SEACON

EX-MATE

EXD EXPLOSION PROOF CONNECTOR RANGE

MATE

TRAC14ATEX0005X
IECEx TRC14.0003X

TE connectivity

SECTION **PAGE**

EX-MATE

INTRODUCTION

In recent years there has been an increased requirement for connectors to operate in hazardous environments and many applications now require quick and safe disconnection of connectors to be used in these environments. As a result SEACON (europe) Ltd has developed a new robust range of Exd connectors.

AVAILABILITY

The EX-MATE is based around SEACON (europe)'s existing and successful SEA-MATE range and can be wet mated in depths of up to 50m in addition to its suitability for use in explosive environments. It is also available in 4 shell sizes (G, K, L, M) between 2 & 37 contact configurations. However like the SEA-MATE, this series has interchangeable inserts so can be adapted to a number of pin configurations. In addition, the EX-MATE incorporates an ATEX - IECEx approved glanding system for the cable which is encapsulated within the over mold, making it suitable for a range of hazardous environments.

APPLICATIONS

The EX-MATE is suitable for a number of applications including Topside FPSO, Drilling vessels or other potentially explosive environments as covered by the extensive qualification testing.

TESTING

The EX-MATE has undergone testing at an independent testing house and has achieved Atex certification to II 2G Ex d IIB T6 amb -40°C +55°C. Full ATEX - IECEx testing information is available upon request.

PART NUMBER SYSTEM - EXAMPLE

EXG - 4 - BCR

- BCR - Bulkhead Connector Receptacle
  CCR - Cable Connector Receptacle
  CCP - Cable Connector Plug
- Number of Contacts
- Shell Size (G, K, L, M)
- EX-MATE Connector Series

GENERAL INFORMATION

COMPONENT	MATERIAL
BULKHEAD BODY (BCR/CCR)	316L Stainless Steel Ferralium version also available
CCP BODY	316L Stainless Steel c/w Aluminum Bronze NES 833 engaging nut Ferralium version also available
CONNECTOR INSERT	Glass Reinforced Epoxy (GRE)
ELECTRICAL CONTACTS	Brass CZ124 gold plated as per MIL-G-45204
O-RING (BULKHEAD/FCR)	Nitrile

CATEGORY	VALUE
MATED PRESSURE	Up to 7,500 psi (5,200m water depth)
OPEN FACE PRESSURE	Up to 7,500 psi (5,200m water depth)
VOLTAGE RATING	600 VDC/440 VAC
CURRENT RATING	Up to 10 amps (G size) Up to 4.3 amps (K, L & M sizes) Cable selection will need to meet the requirements of EN 60079-14

IP68 CERTIFICATION

Approved to IP Code (Ingress Protection) 68. This international standard classifies the level of protection provided against intrusion of dust and water in electrical enclosures.

In order to meet the requirements of the IP68 standard sample connectors were subjected to various tests as per the agreed program including pressure testing to 100m.

ExVeritas

1. Certificate of Accredited Testing
2. Test Type: Ingress Protection
3. Certificate Number: ExVeritas14TEST0492
4. Equipment: ExMate Subsea Connectors
5. Customer: Seacon (Europe) Ltd
6. Address: Seacon House, Hewett Road, Gapton Hall Industrial Estate, Great Yarmouth, Norfolk, NR31 0RB
7. The necessary tests and assessments are recorded in ExVeritas project file numbers EVL0492/A/1
8. The equipment has been assessed against the requirements of BS EN 60529:1992 inc. Amendments A1 and A2 and found to comply with Ingress Protection Level IP68.
9. ExVeritas takes no responsibility for the validity of any information supplied by the manufacturer on which parts of the assessment may be based upon and reports on the testing conducted on a supplied representative sample.
10. IP Coding: IP68 (100m rating)

On behalf of ExVeritas — Date: 16.10.2014

Sean Clarke CEng MSc. MIET
Certification Manager

NOTES:

· Connectors are designed for installation on one atmosphere vessels. For all other applications please contact SEACON.

