



Models "ES" and "ESS"

STUNNER

Parts and Service Manual

USDA APPROVED
CE

INSTALLATION
OPERATION
MAINTENANCE
PARTS LIST
& DIAGRAMS
STUNNING
PROCEDURES



Model "ES"
Electric



Model "ESS"
Heavy Duty Electric



BEST & DONOVAN

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WARNING
THE STUNNING PRODS
ARE HIGH VOLTAGE.
NEVER ALLOW HUMAN CONTACT.
PERSONAL INJURY,
PARALYSIS OR DEATH
MAY RESULT.

WARNING

Always exercise care when operating or performing maintenance, repairs, and making adjustments.

Always disconnect the electric supply before attempting to work on the Model "ESS" or Model "ES" Stunners.

Never allow any part of your person to be in the path of the Prod when in service (operation).

Always grip the Prod hand-piece firmly.



INSTALLATION INSTRUCTIONS

CONTROL BOX

The Control Box should be mounted in a remote location that is out of the area where water will be sprayed. It has to also be mounted so it is accessible to the operator (usually overhead). The Control Box must be plugged into a grounded receptacle. If the mounting area is going to be washed down, it is recommended that the Control Box be removed until needed for stunning.

NOTE: The most important instruction about the mounting of the Control Box is that it be kept as dry as possible. Water or constant dampness could cause circuits in the box to malfunction or short out.

STUNNER HANDLE

The No. 9600100 Stunner Handle Assembly plugs into the bottom of the control box. The handle must be easily moved into position where the operator can stun the animal. The Stunner Handle should have a sturdy and safe place to be hung or laid when not in use. The hanger or shelf that the Handle is to be rested on must also be insulated so that if the prods were activated the unit would not short out. It is a recommended practice to unplug the handle from the Control Box when there is an extended period of time between stunning shifts.

NOTE: KEEP PRODS & SPURS CLEAN FOR BEST RESULTS.

INSULATION OF STUNNING AREA

WARNING: IT IS IMPORTANT THAT THE FOLLOWING INSTRUCTIONS BE FOLLOWED AS CLOSELY AS POSSIBLE FOR THE PROTECTION OF THE OPERATOR, ANYONE IN THE IMMEDIATE AREA, AND THE QUALITY OF THE FINISHED PRODUCT.

WARNING: IF THE UNIT IS ACTIVATED WHEN THE PRODS ARE AGAINST ANY METAL, AN ELECTRICAL CIRCUIT WILL BE MADE WHICH WILL EVENTUALLY CAUSE THE MAIN TRANSFORMER TO OVERHEAT AND BURN OUT.

WARNING: IF THE OPERATOR SHOULD HAPPEN TO ACTIVATE THE STUNNER WITH A PROD TOUCHING A METAL SUPPORT THAT THE OPERATOR IS LEANING AGAINST, THE OPERATOR COULD *BECOME PART OF THE STUNNING CIRCUIT AND EXPERIENCE A SEVERE SHOCK.*

THE OPERATOR MUST BE INSULATED

OPERATOR'S AREA *(See page 11)*

1. Operator should wear rubber boots and gloves to protect against the accidental contact of the Prod to any conductive surface near the operator.
2. Any conductive material (black iron, stainless steel, etc.) in the structure surrounding the operator should be covered or changed to a non-conductive material (rubber, delrin, UHMW, etc.) to protect against accidental shocking.

THE OPERATOR MUST BE INSULATED (cont'd)

HOG, CHUTE AND/OR RESTRAINER (See page 11)

1. Any part of the chute or restrainer that comes in contact with the hog at the time of stunning must be covered or constructed of non-conductive material so the electric charge from the stunner does not short across the hog to the chute wall. This includes bolts, nuts and any other kind of fasteners used in its construction.
2. If at all possible, the hogs should not be touching each other in any way. The charge from the Stunner could go from the stunned hog to the other and affect the immobility of the stunned animal.

OPERATION

1. Before plugging in, make sure that the Handle Assembly Prods and Spurs are "CLEAN".
2. The animals should be lightly sprayed with water, this provides for better electrical contact and reduces the voltage required for stunning.
3. MAKE SURE THAT THE MAIN SWITCH IS IN THE "OFF" POSITION. Plug the Control Box into the proper, grounded receptacle, (Check the Nameplate for the Correct Voltage). Plug the Stunner Handle Assembly into the bottom of the Control Box. Set the Selector switch to low. Then turn the Main switch to the "ON" position.
4. As the animal passes the operator, the operator should place the Prods firmly against the animal with the Prod Spurs on each side of the head directly behind the ears, see page 10. At this time of contact the operator presses the handle button and the timer will shut off after the set time. The animal will stiffen up and as this happens it will drop, STUNNED.

NOTE: See Adjustable TIME-OUT Feature in next section for changing length of stunning times to accommodate various size animals.

5. Immediately after stunning, the animal should be shackled and bled, see page 17. Shackling should take place no later than TEN (10) seconds after stunning. Sticking should be done no later than FIFTEEN (15) seconds after stunning as the animal may regain consciousness.

ADJUSTABLE TIME-OUT FEATURE

This feature was designed so that the operator could pre-set the length of stunning time when the Handle push button is depressed. This stunning time can be adjusted from 1 to 9 seconds by turning the Potentiometer clockwise for longer stunning time and counterclockwise for less stunning time. The numbers on the faceplate are for reference ONLY; THEY DO NOT REFLECT ACTUAL TIME SETTING.

It will be necessary for the operator to experiment with the setting to accommodate the size and weight of the animals being stunned.

This feature also provides some protection to the power transformer from burnout due to extended activation. Should stunning times become excessive, it is recommended that the Handle Assembly be disconnected from the unit and the Prod ends cleaned to permit good electrical contact with the animal.

NOTE: Handle Assembly should also be inspected for shorts or bare wires that could cause injury to the operator or cause damage to the Control Box.

MAINTENANCE

“Maintenance Inspection and Repair Programs” should be set up for the care of all Stunners. Safe operation depends on care being given to the unit as a whole.

1. To keep the Stunner working at its peak efficiency, it is to be kept as dry as possible
2. There is a 15 Amp fuse located next to the Handle Plug on the bottom of the Control Box. Check. this fuse if the Control Box will not work.
3. The Handle Prods and Spurs must be kept clean because of the build-up that occurs from the hair of the hog. This film thickens on the Prods, steel wool, wire brushes or sand paper will clean the metal for more effective stunning.

WARNING: DISCONNECT THE CONTROL BOX FROM THE POWER SOURCE AND UN-PLUG THE HANDLE BEFORE CLEANING THE PRODS.

