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‘C’ Electrical Connector Subsea / Underwater / Marine

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Introduction:

CRE has developed a wide range of metal shell connectors over the years focussed on delivering high reliability in tough environments. They are designed for heavy duty use in the most rigorous underwater applications on the planet. The design offers a high integrity sealing arrangement, metal key-ways, multiple options, size, pin quantity, voltage and current rating along with our ability to design specific solutions for your application.

Manufactured as standard from stainless steel or custom built with any material specified, they come with high open face pressure resistance. The standard connectors are rated to 6000m WD and are designed for use in moulded, oil filled and PBOF assemblies in power, signal and electro-mechanical applications.

Common applications:

- ROV, Resident ROV & AUV
- Manned underwater vehicles
- Aquaculture
- Renewables
- Ocean science/research
- Dive / depressurisation systems

Key features:

- Up to 64 contacts
- Mixed contact sizing options
- Custom solutions (contact qty/size/type, glass to metal)
- Rated for 6000m WD mated and open face as standard, higher pressure available on application
- Oil filled (OF) available as standard, pressure balanced oil filled (PBOF) available for certain pin configurations (connector & bulkhead assemblies)
- Working voltage and current dependent on contact density and diameter.

‘C’ Electrical Connector Subsea / Underwater / Marine

Part numbering:

Bulkhead example:

BR	C	07	M		0900	24	01	BP	Ti	
									*	M.O.C., SS std, Ti, AL, Pk etc.
									*	Back pressure (If required), PBOF
										Interface number
										Wire gauge
									*	Wire length in mm.(i.e 900mm), standard cores
										H / H2 / H3 if the connector has a hybrid option
										Male / Female
										Number of contacts, BC (Blanking Cap)
										Connector family 'A', 'B', 'C' etc.

BR - Bulkhead receptacle (Threaded)
FR - Flanged receptacle
RC - Moulded or oil filled receptacle
FC - Flanged moulded or oil filled receptacle.

Notes:

- For standard assemblies, the part number structure indicated * above is left blank.
- Where custom wiring is required, Engineering will issue a BA**** (Bulkhead Assembly Part Number) to substitute for the wire length/gauge in the part number structure. For example, in the part number above 090024 would be replaced by BA followed by a four digit number to create a unique identifier.

Component	Material
Bulkhead Body	Stainless steel 316L standard
Contact Insert	Epoxy or Glass to Metal
Electrical contacts	Leaded Nickel Copper C(&or K41)
Plating detail	1um Acid Gold over 2.5 um Nickel Copper Flash
Retaining nut/washer (optional, order if req.)	Stainless steel
Flange retainers (optional, order if req.)	Stainless steel
'O' Rings	Nitrile NI70 or as specified by customer

Notes:

- Contact CRE for any special-order materials required

'C' Electrical Connector Subsea / Underwater / Marine

Part numbering:

Connector example:

PL	C	07	M		OF	4500	24	01	Ti	
									*	M.O.C., SS std, Ti, AL, Pk etc.
									*	Oil filled interface
										Wire gauge
										Moulded cable tail length in mm (i.e 4500mm), standard cores.
										Oil filled, PBOF (Pressure Balanced Oil Filled)
									*	H / H2 / H3 if the connector has a hybrid option
										Male / Female
										Number of contacts, BC (Blanking Cap)
										Connector family 'A', 'B', 'C' etc.
										PL - Plug in Line PR - Plug Right Angle

Notes:

- For standard moulded assemblies, the part number structure indicated * above is left blank.
- Where custom wired moulded tail is required, Engineering will issue a CA**** (Connector Assembly Part Number) to substitute for the wire length/gauge in the part number structure. For example, in the part number above 090024 would be replaced by CA followed by a four digit number to create a unique identifier.

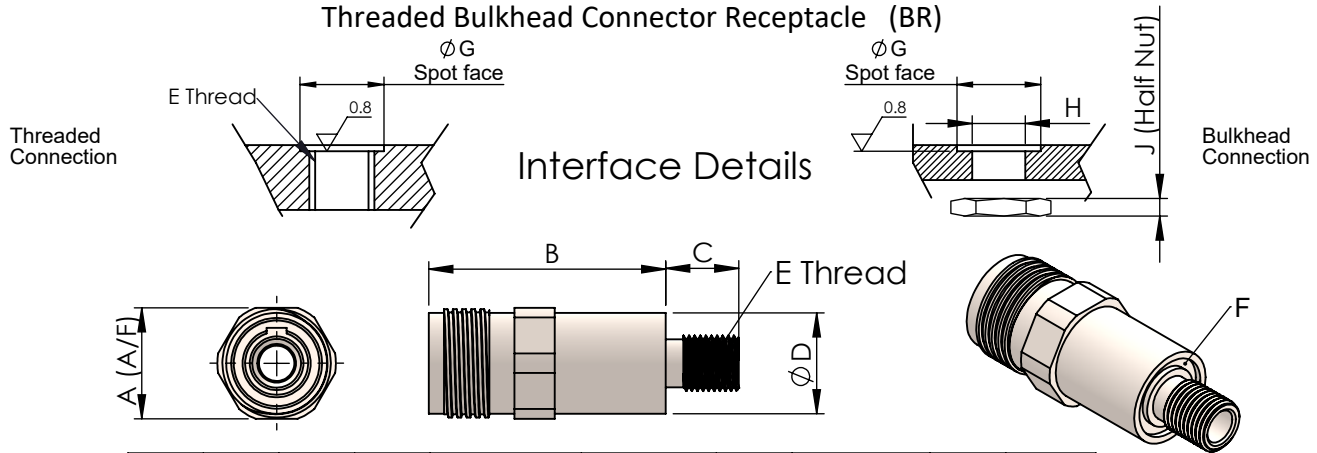
Component	Material
Connector Body	Stainless steel 316L standard
Locking Collar	Aluminium Nickel Bronze
Backing Washer	Acetal
Contact Insert	Epoxy or Glass to Metal
Electrical Contacts	Leaded Nickel Copper C(& or K41)
Plating detail	1um Acid Gold over 2.5 um Nickel Copper Flash
'O' Rings	Nitrile NI70 or as specified by customer

Notes:

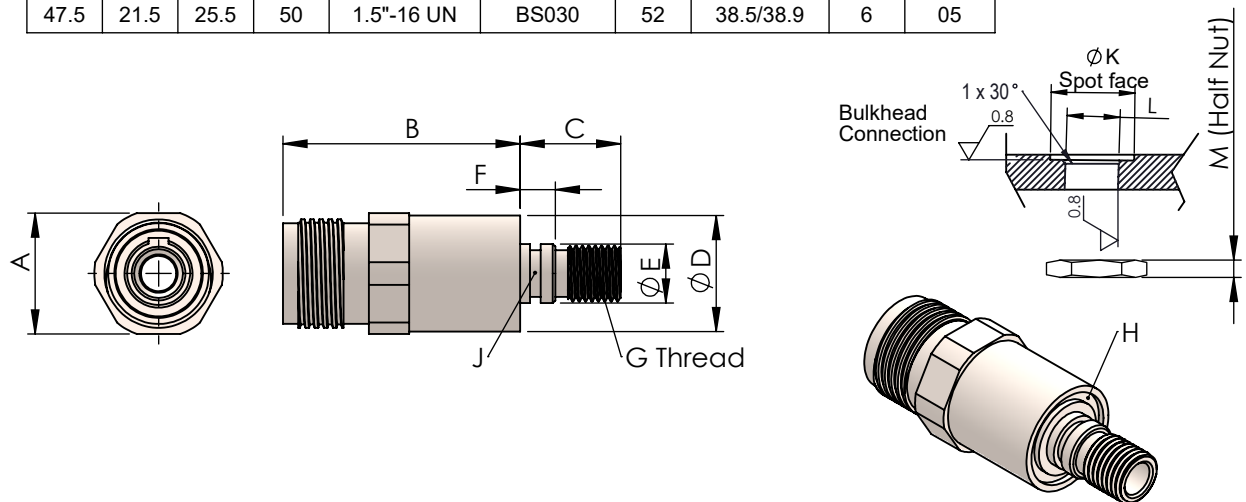
- Contact CRE for any special-order materials required

