

# ES Series compressors

## High-speed reciprocating compressors for natural gas applications

Our ES Series compressors are available in three stroke configurations, three throw configurations, and a range of power ratings from 2,400 to 7,200 HP. The ES Series compressors (formerly FE frame) have a long, successful history in natural gas applications and are readily resized and re-applied in the field.

### Performance features

#### Type

Horizontal balanced opposed in two, four or six throws with a wide range of cylinder arrangements to meet your performance needs.

#### Frame

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

#### Crankshaft

Every GE crankshaft is certified using state-of-the-art scanning CMM technology. Crankshafts are one-piece forged-steel design with integral counterweights, balanced for smooth operation. Journals are precision ground and polished to close tolerances. The main and crankpin journals are the same diameter for maximum stiffness and torque transmission. The crankshaft can be serviced and removed through the top of the frame.

#### Cylinders

A wide range of cylinder options is available. GE cylinders feature watercooling, and field-replaceable liners. The liners provide unrivaled flexibility to adapt compressor performance over time. The table on reverse side illustrates available cylinder and liner options.

#### Compressor valves

Steel valve seats and guards; MTX or HTCX 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

Aluminum alloy or cast iron pistons. Weight is precisely controlled during manufacturing to eliminate the need to match parts in the field. Carbon-filled PTFE combo piston rider rings are standard for most applications. Piston rods are 4140 steel with rolled threads and are hardened in the packing box area.

#### 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 utilizes split precision type tri-metal bearings.

#### Crossheads

Single-piece ductile iron crossheads with full-floating hardened and ground alloy steel crosshead pins and integral babbitt-coated crosshead shoes.

#### Compressor lubrication

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

#### Packing and cylinder lubrication

Standard lubrication systems consist of a shaft-driven force-feed lubricator pump, hand-priming device, overpressure indicating DNFT no-flow shutdown switch, and block distribution system with cycle indicator.

#### Standard testing

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

#### Standard accessories

Specialized tools, where applicable, are included in the toolbox.

#### Optional items

Drive-through arrangement, materials suitable for sour gas service, CSA or XP no-flow switches, immersion oil heaters, flywheels and drive couplings and adapters. Also available are API 618 type II and III distance pieces, finger type valve unloaders and automatic VVCP.

#### Throw configurations

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*	4,900 (2,223)	10,000 (4,536)	16,000 (7,258)
Frame length inches (cm)*	58.9 (149.6)	106 (269.2)	153 (388.6)
Frame width inches (cm)*	69.3 (176)	69.3 (176)	69.3 (176)
Frame height inches (cm)	39 (99.1)	39 (99.1)	39 (99.1)

#### Stroke configuration

Stroke inches (mm)	5 (127)	6 (152.4)	7 (177.8)
Max. rated speed (rpm)	1,500	1,200	1,000

#### Heavy duty running gear

Rod load - tension	47,500 lbs-f	211.29 kN
Rod load - compression	50,000 lbs-f	222.41 kN
Combined rod load	97,500 lbs-f	433.7 kN
Piston rod diameter	2.25 inches	57.2 mm
Crankshaft material	F.S.	
Connecting rod material	F.S.	
Crankpin & main bearing diameter	6.5 inches	165.1 mm
Crankpin & main bearing width	3.25 inches	82.6 mm

\* without cylinders F.S. = Forged Steel



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



	Cylinders for the ES frames										MAWP PSIG	Cylinder cooling	Material	Flange dia inch	Flange rating PSIG		
	Series	Cylinder bore - inches															
		2.75	2.875	3	3.125	3.25	3.375	3.50	3.625	3.75							
Double acting	89	2.75	2.875	3	3.125	3.25	3.375	3.50	3.625	3.75		4,700	Gas	F.S.	2.5	2,500	
	89	3.50	3.75	4	4.25							3,600	Gas	D.I.	2.5	1,500	
	89	4.25	4.50	4.75	5	5.25	6					2,500	Water	D.I.	3	1,500	
	89	5.50	5.75	6	6.25	6.50	7					2,200	Water	D.I.	4	1,500	
	95	5.50	5.75	6	6.25							3,600	Gas	F.S.	4	2,500	
	06	6.75	7	7.25	7.50	7.75	8.25					1,800	Water	D.I.	4	900	
	06	8	8.50	8.75	9	9.25	9.50	9.75	10.25			1,800	Water	D.I.	6	900	
	06				10	10.25	10.50	10.75	11	11.25	11.75	1,250	Water	D.I.	6	600	a
	06	11.50	11.75	12	12.50	12.75	13	13.50	13.75	14.25		800	Water	D.I.	8	400	
	06	14	14.50	15	15.50	16	16.50					635	Water	D.I.	8	300	
	07	16.50	17	17.50	18	18.50	19	19.50	20	20.50	21	250	Water	C.I.	14	300	b
	07	21.50	22	22.50	23.50							250	Water	C.I.	14	300	b
Pipeline	06P	9.75	10	10.25	10.50	10.75	11					1,250	Water	D.I.	6	600	a

L = Nitrided Liner - field replaceable  
 TL = Thin Liner  
 NL = No Liner  
 TH = Thick 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 having identical XYZ flange dimensions to assist interchangeability and package piping standardization

## Designed for flexibility

- The ES Series is backed by 100 years of GE compressor design experience
- Part of a complete line of reciprocating compressors featuring advanced technology and work proven designs
- Compressor stroke can be changed by replacing the crankshaft and piston assembly
- The cylinders can be relined to a variety of bore dimensions in the field to always 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 pulsation bottles
- Over 18,000 GE high-speed reciprocating compressors have been built to date

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

## Operating benefits

- Compressor is easily reconfigured to meet your changing requirements
- Reduces lifecycle costs and increases production
- High fleet utilization rates
- Reduced inventory of machinery and parts
- Higher efficiency, lower fuel or electricity consumption
- Lower cost of reconfiguration
- Greater utilization of driver power over a wide range of conditions

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GE imagination at work

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