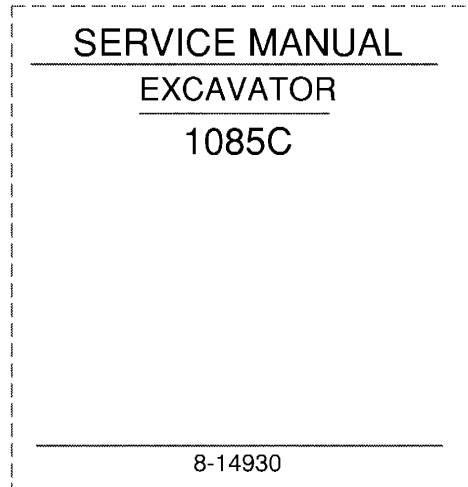


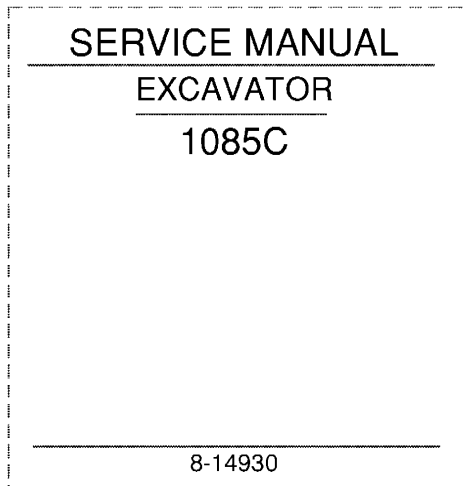
1. Trim along dashed line.
2. Slide into pocket on Binder Spine.

TYPE 1-4



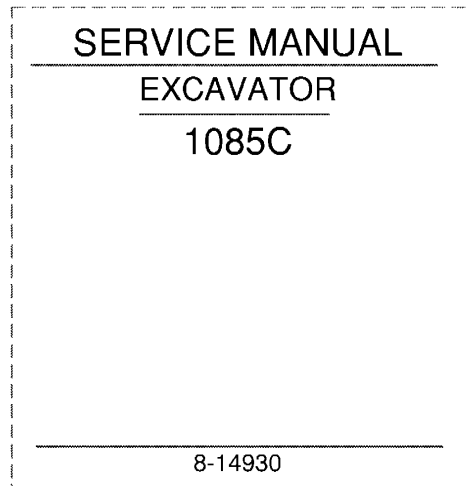
1. Trim along dashed line.
2. Slide into pocket on Binder Spine.

