

LOAD VOLUME SCANNER

LVS-3 Series Operator Manual



SAFETY PRECAUTIONS

- This equipment operates at 110 - 240 VAC mains (line) power. Please follow safety procedures for operating mains-powered electrical devices when installing or using this equipment.
- Ensure all external cables leading to this equipment are adequately protected and correctly installed according to local regulatory requirements.
- When transporting/installing this equipment please follow safety procedures for handling heavy equipment.
- Ensure that this equipment is installed correctly as detailed in this manual.
- Note that all modules used in this equipment are designed to international safety standards for electrical equipment.

GENERAL PRECAUTIONS/NOTICES

- Except where explained in this manual or approved by LoadScan Ltd or its agents, do not attempt to service, disassemble, repair or modify any LVS components yourself. *Unapproved changes or modifications could void the user's authority to operate this equipment.*
- LoadScan Ltd shall not be responsible for any damage attributable to incorrect installation, operation or handling of this equipment or improper operating environments which are not specified in this manual.
- **IMPORTANT:** *This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.*
- *This device may include a low power spread spectrum RF transmitter module (RFID) that operates in the license free 2.45GHz radio spectrum. This module is installed externally on the underside of the Scan Head. The FCC ID for this transmitter module, if fitted, can be found on the main information label for this device.*
- *This device contains Class I (eye-safe) laser components. The FDA ID for these components can be found on the main information label for this device.*

Disclaimer

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Introduction

The *LoadScan* Load Volume Scanner (LVS) is a non-contact 'drive-through' measurement instrument for the measurement of bulk solids in open bin truck and trailer units. The LVS provides fast and accurate volumetric measurement in cubic metres or cubic yards.

The LVS is designed for use with conventional open bin road trucks or truck and trailer units and articulated or rigid body off-highway dump trucks. It has applications in quarrying, civil construction, landscape products manufacturing, public works, mining, oil and gas, forestry and agriculture for the measurement of products such as:

- *Soil, sand, gravel and other similar excavated or mined materials*
- *Mulch, compost and other similar landscaping or horticultural mixes and primary raw constituent materials*
- *Woodchip, sawdust, bark and similar materials.*
- *Unprocessed ore, coal, mining waste*
- *Bulk recycled materials in crushed, shredded or similar form*
- *Snow, semi-liquid waste solids*
- *Lumpy, irregular mixed materials where traded as waste or debris*

Vehicles are scanned and measured by driving slowly below an elevated Scan Head. This scanning process is fully automated. The LVS works on the principle of comparing *empty* scans and *load* scans for the same vehicle to compute the load volume.

A touch-screen Operator Console provides for easy operator control and monitoring of the system. Measurement results are displayed on-screen and loading tickets can be printed automatically. Results are also displayed on a high visibility LED Message Board. Permanent records are saved to file and can be transferred to *LoadScan OverView™* reporting software or to other systems for analysis, invoice generation and reporting.

Trucks can be scanned empty and recorded in the system vehicle database. Load volumes are then computed on subsequent visits by comparing load scans against database records. Trucks and trailers can be identified manually, or they can be fitted with small RFID tags that automatically identify the vehicle(s) when scanned. In addition to recording vehicle ID and load volume the system can optionally collect additional load details such as product type, customer or order number.

The LVS design is approved for trade use within New Zealand and Australia, subject to verification/certification and usage restrictions as required by local trade measurement authorities. Trade usage outside these countries may be subject to local trade measurement requirements. The LVS may be used without restrictions for non-trade "monitoring only" applications in any country.

This manual covers the **LVS-3** series of Load Volume Scanner. Mounting systems and installation procedures vary according to model and application. *Dimensions specified in this manual are for standard LVS models used with road-legal trucks and small off-road dumpers.* All models operate in the same way, except for differences in transportation requirements, physical installation and alignment adjustments. The general installation and operation principles covered in this manual apply to all models and applications. For pre-installation requirements and application or model-specific assembly, installation and commissioning instructions please see *LoadScan LVS support documentation.*

System Components and Installation

The following are general LVS component descriptions and installation requirements only. For detailed installation procedures see [Appendix 2 – Scan Head Installation and Alignment](#) and additional documentation for your specific LVS model, mounting system or application.

System Components

Figure 1 shows the main components of a standard block-mounted LVS for road-legal trucks and small off-road dumpers.

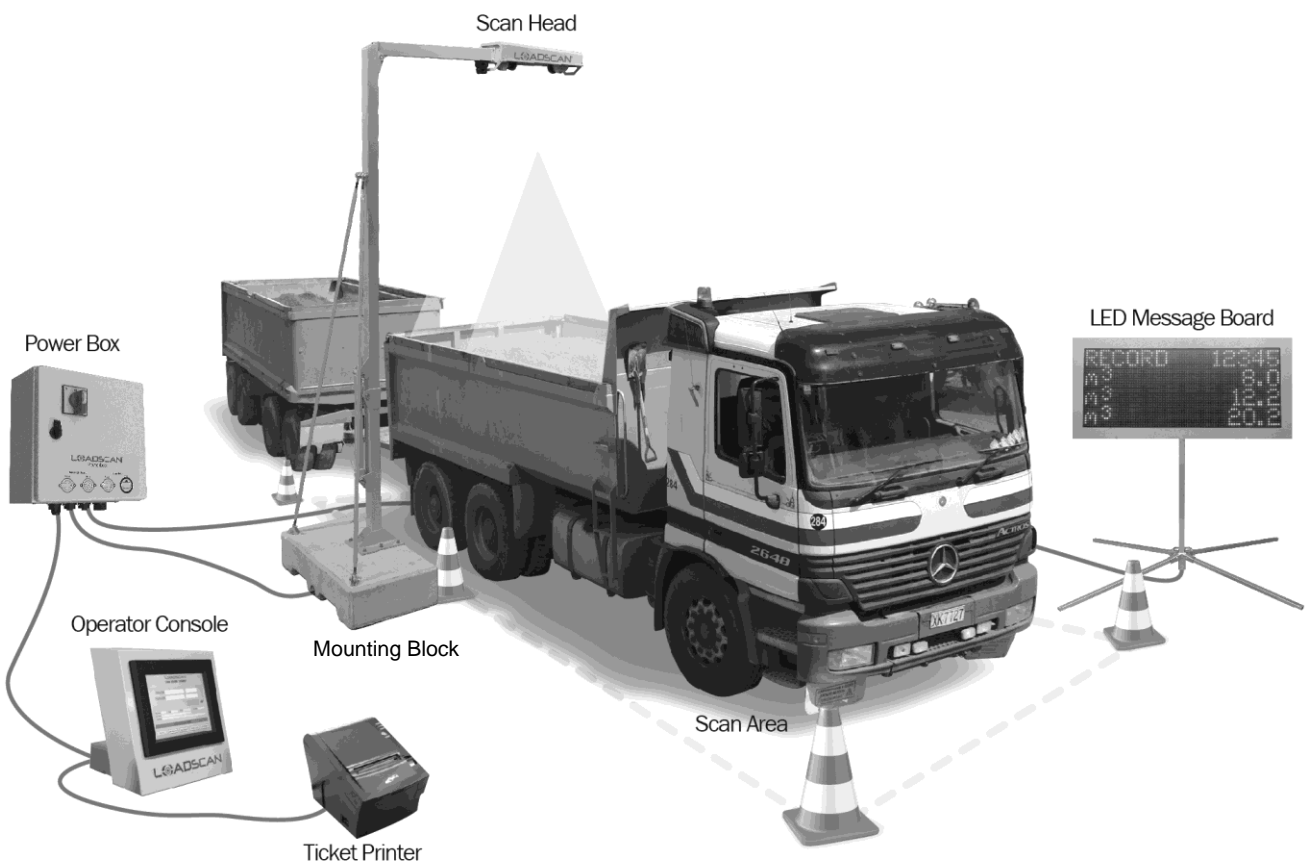


Figure 1 – Standard LVS components

A suitable, level **Scan Area** in a dust-controlled environment is required. For standard road-legal trucks the scan track must be restricted to approximately 3m (10') width for at least 6m (20') each side of the scanner, with suitable access so that the longest truck/trailer unit to be scanned is lined up with the track before it reaches the scan head and does not need to turn until completely clear of the scan head. A concrete strip is ideal but any hard surface with suitable fixed markers/barriers on either side is adequate. Please see the LVS support document *LoadScan LVS – Site Requirements* for more detailed site requirements. Contact your LoadScan representative before preparing the installation site if doing so before initial delivery of LVS or for site requirements for larger dump trucks or custom applications.

The **Scan Head** contains laser scanning equipment that scans target vehicles. It also includes an RFID tag reader that reads optional ID tags for automatic vehicle identification. The scan head is positioned across the centre of the scan area, perpendicular to the vehicle travel direction and aligned parallel to the ground. An optional Wireless Access Point (WAN) may also be fitted to the scan head.

The standard LVS mounting system includes a concrete **Mounting Block** with fork-lift slots for portability and a fold-down pole structure. A removable, manually operated jack is provided for raising and lowering the structure for transportation, installation and servicing. Adjustable backstays provide extra stability and control the alignment of the scan head.

The **Power Box** houses the 24VDC system power supply, power and data connection terminals and associated electronic components. It provides external connectors for quick and easy connection or disconnection of system component cables. Always ensure that the system power switch (isolator) on the front of this cabinet unit is in the OFF position before opening the door.

The **Operator Console** is a portable touch-screen console computer for operator input and display. The operator console runs the LVS software and provides the user interface for control of the system. The console includes interface connections for the following options:

Ethernet (LAN)	for wired local network access to measurement records, other user data and remote-control from connected office computers running LoadScan <i>OverView</i> [™] .
Cellular Router	for internet-based access to measurement records, other user data and remote-control via the LoadScan <i>MyScanner</i> [™] service.
Wireless (WiFi)	for wireless access to measurement records and other user data from remote on-site office computers and remote-control via handheld devices such as vehicle-mounted consoles, tablets or smart-phones.
Keyboard/Mouse	for more flexible user input.
USB Flash Drive	for transferring measurement records and other files.

Weather-proof housing is required for the operator console which connects to the power box by up to 90m (295') of flexible cable. Some models are provided with a built-in kiosk but a site office, shipping container or portable shed is also suitable. The console can be bench or wall mounted. Labelled cable connection ports can be found at the rear of the console.

The **LED Message Board** displays measurement results, driver instructions and status messages. This is supplied with a portable pole-mount, but can be permanently pole or wall mounted. It should be positioned ahead of the expected cab position after a truck completes a scan, so that it can be seen by drivers approaching the scanner and during the entire scan process. A power/data cable connects the message board to the power box. Standard length for this cable is 32m (105') but this can be extended to 64m (210') with a second cable as an extension. Contact your LoadScan representative if additional length is required.

The **Ticket Printer** connects directly to the operator console and prints loading tickets if required. This connects to the operator console via supplied power and data cables. It is a standard POS/receipt printer and takes 80mm (3.125") thermal paper roles available from most stationary stores.

Power Requirements

110-240 VAC mains (line) power is required. A suitable power conditioner should be used to protect the LVS equipment where power quality is poor. A generator with a capacity of at least 1.0 kVA may be used. LoadScan recommends “inverter” type generators for good power quality.

IMPORTANT - THE MANUFACTURER WARRANTY DOES NOT COVER DAMAGE DUE TO IMPROPER VOLTAGE. LOADSCAN RECOMMENDS THAT ONLY “INVERTER” TYPE GENERATORS ARE USED WITH LVS SYSTEMS AND THAT SUITABLE SURGE PROTECTION IS USED IF CONNECTING TO MAINS (LINE) POWER.

All system components should be powered from the same power circuit. If this is not possible, for example when the Operator Console is in an office far from the Scan Head, then please contact your LoadScan representative before installation. Additional power adapters and isolation hardware may be required for power and data protection in this case. LoadScan can also provide battery backup solutions if required.

Installation and Commissioning

If your LVS has not been commissioned on site by LoadScan or its representatives then please perform required pre-installation checks, assembly and installation procedures for your model of LVS. Contact your LoadScan representative if additional documentation is required.

After initial installation and commissioning the LVS can be moved to different locations as required. Ensure that all power and data cables for the scan head, operator console, message board, ticket printer and power box are correctly connected before scanner operation. The scan head alignment procedure must be carried out at each new site before measurement is possible. This procedure is documented in [Appendix 2 – Scan Head Installation and Alignment](#) and should be performed by a trained operator only.

Basic Operation

This section describes basic operation of the LVS after installation and commissioning.

Starting Up and Shutting Down the LVS

Use the locking isolator switch on the front of the power box to power on the LVS. After initialisation sequence the operator console and message board will display 'READY TO SCAN' if no problems are detected. To shut the system down, wait until the system is idle before turning off power with the isolator switch.

IMPORTANT - CLEAR THE SCAN AREA BEFORE **EVERY** POWER-UP AS AUTOMATIC ALIGNMENT CHECKS ARE PERFORMED ON START-UP. IF CHECKS FAIL THEN A 'SYSTEM SETUP REQUIRED' MESSAGE WILL BE GENERATED AND THE 'SCAN HEAD ALIGNMENT' PROCEDURE MUST BE CARRIED OUT.

The Main Screen

The operator console Main screen (figure 2) displays current load details from the most recent measurement, status messages and buttons for accessing other screens. All other screens can be password protected. The default for all passwords is 'TALLY'. See [Password Settings](#) in *User Configuration Options* to change password options. A 'READY TO SCAN' message indicates that the system is operational and ready to start a scan. Ensure this message is displayed and the scan area is clear of obstacles after power-up and initialisation. If the message reads 'SYSTEM SETUP REQUIRED' and the scan area is clear, then the system has detected that the scan head alignment is out and must be re-aligned (see [Appendix 2 – Scan Head Installation and Alignment](#)). Status messages change to show current system status and on-screen prompts request manual input of vehicle/bin IDs or other information as required. Status messages are also reported on the message board. For a list of status messages that can occur see [Appendix 3 - Status Messages](#).

