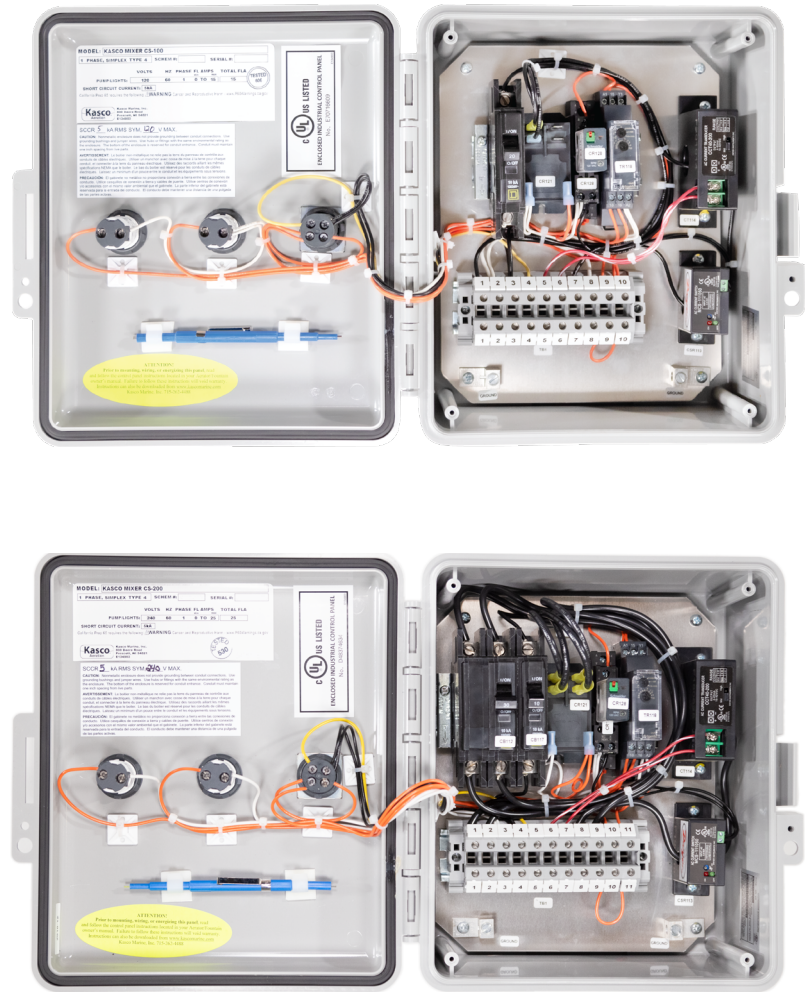


CERTISAFE

by **Kasco**



CONTROL PANEL

CS-100, CS-200

Installation & Operation Manual



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QUESTIONS?



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SAFETY FIRST



- Read and follow all instructions provided with this control panel and instructions provided with your mixer.
- This control panel and the attached equipment is to be installed and service by trained qualified personnel only.
- Test all GFCI (ground fault circuit interrupter) protection devices immediately after installation and every 30 days thereafter.
- Inspect the control panel for any damage and any components that may have loosened during shipping.

PRODUCT OVERVIEW

The CS-100 (120Vac) & CS-200 (240Vac) 60hz, single phase, control panels are engineered to operate Kasco C61 CertiSafe™ Tank Mixers. These UL508a listed control panels are designed for easy installation and operation with included circuit breaker, H-O-A control switch, indicator LEDs, Low water inhibit, UL type 4x enclosure, and SCADA I/O for remote operation and monitoring.

Mounting the Control Panel

The installer's mounting structure must support and prevent movement/flexing of the panel. The control panel must be hung level and upright to be waterproof. Mount this panel out of direct sunlight if possible, in a north facing direction to prevent excessive heat buildup.

Integral mounting tabs are provided to mount this panel to your structure. Use three mounting points (one at top and two at bottom of the enclosure).

FIELD WIRING AND CONDUIT PENETRATIONS:

THE BOTTOM OF THE ENCLOSURE IS RESERVED FOR FIELD INSTALLED CONDUIT.
DO NOT INSTALL CONDUITS IN THE TOP OF THE ENCLOSURE.
INSTALLING CONDUITS IN TOP OF ENCLOSURE MAY VOID WARRANTY.

Electrical Wiring

Installer must follow and comply with all local and national electrical codes. Consult a qualified electrician or service person to perform installation. All electrical connections to this panel must be made with proper strain relief cord grip fittings or with conduit connections as required by local and national electric codes.

The bottom of the enclosure is reserved for field installation of these connections.

Prior to energizing this panel ensure all electrical screw terminals are tight and torqued. See wiring diagram for torque values.

POWER CONNECTIONS

Incoming Power Connection (Power Feed)

This panel must be fed from a GFCI protected circuit.

Provide adequately sized power conductors to prevent excessive voltage drop. Consult with your electrician to properly size power feed conductors. Use copper conductors only. Provide a locking disconnect switch to lockout the control panel for servicing the mixer and this panel as required by code. Connect incoming power feed as detailed on the wiring diagram provided with the control panel.



