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Buick 400-430-455 Engine Specifications and Blueprinting



General Specifications for the 1968 400/430 and 1970 Buick 455 Cubic Inch Engines. The following information has been directly compiled from original Buick service manuals for the respective year of vehicle manufacture.

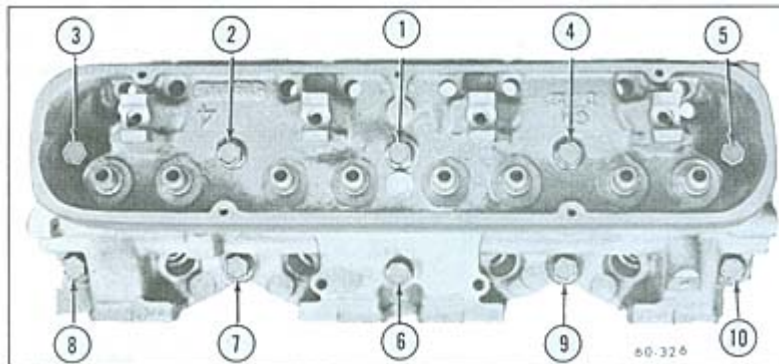
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BOLT TORQUE SPECIFICATIONS

Use a reliable [torque wrench](#) to obtain the figures listed below. This will prevent straining or distorting the parts as well as preventing thread damage. These specifications are for clean and lightly lubricated threads only. Dry or dirty threads produce friction which prevents accurate measurement of the actual torque. It is important that these specifications be strictly observed. Over tightening can damage threads. This will prevent attainment of the proper torque and will require replacement of the damaged part.

Area	Lb. Ft.
Spark Plugs	15
Crankshaft Bearing Caps to Cylinder Block	110
Connecting Rods	45
Cylinder Head to Cylinder Block	100
Harmonic Balancer to Crankshaft	200 Minimum
Fan Driving Pulley to Harmonic Balancer	23
Flywheel to Crankshaft (Auto. & Manual)	60
Oil Pan Baffle to Cylinder Block	455-13, 400/430-8
Oil Pan to Cylinder Block	14
Oil Pan Drain Plug	30
Oil Pump Cover to Timing Chain Cover	10
Oil Pump Pressure Regulator Retainer	455-35, 400/430-25
Oil Pick-Up Tube & Screen Housing Assembly to Oil Pump	8
Oil Gallery Plugs	25

Oil Pressure Switch to Cylinder Block	455-23, 400/430-25
Oil Filter to Cylinder Block	455-13, 400/430-12
Timing Chain Cover to Block	455-29, 400/430-30
Water Pump Cover to Timing Chain Cover	455-7, 400/430-8
Fan Driven Pulley	20
Thermostat Housing to Intake Manifold	20
Automatic Choke Cover to Intake Manifold	8
Intake Manifold to Cylinder Head	455-55, 400/430-50
Exhaust Manifold to Cylinder Head	18
Carburetor to Intake Manifold	455-13, 400/430-12
Fuel Pump to Cylinder Block	20
Motor Mount to Cylinder Block	455-63, 400/430-70
Fuel Pump Eccentric and Timing Chain Sprocket to Camshaft	22
Rocker Arm Cover to Cylinder Head	4
Rocker Arm Shaft to Cylinder Head	455-25, 400/430-30
Delcotron Bracket to Cylinder Head	35
Delcotron Adjusting Mounting Bracket to Cylinder Head	455-35, 400/430-22
Delcotron Mounting Bracket Thru Delcotron to Cylinder Head at Pivot Location	35
Starting Motor to Block	35
Starting Motor Brace to Block	11
Starting Motor Brace to Starter	11
Distributor Hold-Down Clamp	455-13, 400/430-12
Flywheel Housing to Cylinder Block	35
Automatic Lower Flywheel Housing Plate	4



Buick 400-430-455 Head bolt torque pattern.