4. Check for fraying of the power cord to the Handle. This may occur from the way the handle is positioned to stun the hogs.
5. The voltage at the Prods can be checked by “CAREFULLY” using a voltmeter attached to the Prods.
6. Individual components and wires can be checked using an ohmmeter, EVEN WITHOUT HAVING THE UNIT PLUGGED-IN.
7. A 110 Volt wiring diagram is provided in this catalog.

NOTE: A transformer has been used to drop the relay and control circuit to six (6) volts for operator protection.

Models "ES" and "ESS" STUNNING VOLTAGE CHART

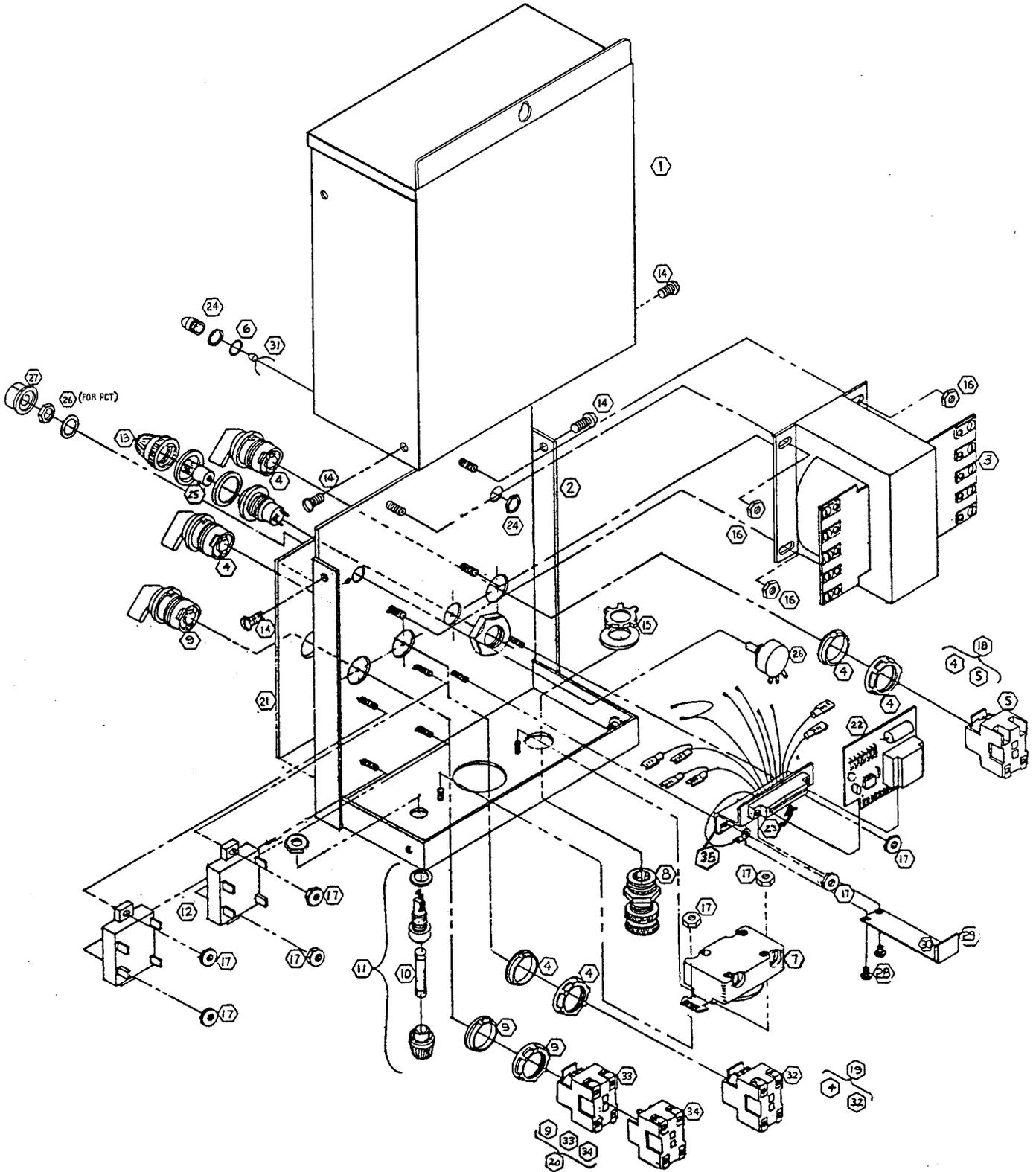
Every installation is different but the principle is the same. Use the least amount of voltage when stunning to avoid blood spotting and broken backs, but use enough to keep the animal immobilized until it is shackling and bled.

Hog Weight (lbs)	Voltage*
250 to 350	400*
350 to 500	420*
500 to 650	460*

NOTE: It is recommended that a lower voltage stun for a longer period of time is more efficient than a high voltage stun at a short period of time.

*Output voltage is related to clean input voltage so this chart is variable.

