USER MANUAL

EN

IntelliFlow™ RM2 Low and Medium Pressure Standard and Acid Catalyst Systems

Scan the related QR code above for other languages of this RM2 low or medium pressure user manual and additional product information.

CONTENTS

CONTENTS (cont.)

SAFETY

SAFETY PRECAUTIONS

Before operating, maintaining or servicing any electrostatic coating system, read and understand all of the technical and safety literature for your products. This manual contains information that is important for you to know and understand. This information relates to **USER SAFETY and PREVENTING EQUIPMENT PROBLEMS.**

⚠WARNING

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

To help you recognize this information, we use the following symbols. Please pay particular attention to these sections.

While this manual lists standard specifications and service procedures, some minor deviations may be found between this literature and your equipment. Differences in local codes and plant requirements, material delivery requirements, etc., make such variations inevitable. Compare this manual with your system installation drawings and associated equipment manuals to reconcile such differences.

Careful study and continued use of this manual will provide a better understanding of the equipment and process, resulting in more efficient operation, longer trouble-free service and faster, easier troubleshooting. If you do not have the manuals and safety literature for your equipment, contact your local Carlisle Fluid Technologies representative or Carlisle Fluid Technologies technical support.

⚠WARNING

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

This equipment is intended to be used by trained personnel **ONLY.**

This manual **MUST** be read and thoroughly understood by **ALL** personnel who operate, clean or maintain this equipment! Special care should be taken to ensure that the **WARNINGS** and safety requirements for operating and servicing the equipment are followed.

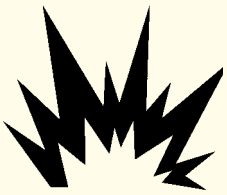
The user should be aware of and adhere to **ALL** local building and fire codes and ordinances as well as **NFPA 33 AND EN 16985 SAFETY STANDARDS, LATEST EDITION,** or applicable country safety standards, prior to installing, operating, and/or servicing this equipment.

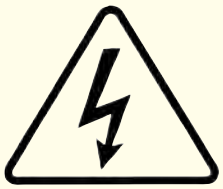
⚠WARNING

The hazards shown on the following pages may occur during the normal use of this equipment.

Repairs may only be performed by personnel authorized by Carlisle Fluid Technologies.

AREA Tells where hazards may occur	HAZARDS Tells what the hazard is	SAFEGUARDS Tells how to avoid the hazard
Spray Area 	**Fire Hazard** Improper or inadequate operation and maintenance procedures will cause a fire hazard. Protection against inadvertent arcing that is capable of causing fire or explosion is lost if any safety interlocks are disabled during operation. Frequent Power Supply or Controller shutdown indicates a problem in the system requiring correction.	Fire extinguishing equipment must be present in the spray area and tested periodically. Spray areas must be kept clean to prevent the accumulation of combustible residues. Smoking must never be allowed in the spray area. The high voltage supplied to the atomizer must be turned off prior to cleaning, flushing, or maintenance. Spray booth ventilation must be kept at the rates required by NFPA 33, EN 16985, country, and local codes. In addition, ventilation must be maintained during cleaning operations using flammable or combustible solvents. Electrostatic arcing must be prevented. Safe sparking distance must be maintained between the parts being coated and the applicator. A distance of 1 inch (25mm) for every 10KV of output voltage is required at all times. Test only in areas free of combustible material. Testing may require high voltage to be on, but only as instructed. Non-factory replacement parts or unauthorized equipment modifications may cause fire or injury. If used, the key switch bypass is intended for use only during setup operations. Production should never be done with safety interlocks disabled. The paint process and equipment should be set up and operated in accordance with NFPA 33, NEC, OSHA, local, country, and European Health and Safety Norms.

AREA Tells where the hazard may occur	HAZARD Tells what the hazard is	SAFEGUARDS Tells how to avoid the hazard
Spray Area 	**Explosion Hazard** Improper or inadequate operation and maintenance procedures will cause a fire hazard. Protection against inadvertent arcing that is capable of causing fire or explosion is lost if any safety interlocks are disabled during operation. Frequent Power Supply or Controller shutdown indicates a problem in the system requiring correction.	Electrostatic arcing must be prevented. Safe sparking distance must be maintained between the parts being coated and the applicator. A distance of 1 inch (25mm) for every 10KV of output voltage is required at all times. Unless specifically approved for use in hazardous locations, all electrical equipment must be located outside or applicable county code hazardous areas, in accordance with NFPA 33. Test only in areas free of flammable or combustible materials. The current overload sensitivity (if equipped) MUST be set as described in the related section of the equipment manual. Protection against inadvertent arcing that is capable of causing fire or explosion is lost if the current overload sensitivity is not properly set. Frequent power supply shutdown indicates a problem in the system which requires correction. Always turn the control panel power off prior to flushing, cleaning, or working on spray system equipment. Before turning high voltage on, make sure no objects are within the safe sparking distance. Ensure that the control panel is interlocked with the ventilation system and conveyor in accordance with NFPA-33, EN 16985. Have fire extinguishing equipment readily available and tested periodically.
General Use and Maintenance 	Improper operation or maintenance may create a hazard. Personnel must be properly trained in the use of this equipment.	Personnel must be given training in accordance with the requirements of NFPA 33. Instructions and safety precautions must be read and understood prior to using this equipment. Comply with appropriate local, state, and national codes governing ventilation, fire protection, operation maintenance, and housekeeping. Reference OSHA, NFPA 33, EN Norms and your insurance company requirements.v

AREA Tells where the hazard may occur	HAZARD Tells what the hazard is	SAFEGUARDS Tells how to avoid the hazard
Spray Area / High Voltage Equipment 	**Electrical Discharge** There is a high voltage device that can induce an electrical charge on ungrounded objects which is capable of igniting coating materials. Inadequate grounding will cause a spark hazard. A spark can ignite many coating materials and cause a fire or explosion.	Parts being sprayed and operators in the spray area must be properly grounded. Parts being sprayed must be supported on conveyors or hangers that are properly grounded. The resistance between the part and earth ground must not exceed 1 Meg Ohm. (Refer to NFPA 33, EN 16985.) Operators must be grounded. Grounding straps on wrists or legs may be used to assure adequate ground contact. Footware to be used by operator shall comply with EN ISO 20344, resistance not to exceed 100 Meg Ohm. Protective clothing including gloves should comply with EN 1149-5, resistance not to exceed 100 Meg Ohm. Operators must not be wearing or carrying any ungrounded metal objects. When using an electrostatic handgun, operators must assure contact with the handle of the applicator via conductive gloves or gloves with the palm section cut out. NOTE: REFER TO NFPA 33, EN 16985 OR SPECIFIC COUNTRY SAFETY CODES REGARDING PROPER OPERATOR GROUNDING. All electrically conductive objects in the spray area, with the exception of those objects required by the process to be at high voltage, must be grounded. Grounded conductive flooring must be provided in the spray area. Always turn off the power supply prior to flushing, cleaning, or working on spray system equipment or applicable county code. Unless specifically approved for use in hazardous locations, all electrical equipment must be located outside or applicable country code, hazardous areas, in accordance with NFPA 33. Avoid installing an applicator into a fluid system where the solvent supply is ungrounded. Do not touch the applicator electrode while it is energized.

AREA Tells where the hazard may occur	HAZARD Tells what the hazard is	SAFEGUARDS Tells how to avoid the hazard
Electrical Equipment 	**Electrical Discharge** High voltage equipment is utilized in the process. Arcing in the vicinity of flammable or combustible materials may occur. Personnel are exposed to high voltage during operation and maintenance. Protection against inadvertent arcing that may cause a fire or explosion is lost if safety circuits are disabled during operation. Frequent power supply shut-down indicates a problem in the system which requires correction. An electrical arc can ignite coating materials and cause a fire or explosion.	Unless specifically approved for use in hazardous locations, the power supply, control cabinet, and all other electrical equipment must be located outside or applicable country codes, hazardous areas in accordance with NFPA 33 and EN 16985. Turn the power supply OFF before working on the equipment. Test only in areas free of flammable or combustible material. Testing may require high voltage to be on, but only as instructed. Production should never be done with the safety circuits disabled. Before turning the high voltage on, make sure no objects are within the sparking distance.
Toxic Substances 	**Chemical Hazard** Certain materials may be harmful if inhaled, or if there is contact with the skin.	Follow the requirements of the Safety Data Sheet supplied by coating material manufacturer. Adequate exhaust must be provided to keep the air free of accumulations of toxic materials. Reference EN 12215 or applicable code. Use a mask or respirator whenever there is a chance of inhaling sprayed materials. The mask must be compatible with the material being sprayed and its concentration. Equipment must be as prescribed by an industrial hygienist or safety expert, and be NIOSH approved.
Spray Area 	**Explosion Hazard - Incompatible Materials** Halogenated hydrocarbon solvents for example: Methylene chloride and 1,1,1, - Trichloroethane are not chemically compatible with the aluminum that might be used in many system components. The chemical reaction caused by these solvents reacting with aluminum can become violent and lead to an equipment explosion.	Spray applicators require that aluminum inlet fittings be replaced with stainless steel. Aluminum is widely used in other spray application equipment - such as material pumps, regulators, triggering valves, etc. Halogenated hydrocarbon solvents must never be used with aluminum equipment during spraying, flushing, or cleaning. Read the label or data sheet for the material you intend to spray. If in doubt as to whether or not a coating or cleaning material is compatible, contact your coating supplier. Any other type of solvent may be used with aluminum equipment.

Product Description / Object of Declaration:	**RM2**
Notified bodies details and role:	TUV SUD America Inc 141 14th St NW New Brighton MN 55112 USA EMC Testing
Certificates used in assessment if applicable:	
This Declaration of conformity / incorporation is issued under the sole responsibility of the manufacturer:	Carlisle Fluid Technologies 7166 4th St. N. Oakdale, MN 55128. USA
Representative authorised to compile the technical file	Sales and Marketing Director. CFT UK Ltd 1 Avenue de Lattre de Tassigny 94736 Nogent, Cedex. France

EU Declaration of Conformity

CE

The object of the declaration described is in conformity with relevant Union harmonisation legislation regulations and fulfils essential safety requirements set out in Annex I

EMC Directive 2014/30/EU
Low Voltage Directive 2014/35/EU
RoHS Directive 2011/65/EU

by complying with the following statutory documents and harmonized standards:
EN 60204-1:2018 Safety of Machinery. Electrical equipment of machines
EN 60079-11:2012 Explosive atmospheres. Equipment protection by intrinsic safety"I"
EN 61000-6-2:2005/AC:2005 Electromagnetic compatability (EMC) Generic Standard– Immunity for industrial environments
EN 61000-6-4:2007+A1:2011 Electromagnetic compatability (EMC) Generic standard. Emission standard for industrial environments
EN 61000-3-2:2014 Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)
EN 61000-3-3:2013 Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤16 A per phase and not subject to conditional connection

Providing all conditions of safe use / installation stated within the product manuals have been complied with and also installed in accordance with any applicable local codes of practice.

Signed for and on behalf of Carlisle Fluid Technologies UK Ltd.

F. A. Sutter

21/2/22

Executive President: Engineering and Operations, Scottsdale, BK, 85254. USA

⚠CAUTION

Do not operate the RM2 before this section is read.

ADDITIONAL SAFETY INFORMATION

The RM2 has a main operator panel emergency stop (E-Stop) pushbutton included with the unit. In the event of a safety fault, all operations for the RM2 will halt, all solenoid outputs will be turned off, and all pressure pilot signals will go to zero psi/BAR. Recovery from this state requires the user to reload material to reset all solenoids, etc. before operation resumes.

⚠WARNING

Do not contact, disconnect, or manipulate electrical connections or devices while the system is under power. The main disconnect on the right side of the controller can be locked out, and proper Lockout – Tagout (LOTO) procedures must be used for electrical work internal to the controller. If this is not possible for the purpose of diagnosis and troubleshooting during working conditions, then only qualified electrical personnel are to perform the work.

NOTICE

During the initial commission of the equipment, and at periodic times throughout the life of the equipment, all fluid fittings must be visually inspected for leaks. Periodically, all pieces of this equipment must be visually inspected for signs of obvious degradation due to chemicals or other conditions present in the environment where the equipment is installed.

⚠WARNING

Local regulations may require fire-suppression equipment to be installed where the equipment is operated.

⚠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 is idled for an extended period of time such as end-of-day shutdown, etc.

Optionally, some sensors, switches, or other ancillary equipment, connected to this equipment may be located in the presence of flammable gases and vapors. All such equipment must be connected through the use of intrinsic-safe or Zener barriers and will be classified as a 'simple apparatus' or themselves be approved for use in these areas.

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RM2 LOW PRESSURE

The low pressure RM2 model can be easily determined by looking at the fluid panel. The low pressure RM2 has a dispense pump (1) on the right hand side of the fluid panel. Use this book section if your RM2 has this pump type.

INTRODUCTION

The RM2 system is designed to accurately mix most two component (2K) and one component (1K) paints. It will supply any low-pressure manual or automatic spray gun and can easily handle very low flow rates or high ratio materials (greater than 20:1). The system uses real-time metering to accurately dispense and mix the resin and hardener on-ratio regardless of varying flow rate as seen in real world paint applications such as feathering or rapid triggering with manual guns.

The system is easily set up and operated with a 10” touch screen. Access to system parameters and usage data is restricted via password protection.

RM2 systems are configurable with many options and accessories:

- Up to 7 paint colors
- One hardener flow sensor
- Gun flush boxes
- Pedestal Stand
- Stack light (Included)
- Atomizing air cut-off (Included)
- 2nd gun capability (Included)

FEATURES

The RM2 System has unique features that provide superior benefits:

Continuous Flow—The mix manifold is designed to optimize mix quality and minimize internal volume by receiving Resin (Component A) and Hardener (Component B) continuously.

Accurate Dispensing—Control and positioning of the B metering pump is precise. An electronically controlled stepper motor with integral linear actuator allow for dispense from 2cc to 600cc per minute, and ratios from 1:1 to 100:1 depending on the pump size chosen. Ratio tolerance down to 1% is possible.

Ease of Use—The touchscreen user interface is easy to learn and efficient to use. It provides control of the system with few actions, along with real-time data and in-depth troubleshooting when alarms occur.

Easily Configurable— Use up to seven different paint resins and up to two spray guns. Flush boxes, atomizing air control, and other options and accessories can be added at any time.

Programmable Flushing— Set unique flushing options specific to material needs.

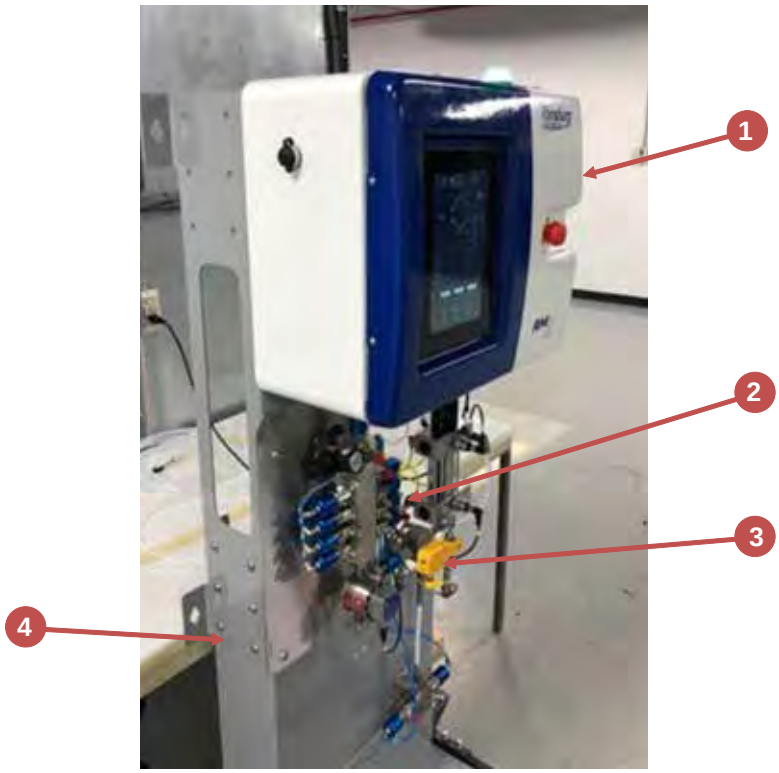
Mounting Options—The system can be mounted to a wall and plumbed into an existing workspace, or it can be bolted to the floor with an available pedestal stand.

Alarm Warnings—The alarm system warns the user of system errors and suggests possible solutions. Help screens provide troubleshooting information to remedy system alarms.

Modular Design—Sub-assemblies are easily and quickly removed for maintenance and repair.

SYSTEM COMPONENTS

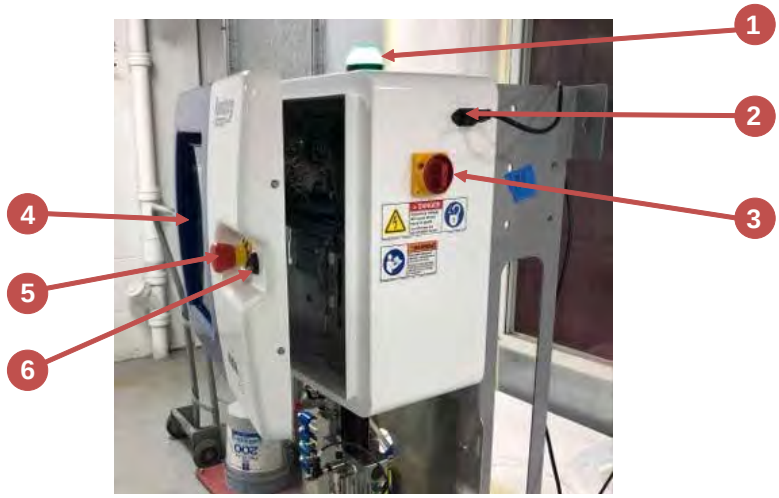
1. Control Panel
2. Fluid Control Module
3. Mix Manifold
4. Pedestal (Optional)



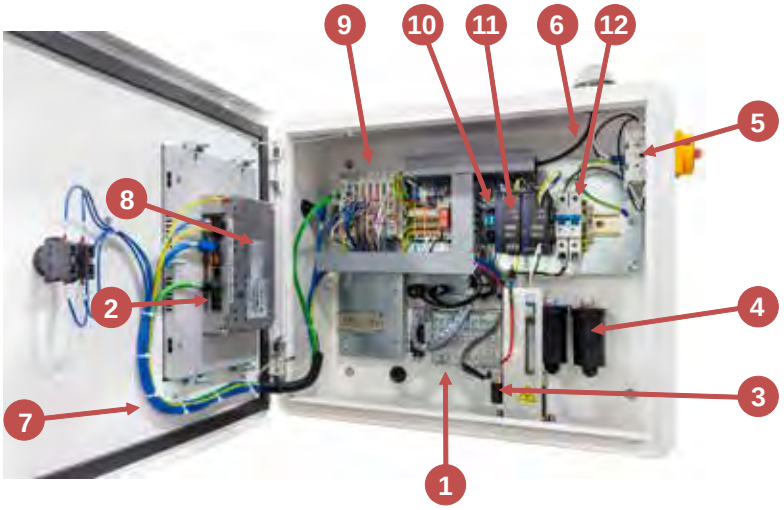
CONTROL PANEL

External Components

1. Status light
2. Main power entry
3. Main power disconnect switch
4. Panel opening latch
5. Emergency stop button
6. HMI

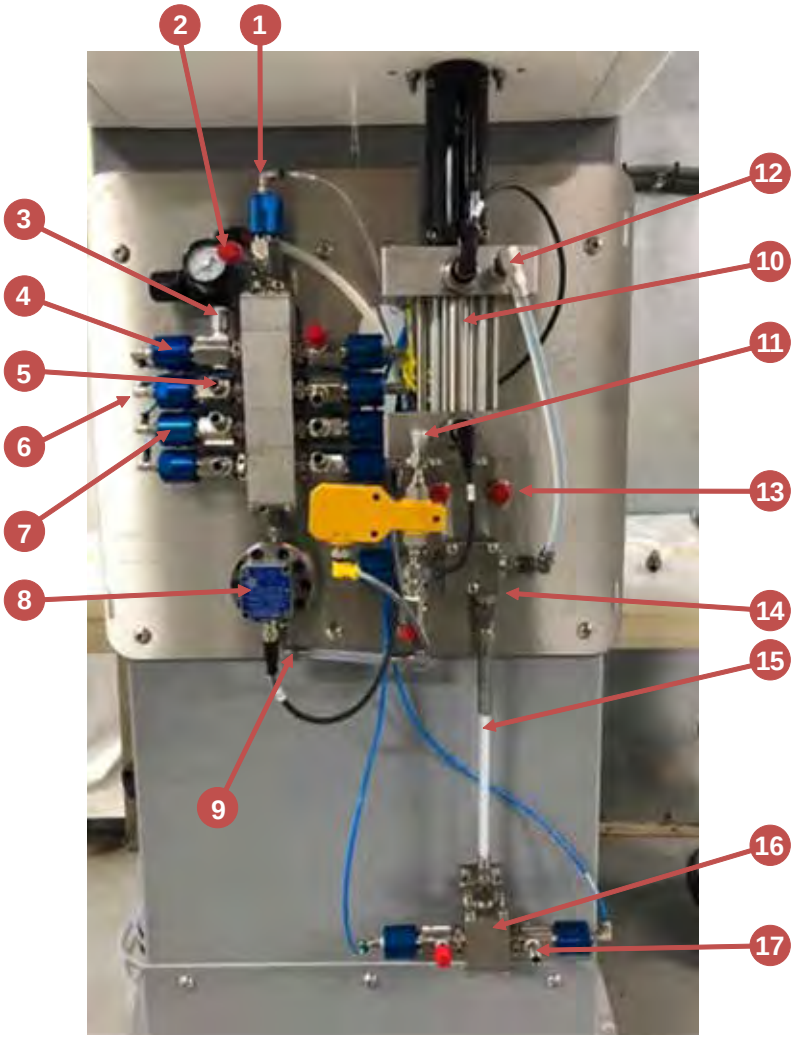


Internal Components



1. Solenoid stack
2. USB flash drive
3. Linear actuator
4. Air flow switches
5. Main power disconnect switch connector
6. Connection to status light
7. Connection to HMI and emergency stop button
8. HMI (Internal)
9. IO block
10. 24VDC circuit breakers
11. 24VDC power supply
12. Main power circuit breaker

FLUID CONTROL MODULE



1. Solvent flush valve
2. Solvent input connection
3. Air input connection
4. Air push valve
5. Component A input connection (x1)
6. Connection to solenoids (x1)
7. Fluid valves (x1)
8. Component A flow meter
9. Connection to mix module
10. Component dispense pump
11. Component B input connection
12. Component B output (to mix manifold)
13. Atomization air out

MIX MANIFOLD

14. Mix block
15. Static mix tube
16. 2-gun manifold (optional)
17. Connection to gun (x1)

SYSTEM CONFIGURATION

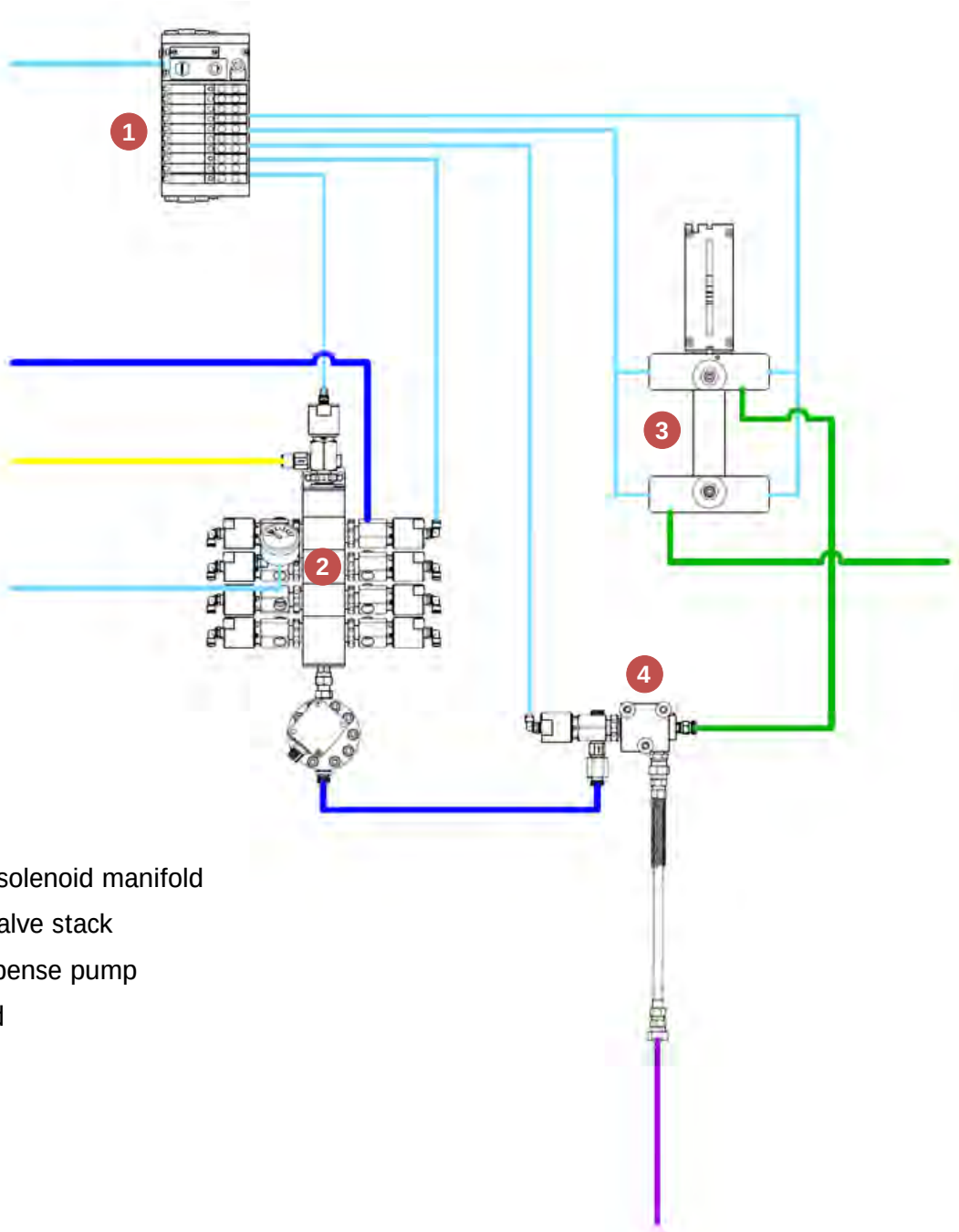
Air Supply

Solvent Supply

Material A lines

Material B lines

Mixed material lines

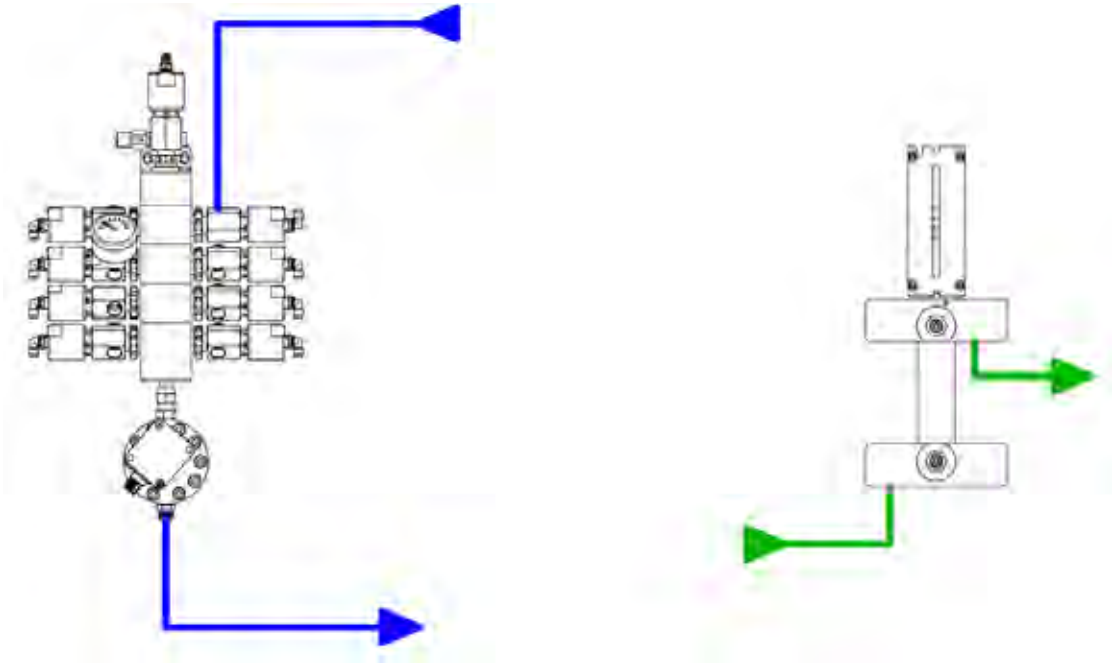


1. Valve stack solenoid manifold
2. Material A valve stack
3. Material dispense pump
4. Mix Manifold

THEORY OF OPERATION

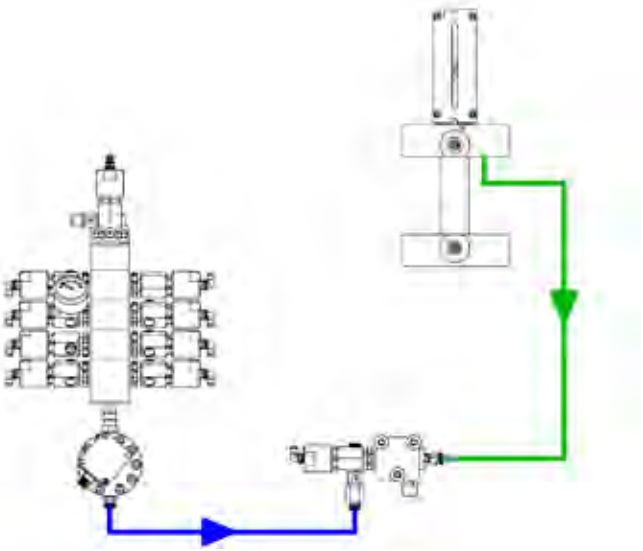
The RM2's operating principle is as follows:

1. The material is fed through the hoses towards the material valves in the color stack, and the hardener dispense pump.
2. The color stack and resin enable valve control material flow on the resin side. The dispense pump controls hardener material flow.
3. Air flow switches are used to sense the operator has opened the spray applicator. The signal is fed to the system controller.

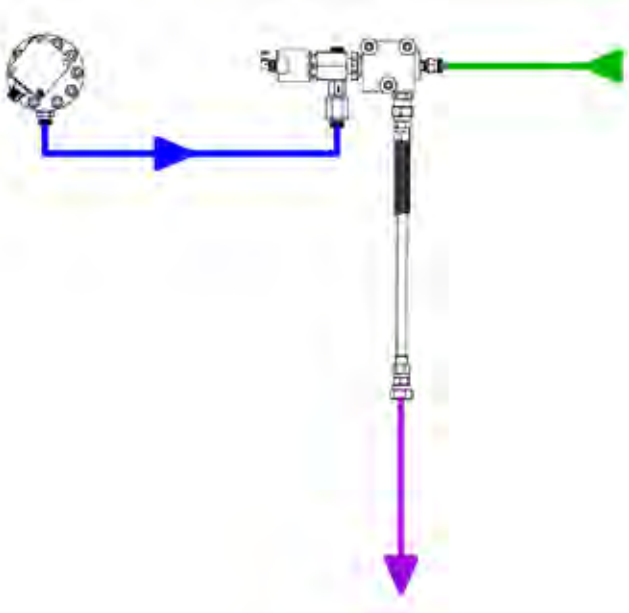


4. The material valves are normally closed. When material flow is needed the system controller opens the color valve via the solenoid addressed to it.
5. The resin material flows from the valves to the flow meter and sends a signal to the control panel to indicate the material's current flow rate.
6. The controller determines what flow rate the dispense pump needs to dispense hardener at to meet the user setpoint for ratio. For more information on operation of the dispense pump see page 52.

7. The material proceeds to the mix block where the individual components are introduced before the static mixer. The resin enters the mix block through a resin enable valve and the hardener enters through an injector valve.



8. The materials flows through the mix block and through a static mixer to the applicator's inlet connection.



9. If needed, the system can be flushed only through the solvent valve on the color stack.

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RM2 MEDIUM PRESSURE

The medium pressure RM2 model can be easily determined by looking at the fluid panel. The medium pressure RM2 has a pulse valve assembly (1) on the right hand side of the fluid panel. Use this book section if your RM2 has this valve.

INTRODUCTION

The RM2 system is designed to accurately mix most two component (2K) and one component (1K) paints. It will supply any medium-pressure manual or automatic spray gun and can easily handle very high flow rates or high ratio materials (greater than 20:1). The system uses real-time metering to accurately dispense and mix the resin and hardener on-ratio regardless of varying flow rate as seen in real world paint applications such as feathering or rapid triggering with manual guns.

The system is easily set up and operated with a 10” touch screen. Access to system parameters and usage data is restricted via password protection.

RM2 systems are configurable with many options and accessories:

- Up to 7 paint colors
- Gun flush boxes
- Pedestal Stand
- Stack light (Included)
- Atomizing air cut-off (Included)
- 2nd gun capability (Included)

FEATURES

The RM2 System has unique features that provide superior benefits:

Continuous Flow—The mix manifold is designed to optimize mix quality and minimize internal volume by receiving Resin (Component A) and Hardener (Component B) continuously.

Accurate Dispensing—Components A and B control and position is precise with the use of individual component flow meters. The electronically controlled pulse valve allows for dispense from 10cc to 1900cc per minute, and ratios from 1:1 to 50:1. The ratio tolerance is up to ± 1%. An additional pulse valve is optional.

Ease of Use—The touchscreen user interface is easy to learn and efficient to use. It provides control of the system with few actions, along with real-time data and in-depth troubleshooting when alarms occur.

Easily Configurable— Use up to seven different paint resins and up to two spray guns. Flush boxes, atomizing air control, and other options and accessories can be added at any time.

Programmable Flushing— Set unique flushing options specific to material needs.

Mounting Options—The system can be mounted to a wall and plumbed into an existing workspace, or it can be bolted to the floor with an available pedestal stand.

Alarm Warnings—The alarm system warns the user of system errors and suggests possible solutions. Help screens provide troubleshooting information to remedy system alarms.

Modular Design—Sub-assemblies are easily and quickly removed for maintenance and repair.

SYSTEM COMPONENTS

1. Control Panel
2. Fluid Control Module
3. Pulse Valve Assembly
4. Pedestal (Optional)

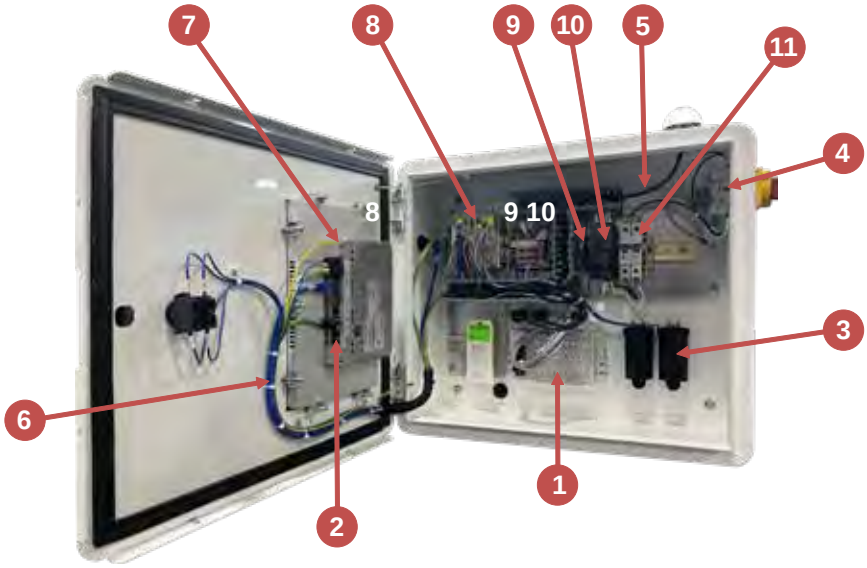
CONTROL PANEL

External Components

1. Status light
2. Main power entry
3. Main power disconnect switch
4. Panel opening latch
5. Emergency stop button
6. HMI

INTERNAL COMPONENTS

1. Solenoid stack
2. USB flash drive
3. Air flow switches
4. Main power disconnect switch connector
5. Connection to status light
6. Connection to HMI and emergency stop button
7. HMI (Internal)
8. IO block
9. 24VDC circuit breakers
10. 24VDC power supply
11. Main power circuit breaker

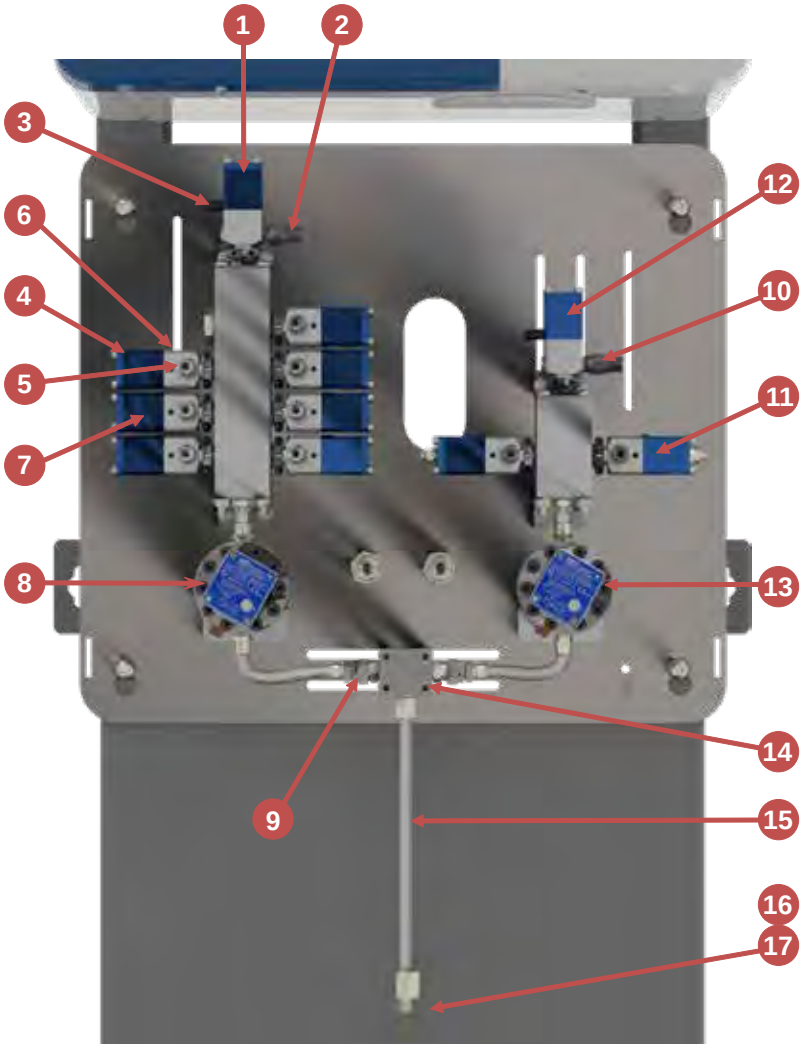


FLUID CONTROL MODULE

1. Solvent flush valve
2. Solvent input connection
3. Air input connection
4. Air push valve
5. Component A input connection (x1)
6. Connection to solenoids (x1)
7. Fluid valves (x1)
8. Component A flow meter
9. Connection to mix module
10. Pulse valve input connection
11. CCV Pulse Valve
12. CCV Valve (to Component B flow meter)
13. Component B flow meter

MIX MANIFOLD

14. Mix block
15. Static mix tube
16. 2-gun manifold (optional, not shown)
17. Connection to gun (x1) (not shown)



SYSTEM CONFIGURATION

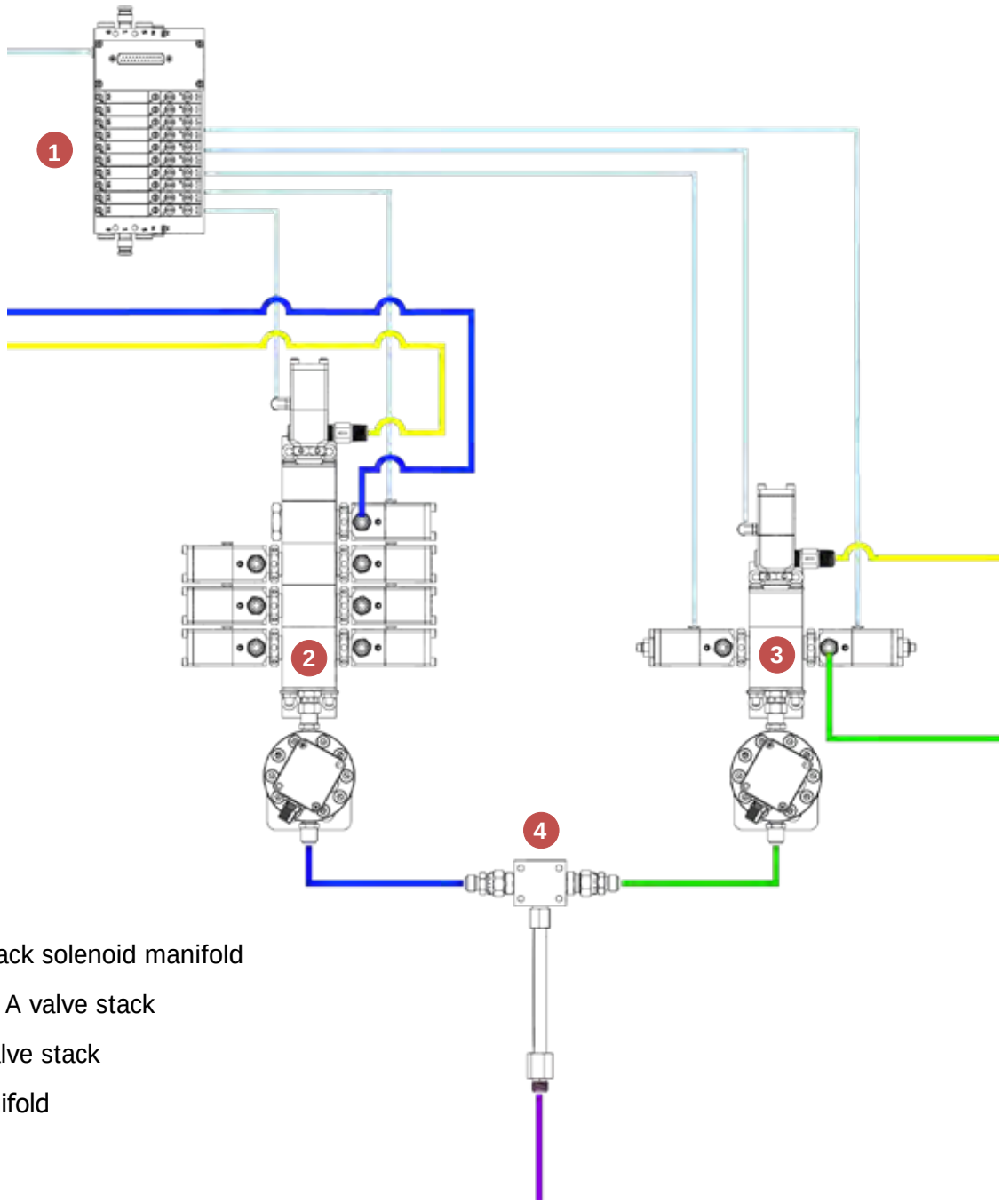
Air Supply

Solvent Supply

Material A lines

Material B lines

Mixed material lines



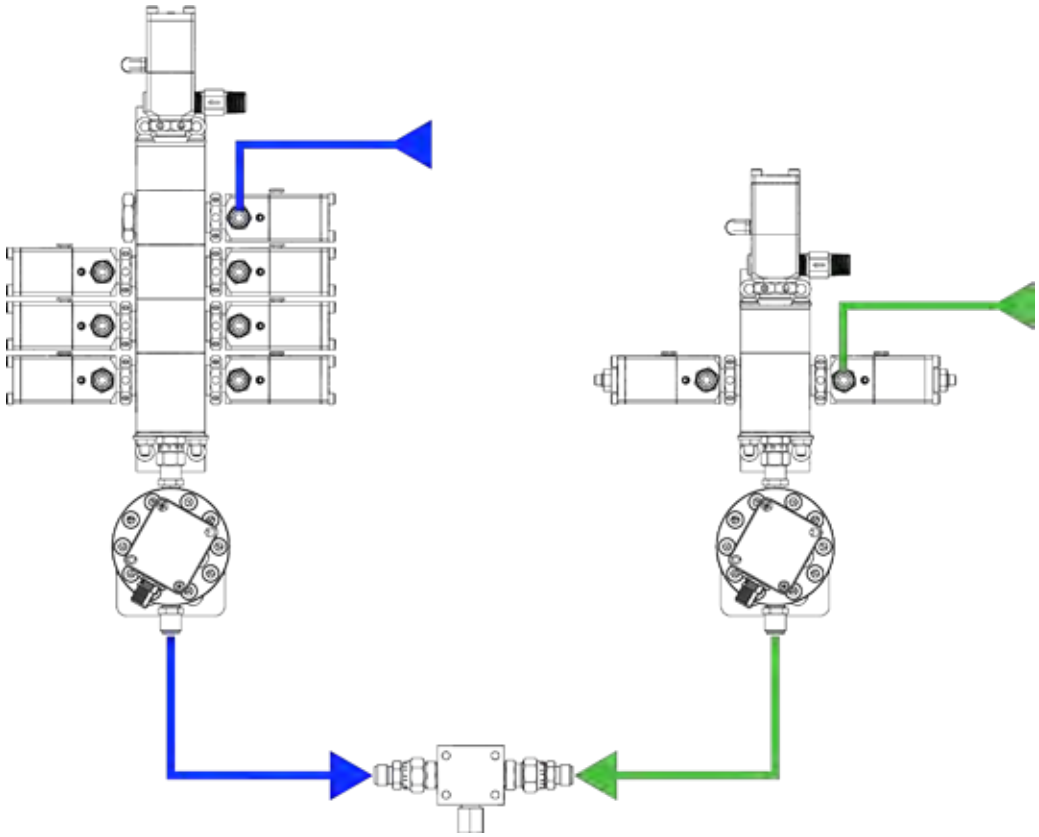
1. Valve stack solenoid manifold
2. Material A valve stack
3. Pulse valve stack
4. Mix Manifold

THEORY OF OPERATION

The RM2's operating principle is as follows:

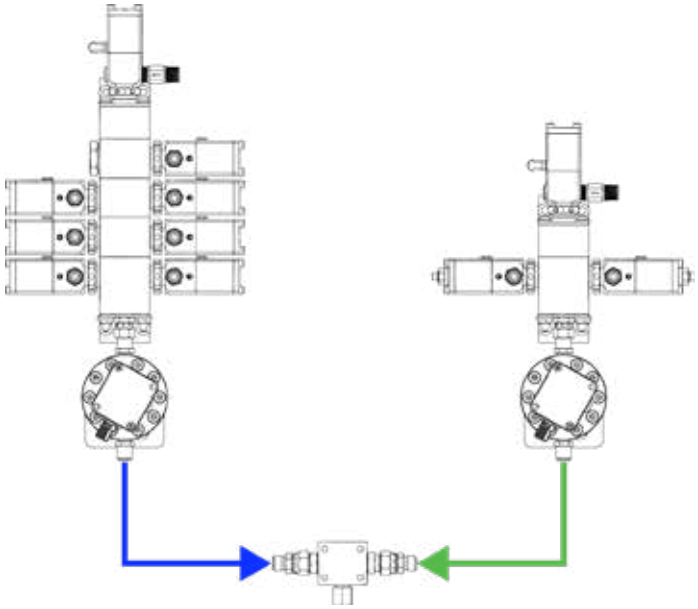
1. The material is fed through the hoses towards the material valves in the color stack, and the pulse valve.
2. The color stack and resin enable valve control material flow on the resin side. The pulse valve controls hardener material flow.

3. Air flow switches are used to sense the operator has opened the spray applicator. The signal is fed to the system controller.

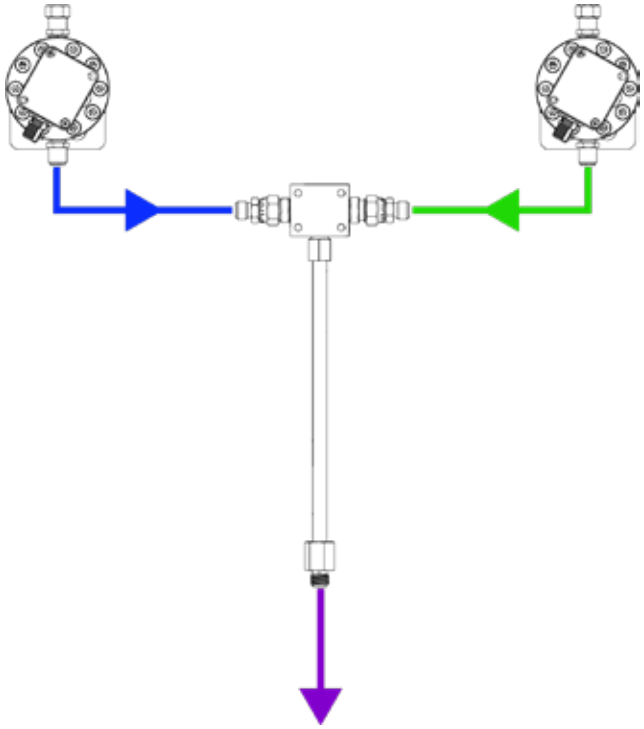


4. The material valves are normally closed. When material flow is needed the system controller opens the color valve via the solenoid addressed to it.
5. The resin material flows from the valves to the flow meter which send a signal to the control panel indicating the material's current flow rate.
6. The controller determines what flow rate the pulse valve needs to dispense hardener and to meet the user setpoint for ratio. For more information on operation of the pulse valve see page 52.

7. The material proceeds to the mix block where the individual components are introduced before the static mixer. The resin enters the mix block through a resin enable valve and the hardener enters through an injector valve.

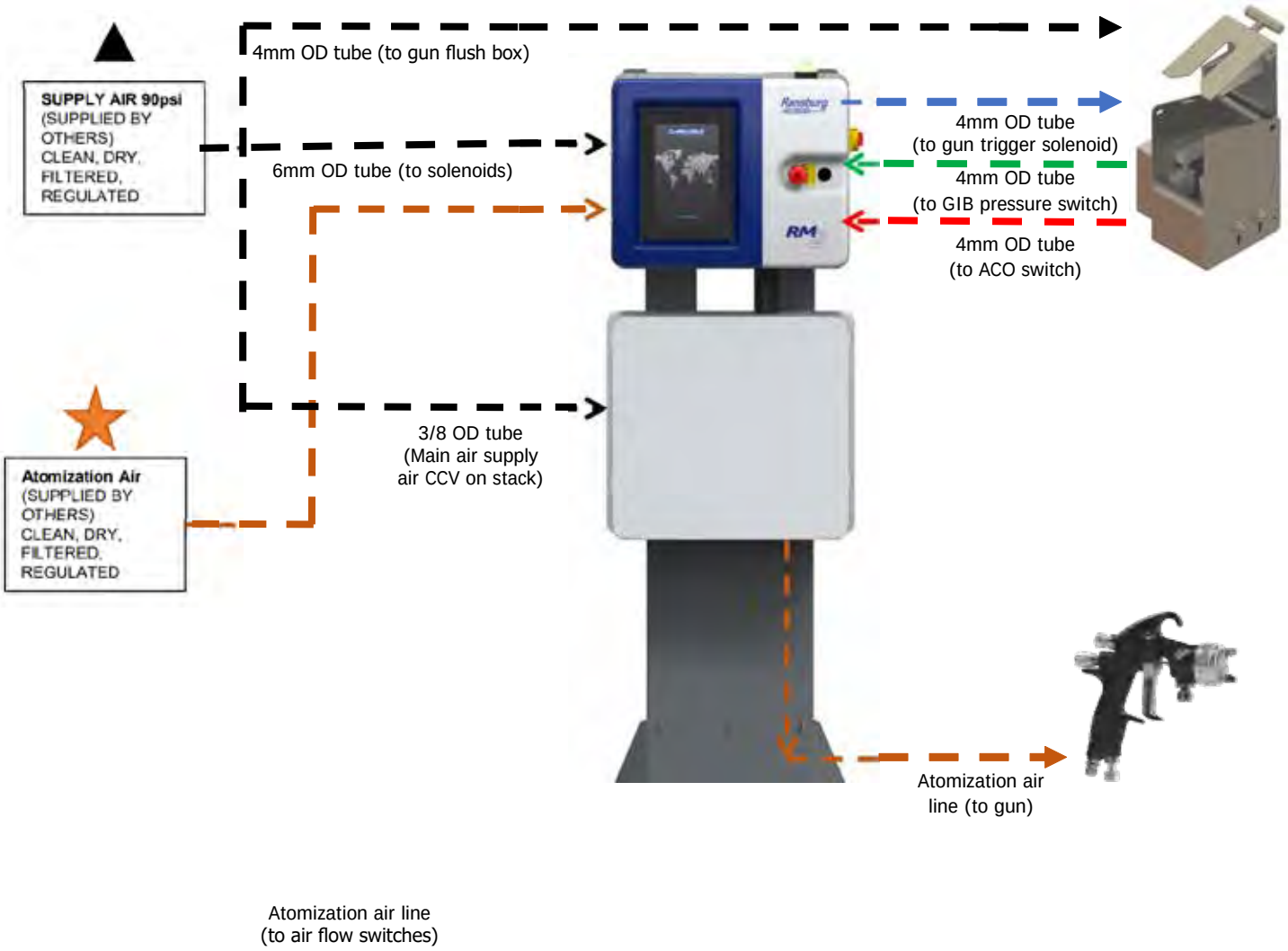


8. The materials flows through the mix block and through a static mixer to the applicator's inlet connection.



9. If needed, the system can be flushed only through the solvent valve on the color stack.

RM2 MAIN AIR, GUN FLUSH, AND ATOM AIR CONNECTIONS



COMPLETE SYSTEM PART NUMBERING

RM2 - # # # # #

Pressure
1= 250 psi
2= 3,000 psi
NOTE: Use of the Coriolis derates the machine pressure rating to 2900 psi.

