



# IntelliVAC Contactor Control Module, Series F

Bulletin Number 1503VC



***Allen-Bradley***

by **ROCKWELL AUTOMATION**

**User Manual**

Original Instructions

# Important User Information

Read this document and the documents listed in the additional resources section about installation, configuration, and operation of this equipment before you install, configure, operate, or maintain this product. Users are required to familiarize themselves with installation and wiring instructions in addition to requirements of all applicable codes, laws, and standards.

Activities including installation, adjustments, putting into service, use, assembly, disassembly, and maintenance are required to be carried out by suitably trained personnel in accordance with applicable code of practice.

If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

In no event will Rockwell Automation, Inc. be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Rockwell Automation, Inc. cannot assume responsibility or liability for actual use based on the examples and diagrams.

No patent liability is assumed by Rockwell Automation, Inc. with respect to use of information, circuits, equipment, or software described in this manual.

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Throughout this manual, when necessary, we use notes to make you aware of safety considerations.



**WARNING:** Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.

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**ATTENTION:** Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you identify a hazard, avoid a hazard, and recognize the consequence.

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## IMPORTANT

Identifies information that is critical for successful application and understanding of the product.

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These labels may also be on or inside the equipment to provide specific precautions.



**SHOCK HAZARD:** Labels may be on or inside the equipment, for example, a drive or motor, to alert people that dangerous voltage may be present.

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**BURN HAZARD:** Labels may be on or inside the equipment, for example, a drive or motor, to alert people that surfaces may reach dangerous temperatures.

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**ARC FLASH HAZARD:** Labels may be on or inside the equipment, for example, a motor control center, to alert people to potential Arc Flash. Arc Flash will cause severe injury or death. Wear proper Personal Protective Equipment (PPE). Follow ALL Regulatory requirements for safe work practices and for Personal Protective Equipment (PPE).

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The following icon may appear in the text of this document.



Identifies information that is useful and can help to make a process easier to do or easier to understand.

	<b>Preface</b>	
	Summary of Changes .....	5
	About This Publication .....	5
	Additional Resources .....	5
	<b>Chapter 1</b>	
<b>Product Description</b>	Description .....	7
	IntelliVAC Features .....	8
	IntelliVAC Versions .....	9
	Specifications .....	9
	Mounting and Connections .....	9
	Configuration .....	9
	Firmware .....	9
	<b>Chapter 2</b>	
<b>Receiving and Storage</b>	Receiving .....	13
	Storage .....	13
	<b>Chapter 3</b>	
<b>Installation and Wiring</b>	General Precautions .....	15
	Safety and Codes .....	15
	Arrangements .....	15
	Integral to an Allen-Bradley MV Controller .....	15
	OEM .....	16
	Control Power Fuse .....	18
	Grounding .....	19
	Connections .....	19
	Control Power .....	19
	Status Relays .....	19
	Interface Connections .....	20
	Wiring Guidelines .....	21
	Electrically Held Contactors .....	21
	Control with Solid-State Devices .....	21
	Two-Wire Control .....	22
	Three-Wire Control .....	23
	Wiring Guidelines Mechanical Latch Contactors .....	26
	Mechanical Latch Contactors .....	26
	Capacitor Trip .....	26
	Motor Jogging Control .....	27
	Undervoltage Protection .....	28
	Time Delay Undervoltage .....	28
	<b>Chapter 4</b>	
<b>Setup and Commissioning</b>	IntelliVAC Configuration .....	31

	<b>Chapter 5</b>	
<b>Monitoring and Troubleshooting</b>	Module Status .....	33
	Contactor Status .....	33
	<b>Chapter 6</b>	
<b>Spare Parts</b>	Spare Parts List .....	37
	Optional Equipment .....	37
	<b>Appendix A</b>	
<b>Contactor Drop-out Time Settings</b>	Typical Settings .....	39

## Summary of Changes

This publication contains the following new or updated information. This list includes substantive updates only and is not intended to reflect all changes.

Topic	Page
Updated the firmware section to specify connector type	9
Changed Command Input AC and DC voltage ratings from 70 to 75	10
Updated number of DIP switches from 16 to 12	18
Updated voltage values for when undervoltage protection is initiated	28
Updated Factory Default Settings table to reflect 12 DIP switches	32
Corrected Series C and D spare part number to 1503VC-BMC4	37

## About This Publication

This document contains information for the Allen-Bradley Bulletin 1503VC IntelliVAC™ control module. The Bulletin 1503VC is used to control the Allen-Bradley Bulletin medium voltage 1502 vacuum contactors that are a significant component of the Bulletin 1500/1900 CENTERLINE® medium voltage motor controllers offered by Rockwell Automation. IntelliVAC control modules are an efficient and flexible solution for controlling medium voltage vacuum contactors used in motor starter and feeder applications.

An IntelliVAC control module may also be provided as a loose OEM component, for use with a Bulletin 1502 contactor by a third party (OEM).

This document applies to the Series F version of IntelliVAC.

- See publication 1503-UM051 for information related to the Series A and B
- See publication 1503-UM052 for information related to Series C and D
- See publication 1503-UM053 for information related to Series E

## Additional Resources

These documents contain additional information concerning related products from Rockwell Automation. You can view or download publications at [rok.auto/literature](http://rok.auto/literature).

Resource	Description
IntelliVAC Contactor Control Module (Series A/B), <a href="#">1503-UM051</a>	Provides information on installing, wiring, commissioning, and troubleshooting of the IntelliVAC Series A/B control module.
IntelliVAC Contactor Control Module (Series C/D), <a href="#">1503-UM052</a>	Provides information on installing, wiring, commissioning, and troubleshooting of the IntelliVAC Series C/D control module.
IntelliVAC Contactor Control Module, (Series E), <a href="#">1503-UM053</a>	Provides information on installing, wiring, commissioning, and troubleshooting of the IntelliVAC Series E control module.
EtherNet/IP Network Devices User Manual, <a href="#">ENET-UM006</a>	Describes how to configure and use EtherNet/IP™ devices to communicate on the EtherNet/IP network.
Ethernet Reference Manual, <a href="#">ENET-RM002</a>	Describes basic Ethernet concepts, infrastructure components, and infrastructure features.
System Security Design Guidelines Reference Manual, <a href="#">SECURE-RM001</a>	Provides guidance on how to conduct security assessments, implement Rockwell Automation products in a secure system, harden the control system, manage user access, and dispose of equipment.
UL Standards Listing for Industrial Control Products, publication <a href="#">CMPNTS-SR002</a>	Assists original equipment manufacturers (OEMs) with construction of panels, to help ensure that they conform to the requirements of Underwriters Laboratories.
American Standards, Configurations, and Ratings: Introduction to Motor Circuit Design, publication <a href="#">IC-AT001</a>	Provides an overview of American motor circuit design based on methods that are outlined in the NEC.
Industrial Components Preventive Maintenance, Enclosures, and Contact Ratings Specifications, publication <a href="#">IC-TD002</a>	Provides a quick reference tool for Allen-Bradley® industrial automation controls and assemblies.
Industrial Automation Wiring and Grounding Guidelines, publication <a href="#">1770-4.1</a>	Provides general guidelines for installing a Rockwell Automation® industrial system.
ProposalWorks™ configuration software, <a href="http://rok.auto/systemtools">rok.auto/systemtools</a>	Helps configure complete, valid catalog numbers and build complete quotes based on detailed product information.
Rockwell Automation Global SCCR tool, <a href="http://rok.auto/sccr">rok.auto/sccr</a>	Provides coordinated high-fault branch circuit solutions for motor starters, soft starters, and component drives.
Product Certifications website, <a href="http://rok.auto/certifications">rok.auto/certifications</a>	Provides declarations of conformity, certificates, and other certification details.

**Notes:**

## Product Description

### Description

An IntelliVAC™ control module can be used to control Bulletin 1502 450 and 800 A medium voltage vacuum contactors. Both electrically held and mechanically latched contactor types can be controlled with IntelliVAC control modules.

Figure 1 - IntelliVAC Contactor Control Module

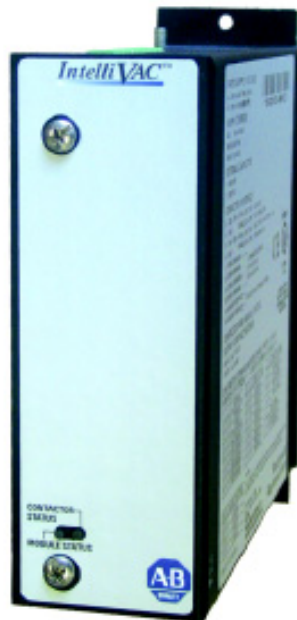
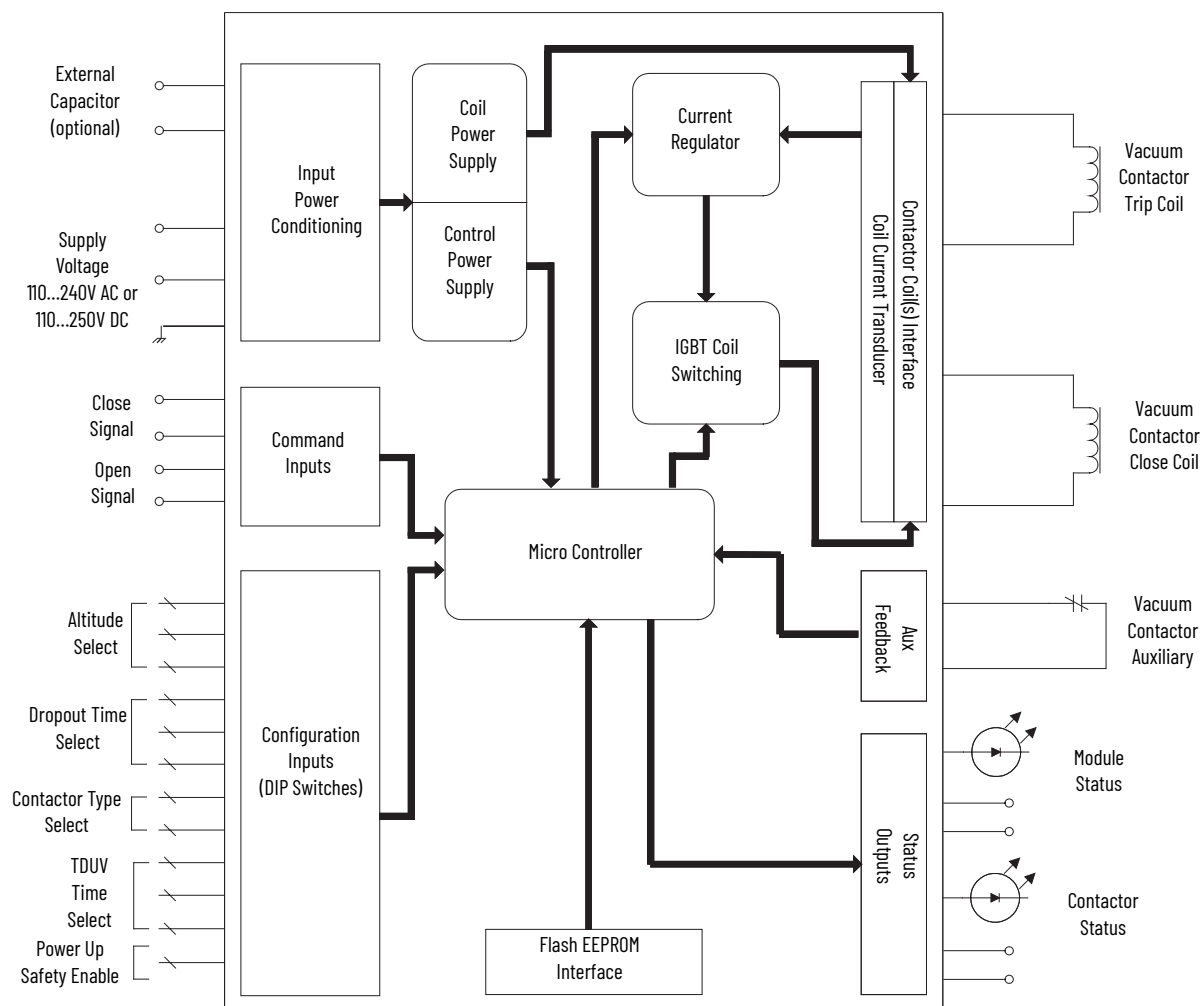


