About Parker Hannifin Corporation

Parker Hannifin is a leading global motion-control company dedicated to delivering premier customer service. A Fortune 500 corporation listed on the New York Stock Exchange (PH), our components and systems comprise over 1,400 product lines that control motion in some 1,000 industrial and aerospace markets. Parker is the only manufacturer to offer its customers a choice of hydraulic, pneumatic, and electromechanical motion-control solutions. Our Company has the largest distribution network in its field, with over 7,500 distributors serving nearly 400,000 customers worldwide.

Parker’s Charter

To be a leading worldwide manufacturer of components and systems for the builders and users of durable goods. More specifically, we will design, market and manufacture products controlling motion, flow and pressure. We will achieve profitable growth through premier customer service.

Product Information

North American customers seeking product information, the location of a nearby distributor, or repair services will receive prompt assistance by calling Parker’s North American Customer Service Center at our toll-free number: 1-800-C-PARKER (1-800-272-7537). In Europe, call 00800-C-PARKER-H (00800-272-7537).

The Fluid Connectors

Group designs, manufactures and markets rigid and flexible connectors, and associated products used in pneumatic and hydraulic systems.

The Hydraulics Group

designs, produces and markets a full spectrum of hydraulic components and systems to builders and users of industrial and mobile machinery and equipment.

The Automation Group

is a leading supplier of pneumatic and electromechanical components and systems to automation customers worldwide.

The Aerospace Group

is a leader in the development, design, manufacture and servicing of control systems and components for aerospace and related high-technology markets, while achieving growth through premier customer service.

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The Climate & Industrial Controls Group

designs, manufactures and markets control and fluid-handing components and systems to refrigeration, air-conditioning and industrial customers worldwide.

The Seal Group

designs, manufactures and distributes industrial and commercial sealing devices and related products by providing superior quality and total customer satisfaction.

The Filtration Group

designs, manufactures and markets quality filtration and clarification products, providing customers with the best value, quality, technical support, and global availability.

The Instrumentation Group

is a global leader in the design, manufacture and distribution of high-quality, critical flow components for worldwide process instrumentation, ultra-high-purity, medical and analytical applications.

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The products described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change by Parker Hannifin Corporation and its subsidiaries at any time without notice.

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Offer of Sale

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Hydraguide™ brand hydrostatic steering units were developed to meet the requirements of a broad range of off-highway applications. The HGF series is designed for light duty applications such as lawn and garden equipment, small agricultural equipment, small off-highway vehicles and material handling equipment.

### HGF Series Features

- **Compact Size**—The compact size of the HGF permits mounting in tight spaces to add overall machine design flexibility.

- **Full-Pressure Shaft Seal**—The Parker full pressure input shaft seal is able to withstand full system back pressure up to the pressure rating of the Hydraguide. This enables operation of auxiliary hydraulic functions downstream of steering.

- **Pressure Dams**—Pressure dams provide a barrier of pressurized system oil between metered oil and return. Pressure dam valving provides more precise steering due to the reduction of leakage oil from the metering element.

- **Needle Thrust Bearing**—The needle thrust bearing reduces input torque required to steer, resulting in lower steering efforts.

- **SAE #6 Female O-Ring Ports Standard.**

- **Integral Mounting Studs**—Integral mounting bolts minimize hardware cost and simplify installation, resulting in fewer service parts.

- **Manual Emergency Steering**—A ball check valve allows manual steering in emergencies when pump flow is interrupted. If the vehicle is large enough to require more that 100 ft.-lb. steering wheel torque in the manual mode, another means of emergency steering is recommended.

- **Integral Relief Available**—Five pressure settings from 500 to 1740 psi. Preset to protect steering unit from excessive system pressure.
Hydraguide™ Series

<table>
<thead>
<tr>
<th>XX</th>
<th>Displacement</th>
<th>cm³/rev</th>
</tr>
</thead>
<tbody>
<tr>
<td>08</td>
<td>3.30</td>
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<tr>
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<td>12</td>
<td>4.95</td>
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<td>16</td>
<td>6.60</td>
<td>108.2</td>
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<tr>
<td>20</td>
<td>8.25</td>
<td>135.2</td>
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<tr>
<td>24</td>
<td>9.90</td>
<td>162.3</td>
</tr>
</tbody>
</table>

