



Ford Lane  
Bramshill  
Hook  
Hampshire  
RG27 0RH  
England

Tool Code: MBH018  
Document: MN-MBH018-D  
**Memory Battery Holder**

# PRODUCTION LOGGING

## MEMORY BATTERY HOLDER

**Operational and Maintenance Manual**

**MBH018: x 1<sup>11</sup>/<sub>16</sub>" for MIT or DBT**

**Date:** 14th August 1997  
**Author:** John Buss, Duncan Fraser  
**Revised:** 2nd September 2002, Robert Holding, Daphne Outwin  
**Approved:** Robert Holding

Tel. +44(0)118 9326755 <http://www.sondex.co.uk>  
Fax. +44(0)118 9326704 email: [sondex@sondex.co.uk](mailto:sondex@sondex.co.uk)

---

**Contents**

0 About This Manual . . . . . 0-1

- 0.1 Manual History . . . . . 0-1
- 0.2 Updates Used With This Manual . . . . . 0-1
- 0.3 Technical Help . . . . . 0-1
- 0.4 Feedback . . . . . 0-1

1 Equipment . . . . . 1-1

- 1.1 Description . . . . . 1-1
- 1.2 Purpose . . . . . 1-1
- 1.3 Specification . . . . . 1-2

2 Safety . . . . . 2-1

3 Operating Procedure . . . . . 3-1

- 3.1 Before Logging Checks . . . . . 3-1
  - 3.1.1 Mechanical . . . . . 3-1
  - 3.1.2 Electrical . . . . . 3-1
- 3.2 Connecting To Toolstring . . . . . 3-2
- 3.3 Logging . . . . . 3-2
- 3.4 Post Logging Disassembly . . . . . 3-2
- 3.5 Transport Handling & Storage . . . . . 3-2

4 Mechanical Description . . . . . 4-1

- 4.1 Overview . . . . . 4-1
- 4.2 Disassembly . . . . . 4-1
  - 4.2.1 Battery Removal . . . . . 4-1
  - 4.2.2 Lower Head . . . . . 4-2
- 4.3 Reassembly . . . . . 4-2
- 4.4 Maintenance . . . . . 4-3

APPENDIX A Equipment And Recommended Spares . . . . . A-1

- A.1 Ancillary Equipment . . . . . A-1
- A.2 Recommended Spares . . . . . A-1

APPENDIX B Drawings and Parts Lists . . . . . B-1

- B.1 Mechanical Drawings . . . . . B-1
- B.2 Electrical Diagrams . . . . . B-1

APPENDIX C Battery Life . . . . . C-1

---

## 0 ABOUT THIS MANUAL

### 0.1 MANUAL HISTORY

Date	Issue	Description
14th May 1999	C	Separate manuals created for each MBH type, containing only relevant information for each tool. Manual layout improvements made.
2nd Sept 2002	D	Manual reformatted to use new templates. Wiring diagram added (ECR 1267).

### 0.2 UPDATES USED WITH THIS MANUAL

Date <sup>a</sup>	Update	Description
	none	

<sup>a</sup> Note: this chapter shall be updated to include information on manual updates to be used with this manual, irrespective of current manual issue.

### 0.3 TECHNICAL HELP

For further technical help contact Sondex as follows:

Address: Ford Lane, Bramshill, Hook, Hampshire, RG27 0RH, UK  
Telephone: +44(0)118 932 6755  
Fax: +44(0)118 932 6704  
Email: [support@sondex.co.uk](mailto:support@sondex.co.uk)

### 0.4 FEEDBACK

Please help us to improve future issues of this manual by sending comments or corrections to Sondex as above.

In your feedback please make reference to:

- The manual title, version and section
- Misprints, errors or unclear explanations
- General comments and suggestions.

Thank you.

**Photographs and sketches are for illustration purposes only. Depending on the tool model that you have, certain features or dimensions may differ from those shown.**

## **1 EQUIPMENT**

### **1.1 DESCRIPTION**

The type MBH018 Memory Battery Holder houses a motor battery pack used for example with the Sondex Multifinger Imaging Tool or memory Diverter Basket Tool. The battery pack fitted contains 5 high current 'C' cells.



**Figure 1.1 MBH018**

### **1.2 PURPOSE**

To power tool motors on slickline or where motor power cannot be provided from surface.

When fitted with a high current Lithium Chloride battery pack, the Sondex Memory Battery Holder contains sufficient power to run the motor to open and close the MIT > 1000 times, or the DBT > 300 times.

**1.3 SPECIFICATION**

<b>Parameter</b>	<b>Specification</b>	<b>Remarks</b>
Pressure (max)	15,000psi	
Diameter	1 <sup>11</sup> / <sub>16</sub> "	
Length	19.5" make-up length	
Weight in air	3.6kg (8lb)	
Battery pack type	Lithium Chloride	Batteries are not supplied as part of the MBH; order batteries separately
	<b>BAT005</b>	
Open circuit voltage (+VDC)	19.5	
Capacity (Amp.hr)	6	
Min Temperature (°C)	-40	
Max Temperature (°C)	150	
End threads (top/bottom)	1 <sup>3</sup> / <sub>16</sub> " UN female/male	
End connectors (top/bottom)	Fischer triax connector/single conductor 4mm socket	

**NOTE:** Contact Sondex for alternative battery pack availability. See also battery manual [MN-BAT](#).

## 2 SAFETY

**Warning!**

**HOT WORK!** Sondex equipment may, under certain circumstances or failure modes, become a potential source of ignition. Using it must therefore be considered "**HOT WORK**" and appropriate precautionary procedures should be followed when testing at surface in areas where there is a risk of gas leaks or other potentially explosive atmospheres.

See Sondex Battery manual [MN-BAT](#).

The Lithium cells incorporated in BAT005 are manufactured by Electrochem and can deliver a high current.

Battery packs supplied by Sondex are fused to prevent explosion should a short circuit occur outside the pack.

**Never** try to repair an open fuse.

**Warning!**

Lithium Chloride batteries have the highest energy density of any electrochemical system and **if mistreated are dangerous** and must therefore be handled properly.

**Never** store or operate cells above their maximum rated temperature. Drawing current from a cell increases its temperature. Exceeding the maximum continuous current limit will overheat the cells and run the risk of **permanent damage and even explosion**.

**Do not** crush, puncture or attempt to disassemble any battery pack or cell.

**Do not** use excessive force or hammering to remove batteries from the MBH housing.

**Do not** allow the battery pack to become wet.

Lithium Chloride batteries require special transportation arrangements according to IATA and DOT regulations.

