



BENNU
PARTS AND SERVICE INC



SERIES 3 CONTINUOUS CLIMB
Hydraulic Work Platform
Operator's Manual





This manual contains information on the installation, operation and maintenance of BENNU™ Parts & Service Inc. Series #3 Automatic Power Unit (APU) and Modular Power Unit (MPU) mast climbing work platforms as well as safety warnings and recommendations.

Should you need more help, please feel free to contact BENNU™ technical support.



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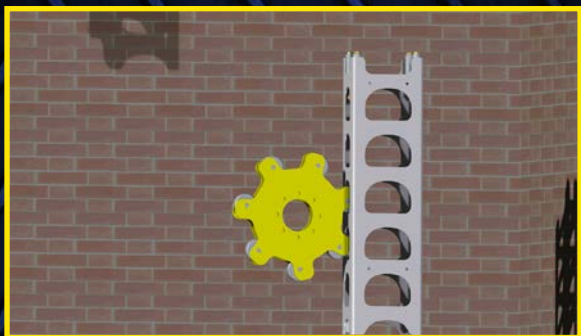
To make the information easy to understand,
we have used the following legend:

GENERAL	- Is used to present general information.
NOMENCLATURE	- Is used to denote a component by proper name.
CAUTION!	- Important Information.
WARNING!!	- Be careful, can be dangerous.
DANGER!!!	- Could cause serious injuries, even death.



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Chapter 1

INTRODUCTION



Chapter 1

INTRODUCTION

A word from the President

Dear Owner,

You have chosen the Bennu Parts & Service Inc. Series #3 mast climbing work platform. It is an innovative design and a fully automated patented system. In our key design criteria, we have given the utmost importance to safety, reliability, simplicity of assembly and operation. When properly operated and maintained, your BENNU Parts & Service Inc. Series #3 platforms will give you years of dependable service.

BENNU Parts & Service Inc. is concerned for your safety and uses only top of the line materials to assemble high quality products, providing the safest work environment under normal conditions.

To reach our goal of a safe work environment, you must read and understand this manual. As well, you must be familiar and abide by ANSI/SIA A92.9-1993 standards for mast climbing.

We encourage you to share this information with all the personnel involved with the operation and safety of your platforms. Failure to do so could result in serious injury or damage.

All Federal, State and Provincial Safety and Health Standards must be followed, including OSHA 29 CFR 1926 subpart L (1926.450 to 1926.454) for scaffolds.

BENNU Parts & Service Inc. cannot be held responsible for users failing to comply with any and all Federal, State and Local Regulations. Further questions may be directed to your distributor or to Bennu Parts & Service, Inc where they will be given immediate attention.

Thank you for purchasing, renting or using BENNU Parts & Service products.

Jerry Castle
President



Chapter 1

INTRODUCTION

Warranty and limitations

Bennu Parts & Service, Inc. warrants new products to be free from defects in material and workmanship for a period of one year, following the date of delivery to the first user, or a maximum of eighteen months following the date of delivery to the authorized distributor, whichever occurs first.

Bennu Parts & Service, Inc.'s obligation and liability under this warranty is expressly limited to repairing or replacing with re-manufactured or new, at Bennu Parts & Service, Inc.'s option, any parts which appear to Bennu Parts & Service, Inc., upon inspection, to have been defective in material or workmanship. Such parts shall be provided at no cost to the user, F.O.B. Bennu Parts & Service, Inc.'s facilities, or other source at Bennu Parts & Service, Inc.'s option.

Bennu Parts & Service, Inc. shall assume the cost to install any repaired or replacement part provided under this warranty, to the extent established by it in its applicable service policy in effect at the time of delivery. The cost of any such work will only be paid by Bennu Parts & Service, Inc. if a written authorization has been granted prior to installation.

This warranty does not apply to component parts or accessories of the products not manufactured by Bennu Parts & Service, Inc. and which carry the warranty of the manufacturer thereof, or to normal maintenance (*such as engine tune-up*) or to normal maintenance parts. Bennu Parts & Service, Inc. makes no other warranty, express or implied, and makes no warranty of merchantability or fitness for any particular purpose.

Bennu Parts & Service, Inc.'s obligation under this warranty shall not include duty, taxes or any other charge whatsoever or any liability for direct, indirect, incidental or consequential damage or delay. Products or parts for which a warranty claim is made must be returned prepaid by sender to the designated location. Any improper use, including operation after discovery of defective or worn parts, shall void this warranty. Improper use also includes operation beyond rated capacity, substitution of parts not approved by Bennu Parts & Service, Inc., including anchors, or any alteration, modification or repair by others, and shall automatically void this warranty.

The above warranty may not be altered without the written authorization of Bennu Parts & Service, Inc.



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Chapter 1

INTRODUCTION

CAUTION!

Plank overlap is subject to rules and regulations which must be closely followed.

WARNING!!

Planks should exceed last outrigger (*Bennu recommends 12" overlap*).

DANGER!!!

Make sure to block off open ends.

Never stand on any unsupported end portion of a plank.

Chapter 1

INTRODUCTION

Main Features

The BENNU S3 Automatic Power Unit:

Climbs on galvanized masts laser cut from high strength steel structural tubing, vertically bolted to ensure zero lean. Masts are available in 5ft and 25ft climbable sections.

(8) Heavy-Duty Roller Assemblies installed along each carriage opening provide a smooth glide path for the platform traveling the masts.

The New S3 Drive:



The new BENNU S3 rotary hydraulic motor and climbing wheel drive uses a dual pump and variable flow valves to ensure smooth and even climbing by efficient delivery of hydraulic power through the powerful rotary motor assemblies, and incorporates new safety features:

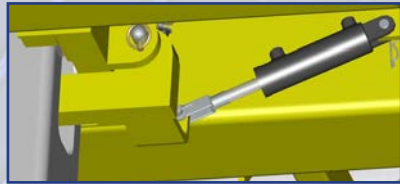
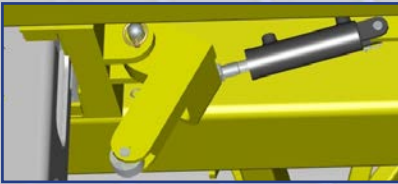
Counter-Balance Valve rated to hold twice the maximum load.

Hydraulic-Release Brake/Clutch on the rotary gearbox ensures the platform can be rested safely at any point along the vertical mast travel.

Pressure Release Fail-Safe Device engages the hydraulic lock on the gear box in the event of sudden fluid loss, preventing platform descent.

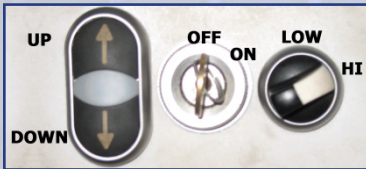
Chapter 1

INTRODUCTION



Under the S3 DRIVE UNIT...

2"x2" Heavy Duty Steel Safety Dogs are installed as a redundant safety device spring loaded to activate under any circumstance, to prevent more than a few inches of platform drop under any emergency.



2-Speed Selector Control allows faster (up to 10ft / min) rates of climb and descent when loads are less than 12,000 lbs., while the low speed setting has the power to lift loads of up to 20,000lbs (up to 5ft / min).

Push-Button Operation allows a single operator to ascend and descend.

Other Features:

Open platform geometry allows bypass of wall ties.

Free standing up to 30ft.

Independent bases allow for installation on uneven ground

Foldable access ladder with cage to transition to the deck (*no need to remove and store*).

300ft maximum reach (*additional contracted engineering services required for projects in excess of 125' high*).

Finished with a layer of primer and a layer of "Bennu Yellow" powder coating, or hot-dip galvanize for added durability.



Chapter 1

INTRODUCTION

GENERAL

APU – Automatic Power Unit Main Features

Platform dimensions:	24ft x 7ft
Setup length:	1 unit = 24ft to 64ft 2 units = 48ft to 138ft
Collapsed height:	55 inches
Shipping weight:	9,300 lbs with standard accessories
Load capacity:	High speed -12,000 lbs; Low speed - 20,000 lbs
Elevation speeds:	High Speed = up to 10ft/minute Low speed = up to 5ft/min
Engine:	13HP GX 390K1 Honda engine, electric start, oil alert

NOMENCLATURE

Guard rails:

- 1) (2) 48" Adj. guard rails
- 2) (2) door guard rails
- 3) (2) sliding doors
- 4) (2) mast toe guards
(2) mason guard rails (*not shown*)

Access:

- 5) (1) foldable access ladder with built-in rest-platform and guard rails
- 6) (1) ladder access door
- 7) (1) power pack access door

Outriggers:

- 8) (7) 8ft outriggers

Base:

- 9) (2) Independent bases with starter 40" mast sections
- 10) (4) high capacity (160,000 lbs) jacks and horse-shoe pads
- 11) (2) stabilizer arms with jacks and standard pads
- 12) (2) transversal stabilizer bars

Lifting system:

- 13) (1) powerpack
- 14) (2) climbing Wheels
- 15) (1) control post





Chapter 1

INTRODUCTION

GENERAL

MPU – Modular Power Unit Main Features

Platform dimensions:	114 ft. x 7 ft. x 30 ft. (48 in. up to 114 ft.)
Setup length:	(2) lifting modules (48") (1) power module (30" or 48") (1) access module (30" or 48")
Elevation Height:	0 - 30 ft. = Free standing; Collapsed height: 55 inches 30 ft. - 100 ft. = Wall tie every 15 ft. 300 ft. maximum height (see manual)
Shipping weight:	8,110 lbs with standard accessories
Load capacity:	High speed: 12,000 lbs; Low speed: 20,000 lbs
Elevation speeds:	High Speed = up to 10ft/minute Low speed = up to 5ft/min
Engine:	13HP GX 390K1 Honda engine, electric start, oil alert

NOMENCLATURE

Guard rails:

- 1) (3) 48" adj. guard rails
- 2) (2) 30" adj. guard rails
- 3) (2) mast toe guards
(2) mason plank guardrails
(not shown)

Accessories:

- 4) (1) access module
- 5) (1) foldable access ladder with built-in rest-platform and guard rails
- 6) (1) ladder access door

Outriggers:

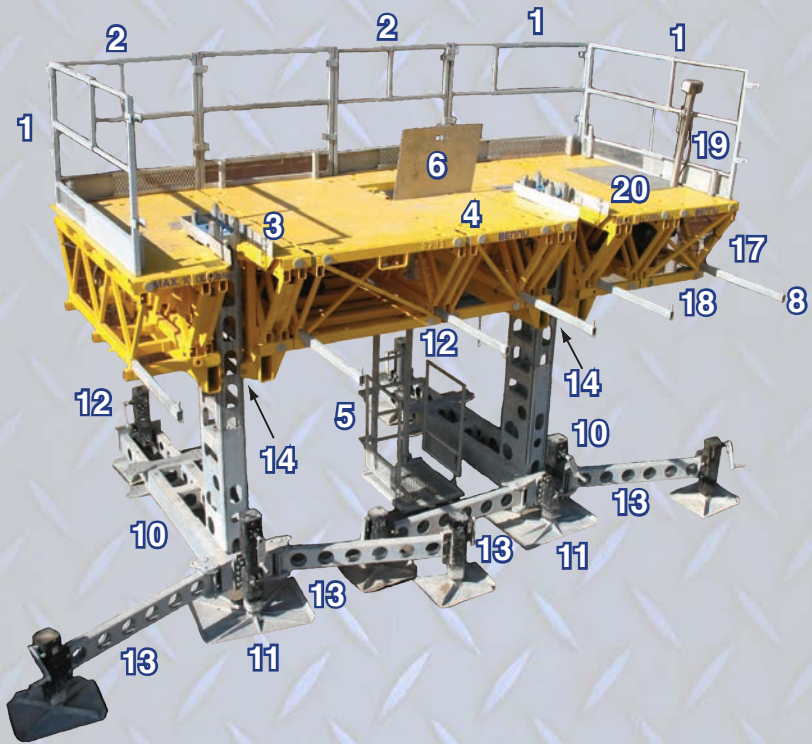
- 8) (6) 8ft outriggers

Base:

- 10) (2) Independent bases with starter 49" mast sections
- 11) (2) high capacity (160,000 lbs) front jacks and main pads
- 12) (2) high capacity (160,000 lbs) retractable rear jacks and standard pads
- 13) (4) stabilizer arms with jacks and standard pads

Lifting system:

- 14) (2) climbing wheels
- 17) (1) power module
- 18) (1) powerpack
- 19) (1) control post
- 20) (1) control post and powerpack access door





Chapter 2

TRANSPORTATION

Chapter 2

TRANSPORTATION

WARNING!!

Make sure smart bars are securely locked in place by smart pins and keepers.

Make sure outriggers are closed and securely locked in place by their bolts.

Make sure to turn off the gasoline valve of APU or MPU during transportation or when it is not used on a daily basis.

Remove guard rails, mast toe guard and any loose moving parts from the unit prior to transporting.

GENERAL

There are several ways to transport your Bennu equipment:

- 1) Semi, with flatbed trailer
- 2) Semi, with drop deck (*or step deck*) trailer
 - a. Transport up to 120' long by 30' high
- 3) Straightbody



Chapter 2

TRANSPORTATION

Pick points for safe and easy handling of A.P.U.:

For crane / chain sling
(deck separated from base)



For lift trucks
(use installed fork pockets)



For sling
(secure chain hooks thru
pocket guides)



WARNING!!

Don't try to pickup more than one unit at a time. To save space, you may stack 2 APU units. The rear jacks will partially overhang the deck of the bottom unit, but the rear weight of the APU is supported by the stabilizer arm jacks in their tuck-back position, which rest squarely on the platform deck.

Unload and place the equipment in a way to make it easy to pick up later for installation.

Example: place what you will use last far from you, and what you will use first nearest you.

Chapter 2

TRANSPORTATION

GENERAL

The wheel kit provides a fast and easy way to move equipment around the job site. It allows moving of heavy P.U. or wing assemblies without having to disassemble the setup.

2 types of wheel kits are available. One has a steerable axle, while the other has a fixed axle.



There are 2 ways to work with wheel kits:

- A) with a fixed wheel kit at one end and a fork lift at the other end,
- B) with a fixed axle at one end and a steerable wheel kit at the other end, using a forklift to push or pull the setup.

Chapter 2

TRANSPORTATION

Installation Procedures:

- 1) Raise one end of the setup to move with forklift using chains or slings.
- 2) Place wheel kit under that end of the setup.
- 3) Lower setup on wheel kit, making sure that tabs on wheel kit are on each side of their longitudinal structural tubes.
- 4) Secure in place with all four clevis pins and hitch pins.



GENERAL

If setup weight is too great, or if ground bearing capacity is low, install two Wheel kits back to back, thus forming a tandem axle system.



Chapter 3

POSITIONING & LEVELING

Chapter 3

POSITIONING & LEVELING

WARNING!!

- Make sure that ground is fairly level and clear of debris.
- Make sure that ground has an acceptable level of compaction, if not multiple layers of planking (*cribbing*) must be used.
- Make sure ground or structure can support the weight of the set up
- Installation should always be performed by a trained competent person.
- Always have a planned layout prior to installation (*an engineer's approval may be needed in certain cases*).



Chapter 3

POSITIONING & LEVELING

Ground capacity, S3 Modular Power Unit (M.P.U.)



Main pad: 6.75 sq ft

Standard pad: 3 sq ft

The main pad surface is large to offset the frequent inadequate back filled conditions alongside of the foundation.

Maximum load per square foot of M.P.U. at full capacity (20,000 lbs):

	(Main Jack)	(Retractable Jack)
Maximum load balanced	1022	945
Maximum load unbalanced lbs / sq ft	1740	1,610

Max load does not include the weight of the masts. Add 25 lbs per sq ft to front load for each 10ft mast.

Back loads are not affected by weight of masts.

Example

For 60ft of masts above starter mast, add:
 $6 \times 25 = 150 \text{ lbs / sq ft}$

Add that pressure to the front pad only:

	(Main Jack)	(Retractable Jack)
Maximum load balanced	1,172	945
Maximum load unbalanced lbs / sq ft	1,890	1,610

Chapter 3

POSITIONING & LEVELING

Ground capacity, S3 Automatic Power Unit (A.P.U.)



Main pad: 6.75 sq ft

Standard pad: 3 sq ft

The main pad surface is large to offset the frequent inadequate back filled conditions alongside of the foundation.

Maximum load per square foot of A.P.U. at full capacity (20,000 lbs):

	(Main Jack)	(Retractable Jack)
Maximum load balanced	1022	945
Maximum load unbalanced lbs / sq ft	1740	1,610

Max load does not include the weight of the masts. Add 25 lbs per sq ft to front load for each 10ft mast.

Back loads are not affected by weight of masts.

Example

For 60ft of masts above starter mast, add:

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Maximum load balanced	1,172	945
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Chapter 3

POSITIONING & LEVELING

Placing A.P.U. to wall

- 1) Determine where jack pads will sit.
- 2) Mark center point of pad on the ground (*parking lot marking paint works well*).
- 3) Level and clean area covered by the pads (*gravel, cribbing, planking may be used to even surface*)
- 4) Check ground capacity. Mudsills must be used if there is insufficient compaction to support the intended load, or if the possibility of ground instability exists.
- 5) **Lift positioning with forks:** Carefully insert forks into the integrated pockets. Allow very little boom extension, if any, for the pick. Tilt the forks up. This maintains a firm position of the APU on the forks while making rear jack deployment easier. Lift the APU several feet, and carry to the building.

CAUTION!

Maintain sight of clearances at the ends and underneath the APU; also maintain awareness of overhead lines. It is recommended to have a spotter to aid in moving the units.

- 6) Before positioning to the wall, stop to prepare the unit. Pull up the retaining pin located forward of each retractable rear jack, and carefully pull them out to their full extension. Re-install the retaining pin.



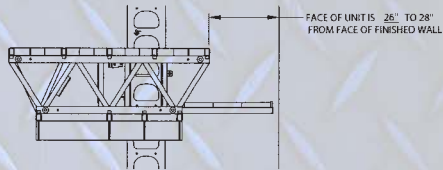
Chapter 3

POSITIONING & LEVELING

- 7) Have a helper support the jack end of each stabilizer arm while pulling out the two short retaining pins (connected by chain). Swing each stabilizer arm forward till holes line up; you must use the short pins **top and bottom** to lock the arm in place. There are other pin positions available to change the angle of the arm in case of obstacles. When the platform is raised up about a foot, the long pin and short pins can be removed to re-position the arm. **Do not crank the stabilizer pad onto the ground** until after leveling the main jacks. For special circumstances, **additional stabilizer arms and jacks are available**.



- 8) Carry the unit to the wall. The front edge of the stocking deck should be set back 26" to 28" from the finished wall face: this will allow for a walkway a bit wider than two of the three planks that you will be able to install. Hold the APU level in this position (*by sight*), just above the grade so you can crank the four main jacks 4"-6" downwards to make contact with the ground. Sit the unit down, and carefully withdraw the forks.



- 9) **Crane or forklift with sling positioning: Be sure to check the rigging for good connections as the lift begins.** The rigging used should hold the APU fairly level. Avoid allowing the APU corners to strike the building. Follow the same preparations as above.



Chapter 3

POSITIONING & LEVELING

Leveling the Automatic Power Unit

WARNING!!

The stabilizer arms have not been designed to be loaded with excessive weight, but only to stabilize the base.

Tips:

The front and back jacks should be used to plumb the base not the stabilizer jacks.

Remember: The platform (*yellow*) is a separate piece from the base and towers. The base and towers need to be plumb and level for the platform to work correctly.

- (1) **Level the base from right to left using front and back (main) jacks.**
Place level on front and back transverse bar (*if present*) for reference.



- (2) **Adjust front/back level using back jacks.**

Place level on the front of the mast section for reference. Raise back jack to push tower forward. Lower back jack to pull tower back.



- (3) **Use front stabilizer arms to make sure the masts are plumb from side to side.**

Start with the stabilizer pads off the ground. Place level on side of mast for reference. Crank pressure onto the ground with the jack at the side of the platform the towers are leaning toward.



Once the vertical plumb is corrected, crank the opposite stabilizer jack pad tight to ground.

Once the base is level install the first tower and recheck the levels.



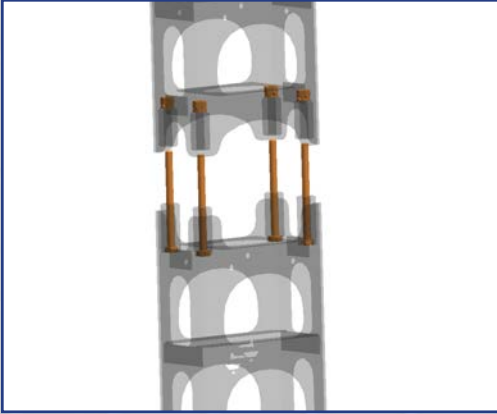
Chapter 4

SETTING UP THE PLATFORM

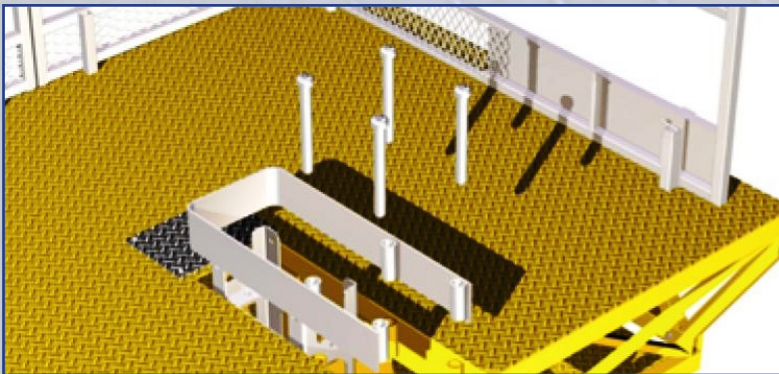
Chapter 4

SETTING UP THE PLATFORM

Install first mast section (refer to chapter 6).