SEACON (europe) LTD

ATEX - IECEx CERTIFICATION GUIDE

ZONING DEFINITIONS

Zones		Definitions
Gas	Dust	
0	20	A place in which an explosive atmosphere is continually present
1	**21**	**A place in which an explosive atmosphere is likely to occur in normal operation occasionally**
2	22	A place in which an explosive atmosphere is not likely to occur in normal operation, but if it does, only occurs for short periods

CATEGORIES

ATEX & IECEx Cat	Typical zone suitability
1G 1D	Equipment suitable for zone 0 Equipment suitable for zone 20
2G 2D	**Equipment suitable for zone 1** Equipment suitable for zone 21
3G 3D	Equipment suitable for zone 2 Equipment suitbale for zone 22

TYPES OF PROTECTION

GAS Type of protection	ATEX code	Standard
General requirements		EN 60079-0
Intrinsic safety	Ex ia & ib	EN 60079-11
Increased safety	Ex e	EN 60079-7
Flameproof	**Ex d**	**EN 60079-1**
Pressurisation	Ex p	EN 60079-2
Powder filling	Ex q	EN 60079-5
Encapsulation	Ex ma & mb	EN 60079-18
Oil immersion	Ex o	EN 60079-6
Type n	Ex n	EN 60079-15

II 2G Ex d IIB T6

TEMPERATURE

T-Class	Max °C
T1	450
T2	300
T3	200
T4	135
T5	100
T6	**85**

GROUPS

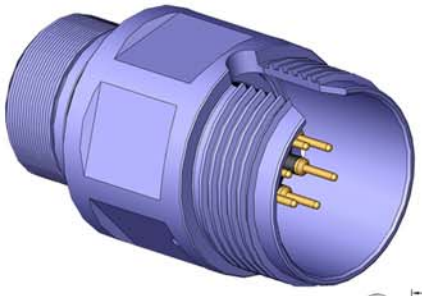
I	Electrical equipment intended for use in mines susceptible to firedamp
II	**Electrical equipment intended for use in places with an explosive gas atmosphere other than mines susceptible to firedamp**
III	Electrical equipment intended for us in places with an explosive dust atmosphere other than mines susceptible to firedamp

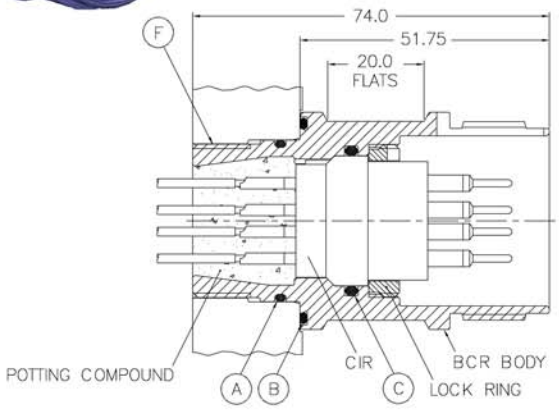
GAS GROUPS

IIA	Propane
IIB	**Ethylene**
IIC	Hydrogen / Acetylene

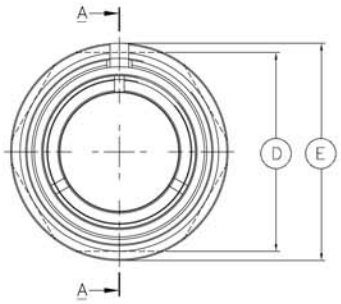
EX-MATE SERIES
EX-BCR

EX-MATE Bulkhead Connector Receptacle
Mates with EX-CCP

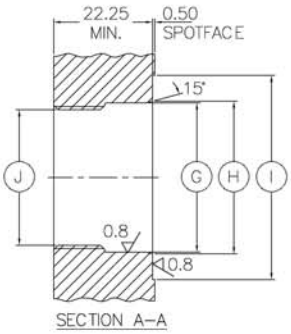




SECTION A–A



CONNECTOR	A - O-RING	B - O-RING	C - O-RING	D - HEX FLATS (MM)	E - Ø (MM)	F - THREAD
EXG-BCR	019	024	2-115	31.75	35.56	M22x1.5p 6g
EXK-BCR	025	029	2-121	41.28	45.10	M32x1.5p 6g
EXL-BCR	519	032	2-127	50.80	54.60	M40x1.5p 6g
EXM-BCR	134	035	2-133	60.32	64.15	M50x1.5p 6g



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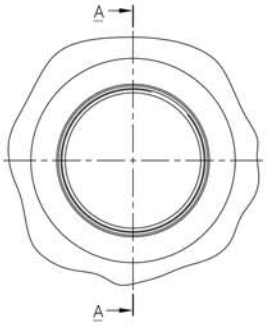
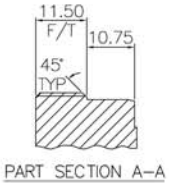




