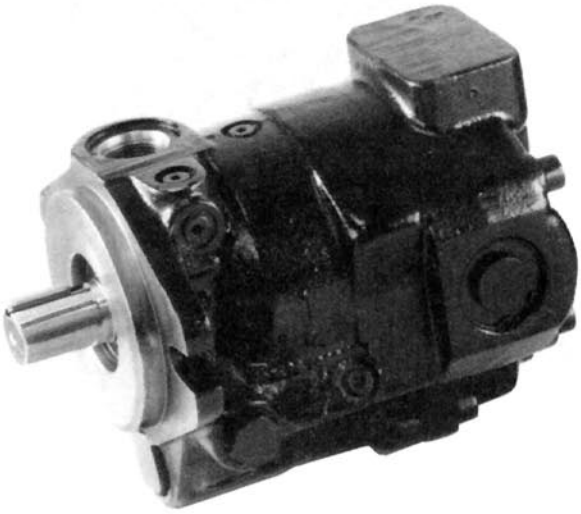
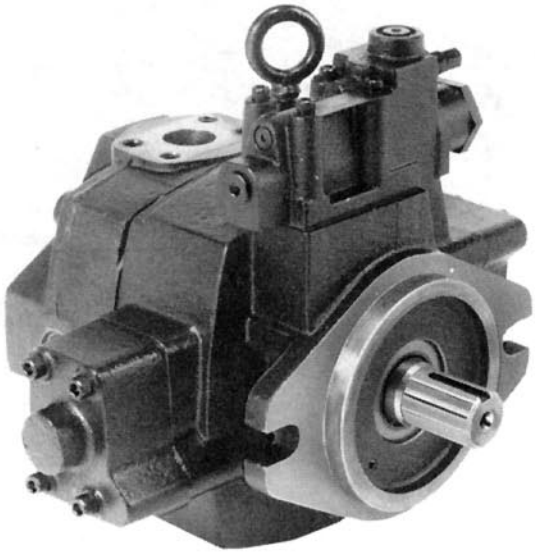
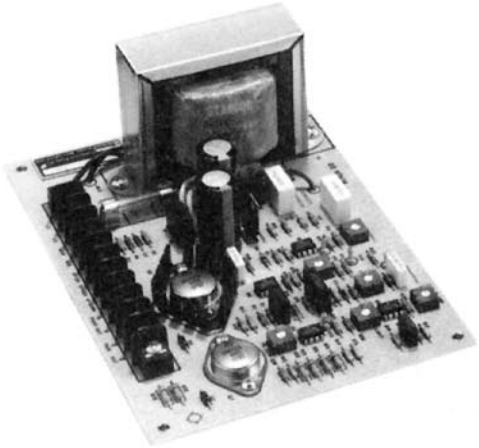
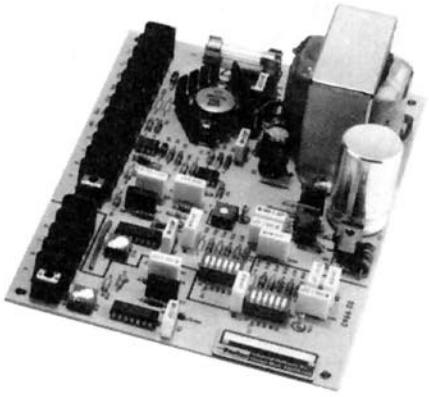
Series PVV & PAVC Electrohydraulic Accessories



