



CALAN • PRECISION FEEDING SYSTEMS

Data Ranger

Model 542 • Operations Manual • 2025

CALAN

DATA RANGER

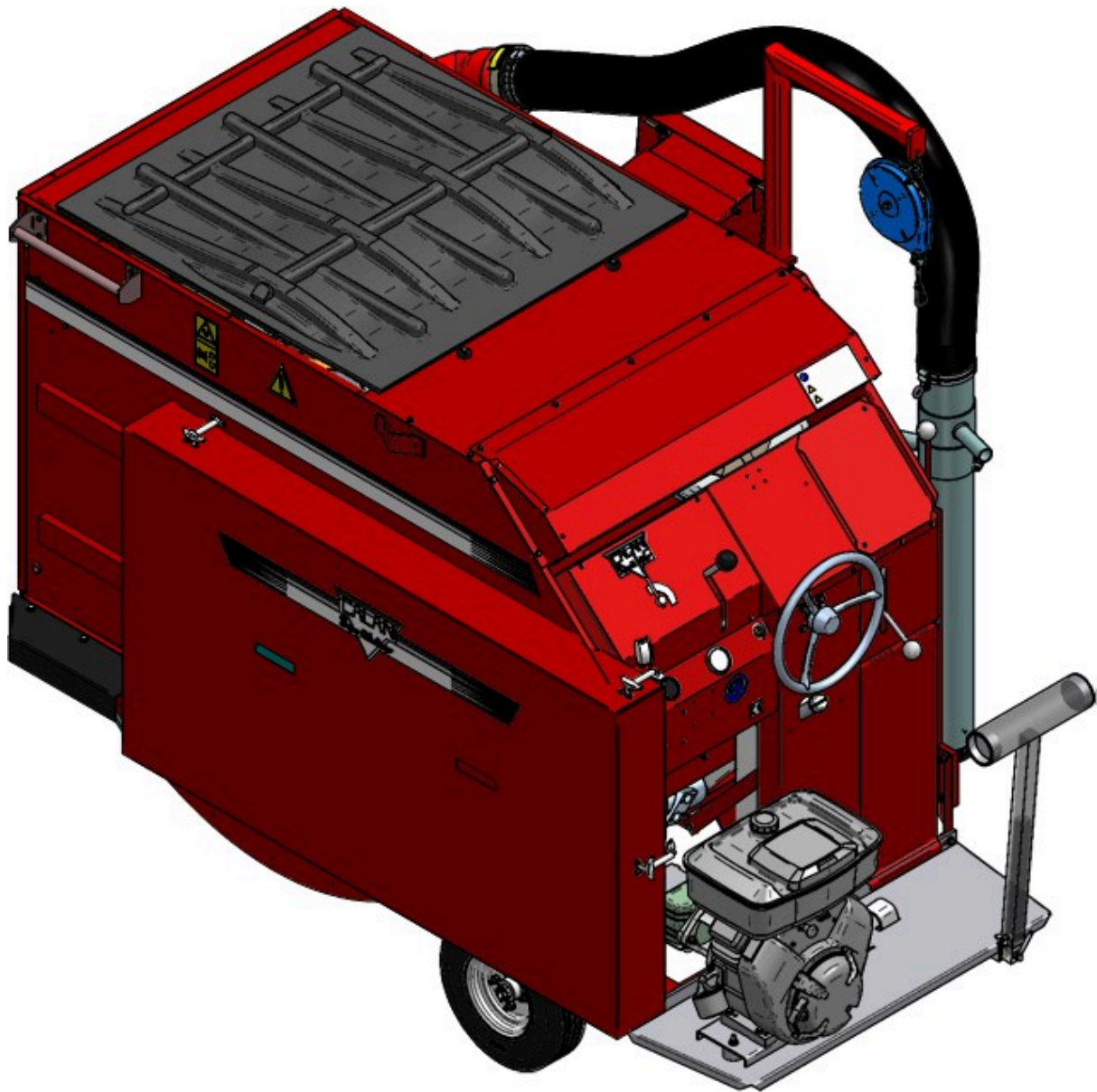
Thank you for choosing American Calan. As a global leader in precision livestock feeding systems, we are proud to support researchers advancing animal nutrition and agricultural innovation. Inside you'll find essential information on installation, operation, and maintenance. Sincerely, the Calan Team.

