Binks®

SERVICE GUIDE EN

77-3165-3

Binks

IntelliFlow™ RF2+™

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RF2+

Obey local or municipal regulations for product recycling and disposal.

ABOUT THIS MANUAL

ITS PURPOSE

The purpose of this manual is to help you get the most value from your Binks Intelliflow™ system. It can help you to determine how to install, operate, maintain, and repair your equipment. It provides information and procedures for routine maintenance and servicing and offers diagnostic and repair procedures to follow when trouble occurs.

ITS CONTENTS

This manual is divided into Chapters, each of which is divided into consecutively numbered Sections.

Chapters will contain text, images, tables, or a combination of them.

Pages with images will have paragraphs and sentences with callout numbers that refer to their respective images, steps, and parts.

Procedures, once described in the text, are not normally repeated. When it is necessary to refer to another Chapter or Section, the reference will be given as Chapter and Section number. Cross references given without the use of the word "Chapter" apply to Sections or paragraphs in the current Chapter.

Chapter 02. Table of Contents.

Chapter 03. Safety–Safety, hazard, and warning rules.

Chapter 04. Servicing–Material purge, inspection, and frequency schedule.

Chapter 05. Maintenance–Maintenance and general servicing information.

Chapter 06. Troubleshooting–Tracing and correcting mechanical, electronic, programming, and fluid delivery faults.

Chapter 07. Manual Change Summary–The revisions and changes made to this manual.

Chapter 08. Warranty–Your equipment’s warranty.

WHO SHOULD USE THIS GUIDE

This guide is intended for users with different levels of knowledge and experience with this system:

Installers: The person(s) who will locate and install this equipment.

Users: The person(s) who will learn how to operate this equipment.

Servicers: The person(s) who will service and maintain this equipment.

This guide assumes all persons who will install, use, operate, and service this equipment have some knowledge of the product and its operating system.

For information on the installation of this equipment, refer to RF2+ Installation Manual 77-3165-1.

For information on the operation of this equipment, refer to RF2+ Operation Manual 77-3165-2.

For information on accessory kits and spare parts of this equipment, refer to RF2+ Kit Instructions & Spare Parts Manual 77-3165-4.

For programming information of this equipment, refer to RF2+ Programming Manual 77-3165-5.

MANUAL DISCLAIMER

All current and applicable certifications shown in this manual confirm Binks adherence to the strict standards met to obtain the required regulatory compliances.

This manual was prepared with the most accurate information current at the time of publishing. Binks does not accept responsibility for errors in, or omissions from, the information contained herein.

Please get in touch with your distributor or Binks Customer Service for additional service information and assistance.

RF2+ RELATED MANUALS & PUBLICATIONS	
Part Number	Description
77-3150	Coriolis Flow Meter Service Guide
77-3154	Flow Meter Kit
77-3155	Remote Fluid Panel Kit-Barrier and F.O. Transceiver Box
77-3156	Flow Meter Sensor Battery Replacement Kit
77-3157	Flow Sensor Kit
77-3158	Color Change Kit
77-3159	Touchscreen Protector Kit
77-3160	Flush Box Kit
77-3164	Flow Meter Replacement Head Kit
77-3165-1	RF2+ Installation Manual
77-3165-2	RF2+ Operation Manual
77-3165-4	RF2+ Kit Instructions and Spare Parts
77-3165-5	RF2+ Programming Manual
LN-9112-00	Weeping MVR Service Guide
LN-9225-00	Weepless MVR Service Guide

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03 SAFETY

03.1 SAFETY PRECAUTIONS

Before the operation, maintenance, or servicing of this Binks system; fully read and understand all technical and safety literature for your product. This manual contains information that is important for you to know and understand.

This information relates to USER SAFETY and the PREVENTION OF EQUIPMENT PROBLEMS.

To help you understand this information, we use recognizable ANSI Z535 and ISO warning boxes and symbols throughout this manual. Please obey these safety sections.

⚠ DANGER

DANGER!: Indicates a hazardous situation that, if not avoided, will result in death or severe injury.

⚠ WARNING

WARNING!: Indicates a hazardous situation that, if not avoided, could result in death or severe injury.

⚠ CAUTION

Caution!: Indicates a hazardous situation that, if not avoided, could result in minor or moderate injury, or equipment damage.

NOTICE

Notice: Indicates information considered important but not hazard related.

SAFETY

Safety: Indicates a type of safety instruction, or a separate panel on a safety placard, where specific safety-related instructions or procedures are described.

Careful study and continued use of this manual will provide a better understanding of the equipment functions and procedures.

This understanding will result in improved operation, efficiency, and longer, trouble-free service with faster and easier troubleshooting. If you need the necessary safety literature for your specific system, contact your local Binks representative or Binks directly.

NOTICE

This manual lists standard specifications and service procedures. Differences can occur between this literature and your equipment.

Differences in local or municipal codes, manufacturer or plant requirements, material delivery requirements, and more can make variations unpreventable. To find these differences, compare this manual to your system installation drawings and other applicable Binks equipment manuals.

⚠ WARNING

The user MUST read and be familiar with the Safety Section in this manual and the safety literature therein identified.

Only trained personnel can operate this equipment.

All personnel who operate, clean, or maintain this equipment MUST fully read and understand this manual! To operate and service the equipment, follow all WARNINGS and safety requirements.

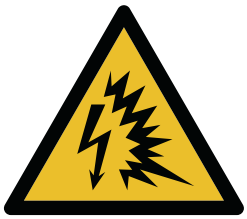
The user must be aware of and adhere to ALL local building and fire codes and ordinances, as well as NFPA 33 AND EN 16985 SAFETY STANDARDS, LATEST EDITION, or applicable country safety standards, before the installation, operation, or servicing of this equipment.

⚠ WARNING

The hazards shown on the pages that follow can occur during the normal use of this Binks equipment, but not all listed hazards will be applicable to your product model or equipment.

Repairs may only be performed by personnel authorized by Binks.

AREAS Indicate possible hazard occurrences.	**HAZARDS** Indicate possible hazards.	**SAFEGUARDS** Prevention of possible hazards.
Spray Areas  	**Fire Hazards** Improper or unsatisfactory operation and maintenance procedures will cause a fire hazard. If the safety interlocks are disabled during operation, protection against accidental arcing is shut off and can cause a fire or explosion. Frequent Power Supply or Controller shutdown identifies a problem in the system. For this occurrence, a correction will be necessary	Fire extinguishing equipment must be present in the spray area. Periodically run a test to make sure the equipment stays usable. Keep spray areas clean to prevent the build-up of combustible residues. Do not smoke in the spray area. The high voltage supplied to the atomizer must be turned off before the equipment is cleaned, flushed or maintained. Spray booth ventilation must be kept at the rates as set by NFPA-33, OSHA, country, local, and municipal codes. If flammable or combustible solvents are used to clean the equipment, ventilate the area. Prevent electrostatic arcing. Maintain spark-safe work distance between the parts that get coated and the applicator. A span of one inch for every 10KV of the output voltage is necessary. Do an equipment test only in areas free of combustible material. The test may necessitate the high voltage to be on, but only as instructed. Non-factory replacement parts or unauthorized equipment modifications can cause a fire or injury. The key switch bypass is used only during setup operation. Do no production work with disabled safety interlocks. Set up and operate the paint procedure and equipment under NFPA-33, NEC, OSHA, local, municipal, country, and European Health and Safety Norms.

