LA 404 Pattern Control System

Customer Product Manual
Part 1037527B
Issued 5/05

This equipment is regulated by the European Union under WEEE Directive 2002/96/EC).

See www.nordson.com for information about how to properly dispose of this equipment.

NORDSON CORPORATION • DULUTH, GEORGIA • USA
www.nordson.com

Nordson Corporation welcomes requests for information, comments, and inquiries about its products. General information about Nordson can be found on the Internet using the following address: http://www.nordson.com.

Address all correspondence to:

Nordson Corporation
Attn: Customer Service
11475 Lakefield Drive
Duluth, GA 30097

Notice

Trademarks

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LA 404 Pattern Control System

Safety

Read this section before using the equipment. This section contains recommendations and practices applicable to the safe installation, operation, and maintenance (hereafter referred to as “use”) of the product described in this document (hereafter referred to as “equipment”). Additional safety information, in the form of task-specific safety alert messages, appears as appropriate throughout this document.

WARNING: Failure to follow the safety messages, recommendations, and hazard avoidance procedures provided in this document can result in personal injury, including death, or damage to equipment or property.

Safety Alert Symbols

The following safety alert symbol and signal words are used throughout this document to alert the reader to personal safety hazards or to identify conditions that may result in damage to equipment or property. Comply with all safety information that follows the signal word.

WARNING: Indicates a potentially hazardous situation that, if not avoided, can result in serious personal injury, including death.

CAUTION: Indicates a potentially hazardous situation that, if not avoided, can result in minor or moderate personal injury.

CAUTION: (Used without the safety alert symbol) Indicates a potentially hazardous situation that, if not avoided, can result in damage to equipment or property.

Responsibilities of the Equipment Owner

Equipment owners are responsible for managing safety information, ensuring that all instructions and regulatory requirements for use of the equipment are met, and for qualifying all potential users.

Safety Information

- Research and evaluate safety information from all applicable sources, including the owner-specific safety policy, best industry practices, governing regulations, material manufacturer's product information, and this document.
- Make safety information available to equipment users in accordance with governing regulations. Contact the authority having jurisdiction for information.
- Maintain safety information, including the safety labels affixed to the equipment, in readable condition.

Instructions, Requirements, and Standards

- Ensure that the equipment is used in accordance with the information provided in this document, governing codes and regulations, and best industry practices.
- If applicable, receive approval from your facility's engineering or safety department, or other similar function within your organization, before installing or operating the equipment for the first time.
- Provide appropriate emergency and first aid equipment.
- Conduct safety inspections to ensure required practices are being followed.
- Re-evaluate safety practices and procedures whenever changes are made to the process or equipment.

User Qualifications

Equipment owners are responsible for ensuring that users:

- receive safety training appropriate to their job function as directed by governing regulations and best industry practices
- are familiar with the equipment owner's safety and accident prevention policies and procedures
- receive, equipment- and task-specific training from another qualified individual

  NOTE: Nordson can provide equipment-specific installation, operation, and maintenance training. Contact your Nordson representative for information

- possess industry- and trade-specific skills and a level of experience appropriate to their job function
- are physically capable of performing their job function and are not under the influence of any substance that degrades their mental capacity or physical capabilities

Applicable Industry Safety Practices

The following safety practices apply to the use of the equipment in the manner described in this document. The information provided here is not meant to include all possible safety practices, but represents the best safety practices for equipment of similar hazard potential used in similar industries.

Intended Use of the Equipment

- Use the equipment only for the purposes described and within the limits specified in this document.
- Do not modify the equipment.
- Do not use incompatible materials or unapproved auxiliary devices. Contact your Nordson representative if you have any questions on material compatibility or the use of non-standard auxiliary devices.

Instructions and Safety Messages

- Read and follow the instructions provided in this document and other referenced documents.
- Familiarize yourself with the location and meaning of the safety warning labels and tags affixed to the equipment.
- If you are unsure of how to use the equipment, contact your Nordson representative for assistance.

Installation Practices

- Install the equipment in accordance with the instructions provided in this document and in the documentation provided with auxiliary devices.
- Ensure that the equipment is rated for the environment in which it will be used and that the processing characteristics of the material will not create a hazardous environment. Refer to the Material Safety Data Sheet (MSDS) for the material.
- If the required installation configuration does not match the installation instructions, contact your Nordson representative for assistance.
- Position the equipment for safe operation. Observe the requirements for clearance between the equipment and other objects.
- Install lockable power disconnects to isolate the equipment and all independently powered auxiliary devices from their power sources.
- Properly ground all equipment. Contact your local building code enforcement agency for specific requirements.
- Ensure that fuses of the correct type and rating are installed in fused equipment.
- Contact the authority having jurisdiction to determine the requirement for installation permits or inspections.

Operating Practices

- Familiarize yourself with the location and operation of all safety devices and indicators.
- Confirm that the equipment, including all safety devices (guards, interlocks, etc.), is in good working order and that the required environmental conditions exist.
- Use the personal protective equipment (PPE) specified for each task. Refer to *Equipment Safety Information* or the material manufacturer's instructions and MSDS for PPE requirements.
- Do not use equipment that is malfunctioning or shows signs of a potential malfunction.

Maintenance and Repair Practices

- Perform scheduled maintenance activities at the intervals described in this document.
- Relieve system hydraulic and pneumatic pressure before servicing the equipment.
- De-energize the equipment and all auxiliary devices before servicing the equipment.
- Use only new factory-authorized refurbished or replacement parts.
- Read and comply with the manufacturer's instructions and the MSDS supplied with equipment cleaning compounds.

  NOTE: MSDSs for cleaning compounds that are sold by Nordson are available at www.nordson.com or by calling your Nordson representative.

- Confirm the correct operation of all safety devices before placing the equipment back into operation.
- Dispose of waste cleaning compounds and residual process materials according to governing regulations. Refer to the applicable MSDS or contact the authority having jurisdiction for information.
- Keep equipment safety warning labels clean. Replace worn or damaged labels.

Equipment Safety Information

This equipment safety information is applicable to the following types of Nordson equipment:

- hot melt and cold adhesive application equipment and all related accessories
- pattern controllers, timers, detection and verification systems, and all other optional process control devices

Equipment Shutdown

To safely complete many of the procedures described in this document, the equipment must first be shut down. The level of shut down required varies by the type of equipment in use and the procedure being completed. If required, shut down instructions are specified at the start of the procedure. The levels of shut down are:

Relieving System Hydraulic Pressure

Completely relieve system hydraulic pressure before breaking any hydraulic connection or seal. Refer to the melter-specific product manual for instructions on relieving system hydraulic pressure.

De-energizing the System

Isolate the system (melter, hoses, guns, and optional devices) from all power sources before accessing any unprotected high-voltage wiring or connection point.

1. Turn off the equipment and all auxiliary devices connected to the equipment (system).
2. To prevent the equipment from being accidentally energized, lock and tag the disconnect switch(es) or circuit breaker(s) that provide input electrical power to the equipment and optional devices.

   NOTE: Government regulations and industry standards dictate specific requirements for the isolation of hazardous energy sources. Refer to the appropriate regulation or standard.

Disabling the Guns

All electrical or mechanical devices that provide an activation signal to the guns, gun solenoid valve(s), or the melter pump must be disabled before work can be performed on or around a gun that is connected to a pressurized system.

1. Turn off or disconnect the gun triggering device (pattern controller, timer, PLC, etc.).
2. Disconnect the input signal wiring to the gun solenoid valve(s).
3. Reduce the air pressure to the gun solenoid valve(s) to zero; then relieve the residual air pressure between the regulator and the gun.

General Safety Warnings and Cautions

Table 1 contains the general safety warnings and cautions that apply to Nordson hot melt and cold adhesive equipment. Review the table and carefully read all of the warnings or cautions that apply to the type of equipment described in this manual.

Equipment types are designated in Table 1 as follows:

HM = Hot melt (melters, hoses, guns, etc.)

PC = Process control

CA = Cold adhesive (dispensing pumps, pressurized container, and guns)

Table 1 General Safety Warnings and Cautions

Equipment Type	Warning or Caution
HM	**WARNING:** Hazardous vapors! Before processing any polyurethane reactive (PUR) hot melt or solvent-based material through a compatible Nordson melter, read and comply with the material's MSDS. Ensure that the material's processing temperature and flashpoints will not be exceeded and that all requirements for safe handling, ventilation, first aid, and personal protective equipment are met. Failure to comply with MSDS requirements can cause personal injury, including death.
HM	**WARNING:** Reactive material! Never clean any aluminum component or flush Nordson equipment with halogenated hydrocarbon fluids. Nordson melters and guns contain aluminum components that may react violently with halogenated hydrocarbons. The use of halogenated hydrocarbon compounds in Nordson equipment can cause personal injury, including death.
HM, CA	**WARNING:** System pressurized! Relieve system hydraulic pressure before breaking any hydraulic connection or seal. Failure to relieve the system hydraulic pressure can result in the uncontrolled release of hot melt or cold adhesive, causing personal injury.
HM	**WARNING:** Molten material! Wear eye or face protection, clothing that protects exposed skin, and heat-protective gloves when servicing equipment that contains molten hot melt. Even when solidified, hot melt can still cause burns. Failure to wear appropriate personal protective equipment can result in personal injury.

Continued...

General Safety Warnings and Cautions (contd)

Table 1 General Safety Warnings and Cautions *(contd)*

Equipment Type	Warning or Caution
HM, PC	**WARNING:** Equipment starts automatically! Remote triggering devices are used to control automatic hot melt guns. Before working on or near an operating gun, disable the gun's triggering device and remove the air supply to the gun's solenoid valve(s). Failure to disable the gun's triggering device and remove the supply of air to the solenoid valve(s) can result in personal injury.
HM, CA, PC	**WARNING:** Risk of electrocution! Even when switched off and electrically isolated at the disconnect switch or circuit breaker, the equipment may still be connected to energized auxiliary devices. De-energize and electrically isolate all auxiliary devices before servicing the equipment. Failure to properly isolate electrical power to auxiliary equipment before servicing the equipment can result in personal injury, including death.
CA	**WARNING:** Risk of fire or explosion! Nordson cold adhesive equipment is not rated for use in explosive environments and should not be used with solvent-based adhesives that can create an explosive atmosphere when processed. Refer to the MSDS for the adhesive to determine its processing characteristics and limitations. The use of incompatible solvent-based adhesives or the improper processing of solvent-based adhesives can result in personal injury, including death.
HM, CA, PC	**WARNING:** Allow only personnel with appropriate training and experience to operate or service the equipment. The use of untrained or inexperienced personnel to operate or service the equipment can result in injury, including death, to themselves and others and can damage to the equipment.

Equipment Type	Warning or Caution
HM	**CAUTION:** Hot surfaces! Avoid contact with the hot metal surfaces of guns, hoses, and certain components of the melter. If contact can not be avoided, wear heat-protective gloves and clothing when working around heated equipment. Failure to avoid contact with hot metal surfaces can result in personal injury.
HM	**CAUTION:** Some Nordson melters are specifically designed to process polyurethane reactive (PUR) hot melt. Attempting to process PUR in equipment not specifically designed for this purpose can damage the equipment and cause premature reaction of the hot melt. If you are unsure of the equipment's ability to process PUR, contact your Nordson representative for assistance.
HM, CA	**CAUTION:** Before using any cleaning or flushing compound on or in the equipment, read and comply with the manufacturer's instructions and the MSDS supplied with the compound. Some cleaning compounds can react unpredictably with hot melt or cold adhesive, resulting in damage to the equipment.
HM	**CAUTION:** Nordson hot melt equipment is factory tested with Nordson Type R fluid that contains polyester adipate plasticizer. Certain hot melt materials can react with Type R fluid and form a solid gum that can clog the equipment. Before using the equipment, confirm that the hot melt is compatible with Type R fluid.

Other Safety Precautions

- Do not use an open flame to heat hot melt system components.
- Check high pressure hoses daily for signs of excessive wear, damage, or leaks.
- Never point a dispensing handgun at yourself or others.
- Suspend dispensing handguns by their proper suspension point.

First Aid

If molten hot melt comes in contact with your skin:

1. Do NOT attempt to remove the molten and/or solidified hot melt from your skin.
2. Immediately soak the affected area in clean, cold water until the hot melt has cooled.
3. In case of severe burns, treat for shock.
4. Seek expert medical attention immediately. Give the MSDS for the hot melt to the medical personnel providing treatment.

Safety Label

The safety label is affixed to the electrical box that is mounted inside the unit. Figure 1 illustrates the location of the safety label. Table 2 provides an picture of the hazard identification symbol, the meaning of the symbol, and the wording of any safety message.

Figure 1 Location of the Safety Label

Table 2 Hazard Identification Symbol and Meaning of Symbol

Item	Description
1.	 **WARNING:**
1.	1. Hazardous voltage.
2.	2. Disconnect all power supply connections before servicing.

System Overview

The LA 404 Pattern Control System generates the signals required to accurately dispense adhesive on a variable speed production line. The system monitors the production line position through a pulse encoder. The pattern controller detects a product traveling down the production line using a photosensor, and then activates the glue guns which dispense the programmed pattern.

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Figure 2 LA404 Pattern Controller

System Description

The pattern controller is a four-channel, four-trigger distance-based device that is capable of supplying signals to electric and pneumatic guns at line speed of up to 600 m/min. It has integral drivers that can drive electric guns like LA 820, LA 844, LA 822, and 24 VDC pneumatic hot melt guns.

The pattern controller is programmable with a multi-line menu driven LCD (liquid crystal display). It has two programming modes, *Administrator* and *Normal*. The *Administrator* mode is used for an initial setup when the pattern controller is installed for the first time. The *Normal* mode is used for daily operation.

