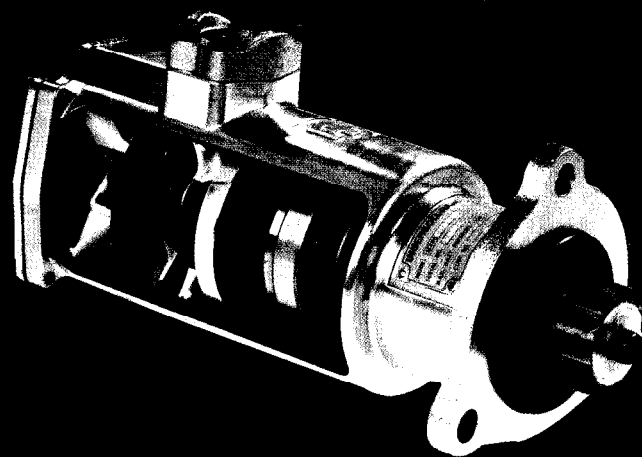


**INGERSOLL-RAND<sup>®</sup>**

**Engine Starting Systems**

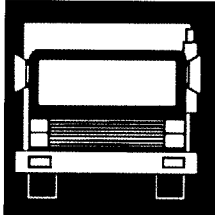


**INGERSOLL-RAND<sup>®</sup>**

# ENGINE STARTING SYSTEMS

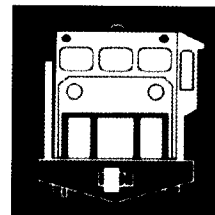
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<b>Definitions</b>	
DP – Diametrical Pitch	
PA – Pressure Angle	
SR – Spark Resistant	





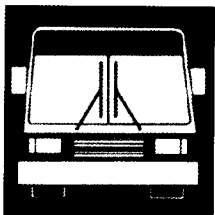
**Class 7 & 8 Truck**

IR Air Starters deliver full-power cranking in extreme conditions, with consistently three times longer life than electric starters. In fact, an IR Air Starter typically performs well beyond a truck's first major engine overhaul, before requiring any maintenance!



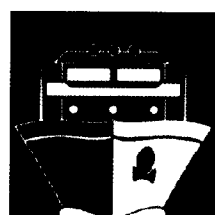
**Locomotives**

A full range of extra heavy-duty high capacity IR Air Starters have been specifically designed for applications involving the largest engines and slow-acceleration starts.



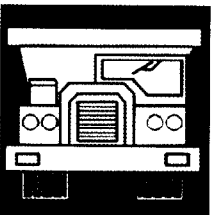
**Public Transport**

IR Air Starters thrive where temperature extremes and demanding schedules drive the application. Their reliability is the perfect match for frequent start cycles resulting from idling limitations and mandated engine shut-downs.



**Marine**

Moisture and salt are the constant enemies of electrical systems and starters. IR Air Starters require no special protection or maintenance procedures to deliver top performance.



**Off-Highway**

The worst operating conditions bring out the best in IR Air Starter benefits. Irregular operating schedules with long duration shut-downs pose no problem, as maximum starting power is always at your command.



**Oil & Gas/ Power Generation**

Whatever the application—pipeline transmission, primary or auxiliary power supply—fast, reliable starting is critical to the entire process. IR Air Starters have earned an unmatched reputation throughout the industry for performance and efficiency.

**Features**

*System Simplicity*

*System Safety*

*Top Performance in Extreme Weather Conditions*

*Reduced Maintenance Cost*

*Pre-Engaged Starter*

*Vane & Turbine Models Available*

*1-3 Years Warranty*

*Remanufactured Starter Program*

**Benefits**

*Easy to Troubleshoot—No Special Training Required*

*No Electrical Hazards—Safe for Use with Natural Gas  
Excellent when Handling Hazardous Materials*

*Maintain 100% of Their Cranking Power at a Temperature 0° F*

*Longer life on Batteries and Alternators/Simplistic Design/Tune-up Kits*

*Reduces Wear on Ring Gear and Pinion*

*IR Offers Vane & Turbine Starter for all Applications*

*Warranty Coverage for all Market Applications*

*Lower Maintenance Cost—No Down Time—Proven Product—Cost Effective Repair*

### Vane Starters

\*For Diesel Engine Displacement

	Series	Gear Ratio	Maximum Pressure, psig	Maximum Torque, ft-lb	Maximum Power, hp	Speed at Max. Power, rpm
<b>5 Liters</b> (up to 300 CID)	3BMG	Direct	150	39	8.4	2800
<b>3 to 8 Liters</b> (200 to 500 CID)	5BMG	Direct	150	40	9.3	2700
	SS175G	B	150	46	18.5	4200
<b>5 to 10 Liters</b> (300 to 600 CID)	SS175G	E	150	71	18.5	2800
	150BMP	E	150	155	34	2100
<b>8 to 27 Liters</b> (500 to 1200 CID)	150LFG	E	150	100	28	2600
	150BMG	E	150	155	34	2800
	SS350G	E	150	160	35	3400
<b>15 to 32 Liters</b> (900 to 2000CID)	150BMPD	D	150	185	34	2100
	SS810G	B	150	260	80	3200
<b>16 to 130 Liters</b> (1000 to 8000 CID)	SS815G	B	150	260	80	3200
	SS825G	C	225	420	130	3000
<b>160 to 320 Liters</b> (10000 to 20000 CID)	SS850G	D	225	600	130	2200

### ST400/ST700 Turbine Starter

\*For Diesel Engine Displacement

	Series	Gear Ratio	Arc	Maximum Pressure, psig	Maximum Torque, ft-lb	Maximum Power, hp	Speed at Max. Power, rpm
<b>5 to 27 Liters</b> (300 to 1600 CID)	ST400	C	Half Arc	150	150	24	1750
	ST750G	B	Half Arc	150	280	60	2300
<b>16 to 130 Liters</b> (1000 to 8000 CID)	ST799G	B	Full Arc	90	310	64	2175
	ST750G	C	Half Arc	150	320	60	1970
<b>80 to 200 Liters</b> (5000 to 1200 CID)	ST799G	C	Full Arc	90	360	64	1867

### ST900 Turbine Starter

\*For Spark Fired-Engine Displacement

	Series	Gear Ratio	Arc	Maximum Pressure, psig	Maximum Torque, ft-lb	Maximum Power, hp	Speed at Max. Power, rpm
<b>16 to 130 Liters</b> (1000 to 8000 CID)	ST950	B	Half Arc	150	280	60	2300
	ST999	B	Full Arc	90	310	64	2175
<b>80 to 200 Liters</b> (5000 to 1200 CID)	ST950	C	Half Arc	150	320	60	1970
	ST999	C	Full Arc	90	360	64	1867
<b>160 to 320 Liters</b> (20000 to 40000 CID)	ST950	D	Half Arc	150	430	60	1466
	ST999	D	Full Arc	90	490	64	1372

These figures are only a guide—for difficult to start engines or for operation under adverse conditions, use the next more powerful Starter. For 2-stroke diesel engines, these figures may be multiplied by 1.5. Ex.: a 3BMG could be used in a 450 CID 2-stroke diesel engine. For Carbureted (gas) engines, these figures may be doubled. Ex.: a 150BMP could be used on a 2400 CID gasoline engine. \*\*Torque values shown are stall torque. Starting torque will be approximately 75% of values shown.

**"Special" Air Starter**—Ingersoll-Rand offers the most complete line of Air Starters in the world. Additional models can be furnished, even if not listed in this catalog. Other special Air Starters can also be built to your specifications. Please contact Ingersoll-Rand, Southern Pines, North Carolina for complete information.

Air Consumption at Max hp, scfs	Gear Case	Drive Type	Pinion Type	Recom'd Tank Size, gal	Recom'd Hose Size	Gas Sealed
4	In-Line	Inertia	Caged	35	#12	Yes
4	In-Line	Inertia	Caged	45	#12	Yes
10	In-Line	Pre-Engaged	Overhung	45	#16	Yes
10	In-Line	Pre-Engaged	Overhung	45	#16	Yes
12	Offset	Pre-Engaged	Caged	60	#16 or #20	No
13	Offset	Inertia	Caged	60	#16 or #20	Yes
12	Offset	Inertia	Caged	60	#16 or #20	Yes
14	In-Line	Pre-Engaged	Overhung	60	#16 or #20	Yes
12	In-Line	Pre-Engaged	Caged	60	#20	No
27	Offset	Inertia	Caged	100	#24	Yes
27	Offset	Pre-Engaged	Overhung	100	#24	Yes
38	Offset	Pre-Engaged	Overhung	100	#24	Yes
38	Offset	Pre-Engaged	Overhung	100	#24	Yes

Air Consumption at Max hp, scfs	Gear Case	Drive Type	Pinion Type	Recom'd Tank Size, gal	Recom'd Hose Size	Gas Sealed
13	In-Line	Pre-Engaged	Overhung	60	#16 or #20	No
20	Offset	Inertia/Pre-Engaged	Caged/Overhung	100	#20 or #24	Yes
22	Offset	Inertia/Pre-Engaged	Caged/Overhung	100	#20 or #24	Yes
20	Offset	Pre-Engaged	Overhung	100	#20 or #24	Yes
22	Offset	Pre-Engaged	Overhung	100	#20 or #24	Yes

Air Consumption at Max hp, scfs	Gear Case	Drive Type	Pinion Type	Recom'd Tank Size, gal	Recom'd Hose Size	Gas Sealed
20	Offset	Inertia/Pre-Engaged	Caged/Overhung	100	#20 or #24	Yes
22	Offset	Inertia/Pre-Engaged	Caged/Overhung	100	#20 or #24	Yes
20	Offset	Pre-Engaged	Overhung	100	#20 or #24	Yes
22	Offset	Pre-Engaged	Overhung	100	#20 or #24	Yes
20	Offset	Pre-Engaged	Overhung	100	#20 or #24	Yes
22	Offset	Pre-Engaged	Overhung	100	#20 or #24	Yes

### Pre-Engaged Versus Inertia Starters

There are two basic types of Air Starters, pre-engaged starters, the drive pinion is completely engaged with the engine ring gear before the starter begins to crank the engine. With an inertia starter, the rotating drive pinion engages the engine ring gear simultaneously with the initial cranking of the engine.

***Vane 3BMG (Air or Gas)***

Pages 6-7

***Vane 5BMG (Air or Gas)***

Pages 8-9

***Vane 150BMG (Air or Gas)***

Pages 10-11

***Vane 150BMP (Air)***

Pages 12-13

***Vane 150BMPD (Air)***

Pages 14-15

***Vane SS175 (Air or Gas)***

Pages 16-17

***Vane SS350 (Air or Gas)***

Pages 18-19

***New!***

***Turbine ST400I (Air Only)***

Pages 20-23

Great for small engines up to 5 liters displacement. Common applications include: on-highway, stationary, marine and genset.

For engine displacement of 8.2 liters, Fit most popular engine, domestic and European. Applications same as above.

For Engine displacement of 600-1700 CID (10-27 liters).  
Inertia Drive, Gas Sealed Starters.

**#1 Starter in oil and gas industry.**

Excellent for truck, bus and marine applications.  
Pre-engaged starter increases pinion and ring gear life.

**For engines (10-20 liters)**

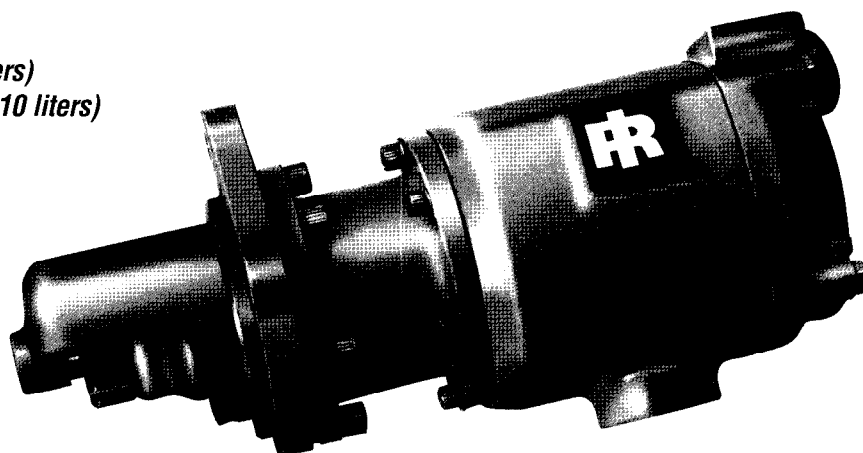
For engines (15-32 liters)  
Ideal for marine and genset applications  
**Pre-engaged drive, Inline design.**

For engines (3-8 liters)  
Overhung pinion design makes this starter ideal for European engines.  
**SAE1 and SAE3 mounting flange available, "Patented" pre-engaged drive.**

For engines (10-27 liters)  
Overhung pinion design makes this starter ideal for European engines.  
**SAE1 and SAE3 mounting flange available, "Patented" pre-engaged drive.**

For engines (6-20 liters), Multiple mounting flanges available.  
Quiet; no muffler required. Lube free, one hose hook up.  
**"Patented" pre-engaged mechanism extends ring and pinion life.**

For engine displacement of:  
**Diesel—up to 300 CID (5 liters)**  
**Carbureted—up to 600 CID (10 liters)**



### Features/Benefits

Inertia drive, Compact, lightweight design, 9" length from Flange  
 Weighs only 18 lbs.  
 8.4hp available/fast reliable starts  
 Assured cranking in adverse temperature conditions  
 High torque motor/40 ft.lb. cap

### Versatile

Air or gas applications  
 Infinite mounting positions  
 Fits virtually all small engines  
 Specials available upon request

### Service

Automatic lubricators provide maintenance free operation.  
 Tune-up Kits available to support your operation.  
 1 Year Warranty

### Literature

Form P5846 Maintenance & Installation manual

### Starter Available

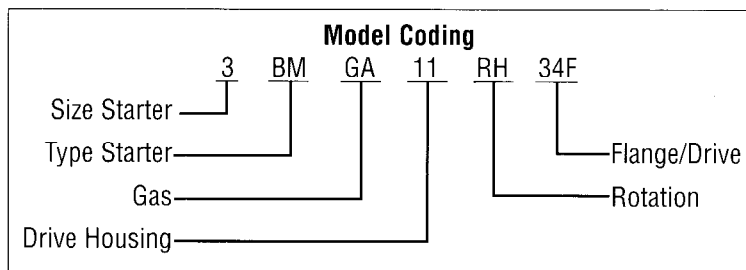
- 3BMGA11RH-12F (1)
- 3BMGA11RH-1F (2)
- 3BMGA11RH-34F (3)
- 3BMGA11RH-60F (4)
- 3BMGA11RH-61F (5)
- 3BMGA11RH-6F (6)
- 3BMGA20RH-34F (7)
- 3BMGA21RH22F-1725 (8)
- 3BMGR/VRSM-1358 (9)

### Genuine Parts & Accessories

Part No.	Description	Size
3BM-WM07	Muffler	1" NPT
HDL2	Lubricator	3/8" NPT
3BM-301-1	Flange	N/A
3BM-301-5	Flange	N/A
3BM-301-20	Flange	N/A
3BM-212-3/4	Spacer	N/A
3BM-TK2	Tune-up Kit	N/A

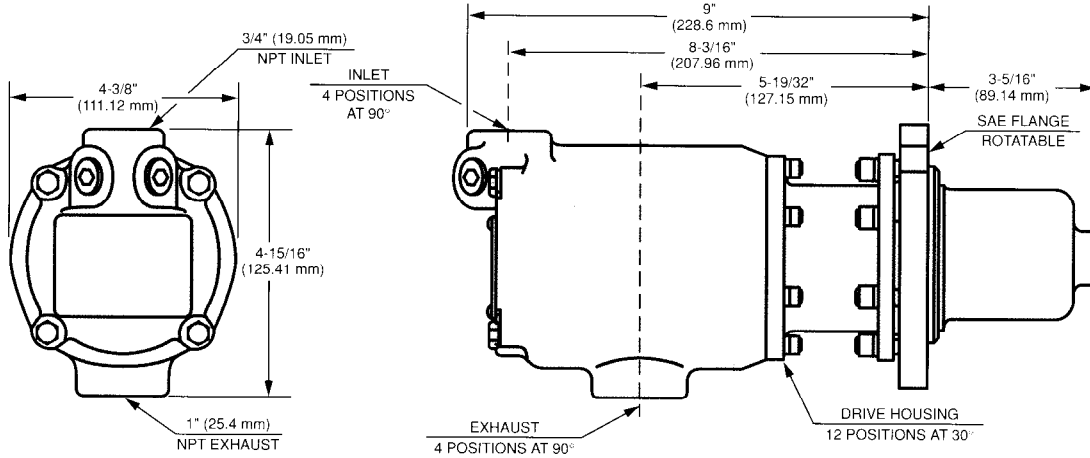
### Common Drive Available

Model	Part No.	Teeth	D.P./Mod.	P.A.	Rotation
(4)	3BM-299-071	10	10/12	20	R
(1, 2)	3BM-299-1	12	8/10	20	R
(3, 7)	3BM-299-3	10	8/10	20	R
(8)	3BM-299-12	9/10,48	12/14	12	R
(5)	3BM-299-85	11	3.5	15	R

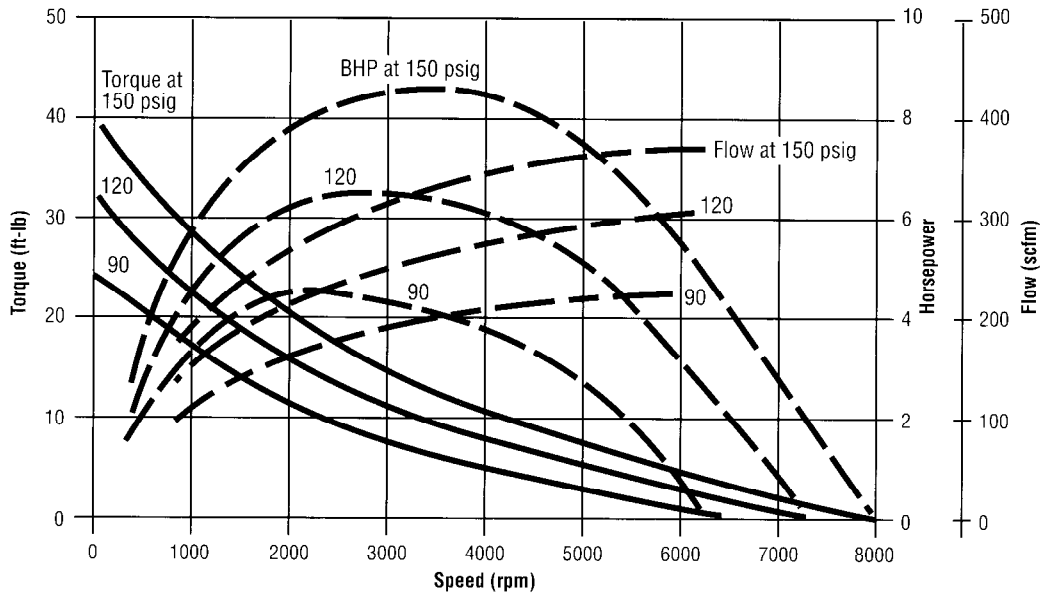




**Series 3BMG Dimensions**



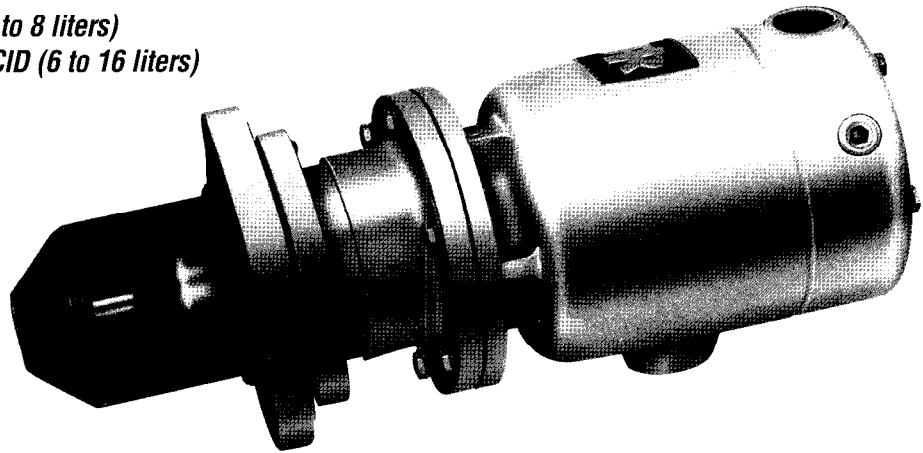
**Series 3BMG Performance Curves**



PSI	Torque @ maximum	Speed @ max hp	HP max	Flow @ max hp
90	24	2100	4.8	150
120	32	2500	6.7	220
150	40	3200	8.4	325

# ENGINE STARTING SYSTEMS Series 5BMG (Air or Gas) Starters

**For engine displacement of:**  
**Diesel—200 to 500 CID (3 to 8 liters)**  
**Carbureted—400 to 1000 CID (6 to 16 liters)**



### Features/Benefits

- Inertia drive
- Inline design 115/8" From flange
- Weighs only 35 lbs.
- 9.3hp available/fast reliable starts
- Assured cranking in adverse temperature conditions
- High torque motor/46 ft.lb. cap
- Fast reliable starts

### Versatile

- Air or gas applications
- Infinite mounting positions
- Fits a wide range of small and medium size engines
- Specials available upon request
- Inlet/Exhaust Independent Orientation

### Service

- SRV-Relay Valves provide reliable starting systems
- Tune-up Kits available to support your entire system—  
starters/valves/lubricators
- 1Year Warranty

### Literature

Form P5776 Maintenance & Installation manual

### Starter Available

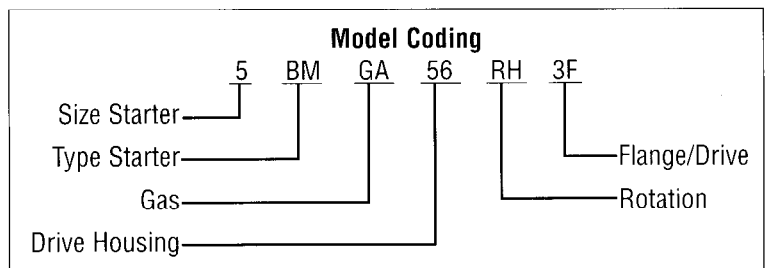
- 5BMGA53RH-1F (1)
- 5BMGA53RH-2F (2)
- 5BMGA56RH-3F (3)
- 5BMGA56RH-49F (4)
- 5BMGA56RH-5F (5)
- 5BMGA56RH5F-1546 (6) Special
- 5BMGA56RH-52F (7)

### Genuine Parts & Accessories

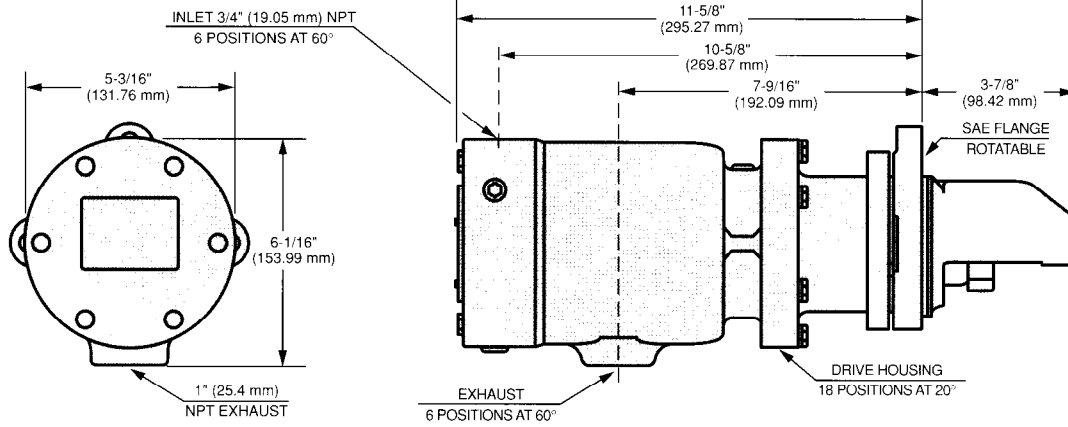
Part No.	Description	Size
3BM-WM07	Muffler	1" NPT
HDL2	Lubricator	3/8" NPT
5BMR-301-3	Flange	N/A
5BM-42-7	Vane pack	N/A
5BM-TK2	Tune-up Kit	N/A

### Common Drive Available

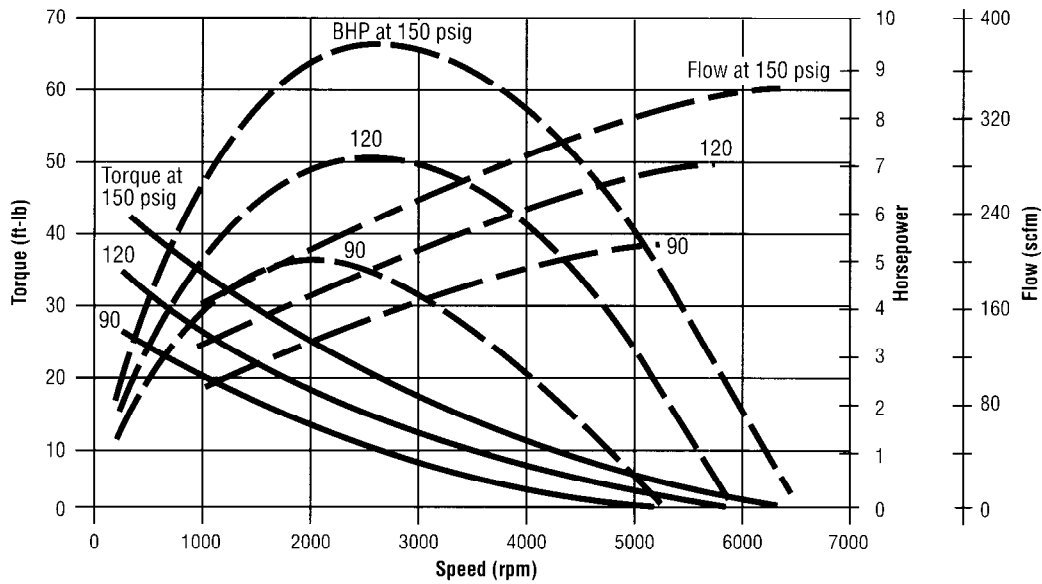
Model	Part No.	Teeth	D.P./Mod.	P.A.	Rotation
(2, 5, 6)	5BM-299-9	12	8/10	20	R
(4)	5BM-299-28	9/9.5	3	15	R
(1)	5BM-299-31	11	6/8	20	R
(3)	5BM-299-33	10	8/10	20	R



**Series 5BMG Dimensions**



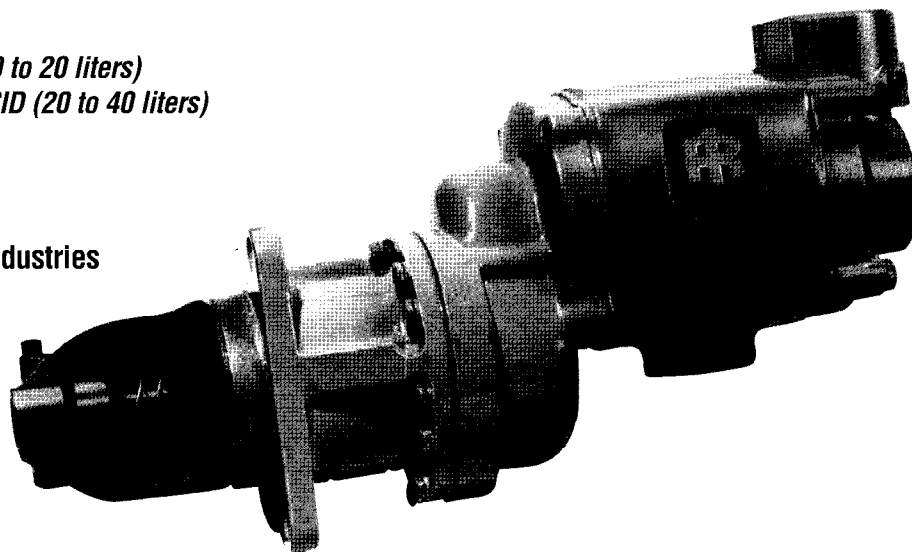
**Series 5BMG Performance Curves**



PSI	Torque	Speed	HP	Flow
	@ maximum	@ max hp	max	@ max hp
90	28	2200	5	165
120	36	2500	7.5	220
150	46	2800	9.5	310

**For engine displacement of:**  
**Diesel—600 to 1200 CID (10 to 20 liters)**  
**Carbureted—1200 to 2400 CID (20 to 40 liters)**

**#1 Starter in the oil and gas industries**



### Features/Benefits

Inertia drive  
 Offset design, 13 19/32" From mounting flange  
 Weighs only 38 lbs.  
 34hp available  
 High torque motor, E ratio: 155 ft.lb. capability  
 #1 Starter in the oil and gas industries.