GENERAL SPECIFICATIONS

General					
	400-4	430-4	455-4	455-4, Stage I	455-4
Code Number Prefix	PR	PD	SR	SS	SF
Export Code Number Prefix	N/A	PE	N/A	N/A	N/A
Engine Type	90° V-8				
Bore and Stroke	4.040 x 3.900	4.1875 x 3.900	4.3125 x 3.900	4.3125 x 3.900	4.3125 x 3.900

Piston Displacement	400 cu. in.	430 cu. in.	455 cu. in.	455 cu. in.	455 cu. in.
<u>Carburetor</u> Type	4 BBL.				
Compression Ratio	10.25:1	10.25:1	10.0:1	10.50:1	10.0:1
Gasoline Requirements	Premium				
Brake Horsepower @ RPM	340@5000	360@5000	350@4600	360@4600	370@4600
Maximum Torque @ RPM	440@3200	475@3200	510@2600	510@2600	510@2800
Taxable Horsepower	51.91	56.1	59.5	59.5	59.5
Octane Requirements - Motor	90				
Octane Requirements - Research	99				
Cylinder Numbers - Front to Rear - Left Bank	1-3-5-7				
Cylinder Numbers - Front to Rear - center Bank	2-4-6-8				
Firing Order	1-8-4-3-6-5-7-2				

Piston and Pin Specifications	
Piston Material	Cast Aluminum Alloy
Type	Divorced Skirt
Finish	Cam Ground
Piston Pins	
Material	Extruded SAE-1018
Type	Pressed in Rod

Connecting Rods	
Material	400/430 Forged - SAE-1141 Steel, 455 SAE-1053
Rod Bearing	Removable Steel Backed M/400

Ring Specifications	
#1 Compression	Cast Iron Molybdenum Coated
#2 Compression	Cast Iron-Lubricated
Oil Control	SAE-1070 Steel-Chrome Plated
Oil Ring Expander	Abutment Type
Ring Locations	Above Pin

Crankshaft Specifications	
Material	Nodular Iron
Bearing Material	Steel Backed M/400 Aluminum - #5 Durex M/100A
Bearing Taking End Thrust	#3

Camshaft Specifications	
Material	Cast Alloy Iron
Bearings	Steel Backed Babbitt
Number of Bearings	5
Drive	Chain
Number of Links	48
Crankshaft Sprocket	Sintered Iron

Camshaft Sprocket	Nylon Coated Aluminum
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Valve Specifications	
Intake Valve Material	Aluminized Face and Chrome Flash Stem SAE 1041 Steel
Exhaust Valve Material	Aluminized Face and Chrome Flash Stem GN-N82152 (21-4N)
Valve Lifter Mechanism	Hydraulic
Valve Spring	Single Helical

Lubrication System Specifications	
Type of Lubrication	
Main Bearings	Pressure
Connecting Rods	Pressure
Piston Pins	Splash
Camshaft Bearing	Pressure
Timing Chain	Drip from Front Cam Bearing
Cylinder Walls	Splash & Nozzle
Oil Pump Type	Gear Driven
Normal Oil Pressure	40 lbs. @ 2400 RPM
Oil Pressure Sending Unit	Electrical
Oil Intake	Stationary
Oil Filter System	Full Flow
Filler Type	Throw-Away Element & Can
Crankcase Capacity	
Less Filter	4 qts.
With Filter	5 qts.

Cooling System Specifications	
System Type	Pressure
Radiator Cap Relief Pressure	15 psi
Thermostat	Choke Type Opening at 190°
Water Pump Type	Centrifugal
GPM @ RPM	15 @ 1000
Drive	V-Belt
Bearings	Double Row
By-Pass Recirculation Type	Internal
Cooling System Capacities	
With Heater	400-16.2 qts., 430-16.7 qts., 455-19.7 qts.
With Air Conditioning	400-16.7 qts, 430-17.0 qts., 455-20.0 qts.
Fan Diameter and Number of Blades	18"X4 GS400 Less AC, GS455 Wildcat Less AC Electra Less AC 18"X7 GS400 With AC GS455 With AC

	20"X5 Riviera Less AC Wildcat With AC Electra With AC Riviera With AC
Fan Drive	
Less AC	Water Pump Shaft
With AC	400/430 Thermostatic Controlled Clutch 455 Torque and Temperature Sensitive Clutch

