OPERATION AND MAINTENANCE MANUAL

BLUE LOGIC

DOCUMENT TITLE:	Operation and Maintenance Manual 2kW Flat Inductive
PROJECT TITLE:	6.1. Subsea USB
PROJECT:	600128
DOCUMENT NUMBER:	600128-TD-0024
REV:	02
NUMBER OF PAGES:	27
DATE:	06.03.2020
CLIENT:	N/A
CLIENT PO:	N/A
CLIENT CONTACT:	N/A

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1. INTRODUCTION

1.1. OBJECTIVE

The objective of this document is to cover all aspects required for safe use, operation and maintenance of the Blue Logic 2kW Flat Inductive Connector System. Relevant technical aspects for information and familiarization shall be covered as well as required technical data.

1.2. REVISION CHANGE/RECORD

REV	REASON FOR REVISION/ DESCRIPTION OF CHANGES
01	Issued for Use
02	Reissued for Use

1.3. SAFETY

WARNING: The equipment to which this manual applies must only be used for the purpose for which it was designed. Improper use or maintenance may cause damage to the equipment and/or injury to personnel. All users must be familiar with the contents of the appropriate manuals before attempting to install, operate, maintain or in any other way work on the equipment. Blue Logic AS disclaims any responsibility for damage or injury caused by improper installation, use or maintenance of the equipment

CAUTION: The equipment to which this manual applies operates on high voltage and has the potential to results in death or severe injury if handled incorrect. The equipment should only be used by qualified personnel. The equipment contains no serviceable parts inside.

1.4. GENERAL

The Blue Logic 2kW Flat Inductive Connector system is based on the WPC/ Blue Logic inductive technology for transfer of electrical power and communication subsea. The 2kW connector system is part of the complete "Subsea USB" family covering power range from 50W to 2kW with Ethernet communication speeds up to 80Mbit, and RS232 or RS485 serial communication speed up to 230 kbps.

Each “Subsea USB” system consists of a Primary and a Secondary side installed in separate subsea housings. Electrical power is transferred from the Primary side to the secondary side whilst communication is bi-directional. Two-way power transfer is available upon request for some connectors.

The Flat Inductive Connectors can be configured in the following alternatives:
1. Manually operated by diver
2. ROV operated
3. Bulkhead installation
4. Combined with hydraulic connector thus allowing for electrical power, communication and hydraulic connections to be made up using the same connector assembly.

The Blue Logic 2 kW inductive connectors may also be combined with Blue Logic’s range of Torque Tools. In this configuration, the Torque Tool will be connected to the inductive coupler’s secondary side for receiving power and data from the primary inductive coupler.

The Blue Logic Flat Inductive Connector System transforms 100-250VAC / 145-350VDC to 325VDC from the primary to the secondary side. The system can also be delivered with other voltage settings thus allowing for optimization of voltage and power for different types of subsea systems and for different consumers. For example, different secondary side connectors can be configured to extract different voltages from the same primary side. Hence, different types of consumers with different voltage or power requirements can be connected to the same primary side.

1.5. DOCUMENT USE

This document shall be used as general information for all aspects related to safe use, installation, removal, maintenance and storage of the 2kW Flat Inductive Connectors.

1.6. ABBREVIATIONS

IP	Internet Protocol
PCD	Pitch Circle Diameter
PFC	Power Factor Controller
ROV	Remotely Operated Vehicle
VAC	Volt Alternating Current
VDC	Volt Directional Current
WPC	Wireless Power & Communication AS

2. TECHNICAL DESCRIPTION

2.1. SYSTEM OVERVIEW

A typical system consists of a PFC canister, a Primary inductive connector and a Secondary inductive connector. The PFC canister transforms ROV supplied 100-250VAC / 145-350VDC voltage to 370VDC voltage required for the Primary inductive connector.

Output form the Secondary inductive connector is 325VDC/2KW when connected to the Primary Inductive connector.
In addition, 80Mbps Ethernet and RS232 or RS485 up to 230kbps can be transferred over the inductive connectors simultaneously.

Primary side inductive connector is equipped with a male Subconn electrical connector, while the Secondary Side is equipped with a female connector. The PFC canister will correspondingly have a male/female connector for input/output.

Cable between the PFC canister and the Primary connector is also included in the kit. Blue Logic can also assist with the delivery of other cables upon request. All cables must be suitable and compatible with the Ethernet Cat5 standard.

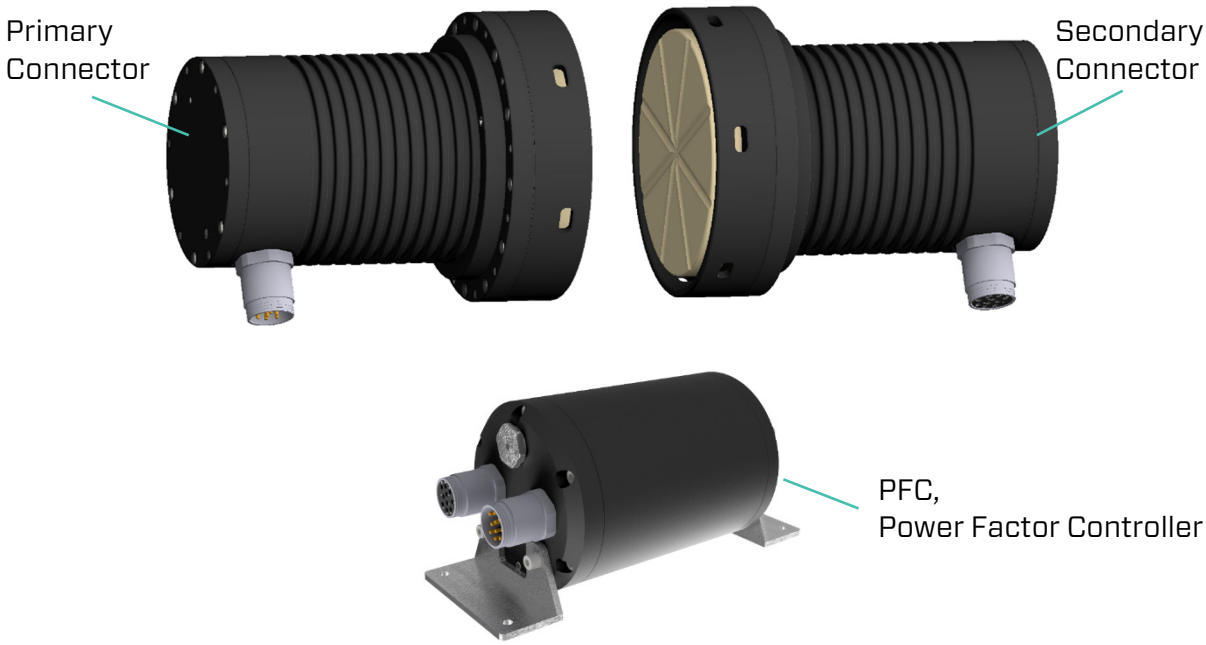


Figure 1 - 2kW Subsea USB System

2.1.1. Main Features

- DC to DC Wireless power transfer
- High efficiency - up to 93%
- Up to 2 kW load
- Inrush limitation
- Over temperature protection
- Overload protection
- Short circuit protection
- RS232 or RS485
- Ethernet 100BASE-TX
- Optional LED Indicators

2.1.2. Primary-Secondary Designation

The primary-secondary designation refers to the transfer direction of electrical power.
The primary inductive coupler act as “sender” of power, with the secondary inductive coupler as “receiver” of the power.

Some units have the capability of switching the power transfer direction, i.e. a unit can act as a primary or as a secondary unit depending on the required power direction.