HGF

**System**

- 0: Open Center Nonreversing
- 1*: Open Center Nonreversing (low noise)
- 2: Open Center Reversing
- 6: Power Beyond Nonreversing
- 3: Power Beyond Reversing
- 4: Closed Center Nonreversing
- 7: Closed Center Reversing

* Only available with port option 2

**Porting**

- 2: Female #6 SAE O-Ring
- 4: Female #6 SAE O-Ring Side Port

**Relief Option**

- 2: No Relief
- 4: 921 psi (64 Bar)
- 7: 1200 psi (83 Bar)
- 6: 1560 psi (108 Bar)
- 8: 1740 psi (120 Bar)

Example:

HGF08220 signifies HGF Hydraguide series unit with 3.30 in³/rev displacement, open center, nonreversing with female #6 SAE O-Ring ports.
## HGF

<table>
<thead>
<tr>
<th>Hydraguide™ Series</th>
<th>08</th>
<th>10</th>
<th>12</th>
<th>16</th>
<th>20</th>
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<td>Displacement</td>
<td>English</td>
<td>Metric</td>
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<td>(in³/rev)</td>
<td>3.30</td>
<td>4.13</td>
<td>4.95</td>
<td>6.60</td>
<td>8.25</td>
<td>9.9</td>
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<tr>
<td>(cm³/rev)</td>
<td>54.1</td>
<td>67.7</td>
<td>81.1</td>
<td>108.2</td>
<td>135.2</td>
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<tr>
<td>Operating Pressure</td>
<td>Maximum</td>
<td>1800</td>
<td>125</td>
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<td>125</td>
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<td>(psi)</td>
<td>1800</td>
<td>1800</td>
<td>1800</td>
<td>1800</td>
<td>1800</td>
<td>1800</td>
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<tr>
<td>(Bar)</td>
<td>125</td>
<td>125</td>
<td>125</td>
<td>125</td>
<td>125</td>
<td>125</td>
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<tr>
<td>Operating Temperature</td>
<td>Maximum</td>
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<td>(°F)</td>
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<td>93.3</td>
<td>93.3</td>
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<tr>
<td>(°C)</td>
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<td>93.3</td>
<td>93.3</td>
<td>93.3</td>
<td>93.3</td>
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<tr>
<td>Flow (gpm)</td>
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<td>8</td>
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<tr>
<td>(l/min)</td>
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<td>30.3</td>
<td>30.3</td>
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<td>Recommended²</td>
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<tr>
<td>(120 rpm)</td>
<td>6.47</td>
<td>8.14</td>
<td>9.73</td>
<td>12.98</td>
<td>16.24</td>
<td>19.45</td>
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<td>Continuous Rated</td>
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<td>8</td>
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<tr>
<td>Weight (lbs)</td>
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<td>9.28</td>
<td>9.77</td>
<td>10.25</td>
<td>10.75</td>
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<tr>
<td>(kg)</td>
<td>3.99</td>
<td>4.10</td>
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<td>“A” Dimensions²</td>
<td>4.37</td>
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<td>(in)</td>
<td>111.0</td>
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<td>123.6</td>
<td>130.0</td>
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<tr>
<td>(mm)</td>
<td>134.6</td>
<td>137.1</td>
<td>142.2</td>
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<td>154.9</td>
<td>162.6</td>
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<td>“B” Dimensions</td>
<td>5.3</td>
<td>5.4</td>
<td>5.6</td>
<td>5.8</td>
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<td>(in)</td>
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<td>137.1</td>
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<td>147.3</td>
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<td>162.6</td>
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<tr>
<td>(mm)</td>
<td>134.6</td>
<td>137.1</td>
<td>142.2</td>
<td>147.3</td>
<td>154.9</td>
<td>162.6</td>
</tr>
</tbody>
</table>

¹ English dimensions are control values; metric values are conversions.
² For two handwheel turns per second.
³ Length from mounting face to end of Hydraguide end.

### Fluid/Filtration

Automatic transmission fluid (ATF) or contact your Parker Sales Engineer for other fluid recommendations.

Use 20-50 micrometer nominal filtration.