Feed Circuit Breaker Size

- CS-100 panel requires a 20amp GFCI single pole circuit breaker feed. (120Vac)
- CS-200 panel requires a 40amp GFCI two pole circuit breaker feed. (240Vac)

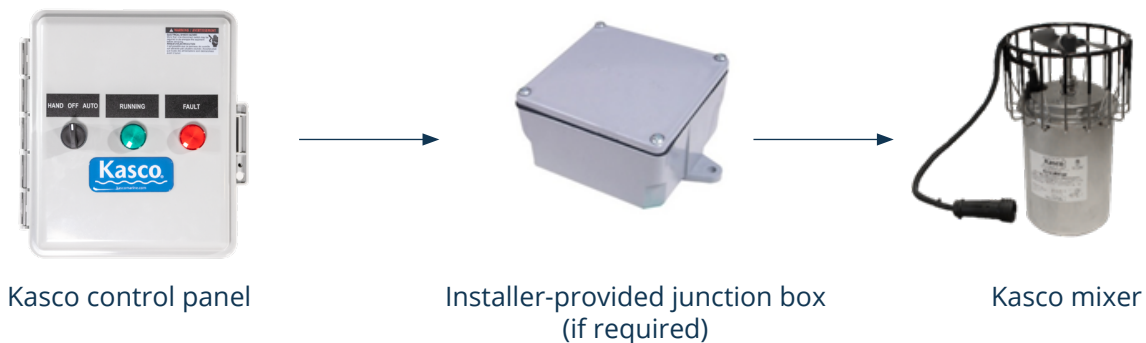
NOTE The CS-200 panel requires a 4-wire feed:



- L1, L2, N, & G
- Voltage between L1 & N must = 120Vac
- Connect L1 to terminal #1

Mixer Power Cord Connection

The mixer is provided with a flexible power cord for connection to a tank mounted junction box or directly to this control panel. Terminate the mixer power cord as detailed in the wiring diagram provided.



Installer to provide conduit and junction box between the Kasco control panel and mixer if required and install these components according to code requirements.

If connecting the mixer power cord directly to the Kasco control panel, use an appropriately sized cord grip strain relief fitting.

POWER CONNECTIONS (CONT.)

SCADA Connections

SCADA monitoring and control connections are provided for remote control and monitoring the mixer operation.

Mixer Motor Amps: 4-20ma current transducer is provided to output motor amps to your SCADA system. This transducer is a 24Vdc loop powered device. 24Vdc loop power is to be provided from existing SCADA control panel.

Auto Mode Remote run: Input terminals are provided to interface to your existing SCADA system. Existing SCADA panel to provide a Dry contact closure (relay contact) for remote starting/stopping of the mixer. SCADA system must provide restart delay to prevent rapid start/stop cycling of the mixer motor. The Dry contact connections are wired to field terminal blocks for easy connection to a SCADA panel.

Refer to the wiring diagram included with this control panel for terminal identification.

Auxiliary Interlock

An auxiliary interlock connection is provided in this panel. The auxiliary interlock feature can be used to prevent running the mixer dry (out of the water). The interlock terminals are jumped and should remain jumped, unless you plan to use an auxiliary interlock to prevent mixer operation. Output from a level controller, float switch, or SCADA output can be connected in place of the factory installed jumper wire.

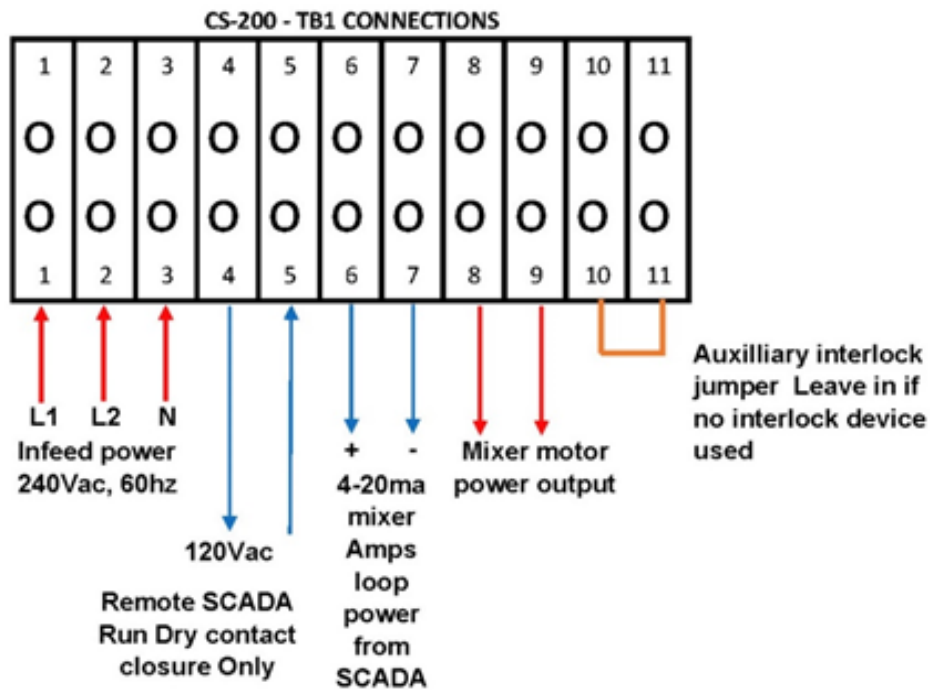
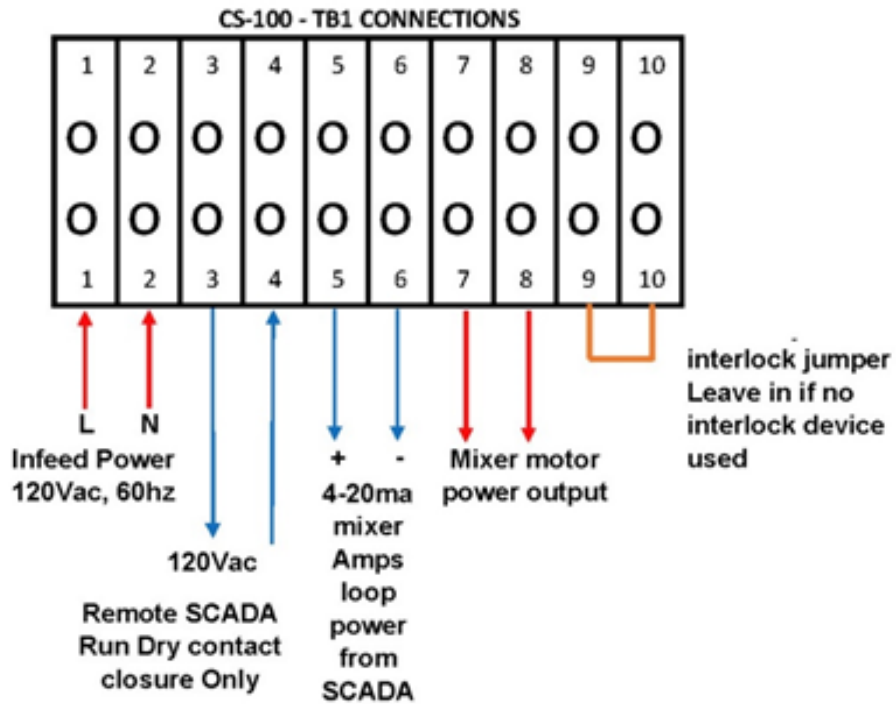
To use the interlock feature, remove the jumper wire and replace with a dry contact closure. A closed contact will allow mixer operation, open contact will inhibit mixer operation.

