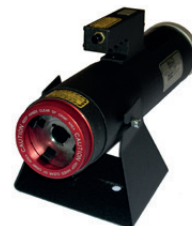
MANUAL CRIMPING PLIERS  
M22520/1-01



HYDRAULIC PLIERS  
809947

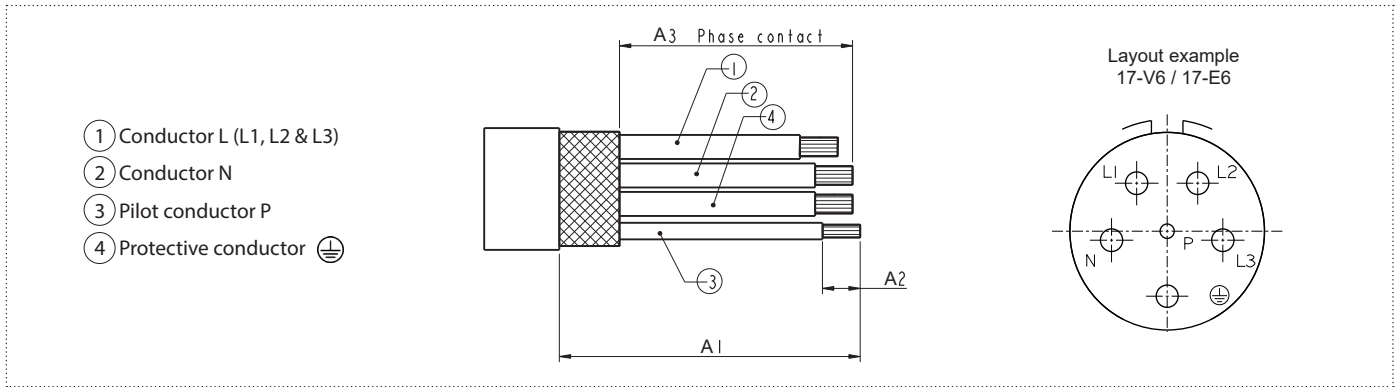


PNEUMATIC PLIERS  
M22520/23-01



All dimensions are given for information only and are in mm, except as otherwise specified | \*in mm: 1mm=0.03937 inch

# POWERSAFE / VG96944 - WIRE STRIP LENGTH



Size	Contact type	A1	A2	A3 (for shielding braid)
13	Protective contact ⊕	53 - 63	6 - 6.5	42 <sub>MAX</sub>
	Phase contacts (N, L1, L2 & L3)			
	Pilot contact (P)			
15	Protective contact ⊕	53 - 63	6 - 6.5	
	Phase contacts (N, L1, L2 & L3)			
	Pilot contact (P)			
17	Protective contact ⊕	53 - 63	6 - 6.5	
	Phase contacts (N, L1, L2 & L3)			
	Pilot contact (P)			
21	Protective contact ⊕	55 - 65	14 - 15.5	
	Phase contacts (N, L1, L2 & L3)			
	Pilot contact (P)			
23	Protective contact ⊕	55 - 65	14 - 15.5	
	Phase contacts (N, L1, L2 & L3)			
	Pilot contact (P)			
25	Protective contact ⊕	55 - 65	14 - 15.5	
	Phase contacts (N, L1, L2 & L3)			
	Pilot contact (P)			

All dimensions are given for information only and are in mm, except as otherwise specified | \*in mm: 1mm=0.03937 inch

