

# TECHNICAL DATA

## SI\* METRIC INFORMATION GUIDE

BASE UNITS			
DESCRIPTION	UNIT	SYMBOL	
length .....	meter .....	m	
mass .....	kilogram .....	kg	
force .....	newton .....	N	
liquid .....	liter .....	L	
temperature .....	Celsius .....	°C	
pressure .....	kilopascal .....	kPa	
torque .....	newton•meter .....	N•m	
speed .....	kilometer per hour .....	km/h	

PREFIXES			
PREFIX	SYMBOL	MEANING	VALUE
kilo .....	k .....	one thousand .....	1 000
centi .....	c .....	one hundredth .....	0.01
milli .....	m .....	one thousandth .....	0.001
micro .....	μ .....	one millionth .....	0.000001

CONVERSION FACTORS			
TO CONVERT	TO †	MULTIPLY BY	
in .....	mm .....	25.4	
in .....	cm .....	2.54	
in <sup>2</sup> .....	cm <sup>2</sup> .....	6.45	
in <sup>3</sup> .....	cm <sup>3</sup> .....	16.39	
ft .....	m .....	0.3	
oz .....	g .....	28.35	
lb .....	kg .....	0.45	
lbf .....	N .....	4.4	
lbf•in .....	N•m .....	0.11	
lbf•ft .....	N•m .....	1.36	
lbf•ft .....	lbf•in .....	12	
PSI (lbf/in <sup>2</sup> ) .....	kPa .....	6.89	
imp. oz .....	U.S. oz .....	0.96	
imp. oz .....	mL .....	28.41	
imp. gal .....	U.S. gal .....	1.2	
imp. gal .....	L .....	4.55	
U.S. oz .....	mL .....	29.57	
U.S. gal .....	L .....	3.79	
MPH .....	km/h .....	1.61	
Fahrenheit .....	Celsius .....	(°F - 32) ÷ 1.8	
Celsius .....	Fahrenheit .....	(°C × 1.8) + 32	






\* The international system of units abbreviates SI in all languages.

† To obtain the inverse sequence, divide by the given factor. To convert mm to in, divide by 25.4.

NOTE: Conversion factors are rounded off to 2 decimals for easier use.

