

PRESSURE BALANCED, OIL-FILLED ELECTRICAL CONNECTOR SYSTEMS

Pressure balanced, oil-filled connector/cable assemblies are recommended when maximum reliability is required.

How They Work - The oil-regulating valve located in the plug body opens when the connectors are mated, seals when they are disengaged.

The electrical contacts are hermetically sealed within the bulkhead connector body to resist open face pressure.

Clear tubing containing the insulated conductors is filled with an insulating oil and installed to the connectors.

When the plug/receptacle are mated, oil flows through the opened valve in the plug body and fills the connector interface area. The whole system is thus pressure balanced (equalized) to this point.

CONNECTOR BODIES

Our **SEA CON**® non-metallic connectors are made of a high density glass reinforced epoxy. This same material is also used to manufacture our standard line of non-metallic connectors. It is a proven material for underwater use, features good mechanical stability, extremely low water absorption and is an excellent dielectric material.

The standard material for our metallic line of PBOF connectors is 316 stainless steel, passivated. The CCP coupling nut is bronze.

TUBING

The most popular type tubing used for the PBOF systems is made of clear modified vinyl, developed especially to maintain its physical properties in contact with fuels, oil, and lubricants. This clear tubing will last approximately 12 to 18 months in sea water without degradation. An opaque orange tubing is also available which lasts 24 months in sea water.

OIL

An insulating type, mild oil is recommended such as a transformer or turbine oil which feature a high dielectric strength.

FASTENERS

The tubing can be secured to the connector with a variety of commercially available clamps.



PRESSURE BALANCED, OIL-FILLED ELECTRICAL CONNECTOR SYSTEMS

SOME ADVANTAGES OF A PRESSURE BALANCED, OIL-FILLED SYSTEM:

The cable connector plug (CCP) is easily assembled in the field since no potting or molding is required.

Connector interface 'O' ring seal responsibility is reduced to the restriction of oil leakage since pressures in and out are equalized.

Various cable combinations are easily obtainable since assembly consists merely of installing insulated conductors within commercially available tubing, securing to the connector shell by tying with waxed nylon string, and filling with oil.

Troublesome void-free potting within connector shells is eliminated.

Since conventional molding of the connector to a cable is not necessary in this type of system, problems such as opens caused by wires being broken or pulled out of the terminals and undue stress being placed on the conductor terminations are eliminated.

Connector flaws and cable jacket pin holes or cracks become obvious prior to usage, evidenced by the leakage of oil.

Should the cable jacket be cut during use the system would continue to operate for a considerable period of time until the oil would be forced out.

The need to x-ray connectors for the purpose of discovering any possible conductor damage or serious misalignment is almost completely eliminated.

Fatigue and failure of termination joints caused by pressure cycling is non-existent since this pressure compensated system eliminates the pistoning action of the conductors.

Rapid and inexpensive cable repair can be accomplished in the field.



