

ACE20 and ACE30 Variable Frequency Drive System

Installation & Maintenance Information

IF 1660

SAVE THESE INSTRUCTIONS FOR FUTURE REFERENCE

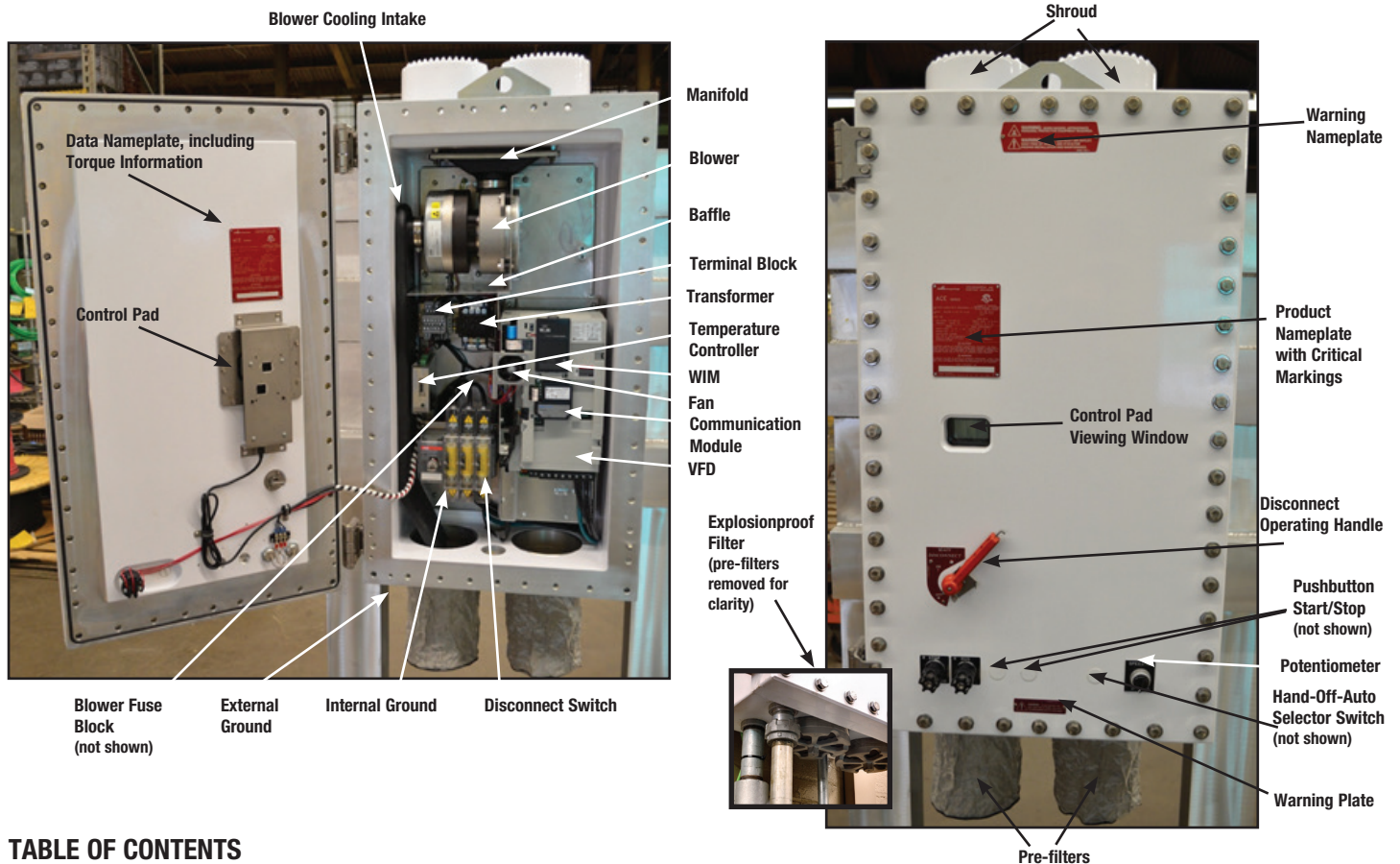


TABLE OF CONTENTS

1. Safety Instructions		
1.1 Application	Page 2	
1.2 Electrical Safety	Page 2	
1.3 Blower Safety	Page 2	
1.4 Hot Surfaces	Page 2	
1.5 Enclosure Safety	Page 3	
2. Mechanical Installation		
2.1 Airflow Provisions - Installation Drawing	Page 3	
2.2 Weights	Page 3	
2.3 Lifting	Page 3	
2.4 Dimensional Drawings	Page 4	
2.5 Mounting	Page 4	
2.6 Shroud Installation	Page 4	
2.7 Pre-filter Installation	Page 5	
3. Electrical Installation		
3.1 Enclosure Grounding - Internal/External	Page 5	
3.2 Line Feed	Page 5	
3.3 Load Feed and Shield Grounding to Drive	Page 5	
3.4 Control Wire Routing	Page 5	
3.5 Blower and Signal Schematic	Page 6	
4. General Operation		
4.1 Control Pad Viewing Window	Page 12	
4.2 Disconnect and Lockout/Tagout	Page 12	
4.3 Communication Modules	Page 12	
4.4 POT, RR3 (HOA), and PB23 (Pushbutton Start/Stop)	Page 12	
5. Maintenance		
5.1 Drive Maintenance	Page 12	
5.2 Cooling System Maintenance	Page 12	
5.3 Periodic Mechanical Maintenance (<i>Torque Verification</i>)	Page 13	
5.4 Status Indication	Page 13	
5.5 Explosive Event Required Maintenance	Page 13	
6. Technical Data		
6.1 Technical Data Chart	Page 13	
6.2 Power Loss (Heat Dissipation)	Page 13	
6.3 Derating Factors and Curves (<i>Ambient Temperature, Altitude, Switching Frequency</i>)	Page 13	
7. Crouse-Hinds Drive Parameters		
7.1 Parameter Table	Page 14	
8. Replacement Parts		
8.1 Pre-filter Kit	Page 14	
8.1.1 Pre-filter Installation Instructions	Page 14	
8.2 Sintered Filter Kit	Page 14	
8.2.1 Sintered Filter Installation Instructions	Page 14	
8.3 Blower Kit	Page 15	
8.3.1 Blower Installation Instructions	Page 15	
8.4 Temperature Controller Kit	Page 16	
8.4.1 Temperature Controller Installation Instructions	Page 16	

1. SAFETY INSTRUCTIONS

The ACE Explosionproof VFD should be installed, inspected, and maintained by qualified and competent personnel.

1.1 APPLICATION

The ACE Explosionproof VFD is rated Class I, Divisions 1 and 2 for use in hazardous environments, and is designed to match the strict requirements of pumps, compressors, fans, separators, and mixers in such process industries as:

- Oil and gas / refineries
- OEM skid builders
- Petrochemical
- Water / wastewater
- Pharmaceutical
- Food and beverage manufacturing

1.2 ELECTRICAL SAFETY

⚠ WARNING: HIGH VOLTAGE

Electrical power must be OFF before and during inspection or service. Ensure electrical supply to the enclosure is disconnected, locked out and tagged out. Personnel injury or damage to equipment can occur if all power upstream from the enclosure is not fully disconnected prior to opening.

Before commissioning the drive and putting it into service, make sure that the motor and all driven equipment are suitable for operation throughout the speed range provided by the drive. The drive can be adjusted to operate the motor at speeds above and below the speed provided by connecting the motor directly to the line power.

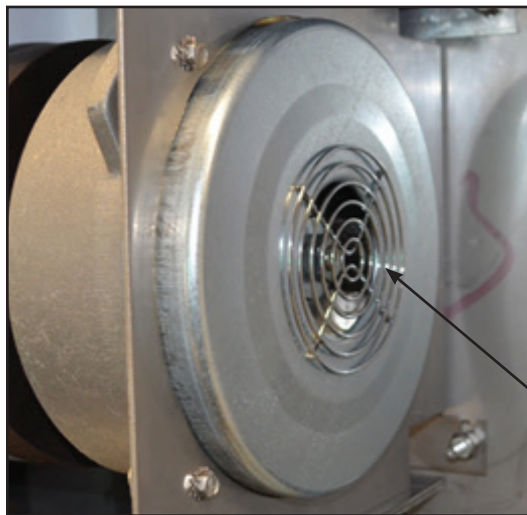
⚠ CAUTION

To ensure safety and VFD performance, grounding provisions for the enclosure, blower, and VFD must be made before operating.

1.3 BLOWER SAFETY

⚠ WARNING

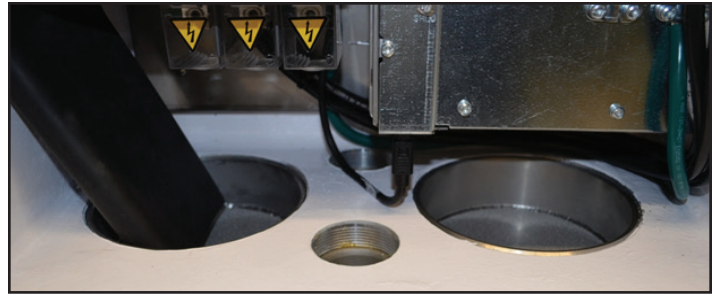
To avoid cooling system malfunction, cooling system failure, and personnel injury, close and seal the enclosure before energizing.



Blower Intake

⚠ WARNING: HIGH SPEED

To avoid personnel injury, DO NOT handle the blower or service the enclosure while energized.



⚠ WARNING

To avoid cooling system malfunction, cooling system failure, and personnel injury, remove all loose debris and deposits before energizing.

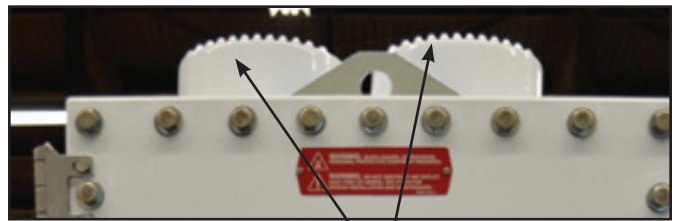
These blowers comply with EN 61800-5-1 safety standards.