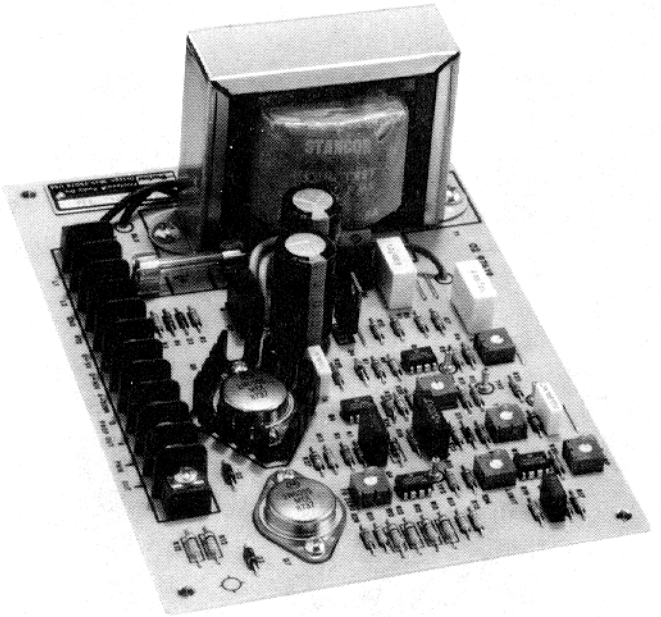


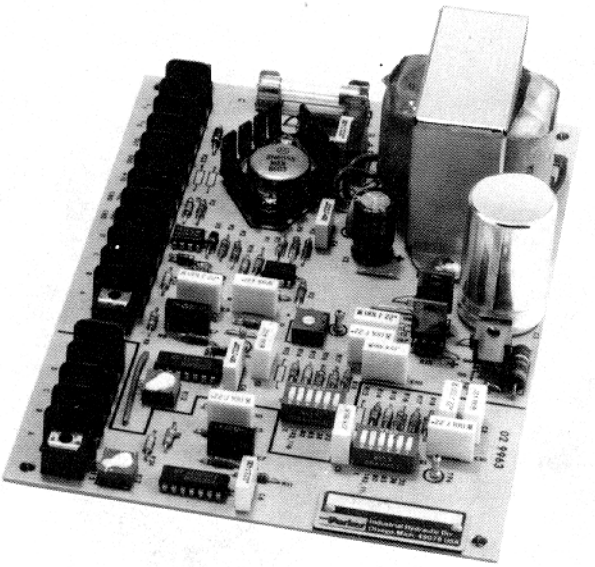




Hydraulic Pump/Motor Division
Otsego, MI 49078

Parker
Motion & Control





Quick Reference Data Chart

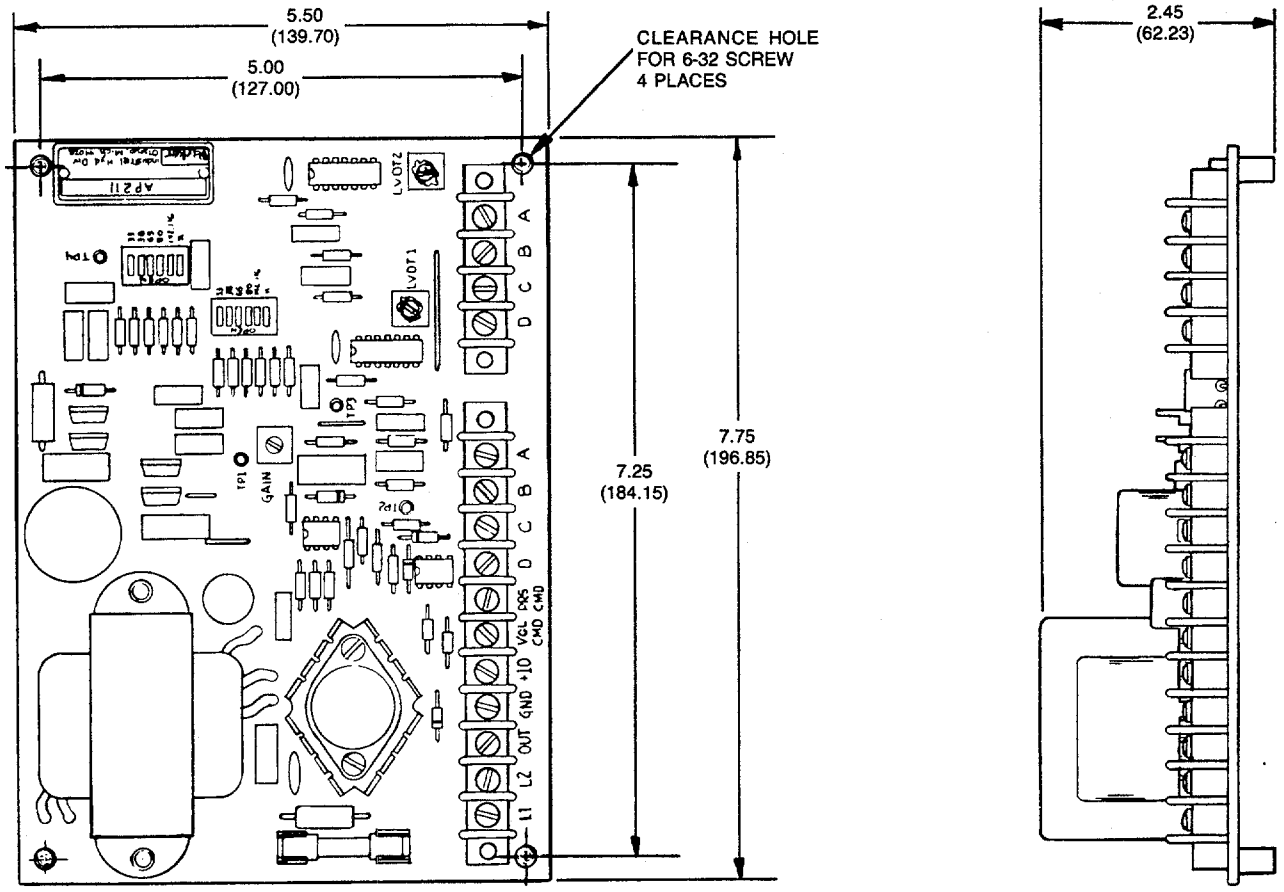
Model Number	Description	Function
AP11	Flow/PSI Driver Card (Single Pump)	PAVC or PVV Electrohydraulic PSI & Flow Controlled Pumps
AP211	Flow/PSI Driver Card (Two Pump Combinations)	PVV with PVV, PAVC with PAVC, & PVV with PAVC — Combined Flow Output
801179	Pressure Driver Card	PAVC & PVV Pumps w/Remote Compensators Electrohydraulic Pressure Control Only
AF10	Feedback Card	Use with AP11/211 for Close Loop Pressure or Flow Control PAVC and PVV Pumps
801221	Current to Voltage Converter Card	Use with AP11/211 Driver Cards to Convert 4-20 ma Signal to 0-10 Volts
694586	Proportional PSI Control Valve 2500 PSI (172 Bar) Max. Line Mounted	PVV & PAVC Pumps
786645	Proportional PSI Control Valve 3000 PSI (207 Bar) Max. Line Mounted	PAVC Pumps
694454	Proportional PSI Control Valve 2500 PSI (172 Bar) Max. Manifold Mounted	PVV & PAVC Pumps
786980	3000 PSI (207 Bar) Max. Manifold Mounted	PAVC Pumps

For additional information – call your local Parker Fluidpower Motion & Control Distributor.

Dimensions — Control Amplifier

Millimeter equivalents for inch dimensions are shown in (**)

Part No. AP11 Single Pump or
Part No. AP211 Double Pump



Dimensions — Proportional Pressure Controller

Millimeter equivalents for inch dimensions are shown in (**)

Part No. 694586 (2500 PSI/172 Bar Max.)
Part No. 786645 (3000 PSI/207 Bar)

Characteristics

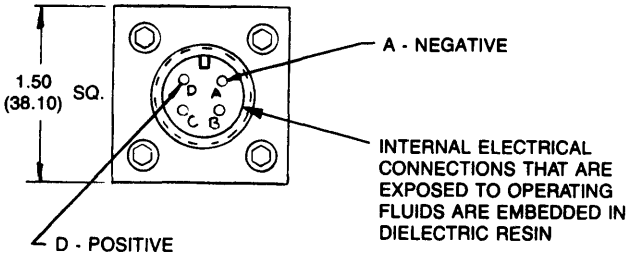
Pressure/Current Relationship: Curve must fall within band indicated.

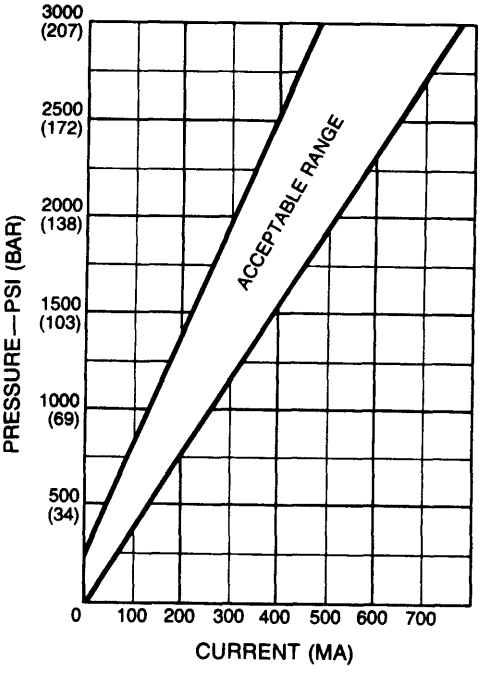
Flow: .45 GPM (1703 CC/MIN.) Minimum @ 250 PSI (17 Bar) & Zero MA

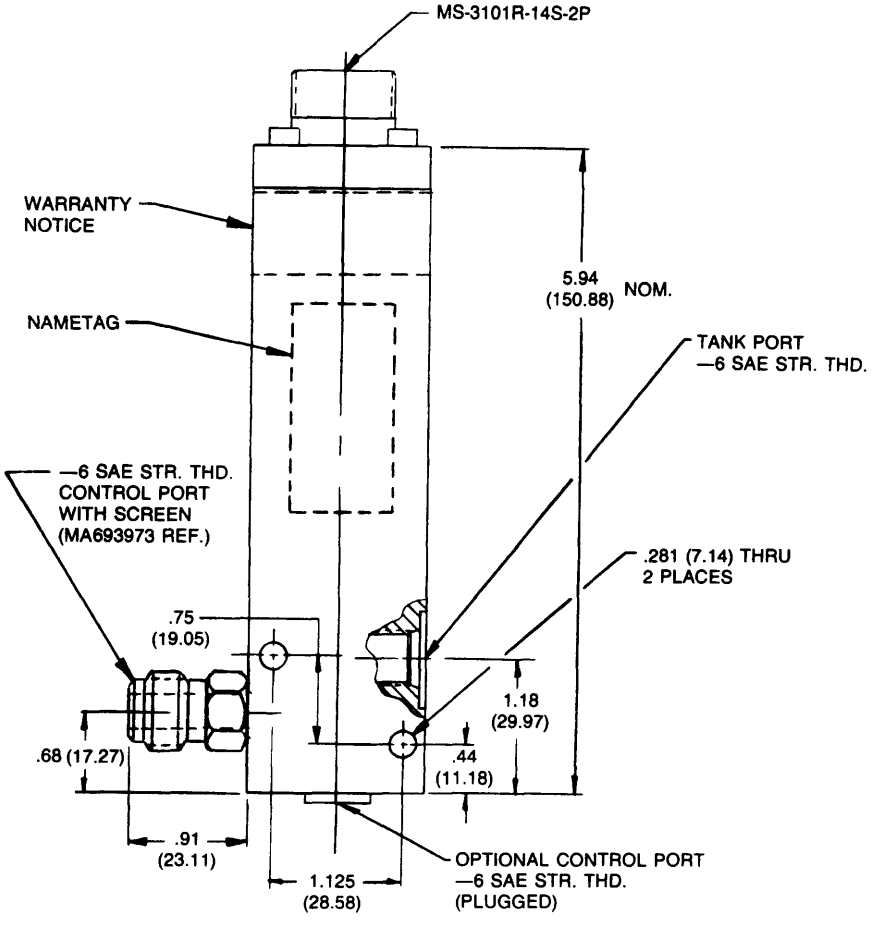
.32 GPM (1211 CC/MIN.) Maximum @ 2500 PSI (172 Bar) & 630 MA

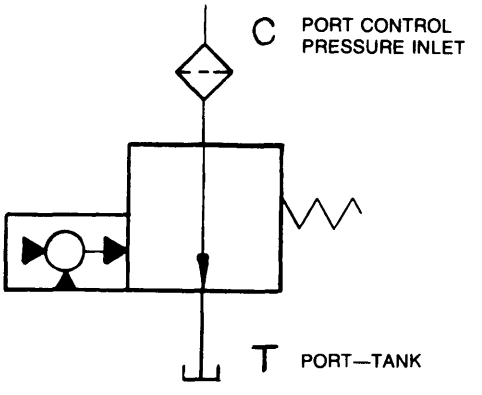
Coil Resistance: 14 OHMS Nominal @ 70°F (21°)

Hysteresis: 5% Maximum









For additional information – call your local Parker Fluidpower Motion & Control Distributor.

