

# CHALLENGER STREET SWEEPER

Introducing the Challenger street sweeper.

This unit is a recent addition to the sweeper market, but with a design that's based on 15 years of mechanical education and sweeping experience. It has been designed and constructed to brave the challenges posed by Canadian winter conditions.

In 2006, three of the biggest truck manufacturers responded to the global energy preservation trend by introducing new models of low, tilt cab chassis with 19,500 lb GVWR. GMC W-Series, International CF-Series and Ford CFL chassis offer excellent manoeuvrability (16.5' turning radius), visibility and operating efficiency. These features are perfect suited for use as a basis for street sweepers.

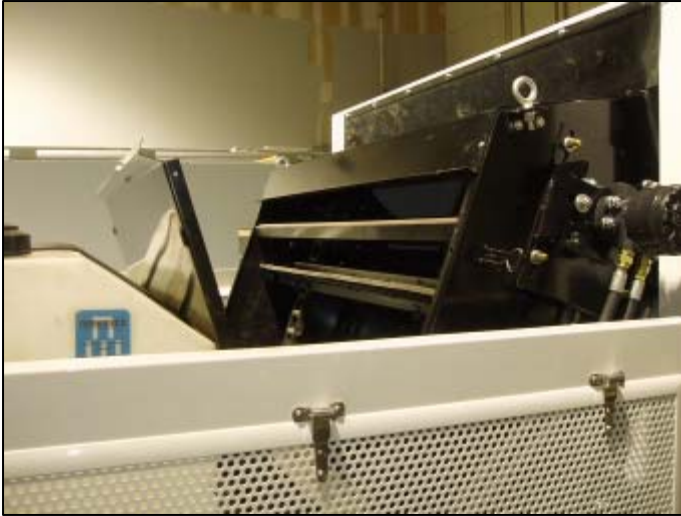
Challenger is the best example of a sweeper that uses traditional, proven designs in combination with the newest technology to create a mechanical sweeper with excellent sweeping performance, comparable to sweepers installed on a chassis with 33,000 lb GVWR – and this with much lower up-front investment and operating costs.

## CONVEYOR ASSEMBLY

Productivity and quality of sweeping are improved significantly when the main broom is located between conveyor walls (see Mobil sweepers). In this case, the broom throws all of the sweeping material onto the conveyor. If the conveyor is narrower than the broom, a complicated system of curtains is needed to keep material inside the main broom compartment. Challenger has a 58.5" wide conveyor and a 58" main broom.

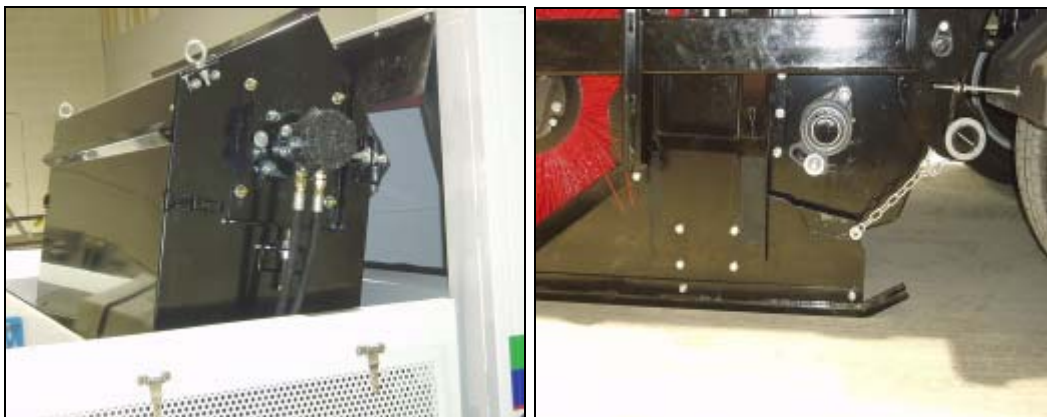


The entire conveyor is mounted on five bolts and there is no shroud covering it. To perform more complicated repairs, such as a chain replacement, a mechanic can remove the conveyor assembly in a very short period of time and complete the repair on a bench or shop floor.



The conveyor's upper cover is installed on hinges. An operator or mechanic can quickly open the cover when washing or a visual inspection is needed.

The unit features extremely easy access to replace upper or lower bearings.



Adjustment for chain tension on upper bearing, and distance from floor on upper and lower bearing.

Advantages of having a squeegee-type conveyor:

- No need to frequently wash lower roller
- Conveyor is the same width as main broom
- Much higher clearance between surface and bottom of conveyor (speed bumps)
- No side movement of chains
- Positive engagement between chain and sprockets (not friction only)
- Extremely easy access to lower and upper bearings
- Lower bearings don't have constant contact with swept material
- Chain and squeegee are resistant to sharp objects

## MAIN BROOM ASSEMBLY

To prevent trailing, main broom arms and dirt shoe plates should not have any side movement. Challenger's main broom arms are supported with side brackets to reinforce pivot bushings. Challenger's dirt shoe plates are Mobil style, with no pivot points, moving vertically inside steel slots. This system insures no trailing even after thousands of hours of use.



Self align bearings and floating type direct mounted hydraulic motor guarantee the elimination of any inside stresses caused by shaft misalignment. Misalignment of a shaft is a result of the welding process and weight of the broom assembly.

To adjust distance between main broom and dirt shoes, the Challenger design uses a set of shims bolted to the dirt shoe assembly.

## PIVOT POINTS



There are only six points to grease the Challenger sweeper – bearings on conveyor and main broom arms. **All pivot points on the challenger sweeper are made out of self-lubricating composite bushings and chromed shafts.** Because of the extremely hard surface of chromed shafts, to repair a pivot point, a mechanic needs only to replace the bushing and not the pin. This system is proved on other sweepers to last a very long time with little wear.

