

TRIO PLUS

*The Next
Generation
Scrubber-Dryer
Control System*



PG DRIVES TECHNOLOGY

DIRECT CONTROL OF ALL MAJOR SCRUBBER-DRYER FUNCTIONS FROM A SINGLE UNIT

TRIO
PLUS

Traction Motor Output

50-100-150A VERSIONS

Brush Motor Output

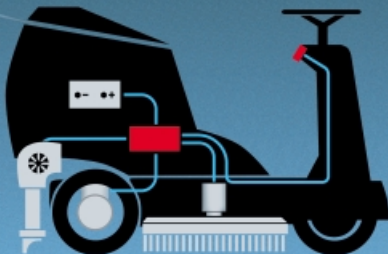
100A VARIABLE SPEED

Vacuum Motor Output

50A VARIABLE SPEED

- *Improved reliability and ruggedness*
- *Increased performance and functionality*
- *Fully compatible with previous Trio Installations*
- *Powerful machine diagnostics with on-board system log*

The Trio+ control system represents the next step in control systems designed specifically for battery operated scrubber-dryers. It is perhaps the most advanced controller available to floorcare machine OEM's today, offering major enhancements in reliability, performance and function. Trio+ controls every major function on a typical scrubber dryer, while having the required level of robustness and ruggedness to survive both the harsh environments and the user abuse that floorcare machines are regularly subjected to.



PG DRIVES TECHNOLOGY

The Trio+ control system performs all the functions required of large pedestrian and small to medium ride-on scrubber driers. The powerful configuration software offers a huge amount of programmable parameters, which allow the operation of the various output devices to be defined exactly. This approach provides the flexibility that floorcare OEM's require to incorporate the functionality unique to their machines, and effectively create their own bespoke control system using an established product.

PROGRAMMABLE PERFORMANCE



- Programmable for 24V or 36V operation
- Self-protecting outputs
- Low impedance inputs
- Auto control of squeegee blade actuator
- Auto control of brush deck actuator
- Optional LCD command & control module
- Soft stop
- Battery lockout
- Sleep mode
- Diagnostic output
- System log - provides a permanent record of all trip conditions
- Hours run timer function
- Handheld or Windows PC programming
- Electronics sealed to IPX5
- Designed For UL recognition
- EMC tested to EN55022 Class B
- Documentation for international approvals

TRACTION MOTOR OUTPUT

Programmable, high frequency PWM full bridge provides up to 150A of power, with smooth acceleration and regenerative braking in both forward and reverse directions.

SOLENOID BRAKE OUTPUT

Provides automatic control of electromagnetic solenoid brakes fitted to traction motor.

BRUSH MOTOR OUTPUT

Provides up to 100A of power with programmable soft start, current limit, variable speed and timers.

VACUUM MOTOR OUTPUT

Provides up to 50A of power with programmable soft start, current limit, variable speed and timers.

BRUSH DECK ACTUATOR OUTPUT

Bi-directional output allows full control of linear actuators to raise and lower the brush deck. Programmable current limit and stall detect allows actuators without end of travel switches to be used.

SQUEEGEE ACTUATOR OUTPUT

Bi-directional output allows full control of linear actuators to raise and lower the squeegee blade. Programmable current limit and stall detect allows actuators without end of travel switches to be used.

SOLUTION PUMP OUTPUT

Uni-directional output allows speed or flow control of a cleaning solution pump. Programming options allow a number of preset flow rates to be configured.

AUXILIARY OUTPUT

Fully programmable uni-directional output can be used for other devices such as re-circulation pumps or anti-drip valves.

REVERSE ALARM OUTPUT

Can be programmed to provide a pulsed or steady signal at 12, 24 or 36V when the machine is backing up.

WARNING LIGHT OUTPUT

Can be programmed to drive warning beacons, brake lights or similar at 12, 24 or 36V.

OUTPUT PROTECTION

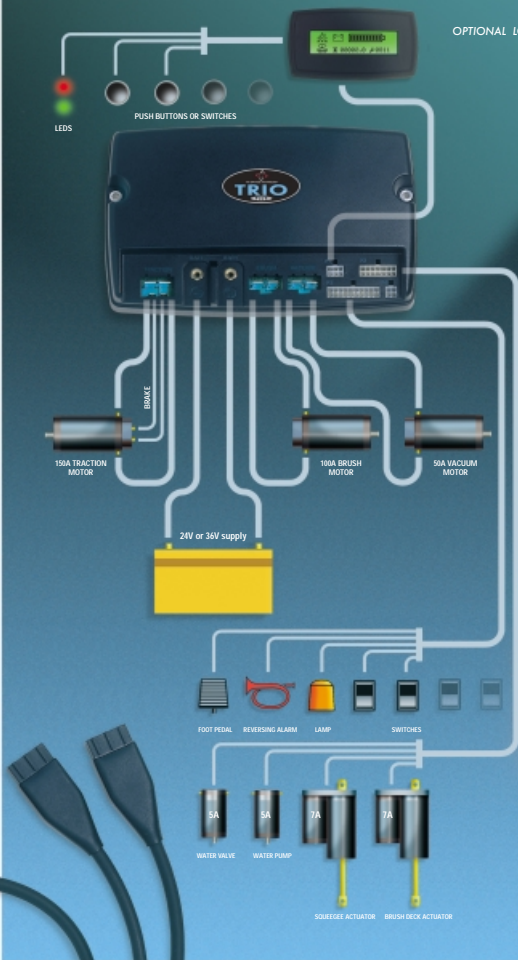
All outputs are fully self-protected against overcurrent, short circuit or wiring errors, and the high-power outputs have programmable current limits. This means that there is no need to fit the fuses and circuit breakers that would normally be required to protect the motors and pumps connected to the Trio+ control system.

