

LOGIC|BOOM

Control System for Spraying Boom Height



Operator's manual N°A120-0023A (REV 3)
Effective November 2017

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INTRODUCTION

Congratulations on your purchase of an MS Gregson system for boom height control for agricultural sprayer.

This equipment is manufactured with top quality components and is engineered using the latest technology to provide outstanding efficiency, now and for the years to come.

This manual is designed to help you in the operation of your new equipment. Please take the time to read this manual completely before using your new equipment. A perfect understanding of this manual will ensure that you receive the maximum benefit from your equipment. Any negligence in this regard may result in injury or property damage.

Each new operator must have received the required training before operating an agricultural sprayer and must have read this operator's manual.

This manual should be considered an integral part of the sprayer and must accompany it upon resale and be stored in the record holder provided for this purpose on the sprayer.



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Description

The MS Gregson system for boom height control is designed especially for agricultural sprayers. This system is upgradable and options may be added. The system is efficient and easy to work with at the same time.

When designing this control system, special attention was taken to ensure that it would be easy to understand, easy to configure, easy to operate, easy to maintain and easy to troubleshoot, all at once.

The base system includes manual controls for the boom sections and tilts, automatic folding and unfolding of the boom, display of hydraulic oil pressure and temperature, control of working lights, control of spraying (run/hold). It also includes a diagnostics section and many more features.

The Logic Boom option includes all above features and also allows to automatically control tilt cylinders and center section cylinder to keep the boom at the desired height while spraying.

The self-levelling option may be added to the Logic Boom to control boom center section inclination. If there is an inclination difference between the center section and the ground caused by spraying on a slope or by folding a boom section, the system automatically realign the boom center with the ground.

Other options are also available. Consult your dealer for more details.

WARRANTY

Limited warranty:

The boom height control systems manufactured by **MS Gregson Inc.** are warranted, to the original purchaser, to be free from defects in materials and workmanship for a period of 1 year. Normal use conditions, according to the instructions in this manual, apply. This limited warranty is subject to the exclusions listed below, is calculated from the date of delivery to the original purchaser, and applies to the original components only. Parts replaced under this warranty will assume the remainder of the corresponding part's warranty period. Upon confirmation of the warranty claim, **MS Gregson** will, at its discretion, repair or replace the defective part. This does not imply any right to compensation for any type of direct or indirect damage.

Exclusions of warranty:

- Routine adjustments and normal maintenance items such as lubricants, hoses, O-rings, fuses and seals.
- Repairs required as a result of collision, accident, bumping, misuse, modifications made to the equipment without authorization, lack of required maintenance, use contrary to the instructions included in this manual or to the common sense.
- Repairs required as a result of freezing or exposition to corrosive products.
- Repairs required as a result of voltage fluctuations of the electric supply.
- Damage to crop due to wrong configuration or incorrect use of the equipment.
- Damage to crop due to components failure and/or accident.
- Additional charge resulting from stoppage for repair or other reason.
- Transportation and/or travelling.
- Any parts which are subject to wear during normal use.
- Any parts which are deemed faulty due to negligence or carelessness during use.

Execution of repairs within the warranty period:

In order to obtain warranty service on items warranted by **MS Gregson Inc.** within the warranty period, you must show to your dealer a proof of purchase. If the equipment is permanently installed, the dealer will carry out repairs on the spot. The dealer has the responsibility to carry out repairs within the warranty period. Repairs will be done at the dealer's repair-shop for mobile equipment or at your site upon dealer's choice; the purchaser has the responsibility to bring his equipment to his dealer's repair-shop. The parts replaced under warranty become the property of **MS Gregson Inc.**

Limitation of liability:

MS Gregson Inc. liability for special, incidental, or consequential damages is expressly disclaimed. In no event shall **MS Gregson Inc.** liability exceed the purchase price of the product in question. **THE WARRANTY CONTAINED HEREIN IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.** **MS Gregson Inc.** does not authorize any other party, including authorized MS dealers, to make any representation or promise on behalf of **MS Gregson Inc.** or to modify the terms, conditions, or limitations in any way. It is the buyer's responsibility to ensure that the installation and use of **MS Gregson** products conforms to local codes. While **MS Gregson Inc.** attempts to assure that its products meet national codes, it cannot be responsible for how the customer chooses to use or install the product.

Description of safety symbols



DANGER

The «DANGER» symbol is used to outline a situation where danger is imminent and must be strictly avoided. Failure to comply would result in serious damage to equipment, personal injury or even death.



WARNING

The «WARNING» symbol describes the potential for danger or improper set up and that should be avoided. Failure to comply could result in serious damage to equipment, personal injury or even death.



CAUTION

The «CAUTION» symbol indicates the potential for a dangerous situation that can be avoided. Failure to take notice could result in potential equipment damage and/or minor to moderate personal injury.

Carefully read and follow the instructions or recommendations provided in each paragraph segment under the headings of «DANGER» «WARNING» and «CAUTION». In each case the paragraphs provide important information that should be read.

It is recommended that, after reading this information sheet, a copy is kept as a future reference or for other operators to read.



PROHIBITED

The «Prohibited» symbol signifies something «that should not be done». As a general indication, the following symbol will be used in this operator's manual sheet to outline a prohibited action or procedure.



MANDATORY

The «Mandatory» symbol signifies something «that must be done». As a general indication, the following symbol will be used in this operator's manual to outline a mandatory action or procedure.

IMPORTANT

Indicates that machine or property damage could result if instructions are not followed.

Warning



Always be sure that all persons stand clear.



Never allow persons or animals near the sprayer when the Logic Boom is enabled, booms may move up or down at any moment.



Never stand under or pass over booms, even if the hydraulic system is not powered.



Always disable the Logic Boom before doing any service or maintenance.



Disable the Logic Boom each time you leave the operator's seat

SAFETY

Caution



Wear appropriate protective equipment when working on the hydraulic system.



Never attempt to service or maintain the hydraulic system with the equipment running. Make sure that hydraulic system has been previously depressurized.



If the equipment has run before work is performed or before disconnecting hydraulic hoses, be aware that the hydraulic fluid may be extremely hot and under high pressure. Precautions must be taken.



When servicing the hydraulic system, always take precautions to prevent dust, foreign material or contaminants from being introduced into the hydraulic system.

Install supports under the boom sections before depressurizing the hydraulic system for service or maintenance.



DANGER

Boosting of a dead battery:
Before boosting, disconnect power from the boom control system. Also disconnect all other electronic console or equipment.

INSTALLATION

Installation of the console

The console has to be installed in the tractor cab.

The easiest way to install the support is to use the levered suction cup and fix the support in a cab window or on a flat and smooth surface. If ever you have to use another tractor to tow your sprayer, the console support will be easily transferred from one tractor to the other.

If it is not possible to use the suction cup, unscrew the cup from the adjustable foot (**figure 1 & 2**) and screw the foot to the desired place in the tractor cab.



Figure 1



Figure 2

Electric power connections

Bring the extremity of the sprayer power harness into the tractor cab.

- 1- A 3 ft power connection cable is supplied with the console (**figure 3**).
- 2- Connect the big grey connector to the grey connector of the power harness (**figure 4**).
- 3- At the other end of the 3 ft cable, connect the 3 pin AMP connector to an accessory outlet. Accessory outlet must be able to supply up to 20 amperes (**figure 5**).



Figure 3

If your tractor does not have an accessory outlet available, a supply kit that replaces the standard 3 ft cable is available and includes: all necessary wires and connectors, a 40 amp. breaker and a solenoid relay with connection wire to accessory switch, option number PA01102.

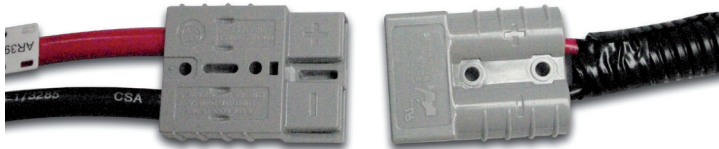


Figure 4



Figure 5

Console connections

- 1- Connect the console plug to the small receptacle of the power harness. Push until it clicks in. (**figure 6**)
- 2- If you want to use the spraying run/hold button on the console, connect the console run/hold receptacle to the spraying rate controller. (**figure 7**)

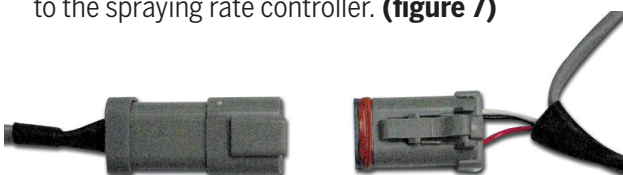
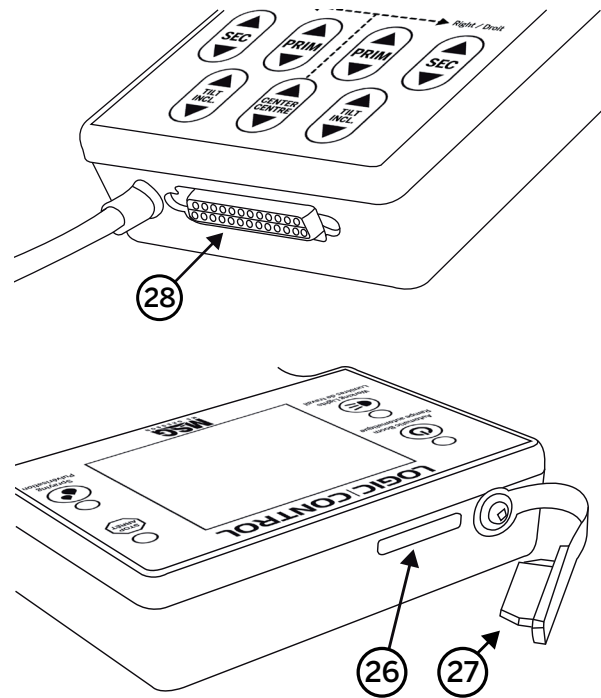
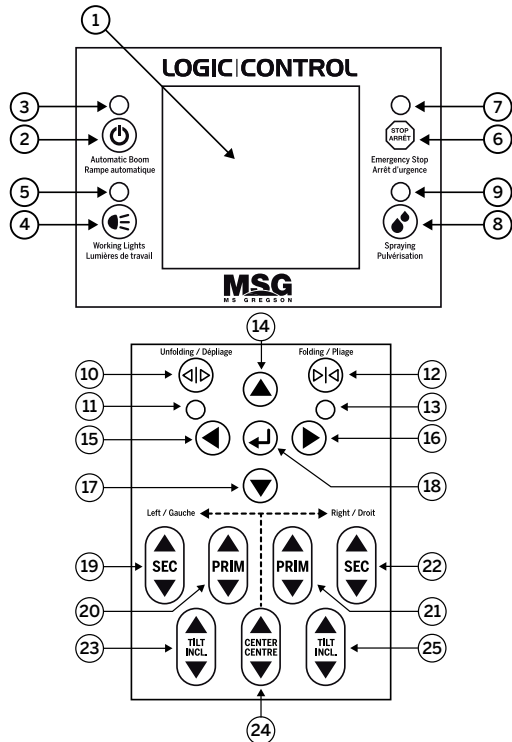


Figure 6



Figure 7

CONSOLE



- 1- Display screen, communicates information to user.
- 2- Automatic Boom button, used to enable/disable/pause Logic Boom function (option).
- 3- Automatic Boom LED (light-emitting diode), lit when Logic Boom is active, flashing when Logic Boom is in pause.
- 4- Working Lights button, used to turn on and turn off the working lights (option).
- 5- Working Lights LED, lit when the working lights are turned on.
- 6- Emergency Stop button, used to stop all functions at once in case of emergency.
- 7- Emergency Stop LED, lit when emergency stop button has been used.
- 8- Spraying button, used to start or stop spraying if the console connector has been connected to rate controller.
- 9- Spraying LED, lit when spraying button has been activated.
- 10- Unfolding button, used to start the automatic boom unfolding function.
- 11- Unfolding LED, lit while automatic boom unfolding is active.
- 12- Folding button, used to start the automatic boom folding function.
- 13- Folding LED, lit while automatic boom folding is active.
- 14- (Up Arrow), used to navigate in menus and to increase values.
- 15- (Left Arrow), used to navigate in menus.
- 16- (Right Arrow), used to navigate in menus and to enable/disable automatic leveling (option).
- 17- (Down Arrow), used to navigate in menus and to decrease values.
- 18- (Enter), used to navigate in menus and to confirm functions and actions.
- 19- Left Secondary Boom, used to manually fold (up arrow) or unfold (down arrow) the left secondary boom section.
- 20- Left Primary Boom, used to manually fold (up arrow) or unfold (down arrow) the left primary boom section.
- 21- Right Primary Boom, used to manually fold (up arrow) or unfold (down arrow) the right primary boom section.
- 22- Right Secondary Boom, used to manually fold (up arrow) or unfold (down arrow) the right secondary boom section.
- 23- Left tilt, used to manually rise (up arrow) or lower (down arrow) the left boom.
- 24- Center, used to manually rise (up arrow) or lower (down arrow) the center section.
- 25- Right tilt, used to manually rise (up arrow) or lower (down arrow) the right boom.
- 26- SD port, used to insert SD card for program downloading or uploading.
- 27- SD port plug, used to protect port against dust.
- 28- DB25 port, used when a joystick is added to the console (option).

INITIAL START UP

After console has been installed and connected, and sprayer has been hydraulically connected, the control system is ready to be started.

First step will be the console configuration. For this step, start the tractor motor or turn the switch to accessory position.

When the system is powered, the console «beeps» and then displays, for 10 seconds, a screen like this: **(figure 8)**

Upper rectangle: Dealer's name

Middle rectangle: the message «WELCOME TO THE SYSTEM» followed, on the third line, by the type of system:

- «MS Control» means that the base system, with manual controls, has been installed.
- «LogicBoom» means that in addition to the base system, the Logic Boom option has been installed.
- «LogicBoom+» means that in addition to the base system, the Logic Boom option and also the Automatic Levelling option have been installed.

Lower left rectangle: the user interface version installed in the console.

Lower right rectangle: the program version installed in the system.

Each time the system is powered, the welcome screen will be seen for 10 seconds while the system is uploading its program.

After 10 seconds, the welcome message disappears and the screen shows: **(figure 9)**

Read carefully the message. If you agree, press the Enter button.

After pressing Enter, the screen shows: **(figure 10)**

From now on, this screen will be called the Main Screen.

Configuration

You will now have to configure the system, according to your needs and preferences. To go into configuration mode, use the down arrow to highlight «CONFIGURATION»: **(figure 11)**

After «CONFIGURATION» has been highlighted, press Enter and configuration menu will be displayed: **(figure 12)**

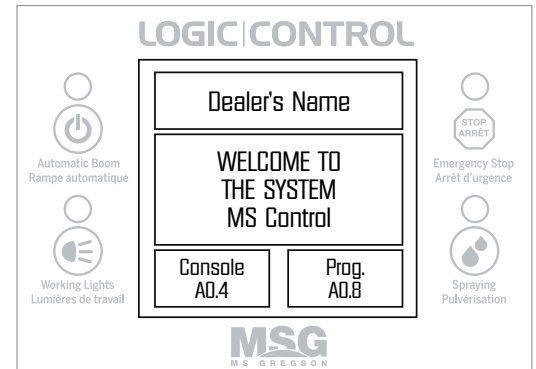


Figure 8

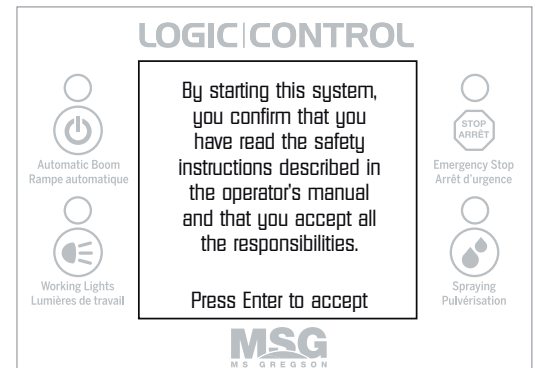


Figure 9

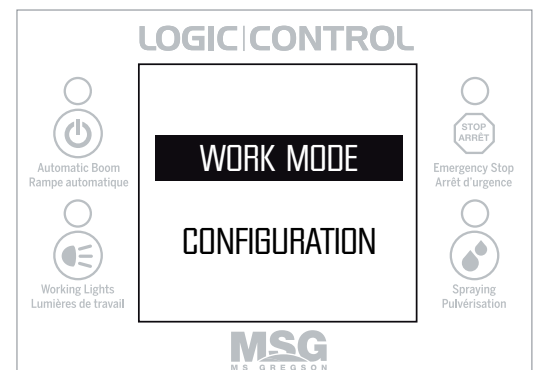


Figure 10

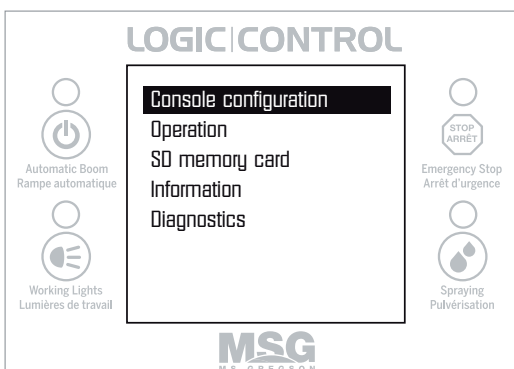


Figure 12

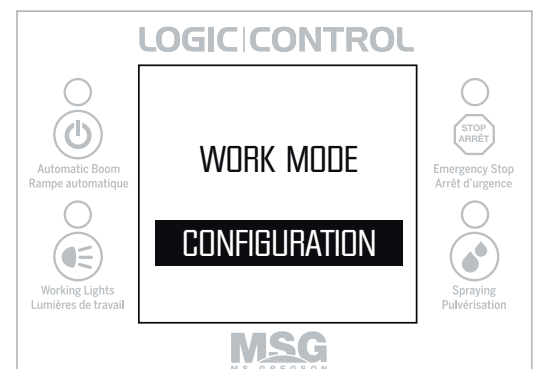


Figure 11

INITIAL START UP

Console configuration

If «Console configuration» is not highlighted, use the up arrow to highlight it, then press Enter. Console will display: **(figure 13)**

All present settings are displayed:

Temperature: units used to display temperature measurements, °F or °C.

Contrast: difference between characters and back screen, 0% to 100%.

Backlight: lighting of the back screen, On or Off.

Language: display language, Français, English or Español.

Reverse: inversion of characters and back screen colors, On or Off.

Measure: units used for height measurements, Imperial (inch) or Metric (cm).

To change one or many of those settings, highlight the setting to be changed, using the up arrow or down arrow, then press Enter. You will enter the chosen setting menu. **(figure 14 & 15)**

Use up or down arrows to select desired setting or to increase or decrease the value. For numeric values, value changes of 1 unit each time the arrow is pressed. If arrow button is maintained, value will change slowly in the beginning, and then faster and faster.

When desired setting has been set, press Enter to exit that setting menu and go back to console configuration menu.

Some settings like contrast, backlight and reverse may have to be adjusted according to ambient conditions such as sunny or cloudy, day or night.

After all settings have been adjusted to your convenience, press left arrow to go back to configuration menu. **(figure 12)**

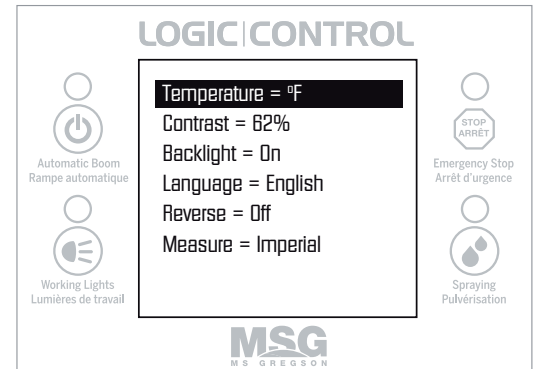


Figure 13

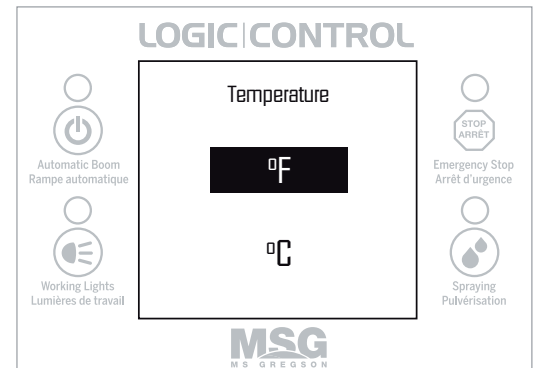


Figure 14

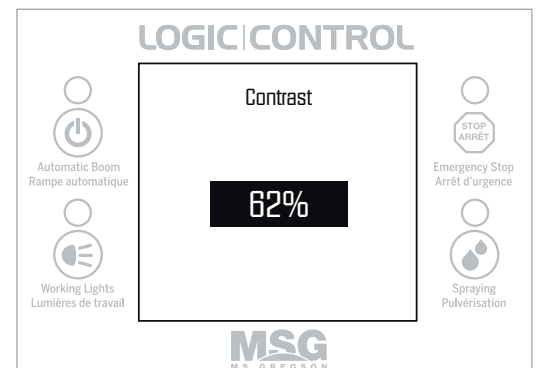


Figure 15

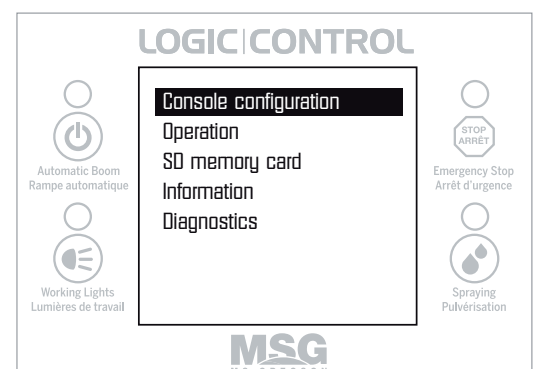


Figure 12

INITIAL START UP

Operation configuration

Use down arrow to highlight «OPERATION», then press Enter to enter operation configuration menu. **(figure 16)**

All present settings are displayed: **(figure 17)**

Min. pressure: minimum hydraulic pressure for the control system, in psi. Typically, this pressure should be adjusted at 1/3 of the pressure shown on the console when cylinders are at rest.

Automatic unfolding: the way that the boom will unfold when the automatic unfolding function is used. With Simultaneous unfolding selected, primary sections AND secondary sections will unfold at the same time. With Sequential unfolding selected, the primary sections will unfold first, and only after that, the secondary sections will unfold. **Do not use simultaneous unfolding for boom exceeding 100 ft.**

Boom unfolding height: height of the boom at the end of automatic unfolding, only for systems with the Logic Boom option, in inches or centimeters, according to selection made in the console configuration menu.

Field cond.: condition of the field where the sprayer will be used, only for systems with the Logic Boom option. Crop cover is the standard selection: boom height is measured from the top of the canopy and spots without vegetation are ignored. Bare soil may be selected for special applications, like spraying before direct seeding, or early in season when crop represents a small percentage of area covered, like cabbage production: the system tends to measure from the ground and vegetation spots or previous season non-continuous residues are ignored.

To change one or many of those settings, highlight the setting to be changed, using the up arrow or down arrow, then press Enter. You will enter the chosen setting menu.

Use up or down arrows to select desired setting or to increase or decrease the value. For numeric values, value changes of 1 unit each time the arrow is pressed. If arrow button is maintained, value will change slowly in the beginning, and then faster and faster.

When desired setting has been set, press Enter to exit that setting menu and go back to operation configuration menu.

After all settings have been adjusted to your convenience, press left arrow to go back to configuration menu. **(figure 12)**

The three last lines will be discussed later in this manual. For now, press left arrow to go back to the main menu. **(figure 11)**

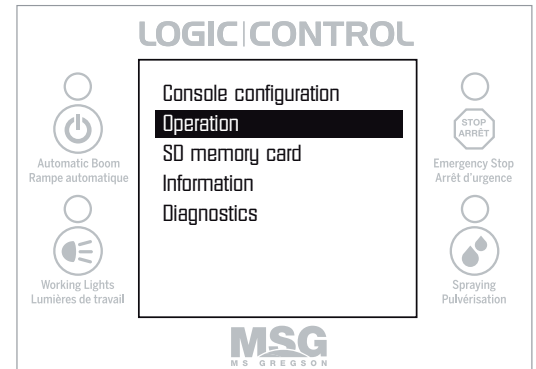


Figure 16

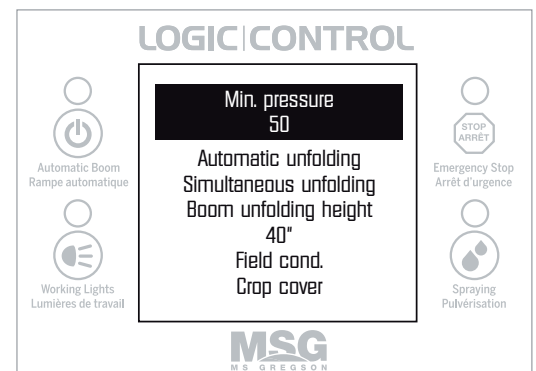


Figure 17

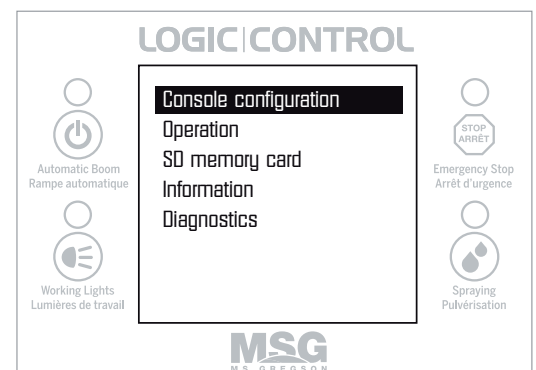


Figure 12

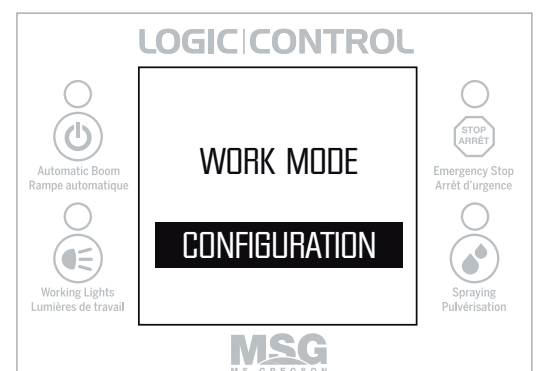


Figure 11

INITIAL START UP

Use up arrow to highlight «WORK MODE». In future use of the system, if there are no changes needed in configuration, you will go directly from the welcome screen to the work mode screen. **(figure 10)**

Press Enter to enter work mode screen.

At this moment, the tractor has to be running and the hydraulic outlet for the boom has to be activated. If the hydraulic outlet is not activated or if the hydraulic pressure at this outlet is lower than the one set in Min. pressure of the Operation configuration, an audible alarm will be heard and the screen will display the message “Hydraulic pressure too low. Check hydraulic outlet”. Activate the hydraulic outlet or press the left arrow to go back to the main screen in order to stop the alarm. While the alarm is on, no cylinder works, in order to protect the sprayer against loss or lack of hydraulic pressure. Check hydraulic connections or adjust the Min. pressure of the Operation configuration in accordance to the pressure available at your hydraulic outlet. When the problem has been solved, go into WORK MODE.

Work screen

Three different versions of screen could be seen, according to the options added or not.

Screen for base version, with manual controls. Screen displays hydraulic oil pressure and temperature. **(figure 18)**

Screen for version with Logic Boom option. Screen displays hydraulic oil pressure and temperature, height of center boom section, height of left and right boom sections, Logic Boom reaction speed, and also Logic Boom state (Enabled or Disabled). **(figure 19)**

Screen for version with Logic Boom and Automatic levelling options. Screen displays hydraulic oil pressure and temperature, inclination of the sprayer frame (Fixed inclination meter), inclination of the center boom section (Mobile inclination meter), height of center boom section, height of left and right boom sections, Logic Boom reaction speed, Automatic levelling state, and also Logic Boom state (Enabled or Disabled). **(figure 20)**

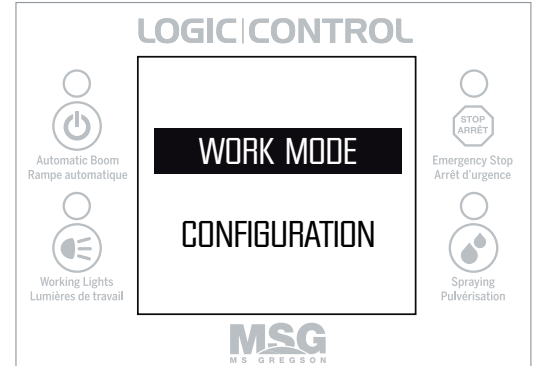


Figure 10

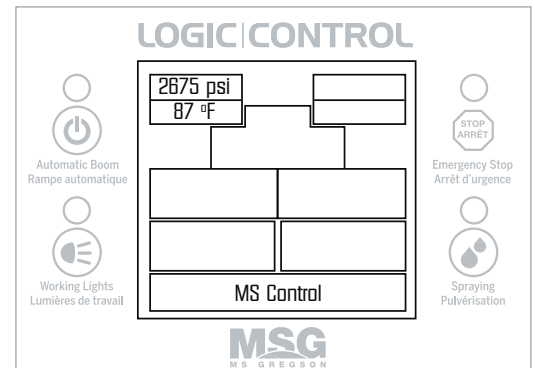


Figure 18

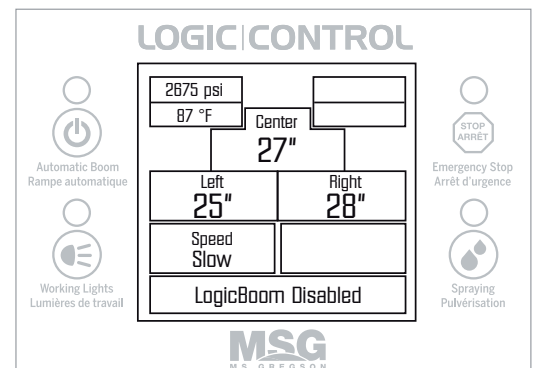


Figure 19

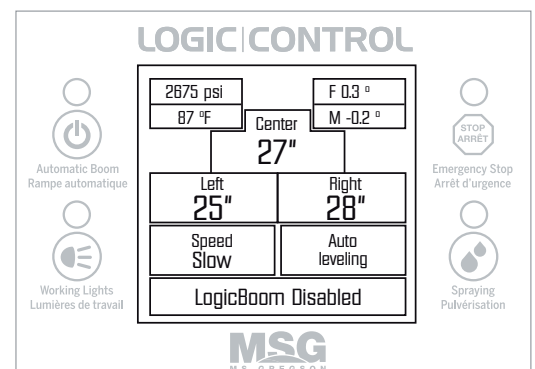


Figure 20

INITIAL START UP

Oil flow adjustment for the booms

For adequate operation, it is necessary to adjust the hydraulic flow of the tractor. The hydraulic distributor (hydraulic block) oil flow must be adjusted to 5 gpm. To do this, complete the following steps:



IMPORTANT! The oil distributor feeding the hydraulic block must be adjustable. If this is not the case, check with the tractor manufacturer that the flow is between 4 and 6 gpm and do not complete the following steps.

1. Take the 5 gpm hydraulic velocity fuse with BLACK anti-dust caps and connect it between the #2 distributor of the tractor and the boom function's hydraulic block (**figure 21**). It is recommended to use the #2 distributor to feed the hydraulic block.



NOTE! Do not leave the 5 gpm velocity fuse permanently on the machine. Use for calibration only.

