

THE BLUE

OxTM
CABLE PULLER



USER'S GUIDE & SAFETY MANUAL



ISO 9001:2008
CERTIFIED

IMPORTANT SAFETY NOTICE

Read and understand all procedures and safety instructions before using a Condux Underground Pulling Trailer. Observe all safety information on this page and note specific safety requirements as explained by procedures in this manual. Failure to follow these instructions could result in serious personal injury or death.

ADVERTENCIA:

Favor de leer y comprender todas las instrucciones de operación y seguridad antes de usar la máquina. Si Ud. no comprende las instrucciones favor de consultarle a su jefe.



Save this user's guide for future reference.

COMMUNICATIONS WITH THE MANUFACTURER:

For information related to the machine (use, maintenance, spare parts) always-state model number, manufacturing Year and Order. This date can be found on the parts identification label.

Manufacturer:

Condux International, Inc. 145 Kingswood Drive

Mankato, MN 56002-0247

1-507-387-6576

Fax 1-507-387-1442

E-mail: cndxinfo@condux.com

If you have questions on:

SAFETY - OPERATIONS - APPLICATIONS

CALL 1-800-533-2077

CONDUX

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1.



THE BLUE OX™
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SAFETY INFORMATION

- The Blue Ox should be operated by qualified operators who have received training from the machine owners, company or, alternatively, from the manufacturer.
- This machine must be used only for the work it was designed for.
- It is important to follow all of the operations steps for safe and optimal use.

OPERATOR INFORMATION

- Operators must be aware of all local, state and federal safety regulations governing the use of this equipment.
- Operators must wear suitable clothing and use personal protective gear (i.e. gloves, boots, helmet, etc.).
- Operators must carefully follow hazard related instructions contained in this instruction manual or indicated on the machine.
- This machine's work area should be free as possible of oil or other liquid spills as well as materials or equipment that may be considered as an obstacle to proper operation.
- The operator must absolutely avoid the direct inhalation of the system's engine exhaust gas.

GENERAL MAINTENANCE INFORMATION

- It is absolutely forbidden to carry out any maintenance, or adjust any settings on this machine while pulling (except for those indicated in this manual).
- Before carrying out any maintenance, stop the engine (except for those instances indicated otherwise in this manual) and wait until the system components subject to heating have cooled sufficiently
- All maintenance performed on this machine must be carried out on a level surface and while the system is not under load.
- Authorized and trained personnel must perform all of the maintenance, both scheduled maintenance and repair. Authorized and trained personnel are those persons who have received training on the maintenance of this equipment from the machine owner's company or, as alternative, from the manufacturer.
- Maintenance personnel must wear suitable clothing to reduce the possibility of entanglement in the machine's moving parts. They should avoid the wearing of chains, and other jewelry for the same reason.
- Operators must use personal protective gear (i.e. gloves, boots, helmet, etc).
- All maintenance operations, both scheduled and repair, must be carried out per the instructions included in this manual or following technical instructions provided by the manufacturer. Failure to follow these instructions relieves the manufacturer from any responsibility and voids their warranty.

MACHINE USAGE

The machine must not be used:

- For lifting persons and/or goods
- In a location where the machine can not be positioned and anchored in a proper way
- In areas with brush or other materials that can be easily set on fire
- In closed/unventilated sites or those poorly ventilated (tunnel or similar)
- At sites where fuels or explosives are present
- For structure demolition
- For the pulling of elastic elements



-
- With ropes or joints having a bigger diameter than that specified in this manual
 - With over-ridden or broken safety system devices
 - For handling trucks or other movable equipment

RESPONSIBILITY

Use of the machine in situations different from those indicated on page 5 or those not described in this manual, is to be considered extremely dangerous and/or forbidden. Persons not using recommended restraints will cause a situation of improper use, and relieve the manufacturer from any responsibility for accidents, injuries to persons or damage to property. The manufacturer's warranty is also voided.

Similarly the manufacturer's responsibility ends when the following situations occur:

- Tampering and/or modifying of the system without the manufacturer's written acceptance (in this case the operator becomes the manufacturer assuming all obligations and responsibilities, both civil and penal).
- The use of non-original spare parts.
- Poor maintenance.
- Use with disconnected or over-ridden safety devices.
- For the connection to machine and/or plans not produced and not directly authorized by the manufacturer in a written acceptance.

OPERATORS MANUAL

- Information contained in this manual applies to all the operators charged with the use and/or the maintenance of the machine.
- This instruction manual is not a training manual.
- Before using the machine, the job site supervisor and the operators must read this instruction manual.
- The supervisor is obligated to inform all operators about the instructions contained in this manual.
- All operators/users must carefully follow the instructions contained in this manual.
- Before using the machine the operator must know the locations and the functions of all the controls.
- The job site supervisor must verify that the instructions contained in this manual are applied.
- This instruction manual must be kept with the machine, for the entire life of the machine, so it is available to all potential users and operators.
- The instruction manual must be kept in a sheltered and dry place.

TECHNICAL SPECIFICATIONS



2.



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GENERAL PULLER SPECIFICATIONS	
Max Line Pull, Pounds	7500
Max Pulling Speed, Ft/Min (no load)	175
Bull Wheel Diameter, Inches	9
Max Rope Diameter, Inches	3/8
Rope, Feet	3000
Engine Type	Diesel T4F
Horsepower	55
Electrical System	12 Volt

Product	Length	Height	Width	Overall Weight	Tongue Weight
The Blue Ox	175"	92"	98"	7,800lb	780lbs
The Blue Ox w/Compressor	224"	92"	98"	10,800lbs	1,800lbs

A. OPERATING CONDITIONS

Temperature: -10°C to +40°C (15-105° F)

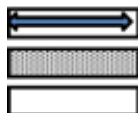
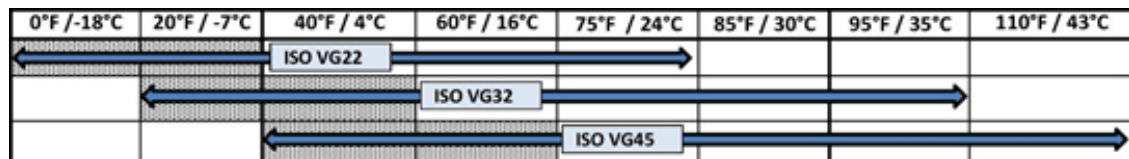
Humidity: from 25% to 95%.

Weather conditions: any (in line with working conditions).

Lighting: Natural and/or artificial lighting of the working site.

B. HYDRAULIC OIL

When using the machine always keep in mind operating conditions and their effect on the possibility of your exceeding the following temperature limits for the system's hydraulic oil.



For additional information concerning the hydraulic oil, see chapter "Maintenance" and the attached comparative table of the oils used on the machine.

C. CALIBRATION

This unit uses Hydraulic Working Pressure to calculate pulling tension. As a result, the tension readings must be set under dynamic loading. The unit should not require regular calibration; although, Condux can review and reset the load curve at their factory.



3.



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A. SAFETY DEVICES

Machine has been equipped with the following safety devices:

- A load-limiting device that automatically disables the pump once the maximum pre-set load value has been exceeded
- Where possible, guards and covers are provided to protect personnel from moving parts.

⚠ DANGER: IT IS ABSOLUTELY FORBIDDEN TO USE THIS MACHINE WITH PROTECTIVE GUARDS REMOVED OR WITH DAMAGED OR DISCONNECTED SAFETY DEVICES.

B. EMERGENCY STOP DEVICE

Two emergency stop buttons are provided - one on the main control panel (Figure 1) and one on the remote control (Figure 2). Pushing it immediately shuts the machine down.



Figure 1

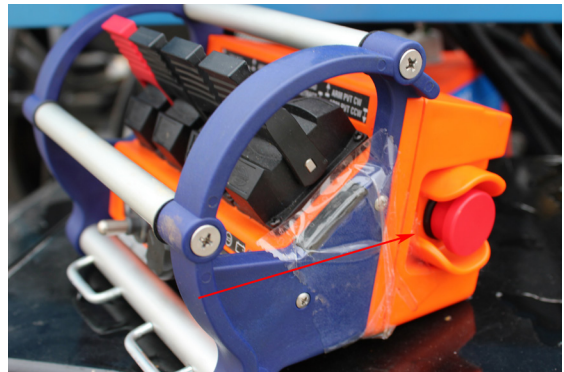


Figure 2

⚠ ANY CUSTOMER ALTERATIONS TO THE PROVIDED SAFETY DEVICES RELIEVES THE MANUFACTURER OF ANY RESPONSIBILITY FOR ANY RESULTING DAMAGE OF PROPERTY OR INJURY TO PERSONNEL.

C. PULLING ROPE FAILURE

Pulling rope failure will cause uncontrolled movement of the entire machine. This movement, as well as the danger presented by the recoil of the pulling rope and/or conductor, can cause serious injury or death.

To reduce operator exposure to these dangers operators must regularly check the rope and replace it as soon as defects or signs of wear are detected.

