Salt & Sand Truck Hydraulics

Innovative Products and System Solutions

Parker Hannifin Corporation

Parker Hannifin is a Fortune 300 corporation listed on the New York Stock Exchange as PH. Parker is the leading global manufacturer with the widest variety of components and systems designed to control motion, flow and pressure in all types of machinery and equipment.

Parker offers over 1,400 product lines that control motion in 1,000 mobile, industrial and aerospace markets. We are the only manufacturer to offer our customers a choice of hydraulic, pneumatic, electromechanical and computer motion control solutions. And we have the largest global distribution network in our field, with over 7,500 distributors serving more than 422,000 customers.

Parker Hannifin introduces its Integrated Spreader Control Systems, Series ISC 2000E, for the Salt and Sand Markets. This IQAN based electronic system offers compact electronic components for improved Cab-Ergonomics coupled with our wide range of load sense hydraulic components. This allows Parker to offer system solutions and innovative products for all aspects of the spreader market.

The ISC 2000E is a J1939 CANbus Communication System with a multiplexing wiring design. This J1939 protocol allows Parker's ISC 2000E electronics to communicate directly with the chassis CPU through the J1939 Public Access Port. The Public Access Port provides ground speed communication or additional engine and transmission data as required. The multiplexing wiring design, similar to chassis wiring, dramatically reduces the size of the wire harness.

Parker's ISC 2000E Windows-based system allows for flexible custom programming, which is easily modified to fit your specific application requirements. Its open architecture allows the user to select the options and variables to fit any system need.

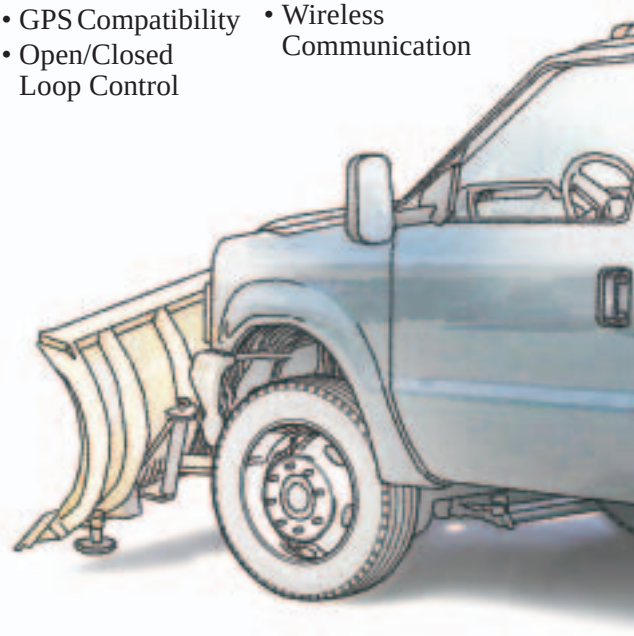
- System Tuning
- Data Collection
- GPS Compatibility
- Open/Closed Loop Control
- Auxiliary J1939 Components
- Wireless Communication

Performance Objectives

- Total System Reliability
- Flexible Programming
- Improved Cab Ergonomics
- Precise Control
- Automated Control

Parker Solutions

- IEC Certified IQAN Electronics
- Flexible Windows-Based Programming
- Small Compact Electronics
- 1% - Closed Loop Rotational Accuracy
- J1939 Communication
- Self Diagnostic
- Total Parker Solution



