

Instruction Manual

Backup Camera System

MSC21970



BOSS Products
2010 The BOSS Way
Iron Mountain, MI 49801



In the box

- 1 x 150° Waterproof Backup Camera (MSC21973)
- 1 x 7" LED Color Monitor (MSC21971)
- 1 x U-Bracket Monitor Mount (MSC21977)
- 1 x Pedestal Monitor Mount (MSC21976)
- 1 x Power Harness (MSC21972)
- 1 x 33' Camera Cable (MSC21974)

In the Box. **03**

Safety Information. **04**

FMVSS-111 Information. **05**

Before Beginning Installation. **06**

Spreader Instructions **07**

Placement Diagram. **08**

Installation and Wire. **09**

Wiring and Triggers. **10-11**

Monitor Operation. **12**

Monitor Dimensions and Button Functions **13**

Monitor Specification. **14**

Camera Specification. **15**

Troubleshooting. **16-17**

Warranty & Disclaimer. **18-19**

THE TORO COMPANY: CONFIDENTIAL NAME: MSC21975 REV: A AUTH: ECM 53070 SHEET: 4

Please read the entire manual and follow the instructions and warnings carefully. Failure to do so can cause serious damage and/or injury, including loss of life. Be sure to obey all applicable local traffic and motor vehicle regulations as it pertains to this product. Improper installation will void manufacturer's warranty.

USAGE:

- The Rear View Camera System is designed to help the driver safely detect people and/or objects helping to avoid damage or injury. However, you the driver, must use it properly. Use of this system is not a substitute for safe, proper or legal driving.
- Never back up while looking at the monitor alone. You should always check behind and around the vehicle when backing up, in the same way as you would if the vehicle did not have the Rear View Camera System. If you back up while looking only at the monitor, you may cause damage or injury. Always back up slowly.
- The Rear View Camera System is not intended for use during extensive back-up maneuvers or backing into cross traffic or pedestrian walkways.
- Please, always remember, the area displayed by the Rear View Camera System is limited. It does not display the entire panorama that is behind you.
- Electric shock or product malfunction may occur if this product is installed incorrectly.
- Use this product within

- the voltage range specified. Failure to do so can cause electronic shock or product malfunction.
- Take special care when cleaning the monitor.
- Make sure to firmly affix the product before use.
- If smoke or a burning smell is detected, disconnect the system immediately.
- Where the power cable may touch a metal case, cover the cable with friction tape. A short circuit or disconnected wire may cause a fire.
- While installing the Rear View System be careful with the wire positioning in order to avoid wire damage.
- The Rear View System should only be used when the vehicle is in reverse.
- Do not watch movies or operate the monitor while driving; as it may cause an accident.
- Do not install the monitor where it may obstruct drivers view or obstruct an air bag device.
- Dropping the unit may cause possible mechanical failure.

THE TORO COMPANY: CONFIDENTIAL NAME: MSC21975 REV: A1 AUTH: FPM 03070 SHEET: 5

FMVSS 111 Information

FMVSS-111 affects all vehicles manufactured on or after May 1, 2018, that weigh less than 10,000lbs. A vehicle's compliance with this new standard is determined as follows: The camera must be able to view a 10-foot by 20-foot space directly behind a vehicle, which traditional mirrors do not enable a driver to fully view. The test used to verify these requirements includes a series of seven specifically sized cylindrical objects with either a horizontal band or vertical stripe applied. They are located in designated positions along the perimeter of this area, and the objects must all be within the rearview camera's field of view.

BOSS confirms that the included camera and monitor will meet FMVSS requirements if installed correctly. To position the camera in an appropriate location, please refer to the specific installation diagrams in this manual for BOSS VBX or Forge models and ensure that the mounted camera height is at least 4' from the ground. If these rules are followed, the positioning requirements can be met. For specific viewing requirements, please refer to the National Truck Equipment Association's (NTEA) summary here:

<http://www.ntea.com/fmvss111>

Proper installation for full compliance will also require only activating the monitor when the vehicle is in reverse. Please refer to the Installation and Wire section of this manual for installation instructions.

Before drilling please check that no cable or wiring is on the other side of the wall. Please clamp all wires securely to reduce the possibility of them being damaged while vehicle is in use. Keep all cables away from hot or moving parts and electrical noisy components.

We recommend doing a bench test before installation to insure that all components are working properly.

Step 1: Choose the monitor and camera locations.

