Tango E5, MOWiT 500F Series II Robotic Mower

TECHNICAL MANUAL

Robotic Mower
Tango E5, MOWiT 500F Series II

TM138919 20JUN16 (ENGLISCH)

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SABO Maschinenfabrik GmbH
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Contents

Section 10—General Information
Group 05—Safety
Group 15—Protective Coatings
Group 20—Electronic Components
Group 25—Serial Number Locations

Section 20—Diagnostics
Group 05—Fault Diagnosis
Group 10—Observed Diagnostics

Section 30—Mower
Group 05—Component Location
Group 10—Theory of Operation
Group 15—Tests and Adjustments
Group 20—Repair

Section 40—Drive System
Group 05—Component Location
Group 10—Theory of Operation
Group 20—Repair

Section 50—Electrical
Group 05—Schematics and Harnesses
Group 10—Component Location
Group 15—Theory of Operation
Group 20—Tests and Adjustments
Group 25—Repair

Section 60—Seasonal Services
Group 05—Post Season Services
Group 10—Off Season Services
Group 15—Pre Season Services
Group 20—Mower and Installation Inspection Log

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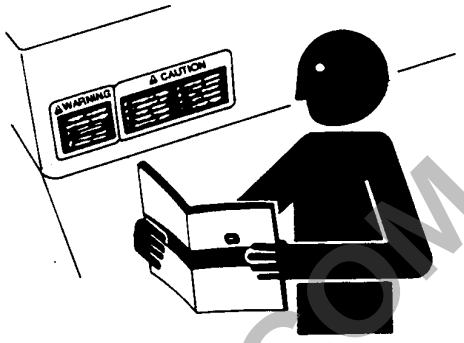
Original Instructions. All information, illustrations and specifications in this manual are based on the latest information available at the time of publication. The right is reserved to make changes at any time without notice.

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A John Deere ILLUSTRUCTION ™ Manual

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Follow Safety Instructions

Carefully read all safety messages in this instruction. Read the product operators manual for operating instructions and safety messages. Do not let anyone operate without instruction. (A copy of the operators manual may also be available from the Service ADVISOR™ application.)



TS201 —UN—15APR13

Service ADVISOR is a trademark of Deere & Company

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Recognize Safety Information

This is a safety-alert symbol. When you see this symbol on your machine or in this manual, be alert to the potential for personal injury.

Follow recommended precautions and safe operating practices.



T81389 —UN—28JUN13

DX,ALERT -19-29SEP98-1/1

Understand Signal Words

A signal word—DANGER, WARNING, or CAUTION—is used with the safety-alert symbol. DANGER identifies the most serious hazards.

DANGER or WARNING safety signs are located near specific hazards. General precautions are listed on CAUTION safety signs. CAUTION also calls attention to safety messages in this manual.



