OPERATOR GUIDE

Monarch Tractor MK-V Operator Guide

PART NUMBER: **M00027728-00-A**

OPERATOR GUIDE

TABLE OF CONTENTS

OPERATOR GUIDE

OPERATOR GUIDE

OPERATOR GUIDE

Chapter 1 – General Information

The **Monarch Tractor MK-V Operator Guide** covers the capabilities and restrictions of the Monarch Tractor.

Your authorized Monarch Tractor dealer can demonstrate the safe operation of the tractor according to Monarch Tractor instructional materials, which are also available to users of Monarch Tractors. Authorized Monarch Tractor dealers can also identify unsafe modifications or use of unapproved attachments or implements.

Approved attachments and implements are designed for three-point hitch lift capacities. They are designed for secure fastening to the Monarch Tractor. Operators must check with an authorized Monarch Tractor dealer, or Monarch Tractor instructional materials, to determine safe loads of material for the MK-V and attachment/implement combination.

The following publications and instructional materials provide information on the safe use and maintenance of the Monarch Tractor and attachments/implements:

- **Pre-Delivery Inspection/Arrival Condition Report.** Used to assure that the Monarch Tractor is delivered to the first user in a safe operating condition.
- **Operator Guide.** This guide, delivered with the Monarch Tractor, gives operating information as well as routine maintenance and service procedures. The Operator Guide is a part of the tractor and can be stored onboard the Monarch Tractor. Replacement Operator Guides can be ordered from your Monarch Tractor dealer.
- **Monarch Tractor decals.** Tractor decals (signs) instruct users on the safe operation and care of your Monarch Tractor or attachment/implement. The decals and their locations are shown in this Operator Guide.

IMPORTANT: The Monarch Tractor dealer and each owner/operator of a Monarch Tractor must review the recommended uses of the Monarch Tractor when delivered. If the owner/operator will be using the Monarch Tractor for different applications, he or she must ask the Monarch Tractor dealer for recommendations on the new use.

Monarch Tractor MK-V Specifications

POWER	
Peak Motor Power	70hp (52kW)
Rated Motor Power	40hp (30kW)
Run Time	4-10 hours (per charge)
DRIVE TRAIN	
Type	Four-wheel drive
Transmission	Automated manual transmission
Number of Speeds	Nine forward/Three reverse
Clutch Type	Wet
Clutch Actuation	Automated electro-hydraulic
Brake Type	Wet, independent
Brake Actuation	Mechanical/electro-hydraulic
POWER TAKE-OFF (PTO)	
PTO Power	40hp (30kW)
PTO Speed	540RPM
PTO Location	Rear
PTO Clutch Type	Wet
PTO Actuation	Electro-hydraulic
HYDRAULICS	
Type	Closed center
Pump Rated Output	19.8gpm
Rated Flow (Constant Flow Valve)	12.0gpm (45 l/min)
Rear Remote Valves	2 Selective Control Valves; 1 Constant Flow
IMPLEMENT INTERFACE	
3-Point Hitch	CAT I/II
Hitch Lift Capacity, 24 in. behind lift point	1,650lbs (750 kb)
Drawbar Type	Swinging; three positions
Drawbar Towing Capacity	5,500lbs (2,500 kg)
Drawbar Maximum Vertical Load	1,100lbs (500 kg)
Front Ballast Capacity	Up to 10 plates, 55lbs (25kg) each
TIRES	
Tire Type	R1 AG
Front Tires	200/70R16 Tubeless
Rear Tires	11.2-24 Tubeless

CHARGING AND EXPORTABLE POWER	
Charging Port	J1722 Type 1 (up to 80A)
Charging Level	AC Level 2
Charging Time (with 80A Charger)	5 – 6 hours
Charging Time (with 40A Charger)	10 – 12 hours
220 VAC Power Outlet	NEMA L6-30R (25A)
110 VAC Power Outlet	NEMA 5-15 (15A)
ROOF	
Roll-Over Protective Structure (ROPS)	Rigid, four-post
LED Work Lights	Eight (two per side)
LED Work Light Brightness, each	2,000 lumens
CONNECTIVITY MODULES	
WiFi	802.11ac Dual Band
Cellular	4G (LTE) Ready
DIMENSIONS	
Overall Length	146.7in (372.5cm)
Minimum Width	48.4in (123cm)
Overall Height	92.1in (234cm)
Wheelbase	85.0in (216cm)
Front Axle Clearance	12.6in (32cm)
Front Track Width	37.0in (94cm)
Rear Track Width, Adjustable	36.0in (91.6cm) 40.6in (103cm) 43.9in (111.6cm) 48.4in (123cm)
Turning Radius	8.9ft (2.7m)
Base Weight	5,200lbs (2,360kg)
WARRANTY	
Tractor	Four years/6,500 hours
Main Battery	10 years/10,000 hours

CHANGE LOG			
REVISION	DATE	DESCRIPTION OF CHANGE	AUTHOR
1.0	06/15/2025	Initial release	A. Thomas

Chapter 2 – Safety Instructions

Carefully read all safety instructions in this manual for operator safety. Tampering with any safety devices, including decals on the tractor, can cause serious injury or death. Keep your tractor in proper condition and do not allow any unauthorized modifications to be carried out on the tractor, which may impair the function/safety and affect tractor life.

DANGER: PROTECT CHILDREN NEAR TRACTORS

- Keep children and others away from the tractor while operating.
- DO NOT allow children to ride on tractor or any attached implement.
- Always look behind tractor for children before operating.
- If children enter the work area shut down the tractor for their safety.

DANGER: USE OF ROPS AND SEAT BELT

The tractor's **Rollover Protective Structure (ROPS)** has been certified to industry and/or government standards. An operator must always wear the seat belt to ensure operator protection in the event of a rollover. Learn how to inspect ROPS here.

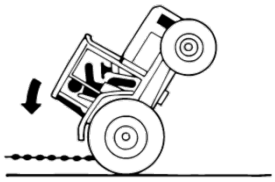
WARNING: DO NOT PRESSURE WASH ROOF

Pressure washing components in the Monarch Tractor can cause damage. Specifically, **NEVER** pressure wash the roof or the radiator units.

WARNING: DO NOT PRESSURE WASH EXPORTABLE POWER PORTS

Keep the covers over all exportable power ports. Wet electrical connectors can cause a fire.

DANGER! AVOID TIPPING

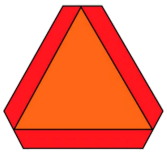


- Do NOT drive where the tractor could slip or tip. Stay alert for holes and rocks in the terrain and other hidden hazards.
- Slow down before making sharp turns.
- Driving forward out of a ditch or mired condition could cause the tractor to tip over backwards. Reverse out of this situation if possible.
- Never drive near the edge of a gully, drop-off, ditch, steep embankment, or a body of water. The tractor could suddenly roll over if a wheel goes over the edge or if the ground caves in.

DANGER! STAY CLEAR OF ROTATING SHAFTS

Entanglement in rotating shafts such as the PTO can cause serious injury or death. Wear close-fitting clothing. Be sure the PTO is stopped before making implement adjustments, removing connections, or cleaning out PTO-driven equipment.

ALWAYS USE SAFETY LIGHTS AND DEVICES



- Use of hazard warning lights and turn signals are recommended when towing equipment on public roads unless prohibited by state or local regulations.
- Use a slow-moving vehicle (SMV) sign when driving on public roads, unless prohibited by law.

DANGER! PRACTICE SAFE MAINTENANCE

- Understand service procedures before doing work.
- Keep the surrounding areas clean and dry.
- Do not attempt to service the tractor when in motion.
- Keep body and clothing away from rotating shafts.
- Remove rings and other jewelry to prevent electrical shorts and entanglement in moving parts.
- Do not wear a necktie, scarf, or loose clothing when you work near moving parts.

DANGER! AVOID HIGH-PRESSURE FLUIDS

- Inspect hydraulic hoses periodically, at least once per year, for leakage, kinking, cuts, cracks, abrasion, blisters, corrosion, exposed wire braid, or any other signs of wear or damage.
- Have worn or damaged hoses/hose assemblies immediately by the Monarch Tractor Service Team.
- Escaping fluid under pressure can penetrate the skin causing serious injury. Avoid hazards by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure.

WORK IN A VENTILATED AREA

Avoid inhaling vapor, aerosol, or dust.

AVOID CONTACT WITH AGRICULTURAL CHEMICALS

If pesticide use instructions require respiratory protection, wear an appropriate respirator. Store the respirator in a closed box or some other type of sealable container.

KEEP RIDERS OFF TRACTOR

DO NOT allow riders on the tractor. Only the operator can be seated on the tractor. Riders on tractors are subject to injury, such as being struck by a foreign object or being thrown off the tractor.

SUPPORT MACHINERY PROPERLY

- Do not work under the tractor or any implement which is supported solely by a jack.
- Always lower implements to the ground before you work on the machine. If the task requires that the implement be lifted, provide secure support for them. If left in a raised position, hydraulic supported implements can settle or leak down.

DANGER! SERVICE TIRES SAFELY

- Explosive separation of a tire and rim parts can cause serious injury or death.
- Do not attempt to mount a tire unless you have the proper equipment and experience to perform the job.
- Always maintain the correct tire pressure. Do not inflate the tires above the recommended pressure.
- Never weld or heat a wheel and tire assembly; the heat can cause an increase in air pressure, resulting in a tire explosion. Welding can structurally weaken and/or deform the wheel.
- When inflating tires, use an extension hose long enough to allow you to stand to one side and NOT in front or over the tire assembly. Use a safety cage if available.
- Check wheels for low pressure, cuts, bubbles, damaged rims, missing lug bolt, and nuts.

PROPERLY TIGHTEN WHEEL RETAINING BOLTS/NUTS

- Torque wheel retaining bolts/nuts at the intervals specified in this manual.
- DO NOT use an impact drill on any part of a Monarch Tractor. Doing so voids the warranty.

STORE IMPLEMENTS SAFELY

Stored implements can fall and cause serious injury or death. Securely store implements to prevent falling. Keep children and bystanders away from the storage area.

DISPOSE OF WASTE PROPERLY

Polluting drains, water courses, or soil is illegal. Use authorized waste disposal facilities, including civic amenity sites and garages able to dispose of used oil. If in doubt, contact your local authorities.
More information about the safe and correct methods of disposal, contact your local authorized servicing dealer or the local agency for waste recycling.

BEFORE SERVICING THE TRACTOR

- Read all instructions in this Operator Guide and on your tractor safety decals.
- Clean work area and wash the tractor.
- Park the tractor on stable, level ground.
- Lower any attached implement to the ground.

Monarch Tractor Keep Out Procedure

I. PURPOSE

The purpose of this lockout procedure (this "Procedure") is to protect employees of Customer from personal injury or property damage while utilizing the driver-optional features of Monarch Tractor equipment and Products, including Tractors ("Autodrive"). Capitalized terms used in this Procedure will have the meanings given them in the applicable Sales Order agreed to by Customer (the "Sales Order") and the Subscription End User License Agreement incorporated into the Sales Order (the "Agreement"). Any conflicts between the terms of the Sales Order, the Agreement, and this Procedure shall be resolved in the following order: the Sales Order shall prevail over the Agreement, and the Agreement shall prevail over the procedure. This Procedure forms a part of the Agreement and his hereby incorporated by reference. No changes may be made to this Procedure without the prior express written agreement of Monarch Tractor.

II. PROCEDURE SCOPE

This Procedure establishes the process for use of the Tractor during Autodrive operations. This Procedure is designed to ensure that Products and Tractors are isolated from human interaction when performing activities without a driver onboard the vehicle (e.g., while in Autodrive).

III. CUSTOMER RESPONSIBILITIES; PROCEDURE COORDINATOR

A. Customer shall designate a responsible employee as the process coordinator (the "Procedure Coordinator") for Customer. The Procedure Coordinator shall:
    a. Provide training on this Procedure to all authorized employees, contractors, and any third party with access to the Tractor or that may be in the vicinity of the Tractor while the Tractor is in Autodrive;
    b. Maintain a listing of all employees, contractors, and third parties who have completed training on this Procedure;
    c. Implement and enforce this Procedure;
    d. Maintain all Tractors used by Customer in accordance with Monarch Tractor requirements (including any cellular connection requirements, software updates, and periodic maintenance services on Tractors and other Products); and
    e. Conduct a daily Tractor health check prior to any use of the Tractor.
B. The Procedure Coordinator shall be responsible for the effective use of this Procedure and to ensure that all required steps are followed in every use of the Tractor in Autodrive.

C. Each authorized employee, contractor, and third party of Customer is responsible for learning and following this Procedure and develop a safety practice for Tractor operations in Autodrive.

IV. BASIC PROCEDURE PRINCIPLES

The Procedure must be followed in every instance where a Tractor is operating in Autodrive to prevent unintended interactions between humans and the Tractor. Operations in Autodrive are to only be conducted by the authorized employee, contractor, or third party, and a single authorized employee, contractor, or third party should start and complete an operation in Autodrive before handing off the Tractor to any other authorized employee, contractor, or third party for further use. Additionally, the Procedure Coordinator must be notified prior to initiating any operations in Autodrive.

Use of Tractors operated in Autodrive will be limited to the authorized employee, contractor or third party that has been designated in the Customer's instance of Company's farm management services as an authorized Tractor operator by the Procedure Coordinator. No one other than the authorized employee, contractor or third party currently in control of the Tractor should attempt to operate Tractors in Autodrive. Disciplinary action, up to and including immediate termination, will be applied if any employee, contractor, or third party violates this Procedure, regardless of whether physical harm or equipment damage results.

V. PROCEDURE TRAINING

Authorized employees, contractors, and third parties are divided two groups, each group defined as follows:

- Authorized Employee. An employee, contractor, or third party whose job requires him/her to operate or use a Tractor that spends any percentage of its time in Autodrive, or whose job requires him/her to work in support of an employee, contractor, or third party operating a Tractor in Autodrive.
- Managing Employee. An employee, contractor, or third party who is responsible for training Authorized Employees on this Procedure, implementing this Procedure, and managing Tractor operations while operating in Autodrive. An Authorized Employee may become a Managing Employee when an Authorized Employees hands off control of a Tractor in Autodrive to another Authorized Employee. All Authorized and Managing Employees must be certified that they have completed the Procedure training in accordance with this Procedure.

Each Authorized and Managing Employee shall be trained in:

- Proper use of the Tractor in Autodrive following this Procedure;
- The key Autodrive functions of the Tractor, including its navigation system, human robot interfaces, and the detection and collision avoidance system;
- Emergency stop and shut down functions of the Tractor;
- Basic first aid and CPR; and
- Procedures and Tractor functions necessary to extricate a worker who is pinned under a Tractor.

At all times during Autodrive operations, Every Authorized and Managing Employee shall possess an effective means of communication such as a cellular phone or a radio for use during emergencies.

Each Authorized and Managing Employee who are operating or supervising the operation of a Tractor in Autodrive shall: (1) wear high visibility reflective vests (ANSI/ISEA 107-2020 Class 3), (2) post signs at the perimeter of the area in which the Autodrive operations are to be completed that provide notice that Autodrive operations are conducted in such area and prohibit entry into such area during Autodrive operations; and (3) receive training in the following:

- Reporting of unintended contact or close calls with a Tractor in Autodrive to the Managing Employee.
- Proper operation of a Tractor in Autodrive mode, and for Managing Employees, proper supervision of Authorized Employees operating Tractors in Autodrive mode. All Authorized and Managing Employees are prohibited from occupying the area in which a Tractor is operating in Autodrive. Such Authorized and Managing Employees shall conduct operations from the perimeter of such area. At no times during Autodrive operations shall an employee be permitted to lay down, sleep, or take a rest break in the area of operation while a Tractor is operating in Autodrive.

All other employees who are not Authorized Employees or Managing Employees will be provided a brief overview of this Procedure.

Training in this Procedure must be administered to all new employees as a part of their new hire orientation. Retraining must be conducted annually or whenever there is a change in job assignment, a change or addition of a Tractor to Customer's fleet, or the initiation of an equipment or process change that presents a new hazard to Tractor operations in Autodrive.

Training records must be kept for all Authorized or Managing Employees covered under this Procedure.

VI. PROCEDURE STEPS

A. The following are the steps required to initiate and conduct Autodrive operations with a Tractor pursuant to this Procedure:
    a. The Authorized Employee must notify all other relevant employees, contractors, and third parties in writing of when and where driverless operations will occur, at least 6 hours prior to initiating the Autodrive operation.
    b. The Authorized Employee must place signs that read “Warning: Autonomous Vehicle in Operation. No Entry During Operation” (each a “Warning Sign”) at each location where a Tractor will be in Autodrive. The Warning Signs shall be in English, Spanish, and other languages spoken by employees, contractors, and third parties as needed to clearly communicate the meaning of the Warning Sign. The Warning Signs shall contain contact information for the Authorized Employee operating the Tractor in Autodrive. The Warning Signs shall be posted at the perimeter of the location where the Autodrive operation will take place and at every usual point of entry to such location, including each road, footpath, walkway, or aisle providing ingress.
        i. The Warning Signs shall be legible at 25-feet away by a person with normal vision, and if operating in low light environments, must be illuminated.
    c. Utilizing “Jump and Go” Manual Operation, the Authorized Employee must position the Tractor at the start of the routine or go to route prior to initiating Autodrive.
    d. Use visual inspection and other means to ensure that no humans are present within the perimeter of the location where Autodrive operations will be conducted and no less than 10 meters from the Tractor prior to the start of and for the entirety of Autodrive operations, Confirm on [the ATOM Portal] that the Autodrive process contained therein has been completed and is ready for use, and the Tractor is safe to begin Autodrive operations.
    e. Click “Start” on the Monarch Tractor web portal to begin Autodrive operations.
        i. Send an update informing the Managing Employee and all impacted employees, contractors, and third parties that Autodrive operations have commenced and the location for such operations. Send a follow up note advising of the completion of such operations when Autodrive operations are completed.
B. The following are procedures to return a Tractor from Autodrive back to standard operating mode:

a. Once the Tractor has notified the Authorized Employee that the Autodrive operation is complete, or has concluded for any other reason, the Authorized Employee will be sent a notification.
b. Using visual inspection and other means, the Authorized Employee shall ensure the Autodrive operation was completed as intended. The Authorized Employee must report any abnormal findings to Monarch Tractor.
c. Upon completion of the Autodrive operations, the Authorized Employee may remove the Warning Signs from the location.
d. Utilizing "Jump and Go" Manual Operation, the Authorized Employee may move the Tractor to its next task.

VII. CONTRACTORS AND THIRD PARTIES

Contractors and third parties involved in the Autodrive operations of a Tractor must be trained on the operation of a Tractor in Autodrive prior to commencing their work.

Emergency Stops

There are two **Emergency Stop buttons** on the Monarch Tractor, one on each fender. When pressed, the Emergency Stop immediately stops moving the tractor by disengaging the drivetrain while powering down the tractor. Simultaneously, high voltage is turned off to the tractor and pressure from the hydraulic accumulators is safely released.

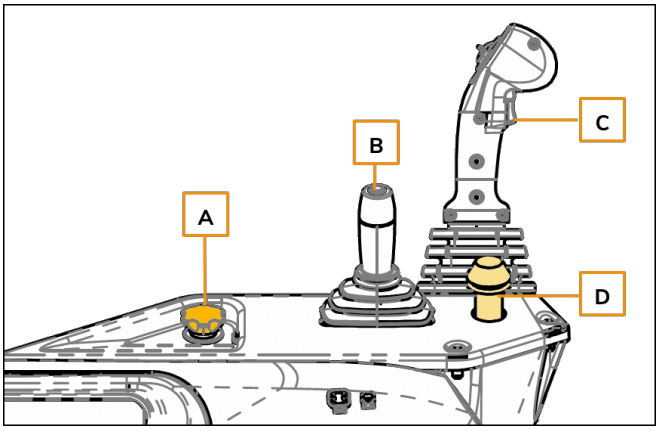


Figure 1: RIGHT-HAND SIDE EMERGENCY STOP BUTTON

A. EMERGENCY STOP BUTTON
B. 3-POINT LEVER
C. HYDRAULIC JOYSTICK
D. PTO BUTTON

IMPORTANT: 20 seconds after pressing an Emergency Stop button the tractor powers down automatically unless an operator cancels the stop by following instructions on the Smart Screen.

