Encore® Engage System Controller

Installation, Troubleshooting, Repair

Customer Product Manual

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1618871-06

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Change Record

Revision	Date	Change
01	4/20	Initial Release
02	8/20	Added information regarding air conditioner unit.
03	6/22	Added UCKA certification.
04	06/23	Updated information and graphics to show air filter, also removed some parts and parts numbers.
05	12/24	Added information to clarify connection schematics and diagrams
06	12/24	Updating Manufacturer Address and Labels

Section 1

Safety

Introduction

Read and follow these safety instructions. Task- and equipment-specific warnings, cautions, and instructions are included in equipment documentation where appropriate.

Make sure all equipment documentation, including these instructions, is accessible to all persons operating or servicing equipment.

Qualified Personnel

Equipment owners are responsible for making sure that Nordson equipment is installed, operated, and serviced by qualified personnel. Qualified personnel are those employees or contractors who are trained to safely perform their assigned tasks. They are familiar with all relevant safety rules and regulations and are physically capable of performing their assigned tasks.

Intended Use

Use of Nordson equipment in ways other than those described in the documentation supplied with the equipment may result in injury to persons or damage to property.

Some examples of unintended use of equipment include:

- using incompatible materials
- making unauthorized modifications
- removing or bypassing safety guards or interlocks
- using incompatible or damaged parts
- using unapproved auxiliary equipment
- operating equipment in excess of maximum ratings

Regulations and Approvals

Make sure all equipment is rated and approved for the environment in which it is used. Any approvals obtained for Nordson equipment will be voided if instructions for installation, operation, and service are not followed.

All phases of equipment installation must comply with all federal, state, and local codes.

Personal Safety

To prevent injury follow these instructions.

- Do not operate or service equipment unless you are qualified.
- Do not operate equipment unless safety guards, doors, or covers are intact and automatic interlocks are operating properly. Do not bypass or disarm any safety devices.
- Keep clear of moving equipment. Before adjusting or servicing any moving equipment, shut off the power supply and wait until the equipment comes to a complete stop. Lock out power and secure the equipment to prevent unexpected movement.
- Relieve (bleed off) hydraulic and pneumatic pressure before adjusting or servicing pressurized systems or components. Disconnect, lock out, and tag switches before servicing electrical equipment.
- Obtain and read Safety Data Sheets (SDS) for all materials used. Follow the manufacturer's instructions for safe handling and use of materials, and use recommended personal protection devices.
- To prevent injury, be aware of less-obvious dangers in the workplace that often cannot be completely eliminated, such as hot surfaces, sharp edges, energized electrical circuits, and moving parts that cannot be enclosed or otherwise guarded for practical reasons.

Fire Safety

To avoid a fire or explosion, follow these instructions.

- Do not smoke, weld, grind, or use open flames where flammable materials are being used or stored.
- Provide adequate ventilation to prevent dangerous concentrations of volatile materials or vapors. Refer to local codes or your material SDS for guidance.
- Do not disconnect live electrical circuits while working with flammable materials. Shut off power at a disconnect switch first to prevent sparking.
- Know where emergency stop buttons, shutoff valves, and fire extinguishers are located. If a fire starts in a spray booth, immediately shut off the spray system and exhaust fans.
- Clean, maintain, test, and repair equipment according to the instructions in your equipment documentation.
- Use only replacement parts that are designed for use with original equipment. Contact your Nordson representative for parts information and advice.

Grounding

WARNING: Operating faulty electrostatic equipment is hazardous and can cause electrocution, fire, or explosion. Make resistance checks part of your periodic maintenance program. If you receive even a slight electrical shock or notice static sparking or arcing, shut down all electrical or electrostatic equipment immediately. Do not restart the equipment until the problem has been identified and corrected.

Grounding inside and around the booth openings must comply with NFPA requirements for Class II, Division 1 or 2 Hazardous Locations. Refer to NFPA 33, NFPA 70 (NEC articles 500, 502, and 516), and NFPA 77, latest conditions.

- All electrically conductive objects in the spray areas shall be electrically connected to ground with a resistance of not more than 1 megohm as measured with an instrument that applies at least 500 volts to the circuit being evaluated.
- Equipment to be grounded includes, but is not limited to, the floor of the spray area, operator platforms, hoppers, photoeye supports, and
- blow-off nozzles. Personnel working in the spray area must be grounded.
- There is a possible ignition potential from the charged human body. Personnel standing on a painted surface, such as an operator platform, or wearing non-conductive shoes, are not grounded. Personnel must wear shoes with conductive soles or use a ground strap to maintain a connection to ground when working with or around electrostatic equipment.
- Operators must maintain skin-to-handle contact between their hand and the gun handle to prevent shocks while operating manual electrostatic spray guns. If gloves must be worn, cut away the palm or fingers, wear electrically conductive gloves, or wear a grounding strap connected to the gun handle or other true earth ground.
- Shut off electrostatic power supplies and ground gun electrodes before making adjustments or cleaning powder spray guns.
- Connect all disconnected equipment, ground cables, and wires after servicing equipment.

Action in the Event of a Malfunction

If a system or any equipment in a system malfunctions, shut off the system immediately and perform the following steps:

- Disconnect and lock out electrical power. Close pneumatic shutoff valves and relieve pressures.
- Identify the reason for the malfunction and correct it before restarting the equipment.