This is a 120Vac connection and must only be connected to a DRY CONTACT (relay type non-powered contact) closure. The controlling device must provide a restart delay to prevent rapid start/stop of the mixer.

The auxiliary interlock will inhibit both local (Hand) and remote (Auto) control of the mixer.

POWER CONNECTIONS (CONT.)

Terminal Connection Diagrams



OPERATION

COMPLETELY READ THIS SECTION PRIOR TO ENERGIZING THE CONTROL PANEL.
LOW WATER INHIBIT CIRCUIT MUST BE CALIBRATED FOR PROPER OPERATION OF THE MIXER.

This control panel provides local and remote modes of operation. Operation modes are selected via the H-O-A selector switch:

H=HAND
O=OFF
A=AUTO

- **Hand mode (H)**, will energize the mixer and will run continuously until switched to the O position (O = OFF).
 - Hand mode is local control of the mixer at the tank location.
 - **Off mode (O)**, the mixer will not operate in the off position.
 - **Auto mode (A)**, will place the mixer control panel in remote-control mode. Auto mode is to be controlled by a SCADA or remote run command signal. The Auto mode is used in conjunction with the SCADA run relay connections. The Mixer can be stopped by switching the H-O-A switch to the O (Off) position for local control of the mixer.
1. Verify the feed voltage is correct to the control panel:
 - CS-100: 120Vac 60hz, single phase
 - CS-200: 208 – 240Vac 60hz, single phase
 2. Confirm the mixer is properly installed and submerged in water according to the mixer installation instructions.
 3. Once you have verified the correct voltage, and all connections are completed to the control panel, you are ready to power up the control panel and calibrate the low water inhibit
 - Set the control panel H-O-A switch to the O (OFF) position
 - Switch on the Feed GFCI circuit breaker
 - Switch on the control panel circuit breaker(s)
 - Switch the H-O-A switch to the H (Hand) position to energize the mixer

At this time, the mixer should be operating.

4. Low Water Inhibit - Calibration
 - CSR113 must be calibrated to inhibit the mixer if it runs out of water. CSR113 will inhibit / lock out the mixer and illuminate the RED fault indicator on the enclosure door.

To calibrate AC current switch CSR113:

- Ensure the mixer is properly installed and submerged in water.
- Follow the instructions below to set timer TR118 and calibrate CSR113

OPERATION (CONT.)

Check and set time delay relay TR118 to a 30-second delay. Flip up clear cover and adjust the two dials as follows:



Adjust CSR113 with included adjustment tool as instructed below.



RED LED = Normal operation, mixer operating above set point (normal amps).

GREEN LED = Out of water, mixer operating under set point (low amps).

With the mixer energized (H-O-A switch in **Hand** mode):

- See which CSR113 LED is on.
- Adjust as instructed below with the included adjustment tool.

GREEN LED is on and remains on, turn the adjustment dial counterclockwise until the GREEN LED turns off and the RED LED turns on. Then continue turning the dial slightly further counterclockwise to prevent minor current fluctuations from activating CSR113.

RED LED is on when first energized, turn the adjustment dial clockwise until the GREEN LED turns on and the RED LED turns off. Then back counterclockwise until the RED LED turns on and GREEN LED turns off. Turn the dial slightly further counterclockwise to prevent minor current fluctuations from activating CSR113.