Compatability
1= Standard
2= Acid

Flow Meter
0= None
1= Gear
2= Coriolis

Dispensing
1= 600 CC
1= 300 CC
5= Pulse

No. of Colors
0= No color stack
1= 1 Color
3= 3 Colors
7= 7 Colors
9= 7 Colors, 2 Catalysts

TECHNICAL SPECIFICATIONS-LOW PRESSURE

Item	Details
Max working air pressure	105 psi (7.2 bar)
Optimal working air pressure	75-105 psi (5.2-7.2 bar)
Pressure rating	250 psi (17.2 bar)
Max dispense pump flow rate RM2 low pressure	10.1 or 20.3 oz/min (300 or 600 cc/m)
Min dispense pump flow rate RM2 low pressure	0.07 or 0.7 oz/min (2 or 20 cc/min)
"A" side flowmeter range	1.3-64 oz/min (10-1900 cc/min)
Operating temperature range	32-122° F (0-50° C)
System weight	130-150 lbs. (59-68 kg)
Color/resin flow rate	20-1900 cc/min
Catalyst/hardener flow rate	2-600 cc/min
Total flow rate range	22-1900 cc/min
Max number of colors/resins	7
Max number of catalyst/hardener	1
Viscosity range of fluid	20—3000 cPs
Mixing ratio range	1:1—100:1
Ratio tolerance range	Up to ± 1%
Trigger response rate	200 ms
Isocyanate catalyst compatible	Yes
Flowmeters	Gear, Coriolis
Wetted parts	300 series stainless steel, PTFE, perfluoro elastomer, UHMW polyethylene
Communication protocol	Ethernet
No. of recipes/jobs	99+
No. of guns per fluid panel	2
External power requirements	100—240 VAC, 50—60Hz. 2.45A/1.55A, 16 AWG power supply wire gauge; NOTE: main supply voltage fluctuations not to exceed ± 10% of nominal
Environmental	Indoor use, pollution degree (2)
Installation category	II
Max altitude	6500 ft (2000m)
Humidity	80% rH up to 88° F (31° C); decreasing linearly to 50% rH @ 104° F (40° C); max 80% rH non-condensing

TECHNICAL SPECIFICATIONS-MEDIUM PRESSURE

Item	Details
Max working air pressure	105 psi (7.2 bar)
Optimal working air pressure	75-105 psi (5.2-7.2 bar)
Pressure rating	3000 psi (206.85 bar)
Max pulse valve flow rate RM2 medium pressure	64 oz/min (1900 cc/m)
Min pulse valve flow rate RM2 medium pressure	0.34 oz/min (10 cc/min)
"A" side flowmeter range	0.68-64 oz/min (20-1900 cc/min)
Operating temperature range	32-122° F (0-50° C)
System weight	120-155 lbs. (59-68 kg)
Color/resin flow rate	20-1900 cc/min
Catalyst/hardener flow rate	10-1900 cc/min
Total flow rate range	30-1900 cc/min
Max number of colors/resins	7
Max number of catalysts and hardeners	2
Viscosity range of fluid	10-3000 cPs
Mixing ratio range	1:1-50:1
Ratio tolerance range	Up to ± 1%
Trigger response rate	200 ms
Isocyanate catalyst compatible	No
Flowmeters	Gear, Coriolis
Wetted parts	Stainless steel, PTFE, perfluoro elastomer, UHMW polyethylene
Communication protocol	Ethernet
No. of recipes/jobs	99+
No. of guns per fluid panel	2
External power requirements	100—240 VAC, 50—60Hz. 2.45A/1.55A, 16 AWG power supply wire gauge; NOTE: main supply voltage fluctuations not to exceed ± 10% of nominal
Environmental	Indoor use, pollution degree (2)
Installation category	II
Max altitude	6500 ft (2000m)
Humidity	80% rH up to 88° F (31° C); decreasing linearly to 50% rH @ 104° F (40° C); max 80% rH non-condensing

WALL MOUNT DIMENSIONS

Requirements:

- Make sure wall is able to support weight of complete system, including air and fluid hoses and other connected devices. Minimum 91 kg (200 lbs.).
- Make sure clearance for electrical and fluid connections to system, and door swing radius.
- Bolt RM2's mast to wall or panel using minimum 4 each of 3/8" lag screws or cap screws with flat washers.

FLOOR STAND DIMENSIONS (OPTIONAL)

Requirements:

- Stand should be bolted to the floor.
- Floor stand kit 240-5199

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INSTALLATION

Before operating the Low Pressure RM2, Make sure all the below installation steps are complete. Schematics and further information are provided separately from this manual.

ELECTRICAL

The RM2 can accept either 120VAC or 240VAC as a power source. The internal 24VDC power supply automatically detects the input voltage and produces control power accordingly.

Main power entry to the cabinet is located at the top right-hand side of the cabinet, and it accepts a universal socket for a power connection.

⚠WARNING

Before making electrical, air, and fluid connections to the RM2, be sure to understand and verify all requirements for installation, including but not limited to: electrical codes, OSHA requirements, NFPA Requirements, and all applicable local codes and ordinances.

Read and understand all operating manuals for connected equipment.Do not supply RM2 with higher fluid or air pressures than recommended in the technical specifications section of this manual.

⚠WARNING

Control enclosure cannot be placed in a hazardous location. Do not use equipment not approved for hazardous locations. Do not modify system equipment.

⚠WARNING

To maintain non-hazardous classification of this equipment, the dispense pump and fluid panel components and assemblies must be monitored for leaks and serviced regularly to prevent leaks from occurring. If a leak is discovered, the system must be immediately shut down, de-energized, and repaired to correct the problem.

⚠WARNING

The equipment is only to be used in the manner specified. If not used in the specified manner the protection provided by the equipment may be impaired.

⚠WARNING

Do not replace the detachable main supply power cord with inadequately rated cords.

⚠WARNING

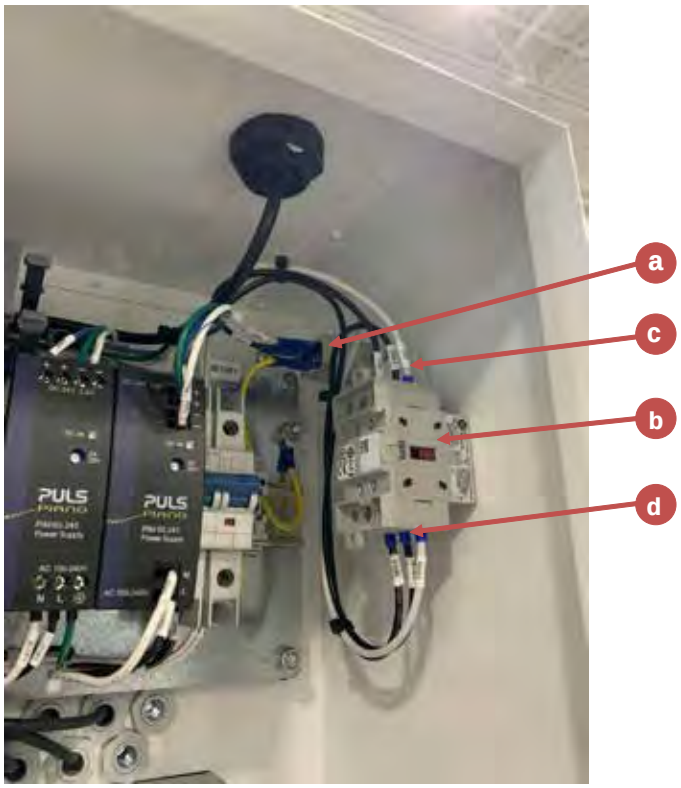
This equipment is intended to be installed outside of classified hazardous areas. There are accessories for this equipment (sold separately) to allow devices such as flowmeters to be installed within the hazardous zone; this should only be done following the instructions provided with those accessories.

NOTICE

Any conductive parts within 2.5m of this equipment (ladders, rails, fences, etc.) shall be bonded appropriately to ground.

Electrical Connection

1. Locate the main power entry plug (a) in the upper right section of the cabinet
2. Locate the disconnect switch connector (b) inside of the control panel
3. Make sure the main power entry plug is connected at the top (c), opposite their secondary connections (d) below.



PNEUMATICS

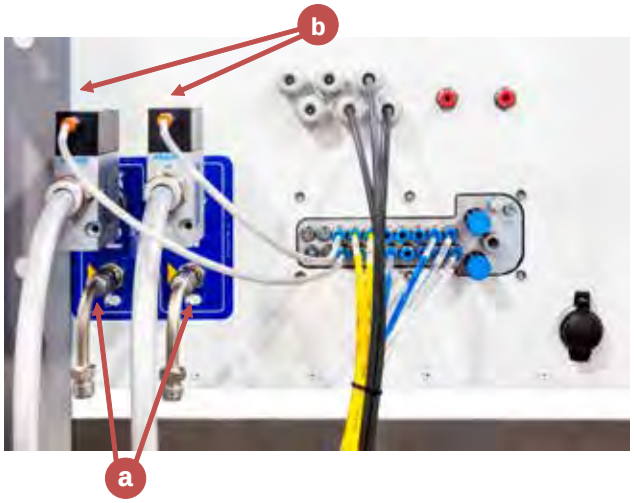
Always use clean, dry air to operate the RM2. The maximum air input pressure is 105 psi / 7 BAR.

Pneumatic Connections

Depending on your application, there are 3 air input connections you need to complete before operating the system.

Gun Air Input

1. Locate the air inlet connection on the back of the system chassis (a).
2. Attach a 3/8” main air line with 1/4” NPS swivel connection to the air inlet.
3. If using two guns, connect an air hose to each inlet.
4. Air is routed internally through the Atomizing Air Cutoff Solenoids (b) which then are connected to bulkheads on the fluid panel that will connect to the gun’s atomization air connection.

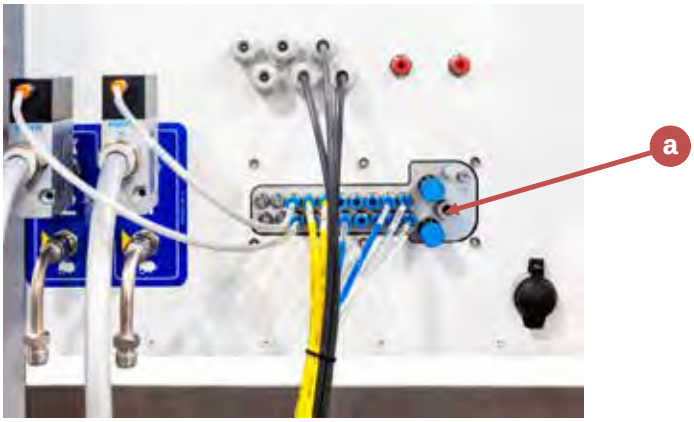


5. Attach a final 3/8” main air line in the front panel connector (c) that will lead to the gun’s air input.

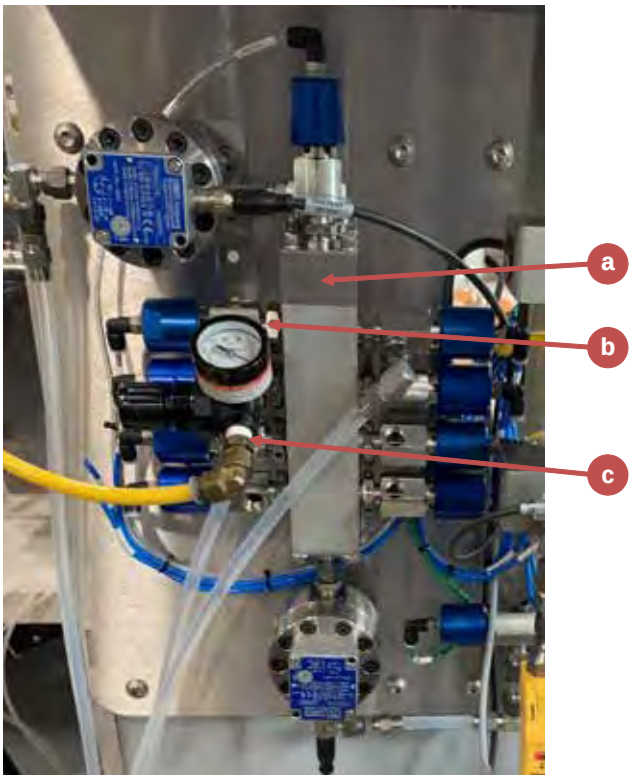
Solenoid Air Input

1. Locate the air inlet connection on the back of the system chassis (a).
2. Attach a 3/8” main air line to the air inlet.

Material A Air Input



1. Locate the Material A valve stack (a).
2. Locate the top left valve (b).
3. Using a 3/8” air line, connect your air source to the valve (c).



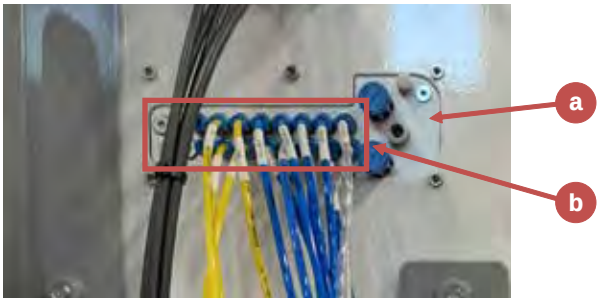
NOTICE

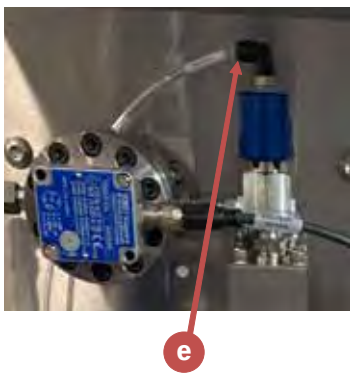
It is recommended to install an air pressure regulator between the air source and the air valve to monitor maximum air pressure.

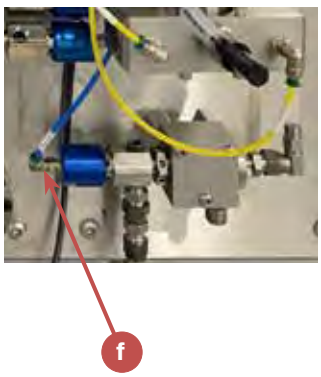
Internal Air Connections

After the air input hoses are connected, the system requires several internal air connections before operation. The steps that follow have been completed by the factory before shipment.

1. Locate the top left valve (b). Locate the solenoid manifold on the back left side of the system (a). This manifold houses all the air outputs to the valve stacks for both materials.
2. Use the desired routing, connect the manifold outputs (b) to each material valve (c), air valve (d), solvent valve (e) , and mixing block valve (f).







PAINT MATERIALS

Your system may include up to 7 material valves. The process to connect each is the same; repeat the steps below as needed. The number of valves on the stack will depend on your application and needs.

Paint resins and hardeners may be supplied to the RM2 system via pressure tanks or pumps. Fluid regulators are strongly recommended if supplying from a pump, and entrained air must be avoided.

Fluid supplied to the RM2 system must also be free of contaminants and solid particles that may clog the flow meter gears or other downstream components. Typical filtration for paint resins is 100 mesh (150 micron) or smaller. Contact your RM2 representative for information regarding fluid supply and conditioning equipment.

Use PTFE tape or liquid sealant on tapered pipe threads.

NOTICE

The inlet fluid pressure to the dispense pump should always be maintained 5 to 10% above the outlet pressure. This Make sures proper operation of the dispense pump.

NOTICE

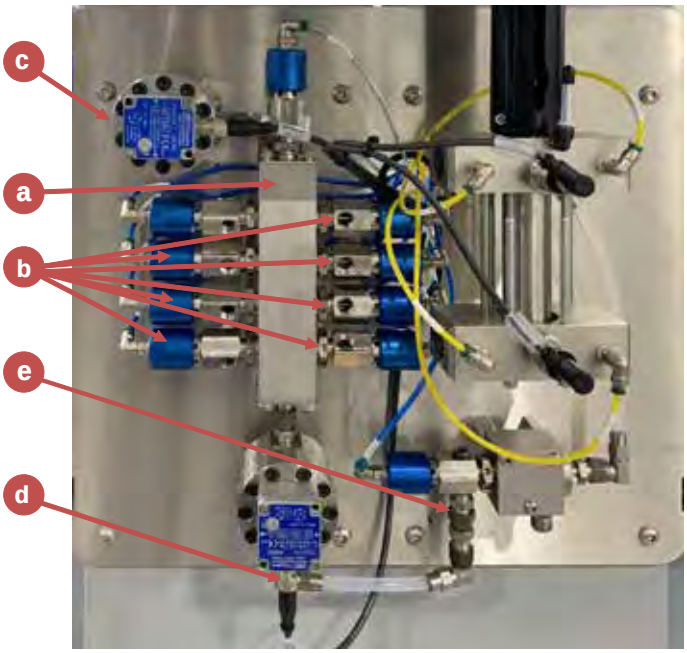
The static mixer assembly (240-3122) connects to the mix manifold outlet. The 240-3122 downstream end connection is 3/8” NPS male thread.

NOTICE

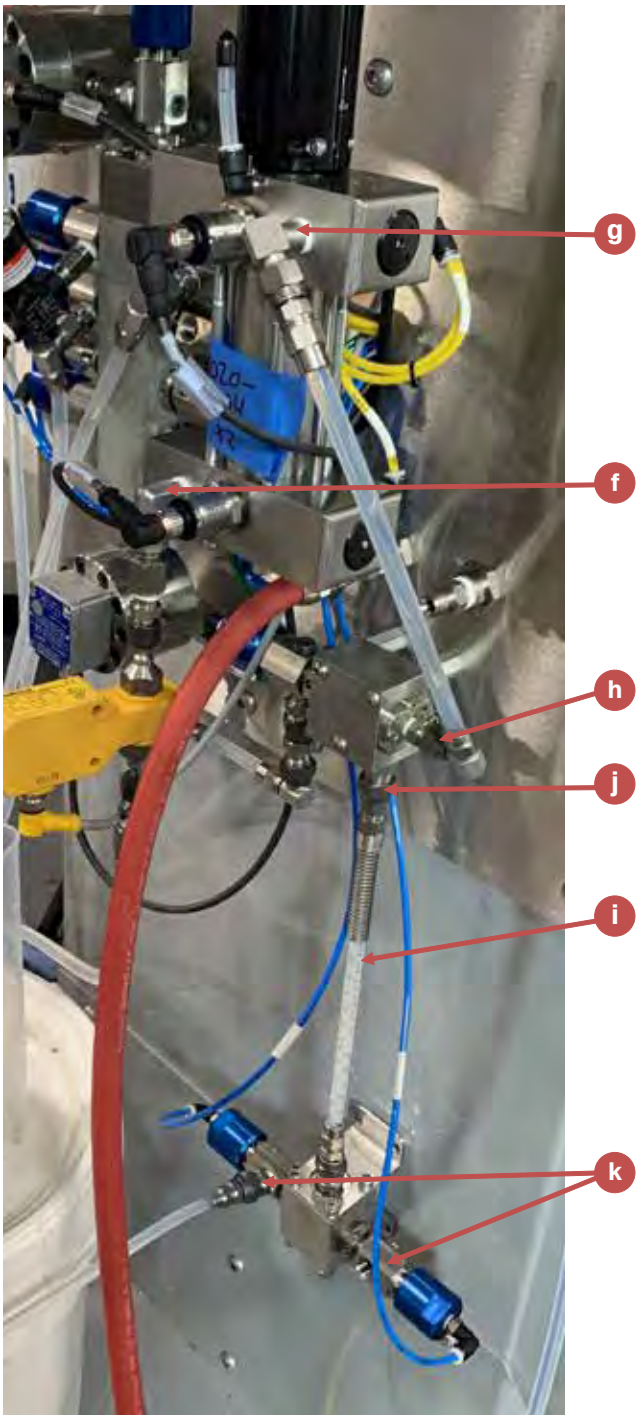
F1 - F5 plugs may be removed from back of valves for connection to paint circulation systems.

Paint Material Connections

1. Locate the material valve stack (a).
2. Locate each of the material input connections on each valve on the stack (b).
3. Connect your material drums to the material input connection according to your desired mapping. Be careful not to mix different kinds of materials into the stack.
4. Connect your solvent drum to the input valve on top of the stack (c) using the input connection.
5. Connect the lower portion of the material flow meter (d) to the first input connector of the mix block (e).
6. Locate the material dispense pump input connector (f).



7. Connect your material B hose into the pump inlet.
8. Connect a material hose between the pump out let (g) and the second mix block connector (h).
9. Connect the mix block to the mixing tube (i) using the bottom connector (j).
10. Connect you gun material hoses to the bottom connectors of the mixing tube (k).



DISPOSAL INFORMATION

Prior to disposal of this equipment at the end of its life cycle, all components that contain electronic printed circuit boards (PCBs), sensors, and any wetted parts that contain hazardous materials should be separated from the unit and recycled/ disposed of in accordance with local regulations.

INSTALLATION

Before operating the Medium Pressure RM2, Make sure all the below installation steps are complete. Schematics and further information are provided separately from this manual.

ELECTRICAL

The RM2 can accept either 120VAC or 240VAC as a power source. The internal 24VDC power supply automatically detects the input voltage and produces control power accordingly.

Main power entry to the cabinet is located at the top right-hand side of the cabinet, and it accepts a universal socket for a power connection.

⚠WARNING

Before making electrical, air, and fluid connections to the RM2, be sure to understand and verify all requirements for installation, including but not limited to: electrical codes, OSHA requirements, NFPA Requirements, and all applicable local codes and ordinances.

Read and understand all operating manuals for connected equipment.Do not supply RM2 with higher fluid or air pressures than recommended in the technical specifications section of this manual.

⚠WARNING

Control enclosure cannot be placed in a hazardous location. Do not use equipment not approved for hazardous locations. Do not modify system equipment.

⚠WARNING

To maintain non-hazardous classification of this equipment, the dispense pump and fluid panel components and assemblies must be monitored for leaks and serviced regularly to prevent leaks from occurring. If a leak is discovered, the system must be immediately shut down, de-energized, and repaired to correct the problem.

⚠WARNING

The equipment is only to be used in the manner specified. If not used in the specified manner the protection provided by the equipment may be impaired.

⚠WARNING

Do not replace the detachable main supply power cord with inadequately rated cords.

⚠WARNING

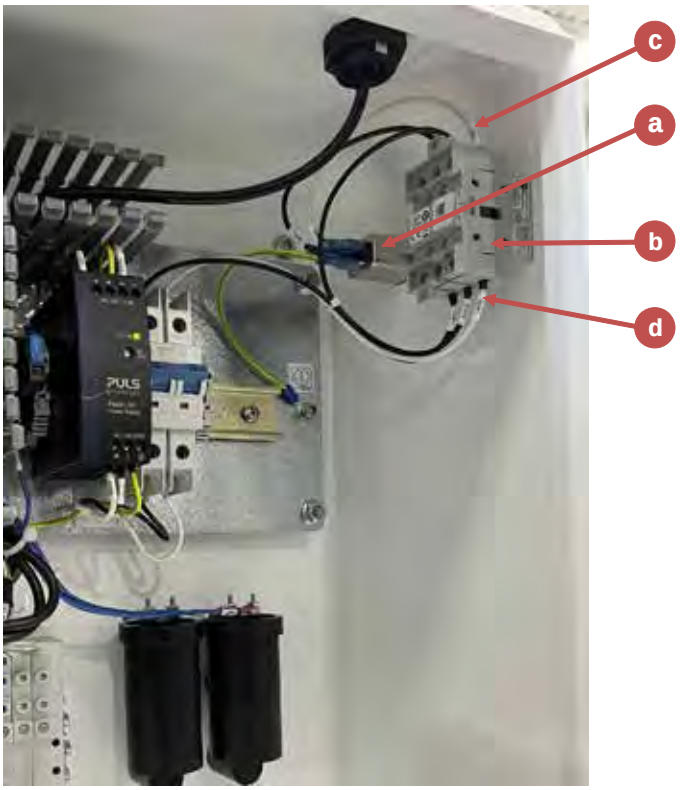
This equipment is intended to be installed outside of classified hazardous areas. There are accessories for this equipment (sold separately) to allow devices such as flowmeters to be installed within the hazardous zone; this should only be done following the instructions provided with those accessories.

NOTICE

Any conductive parts within 2.5m of this equipment (ladders, rails, fences, etc.) shall be bonded appropriately to ground.

Electrical Connection

1. Locate the main power entry plug (a) in the upper right section of the cabinet
2. Locate the disconnect switch connector (b) inside of the control panel
3. Make sure the main power entry plug is connected at the top (c), opposite their secondary connections (d) below.



PNEUMATICS

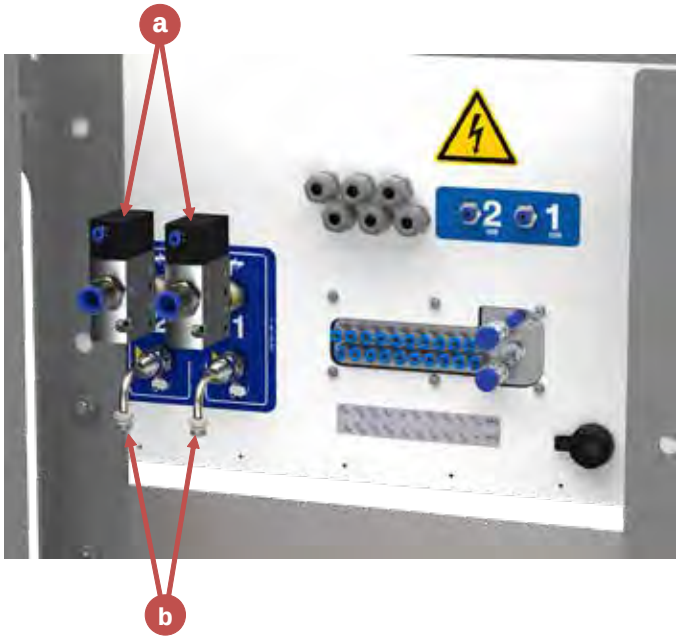
Always use clean, dry air to operate the RM2. The maximum air input pressure is 105 psi/7 BAR.

Pneumatic Connections

Depending on your application, there are 3 air input connections you need to complete before operating the system.

Gun Air Input

1. Locate the air inlet connection on the back of the system chassis (a).
2. Attach a 3/8” main air line with 1/4” NPS swivel connection to the air inlet.
3. If using two guns, connect an air hose to each inlet.
4. Air is routed internally through the Atomizing Air Cutoff Solenoids (b) which then are connected to bulkheads on the fluid panel that will connect to the gun’s atomization air connection.



5. Attach a final 3/8” main air line in the front panel connector (c) that will lead to the gun’s air input.

Solenoid Air Input

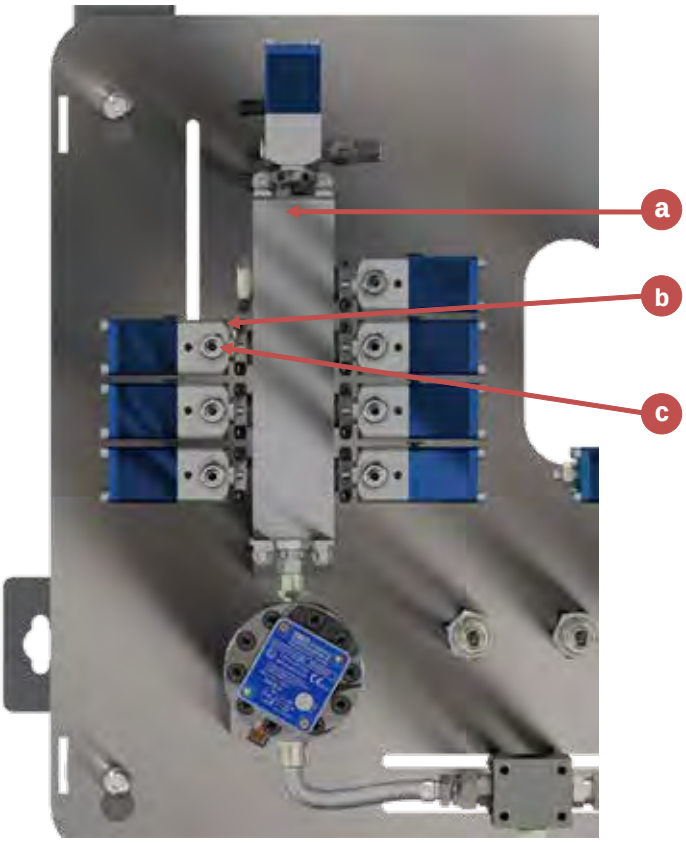
1. Locate the air inlet connection on the back of the system chassis (a).
2. Attach a 3/8” main air line to the air inlet.

Internal Air Connections

After the air input hoses are connected, the system requires several internal air connections before operating.

The following steps may have been completed by the factory before shipment.

1. Locate the solenoid manifold on the back left side of the system (a). This manifold houses all the air outputs (b) to the valve stacks for both materials.
2. Using the desired mapping, connect the manifold air outputs (b) to each material A stack valve © and solvent valve (d), pulse stack valve (e), and solvent pulse valve (f).



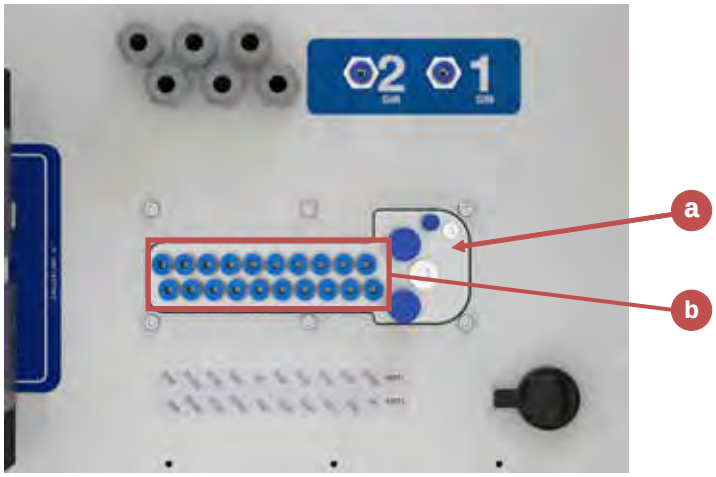
NOTICE

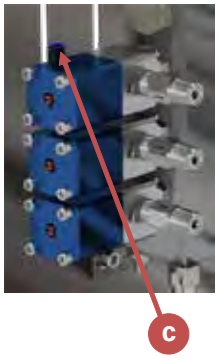
It is recommended to install an air pressure regulator between the air source and the air valve to monitor maximum air pressure.

Internal Air Connections

After the air input hoses are connected, the system requires several internal air connections before operation. The steps that follow have been completed by the factory before shipment.

1. Locate the top left valve (b). Locate the solenoid manifold on the back left side of the system (a). This manifold houses all the air outputs to the valve stacks for both materials.
2. Use the desired routing, connect the manifold outputs (b) to each material valve (c), air valve (d), solvent valve (e) , and mixing block valve (f).





PAINT MATERIALS

Your system may include up to 7 material valves. The process to connect each is the same; repeat the steps below as needed. The number of valves on each stack will depend on your application and needs.

Paint resins and hardeners may be supplied to the RM2 system via pressure tanks or pumps. Fluid regulators are strongly recommended if supplying from a pump, and entrained air must be avoided.

Fluid supplied to the RM2 system must also be free of contaminants and solid particles that may clog the flow meter gears or other downstream components. Typical filtration for paint resins is 100 mesh (150 micron) or smaller. Contact your RM2 representative for information regarding fluid supply and conditioning equipment.

Use PTFE tape or liquid sealant on tapered pipe threads.

NOTICE

The inlet fluid pressure to the CCV pulse valve should always be maintained 5 to 10% above the outlet pressure. This Make sures proper operation of the dispense pump.

NOTICE

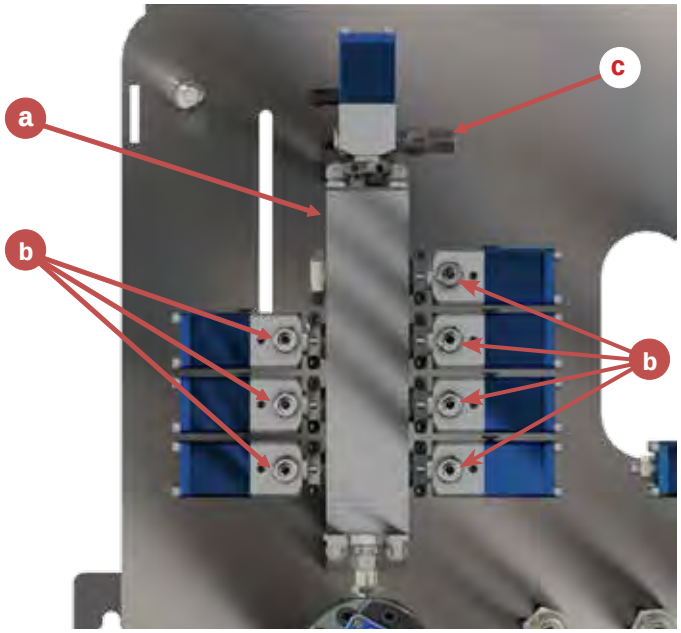
The static mixer assembly (240-3122) connects to the mix manifold outlet. The 240-3122 downstream end connection is 3/8” NPS male thread.

NOTICE

F1 - F5 plugs may be removed from back of valves for connection to paint circulation systems.

Paint Material Connections

1. Locate the material valve stack (a).
2. Locate each of the material input connections on each valve on the stack (b).
3. Connect your material drums to the material input connection according to your desired mapping. Be careful not to mix different kinds of materials into the stack.
4. Connect your solvent drum to the input valve on top of the stack (c) using the input connection.



1. Locate the material B pulse valve input connectors (f).
2. Connect your material B hoses into the pulse valve inlets.
3. Locate the material B solvent pulse valve input connector (g).
4. Connect your material B solvent hose into the solvent pulse valve inlet.

DISPOSAL INFORMATION

Prior to disposal of this equipment at the end of it's life cycle, all components containing electronic printed circuit boards (PCBs), sensors, and any wetted parts that may contain hazardous materials should be separated from the unit and recycled/ disposed of according to local regulations.

RM2 CLOUD SETUP

1. Login to ‘admin’ user.
2. Select Menu > Setup > Exor Internal Menu.

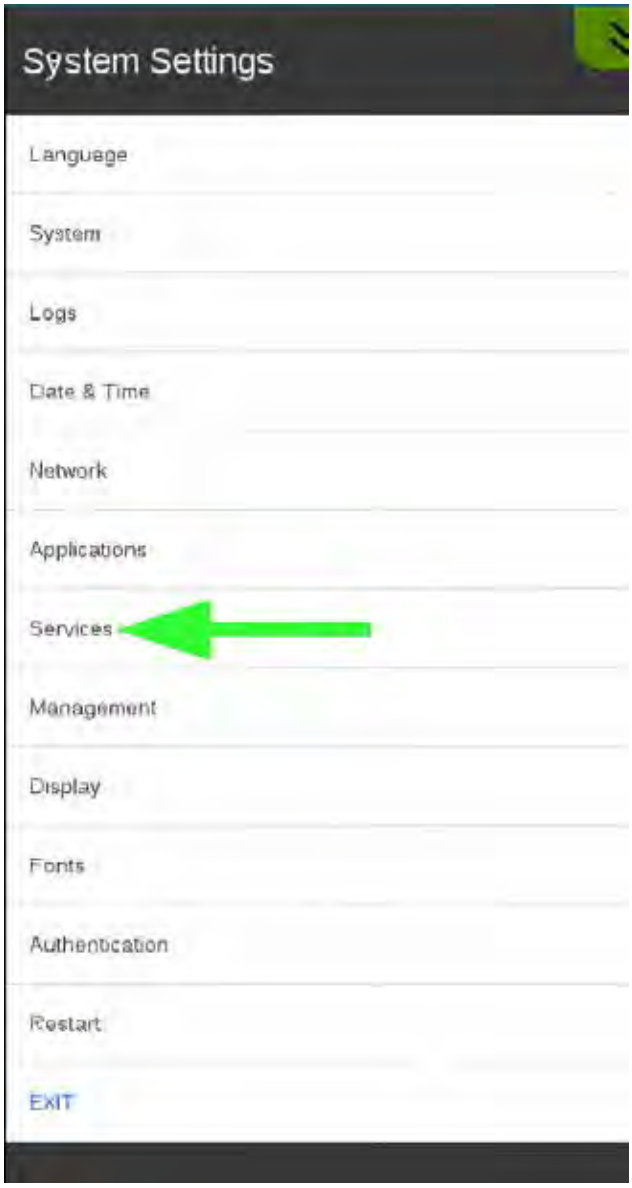
3. Select > Show system settings.

4. Select “Network.”

5. Select “Edit.”

6. Enter Network and network password. Click “Save.”

7. Click “Menu” at the top left. Select “Services.”



8. Enable these three (3) services:

   a) VNC Service

   b) Router/NAT/Port Forwarding

   c) Cloud/VPN Service

9. In “Cloud/VPN” verify the following settings:

   Server: us.corvinacloud.com

   Username: RM2-machineserialnumber/ organization

   For example: RM2-1234/CFTLiquid

   Password: paint123$

NOTICE

Login credentials will be different for each machine based upon the following: your machine serial number, and your organization’s server or cloud login credentials.

OPERATION

POWERING UP THE SYSTEM

Before powering-up the system, Make sure that main power has been installed correctly. See section on electric installation for more details.

To power-up:

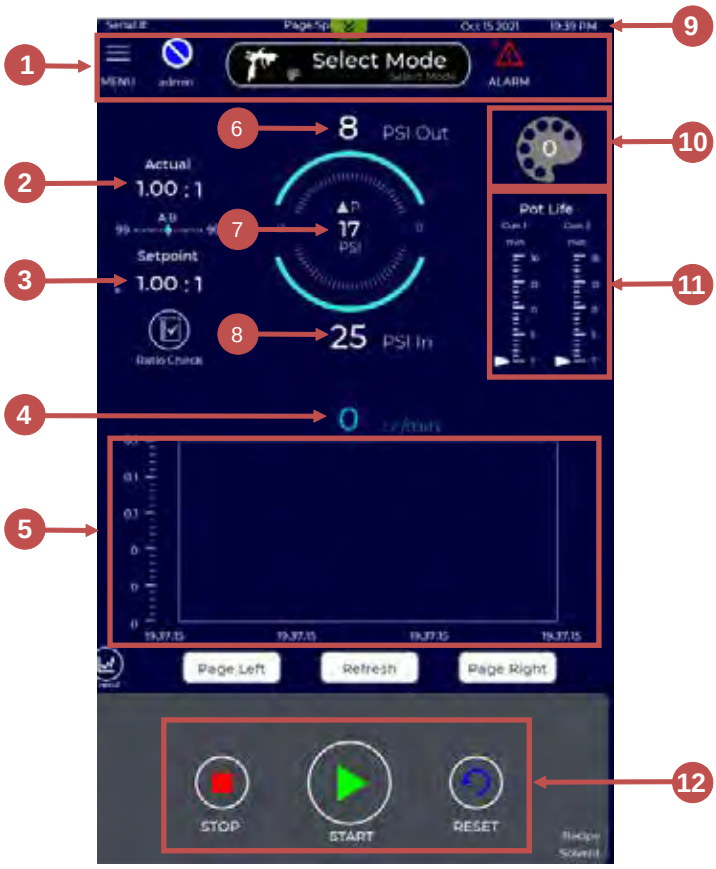
1. On the righthand side of the control module enclosure, turn the rotary disconnect switch clockwise. The system will go through a boot-up sequence. When ready, a button will be shown on screen to access the 'Main Menu'.
2. Pressing the Main Menu button will open the main menu.

USER INTERFACE GUIDE

The touch screen display is used to control the RM2. The following pages identify the various screens and their associated controls. Read and understand this guide to properly understand and operate the RM2 system.

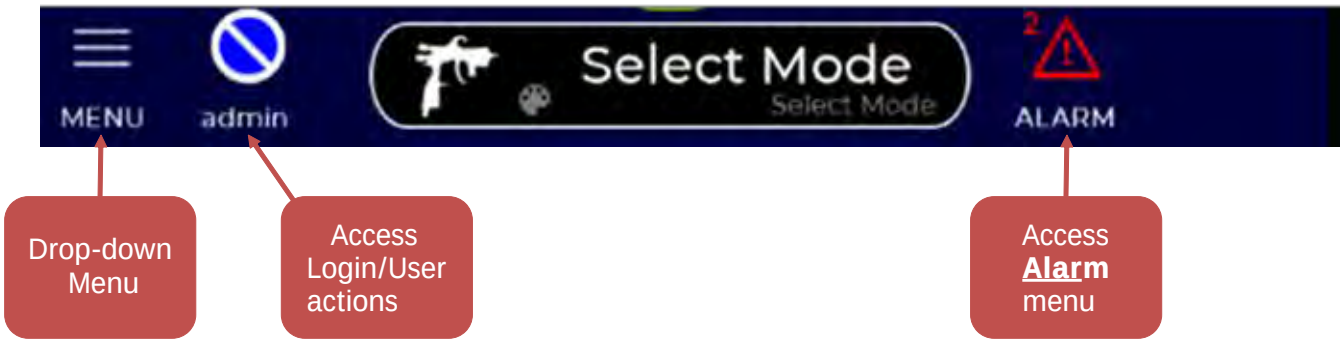
Home Screen Layout/Spray Screen

1. Navigation Bar
2. Measured Ratio
3. Target Ratio
4. Current Flow Rate
5. Flow Rate Graph
6. Outlet Pressure
7. Pressure Differential
8. Inlet Pressure
9. Current Time and Date
10. Currently Loaded Color
11. Pot Life Display
12. Run Menu



NAVIGATION BAR

Except on certain menus that have special purposes, the navigation bar shown below will be visible in the upper section of the screen. Each section will be discussed separately in this manual.



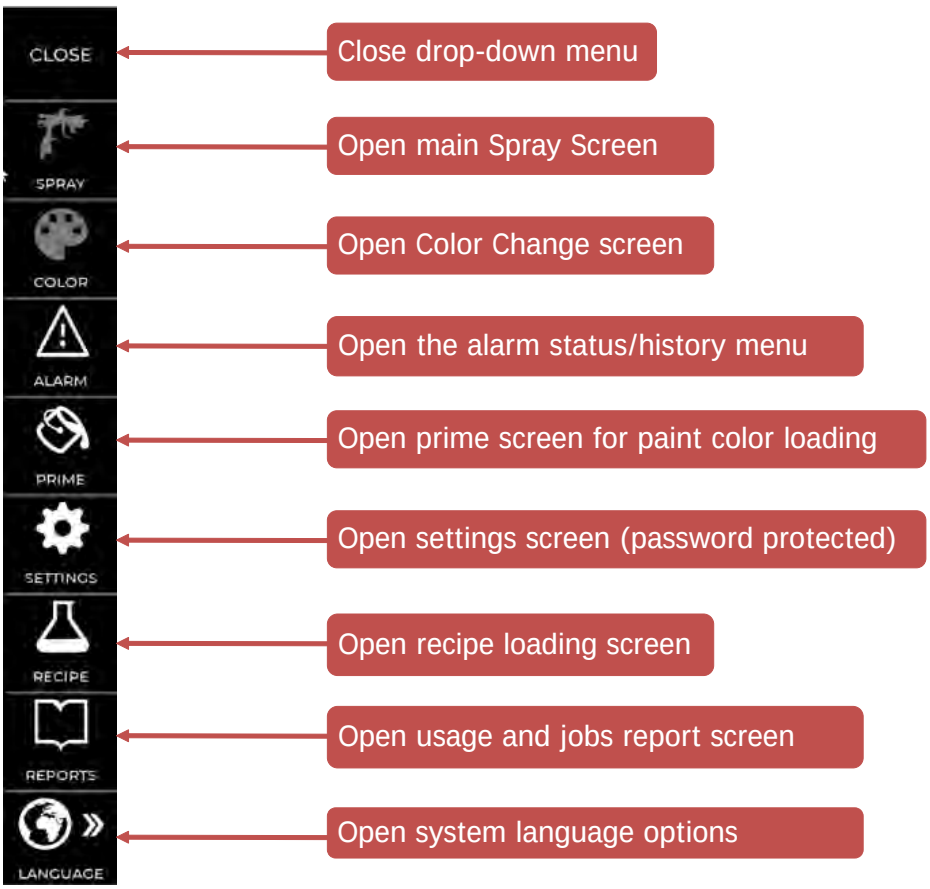
Press the **Menu** button to open a drop-down menu to access other menus.

Press **User to** open a dialog menu that allows log-in, log-out, and other functionality available to the administrator.

Press **Alarm to** open the alarm status/history menu.

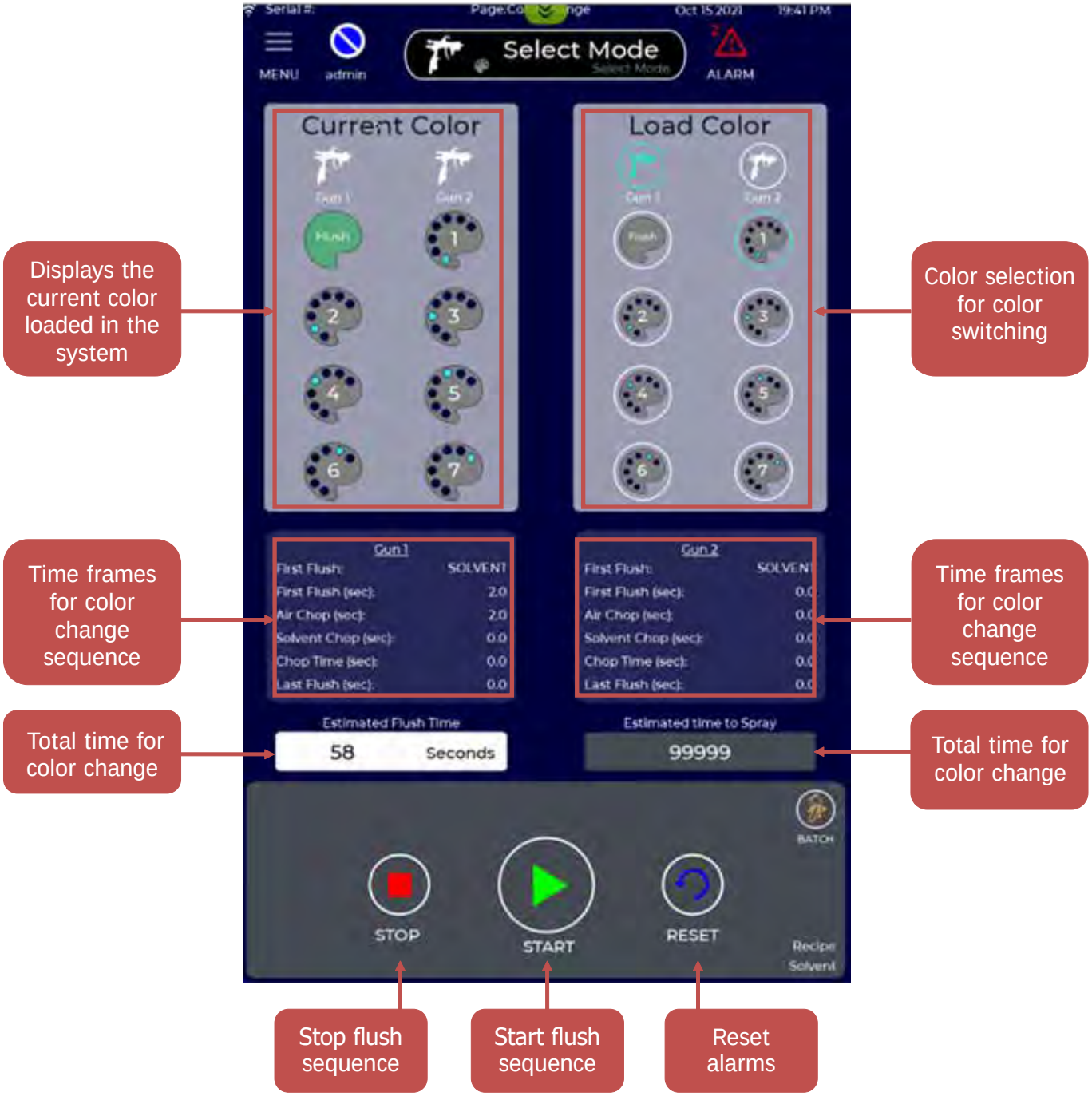
Drop-Down Menu

Options available on the drop-down menu are shown below. Access to specific functions may be limited (greyed out) by the administrator for some users.



Color Change Screen

The color change screen is used for changing colors and flushing the system with the flush/load sequence programmed in the settings screen.

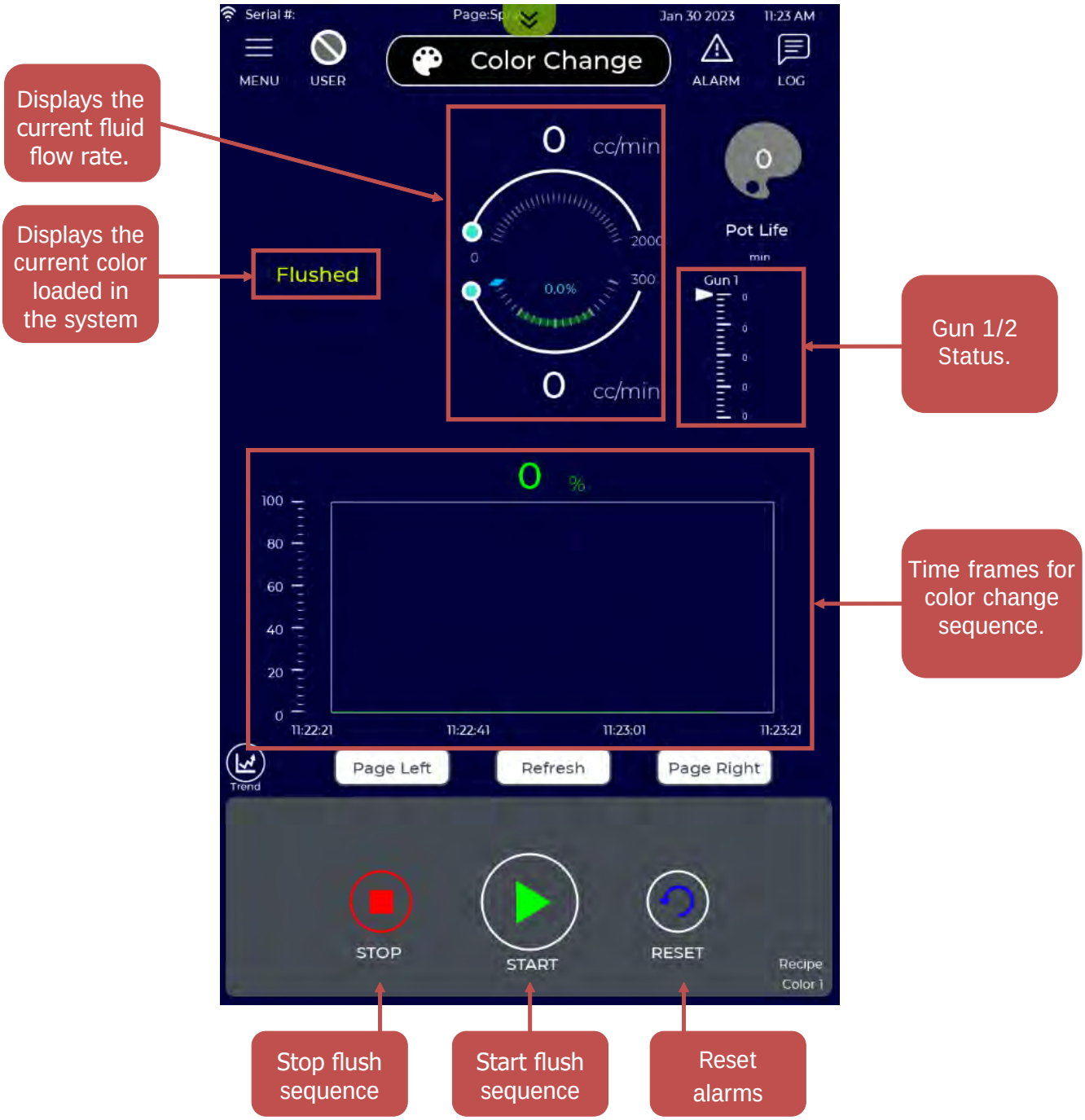


NOTICE

If a flush box is present, the guns will trigger in succession when switching colors. If not, it is necessary to manually trigger them (first gun 1 and then gun 2). Both guns should not be triggered simultaneously, as it is possible that solvent would take the path of least resistant and not flush one of the guns.

Color Change Screen

The color change screen is used for changing colors and flushing the system with the flush/load sequence programmed in the settings screen.



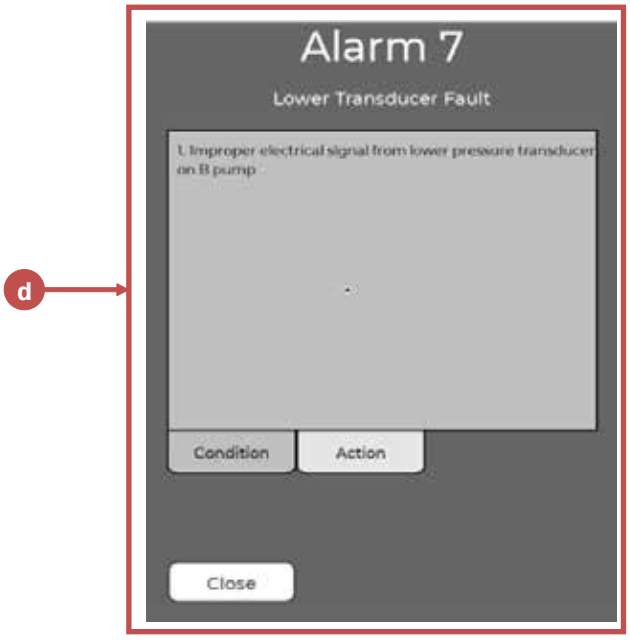
NOTICE

If a flush box is present, the guns will trigger in succession when switching colors. If not, it is necessary to manually trigger them (first gun 1 and then gun 2). Both guns should not be triggered simultaneously, as it is possible that solvent would take the path of least resistant and not flush one of the guns.

Alarms Screen

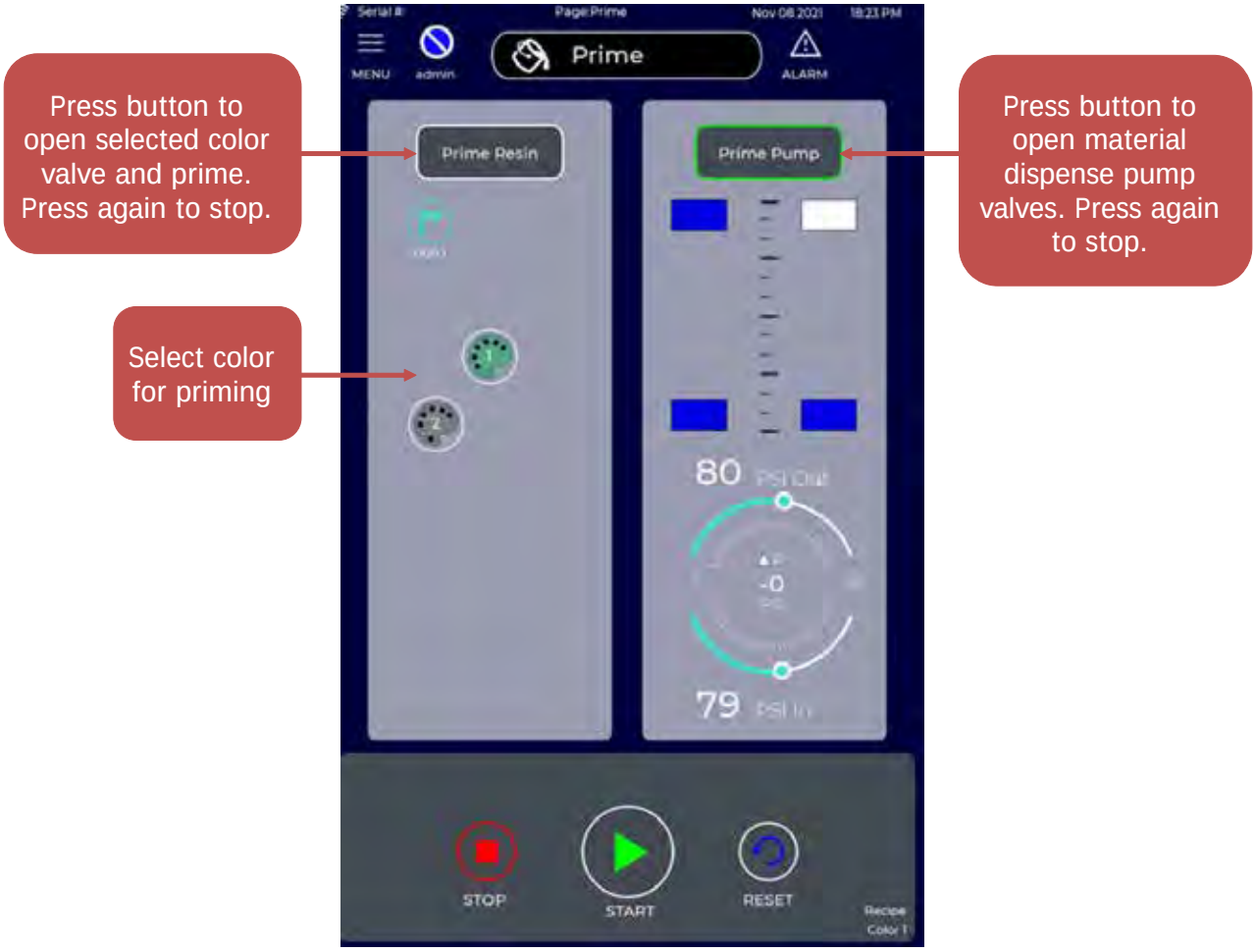
This screen displays all of the available system alarms (a). If an alarm sounds it will be highlighted, and the Reset button in the main spray screen must be pushed before the system can spray again. Alarm history (b) is also saved in this screen.