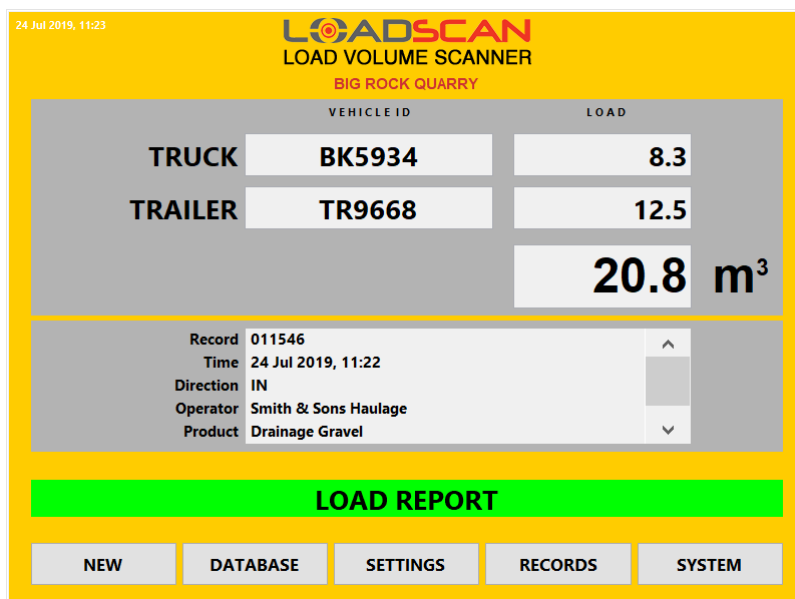


Figure 2 – operator console Main screen

General Scan Procedure

The general procedure for scanning any vehicle combination is as follows:

1. Wait for 'READY TO SCAN' message on Message Board
2. Approach scanner slowly and stop vehicle clear of Scan Head
3. Wait for 'PROCEED' message on Message Board
4. Proceed at a **SLOW, STEADY** speed (walking pace) through the Scan Area
5. Stop clear of Scan Head when message changes to 'STOP FOR RESULT'
6. Enter details at Operator Console if prompted on Message Board/Console screen

COVERS MUST BE FULLY STOWED DURING SCANNING.

Scanning starts and stops automatically when the target vehicle crosses the scan area.

- If the vehicle is empty and has not already been scanned into the database then the details of the vehicle need to be entered at the operator console before initiating a scan (see [Scan a New Vehicle into the Database](#), below).
- If the vehicle is loaded then initiate a scan as above and enter bin IDs and load details as requested to complete the measurement after the scan (see [Scan a Load](#), following).

Scan a New Vehicle into the Database

Normally a truck/trailer is scanned empty and recorded as a *Reference Scan* in the system vehicle database before being scanned with a load. On subsequent visits the loaded vehicle is scanned and load volume computed by comparing the new scan with the reference scan.

To enter a vehicle into the database: push the NEW button on the Main screen or on the Database screen (not available if system is not ready to scan) to open the New Vehicle Record dialog (figure 3).

Vehicle Details

Type ▾

Permanent Pair (no trailer swapping)

Operator/Carrier

	Swappable Bin	Skip This Bin
Truck/Bin 1 <input type="text" value="BK5934"/>	<input type="checkbox"/>	<input type="checkbox"/>
Trailer/Bin 2 <input type="text" value="TR9668"/>	<input type="checkbox"/>	<input type="checkbox"/>

ENTER DETAILS ABOVE

ENSURE BIN(S) COMPLETELY EMPTY BEFORE SCANNING

Figure 3 – operator console New Vehicle Record dialog

BEFORE DOING A REFERENCE SCAN ENSURE THAT ALL TRUCK AND TRAILER BINS ARE COMPLETELY EMPTY AND COVERS ARE FULLY STOWED.

Select the **Type** of vehicle to scan:

- **1 BIN – TRUCK/DUMPER/SEMI-TRAILER:** scan target has only one load carrying bin (e.g. rigid body truck, semi-trailer or tractor-trailer).
- **2 BINS – TRUCK AND TRAILER (TANDEM/DOUBLE):** scan target has two load carrying bins (e.g. truck and trailer/double/tandem combination).

Enter the name of the vehicle operator (owner/company) in the **Operator/Carrier** field and for each bin, enter the vehicle registration number corresponding to that bin. Touch in the text boxes to open the on-screen keypad for text entry. For semi-trailers use the registration number of the trailer rather than the tractor unit.

The **Swappable Bin** option can be enabled where a bin is removable from the truck/trailer body that is carrying it and can be swapped with other bins or swapped between first and second positions on a 2-bin combination vehicle. In this case, enter an ID that identifies the bin rather than the carrying vehicle. Swappable bins appear on both the truck (bin 1) and trailer (bin 2) selection lists in manual ID prompts after scanning.

The **Skip This Bin** option can be enabled where the corresponding bin does not need to be entered into the vehicle database, for example when the bin is already in the database and does not need to be updated or is currently loaded or covered.

If the 2-bin type has been selected then the **Permanent Pair** option is available. See [Linking Truck and Trailer](#) as a *Permanent Pair* in *Advanced Functions* for details.

If ID tags are being used then fit these before scanning the vehicle (see [ID Tags for Automatic Vehicle Identification](#), below).

Push the OK button and follow [General Scan Procedure](#), above. When the scan completes successfully the dialog will close and the message board will briefly display SCAN OK. If the new scan was initiated from the Main screen then the system will return to the Main screen and READY TO SCAN status. Vehicle records can be reviewed in the Database screen (see [Vehicle Database Management](#)). Reference scans expire after 6-12 months (depending on regional/legal settings) and must be updated (see [Updating Reference Scans](#) in *Vehicle Database Management*). If any structural changes are made, or a cover/tarpaulin is added/removed then the reference scan for the affected bin must be updated immediately.

Scan a Load

Scan loaded vehicle as per [General Scan Procedure](#), above. When the scan is complete the vehicle must be identified. Each bin (truck, trailer) is identified separately. If registered ID tags are fitted to the vehicle (see [ID Tags for Automatic Vehicle Identification](#), below) then identification is automatic. If no tags are fitted or a tag cannot be read, then the operator console will prompt for manual ID entry (figure 4). Vehicles (bins) in the database can be selected from the displayed list. Keying the first letter(s) of the ID auto-scrolls the list to the closest match for quick selection. Select bin ID and press [ENTER] key to confirm. If a trailer (second bin) is present its ID will be requested with a second prompt.

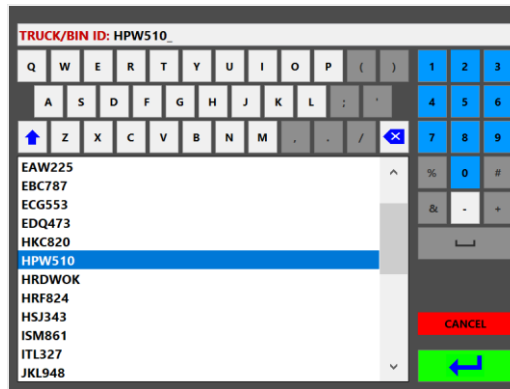


Figure 4 – operator console ID prompt

The LVS searches for the identified vehicles(s) in the database. If found, the load volume is computed. If not found, the operator console will prompt with 2-SCAN and RE-ENTER options. In the case of miss-keyed entry, select RE-ENTER. If the vehicle is not in the database then select 2-SCAN to complete the measurement in 2-Scan mode. This requires a second scan, of the empty bin(s) after the vehicle has been unloaded (see [2-Scan Measurements](#), below).

If additional prompts for load details have been configured then the operator console also prompts for information about the load measured (figure 5). Load details such as product type, customer or order number can be collected at this stage (see [Configuring Load Detail Prompts](#) in *User Configuration Options*).

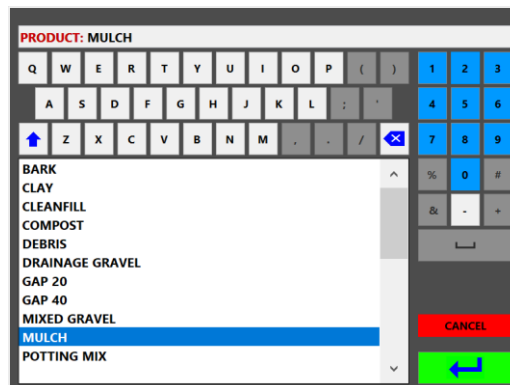


Figure 5 – operator console load detail prompt

Once a load has been scanned and all prompts completed, a load report is displayed on the operator console screen and on the message board. The load details are also logged to file and a ticket may be printed, depending on configuration (see [User Configuration Options](#)).

For a 2-bin combination vehicle where the truck (bin 1) or the trailer (bin 2) are in the database but not both, or where one of the bins is covered and should not be measured, there are two options:

- If both bins must be measured then do a 2-scan measurement (see [2-Scan Measurements](#), below).
- If one bin can be skipped (no measurement required) then do a 'truck only' or 'trailer only' measurement by cancelling the ID prompt for the bin to be skipped. In this case load details on the load report, printed ticket and so on are blank for the cancelled bin.

2-Scan Measurements

It is possible to measure a load on a vehicle that has not previously been scanned empty. In this case the truck or truck and trailer combination is scanned one time loaded and then again when empty. The load is computed as the difference between the two scans. The advantage of 2-Scan measurement is that there is no need to create a reference scan beforehand. The disadvantage is that two scans are required for every measurement. This mode should normally only be used for the first load on a truck that is new to the site and the vehicle should be entered into the database as a reference scan immediately afterwards. However, it may sometimes be desirable to perform 2-scan measurements for all loads:

- Trucks arrive on site loaded and each truck visits the site a very limited number of times. In such case it may not be worthwhile performing controlled empty scans.
- It is desirable to measure the haul-back (load material stuck in bin after off-loading) for every load and report the nett volume as the measured load volume (the difference between the haul-back volume and the fully loaded gross volume).

Scan 1

For the first scan (1 of 2) perform a scan of the vehicle as per [General Scan Procedure](#), above. Then enter an ID to identify the vehicle when the ID Prompt displays. For a 2-bin truck and trailer combination only one ID needs to be entered. The operator console will prompt with a message stating that the ID cannot be found in the database, with 2-SCAN and RE-ENTER options (figure 6). Select 2-SCAN to start a new 2-scan measurement. Enter/select load details for any load detail prompts.

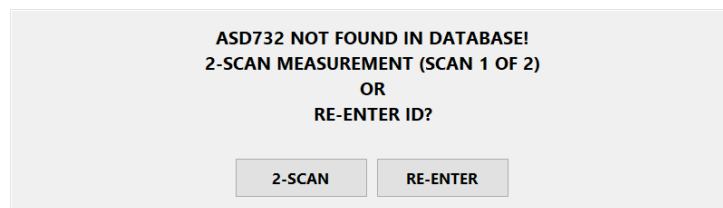


Figure 6 – operator console 2-Scan Mode prompt

Scan 2

For the second scan (2 of 2) scan the vehicle again then select the previously entered ID from the ID Prompt list. The load computation will then proceed as normal. If an ID tag is fitted to the truck (see [ID Tags for Automatic Vehicle Identification](#), below) and this is not registered to a vehicle in the database then this will be used to identify the vehicle and the ID prompt will not display. Note that the first scan of a 2-scan measurement is only valid for 6 hours. After this time it is not possible to complete the 2-scan measurement. Within 10 minutes after the second scan it is possible to repeat the second scan if a re-measurement is desired. In this case the new measurement will be marked as a REPEAT SCAN.

The second scan of a 2-scan measurement can be recorded in the vehicle database as a reference scan to avoid a separate empty scan to create a permanent database record. This is only possible within 10 minutes of completing the second scan and before any other scans are performed. To do this, confirm that all bins are completely empty and follow the steps of [Scan a New Empty Vehicle into the Database](#) (above). When prompted whether to create the database record from the previous scan or a new scan, select PREVIOUS. After entering the required vehicle details click OK and the reference scan will be recorded in the database.

Load details can be requested on either the first or the second scan in 2-scan mode and this mode can be disabled (see [2-Scan Measurement Settings](#) in *User Configuration Options*).

ID Tags for Automatic Vehicle Identification

Vehicles can optionally be fitted with ID tags for automatic identification. An RFID tag reader in the scan head detects the tags during scanning. For 2-bin combinations, separate ID tags are required for truck (bin 1) and trailer (bin 2) unless the trailer has been linked to the truck as a permanent pair (see [Linking Truck and Trailer as a Permanent Pair](#) in *Advanced Functions*). To register an ID tag to a vehicle that has not yet been scanned into the database, mount the tag on the vehicle as described below, before doing the empty reference scan and it will be automatically detected and registered during scanning.

Fit tag to the vehicle/bin it must identify, so that it is as close as possible to horizontal (flat, face up) and as close as possible to the centre of the vehicle (width-ways) with a clear line of site to the scan head when the vehicle passes below. Observe the clearance zone as in figure 7 on all sides of tag. On top of the external sun-visor at front of cab is generally a good position for a truck. For a trailer, fit the tag in a central position at front, away from possible damage area. Tags have 2 mounting holes that suit M4 screws or similar mechanical fasteners. Heavy-duty industrial double-sided adhesive tape can also be used for mounting.

DO NOT STORE UNUSED TAGS WITHIN READING RANGE OF THE TAG READER.

To manually register, replace or clear an ID tag for a vehicle already in the database, see [Manual ID Tag Registration](#) in *Vehicle Database Management*.

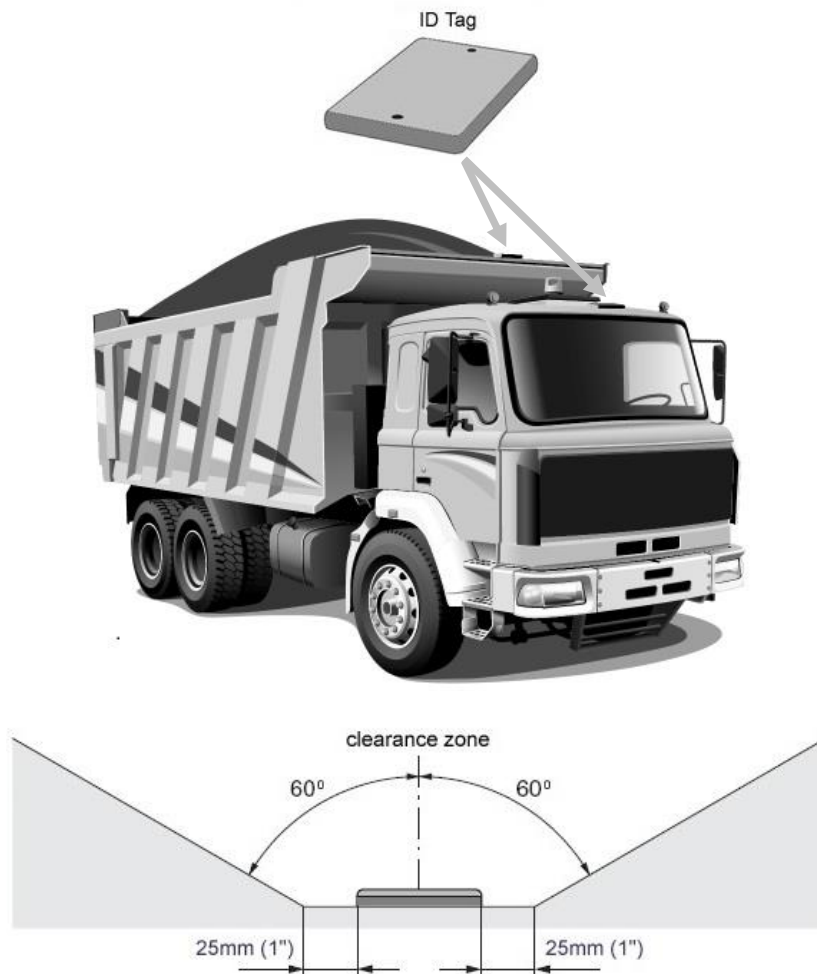


Figure 7 – Typical mounting locations and required clearance zone for ID tags

Advanced Functions

This section describes advanced, optional functionality of the LVS.