The blower is non-serviceable. Refer to ACE KIT 3, Section 8.3, for replacement instructions.

1.4 HOT SURFACES

⚠ WARNING: BURN HAZARD

To avoid personnel injury, use appropriate personnel protective equipment before handling and operating the device.



Filter Shrouds

1.5 ENCLOSURE SAFETY

⚠ WARNING

To avoid personnel injury and property damage, clean dirt and debris from flat ground joint surfaces before the cover is closed. NEVER energize this equipment if the flat ground joint has been scratched or damaged.

All pipe threaded connections into the enclosure require a minimum of five (5) full threads of engagement. All straight threaded connections into the enclosure require a minimum of eight (8) full threads of engagement. Personnel injury or equipment damage can result from threaded joints containing less than the minimum thread engagement required.

All unused conduit openings must be plugged. UL Listed plug must engage a minimum of five (5) full threads and be a minimum of 1/8" thick.

Conduit sealing fittings MUST be installed in each attached conduit run (within eighteen (18) inches of the enclosure) to comply with the latest edition of the National Electrical Code® (NEC) plus any other applicable code.

The cover must be properly fastened to the body with all cover bolts torqued to 40-45 ft.-lbs. (19.2-21.5 N-m). Personnel injury or equipment damage can result if the flat joint flame path is not properly fastened.

Wireless Interface Module (WIM) offered with ACE20 (Rockwell VFD) must be used with precaution. If the device communicating to the WIM is exposed to the hazardous environment during operation, it must be rated and certified for the area of intended use. For the device used to communicate to the WIM, refer to the manufacturer's instructions on acceptable use.

⚠ WARNING

To avoid cooling system malfunction and personnel injury, be sure to torque the first eight (8) cover screws sequentially per Figure 1 before torquing the remaining screws.

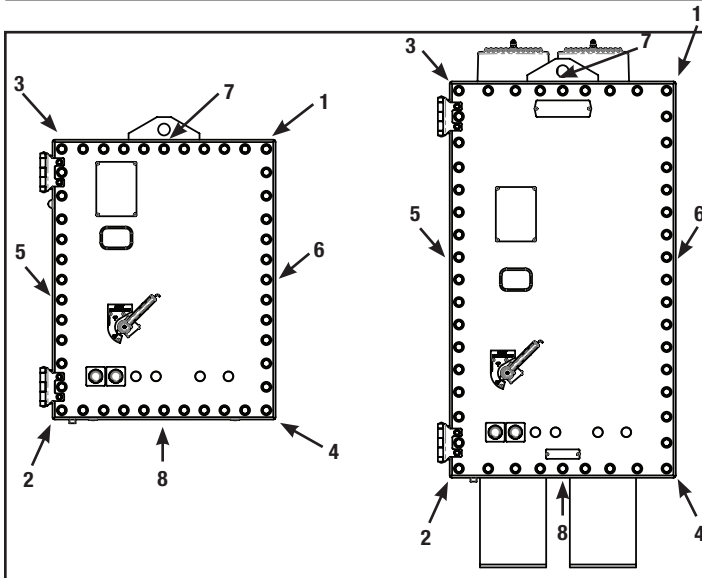


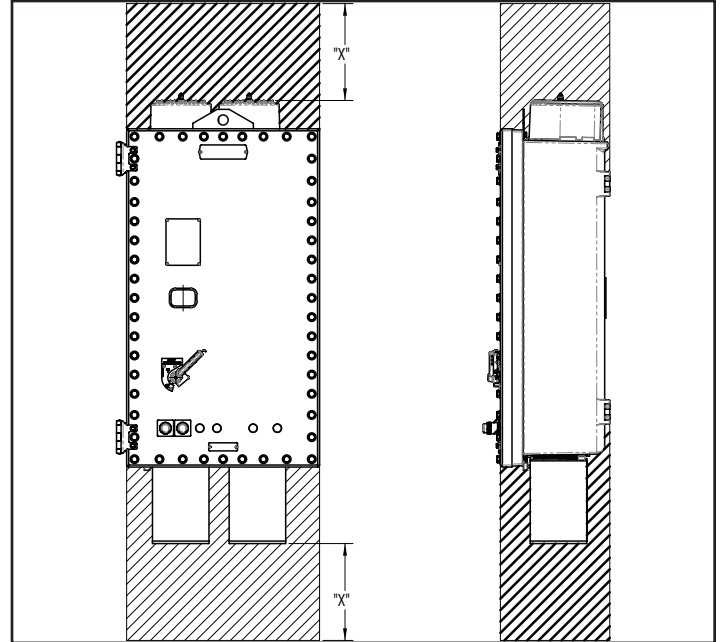
Figure 1

⚠ WARNING

To avoid personnel injury and property damage, DO NOT remove or modify the control pad viewing window.

2. MECHANICAL INSTALLATION

2.1 AIRFLOW PROVISIONS - INSTALLATION DRAWING



It is imperative that the enclosure be well ventilated to ensure reliable performance. Adequate space around the intake and exhaust of the enclosure MUST be accommodated. Crouse-Hinds recommends 'x' be a minimum of 12 inches (0.3 meters).

2.2 WEIGHTS

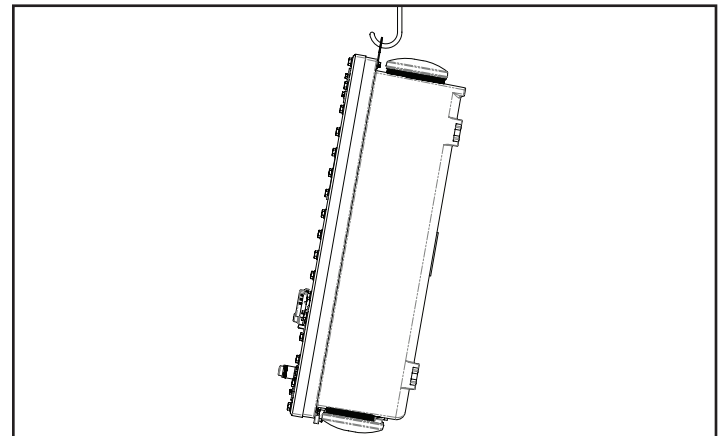
Enclosure	Weight
1-5 HP	390 lbs.
7-50 HP	600 lbs.

2.3 LIFTING

1. Remove top and sides from shipping crate.
2. Remove lag bolts from enclosure mounting feet.

⚠ CAUTION

Do not attach shrouds or pre-filters until after enclosure is mounted.

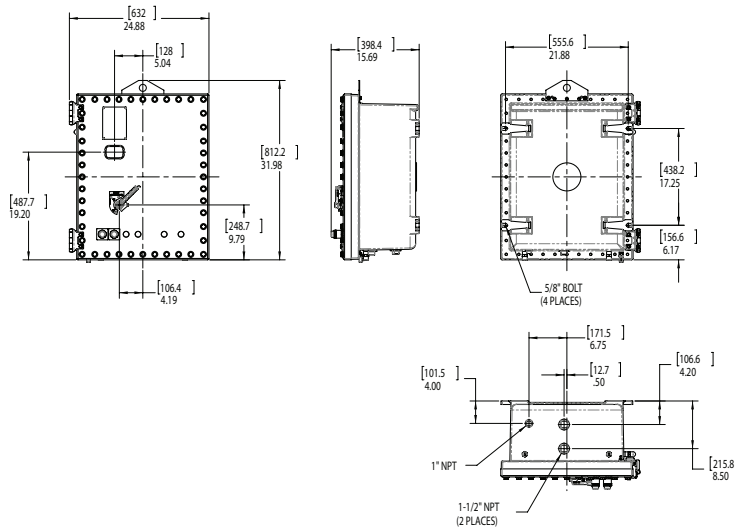


⚠ CAUTION: UNBALANCED LOAD

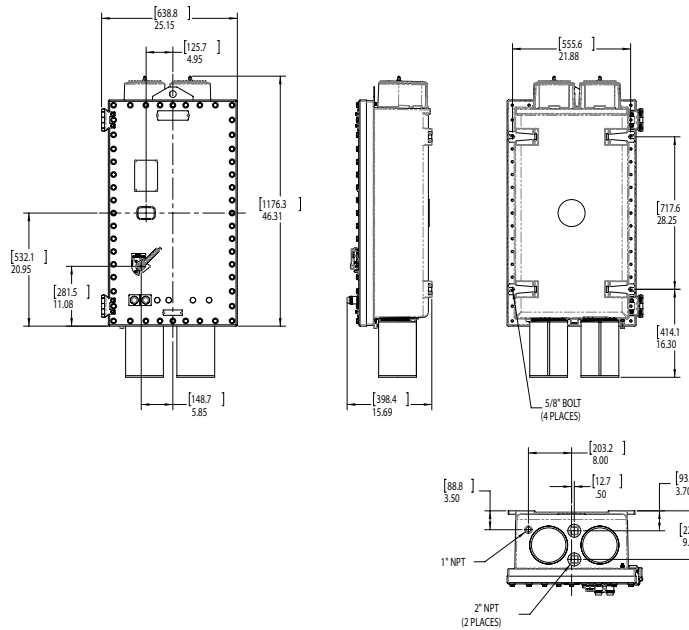
To avoid personnel injury, utilize the dedicated lifting eye and handle appropriately to ensure safe installation.

3. Use the dedicated lifting eye to mount enclosure on suitable mounting surface. Select a mounting location that will provide suitable strength and rigidity for supporting the enclosure and all components.

2.4 DIMENSIONAL DRAWINGS



ACE Size 1



ACE Size 2

2.5 MOUNTING

1. Select a mounting location that will provide suitable strength, rigidity, and space (per Section 2.1) for supporting the ACE Series system and all contained wiring.

⚠ CAUTION

To avoid cooling system malfunction, cooling system failure, and personnel injury, be sure to mount the enclosure as depicted in Section 2.4.

⚠ CAUTION

To avoid cooling system malfunction, cooling system failure, and personnel injury, be sure to mount the enclosure in a shaded area to avoid direct sunlight.

