CS-2T Timer

Customer Product Manual Part 229774A Issued 9/03

For parts and technical support, call the Industrial Coating Systems Customer Support Center at (800) 433-9319 or contact your local Nordson representative.

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Table of Contents

Safety	1
Qualified Personnel	1
Intended Use	1
Regulations and Approvals	1
Personal Safety	1
High-Pressure Fluids	2
Fire Safety	2
Halogenated Hydrocarbon Solvent Hazards	3
Action in the Event of a Malfunction	3
Disposal	3
Description	4
Features	4
Controls and Indicators	4
Display Modes	6
Installation	6
Setting Proper Voltage	6
Setup	7
Clearing Memory	7
Setting Resolution	7
Setting Line Speed	7
Setting Trigger Type	7
Setting Delay and Duration Length	7
Setting Gun Compensation	8
Running Samples	8
Setting Can Skip Count	8
Programming Dropout Line Speed	9

Operation	10
Speed Compensation	11
On and Off Compensation Time	11
Problem	11
Solution	12
Rules for Using Speed Compensation	13
Calculating Delay Time and Duration Time	13
Calculating On Compensation Time	
from Pattern Samples	13
Calculating Off Compensation Time	
from Pattern Samples	14
Alternate Method for Determining	
On and Off Compensation Times	14
Excessive Acceleration or Deceleration	14
Setting Gun Compensation Values	15
Maintenance	15
Troubleshooting	16
Repair	17
Replacing Fuses and Relays	17
Parts	18
Using the Illustrated Parts List	18
CS-2T Timer Parts	19
Specifications	20
CS-2T Settings Form	22

Contact Us

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CS-2T Timer

Safety

Read and follow these safety instructions. Taskand equipment-specific warnings, cautions, and instructions are included in equipment documentation where appropriate.

Make sure all equipment documentation, including these instructions, is accessible to persons operating or servicing equipment.

Qualified Personnel

Equipment owners are responsible for making sure that Nordson equipment is installed, operated, and serviced by qualified personnel. Qualified personnel are those employees or contractors who are trained to safely perform their assigned tasks. They are familiar with all relevant safety rules and regulations and are physically capable of performing their assigned tasks.

Intended Use

Use of Nordson equipment in ways other than those described in the documentation supplied with the equipment may result in injury to persons or damage to property.

Some examples of unintended use of equipment include

- using incompatible materials
- making unauthorized modifications
- removing or bypassing safety guards or interlocks
- using incompatible or damaged parts
- using unapproved auxiliary equipment
- operating equipment in excess of maximum ratings

Regulations and Approvals

Make sure all equipment is rated and approved for the environment in which it is used. Any approvals obtained for Nordson equipment will be voided if instructions for installation, operation, and service are not followed.

Personal Safety

To prevent injury follow these instructions.

- Do not operate or service equipment unless you are qualified.
- Do not operate equipment unless safety guards, doors, or covers are intact and automatic interlocks are operating properly. Do not bypass or disarm any safety devices.
- Keep clear of moving equipment. Before adjusting or servicing moving equipment, shut off the power supply and wait until the equipment comes to a complete stop. Lock out power and secure the equipment to prevent unexpected movement.
- Relieve (bleed off) hydraulic and pneumatic pressure before adjusting or servicing pressurized systems or components.
 Disconnect, lock out, and tag switches before servicing electrical equipment.
- While operating manual spray guns, make sure you are grounded. Wear electrically conductive gloves or a grounding strap connected to the gun handle or other true earth ground. Do not wear or carry metallic objects such as jewelry or tools.
- If you receive even a slight electrical shock, shut down all electrical or electrostatic equipment immediately. Do not restart the equipment until the problem has been identified and corrected.

Personal Safety (contd)

- Obtain and read Material Safety Data Sheets (MSDS) for all materials used. Follow the manufacturer's instructions for safe handling and use of materials, and use recommended personal protection devices.
- Make sure the spray area is adequately ventilated.
- To prevent injury, be aware of less-obvious dangers in the workplace that often cannot be completely eliminated, such as hot surfaces, sharp edges, energized electrical circuits, and moving parts that cannot be enclosed or otherwise guarded for practical reasons.

High-Pressure Fluids

High-pressure fluids, unless they are safely contained, are extremely hazardous. Always relieve fluid pressure before adjusting or servicing high pressure equipment. A jet of high-pressure fluid can cut like a knife and cause serious bodily injury, amputation, or death. Fluids penetrating the skin can also cause toxic poisoning.

If you suffer a fluid injection injury, seek medical care immediately. If possible, provide a copy of the MSDS for the injected fluid to the health care provider.