To stop the Monarch Tractor in an emergency:

1. While seated with the seat belt fastened, press either **Emergency Stop** button. The tractor slows to a stop.
2. To continue the Emergency Stop, take no further action. The Smart Screen will inform you that the tractor is shutting down after 20 seconds.
3. (Optional) To interrupt the Emergency Stop to cancel, follow the instructions on the Smart Screen.

The tractor powers down after 20 seconds, allowing you to safely disembark.

Universal Tractor Symbols

Universal tractor symbols are used consistently across tractor manufacturers to communicate with operators. These symbols make it easier for operators to understand new equipment.

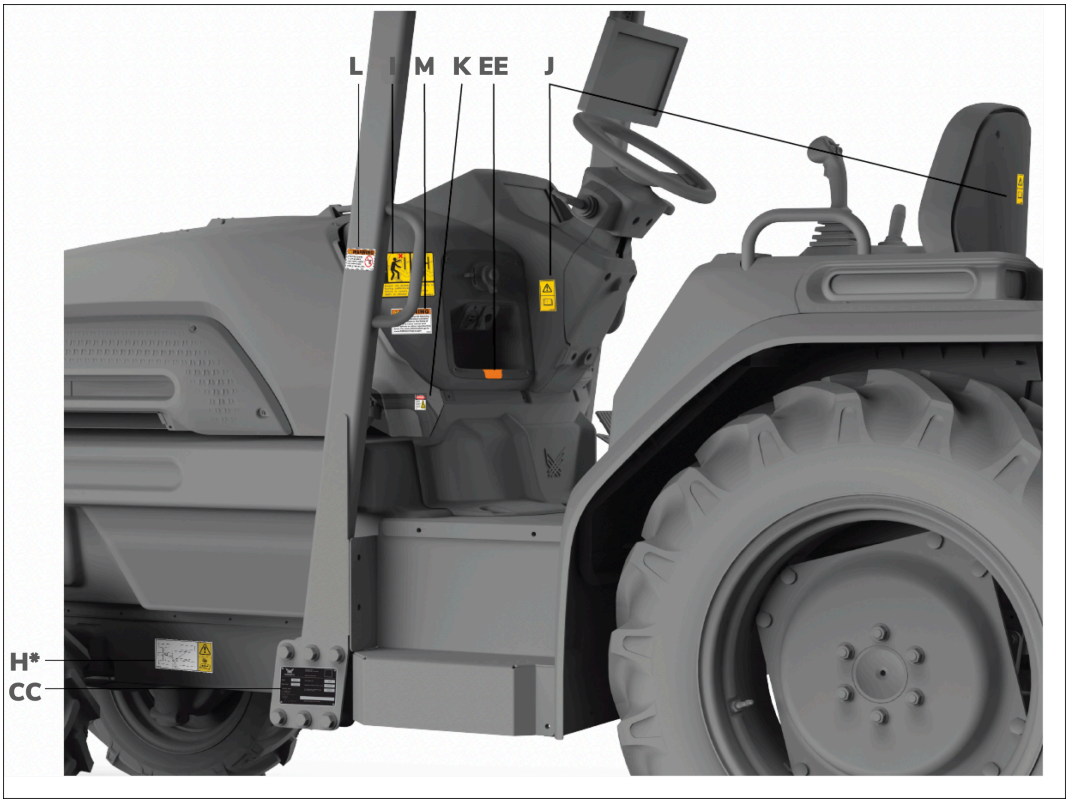
Tractor Safety Labels and Decals

Follow instructions on all Monarch Tractor decals. If any decal is damaged (peeling or has been defaced), replace any damaged decals and make sure they're placed in the correct location. Replacement decals are available from Monarch Tractor or your Monarch Tractor dealer.

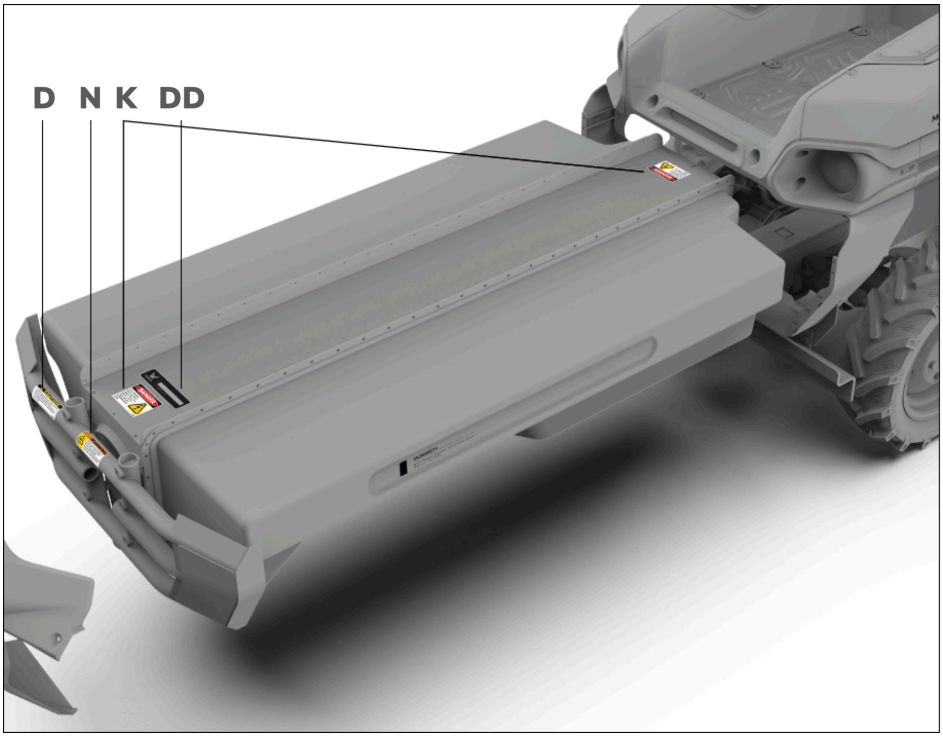
IMPORTANT: Ensure that safety labels are affixed to the tractor in the locations depicted below.

FRONT

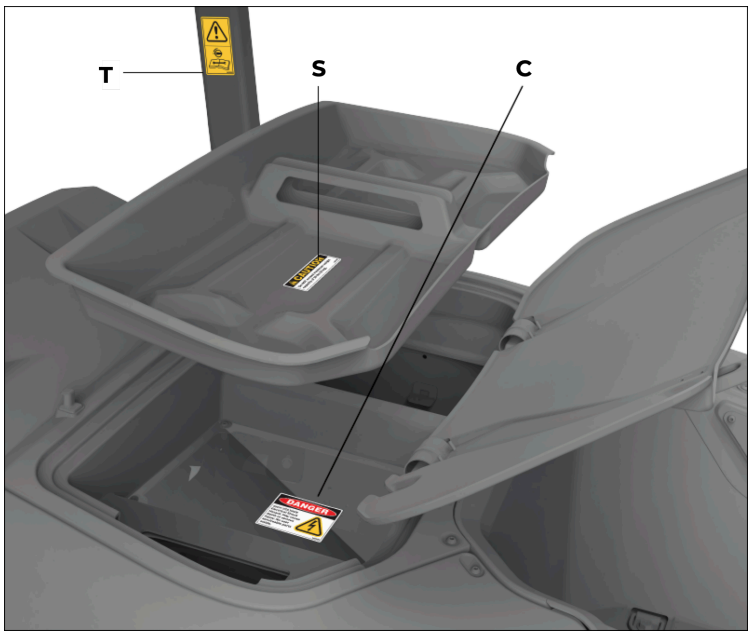
LEFT SIDE



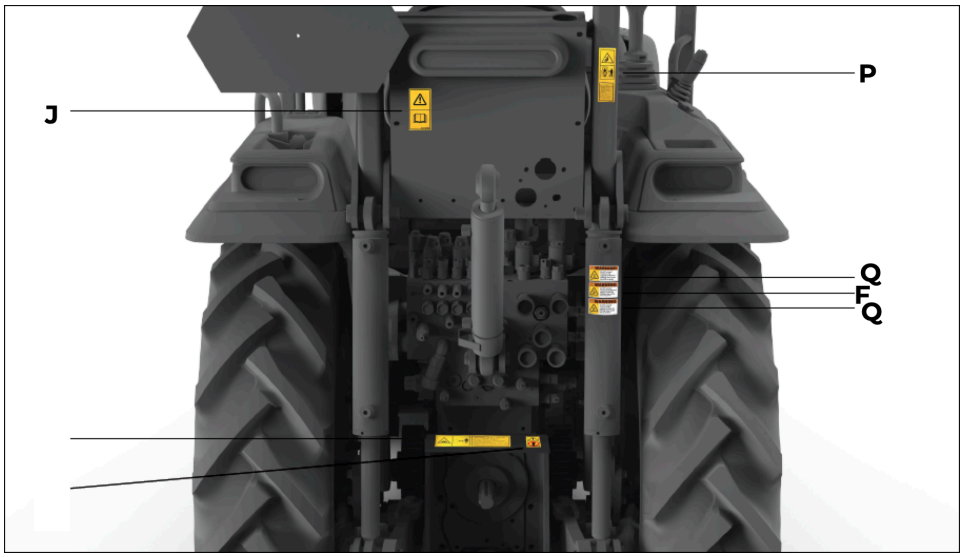
BATTERY



FUSE TRAY

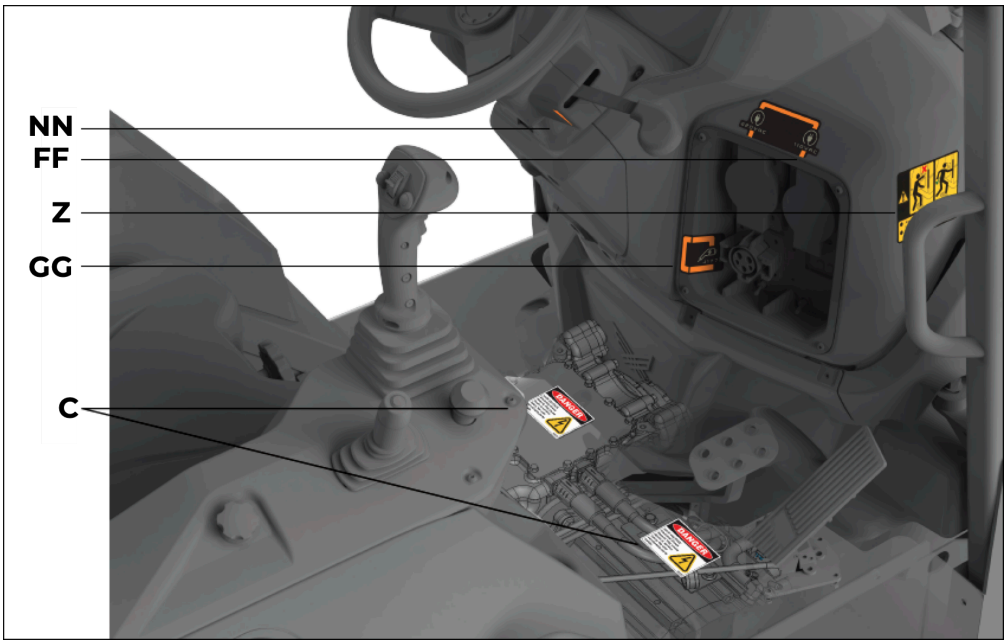


BACK



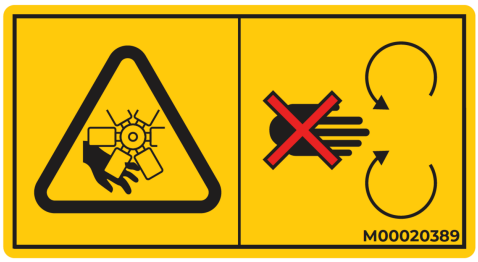
FENDERS

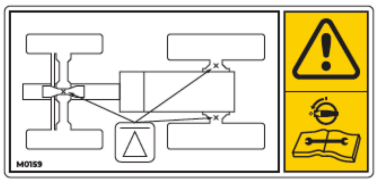
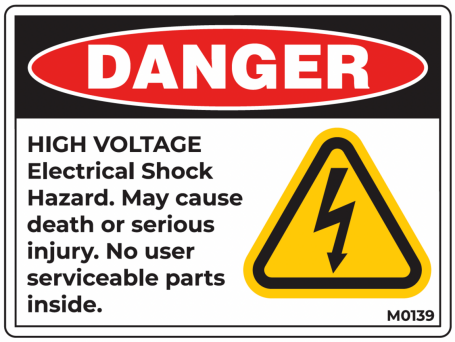
FLOOR/
DASH

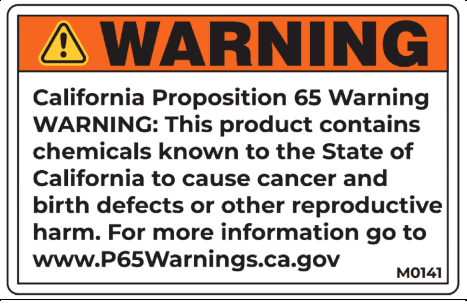
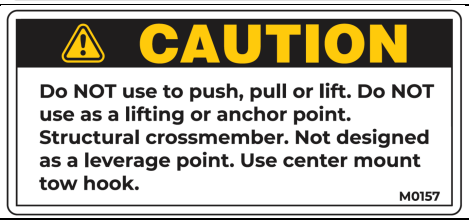


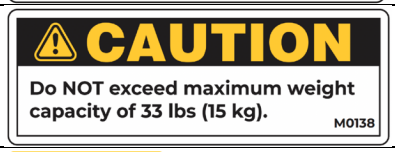
ROOF

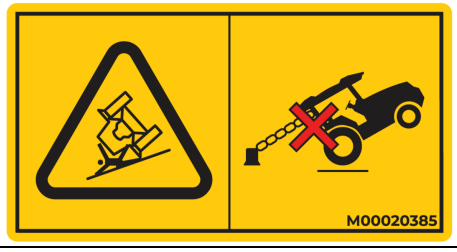
Safety Decal Part Numbers

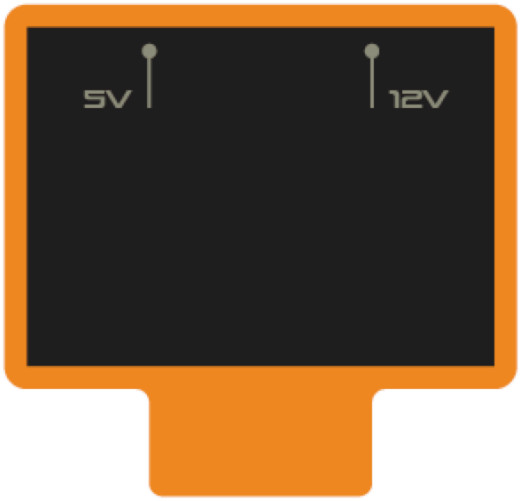
ID	Decal	Description	Part Number
A		Do not exceed max load capacity of 220 pounds (Note: Weight limit applies to tool tray.)	M0135
B		Do not step, stand, or sit on this surface	M0140
C		Do not drill	M0148
D		Do not use as a bumper	M0158
E		Only tie down or use center brackets for leverage	M0149
F		Keep hands out of fan	M00020389

ID	Decal	Description	Part Number
G		Pinch point warning	M00023033
H		Monarch Jacking Points	M0159
I		Always use grabrail	M00020388
J		Read Operator Manual	M00020382
K		High Voltage Danger	M0139

ID	Decal	Description	Part Number
L		Do not power wash Warning	M0142
M		CA Proposition 65 Warning	M0141
N		Do NOT use to push, pull, or lift	M0157
O		Do not use as step warning	M00020380

ID	Decal	Description	Part Number
P		Do not stand between tractor and implement	M00020381
Q		Do not exceed maximum lift capacity of 1650 lbs	M0144
R		Do not exceed maximum lift capacity of 1650 lbs to avoid hydraulic fluid burns	M0137
S		Do not exceed maximum lift capacity caution	M0138
T		Turn off 12V battery before service	M0155
U		PTO Switch Stop	M0156

ID	Decal	Description	Part Number
V		Emergency Stop LH	M0146
W		Emergency Stop RH	M0147
X		PPE reminder	M00020387
Y		3-Point Joystick	M0145
Z		Always use grabrail	M00020388
AA		Avoid tipping	M00020385

ID	Decal	Description	Part Number
BB		Always wear seatbelt for full ROPS protection	M00020386
CC		Monarch Tractor Product ID Plate	M00021034
DD		Monarch Tractor Battery ID Plate	B0276
EE		5V and 12V	D0126
FF		220VAC and 110VAC	D0128

ID	Decal	Description	Part Number
GG		Charging Port J1772	D0127
HH		Monarch Tractor Roof RH	R0186
II		Monarch Tractor Roof LH	R0187
JJ		Monarch Tractor Battery LH	M00022836
KK		Monarch Tractor Battery RH	M00022837
LL		Monarch MK-V Model Designator LH	D0124
MM		Monarch MK-V Model Designator RH	D0123

Monarch Tractor PIN (Product Identification Number)

Each Monarch Tractor has a unique identification number. Use this PIN when requesting service or when ordering parts.

You'll find the PIN of your tractor in three places:

1. On the Product ID Plate located on the outside of the **ROPS** frame, on the left/boarding side of the vehicle.

2. On the chassis frame tube on the left/boarding side of the vehicle.

3. On the Smart Screen.

CHANGE LOG

REVISION	DATE	DESCRIPTION OF CHANGE	AUTHOR
1.0	06/15/2025	Initial release	A. Thomas

Chapter 3 – Controls and Instruments

Monarch Tractor has made every effort to make operating the MK-V as safe as possible and has compiled this guide for your safety. It is the responsibility of the operator to avoid accidents.

ONLY TRAINED AND COMPETENT OPERATORS MAY OPERATE THIS MONARCH TRACTOR. ENSURE THAT THEY ARE FULLY TRAINED AND AWARE OF ALL MONARCH TRACTOR CONTROL AND SAFETY FEATURES.

Operators should not operate the tractor or associated machinery when tired or untrained. To avoid accidents please ensure that the operator wears clothing which will not get entangled in the moving parts of the tractor or machine and protect him or her from the elements.

When spraying or using chemicals please ensure that clothing and protective equipment is worn to prevent respiratory or skin problems. For full details, consult the manufacturer of the chemicals. When working in noisy conditions, avoid lengthy exposure to noise and ensure that ear protection is worn.

Qualified Operator Requirements

To be considered a qualified operator, you must not use drugs or alcoholic drinks, which impair alertness or coordination while working. If you're taking prescription drugs, you must get medical advice to determine if you can safely operate a tractor and any attachments/implements.

To be considered qualified, an operator must:

- **Understand written instructions, rules, and regulations.** Written instructions from Monarch Tractor include the Arrival Condition Report or Pre-Delivery Inspection checklist, this Operator Guide, and onboard decals.
- **Understand the rules and regulation at your location.** On-site rules may include an employer's work safety requirements. Regulations may apply to local driving requirements or use of a slow-moving vehicle (SMV) emblem. Regulations may identify a hazard, such as a utility line.
- **Undergo training with a qualified operator.** Operator training must consist of a demonstration and verbal instruction. New operators must start training in an area without bystanders and use all controls until he or she can operate the tractor and attachment/implement safely under all conditions of the work area.
- **Know the weight of material being handled.** Operators must know the weight of materials being handled. Material which is very dense is heavier than the same volume of less dense material.
- **Be aware of any prohibited uses or work areas.** For example, a qualified operator needs to know how to handle excessive slopes.
- **Know the location of any underground lines.** Call local utilities for assistance.
- **Wear properly fitting clothes and wear safety equipment**. Always wear safety glassed and above the ankle safety toe boots when doing maintenance or service. Safety glasses, hearing protection, and respiratory equipment are required for some work.