Reference Dimensions 'C' Connector

Threaded Bulkhead Connector Receptacle (BR)



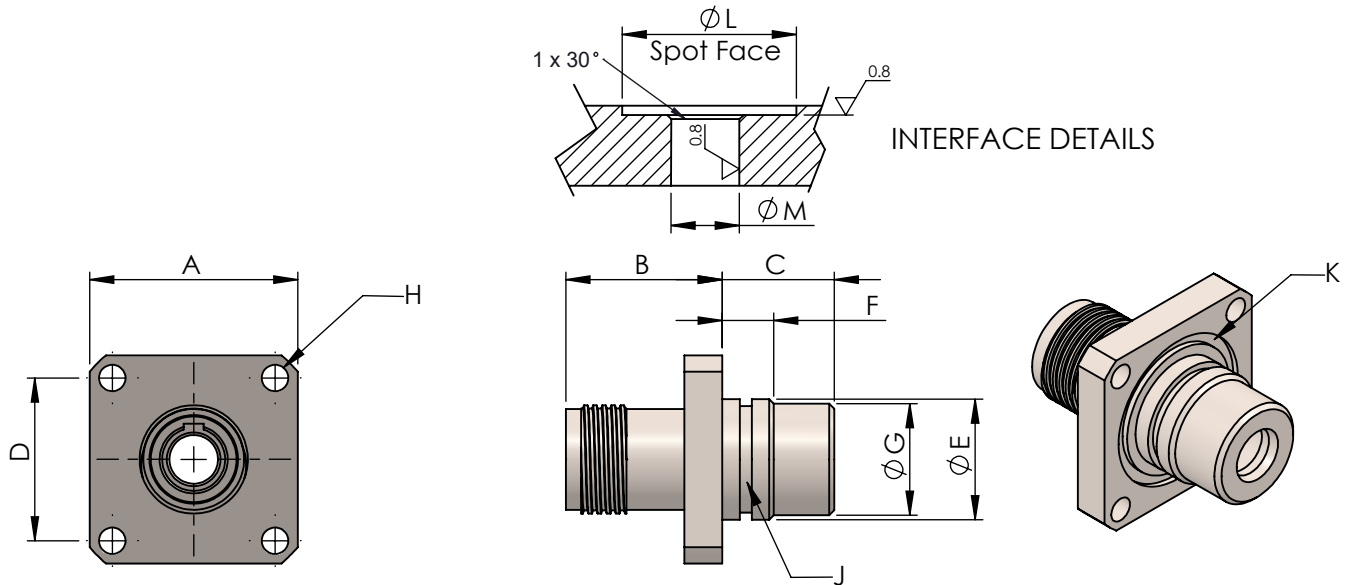
A	B	C	D	E	F-O'Ring	G	H	J	TYPE
40	51	14	36	3/4"-16 UNF	BS119	40	19.4/19.9	5	03
40	51	14	37.16	7/8"-14 UNF	BS120	40	22.6/23.0	5	01
40	51	14	39	1.0"-12 UNF	BS121	40	25.8/26.2	6	02
40	51	22	39	1.0"-12 UNF	BS122	40	25.8/26.2	6	04
40	51	22	39	1.0"-14 UNS	BS122	40	25.8/26.2	6	10
40	56	14	39	1.0"-12 UNF	BS121	40	25.8/26.2	6	13
40	56	22	39	1.0"-12 UNF	BS121	40	25.8/26.2	6	15
40	51	14	49.5	M36.5 x 1p	BS128	52	37.5	6	07
47.5	21.5	25.5	50	1.5"-16 UN	BS030	52	38.5/38.9	6	05



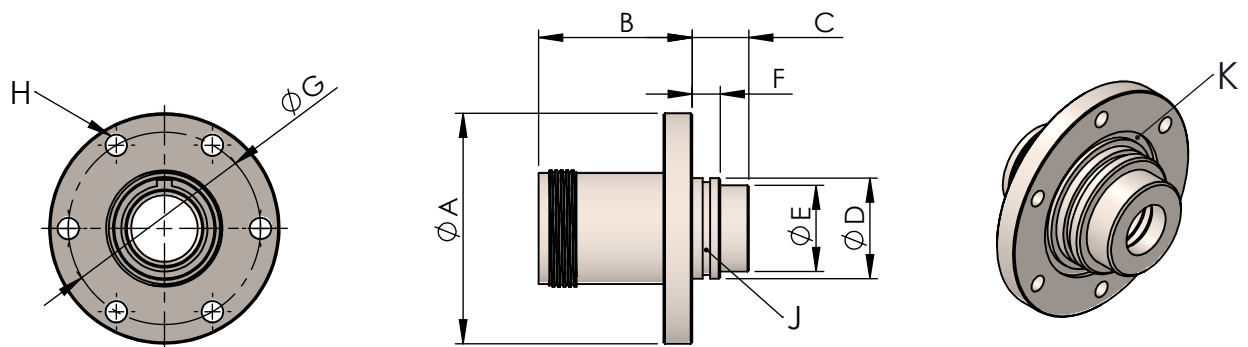
A	B	C	D	E	F	G	H-O'Ring	J-O'Ring	K	L	M	TYPE
38.1	39.8	31.2	41.15	30	10	1.1/8"-16 UN	BS027	BS023	44	30.1/30.139	6	08
40	51	34.25	45	33	9.25	1.1/4"-12 UNF	BS126	BS122	47	33.35/33.389	6	09
47.5	47.5	21	50	38.1	26	1.5"-16 UN	BS030	N/A	52	38.15/38.2	6	06

Reference Dimensions 'C' Connector

Flanged Bulkhead Connector Receptacle (FR)