AREAS Indicate possible hazard occurrences.	**HAZARDS** Indicate possible hazards.	**SAFEGUARDS** Prevention of possible hazards.
Spray Areas  	**Explosion Hazard** Improper or unsatisfactory operation and maintenance procedures will cause a fire or explosion hazard. If the safety interlocks are disabled during operation, protection against accidental arcing is shut off and can cause a fire or explosion. Frequent Power Supply or Controller shutdown identifies a problem in the system. For this occurrence, a correction will be necessary.	Prevent electrostatic arcing. Maintain spark-safe work distance between the parts that get coated and the applicator. A span of one inch for every 10KV of output voltage is necessary. Unless specifically approved for use in hazardous locations, put all electrical equipment outside of Class I or II, Division 1 or 2 hazardous areas in accordance with NFPA-33, or outside of Zone 2 or Zone 22 in accordance with EN standards. If equipped, set the current overload sensitivity as described in the related section of the equipment manual. If incorrectly set, the current overload sensitivity for protection against accidental arcing is turned off and can cause a fire or explosion. Frequent power supply shutdown indicates a problem in the system, which requires correction. Always turn off the control panel power before the system is flushed, cleaned, or servicing the spray system equipment. Make sure no objects are within the spark-safe work distance before the high voltage is turned on. The control panel must interlock with the ventilation system and conveyor in accordance with NFPA-33, EN 50176. Fire extinguishing equipment must be present in the spray area. Periodically run a test to make sure the equipment stays usable. Do an equipment test only in areas free of combustible material.
General Use and Maintenance 	Improper or unsatisfactory operation and maintenance procedures will cause a fire hazard. Personnel must be correctly trained in the operation and maintenance of this equipment.	Train all personnel in accordance with the requirements of NFPA-33, EN 60079-0. Before equipment operation, personnel must read and understand these instructions and safety precautions. Obey appropriate local, municipal, state, and national codes governing ventilation, fire protection, operation maintenance, and housekeeping. Reference OSHA, NFPA-33, EN Norms, and your insurance company requirements.

AREAS Indicate possible hazard occurrences.	HAZARDS Indicate possible hazards.	SAFEGUARDS Prevention of possible hazards.
Spray Area High Voltage Equipment    	**Electrical Discharge** This equipment contains a high-voltage device that can cause an electrostatic induction on ungrounded objects. This electrical charge is capable of igniting coating materials. Insufficient ground will cause a spark hazard. A spark can ignite many coating materials and cause a fire or explosion.	Operators in the spray area and the parts to be sprayed must be sufficiently grounded. All conductive objects inside the spray area must be grounded. Hold the parts that get sprayed on conveyors or hangers that are correctly grounded. The resistance between the parts and the earth-ground must not be more than 1 MΩ. Refer to: NFPA-33. Before the equipment is operated, ground all operators. They cannot wear rubber-soled insulated shoes. Wear ground straps on wrists or legs for sufficient ground contact. Operators must not wear or carry ungrounded metal objects. When used, operators must make complete contact with the applicator handle and electrostatic gun. Use conductive gloves or gloves with the palm section cut out. Operators must wear grounded footwear. **NOTE: REFER TO NFPA-33 OR SPECIFIC COUNTRY SAFETY CODES FOR GUIDANCE TO CORRECTLY GROUND THE OPERATOR.** Except for objects needed for the high-voltage process, all electrically conductive objects in the spray area are to be grounded. Supply a grounded conductive floor in the spray area. Always turn off the applicator voltage before the system is flushed, cleaned, or when servicing the spray system equipment. Unless specifically approved for use in hazardous locations, put all electrical equipment outside of Class I or II, Division 1 or 2 hazardous areas in accordance with NFPA-33, or outside of Zone 2 or Zone 22 in accordance with EN standards. Do not install an applicator into a fluid system if the solvent supply is ungrounded. Do not touch an energized applicator electrode.

AREAS Indicate possible hazard occurrences.	**HAZARDS** Indicate possible hazards.	**SAFEGUARDS** Prevention of possible hazards.
Spray Areas 	**Toxic Fluid or Fumes** Toxic fluids or fumes can cause severe injury or death if splashed in the eyes or on the skin, or if inhaled or swallowed.	Read the Safety Data Sheet (SDS) for instructions to know and understand how to handle the specific hazards of the fluids used, and the effects of long-term exposure. During the spray, clean, or servicing of equipment, or when in the work area, keep the work area fully ventilated. Always wear personal protective equipment (PPE) when in the work area or during equipment operation. Refer to the Personal Protective Equipment warnings in this manual. Store hazardous fluid in approved containers and refer to local, municipal, state, and national codes governing the disposal of hazardous fluids.
Spray Area and Equipment Use 	High-pressure fluid sprayed from the gun, hose fittings, or ruptured/damaged components can pierce the skin. While this injury can appear as cut skin, this is a severe injury that can result in the amputation of the affected area.	Do not point or operate the spray gun at the body part of a person. Do not put your hand or fingers over the gun fluid nozzle or fittings in the hose or Proportioner. Do not try to stop or deflect leaks with your hand, glove, body, or shop rag. Do not “blowback” fluid, as the equipment is not an air spray system. Relieve pressure in the supply hoses, Proportioner, and QuickHeat™ hose before the equipment is inspected, cleaned, or serviced. Use the lowest possible pressure to recirculate, purge, or troubleshoot the equipment. Examine the hoses, couplings, and fittings every day. Service or immediately replace parts that leak, are worn, or are damaged. Replace high-pressure hose sections. They cannot be recoupled or serviced.

AREAS Indicate possible hazard occurrences.	**HAZARDS** Indicate possible hazards.	**SAFEGUARDS** Prevention of possible hazards.
Equipment and Fluids 	**Skin and Clothing Burns** Equipment surfaces and fluids can become very hot during operation.	Do not touch hot fluid or equipment during operation. Do not let clothing touch the equipment during operation or immediately after the equipment is stopped. Let the equipment fully cool before the examination or servicing of the component.
Pressurized Aluminum Parts    	The use of certain solvents and chemicals can cause equipment damage and severe personal injury.	Do not use 1,1,1-trichloroethane, methylene chloride or other halogenated hydrocarbon solvents or fluids that contain such solvents. These solvents can cause a severe chemical reaction and equipment rupture that results in equipment and property damage, serious bodily injury, or death.

AREAS Indicate possible hazard occurrences.	**HAZARDS** Indicate possible hazards.	**SAFEGUARDS** Prevention of possible hazards.
Spray Areas 	**Do Not Touch** The effect of paint flow rates and formulations on the quality of atomization can cause the turbines to rotate at high speeds.	Do not use a rag or gloved hand against the bell edge to stop or slow down a bell during rotation. Do not try to clean the bell edge during rotation.

⚠ CAUTION

Only operate the equipment after you have read this section.

03.2 ADDITIONAL SAFETY INFORMATION

The IntelliFlow™ RF2+™ has an emergency stop (E-Stop) pushbutton on the main operator panel. During an emergency, all operations for the IntelliFlow will halt when the E-Stop is engaged. The operator must disengage the E-Stop and reset the system to recover from this state.

Observe all local or municipal safety measures and wear approved protective equipment when servicing this equipment. Clean all spilled chemicals and materials and do all work in a clean and organized environment to prevent personal injury and equipment damage.

⚠ DANGER

To prevent injury or electrocution while the system is under power, do not contact, disconnect, or manipulate electrical connections or devices. The main disconnect on the right side of the controller can be locked out. Follow the proper Lockout–Tagout (LOTO) procedures for internal controller electrical work.

Only qualified electrical personnel can perform the work if diagnosis and troubleshooting are not possible during working conditions.

⚠ WARNING

To prevent possible chemical spillage when personnel are not on site, air and fluid supplies for the equipment must be disabled when the equipment idles for an extended period, such as an end-of-day shutdown.

