**Annexure E**

**Details of ILS Package and Post Warranty Logistic Support   
for MINI Thermal Weapon Sight (TWS)**

# Maintenance Policy

LEOS will provide Integrated Logistic Supports (ILS)/Post Warranty Logistic Support (PWLS) through Rate Running Contract (RRC) for continued provision of spares/technical support.

The maintenance policy comprised of the following maintenance levels:

|  |  |  |  |
| --- | --- | --- | --- |
| **Maintenance Level** | **Scope** | **Execution** | **Location of maintenance facilities** |
| **O Level**  (FRU\* Replacement Level) | Operation/Replacement  /Maintenance(cleaning) of FRUs | User/operator | Field |
| **I Level**  (SRU\*\* Replacement Level) | Fault Identification and Repair/Replacement of SRUs | User’s Technical Team | User Workshops (505) |
| **D Level**  (SRU Repair Level) | Repair of TI Module | LEOS Technical Team | LEOS |

\* FRU: Field Replaceable Unit

\*\* SRU: Shop Replaceable Unit

**Summary of ILS Package**

|  |  |  |
| --- | --- | --- |
| S. No. | Item | Price  PKR (Million) |
| 1 | Spares FRU Replacement Level (O-Level) | **82,250** |
| 2 | Spares SRU Replacement Level (I-Level) | **2,467,678** |
| **TOTAL (Offered Free of Cost)** | | **2,549,928** |

# “O Level” Maintenance

## Concept

At this level, when the user declares FRU as faulty, the “O-Level” maintenance technician has to replace the faulty FRU with new one available in FRU spare parts stock. Then he sends the faulty FRU (Cat-II) to workshop (505) for repair. The repaired FRU is sent back to the FRU replacement level spare parts stock.

Moreover, when the user “FRU Replacement Level” tech declares the complete TI Sight as faulty, he sends the faulty Sight to workshop (505).

## Documentation

The documentation supplied at the “O-Level” maintenance is as follows:

* Mini TWS User/Operational Manual
* FRU Replacement Manual
* “FRU Replacement Level” Illustrated Parts Catalogue (IPC)

## Training

### Operational Training

Free of cost operational training will be provided at user’s premises. The purpose of this training is to train user to operating the Mini TWS. The successful trainees may train to other users.

### Maintenance Training

Free of cost maintenance training of FRUs will be provided at user’s premises. The purpose of this training is to train User’s field technicians for FRUs replacement/maintenance. The successful trainees may train to other users.

## Necessary Facilities

LEOS trainer will visit user’s premises for this training.

## 2.5 “FRU Replacement Level” Maintenance Tool

Following tools are required:

* Cleaning Kit
* L-Key(M3) for picatinny rail mounting/dismounting

## “FRU Replacement Level” Spare Parts List

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Category** | **Part Number** | **Description** | **Unit Price (PKR)** | **Qty** | **Total Price** | **Remarks** |
| Cat-I | 218-01-4001 | Eye Guard | 1000 | 25 | 25000 | Cat-I parts are replaceable in the field |
| 218-02-4001 | Objective Lens Cover | 950 | 25 | 23750 |
| 218-03-4001 | Rechargeable Battery | 1500 | 15 | 22500 |
| Cat-II | 218-01-4002 | Interface Cable | See para 3.6 | | | In case of failure, Cat-II parts must be sent to workshop (505). |
| 218-02-4002 | Battery Charger | 7000 | 2 | 14000 |
| **TOTAL PKR** | | | | | **85,250** |  |

# “I-Level” Maintenance:

## Concept

At this level, the “I-Level” maintenance technician will perform the test procedures using “SRU replacement level” Special Tool and Test Equipment (STTE) for localizing the faulty SRU. Technician will be able to repair/replace the faulty SRU with new/operational SRU available in SRU spare parts stock.

**NOTE: If the fault is related to the TI module, the faulty TI module or Sight will be sent to LEOS through proper channel for repair.**

## Documentation

The documentation supplied at the “I-Level” maintenance is as follows:

* Mini TWS User/Operational Manual
* SRU Replacement Manual
* “SRU replacement level” Special Tool and Test Equipment (STTE) Technical Manuals
* “SRU Replacement Level” Illustrated Parts Catalogue (IPC)

## “SRU Replacement Level” Tech Training

Free of cost repair and maintenances training (for Officer/Staff) of SRUs will be provided at workshop (505)/LEOS premises. The purpose of this training is to train User’s Technical team technicians for SRUs maintenance/replacement. Training completion certificates will be provided to successful trainees.