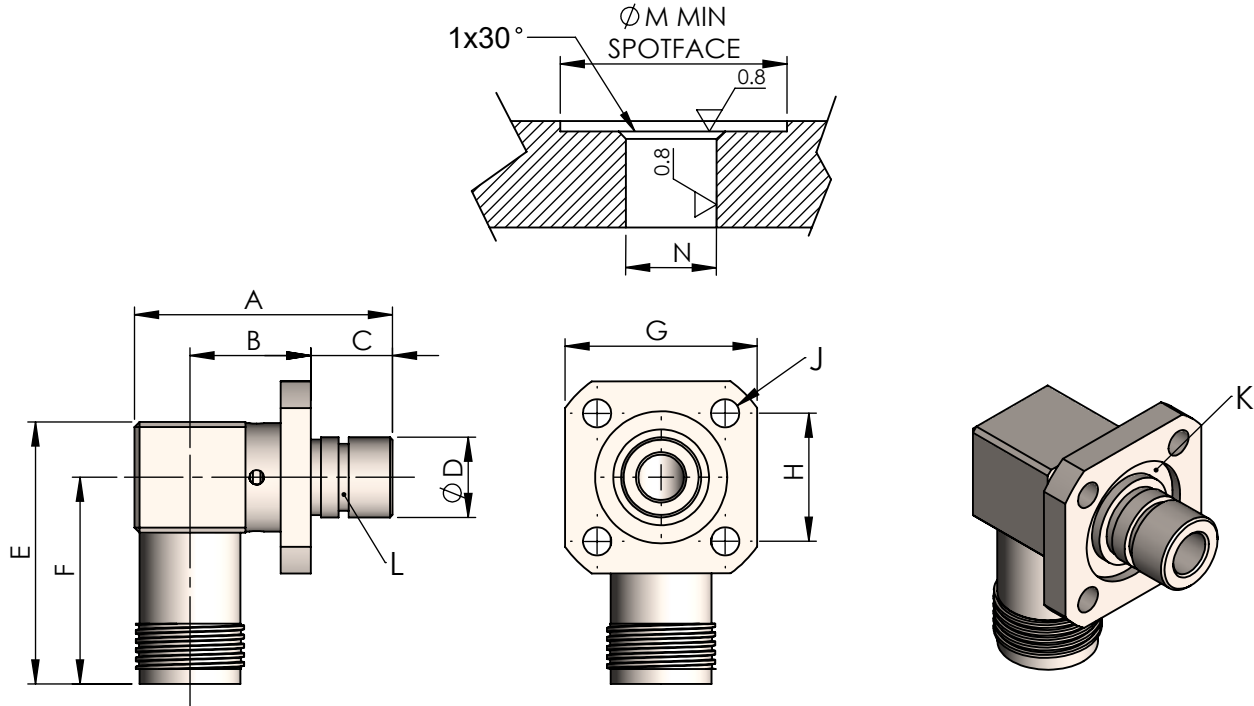
A	B	C	D	E	F	G	H	J-'O'Ring	K-'O'Ring	L	M	TYPE
44.45	44	17.78	36.83	29.97	N/A	N/A	4.37	BS023	BS027	64	30.1/30.139	07
45	57.3	N/A	31.8	18.8	12.7	N/A	7	N/A	22 x 2	64	18.85/18.9	17
50.8	42	12.7	38.1	25.15	N/A	N/A	7.5	BS020	BS125	70	25.25/25.283	05
50.8	39.5	12.7	38.1	25.15	N/A	N/A	7.5	N/A	34 x 3	70	25.2/25.25	03
50.8	47.5	12.7	38.1	25.15	N/A	N/A	7.5	BS020	BS125	70	25.25/25.283	11
50.8	47	12.7	38.1	25.15	N/A	N/A	7.5	BS020	BS125	70	25.25/25.283	12
50.8	45	12	38.1	25.4	12	N/A	M6	BS020	BS125	70	25.5/25.533	14
50.8	42	12.7	38.1	29.97	12.7	N/A	7.5	BS023	BS125	70	30.1/30.139	16
50.8	41	16	38.1	30	4	26.15	6.7	N/A	BS125	70	30.05/30.1	09
66.8	37	12.5	50.8	38	N/A	N/A	8.75	BS028	BS130	90	38.1/38.139	01
66.8	37	24	50.8	38	4	30	8.75	N/A	BS130	90	38.05/38.1	02
76.2	37	25	63.5	50.75	12.3	41.28	8.75	BS032	BS139	105	50.85/50.896	06



A	B	C	D	E	F	G	H	J-'O'Ring	K-'O'Ring	L	M	TYPE
76.2	50.75	18.75	33.25	28.5	9.25	63.5	7.1	BS025	BS131	78	33.35/33.389	04
98.3	37	25	50.72	41.14	12.3	82.55	7	BS133	BS139	100	50.82/50.866	13

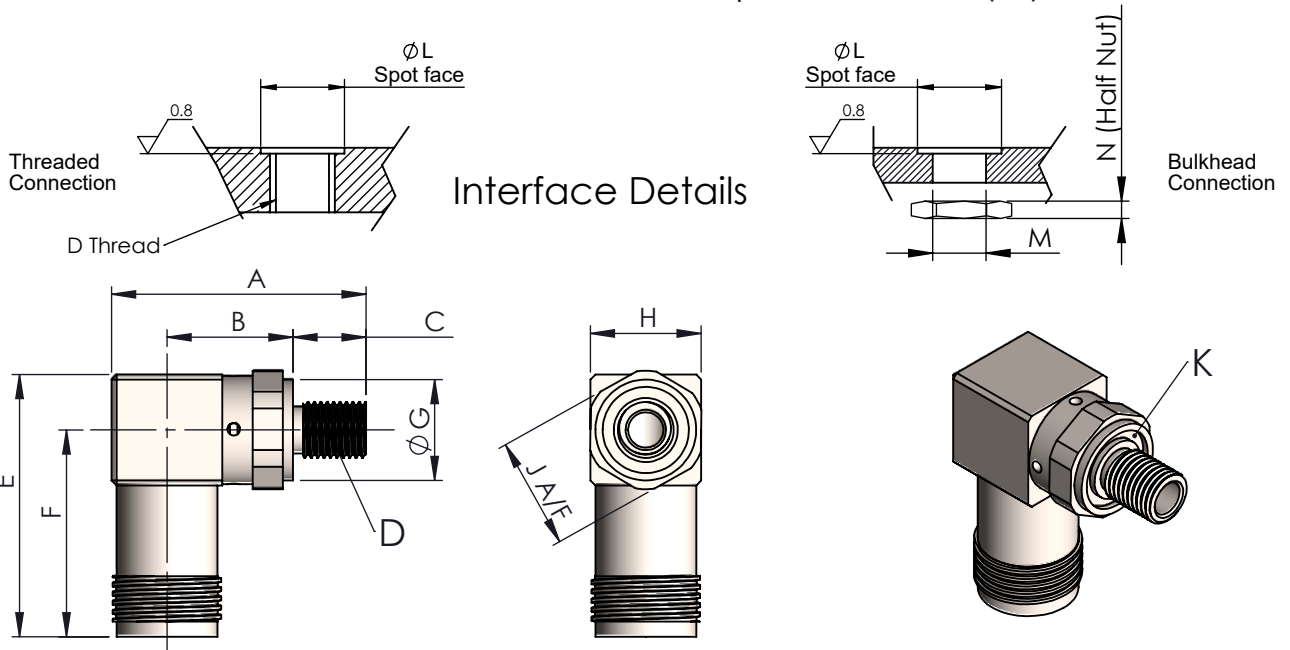
Reference Dimensions 'C' Connector

Low Profile 90° Bulkhead Connector Receptacle - Flanged (FR)



A	B	C	D	E	F	G	H	J	K'O'Ring	L'O'Ring	M	N	TYPE
75	39	16	25.15	74	54	50.8	38.1	7.5	BS125	BS020	68	25.25/25.283	LPF01

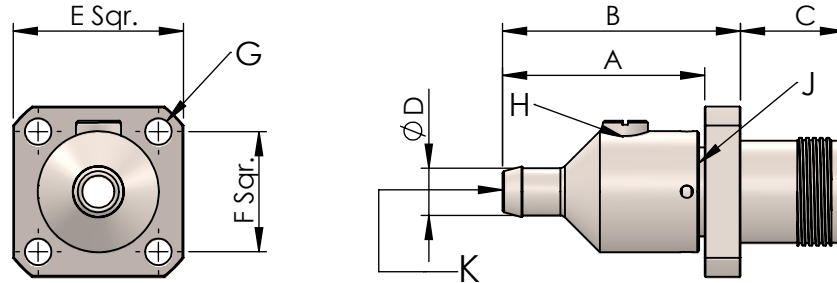
Low Profile 90° Bulkhead Connector Receptacle - Threaded (BR)



A	B	C	D	E	F	G	H	J	K'O'Ring	L	M	N	TYPE
74	39	15	3/4-16 UNF	74	54	N/A	40	40	BS119	46	19.4/19.9	4	LPT01

Reference Dimensions 'C' Connector

Flanged Bulkhead cable Receptacle - Straight Backshell (FPL)