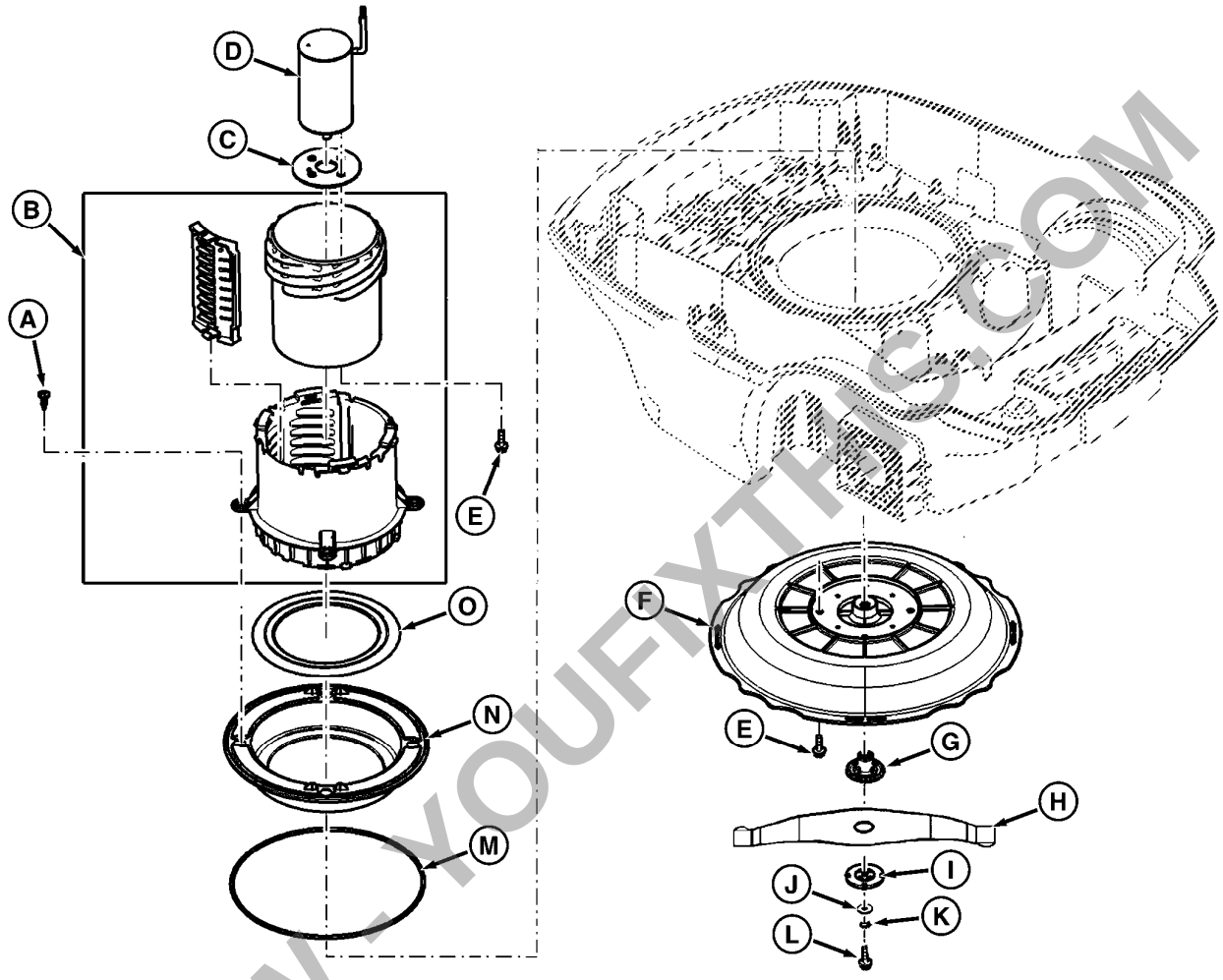
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DX,SIGNAL -19-03MAR93-1/1

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Mower Blade and Adjuster Components



A—Screw (4 used)
B—Adjuster Kit
C—Plate
D—Blade Motor
E—Screw (8 used)
F—Blade Shield
G—Upper Blade Mount
H—Mowing Blade
I— Lower Blade Mount
J— Flat Washer
K—Star Washer
L—Blade Bolt
M—O-ring
N—Seal Support
O—Adjuster Seal

SW00544,00002C1 -19-09JUN16-1/1

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Specifications

Item	Measurement	Specification
Blade Bolt	Torque	7±0.5 N·m (62±4 lb·in)
Blade Motor Bolt	Torque	4.2±0.5 N·m (37±4 lb·in)
Cutting Height Assembly Screw	Torque	4.8±0.5 N·m (42±4 lb·in)
Blade Shield Bolt	Torque	5±0.5 N·m (44±4 lb·in)

SW00544,00002B7 -19-20AUG15-1/1

Safety Precautions

In certain situations, the robotic mower may be in a powered state. Make sure that the mower is in a safe mode before handling or moving.