If the mixer faults out before completing this setting:

- Reset it by switching the H-O-A to Off and back to Hand to restart the mixer.
- The low water inhibit activates after a 30 second delay of timer TR118.

NOTE Upon completion of the above calibration, run the mixer for 15 minutes. Repeat the above calibration as the mixer amps will lower once the unit has reached normal operating current. Not performing this second calibration may result in nuisance inhibit of the mixer.

5. Verify operation by measuring the motor amp draw on the black or white motor lead wire with a clamp-on amp meter. The amp value should be FLA (full load amp) value of your mixer. Refer to the amp chart in the mixer owner's manual.

OPERATION (CONT.)

6. Record the following data while the mixer is operating in the water under load:

CS-100			
L1-N	Volts	L1	Amps
CS-200			
L1-N	Volts	L1	Amps
L2-N	Volts	L2	Amps
L1-L2	Volts		

Date Installed:

_____ / _____ / _____

Troubleshooting

Voltage measurements can be taken with a digital voltmeter. Both AC and DC voltages may be present if the SCADA interface is utilized. Amp measurements can be measured with an AC clamp-on amp meter.

Refer to the wiring diagram included with the control panel.

Voltage Measurement Points

Take the following measurements to verify proper voltages in the panel.

CS-100 120Vac Control Panel	
Terminals 1 to 2	120Vac source voltage: range of 114-126Vac
Terminals 4 to 2	120Vac present if SCADA control is calling for mixer to run
Terminals 5 to 6	NO voltage measurement. This is a 4-20ma current signal to SCADA
Terminals 7 to 8	Mixer motor power. Range of 114-126Vac when mixer is called to run in Hand or Auto mode
Terminals 9 to 10	Auxiliary interlock jumper. 120Vac will be present on these terminals when measured to terminal 2 (Neutral)

CS-200 240Vac Control Panel	
Terminals 1 to 2	240Vac source voltage: range of 208-240Vac
Terminals 1 to 3	120vac source voltage, terminal 3 is Neutral connection
Terminals 2 to 3	120vac source voltage, terminal 3 is Neutral connection
Terminals 5 to 3	120Vac present if SCADA control is calling for mixer to run
Terminals 6 to 7	NO voltage measurement. This is a 4-20ma current signal to SCADA
Terminals 8 to 9	Mixer motor power. Range of 208-240Vac when mixer is called to run in Hand or Auto mode
Terminals 10 to 11	Auxiliary interlock jumper. 120Vac will be present on these terminals when measured to terminal 2 (Neutral)

