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OPERATIONS-PARTS MANUAL



Power Buggy

AR16 and AR21

NOTICE

This manual, or a copy of it, must be kept with the machine at all times. There is a manual storage container located on the machine for your convenience.

Power Buggy

OPERATIONS-PARTS

MANUAL

This manual covers the products listed below:

<u>Part No.</u>	<u>Description</u>
058806	BUGGY AR16 POLY BUCKET 13HPR NON FILL
058807	BUGGY AR16 POLY BUCKET 13HPE NON FILL
058808	BUGGY AR21 POLY BUCKET 20HPE NON FILL
058801	BUGGY AR16 POLY BUCKET 13HPR FOAM
058802	BUGGY AR16 POLY BUCKET 13HPE FOAM
058809	BUGGY AR16 STEEL BUCKET 13HP RECOIL
058810	BUGGY AR16 STEEL BUCKET 13HP ELEC
058803	BUGGY AR21 POLY BUCKET 20HPE FOAM
058813	BUGGY AR21 STEEL BUCKET 20HPE FOAM

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Allen Products are covered under one or more of the following patent numbers:

U.S. Design Patents: 344,736; 400,542; 400,544; 402,998; 402,999; 403,332; 404,041; 404,042; 410,931; 413,127; 416,564; 465,897; 466,909; 474,203.

U.S. Utility Patents: 5,108,220; 5,238,323; 5,328,295; 5,352,063; 5,405,216; 5,476,342; 5,480,257; 5,480,258; 5,533,831; 5,562,361; 5,567,075; 5,613,801; 5,658,089; 5,685,667; 5,803,658; 5,816,739; 5,816,740; 5,890,833; 5,934,823; 5,967,696; 5,988,938; 5,988,939; 6,019,433; 6,019,545; 6,048,130; 6,053,660; 6,089,786; 6,106,193; 6,857,815; 5,288,166; 6,582,153 B1, 7,108,449; 7,114,876; 7,316,523; 7,690,864 B2

Canadian Patents: 2,039,893.

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Limited Warranty

LIMITED WARRANTY and LIMITATION OF LIABILITY

Allen Engineering Corporation ("Allen") warrants its products to be free of defects in material or workmanship for the following periods:

A. New Machines and Parts One Year

Warranty period begins on first day of use by End User. This first day of use is established by the date of a completed Allen Warranty Card or a Bill of Sale to the End User. All warranty is based on the following limited warranty terms and conditions, including the disclaimer of implied warranties and consequential damages.

1. Allen's obligation and liability under this warranty is limited to repairing or replacing parts if, after Allen's inspection, there is determined to be a defect in material or workmanship. Allen reserves the choice to repair or replace.
2. If Allen chooses to replace the part, it will be at no cost to the customer and will be made available to the Allen Distributor, Dealer, or Rental Center from whom the End User purchased the product.
3. Replacement or repair parts, installed in the product, are warranted only for the remainder of warranty period of the product as though they were the original parts.
4. Allen does not warranty engines. Engine warranty claims should be made directly to an authorized factory service center for the particular engine manufacturer.
5. Allen's warranty does not cover the normal maintenance of products or its components (such as engine tune-ups and oil & filter changes). The warranty also does not cover normal wear and tear items (such as belts and consumables).
6. Allen's warranty will be void if it is determined that the defect resulted from operator abuse, failure to perform normal maintenance on the product, modification to product, alterations or repairs made to the product without the written approval of Allen. Allen specifically excludes from warranty any damage to any trowels resulting from an impact to the rotors.
7. Impact damage is not covered under the Allen Gear Box warranty.
8. Allen will pay shop labor on warranty items at the Allen Shop Labor Rate in existence on the date of the warranty claim. An Allen Labor Chart will determine the time allowed to complete a repair and will govern the shop labor hours that will be allowed.
9. Allen will pay freight on warranty replacement parts at worldwide standard ground rates. No warranty replacement parts will be shipped air freight at the expense of Allen. Allen only pays outbound freight charges when sending warranty replacement parts to the customer via ground service. Allen does not pay any inbound freight. However, if Allen determines this to be a warranted item, only then will Allen reimburse the customer for inbound freight at standard ground rates.
10. ALLEN ENGINEERING CORPORATION'S WARRANTY POLICY WILL NOT COVER THE FOLLOWING: TAXES; SHOP SUPPLIES; ENVIRONMENTAL SURCHARGES; AIR FREIGHT; TRAVEL TIME; LOSS OF TIME; INCONVENIENCE; LOSS OF RENTAL REVENUE; RENTAL COSTS OF EQUIPMENT USED TO REPLACE THE PRODUCT BEING REPAIRED; LOSS OF USE OF THE PRODUCT; COMMERCIAL LOSS; OR ANY OTHER CHARGES WHATSOEVER OR ANY LIABILITIES FOR DIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGE OR DELAY.
11. ALLEN ENGINEERING CORPORATION MAKES NO OTHER WARRANTY, EXPRESSED OR IMPLIED. THIS LIMITED WARRANTY IS IN LIEU OF THE WARRANTY OF MERCHANTABILITY AND FITNESS. THERE ARE NO OTHER WARRANTIES THAT EXTEND BEYOND THE DESCRIPTION ON THIS DOCUMENT.
12. No Allen employee or representative is authorized to change this warranty in any way or grant any other warranty unless such change is made in writing and signed by an officer of Allen Engineering Corporation.

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Information Contained in this Manual



This manual provides information and procedures to safely operate and maintain the Allen Machine.

For your own safety and protection from personal injury, carefully read, understand, and observe the safety instructions described in this manual. Keep this manual or a copy of it with the machine at all times.

Always operate this machine in accordance with the instructions described in this manual. A well maintained piece of equipment will provide many years of trouble free operation.

This manual is divided into the following sections:

**SECTION 1
SAFETY**

**SECTION 2
OPERATIONS**

**SECTION 3
SERVICE**

**SECTION 4
PARTS**

Complete any warranty requirements as specified by the engine manufacturer in their instructions found inside the manual box located on the back of the riding trowel operator's seat.

Your engine and clutch is not manufactured by Allen Engineering Corporation, Inc, and therefore is not covered under Allen Engineering Corporation, Inc warranty.

Your engine manufacturer should be contacted if you wish to purchase a parts manual or a repair manual for your engine.

Refer to enclosed owners engine manual for complete O&M instructions. See your battery manufacturer for battery warranty.

Dealer Information

Your Dealer has Allen Engineering Corporation trained mechanics and original Allen replacement parts. Always contact the Allen Dealer who sold you this machine for Allen Certified repairs and replacement parts.

Place Allen Dealer information below for future reference.

Dealer Name: _____

Phone #: (____) - ____ - _____

Address: _____

City: _____ **State:** _____ **Zip:** _____

Salesman: _____ **Mobile Phone** _____

Additional Comments: _____

Ordering Parts

Section 4.0 contains illustrated parts lists for help in ordering replacement parts for your machine. Follow the instructions below when ordering parts to insure prompt and accurate delivery:

1. All orders for service parts - include the serial number for the machine. Shipment will be delayed if this information is not available.
2. Include correct description and part number from the "PARTS" section of this manual.
3. Specify exact shipping instructions, including the preferred routing and complete destination address.
4. **DO NOT** return parts to AEC without receiving written authorization from AEC. All authorized returns must be shipped pre-paid.
5. When placing an order, please contact the AEC dealer nearest you.



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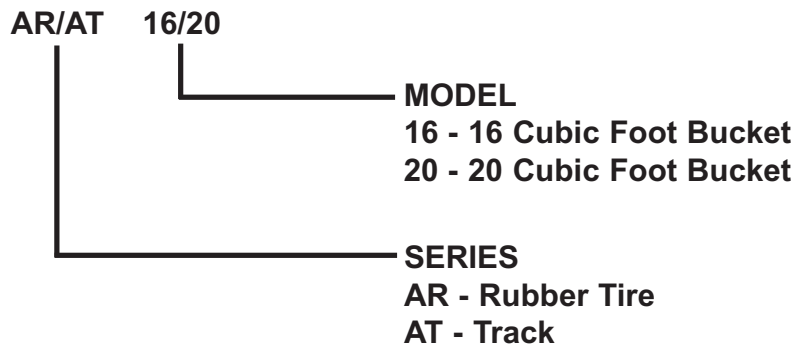
www.youtube.com/AllenMachinery

Model Number - Serial Number Codes

Manufacturer's Codes:

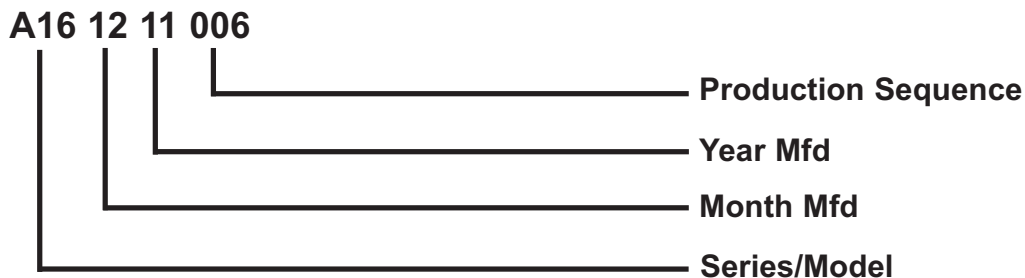
When ordering parts or requesting service information, you will always be asked to specify the model and serial numbers of the machine. The legends below specifically defines each significant character or group of characters of the Model Number and Serial Number codes.

Model Number



Serial Number

The serial number found on the identification plate is a ten digit format. The model number identifies your machine and will ensure that you receive the correct replacement parts.



Unit Identification

Unit Identification Plate Location:

An identification plate listing the model number and the serial number is attached to each unit and is located on the rear lower left side of mainframe. Refer to Figure 1 for serial number and model number location. This plate should not be removed at any time.

Please record the information found on this plate below so it will be available should the identification plate become lost or damaged. When ordering parts or requesting service information, you will always be asked to specify the model and serial numbers of the machine.

FILL IN FOR FUTURE REFERENCE

Model Number:	_____
Serial Number:	_____
Date Purchased:	_____
Purchased From:	_____

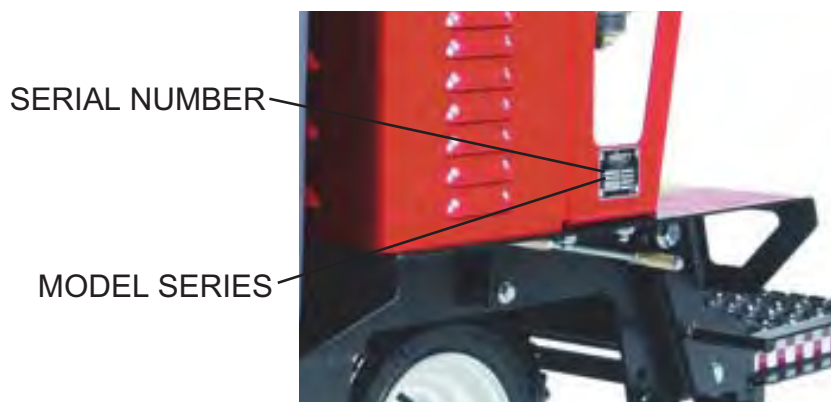


Figure 1
Serial Number Location

Technical Specifications

Measurements in this manual are in U.S. units and their customary metric units (i.e., metric units contained within brackets [8 mm]).

Machine Features for AR16:

- EngineHonda GX390
- Payload2,500 lbs [1,134 kilos]
- Dimensions (L x W x H) inch [cm]97x47x50
.....[246x119x127]
- Wheelbase40 in [102cm]
- Bucket Capacity16 FT³ [0.45 M³]
- WeightPolly Bucket: 1,300 lbs [590 kilos]
.....Steel Bucket: 1,450 lbs [658 kilos]
- Lift Cylinder2" Diamter [51mm]
- Dump/Return Speed (Empty)5 Seconds
- Top Speed7 MPH [11.2 kph]
- Fuel Capacity1.7 GAL [6 Liters]

Machine Features for AR21:

- EngineHonda GX630
- Payload3,200 lbs [1,451 kilos]
- Dimensions (L x W x H) inch [cm]97x47x50
.....[246x119x127]
- Wheelbase40 in [102cm]
- Bucket Capacity21 FT³ [0.59 M³]
- WeightPolly Bucket: 1,405 lbs [637 kilos]
.....Steel Bucket: 1,566 lbs [710 kilos]

Technical Specifications, continued

- Lift Cylinder2.5" Diameter [63.5mm]
- Dump/Return Speed (Empty)8 Seconds
- Top Speed5.9 MPH [9.5 kph]
- Fuel Capacity2.1 GAL [8 Liters]

Machine Dimensional Specifications



Engine Specifications

Honda GX390 Engine Information (13 HP)

Engine Type	Air-cooled 4-stroke OHV
Bore x Stroke	88 X 64 mm
Displacement	389 cm ³
Net Power Output*	11.7 HP (8.7 kW) @ 3,600 rpm
Net Torque	19.5 lb-ft (26.4 Nm) @ 2,500 rpm
PTO Shaft Rotation	Counterclockwise (from PTO shaft side)
Compression Ratio	8.2:1
Lamp/Charge coil options	25W, 50W / 1A, 3A, 10A, 18A
Carburetor	Butterfly Float Type
Ignition System	Digital CDI with variable timing
Starting System	Recoil/electric
Lubrication System	Splash
Governor System	Centrifugal Mass Type
Air cleaner	Dual element
Oil Capacity	1.16 US qt (1.1 L)
Fuel Tank Capacity	6.4 U.S. qts (6.1 liters)
Fuel	Unleaded 86 octane or higher
Dry Weight	69 lb (31.5 kg))



Engine Specifications (cont'd)

Honda GX630 Engine Information (20 HP)

Engine Type	Air-cooled 4-stroke OHV
Bore x Stroke	78 X 72 mm
Displacement	688 cm ³
Net Power Output*	20.8 hp (15.5 kW) @ 3,600 rpm
Net Torque	35.6 lbs ft (48.3 Nm) @ 2,500 rpm
PTO Shaft Rotation	Counterclockwise (from PTO shaft side)
Compression Ratio	9.3:1
Lamp/Charge coil options	2.7A, 17A, 26A
Carburetor	Horizontal type, two barrel butterfly valve, internal vent
Ignition System	Digital CDI with variable ignition timing
Starting System	Electric
Lubrication System	Forced lubrication
Governor System	Mechanical
Air cleaner	Dual element
Oil Capacity	2.1 US qt (2.0l)
Fuel	Unleaded 86 octane or higher
Dry Weight	96.8 lb (44 kg)





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Section 1
SAFETY

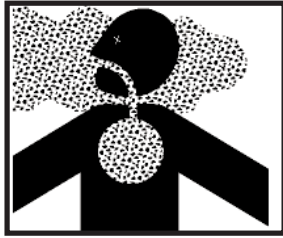
SECTION 1
SAFETY

State Regulations



CALIFORNIA PROPOSITION 65
WARNING

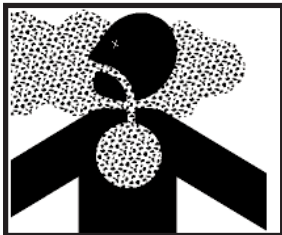
Gasoline engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects and other reproductive harm.



WARNING

SILICOSIS WARNING

Grinding/cutting/drilling of masonry, concrete, metal and other materials with silica in their composition may give off dust or mists containing crystalline silica. Silica is a basic component of sand, quartz, brick clay, granite and numerous other minerals and rocks. Repeated and/or substantial inhalation of airborne crystalline silica can cause serious or fatal respiratory diseases, including silicosis. In addition, California and some other authorities have listed respirable crystalline silica as a substance known to cause cancer. When cutting such materials, always follow the respiratory precautions mentioned above.



WARNING

RESPIRATORY HAZARDS

Grinding/cutting/drilling of masonry, concrete, metal and other materials can generate dust, mists and fumes containing chemicals known to cause serious or fatal injury or illness, such as respiratory disease, cancer, birth defects or other reproductive harm. If you are unfamiliar with the risks associated with the particular process and/or material being cut or the composition of the tool being used, review the material safety data sheet and/or consult your employer, the material manufacturer/supplier, governmental agencies such as OSHA and NIOSH and other sources on hazardous materials. California and some other authorities, for instance, have published lists of substances known to cause cancer, reproductive toxicity, or other harmful effects.

