

**NAT  
II  
HEAVY  
DUTY  
ROBOT  
USERS MANUEL**



## Warnings

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1. Do not operate the device without reading the User Manual!
2. Make sure the mobile platform is always turned off when not in user.
3. Never place your hand between the parts, even when the movable platform is closed!
4. Make sure that the mobile platform is at a safe distance while it is in operation.
5. Failure to follow the warnings may result in serious injury or damage to the mobile platform.

## Warning Symbols and Explanations

1.  Important information and tips for use
2.  Warning of fire hazard
3.  Warning against electric shock
4.  Dangerous to life and product

 **IMPORTANT!** Installation start: Before starting to use the mobile platform be sure to charge it.

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# 1. System Features

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## 1.1. Standard Delivery Package

- 1.1.1 NAT-II Remote Operated Vehicle is delivered with following accessories

S/N; for serial no

P/N; for part no



Picture 1 – Hand Control Unit HCU-II

P/N: 045\_4001\_00

S/N: ELKNAT-II-RCU.2023.1.001

## NAT-II Heavy Duty EOD ROBOT



Picture 2 – Remote Operated Vehicle NAT-II

P/N: 035\_1030\_00

S/N: ELKNAT-II.2023.1.001



Picture 3 – Climbing Support CSP-I

P/N: N/A

S/N: N/A

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Picture 4 – Charger CHR-II for HCU-II

P/N: N/A

S/N: ELKNAT-II-RCU.CH.2023.1.001



Picture 5 – Charger CHR-I for NAT-II CHR-II

P/N: N/A

S/N: ELKNAT-II-MP.CH.2023.1.001

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Picture 6– Antenna AVR-I

P/N: N/A

S/N: N/A



Picture 7 – Ethernet Cable Reel ECR-I

P/N: 045\_1081\_00

S/N: ELKNAT-II-CR.2023.1.001

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Picture 8 – x Griper Finger Tips Set GET-II

P/N: N/A

S/N: N/A



Picture 9 – Magnetic Antenna Holder MAH-I

P/N: N/A

S/N: N/A



Picture 1 – Li-Ion Battery Pack LBP-I for NAT-II

P/N: N/A

S/N: ELKNAT-II-MP.BT.2023.1.001

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Picture 10 – Li-Ion Battery Pack LBP-II for HCU-II

P/N: 045\_2024\_00

S/N: ELKNAT-II-RCU.BT.2023.1.001



Picture 11 – Headphone with speaker HPS-I

P/N: 045\_4001\_00

S/N: ELKNAT-II-RCU.2023.1.001



Picture 12 – Backpack Carry Case BCC-I

P/N: 045\_4001\_00

S/N: ELKNAT-II-RCU.2023.1.001

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Picture 13 – Tactical Shoulder Waistcoat TSC-I

P/N: N/A

S/N: N/A



Picture 14 – Sunvisor SVC-I

P/N: N/A

S/N: N/A



Picture 15 – Toolkit TKC-I

P/N: N/A

S/N: N/A

## 1.2.Techical Specifications

### 1.2.1.Techical specifications of Hand Control Unit HCU-II

- Rechargeable battery operated.
- User friendly operation panel with pushbutton switches and joystick.
- Multi vision for the each camera.
- Fire control switches.
- Safety shoot control switch.
- Dimensions:36X24X10cm (WXDXH). Weight:3.8kg.
- HCU's User Interface Language can be changed with language settings.

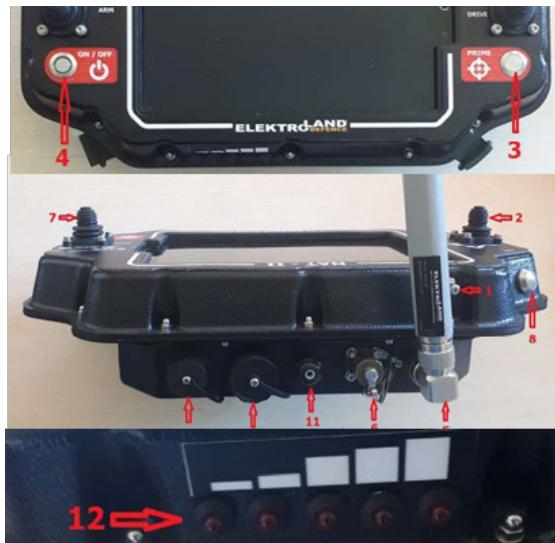
### 1.2.2.Techical specifications of the Mobile Platform and Robotic Arm NAT-II Two 24V

