



Patcher I Diesel

PART MANUAL - 56933

Rev. 0

Revised: 02/06

**Patcher I Diesel
Part Number 56900 (Skid Mount)**



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Patcher I Diesel

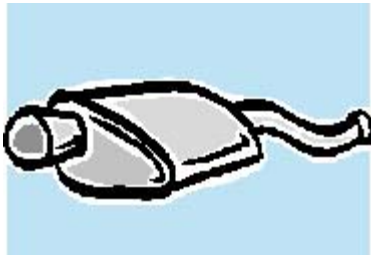
This manual is furnished with each new **CRAFCO Patcher I Diesel MIXER**. The manual will help your machine operators learn to run the mixer properly and understand its mechanical functions for trouble-free operation.

Your **CRAFCO Patcher I Diesel MIXER** is designed to give excellent service and save maintenance expense. However, as with all specifically engineered equipment, you can get best results at minimum costs if:

1. You operate your machine as instructed in this manual, and
2. Maintain your machine regularly as stated in this manual.



WARNING: The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm. Operate in well ventilated area only. Engine exhaust is deadly.



SAFETY PRECAUTIONS

- High operating temperatures of product and machine require protective clothing, long sleeve shirt, long pants/coveralls, hat or hard hat (if required) and flame resistant gloves be worn by operator.
- Always wear eye protection (goggles or faceshield) when operating hot compressed air lance, air gas lance and when applying material. Faceshield is to be worn when adding material to the Patcher I.



- Observe all **CAUTION AND WARNING** signs posted on machine.



- Avoid the entrance of water into any part of the machine. Water will displace heat transfer oil or melted material when it reaches operating temperatures which could be hazardous to personnel surrounding the machine.
- Avoid bodily contact with hot applied patching material or heat transfer oil; serious burns may result.
- Read Operator Manual thoroughly before operating machine.
- Make sure operator is familiar with machine operation.
- Do not operate in closed building or confined areas.
- Shut-down burner and engine prior to refilling diesel tank.
- When adding material to material tank, stop mixer, lift lid, add material and close lid before restarting mixer. Hot material could splash and cause serious burns if this procedure is not followed.
- Keep hands, feet, and clothing away from all moving parts.
- Always keep a fire extinguisher near the unit. Maintain extinguisher properly and be familiar with its use.
- Do not exceed 525°F. for heat transfer oil temperature.
- Do not overfill heat transfer oil level. Expansion of oil during heat up could cause overflow. Check oil each day before starting burner, add oil to touch bottom of dipstick if required (at 70°F.) Use only recommended heat transfer oil and change after 500 hours of operation or one year, whichever occurs first.

SAFETY PRECAUTIONS continued

- Follow operating instructions for starting and shut-down of burner. Instructions are mounted on control box.
- Replace any hoses which show signs of wear, fraying, or splitting. Be sure all fittings and joints are tight and leak-proof.
- Precaution is the best insurance against accidents.
- The Patcher I mixer should not be left unattended with burner lit.
- Tighten all bolts and screws after every 100 hours of operation.
- CrafcO, Inc. assumes no liability for an accident or injury incurred through improper use of the machine.



Patcher I Diesel

LIMITED WARRANTY

Crafco, Inc., through its authorized distributor, will replace for the original purchaser free of charge any parts found upon examination by the factory at Mesa, Arizona, to be defective in material or workmanship. This warranty is for a period within 60 days of purchase date, but excludes engine or components, tires, and battery as these items are subject to warranties issued by their manufacturers.

After 60 days, Crafco, Inc. warrants structural parts, excluding heating system, hydraulic components, and electrical components for a period of one (1) year from date of delivery. Crafco, Inc., shall not be liable for parts that have been damaged by accident, alteration, abuse, improper lubrication/maintenance, normal wear, or other cause beyond our control.

The warranty provided herein extends only to the repair and/or replacement of those components on the equipment covered above and does not cover **labor** costs. The warranty does not extend to incidental or consequential damages incurred as a result of any defect covered by this warranty.

All transportation and labor costs incurred by the purchaser in submitting or repairing covered components must be incurred by the purchaser.

Crafco, Inc. specifically disavows any other representation, warranty, or liability related to the condition or use of the product.



WARNING: Use of replacement parts other than genuine Crafco parts may impair the safety or reliability of your equipment and nullifies any warranty.

WARRANTY CLAIM INSTRUCTIONS

Please follow the instructions stated below when calling in a Warranty Claim. Failure to follow these procedures may be cause to void the warranty.

1. Call your local CrafcO Distributor. If you do not know who your local distributor is, call a CrafcO Customer Service Representative, (toll free 1-800-528-8242) for name, location, and telephone number.
2. On contacting the Distributor, be prepared to identify the machine type, model number, and serial number, also the date of purchase if available.
3. Should the cause of the malfunction be a defective part, the Distributor will advise you of the procedure to follow for a replacement.
4. The warranty is valid only for parts which have been supplied or recommended by CrafcO, Inc.

If you have any additional questions regarding warranty repairs and parts, please do not hesitate to call toll free 1-800-528-8242.

CRAFCO, INC.
235 SOUTH HIBBERT
MESA, AZ 85210
480-655-8333
480-655-1712 (FAX)
Toll Free 1-800-528-8242

SPECIFICATIONS

| | |
|--|---|
| Vat Capacity..... | 95 gallons |
| Heat Transfer Oil Required..... | 17 gallons at 70°F. |
| Tank Construction..... | Double boiler type |
| Tank Opening Size (2)..... | 14.25" x 17.88" (each) |
| Maximum Heat Input..... | 260,000 B.T.U. |
| Burner & Temperature Control..... | Automatic - Digital readout. Hot oil and material. Auto flame shutdown. |
| Engine - Yanmar Model L 100V - Diesel Fueled..... | Single Cylinder (Max. Output) 9.1 BHP @ 3600 rpm |
| Drive Mechanism..... | All hydraulic with two speed forward and reverse action. |
| Mixer..... | Horizontal shaft with 4 sweep paddles |
| Dry Shipping Weight (Skid)..... | Approximately 3,000 lbs. |
| Maximum Equipped Weight (Skid)..... | Approximately 4,850 lbs. |
| Dry Weight Trailer (If Equipped)..... | 900 lbs. |

Patcher I Diesel

OPERATING INSTRUCTIONS

INTRODUCTION

The Crafcro Patcher I Diesel Mixer was developed to melt patching material.

DO NOT operate machine without following these instructions:

1. Check engine crankcase oil level (refer to Engine Operator Manual).
2. Check hydraulic fluid level, at ambient temperature. Add fluid if necessary to bring to correct level (approximately 3" below top of filler tube).
3. Check heat transfer oil level (see Fig. 4). At 70°F., the oil should touch the dipstick. **DO NOT** overfill or spillage may occur when oil is heated and expands. **NEVER REMOVE DIPSTICK WHEN OIL IS HOT.**
4. The rear discharge material valve should be in the closed position and the Burner Control toggle switch "OFF."
5. Fill engine tank with diesel fuel - **DO NOT FILL ENGINE FUEL TANK WHEN BURNERS ARE LIT (see Fig. 7).**
6. Lubricate mixer bearings weekly (see Fig. 1).
7. Make sure discharge gate is in the closed position (see Fig. 2).
8. Place the hydraulic control valve switch in the neutral position (see Fig. 3).

MACHINE START UP

1. Start engine. To start engine, insert key into the control panel. Turn key to first position. Warning lights should turn "ON." Turn key to second position. Engine should start. Release key when engine is running. Leave at idle for a few minutes. Move throttle lever to set engine at desired speed (see Fig. 5). Make sure hydraulic control valve switch is in the neutral position.
2. Set temperature dials to desired temperature. Hot oil temperature should not exceed 525°F. and material 410°F. (see Fig. 6).
3. Turn toggle switch "ON" (see Fig. 6).

CAUTION



If burners do not ignite the first time, turn toggle switch "OFF." Turn toggle switch "ON." Burner should ignite. If burner still does not ignite, determine cause of malfunction (see Trouble Shooting Guide, page 25).

4. Allow the heating oil to continue to heat. Place bags of material in the mixer and heat. Start the mixer as soon as possible to break up the bags. When loading solid material into the mixer tank, the mixer will stop when lifting the lid (if equipped with lid switches), add material and close the lid again to start the mixer. Following this procedure will prevent the hot material from splashing and causing serious burns to personnel.

Engage the mixer by moving the mixer hydraulic control toggle switch to forward or reverse rotation. When changing the speed of mixing, move both bypass hydraulic valves simultaneously. If mixer jams, switch may be moved for opposite rotation. The speed of mixing is controlled by the position of the 2 bypass hydraulic valves (see Fig. 8). The valves should be moved together (either in or out) not one at a time. The minimum amount of material needed for proper mixer operation is 400 lbs.

