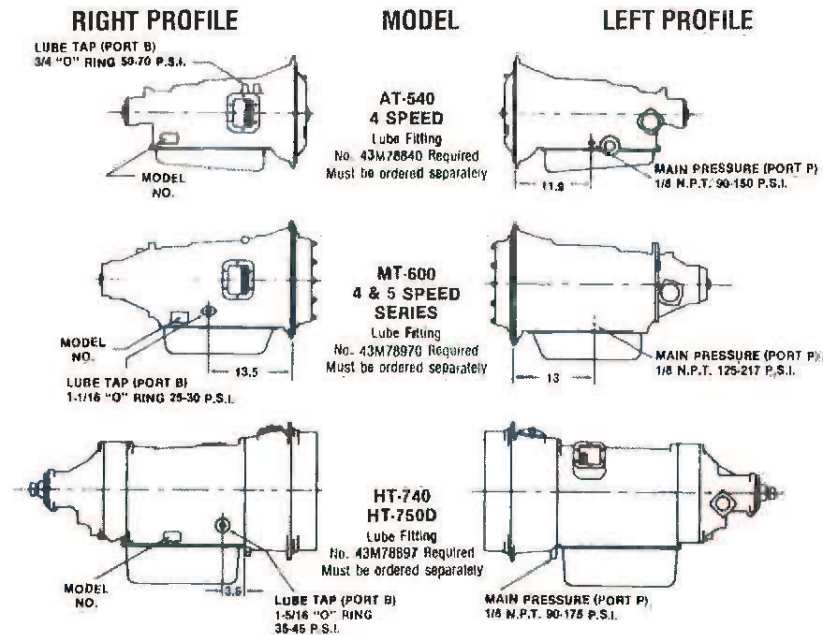
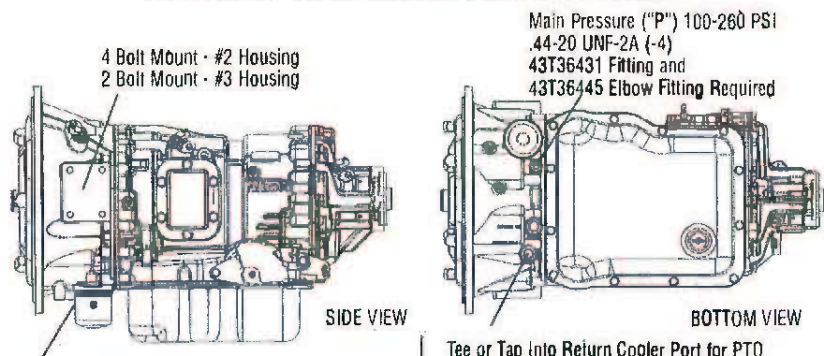


## AUTOMATIC TRANSMISSION DIAGRAMS APPLICATION INFORMATION

### ALLISON TRANSMISSION



### ALLISON AUTOMATIC TRANSMISSION 1000 SERIES™, 2000 SERIES™, AND 2400 SERIES™



Locate Main Pressure Tap on  
Bottom of Transmission Converter

GM (Only) Applications:

Use Lube Tap Kit 43TK4497 on C3500 - C5500 Chassis  
Use Lube Tap Kit 43TK4503 on C6500 - C8500 Chassis

On GM3600 Cab Chassis, the cooling lines enter the  
side of the transmission case, use 43TK4497 for  
lubrication line installation.

Tee or Tap into Return Cooler Port for PTO  
Pressure Lubrication (Where Required)

(SAE-8) 1000 Series (#3 Housing) use 43M78840  
Tee Fitting

(SAE-12) 1000 or 2000 Series (#2 Housing) use  
43M78970 Tee Fitting

Chassis Info: International, Hino, Mitsubishi -  
Remove factory elbow in lubrication return port  
and drill and tap 1/8" NPT port. Thoroughly clean  
and reinstall chassis lines.

## ALLISON AUTOMATIC TRANSMISSION 1000 SERIES™ OR 2000 SERIES™

When using the Allison transmission for stationary operation it is beneficial to engage the torque converter lock-up. This allows for a direct comparison of the output shaft speed to engine speed, without the affects of the torque converter.

Muncie requires an electrical connection to the vehicle TCM terminal J106 (WTEC II) or Pin 43 (Gen IV) reference Allison documentation for PTO enable. This notifies the transmission that a PTO is active and will allow for increased transmission activation pressures and transmission torque converter lock-up.

The Allison automatic transmission special wiring instructions depend on the chassis. Please refer to body builder's manuals and special instructions listed there for connection of Muncie PTOs. It is required that clutch shifted PTOs mounted to the Allison 1000 series or 2000 series be wired to the Allison transmission control. The "PTO enable" circuitry provided by Allison allows for full PTO output specifications. This means that the PTO enable circuit must be located and connected.

On GM Medium Duty vehicles C/K4500 thru C8500, this accomplished by connecting to the GM PTO control harness. Request documentation for the Muncie wiring harness kits 34TK4504 used for clutch shift PTOs or 34TK4505 used for the TG series PTO.

On Light Duty vehicle C/K3600 request installation kit 48TK4461. Pickup chassis C/K2500 - C/K3500 may not have proper electrical connections, contact GM upfitter's group for assistance.

International Truck and Engine Corp. has a specific PTO control which makes the appropriate connection when the correct activation option is ordered with the vehicle. PTO options are specified through the truck chassis dealer.

### CS6B, GA6B Series

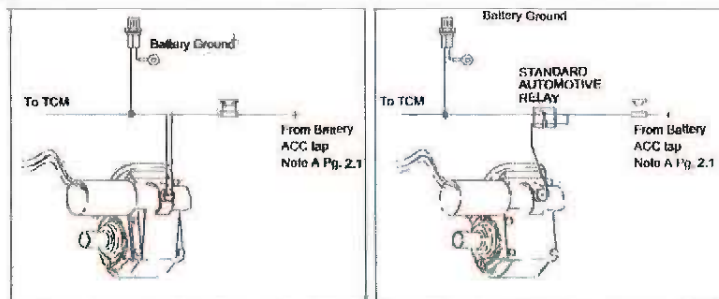
Depending on the Chassis used connection to the PTO enable terminal can be accomplished by attaching a wire to the switched power from the PTO rocker switch and connecting it to the J106 terminal (WTEC II) or Pin 43 (Gen IV). GM chassis wiring harnesses are available for connection to this circuit requires GM "PTO" option to be installed.

### GM6B Series

Installation of this PTO is described in IN 01-03 and is not contain in this document. This PTO is made for the GM 3600 chassis and comes with wiring which already controls the J106 (WTEC II) or Pin 43 (Gen IV) circuit.

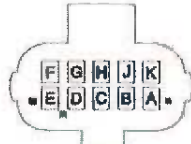
### TG Series

Cable, lever, and air shifted PTOs can be install with either a two terminal switch or the use of a standard automotive relay as shown on the diagrams. Diagram 1 or Diagram 2



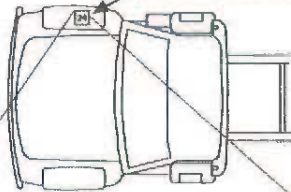
## GM THROTTLE ADVANCE C4500 SERIES™ THRU C8500 SERIES™

