

# CLYMER® REPAIR MANUALS

## YAMAHA



### THE "ORIGINAL" JET SKI BIBLE

A straight forward high performance guide for the Kawasaki 440, 550, 650. The Watcon 2-stroke tech manual is also included.

This is a *MUST* have book for building, maintaining, or owning a high performance personal watercraft. This manual features David Simon's "The Understanding of Air Flow." It goes into structural limitations and factors, crank case design, crank shaft design, cylinder and port design, cylinder head design, exhaust systems and water box design, intake systems, and tuning an engine as a whole.

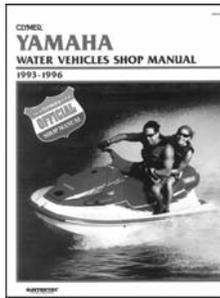
*Two great books for the price of one!*

Description	Part No.
Jet Ski Bible & Watcon 2-Stroke Technology Notes	JSB-02

### Yamaha Water Vehicles 1993-1996

WR500, SJ650, WR650, WRA650, WRA650A, WRB650, WRB650A, FX700, SJ700, RA700, RA700A, RA700B, WB700A, WRA700, WRB700, WVT700, RA760, WB760, RA1100, WVT100

**Part No. W806**



### Yamaha Water Vehicles 1987-1992

WJ500, WRA650, WR500, SJ650, WR650

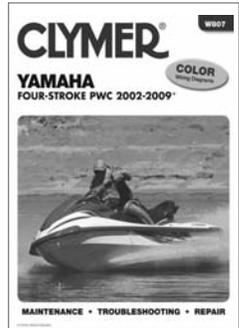
**Part No. W805**



### Yamaha Water Vehicles Four Stroke 2002-2009\*

05-08 FX, 05-08 FX Cruiser, 04-08 FX Cruiser High Output, 04-08 FX High Output, 02-04 FX140, 02-04 FX140 Cruiser, 05-09 VX, 05-09 VX Cruiser, 05-09 VX Deluxe, 05-09 VX Sport

**Part No. W807**



*Includes color wiring diagrams. Does not cover 1800 cc models. Does not cover 2-stroke models.*

## KAWASAKI

### Kawasaki Jet Ski 1976-1991

JS300, JS550, JS300SX, JS550SX, JS400, JF650X-2, JS440, JS650SX, JF650TS, JL650SC, JB650TS Jet Mate

**Part No. W801**



### Kawasaki Jet Ski 1992-1994

JS440, JS550, JS550SX, JB650 Jet Mate, JF650X-2, JF650TS, JL650SC, JS650SX, JH750SS, JS750SX, JH750XI, JT750ST, JH750XIR

**Part No. W802**

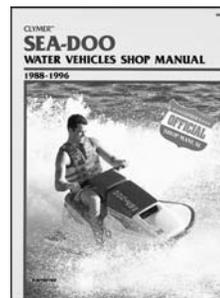


## SEA-DOO

### Sea-Doo Water Vehicles 1988-1996

Standard GT, GTS, GTX, SP, SPI, XP

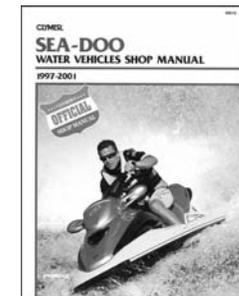
**Part No. W809-3**



### Sea-Doo Water Vehicles 1997-2001

GS/GSI/GSX/GTX RFI/GSX Ltd./GTI/GTS/GTX GTX DI/GTX RFI/GTX Ltd. HX/LRV/RX/RX DI SP/SPX/XP Ltd.

**Part No. W810**

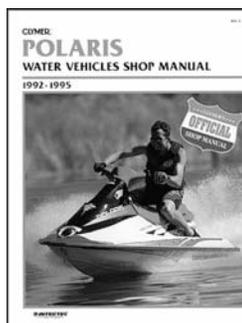


## POLARIS

### Polaris Water Vehicles 1993-1995

SL650, SL650STD, SL750, SLT750

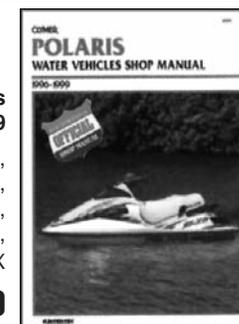
**Part No. W819**



### Polaris Water Vehicles 1996-1999

SL700, SLT700, SL700 Deluxe, Hurricane, SL780, SLT780, SL900, SL1050, SLH, SLTH, SLXN, SLTX

**Part No. W820**



FOUR STROKE  
INTAKE SYSTEMS  
ENGINE/GASKETS  
EXHAUST  
DRIVE LINE HANDLING  
ELECTRICAL  
WATERLINE /BILGE  
STEERING & CONTROLS  
BODY  
ACCESSORIES  
SERVICE TOOLS /HARDWARE  
CHEMICAL



### SUPER BN MANUAL

For the watercraft tuner working with Super BN series carburetors.

Description	Part No.
Mikuni Manual	53-9999

FOUR STROKE  
INTAKE SYSTEMS  
ENGINE/GASKETS  
EXHAUST  
DRIVE LINE HANDLING  
ELECTRICAL  
WATERLINE /BILGE  
STEERING & CONTROLS  
BODY  
ACCESSORIES  
SERVICE TOOLS /HARDWARE  
CHEMICAL

## METRIC STAINLESS STEEL HEX BOLT PACKS

10 Pcs Per Pack



Size/mm	Part No.
6 x 10	60-3010
6 x 12	60-3012
6 x 14	60-3014
6 x 16	60-3016
6 x 18	60-3018
6 x 20	60-3020
6 x 25	60-3025
6 x 30	60-3030
6 x 35	60-3035

Size/mm	Part No.
6 x 40	60-3040
6 x 45	60-3045
6 x 50	60-3050
6 x 60	60-3060
6 x 70	60-3070
6 x 80	60-3080
8 x 18	60-4018
8 x 20	60-4020

Size/mm	Part No.
8 x 25	60-4025
8 x 30	60-4030
8 x 35	60-4035
8 x 40	60-4040
8 x 50	60-4050
8 x 60	60-4060
8 x 80	60-4080
10 x 25	60-5025

## METRIC STAINLESS STEEL SOCKET HEAD CUP BOLT PACKS

10 Pcs Per Pack



Size/mm	Part No.
4 x 30	61-1030
4 x 16	61-1016
5 x 10	61-2010
5 x 25	61-2025
6 x 10	61-3010
6 x 12	61-3012
6 x 14	61-3014

Size/mm	Part No.
6 x 16	61-3016
6 x 20	61-3020
6 x 25	61-3025
6 x 30	61-3030
6 x 35	61-3035
6 x 40	61-3040
6 x 50	61-3050

Size/mm	Part No.
6 x 60	61-3060
8 x 20	61-4020
8 x 25	61-4025
8 x 30	61-4030
8 x 50	61-4050
8 x 60	61-4060
10 x 25	61-5025

## METRIC STAINLESS STEEL NUTS

10 Pcs Per Pack



Size	Part No.
6mm	63-0006
8mm	63-0008

## METRIC STAINLESS STUD PACKS

10 Pcs Per Pack



Size/mm	Part No.
8 X 30	62-4030

## METRIC STAINLESS STEEL FLAT WASHERS

10 Pcs Per Pack



Size	Part No.
6mm	63-2006
8mm	63-2008
10mm	63-2010

## METRIC STAINLESS STEEL SPRING WASHERS

10 Pcs Per Pack



Size	Part No.
6mm	63-4006
8mm	63-4008
10mm	63-4010

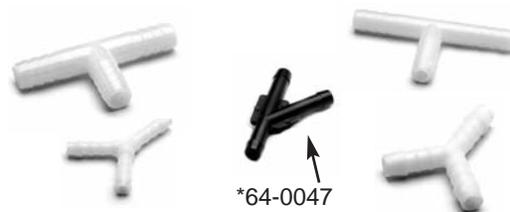
## ZIP TIES



Description	Color	Part No.
3 3/4" x .090	Black	64-0050
7 1/4" x 1.190	Black	64-0051