System Features

- Self configuration upon power up
- LCD programming/setup menu screen
- The operating system software in the pattern controller allows electronic field software upgrades via the computer's serial port
- Capable of storing up to 50 programs
- Can dynamically change program parameters during pattern controller operation
- Monitors fault and warning conditions
- Guns dispense a maximum of four beads. Bead types include normal, modulated, dot, stitch, random, and continuous
- Four channels with up to two gun capacity per channel
- Each channel has a corresponding driver capable of driving two guns simultaneously
- Automatically converts glue line patterns to other bead types
- Digital display of machine speed, work rate, and total count
- Programmable gun compensation
- Internal timer function for fixed speed machines
- Pressure run-up
- Remote gun purge
- Encoder scaling
- Remote recipe program recall
- Integrated tip sealer control
- Programmable gun driver

Software Upgrade

The pattern controller's software can be upgraded, and the user programs can be saved or restored in the field by using the Nordson Configuration Manager (NCM). The NCM is a Windows®-based application that allows the pattern controller to communicate with a personal computer (PC). The communication is enabled by a serial cable that is connected to the PC COM port (selected during the software installation routine) and the serial port connection (COM port) located on your pattern controller's rear panel.

The NCM can be obtained from:
www.enordson.com/support

Specifications

Operating Conditions

Item	Specification
Ambient temperature range	32° – 104° F (0° – 40° C)
Enclosure rating	IP30
Humidity	5% – 95% non-condensing
Altitude	-20 – 5000 feet above sea level

Non-Operating Conditions

Item	Specification
Ambient temperature range	-86° – 185° F (-30° – 85° C)
Humidity	5% – 95% non-condensing
Altitude	Up to 45,000 feet above sea level

Physical

Item	Specification
Dimensions (WxDxH)	12 in. x 9 in. X 8 in. (304.8 mm x 228.6 mm x 203.2 mm)

Power Supply

Item	Specification
Input voltage	100 – 120 VAC/200 – 240 VAC, 50/60 Hz, 4 A
Replacement fuse	5 x 20 mm, 250 VAC, 6.3 A

Performance

Item	Specification
Maximum operational line speed	600 m/min, 1 p/mm encoder gearing
Maximum pulse frequency	100 Khz
Encoder resolution	0.1 p/mm – 20 p/mm
Bead resolution	1.0 mm
Adhesive placement accuracy	± 1.0 mm under the following conditions: a. Encoder resolution at least 1 p/mm b. Acceleration levels + 2.0 m/s^2 and -2.0 m/s^2 (0 – maximum line speed) c. Gun compensation (on/off) 5.0 ms or less d. All triggers activated simultaneously
Gun compensation range	0 – 500 mm in 0.1 mm steps at a given speed, or 0.0 ms – 50.0 ms in 0.1 ms
Trigger setup time	Processes all trigger inputs and generates the initial gun output within 1 ms
Line speed sensor input (encoder or MSD)	One encoder input that accepts single and quadrature type encoders
Number of channel and gun output	Four programmable channel (or gun) outputs
Maximum number of beads per channel	Four beads per programmed channel
Maximum pattern segment length	32768 encoder pulses
Minimum bead delay (gap)	0 mm
Maximum bead duration	Equal to the maximum pattern segment length
Minimum programmable gun-to-trigger offset	2 mm
Maximum gun-to-trigger offset	Equal to maximum pattern segment length minus the first bead offset
Digital circuitry I/O isolation	All external inputs and outputs are electrically isolated from the internal digital circuits

Front Panel

The front panel is used for entering and displaying the user inputs, and transmitting the inputs to the pattern generation engine.

Figure 3 Location of Front Panel Controls and Indicators

Item	Controls and Indicator	Description
1	Right arrow or Left arrow	Selects the item being programmed by moving up or down.
2	STAND BY	Enables and disables the gun output. When active (amber LED) disables all channels. When inactive (green LED) all channels are permitted to run.
3	Up (increase) arrow or Down (decrease) arrow	Increases or decreases the value of the selected parameter.
4	OUTPUT 1–4 LEDs	Illuminates when the selected gun output is activated.
5	CHANNEL SELECT	Selects which channel is being programmed, observed, or adjusted.
6	ENCODER LED	Illuminates with each pulse from the encoder.
7	TRIGGER LED	Illuminates when the selected trigger is On.
8	CHANNEL 1–4 LEDs	Illuminates to indicate that the selected channel is being programmed, observed, or adjusted. The LEDs blink to indicate a warning condition.
9	PURGE	Activates all outputs for active channel only. **NOTE**: In flush mode it acts as an On/Off button. In purge mode it is a momentary contact that is On when pressed and Off when released.
10	SET UP backward	Scrolls backward through the setup screens.
11	SET UP forward	Scrolls forward through the setup screens.
12	Setup menu screen	Alphanumeric, 9.22 mm character height, with a 4 x 20 backlight LCD.
–	Cursor or asterisk (*)	Appears beside a parameter to indicate that it is ready for setup.

Rear Panel

The rear panel contains several input/output (I/O) connectors that connect the pattern controller to other devices.

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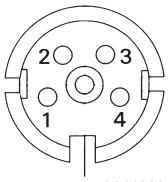
Figure 4 Rear Panel I/O Pin Connectors

1. TRIGGER 1–4
2. CHANNEL Outputs 1–4
3. RUN UP 1–2
4. ENCODER
5. TIP SEAL INPUT and OUTPUT
6. REMOTE PURGE
7. REMOTE INPUT and OUTPUT
8. SERIAL PORT (used for software upgrades in the field)
9. POWER INPUT 100 – 240 VAC

I/O Connector Pin Layout

The I/O connector pin layouts are shown below to make the appropriate cable connections.



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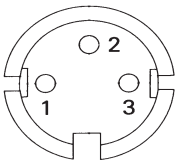
Runup 1 and 2

This is a female connector, the drawing shows the front view (pin side).

Pin	Signal
1	24 VDC common
2	0 to 20 mA output
3	0 to 10 Volt output
4	24 VDC (0.35 A maximum)



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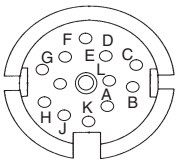
Channel 1 – 4

This is a female connector, the drawing shows the front view (pin side).

Pin	Signal
1	Gun or solenoid +
2	Gun or solenoid –
3	Chassis



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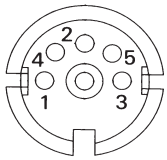
Encoder Input

This is a female connector, the drawing shows the front view (pin side).

Pin	Signal
A	12 VDC (0.35 A maximum)
B	Signal A (quadrature differential)
C	Signal A not (quadrature differential)
D	Signal B (quadrature differential)
E	Signal B not (quadrature differential)
F	12 VDC common
G	12 VDC
H	Pulse train input (NPN)
J	24 VDC common
K	Quadrature differential encoder type (connect to common for quadrature differential encoders)
L	Pulse train encoder type (connect to common for pulse)
M	12 VDC common



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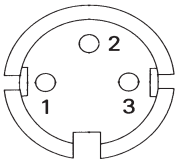
Trigger Input and Tip Seal Input

This is a female connector, the drawing shows the front view (pin side).

Pin	Signal
1	N/A
2	Trigger (NPN or PNP)
3	24 VDC (0.1 A maximum)
4	24 VDC common
5	N/A



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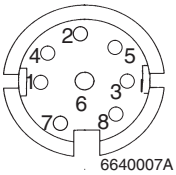
Tip Seal Output

This is a female connector, the drawing shows the front view (pin side).

Pin	Signal
1	Tip Seal Output, 24 VDC (0.5 A maximum)
2	24 VDC common
3	Chassis

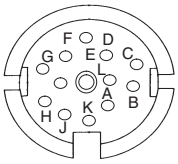


6640007A

Remote Input

This is a female connector, the drawing shows the front view (pin side).

Pin	Signal
1	24 VDC (0.2 A maximum)
2	Remote select 0 (Remote program recall, driven with 24 VDC)
3	Remote select 1
4	Remote select 2
5	Remote select 3
6	Remote select 4
7	Remote enable
8	24 VDC common



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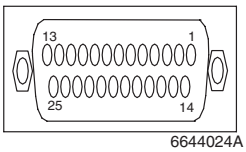
Remote Output

This is a male connector, the drawing shows the rear view (solder side).

Pin	Signal
A	Remote output number 1, normally closed contact
B	Remote output number 1, normally open contact
C	Remote output number 1, common contact
D	Remote output number 2, normally closed contact
E	Remote output number 2, normally open contact
F	Remote output number 2, common contact

Note: Pins G, H, J, L, K, and M are not used.



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Remote Purge Input

This is a 25-pin female D-shell connector, the drawing shows the front view (pin side).

Pin	Signal
1	Purge channel 1
2	Purge channel 2
3	Purge channel 3
4	Purge channel 4
5	24 VDC common
6	Not connected
7	Not connected
8	Not connected
9	Not connected
10	24 VDC common
11	24 VDC common
12	24 VDC common
13	24 VDC common
14	Not connected
15	Not connected
16	Not connected
17	Not connected
18	24 VDC common
19	Not connected
20	Not connected
21	Not connected
22	Not connected
23	24 VDC common
24	24 VDC common
25	24 VDC common

Installation

This section provides pattern controller positioning information and basic startup instructions.

Pattern Controller Ship-With Kit

The following contents are included in the pattern controller ship-with kit:

Kit Contents	Quantity
Fuses	2
Mounting bracket	2
Remote input plug	1
115 V line cord	1
Manual	1

Unpacking and Positioning the Pattern Controller

1. Exercise care to prevent equipment damage during unpacking.
2. Inspect for any damage that may have occurred during shipping. Report any damage to the Nordson representative.
3. Bolt each mounting bracket (included in the pattern controller ship-with kit) on either side of the pattern controller firmly.
4. Position the pattern controller close to the production line.

WARNING: Equipment must be properly grounded and fused according to its rated current consumption (see ID plate). Failure to follow the safety procedures can result in serious injury.

5. Connect the pattern controller power cord to a properly grounded wall outlet.

   NOTE: This pattern controller accepts a 115 V (included in the ship-with kit) or a 230 V line cord. If a 230 V line cord is used, it will need to be supplied by the user.

Remote Input Plug

The remote input plug provided in the ship-with kit connects to the *Remote Input* connector, it is typically used to prevent the pattern controller from dispensing adhesive until a melter or parent machine is *ready* as shown in Figure 5.

To enable the pattern controller to begin dispensing adhesive:

Connect the 24 VDC (*Remote Input* plug, pin 1) to the enable input (*Remote Input* plug, pin 7) using an electrically isolated contact. Refer to the *Remote Input* pin drawing under *I/O Connector Pin Layout*.

To bypass (or to set to INACTIVE) the remote enable function, refer to *System Settings 3*.