NOTICE

During the initial commission of the equipment and at periodic times throughout equipment life, visually examine all fluid fittings for leaks.

Periodically, it is necessary to visually examine all pieces of this equipment for signs of noticeable degradation due to chemicals or other conditions in the equipment’s environment.

SAFETY

Obey local or municipal regulations that require installed fire suppression for equipment operation.

If the operation of this equipment, sensors, switches, or other ancillary equipment occurs in the presence of flammable gases and vapors, connect this equipment through intrinsic-safe or Zener barriers. Classify them as a "simple apparatus" or approve them for use in these areas.

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04 REGULAR SERVICING PROCEDURES AND RECOMMENDATIONS

04.1 MATERIAL PURGE

After a job is completed, remember to purge the system thoroughly. Failure to do so can cause clogs, leaks, or cross-contamination of colors and material when the system is disassembled.

04.2 REGULAR INSPECTION

Regular inspections help prevent RF2+™ system malfunctions. Refer to the table below for the recommended frequency, description, and method for each inspection task.

FREQUENCY	DESCRIPTION	INSPECTION METHOD
Daily	System flushed with solvent	Visual
Daily	Check for leaks	Visual
Daily	Clean spray guns	Visual
Daily	Check alarm history	Visual
Daily	Check for material supply	Visual
Monthly	Check static mixer for clogs	Visual
Monthly	Check all hoses for kinks and wear	Visual
Monthly	Perform flow meter calibration check	Test with beaker
Monthly	Check CCV operation	Trigger manually or from HMI
Monthly	Clean mix manifold and check valves	Disassemble
Monthly	Check fluid hoses for material buildup	Disassemble
As needed	Clean flow meter	Disassemble
As needed	Rebuild color change valves	Disassemble
As needed	Rebuild MVR valve	Disassemble
As needed	Replace static mixer assembly	Disassemble

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05 RF2+™ MAINTENANCE

05.1 COMMON RF2+ PROBLEMS

1. Improperly filtered fluids cause the most common operation problems with the RF2+.

   Particulates and residue in the system can plug the fluid ports and cause sluggish valve operation. Use a 100-mesh (149 Micron) filter for proper filtration. If the system is repeatedly disassembled and cleaned for the removal of solids and residue, examine the entire fluid supply system.

2. Fluid backup, known as reverse flow, can cause reacted or catalyzed material to enter the fluid panel components. The machine will detect reverse flow and shut down. Clean or immediately flush the system to prevent fluid set-up. If the equipment needs to be cleaned repeatedly, examine the check valves and correctly adjust the **Reverse Flow Volume** in **Global Setup**.

3. Kinks or tight bends in the control air line will restrict airflow to the system. Periodically examine the condition of exposed tubing and check the fitting connection at the fluid panel components.

05.2 PREVENTATIVE MAINTENANCE

1. Examine the fluid fittings for leakage. Repair the fittings if leakage is evident.
2. Examine the exposed fluid and air tubing for kinks, tight bends, leaks, and other defects.

05.3 GENERAL

1. Work on a clean, dry bench.
2. Always install new O-rings, gaskets, and diaphragms as recommended when fluid components are disassembled for service.
3. Use only lint-free wipes or cloths to clean the equipment.
4. To order replacement parts, refer to the model number of the components or the respective assembly service manual.

05.4 PRELIMINARY PROCEDURES

Before the removal of components for servicing or repair, do the following:

1. Flush the components with the system purge mode.
2. Remove all pressure from the affected fluid lines.
3. If equipped, close all shut-off valves.
4. Clean the exterior of the components before removal.
5. Disconnect the control air lines from the components and cap the exposed hose ends to prevent system contamination.
6. Remove the components from the fluid lines.
7. If the fluid lines remain open during servicing, cap them to prevent system contamination.

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06 TROUBLESHOOTING

Although the RF2+™ is a complex machine, troubleshooting the unit is straightforward, with a few basic steps.

06.1 ALARM LIST

The alarm dialog is the first indication that something may be wrong with the RF2+ control processes. Below is a list of alarms and troubleshooting steps.

ALARM DESCRIPTION	DETAILS AND TROUBLESHOOTING TIPS
E-Stop Pushbutton Pressed	The E-Stop on the front of the RF2+ control enclosure has been pressed. Pull the emergency stop pushbutton to reset the alarm
Festo VTEM Pressure Regulator Module (x) Fault	The indicated module (x) on the Festo pressure regulator manifold is at fault. This alarm usually occurs at the same time as all other pressure regulator modules and is caused by a lack of input air pressure being fed to the manifol • Make sure the main air pressure is turned on. • Press the "Reset" button on the main HMI. • If the fault persists, troubleshoot the pressure regulator manifold further.
PLC Has Suffered a Critical Fault	The PLC has suffered a critical fault and must be rebooted. Contact Binks support for further assistance.
Comm Loss with Aux. Communications Gateway	The AnyBus gateway is installed, and communications between it and the RF2+ controller have been interrupted. • Power cycle the RF2+. • Examine the cable between the RF2+ and the AnyBus gateway.
Station (x)-Recipe Update Failed	The indicated station (x) failed to load a recipe (timeout occurred). • Try loading the recipe again. • Power cycle the RF2+. • Contact Technical Support.
Station (x)-Fluid Sequence Failed	The indicated station (x) has experienced a failed (incomplete) fluid sequence. Material may not be properly loaded or purged from the system. This occurs when an interlock is lost during a sequence. • Examine all the wired interlocks to ensure they will not turn on at inappropriate times. • Examine other alarms that can occur in conjunction with this for more detailed cause analysis. • Try to run the fluid sequence again.

ALARM DESCRIPTION	DETAILS AND TROUBLESHOOTING TIPS
Station (x)-Solvent Flow Low	The indicated station (x) has run a sequence and detected not enough solvent flow compared to the solvent.
	• Examine the settings. • Make sure the solvent supply is adequate and not restricted. • Examine the Solvent Flow Meter. • Examine the timing of the fluid sequence to make sure that solvent flow occurs for enough time to flush the system.
Pot Life Expired	The material pot life for the indicated gun/mixer has elapsed.
	• If it is safe to do so, trigger the gun/mixer in order to let fresh material into the system. • Or flush the system.
Ratio Out Of Tolerance	The RF2+ has calculated that the ratio of mixtures A:B or %C has deviated by more than the permitted tolerance.
	• Determine if the fluid delivery is ok, if the fluid pressures are correctly set, etc. • Examine for restrictions in any of the fluid channels. • Examine the material's viscosity for abnormalities. • Examine the recipe settings for ratio tolerance.
Flow Rate Out Of Tolerance	The RF2+ has calculated that the overall flow rate is out of tolerance.
	• Determine if the fluid delivery is ok, if the fluid pressures are correctly set, etc. • Examine for restrictions in any of the fluid channels. • Examine the material viscosity for abnormalities. • Examine the recipe settings for flow tolerance.
Ratio Shutdown	"A Ratio Out Of Tolerance" fault has been generated, shutting down the station.
	• Determine if the fluid delivery is ok, fluid pressures are correctly set, etc. • Examine for restrictions in any of the fluid channels. • Examine the material viscosity for abnormalities. • Examine the recipe settings for ratio tolerance. • See the alarm-masking instructions to disable the shutdown of the system for this fault.
Flow Rate Shutdown	"A Flow Rate Out Of Tolerance" fault has occurred and shut down the station.
	• Determine if the fluid delivery is ok, fluid pressures are correctly set, etc. • Examine for restrictions in any of the fluid channels. • Examine the material viscosity for abnormalities. • Examine the recipe settings for flow tolerance. • See the alarm-masking instructions to disable the shutdown of the system for this fault.

