RBD Series

Installation and Maintenance Manual

Boston® Gear

An Altra Industrial Motion Company

TABLE OF CONTENTS

WARNING

Improper installation or operation of this control may cause injury to personnel or control failure. The control must be installed in accordance with local, state, and national safety codes. Make certain that the power supply is disconnected before attempting to service or remove any components!!! If the power disconnect point is out of sight, lock it in disconnected position and tag to prevent unexpected application of power. Only a qualified electrician or service personnel should perform any electrical troubleshooting or maintenance. At no time should circuit continuity be checked by shorting terminals with a screwdriver or other metal device.

INTRODUCTION

- The RBD Series variable speed DC motor control is a versatile, general purpose control rated to 2 HP, available in chassis mount or enclosed configurations with options for specific applications.
- The RBD models have a dual voltage input (may accommodate either 120 or 240 VAC). It is available with an adjustable HP range of 1/8 thru 1 HP for 120 VAC, and 1/4 thru 2 HP for 240 VAC input.
- Designed for DC Permanent Magnet, Shunt Wound, and some Universal (AC/DC) motors in the above horsepower ranges.
- Incoming AC voltage is converted to adjustable full wave rectified DC voltage (via a packaged bridge) to operate the DC motor. Also, a full wave field voltage is provided for shunt wound motors (see page 5 for voltages).
- The control incorporates transient voltage protection with adjustable current limit and an AC fuse for protection. It features adjustable minimum and maximum speeds along with adjustable acceleration and IR Compensation. Tach feedback is accomplished thru a connection to a pin (P2) on the printed circuit board.
- The RBD Series has a linear acceleration/deceleration ramp.
- The control also has a barrier type terminal strip for all power and control wiring.
- Enclosed models use a gasketed cover assembly that is rated NEMA 4/12.
- cULus Listed under, U.L. File # E352602.

CONTROL FEATURES

MIN. SPEED (minimum speed) - allows adjustment of the motor speed when the speedpot is set at minimum (CCW). This permits the user to eliminate the “deadband” on the main speed control permitting zero calibration. Clockwise rotation of “MIN” trimpot increases minimum motor speed.

MAX. SPEED (maximum speed) - provides for adjustment of the motor speed when the speedpot is set at maximum (CW). This permits the user to eliminate the top end “deadband”, which will provide full speed at maximum rotation. Rotation of the “MAX” trimpot in the clockwise direction increases the maximum motor speed.

ACCEL (acceleration) - allows adjustment of the motor acceleration from a minimum of 0.5 seconds to approximately 8.0 seconds. The deceleration time depends on the ACCEL setting.

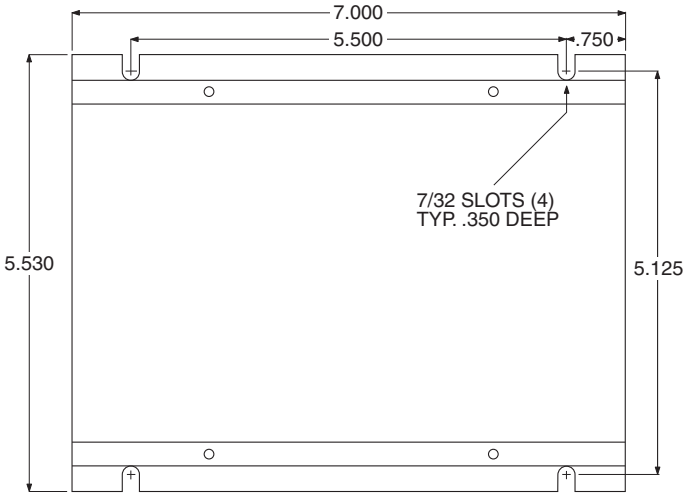
IR COMP (speed regulation) - adjusts the control output to compensate for speed changes caused by varying motor loads. As the motor load is increased, IR COMP increases the voltage output of the control. Clockwise rotation of the “IR COMP” trimpot will increase compensation.

CUR. LIM. (current limit) - provides protection from excessive armature current by limiting the maximum armature current the control can provide. This enables adjustment of the maximum torque the motor can deliver. Current limit adjustment (CUR LIM) is set at 125% of the rated motor current (torque) based on horsepower. Clockwise rotation of the “CUR LIM” trimpot increases the current (torque) the control will provide.

INHIBIT TERMINAL PIN (P2) - allows the user a choice of stopping and starting hard (fast) or stopping hard with a soft start through an adjustable acceleration ramp, without breaking the AC lines (see page 10).

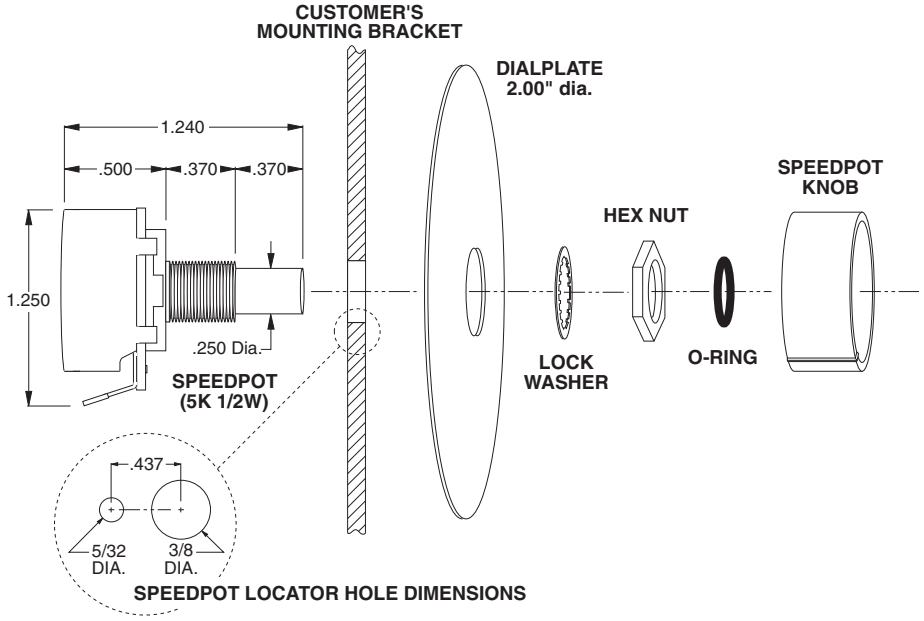
TERMINAL STRIP - allows for connection of AC lines, motor leads, motor field (if needed), and speed potentiometer.

HEATSINK DIMENSIONS



FOR Chassis Model: Allow 1.55" for height clearance, 7.00" for overall length.
FOR Enclosed Models: Allow 3.50" for height clearance, 7.40" for overall length.

SPEEDPOT KIT ASSEMBLY



MOUNTING PROCEDURE

CAUTION: Do not mount control where ambient temperature is outside the range of -10° C. (15° F.) to 45° C. (115° F.)

