PCD Speed Controller Guide

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for

PCD Speed Controller - PN 2200-0297

prepared by GPD Global® Documentation Department

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Contents

Introduction

The PCD Speed Controller is used to integrate the GPD PCD3 or PCD4 dispense pumps into robotic systems or systems with computer control and the ability to provide a variable voltage for speed control. The control was developed for use with systems other than those provided by GPD Global.

Function Description

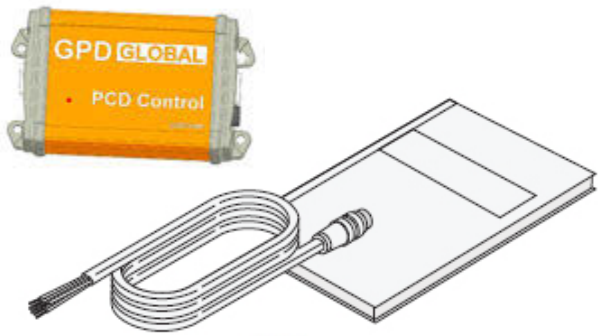
The PCD Speed Controller interfaces with third party robotic systems or computer control through an 8 pin cable. To control the pump, three (3) signals are required:

- a 24V signal to enable forward motion
- a 24V signal to enable reverse motion and
- a variable 0-10V signal to control the speed in forward or reverse.

The time/volume for dispense is controlled by the duration of the forward or reverse ON signal.

Scope of Supply

- PCD Speed Controller
- Operating cable (to connect PCD Speed Controller to robotic system or computer control)
- Operating and maintenance instructions



Additional Requirements

- PCD3 or PCD4 pump with 10” (250 mm) cable
- 52” (1.3 m) Extension cable
- Pump stand or mounting method

Safety

WARNING - Preparing to operate / visual inspection: The PCD Speed Controller must be visually examined each day before the start of work and before all shift changes. If there is any doubt as to system readiness for operation, it must be shut down immediately and inspected by a specialist before operation resumes.

CAUTION - Preventing damage to the dispense pump motor: The dispense pump lead [connector 3 (Displays & Controls / Connections (pg 3)] **may only be connected and disconnected when the power supply is isolated**. The electronics in the drive motor could be damaged if this precaution is not taken.

Informal safety measures

- The operating and maintenance instructions should always be kept at the location where the control system is in use.
- General and local regulations on health, safety, and environmental protection must also be provided and complied with.

Conventions

The following conventions are used in these instructions:

Text in italics	indicates names of keys/buttons, connectors, chapters, screen displays, proper names and input boxes.
WARNING	Failure to observe these notes may result in injury and damage to the control system.
CAUTION	Reference to technical information about preventing damage
NOTE	Reference to technical information about operation.

Correct use, warranty

The PCD Speed Controller is designed to control our dispenser pumps in non explosion-protected environments.

Any:

- modifications and additions,
- use of non-genuine spare parts,
- repairs by persons or organizations not authorised by the manufacturer

that are made without the express, written consent of the manufacturer will render the warranty void and result in the loss of any right to make a claim under the warranty.

No liability can be accepted for damage caused by failure to observe the operating and maintenance instructions.

Qualifications of operators & maintenance personnel

The operating organization is responsible for ensuring that the operators and maintenance personnel are suitably qualified. The operating and maintenance instructions must have been read and understood. Compliance with the relevant technical rules and safety regulations is required.

Organizational measures

The necessary personal protective equipment must be provided by the operating organization. All safety devices that are fitted must be checked regularly. Safety glasses and overalls must be worn during operation and cleaning to provide protection against any splashes of chemicals.

Comply with all safety information contained in the respective operating and maintenance instructions for the dispenser(s) connected to the control system.

Operation

The PCD Speed Controller is operated according to the control signals from the master controller that are present at the connector (Item 1 in Fig.4 - refer to Start Up (pg 5). The maximum and minimum dispensing volume and dispense depend on the model of PCD connected.

NOTE: Before operating the PCD Speed Controller, read all Safety (pg 1) instructions.

Displays & Controls / Connections

Table 1: *Displays & Controls Described*

Item	Description
A - LED	Displays the operating modes: • ON - ready for operation • OFF - dispensing / suck-back in operation • Flashing - fault
1 - Connector 1	Control signal (refer to Cable Assignment, Connector 1 (pg 4))
3 - Connector 3	Dispense pump (refer to Cable Assignment, Connector 3 (pg 5))

