Amphenol
INDUSTRIAL

STAR-LINE® Series

Star-Line Series “ZP/ZR” connectors are heavy duty environmentally sealed plugs and receptacles and have been successfully used in all types of Industrial and Aerospace applications. These compact environmental connectors have provided outstanding performance in complex ground support cable networks, automatic and process control systems and instrumentation systems.

This family of connectors has made a major contribution to the successful interconnection of peak power generating systems as well as offshore petroleum production for power distribution and data acquisition.

Ample margins of safety and reliability have been designed into the Star-Line connectors to maintain capability levels which make them ideally suited for the broad spectrum of demands placed on them by industry.

The specific materials and design features incorporated in Star-Line connectors were originally selected to satisfy the stringent requirements of the Aerospace industry for heavy-duty connectors. These connectors combine electrical and mechanical capabilities that equal or exceed the performance parameters established by the Military Specification MIL-5015.

- **UL & CSA** listed to UL1977/CSA C22.2 requirements
- **ENVIRONMENTAL RESISTANCE** – Design and materials withstand the most challenging operating conditions. Series has an IP 68-8 rating.
- **SOLDER, CRIMP AND PRESSURE TERMINALS AVAILABLE**
- **EASILY ACCESSIBLE WIRE TERMINALS** – Conductors are readily terminated to contacts. Cable housings are slipped over conductors or leads after terminating. Cumbersome handling and seating of inserts with conductors attached is eliminated.
- **LARGE WIRING SPACE** – Ample wiring space is provided in cable housings and conduit fitting bodies. Hub of body mounts in any of four positions (except FS & FD box assemblies).
- **REVERSIBLE INSERTS** – A full range of contact inserts and application adapters are available. All are interchangeable and reversible to suit special needs.

** Star-line Series Connectors are certified to UL 1977 specifications.*

- **DOUBLE-LEAD THREAD COUPLING** – Modified Acme Thread does not clog under adverse conditions of ice, snow, sand or mud and provides the quick coupling feature.
- **HARD ANODIC COATING** – All machine, aluminum parts finished with a hard, scratch-resistant coating per MIL-A-8625, Type III. Dielectric strength 1800 volts. Heat resistance of 750° F.
- **HIGH TENSILE STRENGTH *ALUMINUM** – Bar Stock Components precision machined. Points of impact designed for extra strength.
- **RADSOK® HIGH AMPERAGE CONTACTS** – Special arrangements are available with RADSOK high amperage contacts. Standard Star-line inserts are not interchangeable with new RADSOK contact insert arrangements.
- **RoHS COMPLIANT PRODUCT AVAILABLE** – Consult Amphenol Industrial Operations.

STAR-LINE® EX Series

The Star-Line EX Series is a hybrid form of the parent Starline product line. The series is certified for use in a Zone 1-IIc haz ardous environment. Classified facilities such as petrochemical refineries, land and offshore drilling systems are but a few of the applications for this broad product series.

Star-Line EX Series connectors are certified for use in Zone 1-IIc hazardous environment

- **ATEX CERTIFIED** – for Zone 1-IIc hazardous environment. For certificate contact factory
- **IECEx CERTIFIED**–
  For certificate contact factory
- **CENELEC IP68-8 RATED** –
  Listed under EEx d IIc T6.
  Plugs and receptacles listed under EEx de IIc T6.
- **HARD ANODIC COATING** – All machined aluminum parts finished with a hard, scratch-resistant coating per MIL-A-8625, Type III. Dielectric strength 1800 volts. Heat resistance of 750° F.
- **SOLDER, CRIMP AND PRESSURE TERMINALSAVAILABLE**
- **REVERSIBLE INSERTS** – A full range of contact inserts for power, signal and mixed applications are available. All are interchangeable and reversible to suit specific needs.
- **EASILY ACCESSIBLE WIRE TERMINALS** – Conductors are readily terminated to contacts. Cable housings are slipped over conductors or leads after terminating.
  Cumbersome handling and seating of inserts with conductors attached is eliminated.
- **LARGE WIRING SPACE** – Ample wiring space is provided in cable housings and hardware.