---

### HGF Delta P -vs- Flow at 130° F (54.5° C) (113 SUS)

![Graph showing the relationship between Delta P and Flow for HGF Delta at 130° F (54.5° C) (113 SUS).]
HGF Open Center HGF Power Beyond
(HGFXX2X0) (HGFXX2X6)

“A” Dimensions

<table>
<thead>
<tr>
<th>Series</th>
<th>08</th>
<th>10</th>
<th>12</th>
<th>16</th>
<th>20</th>
<th>24</th>
</tr>
</thead>
<tbody>
<tr>
<td>(in)</td>
<td>4.16</td>
<td>4.28</td>
<td>4.41</td>
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<tr>
<td>(mm)</td>
<td>105.7</td>
<td>108.7</td>
<td>112.0</td>
<td>118.4</td>
<td>124.7</td>
<td>131.1</td>
</tr>
</tbody>
</table>

HGF Open Center Sideport
(HGFXX4X0)

“B” Dimensions

<table>
<thead>
<tr>
<th>Series</th>
<th>08</th>
<th>10</th>
<th>12</th>
<th>16</th>
<th>20</th>
<th>24</th>
</tr>
</thead>
<tbody>
<tr>
<td>(in)</td>
<td>5.38</td>
<td>5.50</td>
<td>5.63</td>
<td>5.88</td>
<td>6.13</td>
<td>6.38</td>
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<tr>
<td>(mm)</td>
<td>136.6</td>
<td>139.7</td>
<td>143.0</td>
<td>149.3</td>
<td>155.7</td>
<td>162.1</td>
</tr>
</tbody>
</table>

Note:
1. All dimensions are for reference only.
2. Add .50 in (12.7 mm) for integral relief. (Porting option 2 only)
3. Reversing units shall be used with balanced area cylinders.

Adapter Fittings

411085A1

Straight Thread SAE #6 O-Ring Male JIC 37° Flare

411090A1

Straight Thread SAE #6 O-Ring Parker Seal-Lok 9/16 x 18
HGF Power Beyond Sideport
(HGFXX4X6)

9/16-18 Straight Thread
SAE #6 O-Ring Ports (5)
on a Ø1.66 (42.16) Circle

Dimension “B”

1.25 (31.8)
.51 (13.0)
.62 (15.7)
.56 (14.2)

2.76 (70.1)

1.00 (25.4)

(.56 (14.2)

3.17 (80.5)

Max

Dimension “B”

(4) 5/16-24 UNF-2A Thread Studs
Equally Spaced & Located on a
Ø3.250 (82.55) Circle

Note:
1. All dimensions are for reference only.
2. Add .50 in (12.7 mm) for integral relief.
(Porting option 2 only)
3. Reversing units shall be used with balanced area cylinders.

“B” Dimensions

<table>
<thead>
<tr>
<th>Series</th>
<th>08</th>
<th>10</th>
<th>12</th>
<th>16</th>
<th>20</th>
<th>24</th>
</tr>
</thead>
<tbody>
<tr>
<td>(in)</td>
<td>5.38</td>
<td>5.50</td>
<td>5.63</td>
<td>5.88</td>
<td>6.13</td>
<td>6.38</td>
</tr>
<tr>
<td>(mm)</td>
<td>136.6</td>
<td>139.7</td>
<td>143.0</td>
<td>149.3</td>
<td>155.7</td>
<td>162.1</td>
</tr>
</tbody>
</table>
Notes:
1. All dimensions are for reference only.
2. Jacket tube diameter of all columns is 1.50 inches.
3. Column support is required for columns longer than 10 inches.
4. For “B” length see HGF Steering Column Selection Chart, page C16.
# HGF Series