Control dust, mist and fumes at the source where possible. In this regard use good work practices and follow the recommendations of the manufacturers or suppliers, OSHA/NIOSH, and occupational and trade associations. Water should be used for dust suppression when wet cutting is feasible. When the hazards from inhalation of dust, mists and fumes cannot be eliminated, the operator and any bystanders should always wear a respirator approved by NIOSH/MSHA for the materials being used.

1.1
General Safety Precautions

1.1.1 Safety-Alert Signs

This manual contains Safety-Alert Signs, as defined below, which must be followed to reduce the possibility of improper service damage to the equipment or personal injury. Read and follow all Safety-Alert Signs included in this manual.



NOTE defines an operating procedure, condition, etc. which is essential to highlight that contains useful or important information.



EMERGENCY is used for the identification of safety equipment, first aid, or emergency egress locations.



NOTICE used to convey safety information on labels and signs.



CAUTION is indicative of a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.



Potentially hazardous situations that could result in death or serious injury are indicated by the word WARNING.



DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

1.2 Spark Arrestor Notice

SECTION 1 SAFETY

1.2.1 Laws Pertaining to Spark Arrestors

Some states require that in certain locations arrestors be used on internal combustion engines. A spark arrester is a device designed to prevent the discharge of spark or flames from the engine exhaust. It is often required when operating equipment on forested land to prevent the risk of fires. Consult the engine distributor or local authorities and make sure that you comply with regulations regarding spark arrestors.





SECTION 1 SAFETY

1.3 General Safety

A) General Safety

Familiarity and proper training are required for the safe operation of this equipment! Equipment operated improperly or by untrained personnel can be dangerous! Read the operating instructions contained in both this manual and the engine manual and familiarize yourself with the location and proper use of all controls. These safety and operating instructions for power buggies are for your protection. Careless disregard of these instructions and other construction practices could result in accidents and injury.

 **CAUTION** *This machine is equipped with instructional and safety labels. Should any of these labels become destroyed, faded, or otherwise illegible, replace them at once. These labels can be purchased from an AEC dealer in your trade area. Should you need the name of a dealer in your area, call Allen Engineering at 800-643-0095 or email customerservice@alleneng.com.*


 **DANGER** *All repairs to this machine must be made by a qualified service mechanic using only Allen Engineering replacement parts or their approved equal. Any deviation from the original AEC supplied machine in the operation, repair, and/or modifications of the machine without the express written consent of AEC, voids all machine warranties and any liability for injuries and/or damage to person or property.*

B) Before putting this equipment into operation inspect the equipment daily.

Inspect this equipment on a hard and level surface with proper lighting and ventilation, away from pedestrian and vehicle traffic. Place Fire Protection equipment/Extinguishers in Inspection Area.

1. Shut engine off. Remove Ignition Key if so equipped.
2. Disconnect spark plug wire(s) to prevent accidental starts.
3. Block wheels in both directions to prevent machine movement.
4. Perform a detailed inspection of the following systems:
 - a) Speed Control Cable. This cable connects the speed control lever to the hydrostatic transmission. With all linkage fully assembled cable travel should be smooth and easy. Approximately 15 lbs. of pressure should be required to depress the speed control lever at the handlebar. Lever should snap back briskly when it is released. Cable should be free of cuts, kinks, binds and sharp bends. Rubber seals to prevent entry of contamination should be intact at both cable ends. Due to the critical nature of this part, replacement is recommended every 24 months or sooner for severe service.
 - b) Speed control return spring. This spring is mounted on the transmission shift bar and allows the speed control lever to return automatically when released. Spring tension should be sufficient to briskly snap back the speed control lever when it is released. Broken, damaged, or deformed springs must be replaced immediately. Note: never

bend, otherwise modify, or attempt to repair this spring. ALWAYS REPLACE. Due to the critical nature of this part, replacement is recommended every 24 months or sooner for severe service.

 DANGER In all cases, upon release of the speed control lever, the speed control linkage should operate smoothly and freely and stop machine travel within 6 - 8' in both forward and reverse. If the speed control linkage does not operate smoothly and freely and/or does not automatically stop machine travel upon release of the speed control lever, then remove machine from service until repairs have been made.

 DANGER

c) The mechanical service and parking brake. The mechanical service brake is designed to act as a reserve system to the primary dynamic hydrostatic braking provided by the hydrostatic transmission. Properly maintained and adjusted mechanical service brakes will stop a fully loaded machine traveling at full speed in the event of failure of the speed control system or loss of hydraulic pressure. A properly maintained and adjusted parking brake will hold a fully loaded buggy in position. Please see "Machine Adjustments" in this manual for adjustment procedures.

d) Verify that all safety and instruction labels are intact and legible.

 CAUTION

5. Inspect lug nuts for proper torque (see Safety and Operation Requirement Chart)
6. Inspect tires, wheels and tire pressure (see Safety and Operation Requirement Chart), and tracks on machines so equipped.
7. Inspect the following controls for proper adjustment, cleanliness and operation: bed dump valve and dumping mechanism, directional control valve, dash mounted EMERGENCY stop switch, and steering assembly. Immediately remove from service any machine on which these controls are not adjusted and operating properly.
8. Inspect: engine oil level, hydraulic oil level. Add Fluids as required. Repair all leaks. Follow all maintenance as outlined in the SERVICE section of this manual.

SECTION 1 SAFETY

1.3, continued General Safety

DANGER

9. Before adding fuel

- Extinguish smoking materials.
- Shut engine off.
- Shut off Fuel. On AR16 turn Fuel Valve at the carburetor to the OFF position.
Note: Fuel shut off on AR21 occurs when the ignition key is turned OFF.
- Let engine cool for a minimum of 5 minutes.
- Inspect Buggy for Fuel leaks. Repair any fuel leak(s) BEFORE refueling.
- Do not stand on Buggy Operator Platform while refueling.
- Add Fuel using only non-metal, UL approved portable fuel containers. If using a funnel it must be plastic without a screen or filter.
- Do not overfill.
- Replace fuel cap after adding fuel.
- A hot engine can ignite spilled gasoline.

EXERCISE EXTREME CAUTION WHEN REFUELING.

10. Make any necessary repairs or adjustments before putting this equipment into operation. All guards must be replaced. Refer to the SERVICE and section of this manual.

11. The above inspection procedures must also be performed by rental store personnel prior to each rental of this equipment.

C) Familiarize yourself with the work site and job conditions.

DANGER

This equipment must only be operated by trained personnel who fully understand its safe operation. Each operator must be able to identify any unsafe worksite conditions and report these conditions to his supervisor for immediate correction.

- The Gasoline Engine on this machine produces carbon monoxide (CO) and hydrocarbon (HC) emissions through its exhaust. Inhalation of this exhaust gas can cause serious injury or death.
- Engine exhaust and some of its constituents are also known to cause cancer, birth defects, and other reproductive harm.
- The monitoring of carbon monoxide on the jobsite by a qualified inspector following OSHA guidelines is mandatory in order to determine the safety of jobsite ventilation. In Canada follow Provincial Ministry of Labor OHSA guidelines.
- **Do not use this machine without safe jobsite ventilation.**

1.3, continued General Safety

SECTION 1 SAFETY

- **Do not operate this machine on an elevator. Using this machine on an elevator will cause unsafe jobsite ventilation.**
- The engine on this machine may be equipped with an exhaust purifier that may reduce, **but will not eliminate** these dangerous emissions.
- The efficiency of this purifier decreases if the engine is not properly tuned, especially if the fuel mixture is too rich. Do not modify the stock Honda fuel/air ratio. If this machine is to be operated regularly at altitudes higher than 6,000 feet above sea level, see the engine manual for additional information. Excessive exhaust temperatures above 1200F (649C) will damage the purifier.
- The exhaust purifier is **extremely hot**. Do not touch. Keep all flammable material at least 10 feet away. Avoid fuel spills. Allow engine to cool at least 20 minutes before refueling.

DANGER

- **Do not operate this equipment on unsafe haul roads, load areas or dump areas. This equipment is intended for use only on well lit, leveled and compacted surfaces. AVOID ALL CONDITIONS OF SLOPE AND/OR GRADE, WHICH MAY CAUSE THIS EQUIPMENT TO TIP.** Never operate this equipment on any grade or slopes greater than 15% (8 degrees), less if site conditions so warrant. Verify that all haul roads, load and dump areas will safely support this vehicle with maximum payload. Operating this buggy on rough, uneven surfaces will cause the steering wheels to jerk and make it difficult for the operator to steer. All haul roads must have a suitable surface for good footing for the operator. Wet, muddy and/or loose surfaces may cause an operator to lose his footing and fall. **Do not operate this equipment in poorly lit areas.** Provide artificial lighting as required for safe operation.
- **Do not operate this machine under the influence of drugs and/or alcohol.**
- Identify all unprotected openings on jobsite and do not operate this equipment near these openings.
- Identify all overhead structures, electrical wires, and door openings on the jobsite. Be sure this equipment and operator will safely pass through and under.
- Identify the load requirements for the jobsite. Do not exceed the load limits in weight or height as shown on safety and operation requirements chart. **Under all operating conditions, the operator is solely responsible for a safe and secure load. If jobsite conditions so warrant, reduce load and speed.**
- Only operate this machine in daylight or OSHA conforming artificial light.

**SECTION 1
SAFETY**

**1.3, continued
General Safety**

SAFETY AND OPERATION REQUIREMENTS CHART				
MODEL	TYPE	1) MAX. NET PAYLOAD. 2) MAX LOAD HEIGHT FROM GROUND. 3) MAX VEHICLE GVW.	LUG NUT TORQUE IN FOOT LBS	
AR16	STAND ON/ WALK BEHIND	1) 2500 LBS 2) 48 INCHES 3) 3200 LBS	FRONT 65 Ft. Lbs	REAR 65 Ft. Lbs
AR21	STAND ON/ WALK BEHIND	1) 3,200 LBS 2) 48 INCHES 3) 4,675 LBS	FRONT 65 Ft. Lbs	REAR 65 Ft. Lbs

⚠ CAUTION

NOTE: ON THE AR16 ONLY THE OUTSIDE WHEELS AND TIRES CAN BE REMOVED TO REDUCE OVERALL WIDTH. WHEN OUTSIDE WHEELS AND TIRES HAVE BEEN REMOVED OPERATE THE AR16 ONLY ON LEVEL, HARD SURFACES I.E., CONCRETE, ASPHALT, OR COMPACTED STONE. OPERATING BUGGY ON ANY OTHER CONDITIONS MAY CAUSE BUGGY TO TIP. REDUCE MAXIMUM NET PAYLOAD BY ONE-THIRD (900 LBS) ON THE AR16 WHEN OPERATING WITH OUTSIDE WHEELS AND TIRES REMOVED. DO NOT REMOVE OUTSIDE WHEELS AND TIRES ON MODEL AR21.D. During operation of this D.

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1.4 Operating Safety

SECTION 1 SAFETY

D) During operation of this equipment:

- Use caution when operating near other personnel and obstructions. Always look to the rear before backing up and back up slowly. Be aware of other jobsite traffic.



DO NOT OPERATE THIS MACHINE WITH YOUR BACK FACING THE CONTROLS. ALWAYS ORIENT YOURSELF SO YOU ARE STANDING AND FACING IN THE DIRECTION OF THE CONTROLS.

- If the operator chooses to ride behind the buggy during operation, the operator's platform must be lifted, pulled back & lowered down to the horizontal position before using the buggy. **The only place for the operator to stand on the buggy while operating the machine is on the operator's platform FACING THE CONTROLS.** Keep operator's platform clean.
- Be sure dump body is securely down at all times when not actually dumping. Keep clear of bucket when dumping and returning bucket to transport position.



DO NOT DUMP BED WHILE DRIVING EQUIPMENT. DUMP BUCKET ONLY WHEN BUGGY IS ON A LEVEL SURFACE. FAILURE TO DUMP ON OTHER THAN A LEVEL SURFACE MAY CAUSE BUGGY TO TIP.



THIS MACHINE IS DESIGNED TO DUMP LOOSE, FREE FLOWING MATERIALS LIKE WET CONCRETE, SLAG, DRY SOIL, ETC. DO NOT DUMP MATERIALS THAT ARE NOT FREE FLOWING, I.E., LARGE CHUNKS OF DRIED CONCRETE, CONSTRUCTION DEBRIS, ETC. THESE TYPES OF MATERIALS MAY CAUSE A SUDDEN LOAD SHIFT, TIP THE MACHINE FORWARD, AND THROW THE OPERATOR. DO NOT LOAD A BUGGY WITH MATERIAL THAT EXTENDS BEYOND THE VERTICAL EDGES OF THE BUCKET OR PLATFORM.

- This vehicle is not intended for the transportation of any personnel other than the operator. **NO RIDERS!**
- Do not use excessive speed or operate recklessly. Careless operation causes accidents and injury. **SLOW DOWN** when operating conditions so warrant i.e., approaching other personnel, wet areas, and traveling up and down otherwise safe grade conditions. Always allow extra stopping time when using a buggy on wet and/or loosely graded materials. **The operator is solely responsible for choosing a suitable machine travel speed for the existing jobsite conditions.**



ALWAYS TRAVEL DOWN GRADES IN REVERSE WITH A LOADED MACHINE. WHEN ON A GRADE NEVER TURN AND ALWAYS TRAVEL IN A STRAIGHT LINE.

SECTION 1 SAFETY

1.4, continued Operating Safety

- If operator must leave operator's station (standing between handlebars either on operator's platform or standing on the ground with the platform in the "UP" position) the operator must:
 - a) Stop equipment. Do not block access to fire isles, stairways, fire equipment.
 - b) Set and lock parking brake.
 - c) Shut off engine by turning engine ignition switch off or depressing EMERGENCY stop button on dash. Note: Some older Honda Engines required the "Emergency Stop Switch" to be "Pushed Down and Held" to stop the engine. Identify which type of Honda Engine you have and the "Emergency Stop" switch operation required to stop the engine.

- Wear appropriate clothing/safety equipment for the construction jobsite including but not limited to safety glasses, clean gloves, safety toed work boots, hard hat, etc. Do not operate this equipment with oily gloves or controls.

- This equipment is not intended to tow other items or equipment. NO TOWING.

- Keep yourself and others away from pinch points on dumping mechanism.

- Refer to LIFTING/LOADING/TIE-DOWN INSTRUCTIONS section of this manual. Note the two (2) ways a buggy may be lifted and the appropriate lifting points for each method. Note the specific load ratings for chains, straps, forklifts. and cranes.

- Avoid all operating conditions where any personnel, including the operator, could become trapped or pinched between the buggy and another obstacle or where a lifted buggy may fall during loading.

Refer to the Lifting/Loading/Tie Down Instructions in this manual. Note the proper method for loading a buggy on a trailer and the limits for loading ramp angle and trailer towing vehicle capacity. Refer to this same section for specific ratings for chains, straps and binders used to tie down a buggy.

DANGER

DO NOT OPERATE THIS BUGGY IN AREAS WITH FLAMMABLE OR EXPLOSIVE ATMOSPHERES. REFER TO CODE OF FEDERAL REGULATIONS OSHA 29 CFR PART 1910.178 TO DETERMINE PERMISSIBLE AREAS WHERE THESE BUGGIES MAY BE OPERATED.

- Do not mount/dismount a moving buggy.

- If operator chooses to walk behind the buggy during operation, the operator's platform must be lifted, pulled back & locked in the UP position before using the buggy. Reduce travel speed to a **MAXIMUM** of 3mph (comfortable walking speed) when using buggy in walk behind fashion.

1.4, continued Operating Safety

SECTION 1 SAFETY

THIS BUGGY MUST BE CLEANED DAILY TO PREVENT CONCRETE AND DIRT BUILD-UP FROM ADVERSELY AFFECTING SAFE MACHINE OPERATION. WASH BUGGY DOWN EACH DAY WITH WATER.

- Always clean the Buggy in an area removed from pedestrian and other machine traffic. Avoid areas where muddy surfaces can cause a Safety Hazard. Wear proper protective clothing, including but not limited to safety glasses/face shield, rubber gloves and boots, etc. If using a pressure washer, do not point the high pressure nozzle at any persons or part of the body.
- Inspect all machine Controls for proper function after cleaning. Refer to the Service Section for proper lubrication if required.



SECTION 1
SAFETY

NOTES

Section 2
OPERATIONS

SECTION 2

OPERATIONS



This machine is built with user safety in mind. However, it can present hazards if improperly operated and serviced. Follow operating instructions carefully.