Daily Pre-Operation Check

Before operating the Monarch Tractor, allow time to check the condition of the tractor and fix any problems. Pre-operation checks should take place before the tractor is powered on. Make sure any attached implements are lowered to the ground and that the tractor is in Neutral.

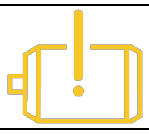
Part	Task
Radiators	Make sure both radiator screens are clean and free of debris.
Coolant	Check coolant level and add coolant if needed.
Lubricants	Clean and lubricate grease fittings. Check hydraulic fluid level and add hydraulic fluid if needed.
Brakes	Check foot brake and parking brake springs and linkages for mud, waste, or debris.
Fluid leaks	Check under the tractor for hydraulic fluid or gear oil leaks after the tractor has been parked for a while. If you see any leaks, check for the cause and correct it immediately.
Underbody	The tractor's underbody is frequently exposed to harsh treatment. Dirt, mud, and animal waste can easily accumulate. Use water and soap to wash underbody. **NEVER use a power washer.**
Tires	Check tire pressure and inspect for leaks or bulges.
Seats	Check seat position controls. Make sure the seat locks into place.
Seat belt	Check that the buckle and retractor operate properly and smoothly. Check the belt webbing for cuts, fraying, wear, or damage.

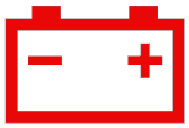
Dashboard

The Dashboard displays information about the tractor and what tasks are being performed. The Dashboard icons illuminate depending on the situation. For example, if there is an issue with the 12V battery, the corresponding icon lights up.

Figure 2: DASHBOARD WITH ILLUMINATED ICONS

Dashboard icons

Number	Icon	Meaning	Trigger	How to clear
L01		Caution	Any active Level 3 error code	
L02		Electric Motor Failure	Active Level 3 error code related to the motor	
L03		Engine coolant	Overheating issue	Check coolant level.

Number	Icon	Meaning	Trigger	How to clear
L04		Work Light	Any light in the roof is turned on	Turn off work light
L05		Position Light	Position light is on	Turn off position light.
L06		Low Beams	Low beams are on	Turn off low beams.
L07		Left turn signal	Left turn signal is on	Turn off left turn signal.
L08		Main battery	Error code with main battery	Follow instructions on the Smart Screen or contact Monarch Tractor.
L09		12V Battery	Error code or issue with 12V battery	See 12V Battery
L10		Steering	Active error code related to steering/steering failure	Follow instructions on the Smart Screen or contact Monarch Tractor.
L11		Seatbelt	Operator is in the seat and seatbelt is unbuckled	Fasten seatbelt.
L12		High beams	High beams are on	Turn off high beams.
L13		Right turn signal	Right turn signal is on	Turn off right turn signal.
L14		PTO	PTO is on	Turn off PO.

Number	Icon	Meaning	Trigger	How to clear
L15		Transmission	Any error related to transmission	Follow instructions on the Smart Screen or contact Monarch Tractor.
L16		Hydraulic fluid	Any error related to hydraulics	Allow tractor to cool down, then check hydraulic fluid level.
L17		Parking brake	Parking brake is on	Release parking brake.
L18		Charging	Main battery is charging	Disconnect charger.

Operating the Monarch Tractor

Make sure that you are properly trained by another operator who can judge and confirm your proficiency before operating the Monarch Tractor by yourself.

Before you begin

To operate the Monarch Tractor, you'll need to have the following:

- Safety equipment as required by your job site
- Monarch Tractor PIN code to log in to the Smart Screen
- Training to conduct the Daily Pre-Operation Check
- This Operator Guide

To operate the Monarch Tractor:

1. Using the provided grabrails, safely board the tractor. **Do not use the steering wheel to board the tractor to avoid slipping**.
2. Sit in the tractor seat.
3. To adjust the position of the seat, grab the handle on the right side of the seat's base. Lift the handle and slide the seat until you're sitting a safe distance away from the steering wheel.
4. Adjust the amount of backrest and suspension.
5. Buckle the seatbelt. Until the seatbelt is fastened the tractor won't drive.
6. Adjust the steering wheel tilt by holding the clip under the steering wheel.
7. Make sure the tractor is in **Neutral**.
8. To power on the tractor, press and hold the **Start** button below the steering wheel. When the tractor turns on, the power button glows blue, and the Smart Screen boots up.
9. Enter your **PIN code** in the Smart Screen and confirm settings for the tractor and any implement attached.
10. Select the gear that is most appropriate for the job.
11. Press the foot brake and take off the Parking Brake. Put the tractor in gear.
12. Drive the tractor.

Stopping and parking

To stop the tractor:

1. Decrease the engine speed using the hand throttle.
2. Step on the brake pedal to bring the tractor to a full stop. **Keep your foot on the brake pedal!**
3. Shift into **Neutral**.
4. Apply the **Parking Brake** by pushing the **P** button on the left-hand side rear fender.
5. Release the foot brake.
6. Disengage **PTO** (if engaged).
7. Lower any attached implement to the ground.
8. Log out of the tractor.

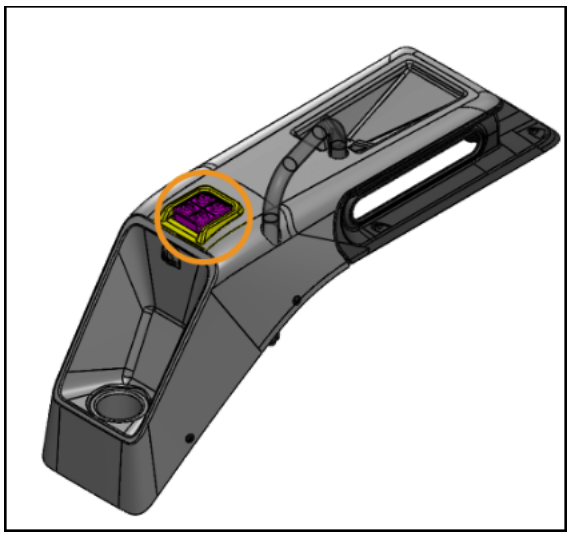


Figure 3: LOCATION OF SHIFTING BUTTONS ON LEFT-HAND SIDE REAR FENDER

Adjusting the Seat

For safe and comfortable operation, you can adjust the seat's distance from the steering wheel and the amount of backrest recline. Additionally, you can increase or decrease the amount of suspension in the seat.

WARNING: Always make sure your seat is properly locked into position by pulling the seat up and back several times. Even if you hear a click when you move the seat into place, tug on the seat to confirm proper latching.

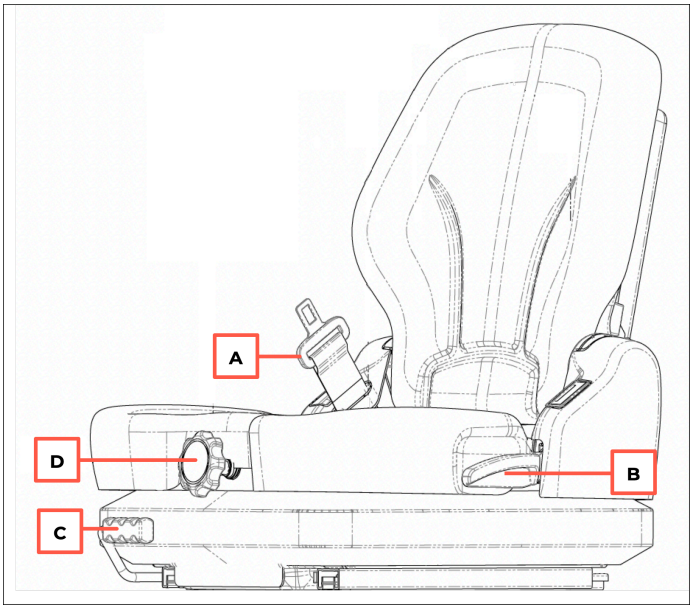


Figure 4: SEAT SAFETY AND COMFORT ADJUSTMENTS

A. SEATBELT
B. SEAT RECLINE/FOLD DOWN
C. DISTANCE FROM STEERING WHEEL
D. SUSPENSION ADJUSTMENT

Starting the Tractor

The tractor's start button is located under the steering wheel.

To power on the tractor:

- Press and hold the power button until the button glows with a blue light. Once the Smart Screen displays the lock screen you can log in and operate the tractor.

Steering, Shifting, and Speed Controls

Along with the steering wheel, the hand throttle and gear shift are used to control the speed and direction of the tractor.

The Monarch Tractor is equipped with 12 gears, nine forward and three reverse. It's important to match the tractor's speed with the task you're undertaking. When moving between fields with implements lifted in the air, for example, you should choose a high gear so you're able to drive more quickly on pavement or harder soil. At times you're plowing a field, you should pick a lower gear to provide maximum torque to handle dense soil.

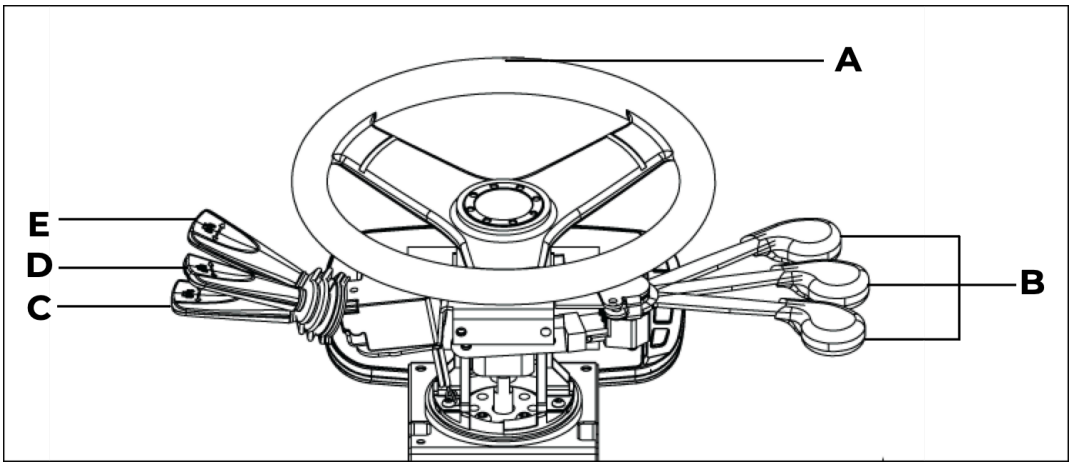


Figure 5: STEERING, SPEED, AND SHIFTING CONTROLS

A. STEERING WHEEL
B. HAND THROTTLE (ADJUSTABLE SPEED)
C. REVERSE
D. NEUTRAL
E. FORWARD

The MK-V has two shifting buttons, used in conjunction with the gear shift buttons. There are nine forward gears:

- L1, L2, L3 (Low)
- M1, M2, M3 (Medium)
- H1, H2, H3 (High)

and three reverse gears:

- R1, R2, R3

Pressing a shifting button three times quickly changes to the next gear. Avoid shifting the tractor when not in motion.

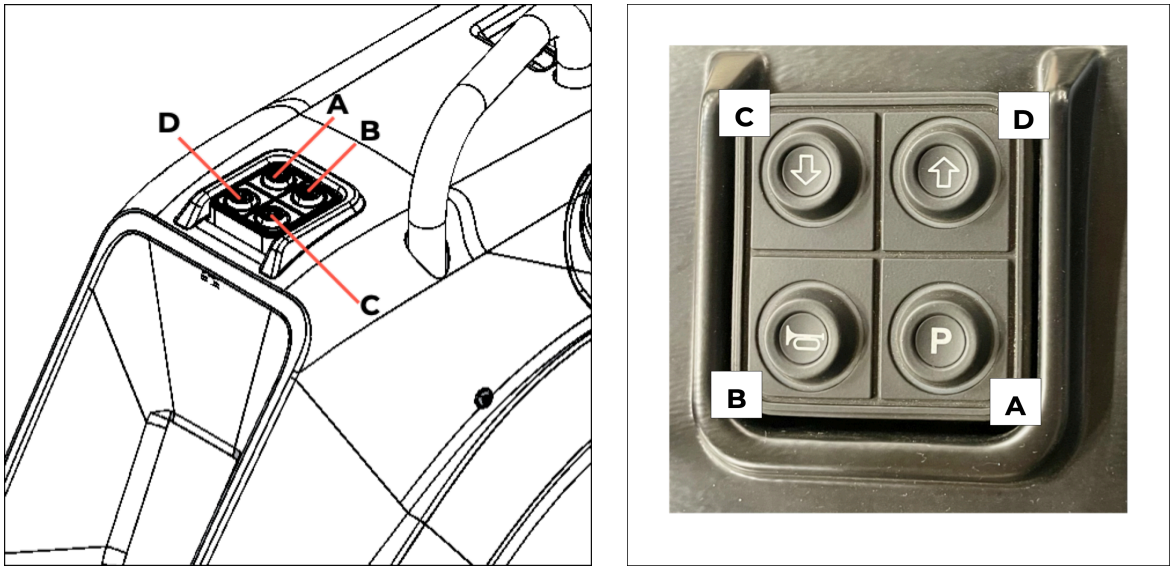


Figure 6: SHIFTING BUTTONS ON LEFT FENDER

A. PARKING BRAKE
B. HORN
C. DOWN SHIFT
D. UP SHIFT

To view the gear your tractor is in, look at the dashboard, where the range and gear are shown:

Figure 7: DASHBOARD WITH GEAR INFORMATION

Split Braking

Split braking tightens the turning radius of the tractor. When split braking is enabled the rear wheel locks up until the steering wheel is turned in the opposite direction.

To allow split braking:

1. Turn the steering wheel all the way in the desired direction.
2. When you feel resistance in the steering wheel, continue to turn the steering wheel in the same direction.
3. The rear wheel of the direction you've turned the wheel locks up until you release the steering wheel and start turning in the opposite direction.

Traction control

Traction control is automatically enabled when one rear wheel is spinning faster than the other rear wheel. Brakes are applied to whichever wheel is spinning faster. When Traction Control is active, its icon displays on the dashboard.

Washing the Tractor

Washing the tractor is the last step in every operational day. If you work with livestock, where waste can gather and solidify, cleaning the tractor after each use to keep the brakes linkages clean is a daily maintenance task. In a vineyard setting, branches and tangled leaves can collect in the brake linkages, requiring a wash after operation.

Your Monarch Tractor MK-V was not designed to be power washed due to the computer components that deliver the technology, data, and autonomy on which our customers rely. Since power washing will damage tractor components, daily washdowns with hose water prevent dirt, mud, and debris from affecting tractor performance.

IMPORTANT: Make sure to avoid getting the interior of the tractor wet. The Smart Screen, Dashboard, and other interior controls should be kept dry.

To wash your tractor:

1. Make sure the tractor is parked on level ground close to a water supply, with the Parking Brake on.
2. Power off the tractor if it is running.
3. If the tractor is charging, disconnect the charger.
4. **Close the charging port cover completely, making sure you hear it click. Close all exportable power ports.**
5. If any implements are attached to the tractor, lower them.
6. Wash the tractor with soap and water, or any solvent your jobsite uses to remove manure or other ag byproduct. Pay special attention to washing the following:
    - **Roof.** Keep the camera lenses and lights clean.
    - **Radiator covers.** Hose off the front of the tractor to clear the radiator screens.
    - ***Steps.*** For operator safety, and to avoid kicking debris into brake lines, wash the steps.
    - ***Brake lines and linkages.*** Wash out behind the front tires, including the brake lines. All components of the brakes should be completely clean. Check behind the rear tires to make sure the areas are completely clean.
    - ***Underside.*** *Wash the underside of the tractor, rinsing off any debris, mud, or waste.*

Charging the MK-V

The Monarch Tractor runs only on electricity—there is no additional source of power. Given the vital need for electricity, daily maintenance of the charging port on the tractor and the wall-mounted charger is a quick task. Keep the charging port on the tractor as clean as possible.

DANGER! Keep the tractor's charging port fully closed when not in use.
If scheduled/preventative maintenance advice is ignored and the charging port is left open, dust settling in the charging port can cause electricity to arc, posing a risk of injury.

When you use the charger, **always wait as the charger completes the process of disengaging from the tractor**. Specifically, after depressing the clip, watch until you see the blue charging light turn off and wait until you hear a click notifying you of the charger's disconnection. Pulling or prying the charger from the tractor prematurely, before the charger is fully disconnected, can damage the charging port, which may not be covered under warranty.

The Monarch Tractor battery should be kept charged to about 80% whenever possible. Charging to greater than 80% or over-charging a full battery negatively affects battery life.

Low Power Mode

If the tractor's battery falls 5% the tractor goes into Low Power Mode until you charge it. In Low Power Mode, implement controls, four-wheel drive, and exportable power are disabled. Motor speed and 3-point raise/lower speeds are reduced.

Inspecting and Cleaning the Charging System

Inspecting the wall-mounted charger and tractor charger port is a daily maintenance task.

The most ideal location for a charging station is in a shed, barn, or other covered area. **Keeping the charging system dry is vital.** While outdoor/uncovered charging stations may be used, pay extra attention to any dampness in the area.

WARNING! Never use abrasive cleaners, harsh chemical cleaners, or any metal objects to clean or inspect the charging system. Avoid exerting pressure onto any component of the charging system. DO NOT attempt to fix charging system components yourself.

Before you Begin

You'll need the following to inspect the charging port:

- Safety equipment required by your job site
- Flashlight
- Camera to take photos of any areas of concern
- Compressed air
- Soft brush
- Foam swabs
- 91% alcohol (zero residue)
- Clean rag

Inspecting Charging Equipment

IMPORTANT! Follow instructions on inspecting and maintaining your wall-mounted charger per its manufacturer. Make sure to never clean the charging handle with abrasive cleaners. Always keep the charger dry.

To inspect the charging system:

- **Check for moisture in the charging port on the tractor.** First, make sure there is no liquid of any kind in the charging port. Use compressed air to dry any moisture after investigating the source.
- **Thoroughly clean the charging port.** Use compressed air to remove dust or debris from between the pins. If needed, you can use foam swabs and 91% alcohol to gently rub away stuck-on dirt or use a soft brush to dust out the charging port. (Do not use cotton swabs due to the risk of leaving tiny pieces of cotton behind.)

- **Inspect the condition of the pins in the tractor charging port.** Check to see that each pin is covered by a thin plastic covering. If any metal is visible on the pins, contact Monarch Tractor for assistance.
- **Inspect the charging cable for cuts, fraying, or abrasions.** Make sure that the cable is flexible, free of tangled, and stored neatly, with the charging handle secured in its holster when not in use.

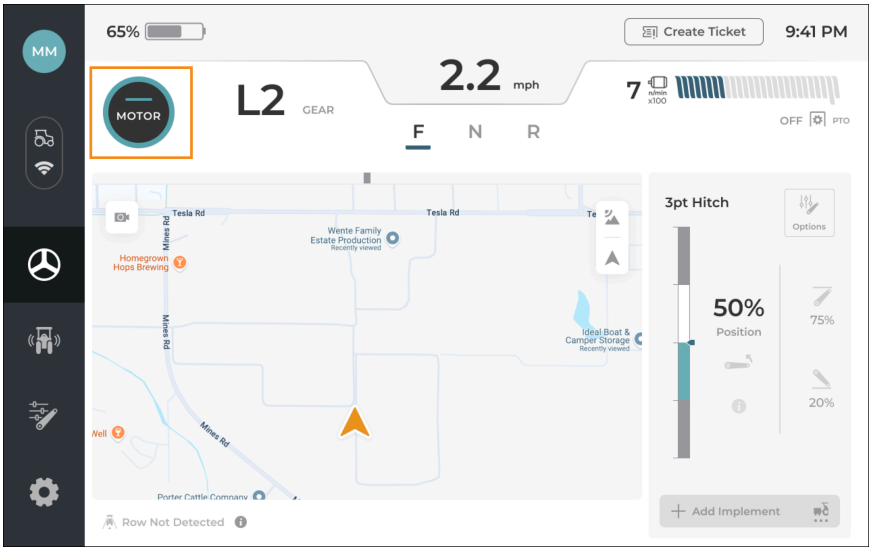
Charging the Tractor

Follow this procedure every time you charge your MK-V.