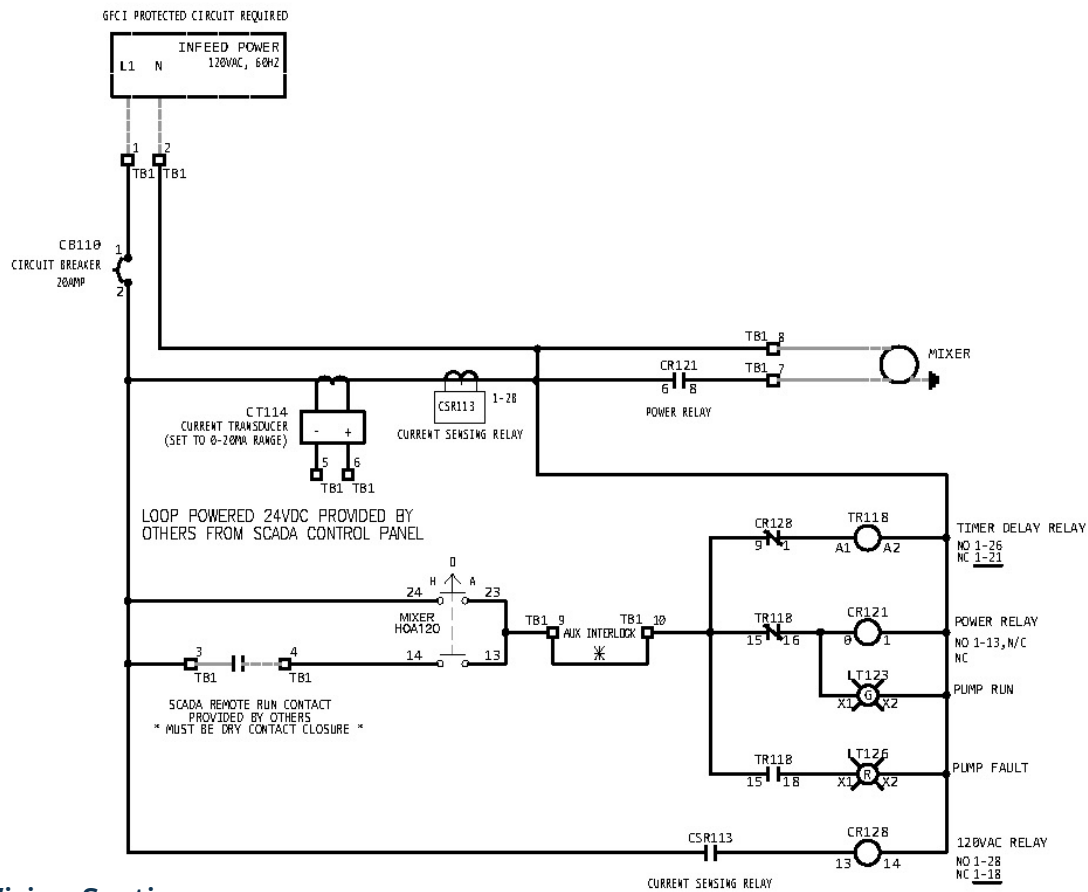
TROUBLESHOOTING SYMPTOMS & CAUSES

<p>Mixer not running.</p>	<ul style="list-style-type: none"> • Check the H-O-A switch is in the Hand or Auto mode (with SCADA calling for mixer to run). • Check for tripped circuit breakers. Check the feed breaker and breakers in this control panel are on. • Check field installed disconnect switch is in the on position. • Measure voltage at terminals to verify incoming power is present, and voltage is present at the mixer motor terminals. • If voltages are present, measure motor amps on one of the mixer motor leads. • 0 amps with voltage present = open circuit. • With the control panel de-energized and locked out. Check for loose wiring connections to the mixer power cord. Disconnect the mixer power cord and ohm the motor connections for continuity. An open circuit would indicate an open in the motor circuit. • Locked rotor amps (LRA) = locked motor due to obstruction or motor failure. • Cycling amps = 0/LRA cycling indicates the mixer is overheating and cycling on the internal motor overload. Check the mixer is not operating out of water, check the propeller for any obstruction. Check the motor shaft spins freely. • If all voltages and connections are correct, an internal failure of the mixer motor may have occurred. Contact an authorized distributor for repair.
<p>Tripped GFCI feed circuit breaker.</p>	<ul style="list-style-type: none"> • GFCI devices are sensitive to current imbalances in the load circuits they protect. Nuisance GFCI tripping can be caused by poor or redundant grounding points in a circuit. Ensure neutrals and grounds are separated in any downstream circuits of the GFCI Breaker. • Reset the GFCI feed breaker. If breaker continues to trip, check for ground fault in mixer motor and wiring. • Use an insulation tester (megaohm meter) to check for insulation shorts to ground. Inspect wiring for damage. • If the mixer motor megs low, contact an authorized distributor for repair.
<p>Mixer motor amps read significantly lower than FLA (full load amp) motor rating.</p>	<ul style="list-style-type: none"> • Check the mixer is submerged properly in the tank. The mixer must be fully submerged to operate at full load. Refer to the mixer owner's manual for installation requirements and operating depths.
<p>Mixer motor amps read significantly higher than FLA (full load amp) motor rating.</p> <p>Mixer starts slowly or spins slowly when energized.</p>	<ul style="list-style-type: none"> • Check there are no obstructions or interference with the mixer propeller. • Check the mixer motor shaft spins freely by hand (disconnect and lock out power prior). • Verify proper voltage is present. • If the mixer starts slowly when energized, or spins slowly; this may indicate low voltage under load. • If all voltages and connections are correct, an internal failure of the mixer motor may have occurred. Contact an authorized distributor for repair.