2. Refer to Section 2.2 for approximate weights and Section 2.4 for dimensions.
3. Install two (2) 5/8" bolts on left side.
4. Tap each of the four (4) mounting feet with a mallet to ensure tight assembly.
5. Align enclosure with the two left side mounting feet engaged with the mounting bolts on selected mounting surface.
6. Tighten two (2) bolts on left side.
7. Install two (2) 5/8" bolts on right side and tighten.
8. After enclosure is positioned and secured in its permanent location, pull wires into the ACE Series system, making sure that they are long enough to make the required connections.

2.6 SHROUD INSTALLATION

1. Remove rubber caps from explosionproof filters.
2. Insert threaded rods into the explosionproof filters. Leave 3-5% of threaded rod exposed.
3. Place shroud over explosionproof filters and threaded rod, with shroud opening facing back of enclosure. See Figure 2.
4. Insert washer and nuts onto end of threaded rod and tighten securely until shroud is firmly contacting the top wall of the enclosure. See Figure 3.

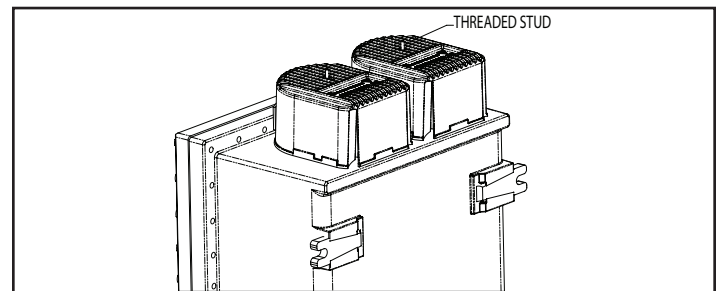


Figure 2

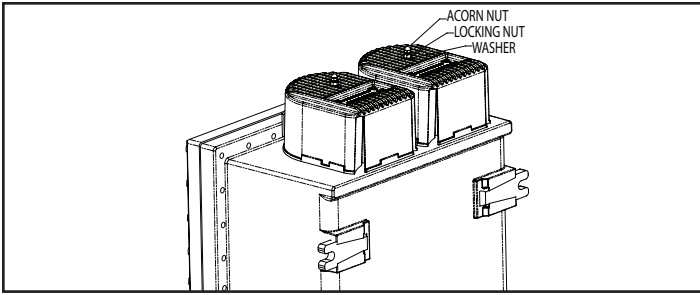
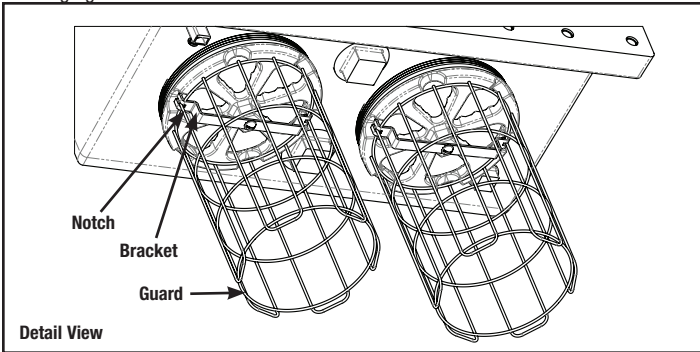


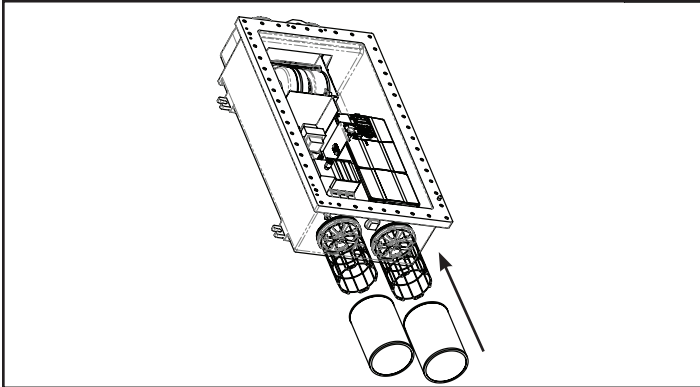
Figure 3

2.7 PRE-FILTER INSTALLATION

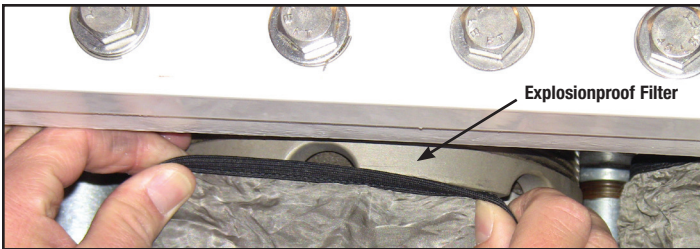
1. Remove rubber caps from explosionproof filters.
2. Install wire guard using the bracket, screw, and lock washer provided to the bottom filter(s).
3. Align guard with notches within the bracket as shown.



4. Tighten screw.
5. Slip pre-filter mesh over guard.



6. Be sure to stretch pre-filter elastic band completely around the explosionproof filter and seat the elastic band on the filter's threads. This will ensure all air flow to the bottom filters passes through the pre-filters.



3. ELECTRICAL INSTALLATION

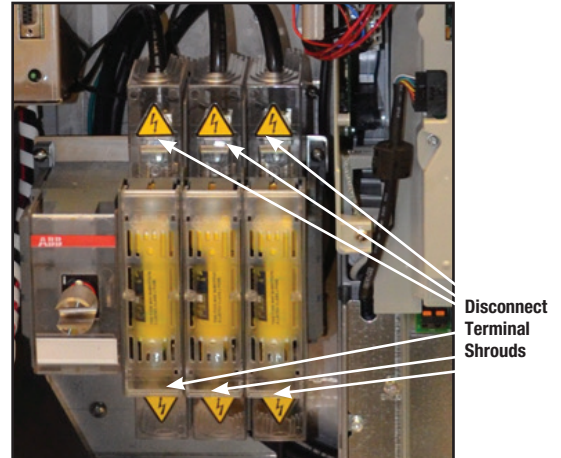
3.1 ENCLOSURE GROUNDING - INTERNAL/EXTERNAL

Grounding and bonding of the conduit and equipment is required by the National Electrical Code®. A grounding conductor must be connected to the grounding lugs furnished.

Determine the type of distribution systems to be used that will comply with NEC requirements and ensure grounding continuity.

All conductive equipment that enclose the electrical conductors or attached equipment or forming part of such equipment must be grounded. A permanent connection must be made between all such equipment and the earth. Refer to Section 5.3 for the torque requirements of all terminations within this device.

3.2 LINE FEED



This equipment is designed for line connection directly to the integral disconnect switch. Factory wiring transmits power to the variable frequency drive.

1. Remove disconnect terminal shrouds (only required on 40-50 HP units).
2. Attach line conductors with phase A on the left, B center, and C to the right (see torque table in Section 5.3).
3. Re-install terminal shrouds (only required on 40-50 HP units).

3.3 LOAD FEED AND SHIELD GROUNDING TO DRIVE

This equipment is designed for load connection directly from the variable frequency drive, although, in the case of an oversized VFD for the given motor, use the VFD and motor manufacturer's recommendations for proper motor overload protection. In certain cases, it is required to include additional motor overload protection between the VFD and the motor for proper motor overload protection. Always be sure to shield load wiring from line and control wiring to reduce noise. Refer to the drive manufacturer's manual for further details.

1. Attach load conductors with phase A to W/T1, B to V/T2, and C to W/T3 (see torque table in Section 5.3).
2. Attach motor cable shielding to VFD ground (see recommendations by drive manufacturer).
3. Refer to the drive manufacturer's manual for further information regarding drive installation.

⚠ CAUTION

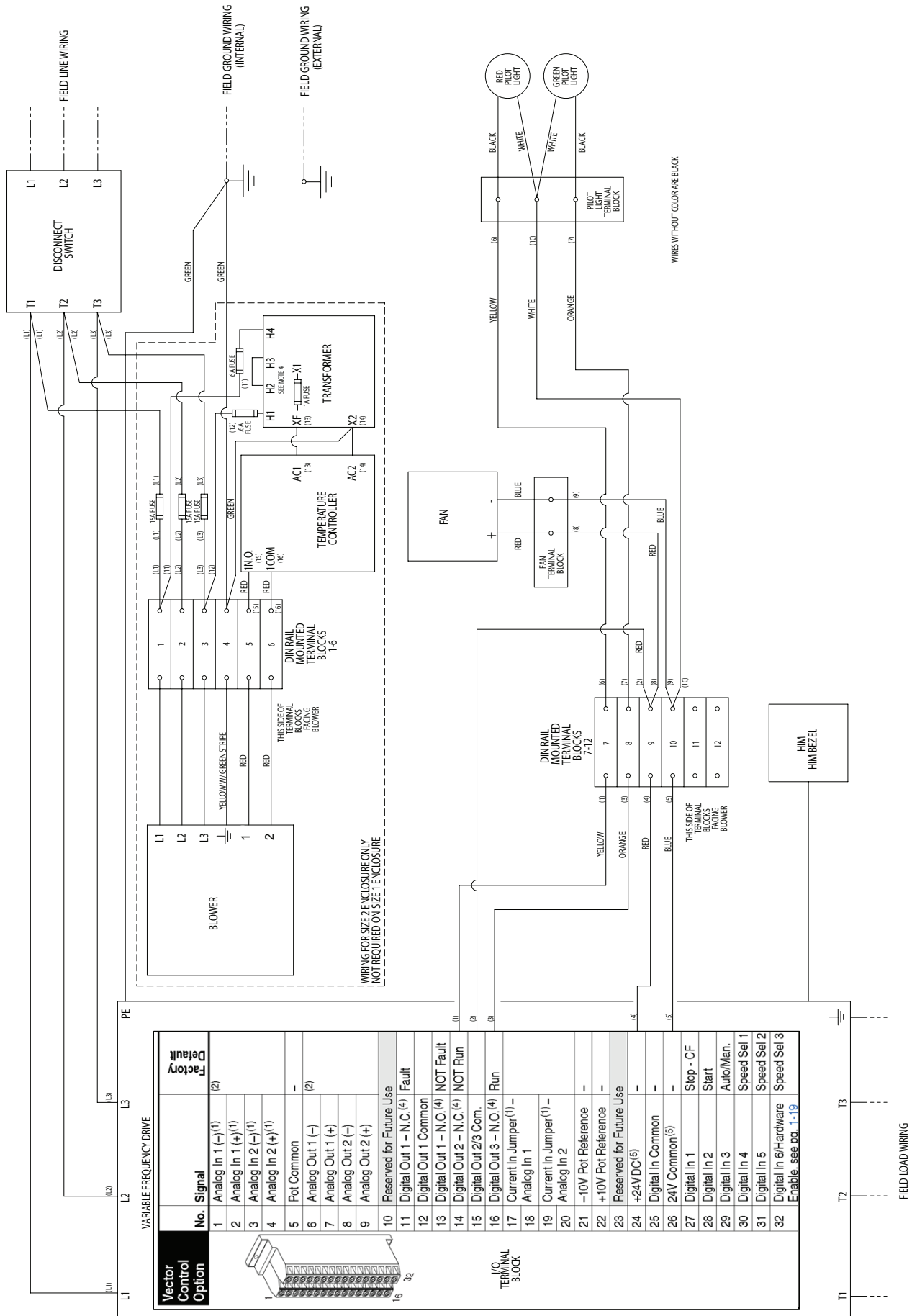
Failure to add additional motor overload protection between the VFD and motor when required can cause motor failure and equipment damage.

