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Chapter 1 : 12V DC Arctic Series Pump

Product Description Fill-Rite FRV fuel transfer pump has a V motor and a 20 gallons.

Standard swing return drain tube eliminates messy work area. Lightweight and portable, with a variety of options, these pumps meet a full range of applications. Ideal for gasoline, oil or a wide variety of approved liquids. The Model Z98 mechanical meter is available as an option. Flow rates will vary according to viscosity and other working conditions. Especially suited for extracting used oil from motor vehicles. Flow rates are from 59 to LPM. The case structure is stamped metal with anti-corrosion treatment and painted for outside use. The units utilize a panel that is treated for corrosion and painted for outdoor use and an integral nozzle holder. These Transfer Kits can be mounted either wall hung or free standing. Flow ranges are from 58 to 75 LPM. These pumps are equipped with self ventilating induction AC motors in V or V, 50Hz or 60Hz configurations - all with IP 55 protection, class F insulation and thermal protection. A by-pass valve is located in the pump body. The pump casting is cast iron treated against corrosion and painted. The pump rotor is sintered steel with a Stainless Steel strainer built into the pump body. All models are equipped with self-priming, AC rotary vane pumps with integrated by-pass and strainer. The self ventilating induction motor has IP 55 protection, class F insulation and thermal protection located in the windings. The pump and motor are installed on an anti-vibration support. Also, included in the Distributors are a volumetric mechanical flow-meter, 4 M X 19 MM rubber delivery hose with brass ends, automatic nozzle with a brass swivel fitting. The Vision Fuel Distributors are easy to maintain, operate and contain an automatic switch for quick and safe operation. Motors have IP 55 protection. A by-pass valve is incorporated in the pump body. Included is a "bolt on" pump support bracket. Kits incorporate 4 M X 19 MM rubber delivery hose with brass ends and aluminum nozzle with 1" female brass swivel fitting. Flow ranges are from 38 to 60 LPM. Flow ranges of 30 - 40 LPM. Standard with metal case. Kits incorporate 4 M X 19 MM rubber delivery hose with brass ends, suction strainer and aluminum nozzle with 1" female brass swivel fitting. Standard with plastic carrying case - metal case optional. Flow rated at 40 - 42 LPM. Pumps are standard with metal case. Motors have IP 55 protection and 30 minute intermittent duty cycle. By-pass valve and Stainless Steel strainer are incorporated in the pump body. Included is a bolt on pump support bracket. This kit incorporates the Model Z98 aluminum mechanical flow meter Models: Flow rated at 40 - 41 LPM. These pumps include stainless steel shaft, permanent magnets with brushes and IP 55 protection on motor, brass pump body, in-line strainer, power cable and battery clips. Flow rated at 14 LPM. Also, includes, telescoping suction tube, ring nut and plastic carrying case - metal case optional. A high horse power-to-flow ratio assures adequate power to pump viscous fluids at low temperatures. The pump mounts on a standard barrel bung and is shipped with a quick-detach adapter. The pump has an internal bypass valve to bypass flow if the discharge pressure exceeds the bypass valve setting. The pump kit mounts on a standard barrel and comes complete with mounting bracket, hose, nozzle, quick-detach adapter and suction pipe. The pump can also be used for transferring waste oil. The LP On-Demand pump employs a gerotor gear design driven by an electric motor to dispense the fluid. A pressure sensing system is utilized to start the pump when the hose end valve is opened. It also stops the pump when the hose end valve is closed, blocking flow. Flat power curve over entire vacuum range prevents motor overload. Reduced stress on motor shaft and bearing. Increased water handling capacity prevents heat build up, extends life of mechanical seals. Flows to CFM. There is no metal-to-metal contact inside the pumping chamber, so wear is minimized. The triplex piston design is practically vibration free. Since these pumps have no metal-to-metal contact from the clearances being filled with oil, these pumps are rugged and reliable. All models include gas ballast valves and KF flanges.

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Chapter 2 : Fuel Transfer Pump AC | eBay

NEW TUTHILL FILL RITE FR BARREL DRUM HEAVY DUTY ROTARY HAND FUEL OIL PUMP. Item model number: FR Pump can be set up for reverse flow. Pump can be padlocked for security.