IEC Certification

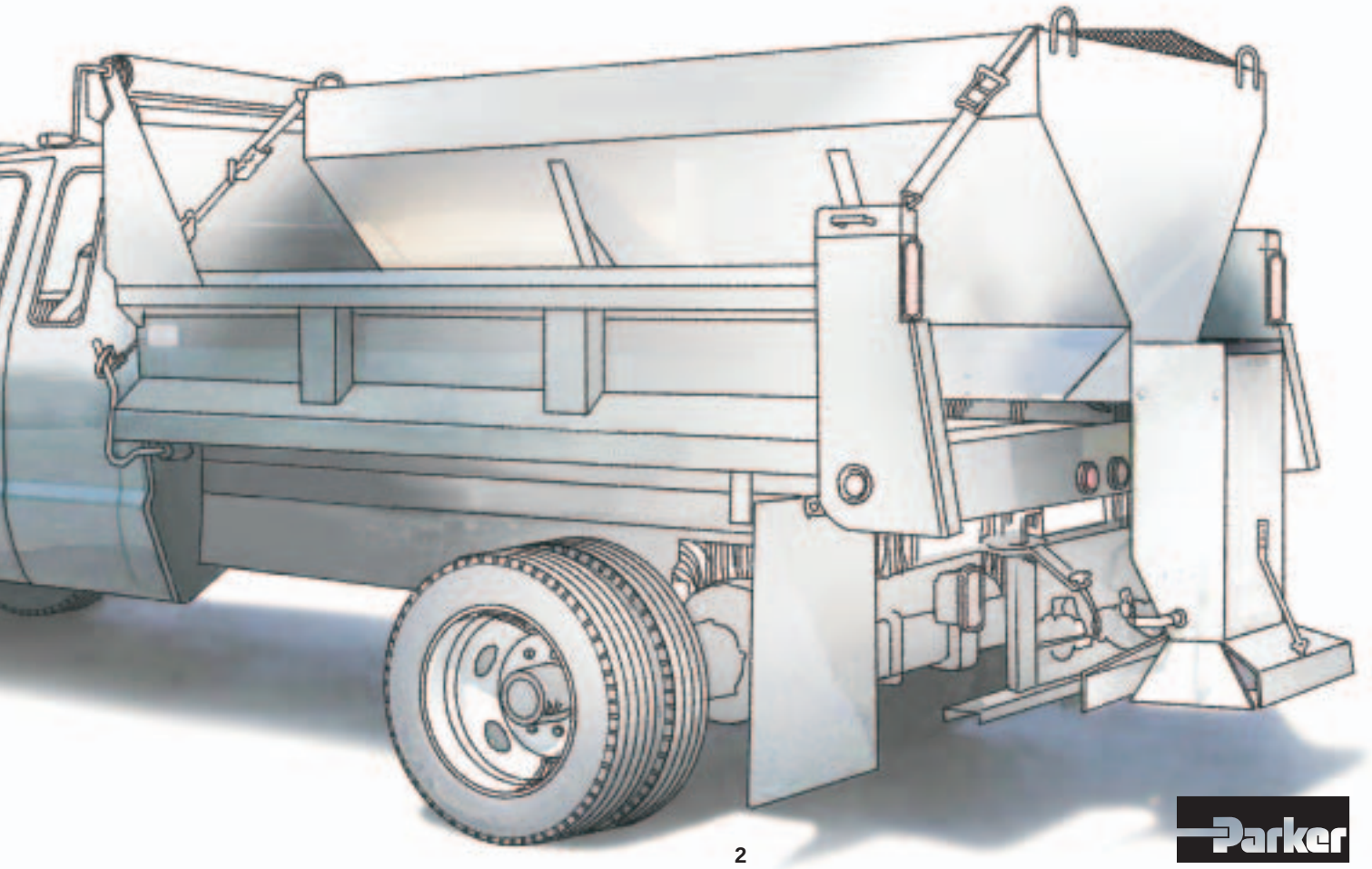
Parker's ISC 2000E is the only electronic spreader control system designed, tested and certified to meet the rigorous Industrial Electronic Compliance Standards, "IEC Certification". This compliance means the ISC 2000E electronic components are tested to meet the same demanding specifications as the chassis manufacturers' electronics. This translates to reliable, certified and self diagnostic electronic components.

