

SLT TECHNOLOGY, INC.

Pro120, 4 Quadrant 12v, 24v, 36v & 48v Vehicle Controller

Building on the success of the NCC series is the Pro 120. It has all the features of our well tried and tested NCC series but includes a reverse polarity protection relay. The connections are all arranged at one end of the board for ease of access once the controller is boxed. The NCC-Pro-120 is a full feature Four Quadrant (acceleration and regenerative braking, forward and reverse) motor speed controller principally for 12v and 24v battery operation, but 36v and 48v versions are available. Although it is similar in size to other industry standard 110 amp controllers, the power performance is considerably enhanced with no loss of reliability.

Some possible applications are:- invalid 'scooters', golf buggies, miniature railways, kiddiecars, floor cleaners, caravan shifters and vehicle loaders. The controller is adequate for all common golf buggies but for heavier and more demanding applications such as heavy golf buggies which use two motors, two controllers can be coupled so the two motors work as one, but with independent current limiting, giving control of currents up to 240 amps. This feature is also popular with miniature railways where two engines are 'double headed'.

Available in 12v, 24v, 36v and 48v versions.

The NCC Pro is technically advanced and packed with useful features without the 'high tech overkill' which is often used as a sales gimmick. The controllers have been extensively 'value engineered' to give the best possible ratio of performance to cost. Of special interest is the automatic ramp down and power off so the controller always stops smoothly and safely even if the ignition is turned off at full speed. Also of interest are the independent, linear, adjustable acceleration and deceleration ramps, the 'dual ramp' automatic reversing, the thermally sensitive overcurrent limiting, the regenerative current limit, pot fault detection, ramp down at power off, high pedal lockout, ignition switch lockout and automatic reverse speed reduction.

Features

- High speed circuit
- MOSFET chopper
- Half Bridge with relays for reversing.
- Fast current limit on drive and regeneration.
- Gain adjustment
- Regenerative braking
- Electronic Ignition - separate, active. Auto-switch-off available as an option.
- Ramps on acceleration and deceleration.
- Reversing.
- Reverse speed is half or full forward speed, selectable by on board option.
- Reverse polarity protection.
- Electromagnetic parking brake driver circuit.
- Pot fault protection (resistance).
- High Pedal Lock-out (resistance).
- Thermal shutdown.
- Battery discharge protection (User Option) is fitted to 24v controllers.
- Overvoltage protection.
- Motor shorted out at zero speed for maximum braking.
- 6 pin control connector (supplied) accepts standard miniature stranded cable (7/0.2).
- Thermal design carefully engineered to maximize output current. Long term current is limited by the relays and by general heating.
- Decelerating output option: brake output is converted to a circuit to drive braking lights which illuminate whilst decelerating.
- The integral heatsink should be bolted to an additional heatsink as required. Normally this will be the main mounting to the machine's chassis. The current limit reduces automatically if the controller gets hot, reducing the danger of failure.
- Power and motor connections are by 9.5mm tabs as standard. Two sets of 9.5 tabs are fitted for the motors. A second 6.3mm connector is fitted to the battery inputs, e.g for a charger connection. The 9.5mm tabs have a 4mm hole enabling bolted connections if required.
- Pre-crimped wires can be supplied as an optional extra.
- Optional accessory board for tachometer generator closed-loop feedback servo control.
- External board available for center-zero (joystick) control of one or two motors in 'pan & tilt' or 'sum & difference' type controls.
- Available as bare board or as cased version. Base and cover available separately.

- Expansion connector option allows tandem control of two connectors or fitting of tachogenerator control board, IR compensation board or other option.
- Some customer changing of operating voltage is possible. See Pro Series controller, Voltages.

Wiring Diagrams

There are several wiring diagrams available:

- A typical wiring diagram.
- With Dual channel Interface as used in Robots.
- With pushbuttons for forward and reverse.

Input is suitable for a standard 10K potentiometer. There is an on-board adjustment to alter sensitivity to suit different operating mechanisms. A connector is supplied.

Various speed controls can be supplied as extras, including a spring-return-to-zero speed pot arrangement suitable for hand operation.

The circuit has fully automatic regenerative braking where most of the braking energy is returned to the battery, giving greatly extended use between recharges.

With a regenerative brake the motor acts as a generator during braking. At zero speed the motor isn't moving, so actual braking effect is zero, until the motor starts to turn.

Regenerative braking can't therefore always replace a mechanical brake since it doesn't work well at slow speed.

A larger base plate and cover mounting options are available to give a choice of mounting, or you can use your own base.

The circuit therefore optionally includes a driver for an electromagnetic parking brake.

You can buy with confidence as the controllers come with a detailed instruction manual and 4QD give full technical service and advice, covered by the 12 month guarantee.

Specifications

Supply voltage		12v or 24v or 36v or 48v - depends on model
Supply current		30mA (At zero speed)
Output voltage (forward)		0 to 100% full speed, adjustable.
Output current max (typ)		155 amps (120 amps regen)
Output Ratings	1 minute rating	115 amps - without additional heatsink!
	2 minute rating	60 amps - without additional heatsink!
	continuous	30 amps or more: ambient temp dependant
	voltage drop at 20a	90mV
Overheat current		25 amps - typical
Overheat temperature		95°C - on heatsink
Switching frequency		20kHz approximately
Reverse threshold		5v approx
Acceleration time		330mSec to 7 Sec (adjustable)
Deceleration time		30mSec to 7 Sec (adjustable)
Input		5k to 25k pot or 0-3v (adjustable) into 100K nominal.
Pot fault detect		greater than 30K
Size		160mm x 102mm x 40mm
Weight		325g