Amphenol SOCAPEX

PowerSafe

Derived from MIL-DTL-38999 Series III & EN3645

VG96944 Qualified

OUR COMPANY

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 serve customers in over 100 countries around the world.

- Amphenol Socapex is part of the leading supplier of interconnect systems **Amphenol.**

1100+
employees

109 M€
Net Sales 2022
71% Export - 29% France

Thyez, **France**
Pune, **India**

Our expertise has no boundaries

Integrated Production in France & India
- 24 000 m² manufacturing capacity on 2 sites
- Design and manufacturing centers in France and India
- State-of-the-art manufacturing technology

Our markets

Military

Commercial Aerospace

Space

Industry

TECHNOLOGIES & INNOVATION

Engineering Laboratory

Product testing and qualification expertise in many fields:
- Environmental, mechanical, electrical, chemical, climatic skills
- RF and fiber optics expertise

High-Speed Expertise

Strong expertise in high-speed signals
- 3D EM simulation software & EM models
- Time Domain and frequency domain

Materials Expertise

Focus on materials expertise and manufacturing techniques to produce faster, smaller and stronger products
- Advanced technology research and development: polymers, metals, platings, resins ...
- Cutting edge characterizations of interconnects: Radio Frequency, partial discharges ...
- 3D CAD mechanical software, simulation & analysis

Eco-responsibility

Sustainable environment approach, with pro-active management of regulations (REACH / RoHS / Conflict minerals...)
- New materials development, plating, and suitable processes
- Recycling and rational resources consumption

Our workshops

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

Automation & Tooling : Tools for our different activities : molding, machining, assembly
Molding : Solid expertise in thermoplastic elastomer and thermoset molding
Machining : Manufacturing of cylindrical shells and rectangular shells
Screw Machining : Manufacturing of electrical contacts
Plating : Plating with cadmium, nickel, electroless nickel, silver, black zinc nickel, gold
Assembly : Connector and harness assembly (electrical & optical)

Our certifications

Product certifications : MIL-DTL38999, EN3645, EN3155, VG (VG95328, VG95319, VG96944, VG95218, VG96949)

LRQA CERTIFIED ISO 9001 — Certified Management System
LRQA CERTIFIED AS 9100 — Certified Management System
LRQA CERTIFIED AQAP 2110 — Certified Management System
LRQA CERTIFIED ISO 14001 — Certified Management System

Our memberships

Member of CMG (Connecting Manufacturing Group) Consortium

GICAT MEMBER
GIFAS
acsiel
GREEN
CIMES

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

Customer Proximity

Design Expertise

Quality Commitment

On Time Delivery Performance

Compliance management

Buy our solutions

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

Field Sales Team :

- 10 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 Advisement & Multilingual Customer Service :

20 people

Worldwide Distribution Network :

Our range of circular connectors, contacts, fiber optic connectors, PCB connectors and accessories are available thru our extensive distribution network.
It includes qualified distributors (QPL approved) for assembling MIL-DTL-38999 & derivatives and PT/451 (VG95328) connectors.

Check our product inventory

Product Selectors & 3D Files

NEW

OUR HISTORY

1947

- **Socapex creation** in Suresnes, France
- 1st 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

1973

New factory in Thyez (74) France with 250 people, 13 000m²

1975

Production of 38999 connectors

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

New factory in Pune, India

2010's

LuxBeam™ and HDAS launch

2014-2017

New workshops :
- Cable Assembly & Contact Manufacturing workshop

2019

Increased manufacturing capacity with 2nd building in Pune, India

2022

75 YEARS 1947 - 2022

Harness in the box solution launch

Today & tomorrow

New technologies :
- Investment in automation & technical expertise

Amphenol SOCAPEX joins the "Convention des Entreprises pour le Climat ".
- Our goal: **to accelerate our transition to a more sustainable operation.**

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

- "E" inserts – up to 200°C & CTI (Comperative Tracking Index) <100

  Available in Amphenol Proprietary designations only
- "V" 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.