5. Temperature readout on burner control box indicates material temperature. When patching material reaches correct application temperature, material may be drawn off as desired. Discharge gate is opened by moving handle down. Drain material into pour bucket.

Remove excess patching material from chute with scraping tool.

CAUTION: Be sure discharge gate is completely closed after each draw off. Lock handle with safety chain if machine is transported (see Fig. 2).



grease fitting

Fig. 1



safety chain

discharge gate

Fig. 2

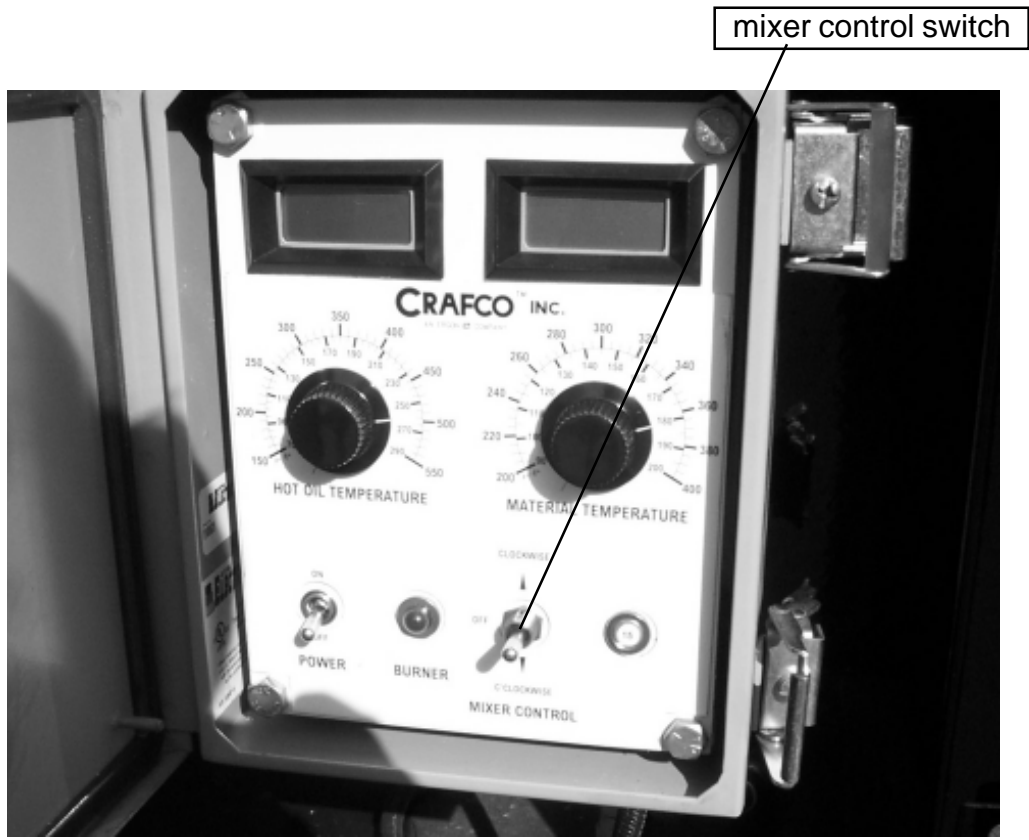


Fig. 3



Fig. 4



Fig. 5

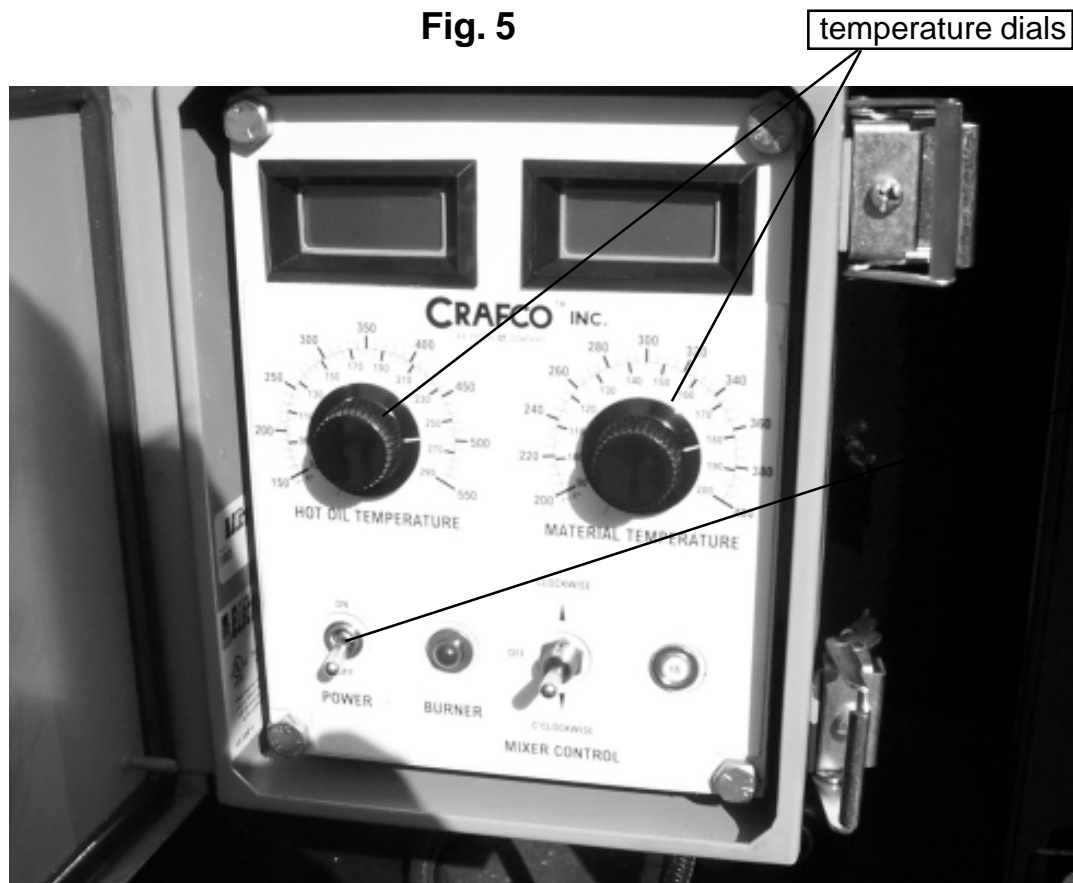


Fig. 6

engine fuel tank

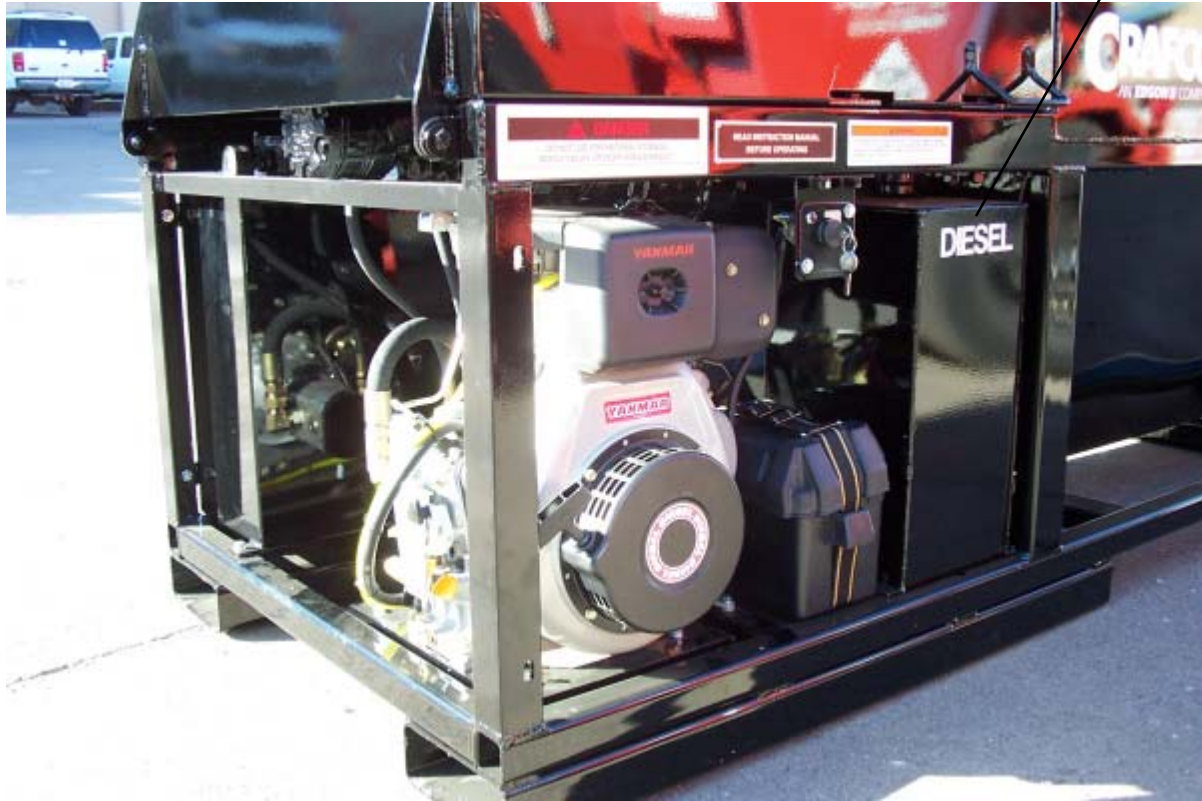


Fig. 7

by-pass valves

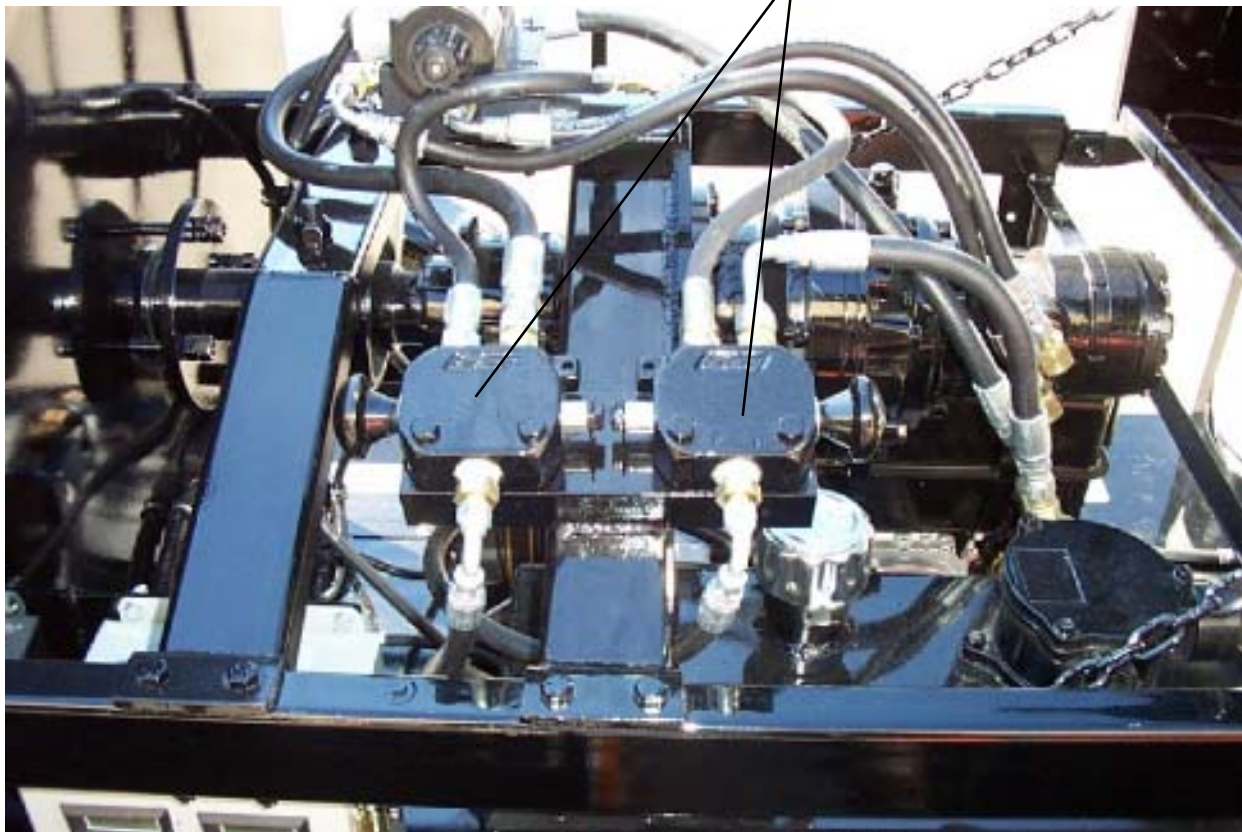


Fig. 8

CAUTION

Extreme care must be used when operating this equipment. Safety is the result of being careful and paying attention to details. Certain exposed parts of this machine, when operating, reach 500°F.; the material as high as 400°F. and the hydraulic fluid may reach 200°F. **Always** wear protective clothing and eye protection. Be sure that all joints and fittings are tight and leakproof. Immediately replace any hose which show signs of wear, fraying or splitting. Tighten all bolts, nuts and screws every 100 hours.

SHUTDOWN PROCEDURE

1. Turn burner toggle switch to "OFF."
2. Return mixer hydraulic control switch to "OFF" position.
3. Turn off engine by closing stop lever and turn off key.

STORING MACHINE

The Patcher I Diesel should be stored in an area where moisture cannot enter machine. Extended down time can cause moisture build up in heating oil tank.

If there is any suspicion moisture that may have collected in heat transfer oil, warm heat transfer fluid to 300°F. for 2 to 3 hours to evaporate the moisture.

TROUBLE SHOOTING CHART

| PROBLEM | CAUSE | REMEDY |
|-------------------------|--|---|
| Mixer will not rotate | Sealant temperature too low. | Continue to heat material |
| | Too many blocks placed at one time. | Continue to heat material & try reversing mixer. |
| | Inadequate hydraulic flow/pressure | Check hydraulic fluid level. Reset pressure/check flow if necessary. |