The National Spray Equipment Manufacturers Association has created a wallet card that you should carry when you are operating high-pressure spray equipment. These cards are supplied with your equipment. The following is the text of this card:



WARNING: Any injury caused by high pressure liquid can be serious. If you are injured or even suspect an injury:

- Go to an emergency room immediately.
- Tell the doctor that you suspect an injection injury.
- Show him this card
- Tell him what kind of material you were spraying

MEDICAL ALERT—AIRLESS SPRAY WOUNDS: NOTE TO PHYSICIAN

Injection in the skin is a serious traumatic injury. It is important to treat the injury surgically as soon as possible. Do not delay treatment to research toxicity. Toxicity is a concern with some exotic coatings injected directly into the bloodstream.

Consultation with a plastic surgeon or a reconstructive hand surgeon may be advisable.

The seriousness of the wound depends on where the injury is on the body, whether the substance hit something on its way in and deflected causing more damage, and many other variables including skin microflora residing in the paint or gun which are blasted into the wound. If the injected paint contains acrylic latex and titanium dioxide that damage the tissue's resistance to infection, bacterial growth will flourish. The treatment that doctors recommend for an injection injury to the hand includes immediate decompression of the closed vascular compartments of the hand to release the underlying tissue distended by the injected paint, judicious wound debridement, and immediate antibiotic treatment.

Fire Safety

To avoid a fire or explosion, follow these instructions.

- Ground all conductive equipment. Use only grounded air and fluid hoses. Check equipment and workpiece grounding devices regularly. Resistance to ground must not exceed one megohm.
- Shut down all equipment immediately if you notice static sparking or arcing. Do not restart the equipment until the cause has been identified and corrected.
- Do not smoke, weld, grind, or use open flames where flammable materials are being used or stored.
- Do not heat materials to temperatures above those recommended by the manufacturer. Make sure heat monitoring and limiting devices are working properly.

- Provide adequate ventilation to prevent dangerous concentrations of volatile particles or vapors. Refer to local codes or your material MSDS for guidance.
- Do not disconnect live electrical circuits when working with flammable materials. Shut off power at a disconnect switch first to prevent sparking.
- Know where emergency stop buttons, shutoff valves, and fire extinguishers are located. If a fire starts in a spray booth, immediately shut off the spray system and exhaust fans.
- Shut off electrostatic power and ground the charging system before adjusting, cleaning, or repairing electrostatic equipment.
- Clean, maintain, test, and repair equipment according to the instructions in your equipment documentation.
- Use only replacement parts that are designed for use with original equipment. Contact your Nordson representative for parts information and advice.

Halogenated Hydrocarbon Solvent Hazards

Do not use halogenated hydrocarbon solvents in a pressurized system that contains aluminum components. Under pressure, these solvents can react with aluminum and explode, causing injury, death, or property damage. Halogenated hydrocarbon solvents contain one or more of the following elements:

Element	<u>Symbol</u>	Prefix
Fluorine	F	"Fluoro-"
Chlorine	CI	"Chloro-"
Bromine	Br	"Bromo-"
lodine	I	"lodo-"

Check your material MSDS or contact your material supplier for more information. If you must use halogenated hydrocarbon solvents, contact your Nordson representative for information about compatible Nordson components.

Action in the Event of a Malfunction

If a system or any equipment in a system malfunctions, shut off the system immediately and perform the following steps:

- Disconnect and lock out system electrical power. Close hydraulic and pneumatic shutoff valves and relieve pressures.
- Identify the reason for the malfunction and correct it before restarting the system.

Disposal

Dispose of equipment and materials used in operation and servicing according to local codes.

Description

The Nordson CS-2T timer is a four-event speed tracking pattern controller. It automatically maintains a constant pattern length for varying line speeds.

Features

In addition to the reliable production capabilities, the CS-2T timer offers these features:

- Speed tracking and automatic pattern length adjustment up to 1080 mpm (3000 fpm)
- Bead detector input*
- Bead alert output activation for missing beads*
- Pattern adjustment during operation
- Permanent memory to store program when power is removed
- Gun group bead alert test switch*

- Self-test capability to check input, output, and memory devices
- Built-in power supply
- Optically isolated circuits for electrical noise immunity
- Program lock procedure for security
- English or metric scale; events are programmed in inches or millimeters
- Gun compensation adjustment for electromechanical response time
- Programmable low rate drop-out, 2-99 mpm (5-248 fpm)
- Displays current line speed (fpm)

*Refer to future supplement.

Controls and Indicators

See Figure 1. CS-2T timer's controls and indicators are described in Table 1.