### PTO Upfitter Connector

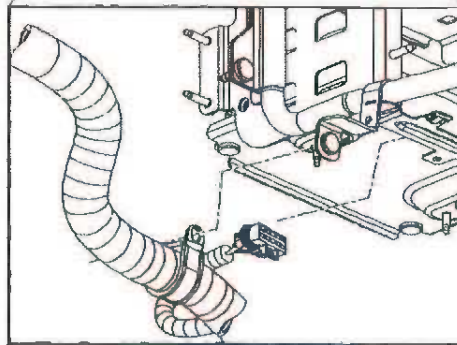


7.2L DIESEL (CAT 3126) VARIES FROM THIS DIAGRAM. BLUE MINICEL CONNECTOR IS CORRECT FOR ALL APPLICATIONS

Upfitter PTO Connector Location #24



Top View of Truck Cab



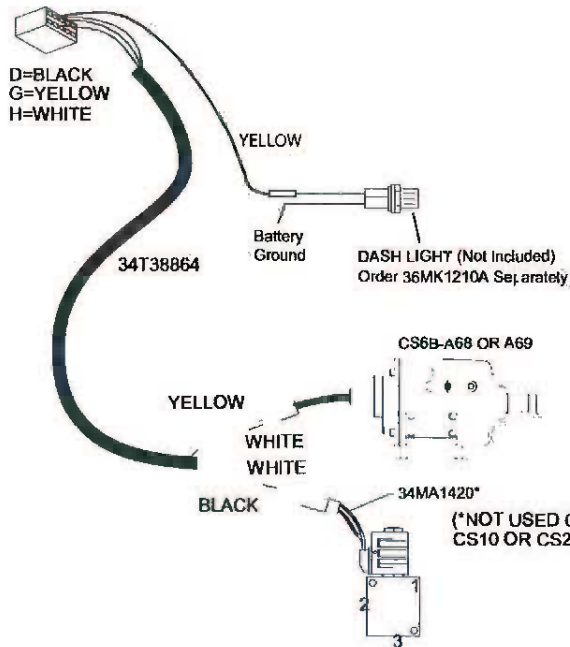
### Upfitter Wire Chart

PIN	WIRE	
	Ckt #	Color
A	N/C	—
B	494	BLU LT
C	498	GRN LT
D	250	BLK
E	2663	PPL
F	498	GRN LT
G	2522	YEL
H	2581	WHT
J	N/C	—
K	2664	TAN



Dash Switch

## 34TK4504 INSTALLATION INSTRUCTIONS FOR CLUTCHSHIFT PTO ONLY



### Note: ALLISON CONNECTOR

TRANSMISSION CONNECTOR LOCATED IN SAME AREA AS PTO CONNECTOR. NOT USED.

PIN	WIRE COLOR
A	PURPLE
B	YELLOW
C	YELLOW
D	—
E	—
F	TAN
G	—
H	BLACK
J	BLACK
K	LIGHT BLUE

Follow PTO shifting instructions listed in the PTO Owner's manual for engagement of CS Series PTOs.

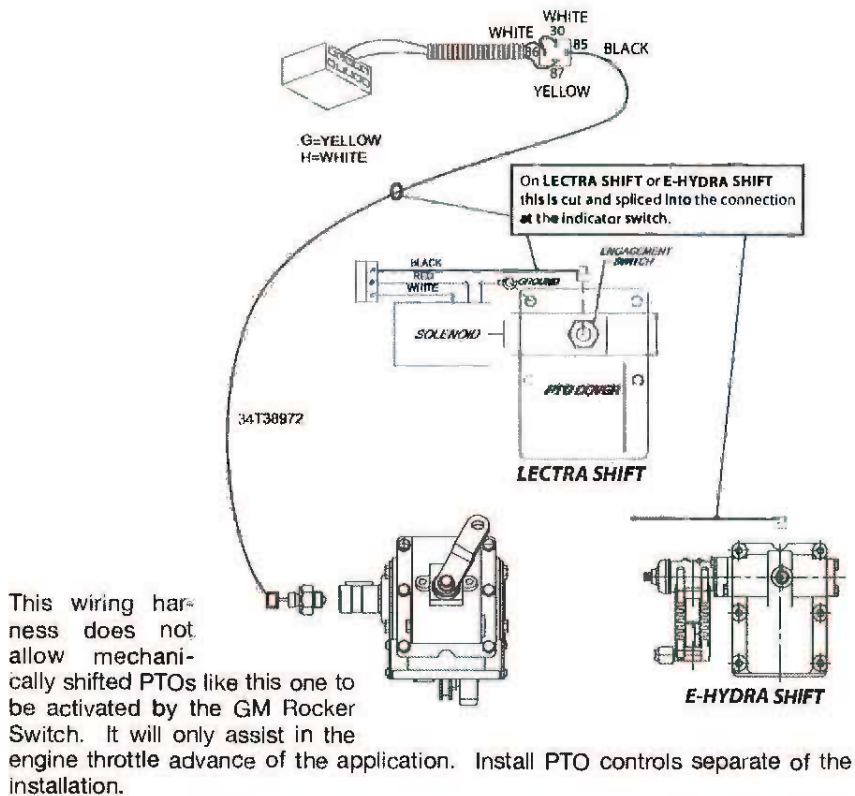
For stationary operation with vehicle stopped and transmission gear selection in park, cruise turned "on", foot off accelerator, turn on PTO dash switch.

For "Preset" type throttle control, push Cruise Control set button to increase throttle to the preset speed programmed into the controller. This is 1200 rpm by default.

Advance only works when Cruise Control is on.

More information is available in the General Motors Body Builders manuals available from GM or on their website at [www.gmupfitter.com](http://www.gmupfitter.com)

### 34TK4505 INSTALLATION INSTRUCTIONS FOR TG SERIES PTO ONLY



Follow PTO shifting instructions listed in this PTO owner's manual for engagement of manual shift-type PTOs.

Engage PTO first.

For stationary operation, throttle advance with vehicle stopped and transmission gear selection in Park, parking brake set, foot off accelerator, and turn on PTO Dash Switch.

For "Preset" type throttle control, push Cruise Control set button to increase throttle to the preset speed programmed into the controller. This is 1200rpm by default.

Advance only works when Cruise Control is on.

More information is available in the General Motors Body Builders manuals available from GM or on their website at [www.gmupfitter.com](http://www.gmupfitter.com).

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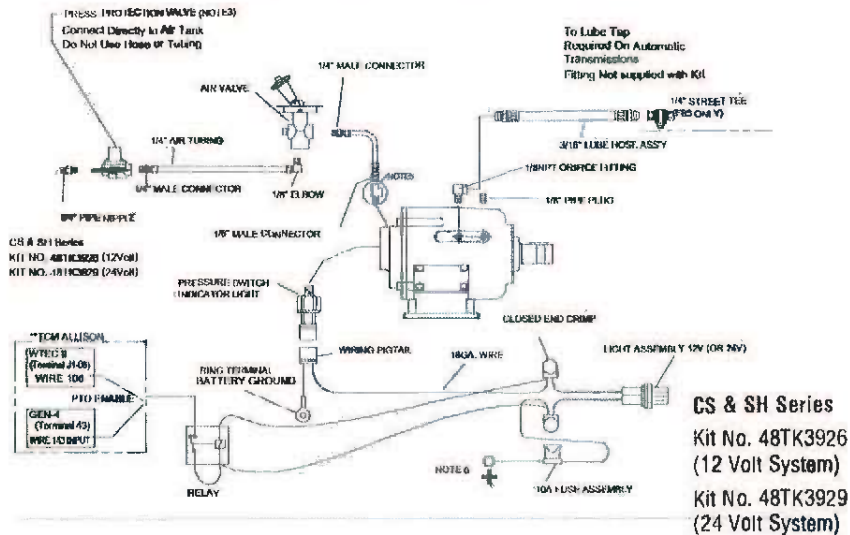
### **MERCEDES AGS (AUTOMATED TRANSMISSION)**

**WARNING: PTOS MOUNTED TO THE MERCEDES AGS TYPE TRANSMISSION WILL NOT FUNCTION UNLESS VEHICLE IS PROPERLY SPECIFIED.**

**THE MERCEDES AGS SERIES TRANSMISSION REQUIRES THE PTO TO BE INSTALLED THROUGH THE PROVIDED PTO ACTIVATION, AIR SOLENOID CONTROL. THE PTO MUST BE AIR SHIFT OPTION WHETHER IT IS A MECHANICAL TYPE (TG, SH, RS4S SERIES) OR CLUTCH SHIFT (CS6 SERIES) TYPE. THE VEHICLE NEEDS TO BE SPECIFIED FOR PTO USE FROM TIME OF ORDER. CONTACT DEALER FOR PTO CONNECTION LOCATIONS.**

