Form No. 3395-604 Rev A

TORO®

Count on it.

Operator's Manual

Air Conditioning Kit

Mauser KS-534 Full Safety Cab

Model No. 02891

Register at www.Toro.com.
Original Instructions (EN)

CE

3395-604 A

This product complies with all relevant European directives. For details, please see the Declaration of Incorporation (DOI) at the back of this publication.

Introduction

This manual provides instructions on the operation of the air conditioning system when fitted to the cab KS-534, Model 02890.

The heater blower is standard in the Cab KS-534 (Model 02890).

Install the Suppressed Beacon Kit (Part 111-7134) when using this kit if an amber beacon is required.

Fitting of the air-conditioning system must be carried out by a qualified technician.

Read this information carefully to learn how to operate and maintain your product properly and to avoid injury and product damage. Refer to the traction unit and cab *Operator's Manuals* for additional information.

You may contact Toro directly at www.Toro.com for product and accessory information, help finding a dealer, or to register your product.

Whenever you need service, genuine Toro parts, or additional information, contact an Authorized Service Dealer or Toro Customer Service and have the model and serial numbers of your product ready. Write the numbers in the space provided.

Model No. _____

Serial No. _____

This manual identifies potential hazards and has safety messages identified by the safety alert symbol (Figure 1), which signals a hazard that may cause serious injury or death if you do not follow the recommended precautions.

Figure 1

1. Safety alert symbol

This manual uses 2 words to highlight information. **Important** calls attention to special mechanical information and **Note** emphasizes general information worthy of special attention.

Contents

8111 Lyndale Avenue South
Bloomington, MN 55420

Safety

⚠ WARNING

If you do not follow certain safety procedures, someone could be seriously injured.

Before working on the machine, ensure the following:

- **The engine is switched off.**
- **The parking brake is applied.**
- **There is no pressure in the hydraulic system.**
- **The cutting units are fully down on the ground.**

⚠ WARNING

Performing maintenance without eye protection could result in serious injury.

When carrying out maintenance operations always wear eye protection.

⚠ WARNING

Working on the electrical system in an unsafe manner could result in serious injury.

Before working on the electrical system of the machine, always disconnect the battery terminals (negative terminal first) and ensure that no contact is made between the terminals and the metal components of the machine.

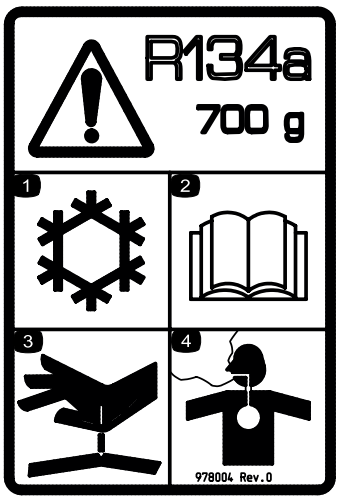
General Safety

- If a fault arises in the air-conditioning system then it must be inspected and repaired by qualified personnel.
- Never allow refrigerant to be discharged into the atmosphere.
- Never attempt to warm any part of the air-conditioning system with an open flame.
- Never allow refrigerant to come into contact with the skin. Refer to the refrigerant data sheet for guidance.
- Wear suitable personal protective equipment when handling refrigerant.
- Never carry out soldering or welding on or near any parts of the air-conditioning system as heat can cause expansion and rupture of the components.
- Always allow the air-conditioning system to cool down before working on any part of it.

To ensure optimum performance and continued safety certification of the machine, use only genuine Toro replacement parts and accessories. Replacement parts and accessories made by other manufacturers could be dangerous, and such use could void the product warranty.

Safety and Instructional Decals

Safety decals and instructions are easily visible to the operator and are located near any area of potential danger. Replace any decal that is damaged or lost.



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1. Cooling/air-conditioning system
2. Read the *Operator's Manual*.
3. High-pressure fluid—hazard of injection into the body
4. Poisonous fumes or toxic gases—asphyxiation hazard