1200155A

Figure 1 CS-2T Controls and Indicators

ltem	Description	Function
1	EVENT selector switch (Green)	Selects each event (Delay 1, Duration 1) being programmed. This toggle switch also accesses Test mode for gun or bead alert output.
2	Event type LEDs (Green)	One of these four green LEDs illuminates when an event is selected for programming. DELAY and DURATION events are programmed in length using the EVENT selector switch and SET LENGTH switch.
3	GUN group output program LED (Yellow)	Displays the output program presently accessed for setting, viewing, and testing.
4	BEAD output LED (Yellow)	Illuminates when testing the bead alert output.
5	SENSOR input LED (Green)	Illuminates with each input for the channel shown.
6	LENGTH/LINE SPEED display switch	Holding the switch up displays the length of the current event. Holding the switch down displays the line speed rate from the tach generator.
7	SET LENGTH/TEST switch	Toggles up to increase the number displayed or down to decrease the number displayed. Holding the switch up or down causes the number display to scroll rapidly. The SET LENGTH/TEST switch is also used as the output test firing switch.
8	Event duration display	Four numeric LED displays show the:
	window	 length selected for a specific event for gun output. Length is displayed in millimeters (0.0-253.975 mm or 0.0-9.999 in.).
		 percentage of beads missed from the last 1,000 attempts or the number of beads missed.
9	CALIBRATE LINE SPEED ADJUST screw	Calibrates the CS-2T line speed.
10	Power switch	Switches the main power to the CS-2T and output relays.

Display Modes

See Figure 1.

Mode	Description	How to Enter the Mode
LENGTH	Displays event length information and allows programming of event lengths for the gun output A test sequence can be fired or run on the output in this mode	This mode is normally displayed when powering up. To re-enter the LENGTH mode from the LINE SPEED mode, toggle the LENGTH/LINE SPEED display switch (6) up.
LINE SPEED	Displays the current line speed according to the input from the tach generator All four LED displays (8) illuminate with no decimal point	Enter the LINE SPEED mode by toggling the LENGTH/LINE SPEED display switch (6) down and calibrating the CS-2T to the line speed with the rate calibration screw (9). The displayed number is feet per minute (fpm). Convert the line speed, cans per minute (cpm), to fpm and enter that result. NOTE: Always set resolution before calibrating. Refer to <i>Setting</i> <i>Resolution</i> on page 7.
Program Lock/Unlock	Allow set values to be viewed but not altered.	Refer to the <i>Operation</i> section on page 10 for procedure on switching between lock and unlock modes.

Installation



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

NOTE: While setting up the CS-2T timer, record the settings in the CS-2T Settings Form at the end of this manual.

Setting Proper Voltage

See Figure 2. Install the jumper as shown for either 200-240 V applications (1) or 100-120 V applications (2).



1200156A

Figure 2 Setting Proper Voltage 1. 200-240 V 2. 100-120 V

Setup

Clearing Memory

- 1. See Figure 3. Hold the EVENT selector switch (1) to the left.
- 2. Turn on the power switch (10). This clears all length and head compensation values, sets resolution to 0.01 in. and dropout line speed to 10 ft per minute.

NOTE: Shutting the timer off while the line is running or clearing memory disables the applicator.

Setting Resolution

- 1. See Figure 3. Hold down the LENGTH/LINE SPEED display switch (6).
- 2. While holding the LENGTH/LINE SPEED display switch (6), turn on the power switch (10).
- While holding the LENGTH/LINE SPEED display switch (6), toggle the SET LENGTH switch (7) up or down to select resolution. Setting options are shown in Table 2. The default is 0.01 in.

Resolution	Maximum Line Speed
mm (in.)	m/min (ft/min)
0.5 (0.01)	270 (450)
1.0 (0.02)	540 (900)
2.0 (0.05)	810 (1500)
3.0 (0.10)	1080 (3000)

Table 2 Resolution and Line Speed

NOTE: If 0.0 mm is selected, all timer functions will be displayed in metric units. If 0.00 inches is selected, then all timer functions will be displayed in inches or feet.

- 4. Release the LENGTH/LINE SPEED display switch (6) to set the resolution.
- 5. Recalibrate the LINE SPEED after changing the resolution.

NOTE: The resolution setting controls the placement of wax on each can or substrate within that specified number.

Setting Line Speed

- 1. See Figure 3. Toggle the LENGTH/LINE SPEED display switch (6) down.
- Turn the rate calibration screw (9) counterclockwise until the display (8) reads 0.
- 3. Turn the rate calibration screw (9) clockwise until the line speed on the display (8) matches the actual maximum line speed.
- 4. To exit this mode, toggle the LENGTH/LINE SPEED display switch (6) up.

NOTE: To adjust the line speed, the production line must be running at the speed being set on the display.