Star-Line EX Connector with EX gland (EX-13-3 style shown)

- **HIGH TENSILE STRENGTH ALUMINUM** – Bar Stock Components precision machined. Points of impact designed for extra strength.
- **CABLE OPTIONS** – Starline EX Series can be terminated onto unarmored or armored and sheathed cables built to IEEE-45 / UL1309, IEC, BS, DIN and JIC standards. Flexible cables like SOOW-A, W, G-GC and DLO constructions can also be used with this Series.
- **EX CABLE GLANDS** – Wide variety of glands are available for Star-Line EX connectors. For more information ask for new Amphenol Cable Glands and Cord Grips catalog 12-055.
- **INSERT VARIETY** – A broad range of inserts are offered ranging from single-contact to 143 contacts.
  High amperage up to 1135 amps at 1000V / AC or DC.
  Contacts are high quality copper with silver plating. (Gold plating available as an option) Composite inserts for power, control and instrumentation service available. *For Amphenol Star-Line product insert de-rating information per the National Electric Code, please consult the Amphenol Industrial website, www.amphenol-industrial.com. Chart is located under LITERATURE tab.*
- **RADSOK® HIGH AMPERAGE CONTACTS** – Special arrangements are available with RADSOK high amperage contacts. Standard Star-line EX inserts are not interchangeable with new RADSOK contact insert arrangements.
- **RoHS COMPLIANT PRODUCT AVAILABLE** – Consult Amphenol Industrial Operations

STAR-LINE®

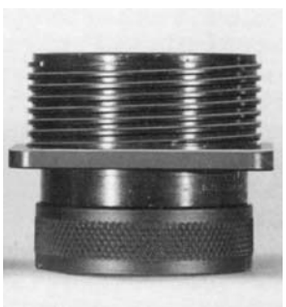
Environmental Highlights

PROPERTY	MIL-5015 REQUIREMENTS CLASSES A, B, E J & R	STAR-LINE, STAR-LOK CONNECTORS
TEMPERATURE	-67° F to 225° F (-55° C to 107° C)	Temperature Classes A, B, E, J and R can withstand 257° F continuously. For short duration high-temperature life, consult factory.
PRESSURE	No requirement	300 PSI external (coupled connectors) 200 PSI internal (with pin and socket inserts)
AIR LEAKAGE	1 cubic inch/ hour maximum	Exceeds Classes E and R specifications
HUMIDITY AND MOISTURE RESISTANCE	1 1/2 times A.C. voltage rating after 14 days. Exposure to 95% relative humidity at 160° F.	Exceeds Classes E and R. MIL-5015 Meets MIL-STD-202B, Method 106A
CORROSION RESISTANCE	48 Hours – Method 1001 MIL-STD-1344 No exposure of base metal.	Salt spray: 300 days – No exposure of base metal.
CHEMICAL RESISTANCE	No requirement	Oil, most acids and alkalis.
DUST RESISTANCE	No requirement	Meets MIL-STD-202B, Method 110, Condition B
SHOCK RESISTANCE	50 G minimum	Exceeds 60 G's Certain inserts available to 200 G.
VIBRATION	Method 2005 Method II MIL-STD-1344	Exceeds Method II & MIL-STD-167-1 (Ships).
TEST PROBE ABUSE	Contact size No. 16 and No. 18	Exceeds MIL-5015 on all contacts No. 18 through 4/0.

Why the Double-Lead Acme Thread?

The double-lead Acme thread is a moderate torque quick-coupling thread which permits complete coupling in approximately one turn of the coupling nut. In addition, there are actually two parallel threads having starting points 180 degrees apart. All of this ensures that plugs and receptacles are being mated or unmated axially. The thread contour makes it self-cleaning.

One parallel thread removed to show actual thread angle.



Standard double-lead Acme. Two parallel threads.

Wire Limitation Guide

There are restrictions to the maximum diameter of wire as they relate to the rear or wire side of the connector insert as follows.