Install Mast Toe Guard



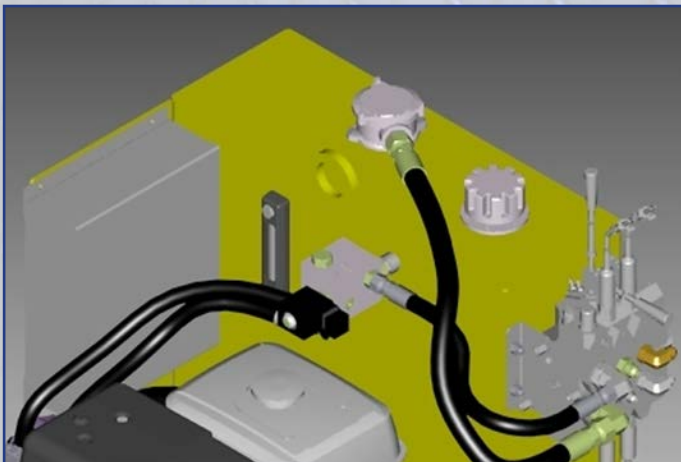
Chapter 4

SETTING UP THE PLATFORM

Lift control post and secure in place with clevis pin and keeper at the bottom of the post.



Check hydraulic tank oil level.



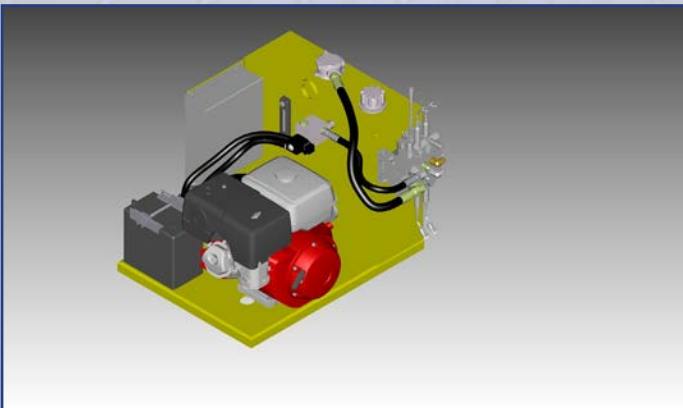
Chapter 4

SETTING UP THE PLATFORM

Fill Honda engine with gasoline.



Check Honda engine oil level



Engine is equipped with oil alert which will prevent starting in low oil level conditions.

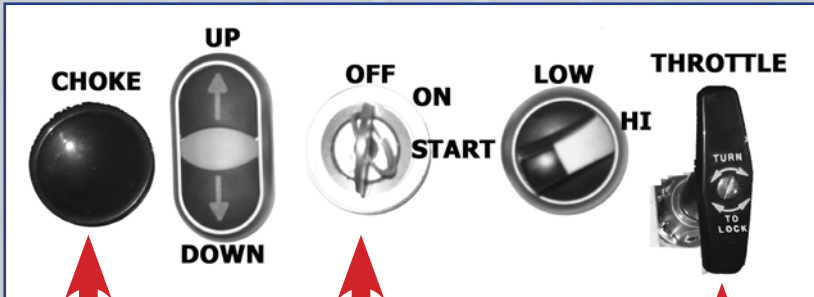
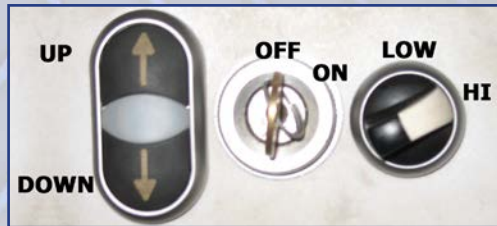
Make sure to turn on gasoline shut off valve.

Chapter 4

SETTING UP THE PLATFORM

Starting engine

- A) Pull choke
- B) Pull throttle to $\frac{1}{4}$
- C) Start engine
- D) Allow engine to warm up, release choke
- E) Bring engine to full operating speed



A/D

C

B/E

Stopping engine

Reduce engine speed to idle (*let it idle for 30 sec*). Unlock and push down on throttle handle.

Stop engine by turning the ignition key to "off" position

Tips

For first time use of the unit, let the engine run for 15 minutes to allow the battery to charge and the oil to reach all parts of the engine.

In winter conditions (*below 32 degrees F°*), you may have to leave the choke a little longer, but you must let the engine run for at least 10 minutes to allow the engine and hydraulic oil to warm up.



Chapter 5

RAISING & LOWERING

Chapter 5

RAISING & LOWERING

Setting the level of the working platform

"Leveling the automatic power unit" on page 19 was for the galvanized base. The following is the procedure to set the level of the Series #3 (yellow) working part of the platform. The platform is designed to rise up evenly. There is an "encoder" on each drive wheel that makes this possible. It is necessary to "tell" the encoders when the machine is level.

CAUTION!

This should be performed each time the unit is moved to a new job, or if the platform is either out of level or one side is rising faster than the other side. (Remember to check the platform level each time you make a new setup). Follow this simple procedure to set (or re-set) the encoders.

- 1) Start the motor, and let it warm up. Check for clearance around all areas of the deck and outriggers. Now you are ready to raise the unit. At the right end of the control box, there is a switch marked LOW and HI. Set the switch on LOW and press the up button, allowing the platform to rise 4 to 8 inches.
- 2) Use a level on the yellow deck surface to see if a correction needs to be made. If so, there are two manual up/down levers that operate the valve mounted to the hydraulic tank under the engine cover. These levers work both sides of the platform separately. The left lever moves the near (*left*) platform side, viewing the machine from the backside, toward the wall. The right lever moves the far (*right*) platform side. The levers should only be used for this procedure, or to raise or lower the platform if there is a malfunction with the electrical system. These levers will override the electrical controls (*including the mast sensor limit switches*).
- 3) Using the up/down lever for the end of the platform reporting as the low side, correct the level of the platform, by bringing the low side up.
- 4) With the ignition key in the "run" position (*motor off or on*), hold in the up and down buttons at the same time. The light between the two buttons will flash for about 10 seconds. When the flashing changes to steady light, you have re-set the encoders. The computer now refers to the current platform position as "level", which is why it is important for the platform to actually BE level when doing this procedure!



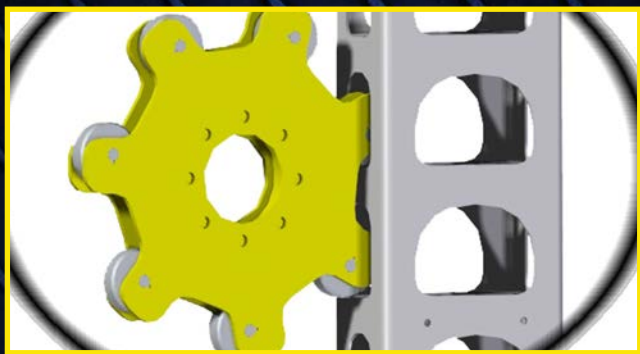
CAUTION!

Note: The platform is raised by an electrical control button! If the battery is very low or dead, the unit will not rise by pressing the button, even with the motor running.

Raising Procedure

TIP: For heavy loads, such as production masonry, use the LOW speed (up to 5' per min.). For light loading (restoration, glazing, etc), use HI speed (up to 10' per min.).

Press the UP, or DOWN button; the platform should raise or lower evenly.



Chapter 6

MASTS

Chapter 6

MASTS

GENERAL

Mast sections are formed out of high tensile strength steel.

Standard sections are 5ft or 25ft high and are provided with heavy vertical bushings at connection points.

Lateral anti-slip steps are built into the mast for safe, legal climbing. Connection between mast sections are assured by $\frac{3}{4}$ " x 10" grade 8 bolts.

These connections are extremely positive and allow no lean.

Sockets are machined in the lower part of the top bushings to hold nut so that a ratchet socket or wrench is required only on the bolt head. Size is 1-1/8".

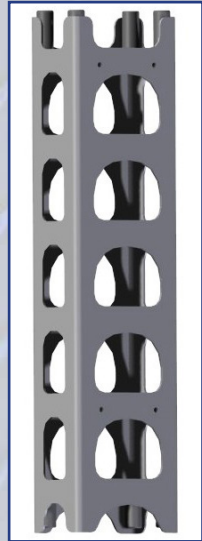
Mast Installation Procedures:

- 1) Lower mast section over previously installed section using bushings as positioning guides.

Option 1: (*Single worker adding mast*). You may raise the platform near the top of the installed mast to minimize lifting height of the mast being added, sliding the bolts through the bushings after positioning it. You would then lower the platform enough to install and tighten the nuts from a comfortable position.

Option 2: With the installed mast at the desired position, two workers can lift the add-on mast and install the bolts safely.

- 2) Slide lock washer and then flat washer ($\frac{3}{4}$ ") on to a bolt ($\frac{3}{4}$ " x 10").
- 3) Insert the bolt and washers in vertical bushing from the top.
- 4) Screw the bolt into the nut. Note: Turn enough threads that the nut pulls up into the socket on the bottom of the lower bushing. You will be able to tighten the bolt without holding the nut.
- 5) Repeat steps 2-4 for other 3 bolts.
- 6) Tighten bolts alternating from corner to corner until all bolts are fully tightened using a 1-1/8" ratchet deep socket or wrench.
- 7) Check that all bushings mate to one another and there are no spaces between the bushings.

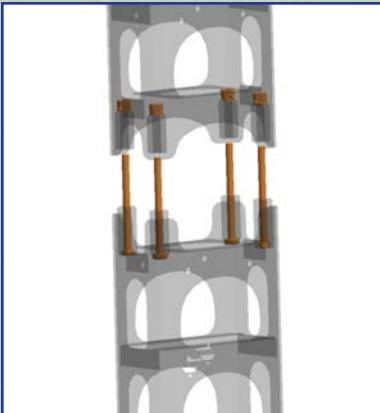


Chapter 6

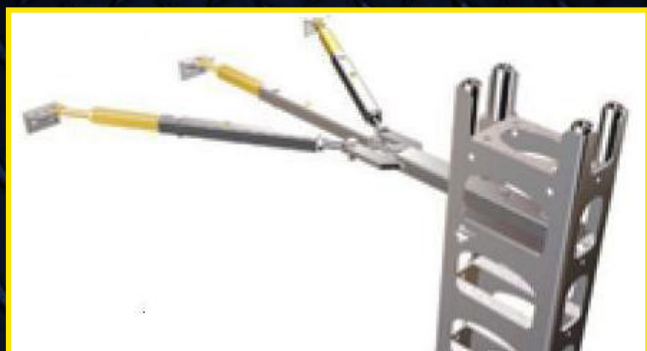
MASTS

WARNING!!