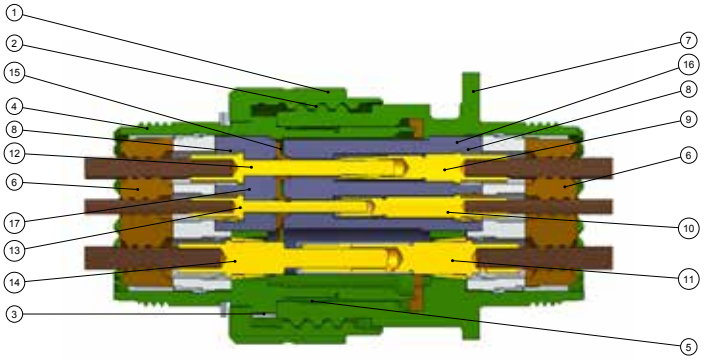
Same panel drilling as standard MIL-DTL-38999 Series III connectors.

Added benefits

- **Power**Safe 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

1. Coupling nut
2. Quick coupling thread
3. Anti-decoupling device
4. Plug shell
5. Grounding spring
6. Grommet
7. Receptacle shell
8. Contact retention clips
9. Phase and neutral socket contact
10. Pilot socket contact
11. Protective socket contact
12. Phase and neutral pin contact
13. Pilot pin contact
14. Protective pin contact
15. Interfacial seal
16. Socket insert
17. Pin insert



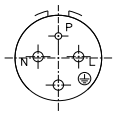
POWERSAFE / VG96944 - LAYOUTS & ELECTRICAL CHARACTERISTICS

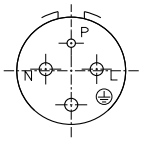
Amphenol **Power**Safe range offers 6 contact arrangements to fit all your power needs, with single-phase & three-phase layouts, and a choice of 2 insert materials for each layout depending on the need :

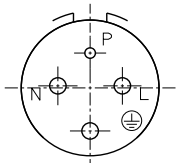
→ V inserts : developped according to VG96944 standard with a material less impacted by the disconnection under load. Able to withstand a maximum temperature of 150°C & have a CTI between 175 & 400 (Material Group IIIa)

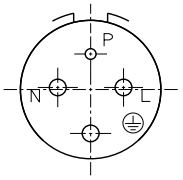
→ E inserts : using the same material than our 38999 series connectors and able to whistand a temperature up to 200°C

Single-Phase Layouts





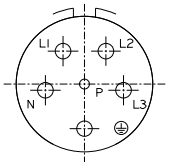


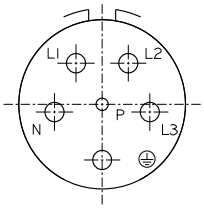


V insert	13-V4	15-V4	21-V4	23-V4
E insert	**13-E4**	**15-E4**	**21-E4**	**23-E4**
Pilot contact (P)	1 Size 20	1 Size 16	1 Size 16	1 Size 16
Phase & neutral (N & L)	2 Size 16	2 Size 12	2 Size 6	2 Size 4
Protective contact ⏚	1 Size 16	1 Size 12	1 Size 6	1 Size 4

Contact Arrangements	Pilot contact - P		Phase, Neutral and Protective contact - N, L & ⏚		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	250 V	1500 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





V insert	17-V6	25-V6
E 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 & ⏚		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	250 V	1500 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 E	Connectors with VG96944 compliants inserts V
Temperature	-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)
Salt spray exposure	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
Sealing	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 E	Connectors with VG96944 compliants inserts V
Durability	500 mating cycles	500 mating cycles
Shocks	-	Half-sine, 500 m/s^2, 11 ms
Sine vibrations	60g from -55 +175°C (Olive drab cadmium) / + 200°C (Nickel)	-
Random vibrations	Per EIA-364-28	Per VG95319-2 (Spectrum 5 Hz to 500 Hz)
Insert material	Thermoplastic insert Silicone rubber grommet and interfacial seal	Thermoplastic insert Silicone rubber grommet and interfacial seal
Insulator material Comparative Tracking Index	<100V	<400V
Contacts	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
Protective contact Resistance	≤100 mΩ	≤100 mΩ

