

Amphenol MIL-DTL-22992, Class 'L'



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MIL-DTL-22992, Class L Connector Typical Markets:

- Power Generators / Air Conditioning Units
- Ground Missile Systems
- Military Shelters / Military Communication Centers
- Medical Units



38999

- III
- HD
- Dualok
- II
- I
- SJT
- Accessories
- Aquacon
- Herm/Seal
- PCB

HIGH SPEED

- Fiber Optics
- Contacts
- Connectors
- Cables

EMI Filter
Transient

26482
Matrix 2

83723 III
Matrix | Pyle

26500
Pyle

5015
Crimp Rear
Release
Matrix

22992
Class L

Back-
Shells

Options
Others

Product Features, Benefits and Specifications

- High Current Capacity
- Rugged Construction
- Safety
- Serviceability



Class L Plug and Receptacle

Amphenol meets the demands for heavy duty & heavy power connectors with features that are critical to reliable interconnection in rugged environmental conditions. Heavy Duty Class L* connectors are highly suitable for industrial or military applications.

- Heavy electrical loads: current range from 40 to 200 amperes
- Direct current or single/three phase, 60/400 Hertz alternating current
- Automatic grounding for safety
- Meet MIL-DTL-22992 qualification
- Resistance to the operating environments of heat, moisture, vibration, high impact and immersion - see chart below.
- Double stub coupling threads for faster connections; no cross threading, easy cleaning
- Left hand accessory threads to minimize cable twisting, wire breakage, accidental connector disassembly
- Gaskets or "O" rings at appropriate surfaces for perfect weather tight connections



Class L Connectors on a Power Unit

Amphenol Heavy Duty Class L connectors have been exposed to the following environmental conditions, without compromise of mechanical integrity or degradation of electrical performance.

| Condition | Configuration | Description | Reference |
|--|-------------------|---|---|
| Thermal Shock | Unmated | Five complete on hour temperature cycles of -55°C to +125°C | MIL-STD-1344, method 1003, test condition A |
| Moisture Resistance (Cable mounted connectors) | Mated | Ten complete 24 hour cycles of +25°C to +65°C temperature at 90% to 98% humidity | MIL-STD-202, method 106 |
| Durability | Mated | 500 complete mating/unmating cycles | MIL-DTL-22992 |
| Salt Spray (Corrosion) | Unmated | 48 hour exposure to atomized 5% saline solution at +35°C | MIL-STD-1344, method 1001 |
| Vibration | Mated | 10 to 55 Hz, .06 inch total excursion in 1 minute cycles for 6 hours, 55 to 2000 Hz, 10G peak amplitude sweep | MIL-STD-1344, method 2005 |
| High Impact | Mated | Nine hammer blows from 1, 3 and 5 feet, three each in three axes on mounting panel | MIL-STD-202, method 207 |
| Heat Rise (Class L only) | Mated | Maximum rated DC current for four hours at +25°C in still air | MIL-DTL-22992 |
| Fluid Immersion | Unmated | 20 hours immersion in hydraulic fluid and lubricating oil | MIL-DTL-22992 |
| Water Immersion | Mated and Unmated | 4 hours immersion at 1 atmosphere pressure differential | MIL-DTL-22992 |

Amphenol also supplies other series of heavy duty cylindrical connectors:

- QWLD Series - Military MIL-DTL-22992 qualified connectors and industrial equivalents.
- QWL Series - A more compact heavy duty design for industrial power and control applications.
- Star-Line, Star-Line EX Series - Industrial high power circulars.

See the Options/Others section of this catalog for more information on these series.

* Amphenol Class L design is covered by one or more of the following U.S. Patent Numbers: 3,023,396, 3,221,292

Shell Styles



The Amphenol Class “L” heavy duty connectors are the largest size cylindricals. They are available only in the specific configurations prescribed by MIL-DTL-22992 for either military or industrial applications. This rigid configuration control assures correct interconnection of electrical circuits for maximum safety and reliability. Controlled parameters include:

- **Connector shell style and contact type** - Wall mount and cable connecting receptacles are supplied with socket contacts only, and always lead from the power source. Plugs (with coupling rings) have pin contacts only, and always lead to the equipment end.
- **Shell size** - The direct relationship of shell size to current carrying capability reduces the possibility of inadequate wiring for heavy electrical loads†.

| Shell Size | Current Rating (Amperes) | Contact Size |
|------------|--------------------------|--------------|
| 28 | 40 | 6 |
| 32 | 60 | 4 |
| 44 | 100 | 1/0 |
| 52 | 200 | 4/0 |

- **Keyway Position** - Four positions of the main keyway are used to discriminate between the following power sources:
two wire D.C.
two wire single phase A.C.
three wire single phase A.C.
four wire three phase A.C.
- **Insert rotation** - When carrying alternating current (A.C.), different angular rotations of the insert within the connector shell are used to distinguish between 60 Hertz and 400 Hertz circuits.

Design features of Amphenol Class L provide:

- **Greatest Capacity** - Current ranges 40 to 200 amps, conductor sizes 6 to 4/0.
- **Safety** - Complete protection of personnel and equipment if connectors are inadvertently disconnected under load.
- **Foolproof Mating** - Design incorporates voltage, current, frequency, phase and grounding requirements
- **Standardization** - MIL-DTL-22992 Class L insert arrangements specify connector/cable combinations for maximum reliability.
- **Serviceable Contacts** - Contacts are normally crimped to the cable before connector assembly. No insertion tools required. Bushings are available to adapt smaller diameter wires to larger contacts.
- **Arc Quenching Design** - Recessed socket contacts within the insert create an arc suppressing chamber which protects the user when connectors are separated under load.
- **Programmed Coupling Sequence** - Grounding and neutral contacts engage before power contacts.
- **Waterproof Design** - A unique combination of grommets and seals provides waterproofing in any condition - mated or unmated, capped or uncapped.
- **Rugged Construction** - Machined from high strength aluminum. Straight-line attachment of accessories eliminates possibility of cable twisting or misalignment.
- **Accessories** - Supplied with all Class L connectors as indicated on the individual connector descriptions. Replacement accessories may be ordered separately. See pages 472 and 473.

38999

| |
|-------------|
| III |
| HD |
| Dualok |
| II |
| I |
| SJT |
| Accessories |
| Aquacon |
| Herm/Seal |
| PCB |

| |
|--------------|
| HIGH SPEED |
| Fiber Optics |
| Contacts |
| Connectors |
| Cables |

EMI Filter
Transient

26482
Matrix 2

83723 III
Matrix | Pyle

26500
Pyle

5015
Crimp Rear
Release
Matrix

22992
Class L

Back-
Shells

Options
Others

38999

- III
- HD
- Dualok
- II
- I
- SJT
- Accessories
- Aquacon
- Herm/Seal
- PCB

HIGH SPEED

- Fiber Optics
- Contacts
- Connectors
- Cables

EMI Filter Transient

26482 Matrix 2

83723 III Matrix | Pyle

26500 Pyle

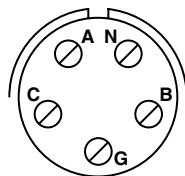
5015 Crimp Rear Release Matrix

22992 Class L

Back-Shells

Options Others

Shell Size 28, 40 amp rating



28-12, 28-13
Three phase AC, 4 wire, grounding

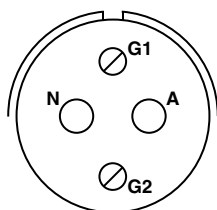
Cable:

| | |
|-------|--|
| 28-12 | IPCEA, type G, round, four #8 conductors |
| 28-13 | CO-04 HDF, (4-6-4/12R) 1090 per MIL-DTL-3432 |

Contacts:

| Position | Size | Pin M39029/48 | Socket M39029/49 |
|----------|------|---------------|------------------|
| A, B, C | 6 | -317 | -329 |
| N, G | 6N | -318 | -329 |

Shell Size 32, 60 amp rating



32-04, 32-05
Single phase AC, 2 wire, grounding

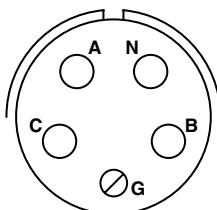
Cable:

| | |
|-------|---|
| 32-04 | IPCEA, type G, round, two #6 conductors |
| 32-05 | CO-02 HDF, (2/4-2/8R) 1100 per MIL-DTL-3432 |

Contacts:

| Position | Size | Pin M39029/48 | Socket M39029/49 |
|----------|------|---------------|------------------|
| A | 4 | -320 | -331 |
| N | 4N | -321 | -331 |
| G1, G2 | 6N | -318 | -329 |