2.2. TECHNICAL DATA

Overall dimensions	See Assembly Drawing
Design Water Depth	3000m
Ambient temperature	-10 - +45 °C
Max operation @2kW in 20°C air	45 min
Max operation @2kW in 20°C water	∞
Overheat protection	55°C, inside canister
Input Voltage PFC	360 – 400 VDC[1]
Output Voltage	310 – 340 VDC
Max. output power	2000W
Output current	6,7A
Efficiency[2] @1kW	93%
Efficiency[2] @2kW	92%
Startup time power & RS232/RS485	12 sec
Startup time Ethernet	90 sec
Data rate RS232	1,2 – 230 Kbps, full duplex
Data rate RS485	1,2 – 230 Kbps, half cuplex
Data rate Ethernet	80 Mbps

1: Other voltage and power configurations are available upon request to meet project or client specific requirements.

2: Efficiency for transmission between primary and secondary connector exclusive PFC.

2.3. PRIMARY CONNECTOR

CAUTION: The primary connector operates on high voltage and may cause death or severe injury if handled incorrect. The equipment should only be handled by qualified personnel. The equipment contains no serviceable parts inside.

The below pictures show a standard setup of the primary connector. The primary connector is normally static and mounted to a structure or ROV.

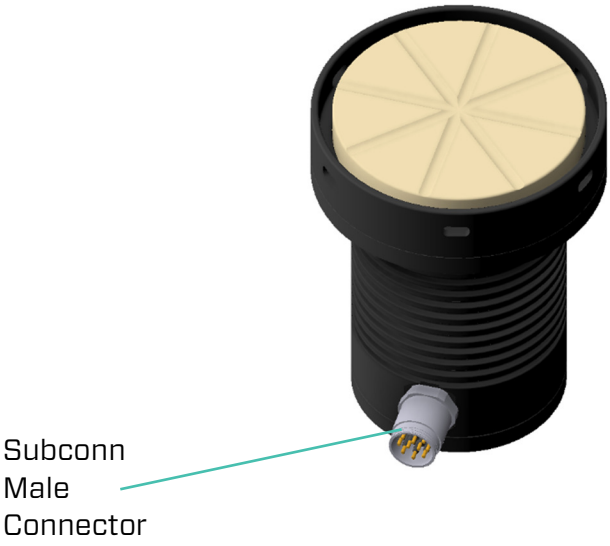


Figure 2 Primary Connector

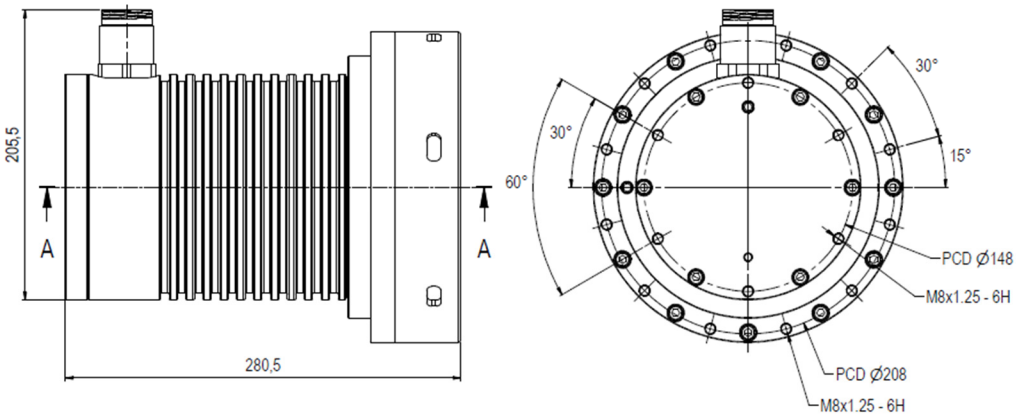


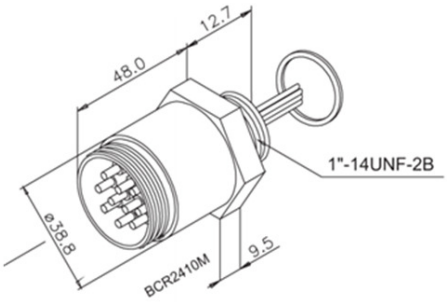
Figure 3: Primary Connector Dimensions and Interfaces

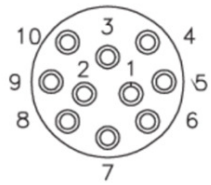
Installation flange interface is 6x M8 on PCD 148m, or 12x M8 on PCD Ø208 as shown on the above figure.

CAUTION: The bulkhead connector on the Primary Inductive Connector and the input bulkhead connector on the Power Controller Factor canister are identical. It is therefore possible to mate the cable intended for the Power Factor Controller to the connector on the Primary Inductive Connector. Make sure that the correct cable is used as connecting 230VAC into the Primary Inductive connector may destroy the equipment.

2.3.1. Pin Configuration for Primary Connector

Primary Side input	
Connector: Subconn BCR2410M	
Pin #	**Signal**
Pin 1	360-380VDC
Pin 2	0 VDC
Pin 3	CHASSIS
Pin 4	RS232RX (input)
Pin 5	RS232TX (output)
Pin 6	RS232GND
Pin 7	TX_p
Pin 8	TX_n
Pin 9	RX_p
Pin 10	RX_n





Male Face View

For prolonged used of the Primary Inductive Connector in seawater, adequate cathodic protection should be considered by the end user.

2.4. POWER FACTOR CONTROLLER

CAUTION: The power factor controller operates on high voltage and may cause death or severe injury if handled incorrect. The equipment should only be used by qualified personnel. The equipment contains no serviceable parts inside.

The Power Factor Controller (PFC) is an atmospheric air-filled canister converting the supplied 100-250 VAC or 145-350 VDC, to 370VDC required for the primary inductive unit.
The PFC should be installed in a suitable position on the ROV frame. The Power Factor Controller is equipped with connectors for input power & data, and for output power & data.
All power and data signals shall go through the PFC canister before connected to the Primary inductive coupler.

