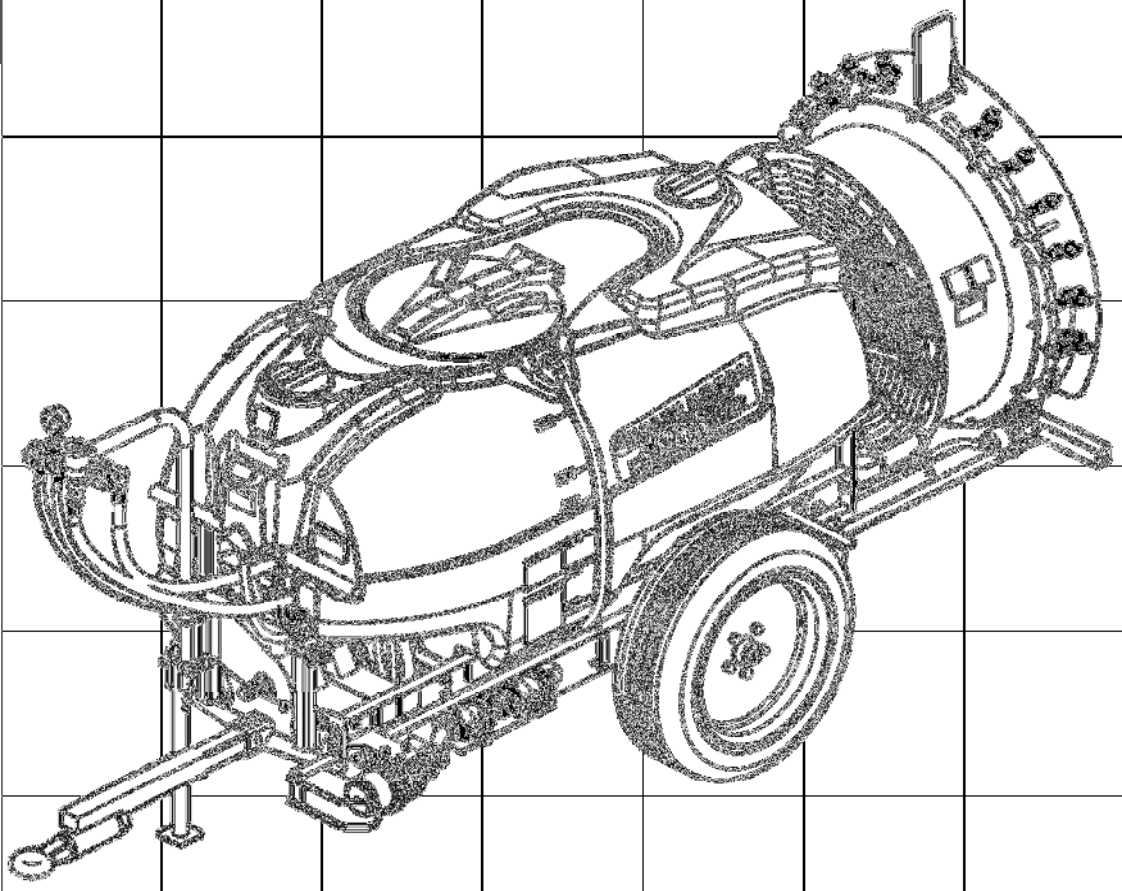
Operation Manual

Tractor-trailed Sprayer

SSD600



Please Read This Document Before Use.

MARUYAMA

Introduction

Thank you for purchasing a Maruyama product. This Operation Manual explains the correct handling of the product and how you can easily inspect and care for it, so that you can carry out your work safely and comfortably using the machine.
Before using the product, read this manual carefully and understand the contents fully so that the product will continue to demonstrate excellent performance.
After reading this manual, keep it in a safe place and reference it every time you have a question.
Please note that information contained in this manual may not exactly match the product you purchased due to specification changes of the product, etc.

If you have any feedback on this product, please contact the Maruyama dealer or sales office near you.

Scope of Use

This product is designed for spraying pesticide and gibberellin in orchards.
Maruyama shall assume no responsibility for any accident caused by using the product outside the foregoing scope of use or accident arising from an unauthorized modification/disassembly.

Precautions

The precautions contained in this manual and warning labels bearing  you see on the machine provide important items that may cause injury if neglected. Read these precautions and labels carefully and be sure to follow the instructions.
In this Operation Manual, particularly important handling precautions are denoted as follows:

 Danger --- Failure to follow this instruction will lead to death or serious injury.

 Warning --- Failure to follow this instruction may lead to death or serious injury.

 Caution --- Failure to follow this instruction may lead to injury.
Caution ---Failure to follow this instruction may lead to machine damage.

International Units

- This Operation Manual uses international units. Carefully read the table below to understand the conversion values before use.

Conversion Table

Quantity	Unit indication under new measuring system	Conversion	Conventional unit indication	Remarks
Area	[m^2] (square meters)	10000 [m^2] = 1 [ha] = 100 [a] = 0 tanbu (1 tanbu = 10a)= 3000 tsubo (approximately 1 tsubo=3.3 m^2) = 2.5 [acre]	[a] (are), [ha] (hectare) Tsubo (approximately 1 tsubo=3.3 m^2), chobu (1 hectare (2.451 acres), tanbu (1 tanbu = 10 a), [acre]	*[1]
Rotational speed	[rpm] (revolutions per minute) [min^{-1}] (per minute)	1 [min^{-1}] = 1 [rpm]	[rpm]	*[2]
Force	[N] (Newton)	9.8 [N] = 1 [kgf]	[kgf] (weight kilogram)	
Moment of force	[N•m] (Newton meter)	9.8 [N•m] = 1 [kgf•m]	[kgf•m]	
Pressure	[Pa] (Pascal)	0.98 [MPa] = 10 [kgf/cm^2] 9.8 [Pa] = 1 [mmH_2O]	[kgf/cm^2] [mmH_2O]	
Work ratio/drive power	[W] (watt)	735.5 [W] = 1 [PS] 9.8 [W] = 1 [kgf•m/s]	[PS] [kgf•m/s]	

* Notes
[1] [a], [ha] and [acre] may be used to indicate land areas.
[2] The number of revolutions per unit time is indicated as “rotational speed” not as “revolutions.”

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1 For Safe Work

(1) Introduction

Carefully read the “Operation Manual” and instruction manual of the agrichemical used, to carry out work correctly and safely.

[1] When using the tractor-trailed sprayer installed on the tractor, make sure it is not tilted more than 10°.

[2] The person performing spraying should wear protective gears for agrichemical spraying (such as a pest control mask, protective glasses, boots, rubber gloves and waterproof protective cloth, etc.) to prevent the chemical from coming in direct contact with the body.

[3] Inspect/service and repair the sprayer on flat ground. To inspect/service the sprayer while still installed on the tractor, stop the engine on flat ground, apply the parking brake, remove the key, and erect the tractor-trailed sprayer stand. Failure to do so may cause the tractor to move unexpectedly, resulting in injury.

[4] Keep non-operators away from the area where pest control work is performed. Failure to do so may lead to an accident.

[5] Exercise due caution not to pollute water supply systems, rivers, lakes, ponds, etc.

[6] Never refuel near a fire source as it may cause fire. Failure to do so may lead to fire.

(2) Precautions When Installing the Tractor-Trailed Sprayer on the Tractor

[1] Carefully read the operation manual for the tractor to familiarize yourself with the tractor operation.

[2] Be sure to perform startup inspection on the tractor and tractor-trailed sprayer to prevent problems during pest control work. Startup Inspection: Page 36

[3] No one should stand between the tractor and tractor-trailed sprayer. Failure to do so may result in injury.

[4] Securely connect the universal joint. Failure to do so may cause damage to the machine or injury.

[5] Strictly observe the instructions provided in the operation manual page 13 for the tractor-trailed sprayer as to which tractor you can install the tractor-trailed sprayer on.
It should be noted, however, that the overall weight and front-rear weight balance vary depending on the tractor. Put weights on the front side so that the loads applied to the steering wheels (front wheels) of the tractor will become 20% or more of the overall weight. If the front wheels are too light, maneuvering the tractor becomes difficult and the tractor may tip over.

(3) Driving

Clean water is sprayed for adjustment of spray pressure and spray check.

[1] Before driving the tractor, check the connection of the universal joint, etc. again, and installation of the options, etc.

[2] While driving, do not increase the speed more than necessary and avoid sudden take-off, acceleration, braking or turning.
Ensure safe driving and work safety.

[3] Always confirm safety when entering/exiting a field, crossing a channel or ditch between fields, or traveling on soft terrain, etc.

Depending on how full or empty the chemical tank is, the center-of-gravity position may change to make the tractor unstable. Pay due attention to safety especially after filling the chemical tank.

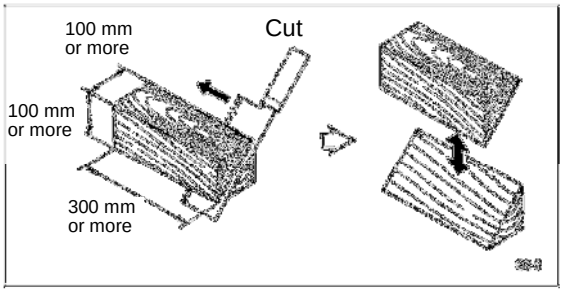
(4) Storage

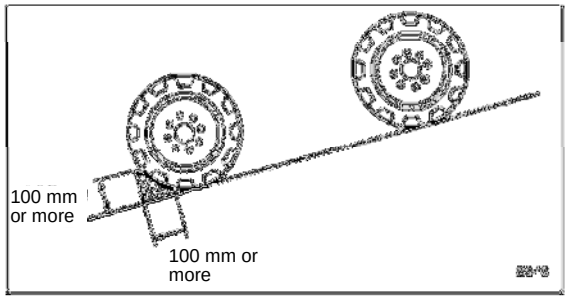
[1] Store the two-behind sprayer on flat ground. Inspect/service the stored sprayer to ensure safely during storage.

[2] To store the tractor-trailed sprayer while still installed on the tractor, be sure to erect the sprayer stand.

(5) Chocking the Tires

Prepare concrete blocks, wooden blocks or other objects (10x10 cm or larger, 30 cm or longer) that can be used to chock the tires so that the tractor can be parked safely. Chock the bottom side of tires on the two wheels, one left and one right, on the lower side of the incline.





Safety-related items are described in P4 to P10. Please read carefully and keep it safe.

●Please pay attention to the drift of agricultural chemicals.

Air assist sprayer spreads using a powerful blast to spread pesticide to the high part of the fruit tree. Therefore, the drift amount of agricultural chemicals is very large, and sprayed particles that soar are carried far.
Therefore, when spraying with Air assist sprayer, careful attention is required, and the following basic measures are also required.

1. Spray when the wind is weak

The biggest factor of pesticide drift is natural wind.
Let's scatter it by choosing a windless day or weak time. In addition, it is necessary to constantly grasp the condition of the wind and pay attention while spraying.

2. Spray the proper amount

The amount of drift increases as the amount of spray increases. If the leaf surface gets wet it will not be sprayed any more, do not wasteful spray.

3. Spray with proper blast volume

Excessive air volume will increase the drift.
Although it tends to increase the amount of air flow so that the medicinal solution reaches to the tree with a height, it is necessary to confirm the growing condition of the tree and the height to be reached once again and send it to reach the tree It is necessary to make it air volume.
It is also effective to perform trial spraying with water in advance and to check adhesion and drift.

4. Note the nozzle arrangement

It is necessary to adjust the arrangement of the nozzles according to the tree type, and to reduce excess discharge as much as possible. It is also effective to stop the nozzle in the direction without branches to match the growing condition of the tree at that time.

5. Stop the cock in the direction without trees at turning and at the end of the farm

Spraying in the outward direction without trees at turning and at the end of the field leads to a large amount of drift regardless of control. Therefore, at the time of turning and at the end of the park, stop spraying in unnecessary directions by cock operation.

6. Use auxiliary spray

While doing basic measures, if you feel uneasy about adhesion, we will actively compensate for dispersion to compensate for the shortage. It is important not to try to complete all the control in one run, but to carefully spray.

7. Wash Main tank (chemical tank)s and hoses carefully

After spraying, wash the sprayer and hose carefully. If agricultural chemicals used in tanks and piping of the sprayer are left, it will be sprayed at the next spray and it may lead to residual

Points of safety

- Please improve the road before you leave this machine in the field. Please also arrange the inside of the field, as well as the entrance to the field and the way to the field. Please reinforce where the shoulder is weak. Shoulder running is very dangerous. There is a fear that the shoulder collapse may lead to falling accidents. Please cut the grass of the road shoulder so that you can see the shoulder better. During the rain, the shoulder is getting weaker as it rains.

- If you have several remote fields and are transporting this machine by truck, we recommend that you create a platform for each field. Using an anchor and loading and unloading involves danger. It is safer to get the track directly down on the platform. Please be careful when using the slope. Please attach a leader.

- Be especially careful when traveling downhill!
  Let the engine brake of the tractor and select the shift position so that it can run at the speed without applying the brake. Do not shift in the middle of the slope. It is very dangerous to run quickly as soon as the clutch is turned off.

- Please do not adjust and maintain the machine after stopping the engine. Please do not adjust, check and repair that you can not do without moving the engine. It leads to accidents involved in the machine, which is extremely dangerous. Please ask the dealer you purchased.

- Please be sure to observe the start-up inspection described in the instruction manual. Please work on improving parts immediately. Please ask the dealer you purchased for periodic inspection.

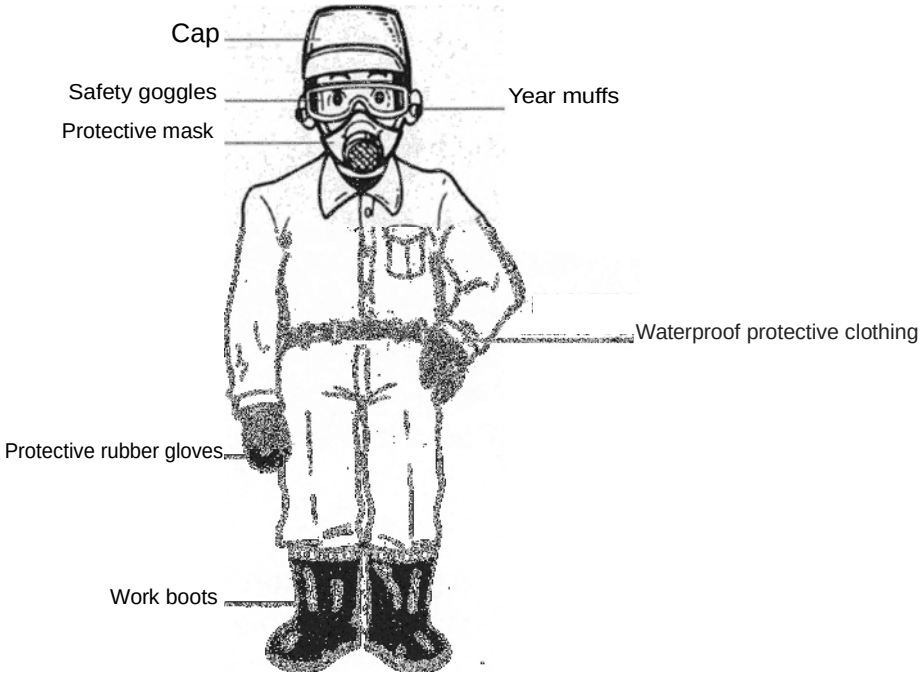
Please observe these items.

[1] Are you physically and mentally healthy? Such a person should not work..

（If you are not in a physical condition that you can concentrate on your work, do not do work.）.

- Drunk person
- Injured person
- A person under 15 years old.
- A person who is pregnant.
- A person who cannot do normal work due to overwork, disease, influence of drugs including agricultural chemicals, and other reasons.

[2] Dress suitable for control work..



Warning

Check and maintain the protective equipment so that it always has normal function and use it correctly. If the noise is large, use ear muffs or earplugs.

[3] Please prepare for emergency.

- Please take out insurance.
- Please be sure to know the contact information in case of emergency.
  〔At home.〕
  - Please prepare for the emergency accident, near the telephone, please specify the telephone number of medical institution and ambulance.
  - Please inform family members about where you are working in case of injury.

  〔To machine〕
  - If you are injured and you cannot move it please write your home contact information on this machine.
  - If you carry a whistle, it is effective when something happens.
- Prepare a medicine for emergency treatment.
- Please prepare inspection tools and inspect the machine.

[4] About chemicals.

Warning
● Do not spray strongly acidic chemicals, strong alkaline chemicals, paint, thinner, gasoline, kerosene, benzine, alcohol etc. There is a possibility of burns or fire. ● Do not use highly flammable chemicals as they may cause fire.