Figure 2 - IntelliVAC Block Diagram



## IntelliVAC Features

- A range of supply voltage (110...240V AC 50/60 Hz, 110...250V DC) allows implementation in multiple applications.
- Consistent vacuum contactor pick-up time (at a given supply voltage) ensures repeatable performance.
- Selectable vacuum contactor drop-out time improves coordination with upstream power fuses.
- Electronic altitude compensation (Bulletin 1502 450 A only) eliminates mechanical compensation required for altitudes above 1000 m (Bulletin 1502 800 A contactors include a user-friendly mechanical altitude adjustment).
- Power loss ride-through (TDUV) allows the vacuum contactor to remain closed during short power loss (may require an optional external capacitor, dependent on ride-through time).
- Anti-kiss and anti-pumping protection ensure that the vacuum contactor close – open sequence occurs as expected, avoiding rapid reclosure due to faulty control devices.
- Delayed restart protects the vacuum contactor by ensuring that the rated duty cycle is not exceeded.
- Temporary jog function (electrically held contactors only) allows the motor to be positioned for process set-up.



## IntelliVAC Versions

See [Chapter 6](#) for part numbers of the various series of modules. The Series Letter is printed on the large label on the right-hand side of the enclosure, beside the part number.

**Series A** There are two versions of IntelliVAC control. The first type is used to control vacuum contactors that are electrically held, with one electrical coil that is economized electronically. The second is used to control mechanically latched vacuum contactors (this series is no longer available).

**Series B** There is one version of IntelliVAC, to control electrically held and mechanically latched vacuum contactors (this series is no longer available).

**Series C** Updated version of the Series B module (this series is no longer available).

**Series D** Minor functionality (firmware) enhancements, primarily related to definition and handling of Faults and Warnings (this series is no longer available).

**Series E** Revised hardware to allow connection to the IntelliVAC Plus or IntelliVAC MC. The removal of the mini Din connector for updating firmware is now updated using the IntelliVAC Plus or IntelliVAC MC boards). New input circuits to reduce thermal output, and decrease sensitivity to leakage current. IntelliVAC Plus and IntelliVAC MC products have been discontinued. This series is no longer available.

**Series F** Removal of IntelliVAC Plus/MC components and firmware content. Minor functionality (firmware) enhancements, primarily related to improved timing performance and minor corrections for handling of and annunciating faults and warnings.

See [Chapter 6](#) for catalog numbers for each version of IntelliVAC.

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<b>IMPORTANT</b>	A Series C, D, E, or F IntelliVAC module can be used to replace a Series A or Series B module. When replacing an older series of an IntelliVAC control module with a newer one, the module and contactor status outputs may function differently. See <a href="#">Contactor Status</a> for more information.
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## Specifications

### Mounting and Connections

The IntelliVAC control modules are mounted using two screws, see [Figure 3 on page 11](#). They are typically located in the low voltage control panel of the medium voltage controller.

The IntelliVAC control module is interfaced with the Bulletin 1502 vacuum contactors using a connector on the module, a wire harness, and a connector at the contactor. Control power and other control circuit connections are similarly achieved with 'quick' connectors.

### Configuration

The IntelliVAC control module is easily configured for a wide variety of medium voltage motor and feeder control applications. It is configured using DIP switches which are located within the enclosure (front side). See [Chapter 3](#) for information.

Bulletin 1500/1900 controllers are shipped with IntelliVAC control modules that are pre-configured for the required application. See the documents provided with the order.

### Firmware

The IntelliVAC control module has firmware stored in flash EEPROM. This may be updated in the field. Update the IntelliVAC board firmware using the mini-DIN connector, which is accessible inside the enclosure.

The firmware version supplied with the module is displayed on top of the DIP switches (see [Figure 17](#)).

**Table 1 - Firmware Compatibility**

IntelliVAC Series Letter	Firmware Version	Compatible with Earlier Versions?
A	2.XXX	No
B		
C		
D	3.XXX	
E	4.XXX	
F	5.XXX	

**Table 2 - Electrical Ratings**

Main Input Voltage (L1 ... L2/N)	AC - 110...240V rms, +10/-15%, 47...63 Hz DC - 110...250V, +10/-15					
	Description	Contactor Ratings (A)	Control Voltage (AC or DC)	AC Rating	DC Rating	Minimum Voltage (V AC, 47...63 Hz)
Main Input Current (L1 ... L2/N)	Inrush current	450/800	120/240	25 A peak (1/2 cycle)	25 A peak	—
	Idle current (maximum without contactor coil energized)	450/800	120/240	125 mA	35 mA	—
	Hold current <sup>(1)</sup> (maximum)	450/800	120/240	300 mA	100 mA	—
	Close current (0.2 s)	450	120	4.6 A	3.6 A	—
			240	3.4 A	3.3 A	—
		800	120	11.3 A	4.8 A	—
			240	8.9 A	4.5 A	—
	Trip current (latch) (0.2 s)	450	120	7.0 A	3.7 A	—
			240	3.6 A	2.0 A	—
		800	120	7.0 A	3.3 A	—
			240	4.3 A	1.9 A	—
Minimum IntelliVAC Operational Supply Voltages	Pick-up	450/800	—	—	—	95
	Drop-out	450/800	—	—	—	75
	Trip (mechanical latch)	450	—	—	—	70
Command Inputs <sup>(2) (3)</sup>	AC - 75...240V rms DC - 75...250V					
	Maximum on state current for open or close command: 4 mA <sub>AC</sub> @ 276V AC, 60 Hz, T <sub>A</sub> = 60 °C 4.1 mA <sub>DC</sub> @ 276V DC, T <sub>A</sub> = 60 °C Minimum on state current for open or close command: 1.2 mA <sub>AC</sub> @ 70V AC, 60 Hz, T <sub>A</sub> = 60 °C 1.2 mA <sub>DC</sub> @ 68V DC, T <sub>A</sub> = 60 °C Maximum off state current for open or close command: 1 mA @ 50V AC, 60 Hz, T <sub>A</sub> = 60 °C 850 µA @ 50V DC, T <sub>A</sub> = 60 °C					
Status Output Contacts	AC - 250V rms, 5 A, R load; 2 A (reactive), PF = 0.4 DC - 30V, 5 A, R load; 2 A (reactive), L/R = 7 ms					
Standards and Approvals	CE, cULus, CSA, IEC pending					

(1) Includes idle current.

(2) T<sub>A</sub> = Ambient Temperature

(3) Ensure compatibility of IntelliVAC input ratings with those of circuit components activating these inputs.

Consider means of isolating/loading these signals, as required (using interposing relays or load resistors).

Consult factory for assistance, if required. The Series C, D, E, and F IntelliVAC control modules are compatible with most PLC outputs, and have been verified with Rockwell Automation OA type 120V triac outputs. See [Wiring Guidelines](#) for more information.

Table 3 - Mechanical Ratings

<b>Temperature</b>	Operating: 0...60 °C (32...140 °F) ambient at the control module <sup>(1)</sup>
	Non-operating: -40...+85 °C (-40...+185 °F)
<b>Altitude</b>	-1000...+5000 m (-3280...+16,404 ft)
<b>Pollution</b>	Pollution level II (as defined by UL 840 and IEC 60664-1)
<b>Humidity</b>	95% non-condensing
<b>Shock (Operational)</b>	15 g peak, 11 ms
<b>Vibration (operational)</b>	10...57 Hz, 0.015 in. displacement peak to peak 57...150 Hz, 2.5 g acceleration

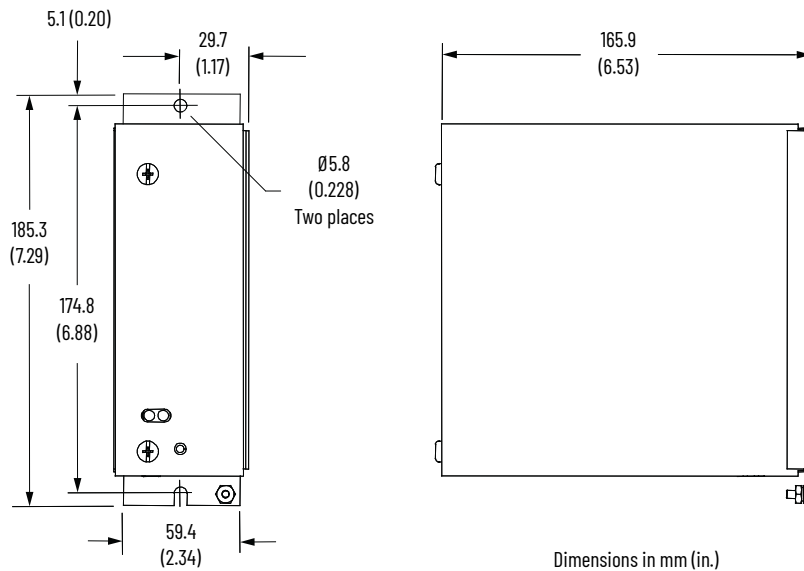
(1) Ambient temperature is derated at altitudes above 1000 m (3300 ft). See [Chapter 1](#).

Table 4 - Altitude Derating

Altitude	Maximum Operation Ambient Temperature <sup>(1)</sup>
-1000...0	60 °C (140 °F)
1...1000	
1001...2000	58 °C (136 °F)
2001...3000	56 °C (133 °F)
3001...4000	54 °C (129 °F)
4001...5000	52 °C (126 °F)

(1) Derate by 2 °C (36 °F) for every 1000 m for high altitude operation.

