USER'S GUIDE AND
TECHNICAL REFERENCE

BEHLMAN MODEL P1350 "POWER PASSPORT"
1.35 KVA AC POWER SUPPLY

FOR SERVICE ASSISTANCE

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DATE: 3/16/10 REV. A

SAFETY SUMMARY

The following safety precautions must be observed during all phases of operation, service, and operation of this equipment. Failure to comply with these precautions or with specific warnings elsewhere in the manual violates safety standards associated with the design and intended use of this equipment.

GROUND THE EQUIPMENT

To minimize shock hazard, the equipment chassis(s) must be connected to an electrical safety ground. This equipment is supplied with a three conductor line connection for single phase applications or a five wire connection for three phase applications. Both types include an earth terminal intended for safety ground connections. In addition, installation sites may require neutral to earth connections as per NEC section 250 (National Electrical Code). Refer installation to licenced electrician or other qualified personnel.

DO NOT OPERATE IN EXPLOSIVE ATMOSPHERE

Do not operate the equipment in the presence of flammable gases or fumes. Operation of any electrical instrument in such an environment constitutes a definite safety hazard.

KEEP AWAY FROM LIVE CIRCUITS

Operating personnel must not remove equipment covers. Component replacement and internal adjustments must be made by qualified maintenance personnel. Do not replace components with power applied. Under certain conditions, dangerous voltage may exist even with the power removed. To avoid injuries, always disconnect power and discharge circuits before touching them.

DO NOT SERVICE OR ADJUST ALONE

Do not attempt internal service or adjustment unless another person, capable of rendering first aid and resuscitation is present .

DO NOT SUBSTITUTE PARTS OR MODIFY INSTRUMENT.

Because of the danger of introducing additional hazards, do not install substitute parts or perform any unauthorized modification to this equipment. Contact Behlman Electronics for proper replacement parts and specific service information.

DANGEROUS PROCEDURE WARNINGS

Warnings will precede potentially dangerous procedures in this manual. Instructions contained in the warning must be followed.

CLAIM FOR DAMAGE IN SHIPMENT

Under the FOB factory terms of sale, ownership and responsibility are transferred to the customer when the equipment leaves the factory. Each Behlman equipment is shipped from the factory in proper operating condition.

Immediately upon receiving equipment, unpack and inspect it for evidence of damage incurred in shipment. File a claim with the freight carrier if the equipment has been damaged in any way or it fails to operate properly. Forward a copy of the damage claim report to Behlman. Include the model number, serial number and date the shipment was received. Behlman will advise the disposition of the equipment and will arrange for necessary repair or replacement.

RETURNING EQUIPMENT TO FACTORY

Do not return equipment to the factory without prior authorization from Behlman.
A RETURN MATERIAL AUTHORIZATION NUMBER (RMA) is required to return equipment.

This equipment, like all precision electronic equipment, is susceptible to shipping damage. It contains heavy magnetic components as well as delicate electronic components.

If equipment is returned without prior authorization, the shipment will be refused, the customer being liable for all shipping, handling and repair costs.

When packing for reshipment, use the original shock absorbent material and shipping container to preclude damage to the equipment.

Insure that the return authorization numbers (RMA) is available on the container for identification.

SHIPPING INSTRUCTIONS

RACK MOUNTED UNITS

1) Box (es) must be double wall with minimum 350 lbs. bursting test.
2) Box (es) must provide for a minimum of 3to 4 inches of clearance around sides, top and bottom of unit.
3) When packing unit, utilize either a foam-in-place system or high density foam. Clearance provided for above must be completely filled with foam.

FAILURE TO COMPLETELY SECURE UNIT IN BOX WILL ALLOW MOVEMENT DURING SHIPPING, RESULTING IN DAMAGE.

4) Secure box(es) to pallet(s). This is necessary to insure proper handling and protection during shipping.
5) Place the following warning label on box (es)

DO NOT STACK

6) Ship unit (s) using a freight cargo carrier; air or ground.

CABINET MOUNTED UNITS

Cabinet mounted units require that a special crate be used. The crate should be manufactured of plywood (3/8" or thicker) and reinforced (using 1 x 3 or larger pine) on all edges. The unit must be firmly secured to the crate's base. The crate must be shock mounted to avoid damage during shipping. Detail drawings for Behlman's crates are available upon request.

WARRANTY CERTIFICATE

Behlman Electronics, Inc. warrants to the original purchaser, for a period of one (1) year from the shipment from Behlman, each item to be free from defects in material and workmanship. Behlman's obligation and the Purchaser's sole remedy for any breach or violation of this agreement is limited to adjustments, repair or replacements for parts which have been promptly reported by the Purchaser as having been in its opinion, defective and so found by Behlman upon inspection. All replacement parts will become the property of Behlman on an exchange basis. This warranty will not apply if such adjustment repair or parts replacement is required because accident, neglect, misuse, failure of environmental controls, transportation damage or causes other than normal use.

