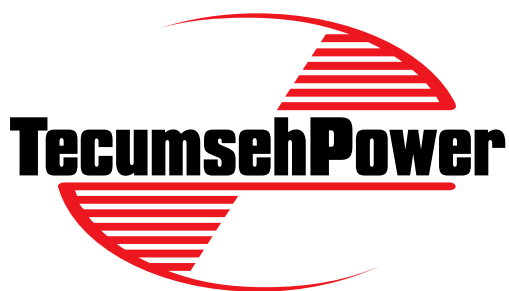


TECUMSEH POWER

Basic Troubleshooting and Service Information



ENGINES & TRANSMISSIONS

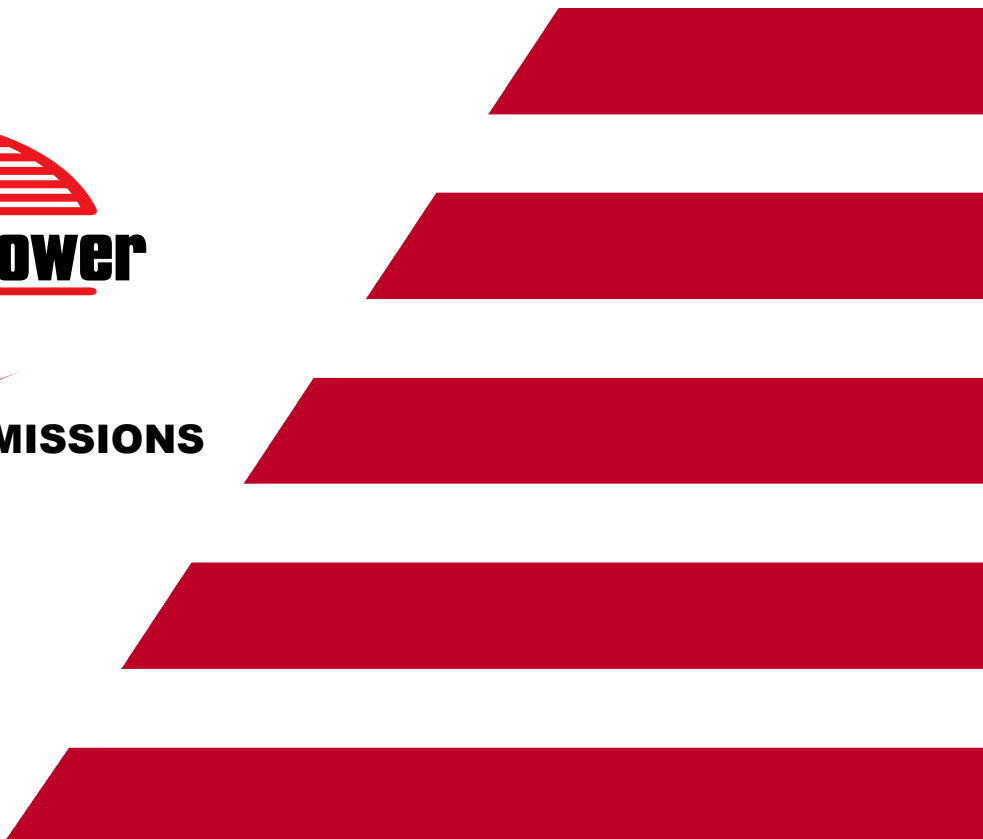


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The information in this guide is intended to assist individuals who are knowledgeable in basic engine repair and maintenance. If you are unfamiliar with two and four cycle engine operation and maintenance, DO NOT attempt any maintenance or repairs. Contact your local TecumsehPower Servicing Dealer for assistance.

IMPORTANT NOTICE!

Safety Definitions

Statements in this manual preceded by the following words and graphics are of special significance:



Or



WARNING indicates a potentially hazardous situation which if not avoided, could result in death or serious injury.

NOTE

Refers to important information and is placed in italic type.

It is recommended that you take special notice of all items discussed on the next two pages and wear the appropriate safety equipment.

Before operating an engine *it is your responsibility* to read the Operator's Manual. Follow these basic rules for your personal safety:

- Keep this manual handy at all times for future reference.
- Read it carefully and familiarize yourself with operating, maintenance, components and safety instructions.

Notice Regarding Emissions

Engines which are certified to comply with California and U.S. EPA emission regulations for SORE (Small Off Road Equipment), are certified to operate on regular unleaded gasoline, and may include the following emission control systems: (EM) Engine Modification and (TWC) Three-Way Catalyst (if so equipped).

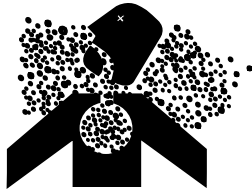
TecumsehPower Contact Information

For engine adjustments, repairs or warranty service, contact your nearest Authorized TecumsehPower Servicing Dealer. Find them on our website at www.TecumsehPower.com or call TecumsehPower at 1-800-558-5402 or 262-377-2700 if you are located outside the U.S.

General Safety Precautions

A. Avoid Carbon Monoxide Poisoning

All engine exhaust contains carbon monoxide, a deadly gas. Breathing carbon monoxide can cause headaches, dizziness, drowsiness, nausea, confusion and eventually death.



Carbon monoxide is a colorless, odorless, tasteless gas which may be present even if you do not see or smell any engine exhaust. Deadly levels of carbon monoxide can collect rapidly and you can quickly be overcome and unable to save yourself. Also, deadly levels of carbon monoxide can linger for hours or days in enclosed or poorly-ventilated areas. If you experience any symptoms of carbon monoxide poisoning, leave the area immediately, get fresh air, and **SEEK MEDICAL TREATMENT**.

To prevent serious injury or death from carbon monoxide:

- NEVER run engine indoors. Even if you try to ventilate engine exhaust with fans or open windows and doors, carbon monoxide can rapidly reach dangerous levels.
- NEVER run engine in poorly-ventilated or partially enclosed areas such as barns, garages, basements, carports, under dwellings, or in pits.
- NEVER run engine outdoors where engine exhaust can be drawn into a building through openings such as windows and doors.

B. Avoid Gasoline Fires

Gasoline (fuel) vapors are highly flammable and can explode. Fuel vapors can spread and be ignited by a spark or flame many feet away from engine. To prevent injury or death from fuel fires, follow these instructions:



- NEVER store engine with fuel in fuel tank inside a building with potential sources of ignition such as hot water and space heaters, clothes dryers, electric motors, etc.
- NEVER remove fuel cap or add fuel when engine is running.
- NEVER start or operate the engine with fuel fill cap removed.
- Allow engine to cool before refueling.
- NEVER fill fuel tank indoors. Fill fuel tank outdoors in a well-ventilated area.
- DO NOT smoke while refueling tank.
- Use only an approved red GASOLINE container

to store and dispense fuel. TecumsehPower recommends purchasing gasoline in containers with a capacity of 2.5 gallons or less. Small containers are easier to handle and help eliminate spillage during refueling.

- DO NOT pour fuel from engine or siphon fuel by mouth.

C. Adult Supervision of Operation, Refueling and Maintenance

Not everyone who is allowed to use an engine is capable of safely and responsibly operating, maintaining and/or fueling it. TecumsehPower recommends the following:

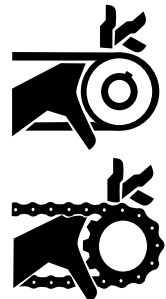
- An adult should fuel the engine. NEVER allow children to refuel an engine.
- An adult should perform maintenance on an engine. Only allow children to perform maintenance if an adult has determined they are experienced and capable of such operation.
- An adult should start the engine. Only allow children to start the engine if an adult has determined they are experienced and capable of such operation.

To avoid unsupervised operation of the engine, especially by children, NEVER leave it unattended when it is running.

D. Stay Away from Rotating Parts

NEVER operate an engine with an unguarded engine shaft.

The equipment manufacturer may attach a sprocket and chain or pulley and belt to the engine shaft. If these parts are not properly guarded, or if you are not sure whether they are properly guarded, DO NOT use your engine; contact the equipment manufacturer. Hands, feet, hair, jewelry, clothing, etc. can become entangled in rotating parts, leading to serious injury or death. To avoid serious injury or death, be sure the flywheel guard is in place.



General Information

The following information is being provided to assist you in locating and recording your engine model and specification numbers. This information will be needed to use this book or obtain parts from a local TecumsehPower dealer.

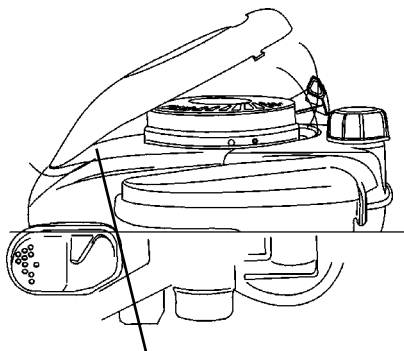
Model Numbering System for TecumsehPower's Full Engine Line Prior to 2004 Production

LOCATING AND READING ENGINE MODEL AND SPECIFICATION
 THE FOLLOWING WILL BE NEEDED TO LOCATE PARTS FOR YOUR ENGINE.

| | | | |
|---------|-----------------|--------------------------|----------------|
| ENGINE: | Model TVM195 | Specification 150288G | (DOM) 8150C |
|---------|-----------------|--------------------------|----------------|

| | | |
|-------------------------------|----------------------------|-----------------------|
| ENGINE MODEL TVM195 | SPEC NO. 150288G | D.O.M 8150C |
|-------------------------------|----------------------------|-----------------------|

Typical Engine I.D. Label



ENGINE MODEL NUMBER LOCATED UNDER COVER

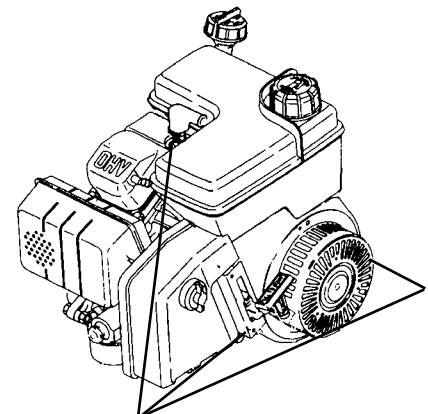
IMPORTANT ENGINE INFORMATION

Tecumseh Power Company

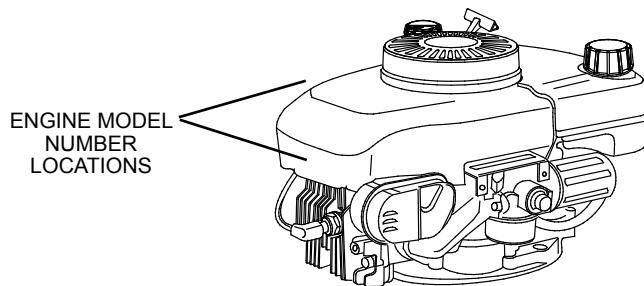
THIS ENGINE MEETS 1995-1998 CALIF./US
 EPA PH1 APPLICABLE EMISSION REGULATIONS FOR ULGE ENGINES FUEL REGULAR
 UNLEADED OIL SAE 30

| | | |
|---------------|-----------------------|---------------------------------|
| ENGINE MODEL | TVM195 150288G | (E) |
| ENGINE FAMILY | STP318U1G2EA | |
| DISPLACEMENT | 318 | D.O.M. 8150 C (S E R) |

CAUTION FOR PERSONAL PROTECTION REFER TO OWNER'S MANUAL FOR IMPORTANT SAFETY AND MAINTENANCE INFORMATION



ENGINE MODEL NUMBER LOCATIONS



ENGINE MODEL NUMBER LOCATIONS

Model Numbering System for Current TecumsehPower's Full Engine Line

Reviewing The Engine ID Label

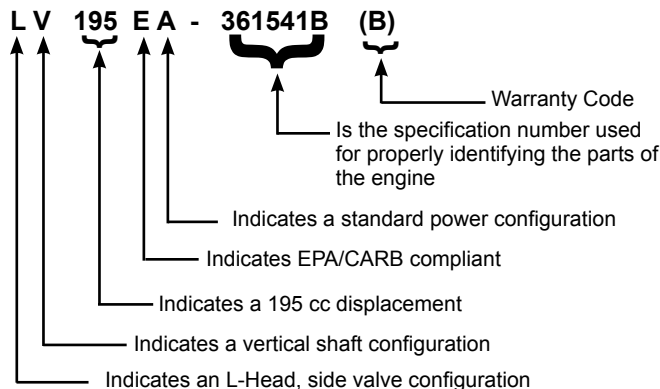
Effective with the 2004 Model Year, we have changes to the engine I.D. label on our products. The following pages will explain the information contained on the label dependent on the age of your product.