Shell Size 32, 60 amp rating



32-12, 32-13
Three phase AC, 4 wire, grounding

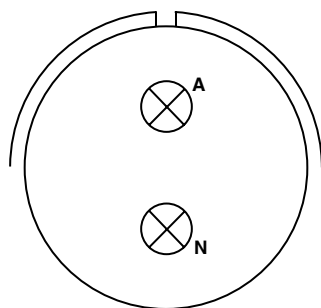
Cable:

| | |
|-------|--|
| 32-12 | IPCEA, type G, round, four #6 conductors |
| 32-13 | CO-04 HDF, (4/4-4/12R) 1290 per MIL-DTL-3432 |

Contacts:

| Position | Size | Pin M39029/48 | Socket M39029/49 |
|----------|------|---------------|------------------|
| A, B, C | 4 | -320 | -331 |
| N | 4N | -321 | -331 |
| G | 6N | -318 | -329 |

Shell Size 44, 100 amp rating



44-02, 44-03
28 Volts DC, 2 wire

Cable:

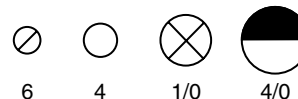
| | |
|-------|---|
| 44-02 | IPCEA, type W, round, two #2 conductors |
| 44-03 | CO-02 HDF, (2/1) 1385 per MIL-DTL-3432 |

Contacts:

| Position | Size | Pin M39029/48 | Socket M39029/49 |
|----------|--------|---------------|------------------|
| A | 1/0-1 | -323 | -333 |
| N | 1/0N-1 | -324 | -333 |

IPCEA – Insulated Power Cable Engineers Association

Contact Legend



38999

- III
- HD
- Dualok
- II
- I
- SJT
- Accessories
- Aquacon
- Herm/Seal
- PCB

- HIGH SPEED
- Fiber Optics
- Contacts
- Connectors
- Cables

- EMI Filter
- Transient
- 26482 Matrix 2
- 83723 III Matrix | Pyle
- 26500 Pyle

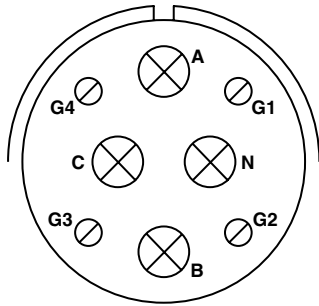
- 5015 Crimp Rear Release Matrix

22992
Class L

Back-Shell's

Options
Others

Shell Size 44, 100 amp rating



44-12, 44-13
Three phase AC, 4 wire, grounding

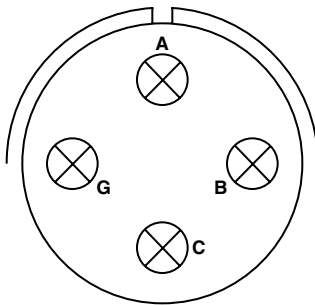
Cable:

| | |
|-------|---|
| 44-12 | IPCEA, type G, round, four #2 conductors |
| 44-13 | CO-04 HDF, (4/1-4/8R) 1620 per MIL-DTL-3432 |

Contacts:

| Position | Size | Pin M39029/48 | Socket M39029/49 |
|----------------|--------|---------------|------------------|
| A, B, C | 1/0-1 | -323 | -333 |
| N | 1/0N-1 | -324 | -333 |
| G1, G2, G3, G4 | 6G | -319 | -330 |

Shell Size 44, 100 amp rating For Navy Ground Support Equipment use only.



44-50, 44-51, 44-52, 44-56
Three phase AC, 3 wire, grounding

| | |
|-------|---|
| 44-50 | Available in MS90555 & MS90558 only 4 each #1 conductors |
|-------|---|

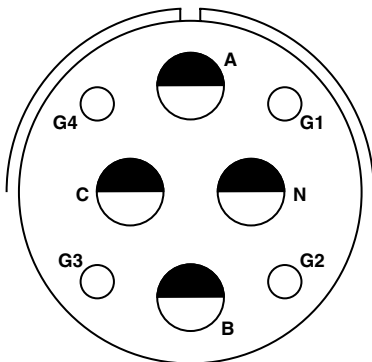
Cable:

| | |
|-------|---|
| 44-51 | Available in MS90556 & MS90557 only IPCEA, type W, round, four #1 conductors |
| 44-52 | Available in MS90556 only IPCEA, type W, round, four #2 conductors |
| 44-56 | Available in MS90556 only IPCEA, type W, round, four #6 conductors |

Contacts:

| Position | Size | Pin M39029/48 | Socket M39029/49 |
|----------|--------|---------------|------------------|
| A, B, C | 1/0-1 | -323 | -333 |
| G | 1/0N-1 | -324 | -333 |

Shell Size 52, 200 amp rating



52-12, 52-13
Three phase AC, 4 wire, grounding

Cable:

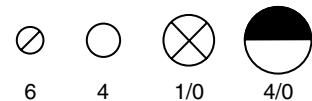
| | |
|-------|--|
| 52-12 | IPCEA, type G, round, four #4/0 conductors |
| 52-13 | CO-04 HDE, (4/0000-4/4R) 2380 per MIL-DTL-3432 |

Contacts:

| Position | Size | Pin M39029/48 | Socket M39029/49 |
|----------------|------|---------------|------------------|
| A, B, C | 4/0 | -327 | -335 |
| N | 4/0N | -328 | -335 |
| G1, G2, G3, G4 | 4G | -322 | -332 |

IPCEA – Insulated Power Cable Engineers Association

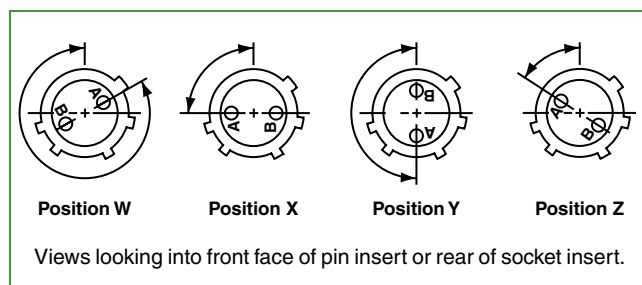
Contact Legend



Alternate Insert Rotations

To avoid cross-plugging problems in applications requiring the use of more than one connector of the same size and arrangement, alternate insert rotations are available. As shown in the diagrams below, position W, X, Y and Z are possible rotations of the insert within Class L connectors. The front face of the pin insert is rotated within the shell in a clockwise direction from the normal shell key. The socket insert would be rotated counter-clockwise the same number of degrees in respect to the normal shell key.

See how to order on next page; the keying position letter W, X, Y or Z goes at the end of the part number.



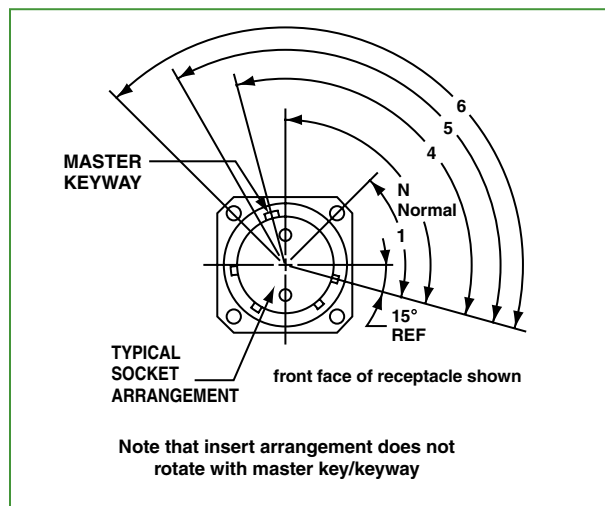
Class L Insert Rotations

| Insert Arrangements | Keying Position (degrees from normal position) | | | | |
|---------------------|--|--------|----|-----|----|
| | DC or 60 Hz Normal | 400 Hz | | | |
| | | W | X | Y | Z |
| 28-12 | 0 | - | - | 180 | - |
| 28-13 | 0 | - | - | 180 | - |
| 32-04 | 0 | - | 90 | - | - |
| 32-05 | 0 | - | 90 | - | - |
| 32-12 | 0 | - | - | 180 | - |
| 32-13 | 0 | - | - | 180 | - |
| 44-12 | 0 | - | - | - | 60 |
| 44-13 | 0 | - | - | - | 60 |
| 44-50 | 0 | - | - | - | - |
| 44-51 | 0 | - | - | - | - |
| 44-52 | 0 | - | - | - | - |
| 44-56 | 0 | - | - | - | - |
| 52-12 | 0 | 300 | - | - | - |
| 52-13 | 0 | 300 | - | - | - |

Alternate Master Key/Keyway Rotations

Another option for preventing cross-mating of incompatible connector voltages is to choose an alternate rotation of the key/keyway positions of the connector shell. The diagram below shows positions 1, 4, 5 and 6 for the master key/keyway.

See how to order on next page; the alternate master key/keyway position is Step 4 in building a part number.