Split Loads

If load detail prompts have been enabled (see [Configuring Load Detail Prompts](#) in *User Configuration Options*) then it is possible to record different load details for the first and second bins when a 2-bin combination is scanned. In this case the measurements are recorded as two separate records, with “A” and “B” appended to the record number and truck (bin 1) details in one record and trailer (bin 2) details in the other. Separate tickets are also printed if printing is enabled. This is useful for example if the truck and trailer are carrying different products or destined for different customers.

Enable **Allow split load** in the Settings screen to activate this option. To split a load, push the SPLIT LOAD button on the keypad prompt for the load detail to split and follow the on-screen instructions. If multiple load detail prompts have been configured then SPLIT LOAD needs to be selected for each detail to be split. If this function is not selected for a particular load detail then the same value will be recorded for both bins.

Cancel/Modify Record

The Cancel/Modify Record function allows the user to cancel the current measurement record and optionally create a new record for the same scan with different vehicle id(s) and/or load details. The function is useful in the following cases:

- The scan indicates that the vehicle is carrying more or less than required and the load size is adjusted and re-scanned. In this case the first scan record can be cancelled.
- Incorrect vehicle id is selected. In this case the scan record can be cancelled, the measurement re-computed with the correct vehicle id and a new record created.
- Incorrect load details are entered at load detail prompt(s). In this case the scan record can be cancelled and a new record created with the correct load details.

Enable **Allow cancel/modify record** in the Settings screen to activate this function. If activated, a CANCEL/MODIFY RECORD button appears on the Main screen for up to 2 minutes after a new load report is displayed. If this button is pushed within the 2 minute period, and before the next scan starts, then the user is prompted to mark the current record as ‘CANCELLED’. If OK is selected then the record for the currently displayed load will be marked in the measurement record with a ‘CANCELLED’ status. This does not delete the record, but provides a convenient way to indicate that the load should be ignored when processing the measurement records.

The user is then prompted to re-enter load details as a new record. If OK is selected then the vehicle id prompt(s) and any configured load detail prompts are repeated for the latest scan and a new record created. In this case the measurement is re-computed so different vehicle id(s) may produce a different measurement value. If CANCEL is selected at this stage then the current scan record will be marked as ‘CANCELLED’ but no new record will be created. Error scans that do not result in a record being created cannot be cancelled/modified.

Automatic Responses to Load Detail Prompts

If load details prompts are active (see [Configuring Load Detail Prompts](#) in *User Configuration Options*) and one or more vehicles will always supply the same value for one or more load details, for every load measured, then it is possible to set automatic responses for these vehicles. If ID tags are fitted to the vehicles then the scanning process can be fully automated in this case. Automatic responses can be set separately for each scan direction.

AUTO-RESPONSE FUNCTIONALITY SHOULD BE USED WITH CAUTION AS FAILING TO CHANGE AUTO-RESPONSE VALUES WHEN LOAD DETAILS CHANGE, WILL RESULT IN INCORRECT LOAD DETAILS BEING REPORTED.

Open the Auto-Responses dialog (figure 8) either by selecting a vehicle in the Database screen and pushing the AUTO RESPONSES button or pushing the LOAD DETAILS button in the Settings screen to open the Load Details dialog and then pushing the AUTO RESPONSES button. If opened from the Database screen, Auto-Response settings for the selected vehicle will be shown by default. Set the **Apply to** selector to one of the following:

- **Vehicle ID:** individual truck/bin
- **Vehicle Operator:** Operator name as set when vehicle entered into the database
- **Group:** a group of selected vehicle IDs
- **All:** all vehicles
- **All Other:** all vehicles not specifically selected by one of the above

Apply to:

Vehicle ID

1BTX624

Prompt	Response (In)	Response (Out)
Product	Compost	Sand
Customer	-	ABC CO

Disable Ticket Printing on Auto-Response

CLEAR ALL

OK

Figure 8 – operator console Auto-Responses dialog

Click in the text box below the **Apply to** selector to select a truck/bin, enter a new group name, select an existing group and so on. For Groups, the list of vehicles in the group can be edited using the EDIT button available after a group name has been entered or selected. ALL takes priority over any other settings. Vehicle Operator takes priority over any Group or individual Vehicle ID settings. Group and Vehicle ID settings have the same priority. So if a vehicle is added to a Group, any existing auto-response settings for that Vehicle ID will be over-written and if auto-response settings are applied to a Vehicle ID then it will automatically be removed from any Group it belongs to.

A list of all configured load details and current auto-response settings for the selected vehicle(s) is displayed. By default all prompts will be set to manual response. To define a pre-set value for a particular load detail, click in the table field corresponding to required load detail and scan direction. Enter/select the required value when the on-screen keypad opens. Use the CLEAR ALL button to reset the selected vehicle(s) to manual response.

If **Disable Ticket Printing on Auto-Response** is enabled, then no load report ticket will be printed in the case where all load details have auto-responses set. This can be used where specific trucks have auto-responses set and the drivers of these trucks are not required to collect printed tickets.

Auto-responses can be set for one direction only and left as manual response for the other direction. In some cases it may be unnecessary to collect data for one or more configured load details in one scan direction. In this case a simple auto-response value such as "NA" (Not Applicable) or "-" can be set to disable manual prompting in that direction.

Linking Truck and Trailer as a Permanent Pair

If the trailer (bin 2) in a 2-bin truck and trailer combination is the only trailer that will ever be towed by a particular truck (bin 1) then the truck and trailer can be linked as a permanent pair. In this case the trailer will be identified automatically whenever the truck is identified and a trailer is attached. This means that only one ID needs to be manually selected, or only one ID tag needs to be fitted to identify both bins. This function should be used with caution as a different trailer attached to the same truck may have unpredictable results.

If truck (bin 1) and trailer (bin 2) are being scanned into the vehicle database together then select **Permanent Pair** on the New Vehicle Record dialog before scanning to create the link. If using ID tags then fit a tag to the truck only, before scanning (see [ID Tags for Automatic Vehicle Identification](#) in *Basic Operation*). If the truck and trailer are both already in the database, but not linked, then open the Database screen, select the trailer from the Identifier list and push the ID TAG button. A prompt will display with options to read ID tag or select a permanent partner truck. Select the TRUCK option. When the standard vehicle ID prompt appears select the truck to link to the trailer.

To unlink a truck and trailer, remove the ID Tag code for the trailer as described in [Manual ID Tag Registration](#) in *Vehicle Database Management*.

Tracking Only (No Measurement)

For some trucks it may be desirable to record vehicle movements without measuring. This can be done by using ID tags and creating special "Tracking Only" database records for these trucks. This feature may be useful for recording trip times and vehicle directions where load volume does not need to be known and can be used with any truck type that triggers the LVS to scan. For example, truck trips can be recorded without needing to remove covers from loads or container trucks with permanently covered bins, tanker trucks and other non-measurable truck types can be recorded. Tracking Only scans record scan time, date, direction and a single vehicle ID only. Tracking Only records do not distinguish between truck only (single bin) or truck and trailer (two bin) vehicle combinations.

This feature is not suitable for utility vehicles/pickup trucks, cars or other small vehicles which may not trigger the LVS to scan.

To create a TRACKING ONLY database record, follow the standard procedure for entering a new vehicle into the vehicle database as detailed in [Scan a New Vehicle into the Database](#) in *Basic Operation*, but select “ID TAG RECORD (Tracking Only)” as the **Type**. Enter a single vehicle identifier in the **Truck/Bin 1** field and click on the **ID Tag** field to open the standard ID Tag Registration dialog and scan the ID tag as described in [Manual ID Tag Registration](#) in *Vehicle Database Management*.

Note that vehicles entered in the database as Tracking Only can drive through the Scan Area a bit faster than the 6kmph (3.7mph) limit for load measurement scans. But a scan must be triggered or no record will be created. Vehicles should pause after scanning to read the Message Board and confirm that their trip was recorded. Also, if a Tracking only vehicle reverses through the scanner this will be logged as a normal Tracking Only record and the recorded direction will be the reverse travel direction.

Road Trains

Road trains with up to 4 separate bins can be scanned with the standard LVS. However this requires custom configuration with minor screen layout differences and functional limitations for more than two bins. Please contact your LoadScan representative to discuss this option.

The following functionality is not available for vehicles with more than two bins:

- **Split Loads** (see [Split Loads](#), above)
- **Permanent Pair** (see [Linking Truck and Trailer as a Permanent Pair](#), above)

Pre-Scan Data Entry

Normally the system prompts for vehicle ID(s) and any configured load details after a scan completes. In some cases it might be desirable to enter this information before performing a scan. For example, the LVS is unmanned and the operator console is located in a site office beyond one end of the scan area. In this case, trucks approaching from the same side as the office normally need to scan first and then the driver must walk back to the operator console from the opposite end of the scan area to enter requested details. This adds considerable inconvenience and time to the scan process.

If **Enable pre-scan data entry** is enabled in the Settings screen then vehicle ID(s) and any configured load details can be pre-entered before performing a scan. To pre-enter load data, push the NEW button on the Main screen and follow the on-screen prompts. Note that:

- ID is always prompted, even if ID tags are fitted, but any tags detected during the scan take precedence over pre-entered IDs.
- Pre-scan data entry does not override 2-Scan measurement setting to prompt for load details on scan 2 (see [2-Scan Measurement Settings](#) in *User configuration Options*).

When this option is enabled, the NEW button on the main screen cannot be used to scan a new truck into the vehicle database. This function must be performed from the Database screen in this case.

Vehicle Database Management

The Vehicle Database screen (figure 9) is accessed from the DATABASE button on the Main screen and is password protected by default. Password requirement can be disabled (see [Password Settings](#) in *User Configuration Options*).

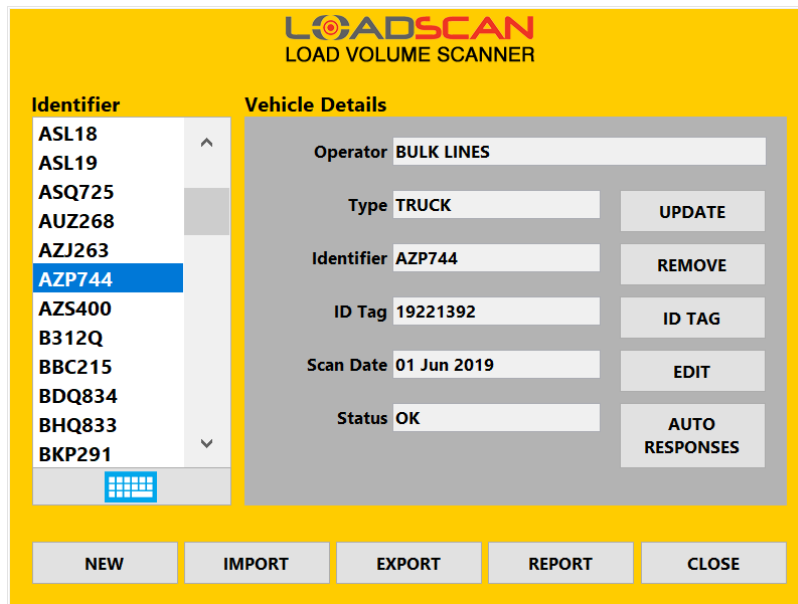


Figure 9 – operator console Vehicle Database screen

On this screen details of any vehicle recorded in the database can be viewed by selecting the corresponding vehicle ID from the **Identifier** list. The keypad icon button below the list opens the standard ID prompt for faster combination text entry/list selection. Use the NEW button to scan new vehicles into the database (see [Scan a New Vehicle into the Database](#) in *Basic Operation*). Use the CLOSE button to return to the Main screen.

Updating Reference Scans

Reference scans expire after 6-12 months (depending on regional/legal settings). An 'EXPIRED' status for a reference scan indicates that it due for update. If any structural changes affecting a bin are made, or a cover/tarpaulin is added or removed then the reference scan for the affected bin must be updated immediately. To update a reference scan record, select the record on the Database screen and push the UPDATE button (not available if system is not ready to scan). The New Vehicle Record dialog will appear with the details for the vehicle already filled in. If a truck was selected and was originally scanned with a trailer as a 2-bin combination, then the trailer details will be filled in also. Similarly, if a trailer is selected and was originally scanned with a truck, then truck details will be present. Check that the details are correct and proceed as for scanning a new vehicle (see [Scan a New Vehicle into the Database](#) in *Basic Operation*). Any ID tags read during the update scan will be registered to the updated reference scan record(s), replacing any previous ID tag registration.

A REFERENCE SCAN IS VALID FOR 6 - 12 MONTHS AND MUST BE UPDATED AFTER THIS PERIOD. LOAD RECORDS COMPUTED FROM EXPIRED REFERENCE SCANS WILL BE MARKED WITH 'REFERENCE SCAN EXPIRED'.

Manual ID Tag Registration

To manually register or replace an ID tag for a vehicle already in the database, select the vehicle ID on the **Identifier** list and push the ID TAG button. If the vehicle is a trailer (second bin) then a prompt will display with options to read an ID tag or select a permanent partner truck (see [Linking Truck and Trailer as a Permanent Pair](#) in *Advanced Functions*). Select the ID TAG option to open the ID Tag Registration dialog (figure 10). If the tag is already fitted to the vehicle then drive the vehicle below the Scan Head until the tag code appears on the screen and on the message board. Otherwise hold up the tag to be used, as high as possible, under the centre of the scan head (flat face up) until the code displays. Select OK to register the tag. Fit tag to the vehicle/bin as described in [ID Tags for Automatic Vehicle Identification](#) in *Basic Operation*.