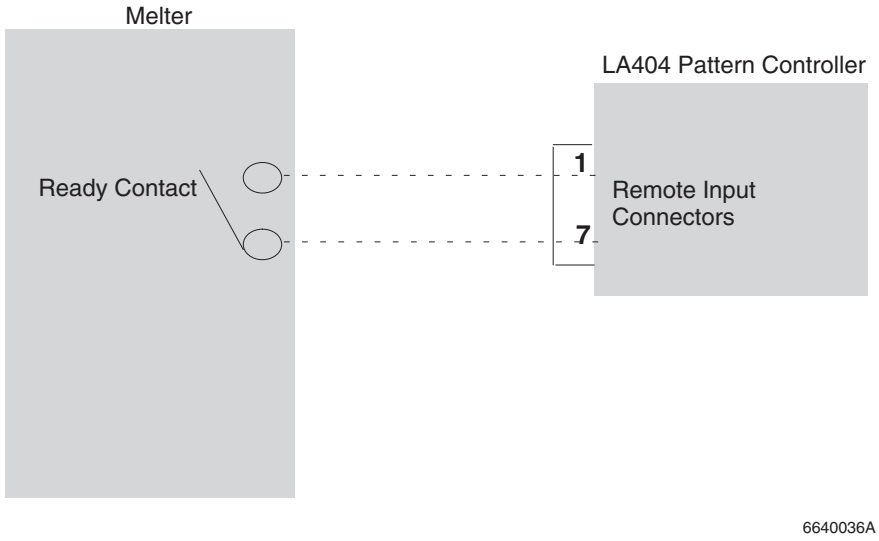

Figure 5 Connecting the Pattern Controller to the Melter for Pattern Generation

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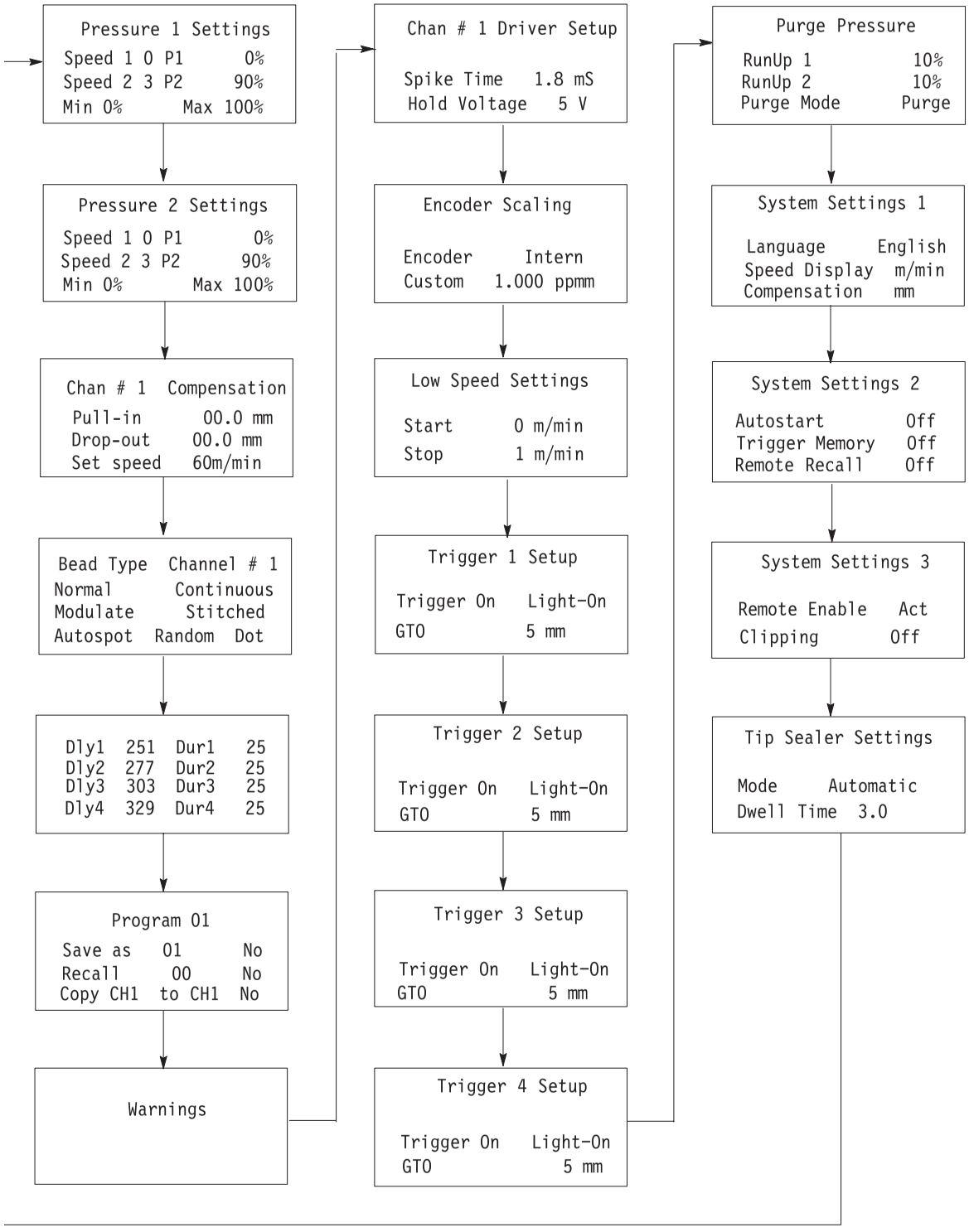
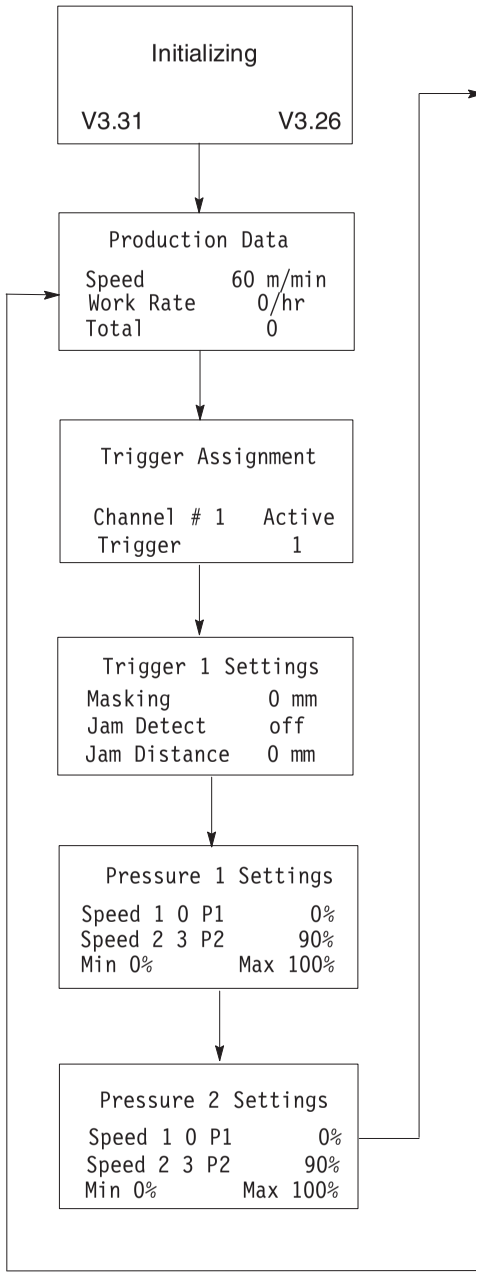

Pressure 1 Settings
Speed 1 0 P1 0%
Speed 2 3 P2 90%
Min 0% Max 100%
Pressure 2 Settings
Speed 1 0 P1 0%
Speed 2 3 P2 90%
Min 0% Max 100%
Chan # 1 Compensation
Pull-in 00.0 mm
Drop-out 00.0 mm
Set speed 60m/min
Bead Type Channel # 1
Normal Continuous
Modulate Stitched
Autospot Random Dot
Dly1 251 Dur1 25
Dly2 277 Dur2 25
Dly3 303 Dur3 25
Dly4 329 Dur4 25
Program 01
Save as 01 No
Recall 00 No
Copy CH1 to CH1 No
Warnings
Chan # 1 Driver Setup
Spike Time 1.8 mS
Hold Voltage 5 V
Encoder Scaling
Encoder Intern
Custom 1.000 ppmm
Low Speed Settings
Start 0 m/min
Stop 1 m/min
Trigger 1 Setup
Trigger On Light-On
GTO 5 mm
Trigger 2 Setup
Trigger On Light-On
GTO 5 mm
Trigger 3 Setup
Trigger On Light-On
GTO 5 mm
Trigger 4 Setup
Trigger On Light-On
GTO 5 mm
Purge Pressure
RunUp 1 10%
RunUp 2 10%
Purge Mode Purge
System Settings 1
Language English
Speed Display m/min
Compensation mm
System Settings 2
Autostart Off
Trigger Memory Off
Remote Recall Off
System Settings 3
Remote Enable Act
Clipping Off
Tip Sealer Settings
Mode Automatic
Dwell Time 3.0

Normal Mode:


Initializing
V3.31 V3.26
Production Data
Speed 60 m/min
Work Rate 0/hr
Total 0
Trigger Assignment
Channel # 1 Active
Trigger 1
Trigger 1 Settings
Masking 0 mm
Jam Detect off
Jam Distance 0 mm
Pressure 1 Settings
Speed 1 0 P1 0%
Speed 2 3 P2 90%
Min 0% Max 100%
Pressure 2 Settings
Speed 1 0 P1 0%
Speed 2 3 P2 90%
Min 0% Max 100%

System Setup

The pattern controller can be customized with several setup options by using the *Administrator* or the *Normal* operating modes. Refer to the *Quick Programming Guide* for the sequence of menu screens that are used to program the pattern controller.

Administrator Mode

Use the Administrator mode to setup the pattern controller for the first time:

1. While holding both the ▲ and ▼ buttons, turn on the power switch located at the rear panel of the pattern controller.
2. Continue holding the ▲ and ▼ buttons until the words *Initializing Administrator*, along with the panel and engine software versions appear on the setup menu screen. Once this information appears, release the buttons.

   NOTE: The pattern controller will perform a brief initializing procedure which includes a self-diagnostic and preparation program. This procedure takes between 10 – 15 seconds to complete.

6640008A

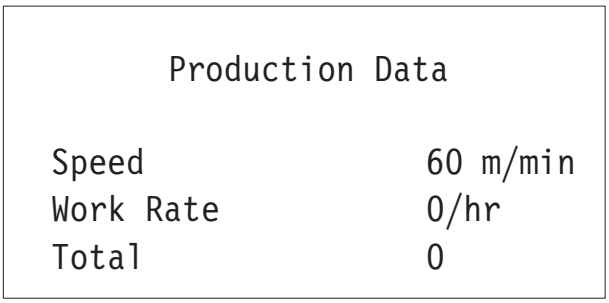
CAUTION: If the SET UP buttons are pressed inadvertently instead of the ▲ and ▼ buttons, the pattern controller will default to factory settings and the current user settings will be lost.

3. Press the SET UP forward button to access each setup screen.

Production Data

The setup menu offers the following parameters:

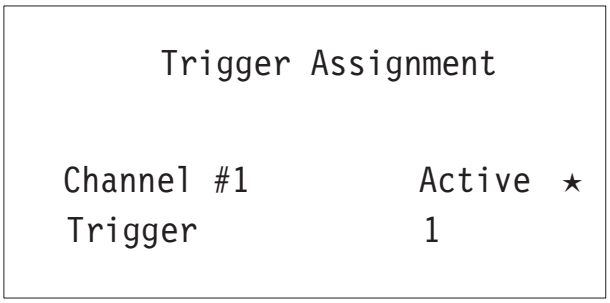
- Speed displays the line velocity as measured by the encoder. The units maybe displayed either as meters per minute or feet per minute, refer to *System Settings 1* menu.
- Work rate is the production rate as sensed by Trigger 1.
- Total is the count of products sensed by Trigger 1. To reset Total, press the ◀ button on the front panel of the pattern controller.



6640009A

Trigger Assignment

In this menu each of the four channels can be activated and assign one of the four trigger inputs.



6640010A

1. To select Channel number's 1 – 4, press the CHANNEL SELECT button on the front panel of the patten controller.
2. To set channel 1 to ACTIVE or INACTIVE:
   a. Press the ◀ or ▶ button for the cursor to appear beside ACTIVE or INACTIVE.
   b. Press the ▲ or ▼ button to select ACTIVE or INACTIVE.
3. To assign trigger's 1 – 4 to a channel:
   a. Press the ◀ or ▶ button for the cursor to appear beside the numeric value.
   b. Press the ▲ or ▼ button to select from trigger number's 1 – 4.

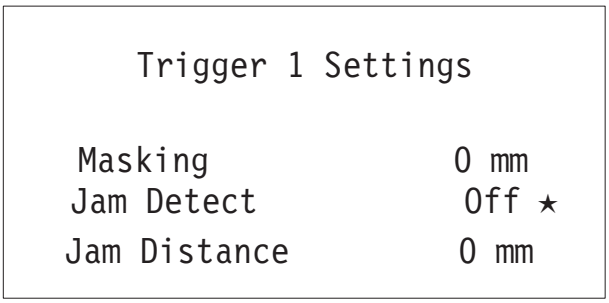
   NOTE: The assigned trigger number will be displayed in the *Trigger Settings* menu.
4. Repeat steps 2 – 3 to set Channel number's 2 – 4.

Trigger Settings (1 – 4)

After activating Triggers' 1 – 4 in *Trigger Assignment*, use this menu to set the masking distance, jam detect option, and jam distance for each trigger.

Masking is a length used to lockout the photosensors for a predetermined distance. This distance is programmed when the products contain holes or cutouts.

Jam detection activates a warning and output when a photosensor is active longer than the user defined product length.



6640011A

1. To set masking:
   a. Press the ◀ or ▶ button for the cursor to appear beside the numeric value.
   b. Press the ▲ or ▼ button to select value from 0 – 9999 mm.
2. To set jam detect:
   a. Press the ◀ or ▶ button for the cursor to appear beside Off or On.
   b. Press the ▲ or ▼ button to On or Off. If set to On, go to step 3 to set the jam distance.
3. To set jam distance:
   a. Press the ◀ or ▶ button for the cursor to appear beside the numeric value.
   b. Press the ▲ or ▼ button to select value from 0 – 9999 mm. Enter a value greater than the product length being glued.

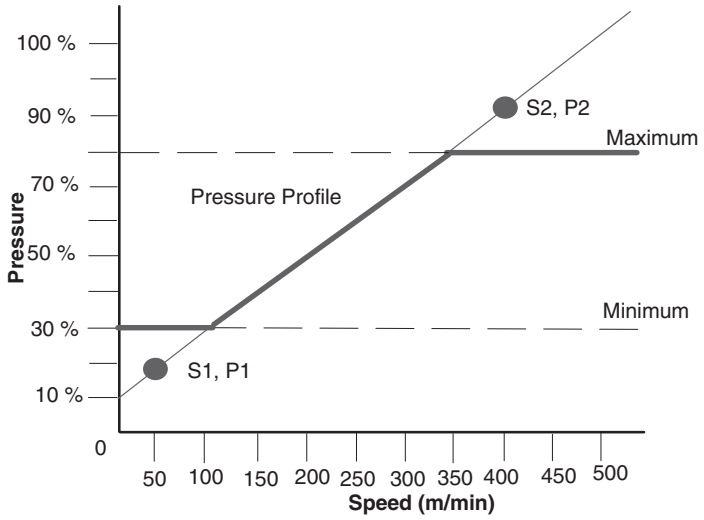
Pressure 1 and 2 Settings

The pattern controller accurately regulates the system pressure to maintain proper adhesive volume during line speed changes. This menu is used to set the two-point linear pressure profile for each runup.

The linear pressure curve is defined by setting Speed 1 (S1) at Pressure 1 (P1), and Speed 2 (S2) at Pressure 2 (P2), see Figure 6.

Maximum and Minimum Line Pressure

The minimum line pressure is reached at the minimum cutoff limit, and the maximum pressure is reached at the maximum cutoff limit. Pressure cannot be set below the assigned minimum cutoff limit or above the assigned maximum cutoff limit.



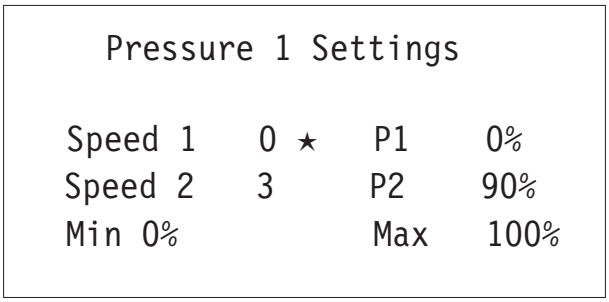
Minimum and maximum line pressure settings:

Minimum= 30%
Maximum= 80%
Speed 1 = 50 m/min, Pressure 1= 20%
Speed 2= 400 m/min, Pressure 2 = 95%

6640013A

Figure 6 Pressure Curve Settings

Pressure 1 and 2 Settings *(contd)*



6640012A

1. To set speed 1:
   a. Press the ◀ or ▶ button for the cursor to appear beside the numeric value.
   b. Press the ▲ or ▼ button to set the desired speed value from 0 – 599 m/min.
2. To set P1:
   a. Press the ◀ or ▶ button for the cursor to appear beside P1's numeric percentage value.
   b. Press the ▶ button to set P1 from 0 – 100%.
3. To set speed 2:
   a. Press the ◀ or ▶ button for the cursor to appear beside the numeric value.
   b. Press the ▲ or ▼ button to set the desired speed value from 1 – 600 m/min.
4. To set P2:
   a. Press the ◀ or ▶ button for the cursor to appear beside P2's numeric percentage value.
   b. Press the ▶ button to set P2 from 0 – 100%.
5. To set minimum and maximum pressure:
   a. Press the ◀ or ▶ button for the cursor to appear beside either Min or Max.
   b. When the cursor appears beside Min, press the ▲ or ▼ button to set the desired percentage value from 0 – 99%.
   c. When the cursor appears beside Max, press the ▲ or ▼ button to set the desired percentage value from 1 – 99%.
6. Press the SET UP forward button to go to Pressure 2 Settings, and then repeat steps 1 – 5.