⚠ ROPE FAILURE CAN CAUSE SERIOUS INJURY OR DEATH IF SAFETY PRECAUTIONS ARE NOT FOLLOWED.

D. ELECTROSTATIC DISCHARGES

To reduce the risk presented by static electric charge build up in the ropes and conductors during pulling operations, the machine must be properly grounded. To minimize these risks operators must be trained in, and apply, the proper methods used to ground the machine during before using the machine.

E. INHALATION OF ENGINE EXHAUST

To minimize these risks operators must:

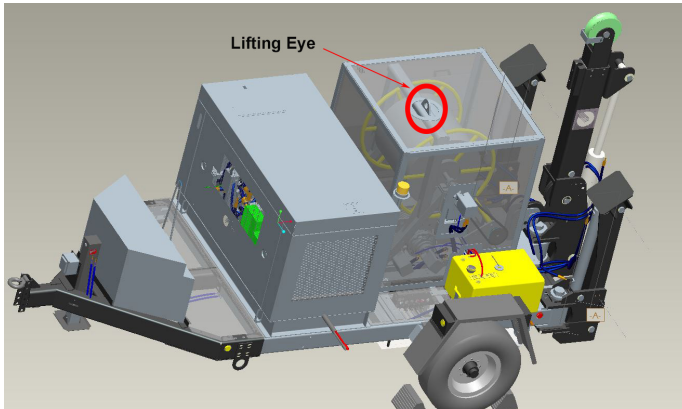
- Assume the proper operating position during operation and use appropriate safety equipment as needed



4.

A. MACHINE LIFTING

For machine lifting use only devices (overhead traveling cranes, lift trucks, ropes, cables, hooks, forklift etc.) with a capacity equal to the weight to be lifted.



Personnel should not be on the machine when it is lifted.

B. TOWING

This machine is designed for towing at highway speeds. No personnel may ride on the machine at any time while towing the machine at ANY speed.

C. PULLING SPECIFICATIONS

The below information is the pulling information for The Blue Ox with and w/out compressor.

Product	Length	Height	Width	Overall Weight	Tongue Weight
The Blue Ox	175"	92"	98"	7,800lb	780lbs
The Blue Ox w/Compressor	224"	92"	98"	10,800lbs	1,800lbs



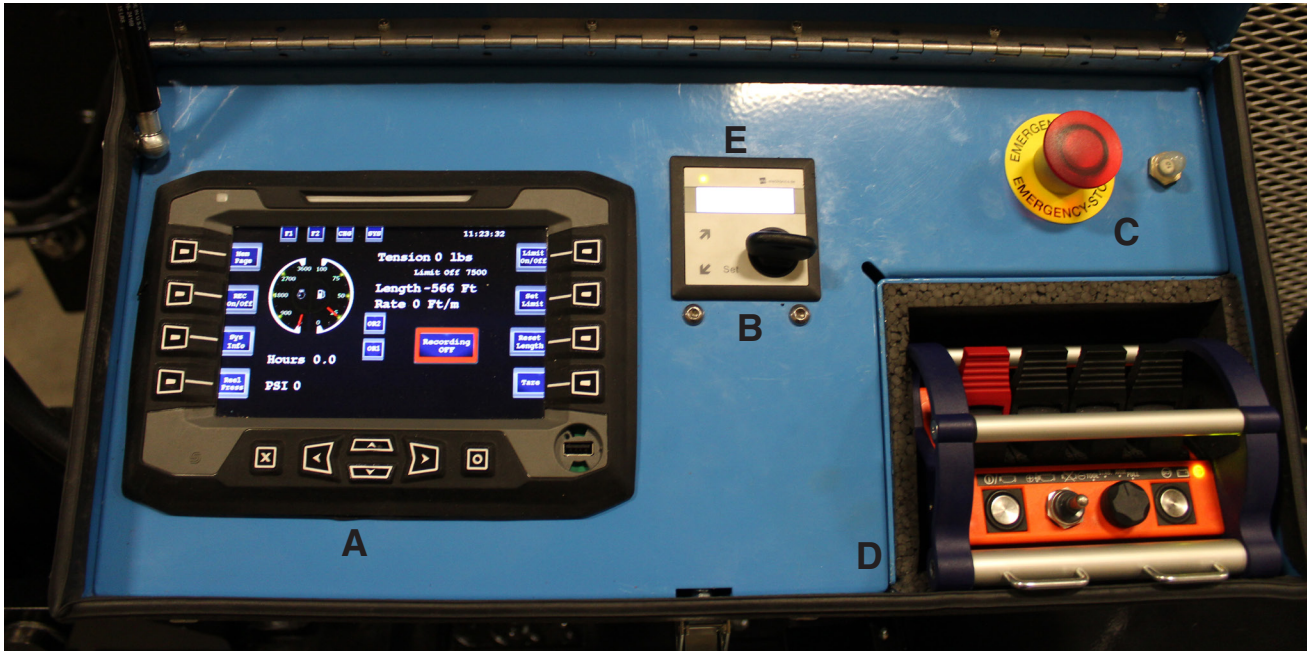


5.



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A. ELECTRONIC DISPLAY

The Electronic Display keep tracks of engine speed, pull speed, fuel levels, tension level, tension limits, payout lengths, record able pull data.

B. IGNITION

C. EMERGENCY STOP BUTTON

Emergency Stop Buttons are located on the main panel and on the remote control. Pushing the E-Stop button will completely shut down the system including engine.

D. REMOTE CONTROL

E. ELECTRONIC CONTROLS AND DISPLAY

Should a lit notification indicating “ENGINE” appear on the Electronic Display, a corresponding code will appear on the Electronic Control Display that can be found in the Kohler manual supplied with The Blue Ox.



6.

Upper Panel

This includes all the paddles used for operations of the Blue Ox. (Figure 3)

Lower Panel

The lower level is responsible for selecting which mode the Blue Ox is operating in: Pull mode, Stabilizing, Utility. It's also responsible for throttle control and connecting the remote to the Blue Ox. (Figure 4)

Emergency Stop Button

Located on the right side of the remote the E-stop button is designed to completely shut down the machine in the event of an emergency. (Figure 5)

Battery Pack

Located in the back of the remote the battery pack includes 2 batteries and 1 charger fitted with a cigarette lighter ending. (Figure 6)

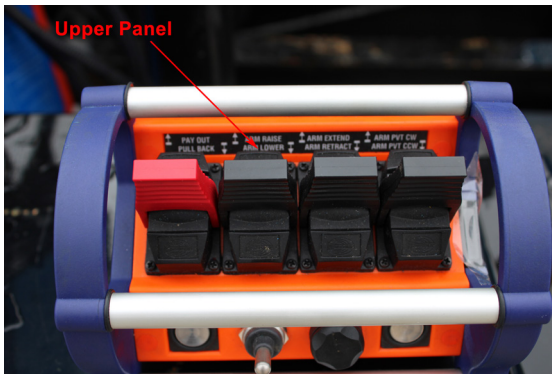


FIGURE 3: Paddles on Upper Panel

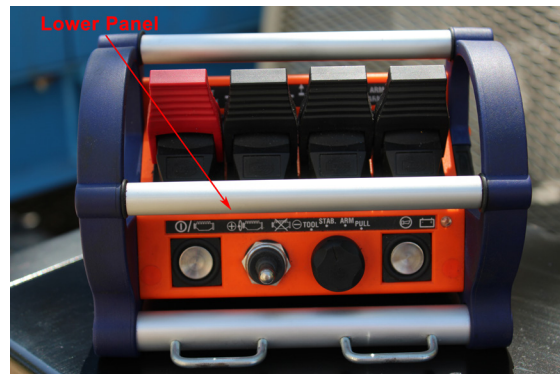


FIGURE 4: Lower Selection Panel

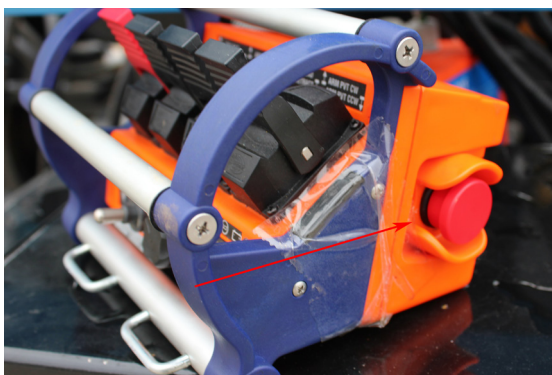


FIGURE 5: E-Stop Button

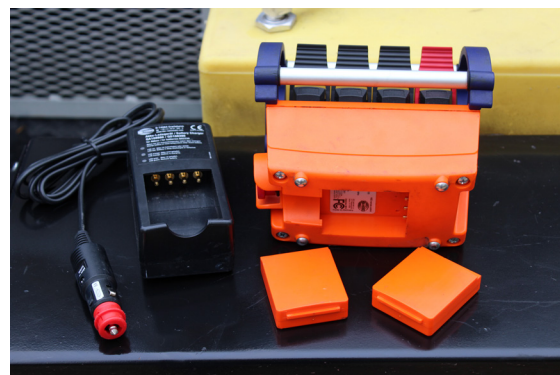


FIGURE 6: Battery Pack



Lower Control Panel

The lower control panel is responsible for connecting the remote control to the Blue Ox, setting engine speed and selecting the mode the Blue Ox is operating in. (Figure 7)



FIGURE 7

A. The Connection Button: This button is used to connect the remote to the Blue Ox.

B. Throttle Control: By moving this toggle left (to increase engine speed) or right (to reduce engine speed) you can adjust the engine speed to accommodate pulling demands.