TYPE 1-4



1. Trim along dashed line.
2. Slide into pocket on Binder Spine.

TYPE 1-4



1. Trim along dashed line.
2. Slide into pocket on Binder Spine.

TYPE 1-4

# 1085C Cruz-Air Excavator

## Table of Contents

DIVISION/SECTION	SECTION NO.	FORM NO.
<b>1 GENERAL</b>		
Section Index - General .....		8-14960
Standard Torque Specifications.....	1001	8-71600
Fluids and Lubricants .....	1002	8-14830
Detailed Engine Specifications .....	1024	8-26061
<b>2 ENGINES</b>		
Section Index - Engines .....		8-14970
Engine and Radiator Removal and Installation .....	2001	8-14980
Stall Tests .....	2002	8-14840
Cylinder Head and Valve Train .....	2415	8-26071
Cylinder Block, Pistons, Rods, Camshaft, Main Bearings, Oil Seals, and Flywheel .....	2425	8-26082
Lubrication System.....	2445	8-26091
Cooling System .....	2455	8-26101
Turbocharger.....	2465	8-26110
Turbocharger Failure Analysis .....	2565	9-78235
<b>3 FUEL SYSTEM</b>		
Section Index - Fuel System .....		8-14990
Removal and Installation of Master Cylinder and Accelerator Cylinder.....	3001	8-15000
Accelerator Master Cylinder.....	3002	8-15010
Accelerator Cylinder .....	3003	8-15020
Fuel System and Filters .....	3410	8-26131
Pump Drive Gear, Timing Pin, Fuel Shutoff Solenoid, Primer Pump, and Pump Timing...	3412	8-26141
Fuel Injectors.....	3413	8-26150
<b>4 ELECTRICAL SYSTEM</b>		
Section Index - Electrical .....		8-15030
Removal and Installation of Starter and Alternator.....	4000	8-15040
Electrical Specifications, Troubleshooting, and Schematics.....	4001	8-14850
Starter and Starter Solenoid.....	4002	8-73830
45 Ampere Alternator .....	4003	8-73840
Batteries .....	4004	8-71701
Electric Swivel .....	4006	8-15050
Gauges.....	4007	8-15060
<b>5 STEERING</b>		
Section Index - Steering.....		8-15070
Removal and Installation of Components .....	5001	8-15080
Steering Specifications, Schematic, and Troubleshooting.....	5002	8-14860
Steering Control Valve.....	5003	8-15090
Steering Selector Valve .....	5004	8-15100
Front Axle .....	5005	8-15110
Accumulator .....	5006	8-15120
Steering Cylinder .....	5007	8-15130

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**6 POWER TRAIN**

Section Index - Power Train ..... 8-15140

Removal and Installation of Power Train Components ..... 6001 8-15150

Transmission Specification, Schematic, and Troubleshooting ..... 6002 8-14870

Torque Converter ..... 6003 8-15160

Transmission ..... 6004 8-15170

Drive Shafts and Universal Joints ..... 6005 8-15180

Differential and Planetary ..... 6006 8-15190

Wheels and Tires ..... 6007 8-15200

**7 BRAKES**

Section Index - Brakes ..... 8-15210

Removal and Installation of Brake Components ..... 7000 8-15220

Brake Specifications, Pressure Checks, and Adjustments ..... 7001 8-14880

Brakes ..... 7002 8-15230

Parking Brake ..... 7003 8-15240

Accumulator ..... 7004 8-15250

Swing Brake ..... 7005 8-15260

Parking Brake Actuator ..... 7006 8-73120

**NOTE:** For parking brake and brake pedal adjustments, see Section 9009.

**8 HYDRAULICS**

Section Index - Hydraulics ..... 8-15270

Removal and Installation of Hydraulic Components ..... 8001 8-15280

Hydraulic Schematics, Specifications, and Troubleshooting ..... 8002 8-14890

Cleaning the Hydraulic System ..... 8003 8-15300

Pump for Boom and Tool ..... 8004 8-15310

Pump for Arm and Swing ..... 8005 8-15320

Pump for Steering and Controls ..... 8006 8-15330

Main Control Valves ..... 8007 8-15340

Outrigger Control Valves ..... 8008 8-15350

Remote Control Valves - Hand ..... 8009 8-15360

Remote Control Valves - Foot ..... 8010 8-15370

High Speed Valve ..... 8011 8-15380

Solenoid Valve ..... 8012 8-15390

Control Circuit Valve ..... 8013 8-15400

Swing Motor ..... 8014 8-15410

Swing Relief Valve ..... 8015 8-15420

Hydraulic Swivel ..... 8016 8-15430

Cylinders ..... 8017 8-15440

**9 MOUNTED EQUIPMENT**

Section Index - Mounted Equipment ..... 8-15450

Pedals and Levers ..... 9000 8-14900

Swing Gearbox ..... 9002 8-15470

Boom and Arm ..... 9003 8-15480

Attachments ..... 9004 8-15490

Turntable Bearing and Related Parts ..... 9005 8-15500

## SECTION INDEX - GENERAL

Section Title	Section Number
Standard Torque Specifications.....	1001
Fluids and Lubricants .....	1002
Detailed Engine Specifications .....	1024

