WHELEN®
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Installation/Operating Guide:
CanTrol™ WC
Siren/Light Control System

Automotive: Sirens/Switches

DANGER! Sirens produce extremely loud emergency warning tones! Exposure to these tones without proper and adequate hearing protection, could cause ear damage and/or hearing loss! The Occupational Safety & Health Administration (www.osha.gov) provides information necessary to determine safe exposure times in Occupational Noise Exposure Section 1910.95. Until you have determined the safe exposure times for your specific application, operators and anyone else in the immediate vicinity should be required to wear an approved hearing protection device. Failure to follow this recommendation could cause hearing loss!

Warnings to Installers

Whelen's emergency vehicle warning devices must be properly mounted and wired in order to be effective and safe. Read and follow all of Whelen's written instructions when installing or using this device. Emergency vehicles are often operated under high speed stressful conditions which must be accounted for when installing all emergency warning devices. Controls should be placed within convenient reach of the operator so that they can operate the system without taking their eyes off the roadway. Emergency warning devices can require high electrical voltages and/or currents. Properly protect and use caution around live electrical connections.Grounding or shorting of electrical connections can cause high current arcing, which can cause personal injury and/or vehicle damage, including fire. Many electronic devices used in emergency vehicles can create or be affected by electromagnetic interference. Therefore, after installation of any electronic device it is necessary to test all electronic equipment simultaneously to insure that they operate free of interference from other components within the vehicle. Never power emergency warning equipment from the same circuit or share the same grounding circuit with radio communication equipment. All devices should be mounted in accordance with the manufacturer's instructions and securely fastened to vehicle elements of sufficient strength to withstand the forces applied to the device. Driver and/or passenger air bags (SRS) will affect the way equipment should be mounted. This device should be mounted by permanent installation and within the zones specified by the vehicle manufacturer, if any. Any device mounted in the deployment area of an air bag will damage or reduce the effectiveness of the air bag and may damage or dislodge the device. Installer must be sure that this device, its mounting hardware and electrical supply wiring does not interfere with the air bag or the SRS wiring or sensors. Mounting the unit inside the vehicle by a method other than permanent installation is not recommended as unit may become dislodged during swerving; sudden braking or collision. Failure to follow instructions can result in personal injury. Whelen assumes no liability for any loss resulting from the use of this warning device. PROPER INSTALLATION COMBINED WITH OPERATOR TRAINING IN THE PROPER USE OF EMERGENCY WARNING DEVICES IS ESSENTIAL TO INSURE THE SAFETY OF EMERGENCY PERSONNEL AND THE PUBLIC.

Warnings to Users

Whelen's emergency vehicle warning devices are intended to alert other operators and pedestrians to the presence and operation of emergency vehicles and personnel. However, the use of this or any other Whelen emergency warning device does not guarantee that you will have the right-of-way or that other drivers and pedestrians will properly heed an emergency warning signal. Never assume you have the right-of-way. It is your responsibility to proceed safely before entering an intersection, driving against traffic, responding at a high rate of speed, or walking on or around traffic lanes. Emergency vehicle warning devices should be tested on a daily basis to ensure that they operate properly. When in actual use, the operator must ensure that both visual and audible warnings are not blocked by vehicle components (i.e.: open trunks or compartment doors), people, vehicles, or other obstructions. It is the user's responsibility to understand and obey all laws regarding emergency warning devices. The user should be familiar with all applicable laws and regulations prior to the use of any emergency vehicle warning device. Whelen's audible warning devices are designed to project sound in a forward direction away from the vehicle occupants. However, because sustained periodic exposure to loud sounds can cause hearing loss, all audible warning devices should be installed and operated in accordance with the standards established by the National Fire Protection Association.

Safety First

This document provides all the necessary information to allow your Whelen product to be properly and safely installed. Before beginning the installation and/or operation of your new product, the installation technician and operator must read this manual completely. Important information is contained herein that could prevent serious injury or damage.

⚠ **WARNING:** This product may contain chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. For more information, visit www.whelen.com/regulatory.

- **Proper installation of this product requires the installer to have a good understanding of automotive electronics, systems and procedures.**
- **Whelen Engineering requires the use of waterproof butt splices and/or connectors if that connector could be exposed to moisture.**
- **Any holes, either created or utilized by this product, should be made both air- and watertight using a sealant recommended by your vehicle manufacturer.**
- **Failure to use specified installation parts and/or hardware will void the product warranty.**
- **If mounting this product requires drilling holes, the installer MUST be sure that no vehicle components or other vital parts could be damaged by the drilling process. Check both sides of the mounting surface before drilling begins. Also de-burr the holes and remove any metal shards or remnants. Install grommets into all wire passage holes.**
- **If this manual states that this product may be mounted with suction cups, magnets, tape or Velcro®, clean the mounting surface with a 50/50 mix of isopropyl alcohol and water and dry thoroughly.**
- **Do not install this product or route any wires in the deployment area of your air bag. Equipment mounted or located in the air bag deployment area will damage or reduce the effectiveness of the air bag, or become a projectile that could cause serious personal injury or death. Refer to your vehicle owner's manual for the air bag deployment area. The User/Installer assumes full responsibility to determine proper mounting location, based on providing ultimate safety to all passengers inside the vehicle.**
- **For this product to operate at optimum efficiency, a good electrical connection to chassis ground must be made. The recommended procedure requires the product ground wire to be connected directly to the NEGATIVE (-) battery post (this does not include products that use cigar power cords).**
- **If this product uses a remote device for activation or control, make sure that this device is located in an area that allows both the vehicle and the device to be operated safely in any driving condition.**
- **It is recommended that these instructions be stored in a safe place and referred to when performing maintenance and/or reinstallation of this product.**
- **FAILURE TO FOLLOW THESE SAFETY PRECAUTIONS AND INSTRUCTIONS COULD RESULT IN DAMAGE TO THE PRODUCT OR VEHICLE AND/OR SERIOUS INJURY TO YOU AND YOUR PASSENGERS!**

ACTIVATION OF THIS SIREN MAY DAMAGE UNPROTECTED EARS!

⚠CAUTION
Loud siren noise can cause hearing damage and/or loss.
Refer to OSHA Section 1910.95 prior to putting ANY siren into service!