- PMDC drive motors.
- Two rubber tracks for various kinds of basement.
- Four front and back lightings.
- Forward and backward cameras for day/night operation.
- Environmental viewing, auto-focusing color camera unit with pan/tilt movements and 30X zooming function.
- Variable speed up to 6 km/h. Pivot turning capability.
- 25.9V %0Ah Li-Ion battery pack
- 3 hours continuous operation after full charge.
- RF control up to 600 m standard and cable control up to 100m.
- Max. Length of the acrobatic arm:extended:190 cm. Max. Load carry capacity of the arm closed:60 kg.
- Mount holders for the disrupters.
- Article for the targeting.
- Dimensions:65X120X105cm (WXLXH). Weight:220kg.

## 2. SWITCHING ON THE REMOTE CONTROL UNIT HCU-II AND NAT-II REMOTE OPERATED VEHICLE

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### 2.1. Functions and Part definitions



a. Hand Control Unit

## NAT-II Heavy Duty EOD ROBOT



b. NAT-II

- 2.1.1.a. Part Definitions for HCU-II
- 1. Tablet PC On/Off Switch
- 2. Arm Control Joystick
- 3. Prime Button
- 4. On/Off Switch
- 5. AVR-I Antenna and connector
- 6. Charging Port
- 7. Drive Control Joystick
- 8. Firing button
- 9. Ethernet Cable Connector
- 10. USB Port
- 11. Headphone Socket
- 12. RF Communication Level Indicator
- 2.1.1.b. Part Definitions for NAT-II
- 1. NAT-II On/Off Switch
- 2. Charging Port
- 3. Ethernet Cable Connector
- 4. Climbing Support
- 5. Disrupter Holder
- 6. Gripper
- 7. PTZ Camera Unit
- 8. Power LED Light
- 9. Zoom Camera
- 10. Terminals Activation Switch
- 11. LED Indicators for Terminals
- 12. Firing Terminals

# NAT-II Heavy Duty EOD ROBOT

## 2.2.PREPERATION FOR OPERATION

### 2.2.1. Switching on the Remote Operated vehicle NAT-II

Be sure that the AVR-I antenna in Picture-2 is placed and tightened well.

Switch on the NAT-II by pressing Power Button <1> in Picture-4.

The driving LED lights starts flashing and it continues flashing until communication established between NAT-II and HCU-II. The self checking process starts and the PTZ Camera Unit starts moving. Wait self checking to be completed until the PTZ Camera Unit stops its movement.

### 2.2.1.1. Switching on the Remote Control Unit HCU-II

Be sure that the AVR-I antenna in Picture-1 is placed and tightened well.

Switch on the HCU-II Tablet PC by pressing Power Button <1> in Picture-3.

Wait Until Tablet PC to be opened until PC screen menu appears. See Picture 5.

Switch on the HCU-II by pressing Power Button <4> in Picture-3. Wait until communication established. Check RF Communication Level Indicator <12> in Picture-3 lights on.

At least first level of the Red LED light should be on.

Run the control software by having double click on NAT-II icon to achieve Main Control Screen as it seen in Picture 6.

Check the battery level of the HCU-II on the screen if it is less than 20% please charge the HCU-II according to the instructions given in 2.3.1 of this manuel.

Check the battery level of NAT-II on the Laptop screen if it is less than 20% please charge the NAT-II according to the instructions given in 2.3.2 of this manuel.

## 2.3. Charging

### 2.3.1. Charging the HCU-II Remote Control Unit

Switch off the HCU-II by keep pressing Power Button <1> in Picture-3 until screen is off.

Switch off the Power Button <4> in Picture-3.

Connect the Charger CHR-II to the <CHARGING> port <6> in Picture-3 and to city mains.. Leave it for charging for at least 3 hours.

### 2.3.2. Charging the RCU-II Remote Control Unit

Switvh off the NAT-II by pressing Power Button <1> in Picture-4.

