



OPERATION MANUAL

(1800) 407-712

Enquiries@LGH.au

LGH.au



OPERATION & MAINTENANCE MANUAL CONVENTIONAL HYDRAULIC POWER UNIT

Models:

CPU-1-2E CPU-3-2E CPU-2G

Revision: September 2025

Hydra-Slide Ltd.
84 Royal Road
Guelph, ON
Canada N1H 1G3
hydra-slide.com

AU Operations Manual 039 04/11/2025



PLEASE READ OPERATING MANUAL BEFORE
USING THIS EQUIPMENT AND ADHERE TO ALL
SAFETY INSTRUCTIONS. FOR QUESTIONS,
CONTACT HYDRA-SLIDE LTD. AT +1-519-900-1450



ORIGINAL INSTRUCTIONS

HYDRA-SLIDE 2-OUTLET CONVENTIONAL POWER UNIT

1 - GENERAL INFORMATION

1.1 Original Instructions

The English version of this manual is the Original Instructions for **Hydra-Slide 2-Outlet Conventional Power Units (Models CPU-1-2E, CPU-3-2E, and CPU-2G)**. All other language versions are translations of the Original Instructions.

1.2 Manufacturer Details

Hydra-Slide Ltd.
84 Royal Road
Guelph, Ontario, Canada
N1H 1G3
(519)-900-1450
info@hydra-slide.com

1.3 Machinery Description

Machinery Designation: **2-Outlet Conventional Power Unit**

The **2-Outlet Conventional Power Unit** is a single-circuit hydraulic power pack with a maximum operating pressure of 10,000 psi (700 bar). It is designed to work with most standard 10,000 psi double-acting and single-acting hydraulic cylinders.

These instructions apply to the following power unit models:

- CPU-1-2E Conventional Power Unit
- CPU-3-2E Conventional Power Unit
- CPU-2G Conventional Power Unit

The power unit's model number and serial number can be found on the unit's "Hydra-Slide" nameplate. Identifying information for the engine/motor and pump can be found on the "Power Team" nameplate and/or on the engine itself.

For specific instructions relating to the engine/motor and pump, please refer to the following appendices in this manual:

- Power Team *Hydraulic Pump Operating Instructions*
- Power Team PQ120 Series & PG120 Series Parts Lists

Note: Hydra-Slide Ltd. endeavours to include the latest version of the PowerTeam Instruction Sheets at time of printing, however these should only be used as a reference. For specific details, refer to PowerTeam's website for up-to-date Instruction Sheets.

1.3.1 System Information

The system consists of the following main components:

MODEL	CPU-1-2E	CPU-3-2E	CPU-2G
Engine/Motor	1 HP (0.75 kW)	3 HP (2 kW)	4 HP (3 kW)
Drive Type	Electric	Electric	Gasoline
Electric Start	Yes	Yes	No (Pull Start)
Electrical Rating	115 V/13.6 A/1-Phase	460 V/6.5 A/3-Phase	-
Oil Reservoir	10 gal (38 L)	10 gal (38 L)	10 gal (30 L)
Pump Type	2-Stage	2-Stage	2-Stage
First Stage Flow Rate*	1.7 gpm (10.6 lpm)	3.2 gpm (12 lpm)	2.1 gpm (11 lpm)
Second Stage Flow Rate*	0.26 gpm (1.0 lpm)	0.6 gpm (2.2 lpm)	0.6 gpm (2.2 lpm)
9500 CONTROL VALVE	1x PowerTeam 9500	1x PowerTeam 9500	1x PowerTeam 9500
Pressure Relief Valves	1 x User Adjustable	1 x User Adjustable	1 x User Adjustable
Pressure Gauges	2 x Wiki (0-15,000psi)	2 x Wiki (0-15,000psi)	2 x Wiki (0-15,000psi)
Pressure Port Outlets	2 x PowerTeam 9796 (Female)	2 x PowerTeam 9796 (Female)	2 x PowerTeam 9796 (Female)
Return Port Outlets	2 x PowerTeam 9796 (Female)	2 x PowerTeam 9796 (Female)	2 x PowerTeam 9796 (Female)
Flow Control/ Holding Valve	2 x PowerTeam 9596	2 x PowerTeam 9596	2 x PowerTeam 9596
Approximate Weight	330 lbs (150 kg)	330 lbs (150 kg)	320 lbs (145 kg)
Approximate Size (in)	31 x 29 x 42	31 x 29 x 42	31 x 29 x 42
Approximate Size (cm)	79 x 74 x 107	79 x 74 x 107	79 x 74 x 107

*gpm = US gallons per minute

*lpg = liters per minute

1.3.2 The Workstation

All control functions of the **2-Outlet Conventional Power Unit** can be accessed from the front of the unit. The operator can view and operate all functions from a standing position as well as maintain visibility over the top of the unit towards the work area. If it is not possible for the operator to see the work area, it is highly recommended to maintain radio or visual contact with a designated spotter who can relay or direct commands.

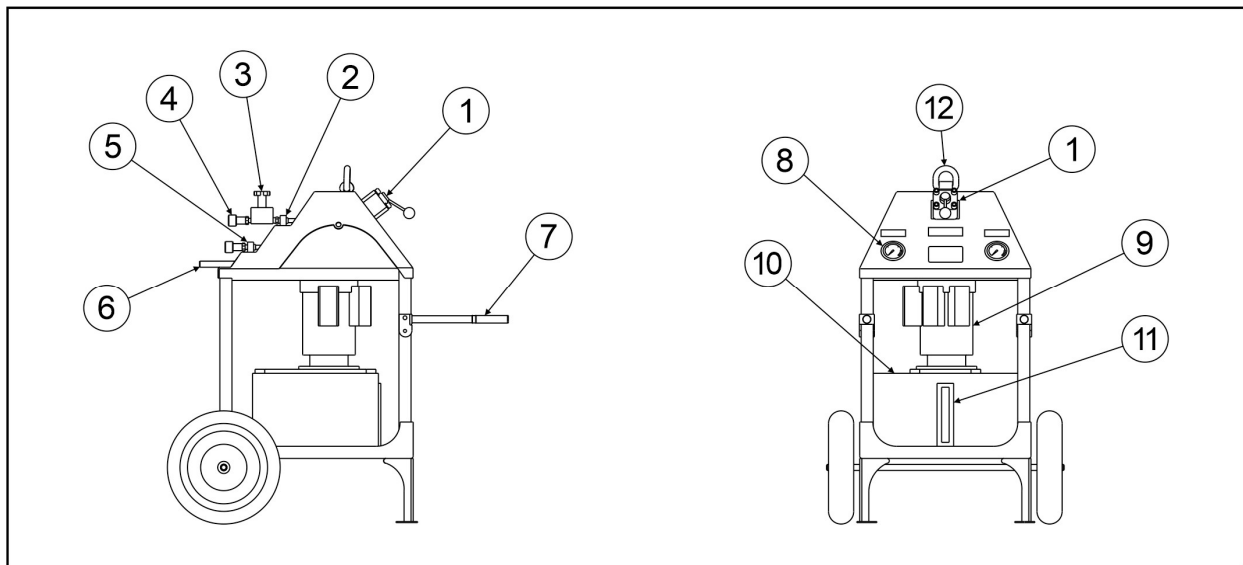


Figure 1: 2-Outlet Conventional Power Unit Layout

Item	Description
1	PowerTeam 9500 Manual 9500 CONTROL VALVE
2	Manifold A – PowerTeam 9617 Manifold Block
3	PowerTeam 9596 Load Holding/Lowering Valve
4	PowerTeam 9796 (Female) Hose Coupler
5	Manifold B – PowerTeam 9617 Manifold Block
6	Oil Drip Pan
7	Cart Handles
8	Manifold Pressure Gauge – Wiki (0 – 15,000 psi)
9	Electric Motor / Gasoline Engine
10	Hydraulic Oil Reservoir – 10 Gallons (38 liters)
11	Hydraulic Oil Level Sight Glass with Temperature Gauge
12	Lifting Lug

1.3.3 Intended Use

The **2-Outlet Conventional Power Unit** has been designed and manufactured exclusively for the purpose of supplying hydraulic oil under pressures up to 10,000 psi (700 bar) in a controlled manner to actuate single or double-acting hydraulic cylinders or other hydraulic equipment.

Use in any other manner or for any other purpose is not intended and is not recommended by the manufacturer. The operational safety of the system is only assured if used as intended.

1.3.4 Operator Training

The operator should be experienced in the safe operation of high-pressure hydraulic jacking systems. The operator should also read and understand these Instructions in full prior to operating the system.

1.3.5 In Case of Breakdown

In case of equipment breakdown or other operational problems, cease operation immediately and take any necessary steps to secure equipment and protect surroundings and personnel. Depressurize hoses and all hydraulic components (use coupler bleed tool as required). Identify the problem. Have a qualified hydraulics technician perform any required service work and/or replace any broken or defective components.

2 - Safety

2.1 General

Set up and operate the **2-Outlet Conventional Power Unit** only under the direction and supervision of experienced and qualified personnel.

This section contains information required for the safe operation of the **2-Outlet Conventional Power Unit**. Please read and understand the instructions and safety warnings that come with the equipment. Failure to comply with these safe operating recommendations could result in property damage or personal injury. Always follow safe work practices.

2.2 Precautions and Potential Misuse

- Only qualified operators should install, operate, adjust, maintain, clean, repair or transport this equipment.
- Only use this equipment in accordance with its intended use and follow all instructions.
- Never exceed recommended maximum pressure and stroke ratings. Good practice recommends not exceeding 80% of these ratings.
- Always wear appropriate Personal Protective Equipment.
- Protect all equipment from potential hazards such as fire, explosion, sharp surfaces, extreme heat/cold, corrosives, and heavy impact.
- Never operate any equipment without all provided guards and safety devices in place and in good working condition.
- Avoid standing in the line of force of hoses or any hydraulic components.
- Lift or move equipment and components using only the provided lift lugs or handles, and only employ proper lifting equipment and techniques. Never lift by the hoses or hydraulic fittings.
- Take steps to keep all equipment clean and free from possible damage. This is particularly important for hoses and couplers.
- Don't allow hoses to kink, twist, crush, cut or bend tightly. Bending radius should be at least 4½ inches (12 cm). Inspect hoses and couplers before each use and remove from service if any signs of damage are noted. Never attempt to repair a hose.
- Do not handle hoses or couplers while they are under pressure, even when wearing Personal Protective Equipment. There is risk of serious personal injury from hose leaks and faulty or improperly connected couplers.

- Use safe practices when bleeding a pressurized hose or coupler. Use only a specially-designed coupler bleed tool such as a CT-604 coupler bleed tool available through Hydra-Slide Ltd.

2.2.1 Residual Risks and Protective Measures

Observing the safety precautions indicated in these instructions minimizes the risks associated with using the **2-Outlet Conventional Power Unit**, however residual risks remain with the use of any high-pressure hydraulic systems, and in the event of loss of control of a load while skidding or jacking.

Failure of any hydraulic components such as hoses, couplers, and fittings can potentially be fatal. Be mindful when the unit is active and avoid standing in the line of force of any hydraulic components, most notably the hydraulic couplers facing outward from the rear of the unit. The unit is designed so that risks to the operator when occupying the workstation are minimized.

3 - Operation

3.1 Jacking Mode

CAUTION: When lifting with hydraulic cylinders it is always advised to follow the lifting/lowering with appropriate cribbing timber supports in the event of any type of failure. This is our standard recommended safety practice for all free lift applications.

CAUTION: The **9500 CONTROL VALVE** should always be in center position when system is not in operation.

WARNING: Flow from two outlets on the same manifold is not separated, and care must always be taken to ensure the load remains stable during jacking. Typically, loads should be jacked sequentially end-to-end, one end at a time, and securely blocked to prevent tipping.

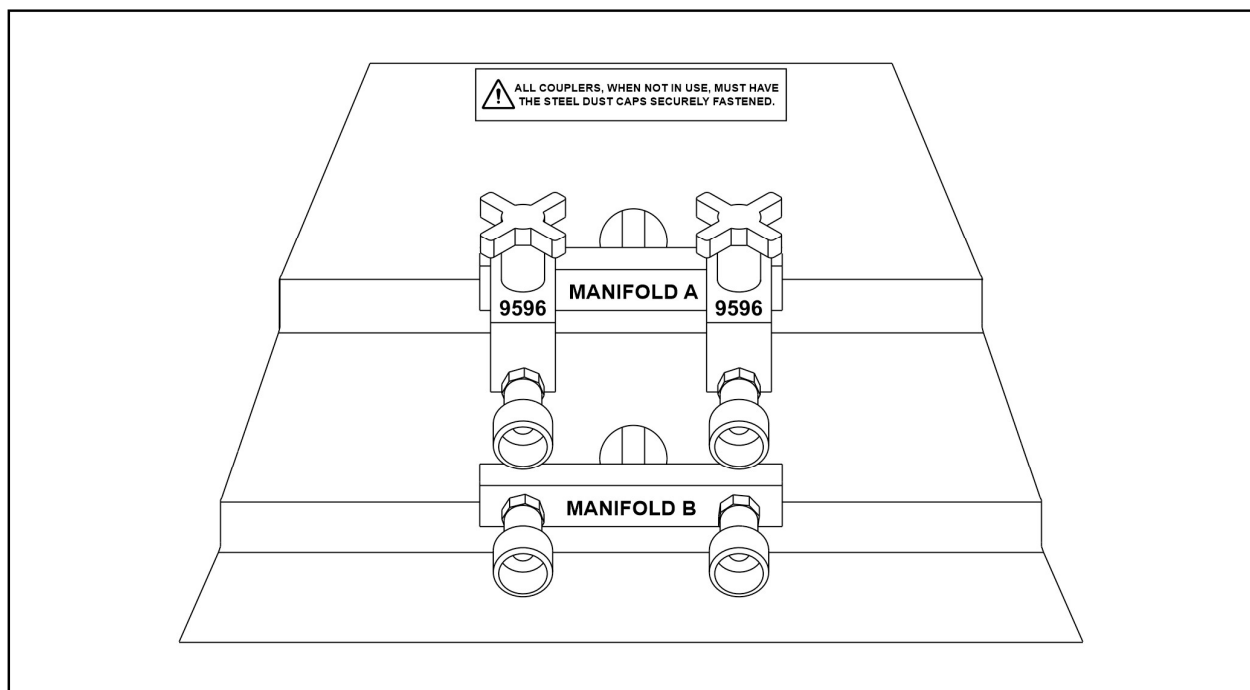


Figure 2: 2-Outlet Conventional Power Unit Back Panel

1. **9500 CONTROL VALVE** must be in neutral or center position prior to start up
2. **9695 LOAD HOLDING VALVES** must be closed (they will act as holding valves and slow-release valves)
3. Connect cylinders to the power unit with appropriate 10,000 psi rated hydraulic hoses
 - i. Connect the bottom port of each cylinder to the **MANIFOLD A** couplers
 - ii. Connect the top port of each cylinder to the **MANIFOLD B** couplers

- iii. Ensure that all couplers are fully engaged and hand tight, otherwise the hose check valves will not open and the cylinders will not function properly
- iv. Start engine

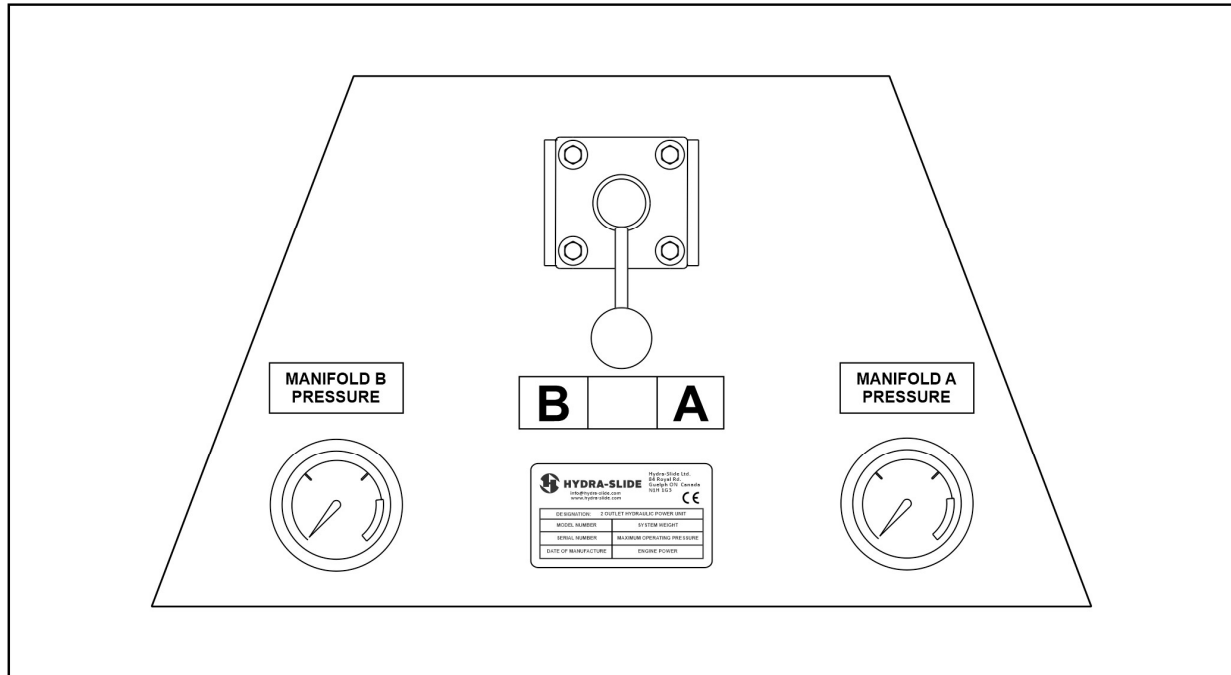


Figure 3: 2-Outlet Conventional Power Unit Front Panel

- 4. To raise jacks:
 - i. Shift the **9500 CONTROL VALVE** to the right (**A position**) to extend cylinders
 - ii. monitor pressure gauges
- 5. To stop jacks:
 - i. Shift the **9500 CONTROL VALVE** to center or neutral position
- 6. To lower jacks with a load:
 - i. Ensure that **9695 LOAD HOLDING VALVES** are fully closed
 - ii. Shut off engine (very important since the bottom of the jack is now under pressure from the load; any pressure applied to the return side at this time could overload the bottom of the jack)
 - iii. Shift the **9500 CONTROL VALVE** to the left (**B position**) or retract position
 - iv. Slowly open the **9695 LOAD HOLDING VALVES** to release pressure and unload jacks; monitor pressure gauges
 - v. Shift the **9500 CONTROL VALVE** to center or neutral position

7. To retract jacks without a load:
 - i. Fully open **9695 LOAD HOLDING VALVES**
 - ii. Start engine
 - iii. Shift **9500 CONTROL VALVE** to the left (**B position**) to retract cylinders
 - iv. When jacks are retracted, fully close **9695 LOAD HOLDING VALVES** again
8. For continued jacking, **repeat steps 4 through 7** above

3.2 Skidding Mode

CAUTION: **9500 CONTROL VALVE** should always be in center position when system is not in operation.

1. **9500 CONTROL VALVE** must be in neutral or center position prior to start up
2. **9695 LOAD HOLDING VALVES** must be fully open (they will act as flow control valves)
3. Connect skidding cylinders to the power unit with appropriate 10,000 psi rated hydraulic hoses
 - i. Connect the bottom port of each cylinder to the **MANIFOLD B** couplers
 - ii. Connect the top port of each cylinder to the **MANIFOLD A** couplers
 - iii. Ensure that all couplers are fully engaged and hand tight, otherwise the hose check valves will not open and the cylinders will not function properly
 - iv. Start engine
4. To advance push cylinders:
 - i. Shift the **9500 CONTROL VALVE** to the left (**B position**) to advance skidding cylinders
 - ii. Adjust **9695 LOAD HOLDING VALVES** as required to equalize push cylinder extension speed
 - iii. Extend push cylinders to near full extension to synchronize skidder positions
 - iv. Immediately shift **9500 CONTROL VALVE** to center or neutral position
(do not hold pressure on a fully extended cylinder as this could damage cylinder)
5. To retract push cylinders:
 - i. Shift the **9500 CONTROL VALVE** to the right (**A position**) to retract push cylinders
 - ii. When push cylinders engage in next position, return **9500 CONTROL VALVE** to the center or neutral position

To continue skidding, **repeat steps 4 and 5** above

4 - MAINTENANCE & CARE

- When not in use, store the power unit in a covered, dry location, protected from damage. Take special care of all hydraulic components, hoses, and fittings.
- Wipe clean inside and outside of all hose couplers using a clean, non-fibrous cloth before connecting and always use protective caps when not in use.
- When transporting the power unit, lift only using the provided lifting lug.
- The wheels do not lock, so the power unit should be secured while being transported.

4.1 Hydraulic System

A complete inspection of the unit should be performed prior to each use at a minimum. Visually inspect all system hoses, pipes, and pipe connections for signs of leaks. Have a qualified hydraulic technician repair or replace any worn, damaged, or broken parts. Contact Hydra-Slide Ltd. for replacement parts.

4.1.1 Hydraulic Oil

Check the oil level of the pump prior to start-up, and add oil, if necessary, by removing the fill port cap. Frequently check oil condition for contamination. If the hydraulic oil appears cloudy, there could be an air or water leak in the system and the unit should be serviced and the oil replaced.

Unless otherwise specified, this unit comes filled with Hydraulic Technologies AW ISO 46 hydraulic oil.

It is recommended to use this same fluid for topping up or when doing a complete oil change. Avoid mixing different hydraulic oils; if mixing of oils is necessary, ensure they have similar properties and are compatible. Residual oil in the system will not be harmful as long as the oils are compatible.

As a general rule, drain and clean the reservoir every 250 hours of use, or more frequently if operating in dirty environments. See the included Enerpac Instruction Sheet for detailed instructions.

5 - TROUBLESHOOTING

Symptom	Probable Cause	Recommended Action
Cylinder(s) advance only partially	A coupler is not fully engaged Oil level in pump is low	Check and tighten all couplers Add oil to reservoir
Cylinder(s) will not extend	A coupler is not fully engaged Load exceeds capacity Skid shoe is jamming in track Oil level in pump is low Cylinder seals leaking	Check and tighten all couplers Reduce load Realign track Add oil to reservoir Repair/replace cylinder
Cylinder(s) exhibit jerky, sporadic movement	Air in hydraulic system	Bleed hydraulic system
Cylinder(s) will not retract	Coupler is not fully engaged	Check and tighten all couplers
Push cylinder will not extend, and oil is coming from pressure relief valve or top of cylinder	Coupler on return line is not fully engaged	Check and tighten all couplers

EC DECLARATION OF CONFORMITY

Manufacturer

Hydra-Slide Ltd.
84 Royal Road
Guelph, Ontario, Canada
N1H 1G3

We declare that the **Hydra-Slide 2-Outlet Conventional Power Unit - Models CPU-1-2E, CPU-3-2E and CPU-2G** are in accordance with the following Harmonized Standards:

EN ISO 12100:2010	Safety of machinery – General principles for design - Risk assessment and risk reduction
EN 4413:2010	Hydraulic fluid power – General rules and safety requirements for systems and their components
EN 60204-1:2006+A1:2009	Safety of Machinery – Electrical equipment of machines - General requirements

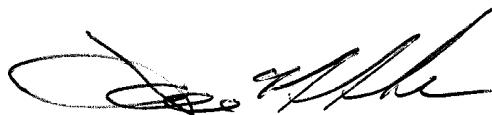
And in accordance with the EC Guidelines of the following:

2006/42/EC –	Machinery Directive
2000/14/EC –	Noise Emission Directive
2005/88/EC –	Amendment to the Noise Emission Directive
2014/35/EU –	Low-Voltage Electrical Equipment Directive
2004/108/EC –	Electromagnetic Compatibility Directive

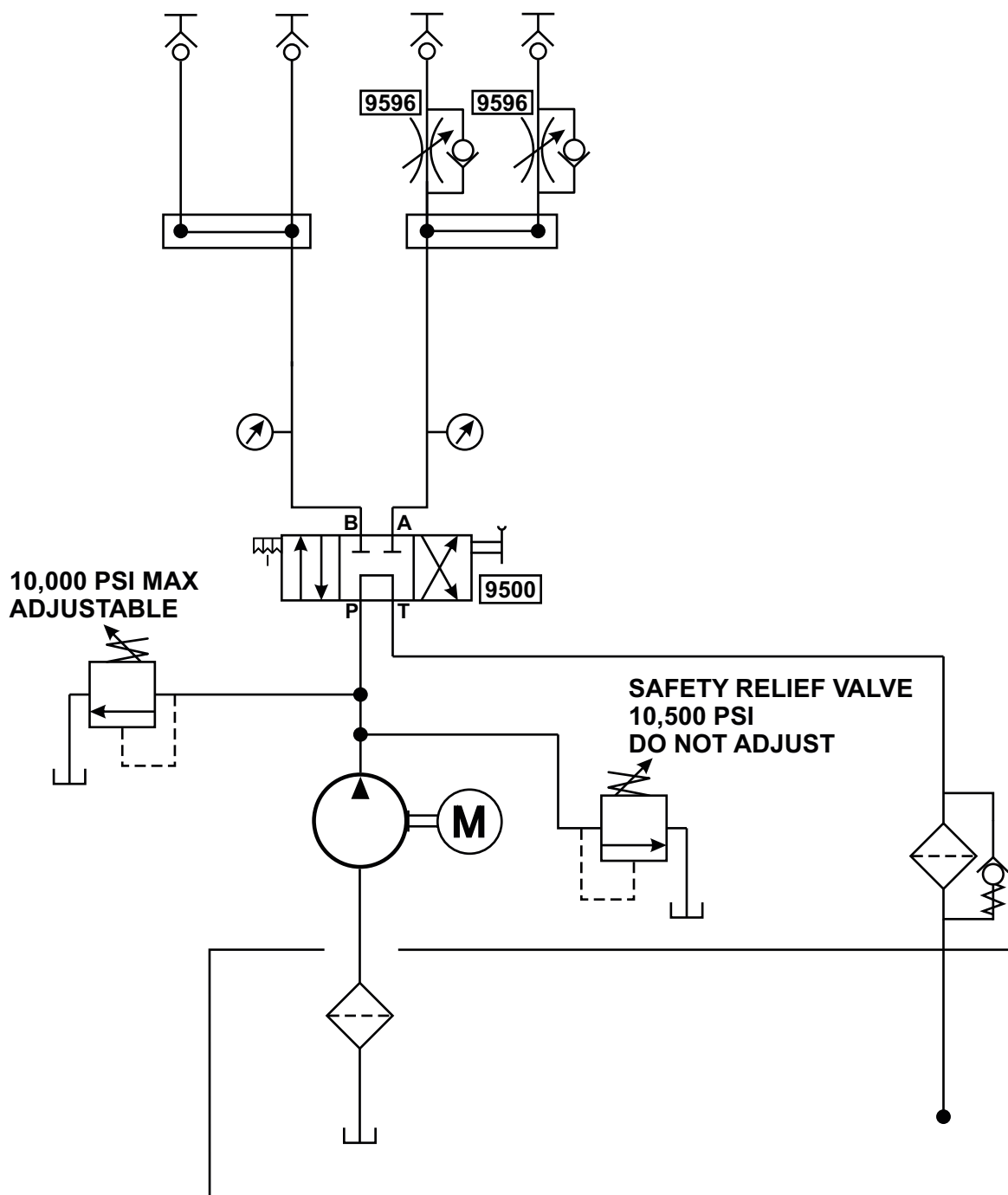
Documentation supporting this declaration is kept on file at the address listed above.

Hydra-Slide Ltd.

June 1, 2021



Don Mahnke P. Eng
President



NOTES:

Prime Mover differs between models:

Model CPU-1-2E: single-phase electric motor, 1 hp (0.75 kW)

Model CPU-3-2E: three-phase electric motor, 3 hp (2.25 kW)

Model CPU-2G: gasoline engine , 4 hp (3 kW)

TITLE

2-Outlet Conventional Power Unit Hydraulic Schematic

DRAWING NO.

CPU-2

REVISION NO.

03

REVISION DATE

2025-09-18

DRAWN BY

DJM

VERIFIED BY

RY



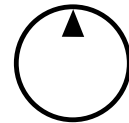
HYDRA-SLIDE

84 Royal Rd.
Guelph, ON
Canada N1H G3

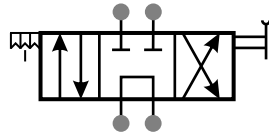
PRIME MOVER



TWO-STAGE HYDRAULIC PUMP



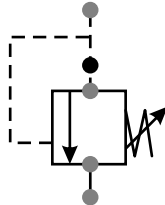
DIRECTIONAL CONTROL VALVE



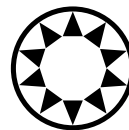
FIXED DISPLACEMENT PISTON PUMP (4-WAY)



PRESSURE RELIEF VALVE



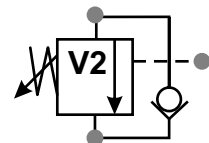
FIXED DISPLACEMENT PISTON PUMP (10-WAY)



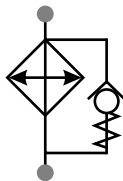
INLINE FILTER or SUCTION STRAINER



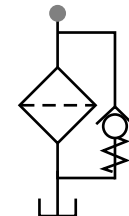
COUNTERBALANCE VALVE



AIR TO OIL COOLER



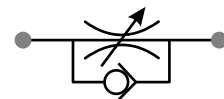
RETURN LINE FILTER WITH BYPASS CHECK



QUICK CONNECT COUPLER



FLOW CONTROL VALVE



RETURN TO TANK



NEEDLE VALVE



CHECK VALVE



NOTES:

TITLE

Hydraulic Schematic Legend

REVISION NO.