Regulations concerning disposal of Lithium batteries vary. **Lithium is a poison** and must be disposed of correctly. Lithium batteries are not to be burned, thrown away, or handed to uninformed 3rd parties. They may explode if improperly handled. Contact your local Environmental Health office to determine the rules in force governing the use, transportation and disposal of lithium batteries.

### 3 OPERATING PROCEDURE

#### 3.1 BEFORE LOGGING CHECKS



**Warning!** If you have not already read [Section 2 Safety](#) then do so now.

##### 3.1.1 MECHANICAL

Ref.: General Assembly drawing [07069](#)

- 1 Clean and grease the O'ring seals (items 4 and 5). Replace if damaged, or after use in gas.

Ref.: Chassis & battery GA drawing [06620](#)

- 2 Check condition of the Fischer triax connector (item 5).

##### 3.1.2 ELECTRICAL

###### With the battery pack removed:

- 3 Check the insulation of the two through connections of the triax from each other and to ground  $>50M\Omega$ .
- 4 Check conductivity of triax connection and the single contact at lower head  $< 0.2\Omega$ .
- 5 Check insulation of single through contact at the lower head assembly (03656)  $> 50M\Omega$ .

###### With the battery pack installed:

- 6 Do **NOT** try to check the battery voltage at the triax connector with meter probes directly. In most cases the probes will slip and short the battery blowing the fuse.
- 7 **DO** use test lead (p/n 85580) which plugs into the triax connector at the top of the battery assembly. The shielded 4mm plugs can then be accessed to safely test the battery in voltage. The voltage should lie in the range 16-19.5V. If less than 16V, the battery is either discharged, damaged or passivated. See [Section 4.4 Maintenance](#).
- 8 **DO** use test lead (p/n 85581) which plugs into the triax connector at the bottom of the MIT and DBT to test the current drain and voltage of the battery while opening and closing the tool at surface.

### **3.2 CONNECTING TO TOOLSTRING**

The battery housing is designed to screw directly into the bottom of the Sondex memory MIT or DBT tool. As soon as this is done the memory motor control circuits are active and awaiting commands to power the motor. PL sensors may be attached below the motor battery.



**Warning!** Do not screw the MBH018 into the lower end of non-motorised tools. It is possible to do this as the MBH018 has standard Sondex PL tool end threads. If this is done it will destroy the MBH top electrical connector.

### **3.3 LOGGING**

The lifetime of the motor battery depends on the number of times the tool is opened and closed. The standby current taken by the motor control circuits is approximately 3 - 20mA depending on tool type.

### **3.4 POST LOGGING DISASSEMBLY**

Remove the Memory Battery Holder with battery pack from the logging tool. Check the open circuit voltage at the central connector, using test lead (p/n 85580, see Appendix A).

Do not leave the MBH connected to the tool motor section, since the standby current will drain the battery.

Clean the makeup thread and check O'rings. Change if necessary. Grease thread and O'rings. Take great care not to short circuit the triax connector.

Screw on the thread protector. Label the holder with the time, number of open and close operations and temperature of use. Change the battery when the life used has reached 3Amp.hr.

### **3.5 TRANSPORT HANDLING & STORAGE**

Store with end threads lightly greased and with water tight thread protectors fitted.

It is not necessary to remove the battery except for replacement or maintenance.

Do not allow internal battery pack to get wet.

Do not subject extreme shock such as dropping or hitting with a hard object.

---

## 4 MECHANICAL DESCRIPTION

Ref.:	General Assembly drawing	07069
	Chassis & Battery Assembly	06620
	Lower Lemo Sub Assembly	03656
	Wiring Diagram	WD06620

### 4.1 OVERVIEW

The MBH018 Memory Battery Holder is a  $1\frac{11}{16}$ "  $\varnothing$  housing to contain a battery pack comprising 5 lithium chloride 'C' cells connected in series. The total voltage of the pack is +19.5V with a nominal capacity of 6 Amp.hr.

The battery pack for use with the MBH018 carries a fuse to protect against explosion or other damage should the battery become short circuited.

Mechanically, the positive lead of the battery pack is a small socket in an insulation at the end of a few inches of Teflon insulated wire. The connection between the battery and motor is made through the intermediate ring of a Fischer triax connector fitted at the top of the battery chassis.

The battery return of a Sondex pack is through a lead soldered at the top of the battery. There is a 4mm pin at this end to plug into the body of the connection sub at the top of the chassis.

There is sufficient free space between the outside of the battery pack and the inside of the housing for normal expansion of the battery pack due to temperature.

The lower connection of the MBH018 screws directly into the top of any standard Sondex PL tool. The upper connection should only be connected to a suitable Sondex motor section.

### 4.2 DISASSEMBLY



#### Warning!

If you have not read *Section 2 Safety*, do so now.

During this procedure, take great care not to ground the centre contact or battery live socket even for an instant, as the short circuit will blow the internal fuse.

#### 4.2.1 BATTERY REMOVAL

- 1 Unscrew the lower sub (item 3, 07069) from the housing (item 1, 07069).
- 2 Remove the 4 x M3 countersunk screws (item 9, 06220) holding the top end of the half-shells to the battery upper bulkhead (item 2, 06220). Carefully withdraw the upper bulkhead sufficiently to unplug the battery leads from the centre connection and ground.
- 3 Screw in the 4 x M4 grubscrews to release the fibreglass tube from the upper bulkhead.
- 4 Slide the bulkhead off the battery.
- 5 Slide the battery out of the chassis.

**4.2.2 LOWER HEAD**

Ref.: Lower Sub Assembly **03656**

Remove circlip (item 8) and extract the Lower Head Connector Assembly (item 7).

**Note:** This pressure tight assembly is difficult to remove due to friction over the O'ring (item 16). The source handling tool (part no 00352) supplied with the Sondex FDR is a suitable extraction tool.

Alternatively a M5 or 10-32 tap can be used. The connector is best tapped out rather than pulled which can cause it to become free suddenly and the Line wire pulled off. Do not rotate the Connector assembly otherwise the anti-rotation pin (item 18) will be damaged.

Pressure Isolation relies on two O'rings:

- Item 16 - this should be checked for damage and replaced if necessary.
- 10057 item 11 - this small O'ring is internal to the Connector assembly and should not need checking except in the event of a tool flood. The connector assembly can be dismantled if required.