Form No.14580F (050417)

For warranty information regarding this product, visit **www.whelen.com/warranty**

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Illustrations

Specifications

General

Input Voltage	12 VDC ±20% Negative Ground Only
Main Input Current	80 Amps Max.
Main Input Fuse	2 Fuses @ 40 Amps ea.
Standby Current (backlight off)	Ign.On - 80mA (typ) / Ign.Off - 100 uA (typ)
Operating Temperature	-30°C to +60°C
Storage Temperature	-40°C to +70°C
Humidity	99% (Non-condensing)

Amp/Relay Module

Audio Bandwidth @ 25 Watts	300 to 10000 Hz ±3db
Distortion @ 25Watts	1% Maximum
Speaker Impedance	5.5 Ohms Minimum

Outlet Current

LED Outlets J2 & J4 (32 Total)	2.5A Each (Internally Limited)

Note: Total combined current not to exceed 40 Amps

High Current Outlets J1 (8 Total)	10A Each (Fused)

Note: Outlets J1-5 thru J1-8 may be Positive or Negative activated
Note: Total combined current not to exceed 40 Amps

LC AUX Outlets (J4-1, J4-2, J4-11)	250mA Each (Internally Limited)

Input Operation

Logic Inputs 1-4	Positive or Negative Activation
Logic Inputs 5-8	Positive Activation Only
Analog Inputs 1-3	0 - 12VDC
Ignition Sense	Connected to 12VDC Ignition Switch

Dimensions (Amp/Relay Module)

Height	3.25 inches
Width	7.62 inches
Depth	9.50 inches

Dimensions (Control Head)

Height	3.58 inches
Width	6.85 inches
Depth	1.32 inches

Installation

CanTrol™ Module

1. Locate a suitable mounting location. A dry, cool compartment is a good choice.
2. Position the CanTrol Module on the proposed mounting location. Using an awl or similar tool, scribe the mounting surface where the mounting holes are to be drilled. Make sure that this mounting area allows sufficient ventilation for the CanTrol™ module's air vents and fans.

Caution: As mounting the CanTrol™ module will require drilling, it is absolutely necessary to make sure that no other vehicle components could be damaged in the process. Check both sides of the mounting surface before starting. If damage is likely, select a different mounting location.

3. Remove the module from its mounting area, and using a drill bit sized for a #10 sheet metal screw, drill a hole in each of the areas scribed in the previous step.
4. Return the module to its mounting location and using #10x3/4" sheet metal screws (provided), secure the module onto its mounting surface. Be sure to install a #10 internal tooth lock washer (included) onto each mounting screw before mounting the unit. **IMPORTANT:** The CanTrol™ module case must be either mounted on, or grounded to the vehicle chassis.

Control Head

The CanTrol™ control head features 18 push-buttons with active illumination, a 4-position slide switch (off, 1, 2 & 3) and a Traffic Advisor™ display that enables the operator to view a representation of the direction being displayed. There are two basic mounting brackets for the CanTrol™ control head. One allows the control head to be mounted into your vehicle's console (if so equipped). The other allows the control head to be mounted directly onto the dash or other surface through the use of a bail strap mounting bracket. **Regardless of the style selected, be sure to observe the air bag warning on the cover of this manual.**

Bail-strap mount

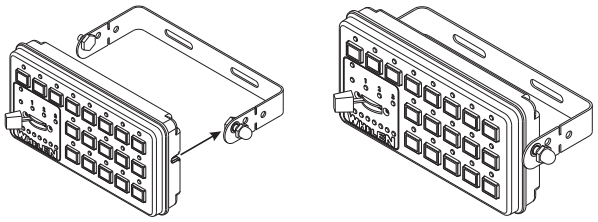
1. Position the bail strap in the selected mounting location. Using an awl or other suitable tool, scribe the surface where the mounting holes are to be drilled.

Caution: As mounting the control head will require drilling, it is absolutely necessary to make sure that no other vehicle components could be damaged in the process. Check both sides of the mounting surface before starting. If damage is likely, select a different mounting location.

2. Drill the mounting holes in the areas scribed in step 1. The size of the drill bit should be determined by the size of the mounting hardware (#10 sheet metal screw) and thickness of the mounting surface.
3. Using hardware provided (#10 x 3/4" sheet metal screw & #10 internal tooth lockwasher), secure the bail strap to the mounting location.

Note: There are 3 sets of holes on the bail strap for positioning the control head at 3 different heights.

4. With the bail strap in place, insert the #10 x 3/8" hex head bolt into the assembly hole from the inner side of the bail strap. Place the #10 internal-tooth lock washer and the acorn nut on the protruding bolt on the outer side of the bail strap. Loosely secure the acorn nut to the hex head bolt.



Now slide the control head onto the bolt heads. Once it is in the position that the customer has chosen, and the control head has fully engaged the bolt heads, tighten the acorn nuts until the unit is firmly secured.

A third pair of mounting holes are provided that will enable the control head to be located much closer to the bail strap than the other pairs allow. If this closer location is used, the tips of the bail bracket may be broken off at the notches shown.

Havis Console Mount

The Havis console mounting kit includes all the necessary hardware needed to secure the control head to the mounting bracket for installation on a Havis console. The control head mounts onto the console mount bracket the same way the control head mounts onto the bail bracket as outlined previously except for the addition of a flat washer that must be inserted between the control head and the bracket. Please refer to the manual included with your console for specific information on securing the control head/mounting bracket assembly onto the console.

For installation into consoles by other manufacturers, a control head bracket designed for your console must be obtained from the console manufacturer.

Microphone (Item 8)

A 1/4" port is provided on the CanTrol™ module for installation of the microphone.

If the optional 20' extension cord is used, install this cord as outlined above. Install the mic plug bracket (included with kit) in the desired area using #8 x 1/2" hardware (included). Route the cord to the plug bracket, install the cable end thru the bracket hole and fasten using the hex nut provided.

PA Volume Adjustment (Item 9)

Using a small, flat-blade screwdriver, set the potentiometer to its middle position. With the CanTrol™ system on, activate the PTT (Push To Talk) feature on the optional microphone. Adjust the potentiometer until a satisfactory PA volume level is achieved using a normal speaking voice.

Radio Repeat Volume Adjustment (Item 10)

To Adjust the Radio Repeat Levels: Before placing this unit into service, the Radio Repeat output volume must be adjusted to satisfactory operating levels. To adjust this level, a small, flat-blade screwdriver is needed. Locate the Radio Repeat adjustment potentiometer on the left side of the CanTrol™ module. Set the volume of the vehicle's two-way radio to its normal operating level. Press the RAD button on the control head to activate Radio Repeat. As incoming transmissions are received, adjust the Radio Repeat potentiometer to set the desired level. Turn the potentiometer clockwise to increase the level and counter-clockwise to decrease the level.

Control Head Configuration:

There is an almost limitless number of configurations in which the CanTrol™ system can be programmed. Each of the available control heads operate differently from one another.

Additionally, each control head has its own, unique default configuration, based on the control head style and other system components. Refer to the CanTrol™ software to configure your specific configuration.