Product Overview

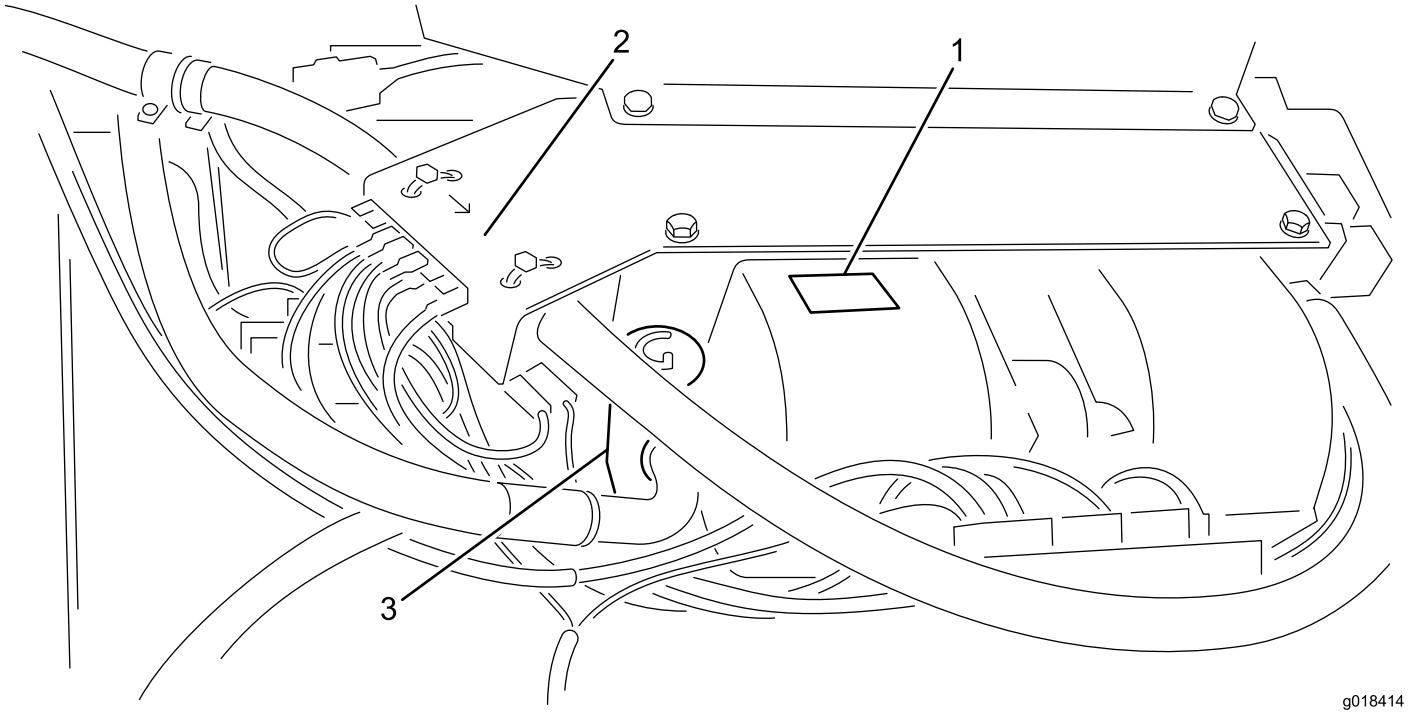


Figure 2

Evaporator, heater, and fans—mounted in front of the cab roof

1. Air conditioner: evaporator, heater, and double radial blower
2. Heater valve
3. Expansion valve

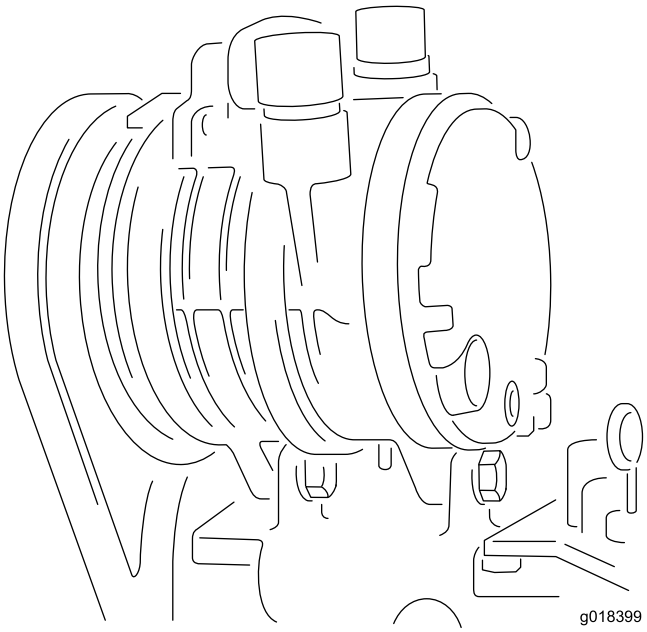


Figure 3

Compressor—mounted on the engine

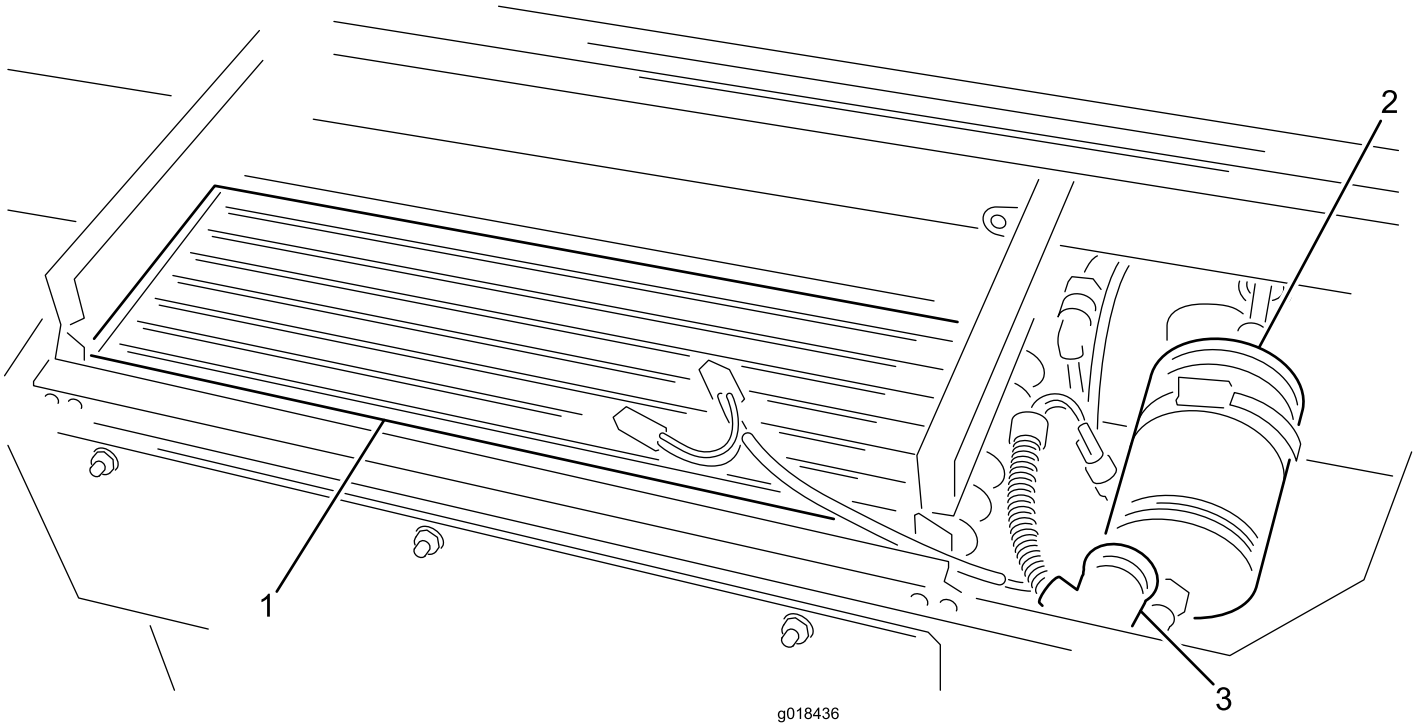


Figure 4

Condenser and dryer/filter—mounted in rear of the cab roof

1. Condenser
2. Dryer/filter
3. Pressure switch

Controls

The controls are mounted on the right side in the roof lining.

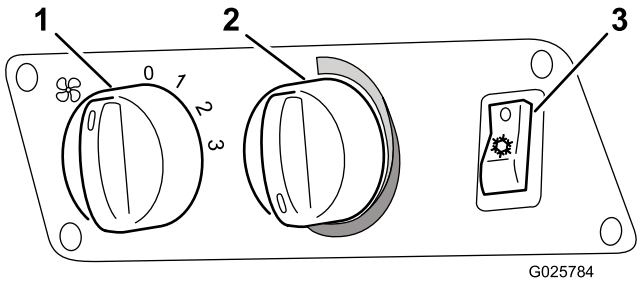


Figure 5

1. 3-position switch for radial-blower speed
2. Temperature controller
3. Air-conditioner switch

Specifications

Note: Specifications and design are subject to change without notice.

AIR CONDITIONER	
Cooling performance	4.2 kW
Refrigerant	R134A
Recommended quantity of refrigerant	850 g (1.87 lb)
Evaporator—volumetric air flow of the blower	660 m^3/h (23,307 ft^3/h)
ELECTRICAL	
Operating voltage	12 V
Fuse for radial blower / compressor	15 A
Fuse for axial blower	25 A
COMPRESSOR	
Designation	TM-08 HS
Direction of rotation (viewing the pulley)	clockwise
Operating speed	700 to 6000 rpm
Piston displacement	82 cm^3/rev (5 $inch^3$/rev)
Pressure-side connection	3/4 inch O-ring
Suction-side connection	7/8 inch O-ring
Magnetic clutch operating voltage	12 V
Magnetic clutch power consumption	0.45 W
Refrigerant oil	ZXL 100 PAG
Refrigerant oil volume in compressor	150 cm^3 (9.15 $inch^3$)
Refrigerant oil—additional required to fill air-conditioner system	25 cm^3 (1.53 $inch^3$)
Power consumption of air-conditioner system	2.5 kW

Attachments/Accessories

A selection of Toro approved attachments and accessories are available for use with the machine to enhance and expand its capabilities. Contact your Authorized Service Dealer or Distributor or go to www.Toro.com for a list of all approved attachments and accessories.