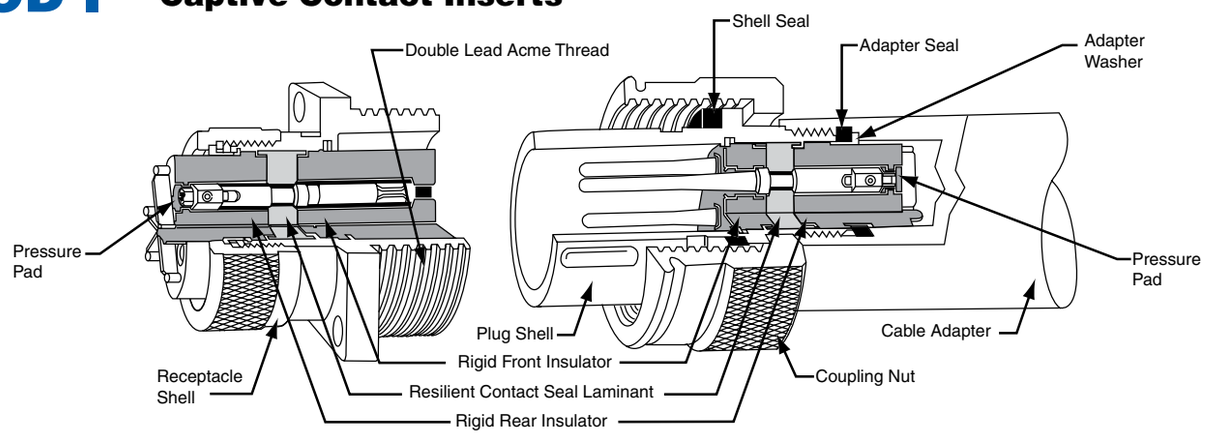
Mod I. When wires are passed through the rigid back insulation for ease of soldering:

Wire size	Maximum diameter
#4/0	.747”
#1/0	.555”
#4	.400”
#8	.262”
#10	.201”
#12	.150”
#16	.107”
#18	.086”
Mod II & III	
#10	.248”
#12	.193”
#16	.130”
#18	.110”

STAR-LINE®

Amphenol INDUSTRIAL

MOD I Captive Contact Inserts



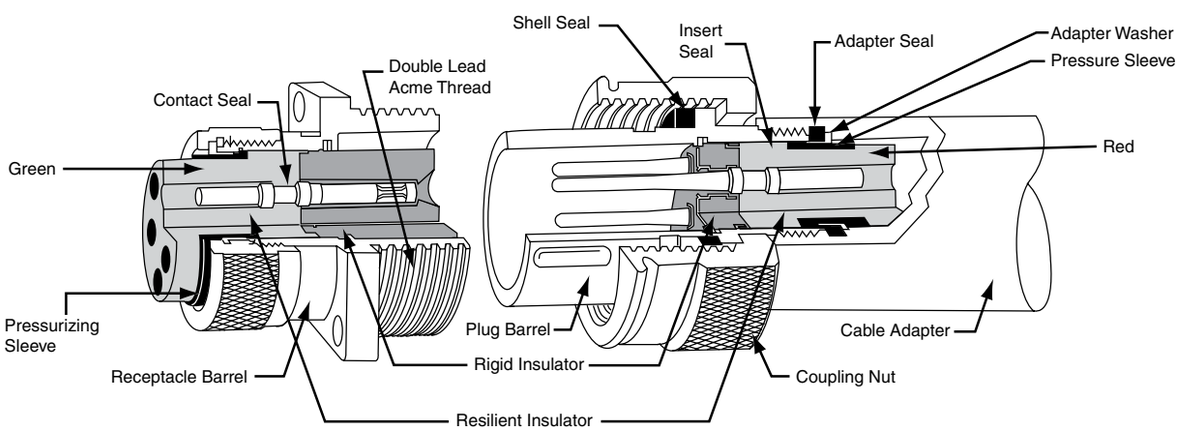
Self-sealing Construction: all MOD I captive contact inserts are capable of being terminated after assembly in the basic barrel and are completely self-sealing when pressurized by any selected adapter. Water, gas, vapor, moisture or dust positively cannot pass in either direction through or around the insulation.