Wiring

WARNING! All customer supplied wires that connect to the positive terminal of the battery must be sized to supply at least 125% of the maximum operating current and fused "at the battery" to carry that load (see wire chart on page 9).

NOTE: Item numbers reference the illustration found on page 7.

IMPORTANT! Wires connecting to the amp/relay module have the proper terminals pre-installed. If the customer needs to re-terminate these wires for any reason, the proper tool MUST be used to insure proper crimping.

System Power (Item 5)

1. Locate the 4-position Molex™ connector (item 5).
2. Using appropriately sized wire, extend the two RED wires to the Positive (+) battery terminal. Fuse each wire independently @ 40 Amps. DO NOT install these fuses until the wiring for the entire system has been completed.
3. Using appropriately sized wire, extend the two BLACK wires from the CanTrol™ module to the vehicle's chassis ground. This is typically adjacent to the battery.
4. Complete the connections and plug the connectors into the CanTrol™ module.

Ignition Sense (Item 13)

1. Locate the RED/WHT wire at J17-7.
2. Connect this wire to the vehicle ignition switch. This will allow the CanTrol™ system to be turned off with the ignition switch.

Outputs

CanTrol™ offers the following outlets:

32 LED outputs (2.5A Max. each)

8 High Current outputs (10A Max. each)

3 Aux. outputs (250mA Max each)

Siren Speaker (Item 7)

1. Route the ORG and BRN wires from the CanTrol™ module to the siren speaker.
2. Connect ORG wire to the WHT speaker wire (speaker high).
3. Connect BRN wire to BLK speaker wire (speaker low).

NOTE: For dual speaker installation, connect the second speakers wires to the same destinations as the first speakers wires (see page 10).

Radio Rebroadcast (Item 13)

Two BLU wires (J17-8 & J17-16) are used to connect your two-way radio's external speaker for radio rebroadcast. This is an optional connection and will not effect the other operations.

Note: Radio rebroadcast will NOT work with amplified remote speakers! If your remote speaker is amplified (i.e.: contains a power amp circuit in the speaker assembly), do not enable the radio rebroadcast feature.

1. Locate the two wires that connect the external speaker to the two-way radio, cut one of them and splice one of the BLU wires into this circuit.
2. Cut the remaining speaker wire and splice the remaining BLU wire into this circuit.

Backlighting (Item 13)

Note: The CanTrol™ backlight circuit has been designed to accept any of the following:

0 VDC Input (off)

12VDC (on)

A Pulse Width Modulated (PWM) input with a range of 0% - 100% duty cycle@100Hz (i.e. dimmer circuit)

1. Route the WHT/BLK wire (J17-5) from the CanTrol™ module to the vehicle's marker light circuit.
2. Splice this wire into this circuit to enable the control head backlighting to be active whenever the vehicle's marker light is active.

Inputs

The CanTrol™ system inputs operate as follows:

Logic Inputs - These are programmable inputs and their default configuration and activation polarity is as follows:

Active High/Low

Logic Input 1 (J17-1) - Horn Ring Input (Ground Activated). Identical in operation to the Manual button when the Horn Transfer Relay has been activated.

Logic Input 2 (J17-2) - Park Sense 1 (Positive Activated). Terminates siren operations.

Logic Input 3 (J17-3) - Unused

When connecting to the vehicle's transmission neutral safety switch signal wire, always consult your vehicle's technical manual before altering your vehicle's wiring. Wiring modifications may compromise your vehicle's safety and/or performance.

Logic Input 4 (J17-4) - Unused

Active High Only

Logic Input 5 (J17-9) - Unused

Logic Input 6 (J17-10) - Unused

Logic Input 7 (J17-11) - Unused

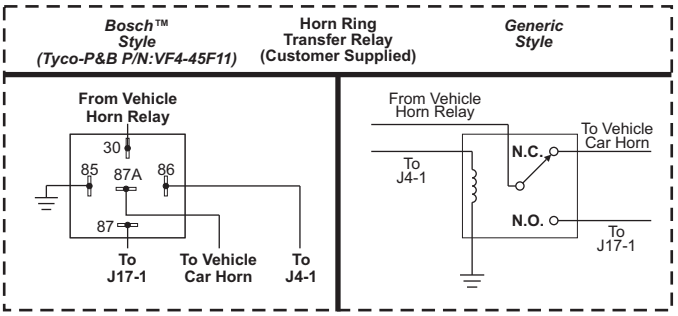
Logic Input 8 (J17-12) - Unused

Analog Inputs - There are three (3) analog inputs (J17-5, J17-13 and J17-6). Their input voltage may range from 0 to 12VDC. By default, Analog Input 2 and Analog Input 3 are disabled and can be enabled as needed.

The remaining inputs are designated to be used for Ignition Sense (J17-7) and Radio Repeat (J17-8 & J17-16).

Hands-Free Siren (Items 4 & 13) (Optional)

1. Using a customer supplied relay capable of handling the current of your vehicle horn, connect as shown below.

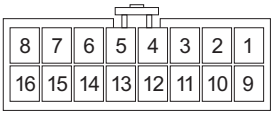


Input Expansion Module (optional)

The optional input expansion module enables up to eight (8) non-CenCom vehicle components and/or equipment to be integrated into the CenCom/ Cantrol network.

As shown in the tables below, connect the input wire of the desired device to the appropriate wire. For example, if the device in question requires a Positive input signal, that input wire would be connected to the BROWN expansion module pigtail wire. In this example, that device would be recognized as “INPUT 1” by the CenCom/Cantrol system. However, if that device requires a Negative input signal, that input wire would be connected to the WHT/BRN expansion module pigtail wire. Note that this device would be recognized as “INPUT 1” by the CenCom/Cantrol system.

