

Instruction Manual
For JETCO
Humane Electric Stunner
MS 305

ELECTRIC STUNNING

A CONDENSED VERSION OF ELECTRIC STUNNING. FROM K.V. GILBERT. MIRINZ

Electric stunning is suitable for sheep, cattle, deer, pigs and poultry. There are advantages in humaneness, hygiene and convenience.

For head only stun the electrical currents must pass through the brain of the animal to produce an epileptic-like fit, which, results in the legs being flexed underneath and/or extended. Following this the animal starts paddling or walking movements which may become violent before a relaxed period, the first sign of eventual recovery. If slaughter takes place by throat cutting, carried out by a Muslim, the process is called Halal.

When the electric current passes through the head and other parts of the body, the heart stops beating and the legs remain expended for much longer periods. Usually the paddling movements are significantly reduced. The animal dies from cardiac arrest and this process is not Halal.

The usual current flow for head to body stunning is by a head to back stun, although head to food stunning is also used in sheep. Head to brisket stunning is used with cattle and automatic sheep stunners. The current can be applied in one application with sheep, or, in the case of cattle, in a sequence, so that the current can be applied initially to the head ensuring humaneness and then to the body to stop the heart and then reduce movement.

The electric current needs to be applied for a minimum period to stun the animal, but may not be suitable for movement control. The total effect of the current depends on the duration of the application, the amperage, the dryness of the skin surface or the contact resistance and the electrical frequency.

The welfare of the live animal prior to slaughter and the humane aspect of the slaughter itself are gaining increased interest from the public worldwide, accordingly these principles are explained in detail within this report. The humaneness of electric stunning is in no doubt, having been established through studies of brain patterns and neurotransmitters. The animal experiences no pain during, or immediately after properly applied electric stunning.

Blood splash occurs in all forms of animal stunning and can be minimized with electric stunning using correct parameters.

The principles of electric stunning are the same for all species. This report discusses stunning mainly in relation to sheep and lambs, where electrodes are often manually applied and hence training and understanding are necessary. Cattle stunning is not dealt with in this report.

Originally, pressure for either mechanically or electrically stunning of animals before slaughter came from those who thought our traditional gash-cutting methods of slaughter was inhumane. This view was strongly challenged, and the introduction of stunning was delayed for some time. Eventually, hygiene considerations became the major justification, and pragmatic consideration meant that all plants adopted stunning before slaughter.

To avoid contamination of the head during slaughter and to facilitate head skinning new slaughter systems were introduced.

These required the animal to be stunned, so that sticking and weasand tying could be carried out at tally speed. Animal stillness was an important consideration dominating the new procedures. Thus the prime objectives of stunning were (and are) not only to render the animal unconscious but also to cause it to be unresponsive and still during sticking.

Animals can be stunned mechanically, using a mushroom-head/captive bolt or percussion system. These methods however, were judged to be ineffective, expensive or undesirable, especially for sheep, because they interfered with recovering the brain for edible purposes. Both of these type of stun, may be questioned on religious and/or humane grounds.

Electric stunning is now accepted as the method of choice for sheep, pigs and cattle, and a number of different successful stunners and stun conditions have been developed. Electrodes vary in size, shape, point of application and in the use of water to improve conductivity and for cooling. Stunning currents range from 0.7 – 1.0 Amps, or higher with long wool lambs. Stun times vary between 0.8 and 4.0 seconds. The time between stunning and sticking is important. The thoracic stick is in common use, but some plants carry out Halal slaughter. Head-only (Halal) and head-to-body (head-to-back or head-to-foot) cardiac arrest stunning method work to ensure effective stunning.

INSTALLATION

Four supporting lugs are fitted to the top and bottom of the control cabinet for mounting using 6mm dia bolts.

In Fig 1, the cabinet and stunner hand-set are shown in the preferred position, i.e. in front of the operator, thus allowing him to view the unit while in operation.

The cabinet and spring balancer have intentionally been set back from the front of the restrainer so as to allow the operator to follow the animal's progress up to the restrainer during the sticking process. This is also a safeguard against either the shackler or the sticker coming into contact with the animal during the stunning operation when these personnel are in the same area.

It is important that the animal is not able to be contacted by any one during the stun.

A 24 vac solenoid (not supplied) needs to be connected via the 7 pin plug supplied. The solenoid controls water for spraying the animals pre-wetting around the electrodes contact area only. This gives better conductivity during the stun. It is not recommended that the animals are pre-wet in the holding area or on the travel conveyor. This allows for stray currents tracking along the pelt which is un-desirable.

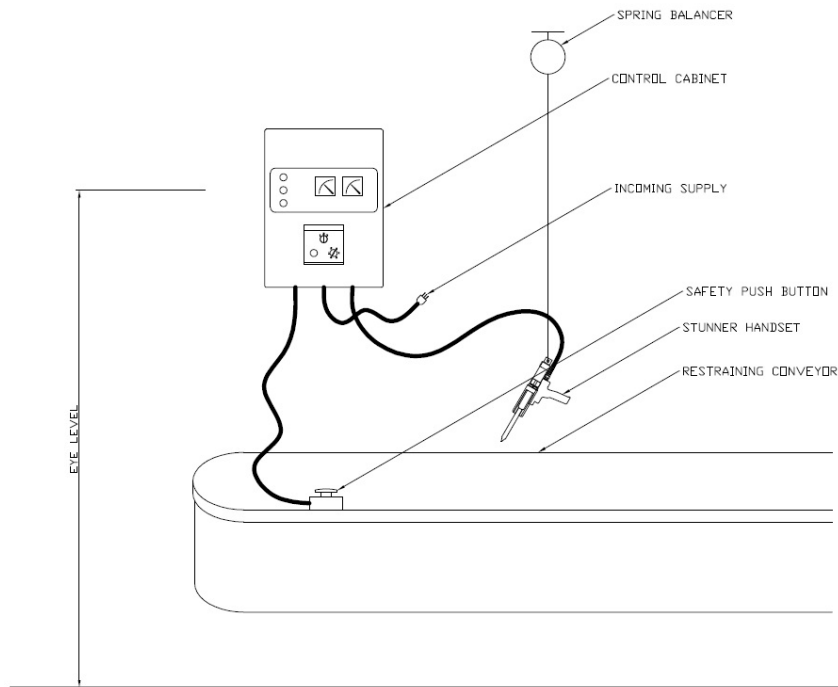


Fig 1

Electrical wiring

Manufactured in accordance with the NZ Wiring Regulations.
All external wiring, except the incoming supply lead is plugged into the cabinet thereby facilitating easy connection and disconnection for maintenance.