(Sold in Packages of 100)

## PLASTIC FITTINGS



Plastic T Fitting	Part No.
3/8" x 3/8" x 3/8"	64-0025
1/2" x 1/2" x 1/2"	64-0027
Plastic Y Fitting	Part No.
3/8" x 3/8" x 3/8" (white)	64-0045
1/4" x 1/4" x 1/4" (white)	64-0046
1/4" x 1/4" x 1/4" (black)*	64-0047

\*Reinforced with Crossbar

# BRASS FITTINGS

MNPT = Male National Pipe Thread



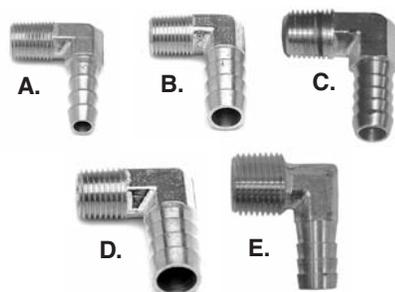
Straight Hose Barbed	Part No.
1/8" MNPT Thread 1/4" Hose	64-0001
1/8" MNPT Thread 3/8" Hose	64-0003
1/4" MNPT Thread 1/2" Hose	64-0005



Barb Connector	Part No.
1/4" I.D. Hose to 1/4" I.D. Hose	64-0057
3/8" I.D. Hose to 3/8" I.D. Hose	64-0058
1/2" I.D. Hose to 1/2" I.D. Hose	64-0059



Brass Push in Nipple	Part No.
1/8" Straight	53-9936
1/4" Straight	53-9937



90 Degree	Part No.
A. 1/8" MNPT Pipe thread 3/8" Hose Barb	64-0007
B. 1/4" MNPT Pipe thread 1/2" Hose Barb	64-0009
C. 1/4" MNPT Pipe thread 3/8" Hose Barb	64-0006
D. 1/8" MNPT Pipe thread 1/4" Hose Barb	64-0010
E. 1/2" MNPT Pipe thread 1/2" Hose Barb	64-0008



Garden Hose Adapter	Part No.
3/8" Hose Barb to Standard Garden Hose	64-0012



Press-in 90 Degree Fuel Inlet	Part No.
1/4" Hose 90 Degree	DF44-2/70



45 Degree	Part No.
1/8" MNPT Pipe thread	64-0065
1/4" Hose Barb	
1/8" MNPT Pipe thread	64-0066
3/8" Hose Barb	
1/4" MNPT Pipe thread	64-0067
1/2" Hose Barb	



Brass Fitting	Part No.
1/8" Pipe threaded junction	64-0011
1/8" to 1/4" Adapter	64-0013
9mm Yamaha Flush Adapter	64-0004



T-Fitting	Part No.
Primer Fitting 1/8" x 1/8" x 1/8"	64-0015
Primer 1/4" x 1/4" x 1/8"	64-0017
Fuel Line 1/4" x 1/4" x 1/4"	64-0019



Brass Threaded Plug	Part No.
1/8" MNPT Threaded Plug	64-0016
1/4" MNPT Threaded Plug	64-0018



## Jetcross Tour

Round 1 - May 25-26  
Cogolin

Round 2 - June 8-9  
Pont-a-Mousson, Lorraine

Round 3 - June 22-23  
Villeneuve-la-Guyard  
(So'Fun Village), Ile de France

Round 4 - July 13-14  
Freestyle Class Only  
Languedoc-Rousillon

Round 5 - July 27-28  
Midi-Pyrenees

Round 6 - August 14-15  
Avignon (PACA)



FOUR STROKE	INTAKE SYSTEMS	ENGINE/GASKETS	EXHAUST	DRIVE LINE HANDLING	ELECTRICAL	WATERLINE /BILGE	STEERING & CONTROLS	BODY	ACCESSORIES	SERVICE TOOLS /HARDWARE	CHEMICAL
-------------	----------------	----------------	---------	---------------------	------------	------------------	---------------------	------	-------------	-------------------------	----------

FOUR  
STROKEINTAKE  
SYSTEMSENGINE/  
GASKETS

EXHAUST

DRIVE LINE  
HANDLING

ELECTRICAL

WATERLINE  
/BILGESTEERING  
& CONTROLS

BODY

ACCESSORIES

SERVICE TOOLS  
/HARDWARE

CHEMICAL



## STAINLESS STEEL HOSE CLAMPS

SAE Size	Min Dia		Max Dia		Part No.
	Inch	mm	Inch	mm	
#5 (3/8" Waterline)	1/4	7	11/16	17	WF62M05
#6 (1/2" Waterline)	5/16	8	7/8	22	WF62606
#36	1-3/4	46	2-3/4	70	WF67004-0036
#48	2-1/2	65	3-1/2	89	WF67004-0048
#56	2-1/8	54	4	100	WF67004-0056
#72	3	76	5	127	WF67004-0072
#80	3-1/2	92	5-1/2	140	WF67004-0080



## T-BOLT CLAMPS

Size	Minimum Diameter		Max Diameter		Part No.
	Inch	mm	Inch	mm	
#238	2 15/64	2.224	2 29/64	2.442	D43H-75-238
#325	3 5/32	3.016	3 21/64	3.312	D40H-75-325
#400	3 49/64	3.766	4 1/6	4.062	D40H-75-400
#450	4 17/64	4.266	4 9/16	4.562	D40H-75-450
#500	4 49/64	4.766	5 1/16	5.062	D40H-75-500
#525	5 11/64	5.016	5 5/16	5.312	D40H-75-525
#550	5 17/64	5.266	5 9/16	5.562	D40H-75-550

All T-Bolt Clamps are 3/4" (.75mm) wide



## HOSE SHEARS

Cuts clean and straight every time.

Description	Part No.
Hose Shears	12-0013



## FUEL LINE

Fuel line is made from a thick walled polyurethane tubing. Sold per foot. or 25 feet/pk

Description	Part No.
Blue (1/4") per foot	53-9970
Blue (1/4") 25 feet package	53-9970-25
Primer Line (1/8") per foot	53-9980
Primer Line (1/8") 25 feet package	53-9980-25

## Fast, Easy, Strong and Secure Installation



## SQUEEZE ON STAINLESS STEEL LOW PROFILE CLAMPS



### Fast & Easy Removal

Oetiker Stepless Ear Clamps, due to the reinforcing 'dimple' in the ear, hold against pressure and vibration or hose shrinkage due to temperature changes. A built-in spring action permits the clamp to "breathe" without loosening, the need to retighten is eliminated. Once installed, any tampering is easily visible, making this an excellent clamp for service or security applications.

Description	Clamp Size	Part No.
Pincer Tool	--	12-0024
Clamp for 1/4" Fuel Line Hose (10/pack)	--	59-4014
Clamp for 1/4" Fuel Injector Hose (10 pack)	9/16	59-4016
Clamp for 3/8" Water Line (10 pack)	11/16	59-4017
Clamp for 1/2" Water Line (10 pack)	13/16	59-4018

100 Clamp Packs	Clamp Size	Part No.
Clamp for 1/4" Fuel Line Hose (100 pack)	--	59-4014-100
Clamp for 1/4" Fuel Injector Hose (100 pack)	9/16	59-4016-100
Clamp for 3/8" Water Line (100 pcs/pk)	11/16	59-4017-100
Clamp for 1/2" Water Line (100 pcs/pk)	13/16	59-4018-100



## WATER LINE HOSE

Flex-Tech multi purpose hose is more flexible and bendable for those complicated water routing requirements. This waterline is highly recommended for Factory Dry Pipe installations. Waterline is sold per foot.

