



duo-scan™

| Instruction manual





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Introduction

Since 1983 IMV has been developing, manufacturing and distributing worldwide animal husbandry equipment becoming market leader in the development and production for real time ultrasound scanners for most animal species.

IMV Technologies, in consultation with leading experts in animal husbandry applications, have combined the best features of the **Duo-Scan** with the latest state of the art technology. The result is the new Duo-Scan, an ultrasound scanner which is small, light, robust, portable and easy to work with.

The **Duo-Scan** is designed and manufactured in Scotland at:

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As specialists in providing ultrasound imaging equipment for veterinary and animal husbandry applications, we realise the importance of equipment reliability and speed of response should service assistance be required. Our engineers and their appointed agents are available to provide a rapid service assistance to ensure optimum performance of IMV imaging systems.

The Duo-Scan meets all essential and safety requirements of all current relevant European Directives.

The CE mark on the rear panel is a symbol of this conformance. If you require any further information regarding these directives please contact us directly. This product is classed as electronic equipment.

At the end of its useful life it should not be disposed of with general waste, it should be taken to a recycling point for electrical/electronic equipment. The crossed-out wheelie bin symbol is placed on the rear panel as a reminder in conformance with the European WEEE Directive. •



Note:

All **IMV Technologies** products are to be used for animal applications only.

Operator safety

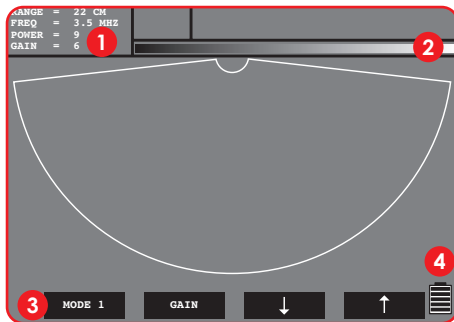
The Duo-Scan is designed to operate only from a 12 V DC source.

The use of a 12 V lead acid battery ensures safety from electrical hazard.

When charging batteries, use only the IMV imaging supplied charger. This charger is matched to the battery capacity and will ensure long life and continued safety. Higher charge rates from unsuitable chargers may lead to hazards from fire or battery leakage in addition to reducing battery life.

Although the Duo-Scan runs from a low voltage source, dangerous voltages are generated within the unit. For this reason, no attempt should be made to disassemble the scanner. Should you require any assistance please contact a IMV imaging Service Engineer. •

Display layout



1 The current range, operating frequency, power and gain settings are displayed at the top left hand corner of the screen.

- 2 The grey bar contains 32 of the 256 shades of grey. This helps with the adjustment of brightness and contrast and gives a comparison of grey intensity for the ultrasound picture.
- 3 The current function of the 'soft' keys is displayed along the bottom of the screen.

The menu disappears after approximately 6 seconds, leaving only the scan, voltage and battery capacity displayed.

To switch the menu back on, press any button on the scanner

- 4 A battery capacity and voltage reading are displayed in the lower corners of the display. •

1. Operating instructions

1.1 Preliminary switch on

Before connecting or disconnecting the probe, ensure that the Duo-Scan power is switched off and that the probe connector is free from dirt.

Connect the probe to the front connector marked (G).

Rotate the probe connector until the notches on the probe and scanner align, and then screw the retaining ring clockwise to lock the connector in position. •

1.2 Power

Duo-Scan is designed to operate only from a 12 V DC battery pack.

Use only the IMV imaging supplied battery pack.

Ensure the charged battery pack is securely latched to the Duo-Scan.

Press and hold the 'POWER' button  on the front panel until the system beeps.

The green 'DC POWER' light located above the power button should be illuminated and the scanner will now perform a system initialisation.

If the probe is connected, it will start to rotate.

If the imaging display device is connected, its screen will be illuminated.

The sector scan and settings will be displayed on the screen.

The buzzer will sound twice; the second indicates that the system initialisation is complete and the system is ready to function.

If the supply voltage is too low (less than 9 volts) the system will power down.

To switch the scanner off, press and hold the power button until the scanner shuts down. •

1. Operating instructions

1.3 Imaging display device connection

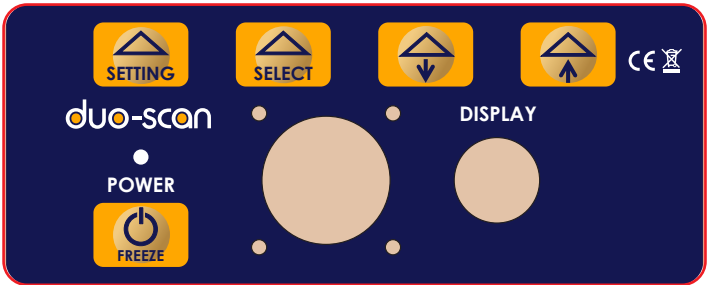
The Duo-Scan accessories allow the ultrasound image to be viewed on the display headset or monitor options.