INPUT PROTECTION

All inputs are programmable and are protected against possible damage by wiring errors. The input impedance is sufficiently low to prevent problems due to moisture and conductive contaminants.

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OPTIONAL LCD COMMAND AND CONTROL MODULE



The LCD module provides the user with a backlit, dot-matrix display of the various functions on the machine, together with a battery status display and hour meters. Diagnostic information is also displayed when required, identifying the nature and location of the fault detected - for example, a short-circuited vacuum motor. The display software can be customized to suit each manufacturer's requirements, so that product differentiation is maintained. The LCD module also provides alternate connections for all of the control switches, and allows the use of membrane keypads by accepting momentary pushbuttons and providing an LED output driver for each associated input.



TRUCHARGE DIAGNOSTIC CODES

- HIGH BATTERY VOLTAGE
- SOLENOID BRAKE FAULT
- POSSIBLE CONTROL SYSTEM FAULT
- THROTTLE FAULT
- INHIBIT ACTIVE
- VACUUM MOTOR FAULT
- FREEWHEEL ACTIVE
- BRUSH MOTOR FAULT
- TRACTION MOTOR FAULT
- LOW BATTERY VOLTAGE

SYSTEM LOG

A powerful system log allows the Trio+ to record the number of occurrences of the last eight detected system problems. These can be viewed at any time when connected to a programming tool, and provide invaluable assistance when attempting to diagnose intermittent machine faults. Hours run timers are also included, so the total number of hours elapsed are recorded. The system log and hours run timers are stored in permanent memory, so they will not be lost even if the Trio+ is disconnected from the battery supply.

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TRUCHARGE MODULES

The PGDT TruCharge display offers an accurate representation of the charge remaining in the batteries, unlike most simple voltmeter displays. The user is presented with a display comprising of 3 red, 4 yellow and 3 green LEDs, which provide an intuitive display thus inspiring confidence in the battery status. This display also provides diagnostic information to pinpoint simple problems, by flashing a number of LEDs as shown. The display is available in two versions - either enclosed in a case for panel mounting, or as a bare board for inclusion behind membrane-type tiller overlays.

PROGRAMMING

PGDT's Industrial PC Programmer software and interface cable allows Trio+ to be programmed by any PC running Microsoft (XP, NT and Windows 98 or later). Using the familiar windows format, PC Programmer allows all parameters to be viewed and modified, saved as files and copied between controllers. Parameters can be modified off line and saved, creating new controller variants instantly and remotely. Whole sets of parameters can be transferred from programmer to controller, or vice-versa by a single command.

PC Programmer therefore provides manufacturers with the ability to quickly create customer-specific settings, allowing a single Trio+ to be configured to suit each vehicle on the production line, thus eliminating the need to stock several variants of the same controller.



PRODUCT CODES

TRIO+

T+ 50	50A Maximum Current
T+ 100	100A Maximum Current
T+ 150	150A Maximum Current

SUPPORT PRODUCTS

LCD Control Panel Module	122 x 32 Graphic LCD includes control connection
TruCharge Display	10-bar LED display showing BDI and Diagnostics.
TruCharge Module 1	TruCharge display, enclosed
TruCharge Module 2	TruCharge display, circuit board

PROGRAMMING

Ind PCPa	CD ROM and cable for Dealer PC Programming*
Ind PCPb	CD ROM and cable for OEM Engineering PC Programming*

* Microsoft® Windows 98 or later, NT, XP



PG DRIVES TECHNOLOGY



Certificate No FM 21061

PG DRIVES TECHNOLOGY INC

2532 East Cerritos Avenue
Anahelm
CA 92806-5627 USA
Tel: +1 (714) 712 7911
Fax: +1 (714) 978 9512
www.pgdt.com

PG DRIVES TECHNOLOGY LTD

1 Airspeed Road
Christchurch
Dorset BH23 4HD UK
Tel +44 (0) 1425 271444
Fax +44 (0) 1425 272655
www.pgdt.com

PG DRIVES TECHNOLOGY ASIA

Taiwan International
Business Center
4F, 25, Sec. 1 Tunhua S. Rd.
Taipei Taiwan ROC
Tel +886 (0)2 2579 1821
Fax +886 (0)2 2579 8381
www.pgdt.com



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SPECIFICATIONS

Supply Voltage:	24V-36Vdc
Operating Voltage:	16Vdc to 48Vdc
Peak Voltage:	50Vdc
Reverse Battery Voltage:	40Vdc
Traction Output:	50/100/150A full bridge
Traction PWM Frequency:	15KHz \pm 1%
Brake Voltage:	24/36Vdc
Brake Current:	2A max. continuous
Brush Output :	100A Fully programmable
Vacuum Output :	50A Fully programmable
Auxiliary 1 & 2 Output:	7A Fully programmable for actuator control
Auxiliary 3 & 4 Output:	Fully programmable, 5A sink
Reverse Alarm Output:	12/24/36V dc, 2A sink
Warning Lamp Output:	12/24/36V dc, 2A sink
Battery Connections:	M6 threaded brass pillars
Traction Motor Connections:	PCDT Proprietary
Brush Motor Connections:	PCDT Proprietary
Vacuum Motor Connections:	PCDT Proprietary
Control Connections:	Molex [®] Mini-Fit, Jr [™]
Moisture Resistance:	Electronics to IP56
Operating Temperature:	-20°C to +55°C
Storage Temperature:	-30°C to +55°C
Safety:	Multiple hardware & software strategy Designed to EN60335/2/67
EMC on sample machine	
Susceptibility:	Tested at 30V/m
Emissions:	To EN55022 Class B
ESD:	IE801 part 2
Weight:	1.7 Kg

For further details, refer to TRIO+ Technical Manual SK76886

DIMENSIONS

