

**VON  
RUDEN**

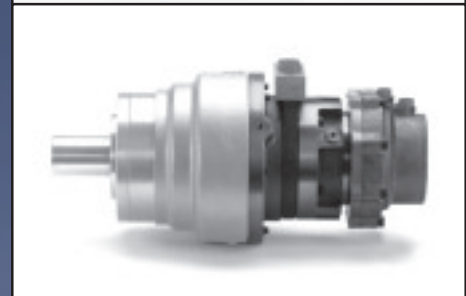
11.05.C

# **AXIAL VANE HYDRAULIC MOTORS**

## **PLANETARY GEAR BOXES**

### **MOTOR/GEAR BOX/ BRAKE PACKAGES**

*Smooth, precise position  
control and rotary  
power transmission.*



VON RUDEN MANUFACTURING, INC.  
1008 FIRST STREET NE  
P.O. BOX 699  
BUFFALO, MN 55313-0699 U.S.A.  
(763) 682-3122 Phone (763) 682-3954 FAX  
[www.vonruden.com](http://www.vonruden.com)

**Compare with the others — only Von Ruden Axial Vane hydraulic motors offer all of these advantages.**



## **1 HOLD POSITION REPEATEDLY AND ACCURATELY**

The case drain leakage in Von Ruden Axial Vane motors is so low that servo valves can easily compensate for it. Case drain leakage is limited to the amount of fluid that can pass through the very tight diametral clearance between the rotor shaft and journal bearings.

In servo systems cross port leakage is effectively zero since servo valves apply equal pressure to both motor ports when in the “null” position.

## **2 MECHANICALLY “STIFF” WHEN LOCKED**

Rigid one piece rotor and shaft.

No internal backlash from keys, splines or gears.

## **3 SMOOTH STARTS AND SMOOTH SLOW SPEED OPERATION**

Low torque and speed ripple. Breakaway pressure is typically less than 10 psi.

Mechanically Smooth since:

- Rotor is 360° pressure balanced.
- The diametral clearance between the vanes and housing is fixed. There is no metal-to-metal contact.
- The design incorporates only a few rotating parts.
- All bearings are pressure lubricated.

## **4 LONG LIFE**

A fixed diametral clearance exists between the rotor veins and housing instead of metal-to-metal contact.

All other rotating parts are pressure lubricated operating on a definite oil film.

Extremely long life can be expected when properly applied within recommended operating specifications.

External radial or thrust loads must not be applied to the output shaft.

## **5 HIGH STARTING TORQUE**

Typically 97% of the theoretical at rated pressure.

Due to their mechanical smoothness.

## **6 MANIFOLD PORT CAPABILITY**

For direct valve mounting.

Or for use with Von Ruden optional cross-over relief valves.

## **INDUSTRIAL SERIES**

Our standard series, with performance suitable for most high performance industrial applications.

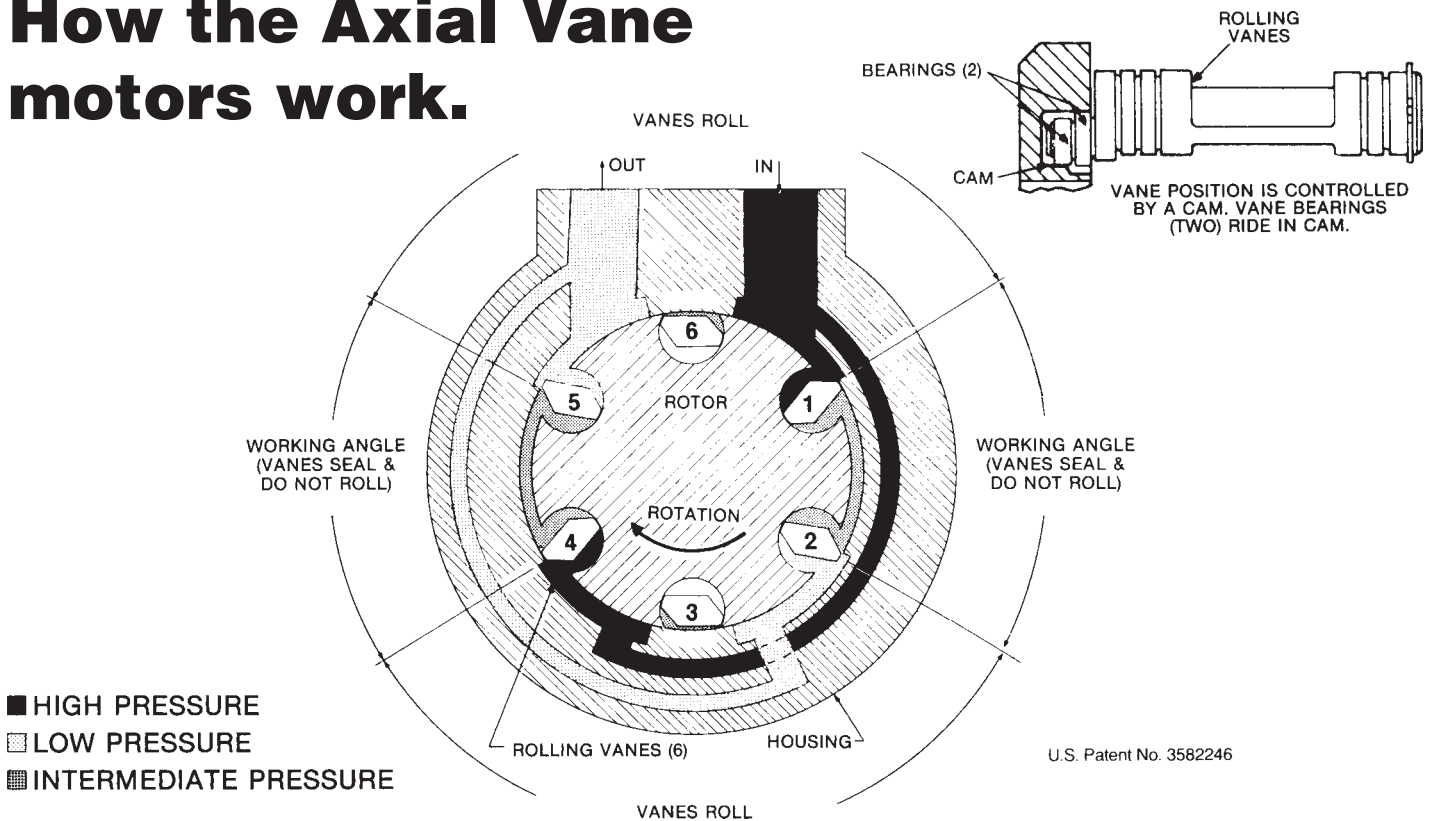
## **SERVO SERIES**

For more demanding applications requiring the highest level of performance.

Servo series motors are obtained by:

- A tighter diametral “select fit” between the housing and rotor vane assembly.
- Additional production test requirements. Torque ripple variation, mechanical binding, total cross port leakage and the variation of cross port leakage within a revolution must all be within tight specific limits.

## How the Axial Vane motors work.



Pressure acting on vanes #1 and #4 causes rotation in the clock wise direction and pressure balances the rotor. Vanes #2 and #5 are inactive in the position shown. Vanes #3 and #6 have been rotated to the position shown to clear steps on the housing.

## Now, a single source for pre-engineered drive packages.

- Single source responsibility
- Pre-engineered and tested
- Reduce your development time
- Reduce your assembly time
- Eliminate duplicate shafts and bearings
- Reduce envelope dimensions
- Reduce your overall cost

### Hydraulic Motor Options

- Choice of motor output shafts
- Motor mounted dual relief valves
- Rotor shaft extensions
- SAE "B" flange mount
- Tach generator packages



### Motors with Brakes

- Brakes mounted directly on rear of motors.
- Normally-on brakes with hydraulic pressure release.
- Optional brake torque capacities.