WARNING! Never connect the charger to the MK-V before checking if any water or fluids are present. Carefully clean and dry the charger and charging port before charging.

To charge the tractor:

1. Drive the MK-V to the charging area. **Do NOT power off the tractor.**
2. Put the MK-V in **Neutral**.
3. Set the **Parking Brake**.
4. On the **Smart Screen**, turn off the main engine by tapping **Motor**. Computerized components that manage the charging process still work, but the engine won't draw electricity.



5. Disembark from the MK-V.
6. Before connecting the charger, check the charging handle and the tractor's charging port for any dirt, dust, liquids or fluid.
7. Hold the clip on the charger and then plug the charger in the tractor's charging port.
8. Release the clip on the charger handle.

To remove the charging cable:

1. Grasp the charger handle, then **push in the clip and HOLD for two seconds** while the charger properly disengages from the tractor.
2. **After you hear a click, and see the blue light turn off, the charger is disengaged**. While depressing the clip, remove the charging cable and store it in the holster.

CHANGE LOG

REVISION	DATE	DESCRIPTION OF CHANGE	AUTHOR
1.0	06/15/2025	Initial release	A. Thomas

Chapter 4 – Field Operation

Hydraulic Joystick

The hydraulics in the top link of the 3-point hitch are controlled with the Hydraulic Joystick. The auxiliary hydraulics on the back of the tractor are also controlled by the joystick.

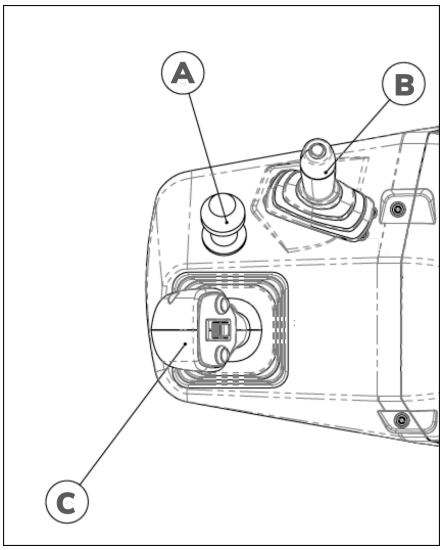


Figure 8: JOYSTICK CONTROLLER

A. PTO SWITCH
B. 3-POINT LEVER
C. HYDRAULIC JOYSTICK

To move the top link in and out:

1. Press the trigger,
2. Do one of the following:

- Push the rocker switch forward to move the top link in (towards the tractor)
- Pull the rocker switch back to move the top link out (away from the tractor)

To extend or retract auxiliary hydraulic ports:

1. Pull the trigger on the joystick.
2. Move the joystick in the desired direction.

To turn continuous flow on or off:

1. Press the trigger on the joystick.
2. Press the top button to turn continuous flow on.
3. Press the top button a second time to turn continuous flow off.

3-point Lever

The 3-point lever controls the lower links of the 3-point hitch.

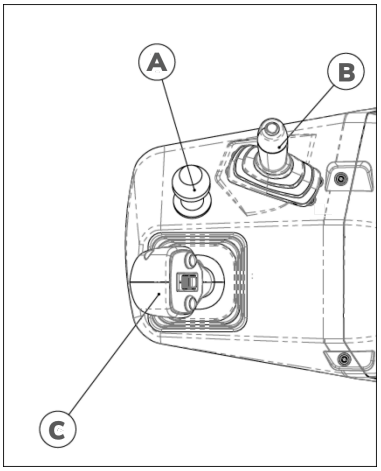


Figure 9: 3-POINT LEVER

A. PTO SWITCH
B. 3-POINT LEVER
C. HYDRAULIC JOYSTICK

To lower or lift lower links:

1. Press the top button.
2. Pull lever back.

To move the hitch to the upper or lower limit:

1. Move the lever in the desired direction, up or down. The hitch is moved to the max position.
2. Press the top button.

Using the 3-Point Hitch

The 3-point hitch is used to mount implements on the back of the tractor. Make sure to add the proper counterbalance ballast on the front of the tractor when using the 3-point hitch.

WARNING: Use the 3-point hitch only with equipment designed for 3-point hitch usage. To avoid injury, attach towed loads to the drawbar.

Do not exceed the following capacities when attaching an implement to the Monarch Tractor:

- 3-point hitch MAX lift: 1,650lbs (750 kg)
- Drawbar MAX tow: 5,500lbs (2,500 kg)
- Tongue MAX load: 1,100lbs (500 kg)

To attach implements to the 3-point hitch:

1. Back up the tractor as close to the implement connectors as you safely can.
2. Adjust the height of the arms to match the implement.
3. Connect the two lower stationary arms first.
4. Insert a lynch pin in each lower link.
5. Connect the top link after adjusting the arm's length, then put a pin through the implement and the top link.

Drawbar

Implements or trailers weighing less than **5,500 pounds** can be connected to the Monarch Tractor drawbar for towing.

WARNING: AVOID PERSONAL INJURY! Never pull from the top link, the rear axle, or any point above the drawbar. Doing so could cause the tractor to tip rearward, causing personal injury or death.

Do not exceed the following capacities when attaching an implement to the Monarch Tractor:

- 3-point hitch MAX lift: 1,650lbs (750 kg)
- Drawbar MAX tow: 5,500lbs (2,500 kg)
- Tongue MAX load: 1,100lbs (500 kg)

To connect an implement to the drawbar:

1. Reverse the tractor as close as you can to the implement if it's too heavy to move.
2. Remove the tractor drawbar pin.
3. Line up the implement with the hole in the drawbar.
4. Pin the implement to the drawbar.

Adjusting drawbar length

There are three positioning holes in the drawbar. Follow recommendations in your implement's user manual for information on positioning the drawbar.

To change the drawbar position:

1. Remove the two pins at the base.
2. Slide the drawbar to the desired position.
3. Re-insert the pins.

To remove the drawbar:

1. Remove the drawbar pin at the base.
2. With the drawbar supported by two hands, slide the drawbar out and store it safely.

Swing drawbar

The drawbar has three swing positions (left, center, and right) as required by certain implements.

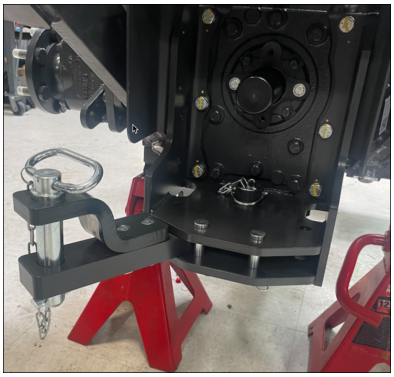


Figure 10: DRAWBAR IN LEFTMOST SWING POSITION

To change the drawbar position:

1. Unhook the two cotter pins from the underside of the drawbar housing. Set them aside.
2. Swing the drawbar right or left. Replace the pins.

PTO Clutch

DANGER: AVOID PERSONAL INJURY!

- **Disengage PTO and allow ALL rotating components to completely stop before connecting to disconnecting PTO implements.**
- **Stay clear of rotating driveline. Always walk around tractors and implements instead of stepping over a rotating shaft!**
- **Keep bystanders away. Do NOT allow any person to sit on or near the tractor when the PTO operating.**
- **Keep hands, feet, clothing, and long hair away.**
- **Keep PTO shields and all guards in place.**
- **Do NOT exceed the rated implement PTO speed of 540rpm.**
- **Do NOT service the tractor or implement with PTO engaged.**
- **PTO shaft can be damaged if you drive through a valley.**

The Power Take Off (PTO) shaft, or PTO clutch, transfers power from the tractor's motor to the implements attached to the PTO. The drive shaft from the motor is connected to the PTO shaft; then a coupler attaches to the implement. The Monarch Tractor MK-V PTO has a max speed of 540 rpm. The PTO has six splines with a 1 3/8-inch diameter.

You can watch the RPM of the PTO on the dashboard and Smart Screen as you increase the speed of the engine using the hand throttle. The yellow PTO switch is used to turn on and off the PTO.

Do not exceed the following capacities when attaching an implement to the Monarch Tractor:

- 3-point hitch MAX lift: 1,650lbs (750 kg)
- Drawbar MAX tow: 5,500lbs (2,500 kg)
- Tongue MAX load: 1,100lbs (500 kg)

IMPORTANT: When towing an implement connected to the PTO, make sure to keep the tractor and implement on even ground. If the implement is being towed at an angle, uphill or downhill, there's a risk of snapping off the PTO splines.

To connect an implement to the PTO:

1. Power on the tractor and let it start up.
2. Make sure the tractor is in neutral.
3. Attach the implement to the 3-point hitch or the drawbar.
4. Slide the PTO shaft onto the tractor PTO.

5. Using the hand throttle and watching the dashboard, give the tractor some throttle. You'll see the RPMs increase on the Dashboard.
6. To start the PTO, grasp the black ring under the yellow PTO button, press the yellow button down against the black ring; then pull up both. Release your grasp.
7. If the implement has a specified RPM, increase the hand throttle to the proper RPM. (Using the foot throttle to control the PTO is not recommended as the RPMs cannot be precisely controlled with the foot throttle while operating.)
8. Operate the tractor and implement.

To disconnect an implement from the PTO:

1. Lower the implement to the ground.
2. Press down the yellow PTO switch. The PTO stops rotating.
3. Power off the tractor.
4. Slide the PTO shaft of the implement off the tractor's PTO.

PTO Maintenance

Lubricating the PTO shaft after every use is recommended. Because of the metal-on-metal contact between the PTO shaft and connected implements, consistent lubrication ensures that implements and the PTO shaft connect smoothly.

IMPORTANT: Make sure you read implement operator guides for lubrication information, especially of implement grease fittings. Grease fittings often lubricate the coupler and implement shaft so the implement can spin freely on the PTO shaft.

After using the PTO, always do the following:

1. Remove any stuck vegetation or debris from the PTO cover.
2. Use a towel to remove any dirt or residue from the PTO shaft and PTO cover.
3. Spread a bit of multi-purpose grease on the PTO shaft.

7-Pin Connector

The 7-pin connector provides power and brake electronics to connected implements. You'll find the 7-pin connector on the back of the tractor. Make sure to keep the connector covered when not in use.

To connect an implement to the 7-pin connector:

1. Connect the implement to the 3-point arm.
2. Lift the cover to the 7-pin connector.
3. Connect the implement's 7-pin cable to the 7-pin connector.

7-Pin Connector Wiring

Below is the color code for the 7-pin connector. Make sure to match the functions of the wires, not just the colors.

Pin	Signal	Color
1	Ground	Black
3	Left Turn	Brown
4	Trailer Brake Light	Brown
5	Right Turn	Brown
6	Taillight	Brown
7	Trailer Accessory	Brown

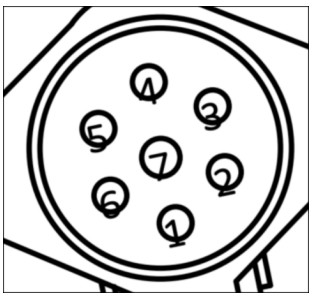


Figure 11: 7-PIN WIRING DIAGRAM

CAN Bus Connector

The Controller Area Network bus (CAN bus) is a connector used to communicate between the Monarch Tractor and sensor-enabled implement systems. As a single point of entry to connected systems, the CAN bus connector enables central diagnostics, data logging, and configuration.

WARNING: Be careful with the top pin of the three-point hitch when connecting implements. Do NOT push the hitch to the left to make room for implement connections; you can damage elements behind the hitch. Instead, release the top hitch, connect the implement, then resecure the top hitch.

To connect an implement with the CAN bus:

1. Attach the implement to the 3-point hitch.
2. Unscrew the cover of the CAN bus connector.
3. Check the CAN bus connector for dirt, debris, or fluid. The port must be dry and clean to properly and safely connect an implement.
4. Check the CAN bus cable on the implement for dirt, debris, or fluid. Clean and/or dry the cable before connecting it to the CAN bus port.
5. Connect the implement cable to the CAN bus port.
6. Start the tractor

To disconnect a CAN bus implement:

1. Stop the tractor, park it, and put it in **Neutral**.
2. Move the top hitch out of the way if it obscures the CAN bus port.
3. Disconnect the implement from the CAN bus port.
4. Safely store the implement.

Exportable Power

The Monarch Tractor has several exportable power connectors that can be used in the field when you're away from other power sources. Depending on your needs, you can power 110-volt and 240-volt equipment using ports on the tractor. Additionally, there are two 5V USB power ports and a 12V dash socket.

All exportable options use the 12V battery as a power source. If you notice that any exportable power ports aren't working, check the charge on the 12V battery as a first troubleshooting step. If the 12V battery is functional but the power ports aren't charging, please contact Monarch Tractor or your Monarch Tractor dealer for next steps.

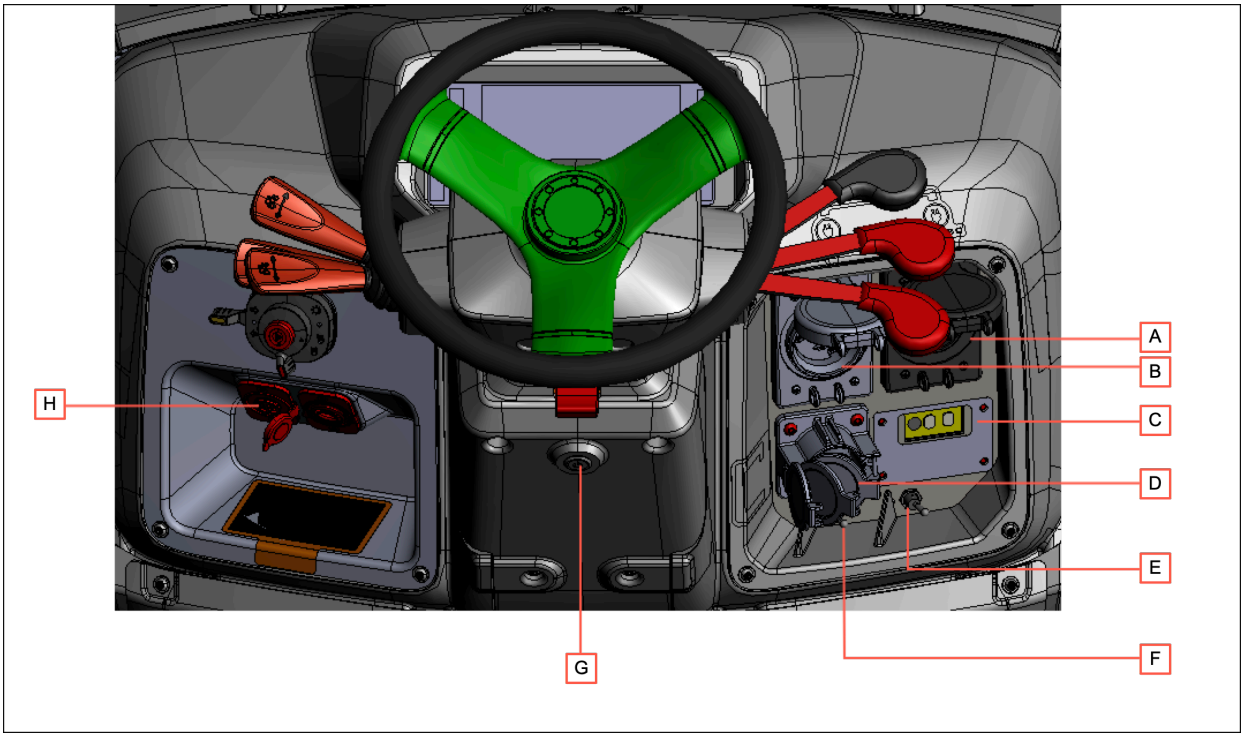


Figure 12: EXPORTABLE POWER

A. 110V
B. 220V
C. POWER TEST/RESET
D. CHARGING CONNECTOR
E. ON/OFF SWITCH FOR 220V CONNECTOR
F. ON/OFF SWITCH FOR 110V CONNECTOR
G. START BUTTON
H. 5V USB CONNECTOR
I. 12V POWER CONNECTOR

Hydraulic Quick Connectors

On the back of the tractor you'll find several quick connectors, or remote hydraulics, used to connect implements to the MK-V hydraulic system. You control the function of hydraulic couplers in the Smart Screen.

- **Aux Port 1 Send and Return.** The first auxiliary port delivers pressurized hydraulic fluid from the tractor to attached implements, then back to the tractor. Use these couplers as described in your implement's operator manual.
- **Aux Port 2 Send and Return.** The second auxiliary port delivers pressurized hydraulic fluid from the tractor to attached implements, then back to the tractor.
- **Constant Flow Send and Return.** Connecting an implement to the Constant Flow couplers forms a closed loop for hydraulic flid to circulate continuously.
- **Free Return.** Used for implements that require the lowest possible hydraulic pressure, the free return coupler moves hydraulic fluid in one direction.

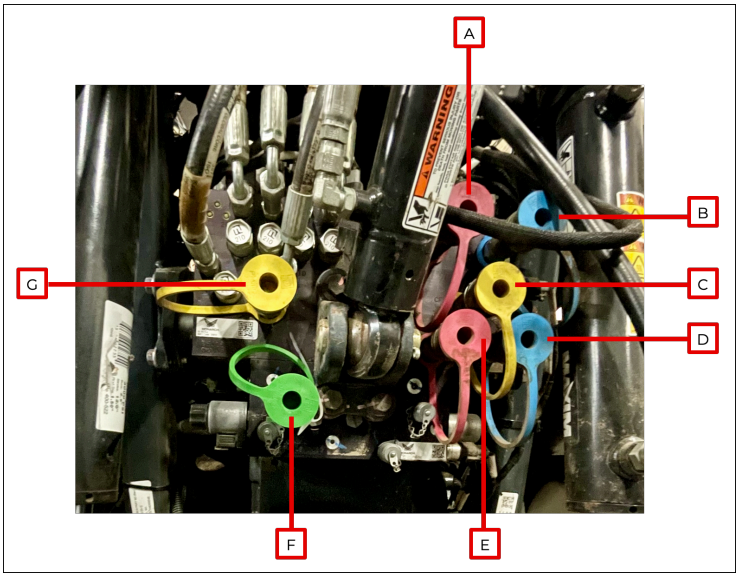


Figure 13: HYDRAULIC MANIFOLD WITH QUICK RETURN COUPLERS

A. AUX PORT 1 SEND
B. AUX PORT 2 SEND
C. CONSTANT FLOW SEND
D. AUX PORT 2 RETURN
E. AUX PORT 1 RETURN
F. FREE RETURN
G. CONSTANT FLOW RETURN

CHANGE LOG

REVISION	DATE	DESCRIPTION OF CHANGE	AUTHOR
1.0	06/15/2025	Initial release	A. Thomas

Chapter 5 – Tires and Ballast

Servicing and maintaining your tires are important tasks to keep your Monarch Tractor operating to its full potential. Tire pressure can vary depending on ballast on the front tires, implement weight on the back tires, and the presence of ballast in the rear tires.

DANGER: SERVICE TIRES SAFELY!

- **Explosive separation of a tire and rim parts can cause serious injury or death.**
- **Do not attempt to mount a tire unless you have the proper equipment and experience to perform the job.**
- **Always maintain the correct tire pressure. Do not inflate the tires above the recommended pressure.**
- **Never weld or heat a wheel and tire assembly; the heat can cause an increase in air pressure, resulting in a tire explosion. Welding can structurally weaken and/or deform the wheel.**
- **When inflating tires, use an extension hose long enough to allow you to stand to one side and NOT in front or over the tire assembly.**

MK-V Tire Options and Information

Each MK-V is optimized for the tires configured for your tractor. Tire options are offered to make sure that the MK-V is ready to use in the setting you have in mind.

IMPORTANT: NEVER INSTALL DIFFERENT TIRES ON THE MK-V WITHOUT RE-CALIBRATING THE TRACTOR. CHANGING TIRES WITHOUT CALIBRATING THE TRACTOR MAY CAUSE DAMAGE AND VOID THE WARRANTY.