Channel Compensation

Entering channel compensation settings ensures accurate placement of the beads in applications where the line speed varies. Manual entry of the time required for each gun to open, and the time required for each gun to close provides channel compensation. Different values of compensation for each channel can be entered.

Compensation can be entered either in milliseconds (ms) or millimeters (mm), refer to *System Settings 1*.

Millisecond (ms) Compensation Setting

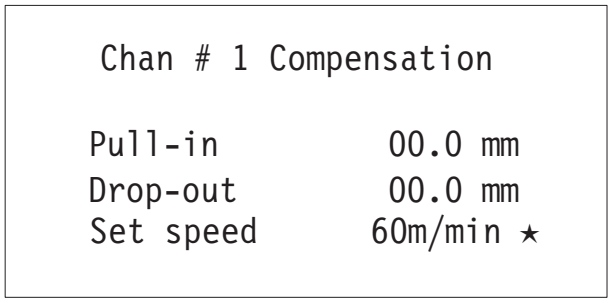
If gun compensation is known, enter the time for each gun to open and dispense adhesive (pull-in compensation), and the time for each gun to close and stop dispensing adhesive (drop-out compensation). Typical values for pull-in and drop-out are as follows:

- liquid adhesive electric guns: 2 – 8 ms
- high-performance air-operated guns (such as Nordson H400 Series guns): 5 – 12 ms
- standard air-operated guns: 8 – 20 ms

Millimeter (mm) Compensation Setting

If gun compensation is not known, the pattern controller provides a method to quickly determine these times and enter them. Set the pull-in and drop-out compensation to zero, produce a *Normal* bead test pattern at run speed. Enter the run speed under set speed, measure the difference between the actual bead placement and the programmed bead start. Enter this value for pull-in settings, and measure the difference between the actual bead stop position and the programmed bead end and enter this value for drop-out settings.

Channel Compensation *(contd)*



6640014A

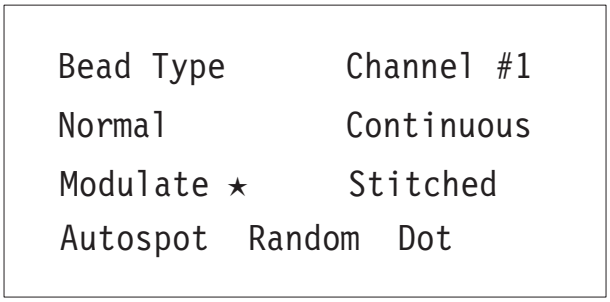
1. To select Chan (channel) number's 1 – 4, press the CHANNEL SELECT button on the front panel of the patten controller.
2. To set pull-in:
   a. Press the ◀ or ▶ button for the cursor to appear beside the numeric value.
   b. Press the ▲ or ▼ button to set the desired pull-in value from 00.0 – 500.0 mm.

   NOTE: Pull-in is the amount of time prior to start of a bead.
3. To set drop-out:
   a. Press the ◀ or ▶ button for the cursor to appear beside the numeric value.
   b. Press the ▲ or ▼ button to set the desired drop-in value from 00.0 – 500.0 mm.

   NOTE: Drop-out is the amount of time prior to the finish of a bead.
4. To set speed:
   a. Press the ◀ or ▶ button for the cursor to appear beside the numeric value.
   b. Press the ▲ or ▼ button to set the desired value from 1 – 600 m/mm.
5. Repeat steps 2 – 4 to set Chan (channel) number's 2 – 4.

Bead Type

This setting allows the user to select one of the seven different bead types.

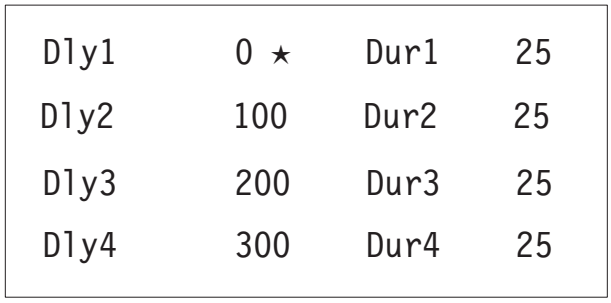


6640015A

1. To select Channel number's 1 – 4, press the CHANNEL SELECT button on the front panel of the patten controller.
2. Press the ◀ or ▶ button for the cursor to appear beside the desired bead type.
3. Select from Normal, Continuous, Modulate, Stitched, Autospot, Random, or Dot.
4. After selecting the bead type, press the SET UP forward button to program the selected bead. The following section discusses programming each bead type.
5. Repeat steps 2 – 4 to set the bead type for Channel 2 – 4.

Normal Beads

When the line velocity is above the start speed (refer to *Low Speed Settings*), a normal or a solid bead is generated. This is the default bead type for each channel.



6640016A

Normal Beads (contd)

1. To set Dly (delay):
   a. Press the ◀ or ▶ button for the cursor to appear beside the numeric value.
   b. Press the ▲ or ▼ button to to set the desired delay value from 0 – 8187 mm.
2. To set Dur (duration, also called length):
   a. Press the ◀ or ▶ button for the cursor to appear beside the numeric value.
   b. Press the ▲ or ▼ button to set the desired duration value from 0 – 8192 mm.

NOTE: This menu screen automatically adjusts the start of successive intervals during setup to prevent overlapping of bead. When incrementing delay or duration settings, the bead editor will stop at the overlap value. To continue incrementing delay or duration settings, release and press the ▲ button.

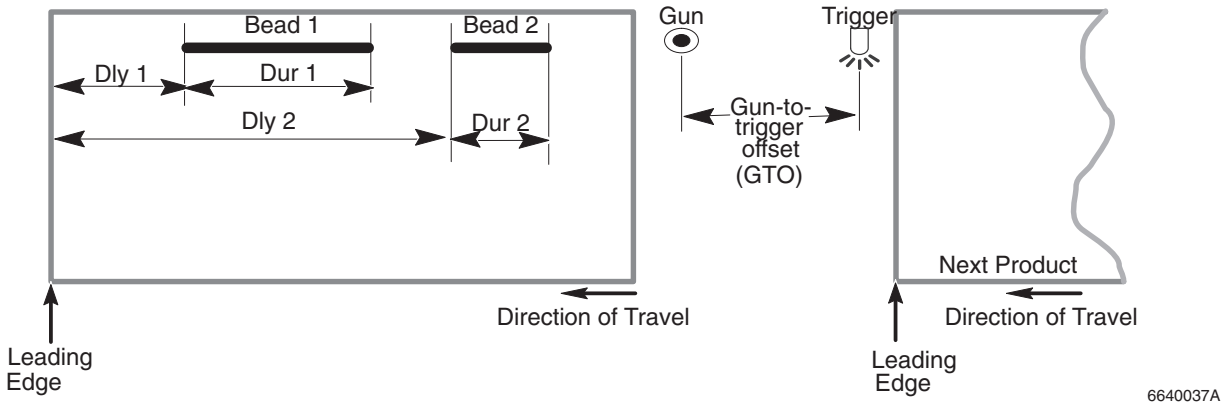


Figure 7 Bead Patterns

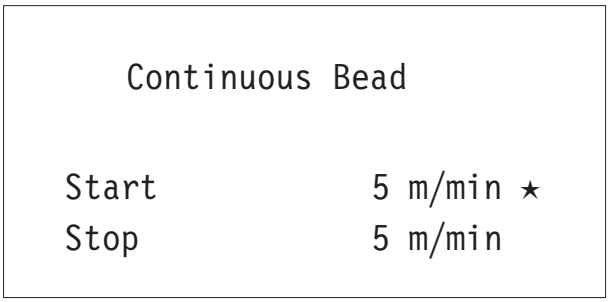
To Delete a Bead

1. Press the ◀ or ▶ button for the cursor to appear beside Dur 1 – 4.
2. Press and hold the ▼ button, the numeric value will decrement to 1 (one).
3. To delete, release and press the ▼ button again for the numeric value to go down to zero. The bead will be replaced by the subsequent bead.

Continuous Beads

When this bead type is selected, the outputs are activated if the line speed is above the start speed, and deactivated if the line speed drops below the stop speed. With continuous gluing no pattern is programmed, and no trigger signal is required.

NOTE: Low Speed Settings will override the line speed settings for continuous bead patterns.



6640017A

1. To set start:
   a. Press the ◀ or ▶ button for the cursor to appear beside the numeric value.
   b. Press the ▲ or ▼ button to to set the desired start value from 0 – 600 m/min.
2. To set stop:
   a. Press the ◀ or ▶ button for the cursor to appear beside the numeric value.
   b. Press the ▲ or ▼ button to set the desired stop value from 0 – 600 m/min.

Modulate Beads

Modulated bead patterns provide a nearly constant bead volume below a set line speed. When the production line slows down to a user-selected speed, the control begins dividing the beads into smaller spaced sub-beads to prevent the bead volume from increasing. At any given line speed, the total gun-on time to produce the modulated bead remains the same as the total gun-on time to produce the solid bead at the set line speed, so that the divided modulated bead contains the same amount of adhesive as the solid bead. As the line speed decreases, the sub-beads get shorter and their thickness increases. Specify the interval desired between sub-beads, and the control will always place a sub-bead at the beginning of the bead length defined and one as close as possible to the end of the bead length.

The bead-modulation feature is typically used in systems that do not have run-up control.

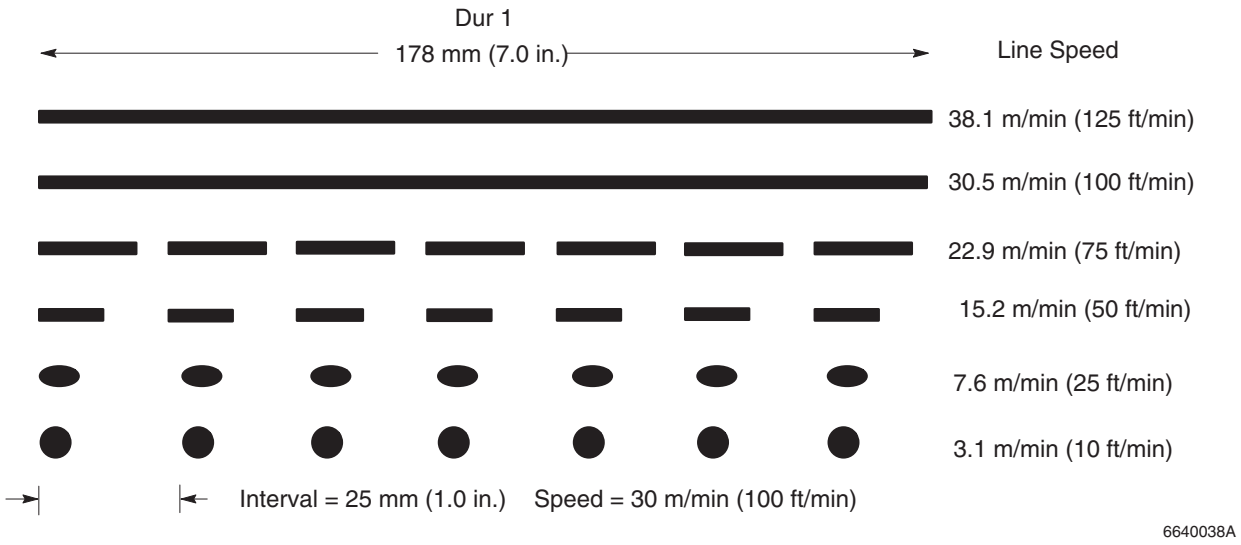
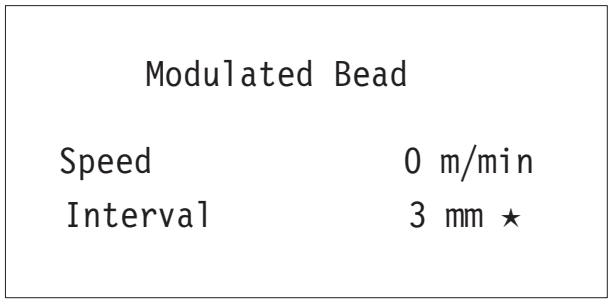


Figure 8 Effect on Modulated Bead Pattern as Production Line Drops Below Activating Line Speed of 30 m/min (100 ft/min)

NOTE: Interval (also known as pitch) is the distance from the start of one bead to the start of the next bead.



6640018A

1. To set speed:
   a. Press the ◀ or ▶ button for the cursor to appear beside the numeric value.
   b. Press the ▲ or ▼ button to set the desired speed value from 0 – 600 m/min.
2. To set interval:
   a. Press the ◀ or ▶ button for the cursor to appear beside the numeric value.
   b. Press the ▲ or ▼ button to set the desired interval value from 3 – 9999 mm.
3. After setting the Speed and Interval, press the SET UP forward button to open the Dly/Dur setup menu screen, refer to *Normal Beads*.
4. To set Dly:
   a. Press the ◀ or ▶ button for the cursor to appear beside the numeric value.
   b. Press the ▲ or ▼ button to to set the desired delay value from 0 – 8187 mm.
5. To set Dur:
   a. Press the ◀ or ▶ button for the cursor to appear beside the numeric value.
   b. Press the ▲ or ▼ button to set the desired duration value from 0 – 8192 mm.