## Steering Column Selection

<table>
<thead>
<tr>
<th>Part Number</th>
<th>&quot;B&quot; Length - in (mm)</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Standard</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SKF00780400</td>
<td>4 (101.6)</td>
<td>7/8&quot; x 36; no horn contact</td>
</tr>
<tr>
<td>SKF00780600</td>
<td>6 (152.4)</td>
<td>7/8&quot; x 36; no horn contact</td>
</tr>
<tr>
<td>SKF00780800</td>
<td>8 (203.2)</td>
<td>7/8&quot; x 36; no horn contact</td>
</tr>
<tr>
<td>SKF00781200</td>
<td>12 (304.8)</td>
<td>7/8&quot; x 36; no horn contact</td>
</tr>
<tr>
<td>SKF00781600</td>
<td>16 (406.4)</td>
<td>7/8&quot; x 36; no horn contact</td>
</tr>
<tr>
<td>SKF00782200</td>
<td>22 (558.8)</td>
<td>7/8&quot; x 36; no horn contact</td>
</tr>
<tr>
<td>SKF00782400</td>
<td>24 (609.6)</td>
<td>7/8&quot; x 36; no horn contact</td>
</tr>
<tr>
<td>SKF00783200</td>
<td>32 (812.8)</td>
<td>7/8&quot; x 36; no horn contact</td>
</tr>
<tr>
<td>SKF00783450</td>
<td>34.5 (876.3)</td>
<td>7/8&quot; x 36; no horn contact</td>
</tr>
<tr>
<td><strong>Single Hornwire</strong></td>
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<td></td>
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<tr>
<td>SKF01780800</td>
<td>8 (203.2)</td>
<td>7/8&quot; x 36; single horn contact</td>
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<td>SKF01783200</td>
<td>32 (812.8)</td>
<td>7/8&quot; x 36; single horn contact</td>
</tr>
<tr>
<td><strong>Dual Hornwire</strong></td>
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<td></td>
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<tr>
<td>SKF02780800</td>
<td>8 (203.2)</td>
<td>7/8&quot; x 36; dual horn contact</td>
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<td>7/8&quot; x 36; dual horn contact</td>
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<table>
<thead>
<tr>
<th>Part Number</th>
<th>&quot;B&quot; Length - in (mm)</th>
<th>Specification</th>
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</thead>
<tbody>
<tr>
<td><strong>Standard</strong></td>
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<tr>
<td>SKF00343200</td>
<td>32 (812.8)</td>
<td>3/4&quot; x 40; dual horn contact</td>
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**Notes:**

1. Steering wheel horn button not included in column kits. Order part number 465611 separately.
2. Steering wheel nut included with column.
3. For column lengths or horn wires not shown above, contact your Parker Sales Engineer.
Hydraguide™

Each Hydraguide unit consists of a directional control valve and metering section. The valve directs the pressurized oil supplied to and from the cylinder and the Hydraguide metering section. The metering section “meters” out the pressurized oil to the steering cylinder.

The Hydraguide works in conjunction with the vehicle’s hydraulic system, which consists of a steering cylinder(s), relief valve, reservoir, filter, fluid lines, and an engine driven pump. The systems must be tailored to the specific vehicle type and service for which it will be used. Parker offers engineering advice and assistance (and encourages use of our engineering assistance) when applying hydrostatic steering to any vehicle.

Typical Steering Circuit
Open Center, Nonreversing

The nonreversing unit keeps the steered wheels in the steered position when the operator releases the steering wheel. The cylinder ports are blocked in the neutral valve position. The operator must steer the wheels back to the straight ahead position.

Open Center, Reversing

The reversing unit allows the steered wheels to return to the straight ahead position after the operator releases the steering wheel. This happens only if the steering geometry exerts a centering force on the steering cylinder. The cylinder ports are interconnected with the metering section so that the steering wheel follows the wheels back to center position. Reversing steering units should only be used in systems where the opposing cylinder chambers are of equal volume. **DO NOT USE** with a single unequal area/volume cylinder.

Open Center, Power Beyond (5-line)

The Hydraguide has an auxiliary fifth port as a Power Beyond feature to supply fluid to other functions downstream of the Hydraguide (Circuit #1). The Hydraguide automatically takes priority flow for steering, with the remainder available for auxiliary functions. When not steering, all flow is available to auxiliary functions. This system eliminates a flow divider or a separate steering circuit, thus saving energy and component cost.
Closed Center System

Closed center systems utilize a variable displacement pump providing variable flow to the steering circuit. All ports of the Hydraguide™ are blocked when the vehicle is not being steered. The amount of flow through the steering circuit depends upon steering speed and displacement of the Hydraguide.

NOTE: If the auxiliary circuit requires a large demand from the pump, such that an inadequate amount of pump flow is available for steering, then a flow limiting control valve should be applied to the auxiliary circuit. This is needed to guarantee steering capability under all operating conditions.
Flow Chart
Use the following chart as a guide to design hydrostatic steering systems.

