TruFlow Flex HS Controller

Customer Product Manual
P/N 1132538_01
- English -
Issued 10/2024

This document contains important safety information
Be sure to read and follow all safety information in this document and any other related documentation.

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

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TruFlow Flex HS Controller

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. Refer to “Safety Labels and Tags” at the end of this section.
- 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. This equipment has not been certified for compliance with the ATEX directive nor as nonincendive and should not be installed in potentially explosive environments.
- Ensure that the processing characteristics of the material will not create a hazardous environment. Refer to the Safety Data Sheet (SDS) 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 SDS for PPE requirements.
- Use properly rated hearing protection when operating applicators. Noise emission levels can reach a maximum of 99 dB(A).
- Do not use equipment that is malfunctioning or shows signs of a potential malfunction.

Maintenance and Repair Practices

- Allow only personnel with appropriate training and experience to operate or service the equipment.
- 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 Nordson-authorized refurbished or replacement parts.
- Read and comply with the manufacturer’s instructions and the SDS supplied with equipment cleaning compounds.

  NOTE: SDSs 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 SDS 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, applicators, 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 Applicators

NOTE: Adhesive dispensing applicators are referred to as “guns” in some previous publications.

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

1. Turn off or disconnect the applicator triggering device (pattern controller, timer, PLC, etc.).
2. Disconnect the input signal wiring to the applicator solenoid valve(s).
3. Reduce the air pressure to the applicator solenoid valve(s) to 0 (zero); then relieve the residual air pressure between the regulator and the applicator.

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, applicators, etc.)

PC = Process control

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

General Safety Warnings and Cautions (contd)

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 SDS. 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 SDS 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 applicators 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.
HM, PC	**WARNING!** Equipment starts automatically! Remote triggering devices are used to control automatic hot melt applicators. Before working on or near an operating applicator, disable the applicator's triggering device and remove the air supply to the applicator's solenoid valve(s). Failure to disable the applicator'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.

Continued...

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

Equipment Type	Warning or Caution
HM, CA, PC	**WARNING!** Risk of fire or explosion! Nordson adhesive equipment is not rated for use in explosive environments and has not been certified for the ATEX directive or as nonincendive. In addition, this equipment should not be used with solvent-based adhesives that can create an explosive atmosphere when processed. Refer to the SDS 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.
HM	**CAUTION!** Hot surfaces! Avoid contact with the hot metal surfaces of applicators, 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 SDS 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 applicator 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 hot melt from your skin.
2. Immediately soak the affected area in clean, cold water until the hot melt has cooled.
3. Do NOT attempt to remove the solidified hot melt from your skin.
4. In case of severe burns, treat for shock.
5. Seek expert medical attention immediately. Give the SDS for the hot melt to the medical personnel providing treatment.

Safety Labels and Tags

Figure 1 illustrates the location of the product safety labels and tags affixed to the equipment. Table 2 provides an illustration of the hazard identification symbols that appear on each safety label and tag, the meaning of the symbol, or the exact wording of any safety message.

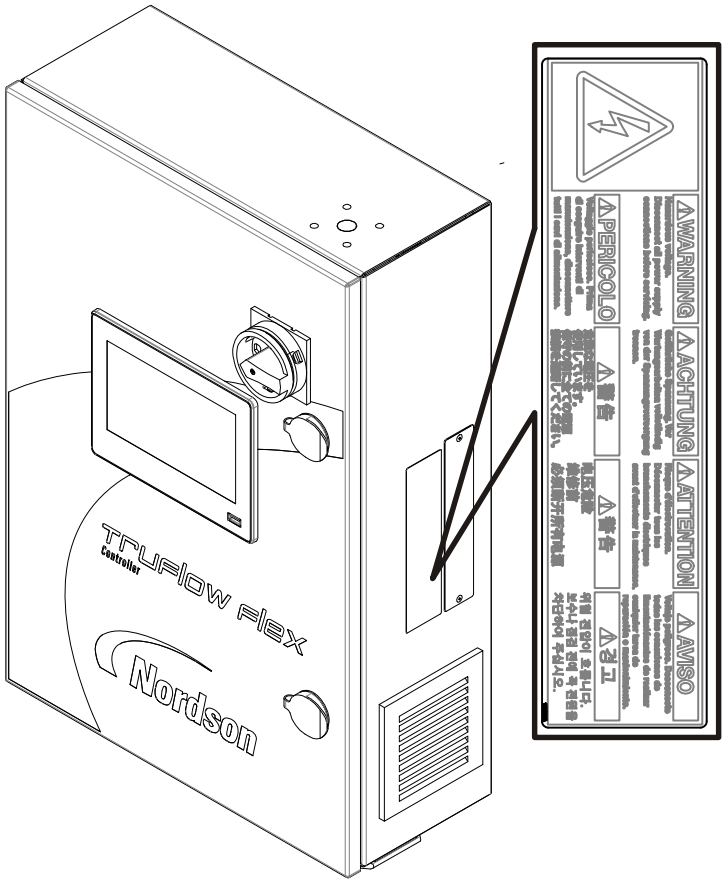


Figure 1: Location of safety labels

Table 2: Safety Labels and Tags

Item	P/N	Label	Description
1	—		**WARNING!** Hazardous voltage. Disconnect all power supply connections before servicing.

Manufacturing Cybersecurity Statement

Some Nordson Corporation equipment is wireless-network enabled, conveniently allowing for remote control and monitoring. However, hackers have expanded their craft, focusing on wireless-network enabled manufacturing equipment in their attempts to steal, change, or destroy data as well as to cause production slowdowns, or even halt them altogether. The results have been costly in terms of lost data and revenues.

Ultimately, It is up to you to take the necessary cybersecurity measures for your organization, which includes having a proven, tested, and maintained Corporate Cybersecurity Policy in place. Nordson Corporation is not liable for unauthorized access and data loss/theft.

Types of Cyberattacks

The following are just some of the more common cyber threats:

- Internal attacks — a disgruntled employee can cause a great deal of harm.
- Phishing — email that fakes a trusted sender and prompts for access.
- Ransomware / Cross-Site Scripting (XSS) — similar to phishing, but more deceptive.
- Drive-by download — visiting an infected site installs malware.
- Advanced Persistent Threat (APT) — a hidden threat from a hacker that can steal data.
- Distributed Denial of Service (DDoS) — an attempt to overload the network with false messages.

What You Can Do to Prevent Cyberattacks

- Keep current with software and firmware updates from Nordson.
- Make sure you have a defined, tested, and maintained Corporate Cybersecurity Policy.
- Use a professional to help you develop your Corporate Cybersecurity Policy. Although some companies rely on their own personnel for network security, there are many professional cybersecurity companies in the marketplace to help you define, test, and maintain your network security and your Corporate Cybersecurity Policy. Below are some suggested policies to include in your Corporate Cybersecurity Policy:

Network Security Policy	Remote Access Policy
Data Classification Policy	Mobile Device Policy
Wireless Policy	Password Policy
Incident Response Policy	Network Access Policy
Confidential Data Policy	Physical Security Policy
Wireless-Network Enabled Manufacturing/Industrial Equipment Policy	

- Use data encryption.
- Use segmented networks to keep damage localized, instead of widespread.
- Include firewalls between segmented networks.

Nordson Security Options for Preventing a Cyberattack

In addition to your Corporate Cybersecurity Policy, Nordson provides the following software security options to help curb the likelihood of a cyberattack:

- Disabling the ability to broadcast the Service Set Identifier (SSID) of a controller
- Disabling write access from a network interface
- Making use of current Internet security protocols, such as Wi-Fi Protected Access (WPA) and pre-shared key (PSK)
- Limiting the number of clients accessing a controller
- Disabling the ability to access the Nordson internal web server

Description

System Overview

This manual describes the installation, operation, and setup of the TruFlow Flex HS controller.

The controller is used in a material delivery system to control and/or monitor adhesive consumption and add-on weights by providing in-line measurement and reporting of adhesive-per-piece data for better process control. The controller includes the following capabilities:

- Monitor and record adhesive output by individual part, either on a time/day/shift or current total basis.
- Preset control parameters, warnings, and alarms to stop the line if dispensing deviates beyond upper or lower dispensing limits.
- Improve the volumetric flow of adhesive during ramp-up and steady state operation by using the closed-loop encoder feedback.

System Overview *(contd)*

See Figure 2 below for an overview of how the controller is integrated in a typical adhesive delivery system.

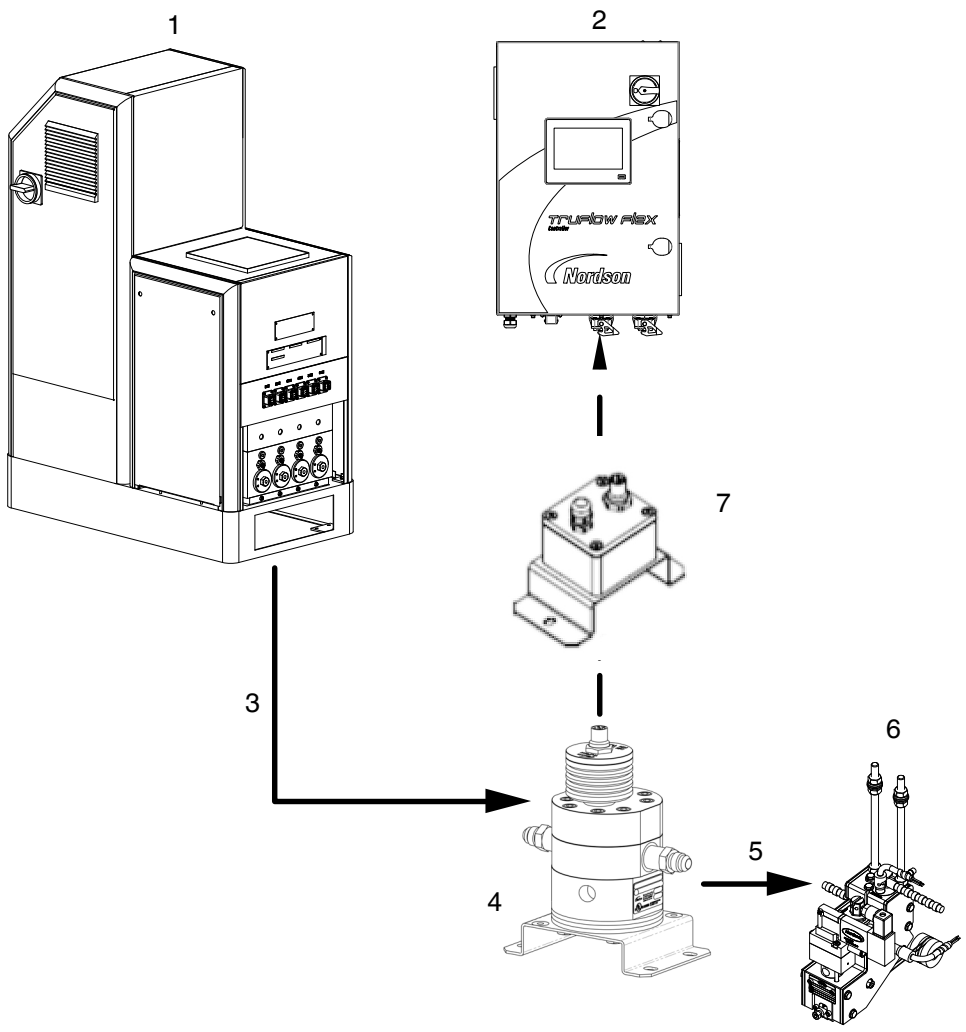


Figure 2: Controller in a typical adhesive delivery system

1. Melter
2. Controller
3. Hose from the melter to the meter
4. Meter
5. Hose from the meter to the applicator
6. Applicator
7. Transmitter box

CAUTION! Do not connect the TruFlow Flex Controller directly to the TruFlow meter. Only connect the TruFlow Flex Controller to the Transmitter Box as shown in Figure 2. Connecting the TruFlow Flex Controller directly to the meter will cause meter damage.

Configurations

There are several different configuration options:

- Controller with 100 Ohm platinum RTD
- Controller with 120 Ohm nickel RTD
- Controller with adhesive heating capability
- Controller without adhesive heating capability
- Controller with built in HMI
- Controller with remote HMI

Intended Use

The controller is specifically designed for use:

- With compatible equipment manufactured by Nordson Corporation
- In non-explosive environments

The controller is intended to be incorporated into machinery or assemblies by an integrator. The equipment must not be placed into use in a member state of the European Union until the parent machinery or assemblies have been declared by the integrator to be in conformity with the applicable directives of the European Commission.

Limitations of Use

Use the controller only for the purpose for which it is designed. **Do not** use the controller:

- With any material that creates a health or safety hazard when heated
- In environments that require the system to be cleaned using a water wash or spray

Product Description

The controller is used in conjunction with the Nordson hot melt melter, hose, and applicator to create a material application system as shown in Figure 2 on page 15. The external components are shown in Figure 3 below, and the internal components are shown in Figure 4 on page 18 and Figure 5 on page 19.

External Components

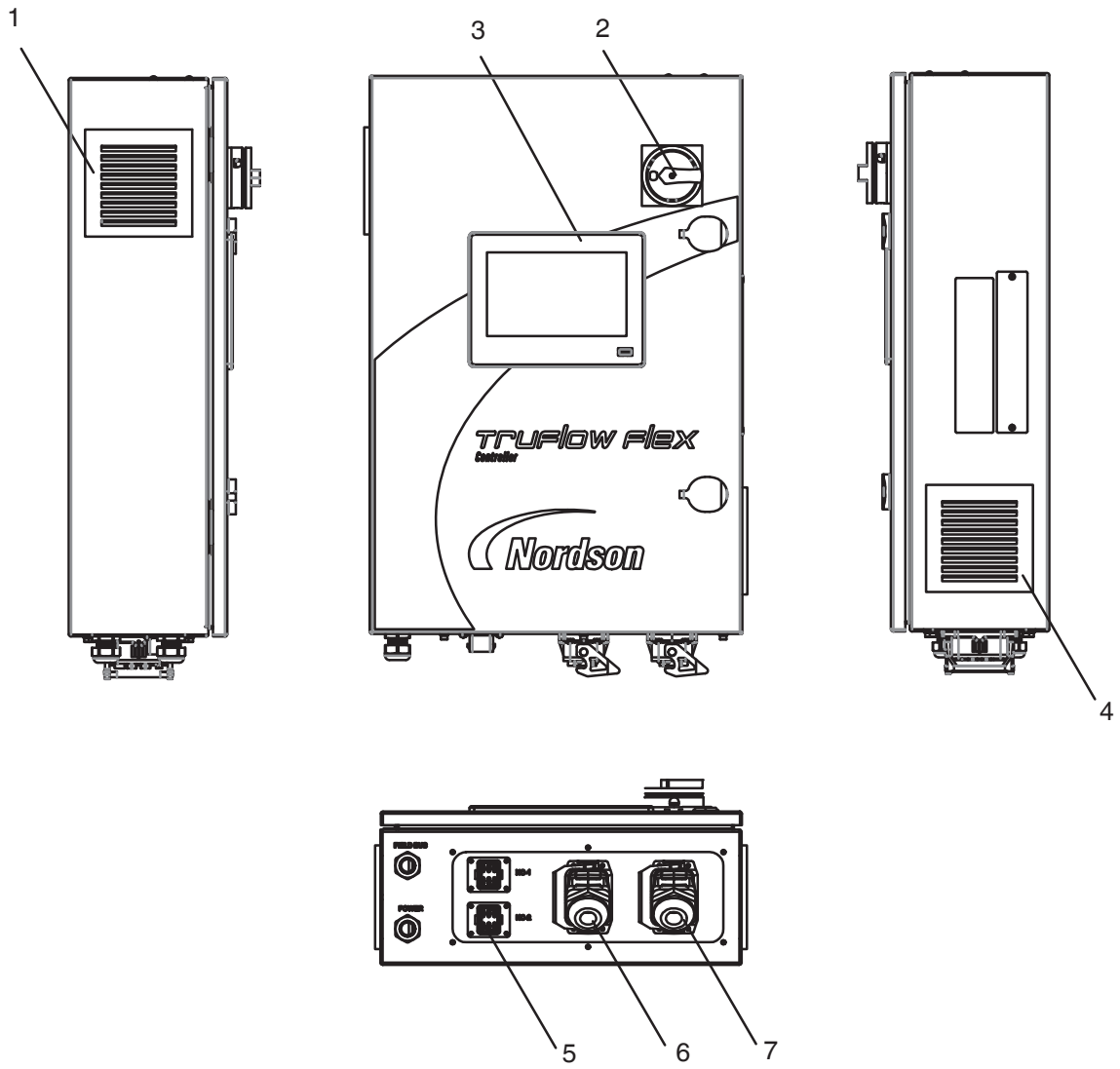


Figure 3: External components of the controller with heating

1. Fan
2. Main Switch
3. Touch screen panel
4. Air-in filter
5. Heater connector with Ni120 RTD (Heating units only)
6. Flow meter connector
7. I/O connector