01

REVISION DATE

2020-10-21

DRAWN BY

DJM

VERIFIED BY

RY



HYDRA-SLIDE

84 Royal Rd.
Guelph, ON
Canada N1H 1G3

*SPX Corporation
5885 11th Street
Rockford, IL 61109-3699 USA*

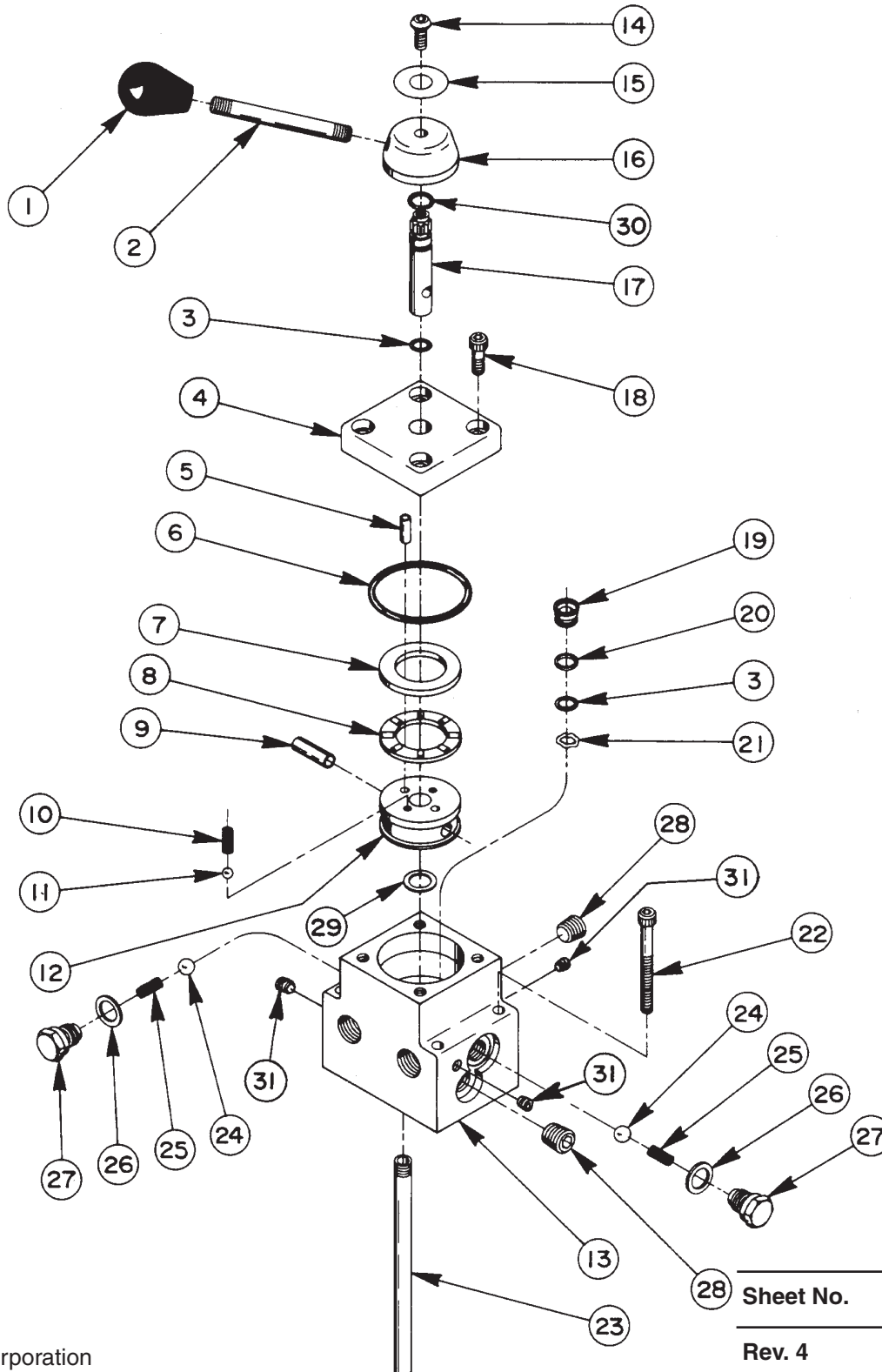
SPX Corporation
655 Eisenhower Drive
Owatonna, MN 55060-0995 USA
Phone: (507) 455-7000
Tech. Services: (800) 533-6127
Fax: (800) 955-8329
Order Entry: (507) 455-1480
Fax: (800) 283-8665
International Sales: (507) 455-7223
Fax: (507) 455-7746

Parts List for:

9506
9506-MHI
9507

9508
9508-BOC
9509

VALVE ASSEMBLY



Parts List, Form No. 100628, Back sheet 1 of 3

Item No.	Part No.	No. Req'd	Description
1	211911	1	Plastic Knob
2	250042	1	Stud
3	*10268	6	O-ring (1/2 X 3/8 X 1/16; Nitrile)
	11439	6	O-ring (1/2 X 3/8 X 1/16; Viton)
	17716	6	O-ring (1/2 X 3/8 X 1/16; EPR)
4	61343	1	End Cap
5	211915	1	Pin (7/32 dia. X 5/8 Lg.; On valves manufactured before 6-1-91)
	250056	1	Pin (7/32 dia. x 15/16 Lg.; On valves manufactured after 6-1-91)
6	*15892	1	O-ring (1.956 X 1.720 X .118; Nitrile)
	19097	1	O-ring (1.956 X 1.720 X .118; Viton)
	212887	1	O-ring (1.956 X 1.720 X .118; EPR)
7	11227-1	1	Thrust Bearing Washer
8	11228	1	Roller Thrust Bearing
9	16940	1	Roll Pin (5/16 dia. X 1-1/2 Lg.; On valves manufactured before 6-1-91)
	10496	1	Roll Pin (5/16 dia. x 1" Lg; On valves manufactured after 6-1-91)
10	15691	1	Compression Spring (1/4 O.D. X 5/8 Lg.)
11	10375	1	Ball (1/4 dia.)
12	46086	1	Rotor (For 9506, 9509, & 9506-MHI)
	46087	1	Rotor (For 9507, 9508, & 9508-BOC)
13	61314	1	Valve Body
14	15911	1	Cap Screw (1/4-20 X 5/8 Lg.; Torque to 60/80 in. lbs.)
15	211936	1	Decal
16	46057	1	Stem End
17	46048	1	Stem
18	11013	4	Cap Screw (5/16-18 X 1" Lg.; Torque to 300/320 in. lbs.)
19	202480	5	Shear Seal
	252460	5	Seal
20	*11863	5	Backup Washer (1/2 X 3/8 X 1/16)
21	21975	5	Spring Washer
22	10856	4	Cap Screw (1/4-20 UNC X 2-1/2 Lg.) Note: When using this valve on a PE30 Series pump order (4) 11956 Cap Screws for mounting valve to pump.
23	200609	1	Drain Tube (For 9506, 9507, & 9506-MHI only)
24	10378	2	Ball (3/8 dia.)
25	10444	2	Compression Spring (3/16 I.D. X 13/32 Lg.)
26	*14874	2	Copper Washer (.700 X 1/2 X 1/32)
27	305975	2	Valve Screw (Torque to 30/35 ft. lbs.)
28	14972	2	Pipe Plug (1/4 NPTF)
29	214801	1	Spacer
30	*213674	1	Shaft Seal
31	15130	3	Pipe Plug (1/16 NPTF)

PARTS INCLUDED BUT NOT SHOWN

209383	1	Patent Decal
--------	---	--------------

Part numbers marked with an asterisk (*) are contained in Repair Kit No. 300451.

Note: Alternate material seals listed for special valves factory equipped with viton or EPR seals.

Refer to any operating instructions included with this product for detailed information about operation, testing, disassembly, reassembly, and preventive maintenance.

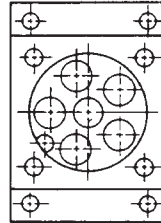
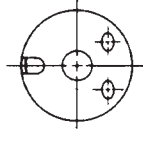
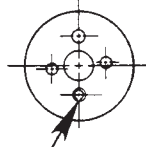
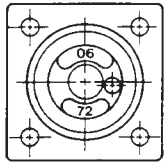
Items found in this parts list have been carefully tested and selected. **Therefore: Use only genuine replacement parts!**

Additional questions can be directed to our Technical Services Department.

Note: Shaded areas reflect last revision(s) made to this form.

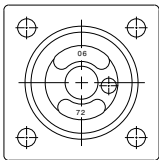
SPECIFICATIONS

9506 & 9506-MHI (Pump Mounted) & 9509 (Remote Mounted) Manual (Posi-check) 3-Position, 4-Way Tandem Center Valve

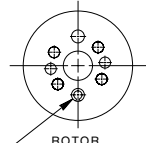


Position opening as shown

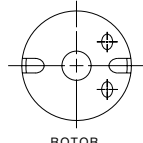
For 9506-MHI only



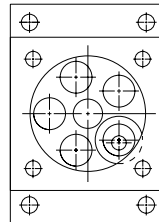
END CAP
BOTTOM VIEW



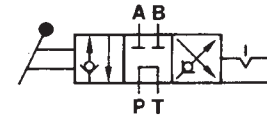
ROLL PIN LOCATION
(POSITION OPENING AS SHOWN)



ROTOR
BOTTOM VIEW



VALVE BODY
TOP VIEW



FUNCTION

Center (Hold) Position:

"A" and "B" Ports blocked
"Pressure" Port to tank

Advance Position:

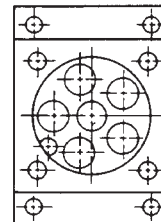
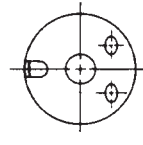
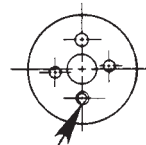
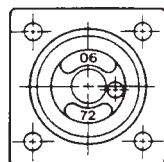
Pressure to "A" Port
(Reverse flow checked)
"B" Port to tank

Return Position:

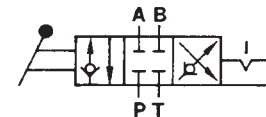
Pressure to "B" Port
(Reverse flow checked)
"A" Port to tank

NOTE: "A" and "B" Ports are blocked with the pressure port open to tank during transition between valve positions. (Non-Interflow)

9507 (Pump Mounted) & 9508 (Remote Mounted) Manual (Posi-check) 3-Position, 4-Way Closed Center Valve



Position opening as shown



FUNCTION

Center (Hold) Position:

All Ports blocked

Advance Position:

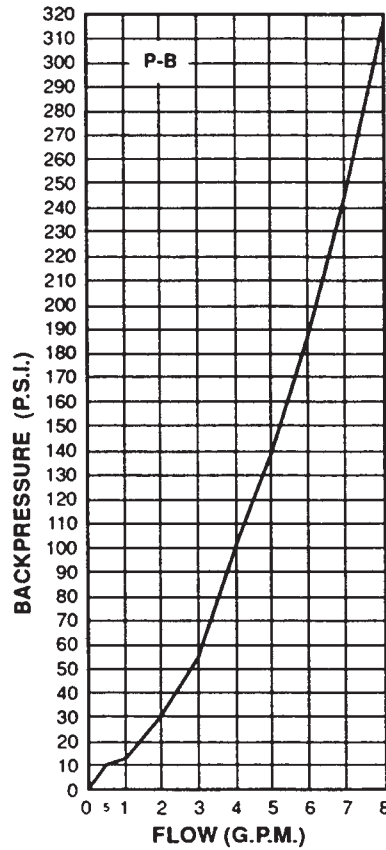
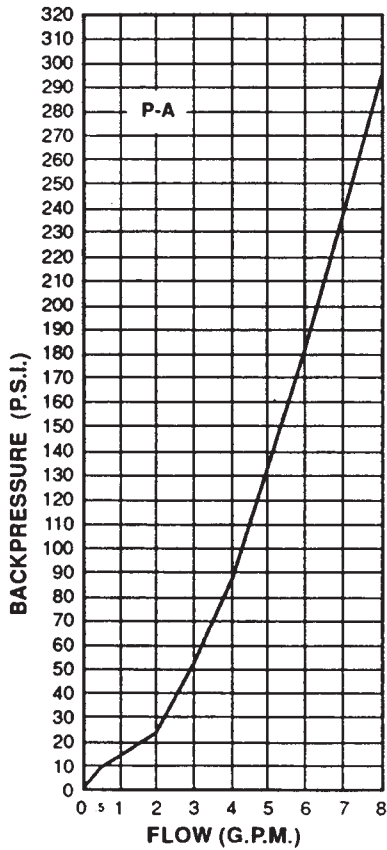
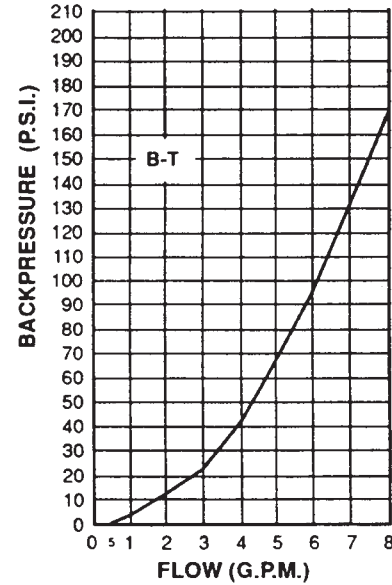
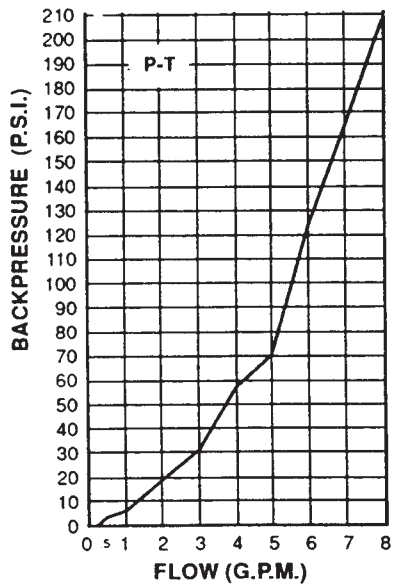
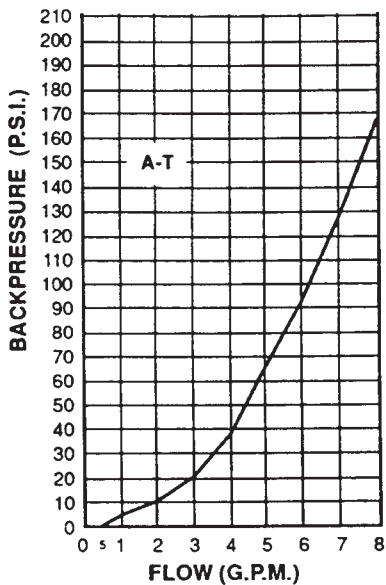
Pressure to "A" Port
(Reverse flow checked)
"B" Port to tank

Return Position:

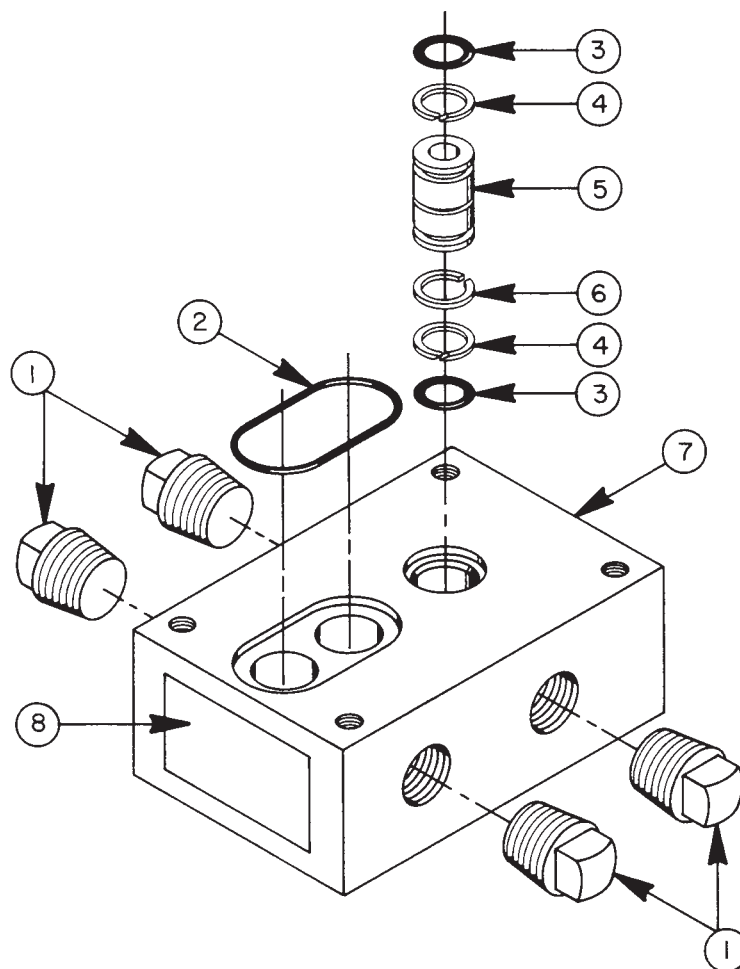
Pressure to "B" Port
(Reverse flow checked)
"A" Port to tank

NOTE: "A" and "B" Ports are blocked with the pressure port open to tank during transition between valve positions. (Non-Interflow)

PRESSURE DROP AND FLOW CHARTS



**#9510 VALVE SUBPLATE
REMOTE MOUNTED
(INCLUDED WITH 9508, 9508-BOC, AND 9509)**



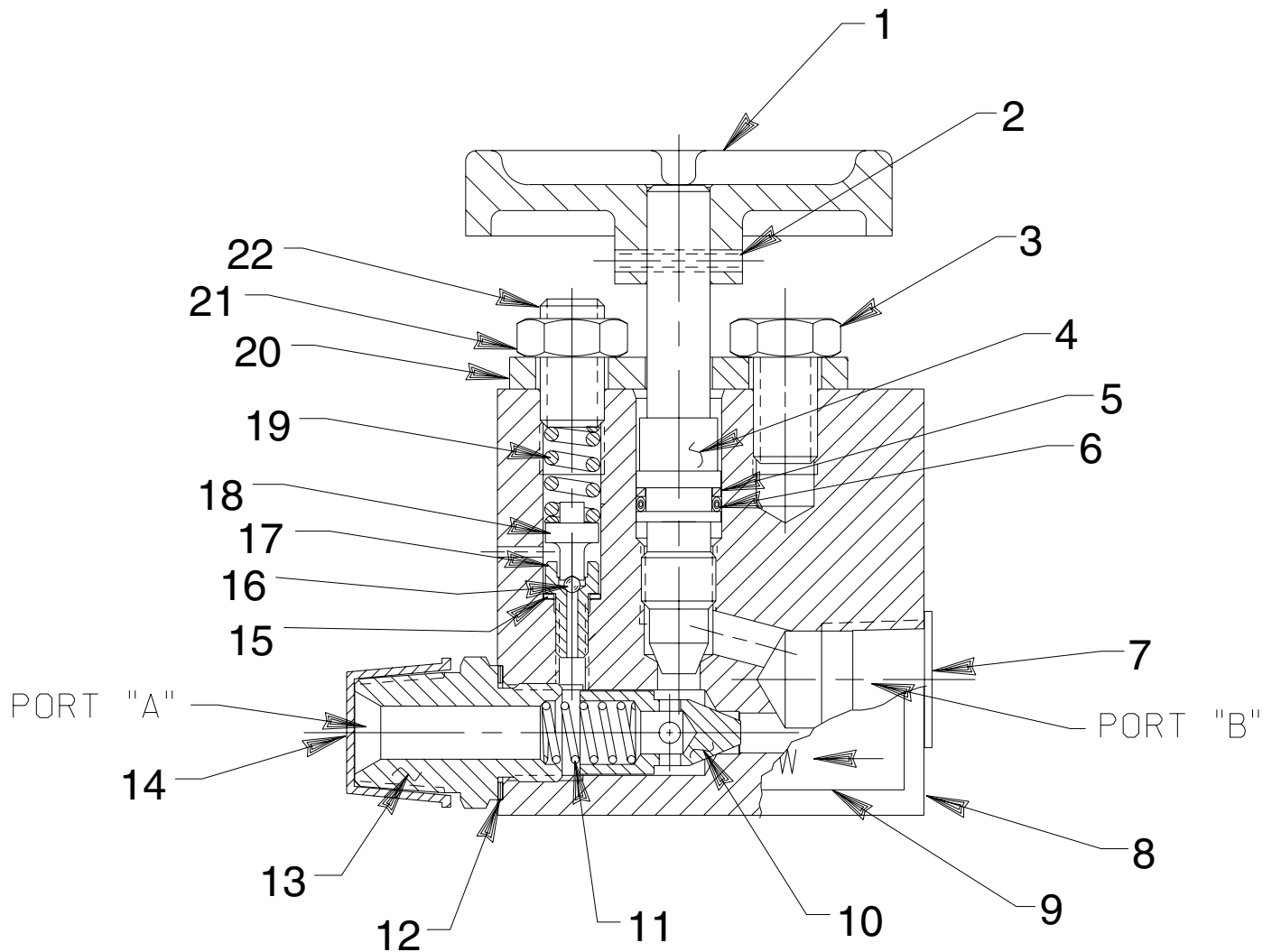
Item No.	Part No.	No. Req'd	Description
1	11127	4	Pipe Plug (3/8 NPTF)
2	*10914	1	O-ring (1-3/8 X 1-3/16 X 3/32; Nitrile)
	19007	1	O-ring (1-3/8 X 1-3/16 X 3/32; Viton)
	12486	1	O-ring (1-3/8 X 1-3/16 X 3/32; EPR)
3	*10268	2	O-ring (1/2 X 3/8 X 1/16; Nitrile)
	11439	2	O-ring (1/2 X 3/8 X 1/16; Viton)
	17716	2	O-ring (1/2 X 3/8 X 1/16; EPR)
4	*11863	2	Backup Washer (1/2 X 3/8 X 1/16)
5	21094	1	Bushing
6	251124	1	Retaining Ring
7	52506	1	Manifold Body
8	208358	1	Warning Decal

Part numbers marked with an asterisk (*) are contained in Repair Kit No. 300451.

Note: Alternate material seals listed for special valves factory equipped with viton or EPR seals.

Parts List for:

9596

**MODEL B
RESTRICTOR VALVE**
Max. Capacity: 10,000 PSI**To Parts
List**

Parts List, Form No. 100666, Back sheet 1 of 1

Item No.	Part No.	No. Req'd	Description	Item No.	Part No.	No. Req'd	Description
1	23272	1	Knob	13	20879	1	Connector (Torque to 40/45 ft. lbs.)
2	10895	1	Roll Pin	14	12546	1	Cap
3	250951	1	Hex. Hd. Cap Screw	15	14319	1	Copper Washer (5/16 X 3/16 X 1/32)
4	307022	1	Control Valve Stem	16	17238	1	Ball (3/32 Dia.)
5	11863	1	Backup Washer (1/2 X 3/8 X 1/16, -012)	17	203364	1	Replaceable Seat (Torque to 40/50 in. lbs.)
6	10268	1	O-ring (1/2 X 3/8 X 1/16, -012)	18	29785	1	Ball Retainer
7	12545	1	Plug	19	14475	1	Compression Spring (5/16 O.D. X 5/8 Lg.)
8	52861	1	Valve Body	20	202653	1	Stop Plate
9	212983	1	Trade Name Decal	21	10386	1	Jam Nut (3/8-24 UNF)
10	20771	1	Poppet	22	16732	1	Set Screw
11	10425	1	Compression Spring (3/8 O.D. X 3/4 Lg.)				
12	10261	1	Copper Washer (3/4 X 19/32 X 1/32)				

To
Drawing

SPECIFICATIONS

This is a valve that features precision metering for controlled cylinder return and built-in pressure relief. It can be used with either single-acting or double-acting hydraulic cylinders. The valve permits free flow as the ram piston is extended. The built-in check feature automatically locks and holds the load in the raised position until the operator opens the valve. The unit may be preset to provide consistent metered return of the load or the operator may select the rate of return with each actuation.

Male and Female Port Size (in.)	Pressure Relief Setting	Max. Flow Rating	Max. Operating Pressure
3/8 NPTF	12,000 PSI	5 GPM	10,000 PSI

OPERATION

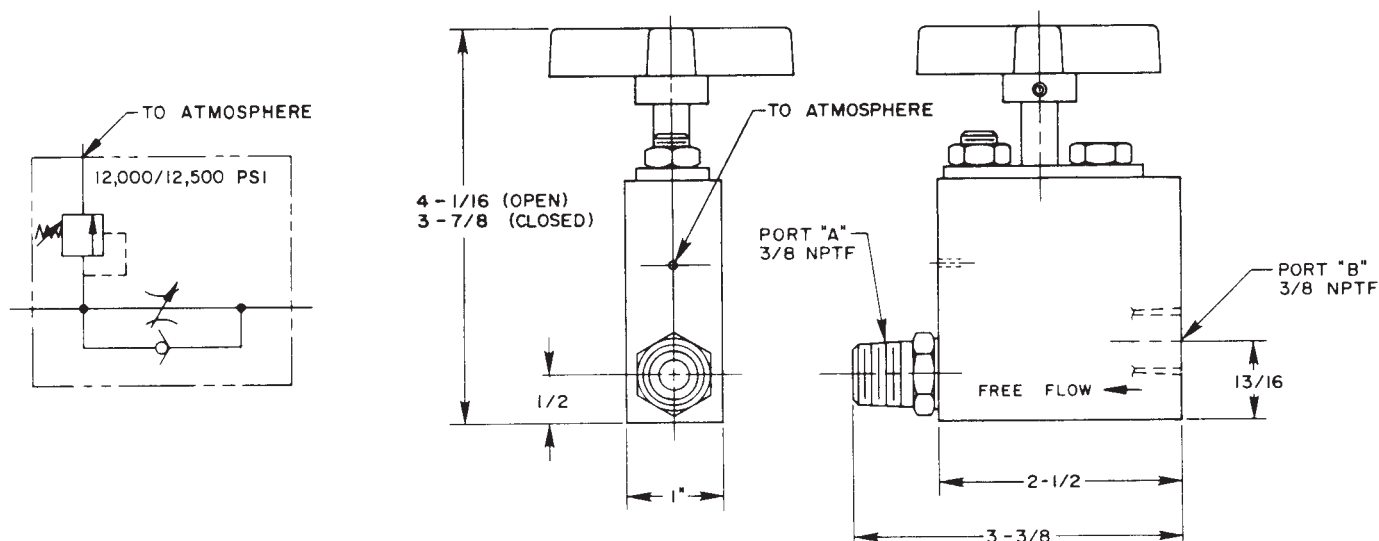
The direction of free flow is marked on one side of the valve body; note before installing valve.

Single-acting cylinders: Connect inline or directly into cylinder port. When valve is closed, free flow is in one direction only. With valve on pumping unit in the retract position the load can then be metered. When load lowering valve is open, operation of the cylinder is normal.

Double-acting cylinders: Connect to desired side of cylinder; inline or directly into cylinder port. On double-acting cylinders the load lowering valve should not be completely closed when pressurizing the opposite port.

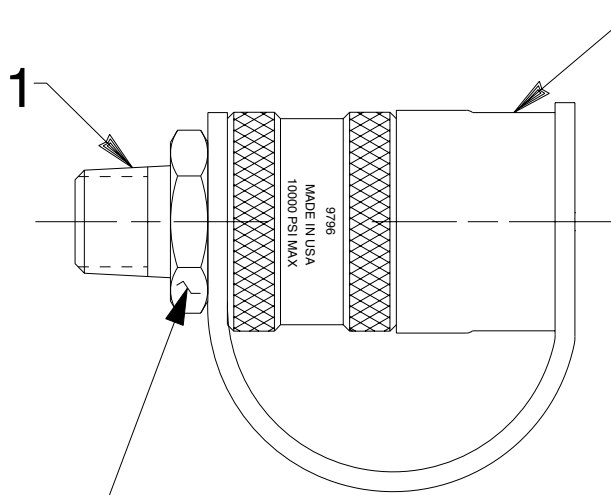
NOTE:

- This valve has a built-in safety device that will vent system pressure to atmosphere if accidentally pressurized beyond 12,500 PSI. The maximum capacity for this valve is rated at 10,000 PSI.
- This valve is not recommended for use with a 4-way solenoid valve with a closed center.

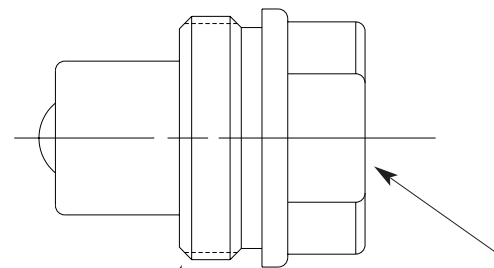


Parts List for:

	9798
9795	25599
9796	25600
9796-E	C38
9796-V	Y-25

QUICK COUPLER ASSEMBLY**RAM AND HOSE HALVES - 3/8 NPTF**

NOTE: "EPR" or "VIT" is stamped on a hex flat to designate a coupler with EPR or Viton seals.



A minimum of four full threads must be engaged when assembled for mating part.

Item No.	Part No.	No. Req'd	Description
1	9796	1	Ram Half Coupler w/ Plastic Dust Cap (Item 2)
	9796-E	1	Ram Half Coupler w/ EPR Seals (Includes #9797 metal dust cap)
	9796-V	1	Ram Half Coupler w/ Viton Seals (Includes #9797 metal dust cap)
2	9800	1	Plastic Dust Cap
3	9798	1	Hose Half Coupler

PARTS INCLUDED BUT NOT SHOWN

209100	1	O-ring (1" x 3/4 x 1/8; Disogrin; Standard)
251880	1	O-ring (1" x 3/4 x 1/8; Buna-n; Option on std. for humid conditions)

OPTIONS

9797	1	Metal Dust Cap (Ram Half)
9799	1	Metal Dust Cap (Hose Half)

NOTE: #9795 is a complete coupler assembly consisting of items #1 & #3, a disogrin o-ring and (2) of item #2.

	SAFETY DATA SHEET	
AW Hydraulic Oil ISO 46	1st April 2024	Page 1 of 13

Complying with Regulation (EC) No 1272/2008 (CLP) as amended by Commission Regulation (EU) 2020/878.

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

1.1 Product identifier

Product name: AW Hydraulic Oil ISO 46

Other means of identification:

CAS Number: Mixture
EC Number: Not applicable
REACH No: Not applicable

1.2 Relevant identified uses of the substance or mixture and uses advised against:

Relevant identified uses: Standard Hydraulic Oil.
Uses advised against: Uses other than those described above.

1.3 Details of the supplier of the safety data sheet

Company Name: Hydraulic Technologies USA LLC
Company Address: 5885 11th Street
Rockford, IL 61109
Company Tel: (800) 541-1418

Contact Name: Office hours (Mon – Fri)
8.00am – 5:00pm (CST)

E-mail address of person responsible for this SDS: EH&S Department. Info@powerteam.com

REACH ONLY Representative Hydraulic Technologies Netherlands B.V.,
(In the E.U.): Albert Thijsstraat 12, 6471WX Eygelshoven,
The Netherlands.

1.4 Emergency telephone number

Emergency telephone number (including hours of operation):

INFOTRAC 24 Hour Emergency Numbers:
USA, Canada, Puerto Rico (800) 535-5053.
International (352) 323-3500.

Poison Centre Information: See Section 16 for the full EU list of Poison Centres.

SECTION 2: HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Classification in accordance to Regulation (EC) No. 1272/2008 (CLP/GHS)

Product name	GHS Classification
AW Hydraulic Oil ISO 46	Not classified as hazardous

2.2 Label elements

	SAFETY DATA SHEET	
AW Hydraulic Oil ISO 46	1st April 2024	Page 2 of 13

Labelling in accordance with Regulation 1272/2008 (CLP)

Hazard pictograms:	None required
Signal word:	None required
Hazard statements:	None required
Precautionary Statements:	None required
Supplemental Hazard Statements.	None known

2.3 Other hazards

This substance/mixture contains no components considered to be endocrine disruptors, persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances :
Not applicable.

3.2 Mixture :

Product/ Ingredient name	Identifiers	%	Classification 1272/2008/EC	Nano material form	M Factor	Specific conc'n limits (SCL)	Acute toxicity estimate (ATE)
Distillates (petroleum), solvent- dewaxed heavy paraffinic	CAS No 64742-65-0 EC No 265-169-7 REACH No 01- 2119471299- 27-XXXX	50 - 100%	Carc 1B H350 * See Note L	No	1	No SCL in Annex VI	No ATE in Annex VI

* Note L: The classification as a carcinogen need not apply if it can be shown that the substance contains less than 3% DMSO extract as measured by IP 346.
This product contains less than 3% (w/w) DMSO extract for total polycyclic aromatic compound (PAC) using IP 346.

Nanoforms present in product:
Based on particle size of the product, there are no nanoforms present.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in section 8.
See section 16 for the full text of the EUH and H phrases declared above.

	SAFETY DATA SHEET	
AW Hydraulic Oil ISO 46	1st April 2024	Page 3 of 13

SECTION 4: FIRST AID MEASURES

4.1 Description of first aid measures

Eye contact: If eyes become irritated, flush immediately with copious amounts of lukewarm water for at least 15 minutes. If easy to do, remove contact lenses. Get medical attention if irritation persists.

Skin contact: Wash with water and soap and rinse thoroughly. Seek medical advice if irritation or pain develops.

Inhalation: Move affected person to fresh air and keep warm and at rest in a position comfortable for breathing. If not breathing, give artificial respiration. Seek medical advice.

Ingestion: Do not induce vomiting. If conscious, give small amounts of water to drink. Never give anything by mouth to an unconscious person. Get medical advice.

4.2 Most important symptoms and effects, both acute and delayed

Not expected to be a health hazard when used under normal conditions. An aspiration hazard may be appropriate if the oil is vaporized under pressure.

4.3 Indication of any immediate medical attention and special treatment needed

If any symptoms are observed, contact a physician and give them this SDS sheet.

SECTION 5: FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media: Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Unsuitable extinguishing media: Do not use water jet.

5.2 Special hazards arising from the substance or mixture

Hazardous combustion products may include carbon monoxide and other toxic gases/vapors.

Hazardous combustion products:

Toxic/Irritating fumes, gases and vapours including carbon oxides and other products of incomplete combustion.

5.3 Advice for firefighters

Self-contained breathing apparatus and full protective clothing must be worn in case of fire. Fight fire from a protected location. Water may be ineffective in fighting the fire. Use water spray to keep fire-exposed container cool. Keep out of drains, surface waters and soil against pollution.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

For non-emergency personnel

No action shall be taken involving any personal risk or without suitable training. Stop leak if able to do so without risk. Keep unnecessary and unprotected personnel from entering. Eliminated ignition sources. Avoid breathing mist/vapor/aerosol/gas/fume. Do not walk through spilled material. Avoid contact with eyes, skin and clothing. Wear recommended personal protective equipment (refer to Section 8 Exposure controls/ personal protection).