1. Existing System

2. New system where steering forces and cylinder stroke(s) are known.

3. New system where steering forces and cylinder stroke(s) are unknown.

   Step I  Calculate Kingpin Torque

   Step II  Select Steering Unit

   Step III  Calculate Cylinder Force

   Step IV  Determine Cylinder Area

   Step V  Determine Cylinder Stroke

   Step VI  Calculate Swept Volume of Cylinders

   Step VII  Calculate Hydraguide™ Displacement

   Step VIII  Calculate Pump Flow

   Step IX  Measure Maximum Steering Pressure

   Step X  Select a Relief Valve Setting

See selection guide for replacement unit. Choose the closest or the next smaller standard displacement. A smaller displacement provides for faster steering speed and more turns lock-to-lock. If necessary, calculate the new valves.
STEP I  Calculate approximate Kingpin torque (KT)

1.1 Determine coefficient of friction:
Select the coefficient of friction (μ) from Chart 1 after calculating E/B. (Kingpin offset/nominal tire width). See Diagram 1.

Diagram 1 (Rubber tires on dry concrete)

1.2 Calculate Kingpin torque:

\[ KT = W (\mu) \sqrt{\frac{B^2}{8} + \frac{E^2}{4}} \]

NOTE: If steered axle wheels are driven (powered), double KT.

Where:
- KT = Kingpin torque in inch-pounds
- W = Weight on steered axle in pounds (Use maximum overloaded weight anticipated.)
- μ = Coefficient of friction
- B = Nominal Tire width (inches)
- E = Kingpin offset (inches) at the intersection with the ground

STEP II  Select steering unit

For small garden tractor-type vehicles, select an HGF — for larger vehicles select HGA or HGB. The purpose of this is to establish what pressure to use in Step IV.

STEP III  Calculate approximate cylinder force (CF)

\[ CF = \frac{KT}{R} \]

Where:
- KT = Kingpin torque (inch-pounds)
- R = Minimum radius arm (inches) (see Diagram 2)

Diagram 2

Diagram 2

STEP IV  Calculate cylinder area (CA)

\[ CA = \frac{CF}{P} \]

Where:
- CF = Cylinder force (pounds)
- P = Pressure (psi) (This is the pressure rating of the steering unit chosen.)

STEP V  Determine cylinder stroke

Calculate using diagram 2 as a guide and the desired vehicle turning circle.

STEP VI  Calculate swept volume (SV) of the cylinder(s)

6.1. One balanced cylinder, double acting

\[ SV = \frac{\pi}{4} \left[ B^2 - R^2 \right] \times S \]

6.2. One unbalanced cylinder, double acting

a. Head side

\[ SV = \frac{\pi \times B^2}{4} \times S \]

b. Rod side

Same as 6.1 above
6.3. Two unbalanced cylinders, double acting

\[ SV = \frac{\pi \times S}{4} \left(2B^2 - R^2\right) \]

Where:
- \( SV \) = Swept volume (volume of oil to move cylinder full stroke) in cubic inches
- \( B \) = Bore diameter (inches)
- \( R \) = Rod diameter (inches)
- \( S \) = Cylinder stroke (inches)

When one single rod cylinder is used, calculate \( n \) for each direction because it will be different. Select the next closest displacement. If desired, recalculate \( n \) as follows:

\[ n = \frac{SV}{\text{Displacement of selected Hydraguide™}} \]

STEP VII Calculate Hydraguide™ displacement (HD)

\[ HD = \frac{SV}{n} \]

STEP VIII Calculate minimum pump flow (Q)

\[ Q = \frac{HD \times SS \times 60}{231} \]

Where:
- \( Q \) = Pump flow (gallons/minutes/revolutions)
- \( HD \) = Hydraguide displacement (cubic inches)
- \( SS \) = Steering speed (revolutions/seconds)

If the steering wheel speed becomes greater than the pump flow, a dramatic increase in steering wheel effort is felt.

STEP IX Measure maximum steering pressure on prototype vehicle

The cracking pressure of the relief valve, which is usually defined as the pressure when the relief valve starts to open and discharge flow to the return line, should be greater than the maximum pressure measured on the vehicle.

The full flow pressure of the relief valve, which is defined as the pressure when maximum flow is going over the relief valve, must not exceed the pressure rating on the steering unit.