### Motor/gear Box Packages

- Gear box torque capacities to 25,000 lb-inches.
- Gear box ratios up to 10:1.
- Choice of gear box output shafts.



## MODEL 10

## MODELS 10A, 25, 35, 50 & 70

### Fluid cleanliness

A cleanliness of ISO 18/15 (NAS 1638 Class 9, or SAE 749D, Class 6) should be maintained prior to and during operation. A nominal filtration of 25 microns or better is recommended.

### Fluids

**MOTORS**—High grade mineral base hydraulic oil with 75-400 SSU viscosity is recommended. Fluid temperature should be between -40° and 160°F. Seals are also available for fire resistant fluids such as phosphate ester.

**GEARBOX**—90 wt. lub. oil above 20°F; 80 wt. below 20°F.

### Braking Circuits

For hydraulic surge pressure, applied to or generated by the motor, a close coupled direct acting relief valve must be provided in the circuit. This will keep these surges from exceeding the maximum pressure rating.

### Overrunning Loads

The inlet must be provided with sufficient oil to prevent cavitation in overrunning loads.

### Radial loads (Output Shaft)

The Axial Vane motors must be protected from any side loads. In applications where this cannot be avoided a radial load adapter must be used.

### Start Up of a New System

Be certain the case is full of oil before starting the motor. The case may be filled through the case filling and flushing port. The case may also be filled by subjecting the motor to 200 to 500 PSI “null pressures” (pressure on both ports) with the case filling and flushing port plug back out slightly. When oil begin to flow out of this port, with motor horizontal, the case is assumed to full.

A filter installed in the inlet line is recommended for the first 15 minutes of operation in a new system.

### “Null Pressure” (Pressure on both ports)

If during Operation, “Null Pressure” are expected to exceed 2000 PSI, connect the case filling and flushing port to a relief valve set at 1000 PSI and drain to the reservoir with a 3/8-inch I.D. line.

### Blocked Center Valves

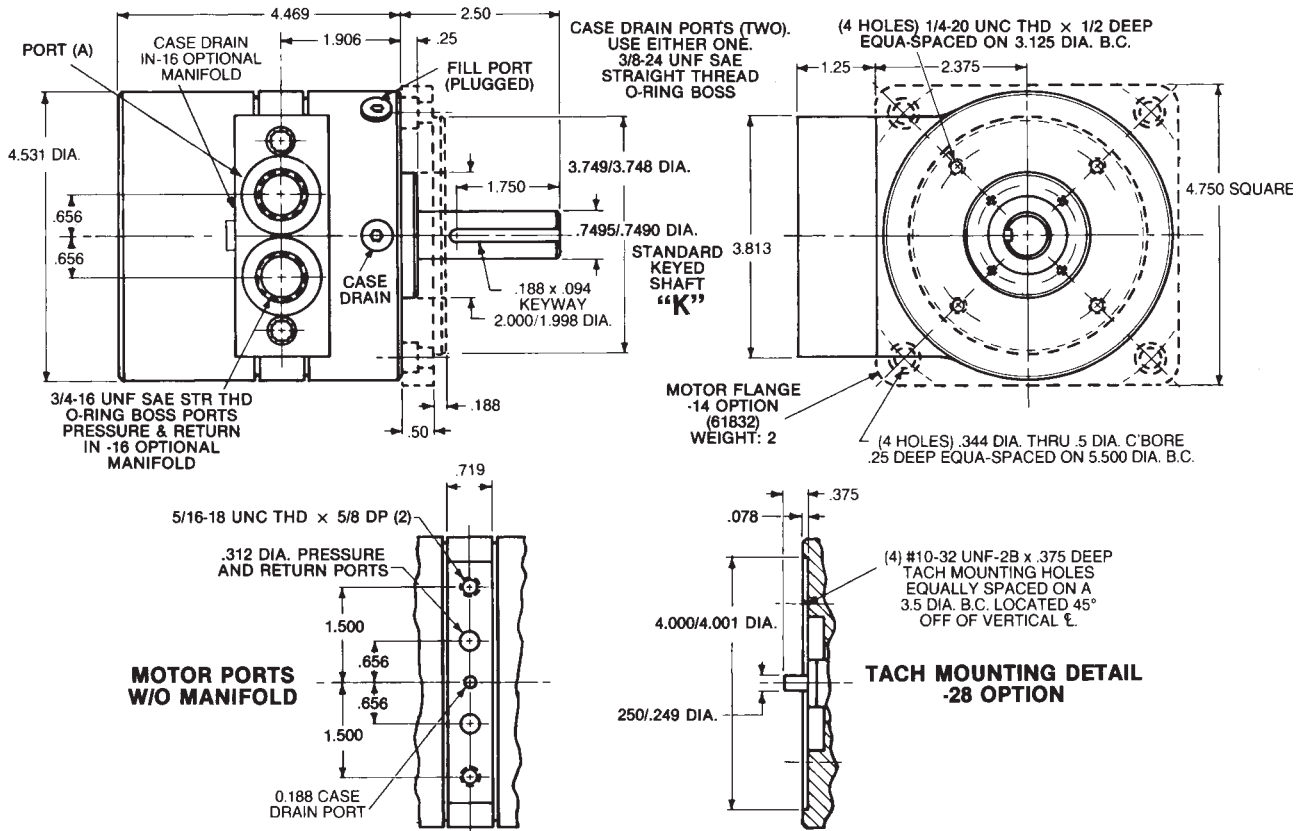
Whenever a block center valve is used, crossover relief valves should be included to protect the motor from excessive pressure surges.

## OPERATING CHARACTERISTICS

Model No.	Displacement In <sup>3</sup> /Rev	Pressure Δ PSI		Max. RPM		Theoretical Torque (continuous) Pound Inches	Theoretical Horsepower at Continuous Speed and Pressure	Weight Pounds
		Continuous	Intermittent	Continuous	Intermittent			
10	1.0	3000	3000	2000 (8.7 GPM)	3000 (13 GPM)	477	15.2	23
10A	1.0	1500	2200					39
25	2.5	3000	3000	1500 (16.2 GPM)	2000 (21.6 GPM)	1194	28.4	39
35	3.5	3000	3000	1500 (22.7 GPM)	2000 (30.3 GPM)	1671	39.73	40
50	5.0	2500	3000	1500 (32.5 GPM)	1500 (32.5 GPM)	1990	47.7	46
70	7.0	2000	2000	1350 (40.9 GPM)	1500 (45.5 GPM)	2229	47.7	52

1. Running torque approximately 94% of the theoretical
2. Stall torque approximately 98% of theoretical
3. Volumetric efficiency up to 98% depending on speed and pressure
4. Case drain line not to exceed 25 PSI (optional seals available for 250 PSI)
5. Intermittent conditions to be less than 10% of every minute
6. Inlet and return pressures not to exceed the ratings listed above
7. Model 10A is 1.0 in<sup>3</sup> performance in 2.5 in<sup>3</sup> form size. For maximum performance maintain a minimum of 500 PSI Δ

