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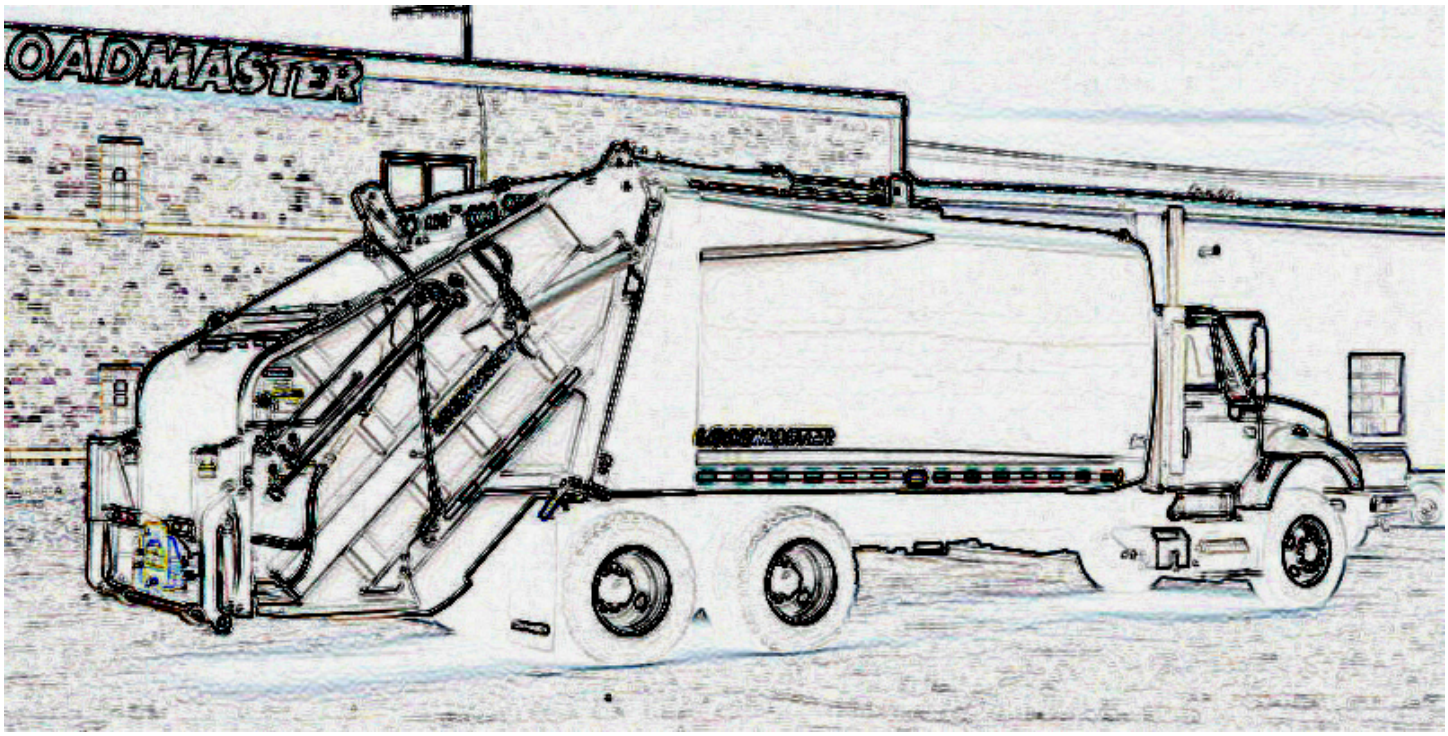

EXCEL SERIES

Maintenance & Repair Manual

General Body & Hydraulics

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Maintenance & Repair…general "body" and "Hydraulics"

Hydraulics Manual…w/ Hydraulics Repair

Schematics…Hydraulics & Electrical

June 2007

This is the Maintenance/ Repair manual for the "Excel".

It includes general body Maintenance & Repair AND is the Hydraulics Manual as well.

The information contained in this Manual applies ONLY to the EXCEL.

See other manuals for other LOADMASTER products.

For the Excel Product…

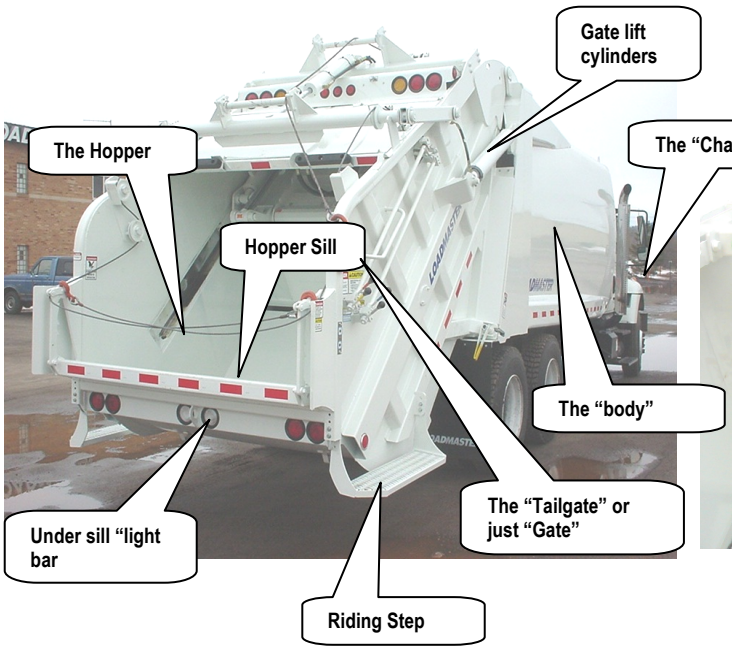
There are 3 manuals for a *complete set*:

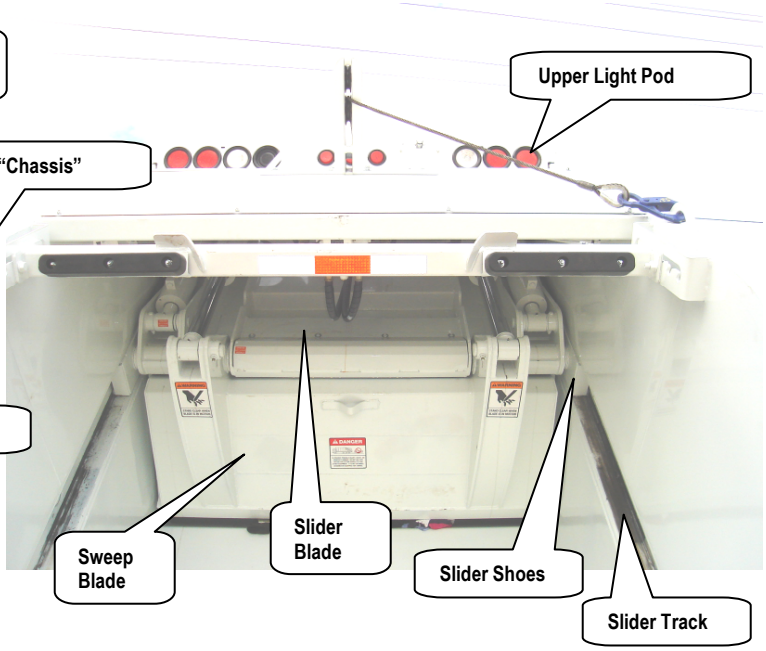
1- the OPERATOR'S MANUAL *with* Preventive Maintenance Manual…*which also includes some schematics.*

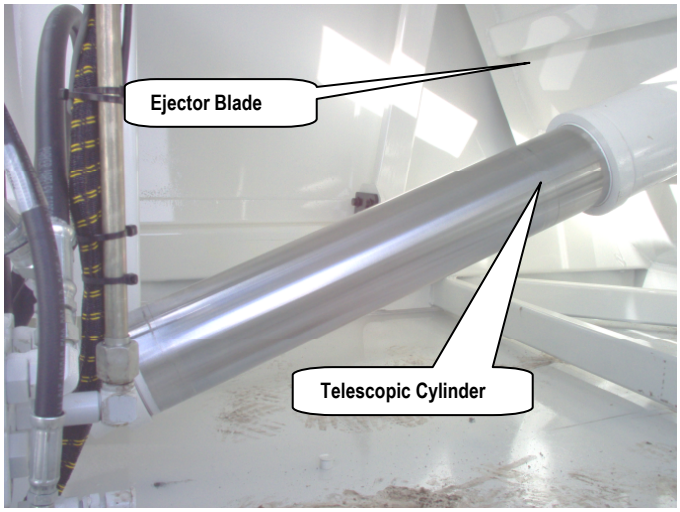
2- The Parts Manual

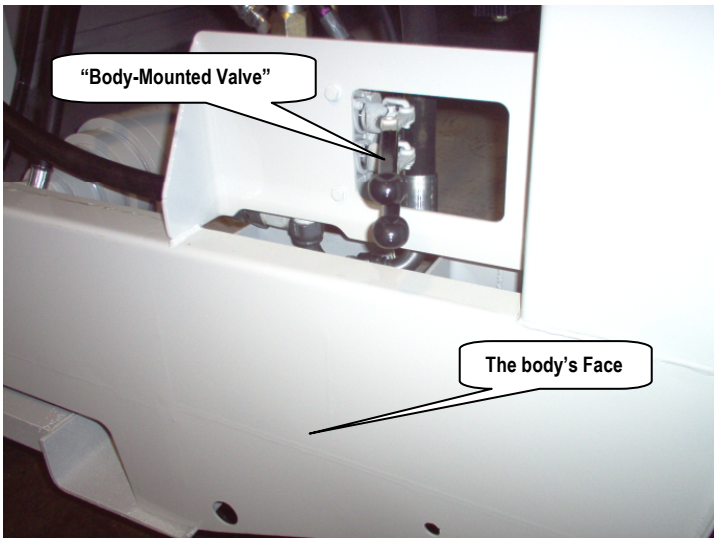
3- **This** Maintenance & Repair Manual
Which includes the Hydraulics

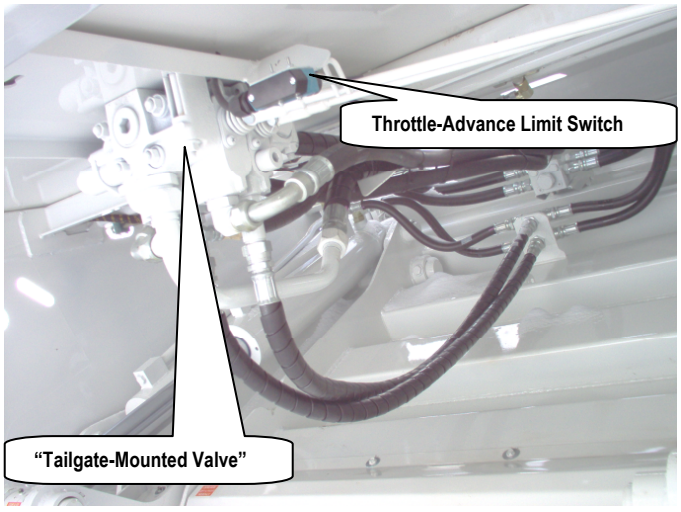
Some NOMENCLATURE…the "words" Loadmaster uses…lingo to "talk"

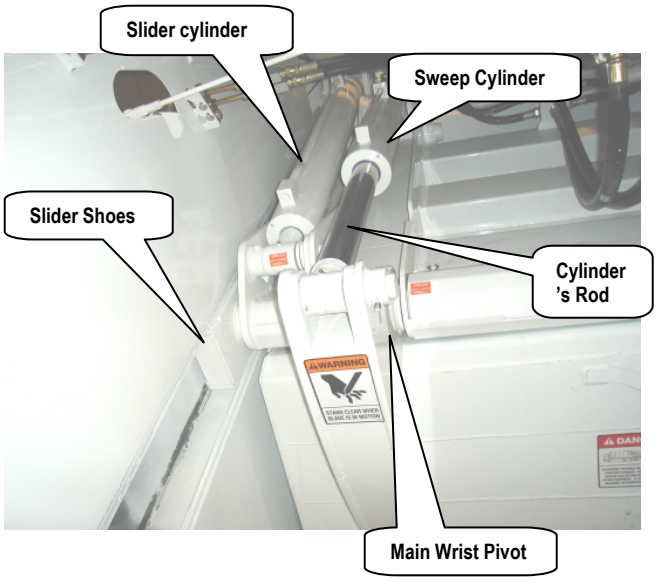












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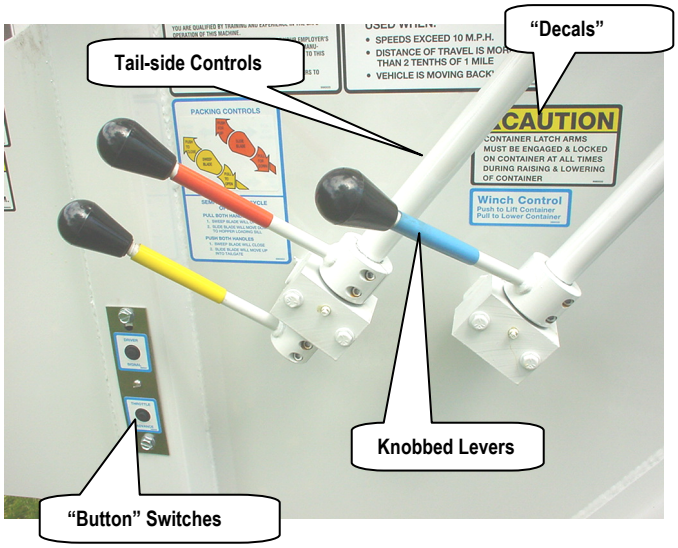
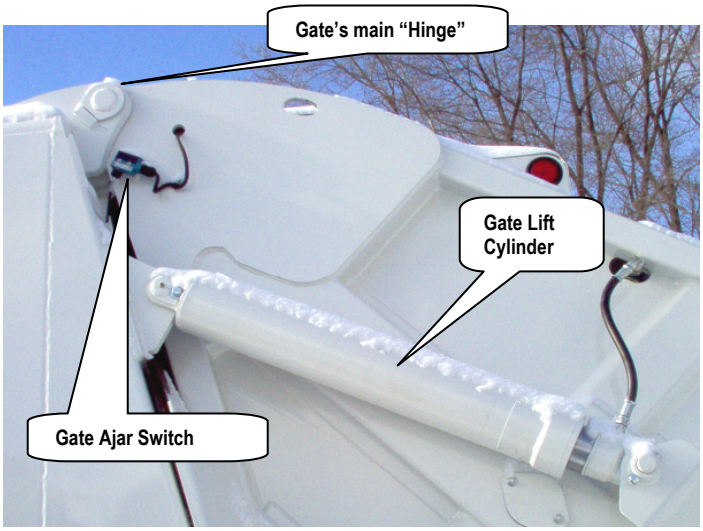
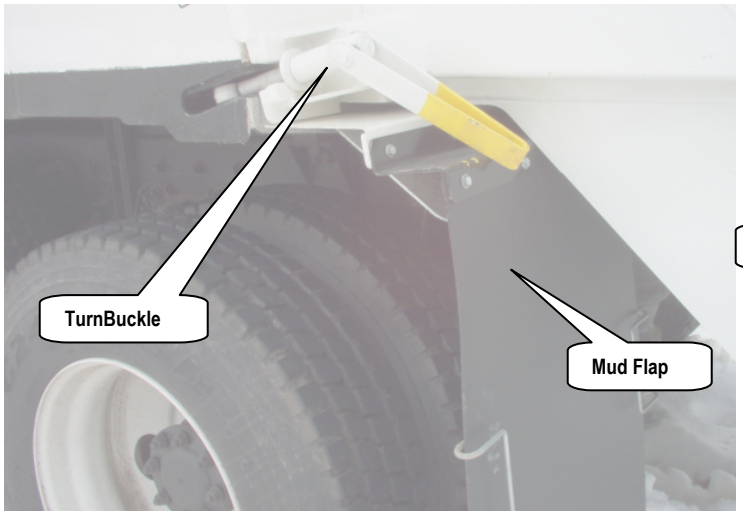
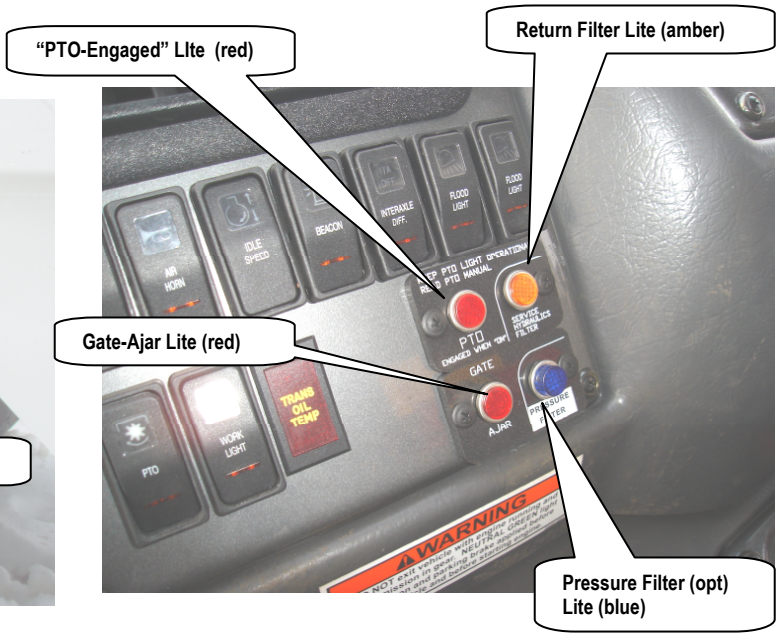
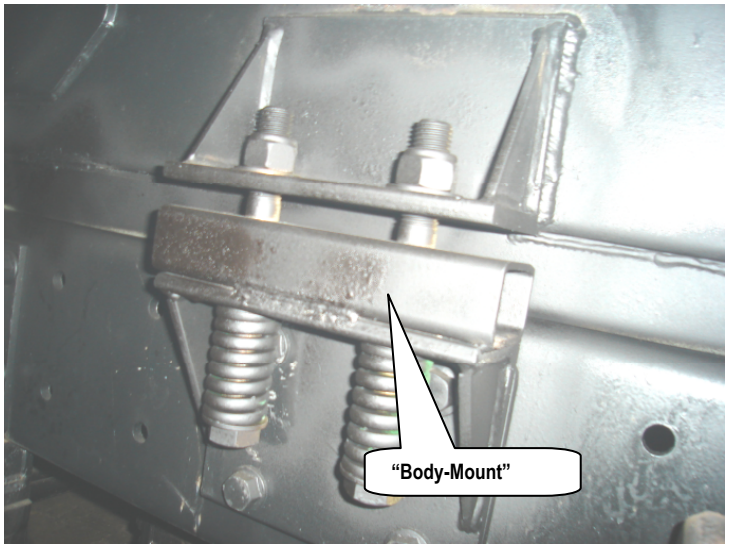
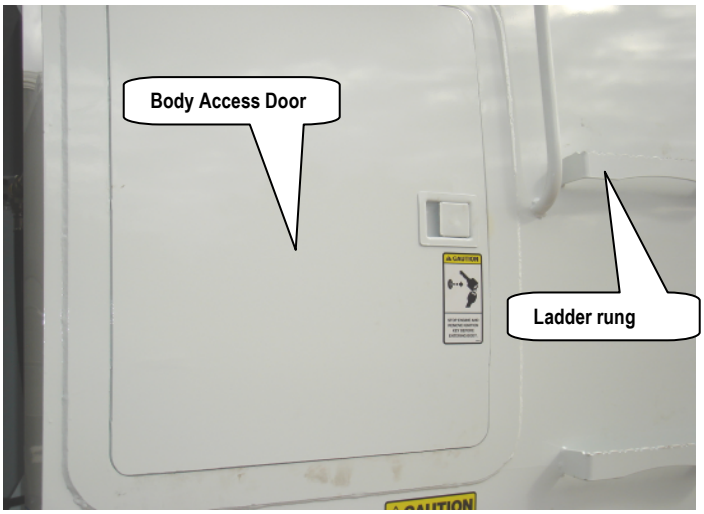












