

## Frame and Running Gear Data: HOSS

---

### I. STANDARD FRAME AND RUNNING GEAR ASSEMBLIES

#### A. Performance Characteristics

1.0 General	<b>5HOSS</b>	<b>6HOSS</b>	<b>7HOSS</b>
Stroke (in.)	5.00	6.00	7.00
Rod Diameter (in.)	2.875	2.875	2.875
Max. Allowable Continuous Combined Rod Load MACCRL (lbs)	75,000	75,000	75,000
Max. Allowable Continuous Gas Load MACGL (lbs)	87,000	87,000	87,000
2.0 Ratings			
Number of Throws	2/4/6	2/4/6	2/4/6
Rated Speed (RPM)	1500	1200	1000
Minimum Operating Speed (RPM)	500	500	500
Nominal BHP/Throw at Rated Speed	1575/1575/1575	1550/1550/1450	1400/1400/1300
Angle Between Pairs of Compressor cranks (degrees)	0/90/120	0/90/120	0/90/120
Average Compressor Piston Speed at Rated Speed (ft./min)	1250	1200	1167
Rod Length / Crank Radius	7.60	6.33	5.43

Crankshaft rotation is counter clockwise (CCW) from pump end view.

#### B. Product Specification for HOSS Frames

1.0 Frame Configuration - Multi-throw, balanced-opposed rigid cast gray iron frame is heavily ribbed for strength and reinforced with integrally cast on crosshead extensions. The open frame top construction contains (2) two steel tie rods and individually fitted cast gray iron spacers per pair of compressor throw. The two tie rods are located at the ends of the crank throw bay, one over each main bearing. Gasketed covers, on top of each bay, at the ends of the frame, and on both sides of each frame extension permit easy access to all the internal running gear components. The inside of the frame is painted with an oil proof white primer paint. The lower flat bottom part of the frame forms the sump for lubricating oil..

Options -  
 Explosion relief device (Bicera Relief Valve)  
 Dry sump configuration  
 Frame liquid level controller  
 Temperature control valve  
 Lifting lugs (Standard on Export only)

- 2.0 Crankshaft Configuration - Forged, alloy steel crankshafts contain rifle-drilled oil passages for pressurized bearing lubrication. Crankshafts are a one-piece design with a straight shaft on the drive end. Both two and four throw crankshafts have shrunk-on counterweights to reduce horizontal forces and moments.
- 3.0 Connecting Rod Configuration - Forged alloy steel rods are 2-piece construction that are held in place by dowel pins and assembled with (4) four forged ferris head capscrews with rolled threads. The connecting rod incorporates a rifle-drilled square beam cross-section to allow pressurized oil lubrication to the crosshead pin and shoes.
- 4.0 Crosshead and Crosshead Pin Configuration - Nodular iron box type crossheads contain two shim adjustable aluminum shoes, one each on top and bottom. The crosshead pin is a semi-floating hardened steel cylindrical type secured in place by bolted on end plates.
- Where required, positive-lock disc-type balance weights can be bolted to the crosshead nose for reciprocating balancing of opposing throws within (2) two pounds maximum.
- 5.0 Distance Piece - Configuration - One piece cast iron design with one compartment distance piece contains pilot locating fits and is bolted to the frame. The inside of the compartment is painted with an oil proof white primer paint. The distance piece compartment, sealed to 25 psig, is 16.00 inches long meaning that the assembled packing case (less flange) can pass easily through either side access opening. Cast iron wiper rings and Teflon® sealing rings are incorporated into the packing case. Two gasketed solid covers, one per side, provide for easy maintenance of the crosshead and packing case assemblies. Stainless steel fittings with either stainless steel braided hose, tubing or a combination thereof.
- Options - Single long 22" distance piece similar to 16".
- Purged wiper assembly and purged packing assembly are required to positively ensure that the gas will not migrate from the cylinder to the frame.
- Distance piece supports.