| Slow heat up of sealant | Build up of coked or crystallized material on the inside of material tank. | Allow machine to cool. Remove deposits and flush with solvent. |
| | Burner not operating | See Burner Trouble Shooting Guide. |
| | Low heating oil level | Make sure fluid level is correct |
| | Low heating oil temperature | See at recommended temperature |
| | Heating oil old or has crystallized | Replace it as recommended every 500 hours |
| Mixer will not rotate | Mixer toggle switch turned off | Turn on toggle switch |
| | Bad wire connection | Find and repair |
| | Bad control valve | Replace valve |
| | Hydraulic cartirdge failure | Remove and replace |
| | Hydraulic coil failure | Remove and replace |

SERVICE INSTRUCTIONS

1. Conduct a general inspection of your machine at least once a week. Replace all worn or damaged parts, make any necessary adjustments and tighten all loose nuts or screws.



2. Keep regular replacement items in stock for emergency repairs, to avoid costly “down” time. Refer to general maintenance items.
3. Watch for leaks - tighten packing on mixer if necessary.
4. Clean machine externally periodically. Check with material manufacturer for recommendation.
5. Follow “Recommended Maintenance Procedures” per Maintenance Chart, page 20.

MAINTENANCE INSTRUCTIONS

ENGINE:

Check oil daily. Service engine per Yanmar owners manual. See engine owners manual for additional operating and maintenance instructions.

HYDRAULIC SYSTEM:

Check hydraulic fluid daily. Change hydraulic filter after 250 hours. Change hydraulic fluid every 500 hours of operation.

MIXER PACKING GLAND/SEALS:

Tighten gland while hot at 40 hour intervals. Do not overtighten.

MIXER SHAFT BEARINGS:

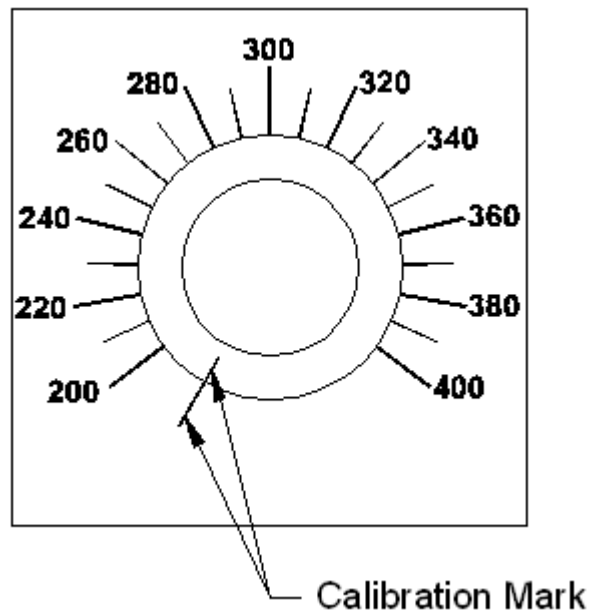
Lubricate weekly using a good grade of high temperature grease.

HEAT TRANSFER OIL:

Check level daily. Oil should touch dipstick when 70°F. Do not overfill (see Fig. 4).

TEMPERATURE CONTROL CALIBRATION

Check control knob calibration weekly. Calibrate by aligning the line on the control knob with the calibration line on the scale plate (see below).