Description	Part No.
3/8" ID 300psi WP	56-8010



## WATER LINE HOSE

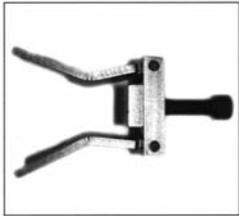
Description	Part No.
3/8" ID Blue 300psi WP (Eaton Synflex)	56-8000
1/2" ID Blue 250psi WP (Goodyear Pliovic Plus)	56-8004
3/8" Clear Vinyl	56-8007
3/8" ID Blue (Venair Technosil)	<b>NEW</b> 56-8012-25
Silicone Tubing (Sold in 25' lengths)	

500 foot reel 3/8" blue hose available and  
400 foot reel 1/2" blue hose available  
Call for special pricing on reel purchases.

# SEA-DOO REPAIR TOOLS

These tools are built to the the OEM specialty tool specifications and have been built using high quality materials.

Make your work day and the repairs you perform for your customers faster and more efficient with the right tool for the job!



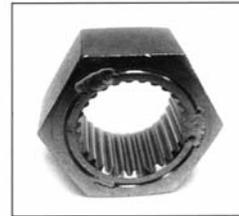
**Drive Shaft / Floating Ring**  
Part No. 950-100  
O.E. No. 529-035-841  
Fits: GTX 4 Tec Models



**Drive Shaft / Floating Ring**  
Part No. 950-102  
O.E. No. 529-035-987  
Fits: Super Charged 4-Tecs



**Drive Shaft Adaptor**  
Part No. 950-115  
O.E. No. 529-035-892  
Fits: GTX 4 Tec



**Drive Shaft Adaptor**  
Part No. 950-120  
O.E. No. 529-035-985  
Fits: RXP 4 Tec



**Camshaft Locking tool**  
Part No. 950-180  
O.E. No. 529-035-839  
Fits: 4-Tec Engines



**Insert Alignment Tool Adapter**  
Part No. 950-145  
O.E. No. 529-035-590  
Fits: XP & DI Models



**Alignment Adaptor**  
Part No. 950-150  
O.E. No. 529-035-719  
Fits: GTX 4-Tec Models



**Super Charger Retaining Key**  
Part No. 950-110  
O.E. No. 529-035-949  
All 4 Tec's with Super Chargers



**Crankshaft Locking Tool**  
Part No. 950-125  
O.E. No. 529-035-821  
Fits: All 4 Tec's



**4-Pin Socket**  
Part No. 950-195  
O.E. No. 529-035-948  
Fits: 4-Tec Supercharged



**Pressure Cap**  
Part No. 950-105  
O.E. No. 529-035-843  
Fits: GTX 4 Tec



**Steering Cable Nut Removal Tool**  
Part No. 950-130  
O.E. No. 295-000-145  
Fits: All Models



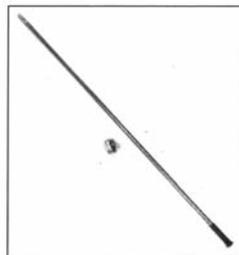
**Support Plate 4-TEC Supercharged Engines**  
Part No. 950-190  
O.E. No. 529-035-947  
Fits: 4-Tec Supercharged



**Alignment Support Plate kit**  
Part No. 950-135  
O.E. No. 529-035-506  
Fits: All Models



**Camshaft Locking tool**  
Part No. 950-180  
O.E. No. 529-035-839  
Fits: 4-Tec Engines



**Alignment Shaft**  
Part No. 950-140  
O.E. No. 295-000-141  
Fits: All Models



**Drive Shaft Holder**  
Part No. 950-155  
O.E. No. 529-035-986  
Fits: GTX 4-Tec & RXP 4-Tec Models



**Seal & Bearing Pusher**  
Part No. 950-165  
O.E. No. 529-035-955  
Fits: GTX 4-Tec Models



**Shaft Pusher**  
Part No. 950-170  
O.E. No. 529-035-819  
Fits: GTX 4-Tec Models



**Ring Gear Blocking Tool**  
Part No. 950-175  
O.E. No. 529-035-946  
Fits: 787 RFI Engines & 947 DI Engines



**Ball Bearing Support Pusher**  
Part No. 950-200  
O.E. No. 529-035-950  
Fits: 4-Tec Supercharged



**Ring Gear Blocking Tool**  
Part No. 950-172  
O.E. No. 529-035-846  
Fits: 529035846



**PTO Support Tool**  
Part No. 950-192  
O.E. No. 529-035-842

Hot Products is proud to offer a complete line of Service Tools and Hardware for all your service and Repair needs.



## FOR SEA-DOO ENGINE

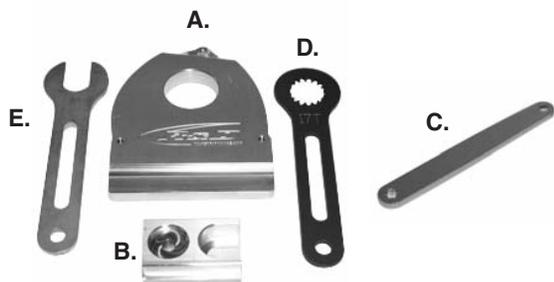


### SD 4-TEC VALVE COMPRESSION TOOL

Our overhead Valve

Compression Tool allows easy removal of valve springs and keepers without removing cylinder head. Includes compression adapter to pressurize cylinder keeping valves in place during removal of stock springs and keepers.

Description	Part No.
SD 4-TEC Valve Compression Tool	RS19050-VCT



### R&D SUPERCHARGER REBUILD TOOL KIT

R&D has designed a custom tool kit that is essential in the rebuilding process of the Sea-Doo Supercharger. All tools are specific in application and are CNC machined to ensure a precision job.

Description	Part No.
A. Supercharger Holder Tool	613-96005
B. Bearing Puller/Installer Tool	613-96006
C. Seal/Bearing Retainer Torx Wrench	613-96008
D. 215HP 16 Tooth Drive Gear Tool	613-96016
D. 185HP 17 Tooth Drive Gear Tool	613-96017
E. 185HP Clutch Drive / Lock Washer Tool	613-96018
E. 215HP Clutch Drive / Lock Washer Tool	613-96019

\*NOTE: Kit comes with a S/C holder, bearing puller/installer tool, drive gear tool and clutch drive/lock washer tool.



### RIVA SEA-DOO SUPERCHARGER SHAFT HOLDER TOOL

Our Sea-Doo Supercharger Shaft Holder Tool makes servicing your supercharger a snap. Ergonomically designed billet handle allows a sure, firm grip without fatiguing your hand. Working ends are made from heat treated tool-grade steel to resist wear and are oversized to prevent flexing. A must for every mechanic's tool box!

Description	Part No.
RIVA Sea-Doo SC Shaft Holder Tool	RS1750-ISH-949



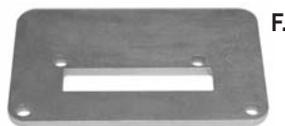
### TORX® SOCKET SET FOR SEA-DOO

Special Star Sockets for Sea-Doo 4-Tec & DI engine bolts are made from heat-treated vanadium steel and black oxide coated for durability. Sockets are kept in a convenient vinyl holder.

