

Verus™ Motor Manual

27-Aug-2007
Teres Audio Inc.



Description

The Verus motor from Teres Audio introduces a simple and effective drive methodology called Direct Coupling. Direct Coupling utilizes a large diameter pulley, an o-ring and gravity to directly couple the motor to the platter. However, the primary advantage of the Verus motor is the Certus inspired multiphase synchronous motor. This unique motor topology provides speed accuracy that only a synchronous motor can deliver coupled with ultra low cogging. The Verus motor controller provides precise drive signals to the multiphase motor accurately establishing rotational speed regardless of load and without servo circuits or speed sensors. This manual applies to Verus motor serial numbers 1-49.

I. Setup

Warning: Do not remove or disturb the drive wheel or ring.

1. The Verus motor unit uses gravity to apply the appropriate amount of pressure for the drive mechanism. Simply place the motor unit so that the pulley rests against the side of the turntable platter. Shift the bottom of the motor unit away from or toward the platter so that the the motor stands straight up.
2. Plug the motor cable into the back of the controller.
3. Connect the AC cord to the controller
4. Remove the controller top cover to provide access to the internal adjustment switches.
5. Adjust the spin-up rate for the fastest spin-up rate that works properly with your bearing and platter. Four spin-up rates are available and may be selected via switch S1, switch positions 6 and 7. S1 is a light blue switch block at the top of the PCB mounted behind the front panel. See table 1 for details. If too fast of a rate is selected the platter will slow down and stop.
6. Using a strobe disk check the speed accuracy and adjust as required. For Teres turntables the default speed setting will generally be correct but should be verified. Switch S1 positions 1-5 are used to provide fine adjustment of the speed (0.32% per step). See table 3 for switch setting details (A nice, down loadable strobe disk is available from Extreme Phono:
http://www.extremephono.com/free_turntable_strobe_disk.htm).
7. Adjust the motor torque setting to suit individual tastes. This is done by rotating switch S2 (blue switch left of switch S1) with a small screwdriver. The default setting of 4 is optimized for Teres 200 and 300 series turntables. However, there is no correct setting and experimentation is strongly recommended.

II. Operation

The Verus controller has 4 pushbutton switches for controlling operation, Off and 0, 33 and 45 RPM.

Power on the controller by pressing the 0 RPM button. When the controller is first powered up it goes through a 5 second sequence that aligns the motor magnets. The red and yellow LEDs light during this process and the platter movement will be erratic.

To start the turntable simply press the button for the desired speed. The red LED will light during the spin up process. The green LED lights when the desired speed has been reached but the speed is not fully stabilized until the red LED shuts off. To stop press the 0 RPM button. It's best to not power down the controller until the listening session is over. Do not spin the platter by hand. For 78 RPM press and release the 33 and 45 RPM buttons simultaneously.

The Verus controller has a sleep timer feature which may be used to shut off the controller after 42 minutes of uninterrupted play. The yellow LED flashes to provide a two minute shutoff warning. When the sleep timer expires the motor will shut off and the yellow LED will flash slowly. Reset the sleep timer by pressing the controller Off button. The sleep timer is disabled by default and is enabled via switch S1 Sw8.

III. Controller Switch Options

The Verus motor controller has a small number of options that may be adjusted via internal switches mounted on the front PCB. The top cover must be removed for access to the switches.

Table 1. Spin-up rates

Platter Weight (lbs)	S1 Sw6	S1 Sw7	Spin-up Time (seconds)
1-20	Off	Off	5.4
20-32	On	Off	7.4
32-50	Off	On	10.5
50+	On	On	15.3

Note: the platter weights are approximate.

S2 (8 position rotary switch)

S2 is used to fine tune motor torque for desired sound quality. The optimal setting will depend on turntable characteristics and also personal preferences.