Specification Number

The numbers following the model number make up the specification number.

Using model **LV195EA-361541B**, as an example, interpretation is as follows:

LV195EA-361541B is the model and specification number.

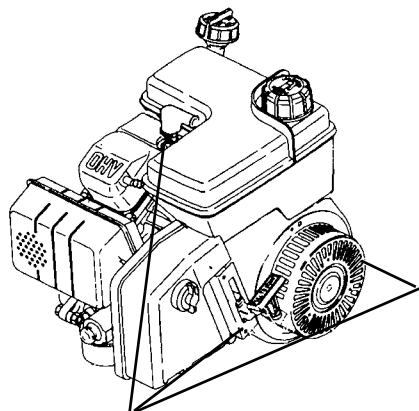


Date of Manufacture

The Date of Manufacture (D.O.M.) indicates the production date.

For this example, **03188BC0010** is the D.O.M. (Date of Manufacture).

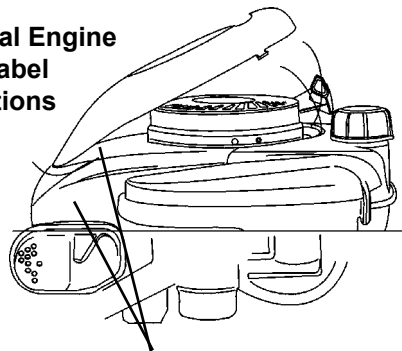
| Year | Day of Year | Mfg Facility | Assembly Line / Shift | Individual Serial # |
|-----------|-------------|--------------|-----------------------|---------------------|
| 2003 | 188th | B | C | 10th unit built |
| 03 | 188 | B | C | 0010 |



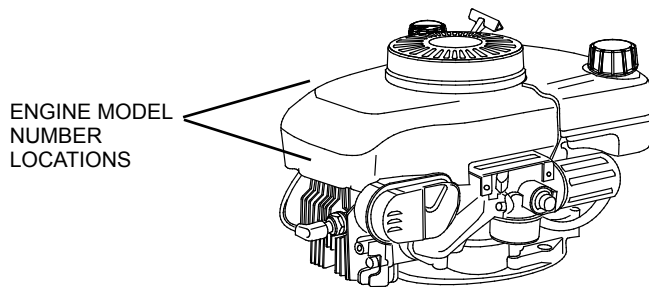
ENGINE MODEL NUMBER LOCATIONS



Typical Engine I.D. Label Locations



ENGINE MODEL NUMBER LOCATED UNDER COVER



ENGINE MODEL NUMBER LOCATIONS

Model Numbering Identification for TecumsehPower's Full Engine Line

| |
|--|
| CURRENT CODE <i>(effective 2004 production)</i> |
| 1st Space - Valve Orientation |
| T = Two Cycle |
| O = Overhead Valve |
| L = L-Head |
| |
| 2nd Space - Crank Orientation |
| V = Vertical |
| H = Horizontal |
| M = Multi-position |
| |
| 3rd, 4th and 5th Space - Displacement |
| |
| 6th Space - Emissions Class |
| E = 50 State/Global Emissions Compliant |
| X = Not for sale in California, except exempt applications |
| S = Snow Emission Compliant |
| |
| 7th Space - Engine Specifics |
| A = Standard (OHH50-60), (OHSK50-70) |
| P = Power Up (OHH65-70, OHSK75-775) |

| | | | | | | | | | | | | | | | | | | |
|--|--------------------------|-------------------------|-------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|------------------------|-------------------------|-------------------------|--------------------------|-------------------------|--------------------------|-------------------------|--------------------------|-------------------------|-------------------------|
| Prior to 2004 Model Number Conversion Chart | | | | | | | | | | | | | | | | | | |
| 4-Cycle | | | | | | | | | | | | | | | | | | |
| <table> <tr> <td>LEV90 - LV148EA</td> <td>OHH60 - OH195EA</td> </tr> <tr> <td>LEV120 - LV195EA</td> <td>OHH65 - OH195EP</td> </tr> <tr> <td>HSSK50 - LH195SA</td> <td>OHSK70 - OH195SA</td> </tr> <tr> <td>HSSK55 - LH195SP</td> <td>OHSK75 - OH195SP</td> </tr> <tr> <td>VSK90 - LV148SA</td> <td>HMSK90 - LH318SA</td> </tr> <tr> <td>OHV135 - OV358EA</td> <td>HMSK110 - LH358SA</td> </tr> <tr> <td>OHV180 - OV490EA</td> <td>OHSK110 - OH318SA</td> </tr> <tr> <td>TVT691 - OV691EA</td> <td>OHSK130 - OH358SA</td> </tr> <tr> <td>VTX691 - OV691EP</td> <td>OHM110 - OH318EA</td> </tr> </table> | LEV90 - LV148EA | OHH60 - OH195EA | LEV120 - LV195EA | OHH65 - OH195EP | HSSK50 - LH195SA | OHSK70 - OH195SA | HSSK55 - LH195SP | OHSK75 - OH195SP | VSK90 - LV148SA | HMSK90 - LH318SA | OHV135 - OV358EA | HMSK110 - LH358SA | OHV180 - OV490EA | OHSK110 - OH318SA | TVT691 - OV691EA | OHSK130 - OH358SA | VTX691 - OV691EP | OHM110 - OH318EA |
| LEV90 - LV148EA | OHH60 - OH195EA | | | | | | | | | | | | | | | | | |
| LEV120 - LV195EA | OHH65 - OH195EP | | | | | | | | | | | | | | | | | |
| HSSK50 - LH195SA | OHSK70 - OH195SA | | | | | | | | | | | | | | | | | |
| HSSK55 - LH195SP | OHSK75 - OH195SP | | | | | | | | | | | | | | | | | |
| VSK90 - LV148SA | HMSK90 - LH318SA | | | | | | | | | | | | | | | | | |
| OHV135 - OV358EA | HMSK110 - LH358SA | | | | | | | | | | | | | | | | | |
| OHV180 - OV490EA | OHSK110 - OH318SA | | | | | | | | | | | | | | | | | |
| TVT691 - OV691EA | OHSK130 - OH358SA | | | | | | | | | | | | | | | | | |
| VTX691 - OV691EP | OHM110 - OH318EA | | | | | | | | | | | | | | | | | |
| 2-Cycle | | | | | | | | | | | | | | | | | | |
| <table> <tr> <td>TC300 - TM049XA</td> </tr> <tr> <td>HSK870 - TH139SP</td> </tr> <tr> <td>HSK600 - TH098SA</td> </tr> <tr> <td>AV520 - TV085XA</td> </tr> </table> | TC300 - TM049XA | HSK870 - TH139SP | HSK600 - TH098SA | AV520 - TV085XA | | | | | | | | | | | | | | |
| TC300 - TM049XA | | | | | | | | | | | | | | | | | | |
| HSK870 - TH139SP | | | | | | | | | | | | | | | | | | |
| HSK600 - TH098SA | | | | | | | | | | | | | | | | | | |
| AV520 - TV085XA | | | | | | | | | | | | | | | | | | |

4-Cycle

| | |
|---------|---|
| ECH - | Exclusive Craftsman Horizontal |
| ECV - | Exclusive Craftsman Vertical |
| H - | Horizontal Shaft |
| HH - | Horizontal Heavy Duty (Cast Iron) |
| HHM - | Horizontal Heavy Duty (Cast Iron) (Medium Frame) |
| HM - | Horizontal Medium Frame |
| HMSK - | Horizontal Medium Frame (Snow King) |
| HMXL - | Horizontal Medium Frame (Extra Life) |
| HS - | Horizontal Small Frame |
| HSSK - | Horizontal Small Frame (Snow King) |
| HXL - | Horizontal (Extra Life) |
| LAV - | Lightweight Aluminum Frame Vertical |
| LEV - | Low Emissions Vertical |
| LH - | L-Head Horizontal |
| LV - | L-Head Vertical |
| OH - | Overhead Valve Heavy Duty (Cast Iron) |
| OHH - | Overhead Valve Horizontal |
| OH195 - | Overhead Valve Horizontal (195 cc's) |
| OHM - | Overhead Valve Heavy Duty Horizontal (Medium Frame) |
| OHSK - | Overhead Valve Horizontal (Snow King) |
| OHV - | Overhead Valve Vertical (Medium Frame) |
| OV - | Overhead Valve Vertical |
| OVM - | Overhead Valve Vertical (Medium Frame) |

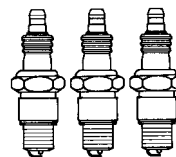
| | |
|--------|---|
| OVRM - | Overhead Valve Vertical (Small Frame) (Rotary Mower) |
| OVXL - | Overhead Valve Vertical (Medium Frame) (Extra Life) |
| TNT - | Toro 'N' TecumsehPower (Toro Exclusive Series) |
| TVEM - | TecumsehPower Vertical European Model |
| TVM - | TecumsehPower Vertical (Medium Frame) (Replaces V & VM) |
| TVS - | TecumsehPower Vertical Styled |
| TVT - | TecumsehPower Vertical Twin |
| TVXL - | TecumsehPower Vertical (Extra Life) |
| V - | Vertical Shaft |
| VH - | Vertical Heavy Duty (Cast Iron) |
| VLV - | Vector Lightweight Vertical |
| VLXL - | Vector Lightweight Vertical (Extra Life) |
| VM - | Vertical Shaft (Medium Frame) |
| VSK - | Vertical Snow King |
| VTX - | Vertical Twin |

2-Cycle

| | |
|------|-----------------------------------|
| TH - | Two Cycle Horizontal Shaft |
| TM - | Two Cycle Multiposition Operation |
| TV - | Two Cycle Vertical Shaft |



Spark Plug Replacement



NOTE: Only models which will continue to be manufactured long term will have an updated Model designation.

4-CYCLE SPARK PLUG

Service Number 35395

RJ19LM

ECV100-120
 HMSK70, LH318SA (HMSK80), HMSK90
 HSK30-70
 HSSK40, LH195SA (HSSK50), LH195SP (HSSK55)
 LH358SA (HMSK100), HMSK110
 LEV80, LV148EA (LEV90), LV195EA (LEV120)
 LV148SA (VSK90), VSK100
 TNT100
 TNT120
 TVS75-120
 TVXL90-120

Service Number 34645

RN4C

OH318EA (OHM90-110)
 † OHM120
 OH195EA (OHH60), OH195EP (OHH65)
 OHH/OHSAK40-130
 OH195SA (OHSK70), OH195SP (OHSK75)
 ‡ OH318SA (OHSK110), OH358SA (OHSK120-130)
 OH180
 OV195EA
 OV358EA (OHV110-135), OV490EA (OHV140-180)
 OV691EP (VTX691, TVT691)
 OVM120
 * OVXL120
 * OVXL/C120
 * OVXL125
 OV195

Note:

- * OVXL models with specification nos. below 202700 use RL86C.
- † OHM120 models with specification nos. below 224000 use RL86C.
- ‡ OHSK110 - 130 models with specification nos. below 223000 use RL86C.

Service Number 34046

RL86C

† OHM120
 ‡ OH318SA (OHSK110), OH358SA (OHSK120-130)
 OVM120
 * OVXL120
 * OVXL/C120
 * OVXL125

Note:

- * OVXL models with specification nos. 202700, 203000 and up, use RN4C.
- † OHM120 models with specification nos. 224000 and up, use RN4C.
- ‡ OHSK110, OHSK120-130 models with specification nos. 223000 and up, use RN4C.