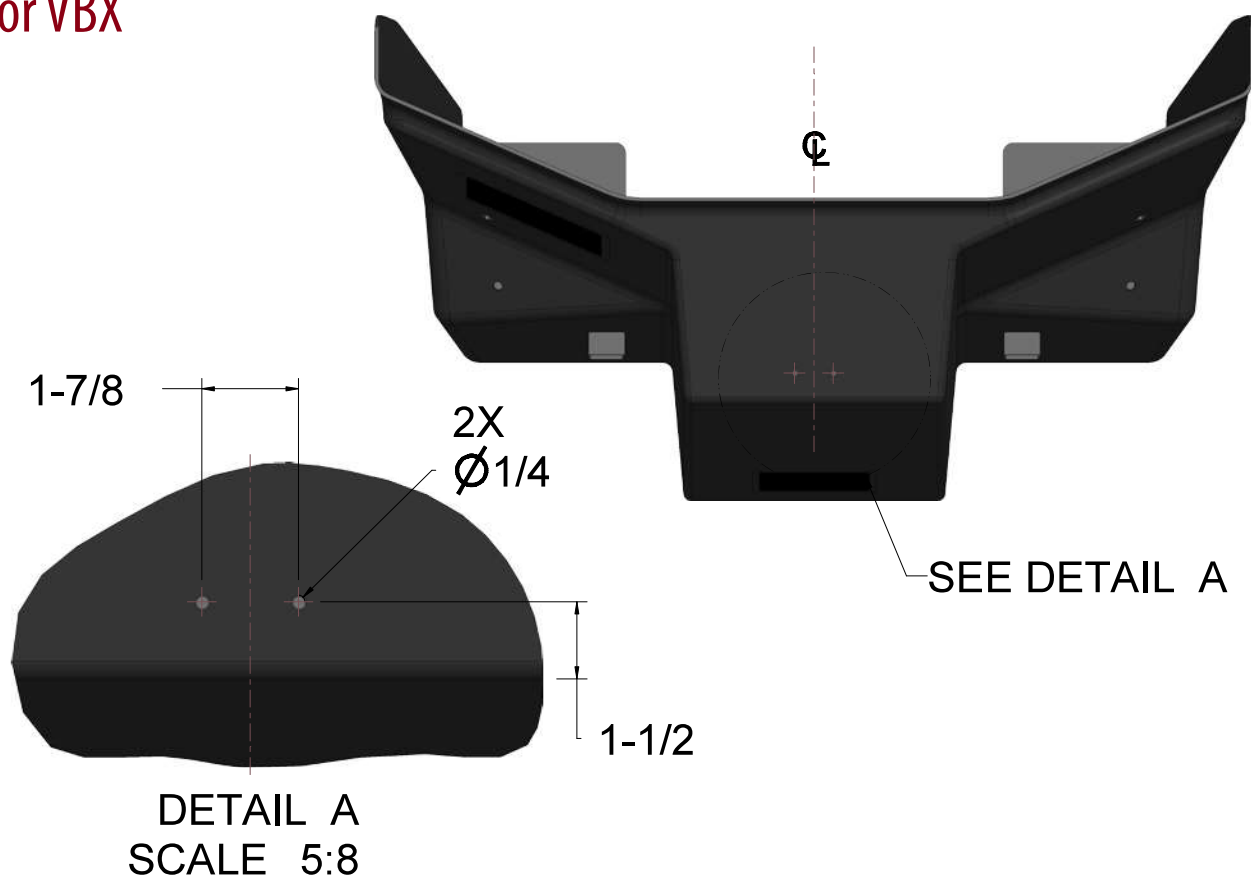
Step 2: Install all cables in vehicle, when necessary a 0.8" (20mm) hole should be drilled for passing camera cable through vehicles walls. Install split grommets where applicable.

Step 3: Once all cables and wiring have been properly routed, perform a system function test by temporarily connecting the system. If the system seems to not be operating properly see troubleshooting page.