For emergency responders

Keep unauthorized people away and upwind. Wear appropriate personal protective equipment (refer to

	SAFETY DATA SHEET	
AW Hydraulic Oil ISO 46	1st April 2024	Page 4 of 13

Section 8 Exposure controls/ personal protection) and avoid inhalation or contact with eyes and skin. See also the information in "For non-emergency personnel".

6.2 Environmental precautions

Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

6.3 Methods and materials for containment and cleaning up

Absorb in vermiculite, dry sand or earth. Sweep up and place in a clearly labeled container for disposal. Ensure adequate ventilation.

6.4 Reference to other sections

See Section 1 for emergency contact information.

See Section 7 for information on safe handling.

See Section 8 for information on personal protection equipment.

See Section 13 for disposal information.

SECTION 7: HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid breathing mist or vapors. Avoid contact with eyes. Use only with adequate ventilation. Wash thoroughly after handling. Observe good personal hygiene practices. Change protective gloves/clothing when signs of contamination appear. Keep out of reach of children.

7.2 Conditions for safe storage, including any incompatibilities

Store in original factory container in a dry area. Do not transfer to an unmarked container. Keep container tightly closed and in a well-ventilated place. Store away from heat and light. Refer to Section 10 – Stability and Reactivity for incompatibilities.

7.3 Specific end use(s):

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated.

SECTION 8: EXPOSURE CONTROL / PERSONAL PROTECTION

8.1 Control parameters

Occupational exposure limit values:

Ingredient name	CAS Number	Occupational exposure limits	Source
Distillates (petroleum), solvent-dewaxed heavy paraffinic (as oil mist)	64742-65-0	Short-term value: 2 mg/m ³ (Denmark) 3 mg/m ³ (Sweden) 10 mg/m ³ (Belgium, Hungary, Spain, U.K.) Long-term value: 1 mg/m ³ (Denmark, Norway, Sweden) 5 mg/m ³ (Austria, Belgium, Finland, Ireland (Pure, highly and severely refined Inhalable fraction), Latvia, Spain, Switzerland (inhalable fraction), The Netherlands, U.K.)	Europe. Occupational exposure limit values

	SAFETY DATA SHEET	
AW Hydraulic Oil ISO 46	1st April 2024	Page 5 of 13

Monitoring procedures: Use methods described in European Standards.

Derived No Effect Level (DNEL):

Distillates (petroleum), solvent- dewaxed heavy paraffinic

Application Area	Exposure routes	Health Effect	Value
Workers	Inhalation	Long-term systemic effects	2.73 mg/m ³
Workers	Inhalation	Long-term local effects	5.58 mg/m ³
Workers	Dermal	Long-term systemic effects	0.97 mg/kg bw/day
General population	Oral	Long-term systemic effects	0.74 mg/kg bw/day

Predicted No Effect Concentration (PNEC):

Distillates (petroleum), solvent- dewaxed heavy paraffinic

Compartment	Value
Hazard for predators - Secondary poisoning	9.33 mg/kg food

8.2 Exposure controls

Appropriate Engineering Measures

Maintain air concentrations below occupational exposure standards using engineering controls if necessary. Local exhaust ventilation is recommended. Eye wash station and showers required for emergency use.

Individual protection measures, such as personal protective equipment:

Eye and face protection: Wear safety glasses or full-face shield if splashes are likely to occur. If possible, have eye-washing facilities readily available where eye irritation can occur. Use equipment for eye protection tested and approved under appropriate government standards such as EN 166(EU).

Skin protection:

Hand protection: Where hand contact with the product may occur the use of gloves approved to relevant standards made from the following materials may provide suitable chemical protection: PVC, neoprene or nitrile rubber gloves. The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it. Suitability and durability of a glove is dependent on usage, e.g. frequency and duration of contact, chemical resistance of glove material, glove thickness, dexterity. Always seek advice from glove suppliers. Contaminated gloves should be replaced. Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturizer is recommended.

Other skin protection: Use as necessary to prevent exposure. Work clothing should be changed daily. Contaminated clothing should be removed and washed thoroughly before re-using.

Respiratory protection: No respiratory protection is ordinarily required under normal conditions of use. In accordance with good industrial hygiene practices, precautions should be taken to avoid breathing of material. If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, select respiratory protection equipment suitable for the specific conditions of use and meeting relevant legislation. Check with respiratory protective equipment suppliers. Where air-filtering respirators are suitable, select an appropriate combination of mask and filter. Use respirators and components tested and approved under appropriate government standards such as CEN (EU).

Thermal hazards: None known.

Environmental exposure controls: Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

	SAFETY DATA SHEET	
AW Hydraulic Oil ISO 46	1st April 2024	Page 6 of 13

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Physical State:	Liquid
Colour:	Blue
Odour and odour threshold:	Mild
Melting point/Freezing point:	Not available
Boiling point or initial boiling point and boiling range:	Not available
Flammability:	Not applicable
Lower and upper explosion limit:	
Lower)%(:	Not available
Upper)%(:	Not available
Flash point:	> 160 °C
Auto-ignition temperature:	Not available
Decomposition temperature:	Not available
pH:	Not available
Kinematic viscosity:	46 cSt @40 degrees C
Solubility:	Insoluble
Partition coefficient	
n-octanol/water (log value):	Not available
Vapour pressure:	Not available
Density and/or relative density:	0.87 -0.89
Relative vapour density:	Not available
Decomposition temperature:	Not available
Particle characteristics:	Not applicable

9.2 Other information:

Information with Regard to
Physical Hazard Classes: None known.

Other Safety Characteristics: None known.

SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity

No hazardous reactions anticipated under normal storage and handling conditions.

10.2 Chemical stability

Stable under normal storage and handling conditions.

10.3 Possibility of hazardous reactions

No hazardous reactions are anticipated under normal storage and handling conditions.

10.4 Conditions to avoid

Incompatible materials, Extreme heat, Open Flame, Sparks.

10.5 Incompatible materials

Materials to avoid include; Oxidizing Agents.

10.6 Hazardous Decomposition products:

Not anticipated under normal conditions of use.

	SAFETY DATA SHEET	
AW Hydraulic Oil ISO 46	1st April 2024	Page 7 of 13

SECTION 11: TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity: Does not meet the criteria for classification.

Product/ingredient name	Test	Species	Dose
Distillates (petroleum), solvent- dewaxed heavy paraffinic	LD ₅₀ Oral	Rat	> 5000 mg/kg
	LD ₅₀ Dermal	Rabbit	> 5000 mg/kg
	LC ₅₀ Inhalation	Rat	> 5 mg/l (4h)

Skin corrosion/irritation: Does not meet the criteria for classification.

Serious eye damage/eye irritation: Does not meet the criteria for classification.

Respiratory or skin sensitization: Does not meet the criteria for classification.

Germ cell mutagenicity: Does not meet the criteria for classification.

Carcinogenicity: Does not meet the criteria for classification.

Reproductive toxicity: Does not meet the criteria for classification.

STOT – Single exposure: Does not meet the criteria for classification.

STOT – Repeat exposure: Does not meet the criteria for classification.

Aspiration hazard: Does not meet the criteria for classification.

11.2 Information on other hazards:

Endocrine disrupting properties: None of the components have endocrine disrupting properties

Information on other hazards: An aspiration hazard may be appropriate if the oil is vaporized under pressure.

SECTION 12: ECOLOGICAL INFORMATION

12.1 Toxicity:

Substance name	Toxicity to fish / other aquatic invertebrates
Distillates (petroleum), solvent- dewaxed heavy paraffinic	Fish LL50 – Pimephales promelas: ≥ 100 mg/L 96h Fish NOEL – Pimephales promelas: ≥ 100 mg/L 96h Invertebrates EL50 Daphnia magna ≥ 10,000 mg/L 48h Invertebrates NOEL Daphnia magna ≥ 1000 mg/L 48h Algae NOEL- Pseudokirchneriella subcapitata: ≥ 100 mg/L 72 h

12.2 Persistence and Degradability:

Major constituents are expected to be readily biodegradable, but the product contains components that may persist in the environment.

12.3 Bioaccumulative potential:

Contains components with the potential to bioaccumulate.

12.4 Mobility in soil:

	SAFETY DATA SHEET	
AW Hydraulic Oil ISO 46	1st April 2024	Page 8 of 13

If it enters soil, it will adsorb to soil particles and will not be mobile.

12.5 Results of PBT and vPvB assessment:

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Endocrine disrupting properties

None known.

12.7 Other adverse effects:

None expected

SECTION 13: DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods:

Product

Dispose of in accordance with all applicable local, state, national and international regulations. Recover or recycle if possible. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste classification and disposal methods. Do not dispose into the environment, in drains or in water courses.

Contaminated packaging

Since emptied containers retain product residue, follow label warnings even after container is emptied. Dispose of as unused product.

SECTION 14: TRANSPORT INFORMATION

International transport regulations

14.1 UN number:

ADR/RID: n/a

IMDG: n/a

IATA: n/a

14.2 Proper shipping name:

ADR/RID: Not classified as dangerous for transport

IMDG: Not classified as dangerous for transport

IATA: Not classified as dangerous for transport

14.3 Transport hazard class(es)

ADR/RID: n/a

IMDG: n/a

IATA: n/a

14.4 Packing group

ADR/RID: n/a

IMDG: n/a

IATA: n/a

14.5 Environmental hazard

Marine Pollutant: No

14.6 Special precautions for user

None known.

14.7 Transport to bulk according to Annex II of MARPOL and the IBC Code

Not applicable

Section 15: REGULATORY INFORMATION

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture This safety datasheet complies with the requirements of:

	SAFETY DATA SHEET	
AW Hydraulic Oil ISO 46	1st April 2024	Page 9 of 13

EU Commission Regulation (EU) 2020/878 (REACH)
EU Regulation (EC) No 1272/2008 (CLP)

EINECS: All components in this product are listed on the European Inventory of Existing Chemical Substance

15.2 Chemical safety assessment

For this product a chemical safety assessment was not carried out on this product.

Section 16: OTHER INFORMATION

Full List of Poison Centres for Section 1.4

COUNTRY	CONTACT DETAILS
Austria	Vergiftungsinformationszentrale (VIZ) Notruf 0–24 Uhr: +43 1 406 43 43 Bürozeiten: Montag bis Freitag, 8 bis 16 Uhr, Tel.: +43 1 406 68 98 Euro-Notruf: 112 Rettung: 144 Ärztefunkdienst: 141
Belgium	Federal Public Service (FPS) Health, Food Chain Safety and Environment Place Victor Horta 40/10, 1060 Brussels Email BPR: info.biocides (at) environment.belgium.be FPS Economy, Rue du Progrès, 50, B-1210 Brussels Telephone: +32 (0) 800 120 33 Fax: +32 (0) 2 277 53 04 Email: reachinfo (at) economie.fgov.be
Bulgaria	Национален токсикологичен информационен център Многопрофилна болница за активно лечение и спешна медицина "Н.И.Пирогов" Телефон за спешни случаи / факс: +359 2 9154 233 E-mail: poison_centre@mail.orbitel.bg http://www.pirogov.bg
Croatia	Ksaverska cesta 2, 10000 Zagreb T 01 2348 342
Cyprus	ΔΔΑ 1401 (σαρες λειτουργίας 24 σαρες/24ωρο, 7 ημερες την εβδομάδα).
Czech Republic	Toxikologické informační středisko Na Bojišti 1 120 00 Praha 2 Telefon: +420 224 919 293, +420 224 915 402 Web: www.tis-cz.cz
Denmark	Bispebjerg hospital bispebjerg bakke 23e, opgang 20 c 2400 kbh nv Telefon: 8212 1212 e-mail: giftlinjen@regionh.dk
Estonia	Poison information telephone number (Mürgistusteabekeskuse number) is nationally 16662, calling from abroad (+372) 7943 794 Hotline 16662 of the Poisoning Information Centre is active 24/7. National poison information centre service in Estonia is accessible at www.16662.ee
Finland	Open 24 hours a day 0800 147 111 (the call is free of charge) 09 471 977
France	numéro ORFILA (INRS) : + 33 (0)1 45 42 59 59 Ces centres anti-poison et de toxicovigilance fournissent une aide médicale gratuite (hors coût d'appel), 24 heures sur 24 et 7 jours sur 7.
Germany	Berlin - Giftnotruf der Charité Universitätsmedizin Berlin CBF, Haus VIII (Wirtschaftgebäude), UG Hindenburgdamm 30, 12203 Berlin Tel. 030 - 192 40 (Notruf) Fax 030 - 450 569 901 mail@giftnotruf.de

SAFETY DATA SHEET

<https://giftnotruf.charite.de>

Bonn - Informationszentrale gegen Vergiftungen
Klinik und Poliklinik für Allgemeine Pädiatrie
Zentrum für Kinderheilkunde, Universitätsklinikum Bonn
Gebäude 30, ELKI (Eltern-Kind-Zentrum)
Venusberg-Campus 1, 53127 Bonn
Tel. 0228 - 192 40 (Notruf)
Tel. 0228 - 287 332 19
Tel. 0228 - 287 334 80 (Sekretariat)
Fax 0228 - 287 332 78

info@giftzentrale-bonn.de

www.ukbonn.de

Erfurt - Giftnotruf Erfurt
Gemeinsames Giftinformationszentrum der Länder Mecklenburg-Vorpommern, Sachsen,
Sachsen-Anhalt und Thüringen
c/o HELIOS Klinikum Erfurt
Nordhäuser Straße 74, 99089 Erfurt
Tel. 0361 - 730 730
Fax 0361 - 730 731 7

ggiz@ggiz-erfurt.de

www.ggiz-erfurt.de

Freiburg - Vergiftungs-Informations-Zentrale
Zentrum für Kinder- und Jugendmedizin
Universitätsklinikum Freiburg
Mathildenstraße 1, 79106 Freiburg
Tel. 0761 - 192 40 (Notruf)
Fax 0761 - 270 445 70
giftinfo@uniklinik-freiburg.de
www.giftberatung.de

Göttingen - Giftinformationszentrum-Nord der Länder Bremen,
Hamburg, Niedersachsen und Schleswig-Holstein (GIZNord)
Universitätsmedizin Göttingen - Georg-August-Universität
Robert-Koch-Straße 40, 37075 Göttingen
Tel. 0551 - 192 40 (Notruf)
Fax 0551 - 383 188 1
giznord@giz-nord.de
www.giz-nord.de

Homburg - Informations- und Beratungszentrum für Vergiftungsfälle*
Klinik für Kinder- und Jugendmedizin
Universitätsklinikum des Saarlandes, Geb. 9
Kirrberger Str. 100
66421 Homburg/Saar * kein Firmenservice
Tel. 06841 - 192 40 (Notruf)
Tel. 06841 - 162 843 6 (Sekretariat)
Fax 06841 - 162 110 9
giftberatung@uniklinikumsaarland.de
www.uniklinikumsaarland.de/giftzentrale

Mainz - Giftinformationszentrum der Länder Rheinland-Pfalz und Hessen
-Klinische Toxikologie-
Universitätsmedizin der Johannes Gutenberg-Universität Mainz
Langenbeckstraße 1
Gebäude 601, 55131 Mainz
Tel. 06131 - 192 40 (Notruf)

	SAFETY DATA SHEET	
AW Hydraulic Oil ISO 46	1st April 2024	Page 11 of 13

	Tel. 06131 - 232 466 (Infoline) Fax 06131 - 232 468 mail@giftinfo.uni-mainz.de www.giftinfo.uni-mainz.de		
	München - Giftnotruf München Toxikologische Abteilung der II. Med. Klinik und Poliklinik, rechts der Isar der Technischen Universität München Ismaninger Straße 22, 81675 München Tel. 089 - 192 40 (Notruf) Fax 089 - 414 024 67 tox@lrz.tu-muenchen.de https://www.mri.tum.de/toxikologie-und-giftnotruf		
Greece	Poison Information Centre Children's Hospital P&A Kyriakou Athens 11762 Greece Director Dr P. Neou, Emergency number: (0030) 2107793777 Fax: 00302107486114 Email: poison_ic@aglaiakyriakou.gr available for consultation 24 hours/day, to medical professionals and the public		
Hungary	Cím: 1097 Budapest, Albert Flórián út 2-6. Sürgősségi információszolgáltatás mérgezés vagy annak gyanúja esetén: +36 80 201 199 (0-24 órában, díjmentesen hívható – csak Magyarországról) +36 1 476 6464 (0-24 órában, normál díj ellenében hívható – külföldről is)		
Iceland	Tel: 543 2222 or 112 or 543 1000 OPIÐ Allan sólarhringinn alla daga		
Ireland	National Poisons Information Centre: 353 (1) 809 2166 (8.00 a.m. to 10.00 p.m. 7 days a week). Healthcare Professionals: +353 (1)809 2566 (24 hour service)		
Italy	CAV "Osp. Pediatric Child Jesus Rome"	Department of Emergency and DEA Acceptance	Piazza Sant'Onofrio, 00165 06 68593726 4
	Az. Osp. Univ. Foggia	Foggia	V.le Luigi Pinto, 1 71122 800183459
	Az. Osp. "A. Cardarelli"	Naples	Via A. Cardarelli, 9 80131 081-5453333
	CAV Polyclinic "Umberto I"	Rome	V.le del Policlinico, 155 06-161 49978000
	CAV Polyclinic "A. Gemelli"	Rome	Largo Agostino Gemelli, 8 168 06-3054343
	Az. Osp. "Careggi" Medical Toxicology Unit	Florence	Largo Brambilla, 3 50134 055-7947819
	CAV National Center for Toxicological Information Pavia		Via Salvatore Maugeri, 10 27100 0382-24444
	Osp. Niguarda Ca 'Granda	Milan	Piazza Maggiore Hospital, 3 02-20162 66101029

	SAFETY DATA SHEET	
AW Hydraulic Oil ISO 46	1st April 2024	Page 12 of 13

	Papa Giovanni XXII Hospital Bergamo OMS Square, 24127 800883300 1 Verona Integrated Hospital Verona Piazzale Aristide 37126 800011858 Stefani, 1
Latvia	Valsts ugunsdzēsības un glābšanas dienests, phone number: 112. Toksikoloģijas un sepses klīnikas Saindēšanās un zāļu informācijas centrs, Hipokrāta 2, Rīga, Latvija, LV-1038, phone number +371 67042473. Service is available 24 hours.
Lithuania	Skambink telefonu 8-5 236 20 52
Luxembourg	070 245 245
Malta	Ministry for Health 15, Palazzo Castellania, Merchants Street, Valletta, VLT 1171 Telephone 2122 4071
Netherlands	UMC Utrecht Heidelberglaan 100 3584 CX Utrecht 088 75 688 90
Norway	Kontakt Giftinformasjonen hvis uhellet er ute 2200 13 59 Døgnåpen telefon.
Poland	Bureau for Chemical Substances 30/34 Dowborczykow Street, 90-019 Lodz, Poland 400 2538 42 48+ E-mail biuro(at) chemikalia.gov.pl https://www.chemikalia.gov.pl/
Portugal	Centro de Informação Antivenenos – CIAV Em caso de intoxicação, ligue 800 250 250 Morada Instituto Nacional de Emergência Médica Rua Almirante Barroso, 36 1000-013 Lisboa Telefone (Secretariado): 213 303 271 Fax: 213 303 275 E-mail: ciav.tox@inem.pt
Romania	Phone number: +40213183606
Slovakia	NATIONAL TOXICOLOGICAL INFORMATION CENTRE University Hospital Bratislava Limbová 5, 833 05 Bratislava Slovakia +421 2 5477 4166
Slovenia	Phone number: 112
Spain	Teléfono de emergencias: + 34 91 562 04 20 (Solo emergencias toxicológicas. Información en español (24h/365 días))
Sweden	Giftinformationscentralen Swedish Poisons Information Centre S-171 76 Stockholm SWEDEN När det är akut 112
United Kingdom	National Poisons Information Centre, Beaumont Hospital, Dublin 9, Ireland. Members of the public: In an emergency, if the patient has collapsed or is not breathing properly, call 999

	SAFETY DATA SHEET	
AW Hydraulic Oil ISO 46	1st April 2024	Page 13 of 13

	For medical advice contact: NHS 111 in England: 111 NHS 24 in Scotland: 111 NHS Direct in Wales: 111 or 0845 4647 In Northern Ireland: contact your local GP or pharmacist during normal hours; click here for GP services Out-of-Hours. In Ireland: contact NPIC on (01) 809 2166 (8 am to 10 pm); outside of these hours contact your GP or hospital emergency department.
--	--

Training advice: Before using/handling the product one must read carefully present SDS.

Abbreviations and acronyms:

ADR:	Accord européen sur le transport des marchandises dangereuses par Route (European)
CAS:	Chemical Abstracts Service (division of the American Chemical Society)
CLP:	Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures.
DNEL:	Derived No Effect Level
EC50:	Half maximal effective concentration
EINECS:	European Inventory of Existing Commercial Chemical Substances
EU:	European Union
GHS:	Globally Harmonized System of Classification and Labeling of Chemicals
IATA:	International Air Transport Association
IBC:	International Bulk Code
IMDG:	International Maritime Code for Dangerous Goods
LC50:	Lethal concentration, 50 percent
LD50:	Lethal dose, 50 percent
MARPOL:	International Convention for the Prevention of Pollution from Ships
OEL:	Occupational Exposure Level
PBT:	Persistent, Bioaccumulative and Toxic
PNEC:	Predicted No Effect Level
REACH:	Registration, Evaluation, Authorisation and Restriction of Chemicals
SCBA:	Self Contained Breathing Apparatus
SCL:	Specific Concentration Limits
UN:	United Nations
VPvB:	Very Persistent and very Bioaccumulative
WEL:	Workplace Exposure Limit

Document history

Version no. 3

Initial date of issue: 1st April 2024

Supersedes: 1st May 2023

Reason for update: Change in company name and phone number.

DISCLAIMER: To the best of our knowledge, the information contained herein is accurate. However, Hydraulic Technologies USA LLC does not assume any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards



HYDRAULIC PUMP

MAX. CAPACITY: SEE PUMP DATA PAGE

Operating Instructions for:
Electric Motor Powered Pumps
Gas Engine Powered Pumps
Rotary Air Motor Powered Pumps
(As listed in EC Declaration)

CONTENTS

SAFETY DEFINITIONS	3
SAFETY PRECAUTIONS	3
SET-UP INSTRUCTIONS	9
1. Filling The Pump Reservoir or Bladder	9
2. Hydraulic Connections	9
3. Bleeding The System	9
PUMP OPERATION	10
1. OPERATING THE PUMP FOR THE FIRST TIME:	10
2. ELECTRIC PUMP	11
3. GAS PUMP	11
4. AIR PUMP	11
DIRECTIONAL CONTROL VALVE OPTIONS	13
1. 2-Position, 2-Way Manual Valve Used With Single-acting Cylinder (Figure 1)	13
2. 3-Position, 3-Way Manual Valve Used With Single-acting Cylinders (Figure 3)	14
3. 3-Position, 4-Way Manual Valve used with Double-acting Cylinders (Figure 3)	14
4. "Posi-Check" Valves	16
5. Automatic Dump Valve	16
6. Solenoid Controlled, Pilot Operated Valve Used With Single-acting Cylinders	17
7. Solenoid Controlled, Pilot Operated Valve Used With Double-acting Cylinders	18
8. Solenoid Controlled, Air Operated Valve Used With Single- or Double-acting Cylinders	18
ADJUSTING THE PRESSURE REGULATING CONTROLS	19
1. Adjusting The Pressure Regulating Valve	19
2. Adjusting The Pressure Switch	20
PREVENTIVE MAINTENANCE	21
1. Checking The Hydraulic Fluid and Filling The Reservoir	21
2. Checking The Hydraulic Fluid And Filling The Bladder	21
3. Maintenance Cleaning	22
4. Lubrication (Air Driven Motor Only)	22
5. Engine Oil (Gas Engine Only)	22
6. Reservoir Vent Air Filter (Optional for all pumps except PR10 series)	22
7. Draining And Cleaning The Reservoir (Except Bladder Type, See Below)	22
8. Draining And Cleaning The Bladder	23
TROUBLESHOOTING GUIDE	23
DECLARATION OF CONFORMITY	28

SAFETY DEFINITIONS

Safety symbols are used to identify any action or lack of action that can cause personal injury. Your reading and understanding of these safety symbols is very important.



Danger is used only when your action or lack of action will cause serious human injury or death.



Warning is used to describe any action or lack of action where a serious injury can occur.



Dangerous voltage is used to describe any action or lack of action that could cause serious personal injury or death from high voltage electricity.

IMPORTANT

Important is used when action or lack of action can cause equipment failure, either immediate or over a long period of time.

SAFETY PRECAUTIONS

These instructions are intended for end-user application needs. Many problems with new equipment are caused by improper operation or installation. For a detailed parts list or to locate a Power Team Authorized Hydraulic Service Center contact your nearest Power Team facility. A list of all Power Team facilities is located at the end of this document.



It is the operator's responsibility to read and understand the following safety statements,

- Only qualified operators should install, operate, adjust, maintain, clean, repair, or transport this machinery.
- These components are designed for general use in normal environments. These components are not specifically designed for lifting and moving people, agri-food machinery, certain types of mobile machinery or special work environments such as: explosive, flammable or corrosive. Only the user can decide the suitability of this machinery in these conditions or extreme environments. Power Team will supply information necessary to help make these decisions.

WARNING

To help prevent personal injury,

GENERAL



- Always wear eye protection whenever operating hydraulic equipment.
- Always wear hearing protection as required. Refer to the sound level (dB[A]) chart.
- Operation, repair, or maintenance of hydraulic equipment should be performed by a qualified person who understands the proper function of hydraulic equipment per local directives and standards.



- Hydraulic equipment must be assembled correctly and then checked for proper function before use. Use hydraulic components of the same hydraulic pressure ratings. An appropriate hydraulic pressure gauge is recommended to monitor pressure.
- Never place your hands or other body parts near a hydraulic fluid leak. Never use your hands or other body parts to check for a possible leak. High pressure fluid can be injected under your skin causing serious injury and/or infection.
- High pressure fluid is present throughout a hydraulic system. Always use caution when operating, repairing, or maintaining this equipment. Before beginning any work on any hydraulic system component, stop the equipment, disconnect from its power source, and relieve all pressure in all parts of the system. Do not tamper with the internal hydraulic relief valve settings.



- Avoid exposing hydraulic equipment (especially hoses) to extreme high or low temperatures. Damage to equipment or failure may result and cause loss of control or injury to the operator.
- Exercise caution to avoid the risk of fire.
- Do not drop any hydraulic system components. Damage to the equipment and/or injury may result.



- Avoid slipping or falling by cleaning up any oil spills.
- Avoid back injury by always lifting equipment carefully.
- It is strongly recommended to view the Power Team Hydraulic Safety video tape before using hydraulic equipment.

POWER SUPPLY

Electric



Electrical Shock or Electrocution

- Any electrical work must be done and tested by a qualified electrician per local directives and standards.
- Disconnect the pump from the power supply and relieve pressure before removing the motor case cover or performing maintenance or repair.
- Never use an ungrounded power supply with this unit.
- If the power cord is damaged or wiring is exposed, replace or repair immediately.
- Changing the voltage on this unit is an involved, and if improperly performed, hazardous procedure. Consult the manufacturer for specific information before attempting any rewiring.
- All PE55 Series pump motors must be wired for clockwise (CW) rotation when viewed from the lead end (top) of the motor. PE8 Series, PE17 Series, PE30 Series, PR10 Series, and PE46 Series pump motors must be wired for counterclockwise (CCW) rotation when viewed from the lead end (top) of the motor.

- Check the total amperage draw for the electrical circuit you will be using. (For example: Do not plug a pump or pumps that may draw 25 amps into a 20 amp fused electrical circuit.)
- Do not attempt to increase the powerline capacity by replacing a fuse with another fuse of higher value. Overheating of the powerline and the possibility of a fire will result.
- To rewire a motor from one voltage to another or when a flow control valve is changed between manual and solenoid, consult the electrical schematic in the pump's parts list.
- Electric pumps should never be exposed to rain or water which could cause personal electrical hazard.
- Avoid conditions which can cause damage to the power cord such as abrasion, crushing, sharp cutting edges, or corrosive environment. Damage to the power cord can cause an electrical hazard.

Gasoline Engine



No Smoking



No Open Flame



Flammable

- Read the instruction manual for the gasoline engine before using for correct operating procedure.
- Turn off the engine and relieve pressure when not in use or when working on any part of the system.
- Proper ventilation is critical during refueling.
- Do not allow fuel to splash on the engine when refueling.
- Do not add fuel when the engine is running or hot. Sheet No. 2 of 8

Air Driven Motor

- A quick disconnect must be installed in the air line to the pump.
- Disconnect air supply and relieve pressure when pump is not in use or when breaking any connection in the hydraulic system.
- Control circuit must comply with local directives and standards.

HYDRAULIC HOSES AND FLUID TRANSMISSION LINES

- Avoid straight line tubing connections in short runs. Straight line runs do not provide for expansion and contraction due to pressure and/or temperature changes. See diagrams in "Set-up Instructions" section of this form.
- Eliminate stress in the tube lines. Long tubing runs should be supported by brackets or clips. Tubes through bulkheads must have bulkhead fittings. This makes easy removal possible and helps support the tubing.
- Before operating the pump, all hose connections must be tightened with the proper tools. Do not overtighten. Connections should only be tightened securely and leak-free. Overtightening can cause premature thread failure or high pressure fittings to split at pressures lower than their rated capacities.
- Should a hydraulic hose ever rupture, burst, or need to be disconnected, immediately shut off the pump and release all pressure. Never attempt to grasp a leaking pressurized hose with your hands. The force of escaping hydraulic fluid could cause serious injury.
- Do not subject the hose to potential hazard such as fire, sharp surfaces, extreme heat or cold, or heavy impact. Do not allow the hose to kink, twist, curl, crush, cut, or bend so tightly that the fluid flow within the hose is blocked or reduced. Periodically inspect the hose for wear, because any of these conditions can damage the hose and possibly result in personal injury. Never repair with tape.
- Do not use the hose to move attached equipment. Stress can damage the hose and possibly cause personal injury.
- Hose material and coupler seals must be compatible with the hydraulic fluid used. Hoses also must not come in contact with corrosive materials such as creosote-impregnated objects and some

paints. Hose deterioration due to corrosive materials can result in personal injury. Consult the manufacturer before painting a hose. Never paint a coupler.

PUMP

- Do not exceed the hydraulic pressure rating noted on the pump nameplate or tamper with the internal high pressure relief valve. Creating pressure beyond rated capacities can result in personal injury.
- Before replenishing the fluid level, retract the system to prevent overfilling the pump reservoir or bladder. An overfill can cause personal injury due to excess reservoir or bladder pressure created when the cylinders are retracted.
- Always shut off the motor or engine and relieve pressure before breaking any connections in the system.
- The motor or engine is the major part of the weight of the pump. Always take this into consideration when lifting or moving the pump.

CYLINDER

- Do not exceed the rated capacities of the cylinders. Excess pressure can result in personal injury.
- Do not set poorly balanced or off-center loads on a cylinder. The load can tip and cause personal injury.
- Read and understand the cylinder operating instructions and warning decals before using the cylinder.



DANGER

A double-acting cylinder or ram must have both hoses and all couplers securely connected to both ports. If one of the two ports is restricted or becomes disconnected, pressure will build and the cylinder, hose or coupler can burst, possibly causing serious injury or death.