### Versatile

Left and right hand rotation available.  
 288 mounting positions.  
 Fits all domestic (USA) engines,  
 70-150 psi operation

### Service

Automatic self-metering or inline lubricator provide maintenance free operation  
 Remanufactured Starter to support your operation.  
 1 Year Warranty

### Literature

Form P6031 Maintenance & Installation manual

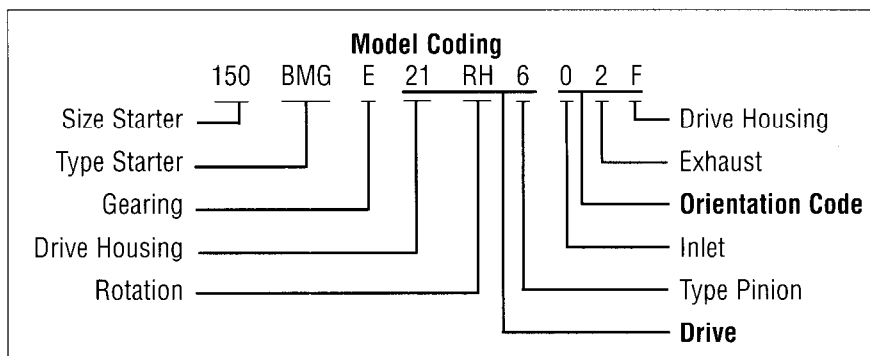
Typical Installation refer to page 51.

### Genuine Parts & Accessories

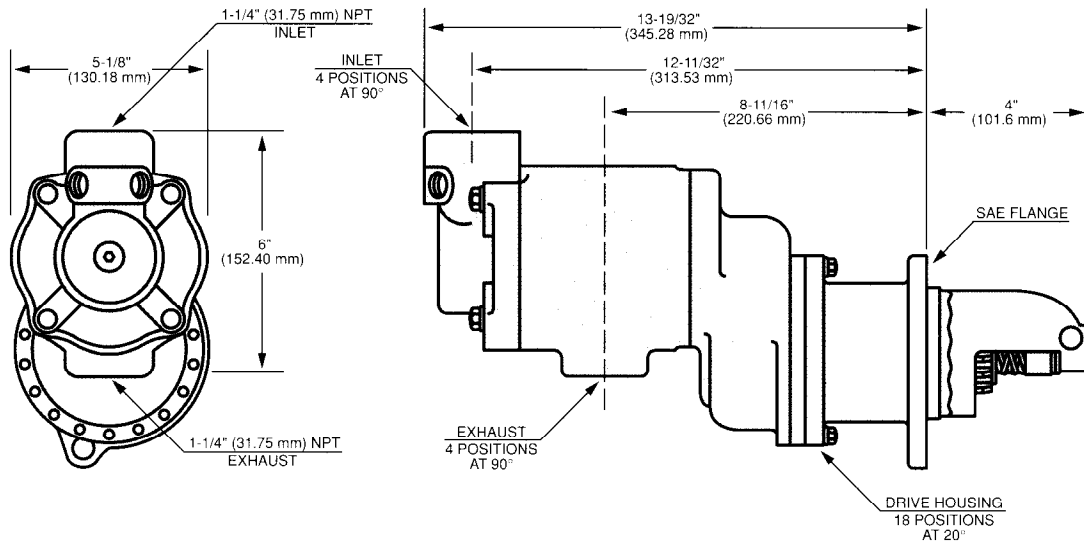
Part No.	Description	Size
150BM-A674	Muffler	1-1/4" NPT
150BM-A735	Splash def.	1-1/4" NPT
SRV 125	Relay Valve	1-1/4" NPT
HDL3	Lubricator	3/8" NPT
SMB-G618	Push Button	N/A
150BMP-1051	Solenoid	N/A
150BM-TK2	Tune-up Kits	N/A

### Common Drive Available

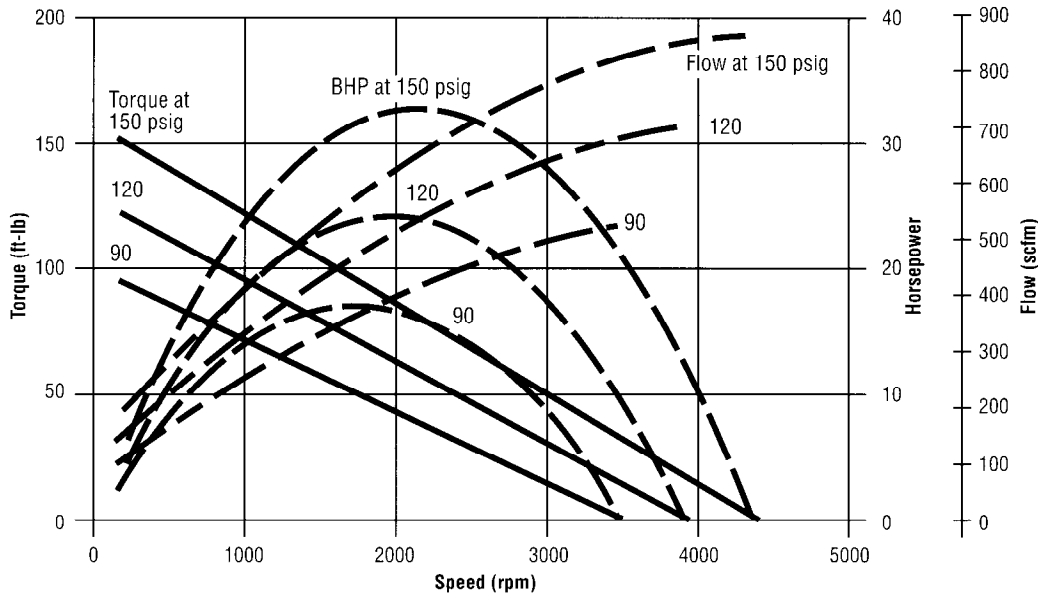
Model	Part No.	Teeth	D.P./Mod.	P.A.	Rotation
21LH11	10BM-299-19	11	6/8	20	L
21RH6	10BM-299-21	11	6/8	20	R
22RH5	10BM-299-22	12	8/10	20	R



**Series 150BMG Dimensions**

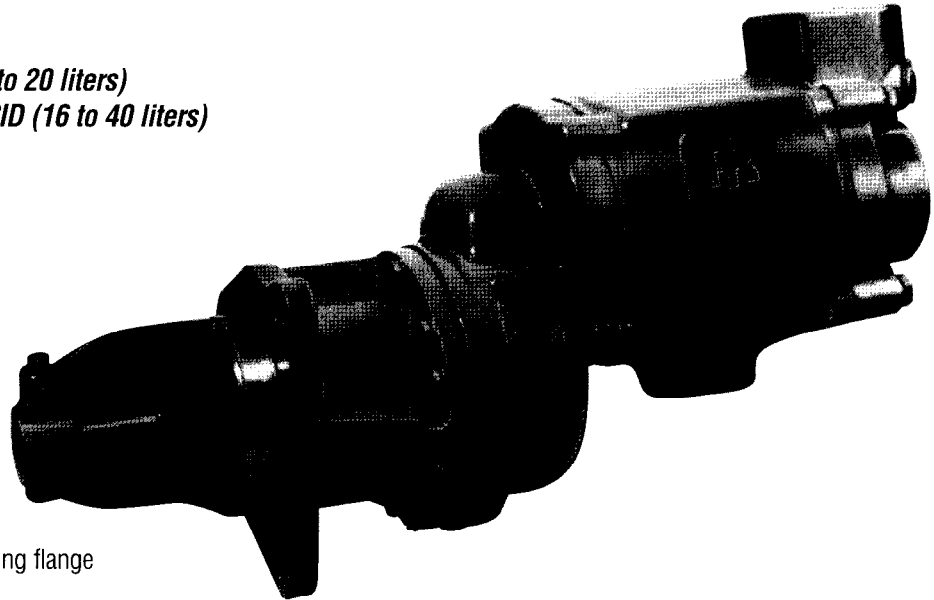


**Series 150BMG Performance Curves**



PSI	Torque @ maximum	Speed @ max hp	HP max	Flow @ max hp
90	100	1800	18	320
120	125	1900	24	500
150	155	2200	34	650

For engine displacement of:  
**Diesel—500 to 1200 CID (8 to 20 liters)**  
**Carbureted—1000 to 2400 CID (16 to 40 liters)**



### Features/Benefits

- Pre-engaged drive.
- Offset design, 13 19/32" From mounting flange
- Weighs only 40 lbs.
- 34hp available
- High torque motor, E ratio: 155 ft.lb. capability
- #1 Starter in the oil and gas industries.

### Versatile

- Left and right hand rotation available.
- 288 mounting positions.
- Fits all domestic (USA) engines,
- 70-150 psi operation

### Service

- Automatic self-metering or inline lubricator provide maintenance free operation.
- Air over electric solenoids provide quick engagement, disengagement.
- Remanufactured Starter to support your operation.
- 1 Year Warranty

### Literature

Form P6628 Maintenance & Installation manual

Typical Installation refer to page 50.

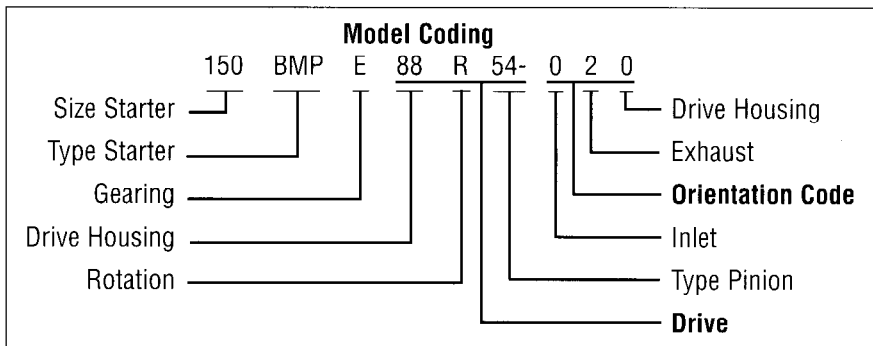
### Genuine Parts & Accessories

Part No.	Description	Size
150BM-A674	Muffler	1-1/4" NPT
150BM-A735	Splash def.	1-1/4" NPT
SRV 125	Relay Valve	1-1/4" NPT
HDL3	Lubricator	3/8" NPT
SMB-618	Push Button	N/A
150BMP-1051	Solenoid	N/A

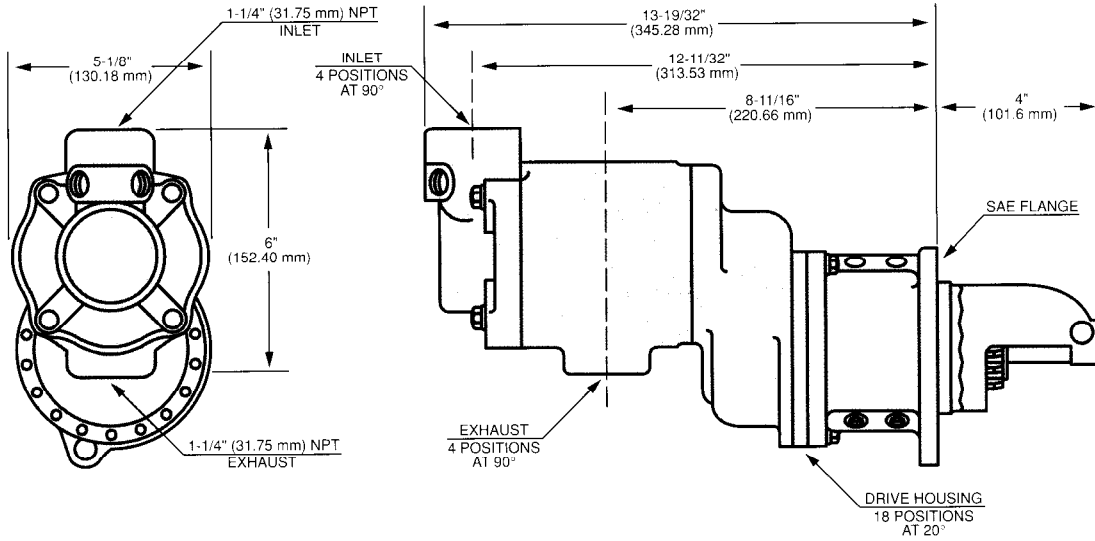
### Common Drive Available

Model	Part No.	Teeth	D.P./Mod.	Rotation
88R54	101BMP-299-1	11/12	6/8	R
88L54	101BMP-299-2	11/12	6/8	L

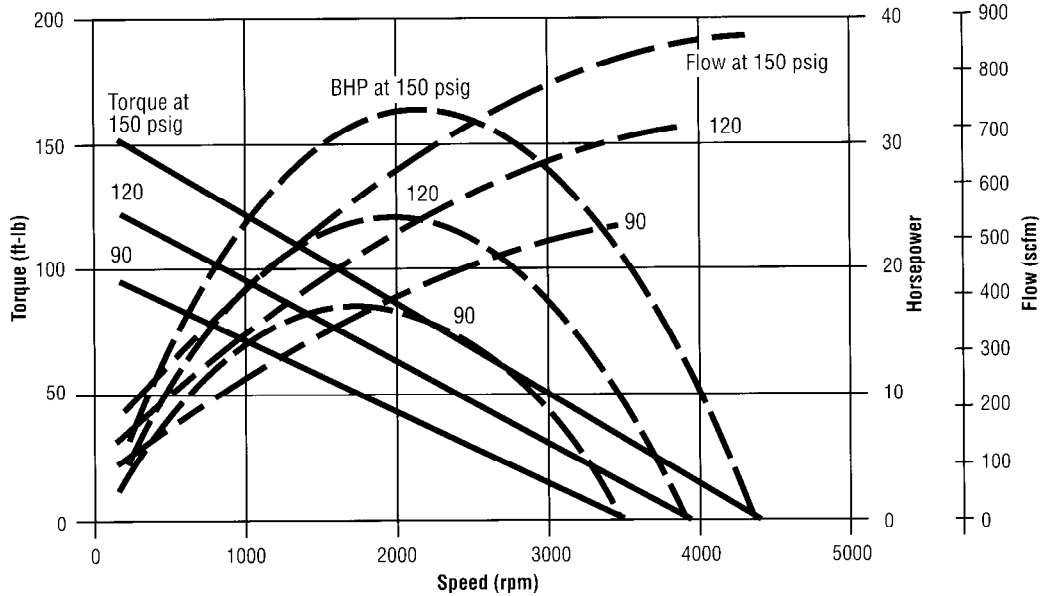
I-R Offers other drives to fit your needs.



**Series 150BMP Dimensions**



**Series 150BMP Performance Curves**

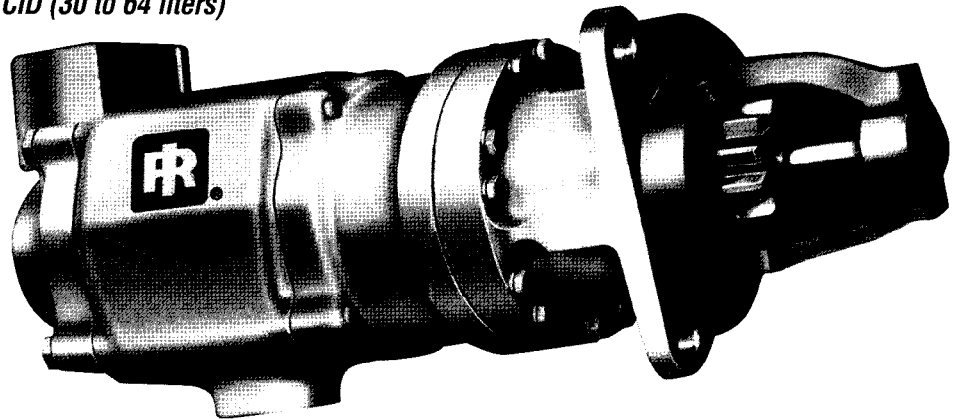


PSI	Torque @ maximum	Speed @ max hp	HP max	Flow @ max hp
90	100	2200	18	350
120	125	2700	25	520
150	155	2800	32	680

*For engine displacement of:*

*Diesel—900 to 2000 CID (15 to 32 liters)*

*Carbureted—1800 to 4000 CID (30 to 64 liters)*



**Features/Benefits**

Pre-engaged drive.  
 Inline design, 14-3/32" From mounting flange  
 Weighs only 40 lbs., 34hp available  
 High torque motor, D ratio: 185 ft.lb. capability  
 Often used in pairs to distribute torque load on ring gear and increase starting performance.

**Versatile**

Left and right hand rotation available.  
 288 mounting positions.  
 Ideal marine industry starter.

**Service**

Automatic self-metering or inline lubricator  
 Available from major engine manufacturers as original equipment or aftermarket.  
 Remanufactured Starter to support your operation.  
 1 Year Warranty

**Literature**

Form P6033 Maintenance & Installation manual

**Genuine Parts & Accessories**

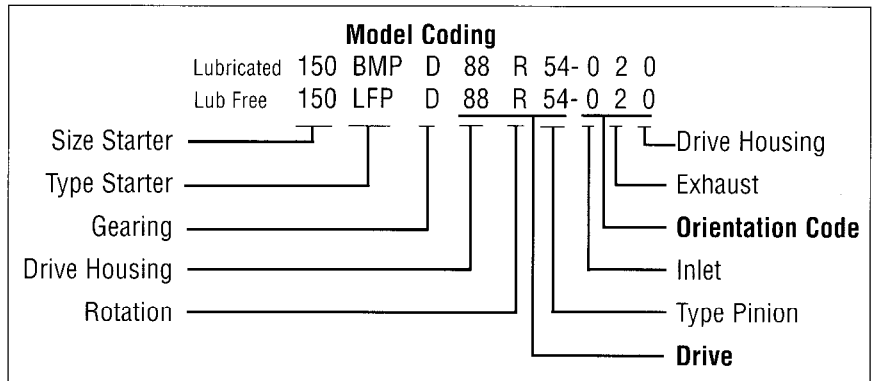
Part No.	Description	Size
150BM-A674	Muffler	1-1/4" NPT
150BM-A735	Splash def.	1-1/4" NPT
SRV 125	Relay Valve	1-1/4" NPT
HDL3	Lubricator	3/8" NPT
150BMD-TK1	Tune-up Kit	N/A

**Common Drive Available**

Model	Part No.	Teeth	D.P./Mod.	Rotation
88R54	101BMP-299-1	11/12	6/8	R
88L54	101BMP-299-2	11/12	6/8	L

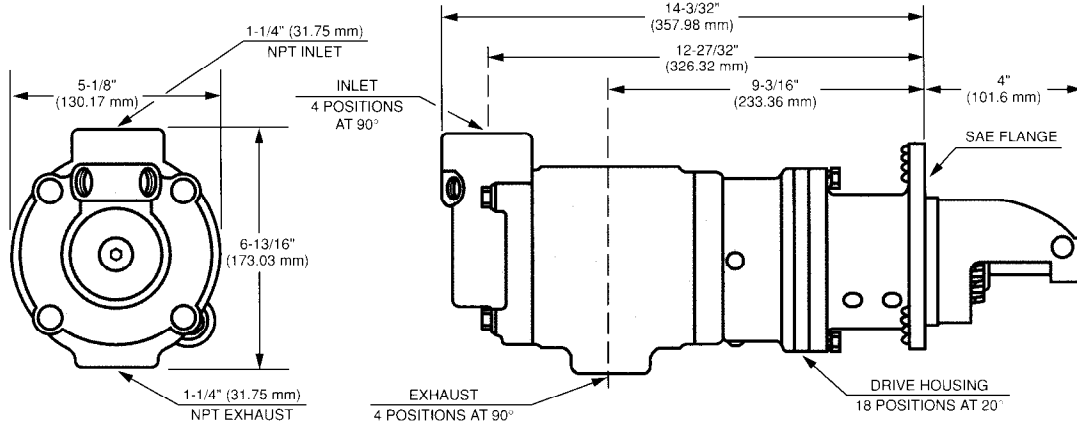
**ORIENTATION OPTIONS**

INLET	EXHAUST	DRIVE HOUSING
4 • 90°	4 • 90°	18 • 20°

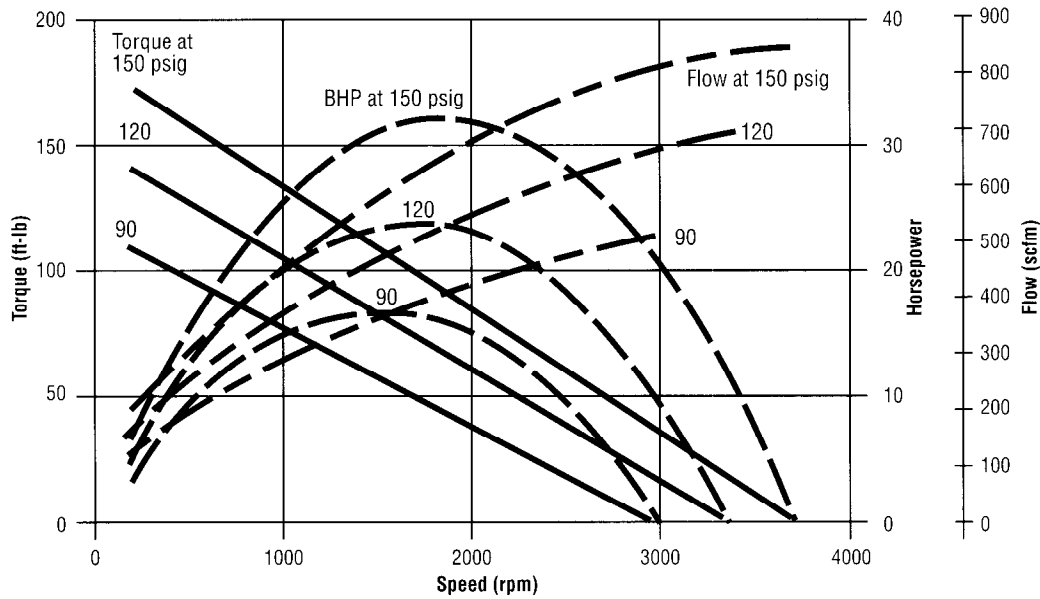




**Series 150BMPD Dimensions**



**Series 150BMPD Performance Curves**

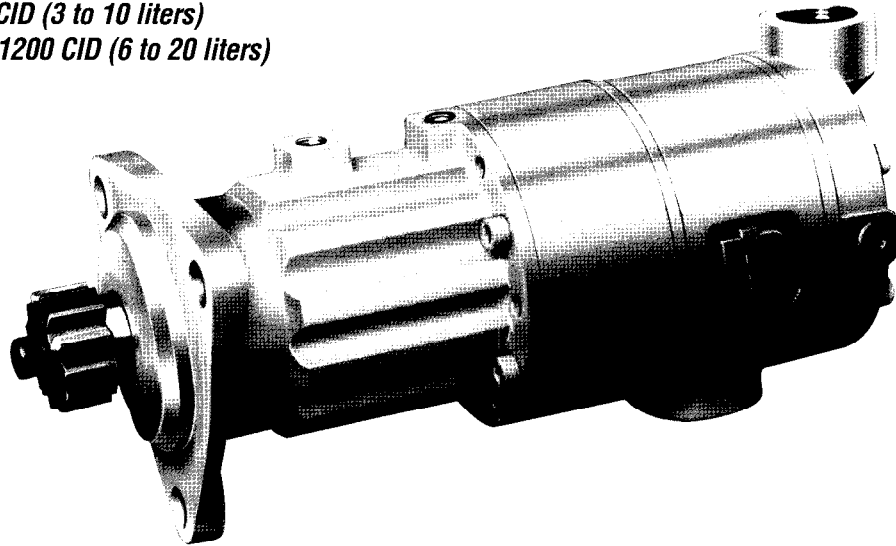


PSI	Torque @ maximum	Speed @ max hp	HP max	Flow @ max hp
90	110	1500	18	390
120	140	1700	24	520
150	185	1900	34	725

*For engine displacement of:*

*Diesel—200 to 600 CID (3 to 10 liters)*

*Carbureted—400 to 1200 CID (6 to 20 liters)*



**Features/Benefits**

- Pre-engaged drive
- Inline design
- 12-3/16" from mounting flange
- Weighs only 29 lbs.
- 18.5 hp available
- High torque motor
- E ratio: 71 ft-lb capability
- Pre-engaged feature extends ring gear and pinion life
- SAE1 and SAE3 mounting flanges available

**Versatile**

- Left and right hand rotation available
- 176 mounting positions
- Overhung pinion design makes this starter ideal for European engine manufacturers
- Fits most worldwide manufacturers' engines

**Service**

- Worldwide service available on completes, accessories
- 1 Year Warranty

**Literature**

Form P6633 Maintenance & Installation manual

Typical Installation refer to page 50.

**Genuine Parts & Accessories**

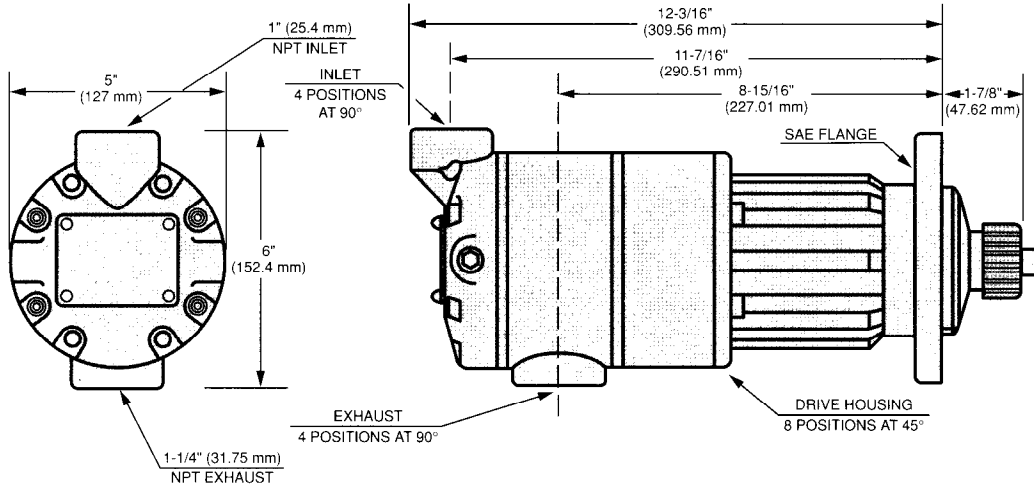
Part No.	Description	Size
150BM-A674	Muffler	1-1/4" NPT
SRV 100	Relay Valves	1" NPT
HDL2	Lubricator	3/8" NPT
SS175-TK2	Tune-up Kit	N/A

**Common Pinions Available**

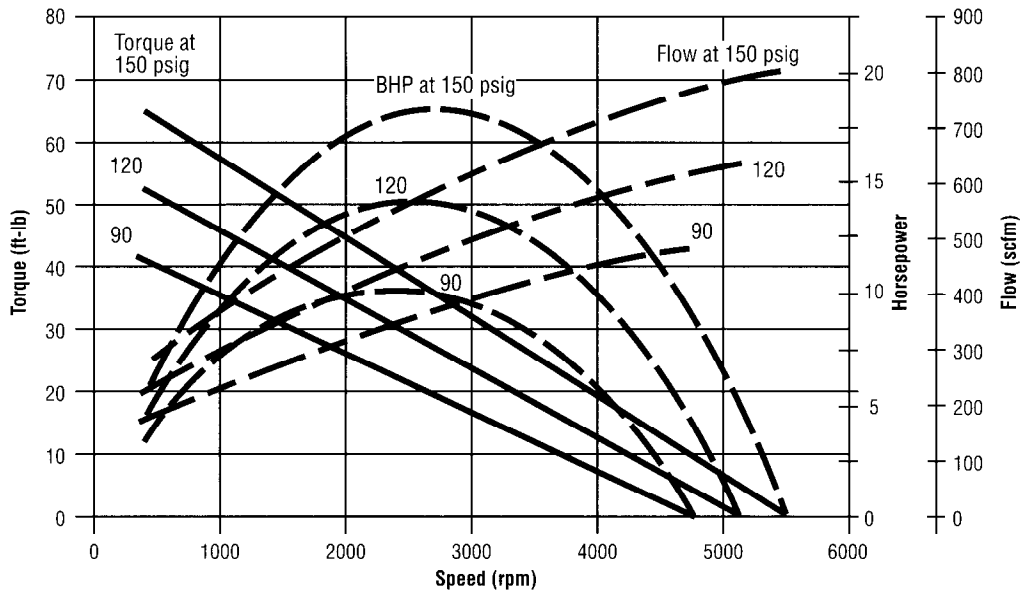
Part No.	Teeth	D.P./Mod.	P.A.	Rotation
ST400-13-15	10/11	8/10	20.0	R
ST400-13-77	9/9.7	3.0	15.0	R
ST400-13-29	12/13	8/10	20.0	R
SS350-13-99	12/13	8/10	15.0	R
4335055(.071)	10/11	10/12	20.0	R
ST400-13-31	12/12	6/8	20.0	R
ST400-13-32	12/12	6/8	20.0	L

SS175	G	E	03	R	85	XX	024
↑	↑	↑	↑	↑	↑	↑	↑
Size	Gas Sealed	Gear Ratio	SAE No. Mounting Flange	Rotation L or R	Pinion Coding	SR=Spark Resistant	Orientation
SS175		SS175	01=1				

**Series SS175G Dimensions**



**Series SS175G Performance Curves**

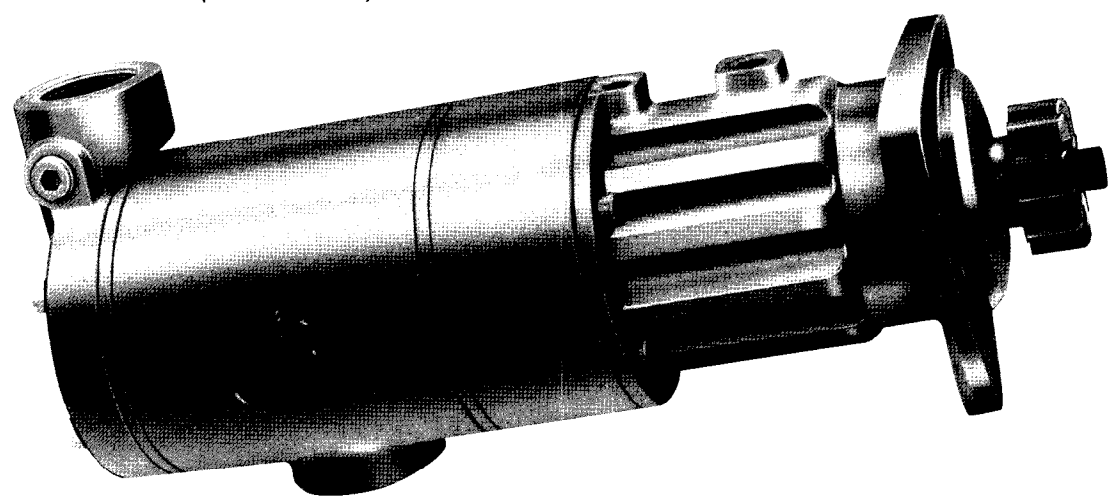


PSI	Torque @ maximum	Speed @ max hp	HP max	Flow @ max hp
90	40	2500	10	300
120	52	2700	14	400
150	71	2900	18	500

# ENGINE STARTING SYSTEMS

## Series SS350 (Air or Gas) Starters

**For engine displacement of:**  
*Diesel—500 to 1200 CID (8 to 20 liters)*  
*Carbureted—1000 to 2400 CID (16 to 40 liters)*



**Features/Benefits**

- Pre-engaged drive
- Inline design
- 14" Total length from mounting flange
- Weighs only 33 lbs.
- 35 hp available
- High torque motor
- E ratio: 160 ft-lb capability
- Built-in Slip Clutch Reduces Initial Torque and Extends Starter Life
- SAE1 and SAE3 mounting flanges available

**Versatile**

- Built and Designed to Operate on air or gas
- 176 mounting positions
- Overhung pinion design
- Compact, lightweight design makes installation easier

**Service**

Worldwide service available on completes, accessories  
 1 Year Warranty

**Literature**

Form P6633 Maintenance & Installation manual

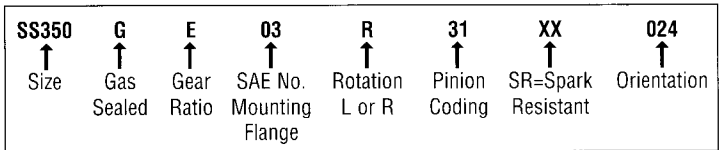
Typical Installation refer to page 50.