Engine Dimensions and Fits			
Piston Clearance Limits*			
	400 Cu. In.	430 Cu. In.	455 Cu. In.
Top Land	.034-.042	.0343-.0423	.0343-.0423
Skirt - Top	.0007-.0013	.0007-.0013	.0007-.0013
Skirt - Bottom	.0017-.0033	.0017-.0033	.0017-.0033
Ring Groove			
#1 - Compression Ring	.2090-.2165	.2090-.2165	.2090-.2165
#2 - Compression Ring	.2115-.2190	.2115-.2190	.2115-.2190
#3 - Oil Ring	.1815-.1890	.1815-.1890	.1815-.1890
Ring Width			
#1 - Compression Ring	.077-.078	.077-.078	.077-.078
#2 - Compression Ring	.077-.078	.077-.078	.077-.078
#3 - Oil Ring	.023-.025	.023-.025	.023-.025
Ring Gap			
#1 - Compression Ring	.013-.023	.013-.023	.013-.023
#2 - Compression Ring	.013-.023	.013-.023	.013-.023
#3 - Oil Ring	.015-.055	.015-.055	.015-.055
Piston Pin Length	3.520	3.520	3.520
Diameter of Pin	.9994-.9997	.9994-.9997	.9994-.9997
Clearance			
In Piston	.0001-.0004	.0001-.0004	.0001-.0004
In Rod	.00075-.00125 press	.00075-.00125 press	.00075-.00125 press
Direction & Amount Offset in Piston	.060 Offset Major Thrust	.060 Offset Major Thrust	.060 Offset Major Thrust
*A11 Measurements in Inches Unless Otherwise Specified.			

Connecting Rod Specifications			
	400 Cu. In.	430 Cu. In.	455 Cu. In.
Bearing Length	.821	.821	.821
Bearing Clearance (Limits)	.0002-.0023	.0002-.0023	.0002-.0023
End Play-Total for Both Rods	.005-.012	.005-.012	.005-.012

Crankshaft Specifications 400/430/455	
End Play at Thrust Bearing	.003-.009
Main Bearing Journal Diameter	3.25

Crank pin Journal Diameter	2.249-2.250
Main Bearing Overall Length	
#1	.865
#2	.865
#3	1.057
#4	.865
#5	1.143
Main Bearing to Journal Clearance	.0007-.0018
Bearing Journal Diameter	
#1	1.785-1.786
#2	1.785-1.786
#3	1.785-1.786
#4	1.785-1.786
#5	1.785-1.786

Valve System Specifications	
Rocker Arm Ratio	1967-68 400/430 - 1.59 to 1, aluminum 1969-70, 400/455 - 1.54 to 1, stamped steel 1971+, 455 - 1.6 to 1, stamped steel
Rocker Arm Clearance on Shaft	.0015-.0030
Valve Lifter Diameter	.8427-.8422
Valve Lifter Clearance in Crankcase	.0008-.0023
Valve Lifter Leak down Rate	12 to 60 Sec. in Test Fixture
Intake Valve	
Head Diameter	2.000
Seat Angle	45°
Stem Diameter	.3725 ± .0005-Max. Allowable Taper to be .0003 with Smallest Dia. @ Valve Head End
Clearance in Guide	.0015-.0035 & .0003 Max. Taper
Valve Stem Height	2.0320"-2.0620", some 2.0900" - 2.1200
Valve Spring	
Valve Closed - Pounds @ Length	72 ± 5@1.890
Valve Open - Pounds @ Length	177 ± 7@1.450
Exhaust Valve	
Head Diameter	1.625
Seat Angle	45°
Stem Diameter	400/430, .3723 Min, and .3730 Max
Clearance in Guide	.0015-.0032 & .0002 Max. Taper
Valve Stem Height	2.0320"-2.0620", some 2.0900" - 2.1200
Valve Spring (Inner)	
Valve Closed - Pounds @ Length	72 ± 5@1.890
Valve Open - Pounds @	177 ± 7@1.450

Length

Additional Blueprint Specifications for the Buick 400/430/455

Cubic Inches	Bore	Stroke	Rod Length	Rod Width	Rod/Stroke Ratio	Bore/Stroke Ratio	Bore Spacing	Deck Height
400	4.040	3.900	6.607	0.928	1.6923	1.0359	4.750	10.57
430	4.1875	3.900	6.607	0.928	1.6923	1.0737	4.750	10.57
455	4.3125	3.900	6.607	0.928	1.6923	1.1058	4.750	10.57

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