Environmental Requirements

• Random Vibration	• IEC 68-2-64 Fh
• Shock	• IEC 68-2-27 Es
• Bump	• IEC 68-2-29 Eb
• Dry Heat	• IEC 68-2-2 Eb
• Delta Temperature	• IEC 68-2-14 Nb
• Cold	• IEC 68-2-1 Ab
• Damp Heat, Cyclic	• IEC 68-2-30 Db
• Damp Heat, Steady State	• IEC 68-2-3 Ca
• Water	• IEC 68-2-18 Rb3
• Salt Mist	• IEC 68-2-52 Kb

Electro Magnetic Compliance

• Conducted Transients	• ISO 7637-2, -3
• Radiated Susceptibility	• EN61000-4-3
• Radiated Susceptibility	• EN50204-4-3
• Radiated Emissions	• EN55022, Class B
• Conducted Emissions	• EN55014
• Conducted Susceptibility	• EN61000-4-6
• Electro Static Discharge	• EN61000-4-2



Salt & Sand System Components

ISC 2000E Electronic Product Range

There are three basic electronic components used to create an "Engineered Spreader Control System". A combination of these components will provide the degree of complexity and the type of plow controls the customer requires.

XCP Control Module
Provides proportional finger tip control for hoist, plow and wing functions utilizing Parker's LST Joysticks. The XCP Control Module provides ground speed control for granular, liquid and spinner with traditional Auto/Manual, Blast, Pass and Auger Reverse functions if required.

XT2 Valve Driver
This driver receives inputs from the MDM and supplies outputs to the appropriate valve coils for independent or simultaneous operation.

MDM Display Module
Provides digital display for granular, liquid and spinner spread rates via an LCD display. The MDM is the central processor of the ISC 2000E System; it communicates with other system components via the CANbus, multi-plexed wire harness. The MDM screen digitally displays spread rates, program/calibration information, system parameters and system defaults.

ISC 2000 Electronic Components

There are only two electronic components in the ISC 2000 Spreader Control System.

XCP Control Module
Provides proportional finger tip control for hoist, plow and wing functions utilizing Parker's LST Joysticks. The XCP Control Module provides ground speed control for granular, liquid and spinner with traditional Auto/Manual, Blast, Pass and Auger Reverse functions, if required.

TOC 8
This component performs two unique requirements, that of a processor and a valve driver. The TOC 8 provides ground speed communication and is used in combination with the XCP Control Module for proportional control of all functions.

Software for ISC 2000E and the ISC 2000

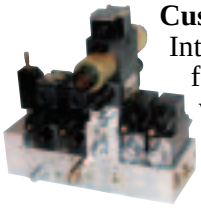
IQAN DEVELOP
A Windows-based software package used to write and modify the unique spreader programs. This software allows Parker's Salt and Sand Integrators to develop and simulate your software program before it is installed into the ISC 2000E or ISC 2000 Spreader Control Systems.

Auxiliary Electronics

GRS 11
This time-tested control system provides reliable ground speed or manual control of granular and spinner requirements. ON/OFF, Auto/Manual, Blast and Pass, are the basic features required to combat any winter event.

TOC 2
A basic non-ground speed manual spreader control. This IQAN based electronic system provides an economical way to take the hydraulics out of the cab and provide proportional control of granular and spinner requirements.

Accessories



Custom Manifolds
Integrated hydraulic circuits for state or township vehicles providing unique, compact assemblies and simplified hydraulic maintenance.

Electronic Joysticks
A variety of Parker IQAN Joysticks are available to complement our ISC 2000E Integrated Spreader Control System.

Pneumatic Controllers
Parker's VP04 single and multi-axis joy sticks are available to provide pneumatic control of plows, hoists and wings.

Blade Saver
Integrated hydraulic circuit increases blade life and truck horsepower while improving steering capabilities. Engage or disengage at driver's discretion.

Low Oil Shut-Down
Parker's integrated hydraulic circuit bolts directly to pump outlet to stop hydraulic flow after hose breakage.

Electronic Spreader Control Matrix

	J1939 CANbus	IEC Certification	Muti-Plexed Wire Harness	Proportional: Plow	Proportional: Hoist	Proportional: Wings	Cable/Pneu: Plow	Cable/Pneu: Hoist	Cable/Pneu: Wings	Digital Display	Ground Speed via J1939	Ground Speed via Pulse/Frequency	Data Collection	GPS Compatible via RS232	GPS Compatible via J1939
ISC 2000E "MDM"	•	•	•	•	•	•				•	•	•	•	•	•
Auxiliary Wing Module				•	•	•									
Cable, Pneumatic Plows, Hoist, Wings							•	•	•						
ISC 2000 "TOC8"	•	•	•	•	•	•					•	•		•	•
Auxiliary Wing Module				•	•	•									
Cable, Pneumatic Plows, Hoist, Wings							•	•	•						
GRS11							•	•	´			•			

ISC 2000E

Parker's ISC 2000E provides many unique features never offered in competitive spreader control systems.