38999

III

HD

Dualok

II

I

SJT

Accessories

Aquacon

Herm/Seal

PCB

HIGH SPEED

Fiber Optics

Contacts Connectors Cables

EMI Filter Transient

26482 Matrix 2

83723 III Matrix | Pyle

26500 Pyle

5015 Crimp Rear Release Matrix

22992 Class L

Back-Shells

Options Others

Easy Steps to build a part number... Class L Series

| 1. | 2. | 3. | 4. | 5. | 6. | 7. |
|-------------------|--------------|------------|--------------------------------------|--------------------|--------------|---------------------------|
| MS Number | Shell Finish | Shell Size | Alternate Master Key/Keyway Position | Insert Arrangement | Contact Type | Alternate Insert Rotation |
| MS90555 | C | 32 | 4 | 12 | S | Y |
| Commercial Number | Shell Finish | Shell Size | Alternate Master Key/Keyway Position | Insert Arrangement | Contact Type | Alternate Insert Rotation |
| CL90555* | C | 32 | 4 | 12 | S | Y |

Step 1. Select a MS Number

Step 1. Select a Commercial Number

| | Designates |
|---------|--|
| MS90555 | Wall Mount Receptacle (Power Source) |
| MS90556 | Straight Plug |
| MS90557 | Cable Connecting Receptacle without Coupling Ring |
| MS90558 | Wall Mount Plug with Coupling Ring (Equipment End) |

| | Designates |
|---------|--|
| CL90555 | Wall Mount Receptacle (Power Source) |
| CL90556 | Straight Plug |
| CL90557 | Cable Connecting Receptacle without Coupling Ring |
| CL90558 | Wall Mount Plug with Coupling Ring (Equipment End) |

Step 2. Select a Shell Finish

| | Designates |
|---|--------------------------------|
| C | Conductive for AC circuits |
| N | Non-conductive for DC circuits |

Grounding Assemblies: Finish C

| Shell Size | Current Rating Amps | Shell Master Key/Keyway Position | | | | | | |
|------------|---------------------|----------------------------------|----------|-------------|-------------|-------------|-------------|-------------|
| | | 60Hz & 400 Hz | | | | | | |
| | | 1 Phase | | | 3 Phase | | | |
| | | 2 Wire | | 3 Wire | 3 Wire | 4 Wire | | |
| | | 120 VAC | 240 VAC | 120/240 VAC | 450/480 VAC | 120/208 VAC | 240/416 VAC | 277/480 VAC |
| 28 | 40 | 4 (120°) | 5 (135°) | 4 (120°) | – | 4 (120°) | 5 (135°) | 6 (150°) |
| 32 | 60 | 4 (120°) | 5 (135°) | 4 (120°) | – | 4 (120°) | 5 (135°) | 6 (150°) |
| 44 | 100 | 4 (120°) | – | 4 (120°) | 1 (60°) | 4 (120°) | 5 (135°) | 6 (150°) |
| 52 | 200 | – | – | 4 (120°) | – | 4 (120°) | 5 (135°) | 6 (150°) |

Non-grounding Assemblies: Finish N

| Shell Size | Current Rating Amps | Shell Master Key/Keyway Position |
|------------|---------------------|----------------------------------|
| | | DC |
| | | 2 Wire |
| | | 28 VDC |
| 28 | 40 | N (105°) |
| 32 | 60 | N (105°) |
| 44 | 100 | N (105°) |
| 52 | 200 | N (105°) |

Step 3. Select a Shell Size - (related directly to current carrying capability)

| | Designates Current Carrying Capability |
|----|--|
| 28 | 40 amperes |
| 32 | 60 amperes |
| 44 | 100 amperes |
| 52 | 200 amperes |

Step 4. Select an Alternate Master Key/Keyway Position if needed
N designates normal position. Positions 1, 4, 5 and 6 of the master key/keyway prevent cross-mating of incompatible voltages. See diagram on page 466.

Step 5. Select an Insert Arrangement

See pages 464-465 for available insert arrangements for Class L connectors. Insert arrangements are determined by connector size (current carrying capability) and cable configuration to be accommodated.

Step 6. Select a Contact Type

| | Designates |
|---|-----------------|
| P | Pin Contacts |
| S | Socket Contacts |

MS90555/CL90555 and MS90557/CL90557 are supplied with socket contacts only. MS90556 /CL90556 and MS90558/CL90558 are supplied with pin contacts only.

*Commercial Numbers are supplied less protection caps and strain reliefs which can be added separately.

Step 7. Select an Alternate Insert Rotation if needed
Used to prevent cross-mating of incompatible frequencies. Absence of a letter in this space indicates Normal (0°) position of the insert. Refer to page 466.

38999

| |
|-------------|
| III |
| HD |
| Dualok |
| II |
| I |
| SJT |
| Accessories |
| Aquacon |
| Herm/Seal |
| PCB |

| |
|----------------------------|
| HIGH SPEED |
| Fiber Optics |
| Contacts Connectors Cables |

| |
|-------------------------|
| EMI Filter Transient |
| 26482 Matrix 2 |
| 83723 III Matrix Pyle |

26500 Pyle

5015 Crimp Rear Release Matrix

22992 Class L

Back-Shell's

Options Others

38999

III
HD
Dualok
II
I
SJT
Accessories
Aquacon
Herm/Seal
PCB

HIGH SPEED
Fiber Optics
Contacts
Connectors
Cables

EMI Filter
Transient

26482
Matrix 2

83723 III
Matrix | Pyle

26500
Pyle

5015
Crimp Rear
Release
Matrix

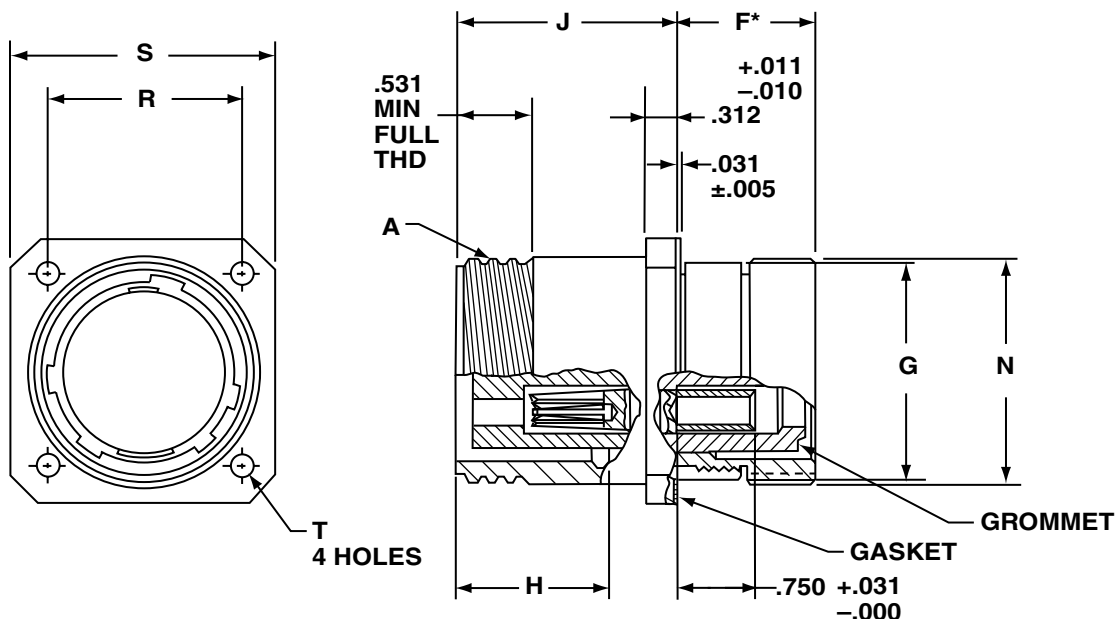
22992
Class L

Back-
Shells

Options
Others

PART # To complete, see how to order page 467.

| Part Number | Shell Finish | Shell Size | Master Key/Keyway Position | Insert Arrangement | Contact Type | Alternate Insert Rotation |
|-------------|--------------|------------|----------------------------|--------------------|--------------|---------------------------|
| MS90555 | C or N | XX | X | XX | P or S | X |
| CL90555** | C or N | XX | X | XX | P or S | X |



| Shell Size | A Thread Class 2A .1428P-.2857L Double Stub | F* ±.031 | G Dia. +.006 - .010 | H ±.005 | J +.016 - .000 | N Dia. +.011 - .020 | R (BSC) | S +.021 - .020 | T Dia. ±.005 |
|------------|---|----------|---------------------|---------|----------------|---------------------|---------|----------------|--------------|
| 28 | 2.000 | 1.376 | 1.938 | 1.514 | 2.188 | 2.000 | 1.844 | 2.375 | .177 |
| 32 | 2.250 | 1.376 | 2.188 | 1.514 | 2.188 | 2.250 | 2.062 | 2.625 | .209 |
| 44 | 3.000 | 1.438 | 3.062 | 1.733 | 2.532 | 3.125 | 2.812 | 3.375 | .281 |
| 52 | 3.500 | 1.438 | 3.562 | 1.733 | 2.532 | 3.625 | 3.156 | 3.875 | .281 |

All dimensions for reference only.