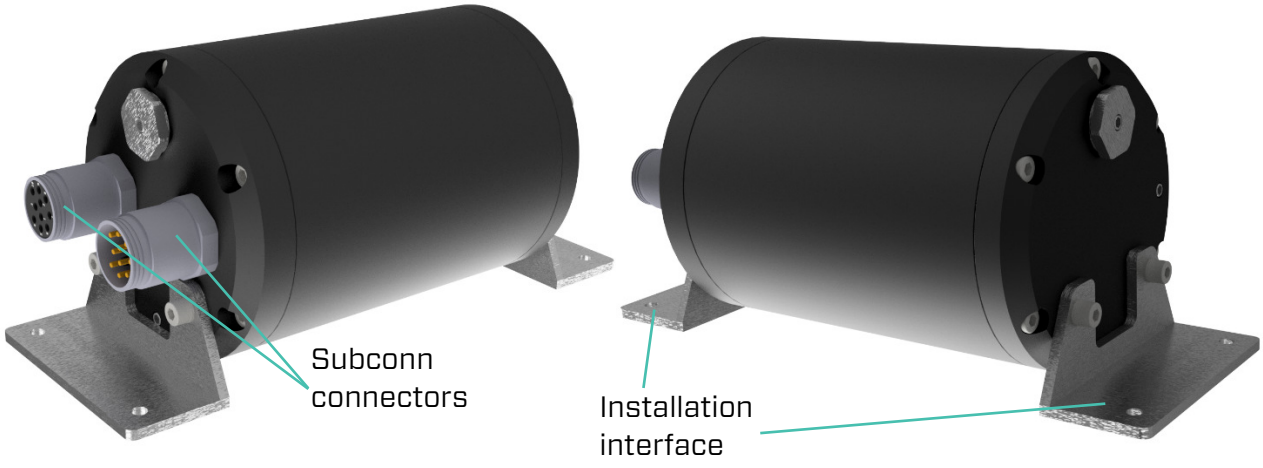


Figure 4 Power Factor Controller

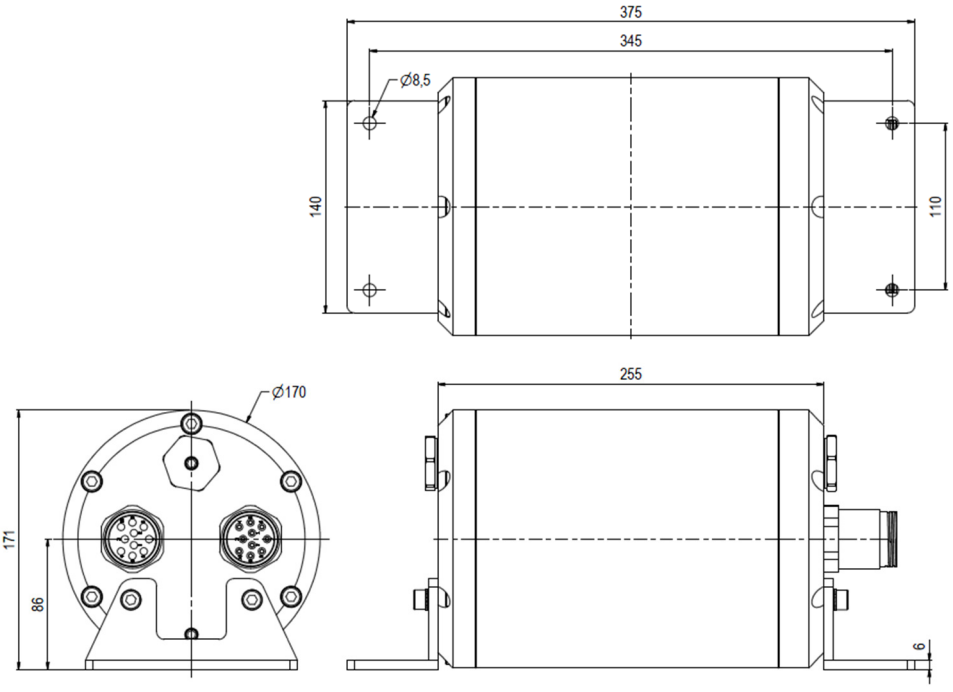
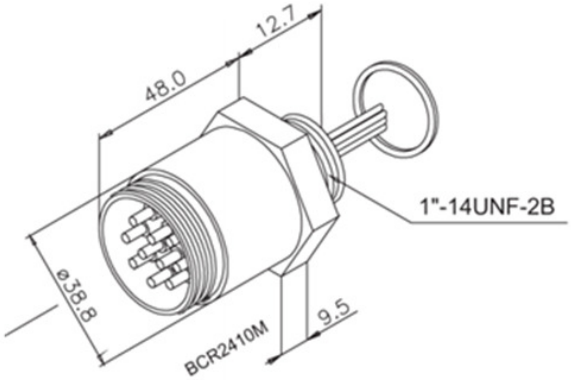
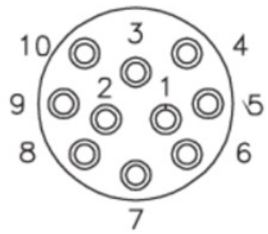


Figure 5 Power Factor Controller Installation interface

2.4.1. Pin Configuration for Power Factor Controller

PFC input with RS232		**PFC output with RS232**	
Connector: Subconn BCR2410M		**Connector:** Subconn BCR2410F	
Pin #	**Signal**	**Pin #**	**Signal**
Pin 1	100-250VAC / 145-350VDC	Pin 1	370VDC
Pin 2	100-250VAC / 0 VDC	Pin 2	0 VDC
Pin 3	CHASSIS	Pin 3	CHASSIS
Pin 4	RS232RX (input)	Pin 4	RS232RX (input)
Pin 5	RS232TX (output)	Pin 5	RS232TX (output)
Pin 6	RS232GND	Pin 6	RS232GND
Pin 7	TX_p	Pin 7	TX_p
Pin 8	TX_n	Pin 8	TX_n
Pin 9	RX_p	Pin 9	RX_p
Pin 10	RX_n	Pin 10	RX_n





Male Face View

For prolonged used of the Power Factor Controller in seawater, adequate cathodic protection should be considered by the end user.

2.5. SECONDARY CONNECTOR

CAUTION: The secondary connector operates on high voltage and may cause death or severe injury if handled incorrect. The equipment should only be used by qualified personnel. The equipment contains no serviceable parts inside.

The below pictures show a standard setup of the secondary connector. The secondary connector is normally installed on a ROV, tool, gear or other equipment and connected by cable.

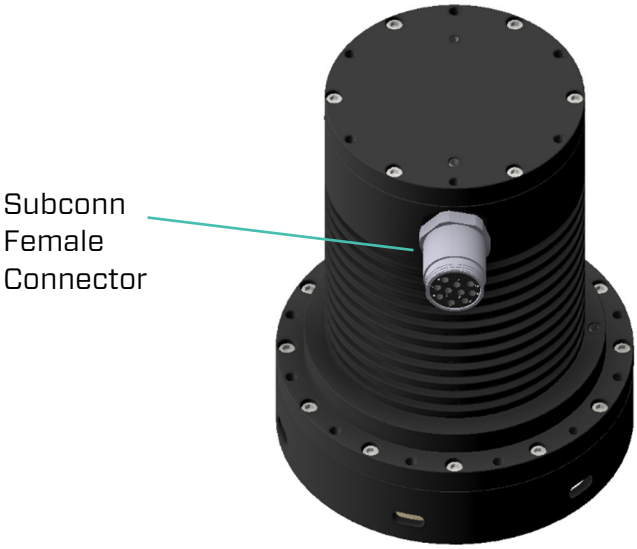


Figure 6 Secondary Connector

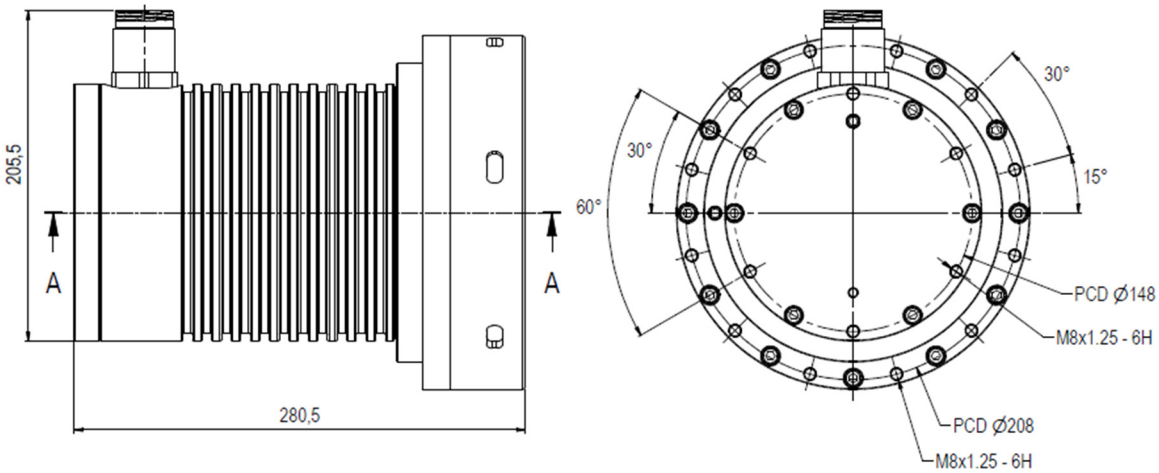
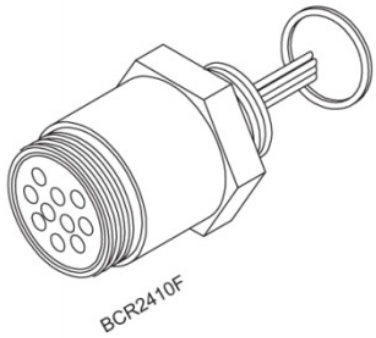


Figure 7 Secondary Connector Dimensions and Interfaces

CAUTION: The bulkhead connector on the Secondary Inductive Connector and the output bulkhead connector on the Power Controller Factor are identical. Make sure that the correct cable is used when connecting the equipment. Using incorrect cable may destroy the equipment.