Figure 10 – operator console ID Tag Registration dialog

To remove a tag code for a vehicle that no longer requires automatic identification use the REMOVE button. To enter a tag code manually if the tag code is known, but the tag is not physically present, click in the **ID Tag** field to open the on-screen keypad for text entry.

Editing Vehicle Details

To edit the ID or Operator name for a vehicle, select the vehicle ID on the Database screen and click the EDIT button to open the Edit Vehicle Record dialog (figure 11). Click in the text boxes to open the on-screen keypad for text editing. This function can be used where the Operator or ID recorded for a vehicle was entered incorrectly or needs to be changed.

Figure 11 – operator console Edit Vehicle Record dialog

Setting Auto Responses for Selected Vehicle

The AUTO RESPONSES button opens the Auto-Responses dialog where pre-set load details can be defined for the currently selected vehicle (see [Automatic Responses to Load Detail Prompts](#) in *Advanced Functions*).

Vehicle Database Reports

A summary list of all vehicles in the database can be printed to the Ticket Printer or exported to USB Flash drive in spreadsheet-compatible CSV text file format. Alternatively, full details of the currently selected vehicle only, can be printed. Push the REPORT button for report options. A prompt will display with options for a summary list or details of the selected vehicle. Choose SELECTED to print a report for the currently selected database record. Choose SUMMARY to open the Vehicle Database Report dialog (figure 12) for printing or exporting a full summary list of all database records.

Vehicle Database List				Sort
Identifier	Operator	Type	Expires	Alphabetical
CML499	KIWI DIGGERS	TRUCK	01 Jan 2020	<input type="button" value="PRINT"/> <input type="button" value="EXPORT"/> <input type="button" value="CLOSE"/>
CMP120	BULK LINES	TRUCK	12 Aug 2019	
CNC697	RAMSEY CARTAGE	TRUCK	23 Nov 2019	
CNF856	RMA TRANSPORT	TRUCK	28 Aug 2019	
CNQ99	BULK LINES	TRUCK	12 Aug 2019	
COZ	RAMSEY CARTAGE	TRUCK	07 Oct 2019	
CPZ766	WATSON COX	TRUCK	23 Nov 2019	
CQC722	GREENSCAPE HIRE	TRUCK	01 Jan 2020	
CQN974	T&E EARTHWORKS	TRUCK	28 Aug 2019	
CR600	JOHN MILLER	TRUCK	07 Oct 2019	
CS2742	MCCLUNIE BROS	TRUCK	23 Nov 2019	
CUQ24	KIWI DIGGERS	TRUCK	28 Aug 2019	
CWG344	HEAVY HAULAGE	TRUCK	23 Nov 2019	
CWJ566	KIWI GIGGERS	TRUCK	01 Jan 2020	
CWP272	BULK LINES	TRUCK	12 Aug 2019	
CWU823	HEAVY HAULAGE	TRUCK	EXPIRED	
CYA306	BULK LINES	TRUCK	07 Oct 2019	
CYA307	BULK LINES	TRUCK	28 Aug 2019	
CYB675	GREENSCAPE HIRE	TRUCK	01 Jan 2020	
CZC108	MERRIT SAND SUPPLIES	TRUCK	01 Jan 2020	
CZK978	RMA TRANSPORT	TRUCK	23 Nov 2019	
CZR686	HEAVY HAULAGE	TRUCK	EXPIRED	
D2462	RMA TRANSPORT	TRAILER	23 Nov 2019	
D281T	BULK LINES	TRAILER	12 Aug 2019	
D341D	HEAVY HAULAGE	TRAILER	07 Oct 2019	
D347F	HEAVY HAULAGE	TRAILER	07 Oct 2019	
D470C	HEAVY HAULAGE	TRAILER	07 Oct 2019	
D487J	EASTSIDE EARTHWORKS	TRAILER	28 Aug 2019	
D696Q	BULK LINES	TRAILER	12 Aug 2019	
D749Z	RMA TRANSPORT	TRAILER	28 Aug 2019	
D782C	HEAVY HAULAGE	TRAILER	07 Oct 2019	

Figure 12 – operator console Vehicle Database Report dialog

A list of all vehicles in the database is displayed. The list can be sorted alphabetically by vehicle ID or by date of expiry, with the closest to expiry at the top of the list. Change the sort type with the **Sort** selector. Push the PRINT button to print the list or insert a USB Flash drive into the operator console USB port and push EXPORT to export to CSV file. Note that due to the limited width of printer paper, only Identifier, Operator and Type fields are printed when the list is sorted alphabetically and Identifier, Operator and Expires fields are printed if the list is sorted by expiry date.

Backing-Up (Exporting) Vehicle Database

The entire vehicle database can be exported to a USB Flash-drive as a single zip file for backup purposes or to transfer to another LVS. To export the database, insert a blank Flash-drive into the operator console USB port, push the EXPORT button, enter the system password when prompted and follow on-screen instructions. Do not remove the USB drive before the 'Please Wait' message disappears. The file created can be copied to computer, CD and so on for storage. The vehicle database can also be backed-up via local network connection if available (see [Network Settings](#) in *User Configuration Options*). To do this, copy the network shared folder called 'Dbase' and all of its contents.

IT IS IMPORTANT TO BACK-UP THE VEHICLE DATABASE REGULARLY SO THAT IT CAN BE RESTORED AFTER LOSS DUE TO HARDWARE FAILURE, THEFT OR DAMAGE WITHOUT NEEDING TO RE-SCAN ALL VEHICLES.

Restoring (Importing) Vehicle Database

A previously backed-up vehicle database can be imported to restore a database or to transfer a database from another LVS. To import a vehicle database, insert a USB Flash-drive containing a previously created database backup file, click the IMPORT button and follow on-screen instructions. Only vehicle records from the imported file that are not already in the database or are newer than existing records will be imported. When import is complete, imported vehicles will appear on the **Identifier** list. The vehicle database can also be restored via network if connected and a network back-up was made previously. To do this, copy the contents of the backed-up 'Dbase' folder into the network shared 'Dbase' folder on the LVS.

Removing Reference Scans from the Vehicle Database

To remove a vehicle from the database, select the vehicle on the Database screen, push the REMOVE button and then select YES when the confirmation dialog appears. Trucks and trailers originally scanned together as a 2-bin combination need to be removed separately.

User Configuration Options

The Settings screen (figure 13) provides options for customising the LVS configuration to meet user requirements. This screen is accessed from the SETTINGS button on the Main screen. The 'system' password is required for access to this screen.

The screenshot shows the 'LOADSCAN LOAD VOLUME SCANNER' settings interface. It is divided into two main sections: 'General Operation' and 'System'.

General Operation:

- IN:** Compute load, Print ticket, Log all errors if ID known
- OUT:** Compute load, Print ticket, Log all errors if ID known
- Site:** Big Rock Quarry
- Vehicle Identification:** Tags and Manual (dropdown), LOAD DETAILS (button), 2-SCAN (button)
- Allow split load
- Allow cancel/modify record
- Enable pre-scan data entry

System:

- Direction Setting:** IN (selected), CUSTOM (button), NETWORK (LAN) (button)
- Language:** English (General) (dropdown)
- Dialog Timeout (seconds):** 180 (dropdown)
- Keypad beep

Buttons at the bottom: OK, CANCEL.

Figure 13 – operator console Settings screen

General Operation Settings

The *General Operation* section of the Settings screen provides separate options for vehicles entering or leaving the site (see [Defining 'In' and 'Out' Scan Directions](#) below) and general options that apply for both scan directions. If all options are disabled for one direction then scanning is disabled in that direction. This may be desirable where the LVS is used in only one direction but vehicles need to pass through the Scan Area in both directions. Note that empty reference scans can always be performed in either direction.

Load computation can be enabled/disabled for either direction with the corresponding **Compute load** check-box.

Ticket printing can be enabled/disabled for either direction with the corresponding **Print ticket** check-box. Note that if printing is enabled then the printer settings must also be correct (see [Ticket Printer Settings](#) below).

Error logging for vehicles fitted with ID tags can be enabled/disabled for either direction with the corresponding **Log all errors if ID known** check-box. When enabled, scans where the target vehicle(s) is identified by ID tag but no measurement result is reported because of errors, will be logged to file. A record of the vehicle trip for a failed scan is recorded, without measurement data. This function is typically used to record the time, date and vehicle ID(s) for failed scans where all vehicles have ID tags fitted and do not stop after scanning (no load details prompts). No tickets are printed for logged error scans. If this option is disabled then error scans that do not result in a load measurement value will not be recorded.

If **Log all errors if ID known** is enabled and **Compute load** is disabled then vehicles with ID tags will be recorded, but marked as TRACKING ONLY, without measurement data.

The **Site** name appears at the top of the Main screen, on printed tickets and in measurement records. Touch the text box to open the on-screen keypad for text editing.

If **Allow split load** is enabled and load detail prompts are active (see [Configuring Load Detail Prompts](#), below) it is possible to record different load details for truck (bin 1) and trailer (bin 2) when a 2-bin combination is scanned (see [Split Loads](#) in *Advanced Functions*).

If **allow cancel/modify record** is enabled then a scan record can be cancelled or load details modified for up to two minutes after a new load report (see [Cancel/Modify Record](#) in *Advanced Functions*).

If **Enable pre-scan data entry** is enabled then vehicle IDs and any configured load details can be pre-entered before performing a scan instead of after the scan (see [Pre-Scan Data Entry](#) in *Advanced Functions*).

The **Vehicle Identification** selector allows the method of vehicle identification to be set:

- **Tags and Manual** – Both ID tags and manual ID entry (via on-screen keypad) are allowed. If no tags are identified during a scan, the on-screen keypad prompts for ID.
- **Tags Only** - automatic ID tag identification only. Vehicles without tags will be ignored.
- **Manual Only** - the operator console always prompts for manual ID entry.

Configuring Load Detail Prompts

To add or edit load detail prompts use the LOAD DETAILS button in the *General Operation* section of the Settings screen. This displays the Load Details dialog (figure 14).

Figure 14 – operator console Load Details dialog

If **Prompt for Load Details** is enabled then the system will prompt for keypad entry/selection of configured load details after every scan, before reporting and recording all measurement data. This can be used to record the product type, customer, order number or such like with measurement records. A basic load report is displayed on the message board at the same

time that the load detail keypad prompts appear on the operator console screen. The load report will not appear on the operator console screen until all load details have been entered. All load details collected appear on printed tickets and are saved with measurements records. A maximum of 6 load details can be added.

If **Skip for Tracking-Only** is enabled then load detail prompts will be skipped for tracking-only vehicle scans (see [Tracking Only \(No Measurement\)](#) in *Advanced Functions*).

Use the ADD, EDIT and DELETE buttons to build the list of load detail names. Names should match the detail to be requested, such as 'Product', 'Customer', 'Order No.', 'Destination' and the like.

The AUTO RESPONSES button opens the Auto-Responses dialog where automatic responses to load detail prompts can be set for selected vehicles (see [Automatic Responses to Load Detail Prompts](#) in *Advanced Functions*).

Load Detail Selection Lists

For each configured load detail prompt it is possible to display a pre-defined selection list that appears with the keypad prompt for quick and accurate text entry. To create/update a list for any of the configured load details, select the load detail name on the Load Details dialog and push the LIST button to open the List dialog (figure 15).

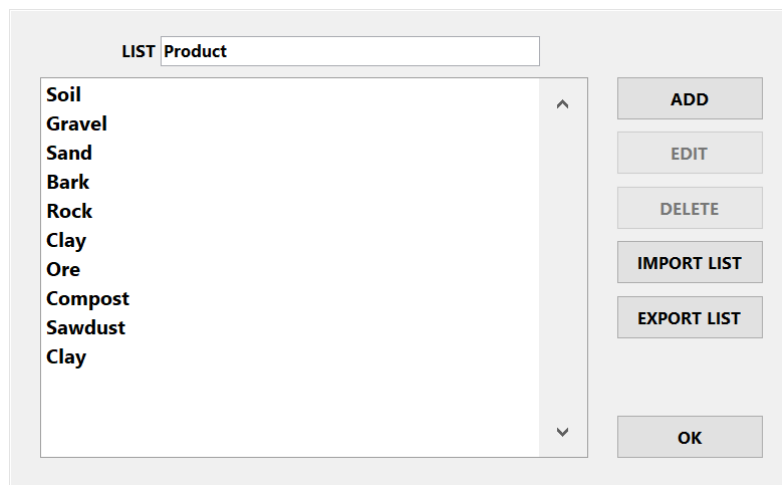


Figure 15 – operator console List dialog

List items can be managed manually with the ADD, EDIT and DELETE buttons or a complete list can be imported from USB Flash-drive. In this case the list can be created in advance on an office computer. To import a list, follow these steps:

1. Create the list as a text file with each item on a new line. LoadScan Overview™ reporting software includes list editing features, or lists can be created in Microsoft® Notepad or similar on any PC. Do not include the <tab> character in list files.
2. Copy the list file to USB Flash-drive. The list file name must match the corresponding load detail name. For example, if the load detail is "Product" then the list file must be "Product.txt".
3. Insert the USB drive into the operator console USB port and push the IMPORT LIST button. If the import is successful the list items will appear in the list display.

The EXPORT LIST button can similarly be used to copy the list file to USB Flash-drive for external editing, transfer to another LVS or backup.

List files are stored in a file folder called 'Lists' that is shared on the local network, if connected. Lists can be updated remotely by writing the list files directly to this folder. List files can be directly copied from this folder.

List items can be entered in any order. They are alpha-numerically sorted when displayed in load detail prompts. For additional advanced list functionality see the LVS support document *LoadScan LVS - Advanced Load Detail Options*.

The **Use List** check-box associated with the selected load detail on the Load Details dialog can be set to enable/disable list selection for the selected load detail. Enable **Require List Match** if text entered/selected must exactly match one of the list items. If **Allow Blank** is enabled it is possible to close the prompt without entering any text.

Defining 'In' and 'Out' Scan Directions

Toggle the button at the top-right of the **Direction Setting** image in the *System* section of the Settings screen so that it matches the direction of the truck shown, relative to the pictured scan head and corresponding to the actual direction for the installed LVS.

Time, Date and Regional Settings

The TIME/DATE button in the *System* section of the Settings screen opens the Time and Date dialog (figure 16) for setting the current time, date and time-zone.