Setting Trigger Type

- 1. See Figure 3. Hold the SET LENGTH switch (7) up for one-shot operation.
- 2. Turn on the power switch (10).

Setting Delay and Duration Length

- See Figure 3. Toggle the EVENT selector switch (1) to the left or right to select the event to program.
- 2. Toggle the SET LENGTH switch (7) up or down to select the value for the event.

Table 3 describes each event and providesrecommended settings.

NOTE: Readjust values as required to improve the application.

Setting Delay and Duration Length (contd)

Event	Description	Settings
DELAY 1	Length of first delay	Set the initial distance value. This is the length between the sensor and nozzle center lines.
DURATION 1	Length of bead pattern	Set from .12 to .22 in., typical.
		NOTE: Do not set below .12 in. for CanNeck lubrication.
DELAY 2	Length of second delay	Not used. Set to 0 (Default).
DURATION 2	Length of second bead pattern	Not used. Set to 0 (Default).

Table 3	Delay and	Duration	Settings
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Setting Gun Compensation

- See Figure 3. Hold down the SET LENGTH (7) and LENGTH/LINE SPEED display (6) switches.
- 2. Turn on the power switch (10).
- 3. After the GUN group 1 (3) and DELAY 1 (2) LEDs illuminate, release both switches.
- 4. Set the off compensate time by toggling the SET LENGTH switch (7) up or down to the desired setting. Typical setting is 0-2 ms. Refer to *Speed Compensation* on page 11.
- 5. Toggle the EVENT selector switch (1) to the right until the DURATION 1 LED illuminates.
- Set the on compensation time by toggling the SET LENGTH switch (7) up or down to the desired setting. Typical setting is 4-5 ms. Refer to Speed Compensation on page 11.
- Exit this mode by either toggling the LENGTH/LINE SPEED display switch (6) up or turning the power switch (10) off and then on.

Running Samples

- 1. Run samples at low and maximum line speeds. Refer to Table 2.
- 2. Check the position and length of the bead pattern with a strobe light. Readjust if necessary.

NOTE: The bead should start approximately at the 10 O'Clock position and stop before the 12 O'Clock position.

- 3. If the bead at maximum line speed shifts back, increase the on compensation time. Refer to *Speed Compensation* on page 11.
- 4. If the bead at maximum line speed shifts forward, decrease the on compensation time. Refer to *Speed Compensation* on page 11.

Setting Can Skip Count

The CS-2T timer can be set to apply lubricant to every can or every other can up to skipping the ninth can.

- See Figure 3. Hold the EVENT selector switch (1) to the right and the LENGTH/LINE SPEED display (6) switch up.
- 2. Turn on the power switch (10).
- 3. Release both switches.
- 4. Toggle the SET LENGTH switch (7) up or down to set cans to be skipped.
 - 0 is the default for no cans skipped.
 - Select 1 to skip one can or up to 9 to skip nine cans.
- 5. Exit this mode by turning the power switch (10) off and then on.

Skip Settings for Turret Pockets

Can necker turret pockets vary in number.

Table 4 shows which can skip settings to use to assure a lubricated can passes through each set of die neck tooling.

NOTE: If the number of turret pockets for a necker-flanger is not listed, contact Nordson for usable can skip settings.

Number of TurretUsable Can SkipPocketsSettings		
7	1, 2, 3, 5 and 7	
8	2, 4, 6 and 8	
9	1, 3, 4, 6, 7 and 9	
10	2, 6 and 8	
11	1, 2, 3, 4, 5, 6, 7, 8 and 9	
12	4, 5 and 6	
13	1, 2, 3, 4, 5, 6, 7, 8 and 9	
14	2, 4 and 8	
15	1, 3, 4, 6 and 7	
16	2, 4, 6 and 8	
17	1, 2, 3, 4, 5, 6, 7, 8 and 9	

Table 4	Skip Setti	ngs for	Turret	Pockets
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Programming Dropout Line Speed

Never program the dropout line speed below 2 mpm (5 fpm). The default dropout low line speed value is 4 mpm (10 fpm). (The default setting is recommended.) If the application requires a higher or lower value:

- 1. Hold the LENGTH/LINE SPEED display switch (6) up.
- 2. Turn on the power switch (10).
- 3. Release the switch.
- 4. Toggle the SET LENGTH switch (7) up or down to set the desired dropout line speed. Set speed between 2-99 mpm (5-248 fpm).
- 5. Exit this mode by toggling the LENGTH/LINE SPEED display switch (6) up or down. A self test follows.