**Genuine Parts & Accessories**

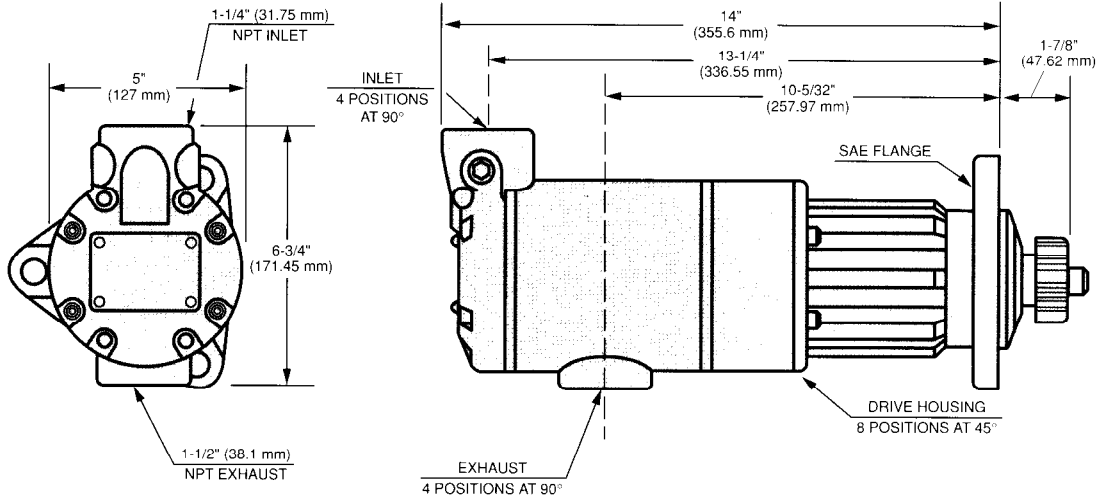
Part No.	Description	Size
SS350-A674	Muffler	1-1/2" NPT
SRV 125	Relay Valves	1-1/4" NPT
HDL2	Lubricator	3/8" NPT
SS350-TK2	Tune-up kit	N/A

**Common Pinions Available**

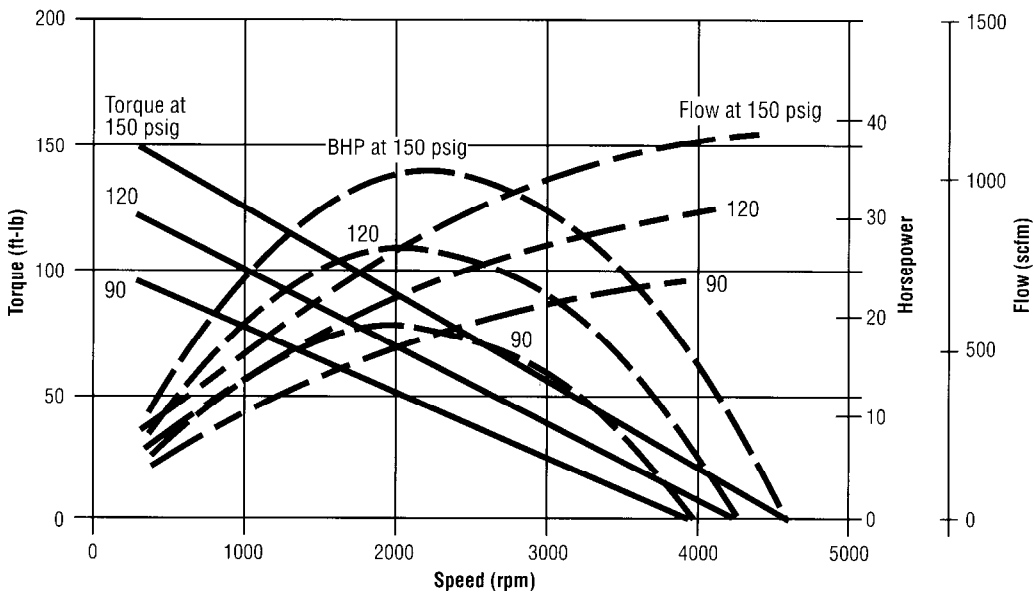
Part No.	Teeth	D.P./Mod.	P.A.	Rotation
ST400-13-31	12/12	6/8	20.0	R
ST400-13-77	9/9.7	3.0	15.0	R
ST400-13-29	12/13	8/10	20.0	R
SS350-13SR-99	12/13	8/10	15.0	R
SS400-13-32	12/12	6/8	20.0	L



**Series SS350G Dimensions**



**Series SS350G Performance Curves**



PSI	Torque @ maximum	Speed @ max hp	HP max	Flow @ max hp
90	100	2000	19	525
120	130	2200	27	750
150	160	2500	38	900

For engine displacement of:  
 Diesel — 260 to 13,000 CID (4 to 20 liters)

# New!



### Features/Benefits

- Pre-Engaged
- Inline design
- Radial Turbine
- Lube Free
- Weighs only 23 lbs. lightest starter in it's class
- One Hose Hookup
- Infinite Mounting Positions
- SAE1, SAE3 and Cradle mount flanges available
- Oil Bath Lubrication For Gears, Bearing and Seals

### Versatile

- No External Lubricator Required
- Environmentally Safe
- Compact, lightweight design makes installation easy
- Overhung pinion design makes this starter ideal for European engine manufacturers
- Fits most worldwide manufacturers' engines.

### Service

Worldwide service available on completes, accessories  
 1 YEAR. Warranty

### Literature

- Form P7061 Maintenance & Installation Manual
- Form 52499 Brochure

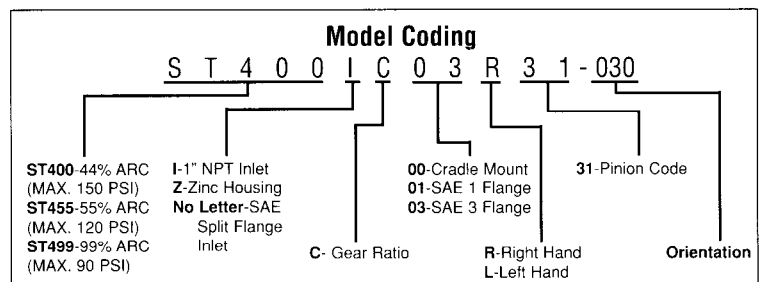
Typical Installation refer to page 53.  
 \* For use with Air only.

### Genuine Parts & Accessories

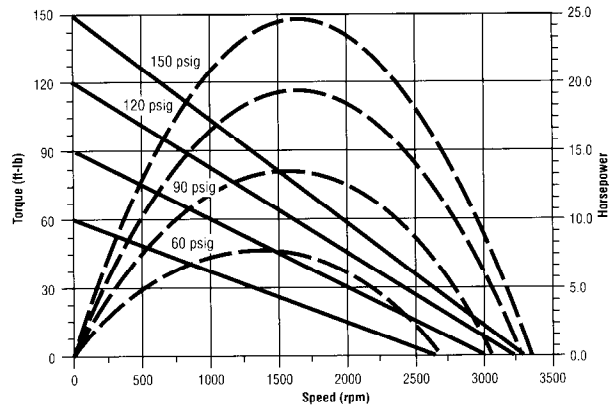
Part No.	Description	Size
ST400-B339	Electronic Relay Valve	N/A
ST400-K17	Inlet Flange Kit	1" NPT
ST400-A339M	Manual Relay Valve	N/A
ST900-267-16	1" Strainer	1" NPT
SRV 100	NPT Relay Valve	N/A

### Common Pinions Available

Part No.	Teeth	D.P./Mod.	P.A.	Rotation
ST400-13-31	12/12	6/8	20.0	R
ST400-13-77	9/9.7	3.0	15.0	R
ST400-13-29	12/13	8/10	20.0	R
ST400-13-32	12/12	6/8	20.0	L
ST400-13-85	11	11.7	15.0	R
ST400-13-15	11	11	20.0	R



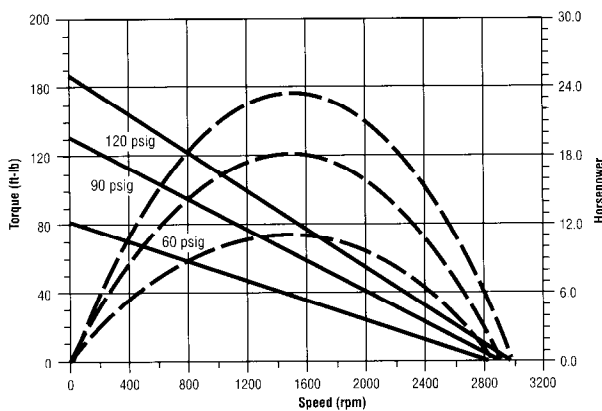
**Series ST400I Performance Curves**



**Performance Curves for ST400 Starters  
Max Pressure 150 PSI**

PSI	Torque @ maximum	Speed @ max hp	HP max	Flow @ max hp
90	90	1500	14	430
120	120	1650	19	600
150	150	1650	25	750

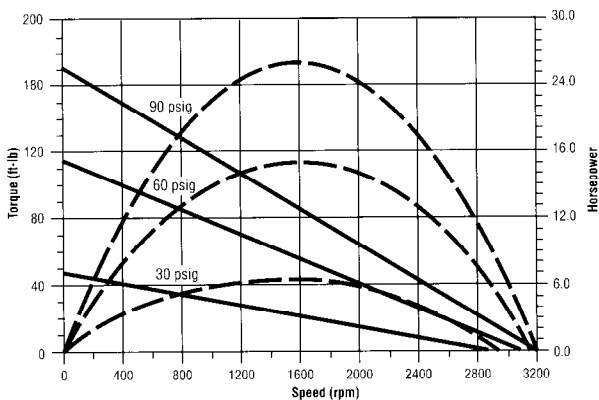
**Series ST455I Performance Curves**



**Performance Curves for ST455 Starters  
Max Pressure 120 PSI**

PSI	Torque @ maximum	Speed @ max hp	HP max	Flow @ max hp
60	80	1400	10	500
90	135	1450	18	650
120	185	1500	23	780

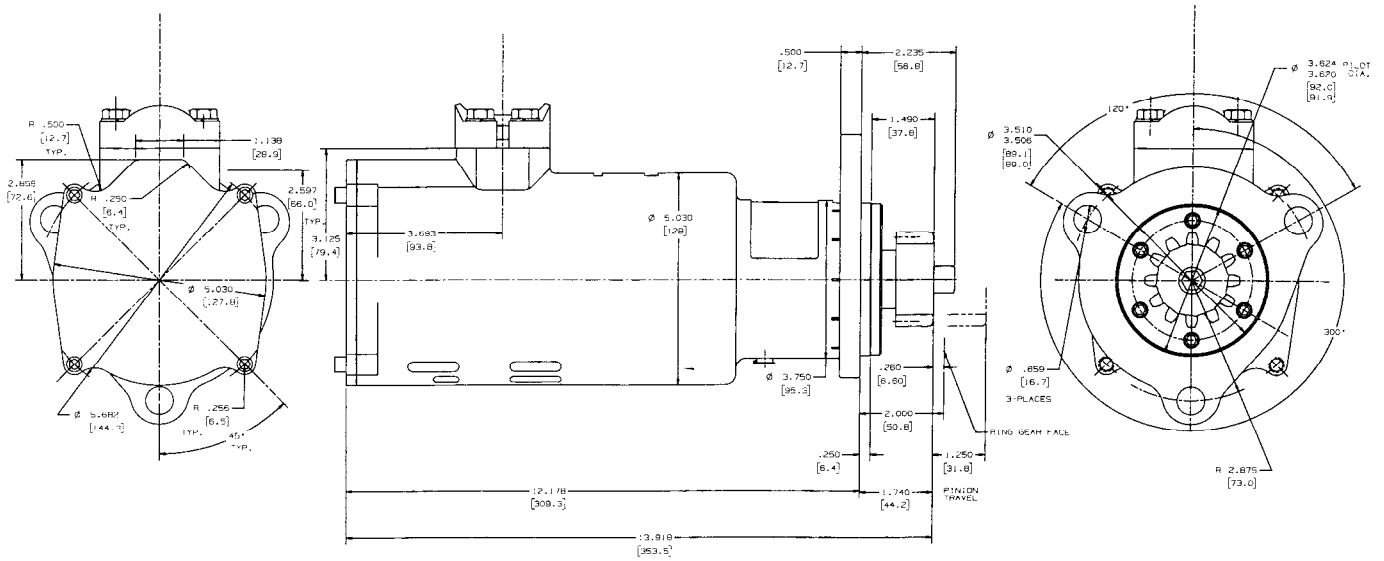
**Series ST499I Performance Curves**



**Performance Curves for ST499 Starters  
Max Pressure 90 PSI**

PSI	Torque @ maximum	Speed @ max hp	HP max	Flow @ max hp
30	50	1550	7	320
60	115	1600	14	550
90	185	1650	26	765

## Series ST400I Dimensions



## Series ST400-B339 Diaphragm Relay Valve

### Features/Benefits

- Diaphragm Type Valve
- O-Ring Flange Connection
- Powder Coated

### Versatile

- Increased reliability, help eliminate freeze-up.
- Less maintenance. Easy to troubleshoot.
- Eliminates air leak at valve.
- Easy installation and maintenance.
- Resists corrosion, durable.
- Electronic or air activated models.

### Literature

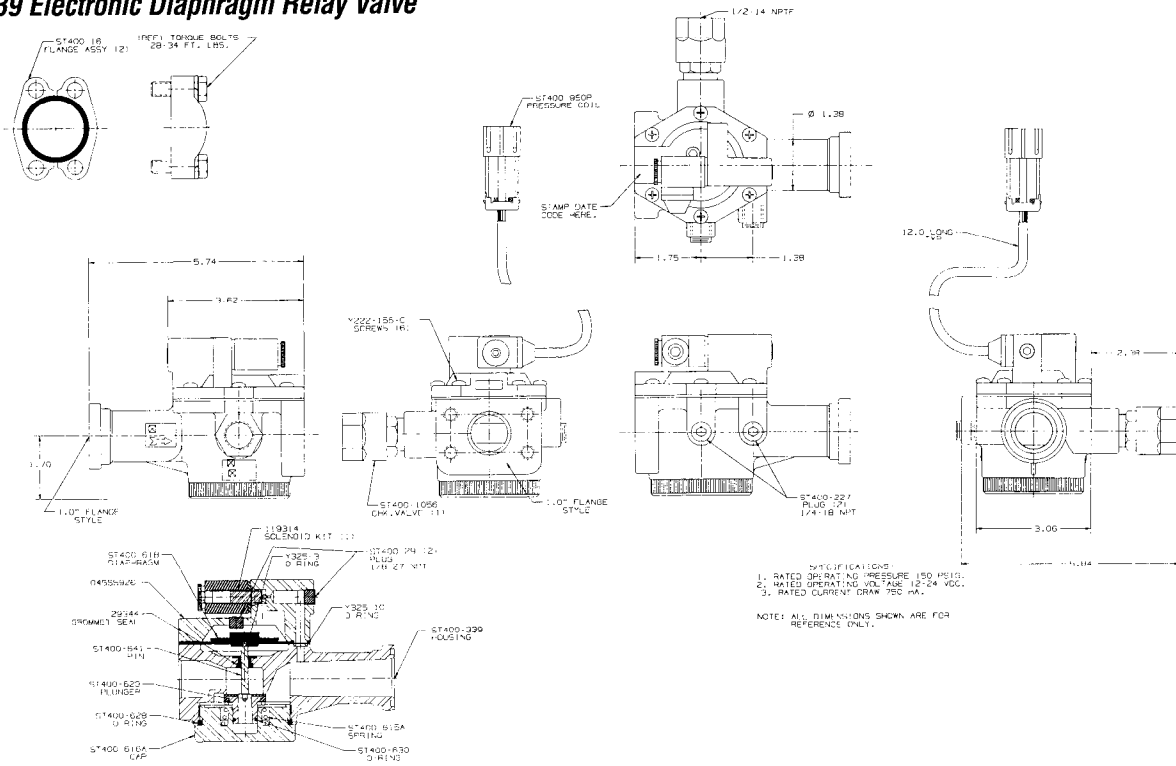
Form P7061 Maintenance & Installation Manual

### Genuine Parts & Accessories

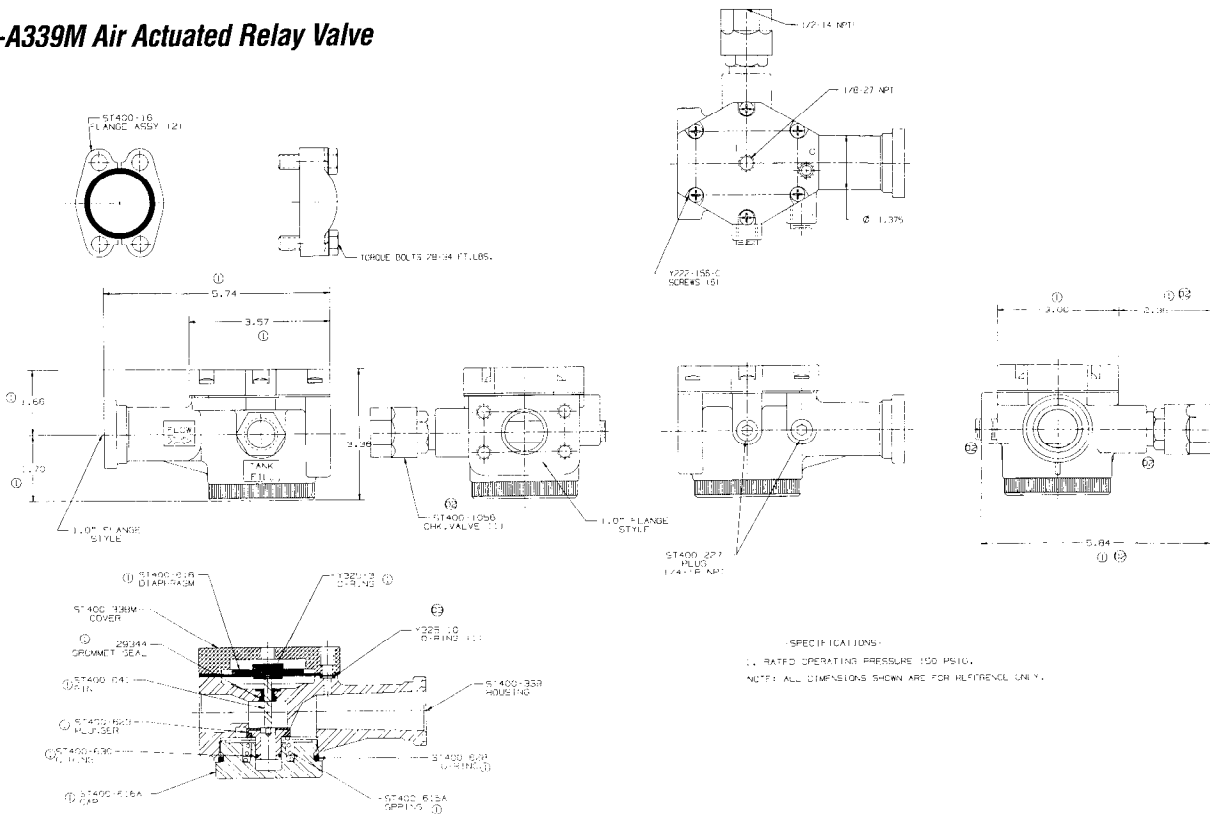
Part No.	Description
ST400-K619	Tune-up Kit



**ST400-B339 Electronic Diaphragm Relay Valve**



**ST400-A339M Air Actuated Relay Valve**



***Vane SS810 (Air or Gas)***

Pages 26-27

***Vane SS815G or SS825G (Air or Gas)***

Pages 28-29

***Vane SS850G (Air or Gas)***

Pages 30-31

***Turbine ST750GBDP OR ST799GBDP (Air or Gas)***

Pages 32-33

***Turbine ST750GCDP OR ST799GCDP (Air or Gas)***

Pages 34-35

***Turbine ST750GBI OR ST799GBI (Air or Gas)***

Pages 36-37

***Turbine ST950BP OR ST999BP (Air or Gas)***

Pages 38-39

***Turbine ST950BI OR ST999BI (Air or Gas)***

Pages 40-41

***Turbine ST950CP OR ST999CP (Air or Gas)***

Pages 42-43

***Turbine ST950DP OR ST999DP (Air or Gas)***

Pages 44-45

For engine displacement 16 to 130 liters. Inertia Drive/Offset gear case.

**Patented pre-engaged drive**, Over hung pinion. Off-highway, Oil, Gas and Marine application.

For engine displacement of 160 to 320 liters. Patented pre-engaged drive, **#1 choice of major engine manufacturers.**

For **diesel engine** displacement 16 to 130 liters. **Patented pre-engaged drive.** Genset, Off-highway, and Marine applications.

For **diesel engine** displacement 80 to 200 liters. No lubricants required in the air line. Low and high pressure models available. **Patented pre-engaged drive.**

Inertia drive. Single air line hook up.  
For **diesel engine** displacement 16 to 130 liters.

For **spark fired engine** displacement 32 to 260 liters. **Patented pre-engaged drive.** Low and high pressure models available. Engine barring port. All units.

For **spark fired engine** displacement 32 to 260 liters. Inertia drive. One hose hook-up.

For **spark fired engine** displacement 160 to 400 liters, **Patented pre-engaged drive.** All ST900 units specifically designed and tested for **spark fired engines.**

For **spark fired engine** displacement 320 to 640 liters, Engine barring port. No lubricants required in air line. Air or gas operation, Highest torque starter on the market in its class. **Patented pre-engaged drive.**

# ENGINE STARTING SYSTEMS

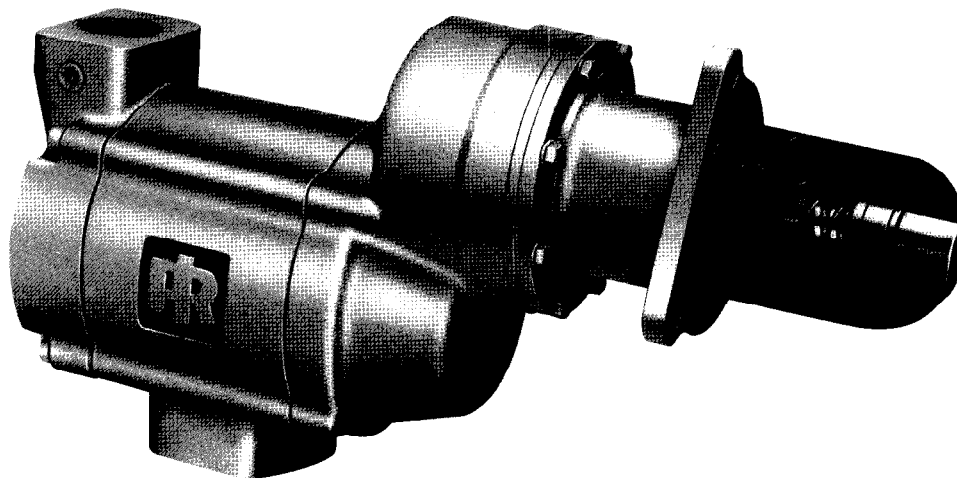
## Series SS810G (Air or Gas) Vane Starter

*Inertia Drive*

*For engine displacement of:*

*Diesel — 1000 to 8000 CID (16 to 130 liters)*

*Carbureted — 2000 to 16,000 CID (32 to 260 liters)*



### Features/Benefits

#### Inertia Drive

- Offset Design
- 15-13/16" Total length from Mounting Flange
- Weighs only 93 lbs.
- 80 hp Available
- High torque motor
- B ratio: 260 ft-lb. torque capacity
- Develops 80 hp on 150 psi

#### Versatile

- Air or gas applications
- Single air line hookup
- 256 different mounting positions

#### Service

- Available in remanufactured units
- Tune-up Kits for quick repair
- Distribution Network worldwide
- One year warranty

#### Literature

Form P6567 Maintenance & Installation manual

\*For Installations see page 51.