Section 01 rel june 28, 2007
HOW IT WORKS..THE HYDRAULICS

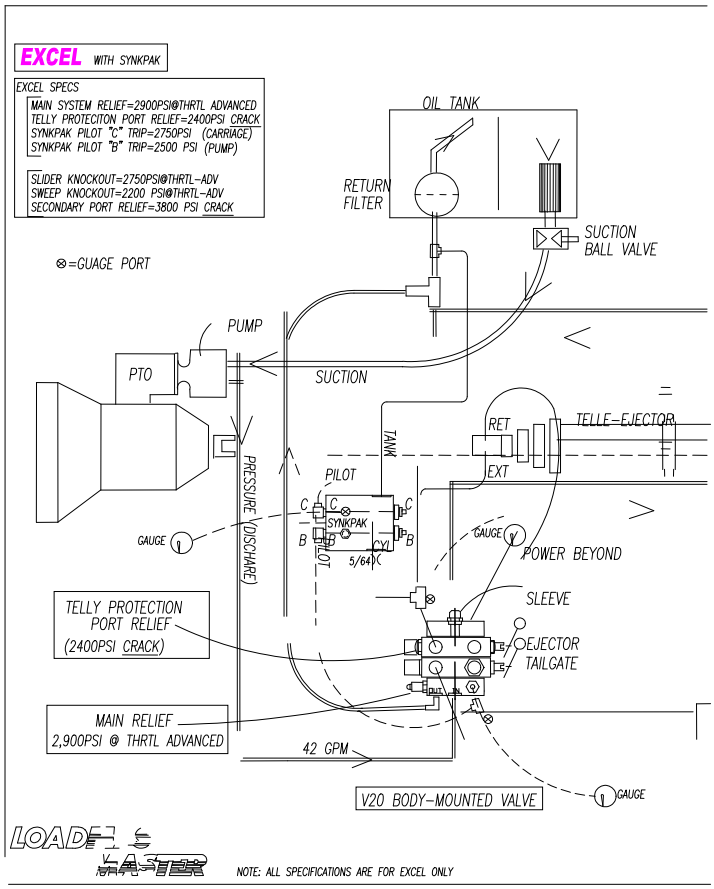
This section of the manual is an overview of the various individual hydraulic components and how they all work together as a "system". Reading this section will have value to you because it will increase your overall understanding of "how your EXCEL works", which will increase your problem solving skills and speed up any troubleshooting

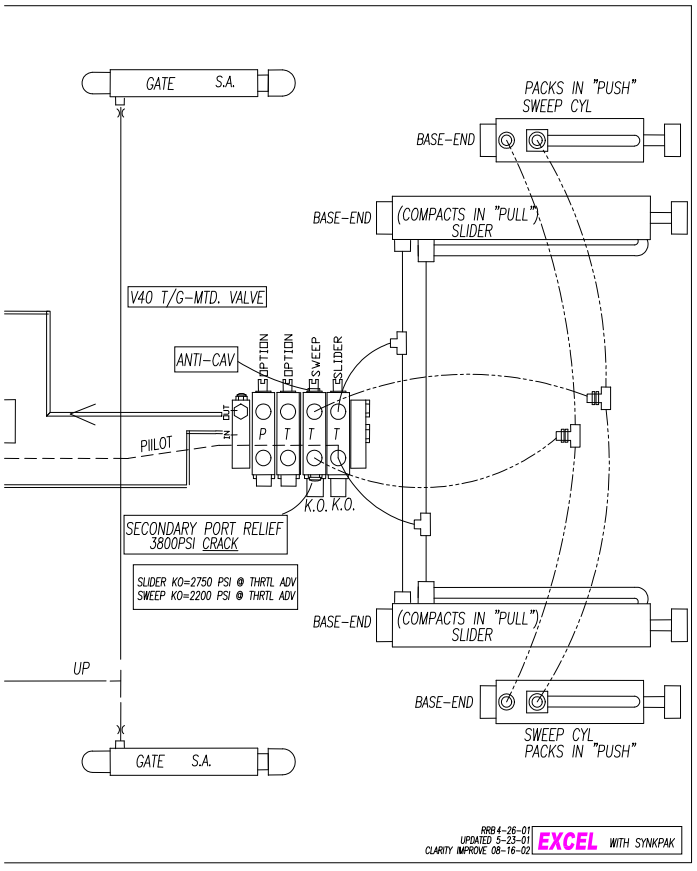
The components... Most EXCEL's are equipped with a CHELSEA *PTO*. When the PTO is engaged on, the pump will begin to rotate. The PTO may have a drive ratio of 1:1.3 (ratio may vary per *specifc* chassis). This means if the diesel is rotating at 1200 RPM, the pump itself will be rotating at 1530 RPM. The EXCEL pump is typically a COMMERCIAL INTERTECH P365 SERIES. This is a modern "journal bearing" gear pump that handles higher speeds and pressures well. Since it is a simple gear pump, any time the pump is rotating it will create flow in proportion to its rotational speed (RPM). The EXCEL uses a 6.4 cubic inch per revolution pump. The circuit therefore is about a 42 GPM flow at a *diesel* speed of 1200 RPM.

The *body-mounted valve* is a 2-spool GRESEN V20. The lowermost cover is the *inlet cover.* The inlet cover is closest to the pump and directly connects to the pump by the *pump pressure hose.* The inlet cover holds the *main relief* and has a *gauge stem* from which all of your pressure gauge readings will be recorded. The EXCEL'S main relief setting is 2900-2950 psi @ throttle advanced. The inlet cover also connects the *auxiliary return hose* to tank. This auxiliary return provides a path to tank for the body-mtd valve's functions, since the outlet of the body-mtd valve has a *power beyond sleeve* that allows pressurized fluid to be available downstream to the tailgate-mounted valve.

The first spool section is the *tailgate section,* which is a single-acting (tailgate is powered up and gravity down) spool in the case of the EXCEL. This work section has *no* port devices installed (such as a port relief; *no* port reliefs used in tailgate section).

The second spool section (highest from body floor) is the *ejector section* which known as double acting. The ejector *telescopic cylinder's* extend (base-side) workport has a fixed port relief set at 2400psi ("crack flow"). This relief will relieve (@2400 psi) during route compaction only during the telescopic's smallest stage (aka, "plunger" stage…the *first* stage to drift closed during the ejector's on-route "automatic drift" (towards the cab).





The EXCEL uses a valve called the *synkpak* valve to control the ejector blade/tellescopic cylinder's *automatic* drift forward (towards the cab) on the route. See the very next topic labeled "EXCEL SYNKPAK" for a detailed description of how the Synkpak works.

The final section of the body-mounted valve is the *outlet cover.* The *power beyond sleeve* is mounted into the *outlet cover* of the body-mounted valve. The *PB sleeve* allows for feeding of pressurized fluid downstream…through the *roof tubing* and to the *tailgate-mounted valve.*

The *tailgate-mounted valve* controls the blade actions and most of the optional equipment, such as a roof mounted "reever" or the "kick bar". It is a PARKER VG35 valve that usually has 3 or more working sections and hangs from the tailgate's roof. (The sections with the "spools" are called "work sections".)

The first section of the tailgate-mounted valve is the *inlet cover.* This inlet receives the flow from the roof mounted pressure tube. It also is the origin of the *return line* since the cover on the other side is a plugged *turnaround outlet cover.*

The next sections are the option work sections such as the "2-10 reever" and the "kickbar". Work sections have "spools" which are spring centered and are manually shifted in or out to direct flow to a desired function. Typically there are no workport devices used for options on the EXCEL (see Kart Dumper exception later).

The *blade* section closest to the pump is the *sweep blade work section*, and it always comes next, (which is "upstream" of the slider blade work section). This spooled section has a *knockout positioner.* This knockout postioner is a device that is controlled by one pressure "'trip" setting for both directions of spool shift. When the spool is manually shifted, the KO mechanically *holds* the spool shifted until the next time the pressure *rises* to its setting, whereupon it releases the spool and the spool knocks-out to centered-neutral position. This pressure rise typically occurs when the cylinders "bottom-out". This sweep section has a port relief mounted to the *sweep cylinders* base-side, known as the *secondary port relief.* This secondary port relief can allow the sweep blade to "unwrap" a little if the pressure induced should exceed "critical" structural loads. This important port relief protects the structure from *excessively* high loads that could otherwise cause structural damage or componentry damage.

Opposite the *secondary port relief* (at the opposite work port) is an *anticavitation check* that allows some "makeup oil" to go into sweep's rod-side during this slight blade unwrap. Whenever the secondary port relief is actually relieving, this anticavitation check precludes powerful suction effects that could extrude the sweep cylinder's piston seals.

The last working section (the one with the *throttle advance switch* trigger) is the *slider blade section.* This slider blade section has no port mounted devices. The slider section also has a *knockout positioner* directly coupled to one end of its spool.

The two hopper blade work sections have an internal flow path known as "tandem center". When a V40's tandem center spool section is shifted to do a function, it blocks the valve's power core on the *downstream side.* This characteristic is important in terms of proper blade *sequence.* Since the start of the first half and second half of the semi-automatic blade cycle is the "simultaneous" shifting of *both* blade spools, the *sweep blade* will always move first since its spool is *tandem center* and it is *upstream* (closest to pump) of the slide blade spool.

The last section of the tailgate-mounted valve is the *outlet cover.* In the case of the EXCEL, this cover's outlet port is actually plugged but this section is casted to be a *turnaround* cover. The actual return hose is then connected to an outlet port of the *inlet cover*.

Leaving the tailgate-mounted valve, the oil flows through the *roof return tube* to the *return filter.*

The return filter is a 5-micron (MICROGLAS) with a 25 PSI bypass valve. It is a in-tank element and has a *condition indicator* affixed to the head casting.

The *hydraulic reservoir* if fully dressed with a *level gauge with thermometer, magnet type drain plug, filler/media breather,* and *cleanout cover.*

The suction side of the tank has a 100 mesh replaceable *suction filter.* It has a 3-PSI bypass valve built into it. The tank has a baffle that separates the suction side from the return side to promote settling of dirt and entrained air.

The open loop...When no functions are being performed (all valve spools in their centered, neutral position); the oil flow follows a path known as the "open loop". It originates at the oil tank's *suction line filter*, through the *suction hose*, to the *pump*, through the pump *pressure hose*, to the *body-mounted valve*, up the *roof tube pressure*, to the *tailgate-mounted valve*, back through the *roof return tube*, through the *return line filter* and back at the *tank* again. As long as none of the spools are shifted, the oil will flow in this simple open loop.

The tailgate up/down function... The EXCEL's tailgate is power-up and gravity-down (known as "single-acting"). The lowermost spool section of the body-mounted valve is the "tailgate" section and is plumbed to the tailgate lift cylinders.

When the hand lever is pulled *outward* the spool itself also moves outward and the pump's output flow is connected to the gate cylinders "up" port (which is the "base-end" cylinder port). At this very same moment, the same spool will also connect the "rod-side" ports to tank. So the gate will "raise". If the hand lever labeled tailgate is pushed *inward*, the tailgate cylinder will connect to tank and the gate will lower by the force of gravity.
Since the tailgate spool section has no *port* relief at all, its *only* pressure-limiting device is the main relief of the body-mounted valve.

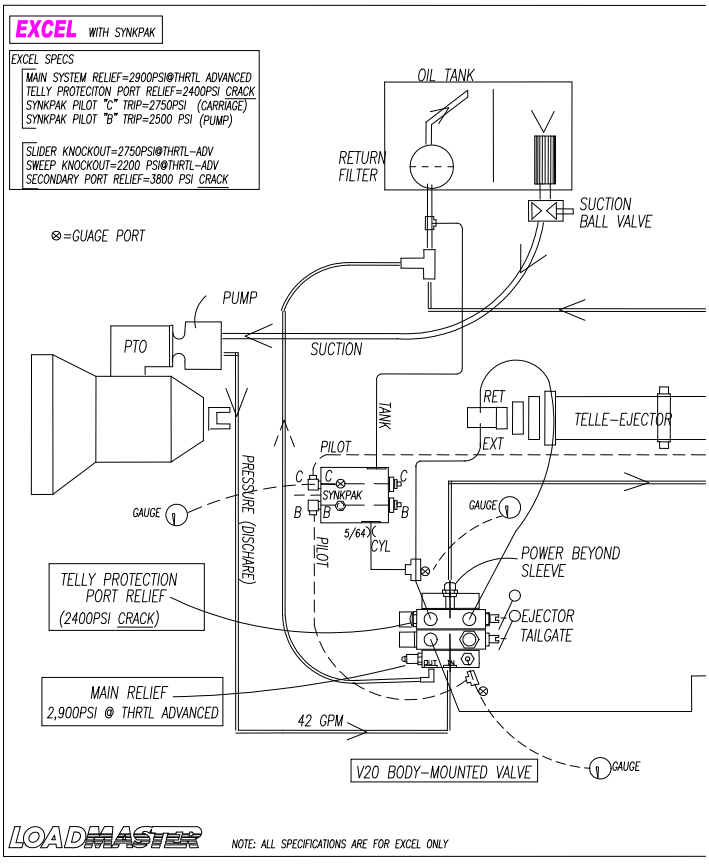
The tailgate cylinders have orifice restrictors built into each port (at the cylinder itself). This purposeful restriction precludes the tailgate from "over-running" the pump flow when lowering the gate, allowing the gate to lower smoothly.

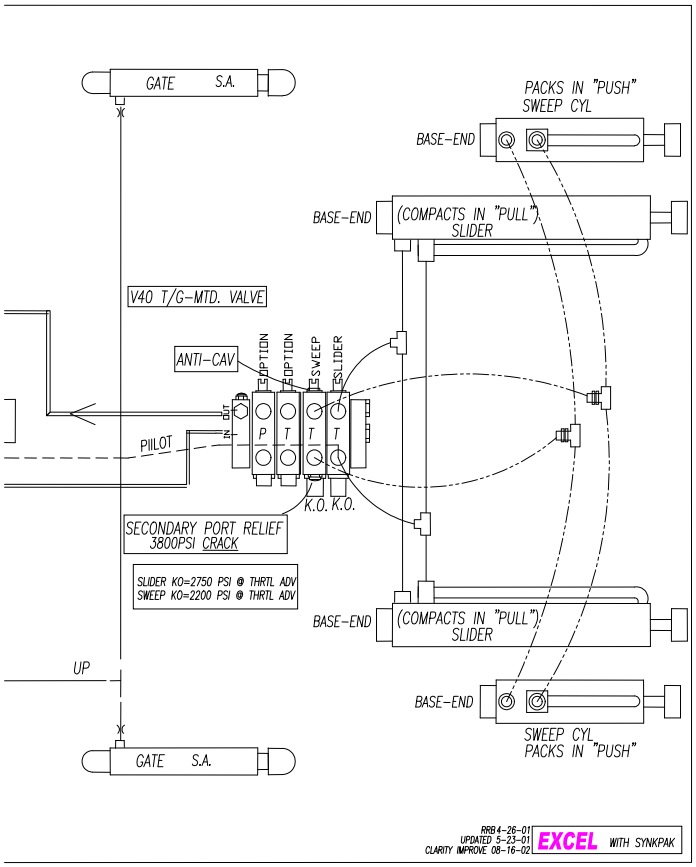
Never stand or cross underneath a raised tailgate!! Tailgate may unexpectedly and suddenly fall causing serious injury or death.

The auxiliary return hose provides the return path to tank during tailgate raising or lowering.

The ejector function... The *telescopic cylinder* actuates the ejector blade. The upper work section of the body-mounted valve controls the ejector's telescopic. When the telescopic is fully *extended,* the ejector blade is fully rearward, towards the tailgate. The ejector blade does two jobs. When the tailgate is fully raised at the landfill or transfer station, the ejector blade is used to "push-out" the payload. This job requires the telescopic cylinder have available 2000 PSI @ throttle advanced.

When the EXCEL is on the route (tailgate fully lowered and latched, of course), the ejector blade starts parked at rear of body and then slowly automatically drifts forward (towards cab) as the garbage is collected and the payload builds. This *drift* will occur automatically as a pressure head is continuously maintained at the *extend* side of the telescopic. This second *on-route* job is to provide a resisting, yet drifting, front surface for the hopper blades to compress garbage against. This resistance is created by hydraulic pressure on the extend-side of telescopic as the telescopic *retracts* toward the cab (blade drifts forward towards the cab). This head of pressure is controlled by the action of the *synkpak* valve (see next subject, labeled EXCEL SYNKPAK for description of how it works).





The compact blades function… Two of the *tailgate-mounted valve's* working sections controls the two compaction blades. The blade that pivots (rotates) is called the *sweep blade.* The blade that slides in the track channels is the *slide blade.* If the tailgate-mounted valve has more than two working sections (the sections with moveable "spools"), the extra work sections are for the "optional equipment". Work sections for the "options" are always "in front" (upstream; closest to the pump) of the blades work sections.

The sweep blade's work section is always upstream of the slider blade's work section. These two blade sections have a casted flow path known as *tandem center.* A V40 "tandem center" work section has the "power core" internally blocked *downstream*…this means that the shifted spool *closest to the pump* (the upstream sweep section) will consume *all* of the available pump flow with any downstream spools that are also shifted (the slider spool) getting no flow *until* the upstream section (the sweep) *shifts back to neutral.*

This creates a simple function "sequencing" effect. Since the correct operator's method of cycling the blades is to shift and release *both* spools' hand levers simultaneously, the sweep blade rotates (sweeps) *first* while the slide blade sits motionless waiting for the sweep's spool to knock-out to neutral. At the very moment the sweep's spool automatically shifts to neutral, all of the pump's flow is then directed to the slider blade's cylinders and the slider blade begins to move.

As mentioned earlier, both the sweep and the slider work sections have knock-out positioners. These knockouts, when teamed with the plumbing scheme and the "tandem" center section castings, provide for the sequencing of the semi-automatic cycling of the compaction blades. The blades must *both* sequence in their specific order and they must move distinct and separate of each other to be functioning normally.

The knockout positioner is the device that holds the blade spools shifted until the hydraulic pressure in that particular section *rises* to the knockouts *pressure setting.* When this setting is reached, the spool is released and it shifts to neutral (spool centered) position. The pressure setting specification for the EXCEL is…sweep knockout spec is 2200 PSI @ throttle advanced and the slider knockout spec is 2700 PSI @ throttle advanced. The pressure *rise* typically occurs when each pair of cylinders bottom-out at the end of their stroke.

Having said all of this, the compact blades do a semi-automatic compaction cycle as follows…The cycle begins with both spools (via hand levers linkage controls) manually simultaneously shifted outward and released. Both knockout positioners grab and hold the spools shifted. The *sweep* cylinders begin to move first with all of the pump's flow going to the sweep cylinders. (The sweep's valve section is closest to the pump and its internal casted passages are "tandem-center", which means all of the pump oil goes to its own workport and nothing goes downstream.) The sweep blade continues to rotate until its cylinders complete their stroke and they bottom-out. This bottoming-out causes a rapid rise in sweep pressure and the sweep knockout will knockout the sweep spool to *neutral* centered*.* Meanwhile, the slider spool has been held shifted with no pump flow available to it. At the very moment the sweep spool knocks-out to neutral, all the pump flow is *now* available to the slider spool which begins directing the flow to the slider cylinders. The slider blade *now* begins to move and it continues to move until its cylinders bottom-out and the pressure rises to its setting. The slider knockout then knocks the spool to centered neutral and the first *half* of the semi-automatic blade *cycle* is complete. *Both* spools are now at their centered neutral position. The blades are said to be stopped at their cycle *interrupted* position. This is correct and normal functioning.

The second half of the semi-automatic cycle begins *(after the operator visually assures it is safe to do so)* with both hand control levers being pushed inward simultaneously. The sweep blade again moves first (its valve section is still upstream of slider, of course) and the second half of the cycle occurs the same way but in the opposite direction of the first half.

The secondary port relief system... As mentioned earlier, the sweep work section has a port relief on the sweep cylinders extend-side (cylinder's base-end) and an anti-cavitation check opposite of it (on the retract-side; the rod-side). Acting together, these two port mounted cartridges are a *system* that can relieve the portion of the structural loads that are above allowable amounts. (This would be seen as a slight *unwrapping* of the sweep blade when the slider blade is nearly all the way up). In some applications this situation will rarely occur and in others it may sometimes occur when the EXCEL body is near its full capacity.

The EXCEL sweep's secondary port relief is set to 3800 PSI @ "crack". (Crack being 2 GPM).

