

Tradition ES Series Compressors

High-speed reciprocating compressors for natural gas applications

The familiar and proven ES Series has been taken to a higher level and redesigned following Six Sigma principles. Six Sigma is GE's rigorous company-wide process for continuous improvement. Like the original FE Frame, which is widely used in natural gas applications, the ES Series machines are available in three stroke configurations from 2400 to 7200 HP, and are readily re-sized and re-applied in the field.

Performance features

Type

Horizontal balanced opposed in two, four or six throws with alternative cylinder sets to provide a wide choice of compression levels and flexible performance to meet changing needs.

Frame

A heavy-ribbed frame is made from smoothly contoured iron casting with doweled, separable crosshead guides. The sides of the frame are bolted together through the full depth main bearing caps. These caps extend to the top of the frame, adding strength and stiffness.

Crankshaft

Forged steel design with integral counterweights and balanced for smooth operation. Journals are precision ground to close tolerances and polished. The main and crankpin journals are the same large diameter for maximum stiffness and torque transmission. The crankshaft can be removed through the top of the frame.

Cylinders

A wide range of lubricated cylinder options are available. Cylinders feature air or water cooling, and field replaceable iron nitrided liners.

Compressor valves

Steel valve seats and guards; MT or PEEK valve plates are standard. Valve springs and plates are easily tailored to meet your operating conditions. Valves are arranged so that the suction valve cannot fit into the discharge valve ports.

Piston/piston rods

Hard anodized aluminum alloy or cast-iron pistons. Weight is precisely controlled during manufacture to eliminate the need to match parts in the field. Carbon-filled Teflon piston rings are standard. Piston rods are 4140 steel with rolled threads and full floating vented rod-and-wiper packing.

Connecting rods

Rods are made from carbon steel I-section drop forgings. The crosshead end is fitted with a solid precision type bushing. The crank end is features split precision type tri-metal bearings.

Crossheads

Single-piece ductile iron crossheads with full floating crosshead pins made from hardened and ground alloy steel.



Compressor lubrication

Lube oil pump is driven directly by the compressor shaft – there are no chains to wear or go out of adjustment. Full-flow, non-bypassing lube synthetic media oil filter and oil-pressure regulating valve. A hand operated pre-lube pump is also provided. Oil passages drilled in the crankshaft carry oil to the main bearings, then through the rifle drilled connecting rods to the crosshead pin and guides.

Packing and cylinder lubrication

Shaft-driven, force-feed lubricator with block distribution systems, cycle indicator and DFNT no-flow, shut-down switch. Stainless steel tubing to cylinders and packing, adjustable feed rate, hand priming on the pump, and rupture-relief valve.

Standard testing

All frames receive a mechanical run test and post-test inspection to GE Infrastructure's high standards. All cylinders undergo shop hydrotesting to a minimum of 1.5 times the maximum allowable working pressure.

Optional items

Drive through arrangement, materials suitable for sour gas service, vibration switches, CSA or XP no-flow switches, immersion oil heaters, flywheels and drive couplings.

Standard accessories

Digital maintenance/operating manuals and parts list, general arrangement drawings, lifting eyes and special tools.

Frames in Two, Four and Six Throw Configurations

Property	Specification		
Compressor Throws	2	4	6
Max BHP/kW	2,400/1,790	4,800/3,580	7,200/5,370
Frame Weight lbs/kg (dry)*	5,000/2,270	10,350/4,700	15,700/7,130
Frame Length in/cm	53/1,346	100/2,540	147/3,734
Frame Width in/cm	70/1,778	70/1,778	70/1,778
Frame Height in/cm	36/914	36/914	36/914

Three Choices of Frame Stroke Configuration

Property	Specification		
Stroke (in/mm)	5/127	6/152	7/178
Rated Speed-Max. (RPM)	1,500	1,200	1,000

Heavy Duty Running Gear

Property	Specification	
Rod Load - Tension	57,000 lbs	25,874 kg
Rod Load - Compression	60,000 lbs	27,236 kg
Combined Rod Load	117,000 lbs	53,109 kg
Piston Rod Diameter	2.5 Inches	63.5 mm
Crankshaft Material	F.S.	F.S.
Connecting Rod Material	F.S.	F.S.
Crankpin & Main Bearing Dia	6.5 inches	165.1 mm
Crankpin & Main Bearing Width	3.25 inches	82.6 mm
Connecting Rod Pin Bushing Dia	5.25 inches	133.4 mm
Connecting Rod Pin Bushing Length	4 inches	101.6 mm