If an alarm has been disabled, the highlighted status will still be displayed, but the alarm will not sound. Click the individual alarm action button (c) additional details (d).



Prime Screen-Low Pressure

Use this screen to prime the RM2 unit with Resin (A) and Hardener (B). Buttons will independently operate the Resin color valves (A0-A9), or the dispense pump for material loading. Gun atomizing air must be off while priming.



NOTICE

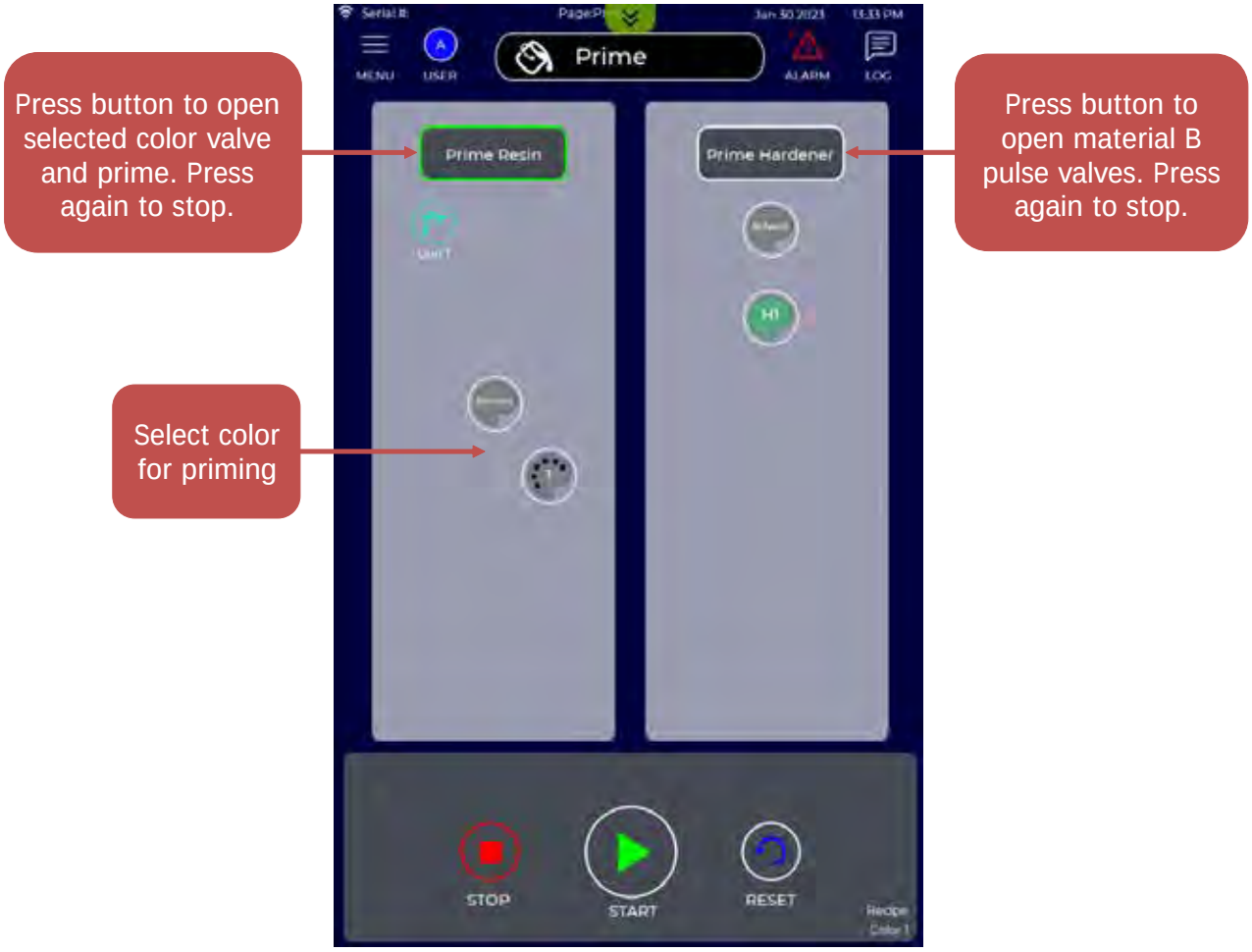
The gun must be triggered without atomizing air to allow the priming or flushing sequences.

⚠CAUTION

Always follow the Prime mode with a solvent load to flush out the fluid lines and prevent mixed material from being sprayed or hardening in the system.

Prime Screen-Medium Pressure

Use this screen to prime the RM2 unit with Resin (A) and Hardener (B). Buttons will independently operate the Resin color valves (A0-A9), or the pulse valves for material loading. Gun atomizing air must be off while priming.



NOTICE

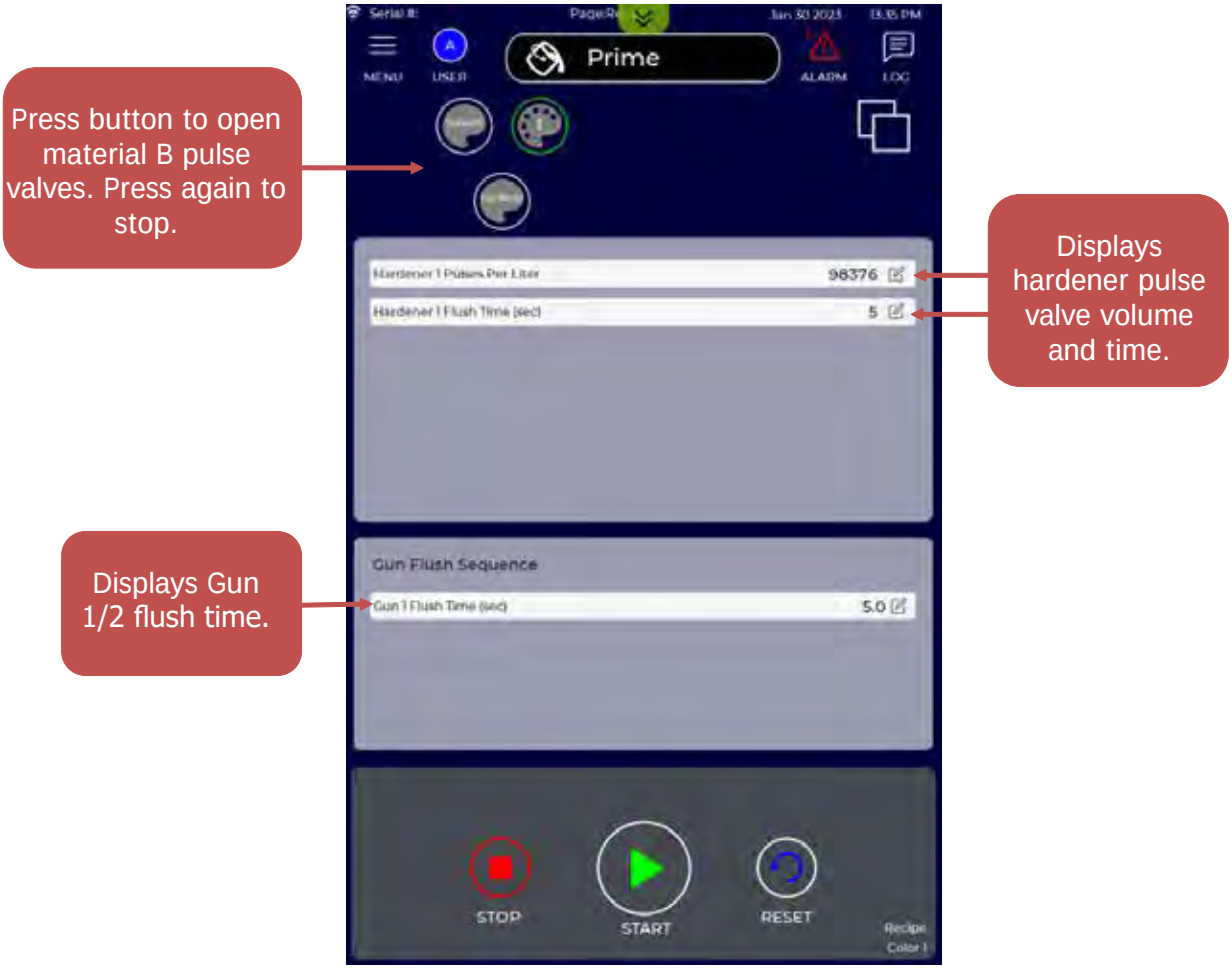
The gun must be triggered without atomizing air to allow the priming or flushing sequences.

⚠CAUTION

Always follow the Prime mode with a solvent load to flush out the fluid lines and prevent mixed material from being sprayed or hardening in the system.

Prime Screen-Medium Pressure

Use this screen to prime the RM2 unit with Hardener (B). Buttons will independently operate the hardener pulse valves for material loading. Gun atomizing air must be off while priming.



NOTICE

The gun must be triggered without atomizing air to allow the priming or flushing sequences.

⚠CAUTION

Always follow the Prime mode with a solvent load to flush out the fluid lines and prevent mixed material from being sprayed or hardening in the system.

Settings Screen

Select the settings button from the dropdown menu to access system settings. Before opening this screen a password prompt for access will take over the screen. Viewing or changing settings requires user permissions (varied between normal users and administrators).

Each screen will be reviewed separately in the next pages of this manual.

On the main setup page, the top four selections are available only to administrators. These are 'Exor Internal Menu' (a) which opens a popup dialog allowing internal settings for the Exor operator interface to be modified, 'System Configuration' (b)– which opens the system configuration menu, and "Alarm Masking" (c).

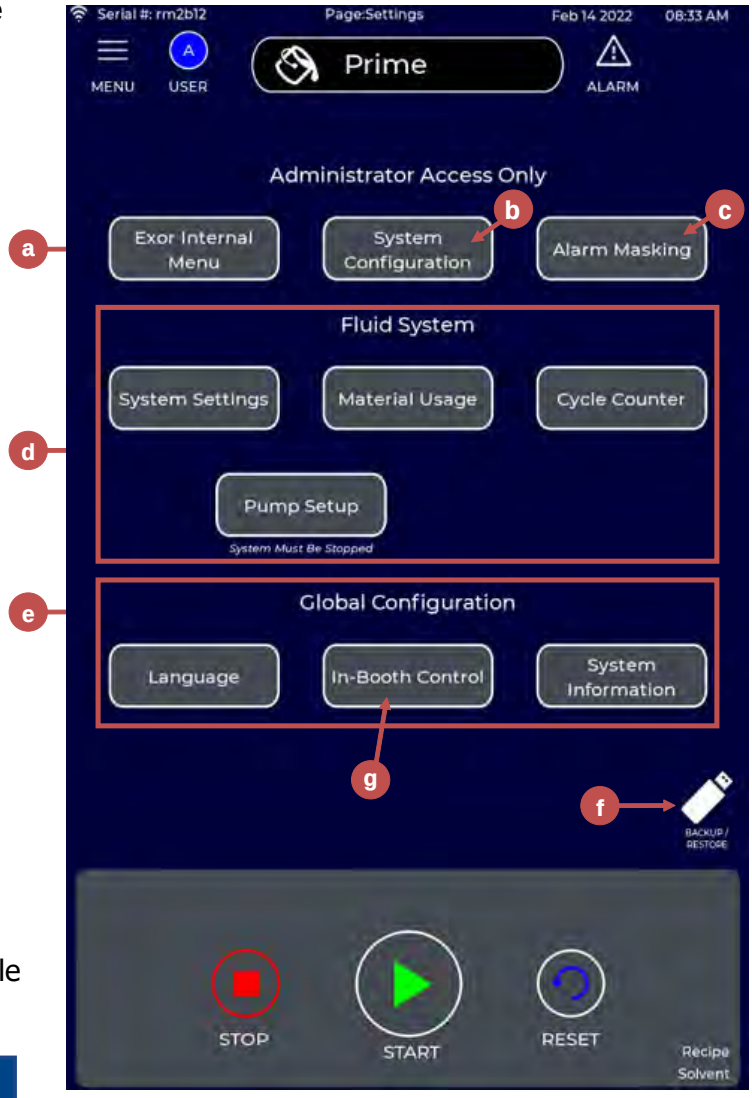
The next group of selections involve setting up the 'Fluid System' (d) which involves setting up material usage, cycle counter pump setup and settings. These selections are access-controlled by the administrator.

The next group of menus (e) are for modifying several miscellaneous parameters used by the system that dictate its behavior.

Finally, the options for backing up and restoring settings will be found in the bottom right of this screen (f). This lets ALL system data to get stored to USB, or recovered using the built-in Linux file browser.

To Store–place USB in slot on the Exor panel. Press 'Store to USB' (h). File will be saved and called RM2Data.CSV

To Restore–press 'Restore' (i) and navigate to the file location. Select the applicable file.



NOTICE

This option (g) is only shown if selected in 'System Configuration'.

NOTICE

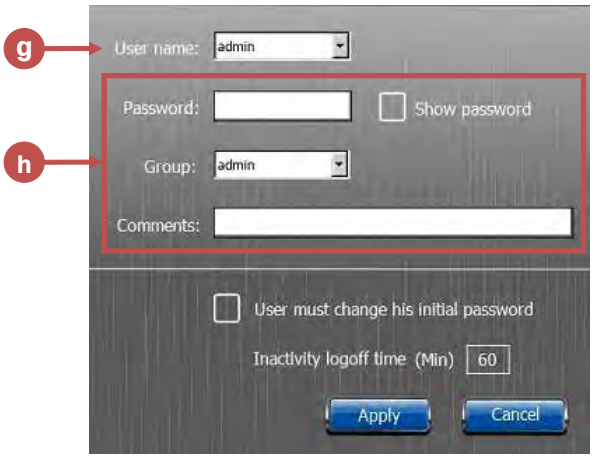
The USB storage location can be accessed via a LAN (through FTP). To do this use a file transfer program such as WinSCP.

User Options

1. To access the user options page, log in as an administrator and then press the 'user' (a) menu key in the navigation bar to open the user actions dialog.

2. A dialog box will open and the administrator will see an option called 'User Options' (b).

3. From the user options menu you can Edit users (c), Add users (d), Delete users (e), or change User permissions (f)



Edit User

To edit a user, press the Edit Users menu.

Select the user you want to edit (g).

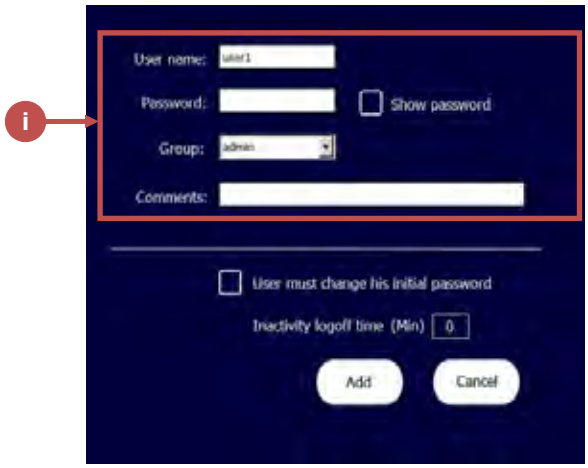
Modify the user's parameters (h). This includes user-group assignment.

Add User

The operator interface supports up to fifty individual users.

To add a user, enter the Add User menu.

Fill in the parameters (i) including user name, group assignment and initial password.

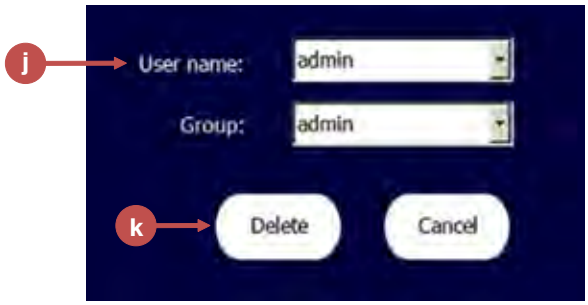


Delete User

To delete a user, enter the Delete User menu.

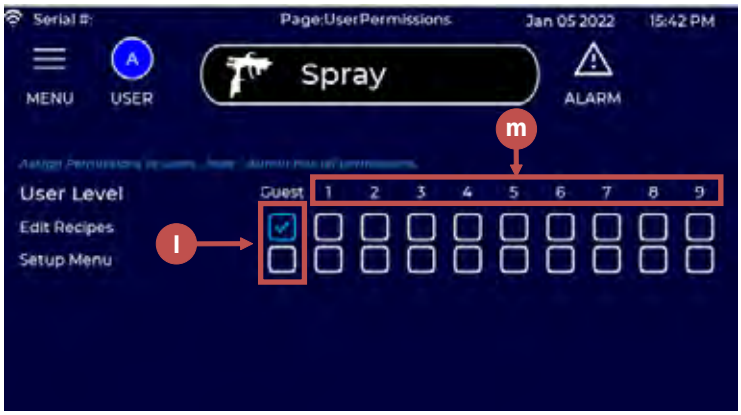
Select the user (j) you want to delete.

Click on delete (k).



User Permissions

Various functions within the operator interface can have their access controlled depending on their group assignment. See more details about this in the 'Security' section in the 'Process Configuration' chapter. To assign rights to different user groups, enter the 'User Permissions' menu from the User Options menu, and select or deselect access for each function (l) by user level (m).

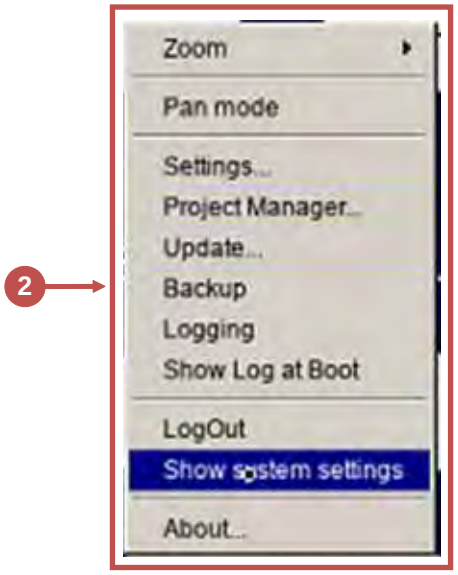


Exor Internal Menu

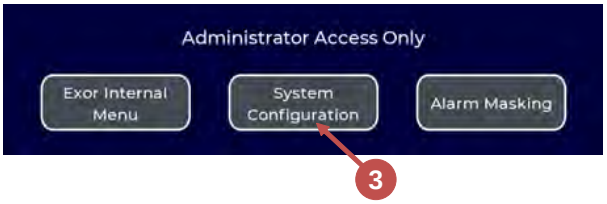
The Exor (1) dropdown dialog (2) allows access to the root settings for the Exor operator interface's internal settings.

Setting the IP addresses for the three networks provided with the interface (described in the Installation section above), and setting the date and time displayed on the panel are the only operations that are necessary to operate the RM2.

For more information, consult the user manual for the Exor eX715 operator interface.

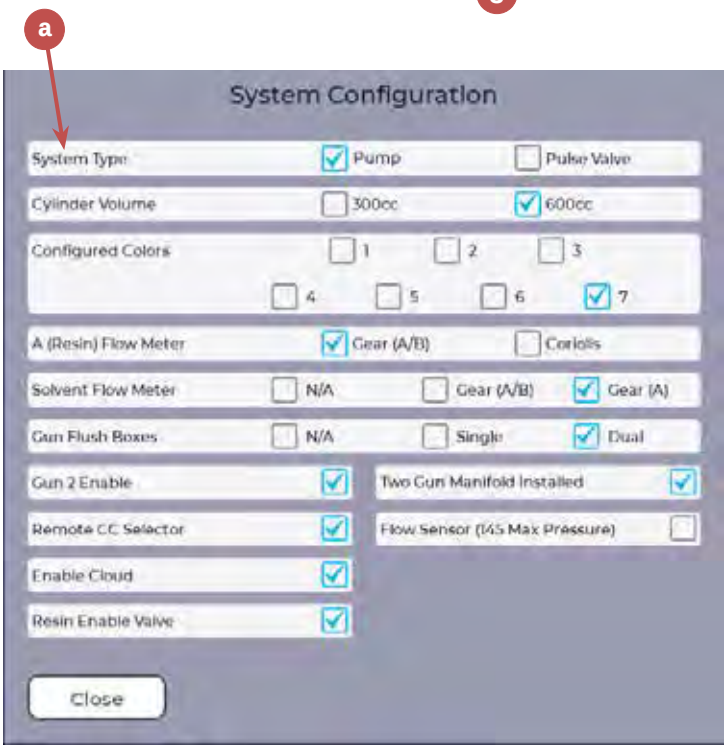


This menu (3) allows the configuration of the system according to the hardware that has been installed in the fluid section.



The parameters are:

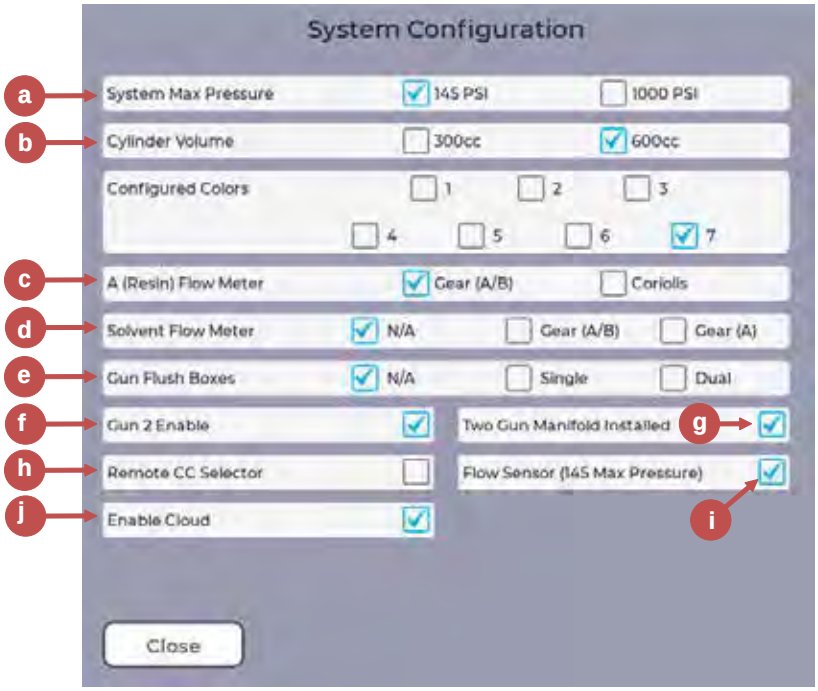
a. **System Type**: Select the type of system.



NOTICE

It is important that the parameters in this menu accurately depict the installed hardware. System behavior is dictated by these settings, and incorrect settings on this menu can cause damage to the equipment.

The parameters are:



a. **System Max Pressure**: Select the maximum fluid pressure that is allowed according to the hardware installed.

b. **Cylinder Volume**: 300cc or 600cc pumps are available.

c. **A (resin) Flow Meter**: Select the flowmeter type that has been installed. Standard installations will use Gear A/B (quadrature) flowmeters, but Coriolis meters are also an option.

d. **Solvent Flow Meter**: If installed, may be a Gear A/B (quadrature) or Gear A (single-channel) flowmeter.

e. **Gun Flush Boxes**: Indicate if zero, 1 or 2 flush boxes are installed.

f. **Gun 2 Enable**: Indicates that a second gun is installed, and this affects visibility of Gun 2 selections on other menus.

g. **Two Gun Manifold Installed**: The two gun manifold enables the user to select one or both guns to be loaded, and disable guns that are not selected. This allows for less material waste and shorter purge times.

h. **Remote CC Selector**: Indicates that a remote (in-booth) color change control box has been installed.

i. **Flow Sensor (145 Max Pressure):** Indicates that a catalyst flow sensor is utilized for confirming flow of catalyst through the pump. This option limits the maximum pressure to 145 psi.

j. **Enable cloud**: Toggle to select whether cloud access is enabled or disabled.

System Settings

Pressing the System Settings button (5) in the fluid system group, will open up the settings screen to the right. Some of these set values will trigger alarms on the system when upper or lower limits are exceeded during operations.

The customizable options available are:

a. **Blowoff Time:** The time allowed between detection of a trigger through the atomization air flow sensor, and detection of fluid flow before a fault will occur.

b. **Atomizing Air Delay:** The delay for the atomization for the spray guns after triggered.

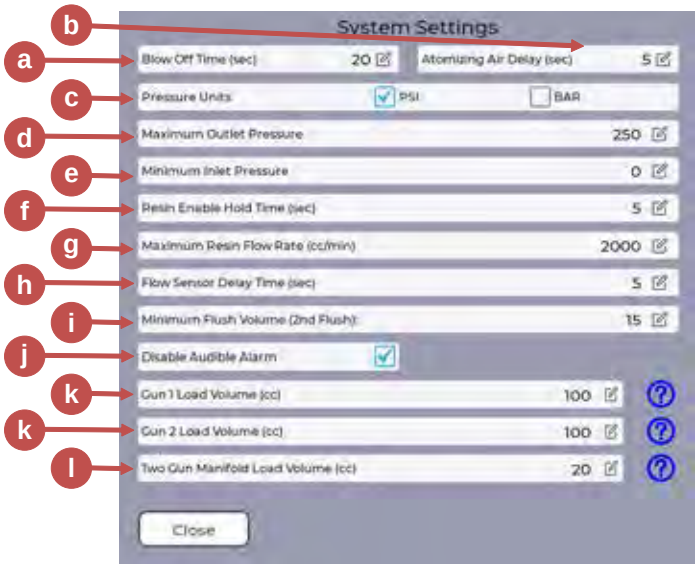
c. **Pressure Units**: Select pressure units to be displayed on the HMI (for visualization purposes only).

d. **Maximum Outlet Pressure**: Maximum outlet pressure of the pump before a fault will be generated.

e. **Minimum Inlet Pressure**: Minimum inlet pressure of the pump before a fault will be generated.

f. **Resin Enable Hold Time**: Time after a loss of trigger input that the resin enable valve will remain on.

g. **Maximum Resin Flow Rate**: Allows a fault to be generated and spray shut down if the gun is producing too much resin flow.



h. **Flow Sensor Delay Time**: Amount of time for the hardener flow sensor to not detect flow after the gun is triggered and before a hardener flow fault will be triggered.

i. **Minimum flush volume (2nd flush):** 2nd flush phase of the purge process requires this much solvent is used in addition to the time being satisfied – a value of zero disables this feature.

j. **Disable Audible Alarm**: Disallow the audible alarm from being active during a fault or warning condition.

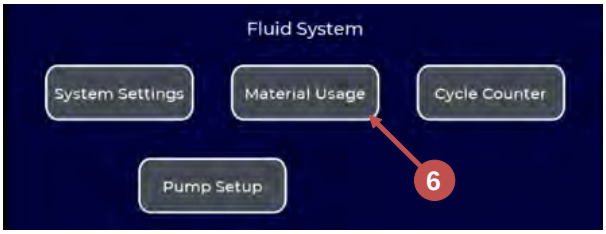
k. **Gun 1/2 Load Volumes:** The volume of fluid from the mix manifold to each gun. This is used in load operations as well as pot-life calculations.

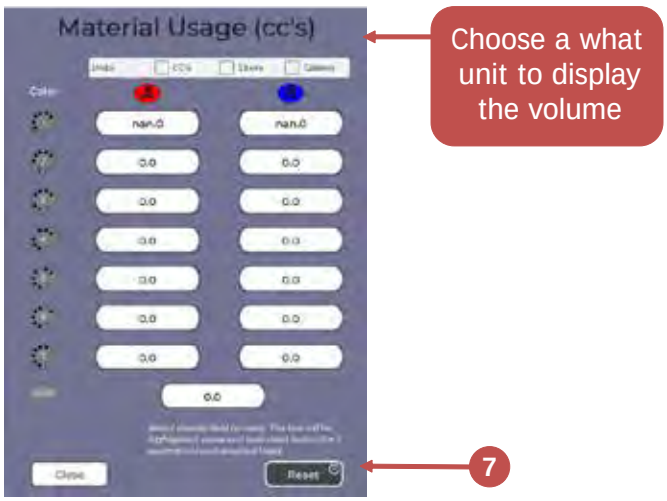
l. **Two Gun Manifold Load Volume**: Added to the gun load volumes to calculate the total fluid volume after the resin pump for pot-life calculations.

Material Usage

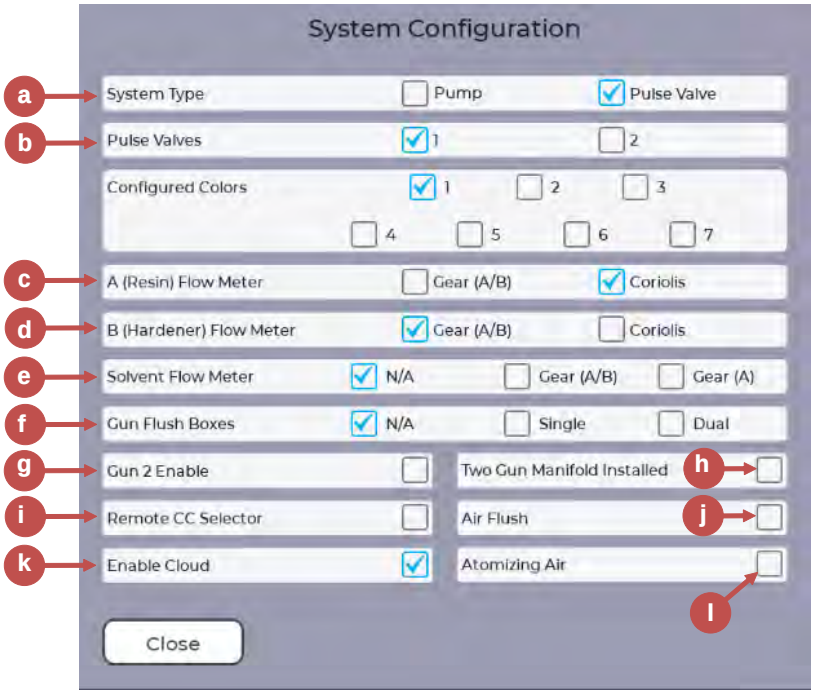
Press the Material Usage button (6) to open the volume totals per material and per color.

To reset the counter for a specific color, select the value to reset. The box will be highlighted. Press and hold the reset (7) button for two seconds.





The parameters are:



a. **System Type**: Select the type of pump action.

b. **Pulse Valves**: 1 or 2 pulse valves are available.

c. **A (resin) Flow Meter**: Select the flowmeter type that has been installed. Standard installations will use Gear A/B (quadrature) flowmeters, but Coriolis meters are also an option.

d. **B (Hardener) Flow Meter**: Select the flowmeter type that has been installed. Standard installations will use Gear A/B (quadrature) flowmeters, but Coriolis meters are also an option.

e. **Solvent Flow Meter**: If installed, may be a Gear A/B (quadrature) or Gear A (single-channel) flow meter.

f. **Gun Flush Boxes**: Indicate if zero, 1 or 2 flush boxes are installed.

g. **Gun 2 Enable**: Indicates that a second gun is installed, and this affects visibility of Gun 2 selections on other menus.

h. **Two Gun Manifold Installed**: The two gun manifold enables the user to select one or both guns to be loaded, and disable guns that are not selected. This allows for less material waste and shorter purge times.

i. **Remote CC Selector**: Indicates that a remote (in-booth) color change control box has been installed.

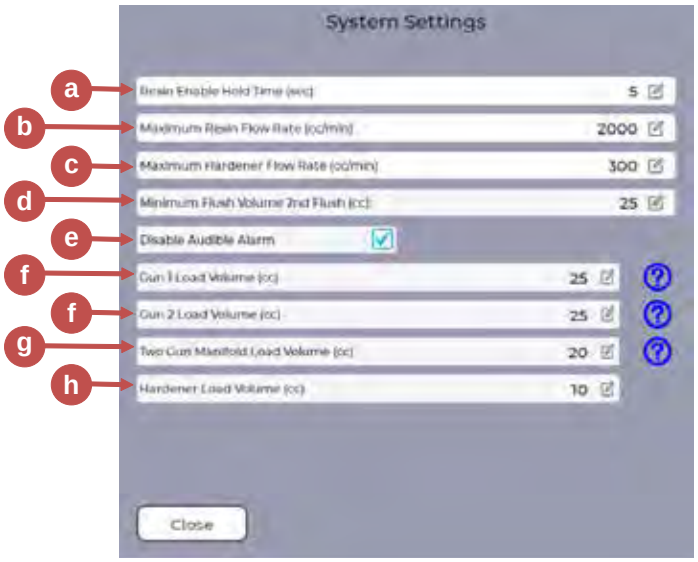
j. **Air Flush**:

k. **Enable cloud**: Toggle to select whether cloud access is enabled or disabled.

l. **Atomizing Air:** Toggle to enabled or disable atomizing air.

System Settings

Pressing the System Settings button (5) in the fluid system group, will open up the settings screen to the right. Some of these set values will trigger alarms on the system when upper or lower limits are exceeded during operations.



The customizable options available are:

a. **Resin Enable Hold Time**: Time after a loss of trigger input that the resin enable valve will remain on.

b. **Maximum Resin Flow Rate**: Allows a fault to be generated and spray shut down if the gun is producing too much resin flow.

c. **Maximum Hardener Flow Rate**: Allows a fault to be generated and spray shut down if the gun is producing too much hardener flow.

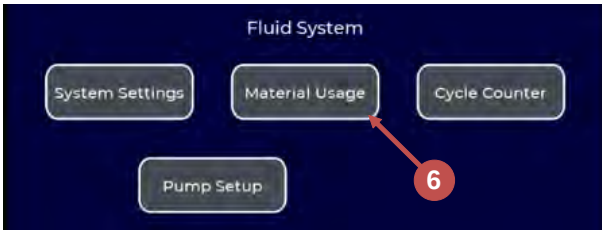
d. **Minimum flush volume (2nd flush):** 2nd flush phase of the purge process requires this much solvent is used in addition to the time being satisfied – a value of zero disables this feature.

e. **Disable Audible Alarm**: Disallow the audible alarm from being active during a fault or warning condition.

f. **Gun 1/2 Load Volumes**: The volume of fluid from the mix manifold to each gun. This is used in load operations as well as pot-life calculations.

g. **Two Gun Manifold Load Volume**: Added to the gun load volumes to calculate the total fluid volume after the resin pump for pot-life calculations.

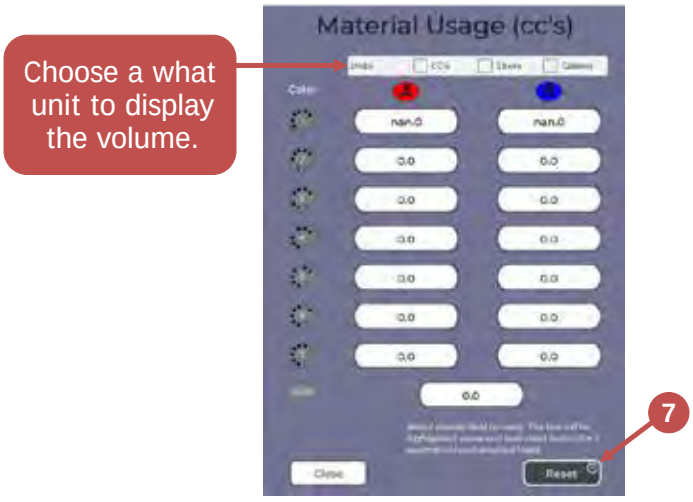
h. **Hardener Load Volume**: Added to the hardener load volume to calculate the total fluid volume after the hardener pulse valves for pot-life calculations.



Material Usage

Pressing the Material Usage button (6) will open up the volume totals per material and per color.

To reset the counter for a specific color, select the value to reset. The box will be highlighted. Press and hold the reset (7) button for two seconds.

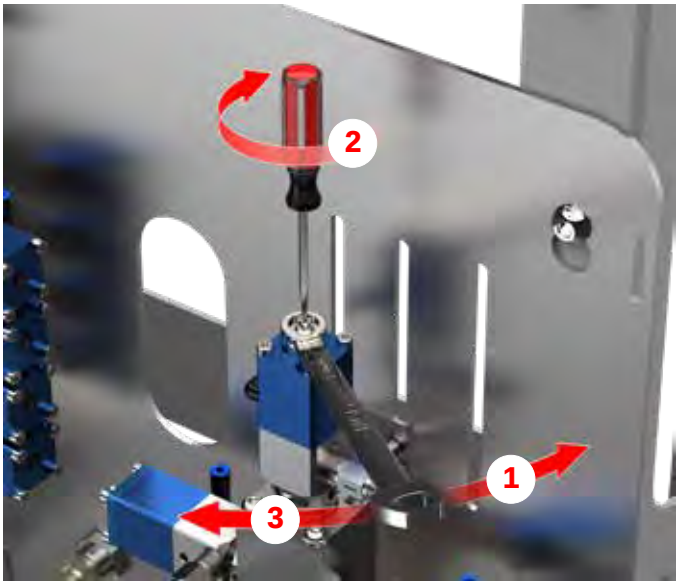


CCV Pulse Flow Adjustment-Below Range

The correct pulse flow range is in the green zone as shown between the green arrows.

In the image shown at the right, the blue diamond shape is left of the green zone and below range. The flow must be increased to a specified 50%. Follow the steps below to adjust the valve flow.

1. Use a 13 mm wrench and turn it counterclockwise to loosen the jam nut on the adjustment screw.
2. Turn the adjustment screw clockwise until the blue diamond moves to the center of the green zone range.
3. Turn the wrench clockwise to set the adjustment screw in position.



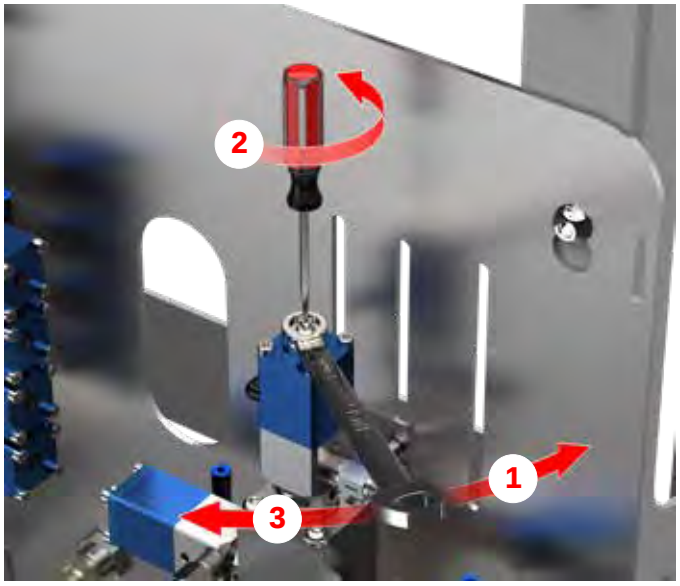
CCV Pulse Flow Adjustment-Above Range

The correct pulse flow range is in the green zone as shown between the green arrows.

In the image shown at the right, the blue diamond shape is right of the green zone and above range.

The flow must be decreased to a specified 50%. Follow the steps below to adjust the valve flow.

1. Use a 13 mm wrench and turn it counterclockwise to loosen the jam nut on the adjustment screw.
2. Turn the adjustment screw counterclockwise until the blue diamond moves to the center of the green zone range.
3. Turn the wrench clockwise to set the adjustment screw in position.



CCV Pulse Flow Adjustment-In Range

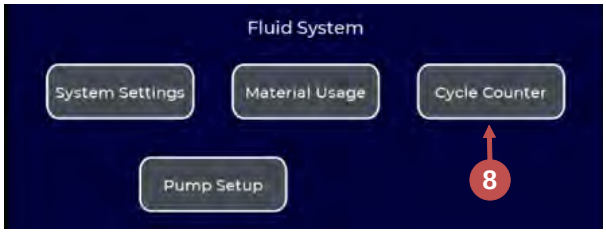
The correct pulse flow range is in the green zone as shown between the green arrows.

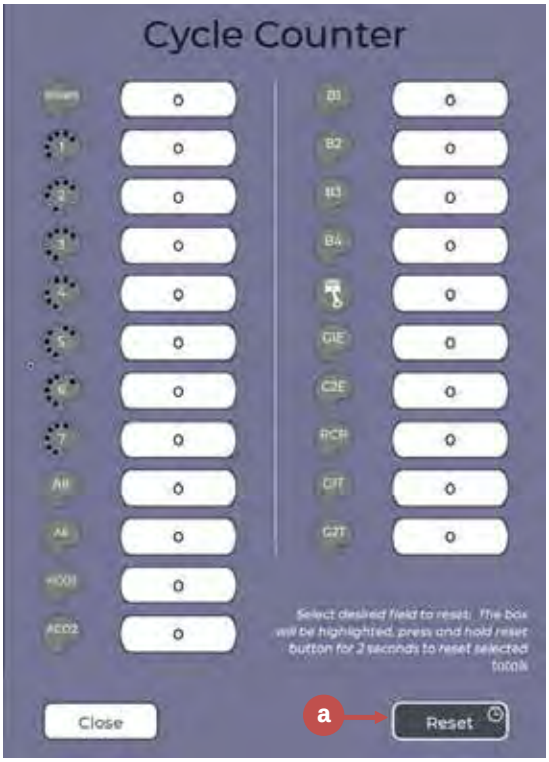
In the image shown at the right, the blue diamond shape is in the center of the green zone and is in range. This is the optimal position, and no more adjustment is necessary.

Cycle Counter

This menu (8) displays the amount of times each solenoid in the system has been activated.

If desired (due to replacement of a solenoid for example) to reset these values, select each field to be reset by pressing and highlighting the icon to the left of the value and press and hold the 'Reset' (a) button for two seconds. All selected fields will be set to zero.

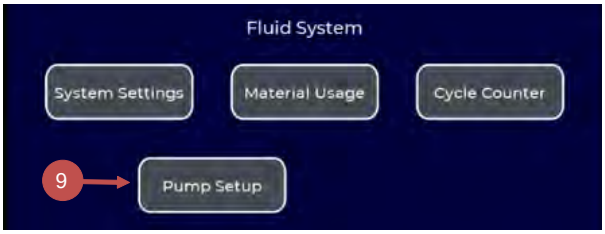


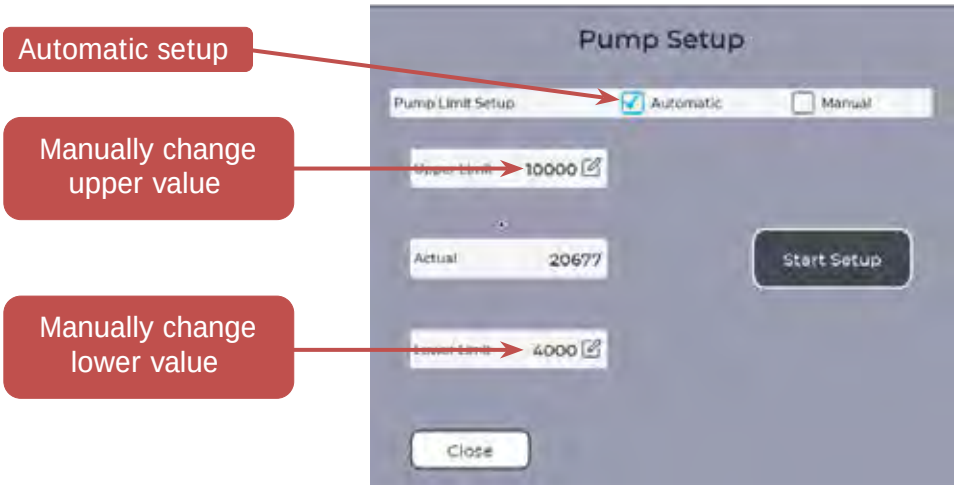


Pump Setup

Press the Pump Setup button (9) to open up the pump settings menu.

Set lower and upper limits manually or setup it up for automatic updating.





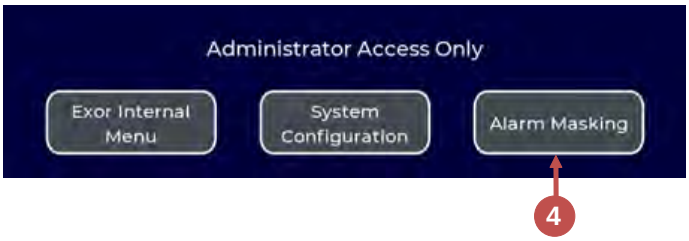
⚠WARNING

Though unlikely, a malicious actor having access to the RM2 via the cloud service would have the ability to activate the unit remotely. The greatest hazard in this case is the potential for the release of chemicals while no personnel are present. However, this hazard is mitigated if the air and fluid supplies to the RM2 are deactivated when no personnel are to be present (as recommended in the safety section).

If it is suspected that someone has unauthorized access to your RM2. Contact your Corvina Cloud organization's administrator (This could be the distributor of your equipment). If this information is not known, contact Carlisle Fluid Technologies.

Alarm Masking

This menu (4) allows individual system alarms to be treated as a 'fault' (a) which will shut down system operation, or 'warning' (b) which will display an alarm but not cause a system shutdown.



NOTICE

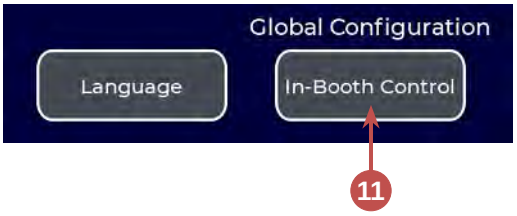
Some alarms may be fixed to a 'fault selection'. These are necessary for protection of the equipment or personnel to shut down the system.

Language

Pressing the Language button (10) in the Global Configuration group, will open up the Language change dialog. These options can also be accessed from the Dropdown menu of the navigation bar in the bottom button. Choose the preferred language by clicking in the corresponding flag.

In-Booth Control—Remote Color Change Box Configuration

Press the In-Booth Control button (11) to open the Remote Color Change Box Configuration screen.



To calibrate the optional Remote Color Change selector box.

Each 'color' (0-7) selector switch can be set. Press 'Set X' when an analog value is present.

Retrieve an analog value and ask someone to set the selector switch on the remote selector box when in this menu. A level of 500 below and above the measured value will be set.

Alternatively, the levels can be manually set. Enter the choices in the associated fields.

Digital value of the analog input reading from the Remote Color change box

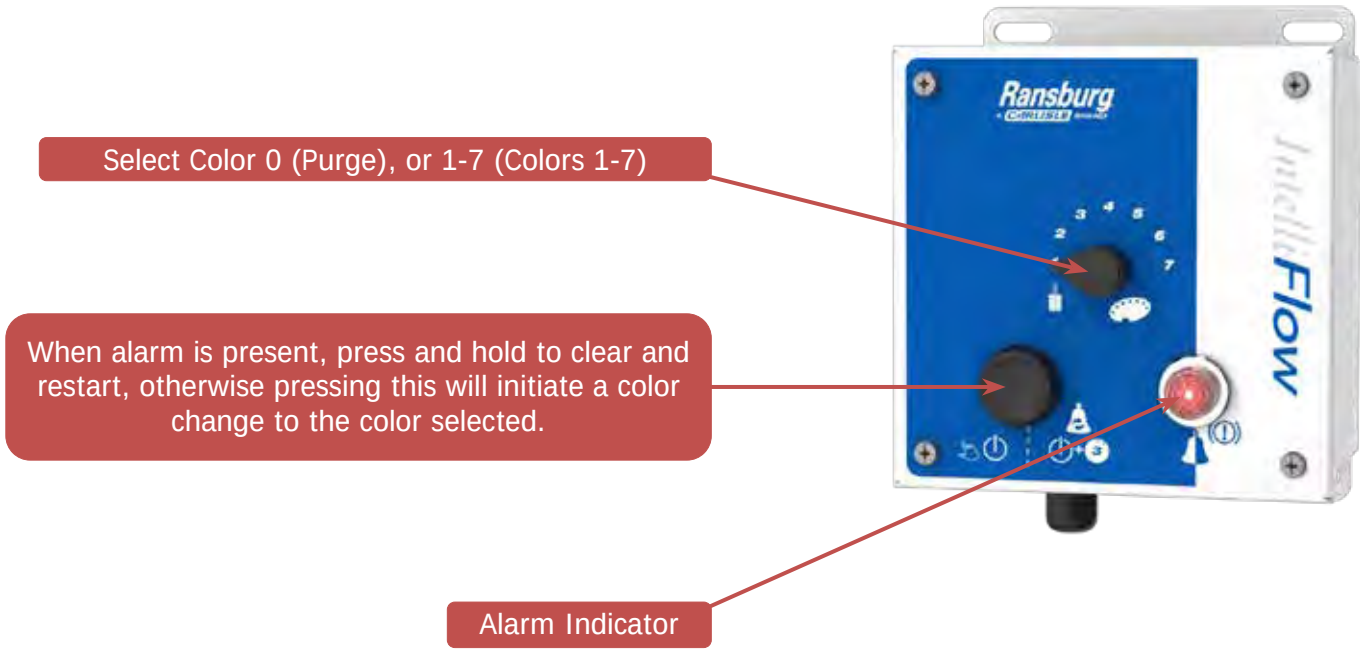
NOTICE

This button (13) is visible only if 'Remote CC Selector' is enabled in System Configuration.

The Remote Color Change Box is an optional purchase compatible with this system.

The color-change controller is connected through an Intrinsic Barrier (Zener Barrier) located outside the hazardous area to the RM2 device.

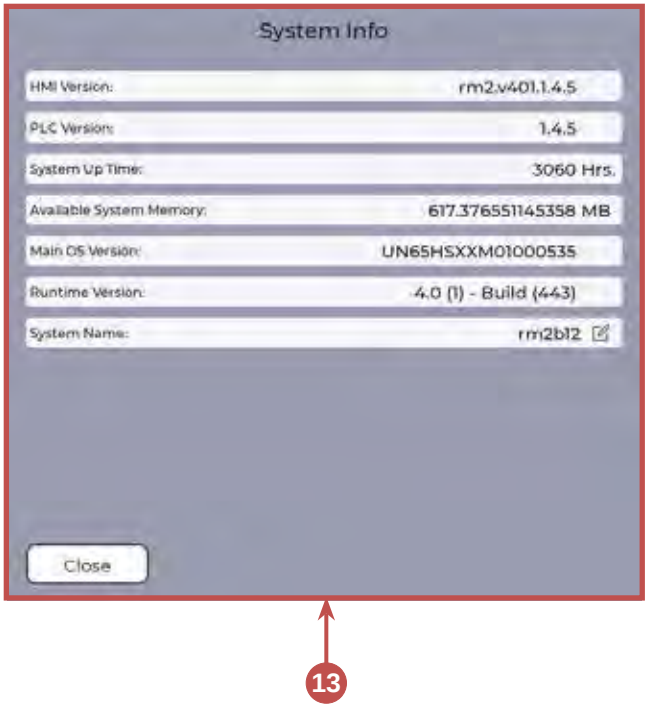
Instructions for installation of the remote color change box are included with it.



System Information

The system information option (12) opens up a summary screen (13) with the touch screen software version, the PLC version, time the system has been used, total available memory in MB, the operating system version and Runtime version.

This screen is automatically updated with the latest information when being updated.



Recipe Screen

The Recipe Menu allows set up of parameters that are specific to resins that are loaded.

In the top part of the menu are material parameters—these are:

Type (1K or 2K): If 1K, the catalyst pump will not be activated (no mixing will be required) but flow rates will be measured and recorded and resin-max flow alarm will still be active.

Ratio: Opens a dialog allowing the ratio to be entered in terms of A:B, A:1, or %B depending on the desired methodology. The 'effective ratio' or A:1 ratio will be calculated from this and used by the system.

Pulses Per Liter: The number of counts per liter of material that passes through the flowmeter. This is somewhat material dependent and can be determined through a calibration process (see below). Note: For quadrature flowmeters, a count is registered for the positive and negative transitions of each channel, so essentially there are four counts per cycle.

The bottom part of this menu allows the definition of the flush sequence for each gun. Select the gun by pressing the button at the top of this panel. Flush sequence parameters are:

a. **First Flush Method:** Solvent or Air.
First step of the flush sequence activates this solenoid.

b. **First Flush Time:** Amount of time for the first step of the flush process.

c. **Chop Time:** The amount of time for the second step of the flush process, which consists of alternating the solvent and air cleaning valves or (solvent/air chop).

   i. Air Chop Time: The time the air valve is active per step of solvent/air chop.

   ii. Solvent Chop Time: The time that the solvent valve is active per step of solvent/air chop.

d. **Last Flush Time:** The final step of the purge sequence consists of a solvent flush. This parameter determines the time that the solvent valve is on.

Flushing Recommendations

Name	Suggested Initial Setting	Description
First Flush	AIR	Air or Solvent to initially flush fluid lines.
First Flush Time	15 seconds	Duration of first flush. This flush is used to move paint out of the system before attempting to “clean” with the chop process.
Air Chop Time	1 second	Duration of each air burst in the chop process
Solvent Chop Time	1 second	Duration of solvent burst in the chop process
Chop Duration	30 seconds	Total duration of chop process.
Last Flush Time	20 seconds	Duration of last solvent flush - should be timed to minimize solvent waste but still completely load the fluid lines with solvent.

The following factors will influence the choices listed above:

- **Worst case flushing** - Always set up the flush parameters using the most viscous/worst case resin material.
- **Flushing air and solvent pressure** - Higher pressures may reduce the time needed to flush the system, but can create significant spitting from the spray gun during the process.
- **Material viscosity** - Viscous materials move more slowly and may require additional time to be purged from the system.
- **Hose volume/ length** - Longer fluid lines encompass a larger volume and may require a longer flush time. Pressure drop through a longer hose or smaller diameter hose will affect the time required to purge paint and clean the system.
- **Spray gun tip size** - Small tips may restrict flow during a flush.

Try to optimize the system to minimize solvent usage during color changes and flushes by:

- Using air instead of solvent for the first flush.
- Let the “chop” process do most of the cleaning.
- Don’t use more solvent than necessary for the last solvent flush.

Reports Screen

This menu allows process data to be tracked by 'jobs' that can be stored to a USB stick if installed in the HMI USB Slot.

Job files in CSV format can be removed from the USB stick and stored and viewed through a CSV viewing software such as MS Excel.

Press 'New/Load' (a) to open a dialog (b) to create a new job, or select a job from the file system.

Enter the correct information in the fields at the top of the screen (c) and click create (d). A CSV file will be created with the name of the job (IF USB FLASH DRIVE IS INSTALLED).

Navigate to the job storage location (USB Stick located at: "\mnt\usbmemory\"), select the job you wish to restore, and click on Open (e).

STARTUP GUIDE

Use the following pages as a quick reference to make electrical, air, and fluid connections to the RM2 and begin operation. Familiarize with the configuration of the machine and any options or accessories attached. Return to the User Interface Guide section of this manual for information on configuration and settings.

Startup Checklist

Verify the frame is secured to the ground or wall and that all components are mounted securely to the enclosure, fluid panel or mast. Check that all cables for flow meter, flow sensor and any other electrical components are connected. Connect the enclosure ground stud to earth ground.

Verify all energy sources are de-energized. Inspect for loose wires anywhere inside the enclosure. Do not attempt to operate with loose wiring. Refer to the Maintenance section for wiring diagrams. After wiring verification, it is safe to plug in the system to a proper grounded AC receptacle. Verify all CCV signal lines are properly connected. See the Configuration section for reference.

Air Connections

Connect the external air connections before use (see below). For more information, see Pneumatics section.