The "sandwich" construction of MOD I inserts consists of a resilient silicone laminate between two rigid plastic insulators. The resilient laminate seals absorbs shock and vibration and allows the contacts to align themselves freely. The rigid faced plastic insulators impart just the right amount of restraint to retain the contacts in place.

The combined "sandwich" provides all the advantages of resilient mounting plus all the advantages of rigid mounting, with none of the shortcomings of either. Under pressure, between a shoulder and a thrust washer, the silicone reacts as a fluid and being non-compressible, flows against all surfaces to affect a reliable seal around the periphery of the insert and around all contacts where they penetrate the insulation.

Contact cavities are clearly numbered on the front and rear insert face to facilitate identification during assembly, inspection and maintenance. Socket insulator contact cavities are of a bellmouth guided entry design. These chamfered lead-ins insure easy and positive mating of male contacts.

MOD II Insertable/Removable Crimp Contact Inserts



MOD II insulations have one less rigid disc than their MOD I counterparts.

Individual unmounted contacts are crimped to their respective wires outside of the connector where ample working space is available. The crimping operation can be by hand or power operated tool.

Contacts with crimped joint intact are inserted one by one, with a hand tool, into the insulation premounted within the connector barrel shell.

The resilient portion of the insert functions to seal around the contacts and prevent leakage through contact cavities, seal against leakage between the insert and shell, absorb shock and vibration, provide electrical insulation between contacts and retain the contacts in the connector.

Contacts may be inserted and removed without degradation of the retention or environmental capability. The front rigid portion of the insert functions to stabilize and ensure positive alignment of the contacts.

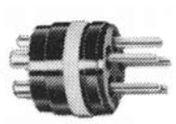
Contact cavities are clearly numbered on the front and rear insert face to facilitate identification during assembling, inspection and maintenance. Socket insulator contact cavities are of a bellmouth guided entry design. These chamfered lead-ins ensure easy and positive mating of male contacts.

STAR-LINE®

Custom Build Your Own Connectors

Power Connectors – 20-30-60-100-200-325-700 Amperes, 1 thru 10 Contacts
Control & Instrumentation Connectors – 3 thru 143 Contacts

The following pages present connector sub-assemblies which are available and can be used in conjunction with the inserts listed.



PIN INSERT CONFIGURATION

PLUG CONFIGURATION

RECEPTACLE CONFIGURATION

SOCKET INSERT CONFIGURATION

Ordering Information

All plug and receptacle assemblies require two part numbers:

A. The catalog number of the desired insert.

B. The catalog number of the selected plug or receptacle hardware.

To Order Complete Assemblies

1. Determine supply voltage, amperage and number of contacts desired.
2. Select insert configuration from pages 37-63. Write down Dash Number, Shell Size and MOD number of insert. Voltage and amperage information can be found on page 30. Example: 3#12 contacts – 27P (MALE) and 27S (FEMALE); MOD I; Shell Size 12 (page 37).
3. Select desired plug and receptacle hardware from pages 9-28. Make certain that the shell size of the hardware corresponds with the shell size of the desired insert. Determine outside diameter of cable. Example: Male Plug with Basket Weave. Cable is 3 conductor #12 (.635 outside diameter). ZPLK-1212-27P (page 15).

   Female Receptacle mounted to Junction Box with 45° Angle Adapter and 1" Conduit Hub. ZRLBB-312-27S (page 23).
4. Order tools from pages 76-77.

To Order Assemblies Without The Insert

(For large users stocking connector components in bulk)

1. If a MOD I insert will be used, order the hardware by the catalog number and eliminate the asterisk. Example: ZPLD-1212 (page 12).
2. If a MOD II insert will be used, order by the catalog number but substitute a 200 for the asterisk. Example: ZPLD-1212-200
3. MOD III inserts must be ordered assembled in their basic barrel (consult Amphenol Industrial Operations).