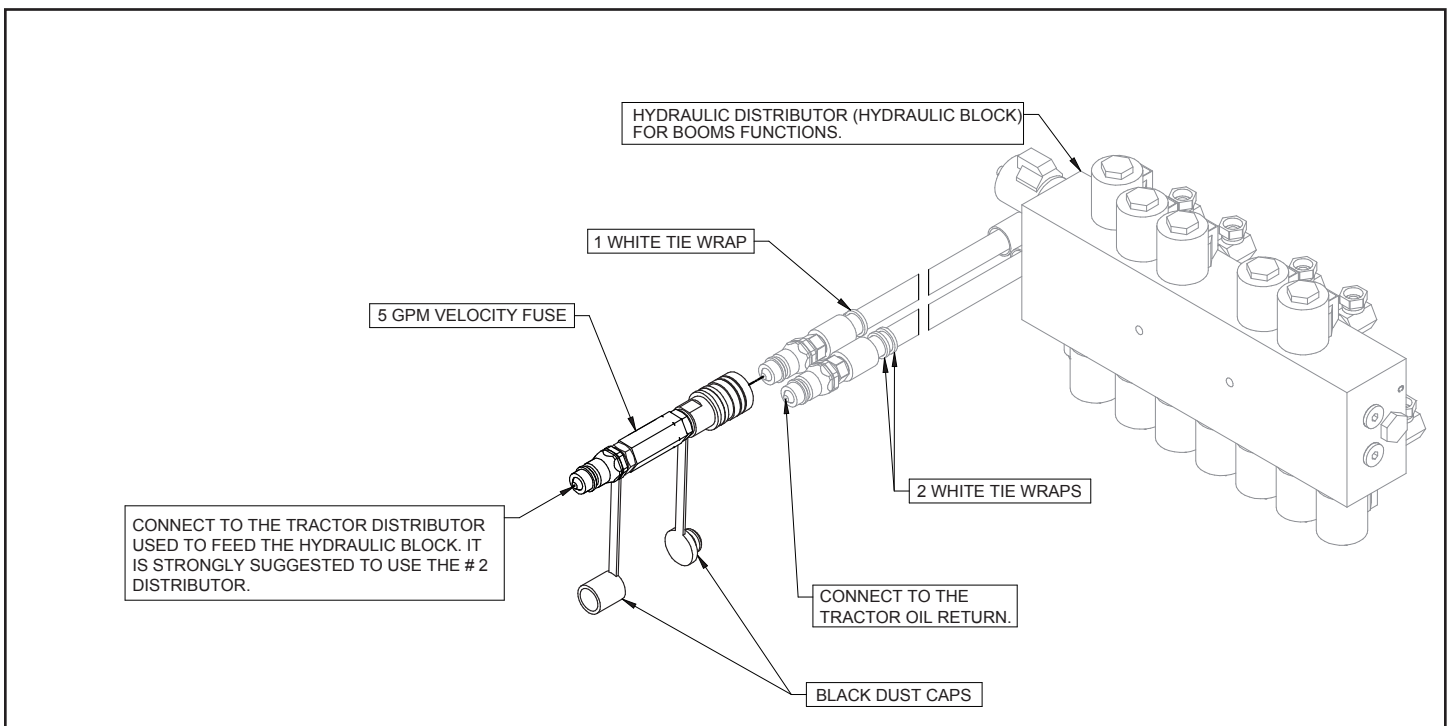


Figure 21

2. Start the tractor. Leave the lever in the neutral or park position and allow the hydraulic oil to warm-up (10-15 min). Reach the operation RPMs.
3. Adjust the oil flow control of the #2 distributor on the tractor to minimum (turtle position).
4. Activate the #2 distributor of the tractor.
5. Do not activate the cylinders, increase very slowly the hydraulic flow of the #2 distributor of the tractor while observing the pressure changes in the upper left-hand corner of the console (**figure 22**).

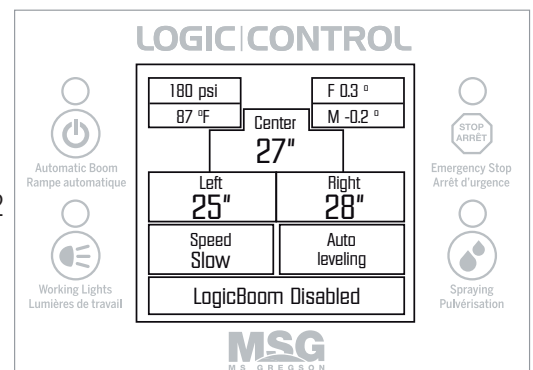


Figure 22

INITIAL START UP

- Continue to increase very slowly the flow until the pressure drops suddenly to 0 psi and the error message “hydraulic pressure too low” appears (**figure 23**). In addition to the message, there will be an alarm that will sound. (**Do not increase the hydraulic flow from now on**). The flow has now reached 5 gpm. On the majority of tractors, the triggering of the circuit velocity fuse will happen when the indicated pressure is at about 180 psi.
- If the flow is disturbed during operation or if there is a change in tractor, follow these steps again.
- Remove the velocity fuse installed in step 1.

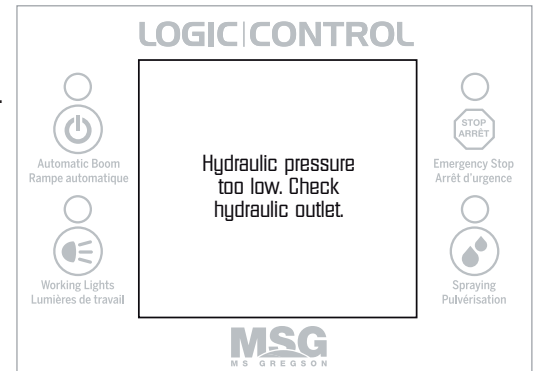


Figure 23

Additional notes on hydraulic oil supply:

- Hydraulic oil flow must be controlled by the tractor. Installation of an external valve to control the flow would result in overheating of hydraulic oil.
- Use of hydraulic oil other than the one recommended by the tractor manufacturer could cause overheating of hydraulic oil.
- A worn distributor or worn outlet coupler would create more restriction to the passage of oil, causing a higher return pressure and producing more heat.
- A dirty hydraulic oil filter causes overheating of the oil.
- When manufactured, the sprayer’s hydraulic manifold has been adjusted for open circuit tractors. That setting work as well with closed circuit tractors as with open circuit ones. Do not modify manifold adjustments before contacting the manufacturer.

Hydraulic system purge



Before using the system for the first time, you must make sure that there is no air in the hydraulic circuit. The following procedure explains how to purge the system. Purge the system before using your sprayer for the first time, at the beginning of each spraying season and also after maintenance or repair works have been performed on the sprayer hydraulic system.

- Choose a place where there is enough space to completely unfold the boom.
- After activating the outlet on which the boom control system is connected, use manual controls and lift the center section of the boom to its highest point.
- Look on both sides to make sure that the boom sections are not lying on their supports anymore. If the boom sections are not high enough to clear the supports, use the left or right tilt buttons to lift the boom sections in order to clear the supports.
- When the supports are cleared, unfold both primary sections at the same time.
- When primary sections are unfolded, fold them and then unfold them a second time.
- When primary sections are unfolded again, do the same with the secondary sections: unfold, fold and unfold a second time, both sides at the same time.
- After that, lift the left tilt to its highest point, lower it completely, lift it again, and then adjust it so that this boom section will be horizontal.
- Do the same with the right tilt.
- Finally, lower completely the center part of the boom, lift it completely and lower it once again.
- For sprayers with automatic leveling option, adjust the boom at 3/4 height, press on right side of the boom to lower it, activate auto-leveling (right arrow), let the system make the correction and stop auto-leveling. Repeat with left side. Repeat 3 times each side, in alternation.
- Purge is finished.

Your sprayer is now ready to work.

WORKING WITH THE CONTROL SYSTEM

It is strongly recommended that you practice before using your sprayer in the field.

Choose a place with enough space and where you will not risk damaging your crop. If you want to practice spraying at the same time, fill the tank with water only.

Going to the field

When the tractor is started, the console “beeps” and then displays, for 10 seconds, the welcome message: **(figure 8)**

After 10 seconds, the welcome message disappears and is replaced by the responsibility message **(figure 9)**: Press Enter to go to the main screen. **(figure 10)**

While the main screen is displayed, the system is locked, nothing works. It is recommended that you keep the main screen displayed while you travel to the field and from one field to the other. While on the main screen, an accidental touch of the console buttons would not activate cylinders. It is also recommended that you do not activate the hydraulic outlet while you are traveling.

When you are in the field, make sure there is enough space to unfold the boom. Activate the hydraulic outlet for the boom.

Check if WORK MODE is highlighted on the console. If not, use the up arrow to highlight it. Press Enter to go to the work screen.

Check pressure reading on the console to make sure that hydraulic outlet has been activated.

You may unfold the boom manually or you may use the automatic unfolding function.

If you choose to manually unfold, proceed like this:

- Lift completely the center section of the boom.
- Unfold both primary sections at the same time.
- Unfold both secondary sections at the same time.
- Lower the center section of the boom to desired height.
- Adjust tilt cylinders if necessary.

Automatic boom unfolding

To start the automatic boom unfolding function, press “Unfolding” button on the console.

The screen will display the warning message: **(figure 24)**

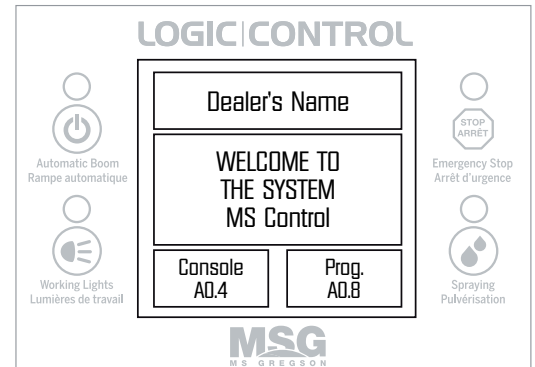


Figure 8

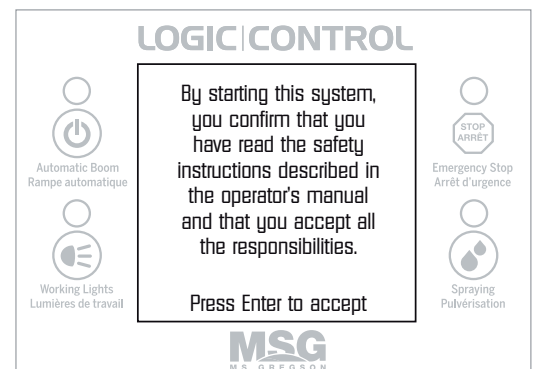


Figure 9

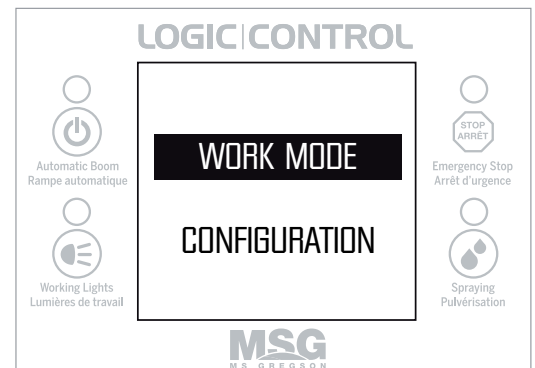


Figure 10

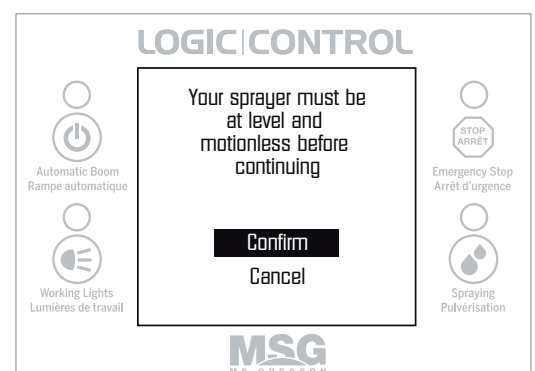


Figure 24

WORKING WITH THE CONTROL SYSTEM

«Confirm» is highlighted by default.

Confirmation is asked in case the button had been accidentally pressed.

If you change your mind and want to cancel the function, press the down arrow to highlight «Cancel» and then press Enter and the console will go back to the work mode screen.

If you still want to use the automatic unfolding function, press Enter to confirm.

The LED under the Unfolding button will light and the console will display:

(figure 25)



DANGER

During the automatic unfolding, check on both sides to be sure that there are no persons, animals, fences, trees or other obstacles and always be ready to press the “Emergency Stop” button.

The system will first lift a little the tilt cylinders (on some models), then lift the center section of the boom, then unfold primary AND secondary sections at the same time if simultaneous unfolding has been selected in Operation configuration OR unfold primary sections and then secondary sections if sequential unfolding has been selected, and will finally lower the center.

When the unfolding operation is completed, the console will automatically go back to the work mode screen.

Final height of the center section of the boom will be the height selected as “Boom unfolding height” in the Operation Configuration for systems equipped with the Logic Boom option. If you want to change that height, refer to “Operation configuration” section in this manual.

For systems without the Logic Boom option, height is determined by a time delay and will be approximately 40 inches (100 cm).

If one or more of the unfolding steps were not completed, your hydraulic pressure is probably lower than 2600 psi. Make sure that your tractor’s rpm is the same as when you are spraying. With some tractors, hydraulic flow decreases when the engine is idling. If it does not solve the problem, contact your dealer. Your dealer can adjust times allowed for each step of the unfolding/folding sequences. A dead time of about 2 seconds must be present between each step to make sure that the step is perfectly completed and that hinges are not loose.

If you have to use the “Emergency Stop” button to avoid an obstacle:

As soon as you press the button, all boom hydraulic functions are instantly stopped, console emits an audible signal, lights the emergency stop LED and displays the message: (figure 26)

Press Enter to stop the audible signal and go back to the work screen. Remove the obstacle or move the sprayer and finish unfolding manually.



IMPORTANT

If the sprayer is used at temperatures under 45°F (7°C), cylinders may be slower due to oil higher viscosity. At the end of automatic unfolding, use manual buttons to ensure that primary and secondary sections are perfectly unfolded.

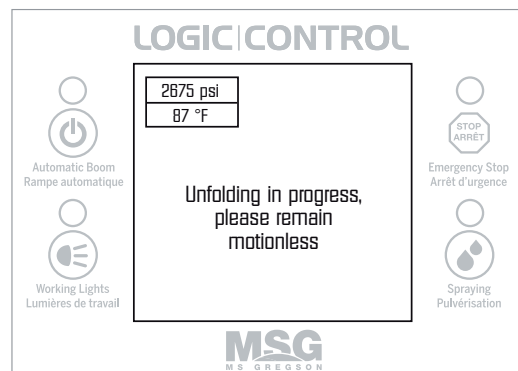


Figure 25

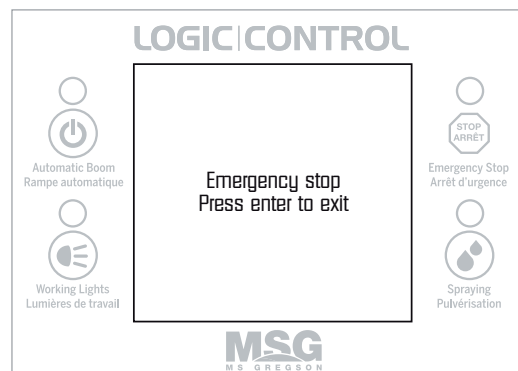


Figure 26

WORKING WITH THE CONTROL SYSTEM

Manual boom height control

All systems, including those with the Logic Boom option, may be manually controlled.

Use the bottom row buttons to control the boom height:
CENTER buttons to rise (green) or lower (red) the center section.
Left TILT buttons to rise (green) or lower (red) the left section.
Right TILT buttons to rise (green) or lower (red) the right section.

Automatic boom height control (option)

This section applies only to sprayers equipped with the Logic Boom option.

To start the automatic boom height control function, press the “Automatic Boom” button.

The console will display: **(figure 27)**

Default height proposed by the system is the last height used.

Note that the Automatic Boom LED is not lit, meaning that the function is not active yet.

If you want to change the height, use up arrow to increase height or down arrow to decrease.

Height is the distance between the spraying tip and the first thing the ultrasound sensors detect. If there is no vegetation, distance is measured from the ground; if there is vegetation, distance is measured from the crop, not from the ground.

All rectangles are blue, meaning that, by default, the system will control all three sections. If, for any reason, you do not want the system to automatically control height on one or two of the sections, use the corresponding button to disable those sections: **(figure 28)**

Left arrow to disable the left section.

Right arrow to disable the right section.

Spraying button to disable the center section.

The rectangle for the right section not blue anymore means that the right section will not be automatically controlled. Only the left section and the center section will be controlled.

A section that has been disabled can be enabled by pressing the corresponding button.

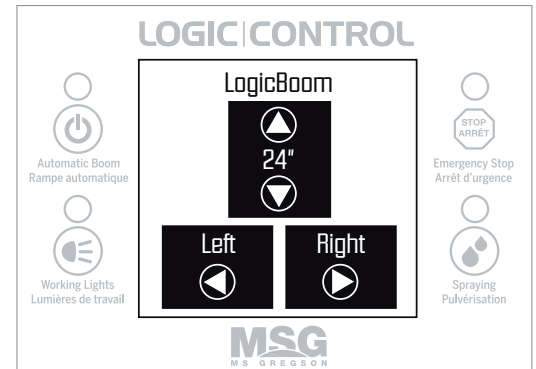


Figure 27

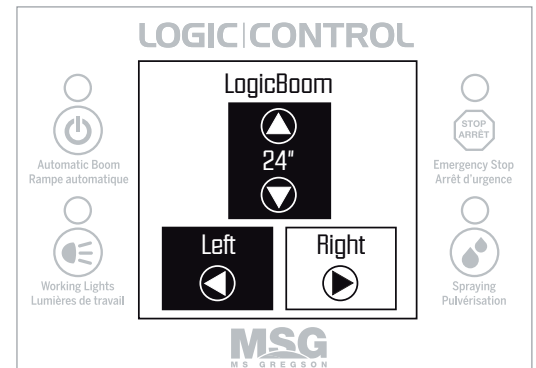


Figure 28

WORKING WITH THE CONTROL SYSTEM

At any moment, you can stop the procedure by pressing the “Automatic Boom” button. The console will go back to the work screen.

When you are satisfied with the boom height and the sections to be automatically controlled, press Enter.

The console will ask for a confirmation: **(figure 29)**

«Cancel» is highlighted by default. If you want to cancel the function, press Enter and the console will go back to the work screen.

If you want to confirm the function, press the up arrow to highlight «Confirm» and then press Enter.

The Automatic Boom LED will light and the console will go back to the work screen, but with the Logic Boom function activated. **(figure 30)**

Center, Left and Right sections rectangles are blue, meaning that all those sections are automatically controlled. Present height of each section is displayed. If one or two sections are not automatically controlled, the corresponding rectangles will be white instead of blue.

«Speed Slow» rectangle indicates that reaction speed is set to slow reaction speed. The reaction speed proposed by the system is the last reaction speed used. The reaction speed can be switched between slow, medium and fast at your will by pressing the up arrow or the down arrow. «Slow» reaction speed is typically used when moving slowly and/or when fields are quite even. The slow reaction speed offers more stability and less activity from the hydraulic cylinders. «Fast» reaction speed is typically used when moving faster and/or when fields are uneven. The fast reaction speed offers more speed for the hydraulic cylinders and allows avoiding obstacles even when moving fast. «Medium» reaction speed offers higher cylinders speed than slow reaction speed and more stability than fast reaction speed. As you can change reaction speed easily by the touch of a button, try all settings in your field and choose the one that gives the best results. It is possible that in the same field, a reaction speed gives best results in one section and another reaction speed gives best results in another section.

As a protection measure, the automatic boom height control will be stopped if a manual operation button is pressed, so that the operator will not forget that the automatic control was activated.

To stop the automatic boom height control function, press the “Automatic Boom” button for at least 1 second. To help measure that second, a “beep” will be heard after one second. After that “beep”, release the button.

Pause

If you want to temporarily stop the automatic height control function, press the “Automatic Boom” button for less than 1 second. The function will stop (rectangles will become white and cylinders will stop) and the Automatic Boom LED will flash, showing that the function has been paused. While the function is paused, manual buttons for cylinders may be used without disabling the function. When you want the function back, just press the Automatic Boom button and the function will be operating exactly like before the pause. This pause mode can be useful for momentary stopping of the automatic control like for crossing a ditch or turning at the end of a field.

DO NOT FORGET:



DANGER

When the automatic boom height control function is activated, boom sections may move at any moment if an ultrasound sensor detects a height difference. Any animal, child, person, object passing under or near a sensor could cause a movement from a boom section. Even plants waving with the wind could cause a boom section movement.

Always disable the function before you leave the operator’s seat.

Never let persons or animals come close to the boom while the function is activated.

Never pass over or under a boom section.

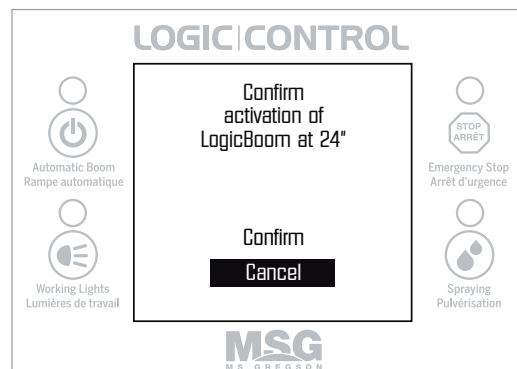


Figure 29

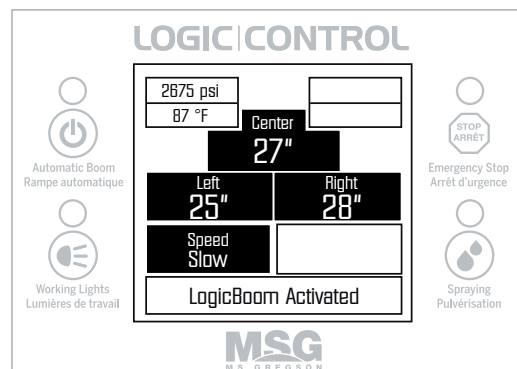


Figure 30

Extra ultrasound sensors (option)

This section applies only to sprayers equipped with the Logic Boom option that also have the 2 extra ultrasound sensors option.

On sprayers equipped with five ultrasound sensors instead of three, two sensors are installed on the left boom section and two on the right section.

In order to protect the boom, the system does not make a mathematical average of the readings of the 2 sensors installed on the same section. It displays and reacts to the closest distance amongst the 2 readings.

If a sensor reads 25 inches and the other reads 30 inches, the console displays 25 inches and the automatic boom height control uses 25 inches as the height of that section.

Automatic boom leveling (option)

This section applies only to sprayers equipped with the Automatic Leveling option. **(figure 20)**

The boom is mounted on a pivot and tends to stay horizontal, but the sprayer frame follows the ground. If the field is quite flat and horizontal, the boom remains almost parallel to the frame and the automatic leveling control is not needed.

If the sprayer is used on the side of a slope, the boom tends to remain horizontal, but the sprayer frame follows the slope. The automatic boom height control operates the tilt cylinders to maintain the correct height to the crop. Primary and secondary sections of the boom remain parallel to crop and ground as long as tilt cylinders are not at the end of their stroke. Because the center part of the boom remains horizontal and the side sections follow the slope, crop under the junctions between center and side sections could be over sprayed or under sprayed.

To prevent that situation, use the Automatic Leveling function.

To enable the Automatic Leveling function, press the right arrow. The console beeps to indicate that the function has been enabled and the Auto leveling rectangle turns to blue. **(figure 31)**

When the Automatic Leveling function is enabled, the system uses readings from the Fixed inclination meter installed on the sprayer Frame and the Mobile inclination meter installed on the Mobile center of the boom. According to the readings, the leveling cylinders are activated to align center with the frame. When the center is aligned, leveling cylinders are blocked to maintain the position of the center. The system continually checks the meter readings. If inclination difference between the center part of the boom and the frame exceeds 1.0°, cylinders correct the center position. **(figure 32)**

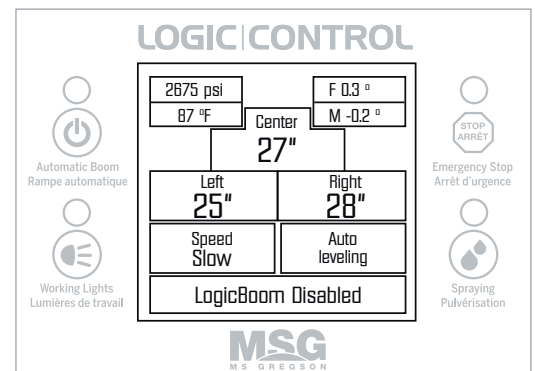


Figure 20

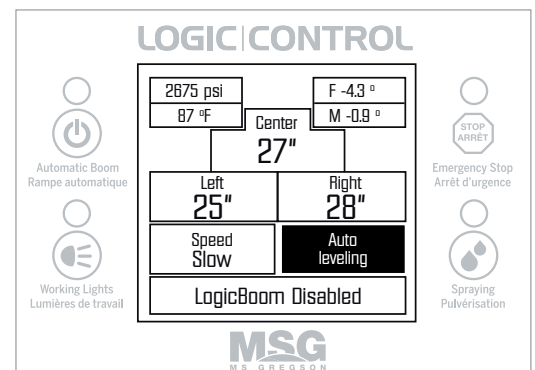


Figure 31

WORKING WITH THE CONTROL SYSTEM

When leveling cylinders are blocked, they are not blocked at 100%. If the boom suffers an impact, cylinders slip to protect the boom structure. Alignment is then readjusted, if necessary.

As long as the Automatic Leveling is enabled, the console beeps every 30 seconds as a reminder. When work on the side of the slope is finished, press the right arrow to disable the Automatic Leveling function and let the pivot do its work again.

If you have to close a boom section to finish spraying a field, closing that section would normally unbalance and tilt the boom. Before folding the section, enable the Automatic Leveling function. When the boom begins to tilt, the leveling cylinders will realign the center part of the boom with the sprayer frame. When that field section is finished, unfold the folded section and then turn off the automatic leveling.

The automatic leveling can be used in conjunction with the automatic boom height control or independently. When used with the Logic Boom, disabling or setting in pause the Logic Boom does not disable the automatic leveling.



CAUTION

Turning off the automatic leveling or exiting the work screen to go back to the main screen while the boom is unbalanced could cause the boom to touch the ground.

Automatic boom folding

When spraying is completed in the field, you may fold the boom manually or you may use the automatic folding function.

If you choose to manually fold, proceed like this:

- The sprayer must not be moving.
- Lift completely the center section of the boom.
- Fold both secondary sections at the same time.
- Fold both primary sections at the same time. Adjust tilts if necessary.
- Lower the center for about 4 seconds.
- Adjust tilt cylinders if the boom does not perfectly lie on the supports.

If you choose to use the automatic folding function:

Before proceeding to the automatic boom folding, the sprayer must not be moving and the boom must be completely unfolded and at level.

To start the automatic boom folding function, press “Folding” button on the console.

The screen will display the warning message: **(figure 33)**

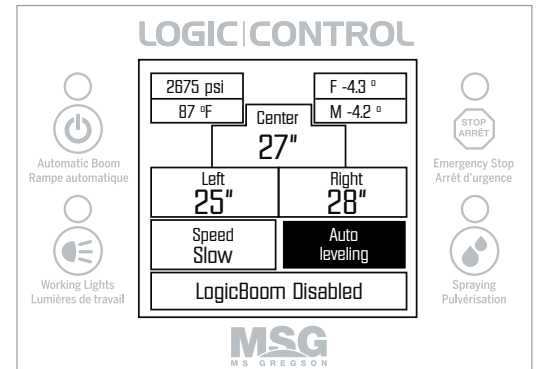


Figure 32

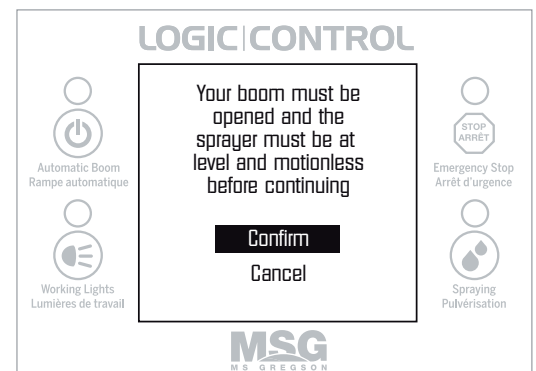


Figure 33

WORKING WITH THE CONTROL SYSTEM

«Confirm» is highlighted by default.

Confirmation is asked in case the button had been accidentally pressed.

If you change your mind and want to cancel the function, press the down arrow to highlight «Cancel» and then press Enter and the console will go back to the work mode screen.

If you still want to use the automatic folding function, press Enter to confirm.

The LED under the Folding button will light and the console will display:

(figure 34)



DANGER

During the automatic folding, check on both sides to be sure that there are no persons, animals, fences, trees or other obstacles and always be ready to press the «Emergency Stop» button.

The system folds the boom like this:

- Lifts completely the center section of the boom.
- Folds both secondary sections at the same time.
- Lifts completely both tilts at the same time.
- Lowers both tilts to the right height at the same time.
- Folds both primary sections at the same time.
- Lowers the centre section of the boom.
- Lowers tilts in the boom supports (on some models).

When the folding operation is completed, the console will automatically go back to the work mode screen.

Make sure the boom perfectly lies on the supports.

If one or more of the folding steps were not completed, your hydraulic pressure is probably lower than 2600 psi. Make sure that your tractor's rpm is the same as when you are spraying. With some tractors, hydraulic flow decreases when the engine is idling. If it does not solve the problem, contact your dealer. Your dealer can adjust times allowed for each step of the unfolding/folding sequences.

If saccades are present when the tilts are going up or down, contact your dealer. Your dealer can modify the sequence so that the tilts height will be adjusted one tilt at a time.

If you have to use the «Emergency Stop» button to avoid an obstacle:

As soon as you press the button, all boom hydraulic functions are instantly stopped, console emits an audible signal, lights the emergency stop LED and displays the message: (figure 26)

Press Enter to stop the audible signal and go back to the work screen. Remove the obstacle or move the sprayer and finish folding manually.

Going out of the field

After the boom has been folded, press the left arrow to go to the main screen. While the main screen is displayed, the system is locked, nothing works. It is recommended that you keep the main screen displayed while you travel from one field to the other. While on the main screen, an accidental touch of the console buttons would not activate cylinders. It is also recommended that you disable the hydraulic outlet while you are traveling.

When in the next field, just press Enter and the console will go to the work screen.

Working lights (option)

If your sprayer is equipped with optional working lights, just press the "Working Lights" button to turn on and turn off the lights. The LED over the button indicates that the lights are turned on.

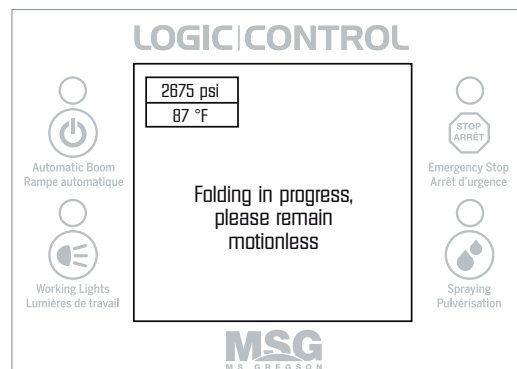


Figure 34

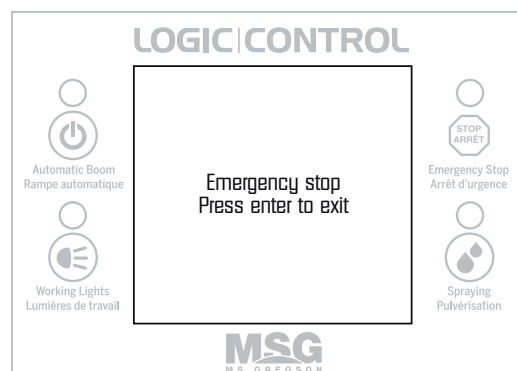


Figure 26

Spraying

If your console has been connected to the spraying rate controller, you can turn on and turn off spraying by pressing the “Spraying” button.

The LED over the button indicates that spraying is turned off.

Hydraulic oil temperature

Hydraulic oil temperature is displayed in the top left corner.

If, while you are working, oil temperature reaches 90°C (194°F), a warning message appears on the screen with an audible signal and a note is written in the system log. The system notes the number of times 90°C was reached or exceeded and the maximum temperature reached.

If temperature reaches 95°C (203°F), the system enters Shutdown mode. A warning message appears on the screen with an audible alarm. All functions are stopped and nothing can work in order to protect the system and also the tractor. Stop all hydraulic functions and let the hydraulic oil cool before restarting hydraulic functions.

INFORMATION ON THE SYSTEM

After the responsibility message when the system is powered, or after pressing the left arrow from the work screen, the console displays the main screen. **(figure 10)**

If you want to have information on your system, that information is available in the configuration menu.