To best protect your investment and maintain optimal performance of your Toro equipment, count on Toro genuine parts. When it comes to reliability, Toro delivers replacement parts designed to the exact engineering specification of our equipment. For peace of mind, insist on Toro genuine parts.

Operation

Note: Determine the left and right sides of the machine from the normal operating position.

Using the Air Conditioner for the First Time

1. Start the engine.
2. Switch on the blower switch (Figure 5).
3. Switch on the air-conditioning switch (Figure 5).
4. Set the temperature controller (Figure 5) to the maximum Cold setting (full counterclockwise direction).

   Note: After 3 minutes, the air-outlet louvers should emit cold air.
5. Adjust the fan speed and temperature control to achieve the required amount of cooling.

Operating the Air-Conditioning System

Do not run the air-conditioning system without running the engine as it will not function and the battery will be discharged.

To prevent premature failure of the compressor-shaft seals, run the air-conditioning system for 15 minutes every 14 days.

1. Set the switch to the ON position.
2. Set the fan-speed switch to the desired speed.
3. Set the temperature regulator to the required setting.

   Note: The thermostat in the system switches the compressor on and off to maintain the set temperature.

Operating the Heating System

1. Set the switch to the OFF position.
2. Set the fan-speed switch to the desired speed.
3. Set the temperature regulator to the required setting.

Maintenance

Note: Determine the left and right sides of the machine from the normal operating position.

Recommended Maintenance Schedule(s)

Maintenance Service Interval	Maintenance Procedure
After the first 100 hours	• Check all connections for tightness.
Every 50 hours	• Check the refrigerant level.
Every 250 hours	• Check the compressor magnetic clutch for correct operation. • Check the water drain for blockage, and clean it as necessary. • Examine and clean the condenser fins as necessary. • Examine the condition of the electrical cables. • Examine the condition and tightness of the electrical connectors.
Every 500 hours	• Check the compressor-fan belt condition and tension, and adjust it as necessary. • Examine the hose lines for abrasion and general condition. • Check all connections for leaks. • Examine the condition of the climatic unit in the cab roof, and check the parts for tightness. • Check the compressor brackets tightness of fittings.
Every 2 years	• Change the dryer/filter.

⚠ CAUTION

If you leave the key in the ignition switch, someone could accidently start the engine and seriously injure you or other bystanders.

Remove the key from the ignition before you do any maintenance.

Important: All work on the refrigerant part of the air-conditioning system should be carried out by fully qualified personnel.

- You can use the air-conditioning system for many months of the cutting season. Follow the regular prescribed maintenance to prolong the life of the system and ensure efficient operation. Failure to carry out the prescribed and documented maintenance could invalidate the warranty on the system and its components.
- Even if the air-conditioning system is used infrequently, follow the maintenance schedule, as aging and refrigerant loss can occur with time.
- Clean the condenser and evaporator fins with compressed air in the opposite direction of the normal air flow. If there is any buildup of greasy deposits, clean it with a non-abrasive soap solution.
- Low levels of refrigerant can reduce the efficiency of the air-conditioning unit.
- Extremely low levels can cause the low-pressure switch to shut down the system.
- To check the refrigerant level, there is an integrated sight glass in the collecting tank. After filling, run the system for 5 minutes to allow all air bubbles to be purged from the system. Check the level after this period and top up is necessary. The occasional air bubble can be accepted.

  Important: Do not spill compressor oil on the vehicle surface. It can cause discoloration of vehicle paint and deterioration of acrylic or ABS plastic components.
- When attaching the climatic hoses, oil the sealing rings with refrigerator oil.
- After removal of climatic hoses from the air-conditioner system, always replace the O-rings with new ones specified for refrigerant 134A.
- When tightening or loosening fittings, always use 2 wrenches to prevent the tubes from twisting.

Checking the Refrigerant Pressure

When using the air-conditioning system the operating pressure is different on the suction side and the pressure side of the compressor.

This pressure difference is influenced by the speed of the compressor, the inside temperature of the vehicle, the outside air temperature and the relative air humidity.

Pressures that differ from those in the table below indicate a possible fault in the system.

To check the pressures, set the compressor speed to 2000 rpm with an air temperature between 20 and 40 degrees C (68 and 104 degrees F). Operate the blower at position 3 (fastest speed setting).

System Refrigerant Pressures

Outside Temperature	Low-Pressure Side	High-Pressure Side
20° C (68° F)	1.7 to 2.1 bar (24.7 to 30.5 psi)	10 to 14 bar (145 to 203 psi)
25° C (77° F)	1.8 to 2.2 bar (26.1 to 31.9 psi)	12 to 16 bar (174 to 232 psi)
30° C (86° F)	1.9 to 2.3 bar (27.6 to 33.4 psi)	14 to 18 bar (203 to 261 psi)

Troubleshooting the Pressure Readings

During the compression test, deviations from the values in the table may be measured. Locating the cause can determine whether a part requires repair or replacement.