**4.3 REASSEMBLY**

- 1 Replace O'rings (items 4 and 5, 07069) if necessary.
- 2 Check a new battery for open circuit voltage to ensure it is good.
- 3 Slide it blank end in into the chassis halves (items 1, 06620), sufficient that the battery leads can be plugged onto the central pin and into the ground hole of the battery upper bulkhead (item 2, 06620).
- 4 Slide the upper bulkhead into the battery fibreglass tube end ensuring the battery leads are not damaged. Screw the 4 x M4 grub screws outwards sufficient to lock the bulkhead to the battery tube.
- 5 Slide the battery upper bulkhead in between the chassis halfshells. Screw in the 4 x M3 countersunk screws (item 9, 06620).
- 6 Using test lead (p/n 85580), check the battery voltage with a 200 $\Omega$  resistor across the terminals. Take care not to short circuit the battery. It may take a little time to depassivate, but should normally be up to full voltage (>19V) within one minute.

## 4.4 MAINTENANCE

Perform [Section 3.1 Before Logging Checks](#).

Replace O'ring (item 16, 03656) every 6 months.

### **With battery pack installed:**

Using test lead (p/n 85580), check open circuit voltage between centre contact and ground. New battery should be >19V.

Place a 200 $\Omega$  resistor across the battery and check the voltage across it. If the battery has not been used for some time it may well depassivate, indicated by a rising battery voltage, but the voltage of a healthy battery will rise to within 1.4 volts of open circuit value within a short time.

**Take great care not to ground the centre contact or battery live socket even for an instant, as a short circuit will blow the internal fuse.**

**APPENDIX A EQUIPMENT AND RECOMMENDED SPARES**

Item	Part no.	Tool Description	Diameter	Remarks
1	MBH018	Memory Battery Holder	1 <sup>11</sup> / <sub>16</sub> "	Use with DBT/MIT tools
2	BAT005	Battery Pack 5 cell 150°C		Not included in MBH: order separately

**A.1 ANCILLARY EQUIPMENT**

**Calibration Fixtures**

Item	Part no.	Description	Qty	Remarks
1	-	Multimeter	1	

**Special Tools**

Item	Part no.	Description	Qty	Remarks
1	91005	Spanner 38-42mm AF	1	For 1 <sup>11</sup> / <sub>16</sub> " tools
2	85580	Test connection lead, triax, battery to 4mm plugs	1	
3	85581	Test connection lead, triax, MDBT/ MMIT to 4mm plugs	1	
4	00352	Lower Connector extraction tool	1	Supplied with FDR source

**A.2 RECOMMENDED SPARES**

Item	Part No	Description	Qty	Remarks
1	<i>KITB-MBH018</i>	Basic Spares Kit	1	To support 1 run in hole
2	<i>KITR-MBH018</i>	Recommended Spares Kit	1	To support 25 runs in hole
3	LOR101	Grease for O'rings and threads	1	5oz pot
4	LOR101L	Grease for O'rings and threads	1	16oz pot

<b>PARTS LISTING</b>					
Part: <b>KITB-MBH018</b>	Issue: <b>A</b>		Drawn: <b>DMO</b>	Checked: <b>RLH</b>	Approved: <b>RLH</b>
			Date: <b>9/13/2002</b>	Date: <b>9/20/2002</b>	Date: <b>9/20/2002</b>
Description: <b>Kit, Spares, Basic, MBH018</b>					

<b>CHANGE HISTORY</b>					<b>RELATED DOCUMENTS</b>		
Iss	Date	Remarks	Chkd	Appr	# Documents	Issue	Notes
A	9/20/2002	First Issue	RLH	RLH			

<b>PARTS LIST</b>							
Item	Part No.	Issue	Description	Component Value	Qty	Units	Remarks
001	01029	-	Screw, Csk Hd(Slotted), M3 x 06mm Lg, St/Steel		2	ea	
002	93157	-	Screw Grub Skt Hd M4x08mm Lg SS		2	ea	
003	99124	-	O Ring Viton 90 Type 124		2	ea	
004	99211	-	O Ring Viton 90 Type 211		2	ea	

(AR = As Required)

<b>PARTS LISTING</b>					
Part:  <b>KITR-MBH018</b>	Issue:  <b>A</b>		Drawn: <b>DMO</b>	Checked: <b>RLH</b>	Approved: <b>RLH</b>
			Date: <b>9/13/2002</b>	Date: <b>9/20/2002</b>	Date: <b>9/20/2002</b>
Description: Kit, Spares, Recommended, MBH018					

<b>CHANGE HISTORY</b>					<b>RELATED DOCUMENTS</b>		
Iss	Date	Remarks	Chkd	Appr	# Documents	Issue	Notes
A	9/20/2002	First Issue	RLH	RLH			

<b>PARTS LIST</b>							
Item	Part No.	Issue	Description	Component Value	Qty	Units	Remarks
001	01027	-	Washer, Plain, 10-32UN, St/Steel		2	ea	
002	01029	-	Screw, Csk Hd(Slotted), M3 x 06mm Lg, St/Steel		5	ea	
003	01047	-	Circlip, Internal, 5/8, St/Steel		1	ea	
004	01082	A	Screw Grub Skt Hd M6x5mm Lg SS MOD		3	ea	
005	92019	-	Connector, Male, Burndy		1	ea	
006	93019	-	Pin, Spirol, 1mm x 8mm Lg, SS		2	ea	
007	93157	-	Screw Grub Skt Hd M4x08mm Lg SS		5	ea	
008	94035	-	Sleeving Heatshrink 1 6mm Polyvinylidene Fluoride (91078?)		(AR)		10cm
009	94088	-	Wire Elec 7/0 2 A (Red, PTFE Coated)		(AR)		1 metre
010	94106	-	Connector TriAx Skt		1	ea	
011	94108	-	Sleeving Heatshrink 3 2mm Polyvinylidene Fluoride		(AR)		10cm
012	95009	-	O Ring Viton 75 Type 009		2	ea	
013	95017	-	O Ring Viton 75 Type 017		1	ea	
014	95112	-	O Ring Viton 75 Type 112		2	ea	
015	95211	-	O Ring Viton 75 Type 211		2	ea	
016	99124	-	O Ring Viton 90 Type 124		50	ea	
017	99211	-	O Ring Viton 90 Type 211		50	ea	

(AR = As Required)