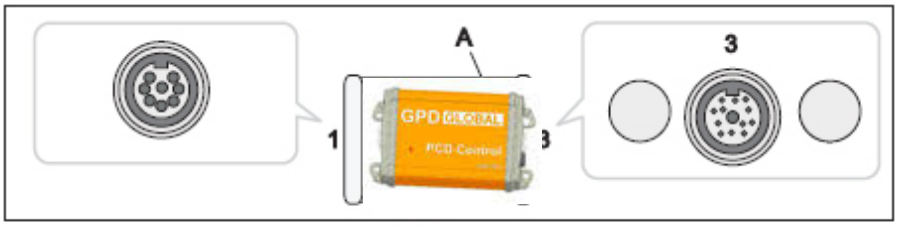
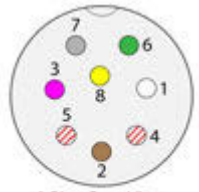


Fig. 2

Cable Assignment, Connector 1

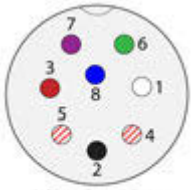
With Standard Length Cable

Table 2: *Connector 1 (Standard) Cable Function by PIN & Color*

Connector	PIN	Color	Function	Notes
 8 Pin - Rear View (Standard Length Cable)	1	white	Start dispensing (+ 24 V)	Dispense pump motor runs, medium is delivered.
	2	brown	Start suck-back (+ 24 V)	Dispense pump motor runs in reverse, medium is sucked back in to avoid dripping.
	3	pink	Fault, interval 0.5 sec + 24 V / 0 V	---
	6	green	U_{Nnom} (set point selection 0 - 10 V)	Speed of the dispense pump. Input resistance must be greater than 5 kOhm.
	7	grey	GND (Ground)	---
	8	yellow	Supply (+ 24 V)	---

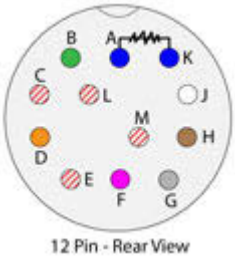
With 5 Meter Length Cable

Table 3: *Connector 1 (5 meter) Cable Function by PIN & Color*

Connector	PIN	Color	Function	Notes
 8 Pin - Rear View (5 Meter Length Cable)	1	white	Start dispensing (+ 24 V)	Dispense pump motor runs, medium is delivered.
	2	black	Start suck-back (+ 24 V)	Dispense pump motor runs in reverse, medium is sucked back in to avoid dripping.
	3	red	Fault, interval 0.5 sec + 24 V / 0 V	---
	6	green	U_{Nnom} (set point selection 0 - 10 V)	Speed of the dispense pump. Input resistance must be greater than 5 kOhm.
	7	violet	GND (Ground)	---
	8	blue	Supply (+ 24 V)	---

Cable Assignment, Connector 3

Table 4: *Connector 3 Cable Function by PIN & Color*

Connector	PIN	Color	Function	Notes
 12 Pin - Rear View	A	blue	Resistor for pump configuration of controller.	---
	B	green	Encoder feedback.	Encoder A
	C	---	Not used.	---
	D	orange	Encoder feedback.	Encoder B
	E	---	Not used.	---
	F	pink	Pump power 24VDC.	24 VDC
	G	grey	GND (Ground)	---
	H	brown	Motor control.	Motor A
	J	white	Motor control.	Motor B
	K	blue	Resistor for pump configuration of controller.	---
	L	---	Not used.	---
	M	---	Not used.	---

Important for Signal Definition

The amount of medium drawn back in by the suck-back must only be just enough to prevent dripping. If more is sucked in, air will enter the dispense pump and the medium will emerge late at the next dispense.

CAUTION: If the suck-back is set higher than the dispense, the dispense pump may be damaged by running dry.

Start Up

CAUTION: The dispense pump lead [connector 3 (Displays & Controls / Connections (pg 3)] may only be connected and disconnected when the power supply is isolated. The electronics in the drive motor could be damaged if this precaution is not taken.

To start up:

1. Prepare the pump for operation per the *PCD Pump User Guide* instructions.
2. Remove power from the PCD Speed Controller:

Table 5: *Removing Power*

If PCD Speed Controller is integrated into:	**then:**
DS or MAX Series dispenser	press the dispenser Motion STop button.
TMax dispenser	remove power from PCD Tabletop Controller.

3. Plug the PCD pump connector (Item 1) into (Item A):

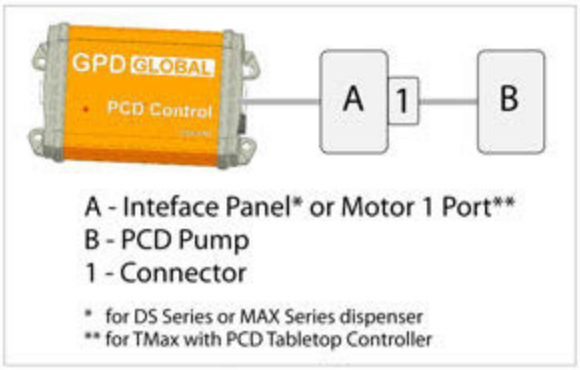


Fig. 4 Connection schematic

NOTE: The PCD Speed Controller is only ready for operation when the dispense pump is connected.