C. Mode Control Selector: The mode control selector dictates what mode the Blue Ox is operating in. (Figure 8)



1. Tool Mode: This is used to divert the hydraulic fluid to an additional pair hydraulic hookups for any additional needs you may have.
2. Stab (Stabilizer Mode): when in this mode you will be able to raise and lower the outriggers.
3. Arm Mode: This mode allows you to move the boom to your Left, Right, Up, Down and Extend.
4. Pull Mode: This mode allows you to Pay-in or Pay-out rope.

FIGURE 8

D. Dead Button: This button currently does not have a purpose and is not being utilized.

E. Indicator Light: This LED light will let you know if you are connected to the Blue Ox. Red indicates that you are not connected, while Green indicates a connection.



Upper Control Panel

The upper control panel consists of paddles that control the movement of the boom arm and outriggers. All of the paddles are designed to have multiple (with the exception of the paddle A) uses depending on which mode it currently is in.

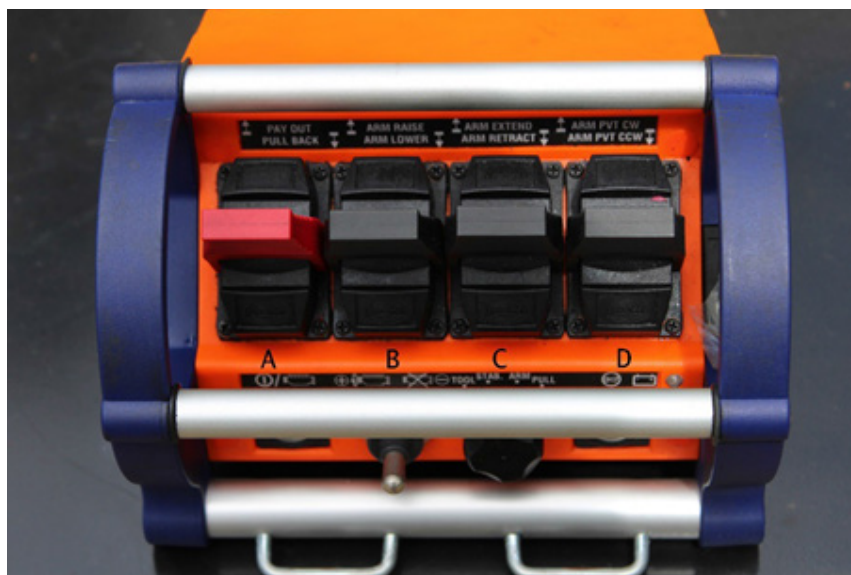


FIGURE 9

- A. Left Paddle:** This paddle is used for the express purpose of paying in and paying out the cable during the pull. This is the only paddle that is used for one purpose only.
- B. Left-Center Paddle:** When set in “stabilization” mode (STAB) this is used to lower the back right outrigger. When set “ARM” mode this paddle is responsible for raising and lowering the boom arm.
- C. Right-Center Paddle:** When set in “stabilization” mode (STAB) this paddle is used to lower the back left outrigger. When set in “ARM” mode this paddle is responsible for extending and retracting the boom arm.
- D. Right Paddle:** When set in “stabilization” mode (STAB) this paddle is used to lower the front jack (located by the tool box). When set in “ARM” mode the paddles will control the lateral movement of the boom arm.



Battery Pack

The battery Pack includes 2 specialized batteries and 1 charger designed to be plugged into cars or trucks. These can be replaced through Radiomatic. (Figure 10)

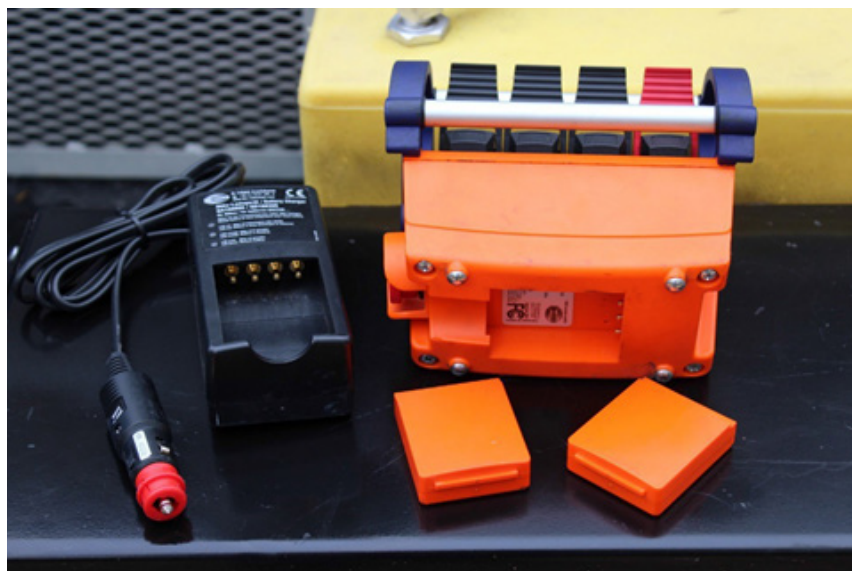


FIGURE 10

Control Chip

The control chip needs to be inserted into controller in order for the remote control to work. If this chip becomes dislodged, the remote will no longer work. (Figure 11)

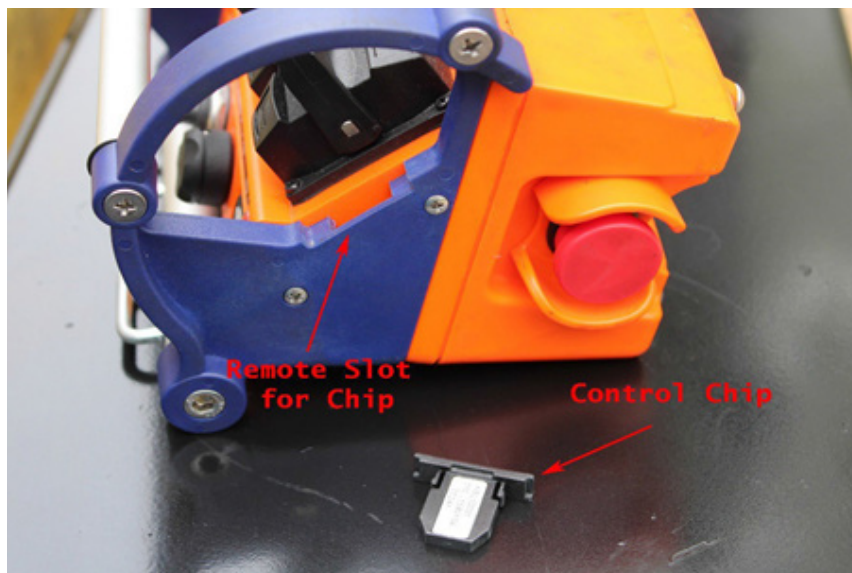


FIGURE 11



7.

A. MAIN SCREEN

The Main Screen displays everything the operator needs to see during the course of a pull (Figure 12).



FIGURE 12

Number	Feature	Number	Feature
1	Memory	11	Hour Counter
2	Rec. On/Off	12	Outrigger Pressure Indicator
3	System Info	13	Fuel Gage
4	Reel Pressure	14	RPM Gage
5	Limit On/Off	15	Clean Filter Indicator
6	Set Limit	16	Clean Filter Indicator
7	Reset Length	17	Hydraulic System Indicator
8	Tare	18	System Error Indicator
9	Reording indicator	19	Cable Tension/Tension Limit Indicators
10	Take-up Reel Presser Indicator	20	Cable Payout and Ft/m Indicators

1. Memory Page

The memory page allows the ability to download all the pull information on to a flash drive. To process the information onto a flash drive:

- Press the button to the left of the “Mem Page”
- Once in the “Mem Page” (Figure 13) screen:
 - Insert the flash drive into the USB port.
 - When the ECB is reading the flash drive the indicator light around the “USB Device Detected” indicator will turn from Orange to Green.
 - Press the “Write To USB” button on the left side of the of the indicator.
 - When the information is downloading the “USB Busy” indicator will flash. (Figure 14)
 - When the information is done downloading the “USB Busy” indicator will stop flashing.
 - Once the information is downloaded you can either:
 - Press the “Return” Button to return to the main screen. This will leave the pull data in the ECB should you need it in the future.