Protective cover MS90563 is supplied as part of this connector assembly. Refer to page 473 for dimensions.

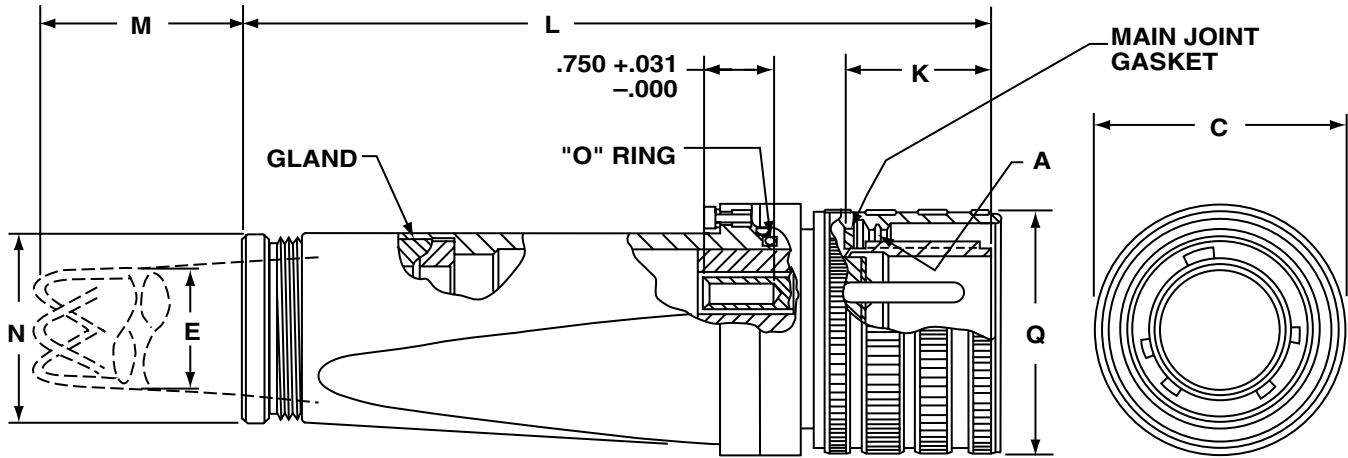
*F dimension applies only when rear nut is fully tightened.

**Commercial Numbers are supplied less protection caps and strain reliefs which can be added separately.

MS (CL) 90556, MIL-DTL-22992, Class L Straight Plug

PART # To complete, see how to order page 467.

| Part Number | Shell Finish | Shell Size | Master Key/Keyway Position | Insert Arrangement | Contact Type | Alternate Insert Rotation |
|-------------|--------------|------------|----------------------------|--------------------|--------------|---------------------------|
| MS90556 | C or N | XX | X | XX | P or S | X |
| CL90556* | C or N | XX | X | XX | P or S | X |



| Shell Size and Arrangement | A Thread Class 2A .1428P-.2857L Double Stub | C Dia. Max. | E Cable Range | K ±.005 | L Max. Free Length | M Approx. Free Length | N Dia. +.011 / -.020 | Q Dia. Max. |
|----------------------------|---|-------------|---------------|---------|--------------------|-----------------------|----------------------|-------------|
| 28-12 | 2.000 | 2.439 | 1.047-.922 | 1.557 | 8.188 | 7.188 | 2.000 | 2.312 |
| 28-13 | | | 1.130-1.005 | | | 7.188 | | |
| 32-04 | 2.250 | 2.689 | .969-.844 | 1.557 | 8.188 | 7.188 | 2.000 | 2.562 |
| 32-05, 32-12 | | | 1.130-1.005 | | | 7.188 | | |
| 32-13 | 3.000 | 3.667 | 1.342-1.217 | 1.776 | 10.172 | 8.688 | 2.500 | 3.531 |
| 44-02 | | | 1.312-1.187 | | | 10.688 | | |
| 44-03 | | | 1.438-1.313 | | | 9.688 | | |
| 44-12 | | | 1.516-1.391 | | | 10.688 | | |
| 44-13 | 3.000 | 3.667 | 1.672-1.547 | 1.776 | 10.172 | 12.688 | 2.500 | 3.531 |
| 44-51 | | | 1.734-1.609 | | | 11.688 | | |
| 44-52 | 3.000 | 3.667 | 1.525-1.435 | 1.776 | 10.172 | 11.188 | 2.500 | 3.531 |
| 44-56 | | | 1.135-1.065 | | | 7.188 | | |
| 52-12 | 3.500 | 4.167 | 2.328-2.183 | 1.776 | 11.109 | 17.188 | 3.250 | 4.016 |
| 52-13 | | | 2.453-2.308 | | | 18.188 | | |

All dimensions for reference only.

Protective cover MS90564 is supplied as part of this connector assembly. Refer to page 473 for dimensions.

Contact bushings MS3348 are supplied as part of connector as required. Refer to page 472 for dimensions.

*Commercial Numbers are supplied less protection caps and strain reliefs which can be added separately.

38999

III

HD

Dualok

II

I

SJT

Accessories

Aquacon

Herm/Seal

PCB

HIGH SPEED

Fiber Optics

Contacts
Connectors
Cables

EMI Filter
Transient

26482
Matrix 2

83723 III
Matrix | Pyle

26500
Pyle

5015
Crmp Rear
Release
Matrix

22992
Class 1

Back-
Shells

Options
Others

38999

- III
- HD
- Dualok
- II
- I
- SJT
- Accessories
- Aquacon
- Herm/Seal
- PCB

- HIGH SPEED
- Fiber Optics
- Contacts
- Connectors
- Cables

EMI Filter
Transient

26482
Matrix 2

83723 III
Matrix | Pyle

26500
Pyle

5015
Crimp Rear Release
Matrix

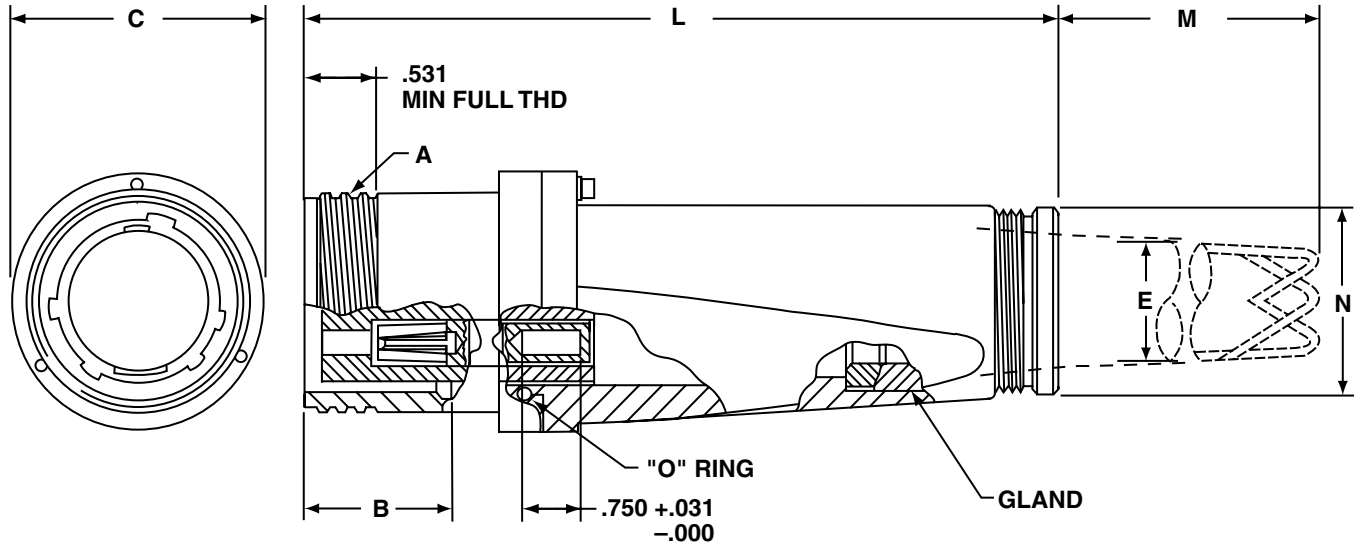
22992
Class L

Back-
Shells

Options
Others

PART # To complete, see how to order page 467.

| Part Number | Shell Finish | Shell Size | Master Key/Keyway Position | Insert Arrangement | Contact Type | Alternate Insert Rotation |
|-------------|--------------|------------|----------------------------|--------------------|--------------|---------------------------|
| MS90557 | C or N | XX | X | XX | P or S | X |
| CL90557* | C or N | XX | X | XX | P or S | X |



| Shell Size and Arrangement | A Thread Class 2A .1428P-.2857L Double Stub | B ±.005 | C Dia. Max. | E Cable Range | L Max. Free Length | M Approx. Free Length | N Dia. +.011 -.020 |
|----------------------------|---|---------|-------------|---------------|--------------------|-----------------------|--------------------|
| 28-12 | 2.000 | 1.514 | 2.439 | 1.047-.922 | 8.156 | 7.188 | 2.000 |
| 28-13 | | | | 1.130-1.005 | | 7.188 | |
| 32-04 | 2.250 | 1.514 | 2.689 | .969-.844 | 8.156 | 7.188 | 2.000 |
| 32-05, 32-12 | | | | 1.130-1.005 | | 7.188 | |
| 32-13 | | | | 1.342-1.217 | | 8.688 | |
| 44-02 | 3.000 | 1.733 | 3.667 | 1.312-1.187 | 10.125 | 10.688 | 2.500 |
| 44-03 | | | | 1.438-1.313 | | 9.688 | |
| 44-12 | | | | 1.516-1.391 | | 10.688 | |
| 44-13 | | | | 1.672-1.547 | | 12.688 | |
| 44-51 | | | | 1.734-1.609 | | 11.688 | |
| 52-12 | 3.500 | 1.733 | 4.167 | 2.328-2.183 | 11.062 | 17.188 | 3.250 |
| 52-13 | | | | 2.453-2.308 | | 18.188 | |

All dimensions for reference only.

