



## Brake Actuating Systems

This section consists of various ways to activate and actuate your trailer brakes and includes the following: Electric Brake Controls, Breakaway Kits, Hydraulic Surge Brake Actuators, Plumbing Line Kits, Electric-Hydraulic Brake Systems and Redline Brake Actuating Systems for Vacuum/Hydraulic, Air/Hydraulic or Straight Air Brake Systems.

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## Redline Brake Control



### TA900A Features Include:

- **Time Actuated Power:** Trailer brakes are gradually applied at pre-set rates. Full brake actuation in 2 seconds. 100% solid state
- **Manual Override:** Aids in setting controls and allows manual brake actuation, activates brake lights
- **Multi-color LED:** Indicates completed circuit, brake actuation and brake wire shorts
- **Installation:** Mounts in any position, no leveling required, quick disconnects for easy removal
- **Warranty:** Limited lifetime warranty

Part No.	Ref. No.	Description
TA900A	416321	ELECTRONIC BRAKE CONTROL FOR 1-3 AXLES



### TA1000 Features Include:

- **Time Actuated Power:** Trailer brakes are gradually applied at pre-set rates. Full brake actuation in about 2.5 seconds. 100% solid state
- **Manual Override:** Aids in setting controls and allows manual brake actuation
- **Two Color LED:** Indicates completed circuit and brake actuation
- **Installation:** Mounts in any position, no levelling required
- **Warranty:** Limited 3 year warranty

Part No.	Ref. No.	Description
TA1000	416310	ELECTRONIC BRAKE CONTROL FOR 1-2 AXLES



### TA1100 Features Include:

- **Time Actuated Power with "Panic Stop" Override:** Trailer brakes are activated at desired setting up to 2.8 seconds unless "hard" braking of tow vehicle occurs and inertia sensor overrides timer system for panic stop situations
- **Two Control System:** Controls power output to trailer brakes and braking response
- **Manual Override:** Aids in setting controls and allows manual brake actuation
- **LED Display:** Indicates there is a complete electrical circuit
- **Installation:** Mounts conveniently under vehicle dash
- **Warranty:** Limited 3 year warranty

Part No.	Ref. No.	Description
TA1100	416300	ELECTRONIC BRAKE CONTROL FOR 1-2 AXLES



### TA1200 Features Include:

- **Digital Display:** Displays voltage being applied to brakes; presence of short circuit and trailer connection
- **Time Actuated Power:** Trailer brakes are gradually applied at pre-set rates. Full brake actuation in about 2.5 seconds. 100% solid state
- **Manual Override:** Aids in setting controls and allows manual brake actuation
- **Installation:** Mounts in any position, no levelling required. Digital readout can be reset for installation requiring upside down mounting
- **Warranty:** Limited 3 year warranty

Part No.	Ref. No.	Description
TA1200	416296	DIGITAL BRAKE CONTROL FOR 1-3 AXLES

## Hayes-Lemmerz Energize Series Brake Controls



### Features Include:

- **True Proportional Braking Power:** Inertia Activated Sensor
- **Two Control System:** Controls power output to brakes and braking response
- **Manual Override:** Aids in setting controls and allows manual application of brakes
- **LED Light Display:** Indicates there is a completed electrical circuit, and informs operator of vehicle's braking response and relative braking power
- **Installation:** Mounts conveniently on top or under vehicle dash
- **Warranty:** Limited five year warranty

Part No.	Ref. No.	Description
81741B	416225	"ENERGIZE III", ELECTRIC BRAKE CONTROL, 1-2 AXLES
81745	416240	"ENERGIZE XPC", ELECTRIC BRAKE CONTROL, 1-3 AXLES
81770	416250	"ENDEAVOR" DIGITAL CNTRLR PROPORTIONAL, 1-4 AXLE



81770

## Tekonsha Brake Controls



### Voyager Features Include:

- **True Proportional Braking Power:** Inertia Activated Sensor
- **Two Control System:** Controls power output to brakes and braking response
- **Manual Override:** Aids in setting controls and allows manual application of brakes
- **LED Light Display:** Indicates a completed electrical circuit, aides in setting controls, changes from green to red indicating relative braking power
- **Installation:** Mounts conveniently under vehicle dash
- **Warranty:** Limited five year warranty



Part No.	Ref. No.	Description
9030A	416430	NEW "VOYAGER", ALL ELECTRONIC FOR 1-4 AXLES

### Envoy Features Include:

- **True Proportional Braking Power:** Inertia Activated Sensor
- **Two Control System:** Controls power output to brakes and braking response
- **Manual Override:** Aids in setting controls and allows manual application of brakes
- **LED Light Display:** Green LED monitors a secure connection with trailer and changes to red to indicate increase of power to the trailer brakes
- **Installation:** Rounded mounting bracket allows multiple angles of control positioning under dash
- **Warranty:** Limited five year warranty



Part No.	Ref. No.	Description
9040	416627	"ENVOY", ALL ELECTRONIC FOR 1-2 AXLES

### Sentinel Features Include:

- **True Proportional Braking Power:** Inertia Activated Sensor
- **Two Control System:** Controls power output to brakes and braking response
- **Manual Override:** Aids in setting controls and allows manual application of brakes
- **Five LED Light Display:** Indicates a completed electrical circuit, one light is dedicated to aid in setting control for braking response, the other four change from green to red indicating the relative braking power
- **Installation:** Mounts flush under vehicle dash
- **Warranty:** Limited five year warranty



Part No.	Ref. No.	Description
9055	416630	"SENTINEL", ALL ELECTRONIC FOR 1-4 AXLES

### Prodigy Features Include:

- **True Proportional Braking Power:** Inertia Activated Sensor, no manual leveling
- **Two Control System:** Controls power output to brakes and braking response
- **Manual Override:** Aids in setting controls and allows manual application of brakes
- **Digital Display:** Indicates voltage readout and NC (no connection) if connection is missing  
Visual warning if trailer becomes disconnected
- **Installation:** Control design allows multiple angles of control positioning
- **Warranty:** Limited lifetime warranty



Part No.	Ref. No.	Description
90185	416635	"PRODIGY", ALL ELECTRONIC FOR 1-4 AXLES
7686	416637	REPLACEMENT "POCKET" BRACKET
7894	416638	REPLACEMENT PLUGIN HARNESS

BRAKE  
ACTUATING  
SYSTEMS

## Dexter Brake Control



### Predator Features Include:

- **True Proportional Braking Power:** Inertia Activated Sensor
- **Two Control System:** Controls power output to brakes and braking response
- **Manual Override:** Aids in setting controls and allows manual application of brakes
- **LED Display:** Large digital LED displays voltage output, and makes leveling quick and easy
- **Mounting Range:** Versatile mounting range of -35° to +90°, to accommodate a wide variety of vehicle interiors
- **Warranty:** Limited seven year warranty



Part No.	Ref. No.	Description
58-8	416260	"PREDATOR" DX2 BRAKE CONTROL FOR 1-2 AXLES

## Carlisle Brake Control



The Carlisle ElectraStar brake control system is today's choice for trailer mounted electric brake control. Using the tow vehicle's standard wiring, the ElectraStar needs no special wiring or additional hardwired control units to function. This self-contained unit mounts on the trailer, and using the standard 4-wire vehicle plug, operation is trouble free. Using its onboard microprocessor and accelerometer, the ElectraStar senses the amount of braking effort being generated by the tow vehicle, and adjusts its output to the trailer brakes accordingly. Panic stop and aggression adjustments are made through the in-cab remote control, which plugs into the cigarette lighter. A 17 amp/hour battery pack is required for unit activation and breakaway function. A 3 amp automatic charger is incorporated into the actuator.



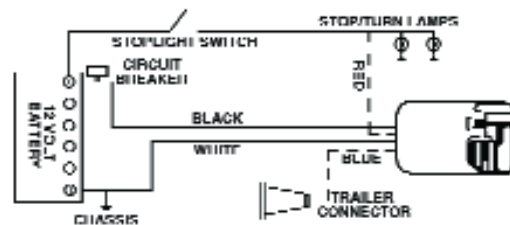
Part No.	Ref. No.	Description
EBAC-CLR	416265	ELECTRASTAR TRL MNT UNIT W/IN-CAB CONTROLLER
CAR-EB	416270	ELECTRASTAR UNITw/IN-CAB CONTROLLER & 17AMP BRKWY
CAR-CLR	416275	REPL IN-CAB CONTROL FOR HYDRASTAR XL & ELECTRASTAR
HBA-EBA	419450	17AMP BREAKAWAY KIT/POWER UNIT FOR ELECTRASTAR

## Brake Control Installation Kit



All in one package, everything needed for proper brake control installation! Redline offers a universal kit, including all wire and electrical items necessary for a standard brake control installation. Vehicle specific kits plug directly into the vehicle wiring harness.

Universal Kit



Part No.	Ref. No.	Description
TA05-020	417900	UNIVERSAL BRAKE CONTROL INSTALLATION KIT, INCLUDES WIRE, TERMINALS & BREAKER
TA05-025	417902	BRAKE CONTROL INSTALLATION HARNESS W/ PRODIGY ADAPTER FOR 1999-02 GM TRUCKS WITH TOWING PACKAGE
TA05-026	417903	GM BRAKE CONTROL HARNESS W/PRODIGY ADAPTER FOR 2003 FULL SIZE PICKUPS
TA05-126	417904	BRAKE CONTROL HARNESS 99-04 GM TRUCK
TA05-030	417905	BRAKE CNTRL INSTALLATION HARNESS W/PRODIGY ADAPTER FOR 1994-03 FORD F SERIES P/U, E SERIES VANS 94-98 EXPLORER & 97-98 EXPLORER W/TOW PKG, 97-03 EXPEDITION, 99-03 EXCURSION
TA05-130	417906	BRAKE CONTROL HARNESS 94-04 FORD TRUCK
TA05-035	417915	BRAKE CONTROL INSTALLATION HARNESS W/PRODIGY ADAPTER FOR 96-03 DODGE RAM PICKUPS, DURANGO
TA05-135	417916	BRAKE CONTROL HARNESS 97-04 DODGE TRUCK

## THE ENGAGER



Easy to monitor battery condition. A simple "push to test" button on the front activates LED lights. A weld-on mounting bracket is also available.