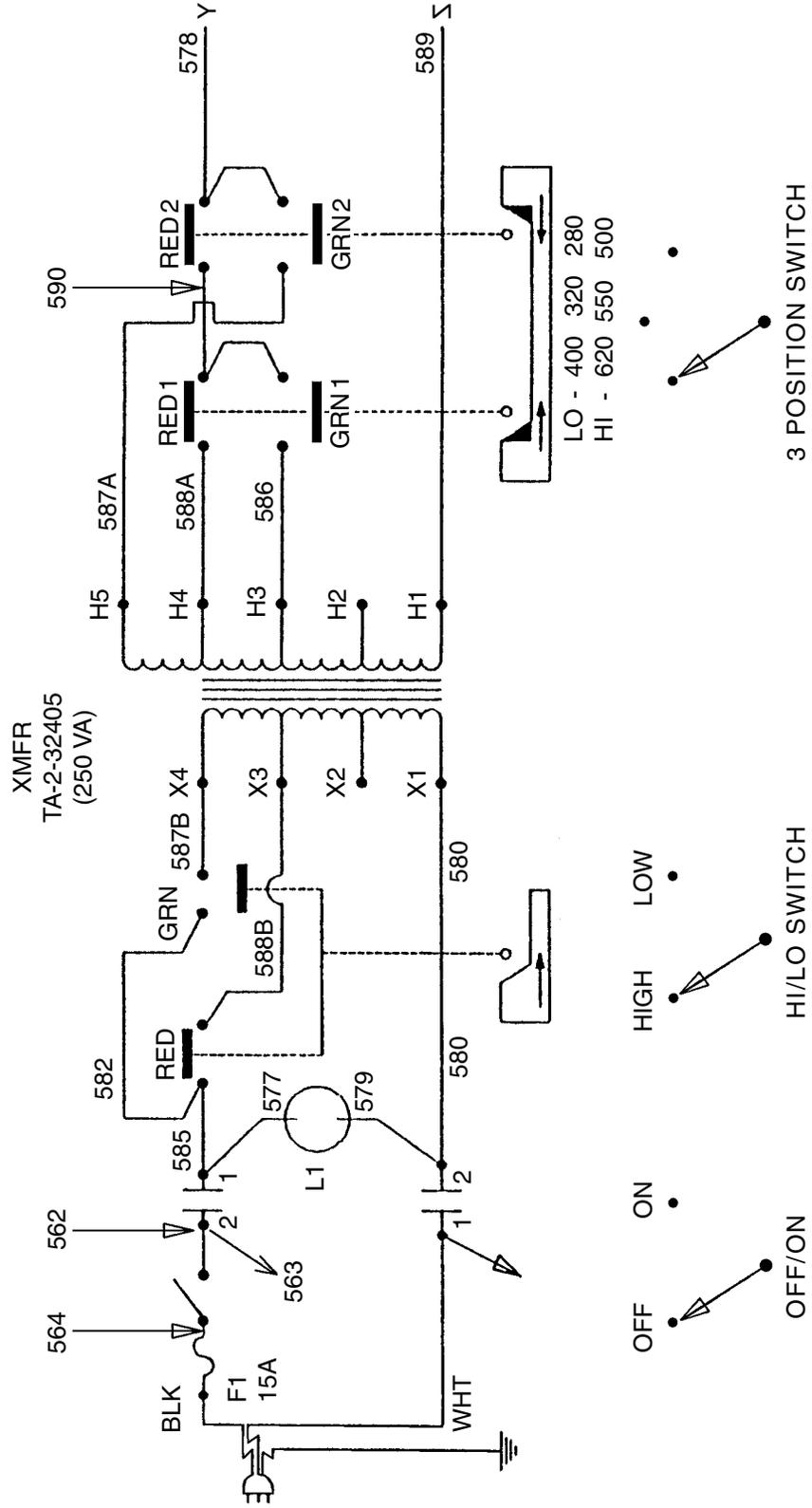
9600042 - Model "ES" 110V CONTROL BOX



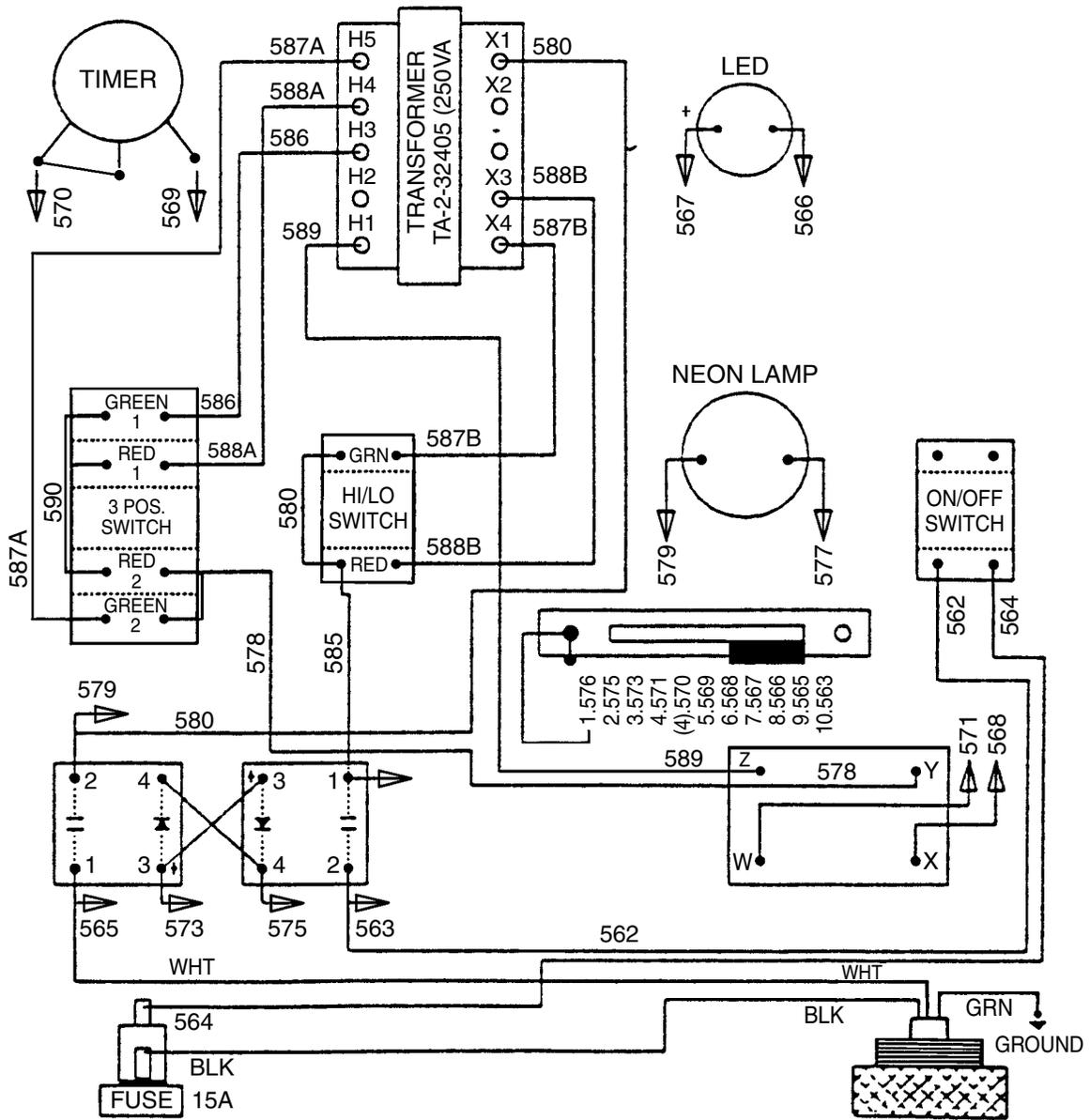
960042 - Model "ES" 110V CONTROL BOX

REF. No.	PART NUMBER	DESCRIPTION	QTY
1	9609500	WELDMENT - COVER	1
2	9605400	FRONT PANEL	1
3	9601700	TRANSFORMER	1
4	9609869	SELECTOR SWITCH - 2 POSITION	2
5	9609872	CONTACT BLOCK - N.O.	1
6	9609824	"0" RING	1
7	9601000	4 - POLE RECEPTACLE	1
8	9602300	CABLE CONNECTOR	1
9	9609866	3 POSITION SELECTOR SWITCH	1
10	9600048	FUSE - 15 AMP MDA	1
11	9601800	FUSE HOLDER COMPLETE	1
12	9605900	RELAY	1
13	9609100	PILOT LIGHT COMPLETE	1
14	9600840	PAN HEAD SCREW	2
15	9607400	LOCKNUT	1
16	9901704	HEX HEAD NUT	4
17	9901645	HEX HEAD NUT	8