3.4 CONTROL WIRE ROUTING

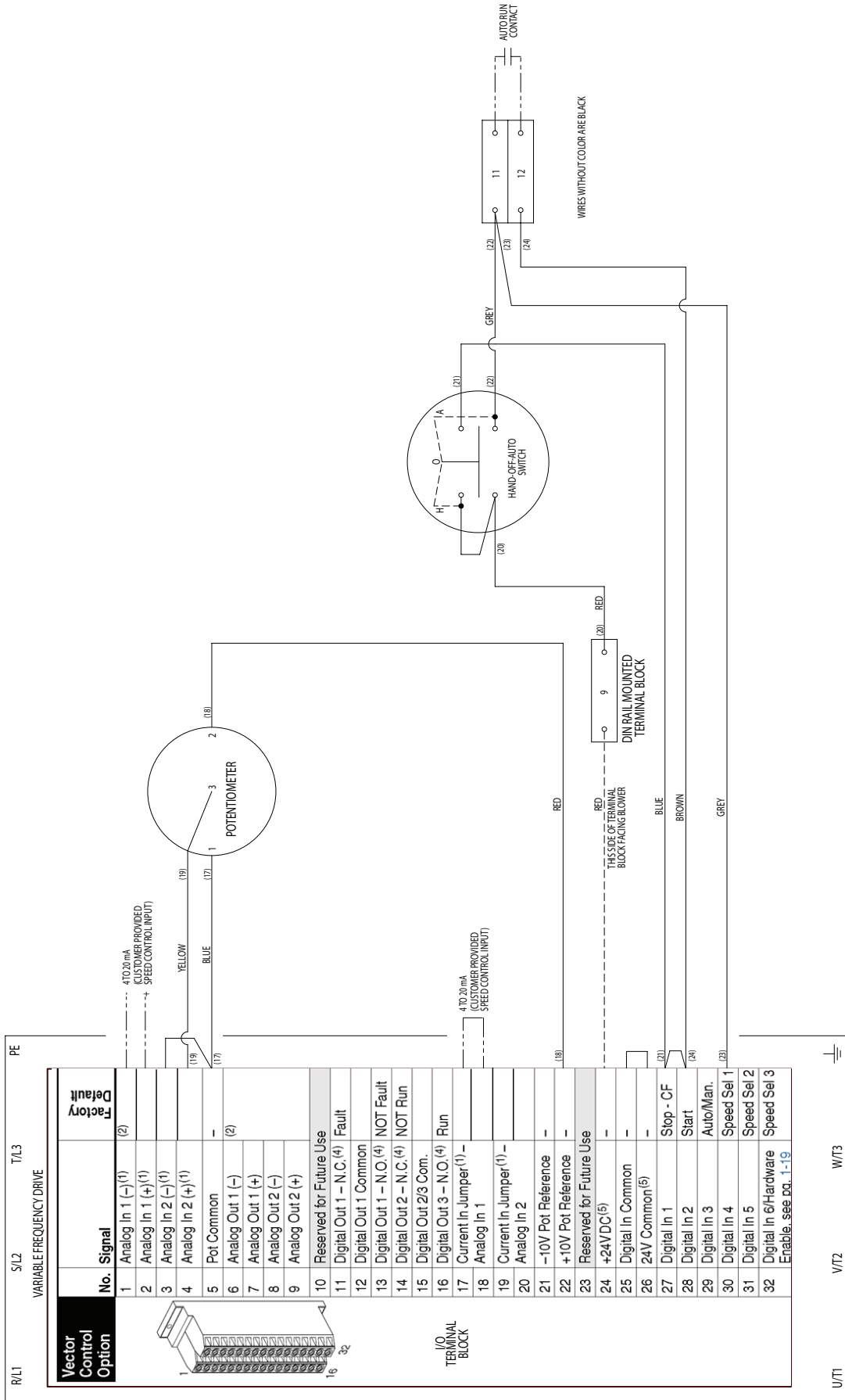
To avoid the transmission of noise to/from the blower, control system, and/or the variable frequency drive load conductors, be sure to bundle all field control wiring and shield as necessary.

3.5 BLOWER AND SIGNAL SCHEMATIC

ACE20 WIRING

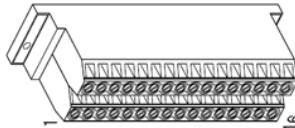


ACE20 PT RR3 WIRING

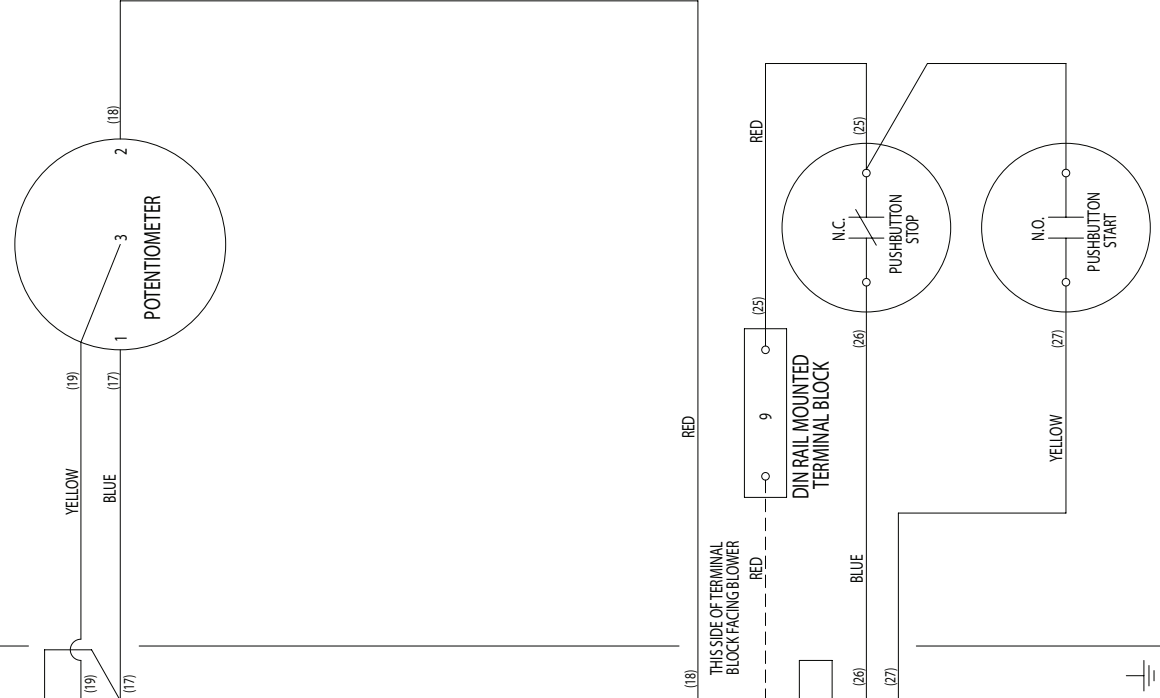


ACE20 PT PB23 WIRING

R/L1 S/L2 T/L3 PE
VARIABLE FREQUENCY DRIVE

Vector Control Option	No.	Signal	Factory Default
	1	Analog In 1 (-) ⁽¹⁾	(2)
	2	Analog In 1 (+) ⁽¹⁾	
	3	Analog In 2 (-) ⁽¹⁾	
	4	Analog In 2 (+) ⁽¹⁾	
	5	Pot Common	-
	6	Analog Out 1 (-)	(2)
	7	Analog Out 1 (+)	
	8	Analog Out 2 (-)	
	9	Analog Out 2 (+)	
	10	Reserved for Future Use	
	11	Digital Out 1 - N.C. ⁽⁴⁾	Fault
	12	Digital Out 1 Common	
	13	Digital Out 1 - N.O. ⁽⁴⁾	NOT Fault
	14	Digital Out 2 - N.C. ⁽⁴⁾	NOT Run
	15	Digital Out 2/3 Com.	
	16	Digital Out 3 - N.O. ⁽⁴⁾	Run
	17	Current In Jumper ⁽¹⁾ -	
	18	Analog In 1	
	19	Current In Jumper ⁽¹⁾ -	
	20	Analog In 2	
	21	-10V Pot Reference	-
	22	+10V Pot Reference	-
	23	Reserved for Future Use	
	24	+24VDC ⁽⁵⁾	-
	25	Digital In Common	-
	26	24V Common ⁽⁵⁾	-
	27	Digital In 1	Stop - CF
	28	Digital In 2	Start
	29	Digital In 3	Auto/Man.
	30	Digital In 4	Speed Sel 1
	31	Digital In 5	Speed Sel 2
	32	Digital In 6/Hardware Enable. see pg. 1-19	Speed Sel 3