MAINTENANCE CHART

| | | HOURS | | | |
|----------------------------------|---|---------------------------|----|-----|-----|
| LOCATION | PROCEDURE | 8 | 40 | 250 | 500 |
| Engine Check Oil Level | See Engine Instruction Manual. | * | | | |
| Other Engine Maintenance | See Engine Operating & Maintenance Instructions. | | | | |
| Battery | Check Water Level Weekly. | | | | |
| Mixer Shaft Packing | Tighten when hot at 40 hour intervals. Do not overtighten. | | * | | |
| Heat Transfer Oil | Check (every 8 hours) | * | | | |
| | Change | After 500 hours or 1 year | | | |
| Hydraulic Oil Return Line Filter | Change at 250 hour | | | * | |
| Hydraulic Oil | Check Oil (every 8 hours) | * | | | |
| | Change Oil (every 500 hours) | | | | * |
| | For proper oil, see Recommended Fluids & Lubricants, page 21. | | | | |
| Mixer Shaft Bearings | Grease using good grade of bearing grease. | | o | | |

RECOMMENDED FLUIDS & LUBRICANTS

| APPLICATION | RECOMMENDED | FULL POINT |
|-------------------|------------------------------------|------------|
| Engine oil | Refer to Yanmar owners manual. | 1.7 Qts. |
| Diesel | #1 Cold climate #2 Warm climate | 7.4 Gals. |
| Hydraulic oil | Rondo Oil - HD - 46 Texaco | 12 Gals. |
| Heat transfer oil | Regal R&O 68 | 17 Gals. |

The following is a list of suitable Heat Transfer Oils to be used in CrafcO equipment.

| PRODUCER | PRODUCT NAME | PRODUCT NO. |
|-------------|----------------------|-------------|
| Texaco | Regal | R&O 68 |
| Gulf | Harmony | 68 |
| Shell | Thermia | "C" |
| Exxon | Teresstic | 68 |
| Phillips | Magnus | 68 |
| Chevron USA | Heat Transfer Oil #1 | |
| Conoco | Dectol R&O | 68 |
| Union Oil | Turbine Oil | 68 |

TYPICAL SPECIFICATIONS

| | | | |
|------------------------|--------|-----------------|--------|
| ISO | 68 | Viscosity Index | 95-100 |
| Flash Point, COC | 445°F. | Pour Point | 0°F. |
| Viscosity @ 100°F.-SUS | 325 | Carbon Residue | 1% |
| Viscosity @ 210°F.-SUS | 50 | | |



WARNING

The Heat Transfer Oil in this machine is a grade that has been tested and recommended by CRAFCO, Inc. The addition of any grade of oil not specifically recommended by CRAFCO, Inc. shall be cause for the voidance of all warranties.

All oils subjected to high temperatures deteriorate with time and lose many of their characteristics. Tests conducted by CRAFCO, Inc. have determined that for best results and safety, the Heat Transfer Oil in this machine must be drained and replaced with recommended oil after five hundred (500) hours of operation or one (1) year, whichever occurs first.

GENERAL MAINTENANCE ITEMS

| RECOMMENDED QUANTITY | DESCRIPTION | PART NO. |
|----------------------|----------------------|----------|
| 1 | Packing, mixer shaft | 32226 |
| 1 | Diesel Burner | 43110 |
| 1 | Fuel Filter | 56932 |

INSTRUCTIONS FOR ORDERING PARTS

Parts may be ordered from your local CRAFCO distributor or directly from CRAFCO, Inc. if a distributor is not available in your area. When ordering parts, give the following information:

1. Part Number
2. Machine Model
3. Serial Number from Name Plate

Write or telephone:

CRAFCO, Inc.
420 N. Roosevelt Ave.
Chandler, AZ 85226
Phone: (602) 276-0406
Toll Free: 1-800-528-8242

HOT APPLIED PATCHING MATERIAL PLACEMENT

Prior to the material application you will need to move the equipment to the work area. The items needed are:

1. Compressor
2. Saw to cut out repair area
3. Pneumatic hammer
4. Broom and shovels to clean up area
5. Broom or sweeper (if required to remove FOD)
6. TechCrete machine, material, and application tools
7. Dressing stone
8. Heat lance
9. Primer
10. "Hudson" sprayer for the primer
11. Paint brushes
12. Small paint cans
13. Rags
14. 1 or 2 gallons of water (to speed up cooling process if required)
15. Gloves, heavy welder gloves and standard leather gloves
16. Cloth duct tape
17. Reference materials

APPLICATION STEPS

1. Locate area to be repaired.
2. Mark the areas to be cut out. Make sure you cut out enough of the pavement to remove all cracking around the patch area. If the repair area extends to both sides of a joint, the repair area must be a minimum of 4" on each side of the joint.
3. Cut with either a wet or dry saw. The saw should cut a minimum of 1-1/2" to 2" deep.
4. Remove the remaining material with a chipping or jack hammer to a minimum depth of 1-1/2 to 2".
5. After the repair area has all the loose material removed, use the hot air lance to clean and dry the pavement.
6. Apply tape 1/4" from the edge of the prepared area.
7. Prime the area with the Primer using the "Hudson" sprayer or paint brushes. If spraying the primer on repair areas, you may need to do some touch-up with a paint brush. When touching up, you want to cover any missed spots and spread any pooled primer. Allow the primer to set up which takes about 10-12 minutes. **DO NOT DRY WITH A TORCH.**

APPLICATION OF THE PATCHING PRODUCT

During the time you have been preparing the patch areas you should have calculated the amount of material needed for the repairs.

Place bags of material in the mixer and heat. Start the agitator as soon as possible to break up the bags. The heat up time is usually within 60-90 minutes. Care should be taken not to overheat the material. If material temperature is too high, lower the burner material temperature control and/or open the lid.

1. Have the tools needed for the repair heating in the heated box.
2. Heat the discharge gate.
3. Remove at least two pails of product and pour back into the melter. This will insure a good flow of material when you start the application.
4. Apply the first lift of material to the repair. Apply adequate material so you get material within 1" of surface.
5. Allow the material to cool for a period of time allowing air bubbles to move to the surface of the product. The bubbles are generated from uncured primer, air, or moisture. When the bubbles stop rising to the surface (usually within 15-20 minutes). Flash surface with hand torch to "pop" bubbles.
6. Apply the next level and float surface of the material with the hot irons. Seal the edges of the repair by pulling liquid to the edge, then remove the duct tape. The main portion of the material will self level, but you may need to do some smoothing with the hot iron to insure a level surface.
7. Allow this material to cool similar to the first lift - you may not experience as many bubbles this time but some may appear. When they do, flash them with the torch.
8. Dry the aggregate dressing prior to placing on TechCrete material as wet or damp dressing will not adhere. Smooth the aggregate dressing material over the patched area with your gloved hand. This will insure coverage of the whole surface of the TechCrete.

If you applied the aggregate dressing material too soon the bubbles will continue to rise to the surface and pop leaving a pock marked surface. If this occurs, adjust your timing to allow more bubbles to break the surface.

9. Shut down the melter and clean up the repaired area. If the cooling time of the material needs to be shortened, broadcast some water over the surface.
10. Sweep excess aggregate dressing material from the surface of the repair and finish clean up.

BURNER TROUBLE SHOOTING

BURNER WILL NOT IGNITE

Step 1: Check for 12 volts at "POWER" toggle switch.

No: Engine key "OFF"
Toggle switch "OFF"
Blown fuse
Broken wire

YES: 12 volts at terminal #4 on "MATERIAL" Pak-Stat

NO: Bad Pak-Stat
Faulty sensor

YES: Check for 12 volts at terminal #7 on "OIL" Pak-Stat

NO: Bad Pak-Stat
Faulty sensor

YES: Check for 12 volts at solenoid (frame).

NO: Bad solenoid
Bad connection at battery
Faulty circuit breaker
Broken or loose wire

YES: Faulty DC Controller, poor ground / loose wire
Faulty or dirty flame
Faulty igniter transformer, cracked electrode (ceramic)
Incorrect igniter gap
Faulty fuel solenoid
Bleed fuel pump / check fuel pump coupling
Fuse under DC Controller
Blower motor relay
Faulty blower motor
Faulty 12 volt battery



BURNER LIGHTS BUT SHUTS DOWN AFTER 15 SEC.