Dimensions — Manifold Mounted

Millimeter equivalents for inch dimensions are shown in (**)

Part No. 694454 (2500 PSI/172 Bar Max.)
Part No. 786980 (3000 PSI/207 Bar)

Characteristics

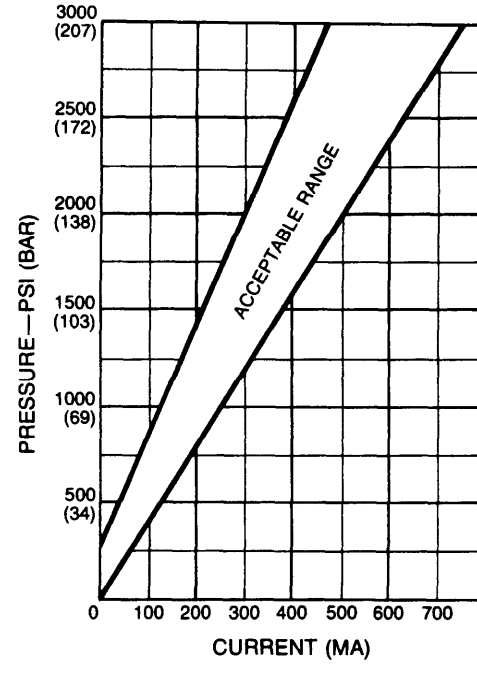
Pressure/Current Relationship: Curve must fall within band indicated.

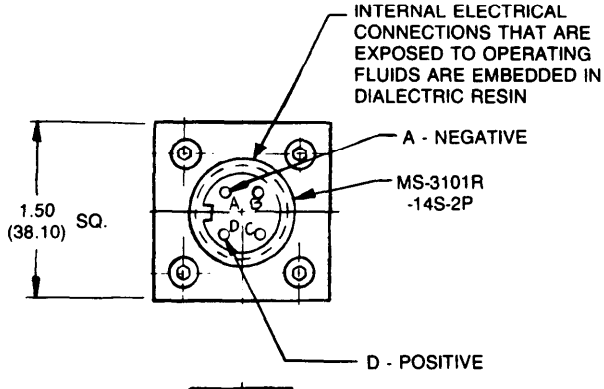
Flow: .45 GPM (1703 CC/MIN.) Minimum @ 250 PSI (17 Bar) & Zero MA

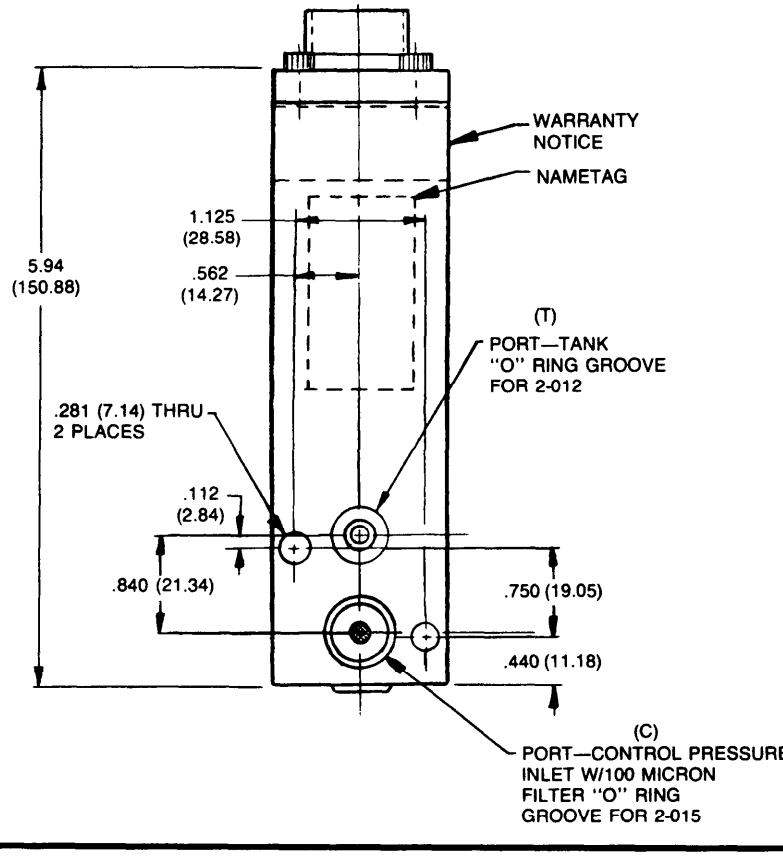
.32 GPM (1211 CC/MIN.) Maximum @ 2500 PSI (172 Bar) & 630 MA

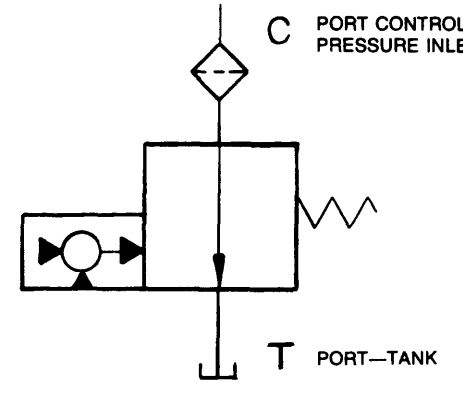
Coil Resistance: 14 OHMS Nominal @ 70°F (21°)

Hysteresis: 5% Maximum









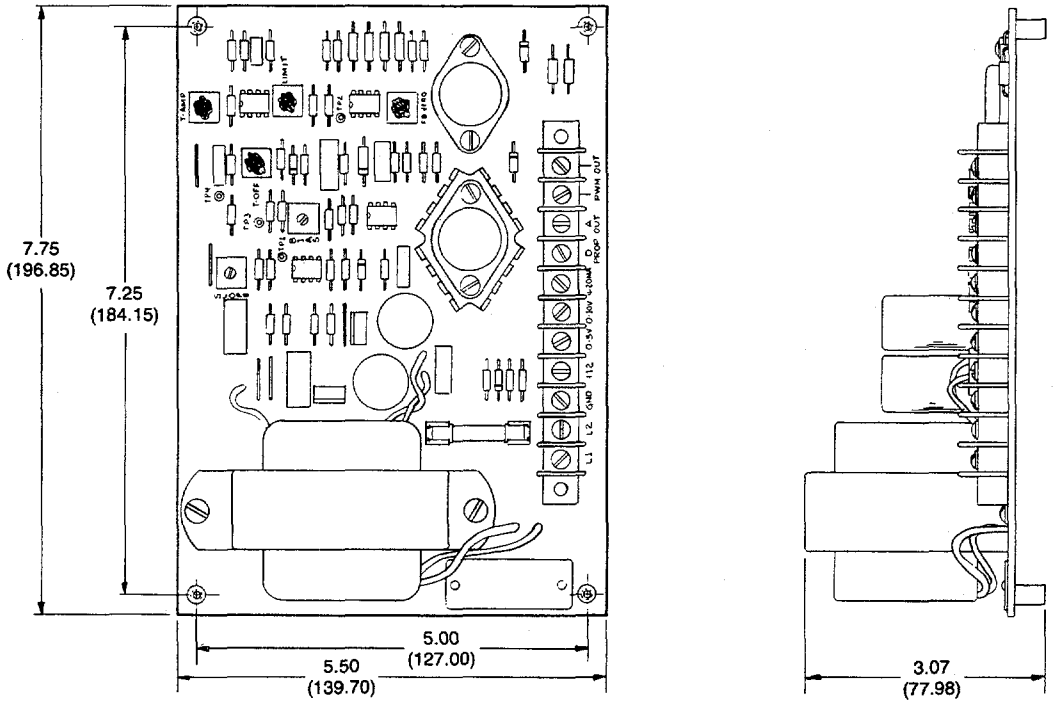
Dimensions/Installation — Pressure Driver Card

