Nordson Corporation

OPERATOR'S CARD

P/N 107 104A

Pro-Flo® Controller

Safety Symbols

The following symbols warn against dangers or possible sources of danger. Become familiar with them! Failure to heed a warning symbol could lead to personal injury and/or damage to the unit or other equipment.

Heed all warning symbols that appear in this document, the operator's manual, or on the equipment.

WARNING: Failure to observe this warning may result in personal injury, death, or equipment damage.

WARNING: Risk of electrical shock. Failure to observe this warning may result in personal injury or death or equipment damage.

System Components

See Figure 1. The Pro-Flo Controller automates the control of Pro-Flo guns. Use the operator interface (3) to select and define production parameters. The diagnostic panel (5) displays the system status. Use the LAMP TEST key (4) to test the lights on the panel. When a fault is detected, the alarm tower (1) lights and the type of fault is indicated on the diagnostic panel. The robot signal indicators (2) on the diagnostic panel light when signals are received from the robot controller. Under normal operating conditions, these lights flash on and off in a specific sequence.

1. *Alarm tower*
2. *Robot signal indicators*
3. *Operator interface*
4. *LAMP TEST key*
5. *Diagnostic panel*

Please Note

This operator's card contains only information necessary for daily operation and troubleshooting. For other information, refer to the product manual.

WARNING: Allow only qualified personnel to perform the following tasks. Observe and follow the safety instructions in this document and all other related documentation.

- Always follow the instructions given in the operator's card and operating manual.

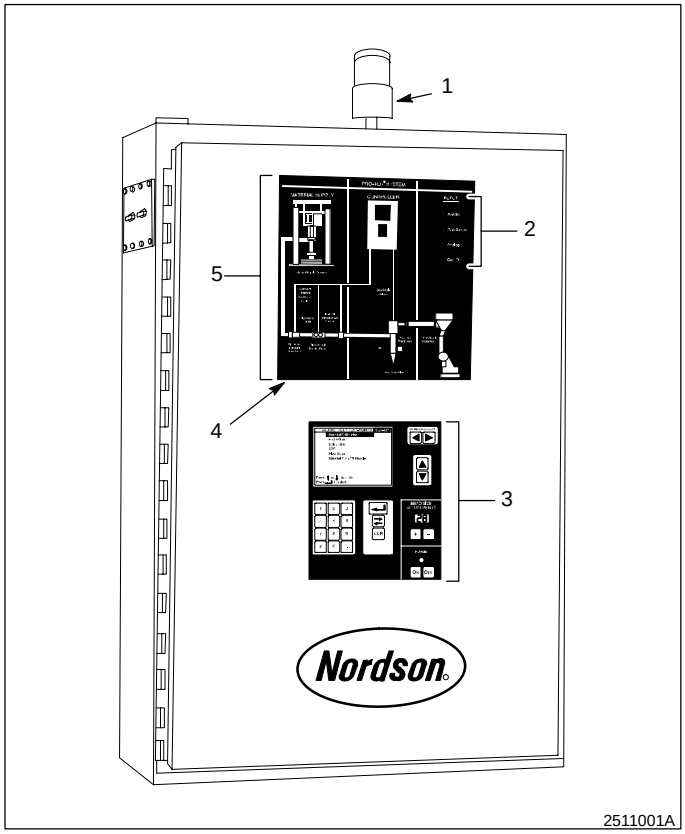


Fig. 1 Pro-Flo Controller

Controls

See Figure 2. The keys and indicators on the operator interface panel are described below:

Fig. ref. #	Item	Function
	Keys	
1	Left and right arrow	highlights a screen selection from the top menu bar shown on the display
2	Up and down arrow	highlights a prompt from a screen
4	+/–	increases or decreases the bead size
6	ON/OFF	starts or stops the gun from purging
7	CLR	clears a numeric value
8	Toggle	toggles between on/off or yes/no
9	Enter	activates the screen selection or enters the numeric value typed at a prompt
10	Numeric	types in a numeric value
	Indicators	
3	Bead size	displays the bead size
5	Purge	lights when the gun is open for purging
11	Display	displays the top menu bar and currently selected screen

The screen selection menu (12) is displayed across the top line of the display (11). Use the left or right arrow key (1) to highlight one of four screen choices: VOLUME, HELP, TEST-POINTS, or SET-UP. Press the enter key (9) to activate your selection. Use the up or down arrow key (2) to highlight prompts from the screen.