If during the warranty period a defect should impair the performance of the unit, Behlman agrees, at its option, to repair or replace the unit or its defective components F.O.B. Behlman at 80 Cabot Court, Hauppauge NY 11788 or at another Behlman service facility at Behlman's option. To obtain service under this warranty, the original Purchase shall notify Behlman at the above address or by telephone at 631-435-0410 and provide information about the defect or impairment of performance. Behlman with then supply the Purchaser a Return Material Authorization (RMA) number. This number must be attached to the equipment sent back for warranty repair. Equipment must be shipped back to Behlman prepaid. No collect shipments will be accepted.

Behlman shall be excused from supplying warranty service if the unit's case has been open or if the unit has been subject to unauthorized repair. All service outside the scope of this warranty shall be paid for by the Purchaser at Behlman's rates in effect at the time of this repair. Behlman will not perform any repairs outside of the warranty without written authorization by the Purchaser. If the repair is a warranty repair, Behlman will ship the unit back to the Purchaser, by a method determined solely by Behlman, prepaid. If the Purchaser requests, any other means of transportation it shall be at the Purchaser's expense.

The use of the equipment shall be under the Purchaser's exclusive management and control. The Purchaser will be responsible for assuring the proper installation, use, management and supervision of the equipment. Behlman will not be liable for personal injury or property damage.

The forgoing warranties are in lieu of all other warranties, expressed or implied including without limitation warranties of merchantability and fitness for purpose.

In no event shall Behlman be liable for loss of profits, loss of use, or any indirect, consequential or incidental damages. Purchaser agrees that Behlman will not be liable for any damages caused by the Purchaser's failure to fulfill any of the Purchaser's responsibilities set forth herein.

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INSERT ADDENDUMS HERE

TABLE OF CONTENTS
BEHLMAN AC POWER SOURCE, MODEL P1350

SECTION

The Behlman model P1350 AC Power Source is a solid state frequency converter. It provides regulated AC power at frequencies that are not available from local utility power. The output of the model P1350 is transformer coupled providing an isolated voltage source similar to utility power. The model P1350 incorporates the latest in hard switched, PWM technology. A high frequency "Class D" type output stage provides a savings in weight and waste heat. This accounts for the compact size and high power capability of this AC power source. The following is a brief description of the conversion process performed by the P1350.

Line power at 120 VAC 47 - 440Hz is applied to the input of the unit. After passing through a noise filter, the input AC is converted to a bulk DC voltage. This DC voltage is applied to the output inverter (refer to the block diagram below). The output inverter is a switch mode power amplifier. A sine wave signal of the desired frequency is developed by the control circuitry and applied to the input of the power amplifier. This sine wave is amplified and "stepped - up" by the output transformer to provide the proper voltage. The output voltage of the unit is sensed electronically and used as feedback to regulate the output. This action rejects fluctuations in the input line voltage and provides an output that may be adjusted above or below the input line. The output current of the power source is monitored and used to provide overload protection for the output inverter.