WIRE SIDE VIEW

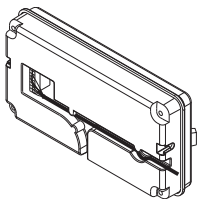


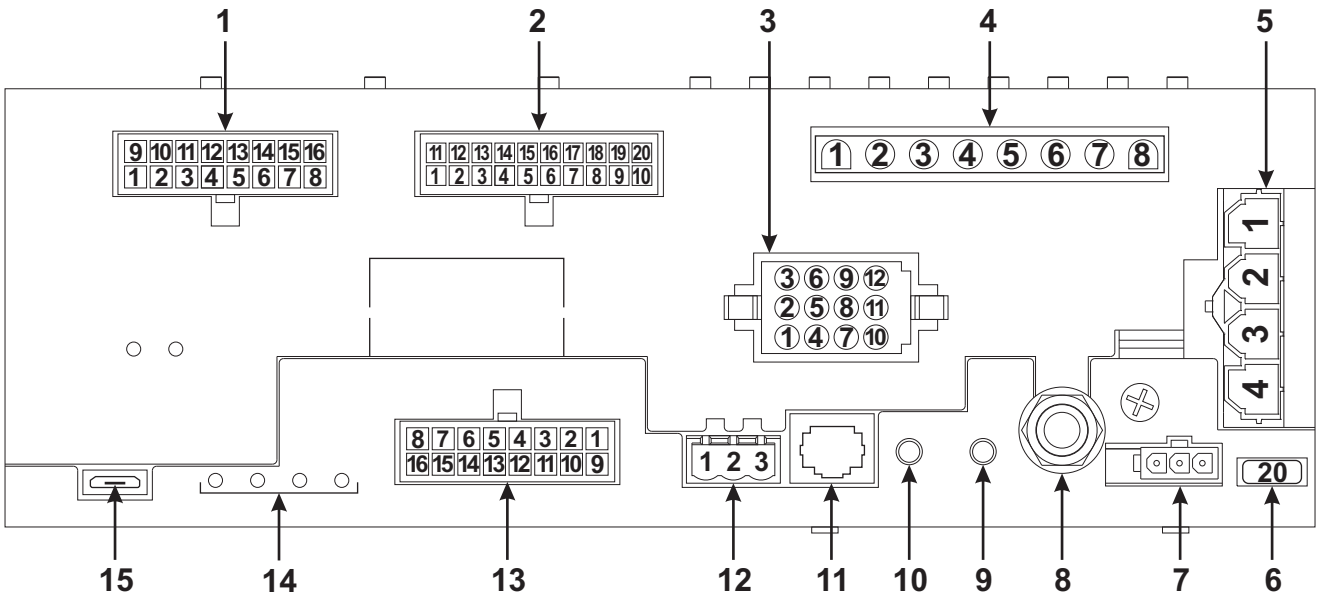
WIRE CHART

POS	COLOR	FUNCTION
1	BROWN	Positive Input 1
2	RED	Positive Input 2
3	ORANGE	Positive Input 3
4	YELLOW	Positive Input 4
5	GREEN	Positive Input 5
6	BLUE	Positive Input 6
7	VIOLET	Positive Input 7
8	GREY	Positive Input 8
9	WHT/BRN	Negative Input 1
10	WHT/RED	Negative Input 2
11	WHT/ORG	Negative Input 3
12	WHT/YEL	Negative Input 4
13	WHT/GRN	Negative Input 5
14	WHT/BLU	Negative Input 6
15	WHT/VIO	Negative Input 7
16	WHT/GRY	Negative Input 8

Control Head Strain Relief

1. Route the control head cable (provided) from the CanTrol™ module to the designated mounting location. Plug this cable securely into the rear of the control head. Be sure to route the cable through either of the two recessed pathways (shown here). This will prevent the cable from being accidentally disconnected or pinched by the control head.





1 (J2) - LED Outputs 17-32

Pos.	Output	Color
J2-1	17	BRN
J2-2	18	RED
J2-3	19	ORG
J2-4	20	YEL
J2-5	21	WHT/BRN
J2-6	22	WHT/RED
J2-7	23	WHT/ORG
J2-8	24	WHT/YEL
J2-9	25	GRN
J2-10	26	BLU
J2-11	27	VIO
J2-12	28	GRY
J2-13	29	WHT/GRN
J2-14	30	WHT/BLU
J2-15	31	WHT/VIO
J2-16	32	WHT/GRY

2 (J4) - LED Outputs 1-16 + LC AUX 1, 2, 3

Pos.	AUX	Color	Function*
J4-1	1	WHT/BLK	Horn Transfer Relay
J4-2	2	RED/WHT	Unused
J4-11	3	WHT	Unused

Pos.	Output	Color
J4-3	1	BRN
J4-4	2	RED
J4-5	3	ORG
J4-6	4	YEL
J4-7	5	WHT/BRN
J4-8	6	WHT/RED
J4-9	7	WHT/ORG
J4-10	8	WHT/YEL
J4-12	*- Not Used -*	
J4-13	9	GRN
J4-14	10	BLU
J4-15	11	VIO
J4-16	12	GRY
J4-17	13	WHT/GRN
J4-18	14	WHT/BLU
J4-19	15	WHT/VIO
J4-20	16	WHT/GRY

3 (J10) - Traffic Advisor Outputs

Pos.	Description
J10-1	(BRN) - T/A 1
J10-2	(RED) - T/A 2
J10-3	(ORG) - T/A 3
J10-4	(YEL) - T/A 4
J10-5	(GRN) - T/A 5
J10-6	(BLU) - T/A 6
J10-7	(VIO) - T/A 7
J10-8	(GRY) - T/A 8
J10-9	(WHT) - Comm. (+12V)
J10-10	*Not Used*
J10-11	*Not Used*
J10-12	*Not Used*

4 (J1) - High Current Outputs

Pos.	Color
J1-1	BRN
J1-2	RED
J1-3	ORG
J1-4	YEL
J1-5	GRN
J1-6	BLU
J1-7	VIO
J1-8	GRY

5 - Main Power

Pos.	Description
1	GND
2	GND
3	+12VDC(Fuse @ 40A)
4	+12VDC(Fuse @ 40A)

6 - Siren Fuse
This fuse (20A) protects the Siren Output

7 - Siren Speaker

Pos.	Description
1	Speaker (+)
2	*Not Used*
3	Speaker (-)

8 - PA Microphone Port
This port accepts a standard 1/4" Microphone plug for PA functions. NOTE: If your system uses the hand-held controller, this port should not be used.

9 - MIC Volume Adjustment
Used to set the PA broadcast level to the desired volume *(see text)*.

10 - RAD Repeat Volume
Used to set the PA broadcast level to the desired volume *(see text)*.

11 - Control Head
Used to connect the control head to the CanTrol system

12 - WC Lightbar

Pos.	Description	Color
1	CAN A	GRN
2	SHIELD	BARE
3	CAN B	GRY

*These lists shows the default functions. These functions can be changed using the CanTrol™ configuration software

13 (J17) - Logic Inputs

Pos.	Input	Color	Function*
J17-1	Logic 1	WHT/BRN	Horn Sense (Neg.)
J17-2	Logic 2	WHT/RED	Park Sense 1 (Pos.)
J17-3	Logic 3	WHT/ORG	Unused
J17-4	Logic 4	WHT/YEL	Unused
J17-9	Logic 5	BLK/WHT	Unused
J17-10	Logic 6	WHT/GRN	Unused
J17-11	Logic 7	WHT	Unused
J17-12	Logic 8	WHT/BLU	Unused
J17-5	Analog 1	WHT/BLK	Backlight
J17-13	Analog 2	WHT/GRY	Unused
J17-6	Analog 3	WHT/VIO	Unused
J17-7	Ign.Sense	RED/WHT	Ignition
J17-8	Radio	BLU	Radio Repeat
J17-16	Radio	BLU	Radio Repeat

14 - Diagnostic LEDs

USB LED

Off	No connection detected
Slow Flash	For factory purposes only
Mom.Blink ON	Connection Detected / Not ready
Mom.Blink OFF	Data Packet transferred
Steady	Connection Detected / Ready for use

ERR (Error) LED

Steady	CanTrol Controller Bus is set to OFF. Check Interface Box.
Off	No Error.
Single Flash	Bad CanTrol connection. Check Lightbar I/O or Interface Box for proper operation.
Double Flash	Error Control Event. Check Lightbar I/O.