Contact retention force

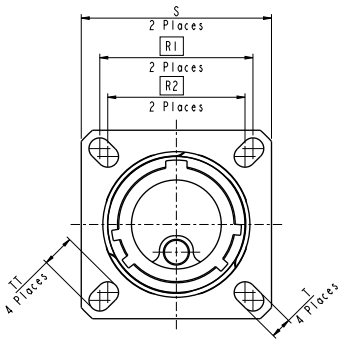
Contact Size	20	16	12	6	4
Maximum load (N)	67	111	111	111	150

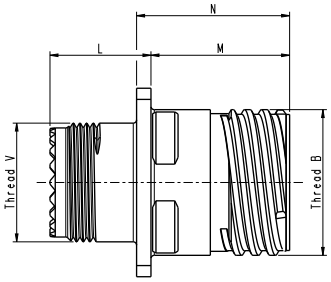
POWERSAFE / VG96944 - OVERALL DIMENSIONS - RECEPTACLES

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***	



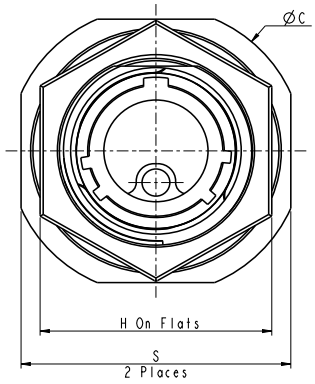


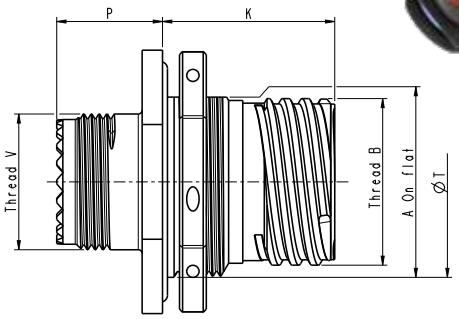
Shell size	B thread Class 2A (inches)	L Max (mm)	M Max (mm)	N +0.13 0 (mm)	R1 (mm)	R2 (mm)	S ±0.3 (mm)	T ±0.2 (mm)	TT ±0.2 (mm)	V thread (metric)
13	.875	15.5	20.9	22.99	23.01	20.62	28.6	3.25	4.93	M18x1-6g
15	1.0000	15.5	23.3	25.49	24.61	23.01	31.0	3.25	4.39	M22x1-6g
17	1.1875	15.6	23.4	25.49	26.97	24.61	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	

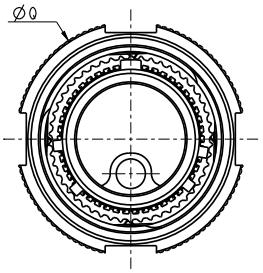
All dimensions are given for information only and are in mm, except as otherwise specified | *in mm: 1mm=0.03937 inch

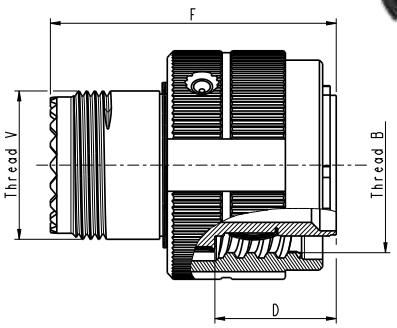
POWERSAFE / VG96944 - OVERALL DIMENSIONS - PLUG

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

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

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

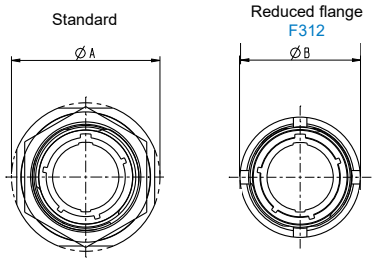
- For Jam nut receptacle (TV07/TVS07).
- Higher density on panel: **41% average footprint surface reduction.**
- Lighter: **20% average lighter than standard 38999**
- Mates with standard **Power**Safe plug and caps.
- Matches the **Power**Safe performances.
- Improved design of the o'ring groove allowing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