To go into configuration menu, use the down arrow to highlight «CONFIGURATION». **(figure 11)**

After «CONFIGURATION» has been highlighted, press Enter and configuration menu will be displayed: **(figure 12)**

Use the down arrow to highlight «Information». **(figure 35)**

Press Enter to display information screen: **(figure 36)**

Information content will be displayed:

- Line 1: the name of the dealer who sold the sprayer
- Line 2: the date at which the system was powered for the first time
- Line 3: the serial number of the sprayer
- Line 4: the total time the system has been powered
- Line 5: the number of times that the hydraulic oil temperature has reached or exceeded 90°C (194°F)
- Line 6: the maximum temperature reached the last 5 times that temperature has reached or exceeded 90°C (194°F)
- Line 7: the program version installed in the console
- Line 8: the program version installed in the control system
- Lines 9 and 10: options that have been installed or not: Logic Boom followed by number 0 means Logic Boom not installed, followed by number 3 means Logic Boom installed with 3 ultrasound sensors and followed by number 5 means Logic Boom installed with 5 sensors. Hydraulic brake installed: Yes or No. Automatic leveling installed: Yes or No.

To exit the information screen, press the left arrow to go back to configuration menu and press it a second time to go back to the main screen.

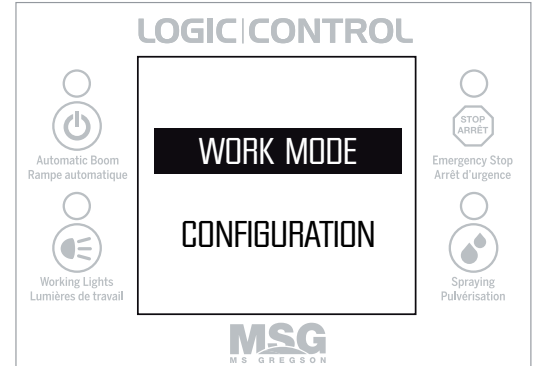


Figure 10

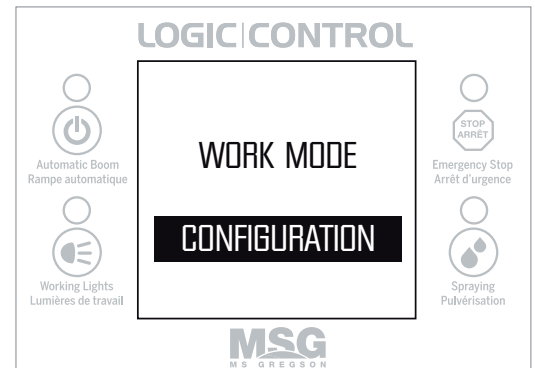


Figure 11

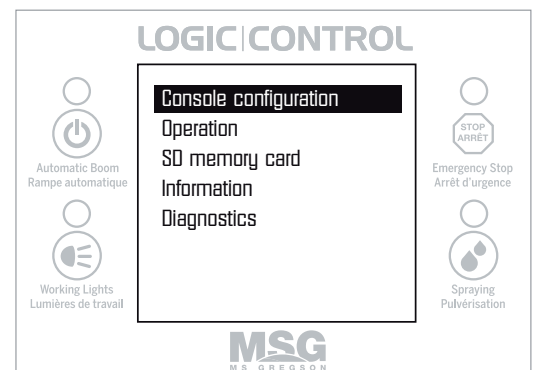


Figure 12

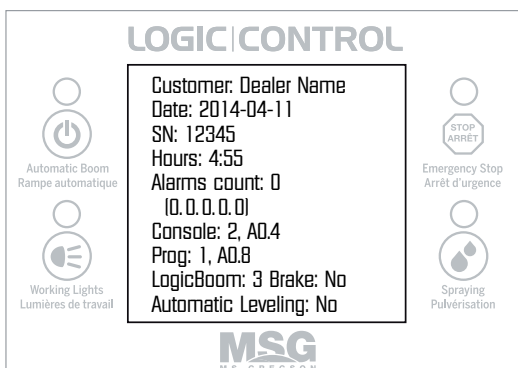


Figure 36

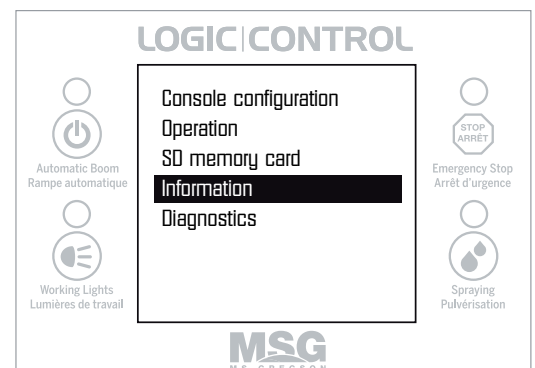


Figure 35

SD MEMORY CARD

If your system needs to be updated or when you want to add features that became available for your system, communication with the system is possible by using an SD card.

When you bought your sprayer, you received an SD memory card that contains a copy of the programs installed in your boom control system.

The SD memory card is stored in the control box behind the sprayer in order to be always available to technicians called for service or maintenance.

Before updating the system, you have to prepare the SD card.

Preparing the SD memory card

Insert the sprayer's SD card into an SD card port on the computer or use an SD-USB adaptor to plug the SD card to a USB port. **(figure 37)**

Open the SD card. 4 files are present on the card.

The names of the files look like these:

CON-A1-2.mgu (Console program).

CON-BT3.mgu (Bootloader program)

MSG1A1.XML (Configuration program).

PWR-A1-1 Msg1A103.mgu (Power control program).

Check the file(s) that you received by e-mail or that you downloaded.

On the SD card, replace the file(s) by the new corresponding version(s).

Example 1: you receive a new file for update named PWR-A1-2 Msg1A103.mgu. According to its file name, it's a power control program. Copy the file PWR-A1-2 Msg1A103.mgu and paste it on the SD card. Delete the old file PWR-A1-1 Msg1A103.mgu from the SD card.

Example 2: you receive a new file for update named MSG1A1.XML. According to its file name, it's a configuration program. Copy the file MSG1A1.XML and paste it on the SD card. You will have a message like "This folder already contains a file named MSG1A1.XML. Do you want to replace it?". Answer Yes. The old file will be replaced by the new one.

Once the files have been copied to the card, remove the SD card from the computer. The card is ready for the update.

Updating the system

The following step is to download the files from the SD card to the boom control system.

Remove the dust protection plug on top of the console and insert the SD card as shown. **(figure 38, 39, 40 & 41)**



Figure 37



Figure 38

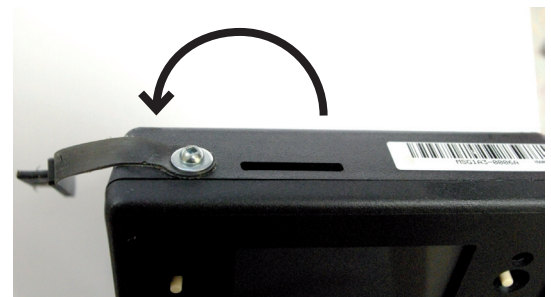


Figure 39

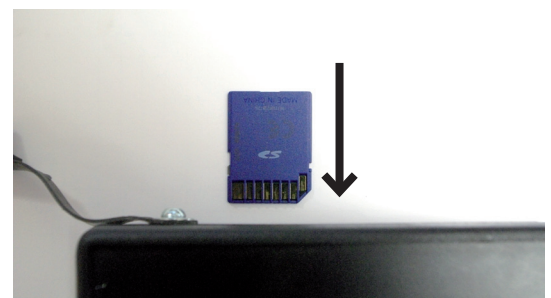


Figure 40

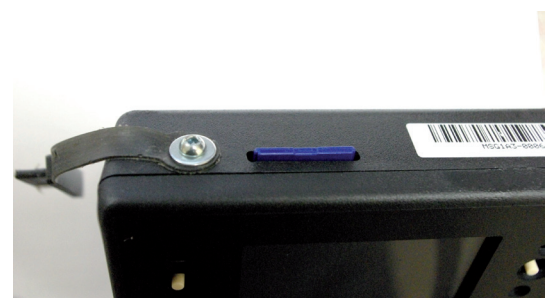


Figure 41

SD MEMORY CARD

If more than one file need to be updated, proceed in the following order:

- 1- Bootloader update (file name beginning by CON-B...)
- 2- Console update (file name beginning by CON-A...)
- 3- Power update (file name beginning by PWR...)
- 4- Configuration update (file name beginning by MSG...)

It is not necessary to have the sprayer run for updating. Just start the motor or turn the switch to accessory position.

After the responsibility message, the console displays the main screen. **(figure 10)**

The SD memory card menu, used for updates, is in the configuration menu.

To go into configuration menu, use the down arrow to highlight «CONFIGURATION». **(figure 11)**

After «CONFIGURATION» has been highlighted, press Enter and configuration menu will be displayed: **(figure 12)**

Use the down arrow to highlight «SD memory card». **(figure 42)**

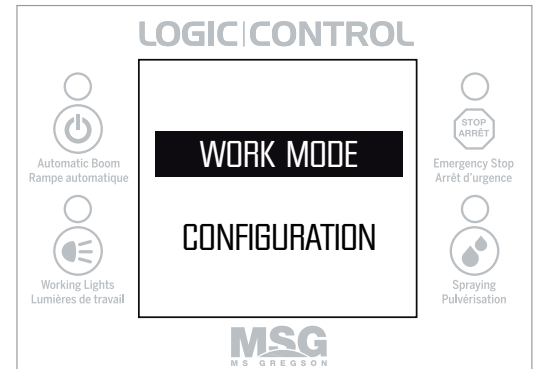


Figure 10

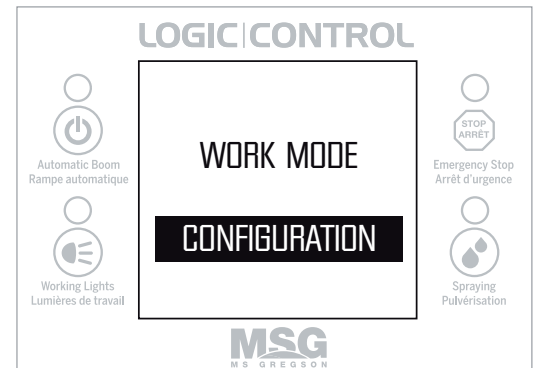


Figure 11

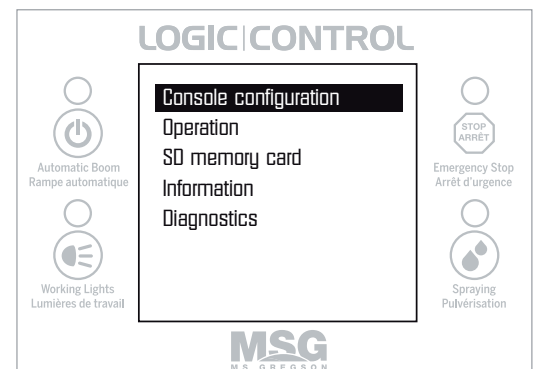


Figure 12

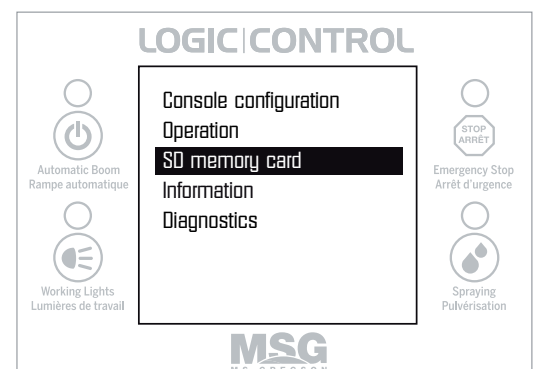


Figure 42

SD MEMORY CARD

Press Enter to display SD memory card menu. **(figure 43)**

Bootloader update

If you do not need to update the bootloader program (if you do not have to update a file beginning by CON-B...), skip this section and go to Console update section. If you need to update the bootloader program (if you need to update a file beginning by CON-B...), use down arrow to highlight «Bootloader update». Press Enter to access bootloader update. **(figure 44)**

If you forgot to insert the SD card, console will display: **(figure 45)**

Read previous section «Updating the system» to learn how to insert the SD card or press the left arrow to cancel.

When the SD card is present, the console displays: **(figure 46)**

Press the left arrow if you want to cancel or the right arrow if you want to continue.

While the system validates the program, the screen displays: **(figure 47)**

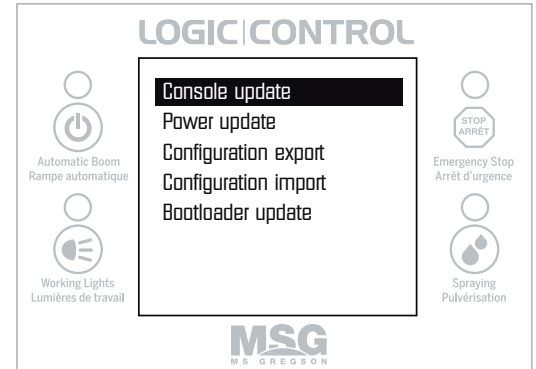


Figure 43

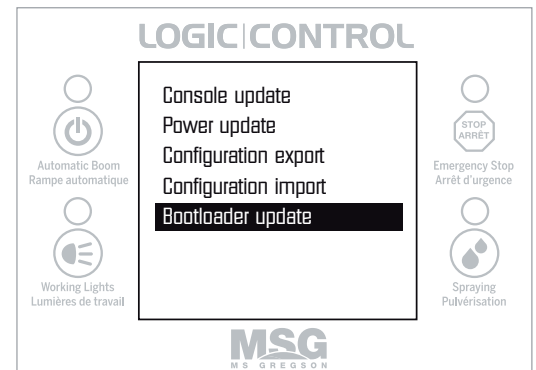


Figure 44

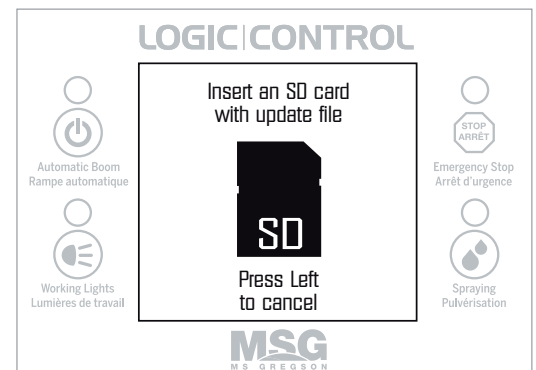


Figure 45

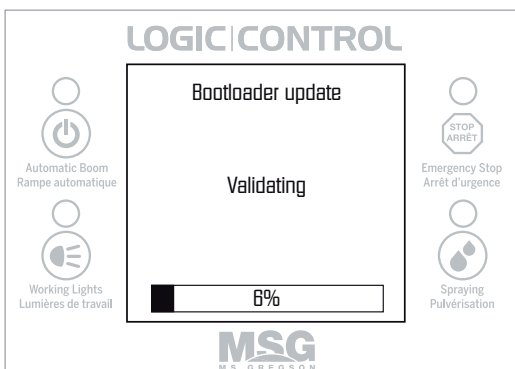


Figure 47

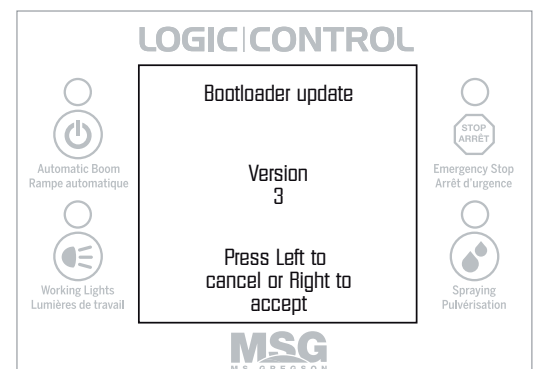


Figure 46

SD MEMORY CARD

While the system installs the new version, the screen displays **(figure 48)**

When the update is finished, the console displays the welcome message for 10 seconds, and then displays the responsibility message. Press Enter to go to main screen.

If you had only the bootloader program to update, update is finished. Slightly push on the SD card to unlock, remove it and store it. Put back the dust protection plug.

If you have other programs to update, once again highlight «CONFIGURATION» then press Enter and highlight «SD memory card» and then press Enter.

Console update

If you do not need to update the console program (if you do not have to update a file beginning by CON-A...), skip this section and go to Power update section. If you need to update the console program (if you need to update a file beginning by CON-A...), «Console update» is already highlighted. Press Enter to access console update.

If you forgot to insert the SD card, console will display: **(figure 45)**

Read previous section «Updating the system» to learn how to insert the SD card or press the left arrow to cancel.

When the SD card is present, the console displays: **(figure 49)**

Press the left arrow if you want to cancel or the right arrow if you want to continue.

While the system erases the old version, the screen displays: **(figure 50)**

While the system installs the new version, the screen displays: **(figure 51)**

When the update is finished, the console displays the welcome message for 10 seconds, and then displays the responsibility message. Press Enter to go to main screen.

If you had only the console program to update, update is finished. Slightly push on the SD card to unlock, remove it and store it. Put back the dust protection plug.

If you have other programs to update, once again highlight «CONFIGURATION» then press Enter and highlight «SD memory card» and then press Enter.

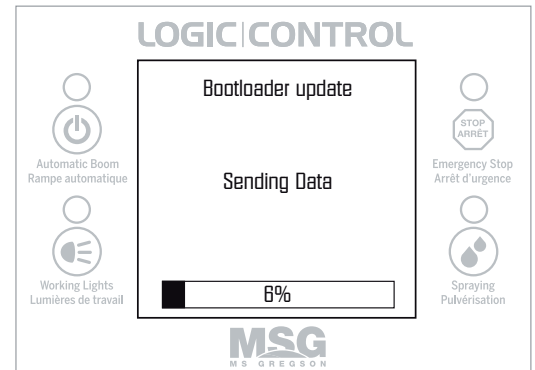


Figure 48

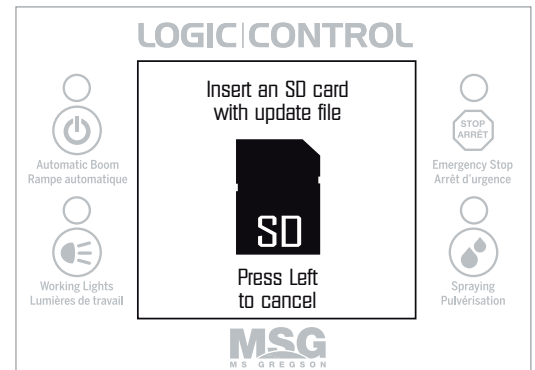


Figure 45

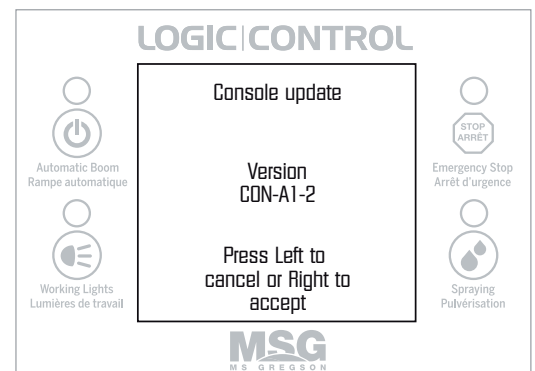


Figure 49

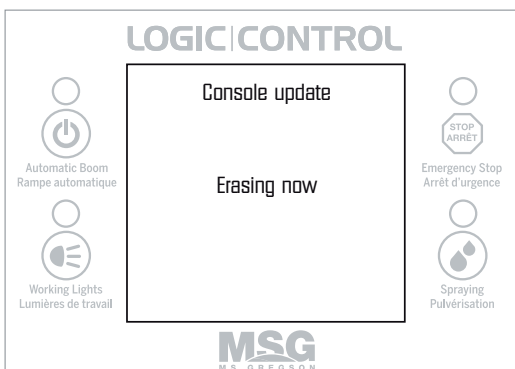


Figure 50

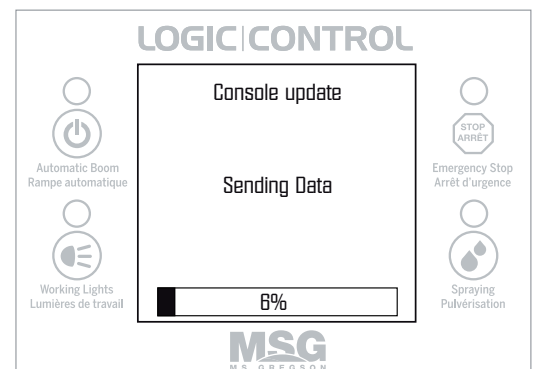


Figure 51

SD MEMORY CARD

Power update

If you do not need to update the power program (if you do not have to update a file beginning by PWR...), skip this section and go to Configuration import section.

If you need to update the power program (if you need to update a file beginning by PWR...), press the down arrow to highlight «Power update». Press Enter to access power update. **(figure 52)**

If you forgot to insert the SD card, console will display: **(figure 45)**

Read previous section “Updating the system” to learn how to insert the SD card or press the left arrow to cancel.

When the SD card is present, the console displays: **(figure 53)**

Press the left arrow if you want to cancel or the right arrow if you want to continue.

While the system erases the old version, the screen displays: **(figure 54)**

While the system installs the new version, the screen displays: **(figure 55)**

When the update is finished, the console will go to the work screen.

If you do not have to update the configuration program, update is finished. Slightly push on the SD card to unlock, remove it and store it. Put back the dust protection plug.

If you have to import the configuration program, press the left arrow to go to the main screen. Once again, highlight «CONFIGURATION» then press Enter and highlight «SD memory card» and then press Enter.

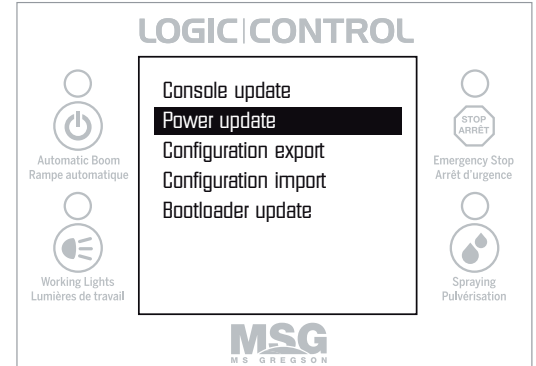


Figure 52

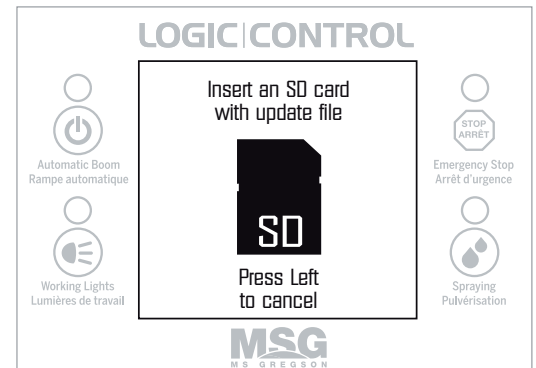


Figure 45

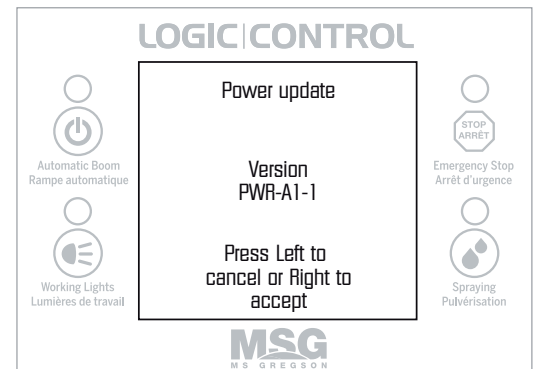


Figure 53

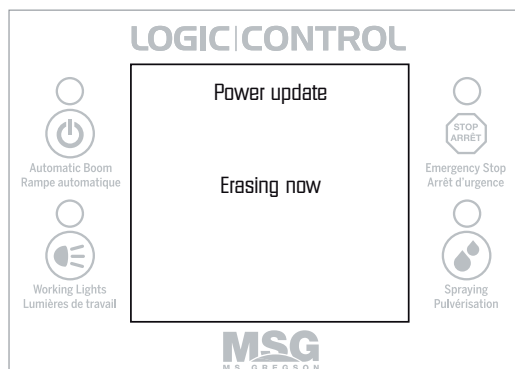


Figure 54

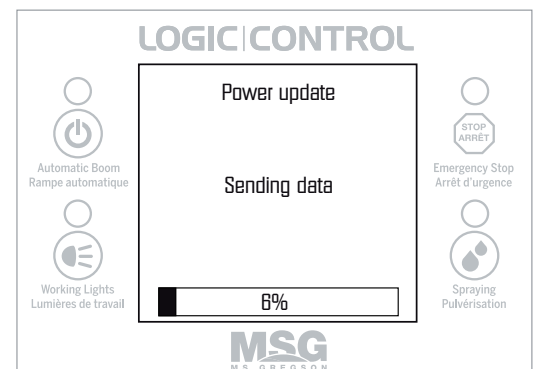


Figure 55

SD MEMORY CARD

Configuration importation

If you need to import the configuration program (if you need to update a file beginning by MSG...), press the down arrow to highlight «Configuration import». Press Enter to access Configuration importation. **(figure 56)**

If you forgot to insert the SD card, console will display: **(figure 45)**

Read previous section Updating the system to learn how to insert the SD card or press the left arrow to cancel.

When the SD card is present, the console displays: **(figure 57)**

When the reading is finished, the console displays: **(figure 58)**

Press Enter to exit Configuration importation.

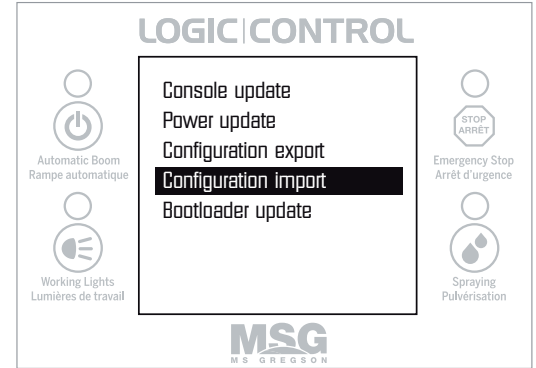


Figure 56

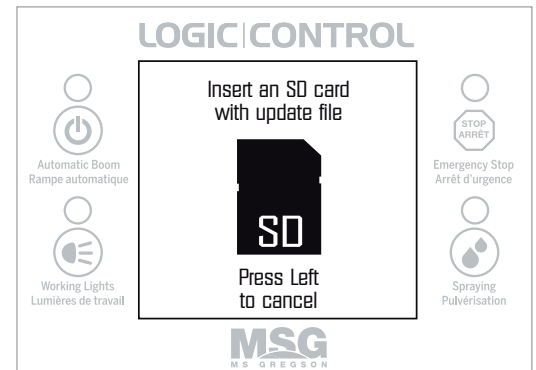


Figure 45

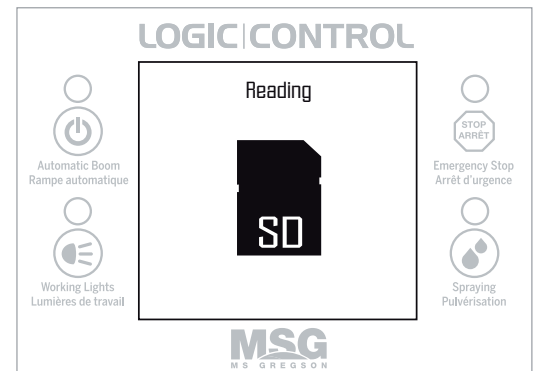


Figure 57

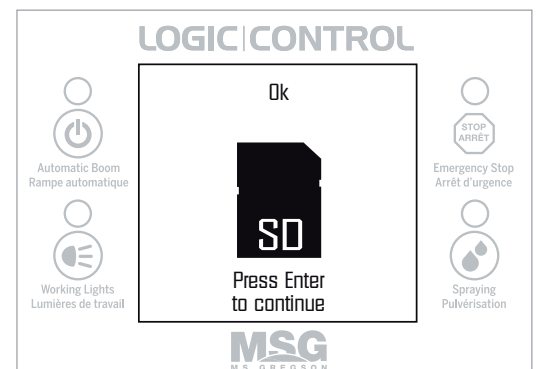


Figure 58

SD MEMORY CARD

Configuration exportation

If there is something going wrong with your system and the manufacturer asks you to send the configuration file by e-mail, you will need to export configuration.

Make sure the SD card is not “locked for writing”. If the card is locked, unlock it. **(figure 59)**

Insert the SD memory card into the console. Read previous section «Updating the system» to learn how to insert the SD card.

Press the down arrow to highlight «Configuration export». Press Enter to access Configuration exportation. **(figure 60)**

After one second or two, exportation is finished and the console displays: **(figure 58)**

Press Enter to exit Configuration exportation.

Slightly push on the SD card to unlock, remove it and store it in its case. Put back the dust protection plug.

To send the file by e-mail, plug the SD memory card to a computer as specified in the section «Preparing the SD memory card».

The file you have to send is the file named MSG1A1.XML (Configuration program).

Attach that file to your e-mail and send it to the address you were told.

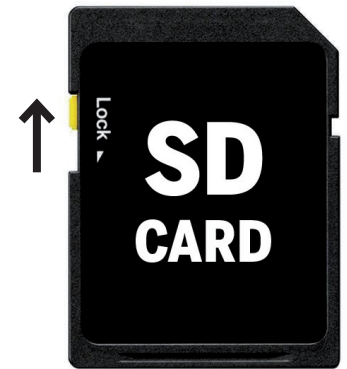


Figure 59

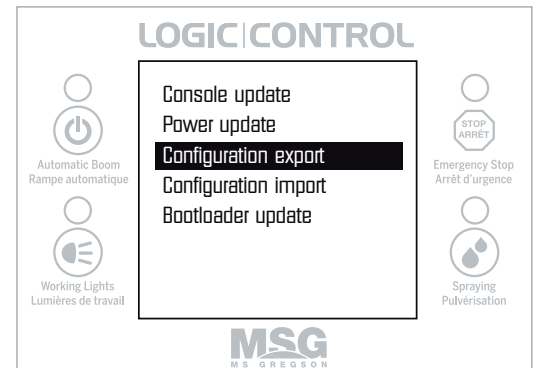


Figure 60

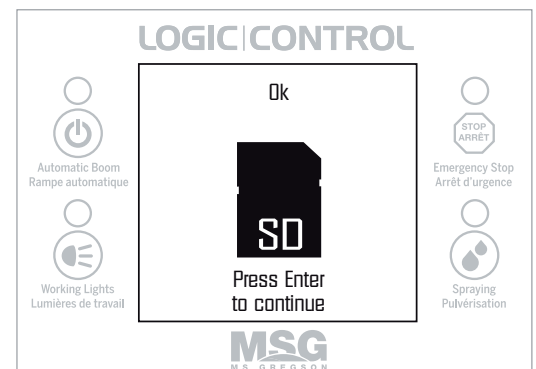


Figure 58

TROUBLE SHOOTING

Diagnostics

The console can be used for trouble shooting. The complete diagnostics section of the system is dedicated for assistance to users and technicians in finding the origin of problems.

For an overview of what you can do with this section, read the example that follows the «diagnostics» section.

To go into diagnostics section from the main screen, highlight «CONFIGURATION» then press Enter.

Highlight «Diagnostics» and press Enter. **(figure 61)**

Inputs

You can see the readings of all sensors installed on your system.

Highlight “Inputs”, then press Enter to open Inputs screen. **(figure 62)**

In this screen, you can see the readings of all sensors, even the 2 extra ultrasound sensors (option). In the work screen, only the nearest reading is seen when 2 sensors are installed on the same boom side.

Up to 4 digital sensors could be added to the system. The 4 squares down the screen would show the state (On or Off) of those sensors. Full square means On, empty square means Off.

To exit Inputs screen, press Enter.

Outputs

Outputs section allows manual activation of outputs.

To enter Outputs section, highlight “Outputs”, then press Enter. **(figure 63)**

In the control box behind the sprayer, each output has its own LED (Light-Emitting Diode), showing the state of the output. Each LED has its own number beside. The LED numbers in the outputs list correspond to the LED numbers in the control box.