## POWERSAFE / VG96944 - VG96944 QUALIFIED CABLES

Size 13	PN	Raw material
WIRE AWG16 white	VG95218T020A003	Tinned copper, jacket PVF modified
WIRE AWG14 white	M81044/12-14-9	Tinned copper, jacket PVDF
WIRE AWG14 blue	M81044/12-14-6	Tinned copper, jacket PVDF
WIRE AWG14 green yellow	M81044/12-14-45	Tinned copper, jacket PVDF
Fillers	-	PTFE
Braid	TB13-T-63	Tinned copper
Heatshrink	DR25 3/8-0M (VG95343 Part 5 Type D)	Elastomer
Size 15	PN	Raw material
WIRE AWG16 white	VG95218T020A003	Tinned copper, jacket PVF modified
WIRE AWG12 white	VG95218T020A017	Tinned copper, jacket PVF modified
WIRE AWG12 blue	M81044/12-12-6	Tinned copper, jacket PVDF
WIRE AWG12 green yellow	M81044/12-12-45	Tinned copper, jacket PVDF
Fillers	-	PTFE
Braid	TB13-T-695	Tinned copper
Heatshrink	DR25 1/2-0M (VG95343 Part 5 Type D)	Elastomer
Size 17	PN	Raw material
WIRE AWG16 white	VG95218T020A003	Tinned copper, jacket PVF modified
WIRE AWG12 white	VG95218T020A017	Tinned copper, jacket PVF modified
WIRE AWG12 blue	M81044/12-12-6	Tinned copper, jacket PVDF
WIRE AWG12 green yellow	M81044/12-12-45	Tinned copper, jacket PVDF
Fillers	-	PTFE
Braid	TB13-T-695	Tinned copper
Heatshrink	DR25 1/2-0M (VG95343 Part 5 Type D)	Elastomer
Size 21	PN	Raw material
WIRE AWG16 white	VG95218T020A003	Tinned copper, jacket PVF modified
WIRE AWG6 white	M22759/16 6-9	Tinned copper, jacket PVDF
WIRE AWG6 blue	M22759/16 6-6	Tinned copper, jacket PVDF
WIRE AWG6 green yellow	M22759/16 6-4/5	Tinned copper, jacket PVDF
Fillers	-	PTFE
Braid	TB13-T-200	TINNED copper
Heatshrink	DR25 1-0M (VG95343 Part 5 Type D)	Elastomer
Size 23	PN	Raw material
WIRE AWG16 white	VG95218T020A003	Tinned copper, jacket PVF modified
WIRE AWG4 white	M22759/34 4	Tinned copper, jacket ETFE
WIRE AWG4 blue	M22759/34 4	Tinned copper, jacket ETFE
WIRE AWG4 green yellow	M22759/34 4	Tinned copper, jacket PVDF
Fillers	-	PTFE
Braid	TB13-T-200	Tinned copper
Heatshrink	DR25 1-0M (VG95343 Part 5 Type D)	Elastomer
Size 25	PN	Raw material
WIRE AWG16 white	VG95218T020A003	Tinned copper, jacket PVF modified
WIRE AWG6 white	M22759/16 6-9	Tinned copper, jacket PVDF
WIRE AWG6 blue	M22759/16 6-6	Tinned copper, jacket PVDF
WIRE AWG6 green yellow	M22759/16 6-4/5	Tinned copper, jacket PVDF
Fillers	-	PTFE
Braid	TB13-T-200	Tinned copper
Heatshrink	DR25 1-0M (VG95343 Part 5 Type D)	Elastomer

## POWERSAFE / VG96944 - MIL QUALIFIED CABLES

Size 13	PN	Raw material
WIRE AWG20	M22759/34 20	Tinned copper, jacket ETFE
WIRE AWG14	M22759/34 14	Tinned copper, jacket ETFE
Fillers	/	PTFE
Braid	4D045558	Nickel copper
Heatshrink	RW200E-1/2-0 or HLR33001270	Fluroelastomeric or Viton
Size 15	PN	Raw material
WIRE AWG16	M22759/34 16	Tinned copper, jacket ETFE
WIRE AWG12	M22759/34 12	Tinned copper, jacket ETFE
Fillers	/	PTFE
Braid	4D047547	Nickel copper
Heatshrink	RW200E-3/4-0 or HLR33001900	Fluroelastomeric or Viton
Size 17	PN	Raw material
WIRE AWG16	M22759/34 16	Tinned copper, jacket ETFE
WIRE AWG12	M22759/34 12	Tinned copper, jacket ETFE
Fillers	/	PTFE
Braid	4D047547	Nickel copper
Heatshrink	RW200E-3/4-0 or HLR33001900	Fluroelastomeric or Viton
Size 21	PN	Raw material
WIRE AWG16	M22759/34 16	Tinned copper, jacket ETFE
WIRE AWG6	M22759/34 6	Tinned copper, jacket ETFE
Fillers	/	PTFE
Braid	4D045591	Nickel copper
Heatshrink	RW200E-1 1/2-0 or HLR33003810	Fluroelastomeric or Viton
Size 23	PN	Raw material
WIRE AWG16	M22759/34 16	Tinned copper, jacket ETFE
WIRE AWG4	M22759/34 4	Tinned copper, jacket ETFE
Fillers	/	PTFE
Braid	4D045591	Nickel copper
Heatshrink	RW200E-1 1/2-0 or HLR33003810	Fluroelastomeric or Viton
Size 25	PN	Raw material
WIRE AWG16	M22759/34 16	Tinned copper, jacket ETFE
WIRE AWG6	M22759/34 6	Tinned copper, jacket ETFE
Fillers	/	PTFE
Braid	4D045591	Nickel copper
Heatshrink	RW200E-1 1/2-0 or HLR33003810	Fluroelastomeric or Viton

Note that High performance Nickel plated or Silver plated wires can also be used for harsh environment applications, to withstand higher temperatures.