If you have any questions about operating or servicing this equipment, please contact your Allen Engineering Dealer or AEC Customer Service at 800-643-0095 or 870-236-7751.



2.1.1 Description

The versatile Allen Power Buggy is perfect for any job-site or work area that requires hauling loads conveniently and effortlessly. With side-to-side and front-to-back lift pockets, the Allen Power Buggy can be fork-lifted for easy on and off job-site loading. Whether your work requires a rubber tire or track driven hauling machine, Allen has the dependable, reliable and powerful power buggy for hauling and transporting your loads.

The sixteen cubic foot AR16 and the twenty-one cubic foot AR21 have earned their rank as the standard by which all power buggies are judged. Their massive two-inch thick solid steel tank-tough frames provide unparalleled strength and durability along with a lower center of gravity and ideal weight distribution. These buggies give excellent traction in real-world job site conditions. Drive components are protected by a removable steel shroud. This shroud is louvered to keep concrete out while providing proper ventilation and cooling to the engine compartment. The standard high-strength, high-density polyethylene bucket is the industry's thickest and most durable. And standard features like heavy-duty hydraulic wheel motors, steel raceways for hydraulic hose protection and optional foam-filled tires ensure the AR16 and AR21 Power Buggies will operate for the duration under tough conditions.

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SECTION 2 OPERATIONS

2.2 Start Up Procedures

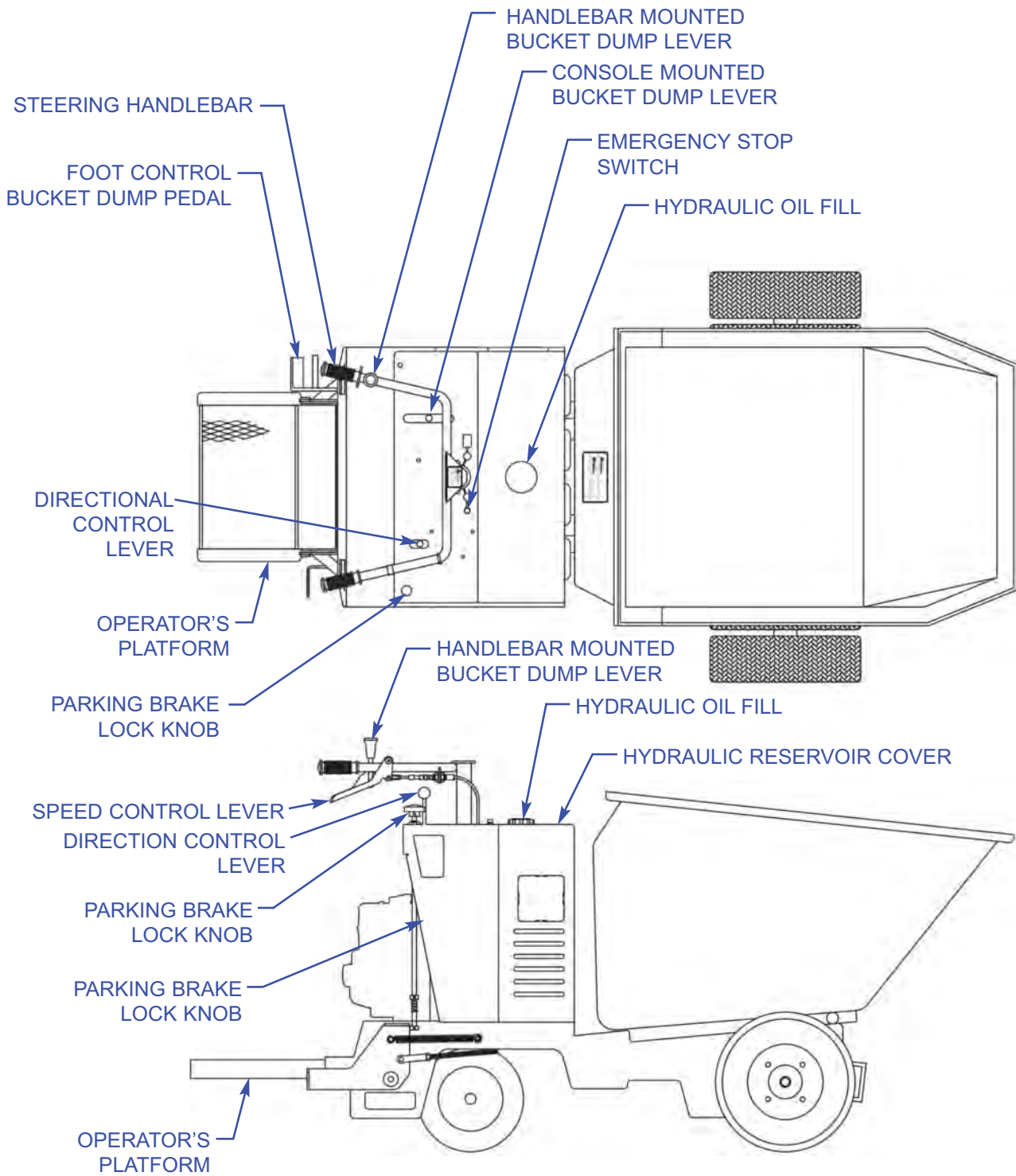


FIGURE 2.2.1
CONTROLS

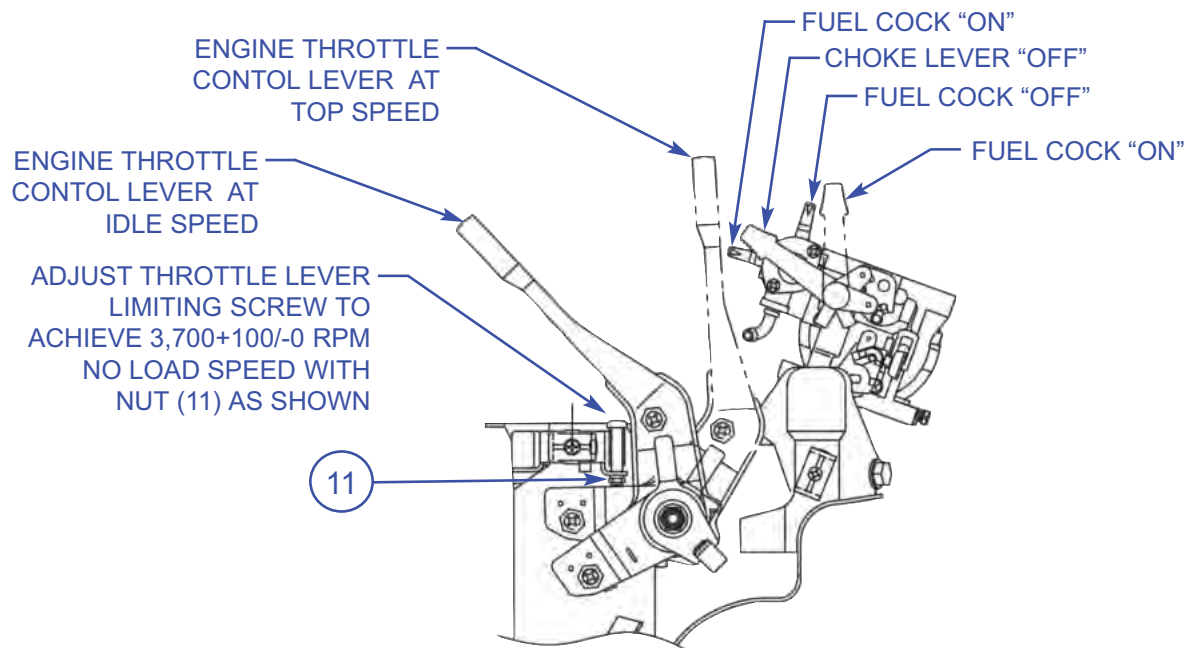
2.2, continued Start Up Procedures

SECTION 2 OPERATIONS

2.2.1 Before Starting Procedures

Before putting this machine into operation each operator must:

- 1) Receive training on ALL machine controls. Each operator must know the location and function of each control, how to operate each control and what to do in the case of a malfunction of any control.
- 2) Receive training on the Safety, Machine Operation, Machine Adjustments, Maintenance and Machine Lifting and Tie Down Procedures.



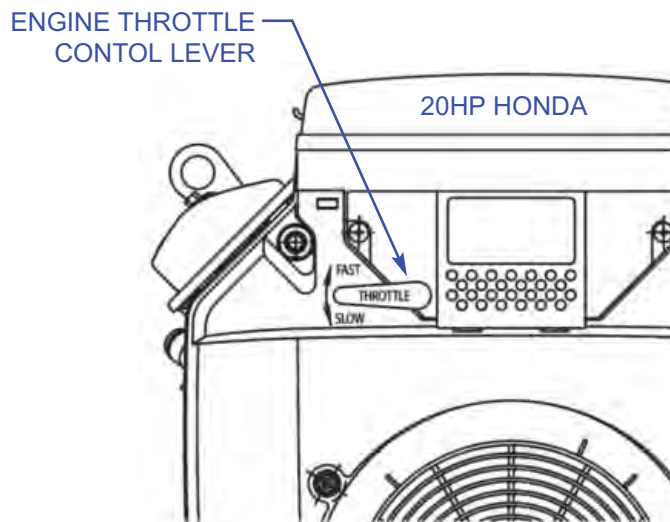
Starting Procedures for AR16 (13 HP Honda gasoline engine)

- Position yourself in operator's position standing on the ground between the handlebars or standing on the operator's platform.
- Set parking brake (refer to page ??? for instructions on setting the parking brake).
- Place directional control lever on dash in NEUTRAL position.
- Move choke lever to closed position (When engine is cold).
- Set throttle control to one-third open position. To increase engine speed move throttle from right to left as you face the recoil starter.
- Open fuel valve on engine carburetor.

SECTION 2 OPERATIONS

2.2, continued Start Up Procedures

- To start recoil start Honda GX390 13 HP, switch engine ignition switch to ON position and pull recoil starter until engine starts. After the engine starts return starter rope handle slowly against the flywheel cover of the engine.
- To start electric start Honda GX390 13 HP, turn engine start switch to START position and return switch to ON position when engine starts.
- After engine starts, move choke lever to OPEN position. Let engine warm up at full throttle and run smoothly for approximately 5 minutes, before applying load. Failure to permit engine to warm up will foul spark plugs and cause hard starting and/or loss of power. Avoid starting and stopping engine without warming engine.



Starting Procedures for AR21 (20 HP Honda gasoline engine)

- This engine is equipped with a low oil level shut down. Should the oil level fall below a safe minimum level the engine will not start. Check oil level before starting engine.
- Position yourself in operator's position standing on the ground between the handlebars or standing on the operator's platform.
- Set parking brake (see page ?? for instructions).
- Place directional control lever on dash in NEUTRAL position.
- When engine is cold, move choke lever to CLOSED position.
- Set throttle control to one-third open position. Turn the throttle clockwise as you face the engine flywheel cover to increase engine speed.

2.2, continued Start Up Procedures

SECTION 2 OPERATIONS

- Insert ignition key in start switch on engine. Turn engine start switch to START position and return switch to ON position when engine starts.
- Should the engine fail to start using the electric starter (dead battery, malfunctioning starter, etc.) the recoil starter can be used to start the engine. To start the engine using the recoil starter, switch engine ignition switch to ON position and pull recoil starter until engine starts. After the engine starts return starter rope handle slowly against the flywheel cover of the engine.
- After engine starts, move choke lever slowly to the OPEN position. Let engine warm up at full throttle and run smoothly for approximately 5 minutes, before applying load. Failure to permit engine to warm up will foul spark plugs and cause hard starting and/or loss of power. Avoid starting and stopping engine without warming engine.
- To avoid draining the battery, do not leave ignition switch in the ON position when engine stops.



SECTION 2 OPERATIONS

2.3 Parking Brake Operation

Setting and Releasing the Parking Brake

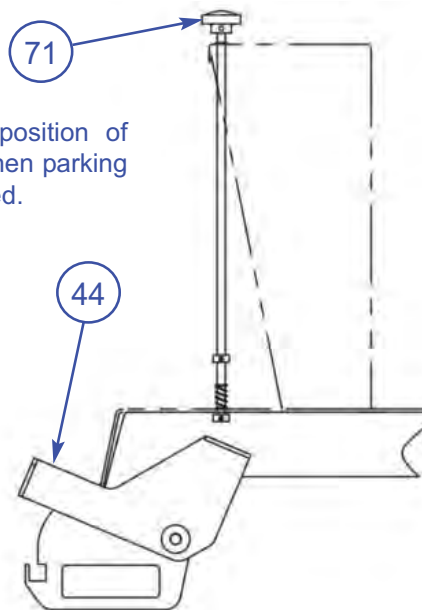
To set parking brake:

1. Stand on the operator's platform.
2. Place right foot on brake pedal (44) and stand on the pedal so it depresses to the lowest point.
3. Continue standing on the pedal and press down and hold the parking lock knob (71).
4. Remove right foot off the brake pedal (44). Remove right hand from parking lock knob. The parking brake is now set.

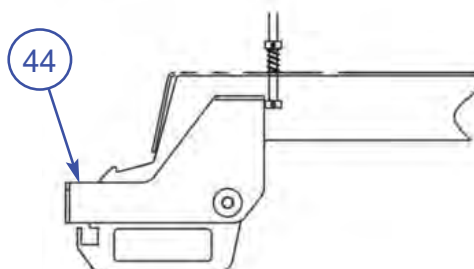
To release parking brake:

1. Stand on the operator's platform.
2. Place right foot on brake pedal (44) and stand on the pedal so it depresses to the lowest point. When the pedal is depressed fully the parking brake detent rod will disengage and the parking lock knob (71) will return to its up position.
3. Remove right foot from brake pedal(44). The parking brake is now released.

Normal breaking position of the brake pedal when parking brake is disengaged.



Position of the brake pedal when parking brake is set.



Battery Jump Start Procedures

WHEN JUMP STARTING THESE HONDA ELECTRIC START ENGINES FOLLOW INSTRUCTIONS BELOW. FAILURE TO FOLLOW THESE INSTRUCTIONS CAN CAUSE BURNS AND/OR EYE INJURIES FROM ELECTRIC SPARKS, IMPROPER CONNECTIONS, ETC., TO PERSONNEL OR DAMAGE TO ENGINE.



- Wear OSHA compliant safety glasses when jump starting.
- Lock parking brake. Shift directional control lever to NEUTRAL position.
- Turn ignition switch on engine to OFF position.
- Jumper vehicle used to start buggy must have a 12-volt electrical system. Failure to use a vehicle with a 12-volt electrical system will damage both vehicles' electrical systems.
- Position jumper vehicle as close to the buggy as possible, but do not allow vehicles to touch. If buggy and jumper vehicle touch, both electrical systems may be damaged.
- Turn off ignition of jumper vehicle.
- Locate positive (+) and negative (-) battery terminals.
- Use only jumper cables in good condition with tight connections, secure insulation, and a 100 AMP (5 gauge minimum) rating.
- Make cable connections as follows:
 - a) Attach one (1) end of POSITIVE (+) jumper cable to the POSITIVE (+) post of Honda electric starter motor solenoid. Refer to engine manual for location of these items.
 - b) Attach the other end of the POSITIVE (+) jumper cable to the POSITIVE (+) terminal of the jumper vehicle's battery.
 - c) Connect one (1) end of the NEGATIVE (-) jumper cable to the NEGATIVE (-) battery terminal on the jumper vehicle's battery.
 - d) Connect the other end of the NEGATIVE (-) jumper cable to the Pivot Bolt, item 47, for the service/parking brake pedal on the buggy. See page 20. DO NOT CONNECT THIS CABLE ANYWHERE ON THE ENGINE
 - e) Start jumper vehicle engine.
 - f) Start buggy engine.
 - g) Remove jumper cables in reverse order in which they were attached. At no time should jumper cable clamps touch each other or any other metal.