Stitched Beads

Each channel may be programmed to deposit beads in a stitched fashion in order to conserve adhesive. The beads are broken into a series of shorter beads. A percent glue savings and an interval value will need to be entered. All the stitched patterns begin and end with a sub-bead.

NOTE: Interval (also known as pitch) is the distance from the start of one bead to the start of the next bead.

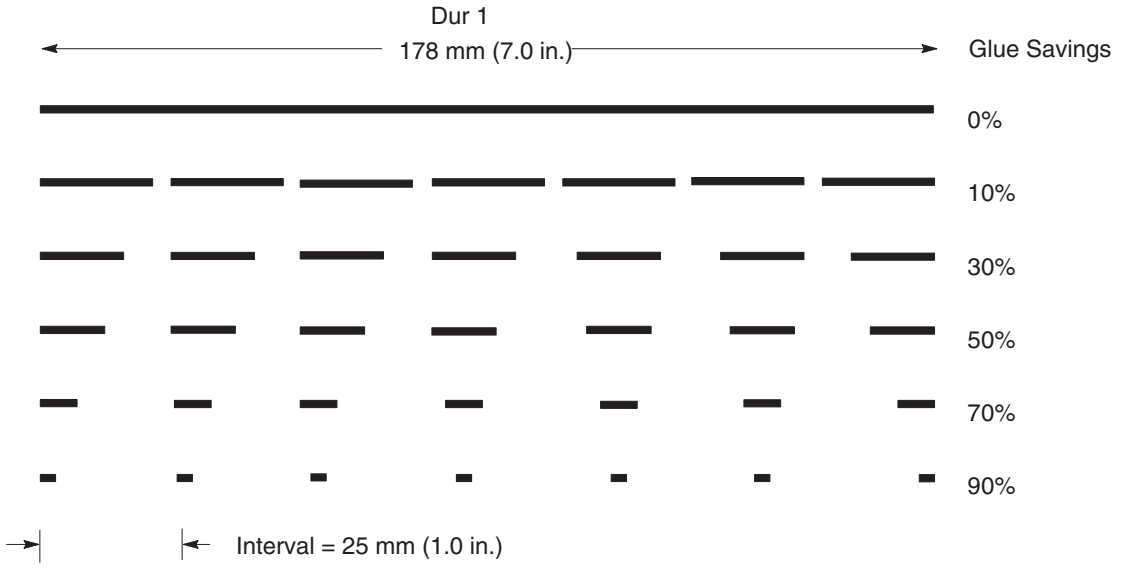


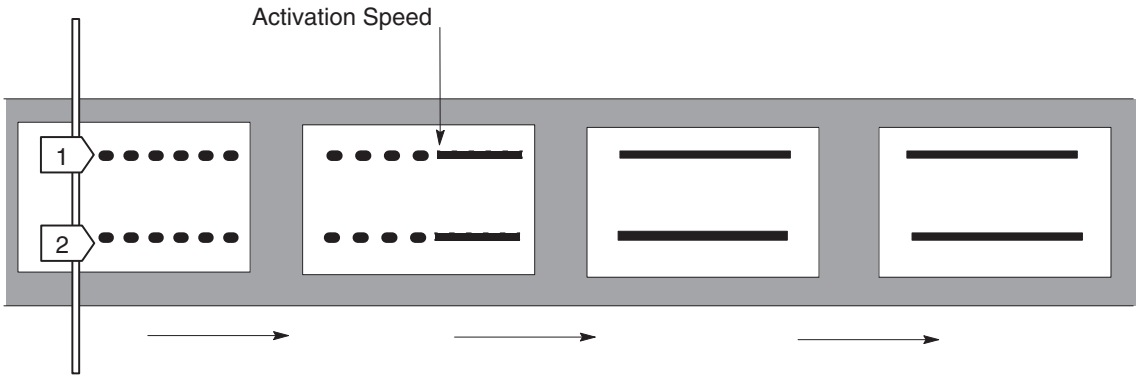
Figure 9 Effect of Increasing Glue Savings from 0 Percent (top) to 90 Percent (bottom)

6640019A

1. To set glue savings:
   a. Press the ◀ or ▶ button for the cursor to appear beside the numeric percentage value.
   b. Press the ▲ or ▼ button to set the desired glue savings value from 10 – 90%.
2. To set interval:
   a. Press the ◀ or ▶ button for the cursor to appear beside the numeric value.
   b. Press the ▲ or ▼ button to set the desired Interval value from 3 – 9999 mm.
3. After setting the Glue Savings and Interval, press the SET UP forward button to open the Dly/Dur setup menu screen, refer to *Normal Beads*.
4. To set Dly:
   a. Press the ◀ or ▶ button for the cursor to appear beside the numeric value.
   b. Press the ▲ or ▼ button to to set the desired delay value from 0 – 8187 mm.
5. To set Dur:
   a. Press the ◀ or ▶ button for the cursor to appear beside the numeric value.
   b. Press the ▲ or ▼ button to set the desired duration value from 0 – 8192 mm.

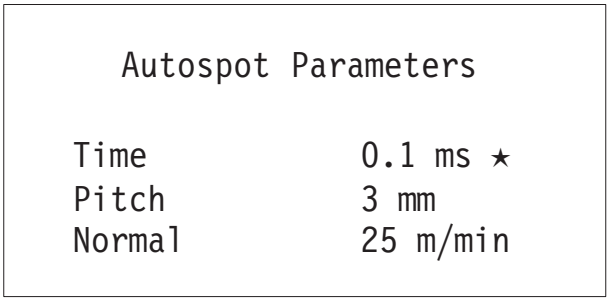
Autospot Beads

With this bead type the channel output operates in dot mode when the pattern controller is below the activation speed, and operates in normal mode when above the activation speed. This bead type is used to relieve residual pressure after a sudden machine stop.



6640041A

Figure 10 Autospot Bead Pattern for Decelerating Line Speed



6640020A

1. To set the size of each dot (time):
   a. Press the ◀ or ▶ button for the cursor to appear beside the numeric value.
   b. Press the ▲ or ▼ button to enter the desired gun-on time value from 0.1 – 50.0 ms.
2. To set the spacing between dots (pitch):
   a. Press the ◀ or ▶ button for the cursor to appear beside the numeric value.
   b. Press the ▲ or ▼ button to enter the desired pitch value from 3 – 9999 mm.

3. To set the activation speed (normal):

   a. Press the ◀ or ▶ button for the cursor to appear beside the numeric value.

   b. Press the ▲ or ▼ button to set the desired normal value from 0 – 600 m/min.

   NOTE: The normal setting is used to enter the activation speed. Below this speed, the normal bead pattern is broken into dots.

4. After setting Time, Pitch, and Normal, press the SET UP forward button to open the Dly/Dur setup menu screen, refer to *Normal Beads*.

5. To set Dly:

   a. Press the ◀ or ▶ button for the cursor to appear beside the numeric value.

   b. Press the ▲ or ▼ button to to set the desired delay value from 0 – 8187 mm.

6. To set Dur:

   a. Press the ◀ or ▶ button for the cursor to appear beside the numeric value.

   b. Press the ▲ or ▼ button to set the desired duration value from 0 – 8192 mm.

Random Beads

The random-length bead mode provides a way to mix products of differing length on the production line during the same production run. For example, when alternating between short and long products on the production line, the control will produce continuous beads that fit each product. The control automatically determines the length of each product as it passes the trigger and then sizes the beads to fit the product. Although each bead is continuous, a bead margin can be specified at each end of the product where adhesive will not be applied.

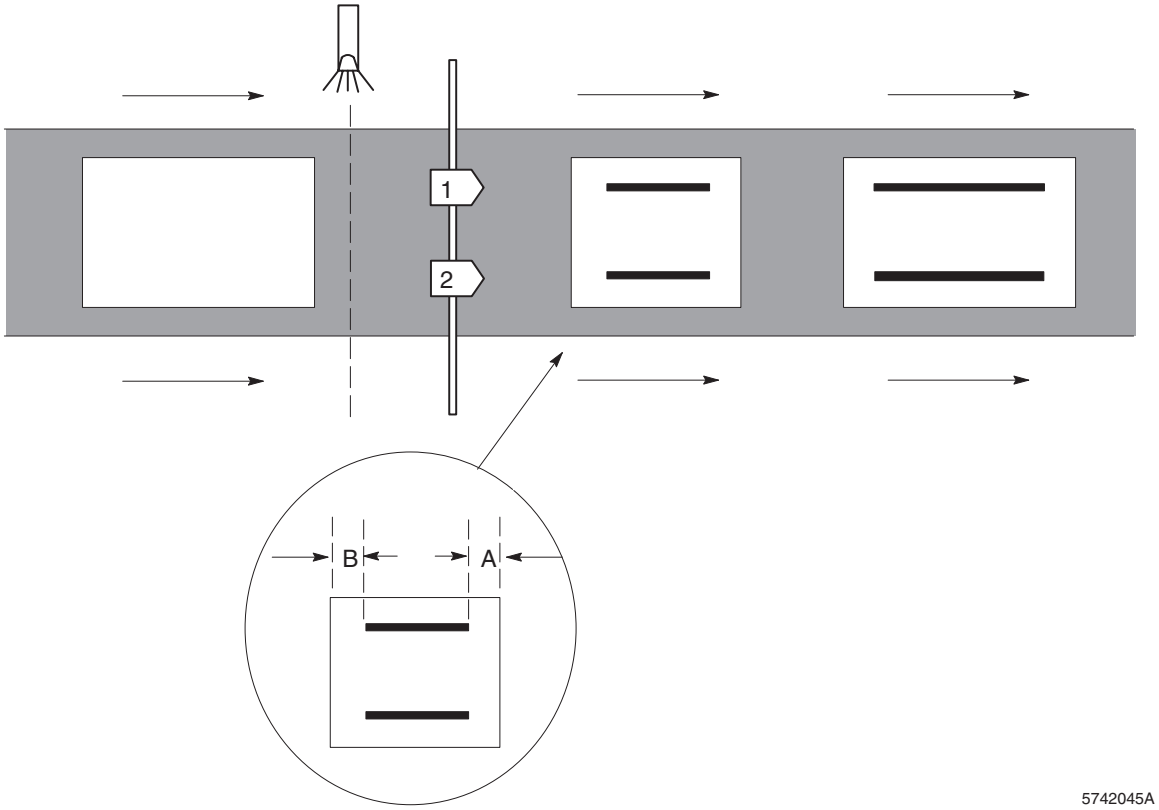
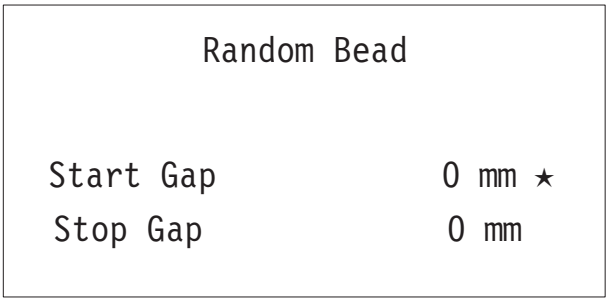


Figure 11 Random-Length Bead Pattern (A: Start Gap/B: Stop gap)



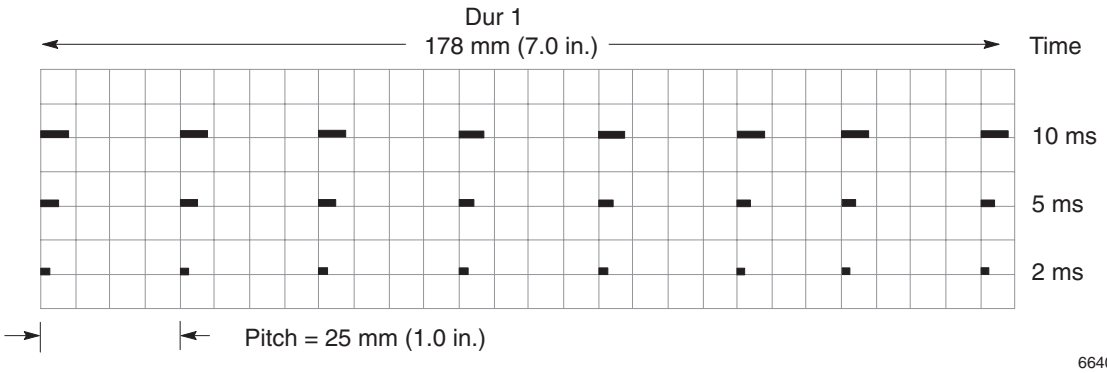
6640021A

1. To set start gap:
   a. Press the ◀ or ▶ button for the cursor to appear beside the numeric value.
   b. Press the ▲ or ▼ button to set the desired value from 0 – 8191 mm.
2. To set stop gap:
   a. Press the ◀ or ▶ button for the cursor to appear beside the numeric value.
   b. Press the ▲ or ▼ button to set the desired value from 0 – 8191 mm.

Dot Beads

When this bead type is enabled, the normal bead duration is broken into dots. The size of each dot is programmed in 0.1 ms increments with a maximum value of 50.0 ms. The spacing between the dots (pitch) is programmed in millimeters from 2 – 999 mm. Once the dot bead is selected, all the beads for that channel will be in dot mode. In this mode the start position of the dot pattern will be speed compensated but the size of the dot is not.

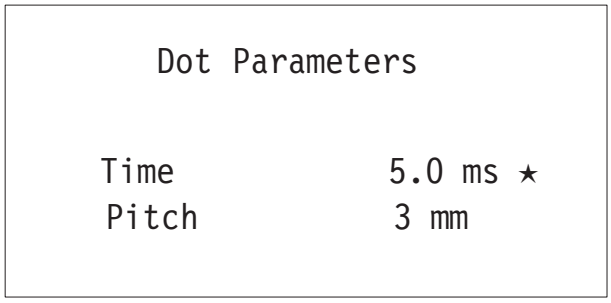
NOTE: Interval (also known as pitch) is the distance from the start of one bead to the start of the next bead.