If all four bushings do not mate together remove the tower and inspect the two connections. To determine if the lower tower or upper tower is the problem, install another tower. If the problem is solved then the original tower needs to be taken out of service. If the problem is the same the lower tower needs to be taken out of service.



Note: If setting a tower with a forklift or crane be sure that the lift is not keeping the four bushings from mating together. Once the bolts are tightened, and the lift forks are pulled away, recheck the bolts.



Chapter 7

TYING THE PLATFORM

Chapter 7

TYING THE PLATFORM

GENERAL

Series #3 platforms are braceless, meaning that lateral stability is obtained mostly from the wall tie system in configurations exceeding 30ft.

The demand on such a system is significant; however it offers the benefit of travelling up and down the mast without having to remove the braces.

Bennu has designed a 3 point tying system to ensure such stability. This system is anchored or clamped to the building structure. Turnbuckles allow for plumb adjustment.



A tube and clamp fastening system is also available.



Any combination of these 3 systems is possible.

There are several lengths of turnbuckles available from BENNU Parts and Service. There are 5 lengths commonly available to facilitate almost any dimension between the platform upper deck and the tie-in point of the structure. They can be described as "very short", "short", "medium", "long", and "very long". "Medium" (which is the "standard" size), is normally provided for dimensions of 26"-28" from the finish wall (the nominal for masonry work) up to 49" to the tie point. Special lengths available on request.



Chapter 7

TYING THE PLATFORM

WARNING!!

WALL TIE SCHEDULE (*Minimum required*)

HEIGHT	Tying without Hoist or M.F.S	Tying with Hoist or M.F.S.
0 - 30'	FREE STANDING (no tie required)	15' & 30'
30' - 100'	20' - 40' - 60' - 80' - 100'	15' - 30' - 45' - 60' - 75' - 90'
OVER 100'	EVERY 20'	EVERY 15'

M .F .S. = Multi-function system

Remember you can never install too many ties.

Chapter 7

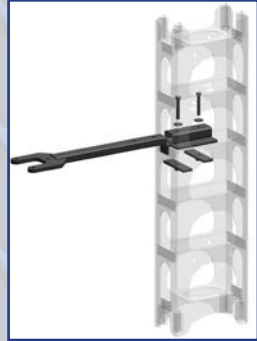
TYING THE PLATFORM

Installation of wall tie mast support plates and forks

Place wall tie mast support plate in the mast, flat on steps, at the desired height.

The tab on the support plate must be placed outside the mast in order to retain the P.U. when load is applied.

Slide the wall tie fork in the plate's pocket and secure with provided fastener plates and 5/8" bolts, using a 15/16" wrench. When using the tube and clamp system, install adapter in place of wall tie fork, using the same method.



Anchoring to the building structure

Anchor bracket

A minimum angle of 30° and a maximum of 45° between each brace is required. This is approximately 18" between each turnbuckle in a standard 3-plank setup when the P.U. is placed 26" to 28" from the finished wall.



Attach the two hole side of the anchor bracket to the building using a minimum of 1/2" x 4" concrete anchors leaving the side with 3 holes available to attach the turnbuckles.

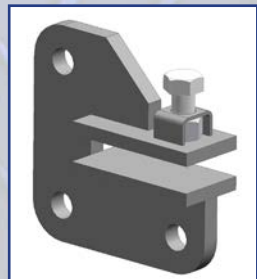


2 anchors are necessary for each anchor bracket, providing at least the minimal capacity of 1,500 lbs / anchor.

Beam clamp

Where there are structural steel beams present, beam clamps are available.

Attach beam clamp to building by sliding the slot over either flange of the beam and secure with provided 5/8" bolts using a 15/16" wrench. We recommend (*whenever possible*) that you attach the beam clamp to the back side of the beam. As for the anchor bracket, a minimum angle of 30° between each brace is required.



Chapter 7

TYING THE PLATFORM

Installation of turnbuckles, adjustable tube type:

Both **anchor brackets** and **beam clamps** are used with **turnbuckles**. Before installing turnbuckles, adjust approximate length by sliding tubes into each other and leaving thread adjustment in and out at each end. Install all 3 turnbuckles with provided clevis pins and hitch pins.



The center turnbuckle position is intended to maintain plumb of the mast perpendicular to the all. The left and right turnbuckle positions are used to adjust the lateral (*left-right*) plumb of the mast, pushing out from one side and pulling in from the other in the direction needed to establish plumb.

NOTE: Always install turnbuckles in the same direction. Once the pins and clips are installed in the ends of the turnbuckles adjustments can be made by turning the center of the turnbuckle in the appropriate direction. By installing them in the same direction each turnbuckle will turn in the same manner for each adjustment.

Tube and Clamp

The tube and clamp assembly is designed to tie the P.U. from the mast to the building wall, floor or ceiling, allowing passage through openings such as windows, doors, etc. The tube clamps and tubes are not provided by Bennu Parts and Service. We recommend the use of tubes of 2" diameter and standard 2" tube clamps.



A minimum angle of 30° between each tube is still required. Secure one end of the tube to the floor or ceiling using anchor bracket or any other equivalent means. These anchor points must be able to withstand forces of 1,500 lbs / anchor. A tube and clamp fitting for the mast support is available to attach tubes using standard swivel clamps.

If only two tubes are used, they must be cross tied using a short tube.

Plumb the mast along each axis and tighten the beam. You may need to use a rigging tool, like a cable puller connected to a point on the structure, to bring the mast plumb before tightening clamps. Remember to tie a cross leg if clamping the structure at two points.



Chapter 8

ACCESS

Chapter 8

ACCESS

An access ladder is provided on all A.P.U. It is located under the deck next to the tower opposite the power pack/control stalk. This ladder provides easy and safe access to the power unit, from the climbable mast towers.



To install access ladder:

- 1) To unfold the ladder, remove chain linking it to the P.U. structure
- 2) Unfold ladder platform
- 3) Unfold and secure ladder platform guardrail locking mechanism to ladder platform

To use access ladder:

- 1) Open access door
- 2) Climb up or down the ladder
- 3) Close access door

WARNING!!

Make sure unit is at least 10ft high and do not go below that level when using the access ladder. Failure to do so could result in serious injuries or damages to the ladder or A.P.U. structure.

Lifeline and/or fall protection devices (*not included*) may be required by local codes for platform heights greater than 35' when using the access system.

Federal OSHA regulations limit the climbing of integrated access ladders to 35' vertical without a rest stop. At distances of 35' from the ground to the bottom of the access ladder, the preferred access is from designated floor level locations directly to the deck. If not optimal, there are several methods of positioning a rest platform. Consult your supplier for details.



Chapter 9

WING

Chapter 9

WING

30 inch wing

Dimensions: 7' x 30"

Weight: 650lbs (with standard accessories)

Guard Rails: (1) 30" Adjustable Guard Rail

Outriggers: (1) 8' Adjustable Outrigger



4 foot wing

Dimensions: 7' x 4'

Weight: 850lbs (with standard accessories)

Guard Rails: (1) 4' Standard Guard Rail

Outriggers: (1) 8' Adjustable Outrigger



6 foot wing

Dimensions: 7' x 6'

Weight: 1,000lbs (with standard accessories)

Guard Rails: (1) 48" Adjustable Guard Rail

Outriggers: (1) 8' Adjustable Outrigger

(1) 6' wing Support Leg



8 foot wing

Dimensions: 7' x 8'

Weight: 1250lbs (with standard accessories)

Guard Rails: (2) 4' Standard Guard Rail

Outriggers: (2) 8' Adjustable Outrigger



Chapter 9

WING

45° wing

Dimensions: 7' x 78" / 14"

Weight: 950lbs (*with standard accessories*)

Guard Rails: (1) 48" Adjustable Guard Rail

Outriggers: (2) 8' Adjustable Outrigger

Functions: these angular wings are normally used to create inward or outward angles at the end of the A.P.U.



Two reversed wings can be used to create an offset of 3'.

Two consecutive 45° wings on either side create an outside corner or an inside corner.

Chapter 9

WING

Cantilever Mode

Cantilever wings are directly connected to a P.U. using smart bars.

Use a combination of any 30", 4', 6' or 8' wings.



Bearing Mode

Bearing bridges are preassembled and laid out between the ends or along two P.U. either in a straight line or forming an angle with P.U.

Use a combination of any 30", 4', 6' or 8' wings ending with a 6' wing at each end of the bridge.



Extension Mode

The angled end of wings may be attached to the front or back of the P.U. alternating between inverted and normal.

Use a combination of normal/inverted 30" or 4' wings.



Cross Wing Mode

Wings are assembled in their cross direction.

Use a combination of normal/inverted 30" or 4' wings.



Chapter 9

WING

GENERAL

Smart bars are used to connect and adapt most of the Bennu components and accessories.

The smart bar is a plated rectangular tube with three holes and one angular cut. This innovative connecting system allows components to be connected without sagging.

Since only two holes of the smart bars are used at any time, it is very important to understand which holes are used in each configuration.

The center hole is always used.

There is a difference of 3/8" between the long and short distance.

To use the short distance of the smart bar:
Use the center hole and the Square end hole.

To use the long distance of the smart bar:
Use the center hole and the angle end hole.



Note: If the angle end is showing, it does not matter if the angle slants up or down. Which pair of holes are in use across each of the top and bottom rows is all that matters.

TIP: if you install the bars in the top and bottom rows with the same end showing (square or angle), one row will have two holes showing, the other only one hole showing, according to which joint you are making. This assures you are not using the same pair of holes for both rows. It also allows you to align the smart bars one row at a time as you slide the wings together, which aids the other row in lining up to complete the insertion.

WARNING!!

Always install smart bars on the wing or P.U. that you are not handling, i.e. on the section already installed.

NEVER place hands or arms in between wings when making connections.

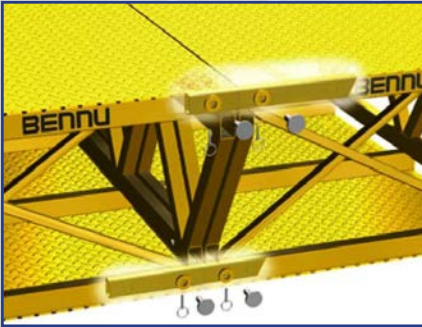
Make sure all pins and clips are installed before using.

Chapter 9

WING

Cantilever Wings

On a cantilever set-up, the objective is to create an end lift on the wing. When weight is placed on the wing, it will level out with the power unit. A correctly connected joint will have a slightly wider gap along the bottom row than along the top row of the joint. This is how the end lift is created.



Maximum length:

20' maximum on each side of an A.P.U.

Smart Bar:

Short distance hole pair in play along the top joint row.