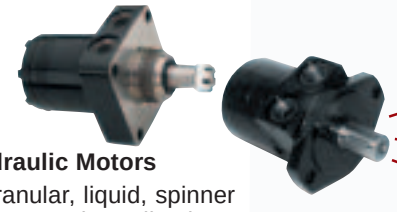
Small, compact electronic components provide the driver with stress-free finger tip proportional control of plow, hoist and spreader functions. Granular and liquid rates are displayed: **pounds/lane and gallons/ton**. The only decision required by the operator is the number of lanes to be covered; granular and liquid rates adjust automatically with the selected lane width.

J1939 CANbus Communications allow the ISC 2000E Spreader Controls to communicate with the chassis CPU for ground speed and vital engine and transmission output. We also communicate with GPS Systems and Roadwatch Systems through J1939 communications.

IEC Certified Electronics are designed, tested, and certified for rugged applications. We pre-test the electronics for mechanical stress, radio frequency interference and electro-magnetic interference to confirm a reliable product.

Hoist Cylinder

- 3"-14" bores at 3000 PSI
- Rod material
  - Chrome, double chrome
  - Nitrided rods
  - Stainless



Hydraulic Motors

- Granular, liquid, spinner
  - Integral Feedback Sensor at 100 pulses/rev
- Displacements 2.2-24.0 in^3/rev at 2000 PSI

Hydraulic Quick Couplings

- Double Shut-Off design
- Virtually oil-free connect/disconnect
- Brass, steel, stainless

Hydraulic Filtration

- High pressure to 3000 PSI
  - 45 GPM, inline or manifold mount
- Medium/low pressure
  - CN Series, inline to 120 GPM
  - FT Series, inline or tank mounted to 75 GPM
- 10 Micron Absolute 98.7% efficient
  - 3-Year Warranty