ALARM DESCRIPTION	DETAILS AND TROUBLESHOOTING TIPS
Channel (x)-Outlet Underpressure	The indicated channel (x) has detected low pressure on its outlet pressure sensor (applicable only for gear-pump controlled channels).
	• Determine if the fluid delivery is ok, fluid pressures are correctly set, etc. • Examine for restrictions in the tubing feeding this channel. • Examine the material viscosity for abnormalities. • Examine the settings for low pressure. • Examine the pressure sensor scaling/operation.
Channel (x)-Outlet Overpressure	The indicated channel (x) has detected high pressure on its outlet pressure sensor (applicable only for gear-pump controlled channels). This event will cause a spray shutdown.
	• Determine if the fluid delivery is ok, fluid pressures are correctly set, etc. • Examine for restrictions in the tubing downstream from this channel. • Examine the material viscosity for abnormalities. • Examine the settings for high pressure. • Examine the settings for trigger timing. • Examine the pressure sensor scaling/operation.
Channel (x)-Inlet Underpressure	The indicated channel (x) has detected low pressure on its inlet pressure sensor (applies only to the gear-pump controlled channels).
	• Determine if the fluid delivery is ok, fluid pressures are correctly set, etc. • Examine for restrictions in the tubing feeding this channel. • Examine the material viscosity for abnormalities. • Examine the settings for low pressure. • Examine the pressure sensor scaling/operation.
Channel (x)-Inlet Overpressure	The indicated channel (x) has detected high pressure on its inlet pressure sensor (applicable only for gear-pump controlled channels).
	• Determine if the fluid delivery is ok, fluid pressures are correctly set, etc. • Examine for restrictions in the tubing feeding this channel. • Examine the material viscosity for abnormalities. • Examine the settings for high pressure. • Examine the pressure sensor scaling/operation.

ALARM DESCRIPTION	DETAILS AND TROUBLESHOOTING TIPS
Channel (x)-Low Flow	The RF2+ has determined that the flow rate for this channel is low.
	• Determine if the fluid delivery is ok, fluid pressures are correctly set, etc. • Examine for restrictions in any of the fluid channels. • Examine the material viscosity for abnormalities. • Examine the recipe settings for flow tolerance. • Examine the Flow Sensor Calibration/Operation.
Channel (x)-High Flow	The RF2+ has determined that the flow rate for this channel is high.
	• Determine if the fluid delivery is ok, fluid pressures are correctly set, etc. • Examine for restrictions in any of the fluid channels. • Examine the material viscosity for abnormalities. • Examine the recipe settings for flow tolerance. • Examine the Flow Sensor Calibration/Operation.
Channel (x)-Flow Feedback Loss	Zero flow is detected by the RF2+ for the indicated channel (x).
	• Determine if the fluid delivery is ok, fluid pressures are correctly set, etc. • Examine for restrictions in any of the fluid channels. • Examine the material viscosity for abnormalities. • Examine the recipe settings for flow tolerance. • Examine the Flow Sensor Calibration/Operation.
Channel (x)-Spray Shutdown	The indicated channel (x) has caused a spray shutdown, due to a flow or feedback fault that has been configured to shut down the system.
	• Address the other channel faults that occurred in conjunction with this fault. • See the alarm-masking instructions to disable the shutdown of the system for this fault.
Channel (x)-Reverse Flow Detected	The RF2+ has detected flow in the reverse direction that exceeds the reverse-flow volume setting. This will cause a spray shutdown.
	• Inspect the-valves on mix manifold and color stacks. • Examine the wiring to flow meter. • Examine the trigger timing settings. • Examine the settings for reverse flow volume. It is normal to detect a small reverse reading when triggering off, as the fluid may create a wave in the reverse direction momentarily. This condition does not indicate fluid has passed beyond the check valve.
Channel (x)-Inlet Pressure Loss of Feedback	If an inlet pressure sensor is configured (gear-pump systems only), the RF2+ has detected no feedback from the inlet pressure sensor.
	Examine the pressure sensor scaling/operation.
Channel (x)-Outlet Pressure Loss of Feedback	If an outlet pressure sensor is configured (gear-pump systems only), the RF2+ has detected no feedback from the outlet pressure sensor.
	Examine the pressure sensor scaling/operation.

ALARM DESCRIPTION	DETAILS AND TROUBLESHOOTING TIPS
Channel (x)-Flow Out Of Range	The flow actuator (MVR or DR1) is operating at its maximum pilot pressure signal, but the flow rate is low.
	• Examine that the desired flow rate is attainable given the system flow restrictions (gun tip settings, tubing size, and lengths, etc.). • Examine the material viscosity for abnormalities.
Channel (x)-Unconfigured Inlet Pressure Pilot	The indicated channel has been configured with inlet pressure control, but no pressure regulator has been assigned for this purpose.
	Examine the System Configuration Settings.
Channel (x)-Unconfigured Flow Pressure Pilot	No flow rate pilot signal is assigned to a regulator.
	Examine the System Configuration Settings.

06.2 DISPENSE PUMP

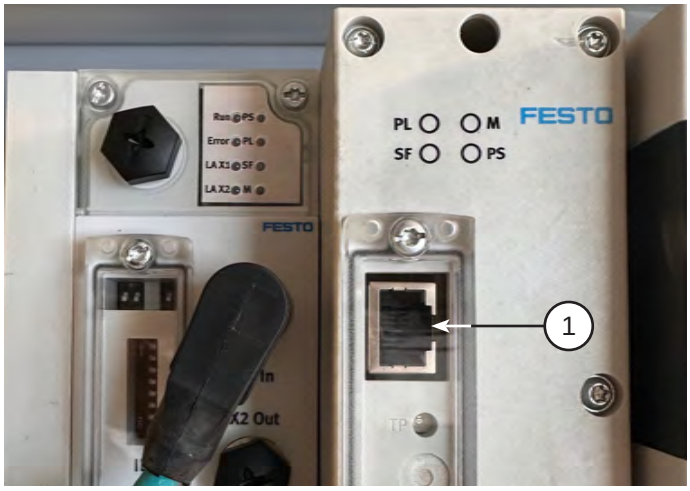
Use this checklist to help identify potential problems with the dispense pump to avoid unnecessary disassembly. If the problem is still not corrected, it may be necessary to remove the dispense pump and clean it thoroughly after flushing it with a solvent. Look for clogged passageways and evidence of fluid leaks.

DESCRIPTION	PASS/FAIL
Verify that the system is not in an Alarm state. An Alarm can cause the pump to not run.	
Verify there are no leaks anywhere on the pump fluid end.	
Examine the Oil Reservoir. Look for overflowing or hints of hardener/catalyst material in the reservoir.	
Check for air in all fluid lines. There must be no air bubbles anywhere.	
Visually inspect the threaded actuator rod; look for wear or damage. Check the rod for adequate lubrication.	
Verify that the ball plunger correctly contacts the linear potentiometer. The center value changes on the "Dispense Pump Limits" screen during the jog-up or jog-down movement.	
Go to the PRIME screen. Trigger the gun and dispense pump. Confirm the valve operation and look for a constant stream of material exiting the gun.	
Examine the stepper motor. Verify for smooth operation when the pump runs.	
Verify that Signal 1A and Signal 1B (the top two LEDs on the rightmost card of the I/O block) light up and flash when the material travels through the unit.	

06.3 FESTO VTEM PRESSURE REGULATOR MANIFOLD

If an issue with the Festo VTEM Pressure regulator manifold (310-6910 or 310-6911) occurs, the unit can access more detailed troubleshooting.