6640040A

Figure 12 Effect on Dot Size of Decreasing Gun–On Time from 10 ms (top) to 2 ms (bottom)

Dot Beads (contd)

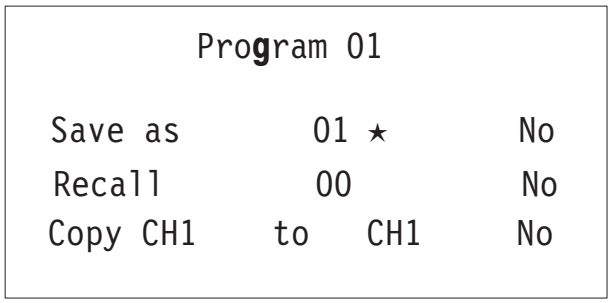


6640022A

1. To set the size of each dot (time):
   a. Press the ◀ or ▶ button for the cursor to appear beside numeric value.
   b. Press the ▲ or ▼ button to enter the desired gun-on time value from 0.1 – 50.0 ms.
2. To set the spacing between dots (pitch):
   a. Press the ◀ or ▶ button for the cursor to appear beside numeric value.
   b. Press the ▲ or ▼ button to enter the desired pitch value from 3 – 9999 mm.
3. After setting Time and Pitch, press the SET UP forward button to open the Dly/Dur setup menu screen, refer to *Normal Beads*.
4. Press the ◀ or ▶ button for the cursor to appear beside the Dly (delay).
5. Press the ▲ or ▼ button to set the desired delay value from 0 – 8187 mm.
6. Press the ◀ or ▶ button for the cursor to appear beside the Dur (duration, also called length).
7. Press the ▲ or ▼ button to set the desired duration value from 0 – 8192 mm.

Programs (1 – 50)

This setup menu screen can be used to save and recall any of the 50 programs, as well as copy one channel to another.



6640023A

1. To save a program:
   a. Press the ◀ or ▶ button for the cursor to appear beside the program number.
   b. Press the ▲ or ▼ button to select the desired program from 01 – 50.
   c. Press the ◀ or ▶ button for the cursor to appear beside No.
   d. Press the ▲ or ▼ button to change No to Yes, and this will save or recall the desired program.
2. To recall a program:
   a. Press the ◀ or ▶ button for the cursor to appear beside the program number.
   b. Press the ▲ or ▼ button to select the desired program from 01 – 50.
   c. Press the ◀ or ▶ button for the cursor to appear beside No.
   d. Press the ▲ or ▼ button to change No to Yes, and this will save or recall the desired program.
3. To copy a channel to another channel:
   a. Press the CHANNEL SELECT button on the front panel of the patten controller to select a channel number (Copy CH1 – 4) whose settings you would like to copy to another channel number.
   b. Press the ◀ or ▶ button for the cursor to appear beside CH1.
   c. Press the ▲ or ▼ button to go from CH2 – CH4.
   d. Press the ◀ or ▶ button for the cursor to appear beside No.
   e. Press the ▲ or ▼ button to change No to Yes, and this will copy the channel settings.

NOTE: The copy CH1 feature copies the channel data and setup parameters (like delay, duration, bead type, and trigger assignment) from the source channel to the destination channel.

Warnings

The pattern controller monitors warning conditions like:
Trigger 1 – 4 too short (clipping), T1 – 4 max distance exceeded (jamming), Ch1 – 4 short circuit, etc.

A blinking CHANNEL LED on the front panel of the pattern controller notifies the user that there is a fault or a warning condition, see *Warnings* in *Appendix A.*

Press the ◀ or ▶ button on the front panel of the patten controller, to review all the warnings and faults in the system.

6640024A

Fault Condition

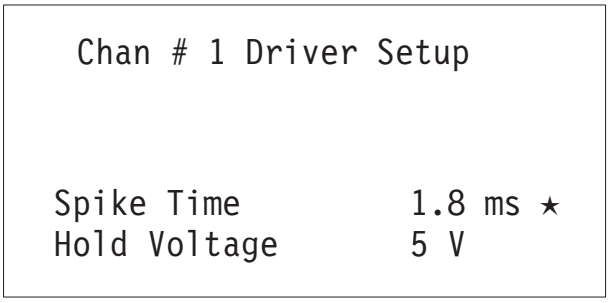
A fault condition occurs typically when there is a hardware or software defect. When a fault condition occurs, the user will need to take immediate action.

Warning Condition

A warning condition alerts the user that there may be an error with the setup of the pattern controller. When a warning condition occurs, immediate action may not be required.

Channel Driver Settings

Each of the four channels has a programmable voltage-mode gun driver. The user may program the spike time duration and holding voltage for each channel.



6640025A

1. To select Chan (Channel) number's 1 – 4, press the CHANNEL SELECT button on the front panel of the patten controller.
2. To set spike time:
   a. Press the ◀ or ▶ button for the cursor to appear beside the numeric value.
   b. Press the ▲ or ▼ button to set the desired value from 0.0 – 5.0 ms.
3. To set hold voltage:
   a. Press the ◀ or ▶ button for the cursor to appear beside the numeric value.
   b. Press the ▲ or ▼ button to set to 5 V, 10 V, or 24 V.

   NOTE: When a holding voltage of 5 V is selected, the over-energize range time is 0.1 – 5 ms. When a holding voltage of 10 V is selected,the over-energize range time is 0.1 – 15 ms. When a holding voltage of 24 V is selected, the over-energize range time is 0.1 – 15 ms.

Guns Supported By Pattern Controller Driver Boards

Electric guns:

- LA 820, recommended settings:

  Spike Time: 1.8 ms/Hold Voltage: 5 V
- LA 844, recommended settings:

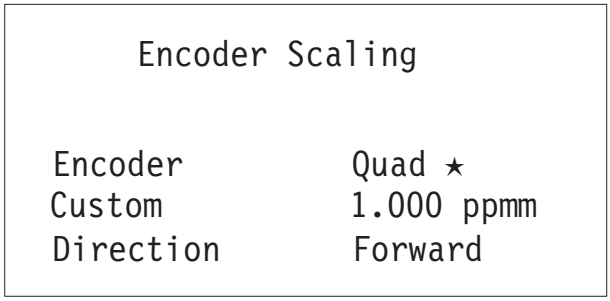
  Spike Time: 2 ms/Hold Voltage: 5 V
- LA 822, recommended settings:

  Spike Time: 2.5 ms/Hold Voltage: 10 V

The pattern controller supports 24 VDC pneumatic guns, recommended settings: Spike Time: 0 ms/Hold Voltage: 24 V

Encoder Scaling

This menu is used to display the encoder type and configure the encoder scaling. The pattern controller automatically detects the type of encoder installed. If no encoder is detected the pattern controller is set to timer mode. The encoder scaling ratio is determined by entering the number of pulses per millimeter that the encoder outputs when installed. If a quadrature encoder is used, the direction of rotation travel maybe reversed.



6640026A

1. To set the encoder scaling:
   a. Press the ◀ or ▶ button for the cursor to appear beside Custom.
   b. Press the ▲ or ▼ button to set the encoder gearing ratio from 0.001 – 20.000 ppmm (pulses per millimeter).
2. To set the encoder direction:

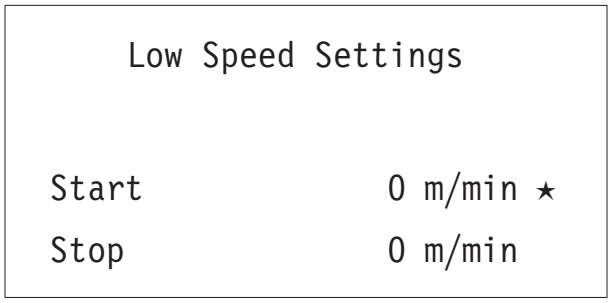
   Press the ▲ or ▼ button to set the direction to Forward or Backward.

   NOTE: The direction parameter is used only if a quadrature encoder is detected.

Low Speed Settings

This setup menu is used to configure the minimum operational line speed above which the guns will begin dispensing, and below which the guns will stop dispensing adhesive. Setting this feature prevents a puddle of adhesive from forming when the line stops.

NOTE: Low Speed Settings will override the line speed settings for continuous bead patterns.

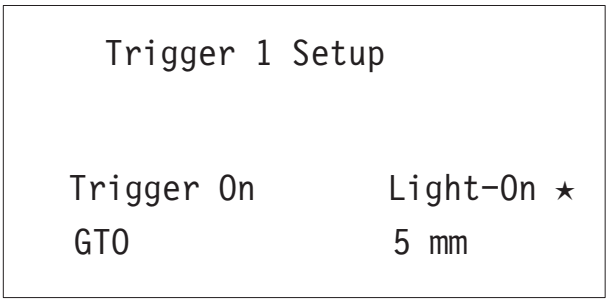


6640027A

1. To set start speed:
   a. Press the ◀ or ▶ button for the cursor to appear beside Start.
   b. Press the ▲ or ▼ button to set the desired value from 0 – 600 m/min.
2. To set stop speed:
   a. Press the ◀ or ▶ button for the cursor to appear beside Stop.
   b. Press the ▲ or ▼ button to set the desired value from 0 – 600 m/min.

Trigger Setup (1 – 4)

This setup menu is used to configure the trigger polarity and the distance between the gun and each trigger. For leading edge triggering select Light On. For trailing edge triggering select Dark On. The GTO (gun-to-trigger offset) is used by the pattern controller to set the distance between each photosensor and its corresponding gun.

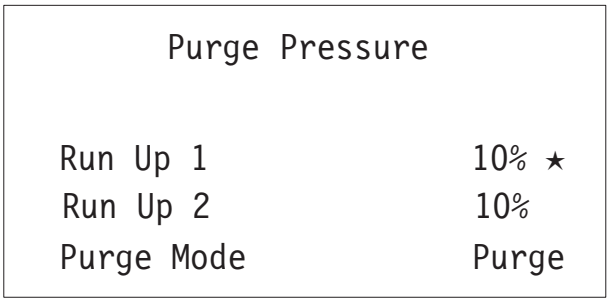


6640028A

1. To select Trigger number's 1 – 4, press the CHANNEL SELECT button on the front panel of the pattern controller.
2. To set trigger polarity:
   a. Press the ◀ or ▶ button for the cursor to appear beside Light-On.
   b. Press the ▲ or ▼ button to select Light-On or Dark-On.
3. To set GTO:
   a. Press the ◀ or ▶ button for the cursor to appear beside the numeric value.
   b. Press the ▲ or ▼ button to set the desired value from 2 – 9999 mm.

Purge Pressure

The setup menu is used to configure the run-up pressures when purge is activated. In addition the user may configure the operational mode of the purge button on the front panel. When set to purge, the gun outputs are maintained as long as the button is activated. When set to flush, depressing the button activates the gun channel output, and pressing the button again deactivates the gun channel output. This feature is used for flushing liquid adhesive system.



6640029A

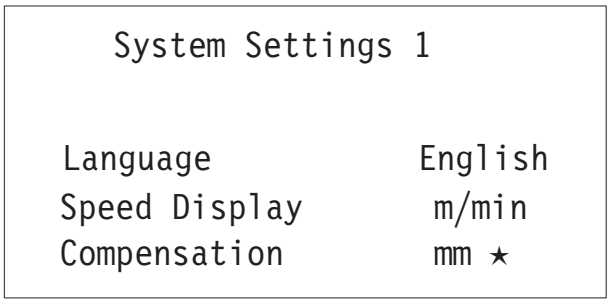
1. To set run up 1:
   a. Press the ◀ or ▶ button for the cursor to appear beside the percentage value.
   b. Press the ▲ or ▼ button to set to the desired the value from 0 – 100%.
2. To set run up 2:
   a. Press the ◀ or ▶ button for the cursor to appear beside the percentage value.
   b. Press the ▲ or ▼ button to set to the desired the value from 0 – 100%.
3. To set purge mode:
   a. Press the ◀ or ▶ button for the cursor to appear beside Purge.
   b. Press the ▲ or ▼ button to set to Flush or Purge.

Remote Purge

Each channel output has an individual remote purge input, and a switch closure on the remote purge input activates the channel output.

System Settings 1

This setup menu is used to configure the operational language, the units of measure for speed display, and the gun compensation method.



6640030A

1. To set the language:
   a. Press the ◀ or ▶ button for the cursor to appear beside language.
   b. Press the ▲ or ▼ button to select the appropriate language.
2. To set the units of measure for speed display:
   a. Press the ◀ or ▶ button for the cursor to appear beside speed display.
   b. Press the ▲ or ▼ button to set either to m/min or ft/min.
3. To set the method of compensation:
   a. Press the ◀ or ▶ button for the cursor to appear beside compensation.
   b. Press the ▲ or ▼ button to set to either mm or ms.

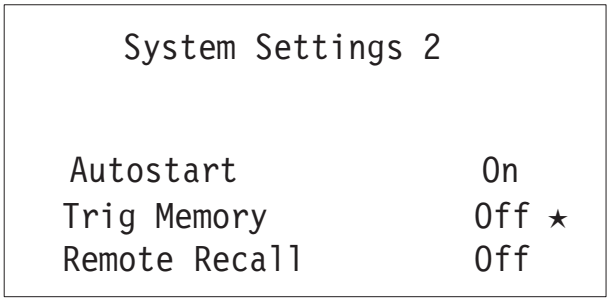
System Settings 2

This setup menu is used to configure automatic and manual startup of the pattern controller, the trigger memory function, and to enable and disable the remote recall of programs.

When the autostart feature is on the pattern controller will automatically be placed in run mode when the unit is powered. When set to off, the pattern controller will *always* be placed in STANDBY when the unit is powered.