SECTION 1

General Information

What the Data Ranger is and what it does

The Super Data Ranger (SDR) is a specialized TMR (total mixed ration) mixer for precision feeding and data collection in animal research facilities. Developed over two decades, it is tailored to meet the stringent requirements of scientific feed trials.



MODEL
542

TANK CAPACITY

70 ft³ · 2.0 m³

ENGINE

B&S Vanguard 16 HP

DRIVE

Hydrostatic, 2 wheel motors

MIXER

5-paddle rotor

DESIGN LIFE

~15 years

Key features

- **Precision feeding:** accurately weighs, mixes, and dispenses both forage and concentrate feeds, for individual animals or small groups.
- **Efficient feed recovery:** a high-velocity vacuum system retrieves feed refusals (ORTS), enabling precise intake measurement.
- **Robust construction:** durable sheet and structural steel, designed for roughly a 15-year service life under proper maintenance.
- **Corrosion resistance:** the mixing tank uses a polyethylene liner to protect against silage-acid corrosion.
- **Hydraulic systems:** hydraulics power vehicle movement, the mixer, the discharge elevator, and the vacuum system for smooth, efficient operation.

Overall, the SDR is an indispensable tool for researchers conducting detailed, accurate animal feeding studies, offering precision and reliability in data collection and feed management.

SECTION 2

Specifications & Dimensions

Capacity and dimensional reference for the Model 542

This manual covers the Data Ranger Model 542. Letter callouts (A to U) in the table below correspond to the dimensioned technical drawing.

MODEL	CAPACITY (M³)	CAPACITY (FT³)
#542	2.0	70

Dimensions (inches)

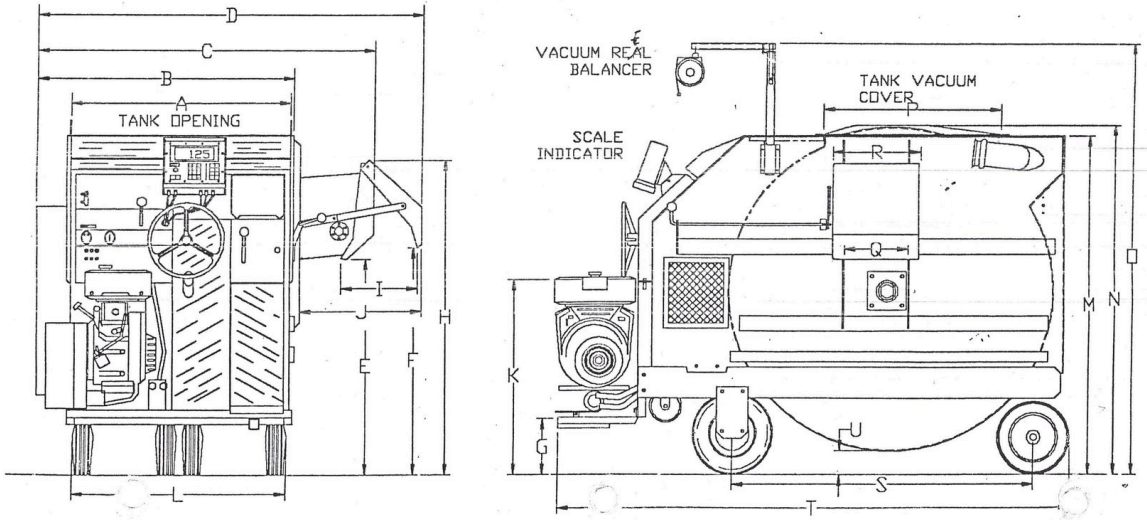
MODEL	A	B	C	D	E	F	G	H	I	J	K
#542	41	49	65	74	42	44	11	61	15	23	38

MODEL	L	M	N	O	P	Q	R	S	T	U
#542	41	66	68	84	34	12	16	58	98	5

SUPER DATA RANGER TECHNICAL DRAWING

CAPACITY			SUPER DATA RANGER DIMENSIONS										
MODEL	CU. METERS.	CU. FEET.	A	B	C	D	E	F	G	H	I	J	K
#536	1.7	60	35"	43"	60"	69"	42"	44"	11"	61"	15"	23"	38"
#542	2.0	70	41"	49"	65"	74"	42"	44"	11"	61"	15"	23"	38"

MODEL	CU. METERS.	CU. FEET.	L	M	N	O	P	Q	R	S	T	U
#536	1.7	60	35"	66"	68"	84"	34"	12"	16"	58"	98"	5"
#542	2.0	70	41"	66"	68"	84"	34"	12"	16"	58"	98"	5"



SECTION 3

Startup Guide

Daily preparation for accurate, safe operation

Proper startup procedures are essential to ensure accurate data collection, safe operation, and long-term equipment reliability. These steps prepare the Data Ranger for daily use.