Disposal

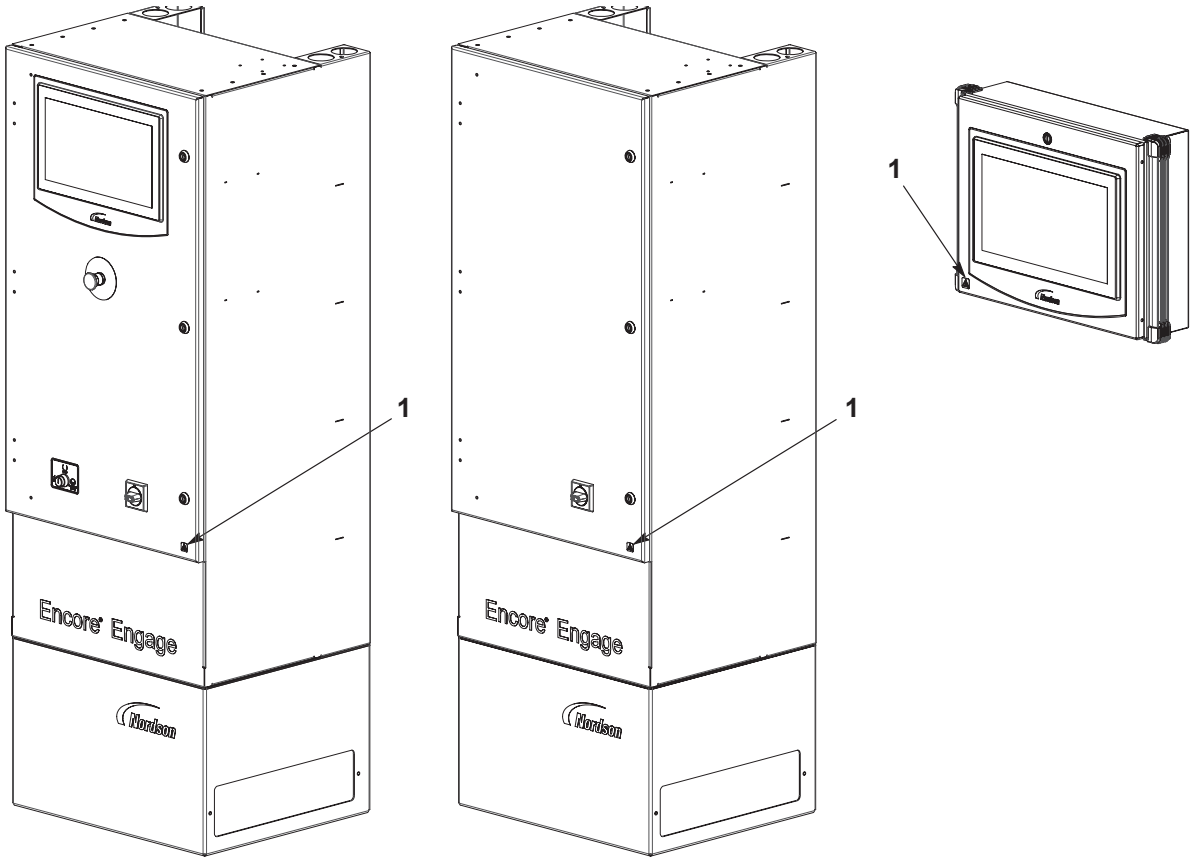
Dispose of equipment and materials used in operation and servicing according to local codes.

Safety Labels

Table 1-1 contains the text of the safety labels on the front of the cabinet. The safety labels are provided to help operate and maintain the console safely. See Figure 1-1 for the location of the safety labels.

Table 1-1 Safety Label Text

Item	Description
	WARNING: Disconnect power before servicing.



10019246
10019333
10019168

Figure 1-1 Safety Label Location

Section 2

System Overview

Introduction

This manual covers the system controls hardware for Encore® Engage system controllers.

NOTE: The system also requires external part ID sensors such as photoeyes or scanners for part identification and zone detection.

See Figure 2-1. The following Encore Engage controllers are available:

- **Encore Engage Main System Controller** − Includes touchscreen controls and supports 4−16 powder spray guns
- **Encore Engage System Controller with Remote Interface Controller** − Supports 4−16 powder spray guns with remote controller for interface controller mobility
- **Encore Engage Auxiliary Controller** − Provides support for adding an additional 4−16 spray guns

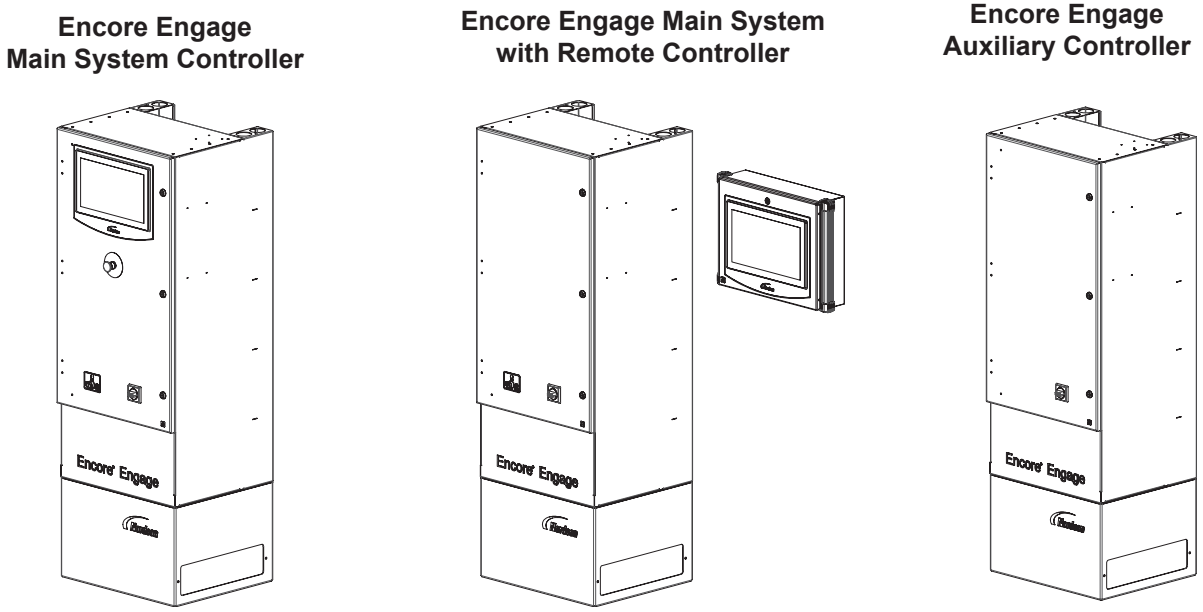


Figure 2-1 Encore Engage Controllers

Console and System Hardware and Software

Main Controller Components

See Figure 2-2. A fully equipped main controller supporting 4−16 spray guns contains the following hardware:

- Touchscreen interface
- Interlock switch and power switch
- PLC
- Relay board
- Backplane and card cage with up to 8 spray gun cards (each card controls 2 spray guns)
- One 600 W and one 120 W 24 Vdc power supply
- E-stop
- Flow modules
- Gateway

Auxiliary Controller Components

Auxiliary consoles do not include the touchscreen, PLC, interlock switch, relay board, or E-stop.