Figure 3 - Mechanical Dimensions



**Notes:**

## Receiving and Storage

### Receiving

Upon receiving the controller, remove the packing and check for damage that may have occurred during shipping. Report any damage immediately to the claims office of the carrier.

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<b>IMPORTANT</b>	If the IntelliVAC™ module is an integral component of a complete MV controller (Bulletin 1500/1900), special receiving and handling instructions will apply. For details, see the service manual provided with the equipment.
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### Storage

Consider these important storage requirements if you are not installing your controller immediately after receiving it.

- Store the controller in a clean, dry, dust-free environment.
- Storage temperature should be maintained between -40...+85 °C (-40...+185 °F).
- Relative humidity must not exceed 95%, non-condensing.

**Notes:**

## Installation and Wiring

### General Precautions

In addition to the precautions listed throughout this manual, the following statements, which are general to the system, must be read and understood.



**ATTENTION:** The controller contains ESD (electrostatic discharge) sensitive parts and assemblies. Static control precautions are required when installing testing, servicing, or repairing the assembly. Component damage may result if ESD control procedures are not followed. If you are not familiar with static control procedures, see applicable ESD protection handbooks.



**ATTENTION:** An incorrectly applied or installed controller can damage components or reduce product life. Wiring or application errors, such as incorrect or inadequate AC supply, or excessive ambient temperatures, may result in malfunction of the system.



**ATTENTION:** Only personnel familiar with the controller and associated machinery should plan or implement the installation, start-up, and subsequent maintenance of the system. Failure to do this may result in personal injury and/or equipment damage.

### Safety and Codes



**ATTENTION:** The Canadian Electrical Code (CEC), National Electrical Code (NEC), or other local codes outline provisions for safely installing electrical equipment. Installation **MUST** comply with specifications regarding wire type, conductor sizes, branch circuit protection, interlocking and disconnect devices. Failure to do so may result in personal injury and/or equipment damage.

### Arrangements

The IntelliVAC™ is offered in two arrangements, Integral (part of an Allen-Bradley® Bulletin 1500/1900 MV controller) or as an OEM component.

#### Integral to an Allen-Bradley MV Controller

The IntelliVAC is available as a primary component of an Allen-Bradley Bulletin 1500/1900 MV controller, see [Figure 4 on page 16](#).

**Figure 4 - Typical IntelliVAC Installation within a Bulletin 1500/1900 MV Controller  
(Shown with optional external capacitor for enhanced ride through capabilities)**

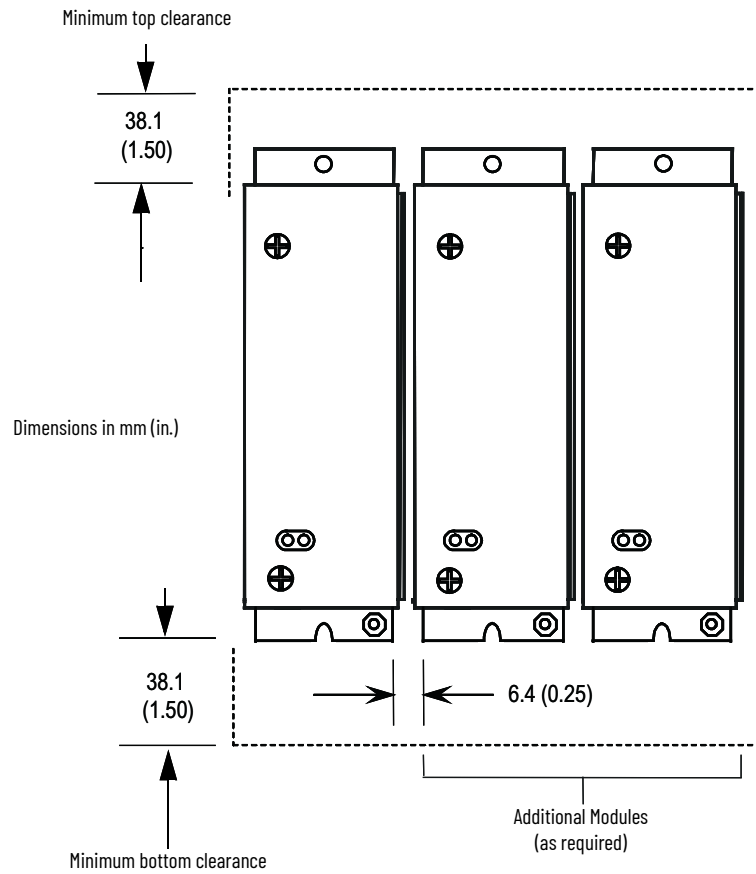


## OEM

The IntelliVAC control module can be ordered as an OEM component. This allows the OEM to mount the components in a configuration most suitable to the control equipment layout. The IntelliVAC control module must have adequate ventilation provided around it. See [Figure 5 on page 17](#) for mounting the module. A minimum of 38.1 mm (1.5 in.) of free air space is provided between the IntelliVAC and any solid barrier above or below. A minimum distance of 6.4 mm (0.25 in.) must be left between adjacent modules.

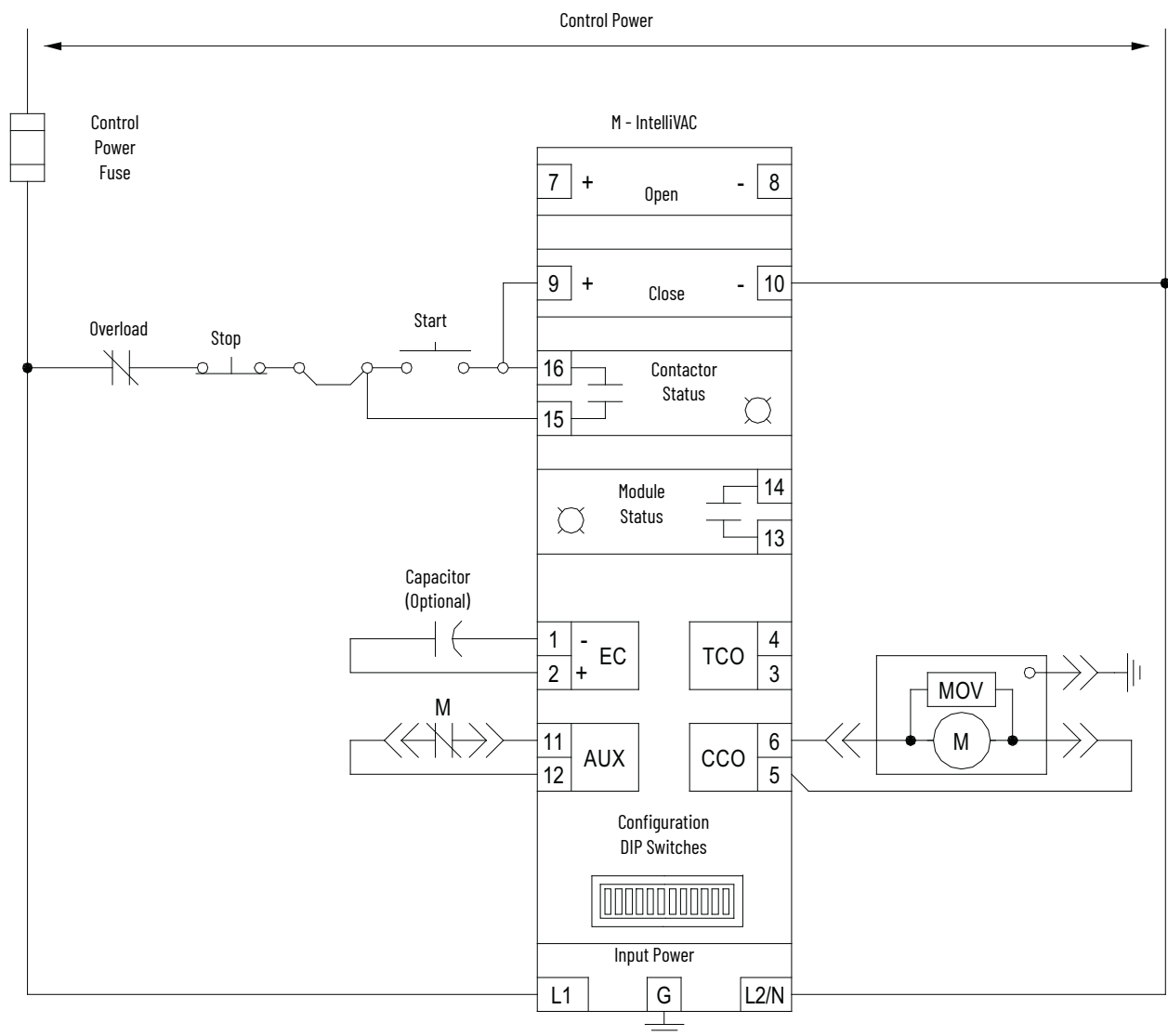
The OEM is responsible for controller fusing, motor overload protection, control devices (for example Start/Stop push buttons), and wiring between the IntelliVAC and 1502 vacuum contactor (using optional wire harness). Wiring and mounting for optional items, such as a TDUV Capacitor, are also the responsibility of the OEM. See [Figure 6 on page 18](#) for basic connections.



**Figure 5 - Typical Mounting Configurations**

**IMPORTANT** Adjacent IntelliVAC modules may be mounted with a minimum separation of 6.4 mm (0.25 in.).

Figure 6 - IntelliVAC Typical Schematic (Electrically Held Vacuum Contactor)



Control Power Fuse

The IntelliVAC module requires external fuse protection to coordinate with the power supply and contactor. The fuse ratings shown in [Table 4 on page 16](#) allow the passage of inrush currents expected when the contactor is closed, or from recommended external capacitors for the TDUV option. They also protect the contactor coils in the event of a module malfunction.

The recommended fuses are tested to confirm reliable protection of the module. If the supply voltage is DC, the module must be used with an external fuse that is approved for and rated to interrupt the DC voltage supply. The types listed are Ferraz-Shawmut Midget Fuses (1.5 x 13/32 in.). The TRM is a time-delay type, rated 250V AC. The ATM is a fast-acting type, rated 500V DC.

Table 5 - IntelliVAC Fuse Protection

Rated Supply Voltage	Contactor Type <sup>(1)</sup>	Recommended Fuse	
		(Minimum)	(Maximum)
110/120V AC	450 A, EH	TRM 2	TRM 3.2
	800 A, EH	TRM 2	TRM 6.25
	450/800 A, ML	TRM 2	TRM 3.2

Table 5 - IntelliVAC Fuse Protection (Continued)

Rated Supply Voltage	Contactor Type <sup>(1)</sup>	Recommended Fuse	
		(Minimum)	(Maximum)
220/240V AC	450 A, EH	TRM 2	TRM 6.25
	800 A, EH	TRM 2	TRM 6.25
	450/800 A, ML	TRM 2	TRM 6.25
125V DC	450 A, EH/ML	ATM 3	ATM 3
	800 A, EH/ML	ATM 5	ATM 6
250V DC	450 A, EH/ML	ATM 3	ATM 5
	800 A, EH/ML	ATM 5	ATM 6

(1) Electrically held vacuum contactor (EH), mechanical latch vacuum contactor (ML).