Figure 3 CS-2T Timer Controller

- 1. EVENT selector switch
- 2. Event type LEDs
- 3. GUN group output program LED
- 4. BEAD output LED

- 5. SENSOR input LED
- 6. LENGTH/LINE SPEED display switch
- 7. SET LENGTH/TEST switch
- 8. Event duration display window
- 9. CALIBRATE LINE SPEED ADJUST screw
- 10. Power switch

1200155A

Operation



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

See Figure 3.

Task	Procedure	
Startup	1. Turn on the power switch (10). A self test follows.	
	NOTE: The CS-2T displays the length previously set for GUN group DELAY 1. Only GUN and DELAY 1 LEDs are illuminated.	
	Toggle the EVENT selector switch (1) to the left or right to select the event.	
	Toggle the SET LENGTH switch (7) up or down to enter the desired length values.	
Reading Line Speed	Toggle the LENGTH/LINE SPEED display switch (6) down.	
	Toggle the LENGTH/LINE SPEED display switch (6) up to return to normal operation.	
Locking/Unlocking	1. Hold the EVENT selector switch (1) to the left, with the power on.	
the CS-2T Timer	2. Hold down the SET LENGTH (7) switch.	
	3. Release the EVENT selector switch (1).	
	4. Repeat steps 1-3 to toggle between lock and unlocked modes.	
Test Firing a Head Group	 Toggle the EVENT selector switch (1) until only the GUN or BEAD LED illuminates and the event duration display window is blank. 	
	2. Hold the SET LENGTH switch (7) up to test fire in a continuous fashion.	
	3. Hold the SET LENGTH switch (7) down to test fire in a programmed sequence.	
	 Toggle the LENGTH/LINE SPEED display switch (6) up to return to normal operation. 	

Speed Compensation

A speed compensation setting dispenses a fixed-length pattern that starts and stops at the same place regardless of how fast the cans are moving. This process requires continuous adjustment of dispensing time intervals to accurately produce a pattern of constant length with correct registration over varying line speeds. In addition, on and off response times of dispensing equipment must be considered.

On and Off Compensation Time

On compensation time is the response time for an applicator to spray after it receives an activating turn ON signal.

Off compensation time is the response time for an applicator to shut off after it receives a turn OFF signal.

On and off compensation times are not necessarily equal. Different applicators have different delay times. The following paragraphs illustrate a common problem associated with speed compensation. A solution is provided to ensure proper processing results.

Problem

On and off compensation times are fixed for each applicator. At variable speeds, a fixed time delay results in variable pattern lengths and placement.

See Figure 4. In this example, the applicator has a 5 ms on compensation time and a 10 ms off compensation time.

Variable	Setting	Bead Placement
Can Speed	Slow 3 mpm (10 fpm)	
On Compensation Time	5 ms	leading edge is shifting by 2.54 mm (0.1 in.)
Off Compensation Time	10 ms	trailing edge is 5.08 mm (0.2 in.) too long



Figure 4 Pattern at Slow Speed

- 1. Lubricant
- 2. Applicator nozzle
- 3. Proximity sensor
- 4. Delay 2
- 5. Off compensation time
- 9. Delay 1
 10. Leading edge product

7. On compensation time

11. Product (can)

flow

8. Control signal

6. Desired pattern location

Problem (contd)

See Figure 5. As the can speed increases with the same on/off compensation times, the bead placement is even less accurate.

Variable	Setting	Bead Placement
Can Speed	Fast 91.44 mpm (300 fpm)	
On Compensation Time	5 ms	leading edge is shifting by 7.62 mm (0.3 in.)
Off Compensation Time	10 ms	trailing edge is 15.24 (0.6 in.) too long

Solution

See Figure 6. The product is moving at a fast speed. To correct the bead placement, the pattern controller compensates for the on compensation time (7) and off compensation time (5):

Bead Placement Problem	Solution	
Shifted Leading Edge	The controller subtracts the on compensation time (7) from the leading OFF time (Delay 1) and adds it to the ON time (Duration 1). This starts the glue bead in the proper place.	
Lengthened Trailing Edge	ed The controller subtracts the off compensation time (5) from ON time (Duration 1) and adds it to the OFF time (Delay 2).	

NOTE: The lubricant is placed on the intended area of the product.



Pattern at Fast Speed with Compensation

1. Lubricant

Figure 6

- 2 Applicator
- 2. Applicator nozzle
- 3. Proximity sensor
- 4. Delay 2
- 5. Off compensation time
- 6. Desired pattern location
- 7. On compensation time
- 8. Control signal
- 9. Delay 1
- 10. Leading edge product flow
- 11. Product (can)



Figure 5 Pattern at Fast Speed

- 1. Lubricant
- 2. Applicator nozzle
- 3. Proximity sensor
- 4. Delay 2
- 5. Off compensation time
- 6. Desired pattern location
- On compensation time
 Control signal
- 9. Delay 1
- 10. Leading edge product flow
- 11. Product (can)

Rules for Using Speed Compensation

Follow these rules when using speed compensation.