1. Four 7/32" diameter slots are provided for control mounting.
2. The chassis of the control can be used as a template.
3. Use standard hardware to mount.
4. The enclosed version has two threaded holes (1/2" NPT) provided on the bottom side endplate near the terminal strip to facilitate wiring.

MODEL SELECTION

Note: The minimum current rating for all RBD Series controls is 150mA.

HORSEPOWER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT AMPS DC	CHASSIS MODEL	ENCLOSED MODEL	ENCLOSED MODEL SWITCH FUNCTION
1/8 1/4 1/3 1/2 3/4 1.0	120/240 VAC	0-90/0-180 VDC	10.8A	RBD2C	RBD2S	ON/OFF
					RBD2R	FWD/REV
					RBD2SN4X	ON/OFF
					RBD2RN4X	FWD/REV
					RBD2B	NONE
					RBD2B-25A-38	AUTO/MANUAL
					RBD2B-25D-38	ON/OFF
1.5* 2.0*	240 VAC	0-90/0-180 VDC	10.8A	RBD2C	RBD2S	ON/OFF
					RBD2R	FWD/REV
					RBD2SN4X	ON/OFF
					RBD2RN4X	FWD/REV
					RBD2B	NONE
					RBD2B-25A-38	AUTO/MANUAL
					RBD2B-25D-38	ON/OFF

* Not available with 120 VAC input - Input voltage determines maximum allowable H.P.

These controls will operate a 90 VDC motor in the H.P. range of 1/8 through 1 H.P., and a 180 VDC motor in the range of 1/4 through 2 H.P., using different trimpot settings.

WARNING

1. **Be sure the control housing is properly grounded.**
2. **Arm connections must not be switched or broken while the control is on. Serious damage may result.**
3. **For non-speedpot applications, the input connections to the Lo-Wiper-Hi leads must not be grounded. Serious control damage may result from a grounded input.**

WIRING PROCEDURE

1. **Size all wires** which carry armature or line current to handle currents as specified by national, state, and/or local codes. All other wires may be #18 AWG or smaller as permitted by local code.
2. **Separate control wires** from all the Armature and AC line wires when routed in conduits or in wire trays. The enclosed version has two threaded holes (1/2" NPT) in one endplate, located near the terminal strip, for this purpose.

FUSING

The RBD is provided with a fuse in AC line 1 (P1-11). This fuse is sized to open in the event of a shorted armature or if an armature line is shorted to earth ground. As long as 120 VAC input is connected properly, there is no additional fusing needed.

For 240 VAC applications, an external fuse may be used in AC line 2 (P1-10). This fuse should be a Bussman ABC10 or LittleFuse 314-010. This added fuse will provide protection on both AC legs to the RBD control. If you desire not to fuse both legs, the fuse in the control will open in the event of excessive armature currents.

Note: AC current is determined by motor characteristics. In some applications it may be necessary to increase fuse value.

TERMINAL STRIP WIRING

The RBD Series has an 11 position terminal strip for ease of connection.

P1-1 **(SPEEDPOT LO)** Connects to low side (orange wire) of the 5K speedpot (normally the CCW end). This input is raised and lowered by the MIN. trimpot. Electronic speed input (voltage follower) may be referenced to speedpot LO if the MIN trimpot adjustments are to be active. Otherwise, inputs may be referenced to -ARM, which will bypass the MIN trimpot. **NOTE: INPUT MUST NOT BE GROUNDED!!**

P1-2 **(SPEEDPOT WIPER)** Connects to wiper (red wire) of the 5K speedpot (center lead). For voltage follower applications, this **INPUT MUST NOT BE GREATER THAN +12 VOLTS MAXIMUM AND MUST NOT BE GROUNDED!**

P1-3 **(SPEEDPOT HI)** Connects to high side (white wire) of the 5K speedpot (CW end). This is internal +12 volts. For start-stop applications, the connection between this terminal and speedpot HI can be opened and closed by a SPST switch. **NOTE: INPUT MUST NOT BE GROUNDED!!**

P1-4 **(-ARM)** Connects to minus (-) Armature wire (A2) on motor. For voltage follower applications where the MIN trimpot is bypassed, connect minus (-) of the follower to this terminal.

P1-5 **(+ARM)** Connects to plus (+) Armature wire (A1) on motor. 0-90 VDC for 120 VAC input OR 0-180 VDC for 240 VAC input. See "SPECIFICATIONS" for output rating.

P1-6 **(+FIELD) DO NOT USE for permanent magnet motor.** This supplies +Field voltage for a SHUNT WOUND MOTOR. Refer to Field Voltage table. For motors with dual voltage field (i.e. 50/100V or 100/200V), make sure highest value is connected.

FIELD VOLTAGE TABLE		
VAC INPUT	**120**	**240**
VDC FIELD	**100**	**200**

P1-7 **(-FIELD) DO NOT USE for permanent magnet motor.** Connect minus (-) Field wire of SHUNT WOUND MOTOR.

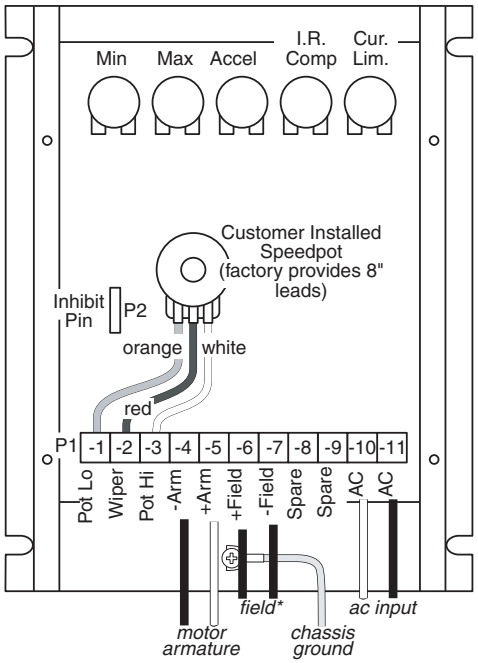
P1-8 } **VERY IMPORTANT !!!** **Refer to "FUSING", shown above.**
P1-9 } **CHASSIS VERSION:** **(SPARE)** Make no connection to P1-8 or P1-9

ENCLOSED VERSION: **(AC)** ***120VAC -*** Connect incoming hot AC (black wire) to P1-9 and Neutral (white wire) to P1-8. Connect ground (green wire) to Chassis Ground, as shown in diagram - page 5.
240VAC - Connect both hot sides, one to P1-8 and one to P1-9. Also connect ground wire to Chassis Ground.

P1-10 } **VERY IMPORTANT !!!** **Refer to "FUSING", shown above.**
P1-11 } **CHASSIS VERSION:** **(AC)** ***120VAC*** - Connect incoming hot AC (brown or black wire) to P1-11 and Neutral (white or yellow wire) to P1-10. Connect ground (green wire) to Chassis Ground.
240VAC - Connect both hot sides, one to P1-10 and one to P1-11. Connect ground wire to Chassis Ground.