NOTE:
Reversing units used with balanced area cylinders.

HGF Series
- Open Center
- Closed Center
- Power Beyond

Operating Parameters:
- 1800 PSI
- 8 GPM
- 3.3 to 9.9 cu. in.

Typical Systems:
- Turf, Material Handling, General Purpose, and Light Agricultural Vehicles.
Hydraguide™ System Data Sheet

1. Customer

<table>
<thead>
<tr>
<th>Company</th>
<th>Address</th>
<th>City</th>
<th>State</th>
<th>Zip Code</th>
<th>Country</th>
<th>Customer Contact</th>
<th>Telephone</th>
<th>Fax</th>
</tr>
</thead>
</table>

2. Vehicle

- Truck
- Tractor
- Lift Truck
- Earth Mover
- Other
- Articulated
- Ackerman
- Tricycle
- 4-Wheel

3. Vehicle Specifications

3.1 Number of Steered Wheels:  
- Front Wheel Steer
- Rear Wheel Steer
- Articulated

3.2 Gross Vehicle Weight and Maximum Weight on Steered Axle:

<table>
<thead>
<tr>
<th>G.V.W.</th>
<th>Lbs. (Kg)</th>
<th>G.F.E.W.</th>
<th>Lbs. (Kg)</th>
</tr>
</thead>
</table>

4. Steering Unit

Operating Parameters

4.1 Number of Hand Wheel Turns Requested:  

4.1.1 Steering Effort @ Expectations: ___ In Lb (Kg. cm.)

4.2 Speed of Steer (Seconds - Lock to Lock):
- Low Idle: ____________ Sec.
- High Idle: ____________ Sec.

4.3 Displacement of Steering Unit: ____________ In.³/Rev. (cc/Rev.)

4.4 Reversing (Load Reactive) (Open Cylinder):

4.5 Power Beyond

4.6 Options

<table>
<thead>
<tr>
<th>Shock Valves (Crossovers)</th>
<th>Anticavation Checks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

4.7 Hose Line Size ___________

4.8 Relief Valve in Steering Unit

5. Steering Cylinder

5.1 Number Used: ____________ Balanced

5.2 Bore: ____________ In. (cm)

5.2.1 Stroke: ____________ In. (cm)

5.2.2 Rod Dia.: ____________ In. (cm)

5.3 Amount of Stroke Used: ____________ In. (mm)

5.4 Cylinder Cross Port Relief Valves

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Pressure Settings</th>
<th></th>
</tr>
</thead>
</table>

5.5 Cylinder Line Size (I.D.): ____________ Length

5.6 Expected Maximum Pressure: ____________
### 6. Pump

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Displacement: □ Fixed  □ Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.1 Flow Control</td>
<td>□ Yes  □ No □ Integral  □ External</td>
</tr>
<tr>
<td>6.2 Pressure Relief</td>
<td>□ Integral □ External Maximum Relief Setting ________________ PSI (Kg/cm²)</td>
</tr>
<tr>
<td>6.3 Flow Divider</td>
<td>□ Yes □ No</td>
</tr>
<tr>
<td>6.4 Pump Flow</td>
<td>High Idle ___________ GPM (L/min.) Low Idle _____________ GPM (L/min)</td>
</tr>
<tr>
<td>6.5 Flow Available</td>
<td>Maximum Steering Flow _____ GPM (L/min.) Minimum Steering Flow ____ GPM (L/min)</td>
</tr>
<tr>
<td>6.6 Full Engine Speed</td>
<td>_______ RPM Idle Engine Speed _______ RPM</td>
</tr>
</tbody>
</table>

### 7. Reservoir

| Capacity | _________ Gal. |
| Location | ____________________________________________________________________________ |
| Integral with Pump | □ Yes □ No Separate _________________________ (Head Relative to Pump) |
| Filtration | _________ Micron □ Normal □ Absolute |
| Expected Operating Temperature | _________ |

### 8. Column and Steering Wheel Data

| Steering Wheel Diameter | _________ (In/cm) |
| Shaft Serration | □ 3/4 x 40 □ 7/8 x 36 Other __________________________ |
| Upper Column Extension | _____ Length Extended □ Yes □ No |
| Length Required | ____________ In/(cm) |

### Additional Information:

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
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