Supply

A 230V, 1PH 50-60Hz supply is required and should be controlled by a separate circuit breaker or isolation.

The standard MS305 is supplied with a 3 pin appliance lead.

It is advised that each stunner should be supplied via its own circuit. The MS 305 requires Earthing via the supply. The current drawn at 230VAC is approximately 6 Amps, but the cables etc. should be rated at 10 Amps.

Safety Switch

An enclosed push button which plugs into the cabinet is supplied for the remote safety circuit switch. The remote safety switch is normally mounted on the restrainer as in fig1.

The safety switch is used to prevent the operator coming into contact with the animal during the stunning period, by ensuring his free hand is not able to touch the animal being stunned. The stun contactor current will not close if the safety push button is not operated within 0.5 seconds of the hand set trigger being depressed. Both triggers must be released before another stun can take place, e.g. anti tie down

Stunner hand set

The stunner handset is pre-wired and needs only to be plugged into the control cabinet. It is equipped with an eyelet for a balancer. This is recommended for use with the stunner handset. Fig 1 shows the placement of the balancer, with the balancer and the handset.

The water attachment has 5 meters of clear PVC tubing, 6mm in diameter. The tubing must not be shortened under any circumstances, as the 5 meters of water, in the tubing, acts as the impedance to earth.

IMPORTANT: DO NOT SHORTEN THE WATER TUBING

General Operation

The MS305 can be programmed for 3 different animal species (eg, lamb, mutton, bobby calves). The minimum current, maximum current rise time, minimum stun time and overall stun time can all be selected for each of the 3 settings.

Further, there are 6 different current settings available, ranging from 0.7 – 2.0A. The operator needs to select the appropriate current setting for the animal being stunned, i.e. animals with long wool will likely require a higher setting than freshly sheared animals to reach the same current.

Operating Procedure

It must be noted that the output current will vary depending on the impedance across the probes (and rear electrode if full kill stun) of the hand piece. This varies due to poor contact with the animal and it becomes the responsibility of the operator to ensure he has a good stun.

As the animal travels up the restraining conveyor, once the animal has reached the point where the front of the stunner handset is over the head of the animal, the stunner handset is applied.

Head only stunning (Halal) with a typical Model 1 J Handset

The recommended, and proven method is to operate the trigger and push button simultaneously, present the handset onto the back with a firm, positive movement, placing the front electrode as high up the head as possible (electrodes should be placed between the ears). The current will start to flow and the stun timer commence, when the 2 front electrodes are in contact with the head. Releasing the trigger or safety push button will stop the stun, however standard procedure is to hold both buttons until the stun 'times out' as indicated by the 'stun on' lamp extinguishing.

The operator can either stop the restraining conveyor when stunning, or he can follow the animal during the stun period.

The trigger and safety push button must both be released before another stun cycle can commence (Anti tie down). The indicator light "Stun" will extinguish when the preset stun time has been reached. The operator is then able to proceed to the next animal.

Head only stunning (Halal) with a Model 1 C Handset (Clamp Handset)

Once the animal has reached the end of the conveyor, where the stunner handset is now over the head of the animal the stunner handset is placed over the animals head. To ensure a high quality stun the electrodes must be placed as close as possible to the ears of the animal, see figure below. Once the trigger and remote safety switch are engaged the electrodes will close, thus restraining the animals head, and the stun cycle will begin



The end of the cycle is shown by the opening of the electrodes, thereby releasing the animals head. It is important that the trigger and remote safety switch remain constantly engaged until the cycle ends. An early release of the trigger and or remote safety switch results in a poor stun and or double stun.

Once the electrodes have opened the trigger and remote safety switch must be released before the operator may proceed to the next animal.

Head to Body stunning (Full Kill)

This is the same as head only but the current flows from the two pointed probes down to the back heel plate or electrode (or leg electrodes if fitted). Upon simultaneously activating the trigger and push-button the stun starts as soon as the two sharpened probes make contact with the animal.

Remember:

The onus is on the operator to ensure the animal receives an effective stun.

DO NOT DOUBLE STUN

Typical Stun Parameters

The following table details the accepted parameters for humane stunning of animals, the MS305 needs to be calibrated for the specific animal being stunned

Head-only Electrical Stunning					
	Sheep	Lambs	Calves	Cattle	Deer **
Min. Amps *	1.0	0.7	0.9	1.1	1.0
Range	1.0 - 1.5	0.7 - 0.9	0.9 - 1.5	1.1 - 2.5	1.0 - 2.0
Time(s)	1.0	0.8	1.0	1.0	1.0
Range	1.0 - 4.0	0.8 - 1.5	1.0 - 4.0	1.1 - 4.0	1.0 - 1.3

* Minimum current that is required for humaneness but not necessarily for movement control

** Hinds only at this stage

Reference: Electrical Stunning and Slaughter in New Zealand
K.V. Gilbert, 1993
MIRINZ 908
ISSN 0465-430

Adjusting the Stun Settings

As discussed previously the MS305 can be programmed with 3 different stun settings for different species.