Service Number

33636

RJ17LM

H30-80
 HM70-100
 HS40-50
 TVM195-220
 TVXL195-220
 VLV-all

Service Number

35552

RL82C

HH140-160
 OH120-160

Service Number

34277

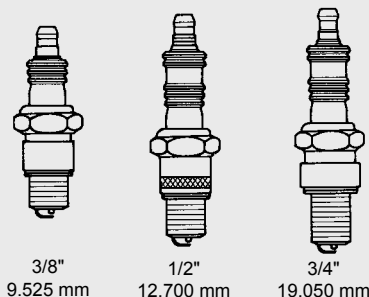
RJ8C

H22
 H25
 HH40-120
 HHM80
 HMXL70
 HT30
 HT35
 HXL35
 LAV25-50
 TVM125-170
 V40-80
 VH40-100
 VM70-100

NOTE: THE SERVICE NUMBERS LISTED BELOW WILL GIVE CORRESPONDING CHAMPION AND AUTOLITE SUBSTITUTIONS.

| | Champion | Autolite |
|-------|----------|----------|
| 35395 | - RJ19LM | NA |
| 35552 | - RL82C | 4092 |
| 34046 | - RL86C | 425 |
| 34645 | - RN4C | 403 |
| 33636 | - RJ17LM | 245 |
| 34277 | - RJ8C | 304 |

SPARK PLUG AIR GAP ON ALL MODELS IS .030 (.762 mm)



NOTE:

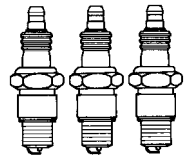
Not all spark plugs have the same heat range or reach. Using an incorrect spark plug can cause severe engine damage or poor performance. TecumsehPower uses all three of the reaches shown.

FOR TWO CYCLE INFORMATION REFER TO NEXT PAGE.

Note: If you need assistance locating your engine model numbers please check page 3 or 4.



Spark Plug Replacement



NOTE: Only models which will continue to be manufactured long term will have an updated Model designation.

2-CYCLE SPARK PLUG

| | | | | | |
|--|---|---|--|--|---|
| Service Number 611100 RCJ6Y TC300 TCH300 TM049XA | Service Number 33636 RJ17LM AV600 AV520 TVS600 TV085XA | Service Number 35395 RJ19LM TVS840 TVXL840 | Service Number 611049 RCJ8Y AH520 AH600 HSK840 HXL840 TC200 TCH200 Type 1500 TH098SA | | HSK600 HSK635 TH139SA HSK845, 850 TH139SP HSK870 |
|--|---|---|--|--|---|

EUROPA MODELS

4-CYCLE SPARK PLUG

| | |
|---|---|
| Service Number 33636 RJ17LM | |
| All Horizontal Models BV BVL BVS Centura Futura HTL | LAV Legend Premier 153/173 Prisma Spectra Synergy Vantage |

| | | |
|--|-----------------------------|-------------|
| Service Number 34645 RN4C | | |
| Centrua OHV Futura OHV | Geotec OHV Premier 45/55 | Synergy OHV |

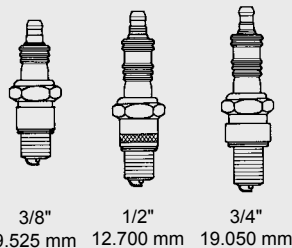
2-CYCLE SPARK PLUG

| | |
|--|------------------|
| Service Number 33636 RJ17LM | |
| AV85/125 AV520/600 | MV100S TVS600 |

NOTE: THE SERVICE NUMBERS LISTED BELOW WILL GIVE CORRESPONDING CHAMPION AND AUTOLITE SUBSTITUTIONS.

| | Champion | Autolite |
|--------|----------|----------|
| 35395 | - RJ19LM | NA |
| 33636 | - RJ17LM | 245 |
| 611100 | - RCJ-6Y | 2974 |
| 611049 | - RCJ-8Y | 2976 |

SPARK PLUG AIR GAP ON ALL MODELS IS .030 (.762 mm)



NOTE: Not all spark plugs have the same heat range or reach. Using an incorrect spark plug can cause severe engine damage or poor performance. TecumsehPower uses all three of the reaches shown.

Note: If you need assistance locating your engine model numbers please check page 3 or 4.

Fuel Recommendations

Today's fuels have a short shelf life and it is recommended you buy no more than a two week supply at a time.

GASOLINE

TecumsehPower strongly recommends the use of fresh, clean, unleaded regular gasoline in all TecumsehPower engines. Unleaded gasoline burns cleaner, extends engine life, and promotes good starting by reducing the build-up of combustion chamber deposits. Leaded gasoline, gasohol containing no more than **10%** ethanol, premium gasoline, or unleaded gasoline containing no more than **15%** MTBE (Methyl Tertiary Butyl Ether), **15%** ETBE (Ethyl Tertiary Butyl Ether) **or 10%** ethanol, can be used if unleaded regular gasoline is not available.


Reformulated gasoline that is now required in several areas of the United States is also acceptable.

NEVER USE gasoline, fuel conditioners, additives or stabilizers containing methanol, gasohol containing more than 10% ethanol, unleaded regular gasoline containing more than 15% MTBE (Methyl Tertiary Butyl Ether), 15% ETBE (Ethyl Tertiary Butyl Ether) or 10% ethanol, gasoline additives, or white gas because engine/fuel system damage could result.

SPECIALTY FUELS

Fuels being marketed for use on small engines can have a significant effect on starting and engine performance. Prior to using any specialty fuel, the Reid Vapor Pressure (RVP) must be determined. Fuels with a rating of less than 50kPa (7psi) should not be used in summer, and fuel with a rating of 85kPa (12psi) should not be used during winter.

SHORT TERM STORAGE

 **WARNING** NEVER store the engine with fuel in the fuel tank inside a building with potential sources of ignition such as hot water and space heaters, clothes dryers, electric motors, etc.

If engine fuel stored in the gas tank and/or an approved gas container is to be unused without gasoline stabilizer for more than 15-30 days, prepare it for short term/seasonal storage.

TecumsehPower recommends using **ULTRA-FRESH™** or Fuel Saver Plus Gasoline Stabilizer plus Fuel System Cleaner as an acceptable method of minimizing formation of fuel gum deposits during storage. This product is available from your Authorized TecumsehPower Servicing Dealer.

Always follow mix ratio found on stabilizer container. Failure to do so may result in equipment damage.

It is not necessary to drain stabilized gas from carburetor.

FUEL TREATMENT

1. Add fuel stabilizer according to manufacturer's instructions.
2. Run engine at least 10 minutes after adding stabilizer to allow it to reach carburetor.
3. Instead of using a fuel preservative/stabilizer, you can empty the fuel tank as described under "Extended Storage".

Fuel Recommendations - *continued*

EXTENDED STORAGE

NOTES

Clean debris from engine before draining fuel from carburetor. If you have prepared your fuel for short term storage it is not necessary to drain fuel that contains stabilizer from your carburetor.

To avoid severe injury or death, DO NOT pour fuel from engine or siphon fuel by mouth.

1. To prevent serious injury from fuel fires, empty fuel tank by running engine until it stops from lack of fuel. DO NOT attempt to pour fuel from engine.
2. Run the engine while waiting until the remaining fuel is consumed.

NEVER leave the engine unattended when it is running and NEVER run engine in enclosed areas.

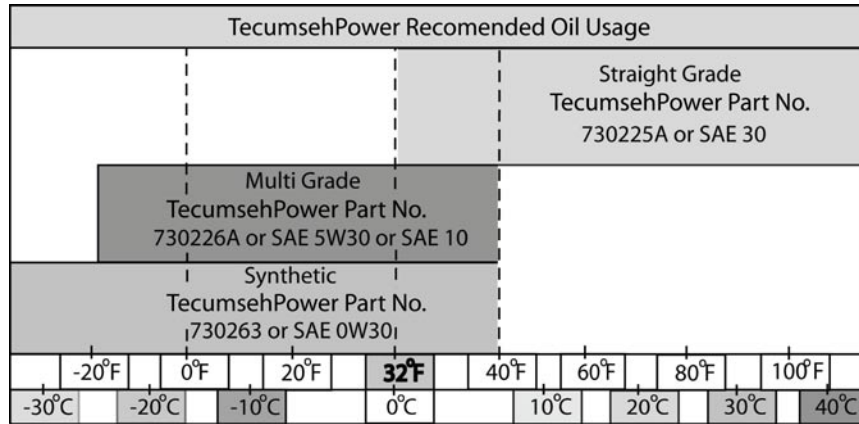
FUEL ADDITIVES

Only fuel additives such as TecumsehPower's fuel stabilizer Part No. 730245A or liquid varieties can be used when mixed properly. For winter applications, Isopropyl alcohol fuel dryers may be used in the fuel system but must be mixed at the proper ratio recommended by the manufacturer. **NEVER USE METHANOL BASED FUEL DRYERS.**

TECUMSEHPower 4-CYCLE LUBRICATION

TecumsehPower recommends the use of a high quality, brand name oil with a minimum classification of SL/SJ. Very few air cooled engines have any type of oil filtration system, making regular oil changes critical to remove

impurities from the engine and maximize engine life. **Consult the operator's or repair manual for the oil change interval and viscosity based on equipment operating temperature.**



TecumsehPower 4-CYCLE ENGINE OIL

shown with model names prior to 2004

CLASSIFICATIONS: "SL/SJ"

DO NOT USE 10W40

CAPACITIES:

| Engine Model | ml | Oz. |
|---------------------------------|------|-----|
| All LAV, TVS, LEV, OVRM | 630 | 21 |
| ECV, TNT | 630 | 21 |
| V & VH50-70 | 810 | 27 |
| TVM 125, 140 | 810 | 27 |
| TVM 170-220 | 960 | 32 |
| VM70-100, HHM80 | 960 | 32 |
| VH100 | 1500 | 50 |
| All VLV | 810 | 27 |
| VSK90-100 | 630 | 21 |
| OVM120, OVXL120, 125 | 960 | 32 |
| OHV11-13 Without Filter | 960 | 32 |
| OHV11-13 With Filter | 1170 | 39 |
| OHV13.5-17 With Filter | 1800 | 61 |
| OHV13.5-17 Without Filter | 1650 | 55 |
| TVT691 With Filter | 2150 | 71 |
| TVT691 Without Filter | 1950 | 64 |
| H, HSK30-35 | 630 | 21 |
| HS, HSSK40-50 | 630 | 21 |
| H, HH, HSK50-70 | 570 | 19 |
| OHH/OHSK50-70 | 630 | 21 |
| HMSK, HM70-100 | 720 | 26 |
| OHSK80-100 | 720 | 26 |
| OHM120, OHSK110*-130 | 840 | 28 |
| HH100,120, OH120-180 | 1560 | 52 |

*NOTE: Model OHSK110 with a spec. of 221000 and up, have a capacity of 26 oz. (720 ml).

TecumsehPower 4-CYCLE ENGINE OIL

shown with model names 2004 production and later

| Engine Model | ml | Oz. |
|------------------------|------|-----|
| LH195SA, LH195SP | 630 | 21 |
| LH318SA, LH358SA | 720 | 26 |
| LV148EA, LV148SA | 630 | 21 |
| LV195EA | 630 | 21 |
| OH195EA, OH195EP | 630 | 21 |
| OH195SA, OH195SP | 630 | 21 |
| OH318EA | 720 | 26 |
| OH358SA | 840 | 28 |
| OV195EA | 630 | 21 |
| OV358EA With Filter | 1170 | 39 |
| OV358EA Without Filter | 960 | 32 |
| OV490EA With Filter | 1800 | 61 |
| OV490EA Without Filter | 1650 | 55 |
| OV691EA With Filter | 2150 | 71 |
| OV691EA Without Filter | 1950 | 64 |
| OV691EP With Filter | 2150 | 71 |
| OV691EP Without Filter | 1950 | 64 |

EUROPA MODELS *

VERTICALS

| | ml | Oz. |
|--------------|-----|-----|
| Vantage | 630 | 21 |
| Prisma | 630 | 21 |
| Synergy | 630 | 21 |
| Synergy "55" | 810 | 27 |
| Spectra | 630 | 21 |
| Futura | 630 | 21 |
| HTL | 630 | 21 |
| BVS | 630 | 21 |

HORIZONTALS

| | | |
|---------------------|-----|----|
| BH Series | 630 | 21 |
| Geotec Series 35-50 | 630 | 21 |

NOTE: Vertical shaft engines with auxiliary PTO: 26 oz. (700 ml).