Before moving, servicing, or maintaining the mower:

- Push the STOP button (A) at the top of the mower.
- Turn the main power switch (B) to the OFF position.

A—Stop Button **B—Main Power Switch**



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Remove Blade

1. Push STOP button (A).
2. Turn main power switch (B) to OFF position.
3. If there is reason to suspect that there is moisture inside the mower housing, check for moisture before proceeding. (See Moisture Inside Mower Housing.)
4. To protect machine surface, place a soft cloth on work surface.

CAUTION: Avoid Injury! Blades are sharp and can cut. Use caution and wear gloves when handling blades or working near blades.

5. Place machine on its side with the main power switch at upper side of handle.

A—Stop Button
B—Main Power Switch

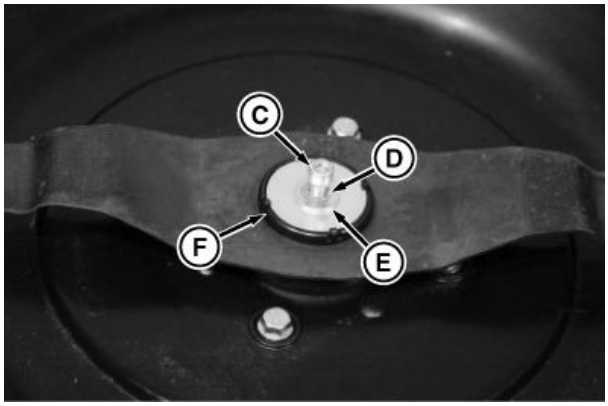


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6. Secure blade. Remove screw (C), washer (D), washer (E), and washer (F).
7. Remove blade.

C—Hex Socket Screw
D—Star Lock Washer
E—Flat Washer
F—Drive Washer



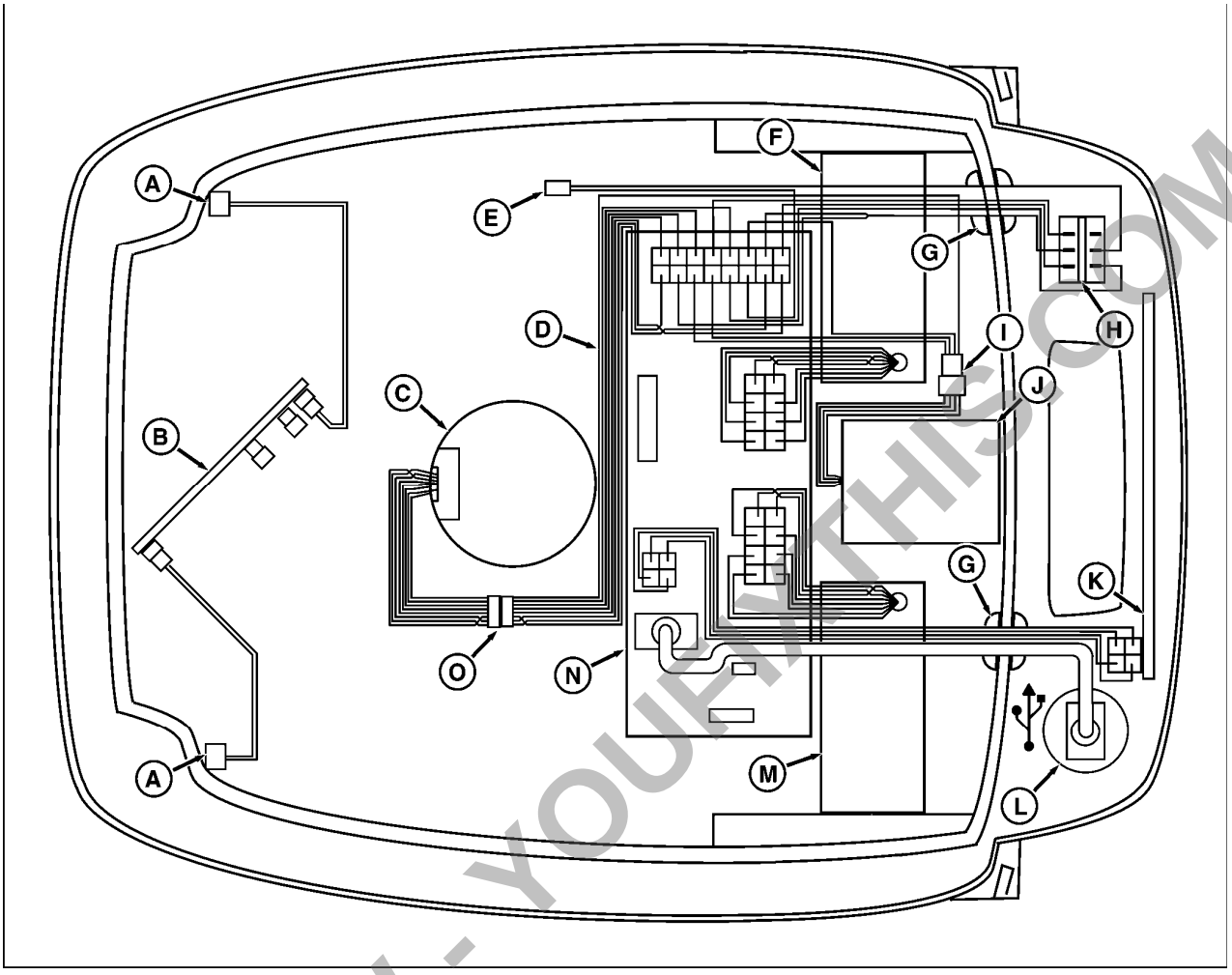
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Wire Harness



