

		PRODUCT SPECIFICATION In-situation Battery Cell		Docu Code: ISBC-X1
Date: Feb 04, 2021	Product Code: ISBC-PAN-H102-HX	Prepared by: G.A KANG	Approved by: JAKE CHOI	Version: 01

Specification for ISBC

In-situation Battery Cell for XRD

Model : ISBC-PAN-H102-HX

Revisions :

Revision	Date	Initials	Comments
1	Apr 20, 2018	G.A KANG	First Draft
2	Jan 09, 2020	G.A KANG	Update the Heat exchange
3	Sep 17, 2020	G.A KANG	Update the specification
3	Feb 04, 2021	G.A KANG	Update the picture

References :

Ref No.	Documents ID	Initials

PDC TECHNOLOGY

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Contents :

1.General

1.1 Purpose

1.2 Description

2.Configuration

2.1 Main Battery Cell

2.2 Heat Exchange stage Module

2.3 Circulator (local item)

2.4 Charger/Discharger - Wonatech (WPG100e) : option

3.General specification

4.Inspection Condition

4.1 XRD System (Based on Panalytical XRD)

4.2 Sample (Based on Cathode Material)

4.3 Battery Characteristics (Coin-cell Basis)

4.4 Charge / Discharge Conditions

5.Consumable Parts

6.Warranty

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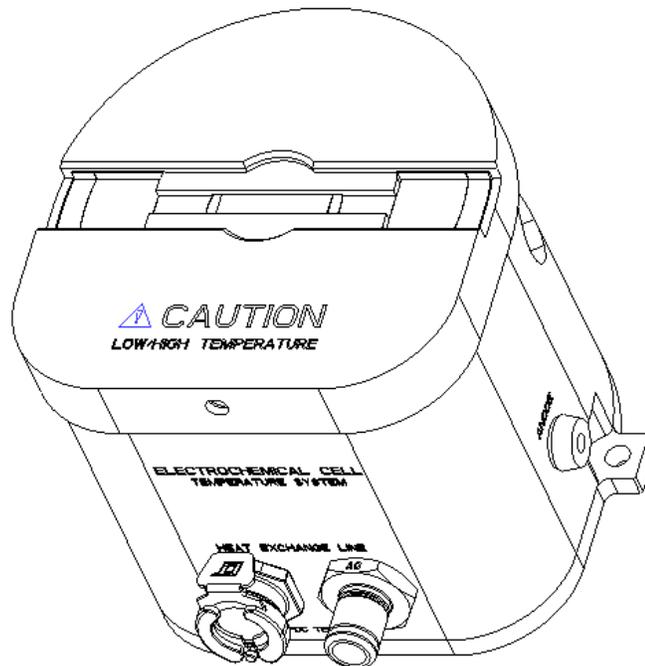
1. General

1.1 Purpose

This is the In-situation Battery Cell system (ISBC) developed to measure the electrode reactions which occur during charging and discharging with XRD.

1.2 Description

The size of an ISBC is W111mm×D117mm×H92mm. This system is suitable for Research & Development. The ISBC attachment is designed to mount on the Panalytical XRD System.



External view of ISBC module : ISBC-PAN-H102-HX

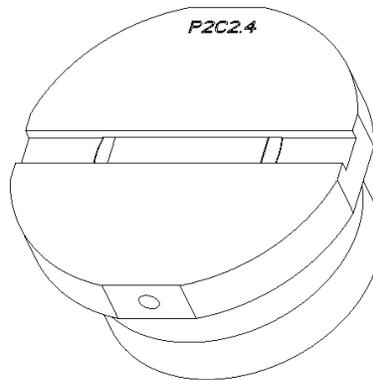
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2. Configuration

The standard configuration of the ISBC consists of the following components.

2.1 Main Battery Cell

Whole Dimension	Dø55mm x H44mm
Top Body	SUS316L, Dø55mm
Mid Insulator	TEFLON, Dø44mm
Bottom Insulation	TEFLON, Dø44mm
Pusher	SUS316L, Dø19mm x H21mm

