TECH DEVELOPMENT

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INSTALLATION AND OPERATING MANUAL

T30ML
TURBOTWIN Air Motor

GENUINE PARTS
TURBOTWIN™
AIR STARTERS
KEEP IT REAL

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1.0 GENERAL INFORMATION

This manual provides instructions for the installation and operation of the TDI TurboTwin™ Model T30 ML air motors. If there are questions not answered by this manual, please contact your TDI TurboTwin™ distributor or dealer for assistance.

The T30 ML is a turbine driven air motor with a .625" diameter keyed output shaft. The T30 ML is designed for installation on an oil pump with D-type mounting flange.

The T30 Series motors are suited to operate within a wide range of inlet air pressures and ambient temperatures.

A pressure regulator installed within 10 feet of the motor can be used to adjust pressure to the motor.

The T30 Series motors are designed for operation with compressed air or natural gas. Moderate amounts of foreign matter or liquid in the air stream will normally not adversely affect T30 Series motors.

As with all other TDI TurboTwin™ models, **no lubrication** is required in the supply air.

You need to review the rest of this manual before installing your TDI TurboTwin™ T30 Series motor.

1.1 WARNINGS, CAUTIONS, & NOTES

Throughout this manual, certain types of information will be highlighted for your attention:

WARNING - used where injury to personnel or damage to the equipment is possible.

CAUTION - used where there is the possibility of damage to the equipment.

NOTE - used to point out special interest information.

1.2 INSTALLATION and SERVICE

The TDI TurboTwin™ T30 Series motors provide distinct advantages of size and efficiency compared to electric motors, vane-type, or other turbine-type air motors. It is important to properly install the motor to receive full benefit of these advantages.

Repair technicians or service organizations without turbine motor experience should not attempt to repair this machine until they receive factory approved training from TDI, or its representatives.

Proper operation of your TDI TurboTwin™ T30 Series motor will assure continued reliable and superior performance for many years.

WARNING

The TDI TurboTwin™ T30 Series motors must be installed and operated in accordance with the instructions given in this manual. Failure to properly install the motor or failure to operate it according to these instructions may result in damage to the motor, the engine, or cause personal injury.

NOTE

THIS MOTOR IS TO BE SERVICED ONLY BY AUTHORIZED TDI TURBOTWIN™ DISTRIBUTORS, DEALERS, AND REPAIR STATIONS. DO NOT OPERATE THIS MOTOR UNLESS IT IS PROPERLY INSTALLED ON AN ENGINE.

2.0 ORIENTATION OF THE MOTOR

The factory orientation of the motor's mounting flange is ideally configured for most applications and does not required reorientation.

2.1 MODEL T30-I ORIENTATION

Determine the required orientation of the optional exhaust port if installed.

2.1.1 Exhaust Housing Orientation

If this unit has an optional exhaust housing remove the seven (if a 90º elbow) or eight (if a straight exhaust) socket head cap screws connecting the exhaust to the turbine assembly. Rotate the exhaust housing to the desired position relative to the inlet port.

Reinstall the seven or eight socket head cap screws. **Torque to 61 Lbs.-In. (6.89 Nm)**

CAUTION
Ensure the O-ring on the exhaust housing remains in position and is not cut.

3.0 INSTALLING THE MOTOR

The T30ML air motor is configured with a footed section on the gearbox housing for installing onto the engine or appropriate mounting bracket. The air motor and optional 7 or 30 GPM oil pump if attached to motor should be mounted in a horizontal position as shown.

The piping illustrated may vary in shape, but there must at least be a start initiation switch, air supply, and a motor relay valve to correctly install and operate a T30 Series motor.

NOTE
Installing the air piloted relay valve on the motor is preferred in installations where the space is available.

TDI recommends mounting the air piloted relay valve no more than 3 meters (10 feet) from the motor's inlet port, and as close to the motor as possible. If the motor is being installed on a vehicle where the air tank is within 3 meters (10 feet) of the motor, then the relay valve may be mounted on the tank.

A turbine driven motor does not require lubrication in the supply air. Therefore, if a vane-type motor is being replaced, TDI recommends that all lubrication devices and lines be removed to minimize flow restrictions.

WARNING
If a fuel (pulse) lubricator is installed in the system, disconnect and plug the line to eliminate spraying diesel fuel on the engine.