Before connecting an imaging display device, be sure the connector is free from dirt.

Displays are connected to the 'Display' connector 'H'.

Make sure the connector is correctly oriented before pushing home and the external threaded metal lock ring is engaged carefully before tightening gently.

If you are using a wireless monitor you do not need to connect it to the console, and the display connector cover plug may be left in place. If the monitor uses a video cable, follow the instructions above. •



1.4 Scanning

All functions of the console are set using the front panel keys shown below. •



Scrolls through preset modes



Switches between power or gain adjustments



Power or gain down



Power or gain up



Short press freezes image. Long press switches on/off.

1.4.1 Standard operation

Duo-Scan comes with 8 default preset modes for cattle pregnancy scanning, 4 of the modes come with Foetal Ageing circles, which help to identify the approximate foetal age. See list below:

- Mode 1: Range 16cm, Frequency 5MHz, Foetal Ageing Circles On
- Mode 2: Range 16cm, Frequency 5MHz, Foetal Ageing Circles Off
- Mode 3: Range 19cm, Frequency 3.5MHz, Foetal Ageing Circles On
- Mode 4: Range 19cm, Frequency 3.5MHz, Foetal Ageing Circles Off
- Mode 5: Range 22cm, Frequency 3.5MHz, Foetal Ageing Circles On
- Mode 6: Range 22cm, Frequency 3.5MHz, Foetal Ageing Circles Off
- Mode 7: Range 25cm, Frequency 3.5MHz, Foetal Ageing Circles On
- Mode 8: Range 25cm, Frequency 3.5MHz, Foetal Ageing Circles Off

1.4.2 Foetal ageing modes

The Duo-Scan comes with 4 preset modes for foetal aging which help to identify the approximate foetal age.

To use this measurement look at the circles at the bottom of the screen as a visual reference to identify the age of the embryo.

Depending on the mode there are 2 different measurements available on Duo-Scan: trunk diameter and crown rump length.

These modes are the default factory settings.

Your scanner will be preloaded with the settings requested when ordered so the information provided above may vary.

The shorter ranges are for use in early pregnancy and for improved detail, the longer ranges for late pregnancy and better penetration.

As the range is altered, the speed of the probe varies to provide the best quality image. The smaller the range, the faster the probe rotates.

The scanner always powers on in Mode 1.

To scroll through preset modes

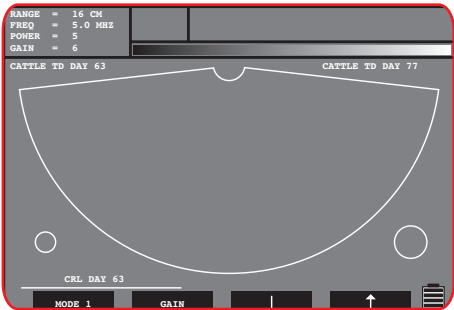
press  •

Trunk diameter is the measurement across the embryo body. To use this measurement look at the circles at the bottom of the screen as a visual reference.

Crown rump length is the measurement from head to tail of the embryo. To use this measurement look at the line at the bottom of the screen to get approximate idea of the foetal age. •

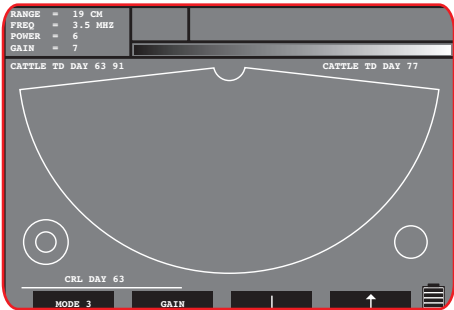
1. Operating instructions

Mode 1: Range or depth of scanning 16 cm



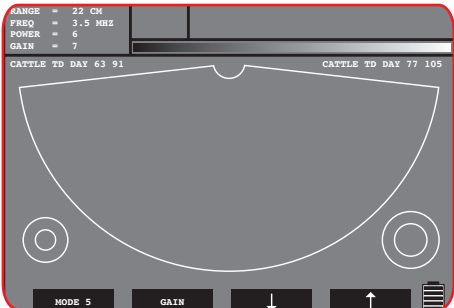
Trunk measurement: Small circle is 63 days and bigger circle is 77 days.
Crown rump length measurement: 63 cm line at the bottom shows what should be the length of the embryo from head to tail.