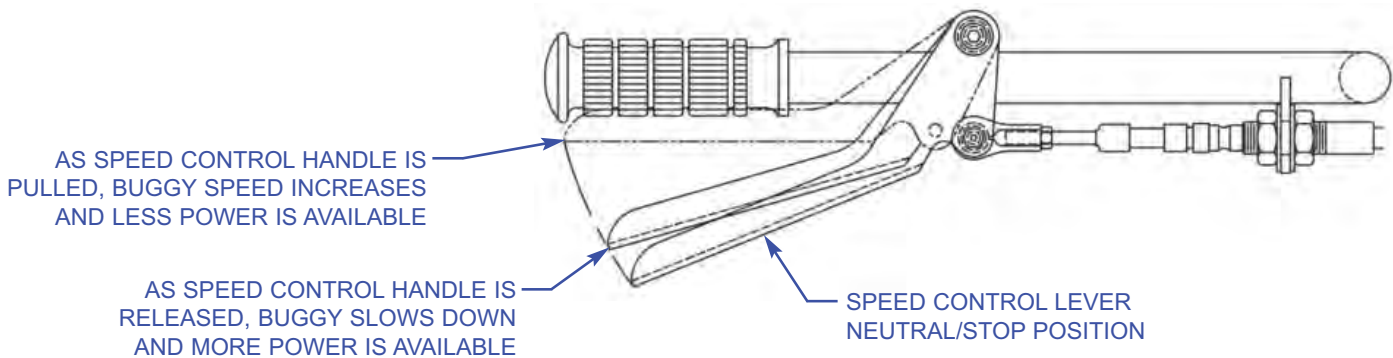
SECTION 2 OPERATIONS

2.5 Operating Instructions

Driving Equipment

➤ The Directional Control Lever (located on the top right side of the dash) controls the direction of travel - forward, reverse and neutral (free-wheeling). Select the direction of travel desired. The Speed Control Lever (located on the right side of the handle bar) controls the vehicle speed, power, and dynamic hydraulic braking.

IMPORTANT OPERATOR NOTE: When starting from a stop, steadily pull the Speed Control Lever towards the hand grip. The more the Speed Control Lever is squeezed towards the hand grip the faster the buggy will move. Position the Speed Control Lever where the engine does not lug to achieve maximum speed or power depending on jobsite conditions. Do not use the engine rpm speed to control buggy speed. Letting the Speed Control Lever return to the neutral position will slow the buggy (by means of dynamic hydraulic braking) and increase power at the drive wheels, acting as a “downshift”.



➤ To slow and/or stop vehicle:

- Release Speed Control Lever.
- Service brake pedal (located at right of stand-on platform) may be pushed down to activate service brake and assist in slowing the vehicle.
- Avoid sudden stops whenever possible.

⚠ DANGER

In all cases, upon release of the speed control lever, the speed control linkage should operate smoothly and freely and completely stop machine travel within 6' – 8' in both forward and reverse. If the speed control linkage does not operate smoothly and freely and/or does not automatically stop machine travel upon release of the speed control lever, then remove machine from service until repairs have been made.

2.5, continued Operating Instructions

SECTION 2 OPERATIONS

Dumping Bucket

CAUTION DO NOT DUMP BUCKET WHILE BUGGY IS MOVING

- Stop vehicle.
- Push the Dump Control Lever (mounted on either the left side of the console or the left side of the steering handle) forward toward the front of the buggy to dump bucket. Console Mounted Dump Controls have a foot pedal on the left of the operator's platform that can be pushed down to dump the bucket. See MACHINE OPERATION for identification of controls.
- Pull the Dump Control Lever (either Console Mounted or Handle Mounted) backward towards the operator to retract the bucket. Console Mounted Dump Controls have a foot pedal on the left of the operator's platform that can be pulled backward to return the bucket.

Stopping Engine

- Turn ignition switch to the OFF position or push or activate Engine Stop Switch on dash.
- Turn fuel valve on engine to the OFF position. Failure to do so will ultimately result in gas entering the crankcase.

Steering the Buggy

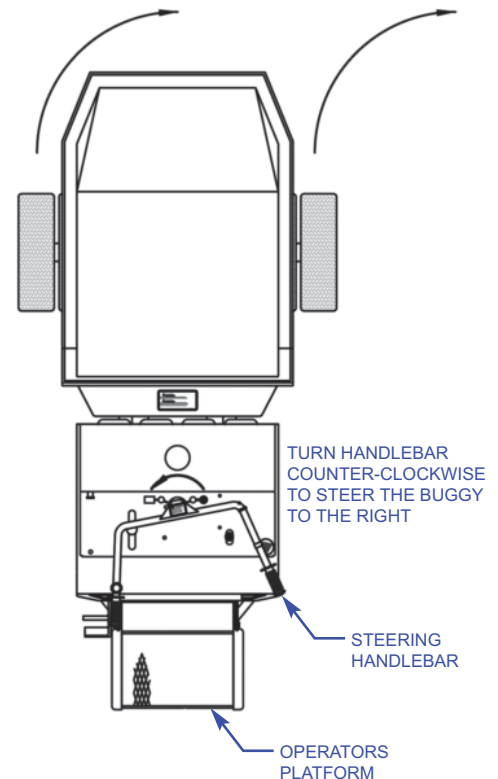
- Allen Buggies, models AR16 and AR21 are steered using the Handlebars in front of the operator's platform.

Turning the Handlebars **Clockwise** will cause the Buggy to turn to the **Left** when **traveling in the Forward Direction**.

Turning the Handlebars **Counter-Clockwise** will cause the Buggy to turn to the **Right** when **traveling in the Forward Direction**.

- When steering the Buggy turn the handlebar slowly. Avoid sudden, quick steering. of the buggy. When traveling on a grade always travel facing the controls and travel in a straight line either up or down the grade.

DANGER DO NOT TURN THE BUGGY WHEN TRAVELING ON A GRADE. TRAVEL IN A STRAIGHT LINE EITHER UP OR DOWN THE GRADE



SECTION 2

OPERATIONS

OUR MISSION STATEMENT

Our Mission is to provide superior quality products (manufactured in a safe and efficient environment by highly trained and dedicated personnel), on-time deliveries, and reactive & knowledgeable customer service.

OUR QUALITY POLICY

The Allen Engineering Team is fully committed to exceeding customer expectations for the quality of the products and services provided through the continuous improvement process of reducing waste, defects, and variability in everything we do.

OUR VISION

Our Vision is to be a world-class manufacturer of concrete placing and finishing equipment.



Section 3
SERVICE

SECTION 3 SERVICE

3.1 Brake Service

Service Brake See page 3-5 for brake schematic.

Inspect the Service Brake DAILY. A daily Service Brake inspection performed with an empty buggy traveling at full speed must demonstrate that when full foot pressure (125 LB.) is applied to the brake pedal both brakes engage equally, the pedal is level with the top of the operator's platform, the buggy stops in 6-8' of travel and the engine stalls.

Brake Operational Problem	Adjustment/Repair Required	Adjustment/Repair Procedure
1) Brake pedal (44) travels below operator's platform before brake engages.	Tighten brake bands.	1) Turn nut (16) clockwise. Use 3/4" deep well socket. Turn nuts for both brakes in increments of 1/4 turn until brake pedal activates brake at the top of operator's platform. Verify both brakes engage at the same time by running buggy, applying brake and having an observer verify both brakes lock up together. 2) If after making adjustment in #1 above, the pedal is still below operator's platform when the service brake is engaged, shorten the distance of the two (2) clevis', item 34. Reattach clevis pins with NEW 1/8" x 3/4" long cotter pins.
2) One brake engages before other brake.	Tighten brake band on brake that engages late.	Turn nut (16) clockwise on brake that engages late in increments of 1/4 turn until both brakes activate together. Verify brake operation with an observer (see 1 above).
3) Brakes screech when applied.	1. Clean concrete/dirt /oil accumulation away from brake bands. 2. Replace worn brake bands(s) (brass rivets are contacting brake drum and/or brake lining worn less than 1/8" thick).	Remove four (4) front wheels. Remove two (2) brake covers and brake band(s) and clean. Replace brake bands if required and readjust brakes per above.

3.1, continued Brake Service

SECTION 3 SERVICE

Brake Operational Problem	Adjustment/Repair Required	Adjustment/Repair Procedure
1) Brake pedal (44) travels below operator's platform before brake engages.	<ol style="list-style-type: none"> 1. Clean concrete/dirt accumulation away from brake pedal (44). 2. Adjust & lube pivot bolt (47) and pedal (44). 3. Replace spring (48) if damaged or worn. 	<p>Clean all dirt from pedal area. Adjust clearance of brake pedal (44) with pivot bolt assembly (47) by tightening 5/8" jam nut against flat washers and 3/4" hex nut. Back off jam nut 1/4 turn. While holding pivot bolt (47) tighten 5/8" locknut to 120 ft. lbs. Spray pivot bolt assy. (47) with lube.</p>
5) Engine fails to stall during brake test and/or buggy travels more than 8' during brake inspection	<ol style="list-style-type: none"> 1) Tighten brake bands. 2) Clean concrete/dirt /oil accumulation away from brake bands. 3) Hydrostatic pump is worn (Engine fails to stall). 4) Replace worn brake bands(s) (Brass rivets are contacting brake drum and/or brake lining worn less than 1/8" thick). 	<p>See "Adjustment/Repair Procedure" Recommended for "Brake Operational Problem", items #1 and #3 above.</p> <p>See "Adjustment/Repair Procedure" Recommended for "Brake Operational Problem", item #3</p> <p>If Hydrostatic Pump is suspect return it to the Miller Spreader Company or to an authorized Eaton Repair Facility.</p> <p>See "Adjustment/Repair Procedure" Recommended for "Brake Operational Problem", item #3</p>

After any brake service/adjustment apply approved lube to all brake pivot points.

SECTION 3 SERVICE

3.2 Parking Brake

Parking Brake See page 3-5 for brake schematic.

Adjust parking brake so that when engaged, parking brake will hold a loaded buggy on 15% slope (8.5 degrees). If parking brake does not operate as indicated, adjust as follows:

- Adjust service brake per the troubleshooting guide above.
- Remove clevis cotter pin (31) & clevis pin (35).
- Loosen hex nut (37) 4 turns.
- Tighten clevis (34) 1 turn clockwise.
- Replace clevis pin (35) and test parking brake.
- If required, continue to tighten clevis by turning clockwise until proper parking brake adjustment is made.
- Replace cotter pin (31) with a NEW 1/8" X 3/4" Long Plated Cotter Pin.
- Tighten hex nut (37).
- Apply approved lube to all brake pivot points (See Maintenance Section).

 **CAUTION** BLOCK WHEELS TO PREVENT INJURY

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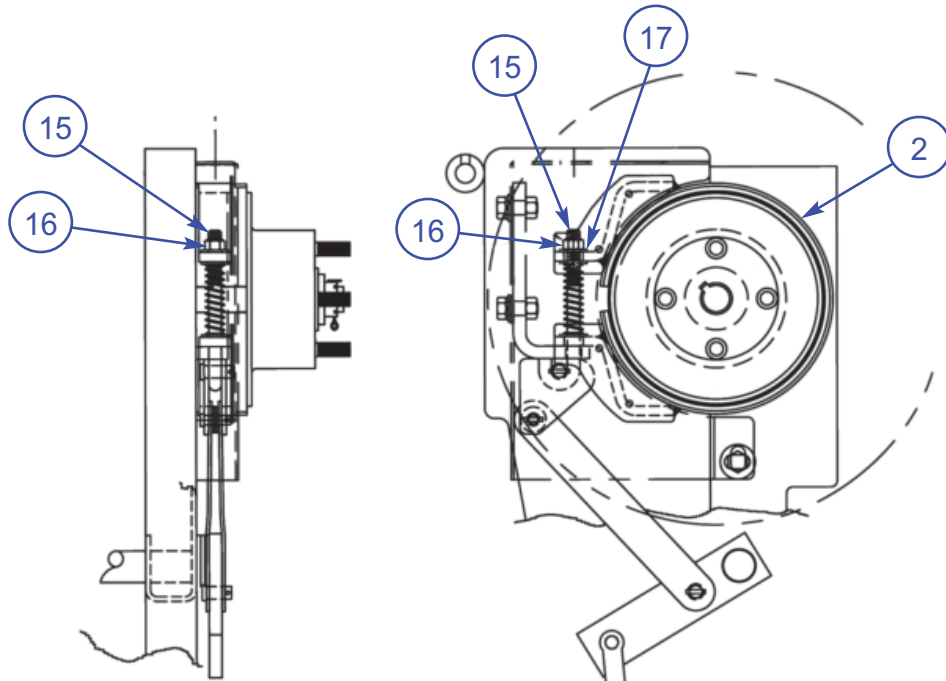
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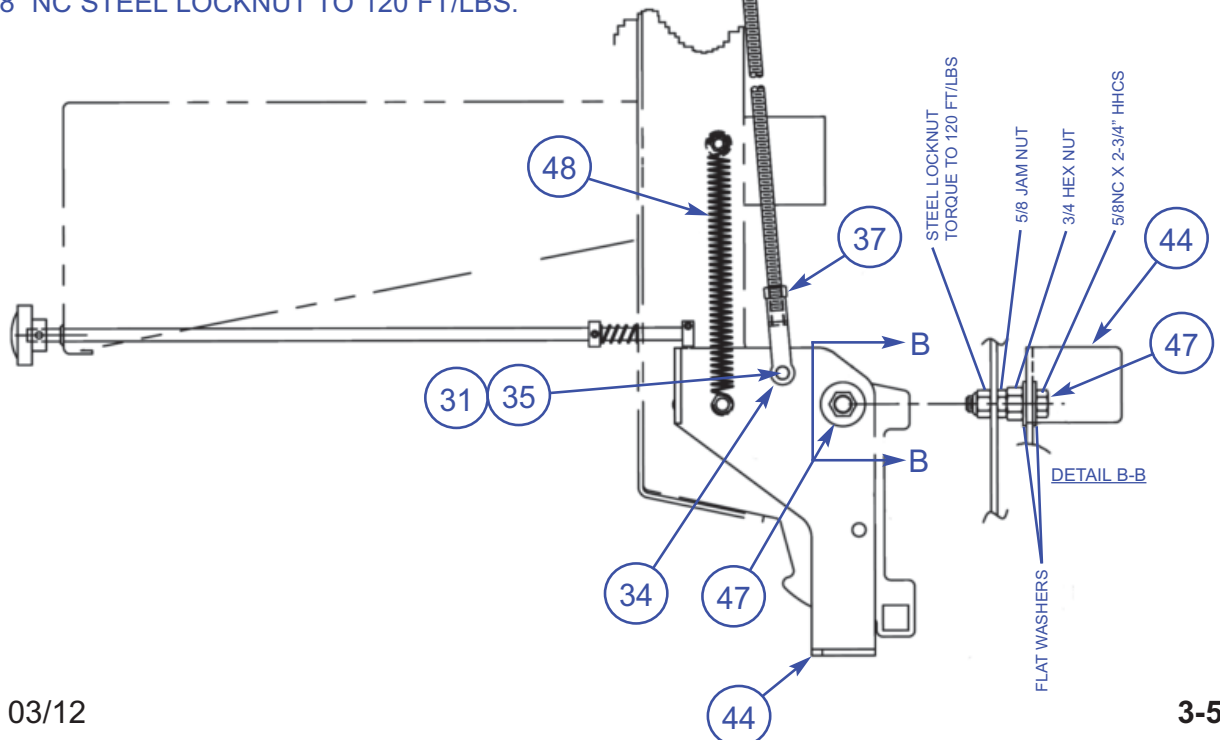
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3.2, continued Brake Schematic

SECTION 3 SERVICE



ADJUST CLEARANCE OF BRAKE PEDAL 44 WITH PIVOT BOLT ASSEMBLY 47 BY TIGHTENING 5/8"NC -10 JAM NUT AGAINST FLAT WASHERS AND 3/4" HEX NUT. THEN BACK OFF JAM NUT 1/4 TURN WHILE HOLDING PIVOT BOLT, TIGHTEN 5/8" NC STEEL LOCKNUT TO 120 FT/LBS.



SECTION 3 SERVICE

3.3 Speed Control



When making adjustments to the Speed Control system, block the buggy's wheels in both directions to prevent injury.