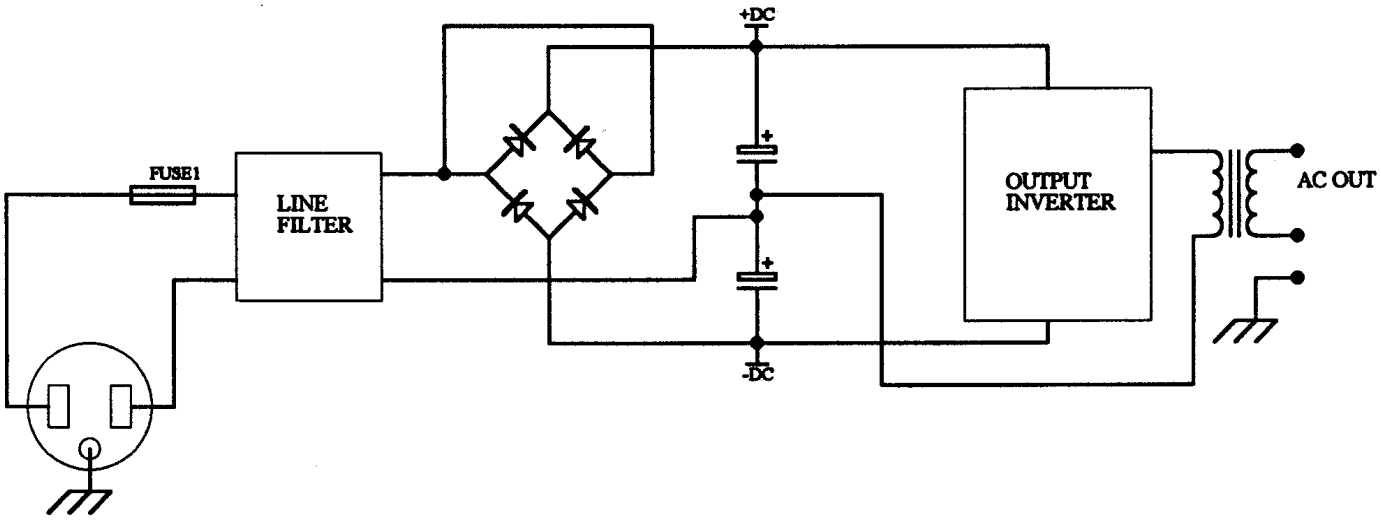


FIGURE 1-1 P SERIES BLOCK DIAGRAM

SECTION1
P1350 AC POWER SUPPLY INTRODUCTION

P1350 AC POWER SUPPLY SPECIFICATIONS

INPUT REQUIREMENTS:	120 VAC +/- 10% 47-440 Hz
OUTPUT POWER:	1350 VAC MAX. (with input @ 120 VAC)
LOAD POWER FACTOR:	Zero to Unity with no derating.
OUTPUT VOLTAGE:	0 -135VAC @ 10 AMPS AND 0-270VAC @ 5 AMPS
OUTPUT FREQUENCY:	Fixed at 50, 60 , & 400Hz. Switch selectable +/- .01 Hertz
OUTPUT REGULATION:	Less than 1% of full scale from no load to full load
SETTLING TIME:	Approximately 200mSec to 1%. 10-90% (linear load)
LINE REGULATION:	+/- 0.1% for +/- 10% line change @ 115V 10A/230 5A
OUTPUT DISTORTION:	1% Typical @ 115 V 50Hz into pure resistive load
.	
OUTPUT NOISE :	2.5 V peak to peak typ.(on low range into 10 ohms)

FRONT PANEL METER:

VOLTMETER RESOLUTION:	1 Volt
ACCURACY:	2% of reading + (+/- 1digit) RMS responding

PROTECTIVE CIRCUITS:

SHORT CIRCUIT	Inverter latches off in response to output short. Response time less than 20usec.
CONSTANT CURRENT	Responds to long term overloads by reducing output voltage. Set @ approximately 110% of rated current for range in use. 250mSec approximate response time.

MISCELLANEOUS:

PHYSICAL	Steel chassis, 17" W x 17.5" D x 3.5" H. 45 lbs.
TEMPERATURE RANGE	0 - 55 Degrees Celsius (operating) -10C to +65C (storage)

SECTION 2
P1350 AC POWER SUPPLY UNPACKING AND INSTALLATION

2.1 UNPACKING

After unpacking the equipment, carefully conduct a thorough inspection of all controls, indicators, and chassis. If the unit shows signs of shipping damage, do not attempt to operate. File a damage claim with the responsible carrier. Notify Behlman immediately.

2.2 INSTALLATION

This device is designed to operate on a bench or desk top. It can be mounted in a standard 19 inch rack cabinet using the RM option. **DO NOT ! ATTEMPT TO MOUNT BY RACK "EARS" ONLY.** Rear support must be provided. See information for the RM option contained elsewhere in this manual.

It is preferable to operate this equipment in a location which will maintain an air temperature of 0 to 40 degrees C around the ventilation ports. If the unit is to be rack mounted, the enclosure must be ventilated. The installation should insure that the side and rear vents are unobstructed.

2.3 INPUT POWER REQUIREMENTS

This model is supplied with a standard IEC20 type line cord with an NEMA 15P molded to the line end. This cord is rated at 15A and will suit most applications. The Model P1350 can operate from a wide input voltage range but continuous full power operation requires a "stiff" 120V line capable of suppling at least 20A. The cord should be replaced with an IEC20 plug wired with the desired 20A plug to match the user's receptacle. Consult with qualified electrician or Behlman if in doubt.

This equipment produces AC leakage current that may exceed dangerous levels. **This equipment is supplied with a three-wire AC input that provides for a safety earth connection to the equipment chassis. For operator safety the chassis of the equipment must be connected to the installation site safety earth. The safety earth connection also provides a return path for leakage currents associated with the equipment's internal line filter. Leaving this connection floating may create a shock hazard and/or electromagnetic interference**.

IMPORTANT NOTE:

The output of the power supply is floating and also provides a safety earth connection. It is permissible to tie one side of the output to the safety earth. This will allow the power supply to conform to section 250 of the National Electrical Code (NEC). Consultation with a qualified electrician is recommended for permanent installations in buildings or vehicles.

This equipment is designed to be operated in a dry indoor location. Do not operate in the presence of rain or other moisture.

SECTION 3
P1350 AC POWER SUPPLY OPERATING INSTRUCTIONS

⚠ WARNING !

THIS DEVICE PRODUCES VOLTAGE AND CURRENT LEVELS WHICH CAN BE LETHAL.
MIS APPLICATION OF THIS DEVICES MAY CAUSE SERIOUS INJURY OR DEATH.
THIS DEVICE IS INTENDED FOR USE BY QUALIFIED PERSONNEL ONLY !

The following section provides descriptions of the various features of the MODEL P1350 AC power supply front and rear panels. Figure 3-1 below illustrates the various controls and indicators associated with this model.