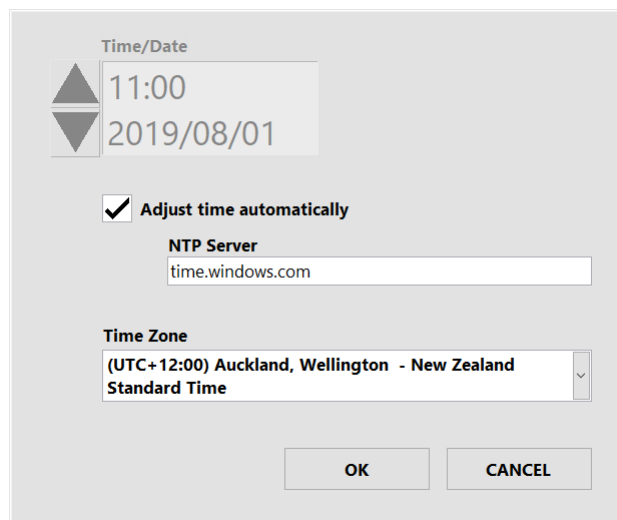


Figure 16 – operator console Time and Date dialog

If the operator console is connected to a local network with internet access or a local NTP time server then the system time can be adjusted automatically. When **Adjust time automatically** is enabled, the system will synchronize time with the time server specified in **NTP Server**. The NTP server can be specified by DNS name or IP address. **Time/Date** can be adjusted manually only when automatic time adjustment is disabled.

The current time is displayed at the top left of the Main screen. Note that time is displayed in 24-hour format and abbreviated, language-specific month names are used for on-screen date displays and on printed tickets. However date and time is written to measurement records log-files in the following ISO 8601 compliant format:

YYYY-MM-DD HH:MM:SS

This format provides compatibility for importing measurement records into databases, spreadsheets and other software systems and is a widely accepted international format.

If alternative languages or regional variants are installed for the LVS software then the **Language** selector in the *System* section of the Settings screen can be used to switch between installed languages/regions. The system must be re-started for language or region changes to take effect.

Message Board Settings

The MESSAGE BOARD button in the *System* section of the Settings screen opens the Message Board Settings dialog (figure 17).

The screenshot shows a dialog box with the following elements:

- Load Report Duration (seconds):** A dropdown menu with the value '30' selected.
- Custom 'Ready' Message:** A text input field containing the text 'COLLECT TICKET BEFORE LEAVING'.
- Hide Measurement Results:** An unchecked checkbox.
- Show All Load Details:** A checked checkbox.
- OK:** A button at the bottom right of the dialog.

Figure 17 – operator console Message Board Settings dialog

Load Report Duration is the number of seconds to display load reports before returning to ready state. This can be set to allow truck drivers enough time to read load details. It is possible to scan the next vehicle while a load report is being displayed but no 'Ready' or 'Proceed' messages will be displayed before the load report time is up. Once a new scan starts however, the load report will be interrupted immediately by the 'Scanning' message.

Custom 'Ready' Message allows an optional scrolling text message to be displayed on the message board, below the standard 'Ready' message which displays when the LVS is ready to scan but no vehicle has been detected.

The **Hide Measurement Results** option allows measured volumes to be blanked out on the message board so they cannot be read by truck drivers or casual observers. Measurement volumes are displayed on the operator console and printed tickets and recorded as normal. Use this option only where the measurement results are confidential. This function should not be enabled if the LVS is being used for trade legal measurement.

If **Show All Load Details** is enabled then load details data collected with each measurement is displayed on the message board along with the standard load report.

Ticket Printer Settings

The **PRINTER** button in the *System* section of the Settings screen opens the Ticket Printer Settings dialog (figure 18).

Figure 18 – operator console Ticket Printer Settings dialog

The **Printer** selector needs to match the type of installed printer. If no printer is attached then set to 'None'.

Set **Extra Ticket Copies** to print additional copies each time a load report ticket is printed. Extra copies are marked with 'COPY ONLY'. Up to two extra copies can be printed (for a total of 3 tickets).

If **Allow Ticket Print from Main Screen** is enabled then a **PRINT** button becomes visible in the load report section of the Main screen whenever a valid load report is displayed and additional ticket copies for the currently displayed record can be printed manually.

Print Custom Logo can be enabled to print a custom business logo at the top of each ticket. This requires that the logo image is pre-loaded into the printer. Please contact your LoadScan representative if you would like to use this option.

Custom Ticket Message allows an optional text message to be appended to the bottom of every ticket. Touch the text box to open the on-screen keypad for text editing.

Keypad Beep

If **Keypad Beep** is enabled then the operator console will produce a regular beep tone when the on-screen keypad is displayed and requires manual input. The beep will not start until the keypad has been visible for 10 seconds and no input received.

Password Settings

The **PASSWORDS** button in the *System* section of the Settings screen opens the Password Settings dialog (figure 19).

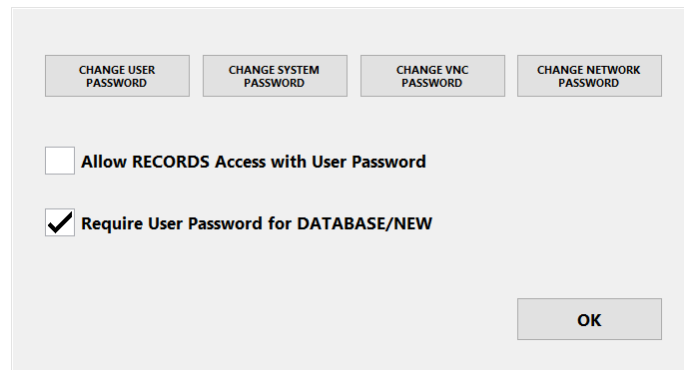


Figure 19 – operator console Password Settings dialog

Use the CHANGE USER PASSWORD button to change the lower level ‘user’ password that can be used to access the Database and Records screens only. This password should be given to users who need to add new vehicles to the database and view measurement records, but who should not be able to change system configuration. The default password is ‘TALLY’.

Use the CHANGE SYSTEM PASSWORD button to change the ‘system’ password which allows access to all screens. User configuration and system alignment settings cannot be modified without this password. The default password is ‘TALLY’.

Use the CHANGE VNC PASSWORD button to change the password for remote-control of the operator console from LoadScan *OverView*[™] reporting software or alternative wired or wireless networked VNC clients. The default password is ‘TALLY’. Contact your LoadScan representative for detailed information on remote control options.

Use the CHANGE NETWORK PASSWORD button to optionally set a password requirement for network access to shared folders the operator console. If a password is set, then remote network access to shared folders requires connecting as “Guest” user with the password as set. Set blank password (default) to allow network access without password. See [Network Settings](#) below for additional network-related settings.

If **Allow RECORDS Access with User Password** is enabled then the Records screen for reviewing measurement records is accessible with the user password. If this option is not enabled then the system password is required to access the Records screen.

If **Require User Password for Database/NEW** is enabled then the user password is required to access the Database screen or to scan new vehicles into the database. No password is required if this is not enabled.

Dialog Timeout

By default, on-screen keypad prompts for vehicle ID and load detail entry timeout after 3 minutes (180 seconds). If vehicle IDs are not entered then the scan is cancelled. If load details are not entered then a load report is generated with load details set to ‘not entered’. The dialog timeout can be adjusted with the **Dialog Timeout** selector. Increasing the timeout allows more time for data entry and decreasing the timeout reduces the time before the system returns to READY state and the next truck can be scanned when no data is input for a scan.

Network Settings

The LVS can be connected to wired and/or wireless computer networks for remote access to measurement records and other files as well as remote-control and data entry from LoadScan *OverView*™ reporting software, the *MyScanner*™ online web portal or wireless in-cab *LoadTrak*™ consoles. A 1000 Mbps Ethernet port is provided at the rear of the operator console for wired connection to office network, cellular router or user supplied networking equipment. Additionally, an optional Wireless Access Point (WAP) may be fitted directly to the scan head and configured for connection to local roaming devices or as a long-distance wireless link to a remote network.

The NETWORK (LAN) button in the *System* section of the Settings screen opens the Network Settings dialog (figure 20).

Figure 20 – operator console Network Settings dialog

The **Port** selector can be set to LAN or WLAN. The default is LAN, which corresponds to the wired Ethernet port on the operator console. If your LVS has a Wireless Access Point fitted directly to the scan head then the WLAN option can be selected to set TCP/IP settings for the operator console on the wired side of the Access Point. In this case, suitable settings will depend on the Access Point configuration. If the supplied pre-configuration does not meet your requirements then please see the LVS support document *LoadScan LVS – Wireless Access Configuration* for more detailed information.

By default, **IP Address Type** is set to DHCP for automatic network settings on the LAN port. To set a static IP address change to STATIC and click in the **IP Address**, **Subnet Mask**, **Default Gateway** and **DNS** text boxes as required, to open the on-screen keypad and enter appropriate values for your network. DHCP is not available for the WLAN port.

The **Network Name** (hostname) of the operator console and the **MAC ID** (physical address) of the selected port are displayed for informational purposes. Note that the MAC ID of the WLAN port is the physical address of the corresponding port on the operator console, not the connected wireless device.

Contact your network administrator or LoadScan technical support if you need further assistance connecting to your network.

The following folders are network-shared and can be accessed from connected networks:

- **Logs** – Records of measured loads (see [Reviewing Measurement Records](#)).
- **Lists** – Selection list files for load details prompts (see [Configuring Load Detail Prompts](#), above).
- **Dbase** –Vehicle database files. Database backup/restore or imports from other LVS systems can be made via network (see [Vehicle Database Management](#)).
- **Data** – Each scan is recorded as a ‘Scan Data File’ that can be retrieved for 3D load profiling in LoadScan *OverView*™ reporting software or when requested for technical support purposes (see [Scan Data Files](#) in *Reviewing Measurement Records*).
- **Downloads** – Repository for miscellaneous files that need to be downloaded to the LVS. Mainly used for remote internet-based connections through LoadScan’s *MyScanner*™ service.

MyScanner Web-Server Settings

The *MyScanner* web-service provides remote internet-based access to measurement records, online reporting and LVS remote-control functionality. The MYSCANNER button in the *System* section of the Settings screen opens the MyScanner Settings dialog (figure 21) for configuring LVS connection to the *MyScanner* web-server.

The screenshot shows a dialog box with the following elements:

- User:** A text input field containing the text "bigrock".
- Password:** A text input field containing a series of asterisks "*****".
- Checkboxes:**
 - Upload measurement records
 - Allow Remote-Control
 - Synchronize vehicle database
 - Synchronize load detail lists
- Status:** A line of text indicating "Web-Server status: online" in green.
- Buttons:** Two buttons at the bottom labeled "OK" and "CANCEL".

Figure 21 – operator console MyScanner Settings dialog

An internet connection to the LVS operator console and an active *MyScanner* account are required. Enter **User** and **Password** as supplied by your LoadScan representative at the time your *MyScanner* account is activated.

Upload measurement records enables/disables automatic upload of measurement records to the web-server for real-time backup and remote access to measurement data. LoadScan *OverView*™ reporting software can connect to the *MyScanner* web-server to download measurement records automatically or users can log onto the online web-portal to manually view and download measurement record files.

Allow Remote-Control enables/disables web-based LVS remote-control via the *MyScanner* web-portal or from LoadScan *OverView* reporting software connected to the *MyScanner* web-service. *MyScanner* remote-control makes it possible to remotely control the LVS from anywhere with an internet connection and facilitates remote support connections by LoadScan Technical Support when required.

If **Synchronize vehicle database** is enabled, the LVS vehicle database will be synchronized with an online database linked to your *MyScanner* account. This can be used as a backup of your vehicle database and to synchronize vehicle databases between multiple LVS systems connected to the same *MyScanner* account. When the same trucks visit multiple LVS sites, synchronizing vehicle databases between the LVS systems avoids needing to do empty reference scans of the same truck at each site.

If **Synchronize load detail lists** is enabled, the selection lists for configured load detail prompts will be synchronized with online lists linked to your *MyScanner* account. This can be used as a backup of your selection lists and to synchronize lists between multiple LVS systems connected to the same *MyScanner* account. If the same load details need to be collected at each LVS, this can avoid maintaining separate lists at each site. Do not enable this option if lists need to be different at each site.

A **Web-Server status** message indicates whether the LVS has an internet connection and can successfully connect to the web-server.

Contact your LoadScan representative for more information on the *MyScanner* service and internet connection options.

2-Scan Measurement Settings

The 2-SCAN button in the *General Operation* section of the Settings screen opens the 2-Scan Measurement Settings dialog (figure 22).

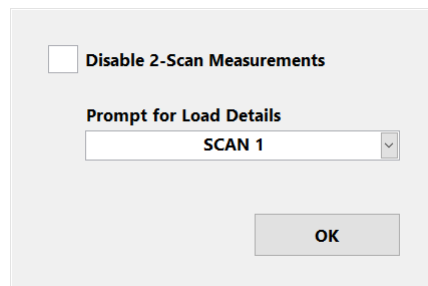


Figure 22 – operator console 2-Scan Measurement Settings dialog

Disable 2-Scan Measurements can be used to disable 2-Scan mode. When disabled, the system will not prompt to start a 2-Scan measurement when a vehicle ID that is not found in the vehicle database is entered at a vehicle ID prompt after a scan.

Set **Prompt for Load Details** to SCAN 1 or SCAN 2 to control whether configured load detail prompts are shown on the first or second scan in 2-Scan mode. Generally, if trucks arrive on site loaded for the first scan, load details should be collected on the first scan. If trucks arrive empty for the first scan and pick up a load on site before the second scan, load details should be collected on the second scan.

Custom Settings

Custom functionality to meet your application-specific requirements may be enabled on the LVS system. Custom functionality can only be activated by LoadScan. If you have any custom functionality enabled then use the CUSTOM button to open the Custom Settings dialog (figure 23) to change any custom configuration parameters. If no custom functionality is enabled, the CUSTOM button is disabled and grey-out.

Settings Type:

Setting	Value
[custom]	
LoadTrakEnable	TRUE
LoadSyncAPIEnable	TRUE
LoadSyncAPIPassword	TALLY
LoadSyncRemoteEnable	TRUE
LoadSyncRemoteName	Loadscan
LoadSyncRemotePassword	SQL12345
LoadSyncRemoteServer	10.1.1.12,1433
LoadSyncRemoteType	sqlsrv
LoadSyncRemoteUser	loadscan

Buttons:

Figure 23 – operator console Custom Settings dialog

If you are interested in adding custom functionality to your LVS system then contact your LoadScan representative to discuss the possibilities.