18	9600033	ON - OFF SWITCH	1
19	9600032	HI - LOW SWITCH COMPLETE	1
20	9600031	3 - POSITION SWITCH COMPLETE	1
21	9605500	LEGEND PLATE	1
22	9609802	120 VOLT PC BOARD	1
23	9609810	10 - PIN CONNECTOR ASSEMBLY	1
24	9609828	LED SLEEVE	1
25	9609200	NEON BULB	1
26	9609822	POTENTIOMETER	1
27	9609820	KNOB	1
28	9900088	ROUND HEAD SCREW 2	
29	9609816	PC BOARD HOLD DOWN BRACKET	1
30	9609818	PC BOARD CUSHION	1
31	9609826	LED	1
32	9609875	CONTACT BLOCK NC/NO	1
33	9609878	CONTACT BLOCK NO/NO	1
34	9609881	CONTACT BLOCK NC/NO	1
35	9609814	10 - PIN CONNECTOR BRACKET	1

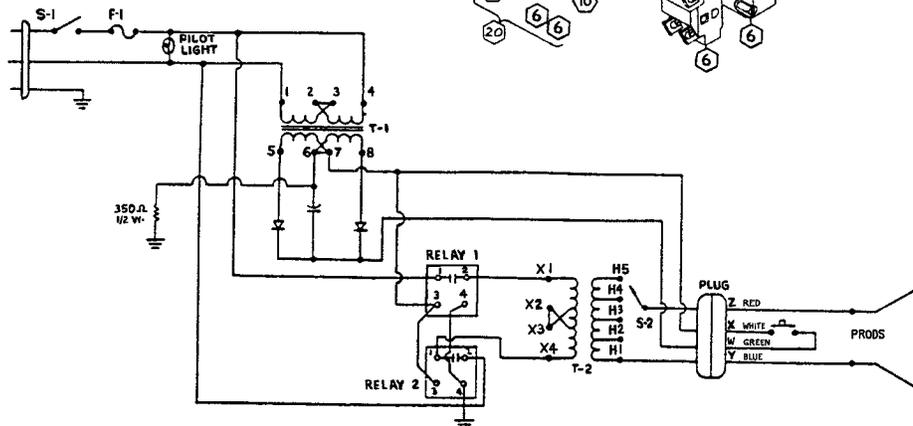
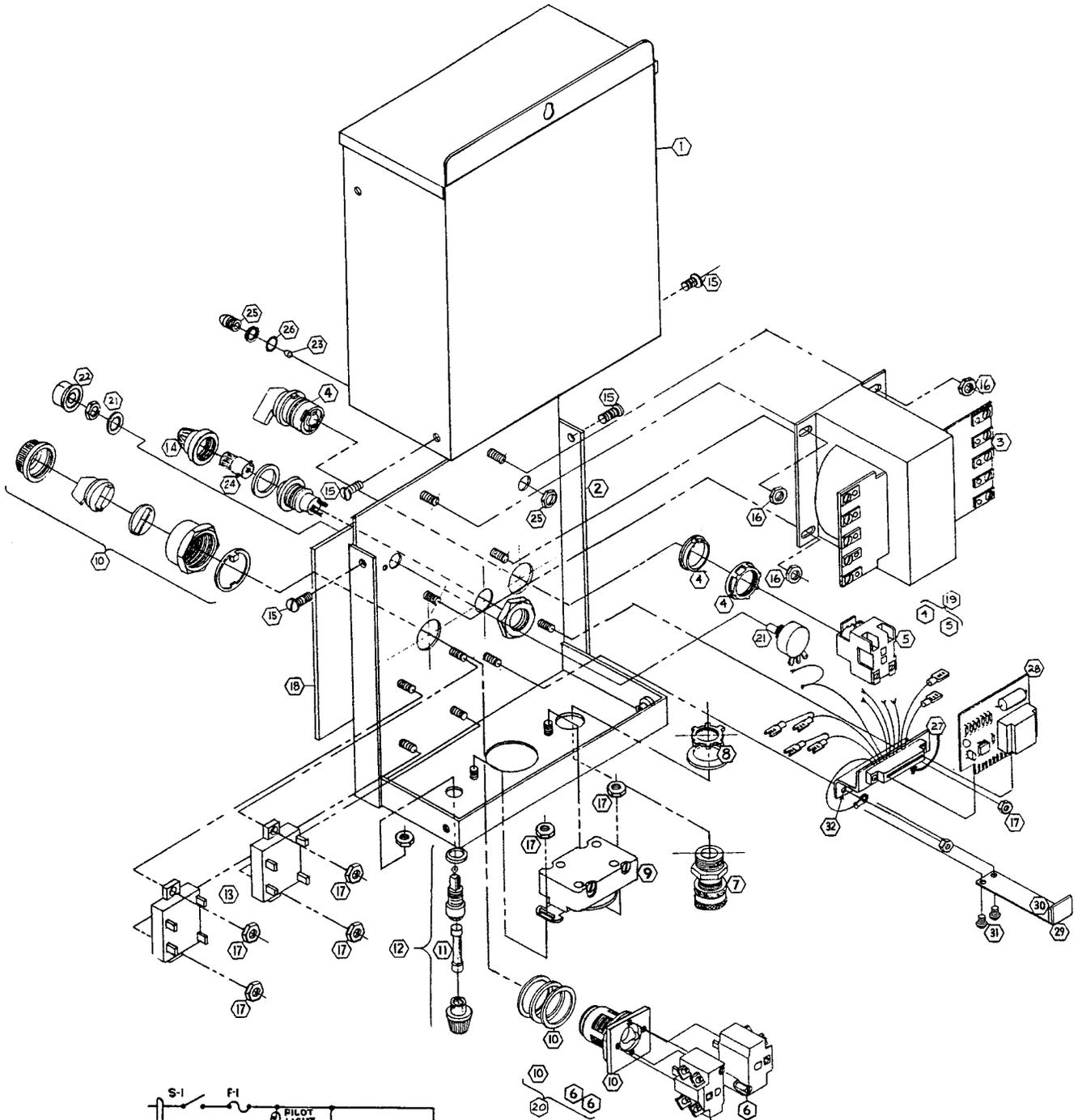
Model "ES" 110V WIRING DIAGRAM