## MODEL 10

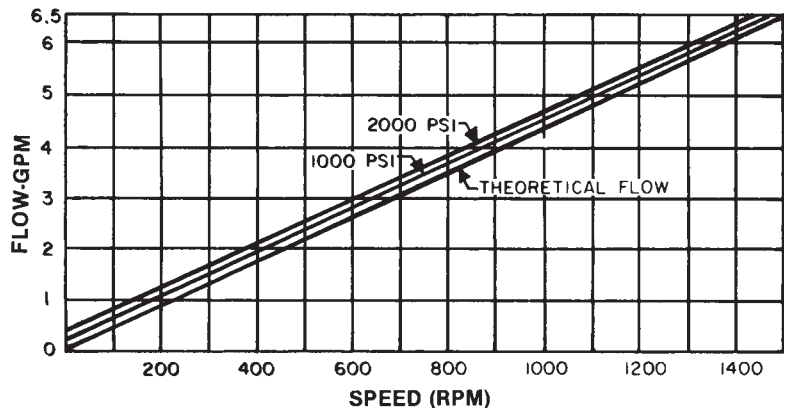
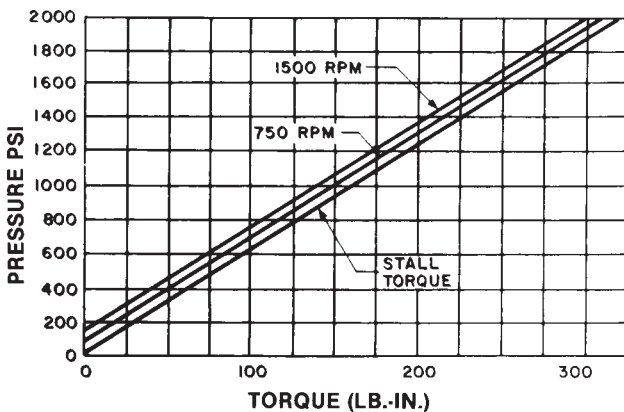


## MODEL 10 SPECIFICATIONS

Operating pressure (Continuous) ..... 3000 PSI  
 (Intermittent) ..... 3000 PSI  
 Speed (Rated Continuous) ..... 2000 RPM  
 Displacement ..... 1.0 Cu. In./Rev.  
 Torque (Theoretical) ..... 15.9 lb. in. @ 100 PSI  
 477 lb. in. @ 3000 PSI  
 Theoretical Input Flow ..... 8.7 GPM @ 2000 RPM  
 Volume of Oil under Compression ..... .84 cu. in.

WK<sup>2</sup> ..... 1.47 lb. in.<sup>2</sup>  
 Weight ..... 23 lbs.  
 Shaft will turn clockwise with pressure applied to port (A).

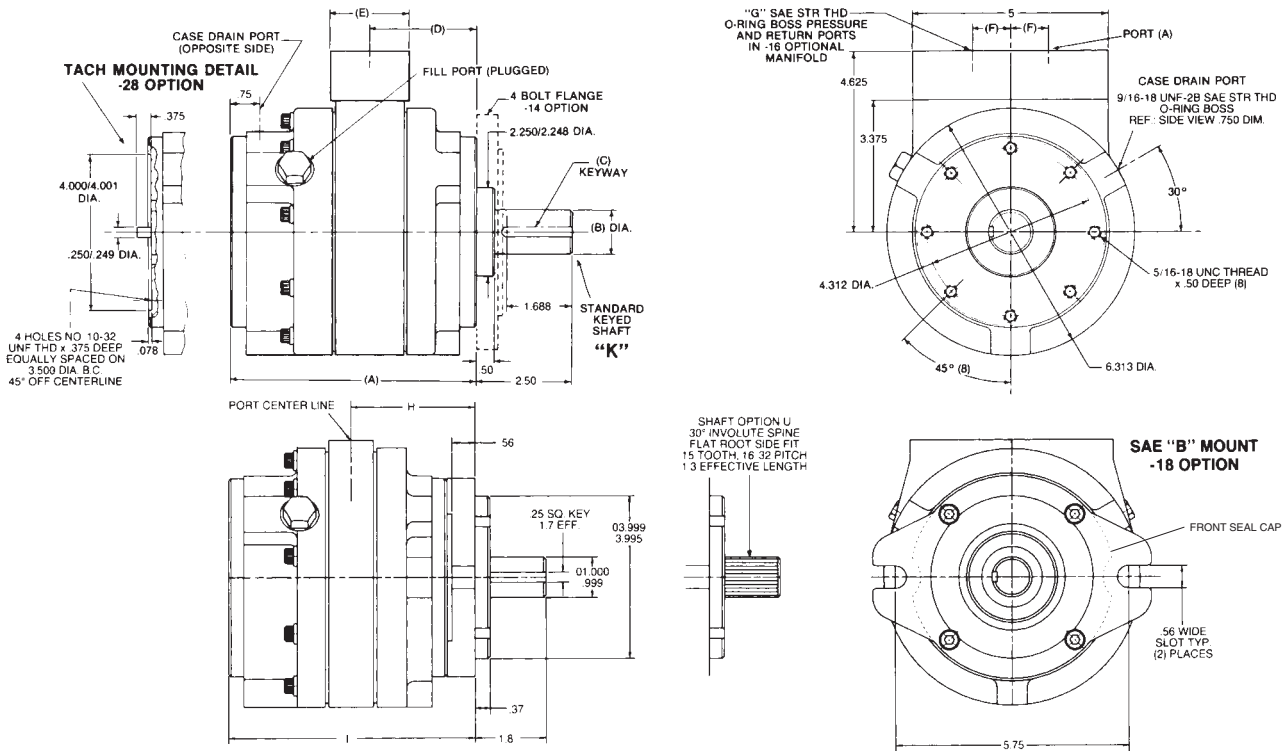
## MODEL 10 TYPICAL PERFORMANCE CHARACTERISTICS



# AXIAL VANE MOTORS



## MODELS 10A, 25, 35, 50, & 70



MODEL	A	B	C	D	E	F	G	H	I
10A	5.188	.875/.874	.188 x .094	2.187	1.50	.750	7/8-14	2.9	5.9
25	5.188	.875/.874	.188 x .094	2.187	1.50	.750	7/8-14	2.9	5.9
35	5.563	1.000/.999	.250/.125	2.375	1.50	.750	7/8-14	3.1	6.3
50	6.125	1.125/1.124	.250/.125	2.625	2	.968	1-5/16-12	3.4	6.9
70	6.785	1.125/1.124	.250/.125	3	2	.968	1-5/16-12	3.7	7.6

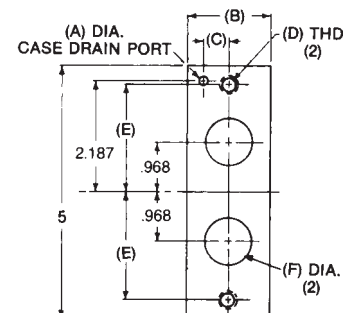
## MODELS 10A, 25, 35, 50, & 70 SPECIFICATIONS

	Model 10A	Model 25	Model 35	Model 50	Model 70
Operating Pressure (Continuous) Δ	3000 PSI	3000 PSI	3000 PSI	2500 PSI	2000 PSI
(Intermittent) Δ	3000 PSI	3000 PSI	3000 PSI	3000 PSI	2000 PSI
Speed (Rated Continuous RPM)	1500	1500	1500	1500	1350
Displacement (in. <sup>3</sup> /rev.)	1.0	2.5	3.5	5.0	7.0
Thoretical (lb. in. @ PSI)	15.9 @ 100	39.7 @ 100	55.4 @ 100	79.6 @ 100	111.4 @ 100
	477 @ 3000	1194 @ 3000	1671 @ 3000	2388 @ 3000	2229 @ 2000
Thoretical INPUT FLOW (GPM @ RPM)	8.7 @ 2000	16.2 @ 1500	22.7 @ 1500	32.5 @ 1500	40.9 @ 1350
Volume of oil under compression (in. <sup>3</sup> )	.84	2.02	3.09	4.81	5.60
WK <sup>2</sup> lb. in. <sup>2</sup>	1.47	12.2	13.4	15.25	17.7
Weight lbs.	23	39	40	46	52

Shaft will turn clockwise with pressure applied to Port (A). See notes 5 and 6 on page 4.