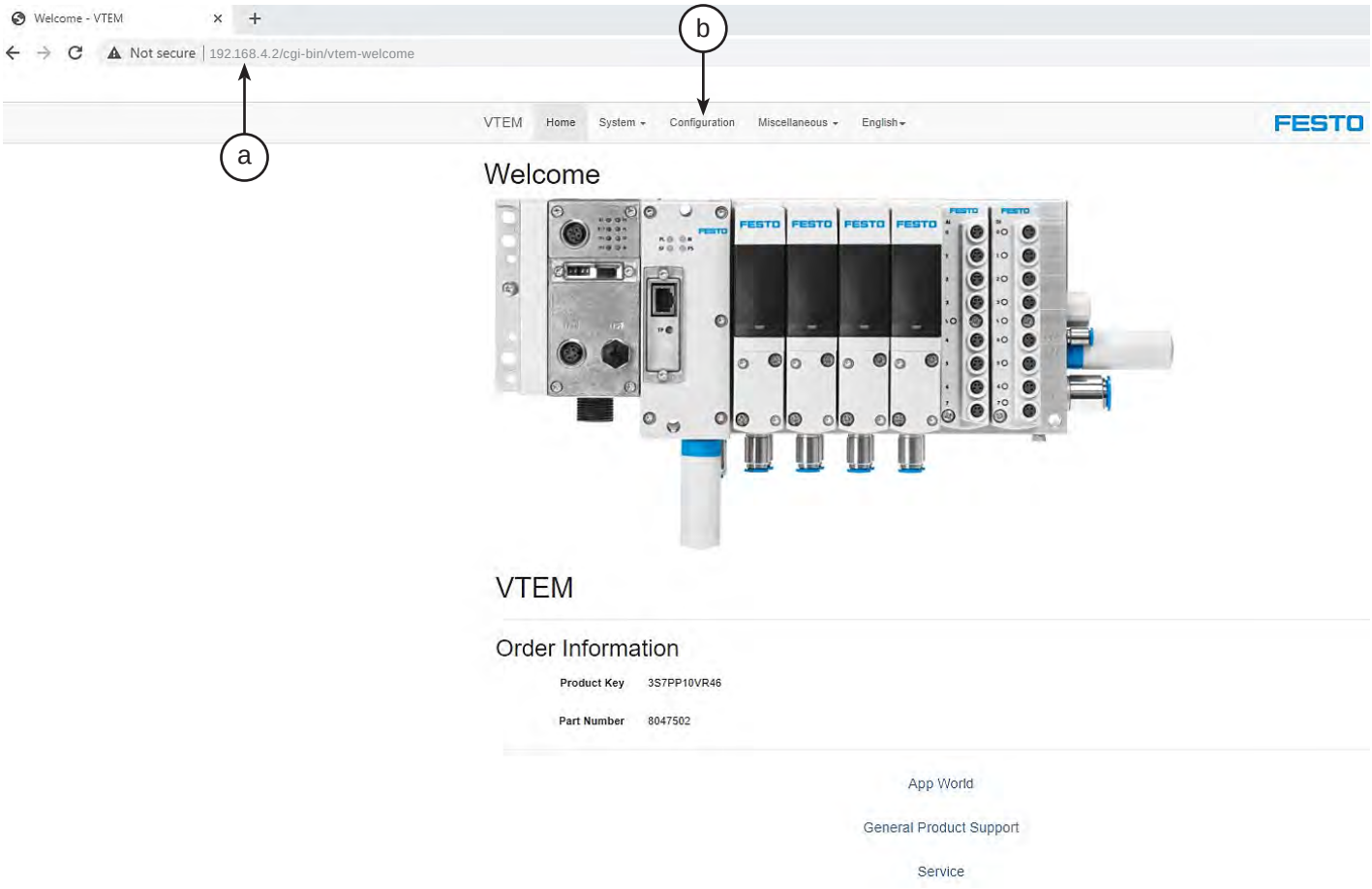
First, locate the RJ45 port (1) used to configure the VTEM module, and then connect a PC to this port.



Set the IP address of the connected PC to 192.168.4.1.

Open a web browser and enter 192.168.4.2 (a).

To troubleshoot a module, click the configuration tab (b).



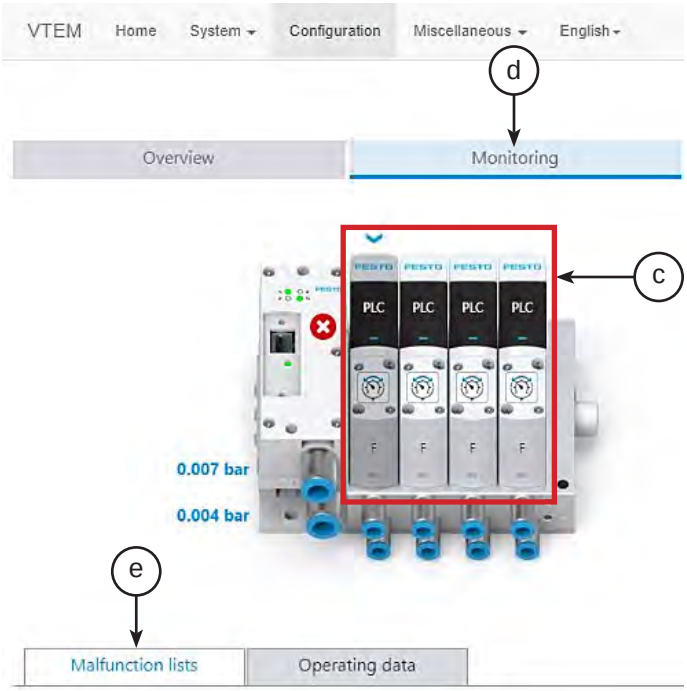
Click on any module to select it (c).

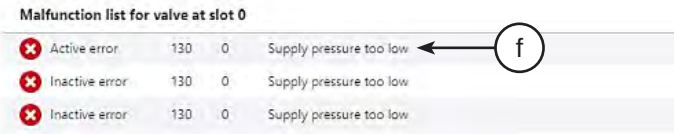
Select the monitor tab (d) to show a list of malfunctions (e).

The example below shows that the supply pressure is too low (f).

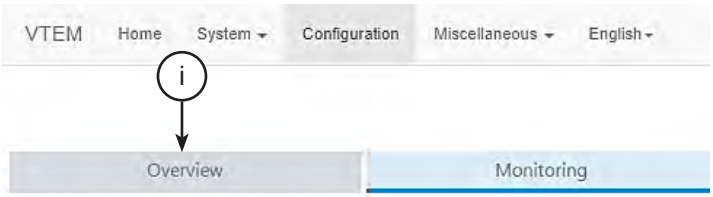
If the fluid panels for the RF2+ are installed too far from the unit, tune the pressure regulators. To do this, press the login key (g) and enter the password (h) to log into the VTEM unit.

The factory default password is "vtem". DO NOT change this password.