### IMPORTANT

If external capacitors are connected, or more than one IntelliVAC module is protected by a common control fuse, the maximum recommended fuse should be used to prevent fuse opening due to increased inrush current when control power is applied.

## Grounding

The IntelliVAC control module must be connected to a common ground terminal (PE) on the controller panel. The ground terminal is located on the bottom of module enclosure, see [Figure 7 on page 20](#).



**ATTENTION:** It is important that the IntelliVAC control module is properly grounded using the ground connection provided. Failure to do so may result in damage to equipment or personal injury.

## Connections

There are three green connectors on the IntelliVAC module for connections to the control circuitry. Connector plugs are provided with the module. If replacement plugs are required, see [Chapter 6](#).

## Control Power

The IntelliVAC control module accepts either AC or DC control power. See [Table 2](#) for acceptable input power and control signal ratings.

Control power is applied to the module with a two-pole connector located at the bottom rear portion of the module. See [Figure 7](#) for connections. The 'L1' connection is intended to be the 'Hot' or '+' side of the control power, and the 'L2/N' connection is intended to be the 'Neutral', 'Return', or '-' side of the control power.

## Status Relays

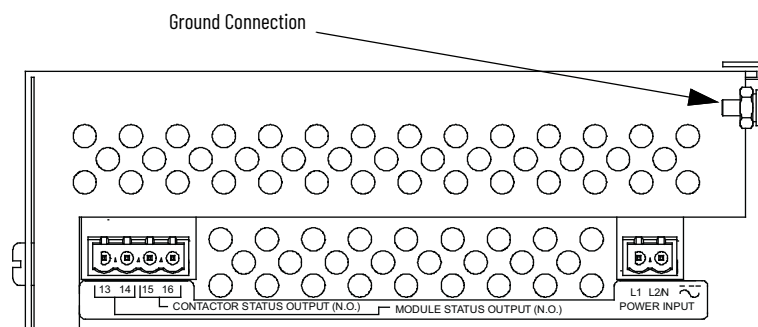
Status relay connections are accessed with a four-pole connector located at the bottom front portion of the module. See [Figure 7](#) for connections. There are two status relays, each with one normally-open contact:

- Module Status: Terminals 13 and 14
- Contactor Status: Terminals 15 and 16

See [Chapter 5](#) for a description of operation for the relays.

See [Table 2](#) for electrical ratings of the status relays.

Figure 7 - Bottom Side Connections



## Interface Connections

All other control interface connections are made at a twelve-pole connector located on the top of the module. See [Figure 8 on page 20](#) and [Table 6 on page 20](#) for connections, and [Table 5](#) for electrical ratings.

See [Wiring Guidelines on page 21](#) for guidance in making connections to the control circuit.

Figure 8 - Top Side Connections

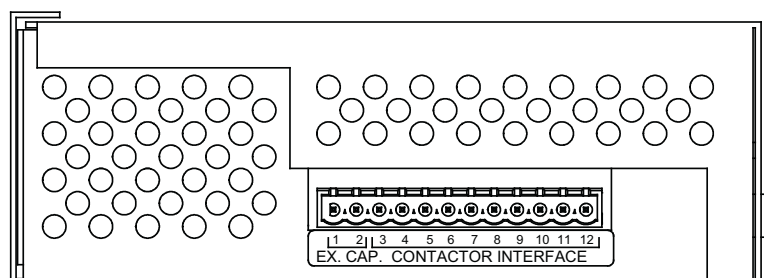


Table 6 - Terminal Assignments for IntelliVAC Interface Connections

Terminal Number	Terminal Designation	Description
1	External capacitor (negative) <sup>(1)</sup>	Power connection for TDUV or capacitor trip options only
2	External capacitor (positive) <sup>(1)</sup>	
3	Latch trip coil (common) <sup>(1)</sup>	Output for mechanical latch contactor trip coil
4	Latch trip coil <sup>(1)</sup>	
5	Close coil (common)	Output to close coil of electrically held & mechanical latch contactors
6	Close coil	
7	Open / Jog command <sup>(1) (2) (3)</sup>	Input to open a mechanical latch contactor or jog an electrically held contactor (mutually exclusive)
8	Open / Jog command (common) <sup>(1) (2) (3)</sup>	
9	Close command <sup>(2)</sup>	Input to initiate the closure of electrically held and mechanical latch contactors
10	Close command (common) <sup>(2)</sup>	
11	Contactor auxiliary contact <sup>(2)</sup>	Input to indicate the state of the contactor (typically wired to a normally closed auxiliary contact)
12	Contactor auxiliary contact <sup>(2)</sup>	

(1) No connection required if option is not used.

(2) Ensure compatibility of IntelliVAC input ratings with those of circuit components activating these inputs. Consider means of isolating/loading these signals, as required (using interposing relays or load resistors). Consult factory for assistance, if required. The Series F IntelliVAC control module is compatible with most PLC outputs, and have been verified with Rockwell Automation OA type 120V triac outputs. See [Wiring Guidelines on page 21](#).

(3) For electrically held contactor, this command will energize the close coil output (CCO). For mechanically held contactor, this command will energize the trip coil output (TCO).

## Wiring Guidelines

### Electrically Held Contactors

The IntelliVAC control module can be applied with two- wire or three-wire control circuits. The control system used determines the configuration of the input wiring. Consider the following input and output for the type of control used:

- Terminals 9 and 10 – Close Contactor
- Terminals 15 and 16 – Contactor Status

In either case, the CLOSE input must receive a maintained voltage high to keep the contactor closed.

#### IMPORTANT

- When used with electrically held contactors, the IntelliVAC allows close commands every six seconds. This verifies the rated contactor duty cycle is not exceeded.
- If the IntelliVAC control module powers up configured for an electrically held contactor, and the vacuum contactor is detected as being closed, the module does not respond to a close command until the vacuum contactor auxiliary contact input is in the correct (closed) state and module power is removed and reapplied. See [Chapter 5](#).
- In general, a Close command should only be applied 4 seconds after energizing the IntelliVAC control module.



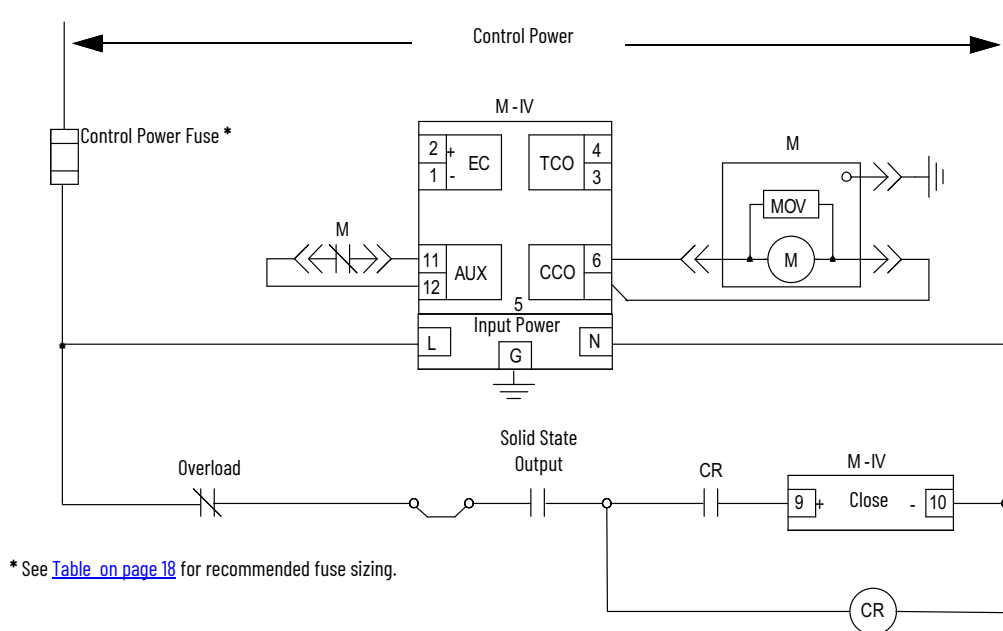
**ATTENTION:** For Emergency Stop applications requiring removal of power, a contact should be placed in the 'L1' control power rung to the IntelliVAC. If the TDUV feature is used, the contactor does not open until the programmed TDUV time has expired.

### Control with Solid-State Devices

When control devices that employ electronic or suppressed output circuits are used in the rungs that control the inputs to the IntelliVAC control module, alternate arrangements may be required. Devices employing transistor or triac output circuits have finite impedance and allow a leakage current to flow in the blocking or off state. Some PLC and I/O modules with relay outputs have R-C snubber circuits across the contact to suppress voltage transients generated during contact opening. The impedance of these snubber circuits also allows leakage current to flow when the contacts are open. The input circuits are designed such that typical output leakage currents do not create unintended operation of the contactor. The vast majority of control devices can be directly connected to the IntelliVAC control module without any inappropriate operation occurring.

This situation is prevented by consideration of the control devices when designing the control system. With control devices that have excessive leakage current (that is PLC or similar control devices) consider using relay outputs with now suppression across the contacts. If this cannot be done, consider the leakage current of the device to see if it is compatible with the IntelliVAC inputs (see [Table 2](#)). If the control device is not compatible consider using an interposing relay connected as shown in [Figure 9](#).

### Figure 9 - Control with Solid-State Devices



## Two-Wire Control

If using two-wire control, the CLOSE contactor input is maintained high using a contact. Momentarily opening this input causes the module to open the contactor. Maintaining the contact provides a CLOSE command to IntelliVAC control module (given that all permissives are satisfied). If a fault occurs, in addition to cycling control power to the IntelliVAC module, the CLOSE command must be removed for a minimum of 4 seconds before being reapplied (see [Figure 10 on page 23.](#))

Some two-wire control schemes may be configured such that a close command is present when IntelliVAC is energized. In this case, the Power-Up Safety feature may be disabled by setting DIP switch 12 accordingly (see [Table 10](#)).

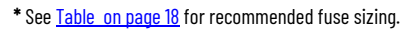


**ATTENTION:** Only disable the Power-Up safety feature when absolutely necessary. Doing so can create unsafe operating conditions.



**ATTENTION:** For Emergency Stop applications requiring removal of power, a contact should be placed in the 'L1' control power rung to the IntelliVAC. If the TDUV feature is used, the contactor will not open until the programmed TDUV time has expired.

### Figure 10 - Two-Wire Control



## Three-Wire Control

If using three-wire control, the CLOSE contactor input is maintained high using two contacts. Momentarily opening this input causes the module to open the contactor. Momentarily closing the START contact provides a CLOSE command to the module (given that all permissives are satisfied).

In this configuration, the STATUS output acts as a seal-in contact. If a fault occurs, in addition to cycling control power over to the IntelliVAC module, the CLOSE command must be removed for a minimum of 4 seconds before being reapplied. See [Figure 11 on page 24](#).