The following is a short list of some pressure deviation that may be measured and some possible causes.

- **Pressure on high-pressure manometer too high**
  - The air volume in the condenser is too small.
  - Refrigerant quantity is too high
  - The dryer/filter is blocked.
- **Pressure on high-pressure manometer is too low**
  - The refrigerant quantity is too low (check the sight glass).
  - The compressor speed is too low (check the drive belt for slip/tension).
  - There is a fault with the compressor.
- **Pressure on low-pressure manometer too high**
  - The expansion valve is incorrect.
  - The compressor speed is too low (check the drive belt for slip/tension).
  - There is a fault with the compressor.
- **Pressure on low-pressure manometer too low**
  - There is restriction in the suction or pressure hoses.
  - The expansion valve is incorrect.
  - The refrigerant quantity is too low (examine the sediment bowl).
  - The air volume in the evaporator is too small.

  Have a qualified person examine and repair all deviations in pressure from the values in the table.

Important: Do not allow refrigerant to discharge into the atmosphere. Before opening or disconnecting parts from the refrigerant circuit, empty the refrigerant into a specified recycling bottle, and dispose of it correctly.

Always use genuine Toro spare parts when repairing or servicing the air-conditioning system.

Checking the Refrigerant Level

Service Interval: Every 50 hours

Check the refrigerant to assure it is at the correct level for operation. As the level of the refrigerant lowers, more air bubbles can be seen passing through the sight glass. Low levels of refrigerant can reduce the efficiency of the air-conditioning unit. Extremely low levels can cause the low-pressure switch to shut down the system.

1. Using the sight gauge in the collecting tank, check on refrigerant level (Figure 6).

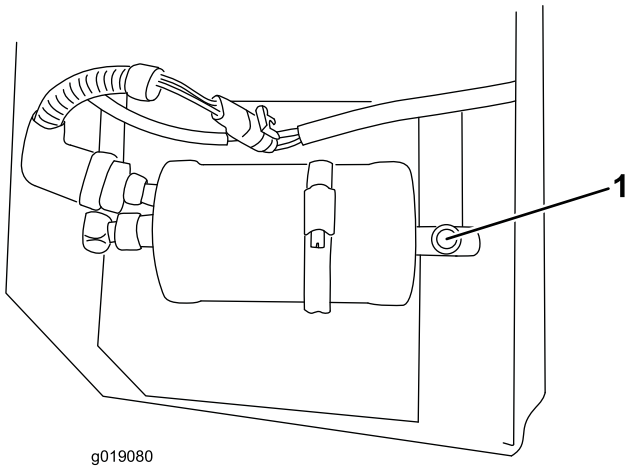


Figure 6

1. Refrigerant-level sight gauge

2. After filling, run the system for 5 minutes to allow all air bubbles to be purged from the system.

3. Check the level after this period and top up is necessary.

   Note: The occasional air bubble is acceptable.

Checking the Compressor Magnetic Clutch

Service Interval: Every 250 hours

The compressor magnetic clutch is operating correctly if it clicks when it is turned on (Figure 7).

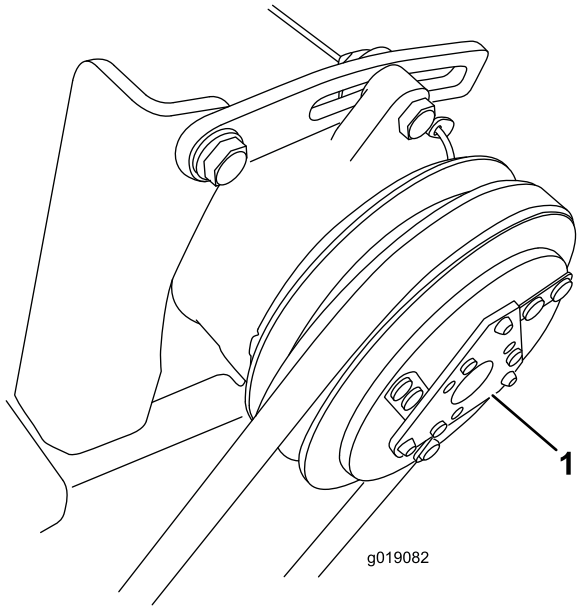


Figure 7

1. Compressor magnetic clutch

Checking the Drain Tube

Service Interval: Every 250 hours

The water drain is the clear plastic tube connected to the condenser. It runs from the condenser through the cab structure to below the front of the cab (Figure 8). Check the water drain for blockages and clean as necessary.

If the tube is blocked, use a flexible unblocking tool (pipe cleaner) or disconnect the tube and blow it out with compressed air.