1. On the control PCB press and hold the 'MENU' button to enter setup mode
2. Using the 'UP' and 'DOWN' buttons on the control PCB select which species setting you wish to adjust (1, 2 or 3)
3. Once the correct setting is selected, press the 'ENTER' button to select that selection. The stun time will appear 'STUN TIME'
4. Adjust the stun time with the 'UP' and 'DOWN' buttons until the desired time is displayed.
NOTE: this is the total time that the unit will stun for, the MINIMUM time is adjusted later.
5. Press the 'ENTER' button to save the stun time, 'MIN HOLD TIME' will now be displayed. This is the minimum time the stun current needs to be above the selected minimum current for humane slaughter.
6. Using the 'UP' and 'DOWN' buttons adjust the minimum stun time until the desired time is displayed. Press the 'ENTER' button to save the time
7. 'START CURRENT' is now displayed; this is the maximum allowable time for the minimum current to be reached. Using the 'UP' and 'DOWN' buttons adjust the current rise stun time until the desired time is displayed. Press the 'ENTER' button to save the time
8. 'MIN. CURRENT' is now displayed. Using the 'UP' and 'DOWN' buttons adjust the minimum current until the desired amperage is displayed. Press the 'ENTER' button to save the current
9. All 4 adjustable settings have now been selected. Press and hold the 'MENU' button. The settings will now be saved to memory, and you will be returned to step 2 in these instructions.
10. Repeat steps 2-9 for the remaining 2 species settings if required.
11. Using the 'UP' and 'DOWN' buttons select 'EXIT' and press enter. The PCB will exit adjustment mode and return to stunning mode

Error codes on control PCB

1. **Anti Tie Down Error:** The PCB did not receive a trigger signal from the handset and safety push button within 0.5 seconds. This is caused by:
 - a. Not triggering both buttons simultaneously
 - b. Faulty switch in either handset or safety push button
 - c. Faulty relay connecting handset trigger to the safety relay (R1)
 - d. Faulty Safety relay
2. **Start Current Error:** The stunner did not reach its minimum current within the programmed time (as programmed following instructions on page 8)
 - a. Check the current select switch is set appropriately (higher than) for the minimum current. i.e. min current = 1.0A, current select switch = 0.9A will result in 100% fail.
3. **Minimum Hold Error:** The stunner did not maintain it's minimum current for the selected minimum stun time (as programmed following instructions on page 8)
 - a. Operator must ensure good contact is maintained between electrodes and handset to ensure consistent current flow.
4. **Trigger Release Error:** Either the handset trigger, or safety push button has been released before the stun has completed (Stun time as programmed on the PCB following instructions on page 8)
 - a. Operators must let the stun finish before releasing triggers.

Safety procedures

1. NO other personnel other than the operator and the technical staff should be allowed in the area when in operation.
2. The stunner must be left in an inoperable condition when not in use.
3. The operator must be fully trained and informed of the dangers to self and others of misusing stunning equipment.
4. Regular preventative maintenance (As set out in the maintenance schedule) must be carried out on the stunning equipment.
5. Do not touch or allow other personnel to touch animals being stunned.
6. Ensure that on any restraining conveyor the metal work is earthed.
7. The animals being stunned should be adequately separated from each other.

Maintenance

PREVENTATIVE MAINTENANCE FOR STUN CABINET

A copy of the monthly test form is included in the back of the manual. We recommend that the tests listed be carried out and signed by an electrician on a monthly basis for all stunners within your works.

It should be noted that the general inspection test for the stunner hand-set (test No.II) consists of checking for broken or worn leads and loose connections. The hand-set should also be cleaned regularly with a mild detergent.

Successful stuns rely on the probes etc. of the hand-set being kept clean and the probes sharp. Lanoline etc. coats the probes and is an insulator, decreasing the stun. **Blunt or rounded points on the probes also decreases the stunning effect.** The use at regular intervals of emery cloth to keep the points sharp is recommended.

The same inspection applies to the stunning cabinet, with all internal connections being checked for loose wiring and the components checked also for any faults.

If the tests listed are carried out on a regular basis the unit will give you reliable service and reduce the number of stoppages during production.

FAULT FINDING

(1) No Output Current

Check

1. Supply voltage-OK
2. Main. Switch-off - or main fuse has blown on supply input. (10 amp)
3. Secondary fuses blown
4. 24 vac fuse mounted on Printed circuit (PCB) may be blown or disconnected from holder.(2 amp slow blow)

(2) Trigger not working

Above faults checked and remedial action taken if found faulty.

1. Check that both LED indicators on PCB labelled PBI & PB2 are coming on when the hand-set & the safety push are being activated. If only one is being lit, a faulty push-button, trigger, or circuit would be the trouble.

Preventative Maintenance for Handset

1. Daily:

- a. Visual Inspection of Handset
 - i. Electrical connections are tight
 - ii. Water supply correctly inserted to electrode
 - iii. Pneumatic lines are connected correctly
- b. Test operations by short circuiting electrodes and observing the current through a stun cycle. An instantaneous current rise followed by consistent flow is required

2. Weekly

- a. Remove electrodes from handset and clean/polish with wire brush until tarnishing has been removed.
- b. With handset connected to stun cabinet check the resistivity between:
 - i. Each electrode and earth
 - ii. Between the electrodes

TEST PROCEDURE FOR HAND STUNNER

THE PREFERRED WAY TO TEST THE MS305 AND HANDSET IS TO USE THE JARVIS STUN TEST UNIT

The JETCO Stun tester will confirm the stun time and current of the complete system. As per instructions on following page.