Reviewing Measurement Records

The Records screen (figure 24) displays measurement records. Access is from the RECORDS button on the Main screen ('system' or 'user' password required, depending on password settings).

Record	Time	Dir.	Operator	Truck ID	Truck Load (m³)	Trailer ID	Trailer Load (m³)	Total Load (m³)
121212-000143	01 Mar 2019, 17:34	OUT	BULK NZ	ZY2046	10.1	5688U	14.4	24.5
121212-000142	01 Mar 2019, 17:19	IN	ABC CARRIERS	LZ9093	9.3			9.3
121212-000141	01 Mar 2019, 17:12	IN	ABC CARRIERS	LZ9093	9.3			9.3
121212-000140	01 Mar 2019, 17:08	IN	ABC CARRIERS	WO9527	10.6	1369R	15.7	26.3
121212-000139	01 Mar 2019, 16:55	IN	ABC CARRIERS	ASA214	11.6	472AB	13.5	25.1
121212-000138	01 Mar 2019, 16:42	OUT	BULK NZ	AZP744	11.8	A416H	15	26.8
121212-000137	01 Mar 2019, 16:32	OUT	BULK NZ	ZY2046	11.2	5688U	14.5	25.7
121212-000136	01 Mar 2019, 16:24	IN	ABC CARRIERS	WE3420	11.1	9376L	15.9	27
121212-000135	01 Mar 2019, 16:16	OUT	ABC CARRIERS	BEC869	9	B813B	13.2	22.2
121212-000134	01 Mar 2019, 16:11	IN	ABC CARRIERS	AQK137	10.2	4087J	12.4	22.6
121212-000133	01 Mar 2019, 15:56	IN	ABC CARRIERS	ASA214	10.4	472AB	11.9	22.3
121212-000132	01 Mar 2019, 15:47	IN	ABC CARRIERS	W19620	10.1	22037	0	10.1
121212-000131	01 Mar 2019, 15:43	OUT	BULK NZ	AZP744	12.4	A416H	16.4	28.8
121212-000130	01 Mar 2019, 15:34	OUT	BULK NZ	ZY2046	10.1	5688U	14.4	24.5
121212-000129	01 Mar 2019, 15:28	IN	ABC CARRIERS	AQK137	8.5	4087J	10.6	19.1

Figure 24 – operator console Records screen

When this screen is opened, measurements records for the current day or the most recent day for which records exist are displayed. Use the SELECT DATE button to select records for a different day or all records in a selected date range. Measurement records are displayed with most recent first (top-most). **TOTAL Measured Loads** displays the number of scan records within the displayed date range that include at least one valid truck or trailer measurement and **TOTAL Measured Volume** displays the corresponding total volume measured (excluding error results). The number of measured loads and measured volume are also shown separately for IN and OUT directions.

Downloading Measurement Records

The currently displayed measurement records can be copied to USB Flash-drive. To do this, insert a flash drive into the Operator Console USB port and push the DOWNLOAD button. The measurement records corresponding to the displayed days will be saved as daily log files in tab-delimited text file format which can be opened and processed by LoadScan *Overview*[™] reporting software or most spreadsheet or accounting applications.

Remote Access to Measurement Records

The LVS can be connected to a computer network for remote access to measurement records (see [Network Settings](#) in *User Configuration Options*). A folder called 'Logs' is shared on the network. Remotely connected users can read or copy daily log-files from this folder. Network access can be password protected (see [Password Settings](#) in *User Configuration Options*). Note that log files in the 'Logs' folder are automatically deleted after 90 days. Older log files can only be retrieved by downloading to USB drive.

Measurement records can also be accessed from the internet via the LoadScan *MyScanner*[™] web-service (see [MyScanner Web-Server Settings](#) in *User Configuration Options*). LoadScan *Overview*[™] reporting software running on a remote PC can automatically download measurement records via local network connection or from the *MyScanner* web-server. Contact your LoadScan representative for more information about *OverView* and *MyScanner* which are provided and documented separately.

Re-Printing Tickets

To re-print a ticket for a load record, click on that record in the display to highlight it and then click the PRINT button. The printed ticket will be marked with 'COPY ONLY'.

Scan Data Files

The LVS records raw data for every complete scan to a scan data file that can be retrieved for generating 3D load images, measurement auditing or technical support purposes. These files are in a proprietary format that can only be viewed in LoadScan *OverView*[™] or other software from LoadScan. The DATA FILES button opens the Scan Data dialog (figure 25) for downloading scan data files to USB Flash-drive.

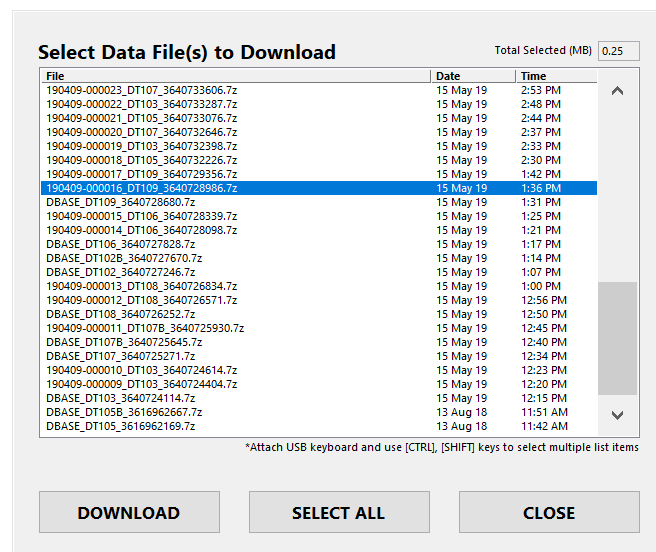


Figure 25 – operator console Scan Data dialog

Files are listed from newest to oldest and can be identified by the filename which includes the record number and vehicle ID(s) where known, or from the time the file was recorded. Reference scan filenames start with 'DBASE_' followed by the vehicle ID(s). Error scan filenames include 'ERR' followed by an error code. Select file(s) and push the DOWNLOAD button to copy to USB drive. Files will be copied to a folder called 'LoadScan Data'.

Scan data files can also be copied from the shared 'Data' folder if the LVS is connected to a computer network. These files may be requested by LoadScan, to help with technical support.

Scan data files for normal measurement scans are automatically deleted after 60 days, empty reference scans after 12 months and non-measurement error scans after 7 days.

System Tools

The System screen (figure 26) provides tools for aligning the scan head during installation and performing system hardware checks. Access is from the SYSTEM button on the Main screen ('system' password required).

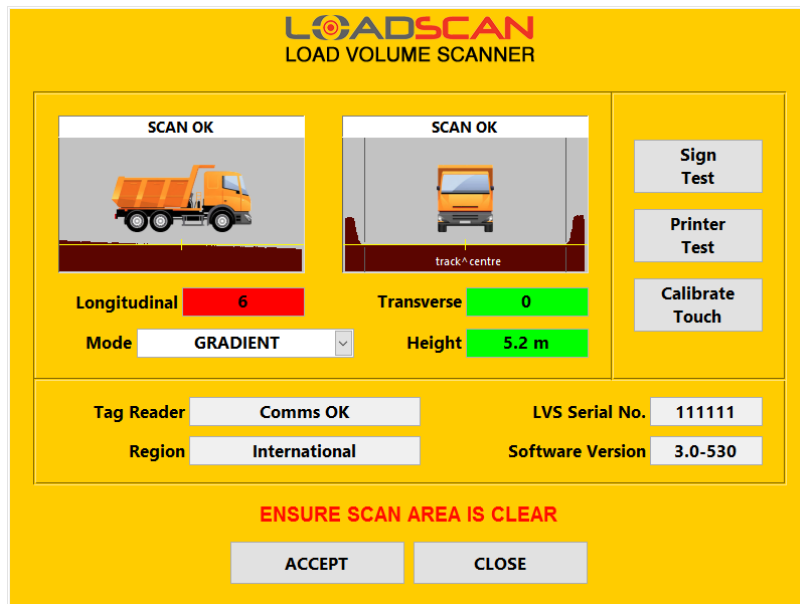


Figure 26 – operator console System screen

The main purpose of the System screen is to assist with the scan head alignment procedure. This procedure is only required when a scanner is installed on a new site, is moved significantly or the ground profile changes. This procedure is fully documented in [Appendix 2 – Scan Head Installation and Alignment](#).

System Hardware Checks

The System screen can be used to check if system hardware is operational.

Laser scanner status messages are displayed above longitudinal and transverse ground profile displays. See [Appendix 3 - Status Messages](#) for a list of possible messages.

The **Tag Reader** box indicates the status of the RFID Tag reader module. To test if the tag reader is successfully reading tags, hold up a tag, flat face up under the centre of the scan head or drive a truck with tag fitted below the scan head. If the tag is detected the code will display for a few seconds on the message board and will show in the Tag Reader box.

The **Sign Test** button writes a test message to the message board.

The **Printer Test** button prints a test message to the ticket printer.

Use the **Calibrate Touch** button to re-calibrate the touch-screen pointer position if this does not move exactly to finger push locations.

The **LVS Serial Number**, **Software Version** and **Region** settings are also displayed on this screen. Please report these when requesting technical support from LoadScan.

Maintenance and Care

The following guidelines should be followed to ensure good care of your LVS.

Cleaning the Scanner Lenses

The dark plastic lenses on the two laser scanner modules in the scan head must be cleaned periodically. Check these at regular intervals for signs of dust, smudges, or other contamination. Clear any spider-webs or other visual obstructions. In the event of a VISUAL POLLUTION (LENS) message check the lenses immediately.

IMPORTANT – USE ONLY SOFT, LINT-FREE CLOTH AND WATER TO CLEAN LENSES. DO NOT USE CHEMICAL OR ABRASIVE CLEANERS.

Lower the scan head for lens cleaning if possible. If not possible then follow site-specific and regional safety regulations where using access equipment to reach the scan head.

Physical Protection

Where vandalism or theft is a risk, the following protective measures are suggested:

- Ensure all power and data cables are buried or protected by metal cover.
- Remove lifting jack from support structure.
- Install operator console, message board and printer so that they can be securely locked up when not in use.
- If an generator is being used to power the LVS then ensure this is secured.

Electrical Protection

The LVS power box incorporates a mains (line) power surge protector designed to protect the LVS system against power surges from nearby lightning strikes or other power supply issues. This module can fail if it absorbs a large surge and should be checked periodically. To check the status of the surge module, turn the isolator switch on the front of the power box to the off position, open the cabinet door and locate the bright-red module with coloured status indicator. If the status indicator is green then this module is OK. If the status indicator is red then the removable (push-in/pull-out) surge module needs to be replaced. Please contact your LoadScan representative for a replacement **surge module**. Also ensure that any installed power conditioners or Uninterruptable Power Supply (UPS) equipment for your site is properly maintained and operating correctly.

Transportation

When moving LVS from one site to another:

- Ensure a soft protective cover is used to protect the scan head during transport. Secure the cover so that there is no chance of rubbing against scanner lenses.

- Avoid excessive vibration of scan head during transport.
- Transport operator console, message board and printer separately in a dry, low-vibration space (if removable).
- Secure cables and protect electrical connectors from rain and dirt.
- Follow site-specific and regional safety regulations when lifting or securing LVS for transport.

Trouble-Shooting

The following is a list of problem symptoms and possible solutions.

SYSTEM SETUP REQUIRED message on start-up:

This indicates that the system has not been installed and aligned correctly, the scan head has shifted or the scan track profile has changed. Check the LVS installation as per [Appendix 2 – Scan Head Installation and Alignment](#). Ensure the scan area is completely clear on start-up and the scan area markers/barriers have not shifted. If the problem cannot be resolved by re-aligning the scan head then check that:

- Scanner lenses are clean.
- There are no puddles of water on the scan track.
- No vegetation, barriers, cables or other objects are overhanging or protruding into the scan area above ground level.

TRAY SHAPE MISMATCH or OFF CENTRE errors occur repeatedly for all vehicles:

The scan track position may be out (relative to the scan head), the scan track may be too uneven or the scan head may have moved. Check the LVS alignment as per [Appendix 2 – Scan Head Installation and Alignment](#). Check that:

- No vegetation, barriers, cables or other objects are overhanging or protruding into the scan area above ground level.
- There are no extra objects on the ground
- Trucks are completely on the scan track before scanning starts and not turning off the scan track before scan is complete.

TRAY SHAPE MISMATCH error occurs repeatedly for a particular truck/trailer unit:

If there have been any physical modifications to the bin since original scanning into the vehicle database, then the vehicle must be scanned into the database again (updated). Changes that could produce this error include adding or removing topper/cheater side-boards, adding or removing tarpaulin/cover and such like. Otherwise check that any covers are fully stowed (not hanging into tray, fully pulled forward) and that the truck is following the correct path on the scan track during scanning.

COVERED/OVER-FULL or TRAY SHAPE MISMATCH error occurs unexpectedly for a particular load:

Bin may be over-full. If the bin is loaded to the very top all the way around or a very humped load blocks the scan head's view of the tray sides then the system may be unable to identify the load-bearing section of the vehicle. Otherwise, check that:

- Covers are in fully stowed position
- No branches, rocks or suchlike are overhanging the side of the bin.
- The truck is following the correct path on the scan track during scanning.
- The load is not loaded to one side of the tray, causing tray to tilt excessively.
- The hoist is not partially raised (tipper bins).

VISUAL POLLUTION displays continuously:

The level of dust, fog or steam in the air is too high for the system to operate or vegetation or other unwanted obstacles are protruding into the scan area. Wait for dust, fog or steam to clear or provide external dust control. Check that the scan area is clear of unwanted

objects, puddles of water, ice or overhanging vegetation and that markers/barriers are correctly positioned. If unsure where the visual disturbance is occurring, open the System screen and view the scanned longitudinal and transverse ground profiles.

VISUAL POLLUTION (DIRTY LENS) displays continuously

Scanner lenses are dirty or obstructed. Clean the dark plastic lenses on the two laser scanner modules in the scan head (see [Cleaning the Scanner Lenses](#) in *Maintenance and Care*).

VISUAL POLLUTION (DIRTY LENS) message after start-up on a cold or humid day:

If the system power has been off and temperature/humidity levels have caused ice or condensation to form on the scanner lenses then a VISUAL POLLUTION (DIRTY LENS) message may display after start-up. Built-in heaters automatically turn on and the system will return to normal ready state after the ice/condensation has cleared.