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A—Front Lift Sensor
B—Front Boundary Sensor Circuit Board
C—Blade Motor
D—Blade Motor Wire Harness
E—Charging Contact Wire Harness Connector
F—Right Wheel Motor
G—Wire Harness Seal
H—Main Power Switch
I—Battery Wire Harness Connector
J—Battery
K—Rear Handle Sensor
L—Communication Sensor
M—Left Wheel Motor
N—Vehicle Control Unit (VCU)
O—Blade Motor Wire Harness Connector

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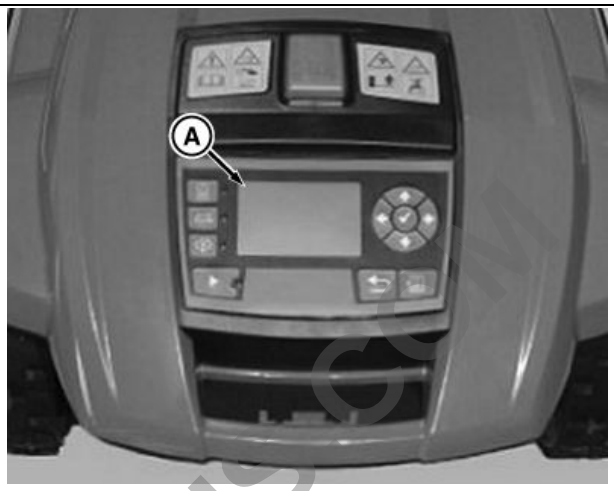
Fault Display

NOTE: Fault number assignments may change. Refer to DTAC for the most up-to-date code list.

The mower user interface screen (A) displays a code when an adverse operating condition or component problem is detected. Faults are displayed one at a time and must be individually cleared. The most relevant active fault is displayed at the top row of the user interface status bar. Fault codes are displayed in the format F nn, with n being the specific code number.

Fault codes indicate system or component operation outside of set parameters. When a fault condition is detected, the machine stops, and the fault code is stored. A detected fault requires the operator to clear the fault condition and restart the mower.

Contact your local authorized John Deere service facility if the displayed code persists.