## Section 10 TECHNICAL DATA

### Subsection 02 (ENGINES)

VEHICLE MODEL		GRAND TOURING 700	GRAND TOURING SE/SE M.E.	FORMULA III 700 R		
<b>ENGINE TYPE</b>		<b>699</b>	<b>809</b>	<b>699</b>		
	Number of Cylinders	3	3	3		
	Bore	69.75 (2.746)	70.5 (2.776)	69.75 (2.746)		
	Stroke	61.0 (2.402)	68.0 (2.677)	61.0 (2.402)		
	Displacement	699.25 (42.67)	796.3 (48.59)	699.25 (42.67)		
	Compression Ratio (corrected)	6.8	6.8	6.8		
	Maximum Power Engine Speed ①	± 100 RPM	8000	8000	8000	
	Piston Ring Type	1 <sup>st</sup> /2 <sup>nd</sup>	KS/R	KS/R	KS/R	
	Ring End Gap	New	0.2 (.008)	0.2 (.008)	0.2 (.008)	
		Wear Limit	1.0 (.039)	1.0 (.039)	1.0 (.039)	
	Ring/Piston Groove Clearance	New	0.03 (.0012)	0.03 (.0012)	0.03 (.0012)	
		Wear Limit	0.2 (.0079)	0.2 (.0079)	0.2 (.0079)	
	Piston/Cylinder Wall Clearance	New	± 0.013 mm (± .0005 in)	0.085 (.0031)	0.085 (.0031)	
		Wear Limit	0.20 (.0079)	0.095 (.0037)	0.20 (.0079)	
	Connecting Rod Big End Axial Play	New	0.31 (.0122)	0.39 (.0154)	0.39 (.0154)	
		Wear Limit	1.2 (.0472)	1.2 (.0472)	1.2 (.0472)	
Maximum Crankshaft End-play ②		0.3 (.012)	0.3 (.012)	0.3 (.012)		
Maximum Crankshaft Deflection at PTO		0.06 (.0024)	0.06 (.0024)	0.06 (.0024)		
Rotary Valve Timing and P/N 420 924 XXX	Opening Closing	N.A.	N.A.	N.A.		
	Magneto Generator Output	W	360	290		
	Ignition Type		CDI	CDI		
	Spark Plug Make and Type		NGK BR9ES	NGK BR9ES	NGK BR9ES	
	Spark Plug Gap	mm (in)	0.45 (.018)	0.45 (.018)	0.45 (.018)	
	Ignition Timing BTDC ③	mm (in)	2.77 (.109)	2.59 (.102)	2.77 (.109)	
	Trigger Coil ④	Ω	190 – 300	190 – 300	190 – 300	
	Generating Coil ④	Low Speed	Ω	N.A.	25 – 56	
		High Speed	Ω	N.A.	3.5 – 8.1	
	Lighting Coil ④	Ω	0.0 – 0.05	0.0 – 0.05	0.15 – 0.35	
	High Tension Coil ④	Primary	Ω	0.2 – 0.5	0.2 – 0.5	
Secondary		kΩ	6 – 13	6 – 13		
	Carburetor Type	PTO/CTR/MAG	VM 38 436/441/436	TM 38 C301	VM 38 435/440/435	
	Main Jet	PTO/CTR/MAG	270/280/270	340/360/340	270/280/270	
	Needle Jet		480-P-4	876 O-2	480 P-4	
	Pilot Jet		50	15	50	
	Needle Identification — clip position		6DEY2-4	8BCY01-42-4	6DEY2-4	
	Slide Cut-Away		2.5	2.0	2.5	
	Float Adjustment	± 1 mm (± .040 in)	18.1 (.71)	21.0 (.83)	18.1 (.71)	
	Air Screw Adjustment	± 1/16 Turn	1-1/2	Closed	2.5	
	Idle Speed	± 200 RPM	2000	2000	1800	
	Gas Type/Pump Octane Number		Super Unleaded/91	Super Unleaded/91	Super Unleaded/91	
	Gas/Oil Ratio		Injection	Injection	Injection	
	Type		Liquid	Liquid	Liquid	
	Axial Fan Belt Adjustment	Deflection	mm (in)	N.A.	N.A.	N.A.
		Force	kg (lbf)	N.A.	N.A.	N.A.
	Thermostat Opening Temperature	°C (°F)	N.A.	N.A.	N.A.	
Radiator Cap Opening Pressure	kPa (PSI)	90 (13)	90 (13)	90 (13)		
	ENGINE COLD N·m (lbf·ft)	Drive Pulley Retaining Screw	⑤	⑤	⑤	
		Exhaust Manifold Nuts or Bolts	10 (7)	10 (7)	10 (7)	
		Magneto Ring Nut	125 (92)	125 (92)	125 (92)	
		Crankcase Nuts or Screws	M6	13 (9.5)	13 (9.5)	13 (9.5)
			M8	29 (21)	29 (21)	29 (21)
		Crankcase/Engine Support Nuts or Screws		35 (26)	35 (26)	35 (26)
		Cylinder Head Nuts		29 (21)	29 (21)	29 (21)
		Crankcase/Cylinder Nuts or Screws		29 (21)	29 (21)	29 (21)
Axial Fan Shaft Nut		N.A.	N.A.	N.A.		