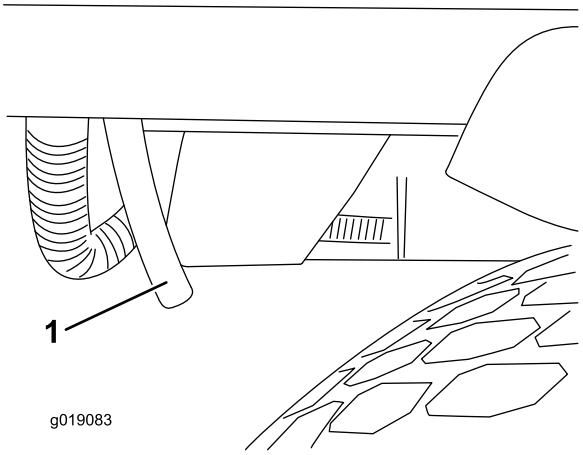


Figure 8

1. Drain tube

Note: If the blockage is not reachable with a flexible unblocking tool, the other end of the tube can be disconnected and blown out with compressed air (Figure 9).

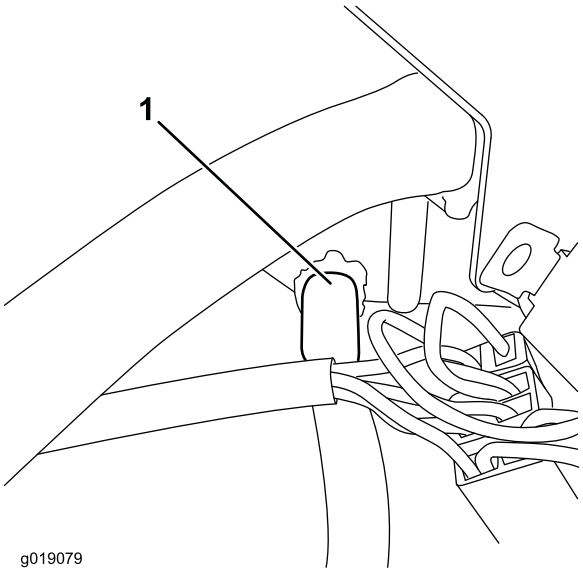


Figure 9

1. Disconnect the tube here.

Checking the Compressor-Fan Belt

Service Interval: Every 500 hours

1. Proper tension allows 10 mm (3/8 inch) deflection when applying a force of 40 N (9 lb) on the belt, midway between the pulleys.
2. If the deflection is not 10 mm (3/8 inch), loosen the upper and lower compressor-mounting bolts.

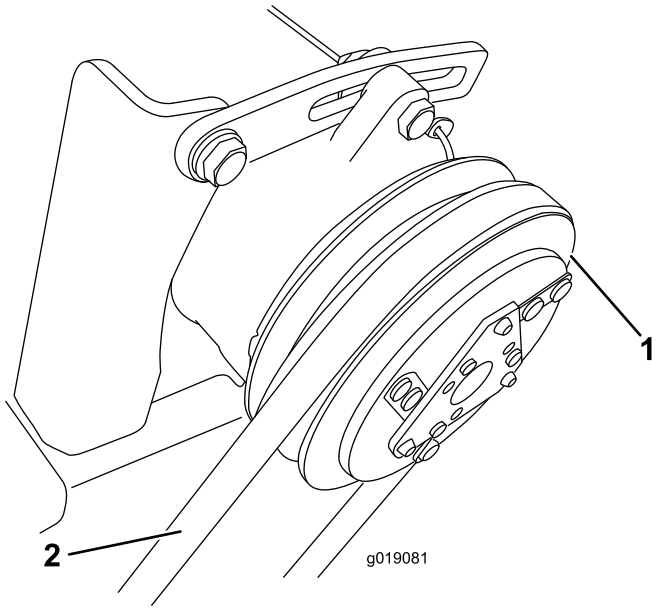


Figure 10

1. Compressor
2. Check the belt deflection here.

3. Increase or decrease the compressor-belt tension and tighten the bolts.
4. Check the deflection of the belt again to ensure that the tension is correct.

Locating the Fuses

The fuse box is located in the cab roof liner in front of the driver.