Four Cycle Troubleshooting

The following is provided as a basic troubleshooting guide. Its use requires a complete review of all conditions and symptoms. Always examine the exterior for clues: leaks, excessive dirt, or obvious damage. Some repairs will require the assistance of a TecumsehPower Servicing Dealer.

Preparation

Before troubleshooting any system problem, see original equipment manufacturer's (O.E.M.) instructions.

Make your troubleshooting easier by preparing as follows:

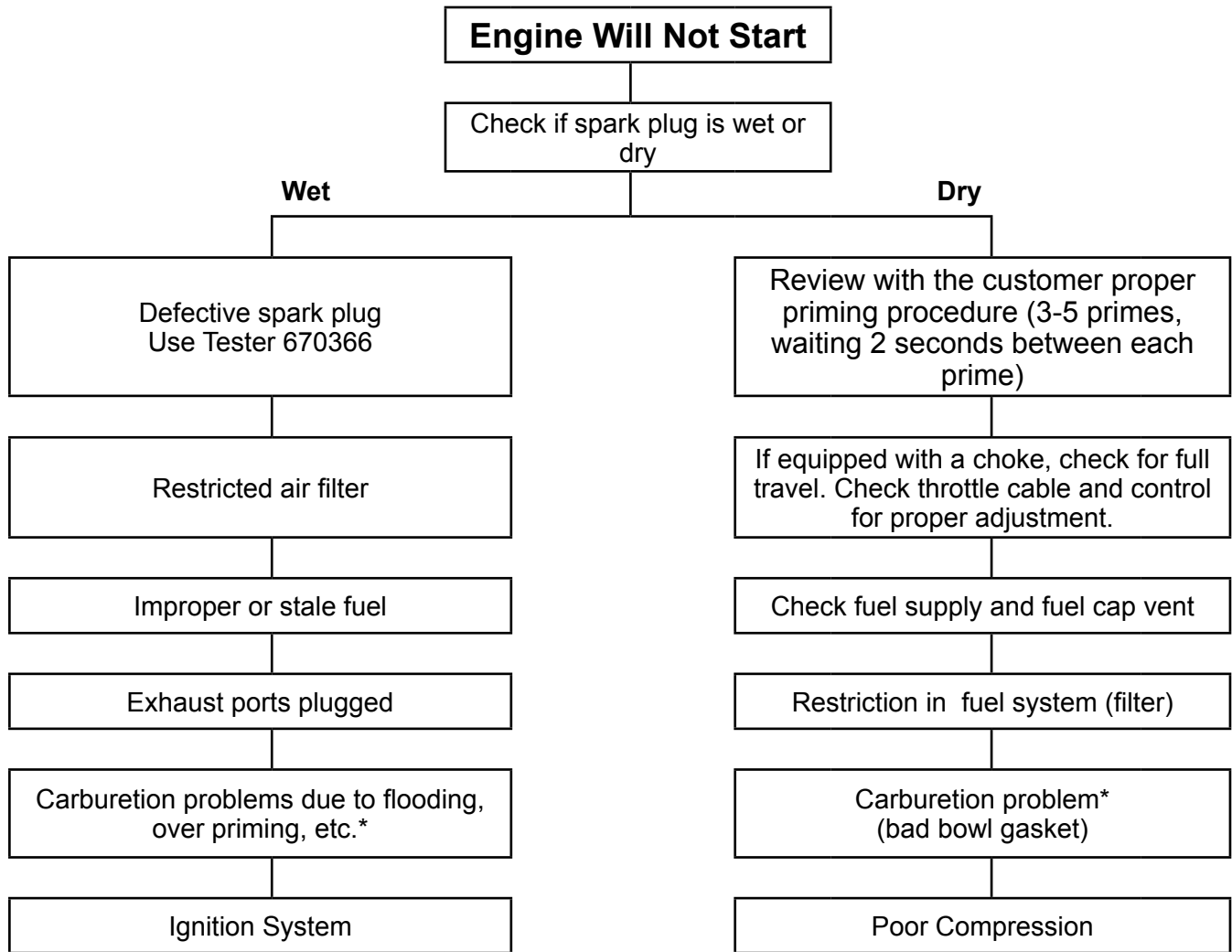
- Work in a clean, well-lighted place.
- Keep proper tools and materials nearby.
- Keep an adequate supply of clean petroleum-based solvent.

WARNING To reduce the risk of serious injury or death from fires and/or explosions, NEVER use flammable solvents (e.g., gasoline) to clean serviceable parts. Use a water-based, non-flammable solvent such as TecumsehPower Degreaser Cleaner.

CAUTION NEVER use compressed air to clean debris from yourself or your clothing. When using compressed air to clean or dry serviceable parts:

- Wear appropriate eye protection.
- Air pressure must not exceed 30psi (206kPa).
- Use only approved air blow nozzles.
- Shield yourself and bystanders from flying debris.

FUEL SYSTEM



Should more extensive repair be needed, we recommend you contact a local TecumsehPower Servicing Dealer for repair. Repair manuals are also available from your local dealer or direct from www.TecumsehPower.com. A complete list of the available manuals can be found at the end of this book.

NOTE: Refer to Technician's Handbook for a more detailed list of remedies.

Four Cycle Troubleshooting - continued



WARNING

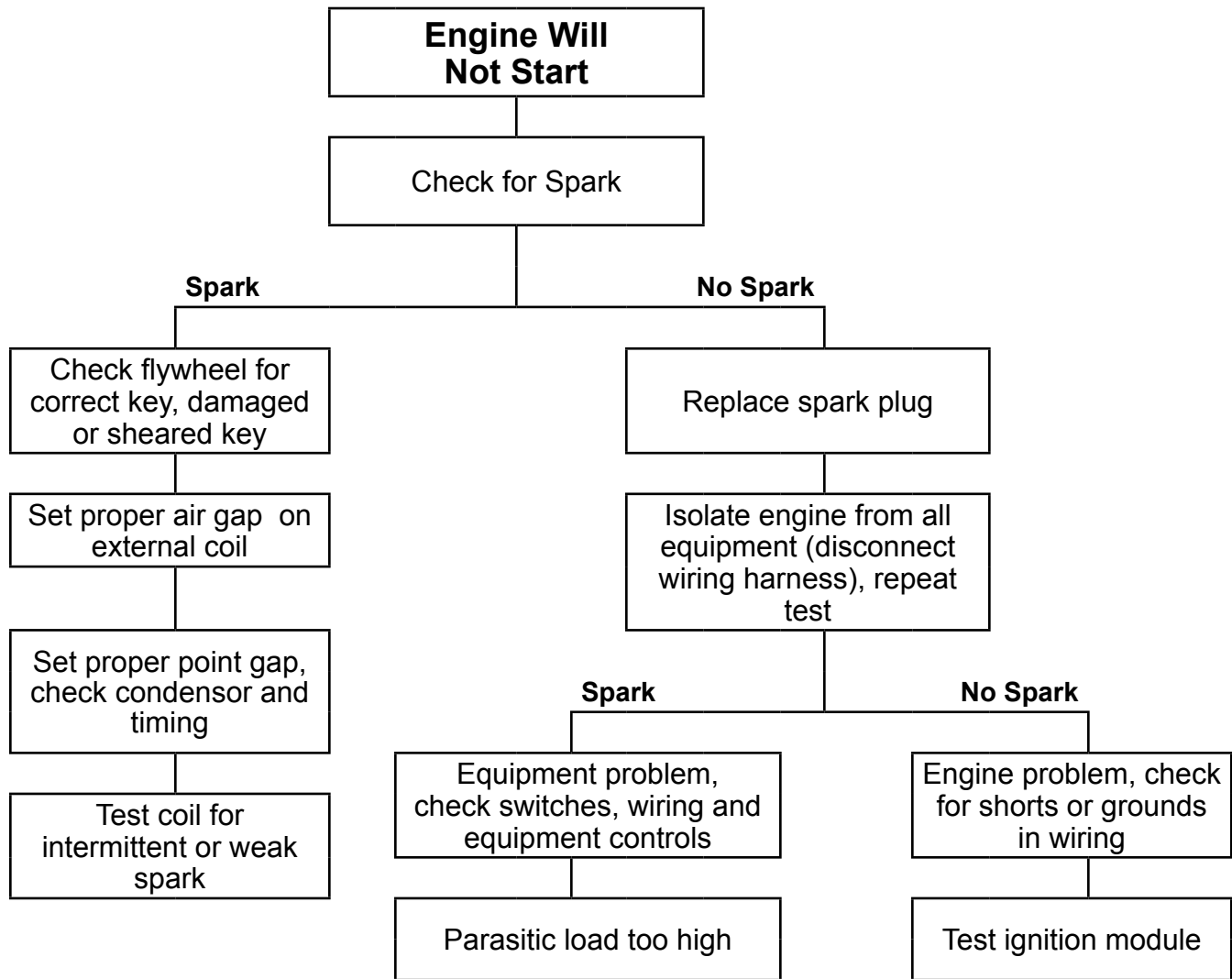
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CAUTION

NEVER use compressed air to clean debris from yourself or your clothing. When using compressed air to clean or dry serviceable parts:

- Wear appropriate eye protection.
- Use only approved air blow nozzles.
- Air pressure must not exceed 30psi (206kPa).
- Shield yourself and bystanders from flying debris.

IGNITION SYSTEM



Should more extensive repair be needed, we recommend you contact a local TecumsehPower Servicing Dealer for repair. Repair manuals are also available from your local dealer or direct from www.TecumsehPower.com. A complete list of the available manuals can be found at the end of this book.

NOTE: Refer to Technician's Handbook for a more detailed list of remedies.

TECUMSEHPOWER 2-CYCLE ENGINE OIL

The proper type and ratio of 2-cycle oil is critical to long life and low maintenance of the engine. The use of non-certified oils and improper mix ratios can cause severe engine damage and possibly void warranty consideration.

The following is a list of 2-cycle engine oil classifications which are certified for use in TecumsehPower 2-cycle engines:

- National Marine Manufacturers Association, (NMMA), TC-WII or TC-W3
- American Petroleum Institute, (API), TC
- Japanese Automobile Standard Organization, (JASO), FB or FC

| TWO-CYCLE FUEL/OIL MIX RATIOS | | |
|--|---------------------------|--|
| 24:1 | 32:1 | 50:1 |
| AV520 Types 670 & 653, TV085 TV085XA (AV600 Type 600-10 & Up) TC200, TCH200, TCH300 TM049XA (TC300) MV100S | TVS600 ALL TYPES AH600 | TVS / TVXL HSK840 - 870 - TH139 HSK600 - 635 - TH098 |

Sears/Craftsman 40:1 2-Cycle Oil has been tested and approved for use in all engines, EXCEPT the TC / TM Models which require a 24:1 Ratio.

2-CYCLE SYNTHETIC BLEND

ENGINE OIL WITH FUEL STABILIZER

PART NO. 730227D

TecumsehPower 2-CYCLE ENGINE OIL may be used in a variety of 2-cycle engines including: outboards, lawnmowers, snow-blower, string trimmers, and edgers at any fuel/oil mixing ratio up to 50:1.

- Superior Lubricity **Extends** engine life by reducing wear
- Longer Spark Plug life through reduced fouling
- Reduces Carbon Build-Up extending required service intervals
- Helps maintain emissions compliance which helps our environment
- Contains Fuel Stabilizer-Extends fuel life and protects fuel system

| ENGINE FUEL MIX | | | | |
|-----------------|------------------|--------------------------------------|------------------|--|
| | U.S. Gasoline | U.S. Amount of Oil To Be Added | METRIC Petrol | METRIC Amount of Oil To Be Added |
| 24:1 | 1 Gallon | 5 oz. | 4 Liters | 167 ml |
| | 2 Gallons | 11 oz. | 8 Liters | 333 ml |
| | 5 Gallons | 27 oz. | 20 Liters | 833 ml |
| 32:1 | 1 Gallon | 4 oz. | 4 Liters | 125 ml |
| | 2 Gallons | 8 oz. | 8 Liters | 250 ml |
| | 5 Gallons | 20 oz. | 20 Liters | 625 ml |
| 50:1 | 1 Gallon | 2.5 oz. | 4 Liters | 80 ml |
| | 2 Gallons | 5 oz. | 8 Liters | 160 ml |
| | 5 Gallons | 13 oz. | 20 Liters | 400 ml |

Two Cycle Troubleshooting

The following is provided as a basic troubleshooting guide. Its use requires a complete review of all conditions and symptoms. Always examine the exterior for clues: leaks, excessive dirt, or obvious damage. Some repairs will require the assistance of a TecumsehPower Servicing Dealer.