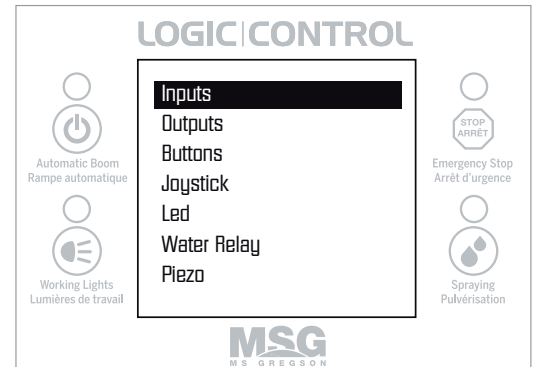


Figure 61

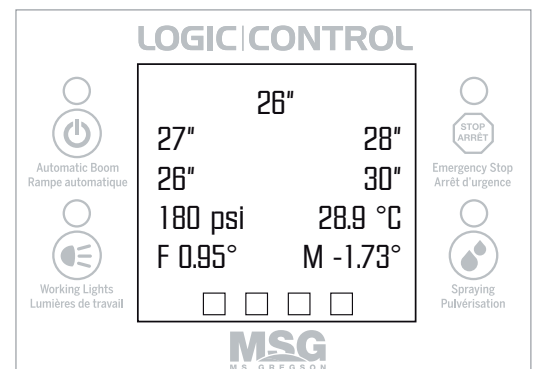


Figure 62

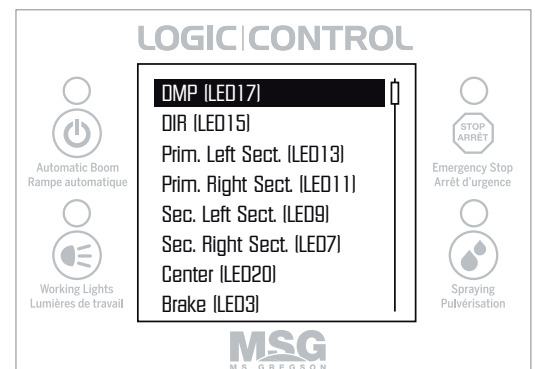


Figure 63

TROUBLE SHOOTING

Outputs table

Identification	Description
DMP (LED17)	Dump valve
DIR (LED15)	Directional valve
Prim. Left Sect. (LED13)	Left primary section valve
Prim. Right Sect. (LED11)	Right primary section valve
Sec. Left Sect. (LED9)	Left secondary section valve
Sec. Right Sect. (LED7)	Right secondary section valve
Center (LED20)	Center section valve
Brake (LED3)	Brake valve (not used)
Left Tilt Series (LED4)	Left tilt solenoid valve (Logic Boom option)
Left Tilt Up (LED6)	Left tilt proportional valve, up (Logic Boom option)
Left Tilt Down (LED8)	Left tilt proportional valve, down (Logic Boom option)
Right Tilt Series (LED10)	Right tilt solenoid valve (Logic Boom option)
Right Tilt Up (LED12)	Right tilt proportional valve, up (Logic Boom option)
Right Tilt Down (LED14)	Right tilt proportional valve, down (Logic Boom option)
BAL (LED27)	Balance proportional valve (Automatic levelling option)
Auto Level Series (LED16)	Automatic levelling solenoid valve (Automatic levelling option)
Auto Level L (LED19)	Automatic levelling left proportional valve (Automatic levelling option)
Auto Level R (LED21)	Automatic levelling right proportional valve (Automatic levelling option)
Lights Relay (LED22)	Working lights relay (Working lights option)
Spare relay 1 (LED23)	Spare relay #1 (not used)
Spare relay 2 (LED24)	Spare relay #2 (not used)
Spare relay 3 (LED25)	Spare relay #3 (not used)

If you think that a valve is not working properly, you can test it.

Highlight the valve you want to test and press Enter.

If it's a solenoid valve, screen will be like this: **(figure 64)**



CAUTION

IMPORTANT NOTE:

When turning on valves, cylinders and boom sections may move.

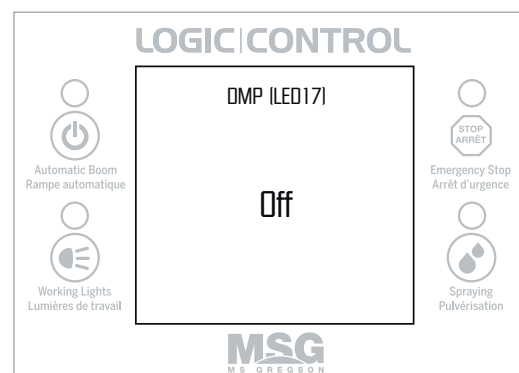


Figure 64

TROUBLE SHOOTING

Using the up or down arrows, you can turn on and turn off the valve.

When you turn on the valve, check if corresponding LED lights in the control box.

Always turn off the valve before exiting.
Press Enter or Left arrow to exit.

For more information on what you can do with this section, read the example that follows the “diagnostics” section.

If you want to test a proportional valve, highlight the valve and press Enter.
Screen will be like this: **(figure 65)**

Pressing Enter alternates highlighted zone between state and percentage. Up and down arrows change On/Off state, and also increase and decrease the opening percentage of the valve.

When you turn on the valve, check if corresponding LED lights in the control box. With the valve turned on, if you slowly increase percentage, you will have the impression that at 2% the LED is totally lit. Human eye does not really see the difference between 2% and 100%.

Always turn off the valve before exiting.
Because Enter is used to alternate highlighted zone, press the Left arrow to exit.

For more information on what you can do with this section, read the example that follows the “diagnostics” section.

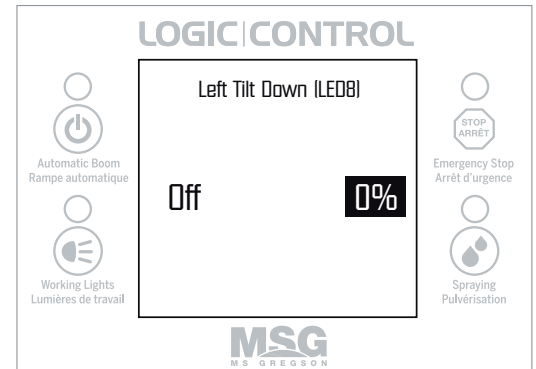


Figure 65

TROUBLE SHOOTING

Functions tables

In each function or cylinder movement, 2 valves or more need to be activated. The following tables show, for each movement, which valves must be activated and in which order. Do not forget that after each test, all valves must be turned off.



IMPORTANT NOTE:

CAUTION When turning on valves, cylinders and boom sections may move.

Base model (MS Control), for all boom models except 120 ft Fusion boom

Function	First step	Second step	Third step
Rise center	Turn On DMP (LED17)	Turn On Center (LED20)	
Lower center	Turn On DMP (LED17)	Turn On DIR (LED15)	Turn On Center (LED20)
Fold left primary	Turn On DMP (LED17)	Turn On Prim. Left (LED13)	
Unfold left primary	Turn On DMP (LED17)	Turn On DIR (LED15)	Turn On Prim. Left (LED13)
Fold right primary	Turn On DMP (LED17)	Turn On Prim. Right (LED11)	
Unfold right primary	Turn On DMP (LED17)	Turn On DIR (LED15)	Turn On Prim. Right (LED11)
Fold left secondary	Turn On DMP (LED17)	Turn On Sec. Left (LED9)	
Unfold left secondary	Turn On DMP (LED17)	Turn On DIR (LED15)	Turn On Sec. Left (LED9)
Fold right secondary	Turn On DMP (LED17)	Turn On Sec. Right (LED7)	
Unfold right secondary	Turn On DMP (LED17)	Turn On DIR (LED15)	Turn On Sec. Right (LED7)
Rise left tilt	Turn On DMP (LED17)	Turn On Left Tilt Series (LED4)	
Lower left tilt	Turn On DMP (LED17)	Turn On DIR (LED15)	Turn On Left Tilt Series (LED4)
Rise right tilt	Turn On DMP (LED17)	Turn On Right Tilt Series (LED10)	
Lower right tilt	Turn On DMP (LED17)	Turn On DIR (LED15)	Turn On Right Tilt Series (LED10)

Base model (MS Control), for 120 ft Fusion boom

Function	First step	Second step	Third step
Rise center	Turn On DMP (LED17)	Turn On Center (LED20)	
Lower center	Turn On DMP (LED17)	Turn On DIR (LED15)	Turn On Center (LED20)
Fold left primary	Turn On DMP (LED17)	Turn On DIR (LED15)	Turn On Prim. Left (LED13)
Unfold left primary	Turn On DMP (LED17)	Turn On Prim. Left (LED13)	
Fold right primary	Turn On DMP (LED17)	Turn On DIR (LED15)	Turn On Prim. Right (LED11)
Unfold right primary	Turn On DMP (LED17)	Turn On Prim. Right (LED11)	
Fold left secondary	Turn On DMP (LED17)	Turn On DIR (LED15)	Turn On Sec. Left (LED9)
Unfold left secondary	Turn On DMP (LED17)	Turn On Sec. Left (LED9)	
Fold right secondary	Turn On DMP (LED17)	Turn On DIR (LED15)	Turn On Sec. Right (LED7)
Unfold right secondary	Turn On DMP (LED17)	Turn On Sec. Right (LED7)	
Rise left tilt	Turn On DMP (LED17)	Turn On Left Tilt Series (LED4)	
Lower left tilt	Turn On DMP (LED17)	Turn On DIR (LED15)	Turn On Left Tilt Series (LED4)
Rise right tilt	Turn On DMP (LED17)	Turn On Right Tilt Series (LED10)	
Lower right tilt	Turn On DMP (LED17)	Turn On DIR (LED15)	Turn On Right Tilt Series (LED10)

TROUBLE SHOOTING

Model with the option automatic boom height control (Logic Boom), for all boom models except 120 ft Fusion boom

Function	First step	Second step	Third step	Fourth step
Rise center	Turn On DMP (LED17)	Turn On Center (LED20)		
Lower center	Turn On DMP (LED17)	Turn On DIR (LED15)	Turn On Center (LED20)	
Fold left primary	Turn On DMP (LED17)	Turn On Prim. Left (LED13)		
Unfold left primary	Turn On DMP (LED17)	Turn On DIR (LED15)	Turn On Prim. Left (LED13)	
Fold right primary	Turn On DMP (LED17)	Turn On Prim. Right (LED11)		
Unfold right primary	Turn On DMP (LED17)	Turn On DIR (LED15)	Turn On Prim. Right (LED11)	
Fold left secondary	Turn On DMP (LED17)	Turn On Sec. Left (LED9)		
Unfold left secondary	Turn On DMP (LED17)	Turn On DIR (LED15)	Turn On Sec. Left (LED9)	
Fold right secondary	Turn On DMP (LED17)	Turn On Sec. Right (LED7)		
Unfold right secondary	Turn On DMP (LED17)	Turn On DIR (LED15)	Turn On Sec. Right (LED7)	
Rise left tilt	Turn On DMP (LED17)	Turn On Left Tilt Series (LED4)	Turn On Left Tilt Up (LED6)	Increase % Left Tilt Up (LED6)
Lower left tilt	Turn On DMP (LED17)	Turn On Left Tilt Series (LED4)	Turn On Left Tilt Down (LED8)	Increase % Left Tilt Down (LED8)
Rise right tilt	Turn On DMP (LED17)	Turn On Right Tilt Series (LED10)	Turn On Right Tilt Up (LED12)	Increase % Right Tilt Up (LED12)
Lower right tilt	Turn On DMP (LED17)	Turn On Right Tilt Series (LED10)	Turn On Right Tilt Down (LED14)	Increase % Right Tilt Down (LED14)

Model with the option automatic boom height control (Logic Boom), for 120 ft Fusion boom

Function	First step	Second step	Third step	Fourth step
Rise center	Turn On DMP (LED17)	Turn On Center (LED20)		
Lower center	Turn On DMP (LED17)	Turn On DIR (LED15)	Turn On Center (LED20)	
Fold left primary	Turn On DMP (LED17)	Turn On DIR (LED15)	Turn On Prim. Left (LED13)	
Unfold left primary	Turn On DMP (LED17)	Turn On Prim. Left (LED13)		
Fold right primary	Turn On DMP (LED17)	Turn On DIR (LED15)	Turn On Prim. Right (LED11)	
Unfold right primary	Turn On DMP (LED17)	Turn On Prim. Right (LED11)		
Fold left secondary	Turn On DMP (LED17)	Turn On DIR (LED15)	Turn On Sec. Left (LED9)	
Unfold left secondary	Turn On DMP (LED17)	Turn On Sec. Left (LED9)		
Fold right secondary	Turn On DMP (LED17)	Turn On DIR (LED15)	Turn On Sec. Right (LED7)	
Unfold right secondary	Turn On DMP (LED17)	Turn On Sec. Right (LED7)		
Rise left tilt	Turn On DMP (LED17)	Turn On Left Tilt Series (LED4)	Turn On Left Tilt Up (LED6)	Increase % Left Tilt Up (LED6)
Lower left tilt	Turn On DMP (LED17)	Turn On Left Tilt Series (LED4)	Turn On Left Tilt Down (LED8)	Increase % Left Tilt Down (LED8)
Rise right tilt	Turn On DMP (LED17)	Turn On Right Tilt Series (LED10)	Turn On Right Tilt Up (LED12)	Increase % Right Tilt Up (LED12)
Lower right tilt	Turn On DMP (LED17)	Turn On Right Tilt Series (LED10)	Turn On Right Tilt Down (LED14)	Increase % Right Tilt Down (LED14)

TROUBLE SHOOTING

Model with the options automatic boom height control and automatic levelling (Logic Boom+), for all boom models except 120 ft Fusion boom

Function	First step	Second step	Third step	Fourth step	Fifth step	Sixth step
Rise center	Turn On DMP (LED17)	Turn On Center (LED20)				
Lower center	Turn On DMP (LED17)	Turn On DIR (LED15)	Turn On Center (LED20)			
Fold left primary	Turn On DMP (LED17)	Turn On Prim. Left (LED13)				
Unfold left primary	Turn On DMP (LED17)	Turn On DIR (LED15)	Turn On Prim. Left (LED13)			
Fold right primary	Turn On DMP (LED17)	Turn On Prim. Right (LED11)				
Unfold right primary	Turn On DMP (LED17)	Turn On DIR (LED15)	Turn On Prim. Right (LED11)			
Fold left secondary	Turn On DMP (LED17)	Turn On Sec. Left (LED9)				
Unfold left secondary	Turn On DMP (LED17)	Turn On DIR (LED15)	Turn On Sec. Left (LED9)			
Fold right secondary	Turn On DMP (LED17)	Turn On Sec. Right (LED7)				
Unfold right secondary	Turn On DMP (LED17)	Turn On DIR (LED15)	Turn On Sec. Right (LED7)			
Rise left tilt	Turn On DMP (LED17)	Turn On Left Tilt Series (LED4)	Turn On Left Tilt Up (LED6)	Increase % Left Tilt Up (LED6)		
Lower left tilt	Turn On DMP (LED17)	Turn On Left Tilt Series (LED4)	Turn On Left Tilt Down (LED8)	Increase % Left Tilt Down (LED8)		
Rise right tilt	Turn On DMP (LED17)	Turn On Right Tilt Series (LED10)	Turn On Right Tilt Up (LED12)	Increase % Right Tilt Up (LED12)		
Lower right tilt	Turn On DMP (LED17)	Turn On Right Tilt Series (LED10)	Turn On Right Tilt Down (LED14)	Increase % Right Tilt Down (LED14)		
Turn center clockwise	Turn On DMP (LED17)	Turn On Auto Level Series (LED16)	Turn On BAL (LED27)	Increase % BAL (LED27) to 100%	Turn On Auto Level L (LED19)	Increase % Auto Level L (LED19)
Turn center counter clockwise	Turn On DMP (LED17)	Turn On Auto Level Series (LED16)	Turn On BAL (LED27)	Increase % BAL (LED27) to 100%	Turn On Auto Level R (LED21)	Increase % Auto Level R (LED21)

TROUBLE SHOOTING

Model with the options automatic boom height control and automatic levelling (Logic Boom+), for 120 ft Fusion boom

Function	First step	Second step	Third step	Fourth step	Fifth step	Sixth step
Rise center	Turn On DMP (LED17)	Turn On Center (LED20)				
Lower center	Turn On DMP (LED17)	Turn On DIR (LED15)	Turn On Center (LED20)			
Fold left primary	Turn On DMP (LED17)	Turn On DIR (LED15)	Turn On Prim. Left (LED13)			
Unfold left primary	Turn On DMP (LED17)	Turn On Prim. Left (LED13)				
Fold right primary	Turn On DMP (LED17)	Turn On DIR (LED15)	Turn On Prim. Right (LED11)			
Unfold right primary	Turn On DMP (LED17)	Turn On Prim. Right (LED11)				
Fold left secondary	Turn On DMP (LED17)	Turn On DIR (LED15)	Turn On Sec. Left (LED9)			
Unfold left secondary	Turn On DMP (LED17)	Turn On Sec. Left (LED9)				
Fold right secondary	Turn On DMP (LED17)	Turn On DIR (LED15)	Turn On Sec. Right (LED7)			
Unfold right secondary	Turn On DMP (LED17)	Turn On Sec. Right (LED7)				
Rise left tilt	Turn On DMP (LED17)	Turn On Left Tilt Series (LED4)	Turn On Left Tilt Up (LED6)	Increase % Left Tilt Up (LED6)		
Lower left tilt	Turn On DMP (LED17)	Turn On Left Tilt Series (LED4)	Turn On Left Tilt Down (LED8)	Increase % Left Tilt Down (LED8)		
Rise right tilt	Turn On DMP (LED17)	Turn On Right Tilt Series (LED10)	Turn On Right Tilt Up (LED12)	Increase % Right Tilt Up (LED12)		
Lower right tilt	Turn On DMP (LED17)	Turn On Right Tilt Series (LED10)	Turn On Right Tilt Down (LED14)	Increase % Right Tilt Down (LED14)		
Turn center clockwise	Turn On DMP (LED17)	Turn On Auto Level Series (LED16)	Turn On BAL (LED27)	Increase % BAL (LED27) to 100%	Turn On Auto Level L (LED19)	Increase % Auto Level L (LED19)
Turn center counter clockwise	Turn On DMP (LED17)	Turn On Auto Level Series (LED16)	Turn On BAL (LED27)	Increase % BAL (LED27) to 100%	Turn On Auto Level R (LED21)	Increase % Auto Level R (LED21)

TROUBLE SHOOTING

Buttons

Buttons section allows manual testing of buttons.

To enter Buttons section, highlight “Buttons”, then press and maintain Enter. **(figure 66)**

The square representing the Enter button is lit (full square), proving that the button works. Maintaining Enter button is the only way to test it. Release it now. The next time you press the Enter button, you will exit the Buttons screen.

Each button is represented in the diagram, even the buttons that you do not see on the console. You can test the buttons you want. When you press a button, the corresponding square should light. If the square does not light, the button is defective.

Press Enter to exit.

Joystick

Joystick section allows testing of the joystick switches when a joystick is connected to the console.

To enter Joystick section, highlight «Joystick», then press Enter. **(figure 67)**

The two upper rows of squares represent the upper row of switches and the two middle rows represent the lower row of switches. When you push upward a switch on the joystick, the upper square lights. When you push downward a switch, the lower square lights. At the same time (except for the lower left switch), the left square in the lower row lights also, meaning that an electric signal is sent by the joystick.

To exit the Joystick section, press Enter.

LED

LED section allows testing of the LED lamps of the console.

To enter LED section, highlight «LED», then press Enter. **(figure 68)**

Each square represents one of the 6 console’s LED:

- Automatic Boom
- Working Lights
- Unfolding
- Folding
- Spraying
- Emergency Stop

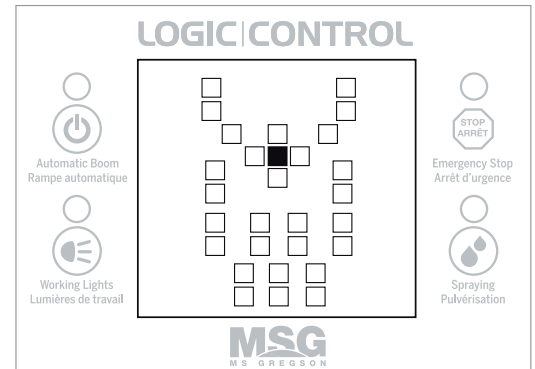


Figure 66

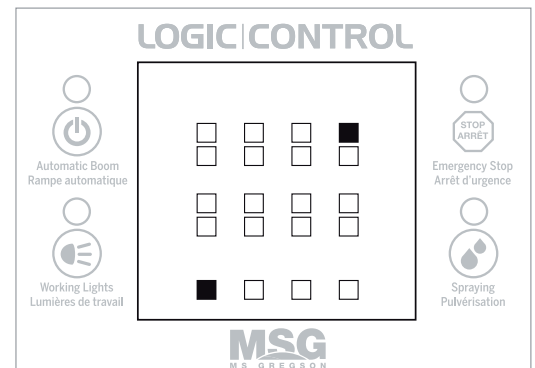


Figure 67

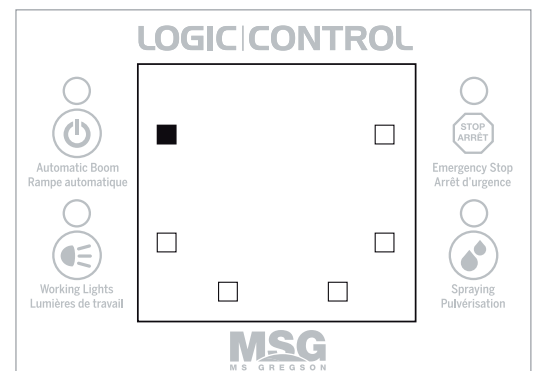


Figure 68

TROUBLE SHOOTING

When you press a button beside a LED, the corresponding square lights and the LED should light. If the square lights but not the LED, the LED is defective.

To exit the LED section, press Enter.

Water Relay

Water Relay allows testing of the relay inside the console in case the «Spraying» function was not working.

Highlight «Water Relay», and then press Enter. **(figure 69)**

Use the up or down arrows to turn on and turn off the relay.

Turn off and press Enter to exit.

Piezoelectric crystal

Allows testing of the piezoelectric crystal that emits audible signals.

Highlight “Piezo”, and then press Enter. **(figure 70)**

Use the up or down arrows to go from Off to Low to High, thus testing the low tone and high tone sounds.

Turn off and press Enter to exit.

Control box LED

In the control box behind the sprayer, each output has its own LED (Light-Emitting Diode), showing the state of the output. Each LED has its own number beside.

When you open the control box, there is a list in the box cover for LED identification. **(figure 71)**

LED corresponding to solenoid valves are On or Off.

LED corresponding to proportional valves vary in intensity from 0 to 100%, but human eye does not really see the difference between 2% and 100%.

In addition to outputs LED, 2 other LED are in the control box:

LED5, when lit, indicates that the system is powered.

LED18, when flashing, indicates that the console and the control box are communicating.

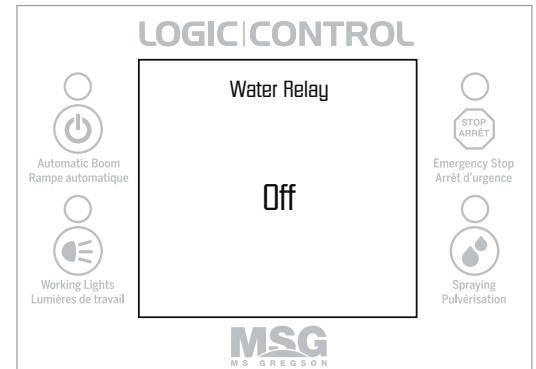


Figure 69

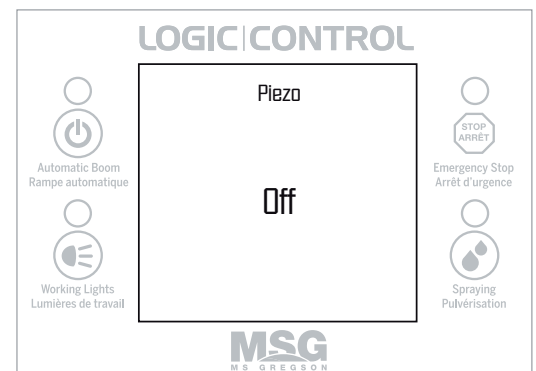


Figure 70

LED identification / Identification des DEL		
LED / DEL	English description	Description française
3	Brake valve	Vanne du frein
4	Left tilt solenoid valve	Vanne solénoïde inclinaison gauche
5	12 V supply	Alimentation 12 V
6	Left tilt proportional valve, up	Vanne proportionnelle inclinaison gauche, monter
7	Right secondary section valve	Vanne section secondaire droite
8	Left tilt proportional valve, down	Vanne proportionnelle inclinaison gauche, descendre
9	Left secondary section valve	Vanne section secondaire gauche
10	Right tilt solenoid valve	Vanne solénoïde inclinaison droite
11	Right primary section valve	Vanne section primaire droite
12	Right tilt proportional valve, up	Vanne proportionnelle inclinaison droite, monter
13	Left primary section valve	Vanne section primaire gauche
14	Right tilt proportional valve, down	Vanne proportionnelle inclinaison droite, descendre
15	Directional valve	Vanne directionnelle
16	Self-levelling solenoid valve	Vanne solénoïde auto-nivellement
17	DMPA valve	Vanne DMPA
18	Communication	Communication
19	Left self-levelling valve	Vanne auto-nivellement gauche
20	Center section valve	Vanne section du centre
21	Right self-levelling valve	Vanne auto-nivellement droite
22	Working lights relay	Relais des lumières de travail
27	Balance valve	Vanne balance

AU-DECLD

Figure 71

Example of trouble shooting

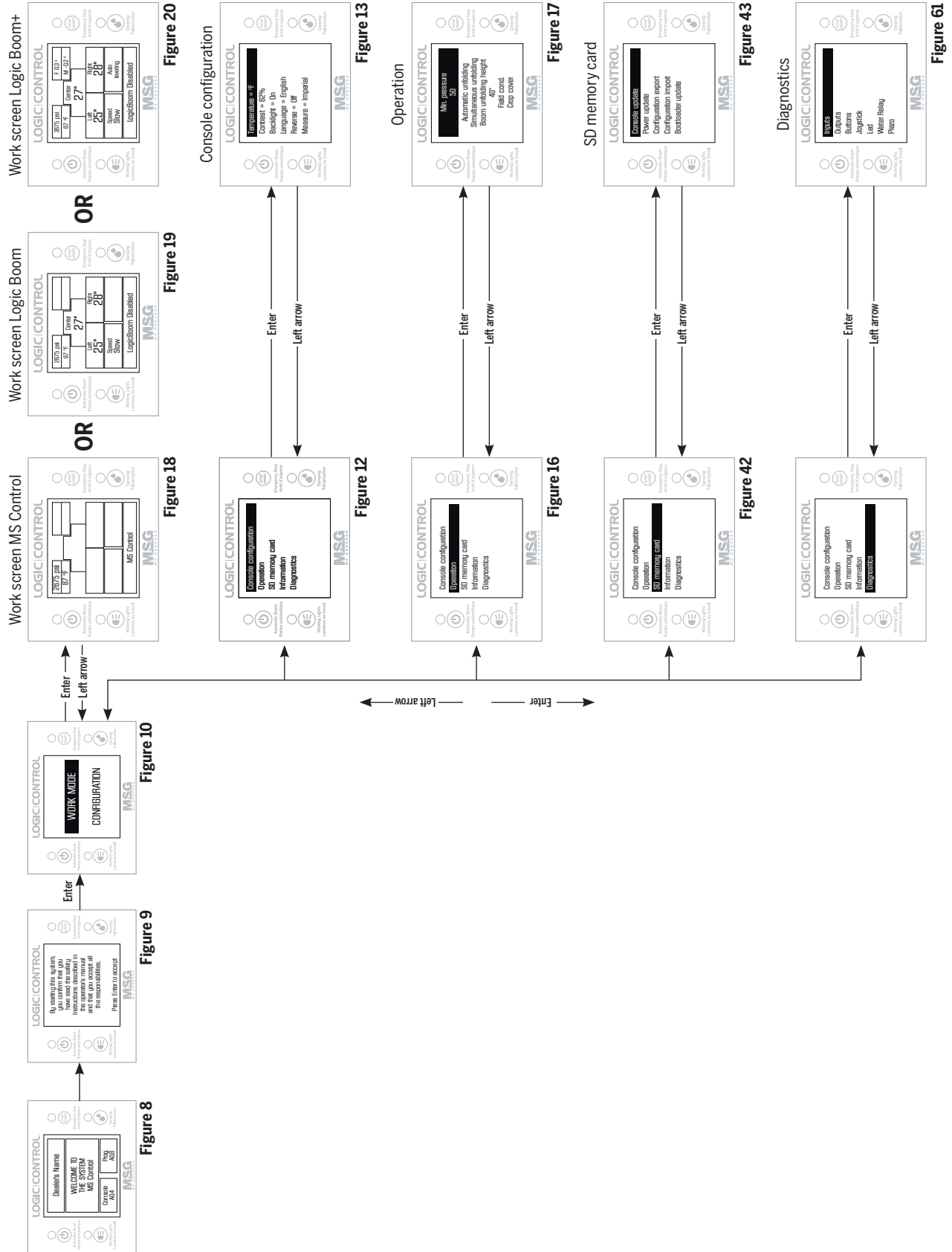
For this example, we will suppose that the problem is that the centre part of the boom refuses to move. All other cylinders are moving normally.

The problem could be caused by the console buttons, by the control board, by a valve cable, by a valve coil, by a valve or by a cylinder.

Instead of replacing all parts that could be defective until it works, you will try to find exactly which part is defective, and then replace the right part.

- 1- First, test the console buttons. From the main screen, go into Configuration, then into Diagnostics and then into Buttons. Press CENTER buttons, up and down. If corresponding squares do not light, buttons are defective, have the console repaired. If squares light, buttons are working properly, go to the next step.
- 2- We will now have to go behind the sprayer. Unscrew a little the 2 knobs of the console holder and slide the console out of its holder. Disconnect the console plug and go behind the sprayer, near the control box. Disconnect the cable from outlet #1 (first one from the left) and plug in its place the console plug. You will now be able to control the system from behind the sprayer. Do not forget to plug back the cable that was in outlet #1 when you bring back the console inside the tractor cab.
- 3- Open the control box. In the upper left corner, LED5 is already lit, proving that the system is powered. More on the right, LED18 is flashing, proving that the console is communicating with the control box.
- 4- Refer to Function tables in the previous Outputs section. According to the tables, when raising the center, LED17 and LED20 should light, and when lowering, LED17, LED15 and LED20 should light.
- 5- As Dump valve LED17 and Directional valve LED15 are used for many other functions that are working normally, we already know that those valves are working normally. But function for Center valve LED20 could be defective.
- 6- Push CENTER UP button and check if LED17 and LED20 light on. Push also CENTER DOWN button and check for LED17, LED15 and LED20. If one of the LED does not light when it should, the control board is defective. Have the control box repaired. If the LED light like they should, the control box is correct, we now know that the problem is at the outlet of the control box.
- 7- Because the Dump valve and the Directional valve are used in other functions that run normally, we know that those valves are working correctly. But Center valve has to be checked.
- 8- Referring to drawings in the manual, Center valve is identified and is the valve #C4. Manually activate Center valve LED20 according to instructions of previous Outputs section or ask somebody to press and maintain the CENTER UP or CENTER DOWN button.
- 9- Disconnect the cable from the valve. With a voltmeter, measure the voltage at the cable plug. If voltage is around 14 volts, the cable is correct. If voltage is 0 volt, the cable is defective and must be repaired or replaced.
- 10- If the cable is correct, plug it back. Use a screwdriver or wrench made of steel alloy and touch the top of the solenoid valve C4. If the valve is not magnetized, it means that the coil is defective and must be replaced. If you feel that the valve is magnetized, it means that the valve coil is working correctly, so the valve is defective or the cylinder is defective.
- 11- If the valve is defective, the cylinder will not move and no oil will be leaking from the cylinder's breather. If the cylinder is defective, oil will leak from the breather, especially when you try to raise the center. Replace the defective part.

MENUS TABLE



LOGIC|BOOM

PROBLEM SOLUTION

For MS GREGSON'S boom control system



Effective November 2017.