- 1) **Adjust Speed Control Lever, Cable and Spring** (Refer to drawing on page ??)
 - a) Position the buggy on a hard, level surface. Turn the engine off. Remove spark plug wire(s) to disable engine. Engage the parking brake.
 - b) Pull up on the speed control lever to the maximum speed position. Then release the lever. A properly adjusted speed control lever, cable and spring will permit the speed control lever to snap back briskly to the Neutral position (the transmission shift bar will be seated firmly against the neutral stop bolt.
 - c) If the Speed Control Lever does not return properly to the neutral position adjust this assembly as follows.
 - d) Remove the hydraulic reservoir cover (four(4) 3/8"NC-16 hex bolts and lock washers).
 - e) Remove the return spring (item 26).
 - f) Remove the cotter pin (item 12) from the clevis pin (item 11) in the clevis on the transmission shift bar (item 13). Also see item 10. Then remove the clevis pin. Inspect the transmission shift bar to make sure it is secure on the transmission shaft, the nut is tightened to 22 ft.lb./265 in.lbs. and the woodruff key in the shaft is not sheared/missing. Repair as required.
 - g) With the transmission shift bar now disconnected from the shift cable, move the transmission shift bar clockwise as facing the bar until it stops. Then rotate the transmission shift bar counter-clockwise until it contacts the neutral stop bolt. The bar must rotate freely in both directions. If the transmission shift bar does not rotate freely, return the hydrostatic transmission to an Eaton authorized repair facility or to AEC for service.
 - h) Inspect the shift cable (item 9). Move the shift lever (item 25) with the cable attached through the full range of travel. The lever must move freely with no binding or catching. The shift cable must have no physical damage, i.e., cuts in outer cable covering, missing and/or torn end boots (2 places), etc. Replace the shift cable if it is damaged and/or does not work freely. Replace the shift cable if it has not been replaced within the last twenty-four (24) months. When a shift cable is replaced follow the assembly steps and assembly dimensions as listed below:
 - 1) Remove the bolt/nut (item 24) from the speed control lever holding the swivel cable end in place.
 - 2) Remove all attachments from both ends of the cable.
 - 3) Loosen and remove the outside 5/8"NF-18 jam nut(2) from each bulkhead fitting on cable.
 - 4) Remove shift cable (item 9) and grommet or compression fitting.
 - 5) If machine is equipped with a rubber grommet in top of console where shift cable passes through, replace the grommet with cord grip (item 30).
 - 6) Install one(1) 5/8"NF-18 nut on both bulkhead fittings of cable. Thread nut to the far end of bulkhead fitting.
 - 7) Install one (1) 1/4" NF-28 jam nut on each end of shift cable. Thread both nuts to end of threaded rod.
 - 8) Insert new shift cable in machine. Insert bulkhead fittings on shift cable into their respective mounting holes on the handlebar and hydraulic reservoir end plate.

3.3, continued Speed Control

SECTION 3 SERVICE

9) Place a 5/8"NF-18 jam nut on the threaded end of both bulkhead fittings protruding through the mounting holes.

10) Attach a clevis (item 10) to the end of the cable used to attach to the transmission shift bar.

Note: In all cases the cable attachments must be threaded onto the 1/4"NF-28 cable end one-quarter of an inch(1/4"). After each attachment is threaded onto the cable end its position must be secured by tightening the jam nut against the attachment.

11) Attach the cable end attachments to the speed control lever (item 25) and the transmission shift bar (item 13). Reconnect the shift cable clevis to the transmission shift bar using the clevis pin. Secure the clevis pin in the clevis with a NEW 3/32"(.093") diameter X 3/4" long PLATED cotter pin. Do not reuse the cotter pin. Do the same for the speed shift lever if the buggy model so warrants.

12) Tighten the two (2) 5/8"NF-18 jam nuts on the cable bulkhead fitting at the mounting hole located near the transmission shift bar. Tighten the jam nuts so that the shift bar rests solidly against the neutral stop bolt (item 17) when the end of the transmission shift bar where the spring attaches is lifted up.

13) Tighten the two(2) 5/8"NF-18 jam nuts on the cable bulkhead fitting on the handlebar. Adjust the nuts so that the end of the speed control lever is 3" below the bottom edge of the handlebar grip when the transmission shift bar is against the neutral stop bolt.

i) Inspect the return spring (item 26). The return spring must have no physical damage, i.e., broken loops, sprung coils, etc. Verify the spring overall length and outside diameter (see page 24). Replace the spring if damaged and/or if not the correct size. If the return spring has not been replaced within the last twenty-four (24), and/or it is 3/4" or 1" in outside diameter, replace it at this time. **DO NOT ATTEMPT TO REPAIR A DAMAGED SPRING.**

j) Install the return spring on to the eye bolt, item 19 and the transmission shift bar, item 13.

k) Inspect the extended length of the return spring with the transmission shift bar against the neutral stop bolt. Verify that the overall extended length of this spring is 4-15/16". Adjust the vertical position of the eyebolt to obtain 4-15/16" overall length. Then torque the eye bolt nut to eighty (80) in. lb. See page 24.

l) Inspect the entire speed control lever, cable and spring assembly for smooth operation and the correct position of the speed control lever.

Adjust shift cable 5/8"NF-18 jam nuts and/or cable attachment positions to achieve correct position of all parts. Note: In no case should any cable attachment be threaded less than one-quarter(1/4")on the cable end. Tighten all hardware.

m) Spray moving ends of cable with approved lubrication.

n) Replace the Hydraulic Reservoir Cover.

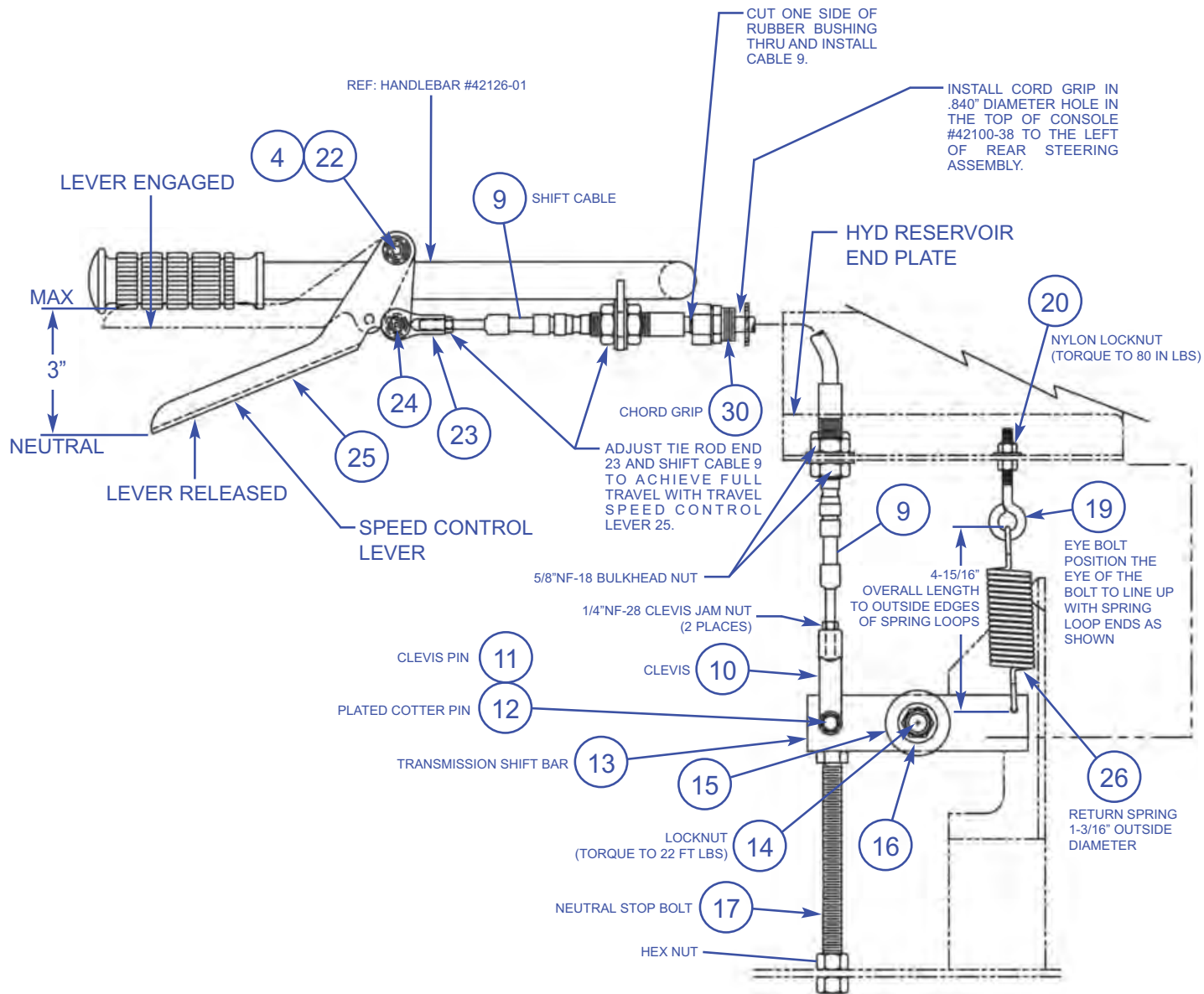
2) Adjust Neutral

The speed control assembly when properly adjusted will not permit the buggy to creep in either direction when the speed control lever is released (in neutral), the service/parking brake is released and the directional control lever is in either the forward or reverse position. If the buggy creeps in either direction adjust as follows:

- a) Position the buggy on a hard, level surface. Turn the engine off. Engage the parking brake.
- b) Remove the hydraulic reservoir cover (four (4) 3/8"NC-16 hex bolts and lock washers).
- c) Loosen the hex nut on the neutral stop bolt, item 17 four(4) turns.
- d) Start the buggy engine. Position the engine throttle lever in the idle position. Keep the parking brake engaged.
- e) Shift the directional control lever on the dash to the Forward position.
- f) Turn the neutral stop bolt, item 17, clockwise until the buggy just begins to creep in the Reverse direction. The engine will begin to slow/lug down slightly when creep begins to occur.
- g) Then slowly turn the neutral stop bolt counter-clockwise until the creep just stops. Tighten hex nut to secure position of the neutral stop bolt.
- h) Position yourself in the operator's position on the operator's platform, facing the controls.
- i) Release the parking brake.
- j) Verify the buggy does not creep in either the Forward or Reverse direction at engine idle. Repeat this test with the engine at full throttle. Readjust if required.
- k) Replace the hydraulic reservoir cover.
- l) Spray moving ends of cable with approved lubrication if not already done.

3.3, continued Speed Control

SECTION 3 SERVICE



SECTION 3 SERVICE

3.4 Pressure Settings

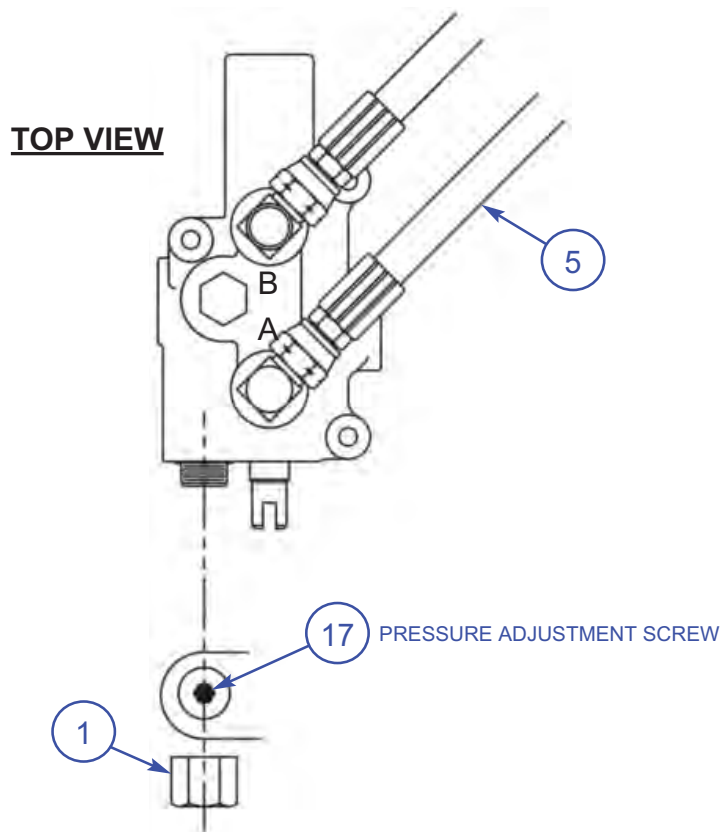
Pressure Relief Settings

DO NOT EXCEED ANY PRESSURE RELIEF SETTING LISTED OR DAMAGE WILL RESULT TO THE MACHINE.

1) Dump Control Valve

Relief pressure setting should be 800 +/-50 PSI. To adjust pressure:

1. Remove hex cap (item 1) covering pressure relief valve (beside valve spool).
2. With a 5/16" allen wrench, turn pressure adjusting screw (item 2) three turns counter clockwise.
3. Disconnect hose (item 5) from elbow in Port "A".
4. Connect pressure gauge with hose to elbow in Port "A". Note male thread on elbow is 7/8-14, 37° JIC.
5. Start engine, run engine at full speed.
6. Push dump lever forward (dump bucket until dump cylinder fully extends) and check pressure.
7. Turn relief adjustment screw (item 2) clockwise to increase pressure, counterclockwise to decrease pressure.
8. Replace hex cap, disconnect pressure gauge, reconnect hose (item 5).
9. Lubricate bucket dump valve spool.



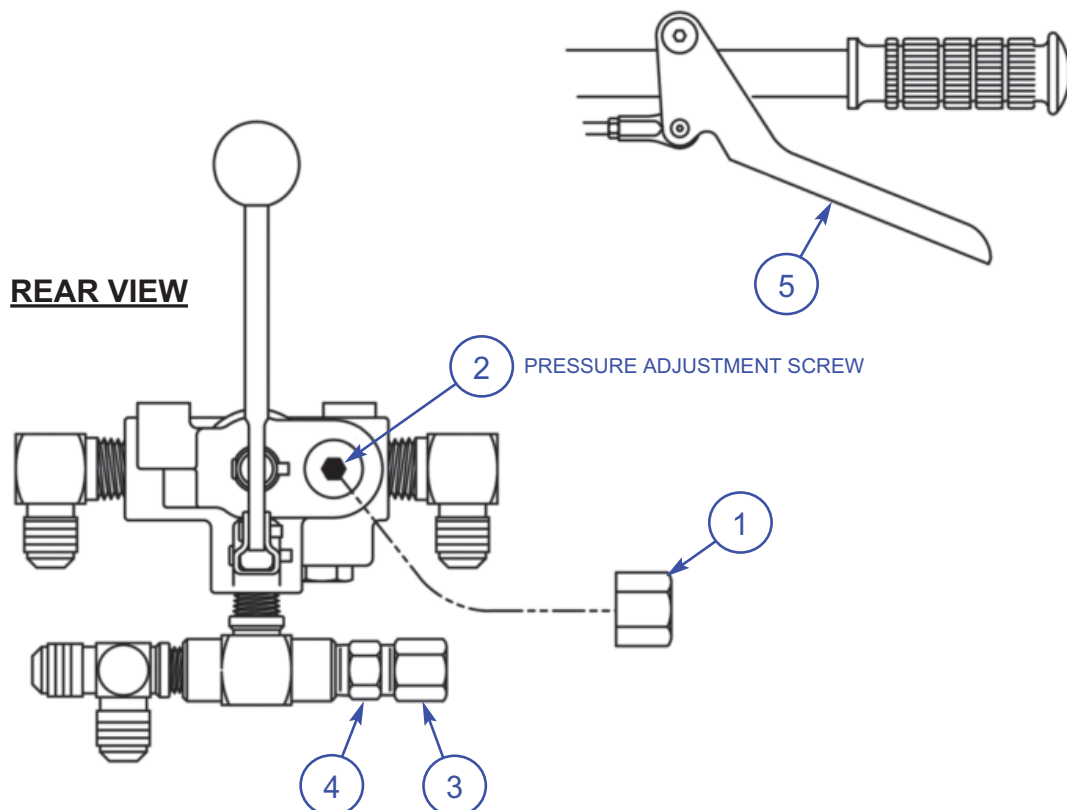
3.4, continued Pressure Settings

SECTION 3 SERVICE

2) Directional Control Valve

Relief pressure setting should be 2000 +/-50 PSI. To adjust pressure:

1. Remove hex cap (item 1) covering pressure relief valve.
2. With a 5/16" allen wrench, turn pressure adjustment screw (item 2) three turns counter clockwise.
3. Remove hex cap (item 3).
4. Attach pressure gauge to fitting (item 4). Note: male thread on fitting is 7/8-14, 37 degree JIC.
5. Block all wheels and engage parking brake. (parking brake must be adjusted properly in order to perform this test. See page 19 for adjustment procedures).
6. Start engine, increase throttle to full speed (on 13HP engines move throttle fully to the left; on 20HP engines turn throttle lever clockwise), and shift directional control valve to the Forward direction.
7. Squeeze speed control lever (item 5) until maximum pressure is registered on the gauge without stalling engine.
8. Adjust relief pressure to 2000 PSI. Turn pressure adjusting screw (item 2) clockwise to increase pressure or counterclockwise to decrease pressure.
9. Remove pressure gauge and replace hex caps (items 1 and 3).
10. Lubricate directional control valve spool and linkage.