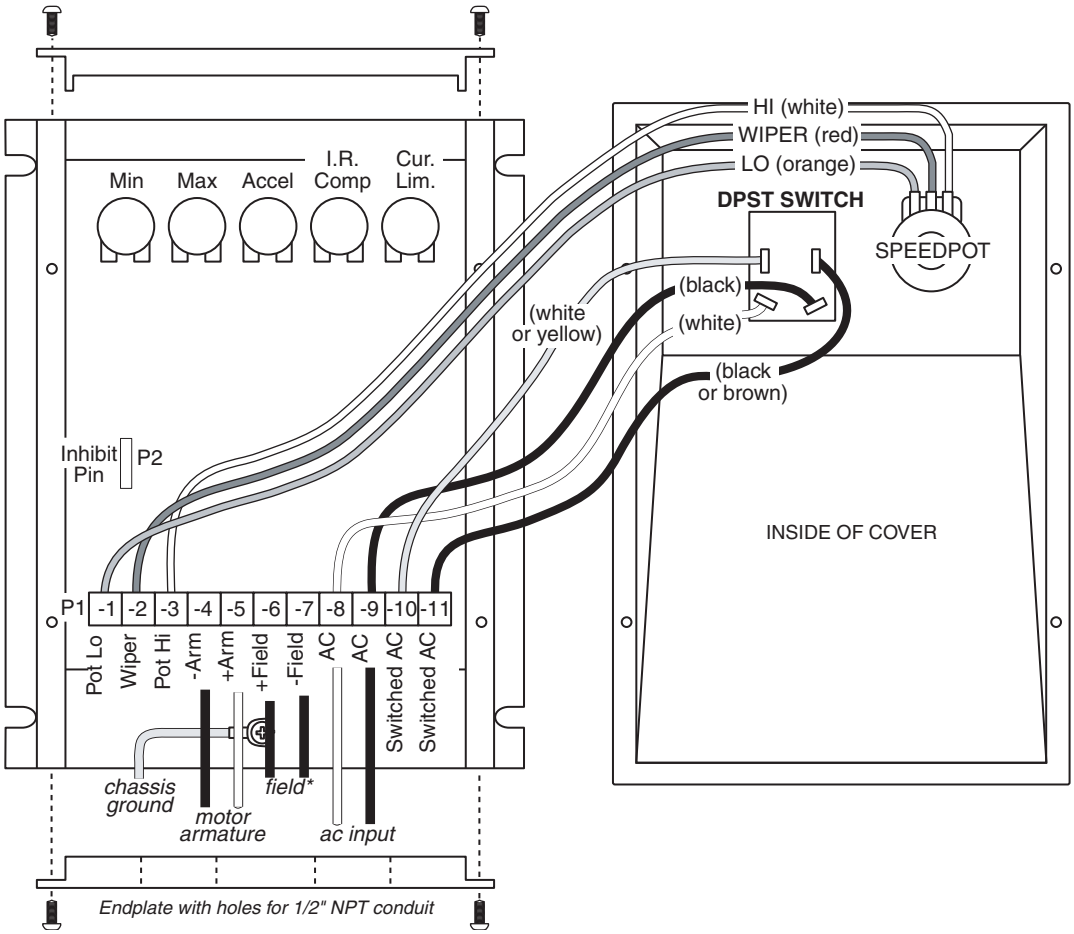
ENCLOSED VERSION: **(SWITCHED AC)** No connections to P1-10 and P1-11. This is for switched AC output. Note "FACTORY WIRING" (page 5). Pilot lights can be connected between these terminals. The voltage present at these terminals is AC input voltage.

RBD2C and RBD2B** HOOK-UP DIAGRAM



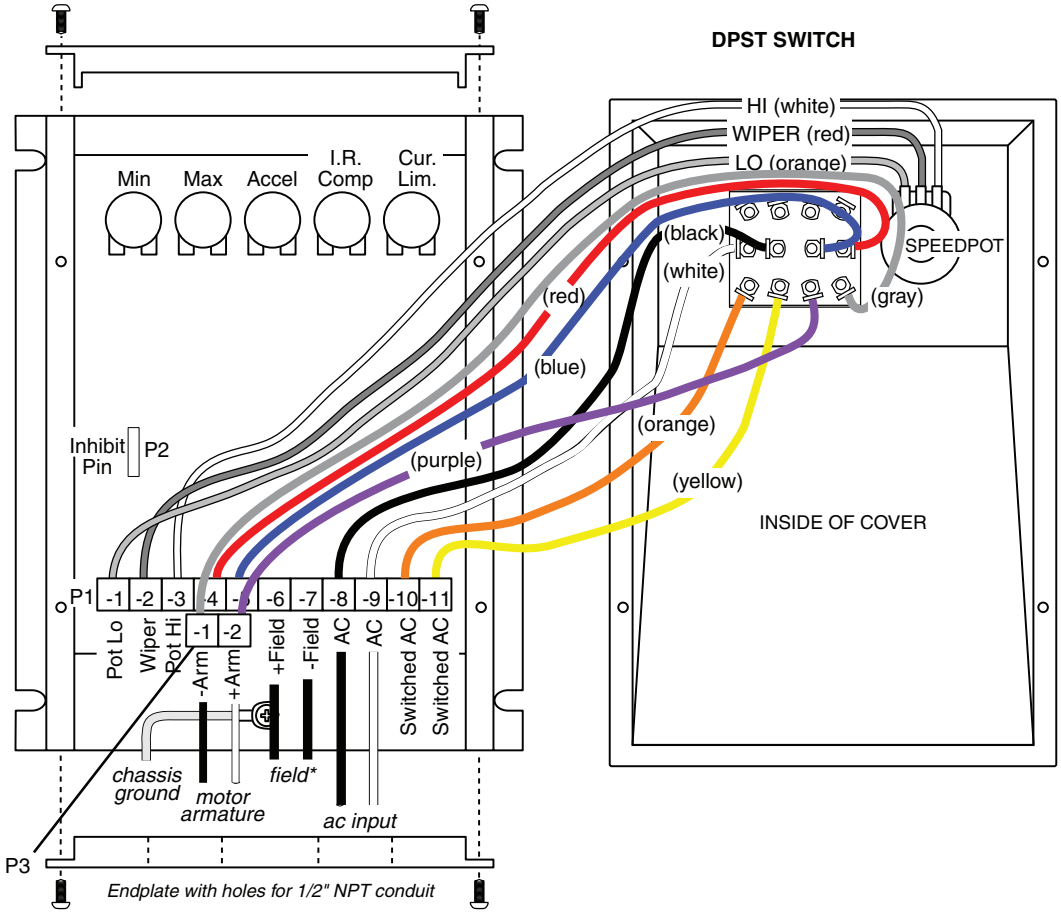
*** Used for shunt wound motors only!** No connection is made to these terminals when using permanent magnet motors.
** Blank cover with no switches or speedpot.