1. *Left and right arrow keys*
2. *Up and down arrow keys*
3. *Bead size indicator*
4. *Bead size adjustment keys*
5. *Purge indicator*
6. *Purge on and off keys*
7. *Clear key*
8. *Toggle key*
9. *Enter key*
10. *Numeric keypad*
11. *Display*
12. *Screen selection menu*

Fault Correction

When a Pro-Flo system fault is detected, the alarm tower lights and the diagnostic panel indicates where faults occurred. Select the HELP screen to display a description of the fault and corrective action.

Bead Size Adjustment

Bead size is an arbitrary number between 1 and 99. The current bead size is displayed on the bead size indicator. Use the bead adjustment keys to increase or decrease the bead size.

Purging

Purge the gun before you use it to remove air from the material supply hose and nozzle. Press the ON key to start purging. The purge indicator lights while the gun is open. Purging will stop after the purge time has elapsed. Press the OFF key to stop purging immediately.

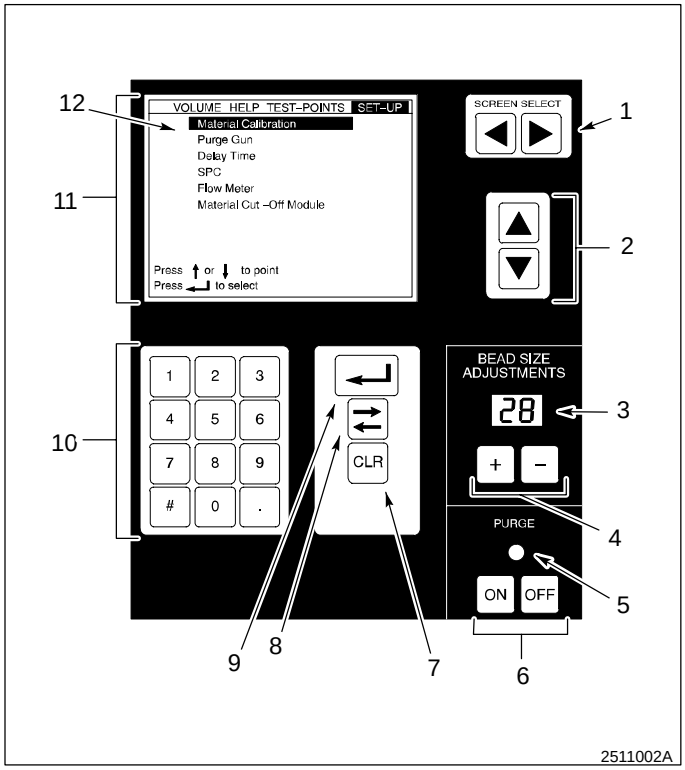


Fig. 2 Operator interface

Set Up

Set the parameters for Pro-Flo dispensing from the SET-UP screen. Highlight and select SET-UP, then highlight and select any of the following prompts:

Material Calibration

NOTE: Material is dispensed during this operation. Place a waste bucket under the gun.

Run a material calibration after the controller is installed and whenever the type of dispensing material is changed. Material calibration allows the controller to learn the material's shear thinning properties. When this prompt is selected, the controller runs an automatic routine for up to 5 minutes while dispensing material.

Purge Gun

Set Dispense Time to determine how long the gun stays open each time the Purge ON button is pressed. Enter a Dispense Time from 1 to 60 sec.

Delay Time

The Tool Speed and gun delay times determine how fast the digital controller reacts to signals received from the robot controller. Sometimes delays are necessary to prevent the controller from reacting more quickly than the robot or gun.

Set Tool Speed to delay the digital controller's reaction to robot motion. Enter a Tool Speed delay from 0 to 500 msec.

Set Gun On and Gun Off to delay the digital controller's reaction to the gun-on and gun-off signals from the robot controller. These parameters adjust the start and stop time of material dispensing. Enter Gun On and Gun Off delays from 0 to 500 msec.

SPC

Use the SPC (statistical process control) screen to clear data from the SPC queue or to download it to a PC running the Nordson DataLink program. Refer to the *Nordson DataLink User's Guide* for more information.

Flowmeter

When a new flowmeter is installed, enter its flow rate (or K-value) in counts/liter. Enter the K-value stamped on the side of the flowmeter body.

Material Cut-Off Module

If your gun is equipped with a material cut-off (MCO) module, it can be disabled or enabled and configured to extend and retract as the gun turns on and off.

Highlight the MCO Control prompt to enable or disable the MCO module.