Part No.	Ref. No.	Description	Battery	Application
BA10-150	419235	"Engager" Breakaway Kit, w/LED charge indicator	5 amp/hr	1-3 axles
BA10-150BKT	419238	Weld-on bracket w/studs, fits BA10-150		
20012	419230	Replacement Pin & Cable, for Engager Switch		

## Breakaway Kits and Accessories



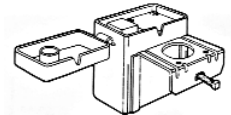
These Electronic Breakaway Kits are the most advanced systems available, featuring a rechargeable, sealed, maintenance-free battery and an optional charger, for trouble-free towing. Choice of 3 Battery Box Designs - (See Below)



- Compact Design
- Rechargeable, sealed, maintenance-free 12 V Battery
- Dependable
- Wide operating temperature (-76°F to +140°F)
- Meets or exceeds D.O.T regulations

### Kits using 2018 Box

Part No.	Ref. No.	Description	Battery	Switch	Charger	Application
1026	419300	Breakaway Kit, no charger	4 amp/hr	2010	N/A	1-2 axles
1028A	419312	Breakaway Kit, with charger	4 amp/hr	2010	1024	1-2 axles
2026	419410	Breakaway Kit, no charger	5 amp/hr	2010	N/A	1-3 axles
2028	419420	Breakaway Kit, with charger	5 amp/hr	2010	2024	1-3 axles
BA10-100	419190	Redline Breakaway Kit, no charger ("bulk", sold in case lots of 12 only)	4.5 amp/hr	Nylon	N/A	1-2 axles



### Kits using 2051 Box

Part No.	Ref. No.	Description	Battery	Switch	Charger	Application
20005	419425	Breakaway Kit, no charger	5 amp/hr	2010	N/A	1-3 axles
20015	419427	Breakaway Kit, with charger	5 amp/hr	2010	2024	1-3 axles
BA10-120	419195	Redline Breakaway Kit, no charger ("bulk", sold in case lots of 10 only)	4.5 amp/hr	Nylon	N/A	1-2 axles



### Kits using 20000 Box

Part No.	Ref. No.	Description	Battery	Switch	Charger	Application
20010	419430	Breakaway Kit, no charger	5 amp/hr	2010	N/A	1-3 axles
20020	419440	Breakaway Kit, with charger	5 amp/hr	2010	2024	1-3 axles



### Kits using 2 Piece Box

Part No.	Ref. No.	Description	Battery	Switch	Charger	Application
BA10-130	419200	Breakaway Kit, no charger, qty of 4, 2 pieces per box	4.5 amp/hr		N/A	1-2 axles
BA02-030	419257	U-Bolt Kit for BA10-130, U-Bolts and Hardware for 4 kits				



### Accessories

Part No.	Ref. No.	Description
2018	420210	BATTERY CASE, POLYETHYLENE PLASTIC, A-FRAME OR JACK POST MOUNT
20000	420215	BATTERY CASE, POLYETHYLENE PLASTIC, LOCKABLE, FLAT SURFACE MOUNT, WELD-ON
2051	420220	BATTERY CASE, POLYETHYLENE PLASTIC, LOCKABLE, FLAT SURFACE MOUNT, BOLT-ON
BA01-010	419240	SEALED LEAD ACID BATTERY, 12 VOLT, 4.5 AMP/HR FOR 1-2 AXLE TRAILERS
BA01-020	419245	SEALED LEAD ACID BATTERY, 12 VOLT, 5 AMP/HR FOR 1-3 AXLE TRAILERS
BA02-010	419250	NYLON BREAKAWAY SWITCH W/ METAL BRACKET, PACKAGED
BA02-020	419255	12V MAINTENANCE CHARGER FOR BREAKAWAY KITS, PACKAGED
2009	419800	BREAKAWAY SWITCH, ALL METAL WITH SILVER CONTACT POINTS & BRASS PULL PIN
1024	420885	MAINTENANCE BATTERY CHARGER, 12 VOLTS (WILL NOT FULLY RECHARGE BATTERY)
2024	420900	QUICK BATTERY RECHARGER, 12 VOLT (WILL RECHARGE BATTERY IN APPROX 4-5 HR)
2010	420000	BREAKAWAY SWITCH, NYLON CASE, WELDABLE METAL TAB, SILVER CONTACT POINTS, NYLON PULL PIN
2010A	420100	REPLACEMENT NYLON PULL PIN & CABLE FOR 2010 BREAKAWAY SWITCH

## Brake Control Accessories



Part No.	Ref. No.	Description
2180S	421425	PULSE PREVENTER PREVENTS INTERFERENCE BETWEEN 4-WAY FLASHER AND BRAKE CONTROL
6560	418250	TEKONSHA TRAILER EMULATOR, 7-WAY RV TYPE CONNECTOR

## Side-Post Mount Battery Adapter Kit



Allows direct connection to battery on vehicles using a side-post battery.

Part No.	Ref. No.	Description
TA05-040	417910	SIDE POST MOUNT BATTERY ADAPTER KIT, CONTAINS ADAPTERS, NUTS & CONNECTORS (QTY 2)

## Ammeter Gauge



- Diagnostic tool for all electrical work
- Clip-on (no wires to cut), comes with instructions
- Pinpoints shorts, broken wiring or bad ground
- Easier and faster than test light

Part No.	Ref. No.	Description
810	421450	CLIP-ON ELECTRIC BRAKE AMMETER GAUGE

## Warner Hydraulic Utility Brake Control



The Warner Hydraulic/Electric Control 1300-76 has a displacement of less than .02 cubic inch, which meets vehicle manufacturers' requirements. It is adjustable for a wide range of vehicle brake system pressures, with low pressure sensitivity that assures immediate and smooth engagement of trailer brakes. The special design of the internal multiple resistor pack provides heat sinking and heat dissipation characteristics. Rated for up to 8 brakes, 30 amps.

Part No.	Ref. No.	Description
1300-76	417000	BRAKE CONTROL, WARNER ELECTRIC, FOR 4-8 BRAKES

## Warner Air Utility Brake Control



The Warner Air Utility Control interconnects with air brake systems of tow vehicles and automatically operates electric trailer brakes in synchronization with air brakes. It may be used in FMVSS 121 systems. The manual override feature operates trailer brakes only. The unit displaces only 2.8 cubic inches of air at 100 PSI. It is adjustable for a wide range of vehicle brake system pressures, with low pressure sensitivity that assures immediate and smooth engagement of trailer brakes. The special design of the internal multiple resistor pack provides heat sinking and heat dissipation characteristics.

Part No.	Ref. No.	Description
1300-80	417400	AIR OPERATED FOR AIR BRAKE TRUCK TO PULL ELECTRIC TRAILER



## Demco Brake Actuators

Demco hydraulic brake actuators are specifically designed to perform even in the harshest braking environments. The master cylinder cap has an automotive-style diaphragm for a completely enclosed brake system, preventing brake fluid contamination. Master cylinder pushrod is covered by a rubber boot for additional dirt and moisture protection. All actuators utilize UHMW nylon wear pads, eliminating the potential for roller "freeze-up". All Demco Actuators feature composite master cylinders, preventing rust and corrosion. Common repair parts are interchangeable between models, minimizing the need for large service parts inventory.

Part No.	Ref. No.	Description
<b>6K Actuator</b>		

8606101	302180	DEMCO DA603T 6K ACTUATOR 3" TONGUE, TOP-MNT, 2"CPLR
8606301	302185	DEMCO DA603 6K ACTUATOR 3" TONGUE, IN-LINE, 2"CPLR

<b>7.5K A-Frame Actuator</b>		
8759522	302275	DA9150 ACTUATOR W/CHANNEL ONLY
DA9150-2HBC	302280	DA9150 ACTUATOR W/ADJ 2"H-BLOW COUPLER (7,000 LB.)
DA9150-2516HBC	302285	DA9150 ACTUATOR W/ADJ 2 5/16"H-BLOW COUPLER

DA9150-2HBC	302280	DA9150 ACTUATOR W/ADJ 2"H-BLOW COUPLER (7,000 LB.)
DA9150-2516HBC	302285	DA9150 ACTUATOR W/ADJ 2 5/16"H-BLOW COUPLER

<b>10K Actuator</b>		
8103102	302775	DA10 ACTUATOR W/FIXED 2 5/16" COUPLER
8101222	302815	DA10 ACTUATOR W/CHANNEL ONLY
DA10-3ADJEYE	302820	DA10 ACTUATOR W/3" ADJ EYE
DA10-2516ADJ-HBC	302846	DA10 ACTUATOR W/ADJ 2 5/16"H-BLOW COUPLER
DA10-2516ADJ-ATW	302847	DA10 ACTUATOR W/ADJ 2 5/16" ATWOOD COUPLER

8103102	302775	DA10 ACTUATOR W/FIXED 2 5/16" COUPLER
8101222	302815	DA10 ACTUATOR W/CHANNEL ONLY
DA10-3ADJEYE	302820	DA10 ACTUATOR W/3" ADJ EYE
DA10-2516ADJ-HBC	302846	DA10 ACTUATOR W/ADJ 2 5/16"H-BLOW COUPLER
DA10-2516ADJ-ATW	302847	DA10 ACTUATOR W/ADJ 2 5/16" ATWOOD COUPLER