## Necessary Facilities

The SRU replacement level maintenance requires at least the following facilities and infrastructure.

* Class 10,000 Clean Room equipped with:
* Class 100 Clean Workstation (Laminar Flow Workstation)

## “SRU Replacement Level” Maintenance STTE

Following STTE are required:

* **Integrated TI Performance & Function Test Bench**

(Already held with workshop 505. No software is required to make it compatible with mini-TWS. However, the required mounting plate will be provided by LEOS within one month of delivery of first batch).

* **Interface Cable Test JIG**
* **Button & Wiring Test JIG**
* **Test JIG for OLED module**
* **Test JIG for Interface card**
* **TI Module Test JIG (for Imaging module)**
* **Nitrogen Leak Test Bench**
* **Diopter Telescope**
* **Special Toolkit**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Item** | **Unit Price** | **Qty** | **Total Price** | **Remarks** |
| **Nomenclature** | **PKR** |  | **PKR** |  |
| **Interface Cable Test JIG** | **1,50,000** | **01** | **1,50,000** | On Payment (If required) |
| **Button & Wiring Test JIG** | **1,50,000** | **01** | **1,50,000** |
| **Interface Card Test JIG** | **1,50,000** | **01** | **1,50,000** |
| **Test JIG for OLED module** | **20,00,000** | **01** | **20,00,000** |
| **TI Module Test JIG** | **15,00,000** | **01** | **15,00,000** |
| **Nitrogen Leak Test Bench** | **7,50,000** | **01** | **7,50,000** |