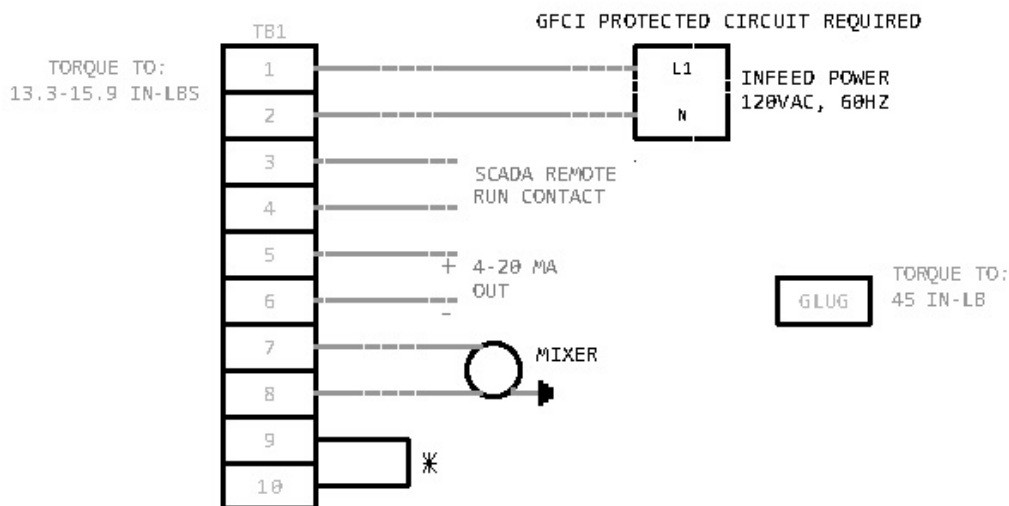
REPLACEMENT PARTS LIST

Kasco Part #	Drawing reference #	CS-100	CS-200	Part Description
987251	CB110	✓		Circuit Breaker,1P QOU 120V 20A SQD
987252	CB117		✓	Circuit Breaker,1P,QOU 120V 10A SQD
987253	CB112		✓	Circuit Breaker,2P,QOU 240V 30A SQD
987260	LT123	✓	✓	Light, Pilot LED,22MM 120V GRN SCHR XB7
987261	LT125, LT126	✓	✓	Light, Pilot LED,22MM 120V RED SCHR XB7
987270	HOA120	✓	✓	Switch, Rotary, 22MM HOA 3POS MAINT SCHR XB7
987276	CT114	✓	✓	CURRENT XFMR, 4-20MA, 10/20/50A
987277	CSR113	✓	✓	RELAY, Current Monitor, 0.5-50 AMP TRIP, MCS-111050
987280	CR121	✓	✓	RELAY, PWR, 2 NO, 1 HP 120V
987281	CR128	✓	✓	RELAY,120V 1P IND TEST RPM TELE
987282	TR118	✓	✓	Timer, DOM,24DC/24-240AC,SPDT .1S-100H
987287	TB1	✓	✓	TERM,BLK,65AMP,20-6AWG,SCREW,GRY,PHX
987290	GND	✓	✓	LUG,GND,#6
987291		✓	✓	TRIMMER ADJUSTMENT TOOL