Internal Components

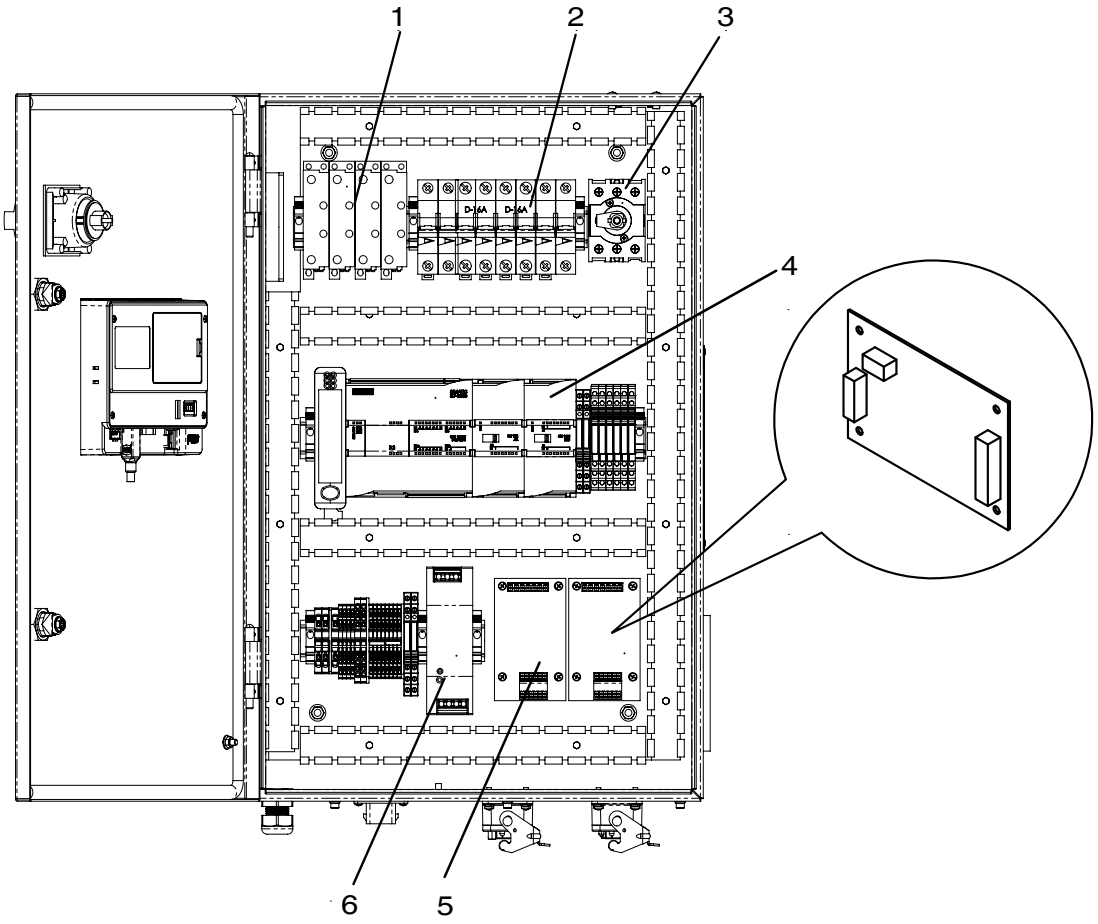


Figure 4: Internal components of the controller with heating zones

1. Solid-state relay
2. Circuit breaker
3. Main Switch
4. PLC
5. Meter board
6. DC power supply

Internal Components *(contd)*

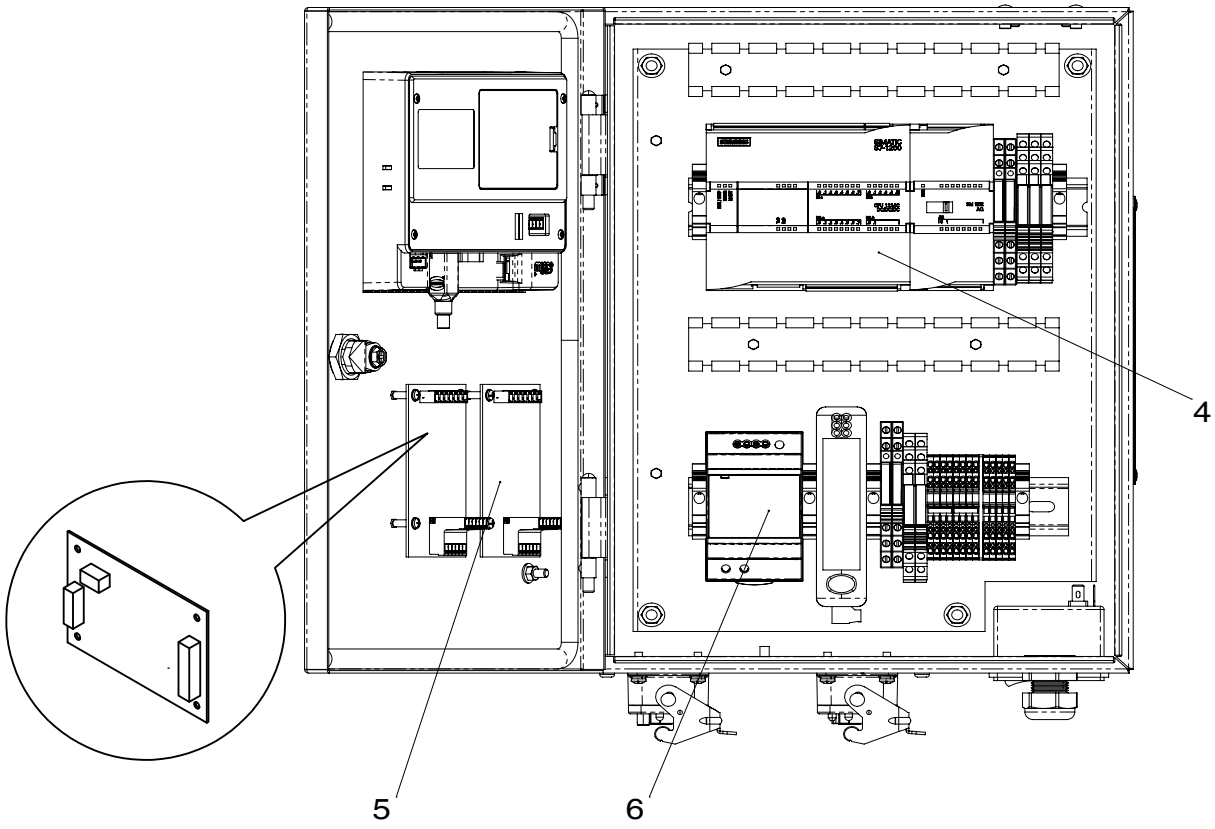


Figure 5: Internal components of the controller W/O heating zones

4. PLC
5. Meter board
6. DC power supply

Controller Identification

You will need the model and part number of the controller when requesting service or ordering spare parts and optional equipment. The model and part number are indicated on the equipment identification plate.

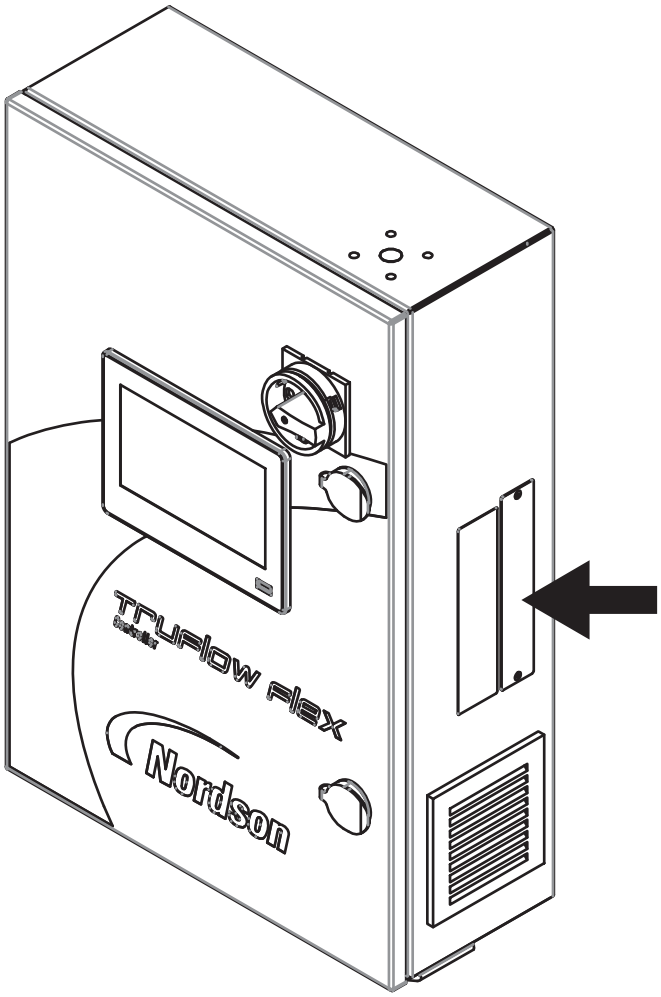


Figure 6: Location of the equipment identification plate

Installation

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

Installation involves positioning the controller in the desired location and making the electrical connections.

For installation details on the melters, hoses, applicators, and other equipment refer to the equipment-specific documentation.

ElectroMagnetic Compliance Information

This system is classified as Class A, Group 1 under the European standard for limits and methods of measurement, EN 55011.

Experience of Installation Personnel

The instructions provided in this section are intended to be used by personnel who have experience in the following subjects:

- Hot melt application processes
- Industrial power and control wiring
- Industrial mechanical installation practices
- Basic process control and instrumentation

Customer-Supplied Installation Components

In addition to the components provided by Nordson Corporation, installing the flow/monitor controller requires the following customer-supplied component:

- Appropriate guarding and signage as required to prevent personal injury during operation and service activities

Installation Considerations

Unpacking the Controller

1. Carefully unpack the controller. Exercise care to prevent equipment damage during unpacking.
2. Inspect for any damage that may have occurred during shipping. Report any damage to your Nordson representative.

Mounting Guidelines

- Position the controller as close as possible to the parent machine or production line.
- Make sure that the mounting location provides sufficient clearance around the sides, base, and rear for easy access to the connectors.

  NOTE: For unhindered air flow, the recommended minimum clearance at the top and base of the unit is 50 mm (1.96 in.).
- Mount the controller vertically on the wall or post to provide maximum cooling by convection across the heatsink fins.
- Mount the controller on a rigid support (e.g. wall or post) to prevent external vibration.

Positioning and Mounting the Controller

Equipment and production line configuration may dictate a variation in the mounting options described in this section. Regardless of the mounting method used, refer to “Mounting Guidelines”.

Controller Dimensions (mm [inches])

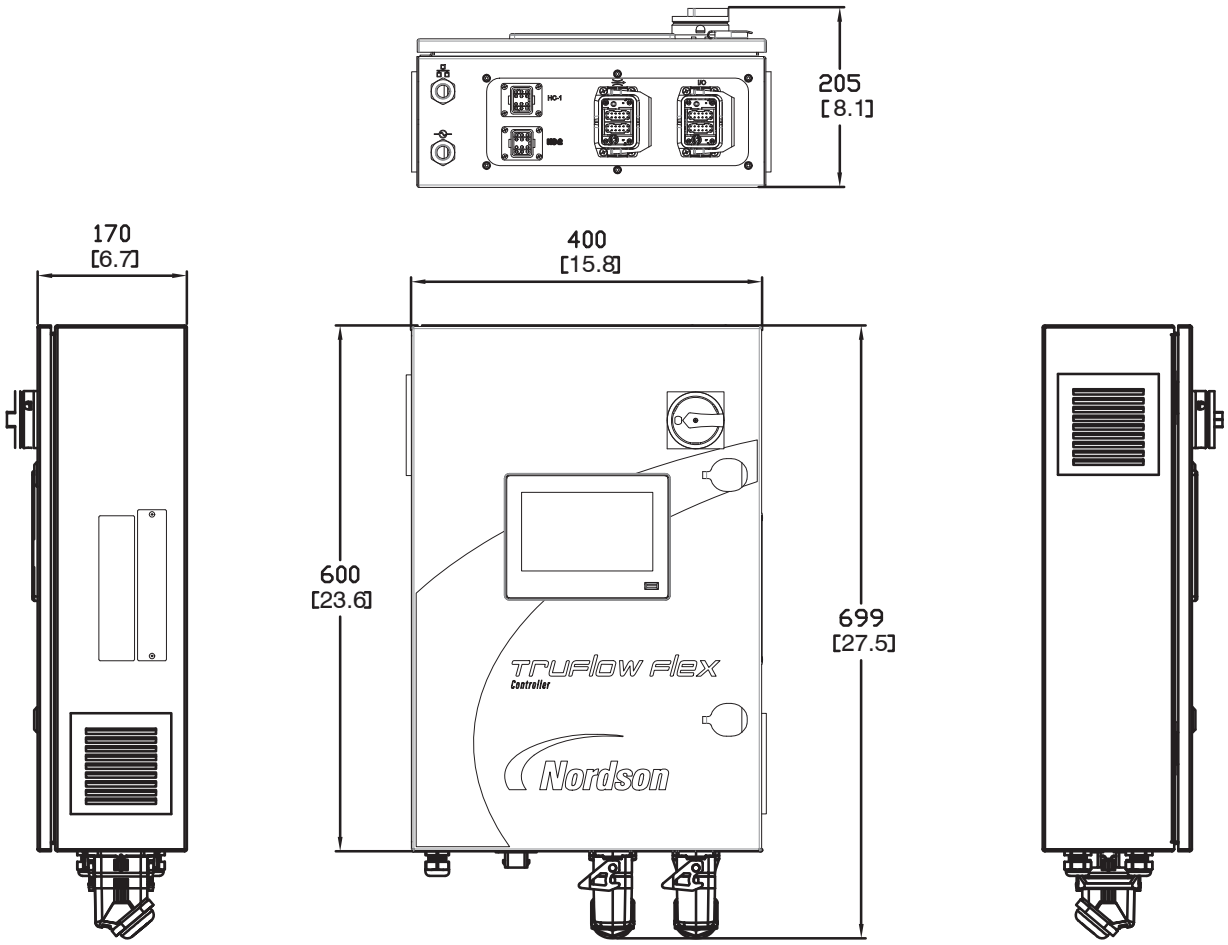


Figure 7: Controller dimensions – With heating

Controller Dimensions (mm [inches]) *(contd)*

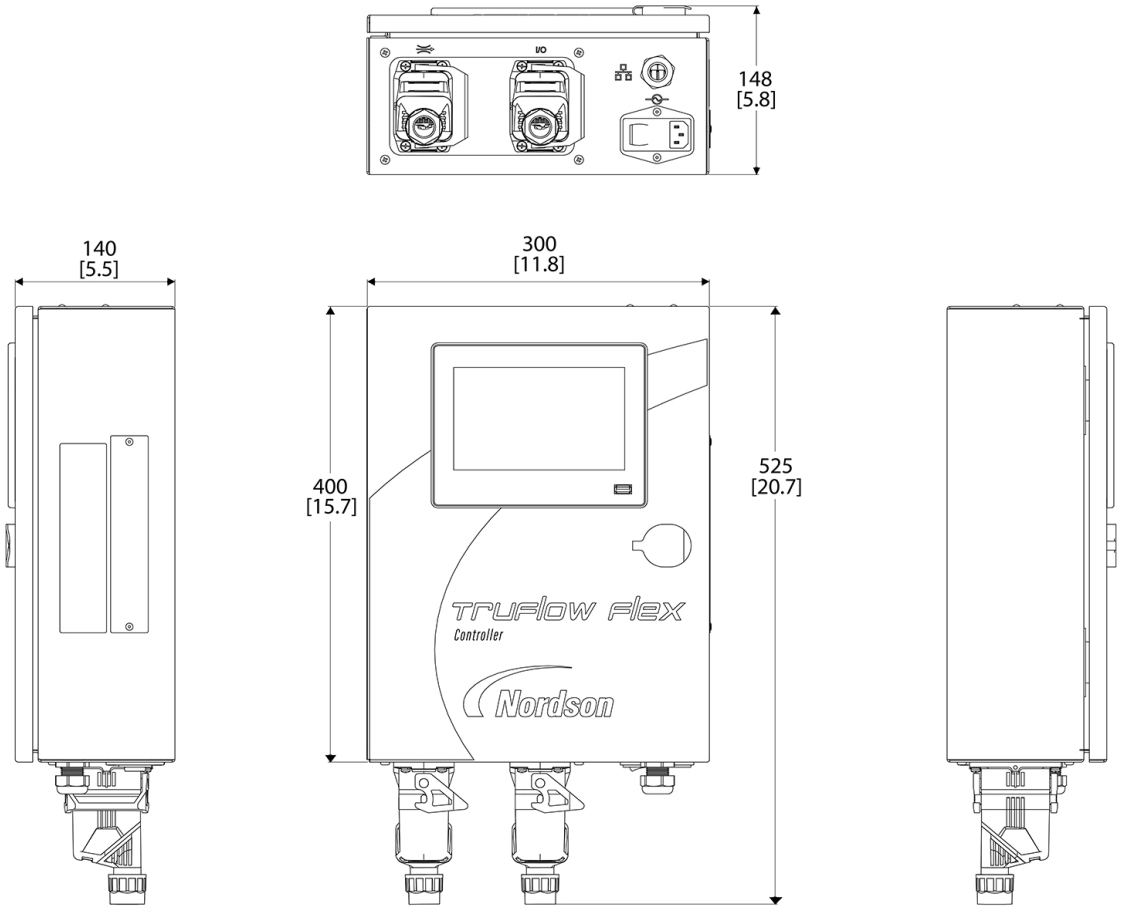


Figure 8: Controller dimensions – Without heating

Electrical Connections

WARNING! Operate only at the operating voltage shown on the ID plate.

Meter Connection

The TruFlow Flex controller is designed to work with the TruFlow series of meters from Nordson.

WARNING: Do not connect the TruFlow Flex controller directly to the TruFlow meter. The TruFlow Flex controller must be connected to the TruFlow transmitter box, as shown below. Connecting the TruFlow Flex Controller directly to the meter will cause meter damage.

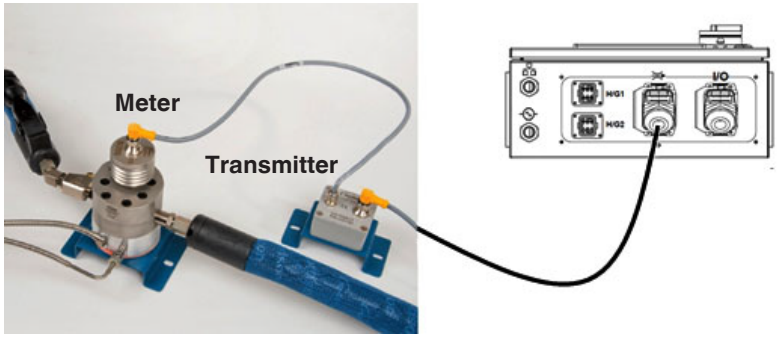


Figure 9: TruFlow Flex meter and transmitter box

Figure 10 on page 26 shows the 24 VDC and 5 VDC connection to a TruFlow meter.

NOTE: When installing, be sure to position the TruFlow meter facing sideways or down. This will prevent bubbles from accumulating inside the meter. In a high-pressure installation, gas bubbles may create undesirable side forces on the gears. Positioning the meter facing sideways or down will allow bubbles to be purged and reduce the amount of heat rising from the flow meter into the encoder circuitry.

Nordson recommends the following actions:

- Purge air from the meter before operating.
- Secure cabling so that it does not come into contact with heated surfaces.