Faulty flame eye
Broken, loose flame eye sensor wires, receptacle
Faulty DC Controller

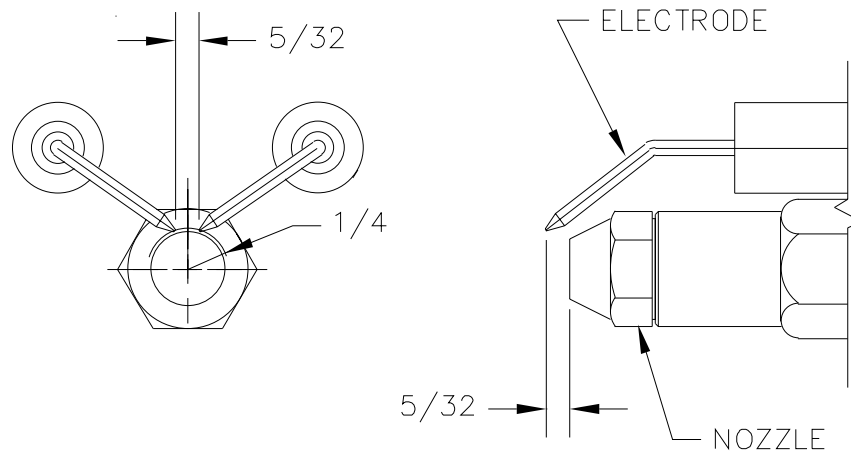
BURNER LIGHTS BUT WILL NOT RELIGHT

Bad connection at battery
Broken or loose wires
Faulty DC Controller
Faulty 12 volt battery

EXCESSIVE SMOKE FROM BURNER EXHAUST

Air vent incorrectly set - set at 7
Blower motor not turning at correct speed
Faulty 12 volt battery

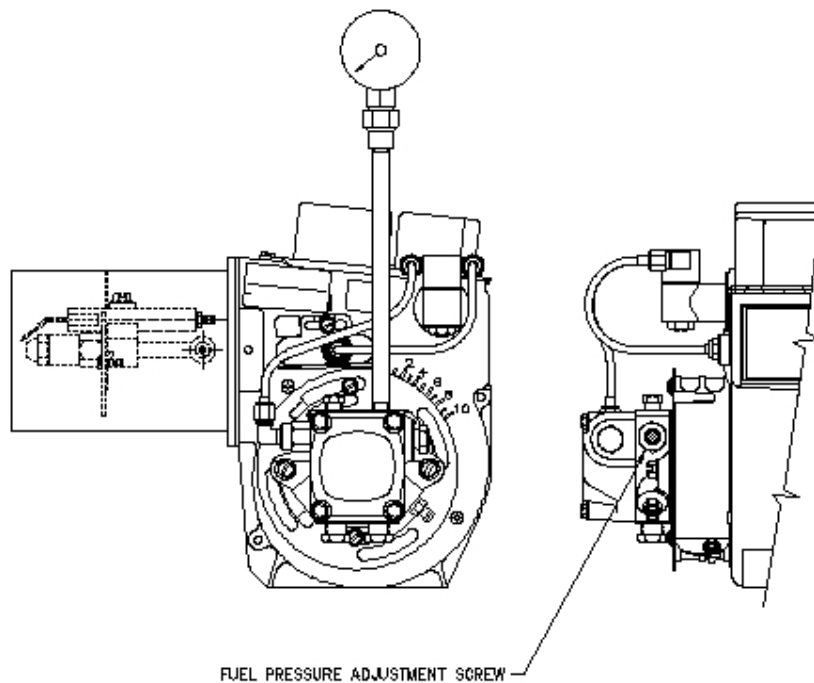
DIESEL BURNER ELECTRODE ADJUSTMENTS



DIESEL BURNER SETTINGS

Air Shutter = 6
Air Band = 0
Fuel Pressure = 140 PSI

Use fuel and hydraulic pressure gauge kit part number 29960.



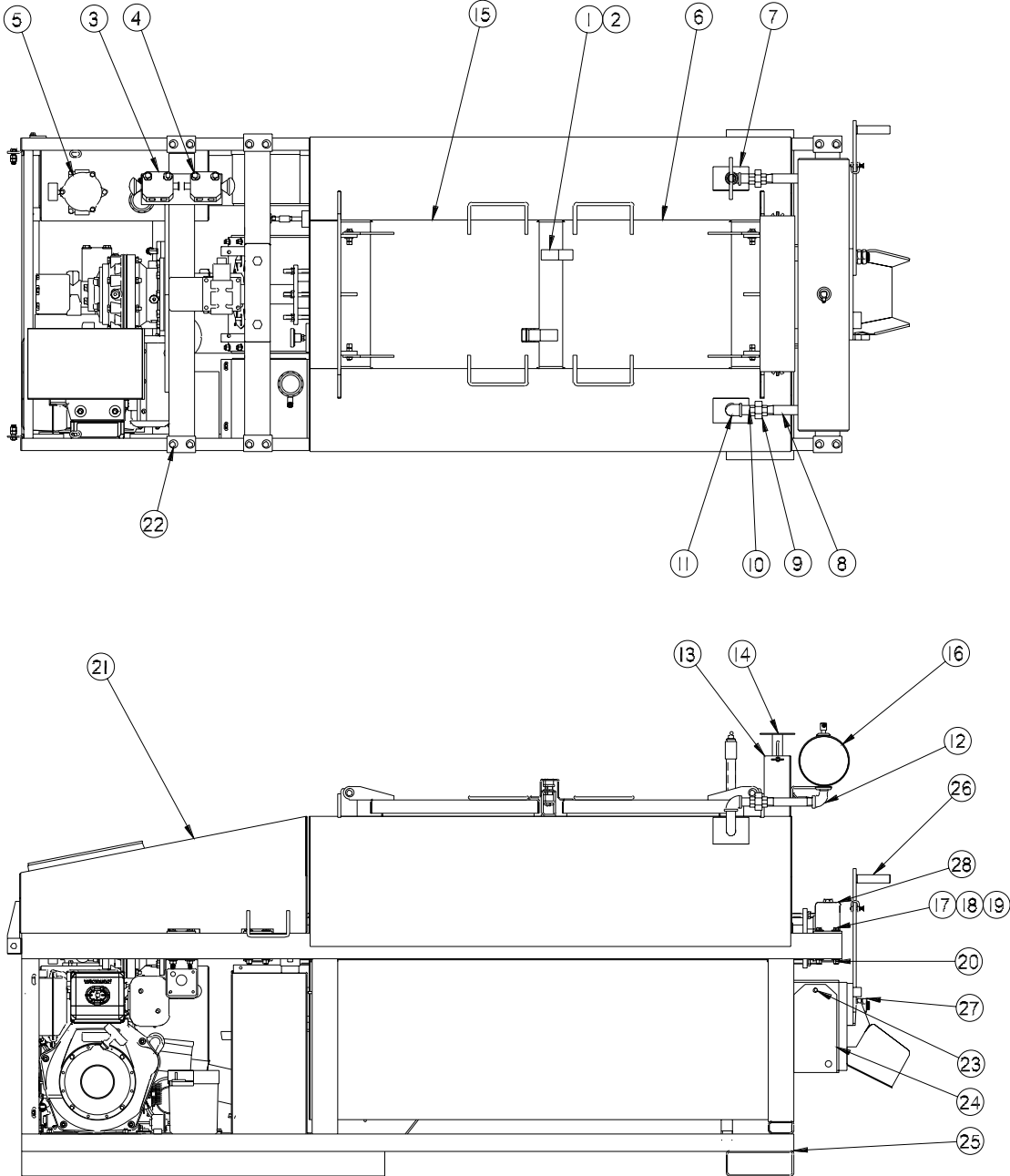
RTD SENSOR - OHMS vs. TEMPERATURE

The following chart shows what the ohm reading would be for a given temperature. The following are the instructions for use.

1. Measure the resistance (Ohms) of the sensor in question with an Ohm meter.
2. Find the reading in the chart.
3. Follow the row to the left and get the temperature in 10° increment, then follow the column up to get the 1° increment. Example: 1573 Ohms = 302°