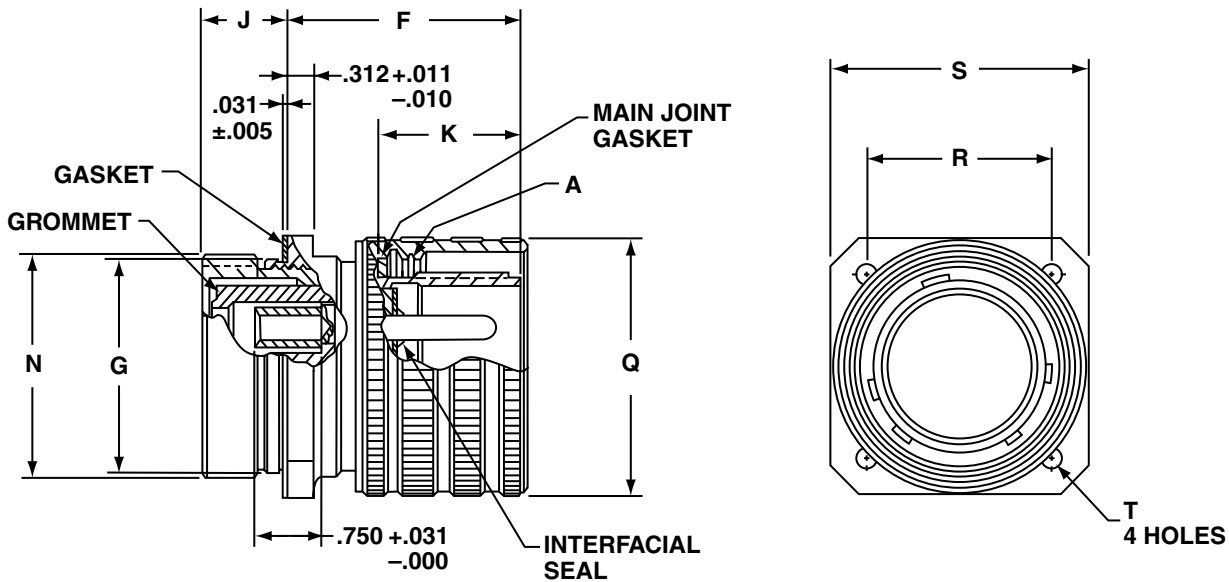
Protective cover MS90563 is supplied as part of this connector assembly. Refer to page 473 for dimensions. Contact bushings MS3348 are supplied as part of connector as required. Refer to page 472 for dimensions.

*Commercial Numbers are supplied less protection caps and strain reliefs which can be added separately.

MS (CL) 90558, MIL-DTL-22992, Class L Wall Mount Plug with Coupling Ring (equipment end)

PART # To complete, see how to order page 467.

| Part Number | Shell Finish | Shell Size | Master Key/Keyway Position | Insert Arrangement | Contact Type | Alternate Insert Rotation |
|-------------|--------------|------------|----------------------------|--------------------|--------------|---------------------------|
| MS90558 | C or N | XX | X | XX | P or S | X |
| CL90558** | C or N | XX | X | XX | P or S | X |



| Shell Size | A Thread Class 2A .1428P-.2857L Double Stub | F* +.016 -.000 | G Dia. +.006 -.010 | J ±.031 | K ±.005 | N Dia. +.011 -.020 | Q Dia. Max. | R (BSC) | S +.021 -.020 | T Dia. ±.005 |
|------------|--|----------------------|--------------------------|------------|------------|--------------------------|----------------|------------|---------------------|-----------------|
| 28 | 2.000 | 2.639 | 1.938 | .959 | 1.557 | 2.000 | 2.312 | 1.844 | 2.375 | .177 |
| 32 | 2.250 | 2.639 | 2.188 | .959 | 1.557 | 2.250 | 2.562 | 2.062 | 2.625 | .209 |
| 44 | 3.000 | 2.998 | 3.062 | 1.021 | 1.776 | 3.125 | 3.531 | 2.812 | 3.375 | .281 |
| 52 | 3.500 | 2.998 | 3.562 | 1.021 | 1.776 | 3.625 | 4.016 | 3.156 | 3.875 | .281 |

All dimensions for reference only.

Protective cover MS90564 is supplied as part of this connector assembly. Refer to page 473 for dimensions.

*F dimension applies only when rear nut is fully tightened.

**Commercial Numbers are supplied less protection caps and strain reliefs which can be added separately.

38999

III

HD

Dualok

II

I

SJT

Accessories

Aquacon

Herm/Seal

PCB

HIGH SPEED

Fiber Optics

Contacts
Connectors
Cables

EMI Filter
Transient

26482
Matrix 2

83723 III
Matrix | Pyle

26500
Pyle

5015
Crimp Rear
Release
Matrix

22992
Class L

Back-
Shells

Options
Others

38999

- III
- HD
- Dualok
- II
- I
- SJT
- Accessories
- Aquacon
- Herm/Seal
- PCB

HIGH SPEED

- Fiber Optics
- Contacts
- Connectors
- Cables

EMI Filter Transient

26482 Matrix 2

83723 III Matrix | Pyle

26500 Pyle

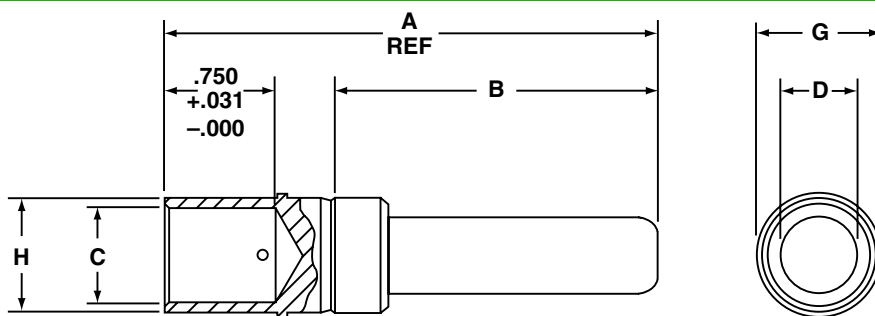
5015 Crimp Rear Release Matrix

22992 Class L

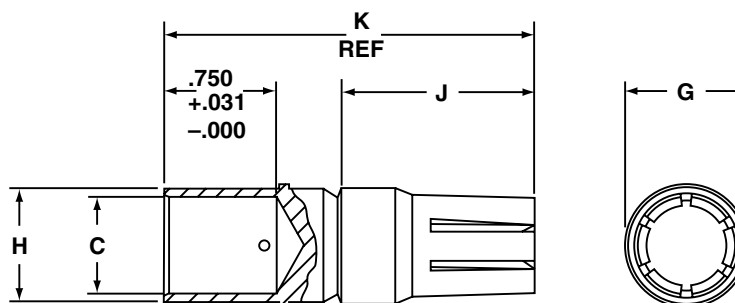
Back-Shells

Options Others

M39029/48 Pin Contact



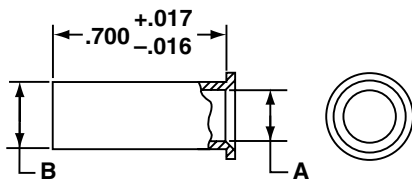
M39029/49 Socket Contact



Order Replacement Contacts by MS part number listed below for either Socket or Pin:

| Socket MS Part Number | Pin MS Part Number | Contact Size | Wire Well Size | A Ref. | B ±.005 | C Dia. | D Dia. ±.001 | G Dia. | H Dia. | J ±.005 | K Ref. |
|-----------------------|--------------------|--------------|----------------|--------|---------|------------------------|--------------|------------|------------------------|---------|--------|
| M39029/49-335 | M39029/48-327 | 4/0 | 4/0 | 3.207 | 2.097 | .641 $+0.004$ -0.003 | .500 | .781 ±.003 | .750 $+0.004$ -0.003 | 1.283 | 2.393 |
| - | M39029/48-328 | 4/0N | 4/0 | 3.325 | 2.215 | .641 $+0.004$ -0.003 | .500 | .781 ±.003 | .750 $+0.004$ -0.003 | - | - |
| M39029/49-333 | M39029/48-323 | 1/0 | 1 | 3.207 | 2.097 | .406 $+0.004$ -0.003 | .357 | .609 ±.003 | .506 $+0.004$ -0.003 | 1.283 | 2.393 |
| - | M39029/48-324 | 1/0N | 1 | 3.325 | 2.215 | .406 $+0.004$ -0.003 | .357 | .609 ±.003 | .506 $+0.004$ -0.003 | - | - |
| M39029/49-331 | M39029/48-320 | 4 | 4 | 2.786 | 1.738 | .281 ±.002 | .225 | .417 ±.002 | .374 ±.002 | 1.158 | 2.206 |
| - | M39029/48-321 | 4N | 4 | 2.904 | 1.856 | .281 ±.002 | .225 | .417 ±.002 | .374 ±.002 | - | - |
| M39029/49-329 | M39029/48-317 | 6 | 6 | 2.786 | 1.738 | .234 ±.002 | .178 | .342 ±.002 | .312 ±.002 | 1.158 | 2.206 |
| - | M39029/48-318 | 6N | 6 | 2.904 | 1.856 | .234 ±.002 | .178 | .342 ±.002 | .312 ±.002 | - | - |
| M39029/49-332 | M39029/48-322 | 4G | 4 | 2.856 | 1.756 | .281 ±.002 | .225 | .417 ±.002 | .374 ±.002 | 1.752 | 2.862 |
| M39029/49-330 | M39029/48-319 | 6G | 6 | 2.856 | 1.746 | .234 ±.002 | .178 | .342 ±.002 | .312 ±.002 | 1.752 | 2.862 |

MS3348 Contact Bushing



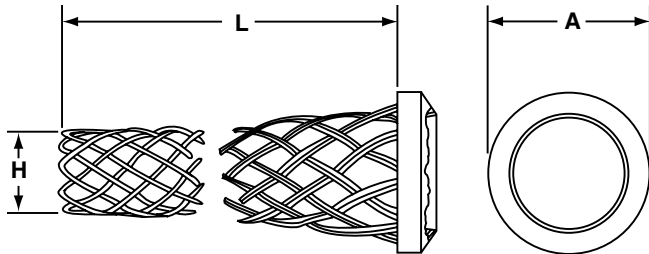
Order Contact Bushings by MS part number listed below:

| MS Part Number | Contact Wire Barrel Size (Ref) | Wire Size (Ref) | A Dia. $+0.010$ -0.003 | B Dia. $+0.002$ -0.003 |
|-----------------|--------------------------------|-----------------|--------------------------|--------------------------|
| MS3348-1-2L | 1 | 2 | .359 | .396 |
| MS3348-4-5L | 4 | 5 | .250 | .272 |
| MS3348-4-6L | 4 | 6 | .225 | .272 |
| MS3348-6-8L | 6 | 8 | .185 | .225 |
| MS3348-6-9L | 6 | 9 | .155 | .225 |
| MS3348-1-6L | 1 | 6 | .225 | .396 |
| MS3348-4-8L | 4 | 8 | .185 | .272 |
| MS3348-6-10L | 6 | 10 | .136 | .225 |
| MS3348-4/0-2/0L | 4/0 | 2/0 | .500 | .629 |

See page 476 and 477 for information on Contact Removal Tools for Class L connectors.

All dimensions for reference only.

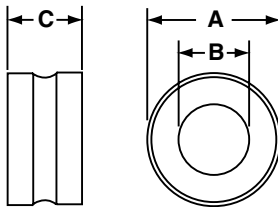
MS90561 Cable Strain Relief



Order Strain Reliefs by MS part number listed below:

| MS Part Number | Arrangement Number | A Dia. +.000 -0.010 | H Dia. Cable Range | | L Approx. |
|----------------|--------------------|---------------------|--------------------|-------|-----------|
| | | | Max. | Min. | |
| MS90561-2 | 28-13, 32-12 | 1.797 | 1.145 | 1.003 | 8.000 |
| MS90561-4 | 28-02, -28-04 | 1.797 | .844 | .688 | 7.500 |
| MS90561-12 | 28-12 | 1.797 | 1.047 | .891 | 8.000 |
| MS90561-13 | 32-13 | 1.797 | 1.342 | 1.185 | 9.500 |
| MS90561-15 | 44-12 | 2.235 | 1.516 | 1.360 | 11.500 |
| MS90561-16 | 44-13 | 2.235 | 1.688 | 1.531 | 13.500 |
| MS90561-17 | 52-12 | 2.922 | 2.328 | 2.039 | 18.000 |
| MS90561-18 | 52-13 | 2.922 | 2.500 | 2.211 | 19.000 |
| MS90561-19 | 44-51 | 2.235 | 1.750 | 1.550 | 12.500 |
| MS90561-20 | 44-52 | 2.235 | 1.578 | 1.375 | 12.000 |
| MS90561-21 | 44-56 | 2.235 | 1.160 | 1.010 | 8.000 |

MS23747 Cable Sealing Gland



Order Cable Sealing Glands by MS part number listed below:

| MS Part Number | Arrangement Number | A Dia. +.000 -0.020 | B Dia. +.020 -0.000 | C ±.010 | Min Cable Dia. Ref. |
|----------------|---------------------|---------------------|---------------------|---------|---------------------|
| MS23747-2 | 28-13, 32-05, 32-12 | 1.805 | 1.130 | 1.034 | 1.005 |
| MS23747-12 | 28-12 | 1.805 | 1.047 | 1.034 | .922 |
| MS23747-13 | 32-13 | 1.805 | 1.342 | 1.034 | 1.217 |
| MS23747-14 | 44-03 | 2.242 | 1.438 | 1.160 | 1.313 |
| MS23747-15 | 44-12 | 2.242 | 1.516 | 1.160 | 1.391 |
| MS23747-16 | 44-13 | 2.242 | 1.672 | 1.160 | 1.547 |
| MS23747-18 | 52-12 | 2.927 | 2.328 | 1.284 | 2.183 |
| MS23747-19 | 52-13 | 2.927 | 2.453 | 1.284 | 2.308 |
| MS23747-20 | 44-51 | 2.242 | 1.734 | 1.160 | 1.609 |
| MS23747-21 | 44-52 | 2.242 | 1.562 | 1.160 | 1.437 |
| MS23747-22 | 44-56 | 2.242 | 1.150 | 1.160 | 1.025 |

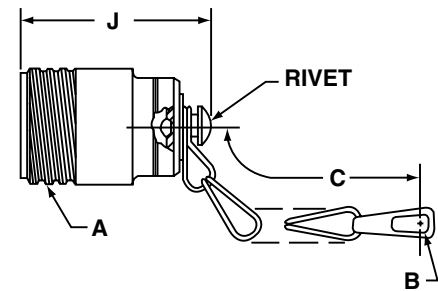
Protection Caps

Order Protection Caps by MS part number listed in charts below. To complete the MS part number add letter C (Conductive) for AC or N (Non-Conductive) for DC connector assemblies.

All dimensions for reference only.

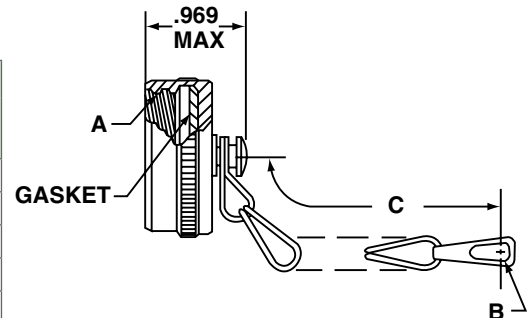
MS90563 Protection Caps used with MS90555 Wall Mount Receptacle, MS90557 Cable Connecting Receptacle

| MS Part Number | Use with Shell Size | A Thread Class 2B .1428P-.2857L Double Stub | B Dia. Ref. | | C Approx. |
|----------------|---------------------|---|-------------|-------------|-----------|
| | | | For MS90555 | For MS90557 | |
| MS90563-1() | 28 | 2.000 | .177 | .177 | 6.000 |
| MS90563-3() | 32 | 2.250 | .209 | - | 4.500 |
| MS90563-4() | 32 | 2.250 | - | .177 | 6.000 |
| MS90563-7() | 44 | 3.000 | .281 | .281 | 7.500 |
| MS90563-11() | 52 | 3.500 | .281 | .281 | 7.500 |