When the slider blade is travelling upward ("compacting" the garbage), the sweep blade has already been fully rotated down to "capture" the hopper's garbage and the sweep worksection will be in its centered neutral position. The compacting action of the slider blade travelling upward will necessarily *induce* a hydraulic pressure on the sweep cylinders base-side. The *only* relief located to relieve the excessive *portion* of this induced load is the relief on the cylinder *ports* side…the secondary port relief. (This is because the sweep spool is in its centered neutral position and the spool itself

blocks any inlet cover mounted relief from "seeing" the induced pressure on the work port side).

The anti-cavitation check simply allows for oil to be drawn into the sweep cylinder rod-side *during* any port relieving that may occur. This prevents any powerful *suction* effect from damaging cylinder seals.

This secondary port relief *system* prevents expensive component and structural failures by preventing blade loads and pressures from exceeding allowable values. LOADMASTER uses a fixed, non-adjustable secondary port relief that is set to the *correct* value for the EXCEL.

Do not shim adjust any of LOADMASTER's non-adjustable reliefs.

The optional equipment… Most EXCEL'S will have an optional attachment or two. The option work-sections are in the tailgate-mounted valve just upstream of the hopper blades worksections.

These option work sections are simple manually shifted spools that must be held shifted for their function to occur. The "kickbar option", the "2-10 reever", or "winch" may be installed options. They are always double-acting and the work sections may or maynot have port reliefs/orifices. See separate "chart".

Some options require *orifices* to be installed at the tailgate-mounted valves option work sections' work ports (both ports) to reduce the flow. This list identifies which options use work port restricting orifices:

Kart dumper(s)	yes
1-2 option	yes
kickbar	yes
drum winch	no
2-10 reever	no

Optional Regeneration…The "regen" valve is a available *option* that reduces the hopper blades' "total cycle time". It increases the *slider* blade speed in the *downward* (non-packing) direction only. The schematic below is the EXCEL hydraulic circuit with the regen valve installed.

Whenever the EXCEL is equipped with the *regeneration* option…the total hopper blade cycle time can not be allowed to be less than **22-23 seconds**. For example…if you "stopwatch" the total blade cycle time to be, say, 19 seconds…it is ***too fast*** and the diesel's throttle advance must be reprogrammed to a *lessor* RPM until the total cycle time is 22-23 seconds (a *slower* speed of blade movement)! See SEC05 for how to "stopwatch".

Optional kart dumper(s)…If the EXCEL is equipped with kart dumpers, one scheme to supply the hydraulic oil, is to use one of the tailgate-mounted valve's option work sections to control the kart dumper. There will be in-line adjustable orifices installed at both work ports of the "CT worksection" to control the up/down speed of the kart dumper function.

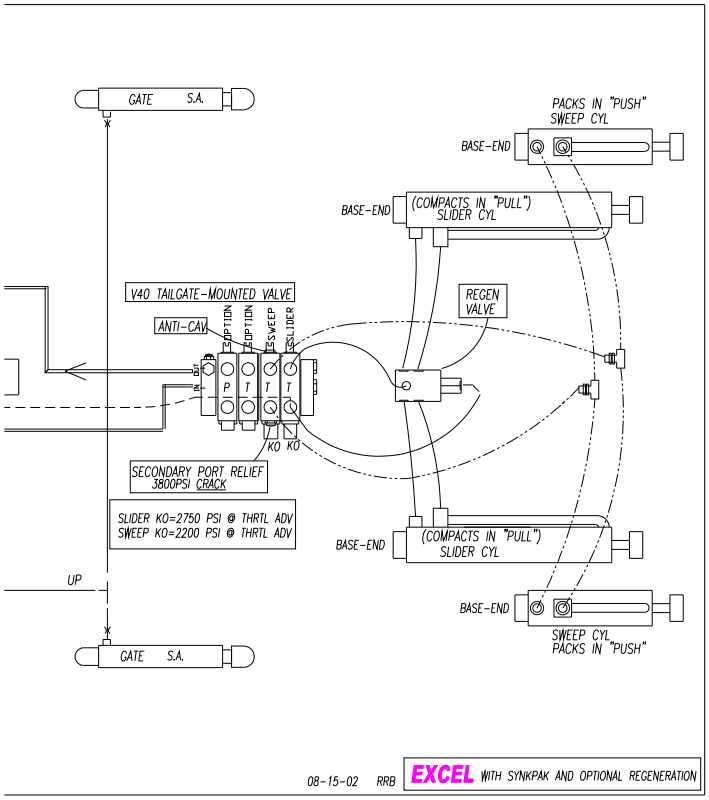
In the case of the EXCEL, there will also be work-port reliefs installed for the kart dumper option.

Cart-tipper up direction=1800 PSI @ crack flow

Cart-tipper down direction=700 PSI @ crack flow

These "port" reliefs are necessary to assure that kart dumper operation does not interfere with functioning of the SYNKPAK valve (which could cause poor payload/densification performance).

The orifice size Loadmaster uses in most cases (for options) is 7/64" diameter drill size.



EXCEL SYNKPAK revision 10-03-02

On the route, the EXCEL's ejector blade must slowly and *automatically* drift forward (towards vehicle cab) in a controlled, pressured fashion to generate good payloads (good garbage densification).

The EXCEL has a valve that controls the ejector blades forward "drift" as garbage is collected and compressed against the ejector blade on the route. This valve is called the "synkpak" valve.

This valve *synchronizes* the slow drifting action of the ejector blade to the *pack* pressure levels occuring at the hopper blades (specifically, the slider blade). The "settings" of this valve are *one* important factor in the EXCEL'S overall payload generation performance.

The synkpak valve consists of *two* sequence valves , in series, built into a aluminum body. Both sequence valves are adjustable. (It is located at the front body face about 2 feet above the "body-mounted valve"…a valve "block" mtd to a bracket). The sequence valves are "cartridge" style, meaning they can be readily unscrewed as a whole *pre-set* unit from the manifold body without needing to tamper with the plumbing connections.

Each sequence valve has a controlling pilot hose…

The upper (physically highest in the manifold body) sequence valve is plumbed to the slider blades "pack" port and is labelled **"C"**. (C=carriage; also called "slider" blade)

The lower (closest to the ground) sequence valve is plumbed to the pump discharge port…sometimes simply called the "pump pressure" hose. Perhaps strangely, this sequence valve is labelled **"B"**…remember **B**ump=pump.

The sequence valve cartridges are BOTH set to the same SETTING of…

C (CARRIAGE) = 2500 PSI
B (PUMP) = 2500 PSI

The synkpak's body is plumbed between the ejector's extend port and the tank. The port marked "CYL" connects to the ejector's tellescopics extend port. The port marked "T" connects directly to tank. Review the schematics. Since the body-mounted valves spool section for the ejector is in its' centered, neutral position (when on-route, collecting garbage), it's work ports are *blocked*. Therefore, the synkpak *controls* the only available path to tank and thusly controls the ejector's telescopic on-route collapse (drift towards cab).

Whenever the *pilot pressure* at a sequence cartridge is less than that sequence cartridge's *setting*…the sequence cartridge will block the to-tank path.

Whenever the *pilot pressure* at a sequence cartridge is greater than that cartridge's *setting*…the cartridge opens.

As mentioned earlier, the two sequence cartridges are in *series.* Therefore ***both*** sequence cartridges must be piloted open before the ejector's tellecopic has a path to tank and can collapse (retract). This means that both pilot pressures must rise to the set trip points *simultaneously*.

Both pilots have guage coupling nipples installed. The **"C"** (carriage; aka slider) nipple is screwed directly onto the synkpak valve and the **"B"** guage nipple is located at the body-mounted valve's inlet cover. A third guage nipple is located at the tellescopic's extend port. See schematic.

A orificed fitting is installed directly into the synkpak's "cyl" port (5/64" dia). When both sequence cartridges have opened, the path to tank is opened and the telescopic will suddenly retract (collapse) just enough to relieve *some* of the force in the garbage bale.

The garbage bale can be thought of as a giant spring that *must be released* just a bit to allow the hopper compaction blades to be able to clear the loading hopper. This orifice assures that this oil release to tank, through the now open synkpak valve, occurs in small controlled amounts. The orifice is therefore important to good payload performance (good garbage densification).

ADJUSTING THE SYNKPAK VALVE

The *only* reason to attempt to adjust the synkpak valve is if your payload performance has been determined to be below normal or the ejector blade is not "autodrifting". Read the OPERATION & MAINTENANCE manual topics related to "generating payload" ***before*** you attempt to adjust the synkpak. Check and *adjust all the other settings* before approaching the synkpak valve.

The most important thing to remember is to *not* adjust the synkpak valve until after you have checked these other system settings (which are, in effect, "timed" to the synkpak's settings…

Check the **system main relief** to be 2900-2950 psi at throttle advanced. (EXCEL spec)

Check the **slider knockout** to be at 2700-2750 psi at throttle advanced. (EXCEL spec)

Replace the **sweep port relief** to be 3800psi crack (*if* excessive sweep blade unwrap occuring). (p/n 8800605)

Now run the unit for a week or two while monitoring the scale weights of the true *full* loads and confirm "good" payload performance.

If the payload still seems to be below normal, only then turn your attention to the synkpak valve.

To dial in your two synkpak settings would require monitoring 3 pressure gauges *while the unit is on the actual route* and body nearly full of garbage. Since this is highly dangerous (be aware vehicle runovers and traffic related accidents are serious refuse truck accidents), LOADMASTER does not recommend this method. Trained personnel only should perform this type of monitoring.

After you have checked all of the other relevant, payload generation factors…use the simple turn-of-the –screw method to reset the synkpak valve. Turn **both** synkpak adjusters inward **1/8 TURN**. Then place the truck back in service and monitor loads for another week or two. Turning *both* synkpak adjusters inward (loosen jamb nuts and remember to re-jamb) increases the resistance of ejector blade and therefore will increase your payload density. Always turn the two adjustments in unison…if you turn **c** inward 1/8 turn, then turn **b** inward 1/8 turn (exactly)…unison.

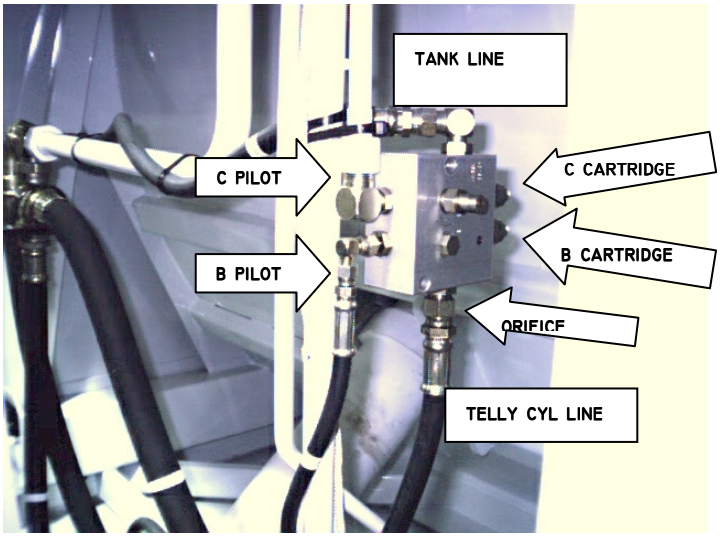
If after monitoring/weighing several true, *full* (not partial) loads and the payload performance is still not acceptable, you can make another **1/8 TURN** "in" and repeat the weighing of true, *full* loads (not partial loads). This is ¼ total turns inward. If payload performance is then still *not* corrected, call LOADMASTER and order the two cartridges from LOADMASTER in new, benchset condition. Replace the **c** and **b** cartridges correctly…remember the cartridges will look the same but have different settings that you will not have to touch.

The synkpak valve's two adjusters are fairly *sensitive*…small 1/8 turns of adjuster can make big changes in payload generation and ejector blade behavior. Do not overadjust. If you dial-up too much ejector drift resistance, the ejector will not *automatically* drift forward towards the cab. This is a functional defect…the ejector must drift automatically. (If the operator is "manually" moving the ejector blade forward, the EXCEL will not achieve good payload performance.)

Tip…after you have loosened one of the jamb nuts…get a *mental picture* of what 1/8 turn will look like *before* you actually do your turning…once you become confused, you will become "lost" and can not get back to where you were. Do this adjustment thoughtfully and carefully. *Immediately* after you adjusted the first cartridge, do the second exactly the same way. This can not be stressed enough…think about it before doing it. After inserting allen wrench in adjuster, use a magic marker to create a "reference" line on valve body which is aligned with the allen wrench…then "turn" *exact* amount.

Reminder…always adjust *both* adjusters exactly the same amount.

If you become "lost", acquire fresh ***pre-set*** cartridges from LOADMASTER. Then remember to install in proper positions..the settings are different. Save your old cartridges, they could be reset on the bench.



Warning!!!
BEFORE ENTERING THE BODY, ALWAYS SHUTDOWN THE DIESEL, PLACE THE IGNITION KEYS IN YOUR POCKET AND ATTACH A SIGN TO THE STEERING WHEEL THAT SAYS "DO NOT START ENGINE"! PERFORM YOUR SHOP'S DETAILED LOCKOUT/TAGOUT PROCEDURE. THE EJECTOR BLADE COULD MOVE UNEXPECTEDLY CAUSING SERIOUS INJURY OR DEATH.
IF ENTERING THE FORWARD (CAB) SIDE OF EJECTOR, *FIRST* EXTEND THE EJECTOR BLADE ALL THE WAY REARWARD (TOWARDS TAILGATE) AND "PARK" IT THERE. THEN DO YOUR COMPLETE LOCKOUT/TAGOUT PROCEDURE.

TIP: a good rule of thumb…if "lost" where adjsuter's are at…gently bottom out the adjuster and then "back-out" exactly **1 5/8 Turns**…do it to both adjusters…this has proven to be very close to correct settings for both.

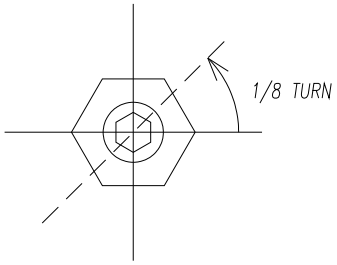
Troubleshooting tips…

If the ejector blade will **not** *automatically* drift forward on the route (a functional defect)…

1-Inspect the orifice to be clear and free

2-Remove both synpak cartridges and inspect the o-ring seal at the tip of the cartridge…if erroded seal, the synkpak can not ever open and ejector blade can not ever auto-drift. (Do one cartridge at a time…do *not* flip-flop the cartridges!) Replace all cartridge seals.

3-If both of above are "ok"', *only then* adjust both synkpak adjusters outward (ccw) exactly 1/8 turn (or slightly less than 1/8 turn) and then retest the excel on the route to confirm the return of automatic ejector drift forward. After inserting a allen key in adjuster, make a magic marker reference mark, on the synkpak's body, that is aligned with the allen key…then turn ccw **exacly** 1/8 turn. (Remember…seemingly very small adjustments will have large effect on ejector's drift behaviour.)



OVERVIEW OF CORRECT EXCEL SPECIFICATIONS…

This page lists the EXCEL specifications needed for checking and setup. These values apply only to the EXCEL; other LOADMASTER models will have other specifications. Refer to the manual that specifically applies to that model. **Always pay attention to the diesel RPM specified…if you measure at some other diesel RPM, the reading will *not* be correct!**

MAIN SYSTEM RELIEF…
This is located in the inlet cover of the body-mounted valve. The body-mounted valve is the valve just inside the body access door. Take your reading at the gauge stem provided at the inlet cover of the body-mounted valve.
Spec is 2900 PSI +/-50 PSI @throttle advanced

SYNKPAK VALVE…
This aluminum-housing valve is mounted at the body's forward face about 2' above the body-mounted valve. This valve controls the ejector blades automatic drifting forward on-route as payload builds-up in the body. It consists of two sequence valves (in series) each with a pilot line. See schematics and separate write-up for detailed information. Spec is..

C-PILOT (SLIDER PACK) 2500PSI
B-PILOT (PUMP PRESSURE) 2500 PSI

These are "cartridge-style" sequence valves that can be replaced easily with **factory pre-set** cartridges when needed.

SWEEP KNOCK-OUT POSITIONER…
This device is directly coupled to the sweep worksection's spool of the tailgate-mounted valve.
Spec is 2200 PSI +/-50 PSI @ throttle advanced
This device is very fast acting and can *not* be measured with a common glycerin-filled gauge. A glycerin filled gauge will give a reading that is very false.

SLIDER KNOCK-OUT POSITIONER…
This device is directly coupled to the slider worksection's spool of the tailgate-mounted valve.
Spec is 2750 PSI +/- 50 PSI @ throttle advanced
This device is very fast acting and can *not* be measured with a common glycerin-filled gauge. A glycerin filled gauge will give a reading that is very false.

SECONDARY PORT RELIEF…
This cartridge type port relief is screwed into the ***sweep*** worksection (on the cylinder's base-end) of the tailgate-mounted valve (on cylinder's base-end…pack side).
Spec is 3800 PSI @ "crack" flow
This setting is not adjustable (and do not "shim").

For more detailed explanations of these specifications, see the "check and setup" writeup that applies to each particular specification.

THROTTLE ADVANCED RPM… ("T-A")
This is the *diesel* RPM that the diesel will raise to when the EXCEL's electric controls signal the need.
Spec is 1150 RPM-1350 RPM (typically).
When the diesel speed does advance, it will be noticeable to the ear and can be read at the cab's tachometer.

DIESEL IDLING RPM…
This is the diesel RPM with diesel at idle
Spec is per whatever the diesel manufacturer says it is supposed to be; usually about 750 RPM.

EVERY SPECIFICATION IS TO BE MEASURED WITH THE GAUGE COUPLED AT THE INLET COVER OF THE ***BODY –MOUNTED VALVE!*** If the readings are taken at some other spot in the hydraulic circuit, the readings will be in error.

LOADMASTER has installed the male gauge stem for gauge coupling at the inlet cover of the body-mounted valve as standard equipment.

LOADMASTER has available the 3000 PSI glycerin filled gauge, 2 feet of hosing, and the matching female coupler all preassembled. (Order LOADMASTER P/N 0130014).

This particular type of coupler requires that the pressure be low to cleanly couple/uncouple. **Shut down the diesel** and disengage the PTO when coupling/uncoupling the gauge to avoid having hydraulic oil escaping.

OVERVIEW OF MAJOR EXCEL COMPONENTRY…

PTO… Varies… a CHELSEA PTO that will allow the pump to be direct coupled to the PTO. Drive ratio is typically near 1:1.3, which is to say a 30% speed increaser. The specific part number will vary depending on the type of chassis transmission, rotation required, etc. Will be OMFB manufacture PTO if unit equipped with "Piston-Pump"

PUMP…Usually a COMMMERCIAL-INTERTECH P350 in a 6.4 cubic inch per revolution displacement. The specific part number will vary depending on the rotational direction needed. Will be OMFB brand if "Piston-pump"

BODY-MOUNTED VALVE…A GRESEN V20 SERIES configured to LOADMASTER's specification. This valve always has 2 spooled work sections. One worksection controls the tailgate cylinders and the other worksection controls the ejectors telescopic

TAILGATE-MOUNTED VALVE…A PARKER V**G**35 SERIES (april2004) configured to LOADMASTER's specification. This valve has usually has 3-4 work sections. Closet to the pump will be any "option" worksection(s), followed by the sweep worksection, and lastly the slider worksection. The sweep and the slider worksections have devices called knockout positioners directly coupled to their spools.

RETURN LINE FILTER… A INTERNORMAN 5 micron (nominal), tank-top filter with synthetic "microglass" element and a condition indicator gauge.

OIL RESERVOIR…In-the-body 42 gallon capacity tank with magnetic type drain plug, fill level gauge with thermometer, top surface clean-out cover, combo screened filler/breather, and a full port ball valve at suction line. Inside the tank, near the bottom, is a 100 mesh suction line strainer.

TELESCOPIC CYLINDER…The ejector blade is actuated by a HYCO telescopic cylinder. It is built to a LOADMASTER dimensional specification for to suit the EXCEL. When the telescopic is fully extended, the ejector blade is fully rearward, towards the tailgate.

SWEEP CYLINDERS…A pair of rod-type hydraulic cylinders. The EXCEL uses a 5" bore x 23-5/8" stroke with a 3" rod diameter. These are internally cushioned to reduce end of stroke pounding. Premium quality design and manufacture by PETTIBONE. All of the EXCEL's various cylinders have zero-leak o-ring boss ports and feature chrome plated rodding.