BOSS Spreader Specific Installation Instructions

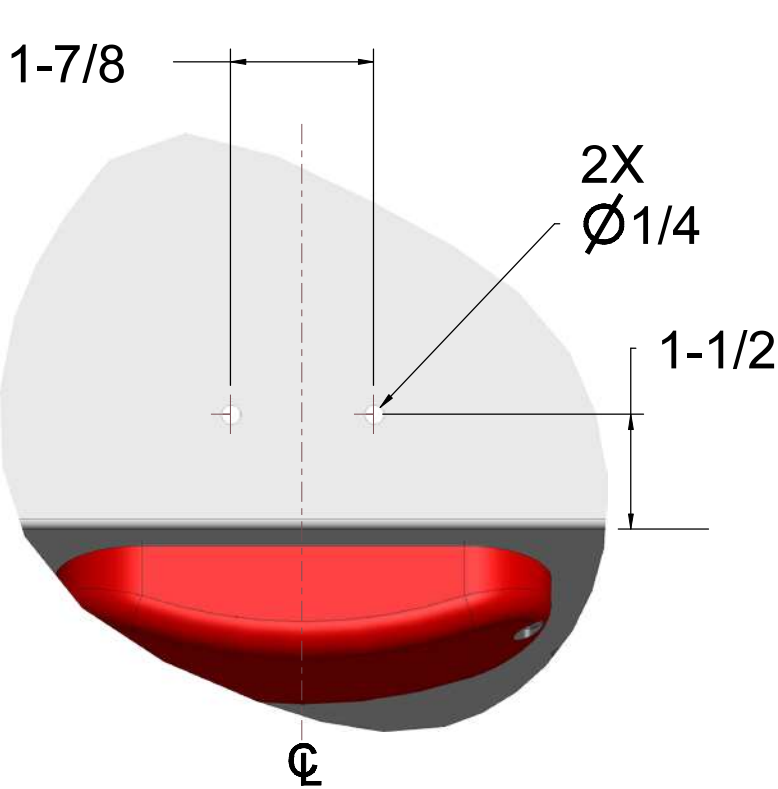
1. Determine if your spreader already has camera mounting holes (if yes, skip to step 4)
2. Mark out drill pattern on the motor cover according to the drawing provided for your model
3. Drill mounting holes with ¼" drill bit
4. Mount camera to motor cover with supplied hardware
5. Camera harness can be run inside the cover or externally, but make sure the connection to vehicle-harness is in an easy-to-access location for when spreader must be removed from vehicle