**ATTENTION:** For Emergency Stop applications requiring removal of power, a contact should be placed in the 'L1' control power rung to the IntelliVAC. If the TDUV feature is used, the contactor will not open until the programmed TDUV time has expired.

Figure 11 - Three-Wire Control

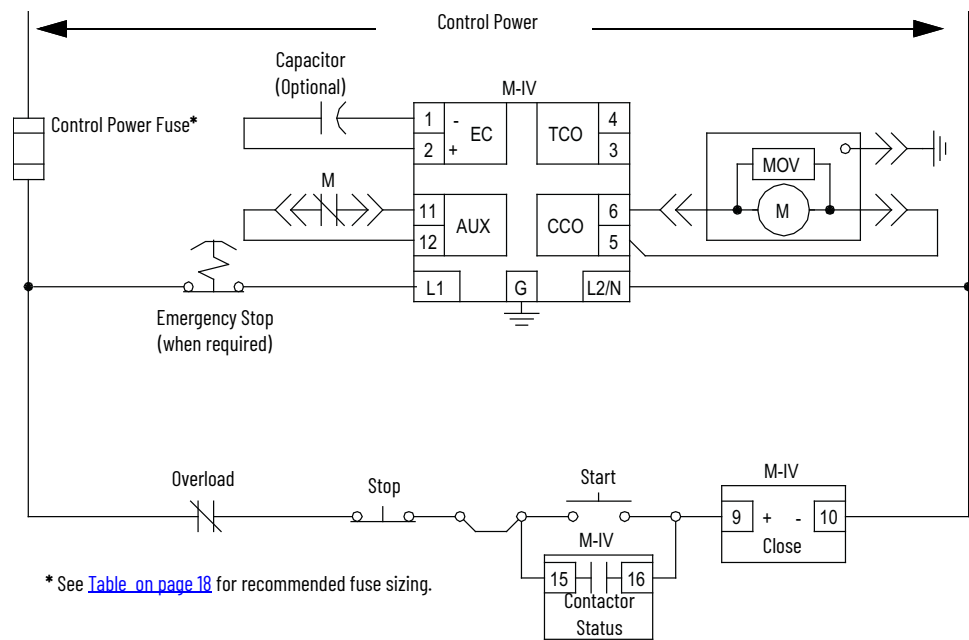
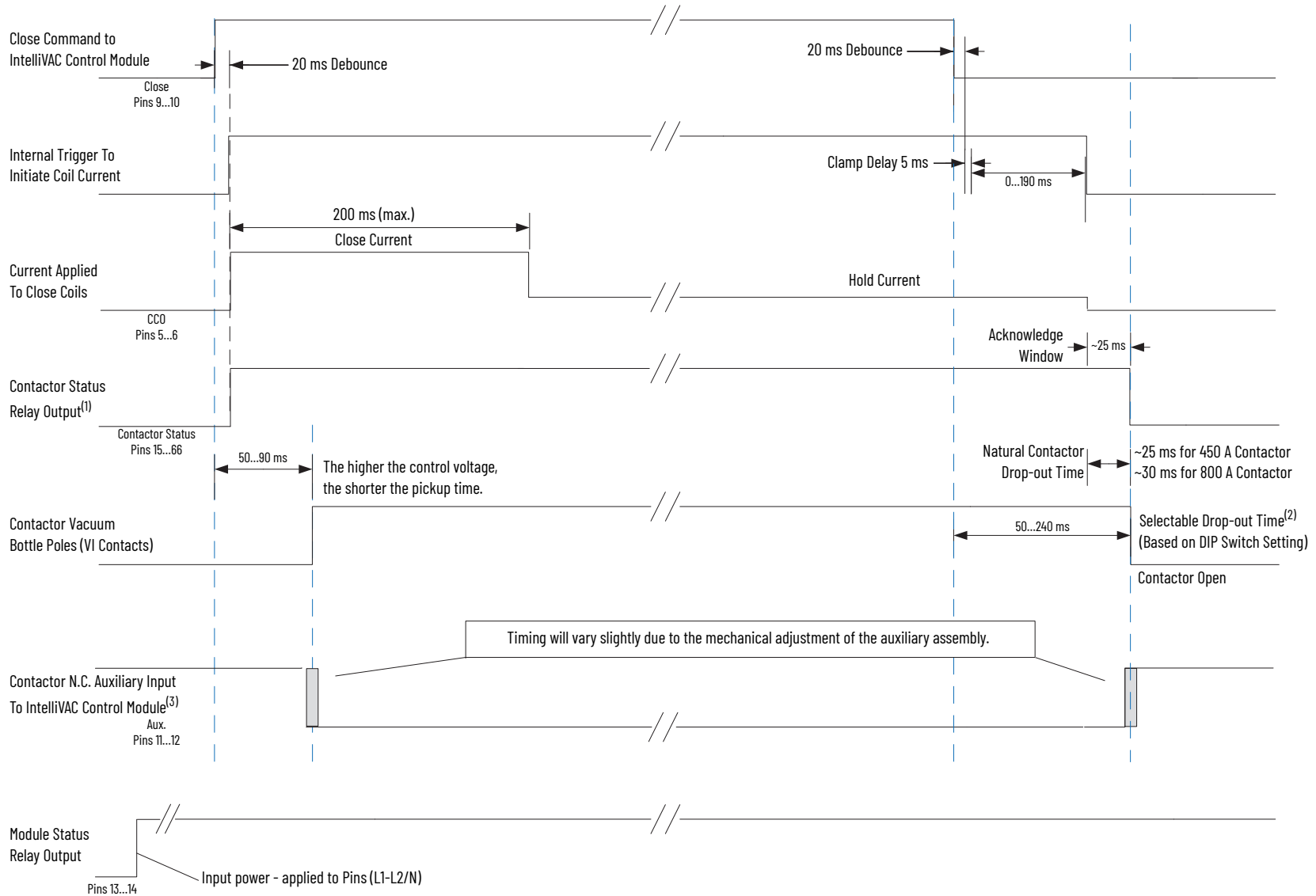




Figure 12 - 450/800 A Contactor with IntelliVAC Series F Control Module Timing Diagram



- (1) The contactor status is artificially forced to closed during the 200 ms Close current pulse. If the contactor closes successfully, (feedback based on a contactor NC auxiliary contact) this status reflects the actual contactor status once the 200 ms have elapsed. Otherwise, it changes the state (opens) after the 200 ms and the IntelliVAC control module faults (Open Module Status Relay).
- (2) The IntelliVAC control module DIP switch settings allow for a drop-out time selection between 50...240 ms. Any selected value includes the debounce (20 ms), clamp delay (5ms), internal coil current trigger (0...190 ms), and the natural contactor drop-out time (~25 ms). The drop out time is measured from when the close command to the IntelliVAC control module is removed until the vacuum bottle contacts open.
- (3) The contactor auxiliary contacts may open or close slightly before or after the contactor bottle contacts. Status checked after POC.

## Wiring Guidelines Mechanical Latch Contactors

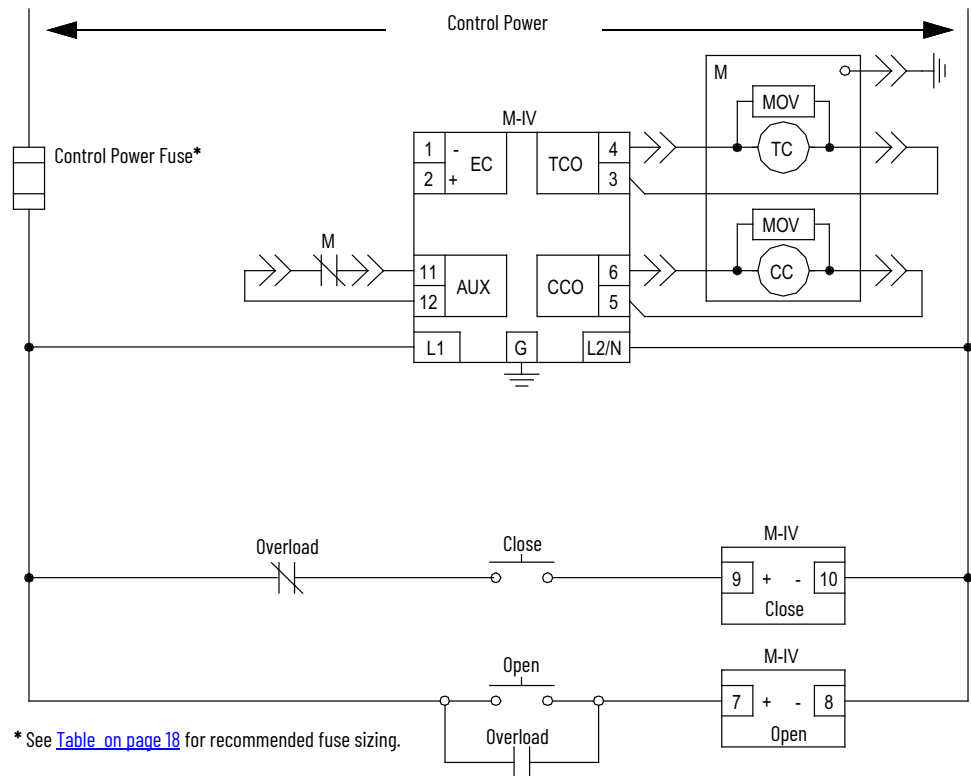
IntelliVAC control can be used for mechanical latch contactors. A momentary control signal is required to close the contactor, and a second momentary control signal is required to open the contactor. The momentary open/close commands must be at least 50 ms in duration.

See [Figure 13 on page 26](#) for a typical mechanical latch control scheme.

**IMPORTANT** A mechanical latch contactor may be closed when power is applied to the IntelliVAC control module.

**IMPORTANT** It is permissible to apply an open command to the IntelliVAC module as power is reapplied.

Figure 13 - Mechanical Latch Contactor Control



## Mechanical Latch Contactors

### Capacitor Trip

The IntelliVAC can be configured to provide capacitor trip functionality with mechanical latch contactors. A capacitor must be connected to the IntelliVAC (terminals #1 and #2) to provide this capability. The capacitor provides control power for the IntelliVAC and stored energy to trip the contactor. Maximum recommended capacitor size is 1650  $\mu\text{F}$  for 120V control or 330  $\mu\text{F}$  for 240V control. Use of larger capacitors is not recommended.

The IntelliVAC must receive an 'OPEN' command within a few seconds of losing AC control power. This time limit depends on voltage and capacitor size as shown in [Table 7](#). If the elapsed time exceeds this limit, the contactor cannot be tripped by IntelliVAC. In this case, the contactor can be tripped by pressing the release button on the door in front of the contactor.

A separate voltage source is required to provide the 'OPEN' command. This can be taken from the external capacitor as shown in [Figure 14 on page 27](#).