Meter Connection *(contd)*

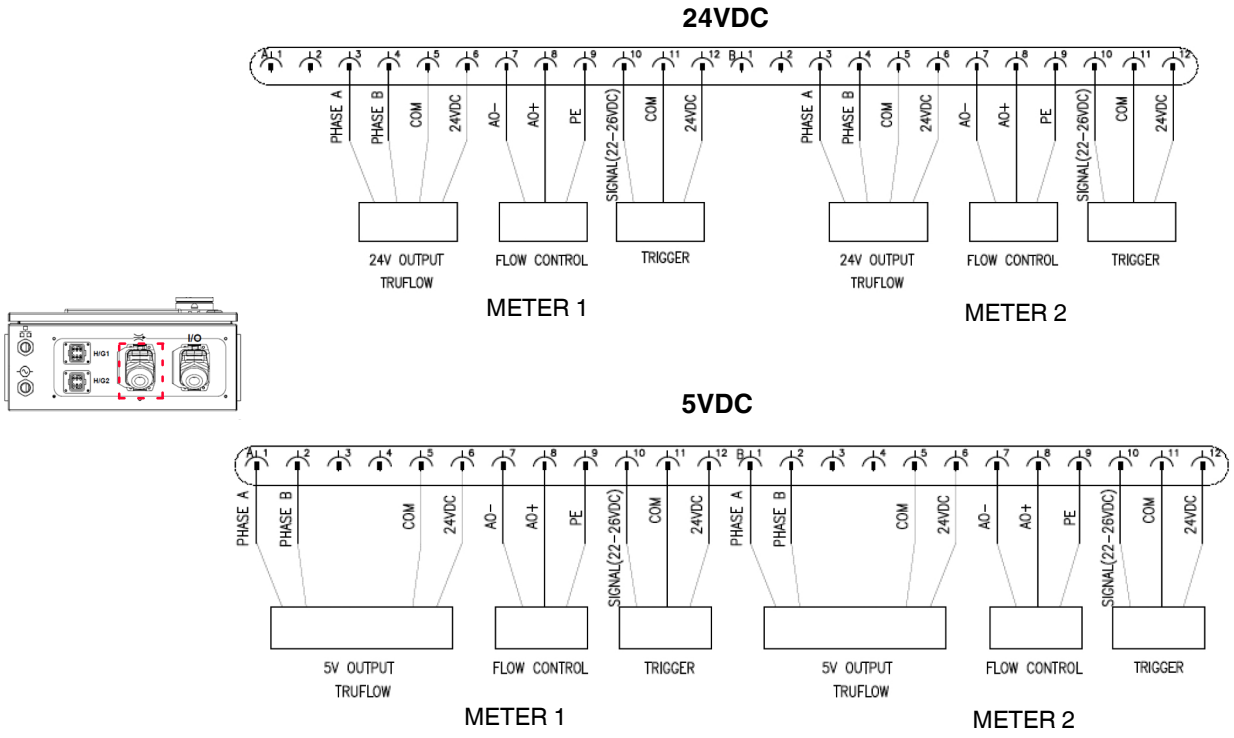


Figure 10: TruFlow meter connections

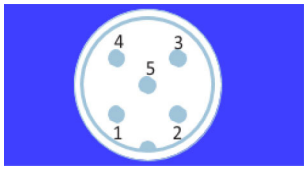


Figure 11: Cable pinout – Front view of connector

Meter Connection *(contd)*

Mating Connector for the TruFlow Transmitter Box

Connection	Pin Number	Mating Cable Wire Color
DC+	1	Brown
DC-	4	Black
Phase A	2	White
Phase B (Quadrature only)	5	Gray
Ground	3	Blue

The meter boards, shown in Figure 12, must be set to work with either NPN or PNP signals from the meter. Please use the switch on each meter board to set this function for your specific meter. Also, for single-phase operation, you must place a jumper between pins 4 and 5 on TB1 as shown.

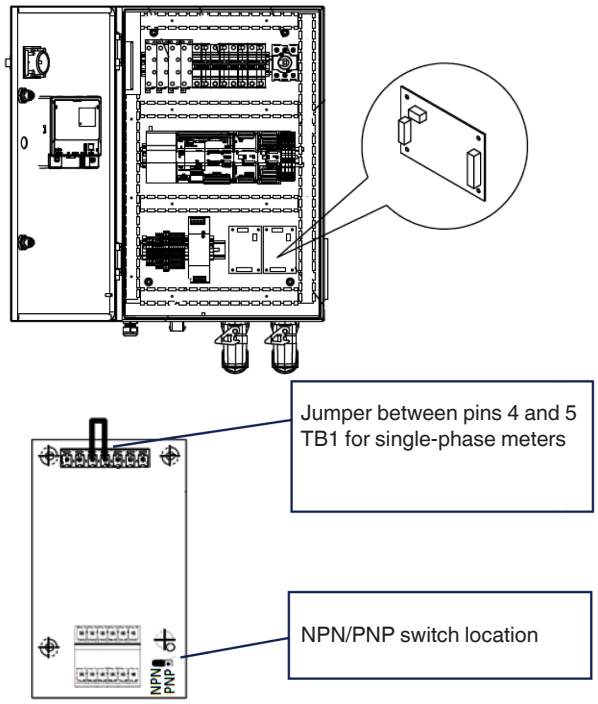


Figure 12: Meter board settings

I/O Connection

The I/O provides the user with three configurable inputs and three standard outputs. The inputs are activated by applying a constant 24 VDC signal voltage, which is supplied by the customer's control equipment.

The outputs are rated for 24 VDC, 300 mA maximum load for each output.

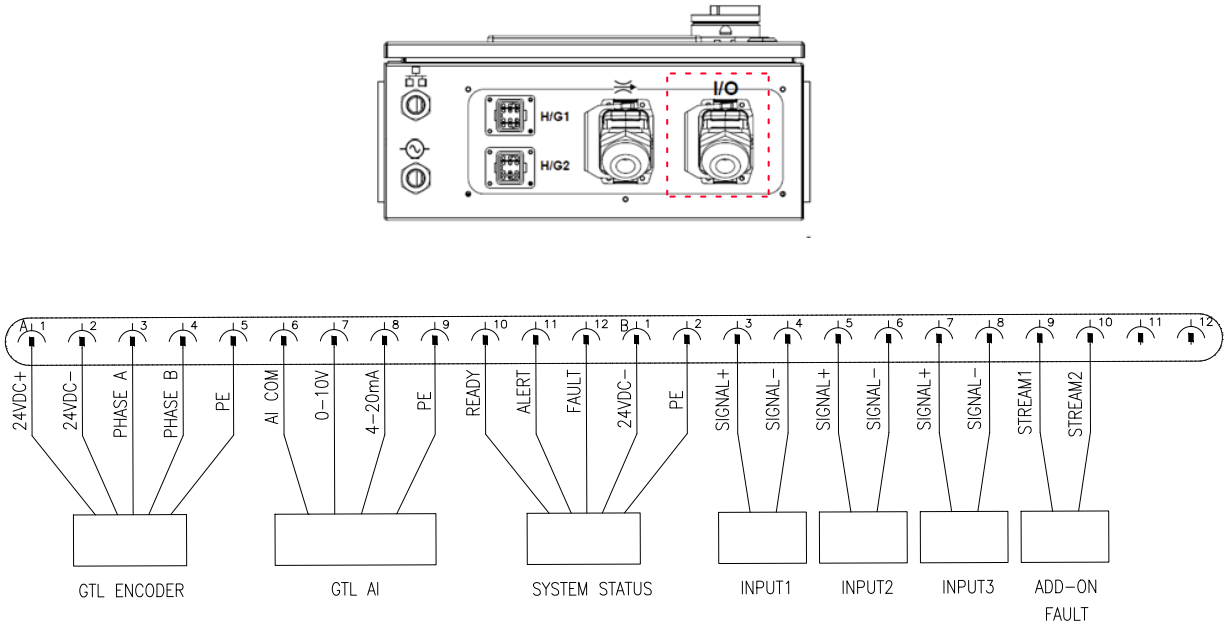
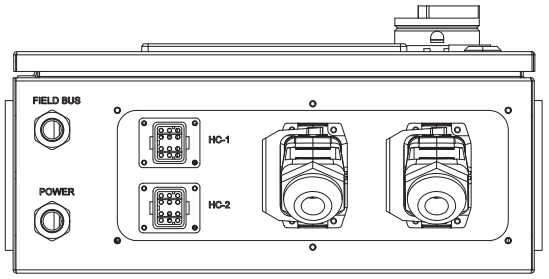
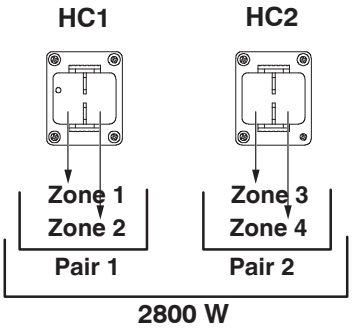


Figure 13: Bottom panel connectors — I/O

Hose/Applicator External Connections

Use these connectors to connect to external hose/applicator devices.

Controller Base Panel with Nickel RTD

Hose/Applicator Connector	Connects to...
	

Single Zone			Dual Zone		
Zone 1	0 W	Pair 1	Zone 1	600 W	Pair 1
Zone 2	1200 W		Zone 2	600 W	
Zone 3	0 W	Pair 2	Zone 3	800 W	Pair 2
Zone 4	1600 W		Zone 4	800 W	
Total	2800 W		Total	2800 W	

Electrical Service Information

For detailed installation guidance, please refer to the *TruFlow Flex Installation Guide*, P/N 1129545.

Before System Setup

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

Before setting up the system make sure of the following:

- All required internal/external connections have been completed.
- Controller is connected to a melter or parent machine.
- Controller is connected to the meter.
- Hoses and applicators are connected.
- Controller power cable must include a ground connection.
- Controller power switch is turned on.

Operation

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

The user interface flow diagram on the following page depicts the touch screen menu hierarchy, including settings and all available options. Depending on your controller configuration, some of the items shown on the flow diagram may not be available.

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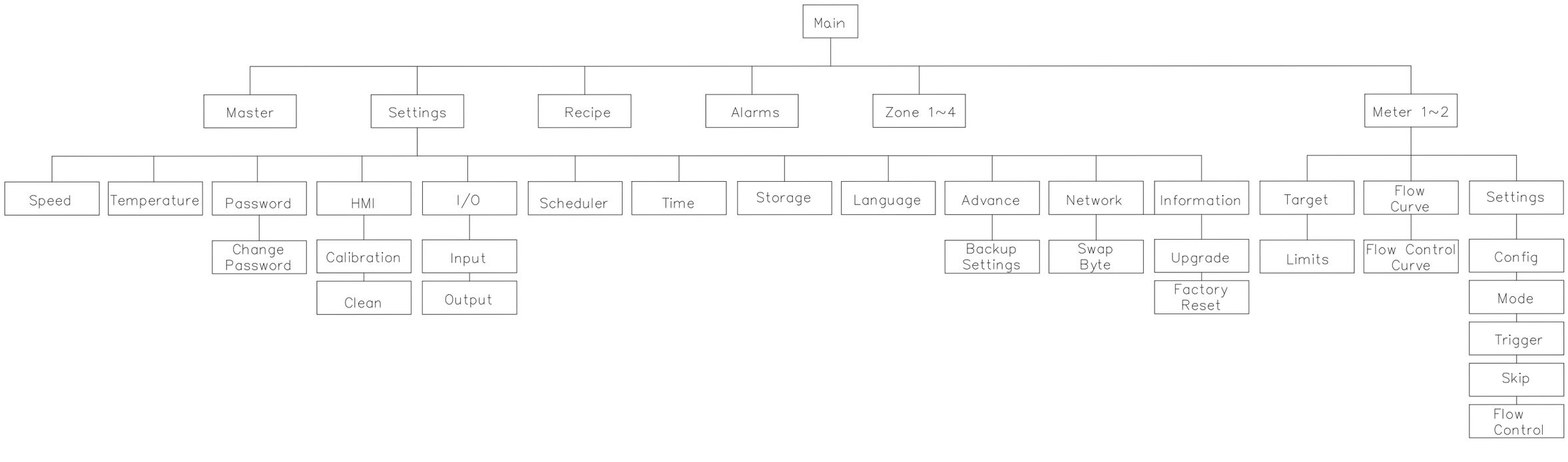
Touch Screen Menu Map

Refer to the following menu map for touch screen menu information.



Home Screen

The Home screen allows you to navigate the graphical user interface to setup, operate, and maintain the controller.

The controller is shipped from the factory with most software settings pre-configured and ready to use. However, there are some settings that you must configure and fine tune to best fit your manufacturing process.

Navigating the Home Screen

The following components on the Home screen allow you to navigate through the various screens for setup and operation.

Refer to Table 3 for the Home screen button functionalities.

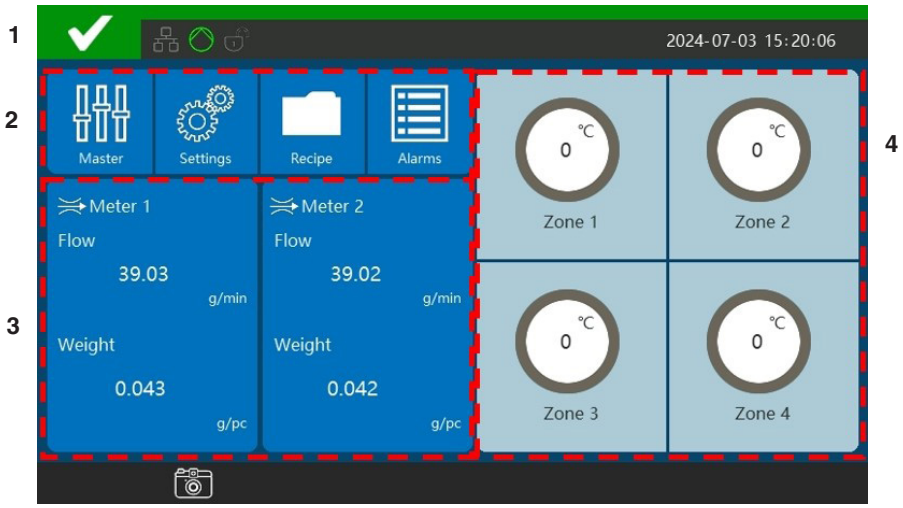


Figure 14: Home screen navigation buttons

1. Status
2. Navigation button
3. Meter buttons
4. Zone buttons

Table 3: Home screen button functionalities

Item	Section	Functions
1	**Zones**	• Enable/disable • Define individual set point temperatures • View actual temperature and status for each zone
2	**Navigation**	• Access the Master Control, System Settings, Recipe, and Event List
3	**Meters**	• Teach or set the flow target value • Create or modify meter name • Configure or view graphing • View status for each meter
4	**Status**	• View controller status

Monitoring the Controller Status

The following figure shows the location that allows you to view the controller status.

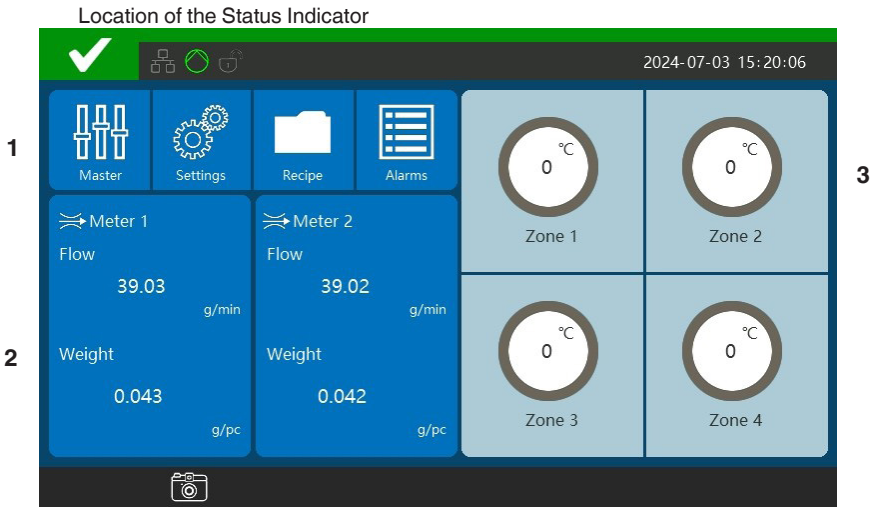


Figure 15: Status Indicator button location

1. Navigation button
2. Meter buttons
3. Zone buttons

Status Indicator Table

The following table details the controller status messages.

System State	Background Color	Description
Run	**Green**	All conditions satisfied for running production. Possible to make product.
Alert	**Yellow**	Possible to make product but there is a condition that may require attention. For example, measured flow or temperature is outside of acceptable range.
Idle	**Blue**	No alert or fault condition, waiting for run condition to be satisfied by all system settings. For example, heat-up phase, setback, low line speed, and remote disable.
Fault	**Red**	Not able to make product – equipment problem that requires system shutdown. For example, temperature fault.
Stop	**Red**	Our machine initiates the stop based on defects detected in the product or equipment problem that does not require system shutdown.
Component or System is Off	**Gray**	System is temporarily not functional. For example, commissioning step not completed, software upgrade in progress, backup/restore in progress, and control switched off.

Master Controls

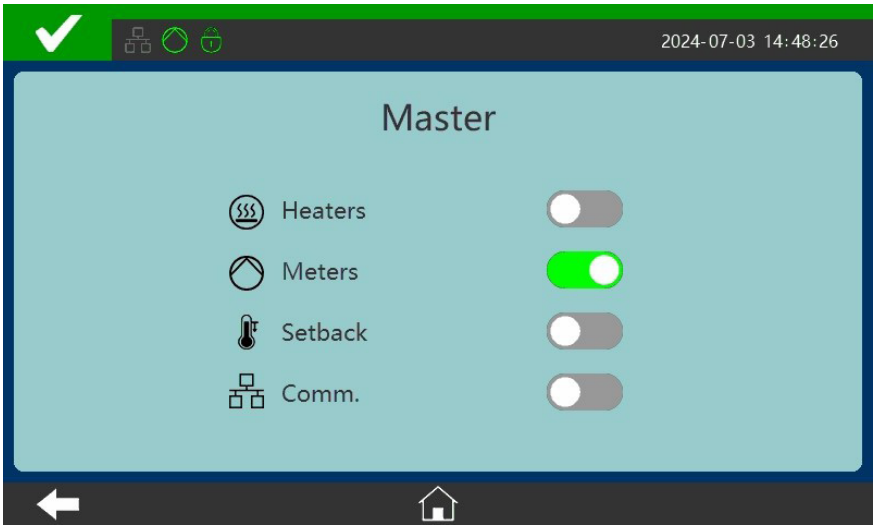
WARNING! Allow only qualified personnel to perform the following tasks. Follow the safety instructions in this document and all other related documentation.