## MOTOR PORTS WITHOUT MANIFOLD

Model	A	B	C	D	E	F
25	.156	.687	.125	3/8-16	1.687	.375
35	.187	1.062	.281	3/8-16	1.687	.562
50	.187	1.625	.50	3/8-16	2.125	.937
70	.187	2.375	.625	3/8-16	2.125	.937

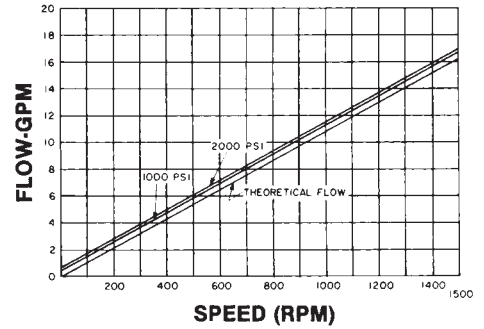
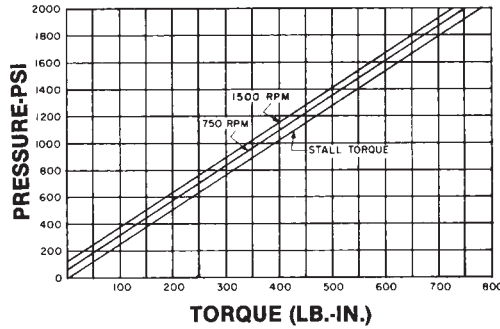


# AXIAL VANE MOTORS TYPICAL PERFORMANCE

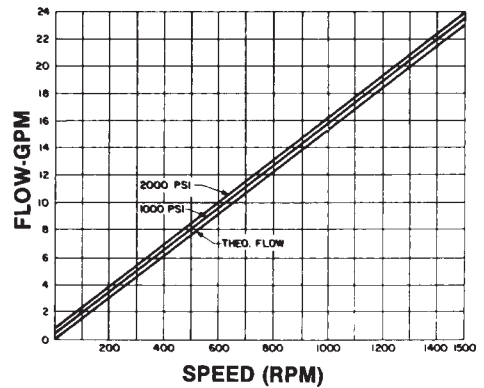
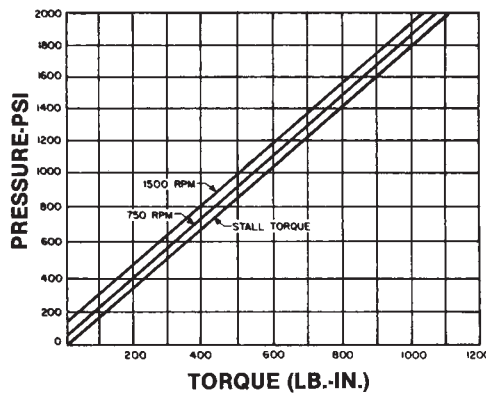


156 SSU Oil Viscosity

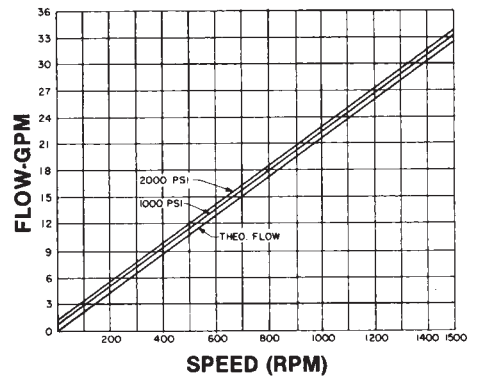
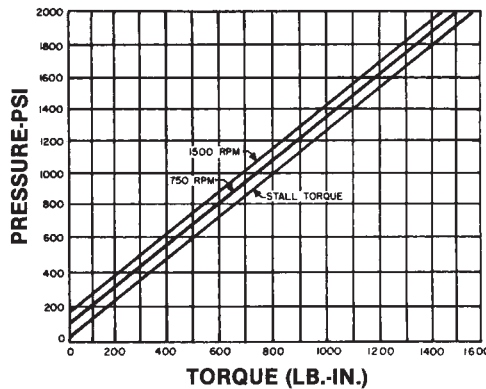
## MODEL 25



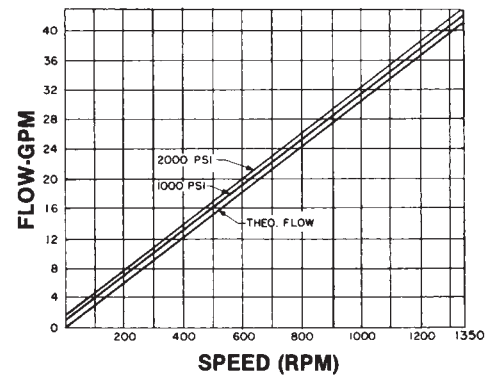
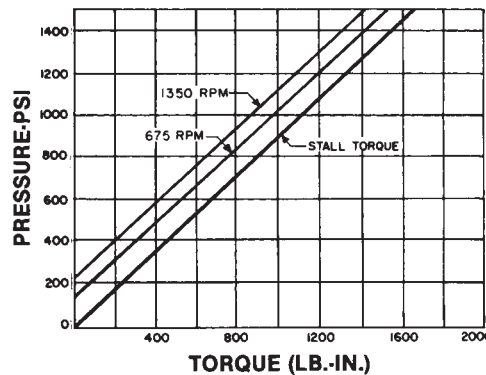
## MODEL 35



## MODEL 50



## MODEL 70



# AXIAL VANE MOTOR OPTIONS MODELS 10A, 25, 35, 50 & 70



## BRAKES, REAR MOUNTED

### General Information

An optional feature of the Von Ruden Axial Vane motor is our rear-mounted normally-on, wet friction disc type brake.

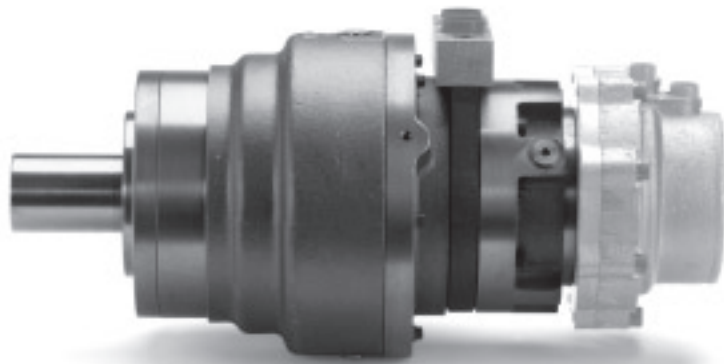
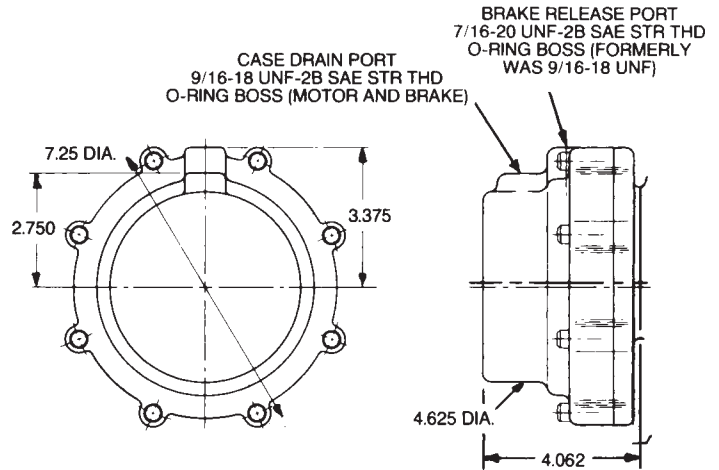
Use of the brake prevents creep under high static loads, which would be due to system leakage, or where positive locking of the motor shaft is required.

The torque capacity of the brake must never exceed the torque capacity of the device driven by the hydraulic Motor.