The trigger memory function allows the user to either apply or not apply adhesive to products between the trigger and the guns when line speed recovers after falling below the stop speed setting. When set to off, the pattern is terminated, and when set to on the pattern resumes when the line speed is above the start speed setting.

The remote recall feature allows the programs to be selected either from the front panel or remotely from the remote input jack. When set to off, 50 programs can be selected from the front panel. When on, 32 programs can be selected through the remote input jack.



6640031A

1. To set autostart:
   a. Press the ◀ or ▶ button for the cursor to appear beside On/Off.
   b. Press the ▲ or ▼ button to select On or Off.

   NOTE: The Autostart feature controls the enabling and disabling of pattern generation on power-up. If set to OFF, then all the channels are set to STANDBY on power-up. If set to ON, then all the channels that were in RUN when powered down will RUN when powered up. The default setting is Autostart OFF.

2. To set trigger memory:
   a. Press the ◀ or ▶ button for the cursor to appear beside On/Off.
   b. Press the ▲ or ▼ button to select On or Off.

System Settings 2 *(contd)*

3. To enable remote recall:

   a. Press the ◀ or ▶ button for the cursor to appear beside On/Off.

   b. Press the ▲ or ▼ button to select On or Off.

   NOTE: When remote recall is on programs cannot be selected from the front panel.

Remote Recall Program Table

Use the table to access programs remotely. Also refer to *Remote Input* pin information under *I/O Connector Pin Layout* given earlier.

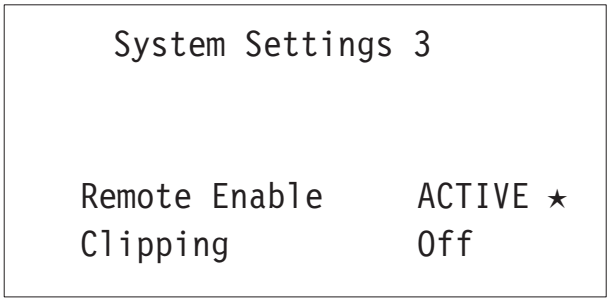
Program Number	Remote Recall 4	Remote Recall 3	Remote Recall 2	Remote Recall 1	Remote Recall 0
0	0	0	0	0	0
1	0	0	0	0	24 V
2	0	0	0	24 V	0
3	0	0	0	24 V	24 V
4	0	0	24 V	0	0
5	0	0	24 V	0	24 V
6	0	0	24 V	24 V	0
7	0	0	24 V	24 V	24 V
8	0	24 V	0	0	0
9	0	24 V	0	0	24 V
10	0	24 V	0	24 V	0
11	0	24 V	0	24 V	24 V
12	0	24 V	24 V	0	0
13	0	24 V	24 V	0	24 V
14	0	24 V	24 V	24 V	0
15	0	24 V	24 V	24 V	24 V
16	24 V	0	0	0	0
17	24 V	0	0	0	24 V
18	24 V	0	0	24 V	0
19	24 V	0	0	24 V	24 V
20	24 V	0	24 V	0	0
21	24 V	0	24 V	0	24 V
22	24 V	0	24 V	24 V	0
23	24 V	0	24 V	24 V	24 V
24	24 V	24 V	0	0	0
25	24 V	24 V	0	0	24 V
26	24 V	24 V	0	24 V	0
27	24 V	24 V	0	24 V	24 V
28	24 V	24 V	24 V	0	0
29	24 V	24 V	24 V	0	24 V
30	24 V	24 V	24 V	24 V	0
31	24 V	24 V	24 V	24 V	24 V

System Settings 3

This setup menu is used to configure the remote enable and the trigger clipping function.

If remote enable is set to ACTIVE then an external contact closure is required on the remote input plug to activate pattern generation.

Clipping inhibits the pattern output if the product length measured by the photosensor is shorter than the programmed pattern for a specific channel. This feature is typically used to prevent glue from dispensing on skewed products. When pattern clipping is detected a warning is displayed in the *Warnings* screen, and the warning relay is activated.



6640032A

1. To set remote enable:
   a. Press the ◀ or ▶ button for the cursor to appear beside ACTIVE.
   b. Press the ▲ or ▼ button to ACTIVE or INACTIVE.

      When set to ACTIVE, make sure you have:

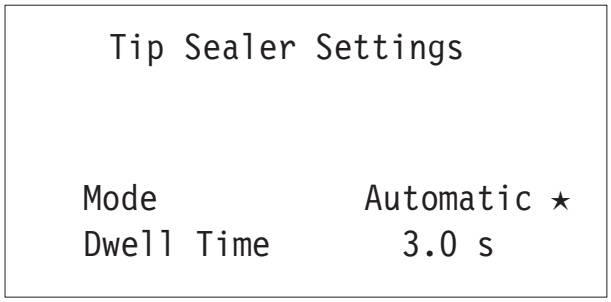
      - connected the plug provided in the ship-with kit to the *Remote Input* connector, refer to *Remote Enable Plug* given earlier in the manual.
      - wired the 24 VDC (*Remote Input* plug, pin 1) to the enable input (*Remote Input* plug, pin 7) using an electrically isolated contact, refer to *Remote Enable Plug*.
      - To bypass this function, set Remote Enable parameter to INACTIVE.
2. To set clipping:
   a. Press the ◀ or ▶ button for the cursor to appear beside On/Off.
   b. Press the ▲ or ▼ button to On/Off.

Tip Sealer Settings

This setup menu is used to configure the operation of the tip sealer output. The tip seal output is capable of driving a 24 VDC solenoid valve. A dedicated photosensor input in addition to the four-triggers has been provided to trigger the tip seal logic.

The tip seal valve output operates in either automatic mode or forced open mode.

- In the forced open mode the tip sealer output is continuously activated.
- In automatic mode the tip sealer output is activated prior to any gun being activated. The output is also activated when triggered by the tip seal photosensor or the assigned channel trigger. If a trigger signal is not received in a programmable period of time, the tip seal output will be deactivated.



6640033A

1. To set tip sealer mode:
   a. Press the ◀ or ▶ button for the cursor to appear beside Mode.
   b. Press the ▲ or ▼ button to Forced Open or Automatic.
2. To set the dwell time:
   a. Press the ◀ or ▶ button for the cursor to appear beside Dwell Time.
   b. Press the ▲ or ▼ button to set the numeric value from 0.0 – 99.0 s.

Normal Mode

Use the Normal mode for daily operation of the pattern controller. In this mode only the following screens can be accessed:

- Production Data
- Trigger Assignment
- Trigger Settings
- Pressure 1 and 2 Settings
- Channel Compensation
- Bead Type
- Program
- Warnings

Refer to the *Quick Programming Guide* for the sequence of menu screens that are used to program the pattern controller.

1. Turn on the power switch located at the rear panel of the pattern controller.
2. The pattern controller will perform a brief initializing procedure that includes a self-diagnostic and preparation program.

   The words *Initializing*, along with the panel and engine software versions appear on the setup menu screen. Initializing takes between 10 – 15 seconds to complete.

6640034A

3. Press the SET UP button to access each setup screen.

   NOTE: The system can be powered down at any time and all information will be saved.

Troubleshooting

Refer to the flow chart on the opposite page to troubleshoot basic pattern controller problems. If the problem persists, contact your local Nordson representative for help or, call customer service at 1-877-667-3782.

The Nordson customer service representative will need the panel and engine software versions in order to assist in troubleshooting the pattern controller effectively. Make sure you have the panel and engine software version numbers prior to calling customer service.

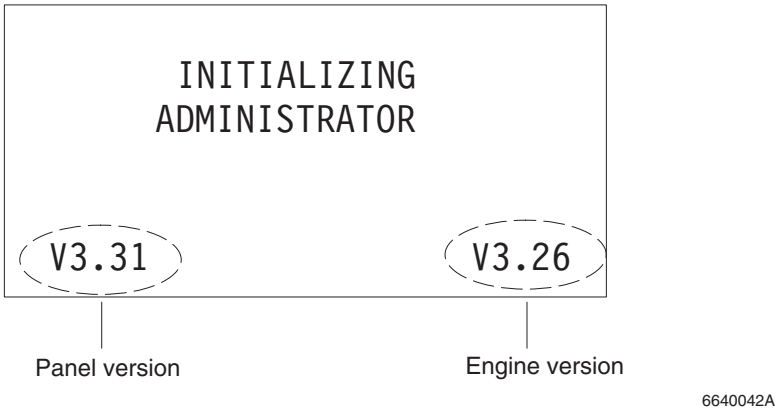
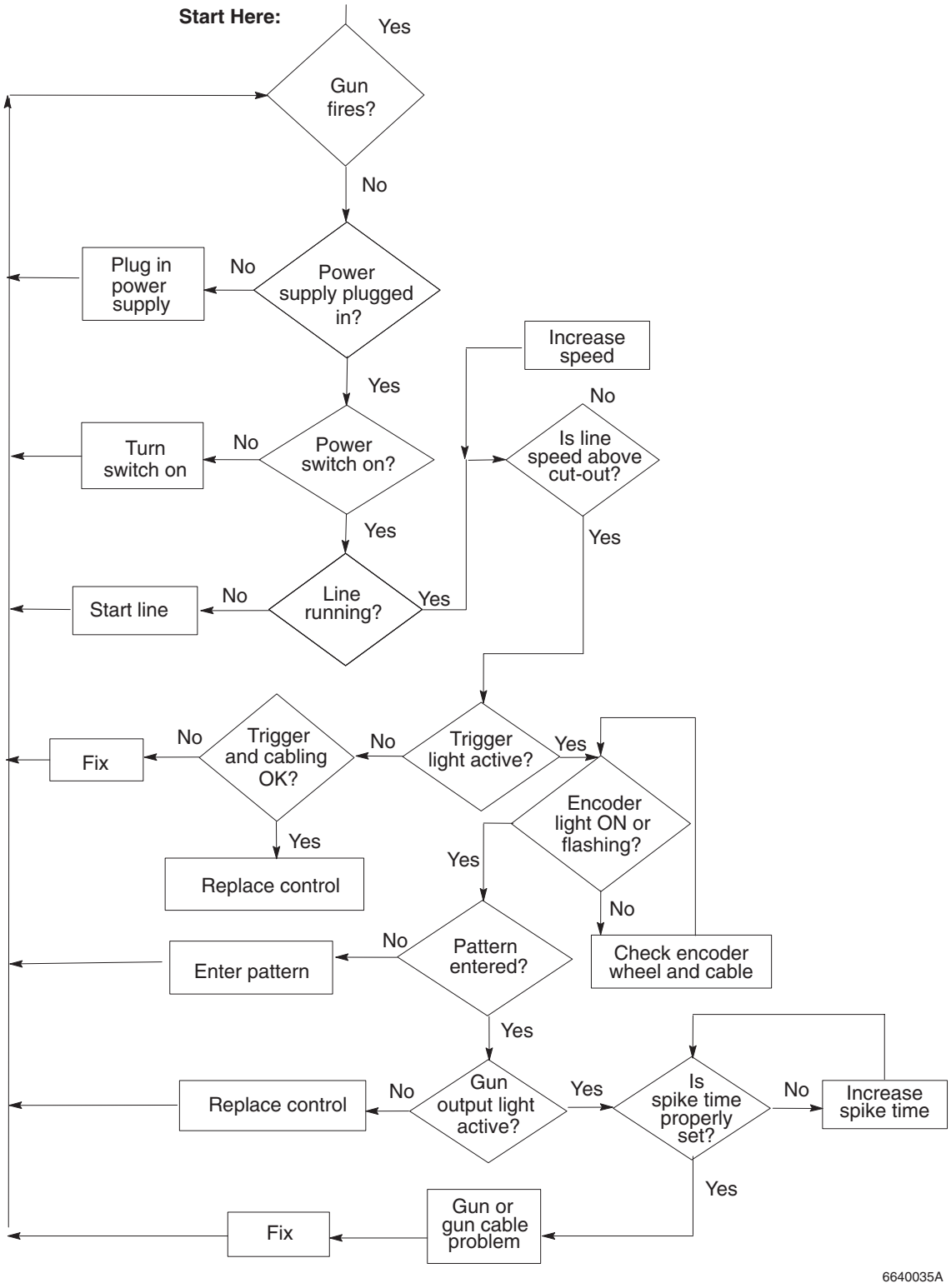


Figure 13 Location of Panel and Engine Version Numbers

Note the panel and engine software version numbers from the *Administrator* mode or *Normal* mode initializing screens. The information can also be obtained during the software download process, refer to *Software Upgrade* given earlier.

Basic Troubleshooting Flowchart



Parts Information

Use this recommended parts list to order the required parts. Call the Nordson Customer Service Center or your local Nordson representative to order the required parts.

Pattern Controller

Part	Description
1039520	LA 404 pattern controller
1042089	Kit, software, operator panel, LA 404
1024934	Kit, software, engine, LA 4400
738277	Remote purge box
1039524	LA 404 ship-with kit
939683	• Fuse, 6.3 A, fast-acting, 250 V, 5X2
1042120	• Mounting bracket
1039829	• Remote input plug
1023676	• 115 V power cord

Gun Output Cables

Part	Description
377238	Cable, driver to pneumatic gun, 5 meters
377239	Cable, driver to pneumatic gun, pigtail
738208	Cable, LA822/LA844, 6 meters, Veritec
375312	Cable, LA 820 gun to VT connector

Photosensor Cables

Part	Description
377219	Cable, extension, photocell, 5 meters
377220	Cable, extension, photocell, 5 meters, 44XX, VT

Encoder

Part	Description
727133	Encoder, 1 p/mm with bracket
311433	Encoder, 500 pulse, 10 mm diameter
772050	Encoder, 500 pulse, 10 mm
772051	Encoder, 500 pulse, $^3/_8$ in.
377221	Cable, quadrature encoder, 5 meters
377222	Cable, MSD, 5 meters, VT
727940	Cable, MSD, 20 feet
727941	Cable, MSD, 30 feet
377223	Cable, encoder, MPC to 44XX, pigtail
377224	Cable, encoder, 44XX to WM, 5 meters
377225	Cable, encoder, 408 to 44XX, pigtail
372759	Cable, encoder/remote output extension, 5 meters
377227	Cable, splitter, encoder repeater, 5 meters
377228	Cable, extension, encoder, 5 meters
738648	Cable, encoder, GSITE to LA 404, 5 meters

Additional Parts

Part	Description
296144	Metric friction wheel
377230	Cable, remote outputs, 10 meters
1042100	Cable, remote inputs, 10 meters, LA 404
377232	Cable, remote purge adaptor, 8 input, 0.15 meters
377234	Cable, tip seal output, 5 meters
738334	Cable, extension, tip seal valve, 7 feet
738335	Cable, extension, tip seal valve, 24 feet
377235	Cable, runup output, voltage, pigtail
371193	Cable, WM408, IP panel
372499	Cable, WM408, IP, transducer, 10 meters
377386	Cable, Runup, 4X00, 2 meters

Glossary

Auto Spotting — Refer to *Modulated Bead Type*.