Preparation

Before troubleshooting any system problem, see original equipment manufacturer's (O.E.M.) instructions.

Make your troubleshooting easier by preparing as follows:

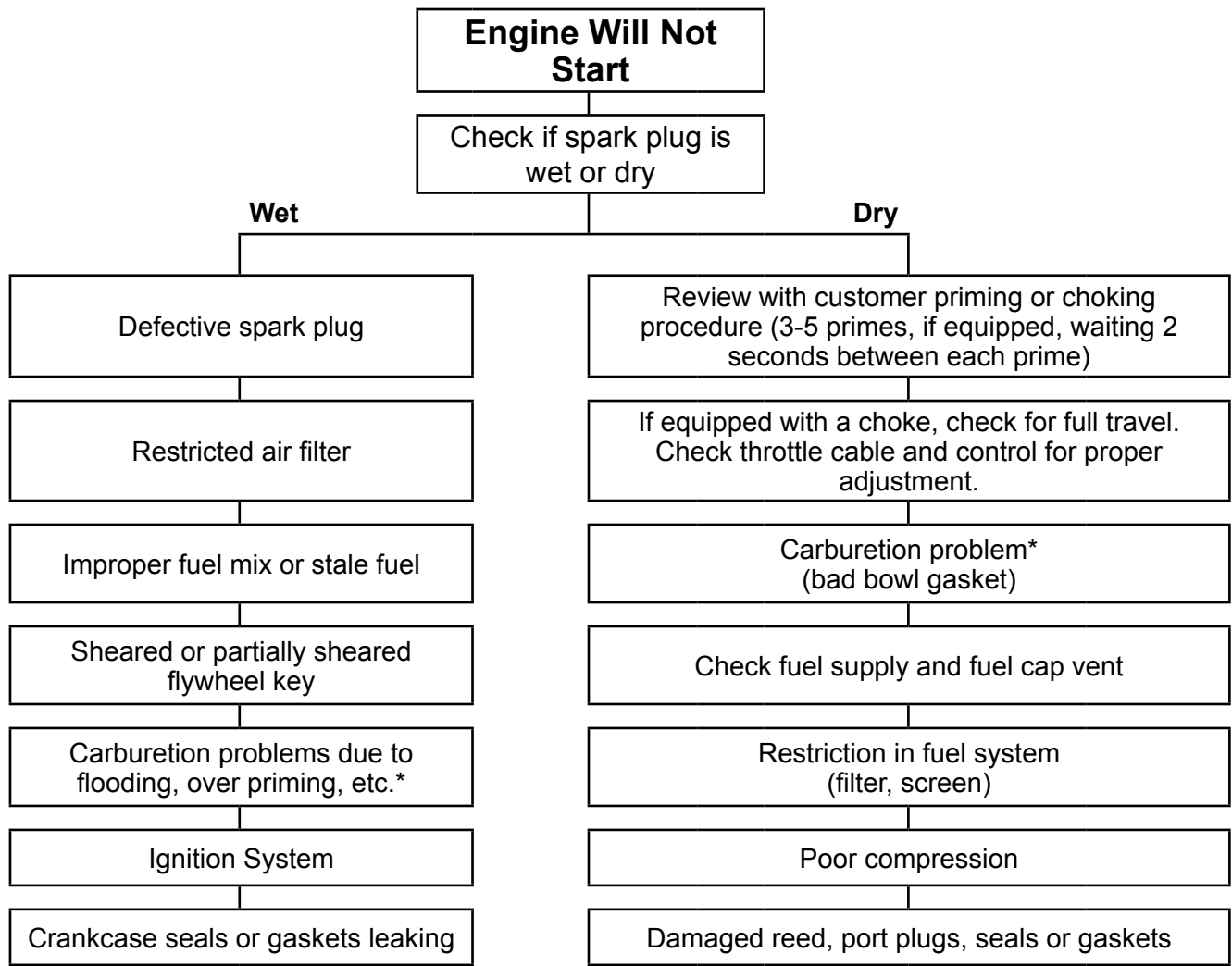
- Work in a clean, well-lighted place.
- Keep proper tools and materials nearby.
- Keep an adequate supply of clean petroleum-based solvent.

WARNING To reduce the risk of serious injury or death from fires and/or explosions, NEVER use flammable solvents (e.g., gasoline) to clean serviceable parts. Use a water-based, non-flammable solvent such as TecumsehPower Degreaser Cleaner.

CAUTION NEVER use compressed air to clean debris from yourself or your clothing. When using compressed air to clean or dry serviceable parts:

- Wear appropriate eye protection.
- Air pressure must not exceed 30psi (206kPa).
- Use only approved air blow nozzles.
- Shield yourself and bystanders from flying debris.

FUEL SYSTEM



Should more extensive repair be needed, we recommend you contact a local TecumsehPower Servicing Dealer for repair. Repair manuals are also available from your local dealer or direct from www.TecumsehPower.com. A complete list of the available manuals can be found at the end of this book.

NOTE: Refer to Technician's Handbook for a more detailed list of remedies.

Two Cycle Troubleshooting - continued



WARNING

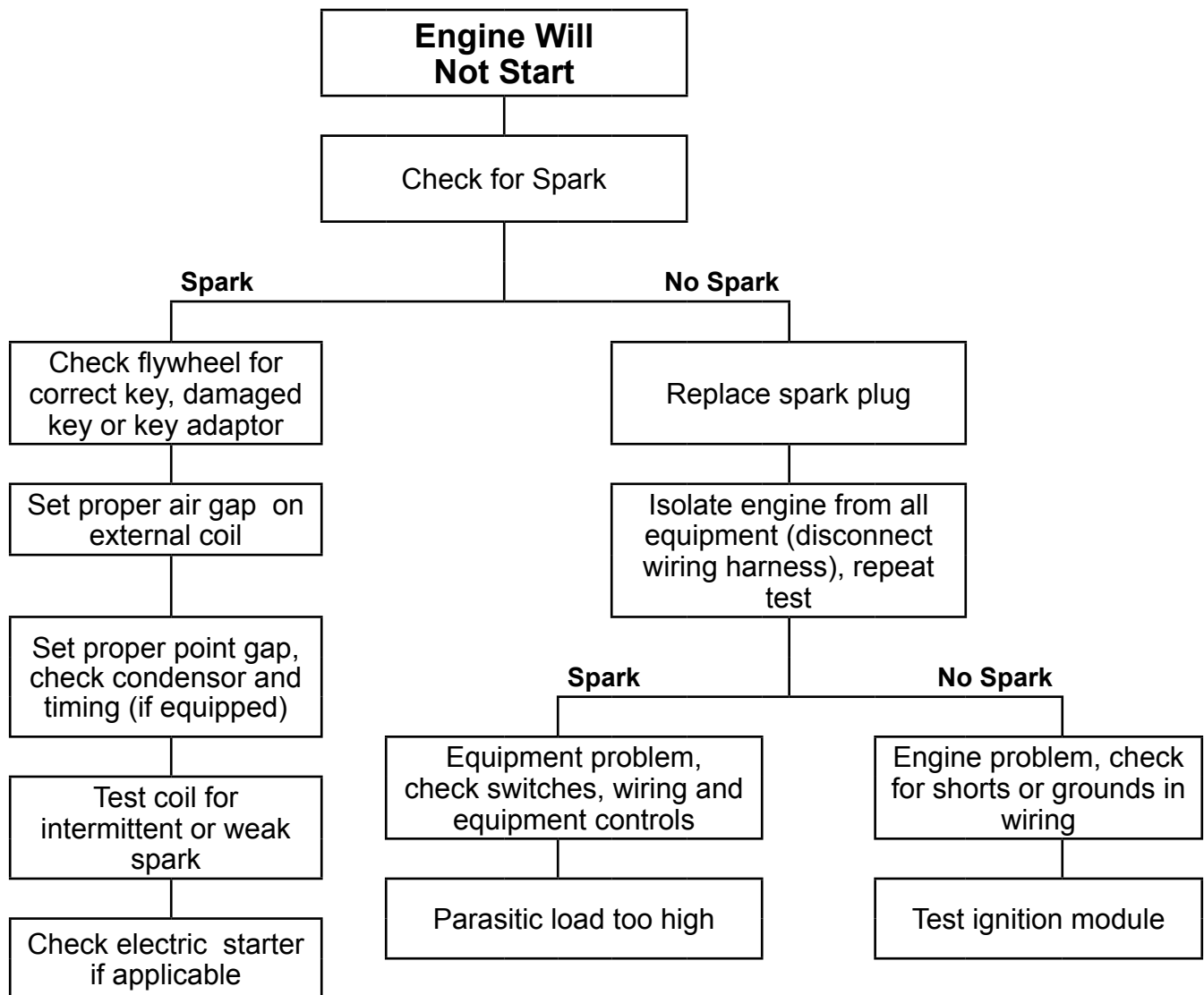
To reduce the risk of serious injury or death from fires and/or explosions, NEVER use flammable solvents (e.g., gasoline) to clean serviceable parts. Use a water-based, non-flammable solvent such as TecumsehPower Degreaser Cleaner.

CAUTION

NEVER use compressed air to clean debris from yourself or your clothing. When using compressed air to clean or dry serviceable parts:

- Wear appropriate eye protection.
- Use only approved air blow nozzles.
- Air pressure must not exceed 30psi (206kPa).
- Shield yourself and bystanders from flying debris.

IGNITION SYSTEM



Should more extensive repair be needed, we recommend you contact a local TecumsehPower Servicing Dealer for repair. Repair manuals are also available from your local dealer or direct from www.TecumsehPower.com. A complete list of the available manuals can be found at the end of this book.

NOTE: Refer to Technician's Handbook for a more detailed list of remedies.

Cross Reference for Specification - To - Model Number Designation

This cross reference chart allows you to determine an engine Model Number if you only have the Specification Number.