- Four 3/8" Drive Sockets (T10, T12, T14, T16) • Three 1/4" Drive Sockets (T6, T7, T8)

Description	Part No.
Torx Socket Set	LS26750

## FOR YAMAHA 1.8L ENGINE



F.

### R&D SPECIALTY SUPERCHARGER TOOLS FOR YAMAHA 1.8L ENGINE



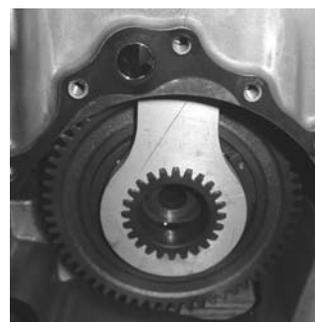
G.

R&D has designed a custom tool kit that is essential in the rebuilding process of the Yamaha Supercharger. All tools are specific in application and are CNC machined to ensure a precision job.

Description	Part No.
F. Supercharger Housing Holder Bracket Tool	612-92010
G. Shaft/Gear Holding Tool	612-92011



### R&D SUPERCHARGER CLUTCH REMOVAL TOOL FOR YAMAHA 1.8L ENGINE



This R&D tool enables the clutch to be changed in a matter of only minutes. With the supercharger and front engine cover removed the tool drops down through the case and secures the drive gear at the front of the crankshaft from rotating when the clutch is removed and installed. This is a "must have" tool that will save

massive amounts of time for any mechanic.

Description	Part No.
R&D Supercharger Clutch Removal Tool	612-92012



### FZR VALVE SPRING COMPRESSION TOOL KIT

The R&D Valve Spring Compression Tool Kit allows easy removal of the intake or exhaust valve springs and keepers without removing the cylinder head. R&D recommends using the compression adapter from a compression gauge kit to pressurize cylinder keeping valves in place during removal of springs and keepers.

Description	Part No.
FZR Valve Spring Compression Tool Kit	612-92013



### R&D VALVE STEM CONCENTRICITY GAUGE

The R&D Valve Stem Concentricity Gauge is a testing tool to check the roundness and trueness of valves. Small valves can distort or bend from heat produced in high performance supercharged or turbo charged engines. To achieve a perfect seal on the seat the valve needs to be concentric and true in every dimension. Gauge is fully adjustable to accommodate a variety of valve sizes and features a rigid, positive stop that can be set once and the trueness for an entire set of valves can be measured. Kit comes complete with dial indicator accurate to .001". This is a must have tool for any engine builder to get the most out of your high performance 4 stroke engine.

Description	Part No.
R&D Valve Stem Concentricity Gauge	612-80010

## FOR YAMAHA 1.8L ENGINE



### RIVA ENGINE VALVE SEAL TOOL

This handy tool provides easy removal and installation of valve stem seals on Yamaha 1.8L engines. Allows seal installation during fitting of valve train upgrade kit without removing cylinder head.

- Prevents seal distortion & gouging.
- Precision machined from 6061 aluminum & anodized.
- Knurled handle for positive grip.

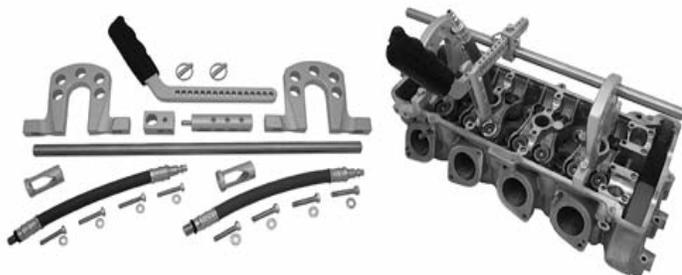
Description	Part No.
Valve Seal Tool for Yamaha 1.8L Engine	RY19040-VST



### TORQUE ANGLE METER

For All Torque-to-Yield Fastener Applications. Commonly used for tightening head bolts & other bolts where a torque angle is required. Use with 1/2" drive.

Description	Part No.
Torque Angle Meter	LS28100



### RIVA VALVE COMPRESSION TOOL

RIVA's overhead Valve Compression Tool allows easy removal of valve springs and keepers without removing cylinder head. Includes compression adapter to pressurize cylinder keeping valves in place during removal of stock springs and keepers. Fits both Yamaha 1.8L & Kawasaki 1.5L 4-stroke engines.

Description	Part No.
RIVA Valve Compression Tool Fits Yamaha 1.8L & Kawasaki 1.5L 4-stroke	RY19040-VCT

## FOR YAMAHA 1.8L ENGINE

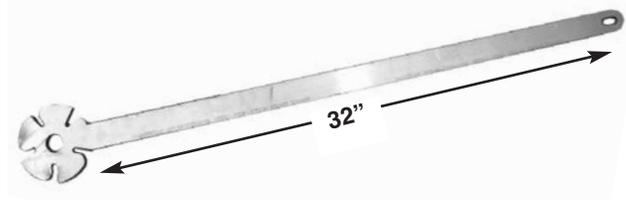


### FZR CAM TENSIONER TOOL

The R&D Cam Tensioner Tool is designed to mechanically spring preload the cam chain in order to set and verify cam timing. This eliminates the process of pressurizing the hydraulic cam tensioner to verify cam timing.

Description	Part No.
R&D FZR Cam Tensioner Tool	612-92015

### DRIVELINE COUPLER WRENCH



Description	Part No.
Driveline Coupler Wrench for SHO, FZR, VXR, VXS	132-57002

## FOR KAWASAKI ENGINE



### R&D ULTRA 250/260X SUPERCHARGER WHEEL PULLER TOOL

The R&D wheel puller tool makes it fast and easy to remove a supercharger wheel without the removal of the intercooler system or the water muffler assembly. The R&D Supercharger

drive wheel puller will save at least an hour on a pulley removal and replacement. A must have tool.

Description	Part No.
R&D Ultra 250/260X SC Wheel Puller Tool	611-26004



### R&D ULTRA 250/260X DRIVER WHEEL HOLDER TOOL

The R&D Holding Tool makes it fast and easy to remove and re-install a supercharger wheel without damaging or breaking the wheel hub. Use the holding tool to properly torque the drive bolts and main spline drive bolt. A must have tool.

Description	Part No.
Ultra 250/260X Driver Wheel Holder Tool	611-26003

FOUR  
STROKE

INTAKE  
SYSTEMS

ENGINE/  
GASKETS

EXHAUST

DRIVE LINE  
HANDLING

ELECTRICAL

WATERLINE  
/BLIGE

STEERING  
& CONTROLS

BODY

ACCESSORIES

SERVICE TOOLS  
/HARDWARE

CHEMICAL



## CARB SCREW ADJUSTING TOOL

Angled head for the hard-to-reach carb adjustment screws

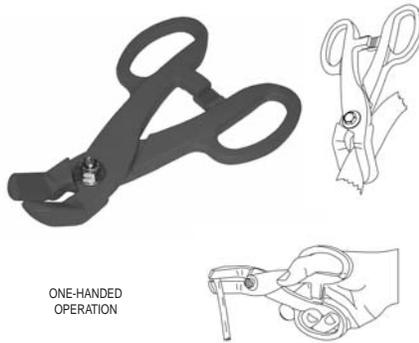
<b>Description</b>	<b>Part No.</b>
Carb Screw Adjusting Tool	08-0119



## 90 DEGREE 1/4" HEX DRIVER

Precision made of high-grade aluminum & stainless steel. Designed for hard-to-reach pilot screw. Gear driven 1/4" hex. Includes 1/4" hex bits, straight slot, Phillips, D-shaped pilot screw bit, 6mm hex jet bit and 1/4"-hex-to-1/4" drive bit.