For VBX

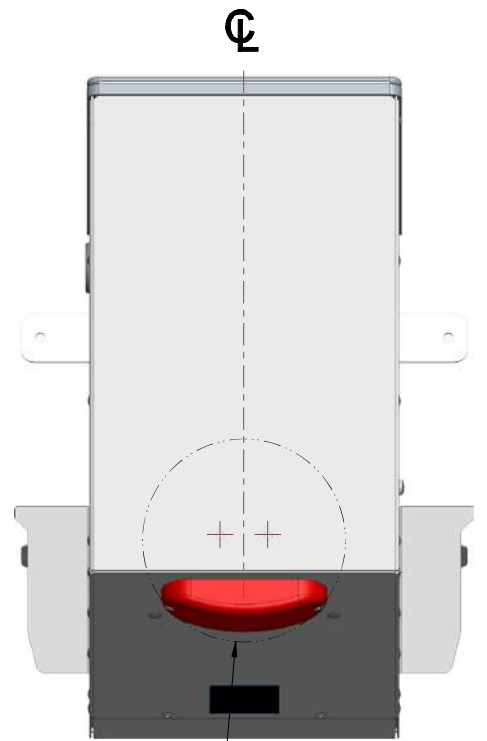


Spreader diagram continues on page 8

For Forge



DETAIL A
SCALE 3:4



SEE DETAIL A

Monitor Placement Diagram

Figure 1.1

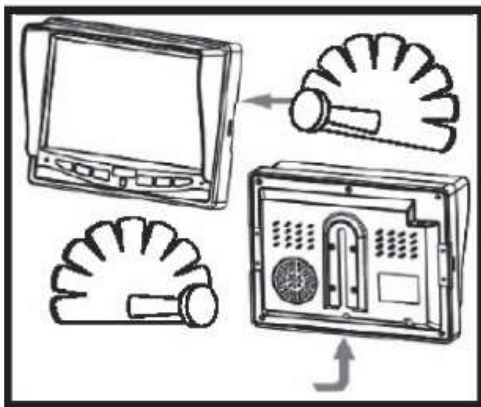


Figure 1.2

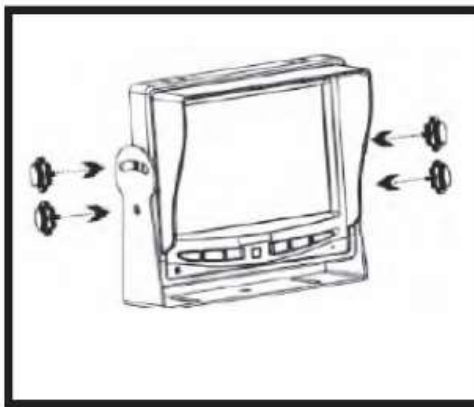
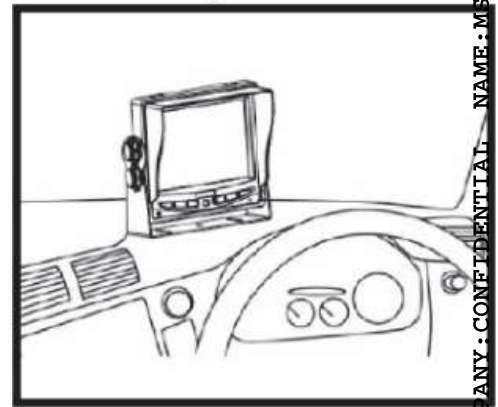
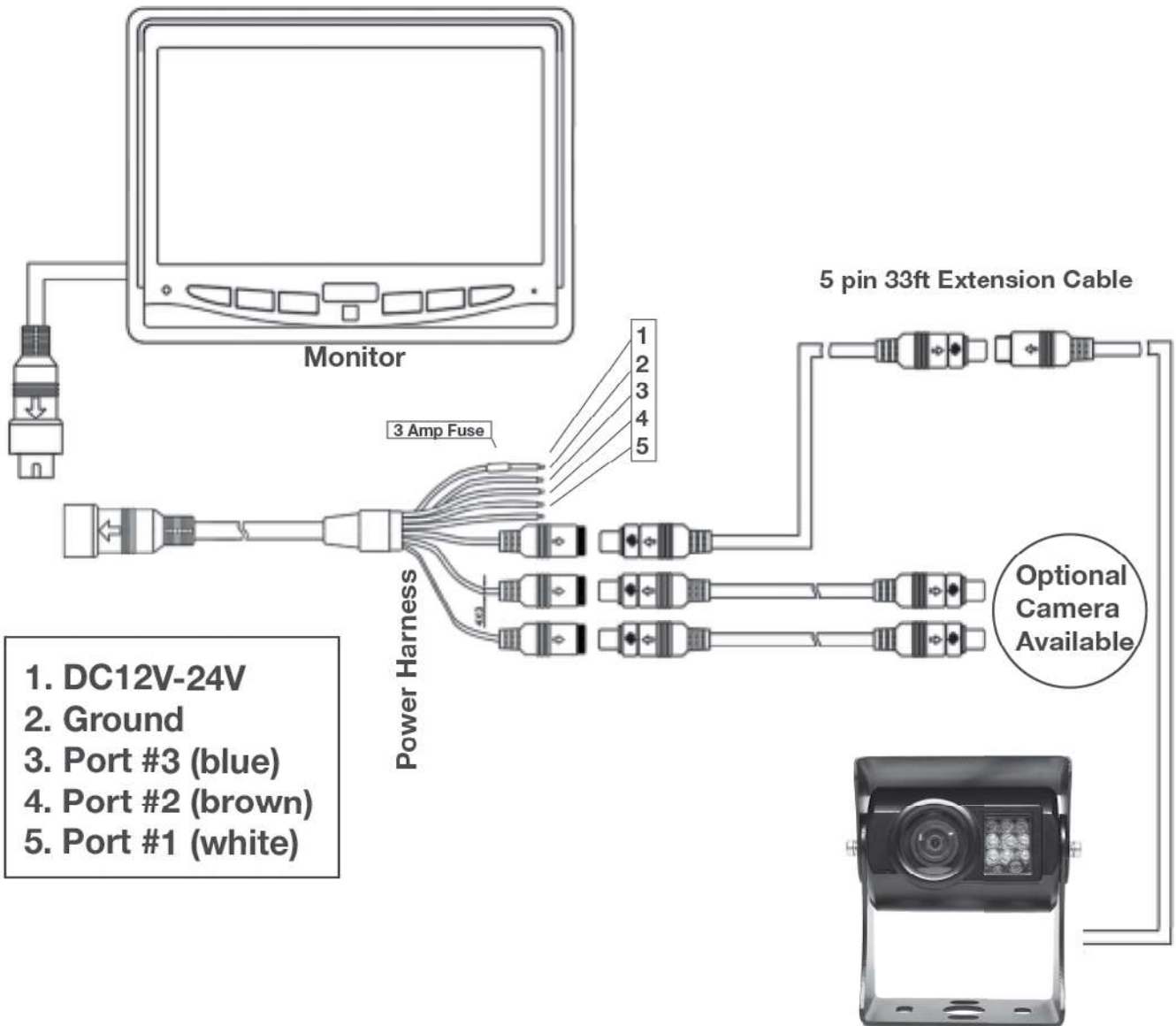


Figure 1.3

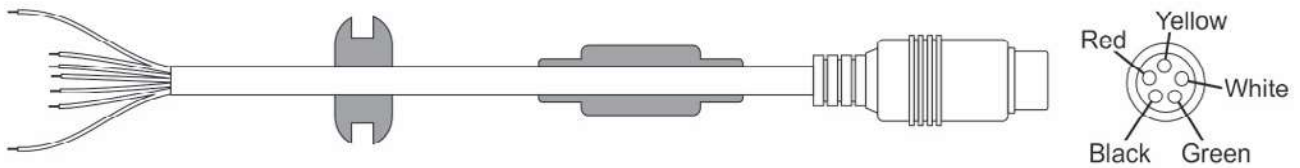


Connection of U
Bracket

Installing the Monitor



- 1. DC12V-24V
- 2. Ground
- 3. Port #3 (blue)
- 4. Port #2 (brown)
- 5. Port #1 (white)



- Red - Power (+)
- Yellow - Video
- Green - Mirror / Normal Imaging
- White - Audio
- Black - Ground (-)

Wiring and Triggers

To power the system connect the power (RED) 12V+ wire to ignition power and the ground (BLACK) wire to chassis ground.