Use the Master Controls display to switch on/off the primary controls of the controller, including the heater and scheduler as well as to manually place the controller into setback mode.

The controller is shipped from the factory with pre-configured system settings and ready to use. However, there are some settings that you must configure and fine-tuned to best fit your manufacturing process.

1. From the Home screen, touch 

to access the Master Controls screen.



Master Controls *(contd)*

2. Touch the color-coded button to switch On or Off the following:

Master Control	Function
Heaters	Manually switch the heaters On/Off. By default, the master heater control is Off. **NOTE:** If Heater On Startup is enabled, the heaters will be enabled automatically at controller startup.
Meters	Manually switch the meters On/Off. **NOTE:** The master must be switched on to enable all the meter flow monitors.
Setback	Manually switch the controller in or out of setback mode.
Communications	Manually switch the Communications functions On/Off.

3. Touch  .

What the Button Colors Indicate

The following table details what the Heaters, Setback, and Master Meter buttons indicate.

Button	Color	Description
	Green	On
	Gray	Off

Flow Meters

Use the Meters display screen to re-configure the flow meter settings to best fit your manufacturing requirements.

Touch the Meter button highlighted in the following figure to access the Meter display screen.

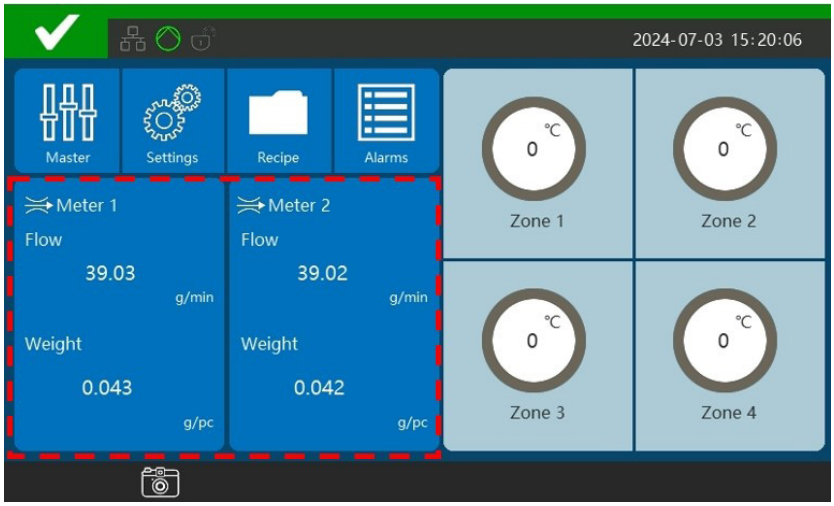


Figure 16: Meters screen

About Meter Status

Figure 17 details what a meter displays.

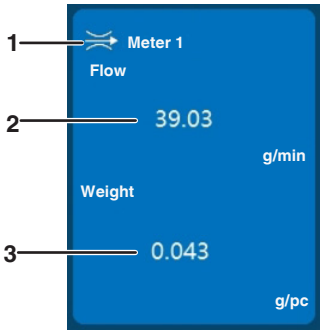
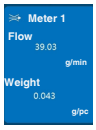


Figure 17: Meter button details

1. Name of meter
2. Real-time flow rate
3. Application add-on weight

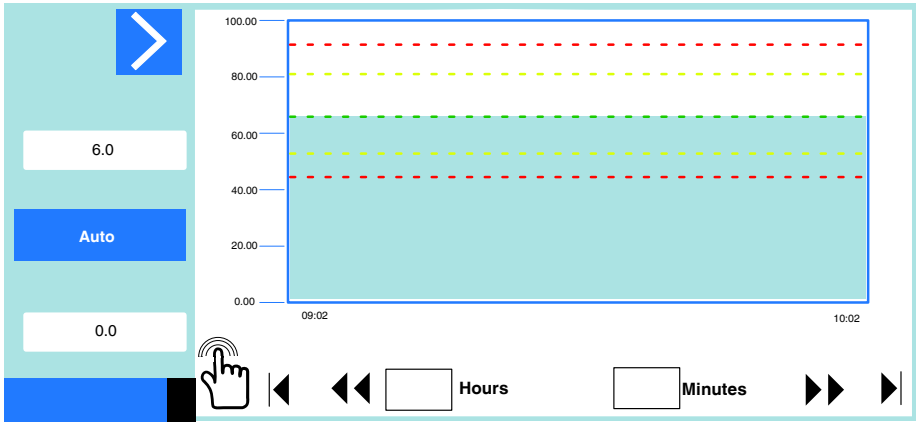
Flow Rate Monitoring

1. From the Flow Rate Monitoring screen, touch 

to change the data display.

2. From the screen, touch each View button 

to change the add-on chart view.
3. Touch the chart's Y axis highlighted in the following figure to adjust the chart scale.



4. Touch **Auto** to adjust the chart scale automatically.

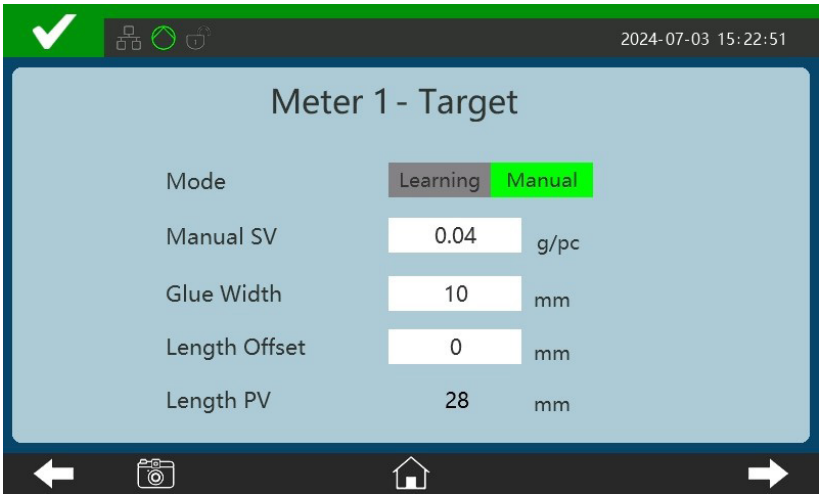
Flow Meter Runtime Setting – Target

Set the flow monitoring add-on target value to best fit your manufacturing requirements.

NOTE: The add-on target method is switched according to the application mode in the flow setting.

1. From the Flow Rate Monitoring screen, touch 

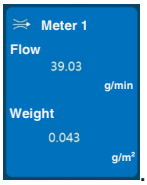
.



2. Define the following settings:
   - Mode
   - Manual SV
   - Glue Width
   - Length Offset
   - Length PV (Read-only)

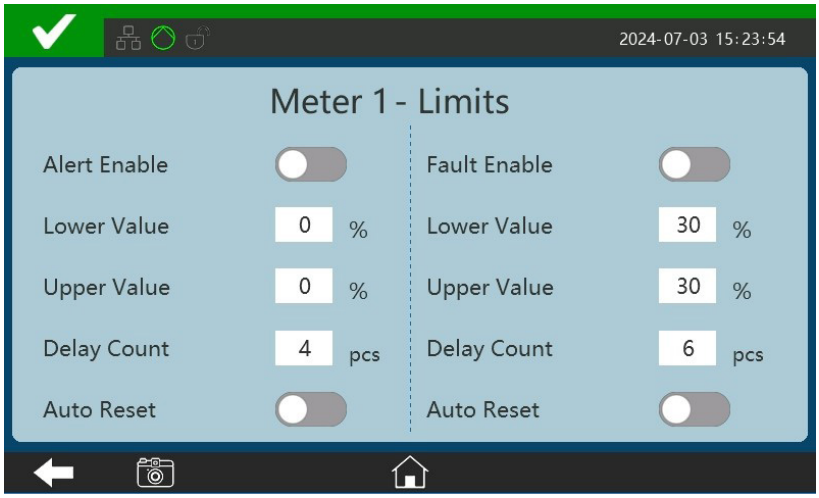
Meter Limits

During normal operation, the system compares the measured Add-On/Product to the Alert/Fault Lower Limit and Alert/Fault Upper limit settings. If a measured Add-On/Product value falls outside the Alert/Fault threshold settings and the number of consecutive defective products equals or exceeds the setting entered for Alert/Fault Delay Count, the system enters an alarm state and activates the Alert/Fault Output.

1. From the Home screen, touch 

.
2. Touch 

.
3. Touch  to access the Meter Limits screen.

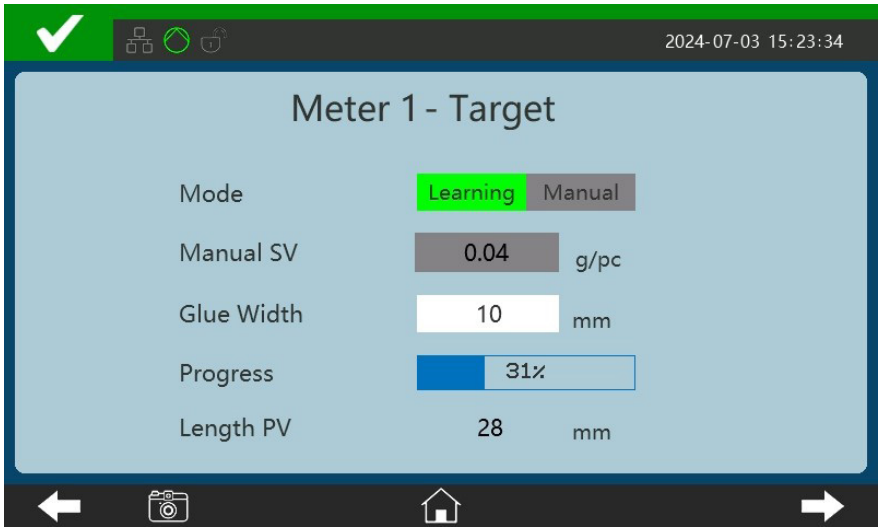


4. Change the settings as needed. Please note the following:
   - The Alert / Fault Enable feature can be disabled.
   - The Alert and Fault settings auto reset as follows:
     - **Alert Auto Reset:** The Alert setting will auto reset after five seconds.
     - **Fault Auto Reset:** The Fault setting will auto reset with the raising of the trigger signal.

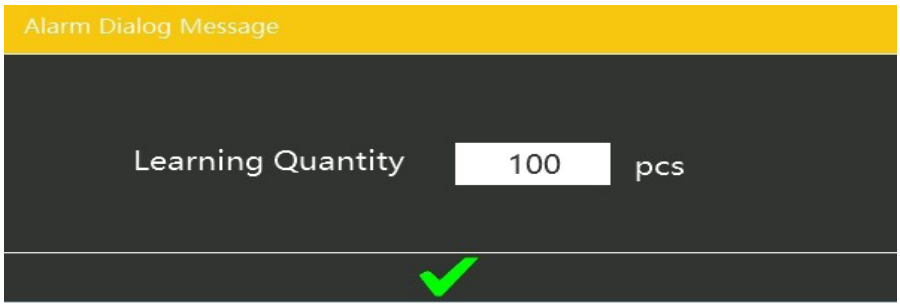
Learning

The target can be entered from a number keypad directly, or by touching Learning to let the system learn the correct value from the specified number of products or amount of time.

1. From the Target screen, touch **Learning**.



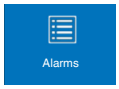
2. Touch  . The screen displays a Progress of Learning indicator.



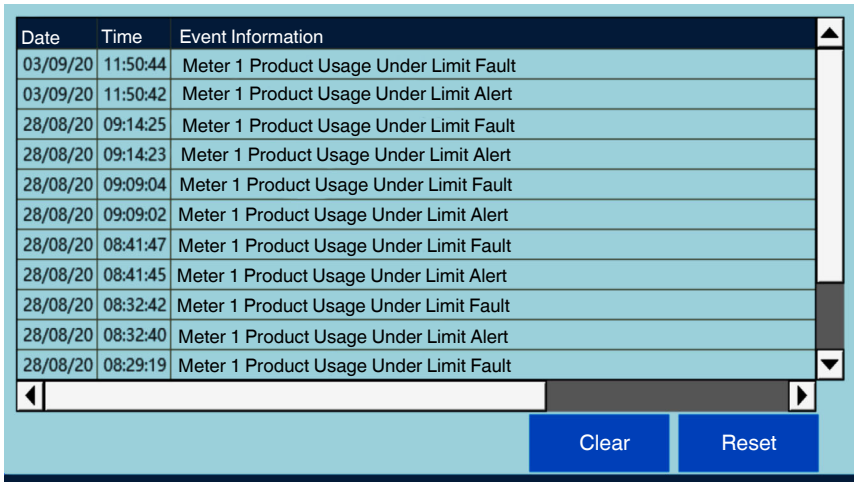
3. Touch **Manual** on the Target screen to stop the learning.

Events List

The Events list shows the most recent major events in the TruFlow Flex controller. This list can be useful for troubleshooting.

1. From the Home *s*creen, touch 

to access the Events list.



2. Select from the following options:
   - Touch **Clear** to clear the screen.
   - Touch **Reset** to reset a fault condition on the controller.

Understanding the Zones

Use the Zone display screen to reconfigure the zone settings to best fit your manufacturing requirements.

Touch any of the Zone buttons, highlighted in the following figure, to access the Zone display screen.

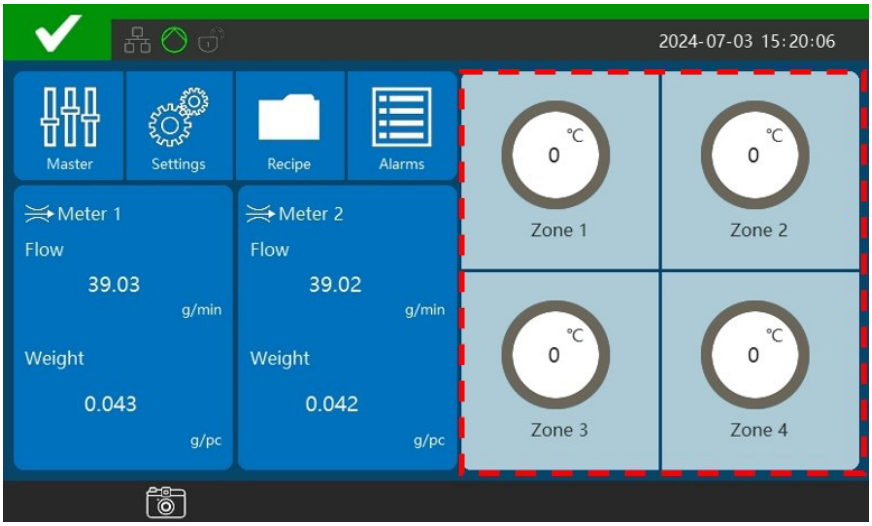


Figure 18: Zone buttons

Type	Default Name	Notes
External Zones	Zone (1,2,3,4)	• External zones include hoses and meter. • Default name consists of the word Zone, and its corresponding channel number. Typically, these are pairs, where Zone 1 represents a hose and Zone 2 represents the flow meter. **NOTE:** Nordson does not recommend that you connect the heater zone to an applicator because applicators may have special power and control requirements that are better served by the melter.

About Zone Buttons

Figure 19 details an enabled zone button displays. Refer to Table 4 for a detailed list and explanation of each zone button.

Figure 19: Zone button details

1. Process Ring
2. Real-time temperature
3. Zone name

Table 4: Zone State and Status Color Reference

Zone States			
Button	**Color**	**State**	**Description**
	Green	Ready/Run	The zone is enabled and has reached its set point temperature.
	Blue	Idle	• The zone is enabled and is in the process of heating to its set point temperature. • The system is in Ready Delay. • The system is in Setback mode.
	Yellow	Alert	The zone is enabled, but the system has detected an alert condition. Touch the Status indicator button to view system message. **NOTE:** In an alert condition, both the Master Heater and Meter controls remain On. You have two minutes from the time the system detects the RTD or an over/undertemperature condition before the alert condition is upgraded to a fault condition.
	Red	Fault	The zone is enabled, but the system has detected a fault condition. Touch the Status indicator button to view system message. **NOTE:** In a fault condition, both the Master Heater and Meter controls are switched Off.

NOTES:

- You can modify zones at any time.
- Changes to set point temperatures and PID Type take effect when the zone is enabled and when the controller itself is in a Ready/OK state.
- The state of a zone is independent of the overall status of the controller.

Configuration

WARNING! Allow only qualified personnel to perform the tasks in the sections that follow. Always follow the safety instructions in this document and all other related documentation.

Heated Zones

Configuring heated zones includes the following tasks:

- Enabling and disabling heated zones
- Setting individual set point temperatures
- Creating or modifying external zone names
- Modifying default channel PID types

Refer to “Understanding the Zones” on page 44 for more information.

Enabling and Disabling the Zones

Use the Zone screen to enable or disable a specific zone.

1. From the Home screen, touch 

.

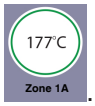
2. Touch the color-coded button to enable or disable the zone.

Button	Color	Description
	Green	On
	Gray	Off

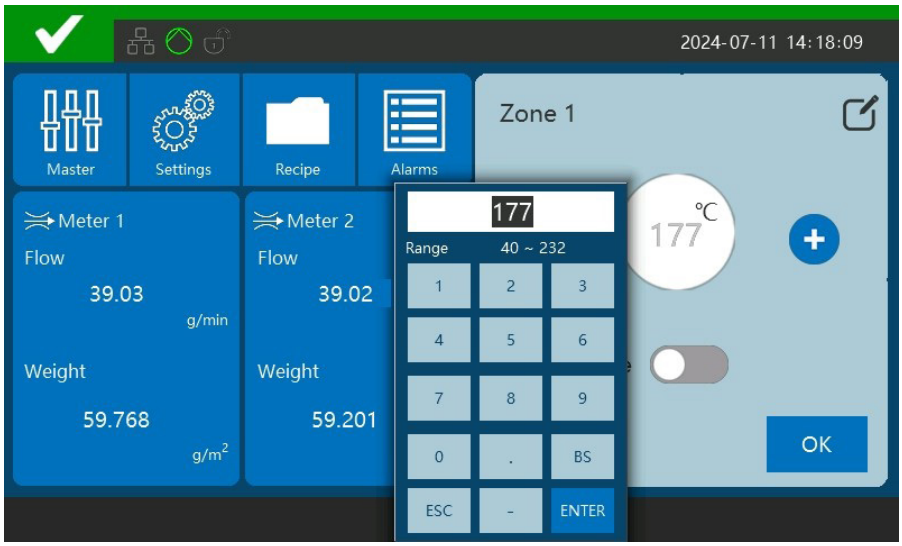
3. Touch **OK**.