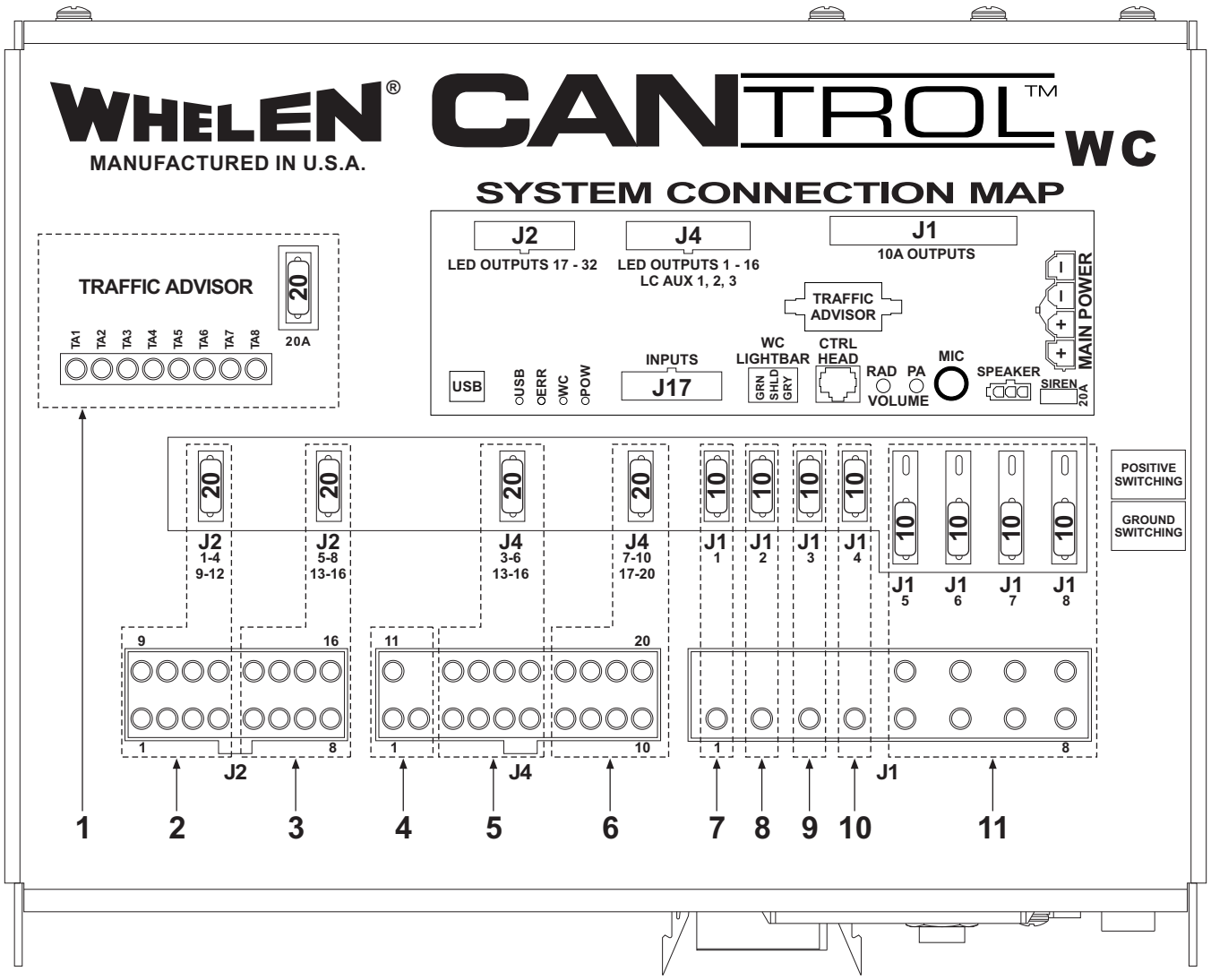
WC (CanTrol Serial Data Bus) LED

Steady	Good communication received from Lightbar.
Off	Check Power LED; If Off, turn on Controller. If On, check connections
Fast Blink	Pre-operational State (Boot-up).
Single Flash	Bad CanTrol connection or CanTrol off. Check lightbar I/O or Interface Box for proper operation.

POW (Power) Status LED

Steady	CanTrol system is On.
Off	CanTrol system is Off.

15 - USB Port
Used to connect a Windows™ based laptop or PC to the CanTrol System.



1 - Traffic Advisor Indicators & Fuse
These indicators display the active T/A pattern. The 20 AMP fuse shown protects this circuit.

2 - LED Indicators
These indicators light when their corresponding J2 LED Output (1-4 & 9-12) is active. The 20 AMP fuse shown protects these outputs.

3 - LED Indicators
These indicators light when their corresponding J2 LED Output (5-8 & 13-16) is active. The 20 AMP fuse shown protects these outputs.

4 - LED Indicators
These indicators light when their corresponding J4 Low Current Output (1, 2 & 11) is active. These outputs are internally fused.

5 - LED Indicators
These indicators light when their corresponding J4 LED Output (3-6 & 13-16) is active. The 20 AMP fuse shown protects these outputs.

6 - LED Indicators
These indicators light when their corresponding J4 LED Output (7-10 & 17-20) is active. The 20 AMP fuse shown protects these outputs.

7 - LED Indicators
This indicator lights when J1 High Current Output 1 is active. The 10 Amp fuse shown protects this output.

8 - LED Indicators
This indicator lights when J1 High Current Output 2 is active. The 10 Amp fuse shown protects this output.

9 - LED Indicators
This indicator lights when J1 High Current Output 3 is active. The 10 Amp fuse shown protects this output.

10 - LED Indicators
This indicator lights when J1 High Current Output 4 is active. The 10 Amp fuse shown protects this output.

11 - LED Indicators
These indicators light when their corresponding J1 High Current Output (5-8) is active.