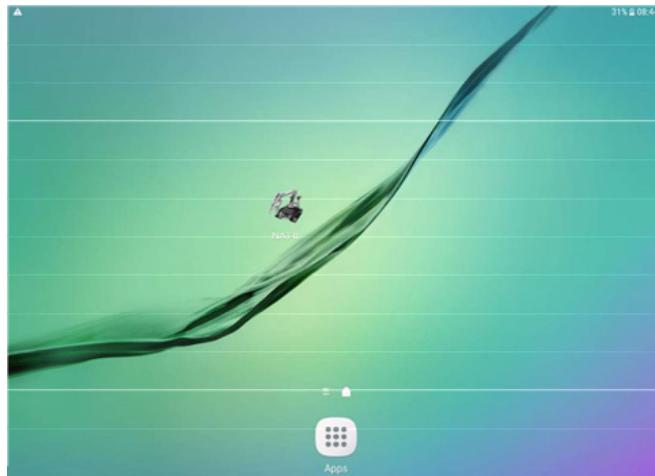
Plug in the NAT-II Charger CHR-I to the <CHARGING> port <6> in Picture-4 and city mains.



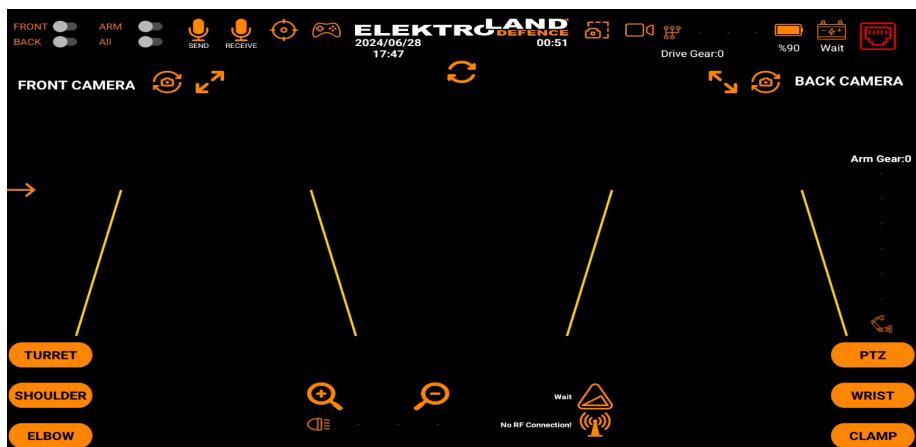
**CAUTION!!!** HCU-II and NAT-II has to be charged once a mount at least, in order to have batteries kept in a good condition and having long battery life.