After mounting the motor to the engine, attach the supply air line from the tank including any control air lines, air piloted relay valve and solenoids.

TDI recommends installation of a "Glad Hand" / quick disconnect for auxiliary pressurization of the air tank.

Because turbine motors are sensitive to flow restrictions, care must be taken to use uniform sized hose or tubing and fittings for connection of the supply air line. Tees, elbows, and line length must be kept to a minimum.

TDI recommends that hose or flex couplings be installed to eliminate possible leakage caused by strain on the supply air line.

Normally an air strainer is not required. In dirty environments, use of a #40 mesh Y-strainer is recommended.

Only type approved metallic hose assemblies are approved in permanently pressurized compressed air lines of motors.

Non-metallic hose assemblies are allowed only in case the piping system will be emptied after the starting procedure.

Pipe unions must be type approved by GL. Downstream of the pressure regulator a pressure relief valve is to be provided.

WARNING
Recheck all connections for tight fit to eliminate leakage.

Fill the air system tank. The T30 Series motor is now ready to operate.

4.0 MOTOR OPERATION

The maximum operating pressure limit is that pressure measured at the motor inlet pressure check port during the run cycle. In order to check the motor inlet pressure, a 1/8" NPT pipe tap connection is provided just below the main inlet for attaching a pressure gauge. Refer to Figure 1. IN NO CASE SHOULD INLET OPERATING PRESSURE EXCEED 10.3 BAR (150 PSIG).

WARNING
Do not operate the TDI TurboTwin T30 Series air motor with air pressure greater than the pressure rating on the nameplate. This pressure should be measured at the motor inlet while the motor is operating.

The static supply pressure will always be higher than the operating pressure. As a guideline, the maximum pressure limit (proof pressure) that the T30 Series motor may be subjected to is 600 PSIG (41.4 Bar).

System pressure that exceeds the maximum operating limit must use a pressure regulator to ensure operating pressure limit to the T30 Series motor is maintained.

System pressure that exceeds the 600 PSIG (41.4 Bar) limit must, in addition to a pressure reducer device, incorporate a pressure relief valve, set below 600 PSIG Bar (41.4) in the supply air line.

All appropriate local pressure codes and pressure limitations on other system components must be adhered to and supersede guidelines given in this manual.
If the motor fails to function properly when first operated, or its performance deteriorates with use, refer to the Operator's Trouble Shooting Guide, Section 6.0. If you cannot solve the problem, or repair is necessary, contact your local TDI TurboTwin™ distributor or dealer.

CAUTION
The grease used in the planetary system has a shelf life of 2 years. Therefore, if the motor is NOT installed and operated on the engine for 2 years after the motor is manufactured, the grease should be replaced prior to motor operation. The manufactured date is reflected in the motor serial number. (Ex: 0602-0567 has a manufactured date of February 2006).

5.0 WARRANTY

Tech Development (TDI) warrants to the original user of the TDI *TURBOTWIN*™ air motors to be free from defects in material and workmanship for a period of one year. The warranty period shall not extend beyond two years from the date the unit was manufactured. (i.e.: a unit with a manufactured date of July 1999 (SN: 9907-101) will not be covered under warranty after July 2001). The conditions of this warranty are: **a)** TDI is notified within this period by return of such product to TDI or its authorized distributor/dealer, transportation prepaid by user; **b)** the motor has been installed according to TDI's specifications; **c)** the motor has not been misused, abused, or improperly maintained by user; **d)** the defect is not the result of normal wear and tear; **e)** the motor has been repaired with parts manufactured or authorized by TDI; and **f**) TDI installation and repair procedures as outlined in the appropriate manual were properly followed.

Tech Development will repair, or at its option, replace the unit during the warranty period at no charge to the customer, provided it is returned to TDI with the proper return procedure.

Tech Development makes no other warranty, and implied warranties including any warranty or merchantability or fitness for a particular purpose are hereby disclaimed.

This warranty constitutes the entire obligation of Tech Development relating to the sale and use of such product, and TDI's maximum liability is limited to the purchase price of such product at the date of purchase. In no event shall TDI be liable for incidental, indirect, consequential, or special damages of any nature arising from the sale or use of such engine motor product.