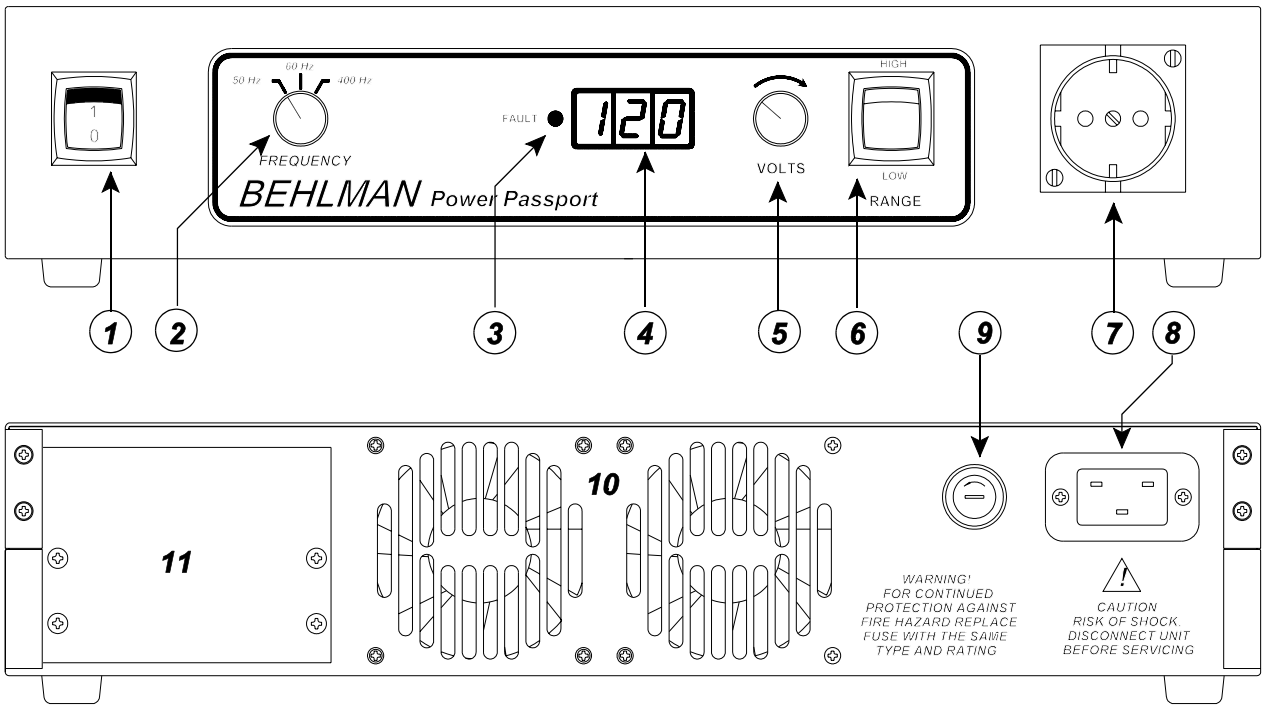


Figure 3-1 P1350 Controls & Indicators

Table 3-1 on the following page lists and explains each of the numbered features from the figure above. The appearance and controls of certain modified units will vary. Addendums will be added to this manual as required.

SECTION 3
P1350 AC POWER SUPPLY OPERATING INSTRUCTIONS

Before operating this equipment the user should become familiar with the controls and indicators provided. These are summarized in the table 3-1. Refer to figure 3-1 (previous page) for locations.

ITEM#	DESIGNATION	FUNCTION / DESCRIPTION
1	**POWER** switch	Controls input line power.
2	**FREQUENCY** switch	Selects one of three output frequencies. 50,60 or 400Hz
3	**FAULT** LED	Indicates unit disabled due to overload (short circuit).
4	**VOLTS** display	LED readout of the units output voltage .
5	**VOLTS** adjust control	Multi-turn control provides continuous adjustment of the unit's output voltage. See item 4.
6	**RANGE** switch	Selects output voltage range of 0-135V or 0 -270V. See operating instructions for more information.
7	Output Receptacle	“Shuko” type receptacle use to connect directly to load or for accepting various output adaptors. Several types are available from Behlman. See chart in this manual.
8	Input power Receptacle	Mates with IEC-20 type line plug. Note: a NEMA 15P to IEC-20 molded line cord is supplied with unit. See operating considerations in this manual.
9	Line fuse Receptacle	Screw type fuse holder for line fuse. 25A @ 132V Slow. **CAUTION ! For continued protection against fire, replace fuse with same type and rating only.** See section 3 of this manual for more information
10	Fan exhaust	Heated air is exhausted at the rear of the unit. A minimum clearance of 4 inches is required for proper cooling.
11	**REMOTE** option	This area reserved for optional DC remote control board. And/or rear output terminal block.

SECTION 3
P1350 AC POWER SUPPLY OPERATING INSTRUCTIONS

3.1 TYPICAL OPERATION.

1.) Connect the power supply to a suitable source of 120 VAC power using the supplied line cord. See operational considerations for further information on input power requirements.

2.) Connect the load or device to be tested to the front plug/adapter or rear panel output terminals.

3.) Set the **VOLTS** adjust control to minimum (fully CCW) .

4.) Turn on the power switch. At this point the sound of the cooling fans should be evident and the front panel **VOLTS** display should indicate zero volts. (000 to 002 is normal)

5.) Set the **FREQUENCY** select switch to the desired output frequency.

6.) Set the output **RANGE** switch to the desired range of 0-135 or 0- 270 Volts.

7.) Set the **VOLTS** control to provide the desired voltage and energize the load. It is also permissible to switch the load on (if provided with switch) and then slowly increase the output voltage with the **VOLTS** control. The best procedure to use is load dependent. See section 4 of this manual for additional information.

The output voltage may now be varied as required by individual testing needs. The load may also be turned on and off using an external switch, however, certain limitations exist. Certain load types may cause surge currents that may trip output protective circuits. See section 4 for more information.

IMPORTANT !