VERTICAL 4-CYCLE ENGINES

| Specification Number Series | Model Number | Specification Number Series | Model Number |
|--------------------------------|---------------------------------|--------------------------------|----------------------------------|
| 10000 | TNT100 | 145000 | ECV100 |
| 12000 | TNT120 | 147000 | ECV105 |
| 20000 | LAV25, OVRM55 | 148000 | VH80 |
| 20500 | OVRM105 | 149000 | VH100 |
| 21000 | OVRM60 | 150000 | V & VM80, TVM195 |
| 21800 | OVRM60 | 150200 | TVM & TVXL195 |
| 22000 | OVRM65, OVRM120 | 150500 | TVM195 |
| 23000 | OV195EA (RM) | 151000 | ECV110, TVM195 |
| 23500 | OV195EA (Utility) | 151500 | TVM220 |
| 30000 | LAV30 | 152000 | ECV120 |
| 33000 | TVS75 | 157000 | VM100, TVM220 |
| 40000 | LAV35 | 157200 | TVM & TVXL220 |
| 42000 | OVRM905 (Sears Only) | 157400 | TVM220 |
| 42600 | OVRM40, OVRM45 (Premier Engine) | 200000 | OVM120 |
| 42900 | OVRM40 (High Tech Look) | 202000 | OVXL120, OVXL125 |
| 43000 | TVS90 | 202200 | OVXL120 (I/C) |
| 43600 | TVS90 (Premier Engine) | 202300 | OHV11, OHV115 |
| 43700 | TVS90, TVXL90 | 202400 | OVXL125 |
| 43900 | TVS90 (High Tech Look) | 202500 | OHV115 |
| 44000 | TVS100 | 202600 | OVXL125 (I/C) |
| 44600 | TVS100 (Premier Engine) | 202700 | OHV12, OVXL120 (Tec.1200) |
| 44800 | TVS100 | 203000 | OHV125, OVXL125 (Tec1250) |
| 46000 | TVS90, TVXL90 | 203200 | OHV13 |
| 46600 | TVS90 | 203500 | OVXL125 (Tec.1250I/C), OHV13/135 |
| 48000 | TVS90 | 203600 | OHV14/140 |
| 50000 | V40 | 203800 | OHV145 |
| 50200 | LAV40 | 204000 | OHV15/150 |
| 52600 | OVRM50, OVRM55 (Premier Engine) | 204200 | OHV16/160 |
| 52800 | OVRM50, OVRM55 | 204400 | OHV165 |
| 52900 | OVRM50, OVRM55 (High Tech Look) | 204500 | OHV155 |
| 53000 | TVS105 | 204600 | OHV17/170 |
| 53600 | TVS105 (Premier Engine) | 204800 | OHV175 |
| 53800 | TVS105 | 206000 | OHV110 |
| 53900 | TVS105 (High Tech Look) | 206200 | OHV115 |
| 54000 | TVXL105 | 206400 | OHV120 |
| 56000 | TVS105, TVS & TVXL115 | 206600 | OHV125 |
| 56600 | TVS105, TVS115 (Premier Engine) | 206800 | OHV130 |
| 56800 | TVS115 | 206900 | OHV135, OV358EA (Sm. Enduro) |
| 56900 | TVS105, TVS115 (High Tech Look) | 208000 | OHV180, OV490EA (Lg. Enduro) |
| 57000 | TVS & TVXL115 | 334000 | LEV90, LV148EA |
| 57600 | TVS115 (Premier Engine) | 334500 | VSK90, LV148SA |
| 57800 | TVS115 | 335000 | LEV100 |
| 57900 | TVS115 (High Tech Look) | 338000 | LEV100 |
| 60000 | V50, TVM125 | 338500 | VSK100 |
| 61000 | TVS & TVXL115 | 340000 | LEV100 |
| 61600 | TVS & TVXL115 | 345000 | LEV100 |
| 61800 | TVS115 | 346000 | LEV105 |
| 61900 | TVS115 | 347000 | LEV105 |
| 62000 | LAV50 | 348500 | VSK105 |
| 62100 | LAV50 & TVS115 | 350000 | LEV115 |
| 63000 | TVS120 | 355000 | LEV115 |
| 63200 | TVS120, TVEM120 | 360000 | LEV115 |
| 63600 | TVS120 (Premier Engine) | 361000 | LEV120 |
| 63900 | TVS120 (High Tech Look) | 361400 | VSK120 |
| 66000 | TVS120 | 361500 | LEV120, LV195EA (Utility) |
| 66100 | TVS120 | 362000 | LEV120, LV195EA (RM) |
| 70000 | V60, TVM140 | 400000 | VLV40 |
| 80000 | VH40 | 500000 | ULT, VLV B24, VLXL50, & VLV126 |
| 90000 | VH50 | 501000 | ULT, VLV, VLXL55, & VLV126 |
| 100000 | VH60 | 502000 | ULT, VLV60, VLV65, & VLV126 |
| 125000 | V70 | 502500 | VLV65, VLV66 |
| 127000 | VM70, TVM170 | 600400 | TVT691 |
| 127200 | TVXL170 | 600800 | TVT691, OV691EA (Twin) |
| 135000 | VH70 | 600900 | VTX691, OV691EP (Twin) |

Cross Reference for Specification - To - Model Number Designation

This cross reference chart allows you to determine an engine Model Number if you only have the Specification Number.

HORIZONTAL 4-CYCLE ENGINES

| Specification Number Series | Model Number | Specification Number Series | Model Number |
|-----------------------------|---------------------------|-----------------------------|----------------------------|
| 15000 | H22 | 120000 | HH120 |
| 25000 | H25 | 130000 | H70 |
| 26000 | OHH45 | 130200 | HSK70 |
| 35000 | H30 | 132000 | HM & HMSK70 |
| 35400 | HSK30 | 132500 | HMXL70 |
| 35800 | H30 | 140000 | HH70 |
| 36700 | H30 | 146000 | ECH90 |
| 45000 | H & HT35 | 155000 | H & HM80 |
| 45400 | HSK35 | 155000 | HMSK80 |
| 45800 | H35 | 155800 | HM85 |
| 46700 | H35 | 155900 | HM & HMSK85 |
| 47000 | HXL35 | 156000 | HM90 |
| 55000 | H40 | 156000 | HM90 |
| 55200 | HS & HSSK40 | 156500 | HMSK90, LH318SA |
| 55500 | HSK40 | 159000 | HM & HMSK100, LH358SA |
| 55700 | H40 | 159900 | HMSK105 |
| 55800 | H40 | 159950 | HMSK110 |
| 55900 | HSSK40 | 160000 | HH & OH140 |
| 65000 | H50 | 170000 | HH150 & 160 |
| 65300 | HSK50 | 170000 | OH160 |
| 67000 | HS & HSSK50, LH195SA | 175000 | OH120 |
| 67500 | HSSK55, LH195SP | 180000 | OH180 |
| 68000 | OHH50 | 190000 | HHM80 |
| 68500 | OHSK50 | 220000 | OHM120 |
| 69000 | OHH55 | 221000 | OHSK110 |
| 69500 | OHSK55 | 221200 | OHSK80 |
| 71100 | OHH60, OH195EA | 221400 | OHSK90 |
| 71500 | OHSK60 | 221600 | OHSK100 |
| 71700 | OHH65 | 221700 | OHSK110 |
| 71800 | OHH65, OH195EP | 221800 | OHSK115, OH318SA (Premium) |
| 71900 | OHSK65 | 222000 | OHSK120 |
| 72000 | OHH70 | 222300 | OHM90 |
| 72500 | OHSK70, OH195SA (Premium) | 222500 | OHM100 |
| 73500 | OHSK75, OH195SP (Premium) | 222700 | OHM110, OH318EA |
| 75000 | H60 | 223000 | OHSK90 |
| 76000 | HSK60 | 223400 | OHSK110 |
| 85000 | HH40 | 223600 | OHSK120 |
| 95000 | HH50 | 223700 | OHSK125 |
| 105000 | HH60 | 223800 | OHSK130, OH358SA (Premium) |
| 110000 | HH80 | | |
| 115000 | HH100 | | |

VERTICAL 2-CYCLE ENGINES

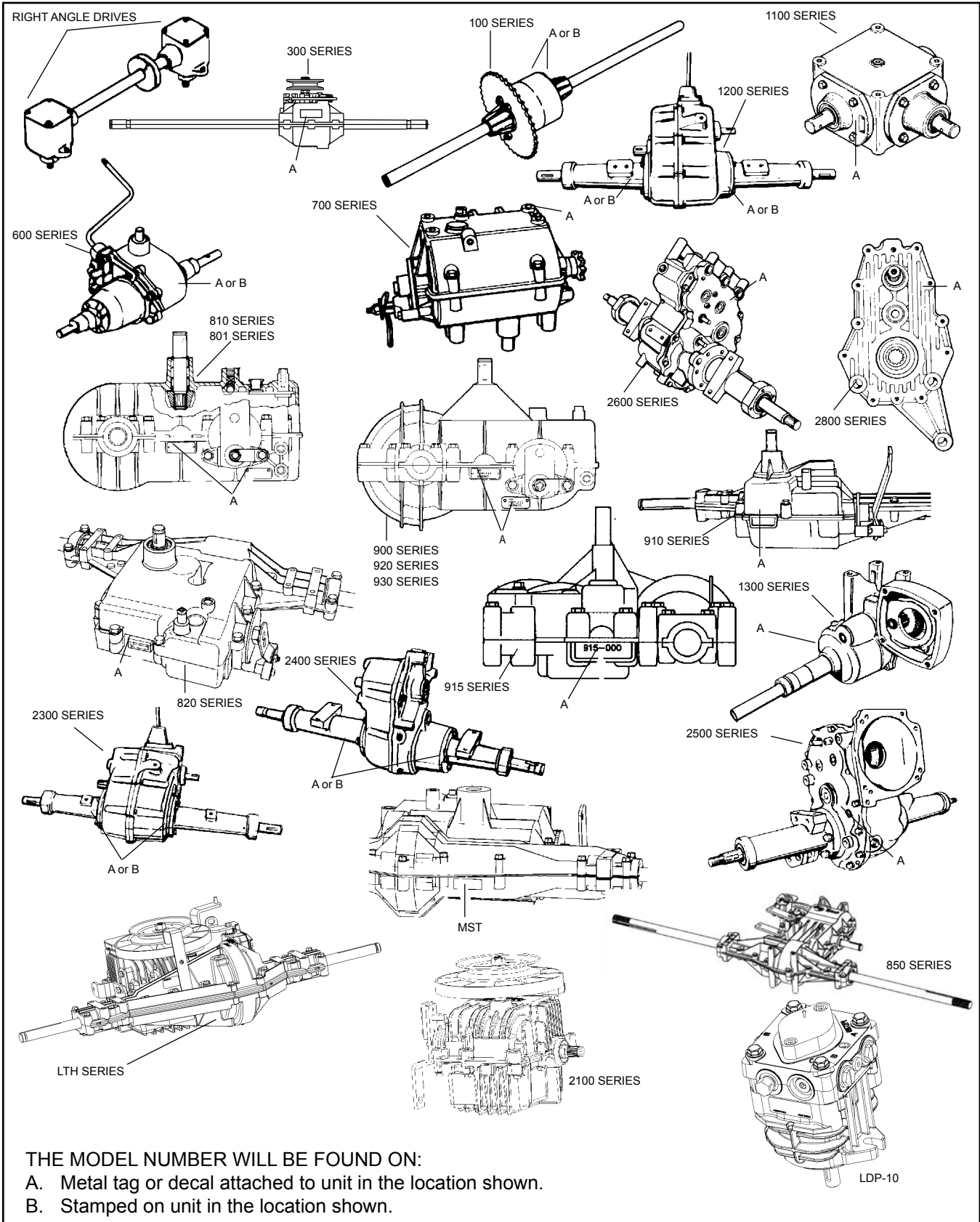
| Specification Number Series | Model Number |
|-----------------------------|----------------|
| 3600 | TC300, TM049XA |
| 670000 | AV520, TV085XA |

HORIZONTAL 2-CYCLE ENGINES

| Specification Number Series | Model Number |
|-----------------------------|-----------------|
| 1720 | HSK635, TH098SA |
| 8300 | HSK850, TH139SA |
| 8700 | HSK870, TH139SP |