ALTERNATIVELY, THESE TESTS CAN BE USED:

TEST FOR HAND~SET

1. (a) Check continuity between Terminal 1 of Plug and one Probe Pin.
(b) Check continuity between Terminal 2 of Plug and the 2nd Probe Pin (Head Only handset) or Heel Plate (Head to Back Handset).
2. Check continuity between terminal 3 and terminal E of plug.
 - a. Should be open circuit when not in use
 - b. Should be short circuit when handset trigger is operated.

TEST FOR COMPLETE STUNNER SYSTEM

1. Plug hand-set and safety push button plugs into stunner control unit sockets.
2. While keeping probes pushed onto a good earthed surface turn on the main supply switch and operate both the safety push button and hand-set trigger together.
 - Current meter should read approximately 2.5 Amps, STUN lamp should glow. After interval pre-set on internal timer STUN lamp will extinguish.
3. While keeping probes in fresh air turn on the main supply switch and operate both the safety push button and hand-set trigger together.
 - Current meter should read 0.0 Amps, Voltmeter should read 550V. Stun will time out after the programmed current rise time has been reached and STUN FAIL lamp will glow.

CAUTION: When carrying out these tests remember that probes have high voltage on them whenever trigger is operated.

Optional Stunner Test Unit

OPERATION:

- Select model 1 or model 2 on select switch depending on which handset to be tested.
- Place handset electrodes on to the test plates, located on the front of the test unit. (And connect the alligator clip to rear electrode if model 2 is selected)
- Operate the Stunner.
- Stun duration and current will be displayed on the LCD screen when current is detected.
- The timer will display and hold the duration of the stun. This requires automatically resets when another stun is performed.
- Current (Amps) will be displayed during the test stun only. At the end of the stun 0.0-0.1A will be displayed.

NOTE:

- The Stunner will deliver a potentially dangerous voltage. And all electrodes on the test unit (including the alligator clip if Model 2 selected), are live during testing.
- This unit is for testing purposes only and may only be operated by qualified personnel.

MONTHLY TEST OF HUMANE ELETRIC STUNNER

Tested By: _____

Date: _____

MEGGER TEST READINGS:

1. Primary of 550V transformer to earth. _____
2. Secondary of 550V transformer to earth. _____
3. Primary of 24V transformer to earth. _____
4. Secondary of 24V Transformer to earth. _____
5. Between probes of handpiece (Not plugged in) _____
6. Between probes and trigger switch circuit on
handpiece (Not plugged in) _____

CONTINUITY TEST OF THE FOLLOWING:

7. Earthing conductor on unit. _____
8. Handpiece conductors. _____
9. General inspection of handpiece. _____
10. General inspection of unit. _____