Rule	Description
1	There must always be a delay (OFF) event before a duration (ON) event.
2	The can proximity sensor (3) must be upstream from the applicator (2). The minimum distance from the sensor to the applicator must be a longer time duration (at maximum line speed) than the on compensation time. $(1.00 \pm .125 \text{ in. recommended.})$
3	All delay lengths must be longer than the on compensation time at maximum line speed. For example, if the ON time is 5 ms and the maximum speed is 91.44 mpm (300 fpm), the shortest allowable delay length is 7.62 mm (0.3 in.). Refer to <i>Calculating Delay Time and Duration Time</i> .
4	The shortest bead length must be longer than the off compensation time at maximum line speed. For example, if the off compensation time is 10 ms and the maximum speed is 91.44 (300 fpm), the shortest allowable duration length is 15.24 mm (0.6 in.). Refer to <i>Calculating Delay Time and Duration Time</i> .
5	On compensation time and OFF time are inherent characteristics of each individual applicator. Once determined, these values do not change, except due to component wear.

Calculating Delay Time and Duration Time

- 1. To determine the time of any event, divide the distance traveled by the line speed of the product.
- 2. To convert meters per minute to millimeters per second, multiply by 16.66.

Speed (mpm) x 16.66 = Speed (mm/sec)

-or-

Time (sec) =
$$\frac{\text{Distance (mm)}}{\text{Speed (mpm)}} \times 0.06$$

3. To convert feet per minute to inches per second, multiply by 0.2.

Speed (fpm) x 0.2 = Speed (in./sec) -or-

Time (sec) =
$$\frac{\text{Distance (in.)}}{\text{Speed (fpm)}} \times 5$$

Calculating On Compensation Time from Pattern Samples

See Figure 3.

- 1. Set the on and off compensation time values to 0 on the controller.
- 2. Enter Delay 1 and Duration 1 patterns.
- 3. Run the machine at two different speeds. Save sample products from both speeds.
- 4. Measure the leading gaps on sample products from each speed.
- 5. Calculate on compensation time as follows: **Metric:**

On comp. time (ms) = $\frac{G2 - G1 \text{ (mm) x 60}}{S2 - S1 \text{ (mpm)}}$

English:

On comp. time (ms) =
$$\frac{G2 - G1 (in.) \times 5000}{S2 - S1 (fpm)}$$

Where:

G1 = length of leading gap at slow speed

G2 = length of leading gap at fast speed

S1 = slow line speed

S2 = fast line speed

Calculating Off Compensation Time from Pattern Samples

See Figure 3.

- Use the calculated on compensation time value (from the previous section) to set the controller. Set off compensation time to 0.
- 2. Enter Delay 1 and Duration 1 patterns.
- 3. Run the machine at two different speeds. Save sample cans from both speeds.
- 4. Make sure there is no shift in the start of the bead between the slow and fast speed samples. If there is a shift, repeat the procedure for *Calculating On Compensation Time from Pattern Samples.*
- 5. If no shift occurs, measure the bead length on the sample cans from each speed.
- Calculate the off compensation time as follows: Metric:

Off comp. time (ms) = $\frac{L2 - L1 \text{ (mm) x 60}}{S2 - S1 \text{ (mpm)}}$

English:

Off comp. time (ms) =
$$\frac{L2 - L1 \text{ (in.) } \times 5000}{S2 - S1 \text{ (fpm)}}$$

Where:

- L1 = length of lubricant bead at slow speed
- L2 = length of lubricant bead at fast speed

S1 = slow line speed

S2 = fast line speed

Alternate Method for Determining On and Off Compensation Times

See Figure 3.

- 1. Enter the Delay 1 and Duration patterns on the controller.
- 2. Enter a trial on compensation time value. Start with 8-12 ms.
- 3. Run sample cans at two different speeds.
- 4. Check for a shift in the start position of the lubricant bead.
- 5. Adjust the on compensation time value and repeat steps 3-5 until no shift occurs.
- 6. Enter a trial off compensation time value. Start with 8-12 ms.
- 7. Run sample cans at two different speeds.
- 8. Check for a length variation of the bead.
- 9. Adjust the off compensation time value and repeat steps 7-9 until no length variation occurs.

Excessive Acceleration or Deceleration

Acceleration and deceleration of the speed compensation system is designed to work with a fixed range. A pattern shift results if the line accelerates or decelerates too quickly.

See Figure 3.