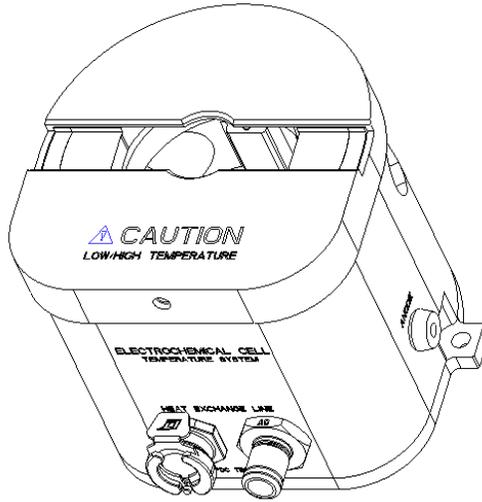


External view of Cell module

2.2 Heat Exchange stage Module

Whole Dimension	W111mm×D117mm×H92mm
Heat Exchanger	Al Block Exchanger, ø85mm
Exchanger Mount	POM, W111mm×D97mm×H92mm
Wire	Teflon Coated Wire
Electrode	Gold Coated Cu

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External view of heat-exchange stage module

2.3 Circulator (local item)

Temperature (min spec.)

Working temp. range -25 ~ 80°C

Temp. Stability ±0.5°C

Controller PID Controlled

Sensor PT100 or TC

Cooling Capacity

To 20°C 280 W

To 0°C 150 W

To -20°C 80 W

Bath Volume 5 L

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2.4 Charger/Discharger - Wonatech (WPG100e) : option

Hardware

Control Voltage range	±10V(standard) or customer specified range
Compliance Voltage	±12V(standard) or customer specified voltage
Control Current range	Control Current range 8 ranges (1A, 100mA, 10mA, 1mA, 100uA, 10uA, 1uA, 100nA) or customer specified range
LED	Run: 1ea, POT/GAL: 2ea, I-range: 8ea
Input impedance	10 ¹⁰ Ohm
Cell Connection	4 probe type, alligator clip cables
Voltage Accuracy	<0.01% f.s
Current Accuracy	<0.01% f.s
Voltage Control & Measurement	
Full Scale Ranges	±10V(Standard)
Resolution (16 Bits)	0.3mV(Standard)
Current Control & Measurement	
Full Scale Ranges	±1A, ±100mA, ±10mA, ±1mA, , ±100uA, ±10uA, ±1uA, ±100nA (Standard)
Resolution 16 bit(0.0015% f.s)	Resolution 16 bit(0.0015% f.s)
Power	30Watt
Sampling time	> 50ms
PC communication	TCP/IP, USB2.0

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3. General specification

Measurement Range	Incident Angle(θ) from 3.5° Min. Measurement Angle(2θ) : 7°
Material of Current Collector	Anode side : Be sheet Cathode side : SUS316L
Material of Insulator	PEEK
Number of Poles	2 Poles
Temperature Range	-10°C ~ 70°C (depending on Circulator spec.)
Sample Size	D > ϕ 14mm, 30um < t < 50um (Recommend)
Sample Weight	W > 50mg (Recommend)
Separator Size	D > ϕ 18mm, 20um < t < 30um (Recommend)
Li Metal Size	D > ϕ 16mm, t = 300um (Recommend)

4. Inspection Condition

The inspection condition of the ISBC consists of the following configurations.

4.1 XRD System (Based on Panalytical XRD)

Detector	More than "Pixel 1D" X'celerator & etc : Check Panalytical
Optic	BBHD FDS & etc : Check Panalytical
Tube	Cu or Mo (The intensity depends on the tube life time, Plz Check it.)

4.2 Sample (Based on Cathode Material)

Cathode Material	LCO (Lithium Cobalt Oxide)
Cathode Diameter	D > ϕ 14mm
Cathode Weight	W > 50mg

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Separator Size	D > ø18mm (Recommend)
Li Metal Size	D > ø16mm (Recommend)
Li Metal Thickness	300um

4.3 Battery Characteristics (Coin-cell Basis)

It is compared with the capacity.

LCO Ideal Capacity	140 mAh/g
Charge/Discharge, ISBC	C > 110 mAh/g (80%)

4.4 Charge / Discharge Conditions

Rest Time	10 Hour
C rate	0.1 C
Cycle	2 Cycle

5. Consumable Parts

Contents	Specification	Code
ISBCell	Version 2.4	JISB-PC24
Be sheet	25mm x 25mm	CS-B****
O-ring	VITON, FKM (AS-019)	CS-S019

6. Warranty

PDC provides a warranty against equipment failure due to deficiency in design and manufacturing of the equipment for repair and replacement of parts free of charge to the customer within 12 month from acceptance. However, consumable items such as Cell, Be sheet and O-rings shall be excluded from the warranty.