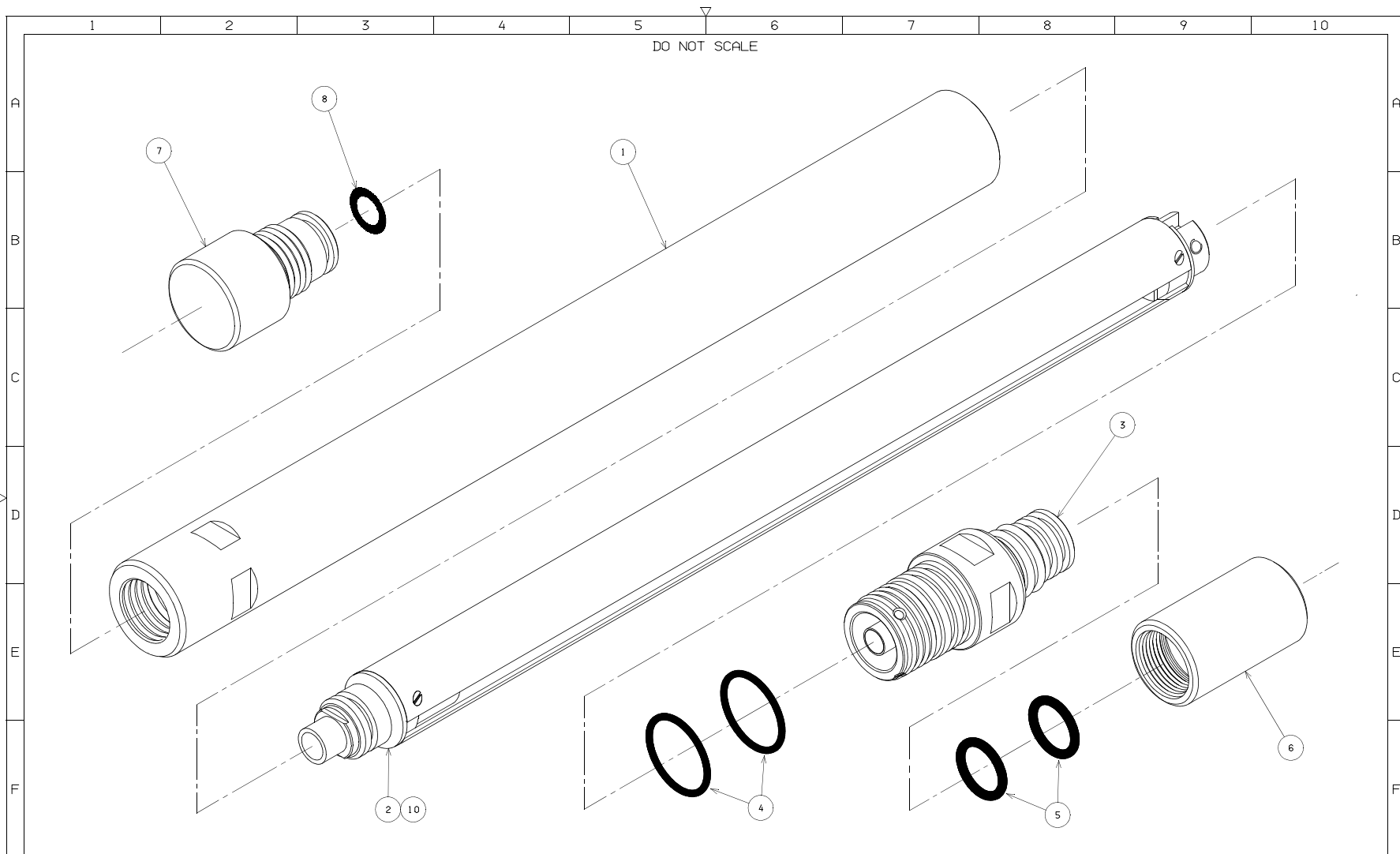
## **APPENDIX B DRAWINGS AND PARTS LISTS**

### **B.1 MECHANICAL DRAWINGS**

MBH018, 1 <sup>11</sup> / <sub>16</sub> " , MIT/DBT type, General Assembly	Drawing/Parts List	07069-A
Chassis and Battery Assembly	Drawing/Parts List	06620-A
Lemo, Lower Sub Assembly	Drawing/Parts List	03656-D
Lower Connector Assembly	Drawing/Parts List	10057-A

### **B.2 ELECTRICAL DIAGRAMS**

MBH018, 1 <sup>11</sup> / <sub>16</sub> " , MIT/DBT type	Wiring Diagram	WD06620-A
--	----------------	-----------



DRAWN NGH	CHECKED	APPROVED PGJ	ISS	DESCRIPTION	APPD	DATE	<b>Sondex</b> GEOPHYSICAL EQUIPMENT Tel. 0118 932 6755	USED ON MBH 18	TITLE ASSY BATTERY HOLDER MEMORY MIT - MOTOR SECTION
DATE 04-11-97	DATE	DATE 01-12-97					THIS DRAWING IS THE PROPERTY OF Sondex AND SHALL NOT BE COPIED OR USED WITHOUT PRIOR PERMISSION	GEN TOL 0.X ±0.020" 0.XX ±0.010" 0.XXX ±0.005" ANGLE ±0.5°	DRAWING No. 07069
DIM IN INCHES	MATL: SEE DETAIL DRAWINGS						THIRD ANGLE PROJECTION		ISSUE A
SCALE 1:1	A	2							