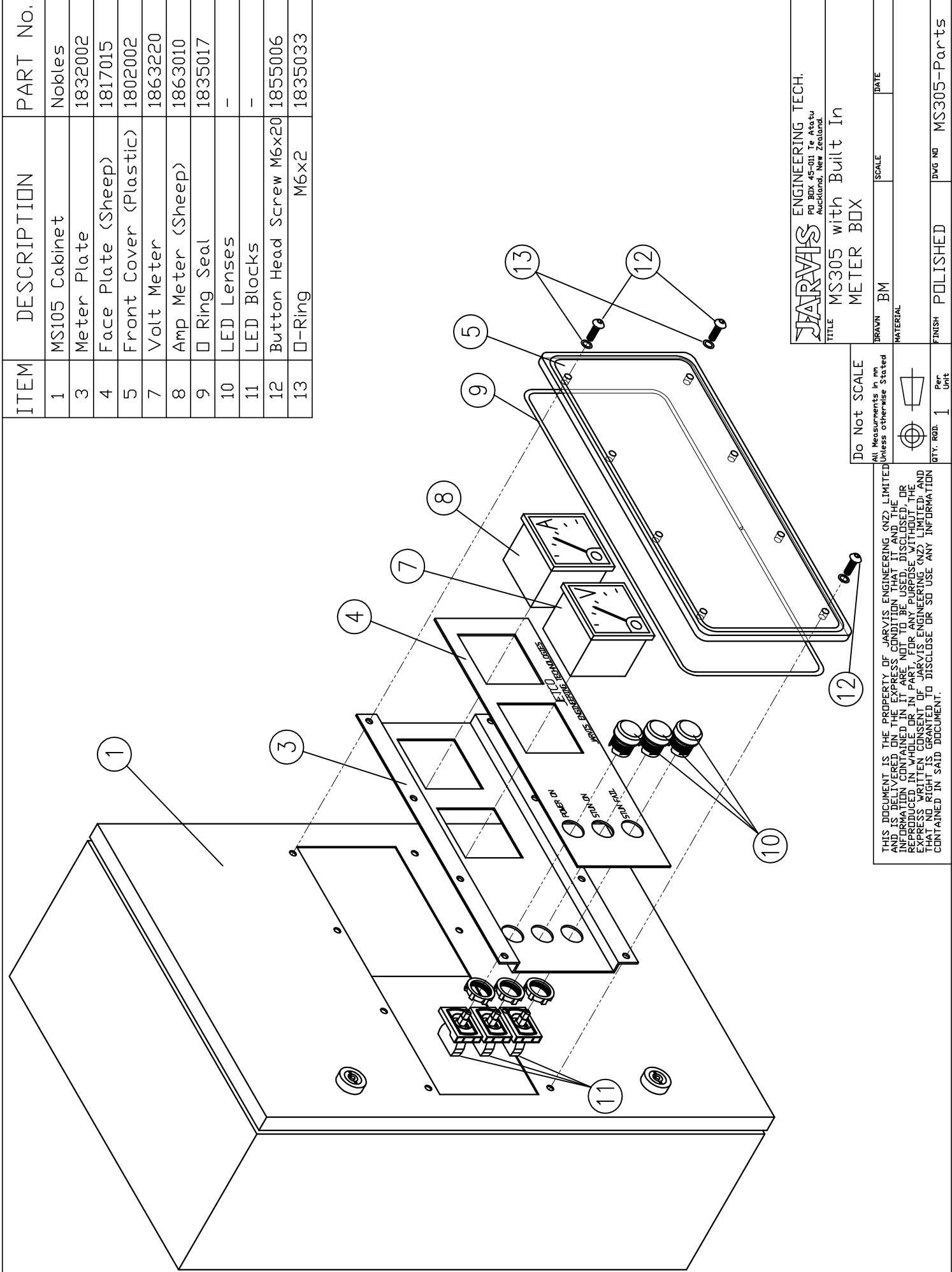
Parts used in the MS 305

	Part Number
1. Stun Transformer 230/550V	1863109
2. Control Transformer 230/24V	1863106
3. Printed Circuit Board	1863315
4. Choke 0.7 – 2.0 A	1863210
5. Meter Box Complete	3863008
6. Current Transformer	1863114
7. Hand piece Plug	1863002
8. Push Button Plug	1863004
9. Solenoid Plug	1863006

Fault Finding

<u>FAULT</u>	<u>CHECK</u>	<u>REMEDY</u>
Pelt Burning	No water sprayed on animals as they move up the restrainer to the operator.	Water, applied to the animal as it moves up the restrainer will enable a better contact to be made between the electrodes and the pelt. This water is delivered in the form of 2 jets out of each electrode. Ensure that jets are strong, and there is no crimping / leak in water line.
Lower than expected current	Check condition of electrodes.	As the stunner is used, electrodes begin to tarnish. This tarnishing must be removed, and the electrodes kept clean in order for a good electrical connection to be made.
Stunning causes broken pelvis or shoulder on animal	Check animal is fully restrained.	Weight of animal should be held up by either: a) non conducting restrainer belts b) non conducting slat restrainer c) non conducting knocking box walls. i.e. animal should have no weight on its legs and the body should be insulated.
Stunning causes broken pelvis or shoulder on animal	Animal is being stunned twice.	Stunning animal twice can cause broken backs.
Blood Splash	Animal is not bled immediately after stun.	Animals should be bled within 20 seconds of stun.
Blood Splash	Check stunning current on meter.	Excessive current or excessive stun time can cause blood splash. Current should be set to 1.3A average value.

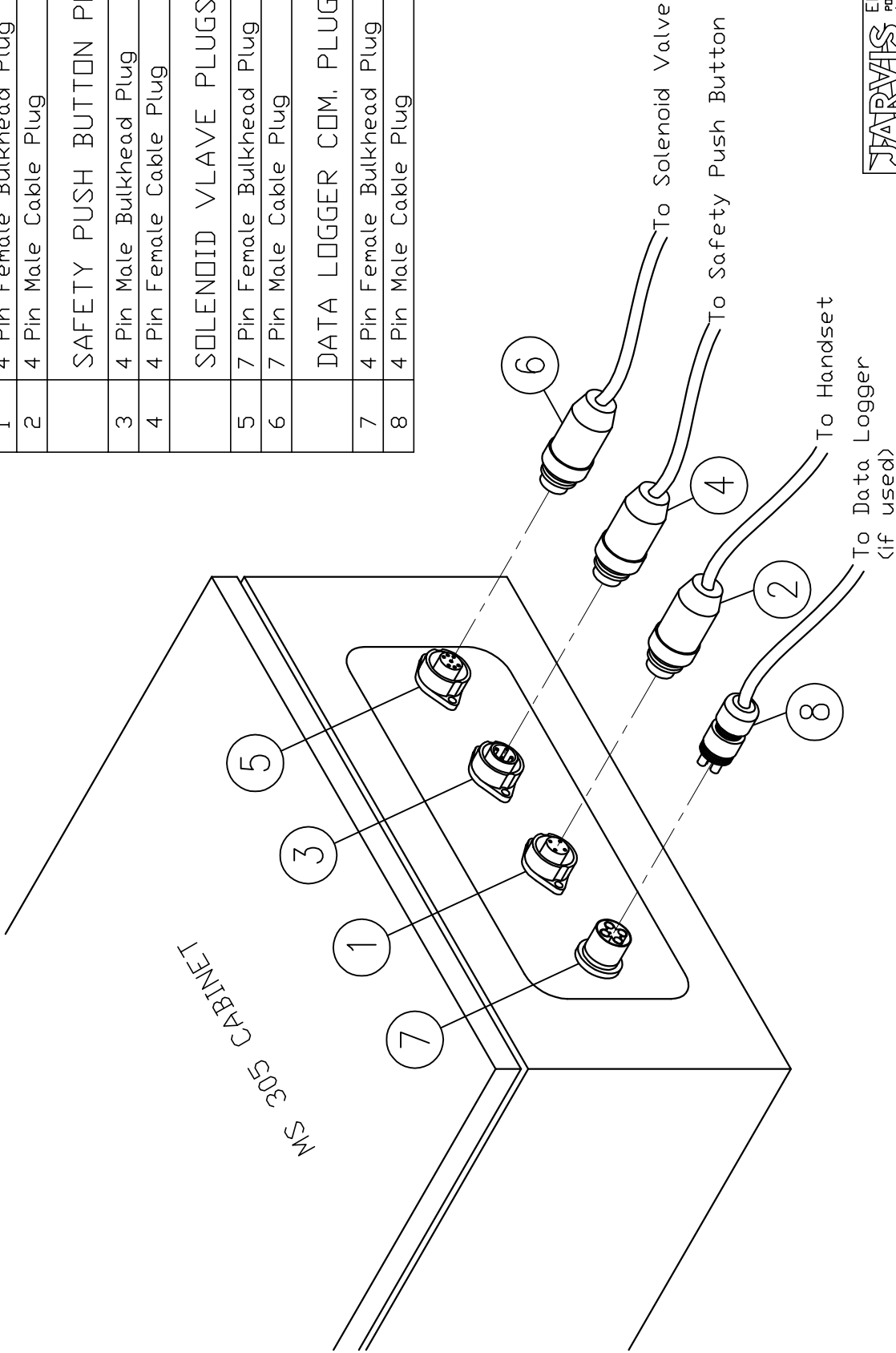
ITEM	DESCRIPTION	PART No.
1	MS105 Cabinet	Nobles
3	Meter Plate	1832002
4	Face Plate (Sheep)	1817015
5	Front Cover (Plastic)	1802002
7	Volt Meter	1863220
8	Amp Meter (Sheep)	1863010
9	□ Ring Seal	1835017
10	LED Lenses	-
11	LED Blocks	-
12	Button Head Screw M6x20	1855006
13	□-Ring M6x2	1835033