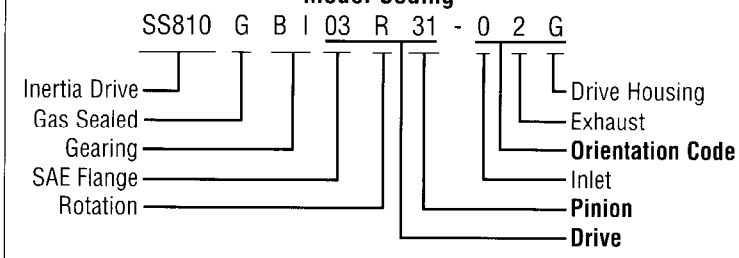
### Genuine Parts & Accessories

Part No.	Description	Size
SRV 150	Relay Valves	1-1/2" NPT
SS800-A674	Muffler	2-1/2" NPT
NL-24-8	Inline lubricators	1-1/2" NPT
SMB-G618	Control Valves	1/8" NPT
SS800-TK2	Tune-up Kit	N/A
HDL2	On shot lubricator	N/A

### Common Drive Available

Model	Part No.	Teeth	D.P./Mod.	P.A.	Rotation
31	20BM-299-1	12/12	6/8	20	R
32	20BM299-3	12/12	6/8	20	L

### Model Coding

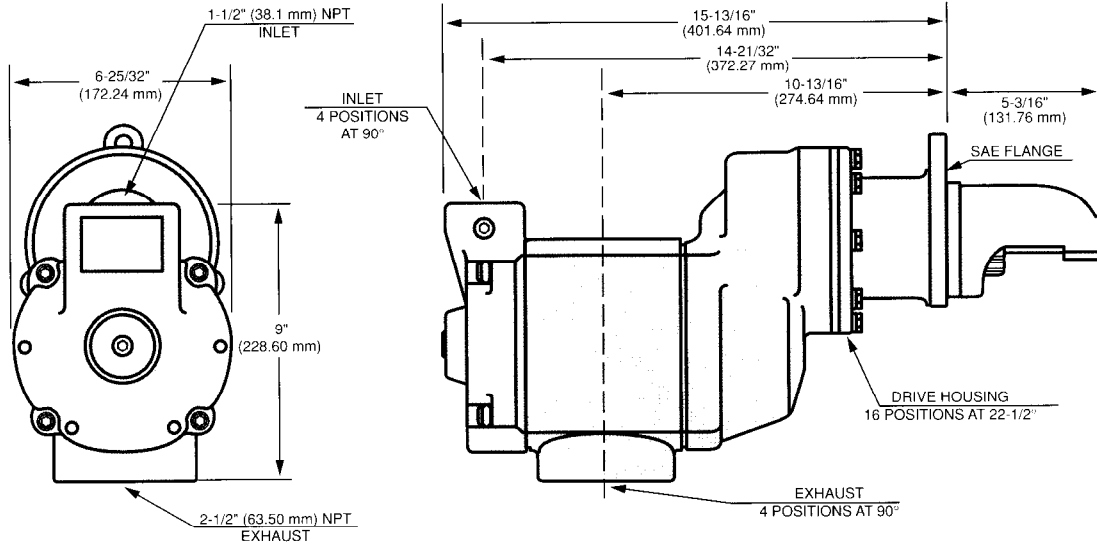


# Series SS810G (Air or Gas) Vane Starter

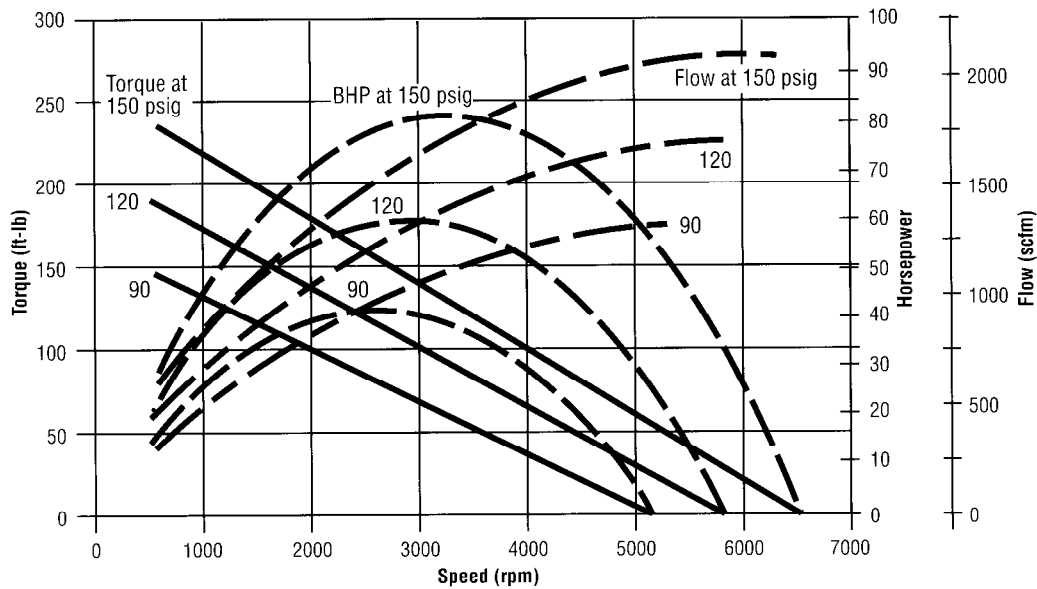
Inertia Drive

**INGERSOLL-RAND**

## Series SS810G Dimensions



## Series SS810G and SS815G Performance Curves



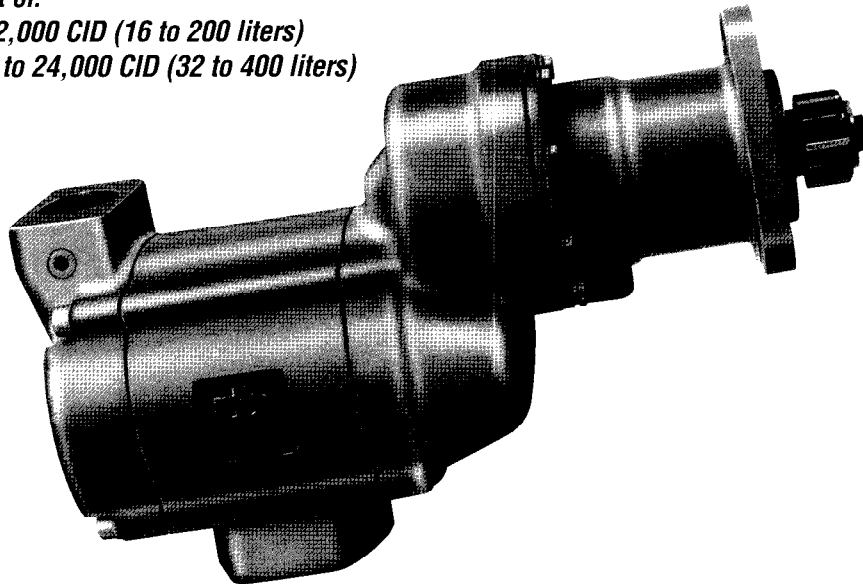
PSI	Torque @ maximum	Speed @ max hp	HP max	Flow @ max hp
90	140	2700	45	1100
120	190	2800	60	1250
150	260	3400	80	1700

Pre-Engaged

For engine displacement of:

Diesel — 1000 to 12,000 CID (16 to 200 liters)

Carbureted — 2000 to 24,000 CID (32 to 400 liters)



### Features/Benefits

- Pre-engaged drive
- Offset Design
- 17-23/32" From Mounting Flange
- Weighs only 93 and 95 lbs.
- 80 hp Available (SS15)
- 130 hp available (SS825)
- B ratio: 260 ft-lb. torque capability
- C ratio: 420 ft-lb. torque capability

### Versatile

- Air or gas applications
- High pressure capability
- 288 mounting positions
- Off-highway, oil and gas models
- Ideal for European engines

### Service

- #1 choice of major engine manufacturers
- Support supplied in aftermarket by all OEM's
- Worldwide Distributor Network
- Remanufactured models available
- One year warranty

### Literature

Form P6567 Maintenance & Installation manual

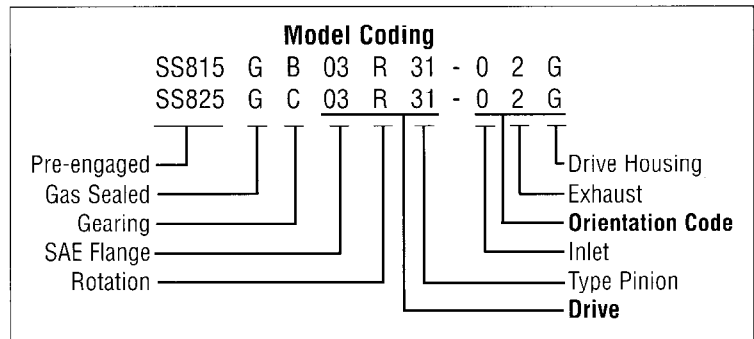
\*For Installations see page 52.

### Genuine Parts & Accessories

Part No.	Description	Size
SRV 150	Relay Valves	1-1/2" NPT
SS800-A674	Muffler	2-1/2" NPT
Inline NL-24-8	Lubricators	1-1/2" NPT
SMB-G618	Push Button Control	1/8" NPT
SS800-TK2	Tune-up Kit	N/A
HDL2	One shot lubricators	N/A

### Common Pinions Available

Part No.	Teeth	D.P./Mod.	P.A.	Rotation
SS815R-13-31	12/12	6/8	20	R
SS815L-13-32	12/12	6/8	20	L
SS825R-13-25	11/12	6/8	20	R
SS825L-13-26	11/12	6/8	20	L

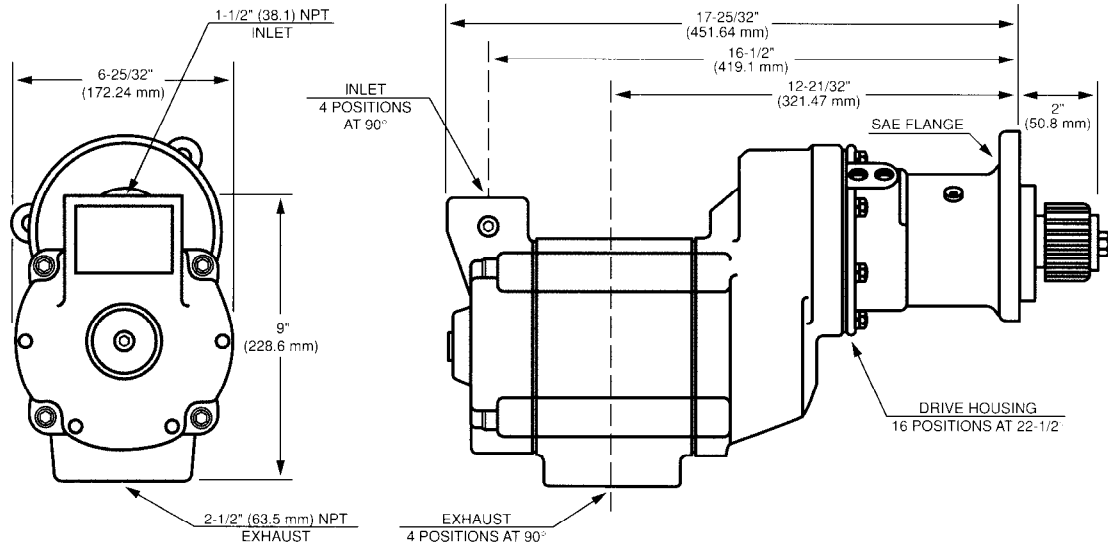


# Series SS815G, SS825G (Air or Gas) Vane Starters

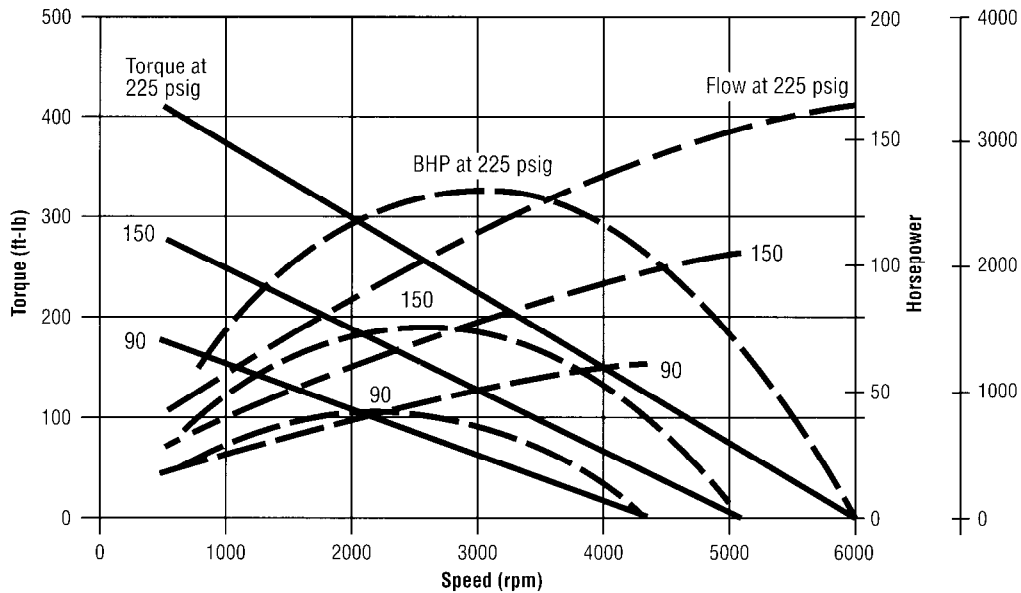
# INGERSOLL-RAND

Pre-Engaged

## Series SS815G and SS825G Dimensions



## Series SS825G Performance Curves



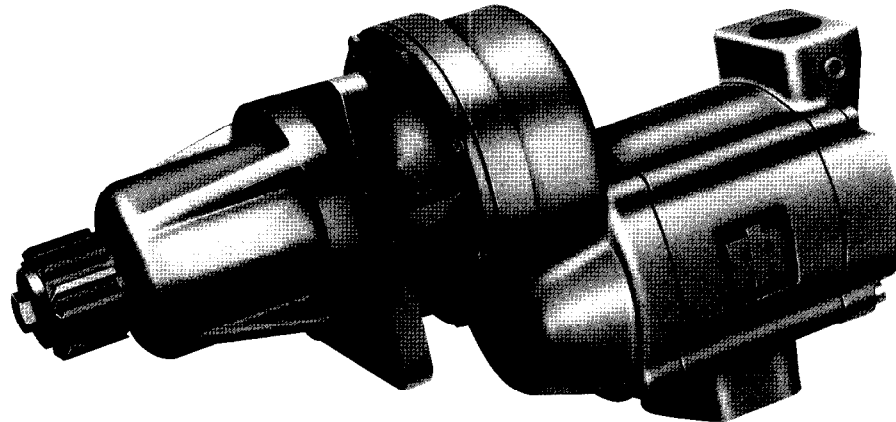
PSI	Torque @ maximum	Speed @ max hp	HP max	Flow @ max hp
90	200	2300	45	900
150	300	2700	75	1500
225	420	3100	130	2300

Pre-Engaged

For engine displacement of:

Diesel — 1000 to 20,000 CID (160 to 320 liters)

Carbureted — 2000 to 40,000 CID (320 to 640 liters)



### Features/Benefits

- Pre-engaged drive
- Offset Design
- 15-1/2" Total length from Mounting Flange
- Weighs only 123 lbs.
- 130 hp available
- High torque motor
- D ratio: 600 ft-lb. torque capability

### Versatile

- Air or gas applications
- 225 psi pressure capability
- 288 mounting positions
- Left and right hand models

### Service

- Worldwide distributor service network
- One year warranty

### Literature

Form P6567 Maintenance & Installation manual

\*For Installations see page 52.

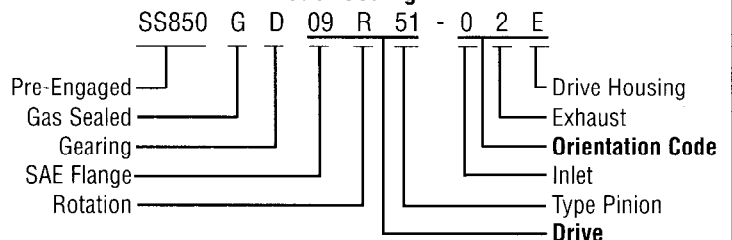
### Genuine Parts & Accessories

Part No.	Description	Size
SRV 150	Relay Valves	1-1/2" NPT
SS800-A674	Muffler	2-1/2" NPT
NL-24-8	Inline Lubricators	1-1/2" NPT
SMB-G618	Control Valves	1/8" NPT
SS850-TK2	Tune-up Kit	N/A
HDL2	One shot lubricators	N/A

### Common Pinions Available

Part No.	Teeth	D.P./Mod.	P.A.	Rotation
SS850R-13-51	15/15	6/8	20	R
SS850L-13-52	15/15	6/8	20	L

### Model Coding



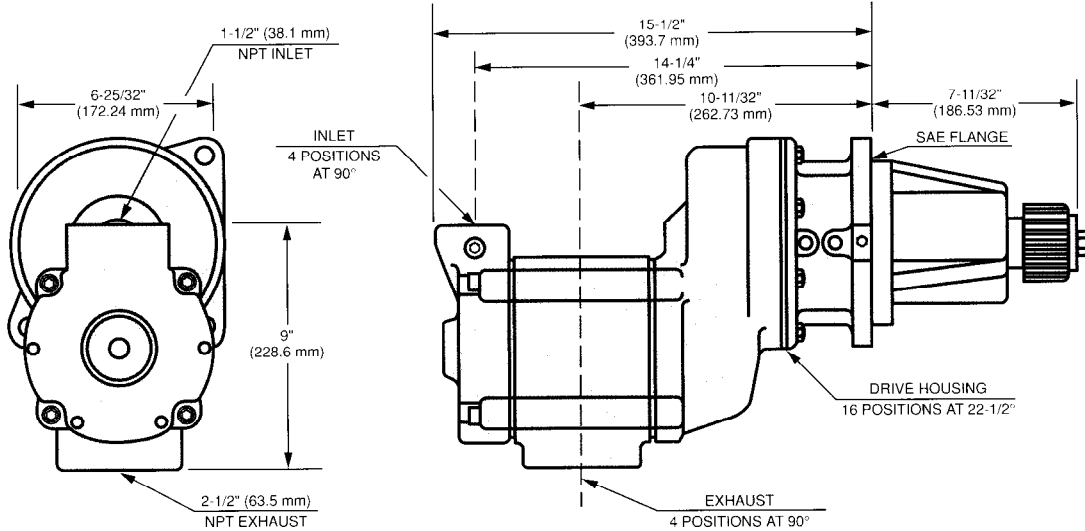


# Series SS850G (Air or Gas) Vane Starters

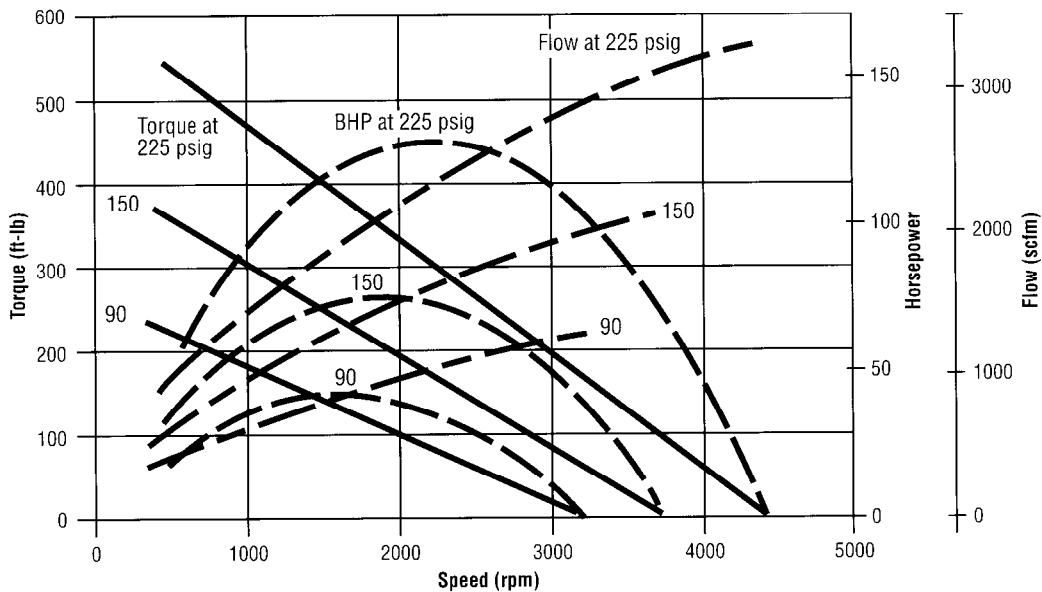
**INGERSOLL-RAND**

Pre-Engaged

## Series SS850G Dimensions



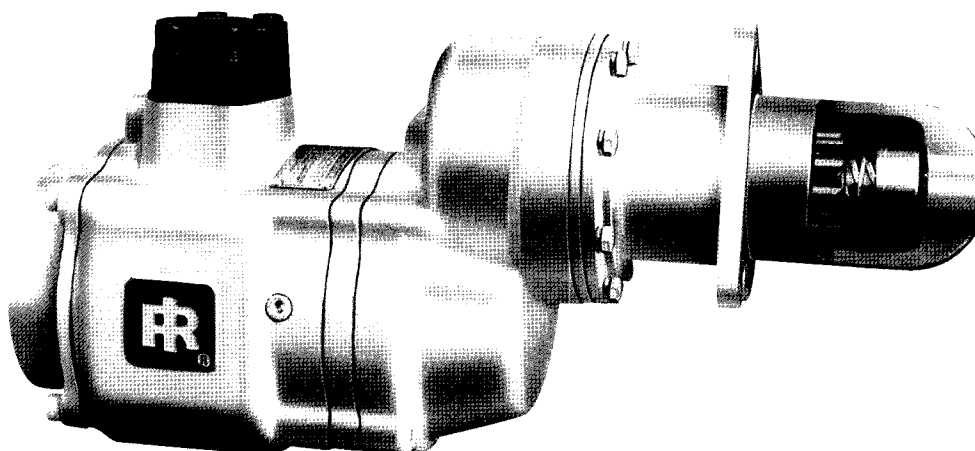
## Series SS850G Performance Curves



PSI	Torque	Speed	HP	Flow
	@ maximum	@ max hp	max	@ max hp
90	250	1700	48	800
150	425	1900	75	1400
225	600	2400	130	1800

### Inertia Drive

For engine displacement of:  
 Diesel — 1000 to 8000 CID (16 to 130 liters)



#### Features/Benefits

- Inertia drive
- Offset Design
- 17-13/32" Total length From Mounting Flange
- Weighs only 62 lbs.
- No external lubricants required
- 30-150 psi operating pressure
- Two stage/radial turbine motor
- No muffler required

#### Versatile

- Air or gas applications
- 64 different mounting positions
- Single air line hook-up
- Engine barring port
- Modular motor packs available to convert vane starter to turbine

#### Service

- Worldwide sales and service
- Remanufactured models available
- One year warranty
- Tune-up Kits Available

#### Literature

Form P6921 Maintenance & Installation manual

\*For Installations see page 52.

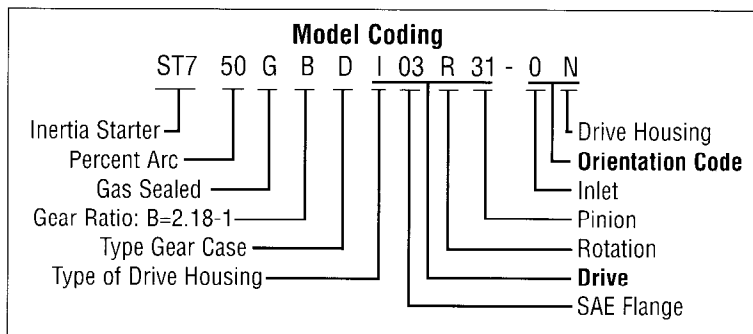
#### Genuine Parts & Accessories

Part No.	Description	Size
SRV 150	Relay Valves	1-1/2" NPT
SMB-G618	Push Button Control	1/8" NPT
ST700-TK1	Tune-up Kit*	N/A
ST900-267-24	Air Strainer	1-1/2" NPT
ST900-267-64	Air Strainer	4" Flange
ST700K-350	Elbow Exhaust Kit	3" Flange

\*(Refer to accessory section)

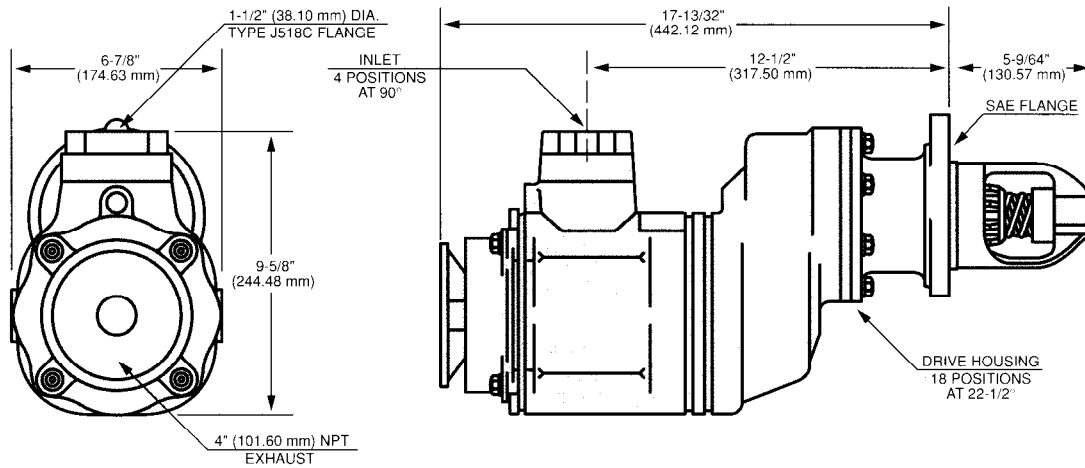
#### Common Pinions Available

Part No.	Teeth	D.P./Mod.	P.A.	Rotation
20BM-299-1-31	13	8/10	20	R
20BM-299-3-32	13	8/10	20	L

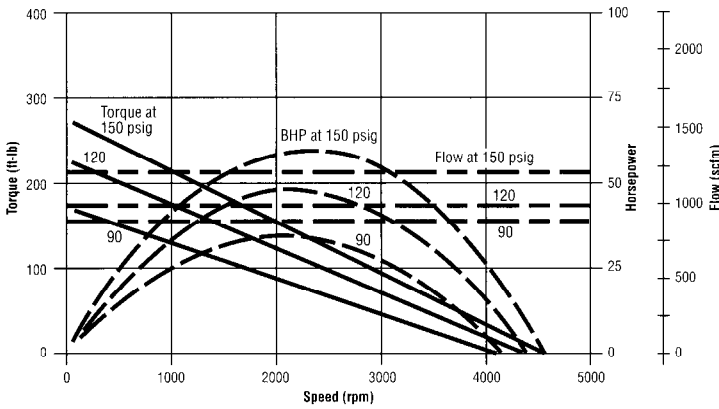


**Inertia Drive**

**Series ST750/799GBI Dimensions**

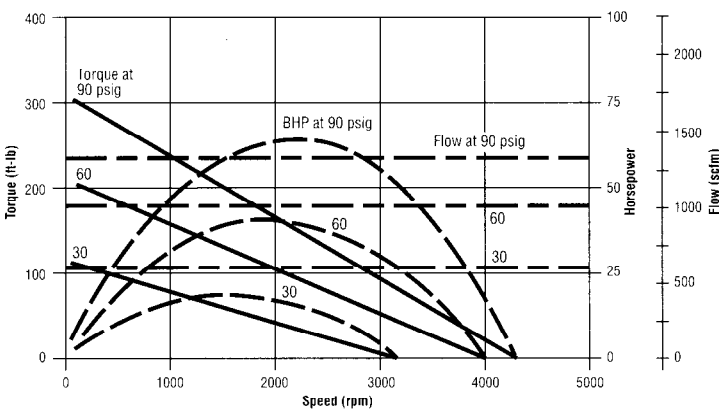


**Series ST750GBI Performance Curves**



PSI	Torque @ maximum	Speed @ max hp	HP max	Flow @ max hp
90	180	2200	30	800
120	230	2400	49	1000
150	280	2800	60	1200

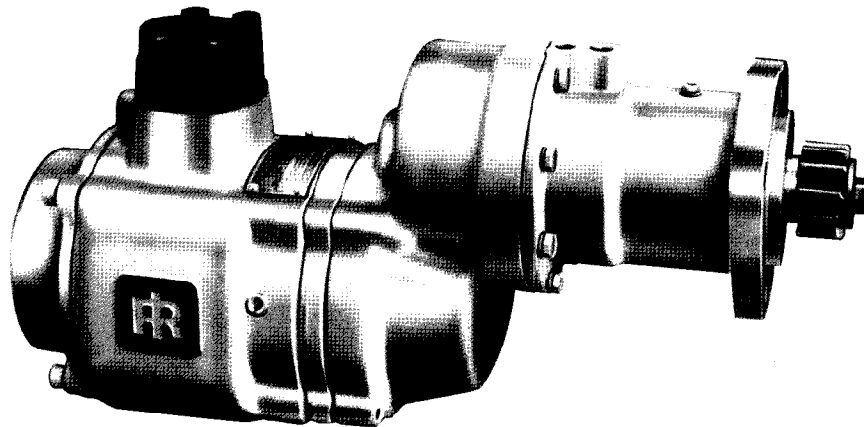
**Series ST799GBI Performance Curves**



PSI	Torque @ maximum	Speed @ max hp	HP max	Flow @ max hp
30	110	1700	20	400
60	210	2000	40	1000
90	310	2300	66	1300

Pre-Engaged

For engine displacement of:  
 Diesel — 1000 to 8000 CID (16 to 130 liters)



### Features/Benefits

- Pre-engaged drive
- Offset Design
- 19-7/32" Total length From Mounting Flange
- Weighs only 63 lbs.
- No lubricants required in the air line
- 30-150 psi operating pressure
- 300 ft.lb Torque capability

### Versatile

- Design for diesel engines
- Air or gas
- 64 different mounting positions
- Left or right hand available
- Off-highway, marine, stationary models
- Modular motor packs available to convert vane starter to turbine

### Service

- Worldwide sales and service
- Remanufactured models available
- One year warranty
- Tune-up kits available

### Literature

Form P6921 Maintenance & Instruction manual

\*For Installations see page 53.