6.0 OPERATOR'S TROUBLESHOOTING GUIDE

TROUBLE	PROBABLE CAUSE	SOLUTION
1. Air always flow through exhaust	A. Relay valve improperly installed.	A. Check typical installation diagram and correct
	B. Relay valve not sealing properly.	B. Check for damaged sealing ring, replace relay valve or damaged parts.
	C. Control valve not sealing, pressure remains in APP port of relay valve.	C. Check control valve and replace if necessary.
2. Motor does not run, small air flow from turbine exhaust.	A. Nozzle blockage.	A. Remove blockage or obstruction from nozzles.
3. Motor does not run. Normal air flow from exhaust.	A. Excessive bends in the supply line.	A. Shorten length or straighten supply air line.
4. Motor runs but pump rotates slowly or not at all.	A. Air pressure too low	A. Increase air pressure to 40 -150 psig.
	B. Excessive back pressure.	B. Increase inlet pressure or reduce back pressure.
	E. Nozzle blocked or damaged.	D. Remove blockage or replace damaged parts.
5. Motor continues to operate after start button is released.	A. Control valve is not sealing correctly.	A. See 1C. above
	B. Relay valve is not sealing correctly.	B. See 1B. above
6. Air tank pressure decays after extended shut down.	A. Air connections are too tight.	A. Tighten loose fittings. Repair or replace damaged fittings.
	B. Damaged air lines: crushed, frayed, kinked.	B. Replace damaged lines.
	C. Relay valve is not sealing correctly.	C. See 1B. above
	D. Control valve is stuck open.	D. See 1C. above