Model "ES" 110V WIRING DIAGRAM



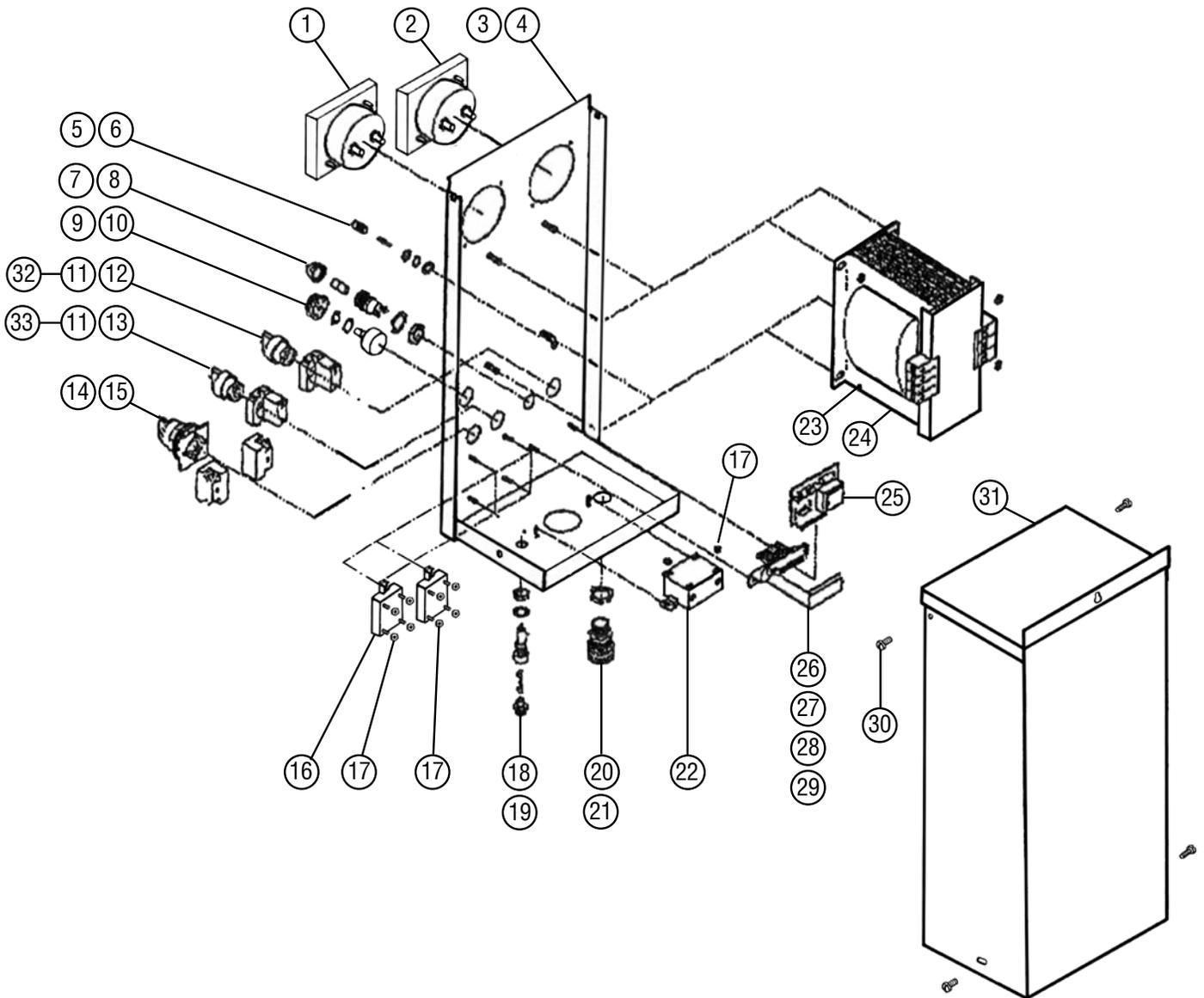
9600043 - Model "ES" 220V CONTROL BOX



960043 - Model "ES" 220V CONTROL BOX

REF. No.	PART NUMBER	DESCRIPTION	QUANTITY
1	9609500	WELDMENT - COVER	1
2	9605700	FRONT PANEL	1
3	9604700	TRANSFORMER	1
4	9609869	SELECTOR SWITCH - 2 POSITION	1
5	9609872	CONTACT BLOCK - N.O.	1
6	9609884	CONTACT BLOCK - KA1	2
7	9602300	CABLE CONNECTOR	1
8	9607400	LOCKNUT -112" N.P.T./WASHER	1
9	9601000	4 - POLE RECEPTICAL	1
10	9609863	SELECTOR SWITCH - 4 POSITION	1
11	9600048	FUSE - 15 AMP MDA	1
12	9601800	FUSE HOLDER COMPLETE	1
13	9606000	RELAY	2
14	9609000	PILOT LIGHT COMPLETE	1
15	9900840	10-32 x 3/8 PAN HEAD SCREW	4
16	9901704	10-32 HEX NUT	4
17	9901645	8-32 HEX NUT	8
18	9605600	LEGEND PLATE	1
19	9900033	ON - OFF SWITCH	1
20	9600030	4 - POSITION SWITCH COMPLETE	1
21	9609822	POTENTIOMETER - 1 MEGAOHM	1
22	9609820	KNOB	1
23	9609826	L.E.D.	1
24	9609200	NEON BULB	1
25	9609828	L.E.D. SLEEVE	1
26	9609824	"O" RING	1
27	9609810	10 - PIN CONNECTOR	1
28	9609804	DURATION PC BOARD 1 - 11 SECOND	1
29	9609816	PC BOARD HOLDDOWN BRACKET	1
30	9609818	PC BOARD CUSHION	1
31	9900088	6-32 x 114 ROUND HEAD SCREW	1
32	9609814	10 - PIN CONNECTOR BRACKET	1