HYDRAULIC FLUIDS

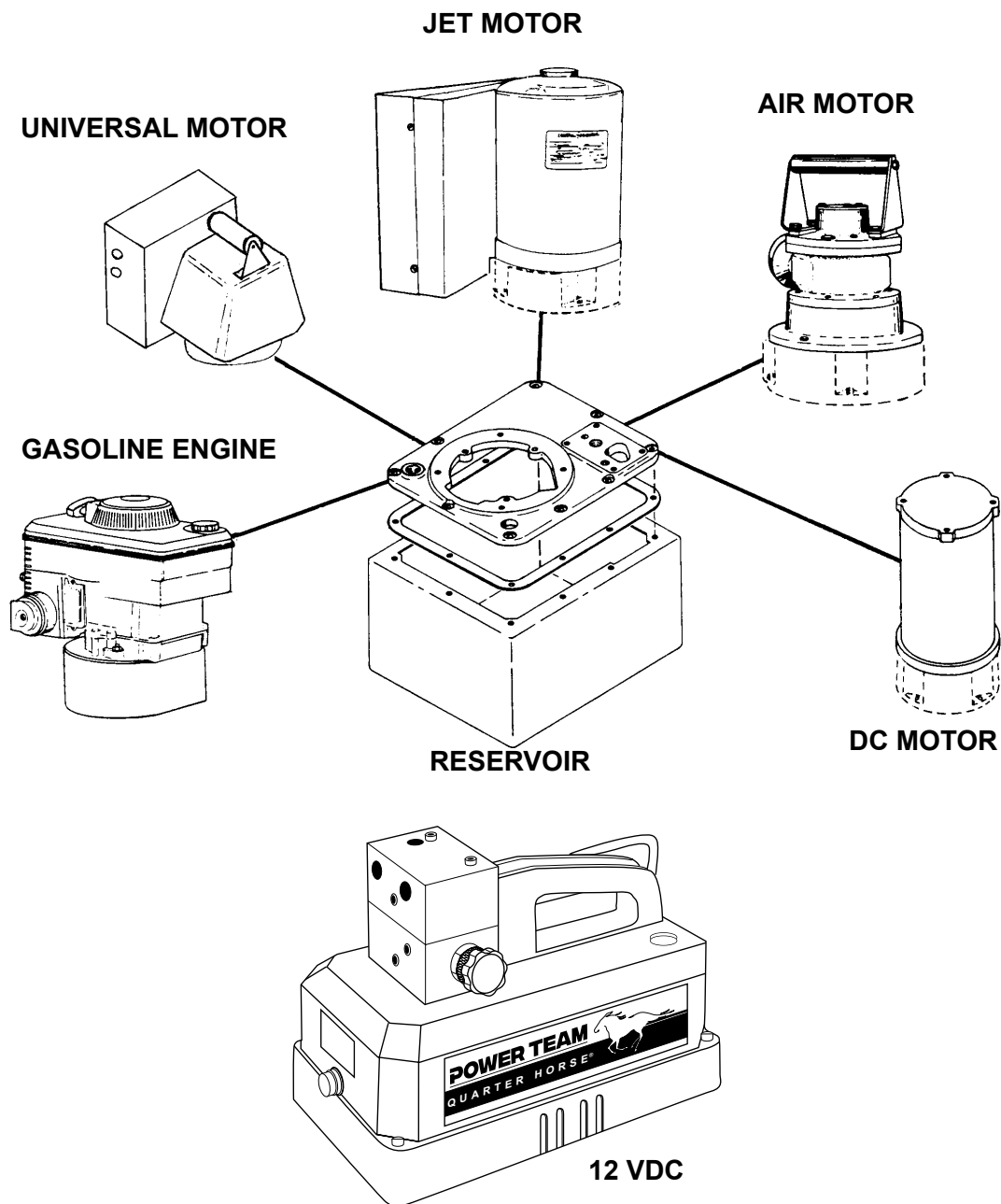
- Properly dispose of all fluids, components, and assemblies at the end of their useful life.
- Hydraulic fluid should be compatible with all hydraulic components.

HYDRAULIC PUMP

5,000 OR 10,000 PSI

Definition: A hydraulic pump delivers hydraulic fluid under pressure through the use of compressed air, an electric motor, or a gas engine as a power source.

Pump	kw	dB(A) at Idle and 700 Bar
		
PE8 Series	.37	82/86
PE17 Series	.37	67/81
PA17 Series	1.12	94/95
PE30 Series	.74	82/87
PG30 Series	1.49	90/96
PE46 Series	1.12	88/92
PA46 Series	2.24	91/94
PE55 Series	3.1	89/94
PA55 Series	2.24	83/89
PG55 Series	2.98	90/96
PR10 Series	.19	65/72
PG18 Series	1.86	90/96
PG120 Series	4.1	90/96
PQ120 Series	2.24	77/81
PG400 Series	14.9	90/96



NOTE

- Carefully inspect the pump upon arrival. The carrier, not the manufacturer, is responsible for any damage resulting from shipment.
- The customer can choose from a variety of motors, controls, reservoirs, and other options. These instructions will include directions for options that your particular pump may not have.
- Do not change motors without consulting the pump manufacturer's Technical Services Department.

SET-UP INSTRUCTIONS

1. Filling The Pump Reservoir or Bladder

NOTE

Most pumps are shipped without hydraulic fluid in the reservoir. Hydraulic fluid may have been shipped with the pump in a separate container. If hydraulic fluid is needed, use 215 SSU @ 100° F (47 cSt @ 38° C) hydraulic fluid. Pumps with a bladder are shipped with hydraulic fluid in the bladder.

- A. Clean the area around the filler cap to remove all dust and grit. Any dirt or dust in the hydraulic fluid can damage the polished surfaces and precision-fit components of this pump.
- B. Retract all cylinder(s) to their return position.
- C. Remove the filler cap and insert a clean funnel with a filter. Fill the reservoir with hydraulic fluid to 1" (25,4 mm) (PE8, PE17 & PE30 series pumps to 1-1/2" [38, 1 mm]) from the cover plate. PR10 series pump bladder must be filled completely. Replace the filler cap.

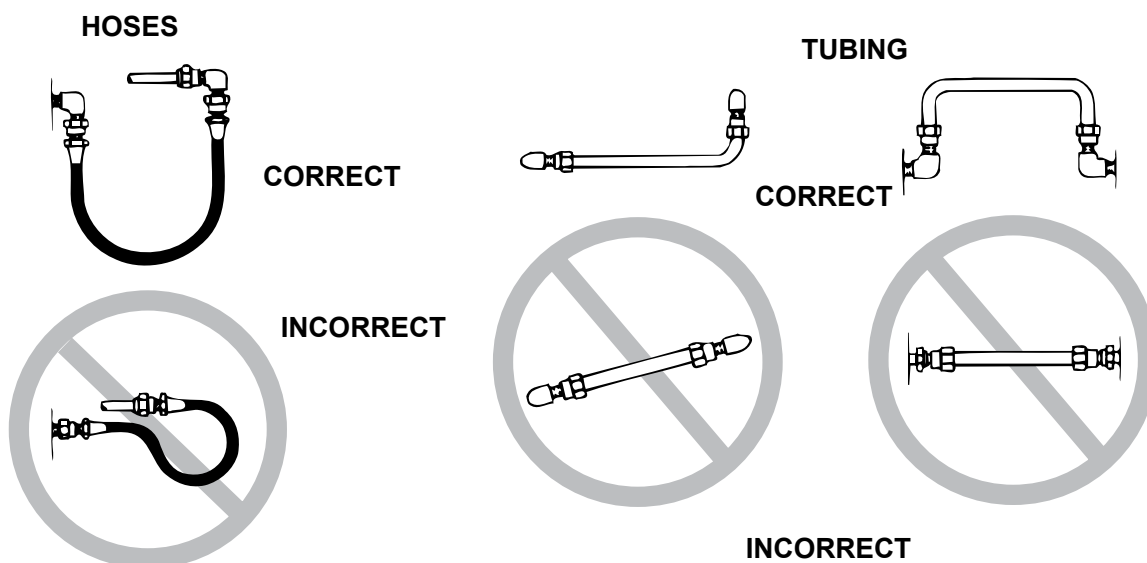
IMPORTANT

For PR10 series pumps, tighten filler cap 1/2 - 1 turn after O-ring contacts sealing surface. Overtightening can cause pump damage on bladder equipped pumps.

2. Hydraulic Connections

Remove the thread protectors or dust covers from the hydraulic ports if applicable. Clean the areas around the fluid ports of the pump and cylinder. Inspect all threads and fittings for signs of wear or damage, and replace as needed. Clean all hose ends, couplers and union ends. Connect all hose assemblies to the pump and cylinder. Use an approved, high-grade pipe thread sealant to seal all hydraulic connections. Tighten securely and leak-free but do not overtighten.

Hydraulic lines and fittings can act as restrictors as the cylinder or ram retracts. The restricting or slowing of the fluid flow causes back pressure that slows the cylinder's or ram's return. Return speed also varies because of the application, condition of the cylinder or ram, inside diameter of hose or fitting, length of the hose, and the temperature and viscosity of the hydraulic fluid.



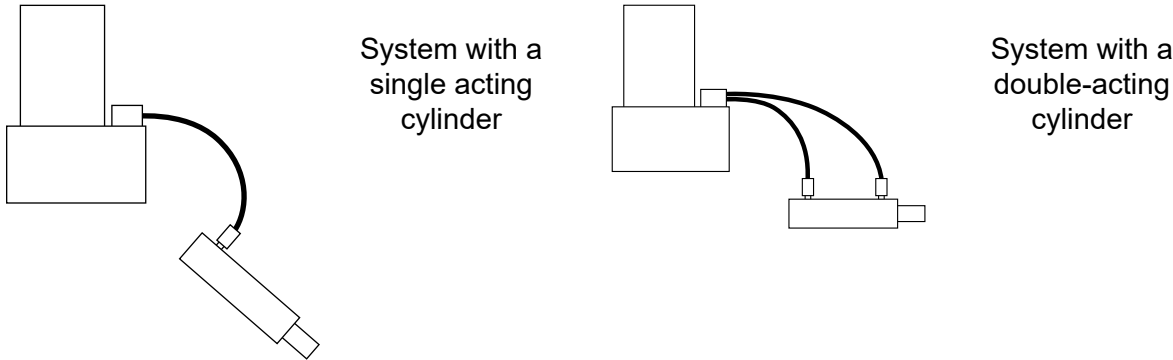
3. Bleeding The System

After all connections are made, the hydraulic system must be bled of any trapped air. Refer to the diagrams below.

With no load on the system and the pump vented and positioned higher than the cylinder or ram, cycle the system several times. Check the reservoir for possible low fluid level and fill to proper level with approved, compatible hydraulic fluid as necessary (see “Filling The Pump Reservoir or Bladder” section under Set-up Instructions).

IMPORTANT

Some spring return cylinders or rams have a cavity in the rod which forms an air pocket. This type of cylinder or ram should be bled when positioned upside down or lying on its side with the port facing upward.



PUMP OPERATION

1. OPERATING THE PUMP FOR THE FIRST TIME:

- A. Valve and hose connections must be tight, and the reservoir or bladder must be filled to the proper fluid level. Start the motor.
- B. Jog the pump several times to build pressure.
- C. Run cylinder out to its full travel several times to eliminate air from the system. For more complete instructions, refer to the section titled “Bleeding The System” under Set-up Instructions.
- D. With the cylinder(s) retracted completely, check the fluid level in the reservoir or bladder and add fluid if necessary. Refer to “Filling The Pump Reservoir or Bladder” under Set-up Instructions.
- E. The pump is now ready to be put into regular operation.



DANGER

When lifting or lowering a load, the load must be under operator control at all times and others must be clear of the load. Use blocking and cribbing to guard against a falling load. Do not drop the load. The use of a load lowering or metering valve is recommended in addition to the pump directional control valve.

2. ELECTRIC PUMP

Universal Motor: The universal motor is wired for 115 or 230 volts, 50/60 cycles according to the customer's request. **This motor cannot be rewired.**

TEFC and DC Motors: See pump data plate for voltage, frequency, current, and power specifications. If re-wired, retesting may be required per local directives and standards. PR10 series pump voltage is 12 VDC and is not changeable.

- A. Place the valve in neutral position.
- B. Plug in the pump.
- C. Start the pump and shift as required.
- D. Turn the pump off when not in use.

Note: For specific function of your pump see the “Valve Options” section of this form.

IMPORTANT:

- **Correct voltage is required for the pump to operate properly.**
 - **Low voltage may cause: overheated motor; motor fails to start under load; motor surging when trying to start; or motor stalls before maximum pressure is reached.**
 - **Check the voltage rating on the pump motor name plate to be certain the outlet or power source you are using is of the proper voltage.**
 - **Always check the voltage at the motor with the pump running at full pressure.**
- **Never run the motor on long, light gauge extension cords. Refer to the minimum recommended gauge chart below.**

AMPS At Maximum Hyd. Pressure	Electrical Cord Size AWG (mm²) 3.2 Volt Drop			
	Length of Electrical Cord			
	0-25 ft. (0-8 m)	25-50 ft. (8-15 m)	50-100 ft. (15-30 m)	100-150 ft. (30-46 m)
6	18 (.82)	16 (1.33)	14 (2.09)	12 (3.32)
10	18 (.82)	14 (2.09)	12 (3.32)	10 (5.37)
14	16 (1.33)	12 (3.32)	10 (5.37)	8 (8.37)
18	14 (2.09)	12 (3.32)	8 (8.37)	8 (8.37)
22	14 (2.09)	10 (5.37)	8 (8.37)	6 (13.30)
26	12 (3.32)	10 (5.37)	8 (8.37)	6 (13.30)
30	12 (3.32)	10 (5.37)	6 (13.30)	4 (21.29)

3. GAS PUMP

Gasoline-Powered: Consult the instruction manual for the gasoline engine to determine its specifications.

- A. Place the valve in the neutral or hold position.
- B. Start the gas engine according to the operating instruction manual provided.
- C. When the engine is running properly, shift the valve as necessary.
- D. Turn the pump off when not in use.

4. AIR PUMP

Rotary Air Motor: Remove the thread protectors from the air inlet, and install the air supply fittings (not sup-

plied) as shown in Figure 1. Air supply must be minimum 50 CFM (1,4 M³/min.) and 80 PSI (5,5 BAR), with 100 PSI (7 BAR) maximum.

- A. Place the valve in the neutral or hold position.
- B. Couple the air pump to the air supply and turn on the supply valve (if provided).
- C. Open (or turn on) the air supply control valve at the pump (hold-to-run hand control is provided).
- D. Shift the pump as necessary.
- E. Turn the pump off when not in use.
- F. Use of an air filter/lubricator is recommended.

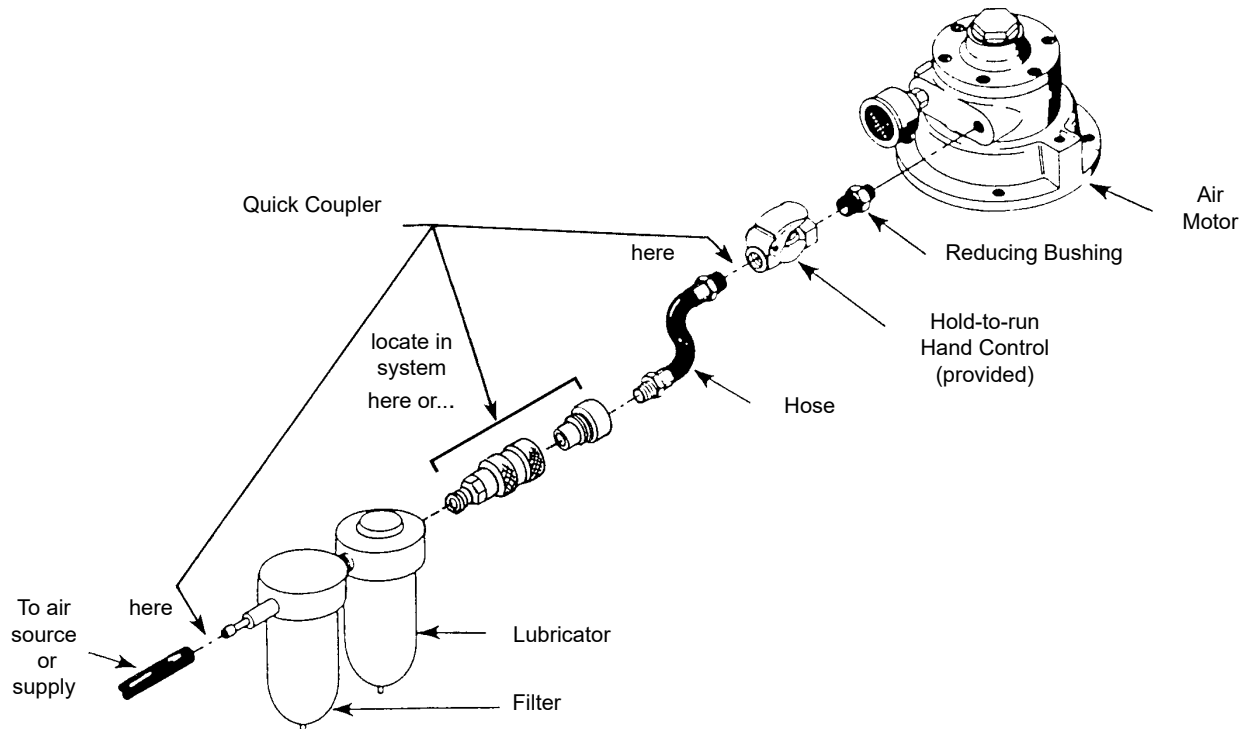


Figure 1
Recommended Air Line Hook-up

DIRECTIONAL CONTROL VALVE OPTIONS

NOTE

- Some valves return fluid to the reservoir or bladder when the pump stops or when the valve is shifted. The correct valve must be used, especially when lifting a load.
- “Hold-to-run” controls are recommended and must be used with correct valves for certain applications, especially when lifting a load.
- Not all valves fit on all pumps.

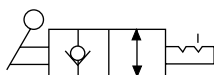


DANGER

When lifting or lowering a load, the load must be under operator control at all times and others must be clear of the load. Use blocking and cribbing to guard against a falling load. Do not drop the load. The use of a load lowering or metering valve is recommended in addition to the pump directional control valve.

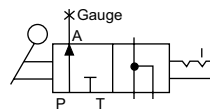
1. 2-Position, 2-Way Manual Valve Used With Single-acting Cylinder (Figure 1)

FOR PE17 SERIES (9517)



9517

FOR PE30, PE46, AND FOR PR10
SERIES (9561)



9584

PE55 SERIES (9584)

- To HOLD pressure, turn the valve control handle counterclockwise (CCW).
- Activate the pump unit to advance the cylinder.
- When the cylinder has advanced to the desired position, deactivate the switch or remote switch, or turn the pump unit OFF. The cylinder will HOLD pressure.
- To retract the cylinder, turn the valve control handle clockwise (CW) slowly.



WARNING

Valve 9517 and 9561 work the same as a manifold if the pump is operated with the valve in the RELEASE position. In this position, the cylinder will advance when the pump is running and retract when the pump is stopped.



DANGER

Never use valve 9517 and 9561 in the RELEASE position when lifting a load!

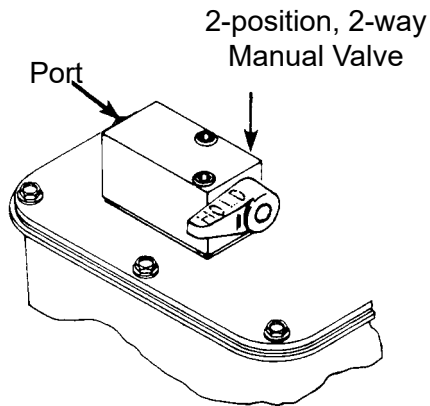
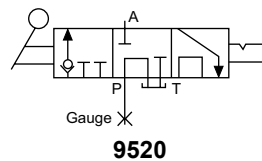


Figure 1

2. 3-Position, 3-Way Manual Valve Used With Single-acting Cylinders (Figure 3)



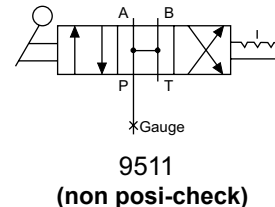
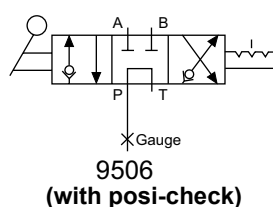
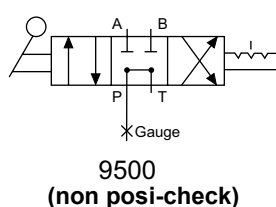
- A. To hold pressure, turn the valve control handle clockwise (CW).
- B. Activate the pump unit to advance the cylinder.
- C. When the cylinder has advanced to the desired position, deactivate the switch or remote switch, or turn the pump unit OFF or shift the valve to the center position. The cylinder will HOLD pressure.
- D. To retract the cylinder, turn the valve control handle counterclockwise (CCW) slowly.



WARNING

When the valve is in the **ADVANCE** position, the cylinder will advance when the pump is running, and hold when the pump is stopped or the valve is in the **CENTER** position. The cylinder can be retracted by moving the valve to the **RETRACT** position.

3. 3-Position, 4-Way Manual Valve used with Double-acting Cylinders (Figure 3)



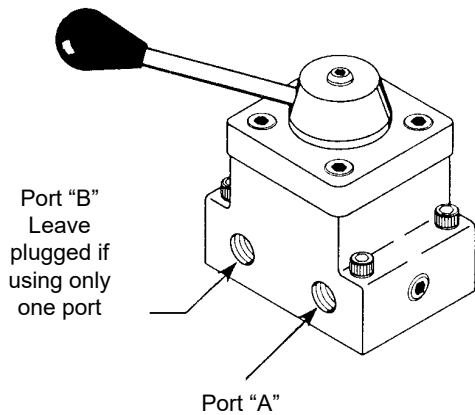


Figure 2

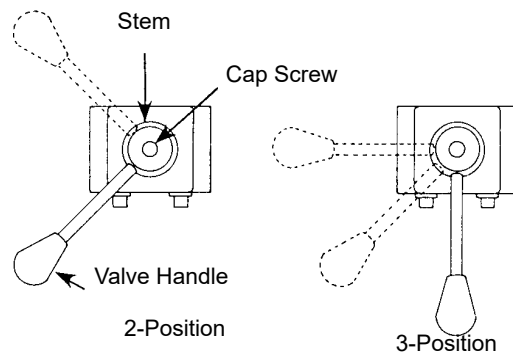


Figure 3

NOTE

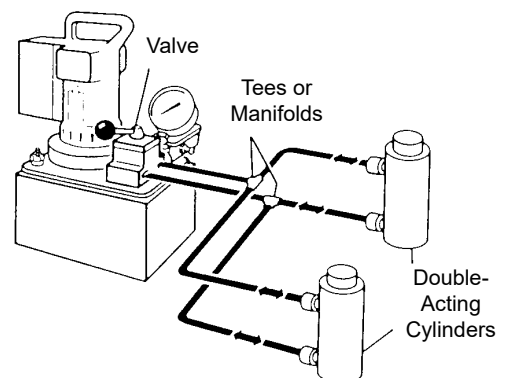
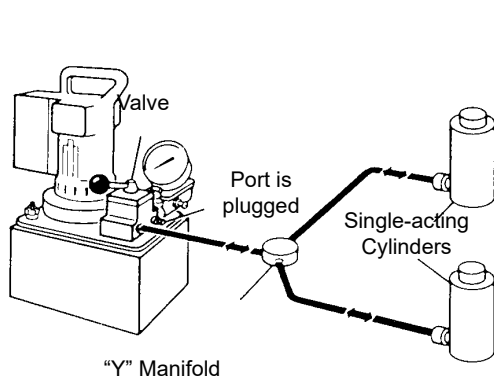
- This valve is a low torque design for use with double-acting or single-acting cylinder(s).
- If this valve is to be used as a 3-way with single-acting cylinder(s), one port (A or B) must remain plugged (use steel plug). (Figure 2)
- Valve handle can be moved to the desired position by loosening the cap screw and rotating in increments of $22\text{-}1/2^\circ$.

- Position the valve control lever in the NEUTRAL or HOLD position.
- Activate the pump unit.
- Advance the cylinder by shifting the valve control lever to the ADVANCE position.
- When the cylinder has advanced to the desired position, turn the pump unit OFF, or shift the valve to the HOLD position.

NOTE

Non “posi-check” valves will momentarily lose pressure when shifting to HOLD position. See “posi-check” valve section of this form.

- Retract the cylinder by shifting the valve control lever to the RETRACT position.
- Activate the pump unit if using double-acting cylinders.



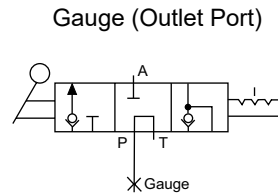
Examples of typical workholding applications:

SINGLE-ACTING CYLINDER(S) IN THE CIRCUIT CONTROLLED BY A PUMP-MOUNTED VALVE

DOUBLE-ACTING CYLINDER(S) IN THE CIRCUIT CONTROLLED BY A PUMP-MOUNTED VALVE

Other valves are available.
Consult your dealer, catalog or valve
operating instructions for details of operation.

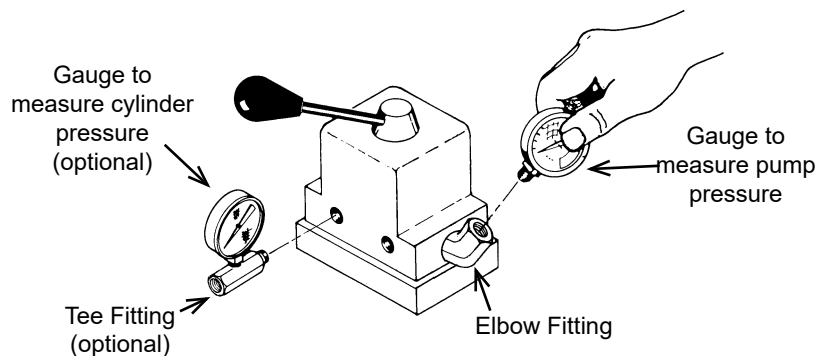
4. “Posi-Check” Valves



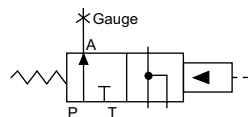
If a “Posi-Check” open center valve is used, a hydraulic gauge in the gauge port shows zero pressure when the valve is switched to the neutral (hold) position. Cylinder pressure, however, is held without loss. **If reading the cylinder pressure, a gauge must be installed in the outlet port of the valve.**

To install a hydraulic gauge (refer to Figure 4):

- Remove the pipe plug from the valve’s gauge port.
- Install a steel 45° elbow fitting.
- Install the gauge into the 45° elbow fitting.



5. Automatic Dump Valve

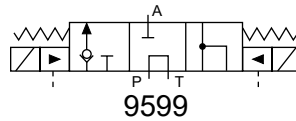


- Activate the pump unit to advance the cylinder.
- Release the remote switch to release pressure and retract the cylinder.



Never use this valve for lifting a load!

6. Solenoid Controlled, Pilot Operated Valve Used With Single-acting Cylinders



OPERATION

Neutral (HOLD): When neither solenoid is energized, fluid from pump is directed back to tank and fluid from cylinder is checked in the cylinder.

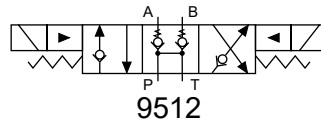
Advance: When solenoid “B” is energized, fluid from pump is directed through pressure port to cylinder.

Return: When solenoid “A” is energized, fluid from the pump and from the cylinder is directed back to tank.

NOTE

Pressure holds without loss when shifted from cylinder port to the neutral (HOLD) position.

7. Solenoid Controlled, Pilot Operated Valve Used With Double-acting Cylinders



OPERATION

Neutral (HOLD): When both solenoids are de-energized, fluid from pump circulates at free flow from the pressure port “P” to tank “T”. Both cylinder ports are blocked.

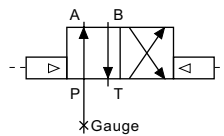
Solenoid “A” Energized: Pressure to cylinder port “A”. Cylinder port “B” to tank.

Solenoid “B” Energized: Pressure to cylinder port “B”. Cylinder port “A” to tank.

NOTE

Pressure holds without loss when shifted from cylinder port to the neutral (HOLD) position.

8. Solenoid Controlled, Air Operated Valve Used With Single- or Double-acting Cylinders



OPERATION

Position “A” (Air Port “A”): Pressure to Port “A”. Port “B” to tank.

Position “B” (Air Port “B”): Pressure to Port “B”. Port “A” to tank.

NOTE

All ports open to tank during transition between valve positions.

Single-acting, Spring Return Cylinder: Either fluid port “A” or “B” must be plugged with a steel plug on the valve. With port “B” plugged, the sequence of operation is as follows: When solenoid is energized to position “A”, fluid port “A” becomes pressurized. When solenoid is energized to position “B”, fluid port “A” becomes the return port.

Double-acting Cylinders: When operating double-acting cylinders, fluid port “A” can be connected to either the advance or return port of the cylinder and fluid port “B” will be connected to the remaining port. Sequence of operation is as follows: When solenoid is energized to position “A”, port “A” becomes pressurized and extends the cylinder and fluid port “B” becomes the return port. When solenoid “B” is energized, the opposite of step 1 happens.

The application in Figure 5 represents a typical set-up using a control valve and multiple double-acting cylinders (one double-acting cylinder may be used). Interflow will occur.

If a different set-up or cylinder is being considered, contact your nearest Power Team facility.

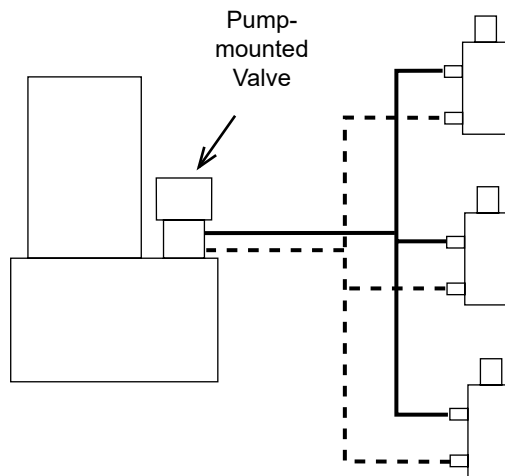


Figure 5

ADJUSTING THE PRESSURE REGULATING CONTROLS

The pressure regulating valve and pressure switch are shown in Figure 6. The pressure regulating valve can be adjusted to bypass fluid at a given pressure setting while the pump continues to run. The pressure switch can be adjusted to stop the pump at a given pressure setting. To ensure accuracy and low pressure differential (approx. 300 PSI [21 BAR]) throughout the pressure range (1,000 to 10,000 PSI [70 to 700 BAR] depending on the pump model), the pressure switch should be used with the pressure regulating valve. The pressure switch must be set at a pressure lower than the pressure regulating valve to work properly.

1. Adjusting The Pressure Regulating Valve

NOTE

For easy adjustment of the pressure regulating valve, always adjust the pressure by increasing to the desired pressure setting.

- A. Loosen the locknut (B) on the pressure regulating valve, and back the adjusting screw or knob (A) out a few turns by turning it in a counterclockwise (CCW) direction. This will *decrease* the setting to a lower than desired pressure.
- B. The pump must be completely connected electrically and hydraulically. Start the pump.
- C. Slowly turn the adjusting screw or knob (A) in a clockwise (CW) direction. This gradually *increases* the pressure setting. When the desired pressure is reached, lock the adjusting screw (A) in position by tightening the locknut (B). Shut off the pump.

IMPORTANT

- The pressure range is from 1,000 to 10,000 PSI (70 to 700 BAR) depending on the pump model.
- The pressure switch must be set at a higher pressure than working range to prevent shut down during adjustment.

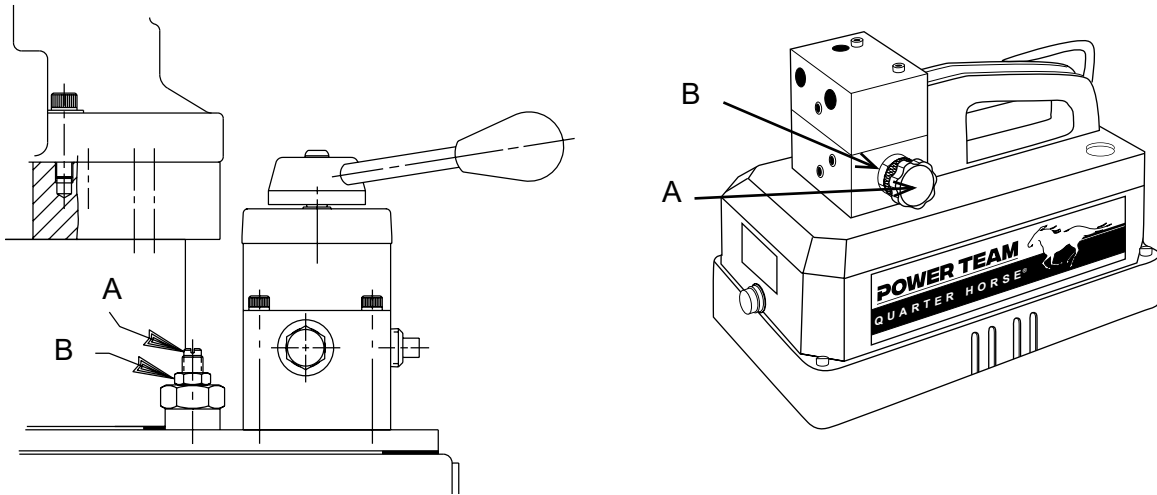


Figure 6

2. Adjusting The Pressure Switch

Generally, the pressure switch should be used with the pressure regulating valve. A pressure switch can be used *alone* for operating electrical devices such as motors, solenoids, relays, etc., which are located elsewhere in the circuit. Refer to Figure 7.