Caution
● Do not use chemicals containing organic solvents. Organic solvents are easy to hurt packing and hoses. If you are forced to use it. Please clean thoroughly with fresh water after use. If cleaning is insufficient, packing and hoses may be damaged, causing machine failure.

Please strictly observe.	There is such a danger.
[5] Management for agricultural chemicals. ◆ Please keep agricultural chemicals in a place where it can be locked. Record the name of the agricultural chemicals stored and the classification and quantity of poisons / deleterious substances ◆ Agricultural chemicals should not be placed in drinks or food containers. When storing agricultural chemicals in other containers, never put in containers of food such as beverage containers and seasoning. When transferring to another container, be sure to indicate the name of the pesticide and the name of the toxic substance / deleterious substance. ◆ Pesticide treatment follows the instructions. Please carefully read the labels of agricultural chemicals to be used, please familiarize yourself with usage and usage precautions. Please prepare for detoxification and first aid in case of emergency. ◆ Pay attention to the transportation of agricultural chemicals. When transporting agricultural chemicals, please be careful not to spill pesticide by breaking bag or breaking bottle, loose stopper and collapse of load. ◆ Pesticide and food shall be carried separately.	◆ Agricultural chemicals may be abused. Please check it from time to time so that you can know immediately even if it is lost. If you are lost, please notify the police. ◆ There is a danger of misunderstanding as food and drink and eating and drinking.
[6] When lending the machine to others. ◆ When lending a machine to another person, please explain the handling method well. Please lend them instruction manual with the machine, and instruct them to work after acquiring the handling method. Please explain with attention to prohibitions especially. The same is true for families.	◆ Lending machines by kindness to others, accidents may occur due to being unfamiliar.

About public road driving.

Please strictly observe.	There is such a danger.
◆ When it is necessary to go through public roads for the movement of the machine, you load the machine on a truck and move.	◆ It may be a violation of laws and regulations. Please follow the laws and regulations.

Mounting to tractor.

Please strictly observe.	There is such a danger.
◆ When attaching and removing the sprayer into the tractor, please work in a flat and wide place. ◆ Set the PTO and gear shift to neutral position and apply the parking brake.	◆ It may move due to poor balance. ◆ If someone accidentally start the engine of the tractor, it may cause injury accident.
◆ Connect the detent chain of the cover of the universal joint to the tractor.	◆ It is dangerous to universal joint and cover rotates together.

When driving.

Please strictly observe.	There is such a danger.
◆ When you start off, you start at low speed after confirming that no people, especially small children and animals are around the machine and that the left and right brake pedals are connected. ◆ When going backwards, check the front and back and the left and right to confirm that there are no obstacles and people, especially small children and animals, then start off.	◆ It will cause a fault accident.
◆ Narrow roads and slopes slow down and drive carefully.	◆ It may cause a rollover accident.
◆ When traveling, keep driving traffic regulations and drive. ◆ Please wear a helmet and drive. ◆ Please do not put people or objects besides the driver.	◆ It may cause injury or failure.
◆ The entrance to the field invades at a low speed and at right angles to the roadway. Please do not enter diagonally. ◆ When the entry into the field is weak or the angle is tight, use the slope.	◆ It may cause a rollover accident.

When doing control work.

Please strictly observe.	There is such a danger.
◆ Please take enough sleep and improve your physical condition the day before the control work. Please stop it when you are out of shape. ◆ Please take a regular medical examination. ◆ Please take a nap and rest. ◆ Please do not drink on the day you control.	◆ Even if you use low-toxicity agricultural chemicals you have a bad effect when you are tired.
◆ Wear protective clothing and protective equipment suitable for your work. ・ Protective mask that can prevent inhalation of agricultural chemicals. ・ Waterproof hood that can cover from head to shoulder. ・ Goggle type protective eyeglasses ・ Rubber gloves ・ Rubber boots ・ Waterproof protective clothing	◆ Even with low-toxicity agricultural chemicals, it accumulates in the body for a long time, and it may damage health.
◆ Please do not spray on night or rainy days.	◆ You cannot see the surroundings, it causes accidents.
◆ Please do the control work during a cool time. ◆ Please spray when the wind is weak. ◆ When starting the control work, please consider the wind direction so that there is no harm or phytotoxicity to nearby residents, passers-bys and crops. Also avoid contamination of rivers, ponds, swamps and so on. ◆ Immediately after spraying work, do not enter the field. Also, please be careful not to enter nearby people.	◆ It is prone to pesticide poisoning when it is hot. ◆ Harm caused by agricultural chemicals, phytotoxicity, etc. may cause trouble for others.
◆ Please do not carry out direct water supply from the place where you keep the drinking water source and the living thing.	◆ Agricultural chemicals may mix and be contaminated.
◆ Please prepare pesticide as much as you can use it on the day.	◆ You may in trouble with disposing of excess pesticide.
◆ When agricultural chemicals are on the skin, rinse thoroughly with soap immediately. ◆ Please prepare wash water and soap in case of emergency. ◆ Wash your hands, face, and gargle before meals and break.	◆ Agricultural chemicals may enter directly from the mouth and cause health harm. It also causes skin rash and eczema.
◆ For joint control, please work alternately. Please alternate it early when hot weather so as not to get tired. ◆ If you feel abnormalities in the body during and after the control work, please see the doctor immediately.	◆ Even if you use low-toxicity agricultural chemicals you have a bad effect when you are tired.
◆ Always pay attention to front, rear, left and right during spraying.	◆ If you are paying attention only to the spray condition, you may hit an obstacle and cause injury accident.

After control work.

Please strictly observe.	There is such a danger.
◆ Wash the machine and spraying equipment after use thoroughly. ◆ Please drain the water in the pump and piping.	◆ It may break due to freezing.

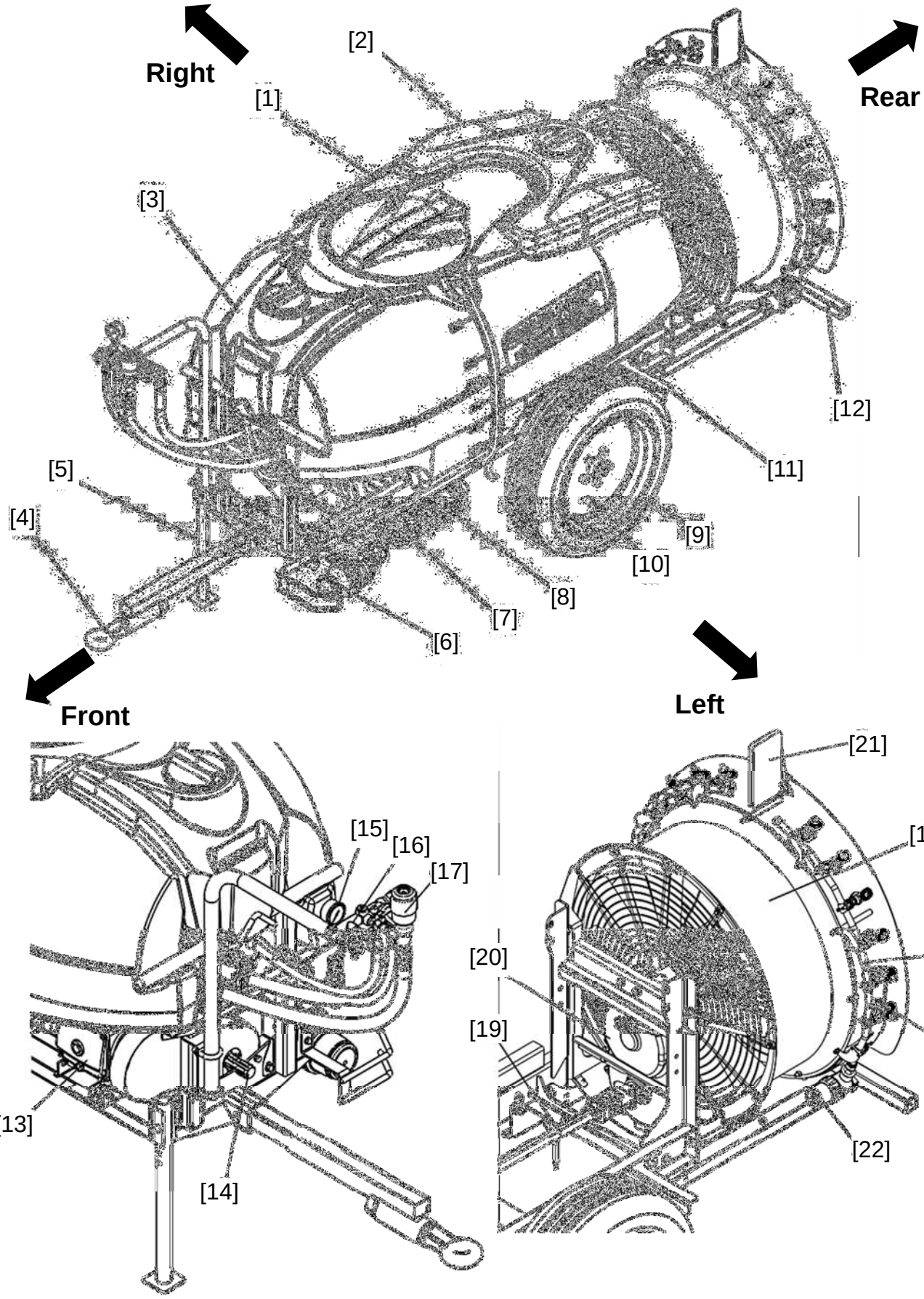
After the day's work is finished.

Please strictly observe.	There is such a danger.
◆ When cleaning the machine, stop the engine of the tractor in a flat place and remove the key.	◆ The machine may start moving or get caught in the rotating part.
◆ After cleaning, lubricate lubricating areas. ◆ Check that the CAUTION label is not peeled off or it cannot be read because it is dirty. If the label that peeled off or cannot read, order immediately and replace with a new one. （Label sticking place and part number are described in the instruction manual.）	◆ Rusting with washing machine water may result in inability to operate properly and cause injury accident. ◆ Safety precautions cannot be confirmed, which may cause personal injury or injury.
◆ After cleaning up, please bath immediately or take a shower, please wash with soap, and gargle. ◆ After work, please care enough for protective mask, protective glasses, gloves, protective clothing etc. And clothes dress everything up to underwear and wash thoroughly. Do not use it next day.	◆ If you leave it exposed to agricultural chemicals, there is a danger of harming your health. ◆ It becomes recontamination of pesticide.

For long term storage.

Please strictly observe.	There is such a danger.
◆ Please check each part and change oil etc until the next season. For details, refer to the instruction manual. Please repair if there are failure or wear. Please check the loosening of the bolt and tighten it if it is loose. Danger involves inspection and repair. Technique is sometimes necessary, so please ask the dealer you purchased for periodic inspection.	◆ An accident may occur unless you keep the machine in the best condition all the time.
◆ Place the machine on a flat surface, chocking the tire, install the stand and store.	◆ It may cause an accident.

2 Name of Each Part and Accessories



■ Name of Each Part and Accessories

No.	Name	Reference page in the manual
[1]	Main tank (Chemical tank)	24
[2]	Cleaning tank	25
[3]	Hand wash tank	25
[4]	Hitch	18,21
[5]	Stand	19,21
[6]	Strainer	26
[7]	Drain cock	26
[8]	Feed valve	26
[9]	Tire	42
[10]	Wheel	42
[11]	Tire scraper	23
[12]	Bumper	-
[13]	Pump	27
[14]	Input shaft	20
[15]	Pressure gauge	27
[16]	Water distributor	27
[17]	Pressure adjustment dial	27
[18]	Fan	-
[19]	Drive shaft	-
[20]	Fan transmission	29
[21]	Adjustment plate	29
[22]	Line filter	28
[23]	2-way switching nozzle	28
[24]	Spray pipe	-

■ Accessories

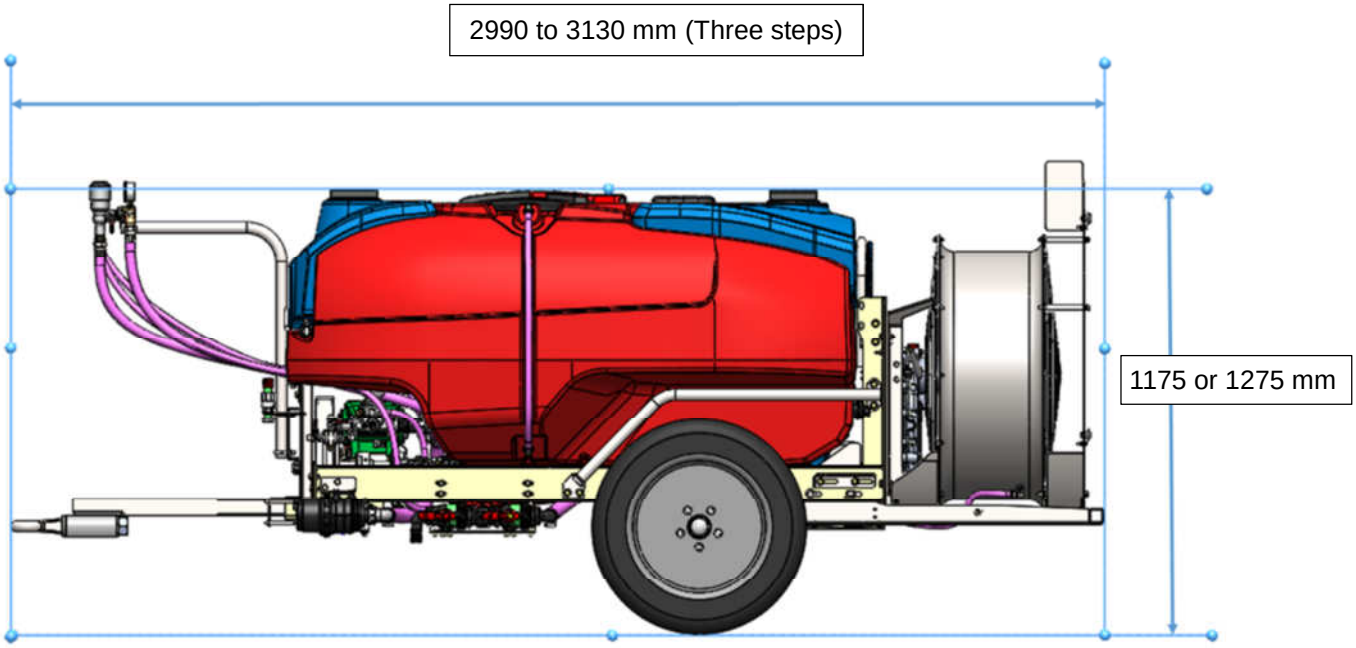
Name	Part number	Quantity	Remarks
Operation Manual	568461	1	This manual
Assembly Procedures	568462	1	

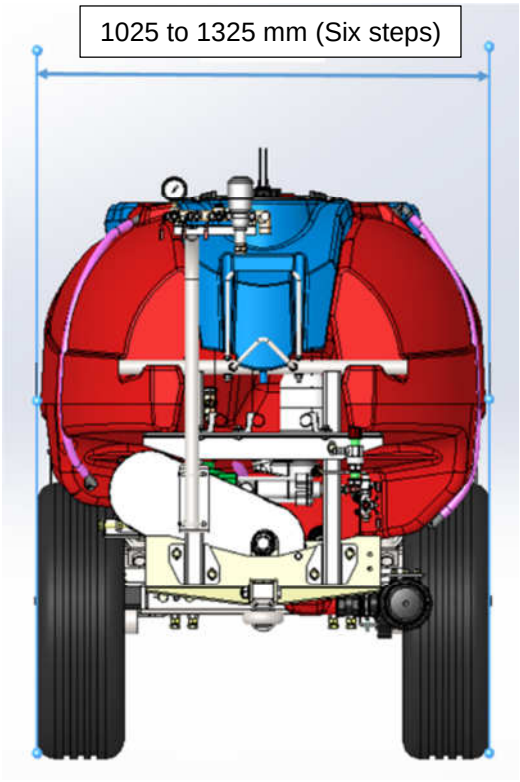
3 Main Specifications

Name			SSD600
Machine dimensions	Overall length	[mm]	2990 to 3130 (Three steps)
	Overall width	[mm]	1025 to 1325 (Six steps)
	Overall height	[mm]	1175 / 1275
Dry mass		[kg]	340
Main tank (Chemical tank)	Material		PE
	Capacity	[L]	600
	Agitation method		Jet type
Cleaning tank	Capacity	[L]	80
Hand wash tank	Capacity	[L]	18
Spray pump	Model		MS800S
	Type		Parallel triple piston type
	Normal rotational speed	[min^{-1}]	540
	Normal operation pressure	[MPa]	1.0 to 2.0
	Capacity	[L/min]	46
Fan	Type		Front stator-vane axial-flow fan
	Material		Nylon + glass fiber
	Fan diameter	[mm]	700
	Rotational speed	[min^{-1}]	2190
	Air flow rate	[m^3/min]	335
	Air flow speed (*3)	[m/sec]	30
Nozzle	Type		2-way switching type
	Number of heads		12
	Model		GA60/YL6002
	Discharge flow rate	[L/min]	4.9/17.7
	Particle size	[μm]	50 to 60/70
Tire	Size		195/60R15
	Air pressure	[KPa]	240
Applicable tractors			17.7 kW ~ (24Ps ~)

*1 Place weights on the front as necessary. Also note that installation may not be possible depending on the tractor.Consult the Maruyama dealer near you.
*2 The applicable tractors are subject to change.
*3 Values measured at the exit of the fan

SSD600 Machine Dimensions





■ The specifications are subject to change without notice for the purpose of improvement.