STAR-LINE®

Amphenol INDUSTRIAL

Please Read Carefully:

1. Hardware with a longer cable housing should be used if the insert has:
   - A. Any pressure contact – line or ground.
   - B. More than 10 contacts-any size.
   - C. More than 4 #10 or larger contacts.
2. A jack coupling nut should be used if the insert has:
   - A. A configuration with shorter relay contacts.
   - B. A configuration of 37 or more contacts.

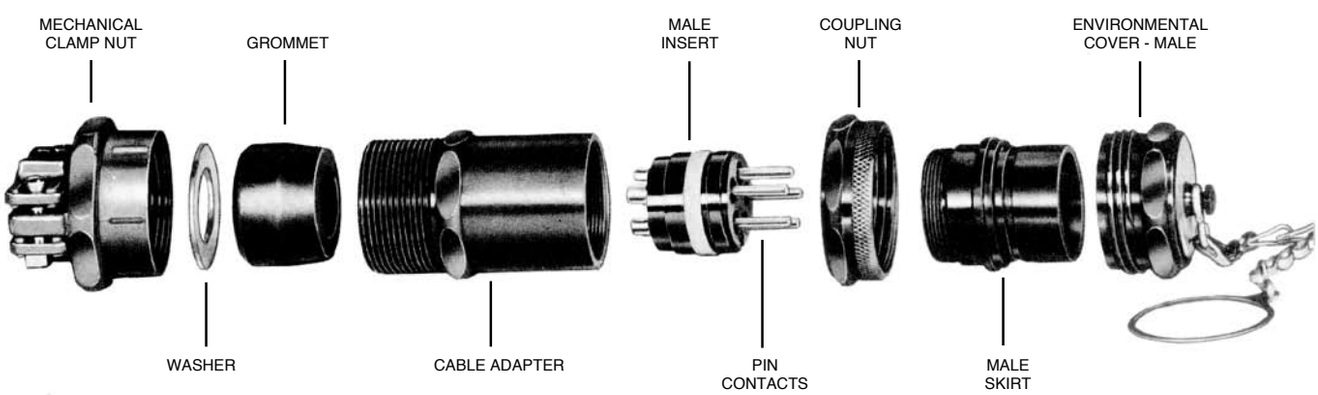
   A JACK COUPLING NUT SHOULD NOT BE USED ON ANY POWER INSERT CONNECTOR THAT IS TO BE DISCONNECTED UNDER LOAD
3. To insure proper coupling the following torque values should be used on the coupling nut:

Shell Size	Torque Setting (lb. ft.)
12	11.0
16	13.5
20	15.5
C20	15.5
24	23.0
C24	23.0
28	31.0
C28	31.0

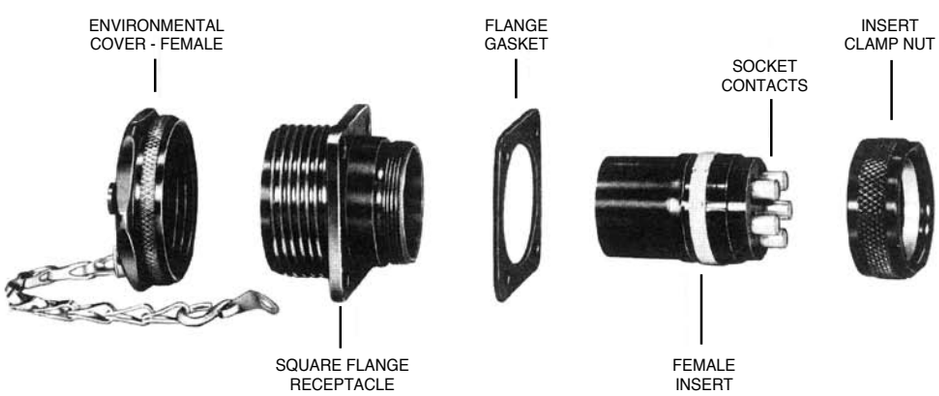
NOTE: The N.E.C. circuit breaking and non-circuit breaking ratings are based on test results of contacts and connectors. Consult the N.E.C. when selecting wire/cable for specific applications. Under certain conditions, a wire size may be rated higher or lower than our table indicates for a given contact size.