<b>Description</b>	<b>Part No.</b>
90 Degree 1/4" Hex Driver	08-0229

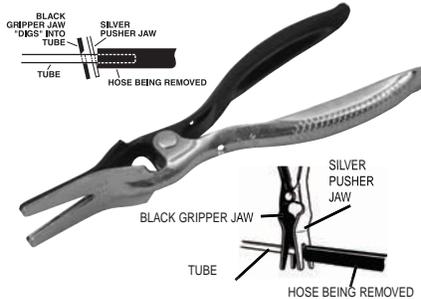


ONE-HANDED OPERATION

## HOSE PINCHER

Clamps and holds hoses up to 3/4" inside diameter. Angled jaws close to create a complete seal every time. Jaws are offset for hard-to-reach areas. The handles lock firmly to hold the jaws in closed position.

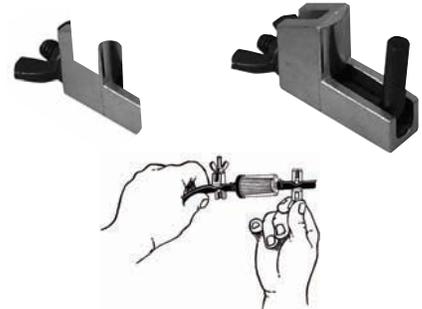
<b>Description</b>	<b>Part No.</b>
Hose Pinchers	LS23000



## HOSE REMOVAL PLIERS

For easy removal of 5/32" to 1/2" (4mm to 14mm) hoses. Engage the tube (line) with the black jaw. This sharpened jaw actually "digs" into the tube to grip it! Squeeze, and the hose is easily pushed off by the silver jaw.

<b>Description</b>	<b>Part No.</b>
Hose Removal Pliers	LS47900



## HOSE PINCHERS

Quick, easy way to pinch off fuel lines, etc. without damaging the line. Sold two per set.

<b>Description</b>	<b>Part No.</b>
Hose Pinchers	LS22850



## MIKUNI TOOL KIT

This handy little kit contains all the tools necessary to make jetting change, perform normal maintenance as well as disassemble and rebuild any Mikuni carburetor

<b>Description</b>	<b>Part No.</b>
Mikuni Tool Kit	MK-404



## ROTARY VALVE TIMING WHEEL

<b>Description</b>	<b>Part No.</b>
Rotary Valve Timing Wheel	012-170



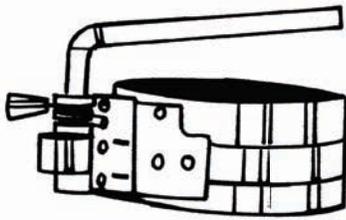
## MIKUNI POP-OFF GAUGE

For Accurate adjustment of pop off pressure levels for fine tuning requirements.

<b>Description</b>	<b>Part No.</b>
Mikuni 30 Lbs. Guage	MK-BN PMP
Mikuni 60 Lbs. Guage	MK-BN PMP-60
Mikuni 100 Lbs. Guage	MK-BN PMP-100



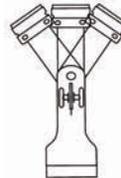
# ENGINE SERVICE TOOLS



## QUICK RELEASE RING COMPRESSOR

Ring Compressor makes it easy to remove ring from piston. Range is from 2-1/8" - 5" (54mm-127mm).

Description	Part No.
Quick Release Ring Compressor	LS19000

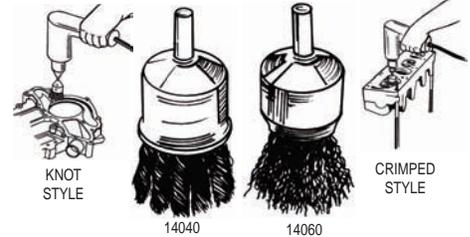


Locks in 3 Different Positions.

## FOLD-UP SCRAPER

The fold-up scraper features three arm positions and a slanted blade for proper scraping. Great for removing decals, etc.

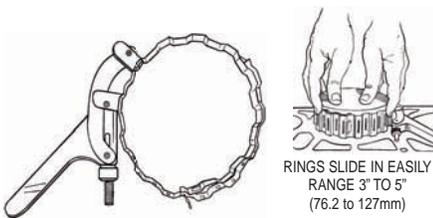
Description	Part No.
Fold-up Scraper	LS52400



## 1" WIRE END BRUSHES

Made with .020" industrial heat-tempered wire. Use with portable electric and air tools. 20,000rpm maximum safe speed.

Description	Part No.
1" Knot Wire End Brush	LS14040
1" Crimped Wire End Brush	LS14060

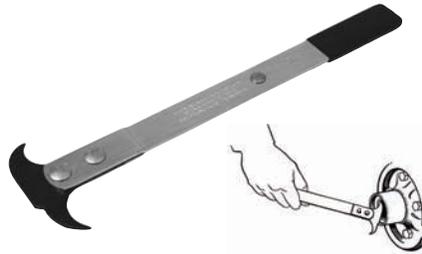


RINGS SLIDE IN EASILY RANGE 3" TO 5" (76.2 to 127mm)

## WRINKLE BAND RING COMPRESSOR

Wrinkle band cuts friction in half. Rings slide in easily 3" - 5" (76.2mm - 127mm).

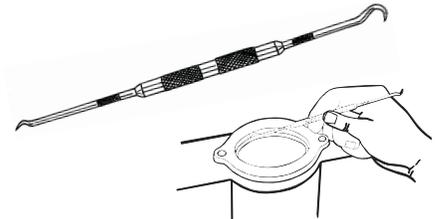
Description	Part No.
Wrinkle Band Ring Compressor	LS21700



## SEAL PULLER

Simply insert the tip of the tool behind the oil or grease seal, press and pull. Leverage works for you. Two size tips reach in and fit nearly all seal applications.

Description	Part No.
Seal Puller	LS56750



## "O" RING AND SEAL PICK

Quickly removes and installs "O" rings and seals. Tips are hardened to stay sharp.

Description	Part No.
"O" Ring and Seal Pick	LS31840



## PISTON RING INSTALLER

Description	Part No.
Piston Ring Installer	LS33500



## PISTON PIN PULLER

Universal piston pin puller easily removes all sizes of piston pins without any damage to the piston.

Description	Part No.
Piston Pin Puller	012-152

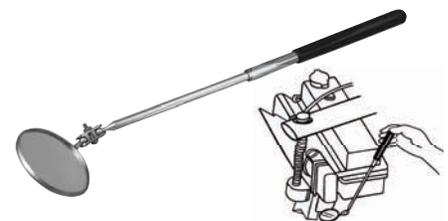
CONVERSION TABLE	
Unit	Conversion
<b>Linear Measure</b>	
centimeter (cm.)	0.3937 inch
meter (m.)	3.2808 feet / 1.0936 yards
kilometer (km.)	0.6214 mile
inch (in.)	2.54 centimeters
foot (ft.) = 12 inches	30.48 centimeters
yard (yd.) = 3 feet	0.914 centimeters
rod (rd.) = 5.5 yards	5.0292 meters
chain (ch.) = 4 rods	20.117 meters
furlong (fur.) = 10 chains	201.17 meters
mile (m., mi.) = 8 furlongs	1.6093 kilometers
league (l.) = 3 miles	4.8279 kilometers
<b>Aviordupois Weight</b>	
Gram (g.)	0.0353 oz. avdp.
kilogram (kg.) = 1,00 grams	2.2046 lb. avdp
metric ton (M.T.)	1.1023 short tons
	0.9842 long ton
grain (gr.)	0.0648 gram
dram (dr. avdp.) = 27.34 grains	1.7718 grams
ounce (oz. avdp.) = 16 drams	28.3495 grams
pound (lb. avpd) = 16 ounces	0.4536 kilogram
hundredweight (cwt.)	
(US) = 100 pounds	45.3592 kilograms
(UK) = 112 pounds	50.8024 kilograms
ton (t., tn.)	
(US) = short ton	
=2,000 pounds	0.907 metric ton
(UK) = short ton	
=2,240 pounds	1.106 metric ton



## COMPRESSION TESTER

Contains hoses for 10, 12 & 14mm spark plug applications. Features a quick disconnect with a pressure release valve and a 300lbs. Gauge. Packed in a convenient carry box. Made in USA.