RBD2S and RBD2SN4X ENCLOSED HOOK-UP DIAGRAM



*** Used for shunt wound motors only!** No connection is made to these terminals when using permanent magnet motors.

RBD2R and RBD2RN4X ENCLOSED FWD/REV HOOK-UP DIAGRAM

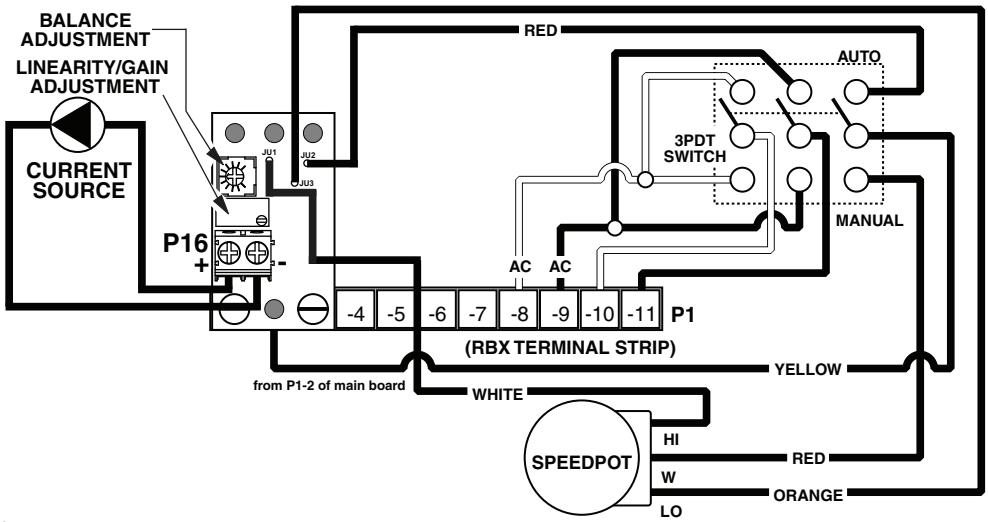


*** Used for shunt wound motors only!** No connection is made to these terminals when using permanent magnet motors.

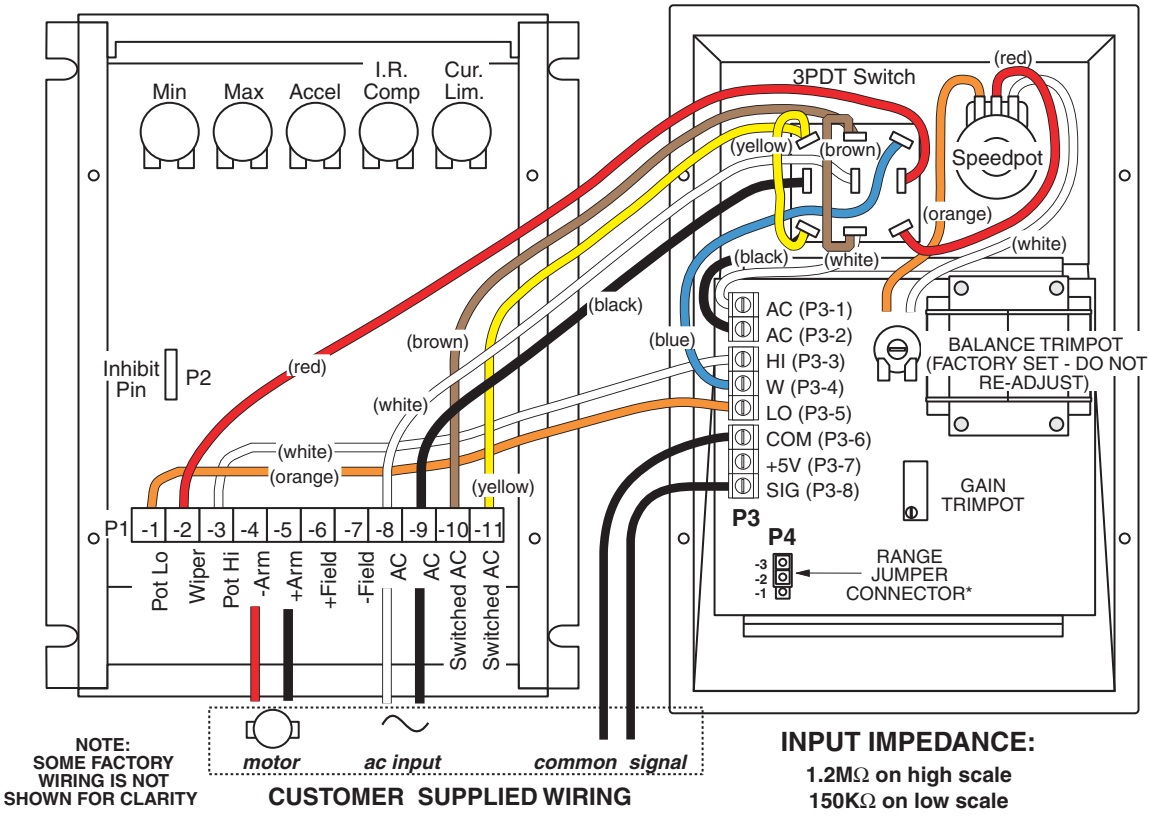
Motor Armature leads must be connected to P3-1 and P3-2, to avoid damage to the control.

If motor does not run in desired direction, disconnect AC source power, exchange leads on P3-1 & P3-2, then reconnect AC power.

RBD2B-25A-38 ENCLOSED AUTO/MANUAL HOOK-UP DIAGRAM



RBD2B-25D-38
ENCLOSED HOOK-UP DIAGRAM



* Jumper clip is used to select input voltage range. When installed from P4-1 to P4-2, the range is 0-25VDC through 0-250VDC; when installed from P4-2 to P4-3, range is 0-5VDC through 0-25VDC.

ADJUSTMENT PROCEDURE FOR RBD2B-25D-38

1. With no power at the control, connect a DC voltmeter (meter must not be grounded) to control outputs as follows: **Meter COMMON to the -ARM terminal; Meter POSITIVE to the +ARM terminal**. Select correct meter range (0-90V or 0-180V).
2. Preset GAIN trimpot (option board) fully CCW, place range jumper clip in proper position.
3. Preset control as follows: MIN and I.R. COMP. fully CCW, MAX at 50%.
4. Apply desired AC voltage to control and option board.
5. With 0 volts into option board, adjust MIN trimpot on control to eliminate deadband. To do this, increase MIN fully CW, then adjust CCW until meter reads 0 volts.
6. Apply maximum input voltage to option board input.
7. Adjust GAIN until no further change in voltage output occurs and turn CCW until a 5V drop occurs, then set control MAX to 90VDC (180VDC for 240V input).
8. Set CURRENT LIMIT by using “TRIMPOT SETTING CHART” in the instruction manual.
9. For closed loop systems the I.R. COMP. should remain fully CCW. For open loop systems, set I.R. as per set-up procedure.
10. ACCEL/DECEL adjustments should be set as needed.