4 Handling of Warning Labels

Warning

- **Constantly remove soiling and mud over the labels so that the information provided on them remains clearly visible.**
- **If you find a damaged warning label, order a new label from the Maruyama dealer near you and replace the old label.**
- **If a part on which a warning label is attached has been replaced, be sure to attach a new label on the new part at the same location.**

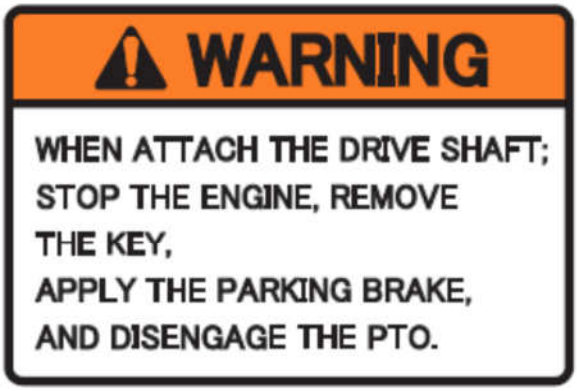
*** The warning labels shown below are attached on this machine. Before commencing work, carefully read and understand these labels. Carefully read the information provided on the labels as described below.**



568472



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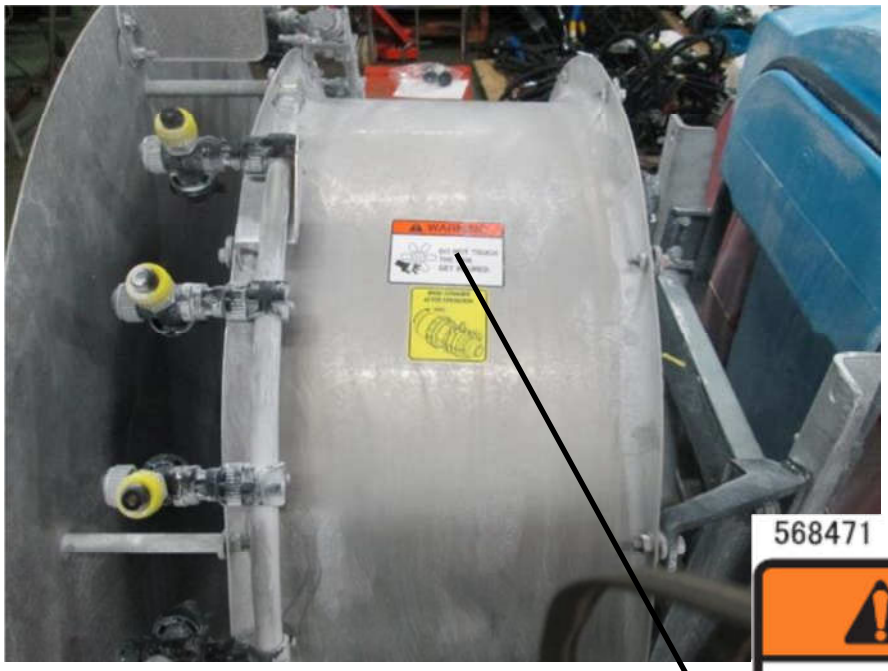
⚠ CAUTION

1. READ THE INSTRUCTION MANUAL AND MEMORIZE HOW TO USE THE MACHINE AND USE IT.
2. READ THE INSTRUCTION MANUAL OF THE CHEMICAL, AND USE CORRECTLY.
3. DURING INSPECTION, ADJUSTMENT AND CLEANING, STOP THE ENGINE OF THE TRACTOR AND REMOVE THE KEY.

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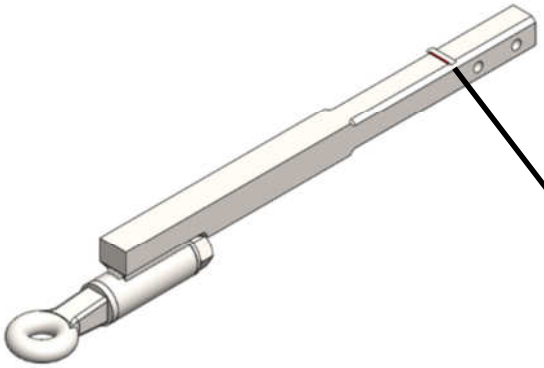
⚠ WARNING

1. PLEASE WEAR CLOTHES THAT FITS YOUR BODY. PREPARE PROTECTIVE CLOTHING, PROTECTIVE MASK, PROTECTIVE GLASSES, RUBBER GLOVES, WORKING SHOES (BOOTS) ETC AND WORK WITH SAFE CLOTHES.
2. DO NOT SUPPLY WATER DIRECTLY FROM DRINKING WATER SOURCES OR LAKES BREEDING LIVING THINGS.
3. MAKE A SPRAY PLAN SO THAT THERE IS NO SURPLUS CHEMICALS.
4. WHEN ATTACHING OR DETACHING THE SPRAYER, MAKE SURE THAT THE CHEMICAL TANK IS EMPTY.
5. DO NOT START MOVING SUDDENLY, SUDDEN TURNING, OR SUDDEN BRAKING. FALLING ACCIDENTS MAY BE INCURRED.



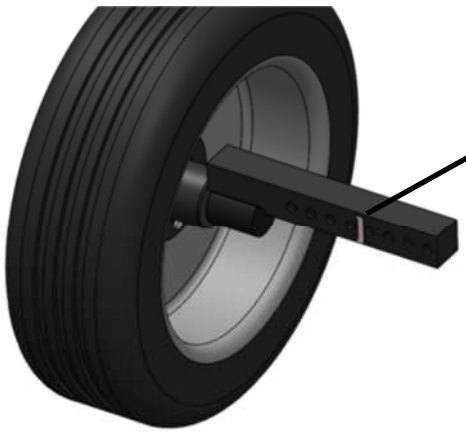
568471





568482





5 Installing/Removing the Sprayer on/from the Tractor

Warning

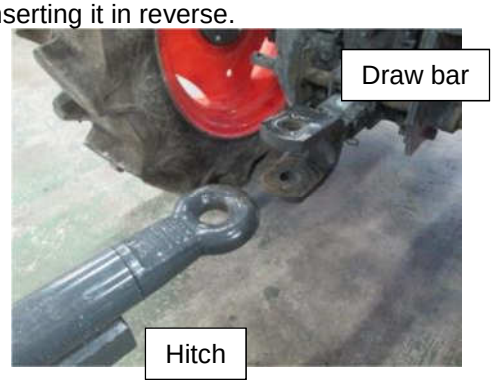
- **For safety reasons, one person should work alone to install or remove the sprayer on/from the tractor.**
- **When installing or removing the sprayer on/from the tractor, make sure the main tank (chemical tank) is empty. If the main tank (chemical tank) contains chemical or water, the center of gravity may shift and cause the tractor to tip over.**
- **When installing or removing the sprayer on/from the tractor, choose a location where the ground is flat.**
- **For the tractor on which to install the sprayer, follow the applicable tractors specified. Weights may have to be prepared separately to be placed on the front. Before commencing work, check with the dealer you purchased your machine from.**

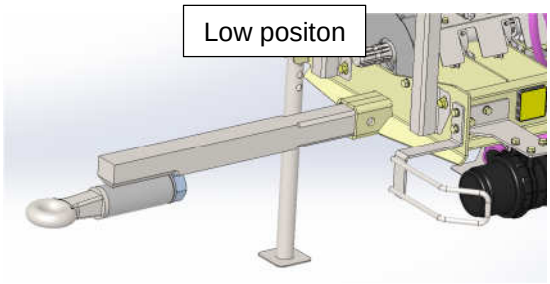
Installing the Sprayer on the Tractor

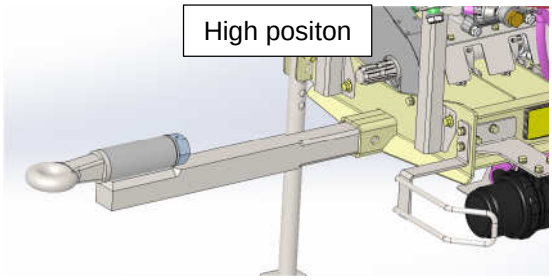
[1] Remove any implement currently installed on the tractor. To install the tractor-trailed sprayer on the tractor, use the supplied hitch pin.



[2] Align the hitch with the draw bar height. You can adjust the height of the hitch by inserting it in reverse.



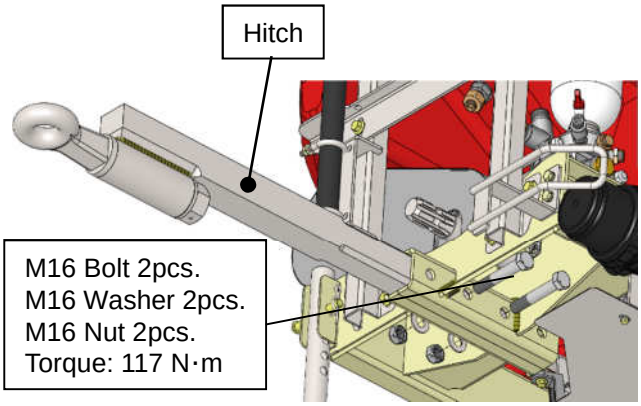




[3] Keep the hitch length as short as possible to the extent that it does not contact the tractor. You can adjust the length of the hitch by removing the two bolts securing the hitch. After the adjustment, securely tighten the bolts (torque: 117 N•m).

Warning

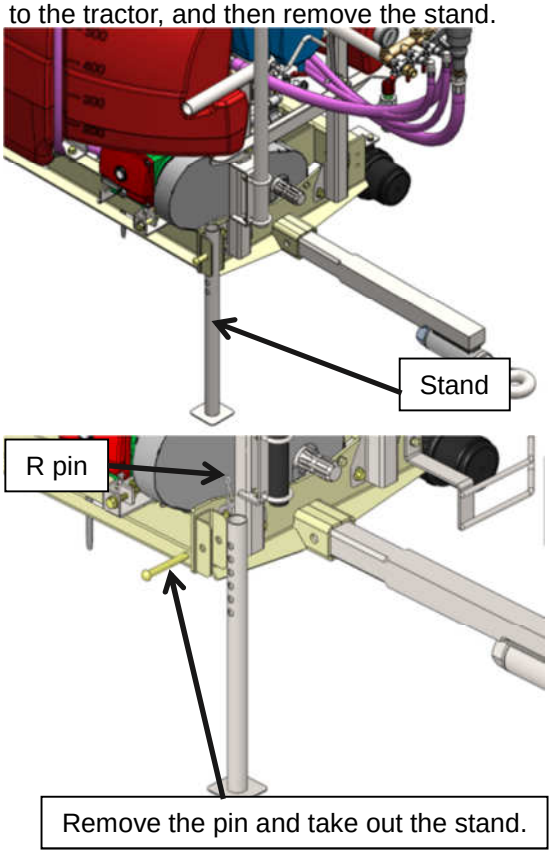
- **Be sure to secure the hitch with two bolts. If the hitch is secured with only one bolt, the hitch may come off and cause an unexpected accident.**



[4] Carefully back up the tractor until the draw bar aligns with the hitch. Next, insert the hitch pin and put the hair pin in.



[5] Confirm that the machine is securely connected to the tractor, and then remove the stand.



How to Install the Universal Joint

Dynamically connect the input shaft of the machine and the PTO shaft of the tractor using a universal joint.

Warning

- **When installing the universal joint, stop the engine of the tractor, apply the parking brake, and be sure to turn off the PTO.**

[1] First, confirm the length of the joint.

A. Turn the tractor fully to the left and right and confirm that bottoming of the universal joint does not occur.

B. With the machine and tractor lined up, confirm that the joint overlaps with each shaft by at least 10 cm.

If the overlap is longer, cut the universal joint by referring to the attached instruction manual for the universal joint. If the overlap is shorter, contact the Maruyama dealer near you, and please purchase a shaft of proper length.



Turn the tractor until just before it contacts the machine.

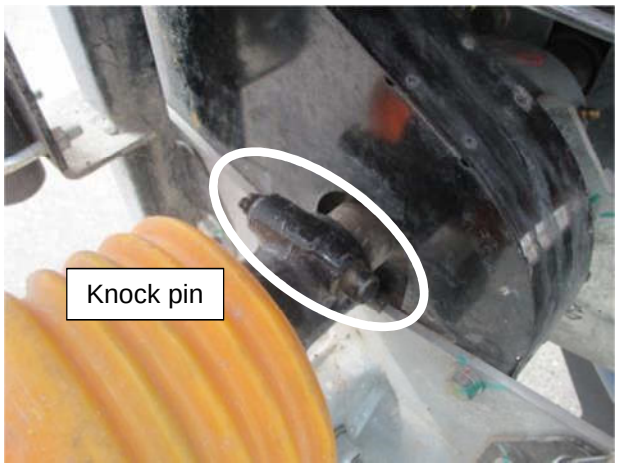


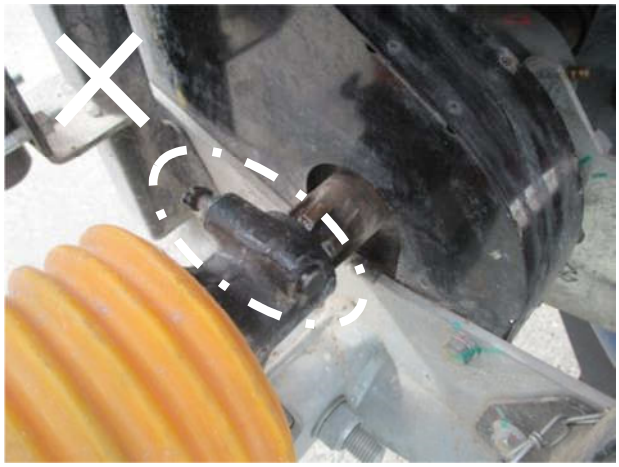
Bottoming of the universal joint shall not occur.

Caution

- **Bottoming of the joint shaft can cause damage to the tractor's PTO or power intake.**
- **If the joint does not overlap sufficiently, the shafts may come off and cause an unexpected accident.**

[2] Push in each shaft until the knock pin stops completely going in further.





[3] When the shafts have been connected, be sure to secure the joint cover with a chain to prevent it from turning.



Warning

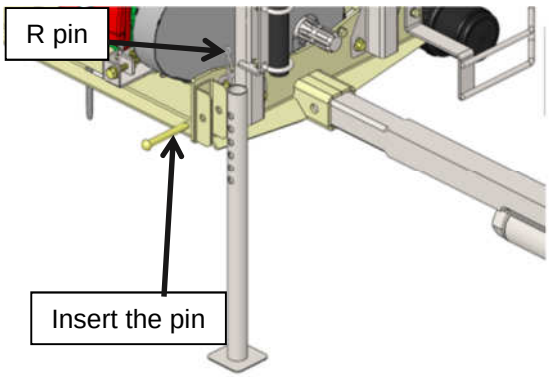
- **Do not use the joint with its safety cover removed. Do not touch or come near the turning shafts. You may be dragged in to the turning parts and get injured or die.**

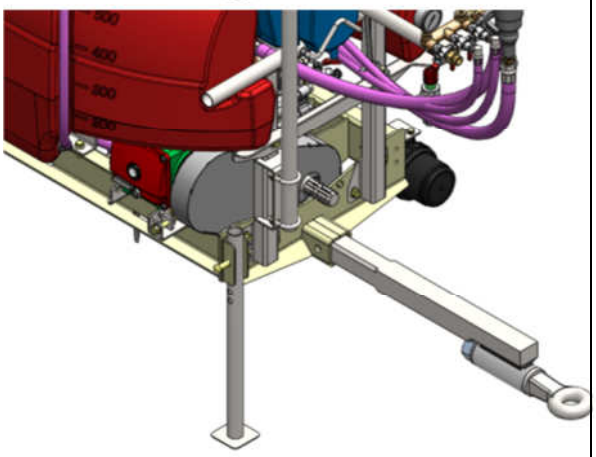
How to Remove the Universal Joint from the Tractor

[1] Remove the universal joint from the machine.