# Section 10 TECHNICAL DATA

## Subsection 02 (ENGINES)

VEHICLE MODEL		FORMULA III 800	MACH 1 R	MACH Z/Z R/Z R M.E.
<b>ENGINE TYPE</b>		<b>809</b>	<b>699</b>	<b>809</b>
Number of Cylinders		3	3	3
Bore	mm (in)	70.50 (2.776)	69.75 (2.746)	70.50 (2.776)
Stroke	mm (in)	68.0 (2.677)	61.0 (2.402)	68.0 (2.677)
Displacement	cm <sup>3</sup> (in <sup>3</sup> )	796.3 (48.59)	699.25 (42.67)	796.3 (48.59)
Compression Ratio (corrected)		6.8	6.8	6.8
Maximum Power Engine Speed ①		± 100 RPM	8000	8300
Piston Ring Type		1 <sup>st</sup> /2 <sup>nd</sup>	KS/R	KS/R
Ring End Gap	New	mm (in)	0.2 (.008)	0.2 (.008)
	Wear Limit	mm (in)	1.0 (.039)	1.0 (.039)
Ring/Piston Groove Clearance	New	mm (in)	0.03 (.0012)	0.03 (.0012)
	Wear Limit	mm (in)	0.2 (.0079)	0.2 (.0079)
Piston/Cylinder Wall Clearance	New	± 0.013 mm (± .0005 in)	0.095 (.0037)	0.085 (.0031)
	Wear Limit	mm (in)	0.20 (.0079)	0.20 (.0079)
Connecting Rod Big End Axial Play	New	mm (in)	0.39 (.0154)	0.31 (.0122)
	Wear limit	mm (in)	1.2 (.0472)	1.2 (.0472)
Maximum Crankshaft End-play ②		mm (in)	0.3 (.012)	0.3 (.012)
Maximum Crankshaft Deflection at PTO		mm (in)	0.06 (.0024)	0.06 (.0024)
Rotary Valve Timing and P/N 420 924 XXX		Opening Closing	N.A.	N.A.
Magneto Generator Output		W	290	290
Ignition Type			CDI	CDI
Spark Plug Make and Type			NGK BR9ES	NGK BR9ES
Spark Plug Gap	mm (in)	0.45 (.018)	0.45 (.018)	0.45 (.018)
Ignition Timing BTDC ③		mm (in)	1.94 (.076)	2.77 (.109)
Trigger Coil ④		Ω	190 – 300	190 – 300
Generating Coil ④	Low Speed	Ω	25 – 56	25 – 56
	High Speed	Ω	3.5 – 8.1	3.5 – 8.1
Lighting Coil ④		Ω	0.15 – 0.35	0.15 – 0.35
High Tension Coil ④	Primary	Ω	0.2 – 0.5	0.2 – 0.5
	Secondary	kΩ	6 – 13	6 – 13
Carburetor Type		PTO/CTR/MAG	TM 38 C297	TM 38 C293
Main Jet		PTO/CTR/MAG	340/360/340	290
Needle Jet			876 O-2	327 N-7
Pilot Jet			15	50
Needle Identification — clip position			8BCY01-42-4	8AGY1-41-4
Slide Cut-away			2.0	2.0
Float Adjustment	± 1 mm (± .040 in)		21.0 (.83)	21.0 (.83)
Air Screw Adjustment	± 1/16 Turn		Closed	4
Idle Speed		± 200 RPM	2000	1800
Gas Type/Pump Octane Number			Super Unleaded/91	Super Unleaded/91
Gas/Oil Ratio			Injection	Injection
Type			Liquid	Liquid
Axial Fan Belt Adjustment	Deflection	mm (in)	N.A.	N.A.
	Force	kg (lbf)	N.A.	N.A.
Thermostat Opening Temperature		°C (°F)	N.A.	N.A.
Radiator Cap Opening Pressure		kPa (PSI)	90 (13)	90 (13)
<b>ENGINE COLD</b> N·m (lbf·ft)	Drive Pulley Retaining Screw		⑤	⑤
	Exhaust Manifold Nuts or Bolts		10 (7)	10 (7)
	Magneto Ring Nut		125 (92)	125 (92)
	Crankcase Nuts or Screws		M6 M8	13 (9.5) 29 (21)
	Crankcase/Engine Support Nuts or Screws			35 (26)
	Cylinder Head Nuts			29 (21)
	Crankcase/Cylinder Nuts or Screws			29 (21)
	Axial Fan Shaft Nut			N.A.