Remote Controller

The touchscreen interface is available in a remote controller with mounting hardware.

The remote controller houses the touchscreen interface, while all other hardware stays in the main controller cabinet.

Up to three touch screen displays can be used per a main controller.

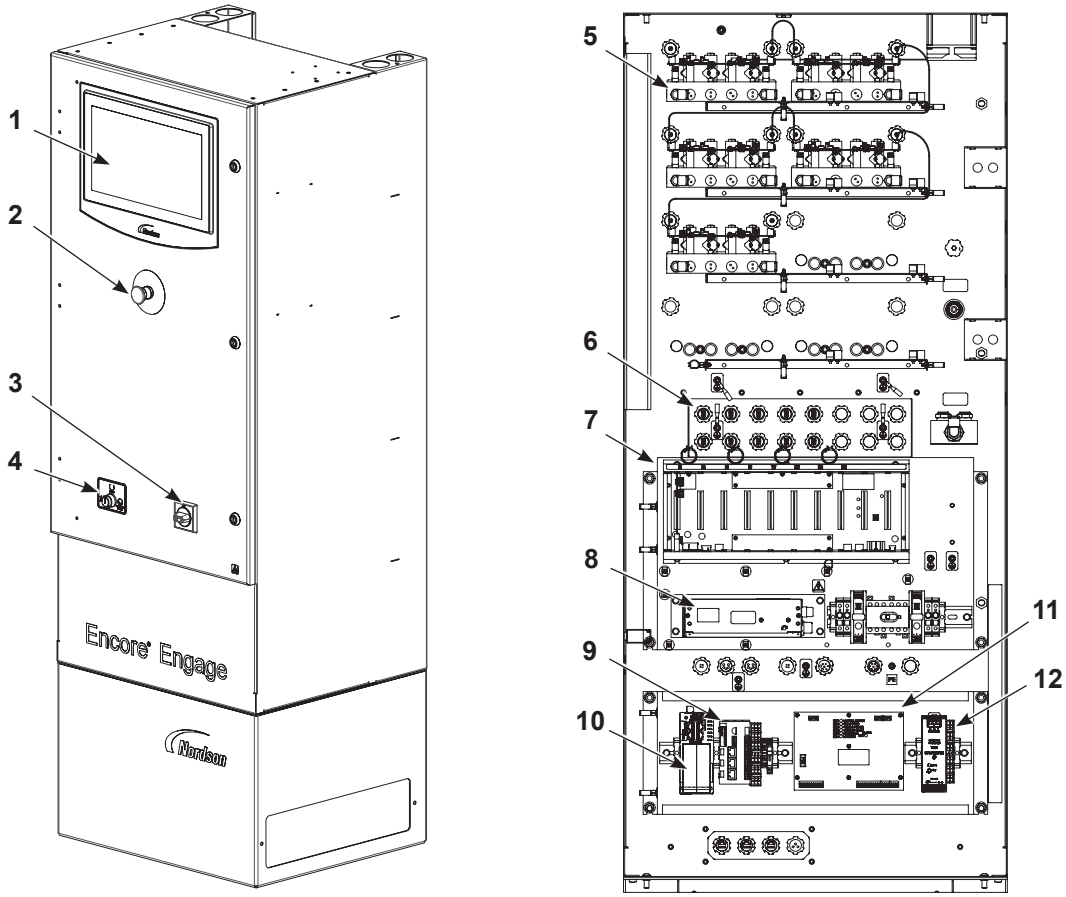


Figure 2-2 Engage Main Console and Pedestal Internal Components

1. Touchscreen interface
2. E-stop
3. Power Switch
4. Interlock keyswitch
5. Flow modules
6. Gun cable connections
7. Dual spray gun cards, card cage, and backplane
8. Single +24 V power supply
9. PLC
10. Gateway
11. Relay board
12. 24 Vdc power supply

Touchscreen Interface

The operator performs all configuration and operation tasks with the touchscreen interface. The touchscreen provides the operator a graphical user interface for system configuration, operation, troubleshooting, and onscreen help support.

NOTE: The operator interface software and operating system should be completely shut down before turning off controller power.

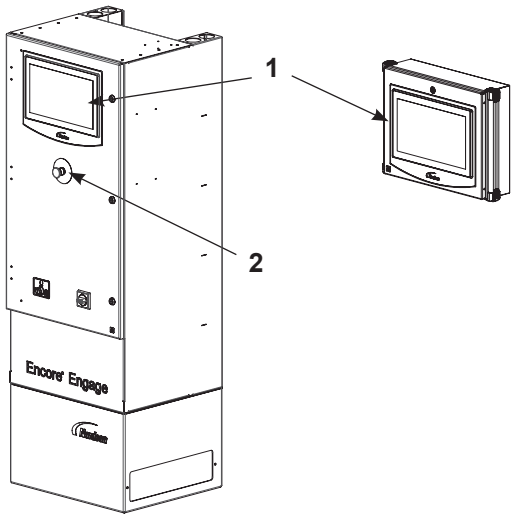


Figure 2-3 Main Controller and Remote Touchscreen

1. Touchscreen
2. E-stop

Interlock Keyswitch Functions

In the **Ready** position, the spray guns cannot be triggered unless the conveyor is running. This prevents powder waste and hazardous operating situations.

In the **Bypass** position, spray guns can be triggered on and off without running the conveyor. Use the Bypass position to set up and test spray gun settings.

In the **Lockout** position, the spray guns cannot be triggered and the in/out positioners and reciprocators cannot be moved. Use this position when working inside the booth.

DC Power Supplies

There are up to two power supplies in a controller cabinet:

- One 600 W − provides power to the dual spray gun cards, flow nodes, and manual spray gun interface (MGI)
- One 100 W (unswitched) − provides 24 Vdc power to the PLC, eWON®, and touchscreen (main controller only)

Dual Spray Gun Cards

Each dual spray gun card in the card cage provides electrostatic controls for two Encore automatic powder spray guns. The cards provide a 0−19 Vac (peak) signal to drive the electrostatic power supplies inside the Encore spray guns. The dual spray gun card also provides process feedback to the operator interface.