# 1001


## STANDARD TORQUE SPECIFICATIONS


### TABLE OF CONTENTS

<b>Torque Specifications - Decimal Hardware</b> .....	1001-2	<b>Torque Specifications - Steel Hydraulic Fittings</b> .....	1001-4
<b>Torque Specifications - Metric Hardware</b> ...	1001-3	<b>Torque Specifications - O-ring Face Seal Fittings</b> .....	1001-5

## TORQUE SPECIFICATIONS - DECIMAL HARDWARE

Use the torques in this chart when special torques are not given. These torques apply to fasteners with both UNC and UNF threads as received from suppliers, dry, or when lubricated with engine oil. Not applicable if special graphites, molydisulfide greases, or other extreme pressure lubricants are used.

Grade 5 Bolts, Nuts, and Studs		
		
Size	Pound-Feet	Newton metres
1/4 in	9-11	12-15
5/16 in	17-21	23-28
3/8 in	35-42	48-57
7/16 in	54-64	73-87
1/2 in	80-96	109-130
9/16 in	110-132	149-179
5/8 in	150-180	203-244
3/4 in	270-324	366-439
7/8 in	400-480	542-651
1.0 in	580-696	787-944
1-1/8 in	800-880	1085-1193
1-1/4 in	1120-1240	1519-1681
1-3/8 in	1460-1680	1980-2278
1-1/2 in	1940-2200	2631-2983


Grade 8 Bolts, Nuts, and Studs		
		
Size	Pound-Feet	Newton metres
1/4 in	12-15	16-20
5/16 in	24-29	33-39
3/8 in	45-54	61-73
7/16 in	70-84	95-114
1/2 in	110-132	149-179
9/16 in	160-192	217-260
5/8 in	220-264	298-358
3/4 in	380-456	515-618
7/8 in	600-720	814-976
1.0 in	900-1080	1220-1465
1-1/8 in	1280-1440	1736-1953
1-1/4 in	1820-2000	2468-2712
1-3/8 in	2380-2720	3227-3688
1-1/2 in	3160-3560	4285-4827


**NOTE:** Use thick nuts with Grade 8 bolts.

## TORQUE SPECIFICATIONS - METRIC HARDWARE

Use the following torques when special torques are not given.

These values apply to fasteners with coarse threads as received from supplier, plated or unplated, or when lubricated with engine oil. These values do not apply if graphite or molydisulfide grease or oil is used.

<b>Grade 8.8 Bolts, Nuts, and Studs</b>		
		
Size	Pound-Feet	Newton metres
<b>M4</b>	2-3	3-4
<b>M5</b>	5-6	6.5-8
<b>M6</b>	8-9	10.5-12
<b>M8</b>	19-23	26-31
<b>M10</b>	38-45	52-61
<b>M12</b>	66-79	90-107
<b>M14</b>	106-127	144-172
<b>M16</b>	160-200	217-271
<b>M20</b>	320-380	434-515
<b>M24</b>	500-600	675-815
<b>M30</b>	920-1100	1250-1500
<b>M36</b>	1600-1950	2175-2600

<b>Grade 10.9 Bolts, Nuts, and Studs</b>		
		
Size	Pound-Feet	Newton metres
<b>M4</b>	3-4	4-5
<b>M5</b>	7-8	9.5-11
<b>M6</b>	11-13	15-17.5
<b>M8</b>	27-32	37-43
<b>M10</b>	54-64	73-87
<b>M12</b>	93-112	125-15
<b>M14</b>	149-179	200-245
<b>M16</b>	230-280	310-380
<b>M20</b>	450-540	610-730
<b>M24</b>	780-940	1050-1275
<b>M30</b>	1470-1770	2000-2400
<b>M36</b>	2580-3090	3500-4200

### Grade 12.9 Bolts, Nuts, and Studs



Usually the torque values specified for grade 10.9 fasteners can be used satisfactorily on grade 12.9 fasteners.