Yokohama R1 Alliance A-370 / FarmPRO 324

Monarch Part Number	M00022808/M00022809	M00022822/M00022823
Brand (Printed on Tire)	Alliance	
Tire Tread Pattern		
Sizes and Specifications	**Front**	**Rear**
Manufacturer	Yokohama	
Model	A-370	Farm PRO 324
Tread Designation	R-1W	R-1
Size	200/70R16	11.2-24
Rim Size	W6 x 16	W10 x 24
Load Index & Speed Symbol	94A8/94B	116A8
Acceptable Pressure Range	12-35psi	12-52psi
Tire Type	TL	TL
Tire Construction	Radial	Bias
Dimensions in. (mm)	**Front**	**Rear**
Unloaded Outer Diameter	27in (686mm)	43.5 (1105)
Unloaded Static Width	7.8 (198)	11.2 (285)
Statically Loaded Radius	12.4 (315)	20.5 (520)
Rolling Circumference	81.5 (2069)	131.6 (3343)
Tractor Minimum Overall Width	48.4 (1229)	
Available Track Widths	37.0 (939)	36.0 (916), 40.6 (1,030), 43.9 (1,116), 48.4 (1,230)
Manufacturer Data	Yokohama Alliance	
Manufacturer Data Sheet	LINK	LINK
Manufacturer Tire Catalogue	LINK	

R14 Goodyear R14T

Monarch Part Number	M00022808/M00022809	M00022822/M00022823
Brand (Printed on Tire)	Alliance	
Tire Tread Pattern		
Sizes and Specifications	**Front**	**Rear**
Manufacturer	Titan	
Model	R14T	
Tread Designation	R-1	
Size	27x8.50-15	320/85R20
Rim Size	7JA x 15	W11 x 20
Load Index & Speed Symbol	102A8	119D
Acceptable Pressure Range	44psi	23psi
Tire Type	TL	TL
Tire Construction	Bias	Radial
Dimensions in. (mm)	**Front**	**Rear**
Unloaded Outer Diameter	27.3 (692)	41.4 (1052)
Unloaded Static Width	8.9 (226)	12.6 (320)
Statically Loaded Radius	12.5 (318)	18.7 (476)
Rolling Circumference	81 (2061)	125 (3178)
Tractor Minimum Overall Width	54.2 (1377)	
Available Track Widths	38.9 (988)	42.1 (1069)
Manufacturer Data	Titan Goodyear	
Manufacturer Data Sheet	LINK	LINK
Manufacturer Tire Catalogue	LINK	

R4 Galaxy Marathoner

Monarch Part Number	M00022790/M00022791	M00022800/M00022801
Brand (Printed on Tire)	Galaxy	
Tire Tread Pattern		
Sizes and Specifications	**Front**	**Rear**
Manufacturer	Yokohama	
Model	The Marathoner	
Tread Designation	R-4	
Size	27x8.50-15	43x16.00-20
Rim Size	7 x 15	13 x 15
Load Index & Speed Symbol	96B/100A6	120A6
Acceptable Pressure Range	45psi	20psi
Tire Type	TL	TL
Tire Construction	Bias	
Dimensions in. (mm)	**Front**	**Rear**
Unloaded Outer Diameter	26.7 (678)	42.2 (1072)
Unloaded Static Width	8.4 (213)	16.1 (409)
Statically Loaded Radius	12.7 (322)	19.4 (495)
Rolling Circumference	84 (2134)	128.7 (3268)
Tractor Minimum Overall Width	59.4 inches (1.5M)	
Available Track Widths	38.9 (988)	45.5 (1156)
Manufacturer Data	Yokohama Galaxy	
Manufacturer Data Sheet	LINK	LINK
Manufacturer Tire Catalogue	LINK	

R3 Galaxy Garden Pro XTD

Monarch Part Number	M00022785/M00022786	M00022803/M00022804
Brand (Printed on Tire)	Galaxy	
Tire Tread Pattern		
Sizes and Specifications	**Front**	**Rear**
Manufacturer	Yokohama	
Model	Garden Pro XTD	
Tread Designation	R-3+	
Size	215/70R15	400/70R20
Rim Size	7 x 15	13 x 15
Load Index & Speed Symbol	90A6/90B	130A8/130B
Acceptable Pressure Range	12-26psi	17-29psi
Tire Type	TL	TL
Tire Construction	Radial	
Dimensions in. (mm)	**Front**	**Rear**
Unloaded Outer Diameter	27 (686)	42 (1068)
Unloaded Static Width	8.5 (216)	15.9 (404)
Statically Loaded Radius	12.5 (318)	19 (483.1)
Rolling Circumference	78.9 (2004)	125.9 (3198)
Tractor Minimum Overall Width	59.2 inches (1.5M)	
Available Track Widths	38.9 (988)	45.5 (1156)
Manufacturer Data	Yokohama Galaxy	
Manufacturer Data Sheet	LINK	LINK
Manufacturer Tire Catalogue	LINK	

R3 Galaxy Turf Special

Monarch Part Number	M00025652	M00025646
Brand (Printed on Tire)	Galaxy	
Tire Tread Pattern		
Sizes and Specifications	**Front**	**Rear**
Manufacturer	Yokohama	
Model	Turf Special	
Tread Designation	R-3	
Size	25x10.5LL-15	22.5LL-16.1
Rim Size	8 x 15	16.1 x 18
Load Index & Speed Symbol	100A6/114A2	145A6/A3
Acceptable Pressure Range	32psi	18psi
Tire Type	TL	TL
Tire Construction	Radial	
Dimensions in. (mm)	**Front**	**Rear**
Unloaded Outer Diameter	25.3	44.6
Unloaded Static Width	10.3	22.6
Statically Loaded Radius	10	19.4
Rolling Circumference	72.7	125.3
Tractor Minimum Overall Width	59.2 inches (1.5M)	
Available Track Widths	38.9 (988)	45.5 (1156)
Manufacturer Data	Yokohama Galaxy	
Manufacturer Data Sheet	LINK	LINK
Manufacturer Tire Catalogue	LINK	

Checking Tire Pressure

Tire pressure depends on the type of tire installed on your tractor along with any installed or liquid ballast. If there is ballast in the rear tires of your tractor, move the tractor slowly forward until the air step is at the top of the tire and the take the tire pressure reading.

Before you begin

You'll need the following to complete this task:

- Safety glasses and any other safety equipment required by your job site.
- Tractor tire pressure gauge

To check tire pressure:

1. For each tire, remove the valve cap and place it in a safe place.
2. Insert the tire gauge and push until the hissing sound stops.
3. Check the PSI reading on the gauge and compare it to the recommended PSI table.
4. If the air pressure is low, add air until the tire is properly filled.
5. Replace the valve cap.

Tire Pressure Table

Below are the recommended PSI of each tire:

Tire	Recommended PSI	Notes
Front Left without ballast	45psi	
Front Left **with** ballast	50psi	
Front Right without ballast	45psi	
Front Right **with** ballast	50psi	
Rear left	18psi – 24psi	Dependent on rear implement weight and presence of inner ballast
Rear right	18psi – 24psi	Dependent on rear implement weight and presence of inner ballast

The weight of implements can cause tractor tires to deform, which impacts tire wear and soil compaction. To compensate, adjust the tire pressure to the correct level for the load and the conditions where you will be operating. A lower tire pressure is better for working in soil (reduces compaction) but higher tire pressure is better for roads as it saves fuel and reduces wear.

IMPORTANT: Check your implement operator manual and follow any instructions.

Avoiding Soil Compaction

Soil compaction is what happens when heavy machinery is operated over ground with tires that aren't right for the setting. Running a tractor on tires that are over-inflated can cause soil compaction, which can be costly to fix. By lowering the air pressure in an overinflated tire, the "footprint" of the tire grows longer and can dig into the ground. With correctly inflated tires, the tractor and any attached implements float over the soil (without digging in), the tractor stays between rows with less effort, and the ride and handling of the tractor is improved.

Inspecting Tires

It's important to consider the following when inspecting the tires of your Monarch Tractor.

Measure tread height. A tire with tread of less than 20% if its original depth needs to be replaced.

Look for signs of uneven tread wear. Tires with signs of odd or uneven tread wear patterns can be under-inflated or over-inflated. Uneven wear can also happen if there is an alignment problem.

Inspect tire sidewalls. Look for cuts, bulges, and tears in tire sidewalls. A bulging tire can't be repaired and must be replaced. If you see fabric through a cut, or if the cut is close to the bead or shoulder of the tire, the tire must be replaced.

Inspect valve stems. If a tire constantly requires air, check the valve stem to make sure it's tight and that the stems are loose or showing signs of dry rot. Also, be sure to cap the valve stems to keep them clean.

Tighten bolts properly. Bolts prevent a wheel from separating during operation and maintain the correct clamp load between the rim and hub to reduce wear.

IMPORTANT: Never use an impact driver to tighten bolts! There is a risk of over-tightening bolts, which can lead to structural issues with the wheel. Instead, use a nut torque wrench to achieve the correct tightness.

Consider the work conditions where you use the tractor. For example, old tires won't grip in a wet field, causing slippage, but it's safe to use tires with a smoother tread to drive the tractor on concrete. Depending on the deployment of the tractor, tires may need to be replaced less frequently or more frequently.

Replace both tires on an axle at the same time. If you need to replace one front tire, for example, it's vital that you replace both front tires with new tires of the same size and brand.

Avoid dry rot. Overexposure to sunlight and dry air can create cracks and lower the elasticity of the tire's material. Tires affected by dry rot look brittle, faded, and have cracks.

Before you begin

You need the following to complete this task:

- Flashlight
- Torque wrench
- Tire tread depth gauge

Inspect Tires, Wheels, and Bolts

To inspect wheels, rims, and bolts:

1. Power off the tractor after setting the parking brake and putting the tractor in Neutral.
2. With a bright flashlight, inspect each tire for small cracks. Cracks can grow quickly, which can lead to catastrophic failure.
3. Using a tire dread depth gauge, measure the depth of the tread ribs, making sure tread is acceptable.
4. Check the rim, making sure the tire is completely surrounded by the metal rim.
5. Inspect the wheel to make sure no modifications have been made (such as welding).
6. Check the bead around the tire to make sure the tire is properly seated.
7. Check the torque of each bolt:

- Rear tires: **230Nm**
- Front tires: **135Nm**

Changing the Rear Wheel Track Width

The track width of the rear wheels can be adjusted to better accommodate the operating environment and implement used. When using a heavier, taller, or less stable implement, adjusting the rear tires to the widest setting can improve tractor stability.

In total there are four adjustable track widths:

- 36 inches
- 40.6 inches
- 43.9 inches
- 48.4 inches

DANGER: To avoid increased tip-over risk, set the rear tire width as wide as possible. Always consider attached implements and the additional weight they add to the tractor while in use.

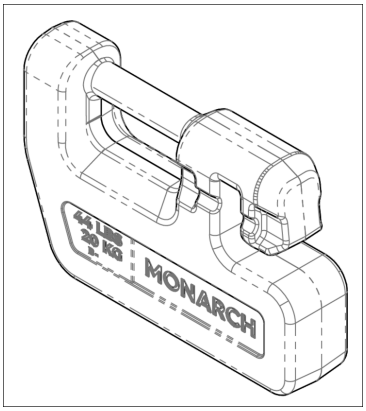
To adjust the rear tire track width:

1. Jack up the tractor.
2. Remove one rear tire, then the second rear tire. Set both tires aside.
3. Move the axle to the width that you need.
4. Repeat the process with the second wheel.
5. Lower the tractor.

Ballast

Ballast improves the tractor performance when using a heavy implement by adding weight to the front of the tractor, preventing the front end of the tractor from lifting or rising. Monarch Tractor ballast weights are designed for safe use without voiding the limited warranty. A max of 10 ballast weights (50lbs each) can be loaded onto the Monarch Tractor.

WARNING: Do not attempt to use the front cross member to push or pull any objects. While ballast can be safely loaded onto the front cross member, it is a structural component of the tractor is and is NOT a bumper or a lifting point.



MONARCH BALLAST WEIGHT (PART NUMBER M0007163)

Liquid Ballast in Rear Tires

Rear tire ballast, or liquid ballast, is used to improve tractor stability and traction. Monarch Tractor recommends the use of **beet juice** or a **31% mixture of calcium chloride solution and water** to provide safe, economical ballast. Beet juice weighs 11 pounds per gallon; calcium chloride weighs 11.3 pounds per gallon. Used properly, liquid ballast doesn't damage tires, tubes, or rims. Soil compaction is a risk of adding liquid ballast.

With tires being the lowest point on the tractor, filling them with heavy ballast liquid instead of air lowers the vehicle's center of gravity. Also, with extra ballast weight pressing the tires into the soil, more horsepower is available for towing/pulling power (or cattle feed pushing power) without the tires losing traction and spinning.

IMPORTANT: Never fill tires with plain water; the addition of calcium chloride is required to prevent the water from freezing. Fill with ballast only to 75% of max capacity.

CHANGE LOG

REVISION	DATE	DESCRIPTION OF CHANGE	AUTHOR
1.0	06/15/2025	Initial release	A. Thomas

Chapter 6 – Transport Operations

Jack up the Tractor

Jacking up the tractor is a common task that requires your full attention. The front axle pivot action that allows the Monarch Tractor to maneuver also makes the tractor unstable if you jack up the rear tires first. **Always jack the front tires first.**

Jack on a flat surface, ideally a concrete floor. Avoid working alone. Ask an operator with training and experience to help. Only use the designated jacking points on the front and rear of the Monarch Tractor. Use jacks and jack stands in good condition that are designed for the load to be suspended.

Chock all wheels that will remain on the ground, using chocks at the front and rear of each wheel. If wooden blocks are used for jacking or chocking, use hardwood of the appropriate size to support the tractor's weight.

Once you've gathered your jack and jack stands, you're ready to jack up the tractor.

DANGER! Only use identified jacking points. Ensure proper support with jack stands and never work under a jacked-up tractor without additional supports or blocks in place. Be aware of your surroundings at all times when jacking up the tractor or when bringing the tractor back down.

Before you begin

Here's what you'll need to safely complete this task:

- Protective gloves
- Safety glasses
- 5-ton jack (minimum)
- 4 jack stands, 6 tons each
- 4 chocks with a service area that will support the tractor's weight

To jack up the tractor:

1. Make sure the tractor is powered off.
2. Disconnect implements connected to the tractor, unless permanently mounted (like the Feed Pusher).
3. Take off ballast if any weights are hung on the front end of the tractor.

4. **Begin with the front axle.** From the side of the tractor, slide the jack under the front center of the tractor.
5. Jack the tractor up.
6. Place TWO jack stands under the front support beam of the tractor.

7. Slowly lower the front of the tractor onto the jack stands.
8. Place jack under ladder hitch or under the rear axle to lift.
   WARNING: DO NOT jack under the hitch where the drawbar pin is located to avoid pushing the pin up and damaging the hitch.
9. Lift the rear of the tractor.
10. Place TWO jack stands under the rear beam of the tractor. Make sure the stands are sitting in the middle of the axle.
11. Slowly lower the tractor down onto the jack stands.

Loading the MK-V for Transport

At some point, you'll need to transport your Monarch Tractor on a trailer. Given the weight distribution of the main battery, please follow the instructions below.

WARNING: Adequately designed ramps of sufficient strength are required to support the weight of the tractor. Do not use wood ramps, which can break and cause personal injury.

Before you begin

Here's what you'll need to safely complete this task:

- Protective equipment as required by your job site
- Safety glasses
- Transport vehicle/trailer equipped to haul 5 tons
- Four 2 ¾-inch clevis pins rated for at least 4,500 pounds each
- Four 5/16-inch or 3/8-inch Grade 70 chains
- Chain binders to tighten the chains

Load the Tractor for Transport

To load the tractor for transport:

1. Wash the tractor, especially if there is animal waste on the tractor.
2. Power on the tractor. Drive the tractor onto the trailer in gear L3 at a slow speed.
3. Position the tractor so that it's in the center of the trailer, with the tractor's rear wheels resting across the middle of the trailer's rear axle.
4. Attach two 2 3/4-inch threaded clevis pins (rated for at least 4,500 pounds) to the holes in the tractor's front tie-down brackets.
5. Use one chain for each clevis pin, for a total of two chains, attaching the clevis pins to the trailer. Use binders to tighten the chains.
6. Loop 5/16-inch or 3/8-inch grade 70 chains to both sides of the drawbar hitch on the rear of the tractor. Use chains to attach the clevis pins to the trailer. Use binders to tighten the chains.
7. Double-check that all chains and clevis pins are properly connected and tightened.
8. Power off the tractor. Turn off the 12V battery.

Towing a Disabled Tractor

If your tractor won't power on and is completely dead, please contact **Monarch Tractor** at **1-833-AGRI-PWR** and request assistance.

DANGER! Steering is NOT functional on a disabled tractor. Do NOT attempt to tow the tractor by yourself. Do NOT drag the tractor.

Righting a Tipped Tractor

The Monarch Tractor is designed to avoid tipping, but conditions can arise where you'll need to right a tractor after it tips. Speed and hilly conditions are two primary reasons for a tractor tipping. Make sure you and all other operators use good judgement and drive as slowly as practically possible.

Because the Monarch Tractor is a first-gen electric tractor, make sure you are prepared in an emergency. **Have the contact information for a local towing company with an oversized, integrated or boom tow truck to help you right and tow a disabled tractor.**

IMPORTANT: If your tractor is tipped as the result of a vehicle collision, do not use the tractor until it's inspected by Monarch Tractor.

To right a tipped tractor:

1. If you are the operator when the tractor tips, exit the tractor safely. If the tractor is tipped to one side, exit from the other side and find safety.
2. Once the operator's safety is secured, contact the site manager and **911** if needed.
3. Call Monarch Tractor at **1-833-AGRI-PWR** to report the tractor accident. We can gather video and photos of the incident to gain a better understanding of what occurred.
4. Call an industrial or heavy-duty towing company with an oversized, integrated, or boom truck rated to lift the 5,000-pound tractor.
5. Ask personnel not responsible for righting the tractor to exit the immediate area.
6. Do one of the following:
    - **If the tractor tipped and one rear tire remains on the ground:** Slide a jack under the tire. Make sure you have a safe place to stand to operate the jack. Begin to jack up the tractor until the tractor rights itself.

- **If the tractor tipped onto its side or cannot be jacked:** Call a heavy duty or agriculture towing company. Industrial tow trucks have strong enough winches and chocks to right the tractor before towing.

7. Once the tractor is upright, follow towing instructions you receive from the Monarch Tractor Service Team.
8. Park the tractor on an area of level ground. **Do NOT charge the tractor until the main battery has been inspected by Monarch Tractor**.

To inspect a tipped tractor after being righted:

1. After righting the tractor, do not operate it for at least 24 hours.
2. Turn off the 12V battery. **Do not touch the main battery or attempt to charge it.** Monarch Tractor must inspect the battery before charging.
3. Once the tractor has been idle for a day, check the following fluid levels:
   - Hydraulic fluid
   - Coolant
4. Check the ground under the tractor for leaks of any kind. Do not touch any fluid. **Take photos to share with Monarch Tractor.**
5. With a flashlight, check for oil leaking from the front axle or mid-gearbox. **Take photos if you see any seeping or leaking oil.**
6. If your site manager determines that the tractor is safe to enter, start the tractor.
7. Watch the tractor as it starts up, keeping an eye on the Smart Screen. Take photos of anything unusual.
8. If the tractor starts up properly and displays the Ready status, take a photo of the dashboard and Smart Screen. If the tractor doesn't start up, follow the Lock Out Tag Out procedure to prevent other operators from touching the tractor.
9. Update your ticket with Monarch Tractor with all information and photos you just took.

Safe Operation on Hills

When navigating hills, the Monarch Tractor can stall, lose forward speed, roll backwards, or overturn if the operator doesn't follow precautions. Whenever possible, avoid negotiating drop-offs; reverse the tractor and select an alternate route. **Never suddenly open the throttle or make abrupt gear changes when operating on hills. Always come to a full stop before changing gears on a slope.**

DANGER: The tractor can "bottom out" and stop if either the front or rear wheels are driven over a drop-off. If the drop is sharp or deep, the vehicle can nosedive and tip over or flip backwards.