## CLUTCH SHIFT & SH STANDARD AIR SHIFT SYSTEM

For Use When Air Shifting CLUTCH SHIFT or SH Series PTOs



## SYSTEM PROTECTION DEVICE

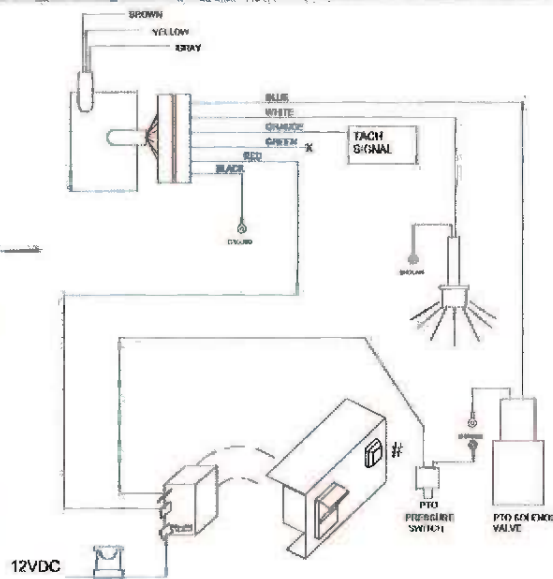
(CS Series Only)

SPD-1000A shown is sold  
separately.

Refer to IN07-04 when making  
this installation.

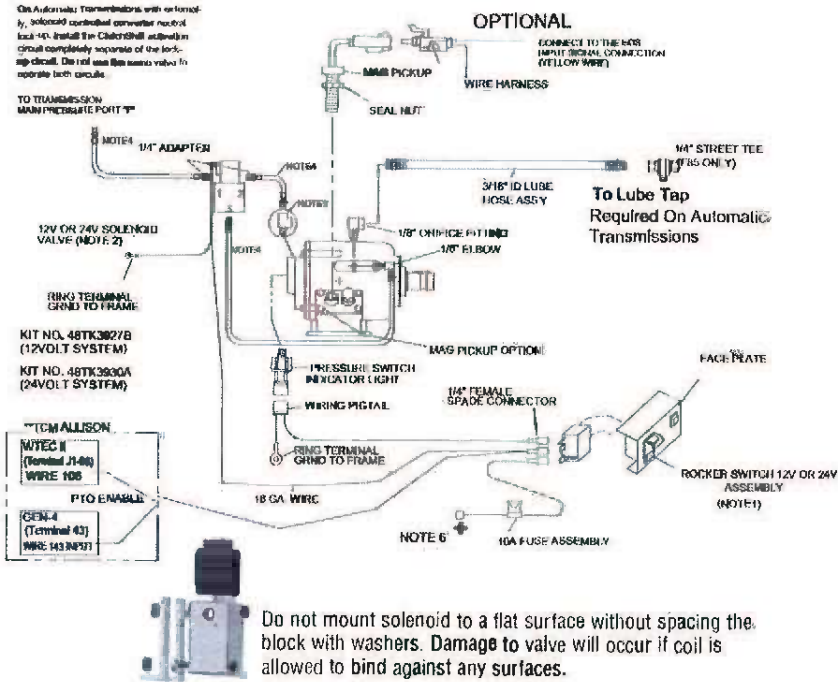
## FOOTNOTES

- Green light in rocker switch is to turn "ON" when PTO is engaged and to turn "OFF" when PTO is disengaged.
- Solenoid valve should be mounted on firewall to protect it from corrosive environment.
- Air System Users... You will not receive any air through the pressure protection valve to the PTO system until your main tank pressure exceeds 65 PSI. Some chassis' have dual air systems. Be sure to connect to the MAIN air supply tank or to the connection specified by the vehicle manufacturer.
- Hydraulic hoses and hose ends not supplied with standard installation kit. Order Muncie 131-2-0001 separately.
- Street Tee provided for clearance mount of pressure switch or for CS6G installation, be sure to plug unused port(s).
- Connection to positive battery ACC tap as identified by chassis manufacturer. See note A on pg 2.1.



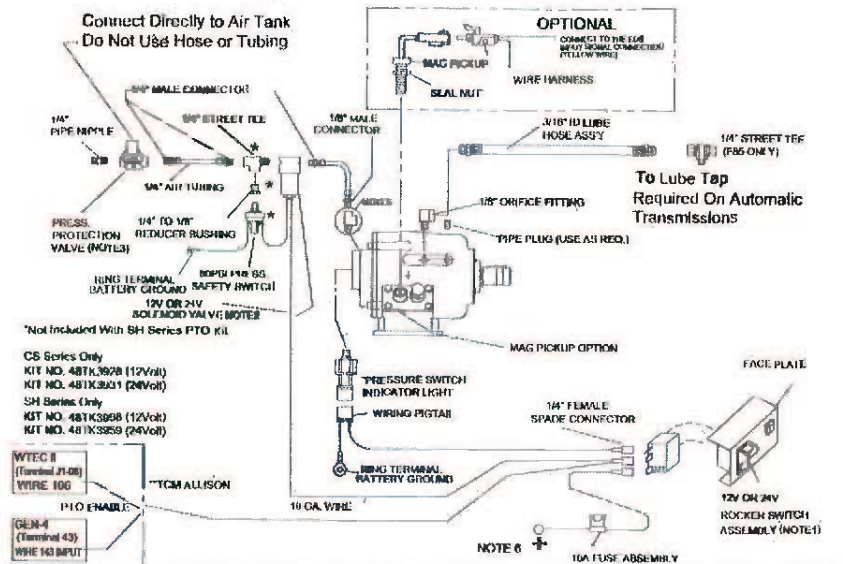
## CLUTCH SHIFT ELECTRIC/HYDRAULIC SHIFT SYSTEM

For Hydraulic Shifting CLUTCH SHIFT Series PTO on Automatic Transmissions



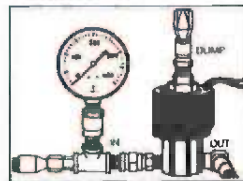
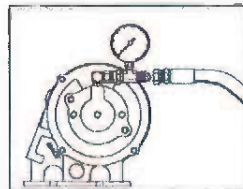
## CLUTCH SHIFT & SH HEAVY ELECTRIC/AIR SHIFT SYSTEM

For Use When Air Shifting CLUTCH SHIFT or SH Series PTOs



## CLUTCH SHIFT INSTRUCTIONS & TESTS

1. Install the appropriate shifter kit components described on pages 2.11 - 2.16. On Allison, Aisin, Eaton Fuller CEEMAT and JATCO Automatic installations be sure that the lube orifice fitting is installed in the housing port as shown on 1. Use only the fitting supplied with your kit to assure proper transmission function.  
Allison transmissions with neutral lock-up should be installed on a circuit separate of PTO shift circuit. The circuits are supplied by the transmission main pressure and should be tied together at, and closest to, the main pressure port (port P) as shown on diagrams found on pages 2.11 thru 2.17.
2. With ignition switch on (but engine not running) turn on the PTO control switch and listen for solenoid valve. You should be able to hear valve snap open. If not, check for a poor ground connection. The ground must be a bare metal contact to frame.
3. Start engine and engage PTO with switch. If PTO fails to operate or will not develop enough torque to operate your equipment, check pressures as follows:
  - a. Stop engine.
  - b. Install 400 PSI pressure gauge at PTO piston port. (Fig. A) (150 PSI gauge for air systems).
  - c. Install a second 400 PSI pressure gauge in front of screen adapter at solenoid valve. (Fig. B) (150 PSI gauge for air systems).
  - d. Start engine. Stay clear of rotating components. Place PTO switch in engage position.
  - e. If either gauge registers less than 90 PSI, or if there is more than 50 PSI difference at any engine speed, check for obstructions in the hoses or the screen adapter.
  - f. On the hydraulic system if gauge (Fig. B) registers 50 PSI or less, you may be connected to the wrong port on the transmission. Recheck the transmission information for the main pressure tap location on your model.
4. Complete installation by placing warning labels as indicated on borders of the decals. Placement examples are illustrated on pages 1.1 and 1.2.