To prevent damage to the load or power supply the RANGE switch should only be used when the output is off and the VOLTS control is set to zero. This will prevent potentially damaging output transients.

To prevent possible damaging transients, The output should be set to zero or load disconnected prior to changing the selected output frequency.

SHUTDOWN PROCEDURE

1.) Switch off the load.

2.) Set the VOLTS adjust to minimum (fully counter-clockwise).

3.) Set the POWER switch to OFF.

SECTION 3
P1350 AC POWER SUPPLY OPERATING INSTRUCTIONS

3.2 CONNECTING LOADS

The load is connected to the front panel “SHUKO” receptacle or optional rear panel terminals. Several adaptors are available to mate with various international line cords. Table 3-2 lists the available adaptors and their Behlman part numbers. The output circuit of the P1350 AC power supply is transformer coupled and isolated from the input line power. This allows the unit to float or operate with either side of the output transformer tied to ground or other potential. The output circuit consists of three connections as illustrated in figure 3-2 below. The load is connected between the “High” and Low” terminals while the third terminal is tied earth via the power supply chassis and input line cord.

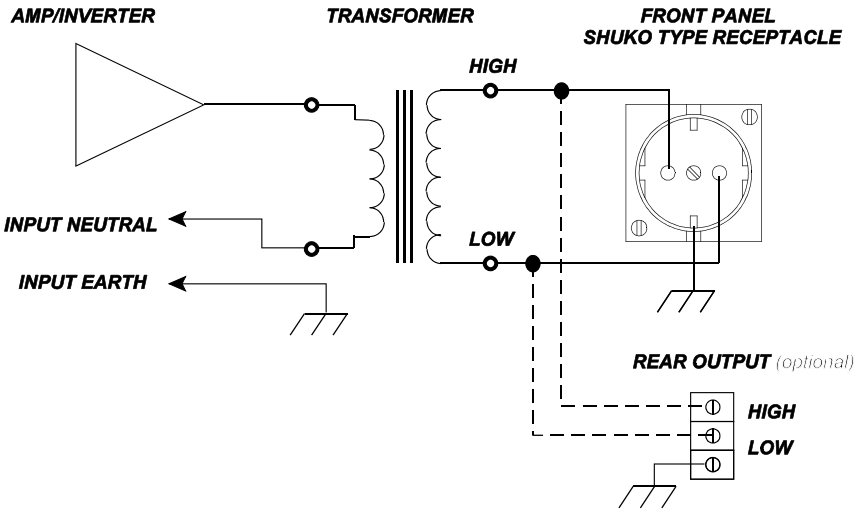


Figure 3-2 P1350 OUTPUT CIRCUIT

3.3 OUTPUT ADAPTORS

Table 3-2 below lists the output adaptors available for the P1350 AC power supply.

OPTION#	ADAPTOR DESCRIPTION	BEHLMAN P/N
A001	SCHUKO to NEMA 5-15R	107-771-001
A002	SCHUKO to NEMA6-15R	107-771-002
A003	SCHUKO to UK 1-13R	107-771-003
A004	SCHUKO to SWISS SW1-10R	107-771-004
A005	SCHUKO to ITALIAN IT1-10R/16R	107-771-005
A006	SCHUKO to AUSTRALIAN A01-10R	107-771-006

Contact Behlman for any special requirements not listed above.

SECTION 3
P1350 AC POWER SUPPLY OPERATING INSTRUCTIONS

3.4 OPERATION UNDER FAULT CONDITIONS.

The P1350 AC source incorporates three levels of over current protection. The first is a fold back circuit that reacts to long term RMS over current. In the event that the load applied is outside the range of the power source, the output voltage will decrease or "fold -back" in order to maintain the current. During fold back the output waveform remains sinusoidal. This can be a useful feature for starting AC induction motors and other types of motion related loads.

In the event the load becomes short circuited the amount of fault current could rise to levels high enough to damage the output semiconductors of the power source. The current of the output stage is monitored on a cycle by cycle basis at the 20KHz switching frequency. If the peak current exceeds an unsafe value, a logic signal is sent to the drive circuits that initiates a controlled shutdown of the output stage. This circuit can respond within 20usec. The action of this overload circuit is latching. The input power must be cycled to reset the power source. Allow at least 20 - 30 seconds for the internal soft start circuit to reset. Further information is provided in this manual under operating considerations.

The final form of protection is provided by a 25 amp input fuse. This fuse is employed primarily to provide fire protection in the event of an internal failure of the power source. Failure of this fuse typically indicates that an internal problem may exist.

CAUTION

In the event the fuse is to be replaced disconnect power before removing the fuse cover.

This fuse is rated at 25A and 132V minimum and **must** be replaced with the same type and voltage rating only! If a replacement fuse blows again the unit should be returned to Behlman for service.