2.5.1. Pin Configuration for Secondary Connector

Secondary Side output with RS232	
Connector: Subconn BCR2410F	
Pin #	**Signal**
Pin 1	325VDC
Pin 2	0 VDC
Pin 3	CHASSIS
Pin 4	RS232RX (input)
Pin 5	RS232TX (output)
Pin 6	RS232GND
Pin 7	TX_p
Pin 8	TX_n
Pin 9	RX_p
Pin 10	RX_n



For prolonged use of the Secondary Inductive Connector in seawater, adequate cathodic protection should be considered by the end user.

2.6. IP ADDRESS CONFIGURATION

All Subsea USB systems are delivered with a fixed IP address. The actual addresses are listed in table below. Other equipment on the same network cannot use the same IP addresses. The IP addresses of the Subsea USB system do not affect the transmission of data and it is not required that the IP address of the Subsea USB system lies within the IP range of the network.

Unit	IP Address
Primary side	192.168.1.253
Secondary side	192.168.1.254

2.7. LED INDICATORS, OPTIONAL

LED indicators can be installed on the connector to enable status monitoring by ROV during connection and operation.

Name	LED Status	Description
POW (Primary side)	On	Start-up voltage limit passed*
	Blinking	Alarm state
POW (Secondary side)	On	Output voltage activated
	Blinking	Alarm state
ETH	On	Ethernet connection made
	Blinking	Data transmitted or received
RX	On	System ready to receive data
	Blinking	System receiving data
TX	On	Primary and Secondary side connected System ready to send data
	Blinking	System sending data

* Turned on "Pow" LED Primary side does not verify that the input voltage is within the specified range.

2.8. OVERLOAD PROTECTION

In case of an overload, the voltage will be reduced and limited to ensure that the maximum current limit is never exceeded. The system can be reset by recycling the power on the primary inductive coupler.

2.9. DIAGNOSTIC INTERFACE

Diagnostic data are available through the Ethernet interfaces by sending request commands. Available diagnostic data are listed below:

- Input voltage on primary side
- Current drawn on primary side
- Output voltage on secondary side
- Current drawn on secondary side
- Voltage alarm primary side
- Current alarm primary side
- Temperature alarm primary side
- System alarm primary side
- Voltage alarm secondary side
- Current alarm secondary side
- Temperature alarm secondary side
- System alarm secondary side

2.9.1. Communication Format

All bytes in a message will normally be sent continuously with no (or a very short) pause between bytes. Maximum time between bytes within a message is 50ms. If a longer pause occur, the message is considered corrupt. For more information regarding timing for responses, see chapter 2.9.10 "Timing and Retransmission".

Communication is point-to-point with one master and one slave.

2.9.2. Ethernet

Couplers supporting configuration over Ethernet is TCP telnet server based. A TCP client must connect to port 5000 and issue commands as described below. There is no welcome message or other indication of connection.

2.9.3. Serial line, RS232/RS485

Coupler supporting configuration over serial line communicates at 19200 bps, 8 data bit, odd parity and 1 stop bit. There is no flow control. This setup can be changed based on HW/SW setup. Please see individual coupler description.

2.9.4. Message Format

Each message consists of three parts, a "header" with ASCII character STX, address and message ID, a "container" with a byte count and data, and a "footer" containing a checksum for the message. A message is either a command or a response.

2.9.5. Command Format

All commands will always have these parts:

STX	ADDR	CMD	NO	DATA	DATA	. . .	DATA	CHS
0x02	Address	Comm and ID	Number of bytes	1. byte	2. byte	. . .	n. byte	Check sum

Some commands do not have any DATA bytes in the container. These commands will have the byte count value of zero.

Explanation of each part:

Abbr.	Name	Size	Description
STX	Start of message	1 byte	STX character, 0x02.
ADDR	Address	1 byte	Reserved for future address information, set to 0x00.
CMD	Command identification	2 byte	This is an explicit identification of each command type. Possible value for each byte is any ASCII characters in upper case from 'A' (0x41) to 'Z' (0x5A).
NO	Number of bytes	1 byte	Byte count including all DATA bytes in the container part of the command.
DATA	Data	0-255 byte	Data needed to fulfill the command. NOTE: Data values are coded with MSB first.
CHS	Checksum	2 byte	Checksum for the message.

2.9.6. Response Format

The response message format is almost the same as the command message format, and will always have these parts:

STX	ADDR	RSP	NO	DATA	DATA	. . .	DATA	CHS
0x02	Address	Response ID	Number of bytes	1. byte	2. byte	. . .	n. byte	Check sum

Some responses do not have any DATA bytes in the container. These responses will have the byte count value of zero.

Explanation of the specific response parts:

Abbr.	Name	Size	Description
STX	Start of message	1 byte	STX character, 0x02.
ADDR	Address	1 byte	Reserved for future address information, set to 0x00.
RSP	Response identification	2 byte	The same characters as for the command, but in lower case.
NO	Number of bytes	1 byte	Byte count including all DATA bytes in the container part of the response.
DATA	Data	0-255 byte	Response data. NOTE: Data values are coded with MSB first.
CHS	Checksum	2 byte	Checksum for the message.

2.9.7. Addresses

For current use no address information is really needed, since the communication bearer is always a point-to-point connection and there are no bridging or other functionality requiring an address system. However, to be able to use the product in future applications an address field is included in the message. The address shall for now be set to 0.

2.9.8. Checksum

All bytes in the header part and the container part (not the footer part) of a message are included when calculating checksum. The algorithm used is CRC-16 with polynomial 0xa001, initialized to 0xffff. Checksum is included in message with MSB first.

Checksum example in c code:

```
uint16_t Crc16(uint8_t *MsgToCalc, uint16_t DataLen)
{
  uint16_t Crc = 0xffff;
  uint8_t i;

  while (DataLen--)
  {
    Crc ^= *MsgToCalc++;
    for (i = 0; i < 8; i++)
    {
      if (Crc & 0x0001)
        Crc = (Crc >> 1) ^ 0xa001;
      else
        Crc >>= 1;
    }
  }
  return Crc;
}
```

2.9.9. Unknown Messages and Messages with Checksum Error

When receiving a message with unknown message ID, a message with checksum error or a message that do not fulfill the protocol, the message shall be rejected. The slave takes no action with such messages. If the master receives a response with any error, the master may retransmit previous command.

2.9.10. Timing and Retransmission

Although the protocol supports a full duplex connection, timing and retransmission system are set to meet the requirements for typical half duplex communication bearer as RS485, radio etc.

When the protocol is using a half-duplex communication bearer, there are to be a pause of at least 10ms between all messages. That is, the slave will wait at least 10ms before sending the response, and master should wait at least 10ms after receiving response before sending next command. On Ethernet based connections such a pause is optional.

The slave will execute the received command and build corresponding response immediately. Sending response shall start as soon as possible after the required pause of 10ms (optional for Ethernet connection). Maximum delay before sending first byte of response is 50ms after received last byte of the command.

The master should wait for the response of the previous command before sending next command. If the master did not receive at least the first byte of a response within 100ms after last byte of the command was sent, the master should consider that these messages are lost. The master may now retransmit the same command or send any other command.

2.9.11. Messages

All messages are built according to specified message format, see chapter 2.9.5 """. In the tables below only the CMD, RSP, NO and DATA fields are pointed out. The STX, ADDR and CHS shall be added when building messages.

Table 1 is a full list of commands. Note that command support can differ based on product setup and configuration. Messages with commands not supported will be discarded by the coupler and no response will be sent.

Command	Values and comment
RI	Read Immediate diagnostic data.
PT	Production Test diagnostic data.