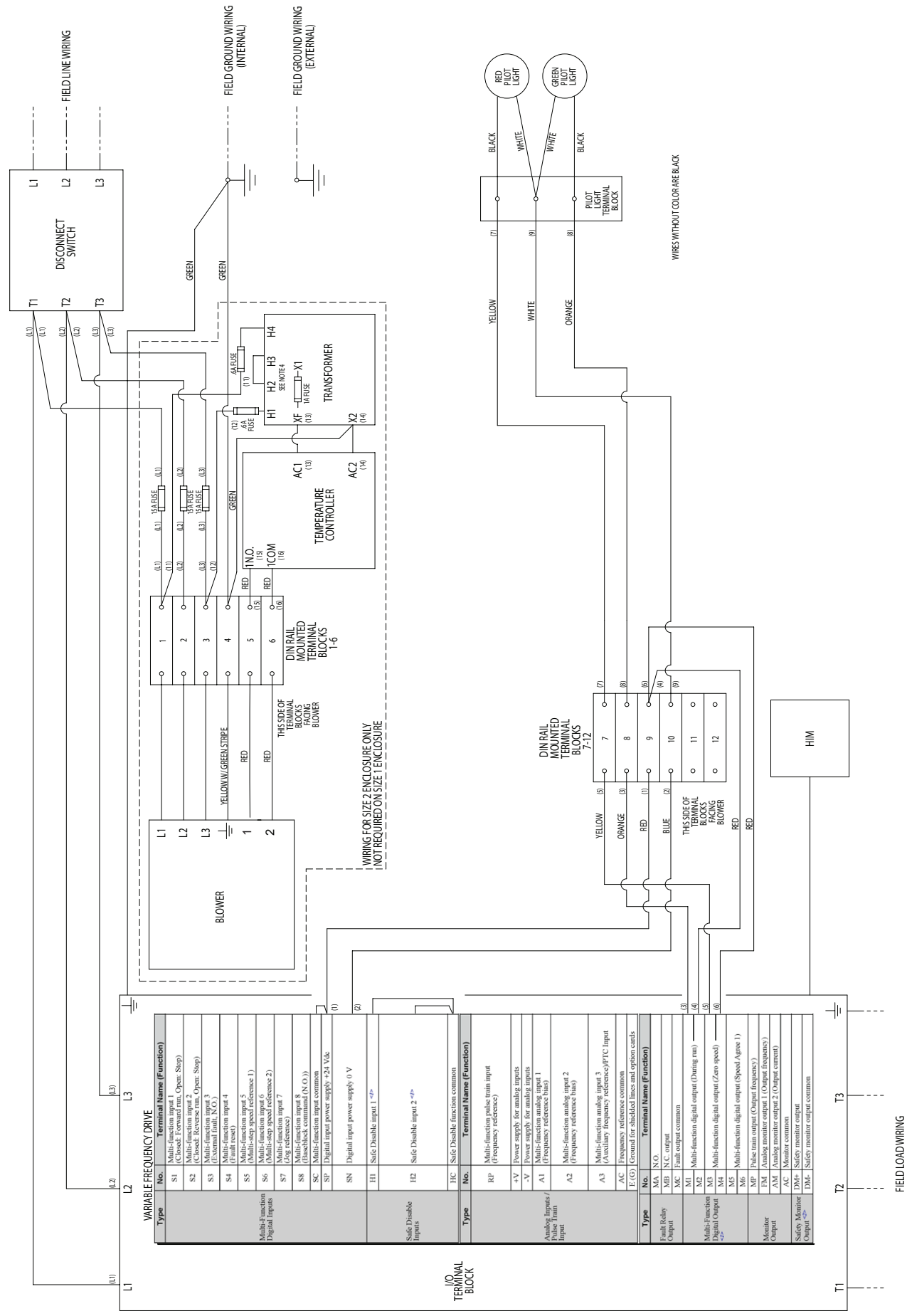
I/O TERMINAL BLOCK



THIS SIDE OF TERMINAL BLOCK FACING BLOWER

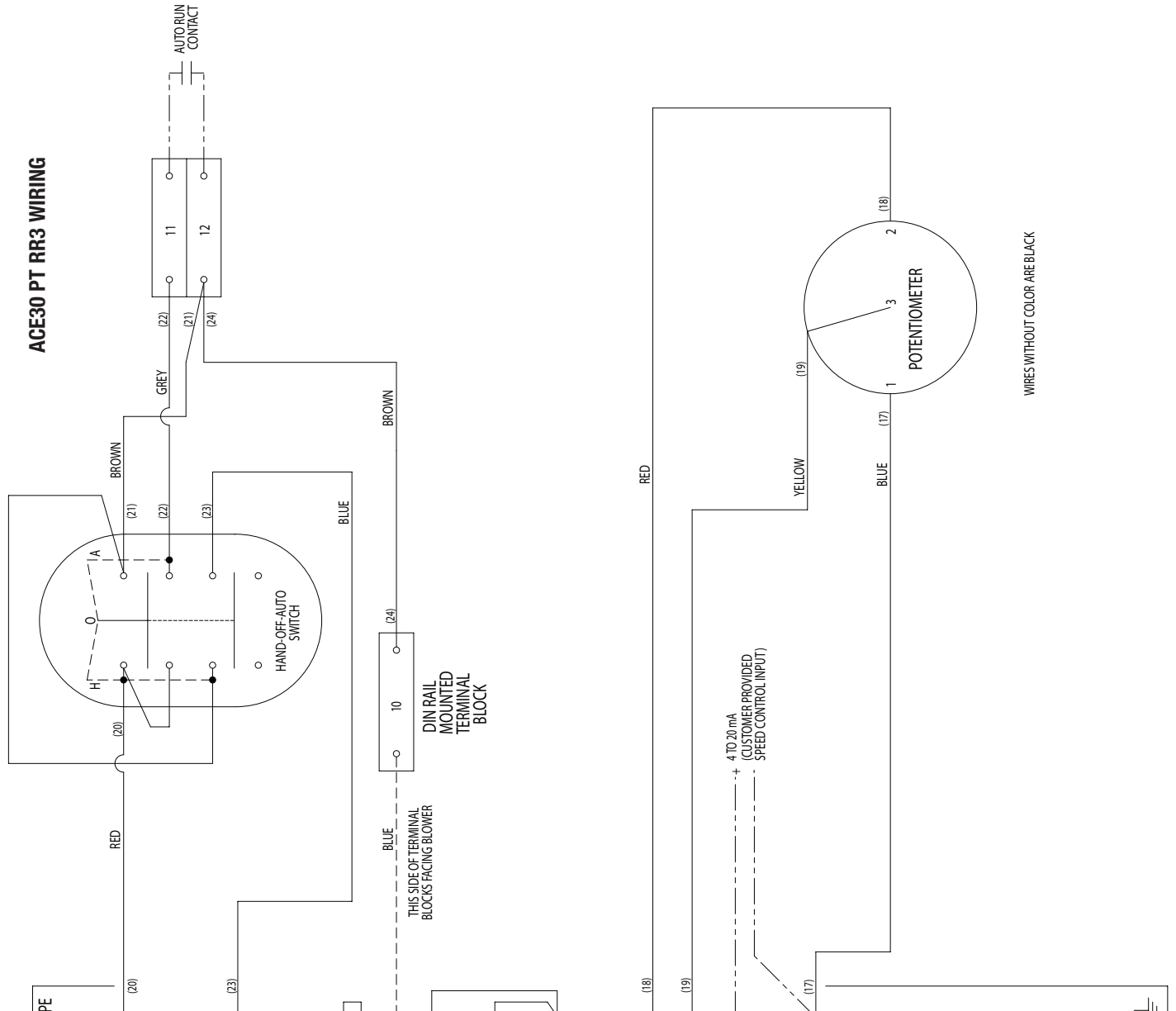
U/T1 V/T2 W/T3

ACE30 WIRING



Type	No.	Terminal Name (Function)
Multi-function Digital Inputs	S1	Multi-function input 1 (Close/ Forward run, Open/ Stop)
	S2	Multi-function input 2 (Close/ Forward run, Open/ Stop)
	S3	Multi-function input 3 (Overhaul fault, N.O.)
	S4	Multi-function input 4 (Multi-reset)
	S5	Multi-function input 5 (Multi-step speed reference 1)
	S6	Multi-function input 6 (Multi-step speed reference 2)
	S7	Multi-function input 7 (Multi-step speed reference 3)
Digital Inputs	S8	Multi-function input 8 (feedback command (N.O.))
	S9	Multi-function input common
	S10	Digital input power supply +24 Vdc
	S11	Digital input power supply 0 V
Scale Disable Inputs	I1	Scale Disable input 1 ^{24V}
	I2	Scale Disable input 2 ^{24V}
I/O Terminal Block	HC	Scale Disable function common
	RP	Multi-function pulse train input (frequency reference)
	+V	Power supply for analog inputs
	-V	Power supply for analog inputs
	A1	Multi-function analog input 1 (frequency reference/bias)
	A2	Multi-function analog input 2 (frequency reference/bias)
	A3	Multi-function analog input 3 (Analog frequency reference/PTC input)
	AC	Frequency reference common
	E (G)	Ground for shielded lines and option cards
	Multi-function Digital Output	MA
MB		N.C. output
MC		Fault output common
MD		Multi-function digital output (during run)
ME		Multi-function digital output (Zero speed)
MF		Multi-function digital output (Speed Agree 1)
Monitor Output	DM	Pulse train output (Output Frequency)
	DM	Analog monitor output 1 (Output frequency)
	DM	Analog monitor output 2 (Output current)
Safety Monitor Output ^{24V}	DM+	Safety monitor output
	DM-	Safety monitor output common