Table 7 - Mechanical Latch Contactor – Capacitor Trip Times (after loss of control power)

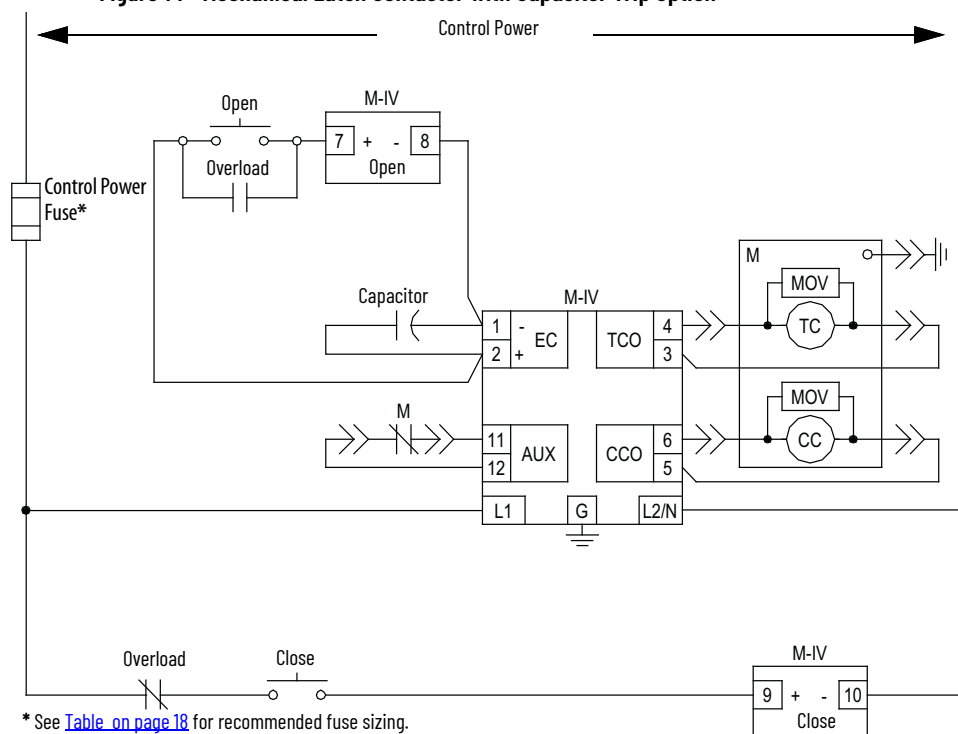
Contactor Rating	Nominal Voltage (V AC)	Actual $V_{input}$ (V AC)	Ext. Capacitor ( $\mu$ F)	Max. time For Trip (s)
450 A	120	120	1650	3.5
		110		2.7
		100		1.7
	240	200	330	7.5
		140		4.7

**IMPORTANT**

Minimum capacitor voltage ratings:

- 120V applications – 200V DC (250V DC preferred)
- 240V applications – 400V DC (450V DC preferred)

Figure 14 - Mechanical Latch Contactor with Capacitor Trip Option



## Motor Jogging Control

**IMPORTANT**

Jog functionality can work with electrically held contactor only.

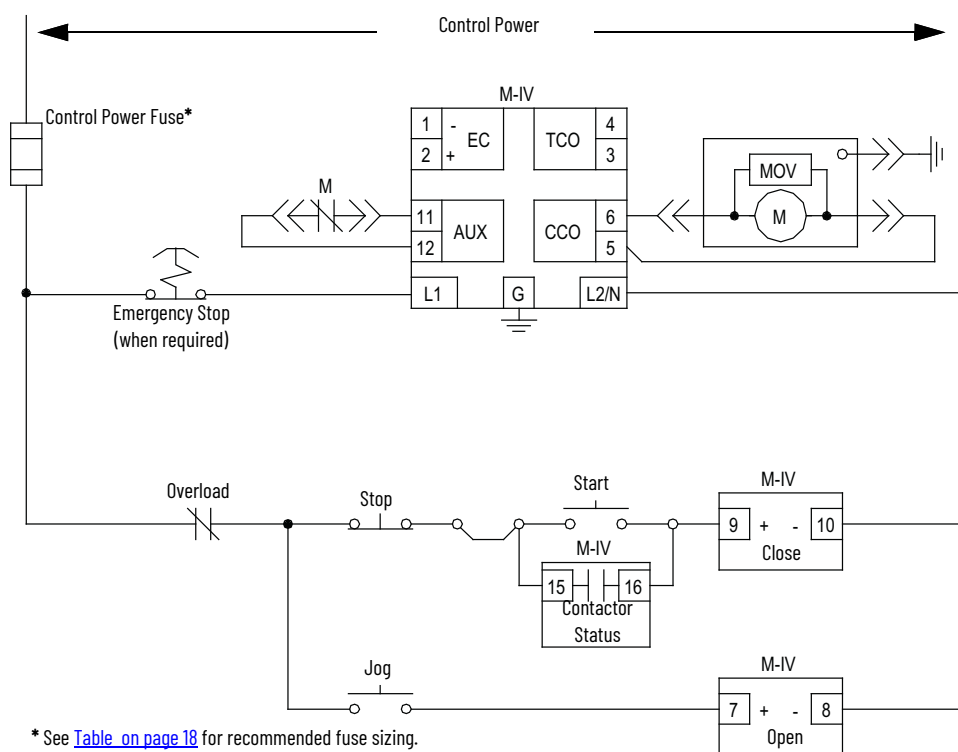
When used with electrically held contactors, the IntelliVAC allows close commands every six seconds. This is to ensure the rated contactor duty cycle of 600 operations per hour is not exceeded.

For motor jogging operations, the second control input, or OPEN command, will close the contactor for as long as the input is present, and open the contactor when the input is removed (see [Figure 15 on page 28](#)). This method will bypass the standard six second motor restart delay for jogging purposes only. Operations will be limited to two starts every twelve seconds.



**ATTENTION:** If the TDUV feature is used, the contactor will not open until the programmed TDUV time has expired. Therefore, applications requiring an immediate removal of power during emergency stop conditions are not compatible with the TDUV feature.

### Figure 15 - Motor Jogging Control



## Undervoltage Protection

The IntelliVAC controller protects the contactor from control voltage dips and loss of power. It provides undervoltage release and prevents attempts to close the contactor when insufficient power is available to guarantee reliable closing of the contacts. The undervoltage protection will be initiated under the following conditions, regardless of nominal control voltage:

1. If the supply voltage drops below 93V (AC or DC). This applies to electrically held and mechanical latch contactors.
2. If the supply voltage drops below 81V (AC or DC) during the 200 ms close sequence (electrically held contactors only) for a period 220 ms from the time the close command was received.

## Time Delay Undervoltage

The IntelliVAC can be configured to provide time delay undervoltage (TDUV) protection. The feature is available to keep electrically held contactors closed during a voltage dip or brief power loss. This option may require the addition of a capacitor (see below). See [Chapter 6](#) for typical capacitor sizing. The capacitor is connected to terminals 1(-) and 2(+) of the IntelliVAC control module, see [Figure 16](#).



**ATTENTION:** If the TDUV feature is used, the contactor will not open until the programmed TDUV time has expired. Therefore, applications requiring an immediate removal of power during emergency stop conditions are not compatible with the TDUV feature.

See [Table 10](#) for more information on the DIP switch settings to change TDUV from 0.2...2.0 seconds. The IntelliVAC control module can provide TDUV protection without the use of an external capacitor, see [Table 8 on page 29](#).

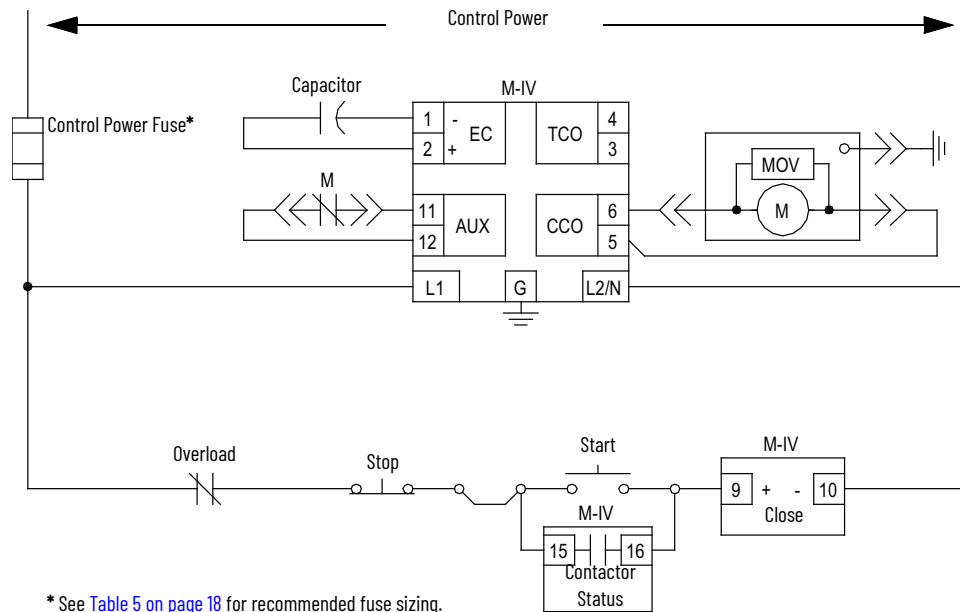


**ATTENTION:** The TDUV feature has limitations, if used for an input contactor on a PowerFlex 7000 drive with the Safe Torque Off option. See [Table 10](#).

**Table 8 - Maximum TDUV Time (without Capacitor)**

Control Voltage	Max. TDUV Time (s)	
	450 A	800 A
110/120V	0.2	0.2
220/240V	1.0	1.0

If the undervoltage condition persists beyond the set delay time, the contactor will be opened and an undervoltage fault or warning condition will occur, see [Chapter 5](#).

**Figure 16 - TDUV Control Circuit**

**Notes:**

## Setup and Commissioning

### IntelliVAC Configuration

The IntelliVAC™ control module is configured for a specific application by setting DIP switches. They are accessed by loosening the two screws on the front of the unit, and removing the cover by sliding it forward. The switches are found on the front edge of the IntelliVAC circuit board ([Figure 17](#)). There are 12 switches, with number 1 being at the top closest to the circuit board part number label.