Note: The position for a given output fuse is determined by how that output is switched. If the output is switching +VDC, the fuse for that output should be in the “Positive Switching” position. In this example, the Green LED indicator for that output would light. If it is switching -VDC, the fuse should be in the “Ground Switching” position. In this example, the Amber LED indicator for that output would light.

Wire Gauge Calculation Chart

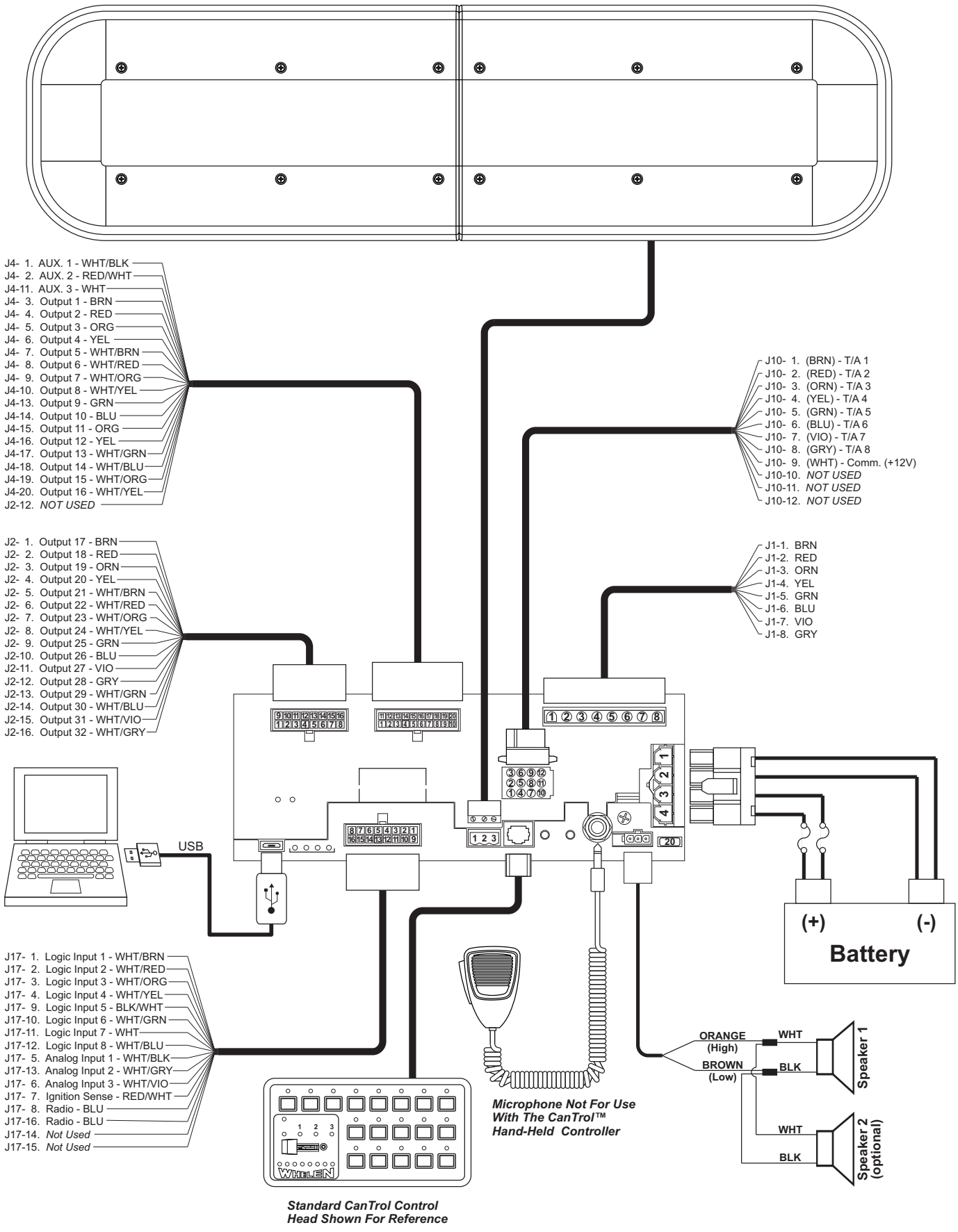
Maximum Current Draw Through The Wire

Wire Gauge	5 Amps	10 Amps	15 Amps	20 Amps	25 Amps	30 Amps	35 Amps	40 Amps	45 Amps	50 Amps
22 AWG	6 Feet	3 Feet	Insufficient	Insufficient	Insufficient	Insufficient	Insufficient	Insufficient	Insufficient	Insufficient
20 AWG	9.5 Feet	5 Feet	3 Feet	Insufficient	Insufficient	Insufficient	Insufficient	Insufficient	Insufficient	Insufficient
18 AWG	15 Feet	7.5 Feet	5 Feet	4 Feet	3 Feet	Insufficient	Insufficient	Insufficient	Insufficient	Insufficient
16 AWG	24.5 Feet	12 Feet	8 Feet	6 Feet	5 Feet	4 Feet	3.5 Feet	3 Feet	Insufficient	Insufficient
14 AWG	39 Feet	19.5 Feet	13 Feet	9.5 Feet	8 Feet	6.5 Feet	5.5 Feet	5 Feet	4.5 Feet	4 Feet
12 AWG	62 Feet	31 Feet	20.5 Feet	15.5 Feet	12.5 Feet	10.5 Feet	9 Feet	7.5 Feet	7 Feet	6 Feet
10 AWG	98 Feet	49 Feet	32.5 Feet	24.5 Feet	19.5 Feet	16.5 Feet	14 Feet	12.5 Feet	11 Feet	10 Feet
8 AWG	156 Feet	78 Feet	52 Feet	39 Feet	31 Feet	26 Feet	22.5 Feet	19.5 Feet	17.5 Feet	15.5 Feet
6 AWG	248.5 Feet	124 Feet	82.5 Feet	62 Feet	49.5 Feet	41.5 Feet	35.5 Feet	31 Feet	27.5 Feet	25 Feet
4 AWG	395 Feet	197.5 Feet	131 Feet	98.5 Feet	79 Feet	66 Feet	56.5 Feet	49.5 Feet	44 Feet	39.5 Feet
2 AWG	629 Feet	314 Feet	209 Feet	157 Feet	125.5 Feet	104.5 Feet	89.5 Feet	78.5 Feet	69.5 Feet	63 Feet