| °F | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|-----|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0 | 930.3 | 932.5 | 934.7 | 936.9 | 939.1 | 941.3 | 943.4 | 945.6 | 947.8 | 950.0 |
| 10 | 952.2 | 954.3 | 956.5 | 958.7 | 960.9 | 963.0 | 965.2 | 967.4 | 969.6 | 971.8 |
| 20 | 973.9 | 976.1 | 978.3 | 980.5 | 982.6 | 984.8 | 987.0 | 989.1 | 991.3 | 993.5 |
| 30 | 995.7 | 997.8 | 1000.0 | 1002.2 | 1004.3 | 1006.5 | 1008.7 | 1010.9 | 1013.0 | 1015.2 |
| 40 | 1017.4 | 1019.5 | 1021.7 | 1023.9 | 1026.0 | 1028.2 | 1030.4 | 1032.5 | 1034.7 | 1036.9 |
| 50 | 1039.0 | 1041.2 | 1043.4 | 1045.5 | 1047.7 | 1049.8 | 1052.0 | 1054.2 | 1056.3 | 1058.5 |
| 60 | 1060.7 | 1062.8 | 1065.0 | 1067.1 | 1069.3 | 1071.5 | 1073.6 | 1075.8 | 1077.9 | 1080.1 |
| 70 | 1082.2 | 1084.4 | 1086.6 | 1088.7 | 1090.9 | 1093.0 | 1095.2 | 1097.3 | 1099.5 | 1101.6 |
| 80 | 1103.8 | 1106.0 | 1108.1 | 1110.3 | 1112.4 | 1114.6 | 1116.7 | 1118.9 | 1121.0 | 1123.2 |
| 90 | 1125.3 | 1127.5 | 1129.6 | 1131.8 | 1133.9 | 1136.1 | 1138.2 | 1140.4 | 1142.5 | 1144.7 |
| 100 | 1146.8 | 1149.0 | 1151.1 | 1153.2 | 1155.4 | 1157.5 | 1159.7 | 1161.8 | 1164.0 | 1166.1 |
| 110 | 1168.3 | 1170.4 | 1172.5 | 1174.7 | 1176.9 | 1179.0 | 1181.1 | 1183.3 | 1185.4 | 1187.5 |
| 120 | 1189.7 | 1191.8 | 1194.0 | 1196.1 | 1198.2 | 1200.4 | 1202.5 | 1204.6 | 1206.8 | 1208.9 |
| 130 | 1211.0 | 1213.2 | 1215.3 | 1217.5 | 1219.6 | 1221.7 | 1223.9 | 1226.0 | 1228.1 | 1230.3 |
| 140 | 1232.4 | 1234.5 | 1236.7 | 1238.9 | 1240.9 | 1243.0 | 1245.2 | 1247.3 | 1249.4 | 1251.6 |
| 150 | 1253.7 | 1255.8 | 1258.0 | 1260.1 | 1262.2 | 1264.3 | 1266.5 | 1268.6 | 1270.7 | 1272.8 |
| 160 | 1275.0 | 1277.1 | 1279.2 | 1281.3 | 1283.5 | 1285.6 | 1287.7 | 1289.8 | 1292.0 | 1294.1 |
| 170 | 1296.2 | 1298.3 | 1300.4 | 1302.6 | 1304.7 | 1306.8 | 1308.9 | 1311.0 | 1313.2 | 1315.3 |
| 180 | 1317.4 | 1319.5 | 1321.6 | 1323.8 | 1325.9 | 1328.0 | 1330.1 | 1332.2 | 1334.3 | 1336.5 |
| 190 | 1338.6 | 1340.7 | 1342.8 | 1344.9 | 1347.0 | 1349.1 | 1351.2 | 1353.4 | 1355.5 | 1357.6 |
| 200 | 1359.7 | 1361.8 | 1363.9 | 1366.0 | 1368.1 | 1370.2 | 1372.4 | 1374.5 | 1376.6 | 1378.7 |
| 210 | 1380.8 | 1382.9 | 1385.0 | 1387.1 | 1389.2 | 1391.3 | 1393.4 | 1395.5 | 1397.6 | 1399.7 |
| 220 | 1401.8 | 1403.9 | 1406.0 | 1408.1 | 1410.3 | 1412.4 | 1414.5 | 1416.6 | 1418.7 | 1420.8 |
| 230 | 1422.9 | 1425.0 | 1427.1 | 1429.2 | 1431.3 | 1433.4 | 1435.5 | 1437.6 | 1439.7 | 1441.7 |
| 240 | 1443.8 | 1445.9 | 1448.0 | 1450.1 | 1452.2 | 1454.3 | 1456.4 | 1458.5 | 1460.6 | 1462.7 |
| 250 | 1464.8 | 1466.9 | 1469.0 | 1471.1 | 1473.2 | 1475.3 | 1477.3 | 1479.4 | 1481.5 | 1483.6 |
| 260 | 1485.7 | 1487.8 | 1489.9 | 1492.0 | 1494.1 | 1496.1 | 1498.2 | 1500.3 | 1502.4 | 1504.5 |
| 270 | 1506.6 | 1508.7 | 1510.8 | 1512.8 | 1514.9 | 1517.0 | 1519.1 | 1521.2 | 1523.3 | 1525.3 |
| 280 | 1527.4 | 1529.5 | 1531.6 | 1533.7 | 1535.7 | 1537.8 | 1539.9 | 1542.0 | 1544.1 | 1546.1 |
| 290 | 1548.2 | 1550.3 | 1552.4 | 1554.5 | 1556.5 | 1558.6 | 1560.7 | 1562.8 | 1564.8 | 1566.9 |
| 300 | 1569.0 | 1571.1 | 1573.1 | 1575.2 | 1577.3 | 1579.4 | 1581.4 | 1583.5 | 1585.6 | 1587.7 |
| 310 | 1589.7 | 1591.8 | 1593.9 | 1595.9 | 1598.0 | 1600.1 | 1602.2 | 1604.2 | 1606.3 | 1608.4 |
| 320 | 1610.4 | 1612.5 | 1614.6 | 1616.6 | 1618.7 | 1620.8 | 1622.8 | 1624.9 | 1627.0 | 1629.0 |
| 330 | 1631.1 | 1633.2 | 1635.2 | 1637.3 | 1639.3 | 1641.4 | 1643.5 | 1645.5 | 1647.6 | 1649.7 |
| 340 | 1651.7 | 1653.8 | 1655.8 | 1657.9 | 1660.0 | 1662.0 | 1664.1 | 1666.1 | 1668.2 | 1670.2 |
| 350 | 1672.3 | 1674.4 | 1676.4 | 1678.5 | 1680.5 | 1682.6 | 1684.6 | 1686.7 | 1688.7 | 1690.8 |
| 360 | 1692.9 | 1694.9 | 1697.0 | 1699.0 | 1701.1 | 1703.1 | 1705.2 | 1707.2 | 1709.3 | 1711.3 |
| 370 | 1713.4 | 1715.4 | 1717.5 | 1719.5 | 1721.6 | 1723.6 | 1725.7 | 1727.7 | 1729.8 | 1731.8 |
| 380 | 1733.9 | 1735.9 | 1737.9 | 1740.0 | 1742.0 | 1744.1 | 1746.1 | 1748.2 | 1750.2 | 1752.3 |
| 390 | 1754.3 | 1756.3 | 1758.4 | 1760.4 | 1762.5 | 1764.5 | 1766.6 | 1768.6 | 1770.6 | 1772.7 |
| 400 | 1774.7 | 1776.8 | 1778.8 | 1780.8 | 1782.9 | 1784.9 | 1786.9 | 1789.0 | 1791.0 | 1793.1 |
| 410 | 1795.1 | 1797.1 | 1799.2 | 1801.2 | 1803.2 | 1805.3 | 1807.3 | 1809.3 | 1811.4 | 1813.4 |
| 420 | 1815.4 | 1817.5 | 1819.5 | 1821.5 | 1823.6 | 1825.6 | 1827.6 | 1829.6 | 1831.7 | 1833.7 |
| 430 | 1835.7 | 1837.8 | 1839.8 | 1841.8 | 1843.8 | 1845.9 | 1847.9 | 1849.9 | 1851.9 | 1854.0 |
| 440 | 1856.0 | 1858.0 | 1860.0 | 1862.1 | 1864.1 | 1866.1 | 1868.1 | 1870.2 | 1872.2 | 1874.2 |
| 450 | 1876.2 | 1878.2 | 1880.3 | 1882.3 | 1884.3 | 1886.3 | 1888.3 | 1890.4 | 1892.4 | 1894.4 |
| 460 | 1896.4 | 1898.4 | 1900.5 | 1902.5 | 1904.5 | 1906.5 | 1908.5 | 1910.5 | 1912.6 | 1914.6 |
| 470 | 1916.6 | 1918.6 | 1920.6 | 1922.6 | 1924.6 | 1926.6 | 1928.7 | 1930.7 | 1932.7 | 1934.7 |
| 480 | 1936.7 | 1938.7 | 1940.7 | 1942.7 | 1944.7 | 1946.8 | 1948.8 | 1950.8 | 1952.8 | 1954.8 |
| 490 | 1956.8 | 1958.8 | 1960.8 | 1962.8 | 1964.8 | 1966.8 | 1968.8 | 1970.8 | 1972.8 | 1974.8 |
| 500 | 1976.8 | 1978.8 | 1980.8 | 1982.9 | 1984.9 | 1986.9 | 1988.9 | 1990.9 | 1992.9 | 1994.9 |
| 510 | 1996.9 | 1998.9 | 2000.9 | 2002.9 | 2004.9 | 2006.9 | 2008.8 | 2010.8 | 2012.8 | 2014.8 |
| 520 | 2016.8 | 2018.8 | 2020.8 | 2022.8 | 2024.8 | 2026.8 | 2028.8 | 2030.8 | 2032.8 | 2034.8 |
| 530 | 2036.8 | 2038.8 | 2040.8 | 2042.8 | 2044.7 | 2046.7 | 2048.7 | 2050.7 | 2052.7 | 2054.7 |
| 540 | 2056.7 | 2058.7 | 2060.7 | 2062.7 | 2064.6 | 2066.6 | 2068.6 | 2070.6 | 2072.6 | 2074.6 |
| 550 | 2076.6 | 2078.5 | 2080.5 | 2082.5 | 2084.5 | 2086.5 | 2088.5 | 2090.4 | 2092.4 | 2094.4 |