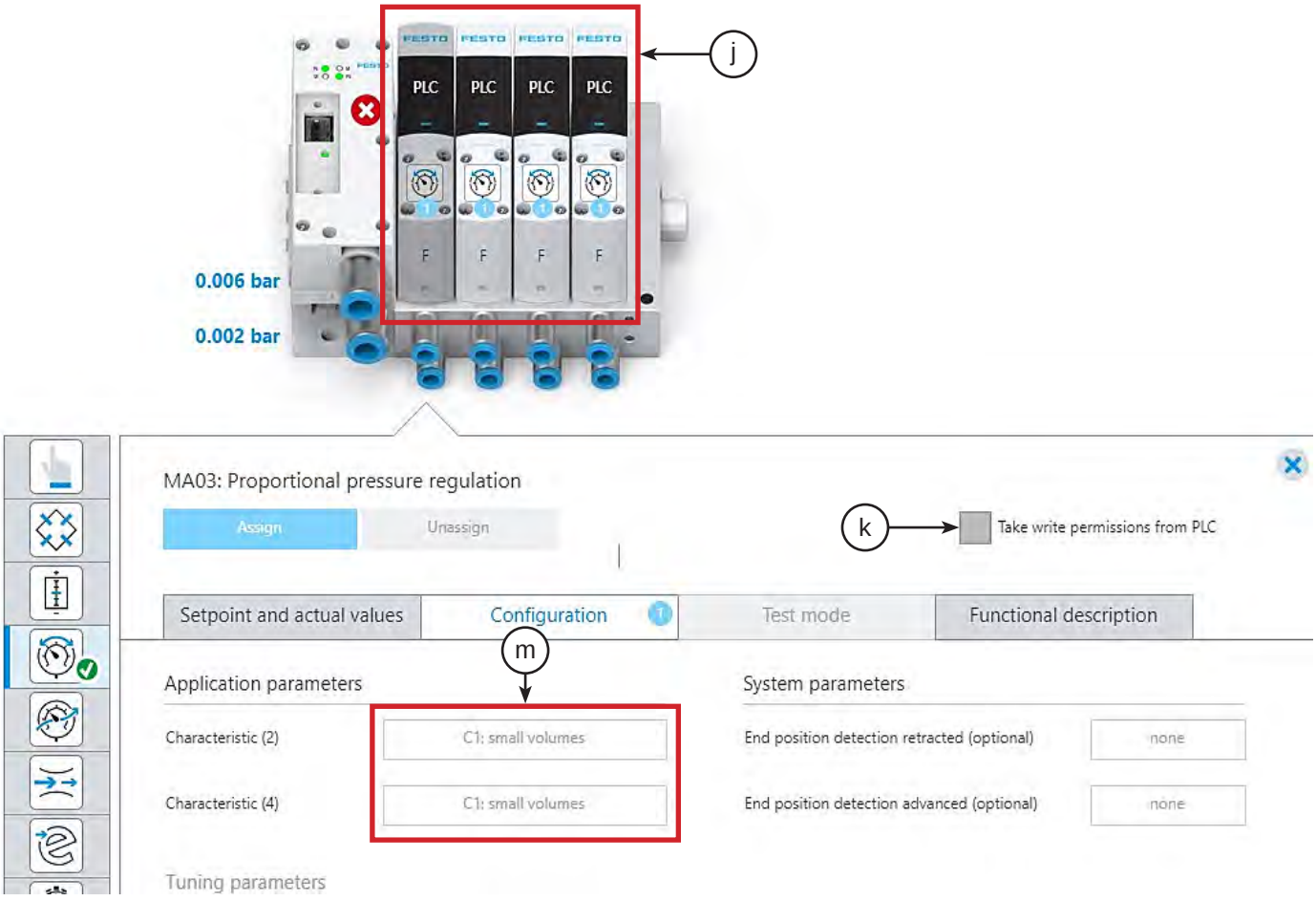
Once logged in, select the overview tab (i) and the module (j) to edit. To make any changes, you must "Take Write Permissions from the PLC" (k).



Changes are not permitted when the PLC is in communication with the VTEM manifold, so the M12 Ethernet cable at the front of the manifold must be unplugged to select the box below.

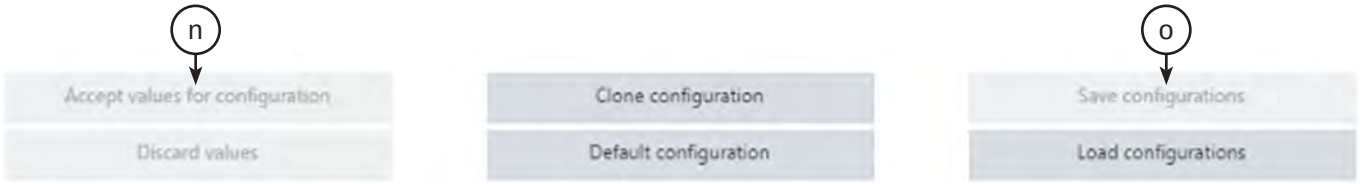
To change the tune, determine the labeled module port (4 or 2) to be connected to the tube type.

Select the small, medium, or large volume setting from the drop-down menu to change the "Characteristic" (m) parameter. The regulator can also be custom-tuned.

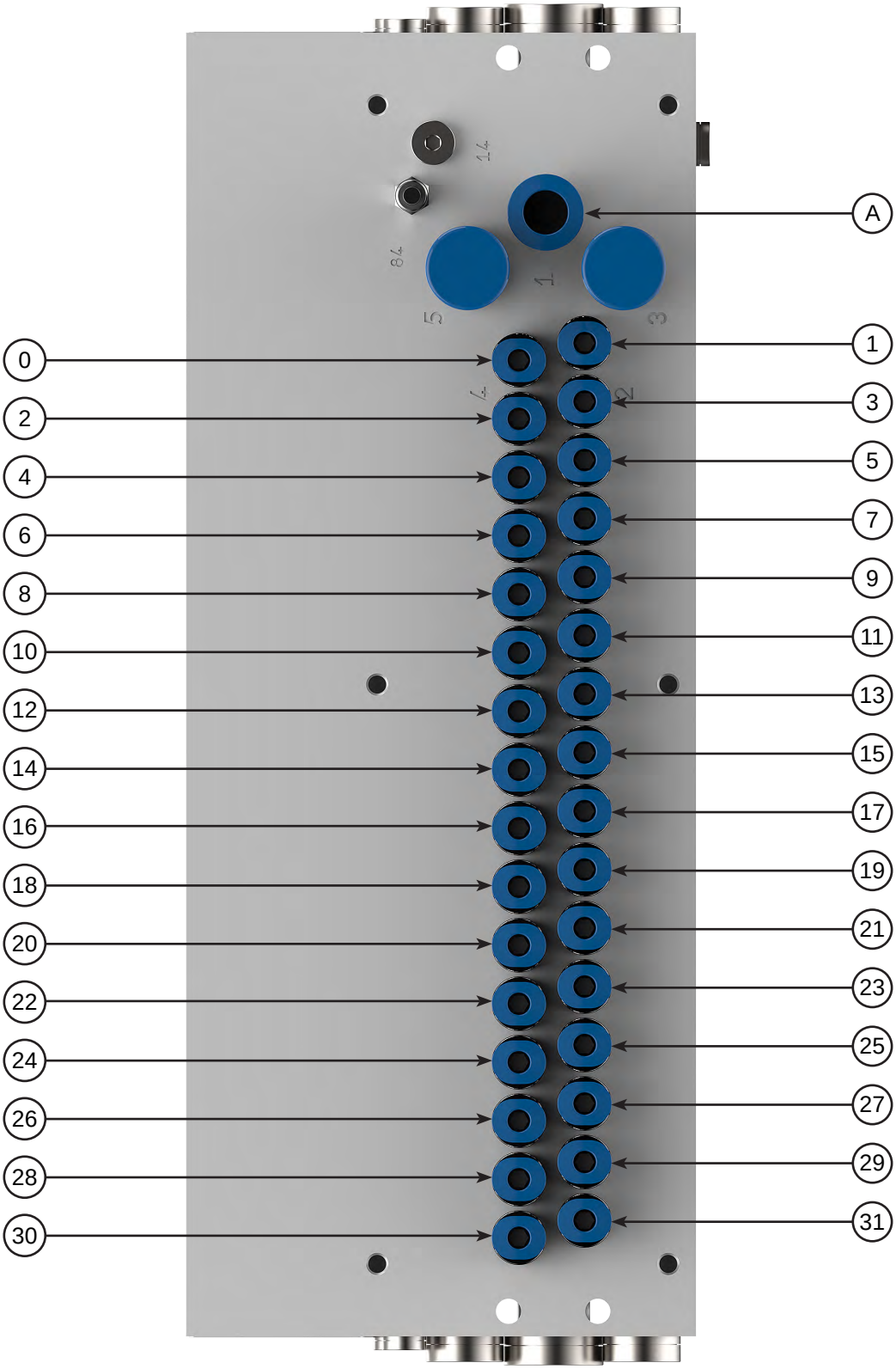


When edits are made, select "Accept values for configuration" (n), then press "Save Configurations" (o).