Upon installation, the Clutch Shift output shaft may operate in the off position. If this occurs, double check plumbing for restrictions in the lines. If OK, adjustment of the drag brake may be required. Clutch Shift requires a minimal load on the output shaft.

The CS6 & CS8 PTO is equipped with an internal drag brake as standard. The brake is adjustable, should the output shaft continue to turn once PTO is disengaged. **Note:** This brake will **not** stop shaft if there is a catastrophic failure with PTO clutch pack. See Section 3 for more information.

### Drag Brake Adjustment Procedure:

1. Stop engine.
2. Locate adjustment screws on the end cover per the diagram.
3. Using 3/16" Allen wrench turn each of the set screws 1/4 turn clockwise.
4. Move away from under the vehicle and away from possible moving components and restart the engine. Look for the output shaft to stop turning. If the shaft continues, then shut the engine off and repeat steps 2 thru 4.

For U60, F85, 184 & 185 PTOs  
Install 1 spring per hole in these 2 holes. No springs in other holes. (Mark these 2 screws with red paint.)  
For all other ratios install 1 spring per hole in all 4 holes. (Do not paint these screws.)



COVER END VIEW



## **SECTION 3 OWNER'S MANUAL**

### **POWER TAKE-OFF WARRANTY**

The Muncie Power Take-Off is warranted to be free of defects in material or workmanship and to meet Muncie's standard written specifications at the time of sale. Muncie's obligation and liability under this warranty is expressly limited to repairing or replacing, at Muncie's option, within one year after date of original installation any defective part or parts or any product not meeting the specifications.





**THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED. MUNCIE MAKES NO WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR ANY PARTICULAR PURPOSE. MUNCIE'S OBLIGATION UNDER THIS WARRANTY SHALL NOT INCLUDE ANY TRANSPORTATION CHARGES OR COSTS OF INSTALLATION OR ANY LIABILITY FOR DIRECT, INDIRECT SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES OR DELAY. THE REMEDIES SET FORTH HEREIN ARE EXCLUSIVE, AND MUNCIE'S LIABILITY WITH RESPECT TO ANY CONTRACT OR SALE OR ANYTHING DONE IN CONNECTION THEREWITH, WHETHER IN CONTRACT, IN TORT, UNDER ANY WARRANTY, OR OTHERWISE, SHALL NOT, EXCEPT AS EXPRESSLY PROVIDED HEREIN, EXCEED THE PRICE OF THE PRODUCT OR PART ON WHICH SUCH LIABILITY IS BASED.**

If requested by Muncie, products or parts for which a warranty claim is made are to be returned transportation prepaid to a Muncie Service Center. Any installation or use not in accordance with catalogue or package instructions, other improper use, operation beyond capacity, substitution of parts not approved by Muncie, use with equipment other than the equipment on which the Power Take-Off is first installed, or alteration or repair made to the Power Take-Off other than at a Muncie Service Center shall void this warranty. No employee or representative of Muncie is authorized to change this warranty in any way or to grant any other warranty.



## **PTO SHIFTING PROCEDURE & PRECAUTIONS**

### **POWER TAKE-OFF OPERATION - VEHICLE STATIONARY**

-  **WARNING - PARKING BRAKE MUST ALWAYS BE SET**
-  **WARNING - VEHICLE'S WHEELS MUST ALWAYS BE CHOCKED**
-  **WARNING - TRANSMISSION MUST ALWAYS BE IN NEUTRAL OR PARK**
-  **WARNING - AN OPERATOR MUST ALWAYS BE IN THE DRIVER'S SEAT WHENEVER THE ENGINE IS RUNNING AND THE TRANSMISSION IS IN GEAR, IN ORDER TO PREVENT OR STOP ANY UNEXPECTED MOVEMENT OF THE VEHICLE WHICH MAY CAUSE INJURIES TO THE OPERATOR OR OTHERS IN THE VICINITY.**

- **READ ALL OPERATORS MANUALS AND INSTRUCTIONS FOR THE EQUIPMENT THAT YOU ARE OPERATING ON THIS VEHICLE.**
- **OBTAIN INSTRUCTIONS AND TRAINING FOR ALL OPERATIONS OF THE EQUIPMENT ON THIS VEHICLE INCLUDING THOSE NOT COVERED BY THIS INSTRUCTION BOOKLET.**
- **NEVER WORK ALONE WHEN REPAIRING OR GOING UNDER A VEHICLE FOR REPAIR OR MAINTENANCE.**
- **ALWAYS BLOCK ANY RAISED OR MOVEABLE COMPONENTS OR DEVICES WHEN WORKING ON OR AROUND THE VEHICLE AS SPECIFIED BY THE EQUIPMENT MANUFACTURER.**
- **WARNING: PTOS MAY DRIVE DRIVEN EQUIPMENT WITH AN EXPOSED DRIVE SHAFT WHICH MAY CAUSE SEVERE INJURY OR DEATH IF CONTACTED.**
- **CARE MUST BE TAKEN WHEN USING A PTO FOR ANY SPECIFIC APPLICATION THAT THE PTO HAS BEEN PROPERLY SPECIFIED TO MATCH THE TRANSMISSION AND AUXILIARY EQUIPMENT. IMPROPER SPECIFICATION AND INSTALLATION CAN CAUSE SEVERE DAMAGE TO THE VEHICLE TRANSMISSION AND THE AUXILIARY COMPONENTS INCLUDING DRIVESHAFTS AND DRIVEN EQUIPMENT. DAMAGED COMPONENTS, EQUIPMENT RESULTING IN FAILURE CAN CAUSE SERIOUS PERSONAL INJURY TO OPERATORS AND PERSONS IN THE VICINITY.**
- **ALWAYS FOLLOW RECOMMENDED PROCEDURES FOR SELECTING, INSTALLING, OPERATING, OR REPAIRING A POWER TAKE OFF AS FOUND IN MUNCIE OWNER'S MANUALS, SERVICE PARTS LISTS AND SERVICE MANUALS, CATALOGS, AND APPLICATION GUIDES.**
- **NEVER USE A MUNCIE PTO ABOVE THE RECOMMENDED OPERATING SPEED OF THE UNIT OR THE SPECIFIED DRIVEN UNIT.**
- **NEVER USE A POWER TAKE OFF THAT HAS NOT BEEN SPECIFIED FOR THE OUTPUT CAPABILITIES FOR THE EQUIPMENT BEING DRIVEN.**

### **ROTATING PTO DRIVE SHAFTS**

**IT IS RECOMMENDED THAT DIRECT COUPLE HYDRAULIC PUMPS BE USED WHENEVER POSSIBLE, BUT IF YOUR APPLICATION REQUIRES THE USE OF AN EXPOSED DRIVE SHAFT IT IS THE RESPONSIBILITY OF THE INSTALLER AND PURCHASER TO DETERMINE THE BEST INSTALLATION OF A GUARD.**

- **ROTATING SHAFT CAN SNAG CLOTHING, SKIN, HANDS, HAIR, ETC. AND WILL CAUSE SERIOUS INJURY OR DEATH.**

- DO NOT GO UNDER THE VEHICLE WHEN THE ENGINE IS RUNNING.
- DO NOT WORK NEAR AN EXPOSED DRIVE SHAFT WITH ENGINE RUNNING.
- AUXILIARY SHAFT CAN BE INSTALLED WITH RECESSED OR PROTRUDING SET SCREWS. IF RAISED, SQUARE HEAD SET SCREWS ARE CHOSEN, THEN BE AWARE THAT THIS IS A CATCH POINT FOR CLOTHES, SKIN, HAIR, HANDS, ETC. AND SERIOUS INJURY OR DEATH MAY RESULT.