Setting Gun Compensation Values

- 1. Calculate the gun on compensation time values. Refer to *Calculating On Compensation Time from Pattern Samples*.
- 2. Turn off the power switch (10) for two seconds, then turn back on while holding down the LENGTH/LINE SPEED display (6) and SET LENGTH switches (7).
- 3. Release switches. The controller displays the following:
 - Type of compensation for the gun, either on indicated by DURATION 1 LED or off indicated by DELAY 1.
 - b. Current programmed compensation value from 0-99 ms (0 = default).
- 4. Using the calculated on compensation value, toggle to On mode. Modify the existing value by toggling the LENGTH/LINE SPEED display switch.

- Run pattern at the lowest and highest speed. The pattern starting point should not shift more than +/- the value accuracy setting.
- 6. Once the starting point of the pattern is constant at varying speeds, check the pattern stopping point.
- 7. If the pattern is longer at high speeds than at low speeds, use the off compensation time.
- Measure the difference in pattern length at low and high speed and calculate the off compensation time. Refer to Calculating Off Compensation Time from Pattern Samples.
- Set the gun off compensation time by toggling the EVENT selector switch (1) until DELAY 1 illuminates. Use the SET LENGTH switch to modify the off compensation value.

Maintenance

This section contains preventative maintenance instructions for the CanNeck Lubrication System. Following these procedures ensure your CS-2T timer provides long-lasting, reliable operation.

Frequency	Procedure	
Every Shift	1. Fill the hot melt tank once per shift. Keep the lid closed while operating.	
	Check the gun nozzle bead pattern every two hours. Clean if necessary. Use a flash light or strobe.	
	3. Check the air pressure twice per shift.	
	4. Check the temperature readouts on hot melt unit twice per shift.	
	5. Check the can track for wax buildup twice per shift. (The can track is located near the gun.) Clean when necessary.	
Weekly	Wipe down the system once per week.	
Monthly	Clean and check the T-filter and metal gasket once per month or maintenance period. Replace if necessary.	
Periodically	Clean and check the 3500 unit filter every three to six months. Replace if necessary.	

Troubleshooting



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

This section contains troubleshooting procedures. These procedures cover only the most common problems that you may encounter. If you cannot solve the problem with the information given here, contact your local Nordson representative for help.

	Problem	Possible Cause	Corrective Action
1.	Trigger input (sensor) LED not blinking when sensor is activated	Inverted trigger polarity	Check polarity of the trigger output. Reverse the polarity.
		Sensor not properly wired	Inspect the wiring and make proper connections.
2.	Trigger input LED remains continuously lit; CS-2T not being triggered	Photo switch in normally closed or ON mode	Inspect and test the photo switch. Replace if necessary.
3.	DC output modules cause trigger input LED to remain continuously lit	Inverted polarized output. DC output switches voltages up to 60 Vdc 3 A in one direction only	Inspect and replace the output relay fuse(s) and output relay(s) if necessary. Refer to the <i>Repair</i> section.
4.	Applicator does not activate from dc output of CS-2T	Gun driver required	Place the gun driver between the CS-2T output and the applicator. If a driver is connected, verify that the trigger light on the driver illuminates when CS-2T outputs.
5.	Applicator does not activate when there is output from CS-2T	Loose or improper electrical connections	Check all wiring. Tighten all terminal strips in the hot melt unit.
		Electrical resistance of coil too high	Check coil electrical resistance with an ohmmeter. A 115 V coil should read 52-55 ohm. A 230 V coil should read 212-214 ohm. Replace the coil if necessary.
		Applicators and hoses are overheating	Verify that the applicators and hoses are at operating temperatures. Adjust the temperatures accordingly.
6.	Display or switches lock up	CS-2T requires resetting	Turn the power off for at least five seconds. Turn the power on. Clear the memory. Refer to <i>Clearing Memory</i> on page 7.

Repair

WARNING: Before performing the following procedures, disconnect electrical power to the CanNeck Lubrication System. Failure to observe this warning may result in personal injury or death.

Should this controller require service, return the entire control panel assembly to the factory for repair. The only serviceable parts are the head group output relays, output relay fuses, and main power fuses.

Replacing Fuses and Relays

 Open the enclosure and remove the control panel by removing the four screws holding the control panel to the mounting standoffs. Remove the hold down screw located in the center of the module. 2. See Figure 7. Locate the fuses and output relays on the back of the timer board. Remove them with a screwdriver.

Main power fuses (2) are rated for 6A for use with 100-115 V and 3A for use with 200-230 V.

Output relays (5 and 6) require 4A output relay fuses (1).

- 3. Insert the relay(s) making sure the pins are properly oriented.
- 4. Replace the fuse(s) making sure they are properly seated.
- 5. Secure the hold down screw located in the center of module.