ACE30 PT RR3 WIRING



WIRES WITHOUT COLOR ARE BLACK

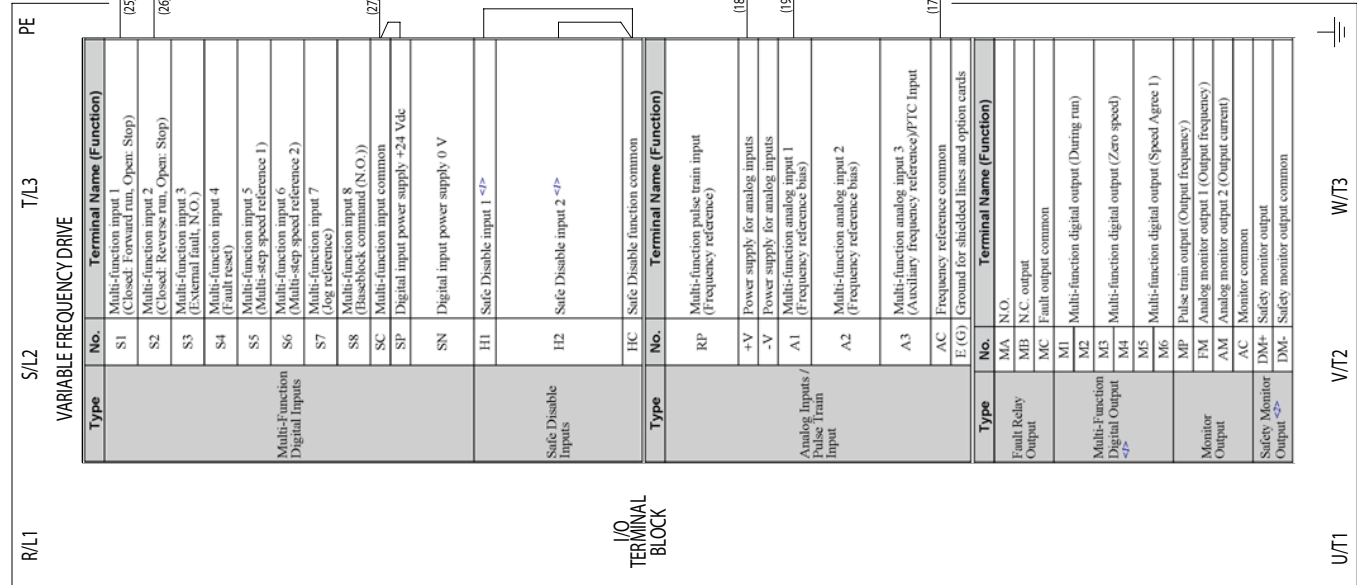
R/L1 S/L2 T/L3 PE
VARIABLE FREQUENCY DRIVE

Type	No.	Terminal Name (Function)
Multi-function Digital Inputs	S1	Multi-function input 1 (Closed: Forward run, Open: Stop)
	S2	Multi-function input 2 (Closed: Reverse run, Open: Stop)
	S3	Multi-function input 3 (External fault, N.O.)
	S4	Multi-function input 4 (Fault reset)
	S5	Multi-function input 5 (Multi-step speed reference 1)
	S6	Multi-function input 6 (Multi-step speed reference 2)
	S7	Multi-function input 7 (Log reference)
	S8	Multi-function input 8 (Baseblock command (N.O.))
Safe Disable Inputs	SC	Multi-function input common
	SP	Digital input power supply +24 Vdc
I/O Terminal Block	SN	Digital input power supply 0 V
	H1	Safe Disable input 1 <I>
Monitor Output	H2	Safe Disable input 2 <I>
	HC	Safe Disable function common

Type	No.	Terminal Name (Function)
Analog Inputs / Pulse Train Input	RP	Multi-function pulse train input (Frequency reference)
	+V	Power supply for analog inputs
Multi-Function Digital Output	-V	Power supply for analog inputs
	A1	Multi-function analog input 1 (Frequency reference bias)
Safety Monitor Output	A2	Multi-function analog input 2 (Frequency reference bias)
	A3	Multi-function analog input 3 (Auxiliary frequency reference)/PTC Input
Fault Relay Output	AC	Frequency reference common
	E (G)	Ground for shielded lines and option cards
Multi-Function Digital Output	MA	N.O.
	MB	N.C. output
	MC	Fault output common
	M1	Multi-function digital output (During run)
	M2	Multi-function digital output (Zero speed)
	M3	Multi-function digital output (Speed Agree 1)
Monitor Output	M4	Multi-function digital output (Speed Agree 1)
	M5	Pulse train output (Output frequency)
Safety Monitor Output	FM	Analog monitor output 1 (Output frequency)
	AM	Analog monitor output 2 (Output current)
Fault Relay Output	AC	Monitor common
	DM+	Safety monitor output
Monitor Output	DM-	Safety monitor output common

W/T1 W/T2 W/T3

ACE30 PT PB23 WIRING



WIRES WITHOUT COLOR ARE BLACK

Type	No.	Terminal Name (Function)	
Multi-Function Digital Inputs	S1	Multi-function input 1 (Closed: Forward run, Open: Stop)	
	S2	Multi-function input 2 (Closed: Reverse run, Open: Stop)	
	S3	Multi-function input 3 (External fault, N.O.)	
	S4	Multi-function input 4 (Fault reset)	
	S5	Multi-function input 5 (Multi-step speed reference 1)	
	S6	Multi-function input 6 (Multi-step speed reference 2)	
	S7	Multi-function input 7 (Log reference)	
	S8	Multi-function input 8 (Diseback command (N.O.))	
	SC	Multi-function input common	
	SP	Digital input power supply +24 Vdc	
Safe Disable Inputs	SN	Digital input power supply 0 V	
	H1	Safe Disable input 1 <->	
Safe Disable Inputs	H2	Safe Disable input 2 <->	
	HC	Safe Disable function common	
Analog Inputs/Pulse Train Input	RP	Multi-function pulse train input (frequency reference)	
	+V	Power supply for analog inputs	
	-V	Power supply for analog inputs	
	A1	Multi-function analog input 1 (frequency reference bias)	
	A2	Multi-function analog input 2 (frequency reference bias)	
	A3	Multi-function analog input 3 (Auxiliary frequency reference/PTC Input)	
	AC	Frequency reference common	
	E (G)	Ground for shielded lines and option cards	
	Fault Relay Output	MA	N.O.
		MB	N.C. output
MC		Fault output common	
M1		Multi-function digital output (During run)	
M2		Multi-function digital output (Zero speed)	
M3		Multi-function digital output (Speed Agree 1)	
M4		Multi-function digital output (Speed Agree 2)	
M5		Multi-function digital output (Speed Agree 3)	
M6		Multi-function digital output (Speed Agree 4)	
MP		Pulse train output (Output frequency)	
Monitor Output	FM	Analog monitor output 1 (Output frequency)	
	AM	Analog monitor output 2 (Output current)	
Safety Monitor Output <->	AC	Monitor common	
	DM+	Safety monitor output	
	DM-	Safety monitor output common	

I/O TERMINAL BLOCK

U/T1

V/T2

W/T3

PE

R/L1

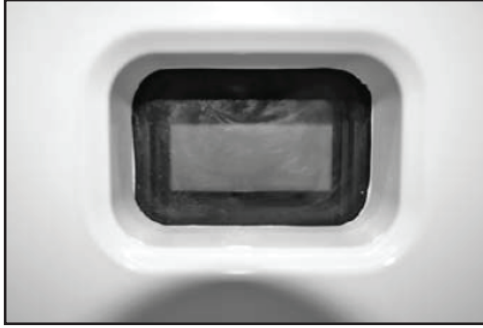
S/L2

T/L3

VARIABLE FREQUENCY DRIVE

4. GENERAL OPERATION

4.1 CONTROL PAD VIEWING WINDOW



The control pad viewing window shows the control pad display containing such information as drive status and operating data. Refer to the drive manufacturer's manual for information regarding the control pad display.

4.2 DISCONNECT AND LOCKOUT/TAGOUT

The disconnect handle is furnished with three (3) holes for lockout/tagout purposes.

1. Turn handle to the 'off' position.
2. Depress lockout tab at the end of the handle.
3. Install OSHA approved lock or tag.
4. Release lockout tab.

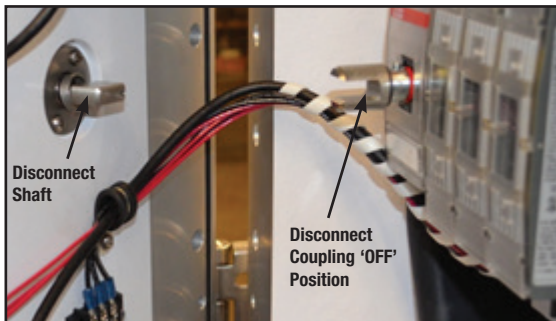
⚠ WARNING

To avoid ignition of explosive atmospheres, all circuits must be de-energized before opening cover.



⚠ CAUTION

To avoid damage to the integral disconnect operating mechanism, be sure the disconnect coupling is in the off position before closing cover.



4.3 COMMUNICATION MODULES

Available Options:

Protocol	Cat. #	Suffix
Profibus	CP	
Devicenet	CD	
CAN Open	CC	• ACE20 Only
Modbus	CM	
Ethernet	CE	
Wireless	WL	• ACE20 Only

Refer to the drive manufacturer's manual for information regarding communication module and WIM installation and use.

4.4 POT, RR3 (HOA) AND PB23 (PUSHBUTTON START/STOP)

Potentiometer, RR3, and PB23 options, when ordered, get wired to the drive for additional user control. Parameters for these options are set up at the factory. Refer to drive manufacturer's manual for further information as well as parameters in Section 7.1.

5. MAINTENANCE

⚠ CAUTION

To avoid cooling system malfunction and cooling system failure, be sure to vacuum debris from the enclosure before energizing. NEVER use forced air for the removal of debris from this enclosure.

5.1 DRIVE MAINTENANCE

Periodic cleaning of the drive fan and heat sink is recommended. Removal of the drive from the enclosure is recommended to ensure debris does not obstruct the cooling system. Refer to the drive manufacturer's manual for additional maintenance recommendations and specific instructions.

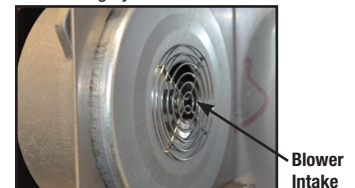
5.2 COOLING SYSTEM MAINTENANCE

1. Clean pre-filter periodically (recommended per parameters and values below). Remove pre-filter and rinse with water as needed.