**⚠** THE OUTPUT SHAFT OF A PTO WITH INTERNAL CLUTCH PACKS MAY ROTATE IN COLD TEMPERATURES WITH THE PTO DISENGAGED. PTO SHAFT ROTATION CAN CAUSE SUDDEN MOVEMENT OF THE OUTPUT SHAFT AND ATTACHED DRIVE SHAFT LEADING TO PERSONAL INJURY OR DEATH. ALLOW TRANSMISSION TO OPERATE FOR A FEW MINUTES BEFORE ENGAGING PTO. ALLOW PTO TO OPERATE FOR A FEW MINUTES BEFORE ACTUATING APPLICATION CONTROLS.

SOME O.E.M. CHASSIS MANUFACTURERS HAVE INTEGRATED ELECTRONIC CONTROLS WHICH REQUIRE CERTAIN CONDITIONS TO BE MET BEFORE ENGAGING A PTO. THESE INCLUDE, BUT ARE NOT LIMITED TO SETTING PARKING BRAKE, FOOT OFF SERVICE BRAKE, ENGINE AT IDLE, FOOT OFF ACCELERATOR PEDAL, AND/OR TRANSMISSION SELECTOR IN PARK OR NEUTRAL.

### 1. Mechanical Transmission

- A. A power take-off is, and should be, operated as an integral part of the main transmission.
- B. Before shifting the Power Take-Off into or out of gear disengage the clutch and wait for transmission or PTO gears to stop rotating.

### 2. Automatic Transmission with Manual Shift PTOs (includes Air Shift)

— Manual Shift PTOs include SG, TG, SH, RL, RG, RX, 82, 83 Series PTOs  
 — On automatic transmissions, the gears in the transmission turn when the transmission is in neutral, therefore, gear clashing will occur if the power take-off is shifted *into gear (engaged)* or *out of gear (disengaged)* at this time.  
 With Converter Driven Gear:

- A. Engine idle. With the operator seated in the driver's seat and while activating the vehicle's brake, shift transmission lever into any of the drive positions. (This will stop transmission gear from turning.)
- B. Shift power take-off into or out of gear.
- C. If the PTO does not engage release the PTO to the disengage position, shift the transmission to neutral and repeat the above steps from step A.
- D. Shift transmission into park or neutral. (This will start transmission gears turning.) If you hear a grinding or ratcheting sound turn PTO off and repeat these procedures from step A.

### 3. Automatic Transmission/Transfer Case Mounted PTO (Also SS66 Splitshaft PTO)

- A. Shift transmission into park.
- B. **Caution: Apply parking brake and block wheels. Note: Applying parking brake does not insure that vehicle will not move when transfer case is in neutral.**
- C. Engage PTO.

- D. Shift transfer case into neutral.
- E. Shift transmission into drive to activate PTO output shaft. Caution: Do not place the transmission selector in park or reverse while PTO is operational as damage to PTO or driven unit may occur.

**To Disengage PTO:**

- F. **Shut off** engine with transmission in drive mode.
- G. Disengage PTO.
- H. Shift transmission selector to park.
- I. Restart engine.
- J. Remove wheel blocks and release parking brake.
- K. Shift transfer case into engaged mode.
- L. Vehicle can now be driven.

**Failure to follow proper shifting or operating sequences will result in premature PTO failure with possible damage to the equipment.**

## **CLUTCH SHIFT OPERATING NOTES**

**CLUTCH SHIFT PTOs should not be engaged (turned "ON") under heavy load and/or at engine speeds over 1200 RPM.** If your operators are careless or negligent in this respect, you can safeguard your equipment with one or more Muncie<sup>®</sup> protective systems.

Consult your Muncie product literature or call your nearest Muncie Power Center for information on the SPD-1000A System Protection Device which prevents engagement of your CLUTCH SHIFT PTO above safe speeds.

The red overspeed light on the PTO control switch panel is for use with the SPD-1000A and will indicate an overspeed condition when wired according to instructions in the SPD-1000A Installation Manual.

**Upon installation, CLUTCH SHIFT output shaft may rotate while in the off position.** If this occurs, recheck plumbing for restrictions in the lines. If the plumbing is okay, adjustment of drag brake will be required. The Clutch Shift requires a minimal load on the output shaft. See your PTO installer or refer to page 2.20 for adjustment instructions. The CB Series does not require adjustment.

## **PTO MAINTENANCE**

The Power Take-Off, being an integral part of the transmission, should be serviced at the same intervals as the transmission. Transmission fluid changes should follow the interval recommended by the vehicle manufacturer for severe service. Transmission oil level is important. Checking for PTO leaks and checking the transmission oil level should be done on a regular basis.

Check for leaks upon delivery of the vehicle and after initial operation of your equipment. Loss of any oil can significantly affect or damage a transmission or PTO. Muncie Power Products, Inc. is not responsible for damage resulting from improper fastener installation, mounting torque or maintenance of the PTO.

The Power Take-Off is also part of a system. The PTO system may include the activation control parts, a driveshaft, or hydraulic pump. This PTO system requires periodic checks and service. Typically the interval for maintenance checks of the PTO system depends on the application of the system. Every time the chassis is lubricated or a mechanic is under the vehicle the PTO system should be checked and serviced. For severe duty PTO system applications, it is recommended that the system be checked for service every 100 hours of use (this guideline can be adjusted based on past

service history once you have it established). Service should include checking and lubricating direct mount pump shaft connections. PTO gears can be checked for wear by removing the inspection or shifter cover. If pitting, galling, cracking, or deformation of the gears or splines has occurred, then the PTO needs to be rebuilt or replaced.

**Within the first week of use, recheck the installation of the PTO. Check for leaks and loose mounting hardware (studs, cap screws, nuts). Recheck the cable or lever connections for proper adjustment and tighten any loose connections. At regular maintenance intervals, check adjustments and lubricate moving parts, tighten and repair the connections, mounting hardware, cable or lever linkages.**

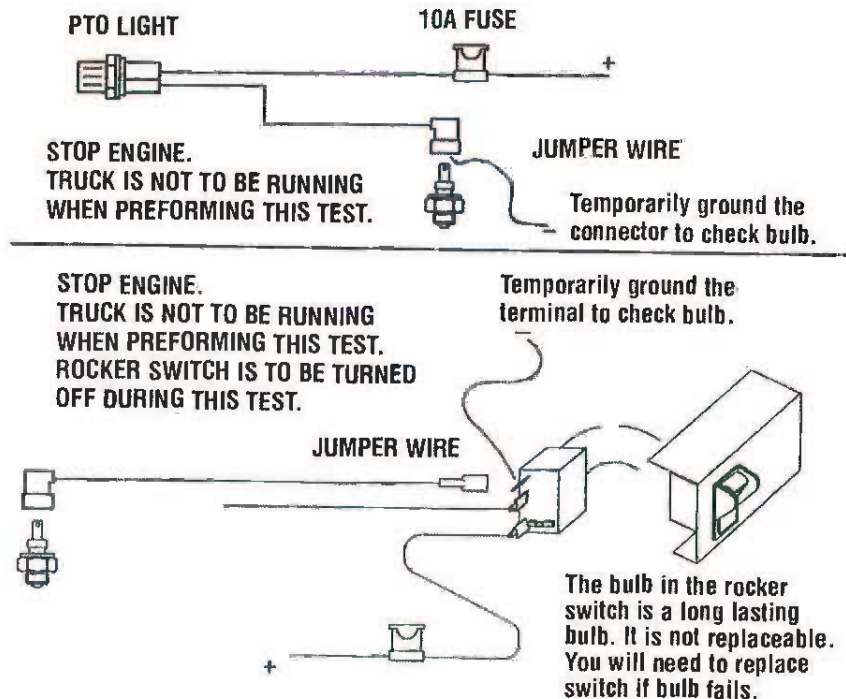
It is recommended that the operator/owner do a visual inspection for leaks under and around the vehicle and equipment on at least a weekly basis. Any leaks found should be corrected immediately.