<b>20K Actuator</b>		
8202022	302875	DA20 ACT W/CHANNEL ONLY
DA20-2516ADJ-ATW	302882	DA20 ACTUATOR W/ 12K, ADJ 2 5/16" ATWOOD COUPLER
DA20-3ADJEYE	303020	DA20 ACTUATOR W/3" ADJ EYE

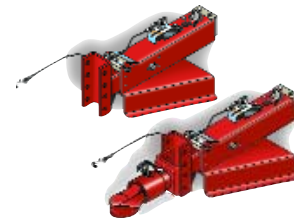
8202022	302875	DA20 ACT W/CHANNEL ONLY
DA20-2516ADJ-ATW	302882	DA20 ACTUATOR W/ 12K, ADJ 2 5/16" ATWOOD COUPLER
DA20-3ADJEYE	303020	DA20 ACTUATOR W/3" ADJ EYE

<b>Replacement Parts</b>		
BP30-010	304001	MASTER CYLINDER, ALL MODELS
BP31-010	304021	MASTER CYLINDER CAP, ALL MODELS
BP32-010	304041	SHOCK FOR DA66 ACTUATORS
BP32-020	304044	SHOCK FOR DA91, DA10, DA20 ACTUATORS
BP33-010	304061	BREAKAWAY CABLE & LEVER FOR DA91, DA10, DA20
BP33-020	304064	BREAKAWAY CABLE & LEVER FOR DA66 ACTUATORS

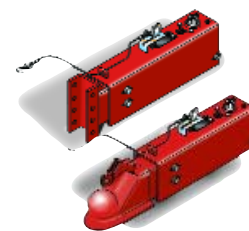
BP30-010	304001	MASTER CYLINDER, ALL MODELS
BP31-010	304021	MASTER CYLINDER CAP, ALL MODELS
BP32-010	304041	SHOCK FOR DA66 ACTUATORS
BP32-020	304044	SHOCK FOR DA91, DA10, DA20 ACTUATORS
BP33-010	304061	BREAKAWAY CABLE & LEVER FOR DA91, DA10, DA20
BP33-020	304064	BREAKAWAY CABLE & LEVER FOR DA66 ACTUATORS



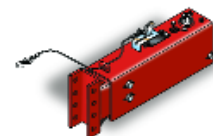
DA603



DA9150



DA10



DA20

## Atwood Brake Actuators



Atwood Actuators have heavy gauge stamped steel housings, with ball socket assemblies. Breakaway mechanism sets and locks the trailer brakes in the event of tow vehicle/trailer separation. A unique pivot linkage permits a lightweight, more compact design. The electrodeposited enamel finish exceeds A.S.T.M. 96-hour salt-spray test requirements, providing added corrosion protection. The "Reverse Lock-Out" lever allows for easier backing of trailer.

Part No.	Ref. No.	Description
82541	302000	ACTUATOR, PAINTED WELD-ON, 2" BALL 3" TONGUE, 6,000 LB CAP
84132	302100	ACTUATOR, PLATED BOLT-ON, 2" BALL 3" TONGUE, 6,000 LB CAP
88730	302105	ATWOOD 6K DISC ACTUATOR 2" CPLR, ZINC PLATED
83000	302725	ACTUATOR, PAINTED WELD-ON, 2" BALL 3" TONGUE, 8,000 LB CAP
83010	302750	ACTUATOR, PLATED BOLT-ON, 2" BALL 3" TONGUE, 8,000 LB CAP
84258	304225	REPLACEMENT BOOT KIT FOR 82541
85841	304250	REPLACEMENT MASTER CYLINDER FOR 82541, AFTER 1980
87478	304350	REPLACEMENT MASTER CYLINDER CAP & GASKET FOR 82541, AFTER 1980
85830	304400	REPLACEMENT SHOCK FOR 82541 ACTUATOR, AFTER 1980
85852	304450	REPLACEMENT PUSH ROD KIT FOR 82541

## Toledo Brake Actuators



This Toledo Actuator has a rugged design with standard 50 degree A-frame mount flange. It has a breakaway device which sets and locks the trailer brakes in the event of tow vehicle/trailer separation. The unique shock absorber/coil spring design of this Actuator provides smooth, positive stopping power, eliminating the possibility of damaging peak pressures to the system. 5,000–6,000 G.V.W.R. capacity, depending on coupler used.

Part No.	Ref. No.	Description
16006	302600	ACTUATOR WITH 2" HAMMERBLOW COUPLER - 5,000 LB.
16039	302700	ACTUATOR WITH 2 5/16" HAMMERBLOW COUPLER - 6,000 LB.
1745	305205	REPLACEMENT NYLON PIVOT BUSHINGS (8 REQUIRED PER ACTUATOR)
1753	305220	1/2"-20 SELF-LOCK PIVOT SHAFT NUT (8 REQUIRED PER ACTUATOR)
1808-1	305280	REPLACEMENT PIVOT LINK (4 REQUIRED PER ACTUATOR)
1829	305300	PIVOT SHAFT FOR TOLEDO TA-6 (4 REQUIRED PER ACTUATOR)
1844-2	305360	REPLACEMENT SHOCK ABSORBER
6018	305380	REPLACEMENT MASTER CYLINDER CAP
10614	305400	REPLACEMENT MASTER CYLINDER



## Carlisle Hydrastar Electric-Hydraulic Brake Actuators

### HYDRASTAR FEATURES:

- 12V DC powered electric-hydraulic pump-style actuator for electronically controlled hydraulic brakes
- Tow vehicle must be equipped with an industry standard electronic brake controller
- “Unloading Piston” feature instantly releases hydraulic pressure upon stop of brake signal, eliminates pump-style actuator “brake drag”
- Completely sealed unit, approved for marine/submersible applications
- Actuator designed for single or tandem axle applications
- Compact design, measures 3.25”W x 5.75”H x 17.5”L



Hydrastar

Part No.	Ref. No.	Description
HBA-10	247636	HYDRASTAR 1000 PSI UNIT
CAR-HBA10-2A	247638	HYDRASTAR 1000 PSI DRUM TDM W/9505 LINEKIT &BRKY
CAR-HBA10-2	247640	HYDRASTAR 1000 PSI DRUM TDM W/DELX LINE KIT&BRKY
HBA-16	247645	HYDRASTAR 1600 PSI UNIT
CAR-HBA16-2	247647	HYDRASTAR 1600 PSI DISC TDM W/DELX LINEKIT &BRKY
CAR-HBA16-2HD	247650	HYDRASTAR 1600PSI DISC TDM W/10-12K LINEKT&BRKY

## Carlisle Hydrastar XL Electric-Hydraulic Brake Actuator

### HYDRASTAR XL FEATURES:

The Carlisle Hydrastar XL uses an on-board microprocessor and accelerometer to sense the amount of braking effort being generated by the tow vehicle. The Hydrastar XL does not require a hard-wired in cab electronic brake controller. The hand held actuator plugs into the cigarette lighter, using the vehicle's original wiring to transmit signals to the actuator. The Hydrastar XL is great for any situation where multiple tow vehicles may be used to pull a single trailer, especially rental units.

- No hard-wired brake controller necessary
- 17 Amp/Hour break-away battery kit required
- No special wiring needed
- Great for rental units or where using multiple tow vehicles on a single trailer



Hydrastar XL  
with controller

Part No.	Ref. No.	Description
HBAC10-CLR	247655	HYDRASTAR XL, 1000 PSI UNIT W/IN-CAB CONTROLLER
CAR-HXL10-2A	247657	HYDRASTAR XL 1000PSI KIT W/CONTROL, HYDLINE & BRKY
CAR-HXL10-2	247660	HYDRASTAR XL 1000PSI KIT W/CNTRL, DLXLINEKIT&BRKY
HBA-EBA	419450	17AMP BREAKAWAY KIT FOR HYDRASTAR XL/ELECTRASTAR

## ElecDraulic™ Electric-Hydraulic Brake System

### ELEC DRAULIC™



- 12V DC powered electric gear-driven booster system for electronically controlled hydraulic brakes
- Internal microprocessor takes signal from electric brake control and converts to hydraulic pressure for smooth trailer braking
- Superior braking responsiveness; can apply full pressure in 0.3 seconds
- Pre-wired electronics; only 3 wires (positive, ground & brake signal) to connect
- Brake-bleed button for 1 person testing and bleeding of brake system
- Complete booster system includes built-in breakaway battery, hydraulic line kit, breakaway switch & 7-pole trailer junction box for easy installation
- ElecDraulic booster measures 10.875"W x 8.875"H x 21.25"L

#### ElecDraulic Trailer Brake Systems

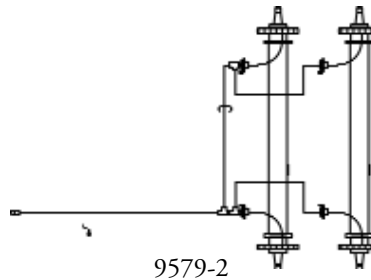
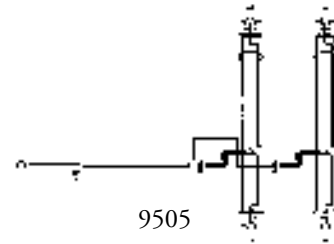
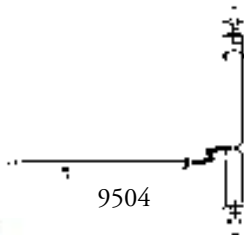
Part No.	Ref. No.	Description
99110-000-2	247612	ELECDRAULIC 1000 PSI TANDEM AXLE SYSTEM FOR DEXTER 3.5K-15K DRUM
99116-000-2	247615	ELECDRAULIC 1600 PSI TANDEM SYSTEM FOR 10K-12K DISC BRAKE AXLES

#### ElecDraulic Universal Truck Harness & Accessories

Part No.	Ref. No.	Description
98020	247608	UNIVERSAL TRK HARNESS W/RELAY FOR TRUCKS W/O FACTORY TOW PACKAGE
79019-8	247609	30 AMP BREAKER FOR GM/FORD W/TOW PACKAGE (NOT NEEDED FOR DODGE)
9579-01	256585	DELUXE 3RD AXLE LINE KIT, DRUM

## Hydraulic Line Kits

Hydraulic Line Kits come complete with all necessary lines, tee fittings, hoses, brackets and clips to properly plumb conventional hydraulic brake axles. Torsion axles require additional line kits, (80910, or 80910-T), or use 9579-2 Deluxe kit with limited access flex hoses included.