MS90564 Protection Caps used with MS90556 Straight Plug, MS90558 Wall Mount Plug

| MS Part Number | Use with Shell Size | A Thread Class 2B .1428P-.2857L Double Stub | B Dia. Ref. | | C Approx. | J Max. |
|----------------|---------------------|---|-------------|-------------|-----------|--------|
| | | | For MS90556 | For MS90558 | | |
| MS90564-1() | 28 | 2.000 | .177 | .177 | 7.500 | 2.266 |
| MS90564-3() | 32 | 2.250 | - | .209 | 6.000 | 2.266 |
| MS90564-4() | 32 | 2.250 | .177 | - | 7.500 | 2.266 |
| MS90564-7() | 44 | 3.000 | .281 | .281 | 8.500 | 2.484 |
| MS90564-11() | 52 | 3.500 | .281 | .281 | 8.500 | 2.484 |



38999

- III
- HD
- Dualok
- II
- I
- SJT
- Accessories
- Aquacon
- Herm/Seal
- PCB

HIGH SPEED

- Fiber Optics
- Contacts
- Connectors
- Cables

EMI Filter
Transient

26482
Matrix 2

83723 III
Matrix | Pyle

26500
Pyle

5015
Crimp Rear Release Matrix

22992
Class 1

Back-Shell's

Options
Others

38999

Complete installation instructions (L-1014) for Class L connectors are available online at www.amphenol-aerospace.com

The following pages are condensed assembly instructions to familiarize the user with the installation procedure and tooling required.

Cable Preparation

(MS90556 and MS90557 connectors only)

The following table shows the standard wire color coding, generator terminal markings, and connector contact identification used with Class L connectors.

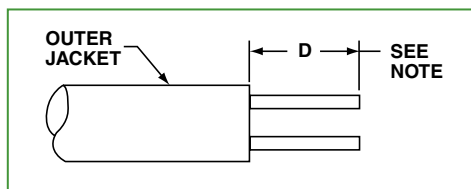
Standardized Generator Wiring and Connections

| Generator Terminal Marking | Current | Contact Designation | Conductor Circuit | Wire Color |
|----------------------------|---------|---------------------|-------------------|---------------------------------|
| + (POS) | 28Vdc | A | Positive | Black |
| - (NEG) ground | 28Vdc | N | Negative | White |
| L ₁ | AC | A | Phase A | Black |
| L ₂ | AC | B | Phase B | Red |
| L ₃ | AC | C | Phase C | Blue (Commercial may be orange) |
| L ₀ | AC | N | Neutral | White |
| G (or Gnd) | AC | G | Safety grounding | Green (Commercial may be bare) |

Step 1) Determine cable lay to facilitate alignment of contacts and insert holes without wire crossing.

Step 2) Strip cable jacket to dimension shown. Avoid cutting or nicking individual conductor insulation.

| Connector Size | D Inches Approx. |
|----------------|------------------|
| 28 | 3.000 |
| 32 | 3.000 |
| 44 | 4.250 |
| 52 | 5.000 |



NOTE: Some insert arrangements require that two or more ground wires are terminated into one contact. Dimension D must therefore be increased to permit routing these wires around the larger conductors.

Step 3) Install connector components in the order shown in the applicable assembly view illustrated on pages 475 and 476.

Step 4) Strip insulation of individual conductors to 3/4 inch from end of connector.

III
HD
Dualok
II
I
SJT
Accessories
Aquacon
Herm/Seal
PCB

HIGH SPEED
Fiber Optics
Contacts
Connectors
Cables

EMI Filter
Transient

26482
Matrix 2

83723 III
Matrix | Pyle

26500
Pyle

5015
Crimp Rear
Release
Matrix

22992
Class L

Back-
Shells

Options
Others

38999

| |
|-------------|
| III |
| HD |
| Duallok |
| II |
| I |
| SJT |
| Accessories |
| Aquacon |
| Herm/Seal |
| PCB |

| |
|--------------|
| HIGH SPEED |
| Fiber Optics |
| Contacts |
| Connectors |
| Cables |

| |
|------------|
| EMI Filter |
| Transient |

| |
|----------|
| 26482 |
| Matrix 2 |

| |
|---------------|
| 83723 III |
| Matrix Pyle |

| |
|-------|
| 26500 |
| Pyle |

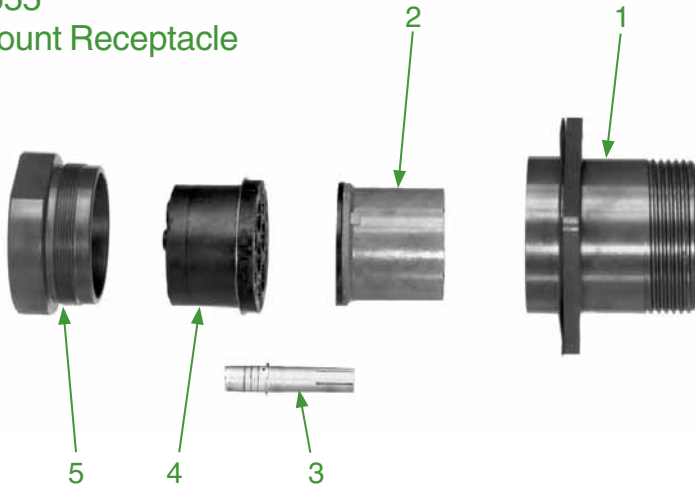
| |
|---------------------------|
| 5015 |
| Crimp Rear Release Matrix |

| |
|---------|
| 22992 |
| Class L |

| |
|--------------|
| Back-Shell's |
|--------------|

| |
|---------|
| Options |
| Others |

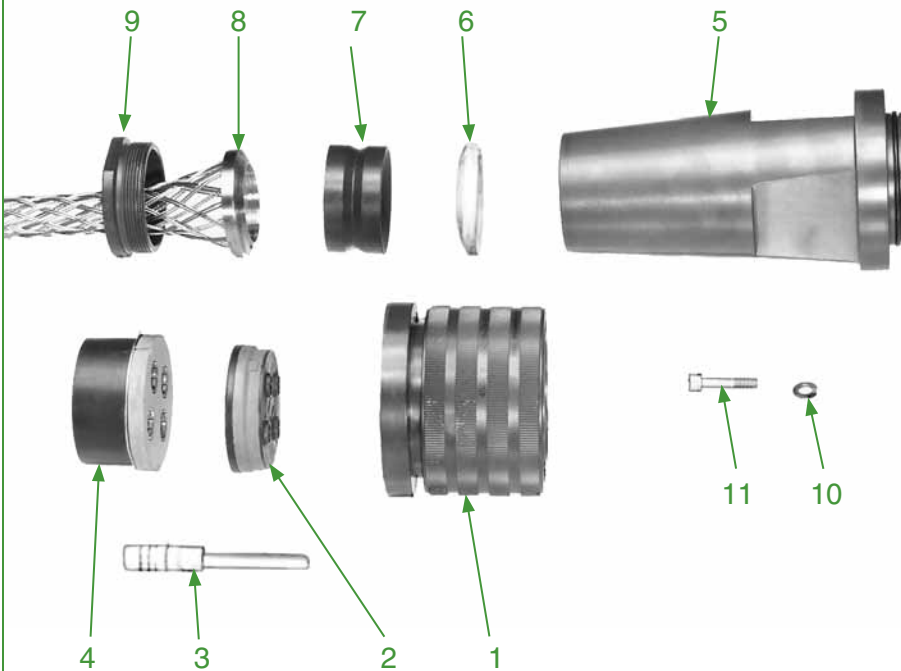
MS90555
Wall Mount Receptacle



Wall Mount Receptacle
Components:

1. Shell
2. Insert Assembly, Socket
3. Contact, Socket
4. Grommet Assembly, Socket
5. Nut, Retaining
6. Protective Cap Assembly (not shown)
7. Flange Gasket (not shown)

MS90556
Straight Plug



Straight Plug Components:

1. Shell & Coupling Nut Assembly
2. Insert Assembly, Pin
3. Contact, Pin
4. Spacer Assembly, Pin
5. Back Adapter
6. Gland Washer
7. Gland
8. Cable Grip
9. Gland Nut
10. Lockwasher (3 each)
11. Screw (3 each)
12. Protective Cap Assembly (not shown)

NOTE: On shell size 32 connectors, item #6 (gland washer) is contained within item #5 (back adapter).