With Castle nut

	MATED PAIR	RECEPTACLE FRONT FACE
Standard **TV*07*** **		
Jam nut Reduced flange **TV*07***F312**		

Footprint savings

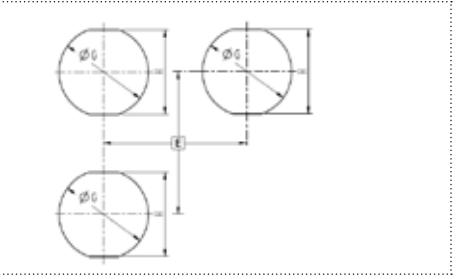
Average 41% footprint reduction:



Size	Standard PowerSafe ØA $_{MAX}$ (mm)	PowerSafe Reduced flange (F312) ØB $_{MAX}$ (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

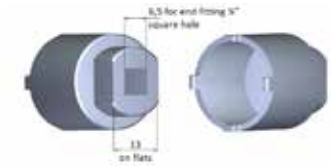
Panel hole dimensions



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

Specific tool for castle nut



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

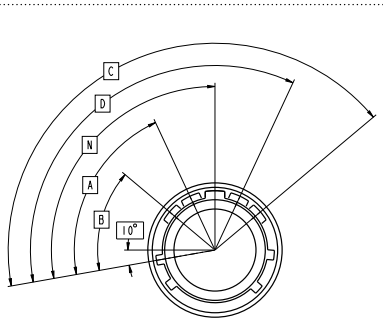
POWERSAFE / VG96944 - KEYWAY & PANEL HOLE DIMENSIONS

Keyway polarization

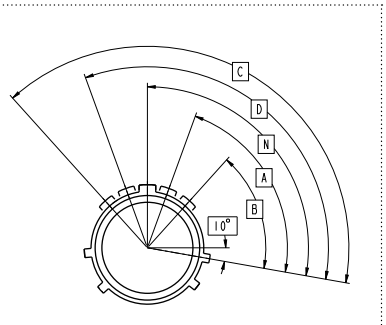
A plug with a given rotation letter will mate with a receptacle with the same rotation letter. The angles for a given connector are the same whether it contains pins or sockets. Minor keys stay fixed, master key rotates.
Keyway identification letter is (Blank) for Normal, A, B, C or D.

Size	Position of the major key				
	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

RECEPTACLE
(front face shown)

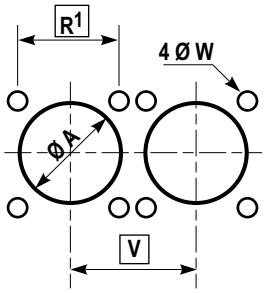


PLUG
(front face shown)

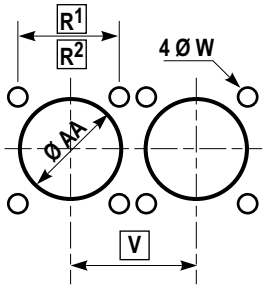


Panel hole dimensions

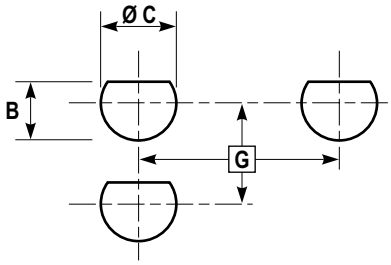
Square flange receptacle rear panel mounting



Square flange receptacle front panel mounting



Jam nut receptacle rear panel mounting



* Maximum panel thickness for back panel mounting: 5.8mm for size 13 to 17, 5mm for size 21 to 25.