# NAT-II Heavy Duty EOD ROBOT

## 2.4.NAT-II CONTROL SOFTWARE AND FUNCTIONS

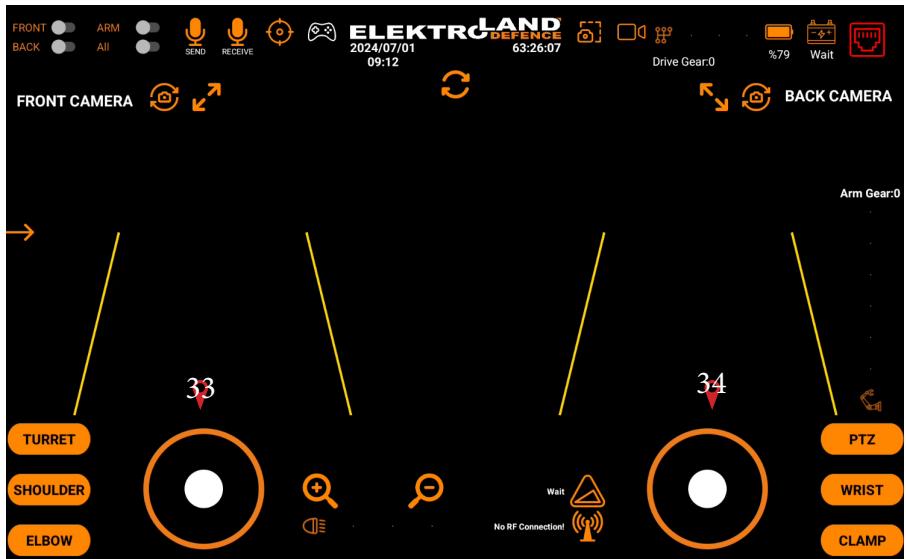
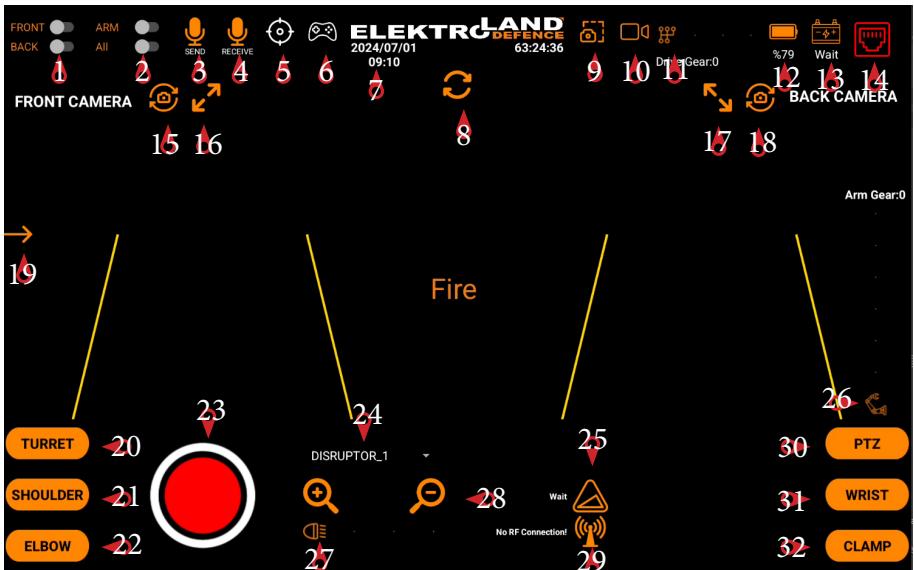


Picture 5



Picture 6

## **NAT-II Heavy Duty EOD ROBOT**



# NAT-II Heavy Duty EOD ROBOT

## 2.4.0>User Interface Icon Definitions

- |   |                         |
|---|-------------------------|
| 1. Light Switches                           | 28. Zoom In/Out         |
| 2. All light Switch                         | 29. Rf Connection       |
| 3. Send Voice                               | 30. Control PTZ         |
| 4. Receive Voice                            | 31. Control Wrist       |
| 5. Firing Mode                              | 32. Control Clamp       |
| 6. Virtual Joystick                         | 33. Virtual Joystick(L) |
| 7. Day and Time                             | 34. Virtual Joystick(R) |
| 8. Switch Camera                            |                         |
| 9. Take Screenshot                          |                         |
| 10. Video Capture                           |                         |
| 11. Mobile Platform Gear Slider             |                         |
| 12. HCU Battery Level                       |                         |
| 13. Mobile Platform Battery Level           |                         |
| 14. Connection Status between HCU and Robot |                         |
| 15. Select Camera                           |                         |
| 16. Full Screen                             |                         |
| 17. Full Screen                             |                         |
| 18. Select Camera                           |                         |
| 19. Drag Side Menu                          |                         |
| 20. Control Turret                          |                         |
| 21. Control Shoulder                        |                         |
| 22. Control Elbow                           |                         |
| 23. Fire                                    |                         |
| 24. Select Article                          |                         |
| 25. Slope                                   |                         |
| 26. Robotic Arm Gear                        |                         |
| 27. Lights Slider                           |                         |

## NAT-II Heavy Duty EOD ROBOT

### 2.4.1. The HCU-II Control Software and its functions

- Switch on the HCU-II Tablet PC as mentioned in the Section 2.2.1 of this manuel.
- Run the control software by having double click on NAT-II icon will get the control screen on NAT-II icon will get the control screen on Picture-6.

#### a) Drive Control Software on HCU-II Remote Control Unit

You will be able to use and control all functions of NAT-II Remote Operated Vehicle via using joysticks, pushbutton switches and onscreen icons. Driving can be controlled via virtual joysticks .

See Picture-7



Picture 7

#### b) Speed Control

Both drive and arm movement speeds can be set to 3 different speeds. Please use Gear icon Picture-8 to increase or decrease the speed to a desired one. At Gear 0 speed you can not run arm or drive. Gear 1 speed control up to 2 km/h Gear 2 speed control up to 4 km/h, Gear 3 speed control up to 6 km/h.