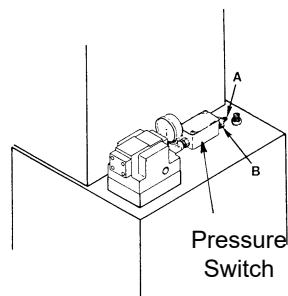


Figure 7

- A. Loosen the locknut (B) on the pressure switch, and turn adjusting screw (A) in a clockwise (CW) direction. This *increases* the pressure setting to a higher than desired pressure.
- B. Adjust the pressure regulating valve to the desired pressure setting. Refer to the section titled “Adjusting The Pressure Regulating Valve”.
- C. With the pump running and bypassing fluid at the desired pressure, slowly turn the pressure switch adjusting screw (A) in a counterclockwise (CCW) direction, *decreasing* the pressure switch setting until the pump motor shuts off. Then lock the adjusting screw (A) in position by tightening the locknut (B).
- D. Release pressure. Run the pump to check the pressure setting and cut-out of the motor. It may be necessary to make a second adjustment.

NOTE

When the pressure switch setting is reached, the motor will shut off. However, the inertia of the motor continues to deliver fluid for a brief period. The pressure regulating valve bypasses this surplus hydraulic fluid, preventing it from going into the system. As a result, the pressure differential can be held to approximately 300 PSI (21 BAR).

PREVENTIVE MAINTENANCE



WARNING

To help prevent personal injury,

- **Disconnect the pump from the power supply before performing maintenance or repair procedures.**
- **Repairs and maintenance are to be performed in a dust-free area by a qualified technician.**

1. Checking The Hydraulic Fluid and Filling The Reservoir (Except Bladder Type, See Below)

The hydraulic fluid level should be checked after initial set-up and after each ten hours of use.

- Thoroughly clean the area around the filler cap with a clean cloth to prevent contamination of the hydraulic fluid.
- Cylinder(s) must be fully retracted and the power supply disconnected.
- Remove the filler cap and insert a clean funnel with filter. Fill to proper level as instructed in "Filling The Pump Reservoir Or Bladder" under Set-up Instructions.
- Replace filler cap.
- The frequency of fluid changes will depend upon the general working conditions, severity of use, and over cleanliness and care given the pump. Three hundred hours of use under general shop conditions is considered a standard change interval. Rain, clean, and refill the reservoir with a high grade hydraulic fluid.

2. Checking The Hydraulic Fluid And Filling The Bladder

The hydraulic fluid level should be checked after initial set-up and after each ten hours of use.

- Thoroughly clean the area around the filler cap with a clean cloth to prevent contamination of the hydraulic fluid.
- Cylinder(s) must be fully retracted and the power supply disconnected. Position the pump with the filler plug in the up (or vertical) position.
- Remove the filler cap and insert a clean funnel with filter. Fill the bladder completely full with a high grade hydraulic fluid.
- Replace filler cap.

IMPORTANT

Tighten filler cap 1/2 - 1 turn after O-ring contacts sealing surface. Overtightening can cause pump damage on bladder equipped pumps.

- The frequency of fluid changes will depend upon the general working conditions, severity of use, and overall cleanliness and care given the pump. Three hundred hours of use under general shop conditions is considered a standard change interval. Drain, clean, and refill the reservoir with a high grade hydraulic fluid.

3. Maintenance Cleaning

IMPORTANT

Never use a high pressure washer to clean hydraulic components!

- A. Keep the pump's outer surface as free from dirt as possible.
- B. Seal all unused couplers with thread protectors.
- C. Keep all hose connections free of dirt and grime.
- D. The breather-hole in the filler cap must be clean and unobstructed at all times.
- E. Equipment connected to the pump must be kept clean.
- F. Use a high grade hydraulic fluid in this pump. Change as recommended (every 300 hours). Some conditions may require the use of different viscosity hydraulic fluids.

4. Lubrication (Air Driven Motor Only)

If the pump is operated on a continuous duty cycle or a maximum speeds for extended periods, an automatic air line oiler should be installed in the air inlet line as close to the pumping unit as possible. Set the unit to feed 1-3 drops of oil per minute (one drop for every 65 CFM [1,8 M³/min.] of air) into the system, or refer to the pump manufacturer's instructions. Use SAE No. 10 oil.

5. Engine Oil (Gas Engine Only)

Change engine oil as recommended for four stroke engines.

Mix the correct oil into fuel in proper ratio as recommended for two stroke engines.

6. Reservoir Vent Air Filter (Optional for all pumps except PR10 series)

- A. Remove the filler cap, and insert either the 45° fitting or the straight fitting. Fasten O-ring end of fitting into pump.
- B. If the 45° fitting is used, place the rubber spacer (included) on the top threaded portion. Then thread the air filter on and hand tighten.
- C. If the straight fitting is used, thread the air filter on and hand tighten.

7. Draining And Cleaning The Reservoir (Except Bladder Type, See Below)

IMPORTANT

Clean the pump exterior before the pump interior is removed from the reservoir.

- A. Remove the screws fastening the motor and pump assembly to the reservoir.

IMPORTANT

Do not damage the gasket or pump filter or pressure regulating valves when lifting the pump and motor off the reservoir.

- B. Clean the inside of the reservoir and clean the filter.
- C. Place the pump and motor assembly back onto the reservoir, and secure with machine screws.
- D. Fill the reservoir with a clean, high grade hydraulic fluid (refer to "Filling The Pump Reservoir Or Bladder" under Set-up Instructions for proper fluid level for your pump).

8. Draining And Cleaning The Bladder

IMPORTANT

Clean the area around the filler hole to prevent contamination of the hydraulic fluid.

- A. Remove the filler plug and drain hydraulic fluid completely.
- B. Fill bladder half full with clean hydraulic fluid. Flush bladder with clean fluid and drain.

IMPORTANT

Never use solvents to clean the bladder! Never disassemble the bladder from the pump!

- C. Fill the bladder completely full with a clean, high grade hydraulic fluid.

TROUBLESHOOTING GUIDE



WARNING

- To help prevent personal injury, any repair work or troubleshooting must be done by qualified personnel familiar with this equipment.
- Use the proper gauges and equipment when troubleshooting.

NOTE

- For a detailed parts list or to locate a Power Team Authorized Hydraulic Service Center contact your nearest Power Team facility.



WARNING

- It is best to check for system leaks by using a hand pump and applying pressure to the suspect area. Watch for leaking fluid and follow it back to its source. **Never** use your hand or other body parts to check for a possible leak.

PROBLEM	CAUSE	SOLUTION
Electric motor does not run.	1. Pump not turned ON. 2. Unit is not plugged in. 3. No voltage supply.	1. Set switch to "ON" position. 2. Plug in unit. 3. Check line voltage. Check reset button on power panel.
 WARNING To help prevent personal injury, disconnect power supply before removing cover. Any electrical work should be performed by a qualified electrician.	4. Pressure switch not set properly.	4. Refer to "Adjusting The Pressure Switch" information under "Adjusting The Pressure Regulating Controls" section.
	5. Broken lead wire or defective power cord plug.	5. Contact a Power Team Authorized Hydraulic Service Center.
	6. Overheated motor has caused overcurrent protection to disengage.	6. Wait for motor to cool before restarting.
Electric motor will not shut off.	1. Defective motor controls.	1. Disconnect from power supply and contact a Power Team Authorized Hyd. Service Center.
Electric motor stalls, surges, overheats or will not start under a load.	1. Low voltage or electrical cord size too small.	1. Refer to the "Electric Pump" information under "Pump Operation" section.
Electric overload protector keeps tripping.	1. Wired incorrectly.	1. See Service Bulletin #9903PT at the end of this document.
Pump is not delivering fluid or delivers only enough fluid to advance cylinder(s) partially or erratically.	1. Fluid level too low.	1. Fill reservoir or bladder according to directions "Filling The Pump Reservoir Or Bladder" under "Set-up Instructions" section.
	2. Quick disconnect couplings are not completely coupled.	2. Check quick-disconnect couplings to cylinders to ensure that they are completely coupled. Occasionally couplers have to be replaced because the ball check does not stay open due to wear.
	3. Air in system.	3. Refer to the section titled "Bleeding the System" under "Set-up Instructions" section.
	4. Cold fluid or fluid too viscous.	4. Hydraulic fluid is of a higher viscosity than necessary. Change to a lighter fluid.

PROBLEM	CAUSE	SOLUTION
	5. Reservoir capacity is too small for the size of cylinder(s) used.	5. Use smaller cylinder(s) or larger reservoir.
	6. Three phase motor rotating in wrong direction.	6. Refer to electrical schematic on motor.
	7. PR10 series pump not connected to correct 12 VDC polarity.	7. Connect to correct 12 VDC polarity.
	8. Vacuum in reservoir.	8. Check for plugged vent in filler plug.
Pump builds pressure but cannot maintain pressure.	1. External leaks.	1. Seal leaking pipe fittings with pipe sealant. Replace leaking pipes or hoses.
	2. Internal or external leakage on hydraulic cylinder.	2. Remove the cylinder from pump. If the pump builds and maintains full pressure, the cylinder is defective. Contact a Power Team Authorized Hydraulic Service Center.
	3. Leaking control valve or check valve	3. Contact a Power Team Authorized Hyd. Service Center.
Pump will not build full pressure.	1. Faulty pressure gauge.	1. Calibrate gauge.
	2. Check for external leakage.	2. Seal faulty fittings with sealant. Replace leaking pipes or hoses.
	3. Improperly adjusted external pressure regulator setting.	3. Refer to "Adjusting The Pressure Regulator Valve" information under "Adjusting the pressure Regulating Controls" section.
	4. Internal or external leakage on hydraulic cylinder.	4. Remove the cylinder from the pump. If the pump builds full pressure, the cylinder is defective. Contact a Power Team Authorized Hyd. Service Center.
	5. Inadequate power supply.	5. Refer to "Air Pump" or "Electric Pump" information under "Pump Operation" section.
	6. Leaking control valve or defective pump.	6. Contact a Power Team Authorized Hydraulic Service Center.

PROBLEM	CAUSE	SOLUTION
Cylinder(s) will not retract or extend.	1. Quick disconnect couplings are not completely coupled.	1. Check quick disconnect coupling to cylinders to ensure that they are completely coupled. Occasionally couplers have to be replaced because the ball check does not stay open due to wear.
	 DANGER A Double acting cylinder or ram must have <i>both</i> hoses and all couplers securely connected to both ports. If one of the two ports is restricted or becomes disconnected, pressure will build and the cylinder, hose or coupler can burst, possibly causing serious injury or death.	
Pump delivers excess oil pressure.	2. Broken return spring in spring return cylinder or seals blown in double-acting cylinder.	2. Contact a Power Team Authorized Hydraulic Service Center.
	1. Faulty pressure gauge. 2. Relief valve not properly set.	1. Calibrate gauge. 2. Contact a Power Team Authorized Hydraulic Service Center.

Hydraulic Technologies Facilities

North America Headquarters

5885 11th Street
Rockford, IL 61109
USA

Customer Service/Order Entry

Tel: +1 800 541 1418
Fax: +1 800 288 7031

Send P.O's to: info@powerteam.com

Technical Services

Tel: +1 800 477 8326
Fax: +1 800 765 8326

European Headquarters

Albert Thijsstraat 12
6471 WX Eygelshoven
The Netherlands
Tel: +31 45 567 8877

infoeurope@powerteam.com

SEA Headquarters

20 Pioneer Crescent #06-01
West Park BizCentral
Singapore 628555
Tel: +65 6264 4366
Fax: +65 6265 9133

infoasia@powerteam.com

China Headquarters

7F Treasury Building
1568 Huashan Road
Shanghai, 200052 China
Tel: +86 21 2208 5888
Fax: +86 21 2208 5682

infochina@powerteam.com

Australia Headquarters

Hydraulic Technologies Australia Pty
Ltd Quad 2, 6 Parkview Drive
Homebush Bay NSW 2127
Tel: +61 02 9763 4900
Fax: +61 02 9763 7888

India Headquarters

Hydraulic Technologies (India) Pvt.
Limited

Survey No. 275

Odhav, Ahmedabad - 382 415

Tel: +91-99099-85454

+91-97277-19950

india@powerteam.com

English Original

EC DECLARATION OF CONFORMITY

We declare under our sole responsibility that our Electric Pump Model:

*** PE8xx – E220 & PE8xx – E110 series**

to which this declaration relates are in conformity with the following:

<u>EN, EN-ISO, ISO standards</u>	<u>Title</u>
Per the provisions of the Machinery Safety Directive	2006/42 EC
EN_ISO 12100	Safety of machinery, basic concepts, general principles for design, risk assessment & risk reduction
EN 4413	Hydraulic Fluid Power – general rules and safety requirements for systems & their components
Per the provisions of the EMC Directive	2014/30 EU
EN_61000-4-2	Electromagnetic Discharge Immunity test
EN_61000-4-3	Radiated, Radio Frequency, Electromagnetic Field Immunity test
EN_61000-4-4	Electrical Fast Transient / Burst Immunity test
EN_61000-4-5	Surge immunity test
EN_61000-4-6	Immunity to Conducted Disturbances, Induced by Radio-Frequency Fields
EN_61000-4-11	Voltage Dip and Interrupt test
EN 55011	Industrial, Scientific and Medical (ISM) Radio Frequency Equipment-Electromagnetic Disturbance Characteristics-Limits and Methods of Measurement
Per the provisions of the Low Voltage Directive	2014/35 EU
EN_60204-1	Safety of Machinery –Electrical equipment of machines – Part 1 General requirements
Per the provisions of the Noise Emission in the Environment by Equipment for Use Outdoors Directive	2000/14 EC
EN_3200L0014	Noise emission in the environment for use outdoors
ISO 3744	Sound Power Level Measurements
measured sound power level on an equipment representative for this type :	82 dB(A)
guaranteed sound power level for this equipment :	86 dB(A) or less
Per the provisions of the RoHS Directive	2015/863 EU
	Restriction of the use of certain hazardous substances in electrical and electronic equipment

Hydraulic Technologies
5885 11th Street
Rockford, IL 61109-3699
United States of America

Hydraulic Technologies
Andreas J. Klemm
Hydraulic Technologies
Albert Thijsstraat 12
NL-6471 WX Eygelshoven
The Netherlands

We hereby declare that the equipment specified under * conforms to the above quoted European Community Directive(s) and Standard(s) as per the currently valid revision. Hydraulic Technologies is certified and registered to ISO 9001: 2015.

The Netherlands January 16th, 2019

Andreas J. Klemm, PhD

English Original

EC DECLARATION OF CONFORMITY

We declare under our sole responsibility that our Gas/Petrol powered Hydraulic Pump Models:

*

**PG18 series, PG30 series
PG55 series, PG120 series
PG400 series
PG182HP-Rxxx**

to which this declaration relates are in conformity with the following:

EN, EN-ISO, ISO standards**Title****Per the provisions of the Machinery Safety Directive****2006/42/EC**

EN_ISO 12100

Safety of machinery, basic concepts, general principles for design, risk assessment & risk reduction

EN 4413

Hydraulic Fluid Power – general rules and safety requirements for systems & their components

Per the provisions of the EMC Directive, automotive**2004/104/EC**

CISPR12

Vehicles, boats and internal combustion engines - Radio disturbance characteristics - Limits and methods of measurement for the protection of off-board receivers

Per the provisions of the Noise Emission**2000/14/EC****in the Environment by Equipment for Use Outdoors Directive**

EN_3200L0014

Noise emission in the environment for use outdoors

ISO 3744

Sound Power Level Measurements

measured sound power level on an equipment representative for this type :

90 dB(A)

guaranteed sound power level for this equipment :

96 dB(A) or less

Hydraulic Technologies

5885 11th Street
Rockford, IL 61109-3699
United States of America

Hydraulic Technologies

Andreas J. Klemm
Hydraulic Technologies
Albert Thijsstraat 12
NL-6471 WX Eygelshoven
The Netherlands

We hereby declare that the equipment specified under * conforms to the above quoted European Community Directive(s) and Standard(s) as per the currently valid revision. Hydraulic Technologies is certified and registered to ISO 9001: 2015.

The Netherlands

January 16th, 2019-----
Andreas J. Klemm, PhD

EC DECLARATION OF CONFORMITY

We declare under our sole responsibility that our Air - driven Pump Model:

*** PA17 - series**

to which this declaration relates are in conformity with the following:

<u>EN, EN-ISO, ISO standards</u>	<u>Title</u>
Per the provisions of the Machinery Safety Directive	2006/42 EC
EN_ISO 12100	Safety of machinery, basic concepts, general principles for design, risk assessment & risk reduction
EN 4413	Hydraulic Fluid Power – general rules and safety requirements for systems & their components
EN 4414	Pneumatic Fluid Power – general rules and safety requirements for systems & their components

Per the provisions of the Noise Emission in the Environment by Equipment for Use Outdoors Directive	2000/14 EC
EN_3200L0014	Noise emission in the environment for use outdoors
ISO 3744	Sound Power Level Measurements

measured sound power level on an equipment representative for this type : 94 dB(A)
guaranteed sound power level for this equipment : 95 dB(A) or less

Hydraulic Technologies
5885 11th Street
Rockford, IL 61109-3699
United States of America

We hereby declare that the equipment specified under * conforms to the above quoted European Community Directive(s) and Standard(s) as per the currently valid revision. Hydraulic Technologies is certified and registered to ISO 9001: 2015.

Hydraulic Technologies
Andreas J. Klemm
Hydraulic Technologies
Albert Thijsstraat 12
NL-6471 WX Eygelshoven
The Netherlands

The Netherlands January 16th, 2019



Andreas J. Klemm, PhD

EC DECLARATION OF CONFORMITY

We declare under our sole responsibility that our Air - driven Pump Model:

*** PA46 - series**

to which this declaration relates are in conformity with the following:

<u>EN, EN-ISO, ISO standards</u>	<u>Title</u>
Per the provisions of the Machinery Safety Directive	2006/42 EC
EN_ISO 12100	Safety of machinery, basic concepts, general principles for design, risk assessment & risk reduction
EN 4413	Hydraulic Fluid Power – general rules and safety requirements for systems & their components
EN 4414	Pneumatic Fluid Power – general rules and safety requirements for systems & their components
Per the provisions of the Noise Emission in the Environment by Equipment for Use Outdoors Directive	2000/14 EC
EN_3200L0014	Noise emission in the environment for use outdoors
ISO 3744	Sound Power Level Measurements
measured sound power level on an equipment representative for this type :	91 dB(A)
guaranteed sound power level for this equipment :	94 dB(A) or less

Hydraulic Technologies
5885 11th Street
Rockford, IL 61109-3699
United States of America

We hereby declare that the equipment specified under * conforms to the above quoted European Community Directive(s) and Standard(s) as per the currently valid revision. Hydraulic Technologies is certified and registered to ISO 9001: 2015.

Hydraulic Technologies
Andreas J. Klemm
Hydraulic Technologies
Albert Thijsstraat 12
NL-6471 WX Eygelshoven
The Netherlands

The Netherlands January 16th, 2019



Andreas J. Klemm, PhD

EC DECLARATION OF CONFORMITY

We declare under our sole responsibility that our Air - driven Pump Model:

*** PA55 - series**

to which this declaration relates are in conformity with the following:

<u>EN, EN-ISO, ISO standards</u>	<u>Title</u>
Per the provisions of the Machinery Safety Directive	2006/42 EC
EN_ISO 12100	Safety of machinery, basic concepts, general principles for design, risk assessment & risk reduction
EN 4413	Hydraulic Fluid Power – general rules and safety requirements for systems & their components
EN 4414	Pneumatic Fluid Power – general rules and safety requirements for systems & their components
Per the provisions of the Noise Emission in the Environment by Equipment for Use Outdoors Directive	2000/14 EC
EN_3200L0014	Noise emission in the environment for use outdoors
ISO 3744	Sound Power Level Measurements

measured sound power level on an equipment representative for this type : 83 dB(A)
guaranteed sound power level for this equipment : 89 dB(A) or less

Hydraulic Technologies
5885 11th Street
Rockford, IL 61109-3699
United States of America

We hereby declare that the equipment specified under * conforms to the above quoted European Community Directive(s) and Standard(s) as per the currently valid revision. Hydraulic Technologies is certified and registered to ISO 9001: 2015.

Hydraulic Technologies
Andreas J. Klemm
Hydraulic Technologies
Albert Thijsstraat 12
NL-6471 WX Eygelshoven
The Netherlands

The Netherlands January 16th, 2019



Andreas J. Klemm, PhD

English Original

EC DECLARATION OF CONFORMITY

We declare under our sole responsibility that our Electric Pump Model:

*** PE46x – E110 & PE46x – E220 series**

to which this declaration relates are in conformity with the following:

<u>EN, EN-ISO, ISO standards</u>	<u>Title</u>
Per the provisions of the Machinery Safety Directive	2006/42 EC
EN_ISO 12100	Safety of machinery, basic concepts, general principles for design, risk assessment & risk reduction
EN 4413	Hydraulic Fluid Power – general rules and safety requirements for systems & their components
Per the provisions of the EMC Directive	2014/30 EU
EN_61000-4-2	Electromagnetic Discharge Immunity test
EN_61000-4-3	Radiated, Radio Frequency, Electromagnetic Field Immunity test
EN_61000-4-4	Electrical Fast Transient / Burst Immunity test
EN_61000-4-5	Surge immunity test
EN_61000-4-6	Immunity to Conducted Disturbances, Induced by Radio-Frequency Fields
EN_61000-4-11	Voltage Dip and Interrupt test
EN 55011	Industrial, Scientific and Medical (ISM) Radio Frequency Equipment-Electromagnetic Disturbance Characteristics-Limits and Methods of Measurement
Per the provisions of the Low Voltage Directive	2014/35 EU
EN_60204-1	Safety of Machinery –Electrical equipment of machines – Part 1 General requirements
Per the provisions of the Noise Emission in the Environment by Equipment for Use Outdoors Directive	2000/14 EC
EN_3200L0014	Noise emission in the environment for use outdoors
ISO 3744	Sound Power Level Measurements

measured sound power level on an equipment representative for this type : 88 dB(A)
guaranteed sound power level for this equipment : 92 dB(A) or less

Per the provisions of the RoHS Directive	2015/863 EU
Restriction of the use of certain hazardous substances in electrical and electronic equipment	

We hereby declare that the equipment specified under * conforms to the above quoted European Community Directive(s) and Standard(s) as per the currently valid revision. Hydraulic Technologies is certified and registered to ISO 9001: 2015.

The Netherlands March 19th, 2020



Andreas J. Klemm, PhD

Hydraulic Technologies
5885 11th Street
Rockford, IL 61109-3699
United States of America

Hydraulic Technologies
Hydraulic Technologies
Albert Thijsstraat 12
NL-6471 WX Eygelshoven
The Netherlands

English Original

EC DECLARATION OF CONFORMITY

We declare under our sole responsibility that our Electric Pump Model:

*** PQ120xx – E380 series**

to which this declaration relates are in conformity with the following:

EN, EN-ISO, ISO standards

Title

Per the provisions of the Machinery Safety Directive

2006/42 EC

EN_ISO 12100

Safety of machinery, basic concepts, general principles for design, risk assessment & risk reduction

EN 4413

Hydraulic Fluid Power – general rules and safety requirements for systems & their components

Per the provisions of the EMC Directive

2014/30 EU

EN_61000-4-2

Electromagnetic Discharge Immunity test

EN_61000-4-3

Radiated, Radio Frequency, Electromagnetic Field Immunity test

EN_61000-4-4

Electrical Fast Transient / Burst Immunity test

EN_61000-4-5

Surge immunity test

EN_61000-4-6

Immunity to Conducted Disturbances, Induced by Radio-Frequency Fields

EN_61000-4-11

Voltage Dip and Interrupt test

EN 55011

Industrial, Scientific and Medical (ISM) Radio Frequency Equipment-Electromagnetic Disturbance Characteristics-Limits and Methods of Measurement

Per the provisions of the Low Voltage Directive

2014/35 EU

EN_60204-1

Safety of Machinery –Electrical equipment of machines – Part 1 General requirements

Per the provisions of the Noise Emission

2000/14 EC

in the Environment by Equipment for Use Outdoors Directive

EN_3200L0014

Noise emission in the environment for use outdoors

ISO 3744

Sound Power Level Measurements

measured sound power level on an equipment representative for this type :

77 dB(A)

guaranteed sound power level for this equipment :

81 dB(A) or less

Per the provisions of the RoHS Directive

2015/863 EU

Restriction of the use of certain hazardous substances in electrical and electronic equipment

Hydraulic Technologies
5885 11th Street
Rockford, IL 61109-3699
United States of America

Hydraulic Technologies
Andreas J. Klemm
Hydraulic Technologies
Albert Thijsstraat 12
NL-6471 WX Eygelshoven
The Netherlands

We hereby declare that the equipment specified under * conforms to the above quoted European Community Directive(s) and Standard(s) as per the currently valid revision. Hydraulic Technologies is certified and registered to ISO 9001: 2015.

The Netherlands

January 16th, 2019



Andreas J. Klemm, PhD

English Original

EC DECLARATION OF CONFORMITY

We declare under our sole responsibility that our Electric Pump Model:

*** PE30xx – E220 & PE30xx – E110 series**

to which this declaration relates are in conformity with the following:

<u>EN, EN-ISO, ISO standards</u>	<u>Title</u>
Per the provisions of the Machinery Safety Directive	2006/42 EC
EN_ISO 12100	Safety of machinery, basic concepts, general principles for design, risk assessment & risk reduction
EN 4413	Hydraulic Fluid Power – general rules and safety requirements for systems & their components
Per the provisions of the EMC Directive	2014/30 EU
EN_61000-4-2	Electromagnetic Discharge Immunity test
EN_61000-4-3	Radiated, Radio Frequency, Electromagnetic Field Immunity test
EN_61000-4-4	Electrical Fast Transient / Burst Immunity test
EN_61000-4-5	Surge immunity test
EN_61000-4-6	Immunity to Conducted Disturbances, Induced by Radio-Frequency Fields
EN_61000-4-11	Voltage Dip and Interrupt test
EN 55011	Industrial, Scientific and Medical (ISM) Radio Frequency Equipment-Electromagnetic Disturbance Characteristics-Limits and Methods of Measurement
Per the provisions of the Low Voltage Directive	2014/35 EU
EN_60204-1	Safety of Machinery –Electrical equipment of machines – Part 1 General requirements
Per the provisions of the Noise Emission in the Environment by Equipment for Use Outdoors Directive	2000/14 EC
EN_3200L0014	Noise emission in the environment for use outdoors
ISO 3744	Sound Power Level Measurements
measured sound power level on an equipment representative for this type :	82 dB(A)
guaranteed sound power level for this equipment :	87 dB(A) or less
Per the provisions of the RoHS Directive	2015/863 EU
	Restriction of the use of certain hazardous substances in electrical and electronic equipment

We hereby declare that the equipment specified under * conforms to the above quoted European Community Directive(s) and Standard(s) as per the currently valid revision. Hydraulic Technologies is certified and registered to ISO 9001: 2015.

The Netherlands January 16th, 2019-----
Andreas J. Klemm, PhD

Hydraulic Technologies
5885 11th Street
Rockford, IL 61109-3699
United States of America

Hydraulic Technologies
Andreas J. Klemm
Hydraulic Technologies
Albert Thijsstraat 12
NL-6471 WX Eygelshoven
The Netherlands

English Original

EC DECLARATION OF CONFORMITY

We declare under our sole responsibility that our Electric Pump Model:

*** PE17xx – E220 series**

to which this declaration relates are in conformity with the following:

EN, EN-ISO, ISO standards**Title****Per the provisions of the Machinery Safety Directive****2006/42 EC**

EN_ISO 12100

Safety of machinery, basic concepts, general principles for design, risk assessment & risk reduction

EN 4413

Hydraulic Fluid Power – general rules and safety requirements for systems & their components

Per the provisions of the EMC Directive**2014/30 EU**

EN_61000-4-2

Electromagnetic Discharge Immunity test

EN_61000-4-3

Radiated, Radio Frequency, Electromagnetic Field Immunity test

EN_61000-4-4

Electrical Fast Transient / Burst Immunity test

EN_61000-4-5

Surge immunity test

EN_61000-4-6

Immunity to Conducted Disturbances, Induced by Radio-Frequency Fields

EN_61000-4-11

Voltage Dip and Interrupt test

EN 55011

Industrial, Scientific and Medical (ISM) Radio Frequency Equipment-Electromagnetic Disturbance Characteristics-Limits and Methods of Measurement

Per the provisions of the Low Voltage Directive**2014/35 EU**

EN_60204-1

Safety of Machinery –Electrical equipment of machines – Part 1 General requirements

Per the provisions of the Noise Emission**2000/14 EC****in the Environment by Equipment for Use Outdoors Directive**

EN_3200L0014

Noise emission in the environment for use outdoors

ISO 3744

Sound Power Level Measurements

measured sound power level on an equipment representative for this type :

67 dB(A)

guaranteed sound power level for this equipment :

81 dB(A) or less

Per the provisions of the RoHS Directive**2015/863 EU**

Restriction of the use of certain hazardous substances in electrical and electronic equipment

Hydraulic Technologies
5885 11th Street
Rockford, IL 61109-3699
United States of America

Hydraulic Technologies
Andreas J. Klemm
Hydraulic Technologies
Albert Thijssstraat 12
NL-6471 WX Eygelshoven
The Netherlands

We hereby declare that the equipment specified under * conforms to the above quoted European Community Directive(s) and Standard(s) as per the currently valid revision. Hydraulic Technologies is certified and registered to ISO 9001: 2015.

The Netherlands

January 16th, 2019

Andreas J. Klemm, PhD

English Original

EC DECLARATION OF CONFORMITY

We declare under our sole responsibility that our Electric Pump Model:

*** PE55xx – E110 & PE55xx – E220 series**

to which this declaration relates are in conformity with the following:

EN, EN-ISO, ISO standards**Title****Per the provisions of the Machinery Safety Directive****2006/42 EC**

EN_ISO 12100

Safety of machinery, basic concepts, general principles for design, risk assessment & risk reduction

EN 4413

Hydraulic Fluid Power – general rules and safety requirements for systems & their components

Per the provisions of the EMC Directive**2014/30 EU**

EN_61000-4-2

Electromagnetic Discharge Immunity test

EN_61000-4-3

Radiated, Radio Frequency, Electromagnetic Field Immunity test

EN_61000-4-4

Electrical Fast Transient / Burst Immunity test

EN_61000-4-5

Surge immunity test

EN_61000-4-6

Immunity to Conducted Disturbances, Induced by Radio-Frequency Fields

EN_61000-4-11

Voltage Dip and Interrupt test

EN 55011

Industrial, Scientific and Medical (ISM) Radio Frequency Equipment-Electromagnetic Disturbance Characteristics-Limits and Methods of Measurement

Per the provisions of the Low Voltage Directive**2014/35 EU**

EN_60204-1

Safety of Machinery –Electrical equipment of machines – Part 1 General requirements

Per the provisions of the Noise Emission**2000/14 EC****in the Environment by Equipment for Use Outdoors Directive**

EN_3200L0014

Noise emission in the environment for use outdoors

ISO 3744

Sound Power Level Measurements

measured sound power level on an equipment representative for this type :

89 dB(A)

guaranteed sound power level for this equipment :

94 dB(A) or less

Per the provisions of the RoHS Directive**2015/863 EU**

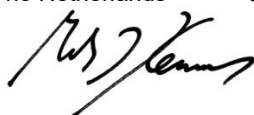
Restriction of the use of certain hazardous substances in electrical and electronic equipment

Hydraulic Technologies
5885 11th Street
Rockford, IL 61109-3699
United States of America

Hydraulic Technologies
Andreas J. Klemm
Hydraulic Technologies
Albert Thijsstraat 12
NL-6471 WX Eygelshoven
The Netherlands

We hereby declare that the equipment specified under * conforms to the above quoted European Community Directive(s) and Standard(s) as per the currently valid revision. Hydraulic Technologies is certified and registered to ISO 9001: 2015.