# POWERSAFE / VG96944 - HOW TO ORDER - PROPRIETARY DESIGNATIONS

1.	2.	3.	4.	5.	6.	7.	
Series	Shell type	Crimp contacts	Class	Contact arrangement	Contact gender	Keying	Deviation
TV	P00	R	W	13-E4	P		-

### 1. Shell type

Shell type	Temperature	Associated materials and platings for E4 & E6 inserts	Associated materials and platings for V4 & V6 inserts
06 S06	+175°C* +200° C	W, ZN, TZ F, K, S, B	W, ZN, TZ, F, K, S, B -
P00 PS00	+175°C* +200° C	W, ZN, TZ F, K, S, B	W, ZN, TZ, F, K, S, B -
07 S07	+175°C* +200° C	W, ZN, TZ F, K, S, B	W, ZN, TZ, F, K, S, B -

\*Max temperature +175°C with a Proprietary version insert and +150°C with a VG compliant insert

### 2. Crimp contacts

R	For Class W, F, K and B platings
Blank	For Class ZN and TZ plating

### 3. Class: Material & Finish

Shell material	Shell finish
W	Olive drab cadmium
F	Nickel ✓
ZN	Black zinc nickel ✓
TZ	Tin Zinc ✓
B	Marine bronze ✓
K	Stainless steel
	Passivated ✓

### 4. Contact arrangement

13-E4	Size 13 – 4 contacts
15-E4	Size 15 – 4 contacts
17-E6	Size 17 – 6 contacts
21-E4	Size 21 - 4 contacts
23-E4	Size 23 - 4 contacts
25-E6	Size 25 – 6 contacts

Please note that standard inserts have a Comparative Tracking Index (CTI) <100V and can withstand a temperature up to 200°C depending on shell material and platings.

13-V4	Size 13 – 4 contacts
15-V4	Size 15 – 4 contacts
17-V6	Size 17 – 6 contacts
21-V4	Size 21 - 4 contacts
23-V4	Size 23 - 4 contacts
25-V6	Size 25 – 6 contacts

Please note that VG inserts have a Comparative Tracking Index (CTI) between 175 & 400V (Material Group IIIa) and can withstand a temperature up to 150°C.

### 5. Contact gender

P	Pin (500 cycles)
S	Socket (500 cycles)

### 6. Keying

(Blank) (for normal)	A	B	C	D
-------------------------	---	---	---	---

### 7. Deviation

Deviation	Description	Shell type compatibility
F312	Reduced flange receptacle with a standard nut	07/S07

For other deviations availability, please consult us

# POWERSAFE / VG96944 - HOW TO ORDER - VG96944 DESIGNATIONS

1.	2.	3.	4.	5.	
Series	Shell type	Contact arrangement	Contact gender	Keying	Material and platings
VG96944-04	A	13-V4	P	N	A

### 1. Shell type

A	Receptacle	Square flange receptacle
B		Jam nut receptacle
C	Straight plug	

### 2. Contact arrangement

13-V4	Size 13 – 4 contacts
15-V4	Size 15 – 4 contacts (qualification to come)
17-V6	Size 17 – 6 contacts
21-V4	Size 21 - 4 contacts (qualification to come)
23-V4	Size 23 - 4 contacts (qualification to come)
25-V6	Size 25 – 6 contacts

Please note that VG inserts have a Comparative Tracking Index (CTI) between 175 & 400V (Material Group IIIa) and can withstand a temperature up to 150°C.