The invention relates to rotary pumps such, for example, as those which are adapted for delivering fuel under pressure to oil-burners. The primary object of the invention is to provide an improved pump of the rotary type, which is readily adaptable for right or left-hand rotation, that is, clockwise or counterclockwise drive, without requiring any reconstruction or change in the inlet and outlet piping. This makes it possible readily to apply the pump to a right or left-hand electric motor. Another object of the invention is to provide a rotary pump which is generally of new and improved construction and may be manufactured at a low and reasonable cost. Other objects of the invention and the various advantages and characteristics of the present pump will be apparent from a consideration of the following detailed description. Fig 8 is a section on the line of Fig. The invention is exemplified in an oil-pumping unit comprising a pump-housing 10 having an inlet II in one of its sides for receiving oil from -, a pipe 12 Fig. The pump is of the internal gear type and comprises an externally toothed gear I7, a driveshaft 18 to which gear I is fixed; an eccentrically disposed rotor 20 which includes gear-teeth meshing with gear 17 and a ring 20b mounted around the shaft 18 and journaled in an annular groove in a sleeve 21 which is fixed in the pumphousing; and a crescent 22 between the crescent shaped space between the gear 17 and rotor-teeth , and integrally formed with sleeve The rotor 20 corresponds in diameter with, and fits in, a cylindrical pump-chamber The chamber 23 containing gear 17, rotor 20 and crescent 22, is closed at its inner end by sleeve 21 and at its outer end by a plate 24 which fits between the flat end-face 25 of pump-housing 10 and the face 29 of the body 27 of valve-unit Bolts 26 extend through lugs on the valve-body 27 and holes 28 in plate 24 and into the pump-housing, to clamp the plate between the flat face 29 on said valve body and the face 25 of the pump-housing. The pump is adapted for rotation in either direction and to put the oil under pressure in transit from either side to the other, according to the direction of rotation of the pump. When the pump is rotated in a given direction, the suction or inlet is at one side, and the pressure or discharge is at the other side. When the direction of rotation is reversed, the inlet and discharge sides are reversed. By reason of this adaptability, and the hereinafter described means for reversing the inlet and discharge ducts for controlling the oil according to the direction of rotation of the pump-gears, the pump may be directly driven by a right or left-hand electric motor. Plate 24 covers the outer end of the pumpchamber and embodies ports for conducting the oil to the suction side and from the pressure side of the pump. This plate is reversible and has embodied therein ports for controlling the 60 oil, which are reversible into proper correlation with the pump, according to its direction of rotation. When side-face 24a of plate 24 is positioned against the face 25 of pump-housing 10, the oil will be directed to enter the chamber 23 at one side and to discharge at the other side when the pump is rotating in one direction and when the plate is reversed to bring its other sideface 24b against the face 25 of the pump-housing, the ports therein will be reversed to supply oil to and discharge it from opposite sides of the pump according to the rotation of the pump in the opposite direction. Plate 24 has formed therein a pair of sym0 metrically arranged kidney-shaped slots 34, 35 which are adapted to communicate with the suction and pressure sides of the pump chamber 23 and function as an inlet or suction port and a pressure or discharge port. These slots 34, 35 are adapted to function at either side of the pump according to the position of the plate 24 and the direction of rotation of the pump. When the face 24a of plate 24 abuts and is secured against face 25 of the pump-housing, the slot 34 will function as an inlet or suction port at the suction side of the pump and the slot 35 will function as an outlet port at the pressure side, while the pump is rotating in one direction. When the reverse face 24b of plate 24 is placed against the pump-casing, the slots 34, 35 will be reversed from one side to the other, so they will be positioned to function for reverse rotation of the pump. Plate 24 has a through-port 31 which is off-set with respect to the vertical center of the pump and registers with either end of the arcuate recess 15 to conduct oil through the plate 24 while the latter is in either of its reversible positions. The face of the valve-body 27, which fits against either face of the plate 24, is provided with a pair of separated grooves 32, 33 which are symmetrically disposed on