B-2

**Memory Battery Holder**

**MBH018**

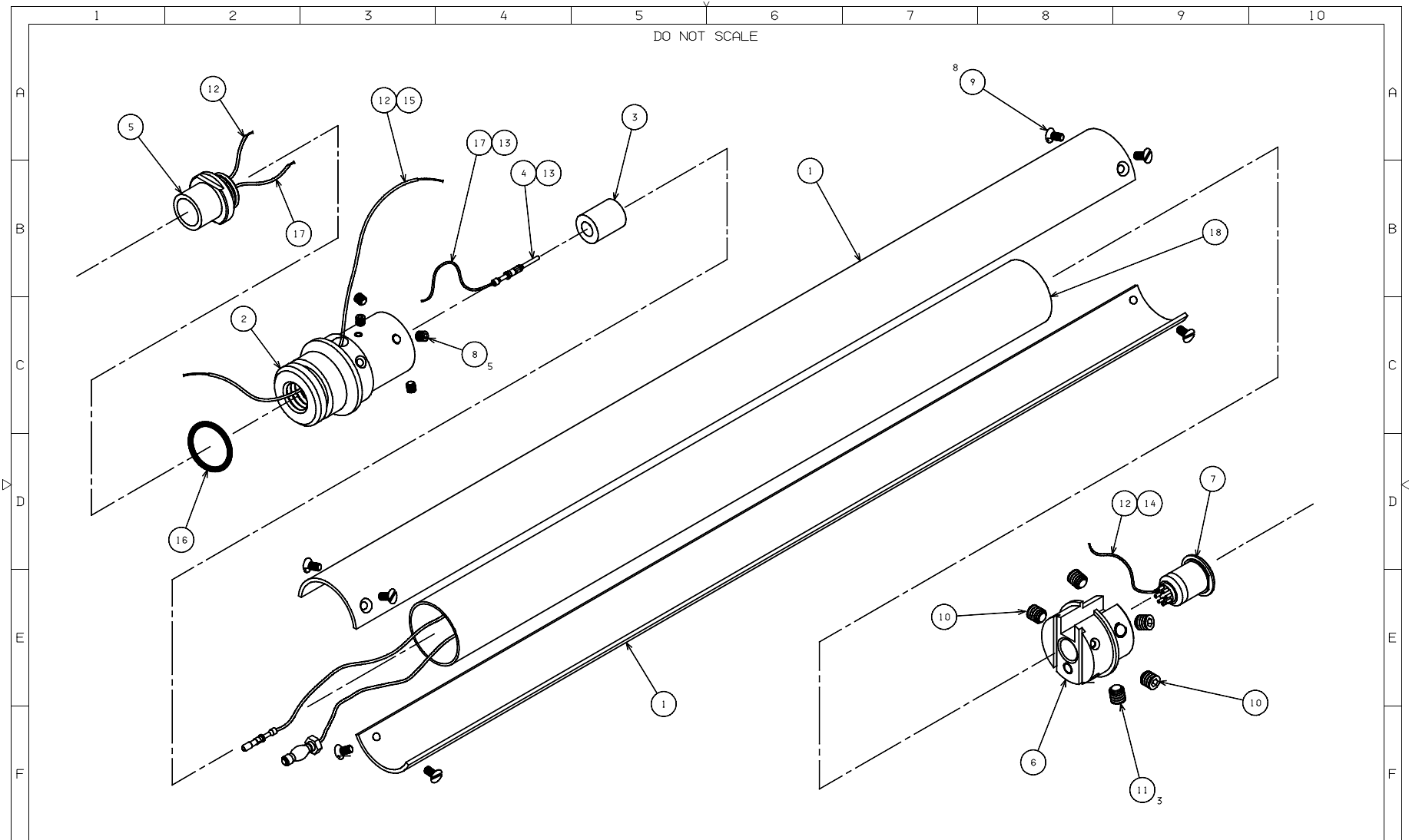
This document contains proprietary information. Copyright 2002 © Sondex Ltd - All Rights Reserved.

<b>PARTS LISTING</b>					
Part: <b>07069</b>	Issue: <b>A</b>		Drawn: <b>NGH</b>	Checked:	Approved: <b>PGJ</b>
Description: Assy Battery Holder Memory MIT, Motor section			Date: <b>11/4/1997</b>	Date: <b>--/--/--</b>	Date: <b>12/1/1997</b>

<b>CHANGE HISTORY</b>					<b>RELATED DOCUMENTS</b>		
Iss	Date	Remarks	Chkd	Appr	# Documents	Issue	Notes
A							

<b>PARTS LIST</b>							
Item	Part No.	Issue	Description	Component Value	Qty	Units	Remarks
001	06610	PT1	Housing Pressure Battery		1	ea	
002	06620	A	Assy Chassis & Battery		1	ea	
003	03656	D	Assy Sub Lower Lemo		1	ea	
004	99124	-	O Ring Viton 90 Type 124		2	ea	
005	99211	-	O Ring Viton 90 Type 211		2	ea	
006	01019	C	Thread Protector, Female, Standard (Lower End)		1	ea	
007	01018	C	Thread Protector, Male, Std, Upper (with O'Ring See 10148)		1	ea	
008	95211	-	O Ring Viton 75 Type 211		1	ea	
009							
010	92039	-	Bat SX (Mk1) 5 C Cell Lithium 150C High Temp			Referente ONLY	

(AR = As Required)



DRAWN	CHECKED	APPROVED	ISS	DESCRIPTION	APPD	DATE	USED ON	TITLE
NGH		PGJ					MBH 18	ASSY CHASSIS & BATTERY
DATE 11-11-97	DATE	DATE 01-12-97					GEN TOL 0. X ±0.020" 0. XX ±0.010" 0. XXX ±0.005" ANGLE ±0.5°	DRAWING No. 06620
DIM IN INCHES	MATL: SEE DETAIL DRAWINGS						THIRD ANGLE PROJECTION	ISSUE A
SCALE 1:1	A	2						

SONDEX FM No: F0022

B-4

# Memory Battery Holder

# MBH018

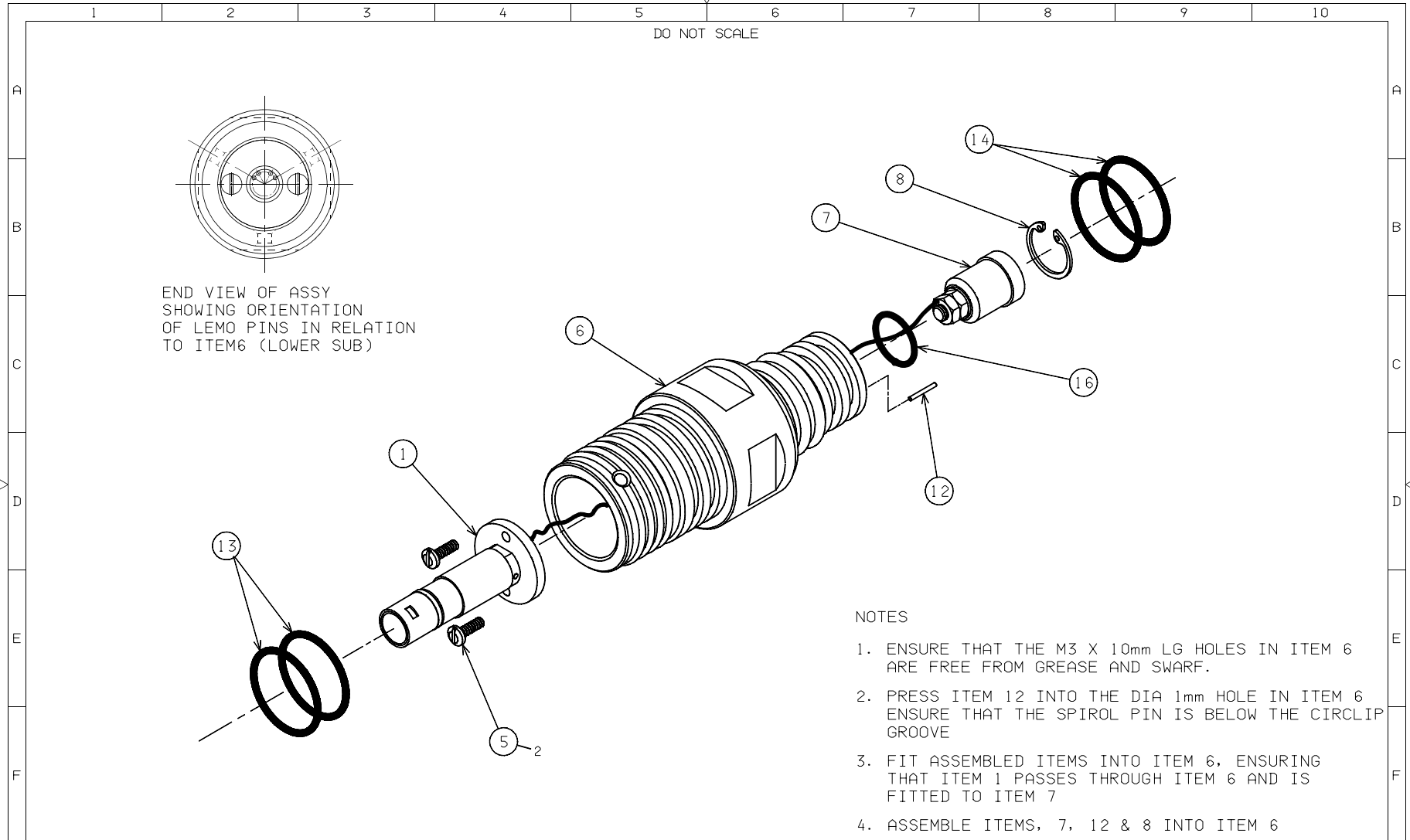
This document contains proprietary information. Copyright 2002 © Sondex Ltd - All Rights Reserved.