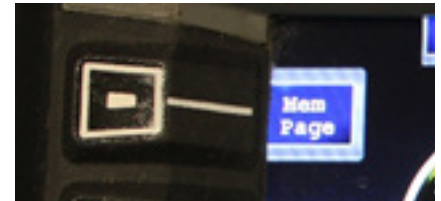


FIGURE 13



FIGURE 14

Note: It is possible to leave pull data on the ECB and still record other pulls. However, there is no way to distinguish from one pull to the next until after the pull data is downloaded. As a result leaving the pull data on the ECB may require longer downloads as you accumulate pull information because it will require you to download every pull whenever you want to download a single pull.

- You can delete the pull data from the ECB. This will keep the pull data easy to download from pull to pull. And then press the “Return” button to return to the main page.



2. Memory Page

The “Record on/off” button (Figure 15) allows the user to record a pull.



FIGURE 15

1) Press the “Start New Pull” button (Point 1). When this button is pressed the “Recording Off” indicator box will change to “Recording Enabled” (Point 4). When the operator sees this change he/she can begin the pull as the recorder is now activated.

2) To stop recording or to pause a pull press the “Exit Pull” button (Point 3). This will either end pull if it is finished. Should you need to pause the recording during a pull you can also use the “Exit Pull” button to pause.

3) To resume a pull press the “Continue Previous” button (Point 3). This will allow you to continue with the previous pull.

Note: Turning the machine off will also end a pull for this reason it's important that the operator go back to this screen and press the “Continue Previous” should The Blue Ox get turned off during the pull.

4) To exit the Record On/Off Screen press the “Return” button.

3. System Info

The “System Info” button gives you the vital statistics in real time.



FIGURE 16: Clock Set

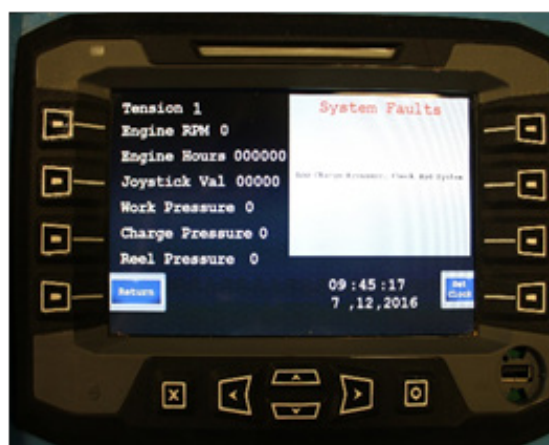


FIGURE 17: System Faults Alert

- The only thing that can be set on this page is the clock. (Figure 16)
- The “Fault” indicator box will allow the operator to see if there are any faults.
- If there is a “System fault” detected the indicator will alert you to the problem and a recommendation as to the source of the problem. (Figure 17)



4. Reel Pressure

The “Reel Pressure” button does not take you to a page.(Figure: 18) However, it will allow you to adjust the take-up reel pressure from the main page.

1) Press the “Reel Pressure” button.(Point 1)

2) You will see a prompt that will instruct you in how to adjust the take-up reel pressure. It reads: “Use the Up and Down arrow to adjust the take-up reel pressure. Press O to enter changes.”

IMPORTANT: The Blue Ox features built in self-adjusting take up reel pressure. Therefore, manual adjustment is not generally necessary.



FIGURE 18

5. Tension Limit

The Blue Ox comes with the ability to set the pull line tension. This will allow the operator to avoid over pull during installation. The “Limit On/Off” and the “Set Limit” buttons work in conjunction with each other to allow the operator to set the tension limit.



FIGURE 19



FIGURE 20

Limit On/Off (Figure 19): Pushing the “Limit On/Off” button (Point 2) will turn the limiter on. The operator will know the limiter is on by the “Limit” indicator (Point 1).

Set Limit (Figure 20): The “Set Limit” button allows the operator to set the pull tension limit.

1) Pressing the “Set Limit” button.(Point 2)

2) Using the Up and Down arrows at the bottom of the screen (Point 3) the operator can increase and decrease the pull tension.

3) The operator will be able to see the values increase or decrease at the limit indicator. (Point 1)



6. Reset Length

With the “Reset Length” button the operator can reset the amount of paid in or paid out rope on the main screen as needed. (Figure 21)



FIGURE 21

7. Tare

Pressing the “Tare” button allows the operator eliminate pull tensions (such as multiple sheaves) from the pull to allow for more accurate assessment of the amount of pull tension actually being applied to the power cable. (Figure 22)



FIGURE 22

8. Outrigger Pressure Indicator

For safety reasons the outriggers on The Blue Ox are required to have 500lbs of pressure applied to them in order to pay in or pay out, the “Outrigger Pressure Indicator” light will illuminate to let the operator know when the proper amount of pressure has been applied to the outriggers.

The indicator lights will be red until the proper amount of pressure is applied. When the proper amount of pressure is applied the indicator lights will turn green. (Figures 23/24)



FIGURE 23: not engaged



FIGURE 24: engaged

9. CHANGE FILTER INDICATOR

The F1 and F2 filter indicators are designed to let the operators know when the filters need to be changed. It's important that if the indicator light turns Red that the operator changes the filter immediately. (Figure 25)

F1: Suction Filter

F2: Return Filter



FIGURE 25

10. SYSTEM ERROR INDICATORS

The system error indicators are designed to give the operator a quick view that there is something wrong with the system. (Figure 26)

CHG: Indicates there is a problem with the Hydraulic system

SYS: Indicates there is a problem with the Electrical or Mechanical system.



FIGURE 26



8.

When getting ready to pay-in or pay-out with The Blue Ox it's important to remember that the pay-in pay-out system. In order for the rope to pay out there must be tension on the line and in order for the rope to pay back there must also be pressure on the line. This eliminates the possibility for cable binding on the bullwheels or take-up reel.



A. PAY-OUT WINCH LINE

The Blue Ox automatically adjusts take-up reel pressure, so there is no need to increase or decrease take up reel pressure manually. Increase engine speed by adjusting the throttle using the toggle button on the lower panel of the remote control. Payout winch line by:

- Putting The Blue Ox into pull mode (Figure 27)
- Pushing the pay-in/pay-out paddle up. (Figure 28)
- The joystick is infinitely variable so payout speed can be varied by the degree to which the joystick is moved.

IMPORTANT: Always keep tension on the winch line when paying it out to prevent slack from developing in bull wheel.

In typical applications, the winch line will need to be paid out to reach the work area first, i.e. man-hole, duct bank, etc. The winch line can then either be pulled through duct bank with a pulling rope or tape, or installed with a Condux Winch Line Blower.



FIGURE 27: Pull Mode

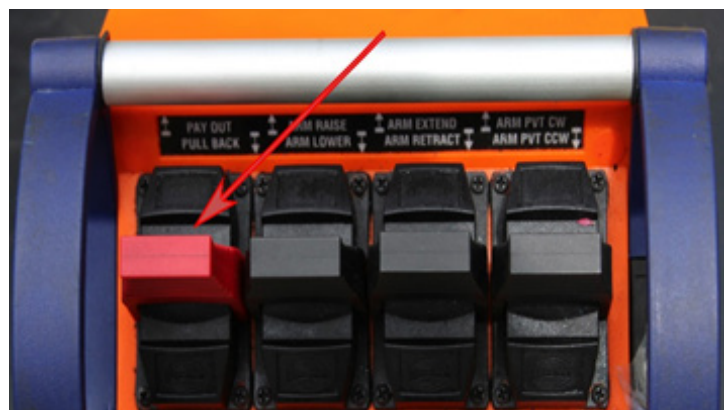


FIGURE 28: Pay-in/Pay-out Paddle

B. PREPARE FOR PULLBACK

Turn on **RECORD** function (if desired) to record pull data. Select the following options

2. Record New - used when starting a new pull
3. Continue Prev. - used when a pull has been interrupted and it is necessary to restart the Record function
4. Stop Record - used at the end of a pull to shut off record function



C. PULLBACK

Increase engine speed by pushing the throttle toggle right.

To start pullback, pull the paddle down slowly towards the “pullback” label. The speed of the pullback can be increased by increasing the pull on the joystick.

During pullback make sure to monitor pull force and distance.

NOTE: All readings and information regarding the pull must be taken from the ECB located in the control box. Operator should periodically check readings during the pull. Additionally, load settings can be programmed so as not to over pull the cable during installation.

NOTE: The HP limiter function integrated into The Blue Ox will optimize the horsepower required by the hydraulic system for maximum pull speed and force. This is done to prevent the engine from being overloaded or stalling. This will be noticeable when the engine speed drops below 3300rpm and the paddle is in the full down position.

D. SHUT DOWN

At the end of the pull, relieve pulling rope tension using the joystick. Allow the machine to cool down for five minutes before turning off the ignition key. The hydraulic oil cooler is automatic, and will start and stop as required. It is normal for it to run for a short period of time after the engine is turned off.



9.

There are a total of eight travel pins which must be accounted for when setting up or taking down the Blue Ox. (Figure 29) They are designed explicitly for travel and should not be engaged during operation.