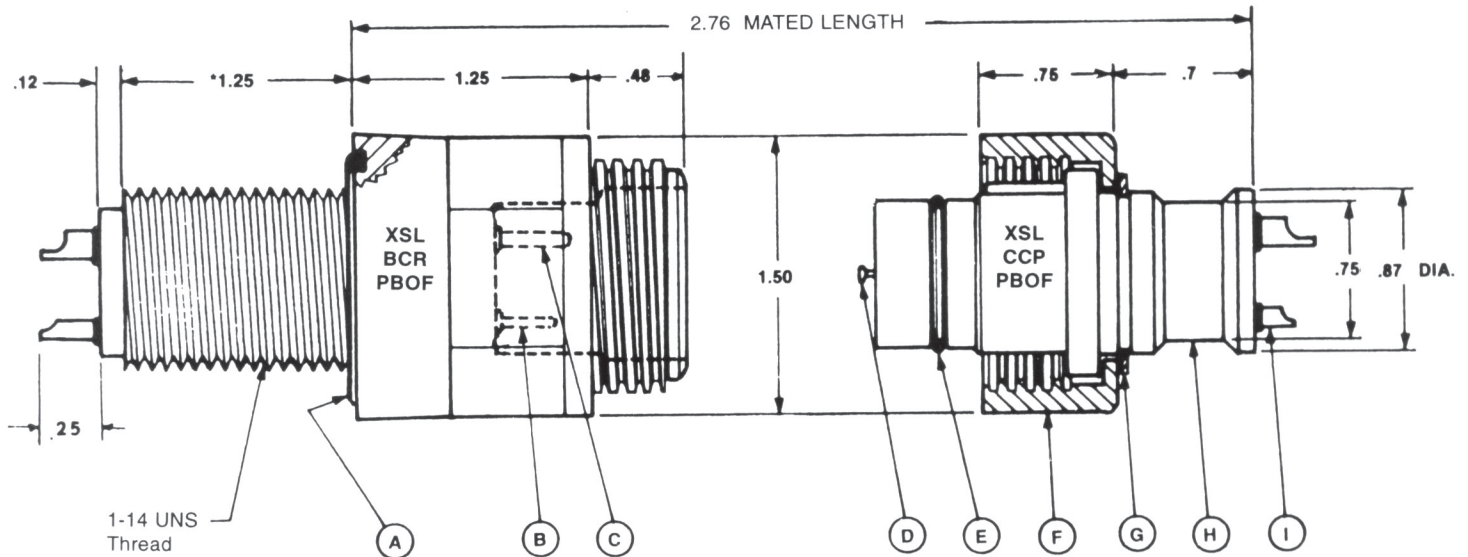
XSL-BCR-CCP-PBOF

PRESSURED BALANCED, OIL-FIELD SERIES

Material: Glass Reinforced Epoxy

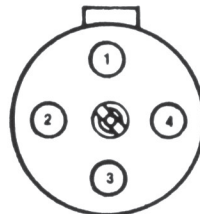
Pressure Rating: 10,000 psi

*Also available in 2 5/8" Thread Length.



AVAILABLE CONTACT CONFIGURATIONS

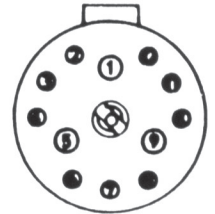
- A - O-Ring 2-123
- B - Male Pin (small)
- C - Male Pin (large)
- D - Oil Compensating Valve
- E - O-Ring 2-017
- F - Engaging Nut
- G - Retaining Ring 5100-87H
- H - Diameter on body for tubing termination
- I - Solder Pots



FRONT VIEW
XSL-4-CCP-PBOF
(4# 10 AWG)



FRONT VIEW
XSL-7-CCP-PBOF
(7# 16 AWG)



FRONT VIEW
XSL-12-CCP-PBOF
12 { 3# 16 AWG
9# 20 AWG

Note: Recommended Tubing Size: .75 ID
Tubing not supplied with parts unless specified.

New Available Configurations:

XSL-5-PBOF
(1 #14 AWG plus 4 #16 AWG).
Thread Length: 1"

XSL-8-PBOF
1 #14 AWG
7 #16 AWG

Note: Torque values referenced in this literature
assume installation into dry metal threads.
Please contact the factory for recommendations.

METAL SHELL - PBOF SERIES

PRESSURED BALANCED, OIL-FIELD SERIES

Specifications:

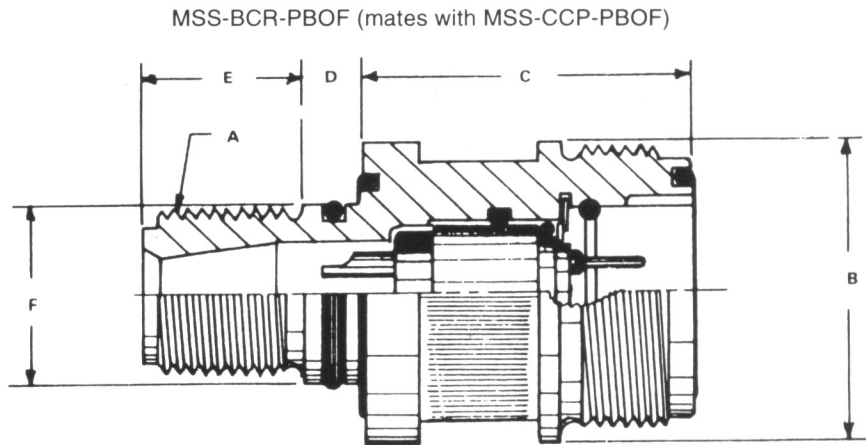
Body Material: 316 SST

Insert: Glass Reinforced Epoxy

Contacts: Brass, gold plated

Pressure Rating: 7,500 psi

2,500 psi or more requires the BCR to be back potted or pressure balanced on solder cup side of insert.