opposite sides of the vertical center of the pump. Groove 32 comprises a pair of substantially concentric arcuate branches 32a and 32b which are connected at the top, as at Groove 33 comprises a pair of substantially concentric arcuate branches 33a and 33b, the upper ends of which are connected at 33c. The branches and 33a of grooves 32 and 33 in the face of the valve-body 27, conform to the kidney-shaped slots 34, 35 in plate 24 and are adapted to register with said slots while the plate is in either of its positions. Port 31 in plate 24 is adapted to conduct oil from either end of arcuate recess 15b, through the plate. With the plate in one of its positions, port 31 will establish communication between inlet duct 15 and the lower end of arcuate groove 32b in the valve-body 27, for the delivery of oil through recess branch 32a to the kidney-shaped slot 34 in plate 24 at that side which constitutes the suction side of the pump while rotating in one direction. When the plate 24 is reversed, its port 31 will establish communication with the other end of groove 15b and the branch 33b of recess 33 in the valve-body 27 for conducting the oil through branches 33c and 33a to the kidney-shaped slot 34 which is located at the other side of the pump which then functions as the suction side of the pump during reverse rotation of the pump. Plate 24 is provided with a port 36 which extends therethrough and serves as a discharge port at one side of the pump when the plate 24 is in one of its positions, and at the other side of the pump when the plate is reversed. A pair of discharge-grooves 37, 38 are formed in the face 25 of the pump-housing and are symmetrically disposed with respect to the axis of the pump. The discharge port 36 of plate 24 is adapted to register alternately with the upper end of either of these grooves 37, 38, according to the position of the plate When the plate is in one of its positions, port 36 will register with the upper end of groove 37 in the face of the pump-housing, to deliver oil under pressure into said groove. When the plate is reversed, port 36 will register with the upper end of groove 38 to deliver oil under pressure into that groove. Plate 24 is provided with a hole 40 which extends therethrough and is adapted to register alternately with the lower end of either of the ports 37, 38 according to the position of the plate 24 and its adaption to the direction of rotation of the gear-pump. These holes 36 and 40 are provided only at one side of the plate so 21o that when the plate is in one of its positions the discharge will be through the groove 38 and when the plate is in its other position the discharge will be through groove The valvebody is provided with ports 41, 42 disposed on opposite sides of the center of the pump, and adapted, respectively, to deliver oil from port 40 in the plate 24 when the latter is in either of its positions, according to the direction of rotation of the pump. With the pump operating in either direction, the oil will be discharged under pressure through port 40 from the pressure side and either of the ports 41, 42 in the valve-body to the valve-chamber The operation of the pump mechanism thus far described will be as follows: When the driveshaft 18 is driven in counter-clockwise direction, the face 24a of plate 24 will be secured against the face 25 of the pump-housing and its face 24b will be against face 29 of the valve-body 27 so the ports and ducts in the pump, plate and said body, will be positioned, as diagrammatically illustrated in Fig. At such time oil will pass to the suction-side of the pump right side of Fig. The oil will be forced from the pressure-side of the pump, which is then the left side in Fig. Upon removal of the bolts 26, this plate 24 can be readily reversed for this purpose. In such reversed position, oil will pass to the suction-side of the pump then the left-hand side G. The oil from the 7o pressure-side of the pump will pass through kidney-shaped port 35 in plate 24, branches 33a, 33c of groove 33 in the valve-body 27, port 36 in plate 24, groove 38 in the face 25 of the pumphousing, port 40 in plate 24, and duct 42 in the valve-body to the valve-chamber When the plate 24 is in one of its positions, for example that shown in Fig. As a result, a mere reversal of the plate 24 is the only change necessary to adapt the pump for rotation in opposite directions while a uni-directional flow of oil is maintained. An arrow 24d is provided on the top edge of plate 24 to indicate the correct setting of the plate with respect to the direction of rotation of the pump. A pipe 44 is coupled to the lower end of the valve-body 27 to deliver the oil under pressure to the oil-burner or for any other use. A plunger 45 is slidably mounted in the valve-body A conical valve A6 is fixed to the lower end of the plunger to control the delivery of the fuel from chamber 43 to the pipe The plunger is also formed with a valve-member An adjustable spring 48 is applied to force the plunger normally downwardly. Valve-member 47 is located above the pressure-chamber When the pressure in chamber 43 exceeds a predetermined point, it will force the plunger 45 and its member 47 upwardly and open valve 46, to supply the fuel under pressure-pipe 44 to its point of use. This action is caused by the pressure developed in