JARVIS ENGINEERING TECH. PO BOX 45-011 Te Atatu Auckland, New Zealand.	
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DRAWN	BM
SCALE	DATE
MATERIAL	
FINISH	POLISHED
DWG NO	MS305-Parts

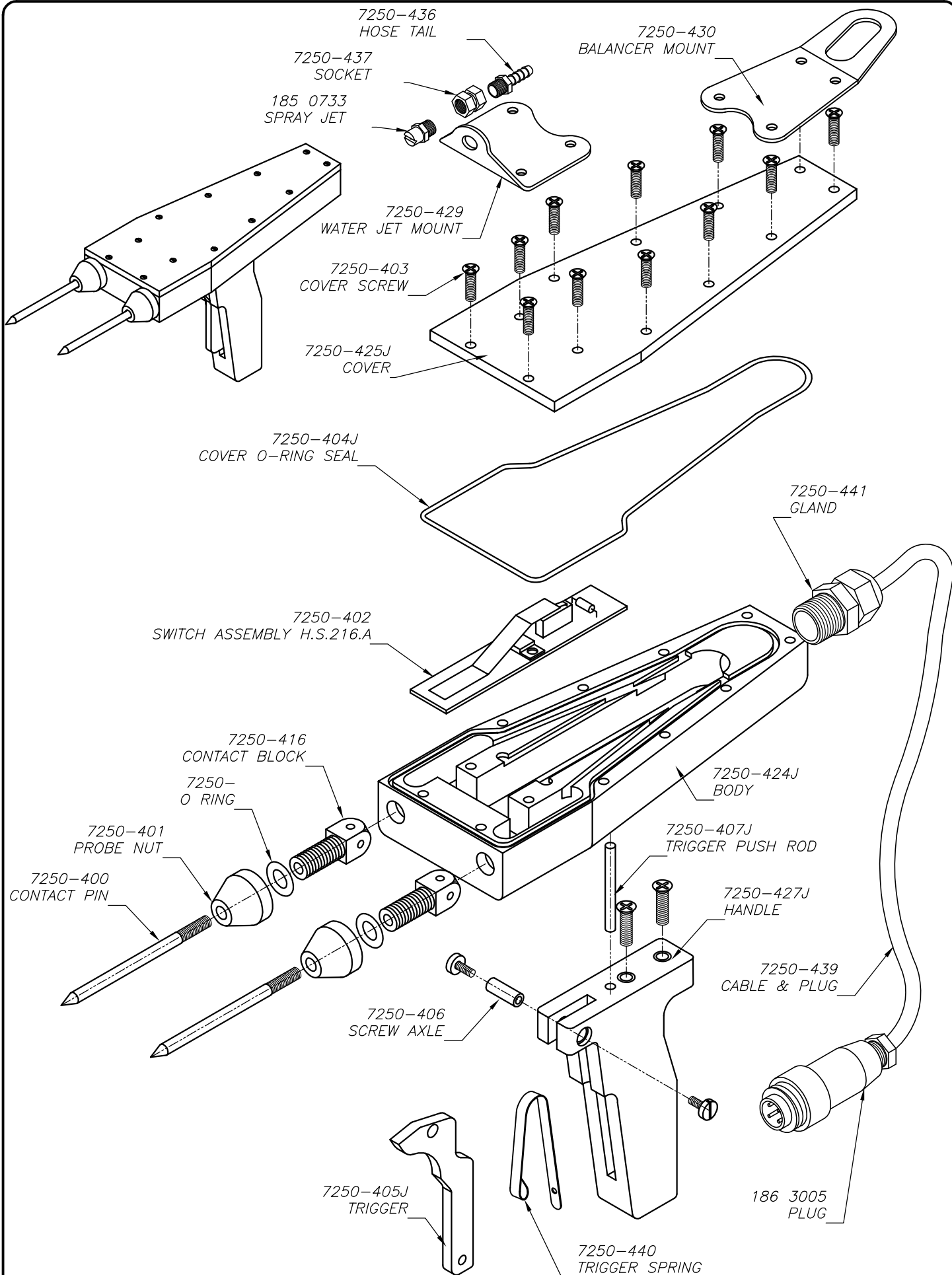
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All Measurements in mm Unless otherwise Stated	1
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ITEM	DESCRIPTION	PART No.
	HANDSET PLUGS	
1	4 Pin Female Bulkhead Plug	1863002
2	4 Pin Male Cable Plug	1863005
	SAFETY PUSH BUTTON PLUGS	
3	4 Pin Male Bulkhead Plug	1863004
4	4 Pin Female Cable Plug	1863003
	SOLENOID VLAVE PLUGS	
5	7 Pin Female Bulkhead Plug	1863006
6	7 Pin Male Cable Plug	1863007
	DATA LOGGER COM. PLUGS	
7	4 Pin Female Bulkhead Plug	1863082
8	4 Pin Male Cable Plug	1863083