CAUTION: **Do not turn on** the PCD Speed Controller until medium has been delivered to it; otherwise, there is a risk of **damage to the equipment**. Even a **short** test run can cause **irreparable damage to the stator**.

4. Apply power to the PCD Speed Controller:

Table 6: *Applying Power*

If PCD Speed Controller is integrated into:	**then:**
DS or MAX Series dispenser	release the dispenser Motion STop button.
TMax dispenser	turn on power at the PCD Tabletop Controller.

Shut Down

The unit is shut down in reverse order of Start Up (pg 5).

Troubleshooting

Table 7: *Troubleshooting*

Fault	Possible Cause	Action
Control system does not operate, LED flashes, fault signal is output (PIN 3)	Over current shutdown.	Clean the dispense pump. If necessary, replace the stator.
	Faulty motor	Motor may need to be replaced. Contact GPD Global for a replacement motor.

Maintenance

The control system can be regarded as maintenance free. Do not use any aggressive solvents or detergents to clean the unit; use a damp cloth only. Isolate from the power supply before cleaning.

Specifications

Dimensions (W x D x H)	85 mm x 50 mm x 142 mm (3.35” x 1.97” x 5.59”)
Weight	260 g (9 oz)
Mounting	4 holes / 5 mm, hole centers 130 x 48 mm
Power supply voltage	24 V DC
Consumption/Rating	100 VA / 2.7 A
Speed Control Voltage	0.3 Volts to 10 Volts (maximum pump speed is 10 V)
Communication Cables	
Bend radius, minimum	80 mm (3.15”)
Controller to Pump	up to 2.5 m (98”)
Robot to Controller	0.6 m (24”) standard. One end is bare wire.
Operating Temperatures	+10° C to +40° C (50° F to 104° F)

Disposal

Dispose of the control system in an environmentally safe way. All materials and products left in containers must be treated in accordance with the appropriate recycling requirements.

Electrical components must not be disposed of together with household waste. They must be taken to the collection points provided for this purpose.

2002/96/EC (WEEE) EC Directive on waste electrical and electronic equipment.

This unit complies with RoHS requirements.

Conformity Directives

EC Low Voltage Directive 2006/95/EG

EC Electromagnetic Compatibility Directives 89/336/EWG and 2004/108/EG

Warranty

General Warranty. Subject to the remedy limitation and procedures set forth in the Section "Warranty Procedures and Remedy Limitations," GPD Global warrants that the system will conform to the written description and specifications furnished to Buyer in GPD Global's proposal and specified in the Buyer's purchase order, and that it will be free from defects in materials and workmanship for a period of one (1) year. GPD Global will repair, or, at its option, replace any part which proves defective in the sole judgment of GPD Global within one (1) year of date of shipment/invoice. Separate manufacturers' warranties may apply to components or subassemblies purchased from others and incorporated into the system. THIS WARRANTY IS EXPRESSLY IN LIEU OF ANY AND ALL OTHER WARRANTIES,EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Limitations. GPD Global reserves the right to refuse warranty replacement, where, in the sole opinion of GPD Global the defect is due to the use of incompatible materials or other damages from the result of improper use or neglect.

This warranty does not apply if the GPD Global product has been damaged by accident, abuse, or has been modified without the written permission of GPD Global.

Items considered replaceable or rendered unusable under normal wear and tear are not covered under the terms of this warranty. Such items include fuses, lights, filters, belts, etc.

Warranty Procedures and Remedy Limitations. The sole and exclusive remedy of the buyer in the event that the system or any components of the system do not conform to the express warranties stated in the Section "Warranties" shall be the replacement of the component or part. If on-site labor of GPD Global personnel is required to replace the non-warranted defective component, GPD Global reserves the right to invoice the Buyer for component cost, personnel compensation, travel expenses and all subsistence costs. GPD Global's liability for a software error will be limited to the cost of correcting the software error and the replacement of any system components damaged as a result of the software error. In no event and under no circumstances shall GPD Global be liable for any incidental or consequential damages; its liability is limited to the cost of the defective part or parts, regardless of the legal theory of any such claim. As to any part claimed to be defective within one (1) year of date of shipment/invoice, Buyer will order a replacement part which will be invoiced in ordinary fashion. If the replaced part is returned to GPD Global by Buyer and found by GPD Global in its sole judgment to be defective, GPD Global will issue to Buyer a credit in the amount of the price of the replacement part. GPD Global's acceptance of any parts so shipped to it shall not be deemed an admission that such parts are defective.

Specifications, descriptions, and all information contained in this manual are subject to change and/or correction without notice.

Although reasonable care has been exercised in the preparation of this manual to make it complete and accurate, this manual does not purport to cover all conceivable problems or applications pertaining to this machine.