Battery connection

- Ensure the battery is properly connected.
- Check the battery charge level before use.
- Replace or recharge the battery if voltage is low.

Engine & fuel system

- Fill the fuel tank with a minimum of 87 octane / 87 AKI (91 RON). Gasoline with up to 10% ethanol is acceptable.
- Inspect for any leaks or loose connections.
- Ensure the engine oil is at the appropriate fill level.

Scale calibration

Perform a scale calibration test to verify accuracy:

- 1 Clear the scale indicator.
- 2 Push the bin on the weighing frame gently.
- 3 The scale should return to zero.

If the scale shows a weight, visually inspect for interference (e.g., debris, misalignment) and ensure the weighing frame is free to move.

Visual inspection

- **Side shield:** ensure there is no interference between the weighing and non-weighing frames. Adjust or reposition as necessary to maintain unobstructed operation.
- **Tank & liner:** inspect the tank for damage. If the liner is torn or compromised, replace it to ensure proper operation and prevent further damage.

Grease

- Grease all fittings with multi-purpose grease as indicated in the maintenance section.

Tire pressure

- Rear tires 90 psi, front tires 50 psi. Adjust for seasonal and climate changes, underinflated tires may affect scale accuracy and overall performance.

Vacuum system check (if equipped)

- Confirm the collection bag is securely attached.
- Inspect the vacuum system for clogs or damage.
- Inspect that the vacuum seal is properly seated.
- Do not operate without the bag in place.

SECTION 4

Safety

Read before operating

DANGER STOP THE MIXER WHEN HAND-LOADING

STOP the mixer when loading ingredients by hand. This is critical to prevent injury from moving parts and to ensure safe operation.

General safety guidelines

- Always observe all safety decals affixed to the SDR. They are placed to prevent accidents and highlight danger zones.
- Like most farm equipment, the SDR can be inherently dangerous if improperly used. The rotating mixing reel is a particular hazard and must be treated with caution.

Safe loading practices

- Only one person should be near the machine while it is in use.
- When hand-loading with tools such as forks, shovels, or grain scoops, the mixing reel must be completely stopped.
- Never reach over the top of the mixer with hands or tools while the reel is in motion.

Safe observation and inspection

- The front-left corner of the SDR has a step and grab handle for safe observation of the mixing tank.
- The mixer must be turned OFF before using the step.
- Use both hands on the grab handle while observing.
- Never attempt to remove feed or obstacles from the mixer unless the ignition switch is OFF.

WARNING MIXING PADDLE SAFETY

Under no circumstances should the operator place hands near the mixing paddles unless the machine is completely shut down. The paddles are powerful and can cause serious injury if contacted during operation.

SECTION 5

Loading, Mixing & Unloading

Batch preparation and feeding procedure

The Data Ranger Model 542 has a 70 cubic-foot tank capacity. The total weight of feed the mixer can handle depends on ration density. For example, the Data Ranger can be loaded with approximately 1,000 lbs of the following ration:

% OF BATCH	INGREDIENT
70.2%	Hay crop silage
24.8%	Corn silage
2.1%	Chopped hay, 2"-4" length
2.4%	Soybean meal
0.5%	Minerals
100%	Total ration

Mixing light and heavy ingredients

- 1 Load light ingredients first** (e.g., chopped hay, cottonseed hulls). Less-dense materials belong at the bottom to ensure proper mixing.
- 2 Add heavier ingredients next** (e.g., grains, minerals, supplements). This layering achieves a more uniform mix.
- 3 Reel direction during loading:** ensure the mixing reel rotates forward (top of the reel moves away from the operator). Move the mixer lever down to the forward position.

Mixing process guidelines

- **Engine speed:** set to approximately 1/3 throttle during mixing, optimal for blending without overworking the machine.
- **Periodic reel reversal:** occasionally move the lever to reverse to redistribute ingredients and prevent layering.