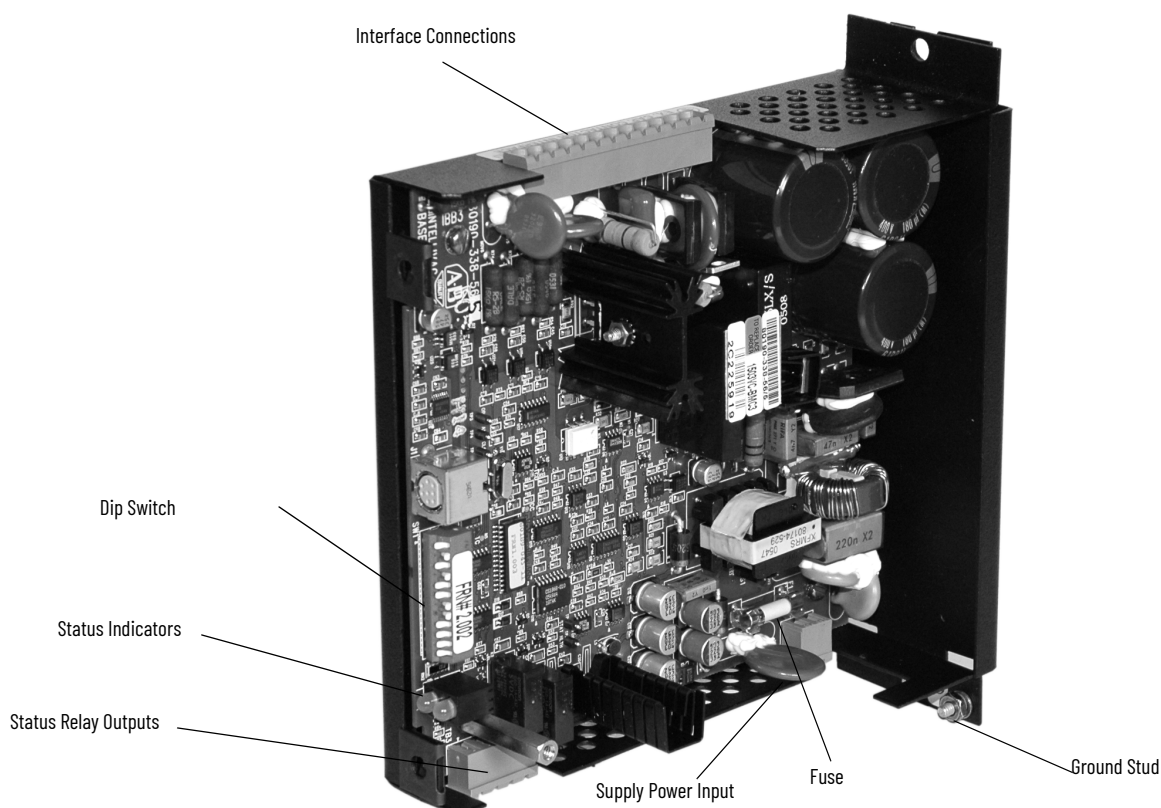


**SHOCK HAZARD:** Hazardous voltage is present inside the module which may cause personal injury or death. Remove all sources of power from the module and discharge any connected capacitors before removing the cover.

#### IMPORTANT

Remove power from the module before removing the cover and before changing the DIP switch settings. The new DIP switch settings are recognized only on power-up.

Figure 17 - DIP Switch and Connector Locations



A 1503WC-BMC IntelliVAC unit shipped separately from the factory will have a default configuration per [Table 9 on page 32](#).

Table 9 - DIP Switch Factory Default Settings

Description	DIP Switch											
	1	2	3	4	5	6	7	8	9	10	11	12
Altitude: 0...1000 m	0	0	1									
Drop-out time: 130 msec				0	1	1						
Contactor config.: 450 A EH							0	1				
TDUV config.: No TDUV									0			
Ext. cap TDUV time: 0.2 s										0	0	
Power-up safety: Enable												0

IntelliVAC control modules that are shipped in a complete MV controller (Bulletin 1500/1900) are configured for the installed application (contactor type). You must verify the settings before energizing the equipment. [Table 10](#) defines the switch settings.

Table 10 - IntelliVAC DIP Switch Explanation

UP = 1 Down = 0	DIP Switch SW1											
	1	2	3	4	5	6	7	8	9	10	11	12
<b>Altitude<sup>(1)</sup></b>												<b>Power-up Safety</b>
-1000...0	0	0	0									0 Enable
1...1000	0	0	1									1 Disable
1001...2000	0	1	0									
2001...3000	0	1	1									
3001...4000	1	0	0									
4001...5000	1	0	1									
Not defined	1	1	0									
Not defined	1	1	1									
<b>Drop out time<sup>(3)</sup></b>				<b>4</b>	<b>5</b>	<b>6</b>			<b>9</b>			<b>TDUV configuration<sup>(2)</sup></b>
50 ms				0	0	0			0			No TDUV
75 ms				0	0	1			1			TDUV Enabled
100 ms				0	1	0						
130 ms				0	1	1						
150 ms				1	0	0	0	0				
175 ms				1	0	1	0	1				
200 ms				1	1	0	1	0				
240 ms				1	1	1	1	1				
							<b>7</b>	<b>8</b>				<b>Contactor Configuration</b>
												450 A Mechanical Latch
												450 A Electrical Latch
												800 A Mechanical Latch
												800 A Electrical Latch

(1) The altitude compensation by DIP switch settings applies to Series E or higher 450 A vacuum contactors only. All 800 A contactors are adapted for altitude by altering the mechanical return springs, see publication [1502-UM054](#). 800 A contactors are to be set for 1...1000 m (001 DIP setting).

(2) Input contactors in PowerFlex 7000 applications with the Safe Torque Off Option (-24STO, -24STORK) must not use the TDUV feature set to more than 0.2 s.

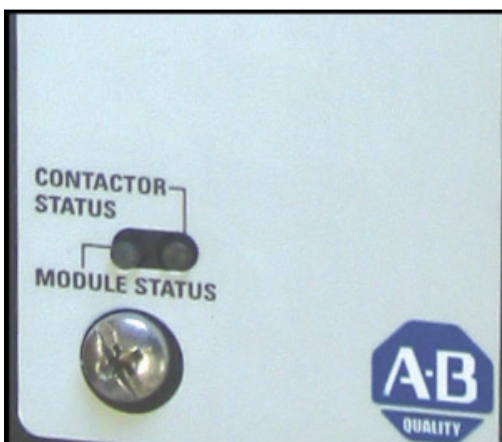
(3) By-pass contactors in medium voltage SMC applications must be set for 50 ms drop-out time. See [Appendix A](#) for typical drop-out time settings used when power fuses are provided by Rockwell Automation.



## Monitoring and Troubleshooting

The IntelliVAC™ control module has two status indicators and relay outputs to indicate the status of the contactor and the IntelliVAC control module. The status indicators are visible on the front of the module and the relay outputs are accessed on the terminal block of the bottom front of the module.

**Figure 18 - IntelliVAC Status Indicators**



### IMPORTANT

This user manual contains information for Series C, D, E, and F IntelliVAC versions. See [Module Status](#) for information about the IntelliVAC series in use.

### Module Status

The module status is indicated with a green status indicator if the module is functioning properly and has a valid configuration. If the module powers up with an invalid configuration the status indicator will be red (flashing once), indicating a fault condition which will not allow the contactor to close. If the module powers up properly and experiences an undervoltage condition when attempting to close the contactor or while the contactor is closed:

If the processor has an internal fault, the status indicator will be red, the outputs will be cleared, and the processor must be reset (input power must be cycled). If the reset is successful, the status indicator will be green and the module will respond to the control inputs. The input command must be toggled before the module will respond to a new command (rising edge triggered).

For Series F, the module status indicator indicates various “Warning” conditions related to the contactor performance, see [Table 11](#).

The module status output relay has a normally open contact. The contact is open during a fault condition (status indicator red), and closed during a healthy condition (status indicator green). The relay is open for some warning conditions, but closed for less severe issues.

### Contactor Status

The Contactor Status is indicated with a yellow status indicator that is off until a CLOSE command is received. The yellow status indicator will stay on if the contactor closes properly, until the contactor is opened. If the processor has an internal fault, the status indicator will be red.

Contactor Status output relay has a normally open contact. The contact is open when the contactor is open (status indicator off), and closed when the contactor has received a close command (for 200 ms) or if it is closed (status indicator on).

**IMPORTANT** The Contactor will only respond to close command reapplications after the restart delay timer has expired.

The contactor states are summarized in see [Table 11](#).

**IMPORTANT** The status indicators are red/green types with both sections ON to produce yellow. If viewed from a sharp angle, you may see only green or red. Please view from directly in front of the module to ensure accurate color recognition.

**Table 11 - IntelliVAC Status Indication (Series F only)**

Conditions <sup>(1) (2)</sup>	Description	Module Status		Contactor Status	
		Status Indicator Color	Status Relay	Status Indicator Color	Relay
Warning	Invalid Command Present <sup>(3)</sup>	Yellow	Closed	Off	Open
Warning	Mechanical Latch Fail to Trip	Yellow	Closed	Yellow	Closed
Warning	Contactor Fails to Pick Up	R1 - Yellow <sup>(4)</sup>	Closed	Off / Yellow <sup>(5)</sup>	Open / Closed <sup>(5)</sup>
Warning	Contactor Drop Out During Hold <sup>(4)</sup>	R2 - Yellow <sup>(6)</sup>	Closed	Off / Yellow <sup>(5)</sup>	Open / Closed <sup>(5)</sup>
Warning	Contactor status shows 'Closed' after dropout	R3 - Yellow <sup>(7)</sup>	Closed	Off / Yellow <sup>(5)</sup>	Open / Closed <sup>(5)</sup>
Warning	TDUV timer expired	R4 - Yellow <sup>(8)</sup>	Closed	Off	Open
Warning	Undervoltage with a CLOSE Command Present <sup>(9)</sup>	Yellow - Flashing	Open / Closed <sup>(10)</sup>	Off / Yellow	Open / Closed <sup>(5)</sup>
Normal	Healthy Module and Contactor OPEN	Green	Closed	Off	Open
Normal	Healthy Module and Contactor CLOSED	Green	Closed	Yellow	Closed
Fault	Power Up with Contactor CLOSED <sup>(11)</sup>	Red - Flash 2 <sup>(12)</sup>	Open	Yellow	Closed
Fault	Microprocessor failure	Red	Open	Red	Open
Fault	DIP switch configuration is invalid	Red - Flash 1 <sup>(13)</sup>	Open	Off	Open

(1) Warnings will be cleared when a change of input state occurs, and the condition has been resolved.

(2) Faults require control power to be removed until the unit resets.

(3) Invalid Command Types:

1. Close, Jog or Trip commands present during power up sequence.

2. Close or Jog command reapplied too quickly (before contactor opening sequence is verified).

Allow at least 60 ms, plus drop out delay time, before reapplying these signals.

**NOTE:** Contactor will only respond to a close command reapplications after the restart delay timer has expired.

3. Close and Trip commands present simultaneously (valid with mechanical latch contactors only).

(4) R1 - Yellow = Red flash followed by 1.5 s of Yellow.

(5) Reflects the actual status of the contactor.

(6) R2 - Yellow = First Red flash, followed by Yellow flash, followed by a second Red flash, followed by 1.5 s of Yellow.

(7) R3 - Yellow = Red flash followed by Yellow flash (2 times), followed by red flash followed by 1.5 s of Yellow.

(8) R4 - Yellow = Red flash followed by Yellow flash (3 times), followed by red flash followed by 1.5 s of Yellow.

(9) See [Undervoltage Protection](#) for more information.

(10) Open during undervoltage, Closed if voltage restored.

(11) Only for electrically held contactor.