Mode 3: Range or depth of scanning 19 cm



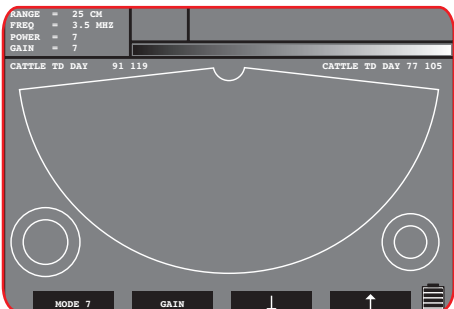
Trunk measurement: 3 circles at the bottom of the screen are available as a reference for 63 days, 91 days and 77 days.
Crown rump length measurement: 63 cm line at the bottom shows what should be length of the embryo from head to tail.

Mode 5: Range or depth of scanning 22 cm



Trunk measurement: 4 circles at the bottom of the screen are available as a reference for 63 days, 91 days, 77 days and 105 days.
Crown rump length measurement is not available in this mode.

Mode 7: Range or depth of scanning 25 cm



Trunk measurement: 4 circles at the bottom of the screen are available as reference for 91 days, 119 days, 77 days and 105 days.
Crown rump length measurement is not available in this mode. •

1.4.3 Gain and power adjustment

Both ultrasound gain and power can be adjusted by the user, the menu along the bottom of the screen will display either "Gain" or "Power" in the 2nd box.

To switch between gain and power, press

the Select button 

To adjust the Gain or Power values, use the Up and Down keys on the front

panel   .

1.4.4 Freeze image

To freeze the image, press the power button briefly.

Pressing this button briefly once more returns the scanner to live

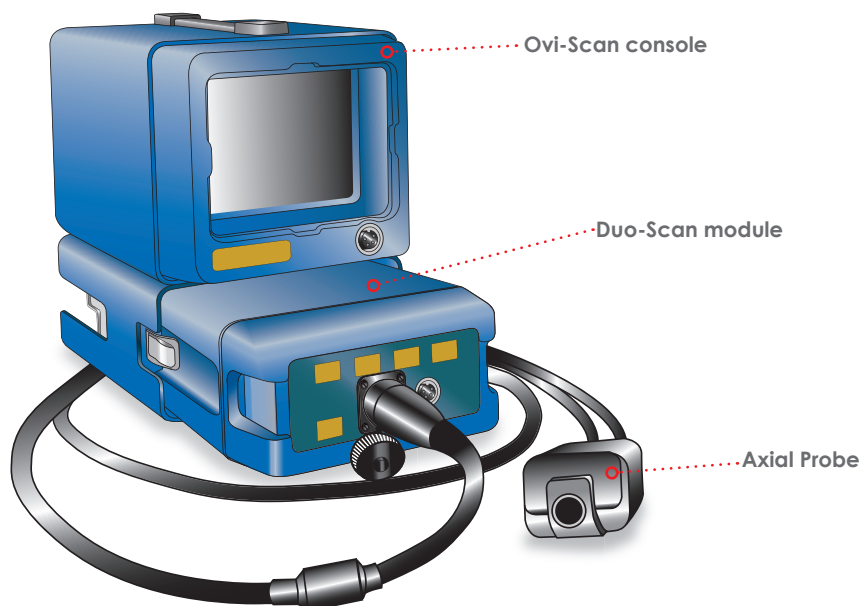
imaging  .

2. The Ovi-Scan option

Ovi-Scan is a scanner that can be used for sheep scanning. Ovi-Scan consists of a Duo-Scan module, an Ovi-Scan console and an axial probe (see below). The Ovi-Scan console and Axial probe can be purchased separately. The Ovi-Scan provides full control of all the operating parameters, allowing you to adjust frequency and range as well as power and gain, switch on and off all or some of the ageing circles.

It also provides a more convenient means of scanning sheep allowing you to sit comfortably while scanning for many hours, as well as allowing connections for drafting gates and entering of tally data.

The Ovi-Scan Console also enables you to change the programmed modes in the Duo-Scan, so you can have the Duo-Scan switch on in your preferred mode and change the rest of the modes to suit your scanning needs. •



3. Care & maintenance

The Duo-Scan was designed for reliability in the animal husbandry marketplace. IMV imaging engineers and their appointed agents are available to provide rapid service assistance to ensure optimum performance of IMV imaging systems. However there is no substitute for careful usage.

As specialists in providing ultrasound imaging equipment for animal husbandry applications, we understand the importance of having reliable equipment.

environments in which they are going to be used. However, should you experience any problems with your Duo-Scan, IMV imaging Service Engineers will be available to provide rapid service support and ensure optimum performance of your IMV imaging system.