Shell size	R^1 (mm)	R^2 (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

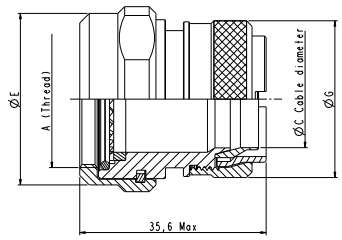
All dimensions are given for information only and are in mm, except as otherwise specified | *in mm: 1mm=0.03937 inch

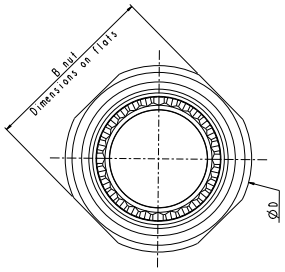
POWERSAFE / VG96944 - BACKSHELLS

TV NSA Backhells

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

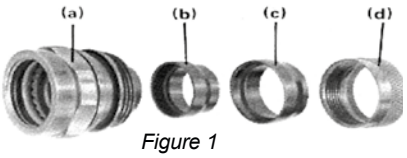


Figure 1

Figure 2

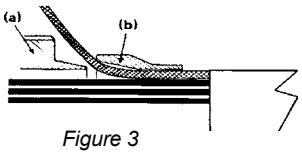


Figure 3

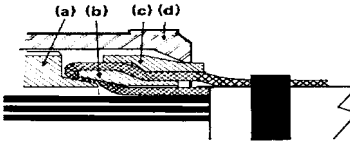


Figure 4

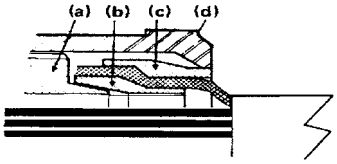


Figure 5

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 **Power**Safe 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							
21	VG95319-1011G008A	VG95343T06B004A		895700				
23	VG95319-1011G009A	VG95343T06B005A						
25	VG95319-1011G010A	VG95343T06C010A						

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

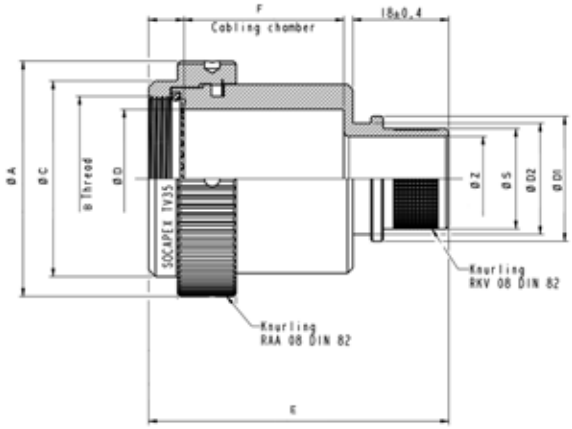
All dimensions are given for information only and are in mm, except as otherwise specified | *in mm: 1mm=0.03937 inch

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 $F^{+/-0.1}$ 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			■							
	56	30							■			
21	36	10					■	■	■	■		
	46	20				■		■				
	56	30						■		■		
23	36	10							■		■	
	46	20							■			
	56	30							■		■	
25	36	10								■		■
	46	20								■		
	56	30								■		■

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 MAX	9.40 9.50	11.10 11.2	14.10 14.30 0	14.10 14.30	15.70 15.90	18.90 19.10	22 22.20	25.20 25.40	28.40 28.60	31.50 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

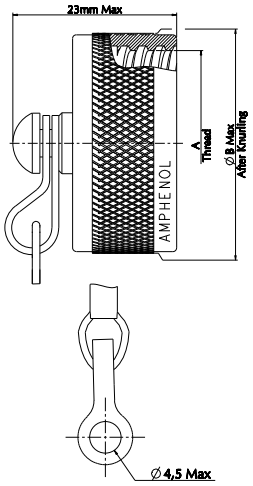
- Available for Plugs, Jam nut and Square receptacles
- IP 68 (permanent sealing)
- Protection against dust, water and moisture
- EMI function
- Nylon cord, stainless steel rope or metallic chain