Table 1 List of commands

2.9.12. Read Immediate

Command		Values and comment
CMD	RI	Read Immediate diagnostic data.
NO	0x00	Number of bytes
Response		
RSP	ri	Immediate readings of diagnostic data.
NO	0x09	Number of bytes
DATA1 – DATA2	16bit unsigned value	Internal input voltage reading on Primary side. Resolution 100mV. Example: 2123 for 212.3V.
DATA3 – DATA4	16bit unsigned value	Internal current drawn reading on Primary side. Resolution 10mA. Example: 554 for 5.54A.
DATA5 – DATA6	16bit unsigned value	External output voltage reading on Secondary side. Resolution 100mV. Example: 2123 for 212.3V.
DATA7 – DATA8	16bit unsigned value	External current drawn reading on Secondary side. Resolution 10mA. Example: 554 for 5.54A.
DATA9	8 bit	Status bits

BIT num	Description
0	0 – Primary input voltage OK 1 – Primary input voltage ALARM
1	0 – Primary current drawn OK 1 – Primary current drawn ALARM
2	0 – Primary temperature OK 1 – Primary temperature ALARM
3	0 – Primary generic and historic OK 1 – Primary generic or historic ALARM
4	0 – Secondary output voltage OK 1 – Secondary output voltage ALARM
5	0 – Secondary current drawn OK 1 – Secondary current drawn ALARM
6	0 – Secondary temperature OK 1 – Secondary temperature ALARM
7	0 – Secondary generic and historic OK 1 – Secondary generic or historic ALARM

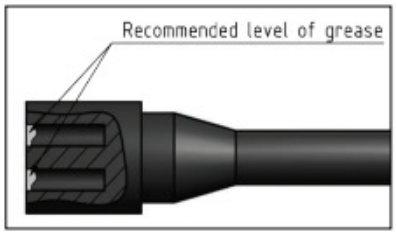
Table 2 Read Immediate data format

3. PREPERATION BEFORE USE

3.1. ONSHORE PREPERATIONS

Prior to shipping offshore, a mobilisation/ verification check shall be performed. All functions to be tested and verified. The following check list shall be used as a guideline for activities to be performed prior to offshore mobilisation.

3.1.1. Mobilisation Check List

No.	Description	Check/Verified
01	Inspect Inductive couplers and PFC canister for visual damage and/or unusual wear and tear. Special attention to be made to the connectors. Always apply grease (Molykote 44 Medium) to the Subconn connectors before mating:   - A layer of grease corresponding to minimum 1/10 of socket depth to be applied to the female connector. - Inner edge of all sockets to be completely covered, a thin layer of grease left visible on the face of the connector. - After greasing, fully mate male and female connector to ensure distribution of grease on pins and sockets. - De-mate to inspect for grease on every male pin. Mate connector.	
02	Inspect supplied cables for visual damage and/or unusual wear and tear.	
03	Assemble the Inductive couplers system and connect to power.	
04	Verify the output voltage.	
05	Verify data transfer.	
06	Disassemble and store in dedicated transport box.	
07	Verify correct packing and documentation in the transport box.	

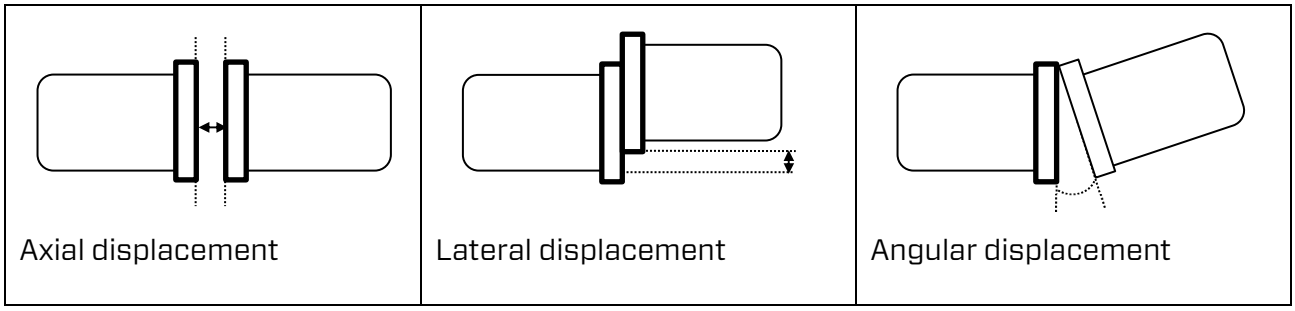
4. OPERATION

4.1. PRE-DIVE CHECK LIST

No.	Description	Chk/Verified
01	Perform a function test by connecting primary and secondary side. - Test communication - Test power transfer	
02	Perform a visual inspection of primary side connector - Housing - Seals - Coil surface - Connector	
03	Perform a visual inspection of secondary side connector - Housing - Seals - Coil surface - Connector	

4.2. CONNECTION

The 2kW Flat Inductive Connector System is designed to be mounted in a guiding system to ensure correct mating. The following design criteria shall be followed to ensure full power and data transmission.



Axial displacement | Lateral displacement | Angular displacement

Displacement parameters:

Parameter	Min	Typ	Max	Unit	Comment
Axial distance tolerance		5		mm	
Lateral displacement	0		10	mm	Displacement from centre alignment.
Lateral displacement with 4mm axial distance	0		5	mm	
Angle	0		3°	deg	No lateral displacement.
Rotation during operation	0		360°	deg	

If mating distance exceed these values, power and data transmission efficiency will drop with the increasing gap between the connectors. At a certain distance, the connectors will stop working, and a new mating must be done to ensure functionality.

4.3. POST DIVE CHECK LIST

No.	Description	Chk/Verified
01	Recover system to deck	
02	Inspect all components and parts. Special attention to the following: - Housing - Surface treatment - Corrosion - Seal - Coil surfaces - Cables - Penetrators - Connectors - Mechanical interfaces	
03	Rinse all components and parts thoroughly with fresh water. Let dry completely before storage/transport.	
04	Connect system and perform a full system check.	

5. STORAGE AND TRANSPORT

5.1. PRESERVATION FOR STORAGE

No.	Description	Check/Verified
01	Visual inspect the Inductive couplers for damages and wear.	
02	Ensure correct post dive sequence are followed, see section 4.3	
03	Apply preservation oil, WD40 or similar, and secure in storage box.	

5.2. TRANSPORT AND SHIPPING

Subsea USB to be transported in dedicated transport box.

Verify the following:

1. Sender name and address clearly visible
2. Receiver name and address clearly visible
3. Inventory list correct filled out

6. SUPPORT CONTACTS

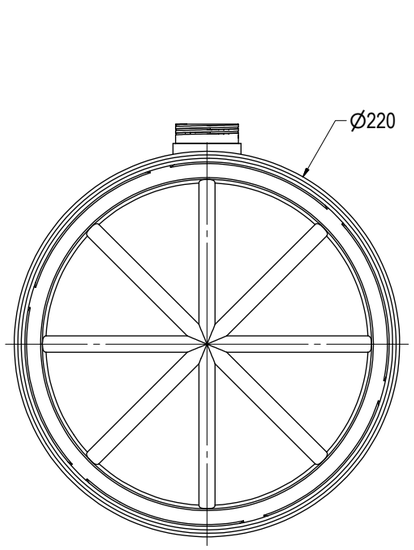
BLUE LOGIC AS
Forus
Luramyrveien 29
4313 SANDNES
NORWAY

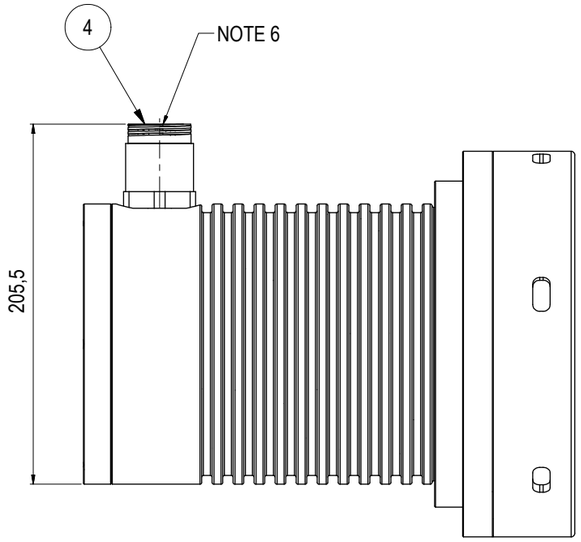
Lars Gunnar Hodnefjell
R&D Manager
Mob: +47 992 63 950
lgh@bluelogic.no