VISUAL POLLUTION or VISUAL POLLUTION IN TRAY error after scanning vehicle:

A VISUAL POLLUTION message may be caused by dust, steam or fog clouds accompanying scanned vehicle (pushed in front, sucked behind or blown off track by air brakes beneath the vehicle). Ensure vehicles stop completely before scan head and allow dust, steam or fog to settle before scanning. A VISUAL POLLUTION IN TRAY message indicates the source of visual pollution is coming off the load itself. The load may be releasing high levels of dust or steam. This is most likely immediately after loading. In this case wait for dust/steam to settle before scanning. Otherwise check that tarpaulin/cover is stowed correctly and not hanging into the tray or flapping around. Check that other objects such as a crane or grapple boom are not covering the load. This error can also occur if the load profile is too uneven (lumpy) for the system to measure. The LVS is intended for measuring particulate (granular) bulk product and attempting to measure unsuitable load types may trigger this error. Branches or other random objects embedded in a load or a very large variation in the size of load particles may trigger this error.

NO DATA LINK message displays continuously:

This indicates that the operator console cannot communicate with the scan head. Check the following and contact LoadScan technical support if this problem does not go away:

- Cable between the power box and the scan head is firmly plugged in at both ends and there is no sign of cable damage.
- Cable between power box and operator console is firmly plugged in at both ends and there is no sign of cable damage.
- Visible LEDs on the scan head laser modules light up when system is powered up.

SCANNER NOT FOUND, SCANNER COMMS ERROR, SCANNER STATUS ERROR or similar error message does not go away:

This indicates hardware or cabling issues inside the scan head. Open the System screen and check the status messages for transverse and longitudinal laser modules. Try restarting the system (shutdown and re-power ALL system components). Contact LoadScan technical support if this problem does not go away.

Printer not printing tickets:

Ensure printer power is on, paper has not run out and printer status indicator does not indicate an error. Ensure printer is connected to the correct port on the operator console and that the correct printer settings are selected and printing is enabled for the required scan direction(s) in the Settings screen.

Nothing happens when power turned on:

This indicates power issues. Check that:

- The power source is correctly connected to the power box and turned on.
- All power and data cables to LVS system components are connected to the power box.
- The circuit breaker (fuse) inside the power box has not been tripped.
- The power isolator switch on the outside of the power box is in the ON position.
- If running the system from a generator then check that the output is stable and within voltage limits.
- If using power conditioning hardware/UPS then check that this is switched on and that the output is live.

Automatic identification fails for a specific vehicle fitted with ID tag(s):

Tag battery may be flat. Try registering new tag(s) to the affected vehicle. If this does not fix the problem then try alternative tag mounting locations as there may be interference from immediate surroundings (see [ID Tags for Automatic vehicle Identification](#) in *Basic Operation* for mounting instructions). Check that ID tag(s) are correctly registered in database record(s) for affected vehicle. If scanning truck and trailer (two bins) then check that both bins have tags registered or the trailer (second bin) is linked to the truck as a permanent partner (see [Linking Truck and Trailer as a Permanent Pair](#) in *Advanced Functions*). Note that if either tag is not detected for a two bin truck and trailer configuration with two tags then neither bin will be identified automatically. It is then necessary to identify which tag is faulty.

Automatic identification fails for all vehicles fitted with ID tags:

Open the Settings screen and check that vehicle identification is set to 'Tags and Manual' or 'Tags Only'. Open the System screen and check that the tag reader module is reading tags (see [System Hardware Checks](#) in *System Tools*). Contact LoadScan technical support if this problem does not go away.

Automatic identification identifies wrong vehicle:

The ID tag detected during scan is registered to a different vehicle than the one scanned. Check that:

- The correct ID tag(s) have been fitted and registered to the correct vehicle.
- No additional ID tags are being carried aboard the vehicle.
- No ID tags are being stored in the area around the scan head.
- No ID tags have fallen off a vehicle and are lying on the ground near the scan head
- No other vehicle fitted with ID tags passed in an adjacent lane during scan
- No other vehicle fitted with ID tags followed too close behind the scanned vehicle.

Scanning does not start when vehicle reaches scan head or scanning starts or stops part-way through scan:

Scanning is triggered by the presence of the target vehicle below the scan head. If the vehicle is too far to one side of the scan track so that it is outside the valid scan area or cannot be seen by the longitudinal laser beam then scanning will not start. If the vehicle turns during scanning or is not aligned correctly with the scan track before reaching the Scan Head then part of the vehicle may move out of range of the longitudinal laser beam and scanning will stop early or fail to start. This can for example result in only the truck or only the trailer being scanned for a truck and trailer (two bin) scan.

After scan completes the system returns immediately to 'READY TO SCAN' state or outputs an INVALID SCAN TARGET error:

After scanning completes, the system analyses the recorded scan profile and determines whether it is a valid target. If the profile is rejected then the scan is discarded and the system returns to ready state. Depending on the system configuration an INVALID SCAN TARGET error may be generated. This is intended to reject scans triggered by large dust or fog clouds, under-size or oversize vehicles or other unsuitable vehicle types. This condition can occur unexpectedly if:

- Vehicle is accompanied by a cloud of dust or fog or excessive dust or steam is coming directly off the load.
- Vehicle reverses through scanner.
- Bin walls/floor are not solid (e.g. mesh, frame-work or lots of holes).
- Bin(s) are covered.
- Vehicle is off-centre during scan.
- Crane or grapple boom or other large object is overhanging the bin.
- Vegetation, barriers, cables or other objects are overhanging or protruding into the scan area.

TOO FAST, TOO SLOW, SPEED UNEVEN or TRACKING ERROR errors occur when vehicle speed during scanning appears normal:

Check that vehicle position during scanning is not off centre such that the longitudinal laser beam is partially or completely missing the vehicle. The position/speed of the scanned vehicle is monitored by the longitudinal laser so the beam must fall within the target vehicle for the full duration of scan. Check that the vehicle is not overloaded so that the hump in the load blocks the longitudinal laser scanner from seeing the front or rear of the vehicle.

Unexplained TRAY PROFILE ERROR during empty reference scan:

This error is most likely to occur where internal overhangs or other obstructions in or above the bin block the scan head from seeing front, rear or side walls. This error can also occur, if vehicle is too far off centre during scan.

Message Board is blank or message does not change:

Check that the message board cable is properly connected at both ends and there are no signs of cable damage. Open the System screen and push the SIGN TEST button. This sends a test message to the Message Board. Contact LoadScan technical support if this problem does not go away.

Appendix 1 – LVS Specifications

General Specifications

Measurement Range (per bin)	0 – 130 m ³ (0 – 170 yd ³) ¹
Measurable Vehicle Types	Conventional open bin on-road truck, truck-trailer, semi-trailer and B-train combinations (including bottom-dump, side-tipper and belt unloaders); Road-trains with up to 4 bins; Rigid-bodied and articulated off-highway dump trucks (mine, quarry, underground); solid-sided rectangular tractor trailers. Maximum 3m (10') wide, 4.25m (14') high for standard fold-down LVS system. Custom mounting may be required for larger trucks.
Measurable Bin Capacity	1.5 – 130.0 m ³ (2.0 – 170 yd ³)
Measurable Load Types	Flowable solids (particulate bulk materials) including: rock aggregates, gravel, lightweight aggregates, sand, soil, clay, spoil, compost, bark, wood-chip, mulch, other garden/landscaping specialty mixes, fertilizer, shredded waste and so on.
Max. Load Particle Diameter (average)	200 mm (7.8") for trade certified systems or for rated accuracy
Measurement Resolution	0.1 m ³ / 0.1 yd ³ ²
Typical Measurement Accuracy	Better than 1% to limit of resolution
Vehicle Speed (during scanning)	0.5 – 6.0 kmph (0.3 - 3.7 mph)
Power Requirements	110 - 240 VAC, 50/60Hz, 4A max (24VDC, 14A max option)
Laser Protection Class	Class 1 (eye-safe)
Clearance (from Ground)	5.0 m (16.4') minimum (depends on mounting system and type of vehicles to be scanned)

¹ **New Zealand:** 85 m³ maximum measurement per bin and 0.5 m³ minimum tradable quantity for trade verified/certified systems as approved by Trading Standards (Pattern Approval Certificate number 1556).

Australia: 35 m³ maximum measurement per tray and 1 m³ minimum tradable quantity for trade verified/certified systems as approved by NMI (Pattern Approval Certificate number 13/1/15).

USA, Canada and International: Load Volume Scanners will be provided as monitoring systems and do not currently have any specific approvals by weights and measures authorities for trade use (where financial transactions take place). However, LVS units perform to the same level of accuracy as trade approved systems operated in New Zealand and Australia.

² 0.05 m³ below 2.5 m³ measured volume for **New Zealand** only.

Rated Operating Conditions

Operating Temperature	-30 – 50°C (-22 – 122 °F) Scan Head, LED Message Board 0 – 50°C (32 – 122 °F) Operator Console, Printer -40°C (-40°F) low temperature option available
Minimum Visibility	50 m (164') (dense fog)
Maximum Scan-Track Gradient	5 degrees (9%)
Maximum Scan-Track Camber	3 degrees (5%)

Appendix 2 – Scan Head Installation and Alignment

The following procedures must be carried out every time an LVS is installed in a new location. These procedures must be performed to correctly install and align the scan head and mark out the path for vehicles to drive along during scanning.

The exact procedure for physical installation, and the mechanism for scan head alignment adjustments will depend on the scan head mounting design. The following instructions are not specific to a particular mounting system but all dimensions relate to standard installation for on-road truck and trailer units. For larger off-highway dump trucks higher mounting and/or wider scan track may be required. Contact your LoadScan representative for assistance with application-specific installation requirements.

Step 1 – Selection of a Suitable Site

1. Scan area must be level, or of even gradient not exceeding 5 degrees (9%) and maximum 3 degree (5%) camber.
2. The scan area must allow for a 3m (10') track width for at least a full truck length before and after scan head, with a minimum of 6m (20') restricted width each way.
3. Truck and trailer units must have suitable unobstructed access, and must be able to approach, pass under and drive clear of the scanner (back of trailer clear of scan head) maintaining a straight line of travel, in either direction throughout.
4. A concrete pad is ideal but any hard, non-dusty surface with suitable markers/barriers is adequate.
5. Site must be in a dust-controlled environment where only low levels of dust or other visual pollutant in the air are expected.
6. 110-240 VAC mains (line) power is required. A suitable power conditioner should be used to protect the LVS equipment where power quality is poor. All LVS components should be powered from the same power circuit. A generator with a capacity of at least 1.0 kVA may be used. LoadScan recommends that only inverter-type generators are used and recommends the Honda EU 20i as these produce good quality power.
7. Weather-proof housing is required for the operator console. The console is connected to the scan head by a flexible cable that may be up to 90m (295") long. A site office, shipping container, portable shed or kiosk is suitable.

Step 2 – Installation

1. Install the LVS so that the Scan Head is in a stable position across the scan area, perpendicular to the desired vehicle travel direction and aligned parallel to the ground (figure 27). The transverse beam lens (outer most black lens) should be directly above the desired centre-line of the track. Clearance from the bottom of the two scanning lenses to ground should be about 5.3m (17.4').
2. Install the operator console in suitable weather-proof housing.
3. Connect the scan head, message board and printer to the operator console via supplied cables.
4. Connect all cables between system components and to the power box.

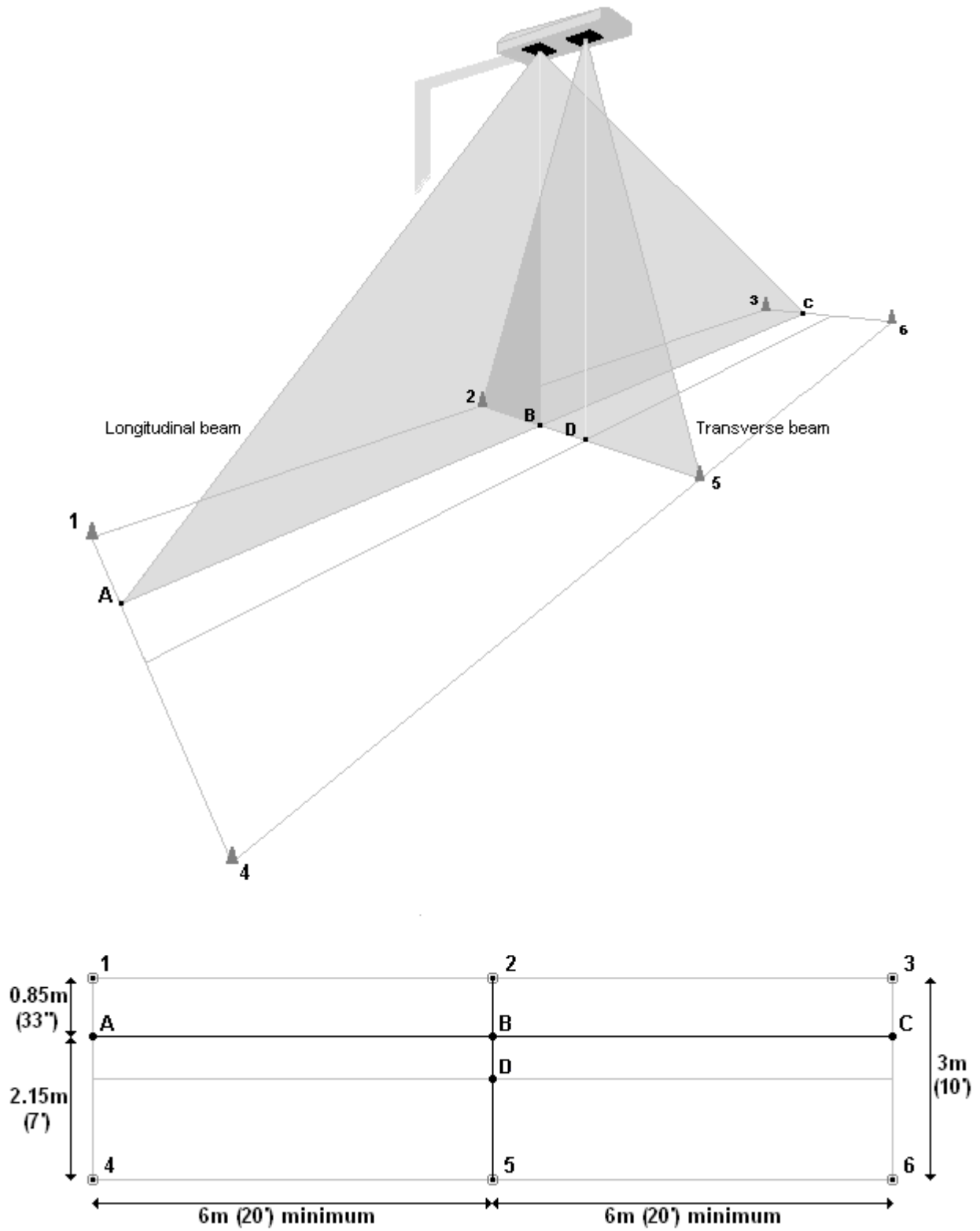


Figure 27 – Standard LVS scan area layout for on-road truck and trailer units

Step 3 – Scan Head Alignment

The Scan Head produces two invisible (infra-red) scanning laser beams in perpendicular planes as shown in figure 27. The **longitudinal** beam scans along the line between points **A** and **C**. The **transverse** beam crosses the longitudinal beam at point **B**. The centre of the track, corresponding to the point directly below the transverse laser lies at point **D**.