- **Conveyor activation:** turn the conveyor switch ON for about 3 seconds during mixing to clear ingredients settled on the chain conveyor. Skipping this may cause the first animal fed to receive an incorrect mix.

Mixing time

- Mixing time depends on feed formulation and batch size.
- Recommended mixing time is approximately 5 minutes.
- Some mixing occurs while loading; the rest can complete while driving to the first animal. The SDR continues mixing during unloading, ensuring consistency.

Unloading procedure

- 1 Switch the conveyor to the ON position.
- 2 Move the mixing lever down to rotate the reel forward (top of reel moves away from the operator).
- 3 Feed discharges rapidly during the first $\frac{3}{4}$ of the load, then slows as the mixer empties.

NOTE CAPACITY NOTE

Full loads take longer to unload, but require fewer total loads and less travel time.

Final feed weight check

- Pause the mixer momentarily before recording the final weight.
- Visually confirm the correct amount has been unloaded.
- If underfed, unload more; if overfed, reload excess into the top opening of the conveyor.

Recording & advancing

- Once satisfied with the amount fed, press the HOLD or MENU key on the scale indicator.
- Proceed to the next animal.

Operator positioning & indicator accuracy

- During loading and unloading, stand on the operator's platform.
- Zero the indicator in load mode before adding the first ingredient.

- During unloading, after the target value appears, clear the indicator while standing on the platform, with the engine running at the predetermined speed.

WARNING **CONSISTENCY MATTERS**

Inconsistent adherence to this procedure may result in weighing errors.

NOTE **SCALE INDICATOR**

The exact keys used for weighing depend on the scale indicator installed on your unit. Units purchased before June 2026 may use an M1015 or Digi-Star EZ3410; units from June 2026 onward use the Scale-Tec POINT. See the Scale Indicator & POINT System section, or contact Calan for guidance on your unit.

SECTION 6

Vacuum Procedures

Feed-refusal (ORTS) recovery system

Your vacuum-equipped SDR recovers feed refusals (ORTS) for precise intake measurement. The following covers components, assembly, operation, and maintenance of the vacuum system.

Components

- **5" vacuum intake port:** mounted on the front-right side of the tank.
- **Vacuum material-handling fan:** behind the dashboard; powers the vacuum system.
- **Vacuum hose assembly:** 4-foot nozzle on one end, coupler with seal on the other.
- **Vacuum coupler clamp:** secures the hose connection during operation.
- **Vacuum hose balancer & stand:** supports the hose to reduce operator fatigue.
- **Vacuum valve:** on the dashboard; controls vacuum airflow.
- **Green fiberglass vacuum cover:** protects the vacuum intake during operation.
- **Conveyor top cover:** used only during vacuuming to prevent material escape and ensure proper airflow.

Assembly of the vacuum system

- 1 **Install vacuum stand and hose balancer.** Ensure the engine is OFF. Mount the stand and balancer, adjusting balancer tension per its instructions.
- 2 **Attach vacuum nozzle.** Use the stainless-steel clip to connect the nozzle to the balancer.
- 3 **Connect vacuum hose.** Locate the tank intake port on the front-right corner. Use the coupler and rubber seal to securely attach the hose.
- 4 **Install green vacuum cover.** The yellow arrow marks the rear of the cover; it should point toward the operator's platform. Stand at the front, walk the cover over the tank, lifting one side to clear the reel blades, until it rests against the rubber stops. Once vacuum is engaged, the cover draws down to form a tight seal.
- 5 **Secure conveyor covers.** Close the discharge conveyor cover and install the top cover over the conveyor.

- 6 **Remove operator seat.** Loosen the lever at the base of the seat post to remove the stand-up seat, preventing obstruction during frequent boarding.
- 7 **Start engine.** Increase throttle to approximately 50% of maximum.
- 8 **Engage vacuum system.** Slowly advance the vacuum control lever. Increase engine speed until the gauge reads 10"-11" (warm engine). Ensure the hose is unrestricted and drawing only air. Optimal performance typically requires full throttle.

Using the scale system during vacuuming

- Stand on the concrete floor just behind the operator's platform so the SDR can sit close to the line of feed tubs.
- Before stepping back onto the platform, press MENU to enter data into the scale system.
- Release the nozzle to rest against the side of the SDR.