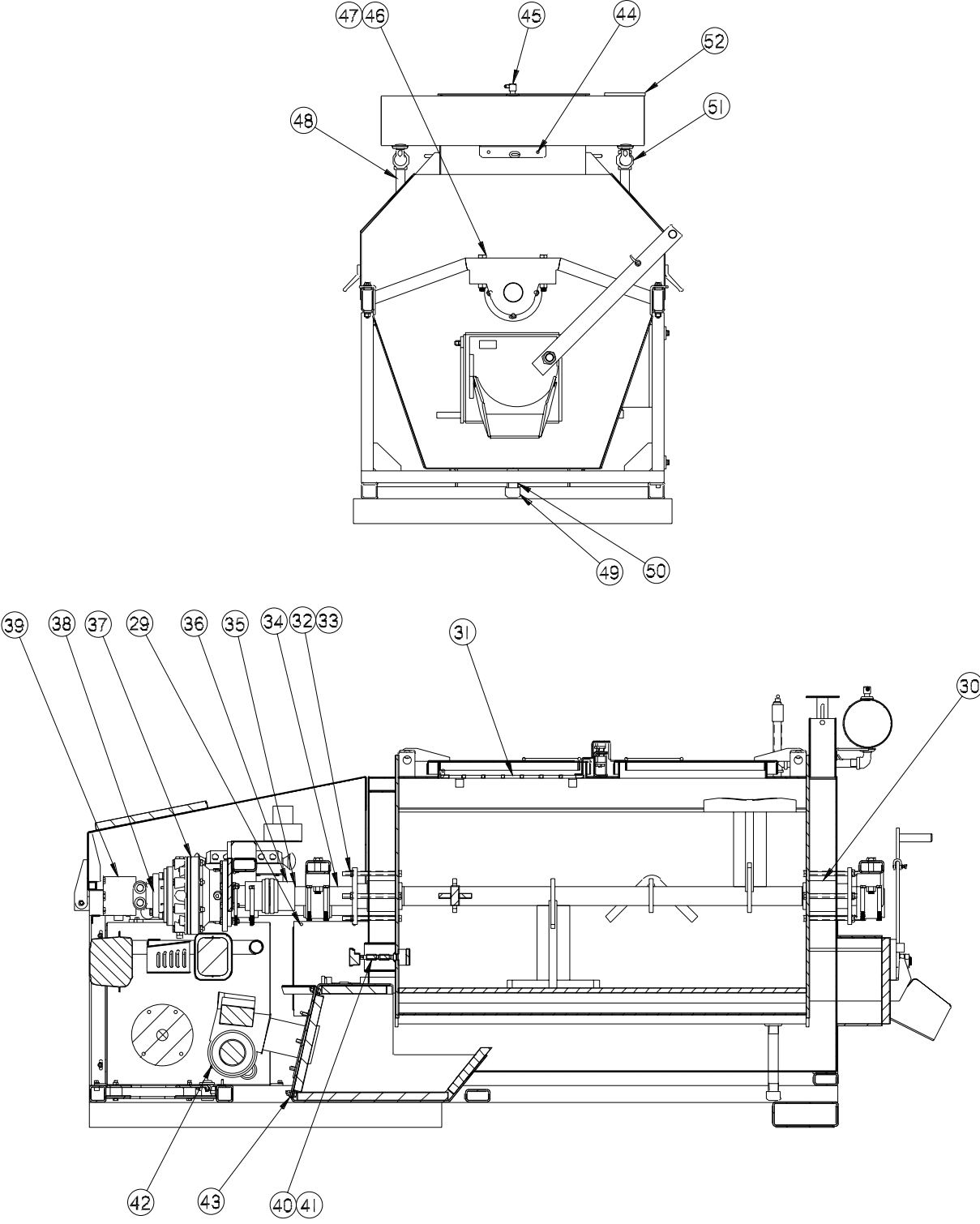
Patcher I Diesel



Patcher I Diesel

| NUMBER | PART NUMBER | QTY | DESCRIPTION |
|--------|-------------|-----|-------------------------------|
| 1 | 39608 | 2 | SWITCH - SAFETY (IF EQUIPPED) |
| 2 | 56362 | 2 | BRACKET - SWITCH |
| 3 | 56317 | 2 | SELECTOR VALVE |
| 4 | 28735 | 4 | BOLT, HEX 3/8-16 X 2 |
| 5 | 56310 | 1 | HYD TANK ASSEMBLY - TECHCRETE |
| 6 | 56237 | 1 | TANK LID ASSEMBLY |
| 7 | 56330 | 2 | COVER, OVERFLOW PIPE |
| 8 | 28071 | 2 | 3/4" X 6" PIPE NIPPLE |
| 9 | 28329 | 2 | 3/4" PIPE UNION |
| 10 | 28004 | 2 | 3/4" CLOSE NIPPLE |
| 11 | 28209 | 1 | 3/4" 90 DEG ELBOW |
| 12 | 28239 | 2 | 3/4" ELBOW |
| 13 | 56270 | 1 | EXHAUST DUCT ASSEMBLY |
| 14 | 56797 | 1 | VENT COVER ASSY |
| 15 | 56370 | 1 | MODIFIED LID ASSEMBLY |
| 16 | 56252 | 1 | OVERFLOW TANK ASSEMBLY |
| 17 | 56293 | 2 | BEARING, PILLOW BLOCK - 60 MM |
| 18 | 28648 | 21 | 7/16" LOCK WASHER |
| 19 | 28745 | 10 | 7/16"-14 X 4" BOLT |
| 20 | 28503 | 33 | NUT, HEX HEAD 7/16"-14 |
| 21 | 56325 | 1 | HOOD ASSEMBLY |
| 22 | 28756 | 2 | 7/16"-14 X 4-1/2" BOLT |
| 23 | 28502 | 10 | NUT, HEX HEAD 3/8-16 |
| 24 | 56350 | 1 | TORCH ACCESS DOOR ASSEMBLY |
| 25 | 56905 | 1 | FRAME PATCHER I DIESEL |
| 26 | 56359 | 1 | DOOR SWING GATE ASSEMBLY |
| 27 | 28520 | 2 | 1"-8 JAM NUT |
| 28 | 56240 | 2 | BEARING SUPPORT ASSEMBLY |