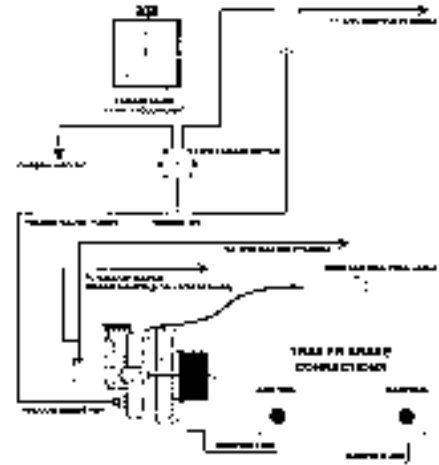


Part No.	Ref. No.	Description
9504	256500	HYD LINE KIT SINGLE AXLE, DRUM
9505	256525	HYD LINE KIT TANDEM AXLE, DRUM
80910	256550	HYD LINE KIT TF AXLE (1WHL) USE W/9504, 9505
80910-T	256575	HYD LINE KIT TF AXLE (1WHL) W/LMTD ACCESS, USE W/ 9504, 9505
9579-2	256580	HYD LINE KIT TANDEM AXLE, DELUXE DRUM & 3.5K-8K DISC
9579-01	256585	HYD LINE KIT, 3RD AXLE, DELUXE DRUM & 3.5K-8K DISC
9501	256595	HYD LINE KIT, 3RD AXLE, FOR VAC&AIR/HYD SYS,DRUM
3057089	259150	ADAPTER FITTING, ADAPTS 9579-2 TO FIT 10K-12K DISC CALIPERS

## 9100 Series Vacuum/Hydraulic Truck Control Kits

The 9100 Series Vacuum/Hydraulic Kits are designed to provide hydraulic brake actuation/control for trailers. All Kits include a low vacuum warning light and gauge panel, to conform to applicable requirements of the Department of Transportation, and are compatible with Anti-lock Brake Systems. These Kits will allow hydraulic braked trucks with adequate vacuum supply to be equipped to pull trailers equipped with Vacuum/Hydraulic brakes. Trucks with inadequate vacuum supply must also be equipped with the appropriate 9600 Series Vacuum Pump Kit. The unique design features of the Truck Control Valve extend the life and dependability of the complete truck control system and include several new features, such as the following:

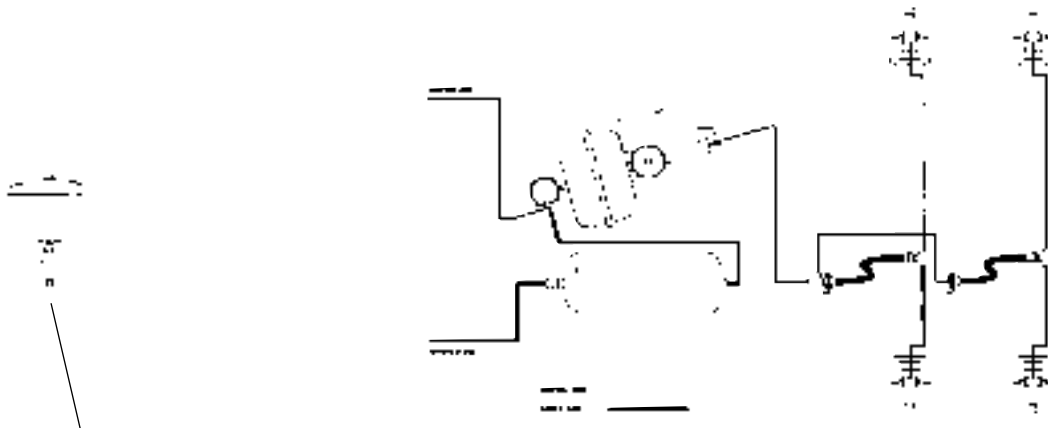
- Low vacuum sensor
- Hydraulic connection and piston built into one unit outside the valve to prevent the possibility of brake fluid entering the truck valve or vacuum pump
- Complete, detailed instructions are provided with every kit
- Low vacuum warning panel is included in the kit
- Color coded couplings to differentiate between the manifold and control lines



Part No.	Ref. No.	Application
9107	247750	3/4-1 TON TRUCKS (ALL) AND 1 1/2 TON AFTER 1987
9111	247775	1 1/2 TON TRUCKS BEFORE 1987

## 9200 Series Vacuum/Hydraulic Trailer Kits

The 9200 Series Vacuum/Hydraulic Trailer Kits are designed to provide brake actuation for trailers towed by trucks equipped with vacuum/hydraulic brake control systems. The 9200 Series Kits are available for all axle capacities. Every axle manufacturer has set different standards requiring various amounts of hydraulic line pressure and fluid displacement. We offer trailer kits that fit the appropriate axle being used. All trailer kits come with enough hydraulic lines and fittings to plumb 2 axles.



### BOOSTER SIZE IDENTIFICATION

- (0 = 7210 BOOSTER 1000 PSIG.)
- (2 = 7212 BOOSTER 1200 PSIG.)
- (6 = 7216 BOOSTER 1600 PSIG.)

Part No.	Ref. No.	Application
9210-2KT	248825	DEXTER 3.5K-15K DRUM BRAKES
9212-2KT	248835	HAYES/ALKO 8K DRUM
9215-2KT	248845	HAYES/ALKO ALL 9K THRU 12K DRUM
9216-2KT	248855	10K AND 12K DISC (ALL MANUFACTURERS)

## 9600 Series Vacuum Pump Kits



Pump Kits are required for engines which produce insufficient vacuum for trailer brake operation. The 9600 Series Vacuum Pump Kits provide adequate vacuum supply for vehicles to actuate vacuum/hydraulic brakes. These Kits are used with 9100 Series Truck Kits to make a complete vacuum/hydraulic brake system.



### Pump Kits

Part No.	Ref. No.	Truck Type/Engine Size	Year Model	Rep'l. Pump No.
9600*	248075	VAC PUMP KIT, 12V ELECT, UNIVERSAL TRK/TRL MOUNT		
9646	248665	FORD 350 SUPER DUTY W/7.3L DIESEL "POWER STROKE"	1999-03	7617
9691	248780	CHEV/GMC 6.6L DURAMAX DIESEL	2001-04	7616

\*Master Cylinder Brake Tee sold separately, see chart below.

### Master Cylinder Brake Tees

Part No.	Ref. No.	Description
3087901	262626	MASTER CYL BRK TEE 1992 & EARLIER FORD FS P/U
3087904	262627	MASTER CYL BRK TEE 1999 & EARLIER CHEV/GMC FS P/U
3087906	262628	MASTER CYL BRK TEE 00-03 CHEV/GMC FS P/U
3087914	262629	MASTER CYL BRK TEE 99-02 FOR FS P/U
3087921	262630	MASTER CYL BRK TEE 98-03 DODGE FULL SIZE TRUCKS
3087933	262635	MASTER CYL BRK TEE 93-98 & 2003 FORD, 90-97 DODGE

### Replacement Pumps

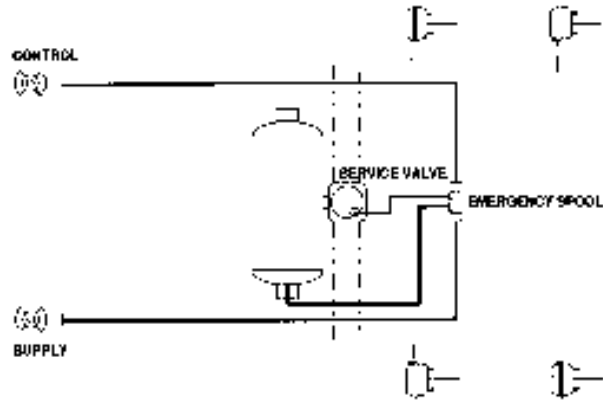
Part No.	Ref. No.	Truck Type/Engine Size	Year Model	Original Pump Kit No.
7610	253850	FORD 6.9L & 7.3L DIESEL	1983-92	9642*
7611	253865	CHEV/GMC 6.0 L V-8 EFI GAS	2000-01	9616*
7611	253865	CHEV/GMC 454 EFI GAS	1988-93	9622*
7611	253865	CHEV/GMC 3116 CAT DIESEL	1990-99	9685*, 9686*
7611	253865	DODGE 5.9 CUMMINS DIESEL	1989-98	9670*, 9671*, 9672*
7611	253865	DODGE 24 VALVE DIESEL	1998-02	9673*
7611	253865	FORD 460 EFI GAS	1988-98	9630*
7611	253865	FORD 6.6L, 7.8L, & FD1060 DIESEL	1987-99	9652*, 9653*
7611	253865	INTERNATIONAL DT360/DT466 DIESEL	1980-93	9660*, 9661*
7613	253875	FORD 1/2-1 TON 7.3L DIESEL	1992-93	9643*
7616	253900	CHEV/GMC 454 ENG W/SERPENTINE BELT	1994-2000	9623*, 9624*
7616	253900	CHEV/GMC 8.1L EFI GAS	2001-02	9625*
7616	253900	CHEV/GMC 6.2L & 6.5L DIESEL	1992-93	9690*
7616	253900	CHEV/GMC 6.6L DURAMAX DIESEL	2001-04	9691
7616	253900	DODGE V-10	1994-98	9675*
7616	253900	FORD 7.3L DIESEL W/DIRECT INJECTION	1994	9644*
7617	253950	FORD 7.3L DIESEL W/DIRECT INJECTION	1995-98	9645*
7617	253950	FORD 350 SUPER DUTY W/7.3L DIESEL "POWER STROKE"	1999-03	9646
9600	248075	VAC PUMP KIT, 12V ELECT, UNIVERSAL TRK/TRL MOUNT	ALL	9600

\* Complete Belt-Drive Pump Kits for these models are no longer available. Order Universal 12V Electric Pump Kit #9600 for new applications on these vehicles.