Millimeter equivalents for inch dimensions are shown in (**)

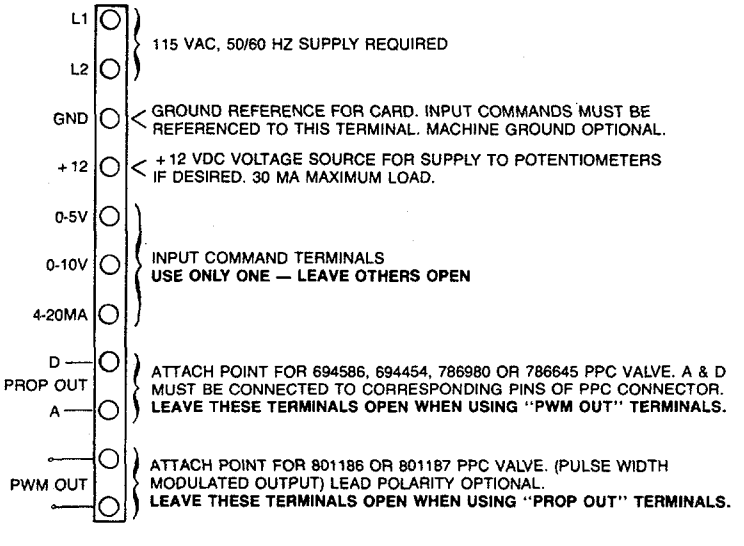
Part No. 801179

NOTES:

1. The Pressure Driver Card is designed to drive either the torque motor type PPC valve (694586 or 694454) with an output current which is linear with input command or the proportional solenoid type PPC (801186 or 801187) with a pulse width modulated output current proportional to input command.
2. Input commands can be from a 0-5 VDC voltage source, 0-10 VDC voltage source or a 4-20MA current source.
3. The card includes adjustable slope (gain) and bias (offset) pots to permit the customer to taylor the output pressure vs input command characteristics of his system. The factory settings of these pots result in rated output current at approximately 85% of full input command. (Rated output = 600MA at "PROP OUT" terminals or 1300MA at "PWM OUT" terminals.) Output current is internally limited to approximately 700MA at "PROP OUT" terminals and 1400MA at "PWM OUT" terminals.



TERMINAL CONNECTIONS



For additional information – call your local Parker Fluidpower Motion & Control Distributor.

Dimensions/Installation — AF10 Feedback Card

Millimeter equivalents for inch dimensions are shown in (**)

Part No. AF10

Application Information

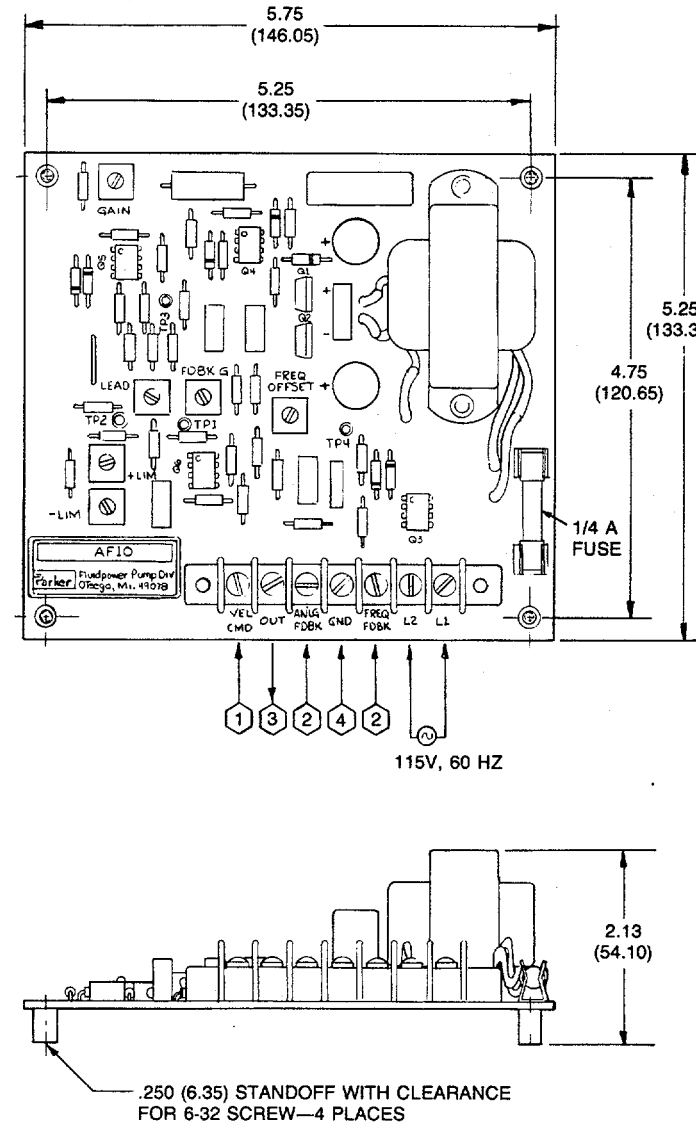
(1) Customer supplied input command signals are required at the "VEL CMD" terminal in the range of 0 to 10 VDC input impedance 100K ohms. Positive input commands cause output to integrate positive. These input commands are compared to positive feedback voltages at the "ANLG FDBK" terminal or to voltages from the built-in frequency to voltage converter resulting from frequency sensitive feedback signals applied at the "FREQ. FDBK" terminal. Typical sources of commands are potentiometers, programmable controllers, etc.

(2) Customer supplied feedback signals are required at either (not both) the "ANLG FDBK" or "FREQ FDBK" terminal.

Analog Feedback — Impedance 50K ohms. Typical Sources: tach generator, velocity transducer, pressure transducer, etc. A "FDBK G" pot can be adjusted to provide a range of input vs feedback matching from approximately 1 volt FDBK/VOLT of input to .05 volt FDBK/VOLT of input. This gain setting can be verified by comparing "ANLG FDBK" voltage to voltage at "TP1". (Voltage at "TP1" will be negative with positive voltage at "ANLG FDBK" terminal.) Ground "FREQ FDBK" terminal when using analog feedback.

Frequency Feedback — Impedance 100K ohms. A ±50 millivolt to ±100 volt signal, wave form option, with a frequency from 60 to 4000 HZ is required. An "OFFSET" pot is provided to offset frequency inputs which do not cross zero. (±.75V maximum offset.) This offset can be measured at "TP4". Signals from turbine flowmeters, magnetic pick-ups on gears, etc., can be used. The "FDBK G" pot provides a range of input vs feedback frequency matching from approximately 50 CPS/volt of input to 1000 CPS/volt of input. When using frequency feedback, leave "ANLG FDBK" terminal open.