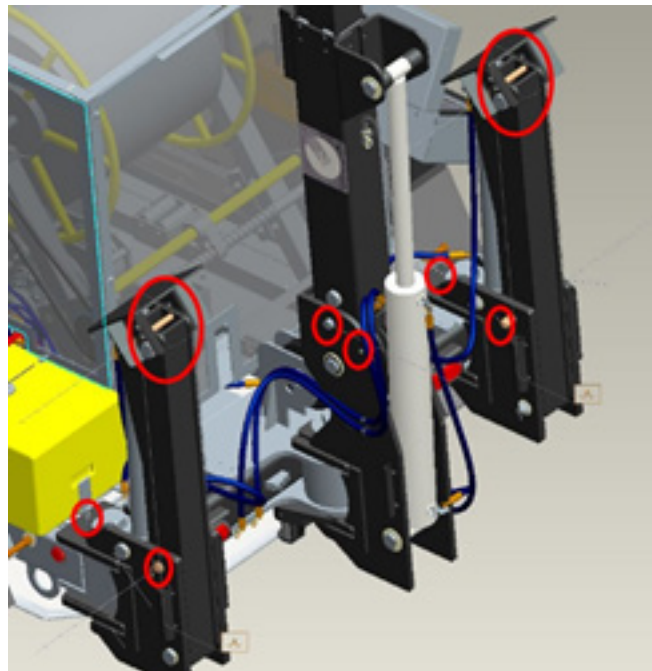
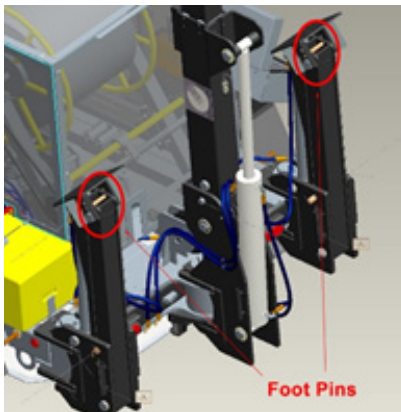


FIGURE 29

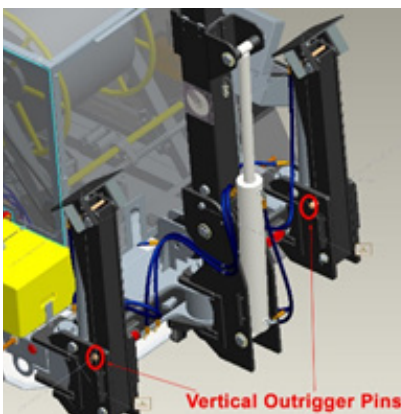
A. FOOT PINS



The foot pins are designed to keep the feet from bouncing back and forth during travel. The pins should be placed in the holding slot during operations. (Figure 30)

FIGURE 30

B. VERTICAL OUTRIGGER TRAVEL PINS

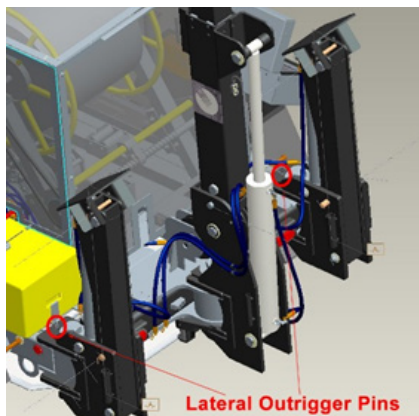


The vertical travel pins are designed to assist the hydraulics in supporting the outriggers during travel. (Figure 31)

FIGURE 31



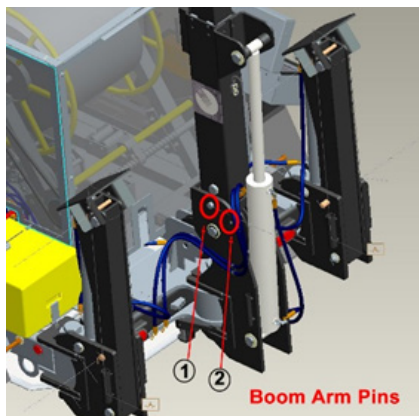
C. LATERAL OUTRIGGER PINS



The Lateral outrigger pins are the only pins that fully support the outriggers without the hydraulic cylinder support. (Figure 32)

FIGURE 32


D. BOOM ARM TRAVEL PINS



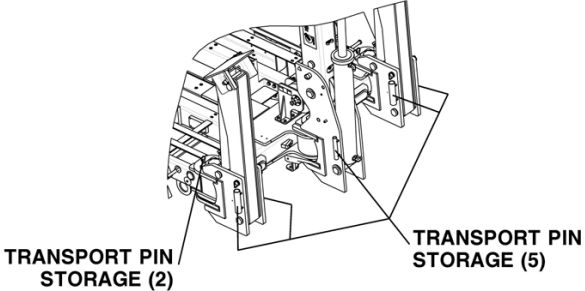
There are two boom arm travel pin setting on The Blue Ox.

1. For road pulling behind a truck or step down trailers.
2. For travel inside of an in closed semi-truck trailer or on a non-step down trailer.

FIGURE 33

**WARNING**

VERIFY ALL TRANSPORT PINS (7 TOTAL) ARE STORED IN PROPER STORAGE LOCATION PRIOR TO STARTING MACHINE OR MOVING BOOM ARM OR OUTRIGGERS. FAILURE TO DO SO CAN CAUSES DAMAGE TO THE UNIT AND/OR BODILY HARM.



TRANSPORT PIN
STORAGE (2)

TRANSPORT PIN
STORAGE (5)



10.

The Blue Ox is designed for fast, easy and safe deployment in the field. By properly setting up the Blue Ox you will ensure a successful pull.

A. STARTING THE BLUE OX

The Blue Ox is designed to be run from the Radiomatic remote control. The Blue Ox start up is specifically designed to ensure that the Blue Ox is started safely with no part of the Blue Ox active.

To Start and Connect the Radiomatic remote control follow the steps below.

Step 1: Make sure that the Estop on the remote control is pushed in (Activated).



FIGURE 34

Step 2: Turn the Power to the Blue Ox with out starting it.



FIGURE 35

Step 3: When the hour glass appears on the screen, pull the Estop (Disengage).



FIGURE 36

Step 4: When the Display turns on, quickly press the "Connection" button on the lower panel of the remote control (The Indicator light will flash red). Then press and hold until the "Connection" button until the "Indicator Light" turns green.



FIGURE 37





Step 5: Start the Blue Ox



FIGURE 38

Step 6: Press the “Connection” button one more time to complete the process.



FIGURE 39

B. TURNING THE BLUE OX OFF

When turning off The Blue Ox there are 2 suggested methods.

1) Use the Estop on the remote: Using the Estop to turn off the machine is considered an acceptable manner of turning off The Blue Ox.

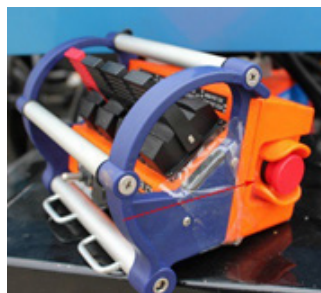


FIGURE 40

Note: If you use the Estop to turn The Blue Ox off it is imperative the key also be turned to the off positions.

2) Turning the key to the off position will shut The Blue Ox off completely.

Note: Remember to engage the Estop for ease of restarting the machine.



FIGURE 41



C. STABILIZE TRAILER

After the Blue Ox is properly positioned it's important that The Blue Ox is stabilized. To do this:

- 1) Unhitch the Blue Ox from the vehicle. It is recommended that the Blue Ox be unhitched from the vehicle to avoid the risk of damage to the bumper and hitch of the vehicle. (Figure 42)
- 2) Raise the Blue Ox's wheels off the ground as high as possible given the working conditions. Using the "STAB" Mode on the remote control. (Figure 43)

NOTE: The Goal in raising the wheels off the ground is to be able to make sure that the pull weight is being transferred to the outriggers making the machine more ridged and effective during the pull.



FIGURE 42



FIGURE 43

D. POSITIONING THE TRAILER

The Blue Ox is built to make positioning the puller the easiest in the industry.