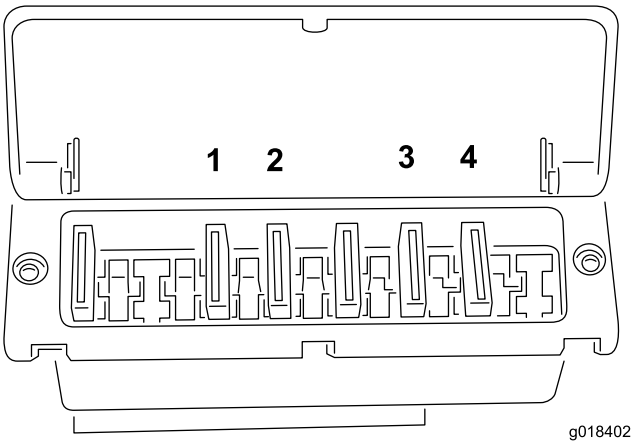


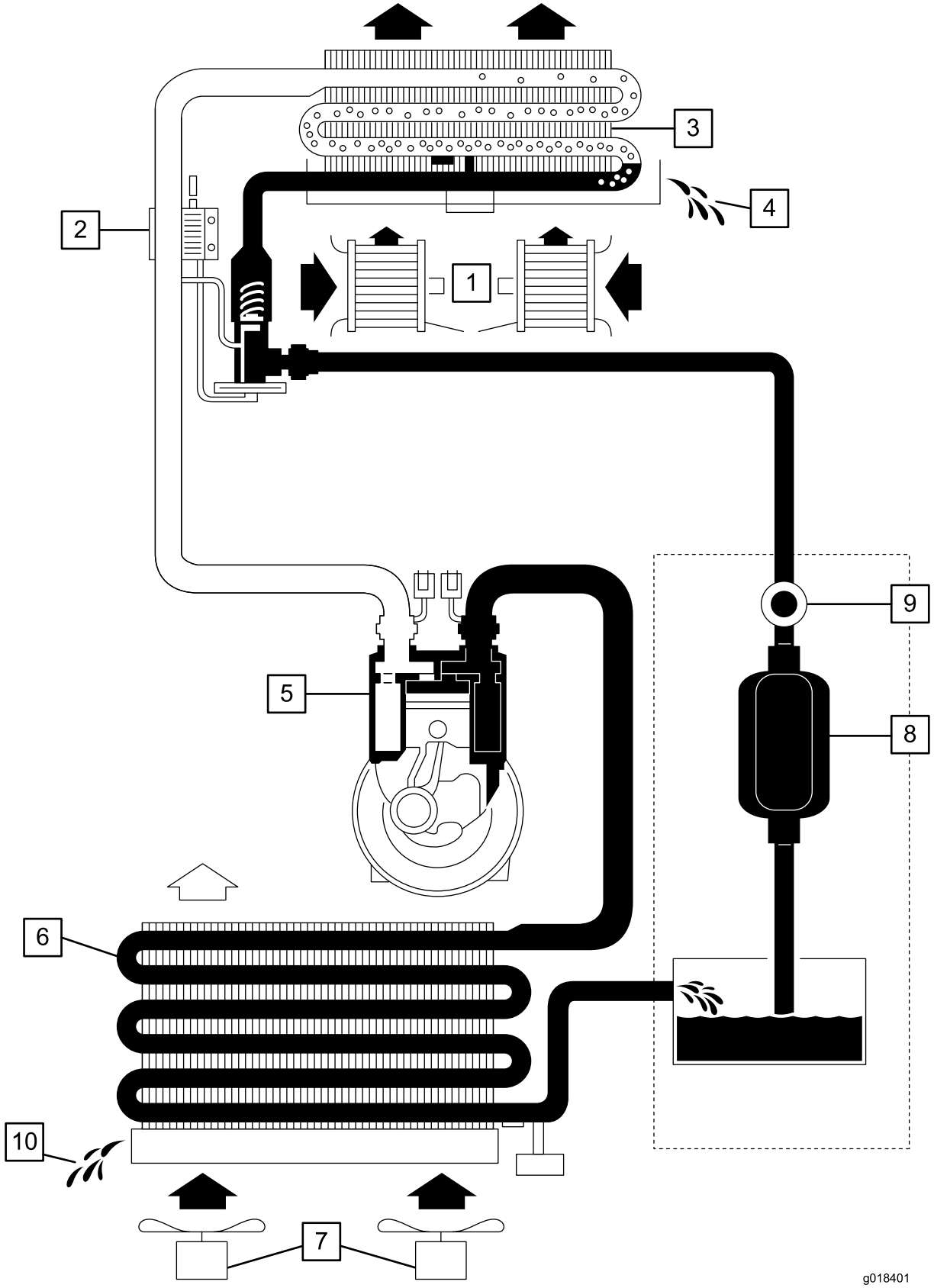
Figure 11

1. 25 amp
2. 15 amp
3. 5 amp
4. 5 amp

Storage

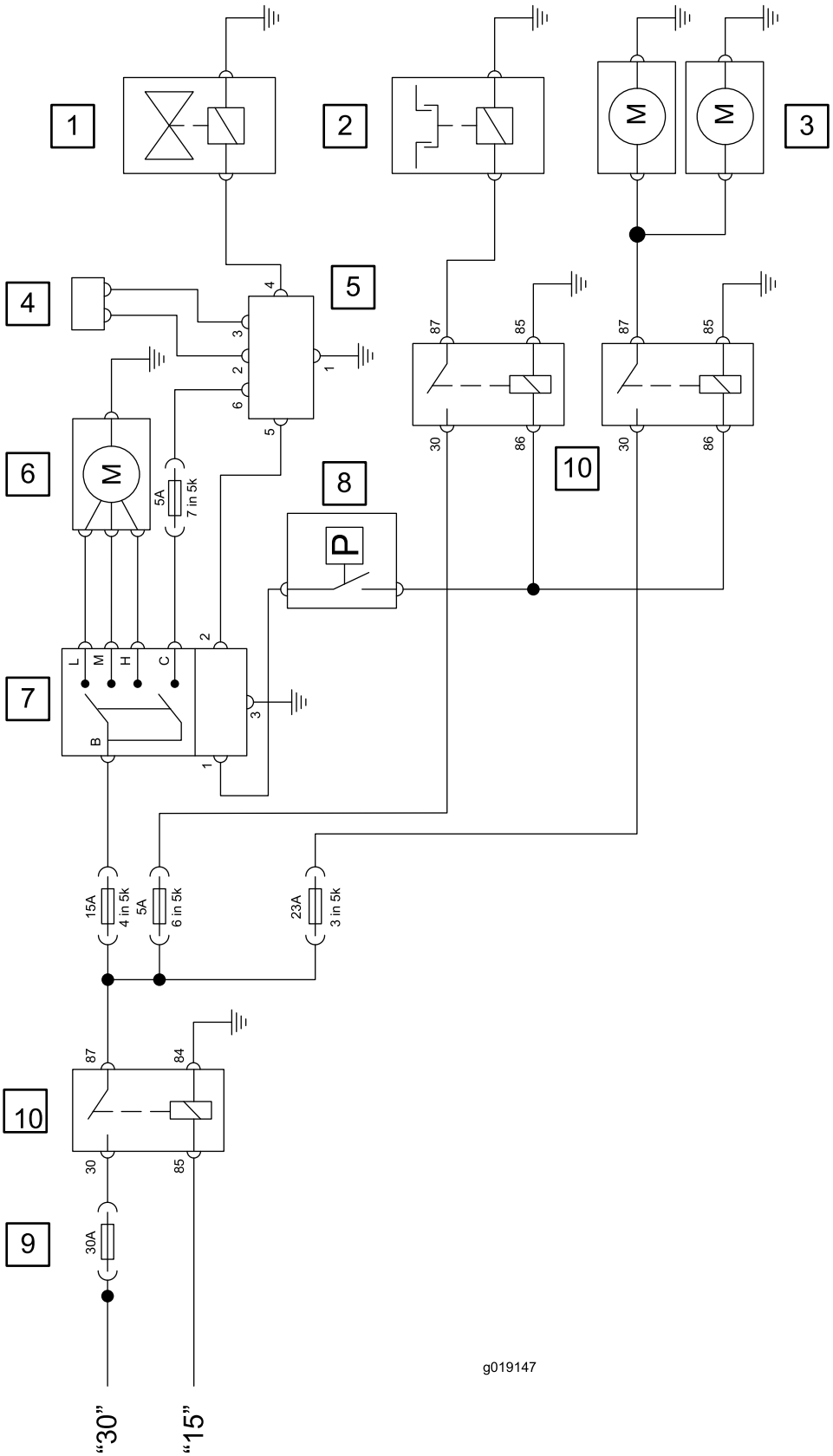
Refer to the traction unit *Operator's Manual* for details on storing the machine.

Schematics



1	Radial blower
2	Expansion valve
3	Evaporator (combined with heat exchanger for heating)
4	Condenser—water
5	Compressor
6	Condenser
7	Axial fans
8	Dryer/filter
9	Sight glass
10	Drain

Functional schematic of the air-conditioning system (Rev. -)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1	Heating valve
2	Compressor with magnetic clutch
3	Twin axial fans
4	Temperature sensor
5	Electronic regulator
6	Radial blower fan
7	Blower-speed switch
8	Pressure switch
9	Main fuse in engine compartment
10	Relay

Electrical schematic of the air-conditioning system (Rev. -)

Declaration of Incorporation

The Toro Company, 8111 Lyndale Ave. South, Bloomington, MN, USA declares that the following unit(s) conform(s) to the directives listed, when installed in accordance with the accompanying instructions onto certain Toro models as indicated on the relevant Declarations of Conformity.

Model No.	Serial No.	Product Description	Invoice Description	General Description	Directive
02891	—	Air Conditioning Kit	AIR CONDITIONING KIT - KS534 CAB	Air-conditioning Kit	2006/42/EC 2004/108/EC

Relevant technical documentation has been compiled as required per Part B of Annex VII of 2006/42/EC.

We will undertake to transmit, in response to requests by national authorities, relevant information on this partly completed machinery. The method of transmission shall be electronic transmittal.

This machinery shall not be put into service until incorporated into approved Toro models as indicated on the associated Declaration of Conformity and in accordance with all instructions, whereby it can be declared in conformity with all relevant Directives.

Certified:

David Klis
Sr. Engineering Manager
8111 Lyndale Ave. South
Bloomington, MN 55420, USA
March 18, 2015

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