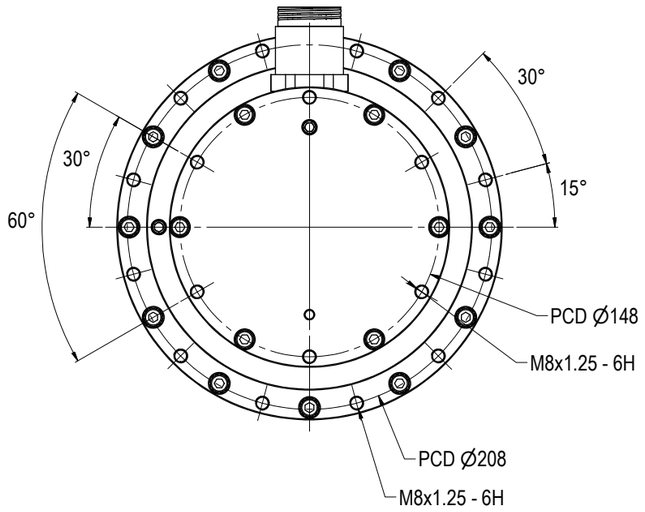
APPENDIX 1 DRAWINGS

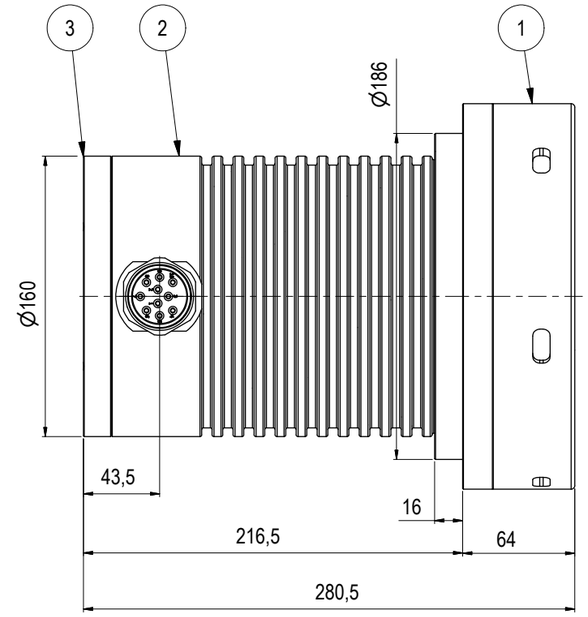
Drawing No.:	Description
BB1719	Type D 2kW Primary Flat Inductive
BB1714	Type D 2kW Secondary Flat Inductive
BA7719	ROV PFC

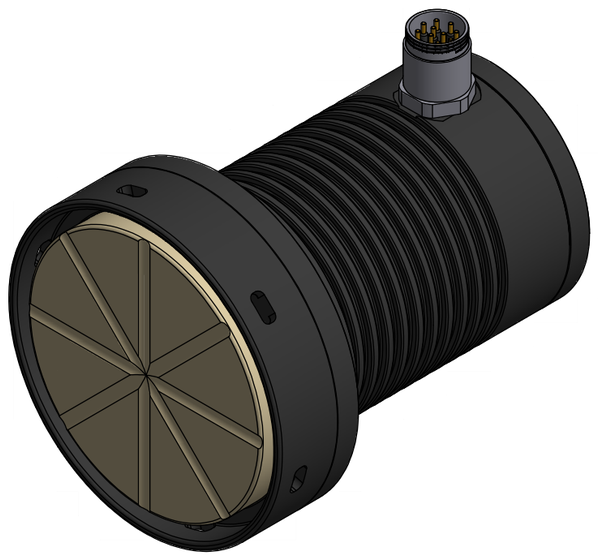
Parts List				
ITEM	QTY	PART No.	DESCRIPTION	MATERIAL
1	1	BB3142	Type D Inductive Element	
2	1	BB1716	Housing	AL 6082 T6
3	1	BB1646	End Lid Female	AL 6082 T6
4	1	100780	Connector SubConn BCR2410M	Stainless Steel











NOTE: 1
DESIGN CODE:
N/A

NOTE: 2
TECHNICAL CLASSIFICATION:

Article Type:	006-El. Connectors
Main Group:	6.01. Subsea USB
Intermediate Group:	6.28.04. 0,9-3,6KW Subsea USB
Sub Group:	6.28.157.02. Female Connector

NOTE: 3
INTERFACE INFORMATION:

Pressure Rating Bar:	304
Design Water Depth:	3000m
Material:	Hard Anodized Aluminium
Weight:	12,6 kg
Volume:	4,94 dm^3
Submerged Weight:	7,58 kg
Surface Area:	12424 cm^2
Hydraulic:	N/A
Mechanical:	Flange Mount
Electrical:	370 VDC Input, Subconn BCR2410M
Com. & Protocol:	Ethernet & RS232/RS485

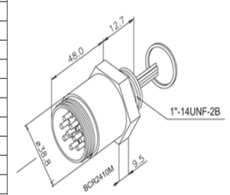
NOTE: 4
OPERATION & MAINTENANCE INFORMATION:
600128-TD-0024

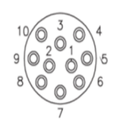
NOTE: 5
ADDITIONAL INFORMATION:
Design proof pressure - 365Bar.
Max allowable working pressure - 304Bar
Communication speed RS232 - Approx. 230 kbps
Communication speed Ethernet - Approx. 80 Mbps - (half Duplex)
Operating ambient temperature (0-30°C)
Storage temperature (-30-55°C for one month continuously)

NOTE 6
Connector Housing is atmospheric and not compensated

NOTE 7
Subconn Pin Configuration:

Primary Side input	
Connector: Subconn BCR2410M	
Pin #	**Signal**
Pin 1	360-380VDC
Pin 2	0 VDC
Pin 3	CHASSIS
Pin 4	RS232RX (input)
Pin 5	RS232TX (output)
Pin 6	RS232GND
Pin 7	TX_p
Pin 8	TX_n
Pin 9	RX_p
Pin 10	RX_n





Male Face View

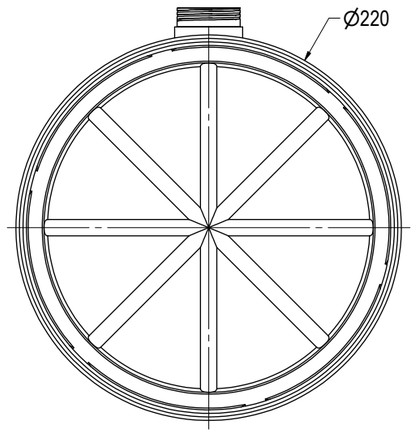
Rev.	Date	Reason for issue	Revision change	Made	Chk'd	Appr.
09	27.9.2019	9-IFU (Issued for Use)		WTJ	TBA	WTJ
08	31.7.2019	9-IFU (Issued for Use)		WTJ	TBA	WTJ
07	10.5.2019	9-IFU (Issued for Use)		WTJ	TBA	WTJ
06	11.4.2019	9-IFU (Issued for Use)		WTJ	TBA	WTJ