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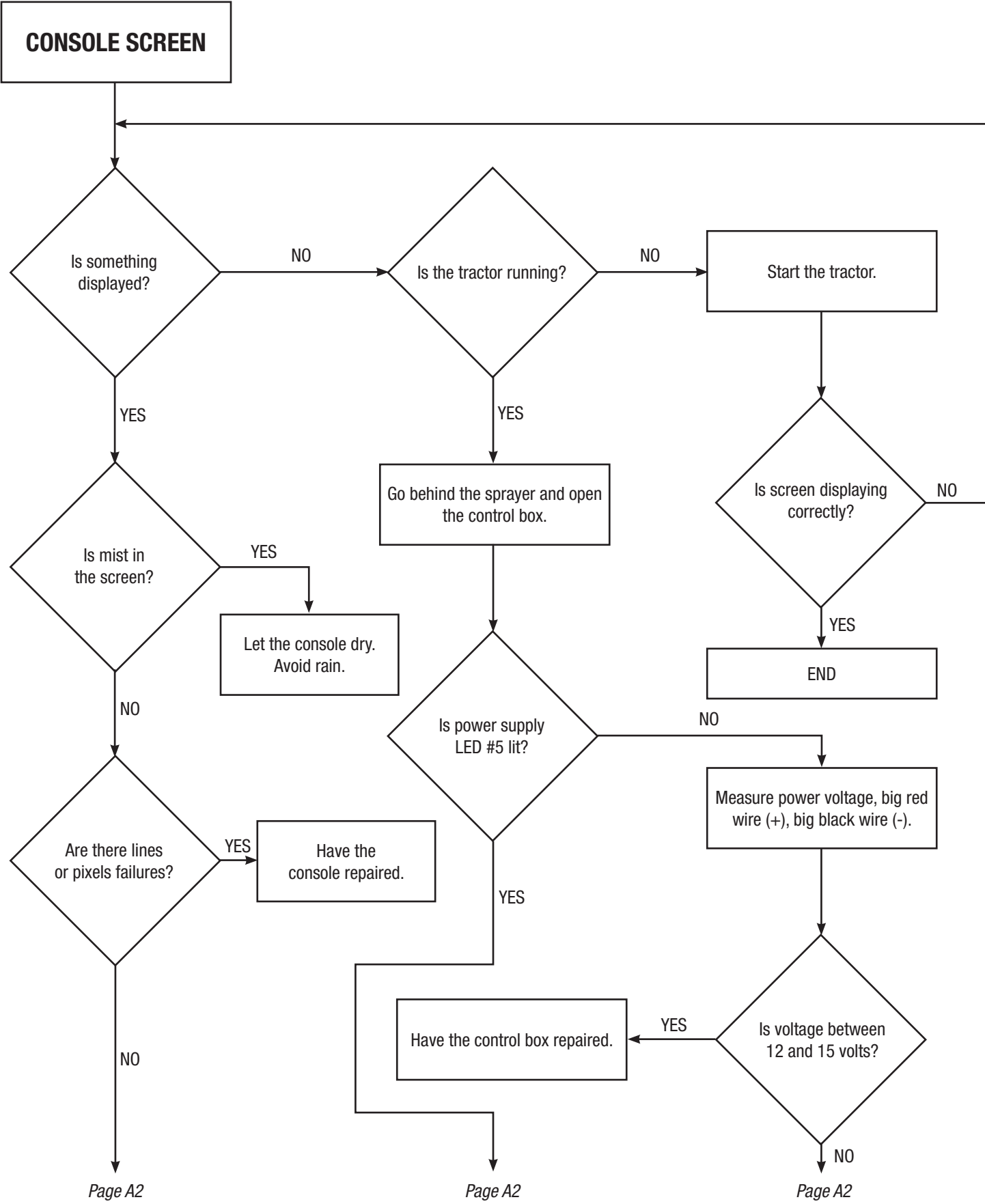
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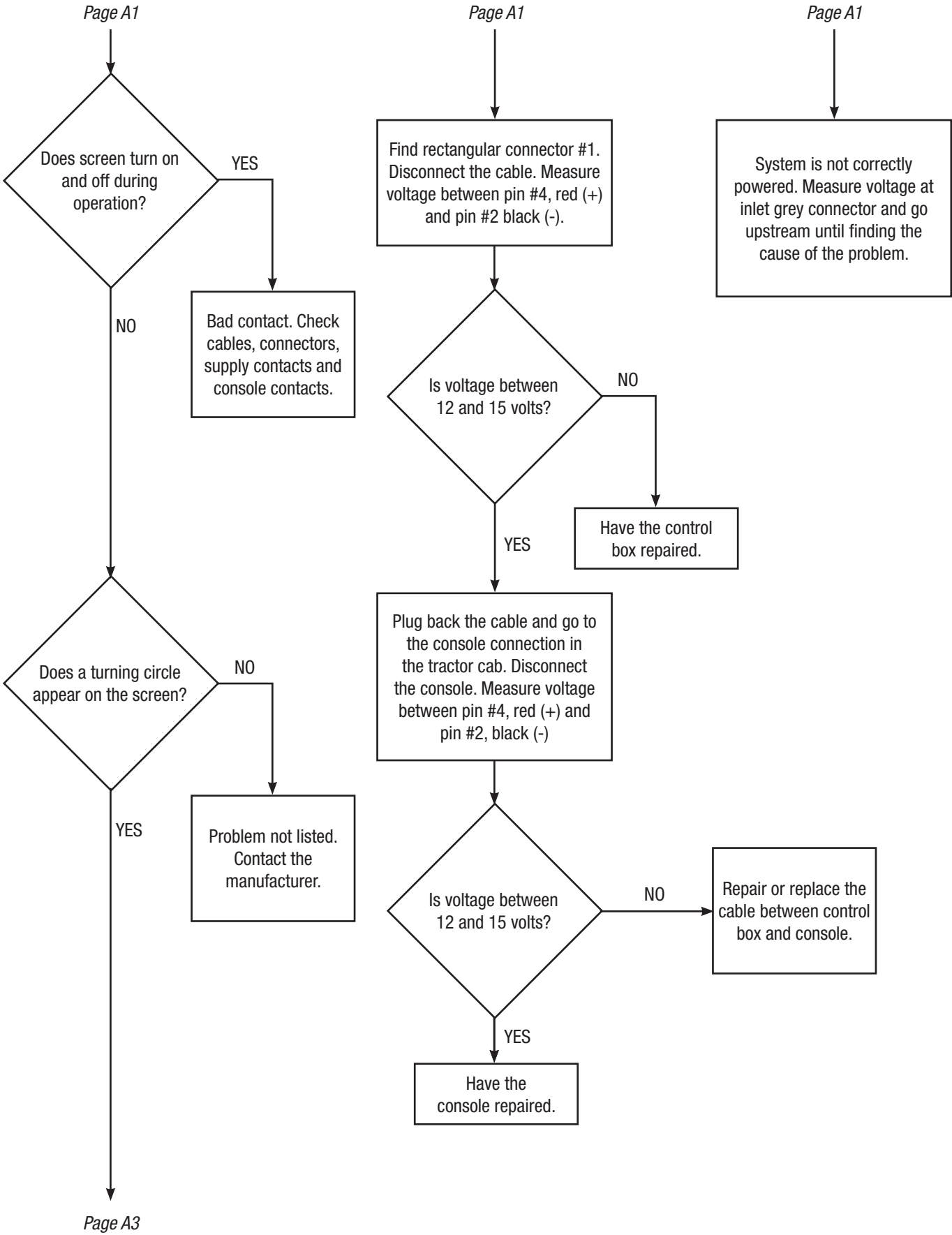
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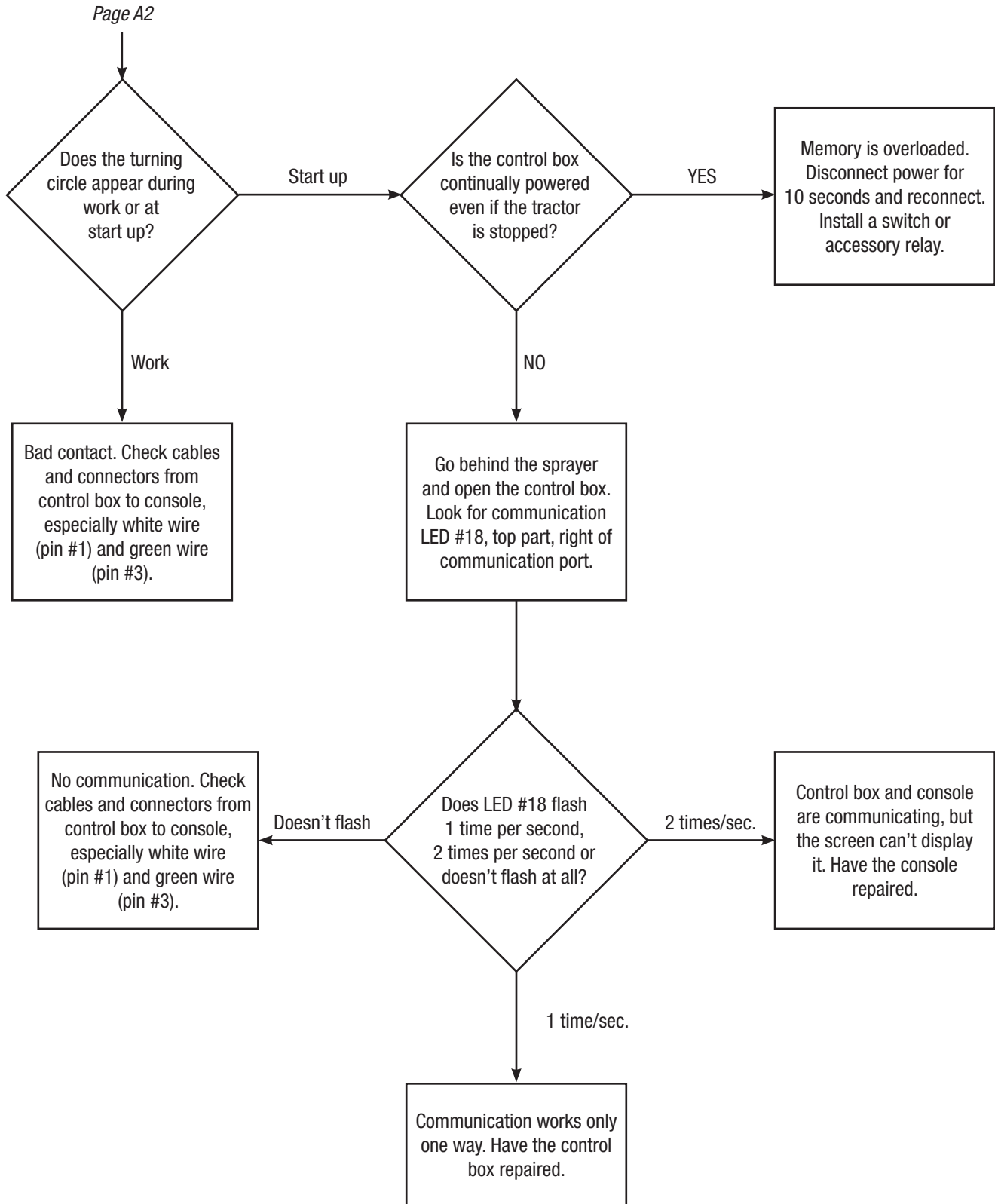
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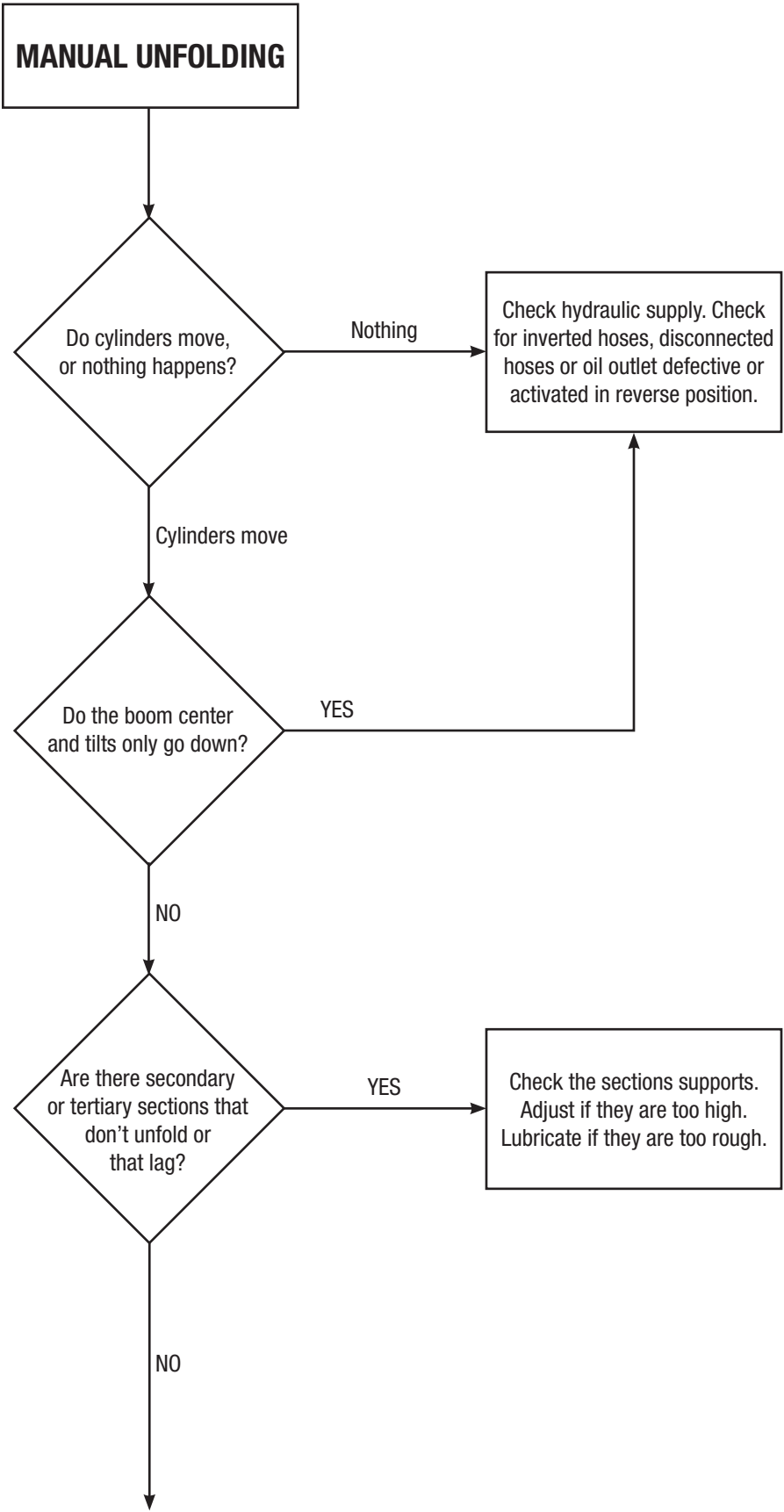


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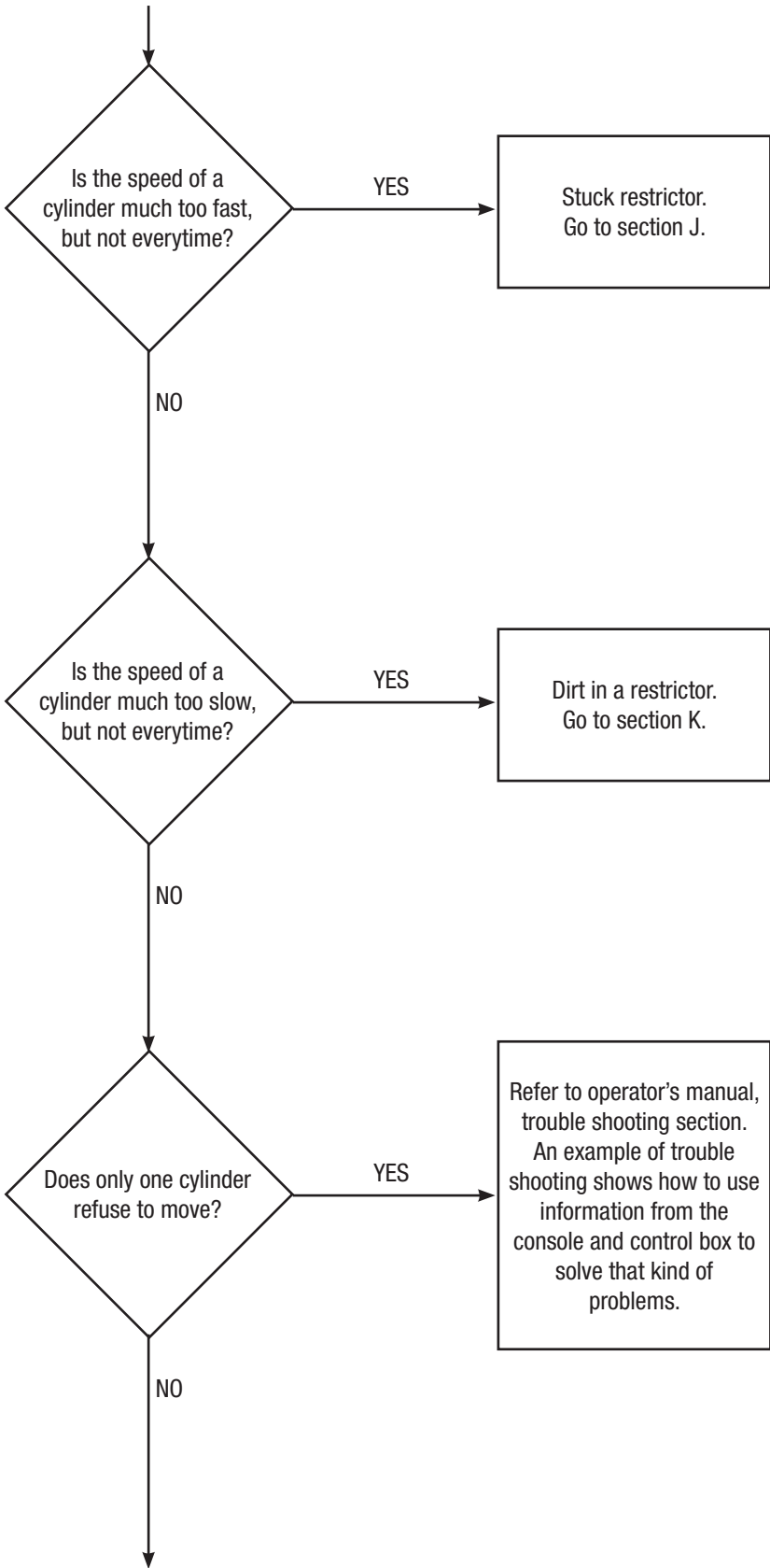


SECTION A - CONSOLE SCREEN (A3)



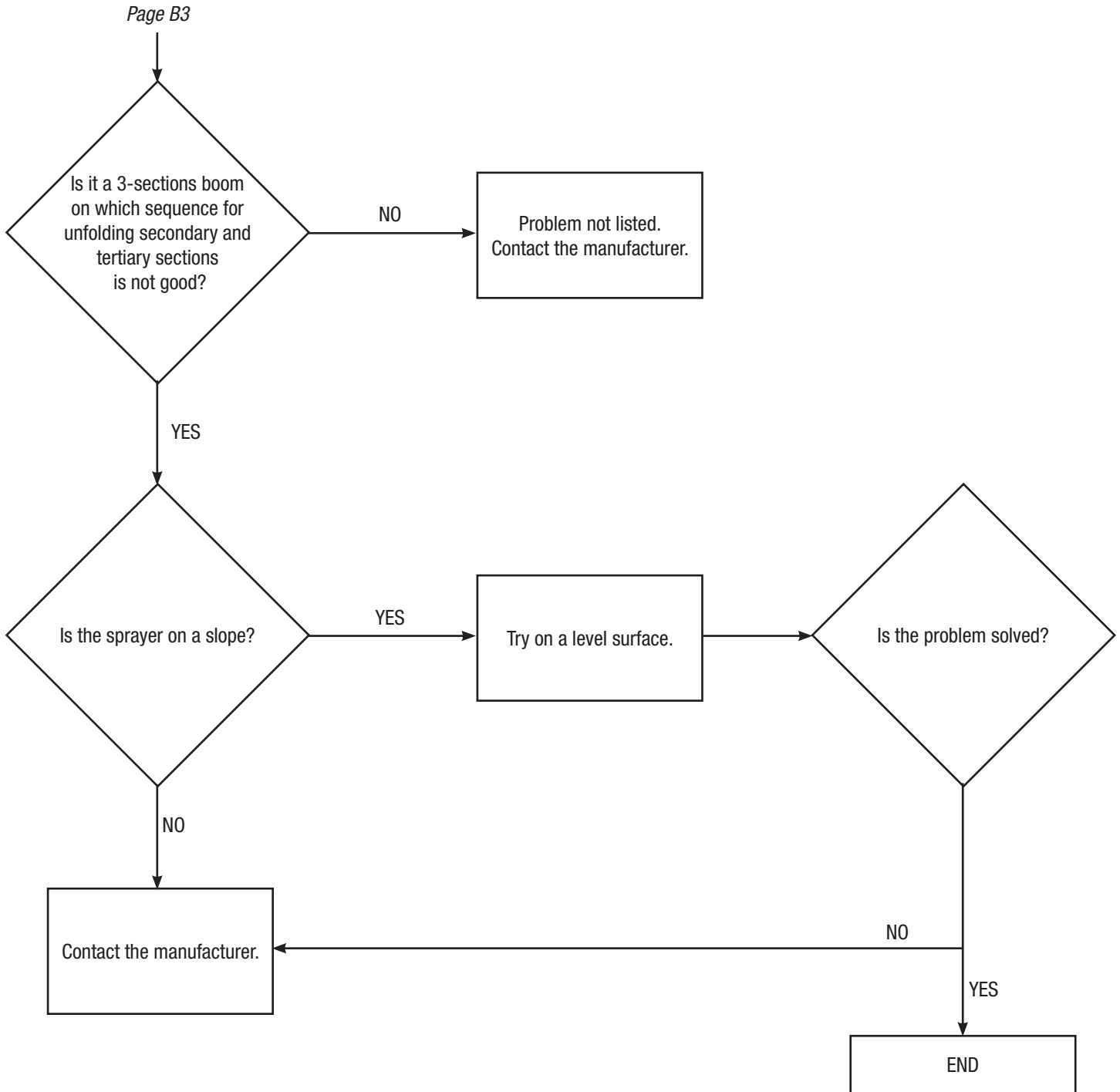


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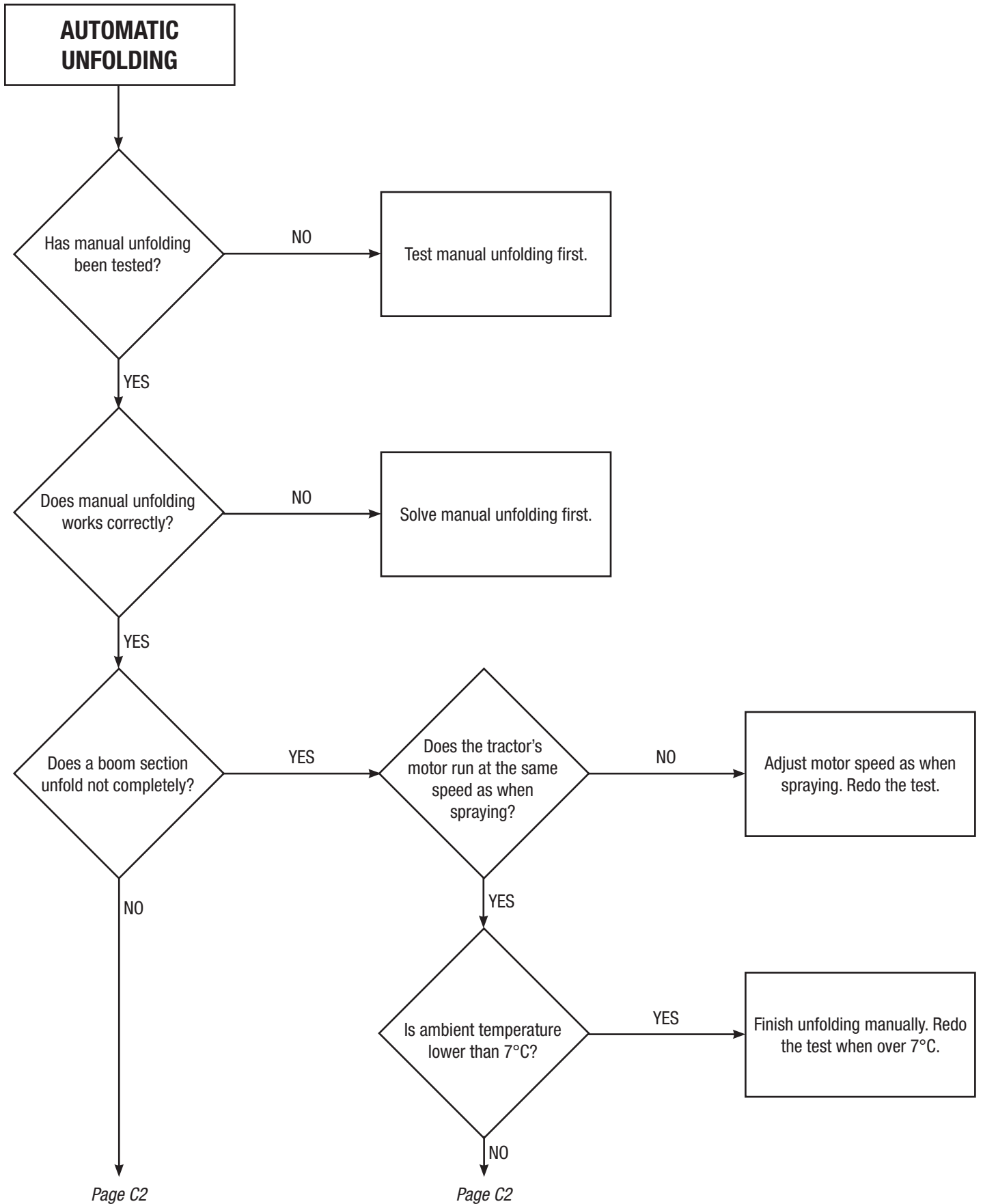


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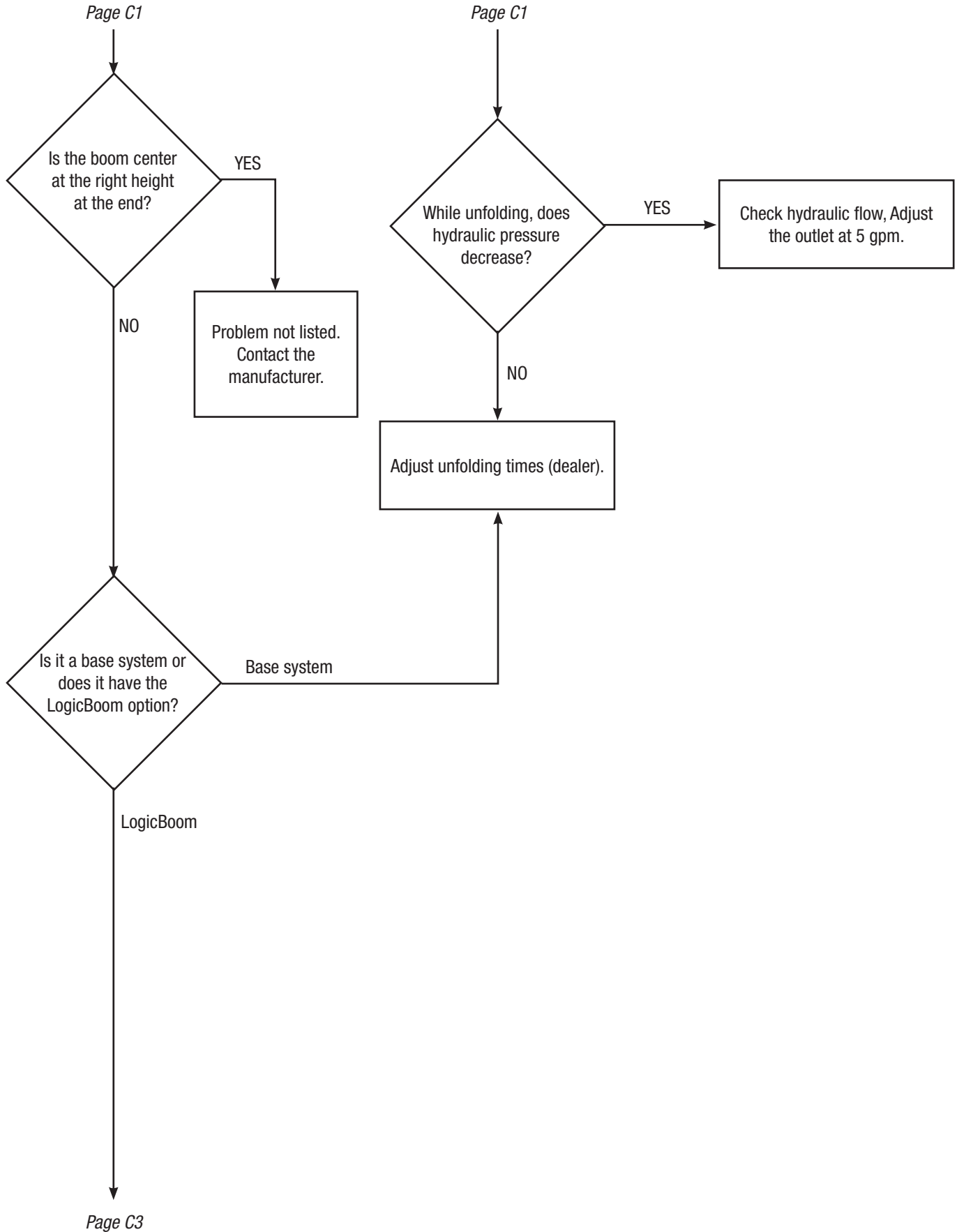
SECTION B - MANUAL UNFOLDING (B4)

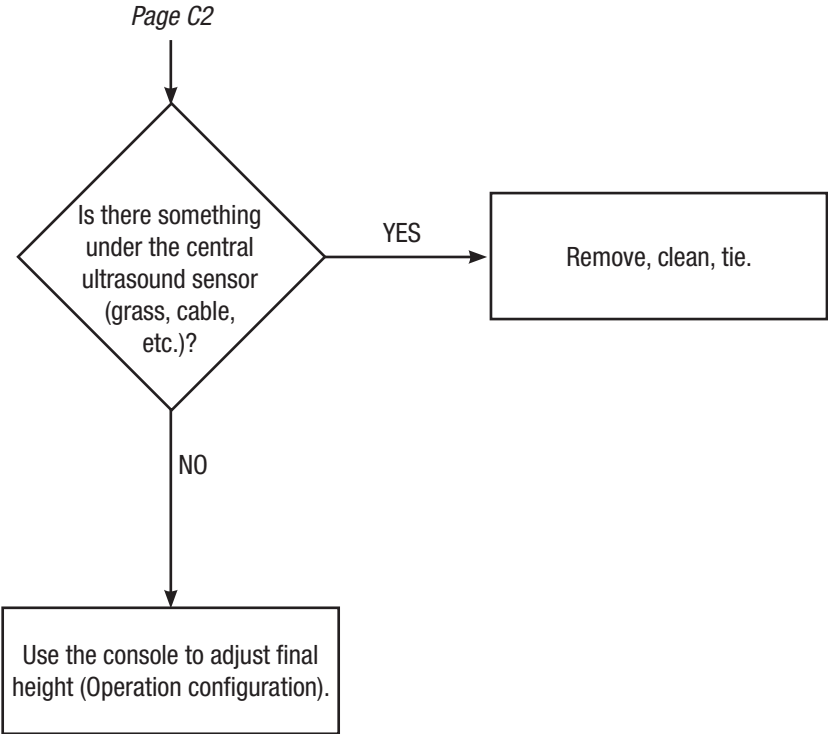


SECTION C - AUTOMATIC UNFOLDING (C1)