## TORQUE SPECIFICATIONS - STEEL HYDRAULIC FITTINGS

Tube OD Hose ID	Thread Size	Pound- Feet	Newton metres
<b>37 Degree Flare Fittings</b>			
<b>1/4 in</b> 6.4 mm	7/16-20	6-12	8-16
<b>5/16 in</b> 7.9 mm	1/2-20	8-16	11-21
<b>3/8 in</b> 9.5 mm	9/16-18	10-25	14-33
<b>1/2 in</b> 12.7 mm	3/4-16	15-42	20-56
<b>5/8 in</b> 15.9 mm	7/8-14	25-58	34-78
<b>3/4 in</b> 19.0 mm	1-1/16-12	40-80	54-108
<b>7/8 in</b> 22.2 mm	1-3/16-12	60-100	81-135
<b>1.0 in</b> 25.4 mm	1-5/16-12	75-117	102-158
<b>1-1/4 in</b> 31.8 mm	1-5/8-12	125-165	169-223
<b>1-1/2 in</b> 38.1 mm	1-7/8-12	210-250	285-338

Tube OD Hose ID	Thread Size	Pound- Feet	Newton metres
<b>Straight Threads with O-ring</b>			
<b>1/4 in</b> 6.4 mm	7/16-20	12-19	16-25
<b>5/16 in</b> 7.9 mm	1/2-20	16-25	22-23
<b>3/8 in</b> 9.5 mm	9/16-18	25-40	34-54
<b>1/2 in</b> 12.7 mm	3/4-16	42-67	57-90
<b>5/8 in</b> 15.9 mm	7/8-14	58-92	79-124
<b>3/4 in</b> 19.0 mm	1-1/16-12	80-128	108-174
<b>7/8 in</b> 22.2 mm	1-3/16-12	100-160	136-216
<b>1.0 in</b> 25.4 mm	1-5/16-12	117-187	159-253
<b>1-1/4 in</b> 31.8 mm	1-5/8-12	165-264	224-357
<b>1-1/2 in</b> 38.1 mm	1-7/8-12	250-400	339-542

<b>Split Flange Mounting Bolts</b>		
Size	Pound- Feet	Newton metres
5/16-18	15-20	20-27
3/8-16	20-25	26-33
7/16-14	35-45	47-61
1/2-13	55-65	74-88
5/8-11	140-150	190-203



## TORQUE SPECIFICATIONS - O-RING FACE SEAL FITTING

Nom. SAE Dash Size	Tube OD	Thread Size	Pound-Feet	Newton Metres	Thread Size	Pound-Feet	Newton Metres
<b>O-ring Face Seal End</b>					<b>O-ring Boss End Fitting or Locknut</b>		
-4	<b>1/4 in</b> 6.4 mm	9/16-18	10-12	14-16	7/16-20	17-20	23-27
-6	<b>3/8 in</b> 9.5 mm	11/16-16	18-20	24-27	9/16-18	25-30	33-40
-8	<b>1/2 in</b> 12.7 mm	13/16-16	32-40	43-54	3/4-16	45-50	61-68
-10	<b>5/8 in</b> 15.9 mm	1-14	46-56	60-75	7/8-14	60-65	81-88
-12	<b>3/4 in</b> 19.0 mm	1-3/16-12	65-80	90-110	1-1/16-12	85-90	115-122
-14	<b>7/8 in</b> 22.2 mm	1-3/16-12	65-80	90-110	1-3/16-12	95-100	129-136
-16	<b>1.0 in</b> 25.4 mm	1-7/16-12	92-105	125-140	1-5/16-12	115-125	156-169
-20	<b>1-1/4 in</b> 31.8 mm	1-11/16-12	125-140	170-190	1-5/8-12	150-160	203-217
-24	<b>1-1/2 in</b> 38.1 mm	2-12	150-180	200-254	1-7/8-12	190-200	258-271