### Genuine Parts & Accessories

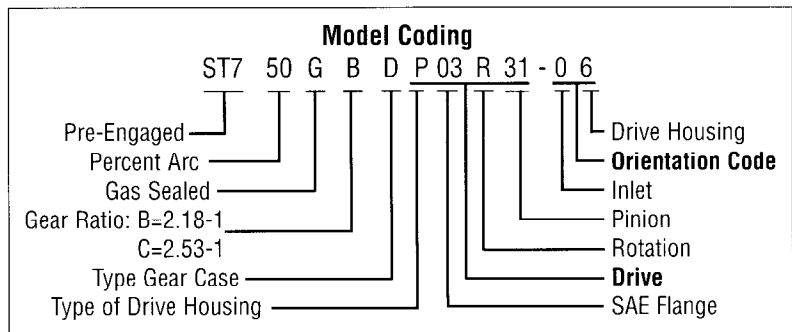
Part No.	Description	Size
SRV 150	Relay Valves	1-1/2" NPT
SMB-G618	Control Valves	1/8" NPT
ST700-TK1	Tune-up Kit*	N/A
ST900-267-24	Air Strainer	1-1/2" NPT
ST900-267-64	Air Strainer	4" Flange
ST700K-350	Elbow Exhaust Kit	3" Flange

\*(Refer to accessory section)

### Common Pinions Available

Part No.	Teeth	D.P./Mod.	P.A.	Rotation
SS815R-13-31	12/12	6/8	20	R
SS815L-13-32	12/12	6/8	20	L

\*Special pinions available upon request

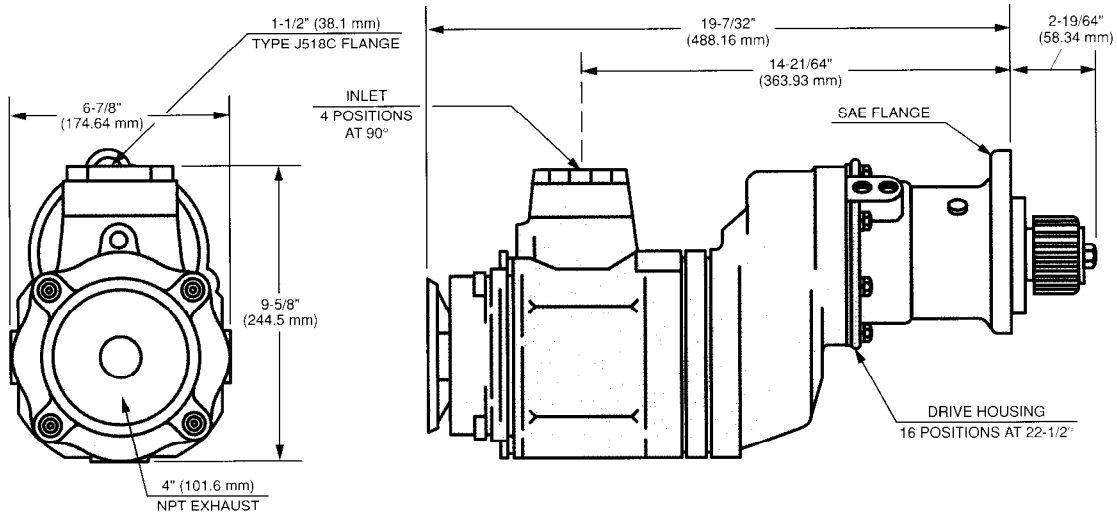


# Series ST750GBDP, ST799GBDP (Air or Gas) Turbine Starter

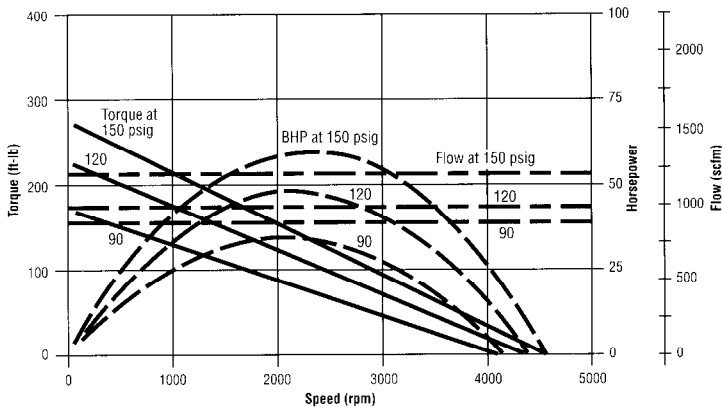
# INGERSOLL-RAND

Pre-Engaged

## Series ST750/799GBDP Dimensions

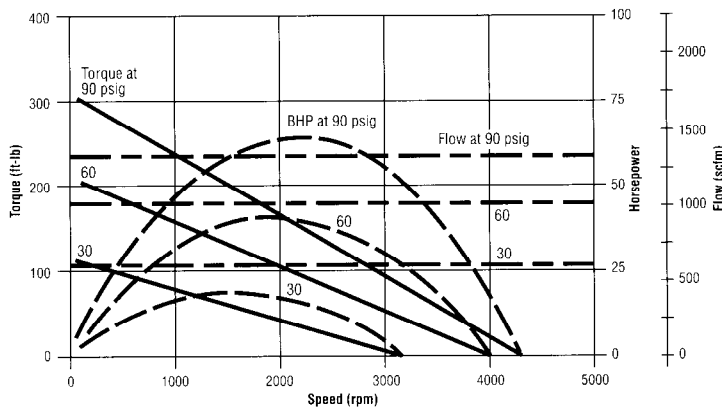


## Series ST750GBDP Performance Curves



PSI	Torque @ maximum	Speed @ max hp	HP max	Flow @ max hp
90	180	2200	30	800
<b>120</b>	<b>230</b>	<b>2400</b>	<b>49</b>	<b>1000</b>
150	280	2800	60	1200

## Series ST799GBDP Performance Curves

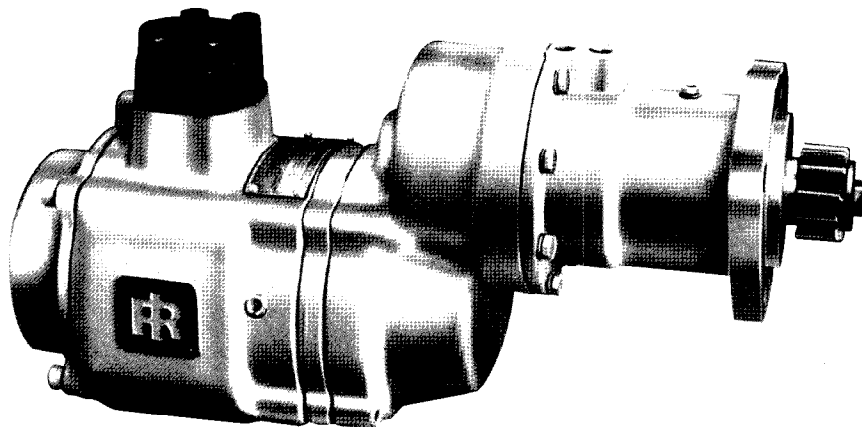


PSI	Torque @ maximum	Speed @ max hp	HP max	Flow @ max hp
30	110	1700	20	400
<b>60</b>	<b>210</b>	<b>2000</b>	<b>40</b>	<b>1000</b>
90	310	2300	66	1300

*Pre-Engaged*

**For engine displacement of:**

**Diesel — 5000 to 12000 CID (80 to 200 liters)**



### Features/Benefits

- Offset Design
- Pre-engage drive
- 19-7/32" Total length From Mounting Flange
- Weighs only 63 lbs.
- No external lubricants required
- 30-150 psi operating pressure
- 360 ft-lb capability
- No external shut-off devices

### Versatile

- Design for diesel engines
- Air or gas operation
- 64 different mounting positions
- Module front end and motor packages
- Left or right hand available
- Modular motor packs available to convert vane starter to turbine

### Service

- Choice of major engine manufacturers
- Worldwide distribution and factory representation
- Remanufactured models available
- One year warranty
- Tune-up Kits Available

### Literature

Form P6921 Maintenance & Installation manual

\*For Installations see page 53.

### Genuine Parts & Accessories

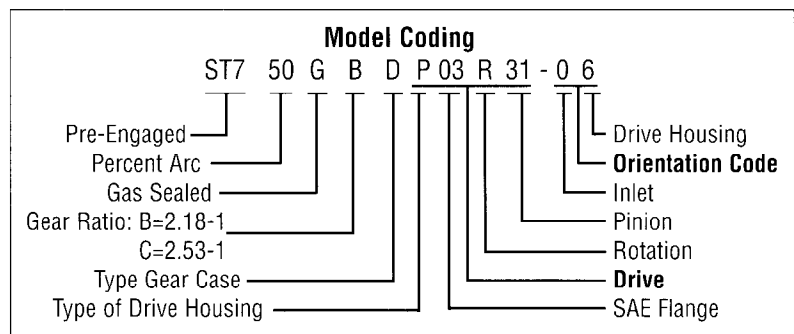
Part No.	Description	Size
SRV 150	Relay Valves	1-1/2" NPT
SMB-G618	Control Valves	1/8" NPT
ST700-TK1	Tune-up Kit*	N/A
ST900-267-24	Air Strainer	1-1/2" NPT
ST900-267-64	Air Strainer	4" Flange
ST700K-350	Elbow Exhaust Kit	3" Flange

\*(Refer to accessory section)

### Common Pinions Available

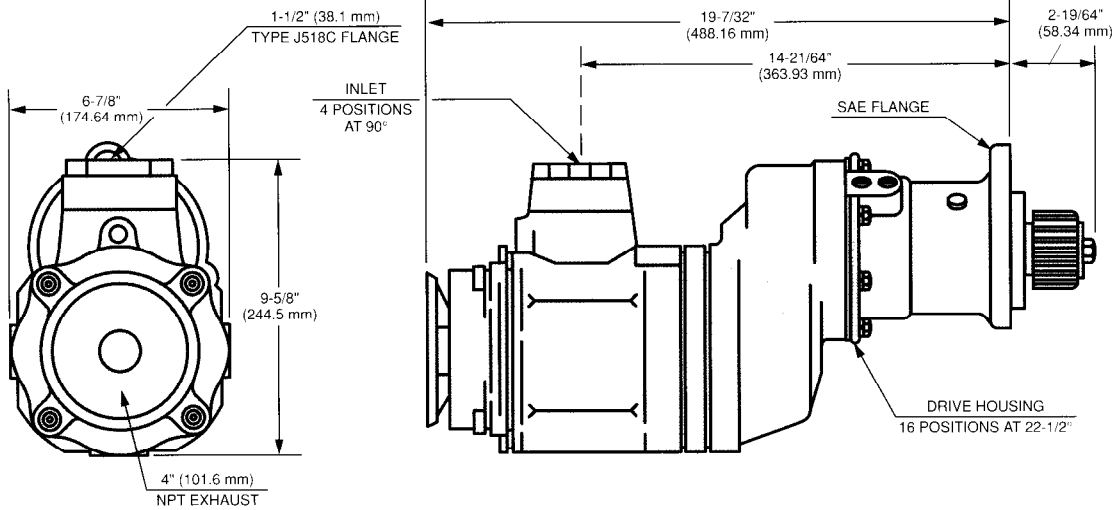
Part No.	Teeth	D.P./Mod.	P.A.	Rotation
SS815R-13-31	12/12	6/8	20	R
SS815L-13-32	12/12	6/8	20	L

\*Special pinions available upon request

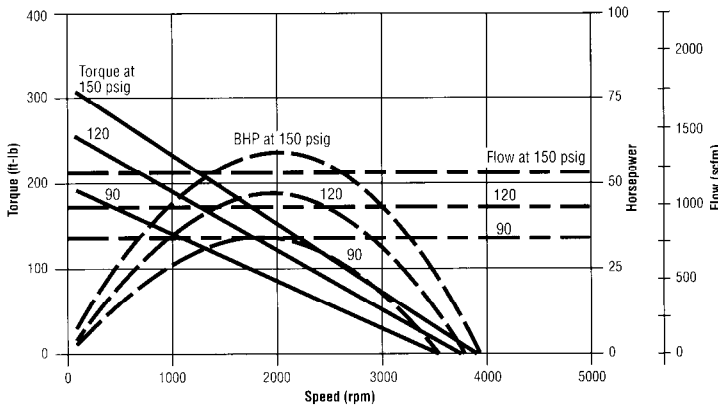


Pre-Engaged

**Series ST750GCPD/ ST799GCPD Dimensions**

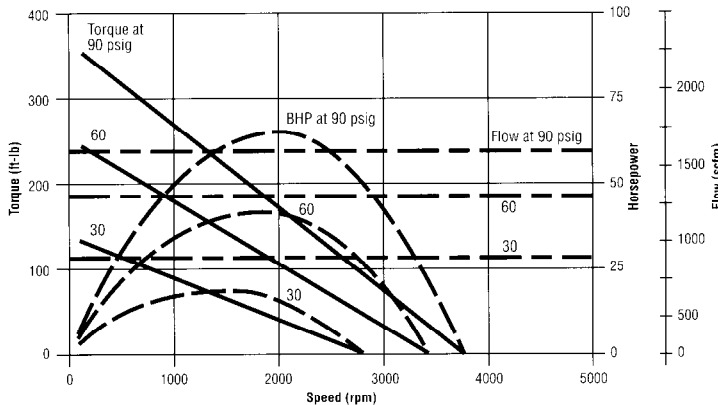


**Series ST750GCPD Performance Curves**



PSI	Torque @ maximum	Speed @ max hp	HP max	Flow @ max hp
90	200	1800	30	700
120	260	1900	45	1000
150	320	2000	54	1200

**Series ST799GCPD Performance Curves**

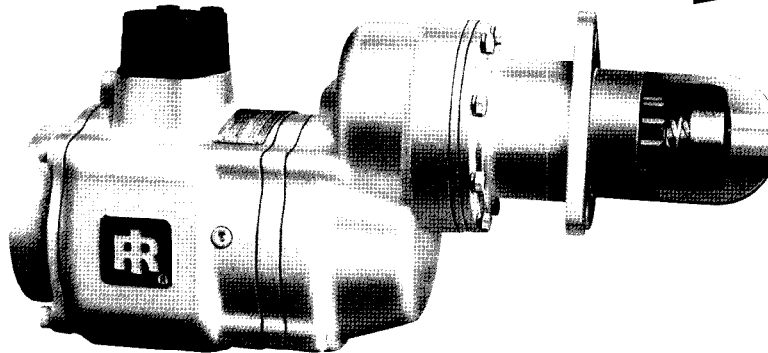


PSI	Torque @ maximum	Speed @ max hp	HP max	Flow @ max hp
30	140	1500	18	800
60	260	1700	40	1300
90	360	1900	64	1600

**Inertia Turbine Starter**

*For engine displacement of:  
Carbureted—2000 to 16000 CID (32 to 260 liters)*

**New !**



**For Spark Fired Engines.**

**Features/Benefits**

- Designed for long cranking spark fire engines
- Inertia drive
- Offset design
- 17-7/32" total length from mounting flange
- Weighs only 62 lbs.
- No external lubricants required
- 30-150 psi operating pressure
- Oil bath
- Ring gear idler gear design
- Half arc and full arc available

**Versatile**

- Air or Gas
- 64 different mounting positions
- Module front end and motor packages
- Left or right hand rotation available
- Marine, stationary models
- Motor modules available for upgrades

**Service**

- Worldwide distribution and factory representation
- 1 Year Warranty
- Tune-up kit available

**Literature**

- Form P7156 Maintenance & Installation manual
- Form 52426

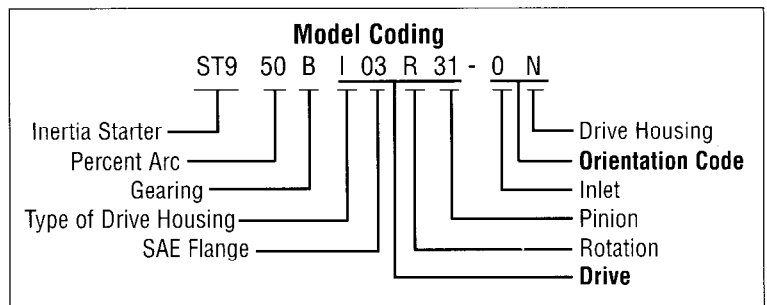
For installations see page 54.

**Genuine Parts & Accessories**

Part No.	Description	Size
SRV 150	Relay Valves	1-1/2" NPT
SMB-G618	Control Valves	1/8" NPT
ST900-GK1	Gear Kit	N/A
ST900-267-24	Air Strainer	1-1/2" NPT
ST900-267-64	Air Strainer	4" Flange
ST700-350	Elbow Exhaust Kit	3" Flange
ST900-SK1	Seal Kit	N/A

**Common Pinions Available**

Part No.	Teeth	D.P./Mod.	P.A.	Rotation
20BM-299-1-31	12/12	6/8	20	R
20BM-299-3-32	12/12	6/8	20	L



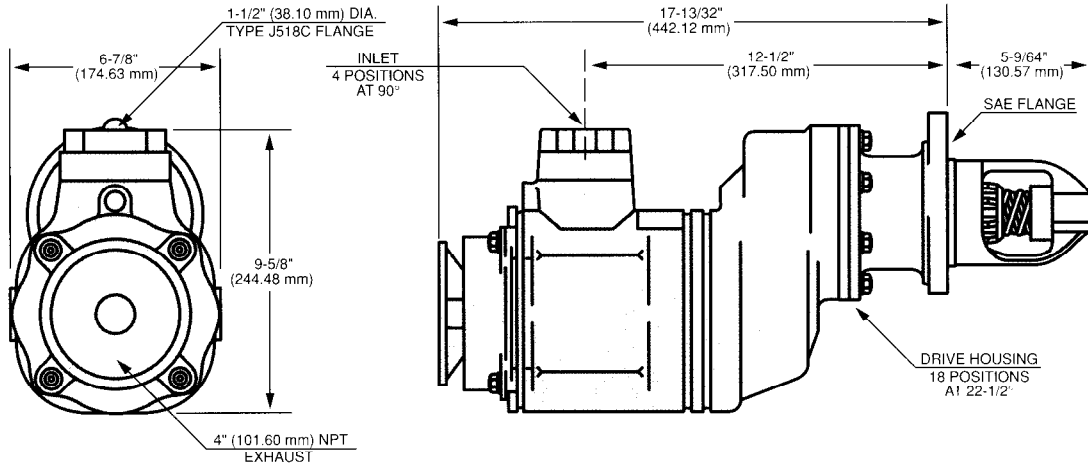


# Series ST950BI, ST999BI (Air or Gas) Starter

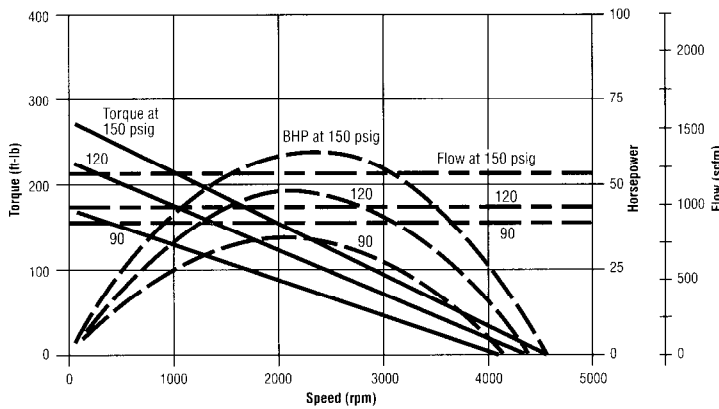
# INGERSOLL-RAND

## Inertia Turbine Starter

### Series ST950BI, ST999BI Dimensions

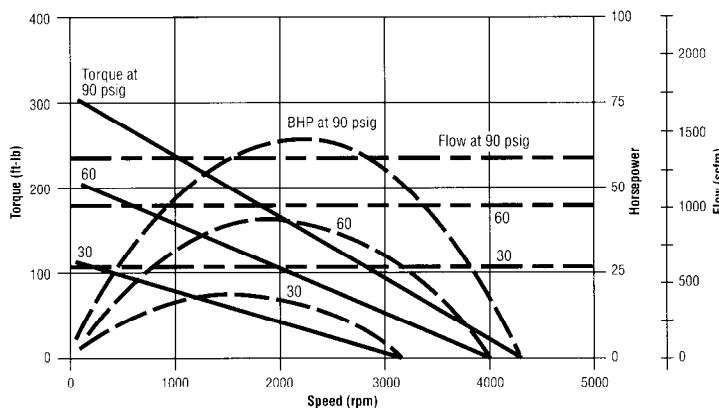


### Series ST950BI Performance Curves



PSI	Torque @ maximum	Speed @ max hp	HP max	Flow @ max hp
90	180	2200	30	800
120	230	2400	49	1000
150	280	2800	60	1200

### Series ST999BI Performance Curves

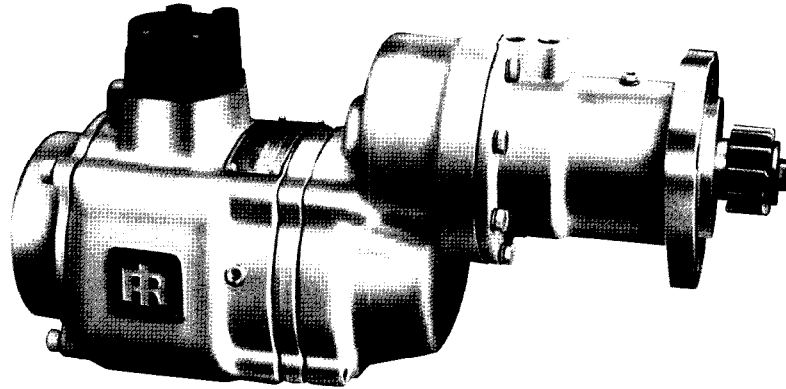


PSI	Torque @ maximum	Speed @ max hp	HP max	Flow @ max hp
30	110	1700	20	400
60	210	2000	40	1000
90	310	2300	66	1300

*Pre-Engaged Turbine Starter*

**New!**

*For engine displacement of:  
Carbureted — 2000 to 16000 CID (32 to 260 Liters)*



## For Spark Fired Engines.

### Features/Benefits

Designed for Long Cranking Spark Fired Engines  
Offset Design

#### Pre-engage drive

19-7/32" Total length From Mounting Flange  
Weighs only 63 lbs.  
No external lubricants required  
30-150 psi operating pressure  
No external shut-off devices  
Idler Gear Design  
Oil bath lubrication

### Versatile

Air or gas  
64 different mounting positions  
Modular front end and motor packages  
Left or right hand available  
Motor Modules Available For Upgrades  
Engine barring port.

### Service

**#1 Choice of major engine manufacturers**  
Worldwide distribution and factory representation  
One year warranty

### Literature

Form P7156 Maintenance & Instruction manual

\*For Installations see page 54.

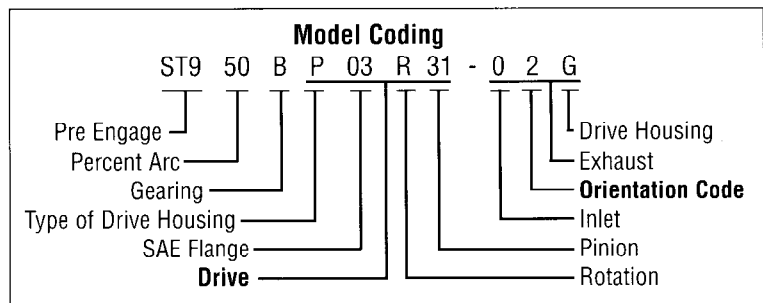
### Genuine Parts & Accessories

Part No.	Description	Size
SRV 150	Relay Valves	1-1/2" NPT
SMB-G618	Control Valves	1/8" NPT
ST900-GK1	Gear Kit	N/A
ST900-267-24	Air Strainer	1-1/2" NPT
ST900-267-64	Air Strainer	4" Flange
ST700K-350	Elbow Exhaust Kit	3" Flange
ST900-SK1	Seal Kit	N/A

### Common Pinions Available

Part No.	Teeth	D.P./Mod.	P.A.	Rotation
SS815R-13-31	12/12	6/8	20	R
SS815L-13-32	12/12	6/8	20	L
SS825R-13-25	11/12	6/8	20	R
SS825L-13-26	11/12	6/8	20	L

\*Special pinions available upon request

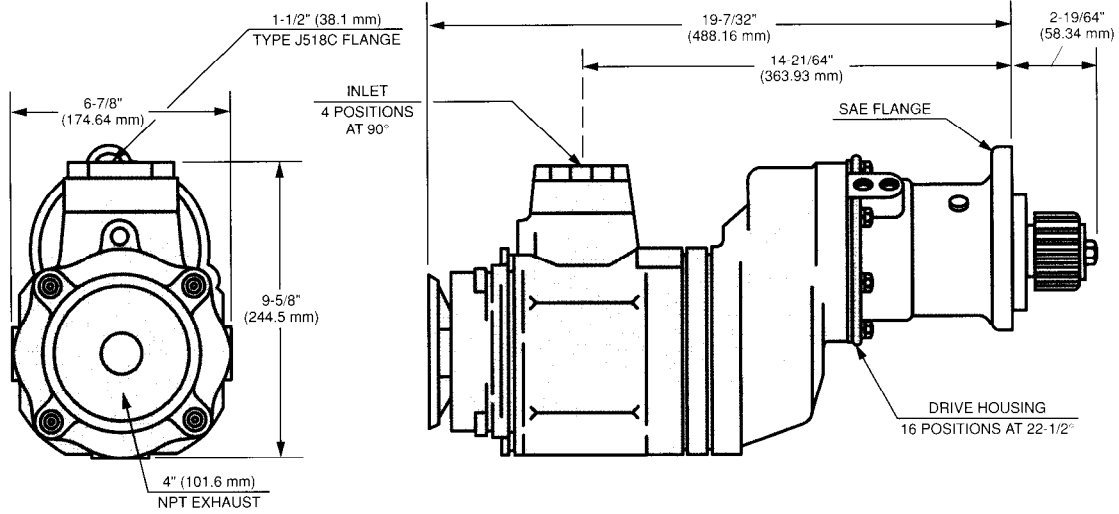


# Series ST950BP, ST999BP (Air or Gas) Starter

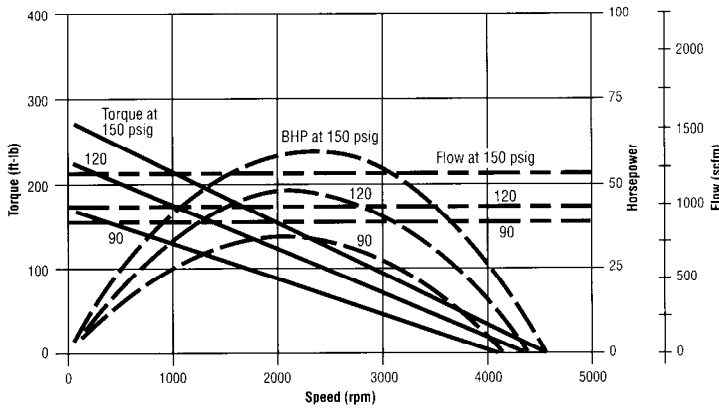
# INGERSOLL-RAND

## Pre-Engaged Turbine Starter

### Series ST950BP Dimensions

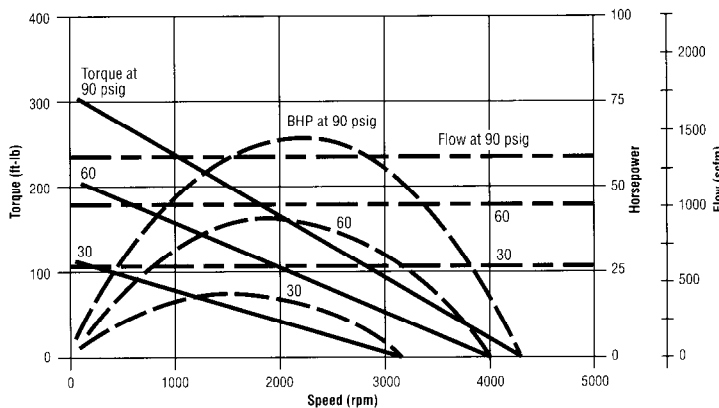


### Series ST950BP Performance Curves



PSI	Torque @ maximum	Speed @ max hp	HP max	Flow @ max hp
90	180	2200	30	800
<b>120</b>	<b>230</b>	<b>2400</b>	<b>49</b>	<b>1000</b>
150	280	2800	60	1200

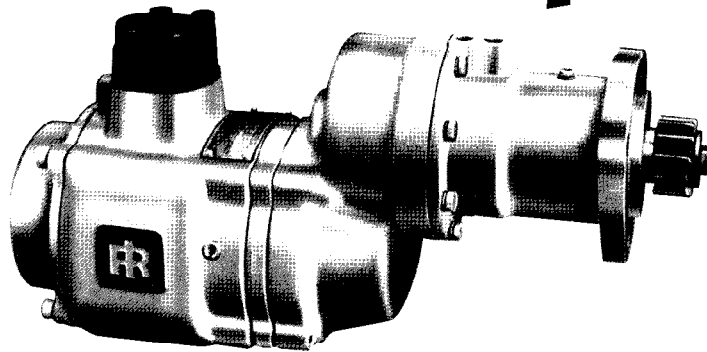
### Series ST999BP Performance Curves



PSI	Torque @ maximum	Speed @ max hp	HP max	Flow @ max hp
30	110	1700	20	400
<b>60</b>	<b>210</b>	<b>2000</b>	<b>40</b>	<b>1000</b>
90	310	2300	66	1300

For engine displacement of:  
 Carbureted—10000 to 24000 CID (160 to 400 liters)

**New !**



**For Spark Fired Engines.**

**Turbine**

**Features/Benefits**

- Designed for long cranking spark fire engines
- Pre-engaged drive
- Offset design
- 19-7/32" total length from mounting flange
- Weighs only 63 lbs.
- No external lubricants required
- 30-150 psi operating pressure
- Oil bath
- Ring gear idler gear design
- Half arc and full arc available
- Low pressure, High pressure available

**Versatile**

- Air or Gas
- 64 different mounting positions
- Modular front end and motor packages
- Left and right hand rotation available
- Marine, stationary models
- Motor modules available for upgrades

**Service**

- #1 Choice of major engine manufacturers
- Worldwide distribution and factory representation
- 1 Year Warranty

**Literature**

- Form P7156 Maintenance & Installation manual
- Typical Installation refer to page 54.