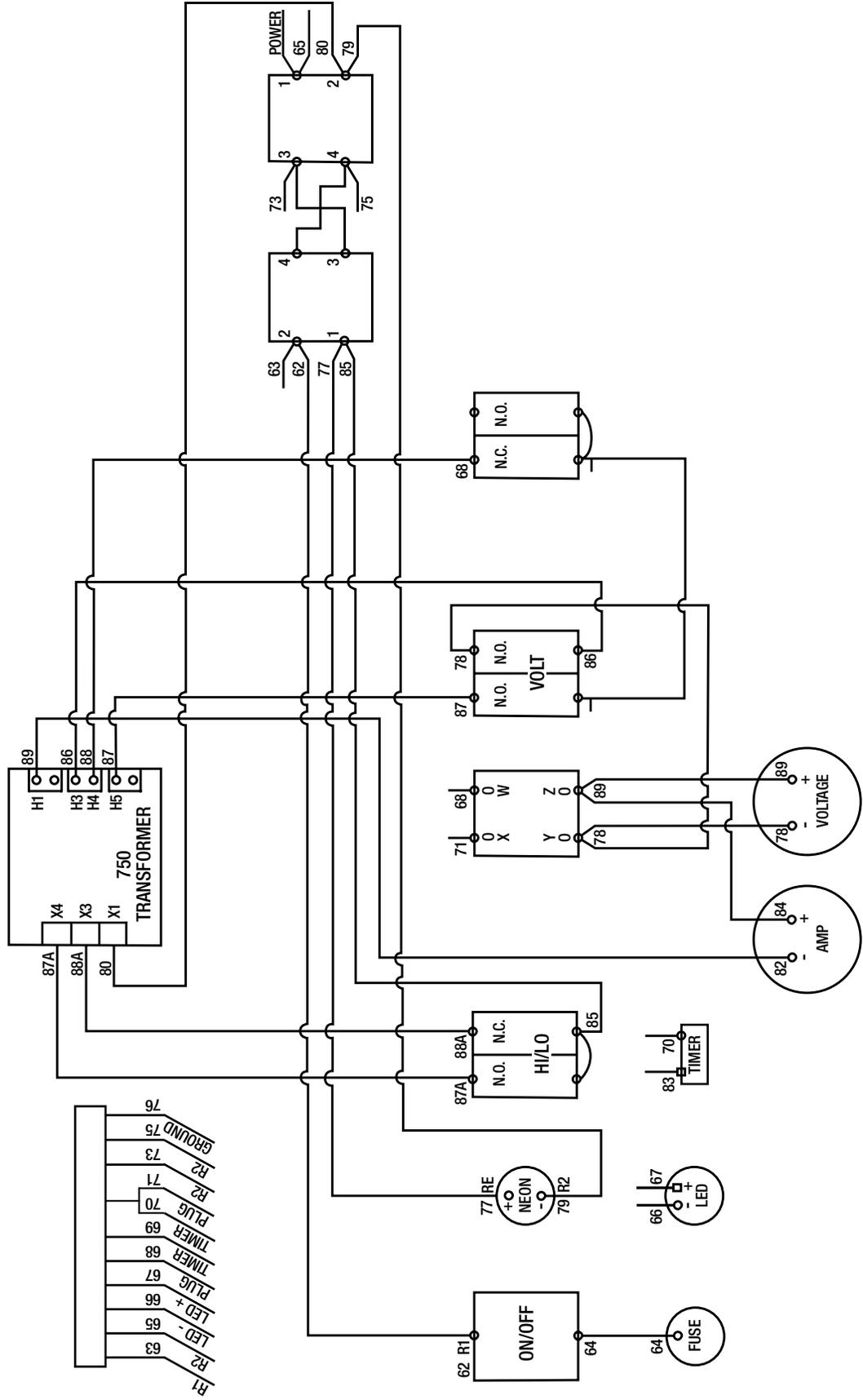
9600011 - Model "ESS" 110V CONTROL BOX

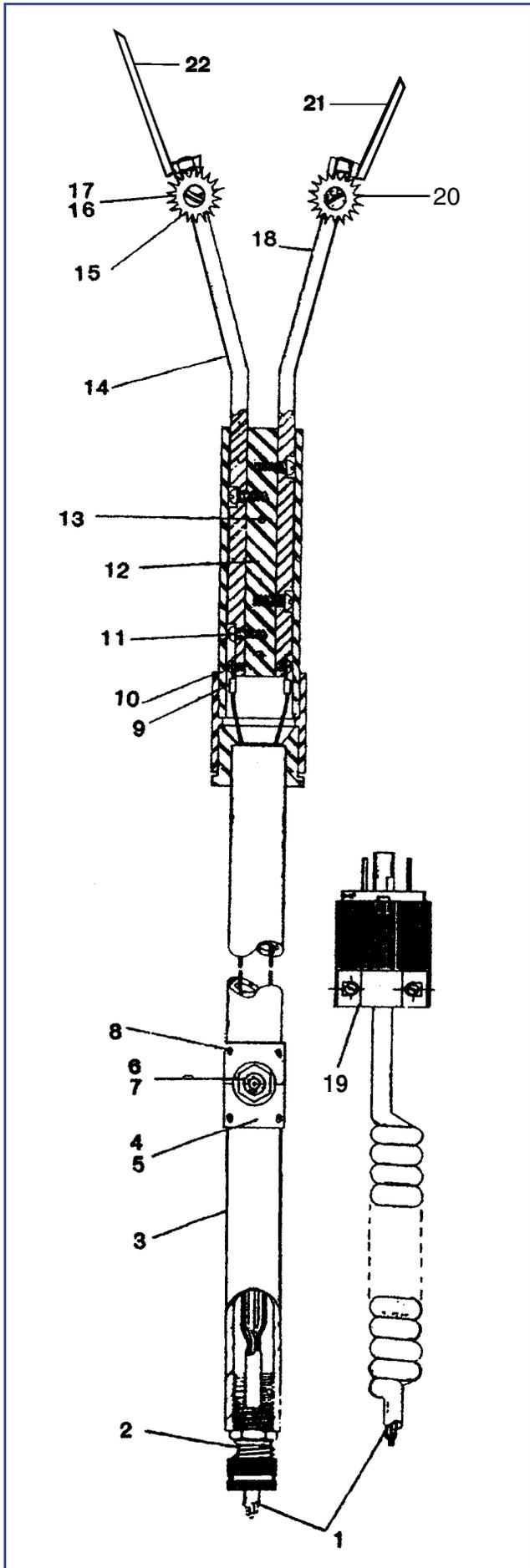


9600011 - Model "ESS 110V CONTROL BOX

REF. No.	QTY	DESCRIPTION	PART NUMBER
1	1	Gauge AC Volts 0-600	9602010
2	1	Gauge AC Amperes 0-3	9602009
3	1	Front Control Panel	9602021
4	1	Legend Plate 110V	9602011
5	1	Led sleeve	9609828
5	1	O-Ring	9609824
6	1	Led	9609826
7	1	Pilot Light Complete	9609100
8	1	Neon Bulb	9609200
9	1	Knob - 1/4" Shaft	9609820
10	1	Potentiometer - 1 Megohm	9609822
11	1	2 Position Switch	9609704
12	1	Contact Block N/O	9609728
13	1	Contact Block 1 N/O & 1 N/C	9609724
14	1	3-Way Switch	9609708
15	2	Contact Block 1 N/O & 1 N/C	9609884
16	2	Relay 110V	9605900
17	8	#8 Hex Nut	9901675
18	1	Fuse Holder Complete	9601800
19	1	Fuse 15 Amps MDA Slow Blow	9600048
20	1	Cable Connector	9602300
21	1	Locknut	9607400
22	1	4-Pole Receptacle	9601000
23	8	#10 Hex Nut	9901704
24	1	Transformer	9602027
25	1	Duration PC Board (1-11 Sec.)	9609802
26	1	1- Pin Connector Assembly	9609810
27	2	#6-32 x 1/4" Round Head Screw	9900088
28	1	Circuit Board Hold Down Bracket	9609816
29	1	Circuit Board Cushion	9609818
30	4	#10-32 x 3/8" Pan Head Slotted Screw	9900840
31	1	Top Control Weldment	9602026
Reference			
32	1	Hi-Lo Switch Complete	9609753
33	1	On-Off Switch Complete	9609750