Long distance hole pair in play along the bottom joint row.



Chapter 9

WING

Procedures

Top

Secure (5) smart bars in the upper row of the stationary wing, using smart pins and lynch pins through the square end hole, angle end pointing out (*two holes will be visible*).

Bottom

Secure (3) smart bars in the lower row of the stationary wing, using smart pins and lynch pins through the center hole, angle end pointing out (*one hole will be visible*).

Assembly

Slide the second wing over the top smart bars until the bottom row lines up with the lower three smart bars. You may need to tap them with a long handled tool to start them in the wing. Continue sliding the wing in place until holes begin to line up.

It doesn't matter whether you install pins in the top or bottom row first; but do not enter under the wing until the two outside smart pins in the top row of the wing are installed. Starting with either the top or bottom outside pair, get both pins inserted before inserting pins in the other level, which will aid in getting the holes lined up.

DANGER!!!

Do not stand under wings until at least the two outside top pins have been installed with lynch pins.

GENERAL

TIP:

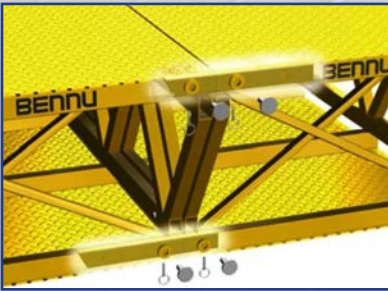
The full wing length of one side may be installed before the other side, even if the A.P.U. must be raised or lowered with one side installed, but no load may be placed until both wings are installed.

Chapter 9

WING

Bearing Wings

On a bearing bridge set-up, the objective is to create an arch in the bridge. When weight is placed on the bridge, it will level out with the power unit. A correctly connected joint will have a slightly wider gap along the top row than along the bottom row of the joint. This is how the arch is created.



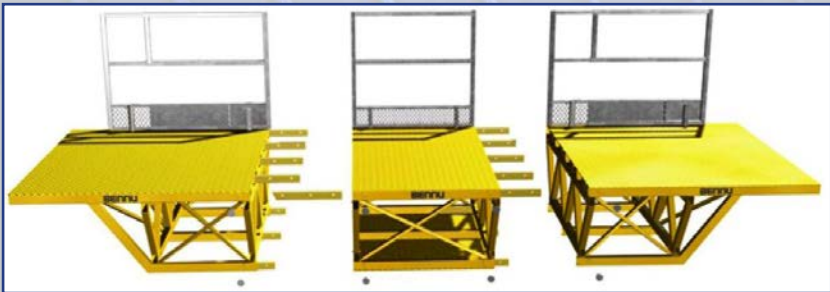
Maximum length:

60' maximum length between two A.P.U.

Smart Bars

Long distance hole pair in play along the top joint row
(angle end out, one hole visible).

Short distance hole pair in play along the bottom joint row
(angle end out, two holes visible).



Chapter 9

WING

Procedures

TIP:

You will need clearance from ground for assembly of a bearing bridge. This can be had by laying the middle wing section on a wood 4" x 4" timber (*common around job sites*) just behind the first joint. Or, you may use another 8' wing as a table, placing your first bridge center wing on top of it, with one end slightly overhanging. The height gain makes installing pins much easier. Use the lift to maintain a position of balance during the assembly.

Top

Secure (5) smart bars in the upper row of the stationary wing, using smart pins and lynch pins through the center hole, angle end pointing out (*one hole will be visible*).

Bottom

Secure (3) smart bars in the lower row of the stationary wing, using smart pins and lynch pins through the square end hole, angle end pointing out (*two holes will be visible*).



Assembly

Slide the second wing over the bottom smart bars until the top row lines up with the upper three smart bars. You may need to tap them with a long handled tool to start them in the wing. Continue sliding the wing in place until holes begin to line up.

It doesn't matter whether you install pins in the top or bottom row first; but do not enter under the wing until the two outside smart pins in the top row of the wing are installed. Starting with either the top or bottom outside pair, get both pins inserted before inserting pins in the other level, which will aid in getting the holes lined up.

Position two P.U. so that a minimum of 6" and a maximum of 14" of the bearing wing overlaps the P.U. at each end. (*Bennu recommends using 12" overlap for simplicity and safety.*)

Secure both 6' wings to the top of the P.U. using the chains provided.

Insert swivel shackle in longitudinal tube of P.U.
Secure using smart pins and lynch pins.

Adjust chain's length using the shackle, leaving approximately 1 link of slack.



Chapter 9

WING

Extension Mode

Do not use extensions on bearing bridges.

4' extension can be connected to a 4' and 8' cantilever wing or directly to the A.P.U.

30" extension can only be connected to a 30" cantilever wing.

Make sure set-up is balanced when using extensions. *(Counterweight may be needed.)*

Maximum extension setup length:

17' maximum with proper counterweight on A.P.U.

Procedures for first extension module

Install smart bars (4) into top and bottom outrigger pocket of main stream unit using the long distance.

Invert (*flip*) wing upside down to use as first extension.

Slide inverted wing on smart bars until holes line up and secure with smart pins and lynch pins.



Chapter 9

WING

Procedures for second and subsequent extension wings

Install smart bars (4) into top and bottom outrigger pocket of installed wing, using the same configuration as cantilever wing mode.

Short distance on top and long distance on bottom.

Wing is used on its normal side for extension #2, and inverted for #1 and #3.

Slide wings on smart bars until holes line-up and secure with smart pins and lynch pins.

Counterweight wings should line-up with the extension on the opposite side of P.U. or cantilever wing.

If an offset is required, consult your official distributor or BENNU technical support .

General counterweight formula:



For every "X" wing(s) installed as a forward extension, install "X"-1 wing(s) as counterweight in the opposite direction. *(For example, for 3 wings forward, 3-1 = 2 wings off the back.)*

CAUTION!

Work load on extensions should not exceed 2,000 lbs without the use of a counterweight on A.P.U.

Alternative:

For every "X" wing(s) installed as forward extension install "X"-2 wing(s) as counterweight and use a 2,000 lbs per wing counterweight. *(For example, for 3 wings forward, 3-2=1 wing off the back with 2,000lbs on it).*

Chapter 9

WING

Cross Wings

There are circumstances where a normal wing is too wide. Rather than supply several wings width, BENNU allows its 30" and 4' wide wings to be connected in their cross direction as with forward/backward extensions.

Do not use outriggers to support cross wings.

Cross wing assembly are supported by a P.U. or another wing of sufficient bearing capacity.

Maximum cross wing length is:

55' when using 30" wings (7 sections)

43' when using 4' wings (5 sections)



Chapter 9

WING

Procedures

Install smart bars (4) on top and bottom outrigger pockets, using the same configuration as for bearing wings. Long on top, short on the bottom, secure with smart pins and lynch pins.

Slide second wing over smart bars until holes line-up and secure with smart pins and lynch pins.

Repeat steps 1 and 2 until desired length is obtained.

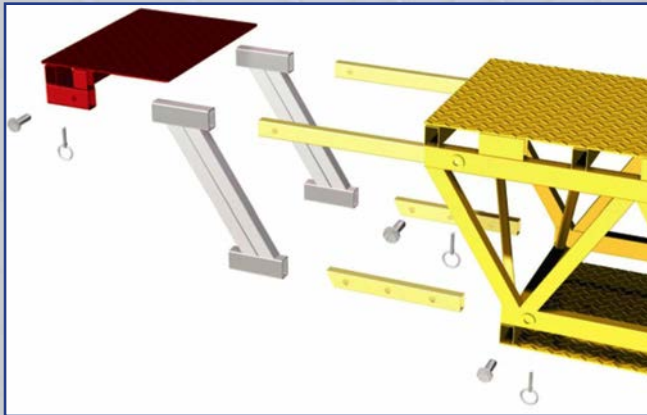
Insert 4' Heavy Duty long bearing members at both ends of cross wings in the top outrigger pockets and secure with smart pins and lynch pins.

Lay wings over bearing structure, cantilever wings or P.U.

(The gap between the end of the cross wings and bearing structure must not exceed 4'. Should a larger gap be required, stiffeners are available. Contact Bennu or your authorized distributor for application limits.)

Secure cross wing in place using a chain as with a bearing bridge.

Slide cross wings stabilizer plate cover bearing members and secure in place using 5/8" bolts.





Chapter 10

GUARD RAILS

Chapter 10

GUARD RAILS

Bennu offers 6 types of guardrails to provide a safe and legal work area on the platform.

Standard 4' guard rail

Adjustable 4' to 7' guard rail

Adjustable 30" guard rail

Door guard rail with rolling gate

Mason guard rail

Guard rail outrigger adaptor
(Used to install guardrails on outriggers)



Chapter 10

GUARD RAILS

The standard 4' guard rail is the most commonly used. It fits most positions on the P.U., wings and extensions.

Set a standard 4' guard rail wherever applicable, by inserting into pockets on floor.

The adjustable 4' to 7' guard rail fits at the ends of P.U. and wings, or on 6' wings.

Place an adjustable 4' to 7' guard rail wherever applicable by stretching it to desired width (7') and inserting mounts in pockets on floor.

For installation, lock rods must be pointing outwards. Raise and pivot lock rods inward (*locked position*).

The adjustable 30" guard rail is used to fill the gap between a bearing wing and the platform. It is also used to fill narrow openings created when using special configuration, or 30" wings.

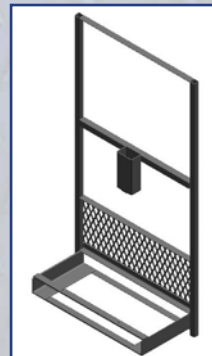
Place an adjustable 30" guard rail whenever applicable by stretching it to desired width.

Slide tabs on each side of the posts of installed guard rails and secure with pins and hitch pin clips.

Mason slip on guard rails are used on working planks to block ends of setup.

Slip guard rail over all working planks at each end of the setup, making sure that planks exceed the collar.

Secure in place with two nails.



Chapter 10

GUARD RAILS

The sliding door and door guard rail are generally placed on the unit itself in order to ease loading.

Instead of removing sections of guard rail to place material loads, workers can benefit from an easy to use 5' temporary opening.

During the loading operation, workers are no longer exposed to this opening, since the door is operated from the side.

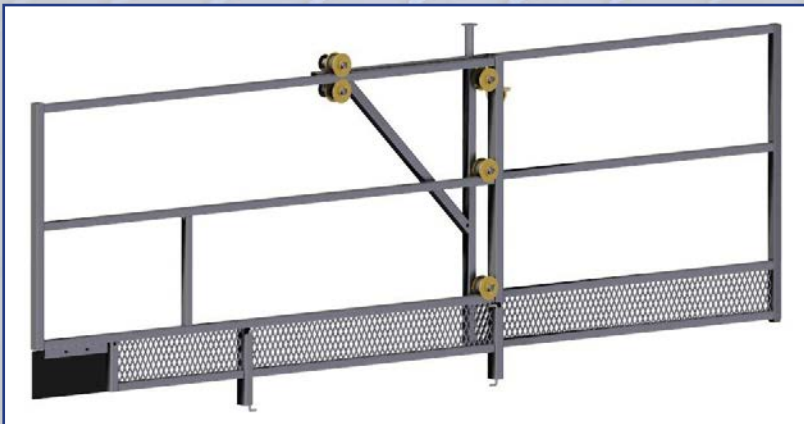
The sliding door and door guard rail assembly can be installed to open either from the right or left hand.