For details on Specifications, Materials and Options please refer to MS Series.

The short pin in the CCP contact insert opens the check valve in the CCP assembly when mated, thus accomplishing complete pressure balancing, completely eliminating the pistoning effect of conductors during pressurization.

Tubing stems are designed to fit standard tubing sizes.

Pressure Balanced Oil Filled Series

The unique Brantner & Associates Inc. valve assembly allows oil into connector interface area when mated, seals when unmated.

RECEPTACLE PART NO.	A	B	C	D	E	F
*MSS-K-BCR-PBOF	1-14NS-2A	1.87	2.0	.375	1.00	1.060
MSSL-BCR-PBOF	1-1/4-12UN-2A	2.12	2.0	.375	1.00	1.310
MSSM-BCR-PBOF	1-3/4-12UN-2A	2.75	2.25	.500	.870	1.997
MSSO-BCR-PBOF	2-1/4-12UN-2A	3.50	2.25	.500	1.250	2.497
MSSP-BCR-PBOF	2-1/2-12UN-2A	3.75	2.25	.500	1.500	2.747
MSS-Q-BCR-PBOF	2-3/4-12UN-2A	4.50	2.25	.750	1.750	3.122

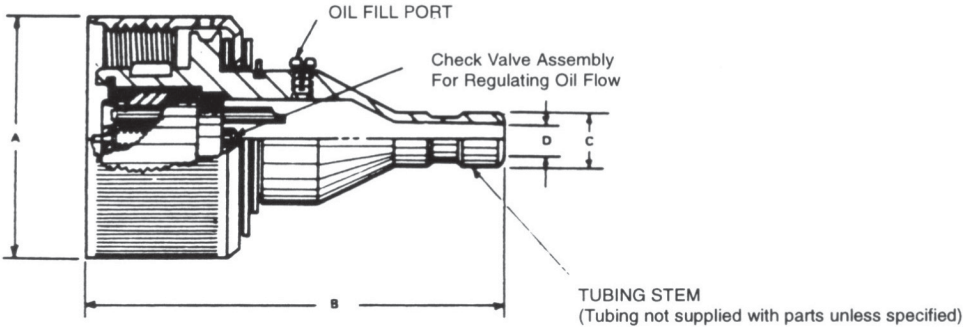
*These parts are standard requiring no set-up charge.
 These parts where asterisks do not appear may require set-up charges and longer deliveries.
 Refer to page 70-8 for available contact configurations.

MSS PBOF SERIES

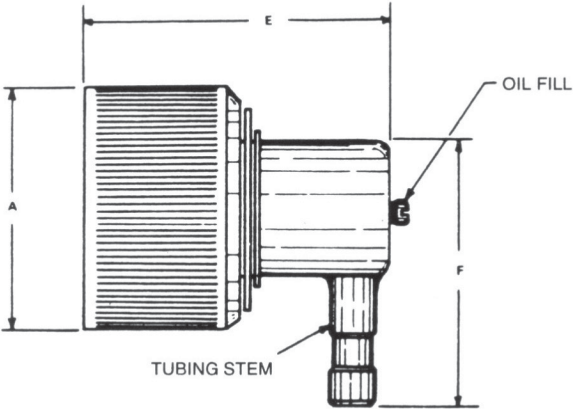
MSS-CCP-PBOF MATES WITH MSS-BCR OR CCR-PBOF

Specifications:
 Body Material: 316 SST
 Nut: Bronze
 Insert: Glass Reinforced Epoxy
 Contacts: Brass, gold plated

Pressure Rating: 7,500 psi



MSS-CCP-PBOF-RA (Right Angle)



CABLE PLUG PART NO.	A	B	C	D	E	F
MSSK-CCP-PBOF	1.87	3.00	.672	.48	2.37	2.12
MSSL-CCP-PBOF	2.12	3.75	.844	.62	2.82	2.56
MSSM-CCP-PBOF	2.50	5.00	.844	.62	3.26	3.00
MSSO-CCP-PBOF	3.00	5.81	1.000	.82	3.50	3.75
MSSP-CCP-PBOF	3.25	6.62	1.000	.82	3.37	3.75
MSSQ-CCP-PBOF	3.87	7.00	1.250	1.06	4.19	4.12

Refer to page 70-8 for available contact configurations.