Spray Gun Pump Control

The Engage controller and the manual spray gun controllers control the powder pumps through the CAN network to the flow node. The flow node is then hardwired out to the HD pump module.

Airflow and atomizing air for VT pumps is controlled through flow nodes.

iFlow® Digital Flow Modules

The controller controls air flow to the pumps supplying powder to the automatic spray guns. The flow controls consist of precision regulators and iFlow® digital flow modules.

One regulator supplies air to two iFlow modules. Each module supplies flow and atomizing air to two powder pumps, plus gun air (electrode wash air) to two spray guns. Flow and atomizing air is turned on and off when the spray guns are triggered on and off.

For HD pumps, the iFlow module also includes HDLV valve drivers to control the HD pumps.

The modules provide closed−loop control of the flow and atomizing air, constantly sensing the output and adjusting it to maintain air flow at the preset settings. The regulators provide air at a constant pressure to the iFlow modules so the closed−loop controls can operate at the calibrated range. The regulators are set to 85−86 psi (5.86−5.93 bar) at the factory—do not change their settings.

Maximum output per flow module is 27.18 m^3/hr (16 scfm). Maximum output per channel is 6.80 m^3/hr (4 scfm).

Two solenoid valves on the iFlow modules control the flow of gun air to the spray guns. The air flow is regulated by a fixed-orifice restrictor at the output. The solenoids can be set to turn on and off as the guns are triggered.

Internal and External Networks

The Engage system uses both a CAN network for internal communications and an Ethernet network for external communications.

CAN Network: Handles communications between the spray gun control cards, iFlow modules, and the PLC. The CAN network is also used to communicate with the spray gun control cards and iFlow modules in auxiliary controller.

An external CAN network communicates out to the auxiliary controller and manual spray guns.

Ethernet Network: Handles communications throughout the Engage system for the following:

- WAN connection
- Part ID (Ethernet 2)
- Remote controller (Ethernet 3)
- Dual axis for gun movers and reciprocators

Conveyor Encoder

Use optical encoders with a 50% duty cycle.

Resolution: At an encoder resolution of one inch to one pulse (1:1), the effective distance parts can be tracked by the Engage system is approximately 431 feet. At a 2:1 resolution (1/2 inch per pulse), the effective tracking distance is halved, to approximately 170 feet.

The maximum speed of the encoder input is 10 Hz (10 pulses per second). This may require a trade-off between desired conveyor speed and part tracking resolution (the higher the conveyor speed the coarser the tracking resolution).

NOTE: An internal clock or an external timer may be used instead of an encoder. Consult your Nordson representative.

Manual Spray Gun Controller Options

The type of manual spray gun controller is dependent on the system configuration:

- HD systems − use Encore Enhance MGI controller. Refer to the Installation section for MGI connections to Engage controller and first time startup instructions. For additional operation information, refer to the Encore Enhance Powder Spray Controller manual.
- VT systems − use Encore LT manual controller. Refer to the Encore LT Manual Powder Spray Systems manual for installation, operation, and repair information.

Specifications

General

See Figure 2-7 and Figure 2-8 for pedestal and console dimensions.

Electrical Requirements	
Input	100−230 Vac, 50−60 Hz, 1 Ø, 500VA max.
	Switched: 500VA Unswitched: 300VA
	Conveyor Interlock, Remote Lockout: 120/230 Vac, 50/60 Hz, 1 Ø, 6 mA
	Alarm Relay contact rating: 120/230 Vac, 1 Ø, 60 W
Output (to spray gun)	± 19V, ± 1A (peak)
Output (remote display)	200VA max.
NOTE: The Engage system must be interlocked with the fire detection system so that the spray guns are shut off if a fire is detected inside the spray booth.	
ANSI/ISA S82.02.01	
Pollution Degree	2
Installation (Overvoltage)	Category II
Environmental	
Operating Temperature	+15° C to +40° C
Operating Humidity	5−95%, non-condensing
Environmental	
Weight (fully populated main controller)	352 lb (160 kg)
Air Conditioner (configuration specific)	
Refrigerant	R134a
NOTE: Branch circuit breaker 8A Max.	

Pump and Spray Gun Pattern Air Quality

Air must be clean and dry. Use a regenerative desiccant or refrigerated air dryer capable of producing a 3.4 °C (38 °F) or lower dew point at 7 bar (100 psi) and a filter system with prefilters and coalescent-type filters capable of removing oil, water, and dirt in the submicron range.

Recommended Air Filter Screen Size: 5 micron or smaller

Maximum Oil Vapor in Air Supply: 0.1 ppm

Maximum Water Vapor in Air Supply: 0.48 grains/ft3

Moist or contaminated air can cause the pumps to malfunction; the powder to cake in the reclaim system, or cause clogging in the feed tubing or spray gun powder paths.

Special Conditions of Use

1. The Encore Engage Control Consoles and Remote Display are only for use in non-explosive atmospheres.
2. For the Encore Engage Series:
   - The Encore Engage Control Console and Remote Display shall be used with the separately and suitably certified applicators and optional manual interface units, in accordance with the manufacturer's instructions.
3. For the Encore HD Pump Module:
   - The Encore HD Pump Module may only be used in areas of low impact risk.
   - Follow the manufacturer's instructions to avoid possible electrostatic charging hazards.

CAUTION: Caution should be taken when cleaning plastic services on the Encore Engage consoles and Remote Display. There is a potential for static electricity buildup on these components.

Approval Labels

The following figures show the content of the approvals labels on the system cabinets.