Parameter Number	Parameter Type	Parameter Description	Testpoint Code	Maintenance Check Point
ACE20				
234	Utility	Testpoint 1 Sel	2 (Heat Sink Temperature)	
235	Utility	Testpoint 1 Data		105
236	Utility	Testpoint 2 Sel	37 (Control Board Temperature)	
237	Utility	Testpoint 2 Data		72
ACE30				
U4-08	Maintenance Monitors	Heat Sink Temperature		105

2. Clean sintered filter as needed. Use of abrasives on the explosionproof filters may compromise the integrity of the cooling system.

3. Clean/inspect blower intake.



4. For ACE20 (Rockwell VFD), clean/inspect muffin fan.
5. Clean/inspect temperature controller.
6. Perform visual, electrical, and mechanical checks on all components on a regular maintenance schedule. NFPA 70B recommends maintenance intervals not exceeding 2 months.
7. Visually check for any damage to the filter assemblies, flat joints, threaded joints, journal joints, and window.
8. Visually check for evidence of excessive heating within the enclosure.
9. Mechanically check that all parts are properly assembled and operating mechanisms are in proper working condition.
10. Verify airflow provisions are maintained per Section 2.1.

5.3 PERIODIC MECHANICAL MAINTENANCE (TORQUE VERIFICATION)

Torque Requirements		
Item Description	Wire Range	Torque Required
ACE20 Drive (0.5-5 HP)		
Line/Load & Ground	18-6 AWG (0.9-13.2 mm ²)	12 in.-lbs. (1.4 N-m)
ACE20 Drive (7.5-20 HP)		
Line/Load & Ground	18-6 AWG (0.9-13.2 mm ²)	12 in.-lbs. (1.4 N-m)
ACE20 Drive (25-50 HP)		
Line/Load & Ground	14-3 AWG (2.1-26.6 mm ²)	16 in.-lbs. (1.8 N-m)
ACE30 Drive (0.75-5 HP)		
Line/Load	14-10 AWG (2.1-5.2 mm ²)	12 in.-lbs. (1.4 N-m)
ACE30 Drive (7.5-20 HP)		
Line	8-6 AWG (8.4-13.2 mm ²)	25 in.-lbs. (2.8 N-m)
Load	10-6 AWG (5.3-13.2 mm ²)	25 in.-lbs. (2.8 N-m)
Ground	10-8 AWG (5.3-8.3 mm ²)	45 in.-lbs. (5.1 N-m)
ACE30 Drive (25-30 HP)		
Line/Load	6-4 AWG (13.3-21.1 mm ²)	50 in.-lbs. (5.7 N-m)
Ground	8-6 AWG (8.4-13.2 mm ²)	45 in.-lbs. (5.1 N-m)
Drive Control (I/O)		
ACE20 Drive	22-14 AWG (0.4-2.0 mm ²)	5.2 in.-lbs. (0.59 N-m)
ACE30 Drive	24-16 AWG (0.2-1.3 mm ²)	4.8 in.-lbs. (0.54 N-m)
Disconnect		
30 Amp	18-8 AWG (0.9-8.3 mm ²)	17 in.-lbs. (1.9 N-m)
60 Amp	14-4 AWG (2.1-21.1 mm ²)	30 in.-lbs. (3.4 N-m)
100 Amp	14-2/0 AWG (2.1-67.4 mm ²)	120 in.-lbs. (13.5 N-m)
Blower Fuse Block	18-10 AWG (0.9-5.2 mm ²)	20 in.-lbs. (2.3 N-m)
Terminal Blocks	24-8 AWG (0.2-8.3 mm ²)	8 in.-lbs. (0.9 N-m)
Temperature Controller	24-12 AWG (0.2-3.3 mm ²)	5 in.-lbs. (0.54 N-m)
Transformer	18-16 AWG (0.9-1.3 mm ²)	12 in.-lbs. (1.4 N-m)
Internal Ground Lug	16-2/0 AWG (1.4-67.4 mm ²)	120 in.-lbs. (13.5 N-m)
External Ground Lug	6-1/0 AWG (13.3-53.4 mm ²)	50 in.-lbs. (5.6 N-m)
Blower Manifold	N/A	20 in.-lbs. (2.3 N-m)
Hose Clamps	N/A	20 in.-lbs. (2.3 N-m)
Cover Bolts	N/A	45 ft.-lbs. (61 N-m)

5.4 STATUS INDICATION

There are two lights for the status indicator - a GREEN light to signify RUN and a RED light to signify STOP or fault condition. When both lights are off, this indicates the power is off to the drive.



5.5 EXPLOSIVE EVENT REQUIRED MAINTENANCE

In the event of an explosion within the enclosure, the filter assemblies and pre-filters must be replaced. Personnel injury or equipment damage may result from failure to replace the filters with new filters after an explosion occurs within the enclosure. Inspect all other components and verify that they are in proper operating condition. Consult Crouse-Hinds for replacement parts as needed.

⚠ WARNING: BURN HAZARD

To avoid personnel injury, allow sufficient time for the enclosure to cool prior to servicing.

6. TECHNICAL DATA

6.1 TECHNICAL DATA CHART

CC-H Base Cat. #	Encl. Size	Max. Discon. Rating (Amps)	Discon. Fuse Type	Nominal HP	Input Rating (Amps)	Max. Output Rating (Amps)	Power Loss (Watts)	Temp. Rating	Temp. Derating Factor	VFD Mfg. Part #
*ACE20 1	1	30	J	1	1.6	2.1	63	T6	N/A	20BD027A0AYNANCO
*ACE20 2				2	2.6	3.4	76	T6	N/A	
*ACE20 3				3	3.9	5.0	93	T6	N/A	
*ACE20 5				5	6.9	8.0	164	T6	N/A	
*ACE20 1 600				1	1.3	1.7	54	T6	N/A	
*ACE20 2 600	2	2.1	2.7	65	T6	N/A	20BE022A0AYNANCO			
*ACE20 3 600	3	3.0	3.9	83	T6	N/A				
*ACE20 5 600	5	5.3	6.1	142	T6	N/A				
*ACE20 7	2	30	J	7.5	9.5	11.0	594	T4A	N/A	20BD027A0AYNANCO
ACE20 10				10	12.5	14.0	618	T4A	N/A	
ACE20 15				15	19.9	22.0	726	T4A	N/A	
ACE20 20				20	24.8	27.0	794	T4A	N/A	
ACE20 25				25	31.2	34.0	841	T4A	N/A	
ACE20 30	30	36.7	40.0	859	T4A	N/A	20BD065A0AYNANCO			
ACE20 40	40	47.7	52.0	1010	T4A	N/A				
ACE20 50	50	59.6	65.0	1117	T4A	Figure 4				
*ACE30 1	1	30	J	0.75	2.1	2.1	68	T6	N/A	CIMR-AU4A0009FUA
*ACE30 2				2	4.3	4.1	81	T6	N/A	
ACE30 3				3	8.1	6.9	121	T6	N/A	
ACE30 5				5	9.4	8.8	126	T6	N/A	
*ACE30 2 600				2	3.6	2.7	45	T6	N/A	
ACE30 3 600	3	5.1	3.9	61	T6	N/A	CIMR-AU5A0006FUA			
ACE30 5 600	5	8.3	6.1	72	T6	N/A				
*ACE30 7	7.5	14.0	11.1	562	T4A	N/A				
ACE30 10	10	20.0	17.5	685	T4A	N/A	CIMR-AU4A0031FUA			
ACE30 15	15	24.0	23.0	754	T4A	N/A				
ACE30 20	20	38.0	31.0	855	T4A	N/A				
ACE30 25	25	44.0	38.0	921	T4A	N/A	CIMR-AU4A0044FUA			
ACE30 30	30	52.0	44.0	999	T4A	N/A				

*Additional motor overload protection is required between VFD output and motor due to oversized VFD used. For other catalogs and setups refer to section 3.3 of this manual.

**Modified product designs may vary in terms of technical information. Contact factory for additional information.

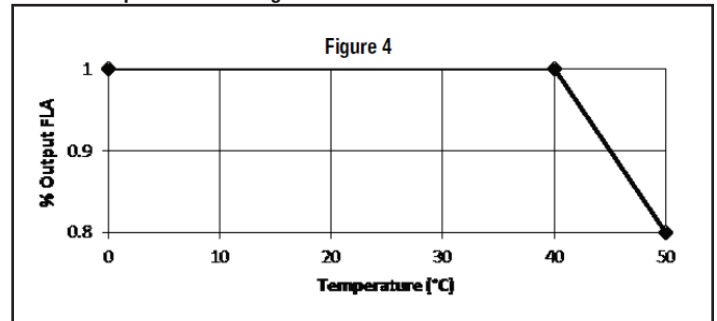
6.2 POWER LOSS (HEAT DISSIPATION)

When the ACE Series enclosure is not installed in a well ventilated area, provisions must be made to account for heat generation and ensure proper operation of the device.

6.3 DE-RATING FACTORS AND CURVES (AMBIENT TEMPERATURE, ALTITUDE, SWITCHING FREQUENCY)

The final drive output rating is a multiplication of all applicable de-rating factors.

Ambient Temperature De-rating



Altitude and Switching Frequency De-rating:

Refer to the drive manufacturer's de-rating guidelines for altitude and switching frequency and ensure compliance.

7. CROUSE-HINDS DRIVE PARAMETERS

7.1 PARAMETER TABLE

Parameter Number	Parameter Type	Parameter Description	Parameter Value
ACE20			
196	Utility	Parameter Access Level	1 (Advanced)
151	Dynamic Control	PWM Frequency	2 (2 kHz)
ACE20 RR3 (HOA)			
196	Utility	Parameter Access Level	1 (Advanced)
320	Inputs & Outputs	Analog Input Configuration	Bit 0 = 1 (Current)
ACE30			
C6-02	Tuning	Carrier Frequency	1 (2 kHz)
ACE30 RR3 (HOA)			
A1-03	Initialization	Initialize Parameters	2220
H3-02	Terminal Functions	Terminal A1 Function Selection	2
H3-06	Terminal Functions	Terminal A3 Function Selection	F
ACE30 PB23 (Pushbutton Start/Stop)			
A1-03	Initialization	Initialize Parameters	3330

To ensure cooling system performance, these parameters must be maintained at all times while observing the appropriate de-rating factors.