Modifying the Zone Set Point Temperatures

Use the numeric keypad to assign set point temperatures.

1. From the Home screen, touch 

.



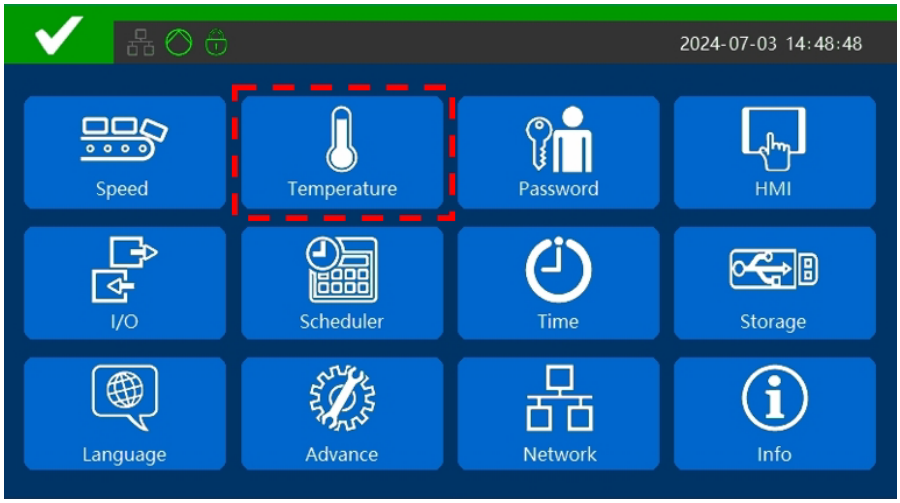
2. Touch 

and enter the temperature.
3. Touch **Enter**.

Advanced Temperature Settings

1. Access the operator display and touch 

.
2. Touch **Temperature**.



3. Refer to the sections that follow for more information about defining temperature settings.

The sections that follow detail the following:

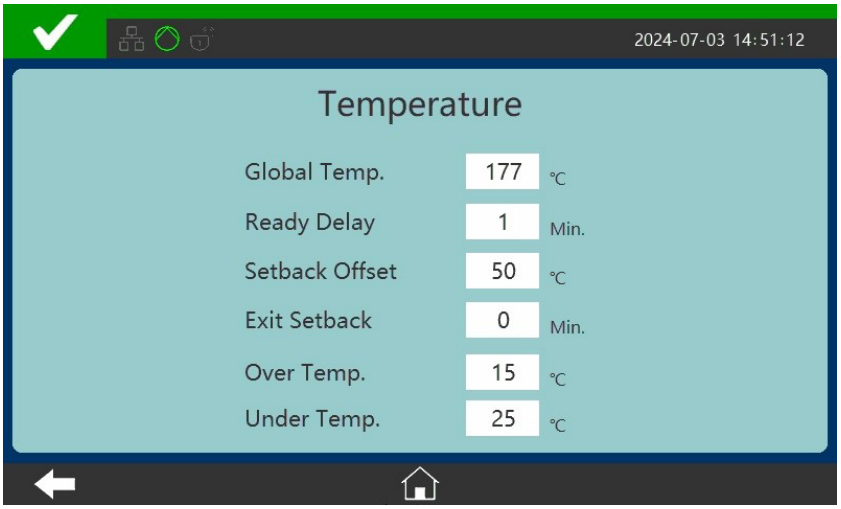
- Accessing temperature settings
- Setting a global set point temperature
- Setting ready delay
- Setting auto exit setback
- Setting temperature limits
- Setting setback settings

Global Set Point Temperature

Use global set point temperature to configure all zones with a uniform set point temperature.

1. Access the operator display and touch 

.
2. Touch **Temperature**.



3. Touch **Global Temp.** and enter the global set point temperature you want for all available zones.

Default	Minimum	Maximum
177 °C	40 °C	232 °C

4. Touch  .

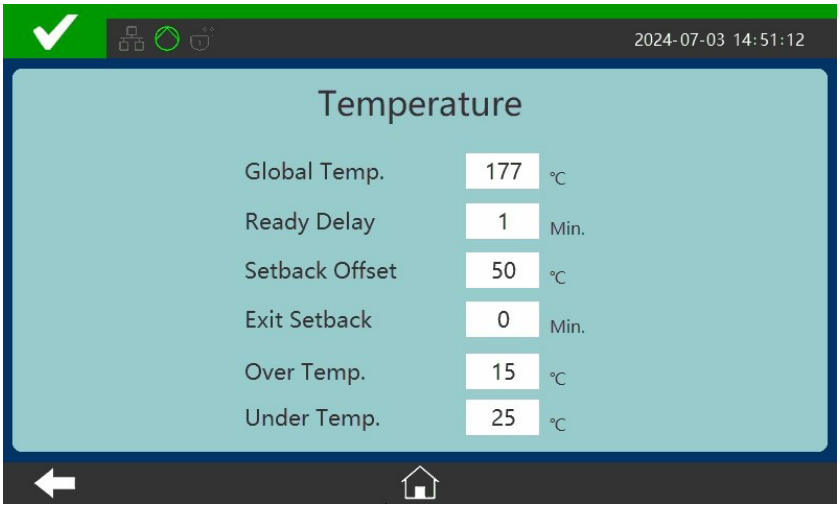
Ready Delay

Use Ready Delay to define the amount of time you want to elapse after all zones have reached their set point temperatures before the Ready/OK status appears.

NOTE: The ready delay time begins when all components are within 3 °C of their respective set point temperatures.

1. Access the operator display and touch 

.
2. Touch **Temperature**.



3. Touch **Ready Delay** and enter the desired value for the time.

Default	Minimum	Maximum
1 minute	0 (zero) minutes	60 minutes

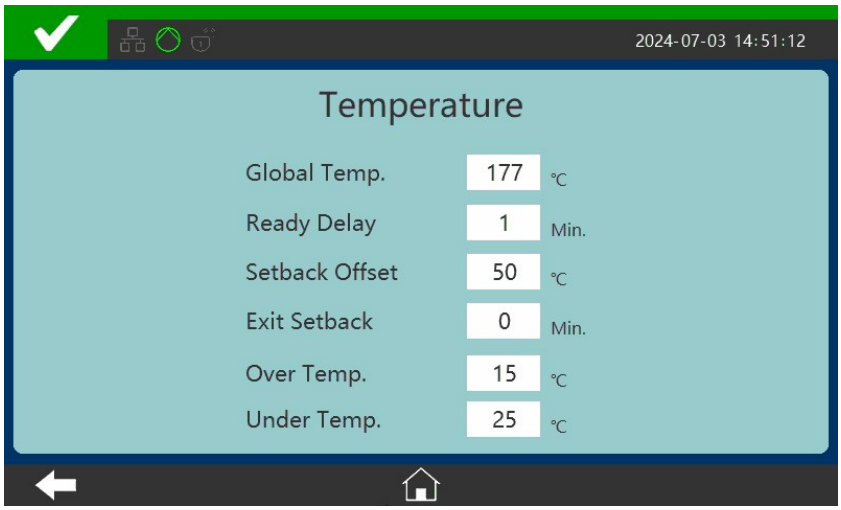
4. Touch  .

Setback Offset Temperature

Use Setback Offset Temperature to define the number of degrees (from the set point temperature) of all enabled zones that you want to decrease while in Setback mode.

1. Access the operator display and touch 

.
2. Touch **Temperature**.



3. Touch **Setback Offset** and enter the number of degrees you want to decrease from the set point temperature.

Default	Minimum	Maximum
50 °C	5 °C	60 °C

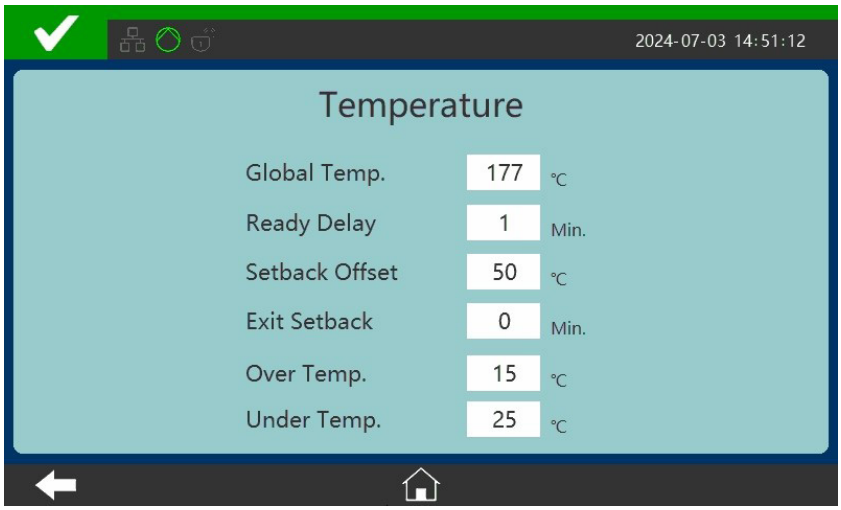
4. Touch 
.

Auto Exit Setback

Use Auto Exit Setback to define the amount of time that the TruFlow Flex will remain in the setback mode after being switched to setback mode. A value of 0 (zero) will disable this function.

1. Access the operator display and touch 

.
2. Touch **Temperature**.



3. Touch **Exit Setback** and enter the amount of time you want to exit Setback mode automatically.

Default	Minimum	Maximum
0 min	0 min	60 min

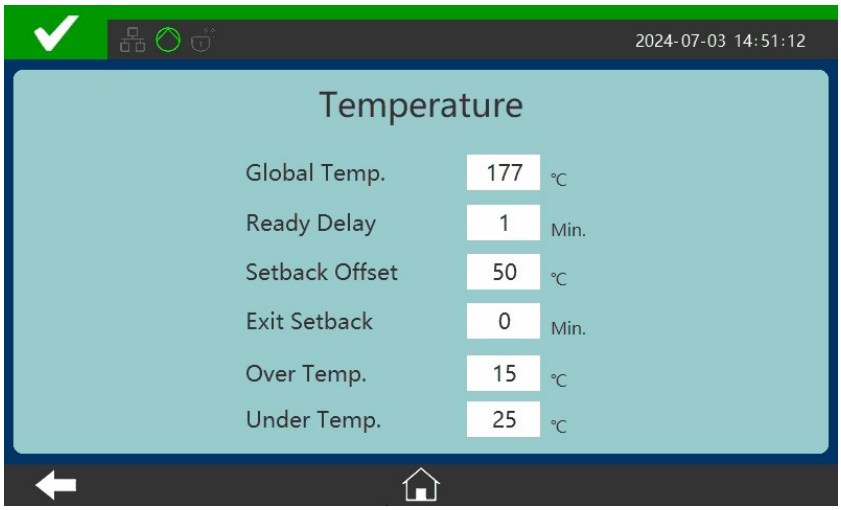
4. Touch  .

Temperature Limits

Use temperature limits to define the number of degrees a zone can increase or decrease from its assigned set point temperature before a temperature alert/fault occurs.

1. Access the operator display and touch 

.
2. Touch **Temperature** to access the Temperature screen.



3. Touch **Over Temp. / Under Temp.** and adjust the threshold.

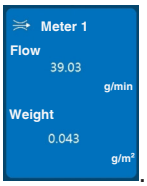
Setting	Default	Minimum	Maximum
Over Temp.	15 °C	5 °C	60 °C
Under Temp.	15 °C	5 °C	60 °C

NOTE: The zone itself changes to yellow 

. If you do not resolve the over/under alert condition within two minutes of it being detected, the alert changes to a fault condition, causing both Heater and Pump controls to automatically switch Off.

4. Touch 
.

Flow Settings

1. From the **Home** screen, touch 

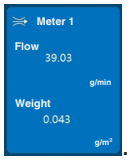
.
2. Touch 

to access all the screens that let you define the Flow settings.

The following sections detail:

- Meter Configuration
- Meter Mode
- Meter Trigger – Trigger
- Meter Trigger – Length
- Meter Trigger – Time
- Meter Skip
- Meter Limits
- Flow Control

Meter Configuration

1. From the Home screen, touch 

.
2. Touch Settings to access the Meter Configuration screen.

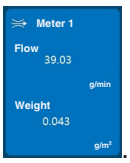
3. Configuring a meter includes the following:
   - **Encoder Resolution:** The number of pulses per revolution.
   - **Flow Per Revolution:** The adhesive volume per revolution.
   - **Encoder Type:** Single phase or quadrature. TruFlow meters can be either single phase or quadrature. Consult the data sheet for your specific meter.
   - **K-Factor:** A calibration factor used to fine-tune the flow meter output. The Calibration Constant Setting, also known as the K-Factor, is a user-calculated value, which is done as follows:
     a. Measure the weight in grams of the actual adhesive from 3-10 products.
     b. Compare these weights to the displayed adhesive weight.
     c. Use this formula to calculate the new K-Factor value:

        $$\text{New K-Factor} = \text{Old K-Factor} \times \frac{\text{Displayed Weight}}{\text{Actual Weight}}$$

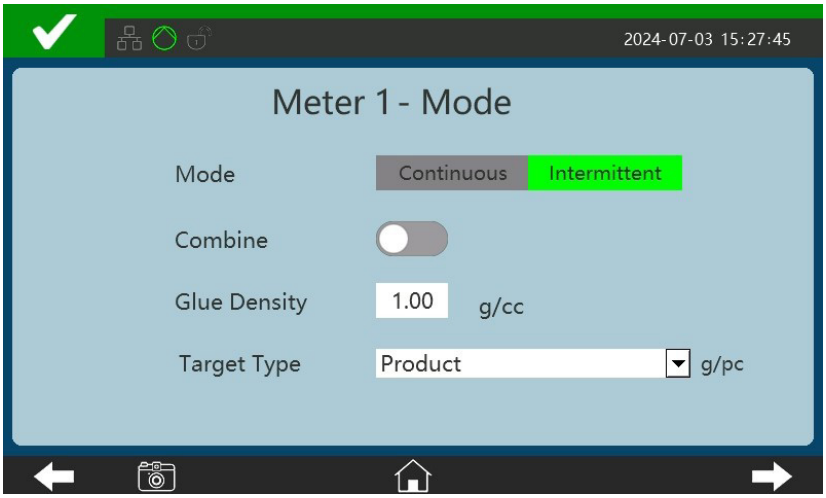
     d. Touch **Calibration** and enter the $\frac{\text{Displayed Weight}}{\text{Actual Weight}}$
     e. Touch **OK**. The system calculates the new K-Factor.

     NOTE: K-Factor is normally between 0.5 and 1.5. If your calculated K-Factor is outside this range, refer to “Password” on page 77 for help.

Meter Mode

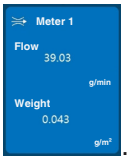
1. From the Home screen, touch 

.
2. Touch Settings, and then touch  to access the Meter Mode screen.



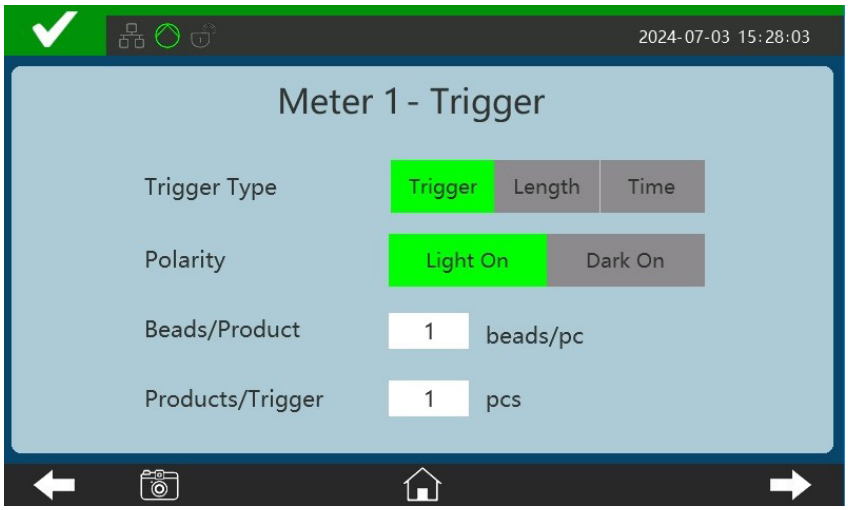
3. Define the following settings:
   - **Mode – Continuous:** This application add-on includes:
     - Per time (g/min)
     - Per surface area (g/m^2)
   - **Mode – Intermittent:** This application add-on includes:
     - Per product (g/product)
     - Per surface area (g/m^2) – e.g., for slot nozzle applications, like edge banding and flat lamination
     - Per length (g/m)
     - Adhesive thickness on the product (mm)
   - **Combine:** Use this setting to add the volume from Meter 2 to the volume from Meter 1 for a combined reading. This setting is only available for Meter 1.
   - **Glue Density:** The specific gravity (g/cc) of the adhesive is used to convert the flow sensor reading from cc (volume) to grams (mass).
   - **Target Type:**
     - Per product (g/product)
     - Per surface area (g/m^2) – for example, for slot nozzle applications, like edge banding and flat lamination
     - Per length (g/m)
     - Adhesive thickness on the product (mm)
     - Per time (g/min)

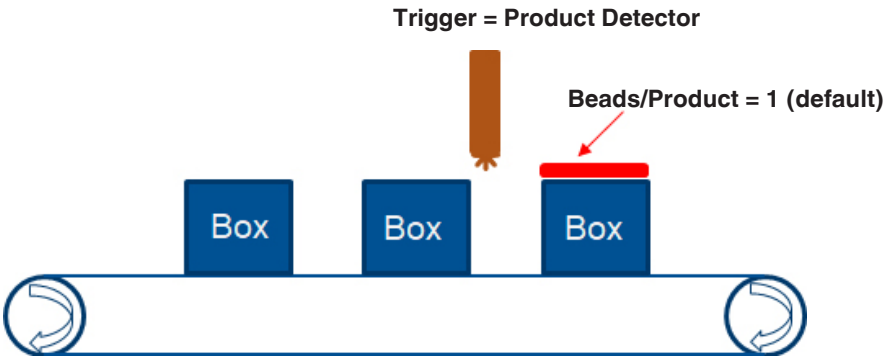
Meter Trigger – Trigger

1. From the **Home** screen, touch 

.
2. Touch 

.
3. Touch  twice to open the Meter Trigger screen and set the trigger mode (**Trigger** / Length / Time).