## 8102 Air Trailer Kit

The 8102 Air Trailer kit is designed for tandem axle trailers without spring brakes, that do not comply with revised FMVSS571.121 brake system mandates, effective March 1, 1998, and should only be used on vehicles that are exempt from those compliance requirements.

Kit includes mounting hardware, fittings, gladhands, one 1488 cu. in. tank, tank drains and all required valves. Air brake tubing is not included, due to variations in lengths required for individual installations.

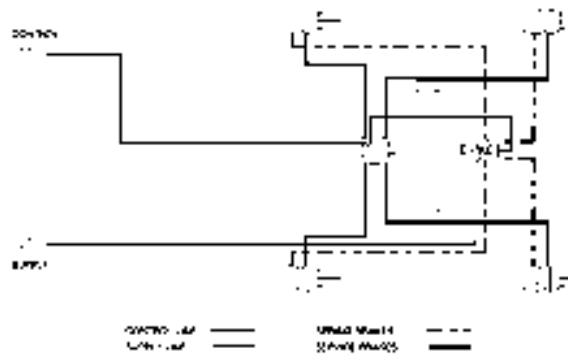


Part No.	Ref. No.	Description
8102	249800	AIR TRAILER KIT FOR 2 AXLES W/O SPRING BRAKES, DESIGNED FOR TRAILERS EXEMPT FROM FMVSS571.121
6606-1	249900	3/8" AIR BRAKE TUBING, 100' ROLL

## 8202-1 Air Trailer Kit

The 8202-1 Air Trailer kit is designed for tandem axle trailers with spring brakes that do not comply with revised FMVSS571.121 brake system mandates, effective March 1, 1998, and should only be used on vehicles that are exempt from those compliance requirements.

This Kit will support spring brakes of type 16-24, type 24-30 and type 30-30. The kit includes mounting hardware, fittings, gladhands, one 2800 cu. in. tank, tank drain and all required valves. Air brake tubing is not included, due to variations in lengths required for individual installations.

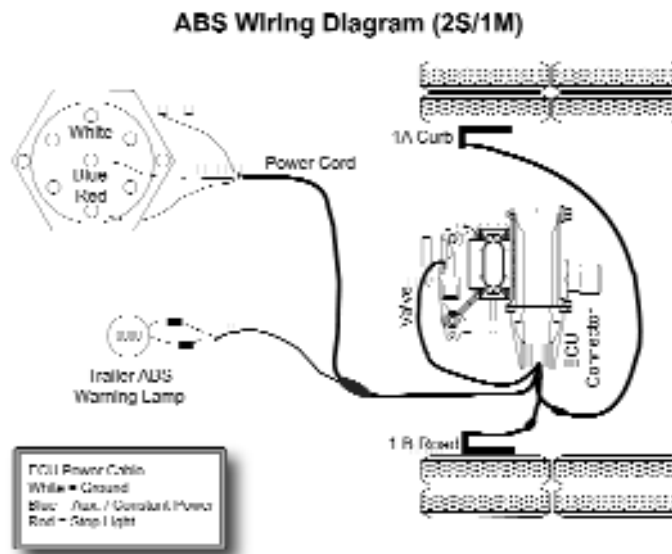
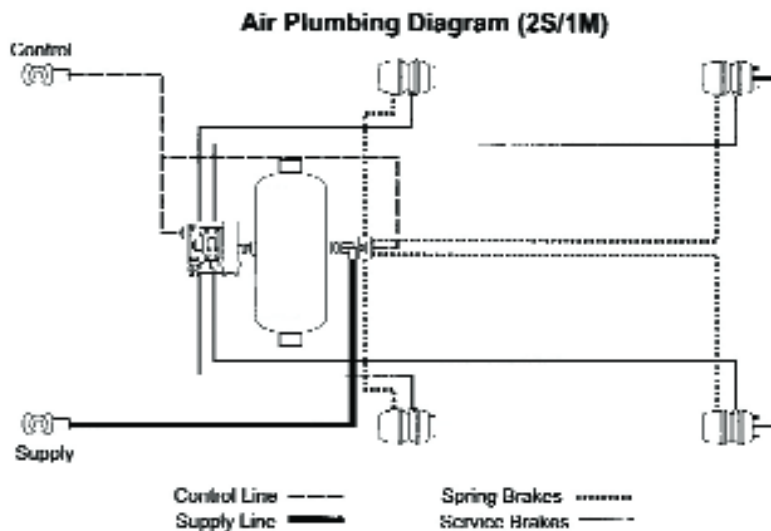


Part No.	Ref. No.	Description
8202-1KT	249851	STRAIGHT AIR TRAILER KIT FOR 2 AXLES WITH SPRING BRAKES, DESIGNED FOR TRAILERS EXEMPT FROM FMVSS571.121
6606-1	249900	3/8" AIR BRAKE TUBING, 100' ROLL

## 8200 Series ABS Air Trailer Kits

The 8200 Series ABS kits are designed for tandem axle trailers that are ABS equipped and have spring brakes. These kits have been designed to conform to all FMVSS571.121 requirements for brake systems, including antilock brake systems, mandated for air brake trailers manufactured after March 1, 2001.

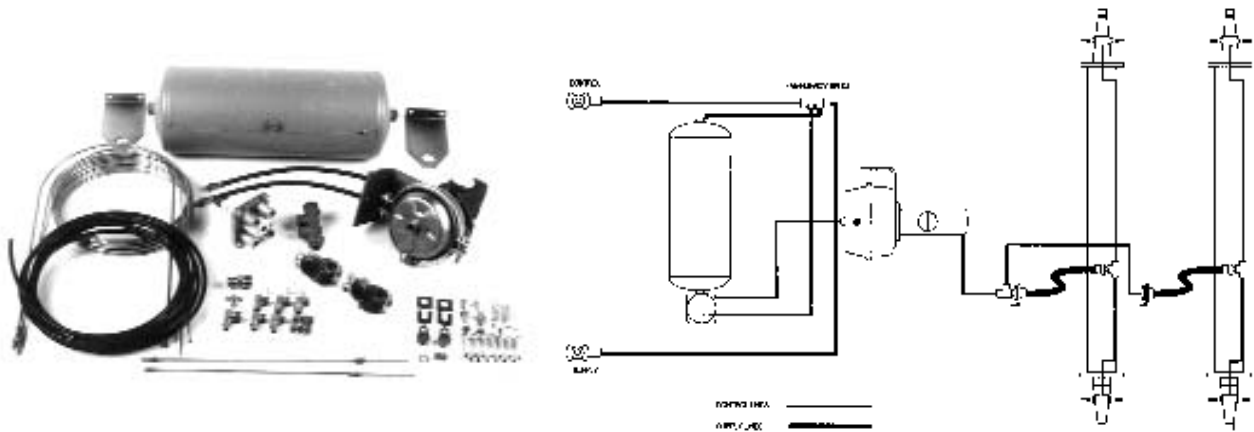
These kits will support spring brakes of type 16-24, type 24-30 and type 30-30. Kits include ABS modulator valve(s), ABS warning light, power cord, cable leads, spring brake valve, mounting hardware, fittings, gladhands, and a 2800 cu.in. tank. Air brake tubing is not included, due to variations in lengths required for individual installations.



Part No.	Ref. No.	Description
8202-21-1KT	249861	"2S/1M" ABS AIR TRAILER KIT FOR 2 AXLES WITH SPRING BRAKES, (ONE AXLE ABS EQUIPPED)
8202-42-1KT	249866	"4S/2M" ABS AIR TRAILER KIT FOR 2 AXLES WITH SPRING BRAKES, (BOTH AXLES ABS EQUIPPED)
6606-1	249900	3/8" AIR TUBING, 100' ROLL

## 8500 Series Air/Hydraulic Trailer Kits

The 8500 Series Air/Hydraulic Trailer Kits are designed to provide hydraulic brake actuation for trailers pulled by trucks/tractors equipped with air brakes or an air supply system, designed for use on axles with hydraulic brakes suitable for power brake actuation. All Kits include control valves, air tank, air/hydraulic booster and a complete hydraulic line kit for tandem axle trailer. ABS kits also include the necessary components for compliance with FMVSS571.121 requirements for Antilock Brake Systems, mandated for trailers manufactured after March 1, 1998. These ABS kits are "2S/1M" systems, requiring 1 axle to be ABS equipped with sensors and tone rings. The axle is the determining factor for which kit should be used.



NOTE: An Air Brake Truck pulling an Air-Hydraulic Brake Trailer is not a balanced brake system! Excessive trailer brake wear may occur. 8500 Series Air-Hydraulic System should be used only as last option to operate trailer brakes.