### The basic rule to quality pivot point design:



A pin should rotate inside a bushing and not rotate inside a steel hole (opening). If a steel pin is rotating inside a metal opening, friction of metal on metal will be the result, and the metal on both surfaces will wear out quickly causing a weak pivot point. To prevent this, we bolted a pin to the narrow arm of the pivot point; this allows rotation inside a larger surface. Repair of a worn shaft opening is very expensive and usually requires the entire arm to be replaced.

## HYDRAULIC SYSTEM



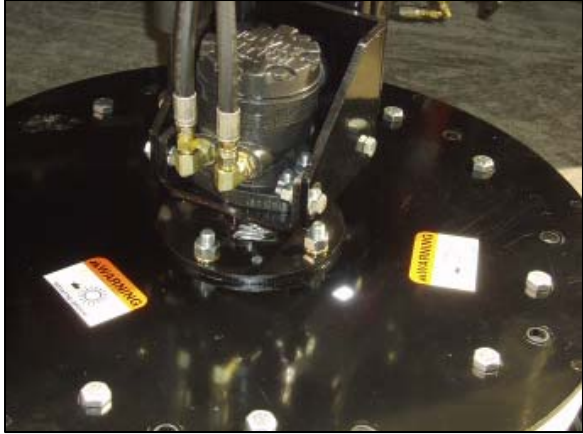
Challenger is equipped with a variable displacement piston-type load sensing hydraulic pump – much more efficient and longer lasting than the old design of gear-type pumps. Hydraulic control valves automatically regulate and distribute the optimum amount of oil to each motor or cylinder, based on the load. **Each function has a separate valve with manual override and flow adjustment.** With these valves, rotation for each motor (conveyor, main broom or side brooms) can be adjusted individually for different applications.

By eliminating unnecessary oil flow with this hydraulic system, fuel consumption is reduced by approximately 20%.

Another advantage of using the piston type pump is the ability to

**hydraulically-adjust down pressure** on each side broom from inside the cab.

All hydraulic valves are installed in one area. This system is simple and easy to trouble shoot. Repairs can be made from the ground, with no need to climb.

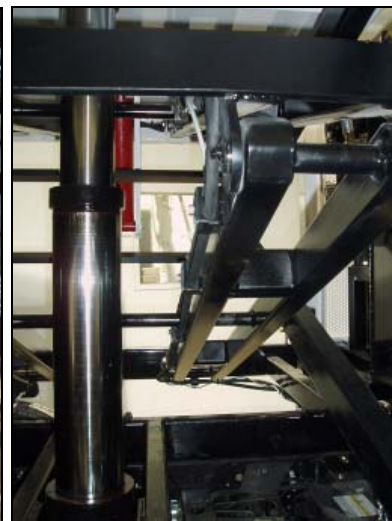


All hydraulic motors have four bolts mounting to prevent damaging brackets with excessive stress concentration.



The hydraulic cooler is installed independently (not “sandwiched”), and cooled with an electric fan triggered by a thermostat.

The hydraulic hoses are secured and organized using detachable mounting clamps (not welded sharp pieces of pipes).



## ELECTRICAL SYSTEM

The control box inside the cab contains switches only. Switches are rated for 16 amperes, heavy duty, made in Germany, and proved by other sweepers to be long lasting. Switches are lighted for night use.



The harness from the control box is connected with a weather-proof connection box using an Amphenol military connector.

Electric wires are numbered and color-coded.

There are no electronics in the system (except side broom down pressure); all functions are run by Bosch-type relays.

The engine is protected with a

Murphy system for low oil pressure, high water temperature, and low hydraulic oil level.

Low water level light prevents unexpected dust creation.

## SIDE BROOM ASSEMBLY



Side brooms are a free floating trailing type with not two, but four solid arms, and a turn buckle like that found on some other sweepers. The turn buckle is always a weak point in a sweeper's design, because it wears out quickly. We pivoted the sideways oscillation on a 2" diameter chromed shaft to increase durability.

The standard equipment of the Challenger includes tilted side

brooms and down pressure adjustable in the cab.



For easy access to chassis components, side brooms are rotated away from the sweeper.

## HOPPER ASSEMBLY

The Challenger hopper is a lifted, four stage hydraulic cylinder. Exactly like dump trucks, the weight of the hopper is lifted on the multi stage cylinder, and scissor arms stabilise the hopper's movement. There are over 150 Husky Sweeprite sweepers on the market working trouble free with the same system.



With a vertical mounted cylinder, 100% of the hydraulic force is applied to lift the hopper. Those systems with cylinders attached to scissor arms and positioned 15 degrees from the horizontal position apply only 26% of hydraulic force to vertically lift the hopper. This means that to have a 14,000 lbs hopper lift capacity, the cylinder(s) have to create approximately 54,000 lbs of force (with a 10-degree angle, 17% means 82,000 lbs of force). These huge forces are transferred through the arms and pivot points, requiring a very heavy construction.

The hopper is welded with continuous weld, preventing water from penetrating inside the construction and causing corrosion.



The hopper's doors are opened hydraulically, with cylinders attached directly to the hopper and the doors, without the use of additional links and levers, causing additional wear on the parts. The brackets holding the cylinders are welded to the large surface in order to spread stress on the larger surface material or bolted to permit adjustment. The front door is reinforced with additional panels to increase strength and prevent the flexibility of the metal.

To prevent corrosion, frame and scissor arms are sand blasted, primed and painted. All other parts are powder coated before being mounted on the unit.

These are only some of the features implemented on the Challenger sweeper. We hope that these details will demonstrate to you the advanced – designed for long life and high quality – piece of equipment we manufacture.