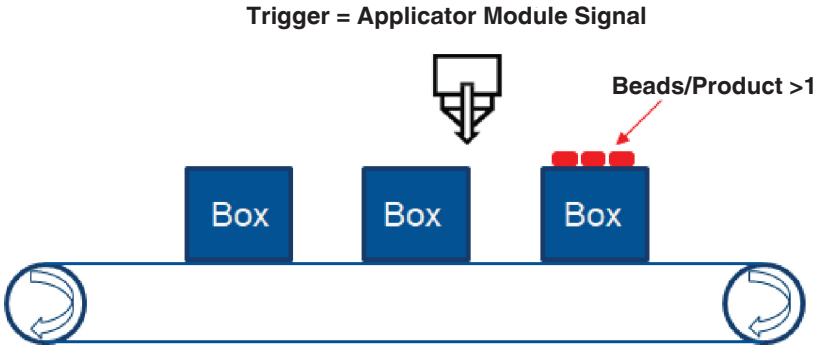




NOTE: This application is typically used for gluing products from end-to-end. The hardware trigger is normally from the parent machine's product detector.

- **Trigger Polarity:** Sets the polarity for correct product trigger operation. Use **Light On** for normally open triggers, and **Dark On** for normally closed triggers.
- **Number of Glue Beads:** For this application, the setting is **1**, because the trigger activates once for each product.

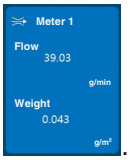
Meter Trigger – Trigger *(contd)*



NOTE: This application is typically for cases where there are several glue beads on one product. The hardware trigger is normally the applicator's module signal.

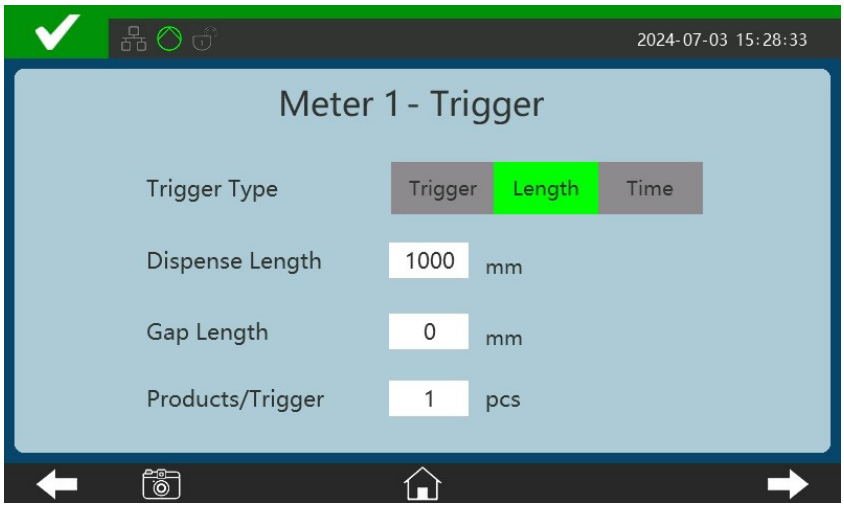
- **Trigger Polarity:** Set this to **Light On**, the same as the applicator module signal.
- **Number of Glue Beads:** For this application, set the quantity to the number of glue beads on each product.

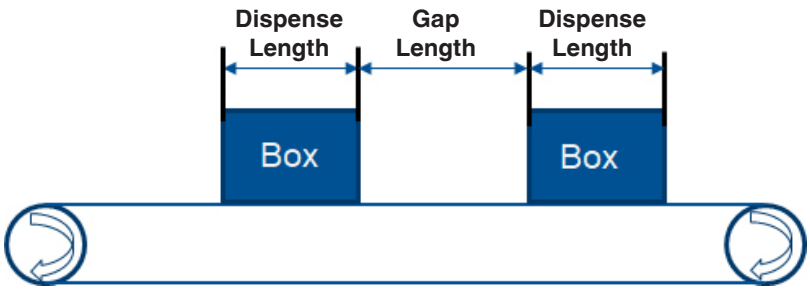
Meter Trigger – Length

1. From the **Home** screen, touch 

.
2. Touch 

.
3. Touch  twice to open the Meter Trigger screen and set the trigger mode (Trigger / **Length** / Time).

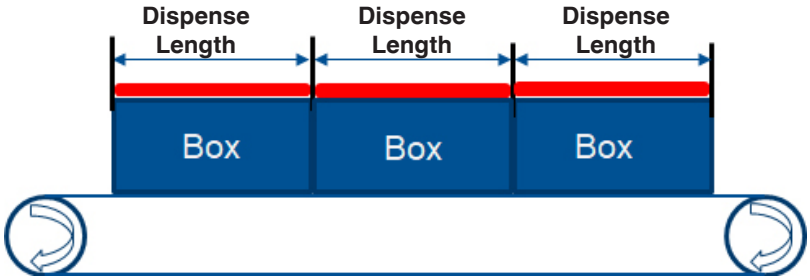




NOTE: This flow add-on is normally based on length measured by the encoder.

- **Dispense Length:** Set the dispense length to the product length.
- **Gap Length:** This length will not be included in the flow calculation. Normally, this is the gap between products.

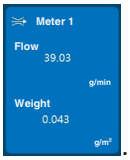
Meter Trigger – Length *(contd)*



NOTE: This application is normally for continuous mode.

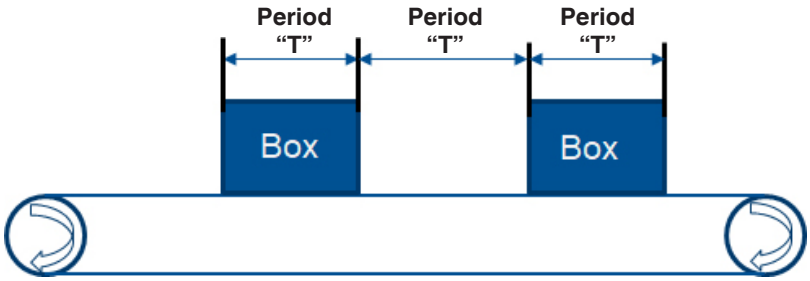
- **Dispense Length:** Set the dispense length to the product length.
- **Gap Length:** This length setting is 0 (zero).

Meter Trigger – Time

1. From the **Home** screen, touch 

.
2. Touch 

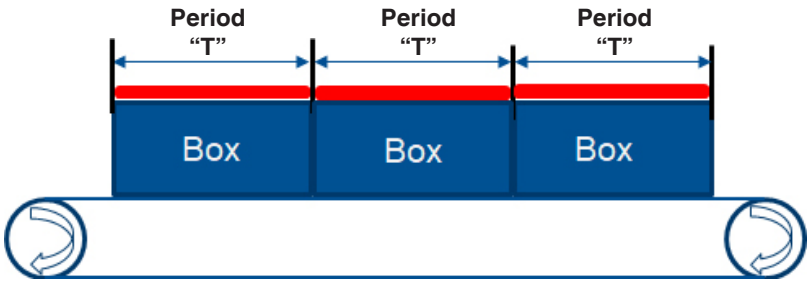
.
3. Touch  twice to open the Meter Trigger screen and set the trigger mode (Trigger / Length / **Time**).



NOTE: This flow add-on is based on time.

- **Dispense Time:** Set the time to detect the glue add-on per product.
- **Gap Time:** This time will not be included in the calculations.

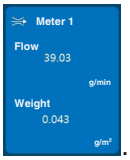
Meter Trigger – Time *(contd)*



NOTE: This application is normally for continuous mode. Flow add-on is based on time.

- **Dispense Time:** Set the time to detect the glue add-on per product.
- **Gap Time:** For this application, the time setting is 0 (zero).

Meter Skip

1. From the **Home** screen, touch 

.
2. Touch 

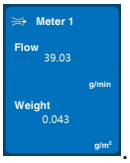
.
3. Touch  three times to access the Meter Skip screen.

4. Define the following settings:
   - **Idle Time:** The time the system will wait to restart product skip.
     - **Trigger Mode:** If the system does not receive a trigger signal within the skip idle time, product skip will restart.
     - **Length Mode:** If the system does not detect product movement past the dispense length within the skip idle time, product skip will restart.
   - **Skip Count:** The default is 0 (zero), and the range is 0–255.
     - **Trigger Mode:** The number of products to ignore before teaching or monitoring products for out-of tolerance adhesive output. A “0” (zero) setting disables product skipping.
     - **Length Mode:** The distance of products to ignore before teaching or monitoring products for out-of tolerance adhesive output. A “0” (zero) setting disables product skipping. The Ignore distance = Skip Count*(Dispense Length+Gap Length).

Flow Control

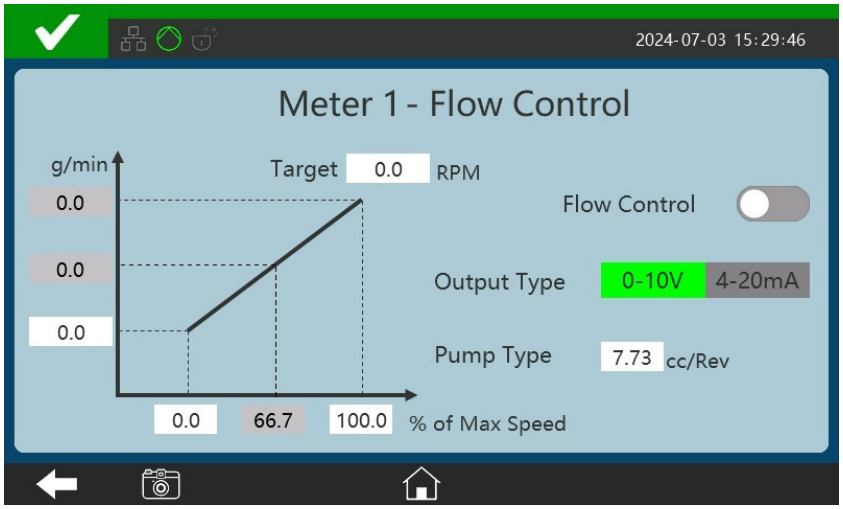
Flow Control dispenses an accurate flow rate of adhesive, based on meter measurements of add-on weights proportional to the line speed.

NOTE: Flow Control is only available in Continuous application mode.

1. From the **Home** screen, touch 

.
2. Touch 

.
3. Touch  four times to access the Flow Control screen.



4. Configure Flow Control settings as follows:
   - **Grammage:** This is the desired add-on weight at the desired line speed set in terms of % of Max Line Speed.
   - **% of Max Line Speed:** Set these values based on the Max Line Speed setting on the Line Speed screen. Both a target percentage and a minimum percentage must be set.
   - **Output Type:** Select the analog signal type to use for motor control. Note that the % value for motor control is always output in the Fieldbus data if the Fieldbus option has been enabled.
   - **Pump Type:** Select this value from the pump table found under “Pump” on page 84. Use your pump’s part number to find the correct cc/revolution.

Flow Control *(contd)*

- **Control Target:** The Control Target RPM value for the Grammage setting is automatically calculated based on the pump's cc/revolution and the Grammage value. The minimum RPM value for the minimum line speed must be set by the user.
- **Line Speed and RPM Actual Values:** The actual values for the detected line speed and the calculated pump RPMs are displayed in the center of the two axes of the Grammage curve.

Tip: Rather than guessing or using the trial-and-error method to determine the correct flow rate (gr/min) set point value to use for flow control and/or monitoring do the following:

1. Run at production speed.
2. Access the Home screen (refer to "Home Screen" on page 34), and write down the observed flow (mg/min) value.
3. When configuring a flow input channel, use that value as the Set Point Flow Rate (g/min).

NOTES:

- The flow control is only available in continuous mode. In intermittent mode, the Flow Control icon will be gray.
- The flow control output type can be 0–10 VDC or 4–20 mA or field bus. If the control output type is changed, the system must be rebooted.
- Flow control output over Fieldbus is intended for adjustments due to small changes in adhesive viscosity over time. It is not intended for ramp up and ramp down.

Line Speed

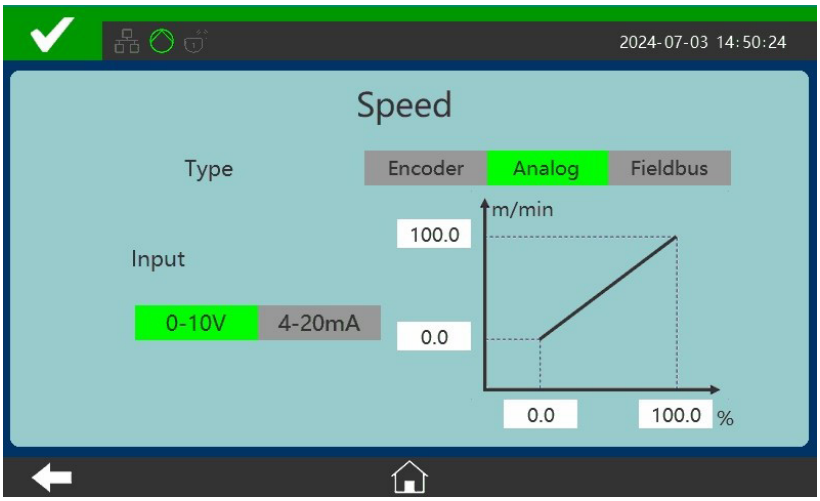
Set the proper line speed detection device. The device will be used for glue add-on calculation.

1. From the Home screen, touch 

.
2. Touch 

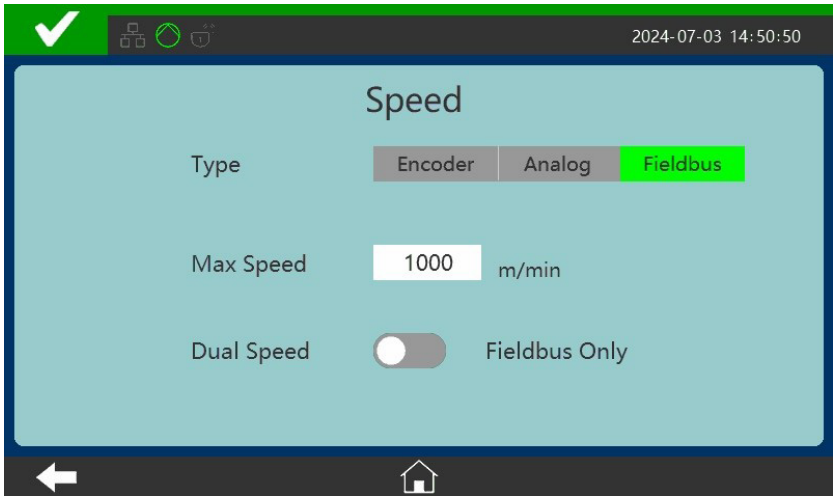
.
3. Touch **Encoder** to define the settings on this screen.

4. Touch **Analog** to define the Analog settings.



Line Speed *(contd)*

5. Touch **Fieldbus** to define the Fieldbus settings.



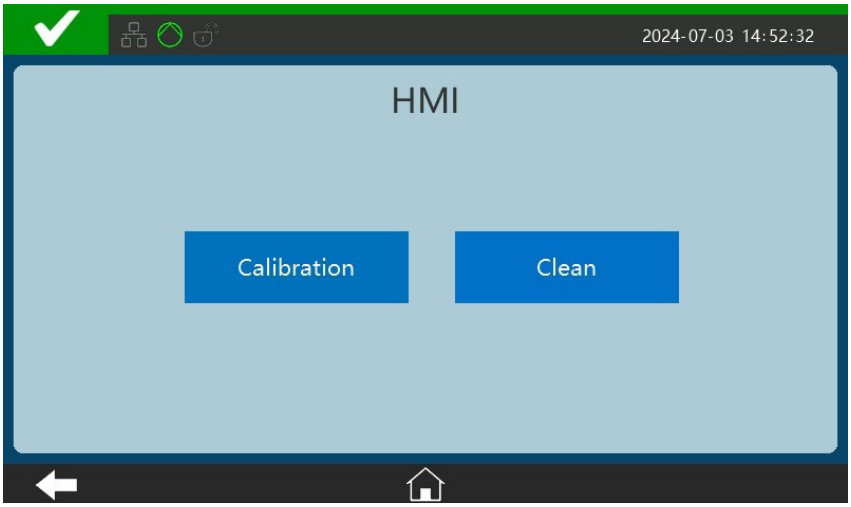
NOTE: Refer to the Fieldbus manual for information on Fieldbus line speed type.

HMI

1. Access the operator display and touch 

.
2. Touch **System Settings**, and then touch 

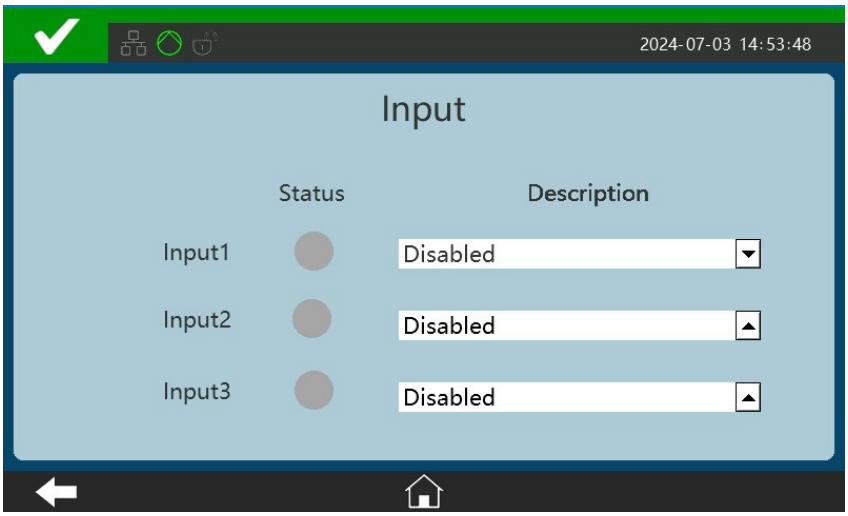
.