Overall dimensions

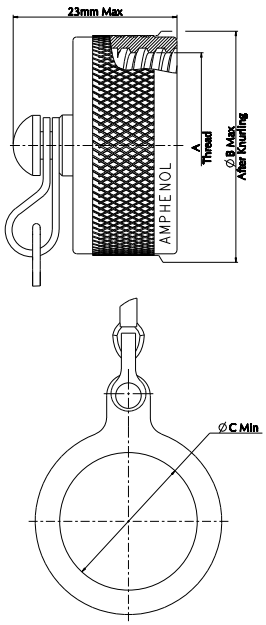
See part how to order page 24

FOR SQUARE FANGE RECEPTACLE | FOR JAM NUT RECEPTACLE | FOR PLUGS

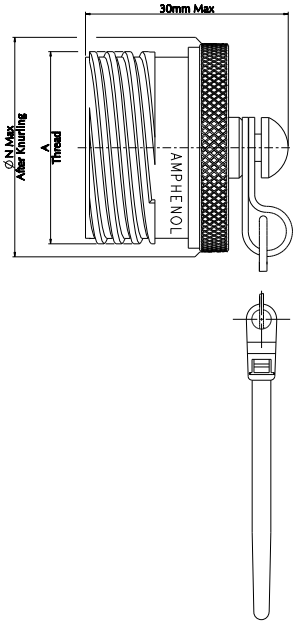
BEC



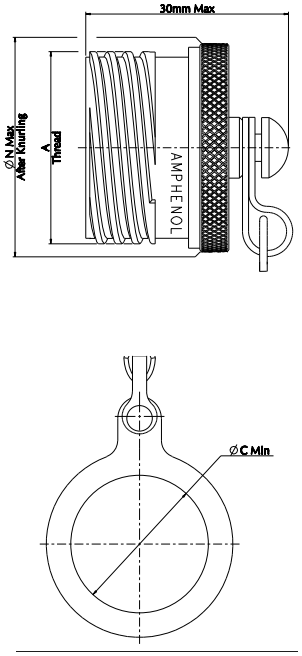
BER



BF



BFRO



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

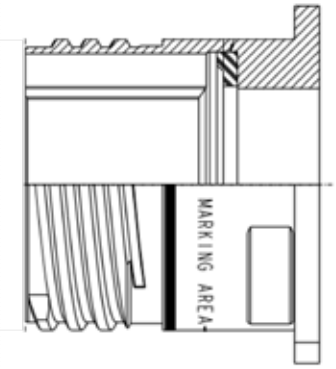
Cap type	Attachement length
BEC/BER for receptacle	127 (+13 / -7)
BF/BFRO for plug	160±5

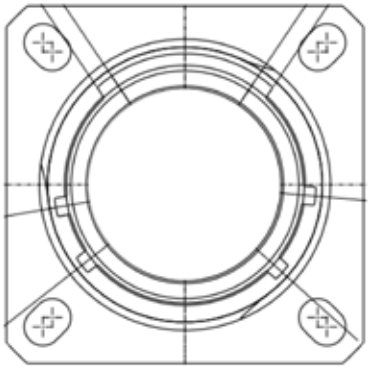
All dimensions are given for information only and are in mm, except as otherwise specified | *in mm: 1mm=0.03937 inch

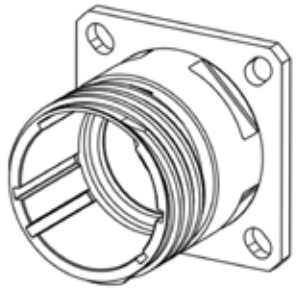
POWERSAFE / VG96944 - DUMMY RECEPTACLES

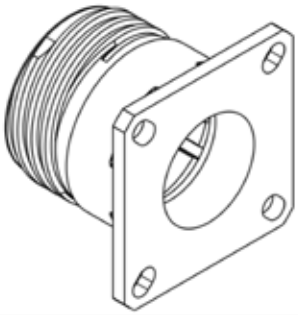
- Dedicated to **Power**Safe
- Universal coding : Compatible with all Keyway polarizations
- Can be used as a backshell tightening tool
- Same dimensions and Panel holes than a standard Square Flange Receptacle (see page 10).