## “SRU Replacement Level” Spare Parts List

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Item** | | **Unit Price** | **Qty** | **Total Price** | **Remarks** |
| **Part Number** | **Nomenclature** | **PKR** |  | **PKR** |  |
| **218-01-4002** | **Interface Cable** | **30,450** | **02** | **60,900** | **Free of cost** |
| 218-01-4002-1 | Connector Circular, Plug, 7 Positions, straight | 5000 | 02 | 10,000 |
| 218-01-4002-2 | Connector Strain Relief Black 3mm | 550 | 02 | 1100 |
| 218-01-4002-3 | Hook-Up Wire Red PTFE 20 AWG 19x0.2mm, 100m | 1000 | 02 | 2000 |
| 218-01-4002-4 | 4 mm Red Male Banana Plug, 30V, 32A | 4300 | 02 | 8,600 |
| 218-01-4002-5 | 4 mm Black Male Banana Plug, 30V, 32A | 4300 | 02 | 8,600 |
| 218-01-4002-6 | BNC Straight Crimp Plug for RG 179, 75 Ohms | 3300 | 02 | 6,600 |
| 218-01-4002-7 | Braided, Nylon Sleeve 6.6 (Polyamide 6.6), Black, 4 mm, 25 m, 82 ft | 5000 | 02 | 10,000 |
| 218-01-4002-8 | Silicon Sealant flowable | 12500 | 02 | 25,000 |
| 218-01-4002-9 | Silicon Sealant Non-flowable | 13,800 | 02 | 27,600 |
| **218-01-4003** | **Interface Connector Socket** | **8700** | **02** | **17,400** | **Free of Cost** |
| 218-01-4003-1 | Connector Circular, Socket,07 Pos | 7500 | 02 | 15,000 |
| 218-01-4003-2 | Connector Cap, Blanking Grey | 1200 | 02 | 2400 |
| **218-02-4003** | **Switch Tactile SPST-NO 1VA 32V** | **800** | **12** | **9,600** |
| **218-03-4003** | **Push Button Switch Latching SPST 4A 12V** | **2500** | **04** | **10,000** |
| **218-04-4003** | **Thermal Imaging Module** | **6,60,000** | **00** |  | **On payment** |
| **218-05-4003** | **OLED Display** | **1,10,000** | **02** | **2,20,000** |  |
| **218-06-4003** | **OLED Driver Board** | **21,000** | **02** | **42,000** | **Free of Cost** |
| 218-06-4003-1 | Video Decoder IC I²C, Serial ITU-R BT.656, NTSC, PAL, SECAM 64-LQFP (10x10) Package | 8200 | 05 | 41,000 |
| 218-06-4003-2 | PIC® XLP™ mTouch™ 16F Microcontroller IC 8-Bit 32MHz 7KB (4K x 14) FLASH 14-SOIC | 2000 | 05 | 10,000 |
| 218-06-4003-3 | 220Ohm Resistor Array | 2000 | 05 | 10,000 |
| 218-06-4003-4 | Mezzanine Connector, Receptacle, 0.5 mm, 2 Rows, 40 Contacts, Surface Mount, Phosphor Copper | 579 | 02 | 1158 |
| 218-06-4003-5 | Headers & Wire Housings VERTICAL HDR 5P | 600 | 02 | 1200 |
| 218-06-4003-6 | CAP CER 0.01UF 50V X7R 0603 | 3 | 100 | 300 |
| 218-06-4003-7 | CAP CER 10UF 25V X5R 0603 | 1 | 100 | 100 |
| 218-06-4003-8 | Translation - Voltage Levels 8-bit dual-supply bus transceiver 24-VQFN -40 to 125 | 1800 | 05 | 9,000 |
| **218-07-4003** | **Eyepiece** | **55,000** | **02** | **1,10,000** | **Free of Cost** |
| **218-08-4003** | **Objective Lens Assembly** | **2,30,000** | **02** | **4,60,000** | **Free of Cost** |
| **218-09-4003** | **O-Ring Kit** | **2000** | **02** | **4000** | **Free of Cost** |
| 218-09-4003-1 | O-Ring 1 | 1000 | 20 | 20,000 |
| 218-09-4003-2 | O-Ring 2 | 1000 | 20 | 20,000 |
| **218-10-4003** | **Main Mechanical Housing** | **70,000** | **02** | **1,40,000** | **Free of Cost** |
| **218-11-4003** | **Interface Card** | **10,500** | **10** | **105,000** | **Free of Cost** |
| 218-11-4003-1 | CAP CER 0.01UF 50V X7R 0603 | 3 | 100 | 300 | Free of cost |
| 218-11-4003-2 | CAP CER 0.022UF 50V X7R 0603 | 1 | 100 | 100 | Free of cost |
| 218-11-4003-3 | CAP CER 0.1UF 50V X7R 0603 | 3 | 100 | 300 | Free of cost |
| 218-11-4003-4 | CAP CER 1UF 50V X7R 0603 | 8 | 100 | 800 | Free of cost |
| 218-11-4003-5 | CAP CER 2.2UF 35V X5R 0603 | 8 | 100 | 800 | Free of cost |
| 218-11-4003-6 | CAP CER 10UF 25V X5R 0603 | 8 | 100 | 800 | Free of cost |
| 218-11-4003-7 | CAP CER 22UF 16V X5R 0805 | 12 | 100 | 1200 | Free of cost |
| 218-11-4003-8 | CAP CER 10pF 50V C0G 0603 | 3 | 100 | 300 | Free of cost |
| 218-11-4003-9 | RES 100 OHM 1% 1/10W 0603 | 2 | 100 | 200 | Free of cost |
| 218-11-4003-10 | RES 1K OHM 1% 1/10W 0603 | 1 | 100 | 100 | Free of cost |
| 218-11-4003-11 | RES 3K OHM 1% 1/10W 0603 | 2 | 100 | 200 | Free of cost |
| 218-11-4003-12 | RES 4.7K OHM 1% 1/10W 0603 | 6 | 100 | 600 | Free of cost |
| 218-11-4003-13 | RES 10K OHM 1% 1/10W 0603 | 6 | 100 | 600 | Free of cost |
| 218-11-4003-14 | RES 49.9K OHM 1% 1/10W 0603 | 3 | 100 | 300 | Free of cost |
| 218-11-4003-15 | RES 100K OHM 1% 1/10W 0603 | 2 | 100 | 200 | Free of cost |
| 218-11-4003-16 | RES 143K OHM 1% 1/10W 0603 | 3 | 100 | 300 | Free of cost |
| 218-11-4003-17 | RES 182K OHM 1% 1/10W 0603 | 3 | 100 | 300 | Free of cost |
| 218-11-4003-18 | RES 750K OHM 1% 1/10W 0603 | 2 | 100 | 200 | Free of cost |
| 218-11-4003-19 | RES 1M OHM 1% 1/10W 0603 | 3 | 100 | 300 | Free of cost |
| 218-11-4003-20 | RES 1.8M OHM 1% 1/10W 0603 | 2 | 100 | 200 | Free of cost |
| 218-11-4003-21 | Diode Schottky 5A 30V SOD-128 | 52 | 50 | 2600 | Free of cost |
| 218-11-4003-22 | Diode Zener 3.3V 200mW SOD323 | 10 | 100 | 1000 | Free of cost |
| 218-11-4003-23 | IC Comparator with fixed reference | 230 | 20 | 4600 | Free of cost |
| 218-11-4003-24 | IC Load Switch 2.7-18-V 2A 79mOhm | 80 | 50 | 4000 | Free of cost |
| 218-11-4003-25 | IC MCU 128KB Flash 28-Pin QFN | 1000 | 5 | 5000 | Free of cost |
| 218-11-4003-26 | IC REG BCK BST 3.3V 0.5A VQFN-12 | 300 | 5 | 1500 | Free of cost |
| 218-11-4003-27 | IC REG BCK BST ADJ 0.5A VQFN-12 | 300 | 5 | 1500 | Free of cost |
| 218-11-4003-28 | IC undervoltage Supervisor, 2.5-11V, SOT-23-5 | 500 | 2 | 1000 | Free of cost |
| 218-11-4003-29 | Inductor 1.5uH 2.2A 99mOHM SMD | 300 | 10 | 3000 | Free of cost |
| 218-11-4003-31 | Battery Spring | 300 | 10 | 3000 | Free of cost |
| **218-12-4003** | **Button Card** | **9570** | **02** | **19,140** | **Free of cost** |
| 218-12-4003-1 | Switch Tactile SPST-NO 1VA 32V | 1000 | 12 | 12000 |
| 218-12-4003-2 | Cable Assembly 4 Circuits 100mm | 550 | 04 | 2200 |
| 218-12-4003-3 | Connector PicoBlade Vertical, 4 Circuits | 120 | 04 | 480 |
| **TOTAL PKR** | | | | **2,467,678** |  |