Warning: Do not attempt to perform a Hi-Pot test across AC lines with control in circuit. This will result in immediate or long term damage to the control.

START-UP PROCEDURE

WARNING: ALL POWER MUST BE TURNED OFF BEFORE PROCEEDING !!!

1. Recheck all wiring. Accidental grounds, loose or pinched wires on armature or speedpot wires may damage the control when power is applied.
2. Check to see that incoming service is of correct voltage.
3. Turn speedpot to zero (fully CCW).
4. Turn power on and advance speedpot while observing motor.
   WARNING: POWER MUST BE OFF BEFORE STEP 5 CAN BE ACCOMPLISHED!
5. If motor rotation is incorrect, turn power off at external disconnect and reverse +ARM and -ARM connections.
6. Check for satisfactory operation throughout the speed range.
7. If operation is satisfactory, no readjustments are needed.
8. If instability or surging is observed, or maximum speed is higher than desired, see section “TRIMPOT ADJUSTMENT”.
9. For other problems, consult section “IN CASE OF DIFFICULTY”.

ADJUSTMENTS

The trimpot adjustments, MIN, MAX, IR COMP, and CUR LIM are checked at the factory using a typical motor at 240 VAC input. Use the **TRIMPOT SETTING CHART** on page 10 to preset the trimpots for the proper setting for your application. The remaining trimpot - ACCEL, is a variable acceleration and should be set for your particular application.

The trimpot chart is approximate. The chart is valid when using the speedpot or a 0-10/12 VDC input signal to set speed.

These adjustments are permanent; periodic readjustment is normally not needed. Operation of the control beyond ±10% of normal line voltage could result in readjustments.

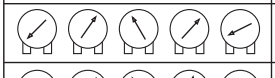
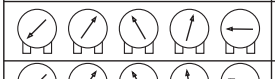
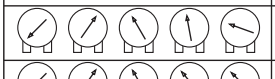
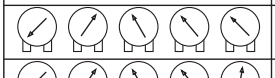
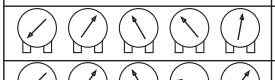
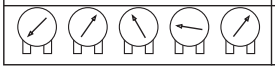
TRIMPOT ADJUSTMENT PROCEDURE

TRIMPOT	FUNCTION	ADJUSTMENT
MAX	**SETS MAXIMUM MOTOR SPEED when speedpot is set at maximum (100% rotation CW). CW rotation of MAX trimpot increases maximum motor speed.**	1. TURN DRIVE POWER OFF!! 2. Connect DC Voltmeter: + to +ARM, - to -ARM. 3. Set meter voltage range: (90VDC or 180VDC). 4. Turn power on. Set speedpot at 100%. 5. Adjust MAX trimpot to rated motor armature voltage as shown on meter. NOTE: A tachometer or strobe may be used in lieu of a meter. Follow above steps, except adjust MAX trimpot to rated motor base speed indicated by tachometer or strobe.
MIN	**SETS MINIMUM MOTOR SPEED when speedpot is set at zero. CW rotation will increase minimum motor speed.**	1. Set speedpot to zero (fully CCW). 2. Rotate MIN trimpot CW until motor rotates. 3. Slowly rotate MIN trimpot CCW until motor stops. NOTE: If motor rotation at zero is desired, rotate MIN trimpot CW until desired minimum speed is reached.
IR COMP.	**CALIBRATES SPEED REGULATION - Provides a means of improving motor speed regulation in the armature feedback mode. If a slowdown due to load change is of no concern, rotate this trimpot fully CCW.**	1. Set speedpot at 50%, 2. Observe motor speed at no load condition. 3. Apply a full load to the motor. 4. Adjust IR COMP trimpot CW to obtain the same motor speed as with no load.
CUR. LIM.	**LIMITS DC MOTOR ARMATURE CURRENT (Torque) to prevent damage to the motor or control. The current limit is set for the rated motor current. CW rotation of this trimpot increases the armature current (or torque produced).**	1. TURN DRIVE POWER OFF !! 2. Connect a DC ammeter between A1 on the motor and +ARM on the control. This is in series with the motor. 3. Turn power on. 4. Set speedpot at the 50% position. 5. Set CUR LIM trimpot fully CCW. 6. Apply friction braking to the motor shaft until motor is stalled (zero RPM). 7. While motor is stalled, set current at 125% of rated nameplate motor armature current by adjusting the CUR LIM trimpot.
ACCEL	**ALLOWS ADJUSTMENT OF ACCELERATION by user.**	1. CW rotation increases time of acceleration.

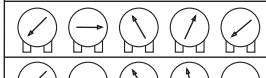
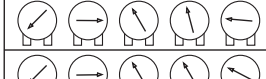
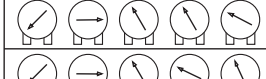
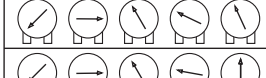
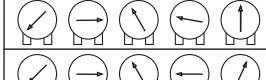
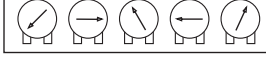
TRIMPOT SETTING CHART

* These settings apply when using a 5000Ω Master Speedpot.
* Settings will differ when using various options, such as the DC-25A.
* This trimpot chart is approximate. Use it in conjunction with the Adjustment Procedures.

RBD SERIES

MIN MAX ACCEL IR C.L.	H.P.	INPUT VOLTAGE	OUTPUT VOLTAGE
	1/8	120VAC	0-90VDC
	1/4	120VAC	0-90VDC
	1/3	120VAC	0-90VDC
	1/2	120VAC	0-90VDC
	3/4	120VAC	0-90VDC
	1.0	120VAC	0-90VDC

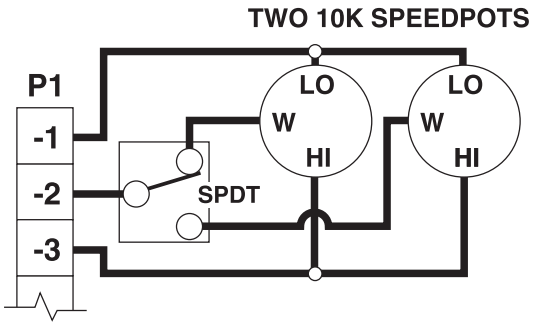
RBD SERIES

MIN MAX ACCEL IR C.L.	H.P.	INPUT VOLTAGE	OUTPUT VOLTAGE
	1/4	240VAC	0-180VDC
	1/2	240VAC	0-180VDC
	3/4	240VAC	0-180VDC
	1.0	240VAC	0-180VDC
	1.5	240VAC	0-180VDC
	2.0	240VAC	0-180VDC