chamber 43 by fuel from the pressure-side of the pump while it is rotating in either direction. In order to permit any excess fuel delivered into -pressure-chamber 43 to be by-passed back to the supply tank, a port 49 is formed in valve-body 27 between its face 29 and the cylinder in which slide the plunger 45 and valve member 47, said valve moving upwardly to open the port 49 when the pressure in chamber 43 becomes excessive. From port 49 the oil is conducted first through a port 50 which is centrally disposed in plate 24 4and communicates with the port 49 while the plate 24 is in either of its alternative positions, and thence through a port 51 Fig. SThe pump may be equipped with means for controlling it so that no oil is supplied to the burner unless the pump and its shaft 8I are driven at or in excess of a predetermined speed by an electric motor not shown as described Sand illustrated in detail in application serially numbered 89,, filed July 10, , by Herbert E. Kempton, to which reference may be had for the details of construction thereof. This means comprises a sleeve-valve 55 on a 0 non-rotatable drum 56 which is longitudinally movable on the pump-shaft 18 and a series of centrifugal balls 57 which are carried in a cage 58 rotatable with the pump-shaft 18, and engage a conoidal surface 59 on the drum. Valve 55, when the pump is at rest, is positioned to open a port 60 in an annular groove 6 in the pump-shaft, which leads to an axial duct 62 extending to the inner end of said shaft and to the reversible plate When the pump-shaft acquires a predetermined speed, sufficient to cause the usual blower to supply the required amount of air for combustion to the burner, centrifugal force will force the balls 57 outwardly against the conoidal surface 58 and slide the valve 55 on shaft 18 into position to close the port Drum 56 is normally pressed by a spring 63 to force the balls 57 toward the axis of shaft I8. This spring is interposed between a collar 64 which engages drum 56 and a conoidal collar 65 engaged by a screw 66 so that the pressure of the spring to resist the centrifugal force of the balls 57, may be varied as desired. Plate 24 is provided on each of its faces with a groove 61 leading from the discharge port 35 in the casing into registry with, and terminating at, the axial port 62 in pump-shaft By providing a groove G7 on each of the faces of plate 24, communication will be established between the discharge port 35 and the sleeve-valve 55 while the plate 24 is mounted for rotation of the pump in either direction. The operation of this means for by-passing the fuel through the pump-shaft until the pump reaches a predetermined speed, is as follows: Normally, valve 55 will be positioned to open the port 60; when the pump-shaft 18 is driven, the pump will be rotated and the groove 67 in the face of the plate 24, which lies against the face 25 of the pump-casing, will deliver oil from the discharge port 35 through the axial duct 62 in the pumpshaft 18, port 60 and annular groove 6S into the chamber 68 in the pump-housing, from which it will flow through a duct 69 to the return or bypass pipe As soon as the pump-shaft reaches the desired predetermined speed for operating the blower to deliver sufficient air to the burner for proper combustion, and at which the delivery of fuel should begin, balls 57, under centrifugal force, will shift the drum 56 axially and slide sleeve 55 over annular groove 61 and thus cut off the escape of oil from duct 62 in the pump-shaft 18, to the chamber Thereupon, the full flow of oil under pressure will be delivered from the pump to the valve-chamber In order to prevent the plunger 45 and its valve 46 from being lifted or opened until the pump has reached the desired speed or while the sleevevalve 55 is open, a duct 70 is formed in the pumphousing between chamber 68 and the face 25 of the pump-housing. This duct registers with a central port 71 Fig. A recess 12 is formed in the face 29 of valve-body 27 in communication with port 71 and a duct 73 delivers oil from recess 72 into the valve-body on the upper side of plunger As a result of this connection, part of the oil in chamber 69 flows into the plunger-chamber of valve-body 21 and builds up sufficient pressure to retain the valves 46 and 47 in their closed position until sleeve-valve 55 is closed, and then all of the oil from the pump will be delivered under pressure into the chamber 43 of the valve-unit In the modification illustrated in Fig. In this form of the inven- o6 tion, the plate In this form of the invention the recess 72, ports 13 and 49 are omitted. Also a pump-unit of this type 75 which is simple nl construction and can be produced at a low cost. The invention is not to be understood as restricted to the details set forth, since these may j be modified within the scope of the appended claims, without departing from the spirit and scope of the invention. Having thus described the invention, what I claim as new and desire to secure by Letters Patent is: A pump unit comprising in combination, a pump housing having a face at one side with a pair of grooves therein and also having a pump chamber opening onto said face between the grooves and an inlet duct for fluid leading to said face, a reversible rotor in the pump chamber, an element

having a face positioned in spaced relation with said face of the pump housing and provided with a pair of grooves in said face and a pair of fluid outlet ducts leading from said face, and a plate between the two faces having a suction slot, a pressure slot, a fluid inlet port, and a pair of fluid outlet ports, and adapted when disposed in one position between said faces and the rotor is driven in one direction to have the inlet port thereof register with and effect 4 5 communication between the inlet duct and one of the grooves of the element and the suction slot register with and effect communication between said one groove of the element and the suction side of the pump chamber and also to have the.