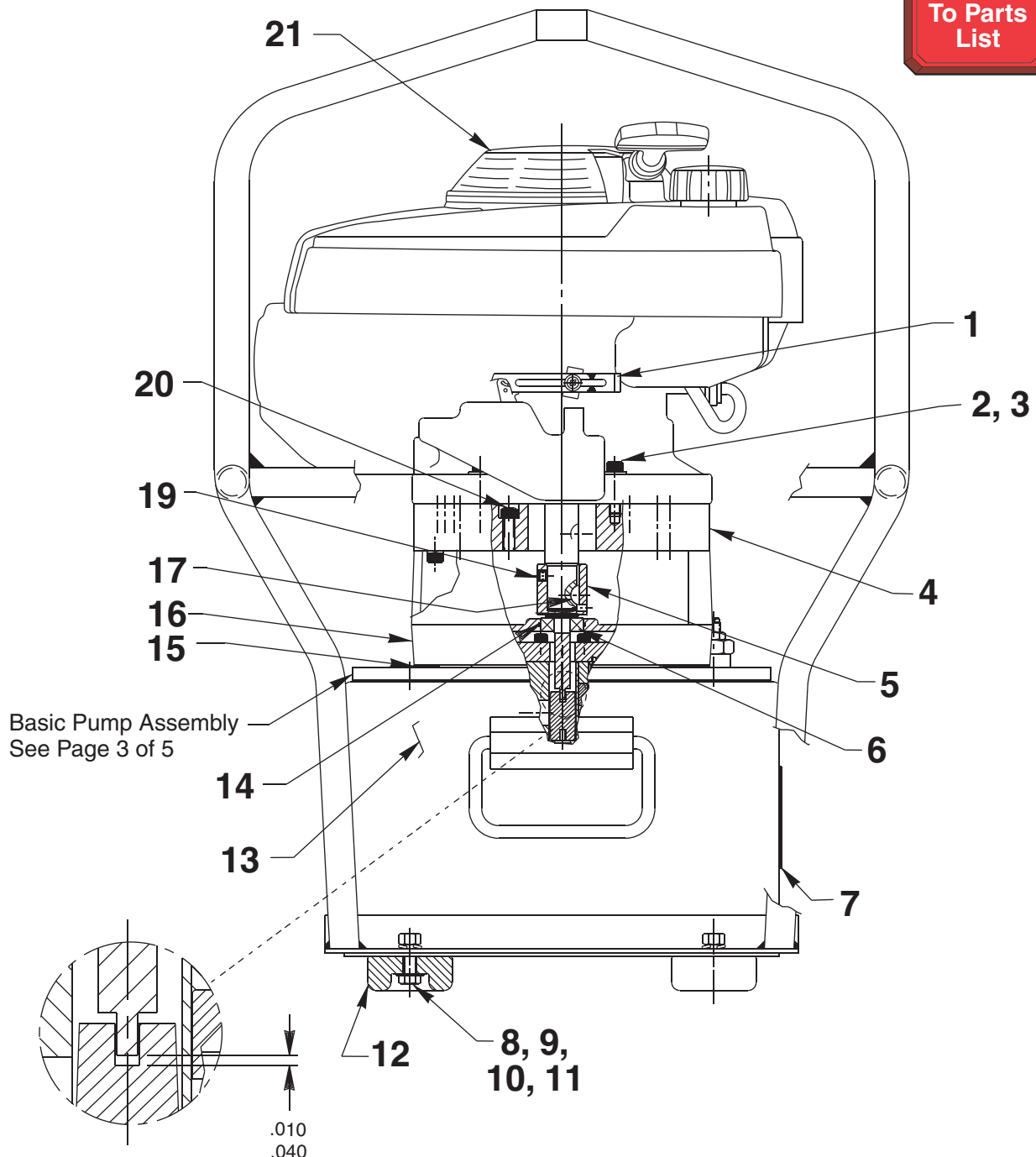
The Netherlands

January 16th, 2019-----
Andreas J. Klemm, PhD

Parts List for:

PG1204S
PG1204S-CCL**GAS HYDRAULIC PUMP**

Max. Capacity: 10,000 PSI

**To Parts
List**(DISTANCE BETWEEN BOTTOM OF
420052 SHAFT ADAPTER AND
BOTTOM OF SLOT IN 251206.)

Sheet No. 1 of 5

Rev. 3

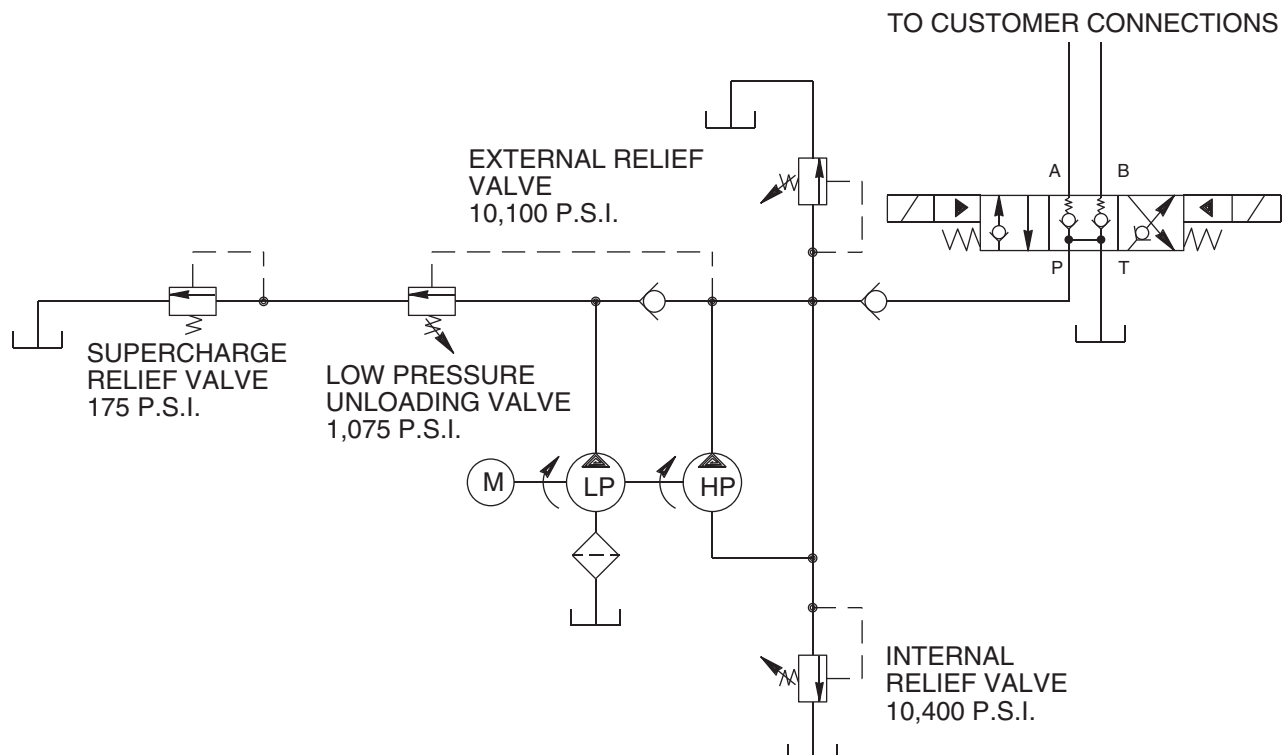
Date: 29 April 2009

Item No.	Part No.	No. Req'd	Description
1	17596	1	Slide Control
2	10948	3	Screw (5/16-18 UNC X 1-1/2 Lg.)
3	10257	3	Washer (For 5/16 bolt)
4	420200	1	Mounting Plate
5	420052	1	Shaft Extension
6	10439	1	Ball Bearing
7	309221	2	Trade Name Decal
8	10052	4	Cap Screw (3/8-16 UNC X 1-1/4 Lg.)
9	10258	4	Washer (For 3/8 bolt)
10	10247	4	Lockwasher (For 3/8 bolt)
11	10204	4	Hex Nut (3/8-16 UNC)
12	250354	4	Rubber Bumper
13	40137OR9	1	Reservoir
14	15124	1	O-ring (1-3/8 X 1-1/4 X 1/16)
15	40987	1	Reservoir Gasket
16	50384WH2	1	Mounting Engine Plate
17	10945	1	Woodruff Key
19	10556	1	Set Screw (1/4-20 UNC X 1/4 Lg.)
20	250427	4	Screw (5/16-18 UNC x 1/2 Lg.)
21	420416	1	Gas Engine (5.5 HP)



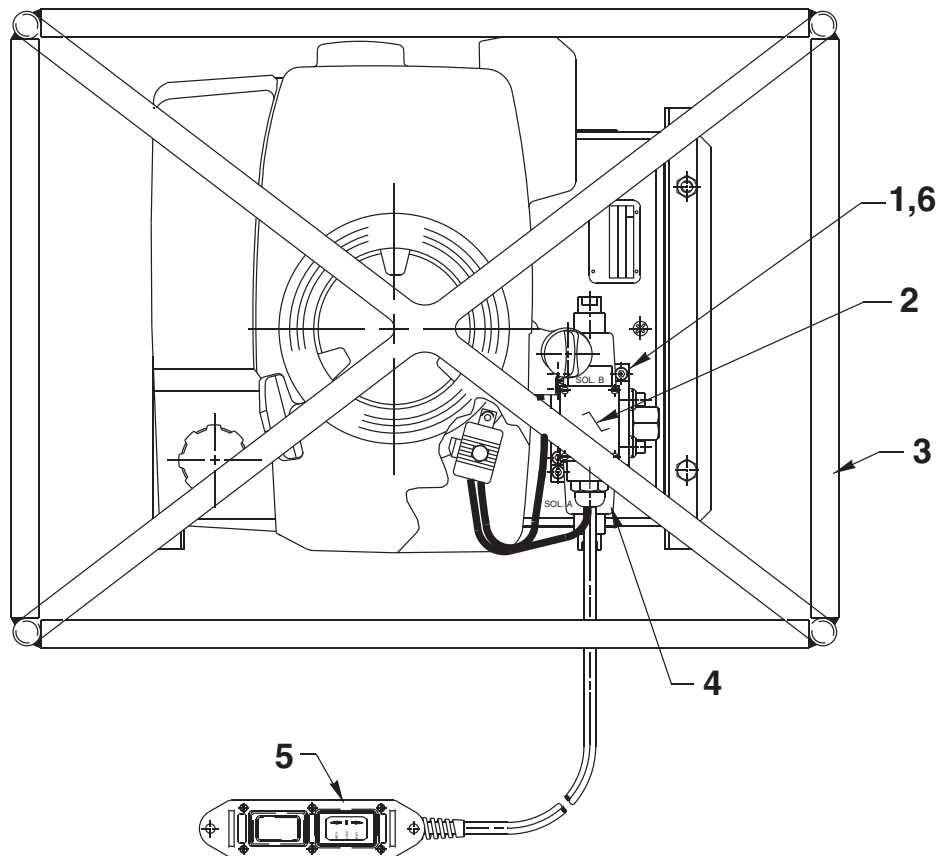
PARTS INCLUDED BUT NOT SHOWN

200609 1 Drain Tube

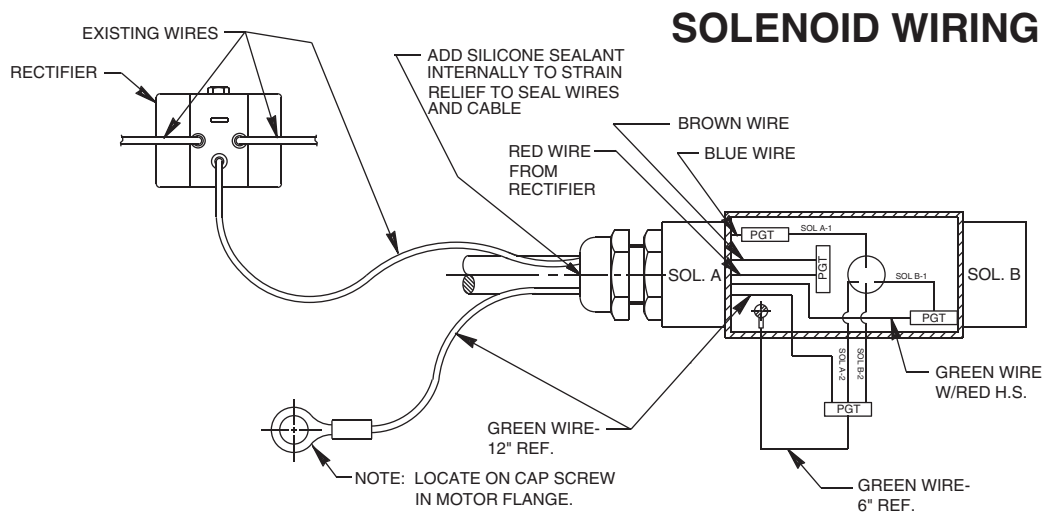


HYDRAULIC SCHEMATIC

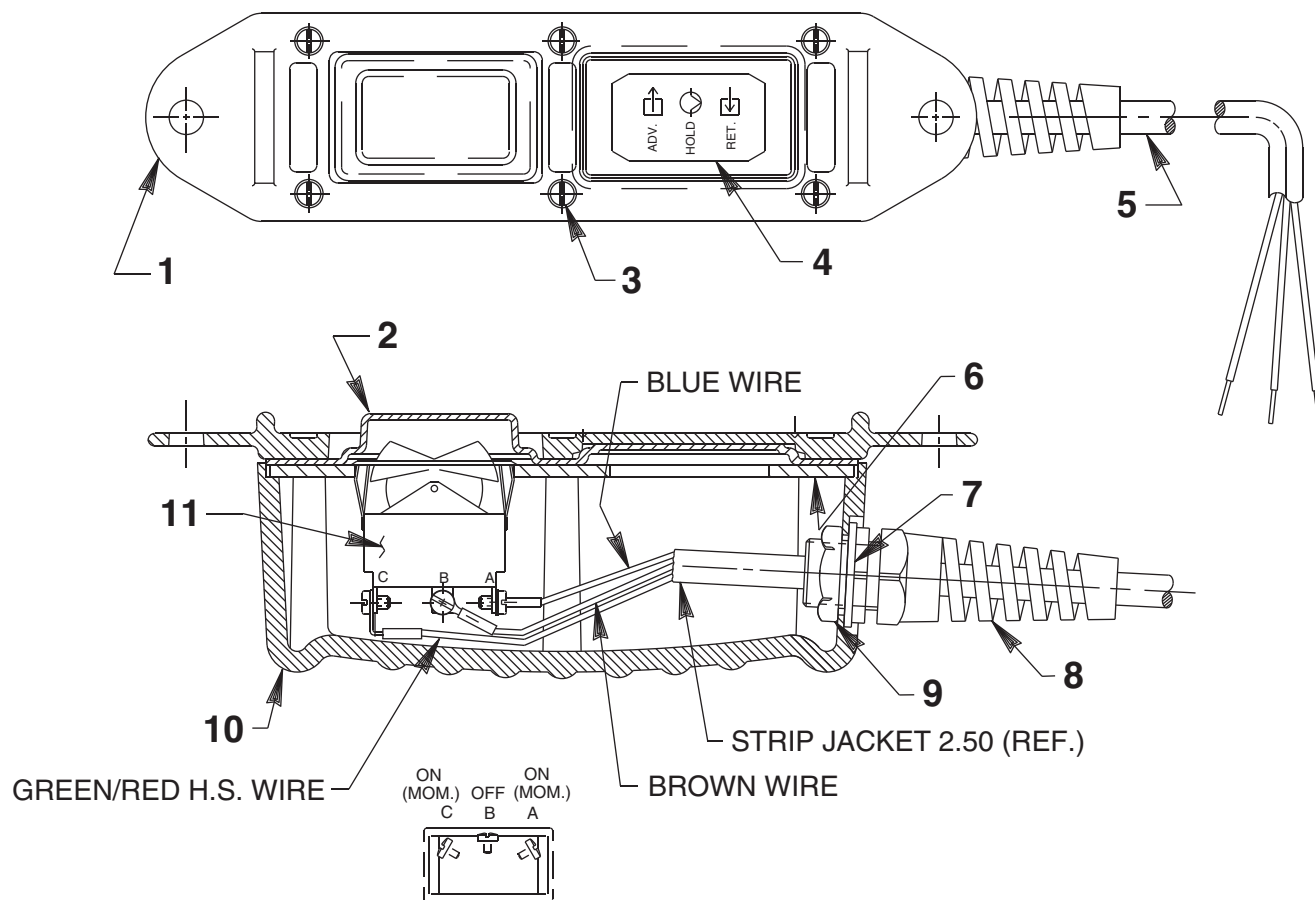
TOP VIEW



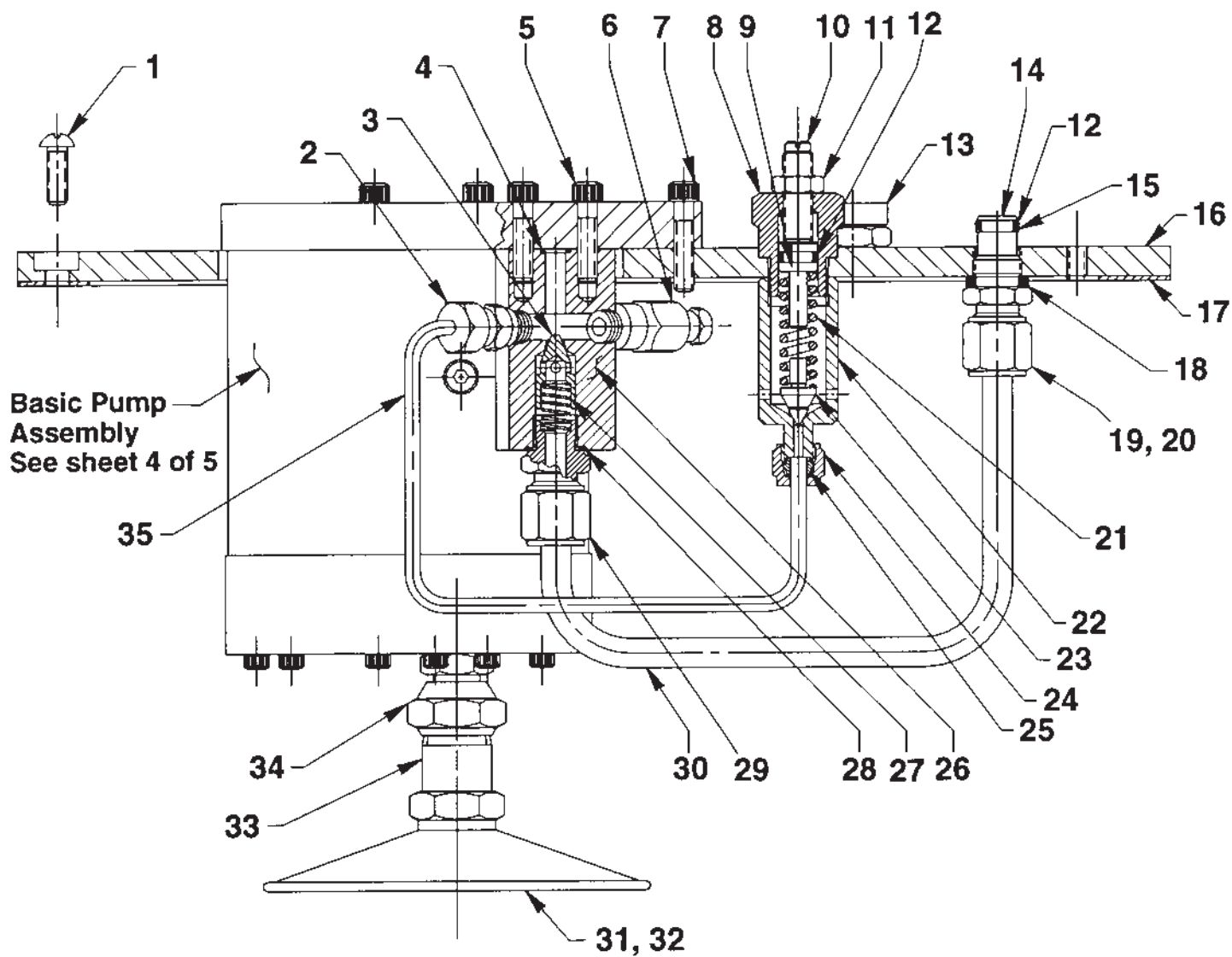
Item No.	Part No.	No. Req'd	Description
1	65008	1	Solenoid Valve (4-way; See Form No. 101653)
2	420417	1	Solenoid Valve (12 VDC)
3	64121BK2	1	Frame Weldment
4	216666	1	Strain Relief Bushing
5	351454	1	Hand Control Assembly (See back sheet 2 of 5)
6	200395	1	Valve Gasket



#351454 REMOTE CONTROL ASSEMBLY



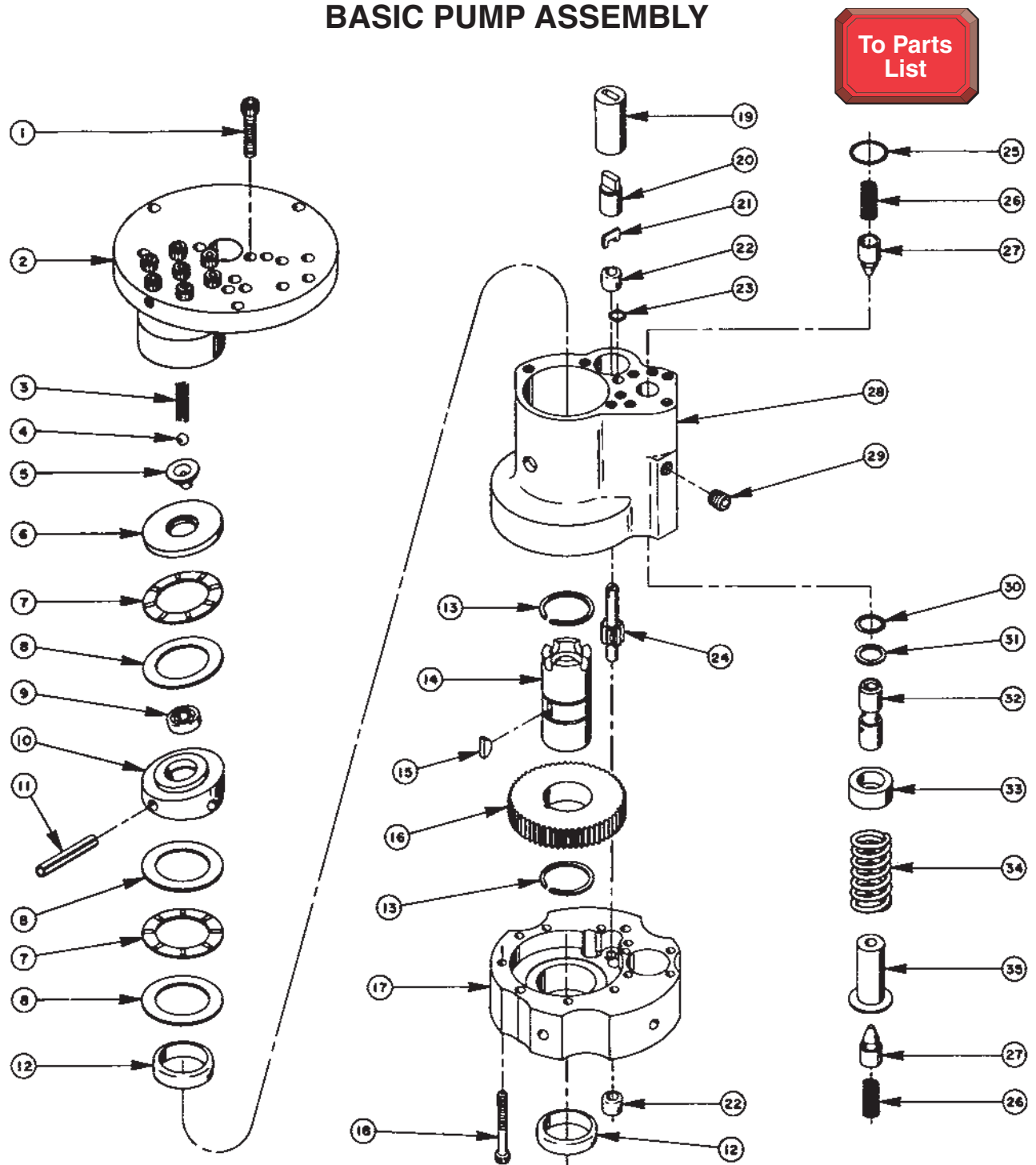
Item No.	Part No.	No. Req'd	Description
1	420050-1	1	Plastic Cover
2	420050-2	1	Gasket
3	250248	6	Screw (4-24 x 3/4 Lg.)
4	202776	1	Decal
5	251879	25 ft.	Electrical Cable
6	420050-3	1	Switch Mounting Plate
7	253607	1	Rubber Seal
8	251818	1	Strain Relief Bushing
9	251802	1	Locknut (3/4-16 UNF; Torque to 30 in. lbs.)
10	420050-4	1	Switch Housing
11	16773	1	Rocker Switch

[To Parts List](#)**GENERAL PUMP ASSEMBLY**

Item No.	Part No.	No. Req'd	Description
1	10177	10	Machine Screw (1/4-20 UNC x 3/4 Lg.)
2	11173	1	Fitting
3	20771	1	Poppet
4	10266	1	O-ring (3/8 x 1/4 x 1/16)
5	10015	2	Soc. Hd. Cap Screw (1/4-28 UNF x 1" Lg.)
6	21278	1	Relief Valve (Set at 10,100/10,700 PSI)
7	10016	3	Cap Screw (1/4-20 UNC X 1" Lg.)
8	21305	1	Valve Cap
9	21306	1	Spring Guide
10	22362	1	Valve Adjusting Screw (Set at 10,000/10,200 PSI)
11	10386	1	Hex Nut (3/8-24 UNF)
12	10268	2	O-ring
13	20937	1	Filler/Breather Cap
14	20787	1	Valve Connector
15	11863	1	Backup Washer (11/16 x 1/2 x .048)
16	50058WH2	1	Cover Plate
17	58506	1	Reservoir Gasket
18	21484	1	Washer
19	10430	2	Tube Sleeve
20	10431	2	Tube Nut
21	10495	1	Compression Spring (.450 x 1-5/8 Lg.)
22	22361	1	External Pressure Valve Body
23	21046	1	Valve Stem
24	11342	1	Tube Nut
25	11174	1	Tube Sleeve
26	20776	1	Outlet Check Body
27	10425	1	Compression Spring (3/8 O.D. x 3/4 Lg.)
28	10261	1	Copper Washer
29	20770	1	Valve Connector
30	21495	1	Oil Line Tube
31	21345	1	Filter Assembly (Includes o-ring, Item #32)
32	10266	1	O-ring (3/8 X 1/4 X 1/16)
33	22033	1	Suction Line
34	10528	1	Straight Fitting
35	22399	1	External Pressure Regulator Tube
36	200395	1	Gasket, Valve Base



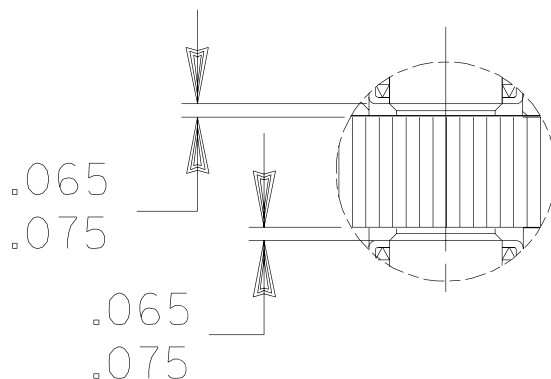
BASIC PUMP ASSEMBLY



Item No.	Part No.	No. Req'd	Description
1	10020	9	Soc. Hd. Cap Screw (1/4-20 UNC x 1-1/4 Lg; Torque to 170/180 in. lbs.)
2	33114	1	High Pressure Pump Assembly (See sheet 5 of 5)
3	10361	1	Compression Spring (1/4 O.D. x 1" Lg.)
4	10375	1	Steel Ball (1/4 dia.)
5	23547	1	Bearing Top Plate
6	23548	1	Top Plate
7	11228	2	Thrust Bearing
8	11813	3	Bearing Race
9	11814	1	Ball Bearing
10	23549	1	Angle Plate
11	11955	1	Roll Pin (1/4 dia. x 3/4 Lg.)
12	11064	2	Needle Bearing
13	11261	2	Retaining Ring
14	23556	1	Shaft
15	11821	1	Woodruff Key
16	23557	1	Gear
17	30533	1	Pump End Plate
18	10001	12	Soc. Hd. Cap Screw (#10-32 UNF x 1-3/4 Lg.; Torque to 50 in. lbs.)
19	251206	1	Coupling
20	21092	1	Adapter
21	21093	1	Key
22	11199	2	Needle Thrust Bearing (See note below)
23	10266	1	O-ring (1/4 x 3/8 x 1/16)
24	21272	1	Drive Gear
25	10303	1	O-ring (3/4 x 7/8 x 1/16)
26	10425	2	Compression Spring (3/8 O.D. x 3/4 Lg.)
27	20771	2	Poppet
28	40120	1	Pump Body
29	10427	1	Pipe Plug (1/8 NPTF)
30	10271	1	O-ring (11/16 x 1/2 x 3/32)
31	12389	1	Teflon Backup Washer (11/16 x 1/2 x .048)
32	20849	1	Spool
33	23255	1	Spring Guide
34	10426	1	Compression Spring (1" O.D. x 1-13/16 Lg.)
35	23256	1	Spring Guide

To
Drawing

NEEDLE BEARING INSTALLATION SPECIFICATIONS

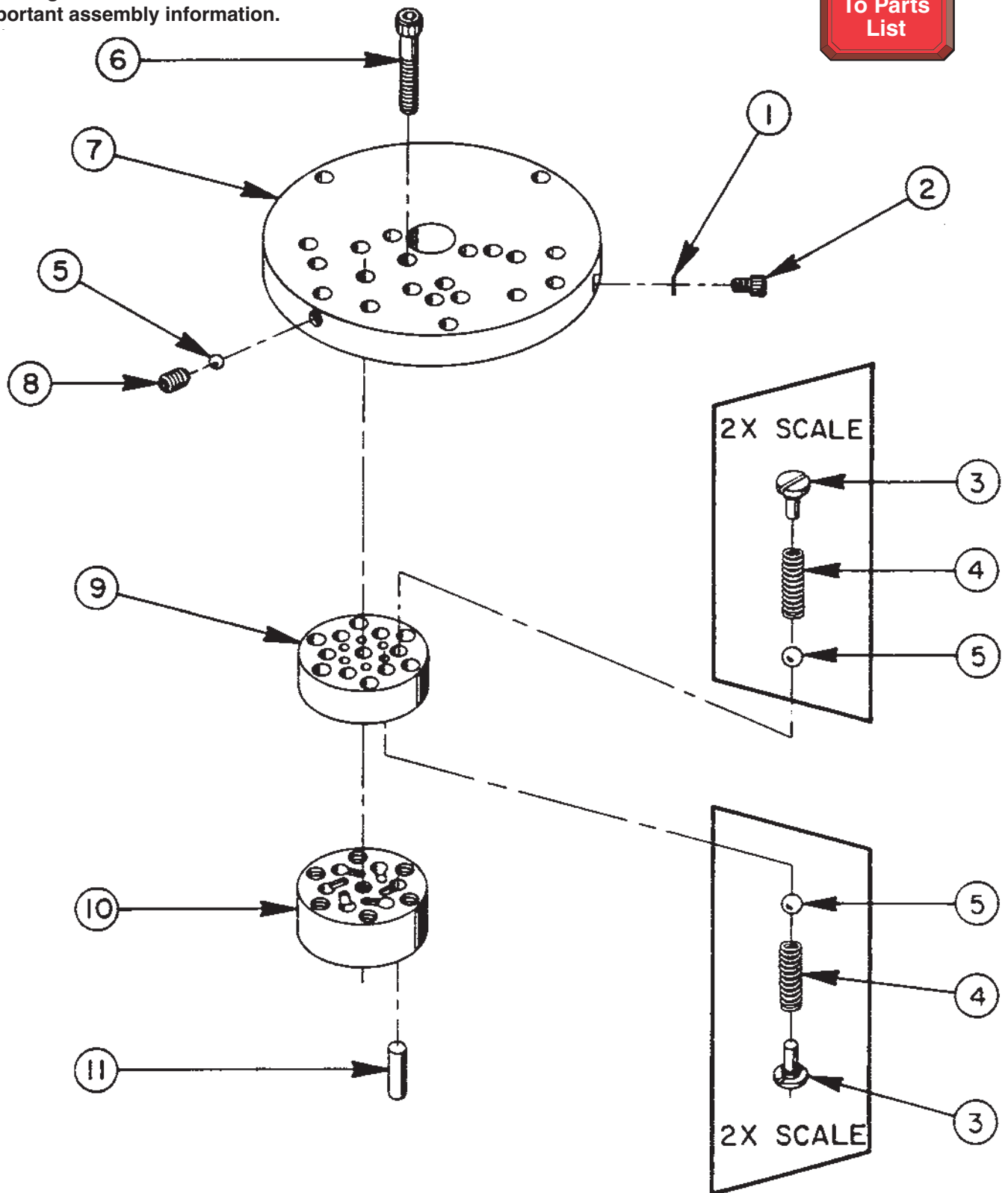


When replacing the needle bearings on the drive gear of the basic pump, the dimensions shown must be as specified.