(3) Output of board is a 10MA maximum signal capable of driving the volume or pressure command input of the pump amplifier (AP*11). "+LIM" and "−LIM" pots are provided to limit the maximum voltage output. "+LIM" range +.6 to +10.0 volts. "−LIM" range −.6 to −5.0 volts. Output is from an integrating amplifier with adjustable gain ("GAIN POT") to control total loop gain. Output is clamped at zero for input voltage of less than .5 VDC to prevent output from integrating when hydraulic power is turned off. Shorting output will not damage board.

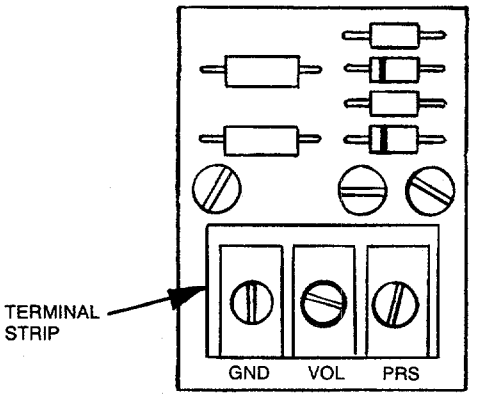


(4) Input, feedback and output signals must be referenced to AF10 board "GND" terminal. The AF10 board has a floating ground and does not require an earth ground.

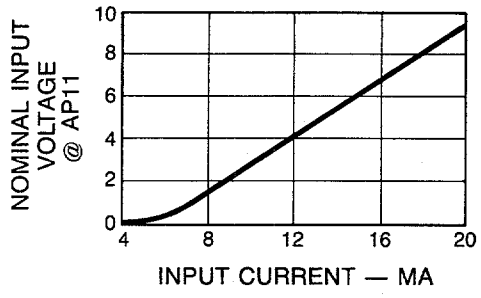
(5) A lead amplifier is incorporated in the feedback circuit which gives an increased equivalent feedback signal proportional to the rate of change of feedback. The amount of signal is adjustable with the "LEAD" pot. This feature is provided to minimize overshoot with large command signal changes. The amplitude of this signal can be observed at "TP2" under transient conditions on a scope.

Dimensions — Current to Voltage Converter Kit

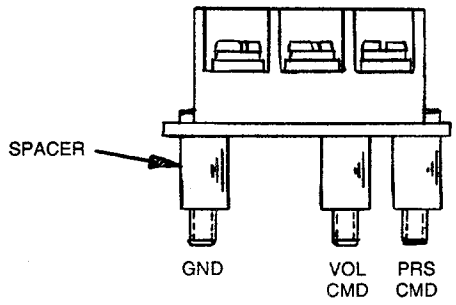
Part No. 801221 — For use with AP11 or AP211 Amplifier when customer requires 4-20 ma input signal capability.



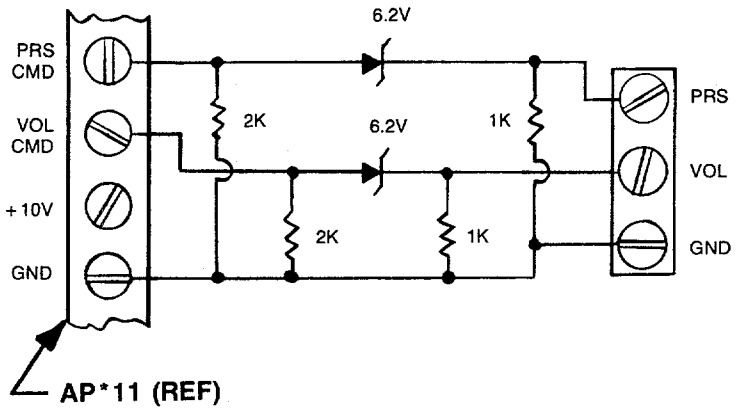
ATTACH POINT FOR CUSTOMER CURRENT INPUT COMMAND



TYP V VS. I RELATIONSHIP



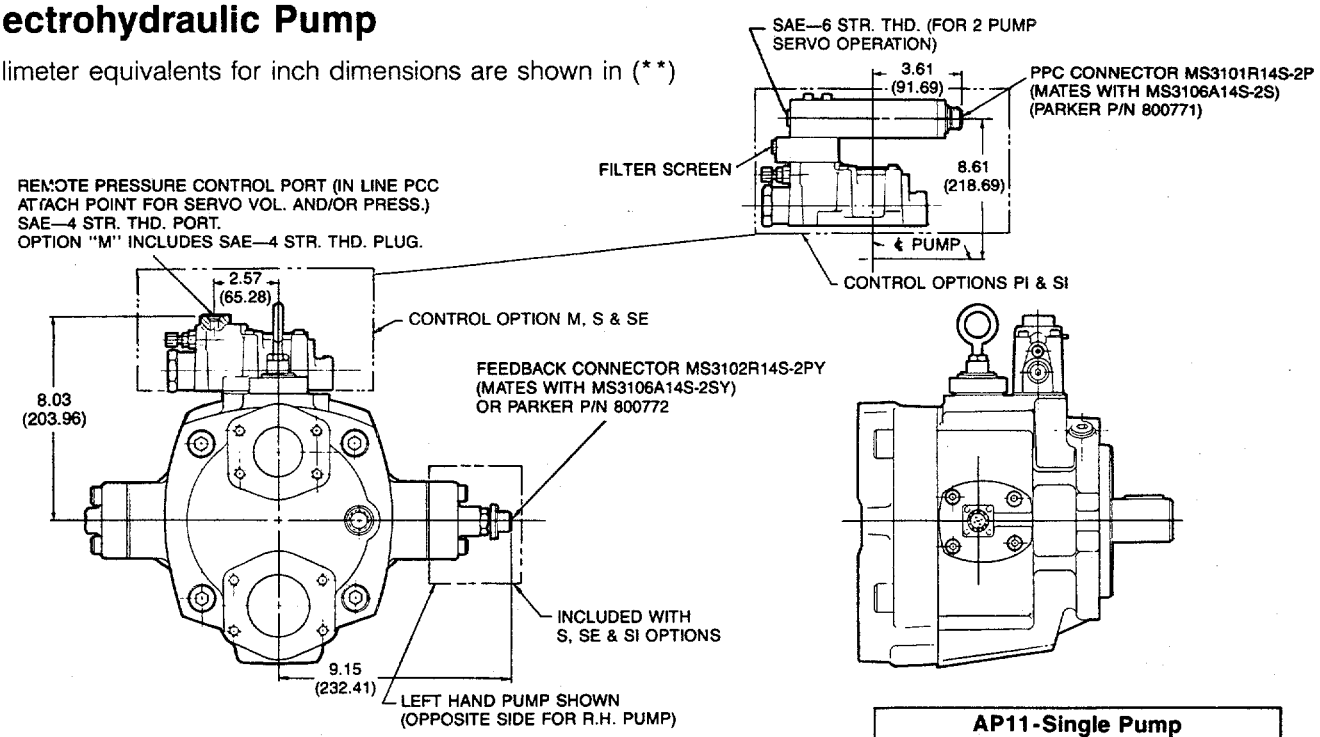
MOUNTS DIRECTLY TO AP11 TERMINAL STRIP



For additional information – call your local Parker Fluidpower Motion & Control Distributor.