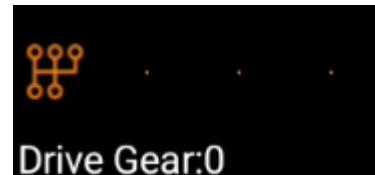
Please select the desired speed to achieve the arm movements and driving movements.

#### c) Control

There are two multi camera view on the screen By pressing camera icons one of the five camera view can be displayed on the related Picture 9 section of the screen.

Picture-9. Please select the desired camera image in first place. Repeat the same for the second place.

Full screen view of the camera selected in area 1 can be achieved by pressing icon. Return to Multi screen can be achieved pressing same icon once again



Picture 8



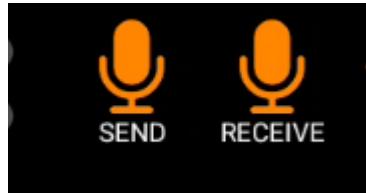
Picture 9

# NAT-II Heavy Duty EOD ROBOT

## d) Sound Control

There is two way sound control on the system. To hear the environmental sound icon around NAT-II . Once again pressing same icon will close the sound from NAT-II.

To activate the microphone to send users voice to be listened on the speakers of NAT-II. Once again pressing same icon will close the sound from HCU-II.



Picture 10

## e) Lighting Control

By pressing Lights icon the light control window will appear on the screen. Please select one of the desired light to have it on or off. Once again pressing the selected button will turns.

## f) Recording a video clip

By pressing icon the video recording will automatically starts and red dot starts flashing. Pressing the Record icon once again, it stops recording and the video clip is automatically stored on the Videos File by date and time.

## g) Taking a picture

By pressing icon the print screen images will be captured automatically pictures automatically saved into Images File by date and time.

## h) Recalling, deleting of stored image or video

Pressing Images icon will allow reaching stored pictures. Choose one of the stored picture by date and time by using <UP> / <DOWN> arrows. Pressing Videos icon will allow reaching stored videos. Choose one of the stored video by date and time by using <UP> / <DOWN> arrows. Press <DELETE> button to delete the video pr picture selected. Press <CLOSE> button to return back to main screen.

## i) Article Calibration

There is double disrupter holder. The disrupters can be fired individually or together at the same time. So there are two articles to be calibrated for each disrupter channel.

Insert empty barrels of the each disrupter to the disrupter holder. Place a target to be marked 50 cm distance from the tip of the barrel. User should mark the target with eye having two circles looking through barrel from back. Apply the same procedure for the second disrupter barrel and get the second mark on the target for the second disrupter.

Without changing the position of the arm return to HCU-II main screen. Press icon and select WJD camera. Press full screen in order to get the full screen view of targetting camera. The article calibration menu appears on the screen. See Picture 10 below There are two articles icons on the screen. Pressing one of the article selecting icon the icon appears full green color then you will be able to drag the selected article to the mark on the target. Pressing once again deactivates. Same procedure to be applied to calibrate the article for the second disrupter.

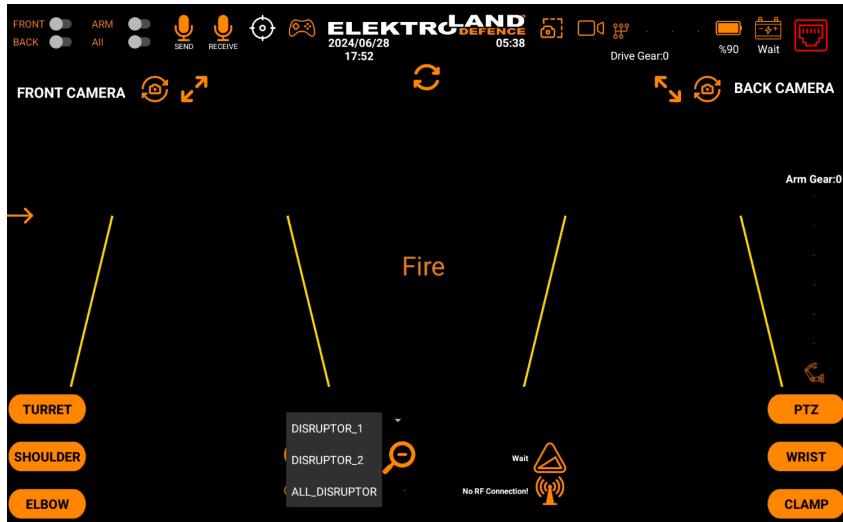
# NAT-II Heavy Duty EOD ROBOT

## 2.4. Firing mode and Firing



Picture 11

Press camera icon and select WJD camera on the main screen then press crossfire icon in order to activate firing screen menu. See Picture-12 below.(Articles only activate when a disrupter attached.)