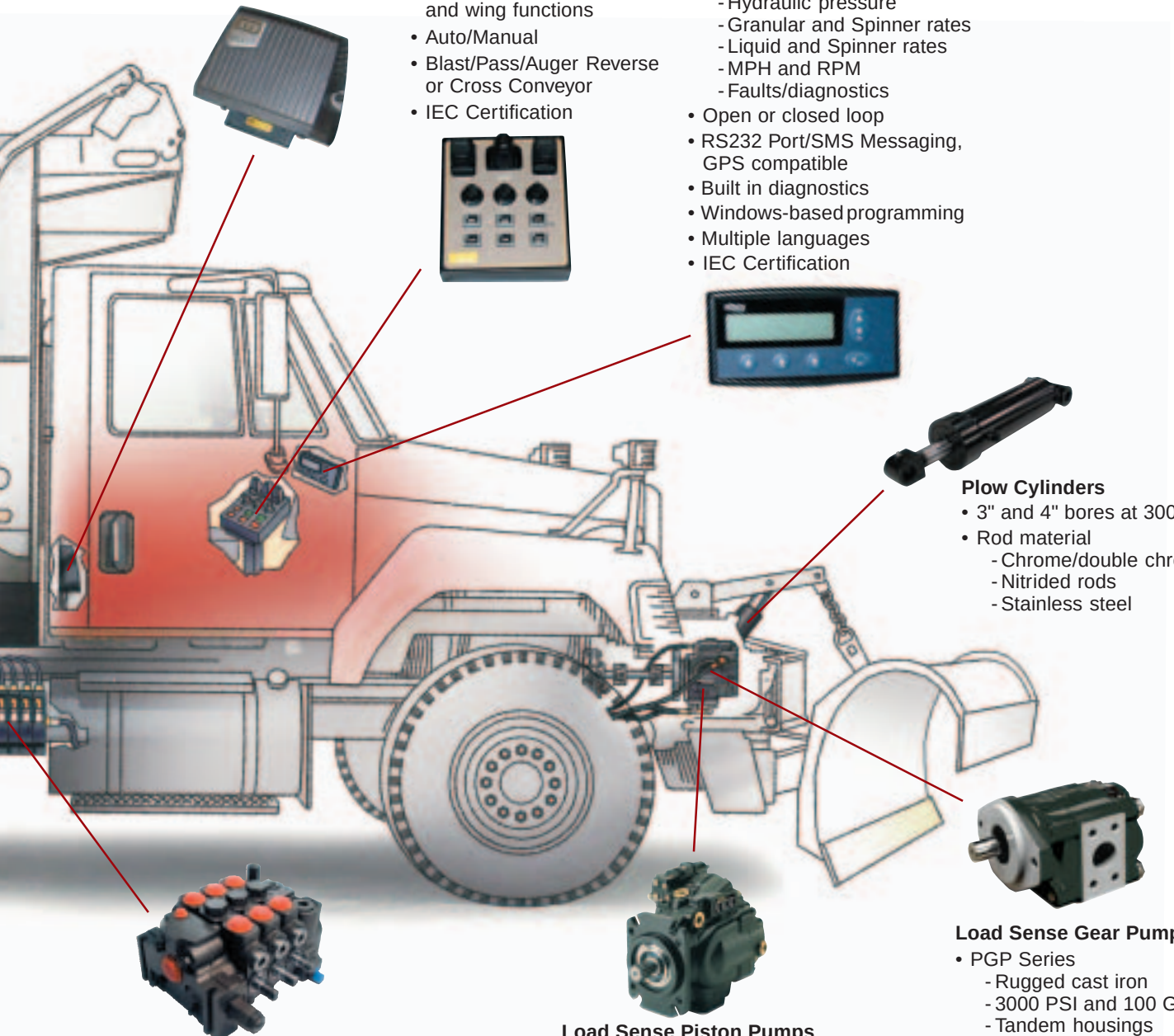
High Pressure Hose & Fittings

- Meets or exceeds SAE specifications
- Abrasion resistant covers, tight bend radius
- No-Skive design utilizing patented Parkrimp System

XT2 Valve Driver
- Outputs to coils
- Built in diagnostics
- IEC Certification

XCP Control Module
- Small/compact
- Mounted to air-ride seat
- Proportional hoist, plow and wing functions
- Auto/Manual
- Blast/Pass/Auger Reverse or Cross Conveyor
- IEC Certification

MDM Display Module
- In-dash or remote mount
- LCD displays
  - Date/Time
  - Hydraulic pressure
  - Granular and Spinner rates
  - Liquid and Spinner rates
  - MPH and RPM
  - Faults/diagnostics
- Open or closed loop
- RS232 Port/SMS Messaging, GPS compatible
- Built in diagnostics
- Windows-based programming
- Multiple languages
- IEC Certification



Plow Cylinders
- 3" and 4" bores at 3000 PSI
- Rod material
  - Chrome/double chrome
  - Nitrided rods
  - Stainless steel

Post Compensated Valve Assembly
- Over-Demand Protection™
  - Flow sharing for low RPM situations
- High flow/high pressure
  - 32 and 45 GPM spools for rapid hoist speeds
  - Proportional, solenoid, cable and pneumatic actuators

Load Sense Piston Pumps
- PAVC Series
  - 33 cc to 100 cc/rev
  - 3000psi/3000 RPM
  - Harsh environment seal/bearing
  - Integral air bleed
- P2/P3 Series
  - 60 cc to 145 cc per rev
  - 4600 PSI/3000 RPM
  - Harsh environment seal/bearing

Load Sense Gear Pumps
- PGP Series
  - Rugged cast iron
  - 3000 PSI and 100 GPM
  - Tandem housings
- Load sense unloader
  - 30 and 60 GPM
  - Excess flow to tank and load pressure

ISC 2000 Integrated Spreader Controls

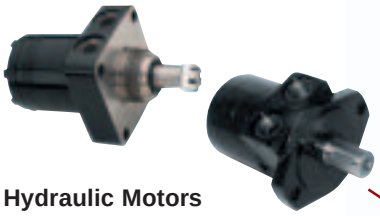
ISC 2000

Parker's ISC 2000 provides many basic features required for a non-data collecting ground speed system, yet maintains the user friendly proportional control that is necessary for stress-free reliable operation.