PARTS LISTING					
Part:	Issue:		Drawn:	Checked:	Approved:
06620	A		NGH		PGJ
Description:			Date:	Date:	Date:
Assy Chassis & Battery			11/11/1997	--/--/--	12/1/1997

CHANGE HISTORY					RELATED DOCUMENTS		
Iss	Date	Remarks	Chkd	Appr	# Documents	Issue	Notes
A	--/--/--	ECR1267. WD06620 added. P/List Approved.			01 06620	A	Assembly Drawing
					02 WD 06620	A	Wiring Diagram

PARTS LIST							
Item	Part No.	Issue	Description	Component Value	Qty	Units	Remarks
001	06611	A	Chassis & Cover Battery		1	pr	
002	06612	A	Bulkhead Upper Battery Chassis		1	ea	
003	06613	PT1	Insulator Burndy Connector		1	ea	
004	92019	-	Connector, Male, Burndy		1	ea	
005	94106	-	Connector TriAx Skt		1	ea	
006	01021	H	Bulkhead, Electronics, Lower, Standard (Lemo)		1	ea	
007	01132	B	Socket 8 Way Lemo MOD		1	ea	
008	93157	-	Screw Grub Skt Hd M4x08mm Lg SS		5	ea	
009	01029	A	Screw, Csk Hd(Slotted), M3 x 06mm Lg, St/Steel		8	ea	
010	93011	-	Screw, Grub Skt Hd, M5 x 5mm Lg, SS		2	ea	
011	01082	A	Screw Grub Skt Hd M6x5mm Lg SS MOD		3	ea	
012	94053	-	Wire Elec 7/0 2 A (Yellow, PTFE Coated) (USE W001-00104)			(AR)	
013	94108	-	Sleeving Heatshrink 3 2mm Polyvinylidene Fluoride			(AR)	
014	94035	-	Sleeving Heatshrink 1 6mm Polyvinylidene Fluoride (91078?)			(AR)	
015	94034	-	Sleeving 1mm Bore Black Si Rubber			(AR)	
016	95017	-	O Ring Viton 75 Type 017		1	ea	
017	94088	-	Wire Elec 7/0 2 A (Red, PTFE Coated)			(AR)	
018	92039	-	Bat SX (Mk1) 5 C Cell Lithium 150C High Temp			Referen <del>ce</del> ONLY	

(AR = As Required)



NOTES

1. ENSURE THAT THE M3 X 10mm LG HOLES IN ITEM 6 ARE FREE FROM GREASE AND SWARF.
2. PRESS ITEM 12 INTO THE DIA 1mm HOLE IN ITEM 6 ENSURE THAT THE SPIROL PIN IS BELOW THE CIRCLIP GROOVE
3. FIT ASSEMBLED ITEMS INTO ITEM 6, ENSURING THAT ITEM 1 PASSES THROUGH ITEM 6 AND IS FITTED TO ITEM 7
4. ASSEMBLE ITEMS, 7, 12 & 8 INTO ITEM 6

DRAWN NGH	CHECKED AJB	APPROVED DJF	ISS	DESCRIPTION	APPD	DATE	<b>Sondex</b> GEOPHYSICAL EQUIPMENT Tel. 0118 932 6755 THIS DRAWING IS THE PROPERTY OF Sondex AND SHALL NOT BE COPIED OR USED WITHOUT PRIOR PERMISSION	USED ON	TITLE
DATE 11-12-95	DATE 31-05-96	DATE 26-07-96	B	ITEM 4 UP - ISSUED, REFER C/R 117 (28May96)	DJF	19-09-97		COM	ASSY SUB LOWER - LEMO
DIM IN INCHES		MATERIAL: SEE DETAIL DRAWINGS		C	DJF	21-01-99	MACHINE FINISH 63/	GEN TOL 0. X ±0.020" 0. XX ±0.010" 0. XXX ±0.005" ANGLE ±0.5°	DRAWING No. 03656
SCALE 1:1	A 3			D	PR	22-06-99	THIRD ANGLE PROJECTION		ISSUE D