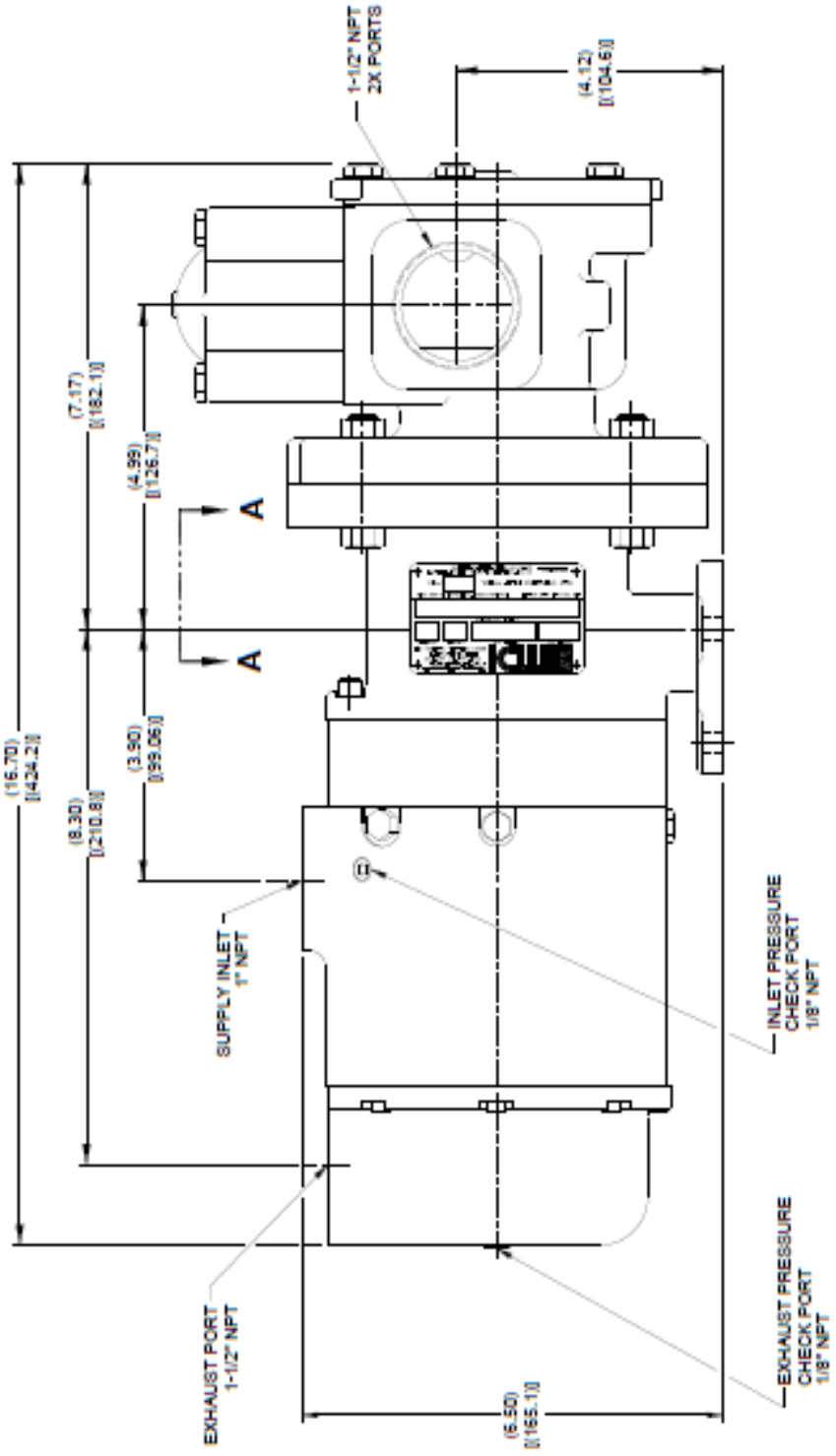


Figure 1. T30ML TurboTwin Air Motor w/Pump Envelope Drawing

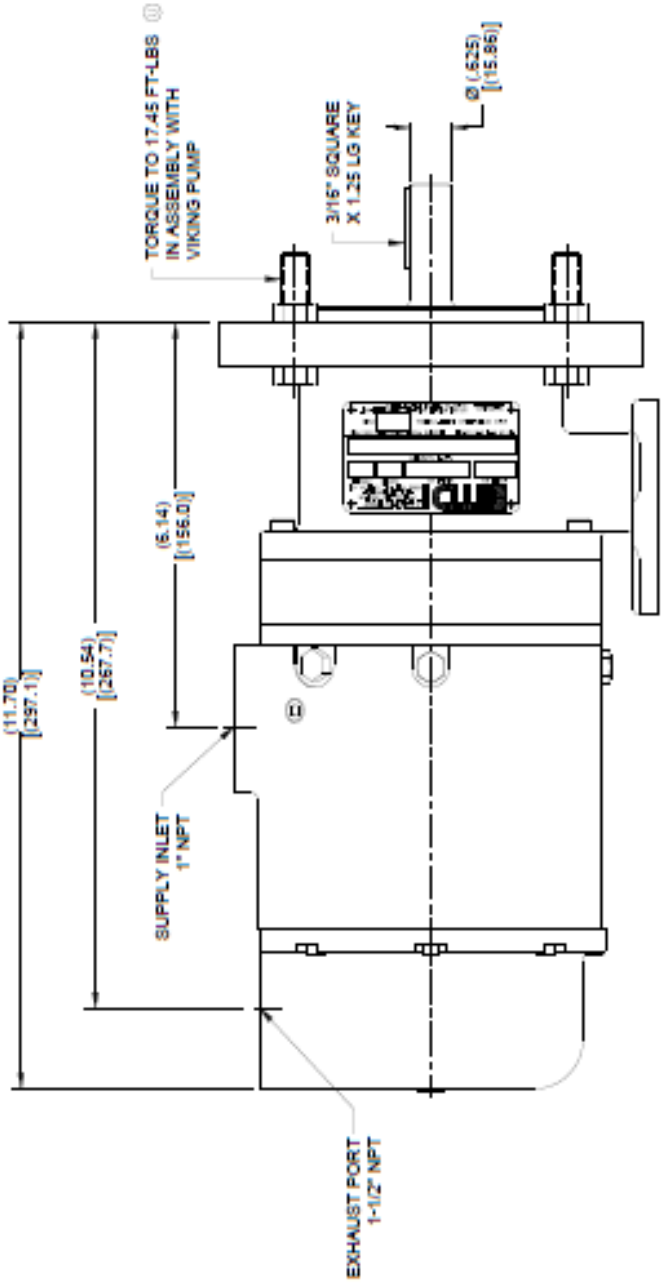
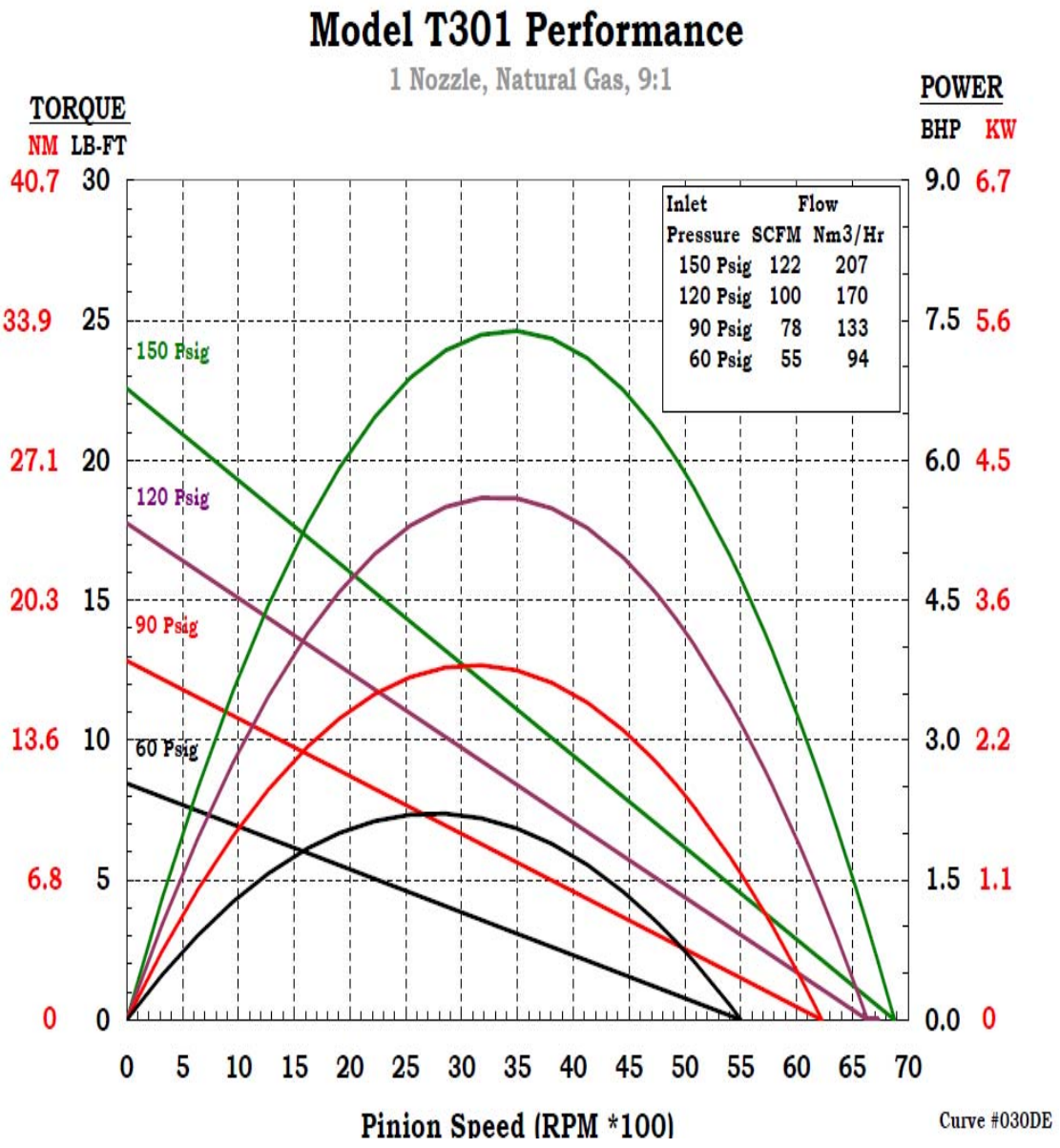
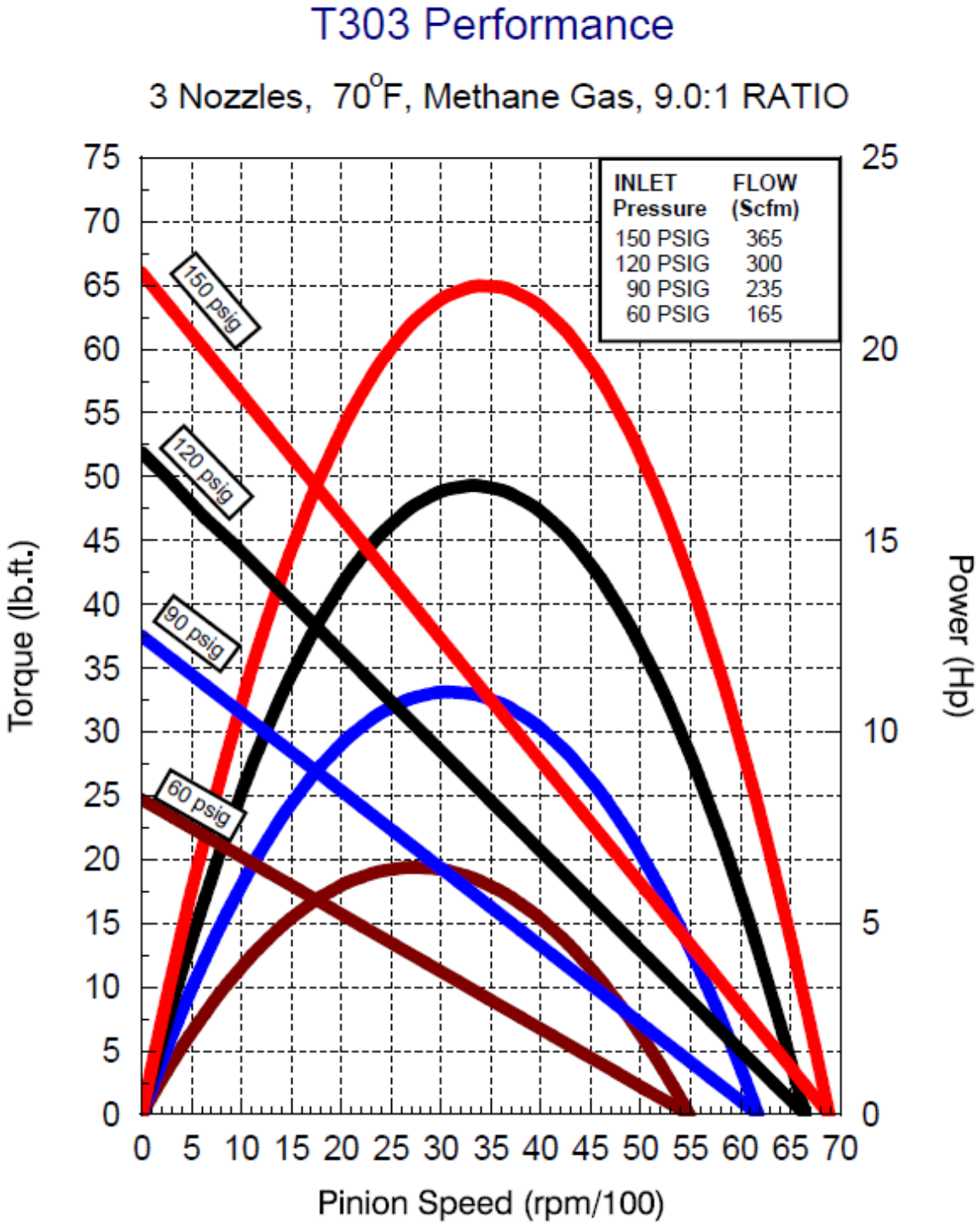


Figure 2. T30ML TurboTwin Air Motor Envelope Drawing


Model T301 Performance
1 Nozzle, Natural Gas, 9:1
TORQUE
NM LB-FT
POWER
BHP KW
40.7 30
33.9 25
27.1 20
20.3 15
13.6 10
6.8 5
0 0
9.0 6.7
7.5 5.6
6.0 4.5
4.5 3.6
3.0 2.2
1.5 1.1
0.0 0
Inlet Pressure
Flow SCFM Nm3/Hr
150 Psig 122 207
120 Psig 100 170
90 Psig 78 133
60 Psig 55 94
150 Psig
120 Psig
90 Psig
60 Psig
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70
Pinion Speed (RPM *100)
Curve #030DE


T303 Performance
3 Nozzles, 70°F, Methane Gas, 9.0:1 RATIO
INLET Pressure
FLOW (Scfm)
150 PSIG 365
120 PSIG 300
90 PSIG 235
60 PSIG 165
150 psig
120 psig
90 psig
60 psig
Torque (lb.ft.)
Power (Hp)
Pinion Speed (rpm/100)
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75
0 5 10 15 20 25