SLIDER CYLINDERS… A pair of rod-type hydraulic cylinders. The EXCEL uses a 5" bore x 43" stroke with a 2-1/2" rod diameter. These are internally cushioned to reduce end of stroke pounding. Premium quality design and manufacture by PETTIBONE.

TAILGATE CYLINDERS… A pair of rod-type hydraulic cylinders. The EXCEL uses a 4-1/2" bore x 30-1/8" stroke with a 3-3/4" rod diameter. These cylinders are single-acting since the EXCEL has a gravity lowered tailgate. These have integral,port-mounted orifices.

IN-CAB ROCKER SWITCH PANEL…The various switched electrical circuits will have their "inside the cab" switches grouped together here. A switch is "on" (closed) if the red color band is visible. This switch panel is typically located just to the left of the steering wheel.

FUSE BLOCK…All of the various branch circuits originate at this ATO style fuse block which is typically located nearly under the dash in a protected location near the operator's left foot.

IN-CAB RELAYS…Some EXCEL's require relays to control the "throttle advance" or other functions. The exact number of relays on any particular EXCEL is dependent upon factors that include the particular chassis used. LOADMASTER uses IDEC brand quality relays. These relays are the yellowish, transparent "ice cube" relays that are typically located in a protected "inside-the-cab" spot usually somewhere near the driver's left foot.

FIREWALL TERM STRIP…Every EXCEL has a term strip mounted to the firewall located "under the hood" ahead of the driver's side. The color-coded, labeled wires "pass through" this strip. LOADMASTER includes this as a "troubleshooting" feature to speed up finding the source of an electrical circuit malfunction.

HARNESSES…The electrical wires are bundled, labeled, colorized, and protectively covered in a "harness". The overall electrical harnessing is made up of several independent *subharnesses* connected together at strategic locations with premium quality DEUTSCH metallic body multi-pin connectors.

LIMIT SWITCHES…The throttle advance limit switch and the tailgate ajar switch is the same switch. The throttle advance switch is wired N.0. (and closes whenever the slider spool is shifted out of neutral) and the tailgate ajar switch is wired N.C.(and is held open by a lowered tailgate). This switch is a MICROSWITCH brand wobble stick with sealed body. A cable connector seals the cable as it enters the switch.

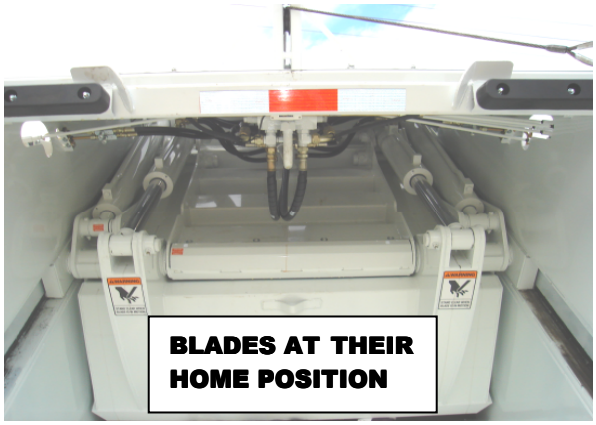
BUTTON SWITCHES…The "buzzer signal" and "throttle" advance switches are fully encapsulated and mounted to a stainless steel panel with a stainless *unpainted* grounding post. Has a "click" feel when it switches. [Sec01-pg10]

Section 02 Checks and Setups
CHECK and SETUP… BLADES
"CYCLE TIME"

rel June 2007

"CYCLE TIME" IS THE TOTAL NUMBER OF SECONDS IT TAKES THE SLIDE AND SWEEP BLADES TO COMPLETE ONE PACK CYCLE, WHILE THE DIESEL IS AT ADVANCED THROTTLE RPM.

The EXCEL specification is 26-27seconds <u>without</u> optional regeneration and with the diesel's RPM advanced to 1150-1350 RPM. (The specific diesel rpm will vary with pump/pto options.) The hopper blade cycle time <u>WITH</u> OPTIONAL REGENERATION specification is 21-23 seconds.



One complete pack cycle is to start with both blades at "home" position and end up also at "home" position.

Checking Procedure:

1- Both the slider and sweep blades are parked in "home" position.

2- Diesel running; Transmission in neutral; Park Brake is applied on; PTO is engaged on; Throttle Rocker switch is on (red band will show)…

3- This is a two person task. One person with a stop watch and one person manning the blade's hand control levers.

4- Pull both control levers outward simultaneously (and release them) as stop watch is triggered on spoken "go".

5- The person manning the controls must be in a state of ready to "push in" (and release) the hand control levers at the very instant that both levers are seen to kick-out to neutral. (This is the "interrupted" or half-way point of the automatic cycle.) This interruption must be kept as brief as practical to correctly measure the "cycle time". Meanwhile, the stop watch has continued to run.

6- Now the stop-watch holding person must be alert to stop the watch at the exact moment the blades are both back to home position (both hand levers will have "kicked-out" to neutral).

7- Record this number of seconds and repeat the time measuring process a total of three times for best confidence of accurate measurement.

⚠ DANGER

STAY CLEAR OF MOVING HOPPER BLADES AND THE HOPPER LOADING SILL WHEN BLADES ARE MOVING! IF YOU OR A WORK PARTNER IS CAUGHT IN THE BLADE ACTION, SERIOUS INJURY OR DEATH WILL RESULT.

To adjust the cycle time, alter the diesel's throttle advanced RPM setting. *Do not adjust outside the previously specified range….damage to componentry may occur.*

Most diesels today are "E-DIESELS". You will most likely need to schedule a visit to your local chassis dealer since the *advanced throttle RPM* is a programmed setting and will require a programming device that you will most likely not posses.

If you do adjust the diesel's advanced throttle to 1300-1350 RPM (maximum allowable EXCEL RPM) and the measured "cycle time" is still "slow", see troubleshooting section for identifying and remedying other causes of "too slow" blade movements.

<u>REGENERATION OPTION AND CYCLE TIME</u>

If your EXCEL is equipped with the *optional* regeneration valve…the correct hopper blades *total cycle time* will be **21-23 seconds (excel specification).**

The regeneration valve will "speed up" the movement of the slider blade during slider blade *downward* travel (only). (The regeneration valve does *not* affect the speed of any other blade movement.)

If your EXCEL has regeneration, the diesel's throttle-advanced setting must be programmed to assure that the hopper blades total cycle time ***<u>does not exceed</u>*** the 22-23 seconds! This may require programming the diesel throttle advance parameter to a value as low as 1150 rpm.

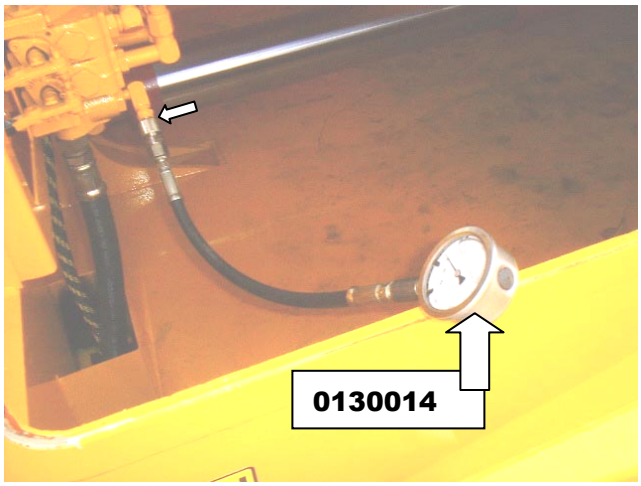
Never allow the EXCEL to operate with a hopper blades *total cycle time* at value less than the 21-22 seconds (which is to say…"faster" blade movements).

For example, if you stopwatch the *EXCEL* and it times to 19-20 seconds (too "fast")…then you must immediately have the diesel's throttle advanced setting reprogrammed to a lower RPM value that results in a timing of 22 to 23 seconds.

CHECK and SETUP…THE "MAIN RELIEF" OF BODY-MTD VALVE rev12-01

THE MAXIMUM OVERALL HYDRAULIC SYSTEM PRESSURE IS REGULATED BY THE "MAIN RELIEF" VALVE, WHICH IS A CARTRIDGE TYPE VALVE SCREWED INTO THE INLET COVER OF THE EXCEL'S BODY-MOUNTED VALVE.

The EXCEL specification is 2,950 PSI +/- 50 PSI @ Throttle Advanced RPM (usually about 1400 rpm).



To check the setting of the system "main relief", do the following procedure.

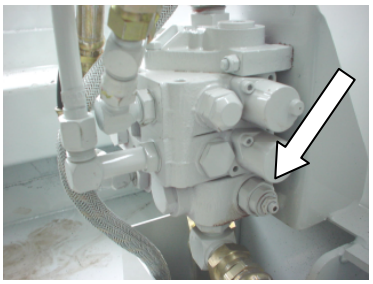
Checking Procedure:

1- **Shut down diesel, place the ignition keys in your pocket and a sign on the steering wheel that says "DO NOT START".**
2- Connect a 0-3000 PSI glycerin filled pressure gauge (on a ¼" hose about 2 feet long) to the body-mtd valve's gauge stem that you will find at this valve's inlet cover. (The "body mounted valve" is the 2-section stack valve located just inside the body's access door). Exit the body and get your feet back on the ground.
3- Start Diesel running; Transmission in Neutral; Park Brake is engaged on; Throttle Rocker switch is on; Tailgate fully down and fully *latched on both* sides…
4- Extend the ejector blade fully rearward (all the way towards the tailgate) if it isn't already and leave it there.
5- Depress and hold the nearby *"throttle"* advance button switch…diesel RPM will be heard to raise to the advanced RPM.
6- Shift "tailgate" hand lever to *"raise"* position (refer to the decal that is affixed to the body) and hold (soak)…read the gauge while *still holding throttle advanced*. This is the "setting" of the main relief valve. Release the hand lever labeled "tailgate" and then repeat taking a reading for a second time.

If the main relief setting needs adjustment to be brought within the above specification, follow this procedure.

Adjustment Procedure:

1- **Shutdown diesel, place ignition keys in your pocket and a place a sign on the steering wheel that says "DO NOT START".**
2- Open body side access door and enter the body.
3- Remove the acorn nut, which acts as a cover over the adjuster stem.
4- Loosen (ccw) the jambing nut.
5- Use a hex key to turn the adjuster…start with about 1/8 turn. Turning adjuster inward (cw) will increase the setting. Turning the adjuster outward (ccw) will decrease the setting.
6- Tighten jamb nut and install acorn nut cap.
7- Never exceed the LOADMASTER specification. Expensive component failures and/or structural damage can occur. Also, if the main relief is set too low, loss of compaction and/or functional performance can occur.
8- Exit the body (your feet back on the ground) and restart diesel. Diesel running; Transmission in Neutral; Park Brake on; PTO engaged on; Throttle Rocker switch on…
9- Recheck the main relief's setting again using previously listed procedure. It is worth mentioning again that you must *advance the throttle* to accurately check this relief setting. If it is within specification, you are done. Otherwise repeat the checking and adjusting until it is "to spec".



TIP….Throughout this manual you will notice that all the pressure settings are stated at a certain diesel RPM speed. It is important that you check the setting at the stated RPM since pump flow is dependent on diesel's RPM. One "setting" of the main relief will measure differently @diesel idle (typically about 750 RPM) versus @ diesel throttle advanced (typically about 1400 RPM).

⚠ WARNING

BEFORE ENTERING THE BODY, ALWAYS SHUTDOWN THE DIESEL, PLACE THE IGNITION KEYS IN YOUR POCKET AND ATTACH A SIGN TO THE STEERING WHEEL THAT SAYS *"DO NOT START ENGINE"!* PERFORM YOUR SHOP'S DETAILED LOCKOUT/TAGOUT PROCEDURE. THE EJECTOR BLADE COULD MOVE UNEXPECTEDLY CAUSING SERIOUS INJURY OR DEATH.

IF ENTERING THE FORWARD (CAB) BODY SIDE OF EJECTOR, FIRST EXTEND THE EJECTOR BLADE ALL THE WAY REARWARD (TOWARDS TAILGATE) AND "PARK" IT THERE. THEN DO YOUR COMPLETE LOCKOUT/TAGOUT PROCEDURE.

CHECKING AND ADJUSTING THE KNOCK-OUT POSITIONERS

The *EXCEL's* correct *knock-out* specifications are…

SLIDER **2700-2750 PSI @ THROTTLE ADVANCED**
(will "advance" automatically during procedure)
SWEEP **2200-2250 PSI @ THROTTLE ADVANCED**
(A second person will have to *hold depressed* a t-adv button switch for sweep).

The *EXCEL's* correct *system main relief* specification is
2900-2950 PSI @ THROTTLE ADVANCED

"CHECKING" WHERE THE *EXCEL'S* SLIDER'S KNOCK-OUT POSITIONER ("K-O") IS PRESENTLY SET…

This procedure will identify the knockout-positioners *present* setting. (See separate procedure below to "adjust" a k-o.) You will use the *system main relief's* adjustment feature to identify where the k-o is set. This relief is located at "body-mounted valve's" inlet.

- ❑ 1- Move the ejector blade fully rearward (towards tailgate) and leave it there.
- ❑ 2- Attach a 0-3000 psi glycerin filled gauge on a 2-foot hose with the female coupler…to the gauge stem that exists at the body-mounted valve's inlet cover. <FIG 1>
- ❑ 3- Loosen jamb nut at main relief. Arbitrarily turn outward (CCW) the main system relief 2 to 3 turns to lower its setting a great deal. <FIG 2>
- ❑ 4- Diesel running; PTO to engaged; Throttle's in-cab, master rocker switch to ON (red band will show)
- ❑ 5- Go the tailgate; move the orange slider control lever to shifted position (push for "up") and let go of lever. <FIG 3>
  The lever should *not* knockout to neutral because the main relief is very low and therefore undercutting the K-O. (Many people will call this "soaking" the relief.) The throttle should be automatically advancing to 1200-1300RPM.
- ❑ 6- Go back to the body-mounted valve. Affix your eyes upon the pressure gauge. Hold the gauge in one-hand so you can clearly read it…. the slider is still "soaking".
- ❑ 7- Begin slowly turning upward (cw) the main relief's hex key adjuster…slowly and smoothly. All the while, *keep your eyes affixed* upon the gauge. Soon you will feel and hear the slider's knock-out kick to neutral. Memorize and jot down on paper the gauge reading that occurred *at the very moment* it kicked-out. This is the *present* slider k-o setting.
- ❑ 8- Repeat steps 3-7 again…until you have confidence your "reading" is accurate…jot this down on paper.

[This procedure will also work for checking the *sweep's k-o*, but a second person must hold pressed a throttle-advance button switch.]

Important! Always remember to *return* the *main system relief* to its correct specification of 2900-2950 PSI @ throttle advanced *when you are finished* identifying what the knock-out is set to.
(Set "main relief" by locking *both* tailgate turn buckles and shifting tailgate raise/lower lever to "raise" while holding *throttle advanced*. See earlier topic in this manual.)

"RESETTING/ADJUSTING" THE *EXCEL'S* SLIDER'S K-O POSITIONER

!DANGER! Be sure diesel is **not** running, **ignition keys** are in your pocket, and affix a **sign** on steering wheel that reads "*do not start*"… **before** you enter the hopper or get near the hopper's blades!
Repeat these lockout/tag out steps each and every time you must enter the hopper! (Your shop may have a more detailed LOCKOUT/TAGOUT procedure. If so, then perform the *detailed* LOCKOUT/TAGOUT procedure.)

To make a *adjustment* (the checking above has shown k.o. to be "out of spec")…

- ❑ 1-Remove the small, rubbery hole plug from the end of the K-O positioner's bonnet (at the end face of it)…the "adjuster" is behind it <FIG. 4> [Sec 02-pg 03]
- ❑ 2-Do the "checking" procedure (above) to find out "where" the K-O positioner is presently set at. (CONT'D NEXT PAGE)

TOOLS REQUIRED…
5/32" ALLEN WRENCH AND 9/16" OPEN END FOR MAIN RELIEF;
3/32" ALLEN WRENCH FOR K.O. ADJUSTMENT; 3000PSI GUAGE & HOSE ASSY

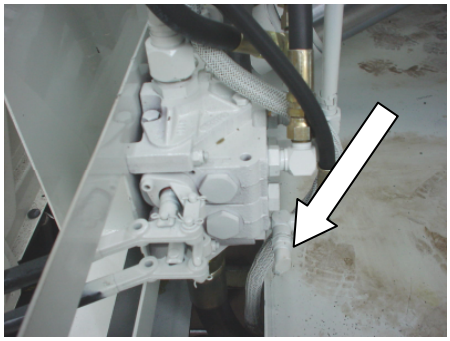


Fig.1

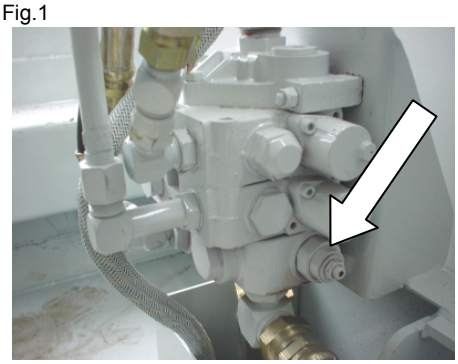


Fig. 2

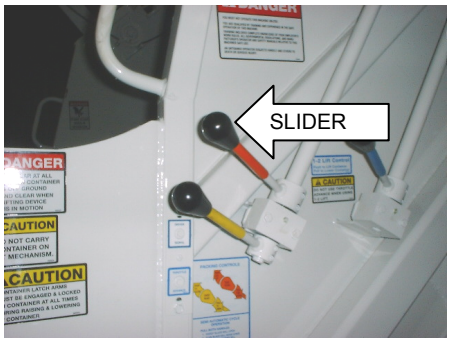


Fig. 3

CHECKING AND ADJUSTING THE KNOCK-OUT POSITIONERS…CON'TD

- 3-The "rule of thumb" is…**1/4 turn** of the k-o's allen-head adjuster is roughly equivalent to **100 PSI** of setting change.
  Based upon where the k-o positioner is presently "checked" to be set at…turn the k-o's allen head adjuster inward (cw…raising the pressure setting) or outward (ccw…lowering the pressure setting) *to get closer* to the EXCEL specification. <FIG. 5>
  EXAMPLE... The correct EXCEL spec for the slider is 2**7**00 psi @ throttle advanced.
  Your "*checking*" procedure reveals the slider's knock-out to be presently set to 2**5**00 psi @ throttle advanced.
  Calculate **27**00 minus **25**00=200 psi "on the low side"…that is ¼ turn x 2= ½ turn total needed.
  Turn slider k-o adjuster's allen-hex inward (cw; the "raising" direction) **exactly** ½ turn.
  (The V40 knock-out adjuster has *no* jamming nut…adjustment is held in place by internal friction.)
- 4-Now repeat the "page 1" *checking* procedure *again* (repeating steps 3-7)…jot down "where k-o setting is *now* set"
- 5-Continue if need be… using *smaller 1/8 turn or 1/16 turns* next, until you are "dialed" into the correct specification.

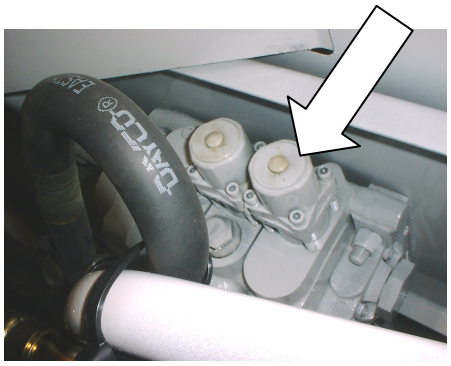


Fig 4

Note : There are two k-o positioners…be sure to first correctly identify the *one* you choose to work on. (The *slider* k-o is the lowest one, nearest to the hopper's loading sill; the *slider* work-section has the switch trigger on its push-pull rod.)

!DANGER! Be sure diesel is **not** running, **keys** are in your pocket, and affix a **sign** on steering wheel that reads "*do not start*"… **before** you enter the hopper or get near the hopper's blades!

Repeat these lockout/tagout steps each and every time you must enter the hopper! (Your shop may have a more detailed LOCKOUT/TAGOUT procedure. If so, then perform the *detailed* LOCKOUT/TAGOUT procedure.)