### Case Drain

These breaks are provided with a case drain connection. A line must be provided to return case drain flow to the reservoir at no more than 25 PSI surge pressure. Optional motor seals are available for case drain pressures up to 250 psi.

WK<sup>2</sup> of Brake ..... 2.6 lb. in<sup>2</sup>  
Volume of Oil to Release Brake ..... 0.6 in.<sup>3</sup>

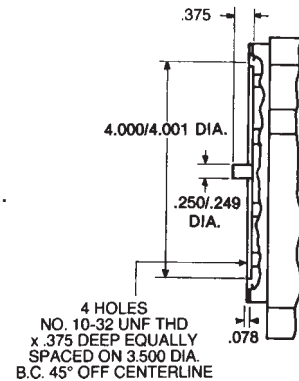


Model Numbers		Holding Capacities	
Standard Brake	w/Tach Adaptor Shaft	250 PSI Release	125 PSI Release
222	222S	940 lb-in	470 lb-in
223	223S	1410 lb-in	705 lb-in
224	224S	1885 lb-in	940 lb-in
225	225S	2355 lb-in	1177 lb-in

**Note:** The above are holding capacities with no back pressure in release line, and using a mineral based hydraulic oil, in applications where excessive holding torque is a concern, please contact factory.

### Optional Tach Adapter Shaft

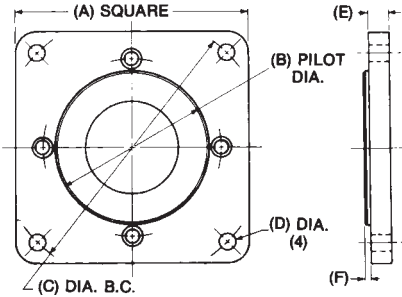
Tach adapter shafts are available as an option either on the rear of the brakes or motors.





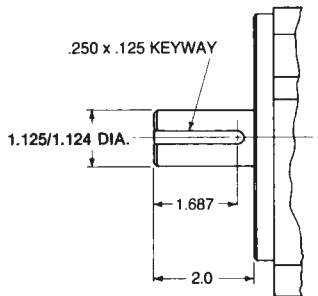
# AXIAL VANE MOTOR OPTIONS MODELS 10A, 25, 35, 50 & 70

## FOUR BOLT FLANGE

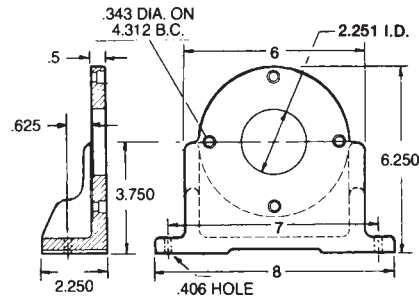


Flange Dimension							
Model	A	B	C	D	E	F	Part No.
10A/25	5.562	3.749/3.748	6.5	.406	.5	.125	60771
35 & 50	6.625	4.499/4.497	7.25	.406	.5	.125	60772
70	7.125	4.499/4.497	8.31	.531	.562	.187	60773

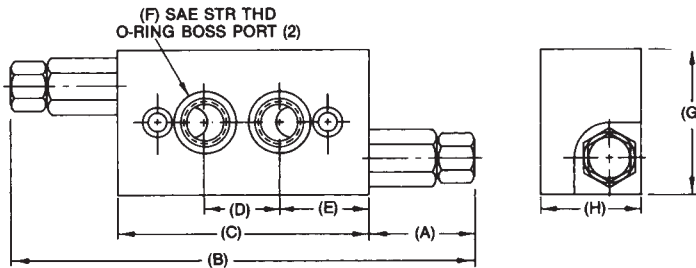
## REAR SHAFT EXTENSION (-49 Option)



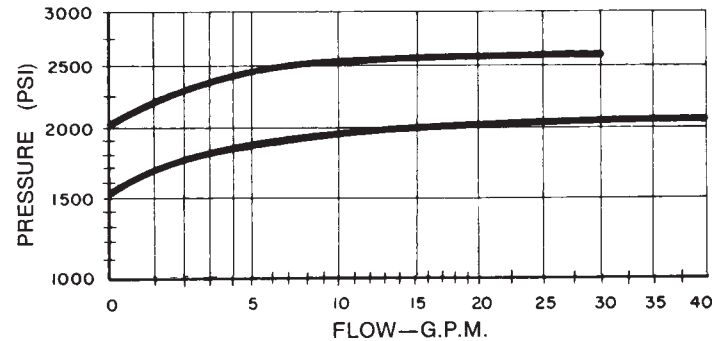
## FOOT MOUNTING BRACKET (Part No. 60549)



## DUAL RELIEF VALVES (-12 Option)



## TYPICAL PRESSURE DIFFERENTIAL ACROSS VALVE VERSUS FLOW



**Factory Preset at 2000 PSI**  
(Adjustable from 750 PSI to 2500 PSI)

Dim.	Model 10A/25	Model 35	Model 50 & 70
A	2.62	2.06	2.44
B	11.50	9.12	9.88
C	6.25	5.00	5.00
D	1.50	1.50	1.94
E	2.38	1.75	1.53
F	7/8-14 UNF	7/8-14 UNF	1-5/16-12 UN
G	2.50	2.88	3.00
H	2.00	2.00	2.00

### Features

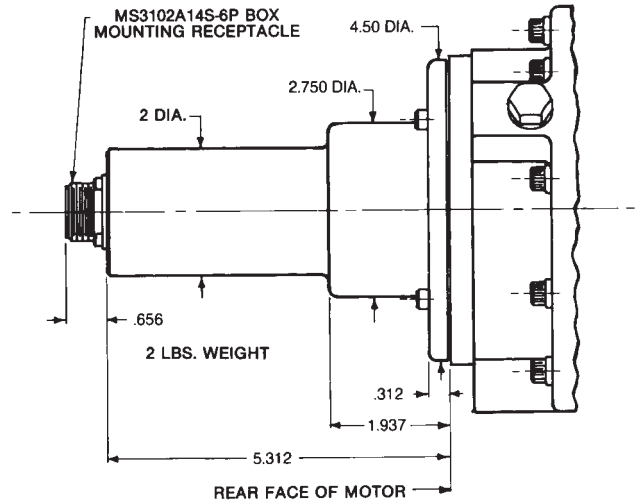
- Direct acting, differential piston—fast response.
- Mounted DIRECTLY on the Von Ruden Hydraulic Motor to reduce plumbing and to protect the motor from high pressure surges.
- Provide safe, smooth starts and stops for fast-acting, reliable protection.
- High-strength aluminum alloy body with steel cartridge-style reliefs.

### Operation

These valves relieve shock pressures at the VRM hydraulic motor when controls are suddenly reversed, centered, or when external loads are applied to the motor. The dual relief is a “cross over” type valve, so that oil relieved from one side of the motor is added to the opposite side.

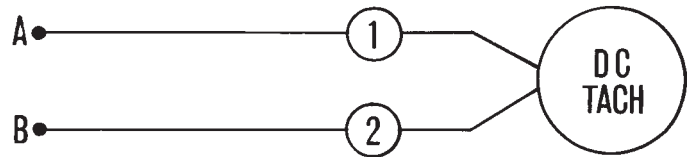
# AXIAL VANE MOTOR OPTIONS MODELS 10A, 25, 35, 50 & 70

## TACH PACKAGE (-32 Option)



The Axial Vane Motors can be supplied with a tach generator package which produces 20.8 V/1000 RPM. Optional voltages available on special request.