CAUTION ORTS WEIGHING ACCURACY

Do not let the nozzle rest against the back of the machine, this can affect the accuracy of weighing ORTS (feed refusals).

The system vacuums ORTS from one animal at a time, then moves forward to the next. You may occasionally rotate the reel to prevent feed buildup at the front of the tank. To empty the machine, use the standard unload procedure.

Vacuum bag purpose

It is mandatory to use a vacuum bag during the vacuum process. The bag is housed in a protected cavity between the feed tank and the operator's platform. It serves two critical functions:

- **Safety:** prevents light feed particles from contacting the hot engine exhaust manifold, reducing fire risk.
- **Cooling efficiency:** supplies a clean, high-velocity air stream through the hydraulic oil cooler fins, holding oil temperature near 150 °F during vacuum operation for peak efficiency.

Vacuum bag cleaning

- For routine cleaning, unzip the bag while the fan is running; airflow dislodges debris.

- For deeper cleaning, pull the long toe of the bag out of the SDR (keeping it connected to the fan), unzip the toe end, and let air turbulence clean the interior.

DANGER DO NOT TOUCH THE FAN WHILE OPERATING

Never place fingers or objects near the exhaust opening of the vacuum fan while running. High-speed blades rotate within a few inches of the casing perimeter and can cause serious injury. No body part or tool should enter the fan housing during operation.

Post-operation care

- Remove all vacuum accessories and hang them on a wall to prevent damage.
- Protect the black 5" vacuum hose: avoid rubbing against the SDR, and never drive over the hose.

Replacing the vacuum bag

Ensure the ignition is OFF before beginning.

- 1 Remove old bag.** Use a 5/8" nut driver to loosen the stainless-steel clamp. Remove the old bag by grasping it from the inside to protect your hands from the hydraulic cooler fins.
- 2 Install new bag.** Center the new bag in the cavity, open its zipper, and from inside the bag attach it to the exhaust port of the blower. Push the neck up generously over the metal ridge around the port; the elastic edge helps hold it while you install the clamp.
- 3 Position & tighten clamp.** Place the clamp over the bag before attaching to the port. Rotate so the hex-head screw aligns with the toe of the bag, on the left side of the port facing away from the screen door (the screw will not be visible during tightening). Tighten securely with a 5/8" nut driver, avoid a screwdriver, as the nut driver gives better control and torque.

SECTION 7

Scale Indicator & POINT System

Weighing hardware and the move to the Scale-Tec POINT indicator

NOTE SCALE SYSTEM IN TRANSITION

Data Rangers purchased before June 2026 may use different scale indicators, such as the M1015 or the Digi-Star EZ3410. As of June 2026, Calan has moved to the Scale-Tec POINT indicator. Contact Calan for guidance on the indicator installed on your unit.

POINT scale indicator (Scale-Tec)

POINT is a rugged digital scale indicator that pairs with a mobile app for calibration and configuration. The reference below summarizes the Scale-Tec POINT Quick Start Guide (7602008-REVD).

Package contents & requirements

- POINT unit, adapter module, and Quick Start Guide.
- Tools: #4 Phillips screwdriver.
- A mobile device (Android 7.0+ or iOS 12.2+) is required for initial setup.

Setup overview

- 1 Assemble units.** Slide the adapter module into the rails on the back and bottom of the POINT unit; tighten the 4 captive screws with a #4 Phillips.
- 2 Choose a mount.** POINT mounts three ways, Rail Mount, V-Plate Mount, or Ram Mount. Use the configuration that matches your hardware.
- 3 Cable connections.** Plug the power and load-cell cables into the adapter module, matching the connector configuration for your module (DT6, AMP, M12, or Crown). Do not power on until cabling is complete.
- 4 Download the app.** Install the Scale-Tec POINT app from the Google Play Store or Apple App Store; register and log in.
- 5 Power on.** Press the power button. Press and hold 3 seconds to power off.

- 6 **Zero the scale.** Press and hold the Zero button for 3 seconds.
- 7 **Activate & calibrate.** Connect your profile to the POINT unit through the app and follow the on-screen prompts to complete calibration.
- 8 **Firmware.** After connecting, the app notifies you of available firmware updates, follow the prompts to install.

WARNING BATTERY WARNING

Never charge the vehicle/tractor battery while POINT is connected to a power source. This will void your warranty.