[This procedure will also work for adjusting the *sweep's k-o*, but a second person must press and hold a throttle-advance button switch. Sweep will not have automatic throttle-advance.]

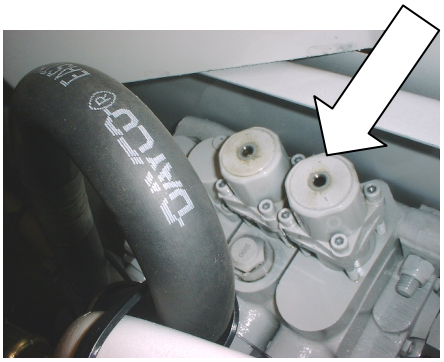


Fig 5

Important! Always remember to return the *main system relief* to its correct specification of 2900-2950 PSI @ throttle advanced *when you are finished* adjusting the knock-out setting. (Set "main relief" by locking *both* tailgates turn-buckles and shifting tailgate raise/lower lever to "raise" while holding *throttle advanced*.)

Important! Always remember to replace the rubber hole plug (see parts manual)…Do not allow dirt or water to enter the knock-out device. Always keep the knock-out "sealed" by installing the rubber hole-plug.

End Knock Out check and adjust

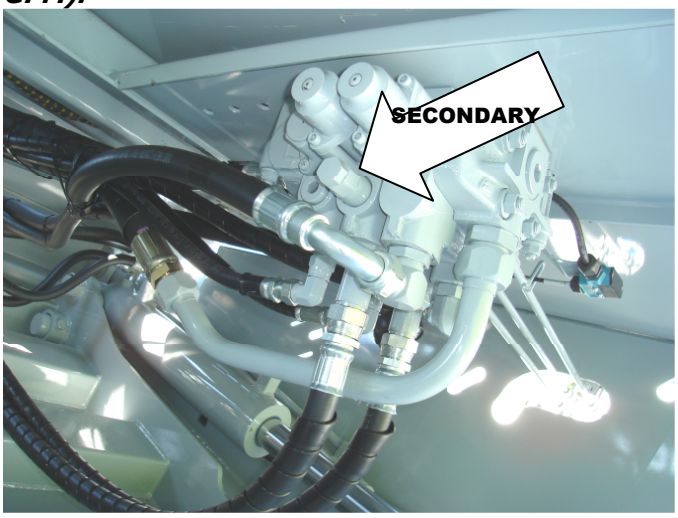
CHECK and SETUP…"SECONDARY PORT RELIEF"

THE TAILGATE-MOUNTED VALVE'S SWEEP SECTION HAS A PORT RELIEF INSTALLED ON THE BASE-SIDE OF THE SWEEP CYLINDERS PAIR.

THIS "SECONDARY PORT RELIEF" IS SET SIGNIFICANTLY HIGHER THAN THE OTHER RELIEF SETTINGS AND IS PROVIDED TO ALLOW FOR SOME RELAXING OF "INDUCED LOADS" THAT WOULD EXCEED THE CRITCAL ALLLOWABLE STRUCTURAL LOADS.

See Table of Contents for a write up of how this particular hydraulic component functions in the system.

The EXCEL'S specification for this S.P.R. is 3800 PSI @ "crack" (with crack being defined as 2 GPM).



Checking Procedure:

Actually, there is no commonly available method to field "check" where this relief is set. This is because it is "test-stand set" at its *crack* value of 3800 PSI *@ 2 GPM*. If you suspect that this port mounted relief is not correct, it is most practical to order from LOADMASTER a brand new bench set cartridge.

Fortunately, changing out this cartridge type valve is a relatively fast operation and the cartridge itself is not expensive. See the Table of Contents to locate a write-up on change-out procedure in Repair Section. It is worth repeating here to pay particular attention to (a) assure a clean valve cavity (magnet wand and penlight and hooking tools) before putting in the new cartridge, and (b) the "cartridge tip seals" rubber 0-ring and plastic backup ring are well doped up with axle grease when you (slowly & gently & straightly) insert the new preset cartridge into this cavity. All the *old junk* must be purposefully "fished out" of cavity; it does not come out on its own.

VG35 PORT RELIEF

Sometimes it is a nicked or extruded "tip seal" that is the real culprit and the cartridge (and its setting) are actually fine.
A typical "symptom" that might lead you to replace this cartridge is that the sweep blade is "tending to unwrap" when the body is nearing its full rated payload capacity. Be careful in your observations here because some occasional unwrap of sweep blade is *normal* (such as when the body *really is full* and the payload is at its rated value).

One worthwhile *check* you can do is to physically trace the sweep cylinder's base side hoses to be sure the Secondary Port Relief is correctly located on the *base-side* (not the *rod-side) of the sweep's cylinders.*

Adjustment Procedure:

This S.P.R. is *not* adjustable; it must be replaced with a totally new preset and *fixed* cartridge.

Never "shim adjust" this port relief cartridge. Eventually this could cause expensive structural damage and/or componentry damage. LOADMASTER warranties are void if this is done.

Replace the entire port relief cartridge with a new LOADMASTER preset cartridge and always replace the old seals with new. See EXCEL parts manual.

In the unlikely event that cartridge replacement does not solve the blade unwrapping symptom, refer to the Troubleshooting Section of this manual for other possible causes and remedies.

⚠ DANGER

BEFORE ENTERING THE LOADING HOPPER, ALWAYS SHUTDOWN THE DIESEL, PLACE THE IGNTION KEYS IN YOUR POCKET AND ATTACH A SIGN TO THE STEERING WHEEL THAT SAYS "DO NOT START ENGINE"! DO YOUR SHOP'S DETAILED LOCKOUT/TAGOUT PROCEDURE.

THE BLADES COULD UNEXPECTEDLY AND SUDDENLY BEGIN MOVING WHICH WILL CAUSE SERIOUS INJURY OR DEATH.

CAUTION!!: BEFORE REMOVING THIS PORT RELIEF, BE SURE THE SWEEP BLADE IF FULLY DOWN SO GRAVITY CAN NOT MOVE IT UNCONTROLLABLY…WHEN THIS PORT RELIEF IS REMOVED…THE SWEEP BLADE WILL BE NO LONGER HYDRAULICALLY "LOCKED" IN POSTION.

CHECK AND ADJUST THE EXCEL'S "*SYNKPAK*" VALVE

See "synkpak" information, also.

A proven "**rule of thumb**" is simply…gently bottom out the synkpak's adjuster (inward..CW)…and then "backout" (ccw) adjusters 1 5/8 turns (**exactly**). Remember to re-jamb the adjuster's jamming nuts when finished.
This simple adjustment technique will work if you **also** assure:

a- Slider's KO positioner is set to 2700 psi @ throttle advanced

b- The main system relief is set to 2900 psi @ throttle-advanced.

c- The synkpak's cartridges' seals are in good condition (see below).

d- The orifice is present and free of debris

The above outline (a thru d…along with adjusting both cartridges to the 1 5/8 turnout) will assure the Excel will pack-out very well…the key players involved with packing out will be addressed.

There are two cartridges… do them one at a time. Set both adjusters to same 1 5/8 turns out from "bottomed".

The synkpak's adjusters are fairly sensitive…so if you are not sure you are exactly to 1 5/8 turns out…just repeat from lightly bottomed-out… until you are confident.

Keep in mind the synkpak is "timed-out" to the Excel's **slider** work section KNOCK-OUT positioner setting…so assure that the slider KO setting is correct… *before* adjusting the synkpak. (You can usually ignore the *sweep's* KO positioner when dealing with the synkpak valve…the *sweep* pressure is NOT sensed by the synkpak. Study the schematics in this manual)

Also, it is good practice to CHECK the condition of the Synkpaks' two cartridge SEALS **first**…then do the adjustment. If seals show any evidence of erosion, then replace with the urethane seals (seal kit p/n 8800717…march2004). Any "failed" cartridge seal will most likely make the synkpak malfunction. (two seals per cartridge, two cartridges= 4 seals to check).

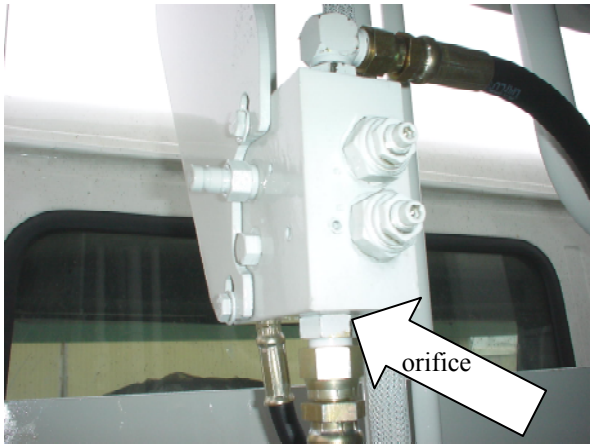
To check the condition of each cartridge's seals…remove the cartridges (one at a time) from their valve body cavities (the wrenching hex closest to the valve's body). Inspect seals in full sunlight for areas of rubber erosion.

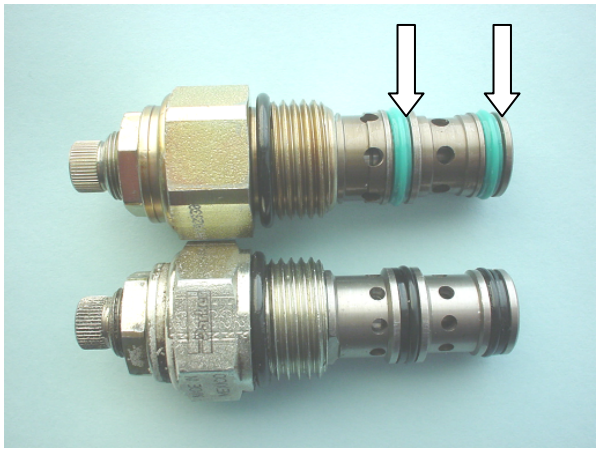
Tip…the *uppermost* cartridge's removal will cause the oil in the roof tube to *gravity* drain down. Have ready a #10orb PLUG to install in the uppermost cartridge's cavity…at the very moment you pull this upper cartridge out of it's body cavity. This will preclude having oil gurgling out into body (a mess and a fire hazard).

Assure the synkpak's body's cavities are clean and *free of debris* before re-installing the cartridges (use penlight to clearly see…shine into body cavity). Note…most likely some oil has escaped from uppermost cavity before it could be "plugged"…this will flush clean the cavity.

When inspecting the seals…also inspect that the synkpak's **orificed fitting** is clear of debris. Debris from any seal failure will tend to migrate to this orifice (or other "dirt", for that matter). The orifice fitting is screwed into Synkpak's CYL port (which points downward towards body floor).

Remove/ CHECK the orifice… and clean if needed.





Section 03
TROUBLESHOOTING…

Troubleshooting is following a logical sequence of steps to identify the cause of a "symptom" and then taking corrective action. This entire manual presents EXCEL-specific technical information needed for a basis of knowledge that will allow a mechanic to understand the steps to be taken in remedying problems. Basic knowledge allows the person to "envision" the most likely causes of problems and how to go about correcting them.

Getting a complete and accurate description of a "symptom" is the most worthwhile first step. Talk and listen to the "operator" who reports the symptom for a complete description of the problem. Listening carefully first and then asking a few "pointed" questions will often reveal useful clues.

This "troubleshooting" section will be helpful by listing some specific symptoms and then giving some suggestions as to possible causes and possible remedies (if not obvious). Breeze through this listing of symptoms until you find one that is similar to your symptom. Read about that symptom to get some ideas to begin with. LOADMASTER has written these in a "conversational" style.

Typical troubleshooting tools will include:

A 0-3000 PSI glycerin filled pressure gauge on a ¼" high-pressure hose with the female coupler at the other end which attaches to body-mounted valves' male stem. (L-M P/N 0130014)

A inexpensive VOM electric meter (Radio Shack) for continuity checks and other checks

A voltage tester…the kind that looks like a ice pick with bulb and wire with alligator clip at wire's end

Some automotive wires in various lengths with alligator clips on both ends for "making a good ground", etc.

This manual is a useful tool for its diagrams, schematics, and other content.

MOST IMPORTANTLY…

SERVICE/MAINTENANCE PEOPLE WHO ARE RESTED, ALERT, CLEAR HEADED AND FOLLOW ALL OF YOUR SHOP'S SAFETY PRACTICES INCLUDING YOUR SHOP'S DETAILED LOCKOUT/TAGOUT PROCEDURES.

SERVICE/MAINTENANCE PEOPLE MUST UNDERSTAND THE SAFE *OPERATION* OF THE EXCEL AND RESPECT THE TREMENDOUS POWER OF ANY HYDRAULICALLY POWERED MACHINE.

DIESEL RPM DOES NOT ADVANCE WHEN A COMPACITION CYCLE IS STARTED…

Both hand levers are pulled outward to begin a blades cycle; the blades begin to move "slowly", but you can hear that the diesel speed is *not* advancing to the normal advanced speed of about 1300 rpm.

First check to be certain the in-cab rocker switch labeled "THRTL" is in ON position. The rocker is ON when the red color band is visible. This rocker switch is a "master switch", if it is not "on", then the throttle can not advance. (The chassis' ignition key switch must be "on", by the way.)

Check the condition of the ATO fuse for the throttle circuit. All the fuses are held by one fuse block, under the dash, to left of steering wheel. Test the throttle fuse for continuity (the wires have labels printed on them). A fuse *can* appear "good" but is actually open. If it is cooked open, then you will have to replace it and consider why the fuse blew in the first place. There may be a "short" that needs fixing.

Try to advance the throttle with one of the two manual *button switches.* If throttle does *not* advance from one of these button switches, then the problem is possibly an open-circuit (like a loose wire termination) on the "diesels' side of things". Focus then on the in-cab electric's, such as the throttle advance relay (if equipped it will be a yellowish "ice cube" relay located in-cab under the dash on the drivers side). This relay is a plug-in type that can be changed-out without touching the wires to the grayish base. Check for good wire connections in this area. Check the wiring that interfaces the LOADMASTER components to the truck chassis "electronic control module".

If the throttle *does* advance when you depress and hold a throttle button switch, then checkout the throttle advance *limit switch.* It is the wobble-stick MICROSWITCH that triggers from a loop on the slider spools push-pull control rod (at the tailgate-mounted valve). This switch is wired NO and closes whenever the slider spool is shifted out of its neutral position to advance the throttle automatically for blade cycling. This switch's bracket has slots for adjusting. Is the horseshoe shaped 'trigger" on the rod engaging the wobble stick? As always check out the wiring terminations, etc. Do a continuity check of the switch by moving the wobble stick, by hand, if you finally believe it is the switch itself.

DANGER…ALWAYS STAY CLEAR OF THE HOPPER AND BLADES WHENEVER THE DIESEL IS RUNNING! SERIOUS INJURY OR DEATH COULD OCCUR IF YOU OR A WORK PARTNER IS CAUGHT IN THE ACTION OF THE BLADES. BLADE ACTION COULD BEGIN UNEXPECTEDLY.

DIESEL MUST BE SHUTDOWN AND THE IGNITION KEYS KEPT IN YOUR POCKET *BEFORE* ENTERING THE HOPPER AREA. PERFORM YOUR SHOP'S FULLY DETAILED LOCKOUT/TAGOUT PROCEDURE BEFORE ENTERING THE HOPPER AREA.

Most chassis have E-DIESELS today, which means the diesel's brain has inputs/outputs for throttle advance that LOADMASTER will connect to. If your EXCEL still uses the old-style pneumatic cylinder and air solenoid valve, this system could be the cause of the throttle *not* advancing. Test with voltage tester or VOM to see if the air solenoid gets power from the throttle advance circuit (when it's supposed to). If the power *is* getting to the firewall mounted air solenoid valve (the small blue MAC air solenoid valve) when it should; you have isolated the cause to the pneumatic solenoid valve, air cylinder, or possibly the cylinder's linkage.

Another possible cause is a "bad" ground somewhere. A lot to LOADMASTER's circuitry is designed as "make a ground and something is supposed to happen." (This is actually true of many DC circuits). Look at the electrical schematics provided in this manual to locate the various needed groundings. Sometimes by making a "good" ground

(scraping paint away, cleaning to bare steel, tightening existing grounding screws, even adding a fresh ground wire), any numbers of various, seemingly mysterious "symptoms" can be corrected. Oftentimes, a "erratic" symptom (it comes and it goes) is caused by a "weak ground". Sometimes an erratic symptom is a loose connection or terminator "anywhere" in the flow of power.

Another similar symptom may be that only one of the two "throttle button-head switches" will correctly cause the throttle advance. This situation points to a failed switch, or more likely, a wiring problem such as a loose or corroded wire terminator or 'bad" ground. These button switches again work on the "make a ground" concept. Focus on the specific switch and it's associated localized wiring to find the cause.

A reverse symptom is "diesel does not return to idle" even though the blades have completed their cycle movements. This would typically be caused by the "throttle advance limit switch" (the switch triggered from the slider's push-pull rod) position relative to the u-shaped trigger loop being in need of adjustment. This wobble-stick switch must be in its normal, un-tripped position (wired open) when the slider spool is in its centered-neutral position.

The throttle will not advance if the transmission is in any "gear" other than neutral. Check to be sure the operator is always going to neutral when at a vehicle stopped situation (and Park Brake Applied On).

If the throttle *does automatically* advance with the transmission in any drive or reverse gear…PARK THE TRUCK IMMEDIATELY AND CORRECT THIS MALFUNCTION.

DIESEL RPM DOES ADVANCE WHEN A COMPACTION CYCLE IS STARTED, BUT IT DOES NOT ADVANCE ENOUGH…

Typically, the EXCEL's advanced throttle will be 1250-1350 RPM.

First be aware that "'most" EXCEL's are setup to this specification, but not necessarily all. If your RPM is something above 1400 RPM then you *are* spinning too fast and probably should adjust downward to reduce noise emissions and not be "over-speeding" the componentry, which really will shorten their life. If your advanced RPM is say 1200 RPM your EXCEL will still operate and pack-out fairly normally. The 1200 RPM mainly means your compact blades are a little bit "slower" than LOADMASTER's original intent, but not noticeably. Some EXCEL owners actually may prefer this and LOADMASTER does not require a corrective adjustment be made. If the RPM at throttle advanced is down to about the 1100-1150 RPM you probably *would* want to correct upward if you believe, for example, that the unit is not "packing-out" near its expected performance or you perceive the blades "speed" to be slow.
If it is finally decided that the throttle advance setting really does need to be adjusted, you probably will need to schedule an appointment with your local chassis/diesel distributorship. Most EXCEL's today are Electronic-diesels that require a special electronic calibration tool.

The older style pneumatic throttle advances will have an air cylinder that *can* be mechanically readjusted.

HYDRAULIC PUMP SEEMS TO BE EMITTING MORE NOISE THAN USUAL…

The EXCEL pump/PTO is a direct-couple design with no propeller shafting and is for a relatively "quiet" setup.

Look for anything that could cause pump "cavitation". First make sure the full port ball valve (that is in the pump's suction hose) is *fully* open. The handle must be parallel to the valve's body to be fully open. If the handle is "skewed" off parallel, the valve may be partially closed. Check that the hydraulic reservoir is correctly filled. A *specific* checking procedure must be used to avoid overfilling as well as under-filling (see Table of Contents to find this procedure). Allowing an under filled condition can cause suction line "vortexing" which entrains huge amounts of air. The hydraulic fluid itself should not be "milky", which means water is contaminating the oil. The suction-strainer (in the tank, at the very bottom) may be plugged with contaminants or a shop rag and its built-in bypass is stuck closed (rare). Be certain the pump's suction line is not allowing air to be sucked (rare); re-tighten its connections.

Check the fasteners that attach the pump to the PTO and the PTO to the transmission. Re-torque. It may only *seem* to be the pump as the source of noise. The PTO may be malfunctioning. Check all the hydraulic tubing clamping for secure anchoring by retightening them. Is a damaged tube contacting a body panel and causing a metal-to-metal resonance? Check that the oil tank is securely anchored to body.

The pump may be beginning to "fail" and will require replacement. Most pumps actually begin to fail by internally wearing down and they begin to "slip" internally. This failure symptom is the pump "can't seem to consistently hold the pressures needed for normal functioning" and this usually occurs *quietly.*

The PTO may be malfunctioning. If the PTO was recently changed-out, the replacement PTO needed to be installed per CHELSEA's procedures, otherwise extremely noisy mismatched drive gearing or "gear backlash" problems will generate noise. The correct CHELSEA part number needs to be used for proper mating and proper speed ratio. Do not substitute to a different specification.