ABS Kits			Non-ABS Kits*	
Part No.	Ref. No.	Application	Part No.	Ref. No.
8510-21-2KT	249516	DEXTER 3.5K-12K DRUM	8510-2KT	249511
8514-21-2KT	249526	DEXTER 15K DRUM	8514-2KT	249521
N/A	N/A	HAYES 8K DRUM	8512-2KT	249601
N/A	N/A	HAYES / ALKO ALL 9K THRU 12K DRUM	8515-2KT	249611
8516-21-2KT	249626	10K AND 12K DISC BRAKES (ALL MANUFACTURERS)	8516-2KT	249621

\* Non-ABS air/hydraulic kits do not comply with revised FMVSS571.121 brake system mandates effective March 1, 1998, and should only be used on vehicles that are exempt from those compliance requirements.

## Replacement Boosters and Reservoirs



Part No.	Ref. No.	Description	Replacement for:
6485	250600	TANK, 1060 CU IN FOR VACUUM	9200 SERIES (ALL)
7210	256230	BOOSTER W/O RELAY VALVE	9210
7210-1	256240	BOOSTER W/ RELAY VALVE	9210
7212	256250	BOOSTER W/O RELAY VALVE	9212
7212-1	256260	BOOSTER W/ RELAY VALVE	9212
7216	256270	BOOSTER W/O RELAY VALVE	9215, 9216
7216-1	256280	BOOSTER W/ RELAY VALVE	9215, 9216
6510	256300	AIR/HYDRAULIC BOOSTER	8510
6512-M	256312	AIR/HYDRAULIC BOOSTER	8512
6514	256320	AIR/HYDRAULIC BOOSTER	8514
6515-M	256332	AIR/HYDRAULIC BOOSTER	8515, 8516
9510	257775	FLUID RESERVOIR ASSEMBLY FOR VAC/HYD BOOSTERS	9200 SERIES (ALL)
3057817	256333	LINE ADAPTER FOR 6512-M & 6515-M	

## Replacement Valves and Repair Kits



Part No.	Ref. No.	Description	Replacement for:
7107	254300	TRUCK CONTROL VALVE, FITS 3/4-1 TON AND 1 1/2 TON AFTER 1987	9107
7111	254325	TRUCK CONTROL VALVE, FITS 1 1/2 TON AND LARGER BEFORE 1987	9111
7300	254700	TRAILER RELAY VALVE	9200 SERIES (ALL)
7564	254800	OPEN CHECK VALVE, 1/2" MALE PIPE x 1/2" HOSE BARB	9200 SERIES (ALL)
7100-50	252500	REPLACEMENT FILTER KIT FOR REDLINE VACUUM VALVES W/FILTER, CAP & SCREEN	9100 & 9200 SERIES (ALL)
7107-1	252700	REPLACEMENT HYD MODULE FOR 7107 VALVE (RED)	9107
7111-1	252800	REPLACEMENT HYD MODULE FOR 7111 VALVE (BLUE)	9111
7107-2	252900	REPLACEMENT DIAPHRAM ASSEMBLY FOR 7107, 7111 VALVES	9100 SERIES (ALL)
6102	256335	AIR SERV-RELAY VALVE	8500 SERIES

## Low Vacuum Warning Kits



Part No.	Ref. No.	Description
9522	250550	VACUUM WARNING KIT CONTAINS LIGHT, GAUGE, VACUUM SWITCH AND MOUNTING PANEL

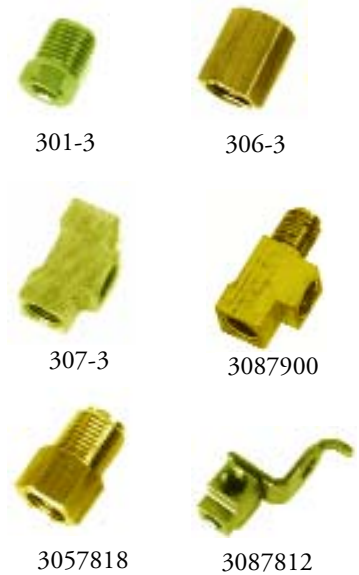
## Vacuum Couplers, Hose and Hand Cables



Part No.	Ref. No.	Description
7550-1	250800	FEMALE COUPLER, 1/2" I.D. VACUUM HOSE, BRASS COLOR (MANIFOLD LINE), USE WITH 7551-1
7550-2	250820	FEMALE COUPLER, 1/2" I.D. VACUUM HOSE, SILVER COLOR (CONTROL LINE), USE WITH 7551-2
7551-1DC	251205	MALE COUPLER FOR 1/2" I.D. VACUUM HOSE, BRASS COLOR (MANIFOLD LINE), USE WITH 7550-1, INCLUDES DUST COVER
7551-2DC	251215	MALE COUPLER FOR 1/2" I.D. VACUUM HOSE, SILVER COLOR (CONTROL LINE), USE WITH 7550-2, INCLUDES DUST COVER
7551DC	251220	DUST CAP KIT FOR REDLINE MALE CONNECTORS W/2 EA CAP, CHAIN & CLAMP
7555	251700	1/2" MALE DUMMY COUPLER PLUG WITH PULL RING (PACKAGE OF 2)
9558-1	251800	VACUUM OVER HYDRAULIC COUPLER CONTROL PANEL FOR TRUCK
7572	252010	1/2" I.D. VACUUM HOSE "VH" RATED PREMIUM 4 BRAIDWALL CONSTRUCTION, WON'T COLLAPSE
7525	252400	REPLACEMENT HAND BRAKE CABLE, 5 FT LONG

## Hydraulic Fittings

Part No.	Ref. No.	Description
301-3	257800	STEEL LINE NUT FOR 3/16" HYDRAULIC STEEL LINE (PKG OF 8)
306-3	258000	LINE UNION FOR 3/16" STEEL LINE (PKG OF 4)
307-3	258200	LINE TEE FOR 3/16" STEEL BRAKE LINE (PKG OF 2)
301-4	258600	STEEL LINE NUT FOR 1/4" HYDRAULIC STEEL LINE (PKG OF 8)
3057818	259200	3/16" FEMALE x 1/4" MALE ADAPTER FOR HYDRAULIC BRAKE LINES (PKG OF 4)
3057828	259400	1/4" FEMALE x 3/16" MALE ADAPTER FOR HYDRAULIC BRAKE LINES (PKG OF 4)
3087812	262600	AXLE LINE TEE FITTING, 3/16" LINE WITH BRACKET (PKG OF 2)
3087900	262625	3/16" HYD SERVICE TEE (PKG OF 2)



## Hydraulic Lines and Brackets

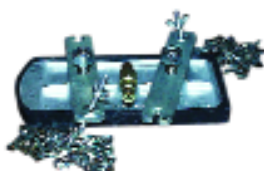
Part No.	Ref. No.	Description
322351	260200	HYDRAULIC STEEL LINE, 3/16" x 51"
323325	260425	HYDRAULIC STEEL LINE, 3/16" x 25' COIL
323425	261625	HYDRAULIC STEEL LINE, 1/4" x 25' COIL
310798	261800	HYDRAULIC FLEX BRAKE HOSE, 7/16"-24 FEMALE x 7/16"-20 MALE, 20.5" LONG
310797	261805	HYDRAULIC FLEX BRAKE HOSE, 3/8"-24 FEMALE x 3/8"-24 MALE, 20.5" LONG
309801	262000	STEEL HOSE BRACKET FOR 310798 HOSE (PKG OF 4)
309802	262200	CLIP FOR 309801 BRACKET (PKG OF 4)
16196	303700	REPLACEMENT FLEX HOSE, FITS 3/16" LINE FITTINGS, 18.5" LONG (3/8"-24 M/F)



## Brake Bleeding System

This Pressure Bleeding Kit will allow one person to bleed all the air from a hydraulic brake line system unassisted; includes all adapters shown.

Part No.	Ref. No.	Description
T3401	496200	ONE MAN PRESSURE BLEEDING KIT



BSE-121



BSE-312



BSE-3402-5



**DEXTER AXLE**

**Electric Brake Trouble Shooting Guide**

PROBLEM	CAUSES	REMEDIES
NO BRAKES	OPEN CIRCUITS	FIND AND CORRECT
	SEVERE UNDER ADJUSTMENT	ADJUST BRAKES
	FAULTY CONTROLLER	TEST AND CORRECT
	SHORT CIRCUITS	FIND AND CORRECT
WEAK BRAKES	GREASE/OIL ON MAGNETS/LININGS	CLEAN OR REPLACE
	CORRODED CONNECTIONS	CLEAN/CORRECT CAUSE
	WORN LININGS OR MAGNETS	REPLACE
	SCORED/GROOVED BRAKE DRUMS	MACHINE OR REPLACE
	IMPROPER SYNCHRONIZATION	CORRECT
	UNDER ADJUSTMENT	ADJUST BRAKES
	GLAZED LININGS	REBURNISH OR REPLACE
OVERLOADED TRAILER	CORRECT	
LOCKING BRAKES	UNDER ADJUSTMENT	ADJUST
	IMPROPER SYNCHRONIZATION	CORRECT
	FAULTY CONTROLLER	TEST AND CORRECT
	LOOSE, BROKEN BRAKE PARTS	REPLACE COMPONENTS
	OUT OF ROUND BRAKE DRUMS	MACHINE OR REPLACE
	INSUFFICIENT WHEEL LOAD	ADJUST SYSTEM RESISTOR
INTERMITTENT BRAKES	FAULTY CONTROLLER	TEST AND CORRECT
	BROKEN WIRES	REPAIR OR REPLACE
	LOOSE CONNECTIONS	FIND AND REPAIR
BRAKES PULL TO ONE SIDE	INCORRECT ADJUSTMENT	ADJUST
	GREASE/OIL ON LININGS/MAGNET	CLEAN OR REPLACE
	BROKEN WIRES	FIND AND REPAIR
	BAD CONNECTIONS	FIND AND REPAIR
HARSH BRAKES	UNDER ADJUSTMENT	ADJUST
	IMPROPER SYNCHRONIZATION	CORRECT
	IMPROPER CONTROLLER	CHANGE
	FAULTY CONTROLLER	TEST AND CORRECT
NOISY BRAKES	UNDER ADJUSTMENT	ADJUST BRAKES
	LACK OF LUBRICATION	LUBRICATE
	BROKEN BRAKE PARTS	REPLACE COMPONENT
	INCORRECT BRAKE PARTS	REPLACE
SURGING BRAKES	GREASE/OIL ON LININGS/MAGNET	CLEAN OR REPLACE
	OUT OF ROUND BRAKE DRUMS	MACHINE OR REPLACE
	FAULTY CONTROLLER	TEST AND CORRECT
DRAGGING BRAKES	OVER ADJUSTMENT	READJUST
	OUT OF ROUND BRAKE DRUMS	MACHINE OR REPLACE
	INCORRECT BRAKE PARTS	REPLACE
	BROKEN BRAKE PARTS	REPLACE
	FAULTY BREAKAWAY SWITCH	REPAIR OR REPLACE
	LOOSE WHEEL BEARING ADJ.	ADJUST
BENT SPINDLE	REPLACE AXLE	