The boom arm can extend to 96" with a 150° of lateral movement and has the ability to pull cable 180° from the hole. With this versatility the operator needs to get close the conduit inside of the Ideal Pull Zone, then use the outriggers and boom arm flexibility to center you over the hole. (Figure 44)

1. If pulling directly out of the ground place the conduit anywhere inside the arch featured in (Figure 44).

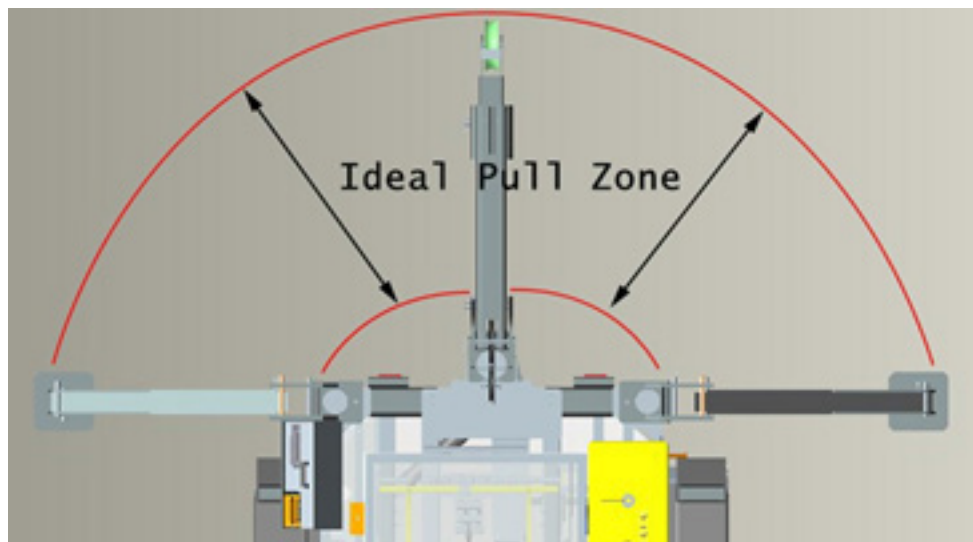


FIGURE 44



E. Engagement of the Outriggers with the Ground

- It is required that the outriggers come in contact with the ground applying at least 500lbs of force to the ground. If this is not established, the machine will not pay in or pay out.
- It is recommended that when setting up The Blue Ox the operator raise it as high off the wheels as reasonably possible using the outriggers and jack. Ideally, raising The Blue Ox to its highest point is recommended. While this is recommended, it is not required and there are exceptions to this recommendation, which include:

Pulling from a termination box: This may cause damage to the box or to the exposed posts. Raising The Blue Ox off the ground is still recommended to a safe height.

Elevated terrain: If The Blue Ox is positioned in such a way that terrain will only allow for limited elevations it is acceptable to pull, provided that the outriggers are in contact with the ground.

Low overhead: Any situations where elevating The Blue Ox to its highest level would damage The Blue Ox or the environment you are pulling in.

F. VERTICAL BOOMARM PLACEMENT

Conventional Use: The Blue Ox has the ability to pull power cable at any available vertical positions.

Standard positioning ranges from 90° from the ground to 150° from the ground.

Having the boom arm extended 90° from the conduit or manhole (parallel to the ground) will give the operator the longest for those hard to get spots. (Figure X)

Pulling with the arm extended and perpendicular to the ground will give the operator the greatest length of pull. This will extend the pull by between 10ft to 12ft depending on if you how high the operator elevates The Blue Ox outriggers.(FigureX) This gives the operator the opportunity to pull slack at the end of the pull without any additional accessories.

When setting up for a pulling from the base of an electrical pole using Condux sheaves, back to Blue Ox into the ideal pull locations. (Figure X) and begin pulling.

Unconventional Use: In situations where you have obstructions that inhibit the operator from getting within the ideal pull zone. If this happens:

It's required that the operator raise the boom arm up to a point that forces the rope over the nylatron sheave at the end of the boom arm. The higher the operator raise the boom arm the more down for is placed on the outriggers creating increased stability. (Figure X)

If raising boom arm to a height were its not possible to completely stabilize The Blue Ox it may be necessary to secure it by connecting a tractor, truck or tie/chain it down to a secured object to keep it in places.

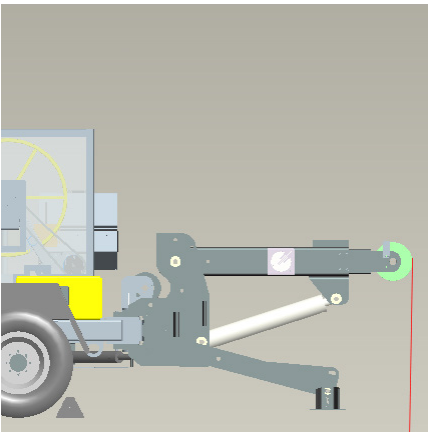


FIGURE 45
Pulling 90° from the ground

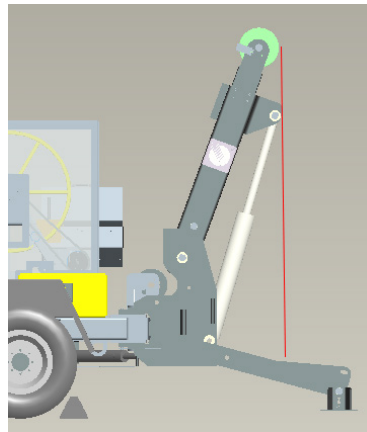


FIGURE 46
Pulling 160° from the ground

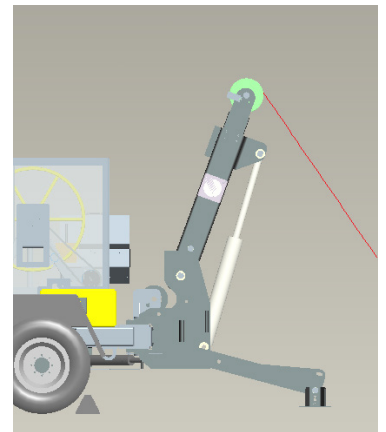


FIGURE 47
Pulling from the base of a pole

G. LATERAL BOOM ARM AND OUTRIGGER PLACEMENT

The Blue Ox is designed to pull 7500lbs from any lateral position provided the boom arm and outriggers are correctly aligned to sustain stability throughout the pull.

Alignment

When setting up to pull using The Blue Ox it's important to remember that the Blue Ox utilized 2 things:

- 1) Leverage: The Blue Ox utilized outriggers for leverage to increase stability. (Figure 48)
- 2) Counter Balance: The Blue Ox utilizes its own weight to help provide stability during the pull. (Figure 48)

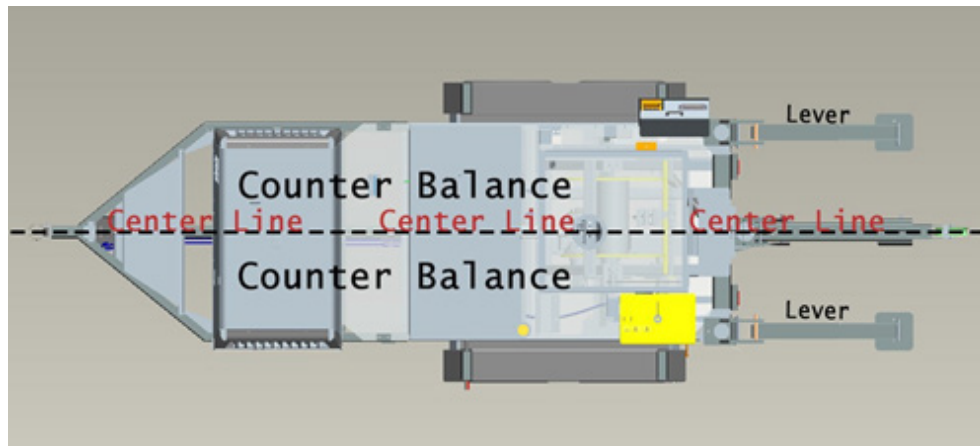


FIGURE 48

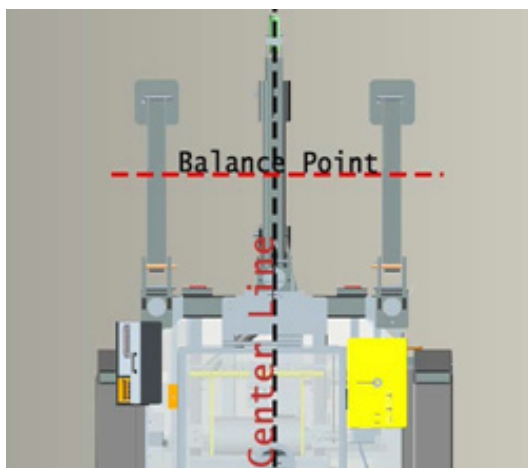


FIGURE 49
Proper alignment for pulling over the back

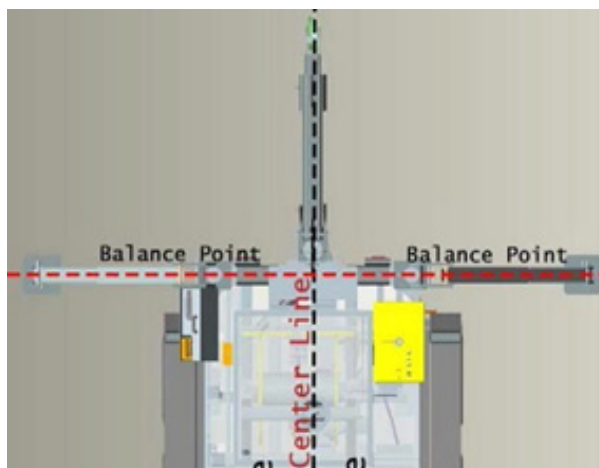


FIGURE 50
Improper alignment for pulling over the back

In the image above we see the two factors of Balance and Leverage in relation to the mid or Center line of the Blue Ox. There are 2 key things to keep in mind with when setting up the Blue Ox.