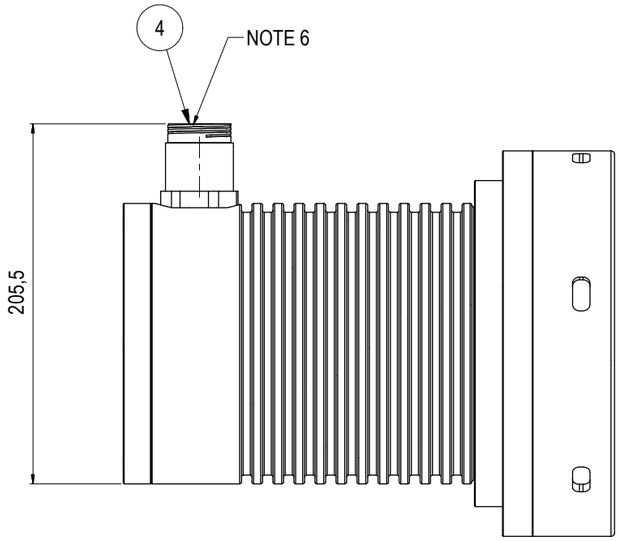
BLUE LOGIC

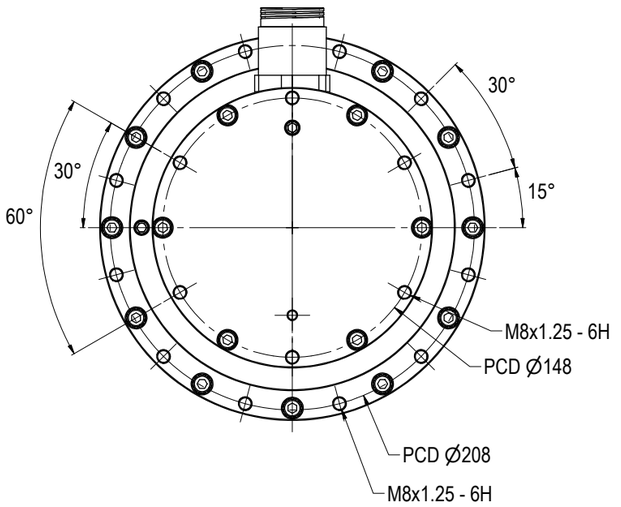
Dwg Scale: NTS
Dwg Proj:
Dwg Format: A3

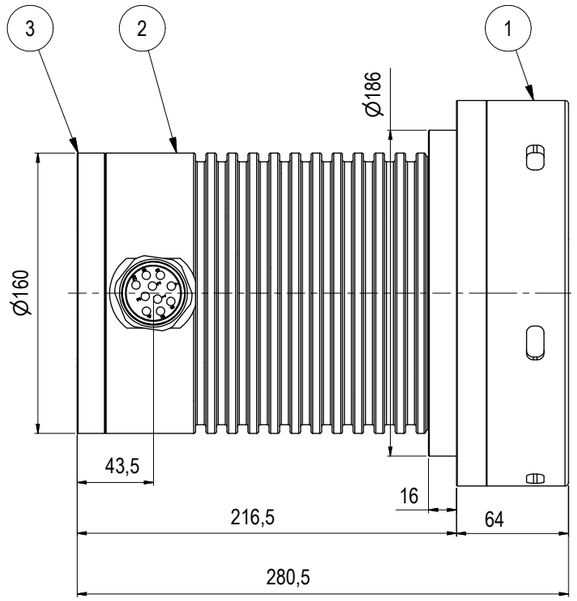
Drawing title: Type D 2kW Primary Flat Inductive
Drawing number: BB1719
Rev. 09

Parts List				
ITEM	QTY	PART No.	DESCRIPTION	MATERIAL
1	1	BB3142	Type D Inductive Element	
2	1	BB1716	Housing	AL 6082 T6
3	1	BB1646	End Lid Female	AL 6082 T6
4	1	100782	Connector Subconn BCR2410F	Stainless Steel









NOTE: 1
DESIGN CODE:
N/A

NOTE: 2
TECHNICAL CLASSIFICATION:

Article Type:	006-El. Connectors
Main Group:	6.01. Subsea USB
Intermediate Group:	6.28.04. 0,9-3,6KW Subsea USB
Sub Group:	6.28.157.02. Female Connector

NOTE: 3
INTERFACE INFORMATION:

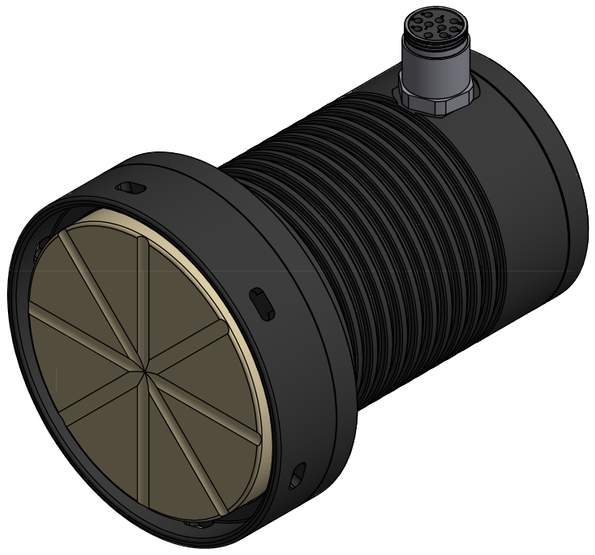
Pressure Rating Bar:	304
Design Water Depth:	3000m
Material:	Hard Anodized Aluminium
Weight:	12,4 kg
Volume:	4,83 dm^3
Submerged Weight:	7,49 kg
Surface Area:	12047 cm^2
Hydraulic:	N/A
Mechanical:	Flange Mount
Electrical:	325 VDC Output, Subconn BCR2410F
Com. & Protocol:	Ethernet & RS232/RS485

NOTE: 4
OPERATION & MAINTENANCE INFORMATION:
600128-TD-0024

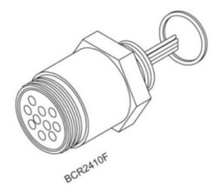
NOTE: 5
ADDITIONAL INFORMATION:
Design proof pressure - 365Bar.
Max allowable working pressure - 304Bar
Communication speed RS232 - Approx. 230 kbps
Communication speed Ethernet - Approx. 80 Mbps - (half Duplex)
Operating ambient temperature (0-30°C)
Storage temperature (-30-55°C for one month continuously)

NOTE 6
Connector Housing is atmospheric and not compensated

NOTE 7
Subconn Pin Configuration:



Secondary Side output with RS232		
Connector: Subconn BCR2410F		
Pin #	**Signal**	
Pin 1	325VDC	
Pin 2	0 VDC	
Pin 3	CHASSIS	
Pin 4	RS232RX	(input)
Pin 5	RS232TX	(output)
Pin 6	RS232GND	
Pin 7	TX_p	
Pin 8	TX_n	
Pin 9	RX_p	
Pin 10	RX_n	



Rev.	Date	Reason for issue	Revision change	Made	Chk'd	Appr.
09	27.9.2019	9-IFU (Issued for Use)		WTJ	TBA	WTJ
08	31.7.2019	9-IFU (Issued for Use)		WTJ	TBA	WTJ
07	10.5.2019	9-IFU (Issued for Use)		WTJ	TBA	WTJ
06	11.4.2019	9-IFU (Issued for Use)		WTJ	TBA	WTJ