The ISC 2000 utilizes J1939 CANbus communication with the chassis CPU for ground speed pick-up and also provides the reliability of IEC Certification.

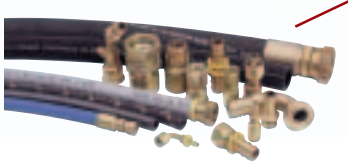
Telescopic Cylinders
- 3"-14" bores at 3000 PSI
- Rod material
  - Chrome, double chrome
  - Nitrided rods
  - Stainless
- Various mounting options

Hydraulic Quick Couplings
- Double Shut-Off design
- Virtually oil-free connect/disconnect
- Brass, steel, stainless



Hydraulic Motors
- Granular, liquid and spinner
  - Integral feedback sensor at 100 pulses/rev
- Displacements 2.2-24.0 in^3/rev at 2000 PSI

Hydraulic Filtration
- High pressure to 3000 PSI
  - 45 GPM, inline or manifold mount
- Medium/low pressure
  - CN Series, inline to 120 GPM
  - FT Series, inline or tank mounted to 75 GPM
- 10 Micron Absolute 98.7% efficient
  - 3-Year Warranty



High Pressure Hose & Fittings
- Meets or exceeds SAE specifications
- Abrasion resistant covers, tight bend radius
- No-Skive design utilizing patented Parkrimp System

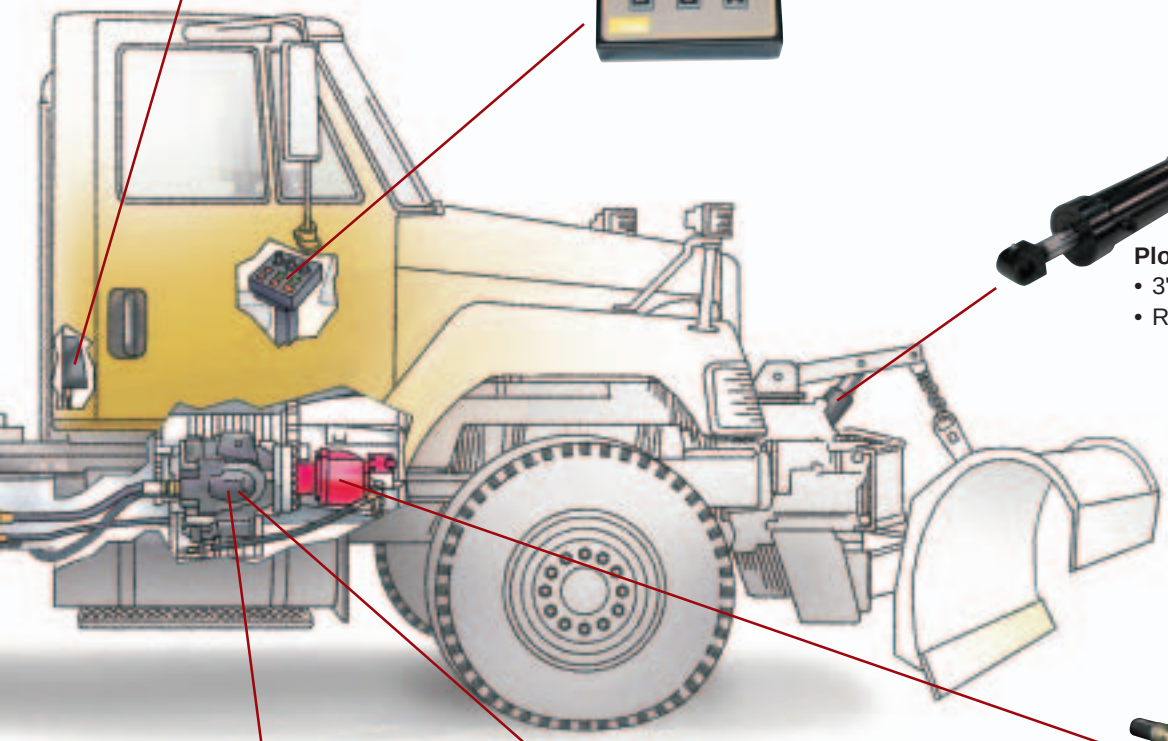
Post Compensated Valve Assemblies
- Over-Demand Protection™
  - Flow sharing for low RPM situations
- High flow/high pressure
  - 32 and 45 GPM spools for rapid hoist speeds
- Proportional, solenoid, cable and pneumatic actuators