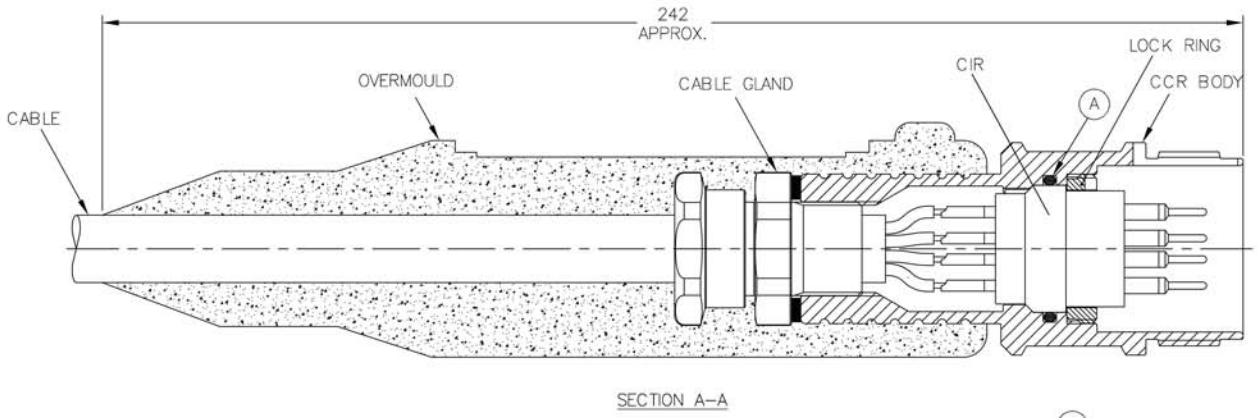
PART SECTION A–A

BCR MOUNTING INFORMATION

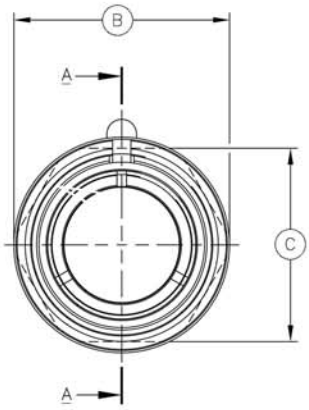
CONNECTOR	G - Ø (MM)	H - Ø MIN. (MM)	I - Ø MIN. (MM)	J - THREAD
EXG-BCR	24.05 24.10	24.84	37.00	M22x1.5p 6H
EXK-BCR	33.58 33.63	34.36	46.00	M32x1.5p 6H
EXL-BCR	43.10 43.15	43.90	56.00	M40x1.5p 6H
EXM-BCR	52.63 52.68	53.52	65.00	M50x1.5p 6H