1200160A

Figure 7 Replacing Fuses and Relays (Rear View of Control Panel)

- 1. Output relay fuses
- 2. Main power fuses
- 8-pin connector
 Voltage selector (power jumper)
- 5. Gun group output relay
- 6. Bead alert output relay

Parts

To order parts, call the Nordson Customer Service Center or your local Nordson representative. Use this five-column parts list, and the accompanying illustration, to describe and locate parts correctly.

Using the Illustrated Parts List

Numbers in the Item column correspond to numbers that identify parts in illustrations following each parts list. The code NS (not shown) indicates that a listed part is not illustrated. A dash (—) is used when the part number applies to all parts in the illustration.

The number in the Part column is the Nordson Corporation part number. A series of dashes in this column (- - - - -) means the part cannot be ordered separately. The Description column gives the part name, as well as its dimensions and other characteristics when appropriate. Indentions show the relationships between assemblies, subassemblies, and parts.

- If you order the assembly, items 1 and 2 will be included.
- If you order item 1, item 2 will be included.
- If you order item 2, you will receive item 2 only.

The number in the Quantity column is the quantity required per unit, assembly, or subassembly. The code AR (As Required) is used if the part number is a bulk item ordered in quantities or if the quantity per assembly depends on the product version or model.

Letters in the Note column refer to notes at the end of each parts list. Notes contain important information about usage and ordering. Special attention should be given to notes.

ltem	Part	Description	Quantity	Note
—	0000000	Assembly	1	
1	000000	Subassembly	2	A
2	000000	• • Part	1	

CS-2T Timer Parts

See Figure 8.

ltem	Part	Description	Quantity	Note
—	179497	TIMER, CS-2T with enclosure	1	
	179496	TIMER, CS-2T	1	
1	228223	 FUSE, 4 amp, normal acting, 125 V, 5 x 20 	2	A
2	228222	 FUSE, 6 amp normal acting, 125 V, 5 x 20 	2	A
3	228224	 CONNECTOR, 8-pin, CS-2T 	AR	
4		POWER JUMPER	AR	
5	225418	 MODULE, dry contact out, ODC5R 	1	
6	225417	RELAY, dc output, ODC5	1	
NOTE A: Four replacement parts are required for two or more systems.				
AR: As Required				



1200160A

Figure 8 CS-2T Timer Parts

Specifications

Electrical			
Power Requirements	110-1 15 V, 25 W, 50/60 Hz 200-230 V, 25 W, 50/60 Hz (Only 230 V models are certified for use in countries requiring the CE mark.)		
Line Speed Input	Tach generator must generate	50-300 Vdc at maximum line speed.	
Input Triggers	Voltage: 5-24 Vdc, 4-2	5 mA	
	Type: Switch closure proximity deter	, semiconductor switch, optical or ctors	
Output Switching/Gun Output	5-60 Vdc, 3 A; DC output relay	1	
	60-250 V, 5 A; AC output relay	,	
Power Supply Output Voltage	12 Vdc, 200 mA		
	Power for photoeyes and exter	nal triggers	
Physical			
Enclosure	Gasket sealed, dust-proof and NEMA 4 specifications	water-resistant metal enclosure meets	
Operating Temperature	0-60 °C (32-140 °F)		
Storage Temperature	-7 -60 °C (20-140 °F)	-7 -60 °C (20-140 °F)	
Weight	2.27 kg (5 lb)		
Performance			
Event Length Range	0.5 mm-9.999 m (0.01-999.9 i	0.5 mm-9.999 m (0.01-999.9 in.)	
Accuracy and Repeatability	<u>+</u> 0.5 ms		
Low-Rate Drop Out	2-99 mpm (5-248 fpm)		
Gun Compensation	0-99 ms		
Resolution	Resolution Setting mm (in.)	Maximum Line Speed (1 or 2 Head Groups) m/min (ft/min)	
	0.5 (0.01)	270 (450)	
	1.0 (0.02)	540 (900)	
	2.0 (0.05)	810 (1500)	
	3.0 (0.10)	1080 (3000)	
Dimensions			
See Figure 9.			



Figure 9 Enclosure Dimensions

CS-2T Settings Form

Use this form to record CS-2T setup parameters. Refer to this form as necessary to verify or readjust settings. Store this form in a safe place for quick, easy reference.

Beechatter	(set to max line speed)		
Resolution			
Rate Mode			
Formula	Can diameter x cans per minute = feet per minute		
Formula:	12		
Trigger Type	(One shot operation)		
Trigger Type			
Gun Settings			
Delay 1			
Duration 1			
Delay 2	0		
Duration 2	0		
Gun Compensation			
Can Skip			
Off Compensation	ms		
On Compensation	ms		