# Section 1002

FLUIDS AND LUBRICANTS

## TABLE OF CONTENTS

CAPACITIES AND LUBRICANTS .....	3
ENGINE LUBRICATION .....	4
Engine Oil Selection .....	4
Engine Lubrication Oil Viscosity .....	4
DIESEL FUEL .....	5
Fuel Storage .....	5

## CAPACITIES AND LUBRICANTS

Engine Oil	
Capacity with Filter Change .....	17 U.S. quarts (16.1 litres)
Type of oil.....	See page 4
Engine Cooling System	
Capacity.....	8.5 U.S. gallons (32 litres)
Type of coolant.....	Use a mixture of 50% ethylene glycol and 50% water the year round. If the lowest ambient temperature will be below -34°F (1.11°C) adjust the mixture.
Fuel Tank	
Capacity.....	75 U.S. gallons (284 litres)
Type of fuel.....	See Diesel fuel specifications on page 5
Hydraulic System	
Hydraulic reservoir refill capacity with filter change.....	36 U.S. gallons (136 litres)
Type of oil.....	Case TCH fluid
Transmission	
Capacity with filter change .....	22.5 U.S. quarts (21.3 litres)
Type of oil.....	Case TCH fluid
Swing Gearbox	
Gearbox .....	14 U.S. pints (6.6 litres)
Reservoir.....	3 U.S. pints (1.4 litres)
Type of oil.....	Case IH 135-H EP gear lube
Axles	
Front Axle	
Capacity of differential .....	16.5 U.S. quarts (15.6 litres)
Capacity of planetary (each) .....	3.5 U.S. pints (1.7 litres)
Rear Axle	
Capacity of differential .....	15.5 U.S. quarts (14.7 litres)
Capacity of planetary (each) .....	3.5 U.S. pints (1.7 litres)
Type of oil.....	Case IH 135-H EP gear lube
Accelerator Master Cylinder	
Master cylinder fluid level.....	1 U.S. pint (0.47 litre)
Type of fluid.....	Case brake oil (Case part number B91244 or Viscosity Oil part number L3828)

## ENGINE LUBRICATION

### Engine Oil Selection

CaselH No. 1 Engine Oil is recommended for use in your CaselH Engine. CaselH Engine Oil will lubricate your engine correctly under all operating conditions. If CaselH No. 1 Multi-Viscosity Engine Oil is not available, CaselH No. 1 Single Grade Engine Oil can be used.

If CaselH No. 1 Multi-Viscosity or Single Grade Engine Oil is not available, use only oil meeting API engine oil service category CE.



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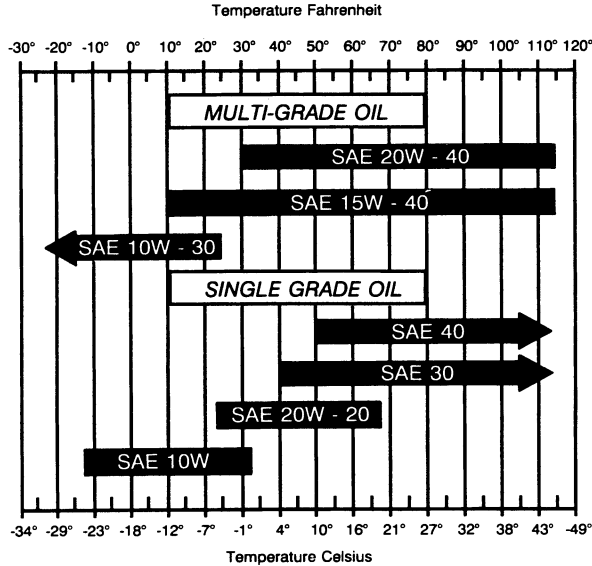
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See the chart below for recommended viscosity at ambient air temperature ranges.

**NOTE:** Do not put Performance Additives or other oil additive products in the engine crankcase. The oil intervals given in this manual are according to tests with CaselH lubricants.