EX-MATE SERIES
EX-CCR

EX-MATE Cable Connector Receptacle
Mates with EX-CCP



SECTION A–A

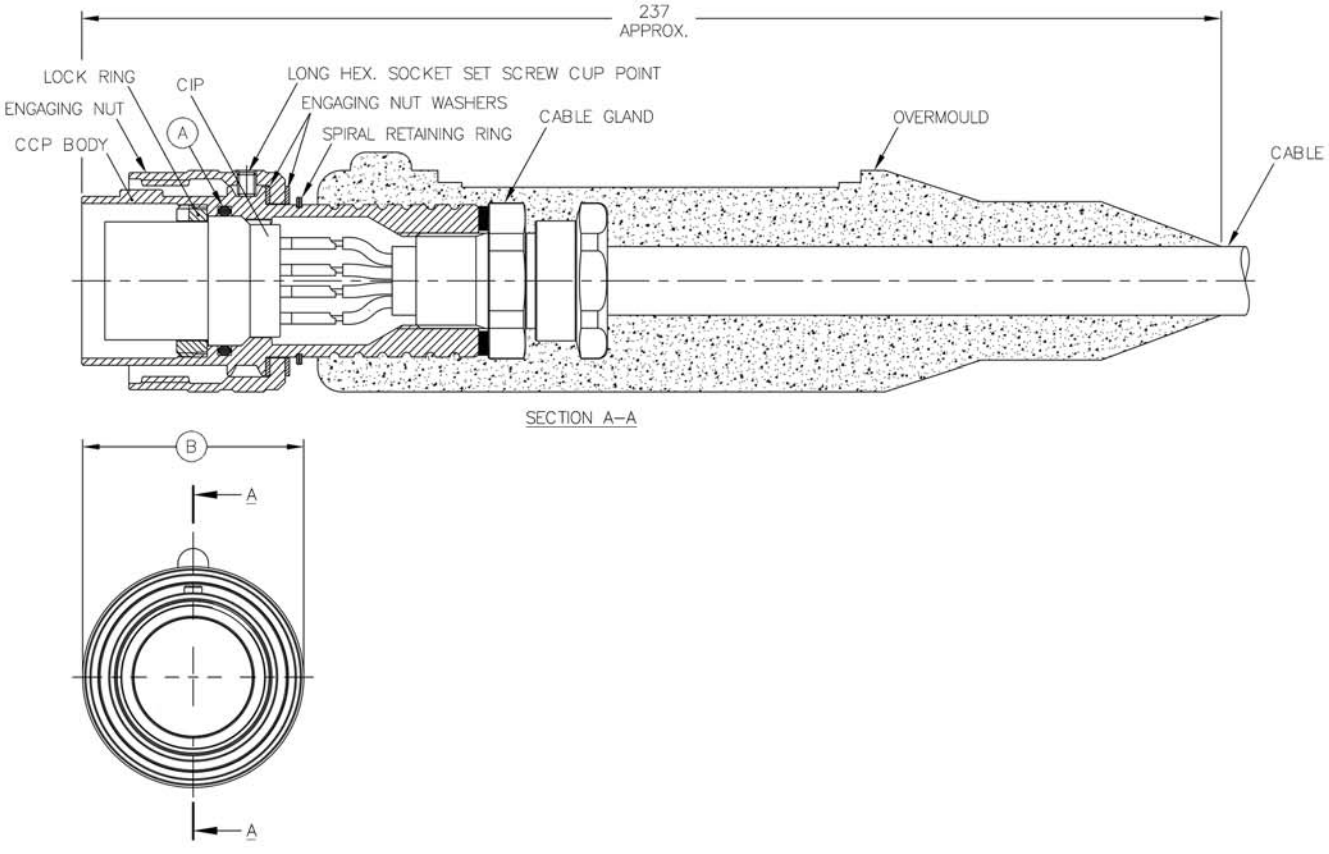


CONNECTOR	A - O-RING	B - Ø (MM)	C - HEX FLATS (MM)
EXG-CCR	2-115	40.00	31.75
EXK-CCR	2-121	46.00	41.28
EXL-CCR	2-127	54.60	50.80
EXM-CCR	2-133	64.15	60.32

NOTE:
· Cable selection will need to meet the requirements of EN 60079-14.

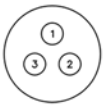
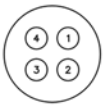
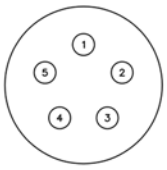
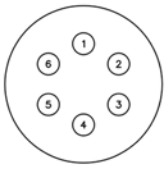
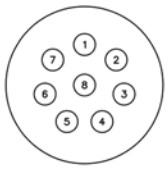
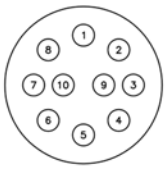
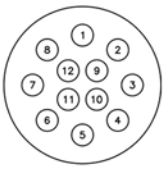
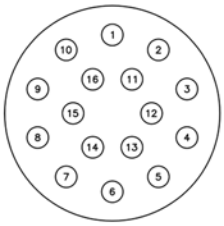
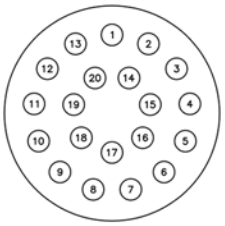
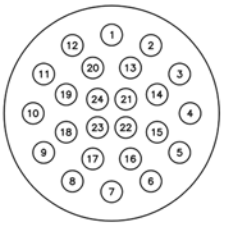
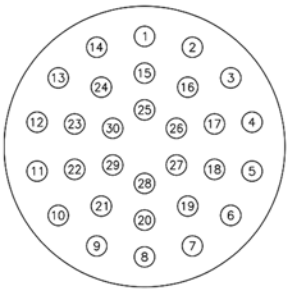
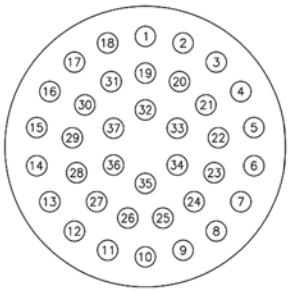
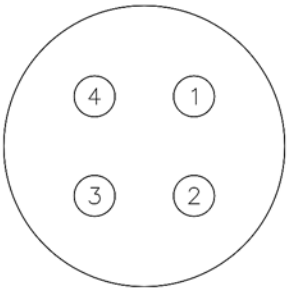
EX-MATE SERIES
EX-CCP

EX-MATE Cable Connector Plug
Mates with EX-BCR/CCR



CONNECTOR	A - O-RING	B - Ø (MM)
EXG-CCP	2-115	40.00
EXK-CCP	2-121	46.00
EXL-CCP	2-127	55.50
EXM-CCP	2-133	65.00

NOTE:
· Cable selection will need to meet the requirements of EN 60079-14.