CS-100 SCHEMATICS

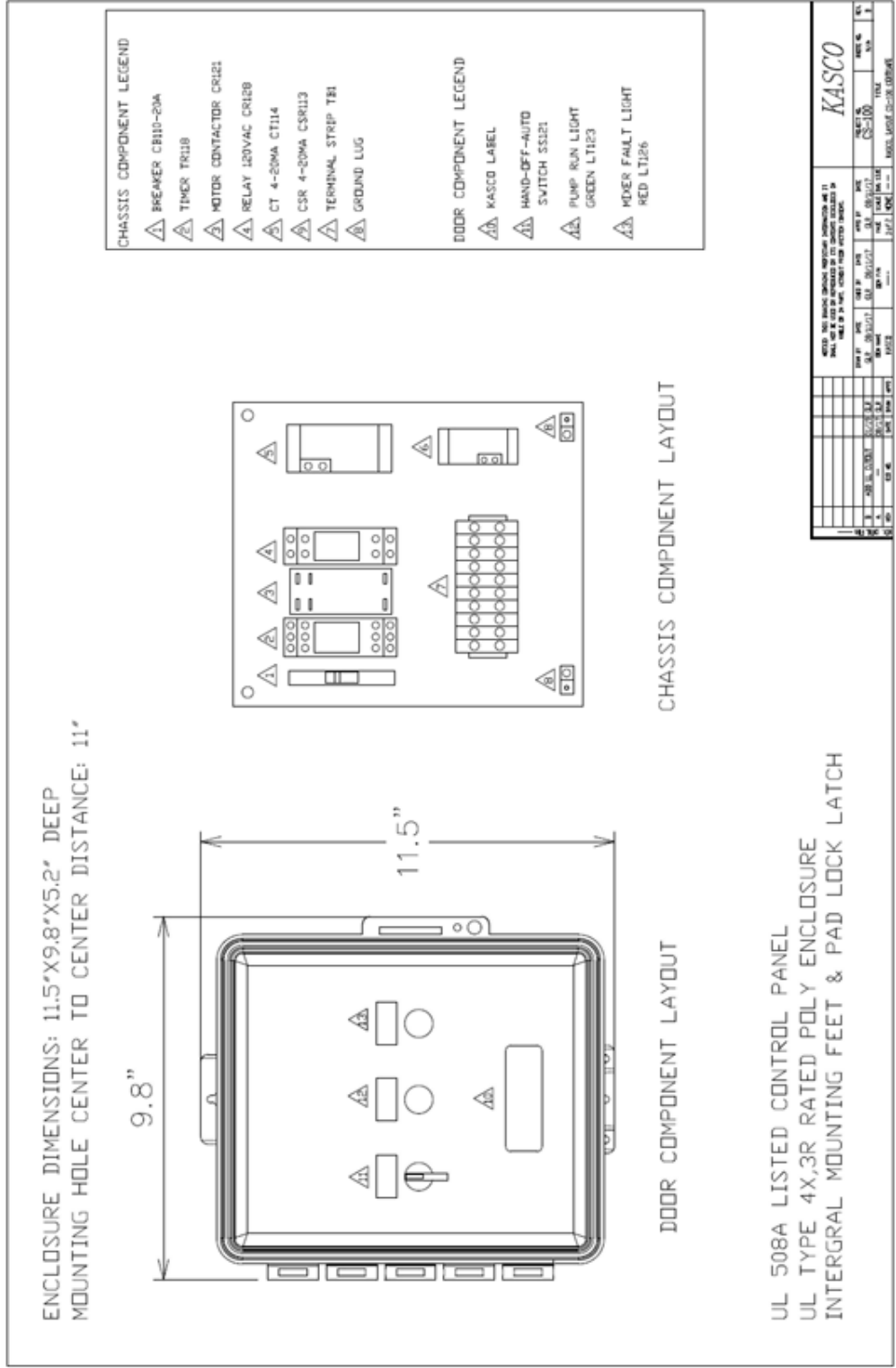


Field Wiring Section

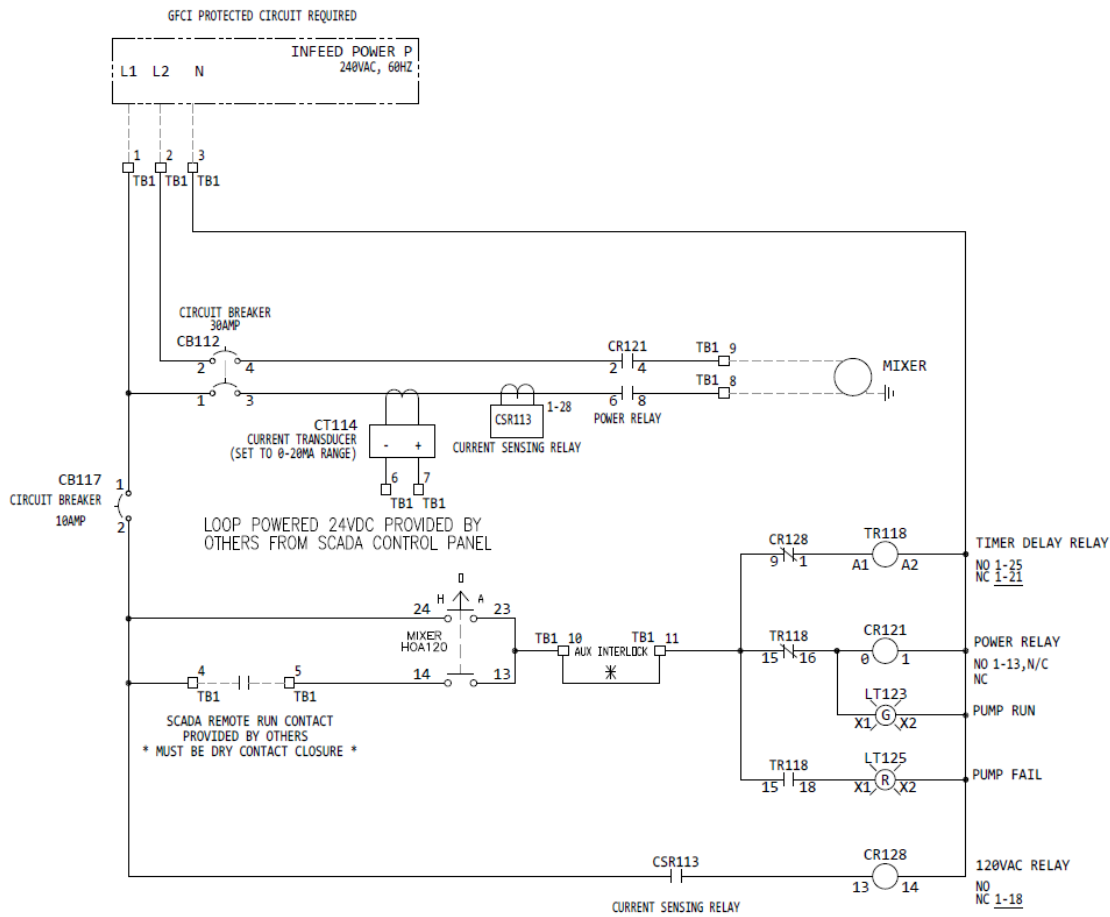


* ONLY REMOVE FACTORY INSTALLED AUX INTERLOCK JUMPER WIRE FROM TB1:9 AND TB1:10 IF EXTERNAL DEVICE IS REQUIRED TO INHIBIT MIXER OPERATION. THE EXTERNAL INTERLOCK DEVICE (FLOAT LEVEL TANK, LEVEL CONTROLLER, REMOTE SWITCH, ETC.) MUST BE A NON POWERED DRY CONTACT (NORMALLY CLOSED) AND PROVIDE DELAY CIRCUITRY TO PREVENT MIXER SHORT/RAPID CYCLING, FAILURE TO DO SO WILL CAUSE MIXER DAMAGE AND VOID WARRANTY.