[2] Install the stand on the machine.
Install the stand at positions where the hitch does not contact the draw bar.
Choose the position of holes where the hitch does not contact the draw bar.





[3] Remove the hitch pin.



[4] Carefully move the tractor forward to separate the draw bar from the hitch.



Adjusting the Sprayer Tread/Height

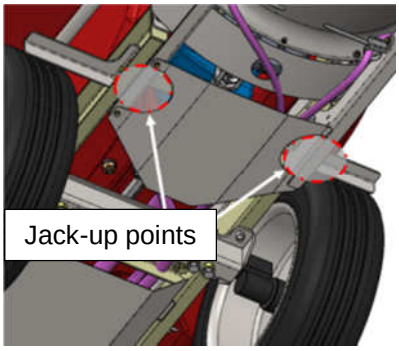
The tread of the machine can be adjusted by changing the position at which the axle is locked. Also, the height of the machine can be adjusted by changing the direction in which the axle is locked. Use the machine by adjusting its tread and height according to the shape of the field.

To adjust the tread and height of the machine, remove the machine from the tractor and set it down on stable, flat ground, and make sure the main tank (chemical tank) is empty.

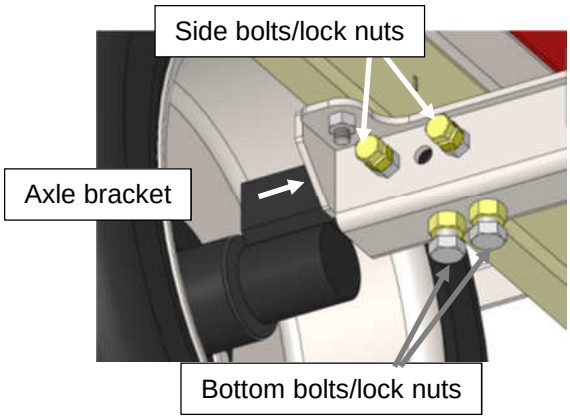
(a) Changing the tread

[1] Chock the tires on the side opposite the adjustment side (refer to page 3).

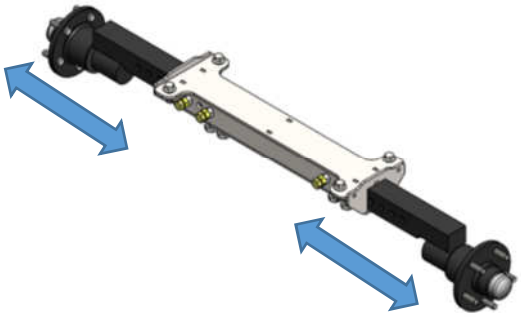
[2] Slowly lift the machine with jacks at the jack-up points in the rear.

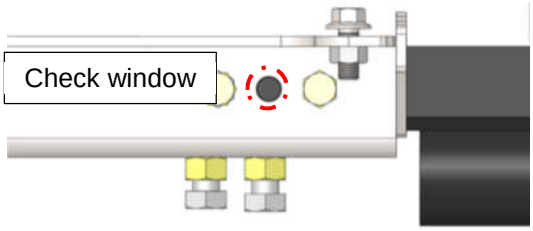


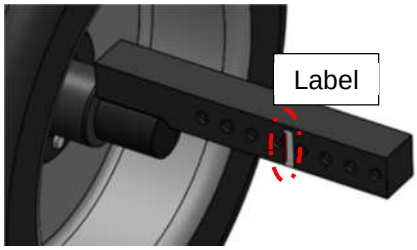
[3] Loosen the lock nuts on the bottom and side faces of the axle bracket, and loosen the bolts.



[4] Move the axle to a desired position. Confirm that the dimple on the side face of the axle is aligned with the check window.
Be sure to lock the axle at the same position on the left and right.







Warning

- **Be sure to insert the axle until the label is no longer visible. If the axle is not fully inserted, it may come off and cause an unexpected accident.**

[5] Tentatively tighten the bottom bolt on the axle and securely tighten the side bolt. Then, securely tighten the bottom bolt. Lastly, tighten the lock nut.
Bottom face: Torque: 60 N•m
Side face: Torque: 45 N•m
Slowly lower the jacks.

[6] Change the axle locking position on the opposite side by following steps [1] to [5].

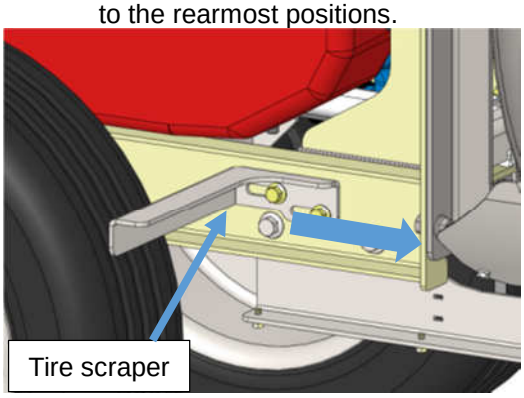
Warning

- **Be sure to secure the axle with four bolts on the bottom and side faces of each axle bracket.**
  If the axle is secured with loose bolts, it may come off and cause an unexpected accident.

(b) Changing the height

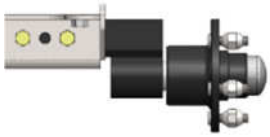
[1] Follow steps [1] to [3] in (a) to lift the machine and loosen the axle bolts.

[2] Loosen the tire scraper bolts and shift them to the rearmost positions.



[3] Pull out the axle completely. Switch the axle at the top and bottom position, and insert in the axle until the original tread is achieved.

Machine height: High



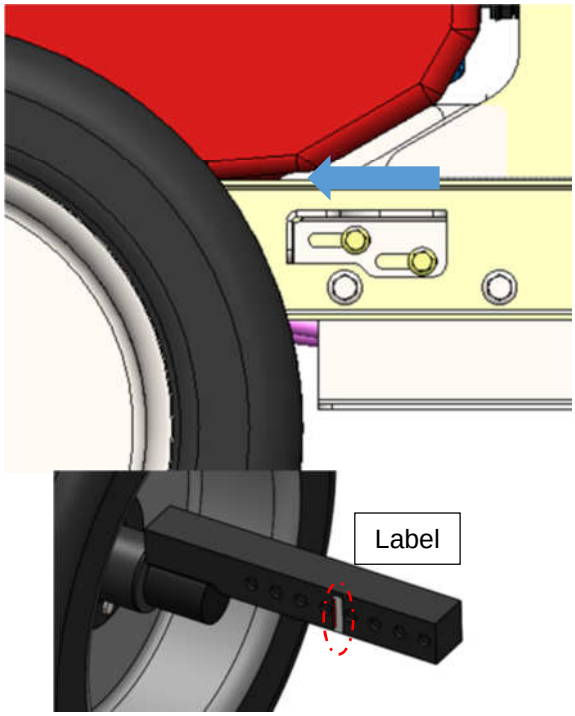
Machine height: Low



[4] Follow steps [4] to [6] in (a) to secure the axle and then slowly lower the sprayer.

[5] Change the axle position up/down in the same manner on the opposite side.

[6] Secure the tire scraper bolts by making sure the tire scrapers are away from the tires by 10 mm.



Caution

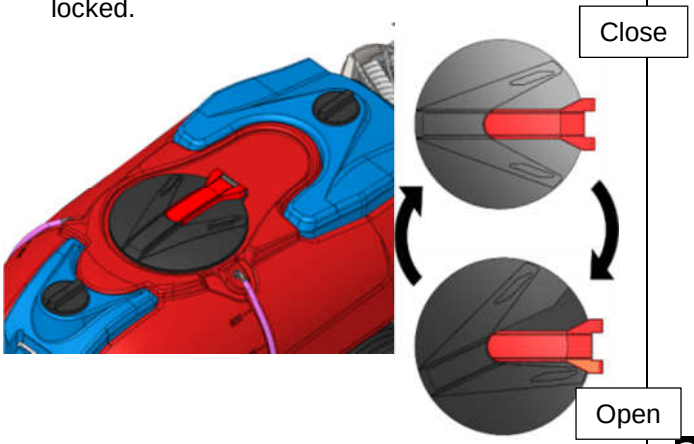
- **Be sure to insert the axle until the label is no longer visible. If the axle is not fully inserted, it may come off and cause an unexpected accident.**

Warning

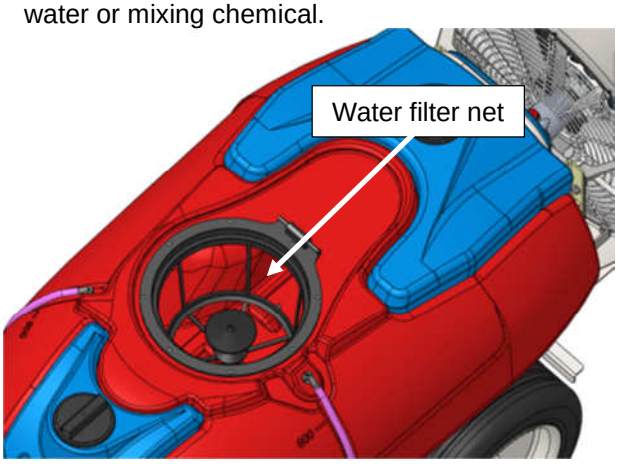
- **Be sure to secure the axle with four bolts on the bottom and side faces of each axle bracket.**
  If the axle is secured with loose bolts, it may come off and cause an unexpected accident.

■ **Main tank (Chemical tank)**

A container in which to store mixed chemical.
The maximum capacity is 600 L.
To open the lid of the main tank (chemical tank), turn it counterclockwise to unlock and open the lid.
To close the lid, turn it clockwise until the lid is locked.



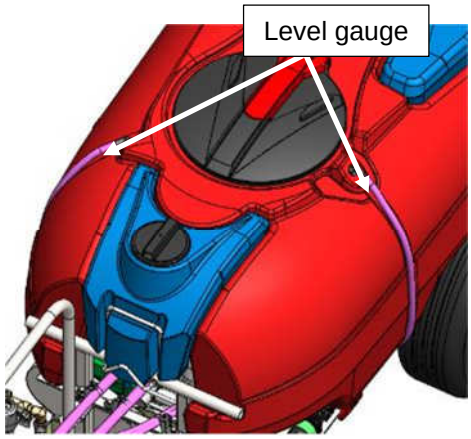
The water filter net in the main tank (chemical tank) filters out contaminants when feeding water or mixing chemical.



Caution

- **Clean the water filter net after each session. Pull out the water filter net. To remove the water filter net, hold the edge and pull out the net.**
  If the water filter net is pulled out by holding the mixer, the mixer may be damaged.
  The mixer hose is connected to the water filter net. Be careful not to let the hose receive any strong force.

A level gauge is provided on both sides of the main tank (chemical tank).
When checking the level in the main tank (chemical tank), make sure the machine is level.

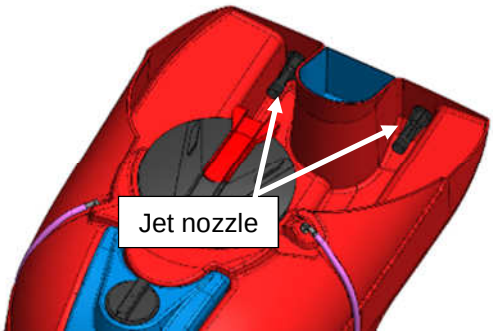


Caution

- **If the tractor is driven when the main tank (chemical tank) is full, chemical may overflow. Do not travel with full tank.**

■ **Jet nozzle**

This nozzle is used to create jet flows to agitate the chemical in the main tank (chemical tank).

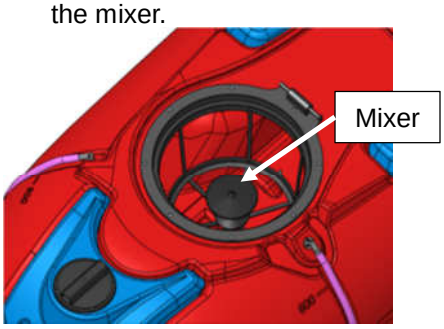


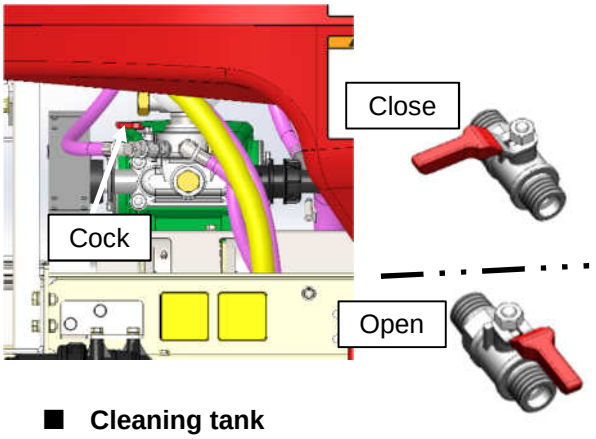
Caution

- **A clogged jet nozzle may lead to improper agitation of the chemical and uneven spraying.**
- **Replace a worn jet nozzle because once the jet nozzle is worn, the pump can no longer demonstrate its designed performance, preventing the pump pressure from rising, causing the spray amount to decrease, and so on.**

■ Mixer

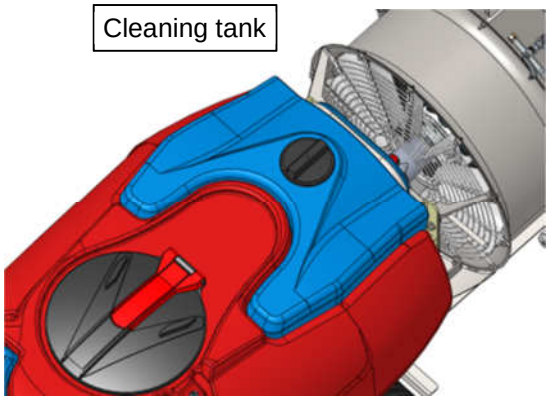
The mixer is used to circulate and thereby agitate the chemical in the main tank (chemical tank).
Actuate the spray pump. Turn the cock on the power sprayer to the “Open” position to actuate the mixer.

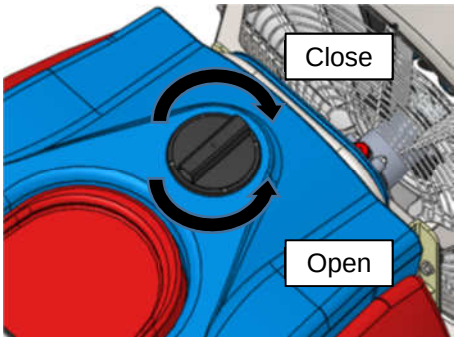




■ Cleaning tank

This tank stores clean water for cleaning the piping after work. The maximum capacity is 80 L.
To open the lid of the cleaning tank, turn it counterclockwise. To close the lid, turn it clockwise. Turn all the way to securely tighten the lid.

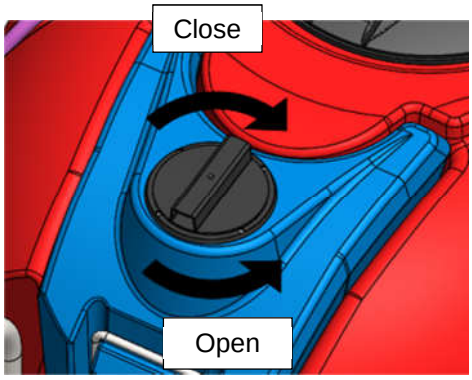




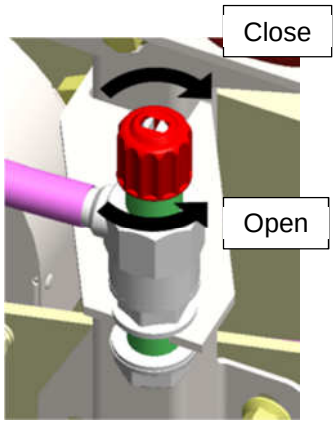
■ Hand wash tank

This tank stores clean water for washing hands. The maximum capacity is 18 L.
To open the lid of the hand wash tank, turn it counterclockwise. To close the lid, turn it clockwise. Turn all the way to securely tighten the lid.