Connector Assemblies

Typical MOD I Plug Components

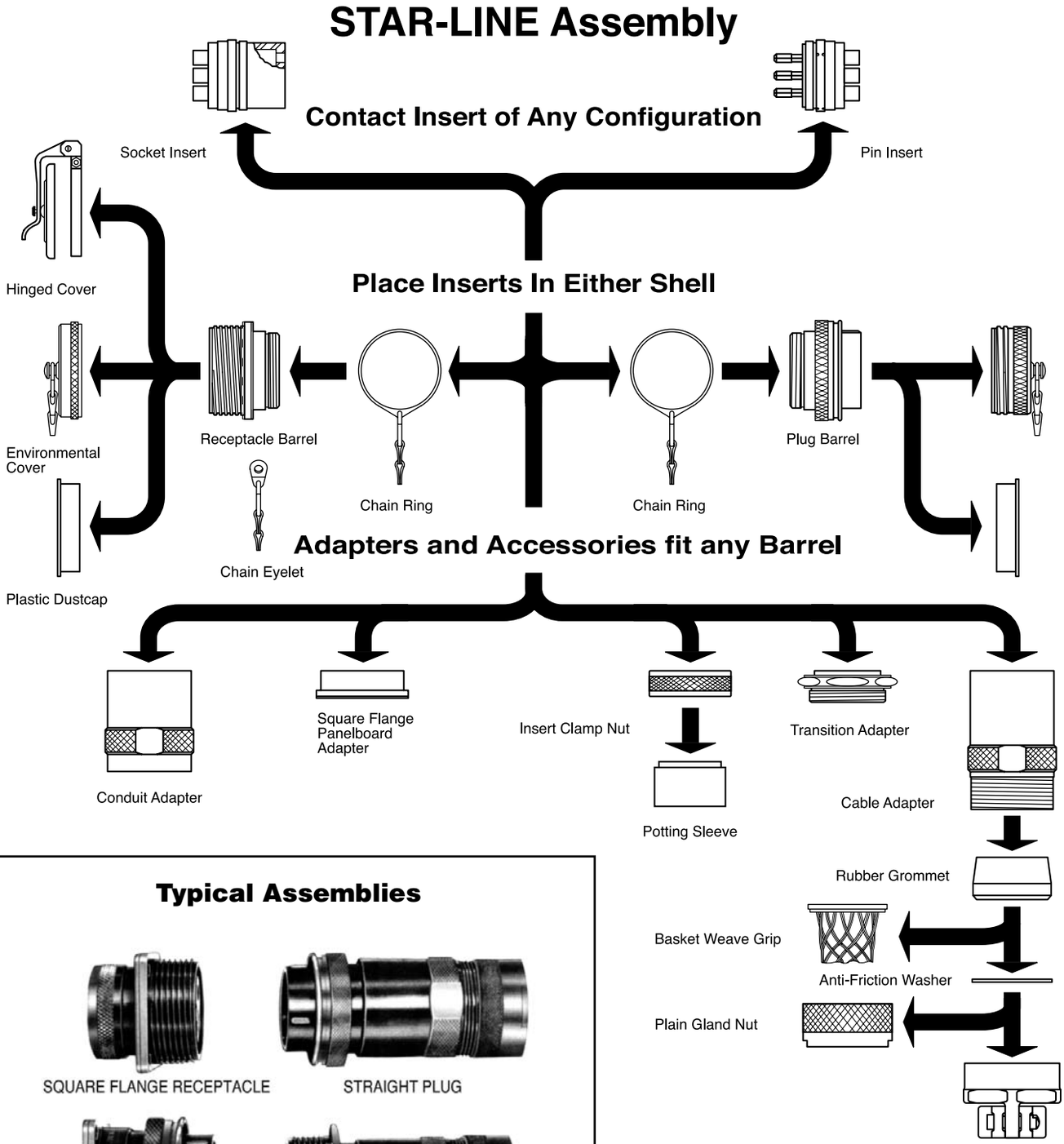


Typical MOD I Receptacle Components



STAR-LINE®

Connector Basic Components



Typical Assemblies