To avoid overturning the tractor while climbing hills:

1. Make sure the tractor is in a low gear. Maintain steady speed when climbing a hill.
2. Use the handle throttle to slow the tractor gently.
3. Apply the parking brake after stopping.
4. Disembark on the uphill side, or to a side if pointed straight.

To avoid overturning the tractor when rolling backwards down a hill:

1. When rolling backwards, gradually apply the brake pedal.
2. When fully stopped, apply the parking brake.
3. Disembark on the uphill side of the tractor, or to a safe side if the tractor is pointed up.
4. Turn the vehicle around and remount the tractor.

CHANGE LOG

REVISION	DATE	DESCRIPTION OF CHANGE	AUTHOR
1.0	06/15/2025	Initial release	A. Thomas

Chapter 7 – Maintenance

After purchasing a Monarch Tractor familiarize yourself with the most important maintenance tasks that will extend the life of your tractor.

Radiators

There are two radiators in the Monarch Tractor, both of which are on the top of the front tractor bed. Screens on the top of the Monarch Traffic radiator to protect the fins of the radiator

- The right-side radiator is a **power electronics cooler (PEC)**with four fans. When the tractor is charging, these fans are used to cool the battery. The fans also run when exportable power is in use.
- The left side radiator is a **hydraulic oil cooler (HOC)** with six fans. Hydraulic fluid is sent through the HOC to cool down the temperature of the fluid before its returned to the hydraulic fluid settling tank. These fans run when the tractor is operating.

Cleaning Radiator Screens

The screens on the radiator protect against dirt and debris clogging the radiator. Cleaning the radiator screens is an important daily task. If the tractor is dusty or if there are long pieces of debris falling into the radiator screens, it's important to remove them as soon as it's safe to do so.

To clean radiator screens:

1. Power off the tractor.
2. Allow the tractor to cool down.
3. Do any of the following:

- Use a clean cloth to wipe each screen.
- Use compressed air to blow dirt and debris off the screen. Keep the air under 30psi to protect the radiator fins below the screen.
- Rinse the radiator screens with hose water.
- Remove the screens to clean with soap and water them if they are extremely dirty.

WARNING: Do NOT use a pressure washer on radiator screens. Radiator fins, which are directly under the radiator screens, can be bent or damaged by pressure washing.

Coolant

Viewing the coolant level in the tractor is as simple as shining a flashlight on the coolant reservoir. The coolant reservoir is located on the left-hand side of the tractor, under the tool tray. Use a 50/50 mixture of distilled water and propylene glycol when you need to add coolant to the reservoir.

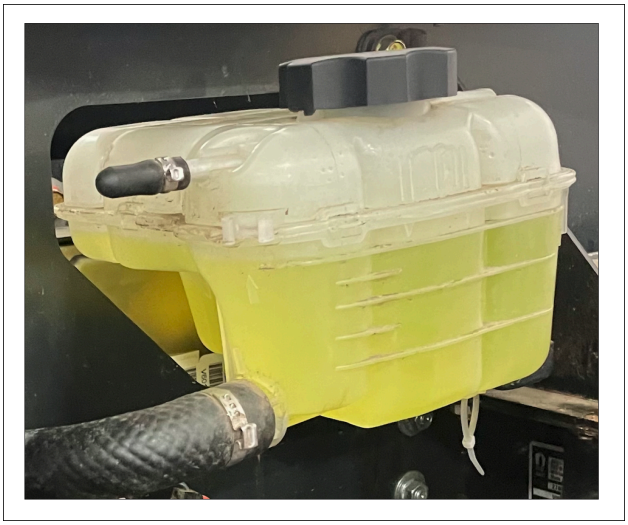


Figure 14: PROPERLY FILLED COOLANT RESERVOIR

WARNING: If your job site doesn't have a vacuum-powered coolant system to add coolant, use a hand pump to add coolant to avoid bubbles in the coolant reservoir.

Checking Coolant

It's important to check the coolant level when the tractor is cold. If you're ever operating the tractor and the coolant warning light illuminates, park the tractor in a safe location (as soon as you're able) and turn the tractor off. Once the tractor is cold, check coolant, as instructed below.

To check coolant level:

1. Make sure that the tractor is turned off.
2. Make sure that the tractor is cool to the touch.
3. Do one of the following:

- Shine a light into the slot between panels on the left-hand side of the tractor (as shown in the image below).
- Open the top panel and remove the tool tray, then shine a flashlight down at the coolant reservoir.

The coolant reservoir illuminates, allowing you to gauge the level of coolant. If the coolant level is lower than the max fill line, add coolant.

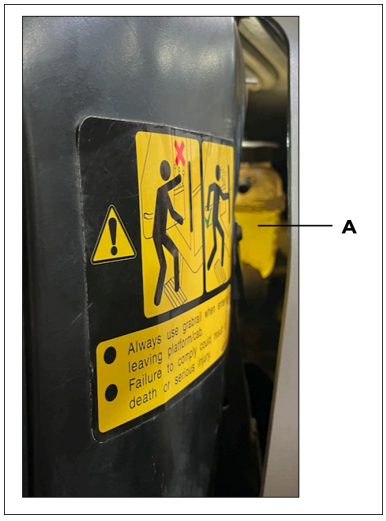


Figure 15: COOLANT LEVEL WHEN A FLASHLIGHT ILLUMINATES THE RESERVOIR

To add coolant:

1. Make sure the tractor is cold.
2. Remove the lid of the coolant reservoir.
3. Add coolant as needed to the MAX line. **Use a 50/50 mixture of distilled water and propylene glycol.** Using distilled water avoids calcium buildup in the reservoir.

Replacing Coolant

Replacing coolant involves draining the reservoir, then filling the reservoir with clean coolant. Always make sure the tractor is cold before draining and replacing coolant.

Never remove the coolant reservoir cap until the coolant temperature has dropped, then loosen the cap slightly to relieve any pressure before removing the cap completely.

Before you Begin

You'll need the following to complete this task:

- Safety equipment required by your jobsite
- Flashlight
- Clean rags to clean up any spilled antifreeze
- Catch container
- Antifreeze
- Distilled water

Drain and replace coolant

WARNING: Do NOT attempt to drain coolant from a hot tractor.

To drain and replace coolant:

1. Make sure the tractor is cold and has not recently run. Never attempt to drain and replace on a running tractor.
2. Slide a container under the coolant hose under the right-hand side of the tractor.
3. Disconnect the coolant hose.
4. Remove the coolant cap to drain the coolant. Allow the coolant to fully drain.
5. Replace the coolant hose fitting.
6. Measure 50/50 coolant/distilled water mix in a third jug.
7. Add pre-mixed coolant to the reservoir to the MAX line.
8. Turn the tractor on before replacing the coolant reservoir cap.
9. Replace the coolant cap and let the tractor run while the coolant is dispersed.

12V Battery

The 12V battery is located under the tool tray on the top of the tractor. **The 12V battery must be charged for the Monarch Tractor to power on. Without a charge from the 12V battery the tractor can't be used.**

When the Monarch Tractor sits idle, the 12V battery can quickly lose its charge. If you know the tractor won't be charged for a day or longer, turn off the main switch. When you return to the tractor, simply switch it back on.

The 12V battery can be jumped to start the tractor. Please keep in mind that jump-starting a 12V can negatively affect the battery's ability to hold charge over time.

IMPORTANT: The tractor cannot start if the 12V battery has lost its charge. The Start button won't illuminate, the dashboard or Smart Screen will not turn on, and the tractor will not provide exportable power.

Keeping the 12V Battery Charged

The 12V battery loses charge repeatedly the life of the battery is affected. Eventually, a new 12V battery will be required with repeated charging and discharging.

The following options are helpful ways to maintain the 12V charge between tractor operations:

- **Battery tender.** Monitors and maintains the 12V battery at its optimal charge level. Battery tenders avoid over-charging the 12V battery and can protect the life of the battery
- **Trickle charger.** Sends a continuous low-power charge to the 12V battery.
- **Store the battery indoors.** If you don't need to operate the tractor during cold weather, remove the 12V battery and store it indoors. If the tractor must be operational, insulate the tractor by covering the hood with a heavy blanket.

Given the importance of having an operational 12V battery, always keep an extra on hand. Order replacement batteries from Monarch Tractor or your dealer.

Turning off the 12V Battery

When the tractor will be sitting idle for more than a day, **disconnecting the 12V battery** protects the battery's charge (unless the tractor is connected to the charger continuously). When the tractor isn't fully powered down, computerized implements in the roof and other components can still draw power from the 12V, causing the 12V battery to lose charge.

To turn off the 12V battery:

1. Open the top cover and remove the tool tray to access the battery.

Figure 16: ACCESSING THE MAIN BATTERY SWITCH

2. Turn off the Main Switch.

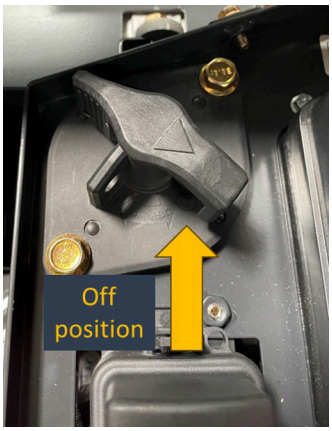


Figure 17: TURN OFF THE MAIN BATTERY SWITCH

3. Replace the tool tray and close the cover.

Checking 12V Battery Charge

Knowing the voltage of the battery is the best way to determine the state of charge.

To check the 12V battery charge:

1. Set your multimeter (read instructions for your multimeter for information).
2. Place the probes on the positive and negative terminals of the 12V battery.

Figure 18: CHECK THE 12V BATTERY CHARGE

3. Read the multimeter. Note the following:
   - You should see a reading above 10V; ideally between 11V and 13V.
   - A declining voltage reading (going from 10V to 9V) suggests a draining battery.
   - If a battery reaches 0, the circuitry in the battery is like the issue. Replace the battery.

Voltage	State of Charge
11 – 13	100%
<10V -0	Discharged

Removing and replacing the 12V battery

If you determine you need a replacement battery, please contact service@monarchtractor.com.

To remove and replace the battery:

1. Open the top cover and remove the tool tray to access the battery.
2. Turn off the main switch.
3. Use a 10mm socket and ratchet to remove the four bolts securing the fuse tray.
4. Remove the 10mm and 8mm bolts securing the battery and its connectors.
5. Carefully lift the battery out of place and dispose of it according to local laws and regulations.
6. Put a fresh 12V battery into place and reconnect the terminals.
7. Replace the tool tray and then close the top cover.
8. Test the operation of the new battery by connecting the charger to the tractor and verifying that the tractor charges.

WARNING: Battery posts, terminals, and related accessories contain lead and lead compounds, chemicals known to the state of California to cause cancer and reproductive harm. Wash hands after handling.

Troubleshooting the 12V Battery

12V battery issues can present themselves in some of the following ways:

- Tractor doesn't start up when the start button is pressed.
- Exportable power doesn't work.
- Smart Screen doesn't illuminate when the tractor is started.
- Tractor icon illuminates on the dashboard.

Symptom	Cause	Remedy
Red battery light and yellow inverter light are illuminated.	12V battery issue.	1. If the tractor has been used within the past 7 days, trickle charge the 12V battery. Start the tractor again. 2. If the tractor has been idle for more than 7 days, or if the tractor doesn't start up, replace the battery.
Tractor can't properly start up; the Smart Screen doesn't power on.	Possible 12V battery issue or wiring issue with the Smart Screen.	1. Take a battery voltage reading. 2. If the battery doesn't have a charge, replace the battery. 3. If the battery has charge, check the screen's cable connections. 4. If there are no other issues related to the 12V battery on the tractor, contact Monarch Tractor about a possible wiring issue or motherboard problem.
Tractor can't properly start up; the dashboard doesn't power on; warning lights don't illuminate at all.	Possible 12V battery issue or wiring issue with the dashboard.	1. Take a battery voltage reading. 2. If the battery doesn't have a charge, replace the battery.

		3. If there are no other issues related to the 12V battery on the tractor, contact Monarch Tractor about a possible wiring issue or motherboard problem.
Battery icons reappear after disappearing or 12V battery voltage drops quickly.	Possible electronic component issue.	Contact Monarch Tractor.

Inspecting the 12V Battery

- **Look for broken terminals.** Broken or loose terminals can cause a short circuit. If a terminal is loose or broken, replace the battery.
- **Look for a bulge or bump in the plastic battery case.** Changes to the shape of the battery case indicate that the battery has been overcharged. Replace the battery to prevent ruptures.
- **Inspect cracks or ruptures of the plastic battery case.** While the battery may still operate, cracks, splits, and holes in the battery case indicate that the battery is not safe for use. Replace the 12V battery.

ROPS

The **Rollover Protection Structure (ROPS)** works along with the seatbelt to protect the operator in case of a rollover. OSHA requires that all agriculture tractor manufactured after 1976 have a ROPS and seatbelt. Without wearing the seatbelt, ROPS won't protect you in a rollover.

Never make any changes to the ROPS. The construction of the Monarch Tractor ROPS has been tested for compliance and structural requirements. Unauthorized modifications or repairs can void your Monarch Tractor warranty.

IMPORTANT: Never remove the identification plate affixed to ROPS. ROPS must be replaced if the tractor overturns as the structure is meant to withstand only one rollover. Contact Monarch Tractor immediately for assistance.

Inspecting ROPS

Perform a visual check of ROPS frequently to make sure your equipment is in good shape. After checking all nuts for changes, look for any damage or imperfections to the metal pillars, including dents dings, or loose bolts/nuts.

ROPS should be inspected every 1000 hours. **Do NOT attempt to loosen the fittings on the ROPS; fittings are treated with thread locker during assembly and should NOT be altered.**

To inspect ROPS:

1. With a flashlight inspect the witness/torque marks in the following locations from the roof to the bottom of the following:
   - Front left-hand side pillar
   - Front right-hand side pillar
   - Rear left-hand side pillar
   - Rear right-hand side pillar
2. Confirm that all nuts are in the proper position, with torque marks lined up perfectly. **If any marks have moved from their original position, or if you see any loose bolts or nuts contact Monarch Tractor immediately.**
3. Make sure no pillar of the ROPS has been welded or changed in any way. Immediately contact your site manager if you see any changes to the ROPS.

Replacing ROPS After a Rollover

If your Monarch Tractor ever rolls over, all components of the ROPS must be replaced. Monarch Tractor can quickly assist you.

Lubrication Specifications

Use the following lubricants when servicing your Monarch Tractor.

Location	Specifications	Capacity
Hydraulic Fluid Reservoir	Universal Tractor Fluid (UTF)	12 gallons
Front Axle Gearbox	SAE 80W90 (GL-4) Gear Oil	6 liters
Mid-Gearbox	Universal Tractor Fluid (UTF) or Super UDT2	6 liters
4WD Gearbox	SAE 80W90 (GL-4) Gear Oil	1 liter
Grease Fittings	Multi-purpose grease	Until a bead of grease escapes

Max hydraulic system flow rates	
Total system	22.5GPM (85LPM)
4WD motor	8.5GPM (32LPM)
Controlled flow to implement	12GPM (32LPM)
Implement auxiliary valves (each)	9GPM (34LPM)
3-point cylinders (each)	6GPM (22.7LPM)
Steering cylinder	9GPM (34LPM)

Max working pressure	
Main system relief	3010psi
Work pump compensator	2600psi
12v pump, steering, brakes	1650psi
Clutches and lube	335psi
3-point and auxiliary relief	3000psi
Steering cylinder relief	1700psi
Softline burst pressure	4500psi

Lubricant Filter Specifications

Use the following to replace the onboard hydraulics filters.

Name	Location	Part Number
Hydraulic Fluid Filter	Hydraulic Fluid Settling Tank	Monarch Tractor C00021797
Pressure Filter	Work Pump	Monarch Tractor H6102

Grease Fittings

Cleaning and servicing grease fittings is an important maintenance task for Monarch Tractor MK-V owners and operators. Grease fittings (also known as Zerk fittings) connect to a grease gun, providing a simple way to deliver grease into bearings and other moving systems. Grease fittings should be cleaned and serviced after every five hours of tractor use, or even better, daily.

Before you begin

Here's what you'll need to safely complete this task:

- Safety equipment required by your job site
- Grease gun
- Clean cloth

Clean and lubricate grease fittings

The dirtier the conditions you operate the tractor in, the more often you should clean and lubricate grease fittings.

To clean and lubricate grease fittings:

1. Starting on the front axle, identify the grease fittings. One fitting is located on the bottom of the transaxle, accessible through a hole (shown left). The second fitting is accessible behind the right tractor (shown right).

Figure 19: GREASE FITTINGS ON THE TRANSAXLE

2. Use a clean cloth to wipe clean the grease fittings. It's important to keep dust out of grease fittings to avoid clogs, which can prevent grease from reaching the bearing properly.

3. Connect a grease gun to each fitting and push grease until you see and hear a bit of grease escape from the axle joint. Wipe off any excess grease.
4. Next, walk to the back of the tractor. Wipe clean the three grease fittings on the left and the three grease fittings on the right 3-point lower arms, where the arm meets the tractor transaxle.

   IMPORTANT: Early production models of Monarch MK-V tractors have only two fittings on the left and two fittings on the right.
5. Connect a grease gun to each fitting and push grease until you see and hear a bit of grease escape from the axle joint. Wipe off any excess grease.

Hydraulic Fluid

Many systems in the Monarch Tractor MK-V rely on hydraulic fluid. To provide enough pressure for the demands, the tractor has a settling tank that provides storage for the 12 gallons on board. Follow the interval described in Scheduled Maintenance to see how frequently you need to change the hydraulic fluid.

Drain and Replace Hydraulic Fluid

Completely draining the hydraulic fluid and removing the filter. Make sure to have a large enough container to hold the used hydraulic fluid (12-gallon capacity).

Before you begin

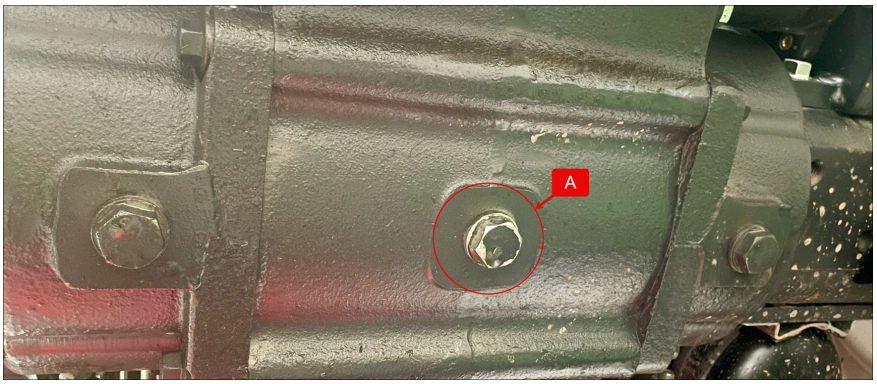
Here's what you'll need to safely complete this task:

- Protective gloves
- Safety glasses
- 24mm socket wrench
- Replacement metal crush washer
- Torque wrench
- Clean container

Changing Hydraulic Fluid

To change hydraulic fluid:

1. Under the tractor, locate the hydraulic fluid reservoir cap as shown below.



LOCATION OF HYDRAULIC FLUID RESERVOIR CAP

2. Remove the drain plug.
3. Remove the crush washer.
4. Slide a container under the reservoir.

5. Allow the hydraulic fluid to drain completely from the hydraulic fluid reservoir.
6. Install a new metal crush washer.
7. Replace the hydraulic fluid reservoir cap under the tractor and torque to 27Nm.
8. Unscrew the hydraulic fluid dipstick near the floor of the tractor, under the seat.
9. Add hydraulic fluid to the reservoir. The maximum capacity is 12 gallons.
10. Once the hydraulic fluid has been replaced, dip the dipstick and then shine a black light on the dipstick to check the level in the reservoir.

HYDRAULIC FLUID USED IN THE MONARCH TRACTOR IS INFRARED. CHECK THE LEVEL OF HYDRAULIC FLUID ON THE DIPSTICK WITH A BLACK LIGHT.

IMPORTANT: DISPOSE OF WASTE PROPERLY!