If the configuration is not saved, the unit will revert to its earlier settings upon start-up.



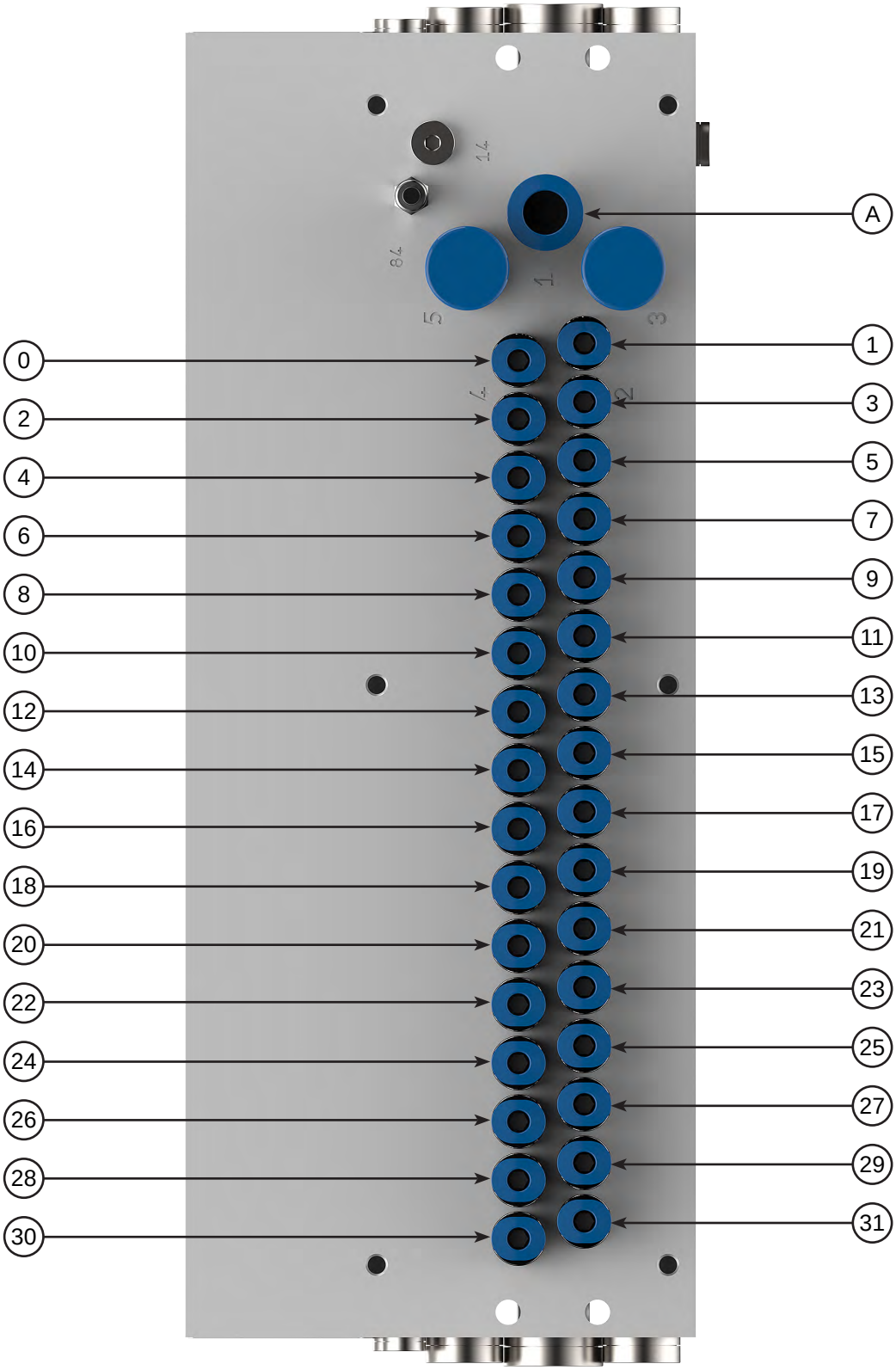
06.4 SOLENOID CONNECTION REFERENCE–COLOR STACK (310-3920 SHOWN)



Use the reference below to reconnect the solenoid air lines to their bulkheads and CCVs. Units that are not fully optioned may not have all solenoids.

#	SOLENOID	LOCATION	DESCRIPTION	BASIC	OPTIONED
A	INLET	AIR MANIFOLD	SOLENOID MAIN AIR INLET	x	
0	K1SS	COLOR STACK 1	COMPONENT 1 SOLVENT FLUSH VALVE	x	
1	K1SA	COLOR STACK 1	COMPONENT 1 STACK AIR	x	
2	K2SS	COLOR STACK 2	COMPONENT 2 SOLVENT FLUSH VALVE	x	
3	SPARE	EMPTY	—		
4	SPARE	EMPTY	—		
5	SPARE	EMPTY	—		
6	K1CAL	CCV VALVE	COMPONENT 1 CALIBRATION	x	
7	K2CAL	CCV VALVE	COMPONENT 2 CALIBRATION	x	
8	MBS	FLUID MIX PANEL	MIX BLOCK SOLVENT	x	
9	SPARE	EMPTY	—		
10	TRG G1	SPRAY GUN 1	GUN 1 TRIGGER	x	
11	TRG G2	SPRAY GUN 2	GUN 2 TRIGGER	x	
12	DUMP 1	—	—		
13	DUMP 2	—	—		
14	K1C1	COLOR STACK 1	COMPONENT 1 CCV VALVE 1	x	
15	K1C2	COLOR STACK 1	COMPONENT 1 CCV VALVE 2	x	
16	K1C3	COLOR STACK 1	COMPONENT 1 CCV VALVE 3	x	
17	K1C4	COLOR STACK 1	COMPONENT 1 CCV VALVE 4	x	
18	K1C5	COLOR STACK 1	COMPONENT 1 CCV VALVE 5	x	
19	K1C6	COLOR STACK 1	COMPONENT 1 CCV VALVE 6	x	
20	K1C7	COLOR STACK 1	COMPONENT 1 CCV VALVE 7	x	
21	K1C8	COLOR STACK 1	COMPONENT 1 CCV VALVE 8	x	
22	K1C9	COLOR STACK 1	COMPONENT 1 CCV VALVE 9	x	
23	K1C10	COLOR STACK 1	COMPONENT 1 CCV VALVE 10	x	
24	K1C11	COLOR STACK 1	COMPONENT 1 CCV VALVE 11	x	
25	K1C12	COLOR STACK 1	COMPONENT 1 CCV VALVE 12	x	
26	K2C1	COLOR STACK 2	COMPONENT 2 CCV VALVE 1	x	
27	K2C2	COLOR STACK 2	COMPONENT 2 CCV VALVE 2	x	
28	K2C3	COLOR STACK 2	COMPONENT 2 CCV VALVE 3	x	
29	K2C4	COLOR STACK 2	COMPONENT 2 CCV VALVE 4	x	
30	K1PV	FLUID MODULE	COMPONENT 1 PULSE VALVE		x
31	K2PV	FLUID MODULE	COMPONENT 2 PULSE VALVE		x

06.5 SOLENOID CONNECTION REFERENCE–DISPENSE PUMP (310-3920 SHOWN)



Use the reference below to reconnect the solenoid air lines to their bulkheads and CCVs. Units that are not fully optioned may not have all solenoids.