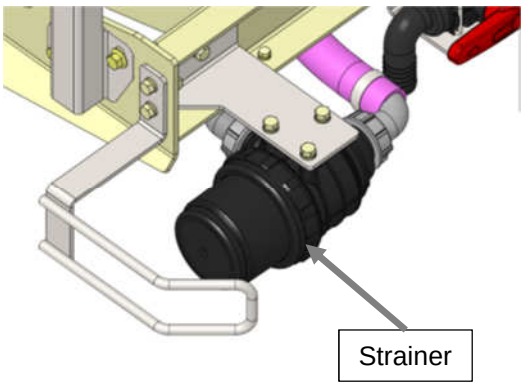


Water comes out of the hand wash tank when the front cock is turned counterclockwise.



■ Strainer

The strainer filters out contaminants that have entered main tank (chemical tank).
The strainer can be removed from the strainer by loosening the cap.



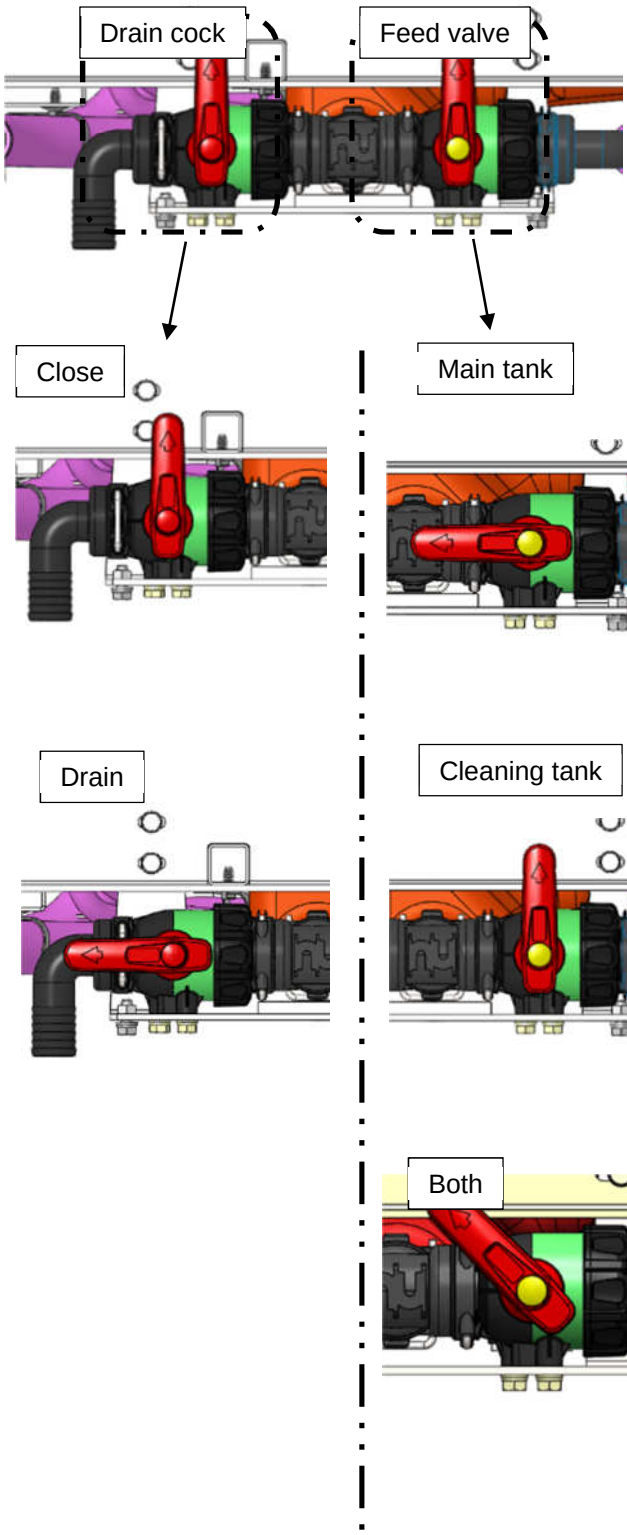
Warning

- **If the strainer is removed while chemical still remains in the main tank (chemical tank), chemical may unexpectedly spout out onto you.**
- **When the strainer is removed, the chemical remaining in the strainer and chemical piping flows out. Prepare a container to collect the chemical in order to prevent it from flowing to the outside.**

- **Clean the strainer after each session. After the cleaning, securely tighten the cap.**

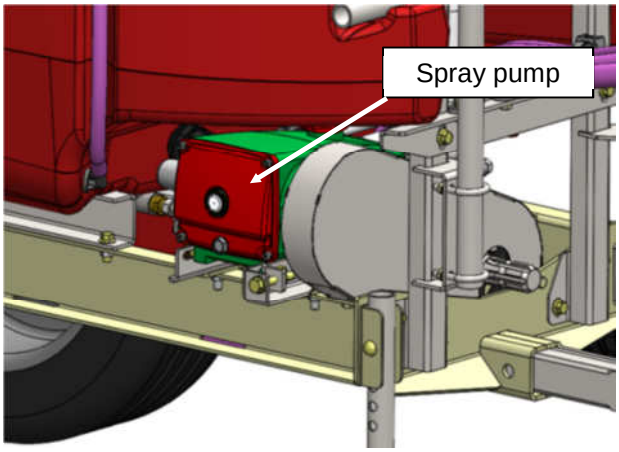
■ Feed valve/drain cock

You can choose to absorb water from the main tank (chemical tank) or from the cleaning tank using the feed valve.
Open the drain cock, and water will be drained. You can choose to drain water from the main tank (chemical tank) or from the cleaning tank using the feed valve. Turn the valve to the 45-degree position, and water will be drained from both tanks.



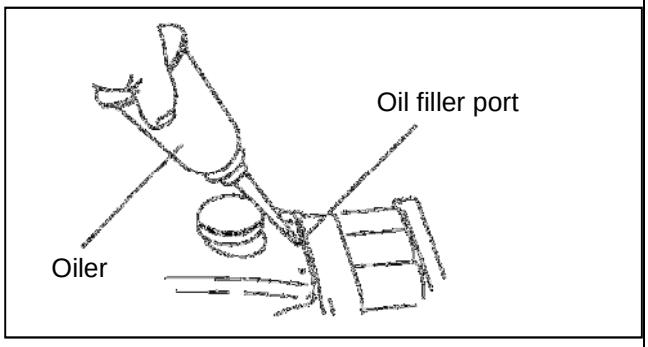
■ **Spray pump**

This pump is used to suction and pressure-feed chemical in the main tank (chemical tank).



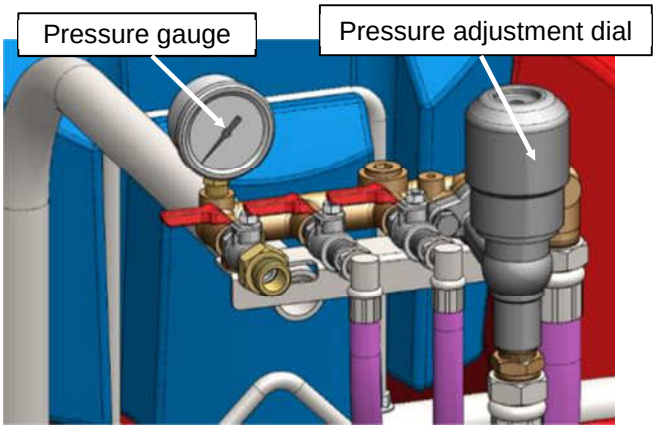
Caution

- **Be sure to use the PTO of the tractor at a speed of 540 min^{-1}.**
  If the PTO speed is too high or too low, uneven spraying or spray pump malfunction may result.
- **After every 100 hours of operation, put around 3 to 5 drops of oil (SAE 10W-30 SH class or higher) into the three holes (oil filler ports) shown in the figure.**



■ **Pressure adjustment dial**

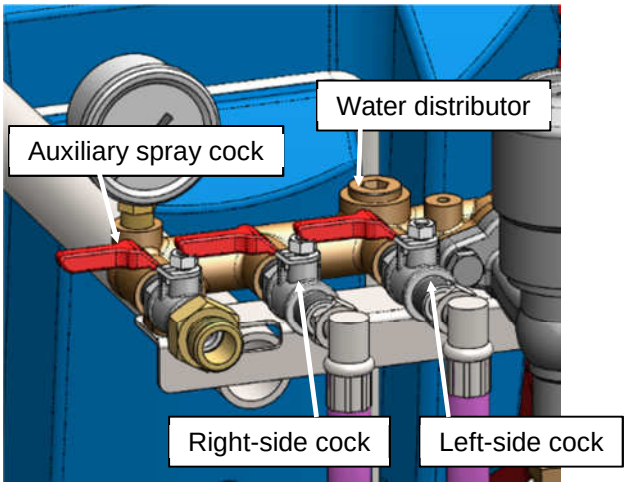
This pressure adjustment dial is used to adjust the discharge pressure of the spray pump. Turn the pressure adjustment dial clockwise to raise the pressure, or turn it counterclockwise to lower the pressure. The discharge pressure can be checked on the pressure gauge.

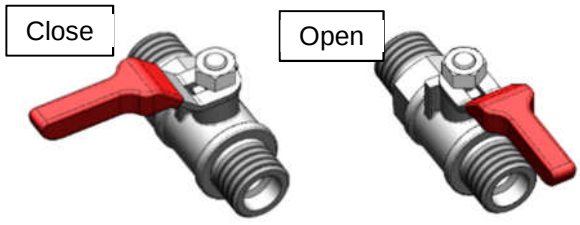


To stop spraying or end the spraying session, turn the pressure adjustment dial counterclockwise until it stops, to lower the pressure, and then turn off the PTO.

■ **Water distributor/spray cock**

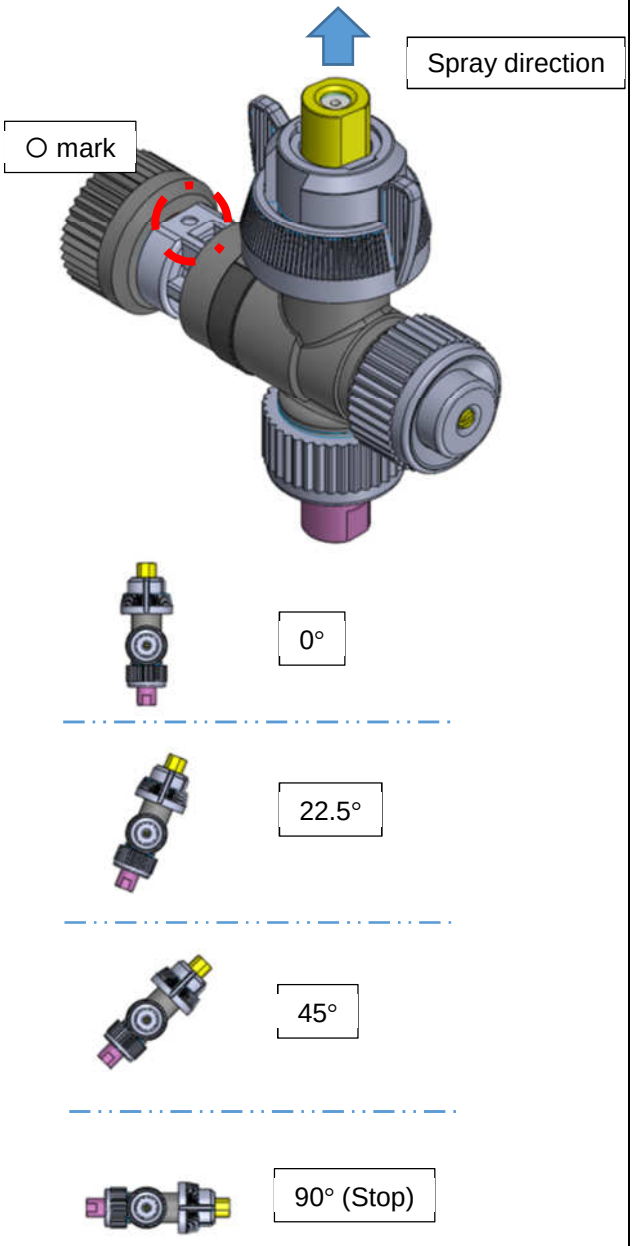
Chemical is sprayed from the nozzle when the spray cock on the water distributor is turned to the “Open” position, and spraying stops when the cock is turned to the “Close” position. The left-side nozzle and right-side nozzle can be operated separately.
An auxiliary spray cock is also available. You can connect existing nozzles you may have. (The hose diameter is 8.5 mm, and the thread size is G1/2.)





■ 2-way switching nozzle

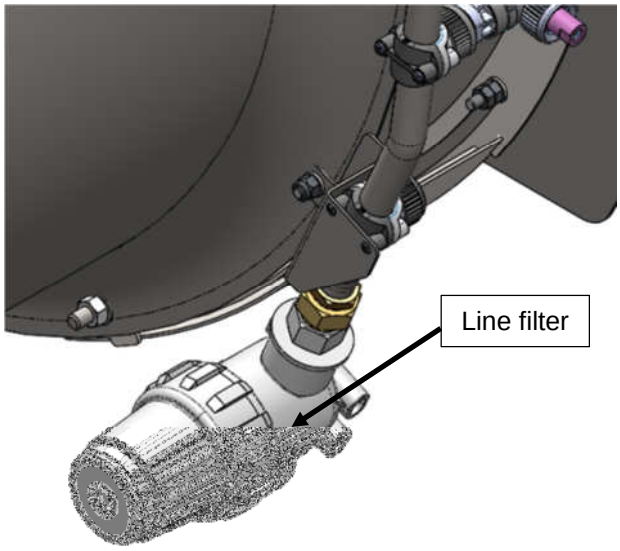
The sprayer comes standard with two different nozzles. Turn the holder 180° to switch the nozzle from which to spray.
The spray direction can be changed to ±22.5° and ±45° from the ○ marked position. Turn the nozzle to the 90° position from the ○ mark, and spraying from the nozzle will stop.



- **Stop spraying before switching the nozzle. If the nozzle is switched while spraying, water may ooze out of the nozzle holder.**
- **Be sure to turn the nozzle holder clockwise. If the nozzle holder is turned counterclockwise, the nozzle may become loose.**

■ Line filter

The line filter filters out contaminants that may otherwise enter the spray pipe. The filter can be removed from the line filter body by loosening the cap.

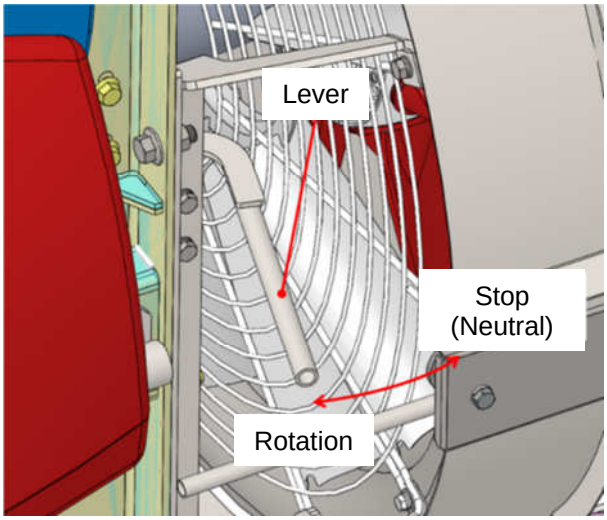


- **When the line filter is removed, the chemical remaining in the line filter and chemical piping flows out. Prepare a container to collect the chemical in order to prevent chemical from flowing outside.**

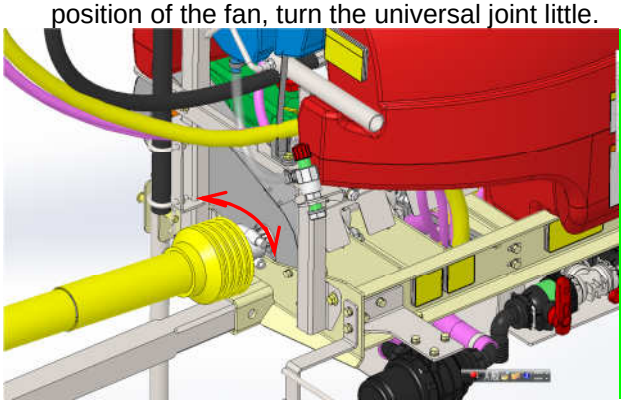
- **Clean the line filter after each session. After the cleaning, securely tighten the cap.**

■ Fan transmission

The fan transmission is used to run and stop the fan.
Move the lever toward the front of the machine to connect the gear, and the fan will run. Move the lever toward the rear of the machine to shift in neutral, and the fan will stop.