These are the only wires needed to power the entire system and all the cameras. Each camera can be seen at any time by simply pressing the power button and using the V1/2 button to toggle.

The three positive trigger wires (BLUE-CH1, WHITE-CH2, YELLOW-CH3) each represent one channel and will turn on their channel when the trigger wire is energized with 12V.

“Camera 3” is the designated backup channel. To have the the backup camera come on when you go into reverse, connect the BLUE wire to reverse power (or any power source that comes on only in reverse). The other channels can similarly be triggered (i.e. side cameras can be triggered by the turn signals etc.)

To automatically have camera and monitor turn ON when vehicle activates, simply twist BLUE positive trigger 12V+ to Red Power line 12V+ and wire to ignition power. Note: When the blue wire is active it will have precedence over the other triggers. Therefore, if you wish to use multiple triggers, do not attach the blue trigger to constant power.

Audio: There is audio on channels 2 and 3. On channel 3 the blue trigger wire must be energized (12V) to activate the audio. On channel 2 the audio is always on.

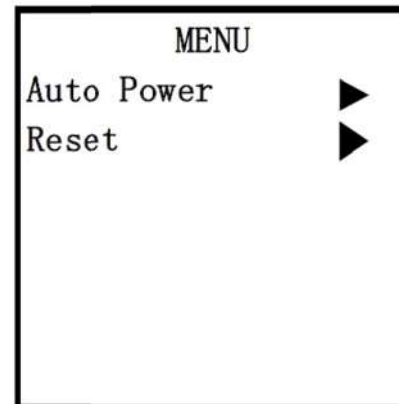
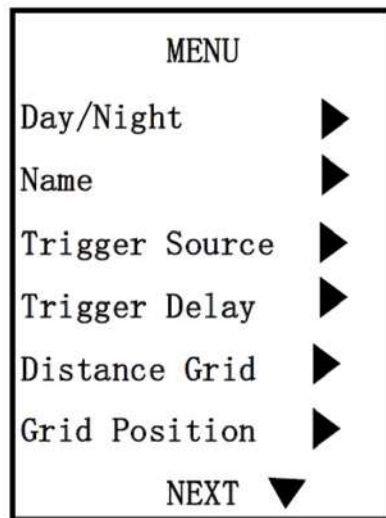
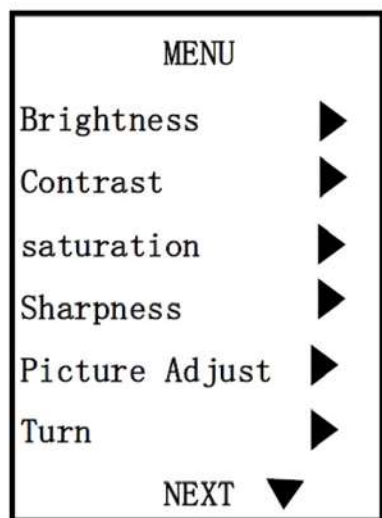
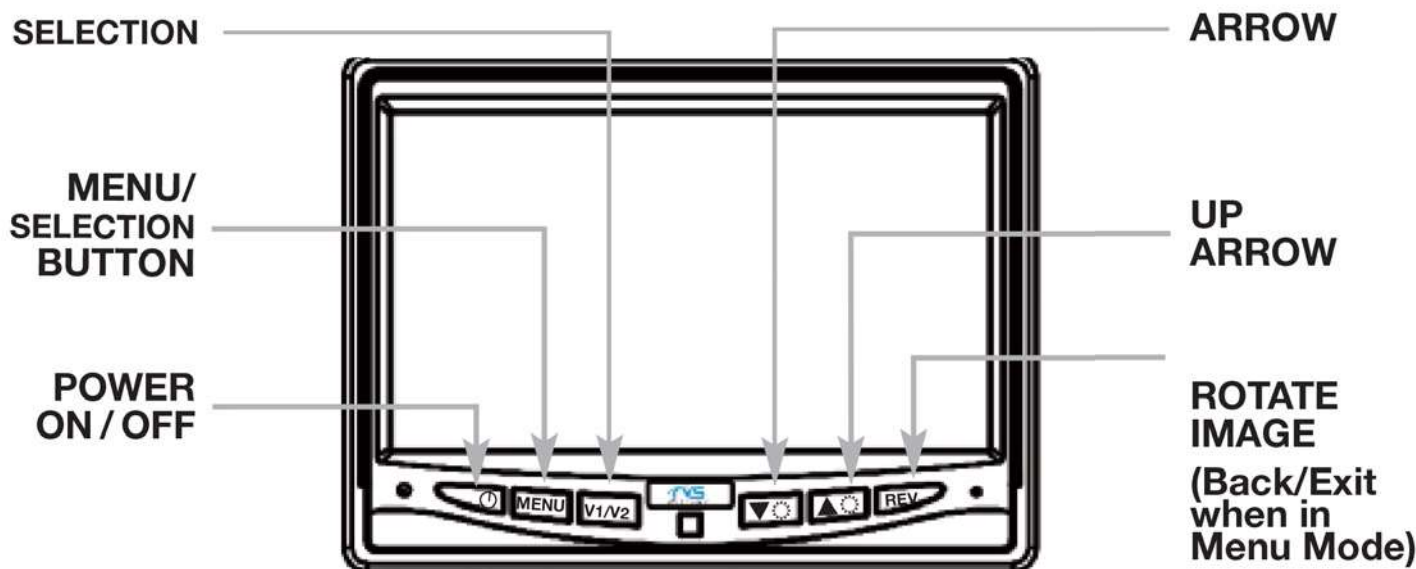
Grid-lines: The grid-lines are also carried through the blue wire. To use the grid-lines for reversing, connect the blue wire to a reverse power.