Pumps that are mounted directly to the PTO output require the application of an anti-seize or a high temperature, high pressure grease. (Muncie PTOs are initially supplied with the required grease.) The purpose of this grease is to help make the PTO easier to service and to reduce the effects of fretting corrosion on the mating PTO and pump shafts. PTO applications under severe duty cycles and/or high torque requirements may require servicing this shaft connection by periodically re-greasing the shafts. Vehicles with low speed diesel engines are also severe applications due to the vibrations inherent in these vehicles. Fretting corrosion cannot be stopped by applying grease, the grease is only a deterrent.

## INDICATOR LIGHT CHECK



Procedure for checking the PTO Indicator Switch is found on Page 2.7



## PTO TORQUE & HORSEPOWER RATINGS

Intermittent service refers to an On-Off operation under load. If maximum horsepower and/or torque is used for extended periods of time, (5 minutes or more) this is considered "Continuous Service" and the horsepower rating of the PTO should be reduced by multiplying the value below by .70.

PTO SERIES	SPEED RATIO	INTERMIT. HP@1000 RPM	INTERMIT. KW@1000 RPM	TORQUE LBS.FT.	TORQUE NM	MAX. SPEED
SG	10	25	18.6	130	176	2500
TG	04	54	40.3	285	386	2500
	05	51	38	270	366	2500
	06	47	35	245	332	2500
	07	44	32.8	230	312	2500
	08	44	32.8	230	312	2500
	09	39	29	205	278	2500
	12H	40	29.8	210	285	2500
	13H	40	29.8	210	285	2500
	15H	37	27.6	195	264	2500
SH	18H	33	24.6	175	237	2500
	05	76	57	400	542	2500
	07	76	57	400	542	2500
	09	71	53	375	508	2500
CS	12	62	46	325	441	2500
	13	62	46	325	441	2500
	03	57	42.5	300	407	2500
	04	57	42.5	300	407	2500
	05	57	42.5	300	407	2500
	06	57	42.5	300	407	2500
	07	57	42.5	300	407	2500
	09	52	38.8	275	373	2500
RG	12	52	38.8	275	373	2500
	14	52	38.8	275	373	2500
RL	13	26	19.4	140	190	2500
RX	03	38	28.3	200	271	2500
	05	38	28.3	200	271	2500
82	ALL	26	19.4	140	190	2500
	05	95	70.8	500	678	2500
	08	85	63.4	450	610	2500
	09	78	58.2	410	556	2500
	10	78	58.2	410	556	2500
	12	71	52.9	375	508	2500
	13	71	52.9	375	508	2500
	15	67	49.9	350	475	2500
83	19	57	42.5	300	407	2500
	05	95	70.8	500	678	2500
	06	95	70.8	500	678	2500
	12	71	52.9	375	508	2500

## PTO TROUBLESHOOTING GUIDE

PROBLEM	POSSIBLE CAUSE	REMEDY	PREVENTION
<b>CABLE SHIFT PTOS</b>			
<b>Hard Shifting</b>	Cable inner member frozen	Thaw in garage	Route cable away from road spray and seal end from moisture
	Sharp bend in cable	Straighten inner member or replace cable	Keep bends larger than the minimum bend radius. Avoid short cable runs
	Improper shifting	Make sure vehicle clutch is adjusted to allow the PTO drive gear to stop before shifting or that the proper shift procedure is followed	See Section 3.
	Worn or damaged shift control	Repair or replace components	Do not connect lever rods to cable shifters
<b>Delayed or partial engagement</b>	Loose linkage or attachment. Loose or missing cable clamps	Repair or replace	Routine maintenance
<b>AIR SHIFT PTOS</b>			
<b>PTO doesn't engage</b>	Contaminated air lines	Remove contaminants from air cylinder	Bleed air system more often
	Air pressure not high enough	Wait until system pressure is above 65 psi before engaging PTO	Systems are designed with a pressure protection valve which does not allow air to the PTO until the system pressure exceeds 65 psi
	Improper method of shifting causing damage to the PTO shift collar	Make sure vehicle clutch is adjusted to allow the PTO drive gear to stop before shifting or that the proper shift procedure is followed	See Section 3.
	Worn or damaged shift control	Repair or replace components	
	Shift fork is out of shift collar	Reassemble onto PTO correctly.	
<b>PTO doesn't disengage</b>	Faulty air valve	Repair or replace	Usually a result of contamination or dirty valve. Keep air system bled and valves free of dirt
	Worn or damaged shift control	Repair or replace components	
	Shift fork is out of shift collar	Reassemble onto PTO correctly.	

## PTO TROUBLESHOOTING GUIDE *Continued*

PROBLEM	POSSIBLE CAUSE	REMEDY	PREVENTION
<b>LECTRA SHIFT PTOS</b>			
<b>PTO doesn't engage</b>	Loose connection	Review wiring diagrams in Section 2	Make sure wires are properly supported and connections are properly made
	Poor/improper grounding of electrical circuit	Make all grounds to the vehicle battery	Control module is very sensitive to proper ground
	Blown fuse	Replace fuse with proper rating	Make proper connections
	Improper shifting	Make sure vehicle clutch is adjusted to allow the PTO drive gear to stop before shifting or that the proper shift procedure is followed	See Section 3
	Worn or damaged shift control	Repair or replace components	
<b>CLUTCH SHIFT PTOS</b>			
<b>PTO doesn't engage</b>	Contaminated air lines	Remove contaminants from air cylinder	Bleed air system more often
	Air pressure not high enough	Wait until system pressure is above 65 psi before engaging PTO or 80 psi for the Electric/Air system.	Electric/Air systems are designed with a pressure protection switch which does not allow current to the PTO valve until system pressure exceeds 80 psi
	Air lines are too long	Re-route lines directly to air tanks	Follow installation diagrams
	Hydraulic line connected to wrong port	Review installation diagrams in Section 2	
	Burned or extremely worn clutch pack	Replace worn components	
	Engine RPM too high (SPD)	Adjust SPD per IN07-04	
	<b>PTO doesn't disengage</b>	Hydraulic or air lines connected to wrong ports on valve control	Re-route lines
Faulty air or hydraulic valve		Repair or replace	Sometimes a result of contamination or dirty valve. Keep air system bled and valves free of dirt
Burned or extremely worn clutch pack		Repair or replace components	Follow proper engagement procedures in Section 3.
Misadjusted drag brake		Adjust brake with adjustment screws, see Section 2.	