A	B	C	D	E	F	G	H-'O' Ring	J-'O' Ring	BORE K	TYPE
61.75	69.5	27	15	66.8	50.8	8.75	6 X 1.5	30 x 2	12	FPL02
63.5	71.25	27	21	66.8	50.8	8.75	6 x 1.5	30 x 2	17	FPL01
81.75	89.5	27	21	66.8	50.8	8.75	6 X 1.5	30 x 2	17	FPL03
63.5	71.25	27	27	66.8	50.8	8.75	6 X 1.5	30 x 2	23	FPL04
61.75	69.5	27	1-1/16 UNF JIC-12	66.8	50.8	8.75	6 X 1.5	30 x 2	16	FPL05

Extended Bulkhead Type

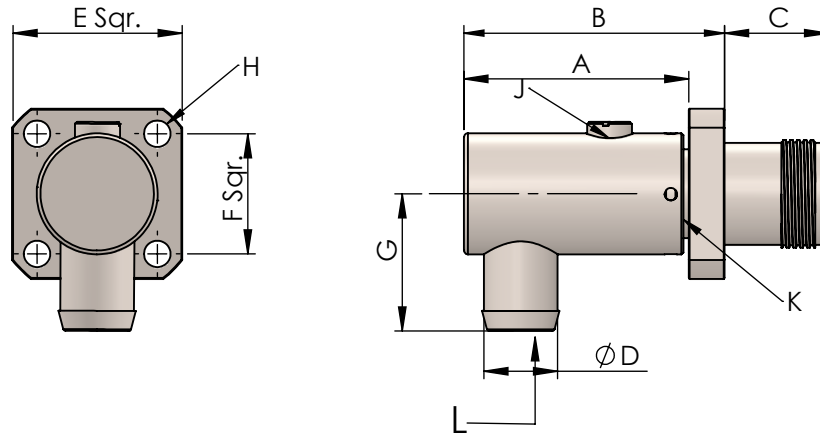
A	B	C	D	E	F	G	H-'O' Ring	J-'O' Ring	BORE K	TYPE
74.75	82.75	27	15	66.8	50.8	8.75	6 X 1.5	30 x 2	12	FPL07
76.5	84.5	27	21	66.8	50.8	8.75	6 X 1.5	30 X 2	17	FPL06
94.75	102.75	27	21	66.8	50.8	8.75	6 X 1.5	30 x 2	17	FPL08
76.5	84.5	27	27	66.8	50.8	8.75	6 X 1.5	30 X 2	23	FPL09
74.75	82.75	27	1-1/16 UNF JIC-12	66.8	50.8	8.75	6 X 1.5	30 x 2	16	FPL10

Extended Bulkhead - Backpressure Type

A	B	C	D	E	F	G	H-'O' Ring	J-'O' Ring	BORE K	TYPE
70.25	78.25	31.5	15	66.8	50.8	8.75	6 X 1.5	30 x 2	12	FPL11
72.0	80.0	31.5	21	66.8	50.8	8.75	6 X 1.5	30 X 2	17	FPL12
90.25	98.25	31.5	21	66.8	50.8	8.75	6 X 1.5	30 x 2	17	FPL13
72	80.0	31.5	27	66.8	50.8	8.75	6 X 1.5	30 X 2	23	FPL14
70.25	78.25	31.5	1-1/16 UNF JIC-12	66.8	50.8	8.75	6 X 1.5	30 x 2	16	FPL15

Reference Dimensions 'C' Connector

Flanged Bulkhead cable Receptacle - 90 Deg. Backshell (FPR)



A	B	C	D	E	F	G	H	J-'O' Ring	K-'O' Ring	BORE L	TYPE
49.5	57.25	27	15	66.8	50.8	41	8.75	6 X 1.5	30 x 2	12	FPR01
43.5	51.25	27	19	66.8	50.8	41	8.75	6 X 1.5	30 x 2	15.5	FPR04
49.5	57.25	27	21	66.8	50.8	41	8.75	6 X 1.5	30 x 2	17	FPR03
71.5	79.25	27	21	66.8	50.8	41	8.75	6 X 1.5	30 x 2	17	FPR02
71.5	79.25	27	27	66.8	50.8	41	8.75	6 X 1.5	30 x 2	17	FPR05

Extended Bulkhead Type

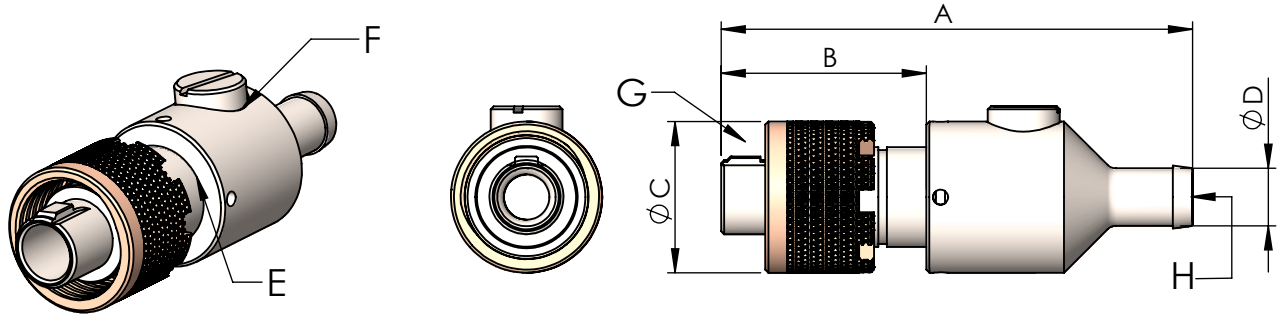
A	B	C	D	E	F	G	H	J-'O' Ring	K-'O' Ring	BORE L	TYPE
62.5	70.5	27	15	66.8	50.8	8.75	8.75	6 X 1.5	30 x 2	12	FPR06
54.5	64.5	27	19	66.8	50.8	8.75	8.75	6 X 1.5	30 x 2	15.5	FPR09
62.5	70.5	27	21	66.8	50.8	8.75	8.75	6 X 1.5	30 x 2	17	FPR08
84.5	92.5	27	21	66.8	50.8	8.75	8.75	6 X 1.5	30 x 2	17	FPR07
84.5	92.5	27	27	66.8	50.8	8.75	8.75	6 X 1.5	30 x 2	17	FPR10

Extended Bulkhead - Backpressure Type

A	B	C	D	E	F	G	H	J-'O' Ring	K-'O' Ring	BORE L	TYPE
58.0	66.0	31.5	15	66.8	50.8	8.75	8.75	6 X 1.5	30 x 2	12	FPR11
50.0	60.0	31.5	19	66.8	50.8	8.75	8.75	6 X 1.5	30 x 2	15.5	FPR12
58.0	66.0	31.5	21	66.8	50.8	8.75	8.75	6 X 1.5	30 x 2	17	FPR13
80.0	88.0	31.5	21	66.8	50.8	8.75	8.75	6 X 1.5	30 x 2	17	FPR14
80.0	88.0	31.5	27	66.8	50.8	8.75	8.75	6 X 1.5	30 x 2	17	FPR15