3. Define the following settings:
   - Calibration
   - Clean
4. Touch 
.

Inputs

1. On the System Settings screen, touch **I/O**.
2. Touch  to access the Input screen.



3. Touch the Input button that you want to modify.

   NOTE: The controller is equipped with three standard, user-configurable inputs. Refer to “Default Input Settings” for more information.

4. Touch  to select from the default settings. Refer to “Default Input Settings” for more information.

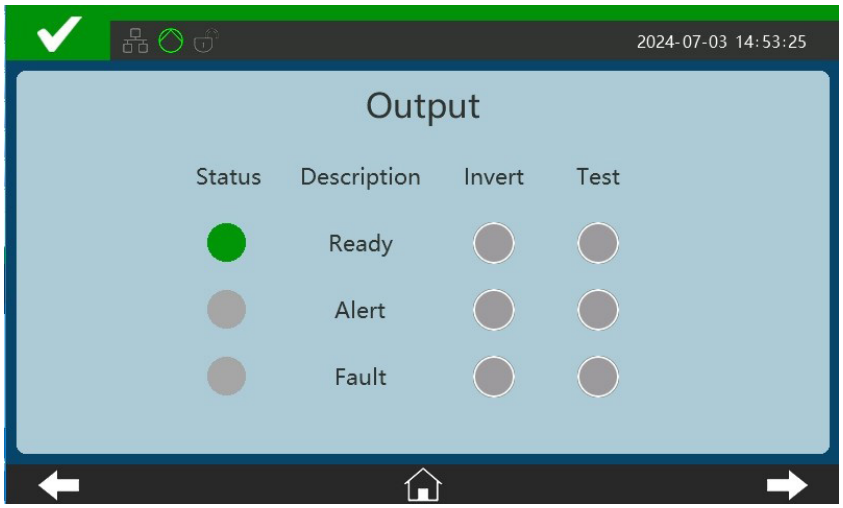
Default Input Settings

By default, all of the inputs are pre-configured for you. The following table details the defaults and available input options.

Input #	Default	Available Options
Input 1	Master Heater	• Disabled • Setback • Master Heater • Zone – Zone 4 enable/disable • Meter 1 – Meter 2 enable/disable • Alarm Reset
Input 2	Setback	
Input 3	Zone 1	

Outputs

1. On the System Settings screen, touch **I/O** to access the Output screen. Or, if you are on the Input screen, touch ⬅.



2. Touch the output buttons you want to modify.

   NOTE: The controller is equipped with three standard outputs:

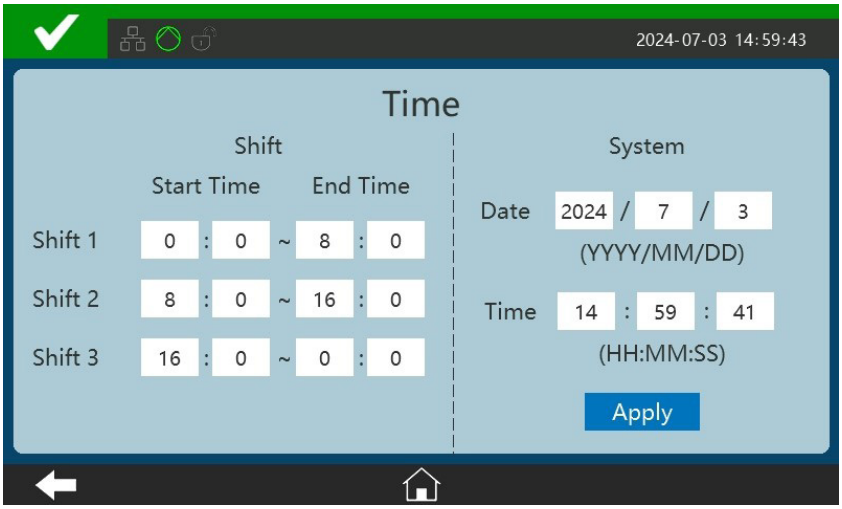
   - Ready
   - Alert
   - Fault

Shift Time

1. From the Home screen, touch 

.
2. Touch 

to access the Time screen.



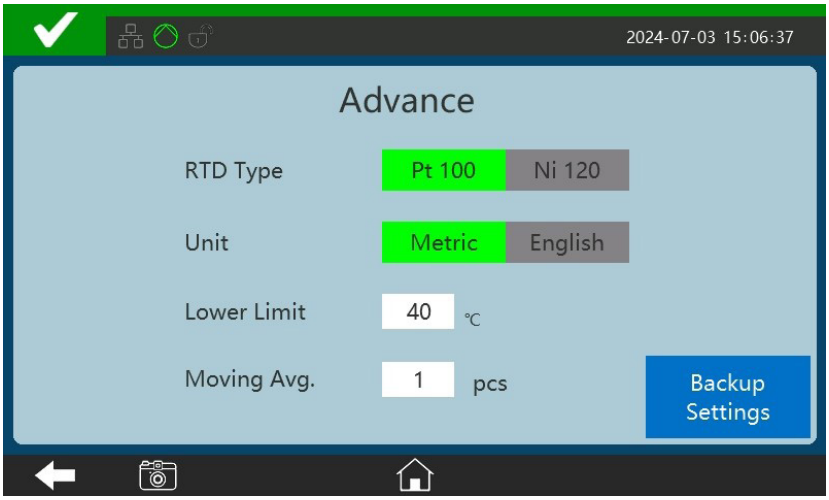
3. Select the Shift **Start Time** / **End Time**.
   - The system can set three shifts, and each shift can set start time and end time. The setting time uses a 24-hour system.
   - Setting 0:0~0:0 will disable the shift adhesive usage data.
   - If the start time is set later than the end time, this means that the end time is the next day.
4. Select the System **Date** / **Time**.
5. Touch **Apply**.

Advance Settings

1. From the Home screen, touch 

.
2. Touch 

.



3. Define the following settings:
   - **RTD Type**
   - **Unit**
   - **Lower Limit**
   - **Moving Average:** Set the Moving Average to adjust the interval in which the moving average is calculated. The moving average settings can reduce the variations in the flow add-on measurements, making the display more stable.
   - **Backup Settings**
4. Touch 
.

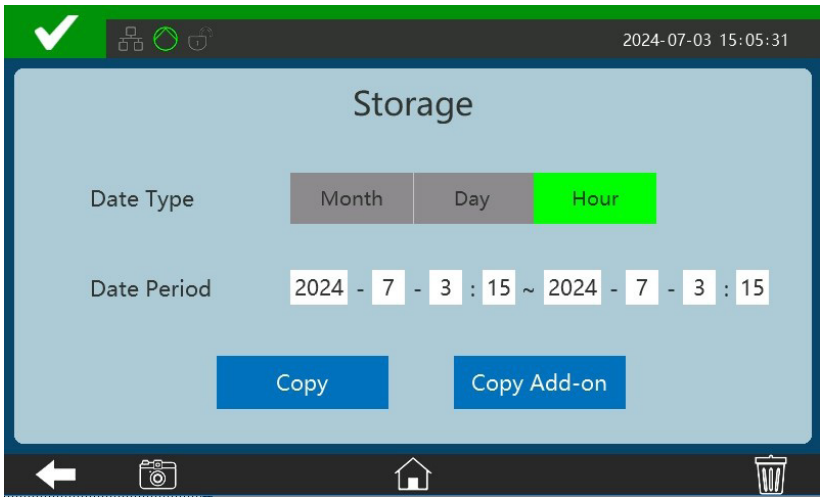
Store Data

Use the Store Data function to store production data to a USB drive.

1. From the Home screen, touch 

.
2. Touch 

.



3. Select the time interval over which you want to generate a data file.
4. Touch **Copy / Copy Add-on**.
5. Touch 
.

NOTES:

- The data will be stored in .csv format. The file name will be automatically generated and time-stamped.
- If the application normally has a production rate faster than one product per 60 ms, it is possible that some products will be missing from the stored Add-on data due to system limitations.
- The normal data file will save a record every second if the trigger interval is faster than one second; otherwise, the record will be saved at the end of the trigger signal.
- The independent add-on data will be save as a packet of 20 products, which includes five application units. In the Add-on data file, the skipped product data will mask as -666.6 when starting flow monitoring, and the length-filled data will mask as -999.9 when the production break-time exceeds the Skip Idle time and the packet data is less than 20.

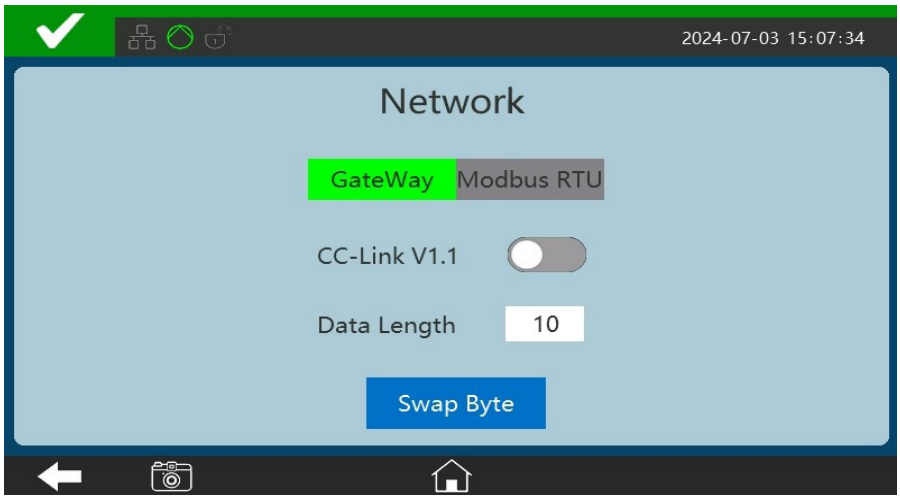
Network

Use the network settings to prepare the TruFlow Flex controller to communicate over a network with a PLC.

1. From the Home screen, touch 

.
2. Touch 

.



3. Define the following settings:
   - **Gateway**
   - **Modbus RTU**
   - **CC-Link V1.1**
   - **Data Length:** Add-on data quantity per data package. The default length is 10, and the range is 5-20.
   - **Swap Byte**
4. Touch 
.

System Information

Use the System Information screen to:

- View software versions
- Upgrade software
- Set factory defaults

1. From the **Home** screen, touch 

.
2. Touch 

.

   The software upgrade files include detailed instructions for upgrading software.

Password

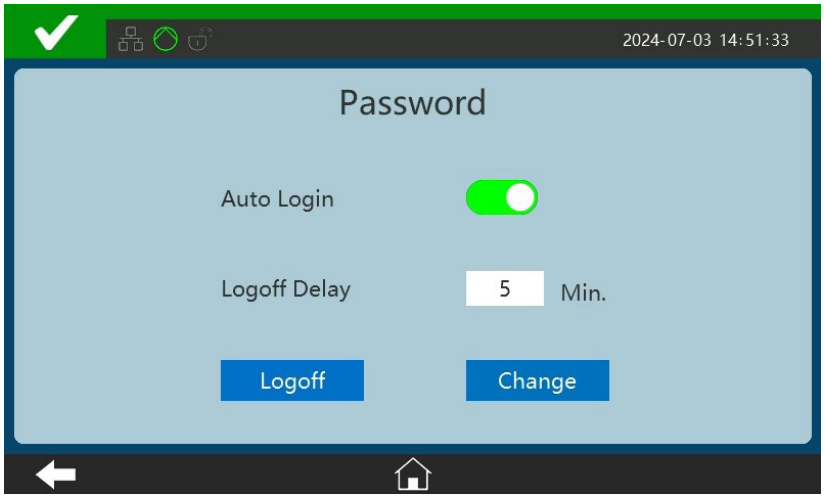
Use the password settings screen to set the logging status and change the password. The default password is **123456**.

NOTE: Both the set password and the super password **NordsonNordson** can use to modify the password.

1. From the Home screen, touch 

.
2. Touch 

.



3. Define the following settings:
   - **Auto Login:** System will auto login, which means all screen password protection is disabled.
   - **Log-off Delay:** After the setting time, the operator needs to enter the password again to define settings.
   - **Logoff:** Changes the logging status to log off.
   - **Change:** Changes the password.
4. Touch 
.

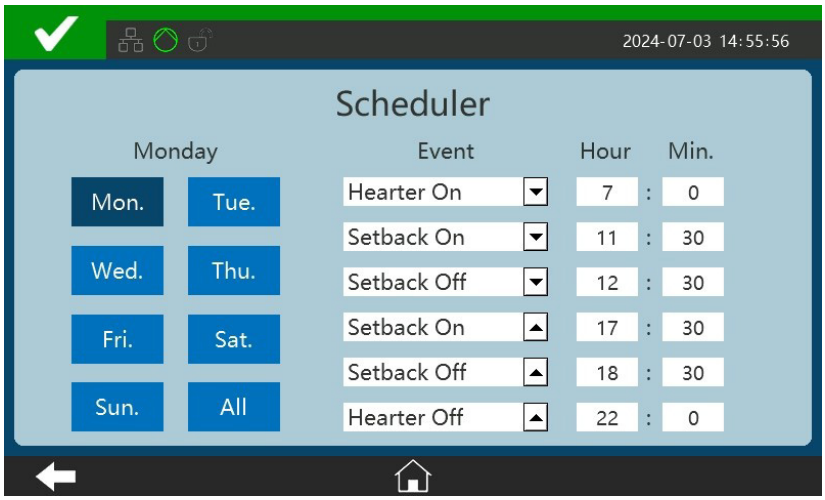
Scheduler

Use the Scheduler to set a seven-day scheduler.

1. From the Home screen, touch 

.
2. Touch 

to access the Scheduler screen.



3. Specify the following options:
   - Select the day of week.
   - Select one of the following events from the Event list:
     - N/A
     - Heater On
     - Heater Off
     - Setback On
     - Setback Off
   - Select the action time from Hour / Min.
   - Touch **All** to copy the displayed settings to all other days.
4. Touch 
.

Troubleshooting

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

WARNING! Observe all safety instructions and regulations concerning energized unit components (active parts). Failure to observe may result in an electric shock.

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.

Safety

- Before breaking any hydraulic connection, always relieve system pressure. Refer to the melter manual for detailed instructions.
- Refer to the safety information provided with optional equipment.

Troubleshooting Tables

The tables in this section uses the Possible Cause and Corrective Action columns to help resolve the Alert or Fault condition.

Problem No.	Possible Cause	Corrective Action
1. Flow Alert/Fault on Meter #	• The flow rate is either above or below defined alert/fault threshold. • K-Factor set incorrectly.	• Check flow configuration settings. • Check applicator/hose/meter for clogging or improper connection. • Modify the high and low alert/fault threshold values. • Adjust K-Factor.
2. Flow Meter or hose does not heat	• Temperature not set, or zone has been disabled through the user panel or input. • Plug not connected. • Circuit breaker for heated zone has tripped. • Heater cartridge(s) in hose/meter defective.	• Check settings and modify if required. • Connect plug. • Disconnect unit from line voltage, then reset breaker. • Replace cartridge/component.
3. No adhesive at outlet	• A heated component has not yet reached operating temperature. • Consult meter and applicator troubleshooting guides for possible causes.	• Wait until temperature has been reached; check temperature setting if necessary.
4. Application weight too low	• Control parameters not optimal. • K-Factor set incorrectly. • Meter configuration incorrect.	• Verify Specific Gravity value is correct. • Verify Pump Displacement (cc/rev) value is correct. • Adjust K-Factor. • Adjust meter configuration.

Continued...

Troubleshooting Tables *(contd)*

Problem No.	Possible Cause	Corrective Action
5. Temperature for heated zone has gone below alert/fault threshold	• The actual temperature of the component has dropped below the threshold. • The RTD for the zone is defective. • Set point for preceding heated zone is set too low.	• Check for conditions that may cause a drop in ambient temperature. • Check circuit breaker for affected zone. • Check/replace RTD/component for affected zone. • Adjust zone set point.
6. Temperature for heated zone has gone above alert/fault threshold	• The actual temperature of the component has risen above the threshold. • The RTD for the zone is defective.	• Check for conditions that may cause an increase in ambient temperature. • Check control module for affected zone. • Check/replace RTD/component for affected zone.
7. Short RTD	• Bad connection • Failed RTD	• Check connections. • Replace RTD/component.
8. Open RTD	• Bad connection • Failed RTD	• Check connections. • Replace RTD/component.

Parts

Kits

The following kits are available.

P/N	Description
7413462	KIT,SERVICE,SIGNAL BOARD,TRUFLOWFLEX
7419145	KIT, SERVICE, PLC CPU, TRUFLOWFLEX,HS
7413469	KIT,SERVICE,PLC AO,TRUFLOWFLEX
7413470	KIT,SERVICE,PLC RTD,TRUFLOWFLEX
7413471	KIT,SERVICE,PLC SD,TRUFLOWFLEX
7419146	KIT, SERVICE, HMI, TRUFLOWFLEX,HS
7413473	KIT,SERVICE,PLC 485 MODULE,TRUFLOWFLEX
7413463	KIT,CC-LINK,TRUFLOWFLEX
7413464	KIT,PROFINET,TRUFLOWFLEX
7413465	KIT,ETHERNET/IP,TRUFLOWFLEX
7413466	KIT,ETHERCAT,TRUFLOWFLEX
7413467	KIT,CC-LINK IE,TRUFLOW FLEX

Spare Parts

The following spare parts are available.