*Without Cylinders F.S. = Forged Steel

ES504 = ES, 50, 4, Model Nomenclature
Model Stroke (in) Throws

A cylinder to fit your application

	89 & 95 for all ES Frames							MAWP PSIG	Cylinder Cooling	Material	Flange Dia Inch	Flange Rating PSIG
	Series	Cylinder Bore - Inches										
Double Acting	89	2.75	3	3.25	3.5	3.75		4700	Air	F.S.	2.5	2500
	89	3.5	3.75	4	4.25			3600	Air	F.S.	2.5	2500
	95	5.5	5.75	6	6.25	6.5		3600	Air	F.S.	4	1500
	89	4.5	4.75	5	5.25	5.5	6	2500	Water	D.I.	3	1500
	89	5.5	5.75	6	6.25	6.5	7	2200	Water	D.I.	4	1500
	95	6.75	7	7.25	7.5	7.75	8.25	1800	Water	D.I.	4	900
	95	8.5	9	9.5	9.75	10.25		1800	Water	D.I.	6	900
	95	10	10.5	11	11.25	11.75		1250	Water	D.I.	6	600
	95	12	12.5	13	13.5	13.75	14.25	800	Water	D.I.	8	400
	95	14	14.5	15				635	Water	D.I.	8	300
	95	15.5	16	16.5				635	Water	D.I.	8	300
	89	16.5	17	17.5	18	18.5		250	Water	C.I.	14	300
	89	19	19.5	20	20.5	21		250	Water	C.I.	14	300
	89	21.5	22	22.5				250	Water	C.I.	14	300
	89	23.5						250	Water	C.I.	14	300
	Pipeline	P	9.75	10	10.25	10.5	10.75	11	1250	Water	D.I.	6
SAHE	95	6.75	7	7.25	7.5			1800	Air	D.I.	4	900
SACE	95	12	12.5	13	13.5			800	Water	D.I.	8	400

L = Nitrided Liner - Field Replaceable
 TL = Thin Liner
 NL = No Liner

D.I. = Ductile Iron
 F.S. = Forged Steel
 C.I. = Cast Iron

SAHE = Tandem Cylinder - Single Acting Head End
 SACE = Tandem Cylinder - Single Acting Crank End

a, b, c, etc Designates cylinders have identical XYZ Flange Dimensions to assist interchangeability and package piping standardization

Designed for flexibility

A heavy duty design combined with built-in flexibility enables FS Series compressors to be re-configured in the field.

- Tradition ES is a design backed by 100 years of compressor design experience; over 15,000 high-speed compressors in operation
- Part of a complete line of reciprocating compressors that feature advanced technology and work proven designs
- Stroke can be changed by replacing the crankshaft and piston assembly
- The cylinders can be re-lined to a variety of bore dimensions in the field to match your operating conditions
- Many cylinders have identical X, Y and Z flange locations, allowing packages to be reconfigured without any changes to the piping and bottles

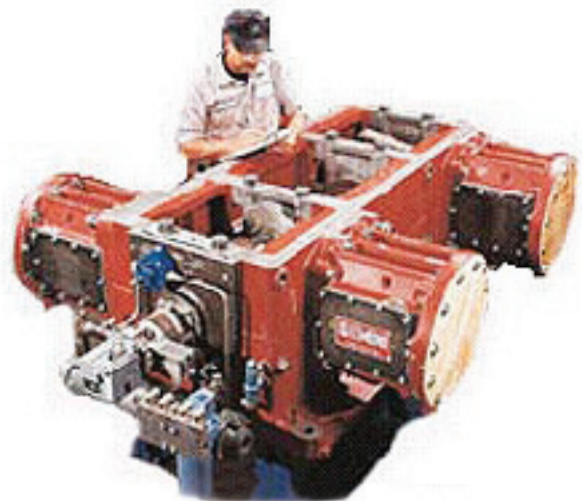
All GE Oil & Gas high-speed reciprocating compressors are packaged, serviced and maintained by a worldwide network of authorized packagers and distributors.

Contact

For more information on ES Series Compressors, contact your GE Oil & Gas representative or visit www.ge.com/oilandgas

Benefits of ES Series flexible design

- Flexible design is easily reconfigured to meet your changing requirements
- Reduces life cycle costs and increases production
- High rental fleet utilization rates
- Reduced inventory of machinery and parts
- Higher efficiency, lower fuel or electricity costs
- Lower capital cost
- Lower cost of reconfiguration



GE imagination at work