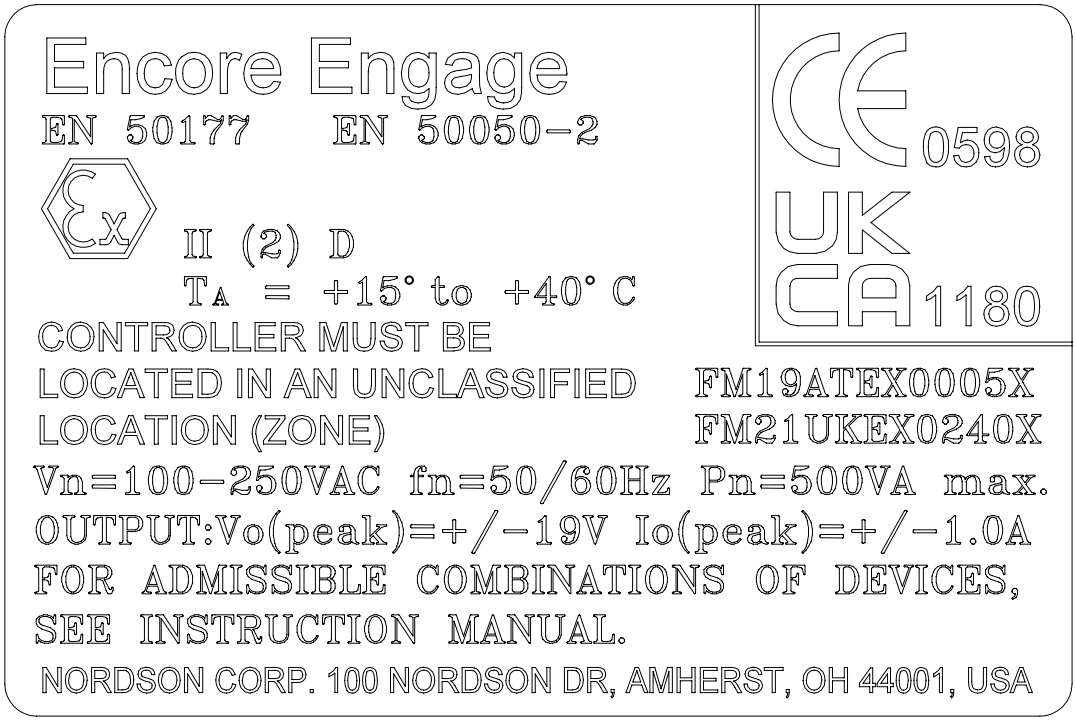


Figure 2-4 Label for CE ATEX and UKCA Approval (On Main and Auxiliary Cabinets)

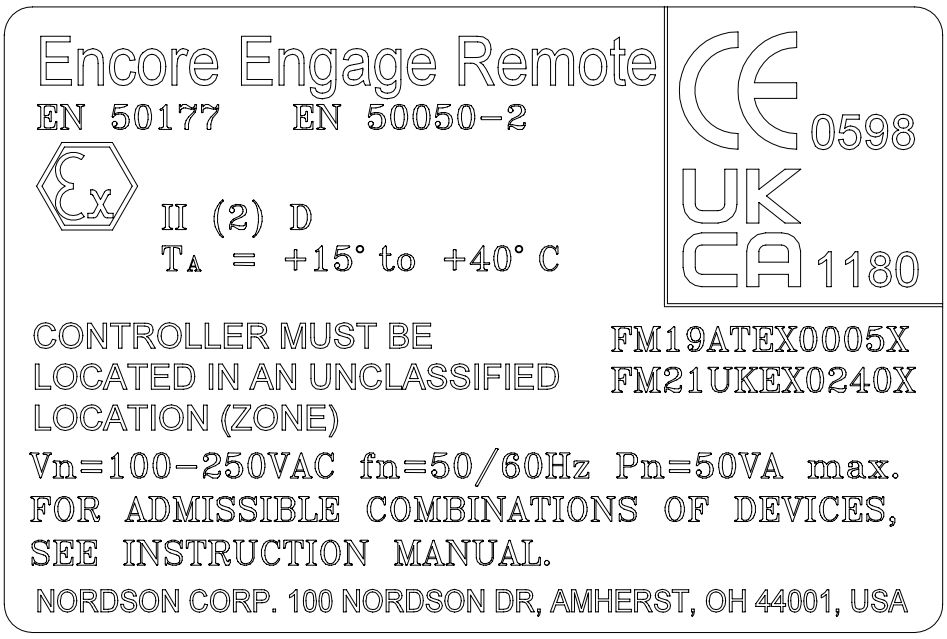


Figure 2-5 Label for CE ATEX and UKCA Approval (On Remote Display)

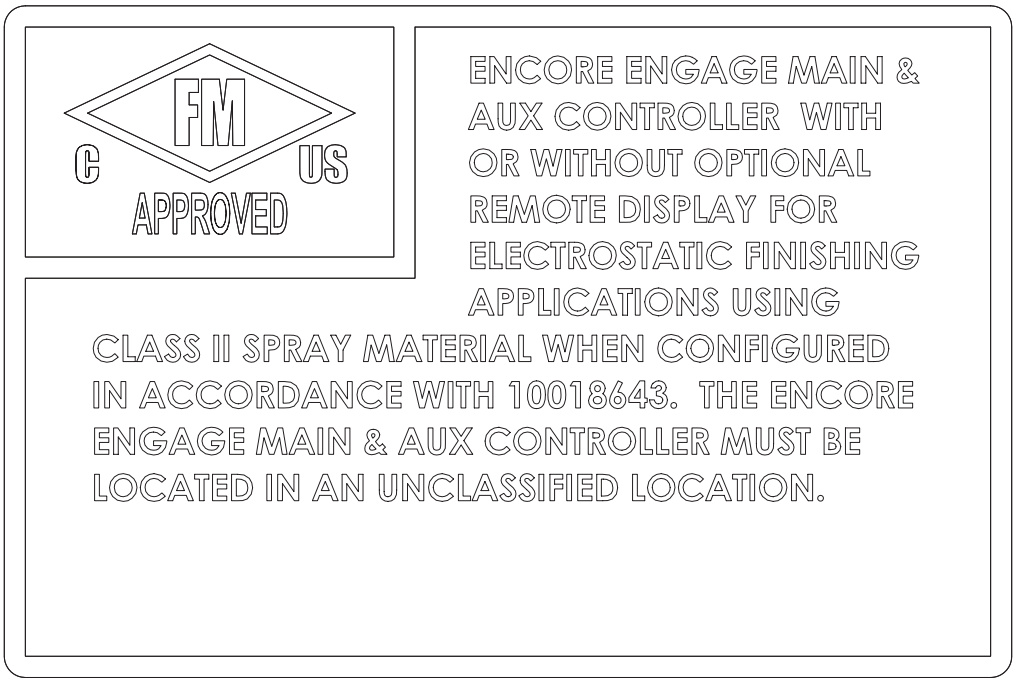


Figure 2-6 Label for FM Approval (On Main and Auxiliary Cabinets)