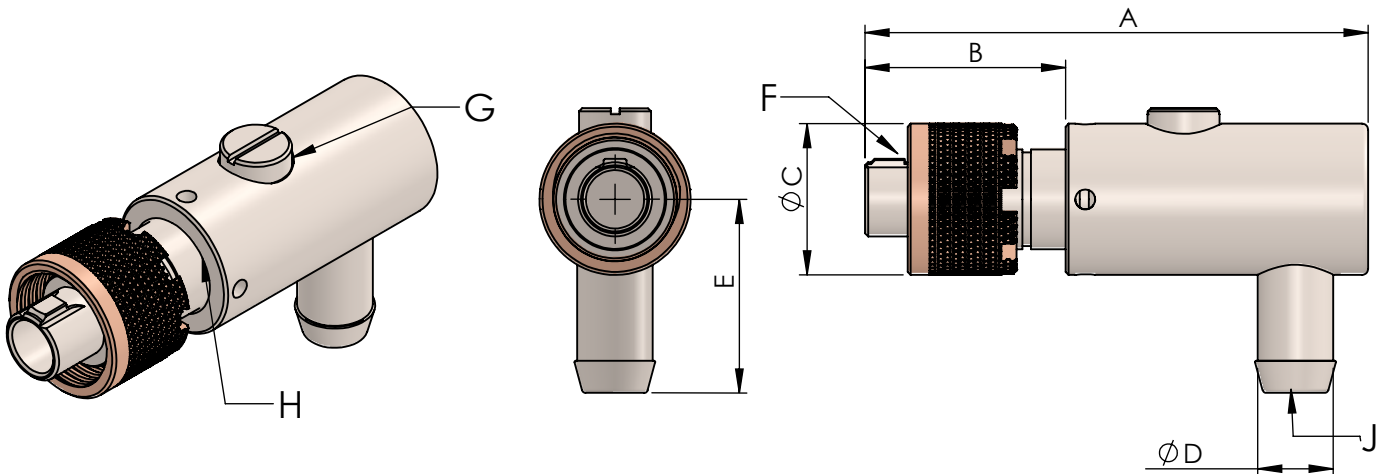
Reference Dimensions 'C' Connector

Backshell Cable Connector Receptacle (PL)



A	B	C	D	E-'O'Ring	F-'O'Ring	G-'O'Ring	BORE H	TYPE
96.5	36.25	45	15	BS025	6 x 1.5	30 x 2	12	02
98.25	36.25	45	21	BS025	6 x 1.5	30 x 2	17	01
116.5	36.25	45	21	BS025	6 x 1.5	30 x 2	17	03
98.25	36.25	45	27	BS025	6 x 1.5	30 x 2	23	04
96.5	36.25	45	1-1/16 UNF JIC-12	BS025	6 x 1.5	30 x 2	16	05

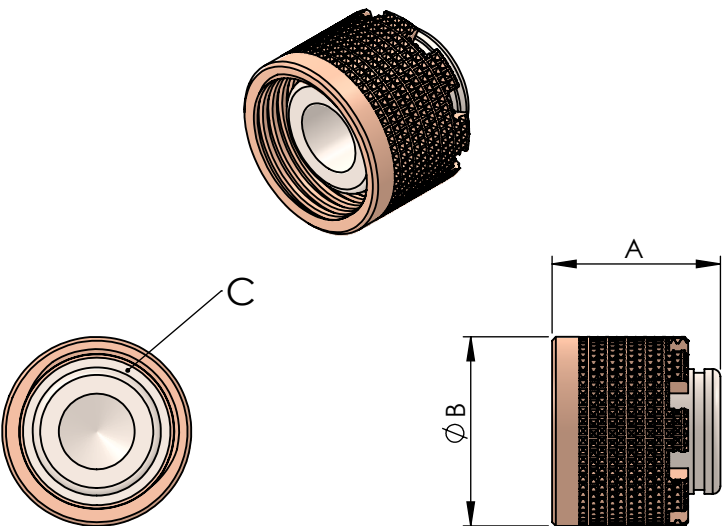
Backshell Cable Connector Receptacle-90 Deg. (PR)



A	B	C	D	E	F-'O'Ring	G-'O'Ring	H-'O'Ring	BORE J	TYPE
84.25	36.25	45	15	41	BS025	6 x 1.5	30 x 2	12	01
78.25	36.25	45	19	41	BS025	6 x 1.5	30 x 2	155	04
84.25	36.25	45	21	41	BS025	6 x 1.5	30 x 2	17	03
106.25	36.25	45	21	41	BS025	6 x 1.5	30 x 2	17	02
106.25	36.25	45	27	41	BS025	6 x 1.5	30 x 2	23	05

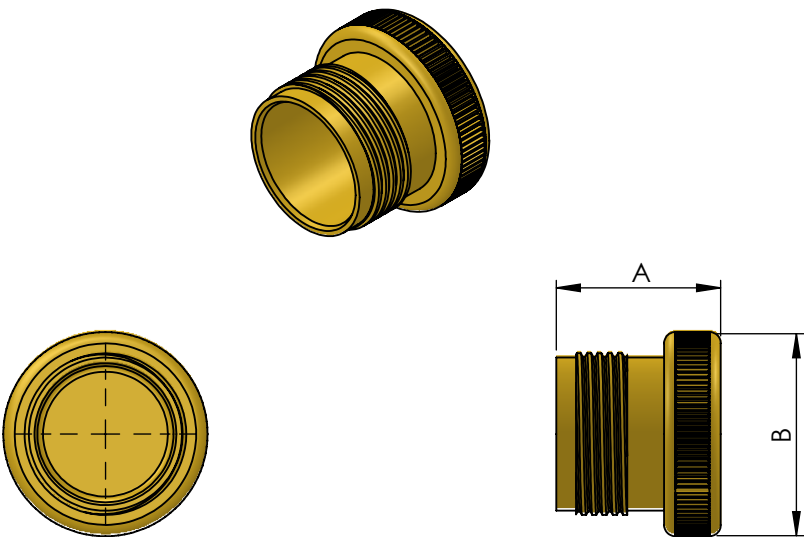
Reference Dimensions 'C' Connector

Bulkhead Blanking Plug - PLCBC



A	B	C-'O'Ring
24.9	45	BS025

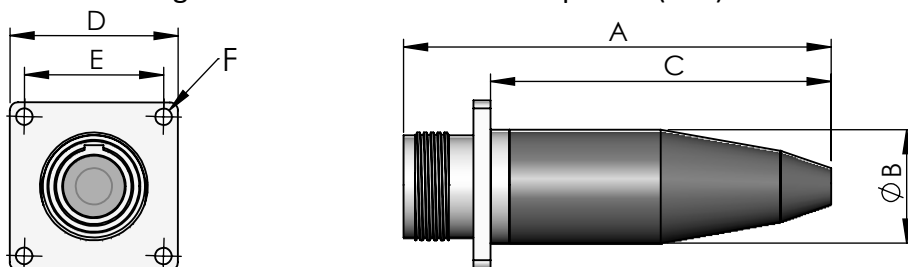
Cable Connector Blanking Plug - BRCBC



A	B
31	46

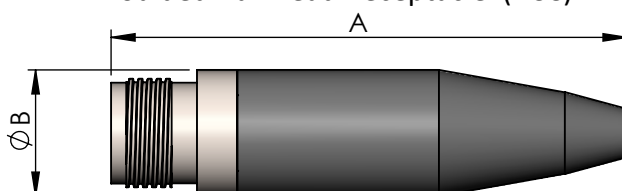
Reference Dimensions 'C' Connector

Flanged Bulkhead Connector Receptacle (FRC)



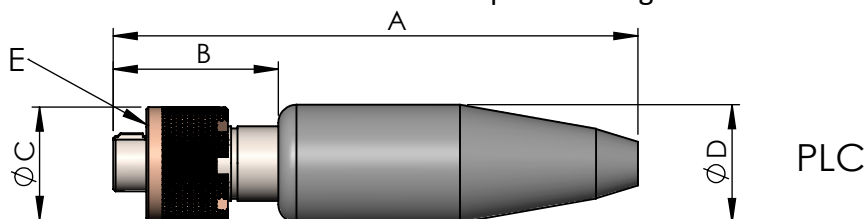
A	B	C	D	E	F
132	38	91	66.8	50.8	8.75

Moulded Bulkhead Receptacle (RCC)