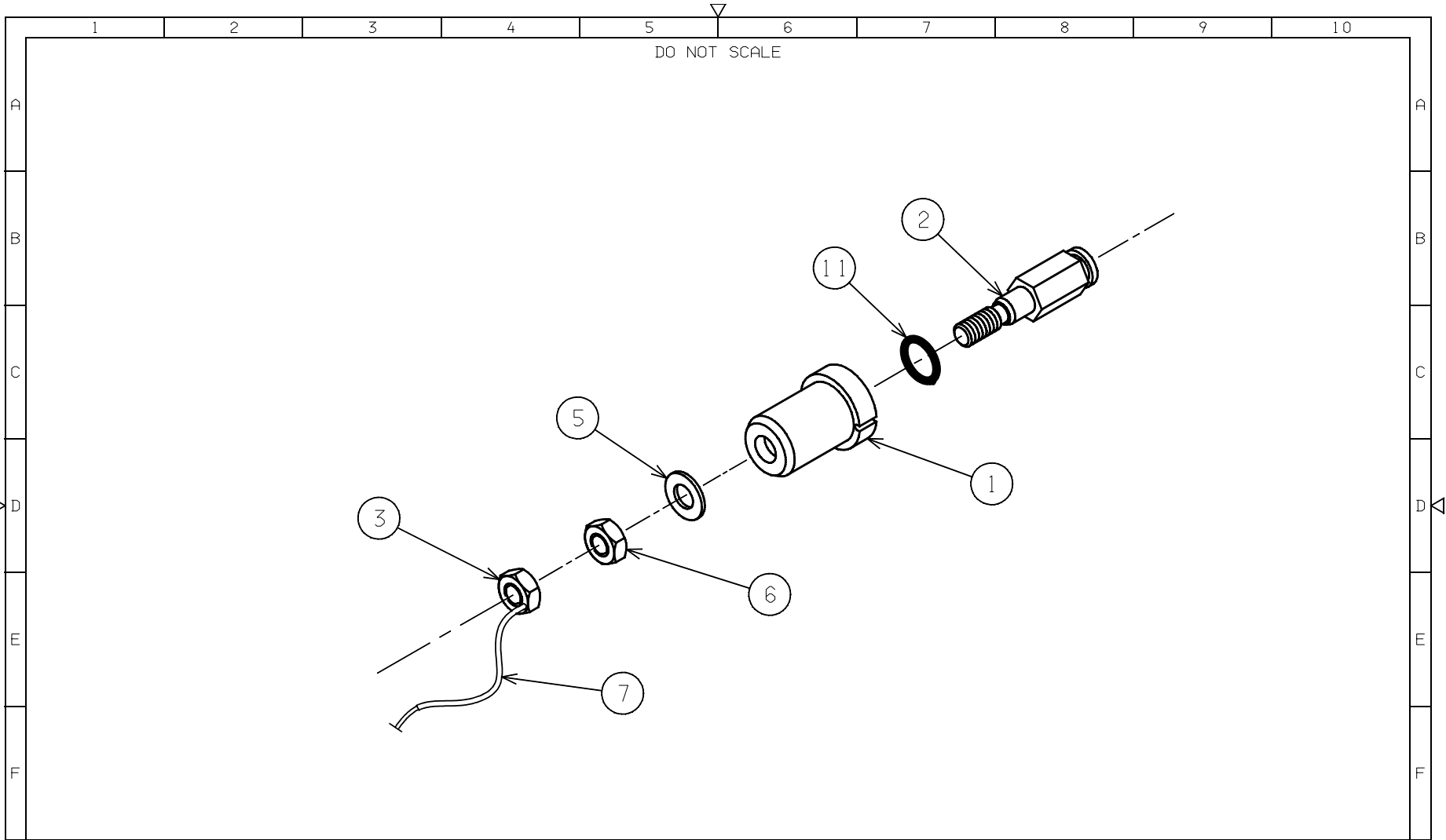
SONDEX FM No: F0023

<b>PARTS LISTING</b>					
Part:	Issue:		Drawn:	Checked:	Approved:
03656	D		NGH		DJF
Description:			Date:	Date:	Date:
Assy Sub Lower Lemo			12/11/1995	--/--/--	9/19/1997

CHANGE HISTORY					RELATED DOCUMENTS		
Iss	Date	Remarks	Chkd	Appr	# Documents	Issue	Notes
A	12/11/1995	Initial Issue			01 03656	D	Assembly Drawing
B	7/26/1996	Refer C/R 117 (28 May 96)		DJF	02 WD 06620	A	Wiring Diagram
D	4/27/1999	Refer ECR 394	AJG	PR			

PARTS LIST							
Item	Part No.	Issue	Description	Component Value	Qty	Units	Remarks
001	03984	A	Assy Lemo Sub Wiring		1	ea	
002							
003							
004							
005	93223	-	Screw Pan Hd Slotted M3x08mm Lg		2	ea	
006	03651	D	Sub Lemo Type		1	ea	
007	10057	B	Assy Connector Lower SX Sealing Type		1	ea	
008	01047	-	Circlip, Internal, 5/8, St/Steel		1	ea	
009							
010							
011	91064	-	Adhesive Loctite 242			(AR)	
012	93019	-	Pin, Spirol, 1mm x 8mm Lg, SS		1	ea	
013	99124	-	O Ring Viton 90 Type 124		2	ea	
014	99211	-	O Ring Viton 90 Type 211		2	ea	
015							
016	95112	-	O Ring Viton 75 Type 112		1	ea	

(AR = As Required)



ISS	DESCRIPTION	APPD	DATE	<b>Sondex</b> GEOPHYSICAL EQUIPMENT Tel. 0118 932 6755 THIS DRAWING IS THE PROPERTY OF Sondex AND SHALL NOT BE COPIED OR USED WITHOUT PRIOR PERMISSION	MACHINE FINISH 63 ✓ USED ON COM	TITLE ASSY CONNECTOR LOWER SONDEX SEALING TYPE
DRAWN JDR DATE 07-10-98	CHECKED AJG DATE 04-01-99	APPROVED DJF DATE 21-01-99		DIM IN INCHES SCALE 1:1	MATL: SEE DETAIL DRAWINGS	DRAWING No. 10057
				THIRD ANGLE PROJECTION	GEN TOL 0.X ±0.020" 0.XX ±0.010" 0.XXX ±0.005" ANGLE ±0.5°	ISSUE A

**Memory Battery Holder**

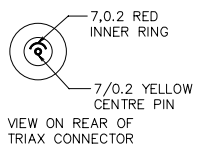
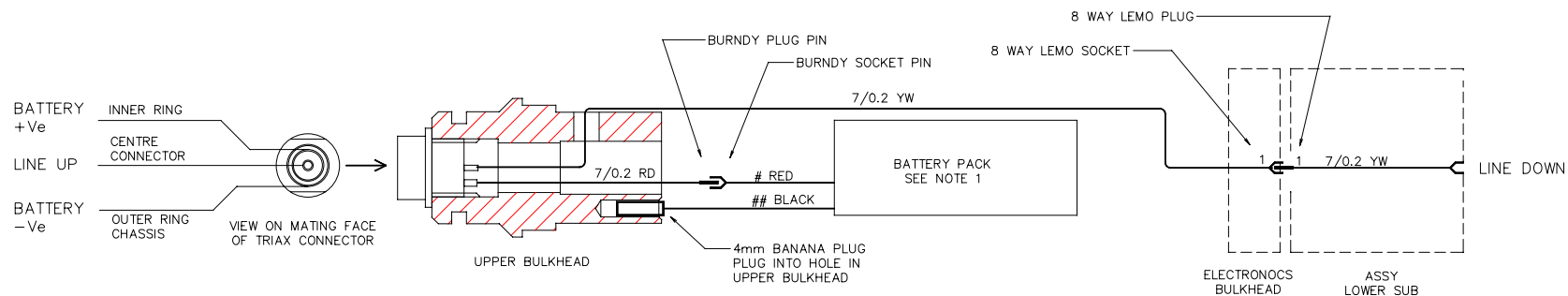
**MBH018**