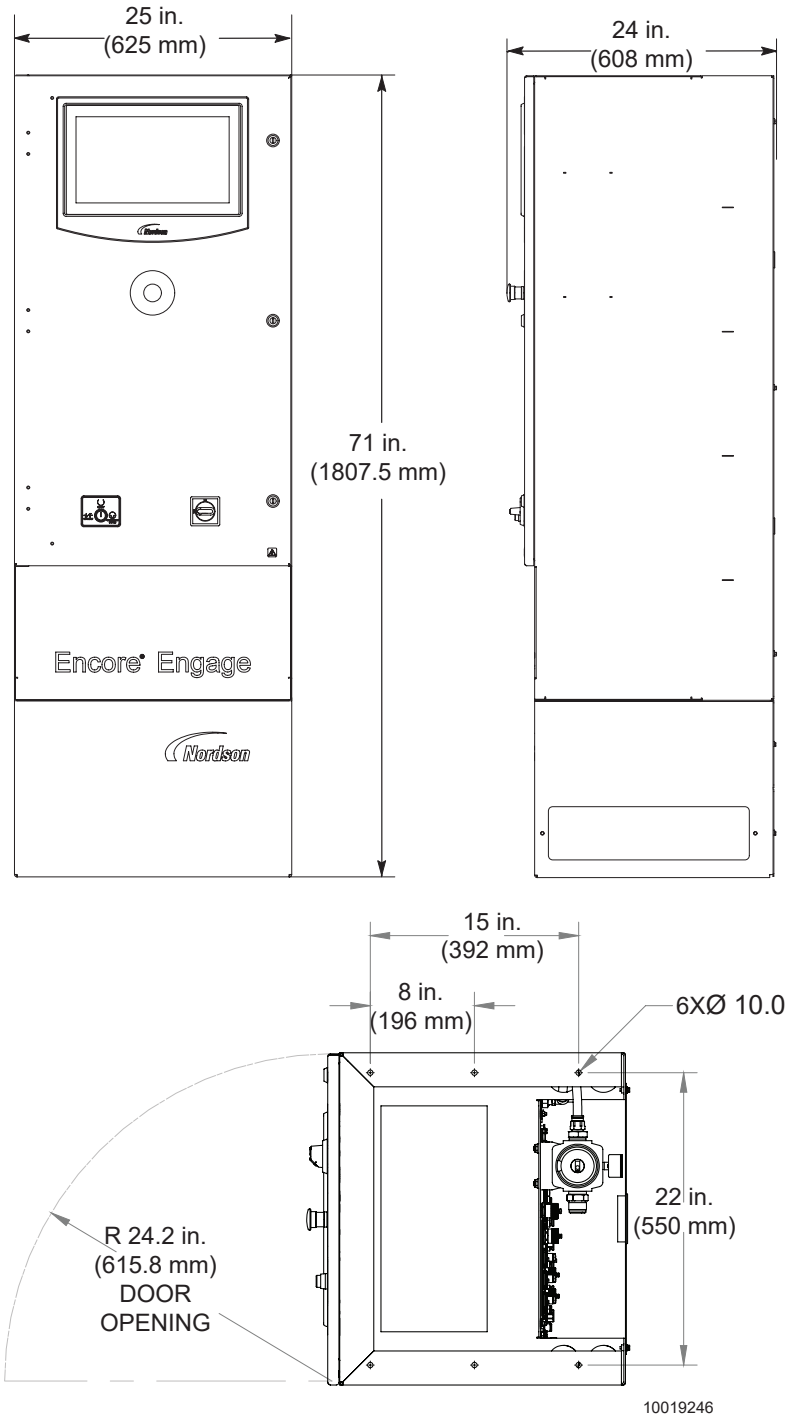


Figure 2-7 Label for CE ATEX and UKCA Approval (On Main and Auxiliary Cabinets)

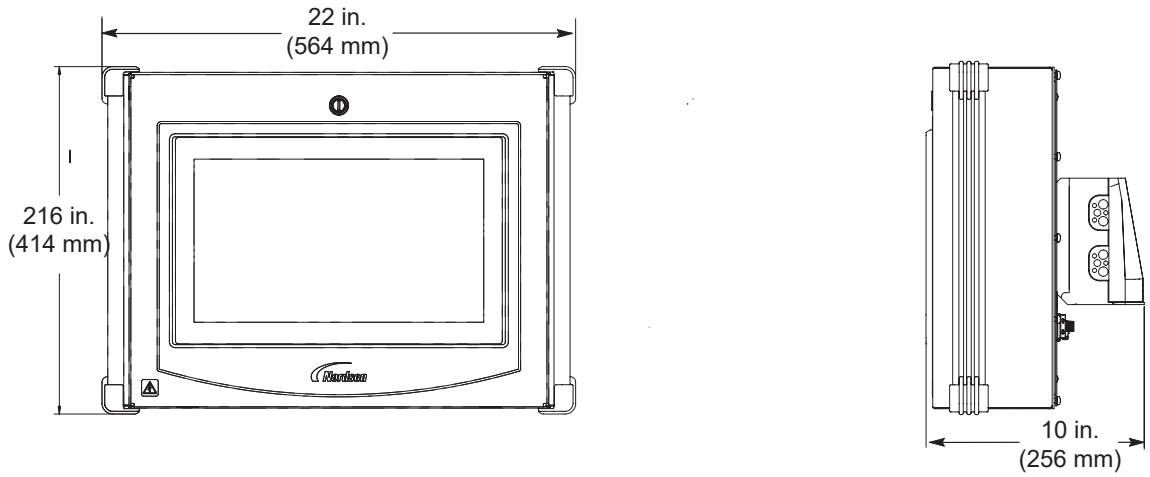


Figure 2-8 Remote Controller Touchscreen Interface Dimensions

Approved Program and User Data USB Flash Drive

Any standard off-the-shelf USB flash drive can be used to back up the user data on the touchscreen interface/PC. For example, a 1 GB capacity Memory Flash USB drive will work.

NOTE: Instructions for backing up the user data can be found in the Encore Engage help support on the touchscreen interface. Reference the Operation section, Backup and Restore.