If you enable the MCO module, set the Extend Time and Retract Time parameters. Extend Time delays the extension of the MCO plunger for a period of time after the gun turns on. Retract Time causes the plunger to retract before the gun turns off. These delays are in milliseconds. Enter Extend Time and Retract Time delays from 0 to 500 msec.

Daily Operation

When the controller is powered on, it runs a self-test to verify that it is operating properly. After the self-test is complete, begin production operation.

1. Adjust any necessary production parameters from the SET-UP screen.
2. Purge the gun to remove air from the material supply hose and nozzle.
3. Set the bead size to the desired value.
4. Display the VOLUME screen to visually monitor the time, Part ID, and bead size requested and achieved for each part run.
5. Begin dispensing material from the robot controller.

Back Up Mode

If one of the following faults is detected, you may continue production in Back Up mode with some sacrifice to bead dispensing characteristics.

- Gun Pressure Transducer
- Upstream Pressure Transducer
- Flowmeter
- Flowmeter Cable

If one of these faults is detected, the HELP screen will include a prompt to enter Back Up mode. When you enter Back Up mode, the BACKUP MODE indicator on the diagnostic panel lights and the alarm tower light shuts off. You can continue production dispensing without interruption.

Once the fault is corrected, the BACKUP MODE indicator light shuts off after the next part is run or the gun is purged.

Dispensing Troubleshooting

Problem	Possible Cause	Corrective Action
1. Gun does not dispense material.	Material supply pressure low	Increase the material supply pressure. Refer to Drum uploader manual.
	Nozzle blocked	Remove and clean the nozzle. Refer to Pro-Flo gun manual.
	Material supply hose blocked	Check material supply hose. Unblock it. Refer to Pro-Flo gun manual.
	Signals not received from robot in proper timing sequence	Set proper timing sequence. Refer to *Robot Signal Timing*.
	Signals not received from robot controller or sent to gun	Check cable continuity and replace it if necessary. Refer to Pro-Flo gun manual.
2. Gun does not dispense material, and does not open.	Control air pressure absent or low	Check supply air pressure. Increase it if necessary.
	Stem binding	Remove the trimset valve. Loosen the bonnet screw on a packing-type bonnet. Check and replace the stem and bonnet if necessary. Refer to Pro-Flo gun manual.
	Actuator malfunctioning	Replace the actuator. Refer to Pro-Flo gun manual.
3. Gun does not dispense material, but opens fully.	Trimset valve blocked	Remove and clean the trimset valve. Refer to Pro-Flo gun manual.
4. Gun does not change dispensing rate to control bead size.	Cordset damaged	Check cordset continuity and replace it if necessary. Refer to Pro-Flo gun manual.
	Gun control or extension cable damaged	Check cable continuity and replace it if necessary. Refer to Pro-Flo gun manual.
5. Gun does not change dispensing rate to control bead size, but opens fully.	Pressure transducer in controller malfunctioning	Check the pressure output voltage of the controller board. Contact your Nordson representative.
6. Dispensing starts early, before robot moves.	Signals from robot controller timed improperly	Set proper timing sequence. Refer to *Robot Signal Timing*.
	Gun On or Tool Speed delay too short	Increase parameter settings. Refer to *Set Up*.