H. Pulling Over the Center Line

- Proper Alignment: The closer the boom arm is to being aligned with the Center Line of The Blue Ox. The More the boom arm relies on both Leverage and Balance to maintain stability throughout the pull. For that reason when pulling directly behind the Blue Ox it's important that the Outriggers are as close to parallel to the boom arm as possible. (Figure 49)
- Improper Alignment: If the outriggers are opened up to far it changes the balance point on The Blue Ox as the pull could become greater than the counter balanced provided by The Blue Ox resulting in The Blue Ox tipping. (Figure 50)

I. Pulling Away from the Center Line

When engaged in a pull that have been set up away from the Center line of the Blue Ox it's important to remember that as the boom arm moves further away from the Center Line the more you lose the Counter Balance provide by The Blue Ox and are going to be relying on pure Leverage to maintain stability during the pull. For this reason there are two things that must be done to maintain stability.

- The outrigger must be placed as close to the Boom arm as possible. This helps to provide maximum leverage and stability. (Figure 51)
- The boom arm cannot cross over the outside of the outrigger or you will lose stability and may cause catastrophic damage to The Blue Ox. These things include but may not be exclusive to: (Figure 52)

Crushing or braking the cylinders. If the cylinder of the boom are and the outrigger cross while there is pressure on the cable it could cause them to press into each other and break one or both other cylinders.

Flipping the Blue Ox. If the boom arm pulls a load while the boom arm is crossed over an outrigger it would create a situation in which the balance point of the Blue Ox is moved causing it to flip.

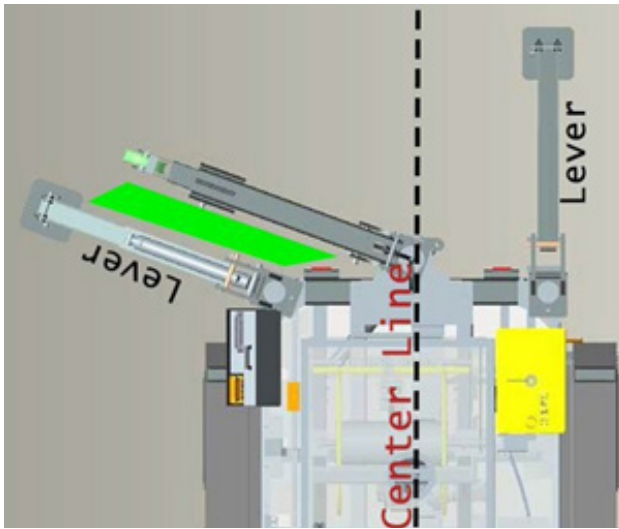


FIGURE 51
Correct Outrigger Placement

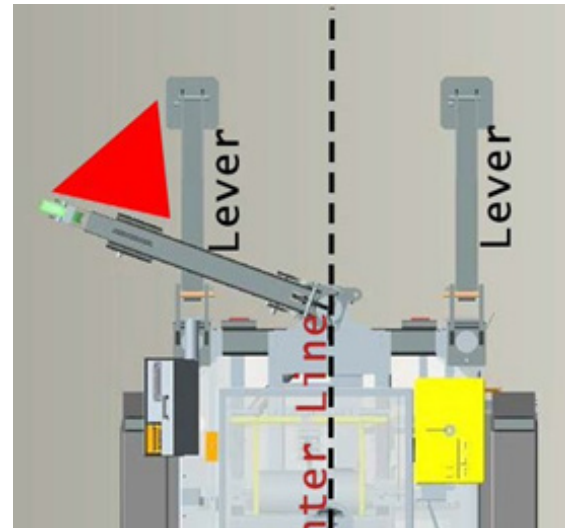


FIGURE 52
Incorrect Outrigger Placement



11.

A. GENERAL PROCEDURES


 Any customer repairs not authorized by the manufacturer relieves the manufacturer of any responsibility for any resulting damage of property or injury to personnel.


B. FLUID LEVELS

Due to safety and/or regulatory reasons, this machine may arrive without hydraulic oil and fuel.

Fill the levels as per the following table:

FLUIDS	QUANTITY
Hydraulic Oil Level (Maintenance Drawing, Item 3)	79.5L/21gal
Engine Oil Level (See Enclosed Engine Booklet)	3.2L/3.3qt
Fuel Level (Maintenance Drawing, Item 6)	68L/18gal
Gearbox Cases	1L/1qt


 Not filling fluids to those levels specified above will cause serious damage to system components and voids all product warranties.

 Purposely ingesting hydraulic liquids, fuels and cooling liquids is potentially lethal.

C. SUGGESTED LUBRICANTS

The manufacturer tests the machine with the following oils and lubricants: hydraulic circuit: INDOL HYDRAULIC OIL 32 (ISO VG 32).

Alternates must be chosen from the enclosed table "SUGGESTED LUBRICANTS". It is possible to use different products, but they must have the same characteristics and ISO specifications.

 The use of lubricants not in conformity with the technical specifications indicated in the referenced table can seriously damage the machine, its components and voids all product warranties.

 Let the engine cool prior to performing any maintenance, or before refueling.

D. HYDRAULIC CIRCUIT MAINTENANCE

Change the hydraulic oil after 500 working hours, then every 1500 hours (or at least annually). To drain the hydraulic oil remove the hydraulic tank's drain plug (Maintenance drawing, item 2).

 Allow the hydraulic oil to completely cool before removing it. Always use suitable safety gear (gloves, etc.).

 Disposal of all drained system oils and fluids must be in accordance with local regulations.

Fill the hydraulic oil using the filler spout designated on (Maintenance drawing, item 1).





⚠ Ensure that no foreign matter enters the system along with the oil; if possible filter the oil with a 10 µm filter.

Replace the filter cartridge after 500 working hours and then, every 1500 hours (or at least annually).

Check that the hydraulic oil filter lamp lights only during start-up. If lit and any other time it indicates that the hydraulic oil filter needs replacing.

For further maintenance instructions on the hydraulic components (pumps and motors) refer to the enclosed documentation.

E. REDUCTION UNIT MAINTENANCE

Change the oil of the bull-wheel reduction unit (Maintenance drawing, item 7) after 100 working hours and, thereafter, every 2500 hours (or at least annually).

To drain the reduction unit use the plugs on the lower part of their housings.

⚠ Manufacturer recommends removing gearbox oil when hot. Always use suitable safety gear (gloves, etc.).

⚠ Disposal of all drained system oils and fluids must be in accordance with local regulations.

Fill the oil into the reduction unit using the proper fill spout

⚠ Ensure that no foreign matter enters the system along with the oil.

For further maintenance instructions on the reduction gear, refer to the enclosed documentation.

F. OIL MAINTENANCE

At least once a year, or as frequently as required, using compressed air, blow all debris from the fins of the oil coolers.

⚠ Personnel cleaning the oil coolers as per above should wear all required personal protective gear, including a respirator.

G. GREASING

Grease all points not automatically lubricated daily, these include: Take-up Reel Bearings, Levelwind Shaft, Pawl, and any other rotating component (Maintenance drawing, items 5 and 8).

Use CASTROL MOLUBALLOY 6040 NLGI 2 (ISO VG 150) grease or equivalent from the enclosed "SUGGESTED LUBRICANTS" table.

H. ELECTRONICS NOTE

When cleaning the machine, avoid direct spraying of water or steam on electronic components or the control panel.

For the other periodic operations refer to the summary table for the ordinary maintenance.



I. SUMMARY TABLE FOR ORDINARY MAINTENANCE

This table lists the recommended service intervals for the systems noted.

PART	OBJECT	INTERVAL				
		DAILY	50 H	250 H	500 H	1500 H
Diesel Engine	Engine Oil	CL		RP		
	Oil Filter			RP		
	Cooling Liquid	CL				RP
	Air Filter			CK		RP
	Fuel	CL				
	Fuel Filter				RP	
Hydraulic Circuit	Hydraulic Oil	CL			RP1	RP*
	Filter	CK			RP1	RP*
Bull-Wheel Gear Box	Oil	CL	RP1			RP*
Reel Winder	Gears	GR				
	Chain Transmission		GR			
	Level Winder Screw	GR				
	Pawl	GR	CK			

Legend:

- CL Check the level (and possible filling up)
- GR Grease
- RP Replace
- RP1 Replace (only for the first time)
- CK Check
- (*) Or in any case every year

J. EXTENDED STORAGE

When an extended storage period is anticipated (two months or more) coat external parts with waterproof protectant.

During the storage period, start the machine at least once every two months and let the engine idle for approx. one hour. Do this so that oil enters the hydraulic system and coats all gaskets, o-rings, etc.