38999

III
HD
Dualok
II
I
SJT
Accessories
Aquacon
Herm/Seal
PCB

HIGH
SPEED

Fiber
Optics
Contacts
Connectors
Cables

EMI Filter
Transient

26482
Matrix 2

83723 III
Matrix | Pyle

26500
Pyle

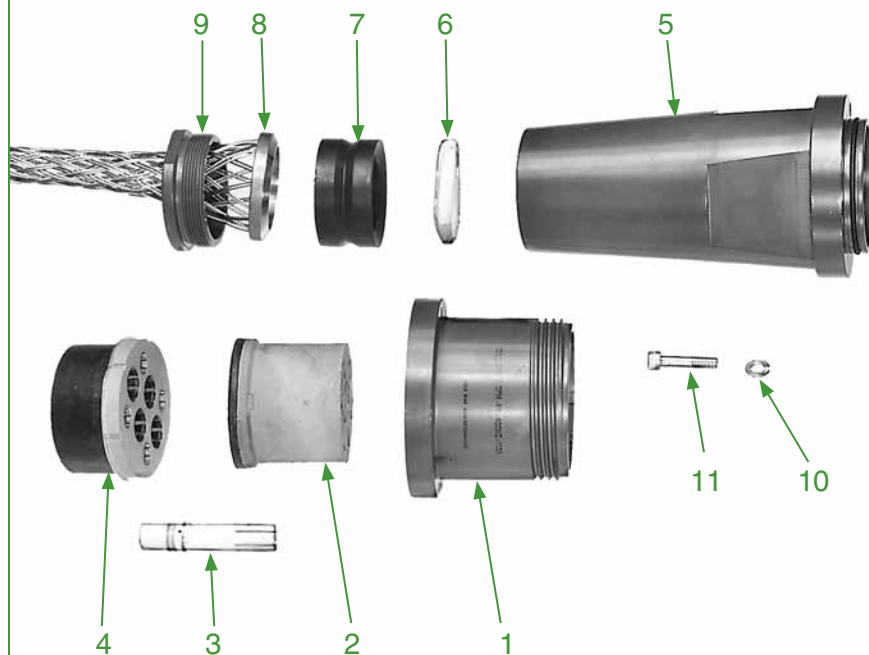
5015
Crimp Rear
Release
Matrix

22992
Class L

Back-
Shells

Options
Others

MS90557
Cable Connecting Receptacle

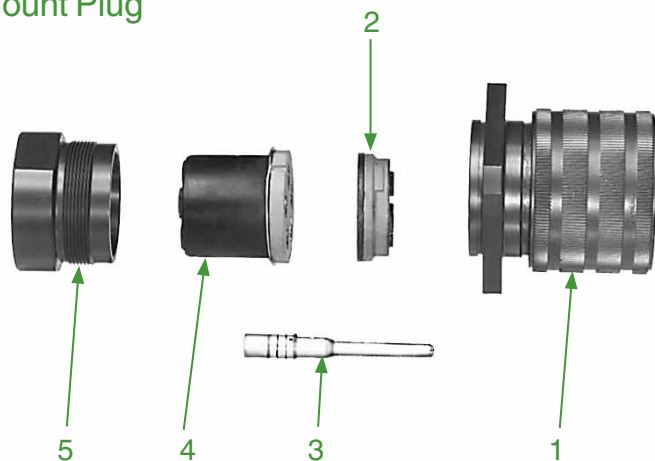


Cable Connecting Receptacle Components:

1. Shell
2. Insert Assembly, Socket
3. Contact, Socket
4. Spacer Assembly, Socket
5. Back Adapter
6. Gland Washer
7. Gland
8. Cable Grip
9. Gland Nut
10. Lockwasher (3 each)
11. Screw (3 each)
12. Protective Cap Assembly (not shown)

NOTE: On shell size 32 connectors, item #6 (gland washer) is contained within item #5 (back adapter).

MS90558
Wall Mount Plug



Wall Mount Plug Components:

1. Shell & Coupling Nut Assembly
2. Insert Assembly, Socket
3. Contact, Pin
4. Grommet Assembly, Pin
5. Nut, Retaining
6. Protective Cap Assembly (not shown)
7. Flange Gasket (not shown)

Contact Installation

- Step 1)** Insert stripped conductors in contact wirewells. If contact bushing is used, insert conductor in bushing and bushing in contact wirewell. If two or more ground wires are inserted into a single contact, make sure all wires are fully seated in wirewell.
- Step 2)** Select correct crimping tool, locator and die combination from the table for contacts to be installed. With conductor or contact bushing in place, insert contact into tool. Close crimping die fully to form a uniform crimp.

| Contact Part Number | Size | Type | Crimping Tool* | Locator* | Die* | Removal Tool |
|---|--------------------------|-----------------------|---------------------------------|----------|--------------|--------------|
| M39029/48-327 M39029/49-335 M39029/48-328 | 4/0 4/0 4/0N | P S P | Pico Model 400B or 400B-1 | 4297-1 | 414DA-4/0N-1 | MS90562-1 |
| M39029/48-323 M39029/49-333 M39029/48-324 | 1/0 1/0 1/0N | P S P | Pico Model 400B or 400B-1 | 4297-3 | 414DA-1/0N | MS90562-3 |
| M39029/48-320 M39029/49-331 M39029/48-321 M39029/48-322 M39029/49-332 | 4 4 4N 4G 4G | P S P P S | Pico Model 400B or 400B-1 | 4297-5 | 414DA-4N | MS90562-5 |
| M39029/48-317 M39029/49-329 M39029/48-318 M39029/48-319 M39029/49-330 | 6 6 6N 6G 6G | P S P P S | Pico Model 400B or 400B-1 | 4297-6 | 414DA-6N | MS90562-6 |

* Available from Pico Crimping Tools Co.,
9832 Jersey Ave., Santa Fe Springs, Ca
90670
Phone: 805-388-5510

If crimping tools are available, contacts may be affixed to conductors by soldering. Use rosin-alcohol solder flux, a good grade of 60/40 solder and a 500 watt soldering iron or probe type resistance soldering equipment. Pre-tin conductors before soldering. Solder must not be present on shoulder or retention area of contact.

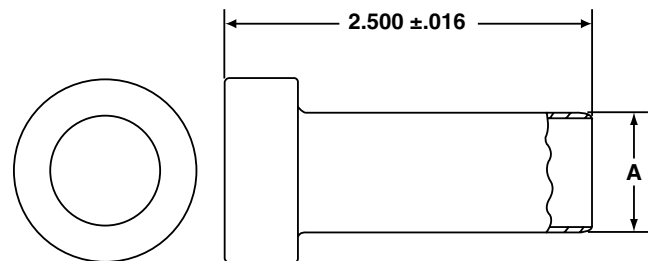
Connector Assembly

- Step 1)** If inserts are not already positioned in the connector shell, align large tab on insert with large slot in shell and push insert in until it bottoms in shell.
- Step 2)** Apply a thin coating of Dow Corning DC-4 lubricant to the periphery of contact holes in spacer or grommet assembly. Push contacts into rear of spacer or grommet assembly until locked into contact retainer bushing.
- Step 3)** Align contacts with proper holes in insert. Small key of insert must be aligned with appropriate keyway in spacer or grommet assembly. Slide contacts into insert holes until spacer or grommet assembly butts against insert. A thin film of Dow Corning DC-4 lubricant applied to the periphery of insert contact holes will provide maximum sealing efficiency.
- Step 4)** Assemble accessories to connector. The back adapter "O" ring should have a very thin film of Dow Corning DC-4 lubricant applied. Outer surfaces only of gland should be lubricated with a thin film of UniTemp Grease EP. Avoid getting grease on inside surfaces of gland and on cable jacket.
- Step 5)** Tighten retaining nut or gland nut on shell or adapter. A metal-to-metal seating condition is desirable, but may not be attainable with maximum cable diameters.

Contact Removal

- Step 1)** Loosen all rear accessories and slide back along cable.
- Step 2)** Remove spacer or grommet assembly with contacts from connector insert.
- Step 3)** Using the appropriate size contact removal tool, push tool over front of contact until it bottoms in spacer or grommet assembly hole. This will open contact retaining bushing and allow contact to be removed from the spacer or grommet assembly from the rear. When using jacketed cable, all contacts should be released from contact retention bushings before removal from spacer or grommet assembly is accomplished.

MS90562 Contact Removal Tool



Order MS90562 contact Removal Tool by MS part number listed below:

| MS Part Number | Contact Size | A Dia. +.000 -.002 |
|----------------|--------------|--------------------------|
| M81969/27-01 | 4/0 | .790 |
| M81969/27-02 | 2/0 | .696 |
| M81969/27-03 | 1/0 | .558 |
| M81969/27-04 | 2 | .462 |
| M81969/27-05 | 4 | .376 |
| M81969/27-06 | 6 | .354 |

All dimensions for reference only.

38999

| |
|-------------|
| III |
| HD |
| Duallok |
| II |
| I |
| SJT |
| Accessories |
| Aquacon |
| Herm/Seal |
| PCB |

| |
|----------------------------|
| HIGH SPEED |
| Fiber Optics |
| Contacts Connectors Cables |

EMI Filter
Transient

26482
Matrix 2

83723 III
Matrix | Pyle

26500
Pyle

5015
Crimp Rear Release Matrix

22992
Class L

Back-Shell's

Options
Others