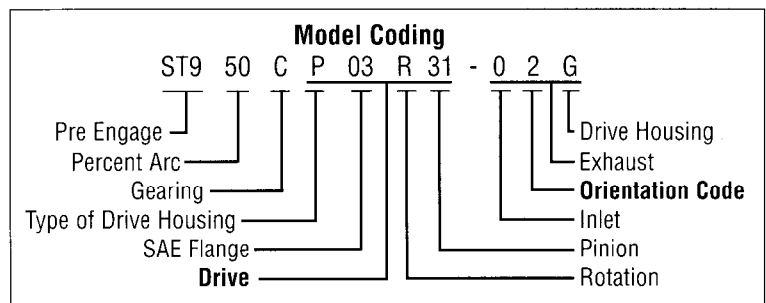
**Genuine Parts & Accessories**

Part No.	Description	Size
SRV 150	Relay Valves	1-1/2" NPT
SMB-G618	Control Valves	1/8" NPT
ST900-GK1	Gear Kit	N/A
ST900-267-24	Air Strainer	1-1/2" NPT
ST900-267-64	Air Strainer	4" Flange
ST700-350	Elbow Exhaust Kit	3" Flange
ST900-SK1	Seal Kit	N/A

**Common Pinions Available**

Part No.	Teeth	D.P./Mod.	P.A.	Rotation
SS815R-13-31	12/12	6/8	20	R
SS815L-13-32	12/12	6/8	20	L
SS825R-13-25	11/12	6/8	20	R
SS825L-13-26	11/12	6/8	20	L

\* Special pinion available upon request

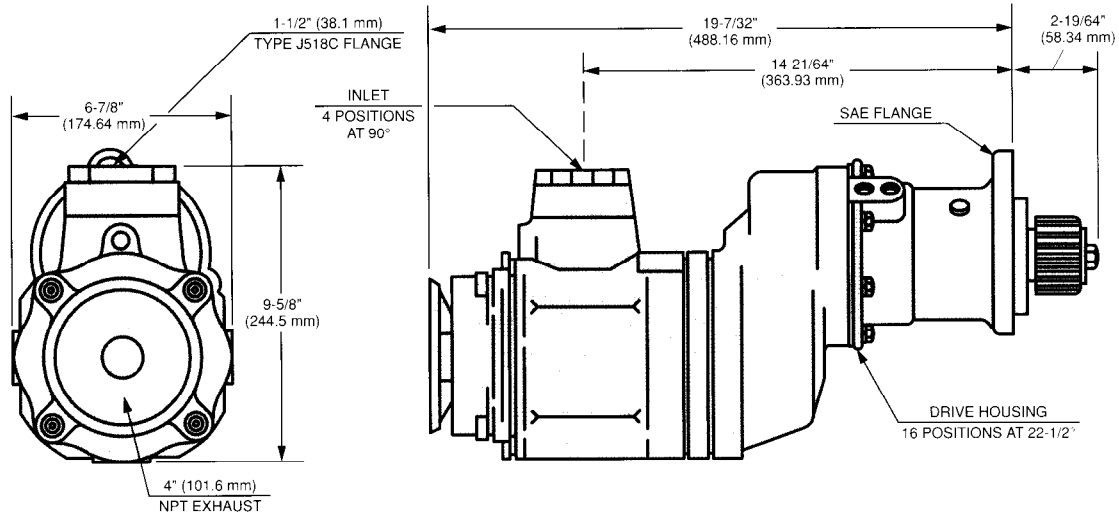


# Series ST950CP, ST999CP (Air or Gas) Starter

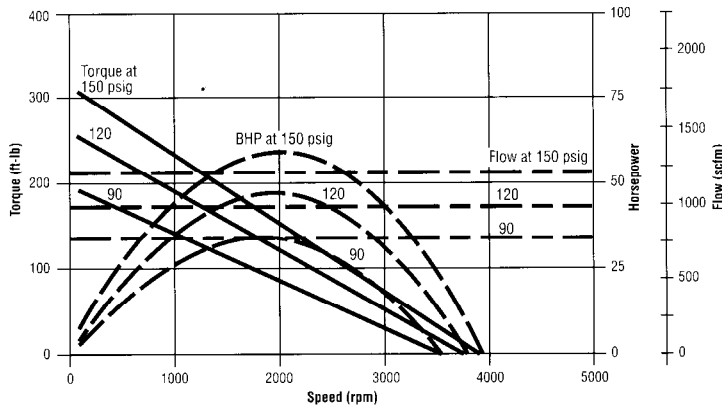
# INGERSOLL-RAND

## Pre-Engaged Turbine Starter

### Series ST950CP Dimensions

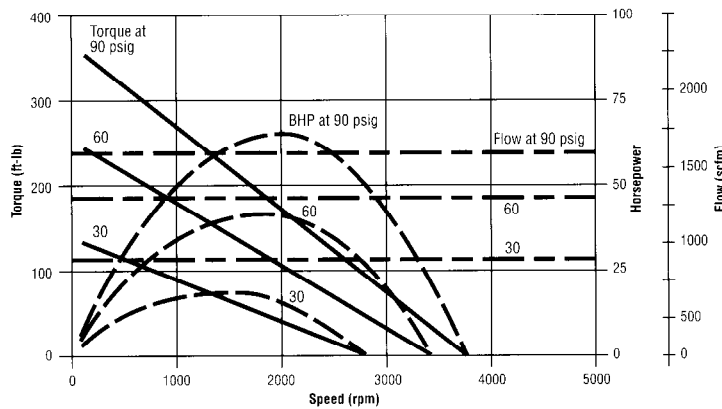


### Series ST950CP Performance Curves



PSI	Torque @ maximum	Speed @ max hp	HP max	Flow @ max hp
90	200	1800	30	700
120	260	1900	45	1000
150	320	2000	54	1200

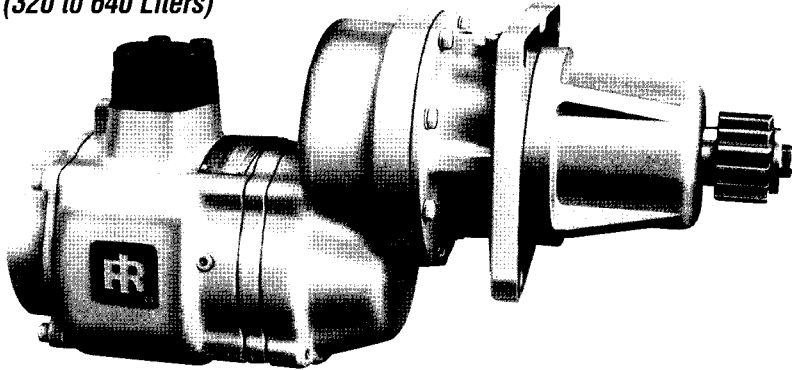
### Series ST999CP Performance Curves



PSI	Torque @ maximum	Speed @ max hp	HP max	Flow @ max hp
30	140	1500	18	800
60	260	1700	40	1300
90	360	1900	64	1600

**New!**

For engine displacement of:  
 Carbureted — 20,000 to 40,000 CID (320 to 640 Liters)



**For Spark Fired Engines.**

**Turbine**

**Features/Benefits**

- Pre-engaged drive
- Offset design
- 16-31/32" Total length From Mounting Flange
- Weighs only 92 lbs.
- No external lubricants required
- Ring gear/idler Gear Design
- Oil Bath
- 600 ft-lb capability. (Highest torque rating of any air starter in its class)

**Versatile**

- Designed for spark fired engines
- 64 different mounting positions
- Modular motor packs available
- Left or right hand available
- Marine, stationary models
- Engine barring port, rear of starter

**Service**

- Choice of major engine manufacturers
- Worldwide distribution and factory representation
- One year warranty

**Literature**

- Form P7156 Maintenance & Instruction manual
- Form 52426-A

\*For Installations see page 54.

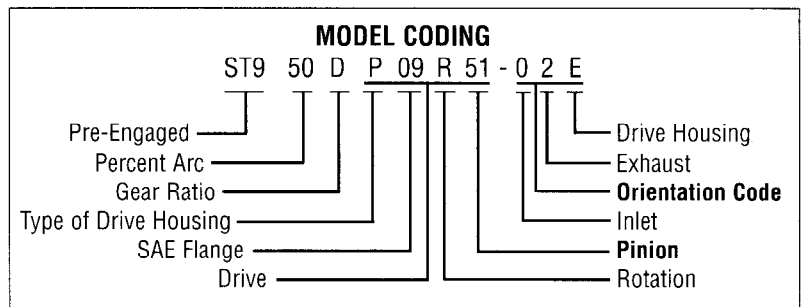
**Genuine Parts & Accessories**

Part No.	Description	Size
SRV 150	Relay Valves	1-1/2" NPT
<b>SMB-G618</b>	<b>Control Valves</b>	<b>1/8" NPT</b>
ST900-GK1	Gear Kit	N/A
<b>ST900-267-24</b>	<b>Air Strainer</b>	<b>1-1/2" NPT</b>
ST900-267-64	Air Strainer	4" Flange
<b>ST700K-350</b>	<b>Elbow Exhaust Kit</b>	<b>3" Flange</b>
ST900-SK1	Seal Kit	N/A

**Common Pinions Available**

Part No.	Teeth	D.P./Mod.	P.A.	Rotation
SS850R-13-51	15/15	6/8	20	R
<b>*SS850L-13-52</b>	<b>15/15</b>	<b>6/8</b>	<b>20</b>	<b>L</b>

\*Special pinions available upon request

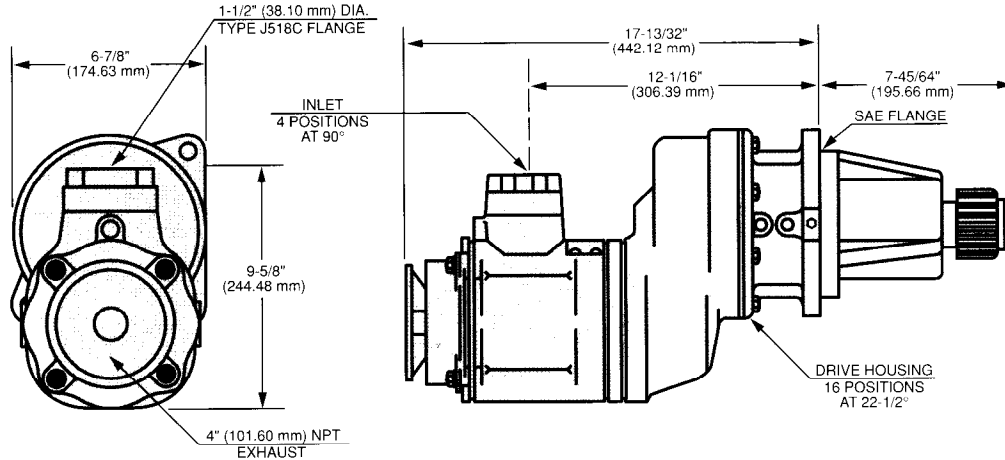


# Series ST950DP, ST999DP (Air or Gas) Starters

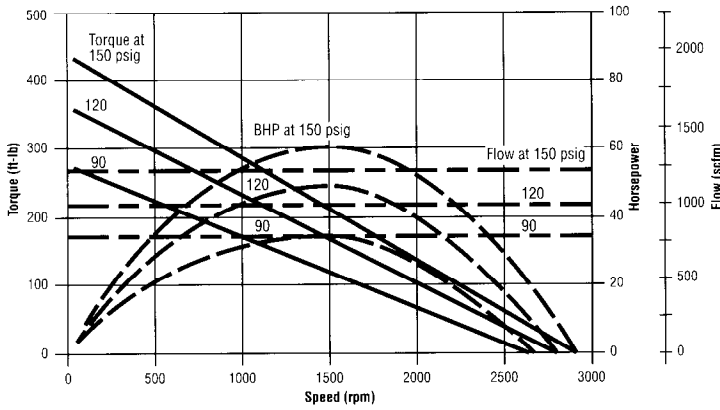
# INGERSOLL-RAND

Pre-Engaged Turbine Starter

## Series ST950DP, ST999DP Dimensions

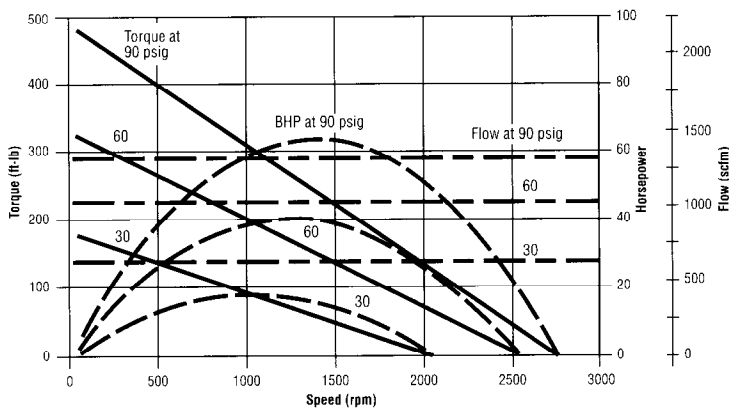


## Series ST950DP Performance Curves



PSI	Torque @ maximum	Speed @ max hp	HP max	Flow @ max hp
90	290	1300	30	700
120	370	1400	50	1100
150	430	1500	60	1300

## Series ST999DP Performance Curves



PSI	Torque @ maximum	Speed @ max hp	HP max	Flow @ max hp
30	180	1200	19	300
60	320	1300	40	800
90	490	1400	65	1350

### Relay Valves

Ingersoll-Rand Relay Valves provide immediate response to assure Air Starter disengagement and prevent damage to the pinion or flywheel ring gear. The aluminum die cast housing resists abrasion and corrosion while the stainless steel piston return spring will not rust from moisture in the air line.

Thread Size	Part	For Starter
NPT in.	Number	Series
1	SRV100	3BMG, 5BMG, SS175G
1¼	SRV125	150BM, SS350G
1½	SRV150	SS800, ST700, ST900
1¾	SRV125T	150BMP Air Only

Designed specifically for compressors, offshore and marine applications, or where natural gas is used, the SRV150SS Relay Valve features a heavy duty stainless steel housing, and Internal Components. This valve is corrosion resistant.

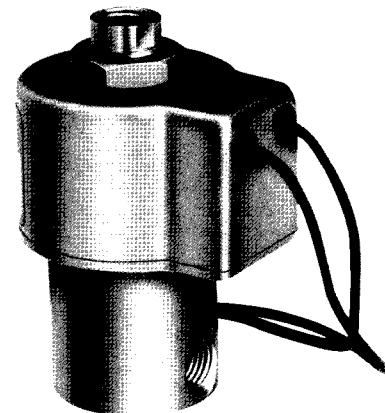
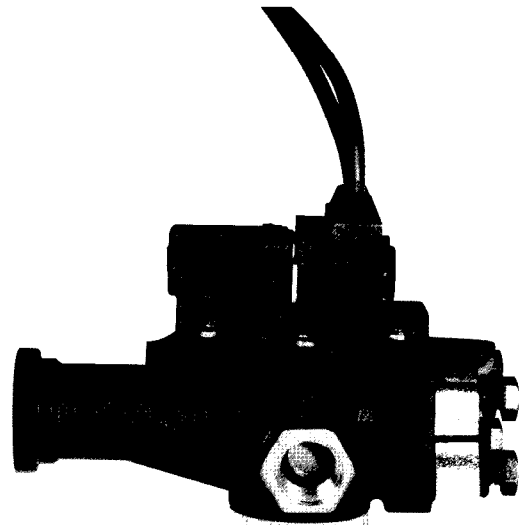
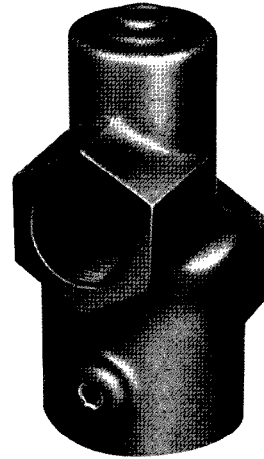
Thread Size	Part	For Starter
NPT in.	Number	Series
1½	SRV150SS	SS800, ST700, ST900

Part Number	Description	For Starter
ST400-B339	Electronic Mechanical	ST400
ST400-A339M	Air Actuated	ST400

### Solenoid Actuated Control Valves

These DC electrically actuated valves are designed for pilot operation of the I-R relay valve and are approved for applications affected by the U.S. Department of Transportation safety code.

Thread Size	Voltage	Part
NPT in.		Number
¼	12 VDC	150BMP-1051B
¼	24 VDC	150BMP-2451B
¼	64 VDC	150BMP-6451



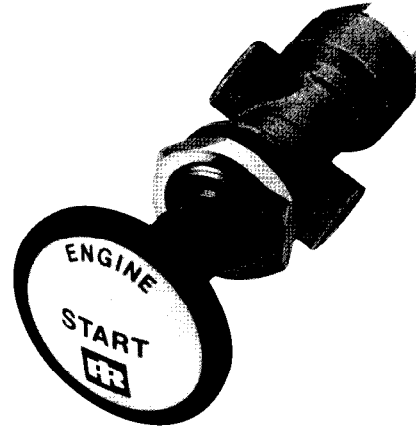


**Manually Actuated Control Valves**

**SMB-618, SMB-G618**

The SMB-618 is a manually actuated push button valve designed for pilot operation of the I-R relay valve. Simple and reliable, this brass bodied valve readily mounts in a 7/8" diameter hole on dashboards or control panels. The chrome plated SMB-G618 valve is available for use in marine, offshore and natural gas applications.

Thread Size	Part
NPT in.	Number
1/8	SMB-618
3/8	SMB-G618

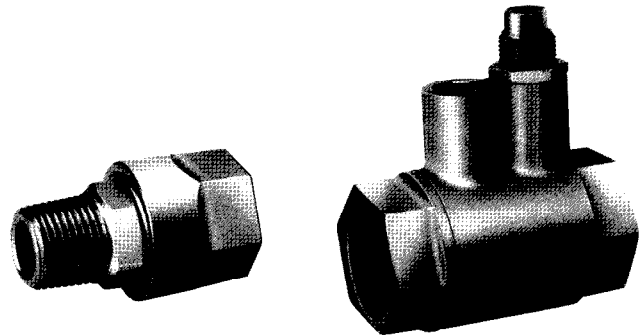


**Check Valves**

**150BMP-1056, 150BMP-1054**

The 150BMP-1056 is a brass bodied check valve designed for use in receiver charging systems. It is particularly recommended for truck applications. The 150BMP-1054 is a combination check valve/pressure relief valve.

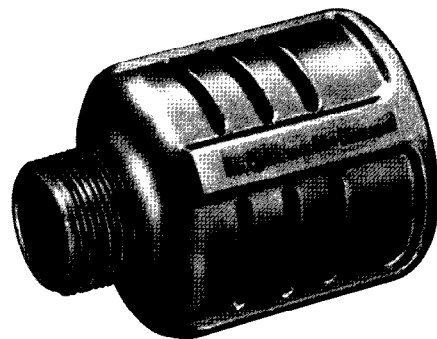
Thread Size	Part	Description
NPT in.	Number	
1/2	150BMP-1056	Check Valve
3/4	150BMP-1054	Combination Pressure Relief/Check Valve



**Mufflers**

These self-cleaning, non-freezing mufflers efficiently reduce operating noise levels while providing minimal power loss. Constructed of die cast aluminum for lighter weight, greater strength and vibration resistance, they can be either directly or remotely mounted to the starter for all applications except gas.

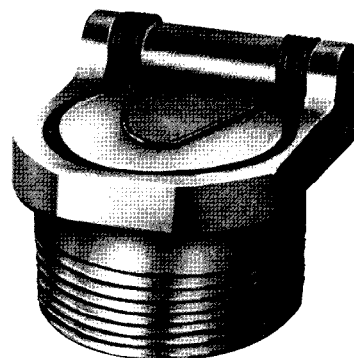
Thread Size	Part	For Starter
NPT in.	Number	Series
1	3BM-WM07	3BM, 5BM
1 1/4	150BM-A674	150BM, 150LF, SS175
1 1/2	SS350-A674	SS350
2 1/4	SS800-A674	SS800



### Road Splash Deflectors

Constructed of all corrosion resistant materials, these road splash deflectors are designed to prevent contamination from entering the exhaust port of the starter. Used in applications where a muffler is not required, they allow maximum exhaust air flow for greater starting power and efficiency.

Thread Size	Part	For Starter
NPT in.	Number	Series
1¼	150BM-A735	150BM, 150LF, SS175
1½	SS175-A735	150BM, 150LF, SS175
1½	SS350-A735	SS350
2¼	SS800-A735	SS800

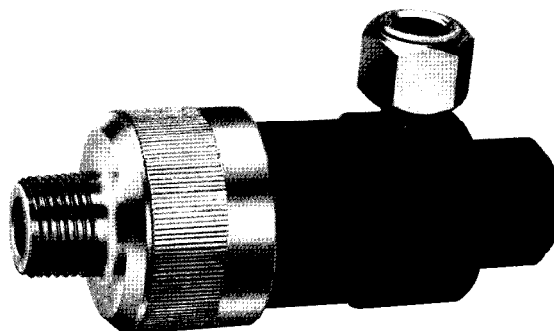


### Injector Lubricators

These small, rugged one-shot lubrication devices dispense a controlled amount of lubricant each time the air starter is engaged. Attached directly to the starter, these lubricators are self-priming lubrication pumps which can draw oil from as far away as 4 feet. Because they are not gravity fed, they can be mounted at any angle and the lubricant supply lines can be routed without regard for loops or low points.

When used on truck or bus engine starters, these units are the best lubricators available today. In these applications, lubricant is supplied to the starter from the fuel return line. Because the lubricators can withstand oil pressures of 50 psi, fuel oil is prevented from leaking through the starter, even if there is a blockage of the fuel return line.

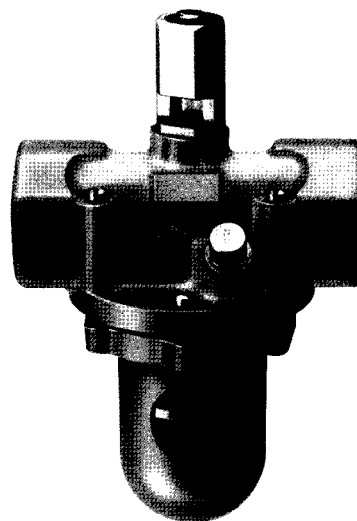
Thread Size	Part	Lubricant Supplied
NPT in.	Number	per Start
¾	HDL2	1.3 cc
¾	HDL3	0.4 cc



### In-Line Lubricators

Recommended primarily for long cranking applications these air line lubricators are also an alternative to the HDL2. They automatically adjust oil feed to the rate of air flow, can be used on multiple starter systems, and can accept air pressures up to 225 psig. The large fill ports allow quick and easy filling.

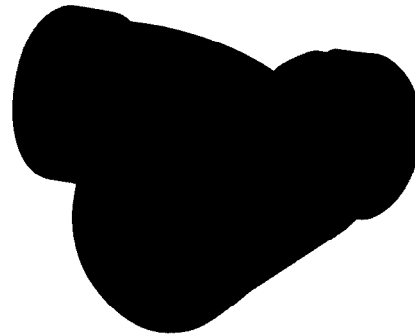
Thread Size	Part	For Starter
NPT in.	Number	Series
1½	NL-24-8	All Series



**Air Strainers**

Used on applications to assure long starter life where air or gas is contaminated.

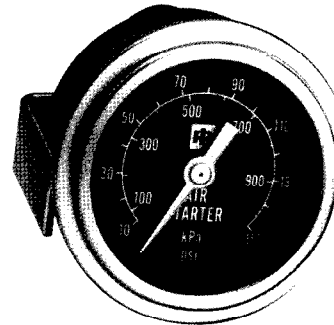
Thread Size	Part	Length	Width
NPT in.	Number	in.	in.
1 – 11½	ST900-267-16	4	3.25
1½ – 11½	ST900-267-24	5.75	5.0
2 – 11½	ST900-267-32	7	6.125
4" Flange	ST900-267-64	13.5	13.0



**Pressure Gauges**

Assure you that sufficient air pressure is available for starting.

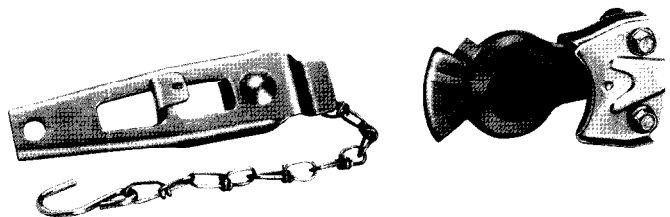
Thread Size	Part	Description
NPT in.	Number	
¼	150BMP-1064	150 psi, Dash Mount
¼	150BMP-1064L	150 psi, Tee Mount
¼	SS825-1064	300 psi, Dash Mount



**Gladhand**

Should system pressure ever be lost, the gladhand makes it simple to pump up your system from any nearby truck.

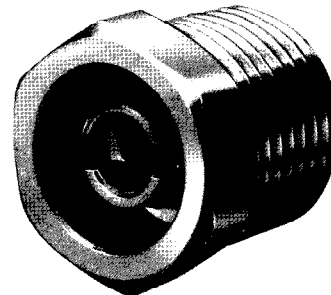
Thread Size	Part	Description
NPT in.	Number	
½ – 14	150BMP-1058	Gladhand
—	150BMP-1158C	Gladhand Bracket



**Drain Valve**

Used to keep air supplies clean and free of water and other contaminants.

Thread Size	Part	Pressure Rating
NPT in.	Number	psi
½ – 14	150BMP-1067	150



**Liquid Sealants**

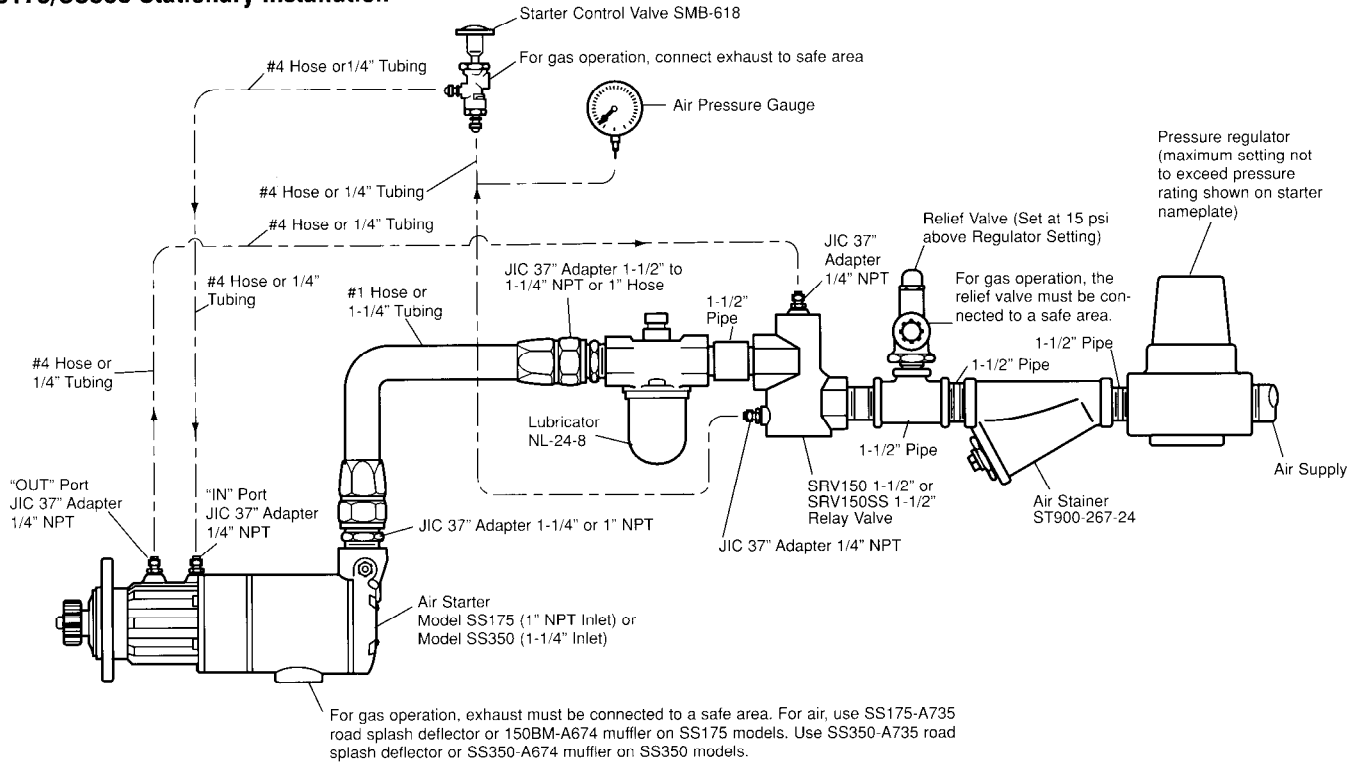
Liquid sealants should always be used to assure an air tight system and for gas sealing starters.