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

POWERSAFE / VG96944 - CONTACTS & TOOLING

	Contact type	Size	Contacts Proprietary Part Number Pin	Contacts Proprietary Part Number Socket	AWG	Section mm²	dia over insulator Min	dia over insulator Max	Crimping tools Tools	Crimping tools Positioner	Crimping tools Selector position	Insertion tools Plastic (Color)	Insertion tools Metallic Straight type	Insertion tools Metallic Angle type	Removal tools Plastic (Color)	Removal tools Metallic Straight type	Removal tools Metallic Angle type
	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
13-V4 13-E4	Phase Neutral	16	600666	600676	14 16 18 20	1,94 1,23 0,96 0,61	1,65	2,77	M22520/1-01	M22520/1-04	6 6 5 4	M81969/14-03 (blue / white)	809816	M81969/8-07	M81969/14-03 (blue / white)	809846	M81969/8-08
	Protective		600667	600677								/			/		
	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
15-V4 15-E4	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								/			/		
	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
17-V6 17-E6	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								/			/		
	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)	/	/
21-V4 21-E4	Phase Neutral	6	600663	600673	6	13,61	7,3	8,1	809947 + 809908 (hex crimp) or M22520/23-01 + M22520/23-03	809697 (pin) 809690 (socket)	/	/	/	/	/	/	809696
	Protective		600664	600674													
	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)	/	/
23-V4 23-E4	Phase Neutral	4	612514	612516	4	21.2			M22520/23-01	M22520/23-04	/	/	/	/	/	809943	/
	Protective		612513	612515													
	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)	/	/
25-V6 25-E6	Phase Neutral	6	600663	600673	6	13,61	7,3	8,1	809947 + 809908 (hex crimp) or M22520/23-01 + M22520/23-03	809697 (pin) 809690 (socket)	/	/	/	/	/	/	809696
	Protective		600664	600674													

CRIMPING TOOLS

MANUAL CRIMPING PLIERS
M22520/1-01

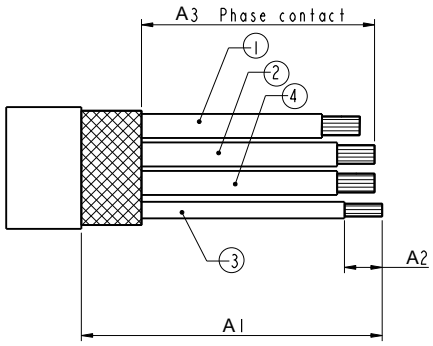
HYDRAULIC PLIERS
809947

PNEUMATIC PLIERS
M22520/23-01

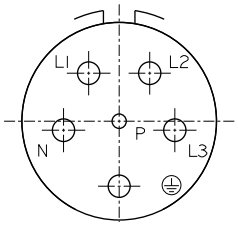
All dimensions are given for information only and are in mm, except as otherwise specified | *in mm: 1mm=0.03937 inch

POWERSAFE / VG96944 - WIRE STRIP LENGTH

1. Conductor L (L1, L2 & L3)
2. Conductor N
3. Pilot conductor P
4. Protective conductor



Layout example
17-V6 / 17-E6



Size	Contact type	A1	A2	A3 (for shielding braid)
13	Protective contact	53 - 63	6 - 6.5	42 MAX
	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)	60 - 70	6 - 6.5	
23	Protective contact	55 - 65	14 - 15.5	
	Phase contacts (N, L1, L2 & L3)			
	Pilot contact (P)	60 - 70	6 - 6.5	
25	Protective contact	55 - 65	14 - 15.5	
	Phase contacts (N, L1, L2 & L3)			
	Pilot contact (P)	60 - 70	6 - 6.5	

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 E inserts	Associated materials and platings for V inserts
06	Straight plug	+175°C*	W, ZN, ZR, TZ	W, ZN, ZR, TZ, F, K, S, B
S06		+200° C	F, K, S, B	-
P00	Square flange receptacle	+175°C*	W, ZN, ZR, TZ	W, ZN, ZR, TZ, F, K, S, B
PS00		+200° C	F, K, S, B	-
07	Jam nut receptacle	+175°C*	W, ZN, ZR, TZ	W, ZN, ZR, TZ, F, K, S, B
S07		+200° C	F, K, S, B	-

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	Aluminum	Olive drab cadmium
F		Nickel ✓
ZN		Black zinc nickel ✓
ZR		Black zinc nickel without Chromium 6+ ✓
TZ		Tin Zinc ✓
B	Marine bronze ✓	-
K	Stainless steel	Passivated ✓
S		Nickel ✓