8. REPLACEMENT PARTS

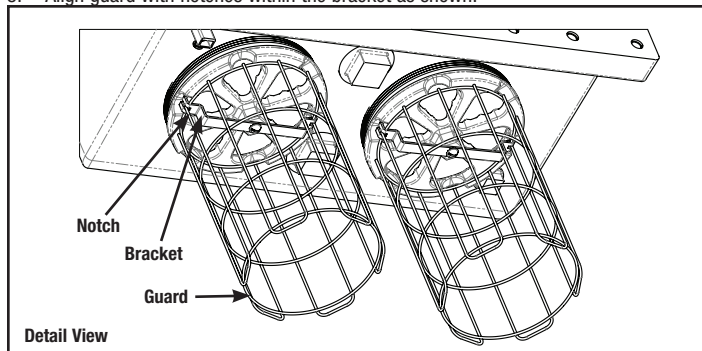
ACE Series systems are designed to provide years of reliable service. However, should the need for replacement parts arise, they are available through your Crouse-Hinds Distributor. Assistance may also be obtained through your Crouse-Hinds Sales Representative or the Crouse-Hinds Customer Service Department.

8.1 PRE-FILTER KIT

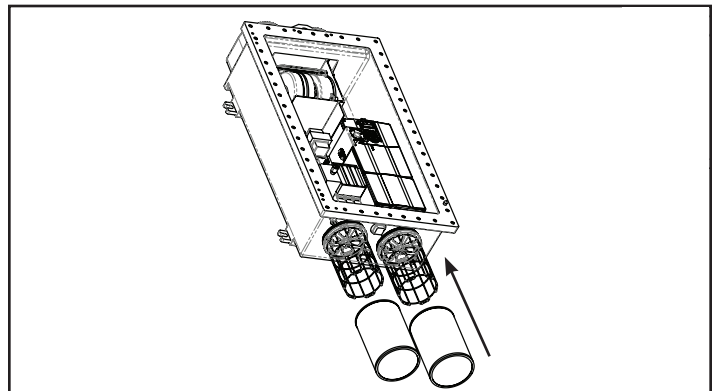
ACE KIT1: Pre-filter and Hardware (1 pc.)

8.1.1 PRE-FILTER INSTALLATION INSTRUCTIONS

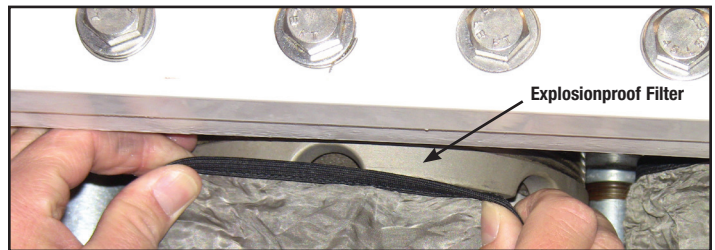
1. Remove rubber caps from explosionproof filters.
2. Install wire guard using the bracket, screw, and lock washer provided to the bottom filter(s).
3. Align guard with notches within the bracket as shown.



4. Tighten screw.
5. Slip pre-filter mesh over guard.



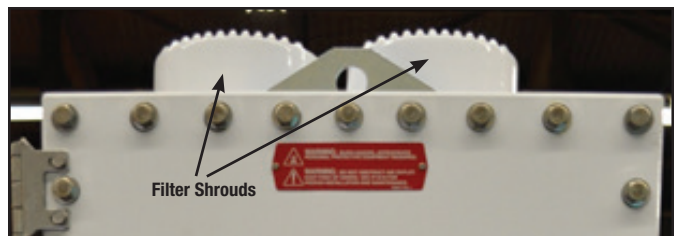
6. Be sure to stretch pre-filter elastic band completely around the explosionproof filter and seat the elastic band on the filter's threads. This will ensure all air flow to the bottom filters passes through the pre-filters.



8.2 SINTERED FILTER KIT

ACE KIT2: Filter Assembly (1 pc.)

8.2.1 SINTERED FILTER INSTALLATION INSTRUCTIONS



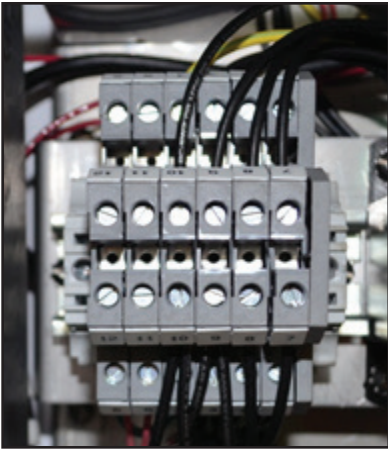
1. Remove shroud and pre-filters and place all parts in a secure area.
2. Using a 1" socket wrench, remove all filters from the enclosure (top and bottom).
3. Remove rubber caps from explosionproof filters.
4. Apply thread grease to threads of explosionproof filters.
5. Install new filters (top and bottom) and torque each to 133 ft.-lbs. (180 N-m).
6. Install pre-filters and shrouds; refer to Sections 2.6 and 2.7.

8.3 BLOWER KIT

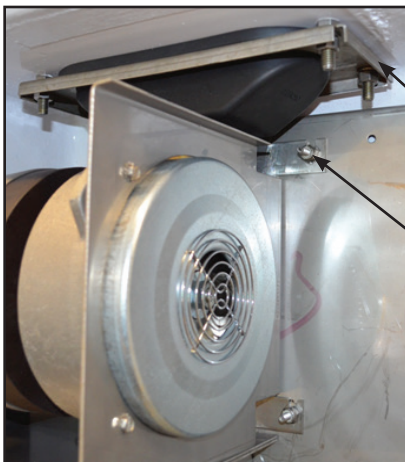
ACE KIT3: Blower, Manifold, and Hardware (1 pc.)

8.3.1 BLOWER INSTALLATION INSTRUCTIONS

1. Disconnect blower power, ground, and control leads from terminal blocks (refer to wiring diagrams in Section 3.5).



2. Loosen five (5) nuts holding blower bracket and baffle to mounting plate. DO NOT remove.
3. Loosen and remove manifold clamp bracket nuts and lock washers. DO NOT remove jam nuts positioned behind the manifold clamp bracket.



Manifold Clamp Bracket

Loosen and DO NOT remove nut during replacement

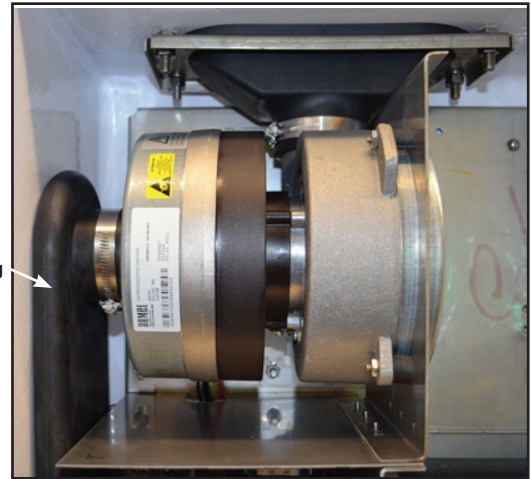
4. Remove blower and brackets.
5. Remove manifold and manifold clamp bracket.
6. Remove blower cooling intake and hose clamp from old blower assembly and hold for re-assembly.
7. Loosen and remove three (3) screws and washers holding the baffle and plug plate to the blower bracket. Remove baffle and plug plate and hold for re-assembly.
8. Attach baffle and plug plate to new blower bracket using the same three (3) screws and washers.
9. Align new manifold to enclosure wall.

10. Align new manifold clamp bracket to threaded studs. Be sure the manifold clamp bracket flanges point toward the interior of the enclosure.
11. Install four (4) lock washers and nuts on threaded studs hand tight before applying required torque. Tighten to 20 in.-lbs. DO NOT over-tighten.
12. Slide new blower/bracket assembly into place until fully seated, aligning to the threaded studs and the manifold.

CAUTION

To avoid system malfunction and electrical shock, be sure that all wires are aligned in the baffle's wire pass through.

13. Tighten nuts wrench tight.
14. Tighten manifold hose clamp, while compressing the manifold to the blower, to 20 in.-lbs.
15. Re-attach blower cooling intake and tighten hose clamp to 20 in.-lbs. Be sure to align bottom of blower cooling intake to the explosionproof filter at the bottom of the enclosure.



16. Terminate the blower power wires to the appropriate terminal block connections (refer to wiring diagrams in Section 3.5).
17. Perform a continuity check between each blower power terminal and each phase of the integral disconnect switch.
18. Terminate the blower control wires to the appropriate terminal block connections (refer to wiring diagrams in Section 3.5).
19. Perform a continuity check between each blower control terminal and the temperature controller (refer to wiring diagrams in Section 3.5).
20. Terminate the blower ground wire to the appropriate terminal block connection (refer to wiring diagrams in Section 3.5).
21. Perform a continuity check between the ground terminal and the ground lug adjacent to the integral disconnect switch.

8.4 TEMPERATURE CONTROLLER

ACE KIT5: Temperature Controller

8.4.1 TEMPERATURE CONTROLLER INSTALLATION INSTRUCTIONS

1. Disconnect wire terminals from temperature controller. Do not remove wires from terminals.
2. Loosen two (2) nuts holding the temperature controller to the mounting plate. Do not remove.
3. Remove temperature controller.
4. Insert new temperature controller into place on mounting plate and tighten two (2) nuts down wrench tight.
5. Reconnect wire terminals to the temperature controller, ensuring terminals are fully inserted.



All statements, technical information and recommendations contained herein are based on information and tests we believe to be reliable. The accuracy or completeness thereof are not guaranteed. In accordance with Crouse-Hinds "Terms and Conditions of Sale," and since conditions of use are outside our control, the purchaser should determine the suitability of the product for his intended use and assumes all risk and liability whatsoever in connection therewith.