Five plastic rollers ensure smooth operation and only one need to be removed for installation.

Sliding door can be placed anywhere 3 consecutive 4' standard guard rails are present, either on the A. P.U. or wings.

Sliding door and door guard rail **MUST** be used together at all times.

The rubber flap in the corner of the door guard rail is to ease installation of a bearing starter wing.



Chapter 10

GUARD RAILS

Sliding door and door guard rail installation

Install door guard rails as you install a standard guard rail.

Remove roller (e) and its axle from sliding door. Make sure all washers are positioned on each side of all rollers, except roller (a).

Tilt door as shown and install on guard rail, outward from the P.U.

Rollers (a) and (b) go over bars (A) and (B).

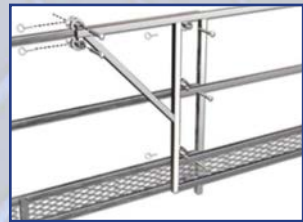
Rollers (c) and (d) go under bars (C) and (D).

Let door rest on its tracks, making sure washers are on either side of the bars.

Install roller (e) over bar (D) to secure door in place.

Push the lock outward to unlock and open the door.

When closing, the door locks itself automatically.



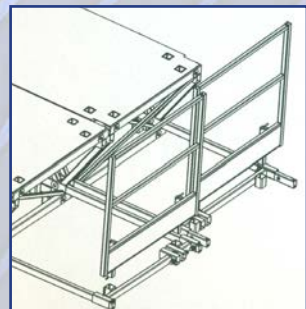
Bennu offers a guard rail outrigger adapter to add safety on the front of the working area. In special applications where the platform exceeds the end of the wall, or when front openings are present, fall protection must be provided at the plank area.

Install every bottom outrigger and secure in place with provided 5/8" bolts.

Slide guard rail outrigger adapter over 2 outriggers. Outrigger pockets are placed in a way that they can accommodate any kind of platform configuration.

Install plank stop pin on outrigger and secure with provided hitch pin clip.

Secure guard rail adapter in place with provided 5/8" bolts.



Install 4' standard guard rail in pockets.
When 2 or more consecutive guardrails are needed, install as shown.



Chapter 11

WORKING ON THE PLATFORM

Chapter 11

WORKING ON THE PLATFORM

GENERAL

To benefit from the series #3 maximum capacity, make sure the load is distributed evenly over the platform length.



To leave a free passage along the back of the platform, keep material load towards the front of the P.U. and wings. This will minimize torque on mast sections and provide a safe passage for workers and brick carts all along the platform.

Refer to wings section for wings & extensions load capacity.

A . P . U .

The first material load should be placed near the center of the P.U. between the masts.

The next loads should be placed alternating evenly between left and right. Keep platform loads balanced from side to side.

It is seldom a good idea to land loads at the end of wings.

Chapter 11

WORKING ON THE PLATFORM

GENERAL

Bennu's work platform provides workers with safe and ergonomic working environment.



In typical installations, it allows workers to stand on the lower outrigger planks and to have material handy, on either the top outrigger planks or the platform deck. This concept will minimize risk of back injuries while providing a productive work area.

Other external wall work applications, such as re-glazing or restoration may be carried out from the upper deck with or without a forward planked extension; a range of wall tie configurations allow a crew to take full advantage of the rapid continuous climb rate of the series #3 APU, eliminating or minimizing adjustment of plank.

Chapter 11

WORKING ON THE PLATFORM

To Suit every purpose, Bennu Parts and Service offers 4 lengths of standard outriggers:

- 6' Outriggers
- 8' outriggers
- 10' outriggers
- 12' outriggers

When sliding an outrigger out, make sure to leave at least 2' in the pocket to provided enough support and stability.

Installation Procedures

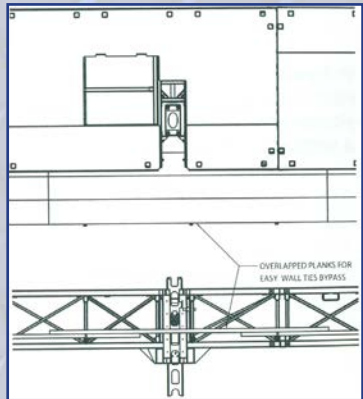
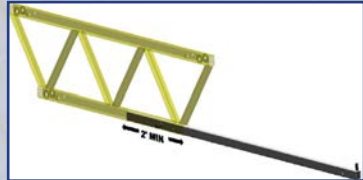
Slide outrigger in its pocket or support tube.

Adjust to desired length.

The working planks should cover most of the whole length of the outriggers, from the structure to the plank stop pins.

Tighten the 5/8" bolts located on the side of the support tubes using a 15/16" wrench.

Make sure there is a plank stop pin on the end of each outrigger and secure with hitch pin clip.



the outrigger positioning offers a working plank layout that does not interfere with the wall tie system.

It might be wise to overlap planks on areas in front of masts. It makes it easier to slide planks aside while raising and lowering the P.U.

Chapter 11

WORKING ON THE PLATFORM

Outriggers stiffening bracket

An outrigger stiffening bracket is available for special applications requiring more reach with longer outriggers, or to be used with cross wing support.



Installation Procedures

Remove plank stop pins on both top and bottom outriggers.

Slide stiffening bracket over outriggers as shown on the picture and secure as shown on the picture with 5/8" bolts using 15/16" ratchet or wrench.

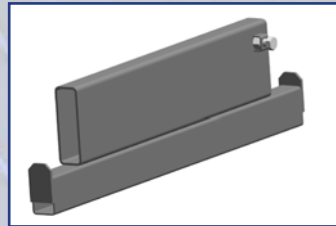


Chapter 11

WORKING ON THE PLATFORM

Portable outrigger

Bennu offers a portable outrigger adapter for applications requiring more outrigger supports.



Installation Procedures

Position a portable outrigger adapter underneath the P.U. or wing, between 2 longitudinal structural tubes.



Slide an 8' outrigger in the adaptor's pocket passing outrigger over both structural tubes as shown. Secure outrigger in place with a 5/8" bolt using 15/16" wrench.



In this example, the adaptor is being used to make the removal of plank easier to pass a tie.

The plank supports have been installed so they cannot come into contact with the turnbuckles. A set of 6' to 8' planks cleated together and overlapping the full planks to either side can quickly and easily be pulled out of position and replaced when passing the tie.

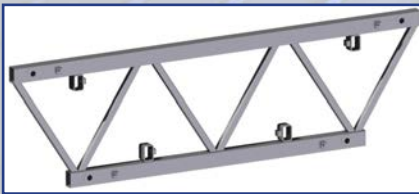
The portable outrigger can also be used at an angle to reach corners with outriggers.

Chapter 11

WORKING ON THE PLATFORM

GENERAL

Multiple trusses may be used to extend a length of working deck forward. Installed as pairs, they may be used to create an extension along a return wall, or to create a “cradle” (with plank across the bottom level), to hold counterweight material used to balance a forward extension. A truss cradle with 600# of added weight is approximately equal to a full 30” or 4’ wing section. (Secure the dead weight material to prevent overhead hazard).



Installation procedures

Using two smart bars and four pins, attach truss to front or back of A.P.U. or wing as shown, in cantilever mode. Several “pre-joined” trusses may be hung as an assembly.

For forward reach beyond full truss length, insert outriggers and lock using 5/8” bolts. If they are installed to a 4’ wing, a guardrail adaptor can be mounted to the outriggers. Plank outriggers as required.

Forward truss pairs used as extensions may have cross 6’ outriggers installed, to support planking laid between trusses.



WARNING!!

If extension truss is not planked, guard rails should be installed to prevent access to open areas.



Chapter 12

MATERIAL LIFTING, DISTRIBUTION, and MULTIFUNCTION SYSTEM



Chapter 12

MATERIAL LIFTING, DISTRIBUTION and MULTI-FUNCTION SYSTEM

BENNU HOIST

GENERAL

The Bennu hoist is a self-powered material lifting device, rated to lift up to 2 tons of load as high as 200' from the ground, and place the load anywhere along a 40' section of working platform. It can be used to feed an adjacent platform, (at the same or lower elevation), including one returning a corner.

The modular assembly consists of the powerhouse pedestal and rotating boom with winch, mounted in a special deck section of the standard 4' wing size. It offers the following features:

- The hoist module operating system is self-contained, powered by 20HP V-twin Honda motor with a fin cooled, large capacity hydraulic tank/boom pedestal, and is capable of continuous operation.
- A computer controlled 50,000 ft-lb torque rated three piece boom design, capable of 2,000# lifts at full 20' extension, or up to 4,000# lifts at the 10' retracted length.
- 380° rotation capability, for multiple placement of loads along a 40' span of platform.
- A variable speed winch with up to 200' of cable, up to 60' per minute cable-up speed.
- Wireless FM radio control provides variable speed functions, with built in torque and travel limiters for user safety.

HOIST TRANSPORT:

The BENNU HOIST is fully assembled when shipped, and ready to operate. It can be carried on any trailer or truck without exceeding height limits. Its module will rest stable and upright when the boom is horizontal to 5° elevated, and oriented across the open area of the deck, in line with the APU length dimension. It may be chained to the trailer bed this way, with the boom resting over other materials on the trailer.

WARNING!!

The module must be in this configuration when dismounting from a platform to rest on ground. If not, other orientation of the boom or operation of any of the boom functions while the module is not installed on the APU, or held by lift truck using the fork guides is likely to cause tip-over of the module, with the possibility of severe injury or even death of persons standing close by.

The BENNU Hoist operating procedure may be found in the operation manual dedicated to the hoist itself. The following are guidelines for the installation of the hoist module to the APU.

Chapter 12

MATERIAL LIFTING, DISTRIBUTION and MULTI-FUNCTION SYSTEM

GENERAL

The hoist module is designed to be mounted directly to the APU only, at either end, with the pedestal next to the APU (*cannot be mounted at the end of a wing section*). The rotation will access any desired operating zones from this orientation. One (1) wing section of any type may be installed on the outboard side of the hoist module, as the additional wing weight/capacity plus the combined weight/load capacity of the hoist will fall within the stated limits of a maximum 20' cantilever wing.

Installation procedure:

Top

The hoist module uses (4) smart bars in its upper row. Install these with square end out, one hole showing (*short distance*), using smart pins and lynch pins.

