



# INTRACEL

*Electroporation by ABBOTSBURY*



## TSS20 OVODYNE ELECTROPORATOR EP21 CURRENT AMPLIFIER

OVODYNE ELECTROPORATOR



## TSS20 OVODYNE ELECTROPORATOR FOR *IN OVO* USE

### Features

- single or multiple pulses
- accurate voltage setting
- resistance measurement facility
- clean square wave pulses
- safe operation with current limit and single sequence current boost
- remote start accessories
- EP21 Current Amplifier accessory

The **TSS20 Ovodyne** is a square wave pulse generator for bench top use capable of single or multi-pulse operation at voltages particularly suitable for *in ovo* electroporation. The use of the chick embryo as a model for gene transfer experiments has grown rapidly in the last few years. The usual basic requirement for a small number of low voltage square wave pulses to deliver genetic material to the embryo has now led to the

development of a refined microprocessor based instrument providing flexibility and convenience of operation.

The predecessor to the TSS20 Ovodyne, the TSS10 Pulse Generator has seen considerable success in this application although it was not originally designed with *in ovo* work in mind. Customer feedback has now enabled Intracel to provide a dedicated instrument incorporating the features you want at a highly affordable price.

## Safety

The **TSS20 Ovodyne** is designed to meet international standards for laboratory equipment safety and to comply with European CE requirements. Up to 60v a 30mA current limiting circuit is employed on the output which will immediately abort a pulse sequence if the current would otherwise be exceeded. From 60 - 100v this current limit is reduced to 2mA.

In cases where electroporation is carried out in the presence of a conductive buffer or Howard Ringer's Solution the resistance measurement feature allows the operator to measure the resistance across the electrodes whilst they are in place. This can help ensure that an appropriate voltage is chosen or that buffer conductivity or electrode spacing is adjusted to avoid current limiting conditions.

The current boost facility allows the current limit (at 0.1-60v) to be overridden and extended to 100mA for one sequence after which the system reverts to the lower limit. The boost must be re-instated for each sequence that it may be required.

From 60.1 to 99.9v the boost setting also allows a current increase on a reducing scale to 10mA (90.1 - 99.9v)

Introduction of the new EP21 Current Amplifier accessory extends the current range of the TSS20 even further, up to 1000mA (see below).

## Accessories

**Electrodes.** Silver electrodes are available made from 0.8mm diameter silicon rubber insulated silver wire, the exposed pole being flattened into a 'paddle' shape approximately 2 x 1mm. Silver wire length extending beyond the electrode holder is 40mm



Tungsten electrodes are produced from 0.5mm o.d. tungsten rod polymide insulated with pointed tips, ideal for accurate targeting of specific parts of interest in the chick embryo.

Platinum tipped electrodes use 0.5mm diameter platinum wire bonded either to a rigid 0.8mm diameter stainless steel tubular shaft, or a semi-rigid silver wire shaft. The exposed length of platinum is 7.5mm. The tip is cut and abraded flat at an angle of 45°. The electrode shaft is silicone rubber insulated. All electrodes push-fit into Intracel single or Adjustatrod holders.

**Remote Handswitch.** Connects to the front or rear of the TSS20.

**Remote Footswitch.** Connects to the front or rear of the TSS20.



*Silver Electrodes with off-set poles*



*Tungsten Electrodes*

**Electrode holders.** The single electrode holder has a 10cm long 6mm o.d stainless steel body which fits most manipulator probe holders. The 1m cable is fitted with a 4mm red or black connector for the TSS20 Ovodyne output. The Adjustatrode holder comprises two 6mm o.d. holders linked by a screw adjustment allowing the silver 'paddle' electrodes to be positioned and adjusted either side of the embryo region. Fitted with 1m cable and 4mm connectors.



*Adjustatrode*



*Single Electrode Holders*

### **TSS20 Specification**

Pulse Voltage	0 - 99.9v in 0.1v increments
Type of pulse	Square wave
No. of pulses	Programmable 1 - 999 in steps of 1
Pulse width	1 - 999ms in steps of 1ms
Space	10 - 9990ms in steps of 10ms
Resistance	Measurement range 0 - 9998ohms. Resolution 1ohm.
Sequence No.	0 - 999
Dimensions / Weight	85 x 230 x 200mm (H x W x D) / 2.5kg
Power supply	230v 50/60Hz 115v 50/60Hz

## EP21 CURRENT AMPLIFIER



The EP21 Current Amplifier is for use exclusively as an accessory for the TSS20 Ovodyne Electroporator.

Some *in ovo* or other electroporation applications require a higher current than can be delivered by the TSS20 on its own. The EP21 now permits currents of up to 1 amp to be passed, at up to 100v whilst maintaining the square wave pulse form.

In practice the EP21 may be used for delivering pulses from about 20v up to 100v into loads of not less than 50 ohms (but depending on voltage setting).

### EP21 Specification

#### EP21 Current Amplifier

<b>Input:</b>	15 - 100v @ 2mA (from TSS20 Ovodyne)
<b>Peak Output</b>	15 - 100v @ 1000mA max.
<b>Output fuse:</b>	1 amp fast blow, type F.
<b>Isolation:</b>	Output stage is floating and isolated to >3kV from mains and control circuit
<b>Power requirements:</b>	230v 50/60Hz 115v 50/60Hz
<b>Weight:</b>	2.35 Kg
<b>Dimensions:</b>	55 x 235 x 225mm (H X W X D)

### ORDERING INFORMATION

- 01-916-02 **TSS20 Ovodyne** square wave multi-pulse Electroporator 230v 50/60Hz
- 01-916-03 **TSS20 Ovodyne** square wave multi-pulse Electroporator 115v 50/60Hz
- 01-918-02 EP21 Current Amplifier 230v 50 / 60Hz
- 01-918-03 EP21 Current Amplifier 115 50 / 60Hz
- 01-918-09 Pair of shrouded 4mm male connectors (red & black)
- 01-918-10 1 amp fast blow (type F) fuse pk/5
- 01-920-09 Footswitch with cable and connector for TSS20
- 01-923-09 Handswitch with cable and connector for TSS20
- 01-925-09 Adjustatode electrode holder with cable and 4mm plug
- 01-926-09 Single electrode holder with cable and red 4mm plug
- 01-927-09 Single electrode holder with cable and black 4mm plug
- 01-928-06 Insulated silver 40mm x 0.8mm wire electrode (flattened pole) pk/2
- 01-929-06 Insulated silver 40mm x 0.8mm wire electrode with offset pole. pk/2
- 01-931-06 Tungsten electrode, polyimide insulated, 76 x 0.5mm with 10:1 tapered tip, 1mm exposure. pk/2
  
- 01-932-06 Tungsten electrode, as above, but 2mm exposure. pk/2
- 01-933-06 Tungsten electrode, as above, but 3mm exposure. pk/2
- 01-934-06 Tungsten electrode, as above, but 4mm exposure. pk/2
- 01-935-06 Tungsten electrode, as above, but 5mm exposure. pk/2
- 01-700-06 Platinum wire tipped electrode, stainless steel shaft. pk/2
- 01-708-06 Platinum wire tipped electrode, silver shaft. pk/2



**TSS20 Ovodyne with remote handswitch accessory**

*In the interests of continuing development Intracel reserve the right to alter specifications without notice.*

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