Section 3
Installation

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

WARNING: This equipment can be dangerous unless it is used in accordance with the rules stated in this manual.

Introduction

Encore Engage systems are configured for each customer's application and requirements. The equipment supplied with the system varies depending on the type of installation (new, upgrade, or retrofit) and the equipment furnished by the customer. Therefore, this section provides only basic installation information. Detailed information is contained in the system wiring diagrams, plan views, and other documentation furnished by Nordson application engineering.

Once all hardware is installed and wired, and the system is powered up, the touchscreen interface is used to configure and operate the system. On screen help support is available through the touchscreen interface for configuring and operating the system.

System Connections

Interconnect Cable Connections

See Figure 3-1 and refer to Table 3-1 and Table 3-2 for connection diagram and cables for a typical system with 32 automatic spray guns, remote controller, and part ID connections.

NOTE: For VT systems, the P6 connection is not applicable.

NOTE: If system has auxiliary controller, MGI connection should be done at P4 location on auxiliary controller.
If only using a main controller, MGI connection should be done at P4 location on main controller

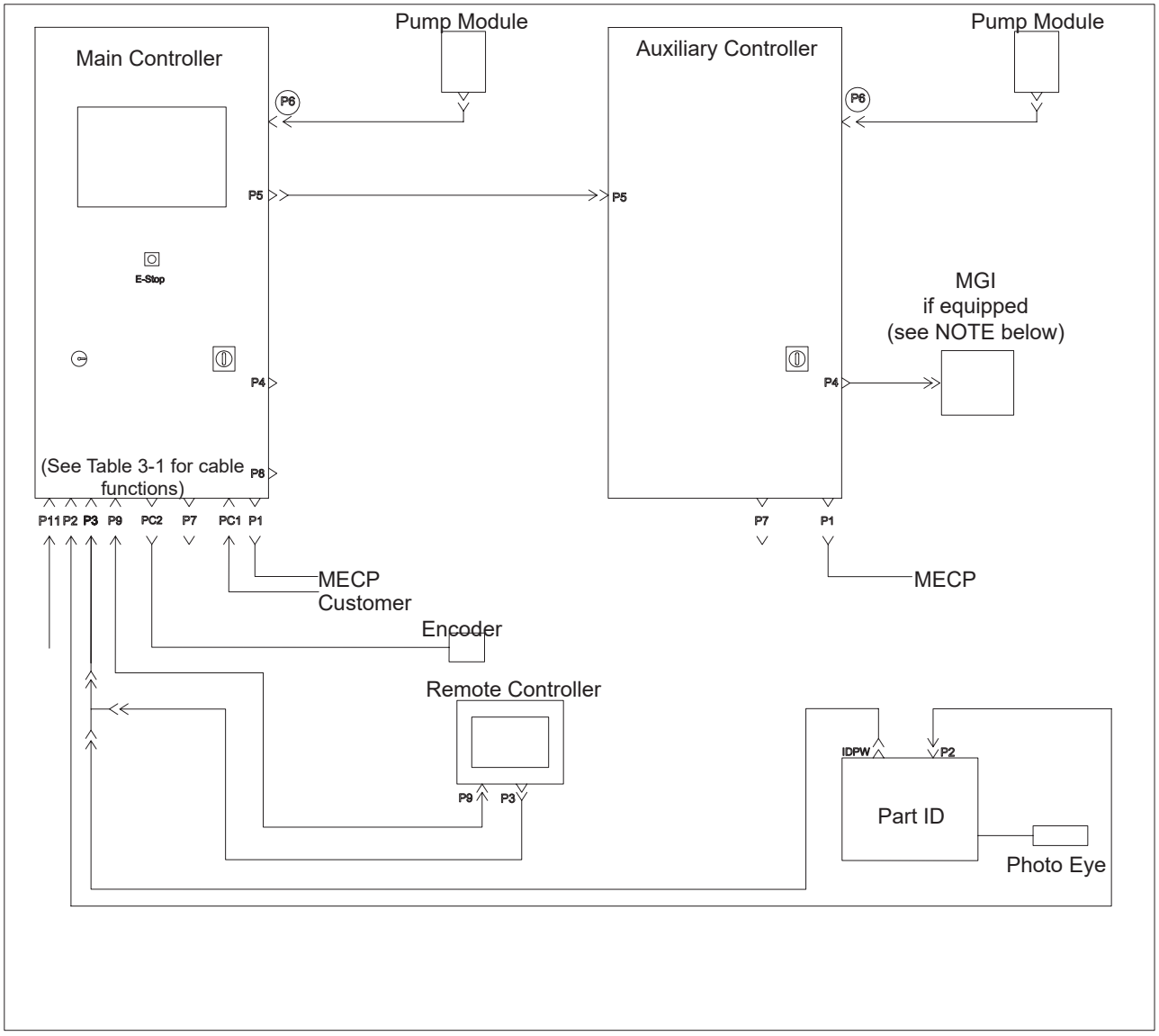


Figure 3-1 Typical System Interconnect Cable Connections

Interconnect Cables

Table 3-1 System Interconnect Cables

Cable	Function	Type
P1	AC Switched/Unswitched	7 Conductor 8A Maximum, 1.25 in. mini
P2	Enet 2 (Nord Network)	M12 D Coded Female E-net
P3	Remote AC Power Source	4A Fused, 200VA Maximum
P4	Manual Gun Connection (CAN 1) (Powered)	CAN +24 V
P5	Auxiliary Automatic Cabinet Connection (CAN 2)	CAN Network/Lockout
P7	Air Conditioner Power (120 VAC only)	⅞-in. mini
P8	E-stop (From EXT source)	4 Conductor M12
P9	Enet 3 (Remote Screen)	M12 D Coded Female E-net
P11	WAN (Customer Data)	M12 D Coded Female E-net
PC1	Interlock/Alarm (Optional)	1.25 in. mini
PC2	Encoder	4 Conductor M12