If it is difficult to switch the lever to the rotational position of the fan, turn the universal joint little.



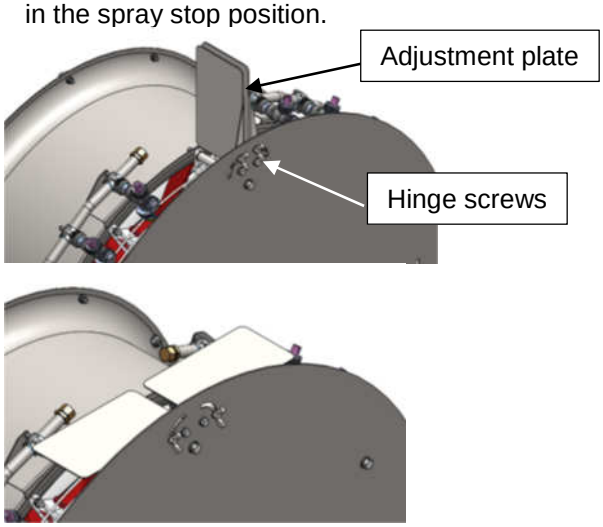
Stop the fan when blowing air with the fan is not necessary, such as while chemical is agitated or the auxiliary spray cock is used for spraying.

Caution

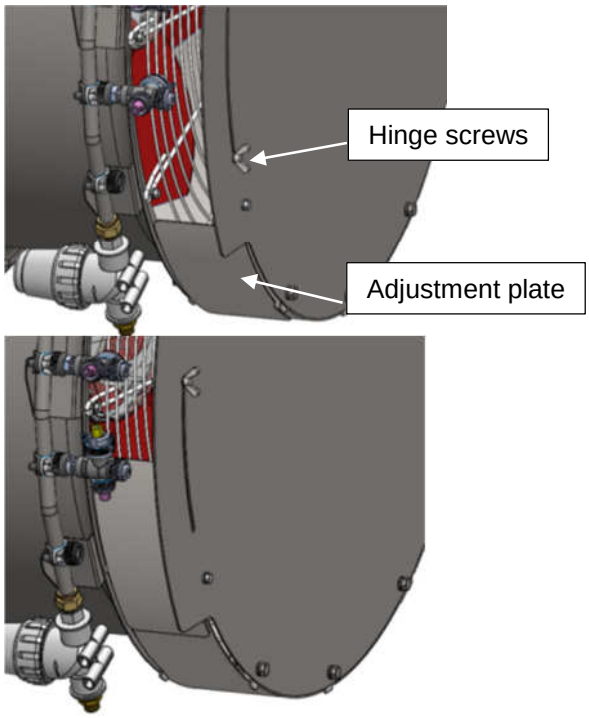
- **Be sure to stop the PTO before shifting the fan transmission. If the PTO is still connected, the fan may be damaged.**

■ Adjustment plate

The adjustment plates are used to adjust the direction in which air comes out.
The adjustment plates can be moved by loosening the hinge screws. After the adjustment, be sure to tighten the hinge screws.
If air need not be blown upward, flatten the top adjustment plates. Before flattening the top adjustment plates, be sure to put the top nozzle in the spray stop position.



If air need not be blown downward, pull up the bottom adjustment plates. Before pulling up the bottom adjustment plates, be sure to put the bottom nozzle in the spray stop position.



7 Spray Plan

Before actually commencing work, set a spray plan for the day.
Set a spray plan that will not cause chemical to remain.

Caution

- **Select a nozzle so that the total spray amount from the nozzle will not exceed 31.4 L/min. The spray pump may malfunction.**
- **Use the machine at spray pressures in a range of 1.0 to 2.0 (MPa). If the pressure is too high, the nozzle may be damaged; if the pressure is too low, uneven spraying may result.**
- **Make sure the spray speed is 5 km/h or less. If the speed is too high, the machine may receive excessive load and get damaged.**

[1] In spray planning, determine the spray amount per unit area (spray amount per acre) first, and then select the spray speed and obtain the spray pressure.
[2] An appropriate spray speed is 3.0 to 5.0 km/h.
[3] Determine the traveling velocity and spray pressure by using the quick reference guide on spray speeds.

■ **Total nozzle spray amount**

GA60 (purple)

Nozzle quantity	Total nozzle spray amount [L/mi]		
	Spray pressure 1.0 [MPa]	Spray pressure 1.5 [MPa]	Spray pressure 2.0 [MPa]
12	3.5	4.3	4.9
10	2.9	3.6	4.1
8	2.3	2.8	3.3
6	1.7	2.1	2.5

Spray amount per nozzle 1.0 MPa: 0.41 L/min 1.5 MPa: 0.36 L/min 2.0 MPa: 0.29 L/min

YL6002（yellow）

Nozzle quantity	Total nozzle spray amount [L/mi]		
	Spray pressure 1.0 [MPa]	Spray pressure 1.5 [MPa]	Spray pressure 2.0 [MPa]
12	12.5	15.4	17.7
10	10.5	12.8	14.8
8	8.4	10.2	11.8
6	6.3	7.7	8.9

Spray amount per nozzle 1.0 MPa: 1.05 L/min 1.5 MPa: 1.28 L/min 2.0 MPa: 1.48 L/min

■ **How to calculate spray speed**

How to Calculate the Spray Speed
(1) Determine the spray amount per acre and the spray pressure.
(2) Calculate the spray speed using the formula below.

$$\text{Spray Speed [km/h]} \approx 242.8 \text{ x} \frac{\text{Total nozzle spray amount [L/min]}}{\text{Spray amount per acre [L/acre]x Furrow width [m]}}$$

<<Example>> Spray amount per acre = 80 L, Total nozzle spray amount at 1.0 MPa = 3.5 L/min, furrow width = 2.8 m

Under the above conditions, the spray speed is

$$\text{Spray Speed} \approx 242.4 \text{ x} \frac{3.6}{80 \times 2.8} \approx 3.8 \text{ [km/h].}$$

■ **Quick reference guide on spray speeds**

The table below shows the spray amounts and traveling velocities when 6 to 12 GA60 (purple) and YL6002 (yellow) nozzles are used.

GA60 x 12

Spray amount		Traveling velocity [km/h]		
L/acre	L/10a	Spray pressure 1.0 [MPa]	Spray pressure 1.5 [MPa]	Spray pressure 2.0 [MPa]
60	14.8	5.0	-	-
70	17.3	4.3	-	-
80	19.8	3.8	4.6	-
90	22.2	3.4	4.1	4.8
100	24.7	3.0	3.7	4.3
110	27.2	2.7	3.4	3.9
120	29.7	2.5	3.1	3.6
130	32.1	2.3	2.8	3.3
140	34.6	2.2	2.6	3.1
150	37.1	2.0	2.5	2.9

GA60 x 10

Spray amount		Traveling velocity [km/h]		
L/acre	L/10a	Spray pressure 1.0 [MPa]	Spray pressure 1.5 [MPa]	Spray pressure 2.0 [MPa]
50	12.4	5.0	-	-
60	14.8	4.2	-	-
70	17.3	3.6	4.4	-
80	19.8	3.2	3.9	4.5
90	22.2	2.8	3.4	4.0
100	24.7	2.5	3.1	3.6
110	27.2	2.3	2.8	3.2
120	29.7	2.1	2.6	3.0
130	32.1	1.9	2.4	2.7
140	34.6	1.8	2.2	2.5

GA60 x 8

Spray amount		Traveling velocity [km/h]		
L/acre	L/10a	Spray pressure 1.0 [MPa]	Spray pressure 1.5 [MPa]	Spray pressure 2.0 [MPa]
40	9.9	5.0	-	-
50	12.4	4.0	4.9	-
60	14.8	3.4	4.1	4.8
70	17.3	2.9	3.5	4.1
80	19.8	2.5	3.1	3.6
90	22.2	2.2	2.7	3.2
100	24.7	2.0	2.5	2.9
110	27.2	1.8	2.2	2.6
120	29.7	1.7	2.1	2.4

GA60 x 6

Spray amount		Traveling velocity [km/h]		
L/acre	L/10a	Spray pressure 1.0 [MPa]	Spray pressure 1.5 [MPa]	Spray pressure 2.0 [MPa]
40	9.9	3.8	4.6	-
50	12.4	3.0	3.7	4.3
60	14.8	2.5	3.1	3.6
70	17.3	2.2	2.6	3.1
80	19.8	1.9	2.3	2.7
90	22.2	1.7	2.1	2.4
100	24.7	1.5	1.9	2.1

YL6002 x 12

Spray amount		Traveling velocity [km/h]		
L/acre	L/10a	Spray pressure 1.0 [MPa]	Spray pressure 1.5 [MPa]	Spray pressure 2.0 [MPa]
220	54.4	4.9	-	-
230	56.8	4.7	-	-
240	59.3	4.5	-	-
250	61.8	4.4	-	-
260	64.2	4.2	-	-
270	66.7	4.0	4.9	-
280	69.2	3.9	4.8	-
290	71.7	3.8	4.6	-
300	74.1	3.6	4.4	-
310	76.6	3.5	4.3	5.0
320	79.1	3.4	4.2	4.8
330	81.5	3.3	4.0	4.7
340	84.0	3.2	3.9	4.5
350	86.5	3.1	3.8	4.4
360	89.0	3.0	3.7	4.3
370	91.4	2.9	3.6	4.2
380	93.9	2.9	3.5	4.0
390	96.4	2.8	3.4	3.9
400	98.8	2.7	3.3	3.8
410	101.3	2.7	3.2	3.8
420	103.8	2.6	3.2	3.7
430	106.3	2.5	3.1	3.6
440	108.7	2.5	3.0	3.5
450	111.2	2.4	3.0	3.4

YL6002 x 10

Spray amount		Traveling velocity [km/h]		
L/acre	L/10a	Spray pressure 1.0 [MPa]	Spray pressure 1.5 [MPa]	Spray pressure 2.0 [MPa]
190	46.9	4.8	-	-
200	49.4	4.5	-	-
210	51.9	4.3	-	-
220	54.4	4.1	5.0	-
230	56.8	3.9	4.8	-
240	59.3	3.8	4.6	-
250	61.8	3.6	4.4	-
260	64.2	3.5	4.3	4.9
270	66.7	3.4	4.1	4.7
280	69.2	3.2	4.0	4.6
290	71.7	3.1	3.8	4.4
300	74.1	3.0	3.7	4.3
310	76.6	2.9	3.6	4.1
320	79.1	2.8	3.5	4.0
330	81.5	2.7	3.4	3.9
340	84.0	2.7	3.3	3.8
350	86.5	2.6	3.2	3.7
360	89.0	2.5	3.1	3.6
370	91.4	2.4	3.0	3.5
380	93.9	2.4	2.9	3.4
390	96.4	2.3	2.8	3.3
400	98.8	2.3	2.8	3.2

YL6002 x 8

Spray amount		Traveling velocity [km/h]		
L/acre	L/10a	Spray pressure 1.0 [MPa]	Spray pressure 1.5 [MPa]	Spray pressure 2.0 [MPa]
150	37.1	4.8	-	-
160	39.5	4.5	-	-
170	42.0	4.3	-	-
180	44.5	4.0	4.9	-
190	46.9	3.8	4.7	-
200	49.4	3.6	4.4	-
210	51.9	3.5	4.2	4.9
220	54.4	3.3	4.0	4.7
230	56.8	3.2	3.9	4.5
240	59.3	3.0	3.7	4.3
250	61.8	2.9	3.6	4.1
260	64.2	2.8	3.4	3.9
270	66.7	2.7	3.3	3.8
280	69.2	2.6	3.2	3.7
290	71.7	2.5	3.1	3.5
300	74.1	2.4	3.0	3.4
310	76.6	2.3	2.9	3.3
320	79.1	2.3	2.8	3.2
330	81.5	2.2	2.7	3.1
340	84.0	2.1	2.6	3.0
350	86.5	2.1	2.5	2.9

YL6002 x 6

Spray amount		Traveling velocity [km/h]		
L/acre	L/10a	Spray pressure 1.0 [MPa]	Spray pressure 1.5 [MPa]	Spray pressure 2.0 [MPa]
110	27.2	4.9	-	-
120	29.7	4.5	-	-
130	32.1	4.2	-	-
140	34.6	3.9	4.8	-
150	37.1	3.6	4.4	-
160	39.5	3.4	4.2	4.8
170	42.0	3.2	3.9	4.5
180	44.5	3.0	3.7	4.3
190	46.9	2.9	3.5	4.0
200	49.4	2.7	3.3	3.8
210	51.9	2.6	3.2	3.7
220	54.4	2.5	3.0	3.5
230	56.8	2.4	2.9	3.3
240	59.3	2.3	2.8	3.2
250	61.8	2.2	2.7	3.1
260	64.2	2.1	2.6	3.0
270	66.7	2.0	2.5	2.8

***1 The values in the reference guide table may not apply due to slipping of tires. In this case, consult the Maruyama dealer near you.**

***2 When spraying at levels outside the quick reference guide, the nozzle must be replaced. Consult the Maruyama dealer near you.**

8 Startup Inspection

The startup inspection refers to the inspection performed before commencing work. By performing the startup inspection every time, accidents associated with the machine, machine malfunctions, etc., can be prevented. Be sure to perform the startup inspection, because it is a very important inspection.

*** Startup inspection includes the items denoted by "Before start of work" in the "Inspection/replacement timing" field of the table provided in "Maintenance and Inspection" (page 39).**

Refer to page 39 onward for the details of the inspection method.

9 How to Feed Water

Warning

- **Never feed water directly from a drinking water source or any lake or pond used for aquatic farming.**

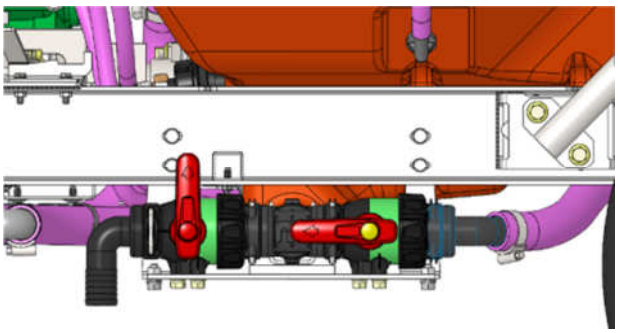
Add the required amount of water in the main tank (chemical tank). At this time, be sure to feed water through the water filter net. If water is not fed through the water filter net, the nozzle may be clogged or malfunction may occur.

10 Spray Inspection

Caution

- **Perform spray inspection by spraying clean water.**

[1] Put clean water into the main tank.
[2] Confirm that the feed valve is open.



[3] Set the tractor engine to low speed and turn the PTO.

- **If the PTO is connected abruptly when the tractor engine is running at high speed, the spray pump and fan transmission may malfunction. Be sure to keep the engine speed low when turning the PTO.**

[4] Operate the throttle and adjust the PTO speed to 540 min^{-1}.
[5] Turn the pressure adjustment dial to adjust the pressure to a desired level.

[6] Set the spray cock in the "Open" position and spray from the nozzle, and check the condition of spraying from each nozzle for abnormality. With a standard nozzle, the nozzle is spraying normally if the mist spreads in a clean, hollow conical shape.

- **When the spray angle is extremely narrow or the mist thickness is uneven, remove the nozzle and check if contaminants, etc., are clogging the nozzle. If the nozzle is clogged, clean the nozzle and spray again to check.**

[7] When remove the nozzle and re-installing the nozzle, securely tighten the nozzle cap to prevent water from leaking.

Caution

- **The nozzle plate will wear and the discharge amount will increase after long hours of use, in which case the nozzle plate should be replaced.**
- **When storing the machine over winter or for an extended period of time, also drain the nozzle.**

[8] Confirm water jets out from the jet nozzle in the main tank (chemical tank).

11 Precautions for Spraying

Warning

- **The person performing spraying should wear protective gears for agrichemical spraying (such as a pest control mask, protective glasses, boots, rubber gloves and waterproof protective cloth, etc.) to prevent the chemical from coming in direct contact with the body.**

Caution

- **Keep only the required amount of spray agent in the main tank (chemical tank) to prevent leftovers.**
- **Chemical spouts out from the nozzle. Do not let anyone come near the nozzle during spraying.**

12 Chemical Preparation

Warning

- **Carefully read the instruction manual of the applicable chemical and use the chemical correctly.**
- **Prepare chemical with the fan transmission in the stop (neutral) position.**

[1] Prepare only the required amount using a dedicated container.