SIZE	EX-MATE SERIES CONTACT CONFIGURATIONS AVAILABLE (BCR FACE VIEW ONLY - NOT TO SCALE)
G	 EXG-2  EXG-3  EXG-4
K	 EXK-5  EXK-6  EXK-8  EXK-10  EXK-12
L	 EXL-16  EXL-20  EXL-24
M	 EXM-30  EXM-37  EXM-4SP-01

Even though these procedures appear simple, only qualified technicians should perform the installation and maintenance.

INSTALLATION PROCEDURES

- Ensure the bulkhead interface is machined in accordance with the manufacturer's recommendations and free from contaminants prior to fitting of the connector.
- Ensure the plug and receptable connectors are free from contaminants prior to fitting.
- Apply a thin film of silicone compound (e.g. Novagard NG624) to the bulkhead receptacle connector 'o' seal prior to fitting.

CARE AND MAINTENANCE

Once mated, the EX-MATE connector requires no maintenance. When stored, the connector should be protected with suitable dust caps.

CABLE AND CONTINUITY PRESERVATION

Avoid sharp bends in cables. Cables subjected to vibration or exposed to seawater drag should be adequately clamped to prevent conductor fatigue infringing cable minimum bend radius and ultimate failure.

SPECIAL ASSEMBLIES

SEACON (europe) Ltd maintains all facilities necessary to furnish complete underwater and environmental electrical connector/cable systems, including Research & Development, Engineering, Manufacturing, Quality Control and Pressure Testing. As well as supplying our standard 'off-the-shelf' items, we have the capability to design and manufacture SPECIAL CUSTOMIZED CONNECTORS AND CABLE ASSEMBLIES to suit your individual needs.

CONNECTOR MATING

The EX-MATE connector uses a series of three o-ring style seals molded into the bores of the CCP / BCP connector which form a pressure tight and electrically insulative barrier when the connector is mated.

The pin contact on the BCR / CCR has a molded and bonded rubber boot along a portion of its length which these seals bear on, completing the seal system.

With the seals being formed from a rubber compound, the behavior of these seals will be determined by their lubrication. If the connectors are not properly lubricated prior to mating the rubber surfaces tend to grip onto one another and damage can be caused to these surfaces. The connector will not function properly if the seals are not adequately lubricated prior to mating. The advised lubricant is Novagard NG624 silicone grease which is commonly available in tube form. Spray grease is not advised since some of the propellant can form a conductive layer which leads to issues with low Insulation resistance.

Water displacement products, thinners and mineral oil lubricants should not be used as they can cause degradation of the rubber compounds. For further advice on lubricants other than NG624 please contact the factory.

Fig. 1

Fig. 2

The grease should be wiped across the face of the connector (Fig. 2), this action naturally deposits a suitable amount of grease within each of the connector bores. The aim is not to fill the bores with grease but just to have the top portion of the bore filled. This grease will be drawn down the bore as the pin is mated.

The grease will attract dirt and debris if left exposed for a period and it is advised that the lubrication is done immediately prior to mating.

Fig. 3

Fig. 4

Align the key with the keyway down the shell of the BCR / CCR (Fig. 4) and slide the connector plug into the socket bore until the threads of the connectors come into contact (Fig. 5).

Fig. 5

Fig. 6

Ensuring that no rotation is transferred to the BCR / CCR (Fig. 6) connector, tighten the engaging nut to draw the connectors together. There is a definite stop once the connectors are fully mated and this ensures that only hand tight is needed to mate the connectors fully. A strap wrench can be employed on the very high density connectors to give increased purchase during the initial engagement if difficulty is found with the mating.

Prior to de-mating a pair of connectors following deployment the outer surface should be free from surface water, dirt or debris. Ensure that the power is isolated prior to de-mating as not only is this a safety issue due to the exposed electrical contacts, it can cause significant damage to the electrical contacts if they are energised whilst mated / de-mated. It is not necessary to pull on the CCP / CCR cable / hose during the de-mating since the engaging nut will 'jack' the connectors apart. After ensuring that the connectors are free of debris or damage and prior to deployment fit the properly lubricated dummy connectors to ensure trouble free operation.

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