MXT014161 —UN—30APR15

A—User Interface Screen

Condition	Displayed Code	Condition (Technical)	Condition
Fault 1	F-01	Mower Front, Left, or Right Lift (Sustained)	Mower Lifted
Fault 2	F-02	Mower Tilted or Flipped (Sustained)	Mower Tilted
Fault 3	F-03	Stop Switch Activated	Stop Button Pressed
Fault 4	F-04	Bootblock, Application Mismatch	Invalid Bootblock Version
Fault 6	F-06	Mower Outside Boundary	Outside Boundary
Fault 7	F-07	Failure of Sensor Board	Sensor Board Failure
Fault 8	F-08	Left Traction Motor Over Current	Left Motor Over Current
Fault 11	F-11	Left Traction Motor Under Speed	Left Motor Stalled
Fault 12	F-12	Right Traction Motor Over Current	Right Motor Over Current
Fault 15	F-15	Right Traction Motor Under Speed	Right Motor Stalled
Fault 16	F-16	Blade Motor Over Current EXTREME (Stuck Blade)	Blade Motor Over Current
Fault 18	F-18	Blade Motor Over Speed	Blade Motor Over Speed
Fault 19	F-19	Blade Motor Under Speed	Blade Motor Stalled
Fault 20	F-20	Battery Charge Critically Low	Battery Charge Low
Fault 21	F-21	Battery Communication Failure	Battery Error
Fault 22	F-22	Mower Stuck	Mower Stuck
Fault 23	F-23	Micro Controller Temperature Too High	Temp Too High
Fault 24	F-24	Rear Handle Touched (Sustained)	Rear Handle Touched
Fault 27	F-27	Lift Sensor Error	Lift Sensor Fault
Fault 28	F-28	Self-Test Failure	Self-Test Failure
Fault 29	F-29	Mower Over Current	Motor Over Current
Fault 32	F-32	Battery Discharge FET	Battery Discharge FET
Fault 33	F-33	Left Motor Controller Fault	Left Motor Controller
Fault 34	F-34	Right Motor Controller Fault	Right Motor Controller
Fault 35	F-35	Blade Motor Controller Fault	Blade Motor Controller
Fault 36	F-36	Voltage on Charge Contacts Inside Mowing Area	Charge Voltage
Fault 37	F-37	Keypad During Operation	Keypad During Operation
Fault 38	F-38	Bump Acceleration	Bump Acceleration
Fault 39	F-39	Bump	Bump
Fault 40	F-40	Push Bump	Push Bump
Fault 41	F-41	Obstacle in Way	Obstacle in Way
Fault 42	F-42	CPLD Failure	CPLD Failure
Fault 43	F-43	Mower Inverted	Mower Inverted

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Fault Diagnosis

Diagnostic Trouble Codes (DTCs)

The user interface screen displays a code when an adverse operating condition or component problem is detected. The user interface code is displayed on the machine as a two-digit number.

Fault codes indicate system or component operation outside of set parameters. When a fault condition is detected, the machine stops, and the fault code is stored. A detected fault requires the operator to clear the fault condition and restart the mower.

Symptom	Problem	Solution
(Fault) 01	Mower front, left, or right lift (sustained)	Press ENTER and then START to clear fault; if fault does not clear, go to next step.
		Check for debris on caster wheel spindle.
		Check for stuck caster wheel spindle.
		Check for dislodged caster wheel spindle snap ring retainer.
		Check for excessive wear in caster wheel spindle housing.
		Check for broken lift sensor harness wire or connector. (See Remove Lift Sensor.)
		Check for loose, misaligned, or missing lift sensor magnet.
		Check for wearing of the washer between the caster wheel and frame.
		Check for debris between lift sensor magnet and mower.
(Fault) 02	Mower tilted or flipped (sustained)	Press ENTER and then START to clear fault; if fault does not clear, go to next step.
		Exclude mower from slopes greater than 20 degrees.
		Use Mow ADVISOR™ or mower service menu to recalibrate the mower tilt sensor on a flat surface; cycle main power switch off and on. (See Tilt Sensor Calibration.)
		If recalibration of the tilt sensor does not eliminate the fault, dock mower in charge station. Allow mower to charge for at least 15 minutes to run sensor self-test. Replace front sensor board if self-test fails.