- Regulated air supply to the solenoid manifold.
- Regulated air supply to both guns on control enclosure. For atomizing, typically 20-75 psi [1.3 - 5 bar].
- Regulated air supply to the color stack flushing air. If the system is equipped with gun flush boxes:
- Regulated air supply to gun flush box(es) "air" connection.
- Flush Box Trigger signals
    - Gun Flush Box #1: Connect to ACO GUN 1 Port (Without gun flush box, this signal is plumbed to the Atomizing Air Cutoff valve).
    - Gun Flush Box #2: Connect to ACO GUN 2 Port (Without gun flush box, this signal is plumbed to the Atomizing Air Cutoff valve).
- Gun In box signal lines to Gun 1 and Gun 2 Pressure switch inputs.
- "Air Cutoff" signals from Gun flush box to the Atomizing Air Cutoff pilot signals (Note, without a flush box, this signal is fed from the ACO GUN 1 or 2 ports. Fluid Connections.

Perform the following fluid connections before use. For more information, go the Paint Material section of this manual. Oil Reservoirs should be filled with pump packing lube supplied with the system.

- Connect hardener supply line to inlet of dispense pump or flow sensor.
- Verify dispense pump outlet is connected to mix manifold.
- Connect solvent supply line to the color stack solvent inlet.
- Connect resin material supply to color stack ports.
- Confirm flow meter outlet hose is tightly connected to the mix manifold material inlet.
- Connect static mix tube to outlet of mix manifold. Connect spray gun fluid line(s) to static mix tube.
- Energize all fluid lines and check for leaks of any kind. If any are present, be sure to remove pressure and repair the leak before continuing with the Startup Procedure.

Startup Procedure

When air and material connections have been tested for leaks the machine should be ready to power on.

Startup for systems without gun flush boxes

1. Make sure all compressed air and fluid sources are connected to the RM2 and energized.
2. Turn the AC lock out switch to the on position. Select the PRIME button on the dropdown menu.
3. With atomizing air off for this step, trigger the spray gun into a grounded metal waste container. Press the dispense pump enable button and allow the pump to stroke for at least 2 full cycles (typically about 30 seconds), allowing all air to be removed from the inner chambers.
4. Press dispense pump enable again to stop. Release gun trigger.
5. Make sure Color 0 shows in the display box and press Resin enable to open the solvent valve. Trigger the gun until solvent is loaded in the fluid lines.
6. Repeat the Resin load process for all system colors to Make sure functionality and to clear air from the fluid lines. After each color has been loaded into the fluid lines, be sure to load with solvent (color 0) so that the inner passageways remain clean and all air is removed.
7. Return to the Home screen by pressing the Spray Button in the dropdown menu button.
8. Press the Settings button on the dropdown menu. Proceed through each page and enter the desired values. Refer to User Interface Guide for more information about each screen.
9. Verify the Pot Life Check Volume (cc) setting is correct for the fluid line setup. Refer to the Hose Size table below.
10. For each color used in the system, an initial calibration must be performed to maintain a proper mixed ratio.
11. Open the Color screen and load the desired color.
12. After the completion of the color load energize atomizing air and spray.
13. When spraying is complete, shut off atomizing air and perform a color change or flush as required.

Startup for systems with gun flush boxes

1. Make sure all compressed air and fluid sources are connected to the RM2 and energized.
2. Turn the AC lock out to the on position. Select the PRIME button on the dropdown menu.
3. Place the spray gun in the gun box and close the lid.
4. Press dispense pump enable and allow the pump to cycle for about 30 seconds to prime the pump and hardener line to the mix manifold. Press again when the pump is primed and no air bubbles are visible in the fluid line leading to the mix manifold.
5. Make sure color 0 shows in the display box and press Resin enable to prime solvent. Press again when solvent is visible downstream from the mix manifold.
6. Repeat this process for the remaining paint colors. Follow up this prime process with a color 0 (solvent) prime again to clear resin from the lines and mix manifold.
7. Press the Spray button in the Dropdown menu.
8. Press the Settings button in the Home screen menu. Proceed through each page and enter the desired values. Refer to User Interface Guide for more information about each screen.
9. Verify Pot Life Check Volume (cc) using the chart below.
10. For each color used in the system, an initial calibration must be performed to maintain a proper mixed ratio.
11. Press the Color button on the dropdown menu and load the desired color.
12. Remove the gun from the gun box, close the gun box lid, and spray.

When spraying is complete, place the gun in the gun box and close the lid. Perform a color change or flush as required.

Hose Size	15 ft	25 ft	50 ft	75 ft	100 ft
1/4” ID est. volume	225 cc	325 cc	600 cc	875 cc	1150 cc
3/8” ID est. volume	400 cc	625 cc	1200 cc	1775 cc	2350 cc

DAILY OPERATIONS

Daily use of the RM2 system involves several procedures. Understanding how the system works and knowing the properties of the paint materials in use is the best way to Make sure continuous use with few alarms and repairs. Study the procedures and tips below to better understand the function of the system. Refer to the Maintenance section of this manual to review maintenance schedules and repair procedures.

Daily Start Up Procedure

Follow the steps below during startup to Make sure proper operation and optimal safety. These daily procedures assume paint solvents, resins, and hardeners have been loaded into the machine, have already been calibrated, and remain connected between each use of the system.

1. Make sure all fluid and air connections on the system are tight and secure. Make sure fluid supply is adequate for duration of operations.
2. Check all valves on the system for fluid supply leaks. Correct if necessary.
3. Connect regulated pressurized air to the system and open. Maintain 75psi (5 bar) minimum at all times to the enclosure main air inlet.
4. Energize fluid supplies and open valves supplying RM2 with resin(s), hardener, and solvent.
5. Connect power and turn the power switch to the 'On' position.
6. Navigate to the Alarms History page. Verify no alarms have occurred recently. If an alarm has occurred, verify that the problem has been resolved.
7. Load the desired color. Go to Loading a Color section for additional detail.
8. Verify Inlet and Outlet hardener pressures are correct for the application, and that the Inlet Pressure is 2-5% higher than the Outlet.
9. If using a gun flush box, remove the gun from the box and begin to spray. If not using a gun box, turn on atomizing air and begin to spray.
10. Fine tune gun settings for the application (flow rate, atomizing air pressure, fan control). Remember that changing the resin pressure to adjust flow rate at the spray gun should be followed by a matching change to the hardener pressure to maintain the 2 to 5% higher target inlet pressure.

⚠CAUTION

If using a GUN BOX, Make sure gun is in box with the lid closed. If loading a color or flushing without a gun box, Make sure atomizing air is turned off, and trigger material into a grounded metal waste container.

Loading a Color

1. Follow steps 1 through 8 of the Daily Start Up Procedure section before proceeding.
2. Go to the Home screen and Make sure atomizing air is turned off. For systems with gun flush boxes, place the gun in the box and close the lid.
3. Press the Color button on the dropdown menu to access the Color Change screen.
4. Enter the color number desired, and press 1 GUN GO or 2 GUN GO to load the color to one or both guns respectively. If not using a flush box, trigger the gun into a grounded metal waste container. When loading a color if the current color is 0, the fluid lines will not be flushed, since it is assumed there is no material in the lines following the End of Day Flushing Procedure.
5. The color should be loaded and ready to spray. If adjustments need to be made to the flush sequence, go to Flushing Setup. If an Alarm occurs, correct the problem and restart the procedure.

NOTICE

For a color change with gun flush boxes, the GO button will not display if:

The spray gun(s) are not in the Gun Box(es).

The Gun Box lids are not closed.

Color Change Procedure

1. To change colors, the initial color must be loaded per Loading a Color procedure.
2. Press the Color button on the dropdown menu to access the Color Change screen.
3. Enter the color number desired, and press 1 GUN GO or 2 GUN GO to load the color. The system will proceed to flush the gun(s) in sequence and then load the desired color at the mix ratio for that color.

The color selected will be loaded, completing the color change procedure. Enable atomizing air to start spraying. If an ACO valve is installed it will enable atomizing air after the gun air delay time has passed.

End of Day Flushing Procedure

To shut down the machine for longer periods or overnight follow the steps below.

1. Flush the Mixed Material using one of the methods below.
    a. Color 0 Load: Perform a color 0 load to clear the fluid lines of material and load with solvent. For information on loading, see Loading a Color.
        i. If the fluid lines are not fully flushed, adjust the Flush/Load Sequence values as necessary.
        ii. When Flush / Load values are correct, go to Flush mode and trigger gun to remove the mixed material remaining in the fluid lines. The machine will go into an air/solvent chop until the button is pressed again, or until 5 minutes have passed. Typically, 30 seconds of flush mode will clear a standard 25 foot hose.
    b. Flush Mode:
        i. Press the button for Flush mode (found on the Prime screen) and allow the valves to cycle until the fluid lines have been cleared of mixed material. Perform a color 0 load to fill the fluid lines with solvent.
2. Always Make sure there are no mixed materials remaining in the fluid lines when shutting down for the day.
    a. Optionally, power off the RM2 using the AC Lock Out Switch.
3. Depressurize all fluid supplies and close fluid supply valves. Depressurize system air pressure.

⚠CAUTION

Always shut down the RM2 with solvent-loaded (color 0) flushed fluid lines.
Residual air or paint in the system may cause clogs or stuck system components.

System Depressurization Process

1. Flush the system if it will not be used for extended periods. Make sure all guns are in gun flush boxes, and that lids are securely closed. If not using flush boxes or ACO, shut off atomizing air for the next steps and use a grounded metal waste container.
2. From the dropdown menu, press the Color button. Enter Color 0 (Solvent) and press 1 GUN GO (or 2 GUN GO if two guns are in use). If not using a flush box trigger the spray gun.
3. Wait for the system to flush the fluid lines and load the solvent. This will purge resin from the color stack and flow meter and also remove mixed material from the mix manifold. If there is still material visible in the lines, Load color 0 again, or switch the system to Flush mode as long as needed to clear any debris from the fluid lines.
4. Shut supply of all paint resin and hardener. Do NOT shut off solvent supply yet - it will be needed in a later step.
5. The fluids in the Color Stack and Dispense Pump are still under pressure. To release this pressure, go to the Prime screen.
6. On the Prime screen press Dispense Pump Prime to engage the Dispense Pump and cycle it to release any internal pressure. Allow it to run for 5 seconds, and then press Dispense Pump Prime again to stop.
7. Press Color Stack Prime with the spray gun triggered and open color stack valves 1 through 5 to bleed pressure. Finally, open valve 0 to allow solvent through the system until all lines have been flushed with solvent. Press Color Stack Prime again to close valves.
8. Shut off Solvent supply to the system. Trigger gun and press Color Stack Prime again, opening valve 0 to bleed remaining pressure in the solvent valve.
9. Power off the system.
10. Shut the main air supply to the system.

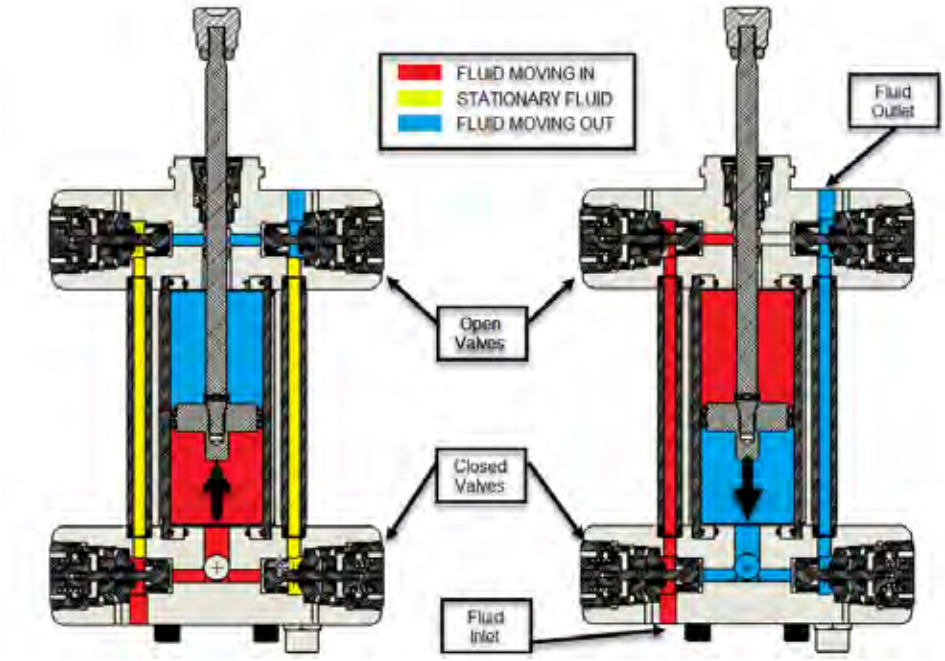
DISPENSE PUMP OPERATION

Material is delivered to be mixed by a piston and cylinder dispense pump. An inlet and an outlet valve on each end of the pump control the material flow. When the piston moves down, the bottom inlet valve is closed, and the bottom outlet valve is open. As the piston moves down, the material in the cylinder below the piston is dispensed through the bottom outlet valve.

Also, as the piston moves down, the top outlet valve is closed, and the top inlet is open. This action lets material get drawn into the top of the cylinder above the piston. When the piston reaches the bottom of its stroke, the valve settings and the piston direction reverse. This action causes the material in the top of the cylinder to be dispensed and the bottom to be filled.

A balancing mechanism is programmed into the system controller to minimize pressure fluctuations during piston reversals. This logic assumes that the inlet material pressure is higher than the dispenser output pressure. When the dispenser reaches the limit of the potentiometer, the inlet valve will close, and the outlet valve will open. This action continues dispensing material on the output side while filling material on the inlet side. At the point where the inlet side pressure is drawn down to match the output pressure, the direction will reverse. The appropriate valves will open, and the filling side will dispense.

The dispense pump is fitted with a linear potentiometer with a wiper. The movement of the motor's screw slides the wiper on the potentiometer and communicates the position of the pump piston.



NOTICE

The 300cc and 600cc versions of the dispense pump operate in the same manner.

FLOW METER

The flow meter is a gear-type positive displacement meter specially designed for paint and will measure flow up to 1900cc per minute. A sensor detects the movement of the inner gears and sends an electronic signal in the form of a pulse to the controller.

Flow Meter Do:

- Filter the paint with a minimum 100 mesh filter. Change filter screens regularly.
- Use pressure regulators upstream from the flow meter to prevent false readings from fluctuating pump pressure spikes.
- Make sure the system is properly grounded and avoid electrical noise at the machine location.
- Calibrate the flow meter cc's/pulse frequently. Even different batches of the same paint can have different flow characteristics.
- Store the meter filled with solvent.
- Remove the tube/nut when removing the flow meter from the fluid panel (the flow meter is mounted to the base of the color stack using a tube fitting).
- Leave the flow meter inlet and outlet fittings intact.

Flow Meter Do Not:

- Run the meter dry or spin the gears for a prolonged time with air only.
- Leave the meter to sit or stagnate with air or water inside the flow meter.
- Let the meter dangle by the cable.
- Let the meter drop onto the floor.

Flow Meter Calibration

Perform flow meter calibration regularly as described on the next page. The A+B calibration will verify ratio and flow meter calibration in one simple operation.

Flow Meter Calibration

For the best accuracy in ratio performance of the RM2, it is necessary to calibrate the flowmeter per the material that is being used.

The calibration menu can be reached through the recipe menu and allows a quick check of the material volume dispensed versus what is calculated.

The currently loaded recipe is indicated at the top right of this popup-menu.

In 'A' calibration mode, the pump will not cycle. Only resin material will flow when the gun is triggered. Press and hold 'Reset' and the pulse count will be set to zero.

Next trigger the gun into a measuring cup and enter the measured volume. The pulse count and expected volume will be compared to the measured volume and will suggest a calculated PPL (pulses-per-liter) calibration value for the flow meter. Pressing the 'Save' button will save this value to the recipe of the material that is currently loaded.

In 'A+B' calibration mode, the pump will operate and the measured volume will include both A and B materials according to the ratio.

If there is a problem with the catalyst pump, it will be detectable if the A+B volume is consistently incorrect, while the A volume is consistently correct.

NOTICE

During active calibration, the atomizing air to the gun will be disabled. If using a Gun Flush Box, make sure the lid stays open to turn off atomization air.

NOTICE

A different calibration dialog may open based on the flowmeter type (square wave, or 4-20mA).

MULTI-COLOR STATUS LIGHT FUNCTIONS

The status light is found on the top of the exterior of the RM2 control panel. The light will change color and/or flash depending on the status of the RM2. Each light function is defined below.

Light	Function
Green—Solid	Machine is in 'RUN' state, and no trigger signal is present on any stations
Green—Flashing	Machine is in 'RUN' state, and trigger signal is present on one or more stations
Red—Solid	Machine fault is present
Yellow—Solid	Warning indication, No fault is currently present, Pot life is nearing expiration
White—Solid	Machine stopped idle state, no system warnings or faults

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MAINTENANCE, TROUBLESHOOTING & SPARE PARTS

Although the RM2 is a complex machine, troubleshooting the unit is straightforward, with a few basic steps.

ALARM TROUBLESHOOTING

The alarm dialog is the first indication that something may be wrong with the RM2 control processes. Below is a list of alarms and troubleshooting steps. To prevent work stoppage or equipment damage, do not disable the alarms.

Alarm Message	Alarm Condition(s)	Action(s)
Low Inlet Pressure	Dispense Pump inlet pressure is below the set limit during operation	Confirm B supply valve is open
		Confirm B supply pressure is correct and matches the Home screen reading
		Confirm B supply material is present
		Check Minimum Inlet Pressure setting on System Settings screen
		Confirm valves B1-B4 correctly function
		Confirm solenoids B1 - B4 correctly function
		Confirm the Dispense Pump pressure transducers correctly function
High Outlet Pressure	Dispense Pump outlet pressure is above the set limit at anytime	Trigger the spray applicator to relieve pressure
		Confirm the main air inlet pressure into RM2 is 75-100 psi (5-7 bar)
		Confirm valves B1-B4 correctly function
		Confirm solenoids B1-B4 correctly function
		Check for restrictions leading to Mix Manifold
		Confirm A supply pressure is below Maximum Outlet Pressure on System Settings screen
		Confirm B supply pressure is below Maximum Outlet Pressure on System Settings screen
		Remove and Inspect Static Mixer
		Remove and inspect Mix Manifold components
		Confirm the Dispense Pump pressure transducers correctly function
Ratio Error	Measured A:B ratio is outside of tolerance	Check for air in the A supply line
		Check for air in the B supply line
	Note: This occurs only during 'ratio check' mode	Confirm valves B1-B4 correctly function
		Coating flow rate too high
		Adjust Ratio Tolerance in Ratio screen. Increase as needed or perform a Resin + Hardener calibration
Resin Flow Error	Component A flow sensed when system not in spraying	Confirm valve AE (Resin Enable) is closed
		Check valve AE for leaks
		Confirm flow meter is not detecting pulses
		Confirm fluid panel is not vibrating

Alarm Message	Alarm Condition(s)	Action(s)
No Hardener Flow	No flow is detected through dispense pump flow sensor when dispense pump is running	Confirm B supply valve is open
		Confirm B pressure in the supply line
		Confirm B material in the supply line
		Check connection of flow transducer cable
		Confirm valves B1-B4 correctly function. Opposite valves should be open (B1&B3 or B2&B4)
		Confirm solenoids B1-B4 correctly function
		B flow sensor out of adjustment. See flow sensor calibration procedure in manual
Upper Transducer Fault	Improper electrical signal from upper pressure transducer on dispense pump	Check electrical connection and wiring
		Confirm upper pressure transducer on dispense pump correctly functions
Lower Transducer Fault	Improper electrical signal from lower pressure transducer on dispense pump	Check electrical connection and wiring
		Confirm upper pressure transducer on dispense pump correctly functions
Check Pump	Dispense pump movement does not match potentiometer output	Check for air in all fluid lines
		Confirm valves B1-B4 correctly function. Opposite valves should be open (B1&B3 or B2&B4)
		Confirm solenoids B1-B4 correctly function
		Perform a calibration (pump-setup) procedure
		Inadequate dispense pump inlet pressure. Increase to 5-10% greater than outlet pressure
		A side material flow rate too high
		Confirm wiper is correctly engaged with potentiometer (check diagnostic screen)
No Resin Flow	Atomization air flow detected with no fluid flow	Confirm no air leaks to include the spray applicator, air flow switch, and air hoses
		Confirm blow off time are not exceeded
		Confirm valve AE are open when the spray gun is triggered
		Check connections on flow meter
		Check solenoid AE
		Check for stuck flow meter gears
		Check for low component A pressures. Check that the A supply pressures and regulators operate correctly
Upper Balancing Fault	Dispense pump top fluid pressure not balanced at pump direction change	Air in the top of dispense pump. If air is present do a component B prime
		Excessive dispense pump inlet pressure. Reduce to 5-10% greater than outlet pressure
		Inadequate dispense pump inlet pressure. Increase to 5-10% greater than outlet pressure
		Confirm pressure transducers correctly function

Alarm Message	Alarm Condition(s)	Action(s)
Lower Balancing Fault	Dispense pump bottom fluid pressure not balanced at pump direction change	Air in bottom of dispense pump. If air is present do a component B prime
		Excessive dispense pump inlet pressure. Reduce to 5-10% greater than outlet pressure
		Inadequate dispense pump inlet pressure. Increase to 5-10% greater than outlet pressure
		Confirm pressure transducers correctly function
Pot Life	Mixed material programmed pot life timer expired	If possible spray out load volume of material in the line
		Flush mixed material from fluid lines with a solvent load on the Color Change screen
Color Change Fault	Color change sequence has been interrupted	Confirm stop button was not pressed
		Confirm atomization air is not detected during color change
		If equipped-Confirm applicator(s) are in gun flush box(s) and lid(s) are closed
		If equipped-Confirm proper operation of gun flush box(s)
High Resin Flow Rate	Component A flow rate above set limit during operation	Check for air in fluid lines to color stack valves
		Confirm no leaks in fluid lines
		Verify max resin flow rate in System Settings
		Adjust fluid pressure/flow to color stack valves to Make sure limit is not exceeded
Component B Flow Fault	Component B flow detected without pump operation	Check component B supply for fluid leaks
		Confirm component B supply valve is open and supply adequate
		Confirm component B pressure is correct
		Adjust flow sensor so display returns to red signal after spray applicator trigger stops
		Adjust flow sensor at minimum flow rate so display moves off red signal
		Confirm valves B1-B4 correctly function. Opposite valves should be open (B1&B3 or B2&B4)
		Confirm solenoids B1-B4 correctly function
Air Flow Detected	Atomization air detected during color change or flush mode	Turn off atomization air during color change or flush
		Check operation of air flow switch(es)
		If equipped-check operation of Gun Flush Box(s)
		If equipped-verify operation of Air Cut Off Valve(s)
EtherCAT Error	An internal error has occurred with PLC communications to the I/O block.	Cycle Power to the RM2.
		Check cables between HMI and I/O block.
Emergency Stop Button Pressed	Emergency stop button is pressed	Pull out emergency stop button on front of machine
		Press reset button on operator panel

Alarm Message	Alarm Condition(s)	Action(s)
Pump Position Sensor Error	Invalid reading from the pump position sensor.	Check sensor for proper operation.
Max System Pressure Error	Pressure has been measured that is higher than the rated system pressure.	Check for restrictions after the outlet of the catalyst pump for fluid flow blockage.
		Check atomizing air flow-switches to Make sure they are not reading erroneously.
		Check for leaks in the resin material circuit. Leaks can prevent flow detection.
		Verify that the maximum system pressure settings in the system configuration are correct.

INTRODUCTION

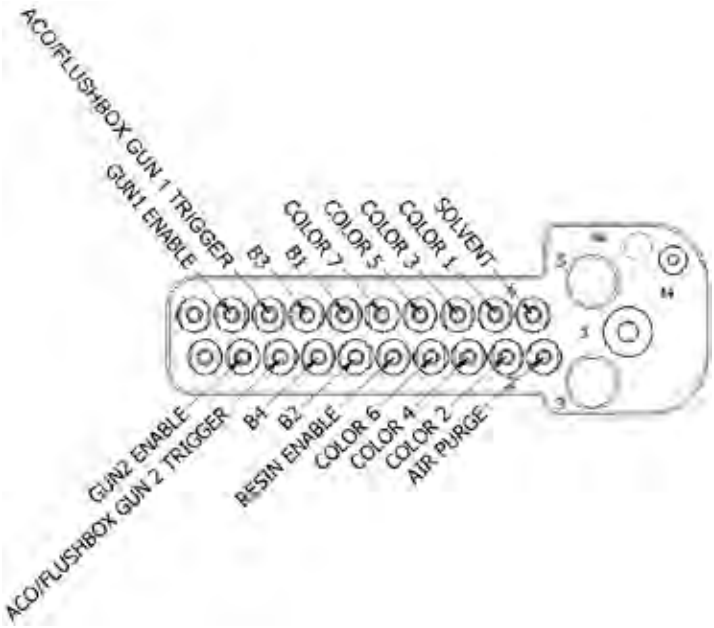
DISPENSE PUMP TROUBLESHOOTING

Use this checklist to help identify potential problems with the dispense pump-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
Check that the system is not in an Alarm state. It is possible an Alarm is not allowing the pump to 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 rod for adequate lubrication.	
Verify the ball plunger is correctly contacts the linear potentiometer. Observe the center value change 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 valve operation and look for a constant stream of material exiting the gun.	
Examine the stepper motor. Verify smooth operation when the pump runs. A dirty flow meter can cause unusual movement	
Verify Signal 1A and Signal 1B (Top two LEDs on rightmost card of I/O block) light up and flash when resin material is travelling through the unit.	

LOW PRESSURE SOLENOID CONNECTION REFERENCE

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 15 solenoids.



Solenoid # / CCV	Location	Description	Basic	Optioned
B1	Dispense Pump	Top Inlet	X	
B2	Dispense Pump	Top Outlet	X	
B3	Dispense Pump	Bottom Inlet	X	
B4	Dispense Pump	Bottom Outlet	X	
RESIN ENABLE	Mix Manifold	Resin Enable Valve	X	
AIR PURGE	Color Stack	Air Enable	X	
SOLVENT	Color Stack	Solvent Enable	X	
COLOR 1	Color Stack	Color 1	X	
COLOR 2	Color Stack	Color 2	X	
COLOR 3	Color Stack	Color 3	X	
COLOR 4	Color Stack	Color 4	X	
COLOR 5	Color Stack	Color 5	X	
COLOR 6	Color Stack	Color 6	X	
COLOR 7	Color Stack	Color 7	X	
ACO GUN 1	Flush Box or ACO Valve	Flush Box Trigger (If Flush Box Used) *or* Atomizing Air Cutoff for Gun 1	X	
ACO GUN 2	Flush Box or ACO Valve	Flush Box Trigger (If Flush Box Used) *or* Atomizing Air Cutoff for Gun 2	X	
GUN1 ENABLE	2-Gun Selector	Enable Gun 1		X
GUN2 ENABLE	2-Gun Selector	Enable Gun 2		X

MAINTENANCE, TROUBLESHOOTING & SPARE PARTS

ALARM TROUBLESHOOTING

System alarms are used to alert the user to conditions which may result in off-ratio spraying or fluid pressure out of range. Refer to the table below to troubleshoot RM2 alarms. Troubleshooting suggestions are listed in order of difficulty with the easier solutions presented first.

If at any time the alarm issue cannot be immediately corrected, the fault may be temporarily disabled until the problem can be resolved. Alarms should never be left disabled.

Alarm Message	Alarm Condition(s)	Action(s)
Ratio Error	Measured A:B ratio is outside of tolerance	Check for air in the A supply line
		Check for air in the B supply line
	Note: This occurs only during 'ratio check' mode	Confirm valves B1-B4 are correctly function
		Coating flow rate too high
		Adjust Ratio Tolerance in Ratio screen. Increase as needed or perform a Resin + Hardener calibration
Resin Flow Error	Component A flow sensed when system not in spraying	Confirm valve AE (Resin Enable) is closed
		Check valve AE for leaks
		Confirm flow meter does not detect pulses
		Confirm fluid panel does not vibrate
No Hardener Flow	No flow is detected through the B supply CCV pulse valve flow sensor when pulse valve is running	Confirm B supply valve is open
		Confirm B pressure in the supply line
		Confirm B material in the supply line
		Check connection of flow transducer cable
		Confirm valves B1-B4 correctly function. Opposite valves should be open (B1&B3 or B2&B4)
		Confirm solenoids B1-B4 correctly function
		B flow sensor out of adjustment. See flow sensor calibration procedure in manual
Upper Transducer Fault	Improper electrical signal from upper pressure transducer on the CCV pulse valves	Confirm upper pressure transducer on the CCV pulse valve assembly correctly functions
		Confirm upper pressure transducer on the CCV pulse valve assembly correctly functions
Lower Transducer Fault	Improper electrical signal from lower pressure transducer on the CCV pulse valves	Check electrical connection and wiring
		Confirm upper pressure transducer on the CCV pulse valve assembly correctly functions

Alarm Message	Alarm Condition(s)	Action(s)
No Resin Flow	Atomization air flow detected with no fluid flow	Confirm no air leaks including spray applicator, air flow switch, and air hoses
		Confirm blow off time is not exceeded
		Confirm valve AE opens when the spray gun is triggered
		Check connections on flow meter
		Check solenoid AE
		Check for stuck flow meter gears
		Check for low component A pressures. Check the A supply pressures and regulators for correct operation
Upper Balancing Fault	CCV pulse valve fluid pressure not balanced	Air in top of pulse valve assembly. If air is present do a component B prime
		Excessive CCV pulse valve assembly inlet pressure. Reduce to 5-10% greater than outlet pressure
		Inadequate CCV pulse valve inlet pressure. Increase to 5-10% greater than outlet pressure
		Confirm pressure transducers correctly function
Lower Balancing Fault	CCV pulse valve fluid pressure not balanced	Air in CCV pulse valve assembly. If air is present do a component B prime
		Excessive CCV pulse valve inlet pressure. Reduce to 5-10% greater than outlet pressure
		Inadequate CCV pulse valve assembly inlet pressure. increase to 5-10% greater than outlet pressure
		Confirm pressure transducers correctly functions
Color Change Fault	Color change sequence has been interrupted	Confirm stop button was not pressed
		Confirm atomization air is not detected during color change
		If equipped, confirm applicator(s) are in gun flush box(s) and lid(s) are closed
		If equipped, confirm proper operation of gun flush box(s)
High Resin Flow Rate	Component A flow rate above set limit during operation	Check for air in fluid lines to color stack valves
		Confirm no leaks in fluid lines
		Verify max resin flow rate in System Settings
		Adjust fluid pressure/flow to color stack valves to make sure limit is not exceeded

Alarm Message	Alarm Condition(s)	Action(s)
Component B Flow Fault	Component B flow detected without CCV pulse valve assembly operation	Check component B supply for fluid leaks
		Confirm component B supply valve is open and the supply is adequate
		Confirm component B pressure is correct
		Adjust flow sensor so display returns to red signal after spray applicator stops triggering
		Adjust flow sensor at minimum flow rate so display moves off red signal
		Confirm valves B1-B4 correctly function. Opposite valves must be open (B1&B3 or B2&B4)
		Confirm solenoids B1-B4 correctly function
Air Flow Detected	Atomization air detected during color change or flush mode	Turn off atomization air during color change or flush
		Check operation of air flow switch(es)
		If equipped-check operation of Gun Flush Box(s)
		If equipped-verify operation of Air Cut Off Valve(s)
EtherCAT Error	An internal error has occurred with PLC communications to the I/O block.	Cycle Power to the RM2.
		Check the cables between HMI and I/O block.
Emergency Stop Button Pressed	Emergency stop button pressed	Pull out emergency stop button on front of machine
		Press reset button on operator panel
Max System Pressure Error	Pressure has been measured that is higher than the rated system pressure.	Check for restrictions after the outlet of the catalyst pump for fluid flow blockage.
		Check atomizing air flow-switches to Make sure they are not reading erroneously.
		Check for leaks in the resin material circuit. Leaks can prevent flow detection.
		Verify that the maximum system pressure settings in the system configuration are correct.

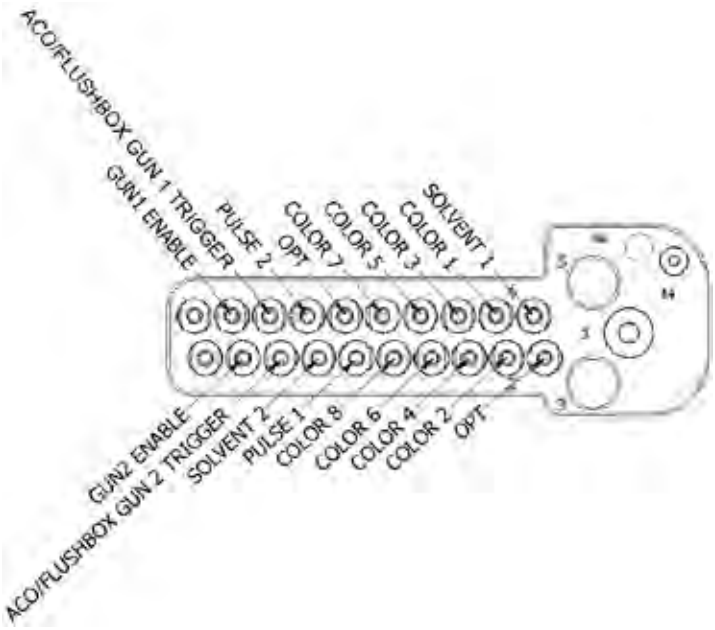
POWER OUTAGE CLEANING PROCEDURE

In the event of a facility power outage RM2 can be cleared of mixed material manually if air pressure supply continues. If the fluid lines are not cleared, it is possible that the mix manifold, downstream fluid lines, and spray gun may become clogged with hardened material. Valves may be manually triggered to open passageways in the unit. Trigger the gun into a grounded waste receptacle. For systems with gun flush boxes add TRG1 and TRG2 solenoid, or remove the gun from the box for flushing.

Pressing up on the blue manual solenoid triggers will open the corresponding CCV if there is enough residual air pressure available. With the aid of a helper, open CCVs per the references below while triggering the gun.

MEDIUM PRESSURE SOLENOID CONNECTION REFERENCE

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 18 solenoids.



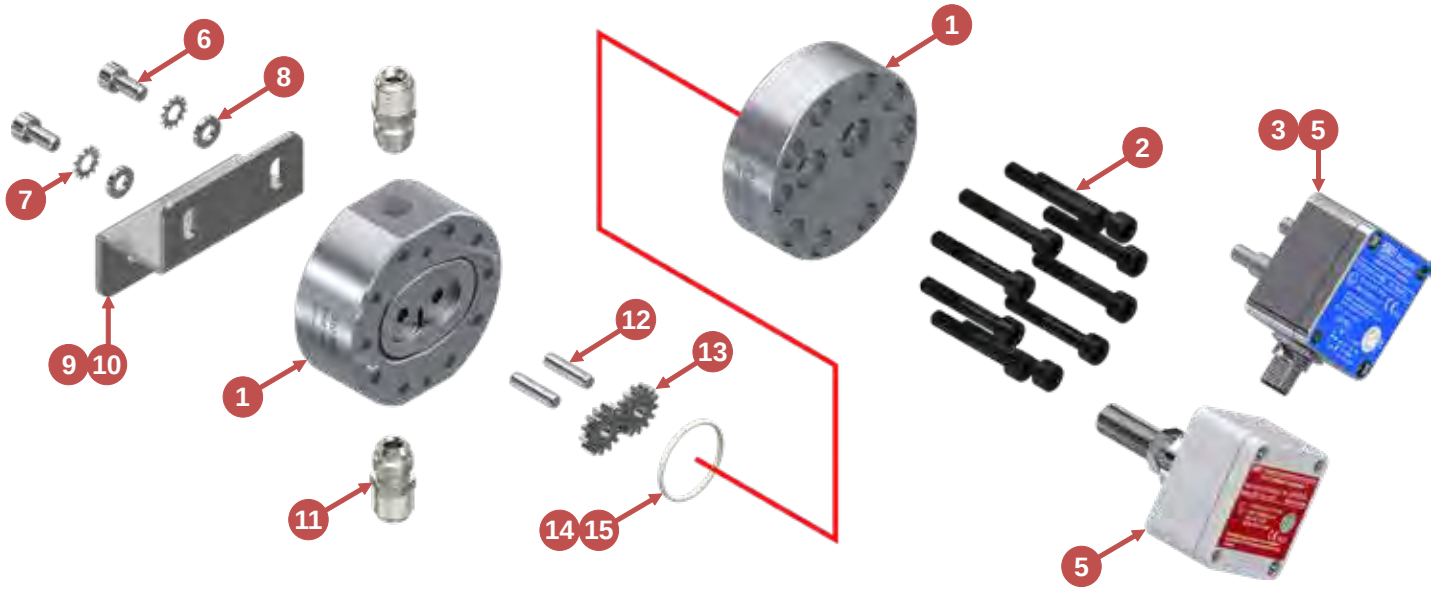
Solenoid # / CCV	Location	Description	Basic	Optioned
OPT				X
PULSE 1	CCV Pulse Valve-Left	Left Inlet	X	
SOLVENT 2	CCV Pulse Valve-Top	Solvent Enable	X	
PULSE 2	CCV Pulse Valve-Right	Right Inlet	X	
OPT				X
SOLVENT 1	Color Stack	Solvent Enable	X	
COLOR 1	Color Stack	Color 1	X	
COLOR 2	Color Stack	Color 2	X	
COLOR 3	Color Stack	Color 3	X	
COLOR 4	Color Stack	Color 4	X	
COLOR 5	Color Stack	Color 5	X	
COLOR 6	Color Stack	Color 6	X	
COLOR 7	Color Stack	Color 7	X	
COLOR 8	Color Stack	Color 8	X	
ACO GUN 1	Flush Box or ACO Valve	Flush Box Trigger (If Flush Box Used) *or* Atomizing Air Cutoff for Gun 1	X	
ACO GUN 2	Flush Box or ACO Valve	Flush Box Trigger (If Flush Box Used) *or* Atomizing Air Cutoff for Gun 2	X	
GUN1 ENABLE	2-Gun Selector	Enable Gun 1		X
GUN2 ENABLE	2-Gun Selector	Enable Gun 2		X

STANDARD FLOW METER TROUBLESHOOTING

Standard flow meter problems can be caused by improperly filtered fluid. Particulates in the fluid can cause gear binding, resulting in improper signals for the actual flow rate. Maintain the fluid filters according to the instructions from the filter manufacturer. 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 back-up, that is, reverse flow, can cause reacted/catalyzed material to enter the flow meter. The flow meter should be cleaned immediately, before the fluid gels or hardens. Under normal operation the sensors or electrical connections will not require replacement.

STANDARD FLOW METER 310-9000				
Item No.	**Part No.**	**Description**	**QTY.**	**Notes**
1	310-9010	Flow Meter Body (F/R Housing)	1	Sold as an assembly
2	310-9020	Socket Head Cap Screws, M6 x 30 mm	10	17.6 N•m (13 lb-ft)
3	310-9011	Dual Probe Pickup Sensor	1	See page 30 for cables
4	—	Socket Head Cap Screws, M4 x 0.7 mm	2	Included with 310-9011
5	310-9012	Fiber Optic Pickup Sensor	1	See page 32 for cables
6	20-7043	Socket Head Cap Screw, M6 x 1, 12 mm LG, 18-8	2	
7	20-7036	Washer, Lock, Etx. Tooth, M6, 18-8	2	
8	20-7035	Washer, Flat, M6, 18-8	2	
9	240-5319	Flow Meter Mounting Bracket	1	For RM2 unit only
10	310-2806	Flow Meter Mounting Bracket	1	For RF2 unit only
11	4-6JIC	Fitting, 1/4" NPS (M) X 3/8" JIC (M)	2	
12	310-9016	Shaft, Flow Meter	2	
13	310-9015	Gear, Flow Meter	2	
14	310-9017	Seal, Flow Meter	1	Sold individually
15	310-9017-K5	Seals, Flow Meter	1	Sold as 5-pack

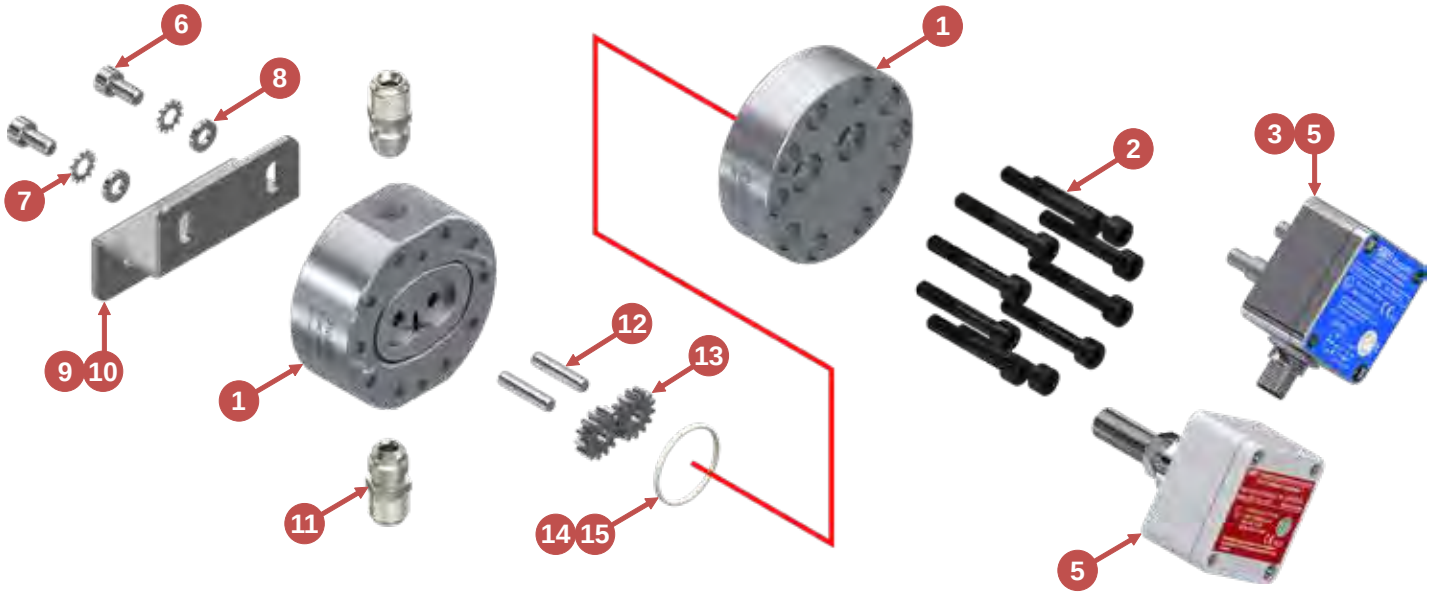


ACID CATALYST FLOW METER TROUBLESHOOTING

Acid catalyst flow meter problems can be caused by improperly filtered fluid. Particulates in the fluid can cause gear binding, resulting in improper signals for the actual flow rate. Maintain the fluid filters according to the instructions from the filter manufacturer. 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 back-up, that is, reverse flow, can cause reacted/catalyzed material to enter the flow meter. The flow meter should be cleaned immediately, before the fluid gels or hardens. Under normal operation the sensors or electrical connections will not require replacement.

ACID CATALYST FLOW METER 310-9002				
Item No.	**Part No.**	**Description**	**QTY.**	**Notes**
1	310-9013	Flow Meter Body, Acid Compatible (F/R Housing)	1	Sold as an assembly
2	310-9020	Socket Head Cap Screws, M6 x 30 mm	10	17.6 N•m (13 lb-ft)
3	310-9011	Dual Probe Pickup Sensor	1	See page 30 for cables
4	—	Socket Head Cap Screws, M4 x 0.7 mm	2	Included with 310-9011
5	310-9012	Fiber Optic Pickup Sensor	1	See page 32 for cables
6	20-7043	Socket Head Cap Screw, M6 x 1, 12 mm LG, 18-8	2	
7	20-7036	Washer, Lock, Etx. Tooth, M6, 18-8	2	
8	20-7035	Washer, Flat, M6, 18-8	2	
9	240-5319	Flow Meter Mounting Bracket	1	For RM2 unit only
10	310-2806	Flow Meter Mounting Bracket	1	For RF2 unit only
11	4-6JIC	Fitting, 1/4" NPS (M) X 3/8" JIC (M)	2	
12	310-9022	Shaft, Flow Meter, Acid Compatible	2	
13	310-9021	Gear, Flow Meter, Acid Compatible	2	
14	310-9017	Seal, Flow Meter	1	Sold individually
15	310-9017-K5	Seals, Flow Meter	1	Sold as 5-pack



MAINTENANCE PROCEDURES

There are no enclosure components which should require cleaning if the enclosure door is kept shut. If material seepage occurs, be sure to correct the problem and maintain a clean work area. To avoid hardening of the paint inside the fluid lines, the system must be cleaned by a complete flushing procedure at the end of operations.

⚠WARNING

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

Cleaning of Hoses

If gun 1 and gun 2 flush sequences are correct the mixed material line(s) will remain clean and ready for the next use. Always finish spraying operations with a color 0 load 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 and the mix manifold disassembled and cleaned.

Maintenance of CCV Valves

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

Maintenance of CCV Pulse Valves

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

Maintenance of Flow Meters

If the flow rate graph or dispense pump movement appears erratic the, flow meter should be inspected for proper operation. Paint solids may collect in and around the gears, bearings, and shafts, interfering with the motion of the gears and resulting in incorrect flow measurement. The use of abrasive or pigmented fluids will lead to wear which influences the accuracy of the flow meter. Routinely calibrate the flow meter for all paints used with the system.

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 240-5143.

⚠WARNING

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

PREVENTIVE MAINTENANCE

The RM2 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, flow meter, dispense pump, and mix manifold.
- Make sure the spray guns are function correctly and that air does not leak from the air valve.
- Examine the Alarm History and review errors with operator. Verify issues have been corrected.
- Make sure material supplies are filled and pressures are correct.

Monthly:

- Examine the static mixer assembly at the mix manifold outlet. If the static mix elements are clogged, replace the static mixer as needed. Balancing alarms or an increase in outlet pressure indicates blockage.
- If equipped: Make sure the dispense pump oil reservoir tubes 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+B Calibration to Make sure flow meter and dispense pump correctly operate.
- Make sure all CCVs are opening and closing properly. Remove valves and clean if needed.
- Make sure all CCV pulse valves can properly open and close. Remove pulse valves and clean if needed.
- Clean and reassemble the mix manifold and examine the valves.
- Examine fluid hoses for material buildup. Material buildup is common around hose fittings on plural component coatings. This can be a source of contamination to finished products. Replace if needed.

As Needed:

- Rebuild the mix manifold and replace O-Rings and parts in the injector assembly.
- Clean and reassemble the flow meter.
- If equipped: Rebuild the dispense pump. This is required if “B” material has leakage from the oil reservoirs, or if the A Only Calibration is correct, but the A+B Calibration is inaccurate.
- Rebuild Color Change Valves – monitor 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 flow meters for excessive wear or buildup of material. Verify smooth dispense pump movement.
- If equipped: Set limits of the Dispense Pump/perform calibration.

NOTICE

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

INSPECTION SCHEDULE

The RM2 system requires periodic inspection and regular maintenance. Follow the corresponding table as a guide to perform routine maintenance at suggested intervals.

Frequency	Description	Inspection Method
Daily	System flushed with solvent	Visual
Daily	Examine for leaks	Visual
Daily	Clean spray guns	Visual
Daily	Examine alarm history	Visual
Daily	Examine for material supply	Visual
Monthly	Examine all electrical and mechanical components for degradation due to environmental factors	Visual
Monthly	Examine static mixer for clogs	Visual
Monthly	Examine all hoses for kinks and wear	Visual
Monthly	Perform flow meter calibration check	Test with beaker
Monthly	Examine CCV operation	Disassemble
Monthly	Examine CCV pulse valve operation	Disassemble
Monthly	Clean mix manifold and check valves	Disassemble
Monthly	Examine fluid hoses for material buildup	Disassemble
As needed	Clean flow meter	Disassemble
As needed	Rebuild color change valves	Disassemble
As needed	Replace static mixer assembly	Disassemble

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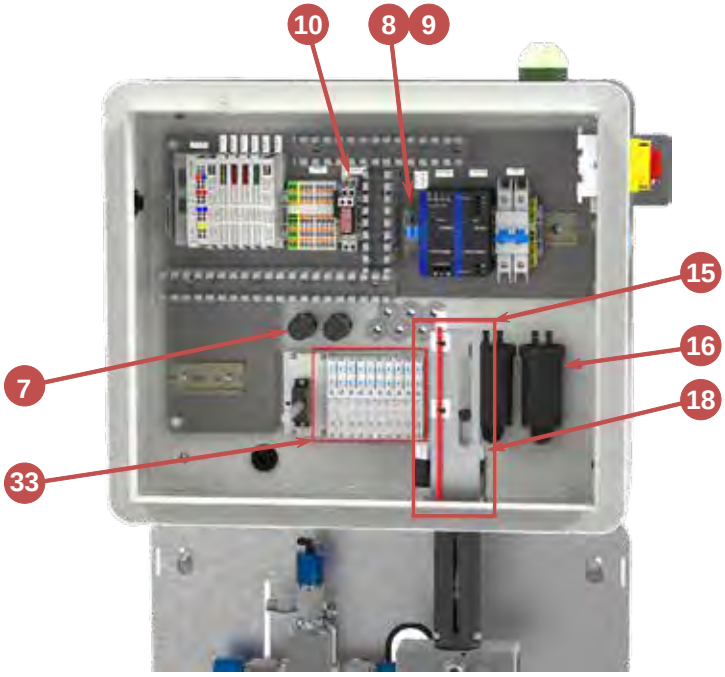
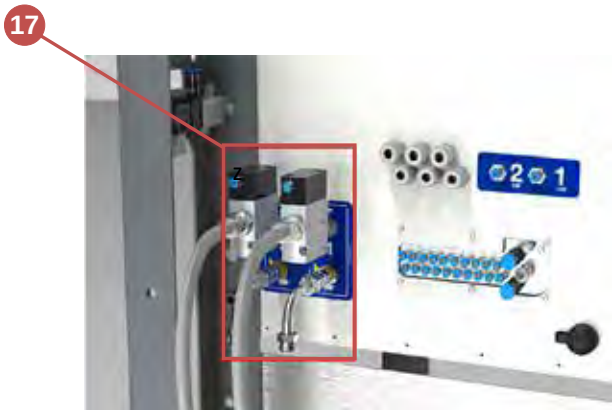
COMPONENT VIEWS & SPARE PARTS

Item No.	Part No.	Description	Qty.
1	240-3122-300	Static Mix Assembly, 300cc	1
2	240-3122-600	Static Mix Assembly, 600cc	
3	240-5136-300	300cc Dispense Pump	as desired
4	240-5136-600	600cc Dispense Pump	
5	240-5141	300cc Pump Rebuild Kit	1
6	240-5142	600cc Pump Rebuild Kit	
7	240-5156	15 psi Pressure Switch	1
8	240-5180	Circuit Breaker, 2a	1
9	240-5181	Circuit Breaker, 3a	1
10	240-5185	Safety Relay	1
11	240-5186	0-500 psi Pressure Sensor	1
12	240-5187	M12 4-Pin to Leads, 2m	1
13	240-5188	M12 4-Pin to Leads, 2m	1
14	240-5241	Linear Motor Assembly	as desired
15	240-3060	Linear Pot Bracket Assembly	1
16	13742-01	Air Flow Switch	2
17	240-5264	ACO Valve Assembly	2
18	240-5368	Stepper Motor Cable Assembly	as desired
19	310-9010	Flow Meter Body	1
20	310-9011	Dual Probe Pickup	1
21	310-9017-K5	Flowmeter Seal Kit, 5 Pack	1
22	SSV-809	Check Valve	2
23	6SN-6CV	Check Valve	1
24	77367-00	Seat Assembly - MCV	4
25	78949-00	MCV Calve Assembly	4
26	CCV-503-SS	CCV Valve	2
27	KK-4841	CCV Repair Kit	10
28	1414-SS-90-T	Fitting, 3/8 ODT x 1/4 NPS, 90	2
29	FEP-0604	Hose, 3/8 ODT x 1/4 ID	50ft
30	240-5334	Mix Manifold Assembly	1
31	240-3124	Mix Manifold Repair Kit	1
32	240-3047	Injector Valve Assembly	1
33	240-5154	Solenoid Valve Slice	2
34	A10756-00	Tool, MCV removal	1
35	240-5290	JP - Cord w/ Connector	1
36	240-5291	NA - Cord w/ Connector	1

Item No.	Part No.	Description	Qty.
37	240-5292	UK - Cord w/ Connector	1
38	240-5293	CN - Cord w/ Connector	1
39	240-5294	EU - Cord w/ Connector	1
—	0114-016099	Throat Seal Lube, Solvent-Based	1
—	0114-016100	Throat Seal Lube, Water-Based	1

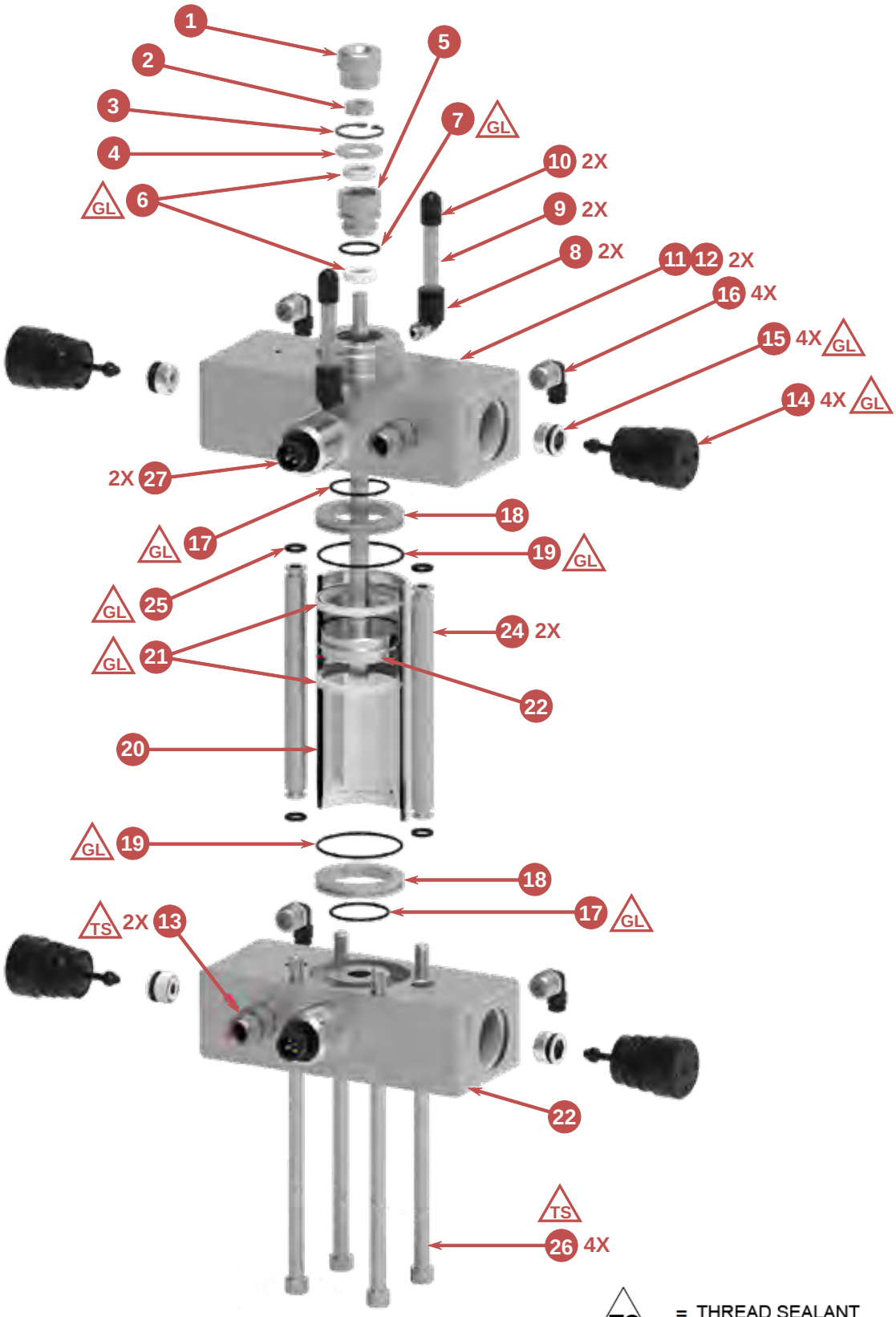




DISPENSE PUMP

Item No.	Part No.	Description	Qty.	Notes
1	240-3020	Pump Rod Adapter	1	
2	20-6953	Hex Nut	1	
3	237-729	Retaining Ring	1	
4	237-727	Flat Washer	1	
5	240-3084	Seal Holder Assembly	1	
6	240-3211	Rod Seal	2	
7	79001-09	O-Ring, 2-015, FFKM	1	
8	240-3116	Elbow, 10-32 x 1/4" ODT	2	
9	FEP-0402	FEP Tubing, 1/4" OD	2	
10	240-3102	1/4" OD Tube Cap	2	
11	240-5133	Top Block	1	
12	20-4844	Dowel Pin, 3/16 DIA x 12 LG, SS	2	
13	4T-4	Fitting, 1/4" NPS x 1/4" NPT	2	
14	78949-00	MCV Valve Assembly	4	
15	77367-00	Seat Assembly, MCV	2	
16	JML-532-2T	Push-In Fitting, 1/8 NPT x 5/32 ODT	4	
17	79001-21	O-Ring, 2-020, FFKM	2	
18	240-3022	Cylinder Adapter (600CC Only)	2	**
19	79001-18	O-Ring, 2-027, FFKM	2	**
20	240-3018-300 240-3018-600	300cc Cylinder 600cc Cylinder	1	
21	240-3212-300 240-3212-600	300cc Piston Seal 600cc Piston Seal	2	
22	240-3224-300 240-3224-600	300cc Rod and Piston Assembly 600cc Rod and Piston Assembly	1	
23	240-5132	Button Block	1	
24	240-5135	Fluid Tube	2	
25	79001-05	O-Ring, 2-010, FFKM	4	
26	7959-176C	1/4-20 x 5.5" SHCS	4	14.0 N•m (10 lb-ft)
27	240-5186	Pressure Transducer	2	
—	0114-016099	Pump Packing Lube, 250mL	1	

See service manuals 77-2983-R2 for complete assembly instructions.