Picture 12

Please select one of the option Article-I, Article-II or All Articles in order to activate the related firind channel. ALL ARTICLES activates the both firing channel at the same moment. To perform firing press Prime button <3> in Picture-13 and keep pressing until count down completed and then press Fire button <8> in Picture-14.

# NAT-II Heavy Duty EOD ROBOT

Picture 13&14



One can perform the firing using virtual joysticks which will appear after dragging icon

See Picture-15

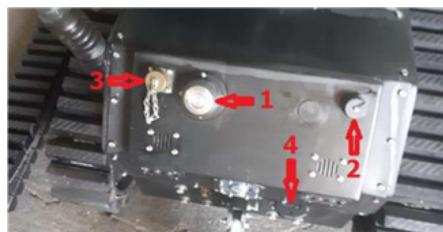
To perform firing press <Prime> button in Picture-15 and keep pressing until count down completed and then press < Fire> button in Picture-15 in order to perform firing of the selected disrupter.

To close virtual joysticks drag the icon back.



Picture 15

PTZ Camera module zooming control You can zoom in and zoom out of the PTZ camera via Pressing and to increase and decrease the zoom.



Picture 16

## 3. Operation

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### 3.1. WIRELESS OPERATION

#### 3.1.1. Switching on the Mobile Platform and the Remote Control Unit

Be sure that the AVR-I antennas are in place and tightened well as mentioned in part 2.1.

Switch on the Power Switch 1 in Picture-16 of NAT-II

Switch on the HCU-II Remote Control Unit as stated in part 2.2.1.

Front and Back Lights start flashing

As soon as the Data Communication established the Front and Back Lights stop flashing and the system is ready for operation.

Whenever the data communication lost between the NAT-II and RCU-I the Front and Back Lights starts flashing.

#### 3.1.2. Driving

- Set the driving speed control Gear to min (1) position. (Picture-16) Position the drive control joystick to the desired direction.
- The NAT-II Mobile Platform start moving towards the direction selected.
- Drive the NAT-I Mobile Platform until you reach the right position.
- To stop driving, release the joystick.

There are 6 direction option.

- Forward, Forward-left, Forward Right
- Backward, Backward left, Backward Right



Picture 17

#### 3.1.3. Arm Movements

##### a) Positioning the Turret

- Set the speed control Gear to min (1) position.
- Select the < TURRET > function. The color of selected function turns to blue.
- You can control Turret Left or Right via arm joystick.
- Increase/decrease the the speed to desired value. To stop, release the joystick.

##### b) Positioning the Shoulder

Set the speed control Gear to min (1) position.

Select the < SHOULDER > function. The color of selected function turns to blue.

You can control Shoulder up and down via arm joystick.

Increase/decrease the the speed to desired value. To stop, release the joystick.

# NAT-II Heavy Duty EOD ROBOT

## d) Positioning the Wrist

- Set the speed control Gear to min (1) position.
- Select the <WRIST> function. The color of selected function turns to blue.
- You can control Wrist, up and down via arm joystick.
- Increase/decrease the speed to desired value. To stop, release the joystick.

## e) Positioning the Gripper

- Set the speed control Gear to min (1) position.
- Select the <CLAMP> function. The color of selected function turns to blue.
- You can move Clamp turret left and right or open/close Jaws via arm joystick.
- Increase/decrease the speed to desired value. To stop, release the joystick.