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OUO2005,000043C -19-09JUN16-1/10

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Specifications

Item	Measurement	Specification
Boundary Wire Specifications		
Wire (maximum)	Length	350 m (1148 ft)
Wire (buried)	Depth	0—15 cm (0—6 in)
Wire (maximum)	Resistance	10 ohms
Guide Loop Specifications		
Guide Loop (minimum)	Length	2 m (6.5 ft)
Guide Loop (maximum)	Length	30 m (98 ft)
Guide Loop (spread)	Width	13 cm (5 in)
Guide Loop	Depth (maximum)	15 cm (6 in)
Guide Loop (maximum)	Resistance	10 ohms
Transport Corridor Specifications		
Transport Corridor Width (minimum)	Distance	20 cm (7.87 in)
Torque Specifications		
Cover Bolts	Torque	4.2±0.5 N·m (37±4 lb·in)
Control Panel Screws	Torque	0.5±0.1 N·m (4.4±0.9 lb·in)
Battery Cover Screws	Torque	2.2±0.5 N·m (19.4±4.4 lb·in)
Boundary Sensor Screws	Torque	1.1±0.2 N·m (9.7±1.7 lb·in)
Lift Sensor Screws	Torque	1.1±0.2 N·m (9.7±1.7 lb·in)
VCU Screws	Torque	4.8±0.5 N·m (42.5±4.4 lb·in)

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Other Material

Number	Name	Use
TY25744 (U.S.)	NLGI Grade 2 Multi-Purpose Extreme Duty Synthetic Grease	Use to protect blade edges during off season storage. Use for dielectric protection of mower power switch and charging station terminals.

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Post Season Service (DTAC Solution 93958)

Complaint or Symptom

Checklist for off season service.

Problem or Situation

Winter service required.

Solution: Prepare the dealership for robotic mower winter storage

NOTE: The dealer may need racks to store the robotic mowers.

1. Prepare storage area (10 degrees C/50 degrees F. 0 - 85% humidity).
2. Plan special offers for winter service (pick up mower, clean, review hardware, install new blade).
3. Inform customers early to store mowers in winter.
4. Read DTAC solutions / information on DealerNet to be up to date.
5. Retrieve new Mow ADVISOR™ and mower software as available.
6. Service cable required for new software:
   - Serial numbers SA1312, SA1318, SA1512, SA1518
   - USB A to A cable JDG11590

Charging Station and Mower Inspection

1. Remove diagnostic port cover (A).
2. Connect to Mow ADVISOR™ to store programming settings (schedule, launch point, clean up pass, etc.). (See Mow ADVISOR™ Auto Test.)
3. Record the height of cut from the mower.
4. Remove the mower from the charging station.
5. Discharge the battery state of charge to 40-60 percent by mowing or using the power system test fan.
6. Use the Utilities Menu to put the mower in Mower Storage mode. Check to be sure that the main power switch is moved to the OFF position.
7. Clean the mower and the charging station without water.

Charge Station Inspection

- Check the continuity of the boundary and guide loop wires with a multi-meter at the end of each mowing season, and at the beginning of the following mowing season, for any changes to resistance.
- Inspect that the charging decal is securely in place and the wires to the charging station are in good condition.



MXT0006656 —UN—15FEB13

A—Diagnostic Port Cover

Wrap the boundary wire and guide loop to reduce corrosion.