## Trouble Shooting Guide

### VACUUM/HYDRAULIC TROUBLESHOOTING GUIDE

**SCOPE AND PURPOSE:**

The purpose of this trouble shooting guide is to provide a concise and orderly procedure for diagnosis of Vacuum/Hydraulic brake systems for trailers. The scope of the diagnostic procedures leads to identification of a failed or troublesome component and recommends maintenance or replacement of the component. The benefit of this procedure is exact identification of the problem, within a minimum of diagnostic time.

**GENERAL PROCEDURE FOR ALL SYMPTOMS:**

The procedure for diagnosis in **every** case is to run the Truck Test followed by the Trailer Test. The total time for both tests is approximately 7 minutes. If either the Truck Test or Trailer Test leads to other charts, the time will be longer.

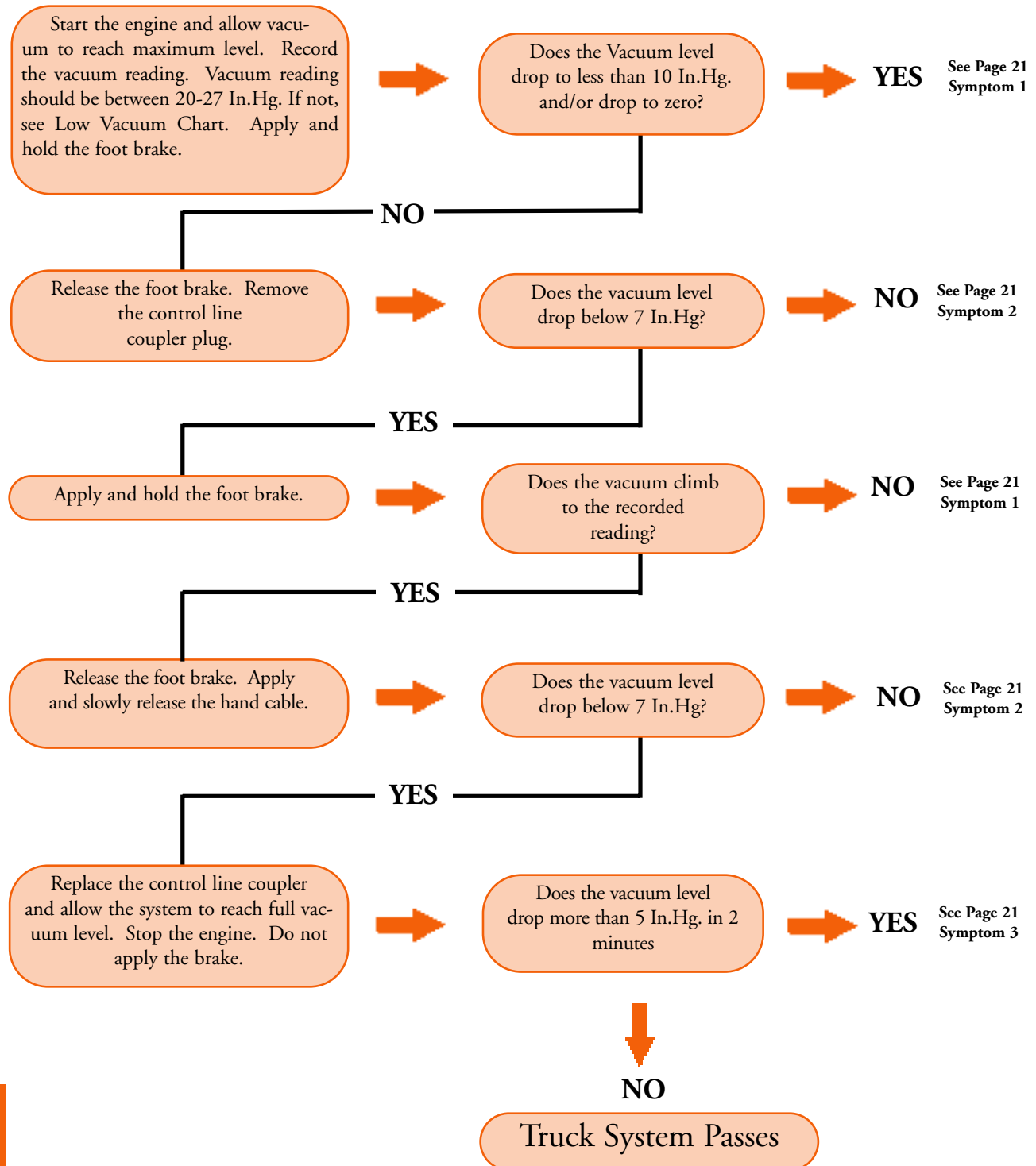
It is **impossible** to correctly diagnose a **trailer** without **the truck** which towed the trailer during the time that the problem occurred!

## *INDEX*

**Truck Test** .....L- 20  
**Trailer Test** .....L- 22  
**Low Vacuum Chart** .....L- 24

## Truck System Test

This test must be run with the trailer disconnected from the truck and the coupler plugs installed in the vacuum couplers. The truck must be equipped with a vacuum gauge connected to the trailer brake system.



## Symptom 1:

The truck control valve is leaking vacuum when operated.

- 1) If the valve is new, the most probable cause is debris between the piston seal and poppet disc. Clean the debris out of the valve and run the failed portion of the test again.
- 2) If the valve is not new, the most probable cause is a bad piston seal. Replace the diaphragm assembly.

## Symptom 2:

The truck control valve is in a constantly applied condition.

- 1) If the valve is new, the most probable cause is an improper cable installation. Make sure the cable sheath has been cut to the proper length, per installation instructions. Make sure the cable sheath is not bound by cable ties in such a manner, as to impair freedom of the cable within the cable sheath. Make sure the cable stop is at least 1/8" away from the valve lever when the cable is in the non-applied condition. If the installation passes the above conditions, *see step 2 below*.
- 2) The problem is in the lever assembly or in the valve casting. Replace the valve.

## Symptom 3:

The truck control valve or the vacuum lines are leaking excessively.

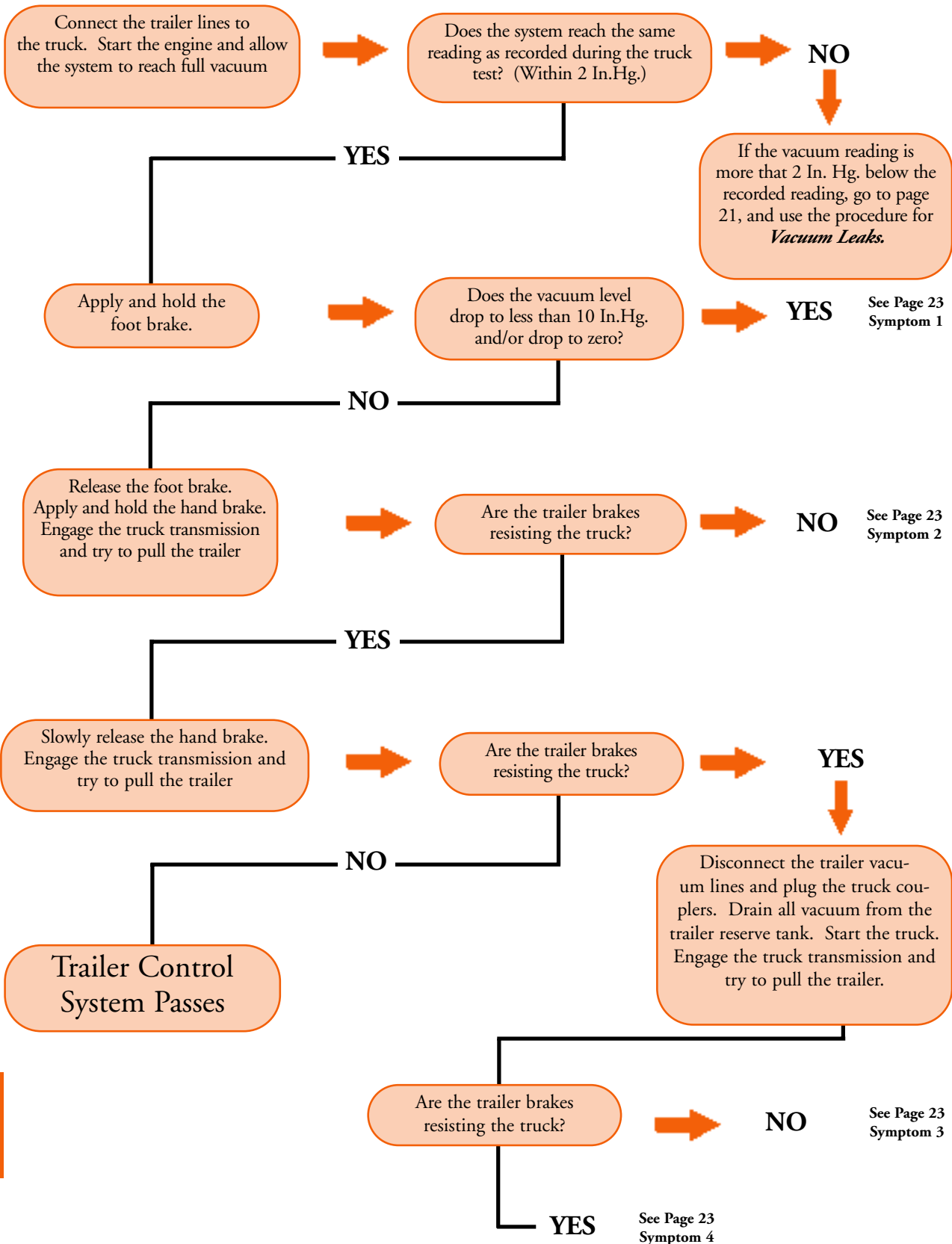
- 1) If the valve is new, the most probable cause is debris in the check valve or debris in the poppet. Clean the check valve and/or the poppet and rerun the leakdown portion of the test.
- 2) If the check valve and poppet area are clean, check for leaks at each fitting and hose connection, from the valve to the coupler plate. Also check for a leak in the vacuum gauge line. After finding the leak, rerun the leakdown test. *See "Vacuum Leaks"* below for recommended procedures to locate and isolate vacuum leaks.