3.5 TROUBLE SHOOTING

In the event a problem is encountered refer to the chart below :

PROBLEM	POSSIBLE CAUSE
No output, meter indicates 000	Adjust output control, check if overload latch LED is on. See section 4.
Load does not operate, unit indicates desired output.	Check that load is switched on. Check that the load is connected between HI and Lo output terminals vs. HI and GND. terminals. See section 3.2.
Output voltage drops when load is connected.	Check load current to insure that the rating of the power supply is not exceeded. This may be indicated by a "blinking" or steady constant current LED.
Output drops to zero when load is connected, Overload LED is on.	Load in-rush or surge current has exceeded the short circuit limit for the power supply. See section 4 for techniques to limit in-rush current.
Unit is Dead, no display or fan sound.	Blown input fuse. Check and replace per para.3.4. If fuse blows repeatedly , remove unit from use and refer to qualified service personnel or Behlman service dept.

SECTION 4
P1350 AC POWER SUPPLY OPERATING CONSIDERATIONS

OPERATIONAL CONSIDERATIONS

4.1 OPERATION INTO LINEAR LOADS

The model P1350 will provide the best overall performance into a linear load. A linear load is characterized by that fact that its current wave shape is sinusoidal. The phase relationship between the voltage and current may be anything between zero and 90 degrees (leading or lagging). Some examples of linear loads are as follows:

Most AC Motors, Power Transformers, Heating Elements, Resistors, Capacitors, Most Inductors Incandescent Lighting (without dimmers), and Most Solenoids

Operation into these types of loads usually causes little interaction with the output stage of the model P1350. The main concern with a linear load is the “inrush” current associated with it. Most heating elements and resistors have no in rush concerns and usually do not present any problem for the power source. Inductive and capacitive loads may present a special problem based on their construction and the way in which they are energized. Motors and tungsten filament lamps also present some special “start-up” concerns. The following is intended to give the end user some insight into applying the AC source to these types of loads.

4.2 DRIVING REACTIVE LOADS

Capacitors and inductors are reactive in nature. If the load is applied during the peak of the AC cycle there may be a considerable inrush of current several magnitudes larger than the steady state current. This current is only limited by any series resistance that may be present in the load circuit. Under the right conditions, this could trip the overload protection circuits in the power source. Certain transformers and solenoids (inductance) present the same problem.

Several methods can be used to prevent tripping the protection circuits in the power source. One common method is to insert a limiting impedance in series with the load. This could be a fixed resistor or NTC (negative temperature coefficient) thermistor. Also, zero crossing switching can be employed. The most obvious way to prevent a high in rush current is to apply the load with the voltage set to zero (or some low value) and energize the load slowly by turning up the voltage.

4.3 DRIVING LAMPS

Tungsten filament lamps, when cold, present a very low resistance. Once they are energized, their resistance quickly climbs to its steady state value. This characteristic must be accounted for when driving tungsten filament lamps. The same methods for driving reactive loads can be applied to tungsten.

4.4 DRIVING MOTORS

Driving an AC motor presents a special problem. Most motors require a starting current that is several times higher than the running current. This current may last for a few cycles to several seconds depending on the construction and mechanical load on the motor. This current is sometimes referred to as the motor’s “locked rotor” current. This current is not to be confused with the in rush current that usually occurs over the course of one or two cycles of the AC waveform.

The model P1351's fold-back current limiting can be an advantage when starting motors. During the starting period, the motor will attempt to draw excessive power from the power source. The fold-back circuit will reduce the output voltage in order to maintain the maximum current for the range in use.

4.4 DRIVING MOTORS (continued)

During this time the current supplied to the motor will remain sinusoidal, this allows the motor to start rotating. Once the motor reaches it's normal operating speed it generates the required "back EMF" and the supply current drops off to the nominal "run" current for the motor. Ramping up the voltage to the motor can reduce the locked rotor current demand. This will allow the AC power supply to start many types of motors with run currents up to 10 Amps.

4.5 DRIVING NON-LINEAR LOADS

Loads utilizing rectifiers and SCRs interact with the AC power source and have a profound effect on the distortion of the output waveform. Consider the use of a bridge rectifier followed by a capacitive filter. The current waveform associated with this circuit is illustrated in figure 4-1. The input current to this type of circuit is drawn in large "gulps" whenever the voltage across the capacitor falls below the peak of the input waveform. This current is limited only by the series impedance present in the wiring and capacitor. The impedance of large electrolytic capacitors is very small. This action causes a current waveform with a peak value that may be several times the RMS value. This ratio of peak current to RMS current is known as "Crest Factor". High values of crest factor cause distortion of the AC voltage waveform.

The amount of distortion incurred is dependant on many factors and is beyond the scope of this manual. It should be noted that this type of load may cause the output waveform to exhibit "flat-topping" This should not be associated with a defect of the power source. Most "real world" electric distribution systems exhibit this distortion for this reason.

4.6 INPUT POWER REQUIREMENTS

The model P1350 utilizes a rectifier followed by a bank of filter capacitors. Because of this fact, it presents a nonlinear load to the utility power. The's input current waveform has a high crest factor and contains a large amount of harmonic currents. These harmonic currents do not contribute to the output power of the power source but must still be supplied by the input line. This adds up to a poor input power factor.

WARNING

When selecting a suitable line input, it must be understood that the input current required for full output power (1350 watts) from the P1350 may exceed 20Amps RMS. This is only true for purely resistive loads (Watts v.s. Volt/Amperes). For this reason the unit is supplied with an IEC 320 C-20 input receptacle. If continuous full power operation is desired, the unit must be supplied from the equivalent 20 amp-rated receptacle. The line cord (P/N 107-802-000) supplied with the unit has standard North American NEMA 15P at one end. This was done due to the fact that it is more convenient to most end users. Although the cord itself can handle the current, the line end should be changed to the appropriate mate for prolonged full power operation. **Failure to do so may cause overheating of the input line connection**. This may cause a fire hazard. Consult with Behlman if unsure.