## Section 10 TECHNICAL DATA

### Subsection 03 (VEHICLES)

VEHICLE MODEL		GRAND TOURING 700	GRAND TOURING SE/SE M.E.	FORMULA III 700 R		
<b>ENGINE TYPE</b>		<b>699</b>	<b>809</b>	<b>699</b>		
Chain Drive Ratio		24/43	24/43	25/43		
Chain	Pitch	in 3/8	3/8	3/8		
	Type/Links Qty/Plates Qty	Silent 72/13	Silent 72/13	Silent 72/13		
Drive Pulley	Type of Drive Pulley	TRA	TRA	TRA		
	Ramp Identification and Roller Pin Type	293X ⑤	293X ⑤	293X ⑤		
	Calibration Screw Position or Calibration Disc Quantity	3	3	3		
	Spring Color	Blue/Violet	Violet/Yellow	Violet/Yellow		
	Spring Length	± 1.5 mm (± .060 in)	96.9 (3.82)	157.9 (6.22)	157.9 (6.22)	
	Clutch Engagement	± 200 RPM	3300	3300	3800	
Driven Pulley	Type	HPV27	HPV27	HPV27		
	Spring Preload	± 0.7 kg (± 1.5 lb)	N.A.	N.A.		
	Cam Angle	Degree 47 – 44	47 – 44	47 – 44		
Pulley Distance	Z	± 0.5 mm (± .020 in)	121.0 (4.764)	121.0 (4.764)	121.0 (4.764)	
Offset	X	± 0.5 mm (± .020 in)	35.5 (1.398)	35.5 (1.398)	35.5 (1.398)	
	Y – X	MIN. – MAX.	mm (in) 1.0 – 2.0 (.039 – .079)	1.0 – 2.0 (.039 – .079)	1.0 – 2.0 (.039 – .079)	
Drive Belt Part Number (P/N)		417 300 066	417 300 066	417 300 066		
Drive Belt Width (new) ①		mm (in) 35.1 (1.382)	35.1 (1.382)	35.1 (1.382)		
Drive Belt Adjustment	Deflection	± 5 mm (± .197 in)	38 (1.496)	38 (1.496)	38 (1.496)	
	Force ②	kg (lbf)	11.5 (25)	11.5 (25)	11.5 (25)	
Track	Width	cm (in)	38.1 (15.0)	38.1 (15.0)	38.1 (15.0)	
	Length	cm (in)	345.5 (136)	345.5 (136)	307.4 (121)	
	Profile Height	mm (in)	22.3 (.878)	22.3 (.878)	22.3 (.878)	
	Adjustment	Deflection	mm (in)	30 – 35 (1-3/16 – 1-3/8)	30 – 35 (1-3/16 – 1-3/8)	30 – 35 (1-3/16 – 1-3/8)
		Force ③	kg (lbf)	7.3 (16)	7.3 (16)	7.3 (16)
Suspension Type		Track	SC-10 HP	SC-10 HP	SC-10 HP	
		Ski	ADSA	ADSA	ADSA	
	Length	cm (in)	303.5 (119.5)	303.5 (119.5)	277.5 (109.3)	
	Width	cm (in)	117.4 (46.2)	117.4 (46.2)	117.4 (46.2)	
	Height	cm (in)	130.0 (51.2)	130.0 (51.2)	114.3 (45.0)	
	Ski Stance	cm (in)	104.1 (41)	104.1 (41)	104.1 (41)	
	Mass (dry)	kg (lb)	278 (612)	282 (620)	245 (539)	
	Ground Contact Area	cm² (in²)	7423.2 (1150.6)	7423.2 (1150.6)	6670.9 (1034)	
	Ground Contact Pressure	kPa (PSI)	3.67 (.532)	3.73 (.541)	3.60 (.522)	
	Frame Material		Aluminum	Aluminum	Aluminum	
	Bottom Pan Material		Impact Copolymer	Impact Copolymer	Impact Copolymer	
	Hood Material		TPO	TPO	TPO	
		Battery	V (A•h)	12/22	12/22	N.A.
Headlight		W	H4 60/55	H4 60/55	H4 60/55	
Taillight and Stoplight		W	8/27	8/27	8/27	
Tachometer and Speedometer Bulbs		W	3	3	3	
Fuel and Temperature Gauge Bulbs		W	3	3	3	
Fuse		Starter Solenoid	A	30	30	N.A.
		Fuel Level Sensor	A	0.25	0.25	0.25
	Fuel Tank	L (U.S. gal)	42 (11.1)	42 (11.1)	42 (11.1)	
	Chaincase/Gearbox	mL (U.S. oz)	250 (8.5)	250 (8.5)	250 (8.5)	
	Cooling System ④	L (U.S. oz)	5.1 (172.5)	5.1 (172.5)	5.0 (169)	
	Injection Oil Reservoir	L (U.S. oz)	4.1 (138.7)	4.1 (138.7)	4.1 (138.7)	