Polluting drains, water courses, and/or soil is illegal. Use authorized waste disposal facilities to dispose of used oil. For more information, contact your local authorized servicing dealer or the local agency for waste recycling.

Changing the Hydraulic Fluid Filter

The Monarch Tractor Hydraulic Fluid Filter is in the hydraulic fluid settling tank located under the step on the left-hand side of the tractor. Removing the step allows for greater maneuverability for removing the filter cover and torquing the replacement filter into place.

Figure 20: HYDRAULIC FLUID FILTER SHOWN INSTALLED IN THE SETTLING TANK

If you don't remove the step, you may be able to access the hydraulic fluid filter through the left-hand side of the tractor.

Figure 21: SIDE VIEW OF HYDRAULIC FILTER

Before you begin

Here's what you'll need to safely complete this task:

- Protective gloves
- Safety glasses
- 24mm socket wrench
- Torque wrench
- Replacement Hydraulic Filter (Monarch Tractor Part Number C00021797)
- Clean container

Remove and Replace the Filter

Step 1: Remove the filter

1. Place a container under the step to catch drips.
2. Use a **24mm socket** wrench to loosen the cover of the hydraulic fluid filter.
3. When the filter is loose, use your hand to gently finish unscrewing the filter and then remove it. Dispose properly of the used hydraulic fluid filter.

IMPORTANT: DISPOSE OF WASTE PROPERLY!

Polluting drains, water courses, and/or soil is illegal. Use authorized waste disposal facilities to dispose of used oil. For more information, contact your local authorized servicing dealer or the local agency for waste recycling.

Step 2: Replace the filter

1. Before installing the new filter, clean any break-in debris in the hydraulic fluid filter cover.
2. Unwrap the new replacement filter. Find the O-ring.
3. Coat the O-ring on the replacement filter with clean hydraulic fluid.
4. Carefully line up the threads on the new hydraulic fluid filter and screw the filter into place.
5. Torque the hydraulic filter cover to **27Nm.**
6. Once the hydraulic fluid filter has been replaced, dip the hydraulic reservoir dipstick and then shine a black light on the dipstick to check the level in the reservoir.
7. If needed, add fluid to the reservoir.

Checking and Changing the Pressure Filter

The Monarch Tractor Hydraulic Fluid Filter (Part Number H6003) connects to the Hydraulic Work Pump. It's the only protective filtering system between the transmission and downstream hydraulics. The Pressure Filter indicator turns red when the tractor is running with a clogged filter.

To get an accurate reading of the Pressure Filter, you'll connect a hose to the Constant Flow ports on the back of the tractor, increase tractor RPMs, then check the red or green indicator on the Pressure Filter. Perform this check when the tractor is cold. Monarch Tractor recommends checking the Pressure Filter ever 50 hours and replacing the Pressure Filter every 250 hours.

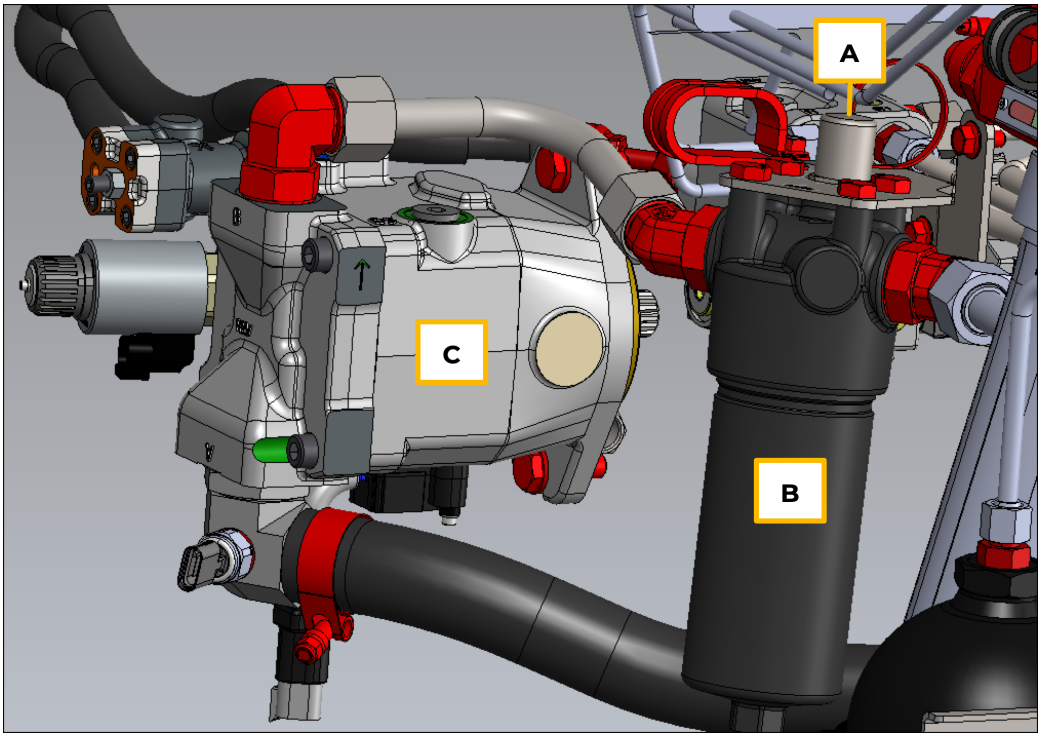


Figure 22: PRESSURE FILTER AND HYDRAULIC WORK PUMP

A. PRESSURE FILTER INDICATOR
B. PRESSURE FILTER
C. WORK PUMP

IMPORTANT: The Pressure Filter goes into bypass mode when pressure reaches 7 bars; the red indicator on the Pressure Filter appears when the pressure hits 5 bars. When there is zero pressure on the filter (when the tractor is off) the indicator turns red. Always check the filter indicator with the tractor is running.

The Pressure Filter is tucked behind the left side rear tire, but to view the filter indicator you'll remove the tractor's floor.

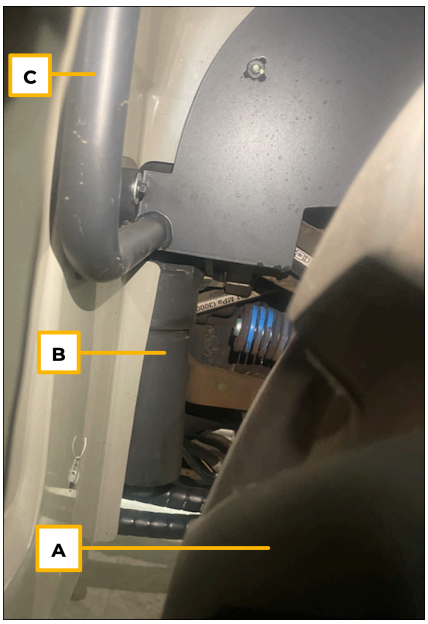


Figure 23: PRESSURE FILTER SHOWN BEHIND REAR LEFT TIRE

A. LEFT REAR TIRE
B. PRESSURE FILTER
C. HANDRAIL

What can I do about debris in the Pressure Filter?

If you notice a sudden increase in debris, changes to the color or clarity of hydraulic fluid, or if you're not sure how long it's been since you've changed the Pressure Filter, Monarch Tractor can help you get reporting and detailed feedback on what's found. Contact us at service@monarchtractor.com for assistance.

Before you begin

Here's what you'll need to safely complete this task:

- Protective gloves
- Safety glasses
- 24mm socket wrench
- Container to catch drips
- Length of hydraulic hose, with or without a flow meter
- Replacement Pressure Filter (Monarch Part Number xxx)

Check the Pressure Filter Indicator

To check the Pressure Filter:

1. Place a container under the Pressure Filter to catch drips.
2. Remove the floor, storing the screws in a safe place.
3. Gently move hydraulic lines out of the way to locate the Pressure Filter. Gently zip tie the lines together to gain more space for your hands, if needed.
4. Make sure you can see the Pressure Filter Indicator. You may need to wipe off dust or dirt. **Remember that the indicator is always red as shown below when the tractor is off.** Do not read the indicator when the tractor is off. **Read the indicator only when the tractor is on and hydraulic fluid is flowing through the filter.**

Figure 24: Pressure filter Red indicator

5. Start up the tractor. Make sure the tractor is in Neutral with the Parking Brake set.
6. Connect a hydraulic hose to both Constant Flow connectors on the back of the tractor.

7. Make sure both ends of the hydraulic hose are properly and snuggly connected. Then turn on the Constant Flow using the Smart Screen.
8. Using the hand throttle, increase the RPMs to 3000RPM.
9. If the hydraulic hose you're using has a flow meter, watch until you see hydraulic fluid is flowing through the Constant Flow connectors at 12GPM.
10. When there is 12GPM of hydraulic fluid pressure, check the Pressure Filter indicator and read the results:

	
Red indictor: Replace filter	**Green indicator: Filter is good**

IMPORTANT: DISPOSE OF WASTE PROPERLY!

Polluting drains, water courses, and/or soil is illegal. Use authorized waste disposal facilities to dispose of used oil. For more information, contact your local authorized servicing dealer or the local agency for waste recycling.

Replace the Pressure Filter

Make sure you have an unused filter on hand.

IMPORTANT: The Pressure Filter housing is left-hand threaded. The fine threads of the housing can be stripped or severely damaged if improperly installed.

1. Before installing the new filter, inspect the Pressure Filter cover for any break-in debris.
2. Clean the filter cover.
3. Lubricate threads and O-rings with clean hydraulic oil.

4. Carefully line up the threads on the new hydraulic fluid filter and slowly screw the filter into place. When the filter is fully seated, unscrew one quarter-turn. Overtightening the filter will not improve the seal.

   IMPORTANT: The Pressure Filter housing is left-hand threaded. The fine threads of the housing can be stripped or severely damaged if improperly installed.

Troubleshooting Hydraulics

Whenever it seems your tractor is having hydraulic issues, do the following:

Check for contamination. Look for dirt or debris in the fluid, or a cloudy appearance that indicates water contamination.

Check the color. Fresh hydraulic fluid is usually clear or pale amber, while a dark, murky fluid indicates it needs to be replaced.

Change the filter on time. when it's no more than 80% full to avoid a bypass stage.

Common hydraulics issues

Symptom	Cause	Remedy
Dirt or debris in the hydraulic fluid.	Contamination of some sort.	Change the hydraulic fluid.
Tractor is struggling to lift and/or lower implements.	Hydraulic fluid may have impurities, or a clog may have formed.	Replace the hydraulic fluid and the hydraulic fluid filter.
Noticeable drop in hydraulic pressure.	A clogged hydraulic filter can cause a drop in hydraulic fluid pressure and power output.	Replace the hydraulic fluid filter.

Front Axle Gearbox Oil

Front Axle Gearbox oil should be changed per Scheduled Maintenance guidelines. There are two vent plugs on the front axle. Make sure to remove the plugs before adding oil to the gearbox. When adding oil to the Front Axle Gearbox it's very important to make sure both ends of the reservoir are full. **Six liters of gear oil must be in the gearbox to protect the tractor.**

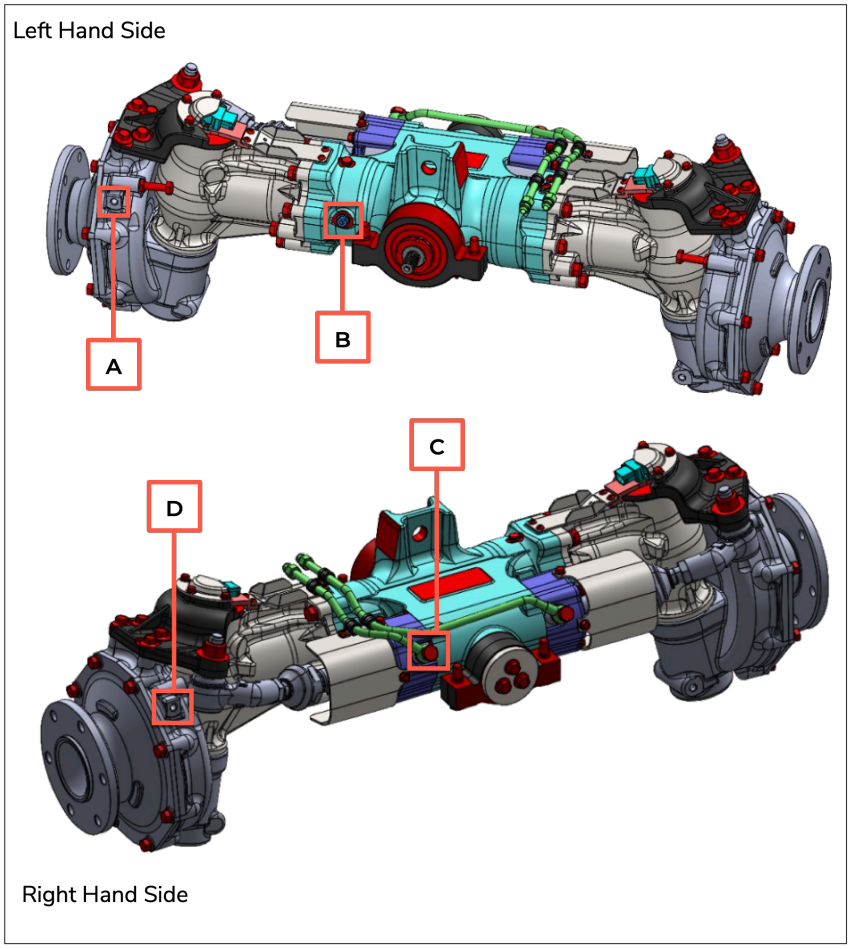


Figure 25: FRONT AXLE GEARBOX

A. VENT PLUG
B. FILL PORT
C. DRAIN PORT
D. VENT PLUG

Before you Begin

To complete this task, you'll need the following:

- Safety equipment required by your jobsite.
- Two pans or containers to catch used oil as it drains
- Clean **SAE 80W90 (GL-4) Gear Oil (6 liter)**
- Torque wrench

Drain and Replace Front Axle Gearbox Oil

To drain and replace Front Axle Gearbox oil:

1. Place two containers under the front axle to catch the used oil.
2. Remove the venting plugs from each side of the front axle.
3. Remove the two drain plugs on the front axle. **Allow the oil to completely drain.** Safely dispose of the used oil.
4. Reinstall both drain plugs and torque to **30-35Nm**.
5. Remove the front axle fill plug.
6. Add 6 liters of oil to the gearbox. Settling time is required after adding the first 3 liters.
7. Reinstall both venting plugs and torque each to **3-5Nm**.
8. Replace the fill plug and torque to **30-35Nm**.

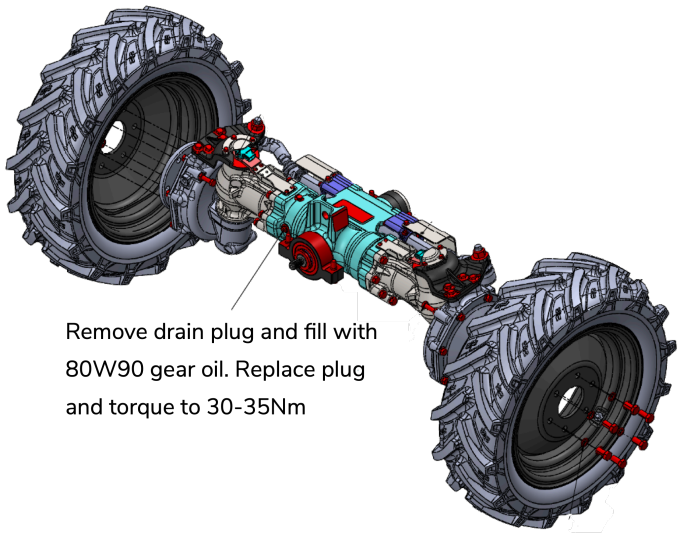


Figure 26: FRONT AXLE DRAIN PLUG LOCATION

4WD Gearbox Oil

The 4WD Gearbox is sealed in the bottom compartment of the Mid-Gearbox. We recommend the use of a grease gun with a clear tube for the easiest method of adding gear oil. The 4WD Gear Box drain is accessible near the bottom of the tractor.

Before you Begin

To complete this task, you'll need the following:

- Safety equipment required by your jobsite.
- Two pans or containers to catch used oil as it drains
- Clean **SAE 80W90 (GL-4) Gear Oil (1 liter)**
- Grease gun to add clean oil

Drain and Replace 4WD Gearbox Oil

To drain and replace 4WD Gearbox Oil:

1. Place a container under the 4WD Gearbox drain.
2. Remove the drain plug and allow the oil to fully drain.
3. While the oil drains, add about 1 liter of gear oil to a grease gun.
4. Remove the grease gun.
5. Replace the drain plug and torque to 30Nm.

Brakes

Monarch Tractor brakes, including the parking brake, are mechanical with a hydraulic cylinder. Independent mechanical wet disk brakes are operated by the brake pedal through brake linkages. The parking brake is also mechanical, with a hydraulic cylinder. The parking brake is engaged/disengaged on a control pad on the left-hand side armrest.

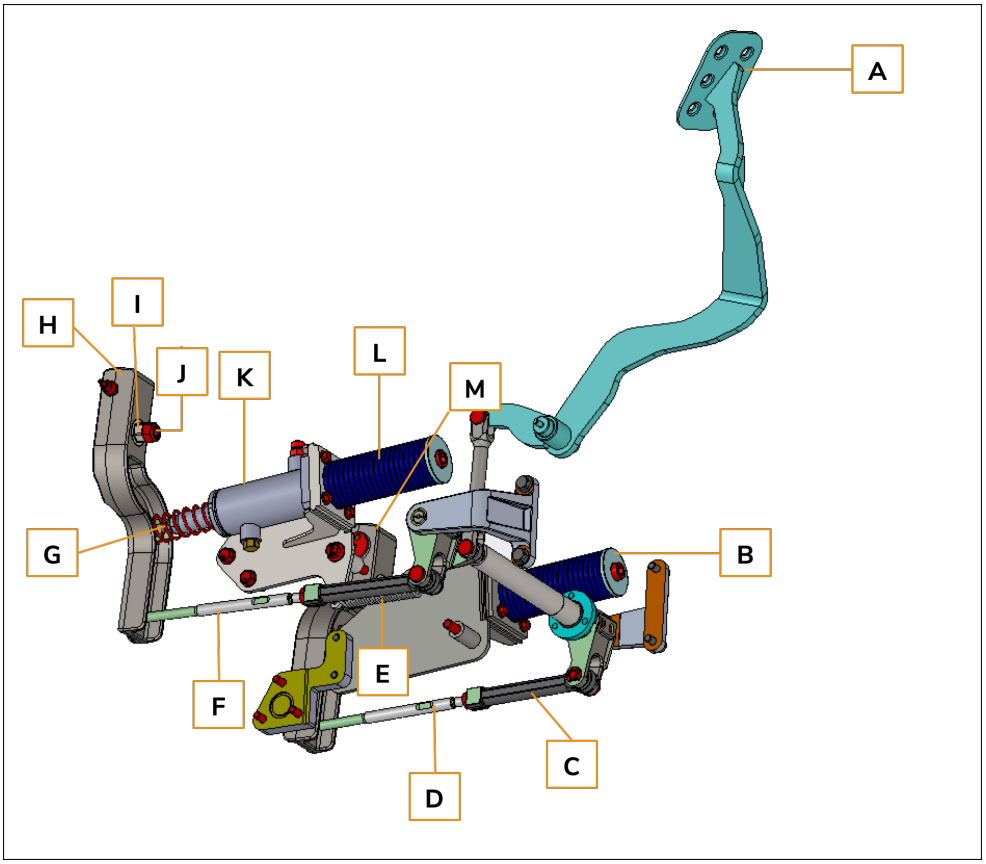


Figure 27: BRAKES

A. FOOT BRAKE PEDAL	H. RIGHT HAND SIDE S-ARM
B. LEFT HAND SIDE PARKING BRAKE SPRING	I. CONICAL NUT
C. LEFT HAND SIDE FOOT BRAKE RETURN SPRING	J. JAM NUTS
D. LEFT HAND SIDE FOOT BRAKE LINKAGE	K. RIGHT HAND SIDE PARKING BRAKE CYLINDER
E. RIGHT HAND SIDE FOOT BRAKE LINKAGE	L. RIGHT HAND SIDE PARKING BRAKE SPRING
F. RIGHT HAND SIDE FOOT BRAKE LINKAGE	M. LEFT HAND SIDE S-ARM
G. RIGHT HAND SIDE PARKING BRAKE RETURN SPRING	

The Monarch Tractor parking brake remains engaged to prevent the tractor from running away, meaning that you must keep the foot throttle depressed to move forward. When you move your foot off the foot throttle pedal, the tractor slows to a stop immediately. In fact, when you press the foot throttle you hear a click, indicating that the parking brake is off and that the tractor is under control of the foot brake.