[2] In the case of water-dispersible powder, dilute a small amount with water in a bucket, etc., and put the prepared solution in the main tank (chemical tank). Put chemical after water.

[3] Confirm that the spray cock is in the “Close” position.

[4] Turn the PTO of the tractor at 540 min^{-1}.

[5] Turn the pressure adjustment dial to adjust the pressure to 2.0MPa.

[6] Run the PTO several minutes in this condition to fully agitate the chemical.

[7] If spreading agent is used, follow the instruction manual that came with the spreading agent.

13 Spray Method

Caution

- **Before spraying, adjust the axle and hitch directions until the <u>universal joint becomes level</u>. If the angle of the universal joint is too sharp, the spray pump may malfunction.**

[1] Move the machine to the spray location.

[2] Stop the machine just before the position where you want to start spraying.

[3] Confirm that the feed valve is open.

[4] Make sure the position of the fan transmission lever corresponds to the rotating direction.

[5] Set the tractor engine to low speed and turn the PTO.

[6] Operate the throttle and adjust the PTO speed to 540 min^{-1}.

[7] Turn the pressure adjustment dial to adjust the pressure to a required level for work between 1.0 and 2.0 MPa.

[8] Put the shift lever on the tractor in the required position and start driving.

[9] After arriving at the desired starting position, set the spray cock in the “Open” position and start spraying.

Caution

- **If the PTO is connected abruptly when the tractor engine is running at high speed, the spray pump and fan transmission may malfunction. Be sure to keep the engine speed low when turning the PTO.**
- **Use the PTO of the tractor at a speed of 540 min^{-1}. If the PTO speed is too high or too low, uneven spraying or spray pump malfunction may result.**

- **Do not run the spray pump continuously for 1 minute or more after chemical has run out. The spray pump may malfunction.**

14 Stopping the Spraying

[1] When the spraying is done, set the spray cock in the “Close” position.
[2] Turn the pressure adjustment dial counterclockwise until it stops, to lower the pressure.
[3] Idle the tractor engine.
[4] Stop the PTO of the tractor.

Caution

- **If the work is stopped without returning the pressure adjustment dial to the 0 position, the spray pump may not suction chemical the next time it is used.**

Caution

- **Do not turn off the engine while the PTO is still connected. It may cause the fan transmission to malfunction.**

15 After Spraying

■ **Cleaning the main tank (chemical tank)**

[1] If chemical remains in the main tank (chemical tank), put a container under the drain and operate the drain cock to collect the remaining chemical.
[2] Use clean water to flush the main tank (chemical tank) thoroughly.
[3] Clean the strainer and line filter.
[4] Clean the water filter net in the main tank (chemical tank).
[5] Fill the cleaning tank with clean water and turn the feed valve to the cleaning tank position.
[6] Follow the spray procedure to spray from the nozzle and clean inside the piping and nozzle. Spray until all clean water in the cleaning tank is consumed.

Caution

- **Do not run the spray pump continuously for 1 minute or more after clean water has run out. The spray pump may malfunction.**

■ **Other tasks**

[1] Thoroughly wash the machine using clean water.
[2] Return chemical to the storage cabinet and lock the cabinet.
[3] Make an entry on the agrichemical use journal.
[4] Clean the containers used.
[5] Clean the protective gears.
[6] Take off the clothes and wash your body from top to bottom.
[7] To store the machine, install the stands and make sure the stands are contacting the ground.

16 Maintenance and Inspection

■ **Inspect each part at the timing shown in the table below.**

Caution

- **Perform inspection/servicing with the tractor-trailed sprayer installed on the tractor and also with the stand erected.**
- **Stop the tractor engine and remove the key before performing maintenance/inspection.**
- **If any inspection or servicing item requires the tractor engine to remain running, do not perform such item on your own, but always contact the service personnel at your Maruyama dealer instead.**
- **Dispose of oils, etc., properly.**

Inspection Item List

Inspection location	Inspection item	Inspection/ replacement timing	Inspection method	Servicing method
Mounting bolt/nut	Looseness	Before start of work	Refer to page 40.	Contact the dealer.
	Securely tighten.	Whenever looseness is found, or every year	Refer to page 40.	Contact the dealer.
Spray pump	Dirty oil in the crank case	Before start of work	Visual check	Refer to page 40..
	Leakage of oil from the crank case	Before start of work	Visual check	Contact the dealer.
	Oil level in the crank case	Before start of work	Visual check	Refer to page 40..
	Change oil in the crank case	Every 100 hours (*1)	-	Refer to page 40..
	Add to the lubrication locations.	Every 100 hours	Refer to page 40..	Refer to page 40..
	Rattling/loose input shaft	Before start of work	Refer to page 40..	Contact the dealer.
	Add grease to the input shaft.	When the universal joint is installed	Refer to page 40..	Refer to page 40..
Water filter net	Clean.	Before start of work	Refer to page 40..	Refer to page 40..
Strainer	Clean.	Before start of work	Refer to page 40..	Refer to page 40..
Line filter	Clean.	Before start of work	Refer to page 40..	Refer to page 40..
Chemical piping connection parts	Looseness	Before start of work	Refer to page 41..	Refer to page 41..
	Leakage	Before start of work	Refer to page 41..	Contact the dealer.
Nozzle	Clogging	Before start of work	Refer to page 41..	Contact the dealer.
	Replace	Replace every 100 hours (rough guide).*2	-	Contact the dealer.
Jet nozzle	Clogging	Before start of work	Refer to page 41..	Contact the dealer.
	Replace	Replace every 100 hours (rough guide).*2	-	Contact the dealer.
V-belt	Looseness	Every 100 hours (*1)	Refer to page 41..	Refer to page 41..
	Damage	Before start of work	Visual check	Contact the dealer.
Fan transmission	Leakage of oil	At start of work	Visual check	Contact the dealer.
	Change oil.	Every 600 hours (*1)	-	Refer to page 41..
Tire	Air pressure	Before start of work	Refer to page 42..	Refer to page 42..
	Cracks and damage	Before start of work	Visual check	Contact the dealer.
	Wear	Before start of work	Visual check	Contact the dealer.
	Foreign deposits	Before start of work	Visual check	Remove.
Wheel	Loose wheel nut	Every 100 hours (*1)	Visually check and touch by hand.	Contact the dealer.
	Damaged rim	Before start of work	Visual check	Contact the dealer.
Axle	Loose fixing bolt	Every 100 hours (*1)	Visually check and touch by hand.	Contact the dealer.

*1 --- Check after 50 hours only for the first time.

*2 --- Even before the replacement timing arrives, replacement may be required if any of the following symptoms is found:

- The pressure does not rise.
- Clogging occurs and persists after cleaning.
- The spray pattern is disturbed.

■ **Mounting bolt/nut**

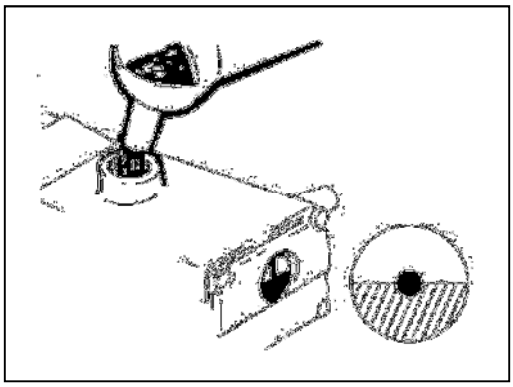
Walk around the machine and inspect the tightening points (bolts, nuts, etc.) for looseness. Securely tighten any loose bolt/nut found.

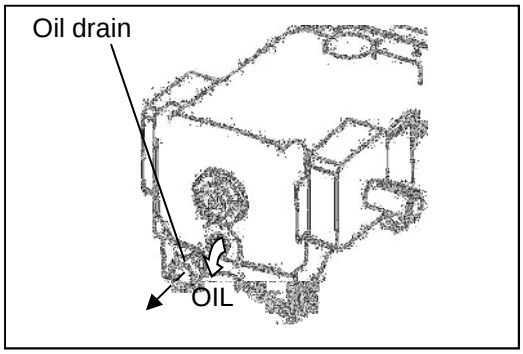
■ **Spray pump**

Caution

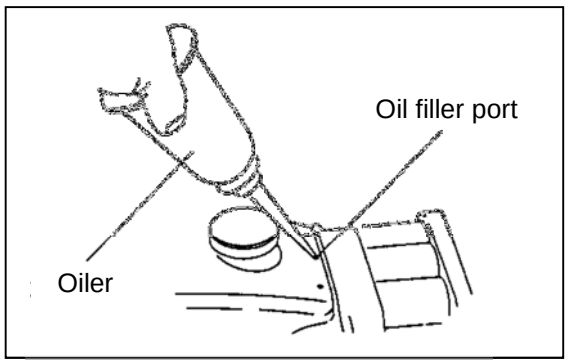
● **Before draining oil, wait for it to cool. Failure to do so may result in burns.**

[1] Check if oil is filled to the red point on the oil gauge in the crank case of the spray pump, and also check if the oil is dirty. If the oil level is low, add oil. If the oil is dirty, change the oil. Add 1.15 liters of SAE#10W-30 SH class oil.
Change oil after 50 hours for the first time, and thereafter change oil every 100 hours. Oil degrades over time, so change oil at least once a year even before the aforementioned timing arrives.
When changing oil, use a long nozzle oil jug, etc., and pay attention not to let the oil flow out to the surrounding areas.





[2] Every 100 hours, add around 3 to 5 drops of oil into the three holes (oil filler ports) in the crank case as shown in the figure. Add SAE#10W-30 SH class oil.



[3] Inspect the mounting point of the input shaft and universal joint for rattling/looseness. If the input shaft is almost coming off or rattling/loose, insert a knock pin into the input shaft groove and push it in until the pin stops.
Before installing the universal joint, apply chassis grease on the shaft.

■ ***Water filter net/strainer/line filter***

Inspect the water filter net/strainer/line filter for attachment of dust or foreign objects, and clean the strainer if necessary.
Replace the water filter net/strainer/line filter if found damaged.

■ Chemical piping connection parts

Perform spray inspection (refer to page 36) and inspect if water leaks from the connection part of each hose. If water is leaking, inspect the gasket and securely tighten the hose fitting.

■ Nozzle

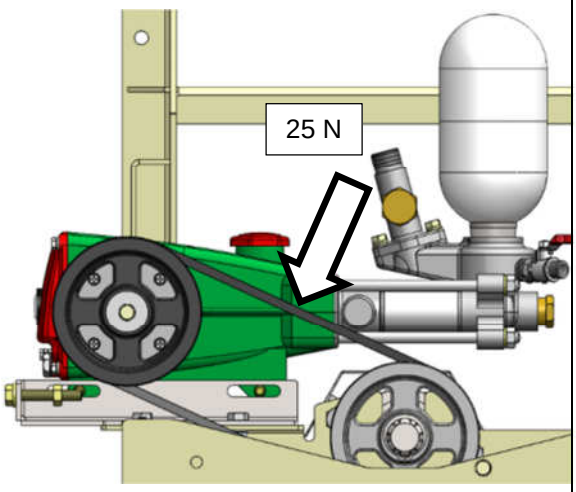
Perform spray inspection (refer to page 36) and check the spray condition of each nozzle for abnormality. If any abnormality is found, disassemble the nozzle and clean the inside. If the problem persists, replace the nozzle. As a rough guide, replace the nozzle every 100 hours.

■ Jet nozzle

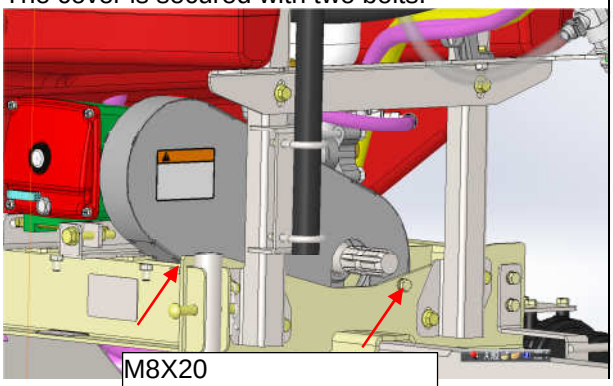
Perform spray inspection (refer to page36) and confirm that water jets out from the jet nozzle. If the water flow is low, the nozzle may be clogged. Contact your Maruyama dealer to clean the jet nozzle. Replace the jet nozzle every 100 hours.

■ V-belt

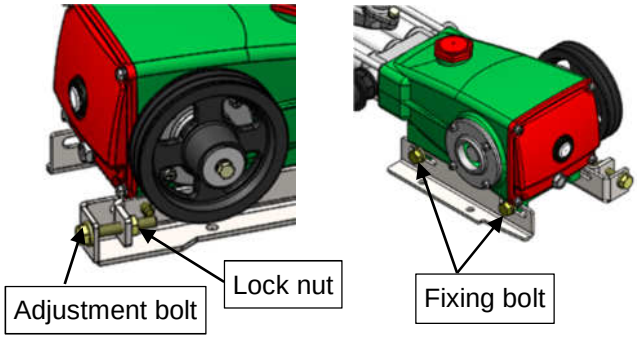
Adjust the belt tension so that when the center of the belt is held with 25 N (2.5 kg) of force, the belt deflects by approx. 5 mm (distance between the belt surface being pushed and the belt surface not being pushed).



When adjust the belt tension remove belt cover. The cover is secured with two bolts.



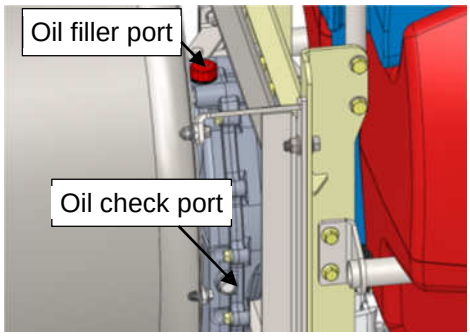
Adjust the belt tension by loosening the mounting bolts of the spray pump and with the adjustment bolt at the rear of the spray pump. After the adjustment, lock the adjustment bolt with the lock nut and securely tighten the spray pump fixing bolts.

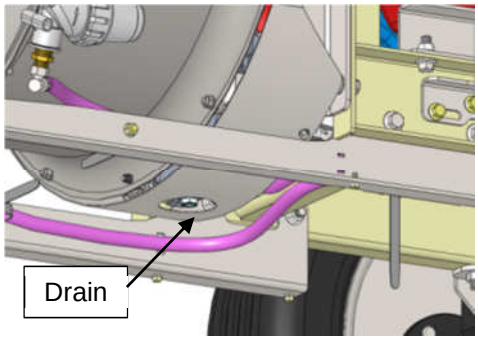


■ Fan transmission

Check to confirm that oil is filled to the oil check port on the side face of the gear case, and the oil is not dirty. If the oil level is low, add oil. If the oil is dirty, change the oil. For the oil, use GL-5 80W-90. If there is no oil, add 1.3 liters of oil.

Change oil after 50 hours for the first time, and thereafter change oil every 600 hours. Oil degrades over time, so change oil at least once a year even before the aforementioned timing arrives.

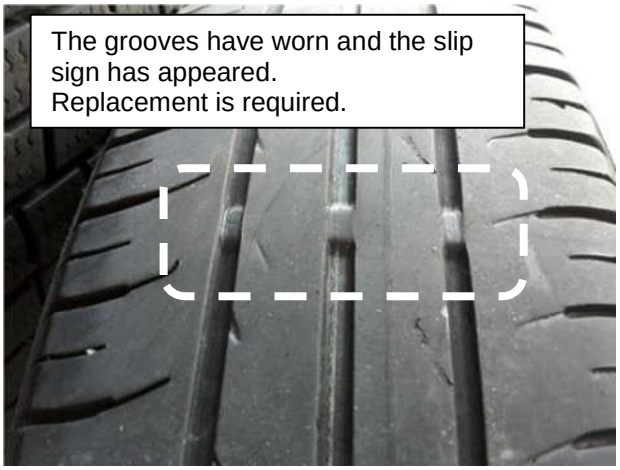




■ Tire

Check the tire on each wheel for wear, cracks, insufficient air pressure or other abnormality.
If the air pressure is excessive or insufficient, adjust it to an appropriate level. If the tire is significantly worn, cracked, etc., replace it with new tire. The tire must be replaced once the slip sign appears.
Contact your Maruyama dealer to replace.
Standard air pressure: 240 kPa

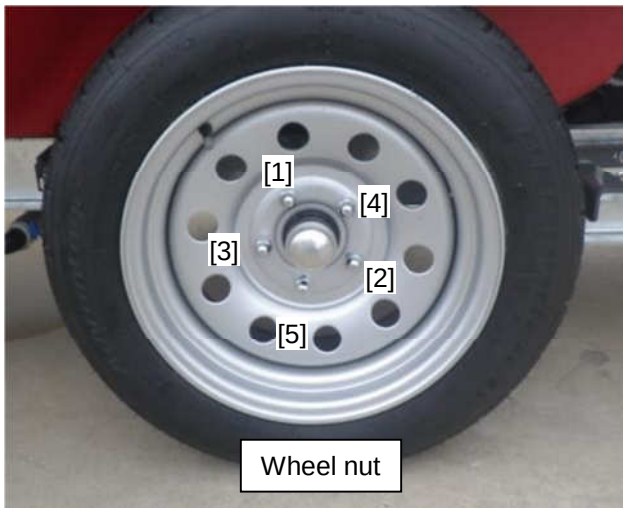




Caution ● If the tire pressure is too high, the tire tends to wear unevenly. If the tire pressure is too low, a flat tire occurs easily.