#	SOLENOID	LOCATION	DESCRIPTION	BASIC	OPTIONED
A	INLET	AIR MANIFOLD	SOLENOID MAIN AIR INLET	x	
0	K1SS	COLOR STACK 1	COMPONENT 1 SOLVENT FLUSH VALVE	x	
1	K1SA	COLOR STACK 1	COMPONENT 1 STACK AIR	x	
2	K2SS	—	—		
3	SPARE	EMPTY	—		
4	SPARE	EMPTY	—		
5	SPARE	EMPTY	—		
6	K1CAL	CCV VALVE	COMPONENT 1 CALIBRATION	x	
7	K2CAL	—	—		
8	MBS	FLUID MIX PANEL	MIX BLOCK SOLVENT	x	
9	SPARE	—	—		
10	TRG G1	SPRAY GUN 1	GUN 1 TRIGGER		x
11	TRG G2	SPRAY GUN 2	GUN 2 TRIGGER		x
12	DUMP 1	—	—		
13	DUMP 2	—	—		
14	K1C1	—	—		
15	K1C2	—	—		
16	K1C3	—	—		
17	K1C4	—	—		
18	K1C5	—	—		
19	K1C6	—	—		
20	K1C7	—	—		
21	K1C8	—	—		
22	K1C9	DISPENSE PUMP	TOP INLET	x	
23	K1C10	DISPENSE PUMP	TOP OUTLET	x	
24	K1C11	DISPENSE PUMP	BOTTOM INLET	x	
25	K1C12	DISPENSE PUMP	BOTTOM OUTLET	x	
26	K2C1	—	—		
27	K2C2	—	—		
28	K2C3	—	—		
29	K2C4	—	—		
30	K1PV	—	—		
31	K2PV	—	—		

06.6 STANDARD FLOW METER TROUBLESHOOTING

Particulates in the fluid can cause the gears to bind to result in improper signals for the actual flow rate. To maintain the fluid filters, refer to the filter manufacturer's instructions.

If repeated disassembly and cleaning for removal of solids and particulates occurs, inspect the entire fluid supply system and evaluate the system cleaning cycle.

Fluid backup, that is, reverse flow, can cause reacted or catalyzed material to enter the flow meter. The flow meter (310-9010) should be cleaned immediately before the fluid gels or hardens.

Under normal operation, the sensors or electrical connections will not require replacement.

To service the flow meter, refer to Flow Meter Service Manual 77-3154.

NOTICE

The fiber optic pickup sensor PN 310-9012 (A) contains a battery with a 15-month lifespan that starts at the assembly date of your IntelliFlow system. For correct signal readings, this battery is to be replaced every 15 months or sooner.

06.7 MAINTENANCE PROCEDURES

If the enclosure door is kept shut, no enclosure components should require cleaning. If material seepage occurs, be sure to correct the problem and maintain a clean work area.

Leftover paint can become hard in the fluid lines. To prevent this occurrence, clean the system with a procedural flush at the end of operations.

06.7.1 CLEANING OF HOSES

If flush sequences are correct, the mixed material line(s) will remain clean and ready for the next use. Always finish spraying operations with a solvent flush that removes all air from the fluid lines. If pot life is greatly exceeded, it is recommended the static mixer and mixed material hose be replaced.

06.7.2 CCV AND PULSE VALVE MAINTENANCE

If a color change valve or pulse valve has not been used for a prolonged period, it is recommended that the valve be removed and the fluid passages cleaned. Paint material may collect inside the valve or manifold passages. If the valve does not operate properly or if fluid leaks occur, the valve must be repaired. Check the valve for proper operation regularly.

06.7.3 CLEANING THE ENCLOSURE EXTERIOR AND HMI

The control enclosure’s exterior painted surfaces must only be cleaned with a soft, damp cloth and household cleaners. Cleaning of the touch-screen display with solvents is not allowed. If contamination of the display is expected, use disposable screen protectors 310-8030.

⚠ WARNING

Never expose electrical equipment to flammable liquids or gases including solvent fumes.

⚠ WARNING

Read and understand all operation manuals for connected equipment. Failure to properly follow the operating instructions could result in severe injury.

06.8 PREVENTIVE MAINTENANCE

The RF2+ system requires periodic inspection and regular maintenance. Follow the corresponding table as a guide to perform routine maintenance at suggested intervals. These intervals are recommendations and largely depend on the material being sprayed.

Daily/Each Shift:

- Make sure mixed material is properly flushed at the end of the shift. Verify there are no air pockets in the fluid lines.
- Identify and correct air and fluid leaks on the system to include the fluid hoses and dispense pump.
- Make sure the spray guns function correctly and that air does not leak from the air valve.
- Examine the Alarm History and review errors with the operator. Verify issues have been corrected.
- Make sure material supplies are filled and pressures are correct.

Monthly:

- Examine the static mixer assembly at the dispense pump outlet. If the static mixer elements are clogged, replace them as needed. Balancing alarms or an increase in outlet pressure indicate blockage.
- If equipped: Make sure that the oil reservoir tubes of the dispense pump have no hardener or contamination.
- Make sure to keep sufficient lubricant levels at all times.
- Examine all air and fluid lines for kinks, cuts, or wear.
- Perform a calibration to make sure the dispense pump correctly operates.
- Make sure the CCVs open and close properly. Remove and clean the valves if needed.
- Make sure all pulse valves open and close properly. Remove and clean the pulse valves if needed.
- Clean, examine, and reassemble the valves.
- Examine fluid hoses for material buildup. Material buildup is common around hose fittings and can be a source of contamination for finished products.

As Needed:

- Rebuild the dispense pump. A pump rebuild is required if there is material leakage from the oil reservoirs, or if the calibration is incorrect or inaccurate.
- Rebuild Color Change Valves – monitor the valves for air leaks or slow response time when triggering.
- Rebuild Pulse Valves – monitor the valves for air leakage or slow response time when triggering.
- Examine the dispense pump for excessive wear or buildup of material. Verify that there is smooth dispense pump movement.
- Set the limits of the dispense pump and calibrate it.

NOTICE

Reactive fluid properties greatly vary. If material blockage occurs to any component, adjust the maintenance schedule accordingly.

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MANUAL CHANGE SUMMARY		
Date	Description	Version
05/2025	Initial Release	R1.0

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WARRANTY POLICY

This product is covered by Binks' materials and workmanship limited warranty.

The use of parts or accessories from sources other than Binks will void all warranties. Failure to follow reasonable maintenance guidance provided can invalidate the warranty.

For specific warranty information, please contact Binks.

For technical assistance or to locate an authorized distributor, contact one of our international sales and customer support locations listed below.

REGION	BINKS CONTACT
Americas	Tel: 1-800-992-4657
Europe, Africa, Middle East	Tel: +4401202571111
India	marketingroa@binks.com
China	Tel: +862133730108
Korea	Tel: +82313663303
Japan	Tel: +81457856421
Australia	Tel: +61085257555

WARRANTY PAGE

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