# *Hydraulic System*

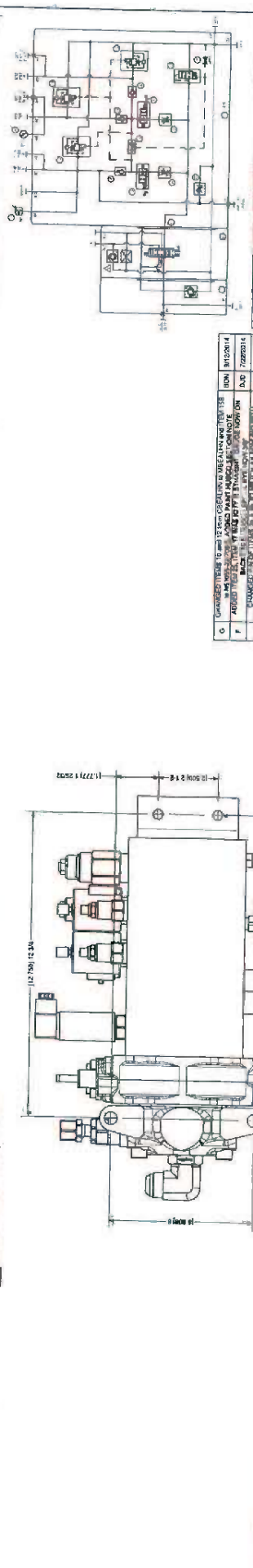
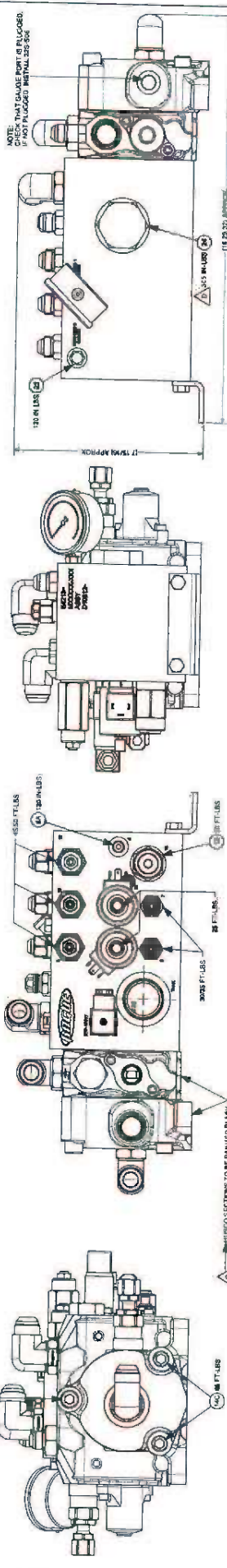
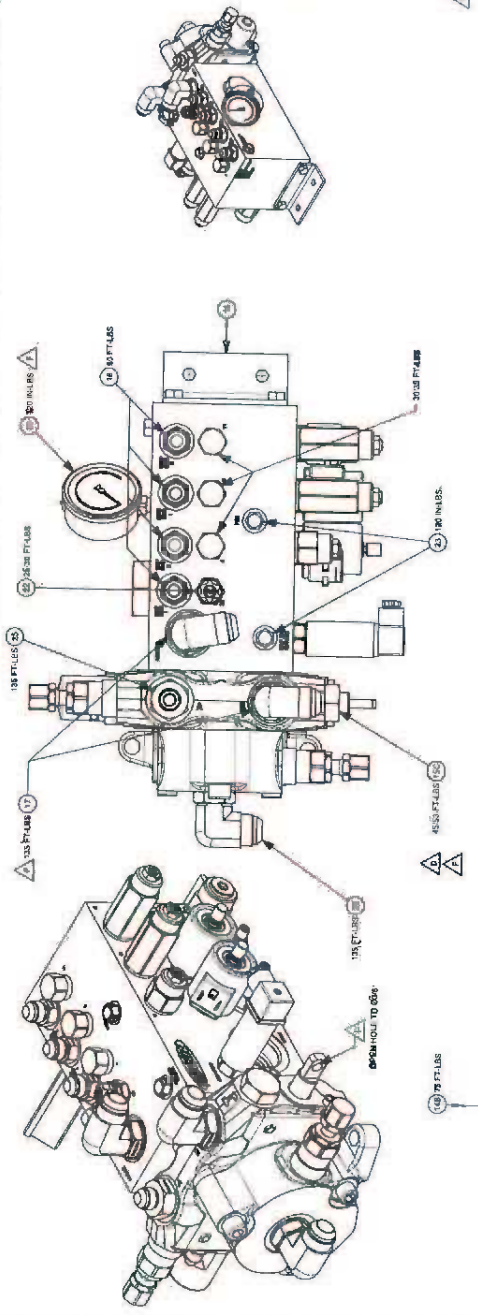
*Sub-Section 3C*



**SUPERDUMP HYDRAULIC FITTINGS LIST**

REF:	ROGUE PART NO.	PART NAME	QUAN	VENDOR	VENDOR PART NO.
A	RTP-16010	HOSE, 1/2 I.D. 2 WIRE TOUGH COVER HYD.	VAR	FLU	471TC-8
B	RTP-13103	HOSE, BXX E-Z FLEX HYDRAULIC-BXX12	VAR	FLU	BXX12
C	RTP-13104	HOSE, BXX E-Z FLEX HYDRAULIC-BXX16	VAR	FLU	BXX16
D	RTP-16002	HOSE, 1 1/4 I.D. 100R4 SUCTION & RETURN	VAR	FLU	811-20
1	RTP-16073	CRIMP FITTING 1-1/4"	4	FLU	10143-20-20
2	RTP-16098	CRIMP FITTING, HY-16 FJIC X 16	2	FLU	106HY-16-16
3	RTP-16096	CRIMP FITTING, HY - 12 FJIC X 12	4	FLU	106HY-12-12
4	RTP-16209	PLUG, 1 1/4"	1	FLU	20P50NS
5	RTP-16093	ELBOW, 90 DEG. 8 FJIC X 8 HOSE	5	FLU	13943-8-8
6	RTP-16104	CRIMP FITTING, 8 FJIC X 8	10	FLU	10643-8-8
7	RTP-16105	CRIMP FITTING, 8 MJIC X 8	5	FLU	10343-8-8
8	RTP-15210	TANK STRAINER, HYDRAULIC SD	1	HYD	P562272
9	RTP-16205	REDUCER, PIPE THREAD	1	FLU	2 X 1 1/2 PTR-S
10	RTP-16129	NIPPLE, PIPE 1-1/4"	1	FLU	1 1/4 FF-S
11	RTP-16201	ADAPTER, 1-1/4 0507 20-20 STEEL	2	FLU	0507-20-20
12	RTP-16005	ADAPTER, 1 MJIC X 1 1/4 MNPT STRT.	1	FLU	16-20 FTX-S
13	RTP-16164	ELBOW, STRAIGHT THREAD	1	FLU	16 C5OX-S
14	RTP-16162	ELBOW, STRAIGHT THREAD	1	FLU	12 C5OX-S
15	RTP-25605	INLINE GAUGE FITTING	1	FLU	12-4HXH6G5TP-S
16	RTP-16179	ELBOW, PS 90DEG SWIVEL	1	FLU	PS1290503-12-12
18	RTP-16207	24-20 REDUCER ORB	1	FLU	24-20 F50G5
19	RTP-16064	ADAPTER	1	FLU	2507-20-20
20	RTP-17501	VALVE, BALL 1-1/4"	1	FLU	V520P-20
21	RTP-16208	PLUG, 1 1/2"	1	FLU	24P50NS
22	RTP-16160	CONNECTOR, STRAIGHT THREAD	1	FLU	8-12 F5OX-S
23	RTP-16159	CONNECTOR, STRAIGHT THREAD	8	FLU	8 F5OX-S
24	RTP-15213	FILTER FOR FILTER ASSY (RTP-15211)	2	HYD	KZ10
26	RTP-52096	CHECK VALVE ASSEMBLY (IN-TANK)		HYD	A-LFT-158Q-1
28	RTP-52122	DRAIN PLUG, 3/4" NPT, MAGNETIC	1	HYD	
29	RTP-52065	ACCUMULATOR	1	SIL	ACP10AA400E88H
30	RTP-52054	MAXLE CYLINDER	2	SIL	HC-4X3X47.9
31	RTP-15016	CS140-5.5-3DA HOIST SUPERDUMP (CALIFORNIA TRUCKS)	1	MAI	CS 140-5.5-3DA
31	RTP-15009	CS150-6.5-4DA HOIST 7 AXLE SUPERDUMP (OREGON TRUCKS)	1	MAI	CS 150-6.5-4DA
32	RTP-52121	FILTER CONNECTOR	1	HYD	LF-1997
33	RTP-52120	SWITCH, HIGH PRESSURE	1	HYD	XM-6A-0040R-WP
34	RTP-22506	GAUGE 3000 PSI LIQ. FILLED 1/4" BTM. MT O-RING WIKA	1	FLU	9795702

BILL OF MATERIALS		DESCRIPTION	MANUFACTURER	PART NUMBER
1	1	MANIFOLD VALVE, 1/2" IN.	HYDRA-POWER	44313
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NOTE: CHECK THAT GAUGE PORT IS PLUGGED. (1) PLUGGED INTERNAL 250 PSI.