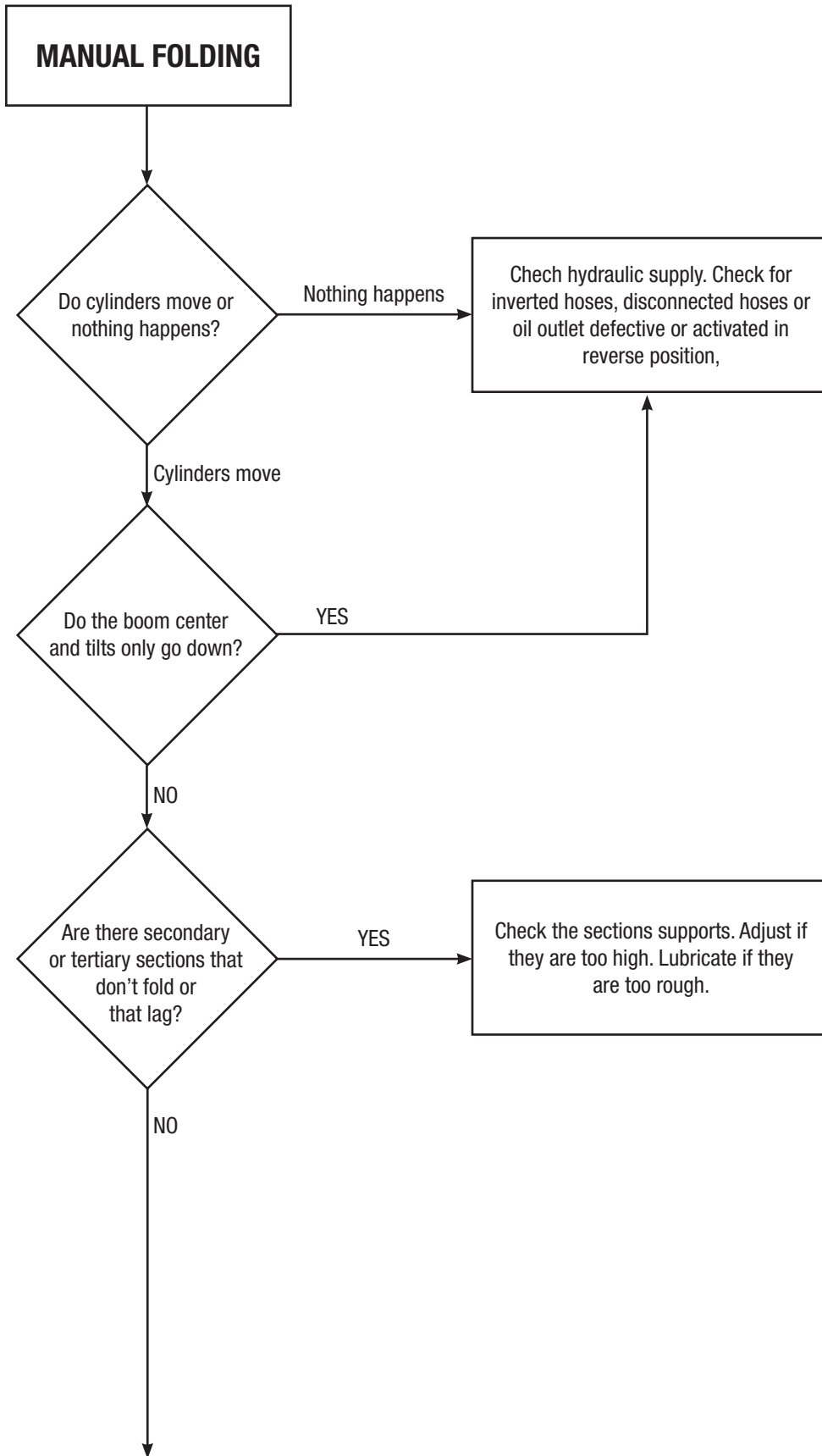


SECTION C - AUTOMATIC UNFOLDING (C2)

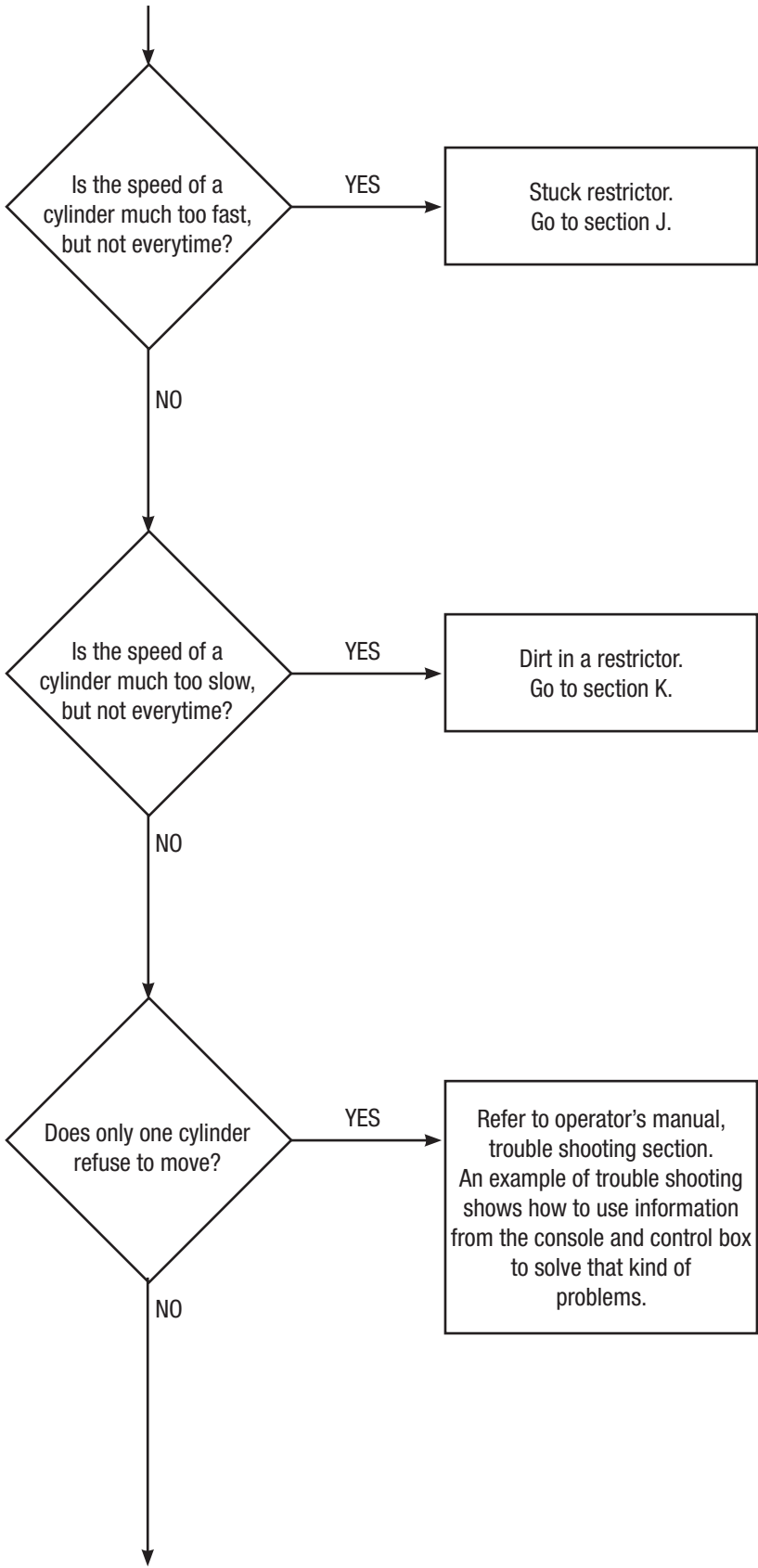




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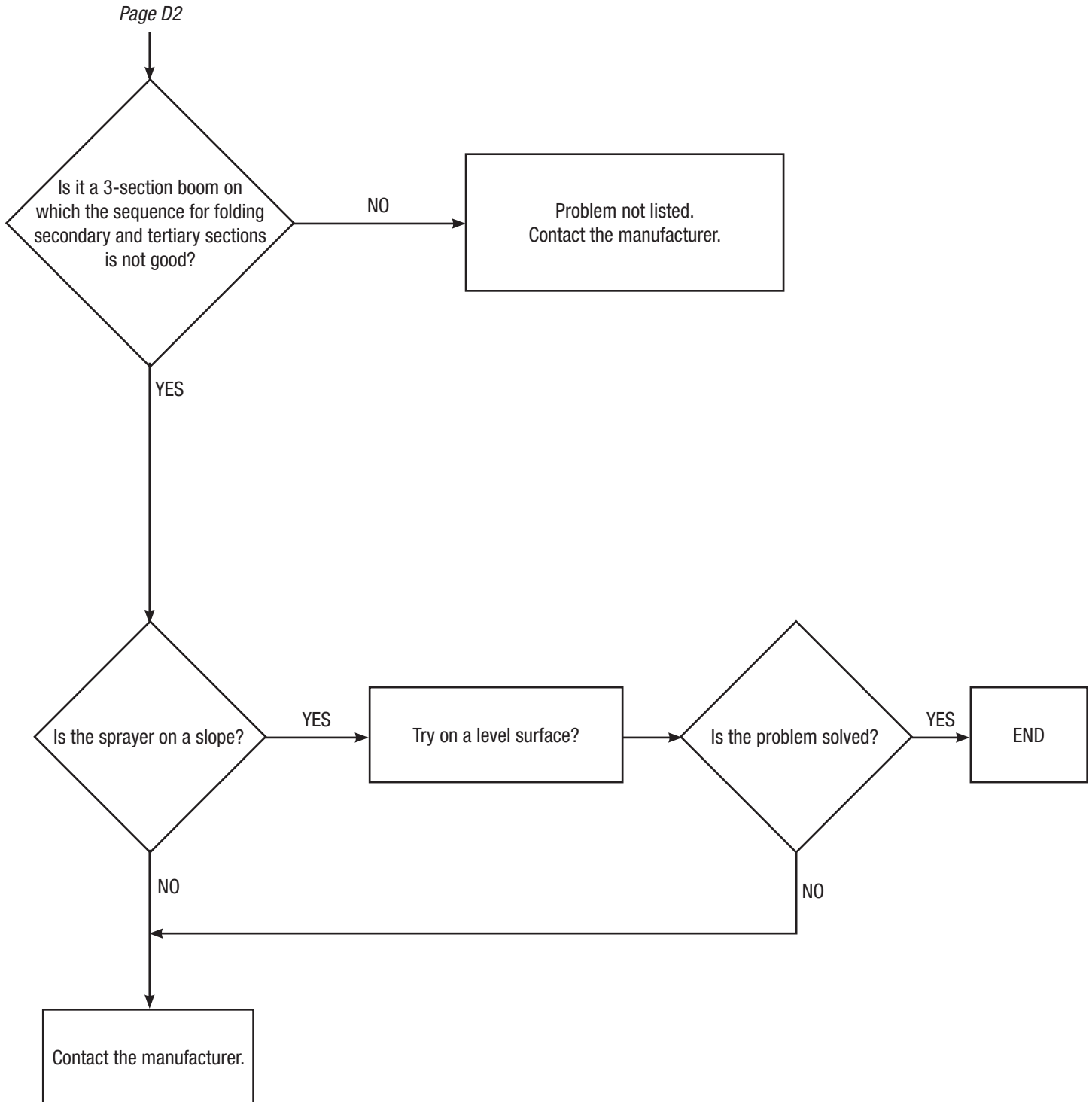


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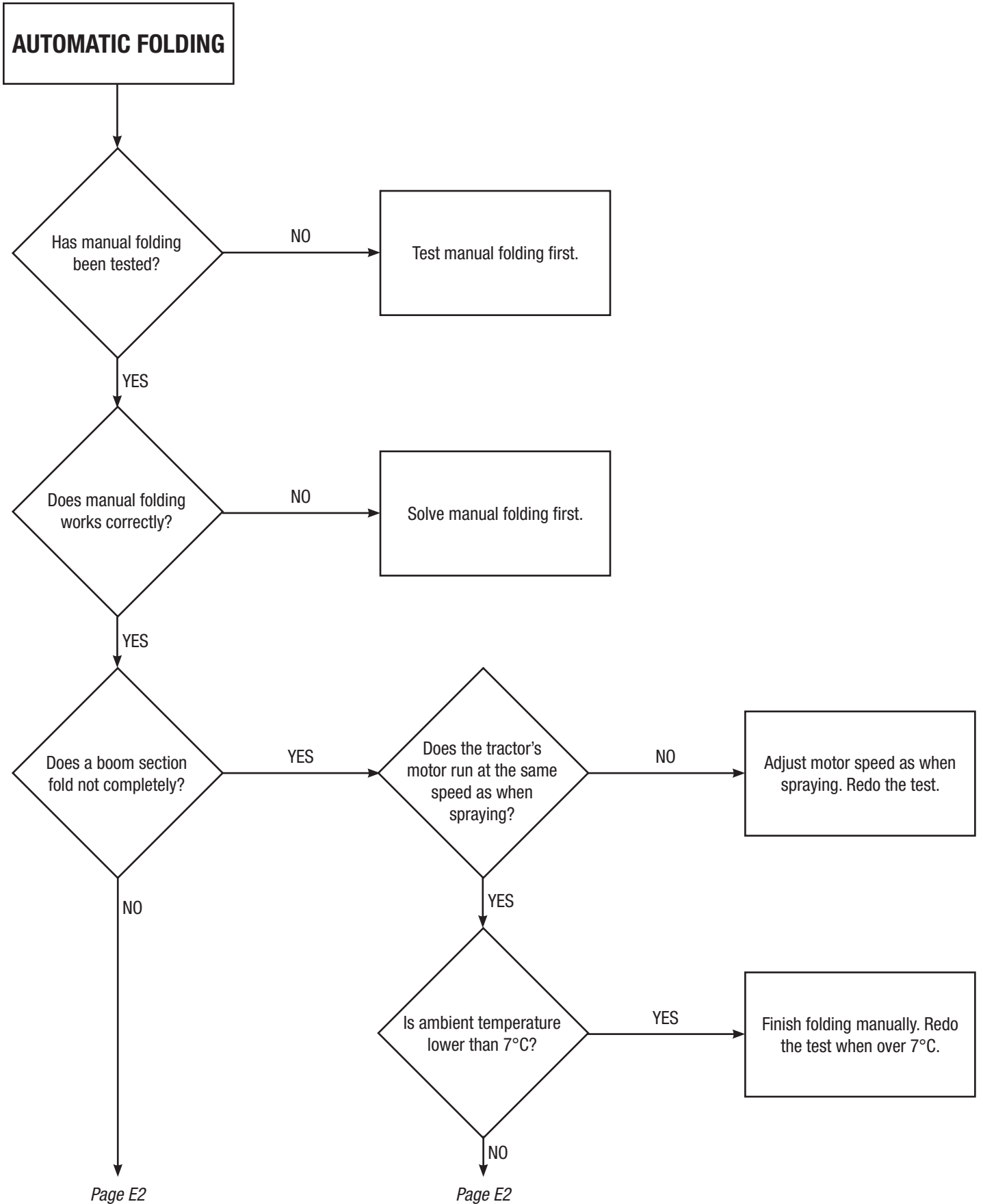


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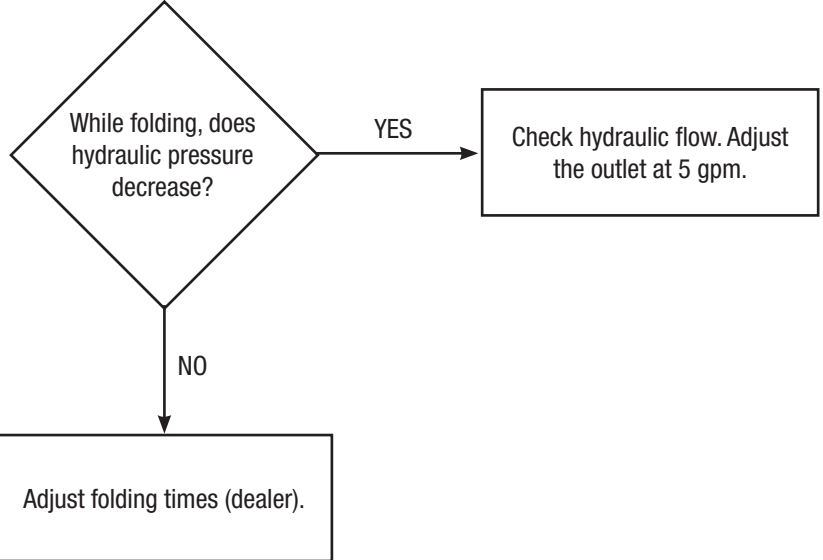
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SECTION E - AUTOMATIC FOLDING (E2)

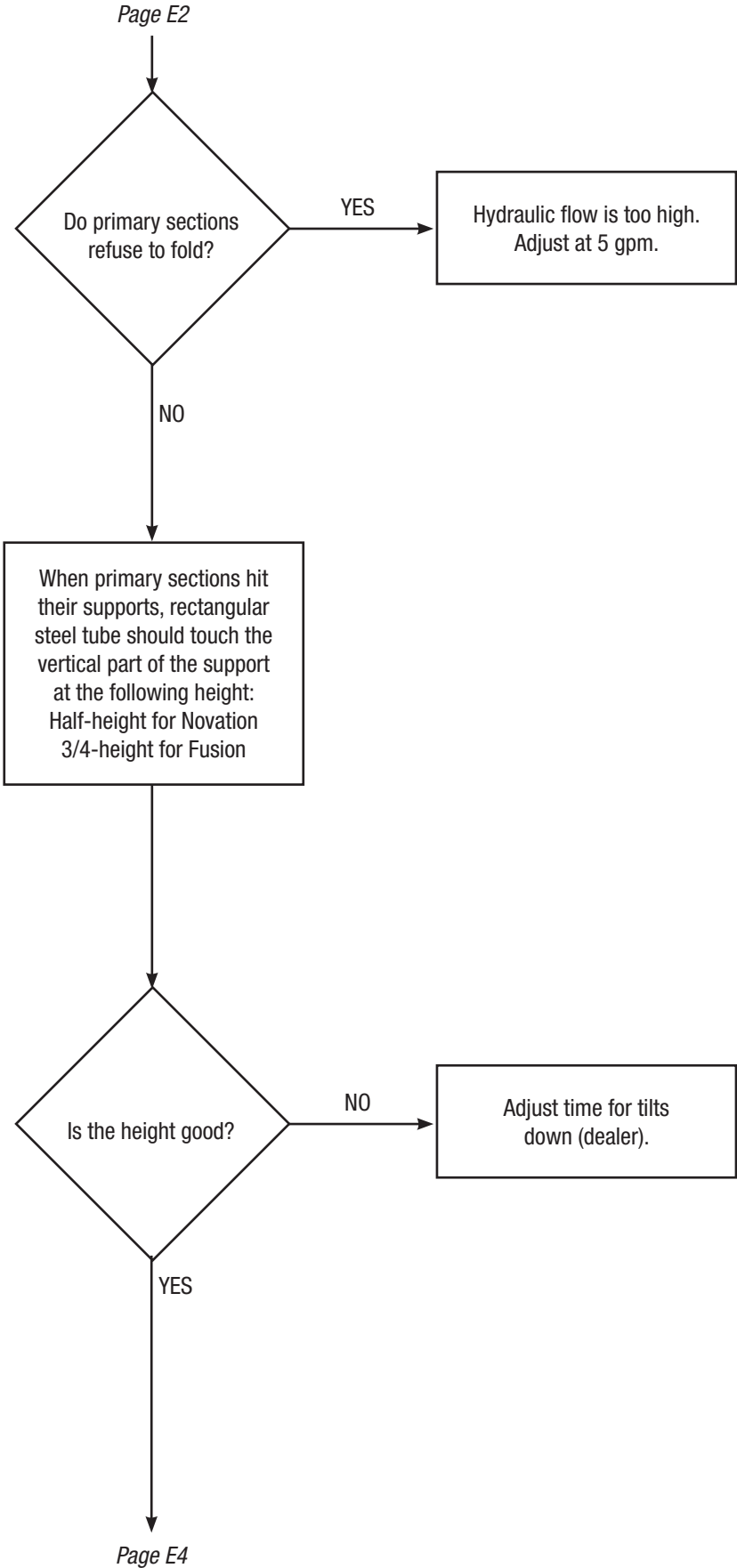
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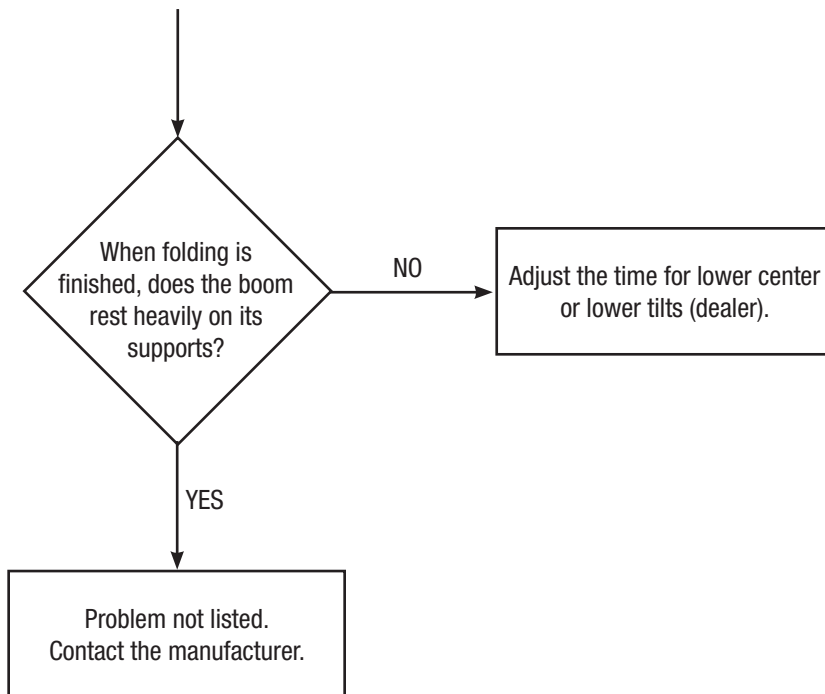
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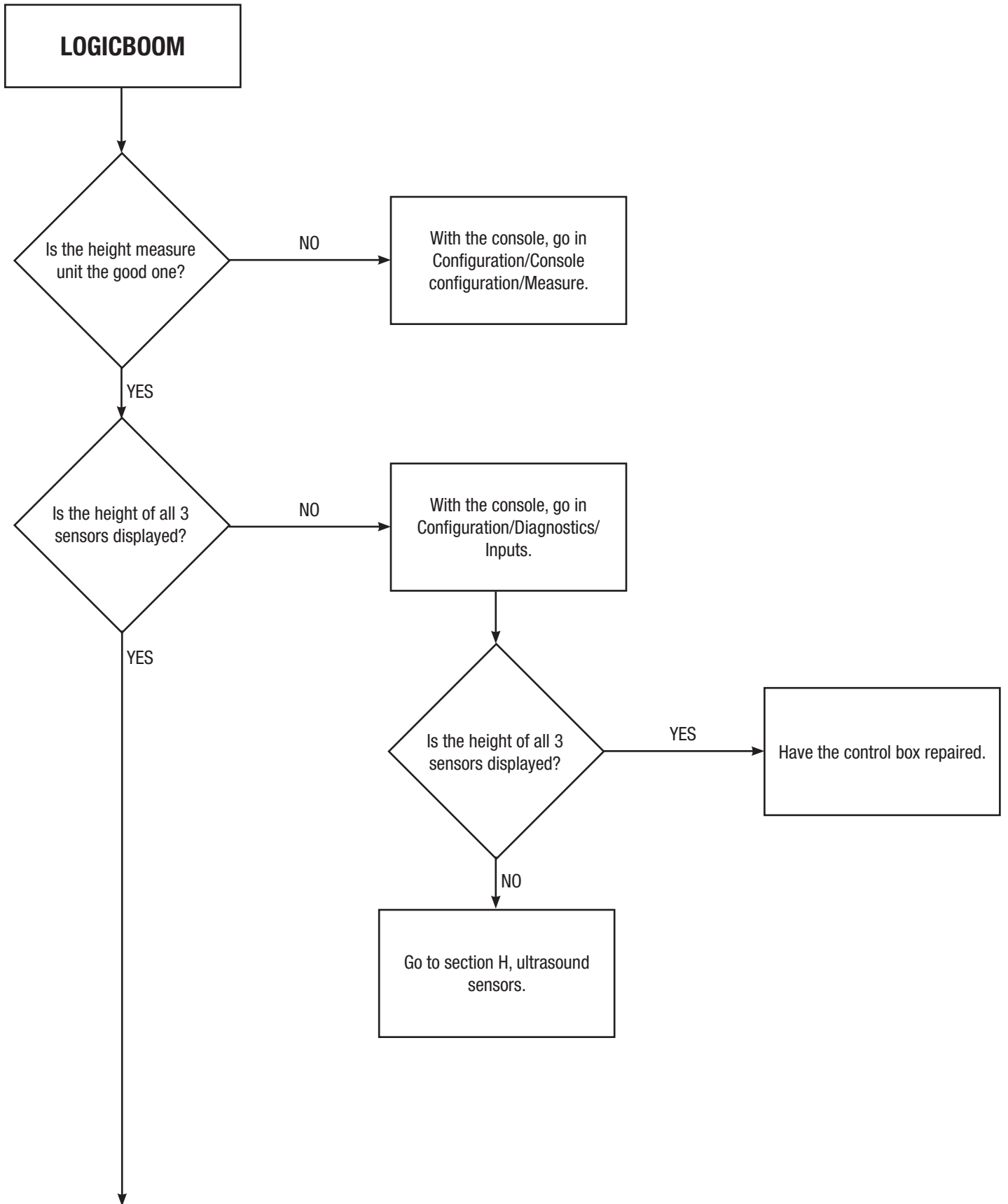
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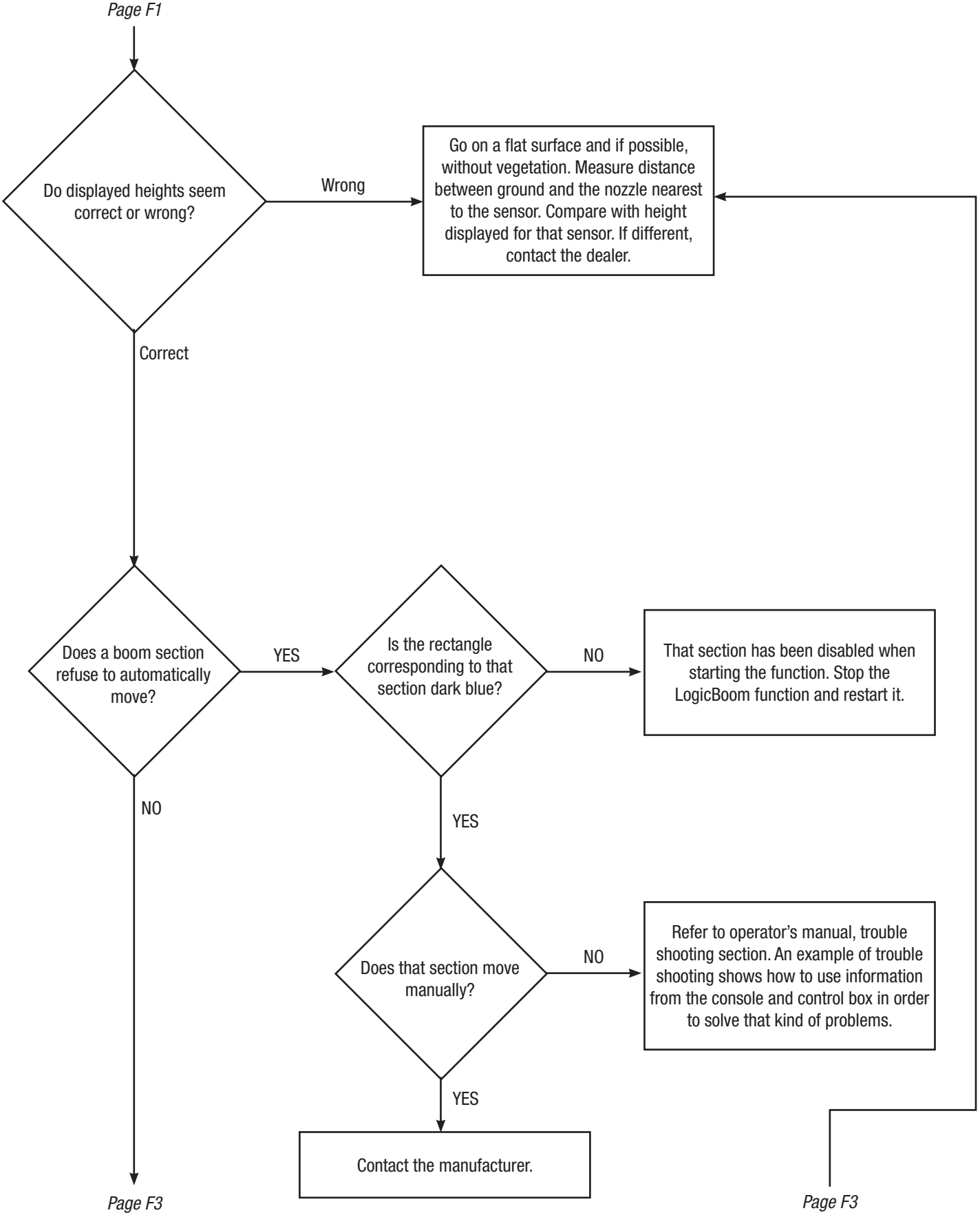
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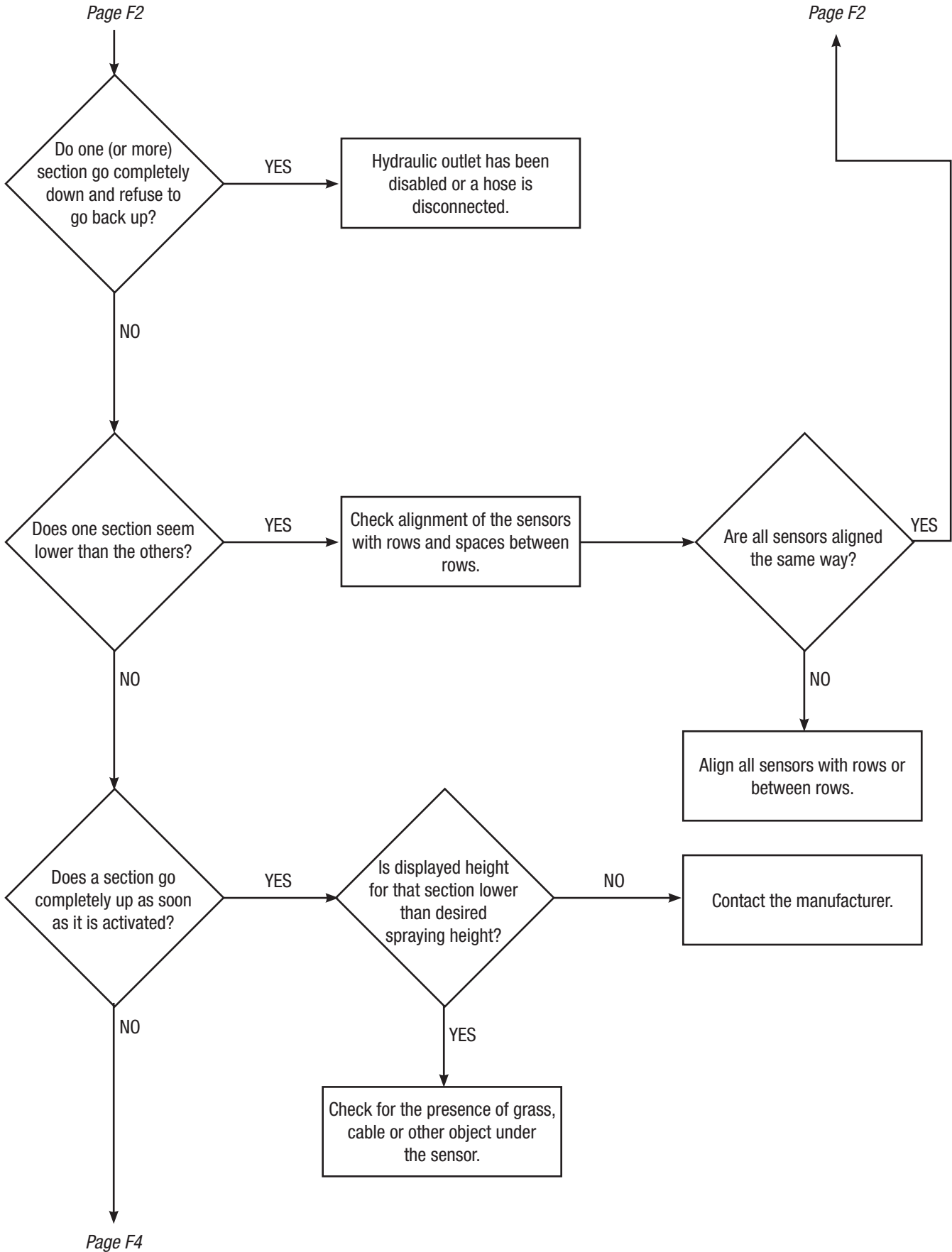