Mower Inspection (only the dealer should complete these)

- Open mower to check for moisture. If only a small amount of moisture is present, dry out by allowing the mower to sit open. Complete safety checks. (See Safety Checks.)
- If a large amount of moisture is inside the inner wall, follow DTAC Solution 93254 (or DealerNet Solution).
- Remove the blade and blade shield. Make sure that the blade motor bearing is clean and dry (do not use water). No clippings should be present.
- Lower the height of cut. Open the mower. Lightly coat the exposed threads of the height-of-cut assembly (black) threads with grease. Store with the height of cut at the maximum position.
- Check to make sure that the rear wheels are tight:

Specification	
Drive Wheel Hub Nut (SN 1SA1112 and 1SA1118)—Torque	6.8±0.5 N·m (60±4 lb·in)
Drive Wheel Hub Nut (SN 1SA1312 and 1SA1318)—Torque	10.5±0.8 N·m (93±6 lb·in)

Continued on next page

OUO2005,0000464 -19-12APR16-1/2

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Index

Page

B

Battery
Install ... 50-25-18
Remove ... 50-25-17
Battery Handling, Safety
Safety, Battery Handling ... 10-05-3
Boundary sensor
Install ... 50-25-20
Remove ... 50-25-19

C

Control panel
Install ... 50-25-16
Remove ... 50-25-14
Correct handling of equipment ... 10-20-2
Cover
Install ... 50-25-13
Remove ... 50-25-12

D

Diagnostics
Fault diagnosis ... 20-05-3
Fault display ... 20-05-1
Programming
User interface ... 50-20-8
Diagnostics, observed
Mowing ... 20-10-1
Navigation ... 20-10-5
Dissipating built-up static charge ... 10-20-1
Drive system
Caster wheel, front
Remove ... 40-20-8
Caster wheel, rear
Remove ... 40-20-9
Component location
Caster and drive wheels ... 40-05-1
Drive wheel
Remove and install ... 40-20-3
Theory of operation
Drive wheels ... 40-10-1
Front wheels ... 40-10-1
Wheel motors ... 40-10-1
Wheel motor
Install ... 40-20-6
Remove ... 40-20-4
DTAC Solution 93958
Post season service
Seasonal services ... 60-05-1
DTAC Solution 93961
Pre season checks
Seasonal services ... 60-15-1

Page

E

Electrical
Component location
Charging station ... 50-10-2
Mower ... 50-10-1
Schematic and harnesses
Charging station wire harness ... 50-05-4
Cover wire and ribbon harness ... 50-05-3
Ribbon harness ... 50-05-1
Wire harness ... 50-05-2
Tests and adjustments
Battery and charge circuit test ... 50-20-18
Battery safety ... 50-20-2
Battery tests ... 50-20-3
Blade motor diagnostic test ... 50-20-23
Boundary sensor tests ... 50-20-25
Dealer technical assistance center (DTAC) ... 50-20-42
Garden control mode ... 50-20-17
Handle, rear sensor test ... 50-20-22
Lift sensor test ... 50-20-30
Mow ADVISOR auto test ... 50-20-14
Mower log ... 50-20-40
mower settings ... 50-20-38
Programming ... 50-20-40
Slope compensation ... 50-20-39
Smart homing ... 50-20-39
Sprial mode operation ... 50-20-39
Tilt sensor calibration ... 50-20-33
Tilt sensor test ... 50-20-32
User interface switch tests ... 50-20-35
User interface system and service access ... 50-20-4
Wheel motor test ... 50-20-28
Theory of operation
Autonomous control ... 50-15-1
Boundry sensor ... 50-15-1
Charging station ... 50-15-1
Expected behavior ... 50-15-2
Handle sensor, rear ... 50-15-2
Lift sensor ... 50-15-1
Mow ADVISOR ... 50-15-1
Mower log ... 50-15-1
Operation and diagnosis ... 50-15-3
Power supply ... 50-15-2
Tilt sensor ... 50-15-2
User interface ... 50-15-2
Electronic components
Handling and protection ... 10-20-1

Continued on next page

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