6.0	Bearings and Bushings -	
6.1	Frame Main -	Horizontally split, precision steel backed copper tin lead shell bearing with micro-babbitt overlay and pressurized oil lubrication.
	Options -	Main Bearing Temperature Detector System (RTD 100 OHN Platinum or "K" type thermocouple) including tube fittings, brackets and bolting with a terminal connection at the frame.
6.2	Frame Thrust Brg. -	Two piece high-leaded tin bronze thrust shoe.
6.3	Connecting Rod Crankpin Brg. -	Horizontally split, precision steel backed copper tin lead shell bearing with a micro-babbitt overlay and pressurized oil lubrication, same bearing as main bearing.
6.4	Connecting Rod Bushing -	One piece solid bronze helical grooved bushing with micro-babbitt overlay, interference fit that has been shrunk into place.
7.0	Frame Lubrication	
7.1	Oil Pump -	A positive displacement gear pump is internally mounted on the frame end cover and direct driven off of the crankshaft by a dowel and hub arrangement. The pump is complete with an adjustable FullFlo external pressure regulating valve for cold start protection. An hand-operated oil-priming pump is optional.
	Option -	Full capacity electric motor driven auxiliary oil pump for prelube.
7.2	Oil Piping -	Carbon steel, seamless or welded schedule 40 pipe with threaded or non-threaded unions and stainless steel tubing and fittings. The piping between oil filter and oil header is stainless steel.
	Option -	All stainless steel seamless or welded schedule 40 pipe.
7.3	Oil Filter -	Frame mounted 10 micron full-flow oil filter with cartridge-type disposable elements. Cartridges have a collapse rating of 100-psi differential pressure.
	Option -	Dual oil filter with transfer valve (shipped loose)
7.4	Oil Cooler -	Fixed bundle shell and tube water-cooled oil cooler. Steel shell (housing), carbon steel tube sheets welded to shell, 4 pass design with cast iron bonnets, seamless admiralty tubes 25 BWG, 3/8", and oil in shell.
	Option -	Tema C
7.5	Oil Heater (Optional) -	Immersion oil heaters available for each of the frames. For (4) four and (6) six throw frames, circulation type heaters are recommended (packager supplied). Standard is 440/480 volt, 3 phase.

- 8.0 Crankshaft Seal Assembly - Prevents oil leakage from frame. Assembly of the seal consists of a split oil slinger ring clamped on the crankshaft along with a lip seal pressed into the frame end cover around the crankshaft.
- 9.0 Tool Kit - Consists of crosshead nut wrench, piston rod entering sleeve and piston nut adapter. One provided per frame.
- 10.0 Cleaning and Painting - All castings are shot blast, chipped and cleaned. Internal surfaces of frame/frame extensions and distance pieces are painted with an oil-proof white primer. All external surfaces are painted with a red oxide primer.
- 11.0 Preservation for Shipment - **Lubricated Cylinder Applications** - For domestic (North America) applications, all internal components within the cylinder and frame are coated with a rust preventative light oil. For overseas shipment or extended storage (6+ months), the compressor frame and cylinder internals are coated with a heavy oil. Critical components within the cylinder such as pistons, piston rods and valves are removed and boxed separately for better preservation. It is recommended that most of the heavy oil preservative be removed prior to start-up. **Special Note:** If the compressor is a domestic shipment, but the package is export, and the packager will be run testing the package in house, it is then up to the packager to insure overseas preservation measures are taken on the compressor prior to overseas shipment.
- Non-Lube Cylinder Applications** - For domestic (North America) applications, aluminum paint is used in the cylinder gas passageway and heads as a corrosion preventative. On export shipments or extended storage, the gas passages and heads will be sprayed with a mineral rust preventative after the aluminum paint is applied. Pressure, partition packing and oil wiper rings are removed and placed into a greaseproof, waterproof, flexible barrier material followed by an outerwrap. Export or extended storage also require the piston and rod assembly to be removed for shipment. Piston and rider rings are to be removed and packed like the packing rings mentioned earlier. Piston and rod are sprayed with a fingerprint neutralizer, then the piston, rod and jamnut are sprayed with a rust preventative and finally wrapped like the packing rings mentioned above.

## 12.0 Quality Assurance -

All major components are visually and dimensionally inspected and their material content reviewed for compliance. Procedures are per Siemens Energy standard manufacturing specifications (See GFP28). Any records generated as a result are maintained at the factory.

### Compressor -

All running clearances and balancing checked and verified. Piston rod runout adjusted and checked. A (1) one-hour full speed no-load mechanical run test performed. Documentation provided: QAF-262 (assembly / test record).

### Frame -

A frame leak test is performed. Chemical and physical certifications are reviewed. Documentation provided: None

### Crankshaft -

Chemical, physical, magnetic particle and ultra-sonic certifications are reviewed. Documentation provided: None

### Connecting Rod -

Chemical and physical certifications are reviewed. Documentation provided: None

### Crossheads -

Chemical and physical certifications are reviewed. Documentation provided: None

### Crosshead Pins -

Chemical, physical and magnetic particle certifications are reviewed. Documentation provided: None

## C. Component Specification

### 1.0 Connecting Rod Assembly

1.1	Connecting Rod	
	- Length (in.)	19.000
1.2	Bearing	
	- Diameter (in.)	8.250
	- Length (actual surface in.)	4.438
	- Proj. Area (sq. in.) (LxD)	36.61
	- Bearing Pressure at MARL (psi)	2050
1.3	Bushing	
	- Diameter (in.)	5.000
	- Length (actual surface in.)	5.000
	- Proj. Area (sq. in.) (LxD)	25.00
	- Bearing Pressure at MARL (psi)	3000
1.4	Bolting	
	- Thread Size	1.250-12UNJF-2A
	- Stretch Required (in.)	.013-.014
	- Torque (with oil) (ft-lbs)	790