Dispensing Troubleshooting *(contd.)*

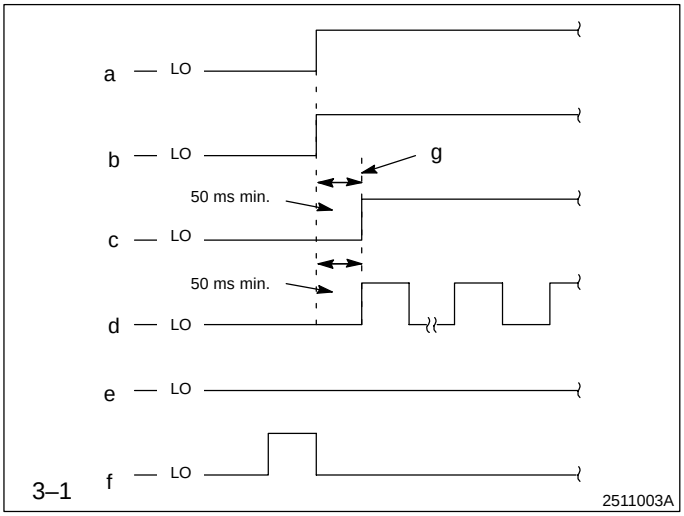
Problem	Possible Cause	Corrective Action
7. Gun continues to dispense after cycle. Controller indicates that gun is closed.	Control air pressure low	Check supply air pressure and increase it if necessary.
	Needle not seating	Purge the gun. Refer to Pro-Flo gun manual.
	Stem and trimset valve seat worn	Replace trimset valve. Refer to Pro-Flo gun manual.
8. Dispensing starts late.	Gun On signal from robot controller timed improperly	Set proper timing sequence. Refer to *Robot Signal Timing*.
	Gun On delay too long	Increase parameter setting. Refer to *Set Up*.
	Stem binding (packing-type bonnet only)	Loosen bonnet screw. Refer to Pro-Flo gun manual.
9. Bead deposition "wiggles".	Nozzle too high above work piece	Lower nozzle. Refer to Robot controller manual.
	Material speed through nozzle too high	Decrease the bead size. Refer to *Controls*.
		Install larger nozzle. Contact Nordson for part numbers.
10. Bead size changes unexpectedly.	Nozzle partially blocked	Clean nozzle. Refer to Pro-Flo gun manual.
	Material has exceeded shelf life	Use fresh material.
11. Material leaks from bonnet.	Bonnet seals worn (lip seal-type only)	Replace bonnet. Refer to Pro-Flo gun manual.
	Bonnet screw loose (packing-type only)	Tighten bonnet screw. Refer to Pro-Flo gun manual.
	Bonnet packings worn (packing-type only)	Replace bonnet. Refer to Pro-Flo gun manual.

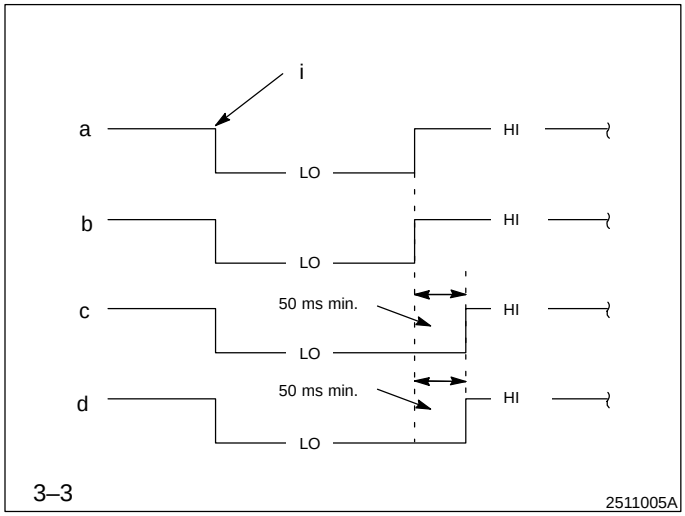
Robot Signal Timing

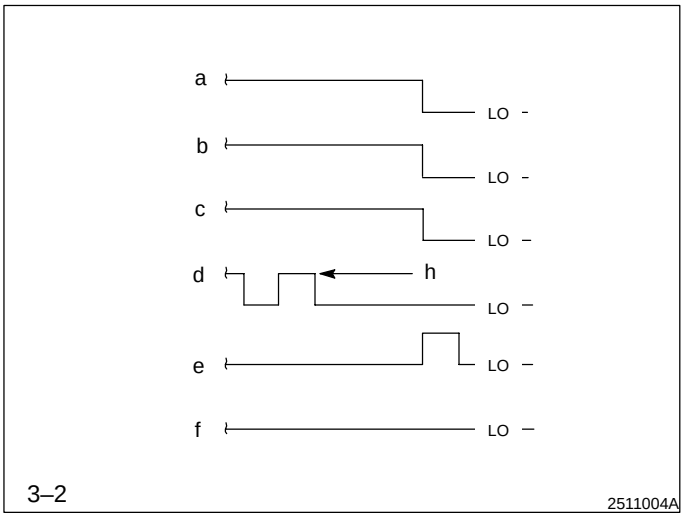
You must adjust the timing sequence of output signals from the robot controller to suit the Pro-Flo controller. This is normally done during installation, but may need readjusting occasionally. Please refer to your robot controller manual for procedures to set the signal timing sequences.

Set the robot timing as illustrated in Figure 3 for

- start up (1)
- shut down (2)
- emergency stop (3)







Key	
a) ANALOG SIGNAL	f) CLEAR FAULT
b) PART ID	g) DISPENSE START
c) PART STROBE	h) DISPENSE FINISH
d) GUN ON	i) EMERGENCY STOP
e) FAULT ACKNOWLEDGE	

Fig. 3 Timing of robot signals

1. *Start up*
2. *Shut down*
3. *Emergency stop*