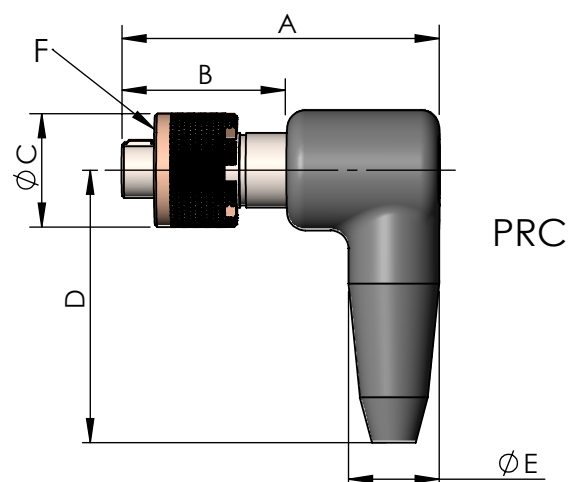
A	B
138	45

Moulded Cable Connector Receptacle-Straight



A	B	C	D	E-'O'Ring
138	40	45	45	BS025

Moulded Cable Connector Receptacle-90°

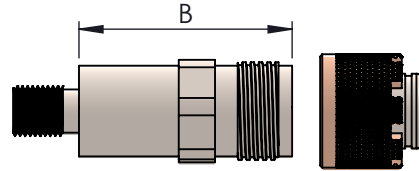


A	B	C	D	E	F-'O'Ring
96	40	45	85	40	BS025

Mould Sizes Are Indicative

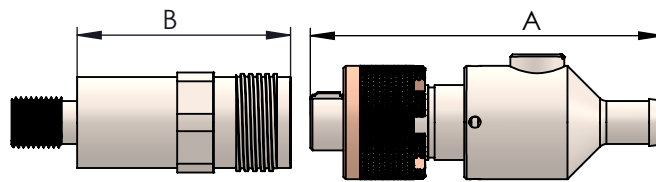
Note: Step files for design purposes available from engineering@CRE-marine.com

Assembled Dimensions 'C' Connector



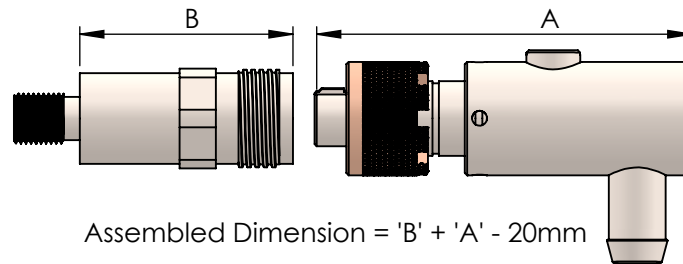
PLCBC

Assembled Dimension = 'B' + 9mm



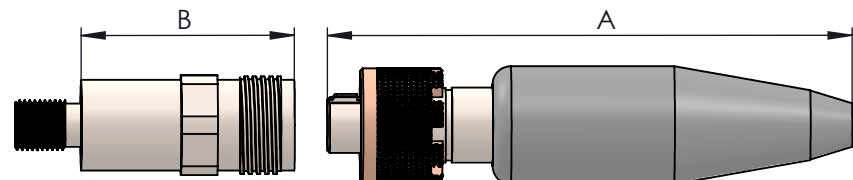
PLCOF01
 PLCOF02
 PLCOF03
 PLCOF04
 PLCOF05

Assembled Dimension = 'B' + 'A' - 20mm



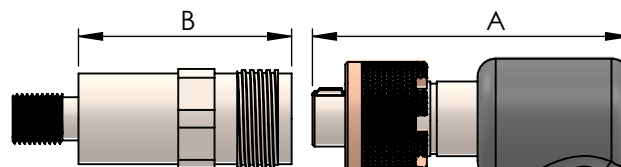
PRCOF01
 PRCOF02
 PRCOF03
 PLCOF04
 PLCOF05

Assembled Dimension = 'B' + 'A' - 20mm



PLC

Assembled Dimension = 'B' + 'A' - 20mm



PRC

Assembled Dimension = 'B' + 'A' - 20mm

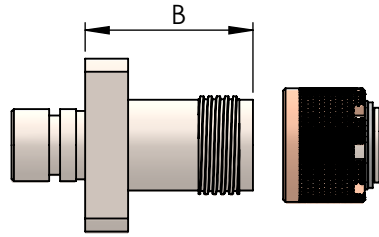
THREADED BULKHEADS
 BRC01 - BRC10
 BRC13, BRC15

EXAMPLE: BRC01 'B' = 51.0, PLCOF02 'A' = 96.5
 THEREFORE ASSEMBLED DIMENSION IS $51.0 + 96.5 - 20 = 127.5$

Mould Sizes Are Indicative

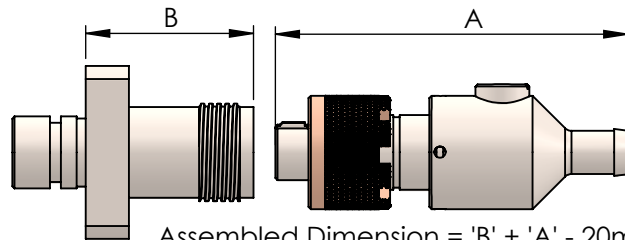
Note: Step files for design purposes available from engineering@CRE-marine.com

Assembled Dimensions 'C' Connector



PLCBC

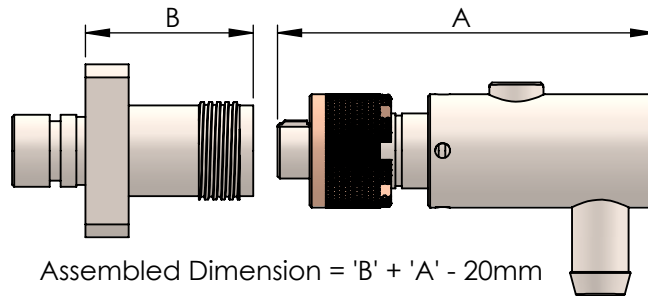
Assembled Dimension = 'B' + 9mm



PLCOF01
 PLCOF02
 PLCOF04
 PLCOF05

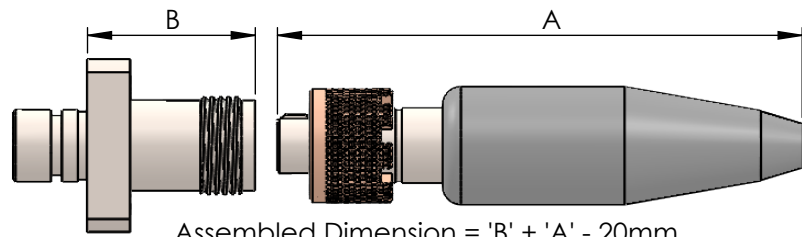
Assembled Dimension = 'B' + 'A' - 20mm

FLANGED BULKHEADS
 FRC01 - FRC07
 FRC09,FRC11,FRC14
 FRC16,FRC17



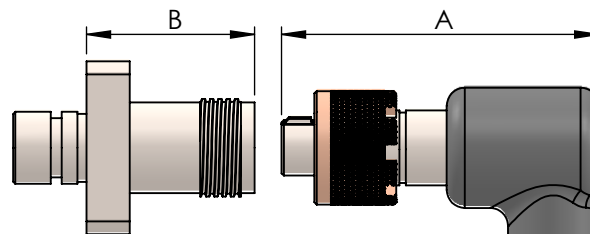
PRCOF01
 PRCOF02
 PRCOF03
 PLCOF04
 PLCOF05