TS = THREAD SEALANT
LOCTITE 567

GL = GUN LUBRICANT / OIL [SSL-10]
DeVILBISS GUN LUBE

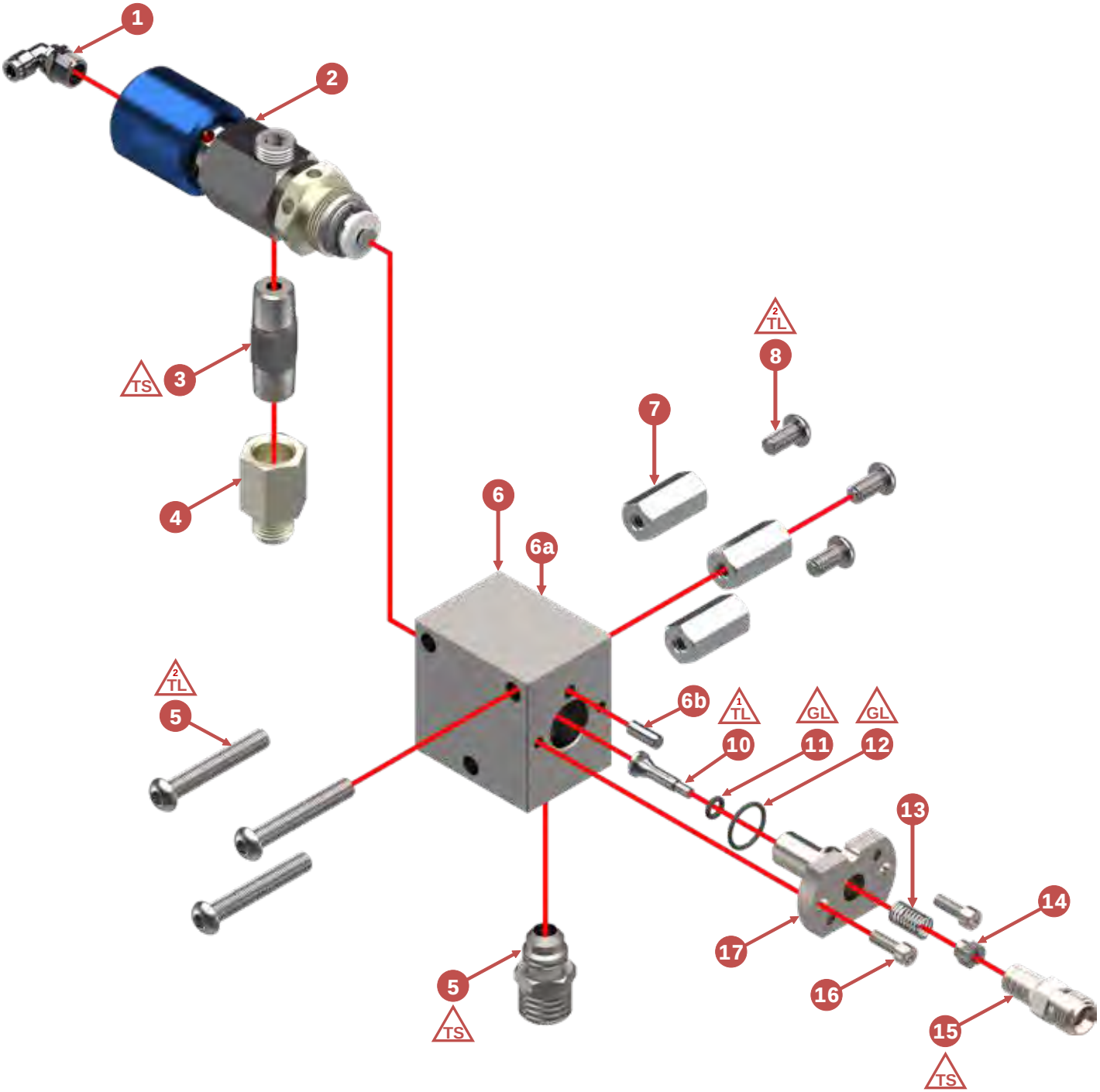
*4” total, 2” per side, buy length and cut to length **

Item is not used on 240-3015-300

MIX MANIFOLD ASSEMBLY-LOW PRESSURE

Item No.	Part No.	Description	Qty.	Notes
1	41-FTP-1006	FTG BRA 5/32 OTD x 1/8 NPT (M) EL	1	
2	CCV-503-SS	Valve Assembly (see next page)	1‡	14.9-17.6 N•m (132-156 in-lbs)
3	SSV-809	Check Valve	1	
4	2T-6 (F)	Adapter, MM 1/8 NPT x 3/8 NPS	1	
5	77578-56C	Button Head Cap Screw, 1/4-20 x 1 3/4 SS	3	
6	240-3049	Mix Manifold Assembly	1	
6a	240-3041	Mix Manifold	1	
6b	20-4844	Dowel Pin, 3/16 DIA x 1/2 LG, SS	1	
7	240-3155	Standoff, 1/4-20 Hex	3	
8	77578-16C	Button Head Cap Screw, 1/4-20 x 1/2 SS	3	
9	6-6JIC	3/8 NPS x 3/8 JIC	1	
10	240-3136	Valve Stem	1	
11	79001-04	O Ring, 2-008, Perfluoroelastomer	1*	
12	79001-08	O Ring, 2-014, Perfluoroelastomer	1*	
13	240-3045	Spring, .750 Long	1*	
14	240-3044	Retainer, Spring	1	
15	4T-6	Nipple	1	
16	A12772-01	Screw, #10-24 x 1/2, SS	2	18-22.8 N•m (160-202 in-lbs)
17	240-3042	Body, Injector	1	
—	SSL-101	Gun Lubricant, DeVilbiss	1	
—	—	Thread Sealant (Loctite 567)	♦	
—	—	Thread Locker (Loctite 242)	♦	
—	—	Thread Locker (Loctite 243)	♦	

* Items included in repair kit 240-3124.
‡ Optional spanner tool CCV-7 (sold separately) or use 27 mm (SAE 1 1/16”) wrench.
♦ Customer supplied (not included in repair kit).
See service manuals 77-2983-R2 and 77-3117-R3 for complete assembly instructions.



1 TL = THREAD LOCKER *LOCTITE 242*

2 TL = THREAD LOCKER *LOCTITE 243*

TS = THREAD SEALANT *LOCTITE 567*

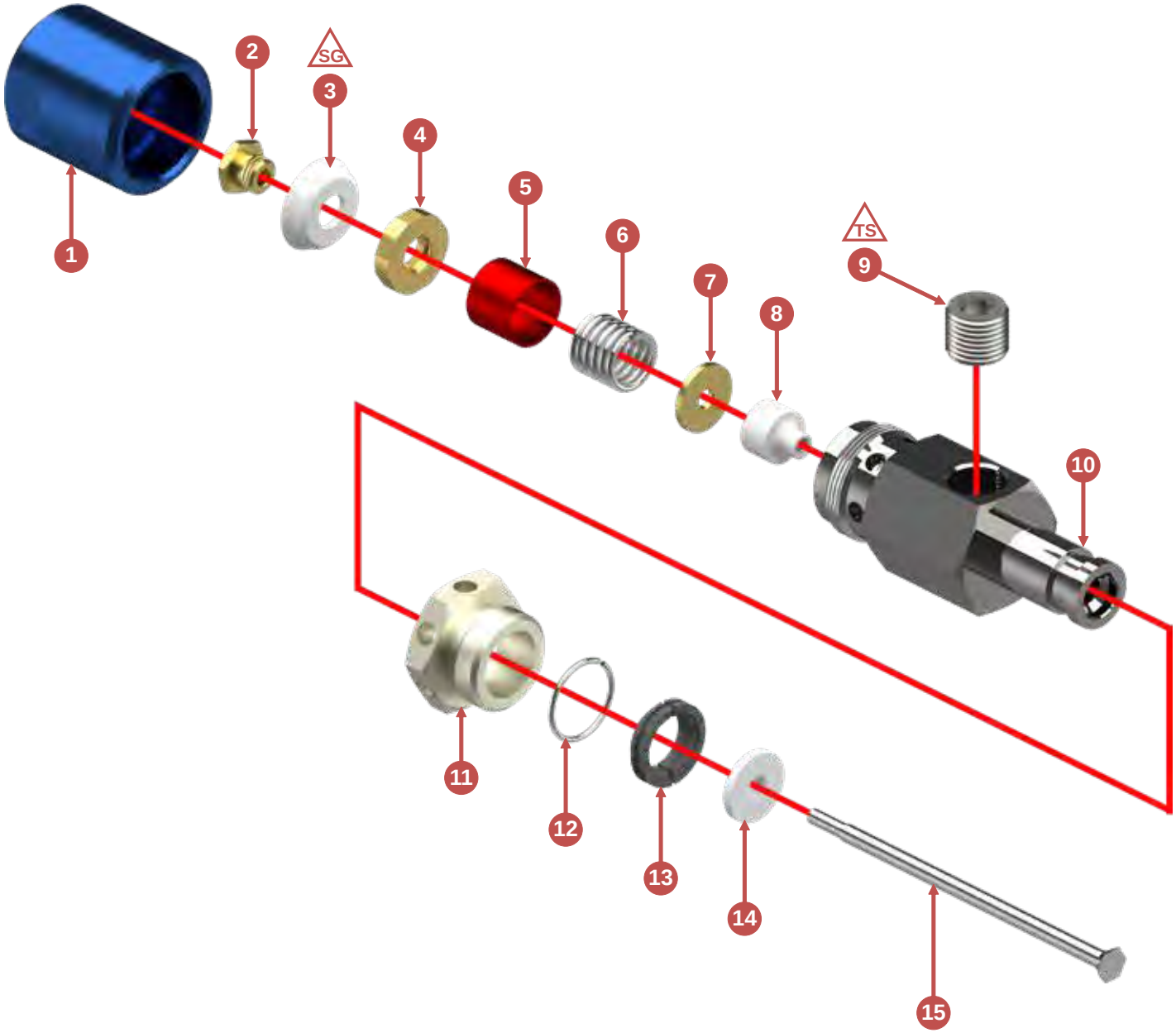
GL = GUN LUBRICANT / OIL [SSL-10] *DeVILBISS GUN LUBE*

CCV VALVE ASSEMBLY-LOW PRESSURE

Item No.	Part No.	Description	Qty.	Notes
1	CCV-43-1	End Cap, Aluminum, Anodized Blue	1	8.5-14.0 N•m (75-125 in-lbs)
2	CCV-45	Nut, Clamping, Brass	1*	0.2-0.5 N•m (2-4 in-lbs)
3	VA-246	Cup, Sealing, Teflon	1	
4	CCV-3	Nut, Brass	1	1.4-2.0 N•m (12-18 in-lbs)
5	CCV-42	Valve Indicator, Aluminum, Anodized Red	1	
6	CCV-41	Spring	1	
7	CCV-4	Washer, Flat, Spring	1	
8	CCV-6	Seal, Valve Needle	1	
9	SSP-1421	Pipe Plug, 1/4	1	
10	240-2039	Valve Body	1	
11	CCV-13	Spanner Nut	1	
12	240-2032	Spring Clip	1	
13	240-2030	Split Collar	1	
14	CCV-40	Poppet Seat	1	
15	CCV-39	Stem	1	
—	—	Synthetic Grease (Super Lube)	1	
—	80092-00	Thread Lubricant, Anti-Seize	1	

* Items included in repair kit KK-5094

See service manuals 77-2983-R2 and 77-3117-R3 for complete assembly instructions.

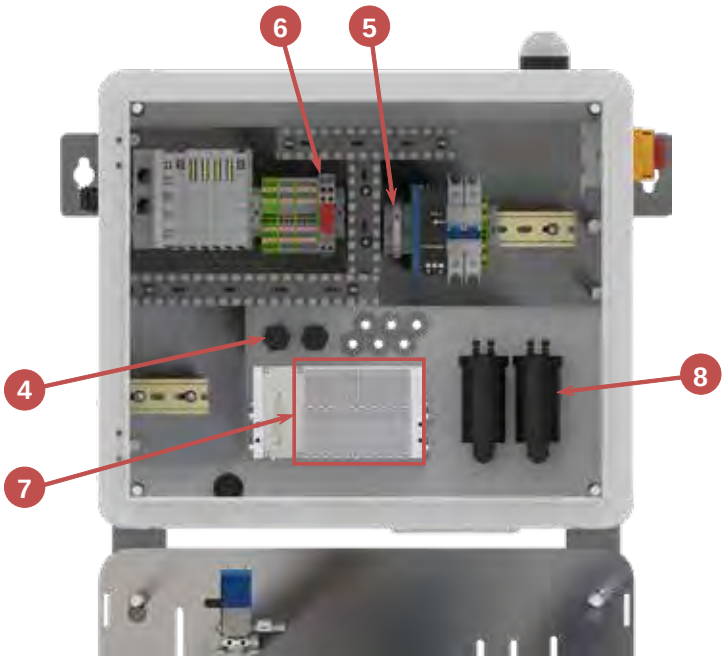


TS = THREAD SEALANT
LOCTITE 567

SG = SYNTHETIC GREASE
PLUNGER SEALING CUP LUBE

COMPONENT VIEWS & SPARE PARTS — STANDARD CATALYST

Item No.	Part No.	Description	Qty.
1	240-3231	Static Mixer, Medium Pressure Assembly	1
2	72-727	Adapter, 1/8″ NPT (F) x 1/4″ NPS (M)	1
3	204-3234	Adapter, 6JIC (M) X 1/8 NPT (F)	1
4	240-5156	15 psi Pressure Switch	1
5	240-5180	Circuit Breaker Kit 1077 1P, Plug 2A	2
6	240-5185	Relay Socket	1
7	240-5154	Solenoid Module, Festo	2
8	13742-01	Air Flow Switch	2
9	240-5264	ACO Air Cut Off Valve Assembly	2
10	240-2012	CCV Valve	11
11	KK-4370	Plug Kit	11
12	SSV-809	Check Valve	11
13	240-5188	M12 4-Pin to Leads, 2m	2
14	310-9010	Flow Meter Body	1
15	310-9011	Dual Probe Pickup	1
16	310-9017-K5	Flowmeter Seal Kit, 5 Pack	1
17	22-863-3	Body Check Valve, Medium Pressure, 3/8 NPS x 5/8-18 (M)	2
18	CCV-17-SS	Manifold Inlet Block	2
19	CCV-16-SS	Manifold Center Block	3
20	CCV-18-SS	Manifold Block Outlet	2
21	4-6JIC	Fitting, 1/4″ NPS (M) x 3/8″ JIC (M)	2
22	PDHC-04-K-012	Hose, Stainless Steel, Braided	2
23	6SN-4	Adapter, Mixing Block, High Pressure	2
24	240-5360	Mix Manifold Assembly	1
25	240-5358	Injector Valve, High Pressure Assembly	2
26	A10756-00	Tool, MCV removal (not shown)	1
27	240-5290	JP - Cord w/ Connector (not shown)	1
28	240-5291	NA - Cord w/ Connector (not shown)	1
29	240-5292	UK - Cord w/ Connector (not shown)	1
30	240-5293	CN - Cord w/ Connector (not shown)	1
—	0114-016099	Throat Seal Lube, Solvent-Based	1
—	0114-016100	Throat Seal Lube, Water-Based	1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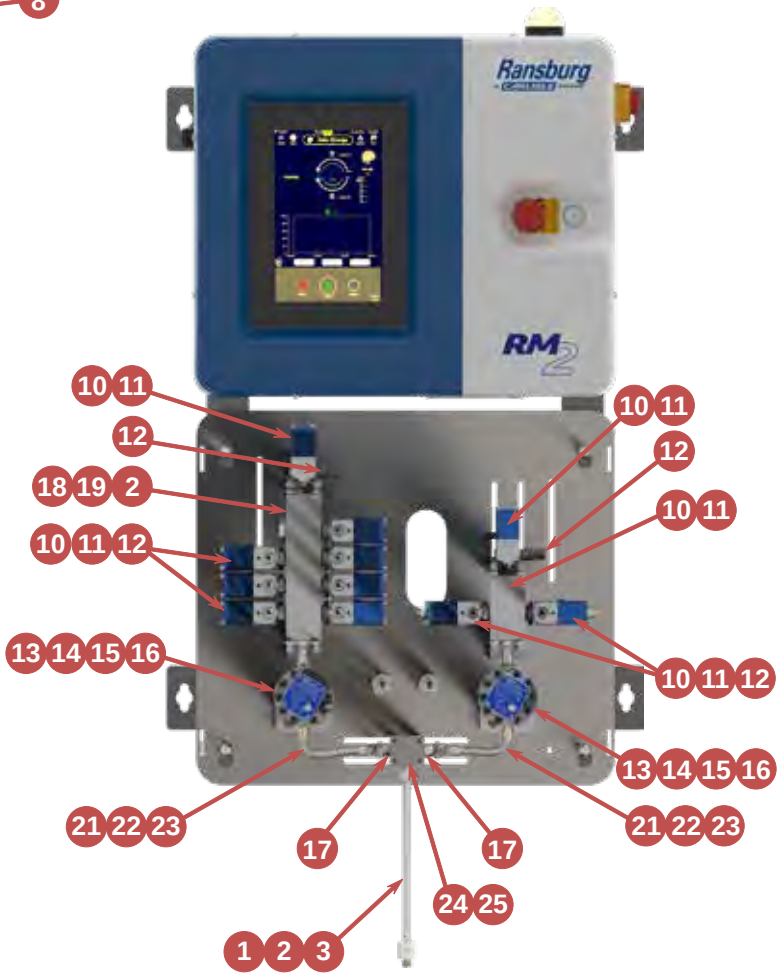
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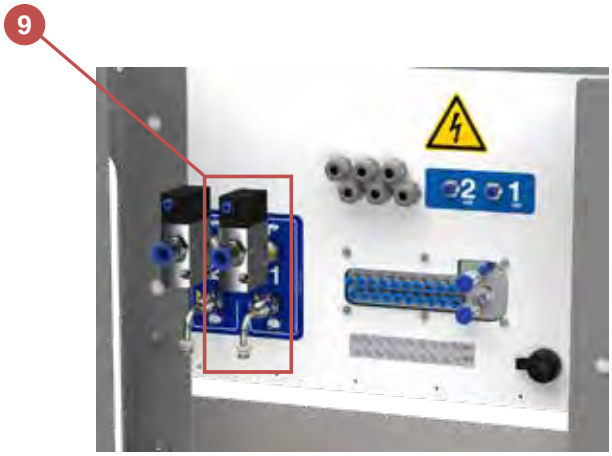
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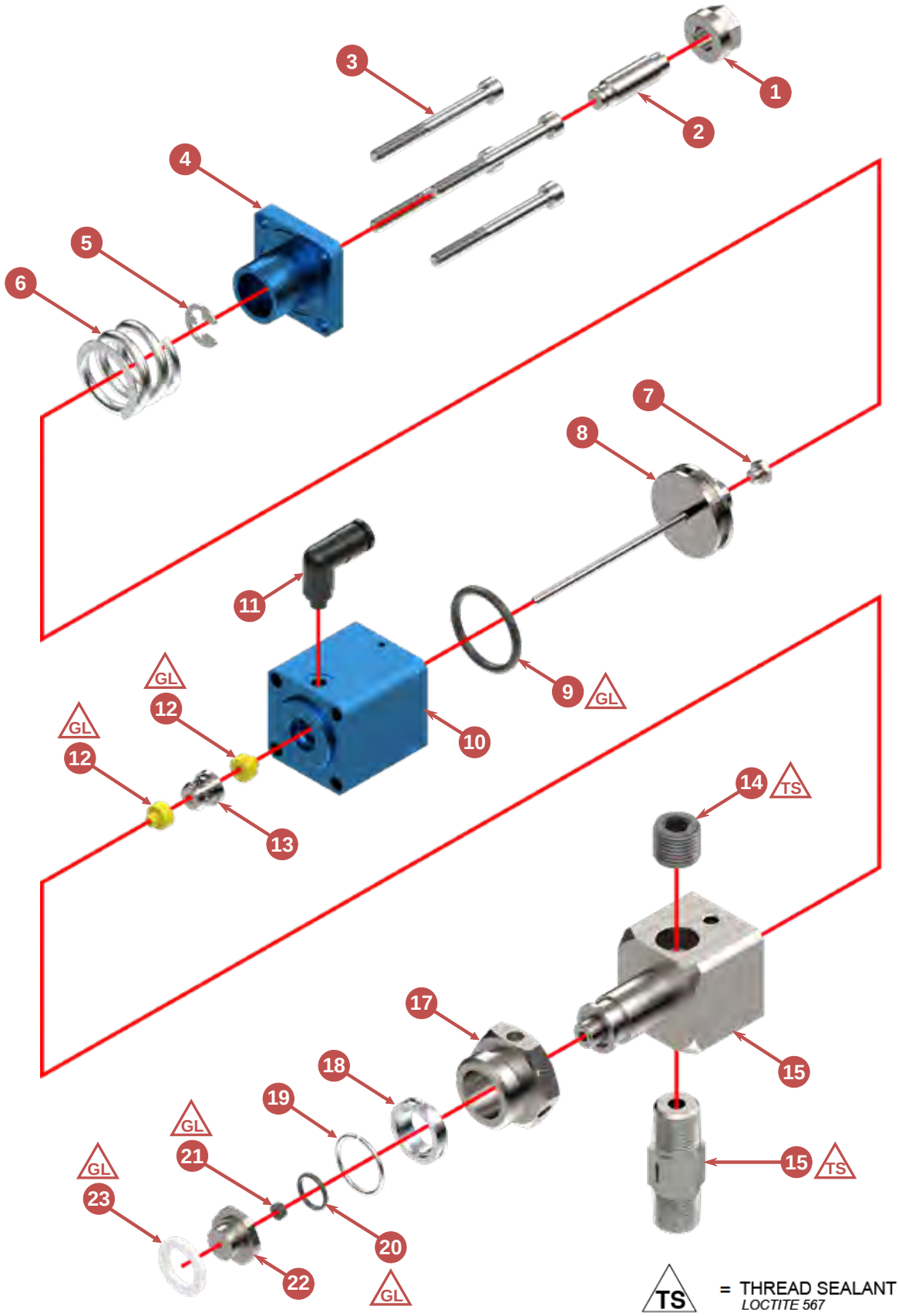
CCV PULSE VALVES — STANDARD CATALYST

Item No.	Part No.	Description	Qty.	Notes
1	240-2059	Lock Nut	1	◇
2	240-2058	Adjustment Knob	1	◇
3	240-2026	Socket Head Cap Screw, SS, M4 x .7 x 45	4	2-2.5 N•m (18-22 in-lbs)
4	240-2017	End Cap	1	
5	240-2036	E-25 Retaining Ring	1	◇
6	240-2037	Spring, Return, High Pressure	1	
7	240-2060	Pulse Bumper	1	◇
8	240-2013	Fluid Needle Assembly	1	
9	SPA-122X	O Ring, 21.89 mm x 2.62 mm, Viton Extreme	1	◇
10	240-2016	Cylinder Body, Aluminum, Anodized	1	
11	240-5192	Quick Connect Pneumatic Elbow, 90°	1	
12	240-2025	Needle Seal	2	◇
13	240-2035	Seal Spacer	1	
14	SSP-1421	Plug, Pipe Coated, Socket Head	1	
15	240-2022	Valve Head	1	
16	SSV-809	Check Valve	1	
17	CCV-13	Spanner Nut, Stainless Steel, Nickel Plated	1	‡
18	240-2030	Split Collar	1	
19	240-2032	Spring Clip	1	
20	240-2047	Housing Seal	1	
21	240-2021-3	Seal, Needle	1	
22	240-2044-1	Seat Housing	1	
23	240-2057	Seal, Square Profile	1	
—	SSL-101	Gun Lubricant, DeVilbiss	1	
—	—	Thread Sealant (Loctite 567)		♦

* Items included in fluid needle assembly 240-2013-K ◇ Items included in seal kit 240-2048
○ Items included in seal kit 240-2049
♦ Customer supplied (not included in repair kit).
‡ Optional spanner tool CCV-7 (sold separately) or use 27 mm (SAE 1 1/16”) wrench.
See service manual 77-3120-R3 for complete assembly instructions.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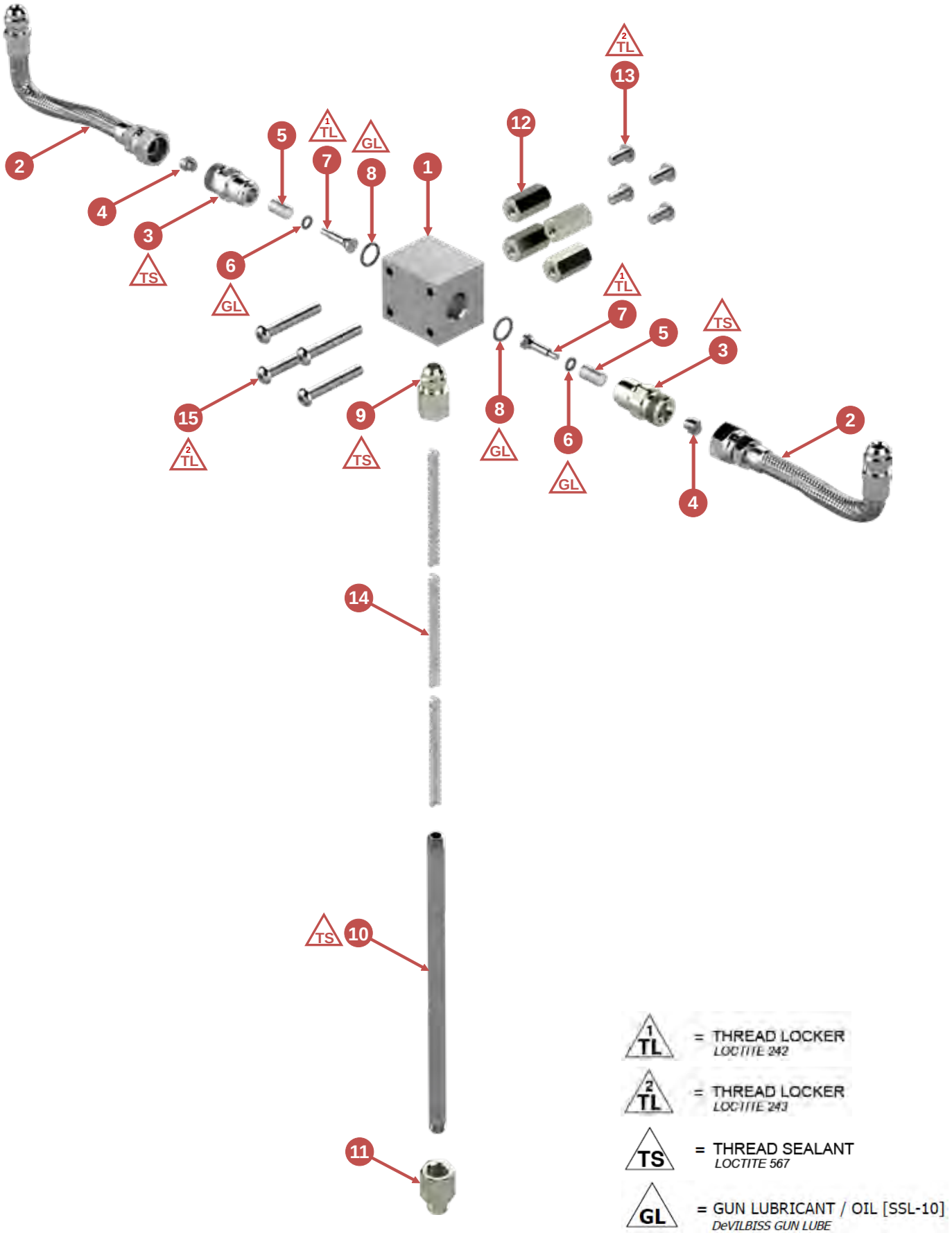
TS = THREAD SEALANT
LOCTITE 567
GL = GUN LUBRICANT / OIL [SSL-10]
DeVILBISS GUN LUBE

MIX MANIFOLD ASSEMBLY, STANDARD CATALYST — MEDIUM PRESSURE

Item No.	Part No.	Description	Qty.	Notes
1	240-5359	Mix Manifold Housing	1	
2	PDHC-04-KK-012	1/4 NOMID X 12 in OAL W-4SS FNPS	2	
3	22-863-3	Body Check Valve, Medium Pressure, 3/8”	2	61-68 N•m (45-50 lb-ft)
4	240-3044	Retainer, Spring	2	
5	240-3045	Spring	2	
6	79001-04	O Ring, 2-008, Perfluoroelastomer	2	
7	240-3136	Valve Stem	2	
8	79001-04	O Ring, 2-013, Perfluoroelastomer	2	
9	240-3234	Adapter, 6JIC (M) x 1/8 NPT (F)	1	
10	240-3232	Static Mixer Tube, SS	1	
11	72-727	Adapter, NPT	1	
12	240-3155	Standoff, Hex, 1/4-20	4	
13	77578-16C	Socket Head Cap Screw, SS, 1/4-20	4	
14	240-3135-01	Element, Disposable Mixer, .248 OD x 3”	3	
15	77578-56C	Button Head Cap Screw, 1/4-20 x 1.75”,SS	4	
—	SSL-101	Gun Lubricant, DeVilbiss	1	
—	—	Thread Sealant (Loctite 567)		♦
—	—	Thread Locker (Loctite 242)		♦
—	—	Thread Locker (Loctite 243)		♦

♦ Customer supplied (not included with parts kits).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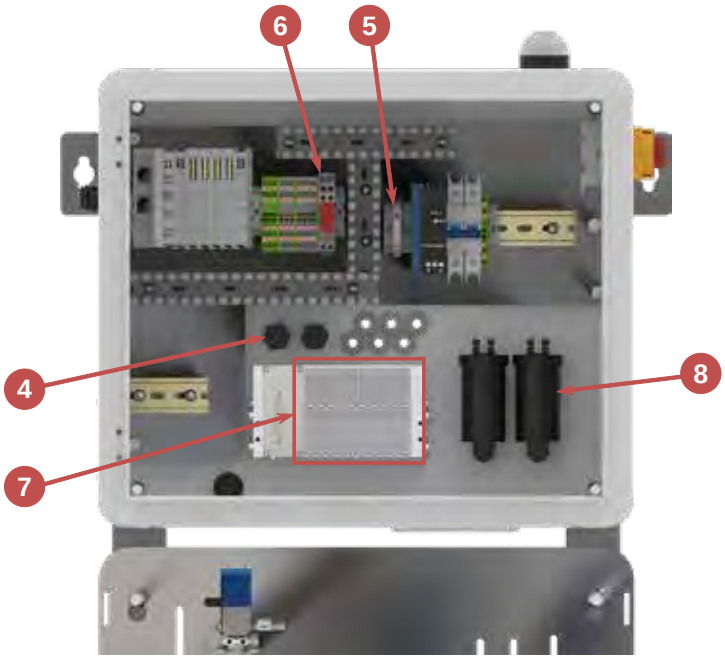
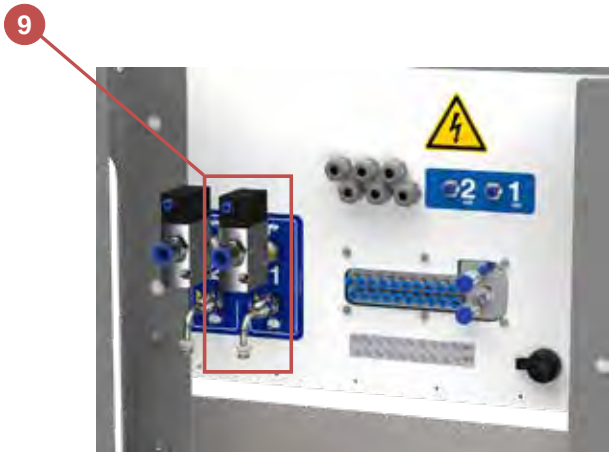
= THREAD LOCKER
LOCTITE 242
= THREAD LOCKER
LOCTITE 243
= THREAD SEALANT
LOCTITE 567
= GUN LUBRICANT / OIL [SSL-10]
DeVILBISS GUN LUBE

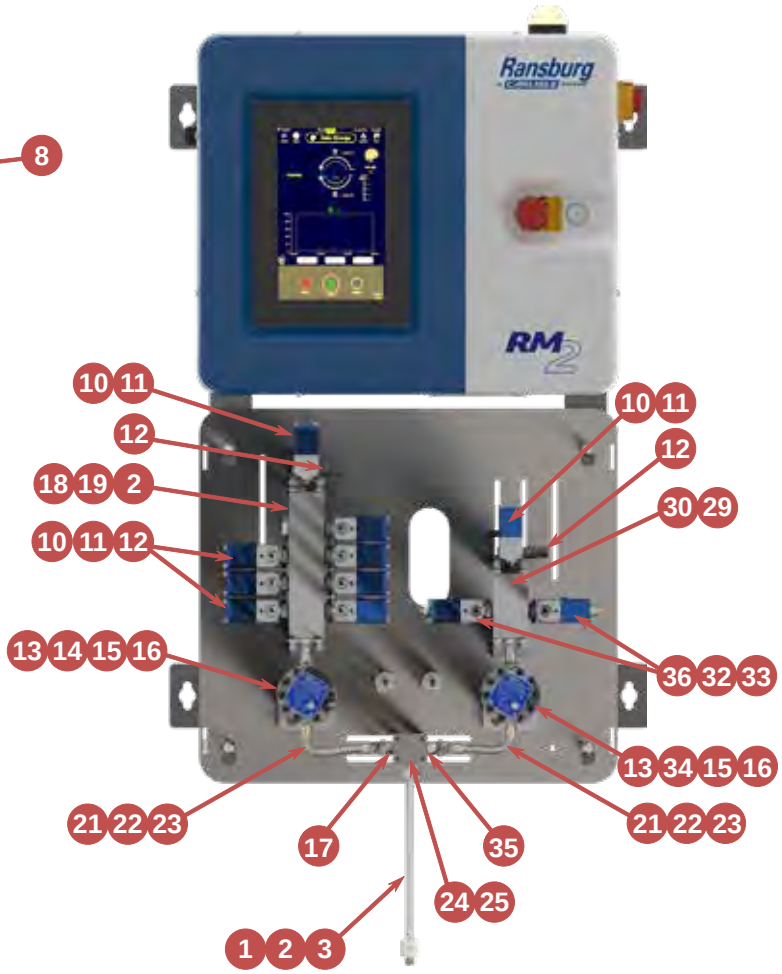
COMPONENT VIEWS & SPARE PARTS — ACID CATALYST

Item No.	Part No.	Description	Qty.
1	240-3231	Static Mixer, Medium Pressure Assembly	1
2	72-727	Adapter, 1/8" NPT (F) x 1/4" NPS (M)	1
3	204-3234	Adapter, 6JIC (M) X 1/8 NPT (F)	1
4	240-5156	15 psi Pressure Switch	1
5	240-5180	Circuit Breaker Kit 1077 1P, Plug 2A	2
6	240-5185	Relay Socket	1
7	240-5154	Solenoid Module, Festo	2
8	13742-01	Air Flow Switch	2
9	240-5264	ACO Air Cut Off Valve Assembly	2
10	240-2012	CCV Valve	9
11	KK-4370	Plug Kit	10
12	SSV-809	Check Valve	9
13	240-5188	M12 4-Pin to Leads, 2m	2
14	310-9000	Flow Meter, Standard	1
15	310-9011	Dual Probe Pickup	2
16	310-9017-K5	Flowmeter Seal Kit, 5 Pack	1
17	240-5358	Injector Valve, Medium Pressure, Assembly	1
18	CCV-17-SS	Manifold Inlet Block	1
19	CCV-16-SS	Manifold Center Block	3
20	CCV-18-SS	Manifold Block Outlet	1
21	4-6JIC	Fitting, 1/4" NPS (M) x 3/8" JIC (M)	2
22	PDHC-04-KK-012	Hose, Stainless Steel, Braided	2
23	6SN-4	Adapter, Mixing Block, High Pressure	2
24	240-5360	Mix Manifold Assembly	1
25	240-5358	Injector Valve, High Pressure Assembly	2
26	A10756-00	Tool, MCV removal (not shown)	1
27	240-5290	JP - Cord w/Connector (not shown)	1
28	240-5291	NA - Cord w/Connector (not shown)	1
29	CCV-17-SS-AC	Manifold Inlet Block, 316L	1
30	CCV-18-SS-AC	Manifold Block Outlet, 316L	1
31	—	—	—

Item No.	Part No.	Description	Qty.
32	CCV-21-AC	Hex Port Plug, 316L	1
33	CCV-19	Plug/Gasket (not shown)	1
34	310-9002	Flow Meter, Acid Catalyst	1
35	240-5358-AC	AC Check Valve, Medium Pressure, Assembly	1
36	240-2061	Pulse Valve Assembly	2
37	240-5292	UK - Cord w/Connector (not shown)	1
38	240-5293	CN - Cord w/Connector (not shown)	1
—	0114-016099	Throat Seal Lube, Solvent-Based	1
—	0114-016100	Throat Seal Lube, Water-Based	1



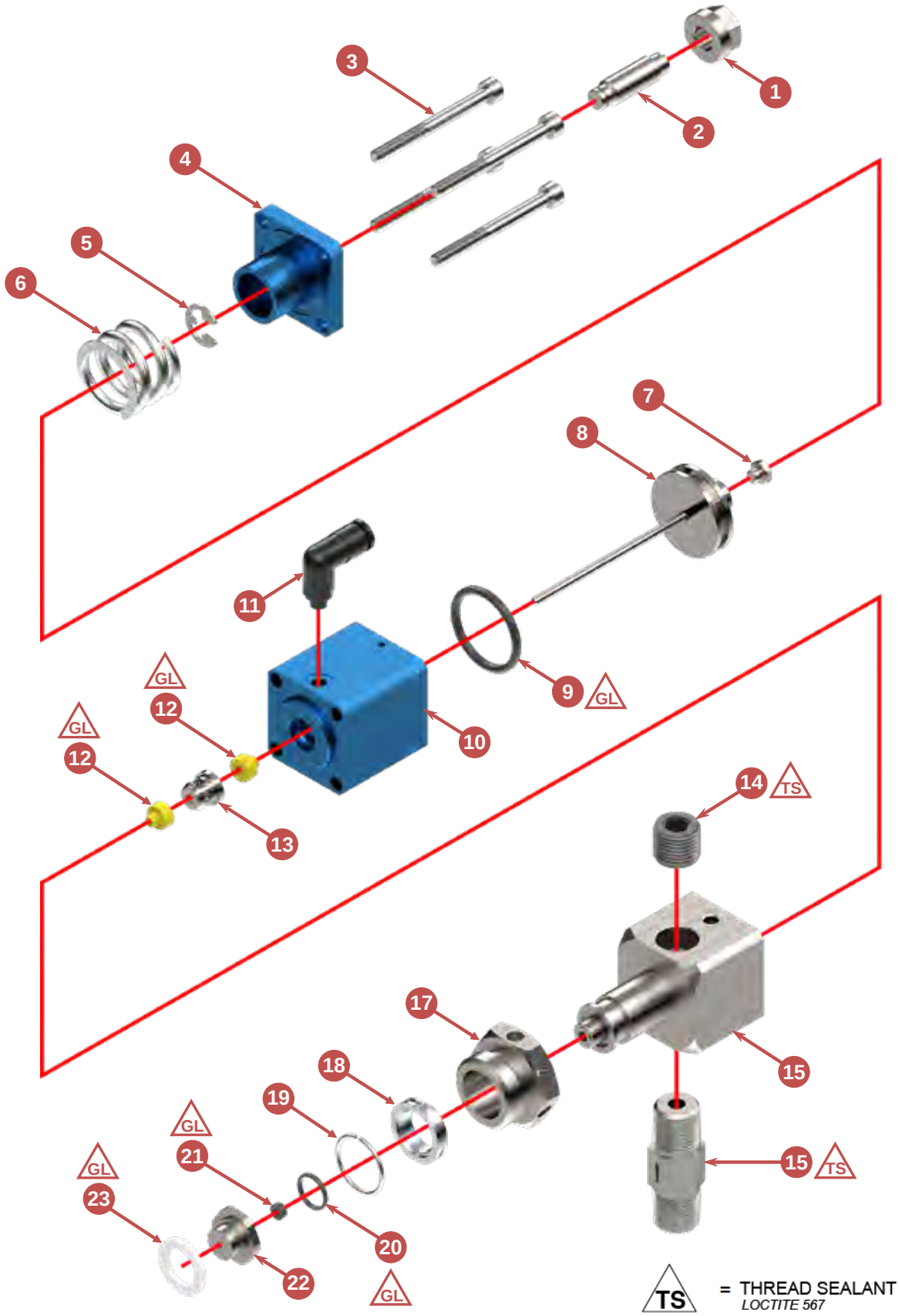




CCV PULSE VALVES — ACID CATALYST

Item No.	Part No.	Description	Qty.	Notes
1	240-2059	Lock Nut	1	◇
2	240-2058	Adjustment Knob	1	◇
3	240-2026	Socket Head Cap Screw, SS, M4 x .7 x 45	4	2-2.5 N•m (18-22 in-lbs)
4	240-2017-1	End Cap, 303	1	
5	240-2036	E-25 Retaining Ring	1	◇
6	240-2037	Spring, Return, High Pressure	1	
7	240-2060	Pulse Bumper	1	◇
8	240-2013	Fluid Needle Assembly	1	
9	SPA-122X	O Ring, 21.89 mm x 2.62 mm, Viton Extreme	1	◇
10	240-2016	Cylinder Body, Aluminum, Anodized	1	
11	240-5192	Quick Connect Pneumatic Elbow, 90°	1	
12	240-2025	Needle Seal	2	◇
13	240-2035	Seal Spacer	1	
14	SSP-1421	Plug, Pipe Coated, Socket Head	1	
15	240-2022-1	Valve Head	1	
16	SSV-809	Check Valve	1	
17	CCV-13	Spanner Nut, Stainless Steel, Nickel Plated	1	‡
18	240-2030	Split Collar	1	
19	240-2032	Spring Clip	1	
20	240-2047	Housing Seal	1	
21	240-2021-3	Seal, Needle	1	
22	240-2044-AC	Seat Housing, Acid Compatible	1	
23	240-2057	Seal, Square Profile	1	
—	SSL-101	Gun Lubricant, DeVilbiss	1	
—	—	Thread Sealant (Loctite 567)		♦

* Items included in fluid needle assembly 240-2013-K ◇ Items included in seal kit 240-2048
○ Items included in seal kit 240-2049
♦ Customer supplied (not included in repair kit).
‡ Optional spanner tool CCV-7 (sold separately) or use 27 mm (SAE 1 1/16”) wrench.
See service manual 77-3120-R3 for complete assembly instructions.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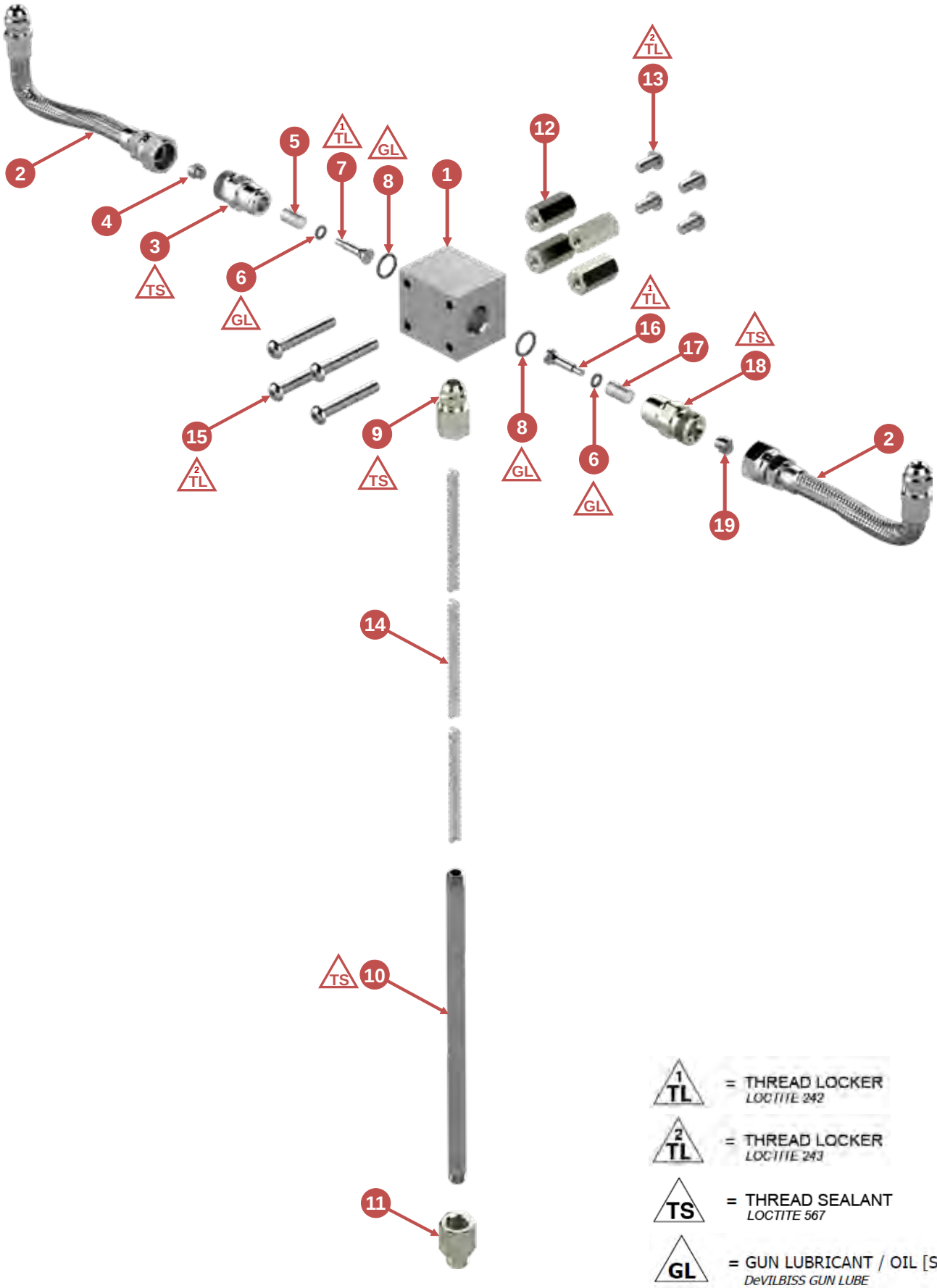
TS = THREAD SEALANT
LOCTITE 567
GL = GUN LUBRICANT / OIL [SSL-10]
DeVILBISS GUN LUBE

MIX MANIFOLD ASSEMBLY, ACID CATALYST — MEDIUM PRESSURE

Item No.	Part No.	Description	Qty.	Notes
1	240-5359	Mix Manifold Housing	1	
2	PDHC-04-KK-012	1/4 NOMID X 12 in OAL W-4SS FNPS	2	
3	22-863-3	Body Check Valve, Medium Pressure, 3/8	1	61-68 N•m (45-50 lb-ft)
4	240-3044	Retainer, Spring	1	
5	240-3045	Spring	1	
6	79001-04	O Ring, 2-008, Perfluoroelastomer	2	
7	240-3136	Valve Stem	1	
8	79001-04	O Ring, 2-013, Perfluoroelastomer	2	
9	240-3234	Adapter, 6JIC (M) x 1/8 NPT (F)	1	
10	240-3232	Static Mixer Tube, SS	1	
11	72-727	Adapter, NPT	1	
12	240-3155	Standoff, Hex, 1/4-20	4	
13	77578-16C	Socket Head Cap Screw, SS, 1/4-20	4	
14	240-3135-01	Element, Disposable Mixer, .248 OD x 3”	3	
15	77578-56C	Button Head Cap Screw, 1/4-20 x 1.75”,SS	4	
16	240-3136-AC	Valve Stem 316L	1	
17	240-3154-1	Spring, .75” Stainless	1	
18	22-863-3-AC	Body Check Valve, 3/8 NPS x 5/8-18, 316L	1	61-68 N•m (45-50 lb-ft)
19	240-3044-AC	Retainer, Spring, 316L	1	
—	SSL-101	Gun Lubricant, DeVilbiss	1	
—	—	Thread Sealant (Loctite 567)	♦	
—	—	Thread Locker (Loctite 242)	♦	
—	—	Thread Locker (Loctite 243)	♦	

♦ Customer supplied (not included with parts kits).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LOCTITE 242
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LOCTITE 243
= THREAD SEALANT
LOCTITE 567
= GUN LUBRICANT / OIL [SSL-10]
DeVILBISS GUN LUBE

ELECTRICAL DIAGRAMS-LOW PRESSURE

FLOW METER	
Drawing #	**Description**
0	General Specifications
1	Schematic Descriptions
2	EMI Filter
3	Power Distribution
4	Power Distribution 24VDC
5-18	Machine Control
19, 20	Communication/Networking

WIRE GAUGE (UNLESS NOTED) USE MIN 75 DEGREE C COPPER WIRE			
American Wire Gauge (AWG)	**Diameter (Inches)**	**Cross Sectional Area (mm^2)**	**Ampacity (75° C Copper)**
3	0.2292	26.65	100
4	0.2043	21.14	85
6	0.162	13.29	65
8	0.1285	8.36	52
10	0.1019	5.26	30
12	0.0808	3.31	20
14	0.0641	2.08	15
16	0.0508	1.31	10
18	0.0403	0.82	7
20	0.0320	0.52	5
22	0.0253	0.33	3

FERRULES TO BE USED ON ALL WIRES (UNLESS NOTED)	
Wire Reference	**Description**
BLACK	UNGROUNDED LINE VOLTAGE
WHITE	UNGROUNDED DC VOLTAGE
WHITE/BLUE	GROUNDED DC COMMON
GREEN/YELLOW	GROUND

WIRE REFERENCE	COLOR
BLK	Black
WHT	White
BLU	Blue
RED	Red
GRN	Green
ORG	Orange
BRN	Brown
YLW	Yellow

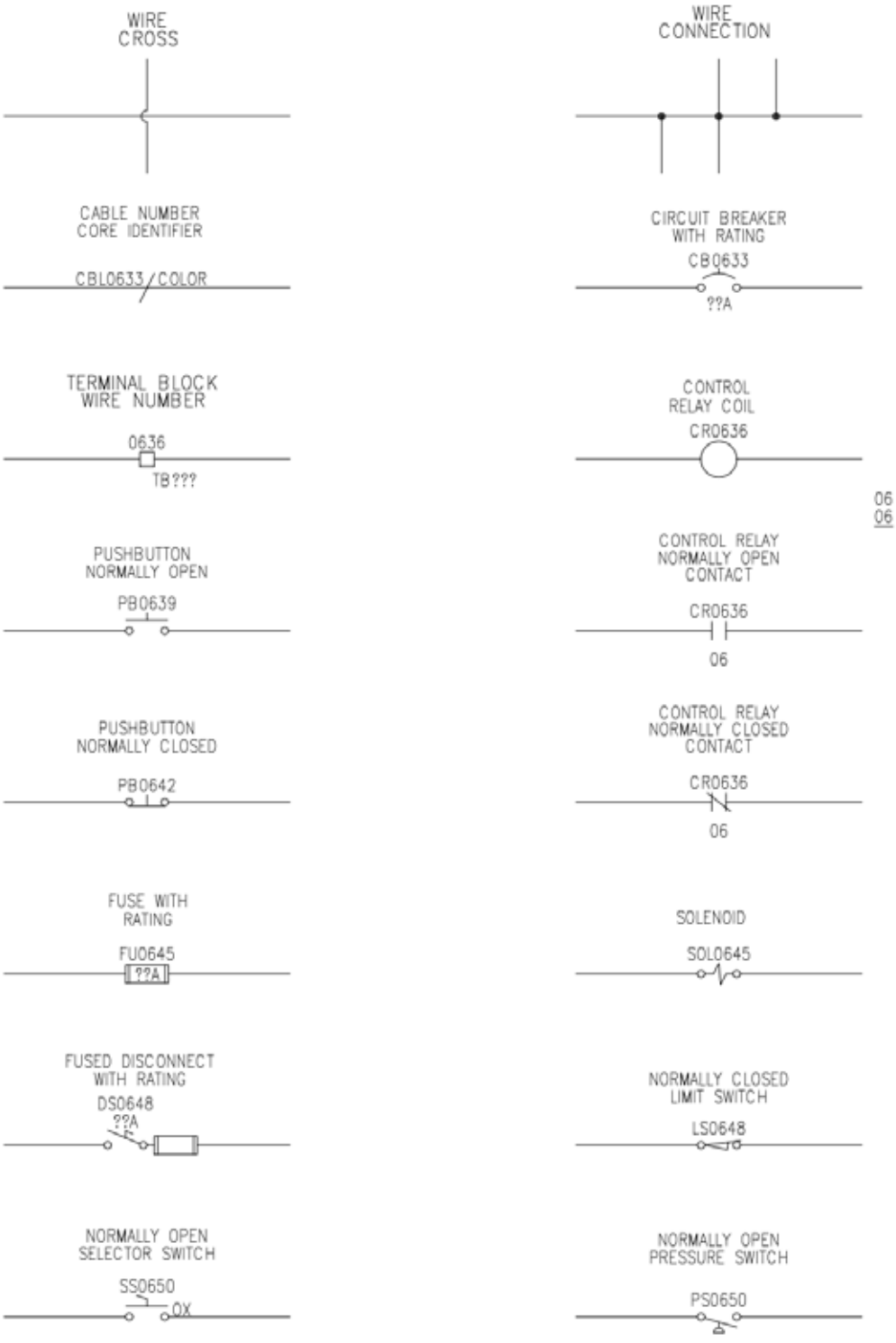
WIRE REFERENCE	COLOR
RED_GRY	RED w/GREY STRIPE
GRY_RED	GREY w/WHITE STRIPE
WHT_BRN	WHITE w/BROWN STRIPE
BRN_WHT	BROWN w/WHITE STRIPE
WHT_GRY	WHITE w/GREY STRIPE
GRY_WHT	GREY w/WHITE STRIPE
RED_BLU	RED w/BLUE STRIPE
BLU/RED	BLUE w/RED STRIPE
RED/ORG	RED w/ORANGE STRIPE
ORG/RED	ORANGE w/RED STRIPE
RED/GRN	RED w/GREEN STRIPE
GRN_RED	GREEN w/RED STRIPE
BRN_RED	BROWN w/RED STRIPE
RED_BRN	RED w/BROWN STRIPE
WHT_GRN	WHITE w/GREEN STRIPE
GRN_WHT	GREEN w/WHITE STRIPE
WHT_BLU	WHITE w/BLUE STRIPE
BLU_WHT	BLUE w/WHITE STRIPE
WHT_ORG	WHITE w/ORANGE STRIPE
ORG_WHT	ORANGE w/WHITE STRIPE