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HYDRA-POWER SYSTEMS, INC.  
SUPER DUMP CONTROL  
MANIFOLD ASSEMBLY  
REV. 11/15/11  
10812

ITEM	QTY	DESCRIPTION	MANUFACTURER	PART NUMBER
00	1	MANIFOLD (ALUMINUM)	HPS	E4213
2	1	NEEDLE VALVE, T-13A	SUN HYDRAULICS	NFCDLFN
3	1	SOLENOID VALVE	HYDRAFORCE	SV10-20M-0-N-0
3A	1	COIL, 12VDC	HYDRAFORCE	6356012
3B	1	DIN CONNECTOR	HIRSCHMAN	GDMZRC21163160
4	1	CHECK VALVE, T-13A	SUN HYDRAULICS	CXDAXCN
5	1	COUNTER BALANCE VALVE	SUN HYDRAULICS	CBEALHN
6	1	SHUTTLE VALVE	SUN HYDRAULICS	CSZNXN
6A	1	CONSTRUCTION PLUG	EPCO	22S-S04
7	1	NEEDLE VALVE, T-13A	SUN HYDRAULICS	NFCDLFN
8	1	SOLENOID VALVE	HYDRAFORCE	SV10-20M-0-N-0
8A	1	COILD, 12VDC	HYDRAFORCE	6356012
8B	1	DIN CONNECTOR	HIRSCHMAN	GDMZRC21163160
9	1	CHECK VALVE	SUN HYDRAULICS	CXDAXCN
10	1	LOAD REACTIVE LOAD HOLDING VALVE	SUN HYDRAULICS	MBEALHN
11	1	CHECK VALVE	SUN HYDRAULICS	CXDAXCN
12	1	LOAD REACTIVE LOAD HOLDING VALVE	SUN HYDRAULICS	MBEALHN
13	1	LOGIC ELEMENT	HYDRAFORCE	EP12-S35T-0-N-160
14	1	INLET SECTION	HUSCO	N6001-J11
14A	1	RELIEF VALVE	HUSCO	N51055-22
14B	1	Hexagon Socket Head Cap Screw	HPS	1/2 - 13 UNC - 4 3/4 SHCS
14C	2	Hexagon Socket Head Cap Screw	HPS	7/16 - 14 UNC - 4 1/2 SHCS
15	1	VALVE SECTION	HUSCO	N6002-J387
15A	1	O-Ring Face Seal Glands (Internal)	PARKER	Parker (Internal) No. 2-129
15B	1	RELIEF VALVE	HUSCO	N51055-22/700/5
15C	1	PORT PLUG	HUSCO	N52810
16	1	MANIFOLD FOOT BRACKET	HPS	B2072
16A	2	Hex Bolt - UNC (Regular Thread - Inch)	HPS	3/8-16 UNC - 0.75
17	3	FITTING	TOMPKINS	6801-12-12
18	4	FITTING	TOMPKINS	6400-08-08
19	1	PRESSURE SWITCH	GEMS	PS71-50-4MSZ-C-HC-FS2400PSIR
19A	1	DIN CONNECTOR	GEMS	COMES WITH ITEM 19
20	1	PRESSURE GAUGE, 0-5000 PSI/BAR	WIKA	9795702
21	1	ORIFICE PLUG	KOENIG	RP 062-020
22	1	NEEDLE VALVE	SUN HYDRAULICS	NFABXXN
23	3	PLUG, HEX HEAD	TOMPKINS	6408-04
24	1	PLUG, HEX HEAD	TOMPKINS	6408-20
25	1	FITTING	TOMPKINS	6400-08-12
26	1	90° FITTING	TOMPKINS	6801-16-16



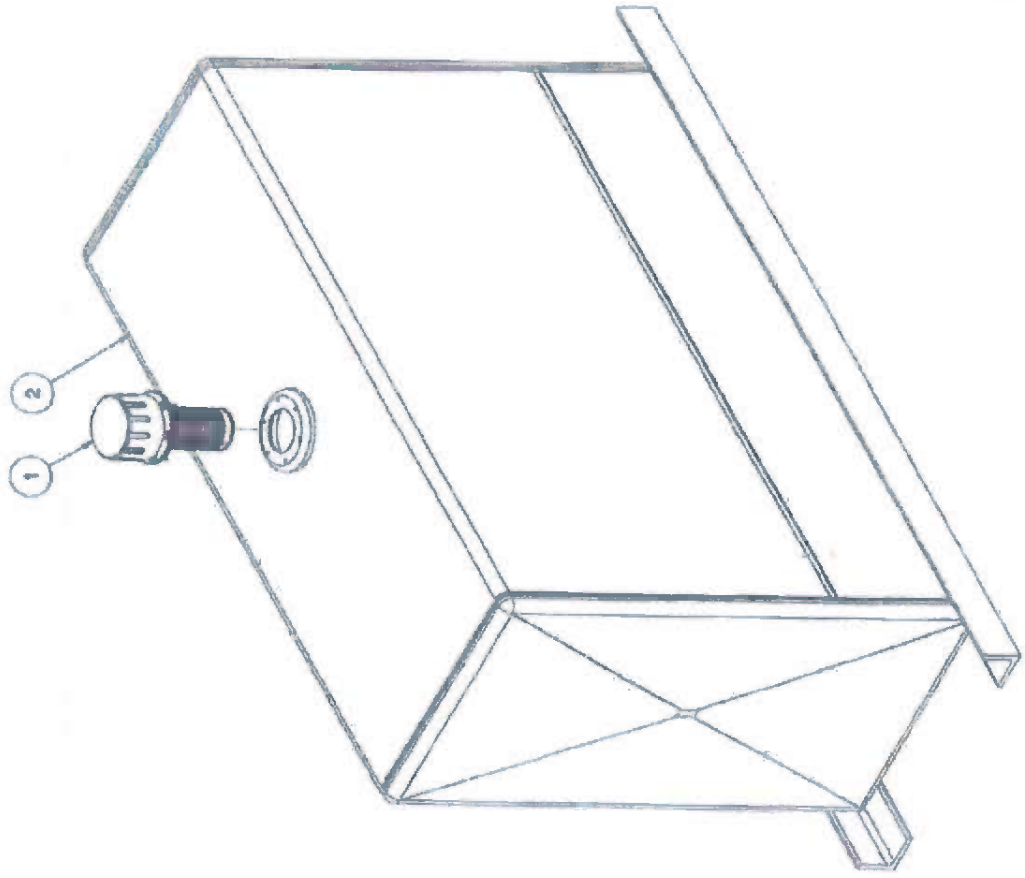
Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	57AL-40N	40 MICRON FILL WYLYON STRAINER
2	1	N NY4000	NAM WELDMENT -57 lbs

AMP PARTS TO INCLUDE:  
-ASK-200 MOUNTING KIT

NOTE:  
-PLUG ALL PORTS FOR SHIPMENT

*Use Schroeder Hyd. Filter Element  
P.N. KZ10 (Bottom of Tank)  
(2 Required)*

*Use Donaldson Strainer  
P.N. P56227A*



DRAWING BY BRIGHT DATE LEST 5/20/2008	DESIGN FOR HYDRA-POWER SYSTEMS	FILE NAME HY4-000
		SHEET NO 1 OF 14
		SHEET SIZE B

OUR ENGINEERING DEPARTMENT HAS DESIGNED THIS TANK SYSTEM TO MEET YOUR SPECIFIC REQUIREMENTS. AMERICAN OIL POWER ASSURES ITS PRODUCTS TO BE OF SUPERIOR QUALITY WITHIN ITS DESIGN PARAMETERS. THE COMPANY CANNOT DETERMINE SUITABILITY OF THIS PRODUCT AS DESIGNED FOR A PARTICULAR APPLICATION WITHOUT COMPLETE ENGINEERING AND STRESS SPECIFICATIONS FROM THE CUSTOMER. PURCHASER ASSUMES RESPONSIBILITY FOR FINAL SUITABILITY, INSTALLATION, AND MAINTENANCE IN ORDER TO INSURE FULL LIFE OF THIS PRODUCT. FITS, SPECIFIC AND PATENTED USE.