

Any small wind turbine with fixed pitch blades can only operate best within a fairly narrow band of wind speeds. Operation outside those speeds is either not efficient or may over task the alternator without a furling mechanism that dissipates energy. Some small turbines are designed to shut down production above 25-30mph in order to preserve the alternator, reduce blade noise or dissipate heat, yet this is the speed where the available energy is greatest. Both LAKOTA and Longbow model alternator windings are designed to operate efficiently within 2 specific ranges of average wind speeds. LAKOTA turbines have 2 recommended winding settings that should be matched to the class of wind found at the site. The LAKOTA and Longbow are normally shipped in MOD 0. Under low wind conditions, where the site only occasionally experiences 20+ mph wind you may consider changing to MOD 3. Optimum energy production will normally be achieved by using MOD 0 for most sites.

Mod 3 Setting is ONLY for low wind sites. MOD 3 will start producing at around 8-10mph at around 5-6Amps 125-150W and reach a max of about 350-375w approaching 20mph which is about all the energy you can extract from such low wind with 3.4 SqM cross-section. Above 20mph the field coils saturate, power output drops and the turbine will only capture a small portion of the available energy in high wind. In MOD 3, frequent operation in winds above 20-25mph may be hard on the alternator and may eventually cause damage over several months. Most sites have consistently higher winds, averaging over 6 m/s, month over month. In most cases then Mod 0 should be used. In MOD 0 there will be less production below 10-15mph than in MOD 3 but you can expect peaks of 1200w+ in gusty winds above 30mph. (40-50Amps at 25v.)

Mod 2 and Mod 1 settings should NOT be used because they create an imbalance in the current flow between windings.

In MOD0 the LAKOTA may not produce much energy in low winds (10-12mph), but the time that it spends in the 20+mph range will generate more than 8 times the energy per hour that it would at 10-12mph.

"1 hour at 20mph is worth 8 hours at 10mph"

Note that setting the LAKOTA to Mod 0 in a Class 1 or 2 wind regime will cause much of the available low energy wind, in that regime, to be missed because most of the time the wind is below 10-12mph and the turbine where MOD 0 production is limited.

To correctly use a Mod 3 setting, the local **average** wind should be Class 1 or Class 2 ie. below 13mph or 6m/s.

Mod 0 Setting should be the normal MOD for most sites when the monthly average wind at the site is in excess of 13mph. Typical windy days on Class 5 sites are consistently above 25-35mph. Using MOD 0 in lower wind regimes will only lower monthly production.

These settings should only be performed by a qualified LAKOTA Dealer or technician, or after direct discussion with a TRUE-NORTH Power Systems technician to assess the appropriate setting for the location. Please consult with the TRUE-NORTH Power Systems, Technical Service Centre (519) 793-3290, info@truenorthpower.com for Technical Bulletin 002 - Winding MODs before making any wiring changes to the LAKOTA or it may void the warranty.

Wind Regime	Annual Average Speed mph	m/s	LAKOTA Setting
CLASS 1	10.1	4.5	Mod 3
CLASS 2	13.4	6.0	Mod 3
CLASS 3	15.0	6.7	Mod 0
CLASS 4	16.2	7.25	Mod 0
CLASS 5	17.3	7.75	Mod 0
CLASS 6	18.8	8.4	Mod 0
CLASS 7	22.3	9.95	Mod 0

MOST SITES WILL BENEFIT BEST FROM MOD 0 SETTING

Remove the back cover with a #2 Philips head screw driver and identify the three heavy multi-stranded black phase cables. Note there is a common green wire and three similar colored wire pairs, grey, orange and blue, in addition to three similar gauge single red, white and black wires.

Identify which colored pair lead is "T1" by checking it's continuity with the Green (Common Lead) using a multi-meter on "ohm" setting. If it does NOT have continuity with green it is a "T1" lead. Follow the color coded chart below and ensure all connections are crimped securely and shrink wrapped for good insulation and moisture protection.

Do not use plastic electricians tape to wrap wire ends or caps. Use heat shrink wrap to ensure the crimped ends do not come loose from the cap.

It does not matter which Phase Cable is used for each phase as long as the colored wires are connected as shown. Recheck your connections for correct pairing and security. Then replace the back cover.

Take time to evaluate your local wind regime. Setting MOD 3 in a high wind CLASS can result in damage to the windings, not covered by warranty. Setting MOD 0 in a low wind class will result in lower energy output.

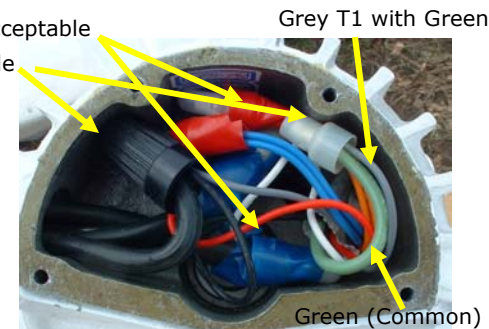
USE THE CORRECT SETTING FOR THE LOCAL AVERAGE WIND CLASS

Wind Regime	Annual Average Speed mph	m/s	LAKOTA Setting
CLASS 1	10.1	4.5	Mod 3
CLASS 2	13.4	6.0	Mod 2
CLASS 3	15.0	6.7	Mod 2
CLASS 4	16.2	7.25	Mod 1
CLASS 5	17.3	7.75	Mod 1
CLASS 6	18.8	8.4	Mod 0
CLASS 7	22.3	9.95	Mod 0

Plastic tape wrapped caps NOT acceptable

Caps not shrink wrapped NOT acceptable

WIND CLASS											
1-2			3			5-6			6-7		
10.1mph 4 m/s - 13.4mph 6m/s			15.0mph 6.7m/s			16.2mph 7.25m/s - 17.3mph 7.75m/s			18.8mph 8.4m/s - 22.3mph 9.95m/s		
MOD 3			Mod 2			MOD 1			MOD 0		
Red	Phase 1		Red		Phase 1	Red		Phase 1	Red	Blue	Phase 1
Black	Phase 2		Black	Grey	Phase 2	Black	Grey	Phase 2	Black	Grey	Phase 2
White	Phase 3		White		Phase 3	White	Orange	Phase 3	White	Orange	Phase 3
Blue	Blue T1		Blue	Blue T1		Blue	Blue T1				
Orange	Orange T1		Orange	Orange T1							
Grey	Grey T1										
Green	(capped off)		Green	Grey T1		Green	Grey T1	Orange T1	Green	Grey T1	Orange T1
											Blue T1
NOTE: T1 Leads are identified as the ones that have NO continuity with Green											
Test for any connection (Ohm reading) between a coloured lead and Green											
Green is Common. It is NOT GROUND and should NEVER be grounded											



The MOD 2 wiring shown here is correct but not capped or shrink wrapped properly. The large black cap with brass screw connector inside it is an acceptable connector but the connector should be shrink wrapped as well.