### 3. Contact gender

P	Pin (500 cycles)
S	Socket (500 cycles)

### 4. Keying

N (for normal)	A	B	C	D
-------------------	---	---	---	---

### 5. Material and platings

Shell material	Shell finish
A	Olive drab cadmium (13-V4/17-V6/25-V6 only)
J	Tin Zinc ✓ (Qualification in progress)
B	Marine bronze ✓
	-

✓ : RoHS compliant

# POWERSAFE / VG96944 - HOW TO ORDER - TV35 BACKSHELLS



	1.	2.	3.	4.	5.
Series	Backshell style	Backshell size	Cabling chamber length	Rear side diameter	Material and platings
TV	35	11	10	11	014

### 1. Backshell style

35	Aluminum straight band backshell accepting heatshrink moulded piece
B35	Marine bronze straight band backshell accepting heatshrink moulded piece

### 2. Backshell size (same as connector size)

13	15	17	21	23	25
----	----	----	----	----	----

### 3. Cabling chamber length

Please refer to Page 15

10	20	25	30
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### 4. Rear side diameter

Please refer to Page 15

06	08	10	12	14	16	20	24	28	32	36
----	----	----	----	----	----	----	----	----	----	----

### 5. Material and platings

	Shell material	Shell finish
014	Aluminum	Olive drab cadmium
023		Nickel ✓
076F479		Tin Zinc ✓
033K		Black zinc nickel ✓
Blank	Marine Bronze ✓	-

# POWERSAFE / VG96944 - HOW TO ORDER - TV NSA DESIGNATIONS



	1.	2.	3.
Series	Backshell style	Backshell size	Material and platings
TV	NSA	13	014

### 1. Backshell style

NSA	Screened clamping braid backshell accepting heatshrink moulded piece
-----	--

### 2. Backshell size (same as connector size)

13	15	17	21	23	25
----	----	----	----	----	----

### 3. Material and platings

	Shell material	Shell finish
014	Aluminum	Olive drab cadmium
023		Nickel ✓
033K		Black zinc nickel ✓

✓: RoHS compliant



## POWERSAFE / VG96944 - HOW TO ORDER - PROTECTIVE CAPS

1.	2.	3.	4.	5.	6.	
Cap type	Cap style	Wire type	Series	Material and platings	Cap size	Deviation
B	EC	N	TV	W	15	-

### 1. Cap style

EC	For Square flange receptacle
ER	For Jam nut receptacle
F	For Plug

### 2. Wire type

-	Metal chain
N	Nylon cord
R	Jacketed stainless steel rope
RO	Jacketed stainless steel rope with washer end (for plugs)

### 3. Series

TV	For PowerSafe
----	---------------

### 4. Material and platings

	Shell material	Shell finish
W	Aluminum	Olive drab cadmium
F		Nickel ✓
ZN		Black zinc nickel ✓
TZ		Tin Zinc ✓ * see deviation F479 below
B	Marine Bronze ✓	-

### 5. Cap size (same as connector size)

13	15	17	21	23	25
----	----	----	----	----	----

### 6. Deviation

F057	For Reduced flange Jam nut receptacle
F479	Mandatory fo Tin Zinc plated Caps in addition to TZ

## POWERSAFE / VG96944 - HOW TO ORDER - DUMMY RECEPTACLES



1.	2.	3.	4.	
Dummy receptacle	Style	Series	Material and platings	Shell size
SE	00	TVE	W	13

### 1. Style

00	Square flange
----	---------------

### 2. Series

TVE	For PowerSafe
-----	---------------

### 3. Material and platings

	Shell material	Shell finish
W	Aluminum	Olive drab cadmium
F		Nickel ✓
ZN		Black zinc nickel ✓
TZ		Tin Zinc ✓
B	Marine bronze ✓	-

### 4. Shell size

13	15	17	21	23	25
----	----	----	----	----	----

✓: RoHS compliant





# NOTES

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# NOTES

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GERMANY	Amphenol AIR LB GMBH	Am Kleinbahnhof 4 - 66740 Saarlouis	+49 6831 981 00
ITALY	Amphenol EUROPEAN SALES OPERATIONS	Via Barbaiana n.5 - 20020 Lainate - Milano	+39 293 254 214
UNITED KINGDOM	Amphenol INVOTEC	Unit 1-3, Hedging Lane Industrial Estate, Dosthill - Tamworth, B77 5HH	+44 1827 263 000
UNITED KINGDOM	Amphenol IONIX SYSTEMS	Prospect House, Taylor Business Park, Risley, Warrington, WA3 6HP	+44 1 942 685 200
UNITED KINGDOM	Amphenol LTD	Thanet Way, Whitstable - KENT, CT53JF	+44 1227 773 200
UNITED KINGDOM	Amphenol MARTEC	St Augustines Business Park, Swalecliffe Whitstable - Kent CT5 2QJ	+44 1227 793 733