The Duo-Scan is designed to be robust, reliable and to withstand the environment in which it will be used. Should you experience any problems, IMV imaging Service Engineers are available to provide rapid service support and ensure optimum performance. •

3.1 Axial and radial probe

- Always clean the probe immediately after use and before any contamination can dry in.
- The probe head can be immersed in warm (not hot) water to clean.
- The probe connector carries critical pulses from the console to the probe head and back. It is imperative to keep these contacts clean and free of contamination. To maintain a good contact, clean the connectors using methylated spirits (or equivalent alcohol) and a small toothbrush to gain access to the contacts, flush with alcohol and leave to drain hanging downwards.
- Never force a connector if it will not go together easily. Debris may collect between the pins and can be carefully removed with a small screwdriver.
- Be very careful to avoid anything getting into the gold plated connector inserts, this may cause damage and some of these are expensive to replace.
- Do not knock or scrape the transducer window, this may cause the window to burst. Do not push against the probe window, the sealing may be damaged or fluid may be forced out of the internal expansion tube. If a window or its seal leaks then the probe must be returned to IMV imaging. Further use of the probe with a window leakage will further damage other internal parts of the probe due to dirt from outside contaminating the internal gears.
- Do not forcibly bend or pull the cable connecting the probe to the module.
- Examine the probe regularly for any damage, especially the window. The chamber behind the window is filled with a silicon fluid and it is normal for a small bubble, about 1 mm diameter, to be present. A large bubble or signs of leaking fluid should be referred to a IMV imaging Service Engineer.
- Any other problems or maintenance queries should be referred to a IMV imaging Service Engineer. •

3. Care & maintenance

3.2 Duo-Scan battery

The battery unit is of sealed lead acid type and will give many hundreds of recharge cycles if the supplied charger is used. While battery is in good condition and is fully charged, it will run the Duo-Scan for approximately 5 hours.

Electrical connection to the battery is through the latches on either side of the battery. Battery output is protected with a resetting fuse but care should be taken to prevent short circuiting between latches.

The battery unit may be cleaned by wiping down with a damp cloth. Dry the battery unit out at the earliest opportunity if it gets wet. •



Warning:

The battery unit must not be stored damp – severe corrosion will result.

3.3 Battery charging

Duo-Scan runs for approximately 5 hours on a fully charged battery, the current charge level of the battery is displayed in the lower right of the display.

Each bar on the meter represents approximately 1 hour of run time. The battery meter will flash when there is less than 5 minutes of power remaining.



The current battery voltage is displayed in the lower left of the display, this is primarily for factory use.

The battery must first be removed from the Duo-Scan before charging.

Attach the battery to the charger by securing both latches.

Once the battery is connected the charger may be plugged in and switched on. An indication of battery condition may be observed on the charger when the Push button is pressed and the unit will show the state of battery condition during charging – “Low”, “Good” or “Full”.

The battery will require at least eight hours charging from fully discharged, but may be left connected for longer without damage. •

3.4 Duo-Scan module

- Keeping all the connectors clean and dry is especially important, use methylated spirits (or equivalent alcohol) and a small toothbrush to gain access to the contacts, flush with alcohol and leave to drain/dry.
- The outer case and PVC carrying case can be wiped clean using a damp cloth.

Note:

If using soap and water on the front panel ensure that no water enters any of the connectors.



- Examine all cables (power and probe) on a weekly basis for signs of damage such as cracks or splits. Pay extra attention close to connectors and joints. If damage is found it is imperative to have repairs carried out immediately to avoid further damage or risk of electric shock.
- Any other problems or maintenance queries should be referred to a IMV Technologies' Service Engineer.

To ensure optimum performance we recommend that the equipment is serviced once a year by a IMV imaging Service Engineer. The Service Engineer will thoroughly check the equipment, ensuring that electrical safety is being maintained and advise of any work which appears to be necessary. •

Technical specification

Digital ultrasound scanner with fixed probe

Size 28 x 19.5 x 9.5 cm / 11 x 7.5 x 4 in

Weight 3 kg / 6.6 lbs (with battery)

Mechanical Splashproof, rugged plastic casing

User operation

Sealed 5 button key pad with LED

User functions

- Selection of operating modes optimises to application, automatically setting suitable range, frequency & post processing

User output

User connector provides video output.

- Composite NTSC video format for display headset Video review or Video printer accessories using adapter lead (accessory)

Probes

- 3.5 and 5.0 MHz radial scan probe – 170 degree only. Length 16"
- 3.5 MHz axial scan probe – 170 degree
- 5.0 MHz axial scan probe – 170 degree
- 3.5 and 5.0 MHz split dual axial scan probe – 170 degree only

Power

- External battery gives 5 hours continuous use
- Charging time 8 hours

Temperature range

- -10 °C to 40 °C / 14 °F to 104 °F

Please note that frequent usage above 35 °C / 95 °F will shorten battery lifetime. Video link stability maybe affected below -10 °C / 14 °F until scanner has warmed up. •

Accessories



Axial probe



Batteries and charger



**BUG
(BCF Universal Goggles)**



Remote Display



Video cable



Backpack



Ovi-Scan option



Service centres

If your Duo-Scan requires servicing, please contact an official authorised service centre or the distributor in your country. •



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