HIGH PRESSURE PUMP ASSEMBLY

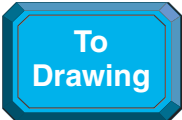
See diagram on reverse side for important assembly information.

To Parts List

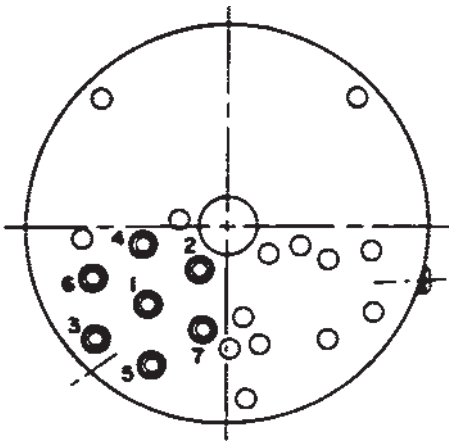


33114 PUMP ASSEMBLY
6 pistons -- 9/32 dia.

Item No.	Part No.	No. Req'd	Description
1	10442	1	Copper Washer (3/8 x 1/4 x 1/32)
2	10002	1	Soc. Hd. Cap Screw (1/4-20 UNC x 3/8 Lg.; Torque to 140/160 in. lbs.)
3	24549	12	Valve Guide
4	10445	12	Compression Spring (.164 O.D. x .718 Lg.)
5	12223	13	Steel Ball (3/16 dia.)
6	10023	7	Soc. Hd. Cap Screw (1/4-28 UNF x 1-1/2 Lg.; Torque to 170/180 in. lbs.; See note below)
7	50411	1	Top Plate
8	10519	1	Soc. Set Screw (1/4-20 UNC x 3/8 Lg.; Torque to 65/70 in. lbs.)
9	41048	1	Valve Head
10	41063	1	Pump Barrel
11	21628	6	Piston



BOLT TIGHTENING SEQUENCE



NOTE: Assemble in sequence shown.
Lubricate under head and on threads.
Torque to 180 in. lbs.

INTRODUCTION

Thank you for purchasing a Honda engine. We want to help you to get the best results from your new engine and to operate it safely. This manual contains information on how to do that; please read it carefully before operating the engine. If a problem should arise, or if you have any questions about your engine, consult an authorized Honda servicing dealer.

All information in this publication is based on the latest product information available at the time of printing. Honda Motor Co., Ltd. reserves the right to make changes at any time without notice and without incurring any obligation. No part of this publication may be reproduced without written permission.

This manual should be considered a permanent part of the engine and should remain with the engine if resold.

Review the instructions provided with the equipment powered by this engine for any additional information regarding engine startup, shutdown, operation, adjustments or any special maintenance instructions.

United States, Puerto Rico, and U.S. Virgin Islands:
We suggest you read the warranty policy to fully understand its coverage and your responsibilities of ownership. The warranty policy is a separate document that should have been given to you by your dealer.

SAFETY MESSAGES

Your safety and the safety of others are very important. We have provided important safety messages in this manual and on the engine. Please read these messages carefully.

A safety message alerts you to potential hazards that could hurt you or others. Each safety message is preceded by a safety alert symbol ⚠ and one of three words, DANGER, WARNING, or CAUTION.

These signal words mean:

⚠ DANGER

You WILL be KILLED or SERIOUSLY HURT if you don't follow instructions.

⚠ WARNING

You CAN be KILLED or SERIOUSLY HURT if you don't follow instructions.

⚠ CAUTION

You CAN be HURT if you don't follow instructions.

Each message tells you what the hazard is, what can happen, and what you can do to avoid or reduce injury.

DAMAGE PREVENTION MESSAGES

You will also see other important messages that are preceded by the word NOTICE.

This word means:

NOTICE

Your engine or other property can be damaged if you don't follow instructions.

The purpose of these messages is to help prevent damage to your engine, other property, or the environment.

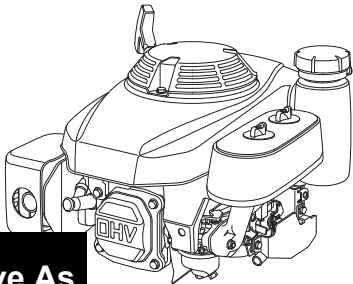
HONDA

OWNER'S MANUAL

MANUEL DE L'UTILISATEUR

MANUAL DEL PROPIETARIO

GXV160



Click to Save As

⚠

WARNING:

⚠

The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

California Proposition 65
This product contains or emits chemicals known to the state of California to cause cancer, birth defects or other reproductive harm

CONTENTS

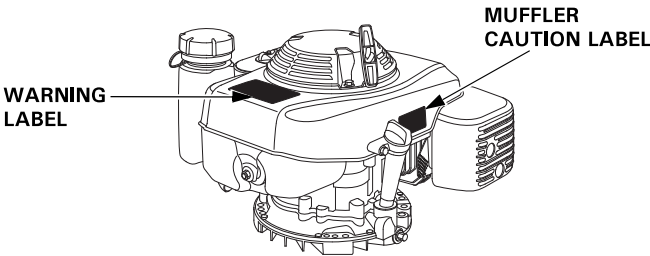
INTRODUCTION.....	1	SPARK PLUG.....	10
SAFETY MESSAGES.....	1	SPARK ARRESTER.....	10
SAFETY INFORMATION.....	2	HELPFUL TIPS &	
SAFETY LABEL LOCATION.....	2	SUGGESTIONS.....	11
COMPONENT & CONTROL		STORING YOUR ENGINE.....	11
LOCATIONS.....	3	TRANSPORTING.....	13
BEFORE OPERATION		TAKING CARE OF	
CHECKS.....	3	UNEXPECTED PROBLEMS.....	13
OPERATION.....	4	TECHNICAL INFORMATION...	14
SAFE OPERATING		Serial Number Location.....	14
PRECAUTIONS.....	4	Remote Control Linkage.....	14
STARTING THE ENGINE.....	4	Carburetor Modifications for	
SETTING ENGINE SPEED.....	5	High Altitude Operation.....	14
STOPPING THE ENGINE.....	6	Emission Control System	
SERVICING YOUR ENGINE.....	7	Information.....	15
THE IMPORTANCE OF		Air Index.....	16
MAINTENANCE.....	7	Specifications.....	16
MAINTENANCE SAFETY.....	7	Tuneup Specifications.....	16
SAFETY PRECAUTIONS.....	7	Quick Reference	
MAINTENANCE		Information.....	17
SCHEDULE.....	7	Wiring Diagrams.....	17
REFUELING.....	8	CONSUMER INFORMATION...	18
ENGINE OIL.....	8	Distributor/Dealer Locator	
Recommended Oil.....	8	Information.....	18
Oil Level Check.....	8	Customer Service	
Oil Change.....	9	Information.....	18
AIR CLEANER.....	9		
Inspection.....	9		
Cleaning.....	9		

SAFETY INFORMATION

- Understand the operation of all controls and learn how to stop the engine quickly in case of emergency. Make sure the operator receives adequate instruction before operating the equipment.
- Do not allow children to operate the engine. Keep children and pets away from the area of operation.
- Your engine’s exhaust contains poisonous carbon monoxide. Do not run the engine without adequate ventilation, and never run the engine indoors.
- The engine and exhaust become very hot during operation. Keep the engine at least 1 meter (3 feet) away from buildings and other equipment during operation. Keep flammable materials away, and do not place anything on the engine while it is running.

SAFETY LABEL LOCATION

This label warns you of potential hazards that can cause serious injury. Read it carefully.
If the label comes off or becomes hard to read, contact your Honda servicing dealer for replacement.



WARNING LABEL	For EU	Except EU
	attached to product	supplied with product
⚠ WARNING Gasoline is highly flammable and explosive. Turn engine off and let cool before refueling. The engine emits toxic carbonmonoxide. Do not run in an enclosed area. Read Owner's Manual before operation.	supplied with product	attached to product
⚠ ATTENTION L'essence est très inflammable et explosive. Arrêter le moteur et le laisser refroidir avant de faire le plein d'essence. Le moteur produit les vapeurs nocives de monoxyde de carbone. Ne pas utiliser dans un local clos. Lire le manuel de propriétaire avant l'utilisation.	supplied with product	supplied with product

MUFFLER CAUTION LABEL	For EU	Except EU
	not included	supplied with product
⚠ CAUTION HOT MUFFLER CAN BURN YOU. Stay away if engine has been running.	supplied with product	attached to product
⚠ ATTENTION L'ECHAPPEMENT CHAUD PEUT VOUS BRULER. S'ÉLOIGNER QUAND LE MOTEUR FONCTIONNE.	supplied with product	supplied with product



Gasoline is highly flammable and explosive. Stop the engine and let cool before refueling.



The engine emits toxic poisonous carbon monoxide gas. Do not run in an enclosed area.

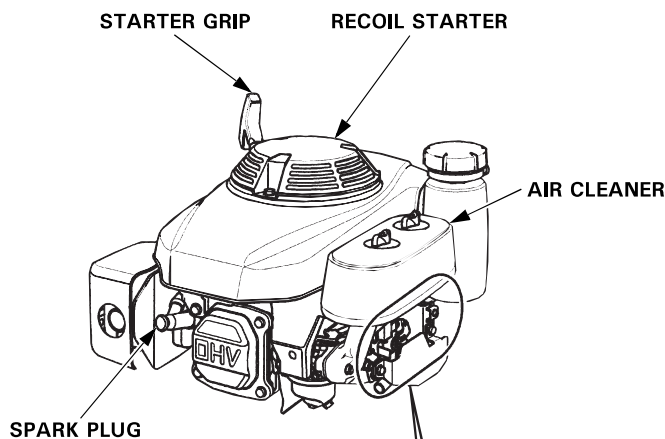
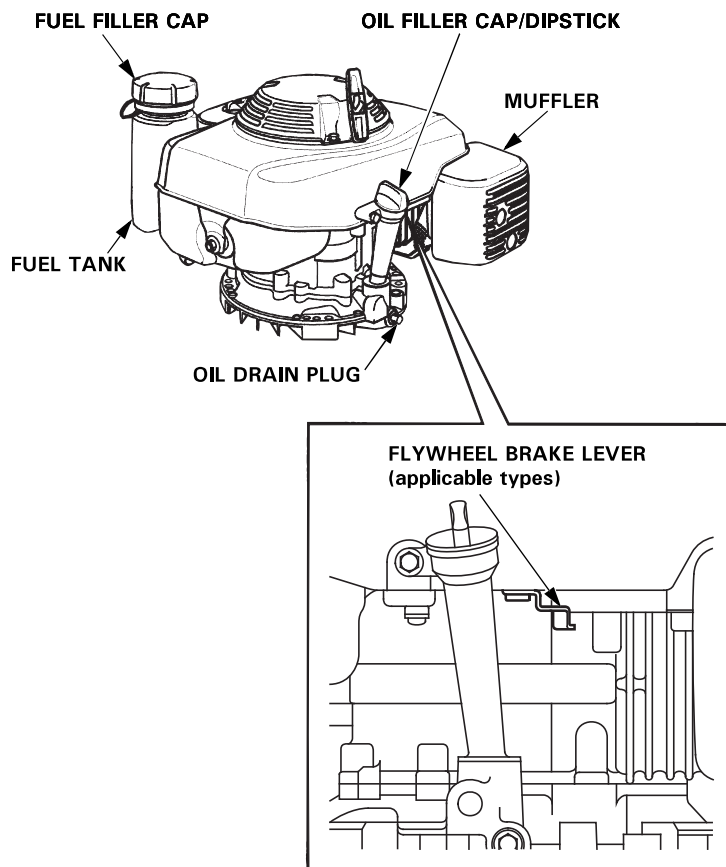


Read Owner’s Manual before operation.

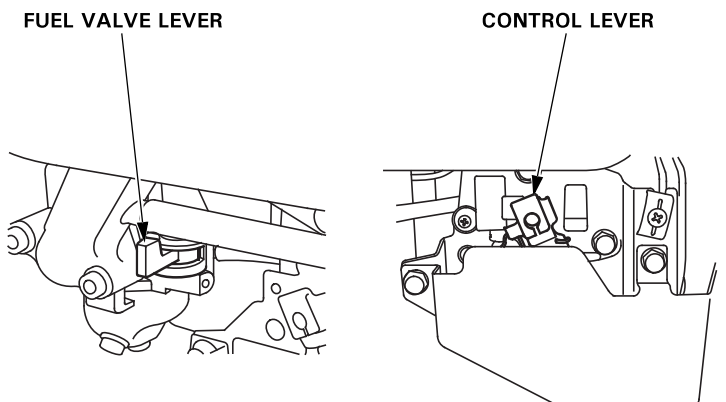


Hot muffler can burn you. Stay away if engine has been running.

COMPONENT & CONTROL LOCATIONS



ENGINE CONTROLS



BEFORE OPERATION CHECKS

IS YOUR ENGINE READY TO GO?

For your safety, to ensure compliance with environmental regulations, and to maximize the service life of your equipment, it is very important to take a few moments before you operate the engine to check its condition. Be sure to take care of any problem you find, or have your servicing dealer correct it, before you operate the engine.

⚠ WARNING

Improperly maintaining this engine, or failure to correct a problem before operation, can cause a malfunction in which you can be seriously hurt or killed.

Always perform a pre-operation inspection before each operation, and correct any problem.

Before beginning your pre-operation checks, be sure the engine is level and the engine switch is in the OFF position.

Always check the following items before you start the engine:

Check the General Condition of the Engine

1. Look around and underneath the engine for signs of oil or gasoline leaks.
2. Remove any excessive dirt or debris, especially around the muffler and recoil starter.
3. Look for signs of damage.
4. Check that all shields and covers are in place, and all nuts, bolts, and screws are tightened.

Check the Engine

1. Check the fuel level (see page 8). Starting with a full tank will help to eliminate or reduce operating interruptions for refueling.
2. Check the engine oil level (see page 8). Running the engine with a low oil level can cause engine damage.
3. Check the air filter element (see page 9). A dirty air filter element will restrict air flow to the carburetor, reducing engine performance.
4. Check the equipment powered by this engine.

Review the instructions provided with the equipment powered by this engine for any precautions and procedures that should be followed before engine startup.

OPERATION

SAFE OPERATING PRECAUTIONS

Before operating the engine for the first time, please review the *SAFETY INFORMATION* section on page 2 and the *BEFORE OPERATION CHECKS* on page 3.

⚠ WARNING

Carbon monoxide gas is toxic. Breathing it can cause unconsciousness and even kill you.

Avoid any areas or actions that expose you to carbon monoxide.

Review the instructions provided with the equipment powered by this engine for any safety precautions that should be observed with engine startup, shutdown, or operation.

Control Lever

The control lever operates the engine switch (Types without FLYWHEEL BRAKE), throttle, and choke.

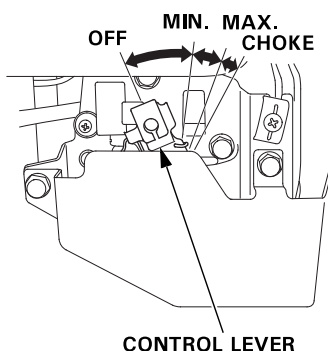
OFF — Stop the engine by switching off the ignition system. (Without FLYWHEEL BRAKE types)
All other control lever positions leave the ignition system switched on.

MIN. — For running the engine at idle speed.

MAX. — For restarting a warm engine, and for running the engine at maximum speed.

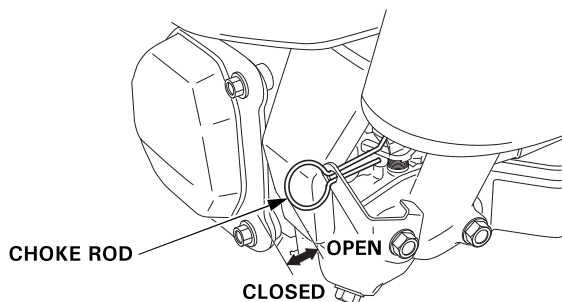
CHOKE — Enriches the fuel mixture for starting a cold engine.

The control lever shown here will be connected to a remote control on the equipment powered by this engine. Refer to the instructions provided by the equipment manufacturer.



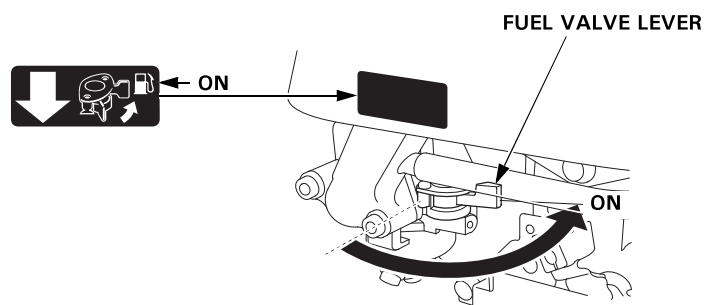
CONTROL LEVER

CHOKE ROD (applicable types)

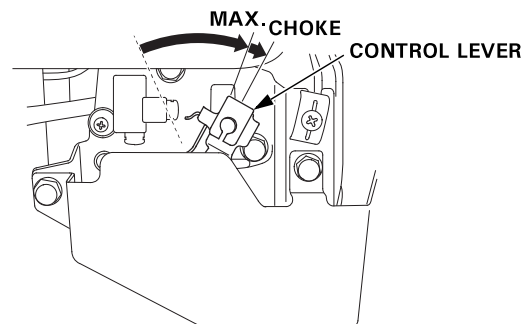


STARTING THE ENGINE

1. Move the fuel valve lever to the ON position.

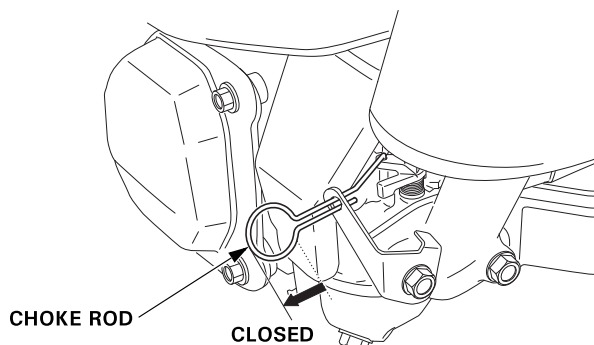


2. To start a cold engine, move the control lever to the CHOKE position.



CHOKE ROD types:

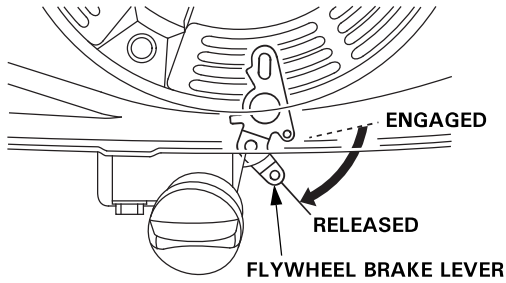
To start a cold engine, move the choke rod to the CLOSED position.



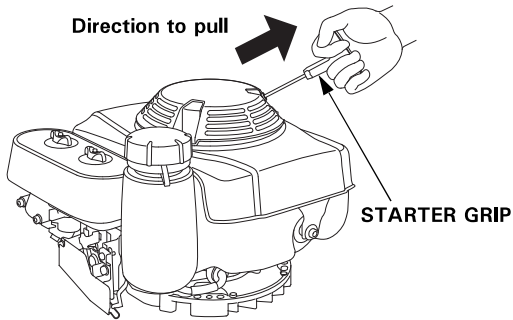
To restart a warm engine, leave the control lever in the MAX. position.

The control lever shown here will be connected to a remote control on the equipment powered by this engine. Refer to the instructions provided by the equipment manufacturer.

3. **FLYWHEEL BRAKE types:**
Move the flywheel brake lever to the RELEASED position. The engine switch, which is linked with the flywheel brake lever, is turned on when the flywheel brake lever is moved to the RELEASED position.



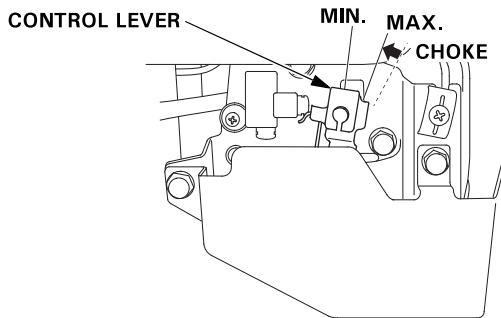
4. Pull the starter grip lightly until you feel resistance, then pull briskly in the direction of the arrow as shown below. Return the starter grip gently.



NOTICE

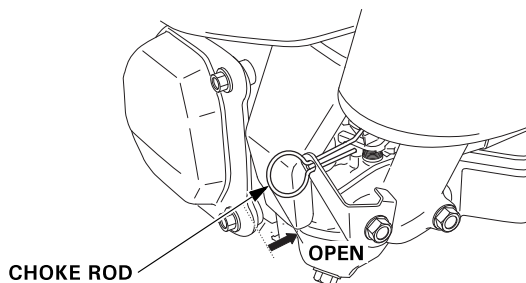
Do not allow the starter grip to snap back against the engine. Return it gently to prevent damage to the starter.

5. If the control lever was moved to the CHOKE position to start the engine, gradually move it to the MAX. or MIN. position as the engine warms up.



CHOKE ROD types:

If the choke rod was moved to the CLOSED position to start the engine, gradually move it to the OPEN position as the engine warms up.

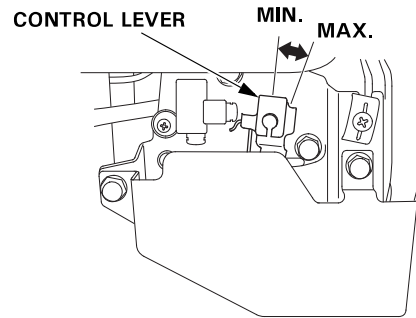


The control lever shown here will be connected to a remote control on the equipment powered by this engine. Refer to the instructions provided by the equipment manufacturer.

6. **FLYWHEEL BRAKE types:** Continue to hold the flywheel brake lever in the RELEASED position. The engine will stop if you move the flywheel brake lever to the ENGAGED position.

SETTING ENGINE SPEED

Position the control lever for the desired engine speed.

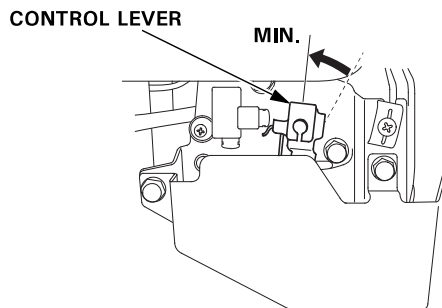


The control lever shown here will be connected to a remote control on the equipment powered by this engine. Refer to the instructions provided by the equipment manufacturer for remote control information and engine speed recommendations.

STOPPING THE ENGINE

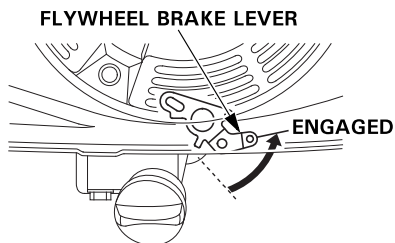
To stop the engine in an emergency, simply turn the control lever to the OFF position. Under normal conditions, use the following procedure. Refer to the instructions provided by the equipment manufacturer.

1. Move the control lever to the MIN. position.

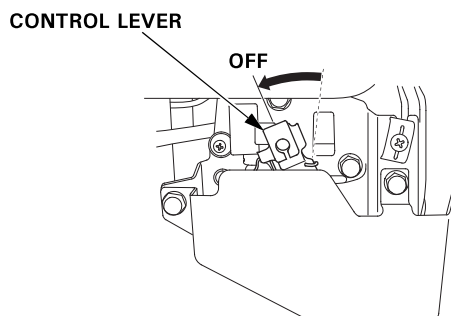


The control lever shown here will be connected to a remote control on the equipment powered by this engine. Refer to the instructions provided by the equipment manufacturer.

2. With FLYWHEEL BRAKE types:
Release the flywheel brake lever to the ENGAGED position.
The engine switch, which is linked with the flywheel brake lever, is turned off when the flywheel brake lever is moved to the ENGAGED position.

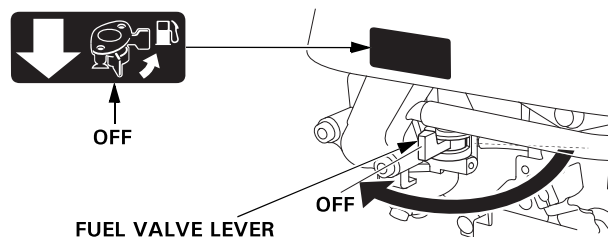


3. Without FLYWHEEL BRAKE types:
Move the control lever to the OFF position.
The engine switch, which is linked with the control lever, is turned off when the control lever is moved to the OFF position.



The control lever shown here will be connected to a remote control on the equipment powered by this engine. Refer to the instructions provided by the equipment manufacturer.

4. Turn the fuel valve lever to the OFF position.



SERVICING YOUR ENGINE

THE IMPORTANCE OF MAINTENANCE

Good maintenance is essential for safe, economical, and trouble-free operation. It will also help reduce pollution.

WARNING

Improper maintenance, or failure to correct a problem before operation, can cause a malfunction in which you can be seriously hurt or killed.

Always follow the inspection and maintenance recommendations and schedules in this owner's manual.

To help you properly care for your engine, the following pages include a maintenance schedule, routine inspection procedures, and simple maintenance procedures using basic hand tools. Other service tasks that are more difficult, or require special tools, are best handled by professionals and are normally performed by a Honda technician or other qualified mechanic.

The maintenance schedule applies to normal operating conditions. If you operate your engine under severe conditions, such as sustained high-load or high-temperature operation, or use in unusually wet or dusty conditions, consult your servicing dealer for recommendations applicable to your individual needs and use.

Maintenance, replacement, or repair of the emission control devices and systems may be performed by any engine repair establishment or individual, using parts that are "certified" to EPA standards.

MAINTENANCE SAFETY

Some of the most important safety precautions follow. However, we cannot warn you of every conceivable hazard that can arise in performing maintenance. Only you can decide whether or not you should perform a given task.

WARNING

Failure to properly follow maintenance instructions and precautions can cause you to be seriously hurt or killed.

Always follow the procedures and precautions in this owner's manual.

SAFETY PRECAUTIONS

- Make sure the engine is off before you begin any maintenance or repairs. To prevent accidental startup, disconnect the spark plug cap. This will eliminate several potential hazards:
 - **Carbon monoxide poisoning from engine exhaust.**
Operate outside, away from open windows or doors.
 - **Burns from hot parts.**
Let the engine and exhaust system cool before touching.
 - **Injury from moving parts.**
Do not run the engine unless instructed to do so.
- Read the instructions before you begin, and make sure you have the tools and skills required.
- To reduce the possibility of fire or explosion, be careful when working around gasoline. Use only a non-flammable solvent, not gasoline, to clean parts. Keep cigarettes, sparks and flames away from all fuel related parts.

Remember that an authorized Honda servicing dealer knows your engine best and is fully equipped to maintain and repair it. To ensure the best quality and reliability, use only new Honda Genuine parts or their equivalents for repair and replacement.

MAINTENANCE SCHEDULE

REGULAR SERVICE PERIOD (3) Perform at every indicated month or operating hour interval, whichever comes first.		Each Use	First Month or 20 Hrs	Every 3 Months or 50 Hrs	Every 6 Months or 100 Hrs	Every Year or 200 Hrs	Refer to Page
ITEM							
Engine oil	Check level	o					8
	Change		o		o		9
Air cleaner	Check	o					9
	Clean			o (1)			9
	Replace					o *	
Flywheel brake pad (applicable types)	Check-adjust		o (2)		o (2)		Shop manual
Spark plug	Check-adjust				o		10
	Replace					o	
Spark arrester (applicable types)	Clean				o (4)		10
Idle speed	Check-adjust					o (2)	Shop manual
Valve clearance	Check-adjust					o (2)	Shop manual
Combustion chamber	Clean	After every 500 Hrs. (2)					Shop manual
Fuel tank & filter	Clean					o (2)	Shop manual
Fuel tube	Check	Every 2 years (Replace if necessary) (2)					Shop manual

* Replace paper element type only.

- (1) Service more frequently when used in dusty areas.
- (2) These items should be serviced by your servicing dealer, unless you have the proper tools and are mechanically proficient. Refer to the Honda shop manual for service procedures.
- (3) For commercial use, log hours of operation to determine proper maintenance intervals.
- (4) In Europe and other countries where the machinery directive 2006/42/EC is enforced, this cleaning should be done by your servicing dealer.

Failure to follow this maintenance schedule could result in non-warrantable failures.

REFUELING

Recommended Fuel

Unleaded gasoline		
U.S.		Pump octane rating 86 or higher
Except U.S.		Research octane rating 91 or higher
		Pump octane rating 86 or higher

This engine is certified to operate on unleaded gasoline with a pump octane rating of 86 or higher (a research octane rating of 91 or higher).

Refuel in a well ventilated area with the engine stopped. If the engine has been running, allow it to cool first. Never refuel the engine inside a building where gasoline fumes may reach flames or sparks.

You may use unleaded gasoline containing no more than 10% ethanol (E10) or 5% methanol by volume. In addition, methanol must contain cosolvents and corrosion inhibitors. Use of fuels with content of ethanol or methanol greater than shown above may cause starting and/or performance problems. It may also damage metal, rubber, and plastic parts of the fuel system. Engine damage or performance problems that result from using a fuel with percentages of ethanol or methanol greater than shown above are not covered under the Warranty.

⚠ WARNING

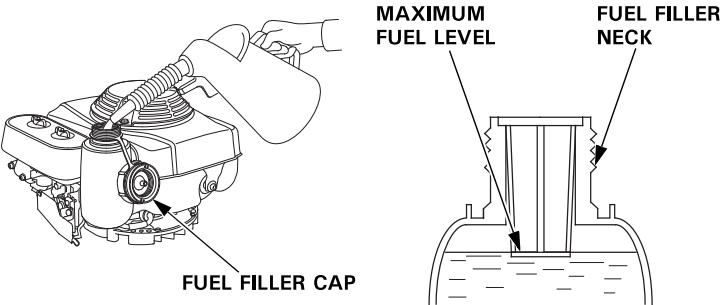
Gasoline is highly flammable and explosive, and you can be burned or seriously injured when refueling.

- Stop the engine and keep heat, sparks, and flame away.
- Refuel only outdoors.
- Wipe up spills immediately.

NOTICE

Fuel can damage paint and some types of plastic. Be careful not to spill fuel when filling your fuel tank. Damage caused by spilled fuel is not covered under the Distributor’s Limited Warranty.

1. With the engine stopped and on a level surface, remove the fuel filler cap and check the fuel level. Refill the tank if the fuel level is low.
2. Add fuel to the bottom of the maximum fuel level limit of the fuel tank. Do not overfill. Wipe up spilled fuel before starting the engine.



Refuel carefully to avoid spilling fuel. Do not fill the fuel tank completely. It may be necessary to lower the fuel level depending on operating conditions. After refueling, screw the fuel filler cap back on until it clicks.

Keep gasoline away from appliance pilot lights, barbecues, electric appliances, power tools, etc.