### North America

CANADA	Amphenol CANADA	605 Milner avenue - Toronto, Ontario	+1 416 291 0647
USA	Amphenol AEROSPACE OPERATIONS	40-60 Delaware street - Sidney, NY 13838	+1 800 678 0141
USA	Amphenol BORISH TECHNOLOGIES	4511 East Paris AVE - Grand Rapids, MI 49512	+1 616 554 9820
USA	Amphenol FSI	1300 Central Expwy N, Suite 100 - Allen, TX 75013	+1 214 547 2400
USA	Amphenol GRIFFITH ENTERPRISES	6000 East Coury Drive - Cottonwood, AZ 86326	+1 928 634 3685
USA	Amphenol NEXUS TECHNOLOGIES	50 Sunnyside Avenue - Stamford, CT 06902	+1 203 327 7300
USA	Amphenol PCD	72 Cherry Hill Drive - Beverly, MA. 01915	+1 978 624 3400
USA	Amphenol PRINTED CIRCUIT	Board Technology, 91 Northeastern Boulevard - Nashua, NH 03062	+1 603 324 4500
USA	Amphenol SV MICROWAVE	2400 Centrepark West Drive - West Palm Beach, FL	+1 561 840 1800
USA	Amphenol TIMES MICROWAVE	358 Hall Avenue - Wallingford, CT 06492	+1 800 867 2629

### Asia

CHINA	Amphenol PCD CO.	Building 21, 1 <sup>st</sup> Liao Keng Industrial Zone, Shi Yan Street - Bao An District - Shenzhen 518108	+86 755 8173 8000/8286
INDIA	Amphenol INTERCONNECT INDIA	105 Bhosari Industrial Area - Pune 411 026	+91 20 27120363
JAPAN	Amphenol JAPAN	471-1, Deba, Ritto-City - Shiga 520 3041	+81 77 553 8501
KOREA	Amphenol DAESHIN	558 SongNae-Dong SoSa-Gu, Bucheon-city, Kyunggi-Do - 420-130	+81 32 610 3830/3845
SINGAPORE	Amphenol EAST ASIA	26/F, Railway Plaza, 39 Chatham Road South, Tsim Sha Tsui, Kowloon, Hong Kong	+65 6294 2128

### Other Areas

AFRICA	Amphenol AFRICA	30 Impala Rd - Sandton 2146	+27 82 410 5179
ARGENTINA	Amphenol ARGENTINA	Av. Callao 930 2do piso Oficina B "Plaza" C1023 - AAP Buenos Aires	+54 11 4815 6886
AUSTRALIA	Amphenol AUSTRALIA PTY	2 Fiveways Blvd., Keysborough - Melbourne - Victoria 3173	+61 3 8796 8888
BRAZIL	Amphenol DO BRAZIL	Rua Diogo Moreira, 132, 20 andar, rooms 2001-2-3	+55 11 3815 1003
ISRAEL	Amphenol BAR-TEC	3 Hagavish Street, K fir-Barkan Bldg. East Industrial Zone - Kfar-Sava, 44102	+972 9 764 4100
MEXICO	Amphenol OPTIMIZE	Carretera Internacional Km 6.5, Col. Parque Industrial, Nogales, Sonora, C.P. 84094	+52 631 311 160
NEW ZEALAND	Amphenol PHITEK	Level 4, 2 Kingdon Street, Newmarket, Auckland 1023	+64 9 524 2984
RUSSIA	Amphenol RUSSIA	Yaroslavskaja Street 8 - 129164 Moscow	+7 495 937 6341
TURKEY	Amphenol TURKEY	Sun Plaza 15 Kat: 15 Maslak Hah. Bilim Sok. No.5 - Sisli/Istanbul, 34398	+90 212 367 92 19

# Amphenol SOCAPEX



## Amphenol Socapex

948, promenade de l'Arve BP29  
74311 Thyez Cedex - France  
Phone: +33 (0)4 50 89 28 00  
[contact@amphenol-socapex.fr](mailto:contact@amphenol-socapex.fr)  
[www.amphenol-socapex.com](http://www.amphenol-socapex.com)



## For Technical Support

+33 (0)4 50 89 28 49  
[technicalsupport@amphenol-socapex.fr](mailto:technicalsupport@amphenol-socapex.fr)  
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