SECTION 3 SERVICE

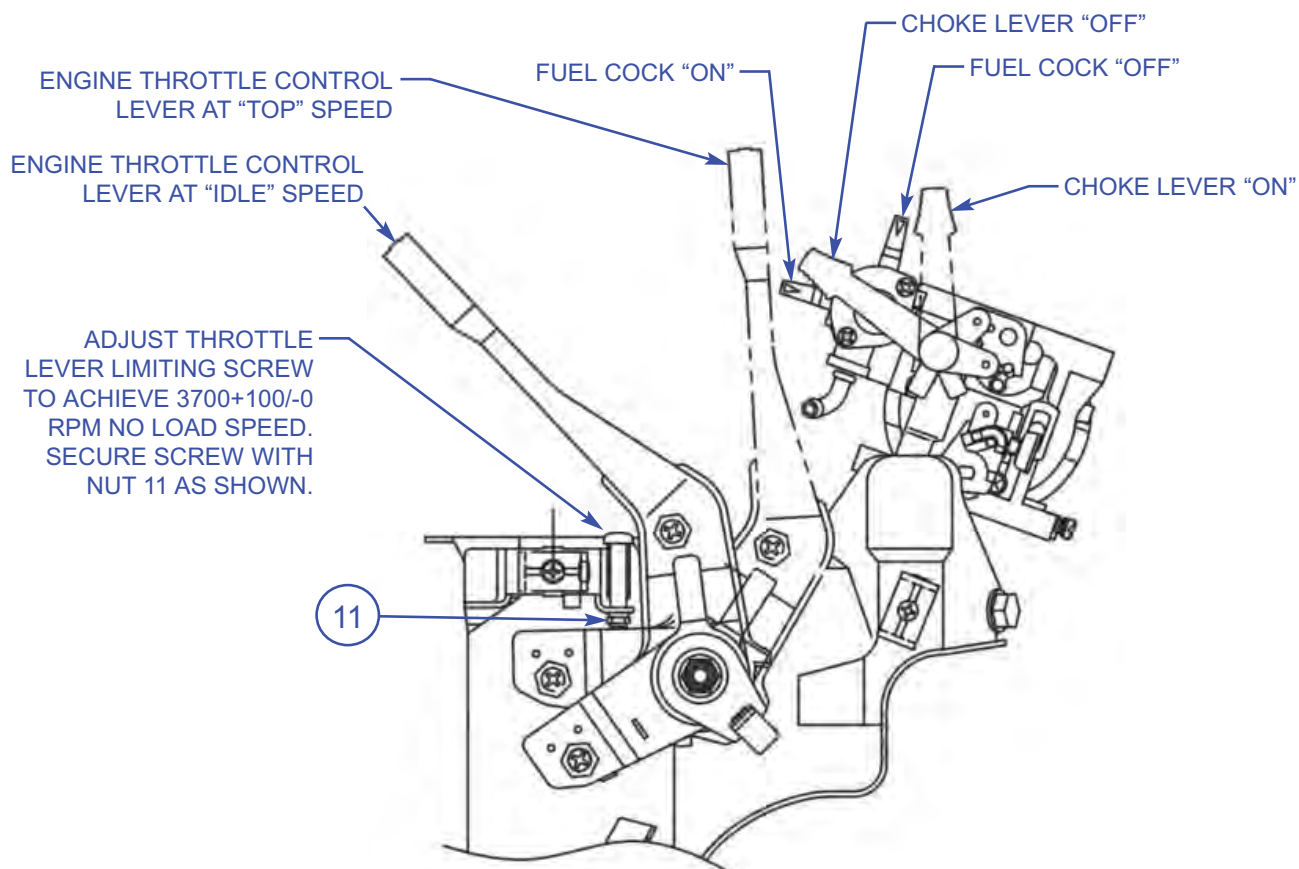
3.5 Setting Engine RPM

Engine Speed (RPM)

1) AR16 (13 HP Honda)

ENGINE SPEED WAS ADJUSTED AT THE FACTORY TO 3,700 RPM +100/-0 WITH NO LOAD. DO NOT EXCEED THIS SPEED. If speed adjustment is required adjust as follows:

1. Start engine and allow to warm up for 5 minutes.
2. Open throttle to full speed. Move throttle lever fully to the right position as standing facing the recoil starter.
3. Loosen hex jam nut (item 11) on throttle lever limiting screw.
4. Turn throttle lever limiting screw clockwise to decrease maximum engine speed or counterclockwise to increase maximum engine speed.
5. After adjusting to desired speed tighten jam nut on throttle lever limiting screw.
6. Move throttle lever to the left (idle speed) and then to the right (full speed). Verify RPM and readjust if necessary.
7. Refer to Honda engine manual for additional information.



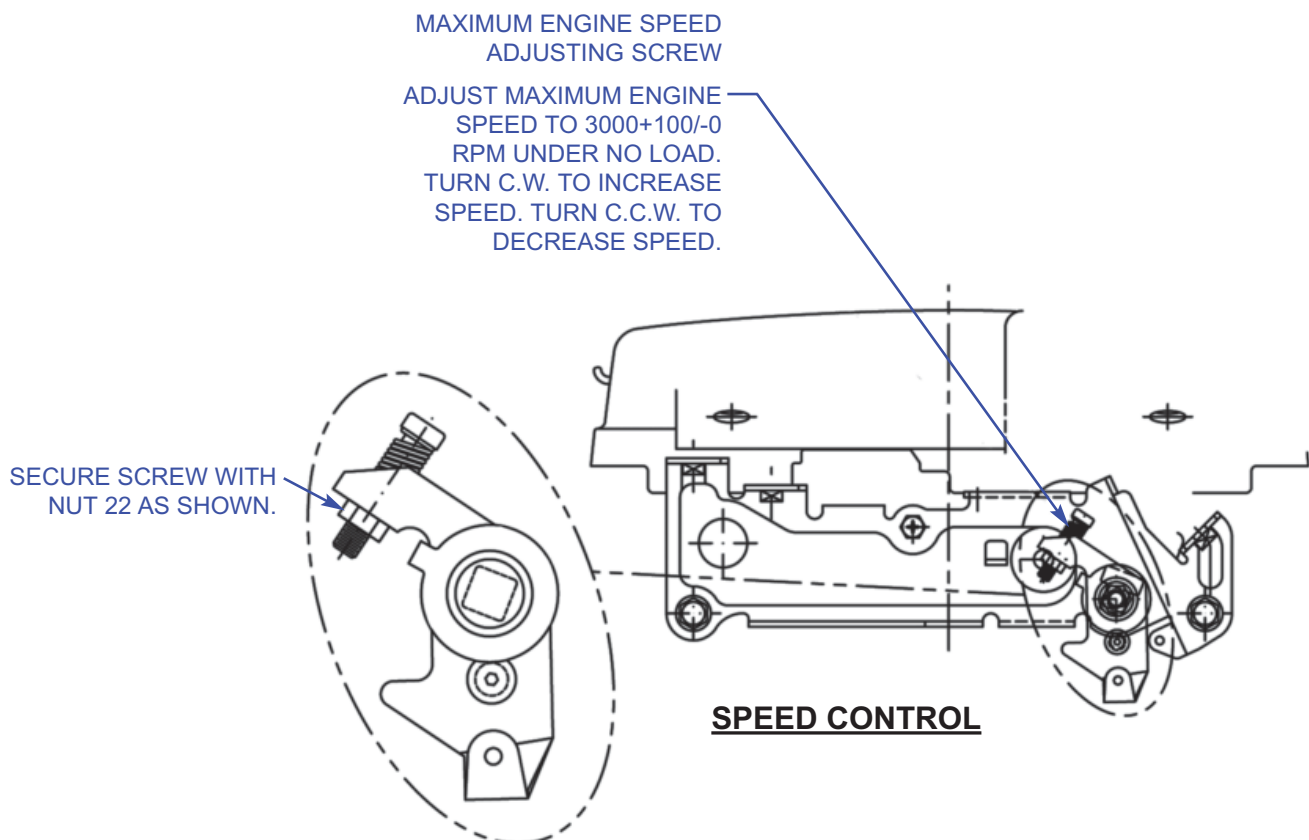
3.5, continued Setting Engine RPM

SECTION 3 SERVICE

2) AR21 (20 HP Honda)

ENGINE SPEED WAS ADJUSTED AT THE FACTORY TO 3,000 RPM +100/-0 WITH NO LOAD. DO NOT EXCEED THIS SPEED. If speed adjustment is required adjust as follows:

- 1) Start engine and allow to warm up for 5 minutes.
- 2) Open throttle to full speed. Turn throttle lever to the full clockwise position.
- 3) Loosen hex jam nut on throttle lever limiting screw.
- 4) Turn throttle lever limiting screw clockwise to decrease maximum engine speed or counterclockwise to increase maximum engine speed.
- 5) After adjusting to desired speed, tighten jam nut on throttle.
- 6) Turn throttle lever to the full counter-clockwise position (idle speed) and then to the full clockwise position (full speed). Verify RPM and readjust if necessary.
- 7) Refer to Honda engine manual for additional information.



SECTION 3 SERVICE

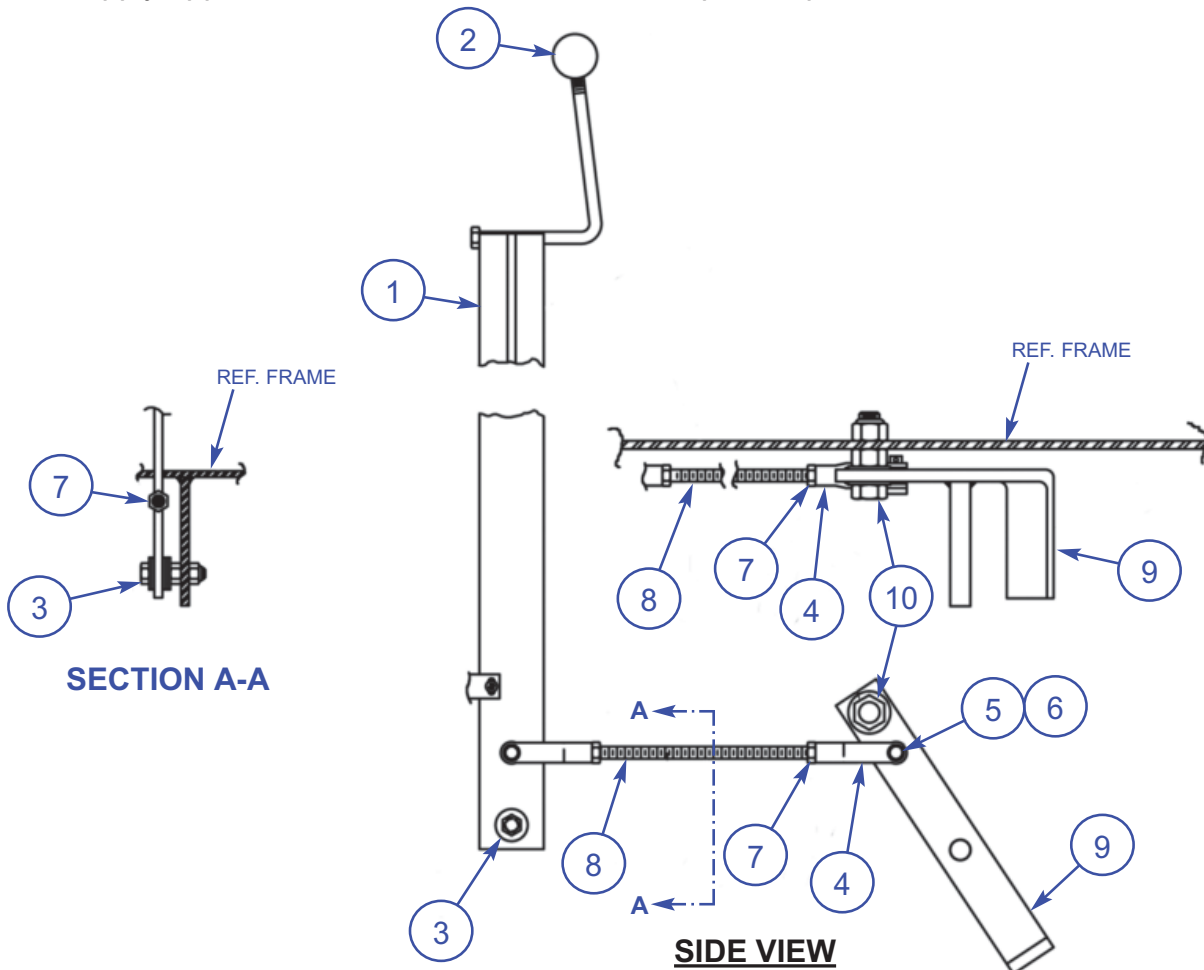
3.6 Dump Lever Adjustments

Dump Control Lever

1) Console mounted dump control lever

Three (3) adjustments are possible: Position of foot pedal, drag on valve lever pivot, and drag on dump pedal pivot.

1. Position of foot pedal: To readjust foot pedal position remove cotter pin (6) and clevis pin (5) at pedal. Loosen hex jam nut (7) and turn clevis (4) clockwise to lower pedal, counter clockwise to raise pedal. Replace clevis pin (5) and cotter pin (6). Tighten hex jam nut (7).
2. Drag on valve lever (1) Pivot: This lever should return easily to neutral position. To change drag, loosen hex locknut on bolt assembly (3). Tighten hex nut to increase drag. Loosen hex nut to decrease drag. Tighten locknut to 25-ft. lbs. Spray with lube after adjustment.
3. Drag on dump pedal pivot (9): same as adjustment 2 above except adjustment is made on bolt assembly (10) and locknut is torqued to 120-ft. lbs. Spray with lube after adjustment.
4. Apply approved lubrication to all bucket dump lever points.



3.6, continued Dump Lever Adjustments

SECTION 3 SERVICE

2) Handle Mounted Bucket Dump Control Lever

Two (2) adjustments/inspections are possible (These adjustments are made with the engine off and the parking brake engaged).

A) Adjust/inspect the position of handle mounted bucket dump control lever (items 18 and 21 on the following page):

To readjust the position of the handle dump lever remove bolt/nut (28) and pivot handle (18) out of the way to access to clevis and pin with cotter pin (23). Remove cotter pin and clevis pin that holds clevis (23) to handle (14). Loosen hex jam nut (24) and turn clevis (23) clockwise to move lever (21) backwards; counterclockwise to move lever (21) forward. Attach clevis (23) to handle (14) with clevis pin. Secure clevis pin to clevis with a new 1/8" X 3/4" long plated cotter pin. Reattach handle (14) to lever (18) with bolt and lock nut.

B) Adjust/inspect the drag on handle mounted dump control cable (item 22) and handle dump lever (items 18 and 21) and pivot bolt (item 27). This lever should return easily to the neutral/bucket hold position.

1) Remove the cotter pin from the clevis pin (item 23) in the clevis on the dump valve connecting link bar (item 13). Then remove the clevis pin. Inspect the dump valve connecting link bar to make sure it is secure on the valve, the attaching bolt/nut is secure and the bar and valve spool move freely in all three (3) positions (dump, hold/neutral, return bucket). Repair as required.

2) Inspect the control cable (item 22). Move the handle mounted bucket dump control lever (item 18), with the cable item 22) attached through the full travel range. The lever must move freely with no binding or catching. The control cable must have no physical damage, i.e., cuts in outer cable covering, missing and/or torn end boots(two(2) places), etc. Replace the control cable if it is damaged and/or does not work freely. Replace the control cable if it has not been replaced within the last twenty-four (24) months. When a control cable is replaced follow the assembly steps and assembly dimensions as listed below:

- a) Remove bolt/nut (28) and pivot handle (18) out of the way to access to clevis and pin with cotter pin (23). Remove cotter pin and clevis pin that holds clevis (23) to handle (14). Do the same for the clevis attached to the other end of the cable.
- b) Remove the clevis from both ends of the cable.
- c) Loosen and remove the outside 5/8"NF-18 jam nut(2) from each bulkhead fitting on cable.
- d) Remove control cable from machine.
- e) Replace rubber grommet in top of console where control cable passes through with cord grip (items 32 and 33) if original equipment did not include a cord grip or the existing cord grip is damaged.
- f) Insert new cable in machine.
- g) Install one (1) 5/8"NF-18 nut on each bulkhead fitting of cable. Thread nut to the far end of bulkhead fitting.