Assembled Dimension = 'B' + 'A' - 20mm



PLC

Assembled Dimension = 'B' + 'A' - 20mm



PRC

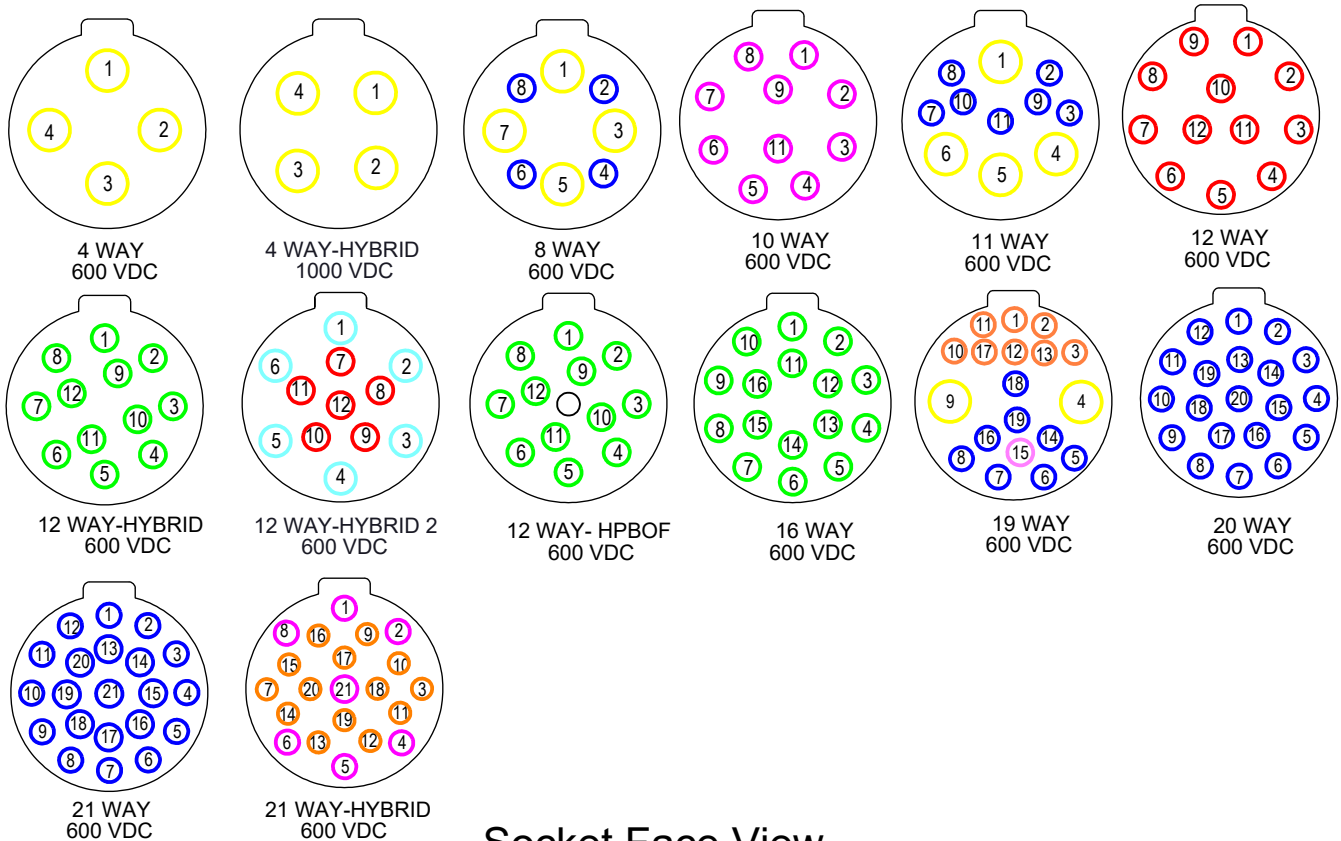
Assembled Dimension = 'B' + 'A' - 20mm

EXAMPLE: FRC01 'B' = 37.0, PLCOF02 'A' = 96.5
 THEREFORE ASSEMBLED DIMENSION IS 37.0 + 96.5 - 20 = 113.5

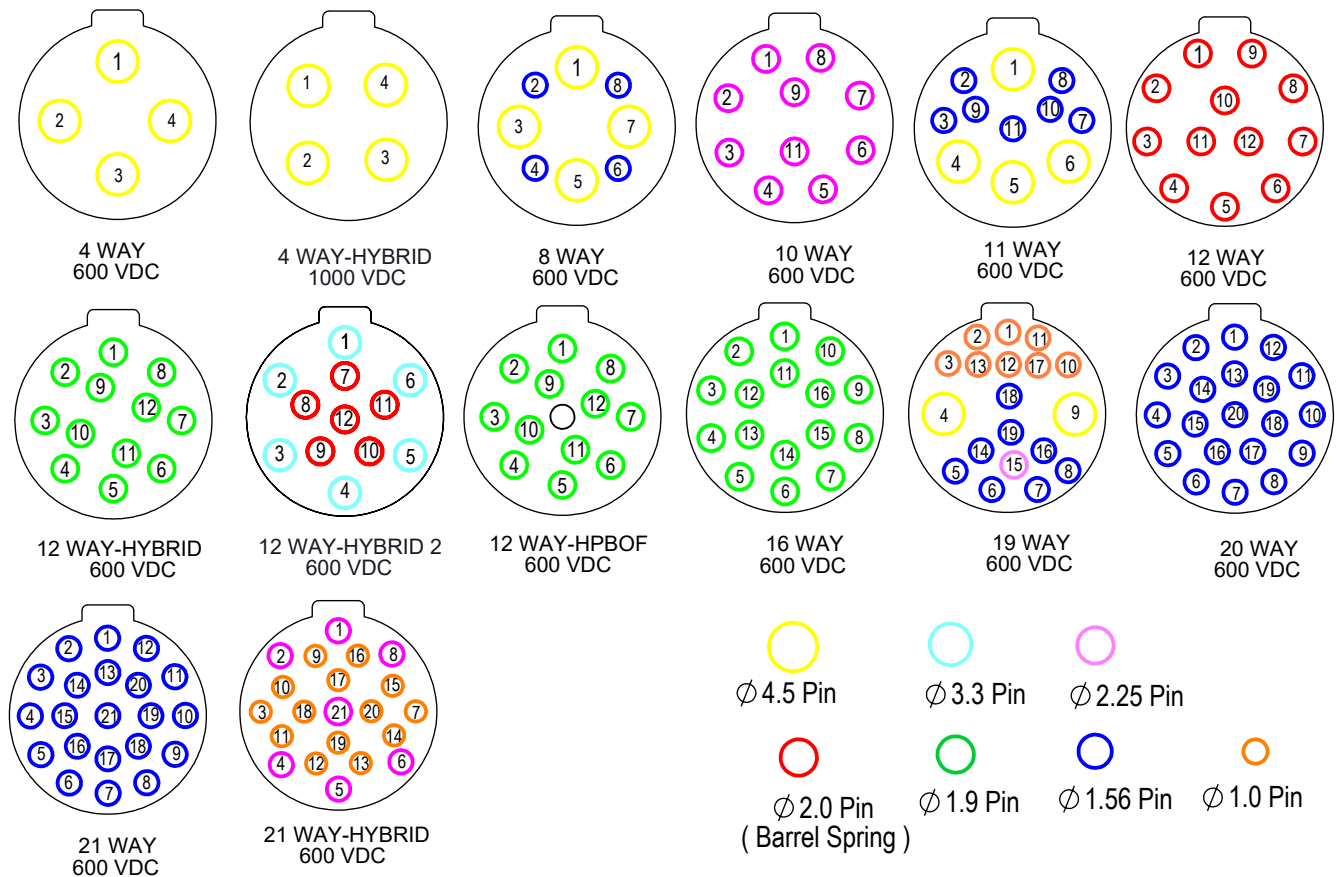
Mould Sizes Are Indicative

Note: Step files for design purposes available from engineering@CRE-marine.com

Pin Face View

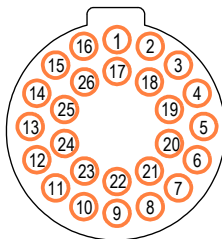


Socket Face View

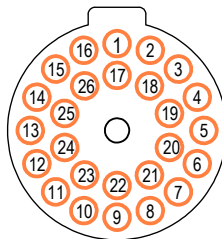


Certain connectors are suitable for 1000V working voltage.
 Please confirm your voltage requirements when ordering the connector
 For current carrying capacity and wire recommendations see page 18