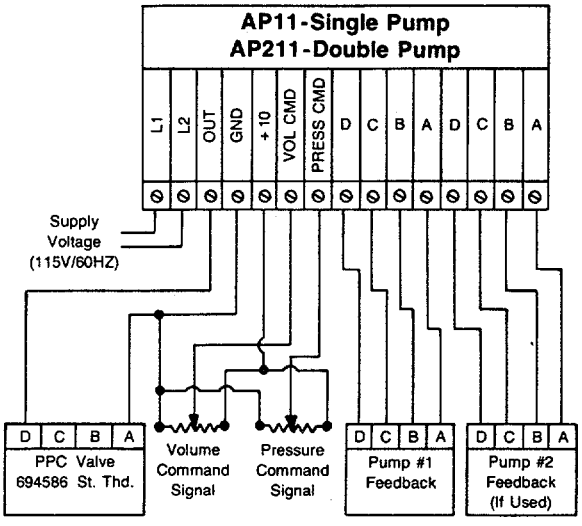
Electrohydraulic Pump

Millimeter equivalents for inch dimensions are shown in (**)



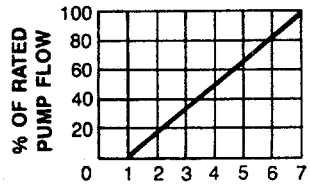
NOTES:

1. Consult factory for information relative to pump option selection and additional components required for desired pump function.
2. For electrohydraulic flow and pressure control of one or two pumps make electrical connections per Fig. IV. When one pump is used, omit connections to pump #2 feedback.
3. For electrohydraulic flow only, eliminate pressure command signal and place jumper between "Press CMD" and "+10V" terminals (compensating pressure will be controlled by manual adjustment on the remote compensator).
4. For electrohydraulic pressure only, eliminate volume command signal, and place jumper between "VOL CMD" and "+10V" terminals or use 801179 Pressure Driver Card.
5. Figures I thru III show nominal input vs. output relationships. The actual values will vary with component tolerances. Full volume range will be realized with 0 to 7 volts. Full pressure range will be realized with 0 to 8 volts, or 0-600MA.



Typical Hookup for Infinitely Variable Electrohydraulic Press and Volume Control

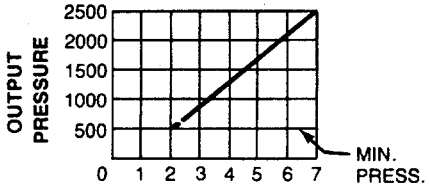
FIG. IV



Volume Command Voltage

Nominal output flow vs. input command voltage when used in conjunction with AP11 (single pump amp.) and 694586 proportional pressure controller.

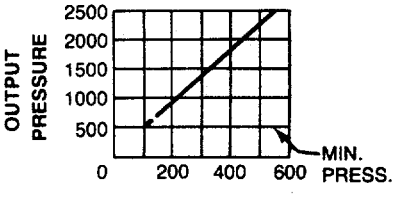
FIG. I



Pressure Command Voltage

Nominal output pressure vs. input command voltage when used in conjunction with AP11 or AP211 and 694586 proportional pressure controller.

FIG. II



Input Current (MA)

Nominal input current vs. pressure when used in conjunction with a current source and proportional pressure controller 694586.

FIG. III

Servo Pump

Introduction

The Parker Hannifin electrohydraulic servo pump control package (for use on the PVV 80, PVV 125/142, PAVC 33/38 and PAVC 65/100 pumps) adjusts pump volume, pressure or both in response to electrical input command signals. (***Note*** that pump "volume" control may also be referred to as "displacement" or "flow" control.)

The servo control consists of three components, in addition to the pump(s). These are:

1. An LVDT feedback transducer mounted on the pump, to give an electrical indication of pump displacement.
2. An electrically controlled valve, known as a proportional pressure controller (PPC), usually mounted in the signal line of the pump and drained to tank.
3. An electronic control board, which powers and interprets return signals from the LVDT. The board compares the LVDT signal to input command signals for flow and pressure, and adjusts a current level to the PPC to maintain the pump(s) at the required flow and/or pressure.

The system needs to be connected both hydraulically and electrically, and the user must supply input command signals to the control board.

Hydraulic and Electrical Connections

Figures 1 and 2 show typical, complete systems, ***except*** for the following items:

1. Inlet and outlet connections to the pump.
   NOTE: A sequence valve is required on the outlet of the pump(s) if load pressure at least equal to the minimum pump pressure (approximately 600 PSI/41 Bar) cannot be guaranteed under all conditions.
2. Mechanical drive to the pump.
3. Input command signals to the board.

Figure 1 shows a typical servo system for a PVV pump. Note that the amplifier board (AP11 or AP211) is common for all pumps (PAVC and PVV), but that a "dipswitch" on the board must be set to the size of the pump being used. Figure 1a shows how this is done.

Figure 2 shows PVV 142/PAVC 33 double pump installation. In this situation, two dipswitches must be set, one for each pump. The illustration is an example only. Many combinations of different pumps can be used. (***Note*** that this system, with the AP211 board, controls the two pumps as if they were a single, larger pump. It is also possible to control two through-shafted pumps independently, using two AP11 boards.) If two pumps are controlled from one AP211 board, one pump must be an "S" option and the other an "SE" option.

Input Commands

The user must supply input command signals to the AP11 or AP211 control board. The pump will respond generally as shown in Figures 3 and 4. Actual volume command voltages for a single pump are shown in Table 1. Volume command voltages for double pump combinations are shown in Table 2.

There are many ways to generate volume and pressure command signals. Figures 5, 6, and 7 show some possibilities using rotary potentiometers. Parker representatives can provide assistance, if required, in selecting alternatives such as programmable controllers, relays, 4-20 MA input current signals, etc.

Note that volume and pressure command signals can be connected to give a "torque" or "horsepower" control. Contact the factory for assistance.

LVDT Feedback Adjustment

The LVDT feedback assembly on the pump is factory adjusted. Should it be necessary to re-calibrate the adjustment, this must be performed as shown in Figure 8.

Table 1 Input Command Voltages Single Pump With AP11 Board

	PVV 142	PVV 125	PVV 80	PAVC 65	PAVC 38	PAVC 33	PAVC 100
Zero Volume (Flow)	.80	.80	.80	.60	1.10	1.10	.90
Full Volume (Flow)	6.80	5.70	6.80	7.00	6.50	6.50	6.20

Table 2 Input Command Voltages Double Pump Systems Using AP211 Board

	PVV 142		PVV 125		PVV 80		PAVC 65		PAVC 38		PAVC 33		PAVC 100	
	Zero Vol. (Flow)	Full Vol. (Flow)	Zero Vol. (Flow)	Full Vol. (Flow)	Zero Vol. (Flow)	Full Vol. (Flow)	Zero Vol. (Flow)	Full Vol. (Flow)	Zero Vol. (Flow)	Full Vol. (Flow)	Zero Vol. (Flow)	Full Vol. (Flow)	Zero Vol. (Flow)	Full Vol. (Flow)
PVV 142	1.0	7.2	1.0	6.6	1.7	6.6	1.9	6.4	2.1	6.1	2.2	6.0	1.4	6.6
PVV 125			1.0	6.1	1.7	6.0	1.9	5.9	2.1	5.5	2.2	5.4	1.4	6.2
PVV 80					2.3	5.9	2.5	5.8	2.8	5.5	2.8	5.4	2.0	6.0
PAVC 65							2.6	5.6	2.9	5.3	3.0	5.2	2.2	5.8
PAVC 38									3.2	5.0	3.3	4.9	2.5	5.5
PAVC 33											3.4	4.8	2.5	5.5
PAVC 100													1.7	6.1

Typical System Characteristics

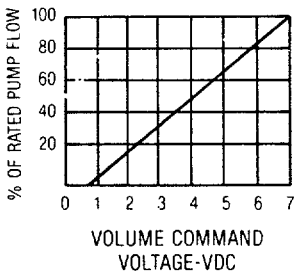


FIG. 3

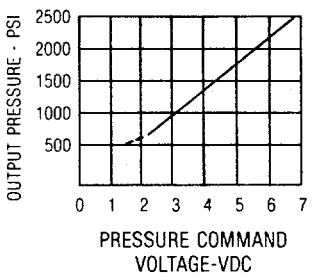


FIG. 4

LVDT Feedback Adjustment

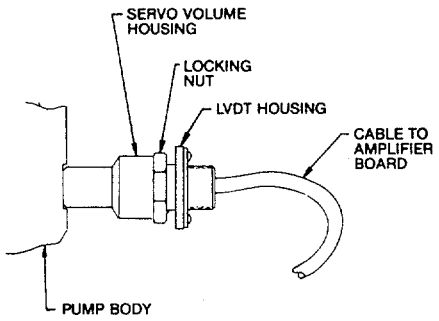


FIG. 8

To adjust — loosen locking nut, turn LVDT housing until required feedback voltage is obtained at TP3 (TP3 and TP4 on AP211 board). Re-tighten nut.