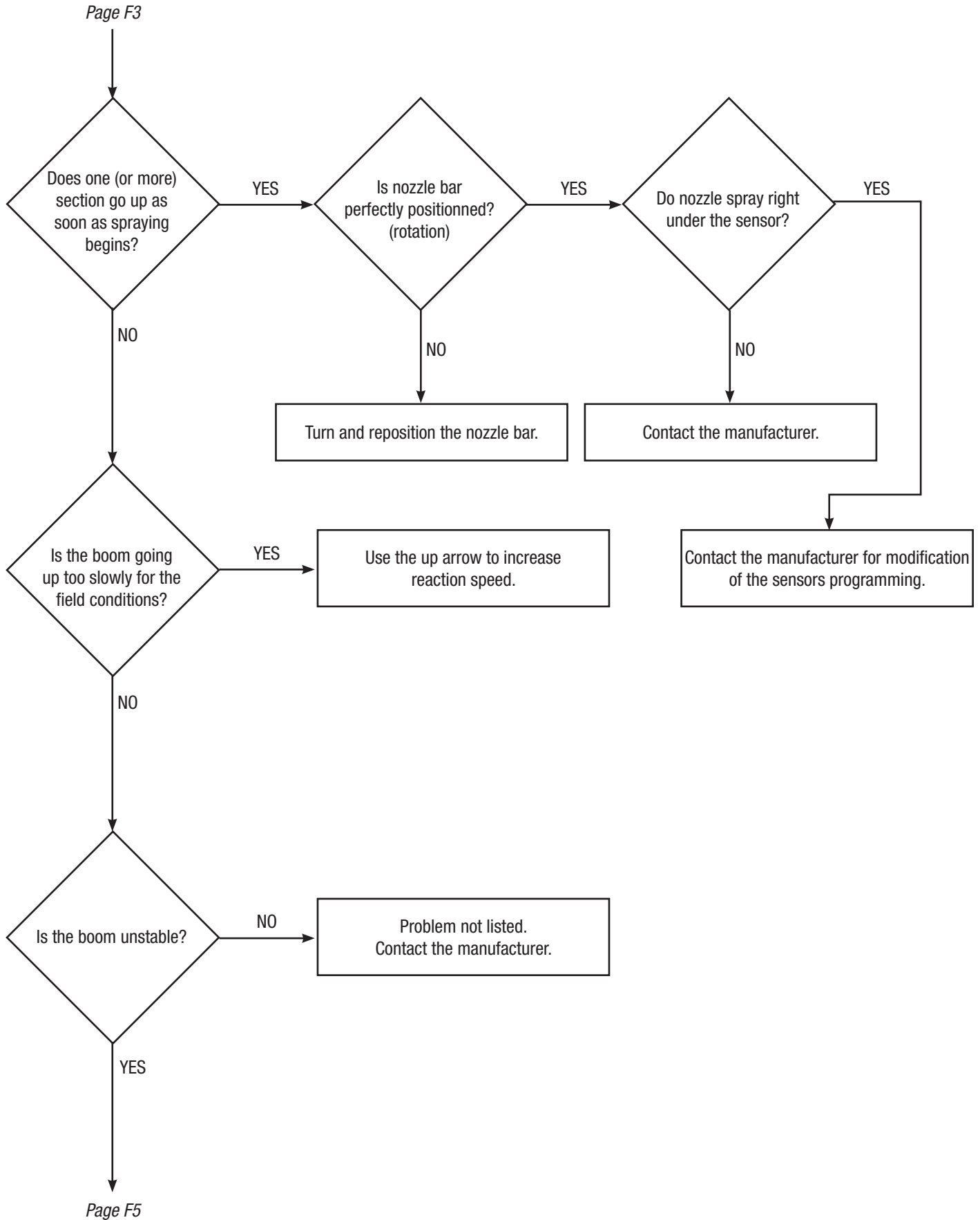
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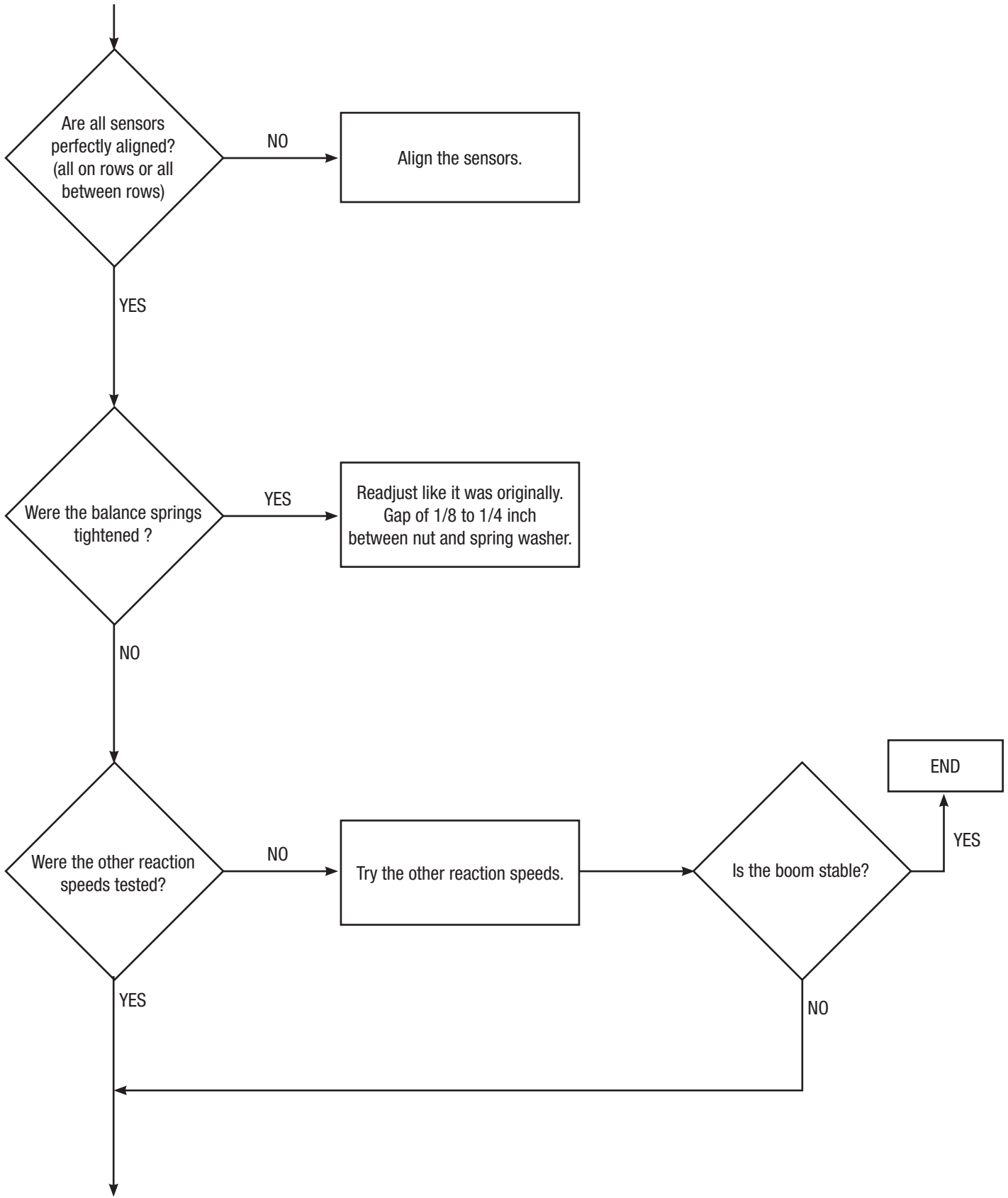
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SECTION F - LOGICBOOM (F4)

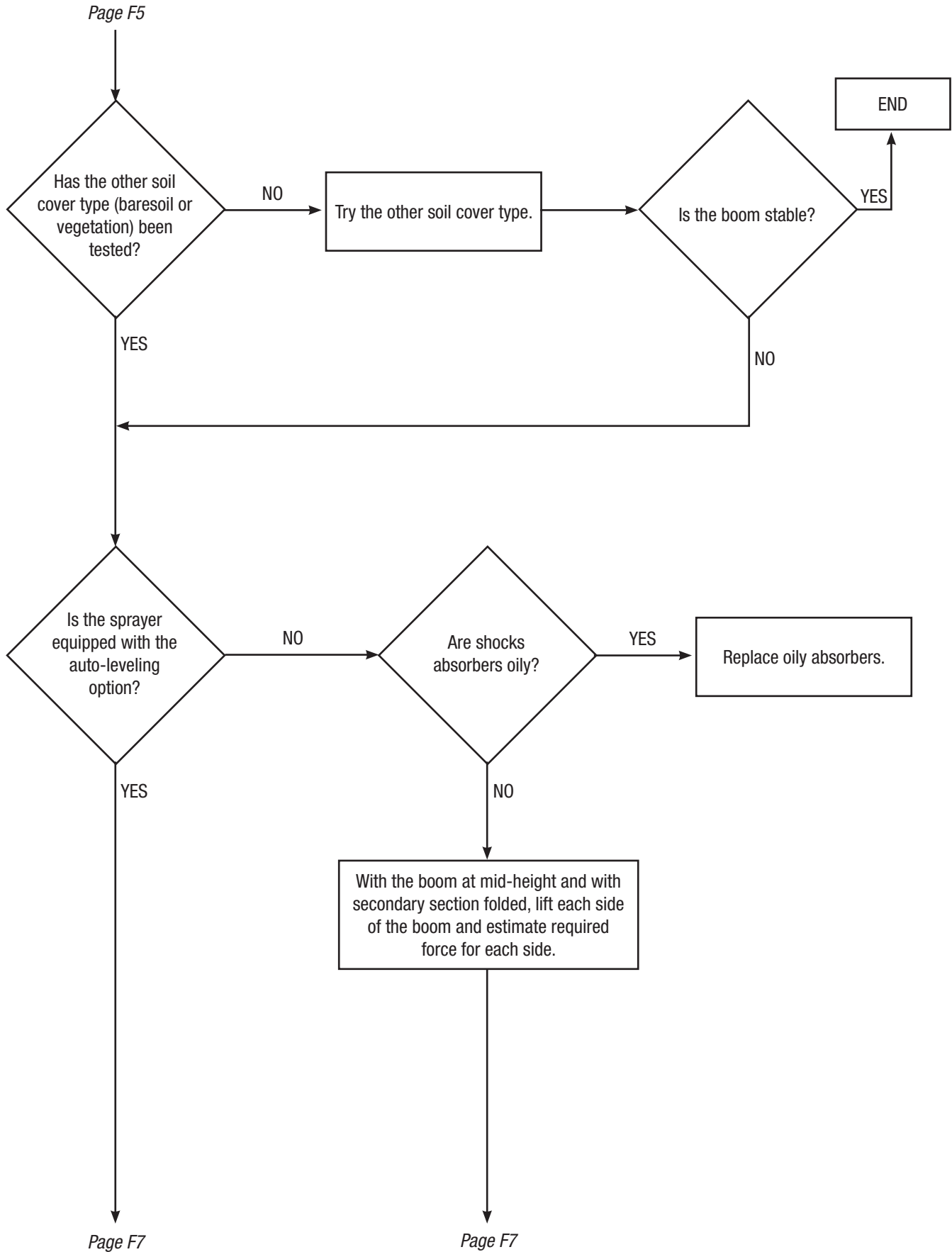


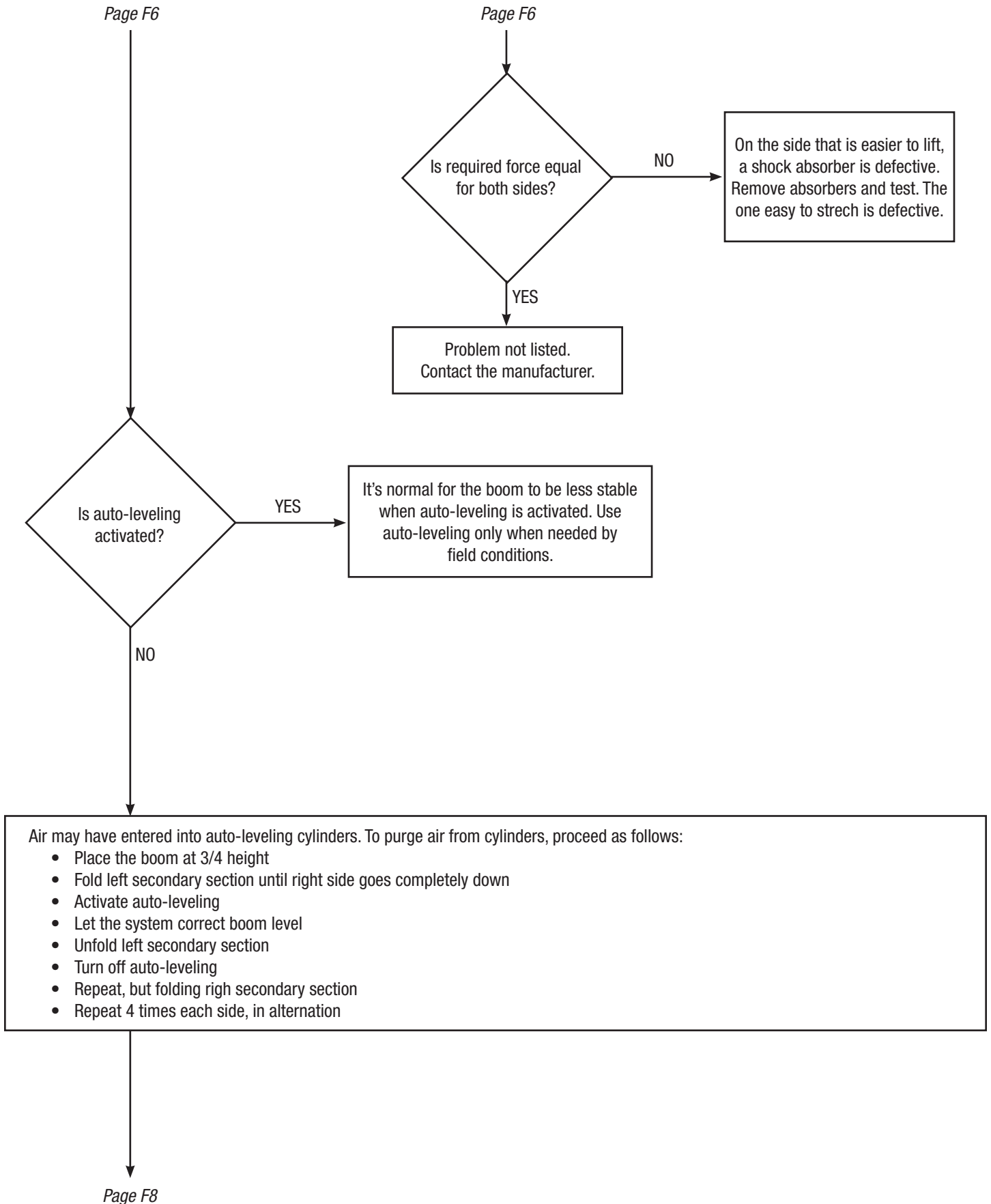
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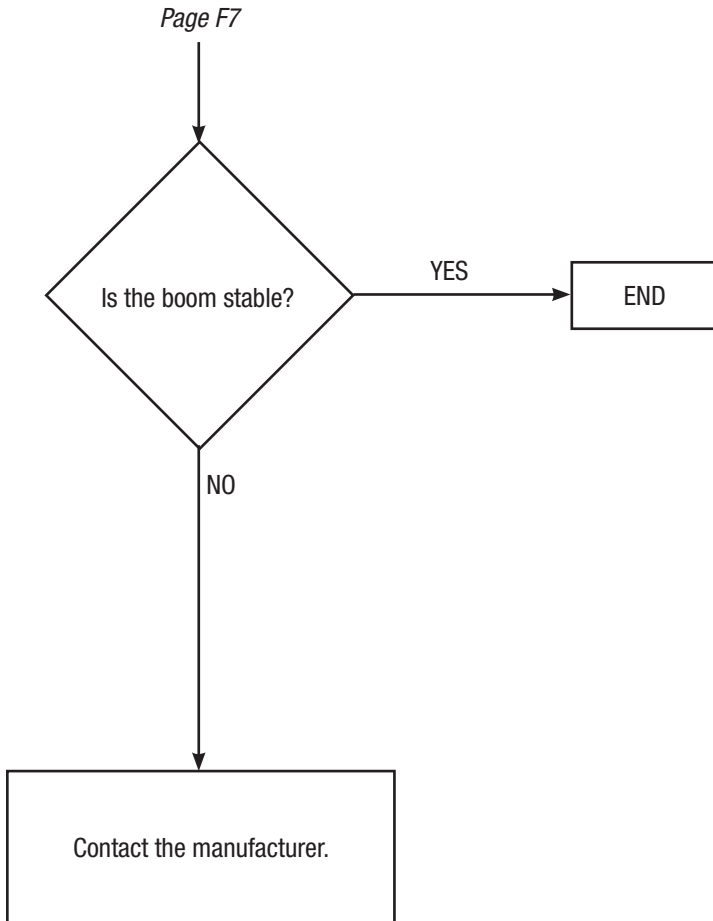
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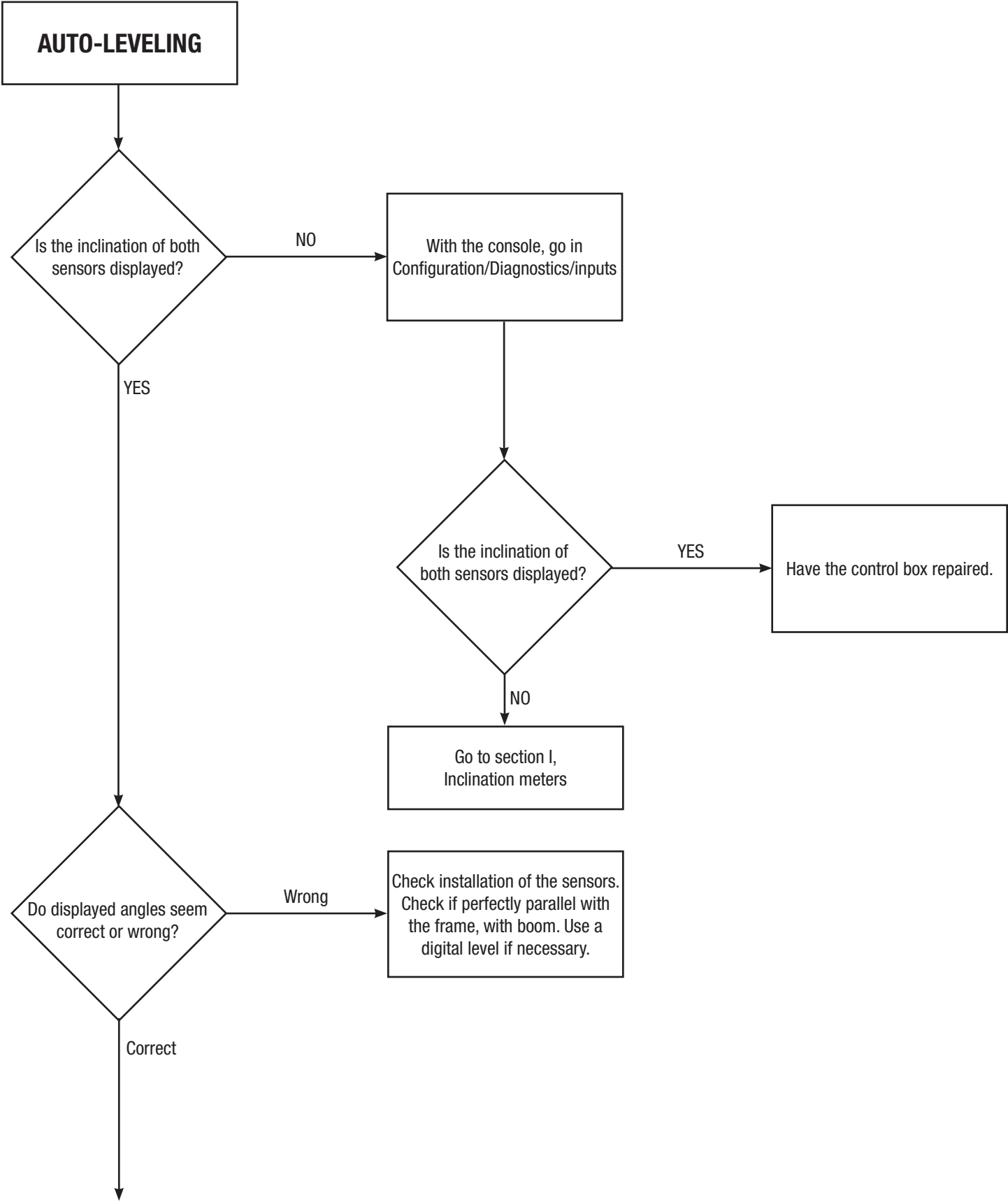
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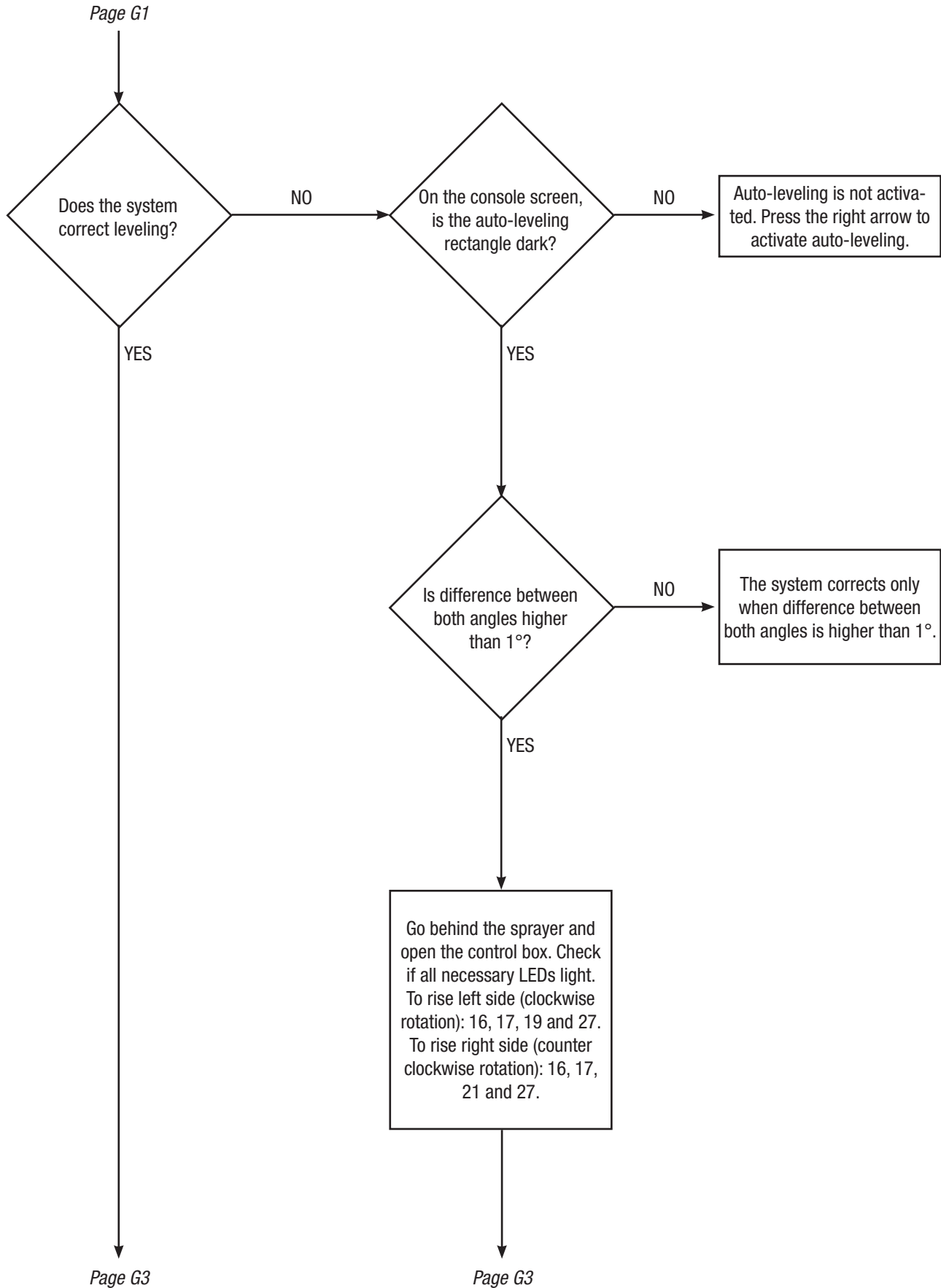


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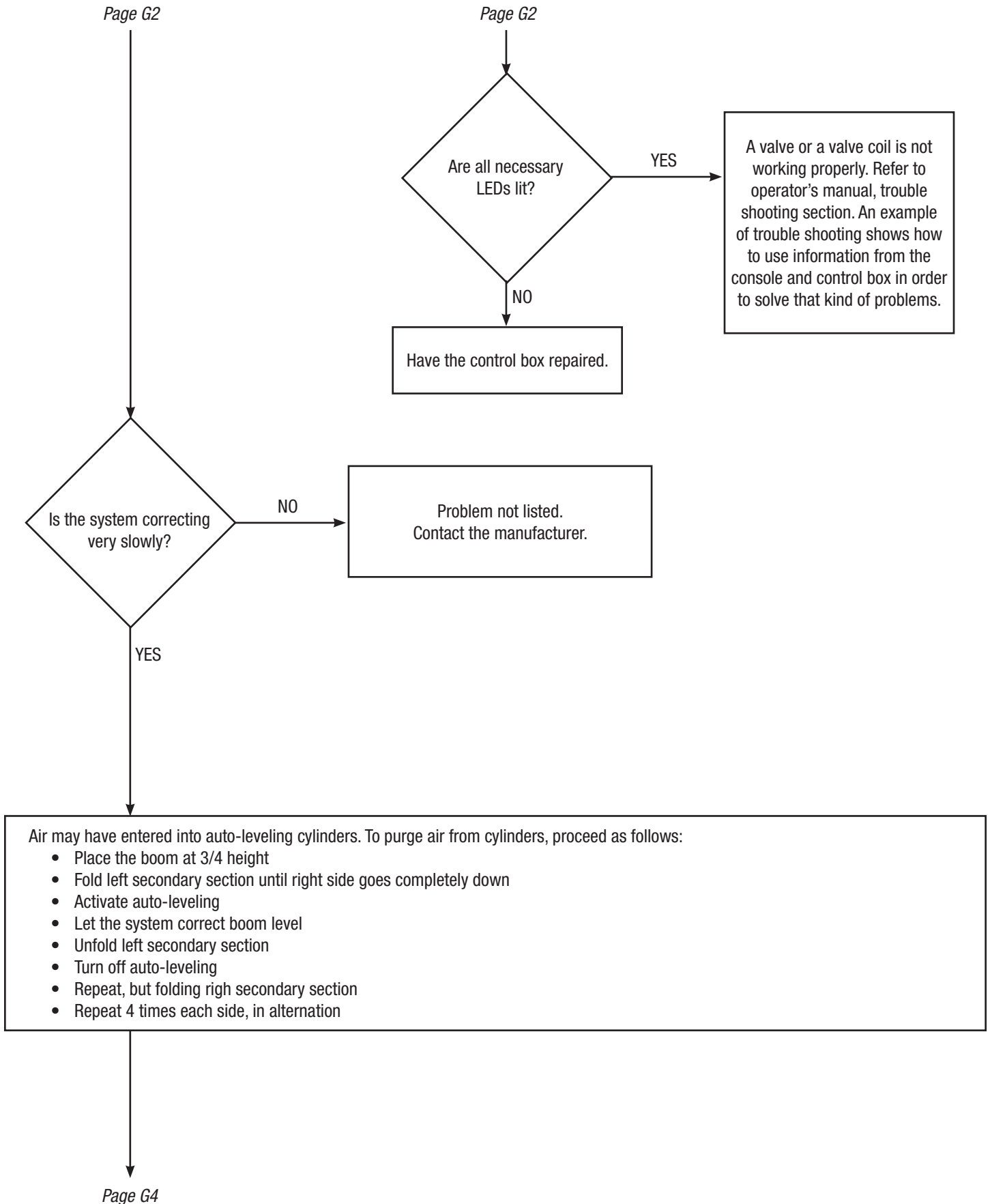