The machine should be stored under a roof. Do not tarp the machine as excess moisture may collect under it and cause damage to the system.

If the machine is stored for a year or more, replace the hydraulic circuit's oil and filters prior to startup.



12.



CABLE PULLER



THE BLUE

PROBLEM	CAUSE	SOLUTION
The diesel engine starter doesn't work.	Burned fuse	Replace
	Run down battery (Light on Kohler Controller)	Recharge or replace
	Disconnected contacts of the ignition system / starter	Reconnect
	Oxidised contacts of the ignition system / starter	Clean or spray with a suitable vaporiser
	Starter out of order	Replace / Technical assistance
Diesel engine doesn't work.	The ignition key is not turned to start position	Turn ignition key clockwise to start position and hold until the engine starts
	The glow plug indicator light isn't turned off (On Kohler Controller)	Wait for the glow plug indicator light to turn off before starting
	Fuel Problem	Check the fuel level in the tank Check the fuel filter
Diesel engine turns off when releasing the ignition key.	Check of the engine oil pressure	Add engine oil
		Defective sensor– check contacts / replace
		Engine anomaly – technical assistance
	Check of the engine cooling liquid temperature	Add cooling liquid
		Defective sensor– check contacts / replace
		Engine anomaly – technical assistance
The charge pressure is lower than 24bar/340psi	Clogged hydraulic oil filter	Replace
	Defective pump	Technical assistance
Diesel engine doesn't increase rpm	Disconnected accelerator cable	Verify and if necessary replace
The clogged filter warning light turns on.	Hydraulic oil temperature too low	Allow oil to warm up by running the engine at idle for several minutes.
	The oil is too thick with respect to the environmental conditions	Use oil with lower viscosity as per the indications in the instruction manual
	Clogged hydraulic oil filter	Replace



PROBLEM	CAUSE	SOLUTION
The diesel engine starter doesn't work.	Burned fuse	Replace
	Run down battery (Light on Kohler Controller)	Recharge or replace
	Disconnected contacts of the ignition system / starter	Reconnect
	Oxidised contacts of the ignition system / starter	Clean or spray with a suitable vaporiser
	Starter out of order	Replace / Technical assistance
Diesel engine doesn't work.	The ignition key is not turned to start position	Turn ignition key clockwise to start position and hold until the engine starts
	The glow plug indicator light isn't turned off (On Kohler Controller)	Wait for the glow plug indicator light to turn off before starting
	Fuel Problem	Check the fuel level in the tank Check the fuel filter
Diesel engine turns off when releasing the ignition key.	Check of the engine oil pressure	Add engine oil
		Defective sensor– check contacts / replace
		Engine anomaly – technical assistance
	Check of the engine cooling liquid temperature	Add cooling liquid
		Defective sensor– check contacts / replace
		Engine anomaly – technical assistance
The charge pressure is lower than 24bar/340psi	Clogged hydraulic oil filter	Replace
	Defective pump	Technical assistance
Diesel engine doesn't increase rpm	Disconnected accelerator cable	Verify and if necessary replace
The clogged filter warning light turns on.	Hydraulic oil temperature too low	Allow oil to warm up by running the engine at idle for several minutes.
	The oil is too thick with respect to the environmental conditions	Use oil with lower viscosity as per the indications in the instruction manual
	Clogged hydraulic oil filter	Replace



When starting the control lever, the bull wheels don't work.	E-Stop has been pressed	Pull up depressed E-Stop Button. Follow instructions on Control Screen to reset the machine
	Tension Limit has been exceeded	Follow instructions on Control Screen to reset the machine. If Tension Limit continues to be exceeded, increase Limit Value or shut off Limit Control to continue pull.
	The joystick is not sending a signal to the controller	Verify that the joystick is sending out an appropriate signal by pressing SETUP>RAW DATA and looking at Joystick. Move joystick and verify that the value changes with joystick stroke. - technical assistance.
	Defective pump servo control	Verify the electric voltage – technical assistance
When moving the control lever, the bullwheels rotate but the rope doesn't move or it slips on the bullwheels.	Reel winder pressure is not sufficient.	Increase the reel winder pressure
		Replace the adjusting valve for the reel winder pressure
		Reel winder pump problem – technical assistance
Diesel engine turns off during operations.	Engine oil pressure too low (Light on Kohler Controller)	Add engine oil
		Defective sensor – check contacts / replace
		Engine anomaly – technical assistance
	Engine cooling liquid temperature is too high (Light on Kohler Controller)	Add cooling liquid
		Defective sensor – check contacts / replace
		Engine overheating – technical assistance
Engine has been overloaded and stalled	When engine starts to slow, reduce joystick stroke.	
Excessive hydraulic oil temperature	The fan of the hydraulic oil doesn't work	Verify the electric contact of the temperature bulb on the radiator
		Verify the electric contact of the ventilator ignition selector on the control panel
	Overused machine	Wait for oil to cool. Hydraulic oil cooler should run automatically when oil temperature exceeds temp limit.



A unexpected stop happens when returning to center position with the control lever	Hydraulic pump with defective zero setting	Carry out the hydraulic and mechanic zero setting – technical assistance
The machine doesn't reach the max pull performances.	Diesel engine rpm not sufficient	Speed up the engine
	Diesel engine decreases rpm and turns off	Decrease pull on the joystick
	Excessive hydraulic oil temperature	Wait for oil to cool. Hydraulic oil cooler should run automatically when oil temperature exceeds temp limit.
	Insufficient fuel feeding at diesel engine	Check the fuel filter
Fuel feeding system to be adjusted – Technical service		
The machine doesn't increase speed.	Diesel engine rpm not sufficient	Speed up the engine
	Diesel engine decreases rpm and turns off	Decrease pull on joystick – the applied pull doesn't allow to reach higher speed
	Excessive hydraulic oil temperature	Wait for oil to cool. Hydraulic oil cooler should run automatically when oil temperature exceeds temp limit.
	Insufficient fuel feeding at diesel engine	Check the fuel filter
Fuel feeding system to be adjusted – Technical service		



13.

Quick Reference Service & Parts List

A. LUBRICANTS

LUBRICANTS	SPECIFICATION (*)
Engine	SAE 10w-40
Hyd. Fluid	ISO 32
Gear Lube	ISO 150
General Grease	NLGI 2

B. ENGINE

MANUFACTURER		ENGINE MODEL
Kohler		KDW1404
CONDUX PART NUMBER	ENGINE SERVICE PART	PART NUMBER
02290989	Oil Filter	ED0021752850S
02290990	Fuel Filter	ED0021752560S
02290991	Air Filter	ED0021751650S
N/A	Fan Belt	ED0024403380S

C. HYDRAULIC OIL FILTERS

CONDUX PART NUMBER	FILTER CODE	MANUFACTURER	PART NUMBER	QTY	VENDOR	ALTERNATIVE VENDORS
02290655	F1	MP FILTRI	CSG 150 P10A	1	OILAIR PRODUCTS	DONALDSON P550251 NAPA 1860
02290654	F2	MP FILTRI	CSG 100 A06A	1	OILAIR PRODUCTS	BEHRINGER BSO12806A38

* See Engine Manual or Recommended Lubricants chart for temperature variances.

Ø All filters, parts, and service for the engine can be found through your local Kohler distributor. Your local distributor can be found at:

Kohler Engines www.kohlerengines.com 1-800-544-2444
USA & Canada only





D. SUGGESTED LUBRICANTS

SUGGESTED LUBRICANTS												
TYPE	HYDRAULIC CIRCUIT AND STATIONARY BRAKE						GEAR BOX				GREASE	
	Universal Oil ATF	ARCTIC -30°C	COLD -10°C	TEMPERATE 30°C	TROPICAL 40°C+		ARCTIC -30°C	COLD -10°C	TEMPERATE 30°C	TROPICAL 40°C+	NLGI TYPE	
VISCOSITY (ISO 3448)	VG 33-VG 39	VG22	VG32	VG46	VG68	VG100	VG150	VG220	VG320	NLGI 2		
SUGGESTED GENERAL MANUFACTURERS												
CASTROL	DEXRON II	HYSPIN AWS22	HYSPIN AWS 32	HYSPIN AWS 46	HYSPIN AWS 68	ALPHA SP 100	ALPHA SP 150	ALPHA SP 220	ALPHA SP 320	SUPERGREASE 2		
MOBIL	ATF 200	DTE 22	DTE 24	DTE 25	DTE 26	MOBILGEAR 627	MOBILGEAR 629	MOBILGEAR 630	MOBILGEAR 632	MOBILUXEP 2		
SHELL	DONAX TM	TELLUS 22	TELLUS 32	TELLUS 46	TELLUS 68	OMALA 100	OMALA 150	OMALA 220	OMALA 320	SUPERGREASE EP 2		



CONDUX

Condux International, Inc.

P.O. Box 247 • 145 Kingswood Drive, Mankato, MN 56002-0247 USA

1-507-387-6576 • 1-800-533-2077 • FAX 1-507-387-1442

www.condux.com • e-mail: cndxinfo@condux.com

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