Model "ESS" 110 Volt - WIRING DIAGRAM





#9600100 HANDLE COMPLETE

REF. NO.	PART NO.	DESCRIPTION	QTY
1	9600800	COIL TYPE CORD	1
2	9601900	CORD CONNECTOR	1
3	9609400	PVC HANDLE ONLY	1
4	9607600	MOUNTING PLATE	1
5	9608200	GASKET	1
6	9600700	PUSH BUTTON SWITCH	1
7	9602800	COVER SWITCH	1
8	9607900	SCREWS	4
9	9608000	TERMINALS	2
10	9900161	SCREWS	2
11	9607800	SCREWS	2
12	9608400	PROD HOLDER	1
13	9608300	SCREWS	4
14	9608500	PROD - LEFT	1
15	9603900	Spur, Collar Assy & Screw	2
16	9608100	COLLAR - ONLY	2
17	9607850	SCREWS	2
18	9608600	PROD - RIGHT	1
19	9600900	4 POLE PLUG	1
20	9603910	SPUR (only)	2
21	9603800	SHEEP PROD	2
22	9600017	PROD - EXTENSIONS	2

Recommended Stunning Procedures.

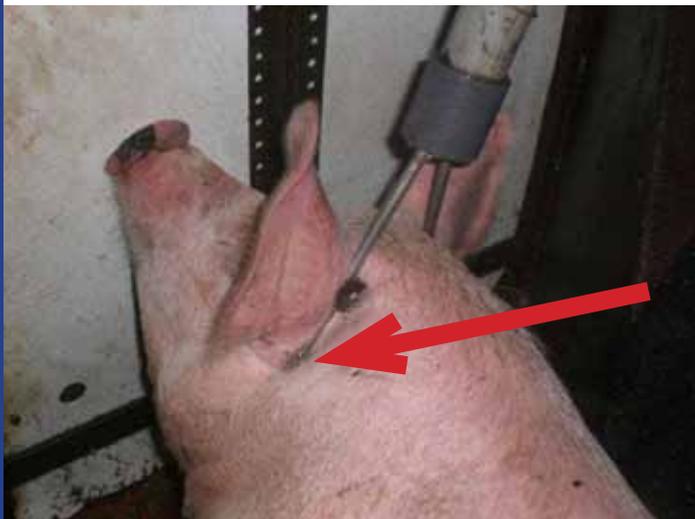
For pigs larger than 200 pounds.



For animals over 200 lbs: use Wand Extension tips and Stainless Steel Spurs to assure correct Stun Wand contact. Note: Stainless Steel Star Wheels (spurs) conduct better than carbon steel.

Wand Extensions and Star Wheels (spurs) are available from B&D, Order: Wand Extension - Part #9600017
Stainless Steel Star Wheel - Part #9603900

The Wand Extension tips and extra Star Wheels (spurs) assure correct Stun Wand contact with brain.



Locate wand as close to the ear as possible, in the thin crevice. Note that this wand has two sets of star wheels for small and large pigs.



The longer, wider wand tips help to facilitate secure contact on the head of larger pigs

It is best to restrain the pig during stunning to prevent Stun Wand slips or pig falling.



Insulate swing gate and wall to restrain the animal during stun.



Restraining the pig during stun can assure an effective stun. Wooden gate is non-conductive.

Before stunning, insulate the stun box to prevent grounding during stun.



Truck rubber mats on floor and wall. Coated metal gate.



Plastic lining in stun box area to insulate electrical current.

At startup: Prior to use, inspect and test the wand.



Turn on the stunner. Press the stunner button to test wand. Observe wand for electrical shorts. Service if necessary. Select the correct voltage for size and weight of pig, see Voltage Chart on Page 6.

Prior to stunning, be sure the head and heart areas of each pig is wet.

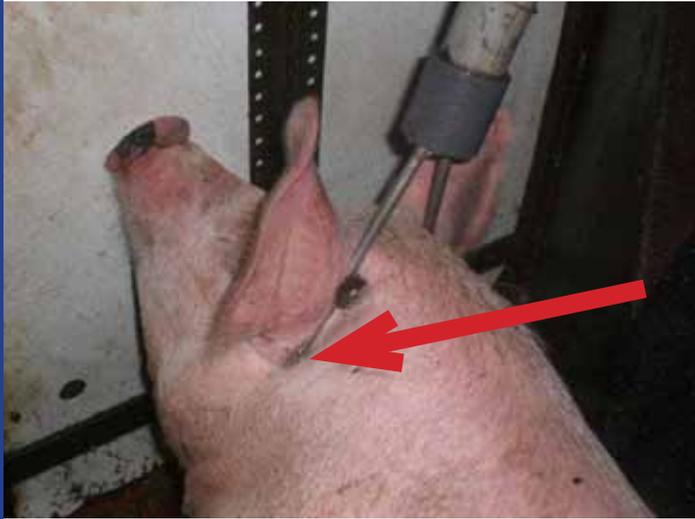


Automatic shower in holding pen.



It is best to wet hogs prior to entry in the stun box area.

Stunning: Stun the head for a minimum of 3 seconds.



Place wand in the thin crevice behind the ear, as close to the ear as possible.



Target the pocket of the ear to assure that the brain is stunned.

Check the eye to assure that the pig is insensible before stunning the heart



Inspect the eye of the pig, but do not touch it. There should be no natural blinking.



If the pig is still sensible, re-stun the head before stunning the heart.

Stunning: Stun the heart for a minimum of 3 seconds.



Stun the heart of the pig.



Target placement of the wand contacts behind the arm pit and on the chest.

Check the eye to assure that the pig is insensible before shackling (hoisting) and before bleeding.



Inspect the eye of the pig, there should be no natural blinking. You can wave a hand in front of the eye and look for "tracking or movement".



Do not touch the eye, as corneal reflex may still be present on an electrically stunned pig.

In electrically stunned pigs, gasping is a sign of a dying brain.



Agonal gasping occurs when the pig's mouth opens and closes and the head jerks slightly (like a fish out of water).

Rapid seizure blinking and nystagmus (eye vibration) can also occur in electrically stunned animals.

Signs of returning to sensibility, (beginning to regain consciousness).

- The eyes are focused and pig is blinking naturally
- Signs of rhythmic breathing, sides are moving up and down.



Signs of Sensibility (fully conscious).



Vocalization.