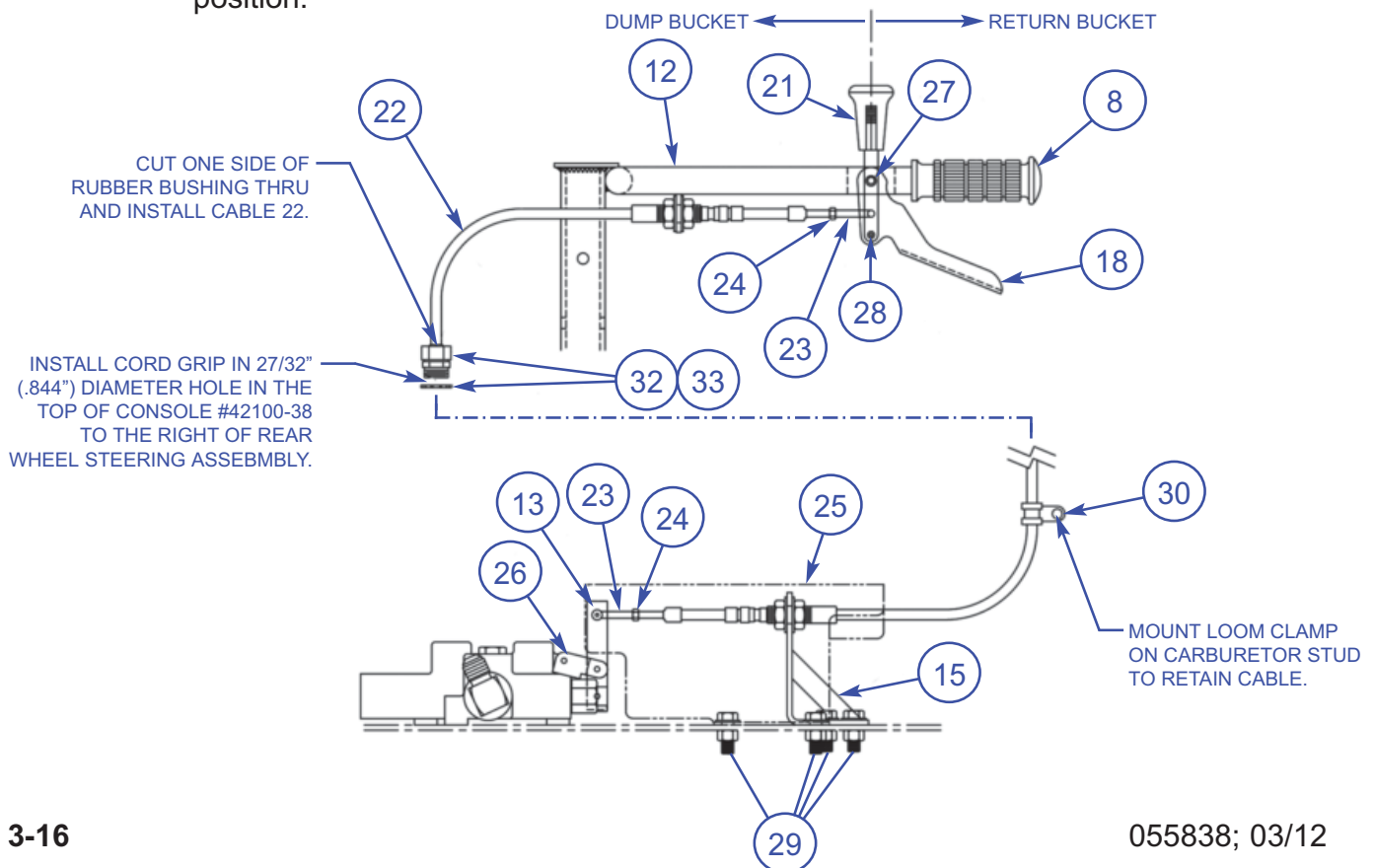
SECTION 3 SERVICE

3.6, continued Dump Lever Adjustments

- h) Install one (1) 1/4" NF-28 jam nut on each end of shift cable. Thread both nuts to back end of threaded rod.
- i) Insert bulkhead fittings on control cable into their respective mounting holes on the handlebar (item 12) and dump valve mounting bracket (item 15).
- j) Place a 5/8"NF-18 jam nut on the threaded end of the bulkhead fitting protruding through each mounting hole.
- k) Attach a clevis to each end of the cable.

Note: In all cases the cable attachments must be threaded onto the 1/4"NF-28 cable end one-quarter of an inch(1/4"). After each attachment is threaded onto the cable end its position must be secured by tightening the jam nut (item 24) against the clevis.

- l) Then attach the cable end clevises to the handle mounted dump control lever (items 14 and 18) and the dump valve connecting link bar (item 13) using the Clevis Pins. Secure the clevis pins in the clevises with NEW 3/32"(.093") diameter x 3/4" long plated cotter pins. Do not reuse cotter pins.
- m) Tighten the two (2) 5/8"NF-18 jam nuts on the cable bulkhead fitting at the mounting hole located at the dump valve connecting link bar. Adjust and tighten the nuts so that dump valve connecting link bar (item 13) is in the vertical position.
- n) Tighten the two(2) 5/8"NF-18 jam nuts on the cable bulkhead fitting on the handlebar. Adjust the nuts so the handlebar mounted dump handle is in the vertical position.



3.7 Flex Coupler Adjustments

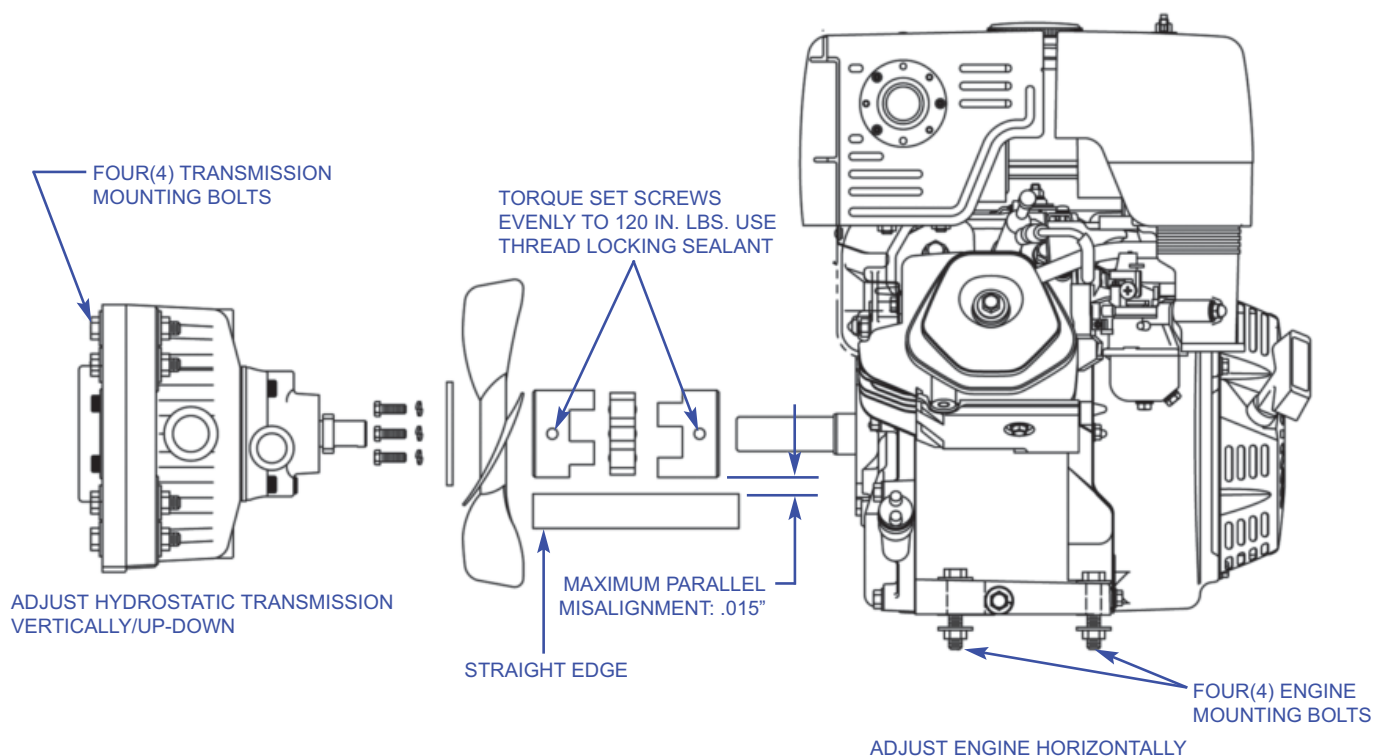
SECTION 3 SERVICE

Flexible Coupling for Engine/Transmission

A flexible coupling is mounted between the engine and transmission. The half with the 1" bore mounts to the engine, the half with the $\frac{3}{4}$ " bore mounts to the transmission. A flexible coupling element is between the two coupling halves.

1. Check the parallel alignment of the coupling in at least 4 places (every 90 degrees), top and bottom and left and right sides. The sides of each coupling half must be within 0.015" in all axes. If adjustment is required use the following procedure to align.

- To begin this adjustment loosen engine and transmission mounting bolts but do not remove.
- First make the vertical adjustment to the coupling assembly by moving the transmission up or down on the transmission mount plate. Tighten transmission mounting bolts.
- Using a straight edge make the horizontal adjustment to the coupling assembly by moving the engine left or right on the engine mounting plate. Tighten engine bolts.
- When alignment is correct and the engine and transmission mount bolts are secured, recheck alignment with a straight edge.
- When alignment is correct, both coupling halves and the flexible coupling element should be centered between the engine and transmission shafts. The coupling assembly should be pressed together as tightly as possible and the set screws tightened to the torque specified. Use thread locking sealant. See notes below.




SECTION 3 SERVICE

3.8 Maintenance

Place buggy on level ground, shut off engine, apply parking brake, and block all wheels before servicing. Should bucket or platform need to be kept in the raised position, securely block bucket in raised position. Service Buggy only in well lit area, free from vehicle and pedestrian traffic.

 **CAUTION** WHEN BUCKET IS RAISED, THE SPACE BETWEEN RAISED BUCKET AND BUGGY FRAME IS A PINCH POINT.

Machine Clean Up:

 **CAUTION** THIS BUGGY MUST BE CLEANED DAILY TO PREVENT CONCRETE AND DIRT BUILD-UP FROM ADVERSELY AFFECTING SAFE MACHINE OPERATION. WASH BUGGY DOWN EACH DAY WITH WATER.

Important areas to clean:

1. Tires (6)
2. Brake covers (2) & linkage
3. Operator's platform
4. Hydraulic reservoir cover (keep all louvers clean).
5. Parking brake and linkage
6. Dump lever controls including foot control linkage and console mounted lever, or handlebar mounted lever on machines so equipped.
7. Bucket
8. Handlebar and speed control lever
9. Directional control lever
10. Hydraulic lift cylinder
11. Crawler tracks on machines so equipped.

NOTE: Do not spray water on hot engine.

Engine Maintenance:

Follow engine maintenance schedules as outlined in the engine manual. Check engine oil daily. Allow engine to warm up at idle before applying load. On Buggies equipped with electric start, disconnect the battery, negative connection first. When reconnecting battery, connect positive connection first.

3.8, continued Maintenance

SECTION 3 SERVICE

Hydraulic Drive/Bucket Dump:

- Check hydraulic oil level daily. Check oil level with bucket in the “down” position, and with oil temperature cold. Fill reservoir to bottom of bolt head on filler cap or “F” mark on dip stick with SAE 10W-40 weight SE motor oil. Reservoir capacity is 18.7 quarts.
- Replace hydraulic oil and hydraulic oil filter every 200 hours or 6 months, whichever occurs first. Drain oil from hydraulic reservoir by disconnecting hose item 28, from elbow fitting item 45.
- Inspect all hydraulic hoses & fittings daily. Repair or replace as required.

Chassis Lubrication

Lubricate all machine points per the following schedule:

Location	Service Interval	Lubricant
Bucket Platform Bushing (2)	Daily	All purpose grease that meets NLGI GC-LB Grade 2 requirements
Lower Steering Column Bearing Tube	Weekly	Same as above
Caster wheels for track machines	Weekly	Same as above
Rear Wheel Bearings	Every 400 Hours	Repack Wheel Bearings with Wheel Bearing grease
Speed Control Lever	Weekly	WD-40 spray lubricant or equal
All Brake Pivot Points	Weekly	WD-40 spray lubricant or equal
All Bucket Dump Lever Pivot Points	Weekly	WD-40 spray lubricant or equal
Bucket Dump Valve Spool	Weekly	WD-40 spray lubricant or equal
Directional Control Valve Spool	Weekly	WD-40 spray lubricant or equal

Brake

Inspect both service brake and parking brake lock DAILY. Parking brake must hold a loaded buggy on 15% grade (8.5 degrees). Service brake must lock both drive wheels of a loaded buggy when brake pedal is applied while buggy is in motion. If adjustment is required to bring brake operation up to these specs, refer to pages ??? for adjustment procedures.

SECTION 3 SERVICE

3.8, continued Maintenance

Wheels & Tires

- For machines that do not have SuperFlex filled tires, inspect **DAILY** for correct tire pressure (check cold).
 - Inflate front tires to 50 PSI
 - Inflate rear tires to 50 PSI

 **CAUTION** INFLATE TIRES WITH CARE. AVOID POSITIONING YOUR BODY WHERE IT CAN BE INJURED BY AN EXPLODING TIRE.

- Inspect daily all wheels/tires for structural damages, tears, rips, bent wheels, etc. Repair or replace any damaged parts immediately.

 **CAUTION** DO NOT OPERATE THIS BUGGY WITH ANY DAMAGED AND/OR UNDER-INFLATED TIRE/WHEEL ASSEMBLIES.

- Inspect lug nut torque **DAILY**.

Tighten all loose lug nuts to 65 ft. lbs. of torque. If lug nuts must be removed, before nut removal clean threads on studs with wire brush and spray with WD-40 type lubricant.

- Castle nuts that hold drive wheel hubs to drive motor shafts must be torqued to **125 ft. lbs.** If cotter pin does not mate to hole in the shaft, tighten castle nut until cotter pin can be inserted in the next slot in the castle nut and through the hole in the shaft. Install a **NEW** cotter pin. Do not reuse cotter pin.

Speed Control System

Inspect speed control cable **DAILY**. This cable connects the speed control lever to the hydrostatic transmission. With all linkage fully assembled cable travel should be smooth and easy. Approximately 15 lbs. of pressure should be required to depress the speed control lever at the handlebar. Cable should be free of cuts, kinks, binds and sharp bends. Rubber seals to prevent entry of contamination should be intact at both cable ends. Due to the critical nature of this part, replacement is recommended every 24 months or sooner for severe service.

Inspect speed control return spring **DAILY**. This spring is mounted on the transmission shift bar and allows the speed control lever to return automatically when released. Spring tension should be sufficient to allow the speed control lever to snap back briskly when it is released. Broken, damaged, or deformed springs must be replaced immediately. Note: never bend, otherwise modify, or attempt to repair spring. **ALWAYS REPLACE.** Due to the critical nature of this part, replacement is recommended every 24 months or sooner for severe service.

3.8, continued Maintenance

SECTION 3 SERVICE

DANGER

In all cases, upon release of the speed control lever, the speed control linkage should operate smoothly and freely and stop machine travel within 6 - 8' in both forward and reverse. If the speed control linkage does not operate smoothly and freely and/or does not automatically stop machine travel upon release of the speed control lever, then remove machine from service until repairs have been made.

LIFTING / LOADING AND TIE DOWN PROCEDURES

DANGER

LIFTING / LOADING AND THE TIE-DOWN PROCEDURES WHEN LIFTING, LOADING AND/OR TYING DOWN A BUGGY AVOID ALL OPERATING CONDITIONS WHERE PERSONNEL MAY BECOME TRAPPED OR PINCHED BETWEEN THE BUGGY AND SOME OTHER OBSTACLE.