### 2.0 Crosshead Assembly

2.1	Crosshead	
	- Diameter (in.)	13.500
	- Piston Rod Thread Size	2.750-8UNJ-3A
	- Piston Rod Root Stress (psi) (MARL/Tensile Stress Area)	13,825
2.2	Crosshead Shoes	
	- Length (actual surface in.)	10.000
	- Proj. Surface Width (in.)	7.721
	- Proj. Bearing Area (sq. in.) (LxW)	77.21
	- Maximum Bearing Pressure at MARL (psi)	180
2.3	Crosshead Shoe Bolts	
	- Quantity/Shoe	4
	- Thread Size	.500-13UNC-3A
	- Torque (with oil) (ft-lbs)	44
2.4	Crosshead Pin Cap Bolt	
	- Quantity/Cap	4
	- Thread Size	.500-13UNC-2A
	- Torque (with oil) (ft-lbs)	44

### 3.0 Frame Assembly

3.1 Main Bearing - Shell	
- Diameter (in.)	8.250
- Length (actual surface in.)	4.438
- Proj. Area (sq. in.) (LxD)	36.61
- Bearing Pressure at MACCRL (psi)	2050

3.2 Main Bearing Cap Bolt	
- Quantity/Cap	4
- Thread Size	0.875-9UNC-3A
- Torque (with oil) (ft-lbs)	240

3.3 Frame Tie Rod Nut	
- Thread Size	1.750-8UNR-3A
- Interference of Spacer	(0.006 - 0.008)

### 4.0 Lubrication System

4.1 Frame & Running Gear	2/4/6
- Crankcase Capacity (gal)	34/69/105
- Pump Capacity at 1000 RPM (gpm)	63/94/125
- Oil Flow to Cooler (gpm)	32/64/96
- Oil Flow to Filter (gpm)	32/64/96
- Oil Temperature (°F)	
- Normal	150-170
- Maximum	180
- Oil Pressure (psig)	
- Normal	60
- Minimum	50
- Shutdown Setting	35
- Oil Cooler	
- Type	Shell and Tube

4.2 Cylinder (Divider Block System)	
- Oil Source	Frame
- No. of pumps provided	1/2/3
- No. of Usable Pump Locations	2
- Maximum Output/(1/4") Pump at 1200 RPM (PPD)	20
- Maximum Pressure (psi)	3500

Options -	
- Distribution System	Pump-To-Point
- Oil Source	Internal or External
- No. Pumps	As Required
- Maximum Pressure (psi)	6000

-Electric Driven Lubrication System (Shipped Loose)

#### D. Materials of Construction of Major Frame Components

<b>COMPONENT</b>	<b>MATERIAL</b>	<b>CODES/STANDARDS (TYPICAL)</b>
Bearings, Main	Steel Backed Bronze with Babbitt Overlay	1010/1020 carbon steel - SAE #49 Bronze - SAE #19 Babbitt
Bearing Caps, Main	Gray Cast Iron	ASTM A48 Class 30
Bolts, Bearing Caps	Alloy Steel	ASTM A193 Grade B7
Crankshaft	Forged Alloy Steel	AISI 4140/4142
Connecting Rod	Alloy Steel Forging	AISI 4140/4142
Bearing, Crankpin	Steel Backed Bronze with Babbitt Overlay	1010/1020 carbon steel - SAE #49 Bronze - SAE #19 Babbitt
Bushing, Connecting Rod	Bronze with Babbitt Overlay	SAE #64 Bronze - SAE #19 Bab.
Bolts, Connecting Rod	Alloy Steel	ASTM A193 Grade B7
Crosshead	Ductile (Nodular) Iron	ASTM A536 65-45-12
Pin, Crosshead	Surface Hardened Alloy Steel	AISI 4140/4142
Bolts, Crosshead Pin	Alloy Steel	SAE J429 Grade 2
Shoe, Crosshead	Aluminum Casting	UNS A08520
Bolts, Crosshead Shoe	Alloy Steel	ASTM A574 / ASME B18.3
Frame/Frame Extensions	Gray Cast Iron	ASTM A48 Class 30
Spacer, Tie Rod	Gray Cast Iron	ASTM A48 Class 30
Tie Rod	Alloy Steel	ASTM A193 Grade B7
Cover, Drive End	Gray Cast Iron	ASTM A48 Class 25
Cover, Oil Pump End	Gray Cast Iron	ASTM A48 Class 30
Covers, Frame Top	Carbon Steel Plate	ASTM A36
Covers, Extension	Carbon Steel Plate	ASTM A36
Capscrews, Covers	Alloy Steel	SAE J429 Grade 5
Distance Piece	Gray Cast Iron	ASTM A48 Class 30
Rings, Oil Wipers	-	-