### Engine Lubrication Oil Viscosity

#### AMBIENT AIR TEMPERATURE RANGES



737L9

## DIESEL FUEL

Use No. 2 diesel fuel in the engine of this machine. The use of other fuels can cause the loss of engine power and high fuel consumption.

In very cold temperatures, a mixture of No.1 and No. 2 diesel fuels is temporarily permitted. See the following Note.

**NOTE:** See your fuel dealer for winter fuel requirements in your area. If the temperature of the fuel lowers below the cloud point (wax appearance point), wax crystals in the fuel will cause the engine to lose power or not start.

The diesel fuel used in this machine must meet the specifications in the chart below or Specification D975-81 of the American Society for Testing and Materials.

### Fuel Storage

If you keep fuel in storage for a period of time, you can get foreign material or water in the fuel storage tank. Many engine problems are caused by water in the fuel.

Keep the fuel storage tank outside and keep the fuel as cool as possible. Remove water from the storage container at regular periods of time.

Fill the fuel tank at the end of the day to prevent condensation in the fuel tank.

#### Specifications for Acceptable No. 2 Diesel Fuel

API gravity, minimum .....	34
Flash point, minimum .....	140°F (60°C)
Cloud point (wax appearance point), maximum .....	-5°F (-20°C) See Note above
Pour point, maximum .....	-15°F (-26°C) See Note above
Distillation temperature, 90% point .....	540 to 640°F (282 to 338°C)
Viscosity, at 100°F (88°C)	
Centistokes .....	2.0 to 4.3
Saybolt Seconds Universal .....	32 to 40
Cetane number, minimum .....	43 (45 to 55 for winter or high altitudes)
Water and sediment, by volume .....	0.05 of 1%
Sulfur, by weight, maximum .....	0.5 of 1%
Copper strips corrosion, maximum .....	No. 2
Ash, by weight, maximum .....	0.01 of 1%



*Engine fuel is flammable and can cause a fire or an explosion. Do not fill the fuel tank or service the fuel system near an open flame, welding, burning cigars, cigarettes, etc.*

84-100-A

# Section 1024

## SPECIFICATION DETAILS

Written In **Clear  
And  
Simple  
English**

**IMPORTANT:** *This engine was made using the metric measurement system. All measurements and checks must be made with metric tools to make sure of an accurate reading when inspecting parts.*

## TABLE OF CONTENTS

RUN-IN INSTRUCTIONS .....	3
ENGINE SPECIFICATION DETAILS	
Cylinder Block .....	4
Service Cylinder Sleeve .....	4
Piston .....	4
Piston Pin .....	4
Piston Rings .....	5
Cylinder Head .....	5
Tappets .....	5
Connecting Rod .....	5
Crankshaft .....	6
Camshaft .....	7
Valve Push Rod Lifters .....	7
Gear Train .....	7
Rocker Arm Assembly .....	7
Turbocharger .....	7
Intake Valve .....	8
Exhaust Valve .....	8
Valve Springs .....	8
SPECIAL TORQUES .....	9-11



## RUN-IN INSTRUCTIONS

### Engine Lubrication

Fill the 6-590 engine crankcase with CC or CD service classification oil that has the correct viscosity rating for the ambient air temperature. Install new oil filters, after the engine has been rebuilt.

Fill the 6T-590 and the 6TA-590 engine crankcase with CD service classification oil that has the correct viscosity rating for the ambient air temperature. Install new oil filters, after the engine has been rebuilt.

### Run-In Procedure For Rebuilt Engine

- Step 1 Disconnect the wire to the electric shut-off on the injection pump so that the engine will not start. Crank the engine for 30 seconds until there is oil pressure, then reconnect the wire.
- Step 2 Remove the air from the cooling system at the temperature sending unit for the 6-590 and 6T-590 engine. Loosen the upper plug on the aftercooler to remove the air from the cooling system for the 6TA-590 engine.
- Step 3 Run the engine at 1000 RPM minimum load for 5 minutes and check for oil leaks.
- Step 4 During the Run-In, continue to check the oil pressure, coolant level, and coolant temperature.