FOR LIFTING AND TYING DOWN ONLY USE OSHA COMPLIANT CHAINS OR STRAPS WITH A MINIMUM WORKING LOAD LIMIT OF 2,500 LB. EACH. LIFT OR LOAD THE BUGGY ONLY WHEN THE ENGINE IS OFF AND THE BUCKET IS EMPTY. FOR 13 HP HONDA ENGINE ONLY, WHEN TRANSPORTING THE BUGGY ON A TRAILER SHUT OFF THE FUEL AT THE CARBURATOR TO PREVENT FUEL LEAKING INTO THE CRANKCASE.

WHEN EMPTY, THE BUGGY CAN WEIGH UP TO 1,800 LB. TO LOAD, LIFT OR TIE DOWN USE ONLY EQUIPMENT DESIGNED TO HANDLE THIS WEIGHT. DO NOT ATTEMPT TO MANUALLY PUSH OR PULL A BUGGY. FAILURE TO LIFT, LOAD OR TIE DOWN WITH THE PROPER EQUIPMENT COULD RESULT IN SERIOUS INJURY OR DEATH.

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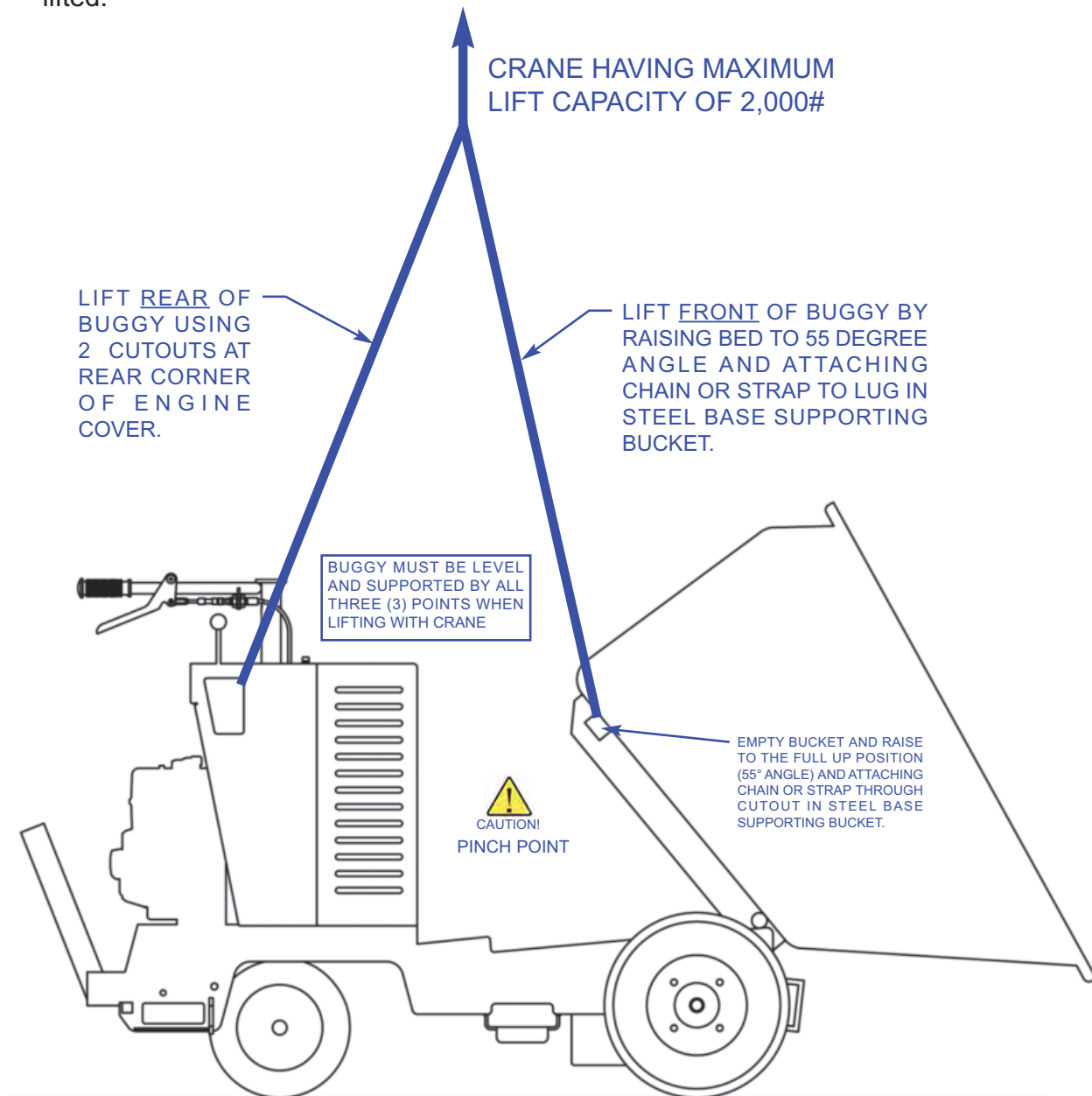
www.youtube.com/AllenMachinery

SECTION 3 SERVICE

3.9 Lifting Procedures

Lifting a Buggy with a Crane

1. Make sure the bucket is completely empty.
2. Raise the bucket to a 55 degree angle with the frame as show below.
3. Attach three (3) chains or straps to the lifting cutouts in the frame as shown below.
4. Attach all three (3) chains or straps to the crane hook. Note: the crane hook must be equipped with a spring loaded safety catch. The crane must be designed to lift at least 2000 LB.
5. Take the slack out of the chains or straps and adjust them so the buggy is level when lifted.



3.9, continued Lifting Procedures

SECTION 3 SERVICE

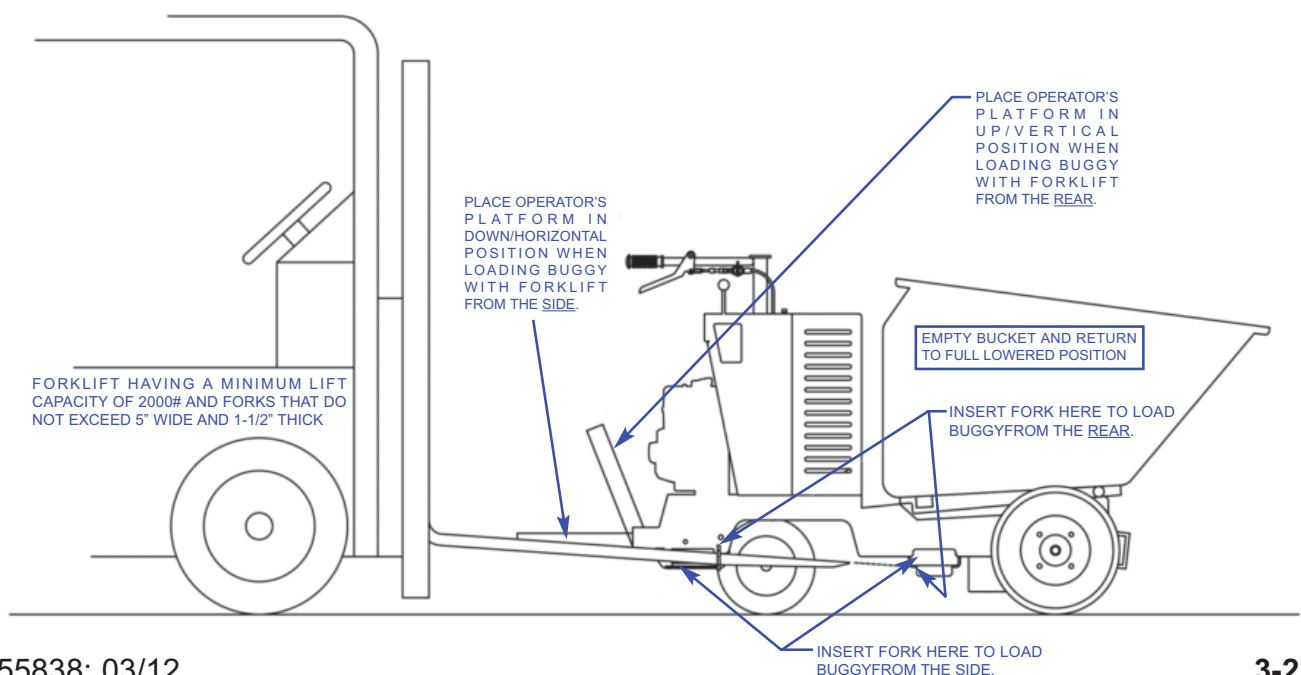
Lifting a Buggy with a Forklift

1. Make sure the bucket is completely empty.
2. Lower the bucket completely against the buggy frame.
3. Lower the operator's platform to the stand-on position.
4. Use a forklift rated to lift a minimum 2,000 LB. payload. The forks on the lift must not exceed five (5) inches in width and one and one-half (1-1/2) inches in thickness.
5. The forklift should only be operated by licensed, OSHA approved operator.
6. Insert the two (2) forks into the two (2) lifting pockets on either the right or left side of the buggy in the locations shown below. The forks must be inserted completely under the buggy frame and fully engage the two (2) pockets on the opposite side of the frame. Continue inserting the forks into the pockets in the buggy frame until the forklift mast touches the buggy.
7. Lift the buggy up only high enough to clear the highest obstacle. Tilt the forks back so the buggy is secure against the forklift mast.

NOTE: all rubber tired models (excluding track models) built after December 2003 have additional lifting pockets on the buggy frame to permit lifting the buggy from the REAR. Follow the procedure outlined above with the following changes:

1. Raise the operator's platform to the upright / walk-behind position.
2. Insert the forks into the two (2) lifting pockets at the rear of the buggy. Continue to insert the forks into the rear pockets until they engage the lifting pockets behind the front wheels and the mast of the forklift is against the uplifted operator's platform.

⚠ DANGER DO NOT LIFT OR TRANSPORT A BUGGY WITH A FORKLIFT OVER SOFT, UNSTABLE OR UNEVEN SURFACES

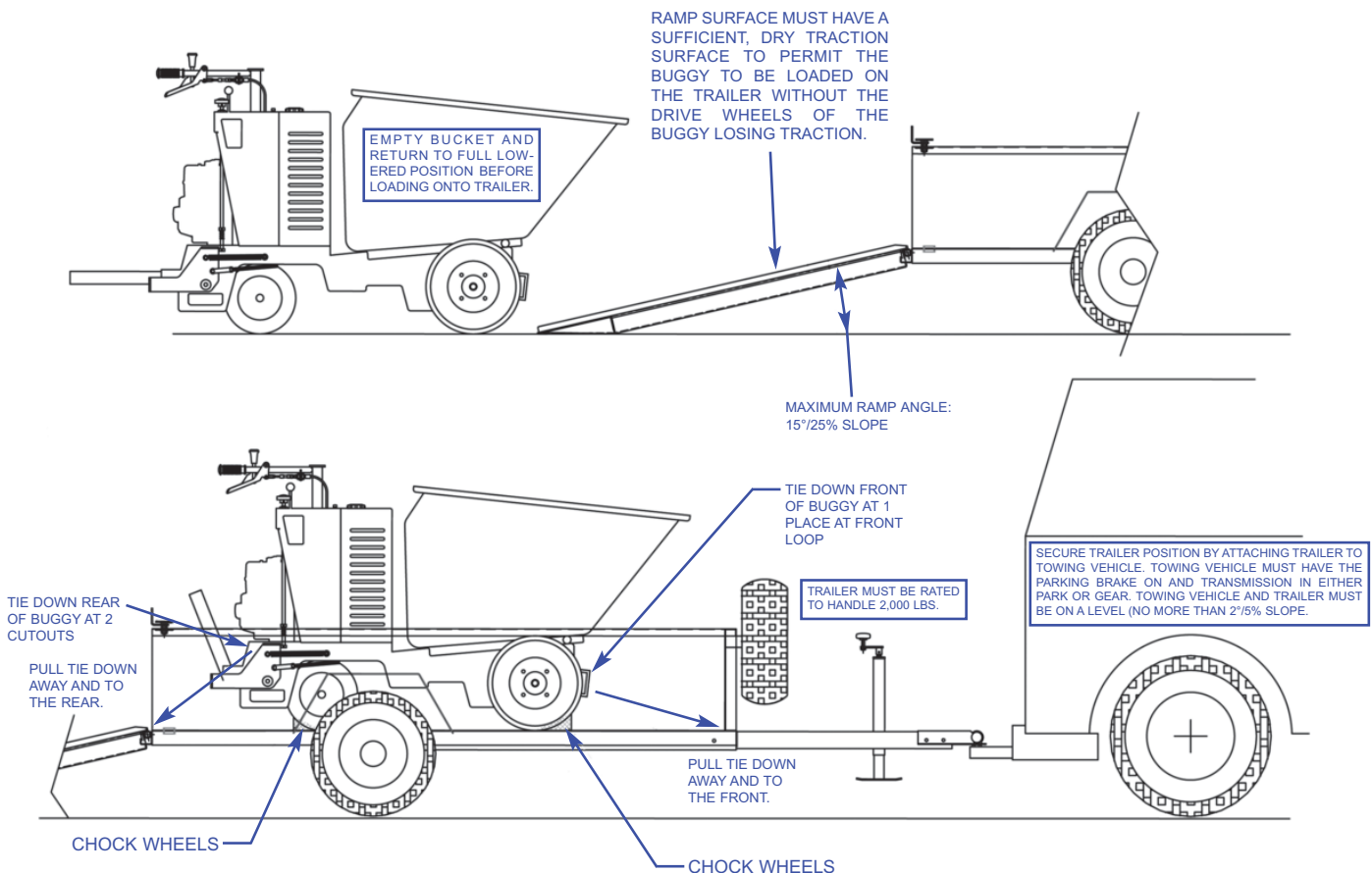


SECTION 3 SERVICE

3.10 Loading Procedures

Loading a Buggy onto a Trailer

1. Make sure the bucket is completely empty.
2. Lower the bucket completely against the buggy frame.
3. Lower the operator's platform to the down / stand-on position.
4. Use a trailer rated to haul a minimum 2,000 LB. payload at posted highway speeds. The trailer must be equipped with Federal DOT approved lighting and braking systems and tie-down loops at the front and rear to secure the buggy as shown on the following page.
5. Use a towing vehicle equipped with a compatible hitch and with sufficient towing capacity for the trailer with the buggy loaded on it. The towing vehicle must be properly attached to the trailer. The trailer must be level. The towing vehicle's parking brake must be "ON" and the transmission in gear.
6. The ramps on the trailer must not exceed 15 degrees (25% slope) with a level trailer. The ramps must have a dry surface with sufficient traction to permit the buggy to be loaded without its wheels losing traction and spinning.
7. Slowly drive the buggy onto the trailer in the forward direction as shown below. Position the buggy on the trailer so that the recommended tongue load for the trailer and towing vehicle is achieved. Engage and lock the buggy parking brake, shut off the engine, turn off fuel supply at the carburetor (13 HP Honda only) and step away from the operator's platform.



3.11 Tie Down Procedures

SECTION 3 SERVICE

Tying Down a Buggy onto a Trailer or Truck Bed



FAILURE TO FOLLOW ALL OF THE FOLLOWING STEPS WHEN TYING DOWN A BUGGY MAY RESULT IN SERIOUS INJURY OR DEATH.

1. Make sure the bucket is completely empty.
2. Lower the bucket completely against the buggy frame.
3. Lower the operator's platform to the down / stand-on position.
4. The truck or trailer bed must be equipped with tie-down rings at the front and rear in order to secure the buggy as shown below.
5. The trailer bed or trailer must be level. Parking brake must be on and transmission in gear.
6. The buggy must be placed correctly on the truck or trailer bed with the buggy's parking brake engaged and locked, engine off and fuel supply turned off at the carburetor (13 HP Honda engine only).
7. Attach two (2) chains or straps through the ring in the front of the buggy frame and through the two (2) rings mounted at the front of the trailer or truck bed.
8. Attach one (1) chain or strap through each of the rear cutouts at the rear of the buggy frame and through the corresponding rings mounted at the rear of the trailer or truck bed.
9. All chains/straps must pull away from the buggy and toward the tie-down rings.
10. Tighten chains/straps with appropriate binders or ratchets until all slack is removed.
11. Block both front and rear wheels of buggy as shown below.