Part	Description
Number	
SMB-431	50cc "Plastic Gasket" for gas sealing
SMB-441	50cc Teflon® Sealant for pipe threads

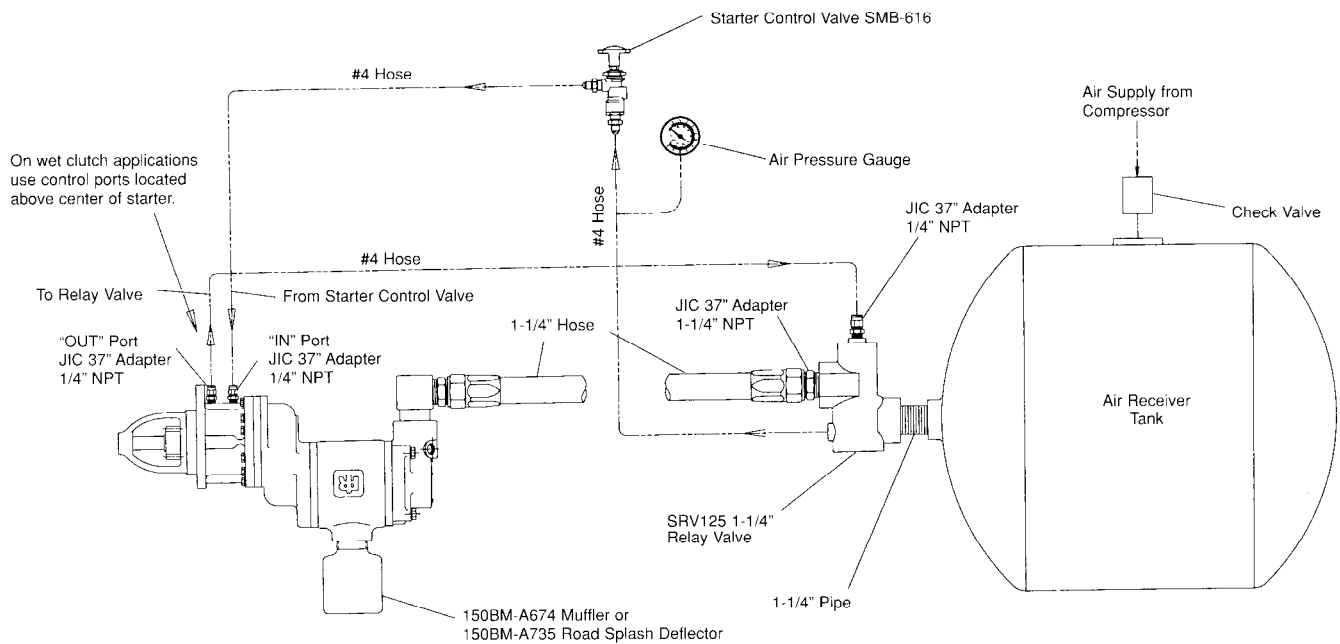


\* Registered trademark of E.I. DuPont

### SS175/SS350 Stationary Installation



### 150BMPE Typical Vehicular Installation



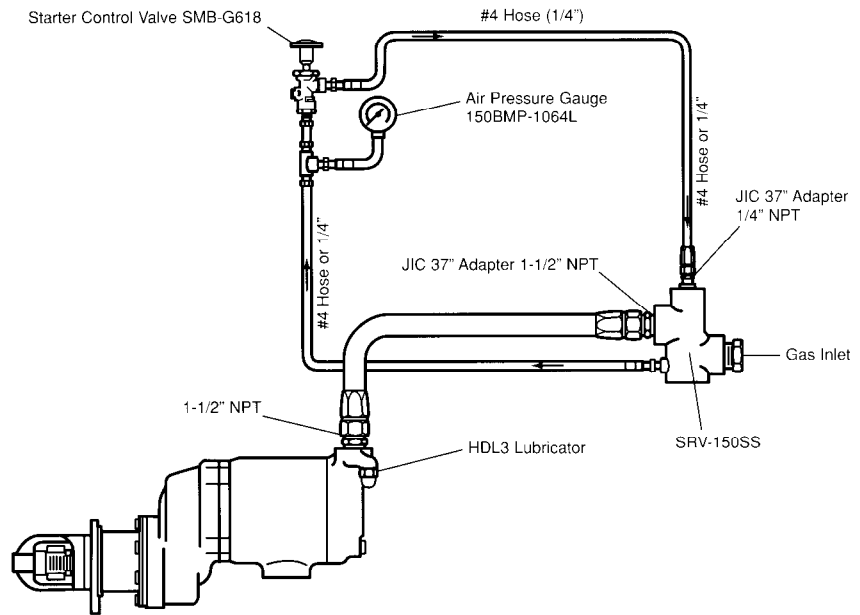
## 150BMG (Gas) Stationary Installation

For gas operation the exhaust outlet must be piped away to a safe location.

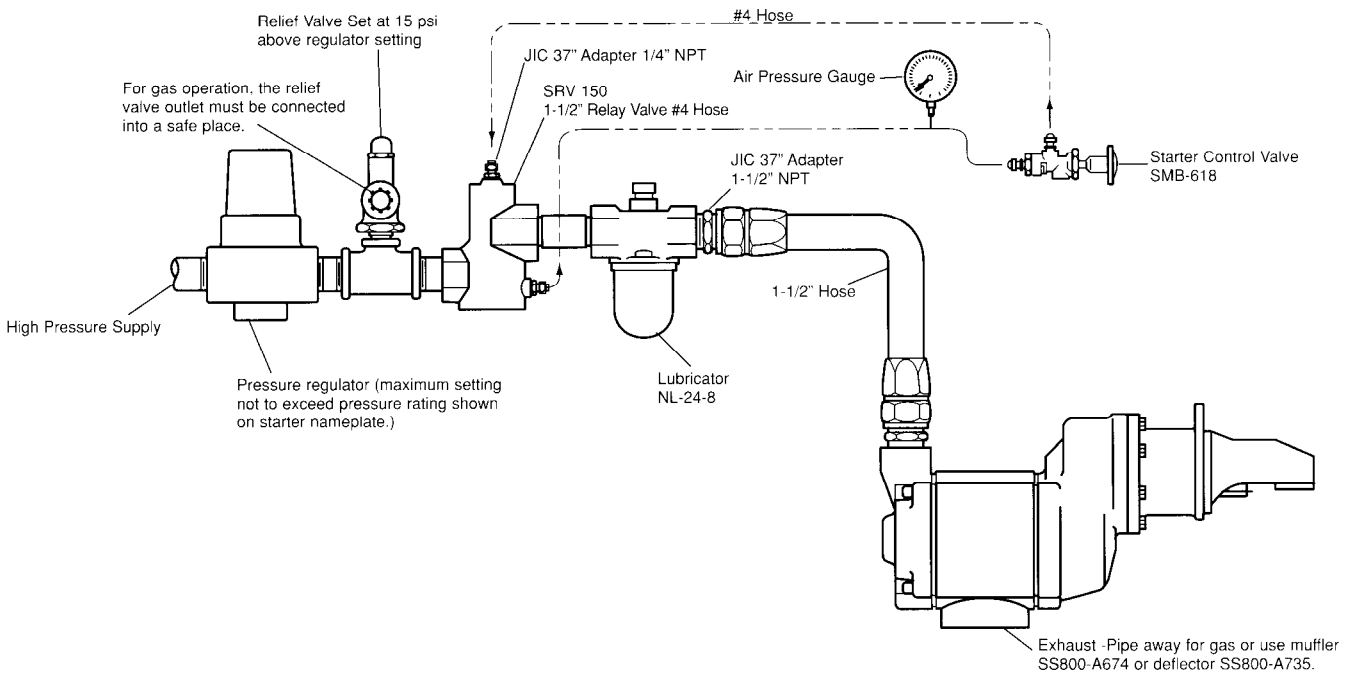
For natural operation, piped exhaust must be used and drive housing vent plug replaced with suitable hose which connects into piped exhaust system.

For air applications a muffler or splash guard deflector must be used.

NOTE: Use sealant on all pipe connections.

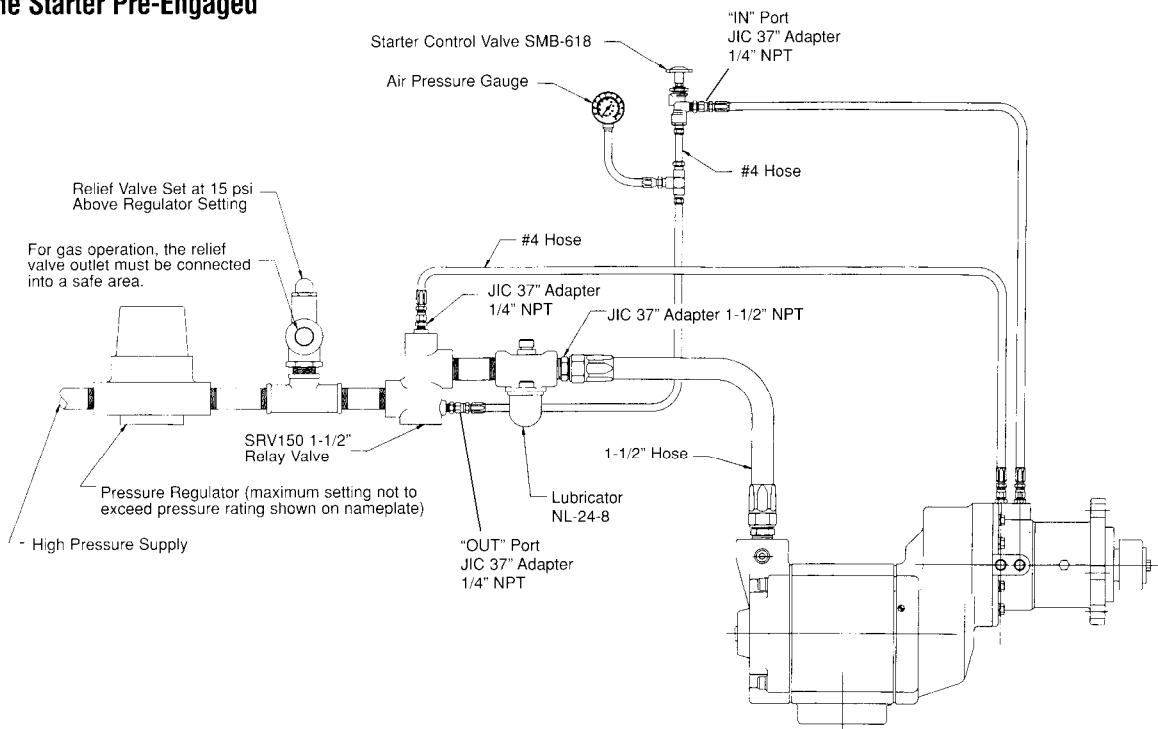


## SS810 Typical Stationary Installation Vane Starter Inertia

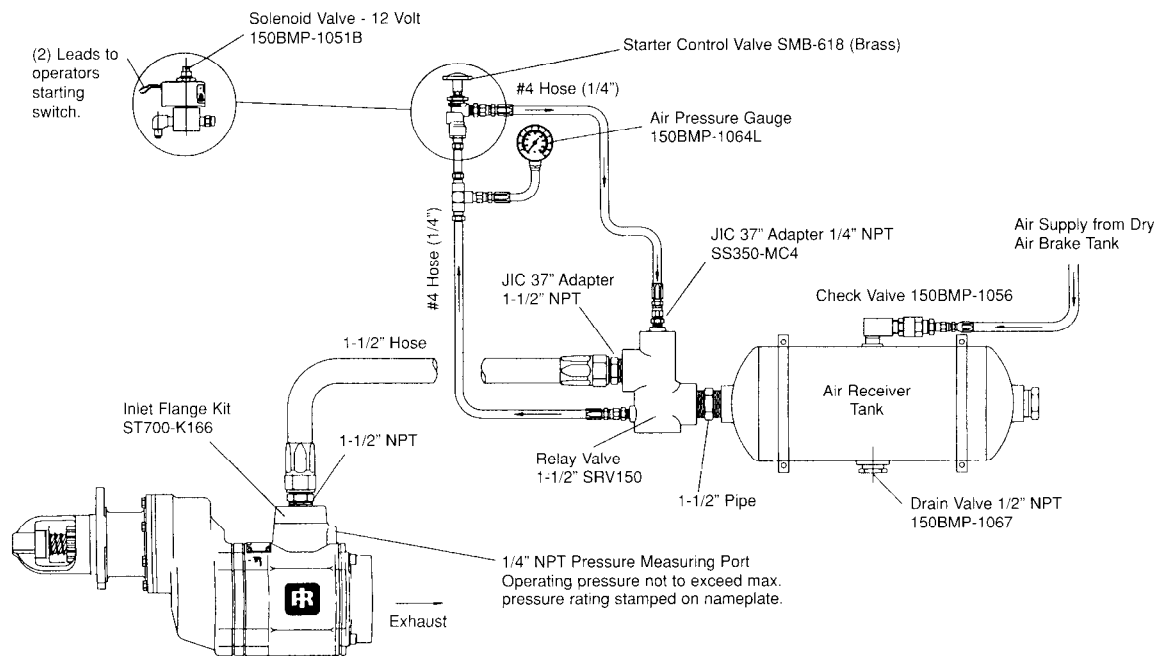


# ENGINE STARTING SYSTEMS Typical Installation

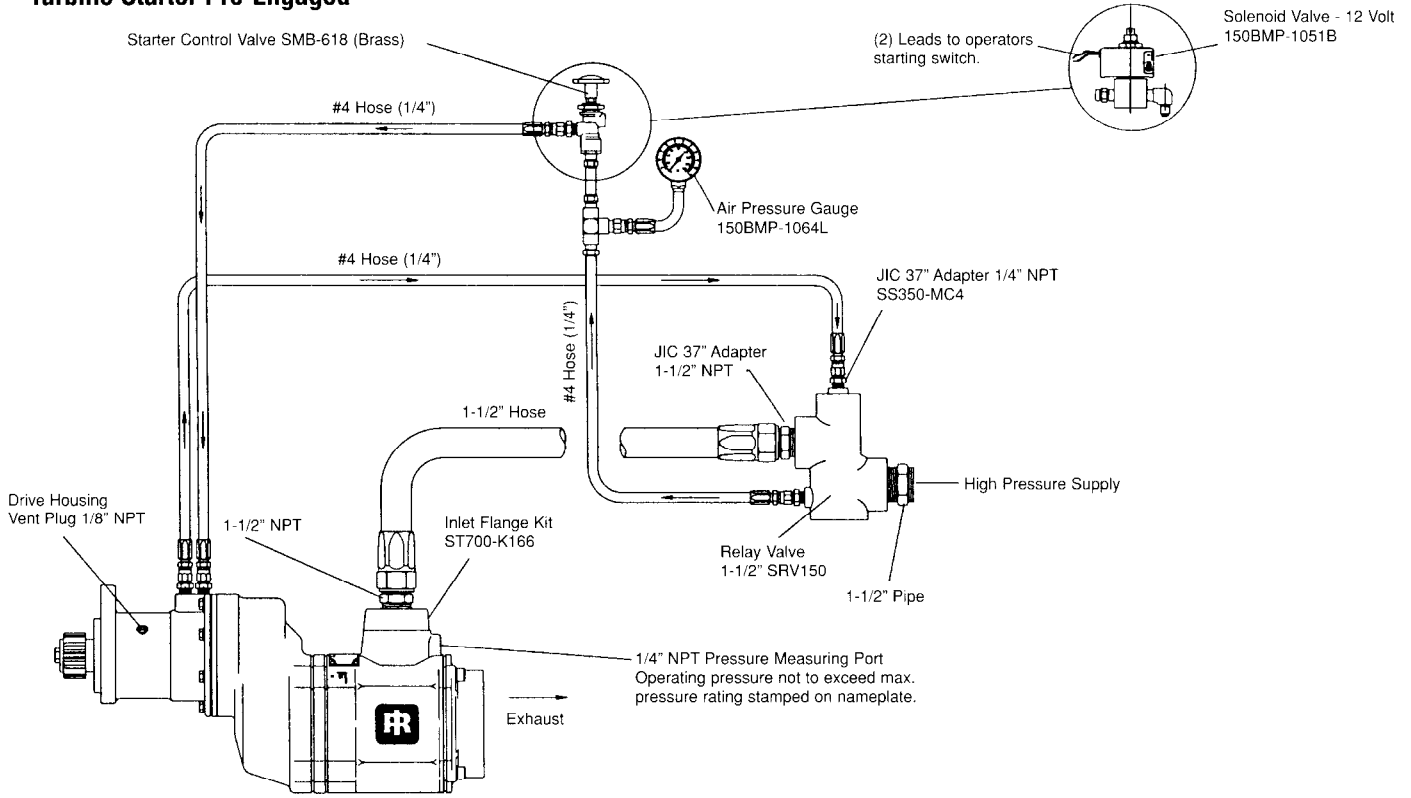
## SS815/SS825/SS850 Typical Stationary Installation Vane Starter Pre-Engaged



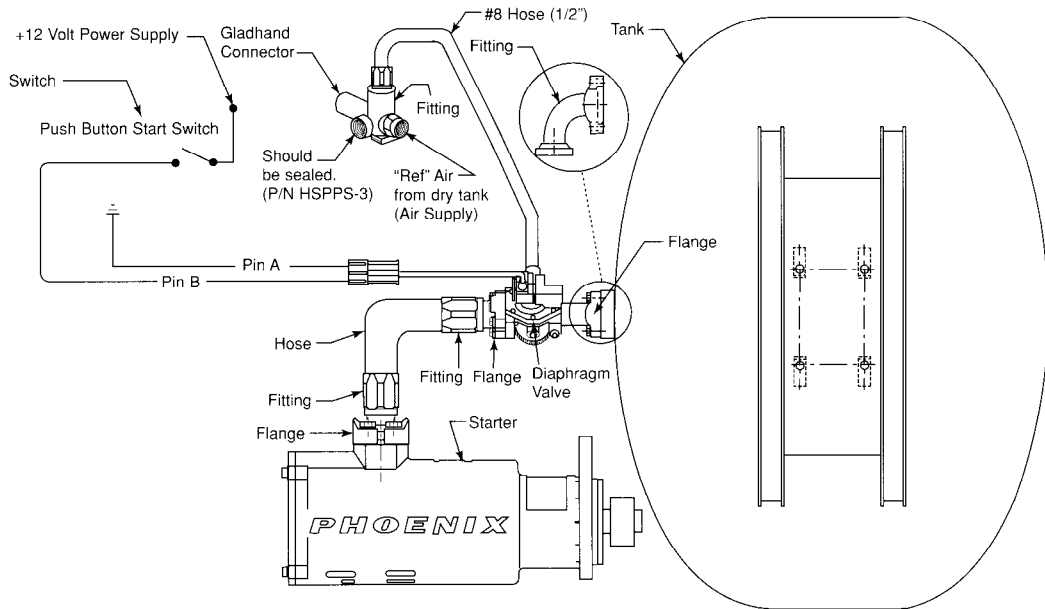
## ST700 Typical Vehicular Installation Turbine Starter Inertia



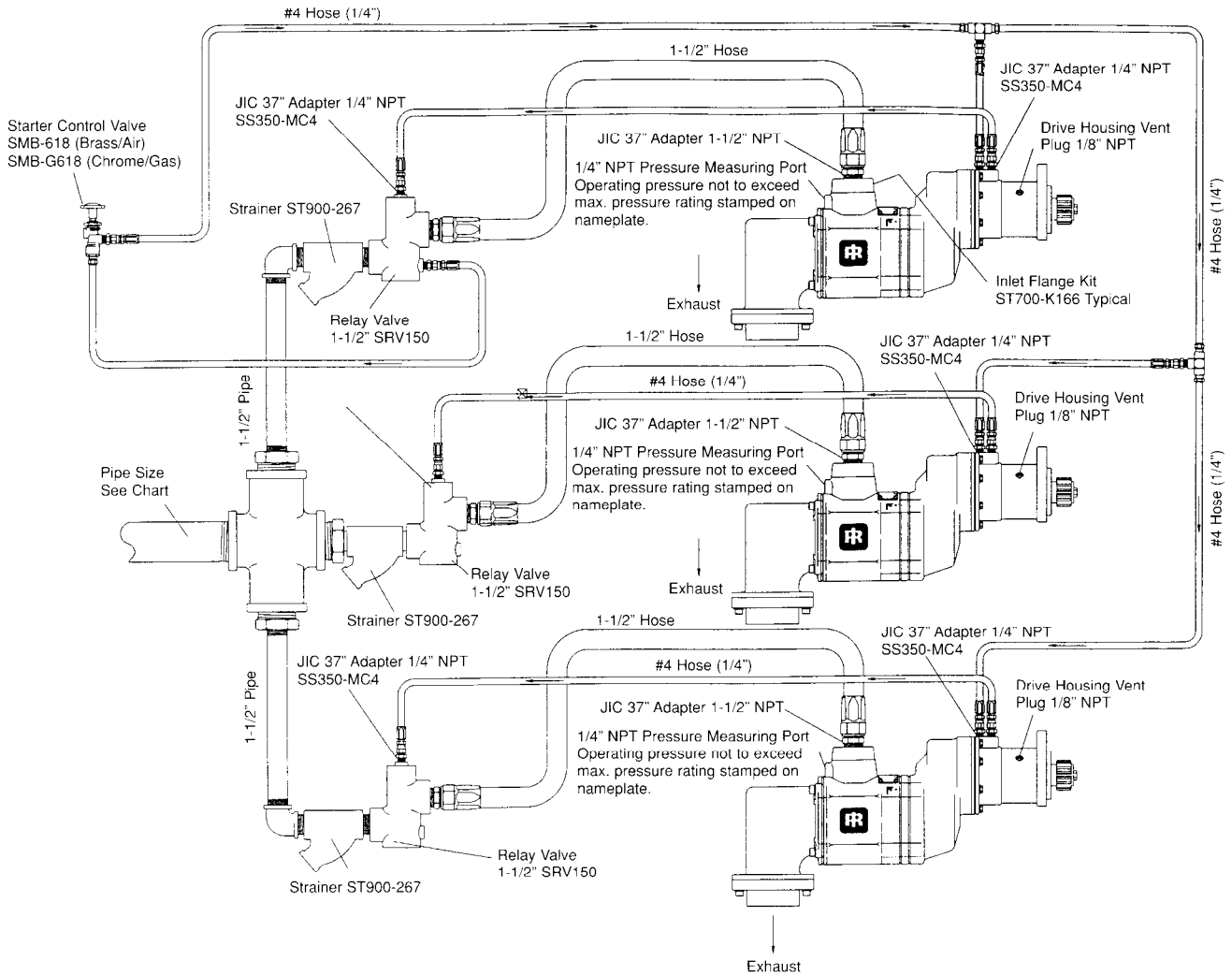
**ST700 Typical Stationary Installation  
Turbine Starter Pre-Engaged**



**ST400 Typical Vehicular Installation  
Turbine Starter**



### ST700/ST900 Typical Multiple Starter Installation Turbine Starter Pre-Engaged



Supply must be adequate to maintain desired operating pressure at the starters with starters running. (Not to exceed max. pressure shown on starter nameplate.)

ST900 Series Multiple Starter Piping Schematic showing the Control Circuit.

NOTE: Use sealant on all pipe connects.

For natural gas operation, starter main exhaust must be piped away.

To pipe the drive housing plug, remove the drive housing plug and replace it with a suitable tubing line. The tubing must vent at a safe location and must not be interconnected with any other exhaust lines which might introduce a back pressure on the drive housing vent.

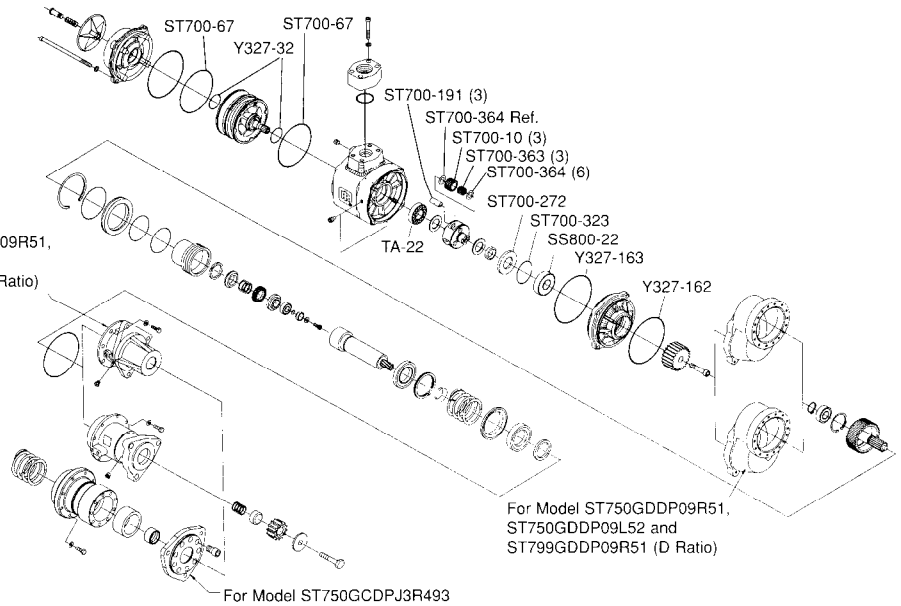
No. Starters	ST950	ST999
	150 PSIG	90 PSIG
	Min. Pipe Size	Min. Pipe Size
2	2-1/2"	3"
3	3"	3-1/2"
4	3-1/2"	4"
5	3-1/2"	4"



**ST700-TK1 Tune-Up Kit**

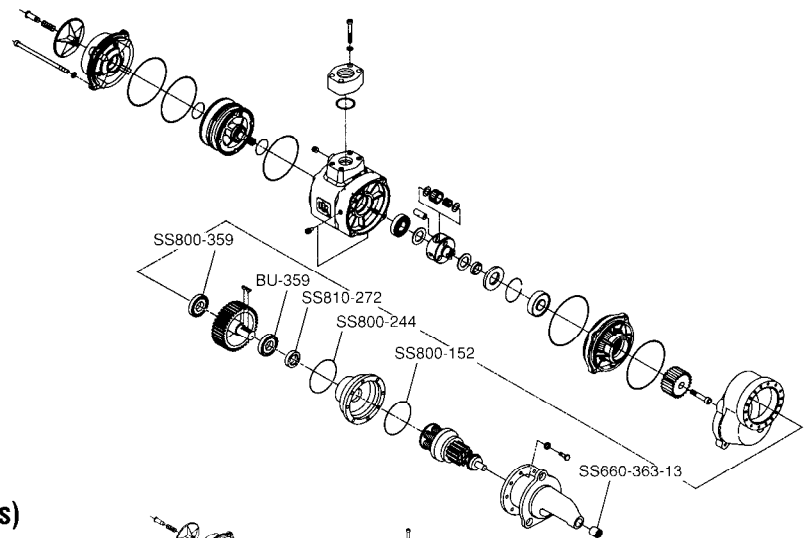
<b>Starter</b>	<b>ST700</b>
<b>Model</b>	
<b>Parts Bulletin</b>	<b>P6921</b>

For Model ST750GDDP09R51,  
ST750GDDP09L52 and  
ST799GDDP09R51 (D Ratio)



**ST700I-TK6 Tune-Up Kit (Inertia Models)**

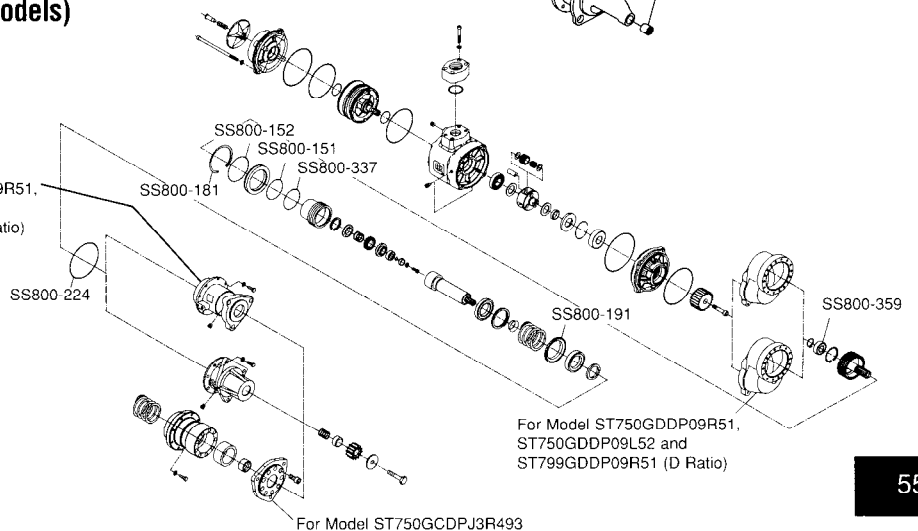
<b>Starter</b>	<b>ST700/ST900</b>
<b>Model</b>	
<b>Parts Bulletin</b>	<b>P6921</b>