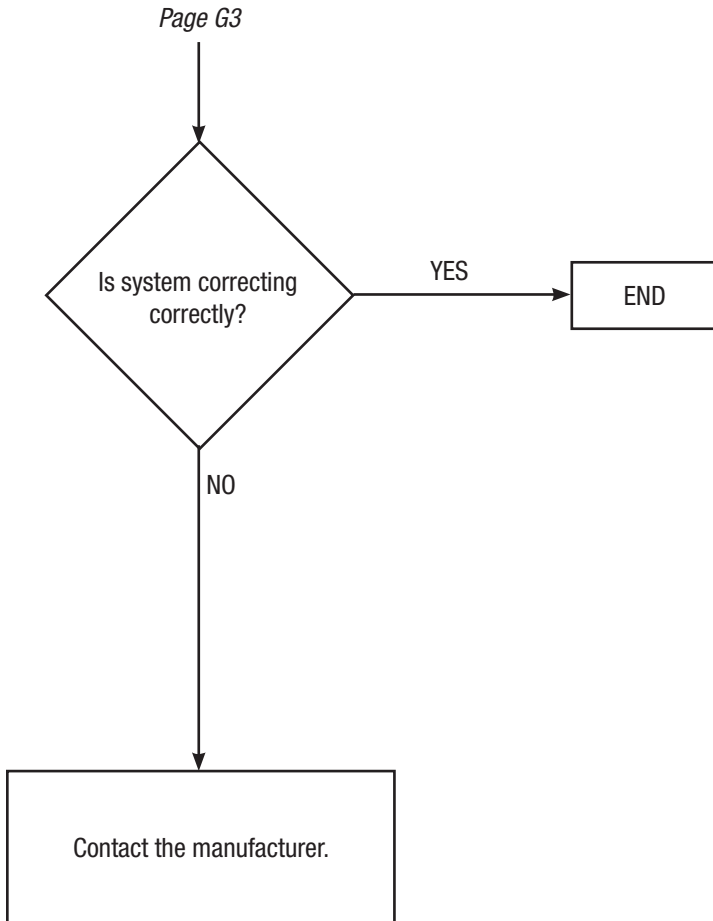
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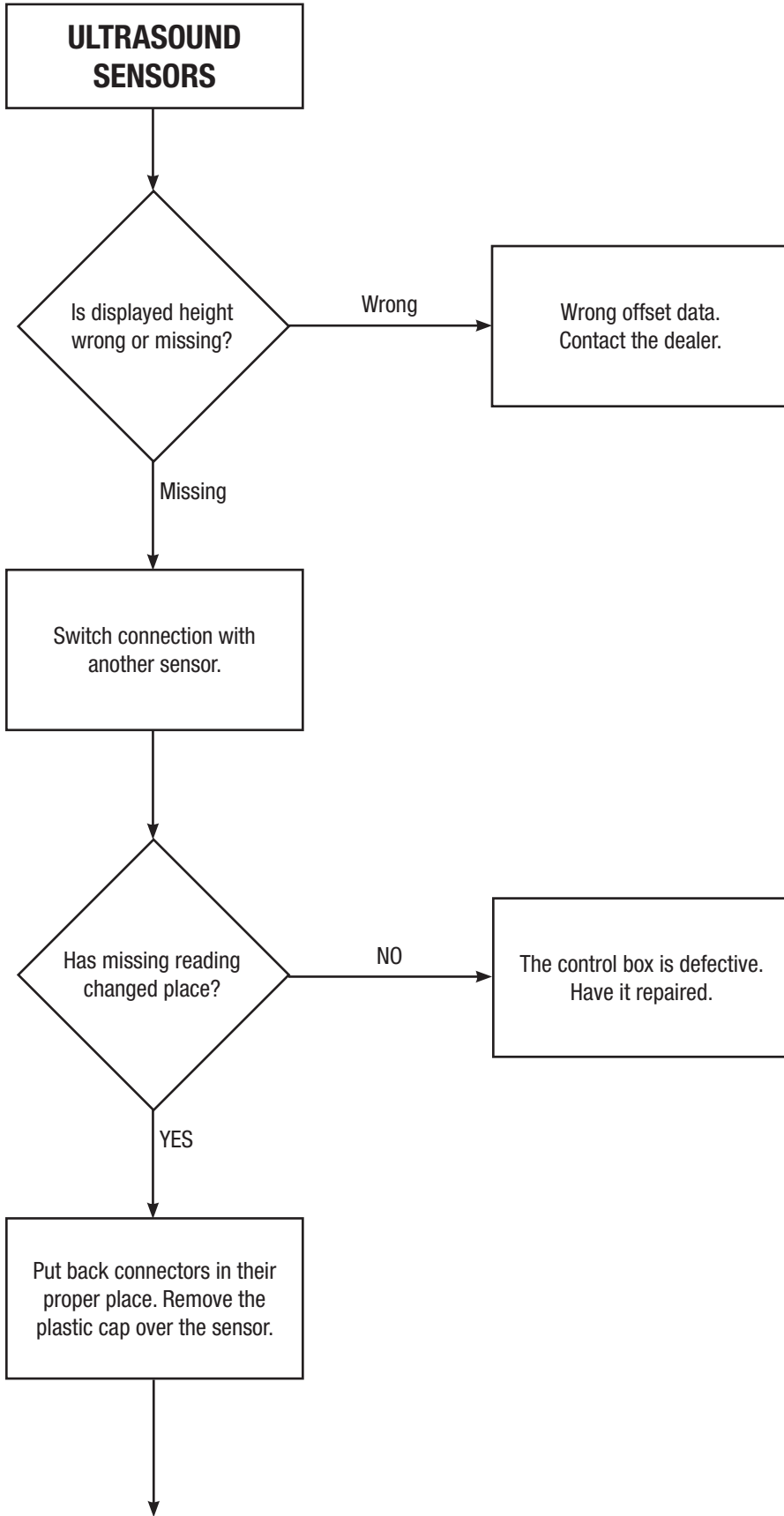
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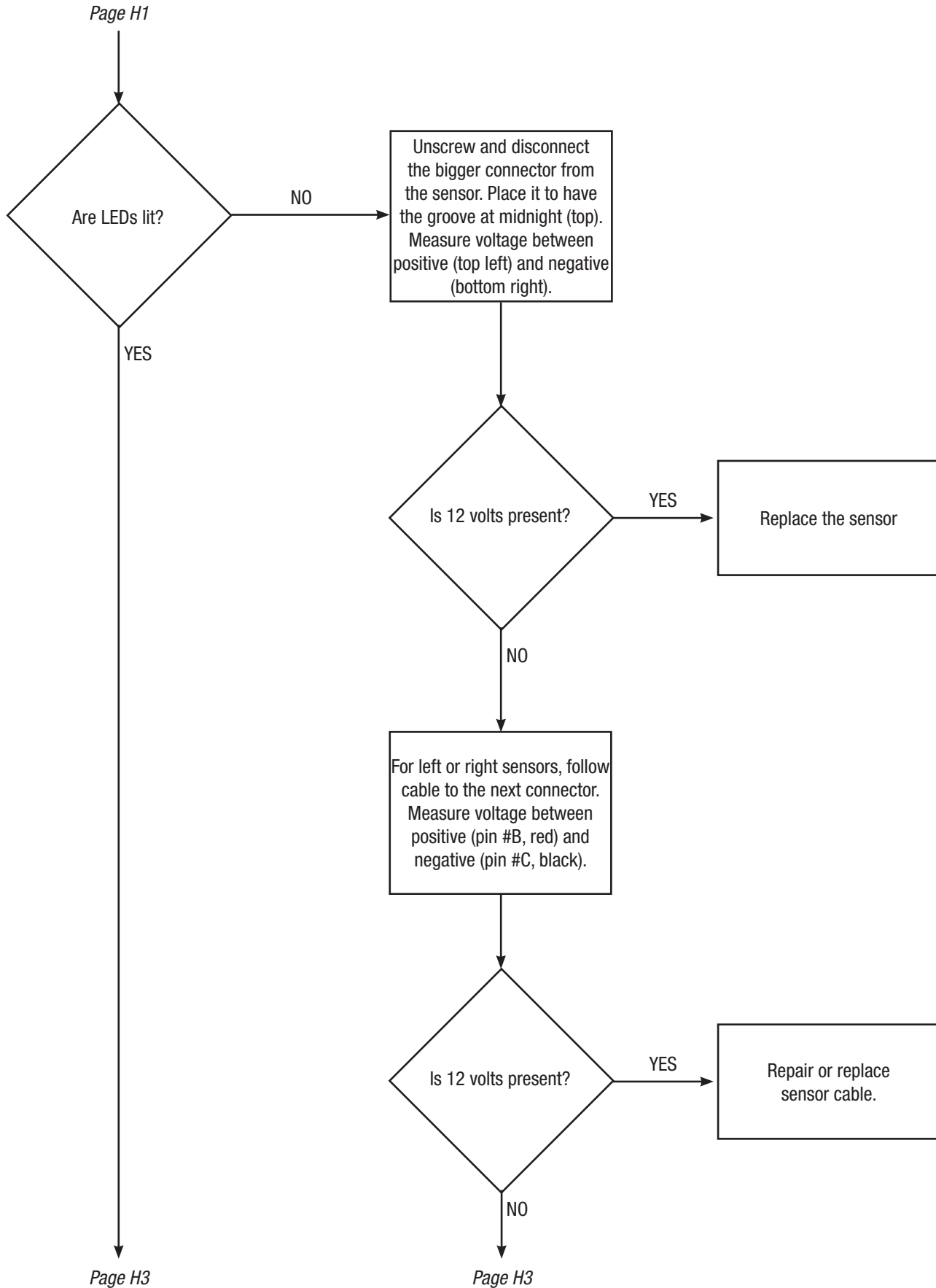
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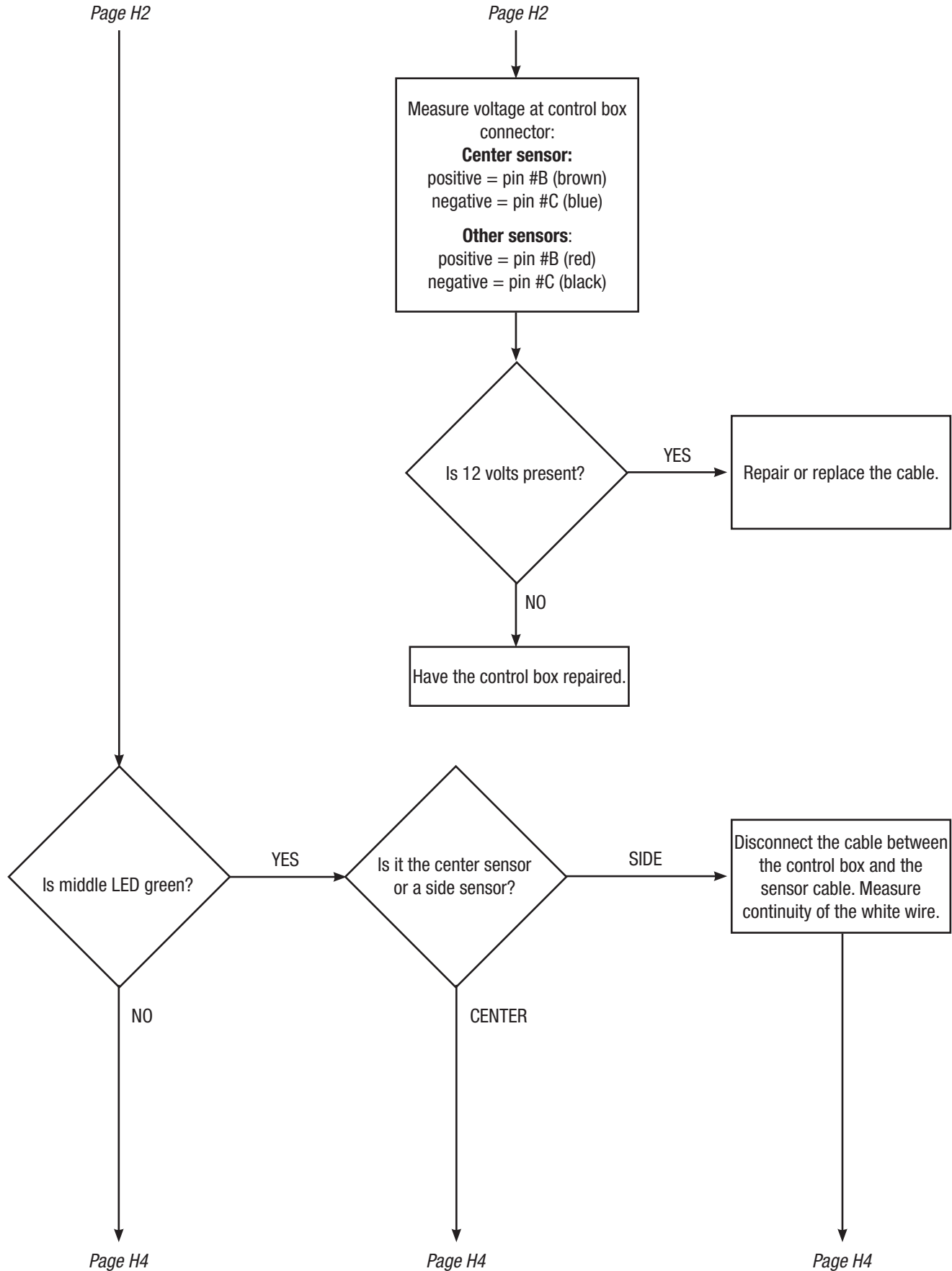
SECTION H - ULTRASOUND SENSORS (H1)



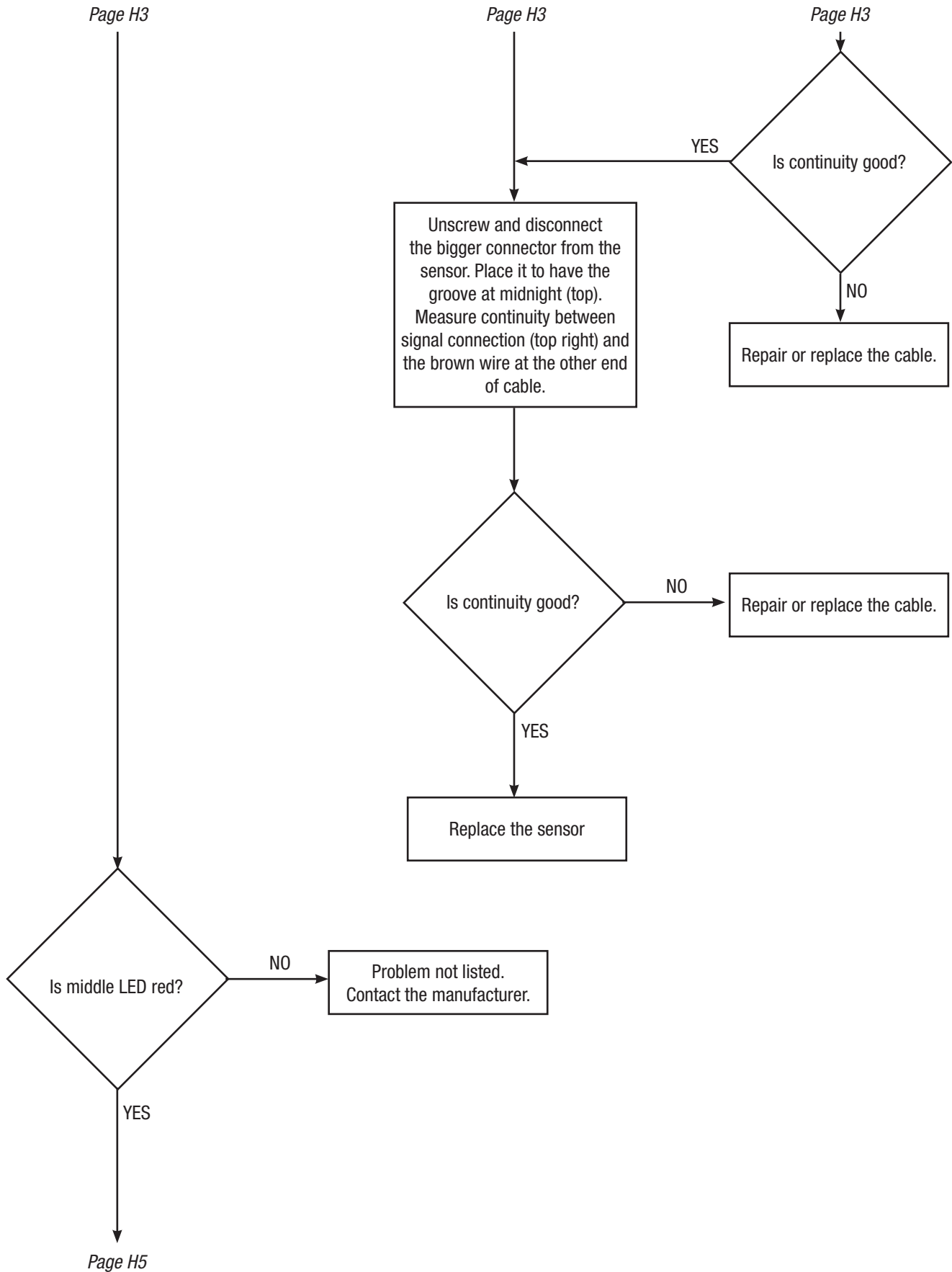
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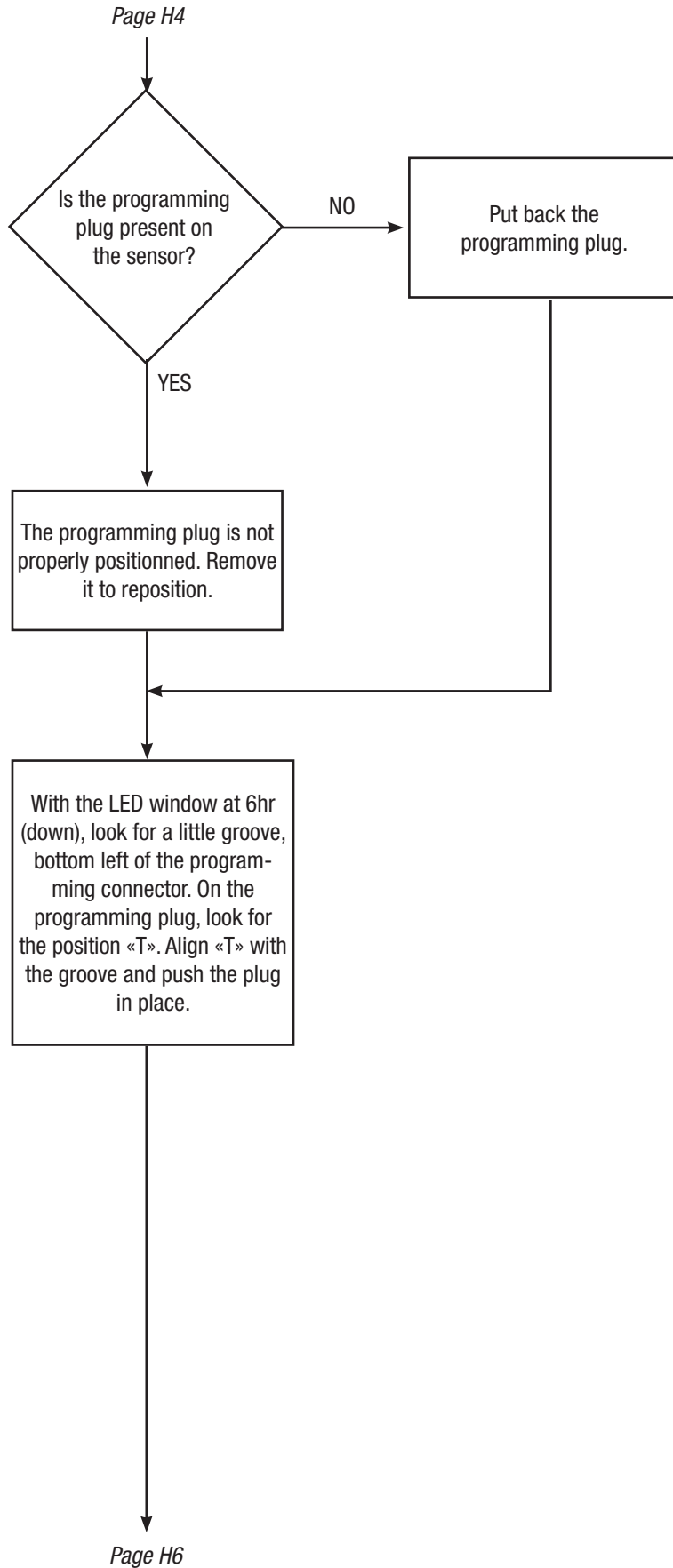


SECTION H - ULTRASOUND SENSORS (H3)



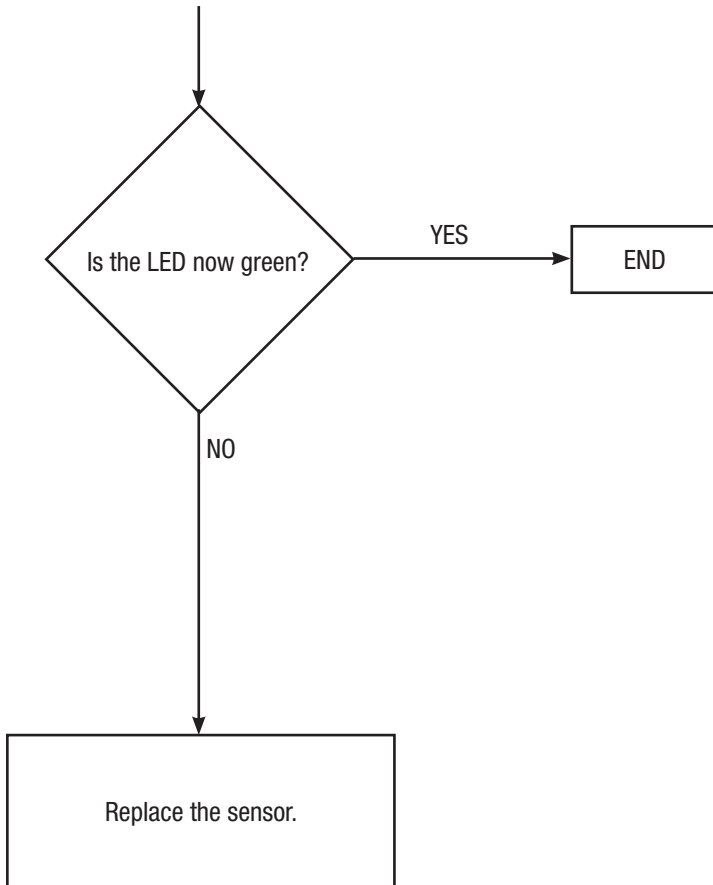
SECTION H - ULTRASOUND SENSORS (H4)

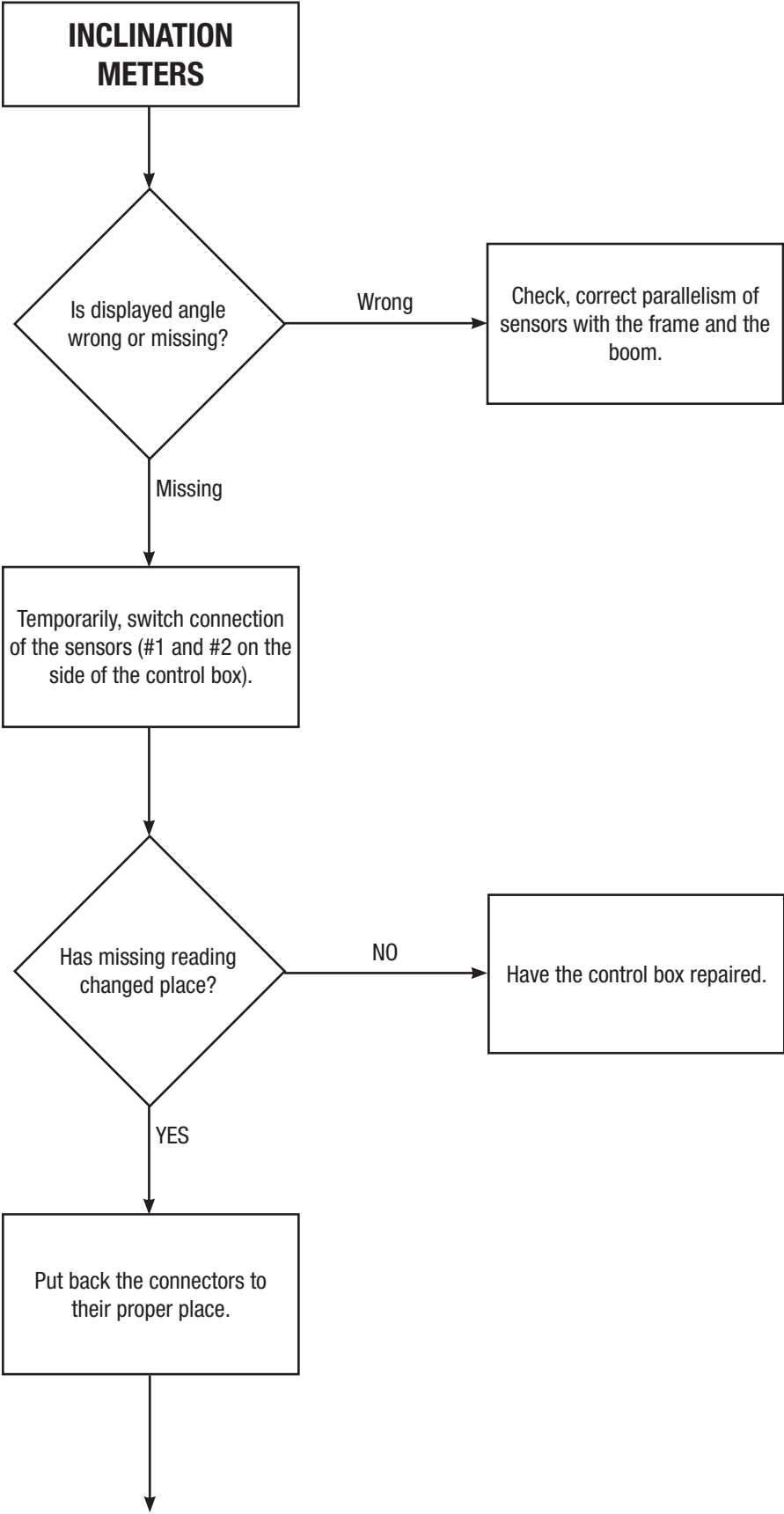




SECTION H - ULTRASOUND SENSORS (H6)

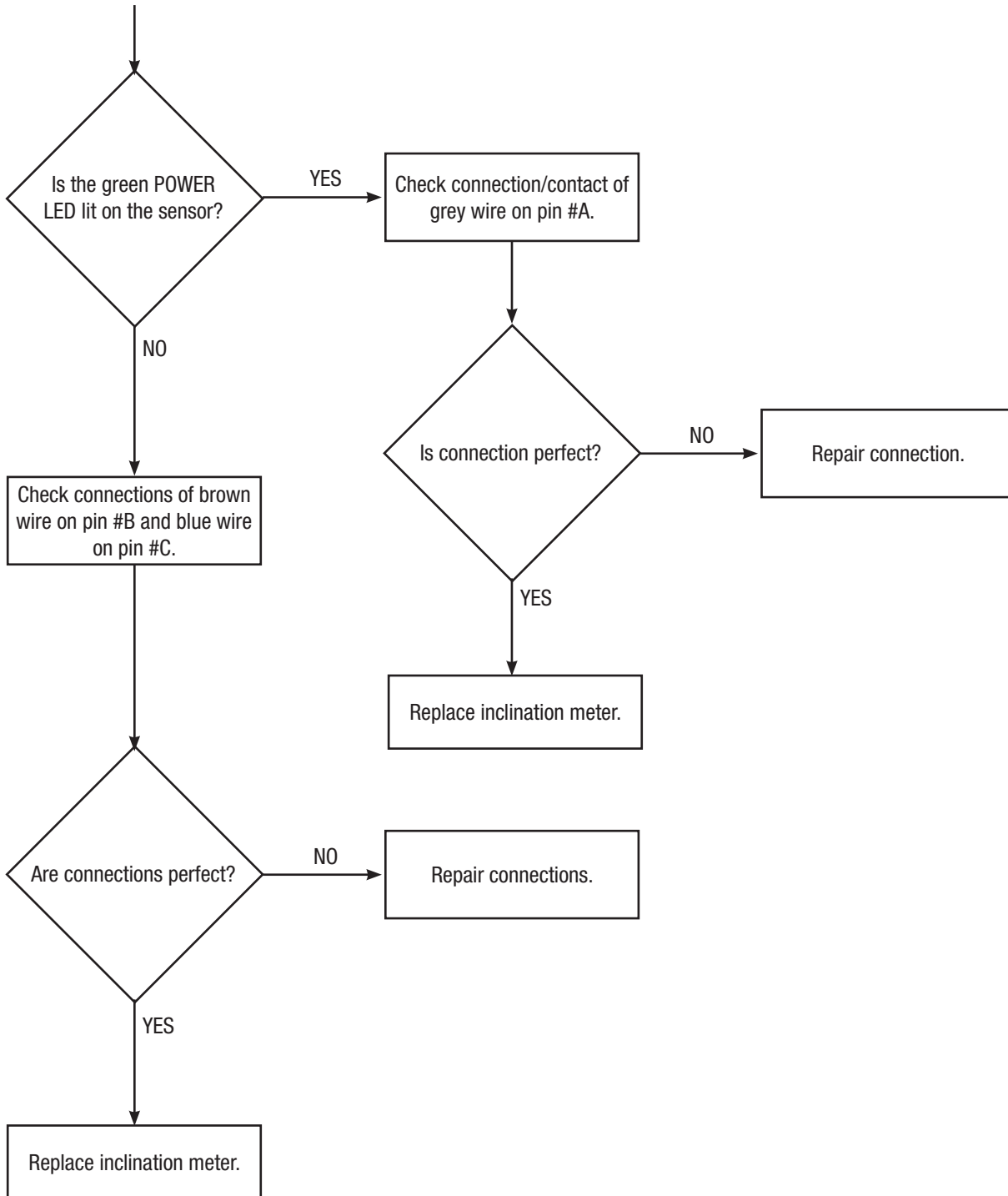
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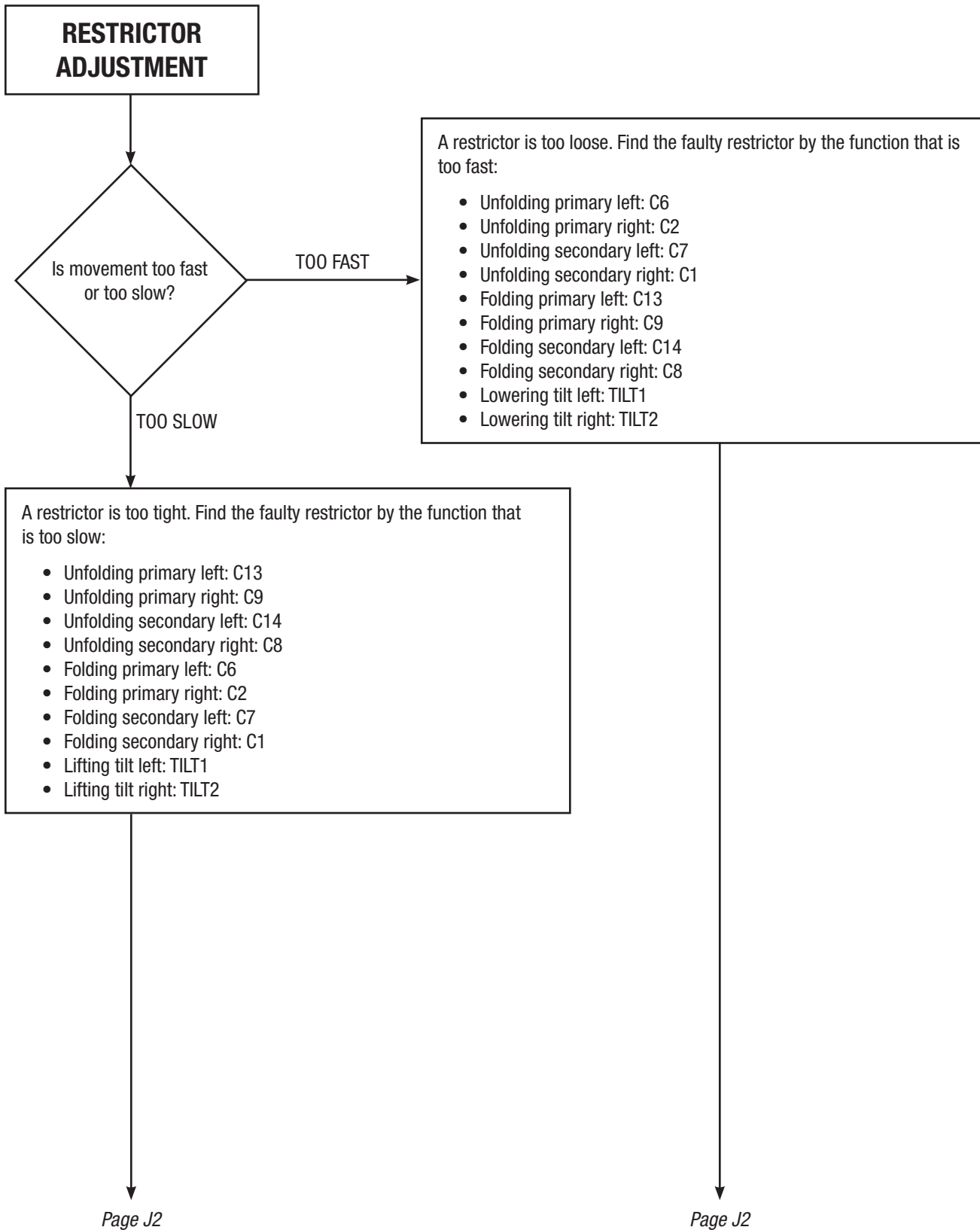
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SECTION J - RESTRICTOR ADJUSTMENT (J1)

This section applies only to directionnal restrictors installed in the hydraulic manifolds.
It does not apply to fixed restrictors installed on lines or in manifolds.



SECTION J - RESTRICTOR ADJUSTMENT (J2)

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Page J1



To adjust a restrictor, proceed as follows:

- Disconnect the hose
- Unscrew the locking nut
- Unscrew the elbow
- Finish total unscrewing of the locking nut up to the elbow
- Inspect and clean the restrictor
- Make sure that manifold cavity is clean.
- Insert the restrictor, with the slotted side visible
- Screw the elbow until it pushes firmly against the restrictor
- From that point, unscrew the elbow to align it. Unscrew at least 3/4 turn, nut not more than 1 3/4 turn.
- Screw the locking nut
- Plug back the hose
- Purge air from hydraulic system

DIRT IN RESTRICTOR

Use the following table to find the faulty restrictor:

Directional restrictors:

- Unfolding primary left: C6
- Unfolding primary right: C2
- Unfolding secondary left: C7
- Unfolding secondary right: C1
- Folding primary left: C13
- Folding primary right: C9
- Folding secondary left: C14
- Folding secondary right: C8
- Lowering tilt left: TILT1 (LOGICBOOM)
- Lowering tilt right: TILT2 (LOGICBOOM)

Fixed restrictors:

- Lowering or lifting center: C4
- Lowering or lifting tilt left C5 (manual controls)
- Lowering or lifting tilt right: C3 (manual controls)

Restrictors on lines:

- From the cylinder, follow the hose until finding the faulty restrictor.

Cleaning procedure:

- Dirt/foreign bodies are not always stuck. Do the movement until the problem happens
- Continue the movement until the end of the course of the cylinder, to be in a stable position
- Make sure there won't be any movement caused by the weight of the boom when the hose will be disconnected
- Disconnect the hose
- Clean the restrictor
- For a single acting cylinders, it may be difficult to keep dirt against the restrictor. In those cases, it may be necessary to flush some oil in a container to make sure to get rid of dirt
- Plug back the hose
- Do not forget to purge air from hydraulic system.



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