<b>PARTS LISTING</b>					
Part:	Issue:		Drawn:	Checked:	Approved:
10057	A		JDR	AJG	DJF
Description:			Date:	Date:	Date:
Assy Connector Lower SX Sealing Type			10/7/98	1/4/99	1/21/99

<b>CHANGE HISTORY</b>					<b>RELATED DOCUMENTS</b>		
Iss	Date	Remarks	Chkd	Appr	# Documents	Issue	Notes
A	1/21/99	Initial Release	AJG	DJF			

<b>PARTS LIST</b>							
Item	Part No.	Issue	Description	Component Value	Qty	Units	Remarks
001	00690	C	Insulator Lower Sub		1.00	ea	
002	00695	B	Pin Hex Female Lower		1.00	ea	
003	10016	A	Nut, Hex, 10-32UNF, Brass/Nickel Plate, (with wire hole)		1.00	ea	
005	01027	-	Washer, Plain, 10-32UN, St/Steel		1.00	ea	
006	01026	-	Half-Nut, Hex, 10-32UNF, St/Steel		1.00	ea	
011	95009	-	O Ring Viton 75 Type 009		1.00	ea	

(AR = As Required)



NOTES

1. BATTERY PACKS ARE SUPPLIED WITH TWO READY TERMINATED LEADS.  
# RED LEAD WITH BURNDY SOCKET #  
## BLACK LEAD WITH 4mm BANANA PIN ##
2. YELLOW WIRE FROM TRIAX CONNECTOR PASSES THROUGH 6mm HOLE IN SIDE OF UPPER BULKHEAD

ISS	REV	DATE	CHANGES	CHKD	APPD	TITLE:	DRAWN	CHECKED	APPROVED
A		18.7.02	ECR1267. New Drawing			WIRING DIAGRAM BATTERY PACK MEMORY MIT MOTOR	D.Jackson	(PR)	(PR)
							DATE 18/7/02	DATE 23/7/02	DATE 23/7/02
							DRAWING No. WD 06620	ISSUE A	REVISION

**SONDEX**  
 FORD LANE, BRAMSHILL,  
 HOOK RG27 0RH,  
 ENGLAND.  
 tel 44 118 9326755 fax 9326704

## **APPENDIX C BATTERY LIFE**

> Memory Tool Battery Life vs. Program Sample Rate (ABC) table (BAT\_LIF4.xls)

Charts (BAT\_LIF4.xls)

> Survey Length vs Time between samples (secs)

> Survey Length vs Time between samples (mins)

> Average Current drain vs time between samples

### ABC Memory Tool Battery Life vs Program Sample Rate

(This review is to determine the APPROXIMATE battery and memory life expectancy for the conditions shown)

Tool	TOOL CURRENT ON/OFF			Total
	Logging	Standby	(1 or 0)	
MPL	45	0.5	1	45
Q-Pressure	10	0	1	10
CCL	2	0	1	2
PGR	20	0	1	20
SPINNER	5	0	1	5
CWH	3	0	1	3
FDP	12	0	1	12
PRT	11	0	1	11
FDR	20	0	1	20
PLC	15	0	0	0
PDC	25	0	1	25
none	0	0	0	0
none	0	0	0	0
SPINNER	5	0	1	5
V Battery	0	0	1	0
<b>Total</b>	<b>173</b>	<b>0.5</b>	<b>158.5</b>	<b>158</b>

BATTERY CHARACTERISTICS		
Temp Rtg deg C	Battery Volts	Max Life Amp.hrs
150	18.35	5.0
180	18.35	4.5

(at 0.05 Amps drain)

Where tool is programmed for sampling at intervals greater than 6 seconds it is on for minimum 5 maximum 6 seconds

#### CALCULATION OF BATTERY LIFE from SAMPLE RATE and CURRENT DRAIN

Hours/ sample	Mins/ sample	Seconds/ sample	Avg Curr (mA)		Minutes / sample	Logging Life (days)		% memory used at end of battery
			min	max		150°C bat	180°C bat	
		0.1	158.5	158.5	0.002	1.3	1.2	637.3%
		1	158.5	158.5	0.017	1.3	1.2	63.7%
		3	158.5	158.5	0.050	1.3	1.2	21.2%
		4	158.5	158.5	0.067	1.3	1.2	15.9%
		5	158.5	158.5	0.083	1.3	1.2	12.7%
		6	158.5	158.5	0.100	1.3	1.2	10.6%
		10	86.75	104.00	0.167	2.0	1.8	9.7%
		20	43.63	52.25	0.333	4.0	3.6	9.7%
	1	60	14.88	17.75	1.00	11.7	10.6	9.5%
	5	300	3.38	3.95	5.00	52.7	47.5	8.5%
	6	360	2.90	3.38	6.00	61.7	55.6	8.3%
	8	480	2.30	2.66	8.00	78.4	70.6	7.9%
	10	600	1.94	2.23	10.00	93.6	84.3	7.6%
	20	1200	1.22	1.36	20.00	152.9	137.6	6.2%
	30	1800	0.98	1.08	30.00	193.8	174.4	5.2%
1	60	3600	0.74	0.79	60.00	264.6	238.1	3.6%
3	180	10800	0.58	0.60	180.00	349.7	314.7	1.6%
6	360	21600	0.54	0.55	360.00	380.2	342.2	0.9%
12	720	43200	0.52	0.52	720.00	397.6	357.9	0.4%
24	1440	86400	0.51	0.51	1440.00	406.9	366.2	0.2%

Hours to fill 4 MByte of memory at 1 sec sampling all 12 channels 49.5

**Note:**

- 1) Used 150 deg C battery life to calculate MBytes of memory filled
- 2) Logging life for both 150 and 180 deg C batteries is calculated using the MAX avg current
- 3) The standard battery pack is 5 x C cells in series

### ABC Memory Tool Battery Life vs Program Sample Rate