Description	Part No.
Compression Tester	08-0188



## TELESCOPING MIRROR

Enables you to see around corner. 2-1/4" diameter mirror swivels to any position. Length extends from 10" to 14".

Description	Part No.
Telescoping Mirror	LS32050

FOUR STROKE

INTAKE SYSTEMS

ENGINE/GASKETS

EXHAUST

DRIVE LINE HANDLING

ELECTRICAL

WATERLINE /BILGE

STEERING & CONTROLS

BODY

ACCESSORIES

SERVICE TOOLS /HARDWARE

CHEMICAL



## PRO-CRIMP TOOL

To do a job right, it is important to have the right tools. If you custom build a lot of plug wires, the Pro-Crimp is the right tool for you! The Pro-Crimp features a hardened steel frame, molded hand grips and built-in ratchet action that is also adjustable. The tool is supplied with jaws to fit MSD's Super Conductor Spark Plug wires and can be removed to use additional jaws (sold separately) for crimping common wiring terminals.

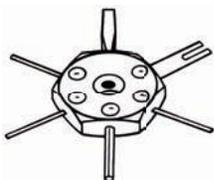
Description	Part No.
MSD Pro Crimp Tool	35051
Spark Plug Dies	3508
Amp Pins	3506
Amp Lug Dies	3507
Weathertight Dies	3509
Deutsch Terminal Dies	3510



## TERMINAL DETENT TOOL

The hollow barrel allows you to depress the tab on the terminal end and to remove the wire from the connector without damaging its ends.

Description	Part No.
Terminal Detent Tool	59-0254



## TERMINAL REMOVAL TOOL

Includes six different shaped blades.

Description	Part No.
Terminal Removal Tool	LS14900



## PERMA-SEAL CONNECTOR KIT

Description	Part No.
MSD Perma-Seal Connector Kit	4377



## TIMING DEGREE WHEEL

Set total loss timing with no guess work. Check crank shaft timing to exact degree. A must for porting and port timing.

Description	Part No.
Timing Degree Wheel	08-0092



ROK FLORJANCIC  
AT 2012 HOT PRODUCTS  
IJSBA WORLD FINALS  
IN LAKE HAVASU CITY, ARIZONA



## FLYWHEEL PULLER

Sea-Doo	Part No.
800/951 38mm x 1.5	MP#42

Kawasaki	Part No.
900/1100 35mm x 1.5	MP#29
1200 STX-R,	MP#64
Ultra 150 33mm x 1.5	



## FLYWHEEL/MAGNETO PULLER

Sea-Doo	Part No.
580/650/720	MP#37
12 Hole Disc 8mm Bolts	

Polaris	Part No.
Polaris All & Universal	MP#37
12 Hole Disc 8mm Bolts	

Yamaha	Part No.
580/650/Pre 94 701	MP#37
12 Hole Disc 8mm Bolts	
701/760/800/1100/1200	MP#37
12 Hole Disc 8mm Bolts	

Kawasaki	Part No.
300/440/550/650	MP#37
12 Hole Disc 8mm Bolts	



Kawasaki	Part No.
750/800	MP#18
Special 18mm x 1.5 Right Hand Bolt	



## CHARGER MODEL #CU2606A

Total Amps: 6  
Battery System: 12Volt



**Description** **Part No.**  
Portable Battery Charger **CU2606A**

## CHARGER MODEL #CU2612A

Total Amps: 10  
Battery System: 12Volt



**Description** **Part No.**  
Portable Battery Charger **CU2612A**



## JUMPER CABLES

8 feet long heavy duty 8 gauge copper jumper cables are big on charging power, yet stow conveniently in the 9 x 9 inch nylon bag.

**Description** **Part No.**  
Jumper Cables **59-0530**



## SPARK PLUG TOOLS

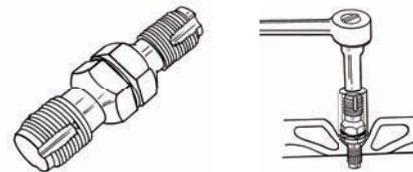
**Description** **Part No.**  
Ratchet Plug Wrench **08-0147**



## SPARK PLUG WIRE TESTER

Now you can check spark plug wires without piercing the wires. Light flashes indicating sound wire.

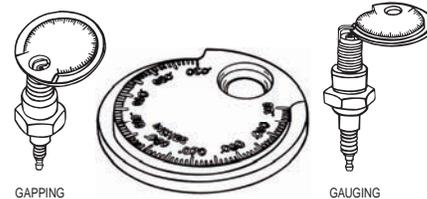
**Description** **Part No.**  
Spark Plug Wire Tester **LS26900**



## SPARK PLUG HOLE THREAD CHASER

Cleans threads in spark plug hole. Use with 13/16" spark plug socket. Double-ended for both 14mm and 18mm threads.

**Description** **Part No.**  
Spark Plug Hole Thread Chaser **LS20200**



## STANDARD/HIGH ENERGY SPARK PLUG GAUGE & GAPPER

Gauge and gap all types of spark plugs from .020" to .110 (.50mm to 2.53mm).

**Description** **Part No.**  
Spark Plug Gauge and Gapper **LS67870**



## SPARK PLUG HOLDERS

Spark Plug Holder protects the electrode, maintaining the proper gap.

**Description** **Part No.**  
2 per Blister Pack **SPH-2**  
40 per Countertop Display **SPH-40**

## IGNITION SYSTEM SPARK TESTER

This ignition system tester checks the integrity and strength of your system by gauging your systems spark.

**Description** **Part No.**  
Ignition System Spark Tester **08-0122**



2012 HOT PRODUCTS IJSBA WORLD FINALS  
IN LAKE HAVASU CITY, ARIZONA

FOUR STROKE  
INTAKE SYSTEMS  
ENGINE/GASKETS  
EXHAUST  
DRIVE LINE HANDLING  
ELECTRICAL  
WATERLINE /BILGE  
STEERING & CONTROLS  
BODY  
ACCESSORIES  
SERVICE TOOLS /HARDWARE  
CHEMICAL



## SUPER OUT EXTRACTOR SET

A super strong extractor set made of a special hardened, shock-resistant tool steel.

Works on both left and right hand threads. Super Outs cut their way straight into bolts, eliminating wedging or further tightening of frozen bolts and screws. Five extractor sizes extract 1/4" to 1/2" and larger bolts and screws.

<b>Description</b>	<b>Part No.</b>
Super Out Extractor Set	LS62900



## 3/8" HAND IMPACT TOOL SET

Loosens Rusted, Frozen Nuts, Bolts

and Screws. Unique design delivers over 200 ft. lbs. of Shock Torque. Can be reversed to tighten. Can also be used with impact sockets!



### Impact Set Includes:

- 3/8" Impact Tool
- 3/8" Bit Holder
- #1 Phillips Bit
- #2 Phillips Bit
- #3 Phillips Bit
- #4 Phillips Bit
- 3/8" Straight Slot Bit

<b>Description</b>	<b>Part No.</b>
3/8" Hand Impact Tool Set	LS29200



## WATCON INTAKE/SCOOP GRATE DEPTH GAUGE

Most savvy tuners are sure to set their intake grates to the maximum IJSBA allowed limits for the best hook-up possible. Watcon's "Depth Gauge" has been manufactured to the Official IJSBA Rule Bok specifications.