<div>JARVIS</div> <div>ENGINEERING TECH.</div> <div>PO BOX 45-011 Te Atatu</div> <div>Auckland, New Zealand.</div>	
TITLE	MS305
PLUG DETAILS	
DRAWN	BM
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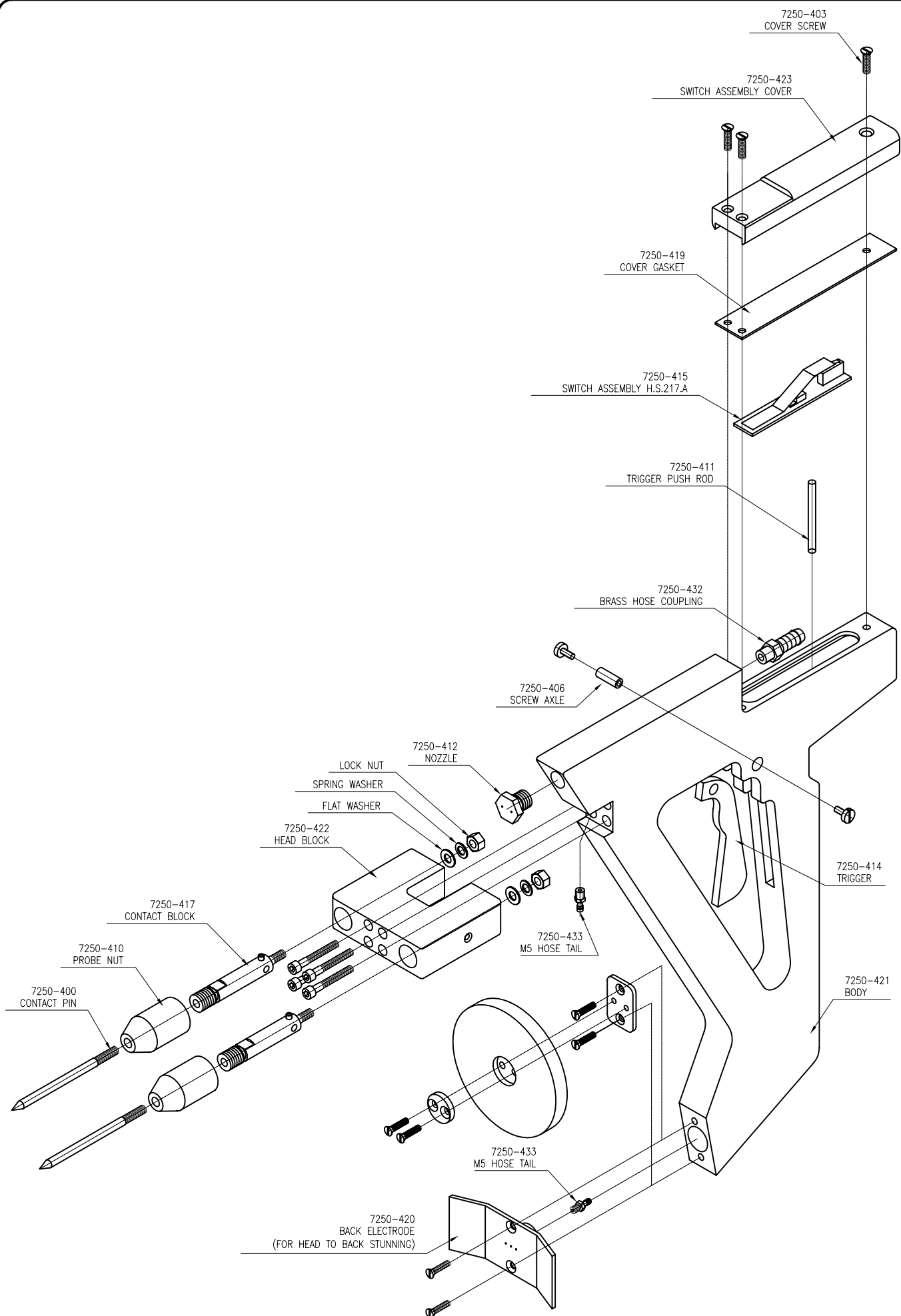


JARVIS

ENGINEERING TECH.
Ph +64 (09) 836 3480
PO BOX 45-011, Te Atatu
Auckland, New Zealand