THE COMPACTING HOPPER BLADES CYCLE, BUT THEY SEEM TO MOVE "SLOW"…

The blade speed should be "timed" first. See Table of Contents for the checking cycle time procedure.

Make sure you stopwatch the blades first, it is common for speed "perceptions" to be variable. Then check the throttle advance to be advancing to EXCEL specification. Adjust the throttle advance setting if it is too low and out of spec. Assure yourself the PTO drive ratio is per LOADMASTER spec (usually about 1:1.3 for EXCEL) if it has been replaced in last few months. If PTO ratio is wrong, the pump itself will spin at wrong speed and you will not have the 42 GPM flow that is required. If the speed has been gradually been slowing down over a period of several weeks (hard to judge), the pump may simply be wearing out and it is beginning to internally "slip" under pressure. Is the diesel RPM "drooping" and not consistent? The diesel's governor or fuel system needs attention.

Hydraulically speaking, look for any way that some of the pump's flow is going directly back to tank and not doing any useful work. The blade cylinders must receive full pump flow to be at correct speed. Is a blade spool not *fully* shifting, thereby some of the pump flow is bled off to tank. A spool may not crisply return to its spring centered neutral position thereby allowing some oil to bleed directly to tank. The mechanical linkage should be checked for excessive drag (grease it up) or mechanical interference. Sometimes an unusually high level of hydraulic system heat is created as the wasted oil is "orificed" to tank and sometimes not. Is a relief valve stuck partially open causing some oil to bleed off to tank? A leak at the tip seal of any relief cartridge could waste oil to tank. Seals could be nicked, extruded, or not properly seated. These types of hydraulic leaks can sometimes have an audible sound, but it can be very hard for a human to filter-out this particular sound amongst other normal hydraulic sounds. Some people describe this as an unusual "hiss" sound. Some people can't describe it at all.
The tank must breathe freely through its filler/breather. This chrome plated, fluted cap contains a "media" that stops airborne dirt from sucking into the oil tank. Replace this inexpensive unit if you suspect it is fouled. The tank must be properly "filled".
The pump itself could be worn and internally slipping.

TROUBLESHOOTING...(CONT'D)

THE PAYLOAD GENERATION SEEMS TO BE ON THE "LOW' SIDE OF EXPECTATIONS...

The EXCEL will routinely generate payloads of 1000 pounds per cubic yard.

Most people in the waste equipment industry would call this a so-called "high compaction" unit.

Keeping records of your "full" loads (in pounds) will give a good rough idea of how the EXCEL is performing in terms of payload generation. A "full" load is when the ejector blade has drifted all the way forward (towards the cab) and the operator can no longer clear the loading hopper. The operator *must* unload because loading hopper has shrunken to the point is slowing collection efficiency.

The EXCEL is built in a few body volume choices, so you must multiply *your truck's* volume by 1000 to rough out what you should be capable of getting. Then compare this to several of your actual "full" loads that you have recorded and the picture will emerge. Expectations must match the specific model used. (You can expect an 25 cubic yard machine to haul bigger/heavier loads than a 20 yard…do the calculation.)

The *weight* of any particular load on-board the EXCEL was influenced by a lot of different factors. The operating habits of an operator, when the body is beginning to fill up, the operator should do Manual Over-rides (extra pressure and force available) whenever the hopper blades do not go to "full home" position *automatically*. Always *manually* over-ride the hopper blades to "home" if they did not automatically get to "home". If the truck is "brand new", it will perform best when all the painted surfaces have polished-up from usage. The time of year (season) is a major factor because the *weight* of a given collected volume of garbage is so dependent on *water content*. Dry garbage weighs a lot less than wet garbage. Winter garbage weighs a lot less than summer garbage. Today's routes were "on the curb" during the big storm…and so it goes. Many weighed "loads" are not *full* loads; they are partial loads. If there are commercial stops on your route, the larger amounts of cardboard will always reduce your scale ticket. Any residential rubbish or tree branches will lighten the payload.

Having said all of the above, the EXCEL *may indeed have* an operational deficiency that needs correcting. A few key pressure checks are needed to troubleshoot the symptom of "payloads not up to par". If you suspect the EXCEL is not packing-out properly…First check the hydraulic pressure settings that are most important in terms of densification/payload generation: 1-the slider blade's knockout positioner setting, and 2- the system main relief setting…see this manual's table of contents for specific information. After confirming that these two pressure settings are to EXCEL specification, only then focus your attention on the so-called "synkpak" valve. The synkpak valve controls the "resistance" that the ejector blade creates as the ejector blade automatically drifts forward as garbage is collected. The settings of the "synkpak" valve are therefore very important to the densification/payload generation performance. The synkpak is "synchronized" to the above two important hydraulic settings. See other sections of this manual for "information" on the synkpak operation.

Next assure that the sweep blade is not "unwrapping" frequently on the route as the slider blade slides upward compacting the garbage. Having some sweep "unwrap" when the body nears full is "**normal**".
See Table of Contents for "check and setup the secondary port relief" procedure.

Then run 2 or 3 complete blade semi-automatic cycles and observe that it operates "normal". The knockouts should knockout cleanly and consistently at full cylinder strokes. The knockouts should "hold" the hand levers/spools fully shifted during blade movements. Stopwatch the blade cycle time (see Table of Contents for correct procedure). The advanced RPM may be way below spec and this takes the pressures "down" with it. Listen to the hydraulics as you cycle blades for any hiss type sounds that indicate oil throttling back to tank (internal leaks waste power). A old, worn down pump can affect EXCEL payloads capability.

THE SWEEP BLADE IS TENDING TO "UNWRAP/ROLLOUT" DURING THE SLIDER BLADES UPWARD COMPACT TRAVEL...

The sweep cylinder's base-ends have a port relief called the "secondary port relief". This port relief will purposefully crack open whenever loads exceed allowable levels. The "secondary port relief" is a cartridge type port relief installed in the sweep work section of the tailgate-mounted valve.
Some of this unwrapping is normal such as when the body *really* is at its rated full load. As the payload "approaches" this point you may see a little sweep blade unwrap. This is normal. If it happens too frequently and too early in the payload generation process, it will not allow the EXCEL to generate a "good" load.

If you have determined that it does occurs too frequently, you should first remove the secondary port relief from its cavity. Inspect the seal at the inboard tip of the cartridge. It may be nicked, extruded, or pinched. If it is damaged, it will allow leakage to tank at the higher pressures and the blade will tend to unwrap even if the relief and its setting are fine. Repair the seal system at the cartridges' tip and monitor results on the route. See the Repairs section for important details on reinstalling a port device correctly (so it doesn't leak again).

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If there is no evidence that the seal system at the tip of the cartridge was leaking, then the next step is to install a *new* preset "secondary port relief" cartridge with fresh seals. Again refer to the Repair section write-up for *correctly* installing this cartridge. This port relief is a fixed, non-adjustable cartridge. Do not use shims to adjust it upward as this will eventually cause serious structural damage or componentry damage. Since the setting is a "crack" setting, it is factory bench-set (at a "test stand") to 2GPM. The crack flow of only 2 GPM can not be duplicated in the field on the truck so the cartridge must be replaced. This setting is not even *measurable* in the field, on the truck. LOADMASTER stocks this "secondary port relief" (with new seals) as P/N 8800605 (3800psi @ crack flow) for the EXCEL. Never substitute something else, never shim adjust it upward, and never just "plug" the valve cavity…serious damage will almost certainly eventually present itself.
If the "too frequent" sweep blade unwrap symptom *still* persists, contact LOADMASTER for further advice.

ONE OF THE VALVE SPOOLS FEELS STIFF, BOUND, OR "HAS A LOT OF DRAG"...

The tailgate-mounted valve worksections have a "controls" linkage, which begins at the black knob and ends at the spool itself. Too much friction or outright mechanical interference can affect the sweep and slider blades "knockout positioners".
First visually inspect the mechanical linkage for the particular function with this symptom. Look for any damage; scrape marks, anything abnormal to the eye. The controls are rotating in bearings…try greasing these bearings. Be certain there is some clearance between the controls "lever arms" and the plastic bearing blocks and "ell" bracket.

DANGER…ALWAYS STAY CLEAR OF THE HOPPER AND BLADES WHENEVER THE DIESEL IS RUNNING! SERIOUS INJURY OR DEATH COULD OCCUR IF YOU OR A WORK PARTNER IS CAUGHT IN THE ACTION OF THE BLADES. BLADE ACTION COULD BEGIN UNEXPECTEDLY.

DIESEL MUST BE SHUTDOWN AND THE IGNITION KEYS KEPT IN YOUR POCKET *BEFORE* ENTERING THE HOPPER AREA. PERFORM YOUR SHOP'S FULLY DETAILED LOCKOUT/TAGOUT PROCEDURE BEFORE ENTERING THE HOPPER AREA.

You can isolate the valve from the linkage by pulling the clevis pin right at the valve spool. With pin removed, now try moving the knobbed hand lever. If it feels "free", then the problem is internal to the valve itself. If the linkage itself is binding and you have not greased the plastic bearings in a "long time", then road-spray water may have washed out the grease and you now have corrosion on the steel shaft rotating surfaces. (Regular greasing is *not just* purely for lubrication, it will also displace outward water that migrated into bearing surfaces). Try to smooth the corroded, pitted surface with emery cloth before greasing, or replace the rusted controls with new ones.

If none of the above has helped, it could be internal to the spooled section itself. First, remove the detent cover from the spool on the side opposite the spool clevis (held by two long socket head fasteners). Look at the now exposed detent or knockout for anything that came loose. If something came mechanically loose the spool may totally "lockup or freeze". You may be able to correct this.

A contaminant may have wedged itself between the moving spool and the section's casting (this is a tight clearance surface). Replacement of that particular valve section will be required and then review your hydraulic PM practices. When ordering that particular valve section from LOADMASTER, be certain you order exactly "that" section… they may appear all the same but they are not. This type of failure sometimes has the spool nearly or completely "frozen" into the housing. See the GRESEN V20 or V40 service booklet or this manual Repairs section for details on "changing out a valve section".

Another possibility is that the tie-bolts (that hold the stack-up of GRESEN V40 sections) are over-torqued or unevenly torqued. Re-torque these evenly to 26 ft-lbs.

TAILGATE WILL NOT RAISE OR ONLY PARTILALLY RAISES…

The only pressure control device for the tailgate is the "main relief valve" of the body-mounted valve.

First do a main relief "check and setup". See Table of Contents for this procedure. The EXCEL's main relief is properly set to 2900 PSI @ diesel advanced. If this setting has "fallen-off", a possible symptom is the tailgate not going up fully or struggling to go fully up.

If one or both of the tailgate cylinders has a bypassing piston seal, there may not be enough thrust left to raise the tailgate. This is rare because the cylinders are of premium quality and are cycled only a couple of times a day. (The tailgate lift cylinders have a relatively easy life.) If you must dismount a tailgate cylinder from the EXCEL, see the Repair section topic for the correct and safest method to do this.

DANGER… ALWAYS HAVE THE TAILGATE FULLY DOWN AND FULLY LATCHED *BEFORE* REMOVING THE CYLINDER ITSELF! ALWAYS POSITION THE TAILGATE FULLY DOWN AND LATCHED *BEFORE REMOVING* ANY TAILGATE HOSE OR STEEL TUBE! DO *NOT* "PROP-UP" THE TAILGATE AND *THEN* REMOVE A TAILGATE HOSE OR A TAILGATE CYLINDER. FULLY LOWER AND LATCH THE TAILGATE AND *ONLY THEN* DO MAINTENANCE/REPAIRS TO THE TAILGATE CIRCUIT.

A TAILGATE THAT IS "PROPPED-UP" WITHOUT THE ADDITIONAL SUPPORT OF THE FULLY OPERATIONAL TAILGATE LIFT CYLINDERS COULD SUDDENLY FALL CAUSING SERIOUS INJURY OR DEATH.

THE EJECTOR BLADE IS NOT STRONG ENOUGH TO "PUSH-OUT" THE FULL PAYLOAD…

The ejector telescopic cylinder needs to have 2000 PSI @ throttle advanced to consistently push out the payload.

First, be sure that the operator is advancing the throttle during load push-out. He must have the rocker switch labeled "THRTL" to ON and the throttle button head switch must be depressed and "held' depressed. If the throttle is not advanced, the LEGACY may or may not have enough pressure available to push-out the payload.

Then do a "check and setup" of push-out pressure. This is set to 2,400 psi (fixed; non-adjustable) by the telescopic "protection port relief" that is installed in the Body-Mounted Valve at the extend work port of the ejector work section. See hydraulic schematics in this manual.

Section 04 REPAIRS...

CHANGE-OUT THE HYDRAULIC PUMP

A pump can fail either by gradual progressive wear down or by "catastrophic" failure (sudden and without forewarning). Follow this procedure to have a successful replacement pump "start-up".

If your pump has failed catastrophically, it probably put a lot of debris *into your system*. You must clean up the system when installing the new pump.

Changeout procedure:

1- Shut off the suction line valve by rotating its handle to 90 degrees to the body.
2- Disconnect the pressure hose (1" diameter, 4-wire) attached to the pump. Lead this hose into an oil waste receptacle.
3- Disconnect the suction hose (1-1/2" diameter) and lead into oil waste receptacle. Now open the suction line valve to *drain all* the hydraulic oil from tank. EXCEL tank holds about 40 gallons of oil.
4- Remove the pump from PTO. Cast iron pumps are heavy so use a mechanical device to aid you.
5- Install the new pump to the PTO. Make sure you have the *same* pump as the original (available from LOADMASTER).
6- Clean up the system. Start by installing a new return line filter. Pull the tank's magnetic drain plug (in tank's floor) and clean it up. Remove the tank access cover after wiping this area clean. Remove the suction filter at the inside bottom of tank. Shine good light inside the tank and mop-up any and all debris. After the tank sides and floor are wiped clean, close the suction line valve and pour 3-5 gallons of fresh, clean AW46 hydraulic fluid into tank. Then fully open the suction line valve again and flush the suction line into waste oil receptacle. Now reinstall a new suction line filter (screwed onto suction piping inside tank; no dope needed here). Re-install the clean magnetic drain plug using pipe dope. Re-install the access cover paying attention to properly "groove" it's big O-ring. Shut off the suction line valve again and refill the tank with a brand-name grade AW46 HYDRAULIC FLUID. Now is a good time to replace the tank's filler/breather if it is about due.
7- Reconnect the two pump hoses using the old adapters if in good condition. Use new o-rings for the adapter fittings if using old adapters.
8- *Fully open up* the suction line valve and let the oil *soak* into the new pump's housing for at least 15 minutes.
9- After assuring it is safe to do so, start the diesel and engage the PTO. Let the truck idle for about 5 minutes with no functions engaged (oil flowing in its open loop). This will allow the new return filter to "trap-out" some debris in the system. Then, still with no functions, use the foot throttle to increase diesel speed to about 1200 RPM for another couple of minutes.
10- Cycle any optional equipment the vehicle may have, such as the "kickbar option" about 3 times. Then do a hopper blades semi-automatic cycles a couple of times.
11- Do a tank fill level check and top off. See Table of Contents for proper way to check tank's level.
12- If the old pump failed "catastrophically", change-out the return filter again after 40 hours of run time.

REMOVAL/REPLACEMENT OF A V20 PORT RELIEF

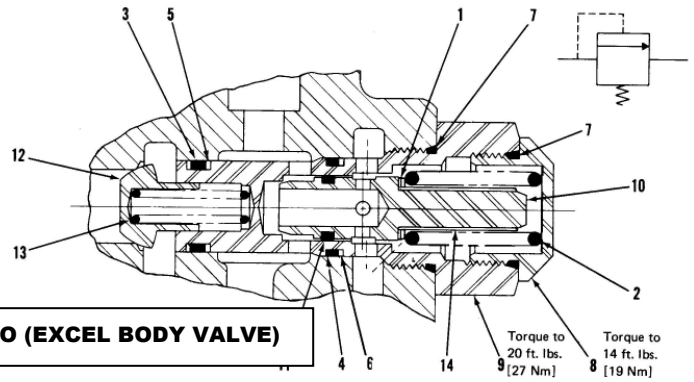
A port relief will screw into a cavity right next to the particular port it will relieve. A port relief is on the cylinder side (the workport side) of the spool. When the spool is in its centered-neutral position, this type of relief can still provide protection because of its location.

All EXCEL's have a V40 port relief mounted on the base-side of the sweep cylinders. This is known as the "secondary port relief".

All EXCEL's have a V20 port relief mounted on the base-side of the ejector's telescopic cylinder. This is known as the "hi/lo relief".

The GRESEN V20 style of port relief has a "load check" at the tip of the port relief cartridge. It is very important when removing/installing a V20 port relief to (a) assure a clean casting "cavity" and (b) assure the load check and seals "go into the cavity" without disassembling itself during the insertion process.

The load check is a simple device. The check itself has a "mushroom" shape and a lightweight spring that biases it



V20 (EXCEL BODY VALVE)

closed. Items 12 & 13.

Removal procedure:

1- **Before removing any port relief, position the blades so it will not move *by gravity* when you remove the port relief. The slide blade *must be fully down*. The sweep blade must dangle *nearly vertical* so gravity will not move it. REMOVING THE PORT RELIEF WILL UNBLOCK THE PORT IT APPLIES TO! You may want to temporarily weld some steel scrap between a blade and the tailgate's shell. Disconnect both battery cables and any harness connectors found inside battery box, before welding to the LEGACY. See the Repair topic "DISCONNECTING VEHICLE BATTERIES".**
2- Unscrew the cartridge by grabbing the wrenching flats *closest* to the section's casting. Turn CCW to loosen.
3- Remove the cartridge by pulling slowly and straightaway
4- The "load check" and its spring probably did NOT come out of the cavity because they are not mechanically held to the cartridge. Use a magnet wand to fish out the mushroom shaped check and spring. Use a penlight to look inside cavity for any debris such as pieces of old O-rings or the backup ring. You must assure that the casting cavity is *cleaned-out.* It will NOT come out on its own, you must use a penlight, a magnetic wand, and hooking tools to assure a clean cavity. [Sec04-pg01]

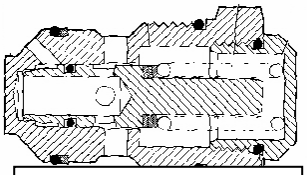
Re-installing procedure:

1- Preassemble the cartridge, the load check and spring. Use plenty of common grease to hold it all together. Smear some grease on the seals at the tip and the o-ring at the wrenching nut so they don't nick or tear.
2- Since you have already totally cleaned-out the cavity, insert the "greased together" unit by inserting into cavity slowly. Don't rattle it or bump it…your goal is to feed it as far into the cavity as you can without having it bump into anything. Start to turn when threads engage. Do not force together…if it is all still "together", it will go into cavity without much force.
3- Torque the cartridge body's wrenching flats snug to section casting.

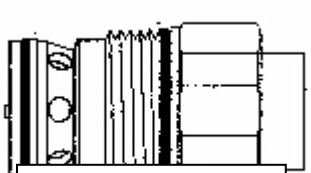
REMOVING/INSTALLING A V40 (or VG35) PORT RELIEF

Another port mounted device is the "secondary port relief" of the EXCEL's tailgate-mtd valves' sweep section. This is a V40 valve (orVG35 APRIL2004) for the EXCEL. The 'secondary port relief" is always mounted to the sweep cylinders' base-side; the V40 (or VG35 april2004)anticavitation check is always mounted on the sweep cylinders *rod*-side. This check provides make-up oil to the sweep cylinder's rod-side whenever the secondary port relief is cracked open and the sweep blade unwraps a bit. This make-up oil precludes the possibility of a 'suction" effect damaging the sweep cylinders piston seals.

The GRESEN V40 (or VG45 april2004) port relief and the anticavitation check are self-contained "cartridges". The load check is ***not*** mounted at the "tip", as it is in the case of the V20. Repairing a V40 (or VG35) port device is therefore simpler to do.