<b>Description</b>	<b>Part No.</b>
Watcon Intake Scoop Grate Depth Gauge	IJSBA-1

*\*THE WATCON DEPTH GAUGE HAS BEEN MANUFACTURED TO THE SPECIFICATIONS IN THE IJSBA RULE BOOK, ALL FINAL DECISIONS ON THE LEGAL DEPTH ARE THE DECISION OF EACH RACE DIRECTOR AND THE TECHNICAL INSPECTOR FOR EACH RACE SITE.*



## IMPELLER HOLDER TOOL

Holds spline of drive shaft for removal of impeller.

### Sea-Doo Part No.

A. 580/650/720/800/951 All	TOOL#23
18mm spline	

### Polaris Part No.

B. Polaris ALL & long reach universal	TOOL#38
20mm spline	



## IMPELLER HOLDER TOOL

### Sea-Doo Part No.

C. GTX 4-Tec SC (22mm)	TOOL#70
D. RXP/RXT (27mm)	TOOL#71



## SOLAS IMPELLER HOLDER TOOL

### Sea-Doo Part No.

RXP/RXT (27mm)	WR012-SRX
----------------	-----------



## IMPELLER HOLDER TOOL FOR KAWASAKI

### Kawasaki Part No.

E. 440/550-89	TOOL#24
16mm spline	

F. 650/750/800/900/1100 & Ultra 250/260/300	TOOL#23
18mm spline	



## IMPELLER SHAFT HOLDER TOOL FOR YAMAHA

### Yamaha Part No.

G. WR500, WJ650LX	TOOL#27
16mm spline	

H. 650/701/760/1100/1200	TOOL#32
18mm spline	

I. GP1200R	TOOL#56
20mm spline (18 tooth)	

SHO/FZR/FZS	TOOL#53
20 mm spline (20 tooth)	



TOOL# 61-5      TOOL# 60-3

## DRIVE COUPLER TOOLS

Use to remove drive coupler from crankshaft and sub-shaft.

### Yamaha Part No.

650/701	TOOL#60-3
760/800/110/1200	TOOL#61-5

### Kawasaki Part No.

440/550/650/750/800	DC-800
---------------------	--------



## WATCON IMPELLER PITCH GAUGES

It's a known fact; not all impellers are created equal. Sometimes when impellers are mass produced, there are subtle differences that can affect performance. Use this simple tool to measure the pitch angle and blade length of each blade throughout its circumference. This enables you to make adjustments to the pitch where needed. Great for fine tuning, making minor changes or verifying pitch when sending impellers off for repair.

### Description Part No.

140-142mm Impellers	IMP-142
---------------------	---------

144-148mm Impellers	IMP-148
---------------------	---------

155-160mm Impellers	IMP-160
---------------------	---------

# SHOP TOOLS



## STUD TOOL

Economy stud installation and removal tool. The kit includes three sizes: 6mm, 8mm and 10mm.

Description	Part No.
Economy Stud Tool Kit	WJ7710



## STUD INSTALLATION TOOLS

Will Install cylinder and intake manifold studs. Hex head is 3/4" or 19mm.

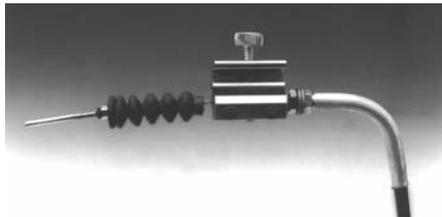
Description	Part No.
6mm x 1.00 Stud Tool	08-0149
8mm x 1.25 Stud Tool	08-0150
10mm x 1.25 Stud Tool	08-0151



## HEX-PRO AND STAR-PRO PIVOT HEAD WRENCHES

- Pivot design allows for easy rotation around obstructions
- Heat treated alloy tool steel
- Includes heavy duty folding canvas storage pouch

Description	Part No.
Hex-Pro Metric	08-0420
Hex-Pro SAE	08-0419
Star-Pro	08-0421



## CABLE LUBBER

Installs quickly and helps free up corroded or tight cables. Note; Damaged cable should be replaced.

Description	Part No.
Cable Lubber	59-0250



## T-HANDLE RATCHET

Features a compact design that allows it to be used even in tight spaces.

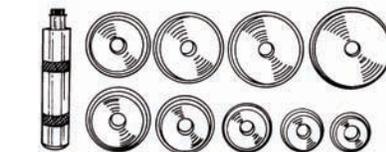
Description	Part No.
1/4" T-Handle Ratchet	08-0231
3/8" T-Handle Ratchet	08-0226



## SCRATCH BRUSH

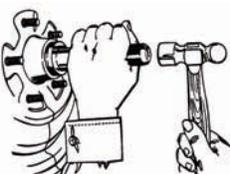
Removes rust, scale, paint, and solder from metal surfaces.

Description	Part No.
Shoe Handle Scratch Brush	LS14180
Scratch Brush	LS14160



SET INCLUDES ONE OF EACH OF THE FOLLOWING DRIVERS:

DRIVER PART NO.	SIZE
12610	1.565"
12620	1.750"
12630	1.965"
12640	2.325"
12710	2.470"
12650	2.555"
12690	2.830"
12700	2.995"
12970	3.180"



## BEARING RACE AND SEAL DRIVER—MASTER SET

Make it easier to insert bearing race and seals without damage to race. This master set includes nine drivers to fit most standard bearings.

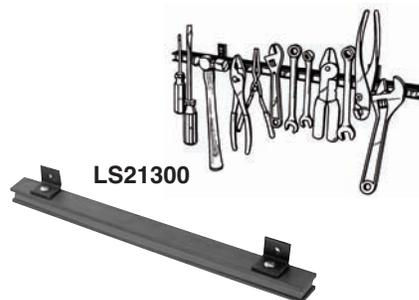
Description	Part No.
Bearing Race and Seal Drive	LS12980



## MAGNETIC SOCKET HOLDERS

Standard and deep sockets fit on one convenient holder with powerful magnets, securely holding on to any steel surface. Red color only.

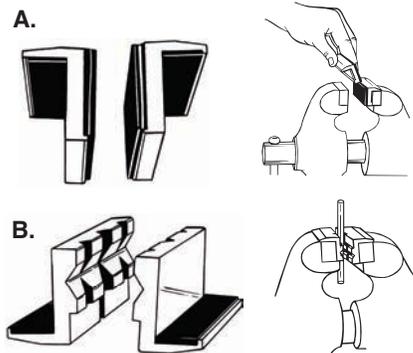
Description	Part No.
1/4" Holder with 26 Compartments	LS40120



## MAGNETIC TOOL HOLDERS

Powerful magnet holds even heavy hand tools. Ideal for both home and shop.