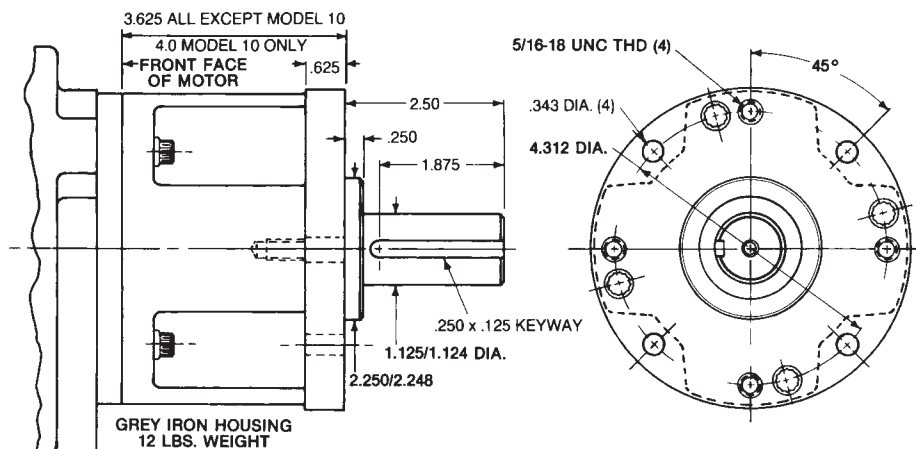
- Bi Directional Operation.
- Linearity from 0-12,000 RPM is better than .1% of the output at 3600 RPM.
- RMS value of ripple will not exceed 3% of the DC value at any speed in excess of 40 RPM.



**WIRING DIAGRAM**

## RADIAL LOAD ADAPTOR (-20 Option)

- Isolates Von Ruden motor from radial and thrust loading.
- Mounts **directly** (by factory) on **ALL** Axial Vane motors.
- Accepts radial loads up to 1,000 lbs., thrust loads up to 500 lbs.
- Allows Von Ruden motor to be direct coupled using sprockets, cog belts, sheaves, and gears.
- Provides bulkhead mounting capabilities.
- Bearings are factory sealed.
- Available with SAE "B" flange (-21 option), added to face.



## MODEL 200B



- Torques to 25,000 lb-inches.
- Five gear ratios. Up to 10:1.
- Maximum output speed 350 R.P.M.
- Bi-directional rotation.
- 95-98% mechanical efficiency.
- Sealed output bearing requires no grease.
- Choice of output shafts.

Gear Ratio		Input Torque (LB-IN)		Output Torque (LB-IN)		Maximum Continuous Horsepower (Thermal)
Nominal	Actual	Continuous	Intermittent*	Continuous	Intermittent*	
10:1	9.94:1	1510	2515	15000	25000	17
8:1	8.06:1	1860	3100	15000	25000	17
7:1	7.07:1	2040	3400	14425	24040	17
6:1	5.85:1	2225	3710	13020	21700	17
5:1	5.2:1	2350	3915	12220	20360	17

\*Intermittent conditions are less than 10% of every minute.  
Intermittent torque and intermittent speed must not occur simultaneously.

## MAXIMUM OUTPUT SHAFT LOAD CAPACITIES

Load (LBS)	R.P.M.				
	25	50	100	200	300
Radial	6490	5275	4285	3480	3080
Thrust	6660	5415	4400	3570	3160

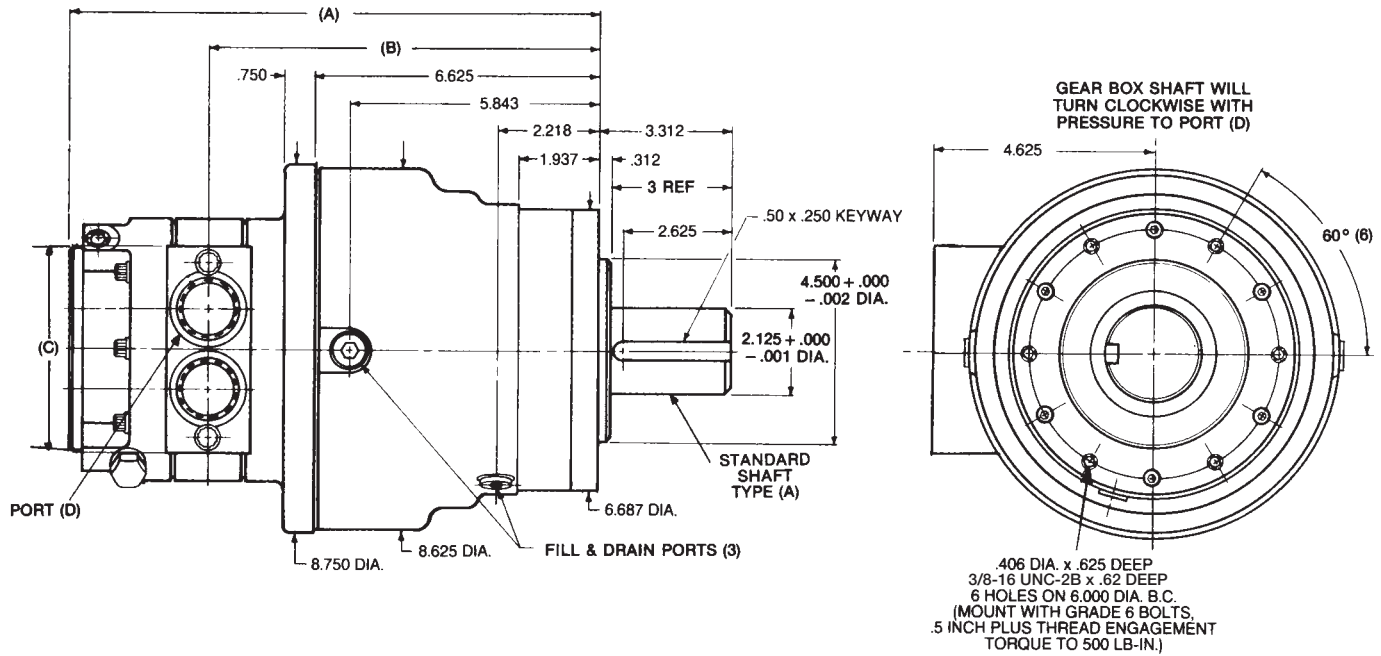
Radial capacities shown are with load located 1.5 inches from mounting face of gear box.  
Maximum radial and thrust loads should not occur simultaneously.

## CONSTRUCTION DETAILS

- Ring gear ..... Case hardened alloy steel
- All other gears and pinion shafts ..... Case hardened alloy steel
- Housing ..... Ductile iron
- Output shaft ..... High tensile ductile iron
- Output bearings ..... Sealed double row ball bearing

# AXIAL VANE WITH PLANETARY GEAR BOX

## DIMENSIONS



See Page 14 for Optional Mounting Flanges and Shafts

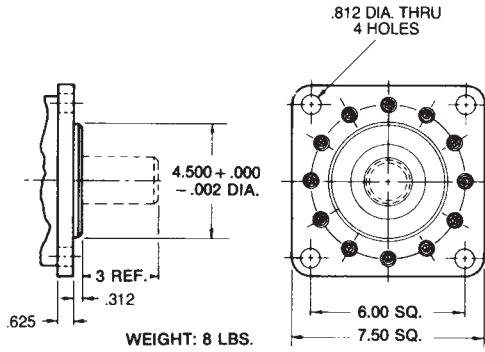
Model	A	B	C	Weight
10	11.250	8.687	4.531	74 lbs.
10A/25	11.687	8.687	6.312	90 lbs.
35	12.062	8.875	6.312	91 lbs.
50	12.625	9.187	6.312	97 lbs.
70	13.375	9.562	6.312	103 lbs.