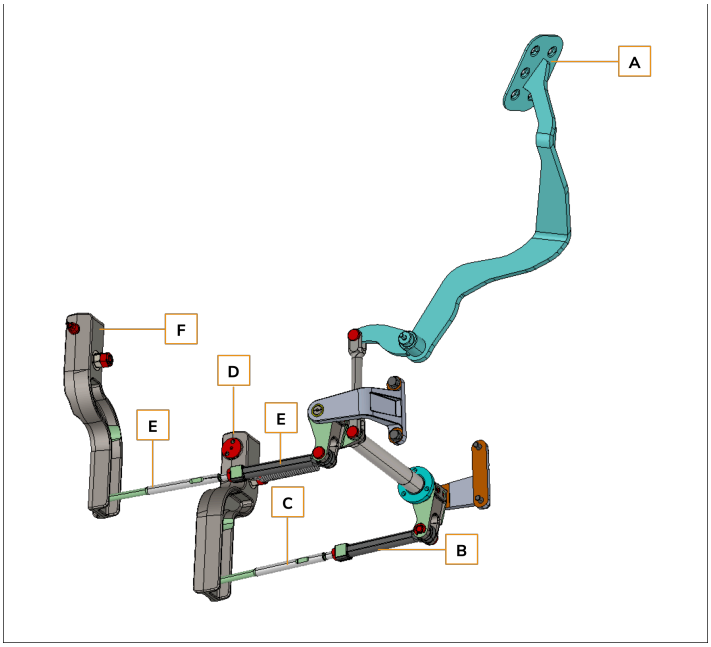


Figure 28: FOOT BRAKE

A. FOOT BRAKE PEDAL
B. LEFT HAND SIDE FOOT BRAKE ACTUATOR ROD
C. LEFT HAND SIDE BRAKE LINKAGE
D. LEFT HAND SIDE S-ARM
E. RIGHT HAND SIDE FOOT BRAKE LINKAGE
F. RIGHT HAND SIDE S-ARM

IMPORTANT: When pressed, the foot brake should never lose resistance. There should always be a feeling of tension in the brake pedal. If the pedal feels too loose or sinks down when pressed, contact Monarch Tractor.

Visual Brake Inspection

Each day before operating the Monarch Tractor perform a quick visual check of the braking system, both the foot brake and the parking brake. The brake inspection below should be conducted daily, and at a minimum, at least every 50 hours.

IMPORTANT: Make sure that the tractor has been washed before performing a brake inspection.

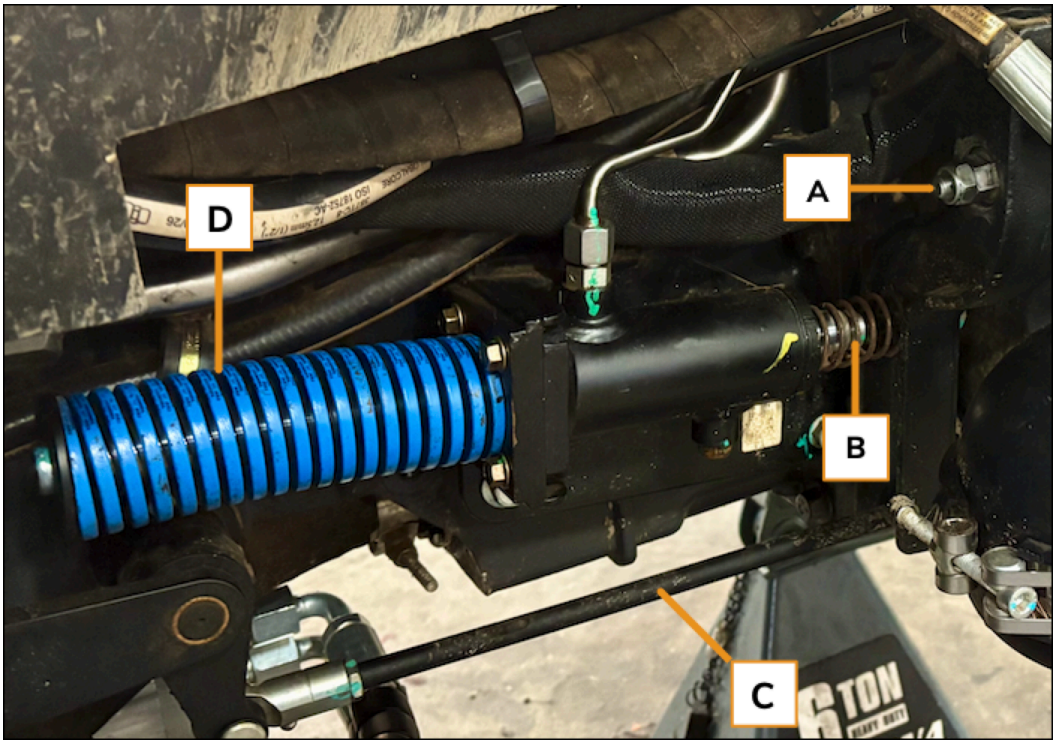


Figure 29: BRAKES (LEFT HAND SIDE; REAR TIRE REMOVED)

A. PARKING BRAKE RELEASE NUTS
B. PARKING BRAKE (IN ENGAGED POSITION)
C. FOOT BRAKE LINKAGE
D. PARKING BRAKE ACTUATOR ROD

To perform a visual brake inspection:

1. Wash the tractor.
2. Park the tractor on level ground and power off the tractor. Chock all four tires to prevent the tractor from moving.
3. Ask a second person to sit in the operator's seat during the inspection.
4. Make sure that there is no debris in the **foot brake actuator rod** or in the **parking brake actuator rod** (under the blue spring) on the left-hand side and the right-hand side.
5. With the tractor in **N** ask the seated person to press the foot brake.
6. Keeping fingers clear of the braking system, ask the seated person to disengage the **Parking Brake** while keeping the foot brake depressed.
7. Using a flashlight, have the seated person slowly release and press the foot brake pedal. Make sure that the rear brakes are fully operational as the seated person presses and releases the foot brake. Inspect both the left-hand side and right-hand side. **Contact Monarch Tractor if you see any of the following issues:**
   - **Brake linkages don't operate smoothly, with obstruction(s).**
   - **Brake linkages don't move.**
   - **Foot brake pedal sinks down with no resistance.**
8. Ask the seated person to set the **parking brake**. Ask the seated person to take his or her foot off the foot brake.
9. Watch the brakes disengage, checking for smooth operation. **Contact Monarch Tractor if you see any of the following issues**
   - **Brake linkage doesn't fully disengage.**
   - **Brake linkages don't move.**
10. Make sure that the parking brake is fully engaged, pushing against the S-Arm. **Contact Monarch Tractor if you see that the parking brake is not sitting against the S-Arm**

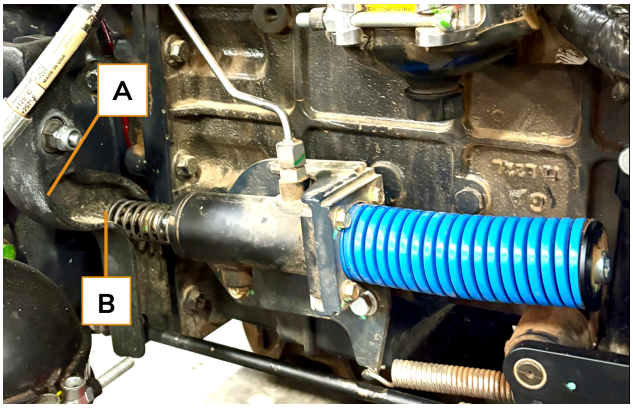
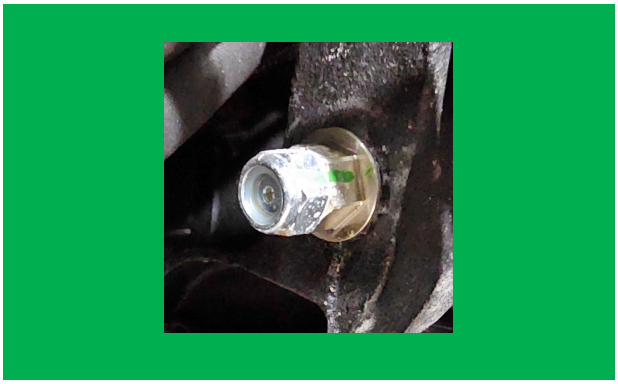


Figure 30: PARKING BRAKE IN PROPER POSITION AGAINST S-ARM

A. S-ARM
B. PARKING BRAKE IN PROPER POSITION

11. Check the jam nuts on the parking brake. **Contact Monarch Tractor if you see any of the following issues:**
    - **One or more jam nuts are loose or missing**
    - **Torque mark is unaligned, indicating that a fastener has moved.**
    - **Threads are not flush with the end of the jam nut.**
    - **Threads are protruding through the jam nut.**

Incorrect nut placement with torque mark broken. Contact Monarch Tractor.



Jam nuts in the correct position, with torque mark intact.

12. If any issues are seen, contact Monarch Tractor for help.

IMPORTANT: When pressed, the foot brake should never lose resistance. There should always be a feeling of tension in the brake pedal. If the pedal feels too loose or sinks down when pressed, contact Monarch Tractor.

.

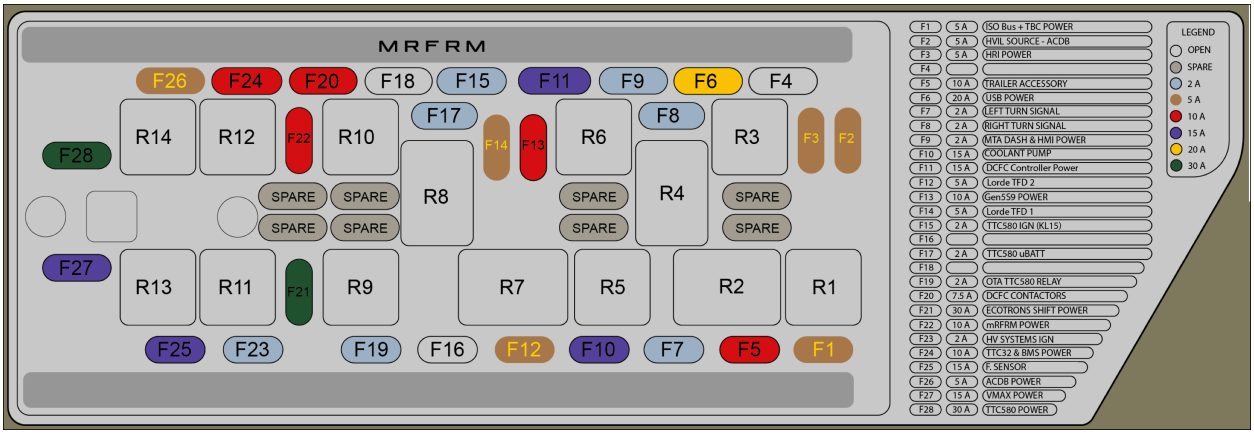
Fuses

Fuses protect the tractor's electrical system from potential damage. A blown fuse indicates that there is an overload or a short somewhere in the electrical system. If a fuse blows, replace it with a new fuse of the same capacity.

All fuses in the Monarch Tractor are replaceable by hand, without additional tools.

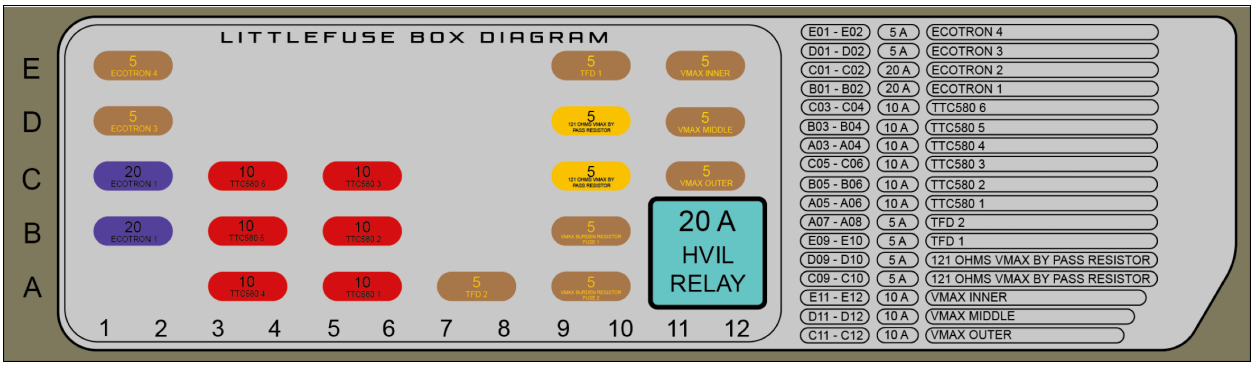
Before replacing a blown fuse, it's important to determine what caused the fuse to blow, and then to make necessary repairs.

IMPORTANT: To avoid serious damage to the tractor and to the tractor's electrical system, determine the cause of a blown fuse before replacing it.

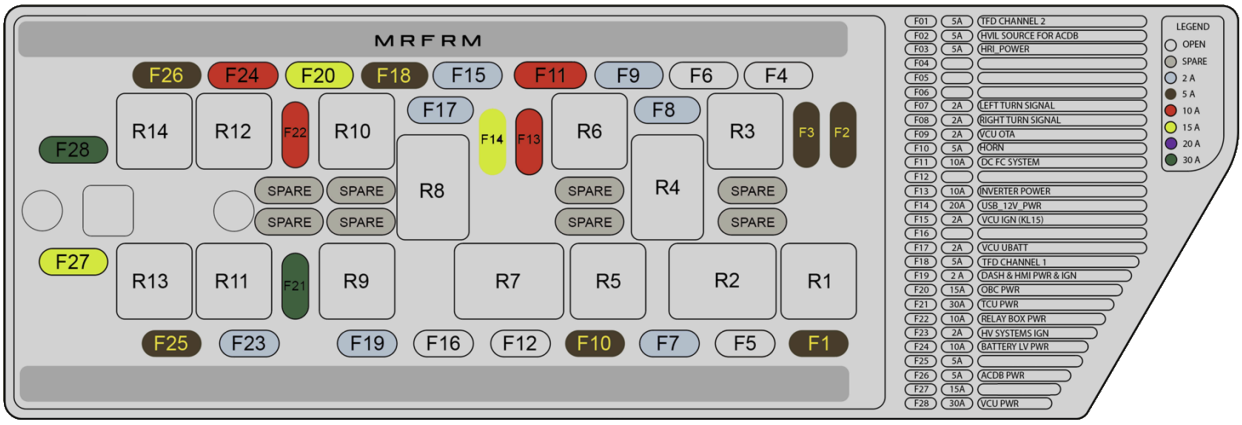


Location	Amps	Protected Circuit
F1	5A	ISO Bus+ TBC Power
F2	5A	HVIL source for ACDB
F3	5A	HRI power
F4	Empty	N/A
F5	10A	7-Pin connector
F6	20A	USB power
F7	2A	Left turn signal
F8	2A	Right turn signal
F9	2A	MTA Dash and HMI power
F10	15A	Coolant pump
F11	15A	DCFC controller power
F12	5A	Lorde TFD 2
F13	10A	Gen559 power
F14	5A	Lorde TFD 1
F15	2A	TTC580 IGN (KL15)

Location	Amps	Protected Circuit
F16	Empty	N/A
F17	2A	TTC580 uBATT
F18	Empty	N/A
F19	2A	OTA TTC580 Relay
F20	7.5A	DCDF Contactors
F21	30A	Ecotrons shift power
F22	10A	mRFRM power
F23	2A	HV systems IGN
F24	10A	TTC32 & BMS power
F25	15A	Front sensor
F26	5A	ACDB power
F27	15A	VMAX power
F28	30A	TTC580 power



Location	Amps	Protected Circuit
E01 – E02	5A	ECOTRON 4
D01 – D02	5A	ECOTRON 3
C01 – C02	20A	ECOTRON 2
B01 – B02	20A	ECOTRON 1
C03 – C04	10A	TTC580 6
B03 – B04	10A	TTC580 5
A03 – A04	10A	TTC580 4
C05 – C06	10A	TTC580 3
B05 – B06	10A	TTC580 2
A05 – A06	10A	TTC580 1
A07 – A08	5A	TFD 2
E09 – E10	5A	TFD 1
D09 – D10	5A	121 OHMS VMAX bypass resistor
C09 – C10	5A	121 OHMS VMAX bypass resistor
E11 – E12	10A	VMAX inner
D11 – D12	10A	VMAX middle
C11 – C12	10A	VMAX outer



Location	Amps	Protected Circuit
F1	5A	ISO Bus+ TBC Power
F2	5A	HVIL source for ACDB
F3	5A	HRI power
F4	Empty	N/A
F5	Empty	N/A
F6	Empty	N/A

Location	Amps	Protected Circuit
F7	2A	Left turn signal
F8	2A	Right turn signal
F9	2A	VCU OTA
F10	5A	Horn
F11	10A	DC FC system
F12	Empty	N/A
F13	10A	Inverter power
F14	20A	USB 12V power
F15	2A	VCU ign
F16	Empty	N/A
F17	2A	VCU U Batt
F18	5A	TFD channel 1
F19	2A	Dash and HMI power and ignition
F20	15A	OBC power
F21	30A	TCU power
F22	10A	Relay box power
F23	2V	HV systems
F24	10A	Battery LV power
F25	Empty	N/A
F26	5A	ACBD power
F27	Empty	N/A
F28	30A	VCU power

CHANGE LOG

REVISION	DATE	DESCRIPTION OF CHANGE	AUTHOR
1.0	06/15/2025	Initial release	A. Thomas

OPERATOR GUIDE

Chapter 8 – Scheduled Maintenance

There are daily as well as hourly tasks that should be completed as the schedule below reflects.

Task		Usage Hours																	
		50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	1000
Daily & hourly	Clean radiator screen	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Check coolant level	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Inspect charger	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Check tire pressure	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Check tire wear	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Inspect brakes	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Wash tractor	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Clean, lubricate grease fittings	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Hourly																				
	Change hydraulic fluid					X					X					X				X
	Replace Hydraulic Fluid Filter					X					X					X				X
	Check Pressure Filter; replace as indicated	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Change Front Axle Gearbox Oil					X					X					X				X
	Change 4WD Gearbox Oil					X					X					X				X
	Replace Coolant																			X
	Inspect ROPS																			X

Daily Maintenance

Part	Task
Radiators	Make sure both radiator screens are clean and free of debris.
Coolant	Check coolant level and add coolant if needed.
Lubricants	Clean and lubricate grease fittings. Check hydraulic fluid level and add hydraulic fluid if needed.
Underbody	The tractor's underbody is frequently exposed to harsh treatment. Dirt, mud, and animal waste can easily accumulate, affecting tractor performance. Use water and soap to wash underbody. **Do not use a power washer.**
Brakes	Check foot brake and parking brake springs and linkages for mud, waste, or debris.
Fluid leaks	Check under the tractor for hydraulic fluid or gear oil leaks after the tractor has been parked for a while. If you see any leaks, check for the cause and correct it immediately.
Tires	Check tire pressure and look for cuts or uneven wear.
Seats	Check seat position controls. Make sure the seat locks into place.
Seat belt	Check that the buckle and retractor operate properly and smoothly. Check the belt webbing for cuts, fraying, wear, or damage.

CHANGE LOG

REVISION	DATE	DESCRIPTION OF CHANGE	AUTHOR
1.0	06/15/2025	Initial release	A. Thomas