1. Ensure the scan area is clear of vehicles or other objects and power up the system.
2. When initialisation is complete, open the SYSTEM screen (figure 28) on the operator console (system password required).

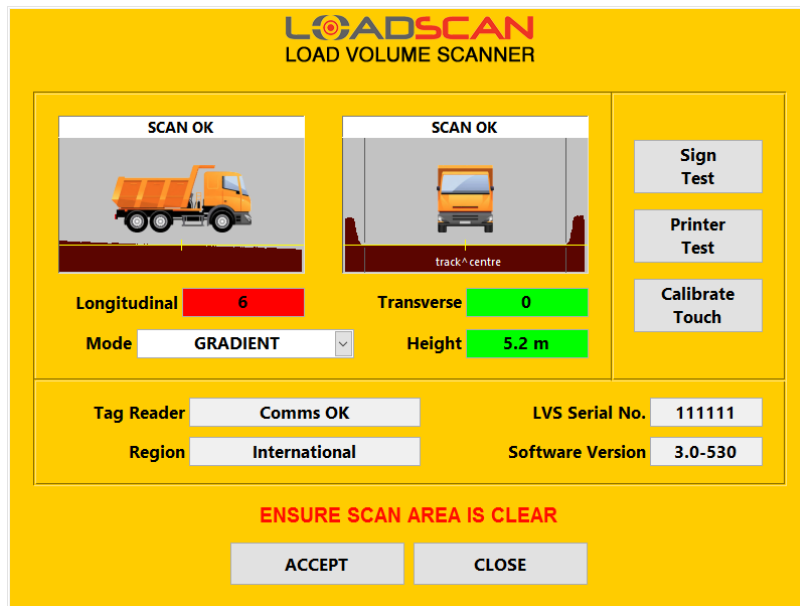


Figure 28 – operator console System screen

3. Profile windows show measured longitudinal and transverse ground profiles. With the **MODE** selector set to GRADIENT the **Longitudinal** and **Transverse** indicators show measures of relative alignment between the Scan Head and the ground in the respective directions. The **Height** indicator displays the distance from the Scan Head to the ground. If gradient or height is acceptable then the background colour of the indicator is green. Gradient and height values are also displayed on the message board ('T' for transverse gradient, 'L' for longitudinal gradient and 'H' for height). The aim of the following procedure is to get all displays green at the same time, with both gradients as close as possible to zero.
4. Before making adjustments, check that the status message displayed above both scan profile windows is 'SCAN OK'. If either of these displays an error message continuously then discontinue installation and contact LoadScan technical support.
5. Adjust the position of the scan head in the longitudinal plane, using the adjustment mechanism provided on the mounting system, until the longitudinal gradient is as close to zero as achievable.
6. Now adjust the position of the Scan Head in the transverse plane until the transverse gradient is as close as possible to zero.
7. Repeat steps 5 and 6 until both the longitudinal and transverse gradients are acceptable (in the range -5 to $+5$) and as close to zero as practically achievable.

8. Check that the HEIGHT indicator is green and if necessary adjust the distance between the Scan Head and the ground, and repeat steps 5-7.
9. The ACCEPT button changes from greyed-out to fully visible when the alignment is acceptable. Push this button and enter requested details to record the alignment. If the CANCEL button is pushed the previous alignment profile is retained.

Step 4 – Marking Out the Scan Area

Suitable markers such as traffic cones or barriers must be securely positioned to define a 3m (10') wide track for the scan area. The procedure for positioning these scan area delineators describes a method for tracing the position of the transverse and longitudinal laser beams along the ground. If a suitable hand-held survey laser detector capable of detecting the infra-red laser beams is available this should be used. The method described below can be used when a laser beam detector is not available.

Note for mini trucks less than 1.8m (6') wide: track centre should be about 0.3m (1') closer to the longitudinal scanner beam than for standard trucks and restricted to about 2.4m (8') width. This can be achieved by moving the track outer edge in 600mm (2') from the standard 3m width position. So the track outer edge offset from the longitudinal beam is then 1.55m (5') instead of 2.15m (7').

Note for large off-highway dump trucks: the track should be widened to the minimum feasible width for the vehicles to be scanned. Widen the track an equal amount either side of the standard 3m track so that point **D** in figure 27 remains at the centre of the track. The height of the scan head may also need to be increased. Contact your LoadScan representative with your truck specifications for height requirements.

1. Open the SYSTEM screen (figure 28) on the operator console (system password required).
2. Change the **MODE** selector to BEAM DETECT. In this mode the LVS indicates when either the longitudinal or transverse scan beam is broken by an object in the scan area crossing the beam above ground level. The location of the detected beam interruption (distance along the ground relative to the beam centre directly below the scan head) is reported on the System screen and on the message board. This function can be used to find the location of the longitudinal scan beam along the ground, between points A and C in figure 27, to a maximum of about 8m (26') from the scan head.
3. Move a short plank, box or similar 'detector' object slowly across from one side of the track towards the expected position of the beam, at a height of at least 10cm (4") from the ground, until a beam detection location is reported on the message board. Ensure only the 'detector' object is crossing the beam. Mark the ground at the point where beam detection first occurs (very end of 'detector' object). Alternatively, use a hand-held survey laser detector to detect the beam.
4. Using the method described above, or a handheld laser beam detector, locate the position where the longitudinal scan beam hits the ground, about 6m (20') to one side of the scan head. Mark the ground at this point. This is point **A**.
5. Use the same method to trace the longitudinal beam back towards the scanner and mark the ground approximately at the point where this line passes directly below the scan head. This is point **B**.
6. Continue to the opposite side of the Scan Head and once again locate the point where the longitudinal beam hits the ground about 6m (20') from the scanner. Mark the ground at this point. This is point **C**.

7. From point **A** measure **0.85m (33")** towards the inner side of the scan area (towards the scanner support/base). Mark the ground here. This is point **1**.
8. Repeat from points **B** and **C** to locate and mark points **2** and **3**.
9. From point **A** measure **2.15m (7')** towards the further side of the scan area. Mark the ground here. This is point **4**.
10. Repeat from points **B** and **C** to locate and mark points **5** and **6**.
11. Secure suitable markers/barriers at points **1-6**, so that the inside edge of each marker lies on the mark. This is the minimum number of demarcation points and additional markers/barriers and a longer restricted track length are suggested.

Appendix 3 – Status Messages

Alphabetical listing of status messages and their meanings. See the *Trouble-Shooting* section of this manual for detailed descriptions of specific error conditions and resolution.

CLEAR SCAN AREA

Vehicles or other objects on scan area need to be removed (for full length of scan area).

COVERED/OVER FULL [-103]

Unable to identify valid tray section of scanned vehicle. Bin may be overloaded or cover may be on. Vehicle type may not be suitable.

DATABASE FILE ERROR [-104]

Reference Scan file in the vehicle database is corrupted and cannot be used.

ID TAG NOT DETECTED [-18]

Less ID tags detected than the number of bins and vehicle identification set to “Tags Only” and truck and trailer not linked in vehicle database as “permanent pair”.

INVALID SCAN TARGET [-6,-7,-8,-9]

Scanned target profile rejected as unsuitable as a result of profile analysis.

LOAD OVER RANGE [-14, +3]

Measured load volume exceeds the rated ‘maximum capacity’ of the system. The maximum capacity is the maximum measurable volume.

LOAD UNDER RANGE [+5]

Measured load volume is less than the rated ‘minimum capacity’ of a trade legal (certified/verified) LVS. Minimum capacity is the minimum trade legal (tradable) measurement volume.

NO DATA LINK

No communication established between operator console and scan head.

NUMBER OF BINS DOES NOT MATCH TYPE [-1011, -19]

Number of load-bearing bins detected does not match type selected for empty reference scan.

OFF-CENTRE (OUT OF RANGE) [-4]

Part of vehicle is outside the valid scan area for all or part of the scan.

OFF-CENTRE (TOO MUCH ANGLE) [-15]

Vehicle off-centre on scan track, turning or excessively angled during scan.

OFF-CENTRE (TOO FAR LEFT) [-16]

Vehicle off-centre on scan track, too far to driver’s left

OFF-CENTRE (TOO FAR RIGHT) [-17]

Vehicle off-centre on scan track, too far to driver’s right.

OVERHANG TOO BIG (FRONT OR REAR) [-1010]

Detected front or rear overhang inside bin exceeds size suitable for use with LVS.

REF. SCAN EXPIRED [+2]

Vehicle Reference scan in vehicle database expired and needs to be updated.

SCANNER COMMS ERROR

Error in communication between operator console and laser module in Scan Head.

SCANNER NOT FOUND

No communications established between operator console and laser module in scan head.

SCANNER STATUS ERROR

Laser module in scan head is reporting an internal status error. Contact LoadScan technical support if this error does not go away after restarting (re-powering) entire system.

SERIAL NUMBER MISMATCH

Serial number of laser module in Scan Head does not match recorded value or laser modules swapped.

SPEED UNEVEN [-12]

Too much variation in vehicle speed during scan.

SYSTEM SETUP REQUIRED

Scan head not aligned with scan track correctly or unwanted objects on or protruding into scan area on system start-up.

TARGET TOO SMALL [-5]

Scan duration too short. Vehicle too small, traveling too fast, or off centre so that scan triggering started late or stopped early.

TOO FAST [-11]

Maximum vehicle speed during scan exceeded 6.0 kmph (3.7 mph).

TOO SLOW [-13]

Vehicle stopped or speed too slow during scan.

TRACKING ERROR [-105]

Vehicle speed during scan cannot be computed from the measured vehicle profile.

TRACKING ONLY [-3]

Vehicle was entered into vehicle database as a 'Tracking Only' record or load computation is disabled in the current scan direction but 'Log All Errors If ID Known' option is enabled and scanned vehicle identified by ID tag(s) and recorded.

TRAY CAPACITY BELOW MINIMUM [-1006]

Computed bin capacity below minimum capacity suitable for use with LVS.

TRAY DEPTH OUTSIDE LIMITS [-1009]

Computed depth of empty bin is outside range suitable for use with LVS.

TRAY LENGTH OUTSIDE LIMITS [-1005, -106]

Computed length of empty bin is outside range suitable for use with LVS.

TRAY PROFILE ERROR [-1007]

Empty bin profile during reference scan cannot be fully determined due to excessive overhangs or other shape features blocking full view of bin walls.

TRAY SHAPE MISMATCH [-101]

Basic bin dimensions, front-to-rear or side-to-side angles or heights for empty and load scans do not match (e.g. wrong ID entered, covers not fully stowed, hoist raised or tray modified since empty reference scan).

TRAY WIDTH OUTSIDE LIMITS [-1008]

Computed width of empty bin is outside range suitable for use with LVS.

VISUAL POLLUTION

Scanner cannot operate due to severe dust or fog pollution or other visual obstructions in scan area.

VISUAL POLLUTION (DIRTY LENS)

Scanner cannot operate due to dirt or visual obstruction on or close to scanner lens(es).

VISUAL POLLUT'N IN TRAY [-102]

Excessive amounts of dust or steam obscuring scan head view of load or load profile indicates unsuitable load type (e.g. excessively lumpy or not a particulate bulk product).

Appendix 4 – Manufacturer Warranty

This product is warranted against manufacturing defects for a period of 12 months from date of delivery. The warranty covers only the replacement or repair of any part that fails as a result of a fault in manufacture or assembly. Defective parts will be replaced or serviced by LoadScan Ltd or their authorized representative without charge for labour or materials, subject to the conditions detailed below.

Conditions of Warranty

1. Defective parts shall at the option of LoadScan Ltd be returned to LoadScan or their authorized representative for repair or replacement.
2. The owner is responsible for any handling, transportation and insurance costs if defective part needs to be returned for repair.
3. Repairs carried out other than by LoadScan Ltd or persons authorized by LoadScan Ltd cancel the warranty.
4. This warranty does not extend to accessory devices or consumables used with the product and not supplied with the original equipment.
5. This warranty does not extend to defects or injuries caused by or resulting from causes not attributable to faulty parts or the manufacture of the product, including but not limited to, defect or injury caused by or resulting from misuse, abuse, neglect, accidental damage, normal wear, improper voltage, mechanical shock, liquid spillage, vermin infestation, external software, connection of accessory devices, power devices or consumables other than those approved by LoadScan, or alterations made to the product which are not authorized by LoadScan Ltd.

This warranty is additional to the mandatory conditions and warranties which are implied by the laws and regulations of the country/state of sale. However, to the extent permitted by such legislation, LoadScan Ltd excludes any liability for any indirect or consequential damages arising from the purchase or use of the product.



DRIVER INSTRUCTIONS

FOR

LOAD VOLUME SCANNER

- 1. APPROACH SLOWLY AND STOP CLEAR OF SCAN HEAD**
- 2. WAIT FOR 'PROCEED' SIGNAL**
- 3. PROCEED AT SLOW STEADY SPEED (WALKING PACE)**
- 4. CONTINUE UNTIL 'WAIT FOR RESULT' SIGNAL. STOP CLEAR OF SCAN HEAD**
- 5. ENTER LOAD DETAILS AT OPERATOR CONSOLE IF REQUESTED**
- 6. COLLECT TICKET FROM PRINTER IF REQUIRED**

COVERS MUST BE FULLY STOWED DURING SCANNING

Note: Vehicles fitted with ID tags do not need to stop after scanning unless the driver is required to collect a ticket or additional load details are requested. Drivers should however ensure that the scan is successful.