TOC8 Valve Driver

- Windows-based programming
- J1939
- RS232
- Built in diagnostics
- IEC Certification

XCP Control Module

- Small/compact
- Mounted to air-ride seat
- Proportional hoist, plow and wing function
- Auto/Manual
- Blast/Pass/Auger Reverse or Cross Conveyor
- IEC Certification



Plow Cylinders

- 3" and 4" bores at 3000 PSI
- Rod material
  - Chrome/double chrome
  - Nitrided rods
  - Stainless steel

PTO

- Allison MD and HD Transmissions
- 277 hotshift at 129% passenger side
- 267 constant mesh at 129% driver side

Load Sense Gear Pumps

- PGP Series
  - Rugged cast iron body
  - 3000 PSI and 100 GPM
  - Tandem housings
- Load sense unloader
  - 30 and 60 GPM
  - Excess flow to tank at load pressure

Load Sense Piston Pumps

- P2060 Allison Transmission Pump
  - 46 GPM and 4600 PSI
  - 2400 engine RPM and 3100 pump RPM

QDB Manual Spreader and GRS11 Electronic Spreader Control

Ground Speed or Manual Spreader Control

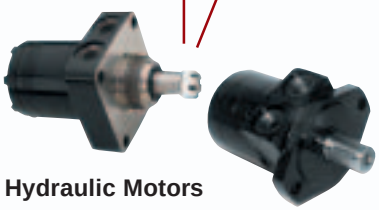
The “spreader control” is the heart of any salt and sand system. Choose the GRS11 Electronic Spreader Control System with basic “ground speed” features for accuracy and driver comfort, or a time tested QDB Manual Spreader Valve for economical, reliable spreader control. These proven systems are appropriate for heavy duty and medium duty applications.

Traditional “open center” cable operated valves for fixed displacement pumps provide reliable operation of plow and hoist functions.