BLUE LOGIC

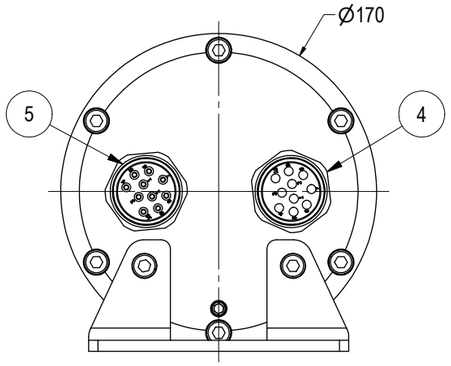
Dwg Scale: NTS
Dwg Proj:
Dwg Format: A3

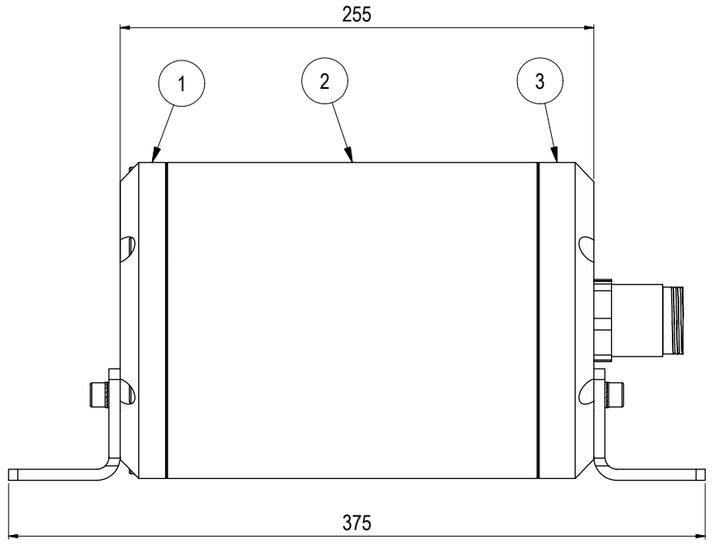
Drawing title: Type D 2kW Secondary Flat Inductive

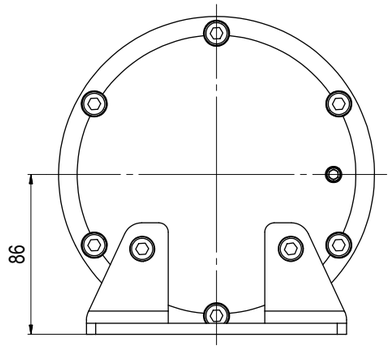
Drawing number: BB1714

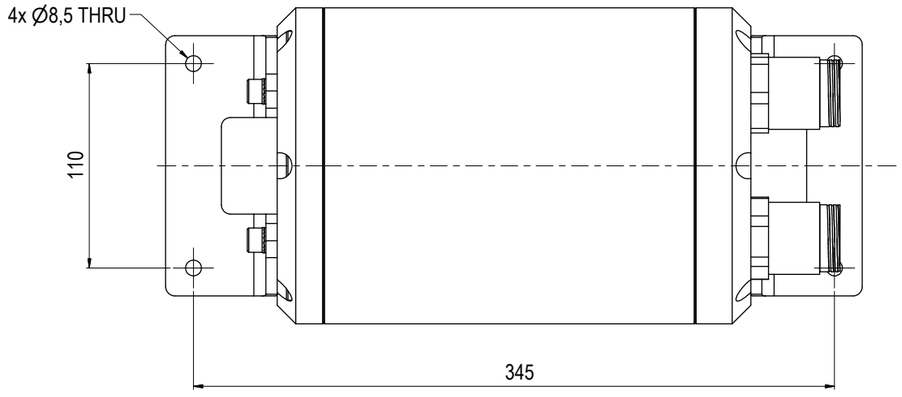
Rev. 09

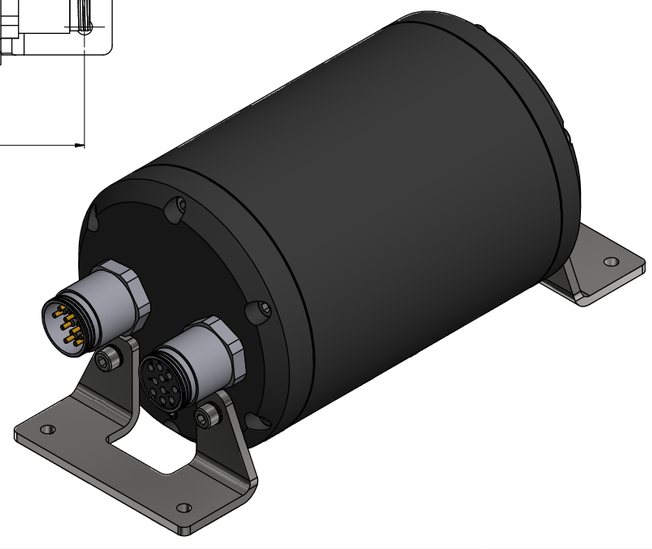
Parts List				
ITEM	QTY	PART No.	DESCRIPTION	MATERIAL
1	1	BA7106	Flange Housing PFC	AL 6082 T6
2	1	BA6785	Housing PFC	AL 6082 T6
3	1	BA6784	End Flange Housing PFC	AL 6082 T6
4	1	100782	Connector Subconn BCR2410F	Stainless Steel
5	1	100780	Connector Subconn BCR2410M	Stainless Steel











NOTE: 1
DESIGN CODE:
N/A

NOTE: 2
TECHNICAL CLASSIFICATION:

Article Type:	006-El. Connectors
Main Group:	6.01. Subsea USB
Intermediate Group:	6.28.04. 0,9-3,6KW Subsea USB
Sub Group:	6.28.157.00. Generic

NOTE: 3
INTERFACE INFORMATION:

Pressure Rating Bar:	300 (3000m)
Material:	Hard Anodized Aluminium
Weight:	11,1 kg
Volume:	5,93 dm^3
Surface Area:	13212 cm^2
Hydraulic:	N/A
Mechanical:	Flange Mount.
Electrical:	In: 100-250 VAC/145-350 VDC Out: 370 VDC
Com. & Protocol:	Pin to Pin, Ethernet, RS232 Feed through

NOTE:
OPERATION & MAINTENANCE INFORMATION:
600128-TD-0013

NOTE: 5
ADDITIONAL INFORMATION:
The Blue Logic 2kW Power Supply is an atmospheric air filled canister which converts the ROV supplied voltage (100-250 VAC or 145-350 VDC) to 370 VDC voltage required for the primary Subsea-USB connector. The Power Supply will typically be installed onto the ROV frame at a suitable place, and is equipped with input and output connectors for power & communication. All power& communication signals will go through the 2 kW Power Supply canister before connected to the primary connector.
The unit is designed for intervention applications. Canister material is hard anodized aluminium.

Design proof pressure - 365Bar.
Max allowable working pressure - 304Bar
Communication speed RS232 - Approx. 230 kbps
Communication speed Ethernet - Approx. 80 Mbps - (half Duplex)
Operating ambient temperature (0-30°C)
Storage temperature (-30-55°C for one month continuously)

NOTE 6
Connector Housing is atmospheric and not compensated

NOTE 7
Subconn Pin Configuration:

PFC input with RS232			PFC output with RS232		
Connector: Subconn BCR2410M			**Connector**: Subconn BCR2410F		
Pin #	**Signal**		**Pin #**	**Signal**	
Pin 1	100-250VAC / 145-350VDC		Pin 1	370VDC	
Pin 2	100-250VAC / 0 VDC		Pin 2	0 VDC	
Pin 3	CHASSIS		Pin 3	CHASSIS	
Pin 4	RS232RX	(input)	Pin 4	RS232RX	(input)
Pin 5	RS232TX	(output)	Pin 5	RS232TX	(output)
Pin 6	RS232GND		Pin 6	RS232GND	
Pin 7	TX_p		Pin 7	TX_p	
Pin 8	TX_n		Pin 8	TX_n	
Pin 9	RX_p		Pin 9	RX_p	
Pin 10	RX_n		Pin 10	RX_n	

Rev.	Date	Reason for issue	Revision change	Made	Chk'd	Appr.
11	21.1.2020	9-IFU (Issued for Use)		WTJ	LGH	WTJ
10	23.10.2019	9-IFU (Issued for Use)		WTJ	LGH	WTJ
09	23.8.2019	9-IFU (Issued for Use)		WTJ	LGH	WTJ
08	10.5.2019	9-IFU (Issued for Use)		WTJ	TBA	WTJ

BLUE LOGIC

Dwg Scale: NTS
Dwg Proj:
Dwg Format: A3

Drawing title: BL Power Supply 2kW
Drawing number: BA7719
Rev. 11