TECUMSEHPower AND PEERLESS® MODEL AND SPECIFICATION NUMBERS

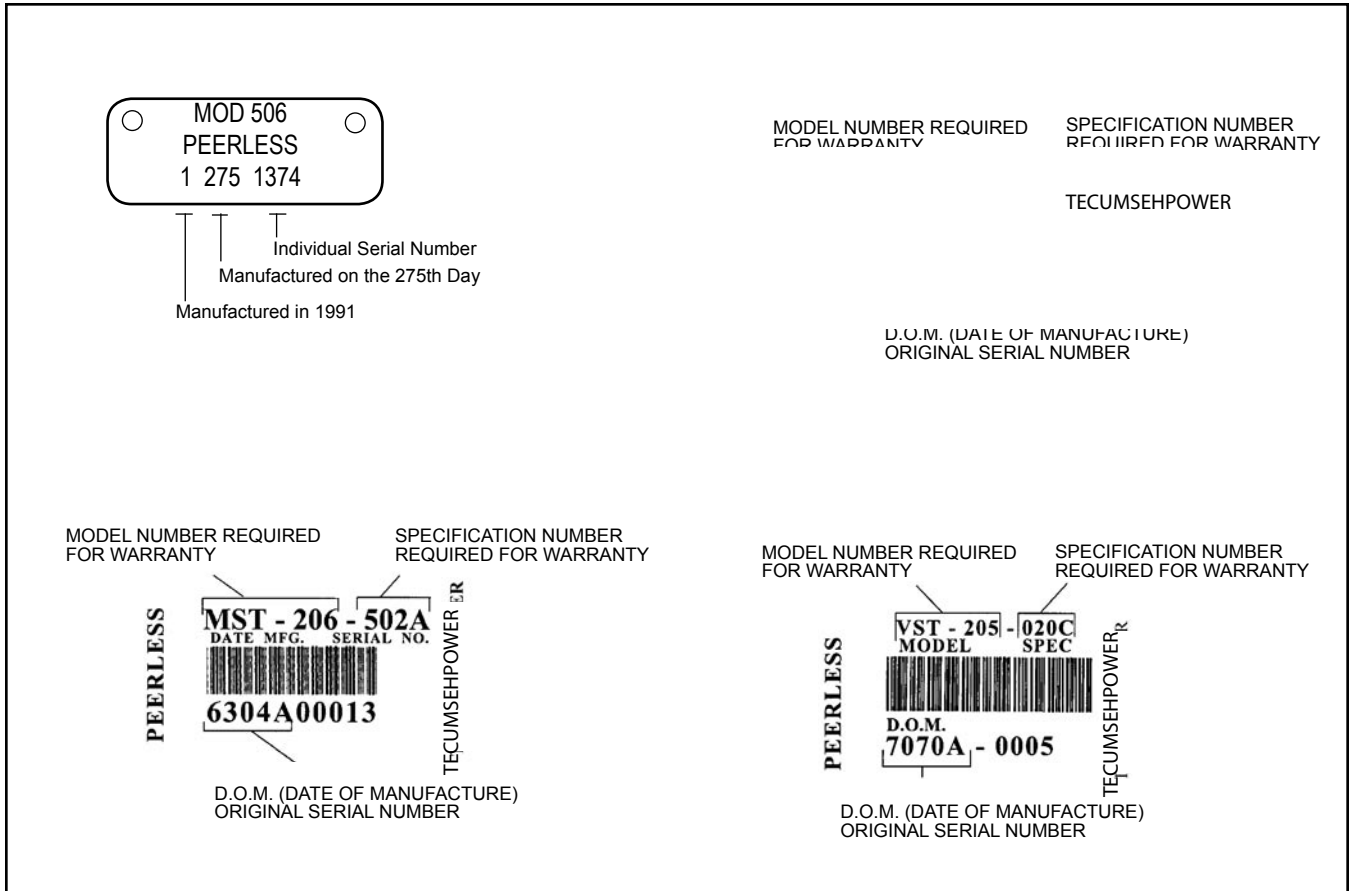
The following information is being provided to assist you in locating and recording your TecumsehPower transmission components model and specification numbers. This information will be needed to use this book or obtain parts from a local TecumsehPower dealer.



THE MODEL NUMBER WILL BE FOUND ON:

- A. Metal tag or decal attached to unit in the location shown.
- B. Stamped on unit in the location shown.

Various Styles of Identification Used On TecumsehPower and Peerless Transmission, Transaxle and Gear Products



Early Models were not identified with a model number on the unit.

Basic Gear Drive Troubleshooting

Preparation

NOTE

Before troubleshooting any system problem, see original equipment manufacturer's (O.E.M.) instructions.

Make your troubleshooting easier by preparing as follows:

- Work in a clean, well-lighted place.
- Keep proper tools and materials nearby.
- Keep an adequate supply of clean petroleum-based solvent.

To avoid carbon monoxide poisoning, make sure engine is outdoors in a well-ventilated area.



WARNING

Some maintenance procedures cannot be performed until the vehicle wheels are secured and off the ground. Failure to do so could result in death or serious injury to yourself and/or bystanders.



WARNING

DO NOT attempt any maintenance procedures with the engine running. Doing so could result in death or serious injury to yourself and/or bystanders.



WARNING

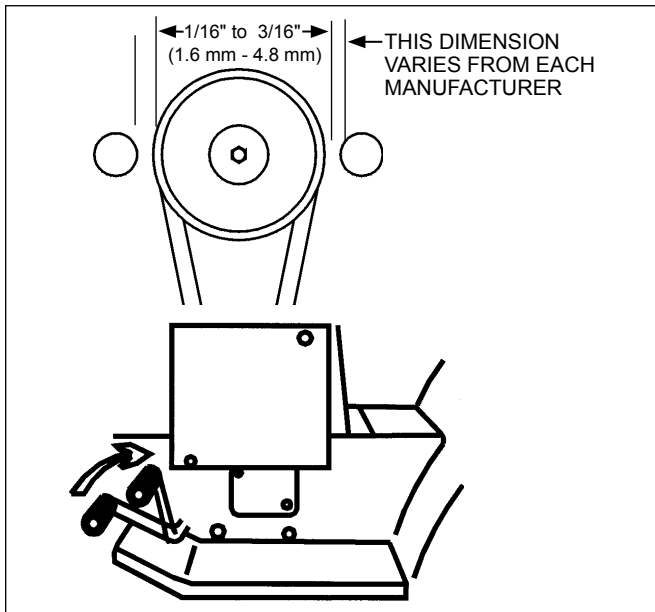
Use care when performing inspection of the drive belt assembly including all vehicle linkage. Failure to do so could result in death or serious injury to yourself and/or bystanders.

Hard Shifting Transaxles and Drive Belts

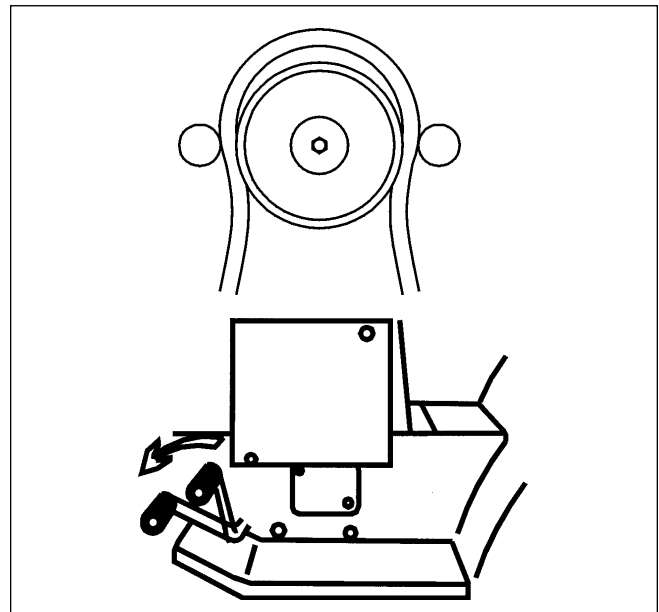
Often hard shifting is blamed on an internal problem in the transaxle.

To determine if the problem is transaxle or equipment related make these simple checks.

1. Turn the unit off so that all power is removed to the transaxle.
2. With the unit off, move the shift lever through the shift gate. Movement of the lever should have only slight resistance. The shifting effort should be equal when the engine is off and when running. If the unit is difficult to shift the problem would be internal and the transaxle would need to be removed and repaired.
3. If the unit shifts with ease, check the following areas that would be equipment related. Check to see if the belt is releasing from the pulley on the engine and transmission / transaxle, it may require that the belt guides be repositioned. The distance required from the pulley to the guide is typically 1/16" to 3/16" (1.6 mm - 4.8 mm), always check the O.E.M. specs.
4. Check to see if the pulley is damaged and may not be releasing the belt.
5. Confirm the correct length and type of belt, as recommended by the manufacturer, is installed.



For proper declutching to occur, it is very important that the engine belt guide be set at a predetermined clearance when engaged (set by the manufacturer) and away from the belt with the belt engaged.



With clutch disengaged, it is very important that the belt blossoms away from the engine pulley. Belt must stop turning before transaxle shifting can occur.

Improper belt or belt guide clearance will not allow the belt to disengage, causing internal transmission damage.

Basic Gear Drive Troubleshooting - *continued*

6. Check the brake/clutch pedal to make sure that when the pedal is depressed that the idler pulley is releasing the belt tension before it applies the brake. If this does not happen the unit will still be under a load and be impossible to shift.
7. The final area to check would be for damaged or binding shift linkage.

Hard shifting with the engine off could be caused by:

1. Shift linkage out of adjustment.
2. Corrosion in the transaxle or transmission.
3. Damaged shift keys, gears, or shifter brake shaft.
4. Belt guides missing or improperly adjusted (see equipment manufacturer specs).

Unit seems to slip:

1. Check for proper belt adjustment (consult O.E.M. operator's manual).
2. Check for proper clutch/brake adjustment (consult O.E.M. operator's manual).
3. Check pulley condition and wheels for sheared or damaged keys.
4. Check drive belt condition, if glazed or worn, replace it.
5. Possible internal transmission damage. We suggest you contact a local TecumsehPower Servicing Dealer.

TecumsehPower and Peerless Transmission, Transaxle and Gear

NOTE

Before troubleshooting any system problem, see original equipment manufacturer's (O.E.M.) instructions.

Make your troubleshooting easier by preparing as follows:

- Work in a clean, well-lighted place.
- Keep proper tools and materials nearby.
- Keep an adequate supply of clean petroleum-based solvent.

To avoid carbon monoxide poisoning, make sure engine is outdoors in a well-ventilated area.

WARNING Some maintenance procedures cannot be performed until the vehicle wheels are secured and off the ground. Failure to do so could result in death or serious injury to yourself and/or bystanders.

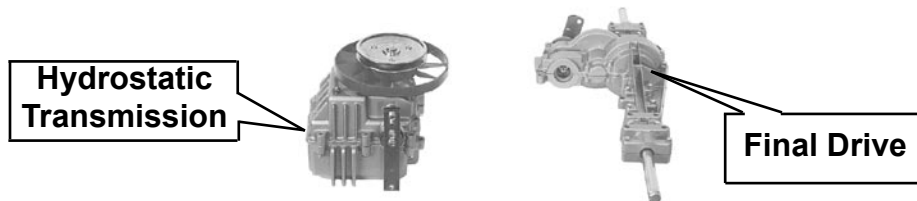
WARNING **DO NOT** attempt any maintenance procedures with the engine running. Doing so could result in death or serious injury to yourself and/or bystanders.

WARNING Use care when performing inspection of the drive belt assembly including all vehicle linkage. Failure to do so could result in death or serious injury to yourself and/or bystanders.

LTH-2000 Series Troubleshooting Chart

TecumsehPower's lawn tractor hydrostatic transaxle (LTH) includes a hydrostatic transmission attached to a final drive. Use of this troubleshooting chart will aid in determining the source of a problem; the hydrostatic transmission, final drive or vehicle's belt drive and/or linkage systems.