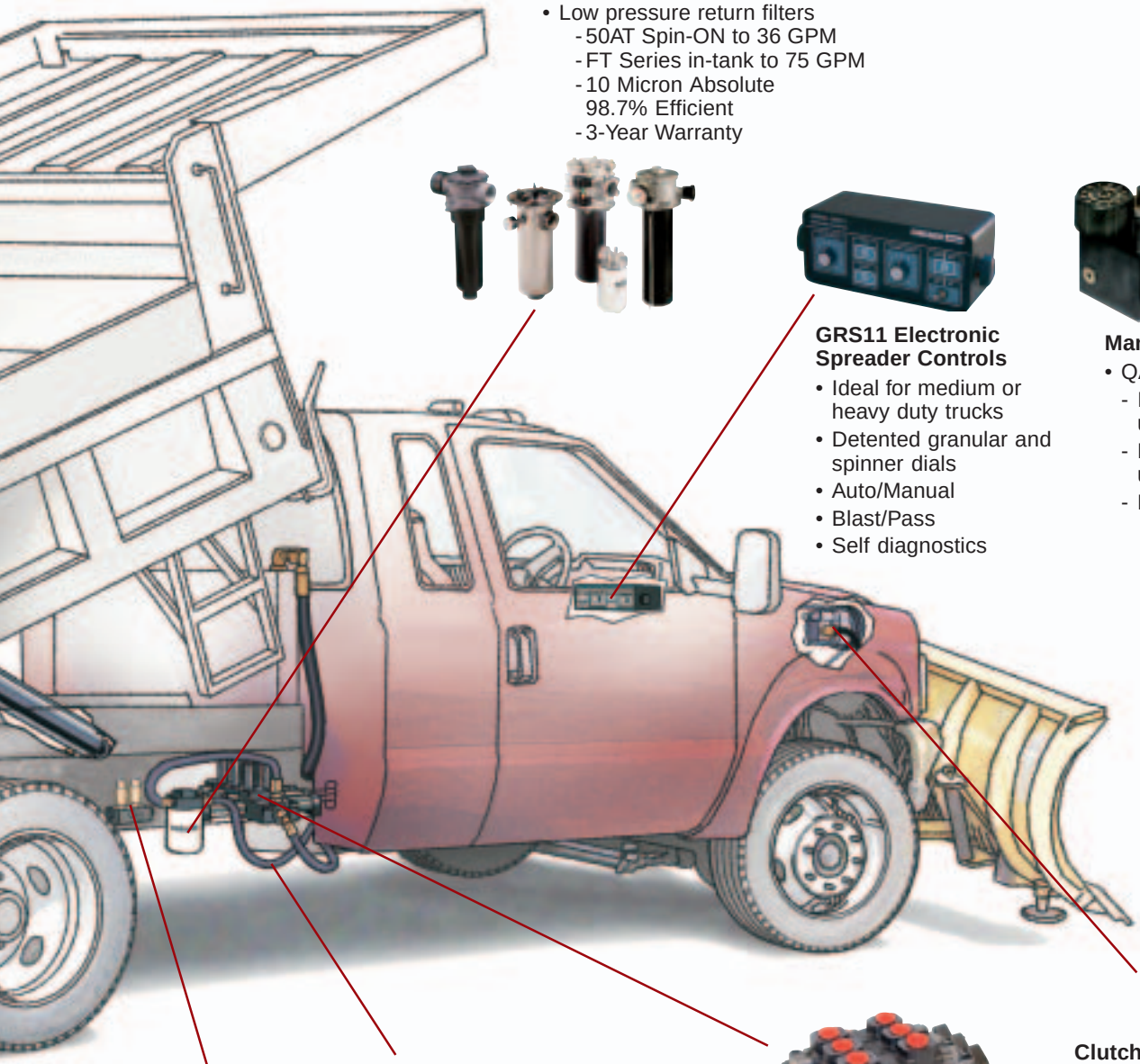
Let Parker create the precise system for your requirements.

Hoist Cylinder
- 3" - 14" bores at 3000 PSI
- Rod material
  - Chrome, double chrome
  - Nitrided rods
  - Stainless

Hydraulic Quick Couplings
- Double Shut-Off design
- Virtually oil-free connect/disconnect
- Brass, steel, stainless



Hydraulic Motors
- Granular, liquid, spinner
  - Integral feedback sensor at 100 pulses/rev
- Displacements 2.2-24.0 in^3/rev at 2000 PSI



Filters

- Low pressure return filters
  - 50AT Spin-ON to 36 GPM
  - FT Series in-tank to 75 GPM
  - 10 Micron Absolute 98.7% Efficient
  - 3-Year Warranty

GRS11 Electronic Spreader Controls

- Ideal for medium or heavy duty trucks
- Detented granular and spinner dials
- Auto/Manual
- Blast/Pass
- Self diagnostics

Manual Spreader Valve

- QA and QD Series
  - Integral load sense unloader
  - Manual or solenoid unload
  - Flows to 30 GPM

Clutch Pump

- Ideal for compact mounting
  - 0.89-3.9 in^3/rev
  - Pressures to 3000 PSI
  - RPM's to 3600 RPM
- V-Belt, serpentine belt, direct clutch options

Valve Assembly

- V20 Open Center Valve Series
  - System relief, load checks and power beyond
  - Flows to 25 GPM, Pressures to 3500 PSI
  - Cable, pneumatic, and solenoid actuators

High Pressure Hose & Fittings

- Meets or exceeds SAE specifications
- Abrasion resistant covers, tight bend radius
- No-Skive design utilizing atented Parkrimp System

Spreader Manifold

- Proportional control of granular and spinner
- 14 GPM granular 7 GPM spinner
- Integral load sense unloader for fixed displacement pumps

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