NOTE GOOD TO KNOW

Internet (cellular/WiFi) is required for initial setup only, POINT does not need internet to function in the field. If the unit displays LOAD or UNLOAD at power-up, press the square stop button to enter Gross Mode.

NOTE SUPPORT

Calan is a distributor of the POINT and takes support calls. For help with any indicator, current or legacy, contact Calan for guidance on the unit you currently have, or search for information online.

CalanIQ integration roadmap

POINT is the foundation for tighter integration with CalanIQ, including automatic weight capture that reduces manual recording during feeding and ORTS collection.

CAUTION NOT YET PRODUCTION-READY

CalanIQ integration and automatic weight capture are in development and are not released for production. As part of each Data Ranger build, Calan will stage and prep the POINT scale for research use so your facility can begin working with it now. Contact Calan for the current status and to plan your deployment.

SECTION 8

Maintenance Schedule

Routine checks to protect accuracy and service life

This schedule is a general guideline. Environmental conditions such as temperature, humidity, dust, and exposure to animals may require more frequent inspections. Refer to the Briggs & Stratton engine manual for engine-specific schedules.

After first 5-10 hours

- ☐ Change engine oil.
-

Daily

- ☐ Check engine oil level.
 - ☐ Check engine fuel level.
 - ☐ Clean the area around the muffler and controls.
 - ☐ Remove any accumulation of dirt or foreign material that may restrict engine cooling and air intake.
 - ☐ Carefully remove residual feed with a brush or compressed air. On vacuum-equipped units, do not direct compressed air into the vacuum gauge port at the top-left of the tank, which may damage the gauge.
 - ☐ Inspect the side shield for interference between the weighing and non-weighing frames; adjust as needed.
 - ☐ Inspect the tank liner and retainers for looseness or damage. A loose or bent retainer may let feed lodge behind the liner and cause damage. Replace a torn or compromised liner.
 - ☐ Inspect the paddles and mixing/discharge components for damage or missing hardware; tighten or replace as needed.
 - ☐ On vacuum-equipped units (or if vacuum pressure drops), inspect all vacuum seals for leaks or wear and ensure the discharge door seats against its gasket.
-

Weekly

- ☐ Check hydraulic oil level on the gauge.
- ☐ Grease all grease fittings with multi-purpose grease (see grease-point photos below).
- ☐ Check tire pressure: rear 90 psi, front 50 psi. Adjust for seasonal/climate changes.
- ☐ Inspect the rubber scrapers inside the tank for torn or missing sections.
- ☐ If vacuum-equipped, inspect the vacuum bag for holes or tears; replace if necessary (bags may be washed if in good condition).

Monthly

- ☐ Clean or replace the air filter as needed.
- ☐ Inspect roller chains for linkage, tension, and lubrication.
- ☐ Perform a calibration: with the engine OFF, zero the indicator; push high on the weighing frame several times; the indicator should return to zero or within ~0.2 lb / 0.1 kg. If it fails, inspect for interference between the weighing and non-weighing frames (bent panels or lodged feed).
- ☐ If vacuum-equipped, check the rubber edge protector at the hose end; replace if damaged.
- ☐ If vacuum-equipped, inspect the discharge elevator door and gasket for rips or tears that could cause vacuum leaks.

Annually

- ☐ Change engine oil (or per hours in the engine manual).
- ☐ Check muffler and spark arrester.
- ☐ Change the hydraulic oil filter.
- ☐ Replace air filter.
- ☐ Replace spark plug.
- ☐ Replace fuel filter.

- ☐ Clean the vacuum cooler system with a low-pressure water hose, taking care not to damage the cooling fins.

Grease points

SECTION 9

Storage Guide

Preparing the machine for periods of inactivity

Proper storage preserves performance, extends lifespan, and prevents damage during downtime, between seasons or for extended periods.

Fuel system

- Drain the fuel tank completely for long-term storage.
- If fuel remains, add a stabilizer to prevent degradation.
- Shut off the fuel supply and run the engine until it stops, to avoid carburetor deposits and vapor buildup.

Battery care

- Use a trickle charger to maintain battery health, or remove the battery and store it in a cool, dry place.

Cleaning

- Wash the exterior and interior tank to remove feed residue.
- Clean or remove the vacuum bag, ensuring no feed remains inside; remove it entirely if possible.