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	Aluminum	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.	6.
Series	**Backshell style**	**Backshell size**	**Cabling chamber length**	**Rear side diameter**	**Material and platings**	**Deviation**
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

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 ✓
076		Tin Zinc ✓
033K		Black zinc nickel ✓
Blank	Marine Bronze ✓	-

6. Deviation

F479	Mandatory fo Tin Zinc plated backshells in addition to TZ

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 **Power**Safe

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

F579	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 **Power**Safe

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

NOTES

ABOUT AMPHENOL

Founded in 1932, **Amphenol** is one of the largest manufacturers of interconnect products in the world. The company designs, manufactures, and markets electrical, electronic, and fiber optic connectors, interconnect systems, and coaxial and specialty cables.

Amphenol has a diversified presence as a leader in high growth areas of the interconnect industry and provides solutions for customers in the automotive, broadband, industrial, information technology and data communications, military and aerospace, mobile devices, and mobile networks markets.

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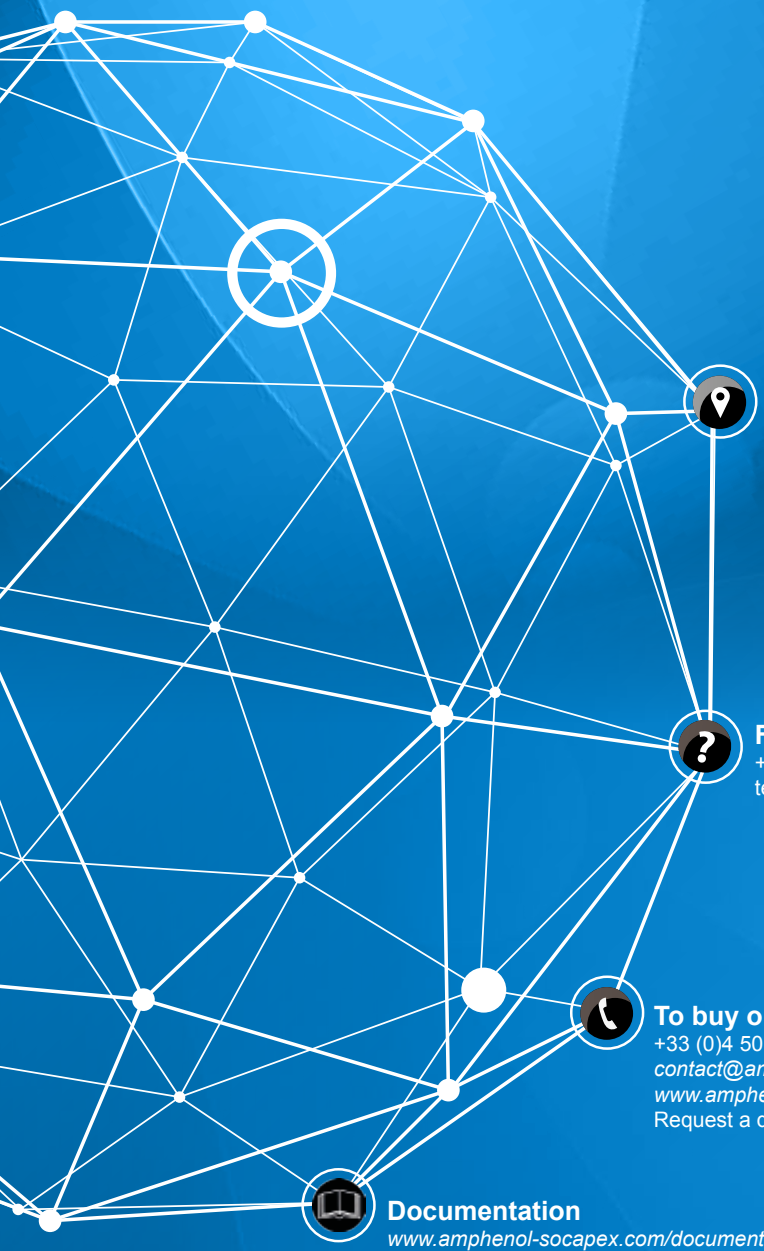

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