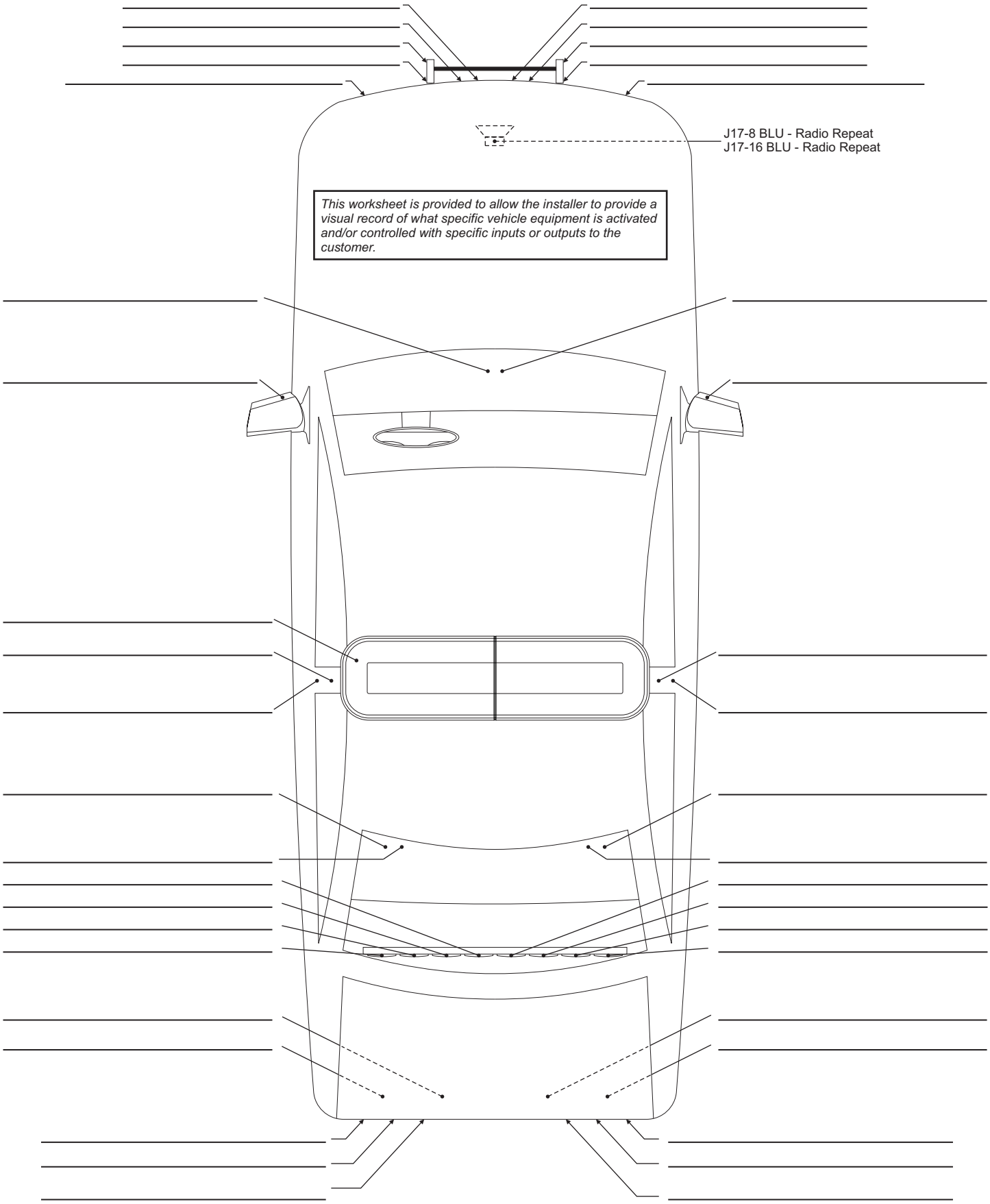
Maximum Current Draw Through The Wire

Wire Gauge	55 Amps	60 Amps	65 Amps	70 Amps	75 Amps	80 Amps	85 Amps	90 Amps	95 Amps	100 Amps
22 AWG	Insufficient	Insufficient	Insufficient	Insufficient	Insufficient	Insufficient	Insufficient	Insufficient	Insufficient	Insufficient
20 AWG	Insufficient	Insufficient	Insufficient	Insufficient	Insufficient	Insufficient	Insufficient	Insufficient	Insufficient	Insufficient
18 AWG	Insufficient	Insufficient	Insufficient	Insufficient	Insufficient	Insufficient	Insufficient	Insufficient	Insufficient	Insufficient
16 AWG	Insufficient	Insufficient	Insufficient	Insufficient	Insufficient	Insufficient	Insufficient	Insufficient	Insufficient	Insufficient
14 AWG	3.5 Feet	3 Feet	3 Feet	3 Feet	Insufficient	Insufficient	Insufficient	Insufficient	Insufficient	Insufficient
12 AWG	5.5 Feet	5 Feet	5 Feet	4.5 Feet	4 Feet	4 Feet	3.5 Feet	3.5 Feet	3.5 Feet	3 Feet
10 AWG	9 Feet	8 Feet	7.5 Feet	7 Feet	6.5 Feet	6 Feet	6 Feet	5.5 Feet	5 Feet	5 Feet
8 AWG	14 Feet	13 Feet	12 Feet	11 Feet	10.5 Feet	10 Feet	9 Feet	8.5 Feet	8 Feet	8 Feet
6 AWG	22.5 Feet	20.5 Feet	19 Feet	17.5 Feet	16.5 Feet	15.5 Feet	14.5 Feet	14 Feet	13 Feet	12.5 Feet
4 AWG	36 Feet	33 Feet	30.5 Feet	28 Feet	26.5 Feet	24.5 Feet	23 Feet	22 Feet	21 Feet	19.5 Feet
2 AWG	57 Feet	52.5 Feet	48.5 Feet	45 Feet	42 Feet	39 Feet	37 Feet	35 Feet	33 Feet	31.5 Feet

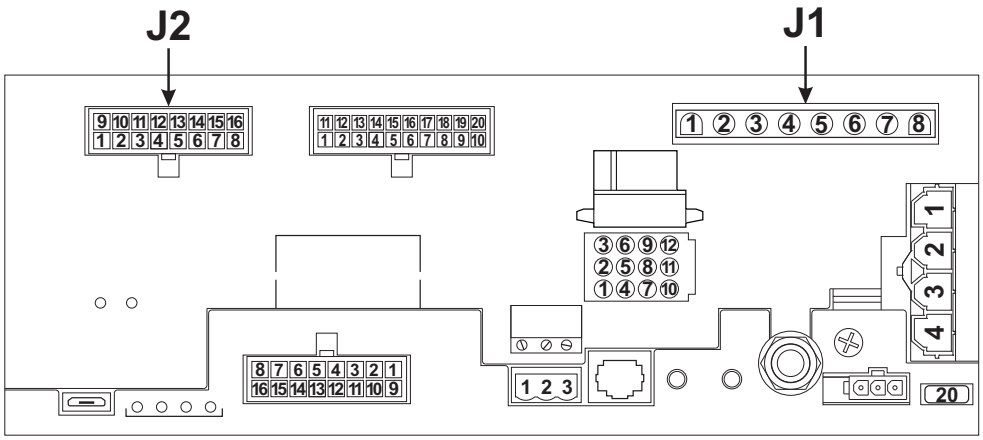
CanTrol™ WC System Wiring Guide



CanTrol™ WC System Worksheet



CanTrol™ Installation Worksheet (J1 & J2)