CABLE NUMBER	CABLE TYPE	PART NUMBER
CBL4004	CAT6	
CBL4208	FACTORY CABLE	
CBL4211	FACTORY CABLE	
CBL4214	M12	
CBL4302	FACTORY CABLE	
CBL4408	FACTORY CABLE	240-5222
CBL4420	FACTORY CABLE	
CBL4511	BULK CABLE	
CBL4517	FACTORY CABLE	240-5187
CBL4520	FACTORY CABLE	240-5187
CBL4602	FACTORY CABLE	240-5188
CBL4610	FACTORY CABLE	240-5188
CBL5007	CAT6	
CBL5020	CAT6	
CBL5518	CAT6	

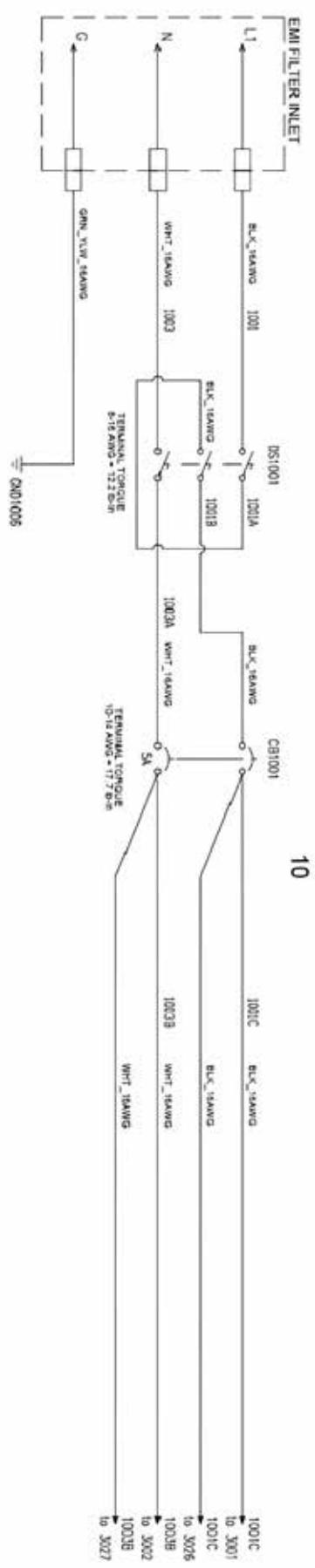
LEGEND DESCRIPTIONS
NUMBERING CODE

CB0633

COMPONENT TYPE
SHEET
COLUMN



DRAWING 2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WHT_16AWG
BLK_16AWG
1003
1001
GND1006
TERMINAL TORQUE
8-16 AWG = 12.2 lb-in
BLK_16AWG
DS1001
1001A
1001B
1003A
WHT_16AWG
BLK_16AWG
CB1001
5A
TERMINAL TORQUE
10-16 AWG = 17.7 lb-in
1001C
BLK_16AWG
1003B
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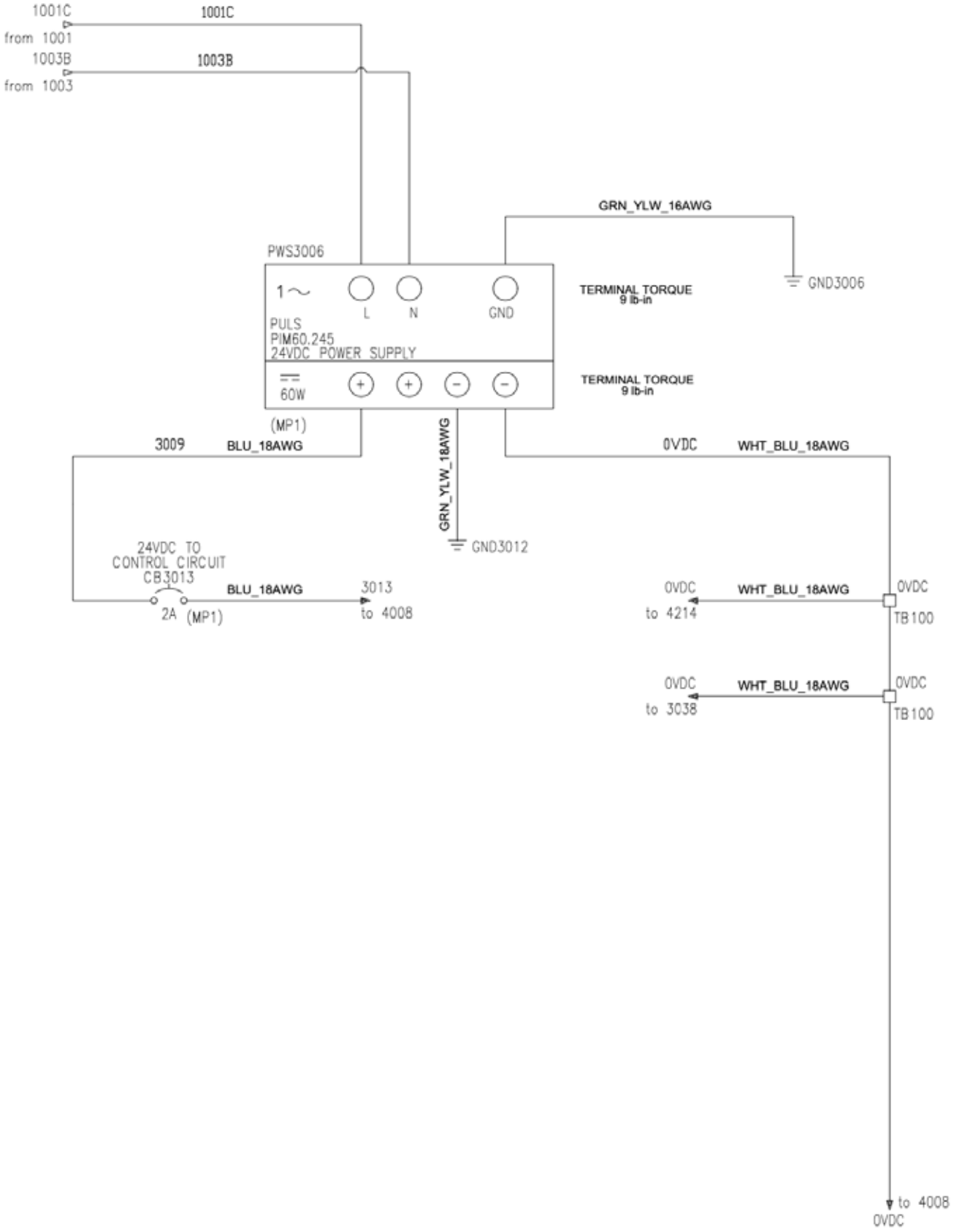
DRAWING 3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from 1003
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GND3006
PWS3006
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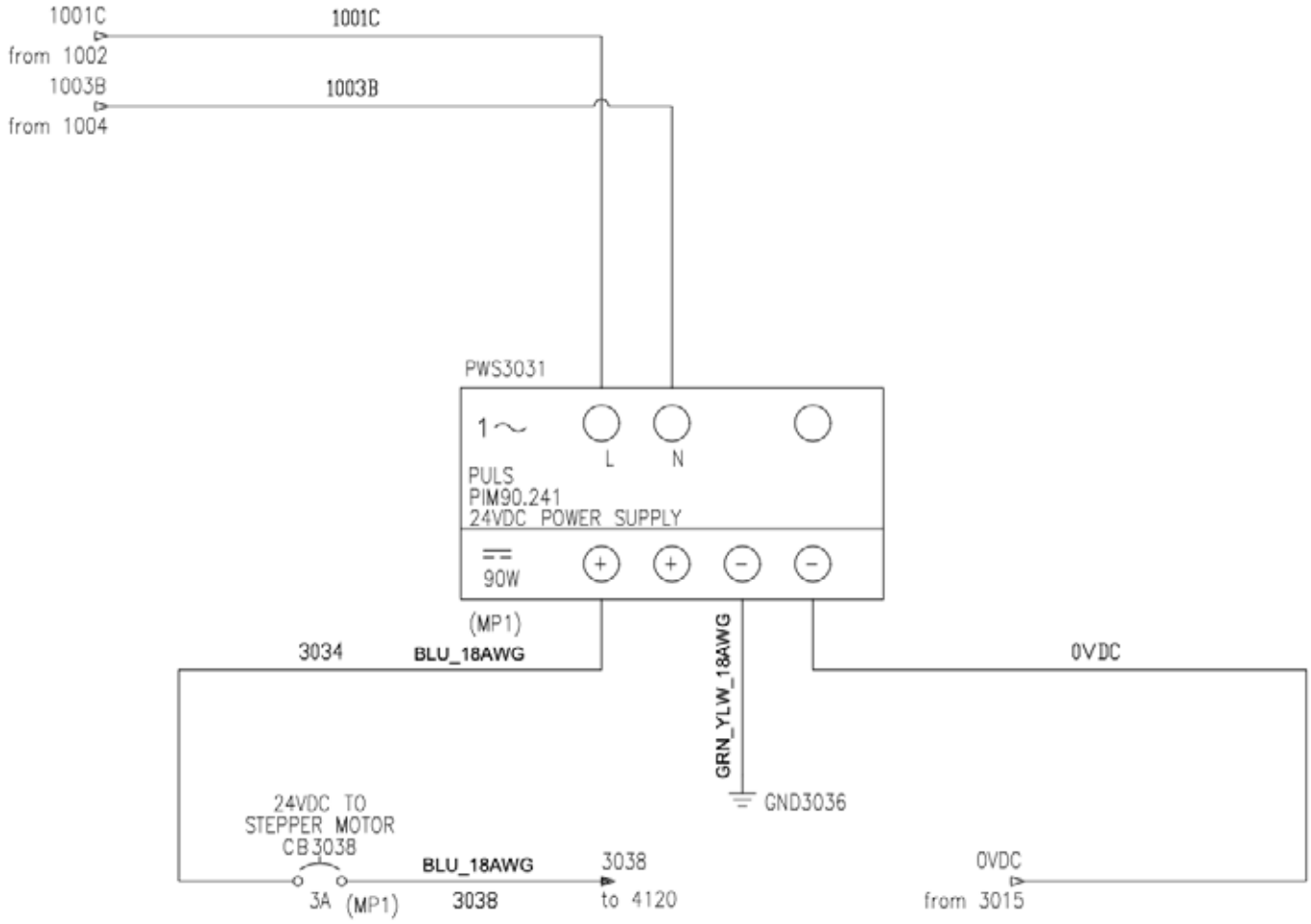
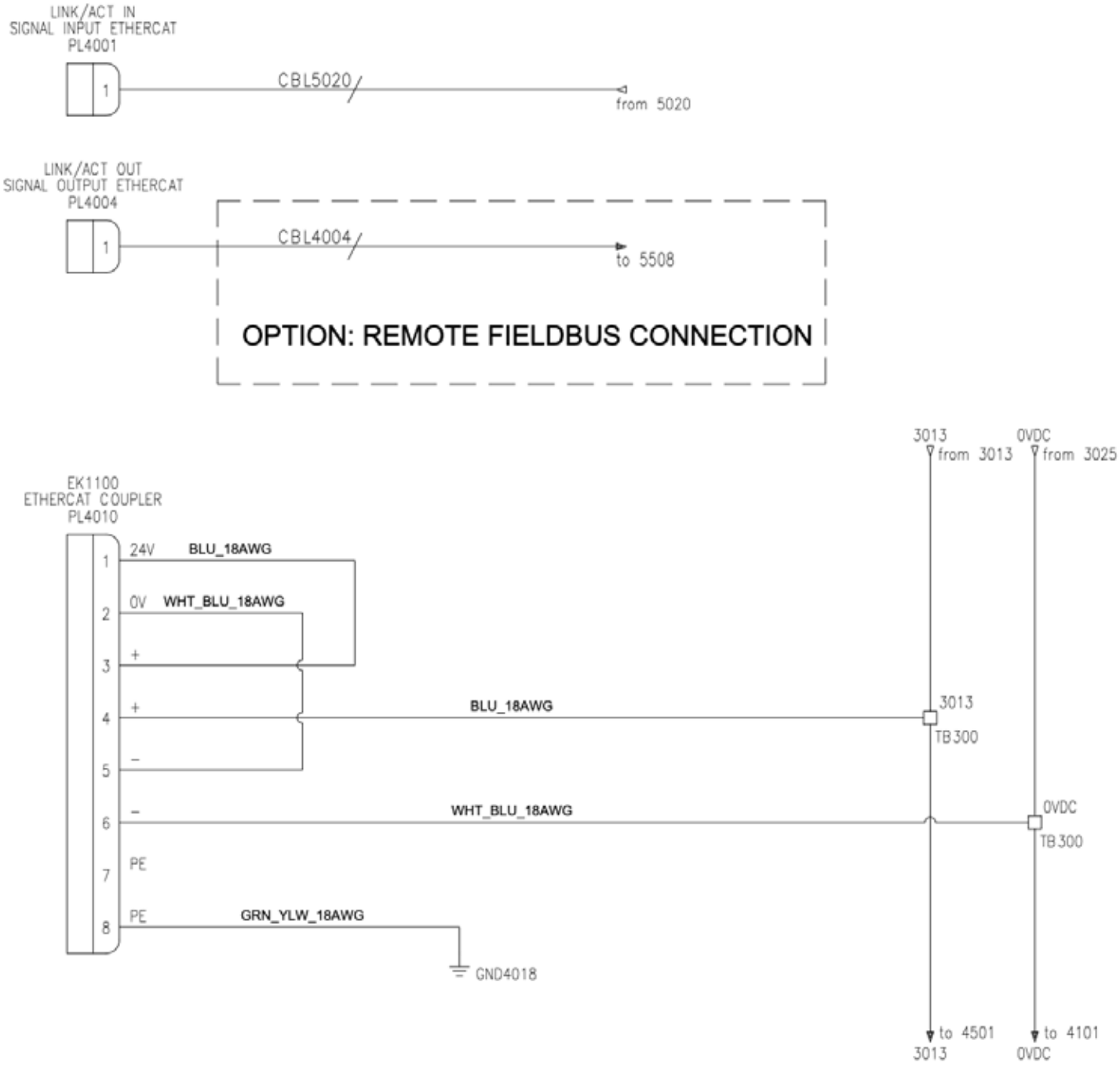
PULS
PIM60.245
24VDC POWER SUPPLY
60W
TERMINAL TORQUE
9 lb-in
TERMINAL TORQUE
9 lb-in
(MP1)
3009
BLU_18AWG
GRN_YLW_18AWG
GND3012
0VDC
WHT_BLU_18AWG
24VDC TO
CONTROL CIRCUIT
CB3013
2A (MP1)
BLU_18AWG
3013
to 4008
0VDC
to 4214
WHT_BLU_18AWG
0VDC
TB100
0VDC
to 3038
WHT_BLU_18AWG
0VDC
TB100
to 4008
0VDC

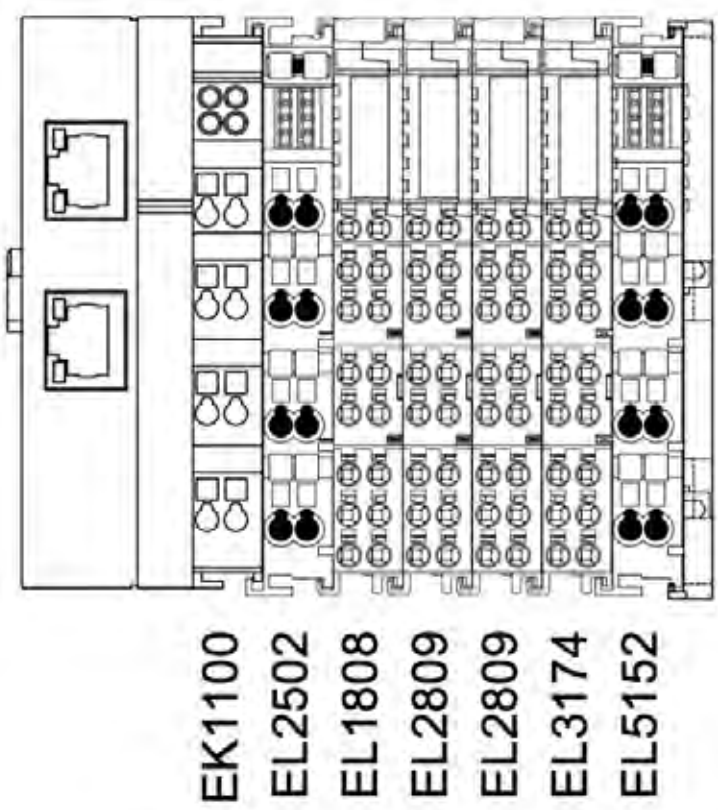
DRAWING 4

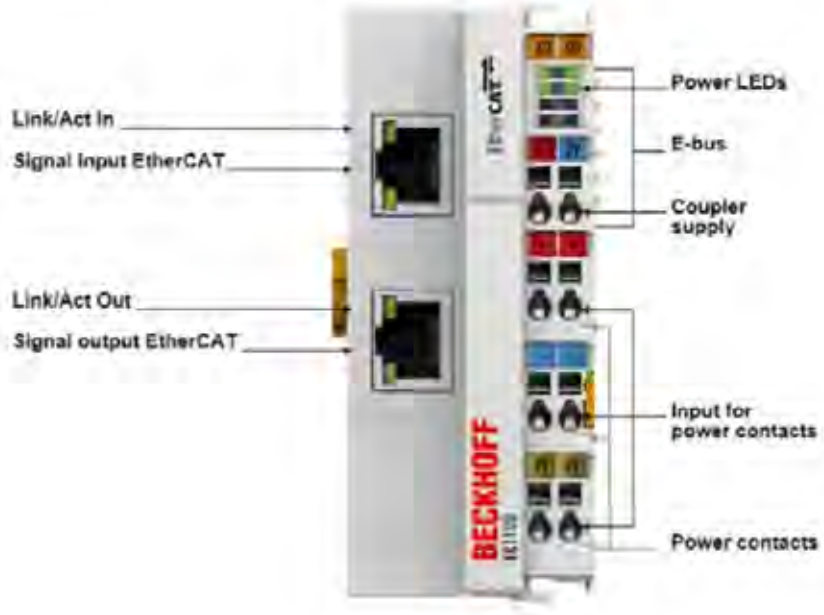

1001C
from 1002
1003B
from 1004
1001C
1003B
PWS3031
1~
L
N
PULS
PIM90.241
24VDC POWER SUPPLY
90W
(MP1)
3034
BLU_18AWG
GRN_YLW_18AWG
GND3036
0VDC
24VDC TO
STEPPER MOTOR
CB3038
3A
(MP1)
BLU_18AWG
3038
3038
to 4120
0VDC
from 3015

DRAWING 5

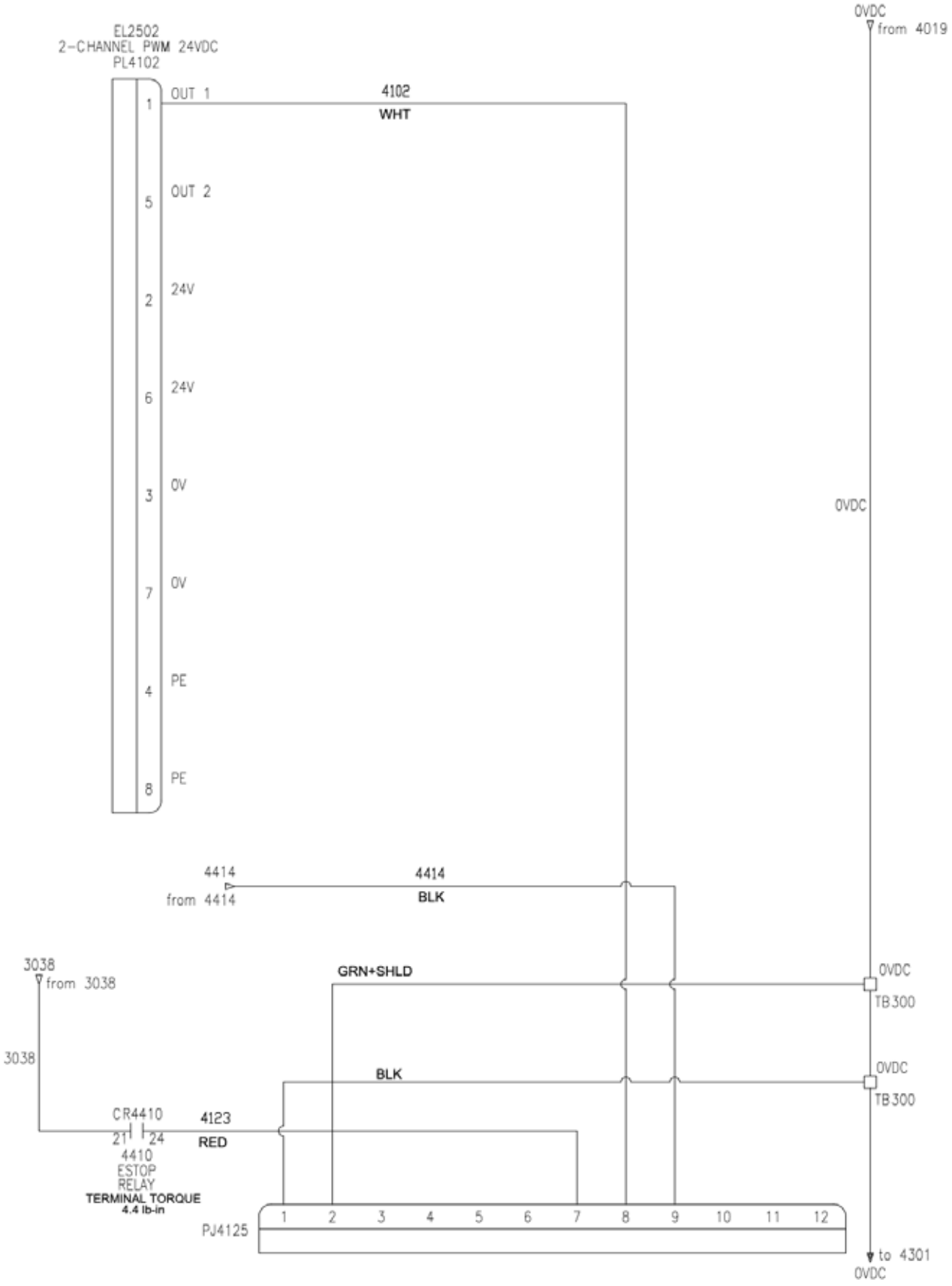

LINK/ACT IN
SIGNAL INPUT ETHERCAT
PL4001
1
CBL5020/
from 5020
LINK/ACT OUT
SIGNAL OUTPUT ETHERCAT
PL4004
1
CBL4004/
to 5508
OPTION: REMOTE FIELDBUS CONNECTION
3013
from 3013
0VDC
from 3025
EK1100
ETHERCAT COUPLER
PL4010
1
24V
BLU_18AWG
2
0V
WHT_BLU_18AWG
3
+
4
+
BLU_18AWG
3013
TB300
5
–
6
–
WHT_BLU_18AWG
0VDC
TB300
7
PE
8
PE
GRN_YLW_18AWG
GND4018
to 4501
3013
to 4101
0VDC

DRAWING 6

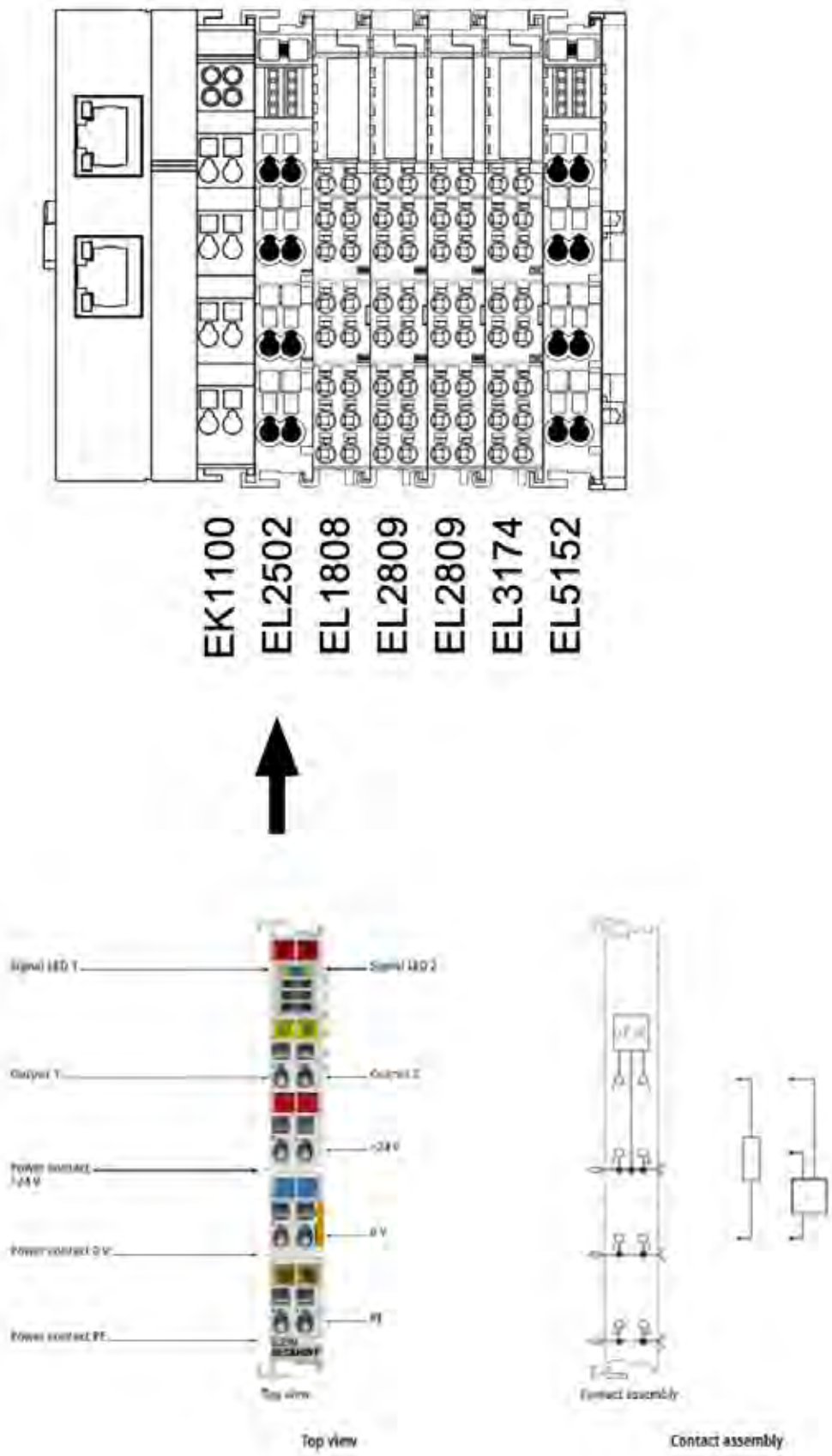

EK1100
EL2502
EL1808
EL2809
EL2809
EL3174
EL5152


Link/Act In
Signal Input EtherCAT
Link/Act Out
Signal output EtherCAT
Power LEDs
E-bus
Coupler supply
Input for power contacts
Power contacts
BECKHOFF

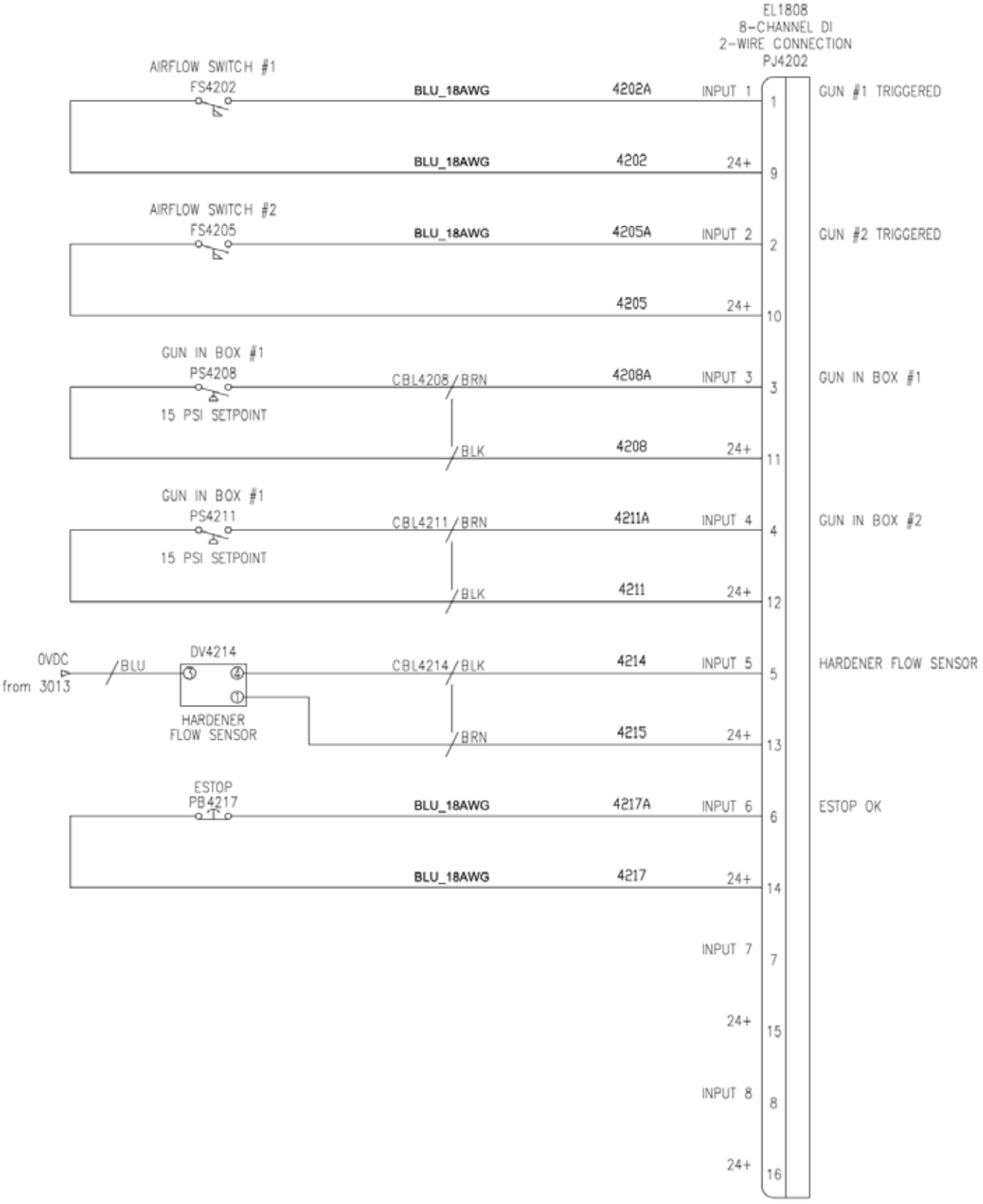
DRAWING 7


EL2502
2-CHANNEL PWM 24VDC
PL4102
OUT 1
OUT 2
24V
24V
0V
0V
PE
PE
4102
WHT
0VDC
from 4019
0VDC
4414
from 4414
4414
BLK
3038
from 3038
3038
GRN+SHLD
0VDC
TB300
BLK
0VDC
TB300
CR4410
21
24
4123
RED
4410
ESTOP
RELAY
TERMINAL TORQUE
4.4 lb-in
PJ4125
1 2 3 4 5 6 7 8 9 10 11 12
to 4301
0VDC

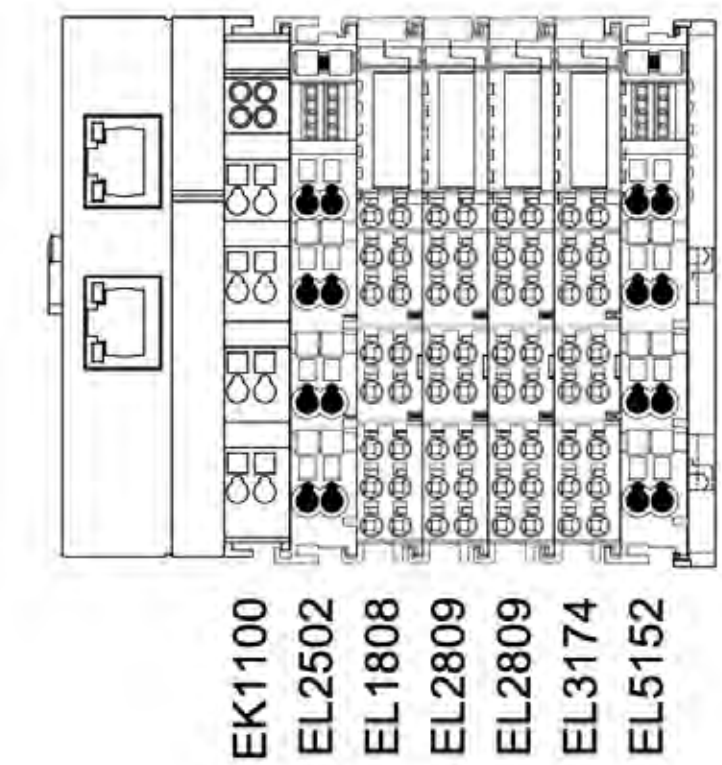
DRAWING 8

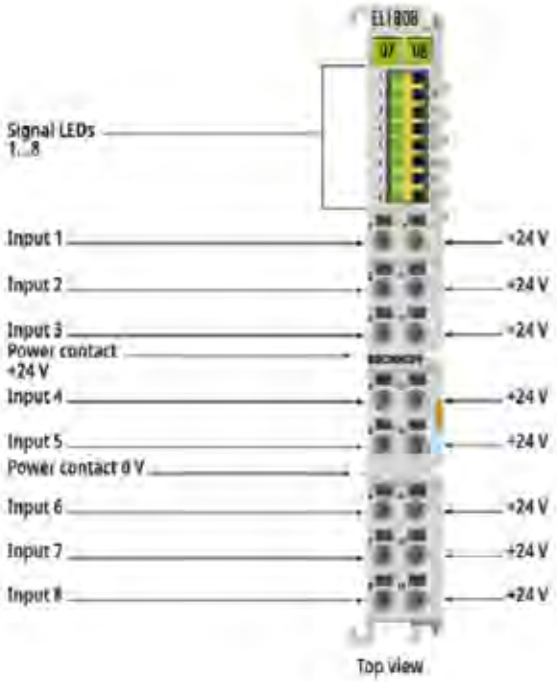

EK1100
EL2502
EL1808
EL2809
EL2809
EL3174
EL5152
Top view
Contact assembly

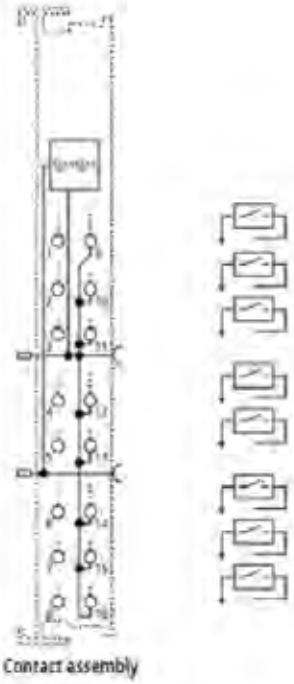
DRAWING 9


EL1808
8–CHANNEL DI
2–WIRE CONNECTION
PJ4202
AIRFLOW SWITCH #1
FS4202
BLU_18AWG
4202A
INPUT 1
1
GUN #1 TRIGGERED
BLU_18AWG
4202
24+
9
AIRFLOW SWITCH #2
FS4205
BLU_18AWG
4205A
INPUT 2
2
GUN #2 TRIGGERED
4205
24+
10
GUN IN BOX #1
PS4208
CBL4208 / BRN
4208A
INPUT 3
3
GUN IN BOX #1
15 PSI SETPOINT
/ BLK
4208
24+
11
GUN IN BOX #1
PS4211
CBL4211 / BRN
4211A
INPUT 4
4
GUN IN BOX #2
15 PSI SETPOINT
/ BLK
4211
24+
12
0VDC
from 3013
/ BLU
DV4214
HARDENER
FLOW SENSOR
CBL4214 / BLK
4214
INPUT 5
5
HARDENER FLOW SENSOR
/ BRN
4215
24+
13
ESTOP
PB4217
BLU_18AWG
4217A
INPUT 6
6
ESTOP OK
BLU_18AWG
4217
24+
14
INPUT 7
7
24+
15
INPUT 8
8
24+
16

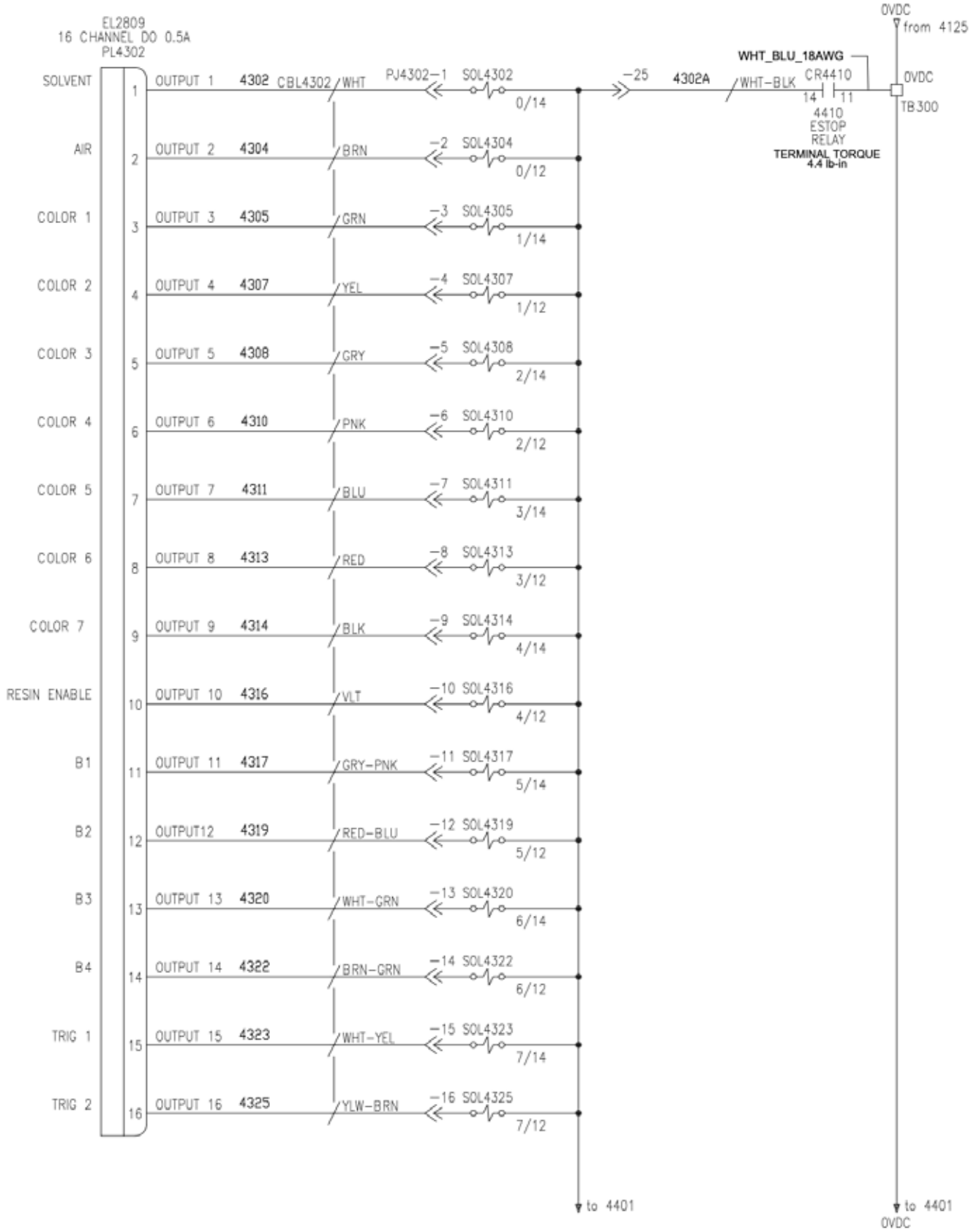
DRAWING 10


EK1100
EL2502
EL1808
EL2809
EL2809
EL3174
EL5152

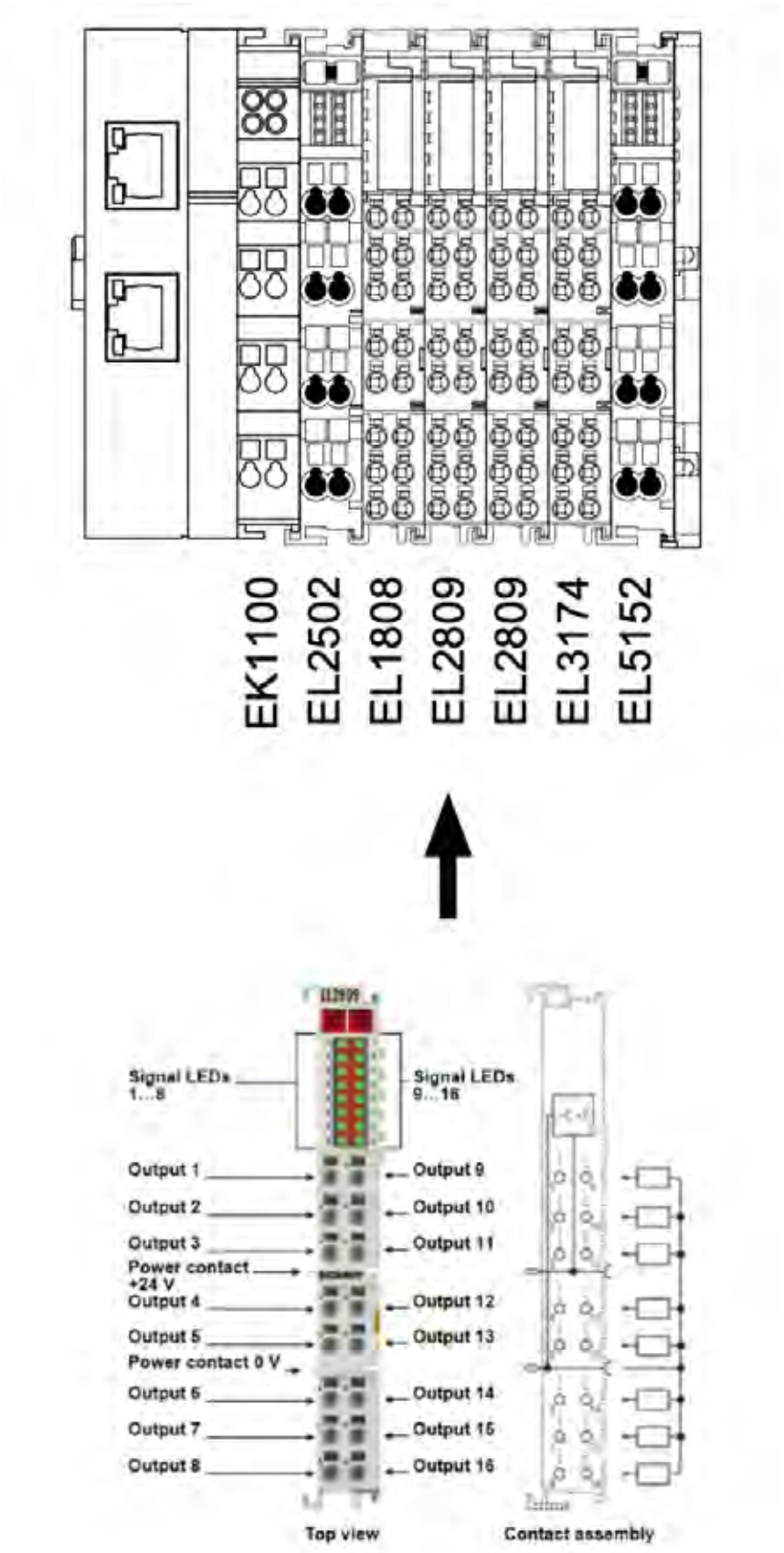

EL1808
Signal LEDs 1...8
Input 1
Input 2
Input 3
Power contact +24 V
Input 4
Input 5
Power contact 0 V
Input 6
Input 7
Input 8
+24 V
Top view


Contact assembly

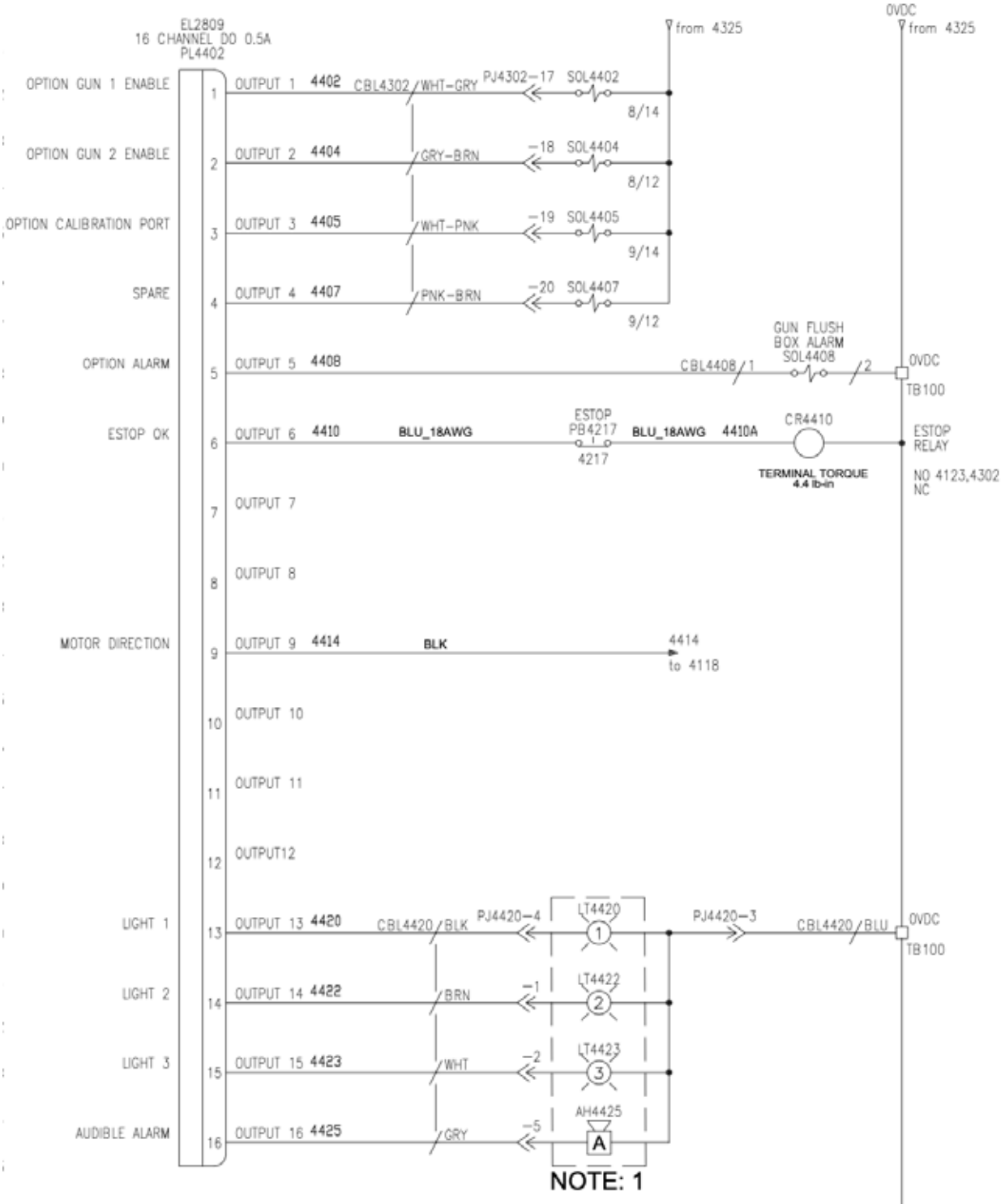
DRAWING 11


EL2809
16 CHANNEL DO 0.5A
PL4302
SOLVENT
AIR
COLOR 1
COLOR 2
COLOR 3
COLOR 4
COLOR 5
COLOR 6
COLOR 7
RESIN ENABLE
B1
B2
B3
B4
TRIG 1
TRIG 2
OUTPUT 1 4302 CBL4302 WHT PJ4302–1 SOL4302 0/14
OUTPUT 2 4304 BRN –2 SOL4304 0/12
OUTPUT 3 4305 GRN –3 SOL4305 1/14
OUTPUT 4 4307 YEL –4 SOL4307 1/12
OUTPUT 5 4308 GRY –5 SOL4308 2/14
OUTPUT 6 4310 PNK –6 SOL4310 2/12
OUTPUT 7 4311 BLU –7 SOL4311 3/14
OUTPUT 8 4313 RED –8 SOL4313 3/12
OUTPUT 9 4314 BLK –9 SOL4314 4/14
OUTPUT 10 4316 VLT –10 SOL4316 4/12
OUTPUT 11 4317 GRY–PNK –11 SOL4317 5/14
OUTPUT12 4319 RED–BLU –12 SOL4319 5/12
OUTPUT 13 4320 WHT–GRN –13 SOL4320 6/14
OUTPUT 14 4322 BRN–GRN –14 SOL4322 6/12
OUTPUT 15 4323 WHT–YEL –15 SOL4323 7/14
OUTPUT 16 4325 YLW–BRN –16 SOL4325 7/12
to 4401
–25 4302A WHT–BLK
WHT_BLU_18AWG
CR4410
14 11
4410
ESTOP
RELAY
TERMINAL TORQUE
4.4 lb-in
0VDC
from 4125
0VDC
TB300
to 4401
0VDC

DRAWING 12


EK1100
EL2502
EL1808
EL2809
EL2809
EL3174
EL5152
Signal LEDs 1...8
Signal LEDs 9...16
Output 1
Output 2
Output 3
Power contact +24 V
Output 4
Output 5
Power contact 0 V
Output 6
Output 7
Output 8
Output 9
Output 10
Output 11
Output 12
Output 13
Output 14
Output 15
Output 16
Top view
Contact assembly

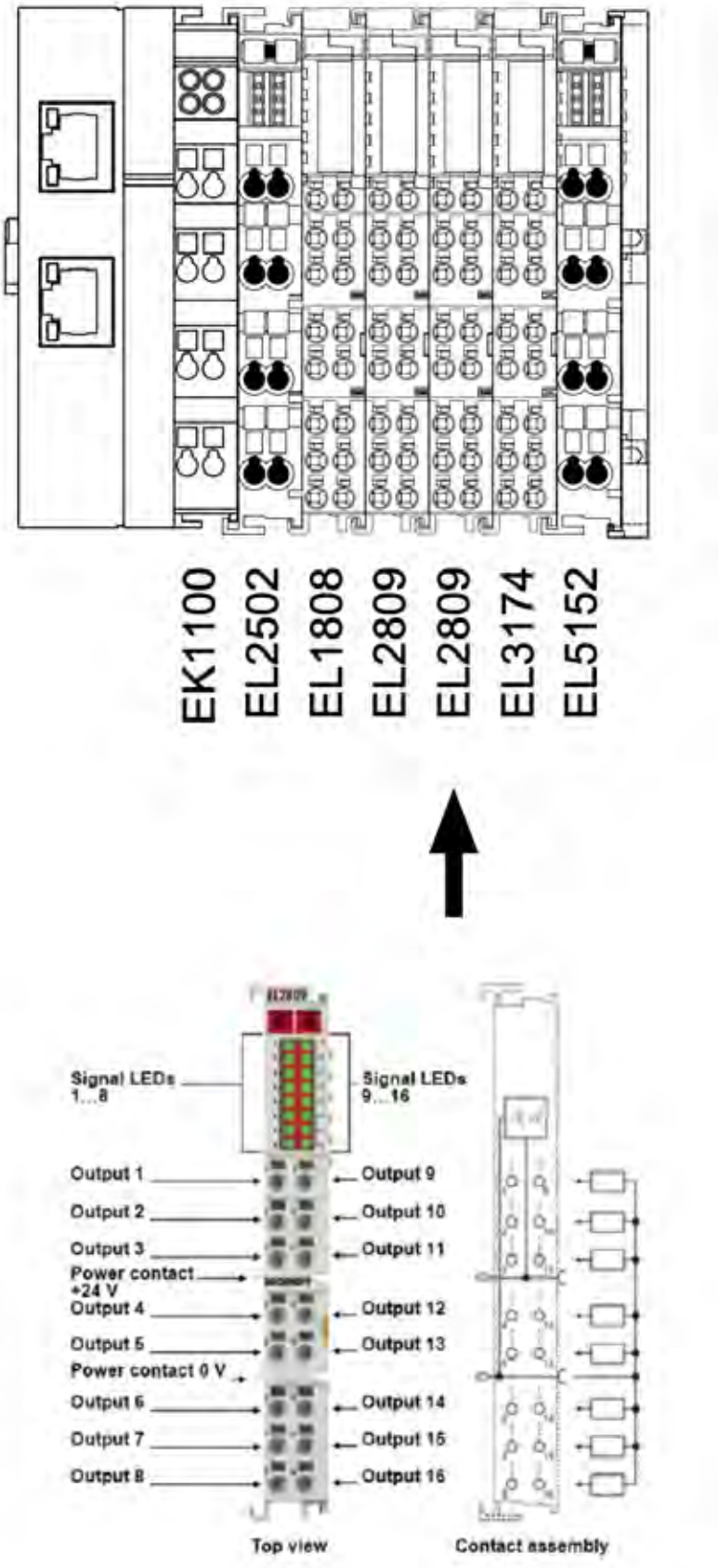
DRAWING 13



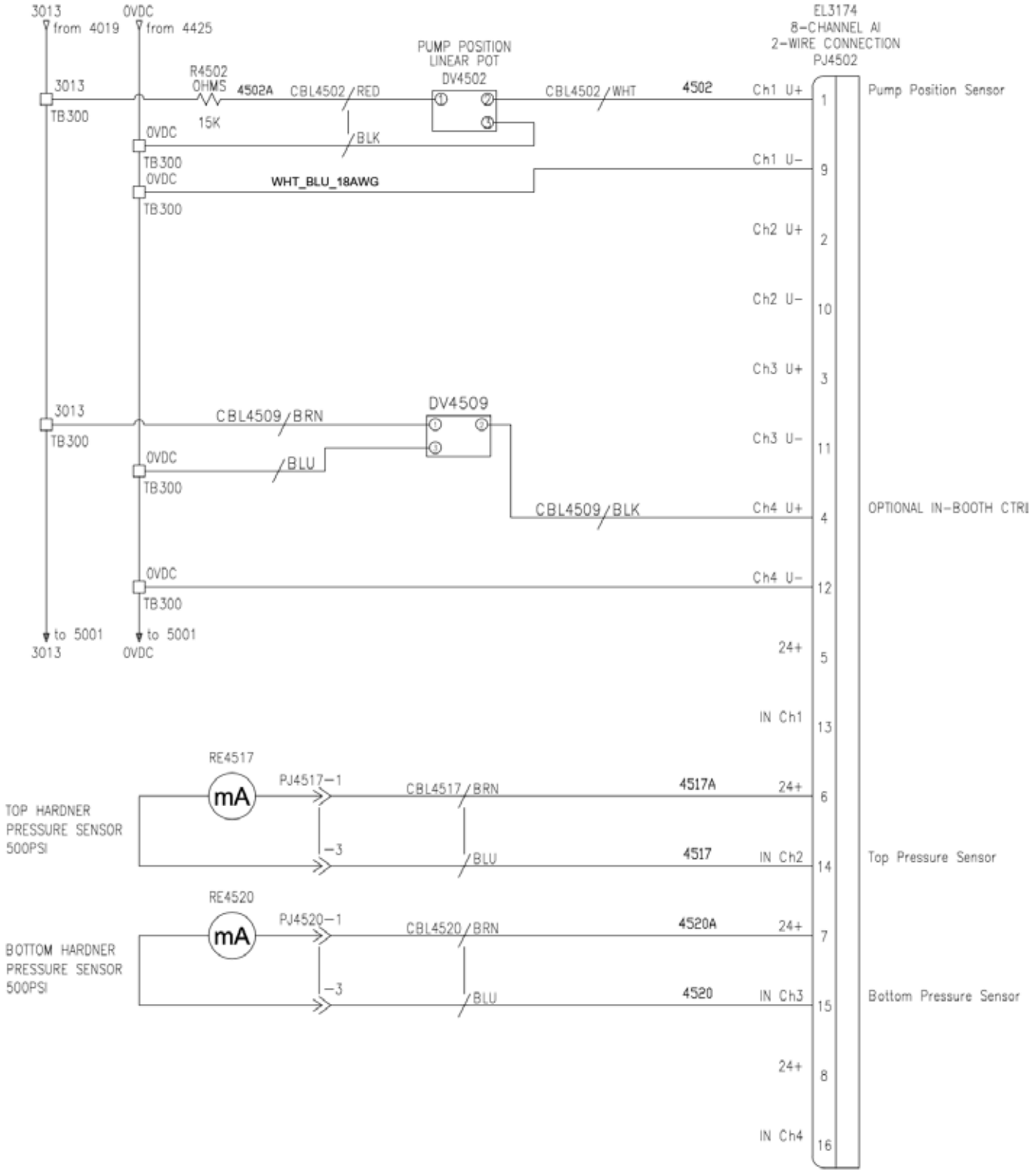
NOTE: 1 Color Chart

	Red	Yellow	Green	Cyan	Blue	Magenta	White
Input 1	X	X				X	X
Input 2		X	X	X			X
Input 3				X	X	X	X