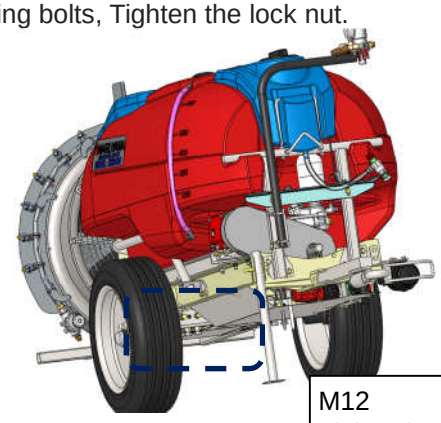
■ Wheel

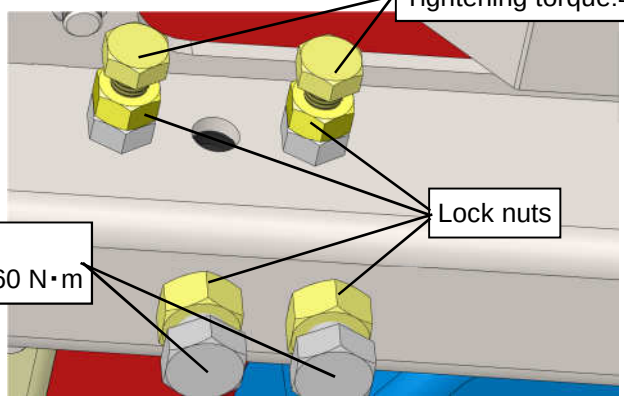
Be sure wheel nuts are not loose at regular intervals.
(Initially after 50 hours and every 100 hours thereafter.)
Tighten the nuts in the order specified below.
Tightening torque: 115 N•m



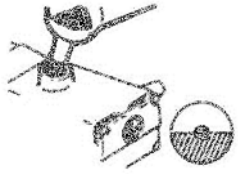
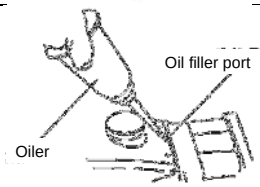
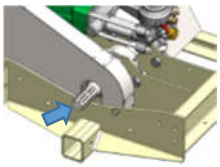
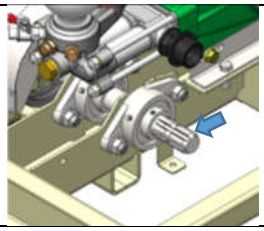
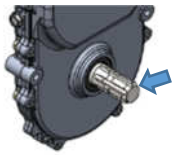
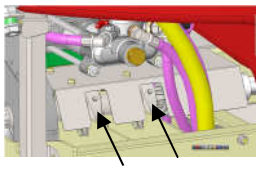
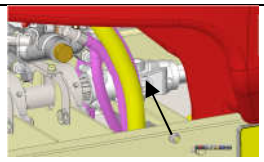
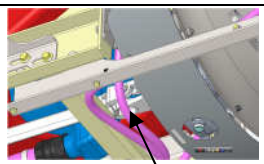
■ Axle

Be sure fixing bolts are not loose at regular intervals.
(Initially after 50 hours and every 100 hours thereafter.)
After loosening the lock nut and retightening the fixing bolts, Tighten the lock nut.





17 Lubricant List

Lubricating location		Applicable oil	Volume	Periodic change
Spray pump crank case		SAE10W-30 SH class	1.15 liters	Initial: 50 hours Thereafter: Every 100 hours (*1)
Base of spray pump cylinder		SAE10W-30 SH class	3 to 5 drops	Every 100 hours (*2)
Input shaft		Molybdenum grease	Appropriate amount	Once every year
Input shaft		Molybdenum grease	Appropriate amount	Once every year
Fan transmission input shaft		Molybdenum grease	Appropriate amount	Once every year
Fan transmission		GL-5 80W-90	1.3 liters	Initial: 50 hours Thereafter: Every 600 hours
Bearing unit		Lithium grease	Until grease protrudes.	Once every year
Drive shaft	 Remove cover	Lithium grease	Until grease protrudes.	Once every year
Drive shaft	 Remove undere cover	Lithium grease	Until grease protrudes.	Once every year

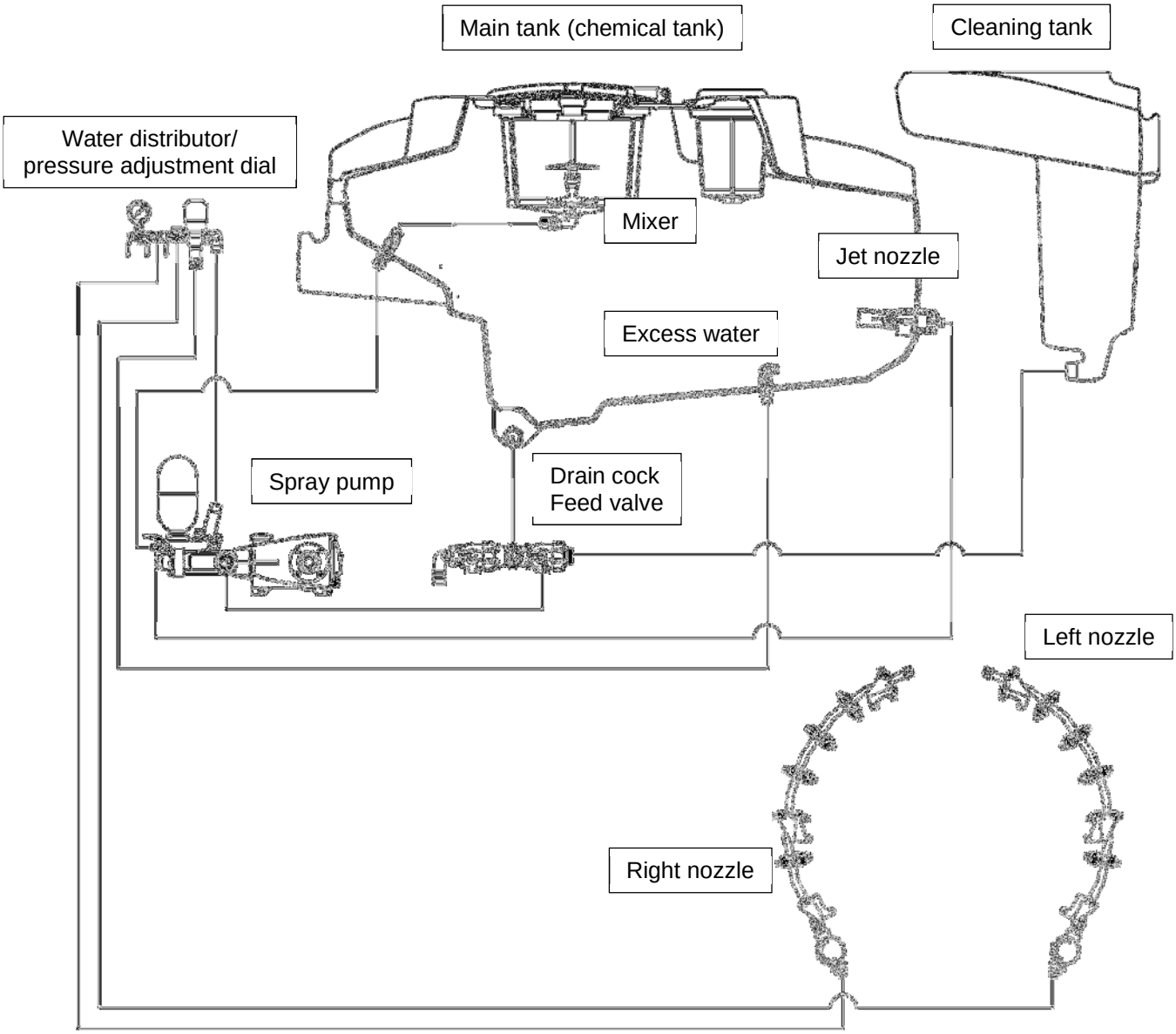
*1: Change at least once a year even before an elapse of 100 hours.
*2: Add oil at least once a year even before an elapse of 100 hours.

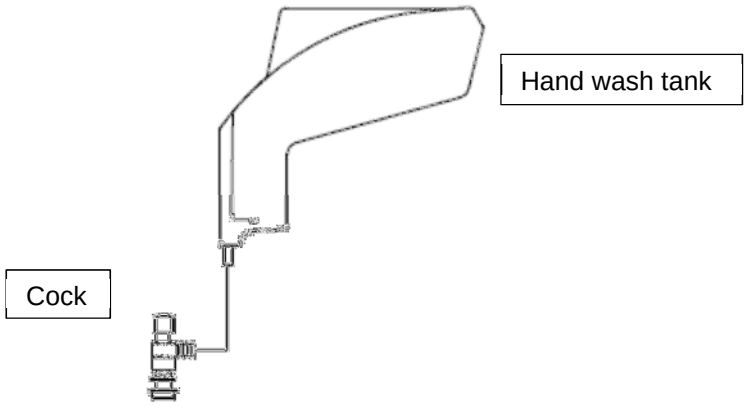
18 Long-term Storage

■ If the machine is not used for a long period of time, follow the care procedure below:

[1] Perform the maintenance and inspection items.
[2] Service any problem locations found. Perform any service item after consulting with your Maruyama dealer.
[3] Spray by following the spray inspection procedure, to clean the piping and nozzle. When all liquid is gone, run the spray pump for 30 more seconds or so to drain the water.
[4] Set all spray cocks in the “Open” position.
[5] Thoroughly wash the machine using clean water.
[6] In areas where paint has peeled, remove the rust using sand paper, etc., and give a new coat of paint.
[7] Keep the lid of the main tank (chemical tank) open for better ventilation. Also remove the strainer and line filter.
[8] Install the stands on the machine and and remove it from the tractor. (Refer to page 21 for information on how to remove the machine.)
[9] Add grease/oil to the lubricating locations by referring to the lubricant list.
[10] Store the tractor-trailed sprayer in a place free from humidity or dust.

19 Piping Diagram





20 Troubleshooting

Caution

- **Perform troubleshooting with the tractor-trailed sprayer installed on the tractor and also with the stand erected.**
- **Stop the tractor engine and remove the key first.**
  If any troubleshooting item requires the tractor engine to remain running, do not perform such item on your own, but always contact the service personnel at your Maruyama dealer instead.

Phenomenon	Cause	Action
The sprayer cannot be installed on the tractor.	The sprayer was installed on inclined ground.	Install the sprayer on flat ground.
	A pin is stuck on the tractor.	Remove the pin.
The nozzle does not spray.	There is no chemical.	Add the required amount of chemical.
	The PTO is not turning.	Turn the PTO.
	The spray cock is in the “Close” position.	Set the spray cock in the “Open” position.
	The nozzle is clogged.	Clean the nozzle.
	The pulley is spinning.	Contact your Maruyama dealer to inspect the belt.
The spray pressure does not rise.	The PTO speed is low.	Turn the PTO at a speed of 540 min^{-1}.
	The pressure adjustment dial is not adjusted.	Turn the pressure adjustment dial to make adjustment.
	The strainer is clogged.	Clean the strainer.
	The spray pump/pressure adjustment valve has a worn part(s).	Contact your Maruyama dealer to perform repair.
	The nozzle is worn.	Replace it with a new nozzle.
	The jet nozzle is worn.	Replace it with a new jet nozzle.
	The pulley is spinning.	Contact your Maruyama dealer to inspect the belt.
Abnormal agitation	The jet nozzle is worn or clogged.	Clean or replace.

21 List of Key Consumables

Location of use	Item name	Part number	Quantity
Spray pump	Water absorption valve seat	100611	3
	Piston gasket set	091259	3
	Water absorption valve collar	027796	3
	Water absorption valve stopper	100614	3
	Spring washer	015850	3
	Nylon nut	115598	3
	Seal gasket	100015	3
	Cylinder pipe	100615	3
	Cylinder pipe O-ring	026969	12
	Valve seat for discharge valve	100226	3
	Discharge valve	027952	3
	Spring for discharge valve	026548	3
	Valve sack for discharge valve	027953	3
	Gasket	100225	3
Pressure adjustment valve	Spring seat for pressure adjustment valve	107912	1
	Compression coil spring for pressure adjustment valve	103274	1
	Spring seat for pressure adjustment valve	107913	1
	Flat washer	107914	1
	Sleeve	117252	1
	O-ring	13975	1
	Piston assembly	105725	1
	Valve seat for pressure adjustment valve	117251	1
	O-ring (P18)	011338	1
	O-ring (P24)	020285	1
Strainer	O-ring	567292	1
	Filter	865825	1
Line filter	Filter	568361	2
Nozzles	Nozzle	889025	12
	Jet nozzle	568632	2
Drive part	V-belt	568485	2

MEMO

MEMO

■ Warranty card

The customer must present the warranty card to receive warranty repair during the warranty period. After you have read the information provided on the warranty card, keep the warranty card in a safe place.

Do not modify the machine as it may create dangerous situations. Please note that the manufacturer's warranty will become void if the machine is modified or used wrongly or for any purpose different from the correct purpose of use as described in the Operation Manual.

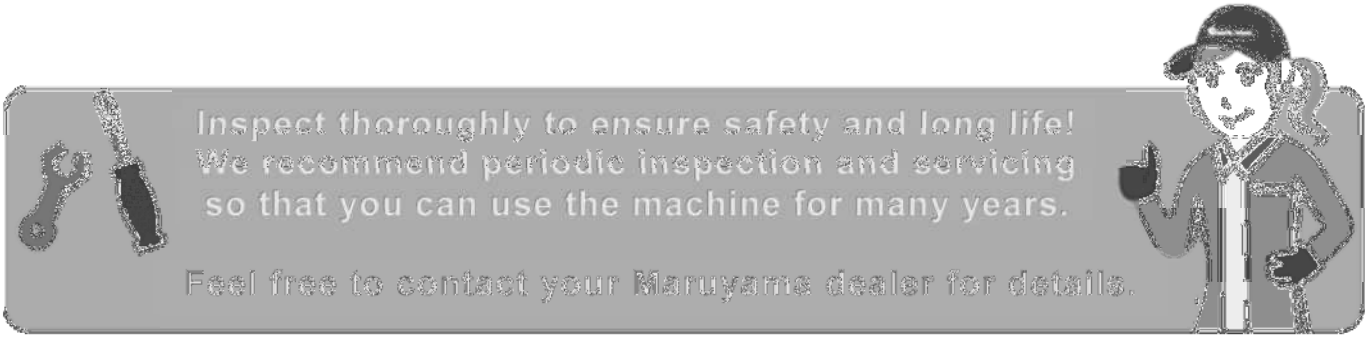
■ After-sale service

○ If a problem is found during the startup inspection or use, proper servicing must be carried out immediately. Contact the dealer where you purchased your machine.
○ Provide the following information to the dealer
- ● Model
- ● Serial number
- ● Description of failure Explain in detail what happened when such-and-such was operated in which way in which condition.

○ So that it can be used safely, this product must be operated correctly and serviced periodically. Have your machine inspected and serviced at least once a year by the dealer where you purchased your machine.
This servicing is chargeable.

■ Supply period of spare parts

Spare parts for this product will be supplied for 9 years after the discontinuation of this product.
Even during the supply period, we may consult you on the delivery schedule and other supply conditions of special parts. As a rule, supply of spare parts will cease at the end of the above supply period. Even after the expiration of the supply period, we may be able to supply certain parts, upon request, based on the delivery schedule and price to be negotiated. Inspect thoroughly to ensure safety and long life!
We recommend periodic inspection and servicing so that you can use the machine for many years. Feel free to contact your Maruyama dealer for details.



So that we can accurately assess the situation, have the following information ready when you contact us regarding your product:

[1] Product model and serial number
[2] Date of purchase
[3] Dealer

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