V40 PORT RELIEF



V40 ANTI-CAV

Removal procedure;

1- **Before removing any port mounted anticavitation check or port relief, position the blades so it will not move *by gravity* when you remove the cartridge. The slide blade *must be fully down*. The sweep blade must dangle *nearly vertical* so gravity will not move it. REMOVING THE CARTRIDGE WILL UNBLOCK THE PORT IT APPLIES TO! You may want to temporarily weld some steel scrap between a blade and the tailgate's shell. Disconnect both battery cables and any harness connectors found inside battery box, before welding to the EXCEL. See the Repair topic "Disconnecting vehicle batteries".**
2- Use a open end wrench to unscrew the anticav plug from the valve housing. Use the wrenching flats closest to the valve housing.
3- The cartridge will come out of cavity "as a unit". Check the condition of the tip seal and backup ring.
4- Visually check that the housing cavity is clean of debris (such as a extruded piece of o-ring or backup ring).
5- When re-installing, dress up the tip seal and the o-ring at the outside with some grease.

DANGER…REMOVING ANY PORT MOUNTED DEVICE (RELIEF OR ANTICAV) WILL *UNBLOCK* THAT CYLINDERS PORT! GRAVITY CAN CAUSE THE SLIDER OR SWEEP TO MOVE IF THE FOLLOWING STEPS ARE NOT TAKEN FIRST.

A.. MOVE SLIDER BLADE FULLY DOWNWARD
B.. MOVE SWEEP BLADE TILL IT'S FACE IS VERTICAL

ALWAYS SHUTDOWN THE DIESEL AND PLACE THE IGNITION KEYS IN YOUR POCKET BEFORE ENTERING THE HOPPER AREA! DO YOUR SHOP'S COMPLETE LOCKOUT/TAGOUT PROCEDURE.

TIP…ALWAYS "CLEAN-OUT" THE CAVITY OF ANY DEBRIS. THERE MAY BE OLD CHUNKS OF BROKEN BACKUP RINGS OR PIECES OF A PINCHED O-RING STILL INSIDE THE CAVITY. THE V20 *LOAD CHECK* AND IT'S SPRING DO *NOT* USUALLY COME OUT OF CAVITY WITHOUT FISHING THEM OUT. INSTALLING FRESH PARTS IN A CAVITY WITH DEBRIS (OR THE OLD LOADCHECK) WILL CAUSE MALFUNCTIONS.

REPAIRS...(CONT'D)

REPLACING A VALVE'S SECTION

The body-mounted valve and the tailgate-mounted valve are built-up of valve "sections". The sections are stacked together and then 3 tie-rod type bolts are evenly torqued to hold the individual sections together. Sets of o-ring seals are installed between the sections. (VG35 Torque=75 ft-lbs)

The obvious service advantage is that an individual section can be repaired or replaced while re-using all the other sections.

It is important to order from LOADMASTER the particular section you will be replacing. Sections right next to each other are not necessarily *the same*. They may appear to be the same but the internal cast passages may be different. Even if the casted passages were the same, the different sections may have different port mounted devices or other differences. See your EXCEL parts book and always order the *particular* section you need.

Follow this procedure when removing a valve section.

Procedure:

1- Look at the plumbing/mounting setup of the particular section and decide upon an overall disassembly "strategy" for the best way to get it removed and replaced. Sometimes it is best to totally remove the entire valve and do the work on the bench. Other times you can save time by removing only portions of the overall valve.

2- **Always park the hopper blades with the slider blade all the way down and the sweep blade with face dangling near vertical. When you begin to uncouple the valves hoses and fittings, the cylinders will no longer be "blocked" and the blades could then move by *gravity*.** You may chose to temporarily weld in place some steel blocking between the blades and the tailgate's shell…to preclude the possibility of blades moving by gravity.

3- Disconnect the hoses and fittings as needed. It is a good idea to "tag" these so you can replumb exactly as it was.

4- Before doing the actual valve disassembly, study the valve and label or number sections so you can reassemble it the same as it was.

5- Remove three assembly stud (tie-bolt) nuts. Do not remove the tie-bolts.

6- Remove the sections from tie rod bolts by sliding them to get at the one you are interested in.

7- Thoroughly clean o-ring counterbores and ground surfaces of each section.

8- Replace the 4 o-rings. See Parts Manual for correct o-ring kit part number.

9- Replace valve sections on assembly studs in the same order in which they were removed. O-ring counterbores must be pointed in the same direction as they were. Use care when replacing valve sections to avoid dislodging o-rings from counterbores.

10- When all valve sections are positioned on assembly studs, replace stud nuts and tighten evenly to 32 FT-LBS torque.

11- Reconnect the hoses and fittings exactly as they were.

12- After assuring everything is "tight", restart and check the hydraulics functions. You may need to "cycle" a few times to work out any air pockets in the hydraulic system.

13- Check the oil tanks fill level. See Table of Contents for the correct procedure to do this. (Do not overfill).

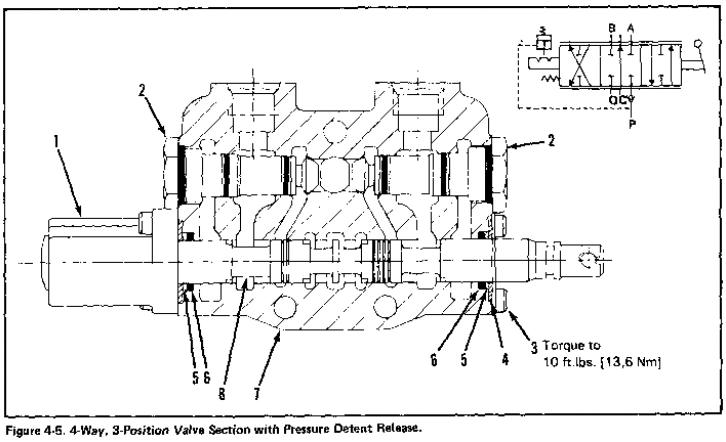


Figure 4-5. 4-Way, 3-Position Valve Section with Pressure Detent Release.

REPLACING SPOOL SEALS

If the spool has a handle bracket, then items 1 and 4 will be omitted from picture below.

Procedure:

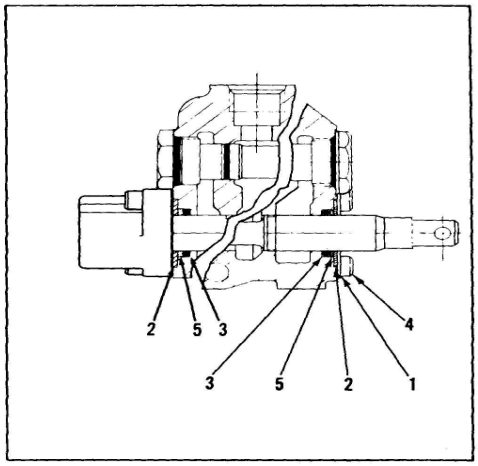
1- Remove bonnet assembly parts from back of valves and keep in order of dissassembly.

2- Remove all parts connected to the spool on the front of the valve, either the complete handle bracket assembly, or the seal retainer assembly if no handle. NOTE… Do not remove the spool as the seals can be replaced externally. Prevent spool from turning or moving by inserting a screw driver through clevis slot. Do not hold with a wrench as this will destroy the finish.

3- Remove retainer plate (item 1), retainer plate washers (item 2), backup washers (item 5), and spool seals (item 3).

4- Thoroughly clean counterbore.

5- Lightly oil new seals. Slide over spool and insert in seal counterbore.



Spool Seal Assembly

REPAIRING A TAILGATE LIFT CYLINDER

ALWAYS HAVE THE TAILGATE FULLY DOWN AND LATCHED BEFORE REMOVING ANY TAILGATE CYLINDER.

ALWAYS HAVE THE TAILGATE FULLY DOWN AND LATCHED BEFORE DOING ANY REPAIR TO THE TAILGATES' PLUMBING (SUCH AS REPLACING A TAILGATE HOSE)

NEVER MECHANICALLY PROP-UP THE TAILGATE AND THEN REMOVE A TAILGATE CYLINDER! TAILGATE MAY SUDDENLY FALL FROM Its MECHANICAL PROPS, CAUSING SERIOUS INJURY OR DEATH.

NEVER MECHANICALLY PROP-UP THE TAILGATE AND THEN REMOVE A TAILGATE HOSE OR TUBE OR FITTING! TAILGATE MAY FALL FROM Its MECHANICAL PROPS AND CAUSE SERIOUS INJURY OR DEATH.

To "prop-up" a tailgate securely requires both hydraulic support (the tailgate lift cylinders and its plumbing) and two mechanical props. (See the Repair topic "Installing a fresh tailgate seal" for a complete discussion of proper propping-up of the tailgate). Relying solely on the mechanical prop-up systems is ***not*** adequate.

If a tailgate cylinder needs repairs or a tailgate lift plumbing component needs removal…**fully lower and latch the tailgate *first* and then remove the cylinder or plumbing component (such as a hose or tube or fitting).** The EXCEL tailgate lift cylinder mounting methods and plumbing methods are designed to allow tailgate lift cylinder or plumbing components to be serviced *with the tailgate fully down*.

LOADMASTER can fax to you at your request the service procedures for the repair the tailgate lift cylinders' seals. These procedures are written by LOADMASTER's supplier. It is not included in this manual because of space considerations. These premium design cylinders have a relatively easy life and should not require repair for many years.

Remember…always fully lower and latch the tailgate before doing any cylinder repairs (including removal).

Remember…always fully lower and latch the tailgate before doing any repairs to the tailgate cylinders' plumbing or valving.

Remember…**never** remove a tailgate cylinder or tailgate plumbing component with tailgate mechanically propped-up.

DISCONNECTING/RECONNECTING THE VEHICLE'S BATTERIES

Disconnect the truck's batteries *before doing any welding* to the EXCEL. If the batteries are left connected during welding, the vehicles charging system will be damaged (alternator/regulator). Most truck chassis today have computers on board that could also be damaged if the battery cables and *any harness connectors* are left connected during welding. When you remove the battery box cover, you will often see one or two harnesses with coupling connectors inside the battery box…disconnect these prior to welding to protect the vehicle's sensitive electronic components.

Disconnect Procedure:

1- Remove the grounding cable **FIRST!** It is typically the black color cable labeled NEG or just -. Disconnect at the battery post that is directly connected to the *chassis* cable (not at the battery jumper cable).
2- Then remove the positive cable second. It is typically of red color and is labeled POS or just +.
3- Disconnect any harness connectors in the battery box.

*YOU MUST DISCONNECT THE GROUNDED CABLE **FIRST**! THIS IS TYPICALLY THE BLACK NEGATIVE CABLE.*

If you should *wrongly* try to disconnect the positive first, when your steel wrench "bumps into" any nearby steel chassis part…you will get *arcing.* Arcing can burn you and could trigger an explosion. BATTERY GASES CAN BE EXPLOSIVE!

DANGER… ALWAYS WEAR EYE PROTECTION WHEN PERFORMING ANY MAINTENANCE OR DOING ANY REPAIR JOBS!

Now do whatever welding task you intend to do. Finish the welding task completely and then reconnect the truck's batteries.

Reconnect Procedure:

1- Reconnect the red, positive battery cable **FIRST!**
2- Reconnect any harness connectors in battery box.
3- Reconnect the black, negative ground cable **last.**

The grounded cable (typically the black NEG) is the FIRST to be disconnected and the LAST to be reconnected.

The above battery cables disconnection/reconnection procedure is provided by LOADMASTER to help prevent damage to the chassis during a welding task. Refer to the chassis operating/maintenance manuals for further details. If any the information in the chassis manuals is different from the above…follow the information given in the chassis manual since it is most specific to that particular chassis.

INSTALLING A FRESH TAILGATE SEAL

The very nature of this task requires a service technician to be underneath a *raised* tailgate. It is therefore extremely important the tailgate be securely *hydraulically and mechanically held* in this partially raised position.

The tailgates' hydraulic cylinders and plumbing *must* be installed and fully functional. The holding power of the tailgate's lift cylinders themselves will then be mechanically supplemented. Do not rely on the tailgate cylinders *only*...should a hose-end blowoff the tailgate will suddenly fall causing serious injury or death.

The procedure described here begins with resting the tailgate onto the EXCEL's tailgate prop rods. The "end" of the prop rod must be lowered all the way *to touching* the prop stop (as shown in photo) and not any higher. After this is done, your shop *must* add *shop-provided* mechanical blocking, such as the steel horse shown in the drawing. You must assure the tailgate is supported ***in three ways,*** *before* beginning the task of "installing a fresh tailgate seal". The three ways are:

1- The tailgate's lift cylinders, plumbing and valving must be fully functional and in good working condition.
2- The tailgate must be supported BOTH of the integral "tailgate prop rods" and these prop rods must be positioned correctly (fully down; touching the "stop tab" vee).
3- Your shop must supplement the above two with additional mechanical support to eliminate any possibility that the gate could suddenly fall. LOADMASTER will offer some suggestions in this section, but your shop must ultimately satisfy this requirement.

It is critical that it be understood that all three of the above support methods be provided. Using *just two* of them is NOT sufficient.

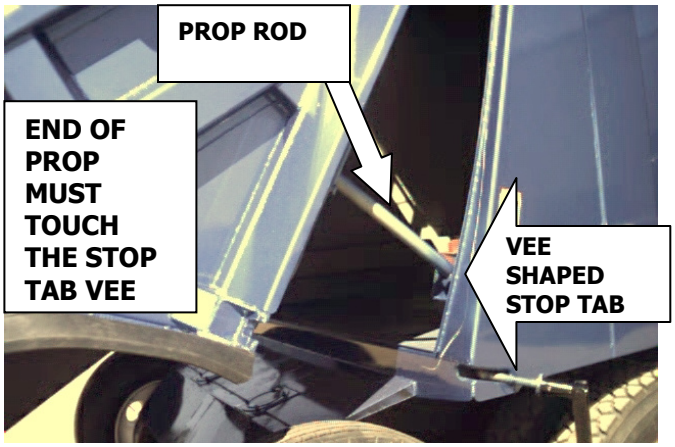
Just after the tailgate is secured (in three ways) in this position, the next step is to do your shop's detailed **LOCKOUT/TAGOUT** procedure. Always shutdown the diesel and place the ignition keys in your pocket *before* going underneath the securely propped up tailgate. Place a sign on the steering wheel that says DO NOT START ENGINE and **chock** the vehicle's tires.

Procedure:

1- Inspect the tailgate hydraulic system to be in good working condition.
2- Put the transmission in Neutral; set the park brake applied ON; start the diesel and engage the PTO
3- Raise the tailgate upward about three feet.

DANGER... STAY CLEAR OF A RAISED TAILGATE AT ALL TIMES! DON'T WALK BENEATH OR STAND UNDERNEATH A RAISED TAILGATE! DO NOT ALLOW PASSERBY'S TO BE ANYWHERE NEAR A RAISED TAILGATE!

4- Remove the tailgate prop rods from their storage pockets. Rotate the thumbscrews CCW to uncage props from their storage pockets. Rotate the entire prop rod until they are downward. Do not allow your body to be underneath the raised and unsupported tailgate. The props are moveable ***while standing outside*** the tailgate.



5- Very slowly begin lowering the tailgate ("feather it") until the props are **touching the stop tabs**. See photo.

6- Be sure *both* the left and the right prop rods are fully down. **Shutdown the diesel.**

7- Now provide a **third means of support** for the tailgate in this partially raised position. Always use **wheel chocks** to prevent the possibility of the truck chassis rolling away from your third means of support (in addition to setting the PARK BRAKE applied-on).

Your shop's situation will influence how you achieve this third means of support.

A stout steel sawhorse positioned as shown in the drawing with welded-on steel blocking will additionally support the raised gate.

If available, park beneath a overhead hoist and carefully rig chains (or heavy strapping) to additionally support the raised tailgate. The hoist should be at least 2-ton capacity and the "slack" mostly removed from the rigging.
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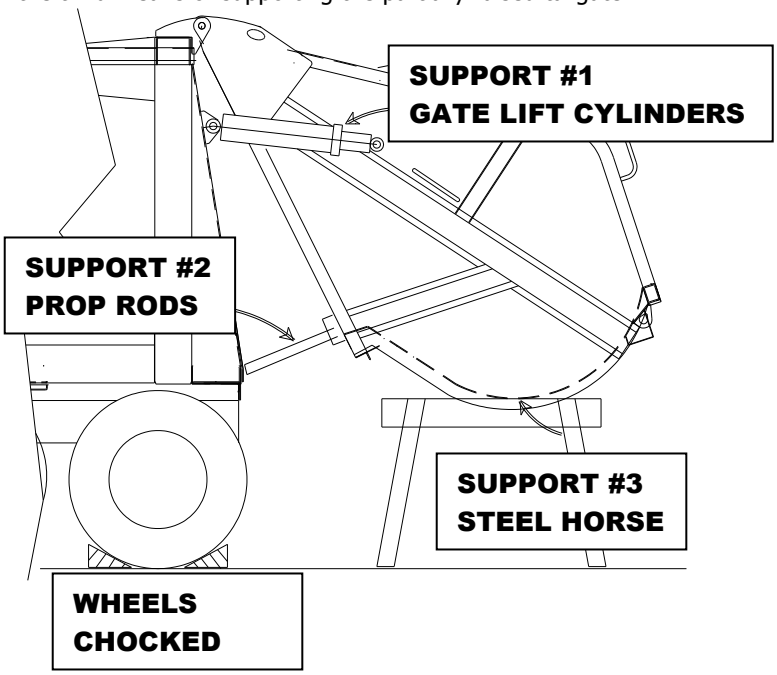
Your shop may have some other way to provide this additional support that LOADMASTER can not anticipate here. Be certain the first two means of support *remain effective* when rigging the third means of supporting the partially raised tailgate.



8- Once you are *completely satisfied* that the partially raised tailgate is <u>secured in three ways</u> in this raised position, institute your shop's detailed LOCKOUT/TAGOUT procedure.
9- Scrape the crud away from the seal's bulb and pounded-over clamp.
10- Use a pry bar to bend outward the unwelded edge of the pounded-over steel seal clamp. Bend just far enough outward to release the seal's rubber flange. Start at one end of the seal and work your way across to the other until old seal is totally free. Clean up the surface again.
11- Install the new seal by beginning at one end and pounding down the pound-over clamp while holding the new seal's rubber flange as *deep* into the clamp as it will go. Keep feeding the seal into the clamp and hammering down the clamp as you work your way across the tailgate. Apply a little "stretch" tension as you go so it lays flat.
12- After seal is completely installed, remove the mechanical support (steel horse or other means) *first* and then return the EXCEL's prop rods to their storage pockets. When returning the prop rods to their storage pockets, do not stand underneath the raised tailgate…stand off to the vehicle's side.
13- Now fully lower and latch the tailgate. Before lowering the gate, be certain that no person is underneath the tailgate. LOADMASTER recommends that one person stand well off to the side of the gate (watching the pinch point between the gate and the body) while a second person (at the tailgate raise/lower hand lever) will very slowly lower the tailgate. The person at the hand lever must always maintain full vision of the person monitoring the pinch-point and be alert to any "stop lowering" voice signal as the tailgate "creeps" slowly down.

A SAFE PRACTICE IS TO NEVER ALLOW A TAILGATE TO BE RAISED OR PARTIALLY RAISED… UNLESS THERE IS A <u>SPECIFIC NEED</u> TO HAVE IT SO. WHEN THE NEED IS SATISFIED, FULLY LOWER AND LATCH THE GATE, AS DESCRIBED ABOVE, AS SOON AS POSSIBLE. A FULLY LOWERED AND LATCHED TAILGATE IS ALWAYS SAFER THAN <u>ANY RAISED</u> TAILGATE, EVEN IF THE TAILGATE IS HYDRAULICALLY AND MECHANICALLY SUPPORTED.

BEFORE LOWERING A TAILGATE, ALWAYS BE CERTAIN THAT NO PERSON IS UNDERNEATH OR NEARLY UNDERNEATH THE RAISED TAILGATE!

NEVER LOWER A TAILGATE IN AN ABRUBT FASHION! KEEP THE DIESEL AT IDLE RPM AND SLOWLY "FEATHER" THE GATE TO FULLY CLOSED BY ONLY <u>PARTIALLY</u> SHIFTING THE HAND LEVER TO "LOWER".