J1 - High Current Outputs

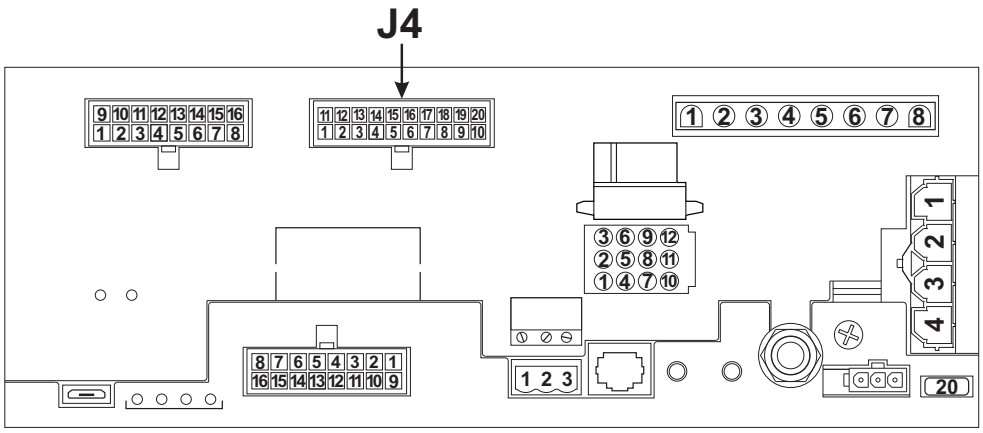
Pos.	Output	Color	Function	Location	Activated By
J1-1	1	BRN			
J1-2	2	RED			
J1-3	3	ORG			
J1-4	4	YEL			
J1-5	5	GRN			
J1-6	6	BLU			
J1-7	7	VIO			
J1-8	8	GRY			

J2 - Outputs 17-32

Pos.	Output	Color	Function	Location	Activated By
J2-1	17	BRN			
J2-2	18	RED			
J2-3	19	ORG			
J2-4	20	YEL			
J2-5	21	WHT/BRN			
J2-6	22	WHT/RED			
J2-7	23	WHT/ORG			
J2-8	24	WHT/YEL			
J2-9	25	GRN			
J2-10	26	BLU			
J2-11	27	VIO			
J2-12	28	GRY			
J2-13	29	WHT/GRN			
J2-14	30	WHT/BLU			
J2-15	31	WHT/VIO			
J2-16	32	WHT/GRY			

This worksheet has been provided so that a written record of all Input, Output and Axillary connections may be created. After all pertinent installation data has been verified and recorded, store and retain this sheet for future reference.

CanTrol™ Installation Worksheet (J4)



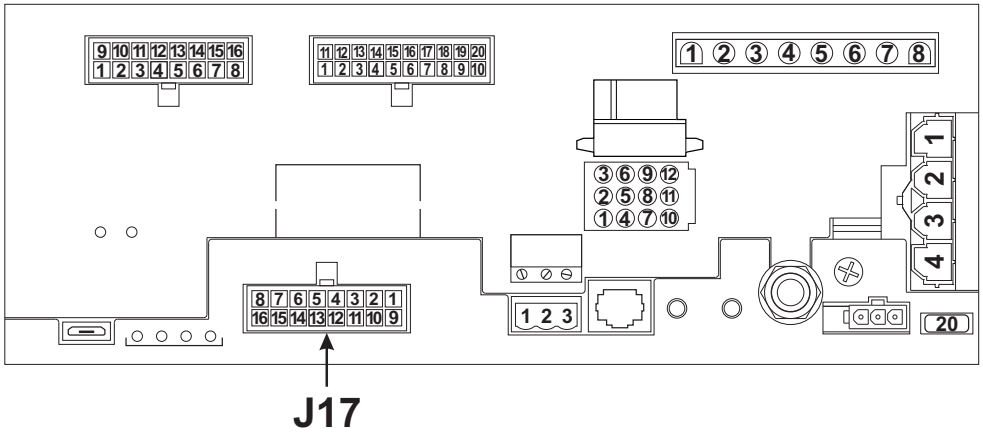
J4 - Outputs 1-16 + LC AUX 1, 2 & 3

Pos.	AUX	Color	Function	Location	Activated By
J4-1	1	WHT/BLK			
J4-2	2	RED/WHT			
J4-11	3	WHT			

Pos.	Output	Color	Function	Location	Activated By
J4-3	1	BRN			
J4-4	2	RED			
J4-5	3	ORG			
J4-6	4	YEL			
J4-7	5	WHT/BRN			
J4-8	6	WHT/RED			
J4-9	7	WHT/ORG			
J4-10	8	WHT/YEL			
J4-12	***- Not Used -***				
J4-13	9	GRN			
J4-14	10	BLU			
J4-15	11	VIO			
J4-16	12	GRY			
J4-17	13	WHT/GRN			
J4-18	14	WHT/BLU			
J4-19	15	WHT/VIO			
J4-20	16	WHT/GRY			

This worksheet has been provided so that a written record of all Input, Output and Axillary connections may be created. After all pertinent installation data has been verified and recorded, store and retain this sheet for future reference.

CanTrol™ Installation Worksheet (J17)



J17 - Logic Inputs

Pos.	Color	Function
J17-1	WHT/BRN	_____
J17-2	WHT/RED	_____
J17-3	WHT/ORG	_____
J17-4	WHT/YEL	_____
J17-5	WHT/BLK	_____
J17-6	WHT/VIO	_____
J17-7	RED/WHT	Ignition (Pre-assigned and non-programmable)
J17-8	BLU	Radio Repeat (Pre-assigned and non-programmable)
J17-9	BLK/WHT	_____
J17-10	WHT/GRN	_____
J17-11	WHT	_____
J17-12	WHT/BLU	_____
J17-13	WHT/GRY	_____
J17-14	***- Not Used -***	(non-programmable)
J17-15	***- Not Used -***	(non-programmable)
J17-16	BLU	Radio Repeat (Pre-assigned and non-programmable)

This worksheet has been provided so that a written record of all Input, Output and Axillary connections may be created. After all pertinent installation data has been verified and recorded, store and retain this sheet for future reference.