## TYPICAL PERFORMANCE SPECIFICATIONS

Ref. No.	Motor Model	Approx. Ratio	Theoretical Displacement (CU. IN.)	Ref. No.	Motor Model	Approx. Ratio	Theoretical Displacement (CU. IN.)	Ref. No.	Motor Model	Approx. Ratio	Theoretical Displacement (CU. IN.)
1.	10/10A	5:1	5	10.	25	8:1	20	18.	50	7:1	35
2.	10/10A	6:1	6	11.	35	6:1	21	19.	70	5:1	35
3.	10/10A	7:1	7	12.	35	7:1	24.5	20.	50	8:1	40
4.	10/10A	8:1	8	13.	25	10:1	25	21.	70	6:1	42
5.	10/10A	10:1	10	14.	50	5:1	25	22.	70	7:1	49
6.	25	5:1	12.5	15.	35	8:1	28	23.	50	10:1	50
7.	25	6:1	15	16.	50	6:1	30	24.	70	8:1	56
8.	25	7:1	17.5	17.	35	10:1	35	25.	70	10:1	70
9.	35	5:1	17.5								

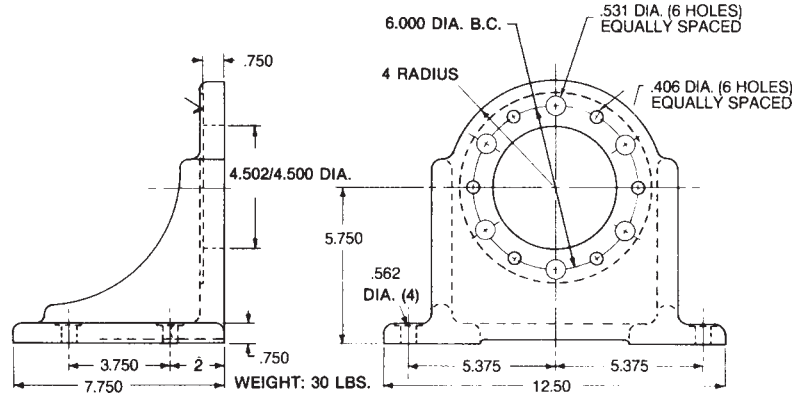
THEORETICAL DISPLACEMENT = MOTOR DISPLACEMENT x GEAR BOX RATIO

## 4-BOLT FLANGE



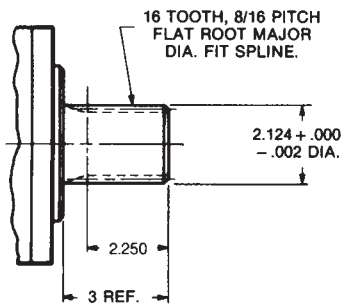
**PART NO. 62347 (-14 Option)**

## FOOT MOUNTING BRACKET

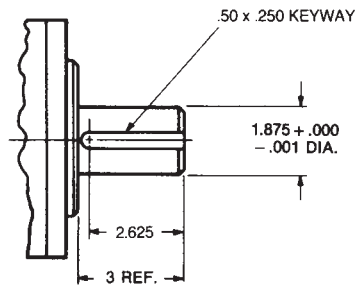


**PART NO. 61077**

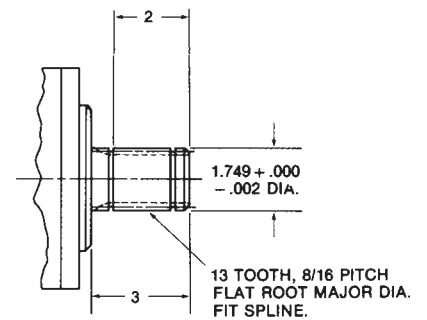
## OUTPUT SHAFTS



**OPTION B**



**OPTION C**



**OPTION D**

# GENERAL DATA



## Fluid cleanliness

A cleanliness of ISO 18/15 (NAS 1638 Class 9, or SAE 749D, Class 6) should be maintained prior to and during operation. A nominal filtration of 25 microns or better is recommended.

## Fluids

**MOTORS**—High grade mineral base hydraulic oil with 75-400 SSU viscosity is recommended. Fluid temperature should be between -40° and 160°F. Seals are also available for fire resistant fluids such as phosphate ester.

**GEARBOX**—90 wt. lub. oil above 20°F; 80 wt. below 20°F.

## Braking Circuits

For hydraulic surge pressure, applied to or generated by the motor, a close coupled direct acting relief valve must be provided in the circuit. This will keep these surges from exceeding the maximum pressure rating.

## Overrunning Loads

The inlet must be provided with sufficient oil to prevent cavitation in overrunning loads.

## Radial loads (Output Shaft)

The Axial Vane motors must be protected from any side loads. In applications where this cannot be avoided a radial load adaptor must be used.

## Start Up of a New System

Be certain the case is full of oil before starting the motor. The case may be filled through the case filling and flushing port. The case may also be filled by subjecting the motor to 200 to 500 PSI “null pressures” (pressure on both ports) with the case filling and flushing port plug back out slightly. When oil begin to flow out of this port, with motor horizontal, the case is assumed to full.

A filter installed in the inlet line is recommended for the first 15 minutes of operation in a new system.

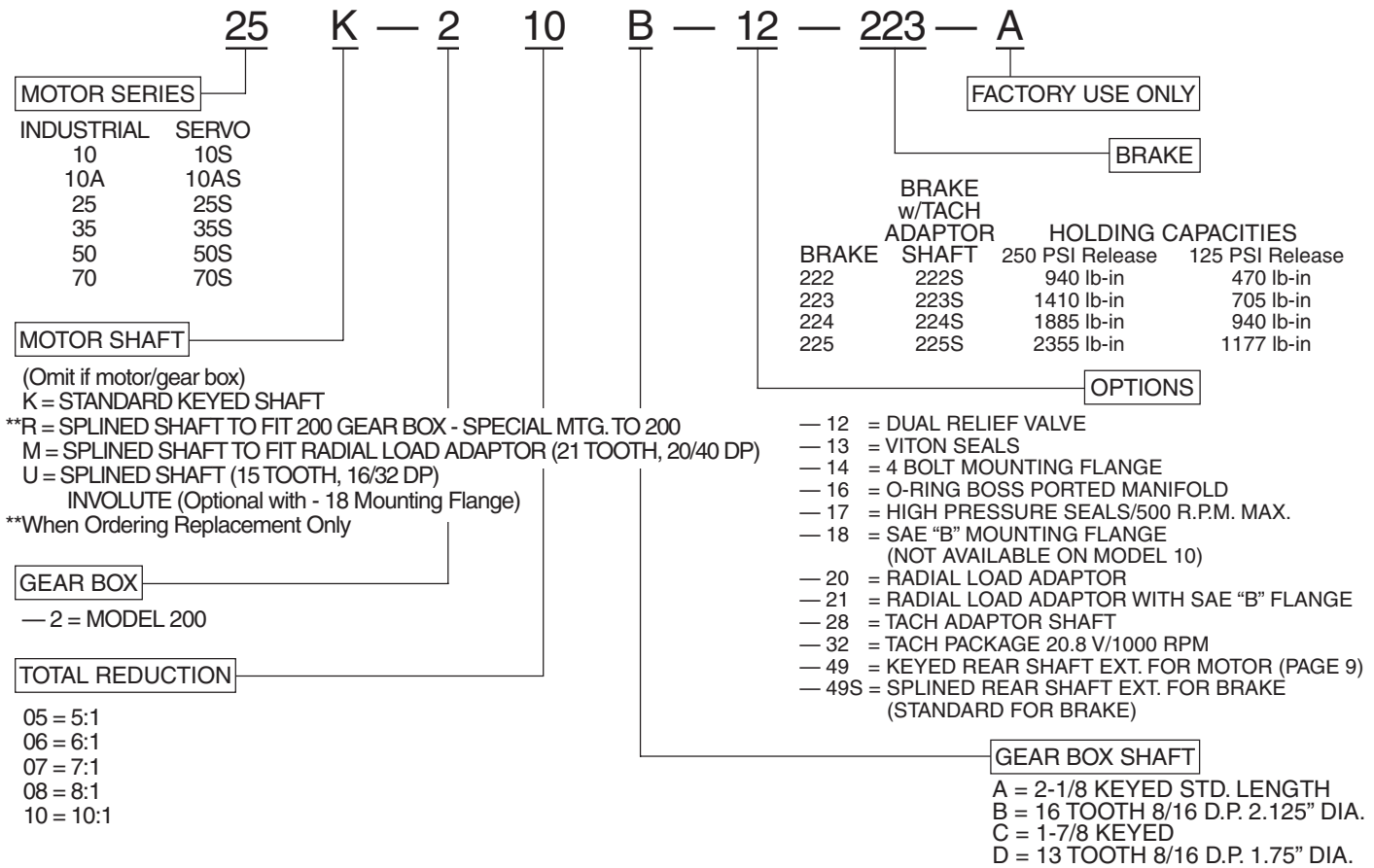
## “Null Pressure” (Pressure on both ports)