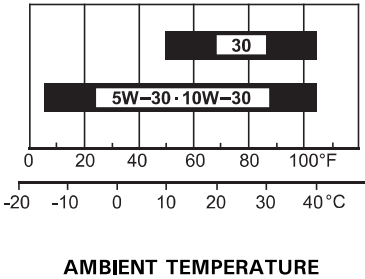
Spilled fuel is not only a fire hazard, it causes environmental damage. Wipe up spills immediately.

ENGINE OIL

Oil is a major factor affecting performance and service life. Use 4-stroke automotive detergent oil.

Recommended Oil

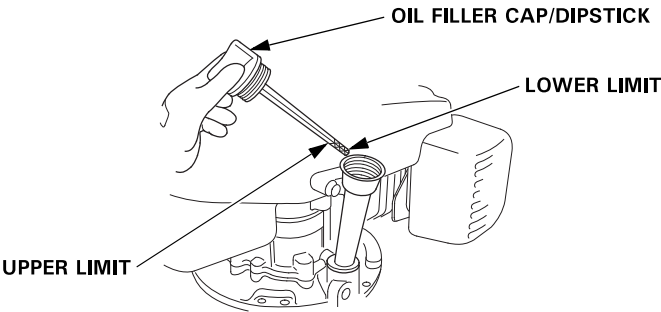
Use 4-stroke motor oil that meets or exceeds the requirements for API service classification SJ or later (or equivalent). Always check the API service label on the oil container to be sure it includes the letters SJ or later (or equivalent).



SAE 10W-30 is recommended for general use. Other viscosities shown in the chart may be used when the average temperature in your area is within the indicated range.

Oil Level Check

- Check the engine oil level with the engine stopped and in a level position.
1. Remove the oil filler cap/dipstick and wipe it clean.
 2. Insert the oil filler cap/dipstick into the oil filler neck as shown, but do not screw it in, then remove it to check the oil level.
 3. If the oil level is near or below the lower limit mark on the dipstick, fill with the recommended oil to the upper limit mark. Do not overfill.
 4. Screw in the filler cap/dipstick securely.



NOTICE

Running the engine with a low oil level can cause engine damage. Engine damage caused by running the engine with a low oil level is not covered under the Distributor’s Limited Warranty.

Oil Change

Drain the used oil when the engine is warm. Warm oil drains quickly and completely.

1. Place a suitable container below the engine to catch the used oil, then remove the oil filler cap/dipstick, oil drain plug and sealing washer.
2. Allow the used oil to drain completely, then reinstall the oil drain plug and a new sealing washer, and tighten the oil drain plug securely.

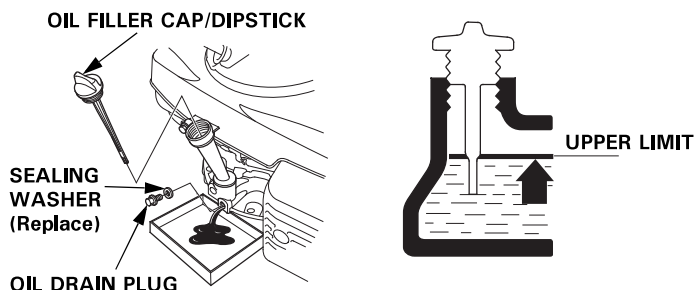
Please dispose of used motor oil in a manner that is compatible with the environment. We suggest you take used oil in a sealed container to your local recycling center or service station for reclamation. Do not throw it in the trash, pour it on the ground, or pour it down a drain.

3. With the engine in a level position, fill to the upper limit mark on the dipstick with the recommended oil (see page 8).

NOTICE

Running the engine with a low oil level can cause engine damage. Engine damage caused by running the engine with a low oil level is not covered under the Distributor's Limited Warranty.

4. Screw in the oil filler cap/dipstick securely.



AIR CLEANER

A dirty air cleaner will restrict air flow to the carburetor, reducing engine performance. If you operate the engine in very dusty areas, clean the air filter more often than specified in the MAINTENANCE SCHEDULE.

NOTICE

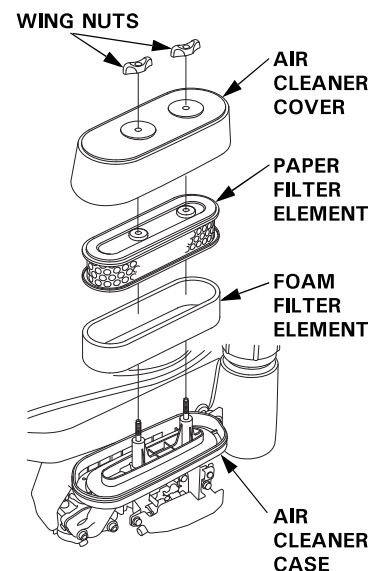
Operating the engine without an air filter, or with a damaged air filter, will allow dirt to enter the engine, causing rapid engine wear. This type of damage is not covered by the Distributor's Limited Warranty.

Inspection

Remove the air cleaner cover and inspect the filter elements. Clean or replace dirty filter elements. Always replace damaged filter elements.

Cleaning

1. Remove the wing nuts from the air cleaner cover, and remove the cover.
2. Remove the air filter elements.
3. Remove the foam air filter element from the paper air filter element.
4. Inspect both air filter elements, and replace them if they are damaged. Always replace the paper air filter element at the scheduled interval (see page 7).
5. Clean the air filter elements if they are to be reused.



Paper air filter element: Tap the filter element several times on a hard surface to remove dirt, or blow compressed air [not exceeding 207 kPa (2.1 kgf/cm², 30 psi)] through the filter element from the inside. Never try to brush off dirt; brushing will force dirt into the fibers.

Foam air filter element: Clean in warm soapy water, rinse, and allow to dry thoroughly. Or clean in non-flammable solvent and allow to dry. Dip the filter element in clean engine oil, then squeeze out all excess oil. The engine will smoke when started if too much oil is left in the foam.

6. Wipe dirt from the inside of the air cleaner case and cover using a moist rag. Be careful to prevent dirt from entering the air duct that leads to the carburetor.
7. Place the foam air filter element over the paper element, and reinstall the assembled air filter.
8. Install the air cleaner cover, and tighten the wing nuts securely.

SPARK PLUG

Recommended Spark Plugs: BPR5ES (NGK)
W16EPR-U (DENSO)

The recommended spark plug has the correct heat range for normal engine operating temperatures.

NOTICE

An incorrect spark plug can cause engine damage.

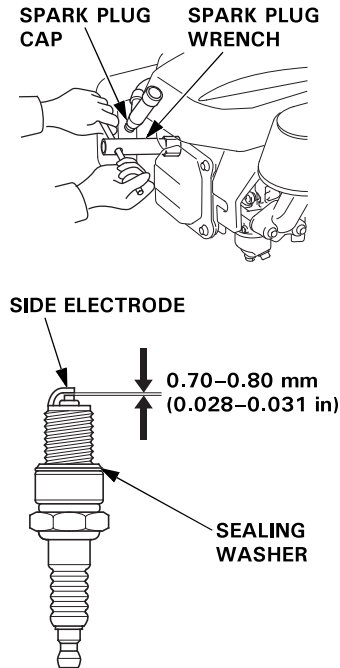
For good performance, the spark plug must be properly gapped and free of deposits.

1. Disconnect the spark plug cap, and remove any dirt from around the spark plug area.
2. Remove the spark plug with a 13/16-inch spark plug wrench.
3. Inspect the spark plug. Replace it if damaged or badly fouled, if the sealing washer is in poor condition, or if the electrode is worn.
4. Measure the spark plug electrode gap with a wire-type feeler gauge. Correct the gap, if necessary, by carefully bending the side electrode. The gap should be: 0.70–0.80 mm (0.028–0.031 in)
5. Install the spark plug carefully, by hand, to avoid cross-threading.
6. After the spark plug is seated, tighten with a 13/16-inch spark plug wrench to compress the sealing washer.
7. When installing a new spark plug, tighten 1/2 turn after the spark plug seats to compress the washer.
8. When reinstalling the original spark plug, tighten 1/8–1/4 turn after the spark plug seats to compress the washer.

NOTICE

A loose spark plug can overheat and damage the engine. Overtightening the spark plug can damage the threads in the cylinder head.

9. Attach the spark plug cap to the spark plug.



SPARK ARRESTER (applicable types)

In Europe and other countries where the machinery directive 2006/42/EC is enforced, this cleaning should be done by your servicing dealer.

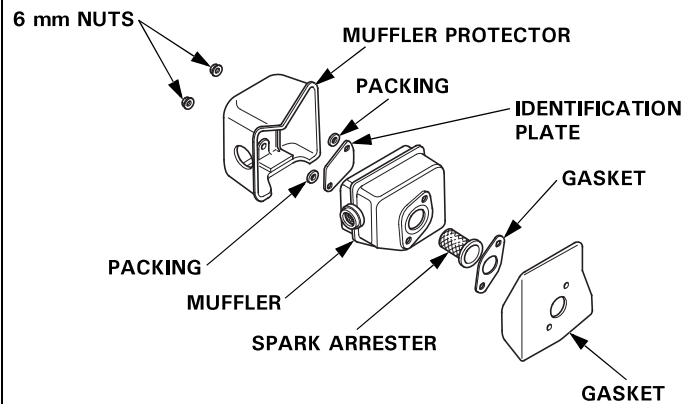
The spark arrester may be standard or an optional part, depending on the engine type. In some areas, it is illegal to operate an engine without a spark arrester. Check local laws and regulations. A spark arrester is available from authorized Honda servicing dealers.

The spark arrester must be serviced every 100 hours to keep it functioning as designed.

If the engine has been running, the muffler will be hot. Allow it to cool before servicing the spark arrester.

Spark Arrester Removal

1. Loosen the two 6 mm nuts and remove the muffler protector, identification plate, muffler and gasket.
2. Remove the spark arrester from the muffler (take care not to damage the wire mesh).



Spark Arrester Cleaning & Inspection

1. Check for carbon deposits around the exhaust port and spark arrester, and clean if necessary.
2. Use a brush to remove carbon deposits from the spark arrester screen. Be careful not to damage the screen. Replace the spark arrester if it has breaks or holes.



3. Install the gasket, spark arrester, muffler, identification plate, packings and muffler protector in the reverse order of disassembly.

HELPFUL TIPS & SUGGESTIONS

STORING YOUR ENGINE

Storage Preparation

Proper storage preparation is essential for keeping your engine trouble-free and looking good. The following steps will help to keep rust and corrosion from impairing your engine's function and appearance, and will make the engine easier to start when you use it again.

Cleaning

If the engine has been running, allow it to cool for at least half an hour before cleaning. Clean all exterior surfaces, touch up any damaged paint, and coat other areas that may rust with a light film of oil.

NOTICE

Using a garden hose or pressure washing equipment can force water into the air cleaner or muffler opening. Water in the air cleaner will soak the air filter, and water that passes through the air filter or muffler can enter the cylinder, causing damage.

Fuel

Gasoline will oxidize and deteriorate in storage. Deteriorated gasoline will cause hard starting, and it leaves gum deposits that clog the fuel system. If the gasoline in your engine deteriorates during storage, you may need to have the carburetor and other fuel system components serviced or replaced.

The length of time that gasoline can be left in your fuel tank and carburetor without causing functional problems will vary with such factors as gasoline blend, your storage temperatures, and whether the fuel tank is partially or completely filled. The air in a partially filled fuel tank promotes fuel deterioration. Very warm storage temperatures accelerate fuel deterioration. Fuel deterioration problems may occur within a few months, or even less if the gasoline was not fresh when you filled the fuel tank.

Fuel system damage or engine performance problems resulting from neglected storage preparation are not covered under the *Distributor's Limited Warranty*.

You can extend fuel storage life by adding a gasoline stabilizer that is formulated for that purpose, or you can avoid fuel deterioration problems by draining the fuel tank and carburetor.

Adding a Gasoline Stabilizer to Extend Fuel Storage Life

When adding a gasoline stabilizer, fill the fuel tank with fresh gasoline. If only partially filled, air in the tank will promote fuel deterioration during storage. If you keep a container of gasoline for refueling, be sure that it contains only fresh gasoline.

1. Add gasoline stabilizer following the manufacturer's instructions.
2. After adding a gasoline stabilizer, run the engine outdoors for 10 minutes to be sure that treated gasoline has replaced the untreated gasoline in the carburetor.
3. Stop the engine.

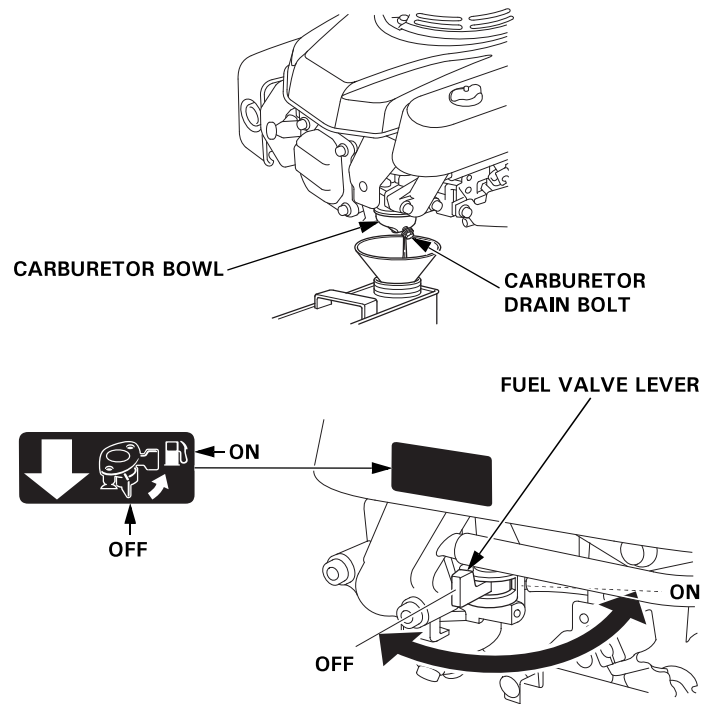
Draining the Fuel Tank and Carburetor

⚠ WARNING

Gasoline is highly flammable and explosive, and you can be burned or seriously injured when handling fuel.

- Stop the engine and keep heat, sparks, and flame away.
- Handle fuel only outdoors.
- Wipe up spills immediately.

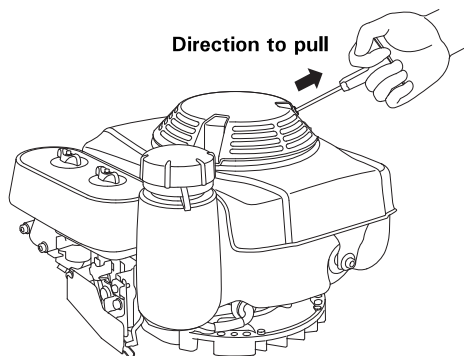
1. Place an approved gasoline container below the carburetor, and use a funnel to avoid spilling fuel.
2. Loosen the carburetor drain bolt, and drain the carburetor bowl fuel into an approved gasoline container.
3. Move the fuel valve lever to the ON position. This will allow the fuel tank to drain through the carburetor bowl.



4. After draining the carburetor bowl and fuel tank, move the fuel valve lever to the OFF position.
5. Tighten the carburetor drain bolt securely.

Engine Oil

1. Change the engine oil (see page 9).
2. Remove the spark plug (see page 10).
3. Pour a teaspoon 5–10 cm³ (5–10 cc) of clean engine oil into the cylinder.
4. Pull the starter rope several times to distribute the oil in the cylinder.
5. Reinstall the spark plug.
6. Pull the starter grip slowly to the direction of the arrow as show below until resistance is felt. This will close the valves so moisture cannot enter the engine cylinder. Return the starter rope gently.



Storage Precautions

If your engine will be stored with gasoline in the fuel tank and carburetor, it is important to reduce the hazard of gasoline vapor ignition. Select a well ventilated storage area away from any appliance that operates with a flame, such as a furnace, water heater, or clothes dryer. Also avoid any area with a spark-producing electric motor, or where power tools are operated.

If possible, avoid storage areas with high humidity, because that promotes rust and corrosion.

Unless all fuel has been drained from the fuel tank, turn the fuel valve lever to the OFF position to reduce the possibility of fuel leakage.

Keep the engine level in storage. Tilting can cause fuel or oil leakage.

With the engine and exhaust system cool, cover the engine to keep out dust. A hot engine and exhaust system can ignite or melt some materials. Do not use sheet plastic as a dust cover.

A nonporous cover will trap moisture around the engine, promoting rust and corrosion.

Removal from Storage

Check your engine as described in the *BEFORE OPERATION CHECKS* section of this manual (see page 3).

If the fuel was drained during storage preparation, fill the tank with fresh gasoline. If you keep a container of gasoline for refueling, be sure it contains only fresh gasoline. Gasoline oxidizes and deteriorates over time, causing hard starting.

If the cylinder was coated with oil during storage preparation, the engine will smoke briefly at startup. This is normal.

TRANSPORTING

If the engine has been running, allow it to cool for at least 15 minutes before loading the engine-powered equipment on the transport vehicle. A hot engine and exhaust system can burn you and can ignite some materials.

Keep the engine level when transporting to reduce the possibility of fuel leakage. Turn the fuel valve to the OFF position (see page 6).

TAKING CARE OF UNEXPECTED PROBLEMS

ENGINE WILL NOT START

Possible Cause	Correction
Fuel valve OFF.	Move lever to ON position.
Choke OPEN.	Move the control lever to CHOKE position unless the engine is warm.
Engine switch OFF.	Move the control lever to MAX. position. (Flywheel brake types: flywheel brake lever to RELEASED position.)
Out of fuel.	Refuel (p. 8).
Bad fuel; engine stored without treating or draining gasoline, or refueled with bad gasoline.	Drain fuel tank and carburetor (p. 11). Refuel with fresh gasoline (p. 8).
Spark plug faulty, fouled, or improperly gapped.	Gap or replace spark plug (p. 10).
Spark plug wet with fuel (flooded engine).	Dry and reinstall spark plug. Start engine with control lever in MAX. position. (Flywheel brake types: flywheel brake lever to RELEASED position.)
Fuel filter restricted, carburetor malfunction, ignition malfunction, valves stuck, etc.	Take engine to your servicing dealer, or refer to shop manual.

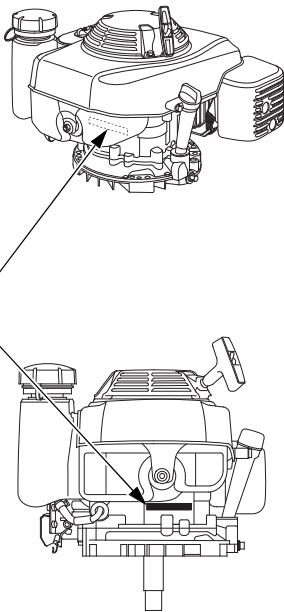
ENGINE LACKS POWER

Possible Cause	Correction
Filter element(s) restricted.	Clean or replace filter element(s) (p. 9).
Bad fuel; engine stored without treating or draining gasoline, or refueled with bad gasoline.	Drain fuel tank and carburetor (p. 11). Refuel with fresh gasoline (p. 8).
Fuel filter restricted, carburetor malfunction, ignition malfunction, valves stuck, etc.	Take engine to your servicing dealer, or refer to shop manual.

TECHNICAL INFORMATION

Serial Number Location
Record the engine serial number, type and purchase date in the spaces below. You will need this information when ordering parts and when making technical or warranty inquiries.

ENGINE SERIAL NUMBER &
ENGINE TYPE LOCATION



Engine serial number: _____ - _____

Engine type: _____

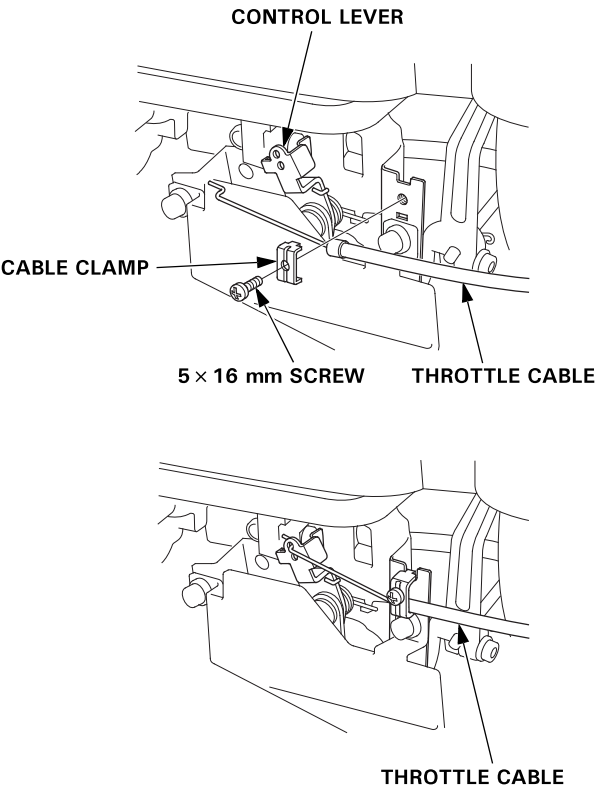
Date Purchased: ____ / ____ / ____

Remote Control Linkage

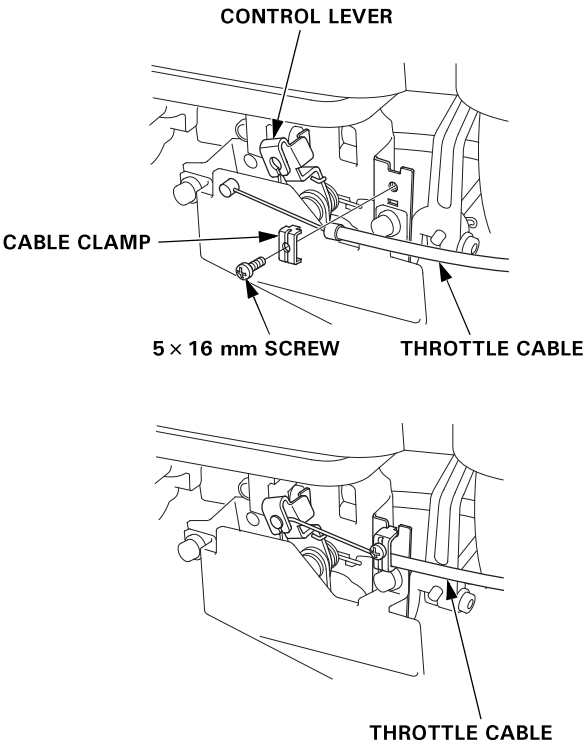
The control is provided with a hole for cable attachment. Install a solid wire cable or wire cable as shown below. Do not use braided wire cable.

REMOTE THROTTLE LINKAGE

SOLID WIRE CABLE types:



WIRE CABLE types:



Carburetor Modifications for High Altitude Operation

At high altitude, the standard carburetor air-fuel mixture will be too rich. Performance will decrease, and fuel consumption will increase. A very rich mixture will also foul the spark plug and cause hard starting. Operation at an altitude that differs from that at which this engine was certified, for extended periods of time, may increase emissions.

High altitude performance can be improved by specific modifications to the carburetor. If you always operate your engine at altitudes above 1,500 meters (5,000 feet), have your servicing dealer perform this carburetor modification. This engine, when operated at high altitude with the carburetor modifications for high altitude use, will meet each emission standard throughout its useful life.

Even with carburetor modification, engine horsepower will decrease about 3.5% for each 300 meter (1,000 foot) increase in altitude. The effect of altitude on horsepower will be greater than this if no carburetor modification is made.

NOTICE

When the carburetor has been modified for high altitude operation, the air-fuel mixture will be too lean for low altitude use. Operation at altitudes below 1,500 meters (5,000 feet) with a modified carburetor may cause the engine to overheat and result in serious engine damage. For use at low altitudes, have your servicing dealer return the carburetor to original factory specifications.

Emission Control System Information

Source of Emissions

The combustion process produces carbon monoxide, oxides of nitrogen, and hydrocarbons. Control of hydrocarbons and oxides of nitrogen is very important because, under certain conditions, they react to form photochemical smog when subjected to sunlight. Carbon monoxide does not react in the same way, but it is toxic.

Honda utilizes lean carburetor settings and other systems to reduce the emissions of carbon monoxide, oxides of nitrogen, and hydrocarbons.

The U.S., California Clean Air Act, and Environment Canada

EPA, California, and Canadian regulations require all manufacturers to furnish written instructions describing the operation and maintenance of emission control systems.

The following instructions and procedures must be followed in order to keep the emissions from your Honda engine within the emission standards.

Tampering and Altering

Tampering with or altering the emission control system may increase emissions beyond the legal limit. Among those acts that constitute tampering are:

- Removal or alteration of any part of the intake, fuel, or exhaust systems.
- Altering or defeating the governor linkage or speed-adjusting mechanism to cause the engine to operate outside its design parameters.

Problems That May Affect Emissions

If you are aware of any of the following symptoms, have your engine inspected and repaired by your servicing dealer.

- Hard starting or stalling after starting.
- Rough idle.
- Misfiring or backfiring under load.
- Afterburning (backfiring).
- Black exhaust smoke or high fuel consumption.

Replacement Parts

The emission control systems on your Honda engine were designed, built, and certified to conform with EPA, California and Canadian emission regulations. We recommend the use of genuine Honda parts whenever you have maintenance done.

These original-design replacement parts are manufactured to the same standards as the original parts, so you can be confident of their performance. The use of replacement parts that are not of the original design and quality may impair the effectiveness of your emission control system.

A manufacturer of an aftermarket part assumes the responsibility that the part will not adversely affect emission performance. The manufacturer or rebuilder of the part must certify that use of the part will not result in a failure of the engine to comply with emission regulations.

Maintenance

Follow the maintenance schedule on page 7. Remember that this schedule is based on the assumption that your machine will be used for its designed purpose. Sustained high-load or high-temperature operation, or use in unusually wet or dusty conditions, will require more frequent service.

Air Index

An Air Index Information hang tag/label is applied to engines certified to an emission durability time period in accordance with the requirements of the California Air Resources Board.

The bar graph is intended to provide you, our customer, the ability to compare the emissions performance of available engines. The lower the Air Index, the less pollution.

The durability description is intended to provide you with information relating to the engine’s emission durability period. The descriptive term indicates the useful life period for the engine’s emission control system. See your *Emission Control System Warranty* for additional information.

Descriptive Term	Applicable to Emissions Durability Period
Moderate	50 hours (0–80 cc, inclusive) 125 hours (greater than 80 cc)
Intermediate	125 hours (0–80 cc, inclusive) 250 hours (greater than 80 cc)
Extended	300 hours (0–80 cc, inclusive) 500 hours (greater than 80 cc) 1,000 hours (225 cc and greater)

The Air Index Information hang tag/label must remain on the engine until it is sold. Remove the hang tag before operating the engine.

Specifications

GXV160 (PTO shaft type N1)

Length × Width × Height	418 × 365 × 357 mm (16.5 × 14.4 × 14.1 in)
Dry mass [weight]	15.1 kg (33.3 lbs)
Engine type	4-stroke, overhead valve, single cylinder
Displacement [Bore × Stroke]	163 cm ³ (9.9 cu-in) [68.0 × 45.0 mm (2.68 × 1.77 in)]
Net power (in accordance with SAE J1349*)	3.2 kW (4.4 PS, 4.3 bhp) at 3,600 rpm
Max. Net torque (in accordance with SAE J1349*)	9.6 N·m (0.98 kgf·m, 7.1 lbf·ft) at 2,500 rpm
Engine oil capacity	0.65 L (0.69 US qt, 0.57 Imp qt)
Fuel tank capacity	1.4 L (0.37 US gal, 0.31 Imp gal)
Cooling system	Forced air
Ignition system	Transistor magneto
PTO shaft rotation	Counterclockwise

* The power rating of the engine indicated in this document is the net power output tested on a production engine for the engine model and measured in accordance with SAE J1349 at 3,600 rpm (Net Power) and at 2,500 rpm (Max. Net Torque). Mass production engines may vary from this value. Actual power output for the engine installed in the final machine will vary depending on numerous factors, including the operating speed of the engine in application, environmental conditions, maintenance, and other variables.

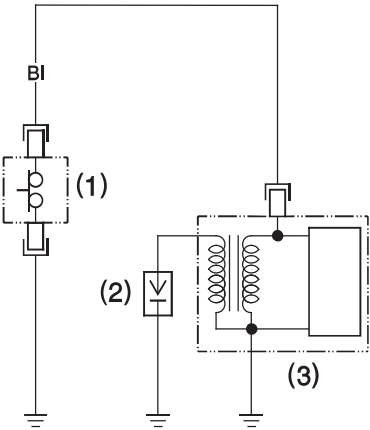
Tuneup Specifications

ITEM	SPECIFICATION	MAINTENANCE
Spark plug gap	0.70–0.80 mm (0.028–0.031 in)	Refer to page: 10
Idle speed	1,700 ± 150 rpm	Refer to shop manual
Valve clearance (cold)	IN: 0.15 ± 0.02 mm EX: 0.20 ± 0.02 mm	See your authorized Honda dealer
Other specifications	No other adjustments needed.	

Quick Reference Information

Fuel	Unleaded gasoline (Refer to page 8)	
	U.S.	Pump octane rating 86 or higher
	Except U.S.	Research octane rating 91 or higher
Engine oil	SAE 10W-30, API SJ or later, for general use. Refer to page 8.	
Spark plug	BPR5ES (NGK) W16EPR-U (DENSO)	
Maintenance	Before each use: • Check engine oil level. Refer to page 8. • Check air filter. Refer to page 9.	
	First 20 hours: Change engine oil. Refer to page 9.	
	Subsequent: Refer to the maintenance schedule on page 7.	

Wiring Diagrams



- (1) ENGINE STOP SWITCH
- (2) SPARK PLUG
- (3) IGNITION COIL

BI	Black
----	-------

CONSUMER INFORMATION

Distributor/Dealer Locator Information

United States, Puerto Rico, and U.S. Virgin Islands:

Visit our website: www.honda-engines.com

Canada:

Call (888) 9HONDA9

or visit our website: www.honda.ca

For European Area:

Visit our website: <http://www.honda-engines-eu.com>

Customer Service Information

Servicing dealership personnel are trained professionals. They should be able to answer any question you may have. If you encounter a problem that your dealer does not solve to your satisfaction, please discuss it with the dealership's management. The Service Manager, General Manager, or Owner can help. Almost all problems are solved in this way.

United States, Puerto Rico, and U.S. Virgin Islands:

If you are dissatisfied with the decision made by the dealership's management, contact the Honda Regional Engine Distributor for your area.

If you are still dissatisfied after speaking with the Regional Engine Distributor, you may contact the Honda Office as shown.

All Other Areas:

If you are dissatisfied with the decision made by the dealership's management, contact the Honda Office as shown.

«Honda's Office»

When you write or call, please provide this information:

- Equipment manufacturer's name and model number that the engine is mounted on
- Engine model, serial number, and type (see page 14)
- Name of dealer who sold the engine to you
- Name, address, and contact person of the dealer who services your engine
- Date of purchase
- Your name, address and telephone number
- A detailed description of the problem

United States, Puerto Rico, and U.S. Virgin Islands:

American Honda Motor Co., Inc.

Power Equipment Division

Customer Relations Office

4900 Marconi Drive

Alpharetta, GA 30005-8847

Or telephone: (770) 497-6400, 8:30 am - 7:00 pm ET

Canada:

Honda Canada, Inc.

180 Honda Blvd.

Markham, ON L6C 0H9

Telephone: (888) 9HONDA9 Toll free
(888) 946-6329

(416) 299-3400

Facsimile: (877) 939-0909 Toll free

Australia:

Honda Australia Motorcycle and Power Equipment Pty. Ltd.

1954-1956 Hume Highway

Campbellfield Victoria 3061

Telephone: (03) 9270 1111

Facsimile: (03) 9270 1133

For European Area:

Honda Motor Europe Logistics NV.

European Engine Center

<http://www.honda-engines-eu.com>

All Other Areas:

Please contact the Honda distributor in your area for assistance.

HONDA
The Power of Dreams

Contact Us

For Technical Documentation:

Log in to the client portal at hydra-slide.com
using the password **HYD123**

For Technical Support & Troubleshooting:

Call us at **+1 (519) 900-1450** and select **option 2**
or
email Robert Young - robert@hydra-slide.com

For Sales Inquiries & Customer Support:

Call us at **+1 (519) 900-1450** and select **option 1**
or
email info@hydra-slide.com