Picture 18

## f) Firing and calibration of Disrupter

- Set the safety switch (1) Picture-18 to OFF Position.
- Install the disrupter(s) as shown in Picture via fixing screws.
- Connect cables of the cartridge to firing terminals (2) in Picture-18  
Set the safety switch (1) Picture-18 to ON Position.
- Perform the firing of disrupter as mentioned in Part 2.4.1. i)
- Press PRIME button, the timer start count down from 5 to 0. Keep pressing prime button, press FIRE button immediately.
- After count down completed in order to activate firing. Picture 18

## g) PTZ Camera Module

- Set the speed control Gear to min (1) position. The color of selected function turns to blue.  
You can move the Camera module via Up/Down, Left /Right via using Arm Joystick Increase/decrease the the speed to desired value. To stop, release the joystick.
- You can zoom in and zoom out of the PTZ Camera via using icons.

# NAT-II Heavy Duty EOD ROBOT

## 3.2. WIRELESS OPERATION

### 3.1.2. Preparation for wire operation

#### a) Connecting the Ethernet Cable to NAT-II Remote Operated Vehicle

- Attach the spring support mast of the ECR-I Cable Unit to fixing support as shown in Picture-19.
- Remove the cap of Ethernet Cable Socket and
- Insert the connector of the Ethernet cable to its socket.
- as shown in Picture-20



Picture 19

#### b) Connecting the Ethernet Cable to the HCU-II Remote Control Unit

- Remove the cap of the <CABLE> Connector Picture 19
- Insert the socket of the Ethernet connector shown in Picture-21. The system is ready for cable operation.



Picture 20



Picture 21

# 4.INSTALLATION OF THE ACCESSORIES

## 4.1.Installation of Climbing Support CSP-I

4.1.1. Remove the screws of the CSP-I climbing support from the CSP-I mounting bracket. Insert the CSP-I Climbing Support as shown in Picture-22



Picture 22

## 4.2.Installation of the Griper Finger Tips GET-II

4.2.1.Install the Gripper finger tips to the jaws of the griper using the fixing screws.



Picture 23

## 4.3.Track Replacement

4.3.1.Loosen the countereng two nuts until its end position.

<1> in Picture-23

- Move the front sliding pulley holder <2> in Picture-23 to the end.
- Remove the track and replace with new one.
- Move the front sliding pulley holder <2> in Picture-23 until it reaches its position. Then fix back the countereng two nuts.
- Applying the same for replacement of the other track if necessary.

# **5.CLEANING & MAINTENANCE**

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## **5.1.Cleaning**

### **5.1.1. Cleaning the Mobile Platform NAT-II and Robotic Arm**

Switch off the Mobile Platform NAT-II

Clean the NAT-II body and the Robotic Arm parts with wet towel whenever its necessary.

### **5.1.2. Cleaning the Remote Control Unit RCU-II and HCU-II**

Clean the HCU-II body and the parts with wet towel whenever its necessary.

## **5.2. STORING**

### **5.2.1. Storing of the Mobile Platform NAT-II**

Switch off the Mobile Platform NAT-II and store in a dry place between temperatures of

Store in a dry place between temperatures of -40....80oC and RH of less than 80%

### **5.2.2. Storing the Remote Control Unit RCU-I**

Switch off the Remote Control Unit RCU-II and HCU-II

Store in a dry place between temperatures of -40....80oC and RH of less than 80%

## **5.3. MAINTENANCE**

### **5.3.1. Quarterly Maintenance**

Please recharge all batteries once in a three months.

Please keep all of the batteries fully charged during storage. Please switch on the mobile platform and control unit and let them communicate at least 1 hour then switch off.

### **5.3.3. Six Months Maintenance**

Please activate the hydraulic system and make sure that all functions of the manipulator arm.

### **5.3.4. Annual Maintenance**

The annual maintenance has to be carried out by authorized service personnel.

# FOOTNOTES

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**IMPORTANT:** When mobile platforms battery is lower than a quarter, operator shoud operate mobile platform with care. Due to low battery level, mobile platform might delay its actions or not fulfill.



**IMPORTANT:** Mobile platform opens in 3 minutes due to battery management system. After getting in operational state, delayed actions recover mostly from 3 minutes to 1 minute.



**IMPORTANT:** User Interface language changes with tablet language settings.



**IMPORTANT:** If the robotic arm is not in the left position when the robot is parked and this happens frequently, the air in the hydraulic arm must be removed.



**IMPORTANT:** During Operation, if the Robotic Arm is losing its control from hydraulic, check the hydraulic levels on the tank and inform the manufacturer.



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