# “D Level” Maintenance:

The “D-Level” maintenance technician at LEOS will further investigate and localized the error. The Special Tool and Test Equipment (STTE) will be used for fault localization as well as for repairing the faulty part/component of the SRU. LEOS technicians will repair/replace the faulty part/component and repaired TI module/ sight to user workshop.

The replaced/repaired parts will be sent back to workshop 505 for inspection/delivery and charged as per RRC price lists.

# Permissive Repair Schedule (PRS):

Permissive Repair schedule (PRS) is attached in Appendix-I

**PERMISSIVE REPAIR SCHEDULE (PRS)**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Main Equipment** |  | **Action Required** | | | | **Interval for Maintenance/ Repair** | **Remarks** |
| **Nomenclature** | **1st Level**  **(O Level)** | **2nd Level**  **(I Level)** | **3rd Level**  **(D Level)** | **STTE**  **(O & I Level)** |
| 218-026-0000 | Eye Guard | Replace | - | - | No STTE |  |  |
| Objective Lens Cover | Replace | - | - | L-Key |  |  |
| Rechargeable Battery | Check/ Replace | - | - | No STTE |  |  |
| Battery Charger | Check/ Replace | - | - | No STTE |  |  |
| Interface Cable | Replace | Check/Repair | - | Cable Test JIG |  |  |
| Interface Connector | - | Check/Replace | - | Button & Wiring Test JIG |  |  |
| Buttons and Wiring assembly | - | Check/Repair/Replace | - |  |  |
| OLED Display | - | Check/Replace | - | OLED Module  Test JIG |  |  |
| Display driver board | - | Check/Repair/replace | - |  |  |
| Interface Card | - | Check/Repair/replace | - | Interface Card Test JIG |  |  |
| TI module | - | Check | Replace | TI Module Test JIG |  |  |
| Firmware/Software |  | Check/Replace | Upgrade | Computer |  |  |
| Eyepiece assembly | - | Check /replace | - | Toolkit |  |  |
| IR Objective Lens Assembly | - | Check/replace | - | Toolkit |  |  |
| Mechanical Housing | - | Check/replace | - | Toolkit |  |  |
| Picatinny Rail | - | Check/replace | - | Toolkit |  |  |