# Section 10 TECHNICAL DATA

## Subsection 03 (VEHICLES)

VEHICLE MODEL		FORMULA III 800	MACH 1 R	MACH Z	MACH Z R MACH Z R M.E.		
<b>ENGINE TYPE</b>		<b>809</b>	<b>699</b>	<b>809</b>	<b>809</b>		
	Chain Drive Ratio		26/43	25/43	26/43	26/43	
	Chain	Pitch in	3/8	3/8	3/8	3/8	
		Type/Links Qty/Plates Qty	Silent 72/13	Silent 72/13	Silent 72/13	Silent 72/13	
	Drive Pulley	Type of Drive Pulley		TRA	TRA	TRA	TRA
		Ramp Identification and Roller Pin Type		295 ⑤	297 ⑤	295 ⑤	295 ⑤
		Calibration Screw Position or Calibration Disc Quantity		2	3	3	3
		Spring Color		Violet/Yellow	Green/Violet	Green/Blue	Green/Blue
		Spring Length	± 1.5 mm (± .060 in)	157.9 (6.22)	133.7 (5.26)	147.4 (5.80)	147.4 (5.80)
		Clutch Engagement	± 200 RPM	3800	4200	4200	4200
	Driven Pulley	Type		Formula	HPV27	Formula	HPV27
		Driven Pulley Spring Preload	± 0.7 kg (± 1.5 lb)	7.0 (15.4)	N.A.	7.0 (15.4)	N.A.
		Cam Angle Degree		50 – 47	47 – 44	53 – 44	47 – 44
	Pulley Distance	Z	± 0.5 mm (± .020 in)	120.0 (4.724)	121.0 (4.764)	120.0 (4.724)	121.0 (4.764)
		X	± 0.4 mm (± 1/64 in)	35.5 (1.398)	35.5 (1.398)	35.5 (1.398)	35.5 (1.398)
	Offset	Y – X	MIN. – MAX. mm (in)	1.0 – 2.0 (.039 – .079)	1.0 – 2.0 (.039 – .079)	1.0 – 2.0 (.039 – .079)	1.0 – 2.0 (.039 – .079)
		Drive Belt Part Number (P/N)		417 300 066	417 300 066	417 300 066	417 300 066
	Drive Belt Width (new) ①		mm (in)	35.1 (1.382)	35.1 (1.382)	35.1 (1.382)	35.1 (1.382)
	Drive Belt Adjustment	Deflection	± 5 mm (± 13/64 in)	38 (1.496)	38 (1.496)	38 (1.496)	38 (1.496)
			Force ②	kg (lbf)	11.5 (25)	11.5 (25)	11.5 (25)
	Track	Width		cm (in)	38.1 (15.0)	38.1 (15.0)	38.1 (15.0)
Length		cm (in)	307.4 (121)	307.4 (121)	307.4 (121)		
Profile Height		mm (in)	22.3 (.878)	22.3 (.878)	22.3 (.878)		
Adjustment		Deflection	mm (in)	30 – 35 (1-3/16 – 1-3/8)	30 – 35 (1-3/16 – 1-3/8)	30 – 35 (1-3/16 – 1-3/8)	30 – 35 (1-3/16 – 1-3/8)
		Force ③	kg (lbf)	7.3 (16)	7.3 (16)	7.3 (16)	7.3 (16)
Suspension Type	Track		SC-10 HP	SC-10 HP	SC-10 HP	SC-10 HP	
	Ski		ADSA	ADSA	ADSA	ADSA	
	Length		cm (in)	277.5 (109.3)	277.5 (109.3)	277.5 (109.3)	
	Width		cm (in)	117.4 (46.2)	117.4 (46.2)	117.4 (46.2)	
	Height		cm (in)	114.3 (45.0)	114.3 (45.0)	114.3 (45.0)	
	Ski Stance		cm (in)	104.1 (41)	104.1 (41)	104.1 (41)	
	Mass (dry)		kg (lb)	251 (552)	254 (559)	260 (572)	261 (574)
	Ground Contact Area		cm <sup>2</sup> (in <sup>2</sup> )	6670.9 (1034)	6670.9 (1034)	6670.9 (1034)	6670.9 (1034)
	Ground Contact Pressure		kPa (PSI)	3.69 (.535)	3.74 (.542)	3.82 (.554)	3.84 (.557)
	Frame Material			Aluminum	Aluminum	Aluminum	Aluminum
	Bottom Pan Material			Impact Copolymer	Impact Copolymer	Impact Copolymer	Impact Copolymer
	Hood Material			TPO	TPO	TPO	TPO
	Battery		V (A•h)	N.A.	N.A.	N.A.	
	Headlight		W	H4 60/55	H4 60/55	H4 60/55	
	Taillight and Stoplight		W	8/27	8/27	8/27	
	Tachometer and Speedometer Bulbs		W	3	3	3	
	Fuel and Temperature Gauge Bulbs		W	3	3	3	
	Fuse	Starter Solenoid	A	N.A.	N.A.	N.A.	N.A.
		Fuel Level Sensor	A	0.25	0.25	0.25	0.25
	Fuel Tank		L (U.S. gal)	42 (11.1)	42 (11.1)	42 (11.1)	
	Chaincase/Gearbox		mL (U.S. oz)	250 (8.5)	250 (8.5)	250 (8.5)	
	Cooling System ④		L (U.S. oz)	5.0 (169)	5.0 (169)	5.0 (169)	
	Injection Oil Reservoir		L (U.S. oz)	4.1 (138.7)	4.1 (138.7)	4.1 (138.7)	