Auto Scaling — A feature of the pattern control that allows the user to determine the encoder gearing ratio without any calculations. There are three different methods of autoscaling: product-length method, line-jog length method, and line-speed method. There is also an option of entering the value for the encoder gearing ratio if it is known.

Auto Start — A setting that automatically places the pattern control in the run mode when power is applied.

Bead — A continuous line of adhesive or, in the case of a custom bead (a stitched, modulated, or dot bead), a line of adhesive that has been divided into sub-beads. Refer also to *Sub-Bead*.

Bead Length — Refer to *Duration.*

Bead Offset — Refer to *Delay*.

Bead Type — A setting that allows the user to select one of five different bead types.

Clipping — A setting that inhibits the pattern output if the product length measured by the photosensor is shorter than the programmed pattern for a specific channel. If the short product is in product queue and has not been initiated, it will be removed from the queue. When pattern clipping is detected a warning is displayed in the *Warnings* screen and the warning relay is activated.

Continuous Line Glue — When gluing starts or stops at a user specified line speed.

Cut Out — Refer to *Minimum Operational Line Speed*.

Delay — The distance from the leading edge of the product to the beginning of the bead. Refer also to *Leading Edge*.

Dot Bead Type — This feature produces patterns of constant-weight (constant-volume) dots of adhesive spaced apart by a user-determined distance. Specifying the gun-on time can control the dot weight. Specifying the dot-interval distance can control the distance between dots. A constant dot weight and interval can be produced over the entire range of line speed without using external run-up equipment.

Dot Pitch — The repeat distance between the center of one spot and the center of the next spot.

Dot Time — Controls the gun opening time, which directs the size of the glue spot.

Drop out The distance from the start of the bead to the end of the bead.

Duration The distance from the start of the bead to the end of the bead.

Edge The edge parameter sets the photosensor to sense either the leading edge or the trailing edge of the product as a trigger.

Encoder A device that tracks line position. Using the pulse count from an encoder, the pattern control can generate highly accurate pattern sets as line speed varies.

Encoder Gearing Ratio The ratio of encoder shaft rotation to line travel. Encoder shaft rotation is measured in pulses per revolution and line travel is measured in millimeters or inches. The encoder gearing ratio is expressed in pulses per millimeter or inch.

Fault Notification that a serious defect or problem has occurred in the pattern control system. When a fault occurs, and if the system is running, the pattern control will stop generating patterns. Faults need to be cleared manually, or else the problem causing the fault will not be fixed.

Flush Refer to *Purge*.

Gap An area at either end of the product where adhesive is not applied when generating random-length beads. The size of the margin a can be independently set t both the leading and trailing edges of the product. Refer also to *Random-Length Bead Type*.

Glue Stop Refer to *Minimum Operational Line Speed*.

GTO Gun-to-Trigger Offset. It is the distance from the center line of the gun nozzle to the centerline of the trigger lens.

Gun Actuator The device that opens and closes the gun. A gun actuator can be a pneumatic solenoid valve or an electric gun driver, depending upon the type of guns you use in your production facility.

Gun Compensation The ability of the pattern control to produce accurate patterns by compensating for the delay, large or small, in gun-response time.

Gun-On Time Refer to *On Compensation*.

Gun-Off Time Refer to *Off Compensation*.

Gun Test Button A button on the main control board that allows you to test-fire the gun connected to any of the four pattern-control outputs. Using this button and associated DIP switches, you can activate one output or any combination of the four outputs.

Gun The dispensing device that applies adhesive to the products. Sometimes called a head or an applicator, a gun can have a single dispensing module or it can have multiple modules. Refer also to *Gun Actuator.*

High Time Refer to *Spike TIme*.

Interval Refer to *Pitch*.

Jam Detect This feature activates a warning when a photosensor is active longer than the user defined product length. Select Jam Detect on, then press the product length text box, enter a value greater than the product length being glued.

LCD Liquid Crystal Display.

Lead Value Refer to *GTO*.

Leading Edge The edge or face of the product that the trigger senses first on the production line. Leading edge is also used as the starting point for the delay measurement. Refer also to *Trailing Edge* and *Delay*.

LED Light Emitting Diode.

Length Refer to *Duration.*

Lockout Value Refer to *Trigger Mask.*

Margin Refer to *Gap*.

Masking This length setting is used when the boxes contain holes or cutouts which the photosensors are programmed ignore.

Minimum Operational Line Speed The speed below which the glue application ceases.

Modulated Bead Type This feature provides a nearly constant bead volume below a set line speed. When the production line is set to a user-selected speed, the control starts dividing each bead into shorter sub-beads to prevent bead volume from increasing. The total gun-on time to produce each divided bead remains the same as the total gun-on time to produce the original solid bead, therefore the bead volume remains the same.

Modulated Pitch Refer to *Pitch*.

MSD Machine Speed Detector. Refer to *Encoder*.

Multiple Pattern Processing Refer to *Product Queuing*.

Off Compensation Represents the off response time of the gun, and is needed to keep the line end position consistent. The value is dependent on several variables including glue viscosity, nozzle size, and height of the gun above the product surface.

On Compensation Represents the on response time of the gun, and is needed to keep the line start position consistent. The value is dependent on several variables including glue viscosity, nozzle size, and height of the gun above the product surface.

Palletizing A feature of the pattern control that handles pallet-stabilization applications. Use this feature to set the number of consecutive products that receive adhesive and the number of consecutive products that are skipped before pattern generation starts again.

Pattern All of the beads produced by a single gun.

Photocell/Photohead Refer to *Photosensor*.

Photosensor A device that detects products as they travel along the production line.

Pitch The distance from the start of one bead to the start of the next bead or, in the case of custom bead types (stitched beads, dot beads, or modulated beads), the distance from the start of one sub-bead to the start of the next sub-bead.

Product Queuing The ability of the pattern control to simultaneously track the position of several products as they move from the trigger to the guns. This feature allows the user to install the sensor farther from the guns, space products closer together, and run the production line faster.

Program Refer to *Recipe*.

PSI Value Test value for pressure.

Purge Pressure Preset run-up value that automatically engages when purging.

Purge The process of removing trapped air or material from the adhesive gun or nozzle, or of relieving system pressure by turning the gun (or guns) on.

Random-length Bead Type A custom bead type that the pattern control can generate. The random-length feature allows the user to apply a continuous bead of adhesive to products of different length. If desired, set a gap at the leading and trailing edges of the product where adhesive will not be applied.

Recipe All of the pattern settings and associated parameters for applying adhesive during a single production run. A program includes the measurements that define a pattern set and may include volume-control settings (if the run-up feature is purchased and installed), optional settings such as the low-line-speed warning, and custom bead settings such as stitching or modulation.

Remote Purge A feature that allows the user to test-fire the gun connected to any of the four pattern-control outputs. Using this button and associated DIP switches, one output or any combination of the four outputs can be activated.

Run-Up Control A pressure variation feature that varies pump output as line speed changes to provide a consistent bead volume.

Run Mode The glue gun stops when the machine stops, but will not start again until the photocell detects a trigger to begin a new gluing cycle.

Sensor Refer to *Trigger*.

Set Mode The glue gun stops when the machine stops, and resumes to complete the current gluing cycle when the machine restarts.

Spike Time The duration of high voltage or current spike at the initiation of an electric gun firing.

Spot Glue/ Spot Mode/Spot Pattern Refer to *Dot Bead Type*.

Spot Pitch Refer to *Dot Pitch*.

Spot Time Refer to *Dot Time*.

Spotting Refer to *Modulated Bead Type*.

Stitched Bead Type This feature allows the reduction of adhesive usage by entering the percentage of glue savings. The pattern control automatically determines the correct length and spacing of the sub-beads in the bead pattern. Refer also to *Sub-Bead*.

Sub-Bead A bead that results when the pattern control divides a continuous bead into smaller spaced beads. Sub-beads are used in the generation of custom bead types (stitched beads, dot beads, and modulated beads).

Trailing Edge The product edge that causes the trigger to stop sensing the product as the product passes by the trigger. Refer also to *Leading Edge*.

Transducer A device that receives an analog current signal from the pattern control and uses it to regulate air pressure. A transducer is used only in systems equipped for run-up control. Refer also to *Run-Up Control*.

Trigger A photosensor that detects products as they travel along the production line. The pattern control can be equipped with one or two triggers, depending upon the requirements of the DC application.

Trigger Mask Distance that a photosensor passes from the trigger edge to the other edge of the product. The photosensor is disabled for the distance entered for the lockout value, thereby preventing unwanted triggering caused by any holes or contrasting colors on the product.

Trigger Memory Mode A user-determined setting (T-MEM) that allows the user to either apply or not apply adhesive to products between the trigger and the guns when line speed recovers after falling below the minimum-speed setting. If a minimum speed is set, the pattern control will stop generating patterns whenever the line speed falls below this speed.

Appendix A
Warnings

These are messages that are displayed on the menu screen to indicate a warning condition.

Engine Warnings

The following engine warnings appear on the menu screen.

Screen Message	Explanation and Action
Out1 queue overflow	This warning appears if there are more than 4 products between the gun and its associated trigger. There should never be more than 4 products between the trigger and the gun. If this occurs, the pattern controller will not generate pattern on the additional products between the gun and trigger. To correct this, increase the distance between products or decrease the distance between the trigger and the gun.
Out2 queue overflow	
Out3 queue overflow	
Out4 queue overflow	
Output1 forced	This is a pattern generation error that is caused by a gun not turning on or off (or both) soon enough. The bead start point or end point has already passed when the signal is sent to the gun actuator. To correct this, decrease the line speed or add more space between the trigger and the gun, or between the beads.
Output2 forced	
Output3 forced	
Output4 forced	
TRG1 too short	This warning appears when the pattern for a channel exceeds the product length as seen by the assigned trigger. Verify proper product placement. This is an indication that the pattern would not fit onto the product as measured by the trigger. It could indicate a jam or skewed product.
TRG2 too short	
TRG3 too short	
TRG4 too short	
T1 max dist exceeded	This warning indicates that the measured product length is longer than the user entered maximum product length. Also refer to *Jamming*. To correct this, check for a possible jam on the production line.
T2 max dist exceeded	
T3 max dist exceeded	
T4 max dist exceeded	
Noisy encoder	This warning appears when one or more encoder signals stop transitioning. To correct this, check for secure connections at both ends of the encoder cable. If the problem persists, replace the cable or encoder.

Continued...

Engine Warnings *(contd)*

Screen Message	Explanation and Action
Communications error	This warning appears when there is an unspecified problem with the LA404. If the problem persists, contact your Nordson representative for assistance.
Lost encoder signal	This warning appears when the encoder signal is not detected (encoder did not move while the system was in the Run mode and at least 2 trigger signals were received). To correct this, confirm that the encoder is working correctly.
Bead memory exceeded	This warning appears if there are too many customized beads (stitch, dot, or modulated) on the line. The pattern controller has a pre-determined limit that has been exceeded. To correct this, increase the interval or pitch (distance from the start of one sub-bead to the start of the next sub-bead).
Edge-to-edge exceeded	This warning appears if the distance limit from one edge of the bead to the other edge of the bead has been exceeded. To correct this, make the beads smaller, make the gaps between each bead smaller, change the encoder gearing, or decrease the GTO.
Thermal fault	This warning appears when the temperature in the pattern controller is excessive. If the problem persists, contact your Nordson representative for assistance.
Ch1 short circuit	Gun Driver Overload. This fault appears when the loads on the gun driver is drawing more than 100 watts. This may be due to too many guns connected, improper settings, or defective loads. To correct this: • Check spike time and hold voltage settings for the type of gun used • Check resistance of guns being driven. • Electric guns should be greater than 8 ohms and pneumatic valves should be greater than 45 ohms. • Check the cable for a short. • The gun driver may be defective.
Ch2 short circuit	
Ch3 short circuit	
Ch4 short circuit	

Engine Warning Codes

The warning codes appear as numeric codes on the menu screen. To correct the condition default the pattern controller to the factory settings. If the problem persists, contact your Nordson representative for assistance.

DECLARATION of CONFORMITY

PRODUCT:

LA 404 Pattern Controller

APPLICABLE DIRECTIVES:

73/23/EEC (Low Voltage)
89/336/EEC (Electromagnetic Compatibility)

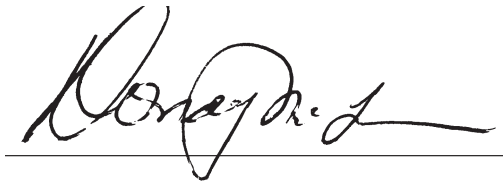
STANDARDS USED TO VERIFY COMPLIANCE:

EN61000-6-4
EN61010-1
EN61000-6-2

PRINCIPLES:

This product has been manufactured according to good engineering practice.

The product specified conforms to the directive and standards described above.



Date: 30 May 2003

Donald J. McLane, Senior Vice President

Nordson

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