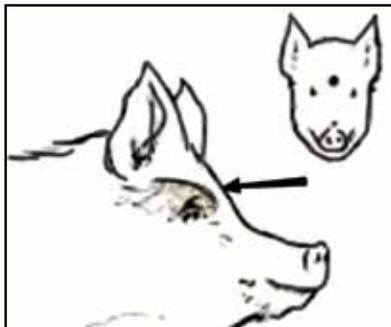
Righting Reflex: The pig tries to lift it's head and right itself.

Order of Events during return to sensibility in CO₂ stunned pigs.

	Average Time
These events are very variable.	
Corneal reflex (touch eye)	42 sec
Rhythmic breathing	68 sec
Excitation	76 sec
Nystagmus (vibrating eyes)	86 sec
Spontaneous natural blinking	93 sec
Conscious movement (Righting reflex)	171 sec
Attempt to stand up	387 sec

Danish Meat Research Institute, Holst (2001)

Re-stun (if necessary) before bleeding, Captive Bolt.

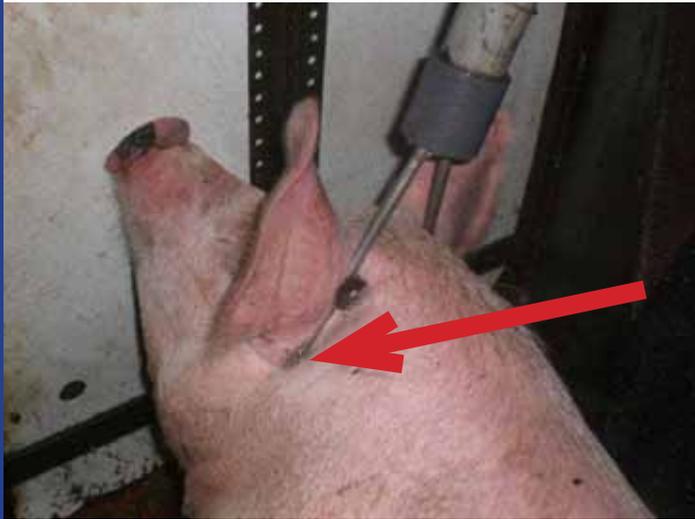


Correct location for captive bolt or free bullet stunning of a pig.



Correct bolt location and angle to show brain destruction.

Re-stun if necessary before shackling and bleeding (electrical).



If the pig is still sensible, re-stun the head first.



Then re-stun the heart.



Good bleed

Bleeding should be rapid with a large volume.

For head/heart stun, target to bleed the pig within 30 seconds, with a maximum of 60 seconds between stun and bleed.



If a large volume of blood does not appear, re-stick the pig.

Weak bleed

Smoking indicates poor Stun Wand conductivity, immediately clean the stun wand contacts.



Smoking indicates poor conductivity.



WARNING: Always unplug the stun wand prior to cleaning.

Routinely clean the stun wand, approximately every 5 pigs.



Use a steel brush or a green pad to clean the wand.



Do not store the stunner on the plant floor.



Storage

After production, clean the Stun Wand and store the Stunner and Wand in a clean, dry location away from the plant floor, never on the plant floor.

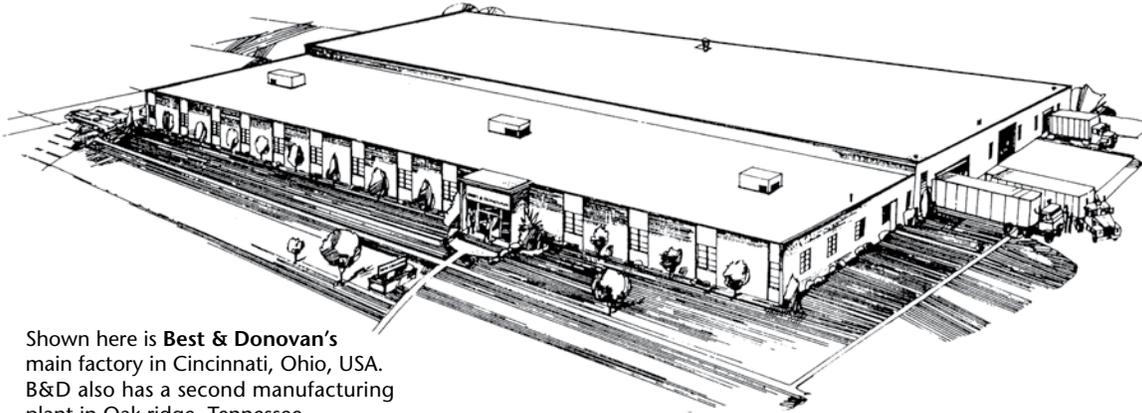
Follow all recommendations for equipment safety and maintenance. Use only B&D replacement parts.



Thoroughly read Stunner P&S Manual, follow all recommendations and make available to operators.

Document equipment cleaning and maintenance, see B&D Record Sheets pages 26 & 27.

BEST & DONOVAN



Shown here is **Best & Donovan's** main factory in Cincinnati, Ohio, USA. B&D also has a second manufacturing plant in Oak ridge ,Tennessee.

WARRANTY

Best & Donovan warrants this machine against defective parts and workmanship for 30 days from the date of factory shipment. In the fulfillment of its warranty, the sole obligation of Seller shall be to repair or replace, at its option F.O.B. its factory, shipping charges prepaid, and which after inspection by Seller are found to be defective. Buyer shall notify Seller of defect in writing, promptly upon discovery, within the warranty period. This warranty does not cover defects caused by corrosion or normal deterioration. It does not extend to consequential damages, loss or delay associated with a warranty defect and it does not cover any costs of labor, travel or other expenses associated with the repair or replacement of defective parts. Seller assumes no liability for product loss or other claims whatsoever arising out of the use or application of the machine in Meat Slaughtering/Processing operations, whether the machine is used alone or in conjoint use with other Meat Slaughtering/Processing machines or Process.

This warranty is voided if repairs, replacements or alterations are made by others without prior authorization by Seller. Notwithstanding the foregoing, Seller warranty obligations with respect to any items not manufactured by Seller shall not exceed the obligations undertaken by the manufacturer thereof under express warranty to the Seller. This express warranty is in lieu of all other warranties of fitness of the machine for any particular purpose.

NOTICE ON WARRANTY WORK

Any warranty work that is to be considered by Best & Donovan on the Model "ESS" Stunner will be done by a service representative of Best & Donovan at the place of use or the entire Model "ESS" Stunner in question must be sent to Best & Donovan for evaluation and consideration for warranty.

Use only Genuine Best & Donovan replacement parts for the repair of the "Model "ESS" Stunner. Any other parts used may void the warranty.

Parts not manufactured by Best & Donovan and used for the repair of the Model "ESS" Stunner can cause power loss. A performance decrease and shorter life of the tool can be expected. Check to make sure the correct parts are being used.



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