P/N	Description
7409187	RELAY,DC24V,1P,W/LED
7407883	MAIN SWITCH, 3X25A,RD/YE
7407884	CIRCUIT BREAKER,16A 2-POLE
7407899	CIRCUIT BREAKER,6A 2-POLE
7407885	CIRCUIT BREAKER,10A 2-POLE
207396	SOLID-STATE RELAY G3PE 100-260V MAX. 15A
7403805	SWITCHING POWER SUPPLY 230V/N/24V,120W
7404373	POWER SUPPLY, 24VDC, 60W
7410211	CONNECTOR ASSY,METER SOCKET,FRM
7410212	CONNECTOR ASSY,IO SOCKET,FRM
7410213	CONNECTOR ASSY,METER PLUG,FRM
7410214	CONNECTOR ASSY,IO PLUG,FRM
7401921	RELAY,SSR,24VDC COIL,1NO/NC,0.2/0.6MS

Technical Data

Specifications

Meter

P/N	Description	Displacement	Resolution	Heater Watts	Number of Heaters	Number of Cordsets	Total Heater Watts
1515087	FLOWMETER ASSY,1.8CC,NI,QUAD,TRUFLOW	1.8cc/rev	900 pulses/rev (quadrature)	200	1	1	200
1511577	FLOWMETER ASSY,4.2CC,NI,QUAD,TRUFLOW	4.2cc/rev	840 pulses/rev (quadrature)	200	1	1	200
1514980	FLOWMETER ASSY,13.5CC,NI,QUAD,TRUFLOW	13.5cc/rev	1890 pulses/rev (quadrature)	200	1	1	200
1515333	FLOWMETER ASSY,38CC,NI,QUAD,TRUFLOW	38cc/rev	1900 pulses/rev (quadrature)	275	2	1	550
1515334	FLOWMETER ASSY,133CC,NI,QUAD,TRUFLOW	133cc/rev	1862 pulses/rev (quadrature)	400	4	2	1600

Pump

P/N	Description	Displacement
7109715	GEAR PUMP SN0030	0.30 CC/REV
729105	GEAR PUMP SN0046	0.46 CC/REV
7116270	GEAR PUMP SN0062	0.62 CC/REV
7104514	GEAR PUMP SN0093	0.93 CC/REV
203708	GEAR PUMP SN0186	1.84 CC/REV
729106	GEAR PUMP SN0371	3.71 CC/REV
729107	GEAR PUMP SN0773	7.73 CC/REV
401723	GEAR PUMP SF0016	0.16 CC/REV
400756	GEAR PUMP SF0030	0.30 CC/REV
316264	GEAR PUMP SF0060	0.60 CC/REV
400757	GEAR PUMP SF0090	0.90 CC/REV
316265	GEAR PUMP SF0120	1.20 CC/REV
400680	GEAR PUMP SF0175	1.75 CC/REV
401648	GEAR PUMP SF0240	2.40 CC/REV
400758	GEAR PUMP SF0300	3.00 CC/REV
408403	GEAR PUMP SF0450	4.50 CC/REV
7116580	GEAR PUMP DN0030	2 X 0.30 CC/REV
7104179	GEAR PUMP DN0046	2 X 0.46 CC/REV
7104180	GEAR PUMP DN0062	2 X 0.62 CC/REV
7116269	GEAR PUMP DN0093	2 X 0.93 CC/REV
7104181	GEAR PUMP DN0186	2 X 1.86 CC/REV
7116268	GEAR PUMP DN0279	2 X 2.79 CC/REV
316125	GEAR PUMP DF0016	2 X 0.16 CC/REV
401215	GEAR PUMP DF0030	2 X 0.30 CC/REV
314006	GEAR PUMP DF0060	2 X 0.60 CC/REV
319287	GEAR PUMP DF0120	2 X 1.20 CC/REV
403619	GEAR PUMP DF0175	2 X 1.75 CC/REV
280356	GEAR PUMP DF0240	2 X 2.40 CC/REV
730718	GEAR PUMP DF0008	2 X 0.08 CC/REV

Controller

Item	Specification
Flow Channels	2
Product Trigger Inputs	2 (20–30 VDC)
Line Speed Detection	• Single phase/quadrature encoder, min. 15 VDC, max. 100 kHz • 0–10 V analog • 4–20 mA analog • Fieldbus
Flow Rate Detection	Single phase/quadrature encoder, min. 15 VDC, max. 100 kHz
Heat Zones	0, 2, 4
Ambient Temperature Range	0–50 °C (32–120 °F)
Heating Temperature Range	40–230 °C (100–446 °F)
Temperature Control Stability	±1 °C (2 °F)
Humidity	<60% relative humidity
Temperature Sensor	• 100-ohm platinum RTD • 120-ohm nickel RTD
Hose/Meter Heat Power	• Each zone supports up to 800 W. • Each pair supports up 1600 W. • The controller supports up to 2800 W.
Control Modes	• Monitor • Closed loop control (continuous flow only)
Input/Output	• 3 configurable inputs (20–30 VDC) • 3 outputs (24 VDC, 1 A max. load)
Analog motor control output	• 0–10 VDC (max. 1 k ohm impedance) • 4–20 mA (max. 600 ohm impedance)
Power	• 1 phase, 50/60Hz • Non-heating — 100 VAC (2.4 A) — 240 VAC (1 A) • Heating — 200 VAC (15 A) — 240 VAC (12 A)
Display	Graphical color LCD touch screen. Controller mount or remote mount.
Ingress Protection Rating	IP54
Weight	• 9.5 kg (non-heating) • 20 kg (heating)

Parameters/Ranges

Bit Table

Bit			
Item	**Action**	**Description**	
2	Reset Fault/Alert	0:Disable	1:Enable
3	Communication	0:Enable	1:Disable
4	Factory	0:Disable	1:Enable
5	Master Heater	0:Disable	1:Enable
6	RTD Type	0:PT100	1:Ni120
7	Unit Type	0:Metric	1:English Unit
8	Trig Polarity	0:Light On	1:Dark On
9	Master Meter	0:Disable	1:Enable
10	Heater on Startup	0:Disable	1:Enable
11	AO Type	0:0-10V	4-20mA
12	Zone1 Enable	0:Disable	1:Enable
13	Zone2 Enable	0:Disable	1:Enable
14	Zone3 Enable	0:Disable	1:Enable
15	Zone4 Enable	0:Disable	1:Enable
16	Zone1 PID Type	0:Hose	1:Meter
17	Zone2 PID Type	0:Hose	1:Meter
18	Zone3 PID Type	0:Hose	1:Meter
19	Zone4 PID Type	0:Hose	1:Meter
20	Meter1 Enable	0:Disable	1:Enable
21	Meter1 Product Delay Enable	0:Disable	1:Enable
22	Meter1 Clear Shift Data	0:Disable	1:Enable
23	Meter1 Learning Enable	0:Disable	1:Enable
24	Meter1 Addon Alert Enable	0:Disable	1:Enable
25	Meter1 Addon Fault Enable	0:Disable	1:Enable
26	Meter1 Clear Accumulate Data	0:Disable	1:Enable
27	Combine Meter2 To Meter1	0:Disable	1:Enable
28	Meter1 Encoder type	0:Quadrature	1:Single Phase
29	Meter1 Application Mode	0:Continuous	1:Intermittent
31	Meter1 Flow Control Enable	0:Disable	1:Enable
32	Line Speed Encoder Type	0:Quadrature	1:Single Phase
33	Meter1 Clear AddOn Data	0:Disable	1:Enable
34	Meter1 Clear Product Data	0:Disable	1:Enable
35	Meter2 Enable	0:Disable	1:Enable

Continued...

Bit Table (contd)

Bit			
Item	**Action**	**Description**	
36	Meter2 Product Delay Enable	0:Disable	1:Enable
37	Meter2 Clear Shift Data	0:Disable	1:Enable
38	Meter2 Learning Enable	0:Disable	1:Enable
39	Meter2 Addon Alert Enable	0:Disable	1:Enable
40	Meter2 Addon Fault Enable	0:Disable	1:Enable
40	Meter2 Addon Fault Enable	0:Disable	1:Enable
42	Meter2 Encoder Type	0:Quadrature	1:Single Phase
43	Meter2 Application Mode	0:Continuous	1:Intermittent
45	Meter2 Flow Control Enable	0:Disable	1:Enable
46	Meter2 Clear AddOn Data	0:Disable	1:Enable
47	Meter2 Clear Product Data	0:Disable	1:Enable
48	Passby Ready Delay	0:Disable	1:Enable
50	AI Type	0:Disable	1:Enable
51	Line Speed Learning Enable	0:Disable	1:Enable
52	Fieldbus Select	0:Gateway	1:Modbus RTU
53	Fieldbus CCLink1.1	0:others	1:CCLink1.1
54	Swap Byte	0:Disable	1:Enable
55	Swap Word	0:Disable	1:Enable

Int Table

Int				
Item	**Action**	**Range Resolution**	**Default**	**Comment**
1	Prod Trigger Type	0-2	0	0:Trigger; 1:Distance; 2:Time
2	Global Temp(°C/°F)	40-232°C / 100-450°F	177°C / 351°F	
3	Ready Delay(Minutes)	0-60	1	
4	Over Temp(°C/°F)	5-60°C / 10-110°F	15°C / 27°F	
5	Under Temp(°C/°F)	5-60°C / 10-110°F	25°C / 45°F	
6	SetBack Offset(°C/°F)	5-60°C / 10-110°F	50°C / 90°F	
7	Exit SetBack(Minutes)	0-60	0	
8	Zone1 SP(°C/°F)	40-232°C / 100-450°F	177°C / 351°F	
9	Zone2 SP(°C/°F)	40-232°C / 100-450°F	177°C / 351°F	
10	Zone3 SP(°C/°F)	40-232°C / 100-450°F	177°C / 351°F	
11	Zone4 SP(°C/°F)	40-232°C / 100-450°F	177°C / 351°F	
12	Shift1 Start Hour(Hour)	0-23	0	
13	Shift1 Start Minute(Minute)	0-59	0	
14	Shift1 End Hour(Hour)	0-23	8	
15	Shift1 End Minute(Minute)	0-59	0	
16	Shift2 Start Hour(Hour)	0-23	8	
17	Shift2 Start Minute(Minute)	0-59	0	
18	Shift2 End Hour(Hour)	0-23	16	
19	Shift2 End Minute(Minute)	0-59	0	
20	Shift3 Start Hour(Hour)	0-23	16	
21	Shift3 Start Minute(Minute)	0-59	0	
22	Shift3 End Hour(Hour)	0-23	0	
23	Shift3 End Minute(Minute)	0-59	0	
24	Meter1 Skip Count(PCs)	0-255	0	
25	Meter1 Learning QTY(PCs)	10-1000	100	
26	Meter1 IdleTime(Seconds)	1-7200	60	
27	Meter1 Alert Delay Count(PCs)	0-15	4	
28	Meter1 Fault Delay Count(PCs)	0-25	6	
29	Meter1 Trig By Length Interval Dispense (mm/inch)	1-10000 mm / 1-393.7 inch	1000 mm / 39.4 inch	
30	Meter1 Trig By Length Interval Gap (mm)	0-10000 mm / 0-393.7 inch	0 mm / 0 inch	
31	Meter1 Trig By Time Interval Dispense (Second)	0.10-600.00	5.00	

Continued...

Int Table (contd)

Int				
Item	**Action**	**Range Resolution**	**Default**	**Comment**
32	Meter1 Trig By Time Interval Gap (Second)	0.00-600.00	0.00	
33	Meter1 Length Offset	-500-500	0	
34	Meter1 P	1-10000	10	
35	Meter1 I	0-10000	158	
36	Meter1 D	0-10000	38	
37	Meter1 Glue Width(mm/inch)	1-1000 mm / 0.1-39.4 inch	10 mm / 0.4 inch	
38	Meter1 Calibrate Display Weight(mg/oz)	1-60000 mg / 0.0001-6.0 oz	1000 mg / 0.1 oz	
39	Meter1 Calibrate Actual Weight(mg/oz)	1-60000 mg / 0.0001-6.0 oz	1000 mg / 0.1 oz	
40	Meter1 Target Type	0-4	0	0: Product usage 1: Time usage 2: Surface usage 3: Thickness 4: Length usage
41	Meter1 Addon Low Alert Percent(%)	5-Addon LowFaultPercent	20	
42	Meter1 Addon High Alert Percent(%)	5-Addon HighFaultPercent	20	
43	Meter1 Addon Low Fault Percent(%)	Addon LowAlertPercent-50	30	
44	Meter1 Addon High Fault Percent(%)	HighAlertPercent-50	30	
45	Meter1 Skip Length(mm/inch)	0-10000 mm / 0-393.7 inch	0 mm / 0 inch	
46	Meter1 Beads/Product(glue/PC)	1-20	1	
47	Meter1 Ramp Threshold of Line Speed(%)	0-100	0	
48	Meter1 Ramp P	1-10000	10	
49	Meter1 Ramp I	0-10000	158	
50	Meter1 Ramp D	0-10000	38	
51	Meter1 Products/Trigger(PCs)	1-1000	1	
52	Meter2 Skip Count(PCs)	0-255	0	
53	Meter2 Learning QTY(PCs)	10-1000	100	
54	Meter2 Alert Delay Count(PCs)	0-15	4	
55	Meter2 Fault Delay Count(PCs)	0-25	6	
56	Meter2 Trig By Length Interval Dispense(mm)	1-10000 mm / 1-393.7 inch	1000 mm / 39.4 inch	
57	Meter2 Trig By Length Interval Gap(mm)	0-10000 mm / 0-393.7 inch	0 mm / 0 inch	
58	Meter2 Trig By Time Interval Dispense(Second)	0.10-600.00	5.00	
59	Meter2 Trig By Time Interval Gap(Second)	0.00-600.00	0.00	
60	Meter2 P	1-10000	10	
61	Meter2 I	0-10000	158	
62	Meter2 Length Offset	-500-500	0	

Continued...

Int Table (contd)

Int				
Item	**Action**	**Range Resolution**	**Default**	**Comment**
63	Meter2 D	0-10000	38	
64	Meter2 Glue Width(mm/inch)	1-1000 mm / 0.1-39.4 inch	10 mm / 0.4 inch	
65	Meter2 Calibrate Display Weight(mg/oz)	1-60000 mg / 0.0001-6.0 oz	1000 mg / 0.1 oz	
66	Meter2 Calibrate Actual Weight(mg/oz)	1-60000 mg / 0.0001-6.0 oz	1000 mg / 0.1 oz	
67	Meter2 Target Type	0-4	0	0: Product usage 1: Time usage 2: Surface usage 3: Thickness 4: Length usage
68	Meter2 Addon Low Alert Percent(%)	5-Addon LowFaultPercent	20	
69	Meter2 Addon High Alert Percent(%)	5-Addon HighFaultPercent	20	
70	Meter2 Addon Low Fault Percent(%)	Addon LowAlertPercent-50	30	
71	Meter2 Addon High Fault Percent(%)	HighAlertPercent-50	30	
72	Meter2 Skip Length(mm/inch)	0-10000 mm / 0-393.7 inch	0 mm / 0 inch	
73	Meter2 Beads/Product(glue/PC)	1-20	1	
74	Meter2 Idle Time(Seconds)	1-7200	60	
75	Meter2 Ramp Threadhold of Line Speed (%)	0-100	0	
76	Meter2 Ramp P	0-10000	10	
77	Meter2 Ramp I	0-10000	158	
78	Meter2 Ramp D	0-10000	38	
79	Meter2 Products/Trigger(PCs)	1-1000	1	
80	Modbus Station NO.	1-255	1	
81	Line Speed Type	0-2	0	0: Encoder 1: AI 2: Fieldbus
82	Line Speed Time(Minutes)	43840	3	
83	Data Length	5-20	10	

Real Table

Real				
Item	**Action**	**Range Resolution**	**Default**	**Comment**
1	Meter1 Add-on Target	0.01-1000 g/PC / 0.01-35.27 oz/PC	250 g/PC / 8.75 oz/PC	Product Usage
		0.01-1000 g/m2 / 0.01-10.75 oz/ft	1000 g/m2 / 10.75 oz/ft2	Surface Usage
		0.01-1000 g/m / 0.01-10.75 oz/ft	1000 g/m / 3.28 oz/ft	Length Usage
		0.01-1000 mm / 0.01-39.37 inch	2 mm / 0.08 inch	Thickness
		0.01-1000 g/min / 0.01-35.27 oz/min	10 g/min / 0.35 oz/min	Time Interval Usage
2	Meter1 Glue Density	0.8-1.2	1.0	
3	Meter1 Resolution(Pulse/Rev)	10-9000	40	
4	Meter1 Revolution(cc/Rev)	0.8-250	1	
5	Meter1 K Factor	0.5-1.5	0.92	
6	Meter1 Max FlowControl SP(g/min / oz/min)	Meter1 FlowControlSPMin-2000 g/min / Meter1 FlowControlSPMin-70.6 g/min	500g/min / 17.5 oz/min	
7	Meter1 Min FlowControl SP(g/min / oz/min)	0-Meter1 FlowControlSPMax	0	
8	Meter1 Max FlowControl Line Speed(%)	Meter1 FlowControlLine Speed Min-100	100	
9	Meter1 Min FlowControl Line Speed(%)	0-Meter1 FlowControlLine Speed Max	0	
10	Meter2 Add-on Target	0.01-1000 g/PC / 0.01-35.27 oz/PC	250 g/PC / 8.75 oz/PC	Product Usage
		0.01-1000 g/m2 / 0.01-10.75 oz/ft	1000 g/m2 / 10.75 oz/ft2	Surface Usage
		0.01-1000 g/m / 0.01-10.75 oz/ft	1000 g/m / 3.28 oz/ft	Length Usage
		0.01-1000 mm / 0.01-39.37 inch	2 mm / 0.08 inch	Thickness
		0.01-1000 g/min / 0.01-35.27 oz/min	10 g/min / 0.35 oz/min	Time Interval Usage
11	Meter2 Glue Density	0.8-1.2	1.0	
12	Meter2 Resolution(Pulse/Rev)	10-9000	40	
13	Meter2 Revolution(cc/Rev)	0.8-250	1	
14	Meter2 K Factor	0.5-1.5	0.92	
15	Meter2 Max Flow Control SP(g/min / oz/min)	Meter2 FlowControlSPMin-2000 g/min / Meter2 FlowControlSPMin-70.6 g/min	500g/min / 17.5 oz/min	
16	Meter2 Min Flow Control SP(g/min / oz/min)	0-Meter2 FlowControlSPMax	0	
17	Meter2 Max Flow Control Line Speed(%)	Meter2 FlowControlLine Speed Min-100	100	
18	Meter2 Min Flow Control Line Speed(%)	0-Meter2 FlowControlLine Speed Max	0	
19	Line Speed Resolution(Pulse/Rev)	10-3000	1500	
20	Line Speed Revolution(m/rev / ft/rev)	0.01-20 m/rev / 0.01-65.62 ft/rev	1 m/rev / 3.281 ft/rev	
21	Min Line Speed AI Percent(%)	0-Line Speed AI Max	0	
22	Max Line Speed AI Percent)(%)	Line Speed AI Min-100	100	
23	Min Line Speed to AI Input(m/min / ft/min)	0-Line Speed AI LS Max	0	
24	Max Line Speed to AI Input(m/min / ft/min)	Line Speed AI LS Min-2000 m/min / Line Speed AI LS Min-6561.6 ftmin	100 m/min / 328.1 ft/min	

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