### Run-In Procedure For Rebuilt Engines (With A Dynamometer)

The following procedure must be followed when using a PTO dynamometer to Run-In the engine. The dynamometer will control the engine load at each speed and will remove stress on new parts during Run-In.

During the Run-In, continue to check the oil pressure, coolant level and coolant temperature.

STEP	TIME	ENGINE SPEED	DYNAMOMETER SCALE LOAD
1	5 Minutes	1000 RPM	50
2	5 Minutes	1100 RPM	1/2
3	5 Minutes	2200 RPM	Full

### Run-In Procedure for Rebuilt Engines (Without A Dynamometer)

STEP	TIME	ENGINE SPEED	LOAD
1	5 Minutes	1000 RPM	No Load
2	5 Minutes	1100 RPM	Light Load
3	5 Minutes	2200 RPM	Full

### Run-In Procedure (Agriculture Tractors)

For the first 8 hours of field operation stay one gear lower than normal. For the next 12 hours DO NOT "lug" the engine. Prevent "lugging" by moving the lever to a lower gear. The engine must not be "lugged" below the rated engine RPM during early hours of life.

### Run-In Procedure (Construction Equipment)

For the first 8 hours, operate the engine at full throttle maintaining a normal load. DO NOT "baby" the engine, but avoid converter or hydraulic stall. The engine must not be "lugged" below the Rated Engine RPM (Do not stall the engine more than 10 seconds).

## ENGINE SPECIFICATION DETAILS

<b>Cylinder Block</b>	Metric Value
Type .....	Non-Sleeved
Material .....	Cast Iron
ID of Cylinder .....	102.00 to 102.04 mm
Maximum Service Limit .....	102.116 mm
Cylinder Out of Round (Maximum) .....	0.038 mm
Cylinder Taper (Maximum) .....	0.076 mm
<b>0.5 mm Oversize Piston</b>	
Machine Cylinder Bore to .....	102.40 to 102.44 mm
Hone Cylinder Bore to .....	102.50 to 102.54 mm
<b>1.00 mm Oversize Piston</b>	
Machine Cylinder Bore to .....	102.900 to 102.960 mm
Hone Cylinder Bore to .....	103.00 to 103.04 mm

### **Service Cylinder Sleeve**

Type .....	Dry, Can Be Replaced
Material .....	Cast Iron
Machine Cylinder Block Bore to .....	104.485 to 104.515 mm
Installation .....	Press Fit
Hone Cylinder Bore to .....	102.00 to 102.10 mm

### **Piston**

Type .....	Cam Ground
Material .....	Aluminum alloy
<b>OD at 12 mm From the Bottom, 90 Degrees From Piston Pin</b>	
Standard Size Piston .....	101.873 to 101.887 mm
Minimum Service Limit .....	101.823 mm
0.5 mm Oversize Piston .....	102.373 to 102.387 mm
Minimum Service Limit .....	102.323 mm
1.0 mm Oversize Piston .....	102.873 to 102.887 mm
Minimum Service Limit .....	102.823 mm
ID of Piston Pin Bore .....	40.006 to 40.012 mm
Maximum Service Limit .....	40.025 mm
Width of 1st Ring Groove (Top) .....	2.465 to 2.485 mm
Width of 2nd Ring Groove (Intermediate) .....	2.425 to 2.445 mm
Width of 3rd Ring Groove (Oil Ring) .....	4.040 to 4.060 mm
Protrusion Above Cylinder Block (Maximum) .....	0.660 mm

### **Piston Pin**

Type .....	Full Float
OD of Pin .....	39.997 to 40.003 mm
Minimum Service Limit .....	39.990 mm