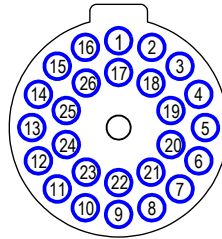
Pin Face View



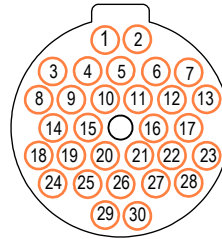
26 WAY
600 VDC



26 WAY-PBOF
600 VDC

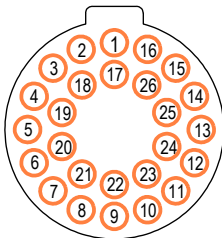


26 WAY- HPBOF
600 VDC

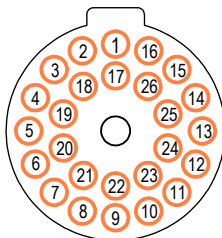


30 WAY- PBOF
600 VDC

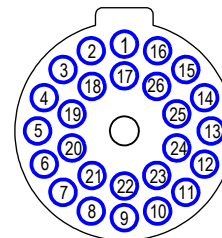
Socket Face View



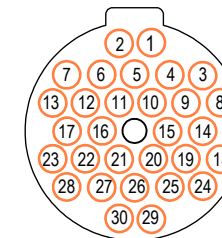
26 WAY
600 VDC



26 WAY-PBOF
600 VDC



26 WAY-HPBOF
600 VDC

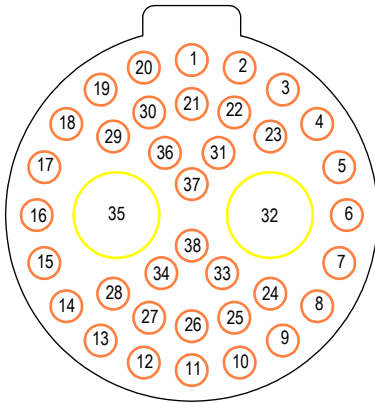


30 WAY- PBOF
600 VDC

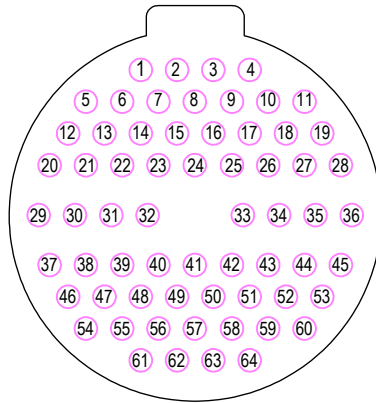


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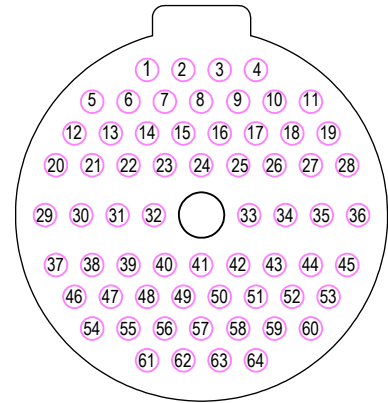
Pin Face View



38 WAY
600 VDC

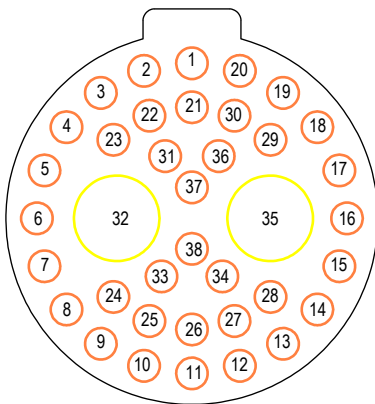


64 WAY
600 VDC

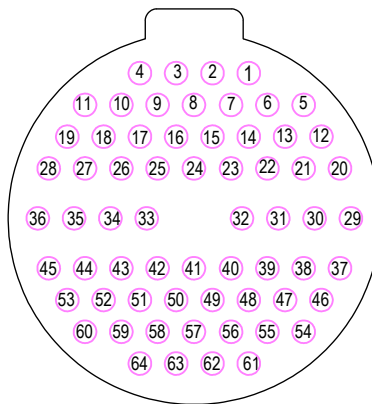


64 WAY-PBOF
600 VDC

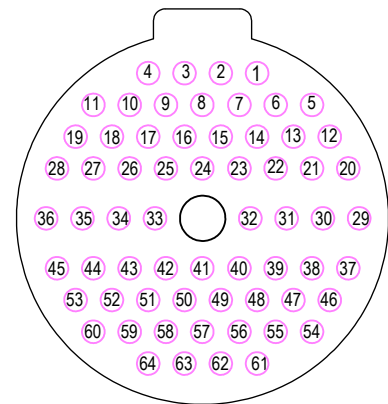
Socket Face View



38 WAY
600 VDC



64 WAY
600 VDC



64 WAY-PBOF
600 VDC



CRE recommend using a mating Bulkhead or Connector tail when carrying out continuity testing on Connectors with the 0.75mm contacts to minimise the risk of accidental damage to the contacts

Certain connectors are suitable for 1000V working voltage.
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Current Capacity and Wire Recommendations

- The wire options for bulkheads are governed by the through bore of the bulkhead body and the dimensions of the solder bucket on the contact.
- Heat, caused by an electrical current flowing through a conductor will determine the amount of current that the wire will handle.
- The current rating follows industry standards for a single wire in free air at 30 deg. C with derating for bundled wires.
- The table below shows the current required to raise the temperature of a single insulated conductor to the limits of its insulation temperature.

Contact dia.	0.75	1.0	1.56	1.9	2.0	2.25	4.5
Wire size	24 awg	22 awg	16 awg	14 awg	12 awg	12 awg	4 awg
Current	8 amps	11 amps	26 amps	40 amps	50 amps	50 amps	170 amps
Contact rating based on PTFE type C cable							

Derating Factors for Bundled Conductors	
Bundle #	Derating Factor (x Amps)
2 - 5	0.8
6 - 15	0.7
16 - 30	0.5

Recommended torque for threaded interfaces manufactured in 316L Stainless Steel assembled into metallic housings.

Thread	Torque N/m (Lubricated)	Torque Inch Pounds (Lubricated)
3/4-16 UNF	7-9	60-65
7/8-14 UNF	8-9	75-80
1.0-12 UNF	9-11	85-95
1.0-14 UNS	9-11	85-95
11/8-16 UNEF	11-13	95-105
11/4-12 UNS	12-14	110-120
11/2-16 UNS	15-17	130-140
M36.5 - 1.0	14-16	125-130

The table above shows the recommended tightening torque values for threaded bulkhead interfaces into metallic housings.

We recommend the use of a small quantity of anti-seize lubricant such as Copaslip applied to the pin thread as a lubricant to aid the make-up process.

Should you require any further information or advice please contact CRE direct on sales@cre-marine.com