Table 2. Motor torque

S2	Torque Percent @ 33-1/3 RPM
0	56%
1	59%
2	62%
3	65%
4	68% (default)
5	72%
6	75%
7	79%

Table 3. Speed adjustment (0.16% steps)

S1 Sw1	S1 Sw2	S1 Sw3	S1 Sw4	S1 Sw5	Speed Setting
Off	Off	Off	Off	Off	-15
On	Off	Off	Off	Off	-14
Off	On	Off	Off	Off	-13
On	On	Off	Off	Off	-12
Off	Off	On	Off	Off	-11
On	Off	On	Off	Off	-10
Off	On	On	Off	Off	-9
On	On	On	Off	Off	-8
Off	Off	Off	On	Off	-7
On	Off	Off	On	Off	-6
Off	On	Off	On	Off	-5
On	On	Off	On	Off	-4

S1 Sw1	S1 Sw2	S1 Sw3	S1 Sw4	S1 Sw5	Speed Setting
Off	Off	On	On	Off	-3
On	Off	On	On	Off	-2
Off	On	On	On	Off	-1
On	On	On	On	Off	0
Off	Off	Off	Off	On	+1
On	Off	Off	Off	On	+2
Off	On	Off	Off	On	+3
On	On	Off	Off	On	+4
Off	Off	On	Off	On	+5
On	Off	On	Off	On	+6
Off	On	On	Off	On	+7
On	On	On	Off	On	+8
Off	Off	Off	On	On	+9
On	Off	Off	On	On	+10
Off	On	Off	On	On	+11
On	On	Off	On	On	+12
Off	Off	On	On	On	+13
On	Off	On	On	On	+14
Off	On	On	On	On	+15
On	On	On	On	On	+16

Table 4. Sleep Timer

S1 Sw8	Sleep Timer
On	Enabled
Off	Disabled

IV. O-Ring Maintenance

For quiet operation the rubber o-ring must be properly aligned, clean and smooth. O-rings have small ridges left over from the manufacturing process that affect speed stability and noise. The o-rings as delivered are carefully placed and have been lightly sanded to insure that the drive surface is uniform and smooth. If the o-ring is replaced or removed for any reason it should be realigned and resurfaced to insure that the contact surface is uniform.

Replacement: If the o-ring is disturbed or removed it must be carefully aligned and resurfaced for proper operation. Here is the procedure:

1. Place the o-ring over the pulley seated into the groove.
2. If the o-ring is new there will be a small ridge on the outside edge. Otherwise there will be a dull line where this ridge has been removed. Carefully rotate the o-ring so that the ridge (or line) faces exactly outward. Take time to get this alignment as accurate as possible.
3. Tape a small square of fine sandpaper (400 to 1000 grit) onto the side of your platter where the o-ring makes contact.
4. Press the 45 rpm button. And carefully slide the motor pod toward the platter until the o-ring makes light contact with the sandpaper. It is tricky to get the pod placed so that there is only light pressure against the sandpaper. Too much pressure stalls the motor. Taking your time to get very light pressure against the sandpaper will produce excellent precision. Continue this process until the ridge is completely removed and there is a dull line all the way around the o-ring.

Cleaning: The o-ring may be cleaned with rubbing (isopropyl) alcohol as required. Only use light pressure to insure that the o-ring is not dislodged.

Replacement o-rings are available from Teres Audio or McMaster-Carr (<http://www.mcmaster.com/>) part number [9557K228](#).

V. Technical Specifications

Dimensions (inches):

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- Motor pod (short): 3.2w x 5.4d x 4.6h
- Motor pod (tall): 3.2w x 5.4d x 6.4h
- Controller: 8.45w x 9.75d x 3.5h

Drive System:

- Low cogging multi-phase permanent magnet synchronous (patent pending)
- High resolution digital drive signal synthesis
- Speeds Supported: 33-1/3, 45 and 78
- Speed adjustment available via internal DIP switch, 32 steps at 0.16% per step (33-1/3 RPM) and 0.21% per step (45 RPM).
- Optional sleep timer (shuts off after 42 minutes of uninterrupted operation)

Power Requirements:

- 115-125vac, 0.4 Amps, 50 watts
- 230-250vac, 0.2 Amps, 50 watts
- Fuse:
 - 120vac - 1.5 amp slow blow
 - 240vac - 1.0 amp slow blow