Description	Part No.
13" Long Magnetic Tool Holder	LS21300



## RUBBER-FACED & ALUMINUM VISE JAW PADS

These vise jaw pads are designed to protect delicate

Description	Part No.
A. Rubber-faced Vise Jaw Pads	LS48100
B. Aluminum Vise Jaw Pads	LS48000

FOUR STROKE

INTAKE SYSTEMS

ENGINE/GASKETS

EXHAUST

DRIVE LINE HANDLING

ELECTRICAL

WATERLINE /BILGE

STEERING & CONTROLS

BODY

ACCESSORIES

SERVICE TOOLS /HARDWARE

CHEMICAL

FOUR STROKE

INTAKE SYSTEMS

ENGINE/GASKETS

EXHAUST

DRIVE LINE HANDLING

ELECTRICAL

WATERLINE /BILGE

STEERING & CONTROLS

BODY

ACCESSORIES

SERVICE TOOLS /HARDWARE

CHEMICAL



**Adapter Kit Included!**

**FLUID EXTRACTOR**

- Empties oil in 15 pumps or less
- Extracts warm or cold oil
- Pressure relief valve allows easy transportation and storage
- Single-hand-ease effortless operation
- Tethered cap
- Delivers gulp-free, mess-free performance
- Complete adapter kit is included featuring three extraction tubes

Description	Part No.
Fluid Extractor (6.5 Liter Fluid Extractor)	CJ-169-S
Fluid Extractor Tube Replacement Kit	72-13117A

\*Note: Not for use with gasoline.



**RULE FLAT TANK ELECTRIC OIL EXTRACTOR**

Eliminate those costly yard service fees with the new quick, clean, compact electric oil extractor. Includes a 3-1/2 gallon compact self-priming diaphragm pump for extraction and an easy pour spout for oil transfer.

- 3.5 gallon (13 liter) leak proof container
- Designed for ease of carrying
- Complete with dipstick, suction tube & battery clamps
- Empties and stows easily
- Self-priming, dry running, 12 or 24 volt diaphragm pump

Description	Part No.
Electric Oil Extractor	17860-0012



**HT MOTO 6 LITER OIL EXTRACTOR**

The unit uses a small vacuum system, which pumps fluid through a hose to the 6-liter reservoir. It also includes a pour spout to aid in emptying the reservoir. Pump is removable for easy storage.

Description	Part No.
HT Moto 6 Liter Oil Extractor	OIL01



**HT MOTO 15 LITER OIL EXTRACTOR**

Ideal for bigger jobs and shops, this larger capacity oil/fluid extractor makes changing the oil on your 4 stroke PWC, snowmobile, ATV, boat, lawn mower, etc. clean and hassle free. Holds up to 15 liters (3.92 gal) in this sturdy portable container with built in pump.

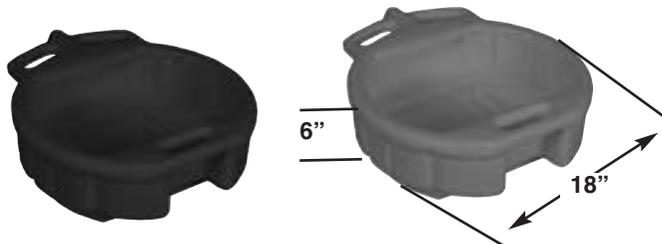
Description	Part No.
HT Moto 15 Liter Oil Extractor	OIL03



**SHOP LANYARD**

Not legal for riding. For shop testing and repairs only.

Description	Part No.
KPTW, Yamaha, Sea-Doo	A3240
KPTW, Yamaha, Sea-Doo DESS	A3250



**4.5 GALLON DRAIN PANS**

Now with built-in-ribs for draining filters in the pan. For easy transfer of liquids. High-density polyethylene material is resistant to chemicals and solvents, and is easy to clean. 1" wide diameter spout for quick and easy pouring. The anti-splash lip and baffles help prevent spilling when carrying or pouring. Comes with large, easy-grip handles. Two colors: 17942 is black for oil and 17952 is green for anti-freeze.

Description	Color	Part No.
4.5 Gallon Oil Drain Pan	Black	LS17942
4.5 Gallon Oil Drain Pan	Green	LS17952



**RATIO RITE CUP & LID**

With Ratio Rite measuring cup get a perfect mix every time. Fill to the pre-calibrated ratio mark and pour into gas. Ratios are from 16:1 to 44:1 for up to 12 gallons. Calibrations also include oz., cc's, and pints.

Description	Part No.
Ratio Cup	59-0548
Ratio Rite Cup Lid	59-0582



## ELME TOOLS SEVED DIAGNOSTIC SYSTEM

Elme Tools has developed the newest essential tool for any PWC mechanic. Elme Tools utilized the newest state of the art technology to develop the "Seved Pro" diagnostic tool.

Seved Pro is the professional multi brand diagnostic solution, it is the most complete tool created for users looking for independence and flexibility in managing jet skis and marine engines.

Seved Pro connects directly to diagnostic socket and read/erase fault codes, output live data, program and reset.

- Multi brand
- Key and remote programming
- Portable and autonomous
- Updates via internet
- Full technical support
- Evolving device

Seved Pro is the only diagnostic tool you will need to purchase. Depending on your requirement, customers are free to configure their own diagnostic tool to manage all engine brands. With the programming facility, you will also be able to program keys and remotes for any PWC brand.

Thanks to Seved Pro, each mechanic will boost business and expand the service offered to their customers

Seved Pro is a complete diagnostic device for:

- BRP Sea-Doo with key programming
- Kawasaki with key programming
- Yamaha with remote programming
- Benelli
- Yanmar
- Weber
- Jet Lev with key programming

Software can also be ordered separately, depending on the services offered to its customers.

### Who is Elme Tools?

Elme Tools are the leader in car keys and controls programming. The company's first commercial activity has been focused on code keys and locks adaptation for all kind of vehicles. As time goes on the business philosophy had clearly gone towards a very specific expertise: the generic knowledge of everything related to active safety car system. Immobilizer, central locking (comfort), remote controls, transponders, activation of crypto keys, etc...

In sum, they have been developing diagnostic tools for the past 15 years and have sold so far 14,000 diagnostic devices in more than 100 countries. It is that experience that has allowed the company to expand their business activity to the pwc and marine industry. The company goal is ambitious but simple; bring a complete diagnostic solution to manage pwc engines with efficiency.

Base Unit	Part No.
Seved Pro Diagnostic System Base Unit*	<b>SEVED PRO</b>
This unit includes: Master Cable (ADC300), SEVED PRO Marine Operating Manual (OPM110), Carry case (ADA100), Neoprene case (ADA101), Dongle case (ADA 102), Dongle A (ADC400), USB Cable (ADC153), Power cable (ADC152), Power cable (12 Volts) (ADC450)	
* <b>Base unit does not include software program.</b>	
<b>You can purchase software separately, or you can purchase a SEVED Pro Kit, which includes Base Unit and software program listed below.</b>	

Kit (Base Unit + Software)	Part No.
Seved Pro + Software PWC Kit	<b>PWCPACK**</b>
ADS400/401/402/404/405/408	
<b>** Due to upgrade of programs &amp; connectors, pricing may change. Please confirm pricing when placing your order.</b>	

Software	Part No.
BRP, BRP CAN-AM, Jet Lev Diagnostics	<b>ADS400</b>
BRP, BRP CAN-AM, Jet Lev Key Programming	<b>ADS401</b>
Suzuki 4 Stroke Outboards	<b>ADS410</b>
Kawasaki Diagnostics (Including Fitch) + Key Programming (cable ADC419)	<b>ADS402</b>
Yamaha PWC & Outboard Diagnostics	<b>ADS404</b>
Hydrospace, Benelli, Weber S4	<b>ADS405</b>
Yanmar Diagnostics	<b>ADS407</b>
Yamaha Remote Programming	<b>ADS408</b>

FOUR STROKE	INTAKE SYSTEMS	ENGINE/GASKETS	EXHAUST	DRIVE LINE HANDLING	ELECTRICAL	WATERLINE /BILGE	STEERING & CONTROLS	BODY	ACCESSORIES	SERVICE TOOLS /HARDWARE	CHEMICAL
-------------	----------------	----------------	---------	---------------------	------------	------------------	---------------------	------	-------------	-------------------------	----------