Full power operation into a full resistive load may cause loading (sagging)of the supplied line voltage if a large series impedance is present. This is due to the high current required by the model P1350. If problems are encountered while trying to achieve full output power, monitor the input line. If the line drops below 110VAC, move the unit to a known "stiff" line.

SECTION 4
P1350 AC POWER SUPPLY OPERATING CONSIDERATIONS

4.7 OUTPUT NOISE

Because the model P1350 uses a high frequency PWM conversion technique, a certain amount of output noise or ripple is to be expected. The noise present on the output voltage waveform from this unit varies somewhat with the load. Maximum noise levels are present when there is no load applied. In any event, the amount of noise present should not constitute a problem for properly designed equipment. If the devices being tested are disabled by the noise present on the output waveform, then serious consideration should be given to the design of the unit being tested as they may not pass the European EMI tests.

In special cases where the output noise is objectionable or interfering with low level measurements an external line filter can be added to the output of the unit. Please note that most line filters are not intended to be used at 400Hz. Radiated output noise may reduced by using shielded output wiring. The shield can be terminated to the GND terminal of the AC supply . This connection should be as short and direct as possible.

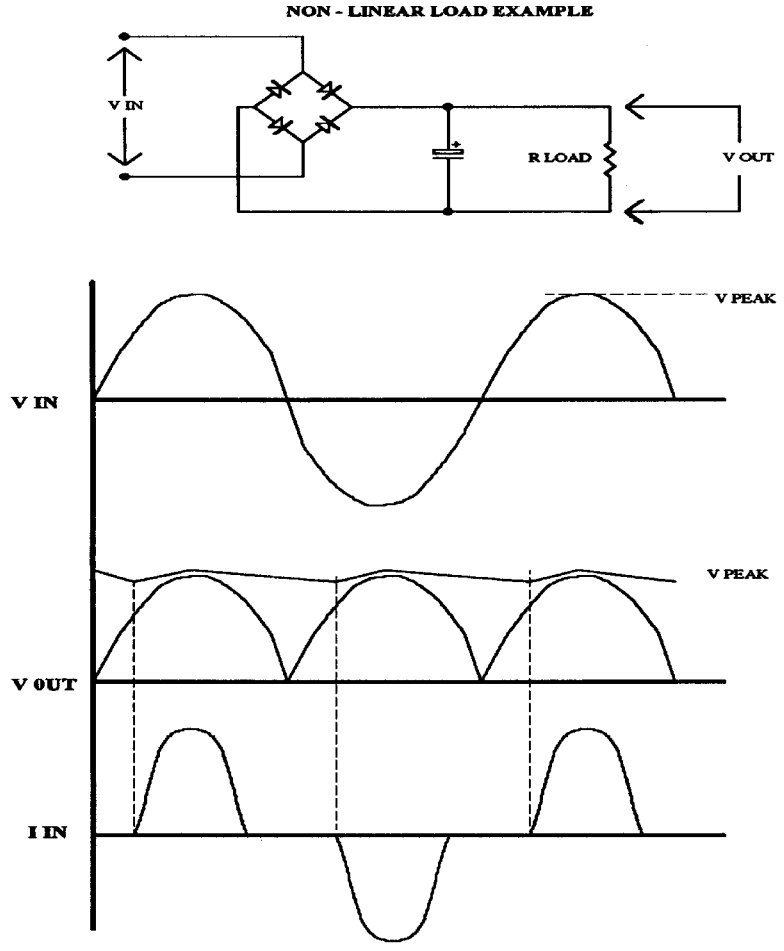
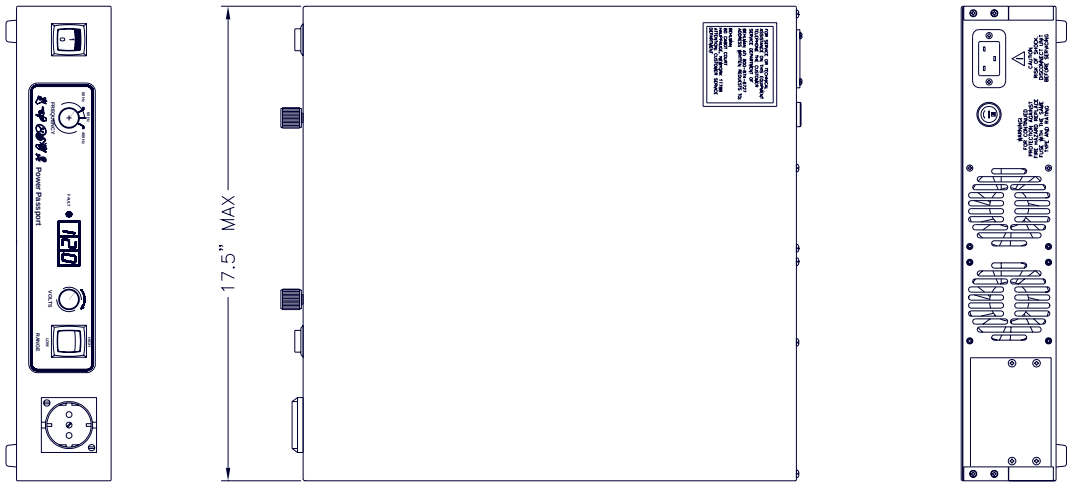