Feedback Voltage With Pump At Deadhead, 500 PSI (34 Bar)
PVV 142, 125, 80 = +3.00 to +2.90 Volts
PAVC 65 = +.90 to +.89 Volts
PAVC 33, 38 = +.70 to +.69 Volts
PAVC 100 = +1.20 to +1.19 Volts

Control Signal Generation

Possible volume/pressure command signal generation alternatives (programmable controllers, relays, etc. — contact Parker representative for assistance).

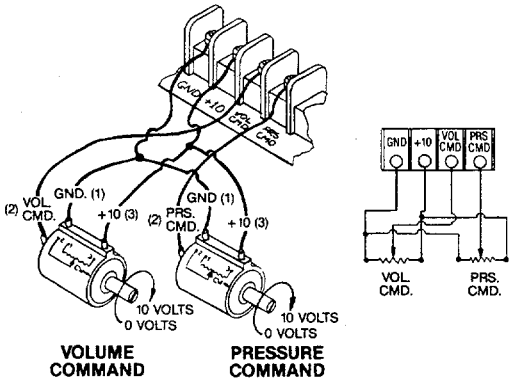


FIG. 5
VOLUME AND PRESSURE COMMANDS

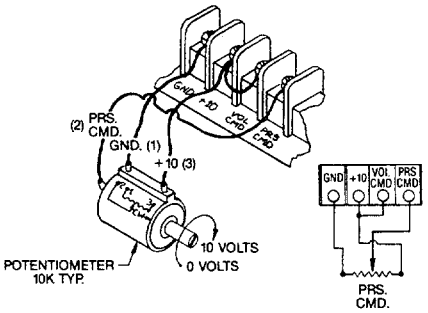


FIG. 6
PRESSURE COMMAND

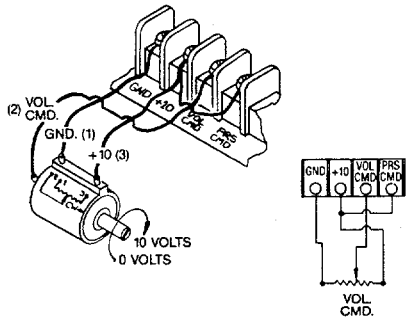


FIG. 7
VOLUME COMMAND

Servo Pump

FIG. 1

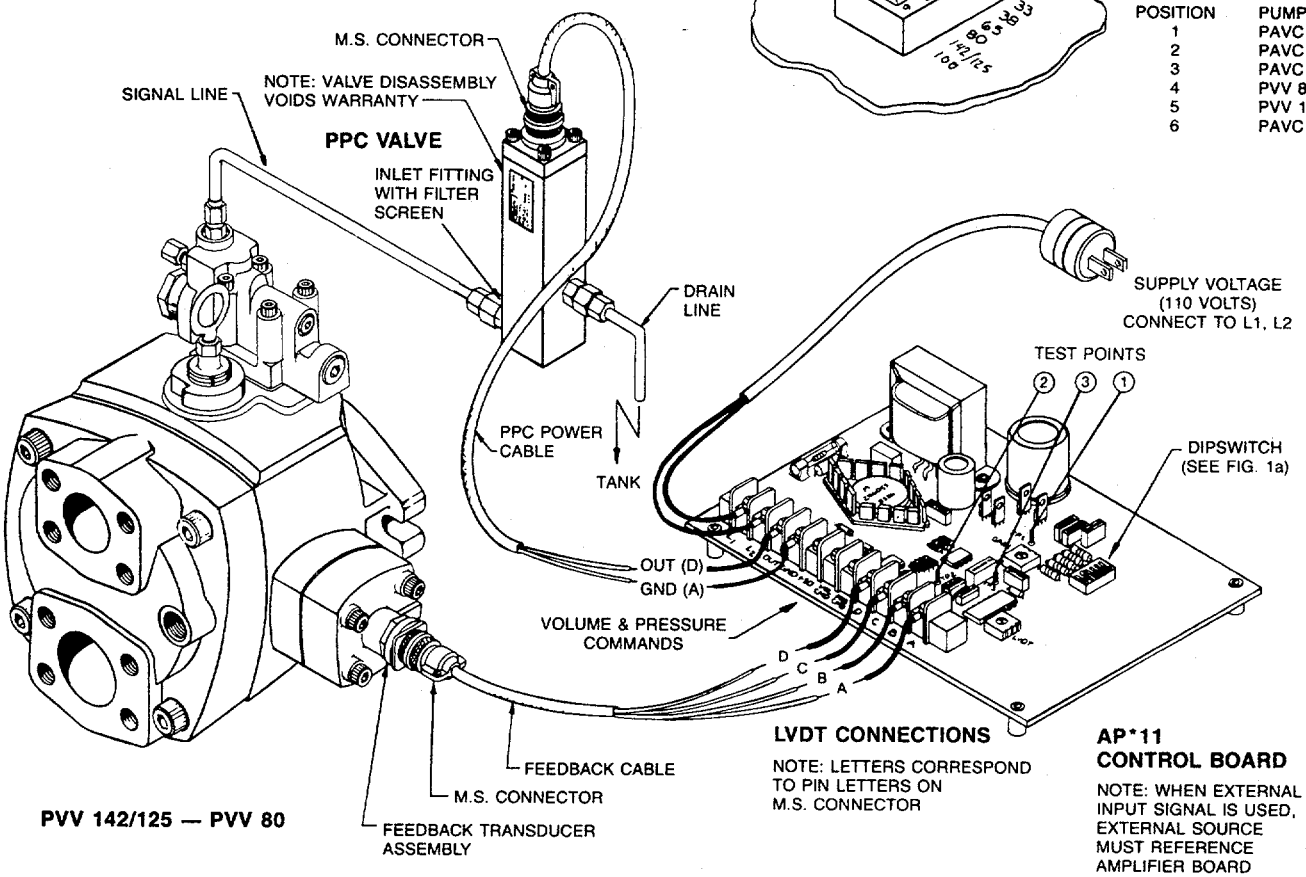


FIG. 1a DIPSWITCH SETTING

POSITION	PUMP USED
1	PAVC 33
2	PAVC 38
3	PAVC 65
4	PVV 80
5	PVV 142/125
6	PAVC 100

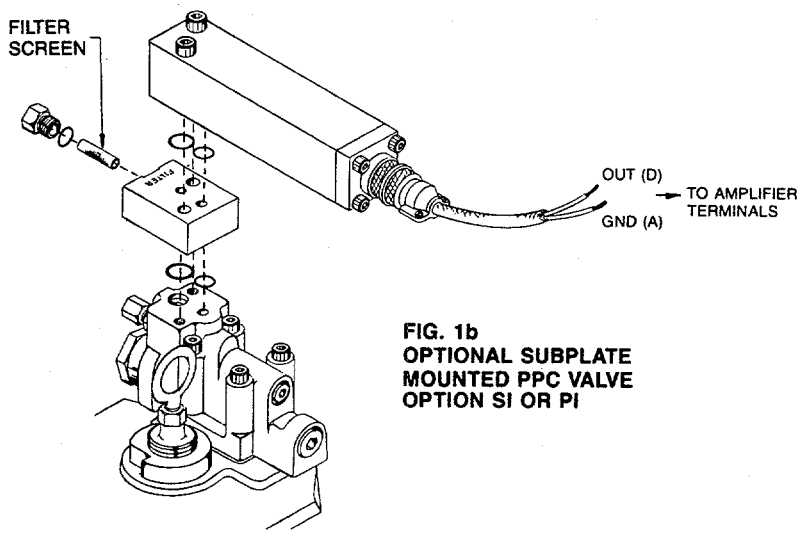
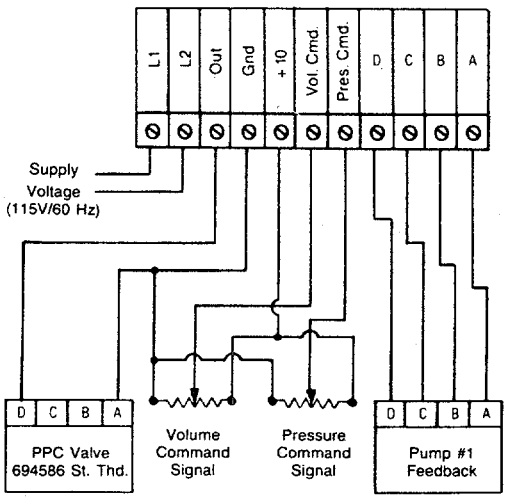