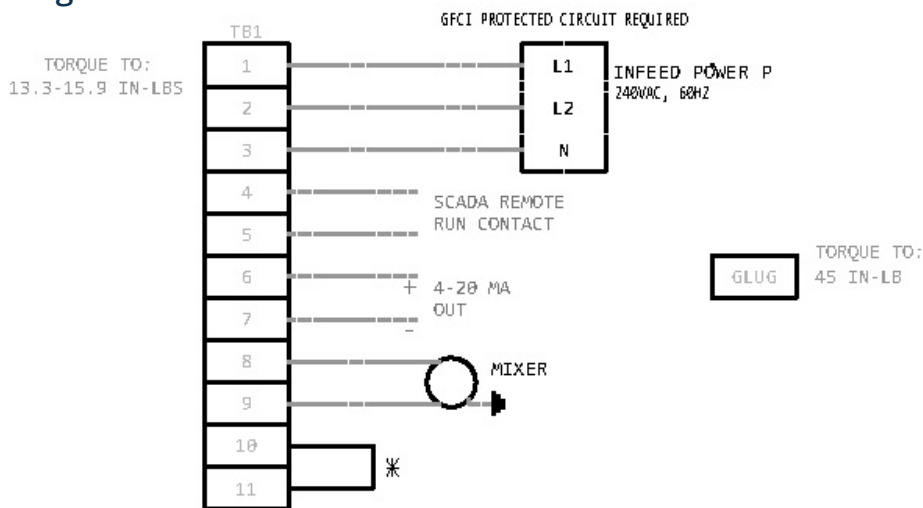
CS-100 COMPONENT LAYOUT



CS-200 SCHEMATICS

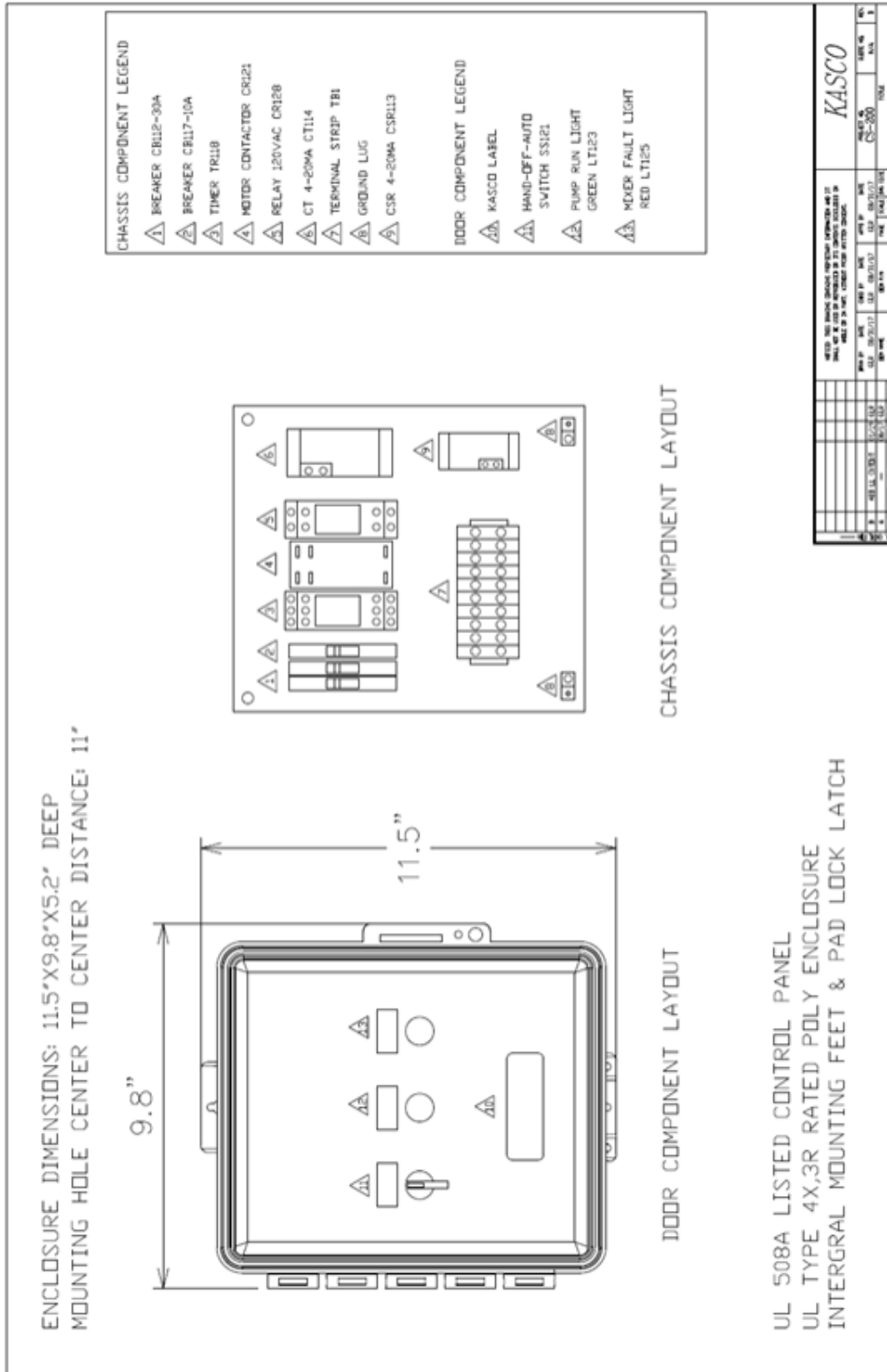


Field Wiring Section



* ONLY REMOVE FACTORY INSTALLED AUX INTERLOCK JUMPER WIRE FROM TB1:10 AND TB1:11 IF EXTERNAL DEVICE IS REQUIRED TO INHIBIT MIXER OPERATION. THE EXTERNAL INTERLOCK DEVICE (FLOAT LEVEL TANK, LEVEL CONTROLLER, REMOTE SWITCH, ETC.) MUST BE A NON POWERED DRY CONTACT (NORMALLY CLOSED) AND PROVIDE DELAY CIRCUITRY TO PREVENT MIXER SHORT/RAPID CYCLING, FAILURE TO DO SO WILL CAUSE MIXER DAMAGE AND VOID WARRANTY.

CS-200 COMPONENT LAYOUT



WARRANTY

The CS-100 and CS-200 control panels are offered with a standard 3-year warranty.

Kasco® Marine, Inc. warrants this CertiSafe™ mixing system to be free from defects in material or workmanship under appropriate use and service. The Kasco Marine, Inc. obligation under this warranty is limited to replacing or repairing, without charge, proven defective part while within the warranty period. Customer shall pay shipping charges for returning the unit to Kasco or an Authorized Repair Center.

THIS WARRANTY IS IN LIEU OF ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED. IN NO EVENT WILL KASCO MARINE, INC. BE LIABLE FOR ANY CONSEQUENTIAL DAMAGES.

Any unauthorized modifications to this control panel will void the UL listing and the Kasco warranty.

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