There is a built-in voltage regulator for our systems which can handle 12-24 volts. Real consumption is 10 to 30 Volts.

Note: The camera and monitor can always be activated by manually pushing the power button on monitor. This is in addition to utilizing the positive triggers.

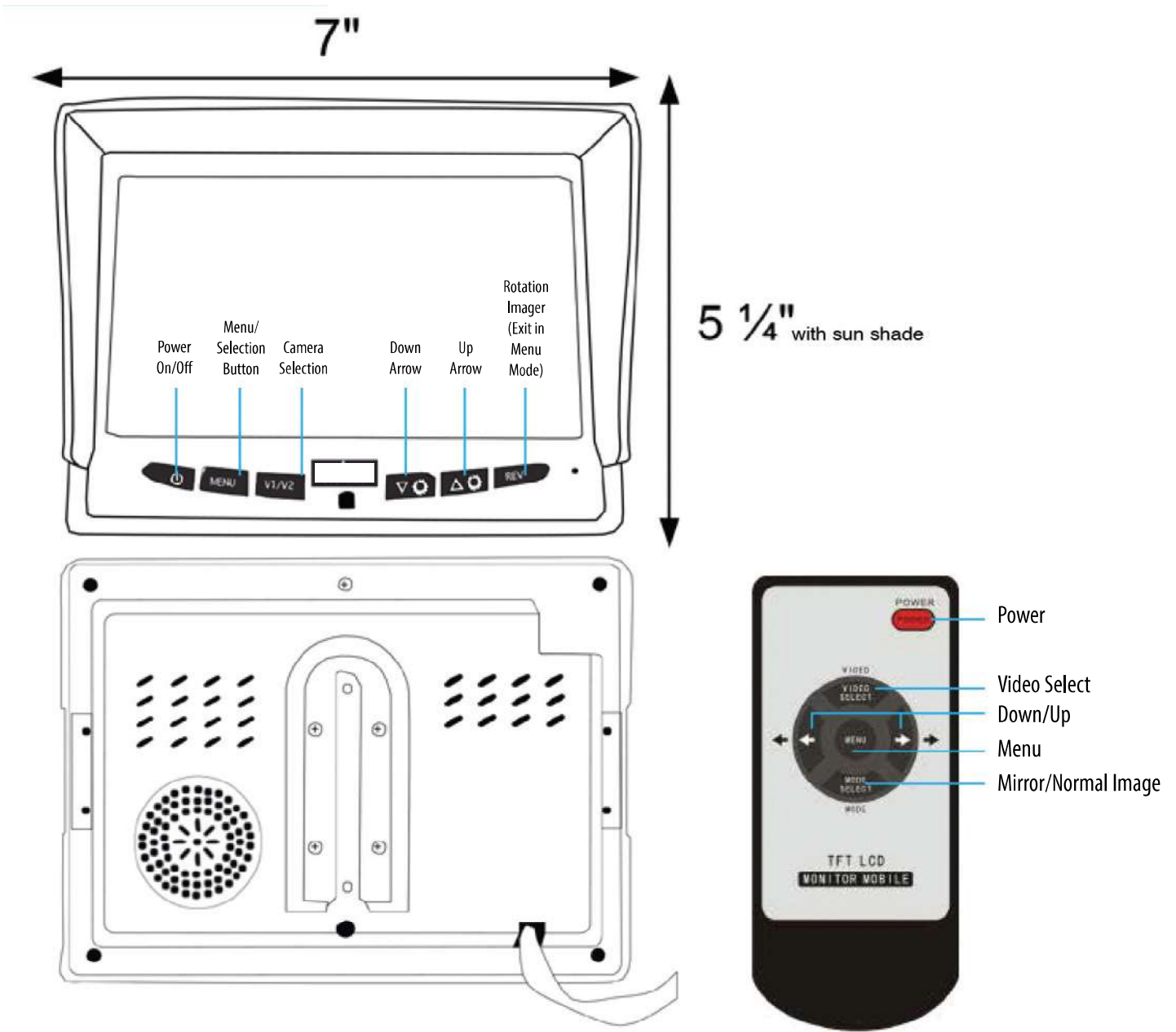
Note: If connecting power directly to battery, the camera is always ON and therefore can drain battery. Therefore it is recommended to connect power to an ignition switched accessory power source.