If during Operation, “Null Pressure” are expected to exceed 2000 PSI, connect the case filling and flushing port to a relief valve set at 1000 PSI and drain to the reservoir with a 3/8-inch I.D. line.

## Blocked Center Valves

Whenever a block center valve is used, crossover relief valves should be included to protect the motor from excessive pressure surges.

# AXIAL-VANE MODEL CODE



# VON RUDEN® "A PROVEN SOURCE..."

VON RUDEN

## FLUID POWER, POWER TRAIN, CUSTOM PRODUCTS

Since 1946, the name Von Ruden®, has been significant in the design and manufacture of drive components, beginning with right angle gear boxes and parallel shaft-mounted reducers. In 1973, the Von Ruden Company was purchased by Washington Scientific Industries (WSI), and the product line was combined with WSI Rol-Seal® and Axial Vane hydraulic motors, motor planetary and brakes.

In 1989, the WSI Power Components Division was sold to the division General Manger, Al Anderson, who formed the present Von Ruden Manufacturing, Inc. to manufacture the combined lines of WSI hydraulic and Von Ruden® mechanical drive components.

Today, Von Ruden Manufacturing is a prime source of drive components, combining the best elements of quality, pricing and delivery in a product line constantly added to and refined to meet ever-increasing performance requirements in every industry.



The Mazak Mazatrol Flexible Machining System (FMS). The FMS cell features three horizontal mill machining centers, each served with a 120 tool capacity automatic tool changer. A vertical pallet stacker crane robot delivers pallets to the machining centers. Set-up time is reduced to zero. Raw casting to finished, inspected parts all completed within the FMS cell, making very short lead times possible.



The modern manufacturing plant, located in Buffalo, Minnesota is kept competitive with the addition of new machinery and technology as it becomes available. A SYMIX, fully integrated MRP/II manufacturing business system operates on a UNIX file server supporting a PC network. A CIM [computer integrated manufacturing] system handles manufacturing by controlling the engineering information to the teams and their equipment on the shop floor. Designs are developed using the latest SolidWorks Modeling software.

### QUALITY SINCE 1946

Von Ruden® has been designing and producing drive components for over fifty years. Von Ruden® now manufactures and distributes complete lines of bevel gear boxes, machine tool gear boxes, parallel reducers, hydraulic motors, planetary gear boxes, brakes and overhung load adapters. These quality product lines cover a wide variety of requirements to meet nearly all performance and cost specifications.



The Multiplex cell features two CNC lathes. Each lathe utilizes dual horizontally opposed spindles allowing for first and second-process machining simultaneously. Option equipment being utilized includes external bar feeder and gantry robot loading. The dual spindles provide the quality required in manufacturing hydraulic and power transmission components while increasing machine throughput and reducing the costs of manufacture.

### TEAM MANAGEMENT

Von Ruden® stands apart in modern management methods. Teams oriented to specific manufacturing or support functions control all aspects of their contributions. The teams determine their own work schedules and even hire their own members, reviewing applications, interviewing and making the final hiring decisions. There are no foremen or shop supervisors. Company advisors support the teams with information, expertise and a common focus.

### MANUFACTURING CELLS

While the employees are organized into teams, the manufacturing efforts are organized into cells. Each cell acts as an autonomous unit controlling almost all facets in the manufacture of its parts or product.

This cellular method allows special or unique parts and configurations to be completed in a fraction of the time required when the entire facility was involved in each special order.



The CNC grinding cell has reduced set-up time by 60% and increased thru' put by 20% while holding more constant tolerances.

### CUSTOM MANUFACTURING

Because of the flexible nature of our manufacturing system we are capable of incorporating your project into our schedule. We offer a modern, well equipped facility with a well trained enthusiastic work force. Put our efficient operation to work on your next project.

Von Ruden Manufacturing, Inc.

# Von Ruden® motors give you more *usable* torque. Smooth and precise.

## ROL-SEAL® HYDRAULIC MOTORS

Unique rolling abutment design offers smooth low speed, high torque with a proven measurable difference. Compare with all others – gerotor, piston, and gear.

**Specifications:** (32 to 163cc)

Seven displacements, 2 to 10 in.<sup>3</sup>/rev.

SAE A, B and C flanges and shafts.

### Benefits:

- Higher starting torque.
- Increased vehicle gradeability.
- Less torque “ripple”.
- Less torque “droop” at high speed.
- More useable speed over entire range.
- Double-ended shaft capability.

## AXIAL VANE HYDRAULIC MOTORS

The ultimate hydraulic design for smooth, precise, repeatable positioning applications such as robotics.

**Specifications:** (16 to 115cc)

Five displacements, 1 to 7 in.<sup>3</sup>/rev.

Options include tach generator, dual relief valves and rear shaft extension.

### Benefits:

- Accurate, repeatable positioning.
- Case drain leakage is so low that a servo valve can easily control speed and position.
- Mechanically and hydraulically “stiff.”
- Smooth slow speed operation.
- High starting torque.
- Fewer wearing parts, exceptional life.

## PLANETARY GEAR BOXES

Specially designed for use with Von Ruden® Rol-Seal® and Axial Vane motors and any other hydraulic motors.

Rated 1,000,000 lb.-inches (113,000 NM) intermittent output torque. Gear reduction ratios to 90,000:1.

## HYDRAULIC MOTOR BRAKES

Von Ruden® rear-mounted, normally on, wet friction disc-type brakes for Rol-Seal and Axial Vane motors. Prevent creep under

high static load, or where positive locking of motor shaft is required. Choice of torque capacity.

## MOTOR/GEAR BOX/BRAKE PACKAGES

Now, a single source for pre-engineered drive packages. Von Ruden® offers combinations ready to meet requirements in most applications.

### Benefits:

- Reduce your development time.
- Reduce your assembly time.
- Eliminate duplicate shafts and bearings.
- Reduce envelope dimensions.
- Reduce your overall cost.

## OVER HUNG LOAD ADAPTORS

Over Hung Load Adaptors (Bearing Blocks) are used for increasing hydraulic motor shaft load capacity and motor life. Permit the removal of hydraulic motors for servicing without disturbing driven gears, pulleys or sprockets while sealing out dirt and grime.

### Benefits:

- Increase hydraulic motor life.
- Increase radial and thrust loads to motors.
- Easily remove or install hydraulic motors.
- Can be used to protect from motor shaft seal leak contamination.

## GEAR BOXES

Von Ruden® manufactures both Right Angle Gear Boxes and Parallel Shaft Gear Boxes. There are 11 series of standard right angle gear boxes ranging up to 200 h.p. and

shafts to 2". Our parallel shaft standard box comes in 1:1 up to 6.38:1 ratios and 277 max. h.p.



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