## Vacuum Leaks:

The recommended procedure to locate a vacuum leak is to isolate each component in the system. For a truck/trailer system, start at the truck control valve by disconnecting the manifold and control line at the valve. Plug the elbows and rerun the leakdown. If the valve passes, reconnect one line at a time and rerun the leakdown to determine which line leaks. Remember, all vacuum connections are suspect. This includes damaged coupler plugs, damaged female coupler O-rings, gauge hoses, gauge tees, etc. Follow the procedure of adding one connection or length of hose to the system at a time and rerunning leakdown to isolate the problem. This is a tedious and often time consuming procedure, but it yields definitive results. Major components in the brake system should have already been eliminated by following the truck test and trailer test.

### TRAILER SYSTEM TEST

This test must be run after the truck system test. Do not attempt to diagnose the trailer system without running the truck system test first.



## Symptom 1:

The trailer system is losing vacuum when operated.

- 1) Disconnect the loop hose from the trailer relay valve to the booster master cylinder. Plug the end of the hose and the open port on the booster master cylinder. Apply and hold the foot brake. If vacuum drops as earlier, replace the relay valve. If vacuum does not drop, replace the trailer booster diaphragm or the trailer booster.

## Symptom 2:

The trailer system cannot produce hydraulic pressure

- 1) Check the trailer brake fluid reservoir. If low, fill the reservoir. If the booster is completely out of fluid or has been out of fluid in the past, re-bleed the trailer brake system. Re-try the failed portion of the test. If the test fails after this step, *go to step 2 below.*
- 2) Check brake shoe adjustment. If the brakes needed adjustment, re-try the failed portion of the test. If the test fails after this step, replace trailer booster.

## Symptom 3:

Failure of this portion of the test indicates a control problem, which should have been identified earlier by the truck test or earlier steps in the trailer test. Rerun the truck test and the trailer test. Pay particular attention to the maximum obtainable vacuum reading. If the level is below 15 In.Hg. or drops below 15 In.Hg. after initial brake release, the booster may be consuming excessive amounts of vacuum during operation. This condition is most often caused by brake shoes out of adjustment. If the vacuum is slow to recover after brake release, ensure a vacuum pump is being utilized with the system, and that it is in good working order. See the *Low Vacuum Chart* to diagnose this problem

## Symptom 4:

The Brakes are not releasing and there is no vacuum available to the brake booster.

- 1) Open the brake bleeder screw on the brake booster. Re-try the failed portion of the test. If the test passes, replace the brake booster. If the test fails, the problem is in the trailer brake assemblies or possibly a crimped brake line. In either case, the truck and trailer control system and trailer booster are not at fault.

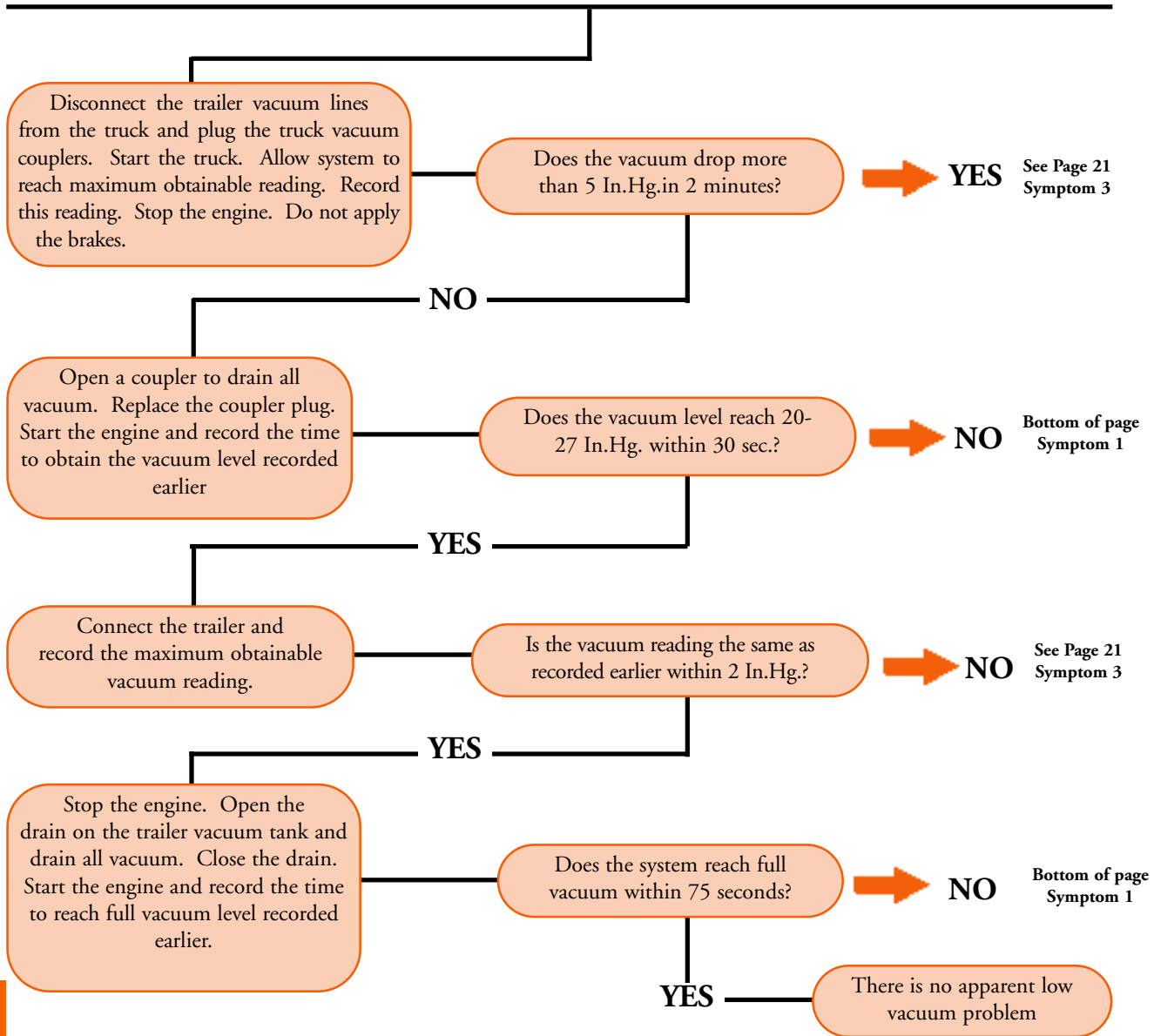
### LOW VACUUM CHART

If this chart has been referred to by other tests in the diagnostic procedure, the first step is to determine if the truck is equipped with a vacuum pump. All trucks after 1986 require a vacuum pump solely dedicated to the operation of the trailer brakes, with the following exceptions: 1994 and later Chev/GMC 6.5 L diesels; Super Duty Ford Trucks prior to 1999 with 7.3L - 7.5L diesel engines.

The trucks listed as exceptions are equipped with factory vacuum pumps and are used only for accessory operations on the truck. This permits their use as a source for trailer brake vacuum.

If the system being diagnosed has operated properly in the past without a vacuum pump, the possible problem can be due to vacuum leaks or high altitude operation, which reduces vacuum capability. If high altitude is present, vacuum capability is reduced 1 In.Hg. for every 1000 ft. of elevation. For example, if a vacuum pump produces 27 In.Hg. at sea level, the maximum gauge reading obtainable at 10,000 ft. elevation is 17 In.Hg. It may be necessary to reduce the vacuum levels requested in this chart by adjusting the values for altitude.

This chart assumes a vacuum pump as the source for trailer brake vacuum.



**SYMPTOM 1:**

The vacuum pump appears to be weak or inoperative. Replace the Pump