Bottom

Install (3) smart bars in the lower row using smart pins and lynch pins, one hole showing, angle end pointing out (*long distance*).

Tip:

Having short smart bar lengths to insert into the APU at top and bottom works best for the hoist, due to its balance and mass.

The hoist /module (*wt 4200#*) may be carried and installed by forklift, from a side or rear approach of the APU (*see pictures*). There are fork guides for both directions. When making a rear approach, a machine with carriage tilt as well as fork tilt allows for a much easier alignment and insertion of the smart bars into the APU.



Sling mounting:

For locations requiring an angled approach, or installation by tower crane, a four leg sling of proper capacity and length may be used. The sling legs should hang the module level, without interfering with the hoist mechanism or pedestal. Smart bars pinned in place in the upper outrigger pockets in the front and back of the module can be used for sling hook attachment points.



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MATERIAL LIFTING, DISTRIBUTION and MULTI-FUNCTION SYSTEM

Platform balance:

The hoist assembly of the hoist module adds 3,400 lbs. vs. the weight of a standard 4' wing. Therefore, to provide balance to a single APU with hoist setup, a cantilever wing on the opposite side of the APU of 12' to 20' is recommended. For a bearing bridge configuration, a bridge length of 36' or more is recommended.

In considering the residual material capacity of a cantilever wing that includes the hoist module (*length 4' to 12'*), the sum of the 3,400lb. hoist assembly weight, and the 4,000lb. hoist lifting capacity (*total 7,400#*) must be deducted from the capacity rating shown on the WINGS CAPACITY chart. (*for a 12' cantilever with hoist, the residual is 600lb.*).

CAUTION!

When rigging with sling(s) to lift the hoist module into position, it is advised **NOT** to attach rigging to the boom or winch portions of the assembly. The lifting eyes on the boom were placed to aid in module assembly only. Doing so may cause the (*boom up*) cylinder to extend, changing the balance and positioning aspects of the pick, and could damage wiring.

When staging loads at ground level for hoisting, it is advised to keep heavier loads close in to the back edge of the BENNU platform, to minimize torque load during the lift. This in turn will minimize the load tension transmitted through the wall tie components.

WARNING!!

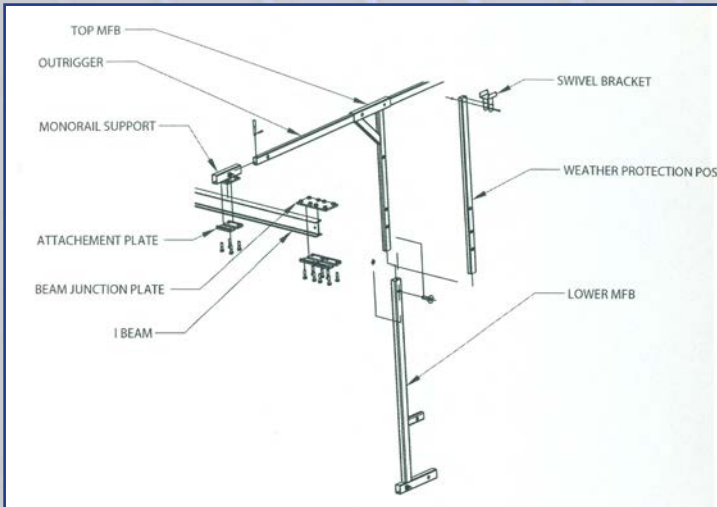
DO NOT INSTALL MORE THAN ONE (1) WING SECTION OUTBOARD OF THE HOIST MODULE. The added torque from the additional section, and possible load placed upon it is likely to exceed designed load restrictions for the maximum allowed cantilever wing length for the APU.

DO NOT CARRY A BEARING BRIDGE ON A HOIST MODULE IN LINE, OR AT RIGHT ANGLES TO THE APU (*for the reasons previously stated*).

REFER TO THE WALL TIE SCHEDULE IN CHAPTER 7, "TYING THE PLATFORM". Do not exceed the allowable vertical spacing of 15' for ties on an APU with hoist mounted.

Chapter 12

MATERIAL LIFTING, DISTRIBUTION and MULTI-FUNCTION SYSTEM



The MFB serves multiple purposes such as weather protection, centered monorail, forward monorail, "end hoist" structure and second work level above or below the main platform level.

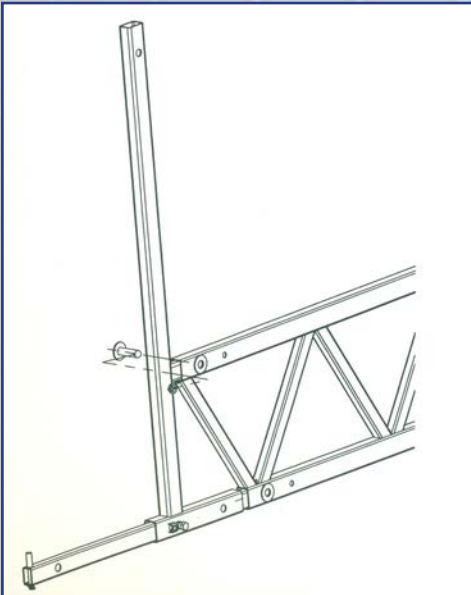
Chapter 12

MATERIAL LIFTING, DISTRIBUTION and MULTI-FUNCTION SYSTEM

MFB Installation procedures

A – Lower MFB on front of A.P.U.

- 1) Remove planks and plank stop pins from bottom outrigger.
- 2) Remove top outriggers.
- 3) Slide lower MFB over bottom outrigger, 8' or other.
- 4) Insert top tube of MFB into top outrigger pocket.
- 5) Secure tube with smart pin and lynch pin and secure lower part with 5/8" bolt using 15/16" wrench.
- 6) Repeat operations 1 to 4 for as many lower MFB as needed.
- 7) Replace planks and install plank stop pins.

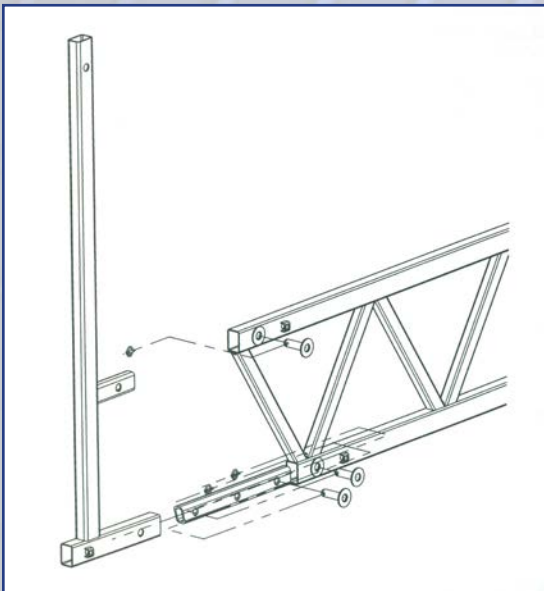


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MATERIAL LIFTING, DISTRIBUTION and MULTI-FUNCTION SYSTEM

B – Lower MFB on back of P.U.

- 1) Insert smart bar in bottom outrigger pocket. Secure with smart pin and lynch pin.
- 2) Slide lower MFB over smart bar.
- 3) Insert top tube of MFB in top outrigger pocket.
- 4) Secure both top and bottom with smart pins and lynch pins.
- 5) Repeat operation 1 to 4 for as many back lower bracket as needed.

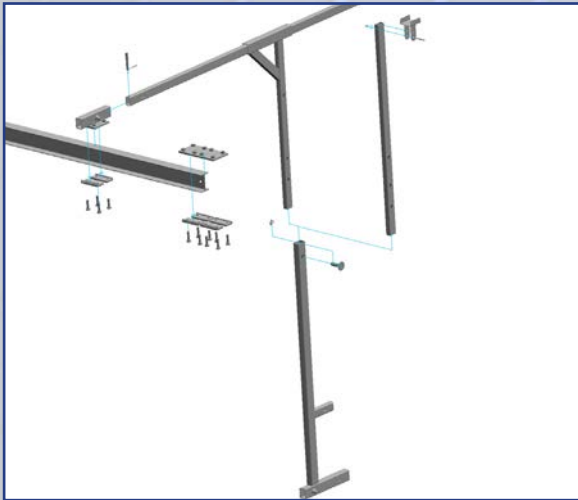


Chapter 12

MATERIAL LIFTING, DISTRIBUTION and MULTI-FUNCTION SYSTEM

C – Top MFB (for monorail, centered monorail, end hoist and second work level)

- 1) Slide top MFB into lower MFB.
Long part facing the wall for front monorail and second work level. Long part facing P.U. for centered monorail and end hoist.
- 2) Secure with smart pin and lynch pin.
- 3) Spacing between MFB must not exceed 48" to allow full capacity.



Chapter 12

MATERIAL LIFTING, DISTRIBUTION and MULTI-FUNCTION SYSTEM

The forward monorail offers a capacity of 750 lbs at a distance of 36" from the center of the beam to the center of the multi-function bracket.

At least 3 consecutive multi-function brackets must be installed to allow use of forward monorail at rated capacity.

Installation Procedures A.P.U.

Install 6' outriggers in top multi-function bracket pockets and secure with 5/8" bolts, using 15/16" wrench.

Slide monorail support over outrigger and secure with 5/8" bolts using a 15/16" wrench.

Repeat steps 1 and 2 for as much multi-function bracket as needed.

Position I-Beam using forklift or crane. Secure I-Beam onto monorail supports using one attachment plate on each side, secure with 5/8" bolts, using 15/16" wrench.



Chapter 12

MATERIAL LIFTING, DISTRIBUTION and MULTI-FUNCTION SYSTEM

The center monorail offers capacity of 2,000 lbs when using 8' outriggers and 4,000 lbs with 10' heavy duty outriggers.

At least 3 consecutive multi-function brackets must be installed to allow use of center monorail at rated capacity.

The end hoist offers a capacity of 2,000lbs at 36" out, using 10' heavy duty outriggers and 3 consecutive multi-function brackets.

Centered monorail installation procedures A.P.U.



Install 8' or 10' heavy duty outriggers in top multi-function bracket pockets and secure with 5/8" bolts using 15/16" wrench. Slide monorail support on outrigger.

Slide outrigger in second top multi-function bracket.

Secure outrigger and monorail support with 5/8" bolts using a 15/16" wrench.

Repeat steps 1 to 4 for as many multi-function brackets as needed. Install beam in the same way as for the forward monorail.



End hoist structure installation procedures A.P.U.

Install monorail support in the same way as for the center monorail.

Install beam, making sure beam is sticking out 36" beyond end of P.U.

Chapter 12

MATERIAL LIFTING, DISTRIBUTION and MULTI-FUNCTION SYSTEM

Bennu's weather protection system provides a fast and easy way to protect workers against the harsh weather conditions.