CONTROL MODIFICATIONS

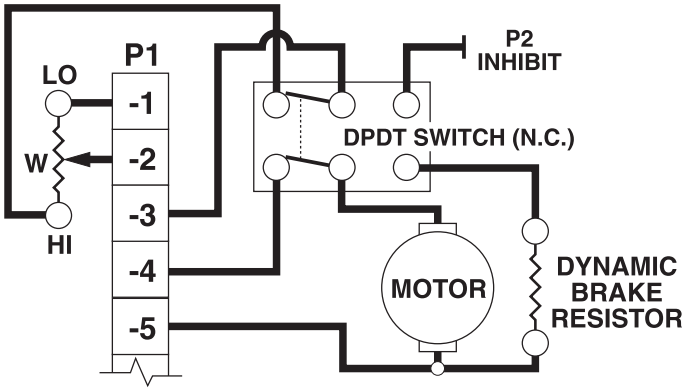
TWO SPEED OPERATION

Two pot operation is done using two 10K ohm speed potentiometers in parallel (both HI's to P1-3, both LO's to P1-1). The WIPER is switched using a SPDT switch.



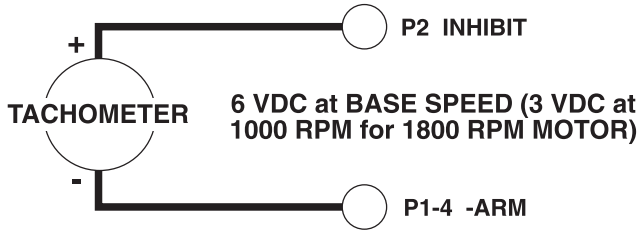
DYNAMIC BRAKING

A DPDT switch is used to inhibit the control and to connect the DBR. Typical values for the DBR (dynamic brake resistor) are 5 ohms for 120V, 10 ohms for 240V (both 35W to 50W). Note that motor horsepower, inertia, and cycle time effect sizing of the DBR.



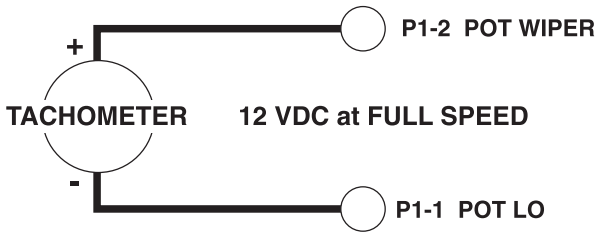
TACHOMETER FEEDBACK

Improves speed regulation to ±1/2% of base speed. Contol goes to full output when input goes to zero, above and beyond MAX trimpot setting



TACHOMETER FOLLOWER

Allows control output to follow tachometer voltage.

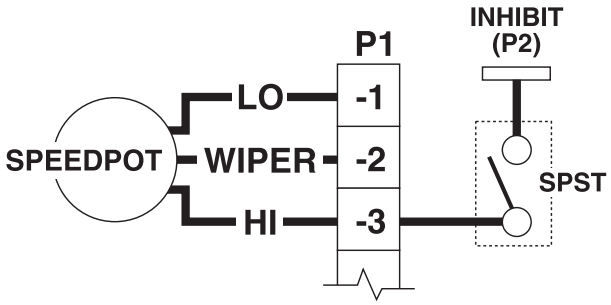


NOTE: NEED 1% OR LESS - TACH OUTPUT RIPPLE

INHIBIT (USED INDEPENDENTLY)

The customer supplied SPST switch is connected in series between the speedpot HI (P1-3) and the Inhibit pin (P2). To inhibit, speedpot HI is closed to the Inhibit pin. To restart, the switch is returned to open.

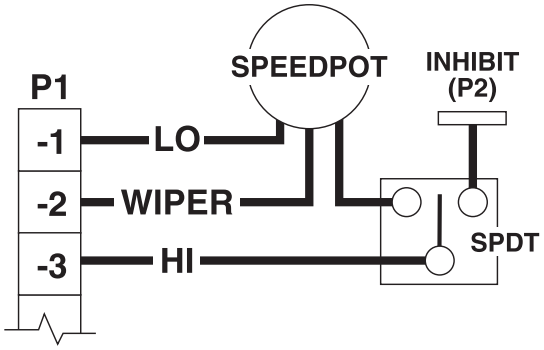
NOTE: The control will stop and start fast, accel is bypassed.



INHIBIT (USED WITH SPEEDPOT)

The Common of the SPDT switch is connected to control pot HI and is switched between Speedpot Hi and the Inhibit pin (P2). To inhibit (stop motor), speedpot HI is closed to the Inhibit pin. To restart, the switch is returned to Speedpot Hi.

NOTE: The control will stop fast and start through the ACCEL trimpot setting.



NOTE: The Inhibit function allows for the starting and stopping fo the motor without breaking AC lines. In the event of SCR failure or false triggering, the Inhibit circuit will not stop the motor.

Always use a shielded wire when connecting to the inhibit terminal. The shield should be connected to -Armature or Common of the control.

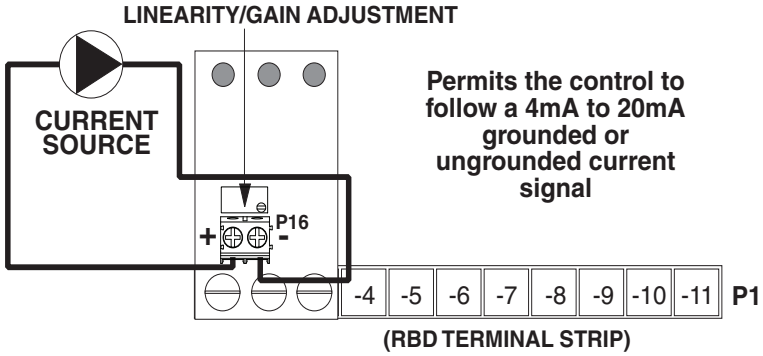
OPTION DESCRIPTIONS

DC-25A option

Field Installed

Isolated 4-20 mA Signal Follower — **Available All Models**

DO NOT USE TRIMPOT CHART TO ADJUST MIN AND MAX TRIMPOTS ON MAIN BOARD.



DC-25A SETUP PROCEDURE

The DC-25A includes a 4-20 mA isolated signal card that replaces the speedpot to control speed. The 4-20 mA signal input can be either grounded or ungrounded. The board sets on spacers screwed to the pot HI, Wiper, and LO terminals on the main board using long screws. The current source connects to the + and - two position terminal strip (P16-1 and -2) on the DC-25A option board.
The Linearity trimpot on the DC-25A option board is set at the factory for proper linearity, however this trimpot may need to be re-set after tuning the Max and Min trimpot settings on the control for your specific application. If needed then refer to the setup procedure below.