Maintenance

- Grease all bearings and grease points (see maintenance section).
- Inspect for damaged, loose, or worn parts, especially tank mixing components and the liner, and replace as needed.

Scale indicator

- Remove the scale indicator and store it in a safe, dry location such as an office to protect the electronics from moisture and dust.

Rodent prevention

- Inspect the storage area for rodent activity.
- Place traps or deterrents around the unit as needed.

- Avoid storing feed or organic material near the Data Ranger.

SECTION 10

Emergency Push / Tow

Protecting the hydrostatic drive when moving without power

If it becomes necessary to push or tow your hydraulic-drive Data Ranger, follow these steps to let hydraulic fluid circulate and prevent damage to the hydrostatic drive.

WARNING LOOSEN THE BYPASS PLUG FIRST

Before pushing or towing, loosen the bypass plug on the hydrostatic pump. This allows hydraulic fluid to circulate freely and protects the drive components.

- 1** **Locate the bypass plug** on the side of the hydrostatic pump (see marked location at left).
- 2** **Loosen the plug** with a 5/8" wrench, 1-2 full turns counterclockwise. It is spring-loaded; do not remove it completely.
- 3** **Push or tow** the SDR at slow speeds, short distances only.
- 4** **Retighten the plug** securely once in position, then resume normal operation.

SECTION 11

Troubleshooting

Common adjustments and fixes

Adjusting paddle clearance

If the rubber paddles wear prematurely, or the machine “jumps” when the paddle rubber contacts the front stainless-steel retainer, the paddles may be too close to the tank.

- 1 Loosen the two carriage bolts on each side of the paddle, and the three carriage bolts on the brace behind the paddle.
- 2 Slide the paddle backward to increase clearance so the rubber makes less contact with the liner while still cleaning effectively.
- 3 Tighten all bolts securely to prevent movement during operation.

CAUTION ADJUST CAREFULLY

Incorrect positioning or loose paddles can damage the stainless-steel retainers, which are difficult and time-consuming to replace.

Conveyor jamming

If the conveyor sticks, it may be catching on the rounded edges of the upper pan, often caused by hay chop length being too long, or improper chain alignment/tension.

- The chain is adjustable on both inside and outside. If it favors one side too heavily, it may catch the upper pan edge.
- If jamming occurs in reverse, the issue is likely the outer portion of the upper pan.
- If the chain favors the outer side, ensure it is not over-tightened.

NOTE KEEP CHAINS TRUE

Proper chain alignment and tension prevent wear and reduce downtime. Inspect and adjust regularly.

SECTION 12

Conditions of Warranty

- American Calan, Inc. warrants equipment for one year from the date of delivery, or from commissioning if applicable.
- Faulty equipment shall be returned to our factory or agent for repair or replacement at the discretion of American Calan.
- Shipping cost of replacement parts reported within 10 days of receipt is paid by American Calan; after that period, by the customer.
- Labor costs for installing replacement parts are paid by the customer.
- The warranty is valid if installation and use instructions have been followed. Failure to observe instructions may invalidate the warranty at American Calan's discretion.
- Equipment is sold for the purchaser's use only. Resale invalidates the warranty, except where an authorized agent resells new equipment to the final user.
- Equipment and hardware are intended for direct customer use, not for resale.

Exclusions

- Unauthorized modification of equipment hardware that causes electrical harm or damage to hardware and/or animals.
- Neglect or misuse, abusive force or intentional conduct intended to damage the product or create harm.
- Unauthorized repairs or replacement parts not provided by Calan.

SECTION 13

Support & Contact

How to reach us

For service, parts, or questions about your Data Ranger, including the POINT scale indicator, contact American Calan. Calan is a distributor of the POINT and takes support calls. You can also find POINT information online.

American Calan, Inc.

454 Jenness Pond Rd, Northwood, NH 03261

603-942-7711

www.americancalan.com

Scale-Tec (POINT manufacturer)

POINT scale manufacturer and online resource

www.scale-tec.com

NOTE COMPANION DOCUMENTS

This manual pairs with the Data Ranger Illustrated Parts Catalog. For engine service, refer to the Briggs & Stratton Vanguard 16 HP engine manual.

American Calan, Inc. · 454 Jenness Pond Rd, Northwood, NH 03261 · 603-942-7711 · www.americancalan.com

Data Ranger Model 542 Operations Manual · Pairs with the Illustrated Parts Catalog