SIZE

MSS PBOF SERIES CONTACT CONFIGURATIONS

G



K



6#16



8#20



12#20

L



3#10



8#16



12#16



16#20



22#20



26#20

M



3#10



4#8



4#8 HV



6#10 HV



6 { 3#6
3#16



6#14



21#16



22#16



30#20



40#20

O



4#6



30#16

P



3#8



5#8



7 { 4#16
3#8



7 { 2#16
5#6



9 { 3#6
6#16



38#16



48#16

ALL CONFIGURATIONS SHOWN ARE THE FACE VIEW OF THE RECEPTACLE CONNECTOR (BCR/FCR/CCR).

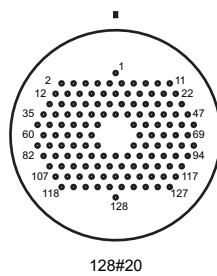
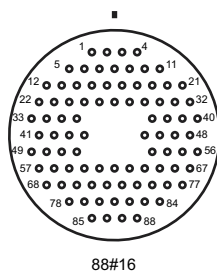
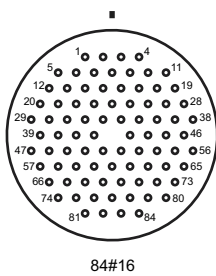
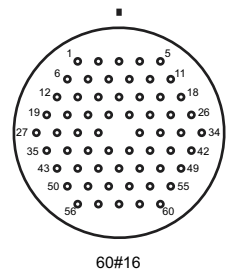
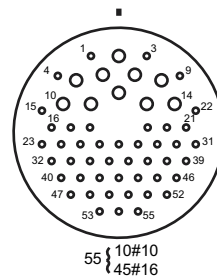
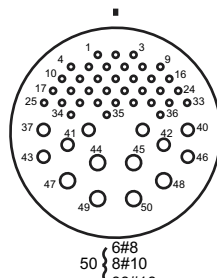
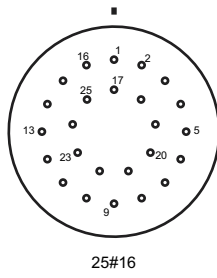
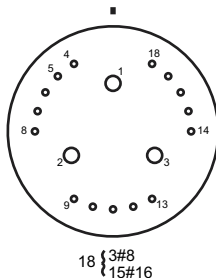
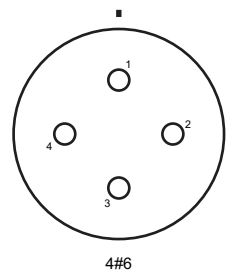
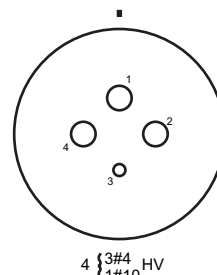
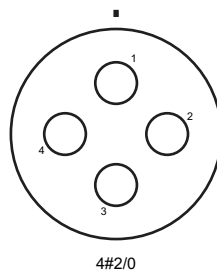
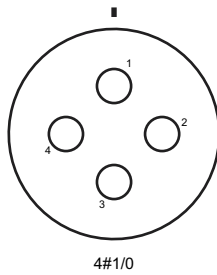
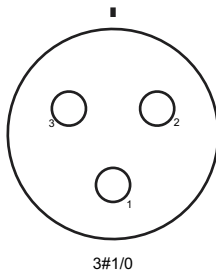
■ THIS SYMBOL REFERS TO THE RECEPTACLE SHELL KEYWAY WHICH KEYS THE BCR, FCR, CCR SHELL TO THE MATING CCP SHELL.