(12) Flash 2 = 2 Consecutive Red status indicator flashes followed by a pause.

(13) Flash 1 = 1 Red status indicator flash followed by a pause.

Table 12 - Module Troubleshooting

Problem or Trip Indicated	Possible Condition	Possible Solutions
Contactor does not energize	<ul style="list-style-type: none"> <li>Motor protection device Trip contact activated</li> <li>Both status indicators 'Off'</li> </ul>	<ul style="list-style-type: none"> <li>Investigate and reset</li> <li>Check control power and control fuse power</li> <li>Loose connections in control circuit</li> <li>Verify IntelliVAC power input plug is in place and properly seated</li> <li>Verify internal control fuse has not opened (see <a href="#">Figure 17</a> for location)</li> </ul>
	<ul style="list-style-type: none"> <li>Module status indicator 'Red' upon power up</li> </ul>	<ul style="list-style-type: none"> <li>IntelliVAC faulted. Cycle control power to reset. Replace IntelliVAC control module if unsuccessful.</li> </ul>
	<ul style="list-style-type: none"> <li>Module status indicator 'Red Flash 1' or 'Red Flash 2' upon power up. See <a href="#">Contactor Status</a> for more information.</li> </ul>	<ul style="list-style-type: none"> <li>Improper setting of dip switches. Check settings and cycle control power.</li> </ul>
	<ul style="list-style-type: none"> <li>Loose connection in control circuit.</li> </ul>	<ul style="list-style-type: none"> <li>Verify contactor auxiliary installation. See publication <a href="#">1502-UM052</a> or <a href="#">1502-UM051</a> - Auxiliary Contact Set-up Procedure.</li> <li>Verify circuit continuity (is contactor plug connected properly?)</li> </ul>
Contactor closes momentarily and will not reclose.	<ul style="list-style-type: none"> <li>Module status indicator 'Yellow - Flashing' and contactor status indicator 'Off'</li> </ul>	<ul style="list-style-type: none"> <li>Undervoltage fault (no TDUV), control voltage dipped below trip point. Verify voltage levels are 110...240V AC, 110...250V DC</li> </ul>
Contactor fails to close.	<ul style="list-style-type: none"> <li>Module status indicator 'R1 - Yellow' and contactor status indicator 'Off'. Check internal control fuse. Verify IntelliVAC operation in test mode before applying medium voltage. See <a href="#">Figure 17</a> for location. See <a href="#">Contactor Status</a> for more information.</li> </ul>	<ul style="list-style-type: none"> <li>Coil damaged or connections are loose. Repair and cycle control power (Series C).</li> <li>Auxiliary Contact Assembly improperly adjusted. See Publication <a href="#">1502-UM052</a> or <a href="#">1502-UM051</a> - Auxiliary Contact Set-up Procedure. Cycle control power to reset (Series C).</li> <li>Armature Plate obstructed from closing to coil face. Verify no foreign material behind the armature plate. Cycle control power to reset.</li> </ul>
	<ul style="list-style-type: none"> <li>Both status indicators 'Off'. See <a href="#">Contactor Status</a> for more information.</li> </ul>	<ul style="list-style-type: none"> <li>Check internal control fuse. Verify IntelliVAC operation in test mode before applying medium voltage, see <a href="#">Figure 17</a> for location.</li> </ul>
Contactor opens during operation	<ul style="list-style-type: none"> <li>Motor protection activated</li> </ul>	<ul style="list-style-type: none"> <li>Investigate and reset.</li> </ul>
	<ul style="list-style-type: none"> <li>'Yellow - Flashing'. See <a href="#">Contactor Status</a> for more information.</li> </ul>	<ul style="list-style-type: none"> <li>Undervoltage fault (no TDUV), control voltage dipped below trip point. Verify voltage levels are 110...240V AC, 110...250V DC.</li> <li>With external capacitor and TDUV feature activated, undervoltage condition for longer than programmed TDUV time. Undervoltage fault activated.</li> </ul>
	<ul style="list-style-type: none"> <li>Module status indicator 'R2 - Yellow' and contactor status indicator 'Off'. See <a href="#">Contactor Status</a> for more information.</li> </ul>	<ul style="list-style-type: none"> <li>Contactor status feedback between Terminals 11 and 12 on the IntelliVAC has closed. The IntelliVAC control module de-energizes the coil, thinking the contactor has opened for other reasons.</li> </ul>
	<ul style="list-style-type: none"> <li>Both status indicators 'Off'. See <a href="#">Contactor Status</a> for more information.</li> </ul>	<ul style="list-style-type: none"> <li>Check control voltage and internal control fuse. (see <a href="#">Figure 17</a> for location).</li> </ul>
Contactor does not open (mechanical latch)	<ul style="list-style-type: none"> <li>Module status indicator 'Yellow' and contactor status indicator 'Yellow'. See <a href="#">Contactor Status</a> for more information.</li> </ul>	<ul style="list-style-type: none"> <li>Trip mechanism is damaged. Inspect and replace if required.</li> <li>Check for loose connections in the control circuit.</li> </ul>
Contactor does not open (electrically held)	<ul style="list-style-type: none"> <li>Module status indicator 'R3 - Yellow' and contactor status indicator 'Yellow'. See <a href="#">Contactor Status</a> for more information.</li> </ul>	<ul style="list-style-type: none"> <li>Contactor welded closed or mechanisms binding. Inspect and repair if required.</li> </ul>

See [Contactor Status](#) for definitions of module status indicator states.

Refer to the correct manual for your Series letter. See [Additional Resources on page 5](#).

**Notes:**

## Spare Parts

### Spare Parts List

IntelliVAC™ (electrically held) Series A <sup>(1)</sup>	1503VC-BMC1 - Order 1503VC-BMC5
IntelliVAC (mechanical latch) Series A <sup>(1)</sup>	1503VC-BMC2 - Order 1503VC-BMC5
IntelliVAC (electrically held and mechanical latch) Series B <sup>(1)</sup>	1503VC-BMC3 - Order 1503VC-BMC5
IntelliVAC (electrically held and mechanical latch) Series C and D <sup>(1)</sup>	1503VC-BMC4 - Order 1503VC-BMC5
IntelliVAC (electrically held and mechanical latch) Series E and F <sup>(1)</sup>	1503VC-BMC5
Internal Fuse: 6.3 A, 250V (Littlefuse 21506.3)	80174-902-14-R
Multi-pole connectors:	
2 pole (module power)	80174-014-01-R
4 pole (status outputs)	80174-014-03-R
12 pole (coil and I/O connections)	80174-014-11-R

(1) The series letter is printed on the large label on the right-hand side of the enclosure, beside the part number.

### Optional Equipment

<b>TUV Capacitor<sup>(1)</sup></b>	
110/120V AC control (1650 µF)	80158-779-51-R
220/240V AC control (330 µF)	80158-779-52-R

(1) Includes mounting bracket and terminal guards.

**Notes:**

## Contactor Drop-out Time Settings

### Typical Settings

The contactor drop-out time settings are typical minimum values used when the power fuses are provided as part of a complete medium voltage controller from Rockwell Automation. The recommendations are based on Ferraz-Shawmut power fuses. Other fuse types may require alternate drop-out time settings.

The IntelliVAC™ control module DIP switches are designed to provide the minimum drop-out times shown, see [Chapter 4](#).

**Table 13 - Typical Contactor Drop-Out Time Settings**

<5000V Fuse Rating	Contactor Drop-out Time Setting (ms) <sup>(1)</sup>	
Designation	450 A	800 A
2R	50	50
3R		
4R		
6R		
9R		
12R		
18R		
19R		
24R	100	
32R	240	
38R		240 <sup>(2)</sup>
48X		
57X		
2 x 24R		
2 x 32R		
2 x 38R		
2 x 48X		
2 x 57X		
20E	50	50
30E		
40E		
50E		
65E		
80E		
100E		
125E		
150E		
175E		
200E		
250E		
300E		
350E	75	
400E	100	
450E	130	
500E	240	
600E	240 <sup>(2)</sup>	75

Table 13 - Typical Contactor Drop-Out Time Settings (Continued)

<5000V Fuse Rating	Contactor Drop-out Time Setting (ms) <sup>(1)</sup>	
Designation	450 A	800 A
750E		200
900E		240 <sup>(2)</sup>
2 x 250E		50
2 x 300E		75
2 x 350E		
2 x 400E		100
2 x 450E		130
2 x 500E		240
2 x 600E		
2 x 750E		
2 x 900E		

(1) Shaded areas indicate that fuses are not suitable for use with contactor.

(2) With the exception of the drop-out time noted here, the drop-out time is chosen to be equal to or greater than the intersection of the rated contactor interrupting current and the fuse melt time curve.

Table 14 - Typical Contactor Drop-Out Time Settings

7200V Fuse Rating	Contactor Drop-out Time Setting (ms) <sup>(1)</sup>	
Designation	450 A	800 A
2R	50	50
3R		
4R		
6R		
9R		
12R		
18R	75	
24R	150	
32R	240 <sup>(2)</sup>	
38R		75
48X		150
57X		200
2 x 18R		50
2 x 24R		130
2 x 32R		240 <sup>(2)</sup>
2 x 38R		
2 x 48X		
2 x 57X		

(1) Shaded areas indicate that fuses are not suitable for use with contactor.

(2) With the exception of the drop-out time noted here, the drop-out time is chosen to be equal to or greater than the intersection of the rated contactor interrupting current and the fuse melt time curve.



Table 15 - Typical Contactor Drop-Out Time Settings

8250V Fuse Rating	Contactor Drop-out Time Setting (ms)	
Designation	450 A	800 A
10E	50	50
15E		
20E		
25E		
30E		
40E		
50E		
65E		
80E		
100E		
125E		
150E		
175E		
200E		

**Notes:**



# Rockwell Automation Support

Use these resources to access support information.

<b>Technical Support Center</b>	Find help with how-to videos, FAQs, chat, user forums, Knowledgebase, and product notification updates.	<a href="http://rok.auto/support">rok.auto/support</a>
<b>Local Technical Support Phone Numbers</b>	Locate the telephone number for your country.	<a href="http://rok.auto/phonesupport">rok.auto/phonesupport</a>
<b>Technical Documentation Center</b>	Quickly access and download technical specifications, installation instructions, and user manuals.	<a href="http://rok.auto/techdocs">rok.auto/techdocs</a>
<b>Literature Library</b>	Find installation instructions, manuals, brochures, and technical data publications.	<a href="http://rok.auto/literature">rok.auto/literature</a>
<b>Product Compatibility and Download Center (PCDC)</b>	Download firmware, associated files (such as AOP, EDS, and DTM), and access product release notes.	<a href="http://rok.auto/pcdc">rok.auto/pcdc</a>

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## Waste Electrical and Electronic Equipment (WEEE)



At the end of life, this equipment should be collected separately from any unsorted municipal waste.





Rockwell Automation maintains current product environmental compliance information on its website at [rok.auto/pec](http://rok.auto/pec).

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PN-702872