FIGURE 4-1

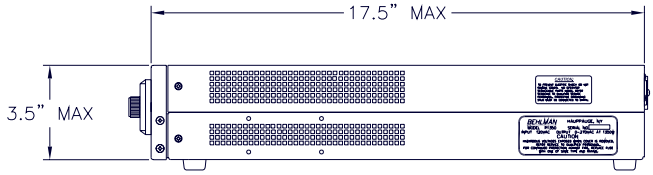
SECTION 4
P1350 AC POWER SUPPLY OPERATING CONSIDERATIONS

4.8 MECHANICAL OUTLINE

The figure below illustrates the mechanical configuration of the P1350 AC power supply. This view does not show the RM option rack mounting kit.



TOP VIEW



SIDE VIEW

4.9 RACK MOUNTING (OPTION RM)

The RM option kit is supplied for units that are to be mounted in a standard EIA equipment rack. This kit includes two mounting brackets and associated hardware. The brackets are attached to the left and right side panels using existing threaded inserts and the supplied screws.

WARNING

DO NOT substitute longer screws as these may damage internal parts and create a shock hazard. Note that these brackets are intended to secure the front panel to the rack only. Due to the weight of this device rear support must be provided by the equipment rack. Do not rely on RM brackets only.

SECTION 5
P1350 AC POWER SUPPLY OPTIONS

The P1350 series of AC power supplies is available with several options. These can be specified at the time of purchase or added as required by end user. Table 5-1 below listed the available options for this model series. Behlman also produces modified versions of this unit that may be application specific. These units will be assigned a 4 digit "engineering" number. Any information required for operation will be added to this manuals as an addendum.

OPTION	DESCRIPTION	PART #
A001	output adapter "SCHUKO" to NEMA 5-15R	107-771-001
A002	output adapter "SCHUKO" to NEMA 6-15R	107-771-002
A003	output adapter "SCHUKO" to UK 1-13R	107-771-003
A004	output adapter "SCHUKO" to Swiss SW1-10R	107-771-004
A005	output adapter "SCHUKO" to Italian IT1 - 10R/16R	107-771-005
A006	output adapter "SCHUKO" to Australian A01-10R	107-771-006
RM	EIA rack mounting bracket kit.	107-822-000
TB *	Rear output terminal block option. This is connected in parallel with the front panel SCHUKO socket. HI, LO, and GND provided.	107-821-001
RO *	Rear panel NEMA 5-15R added to rear panel.	107-821-000
LC001	Line Cord : IEC-320-C20 to NEMA 15P	107-802-000
LC002	Line Cord: IEC-320-C20 to NEMA 5-20P	107-802-002
L	Locking device fitted to front panel VOLTS control.	N/A
4065 *	0- 10VDC remote control of output voltage	P1350 -4065

* Note: options TB, RO, and 4065 are not considered field installable options and must be factory installed . Call a Behlman Sales representative for pricing and further information.

SECTION 5
P1350 with ANALOG REMOTE CONTROL OPTION - 4065

1.0 INTRODUCTION

This option provides a means of controlling the model P1350 output voltage with a 0-10Vdc analog signal. In addition, the power supply's output range may be set to the high range via a digital input. This interface provides complete isolation from ground and the power stage of the power supply. An additional terminal block is fitted to the rear of the power supply chassis.

2.0 SPECIFICATIONS

0 To 10VDC Control Input Impedance ..... 10K ohms minimum

Maximum Input Voltage .....+/- 15 Vdc

Control Input to Output Linearity ..... 1% typical

Control Response Time .....250mS typical

Isolation Voltage .....500 Vdc (300 Vac 60Hz)

3.0 CONTROL TERMINAL ASSIGNMENT (TB-1)

POS.	PIN NAME	FUNCTION
TB1-1	VOLTAGE CONTROL	0-10VDC input control output ac voltage.
TB1-2	COMMON	signal return for dc control
TB1-3	RANGE +	8 - 15 VDC set range to 0-270V
TB1-4	RANGE -	8 - 15VDC signal return

APPLICATION INFORMATION

To use the remote control features the front panel **VOLTS** controls **MUST BE** set fully counter clockwise. The **RANGE** switch must be set to the "LOW" position. Note that the remote input is additive and will increase the setting of the front panel controls.

Cables used to connect the control circuit to the power source should be shielded to prevent noise and electromagnetic interference from entering the remote inputs. A shielded twisted pair is recommended. Cable shields should be terminated at the control side of the circuit. The maximum length of these cables is dependent on the control circuit's drive capability. It should be noted that some IC output stages may become unstable and oscillate when driving long cables with high capacitance. Low output impedance buffers should be considered when long cable lengths are desired.

The stability and regulation of the P1350 output voltage will be directly affected by the quality of the user supplied control signals. This must be considered during the design of the control circuitry.