PBOF IS THE ABBREVIATION FOR PRESSURE BALANCED OIL FILLED STYLE CONNECTORS, REFERENCE CATALOG FOR MORE INFORMATION.

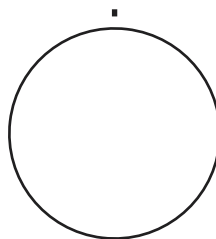
SIZE

MSS PBOF SERIES CONTACT CONFIGURATIONS

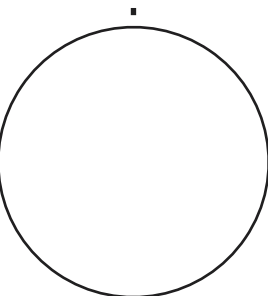
Q



R



S



ALL CONFIGURATIONS SHOWN ARE THE FACE VIEW OF THE RECEPTACLE CONNECTOR (BCR/FCR/CCR).

■ THIS SYMBOL REFERS TO THE RECEPTACLE SHELL KEYWAY WHICH KEYS THE BCR, FCR, CCR SHELL TO THE MATING CCP SHELL.

PBOF IS THE ABBREVIATION FOR PRESSURE BALANCED OIL FILLED STYLE CONNECTORS, REFERENCE CATALOG FOR MORE INFORMATION.

PRESSURE BALANCED OIL-FILLED (PBOF) CONNECTORS

The MINI-CON series has expanded into our PBOF range of connectors to allow for easy field repairs and length adjustments on short cable assemblies. The MINI-CON PBOF series does not utilize a valve in the cable plug. Therefore, the connector interface does not flood with oil through an orifice but, traces of oil may be visible after pressurization. Elimination of the valve enables the MINI-CON characteristics (a high density-small diameter) to be used in the PBOF system. The pressure range for the PBOF series is shown on Page 30-10.

There are two basic styles of MINI-CON PBOF cable connector plugs (CCP): straight and right angles (R/A). Additionally, SEA CON® has developed 30° and 45° CCP-PBOF for use where cable packaging is critically tight. We have built many PBOF connectors for tubing sizes other than our standard. WYE transitions and PBOF to rubber molded transitions have also been furnished by SEA CON®.

Mating connectors for the CCP PBOF are the MINI-CON Bulkhead connector receptacle (BCR-PBOF), flange connector receptacle (FCR-PBOF), and cable connector receptacle (CCR-PBOF). The BCR and FCR

connectors have identical dimensions to our standard connectors, but additional steps are taken to ensure that they are capable of handling the extra stresses that are imposed by the PBOF system. Be sure to state BCR-PBOF or FCR-PBOF when ordering Bulkhead connectors for this system. The CCR-PBOF is designed to use the same size tubing as the corresponding CCP-PBOF. However, other tubing sizes can be accommodated by special order.

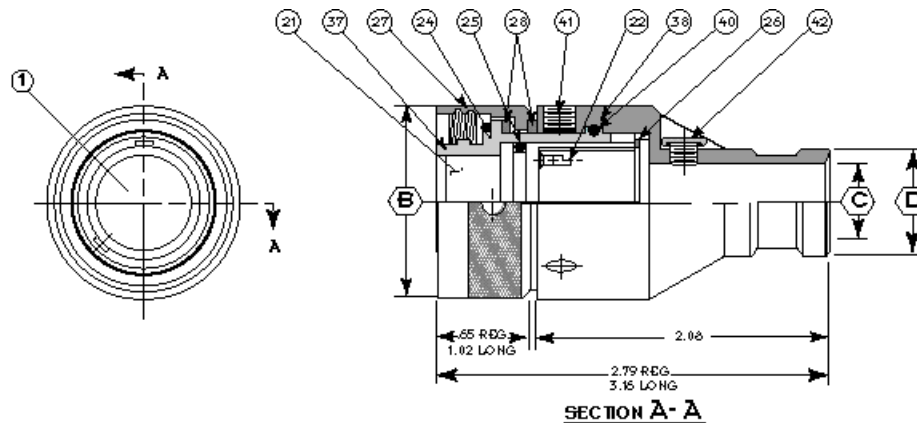
Some advantages of a Pressure Balanced, Oil Filled System:

- The cable connector plug (CCP-PBOF) and cable connector receptacle (CCR-PBOF) are easily assembled in the field as no potting or molding is required.
- Since conventional molding of the connector to the cable is not necessary in this system, problems such as open circuits caused by wires being broken or pulled out of the terminals, and undue stress being placed on the conductor's terminations are eliminated.
- Fatigue and failure of termination joints caused by pressure cycling is nonexistent because the PBOF pressure compensated system eliminates the pistoning action of conductors.
- Various cable combinations are easily obtainable since assembly consists merely of installing insulated conductors within commercially available tubing, securing to the connector shell with hose clamps, and filling with oil.
- Pin holes or cracks in the tubing become obvious prior to usage, evidenced by the leakage of oil.
- Should the tubing be cut during use the system would continue to operate for a considerable period of time until the oil is forced out.
- Rapid and inexpensive cable repair can be accomplished in the field.
- For more information on PBOF's, please refer to Section 70.



MINI-CON CABLE CONNECTOR PLUG (CCP-PBOF)

CCP-PBOF(MATES TO BCR-PBOF/FCR-PBOF/CCR-PBOF)



WHEN ORDERING MIN-CCP-PBOF YOU RECEIVE: (21)(22)(24)(25)(26)(27)(28)(37)(38)(40)(41)(42)

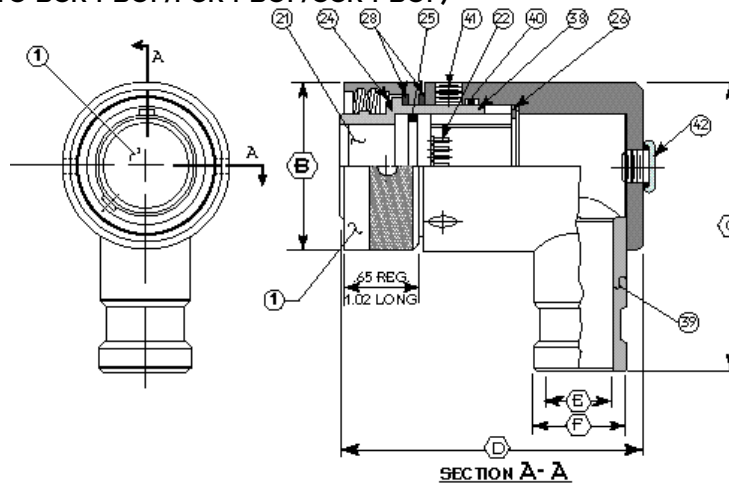
NOTE:

Reference pages 30-26 – 30-29
for pattern availability.

PART NAME	(B) INCHES	(C) INCHES	(D) INCHES	(24) O-RING	(25) O-RING	(26) SPIROLOX	(40) O-RING	RECOMMENDED TUBE I.D. SIZE
MING-CCP-PBOF	1.00	0.50	0.62	2-015	2-013	UR56	2-017	0.50
MINK-CCP-PBOF	1.12	0.50	0.62	2-017	2-015	UR68	2-116	0.50
MINL-CCP-PBOF	1.25	0.56	0.75	2-019	2-016	UR75	2-020	0.63
MINM-CCP-PBOF	1.37	0.56	0.75	2-020	2-018	UR87	2-022	0.63
MINO-CCP-PBOF	1.62	0.94	1.12	2-024	2-020	UR100	2-025	1.00
MINP-CCP-PBOF	1.75	0.94	1.12	2-027	2-022	UR112	2-027	1.00
MINQ-CCP-PBOF	1.87	1.06	1.25	2-028	2-025	UR131	2-029	1.13
MINR-CCP-PBOF	2.00	1.06	1.25	2-029	2-026	UR137	5-009	1.13

MINI-CON CABLE CONNECTOR PLUG (CCP-PBOF-R/A)

CCP-PBOF-R/A(MATES TO BCR-PBOF/FCR-PBOF/CCR-PBOF)



WHEN ORDERING MIN-CCP-PBOF-R/A YOU RECEIVE: (21)(22)(24)(25)(26)(27)(28)(37)(38)(40)(41)(42)