FIG. 1b
OPTIONAL SUBPLATE MOUNTED PPC VALVE OPTION SI OR PI

AP11 Amplifier
For Use With One Pump

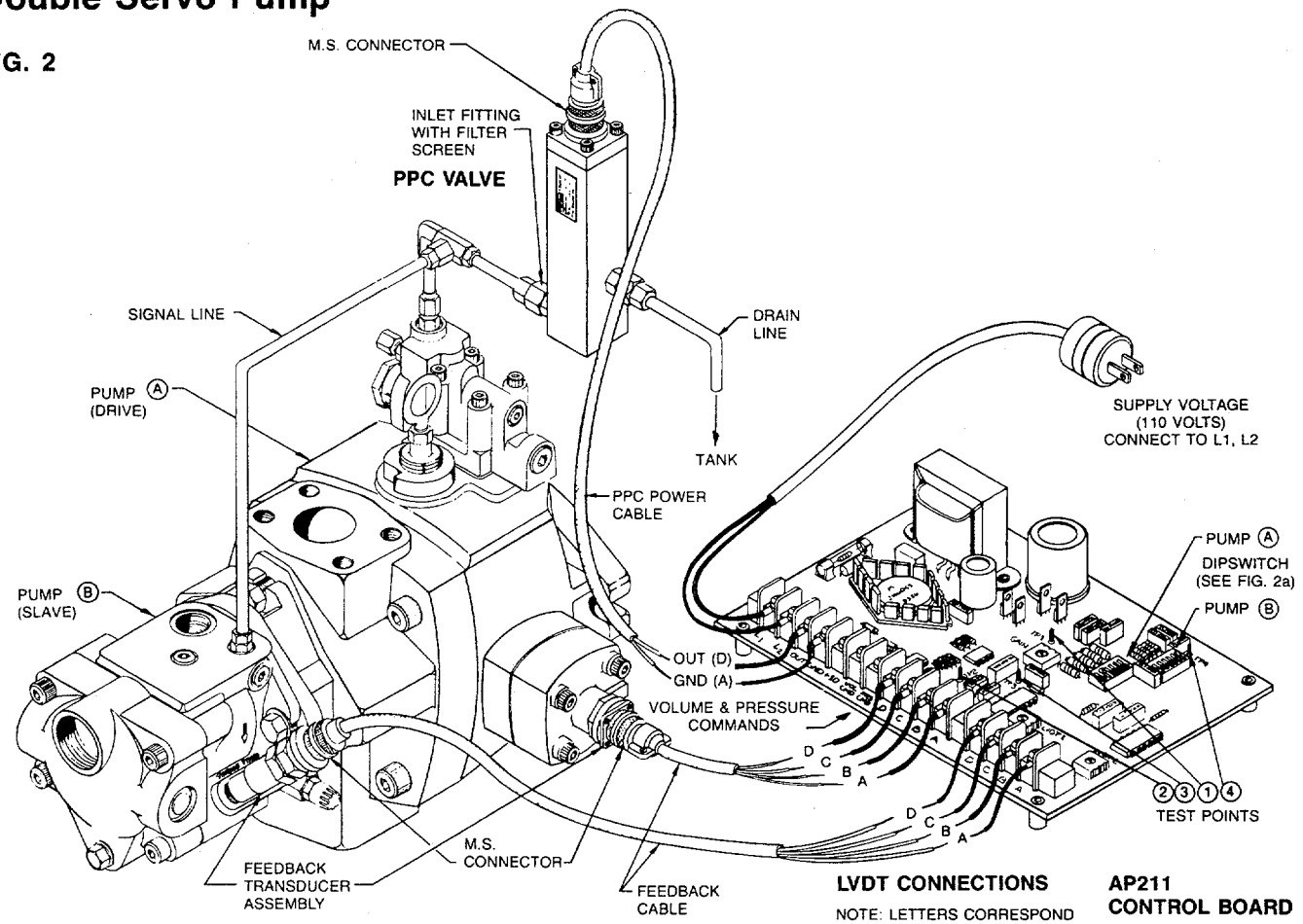


Typical Hookup for Infinitely Variable Electrohydraulic Press and Volume Control

For additional information – call your local Parker Fluidpower Motion & Control Distributor.

Double Servo Pump

FIG. 2



DOUBLE PUMP
PVV 142 — PAVC 33

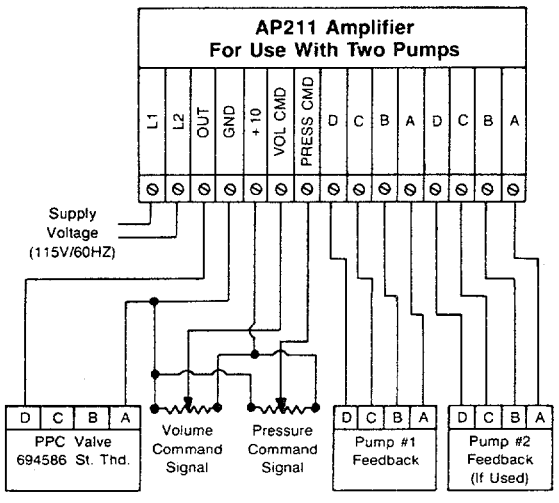
NOTE: PVV 142 SHOWN AS CW ROTATION PUMP, PAVC 33 SHOWN AS CCW ROTATION PUMP FOR CLARITY

LVDT CONNECTIONS

NOTE: LETTERS CORRESPOND TO PIN LETTERS ON M.S. CONNECTORS

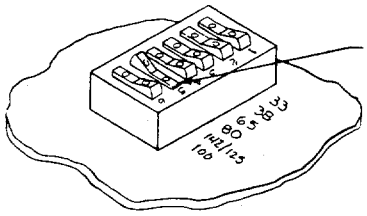
AP211 CONTROL BOARD

NOTE: WHEN EXTERNAL INPUT SIGNAL IS USED, EXTERNAL SOURCE MUST REFERENCE AMPLIFIER BOARD GROUND



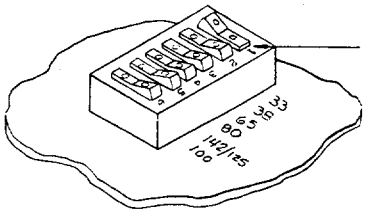
Typical Hookup for Infinitely Variable Electrohydraulic Press and Volume Control

FIG. 2a DIPSWITCH SETTING



POSITION	PUMP USED
1	PAVC 33
2	PAVC 38
3	PAVC 65
4	PVV 80
5	PVV 142/125
6	PAVC 100

PUMP A DIPSWITCH



POSITION	PUMP USED
1	PAVC 33
2	PAVC 38
3	PAVC 65
4	PVV 80
5	PVV 142/125
6	PAVC 100

PUMP B DIPSWITCH