**ST700P-TK7 Tune-Up Kit (Pre-Engaged Models)**

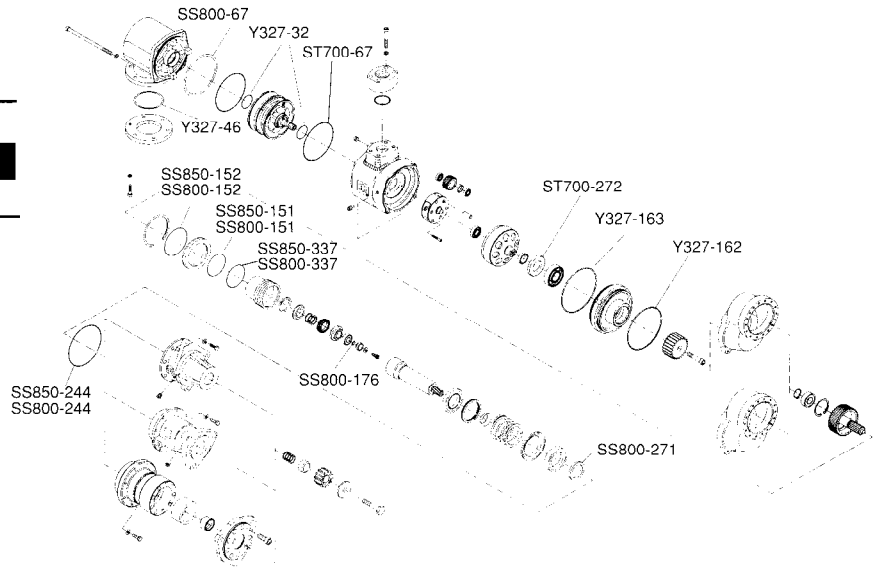
<b>Starter</b>	<b>ST700/ST900</b>
<b>Model</b>	
<b>Parts Bulletin</b>	<b>P6921</b>

For Model ST750GDDP09R51,  
ST750GDDP09L52 and  
ST799GDDP09R51 (D Ratio)



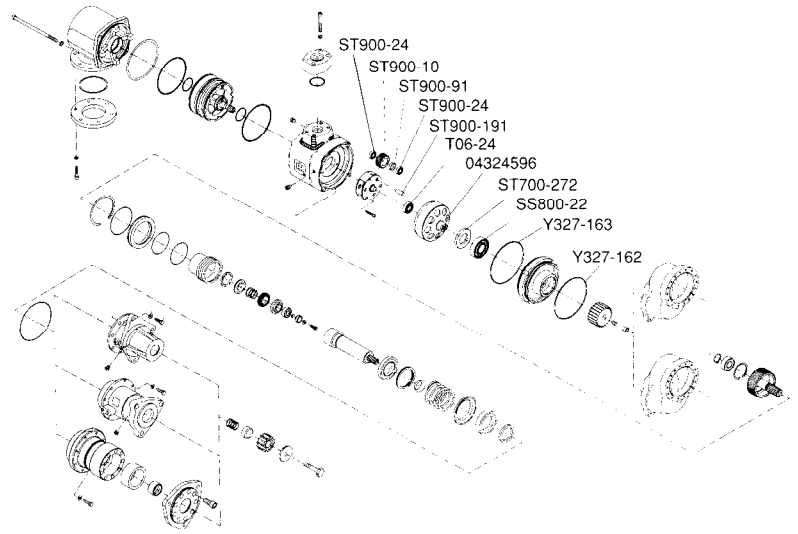
### ST900-SK1 Seal Kit

<b>Starter</b>	<b>ST900</b>
<b>Model</b>	
Installation & Maintenance Manual	P7156



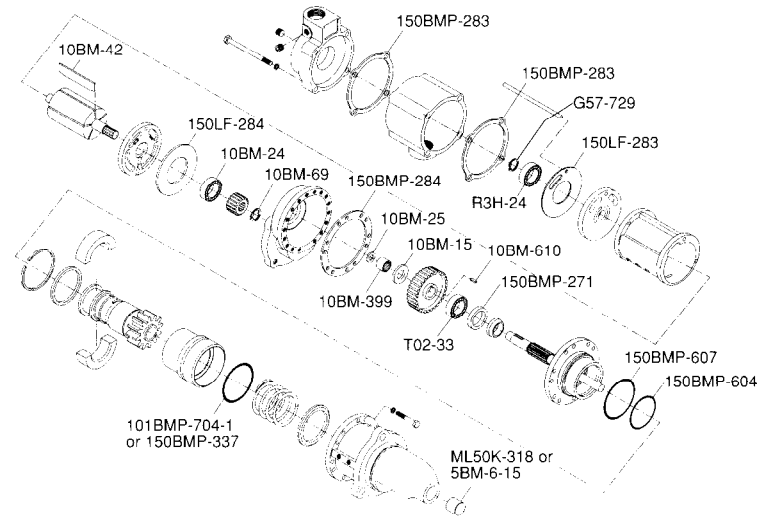
### ST900-GK1 Gear Kit

<b>Starter</b>	<b>ST900</b>
<b>Model</b>	
Installation & Maintenance Manual	P7156



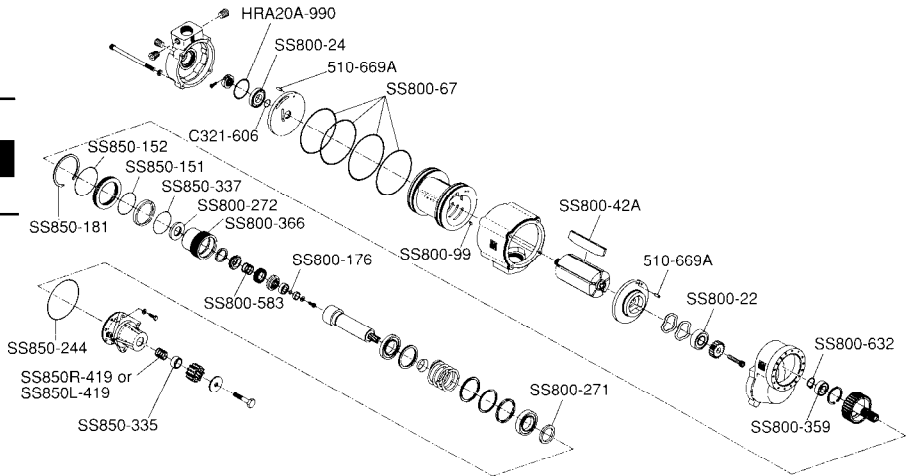
### 150BM-TK2 Tune-Up Kit

Starter	150BM	150BMP
Model		Models C and E
Parts Bulletin	P6031	P6628



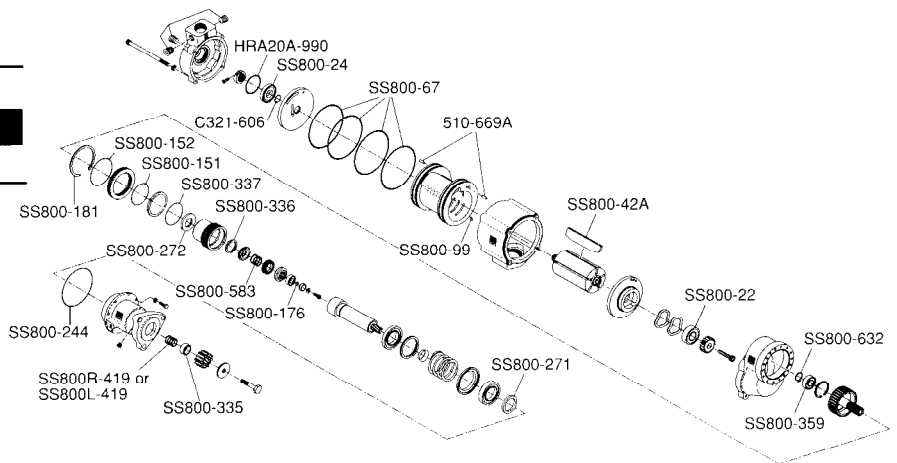
**SS850-TK2 Tune-Up Kit**

<b>Starter</b>	<b>SS850</b>
<b>Model</b>	
Installation & Maintenance Manual	P6567



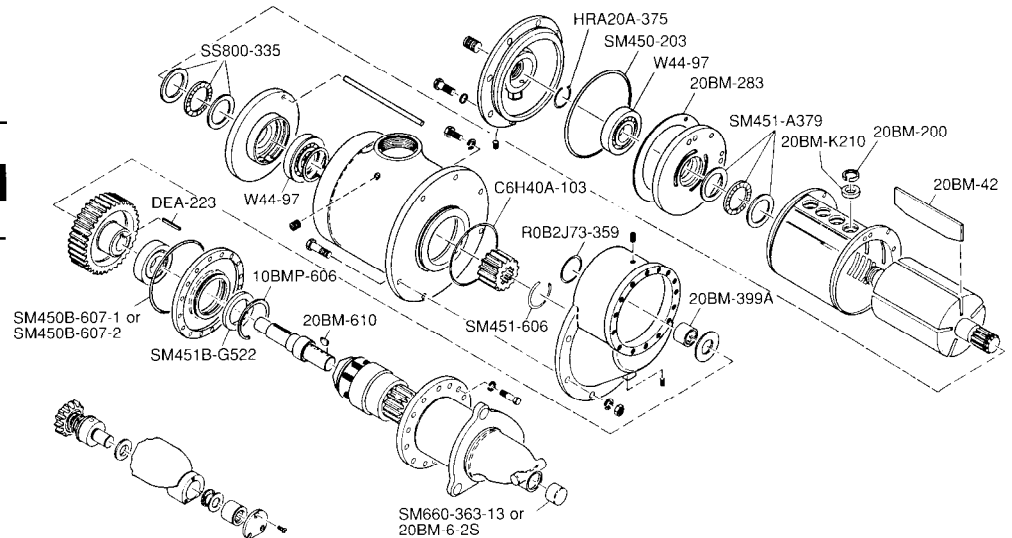
**SS800-TK2 Tune-Up Kit**

<b>Starter</b>	<b>SS800</b>
<b>Model</b>	
Installation & Maintenance Manual	P6567

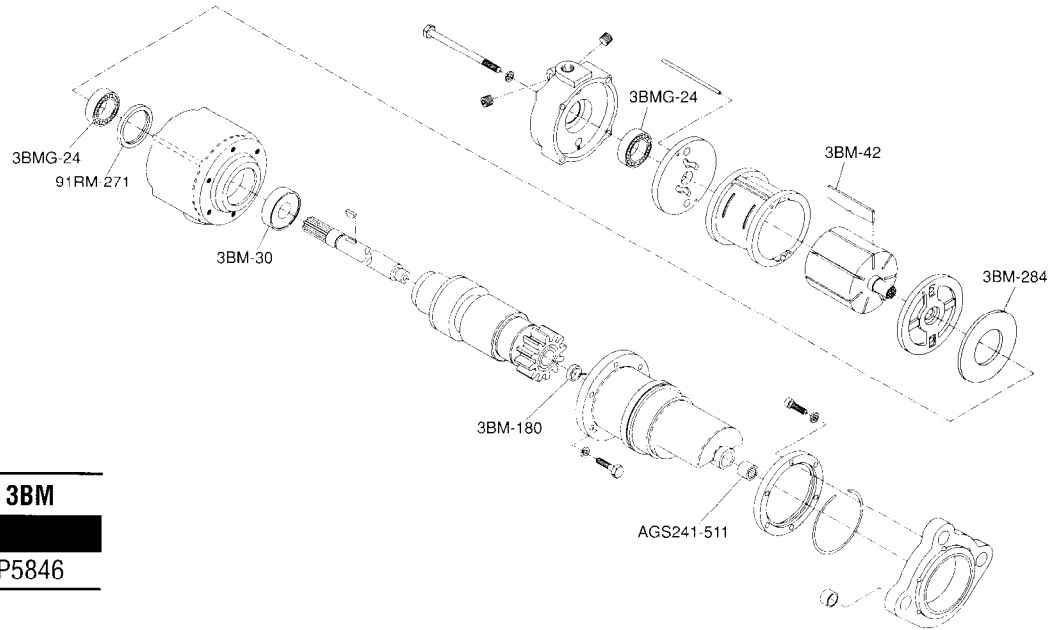


**SS660B-TK2 Tune-Up Kit**

<b>Starter</b>	<b>SS660B</b>
<b>Model</b>	
Parts Bulletin	P6381

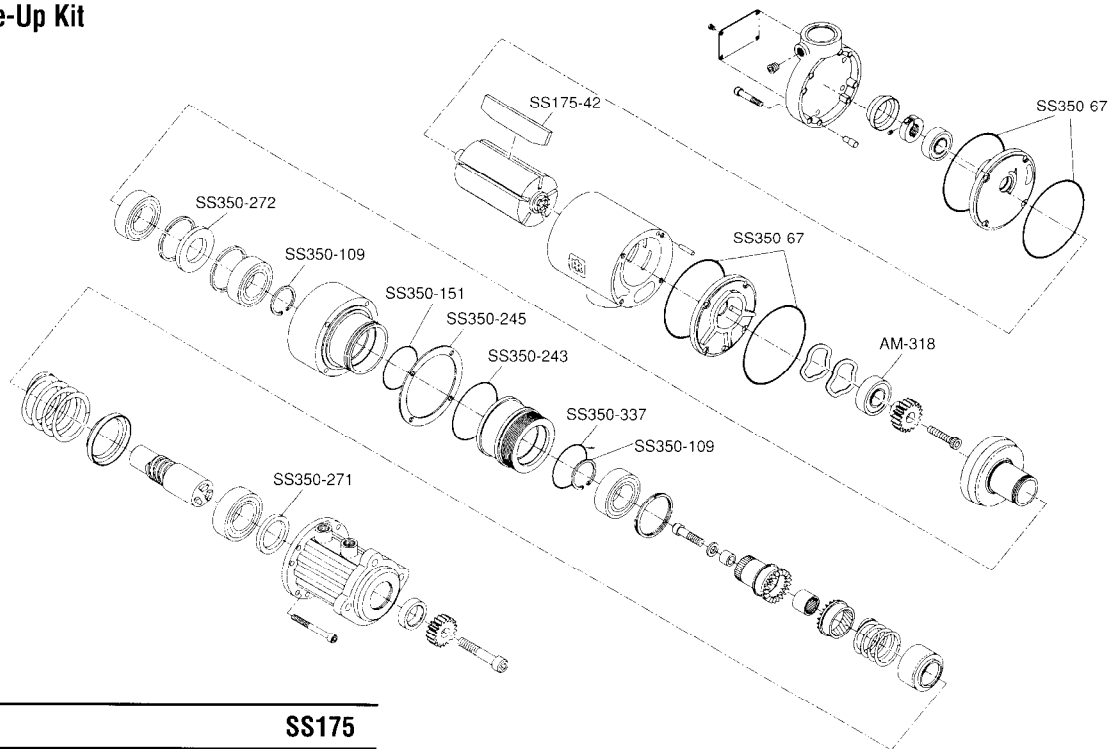


### 3BM-TK2 Tune-Up Kit



<b>Starter</b>	<b>3BM</b>
<b>Model</b>	
Parts Bulletin	P5846

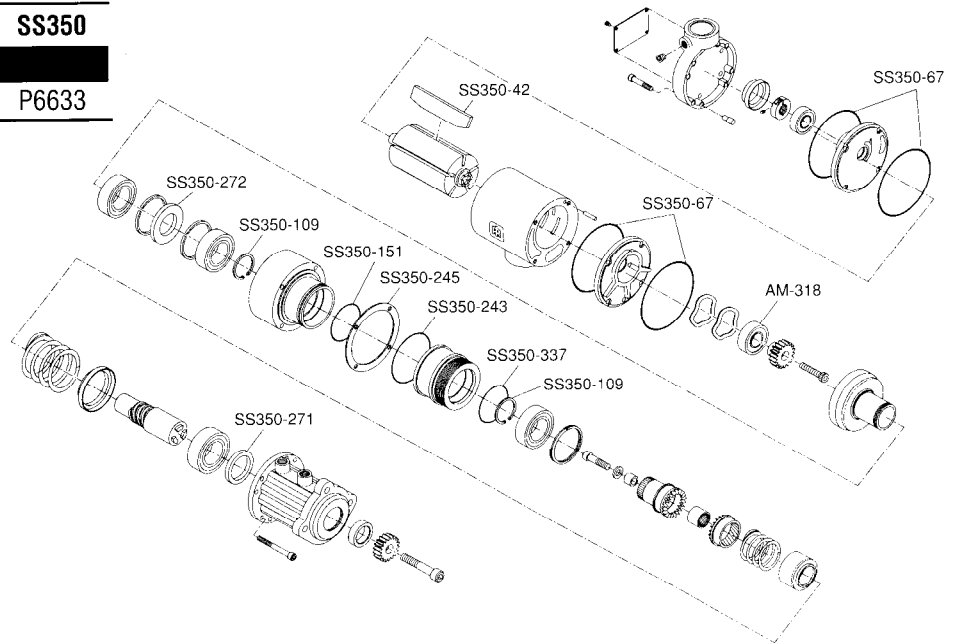
### SS175-TK2 Tune-Up Kit



<b>Starter</b>	<b>SS175</b>
<b>Model</b>	
Installation & Maintenance Manual	P6633

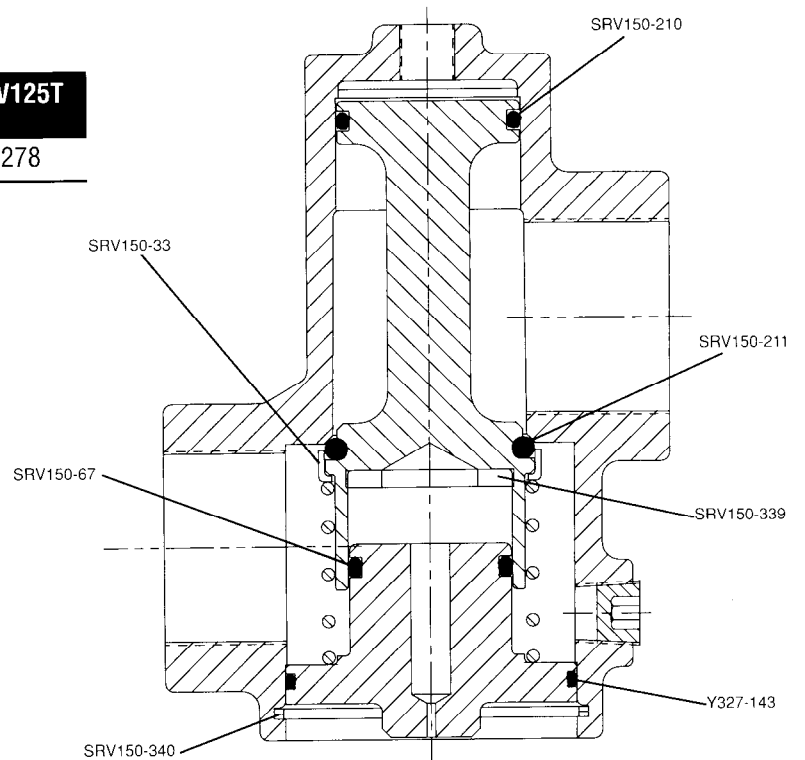
**SS350-TK2 Tune-Up Kit**

<b>Starter</b>	<b>SS350</b>
<b>Model</b>	
<b>Installation &amp; Maintenance Manual</b>	<b>P6633</b>



**SRV150-TK3 Tune-Up Kit**

<b>Model</b>	<b>SRV100, SRV125, SRV150, SRV150SS</b>	<b>SRV125T</b>
<b>Part List</b>	<b>6513</b>	<b>7278</b>



**Small/Midsize Frame Cross Reference**

<b>Current Models</b>					
<b>3BM</b>	<b>5BM</b>	<b>SS175</b>	<b>SS350</b>	<b>150BMP</b>	<b>*ST400I Turbine Option</b>
3BMGA11RH-34F	5BMGA12RH-5F	SS175GB01R15	SS350GB01R15	150BMPE81R15	ST400IC01R15
		<b>SS175GE01R29</b>	<b>SS350GB01R29</b>	<b>N/A</b>	<b>ST400IC01R29</b>
		SS175GE01R31	SS350GB01R31	150BMPE81R54	ST400IC01R31
	<b>5BMGA56RH-49F</b>	<b>SS175GB01R77</b>	<b>SS350GB01R77</b>	<b>N/A</b>	<b>ST400IC01R77</b>
3BMGA11RH-6F	5BMGA56RH-5F	SS175GB01R85	SS350GB01R85	N/A	ST400IC01R85
	<b>5BMGA53RH-2F</b>	<b>SS175GE03R29</b>	<b>SS350GB03R29</b>	<b>150BMPE88R53</b>	<b>ST400IC03R29</b>
		SS175GE03R31	SS350GB03R31	150BMPE88R54	ST400IC03R31
		<b>N/A</b>	<b>SS350GB03L32</b>	<b>150BMPE88L54</b>	<b>ST400IC03L32</b>
		SS175GE03R77	SS350GB03R77	N/A	ST400IC03R77
		<b>SS175GE03R85</b>	<b>SS350GB03R85</b>	<b>N/A</b>	<b>ST400IC03R85</b>
		SS175GE01R31	SS350GB01R31	150BMPE81R54	ST400IC01R31
		<b>SS175GE01L32</b>	<b>SS350GB01L32</b>	<b>150BMPE81L54</b>	<b>ST400IC01L32</b>
		SS175GE01R31	SS350GB01R31	150BMPE81R54	ST400IC01R31
		<b>SS175GE01L32</b>	<b>SS350GB01L32</b>	<b>150BMPE81L54</b>	<b>ST400IC01L32</b>
		SS175GE03R31	SS350GB03R31	150BMPE88R54	ST400IC03R31
		<b>SS175GE03L32</b>	<b>SS350GB03L32</b>	<b>150BMPE88L54</b>	<b>ST400IC03L32</b>

**\* ST400I Series not for use with natural gas.**

Cross reference guide works for starter size upgrades.

When using cross reference check performances curves for torque and hp equivalency.

**Midsize Frame Cross Reference**

Superseded Models			Current Models	
9BM	10BM	150BM	150BM	*ST400I Turbine Option
		150BME21LH-11	150BMGE21LH-11	N/A
		150BME21RH-17	150BMGE21RH-6	N/A
10BMB21RH-31	101BMPC78RH-31	150BME21RH-31	150BMGE21RH-6	N/A
		150BME22RH-5	150BMGE22RH-5	ST400IC03R29
		150BME21LH-11	150BMGE21LH-11	N/A
9BMA31RH-6	10BMB21RH-6	150BME21RH-6	150BMGE21RH-6	ST400IC03R29
9BMA43RH-13	10BMB12RH-13	150BME22RH-5	150BMGE22RH-5	N/A
		150BMPD89LH-50	150BMPD88L54	N/A
		150BMPD89RH-46	150BMPD88R54	N/A
		150LFGE21LH-11	150BMGE21LH-11	ST400IC03R29
		150LFGE22RH-5	150BMGE22RH-5	N/A
		150LFGE21RH-6	150BMGE21RH-6	N/A
		150LFPC83LH-11	150BMPE88L54	ST400IC03L32
		150LFPC81R53	150BMPE81R53	ST400IC01R29
		150LFPC81RH-5	150BMPE81R53	ST400IC01R29
		150LFPC83RH-5	150BMPE88R53	ST400IC03R29
		150BMPC78LH-11	150BMPE88L54	ST400IC03L32
		150BMPC78LH-55	150BMPE88L54	ST400IC03L32
		150BMPC83LH-11	150BMPE88L54	ST400IC03L32
		150BMPC83RH-6	150BMPE88L54	ST400IC03L32
		150BMPE78LH-11	150BMPE88L54	ST400IC03L32
		150BMPE83LH-11	150BMPE88L54	ST400IC03L32
		150LFPE83LH-11	150BMPE88L54	ST400IC03L32
	101BMPC78RH-38	150BMPC78RH-53	150BMPE88R53	ST400IC03R29
9BMA32RH-5	10BMB22RH-5	150BMPE78RH-5	150BMPE88R53	ST400IC03R29
		150BMPE78RH-53	150BMPE88R53	ST400IC03R29
		150LFPE78RH-53	150BMPE88R53	ST400IC03R29
		150BMPC78RH-6	150BMPE88R54	ST400IC03R31
		150BMPE78RH-54	150BMPE88R54	ST400IC03R31
		150BMPE78RH-6	150BMPE88R54	ST400IC03R31
		150LFPC83RH-6	150BMPE88R54	ST400IC03R31
		150LFPE78RH-54	150BMPE88R54	ST400IC03R31
		150BMPE78RH-44	150BMPE88R54	ST400IC03R31

\* ST400I Series not for use with natural gas.

Cross reference guide works for starter size upgrades.

When using cross reference check performances curves for torque and hp equivalency.

**Large Frame Cross Reference**

Superseded Models			Current Models		
SM450	SS660	SS800	SS800	ST700	ST900
			SS810GB03L32	ST750GBI03L32	ST950BI03L32
			SS810GB03R31	ST750GBI03R31	ST950BI03R31
			SS815GB03L32	ST750GBDP03L32	ST950BP03L32
			SS825GC03L26	ST750GCDP03L26	ST950CP03L26
			SS815GB03R31	ST750GBDP03R31	ST950BP03R31
			SS825GC03R25	ST750GCDP03R25	ST950CP03R25
SM450LD971A06	SS660LD971A06		SS850GD09L52	N/A	ST950DP09L52
SM450RD971A05	SS660RD971A05		SS850GD09R51	N/A	ST950DP09R51
SM450LB991A02	SS660LB991A02	SS800GB03L32	SS810GB03L32	ST799GBI03L32	ST999BI03L32
SM450RB991A01	SS660RB991A01	SS800GB03R31	SS810GB03R31	ST799GBI03R31	ST999BI03R31
			SS815GB03L32	ST799GBDP03L32	ST999BP03L32
			SS825GC03L26	ST799GCDP03L26	ST999CP03L26
			SS815GB03R31	ST799GBDP03R31	ST999BP03R31
			SS825GC03R25	ST799GCDP03R25	ST999CP03R25
			SS850GD09L52	N/A	ST999DP09L52
			SS850GD09R51	N/A	ST999DP09R51







**AIR STARTER LIMITED WARRANTY**

Ingersoll-Rand Company (I-R) warrants to the original user its air starters (Starters) to be free of defects in material and workmanship for a period of one year from the date of purchase. I-R will repair, without cost, any Starter found to be defective, including parts and labor charges, or at its option, will replace such Starters or refund the purchase price less a reasonable allowance for depreciation, in exchange for the Starter. Repairs or replacements are warranted for the remainder of the original warranty period. If any Starter proves defective within its original one year warranty period, it should be returned to any Authorized Air Starter Service Distributor, transportation prepaid with proof of purchase or warranty card. This warranty does not apply to Starters which I-R has determined to have been misused or abused, improperly maintained by the user, or where the malfunction or defect can be attributed to the use of non-genuine I-R repair parts.

THE DURATION OF THE EXPRESSED WARRANTY PERIOD AS SET FORTH ABOVE. I-R'S MAXIMUM LIABILITY IS LIMITED TO THE PURCHASE PRICE OF THE STARTER AND IN NO EVENT SHALL I-R BE LIABLE FOR ANY CONSEQUENTIAL, INDIRECT, INCIDENTAL, OR SPECIAL DAMAGES OF ANY NATURE ARISING FROM THE SALE OR USE OF THE STARTER, WHETHER IN CONTRACT, TORT, OR OTHERWISE. NOTE: Some states do not allow limitations on incidental or consequential damages or how long an implied warranty lasts so that the above limitations may not apply to you. This warranty gives you specific legal rights and you may also have other rights which may vary from state to state.

Other warranties applicable based on product and/or specific applications.

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Southern Pines, NC 28387  
(910) 692-8700  
(910) 692-7822 (Fax)

**CANADA**

National Sales Office  
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(416) 858-8480

Kirkland, Quebec H9H 4S3  
3501 St. Charles Blvd.  
(514) 695-9040

Vancouver, British Columbia  
Richmond, B.C. V7C 5C7  
201-6351 Westminster Highway  
(604) 278-0459

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**INGERSOLL-RAND**  
**PRODUCTION EQUIPMENT**

**Engine Starting Systems**

Ingersoll-Rand Company  
P.O. Box 8000  
1725 U.S. Hwy #1-N  
Southern Pines, NC 28387