The system consists of a steel structure on which users can safely install a reinforced plastic cover (*polyethylene or fabrene*).

A key component of the system is the swivel bracket. The bracket is designed to allow easy attachment of a wooden frame onto the steel structure.

Weather protection structures can also be used as an overhead protection. The user of the scaffold is solely responsible for determining the type and strength of material needed to cover the structure for the level of protection required by the general contractor.

Weather Protection Installation Procedures A.P.U.



Install swivel bracket on top of weather protection post. Install weather protection post into lower multi-function bracket and secure with smart pins and lynch pins.

To create a slope, use the top hole in the front weather protection post and the bottom hole in the back.

Repeat step 1 and 2 for as many posts as needed. Bennu recommends a maximum spacing of 8' between posts.

Install lumber (2" x 4" or 4" x 4") across swivel brackets and secure with nails or screws.

Lay some more lumber across to lend more support for the plastic cover.

Install swivel brackets on the back side of the weather protection post.

Install lumber and secure with nails or screws. Install and fasten plastic cover over wooden frame.

Chapter 12

MATERIAL LIFTING, DISTRIBUTION and MULTI-FUNCTION SYSTEM

The same multi-function bracket allows the installation of a second work level.

This addition can suit many purposes, for example, installing insulation and doing masonry work simultaneously.

The installation of a second work level below the platform is also possible with the multi-function bracket. This is most useful for heaters during winter months or also for workers to perform duties below the main work level.

Second work level installation procedures



Install 6" outriggers in top multi-function bracket pockets, making sure not to extend more than the 48" from the center of the multi-function bracket to the end of outrigger and secure with 5/8" bolts, using a 15/16" wrench. Install planks and plank stop pins.

Install guard rail outrigger adapter on either side of the multi-function bracket to provide fall protection,

As for other work levels, make sure planks properly overlap. Do not stand on planks beyond their supports.

Use plank end guard rails on open ends.



Chapter 13

MAINTENANCE



Chapter 13

MAINTENANCE

BENNU MAINTENANCE CHECKLIST

Daily

LEVEL & Plumb

CHECK FLUID LEVELS (GAS, OIL AND HYDRAULIC)

NOTE: Units are provided with an oil alert which should prevent the engine from starting if oil is low.

CHECK FOR LEAKS (GAS, OIL AND HYDRAULIC)

CHECK ALL GUARD RAILS AND TOE GUARDS FOR PROPER INSTALLATION AND OPERATION

MAKE SURE NO MORTAR OR BROKEN MASONRY IS INFRINGING OPERATION OF TOWER ROLLERS, WHEELS OR SAFETY DOGS

CHECK FREE MOVEMENT OF SAFETY DOG UNDER PLATFORM

Weekly (Include all Daily)

CHECK PLANK LAP, BEARING BRIDGE OVERLAP AND CHAINS

CLEAN OFF EXCESS MORTAR FROM UNIT AND ACCESSORIES

MAKE SURE TOWER LIMIT SWITCH IS OPERATING CORRECTLY

CHECK ALL CYLINDERS AND HOSES FOR FUNCTION/WEAR

CHECK TOWER BOLTS FOR TIGHTNESS

CHECK STRUCTURE FOR DAMAGE OR DISTORTION (ESPECIALLY WELDS)

CHECK TOWER GUIDES OR ROLLERS FOR PROPER OPERATION



Chapter 13

MAINTENANCE

Monthly *(Include all Weekly)*

VISUALLY INSPECT STRUCTURE FOR TEARS OR BENDS
(REPAIR IF NECESSARY)

GREASE JACKS AND CONFIRM PROPER OPERATION

CHECK ALL LOCKING PINS, PLANK-STOP PINS AND FASTENERS

EXAMINE ALL GUARD RAILS (REPAIR IF NECESSARY)

CHECK ALL BOLTS FOR DRIVE SYSTEM (TIGHTEN IF NECESSARY)

CHANGE ENGINE OIL EVERY 3 MONTHS OR 50 OPERATING HOURS

S3 DRIVE UNIT(S) GEARBOX: CHECK OIL LEVEL IN
GEARBOX MONTHLY; TOP OFF WITH 90 WEIGHT GEAR
OIL UP TO FILL PLUG OPENING

PRESSURE WASH WHEN MOVING FROM JOB TO JOB OR
EVERY 3 MONTHS

Yearly *(Include all Monthly)*

VISUALLY INSPECT ALL STRUCTURE WELDS FOR CRACKS
(REPAIR BY AUTHORIZED DISTRIBUTOR IF NEEDED)

CHANGE HYDRAULIC OIL AND FILTER (1X PER YEAR OR 200 HRS)

S3 DRIVE UNIT(S) GEARBOX: CHANGE 90 WEIGHT GEAR
OIL ON A YEARLY BASIS; REFILL TO FILL PLUG OPENING

CHECK GAS TANK FOR DEBRIS, CLEAN IF NECESSARY
(SEE HONDA MANUAL)

CHECK BATTERY VOLTAGE (12 VOLTS) RECHARGE OR REPLACE
(IF REQUIRED)





Chapter 14

CAPACITY CHARTS

WINGS CAPACITY



Bearing Wings LENGTH	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72
CAPACITY	18000	17300	16700	16000	15400	14700	14000	13400	12700	12000	11400	10700	10000	7200	6400	5600
CAPACITY / foot	1500	1081	835	667	550	459	389	335	289	250	219	191	167	113	94	78

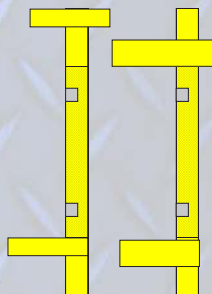
Cantilever Wings LENGTH	4	8	12	16	20											
CAPACITY	9300	8700	8000	7300	6700											
CAPACITY / foot	2325	1088	667	456	335											

Gross-Wings 30" LENGTH	7	12	19	24	31	36	43	48	55
CAPACITY	9300	8600	7900	7200	6500	5800	5100	4400	3700
CAPACITY / foot	1329	717	416	300	210	161	119	92	67

Gross-Wings 48" LENGTH	7	12	19	24	31	36	43	48	55
CAPACITY	9200	8400	7600	6800	6000	5200	4400	3600	2800
CAPACITY / foot	1314	700	400	283	194	144	102	75	51

Extensions 30" LENGTH	5	12	17	24
CAPACITY	4000	3300	2650	2000
CAPACITY / foot	800	275	156	83

Extensions 48" LENGTH	5	12	17	24
CAPACITY	4000	3250	2500	1750
CAPACITY / foot	800	271	147	73

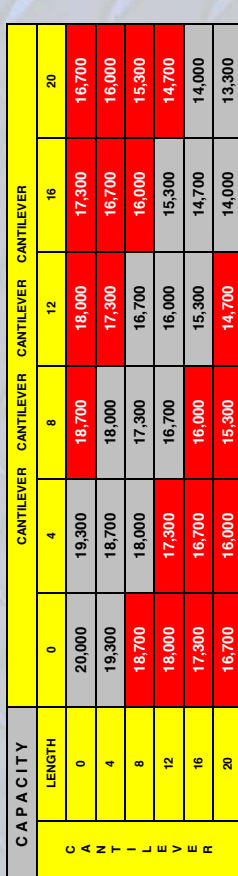


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Modular Power Unit (MPU) Capacity, per unit

CAPACITY	INSERT															
	LENGTH	0	5	9	13	17	21	25	29	33	37	41	45	49	53	57
C A N T I L E V E R	0	20,000	20,000	20,000	20,000	20,000	20,000	19,800	19,200	18,500	17,800	17,200	16,500	15,800	13,400	11,000
	4	20,000	20,000	20,000	20,000	19,800	19,200	18,500	17,800	17,200	16,500	15,800	15,100	14,500	13,800	11,000
	8	N.A.	20,000	20,000	19,200	18,500	17,800	17,200	16,500	15,800	15,100	14,500	13,800	13,100	12,500	9,400
	12	N.A.	N.A.	N.A.	17,800	17,200	16,500	15,800	15,100	14,500	13,800	13,100	12,500	11,800	11,100	10,500
	16	N.A.	N.A.	N.A.	N.A.	15,800	15,100	14,500	13,800	13,100	12,500	11,800	11,100	10,500	9,800	9,100
	20	N.A.	N.A.	N.A.	N.A.	N.A.	13,800	13,100	12,500	11,800	11,100	10,500	9,800	9,100	8,500	7,800
	20	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	13,800	13,100	12,500	11,800	11,100	10,500	9,800	9,100	8,500
CAPACITY	INSERT															
	LENGTH	0	5	9	13	17	21	25	29	33	37	41	45	49	53	57
B E A R I N G	0	20,000	20,000	20,000	20,000	20,000	20,000	18,800	19,200	18,500	17,800	17,200	16,500	15,800	15,100	14,500
	12	20,000	20,000	20,000	20,000	20,000	18,500	17,800	17,200	16,500	15,800	15,100	14,500	13,800	13,100	12,500
	16	N.A.	20,000	20,000	20,000	18,800	18,200	17,500	16,500	15,800	15,100	14,500	13,800	13,100	12,500	11,800
	20	N.A.	20,000	20,000	20,000	18,500	17,800	17,200	15,800	15,100	14,500	13,800	13,100	12,500	11,800	11,100
	24	N.A.	N.A.	20,000	18,800	18,200	17,500	16,800	15,100	14,500	13,800	13,100	12,500	11,800	11,100	10,500
	28	N.A.	N.A.	20,000	18,500	17,800	17,200	16,500	14,500	13,800	13,100	12,500	11,800	11,100	10,500	9,800
	32	N.A.	N.A.	N.A.	18,200	17,500	16,800	16,200	13,800	13,100	12,500	11,800	11,100	10,500	9,800	9,100
G	36	N.A.	N.A.	N.A.	17,800	17,200	16,500	15,800	13,100	12,500	11,800	11,100	10,500	9,800	9,100	8,500
	40	N.A.	N.A.	N.A.	17,500	16,800	16,200	15,500	12,500	11,800	11,100	10,500	9,800	9,100	8,500	7,800
	44	N.A.	N.A.	N.A.	17,200	16,500	15,800	15,200	11,800	11,100	10,500	9,800	9,100	8,500	7,800	7,100
	48	N.A.	N.A.	N.A.	16,800	16,200	15,500	14,800	11,100	10,500	9,800	9,100	8,500	7,800	7,100	6,500
	52	N.A.	N.A.	N.A.	16,500	15,800	15,200	14,500	10,500	9,800	9,100	8,500	7,800	7,100	6,500	5,800
	52	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	14,500	10,500	9,800	9,100	8,500	7,800	7,100	6,500	5,800
	52	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	10,500	9,800	9,100	8,500	7,800	7,100	6,500	5,800

Age Group	Percentage
18-24	10
25-34	25
35-44	15
45-54	10
55-64	10
65-74	10
75-84	10
85-94	10
95-104	10

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