Patcher I Diesel



Patcher I Diesel

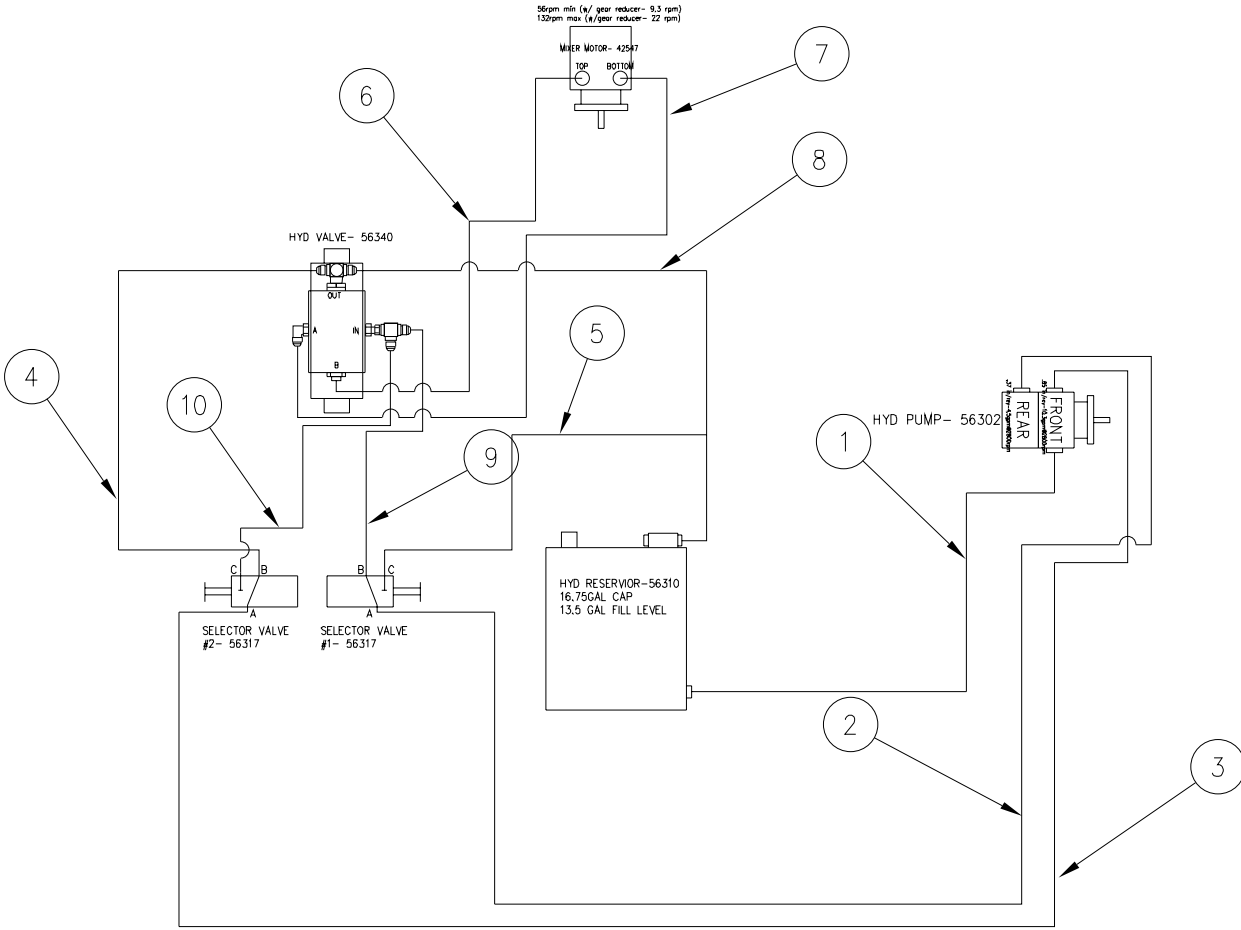
| NUMBER | PART NUMBER | QTY | DESCRIPTION |
|--------|-------------|-----|----------------------------------|
| 29 | 56288 | 1 | PLATE, CONTROL MOUNTING |
| 30 | 32226 | 2 | MIXER GLAND PACKING |
| 31 | 56365 | 1 | GRID ASSEMBLY |
| 32 | 28504 | 8 | 1/2"-13 HEX NUT |
| 33 | 56290 | 2 | PACKING GLAND ASSEMBLY |
| 34 | 56903 | 1 | TANK, ASSY PATCHER I DIESEL |
| 35 | 56332 | 1 | KEY-18MM X 11MM X 90MM LONG |
| 36 | 56334 | 1 | COUPLING HALF - GEAR BOX |
| 37 | 56203 | 1 | 6-1 GEARBOX ASSEMBLY |
| 38 | 56244 | 1 | ADAPTER COUPLING GEAR BOX (HYD.) |
| 39 | 42574 | 1 | MIXER MOTOR |
| 40 | 28001 | 1 | 1/4" CLOSE NIPPLE |
| 41 | 28176 | 2 | 1/4" COUPLING |
| 42 | 41891 | 1 | ADC 14 VOLT BURNER |
| 43 | 43110 | 1 | ANGLED DIESEL BURNER BOX |
| 44 | 56255 | 1 | ANGLE, OVERFLOW TANK SUPPORT |
| 45 | 29845 | 1 | 90 DEG. ELBOW |
| 46 | 28541 | 4 | 5/8"-11 UPSET LOCKNUT |
| 47 | 28782 | 4 | 5/8"-11 X 4" BOLT |
| 48 | 56264 | 2 | NIPPLE, 3/4 X 13 LONG |
| 49 | 28270 | 1 | 1" PIPE CAP |
| 50 | 28101 | 1 | 1" X 8" PIPE NIPPLE |
| 51 | 28254 | 1 | 3/4 NPT TEE |
| 52 | 56326 | 1 | H.O. DIPSTICK ASSEMBLY |

Patcher I Diesel

| NUMBER (Not Shown) | PART NUMBER | QTY | DESCRIPTION |
|-------------------------------|------------------------|------------|------------------------------|
| NS | 56302 | 1 | HYDRAULIC PUMP |
| NS | 56340 | 1 | HYDRAULIC VALVE |
| NS | 56916 | 1 | ENGINE, YANMAR 9.1 HP |
| NS | 56715 | 1 | CONTROL BOX ASSEMBLY |
| NS | 44829 | 1 | COUPLING HALF 1" |
| NS | 44830 | 1 | SPIDER FOR COUPLING |
| NS | 56303 | 1 | COUPLING HALF |
| NS | 44806 | 1 | ADAPTER, PUMP MOUNT |
| NS | 43465 | 1 | RTD SENSOR - 18" STEM |
| NS | 55120 | 1 | RTD SENSOR - 2" STEM |
| NS | 32243 | 1 | IRON |
| NS | 32246 | 1 | SCRAPPER |
| NS | 32276 | 1 | TOOL HEATER BOX |
| NS | 32263 | 1 | BUCKET |
| NS | 32258 | 1 | TANK SCRAPPER |
| NS | 56202 | 1 | PACTHER I TRAILER (OPTIONAL) |

Patcher I Diesel Notes

Patcher I Diesel HYDRAULIC DIAGRAM



Patcher I Diesel HYDRAULIC PARTS

| 1. HYDRAULIC RESERVOIR TO HYDRAULIC PUMP (SUCTION) | | |
|---|--------------------|-------------------------------------|
| 1 | 29901 | MALE CONNECTOR 3/4 TUBE X 1" NPT |
| 1 | C12-12FJ-12FJ9-22 | SUCTION HOSE |
| 1 | 29916 | O'RING ADAPTER - 12MB-12MJ-90° |
| 2. HYDRAULIC PUMP "REAR PORT" TO SELECTOR VALVE #1 | | |
| 1 | 29828 | 90° O'RING ADAPTER |
| 1 | AX6-6FJ-6FJ9-40 | 3/8 X 40" HYDRAULIC HOSE |
| 1 | 29841 | FITTING, STRAIGHT MALE 6MJ X 8MP |
| 3. HYDRAULIC PUMP "FRONT PORT" TO SELECTOR VALVE #2 | | |
| 1 | 29828 | 90° O'RING ADAPTER |
| 1 | AX6-6FJ-6FJ9-36 | 3/8 X 36" HYDRAULIC HOSE |
| 1 | 29841 | FITTING, STRAIGHT MALE 6MJ X 8MP |
| 4. SELECTOR VALVE #2 TO OUTLET PORT HYDRAULIC VALVE | | |
| 1 | 29844 | ADAPTER, 8MJ X 8MP |
| 1 | AX8-8FJ-8FJ-23 | 1/2 X 23" HYDRAULIC HOSE |
| 1 | 29912 | 1/2 SWIVEL NUT BRANCH "T" |
| 1 | 29913 | ADAPTER, 10 O'RING X 8 JIC STRAIGHT |
| 5. SELECTOR VALVE #1 TO HYDRAULIC RESERVOIR (RETURN) | | |
| 1 | 29844 | ADAPTER, 8MJ X 8MP |
| 1 | AX8-8FJ9L-8FJ-13.5 | 1/2 X 13-1/2 HYDRAULIC HOSE |
| 1 | 29886 | 1/2 MALE RUN "T" |
| 1 | 29909 | STRAIGHT O'RING 16 X 8 |

Patcher I Diesel HYDRAULIC PARTS

| 6. HYDRAULIC VALVE "B" PORT TO HYDRAULIC MOTOR TOP PORT | | |
|---|------------------|--------------------------|
| 1 | 22029 | STRAIGHT ADAPTER 6 X 10 |
| 1 | AX6-6FJ-6FJ9-22 | 3/8 X 22" HYDRAULIC HOSE |
| 1 | 29828 | 90° O'RING ADAPTER |
| 7. HYDRAULIC VALVE "A" PORT TO HYDRAULIC MOTOR BOTTOM PORT | | |
| 1 | 29828 | 90° O'RING ADAPTER |
| 1 | AX6-6FJ-6FJ9L-27 | 3/8 X 27 HYDRAULIC HOSE |
| 1 | 29828 | 90° O'RING ADAPTER |
| 8. HYDRAULIC VALVE OUTLET TO HYDRAULIC RESERVOIR (RETURN) | | |
| 1 | AX8-8FJ9-8FJ-24 | 1/2 X 24 HYDRAULIC HOSE |
| 9. SELECTOR VALVE #1 TO HYDRAULIC VALVE INLET | | |
| 1 | AX6-6FJ-8MP-18 | 3/8 X 18" HYDRAULIC HOSE |
| 10. SELECTOR VALVE #2 TO HYDRAULIC VALVE INLET | | |
| 1 | AX6-6FJ-8MP-18 | 3/8 X 18" HYDRAULIC HOSE |
| 1 | 29866 | 3/8 JIC RUN "T" |
| 1 | 22029 | STRAIGHT ADAPTER 6 X 10 |

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