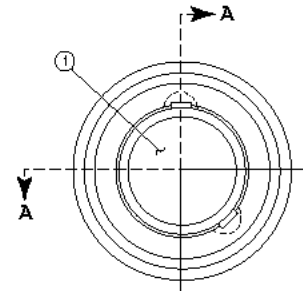
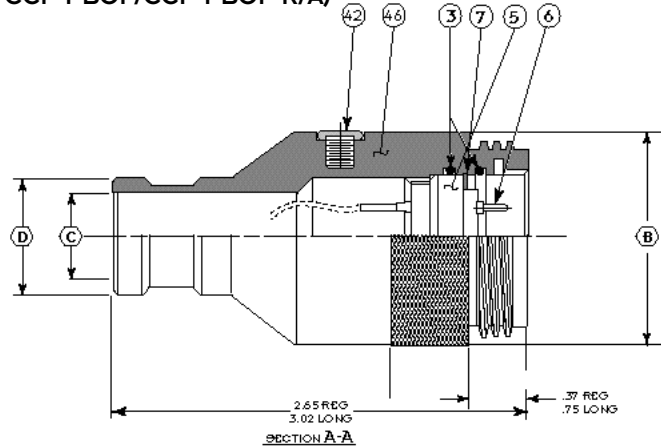
NOTE:

Reference pages 30-26 – 30-29
for pattern availability.

PART NAME											RECOMMENDED TUBE I.D. SIZE
	INCHES	INCHES	INCHES	STD LONG	INCHES	INCHES	O-RING	O-RING	SPIROLOX	O-RING	
MING-CCP-R/A-PBOF	1.00	2.20	2.37	2.75	0.50	0.62	2-015	2-013	UR56	2-017	0.50
MINK-CCP-R/A-PBOF	1.12	2.20	2.37	2.75	0.50	0.62	2-017	2-015	UR68	2-116	0.50
MINL-CCP-R/A-PBOF	1.25	2.37	2.50	2.87	0.56	0.75	2-019	2-016	UR75	2-020	0.63
MINM-CCP-R/A-PBOF	1.37	2.37	2.50	2.87	0.56	0.75	2-020	2-018	UR87	2-022	0.63
MINO-CCP-R/A-PBOF	1.62	3.00	3.03	3.40	0.94	1.12	2-024	2-020	UR100	2-025	1.00
MINP-CCP-R/A-PBOF	1.75	3.00	3.03	3.40	0.94	1.12	2-027	2-022	UR112	2-027	1.00
MINQ-CCP-R/A-PBOF	1.87	3.20	3.15	3.52	1.06	1.25	2-028	2-025	UR131	2-029	1.13
MINR-CCP-R/A-PBOF	2.00	3.20	3.15	3.52	1.06	1.25	2-029	2-026	UR137	5-009	1.13

MINI-CON CABLE CONNECTOR RECEPTACLE (CCR-PBOF)

CCR-PBOF (MATES TO CCP PBOF/CCP-PBOF-R/A)



NOTE:

Reference pages 30-26 – 30-29
for pattern availability.

WHEN ORDERING MIN-CCR-PBOF YOU RECEIVE: ③ ⑤ ⑥ ⑦ ④② ④⑥

PART NAME	⑥ INCHES	⑤ INCHES	④ INCHES	⑦ SPIROLOX	③ O-RING	RECOMMENDED TUBE I.D. SIZE
MING-CCR-PBOF	1.00	0.50	0.62	UR50	2-014	0.50
MINK-CCR-PBOF	1.12	0.50	0.62	UR62	2-016	0.50
MINL-CCR-PBOF	1.25	0.56	0.75	UR75	2-018	0.62
MINM-CCR-PBOF	1.37	0.56	0.75	UR81	2-019	0.62
MINO-CCR-PBOF	1.62	0.94	1.12	UR106	2-023	1.00
MINP-CCR-PBOF	1.75	0.94	1.12	UR118	2-025	1.00
MINQ-CCR-PBOF	1.87	1.06	1.25	UR137	2-028	1.12
MINR-CCR-PBOF	2.00	1.06	1.25	UR150	2-029	1.12

REVERSED MINIATURE CONNECTORS (VMIN)