The following is the recommended procedure to set up the DC-25A option:

1) With the DC-25A oriented so that trimpots are along the top, adjust Min trimpot to minimum (full CCW) and Max trimpot to 50%. The voltage is set below the typical motor voltage to make certain the drive is NOT in saturation before setting the option board saturation point.

2) Set the Linearity/gain pot on the option board full CW. This is a 20 turn pot and you should hear a clicking with each turn when fully up or just count 20 turns.

3) Make certain your motor is connected to +/-ARM output of the drive. (Note: For proper tuning this setup is best done on an unloaded motor.)

4) With power applied and a voltmeter monitoring motor output Vdc, apply 4mA to DC-25A option board. Check voltmeter reading and adjust the Linearity/gain trimpot, R16, on the DC-25A board CCW until motor output voltage is less than 0.1Vdc.

5) Now apply 20mA to the DC-25A option board and adjust the Max trimpot to a voltage that is 5 volts above the final desired max motor voltage output. Adjust the Linearity/gain trimpot on the DC-25A option board CCW until the motor output voltage decreases to the desired max voltage set point.

6) Now, apply 4mA to the DC-25A option board again and adjust the Min trimpot to deadband or the desired minimum motor voltage output. The deadband point is when you are at 0Vdc and any further increase of the Min trimpot would result in an output to the motor. Re-apply 20mA to the option board and verify max output has not changed. A small adjustment may be needed to the Max trimpot to reset to desired max output.

7) Adjust 4-20 input to 12mA. If tuned properly the output voltage of an unloaded motor should be within a few volts of ½ output (based on max output setting above).

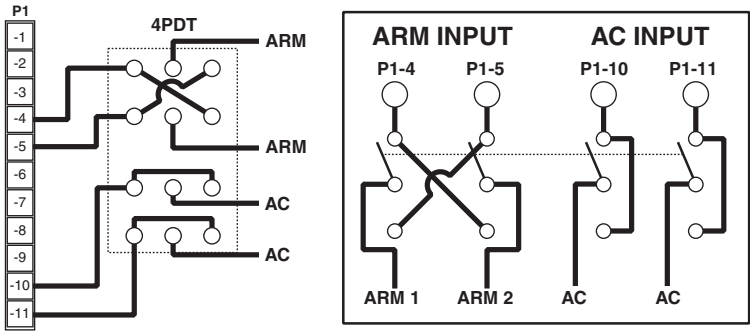
DC-RSW

Manual Reversing options — Chassis Model (RBD2C) only

Permits reversing of motor. This is accomplished using a 4PDT blocked center switch. When switched between the forward/reverse positions, a delay is encountered due to the blocked center position, which protects the control from any voltage that may be at the armature terminals. The center position is OFF/NEUTRAL.

THE MOTOR MUST COME TO A COMPLETE STOP BEFORE CHANGING DIRECTIONS. IF THE MOTOR DOES NOT COME TO A COMPLETE STOP, SERIOUS DAMAGE TO THE CONTROL MAY RESULT. BYPASS OF THE CENTER BLOCK OF THE SWITCH MAY RESULT IN DAMAGE TO THE CONTROL.

Model RBD2C with Field installed 4PDT switch. The customer provides interconnecting wiring.



DC-250D-RBD option

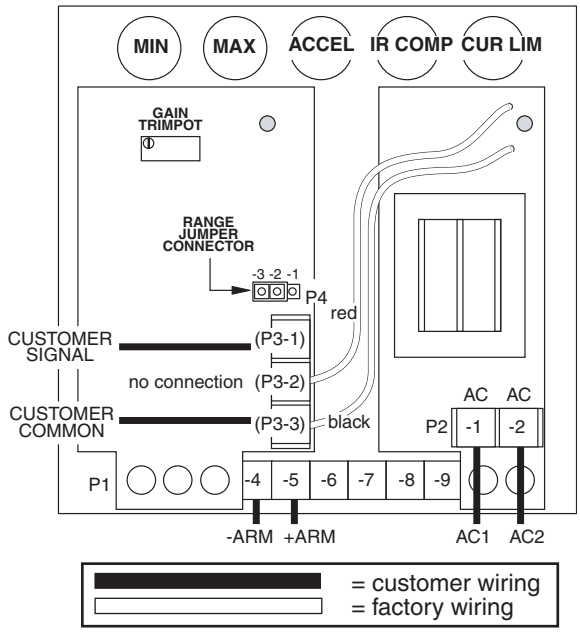
Isolated Voltage Input

Field Installed
Chassis Version

This option permits use of either a grounded or non-grounded remote DC voltage speed command. This DC input range, which can be selected via the range jumper clip and adjusted with the GAIN trimpot, can range from 0-5VDC through 0-25VDC (P4-2 to P4-3) or 0-25VDC through 0-250VDC (P4-1 to P4-2). The output of this option board supplies a linear signal to the control. This signal is developed from the input voltage supplied to the option board. The option is powered by the dual voltage AC input and replaces the 5K speedpot.

INPUT IMPEDANCE:

1.2M ohm on high scale
150K ohm on low scale

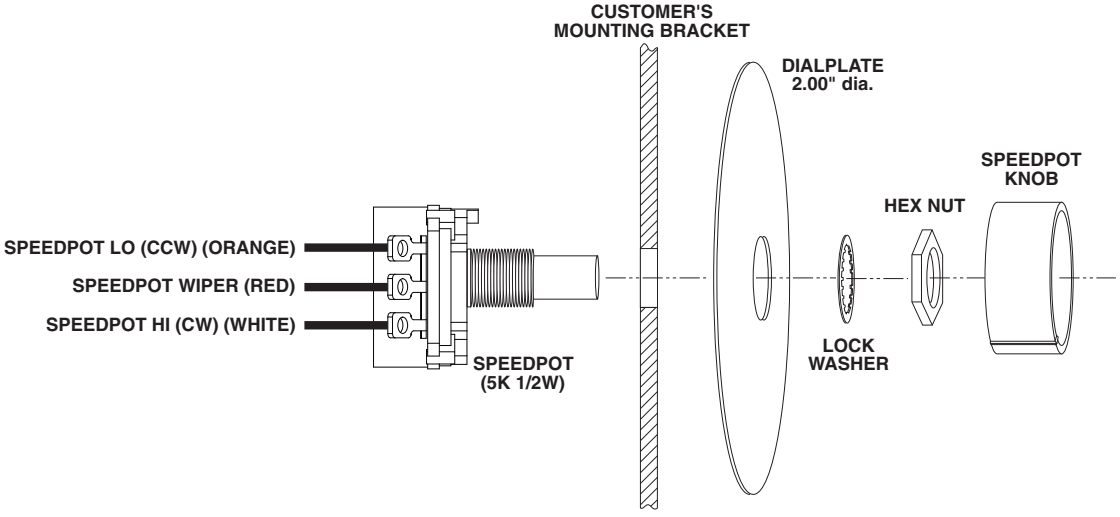


ADJUSTMENT PROCEDURE FOR DC-250D-RBD

1. With no power at the control, connect a DC voltmeter (meter must not be grounded) to control outputs as follows: **Meter COMMON to the -ARM terminal; Meter POSITIVE to the +ARM terminal**. Select correct meter range (0-90V or 0-180V).
2. Preset GAIN trimpot (option board) fully CCW, place range jumper clip in proper position.
3. Preset control as follows: MIN and I.R. COMP. fully CCW, MAX at 50%.
4. Apply desired AC voltage to control and option board.
5. With 0 volts into option board, adjust MIN trimpot on control to eliminate deadband. To do this, increase MIN fully CW, then adjust CCW until meter reads 0 volts.
6. Apply maximum input voltage to option board input.
7. Adjust GAIN until no further change in voltage output occurs and turn CCW until a 5V drop occurs, then set control MAX to 90VDC (180VDC for 240V input).
8. Set CURRENT LIMIT by using “TRIMPOT SETTING CHART” in the instruction manual.
9. For Closed Loop systems the IR COMP. should remain fully CCW. For Open Loop systems, set IR as per set-up procedure.
10. ACCEL/DECEL adjustments should be set as needed.

KDPD

This is a replacement pot kit used to control the speed of the motor.



DCVR-B

This is a blank cover kit to be used with RBD2C which will convert the chassis control into a NEMA 4/12 control. This kit will include endplates, gaskets, and hardware and is intended that the drive will be operated remotely - not from any cover-mounted pot / switch.

DCVR-S

This is a cover kit to be used with RBD2C which will convert the chassis control into a NEMA 4/12 control. This kit will include endplates, gaskets, switches, speedpot, and hardware.

IN CASE OF DIFFICULTY

If a newly installed control will not operate, it is possible that a terminal or connection is loose. Check to make sure that all connections are secure and correct. If control still doesn't operate, refer to the following chart.

PROBLEM	POSSIBLE CAUSE(S)	CORRECTIVE ACTION(S)
Motor doesn't operate	- blown fuse	replace fuse
	- incorrect or no power source	install proper service
	- speedpot set at zero	adjust speedpot CW to start
	- worn motor brushes	replace motor brushes
Armature output voltage cannot be adjusted, output is a constant DC level	- no motor or load connected	check that motor or load is connected to armature terminals
	- speedpot low connection open	check that speedpot low wire is connected
Motor stalls, or runs very slowly with speedpot turned fully CW	- low voltage	check - should be above 108V
	- overload condition	reduce load
	- worn motor brushes	replace motor brushes
	- max speed set incorrectly	see ADJUSTMENT PROCEDURE
Motor hunts	- too much I.R. Comp.	see ADJUSTMENT PROCEDURE
	- motor is in current limit	see ADJUSTMENT PROCEDURE
	- motor not pulling enough current	current must be greater than 150 mA D.C.
	- max trimpot set too high	see ADJUSTMENT PROCEDURE
	- motor speed is above rated speed	reduce speed
Repeated fuse blowing	- low voltage	check - should be above 108V
	- overload condition	reduce load
	- worn motor brushes	replace
	- defective motor bearings	replace
	- defective electrical component	call Boston Gear Representative
Motor runs but will not stop	- incorrect wiring (enclosed version)	check TERMINAL STRIP WIRING for correct wiring instructions (note AC line connection in particular)
	- defective wiring	check wiring
	- defective component	call Boston Gear Representative

If control still will not operate, consult your Boston Gear Representative.

SPECIFICATIONS

AC input voltage ..... ±10% of rated line voltage
Acceleration ..... 0.5 to 8.0 seconds
Amps - DC output ..... 150 mA to 10.8 Amps D.C.
Controller overload capacity ..... 150% for one minute
Current limit trimpot range ..... 1.0 to 15.0 Amps D.C.
Deceleration (dependent on acceleration time setting) ..... .06 to .80 second range
Dimensions and weight:

	WIDTH	LENGTH	HEIGHT	WEIGHT	TYPE
ENGLISH	5.53" 5.53"	7.25" 7.00"	3.50" 1.55"	25.50 oz. 16.25 oz.	enclosed chassis
METRIC	140mm 140mm	184mm 178mm	89mm 39mm	723 grams 413 grams	enclosed chassis

Drive service factor 1.0
Efficiency ..... 85% typical
Input frequency ..... 50 or 60 Hertz
Max. trimpot speed range ..... 66% to 110% of base speed
Min. trimpot speed range ..... 0% to 30% of maximum speed
Minimum external impedance (pot hi to pot low) ..... 5K ohms
Power devices ..... packaged full wave bridge
Shunt field voltage .....100VDC for 120VAC input; 200VDC for 240VAC input; 1 amp maximum
Speed control ..... via 5K ohms 1/2W linear potentiometer or 0-10VDC isolated signal
Speed range 50:1
Speed regulation ..... ±1% of base speed
Temperature range ..... -10° to 45° C. ambient (15° to 115° F.)
Transient protection ..... G-Mov
Type ramp of accel/decel ..... linear

TYPICAL MOTOR CURRENTS

Horsepower	1/50	1/20	1/8	1/4	1/3	1/2	3/4	1.0	1.5	2.0
Typical AC Amps (120VAC)	0.26	.70	1.80	3.50	4.40	6.50	9.30	13.20	-----	-----
Typical Arm Amps (120VAC)	0.20	.50	1.40	2.70	3.40	5.00	7.20	10.20	-----	-----
Typical AC Amps (240VAC)	-----	-----	-----	1.80	2.20	3.30	4.80	6.50	9.70	12.90
Typical Arm Amps (240VAC)	-----	-----	-----	1.40	1.70	2.50	3.70	5.00	7.50	9.90

Boston Gear DC Controls Warranty

Boston Gear warrants its products to be free from defects in material and workmanship.

The exclusive remedy for this warranty is Boston Gear factory replacement or repair of any part or parts of such product which shall within 12 months after delivery to the purchaser be returned to Boston Gear factory with all transportation charges prepaid and which Boston Gear determines to its satisfaction to be defective.

This warranty shall not extend to defects in assembly by other than Boston Gear or to any article which has been repaired or altered by other than Boston Gear or to any article which Boston Gear determines has been subjected to improper use.

Boston Gear assumes no responsibility for the design characteristics of any unit or its operation in any circuit or assembly.

This warranty is in lieu of all other warranties, express or implied; all other liabilities or obligations on the part of Boston Gear, including consequential damages, are hereby expressly excluded.

NOTE: Carefully check the control for shipping damage. Report any damage to the carrier immediately. Do not attempt to operate the drive if visible damage is evident to either the circuit or to the electronic components.

All information contained in this manual is intended to be correct; however information and data in this manual are subject to change without notice. Boston Gear makes no warranty of any kind with regard to this information or data.
Further, Boston Gear is not responsible for any omissions or errors or consequential damage caused by the user of the product. Boston Gear reserves the right to make manufacturing changes which may not be included in this manual.

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