SERIES 150 HUMANE STUNNER
MODEL 1J HEAD ONLY HANDSET
PARTS DIAGRAM

Part No.
7150-400J

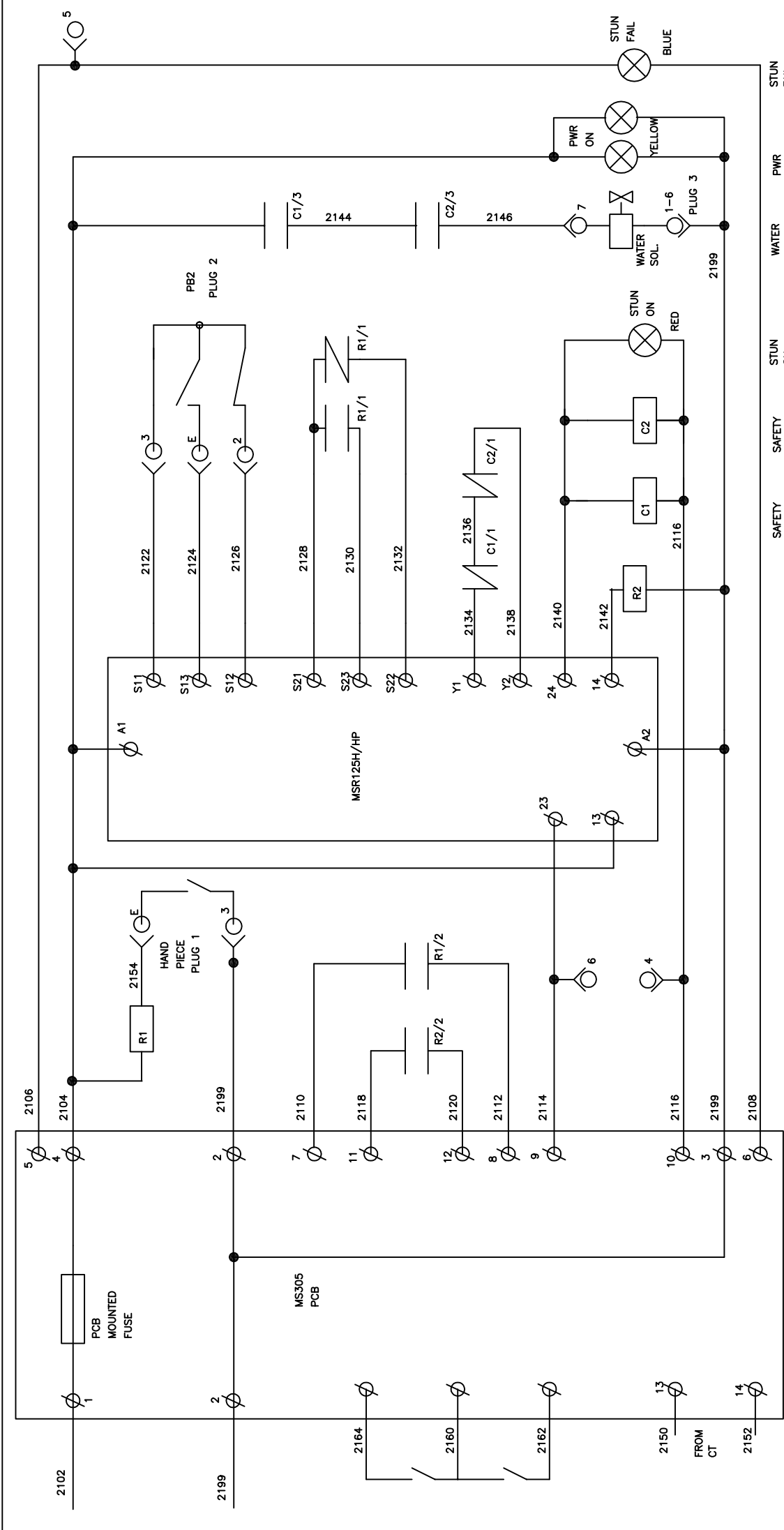


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ENGINEERING TECH.
Ph +64 (09) 836 3480
PO BOX 45-011, Te Atatu
Auckland, New Zealand

SERIES 150 HUMANE STUNNER
MODEL 2 HEAD TO BACK HANDSET
PARTS DIAGRAM

7150-410A



REV.	DATE	APPD.	CHANGE	MS 305 ELECTRICAL WIRING SCHEMATICS MANUAL SHEEP STUNNER		<div>JARVIS</div> <div>Unit 1 – 54 Keeling Road, Henderson Auckland, New Zealand Tel: +64 21 959 137 Fax: +64 9 836 3480 www.jarvisengineering.com</div>	SCALE	NOT TO SCALE
							DRAWN	
							CHECKED	
							DATE	11-JAN-2016
							DRAWING No.	
							02/MS305	
							CAD FILE	
							A3	

SUPPLIER DECLARATION OF CONFORMITY (SDoC)

In accordance with ISO/IEC 17050-1:2004

SDoC Identification Number¹: MS305 20320

Issuer details

Name ² (of New Zealand manufacturer or importer): Jarvis Engineering Technologies	Contact Address: 1/54 Keeling Road Henderson Auckland NZ
Telephone: (09) 836 3480	
New Zealand Company No. (if applicable):	
Email Address: allan@jarvisengineering.com	

Medium Risk Article – Details³ (Product name, type, rating, brand, model, batch numbers, and serial numbers, as applicable):

Manual Small Stock Stunner
MS 305
230 volt supply, 20 amp

The Medium Risk Article listed above, fully complies:

With cited standard(s), as listed ⁴ :	
Standard number and issue year: NZS 6116:2006	Standard number and issue year:
Edition / Amendment status: 2006	Edition / Amendment status:
Standard title: Safe Application of Electricity in the Meat Processing Industry	Standard title:
AS/NZS ZZ modified Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>	AS/NZS ZZ modified Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>
OR Complies with the Conformity Cooperation Agreement ⁵ Yes <input type="checkbox"/> No <input type="checkbox"/>	

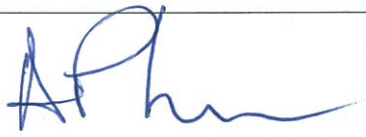
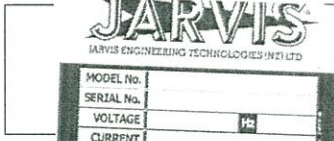
Names and addresses of any testing organisation or body

Name(s): Jarvis Engineering Technologie	Address(es): 1/54 Keeling Road, Henderson, Auckland
Name(s):	Address(es):

Reference to relevant test reports/certification and the issue date that show how compliance is achieved

Standard(s) or document(s) used, to show how compliance with cited standard is achieved: AS/NZS 3000 NZS 6116:2006	Report Certification or Document reference N°(s): Certificate of Conformity	Issue dates(s): As date of Manufacture
Reference to any management quality system involved:		
Additional information ⁶ :		

Declaration (signed for and on behalf of)

Name and position as authorized by the issuer ⁷ : Allan Lee (Managing Director)	Signature: 
Issuer Identification (as affixed to the article): 	Date: 20 March 2020