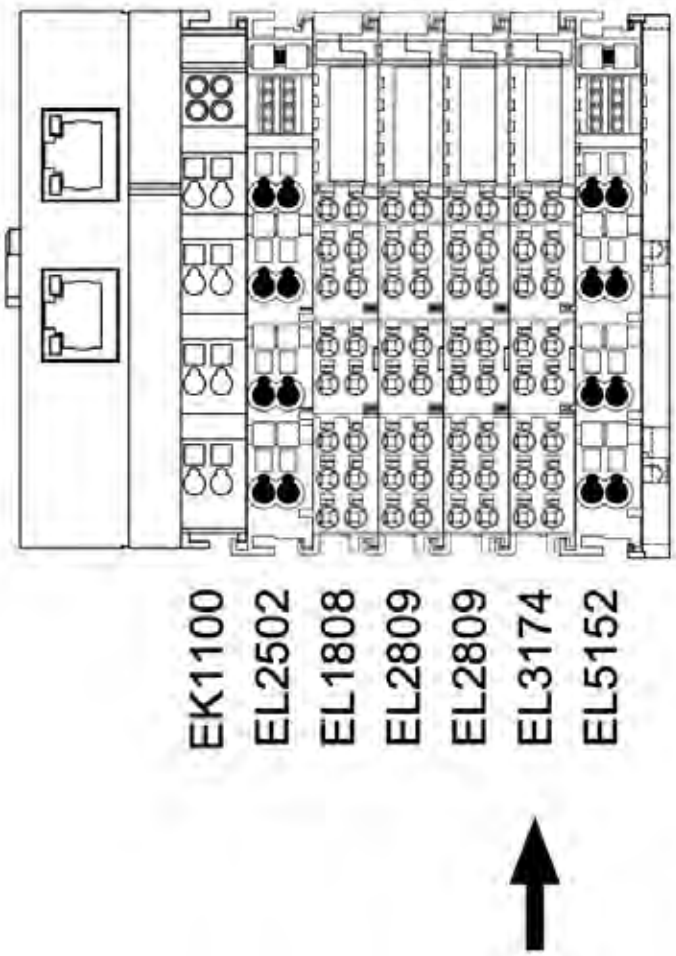
DRAWING 14

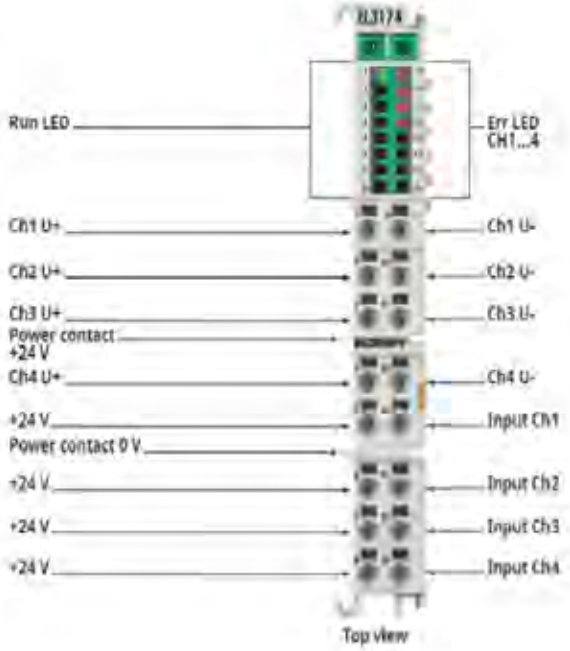

EK1100
EL2502
EL1808
EL2809
EL2809
EL3174
EL5152
Signal LEDs 1...8
Signal LEDs 9...16
Output 1
Output 2
Output 3
Power contact +24 V
Output 4
Output 5
Power contact 0 V
Output 6
Output 7
Output 8
Output 9
Output 10
Output 11
Output 12
Output 13
Output 14
Output 15
Output 16
Top view
Contact assembly

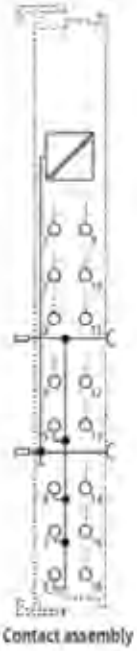
DRAWING 15

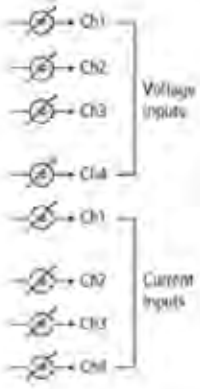

3013
from 4019
0VDC
from 4425
EL3174
8-CHANNEL AI
2-WIRE CONNECTION
PJ4502
PUMP POSITION
LINEAR POT
DV4502
R4502
OHMS
15K
4502A
CBL4502/RED
CBL4502/WHT
4502
Ch1 U+
Pump Position Sensor
TB300
BLK
Ch1 U-
WHT_BLU_18AWG
Ch2 U+
Ch2 U-
Ch3 U+
DV4509
CBL4509/BRN
Ch3 U-
BLU
CBL4509/BLK
Ch4 U+
OPTIONAL IN-BOOTH CTRL
Ch4 U-
to 5001
24+
IN Ch1
RE4517
mA
PJ4517-1
CBL4517/BRN
4517A
TOP HARDNER
PRESSURE SENSOR
500PSI
-3
4517
IN Ch2
Top Pressure Sensor
RE4520
PJ4520-1
CBL4520/BRN
4520A
BOTTOM HARDNER
PRESSURE SENSOR
500PSI
4520
IN Ch3
Bottom Pressure Sensor
IN Ch4

DRAWING 16

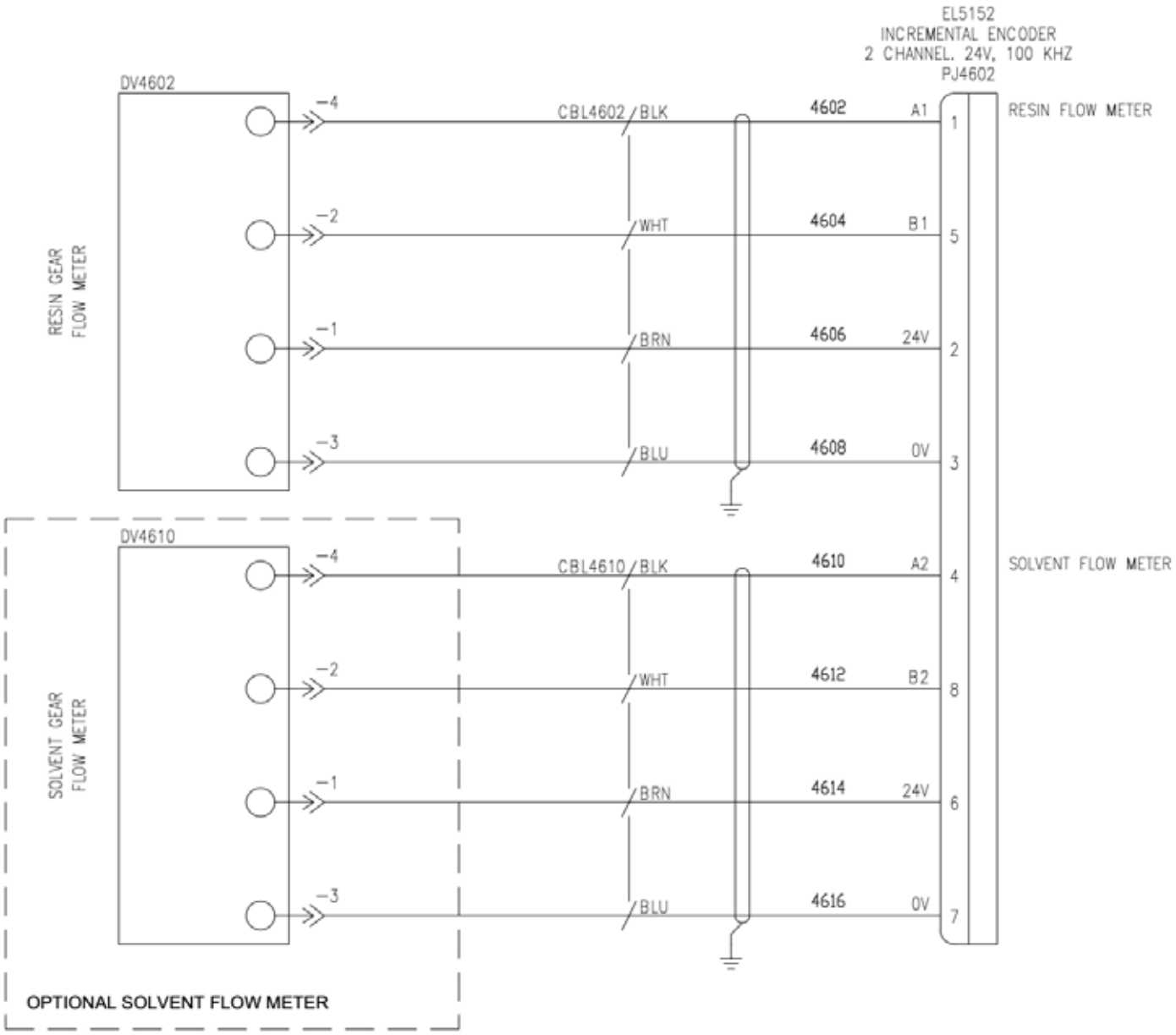

EK1100
EL2502
EL1808
EL2809
EL2809
EL3174
EL5152


EL3174
Run LED
Err LED CH1...4
Ch1 U+
Ch1 U-
Ch2 U+
Ch2 U-
Ch3 U+
Ch3 U-
Power contact +24 V
Ch4 U+
Ch4 U-
+24 V
Input Ch1
Power contact 0 V
+24 V
Input Ch2
+24 V
Input Ch3
+24 V
Input Ch4
Top view


Contact assembly

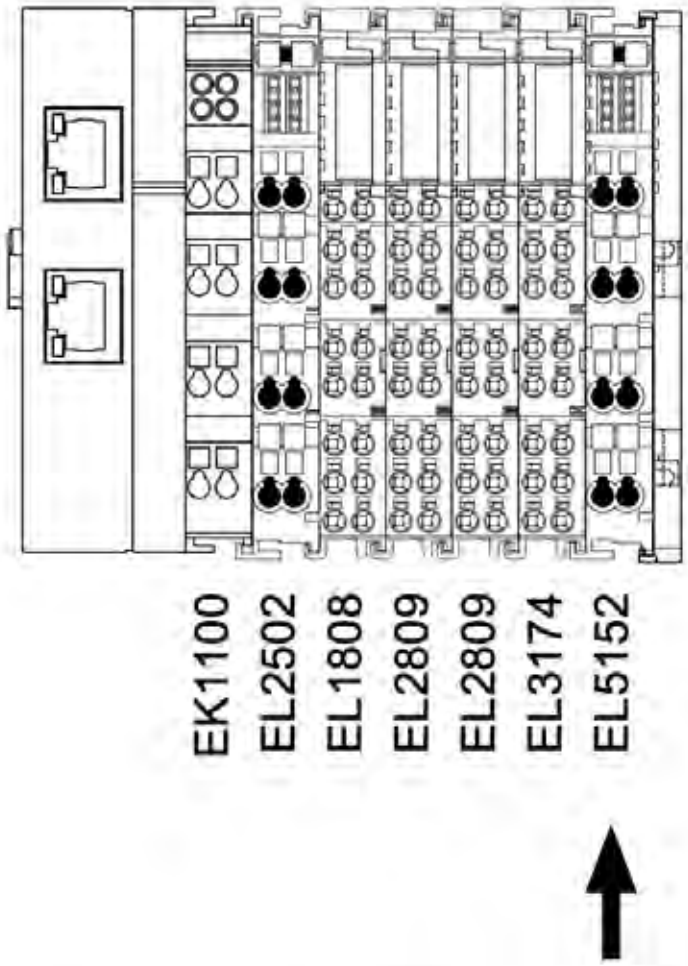

Ch1
Ch2
Ch3
Voltage inputs
Ch4
Ch1
Ch2
Ch3
Ch4
Current inputs

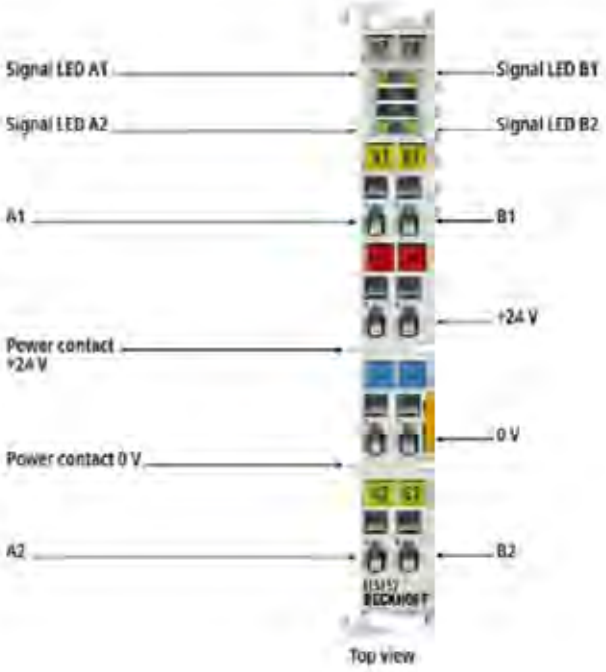
DRAWING 17



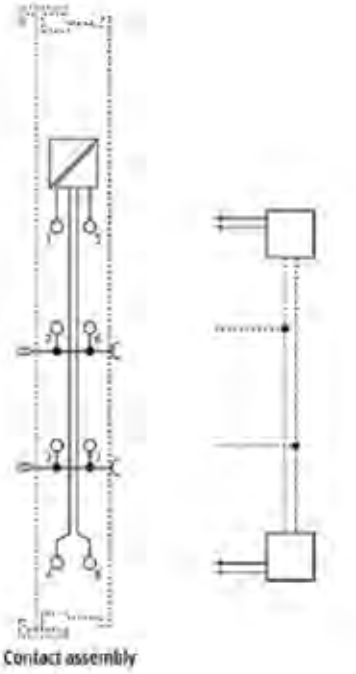
NOTE: OPTIONAL FLOW METER OPTIONS
SCM101 - GEAR METER WITH INTRINSICALLY SAFE BARRIER
SCM102 - GEAR METER WITH FIBER OPTIC
SCM103 - CORIOLIS FLOW METER
SCM104 - CORIOLIS FLOW METER WITH INTRINSICALLY SAFE BARRIER
SCM105 - CORIOLIS FLOW METER WITH FIBER OPTIC
SCM106 - PISTON METER
SCM107 - PISTON METER WITH INTRINSICALLY SAFE BARRIER

DRAWING 18



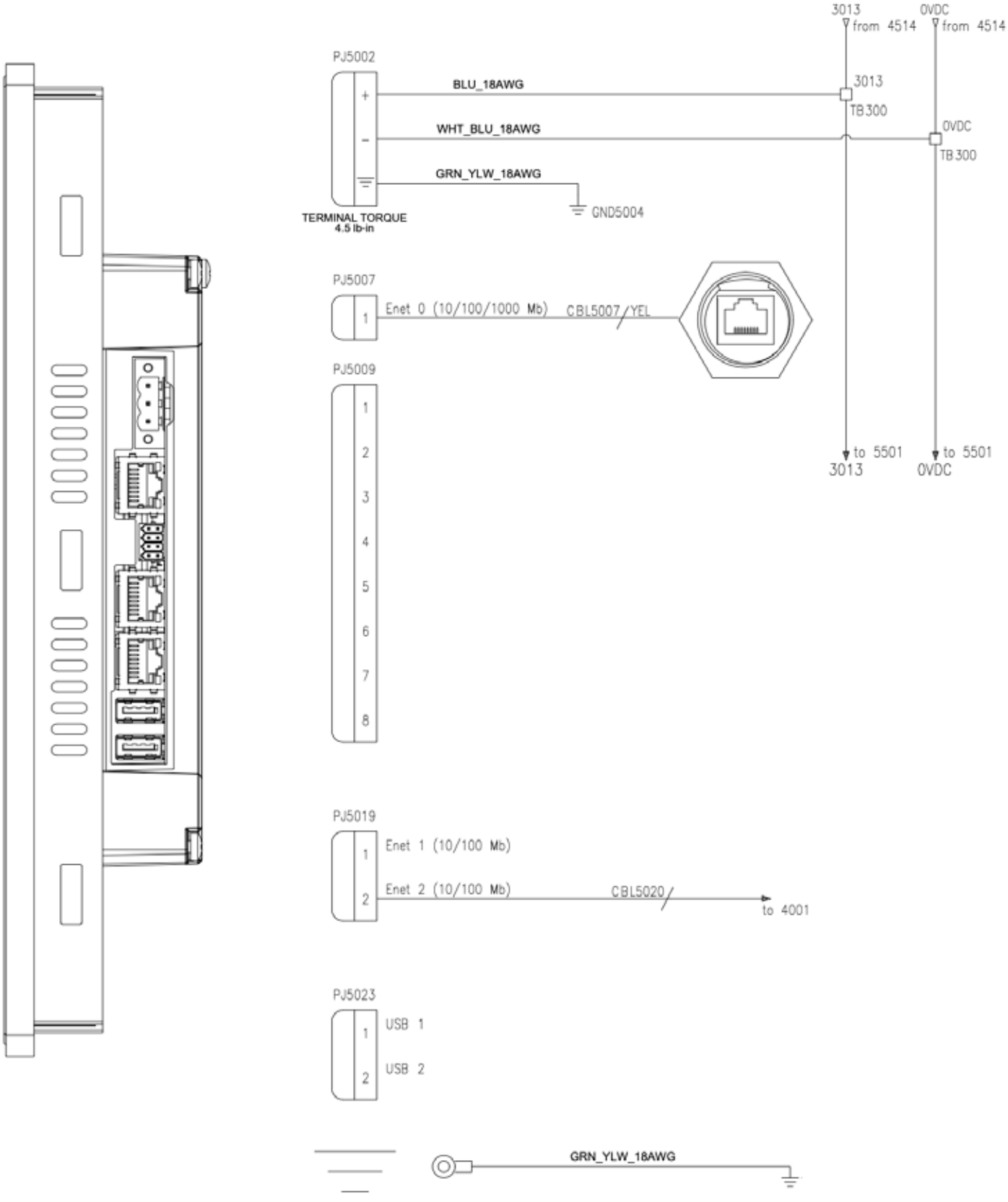


Top view

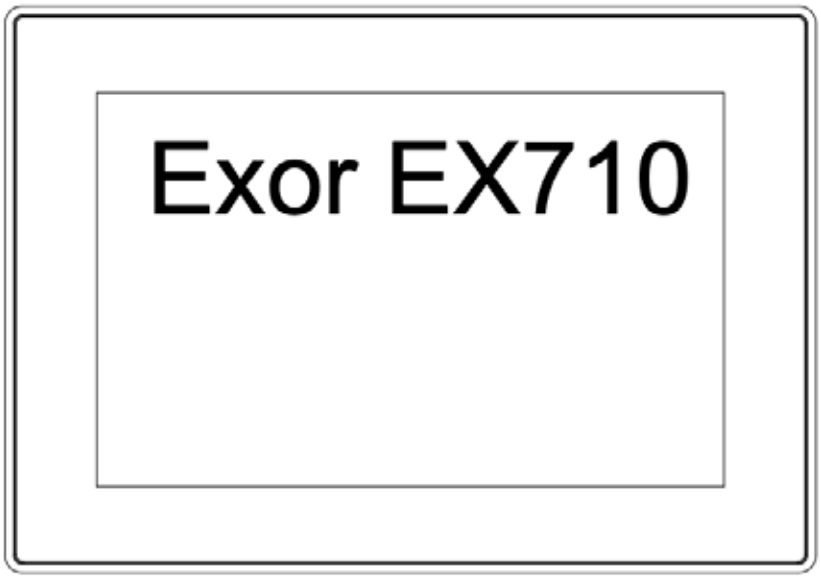


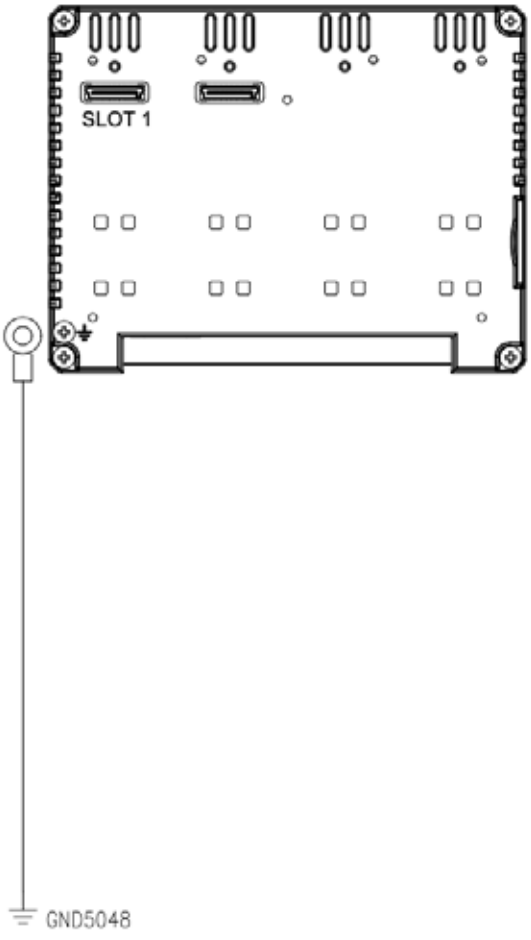
Contact assembly

DRAWING 19


3013
from 4514
0VDC
from 4514
PJ5002
+
–
BLU_18AWG
WHT_BLU_18AWG
GRN_YLW_18AWG
3013
TB300
0VDC
TB300
GND5004
TERMINAL TORQUE
4.5 lb-in
PJ5007
1
Enet 0 (10/100/1000 Mb)
CBL5007/YEL
PJ5009
1
2
3
4
5
6
7
8
to 5501
3013
to 5501
0VDC
PJ5019
1
Enet 1 (10/100 Mb)
2
Enet 2 (10/100 Mb)
CBL5020/
to 4001
PJ5023
1
USB 1
2
USB 2
GRN_YLW_18AWG

DRAWING 20





ELECTRICAL DIAGRAMS-MEDIUM PRESSURE

FLOW METER	
Drawing #	**Description**
0	General Specifications
1	Schematic Descriptions
2	EMI Filter
3	Power Distribution
4-17	Machine Control
18, 19	Communication/Networking

WIRE GAUGE (UNLESS NOTED) USE MIN 75 DEGREE C COPPER WIRE			
American Wire Gauge (AWG)	**Diameter (Inches)**	**Cross Sectional Area (mm^2)**	**Ampacity (75° C Copper)**
3	0.2292	26.65	100
4	0.2043	21.14	85
6	0.162	13.29	65
8	0.1285	8.36	52
10	0.1019	5.26	30
12	0.0808	3.31	20
14	0.0641	2.08	15
16	0.0508	1.31	10
18	0.0403	0.82	7
20	0.0320	0.52	5
22	0.0253	0.33	3

FERRULES TO BE USED ON ALL WIRES (UNLESS NOTED)	
Wire Reference	**Description**
BLACK	UNGROUNDED LINE VOLTAGE
WHITE	UNGROUNDED DC VOLTAGE
WHITE/BLUE	GROUNDED DC COMMON
GREEN/YELLOW	GROUND

WIRE REFERENCE	COLOR
BLK	Black
WHT	White
BLU	Blue
RED	Red
GRN	Green
ORG	Orange
BRN	Brown
YLW	Yellow

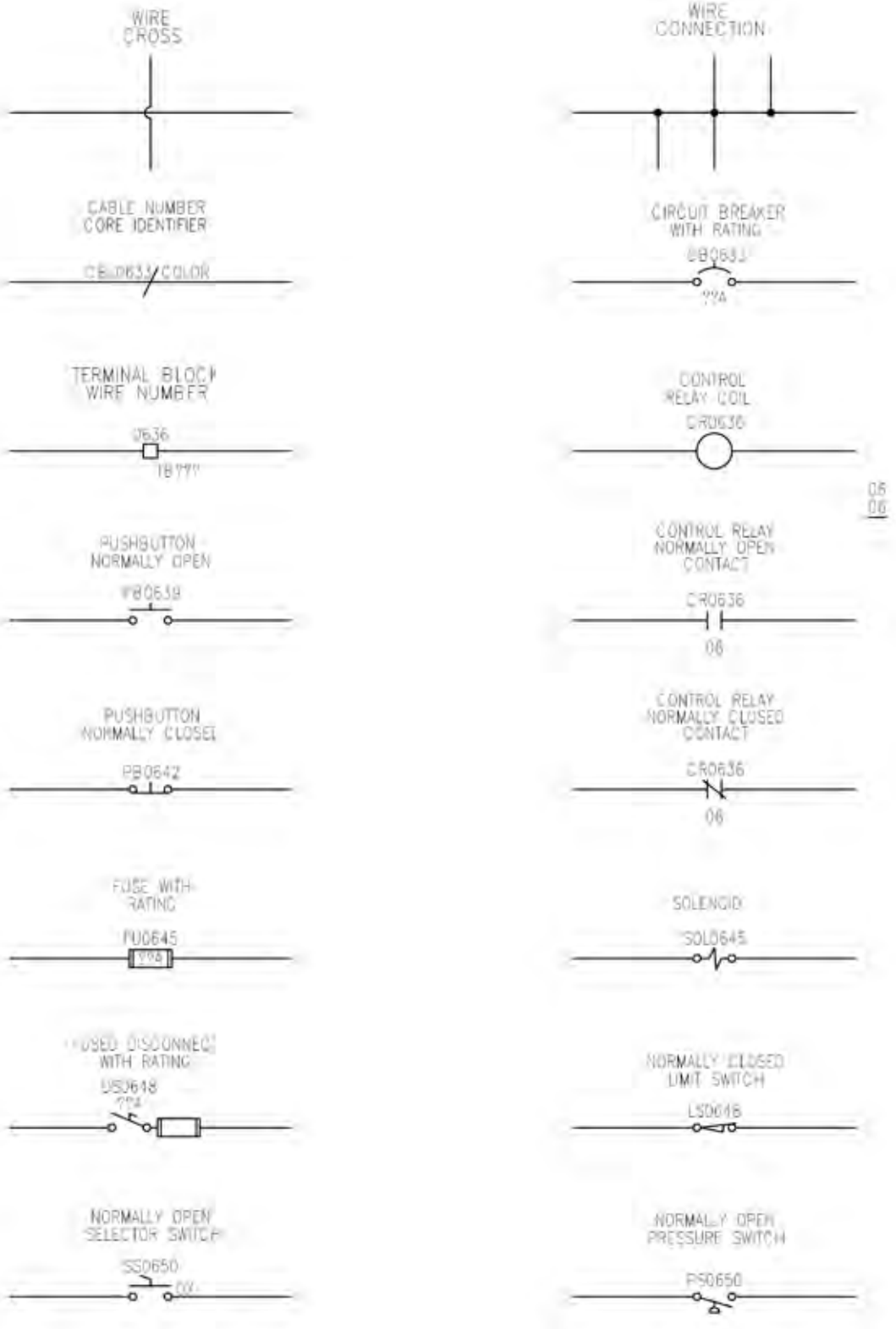
WIRE REFERENCE	COLOR
RED_GRY	RED w/GREY STRIPE
GRY_RED	GREY w/WHITE STRIPE
WHT_BRN	WHITE w/BROWN STRIPE
BRN_WHT	BROWN w/WHITE STRIPE
WHT_GRY	WHITE w/GREY STRIPE
GRY_WHT	GREY w/WHITE STRIPE
RED_BLU	RED w/BLUE STRIPE
BLU/RED	BLUE w/RED STRIPE
RED/ORG	RED w/ORANGE STRIPE
ORG/RED	ORANGE w/RED STRIPE
RED/GRN	RED w/GREEN STRIPE
GRN_RED	GREEN w/RED STRIPE
BRN_RED	BROWN w/RED STRIPE
RED_BRN	RED w/BROWN STRIPE
WHT_GRN	WHITE w/GREEN STRIPE
GRN_WHT	GREEN w/WHITE STRIPE
WHT_BLU	WHITE w/BLUE STRIPE
BLU_WHT	BLUE w/WHITE STRIPE
WHT_ORG	WHITE w/ORANGE STRIPE
ORG_WHT	ORANGE w/WHITE STRIPE

CABLE NUMBER	CABLE TYPE	PART NUMBER
CBL4004	CAT6	
CBL4208	FACTORY CABLE	
CBL4211	FACTORY CABLE	
CBL4302	FACTORY CABLE	
CBL4408	FACTORY CABLE	240-5222
CBL4420	FACTORY CABLE	
CBL4511	BULK CABLE	
CBL4602	FACTORY CABLE	240-5188
CBL4702	FACTORY CABLE	240-5188
CBL5007	CAT6	
CBL5020	CAT6	
CBL5518	CAT6	

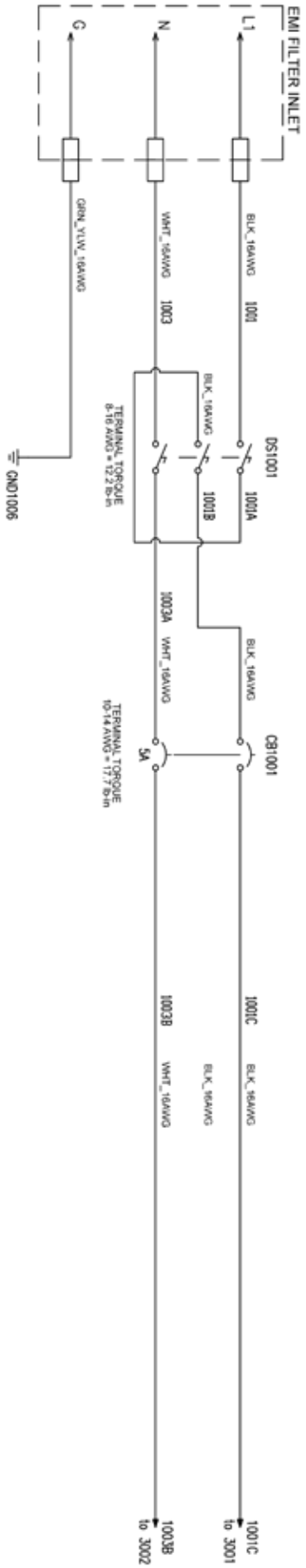
LEGEND DESCRIPTIONS
NUMBERING CODE

CB0633

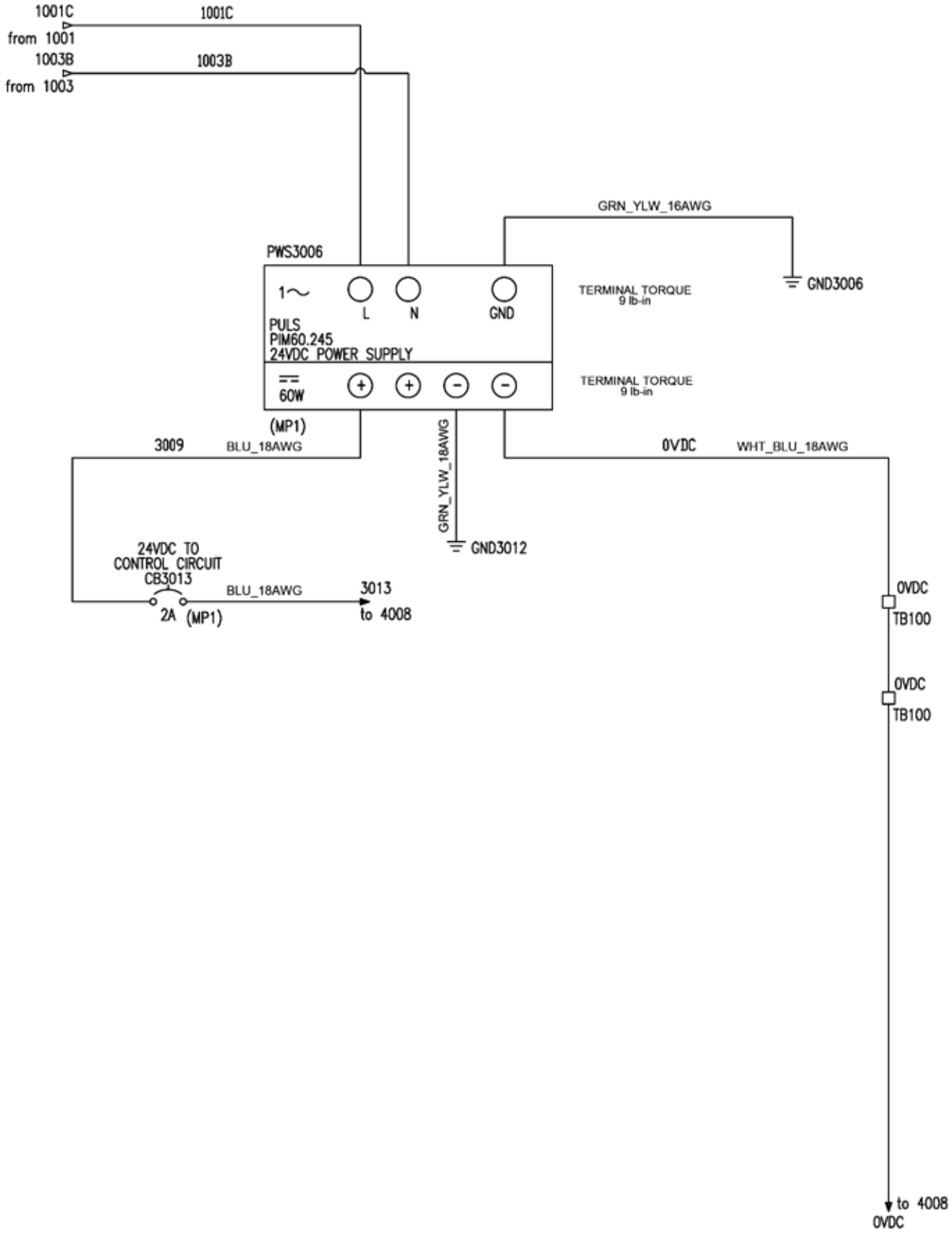
COMPONENT TYPE
SHEET
COLUMN



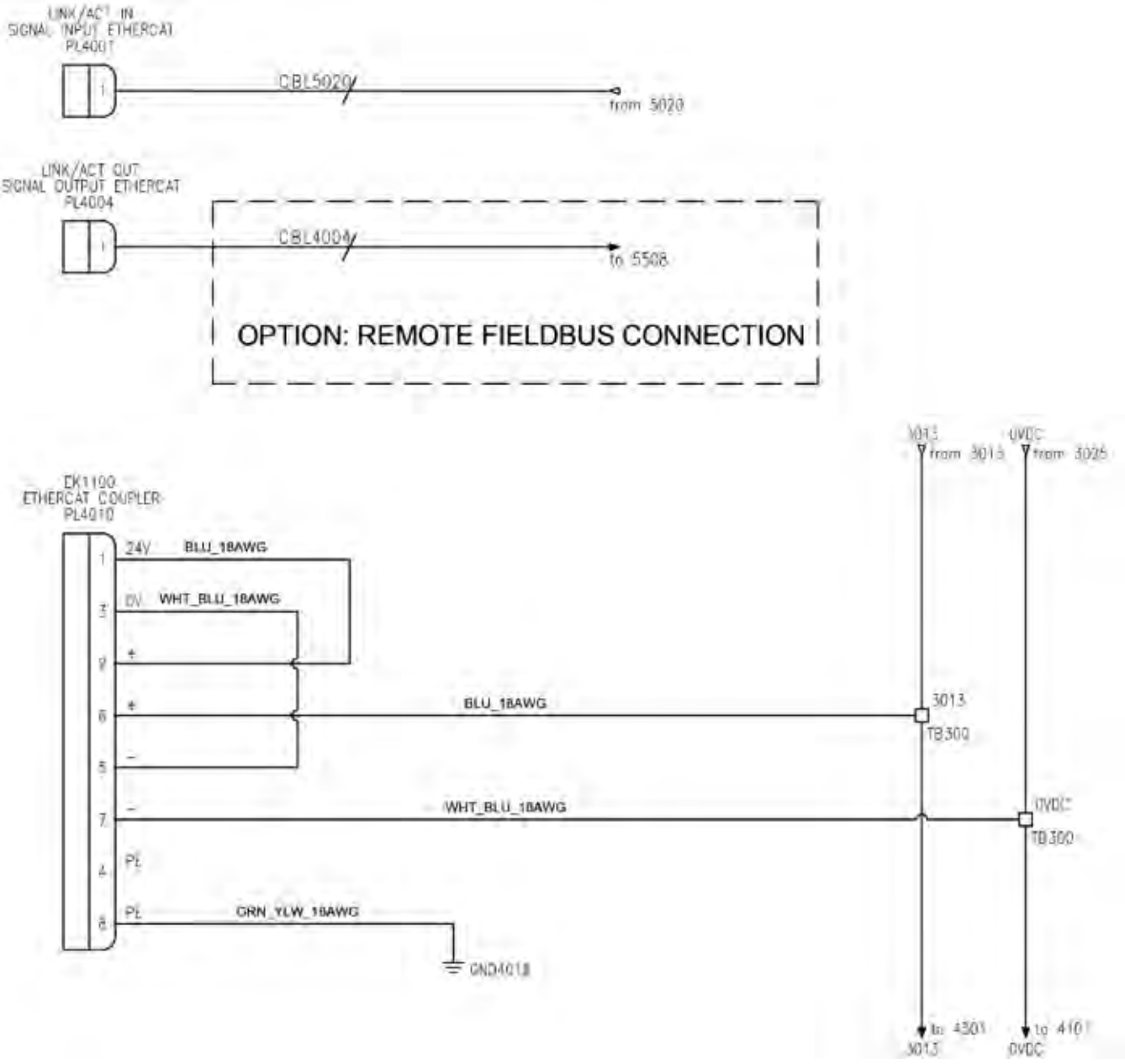
DRAWING 2


EMI FILTER INLET
G
N
L1
GRN_YLW_18AWG
WHT_18AWG
BLK_18AWG
1003
1001
BLK_18AWG
TERMINAL TORQUE
8-16 AWG = 12.2 lb-in
DS1001
1001B
1001A
GND1006
1003A
WHT_18AWG
BLK_18AWG
TERMINAL TORQUE
10-14 AWG = 17.7 lb-in
5A
CB1001
1003B
WHT_18AWG
BLK_18AWG
1001C
BLK_18AWG
1003B
to 3002
1001C
to 3001

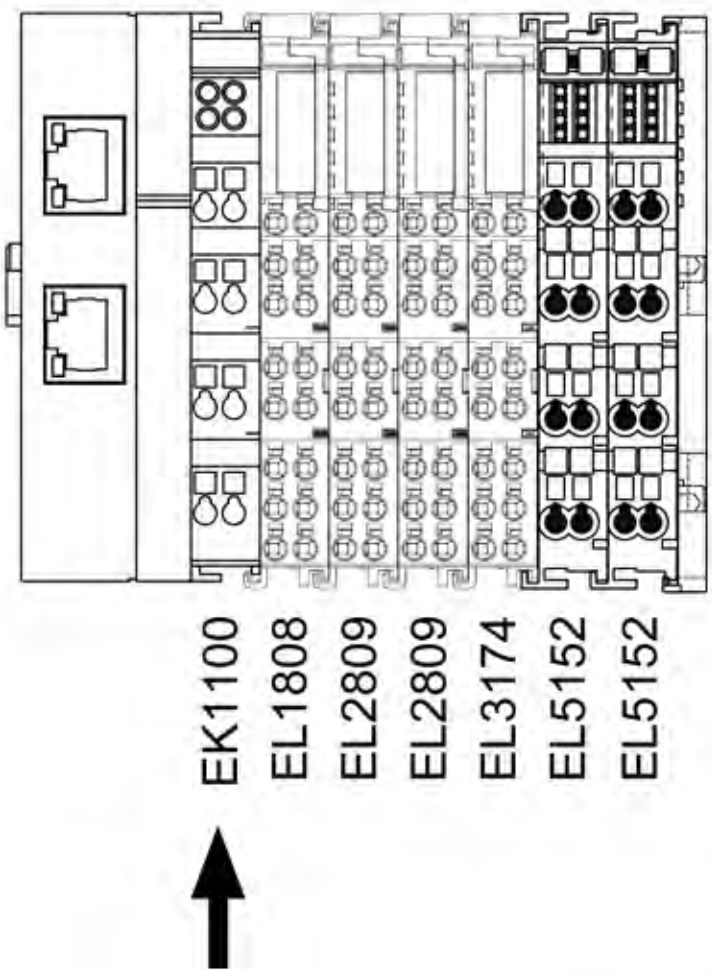
DRAWING 3

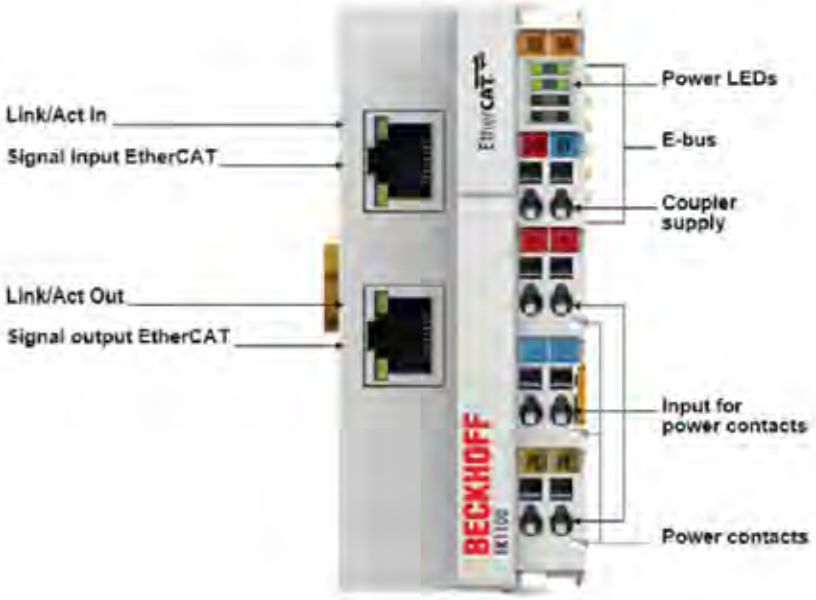

1001C
from 1001
1001C
1003B
from 1003
1003B
GRN_YLW_16AWG
PWS3006
1~
L
N
GND
PULS
PIM60.245
24VDC POWER SUPPLY
60W
TERMINAL TORQUE
9 lb-in
TERMINAL TORQUE
9 lb-in
GND3006
(MP1)
3009
BLU_18AWG
GRN_YLW_18AWG
GND3012
0VDC
WHT_BLU_18AWG
24VDC TO
CONTROL CIRCUIT
CB3013
2A (MP1)
BLU_18AWG
3013
to 4008
0VDC
TB100
0VDC
TB100
to 4008
0VDC

DRAWING 4

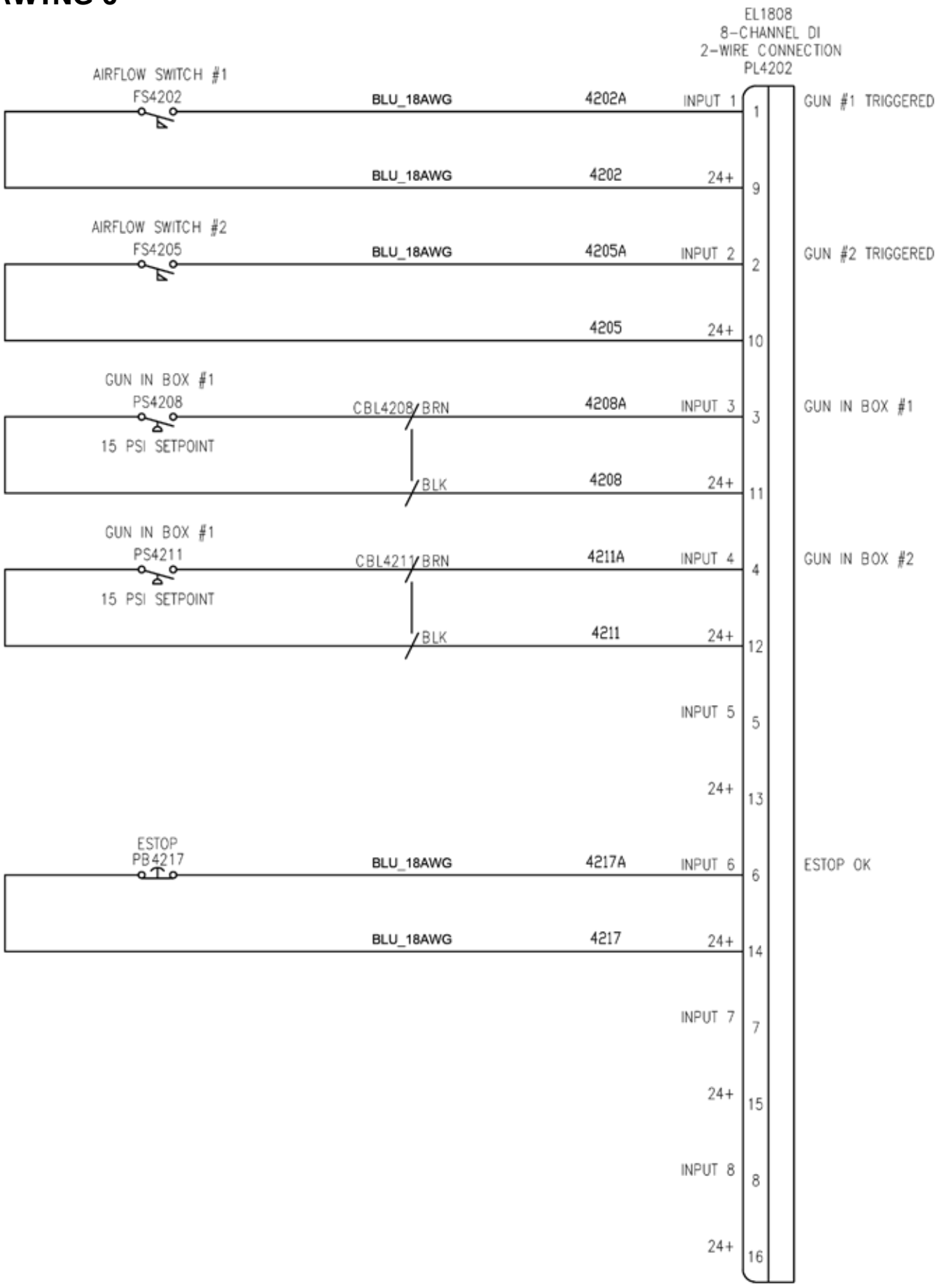

LINK/ACT IN
SIGNAL INPUT ETHERCAT
PL4001
CBL5020/
from 5020
LINK/ACT OUT
SIGNAL OUTPUT ETHERCAT
PL4004
CBL4004/
to 5508
OPTION: REMOTE FIELDBUS CONNECTION
EK1100
ETHERCAT COUPLER
PL4010
24V
BLU_18AWG
0V
WHT_BLU_18AWG
BLU_18AWG
WHT_BLU_18AWG
PE
GRN_YLW_18AWG
GND4018
3013
from 3013
0VDC
from 3025
3013
TB300
0VDC
TB300
to 4301
3013
to 4101
0VDC

DRAWING 5

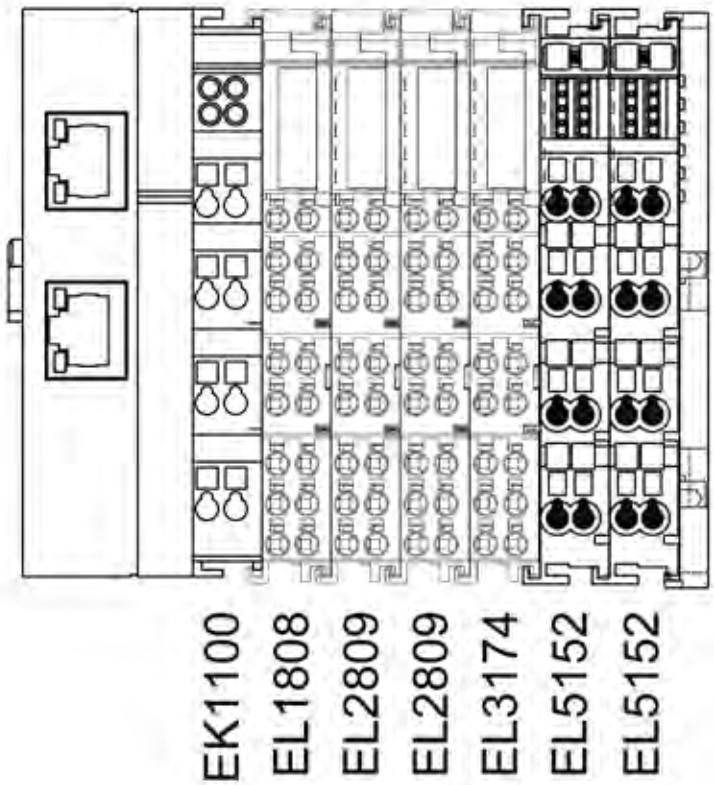

EK1100
EL1808
EL2809
EL2809
EL3174
EL5152
EL5152

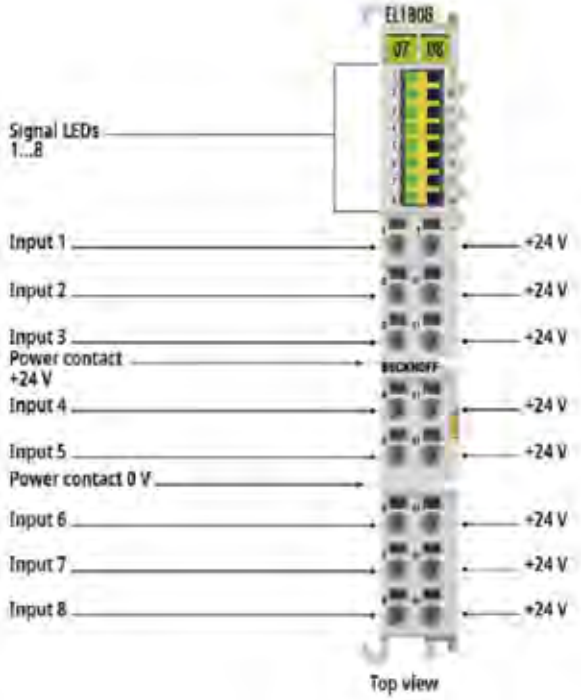

Link/Act In
Signal input EtherCAT
Link/Act Out
Signal output EtherCAT
Power LEDs
E-bus
Coupler supply
Input for power contacts
Power contacts
BECKHOFF
EK1100

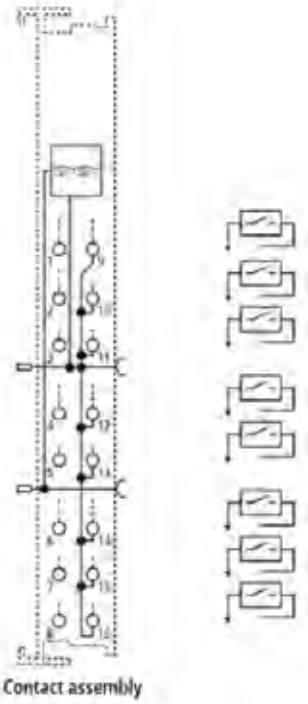
DRAWING 6


EL1808
8-CHANNEL DI
2-WIRE CONNECTION
PL4202
AIRFLOW SWITCH #1
FS4202
BLU_18AWG
4202A
INPUT 1
1
GUN #1 TRIGGERED
BLU_18AWG
4202
24+
9
AIRFLOW SWITCH #2
FS4205
BLU_18AWG
4205A
INPUT 2
2
GUN #2 TRIGGERED
4205
24+
10
GUN IN BOX #1
PS4208
CBL4208/BRN
4208A
INPUT 3
3
GUN IN BOX #1
15 PSI SETPOINT
/BLK
4208
24+
11
GUN IN BOX #1
PS4211
CBL4211/BRN
4211A
INPUT 4
4
GUN IN BOX #2
15 PSI SETPOINT
/BLK
4211
24+
12
INPUT 5
5
24+
13
ESTOP
PB4217
BLU_18AWG
4217A
INPUT 6
6
ESTOP OK
BLU_18AWG
4217
24+
14
INPUT 7
7
24+
15
INPUT 8
8
24+
16