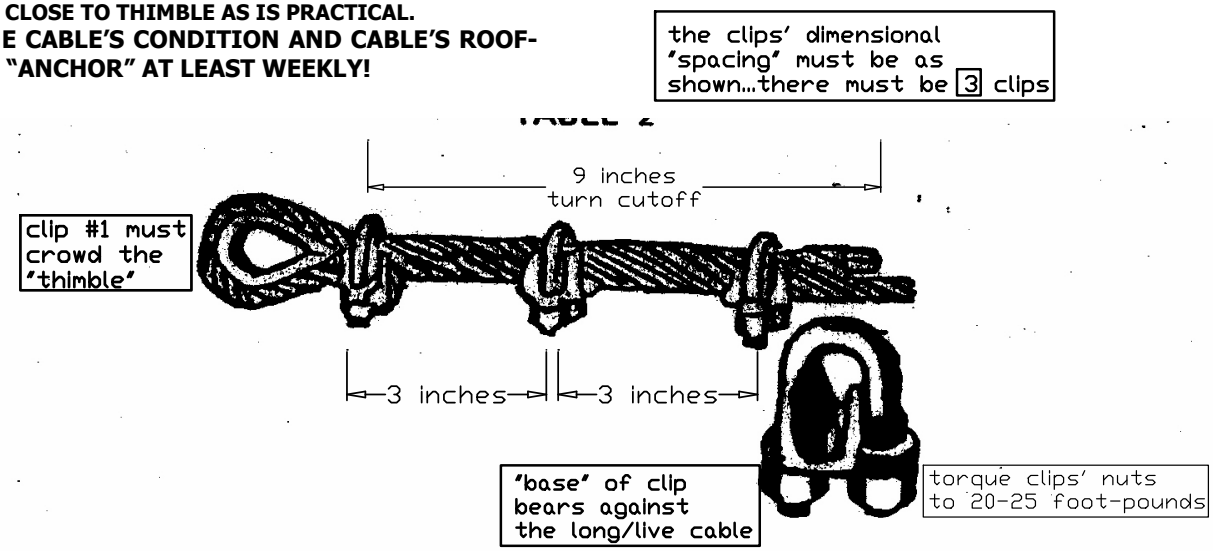
NEVER WORK, STAND, OR WALK UNDERNEATH A RAISED TAILGATE (<u>EVEN IF</u> MECHANICALLY SUPPORTED) THAT DOES NOT HAVE <u>BOTH</u> HYDRAULIC CYLINDERS FULLY INSTALLED, FULLY FUNCTIONAL, AND PURGED OF ALL AIR POCKETS!

NEVER WORK, STAND, OR WALK UNDERNEATH A RAISED TAILGATE THAT HAS <u>ONLY</u> THE HYDRAULIC CYLINDERS SUPPORTING IT RAISED! THE TAILGATE MUST HAVE TWO ADDITIONAL MEANS OF MECHANICAL SUPPORT.

ALWAYS IMPLEMENT YOUR SHOP'S DETAILED LOCKOUT/TAGOUT PROCEDURE <u>BEFORE</u> WORKING UNDERNEATH THE HYDRAULICALLY AND MECHANICALLY PROPPED OPEN (HELD THREE WAYS) TAILGATE TO REPLACE THE SEAL!

REPLACING or ADJUSTING THE 2-10 CABLE...
CORRECT and SECURE CABLE "ANCHORING"

When installing a replacement cable...or making a cable "length" adjustment...for the 2-10 **option. The chart below shows the proper technique for "anchoring". The** 2-10 **uses ½" diameter cable. KEEP THE "CLIP" CLOSEST TO THE LOOP'S THIMBLE AS CLOSE TO THIMBLE AS IS PRACTICAL.**
INSPECT **THE CABLE'S CONDITION AND CABLE'S ROOF-TOP CABLE "ANCHOR" AT LEAST WEEKLY!**
Sec04-pg07



NOTE: There is only one correct method of installing wire rope clips. They should be attached to rope ends as shown in photograph above. The base of each clip should bear against the live, or long rope end, and the U-Bolt should bear against the dead or short rope end.

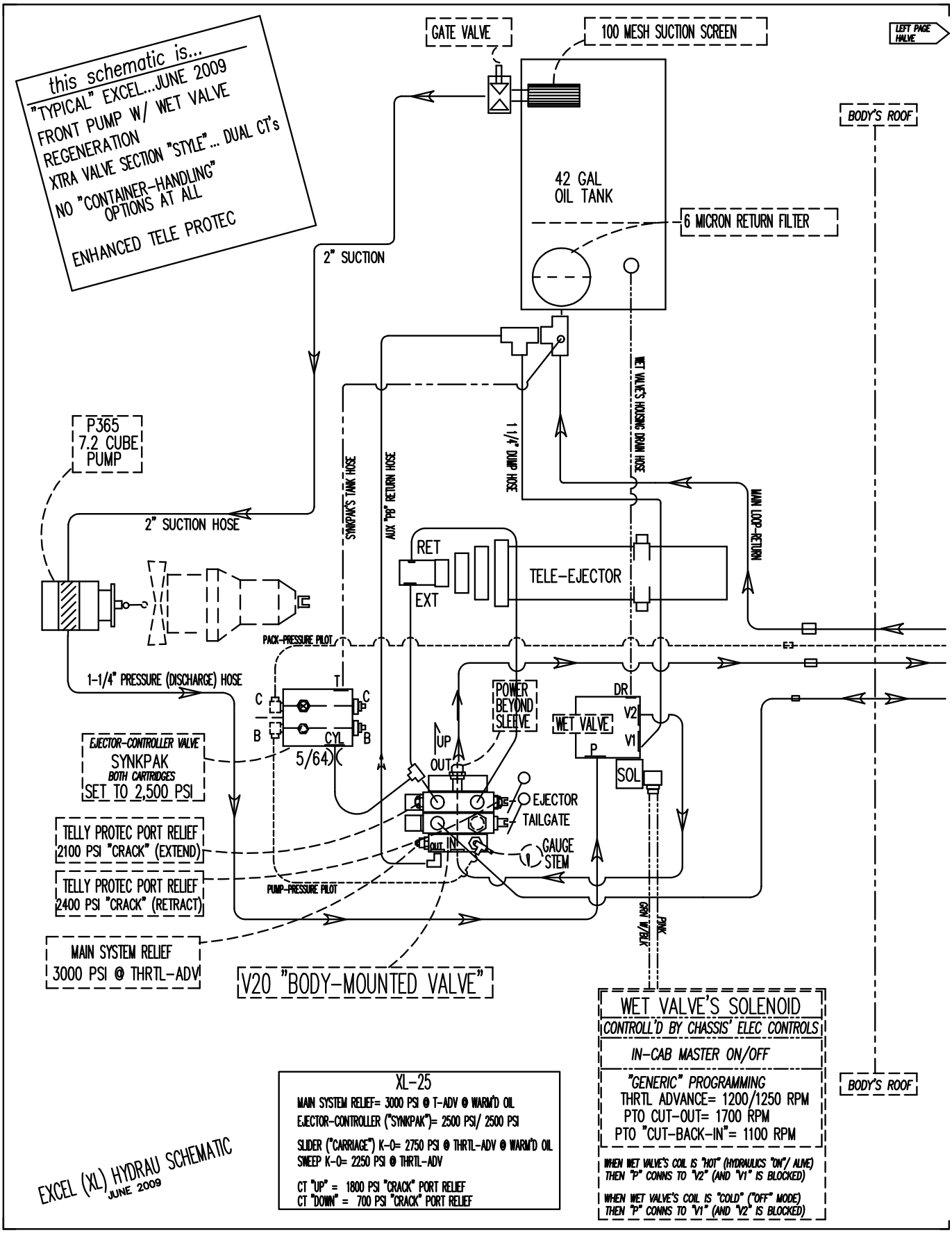
NUMBER AND SPACING OF CLIPS FOR ROPES OF VARIOUS SIZES

Diameter of rope (in.)	Number of clips	Center-to-center space between clips (in.)	Length of rope turned back exclusive of eye (in.)
1/4	2	1 1/2	3
5/16	2	1 7/8	4
3/8	2	2 1/4	5
7/16	2	2 5/8	6
1/2	3	3	9
5/8	3	3 3/4	12
3/4	4	4 1/2	18
7/8	4	5 1/4	21
1	4	6	24
1 1/8	5	6 3/4	34
1 1/4	5	7 1/2	38
1 3/8	6	8 1/4	50
1 1/2	6	9	54
1 5/8	6	9 3/4	60
1 3/4	7	10 1/2	74
1 7/8	8	11 1/4	90
2	8	12	96
2 1/8	8	13	104
2 1/4	8	14	112

Loadmaster uses ½" dia.

Sec07-pg18 (blank for “notes”)

Hydraulics Schematic...XL TYPICAL> LEFT "HALVE" june '09 REV



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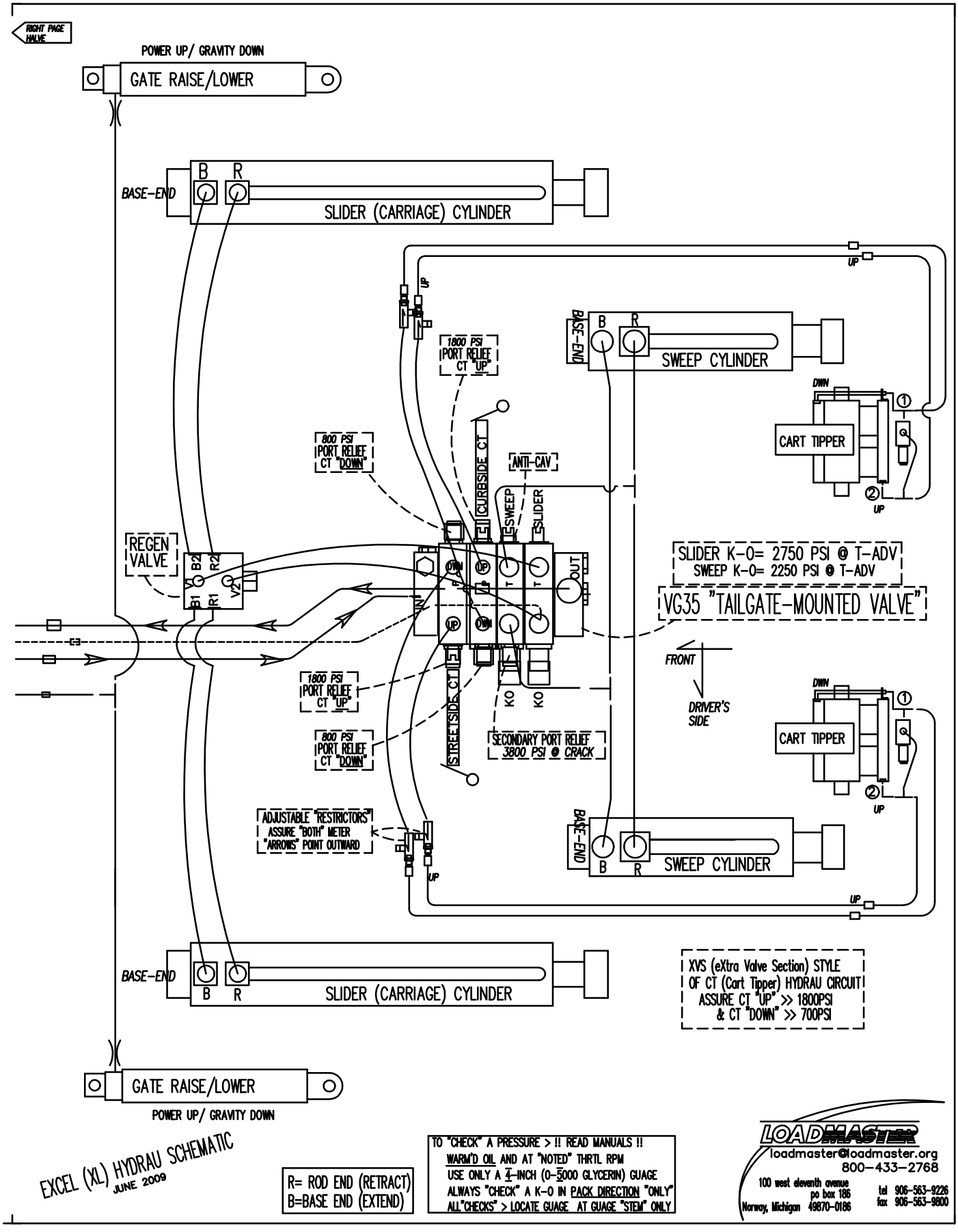
Hydraulics Schematic...XL TYPICAL > RIGHT HALVE june '09 REV



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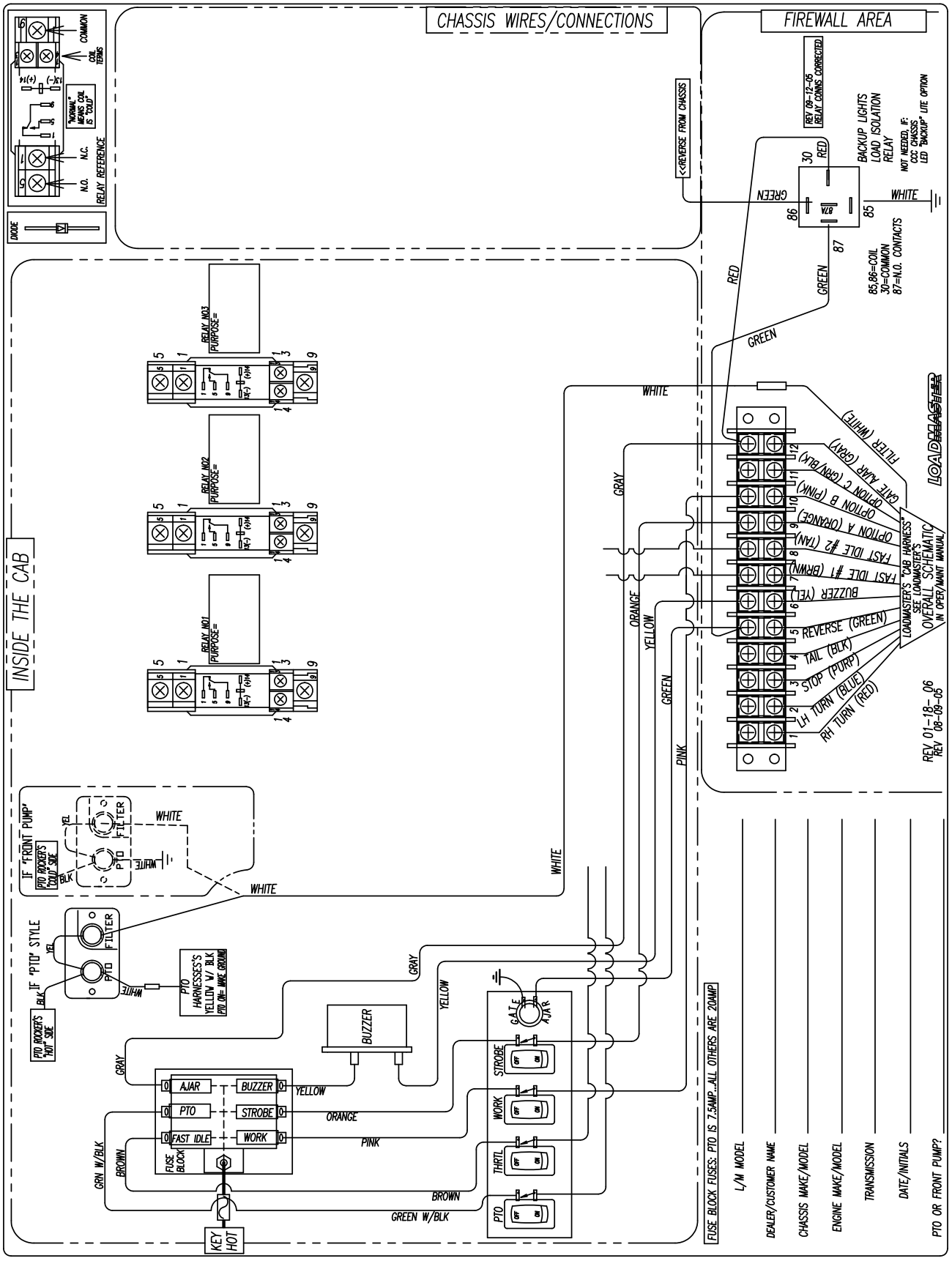
Electrical Schematic… *Chassis Interfacing* Generic Diagram

LoadMaster will "record" each Chassis Interface on "this" Schematic…this CHASSIS-TO-L/M BODY hard wiring "Varies" per "chassis; diesel; transm; pump; etc….



Electrical Schematic… BLANK

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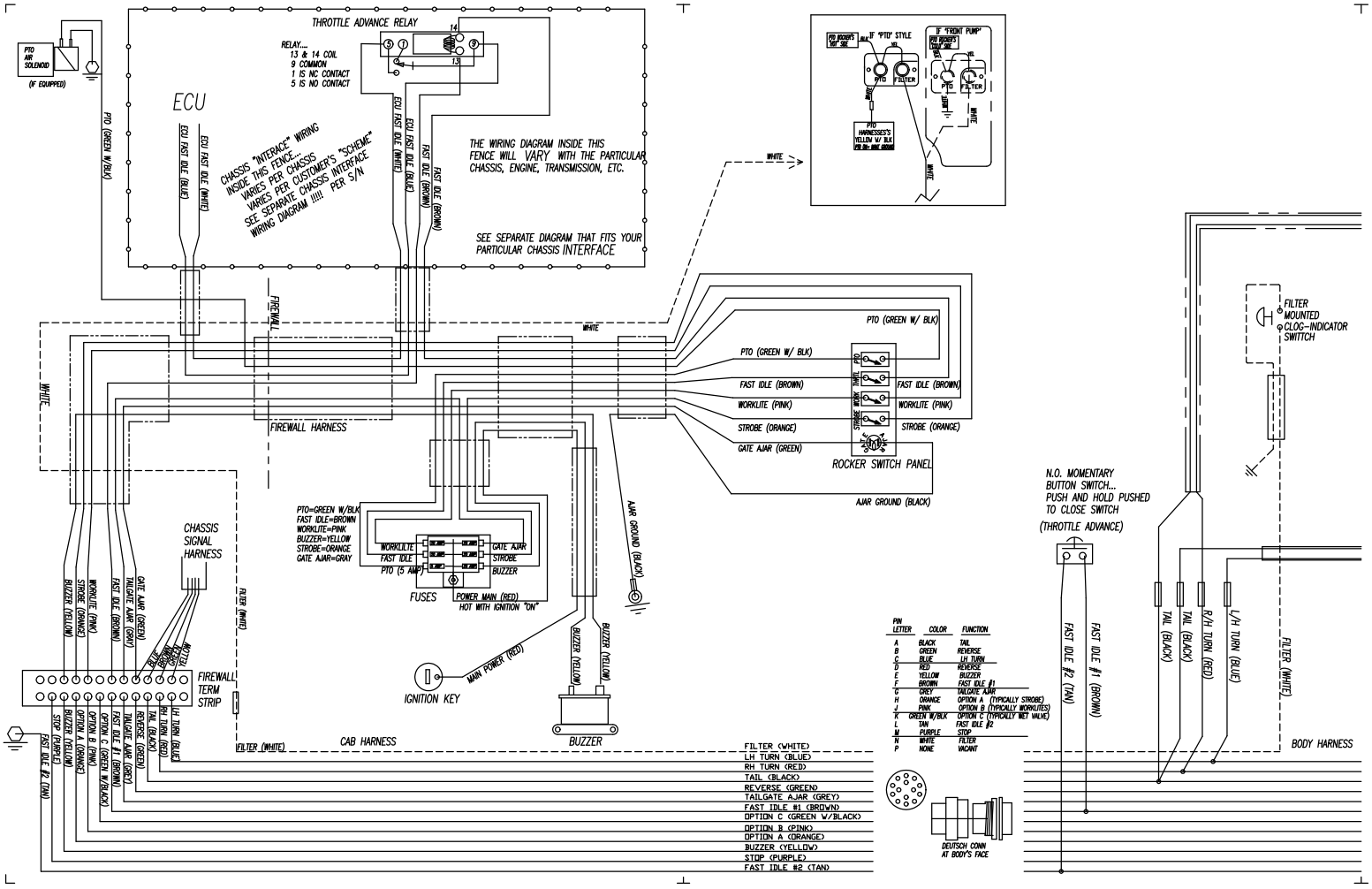
Electrical Schematic…OVERALL “GENERIC” (left “Halve”)



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Electrical Schematic…OVERALL “GENERIC” (right “Halve”)