TecumsehPower LTH-2000 Series Hydrostatic Transaxle Troubleshooting



| SYMPTOM | PROBLEM | CORRECTIVE ACTION |
|---------------------------|--|---|
| REDUCED POWER | Improper belt tension | Belt worn, replace |
| | Belt worn, glazed, or oil saturated | Replace belt |
| | Drive pulley worn | Replace pulley and belt (See O.E.M. equipment manual) |
| | Brake set too tight | Set brake adjustment (See O.E.M. equipment manual) |
| | Shifter linkage misadjusted or broken | Linkage damaged or loose, replace or adjust (See O.E.M. equipment manual) |
| | Fluid low in hydrostatic transmission | Check and add fluid if low (Part No. 730228A) |
| | Hydrostatic transmission bad | Replace hydrostatic transmission |
| DIFFICULT TO SHIFT | Linkage broken or bent | Repair or replace linkage (See O.E.M. equipment manual) |
| | Hydrostatic transmission pump seized | Replace hydrostatic transmission |
| | Hydrostatic transmission control friction pack misadjusted | Replace friction pack washers, tighten nut to 100 in. lbs. (11.2 Nm) loosen nut 4-turns |

TecumsehPower LTH-2000 Series Transaxle Troubleshooting - continued

| SYMPTOM | PROBLEM | CORRECTIVE ACTION |
|--------------------------|--|---|
| UNIT IS NOISY | Final drive gear noise | Check, add gear oil to final drive Check, replace worn gears Check, replace worn bearings |
| | Hydrostatic transmission noise | Replace hydrostatic transmission |
| | Transaxle clicking | Mechanical disconnect not properly engaged, check for obstruction Check, replace mechanical disconnect components (If hydrostatic transmission shaft is damaged, replace transmission) |
| DOES NOT DRIVE | Improper belt tension | Belt worn, replace (See O.E.M. equipment manual) |
| | Brake setting incorrect | Adjust brake to proper setting (See O.E.M. equipment manual) |
| | Belt worn, glazed, or oil saturated | Replace belt (See O.E.M. equipment manual) |
| | Drive pulley worn | Replace pulley and belt (See O.E.M. equipment manual) |
| | Transaxle - hydrostatic transmission bad | Replace hydrostatic transmission |
| | Shifter linkage misadjusted or broken | Linkage damaged or loose, replace or adjust (See O.E.M. equipment manual) |
| | Fluid low in hydrostatic transmission | Check and add fluid if low (Part No. 730228A) |
| | Disconnect is in freewheel position | Move control to connected position (See O.E.M. equipment manual) |
| | Sheared or missing axle key | Replace missing or broken key |
| | Damaged or broken final drive gear | Check, replace worn or damaged gear |
| | Hydrostatic transmission leaking | Replace hydrostatic transmission |
| LEAKING LUBRICANT | Hydrostatic transmission leaking | Replace hydrostatic transmission |
| | Final drive leaking at seam | Split final drive housing, clean old sealant off, replace seals, apply new sealant (torque bolts 80-120 in. lbs.[9.0 Nm - 13.5 Nm]) |
| | Final drive leaking at shaft seal | Split final drive housing, clean old sealant off, replace seals, apply new sealant (torque bolts 80-120 in. lbs. [9.0 Nm - 13.5 Nm]) |
| BRAKE NOT WORKING | Linkage out of adjustment | Adjust brake linkage (See O.E.M. equipment manual) |
| | Linkage bent or broken | Replace components, set brake (See O.E.M. equipment manual) |
| | Brake setting incorrect | Adjust brake to proper setting (See O.E.M. equipment manual) |

1800 / VST Troubleshooting

The information on this page has been provided to help understand the internal operation of the VST. Do not use this information to attempt any internal repairs.

TecumsehPower's current policy on hydrostatic transaxles that have internal failures is to replace the complete unit. This has not changed. However, TecumsehPower would like to provide a failure checklist to assist in making an accurate evaluation of the complete tractor to eliminate any unnecessary replacements. Here is a list of items to check and corrective actions to take.

To properly test the unit for power loss.

1. Allow the unit to cool before trying the following steps.
2. Put the shift lever in a position that is 1/2 of the travel distance from neutral to forward.
3. Place the tractor on a 17° grade.
4. Drive the tractor up the grade (without the mower deck engaged). The loss of power experienced should be approximately 20%. This is considered normal. If the loss of power is approximately 50%, this would be considered excessive.
5. Bring the unit to neutral, shift into forward and note the response. Care should be taken to move the lever slowly to avoid an abrupt wheel lift.

To determine if the problem is with the hydro unit, all external problem possibilities must be eliminated. Here are some potential problem areas.

1. **Overheating:** Heat can cause a breakdown in the viscosity of the oil which reduces the pressure used to move the motor. Remove any grass, debris, or dirt buildup on the transaxle cover and / or between the cooling fins and fan. Buildup of material will reduce the cooling efficiency.
2. **Belt slippage:** A belt that is worn, stretched, or the wrong belt (too large or wide) can cause belt slippage. This condition may have the same loss of power symptom as overheating. Typically, the unit which has a slipping belt will exhibit a pulsating type motion of the mower. This can be verified visually by watching the belt and pulley relationship. If the belt is slipping, the belt will chatter or jump on the pulley. If the belt is good, a smooth rotation will be seen. Replace the belt and inspect the pulley for damage.

3. **Leakage:** The VST and 1800 Series have two oil reservoirs which can be checked for diagnostic purposes. The first is the pump and motor expansion bellows. With a small diameter blunt or round nose probe, check the bellows depth through the center vent hole. Proper depth from the edge of that hole is 3-1/4 - 3-1/2 inches (8.25 - 8.9 cm).

The second chamber is for the output gears including the differential. FIRST make sure the tractor is level, then remove the drain/fill plug. NOTE: Some units that do not have differential disconnect will have two plugs. We recommend using only the primary plug. With a small pocket rule insert until you touch bottom of case. You can then remove it and check for 1/4 - 3/8 inches (6.5 - 9.5 mm) contact, this is full at its 8 oz. capacity.

4. **Low ground speed:** If the linkage is not synchronized to absolute neutral, or the shift lever is not properly fastened to the tapered control shaft, full forward travel may not be achieved. This may cause a false reading and be misdiagnosed as a low power condition. This also could be caused by the brake not releasing.

To determine absolute neutral, the hole in the tapered control shaft must face straight up and down, at this point make sure the O.E.M. linkage is in neutral. To properly fasten the control lever to the shaft, torque the nut to 25-35 ft. lbs. (34 - 48.3 Nm) of torque with the shaft and the lever in neutral.

When attaching the shifter arm to the shaft you must prevent any rotation during torquing. This can be done by placing a long 5/16" bolt in the hole of the shaft. Hold the bolt until the tapers are locked and the nut torque is correct.

To make sure that the brake is not binding, drive the unit up a slight grade. Position the speed control lever into neutral. The unit should coast backwards. If the unit does not coast back slowly, the brake is not released from the brake disk. Adjust the brake linkage to release the brake completely when the foot pedal is released.

5. **Hard to shift:** Typically hard to shift symptoms are not caused by the hydrostatic unit. The shift arm should move with relative ease. Approximately 40-50 in. lbs. (4.48 - 5.6 Nm) at the transaxle for foot pedal units or 150-200 in. lbs. (16.8 -22.4 Nm) for hand operated units. This varies depending on the type of linkage. Binding may occur in the linkage connections due to rust or moisture. Lubricating these connections and checking for bent or damaged parts should resolve hard shifting.

TecumsehPower and Peerless® Lubrication Requirements

NOTE

Use **ONLY** the recommended lubricant in all models as listed to insure proper operation and long life.

| TRANSAXLES | | TRANSMISSION | | RIGHT ANGLE AND T-DRIVES | | |
|-------------------|-----------------------|---|--|--------------------------|---------------------|--|
| Model No. | Quantity | Model No. | Quantity | Model No. | Quantity | |
| 301 | Non-Serviceable | 2500 | † | All Models Except * | 4 oz./118 ml Grease | |
| 600 | 24 oz./710 ml Oil | 2600 | † | *1408-P91 | 3 oz./89 ml Grease | |
| 800 | 30 oz./887 ml Grease | 700 | 12 oz./355 ml Grease | *1409-P91 | | |
| 801 | 36 oz./1065 ml Grease | 700H | 12 oz./355 ml Grease | *1410-P91 | | |
| 820 | 36 oz./1065 ml Grease | 2800 | † | *3002 | | |
| 900 | 26 oz./769 ml Grease | HYDROSTATIC TRANSAXLES and TRANSMISSIONS | | *3003 | | |
| 910 | 18 oz./532 ml Grease | | | 1800 Series | | Limited service; use Kit Part No. 799030 |
| 915 | 10 oz./296 ml Grease | VST205/705 | Limited service; use Kit Part No. 799030 | *3029 | | |
| 920 | 30 oz./887 ml Grease | LTH 2000 | Limited service; final drive ONLY 8 oz./240 ml Oil | *3035 | | |
| 930 | 30 oz./887 ml Grease | 2100 | Non-Serviceable | 1000 Series | | 6 oz./180 ml Oil ††† |
| 1200 | 48 oz./1420 ml Oil †† | LDP-10 | Non-Serviceable | 1100 | | 16 oz./473 ml Oil |
| 1301 | 32 oz./946 ml Oil | DIFFERENTIALS | | | | |
| 1305 | | All Models | 3 oz./89 ml Grease | TWO SPEED AXLE | | |
| 1309 | | All Models | 2 oz./59 ml Grease | THREE SPEED AXLE | | |
| 1313 | | All Models | 2 oz./59 ml Grease | | | |
| 1302 | | 44 oz./1301 ml Oil | <p>Grease: Bentonite Grease Part Number 788067C</p> <p>Oil: SAE E.P. 80W90 Oil Part Number 730229B</p> <p>† Refer to O.E.M. Technician's Manual for type of lubricant.</p> <p>†† To be filled through shift lever opening.</p> <p>††† Some 1000 Right Angle and T-Drives use Bentonite Grease.</p> <p>†††† TecumsehPower's current policy on VST and 1800 Series transaxles with internal failure, is to replace the complete unit. VST and 1800's have two separate reservoirs which can be checked for diagnostic purpose only. The output gear reservoir can be checked with a small pocket rule as outlined in the TecumsehPower & Peerless Transmission and Drive Products Handbook.</p> <p>Refer to TecumsehPower & Peerless Transmission and Drive Products Handbook, 691218.</p> | | | |
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| 1321 | | | | | | |
| 1322 | | | | | | |
| 1325 | | | | | | |
| 1328 | | | | | | |
| 1329 | | | | | | |
| 1323 | 24 oz./710 ml Oil | | | | | |
| 1326 | | | | | | |
| 1327 | | | | | | |
| MST200 | 16 oz./473 ml Oil | | | | | |
| VST205 and 1800's | †††† | | | | | |
| 2300 | 64 oz./1892 ml Oil | | | | | |
| 2400 | 32 oz./946 ml Oil | | | | | |



Repair Manuals

Service Number 740043 or 695244A

- † OHM120
- ‡ OH318SA (OHSK110), OH358SA (OHSK120-130)
OH318EA (OHM90-110)
- † OHM120
OH195EA (OHH60), OH195EP (OHH65)
OHH/OHSK40-130
OH195SA (OHSK70), OH195SP (OHSK75)
- ‡ OH318SA (OHSK110), OH358SA (OHSK120-130)
OVM120
- * OVXL120,
* OVXL/C120
* OVXL125
OV195EA
OV358EA (OHV110-135)
OV490EA (OHV140-180)
OV691EP (VTX691, TVT691)
OVM120
- * OVXL120
* OVXL/C120
* OVXL125

Service Number 691462A

- HH140-160
- OH120-180

Service Number 740047 or 692508

- AH520
- AH600
- HSK840
- HXL840
- TC200
- TCH200 Type 1500
- TH098SA (HSK600), HSK635
- TH139SA (HSK845, 850)
- TH139SP (HSK870)
- AV600
- TV085XA (AV520)
- TVS600

Service Number 694988

- TVS840
- TVXL840

Service Number 694782

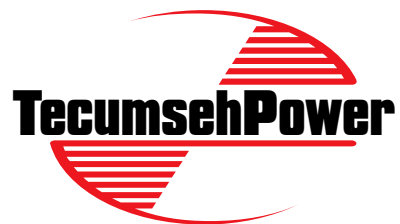
- TCH300
- TM049XA (TC300)

Service Number 740049 or 692509

- ECV100-120
- HMSK70, LH318SA (HMSK80), HMSK90,
H22
H25
H30-80
HM70-100
HH40-120
HHM80
HMXL70
HT30
HT35
HXL35
HS40-50
HSK30-70
HSSK40, LH195SA (HSSK50), LH195SP (HSSK55)
LH358SA (HMSK100), HMSK110
LAV25-50
LEV80, LV148EA (LEV90), LV195EA (LEV120)
LV148SA (VSK90), VSK100
TNT100
TNT120
TVS75-120
TVXL90-120
TVM125-170
TVM195-220
TVXL195-220
V40-80
VH40-100
VM70-100
VLV-ALL

Service Number 740045 or 691218

- 100 Series Differentials
- MST200 Series Transaxles
- 300 Series Transaxles
- 600 Series Transaxles
- 601 Slow Speed Transaxle
- 700 Series Transmissions
- 700H Series Transmissions
- 800/801 Series Transaxle
- 820 Series Transmission
- 900 Series Transaxles
- 910 Series Transaxles
- 915/940 Series Transaxles
- 920 Series Transaxles
- 930 Series Transaxles
- 1000/1100 Series Right Angle / T-Drives
- 1200 Series Transaxles
- 1300 Series Transaxles
- 2300 Series Transaxles
- 2400 Series Transaxles
- 2500 Series Transaxles
- 2600 Series Transaxles
- VST Transaxles



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