Monitor Operation



- "Brightness" "Contrast" "Saturation" "Sharpness": adjust image properties
- Picture Adjust: Stretch image horizontally (right/left and left/right)
- Turn: Toggle between mirror/normal image on each individual channel
- Day/Night: Toggle between back-lit buttons and auto dimming
- Name: Change name of each individual channel
- Trigger source: Toggle channel destination for each trigger
- Distance Grid: Toggle which channel distance grid lines will display on
- Grid Position: Adjust grid lines
- Auto Power: On: Monitor will automatically turn on when powered. Off: Monitor will only turn on when triggered. Auto: Monitor will follow previous state.
- Reset: Reset settings to factory default

Monitor Dimensions and Button Functions



MONITOR DIMENSIONS AND BUTTON FUNCTIONS
 NAME: MSC21197
 PART: EFM 53070
 REV: A
 SHEET: 14

THE TORO COMPANY: CONFIDENTIAL

Monitor Specification

Monitor Type	TFT Digital Monitor
Screen Size	7"
Dot Resolution	800H x 3 (RGB) x 480V
Display Format	16:9 / 500:1
Display Brightness	c 450cd/m2
Viewing Angle	U:50° / D:60° / R:70°
Video Input	3 channel
Video Source	1Vp-p, 75°
Power Supply	DC 12V-24V (+/- 10%)
Power Consumption	5W
Operating Temperature	-30°C ~ +80° C
Video System	Auto NTSC/PAL
Overall Dimensions	7"L x 5.25"H x 1"D
Weight	0.9 lbs
Impact	Rating 5G
Dot Pitch	0.192H x 0.1805V
Sync System	Internal

Camera Specification

Camera Type	1/3" Sharp CCD
Waterproof Rating	IP69K
Pixels	NTSC: 769 (H) X 494 (V) PAL: 752 (H) X 512 (V)
Resolution	600 TV Lines
Viewing Angle	150°
Infra-red Illuminators	9
Minimum Light	0 Lux (IR On)
S/N Ratio	More than 48 Db
Video Output	1Vp-p 75
Voltage	DC12V



Monitor Displays Blue Screen & Displays No Signal

- Do a hard reset, unplug all cables and power cables, leave them out for 1 minute and then re-connect them
- Check to ensure that the connection to the camera is tight
- Verify camera cable is plugged into port labeled Backup Camera
- Verify that the Blue Trigger on power harness is put to power 12v+
- If the problem still persists, verify that alternate ports work

No Audio from Camera

- Verify chosen camera has audio
- Check volume setting
- Confirm that the Blue Audio Trigger is connected to 12v+

Monitor Will Not Power-Up (power button unlit)

- Check fuse
- Check 12v+ to monitor
- Check ground connection

No Image On Screen

- Do a hard reset, unplug all cables and power cables, leave out for 1 minute, and then re-connect them
- Check to ensure that the connection to the camera is tight
- Verify camera cable is plugged into port labeled Backup Camera
- Verify that the Green Trigger on power harness is put to power 12v+
- Verify camera is in correct input
- Verify cable is connected to monitor
- Verify camera is connected to cable
- Connect known working camera and cable to monitor
- Verify Green Trigger is receiving power

BOSS LIMITED WARRANTY

BOSS PRODUCTS WARRANTS TO THE ORIGINAL RETAIL PURCHASER, THAT THE PRODUCT WILL BE FREE FROM DEFECTS IN MATERIAL AND WORKMANSHIP FOR TWO YEARS FROM THE ORIGINAL DATE OF PURCHASE FROM AN AUTHORIZED BOSS DEALER. IF WITHIN THE WARRANTY PERIOD, THE PRODUCT IS FOUND TO BE DEFECTIVE, BOSS PRODUCTS WILL REPAIR OR REPLACE AT ITS SOLE OPTION, THE DEFECTIVE PARTS AT NO CHARGE TO THE ORIGINAL PURCHASER. TO OBTAIN SERVICE UNDER WARRANTY, THE ORIGINAL RETAIL PURCHASER MUST RETURN THE DEFECTIVE PRODUCT TO AN AUTHORIZED BOSS DEALER (PREFERABLY THE ONE FROM WHOM THE PRODUCT WAS PURCHASED). THE PURCHASER MUST ESTABLISH THE WARRANTY PERIOD BY VERIFYING THE ORIGINAL PURCHASE DATE. ALL TRANSPORTATION COSTS TO AND FROM THE DEALER WILL BE THE RESPONSIBILITY OF THE PURCHASER.