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Diesel Engine Maintenance Training Manual. by United States. 4~3. Tuthill reversible fuel pump 38 Packing clamps improperly tightened, cocked 39 Cover.

Turbine wheel with damaged blade 14 Roots type blowers 16 Roots type blower for G. Checking backlash of rotor gears 18 Scored blower lobes 18 Checking clearances of Roots type blower lobes 19 Shaft oil seals 20 Failed serrated shaft 21 Hamilton-Whitfield blower 21 Air intake manifold 22 Schematic drawing of an oil separator 23 Effect of a worn bearing on oil leakage 24 Flame primer as used on the G. Cross section of manifold metal 27 Formation of scale in water jacket 28 Improper installation of wet type muffler 29 Use of pipe bend to prevent backflow of water 29 Use of three-way proportioning valve to regulate water flow to muffler 30 Use of throttling valve to control flow of water to muffler 30 Dry type muffler 31 Force produced in exhaust piping by thermal expansion 32 Use of flexible expansion joint to absorb thermal expansion 32 Illustration of pressure drop in exhaust piping and muffler 33 Types of bends used in exhaust lines 33 Water trapped due to sagging of elbow 34 Exhaust stack showing evidence of corrosion 34 3- Revision of stack design to eliminate corrosion 34 4- 1. Schutte and Koerting gear pump 37 Tuthill reversible fuel pump 38 Packing clamps improperly tightened, cocked 39 Cover plate of pump shown in Figure , showing uneven wear of bushing 39 Vane type fuel oil pumps 40 Worn and damaged seal on G. Bosch fuel supply pumps with hand prime feature. Excello fuel transfer pump 41 Schematic diagram of Bosch supply pumps 41 Sectional views of Bosch type pumps: Pumping principle, one-plunger stroke 44 Metering principle 44 Types of plungers 44 5. Plunger rotating mechanism 45 Good and bad plungers 45 APF pump sight window 48 Typical Bosch spray nozzle 51 Sectional views of nozzles 51 Nozzle and nozzle holder 52 American Bosch nozzle tester in operation 53 Variations in nozzle holder connections and adjustments 54 Throttling type pintle nozzle 56 Good spray from throttling nozzles 56 Spray patterns from standard pintle nozzles 56 Types of General Motors injectors 59 Injection and metering principle 60 Injector test stand 60 Sealing surfaces 62 Type A Excello fuel injection pump 67 Excello fuel pump drive unit, hydraulic unit, and safety filter 68 Excello fuel injection nozzle 71 Exploded view of nozzle tip 72 Use of special tools to assemble and disassemble nozzle 73 Cummins fuel system 74 Cummins fuel injector 75 Worn and scored distributor disk and cover 76 4 Worn and eroded injector cup tip 79 New injector cup tip 79 Pressure regulating valve 79 Atlas fuel system 80 Spray valve and actuating mechanism 81 Cutaway view of fuel oil pump 84 Lapping the plunger and barrel 86 4 Lapping the discharge vaive and seat 86 Square lapping the relief valve seat 86 Fuel injector 87 Cutaway view of fuel injector 88 Lapping the lower valve scat and stem 89 Sectional view of fuel injection nozzle 90 Recommended methods for elimination of pipe breakage at root of threads 91 Duplex system standard practice 93 Duplex fuel filter 93 Plugging filter for washing 94 Schematic drawing of a fuel system 95 Strainer elements 96 4- Tank sampling device for diesel fuel 97 5- 1. Elementary governor mechanisms 99 Governor control mechanism Pierce mechanical governor Operating principle of hydraulic governor Marquette hydraulic governor Woodward type SI governor 5- 8. Simple ovcrspecd trip mechanism 6- 1 Use of the centrifugal pump to clean heat exchangers Use of hand pumps and plungers to clean heat exchangers Repairing a strut tube leak. Both ends of tube require scaling Zinc electrode, before and after use Line valves Distortion of valve seat due to excess threads on pipe. Damaged gate valve, caused by throttling Tubing splice Simplex lube oil strainer 6- Michiana lube oil filter 7- 1. Heat exchangers

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