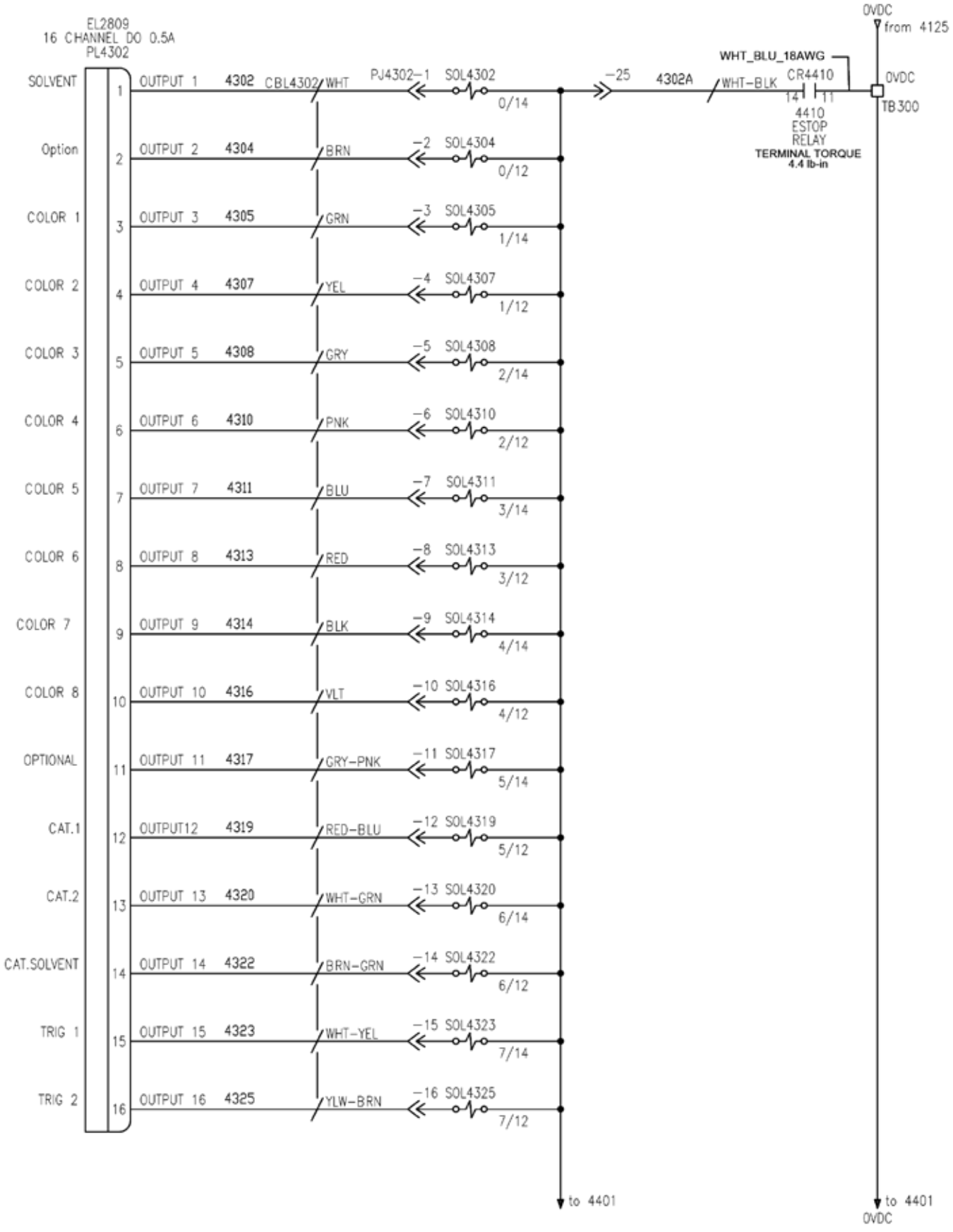
DRAWING 7


EK1100
EL1808
EL2809
EL2809
EL3174
EL5152
EL5152

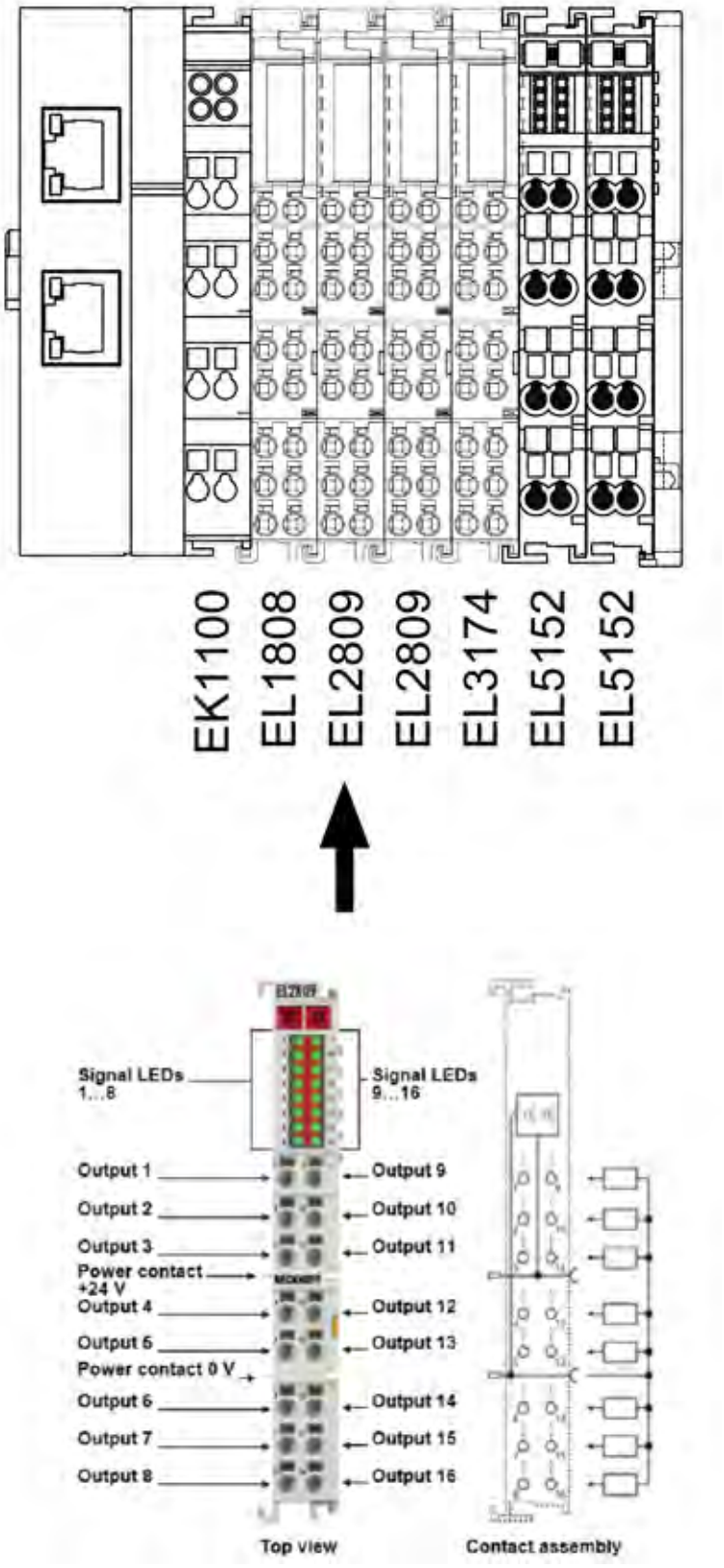

EL1808
Signal LEDs 1...8
Input 1
Input 2
Input 3
Power contact +24 V
Input 4
Input 5
Power contact 0 V
Input 6
Input 7
Input 8
+24 V
BECKHOFF
Top view


Contact assembly

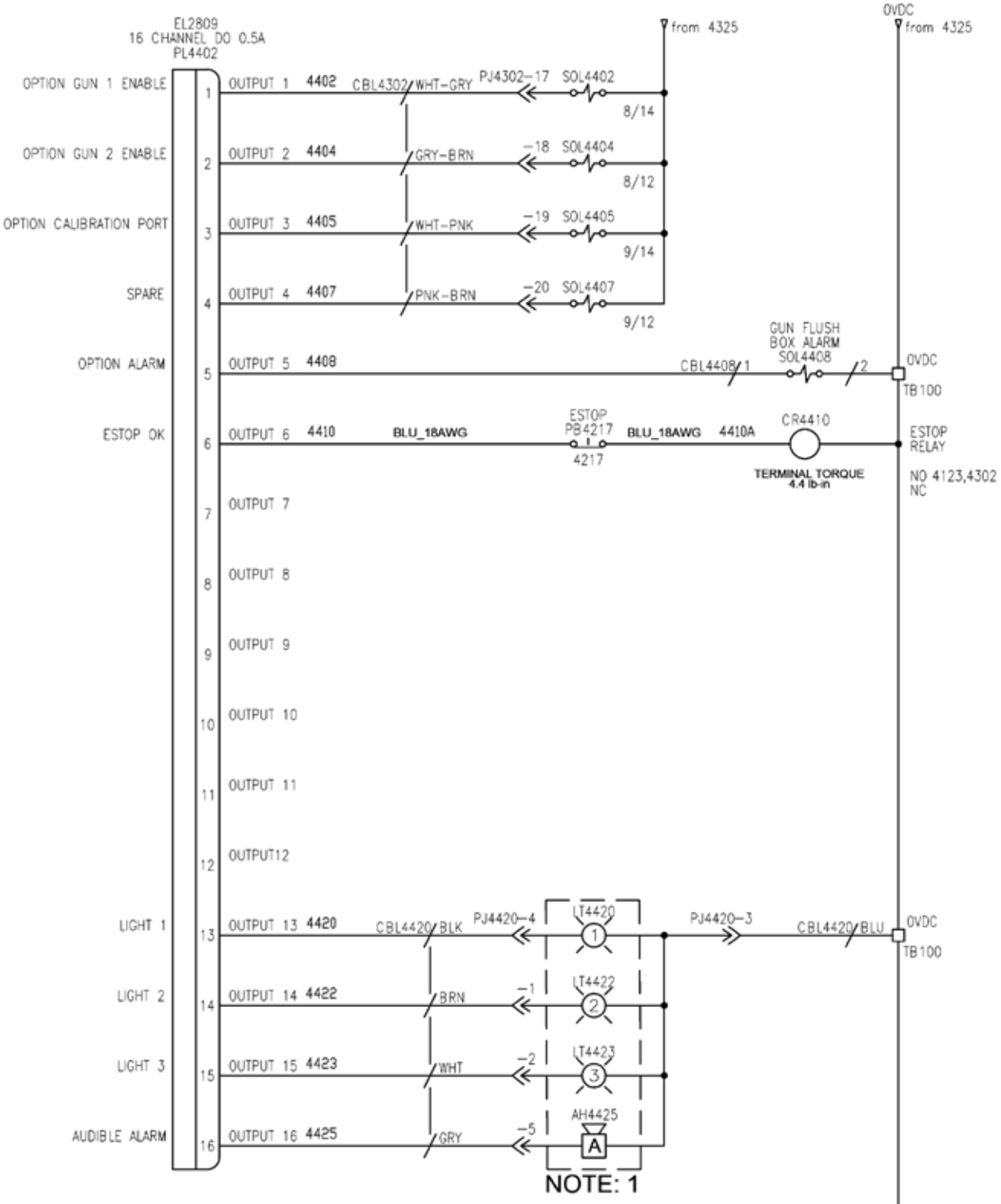
DRAWING 8


EL2809
16 CHANNEL DO 0.5A
PL4302
SOLVENT
Option
COLOR 1
COLOR 2
COLOR 3
COLOR 4
COLOR 5
COLOR 6
COLOR 7
COLOR 8
OPTIONAL
CAT.1
CAT.2
CAT.SOLVENT
TRIG 1
TRIG 2
OUTPUT 1 4302 CBL4302/WHT PJ4302–1 SOL4302 0/14
OUTPUT 2 4304 BRN –2 SOL4304 0/12
OUTPUT 3 4305 GRN –3 SOL4305 1/14
OUTPUT 4 4307 YEL –4 SOL4307 1/12
OUTPUT 5 4308 GRY –5 SOL4308 2/14
OUTPUT 6 4310 PNK –6 SOL4310 2/12
OUTPUT 7 4311 BLU –7 SOL4311 3/14
OUTPUT 8 4313 RED –8 SOL4313 3/12
OUTPUT 9 4314 BLK –9 SOL4314 4/14
OUTPUT 10 4316 VLT –10 SOL4316 4/12
OUTPUT 11 4317 GRY–PNK –11 SOL4317 5/14
OUTPUT12 4319 RED–BLU –12 SOL4319 5/12
OUTPUT 13 4320 WHT–GRN –13 SOL4320 6/14
OUTPUT 14 4322 BRN–GRN –14 SOL4322 6/12
OUTPUT 15 4323 WHT–YEL –15 SOL4323 7/14
OUTPUT 16 4325 YLW–BRN –16 SOL4325 7/12
–25 4302A WHT–BLK
WHT_BLU_18AWG
CR4410
14 11
4410
ESTOP
RELAY
TERMINAL TORQUE
4.4 lb-in
0VDC
from 4125
0VDC
TB300
to 4401
to 4401
0VDC

DRAWING 9


EK1100
EL1808
EL2809
EL2809
EL3174
EL5152
EL5152
Signal LEDs 1...8
Signal LEDs 9...16
Output 1
Output 2
Output 3
Power contact +24 V
Output 4
Output 5
Power contact 0 V
Output 6
Output 7
Output 8
Output 9
Output 10
Output 11
Output 12
Output 13
Output 14
Output 15
Output 16
Top view
Contact assembly

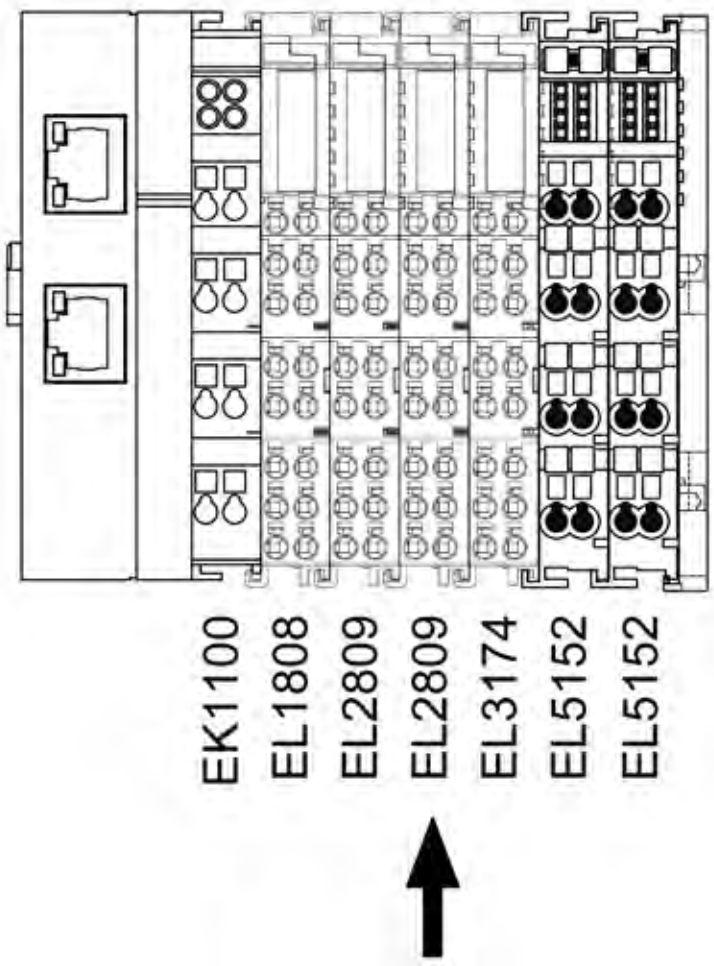
DRAWING 10

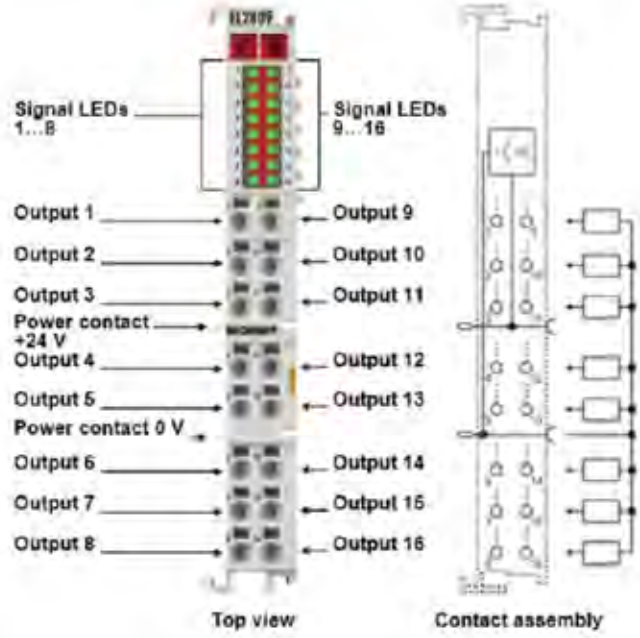


NOTE: 1 Color Chart

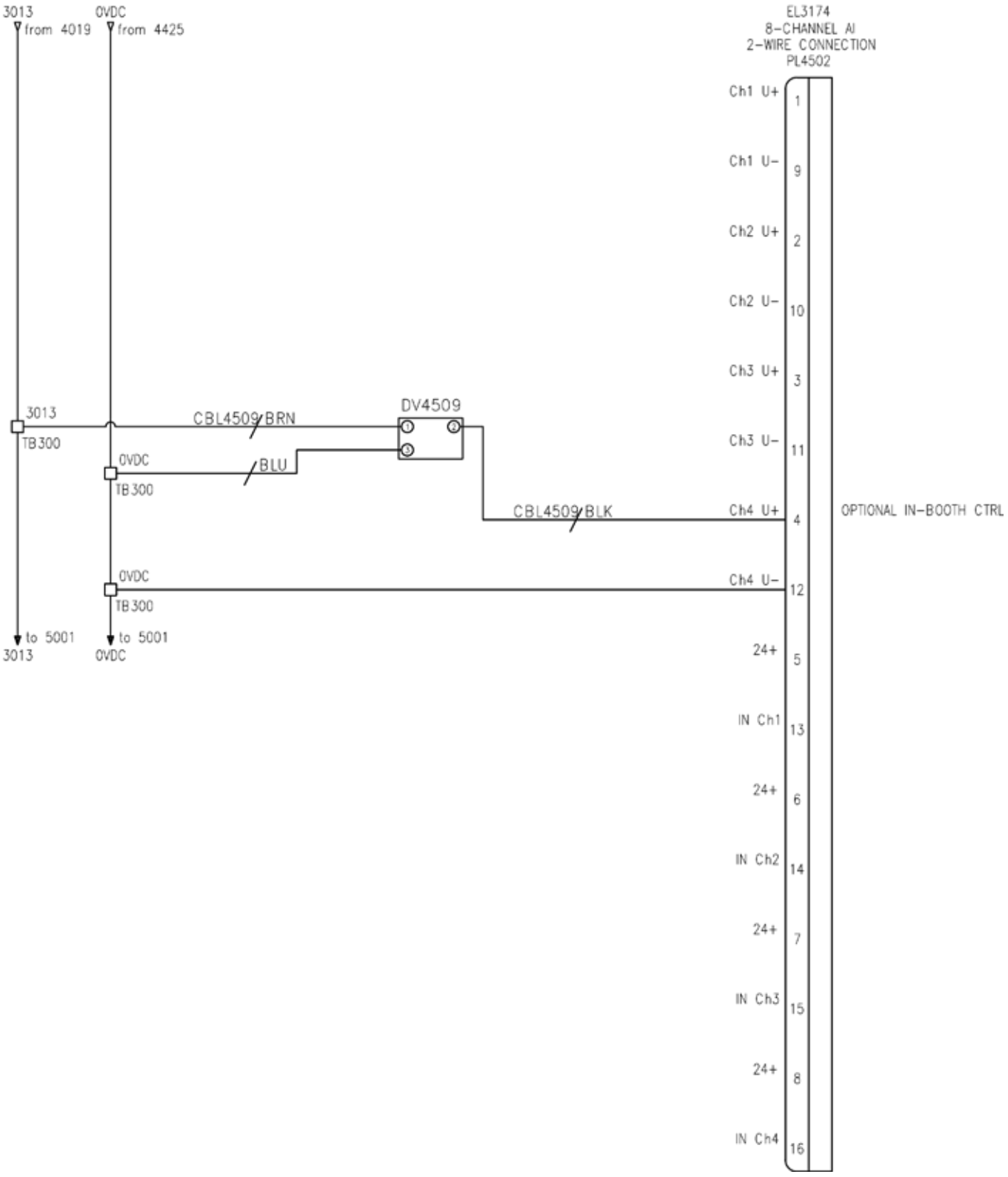
	Red	Yellow	Green	Cyan	Blue	Magenta	White
Input 1	X	X				X	X
Input 2		X	X	X			X
Input 3				X	X	X	X

DRAWING 11

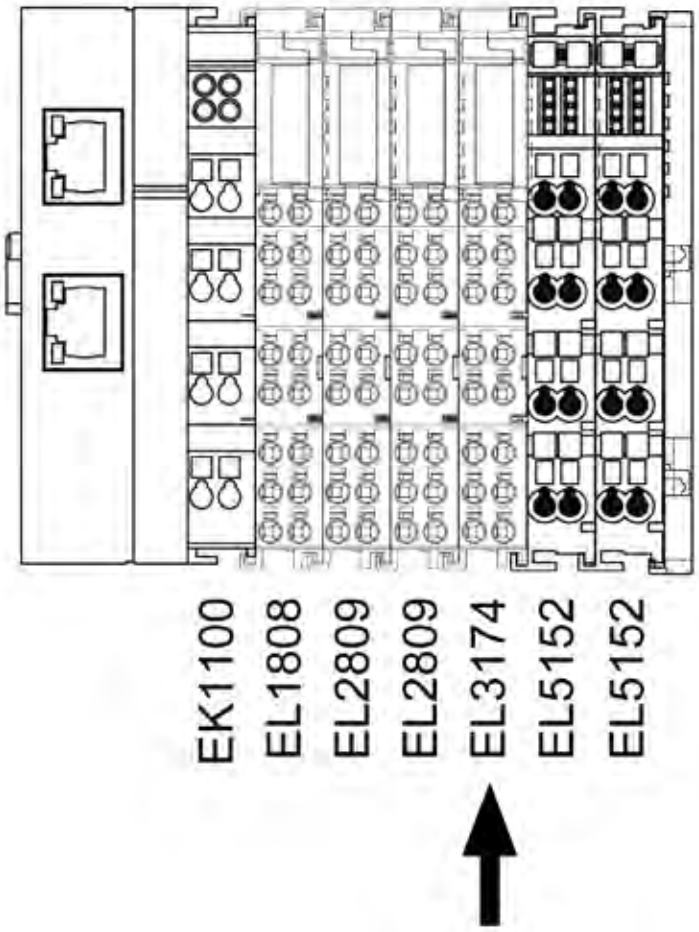

EK1100
EL1808
EL2809
EL2809
EL3174
EL5152
EL5152

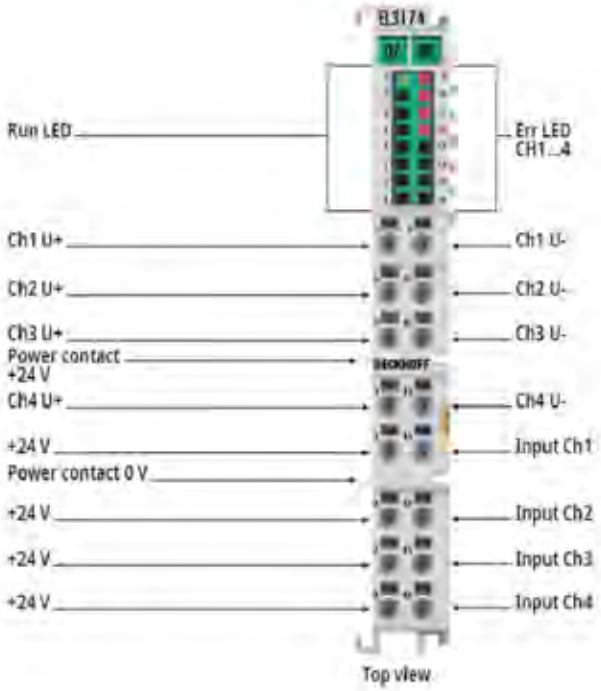

Signal LEDs 1...8
Signal LEDs 9...16
Output 1
Output 2
Output 3
Power contact +24 V
Output 4
Output 5
Power contact 0 V
Output 6
Output 7
Output 8
Output 9
Output 10
Output 11
Output 12
Output 13
Output 14
Output 15
Output 16
Top view
Contact assembly

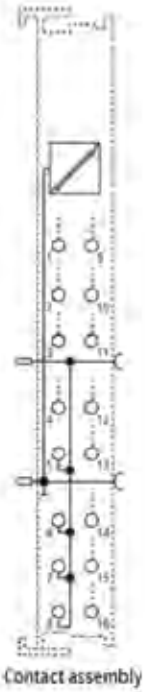
DRAWING 12

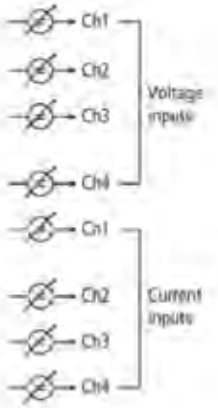

3013
from 4019
0VDC
from 4425
EL3174
8-CHANNEL AI
2-WIRE CONNECTION
PL4502
Ch1 U+
1
Ch1 U-
9
Ch2 U+
2
Ch2 U-
10
Ch3 U+
3
Ch3 U-
11
Ch4 U+
4
Ch4 U-
12
24+
5
IN Ch1
13
24+
6
IN Ch2
14
24+
7
IN Ch3
15
24+
8
IN Ch4
16
3013
TB300
CBL4509/BRN
DV4509
0VDC
TB300
BLU
CBL4509/BLK
OPTIONAL IN-BOOTH CTRL
0VDC
TB300
to 5001
3013
to 5001
0VDC

DRAWING 13

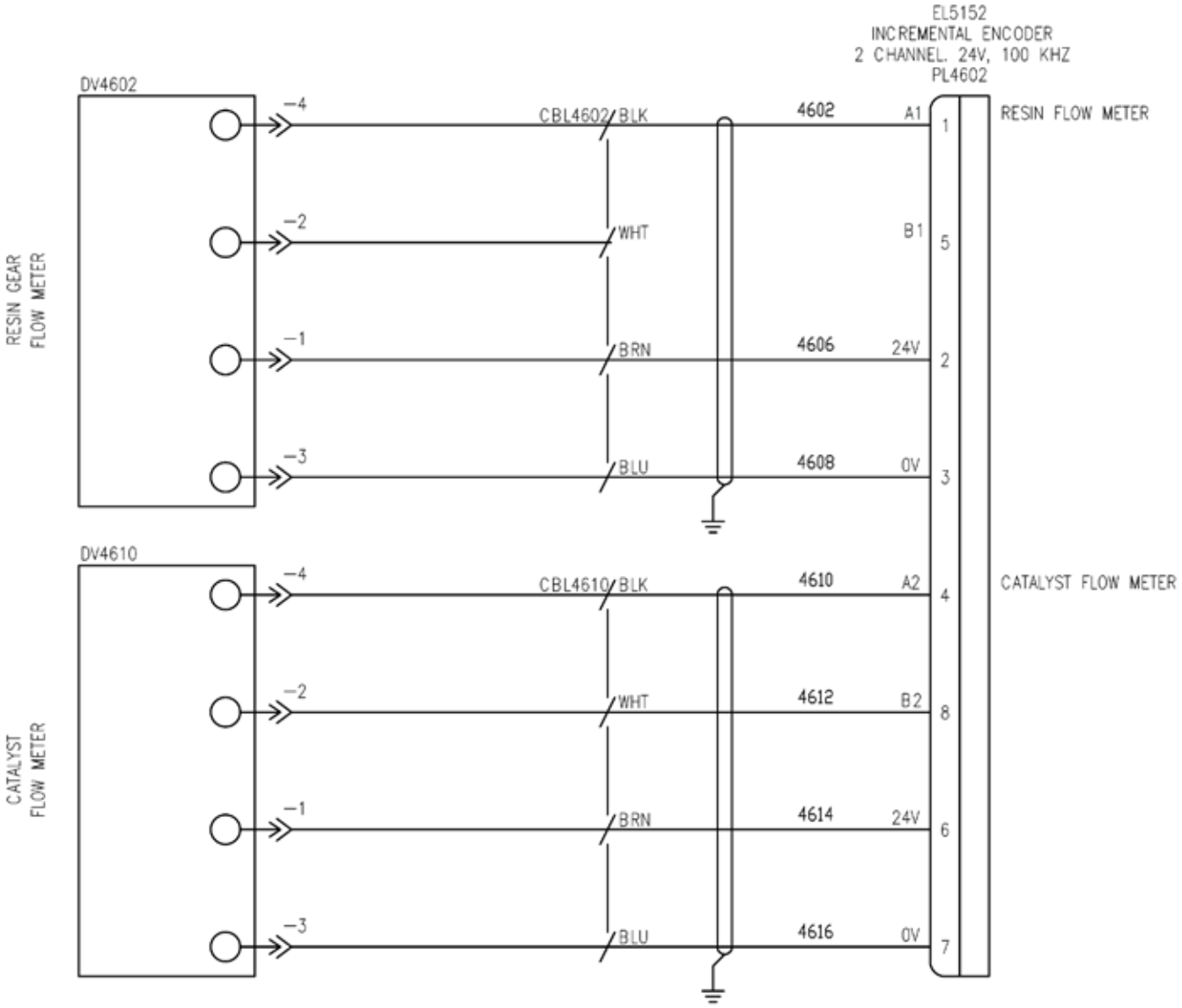

EK1100
EL1808
EL2809
EL2809
EL3174
EL5152
EL5152


EL3174
Run LED
Err LED CH1...4
Ch1 U+
Ch2 U+
Ch3 U+
Power contact +24 V
Ch4 U+
+24 V
Power contact 0 V
+24 V
+24 V
+24 V
Ch1 U-
Ch2 U-
Ch3 U-
Ch4 U-
Input Ch1
Input Ch2
Input Ch3
Input Ch4
Top view

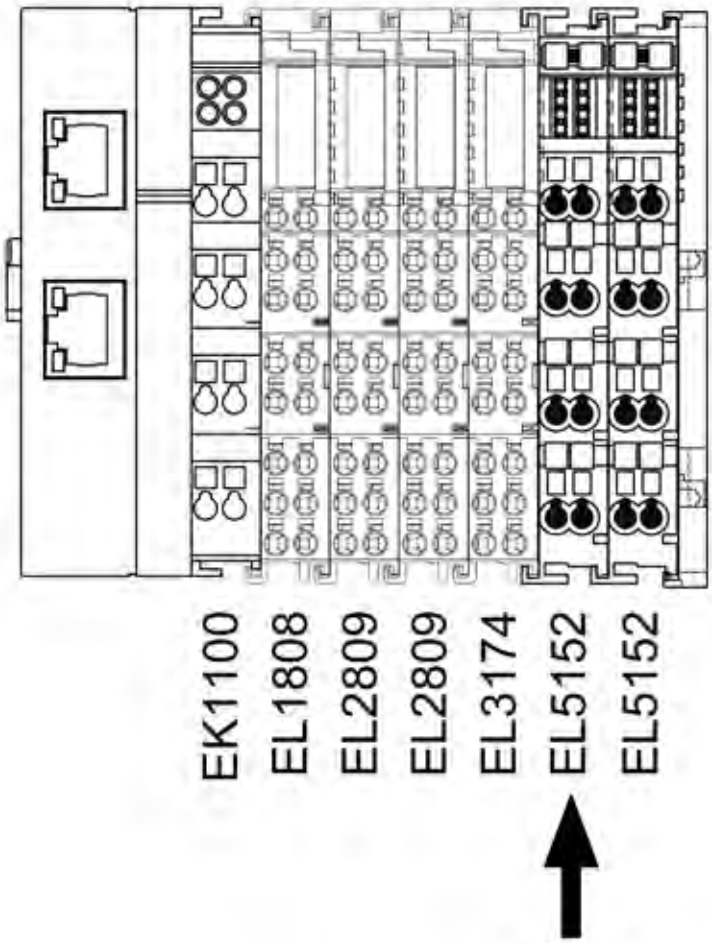

Contact assembly

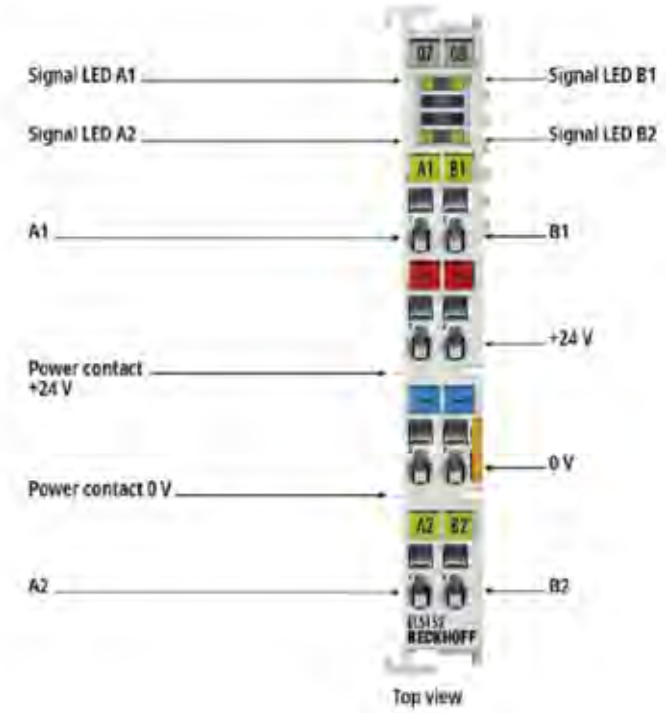

Ch1
Ch2
Ch3
Ch4
Voltage inputs
Ch1
Ch2
Ch3
Ch4
Current inputs

DRAWING 14

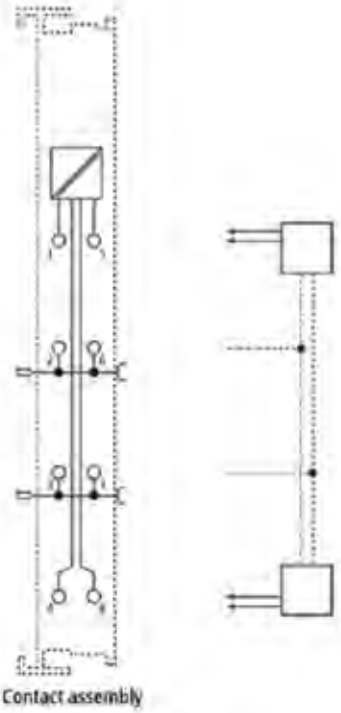

EL5152
INCREMENTAL ENCODER
2 CHANNEL. 24V, 100 KHZ
PL4602
DV4602
RESIN GEAR
FLOW METER
−4
−2
−1
−3
CBL4602/BLK
WHT
BRN
BLU
4602
4606
4608
A1
B1
24V
0V
1
5
2
3
RESIN FLOW METER
DV4610
CATALYST
FLOW METER
CBL4610/BLK
4610
4612
4614
4616
A2
B2
24V
0V
4
8
6
7
CATALYST FLOW METER

DRAWING 15



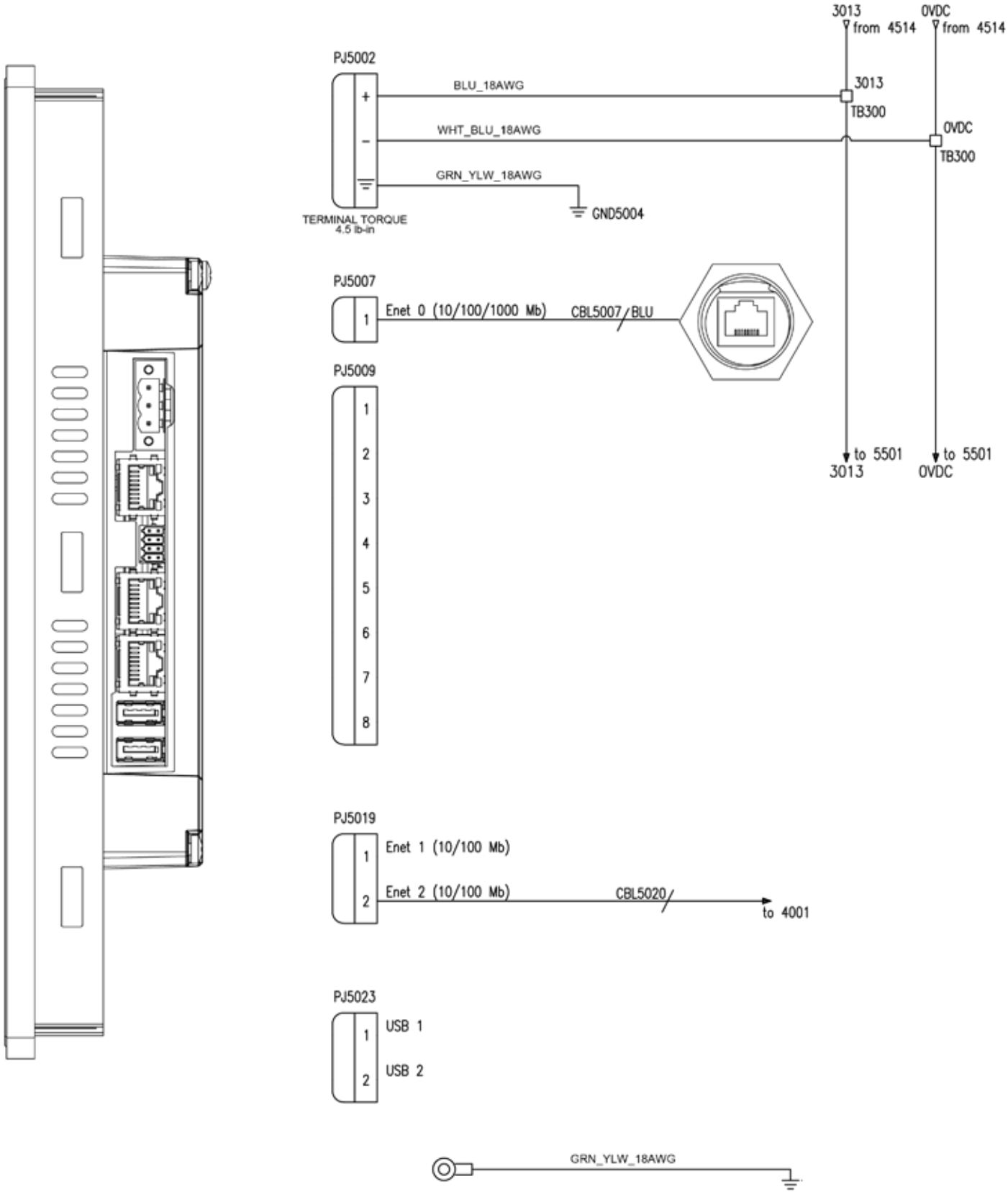


Top view

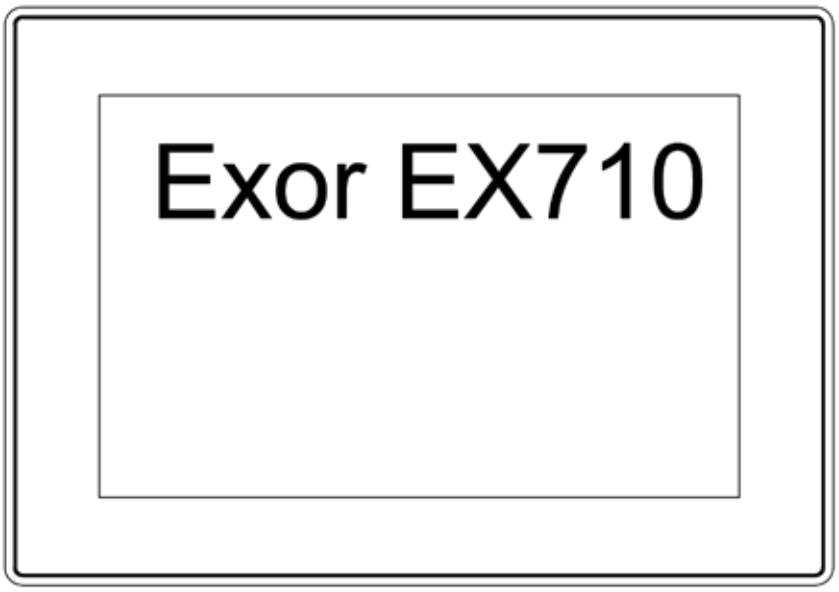


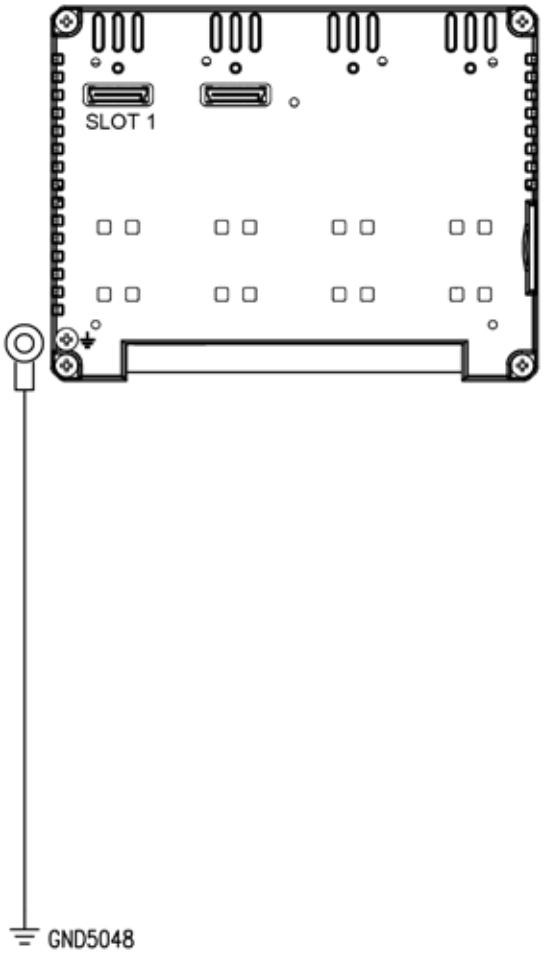
Contact assembly

DRAWING 16

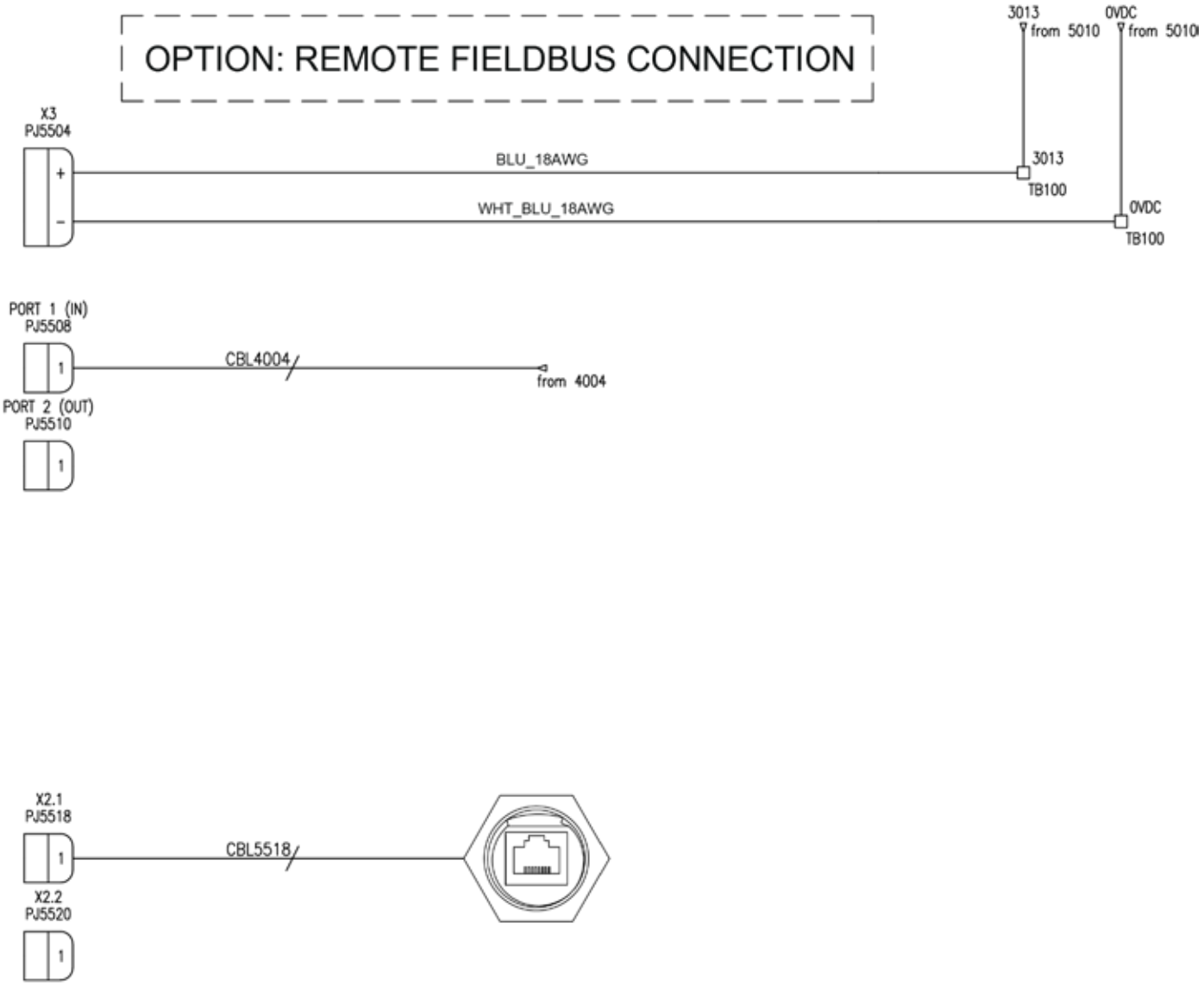

3013
from 4514
0VDC
from 4514
PJ5002
+
–
BLU_18AWG
WHT_BLU_18AWG
GRN_YLW_18AWG
3013
TB300
0VDC
TB300
GND5004
TERMINAL TORQUE
4.5 lb-in
PJ5007
1
Enet 0 (10/100/1000 Mb)
CBL5007/BLU
PJ5009
1
2
3
4
5
6
7
8
to 5501
3013
to 5501
0VDC
PJ5019
1
2
Enet 1 (10/100 Mb)
Enet 2 (10/100 Mb)
CBL5020/
to 4001
PJ5023
1
2
USB 1
USB 2
GRN_YLW_18AWG

DRAWING 17

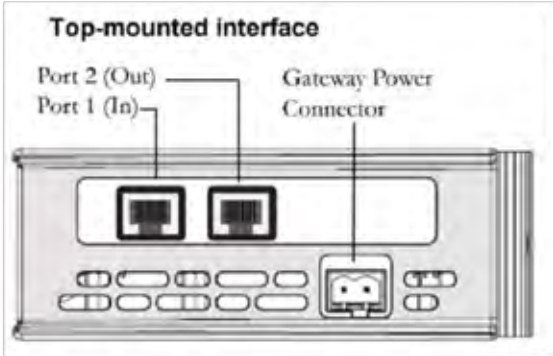


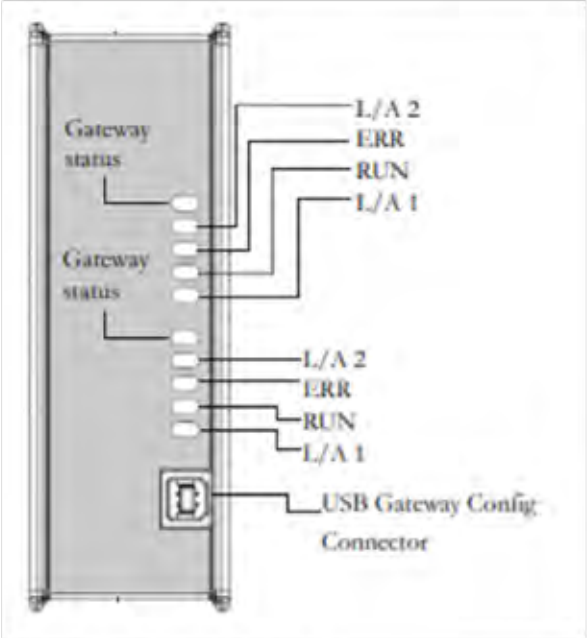


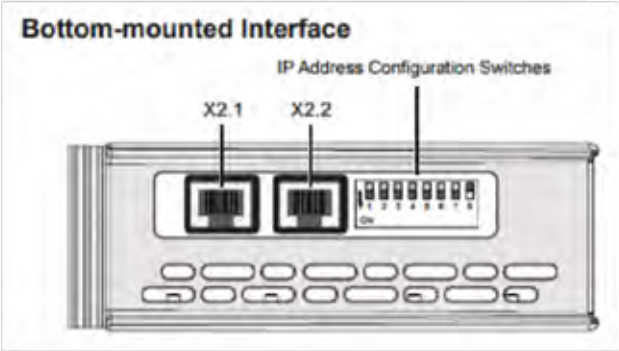
DRAWING 18


OPTION: REMOTE FIELDBUS CONNECTION
3013
from 5010
0VDC
from 5010
X3
PJ5504
+
–
BLU_18AWG
WHT_BLU_18AWG
3013
TB100
0VDC
TB100
PORT 1 (IN)
PJ5508
1
CBL4004
from 4004
PORT 2 (OUT)
PJ5510
1
X2.1
PJ5518
1
CBL5518
X2.2
PJ5520
1

DRAWING 19







128	64	32	16	8	4	2	1	Binary value
OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	IP address set with IPconfig
OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	192.168.0.1
OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	192.168.0.2
ON	ON	ON	ON	ON	ON	ON	OFF	192.168.0.254
ON	ON	ON	ON	ON	ON	ON	ON	(Not valid)
1	2	3	4	5	6	7	8	Switch number

= 192.168.0.1

DATA TABLES-PLC

RM2 TO PLC				
Offset (bytes)	**Name**	**Description**	**Size (bytes)**	**Type**
0	Status	Digital outputs to PLC (See table)	2	word
2	Color	Current color loaded	1	byte
3	Reqested Color	Confirmation of color requested by PLC to RM2	1	byte
4	Potlife Gun1	Potlife in seconds	2	word
6	Potlife Gun2	Potlife in seconds	2	word
8	Alarms	Alarm status bits (See table)	4	dword
12	Warnings	Warning status bits (see table)	4	dword
16	Total Flow	Total flow rate in cc/min x 10	2	word
18	Resin Flow	Resin flowrate in cc/min x 10 (Gun 1 for RE1 2 channel)	2	word
20	Hardener Flow	Hardener flowrate in cc/min x 10 (Gun 2 for RE1 2 channel)	2	word
22	System Mode	Current system mode (See table)	1	byte
24	Pump inlet PS	Pump inlet pressure psi x 10	2	word
26	Pump outlet PS	Pump outlet pressure psi x 10	2	word
28	Ratio setpoint	Ratio setpoint x 10	2	word
30	Ratio actual	Actual ratio x 10	2	word

PLC TO RM2				
Offset (bytes)	**Name**	**Description**	**Size (bytes)**	**Type**
0	Command	Command bits from PLC (See table)	2	word
2	Color Command	Color to load next	1	byte
3	Mode Command	Remote command to change modes (See table) Ignored when status.0 is not 0.	1	byte
4	Flow Setpoint	Flow setpoint for automatic systems in cc/min*10, max setpoint is 2000 cc/min.	2	UINT
6	Flow Setpoint2	Flow setpoint for channel 2 for automatic systems in cc/min*10, max setpoint is 2000 cc/min.	2	UINT

ALARMS	
Bit	**Description**
0	Low Inlet Pressure
1	High Inlet Pressure
2	Ratio Fault
3	Resin Flow without trigger
4	Resin Flow without trigger
5	Upper pressure transducer fault
6	Lower pressure transducer fault
7	Check Pump

ALARMS (cont.)	
Bit	**Description**
8	No resin flow fault (Blow off timer)
9	Upper balancing fault
10	Lower balancing fault
11	Not used
12	Color change interrupted fault
13	High resin flow fault (Hardener flow switch only)
14	Hardener flow when there should be no hardener flow
15	Air flow during priming, flushing or loading fault
16	Ethercat error
17	Emergency stop button pressed
18	Pump position sensor error
19	Max system pressure error
20	Hardener low flow fault (Pulse valve only)
21	Hardener high flow fault (Pulse valve only)

WARNINGS	
Bit	**Description**
0	Low Inlet Pressure (Masking enabled)
1	High Inlet Pressure (Masking enabled)
2	Ratio Fault (Masking enabled)
3	Resin Flow without trigger (Masking enabled)
4	No hardener flow (Hardener flow switch only—Masking enabled))
5	Upper pressure transducer fault (Masking enabled)
6	Lower pressure transducer fault (Masking enabled)
7	Check Pump (Masking enabled)
8	No resin flow fault (Blow off timer—Masking enabled))
9	Upper balancing fault (Masking enabled)
10	Lower balancing fault (Masking enabled)
11	Potlife
12	Color change interrupted fault (Masking enabled)
13	High resin flow fault (Hardener flow switch only—Masking enabled)
14	Hardener flow when there should be no hardener flow (Masking enabled)
15	Air flow during priming, flushing or loading fault (Masking enabled)
16	Ethercat error (Masking enabled)
17	Emergency stop button pressed (Masking enabled)
18	Pump position sensor error (Masking enabled)
19	Max system pressure error (Masking enabled)
20	Automatic purge triggered by potlife
29	Flush box not ready during color change
30	Color change timed out
31	Color change stopped by user

STATUS WORD		
Bit	**Name**	**Description**
0	Run	System is in run state
1	Alarm	An alarm is present
2	Potlife Wrn	Pot life is expired
3	Spray Ready	In Run state AND Spray mode
4	Gun1 Trigger	Gun 1 is triggered
5	Gun2 Trigger	Gun 2 is triggered
6	Color Change	Color change is in progress
7	Color load	Color load is in progress
8	Flushing	System is flushing
9	E-stop	e-stop button status
10	Gun 1 Loaded	Material Loaded to Gun 1
11	Gun 2 Loaded	Material Loaded to Gun 2

SYSTEM MODES		
Value	**Name**	**Description**
0	Invalid	Cannot be set remotely
1	Startup	PLC is waiting for HMI to load (Cannot be set remotely).
2	Spray	System is in spray mode.
4	Color Change	System is in color change mode.
8	Prime	System is in priming mode (Cannot be set remotely).
16	Batch	System is in batch mode (Cannot be set remotely).

COMMAND WORD		
Bit	**Name**	**Description**
0	Start	Remote start request (Momentary)
1	Stop	Remote stop request (Momentary)
2	Reset	Remote alarm reset (Momentary)
3	Flush	Remote flush command. Same as setting color command 0 and color change. This command will interrupt spraying if system is spraying (Momentary).
4	Color Change	Remote color change. ColorCommand should be set before ColorChange to true. This command will interrupt spraying if system is spraying (Momentary).
5	Trigger1	Remote trigger to open resin enable valve
6	Trigger2	Remote trigger to open resin enable valve
7	LoadGun1	Load Gun 1 at next color change
8	LoadGun2	Load Gun 2 at next color change

Date	Changes	Version
03/10/2022	1st Draft	R1
03/29/2022	Formatting changes to the document	R1
08/31/2022	Formatting changes to the document	R2
09/15/2022	Changed cover image	R2
10/11/2022	Added diagrams to Component View and Spare Parts section	R2
12/01/2022	Updated and/or added component views, spare parts, system configurations, and theories of operation	R2
03/27/2023	Added RM2 Medium Pressure model information, parts pages, and revised part numbers	R3
05/22/2023	Added pressure limitations due to Coriolis.	R3
06/01/2023	Added acid catalyst parts numbers to Component View and Spare Parts	R3
08/01/2023	Added PLC Data Tables	R4

WARRANTY POLICY

This product is covered by Carlisle Fluid Technologies' materials and workmanship limited warranty.

The use of any parts or accessories, from a source other than Carlisle Fluid Technologies, will void all warranties.

Failure to reasonably follow any maintenance guidance provided, may invalidate any warranty.

For specific warranty information please contact Carlisle Fluid Technologies.

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

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Americas	Tel: 1-800-992-4657 Fax: 1-888-246-5732	Tel: 1-800-445-3988 Fax: 1-800-445-6643
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Carlisle Fluid Technologies is a global leader in innovative finishing technologies.

Carlisle Fluid Technologies reserves the right to modify equipment specifications without prior notice.

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