## ENGINE LEGEND

BTDC: Before Top Dead Center

CDI: Capacitor Discharge Ignition

CTR: Center

K: Kilo (× 1000)

MAG: Magneto Side

N.A.: Not Applicable

PTO: Power Take Off Side

R: Rectangular

KS: Keystone

- ① The maximum horsepower RPM applicable on the vehicle. It may be different under certain circumstances and BOMBARDIER INC. reserves the right to modify it without obligation.
- ② Crankshaft end-play is not adjustable on these models. Specification is given for verification purposes only.
- ③ At 3500 RPM with headlamp turned on.
- ④ All resistance measurements must be performed with parts at room temperature (approx. 20°C (68°F)). Temperature greatly affects resistance measurements.
- ⑤ Drive pulley retaining screw: torque to 90 to 100 N•m (66 to 74 lbf•ft), install drive belt, accelerate the vehicle at low speed (maximum 30 km/h (20 MPH)) and apply the brake; repeat 5 times. Recheck the torque of 90 to 100 N•m (66 to 74 lbf•ft).

## VEHICLE LEGEND

ADSA: Advanced Direct Shock Action

TPO: Thermo Plastic Olefin

TRA: Total Range Adjustable

N.A.: Not Applicable

- ① Minimum allowable width may not be less than 3.0 mm (1/8 in) of new drive belt.
- ② Force applied midway between pulleys to obtain specified tension deflection.
- ③ Force or downward pull applied to track to obtain specified tension deflection.
- ④ Coolant mixture: 60% antifreeze/40% water.
- ⑤ Lever with roller pin (P/N 417 004 308) (solid).