WHAT IS NOT COVERED:

1. EXPENDABLE PARTS SUCH AS PINS, NUTS BOLTS, HARDWARE.
2. REPAIRS MADE BY ANYONE OTHER THAN AN AUTHORIZED BOSS DEALER.
3. PARTS WHICH HAVE BEEN SUBJECT TO MISUSE OR SERVICE, NEGLIGENCE, ACCIDENT, IMPROPER INSTALLATION, MAINTENANCE, CARE OR STORAGE.

WARRANTY LIMITATIONS:

THIS WARRANTY IS OFFERED IN LIEU OF ANY OTHER EXPRESS WARRANTY. THE DURATION OF ALL IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED TO THE DURATION OF THIS WARRANTY. BOSS PRODUCTS LIABILITY IS EXPRESSLY LIMITED TO THE REPAIR OF THE SPREADER, INCLUDING LABOR AND REPLACEMENT OF DEFECTIVE PARTS. BOSS PRODUCTS SHALL NOT BE LIABLE FOR ANY CONSEQUENTIAL, INCIDENTAL OR CONTINGENT DAMAGES WHATSOEVER, EVEN IF DAMAGES ARE CAUSED BY BOSS PRODUCTS NEGLIGENCE OR FAULT.

DISCLAIMER

BOSS PRODUCTS AND/OR ITS AFFILIATES DOES NOT GUARANTEE OR PROMISE THAT THE USER OF OUR SYSTEMS WILL NOT BE IN/PART OF AN ACCIDENT OR OTHERWISE NOT COLLIDE WITH AN OBJECT AND/OR PERSON. OUR SYSTEMS ARE NOT A SUBSTITUTE FOR CAREFUL AND CAUTIOUS DRIVING OR FOR THE CONSISTENT ADHERENCE TO ALL APPLICABLE TRAFFIC LAWS AND MOTOR VEHICLE SAFETY REGULATIONS. THE BOSS PRODUCTS PRODUCTS ARE NOT A SUBSTITUTE FOR REAR VIEW MIRRORS OR FOR ANY OTHER MOTOR VEHICLE EQUIPMENT MANDATED BY LAW. OUR CAMERA SYSTEMS HAVE A LIMITED FIELD OF VISION AND DO NOT PROVIDE A COMPREHENSIVE VIEW OF THE REAR OR SIDE AREA OF THE VEHICLE. ALWAYS MAKE SURE TO LOOK AROUND YOUR VEHICLE AND USE YOUR MIRRORS TO CONFIRM REARWARD CLEARANCE AND THAT YOUR VEHICLE CAN MANEUVER SAFELY. BOSS PRODUCTS AND/OR ITS AFFILIATES SHALL HAVE NO RESPONSIBILITY OR LIABILITY FOR DAMAGE AND/OR INJURY RESULTING FROM ACCIDENTS OCCURRING WITH VEHICLES HAVING SOME OF BOSS PRODUCTS PRODUCTS INSTALLED AND BOSS PRODUCTS AND/OR ITS AFFILIATES, THE MANUFACTURER, DISTRIBUTOR AND SELLER SHALL NOT BE LIABLE FOR ANY INJURY, LOSS OR DAMAGE, INCIDENTAL OR CONSEQUENTIAL, ARISING OUT OF THE USE OR INTENDED USE OF THE PRODUCT. IN NO EVENT SHALL BOSS PRODUCTS AND/OR ITS AFFILIATES HAVE ANY LIABILITY FOR ANY LOSSES (WHETHER DIRECT OR INDIRECT, IN CONTRACT, TORT OR OTHERWISE) INCURRED IN CONNECTION WITH THE SYSTEMS, INCLUDING BUT NOT LIMITED TO DAMAGED PROPERTY, PERSONAL INJURY AND/OR LOSS OF LIFE. NEITHER SHALL BOSS PRODUCTS AND/OR ITS AFFILIATES HAVE ANY RESPONSIBILITY FOR ANY DECISION, ACTION OR INACTION TAKEN BY ANY PERSON IN RELIANCE ON BOSS PRODUCTS SYSTEMS, OR FOR ANY DELAYS, INACCURACIES AND/OR ERRORS IN CONNECTION WITH OUR SYSTEMS FUNCTIONS.



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If you have any questions
about this product, contact:

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