Table 3-2 System Cable Wires

Cable	Position	Function	Wire	Cable	Position	Function	Wire
P1	1	Conveyor−	White/Black	P7 (A/C)	1	Chassis	Green/Yellow
	2	L1 Unswitched	Black		2	L1	Black
	3	L2 Unswitched	White		3	L2	White
	4	L1 Switched	Red	P8	1	1A	Brown
	5	Conveyor+	Orange		2	2A	White
	6	L2 Switched	Blue		3	1B	Black
	7	Chassis Ground	Green		4	1B	Blue
P3	1	Chassis	Green/Yellow	PC1	1	Alarm Relay 250 VAC, 1A Max	White/Black
	2	L1	Black		2	Alarm Relay 250 VAC 1A Max	Black
	3	L2	White		3	N/C	White
P4	1	Drain	Bare		4	N/C	Red
	2	+24 V	Red		5	Lockout+ 24 VDC 120−230 VAC	Orange
	3	Common	Black		6	Lockout+ 24 VDC 120−230 VAC	Blue
	4	CAN H	White		7	Chassis	Green
	5	CAN L	Blue		1	+24 V	Brown
P5	1	Drain	Bare		2	Encoder Signal	White
	2	Aux Lockout	Red		3	+24 V	Black
	3	Aux Lockout	Black		4	DC Common	Blue
	4	CAN H	White				
	5	CAN L	Blue				

Electrical Connections

See Figure 3-2 and refer to Table 3-1 and Table 3-2.

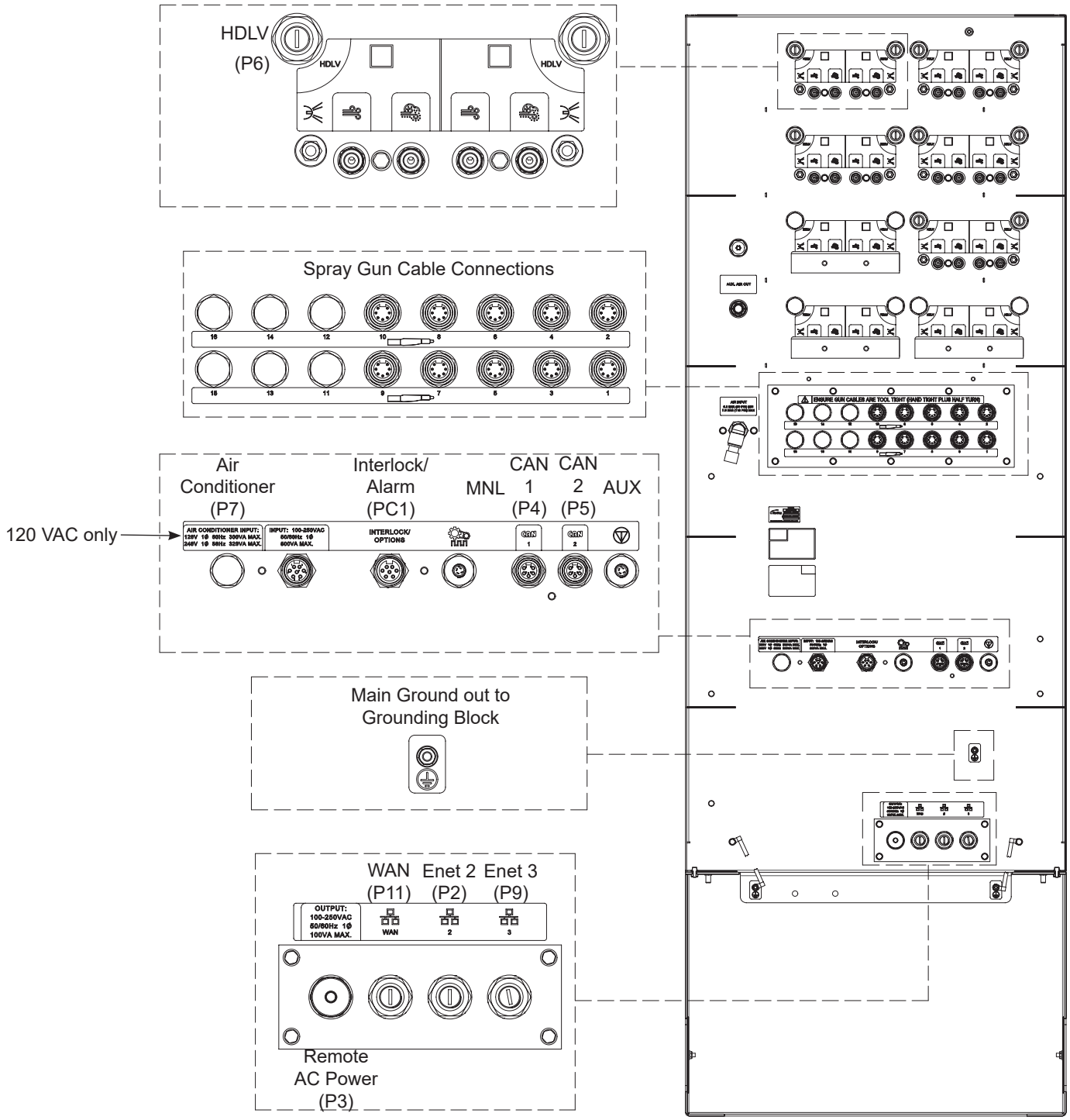


Figure 3-2 Rear Panel of Cabinet (Cover Removed)

Pneumatic Connections

See Figure 3-3. Cable codes are called out for reference to Figure 3-1 and Table 3-1 and Table 3-2.

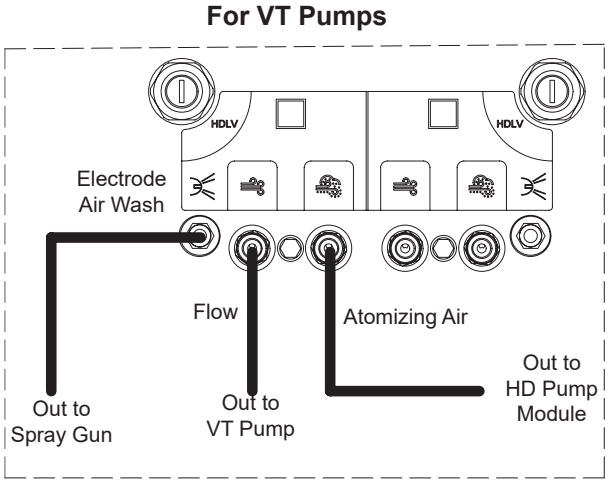


Figure 3-3 Console Rear Panel (Cover Removed)

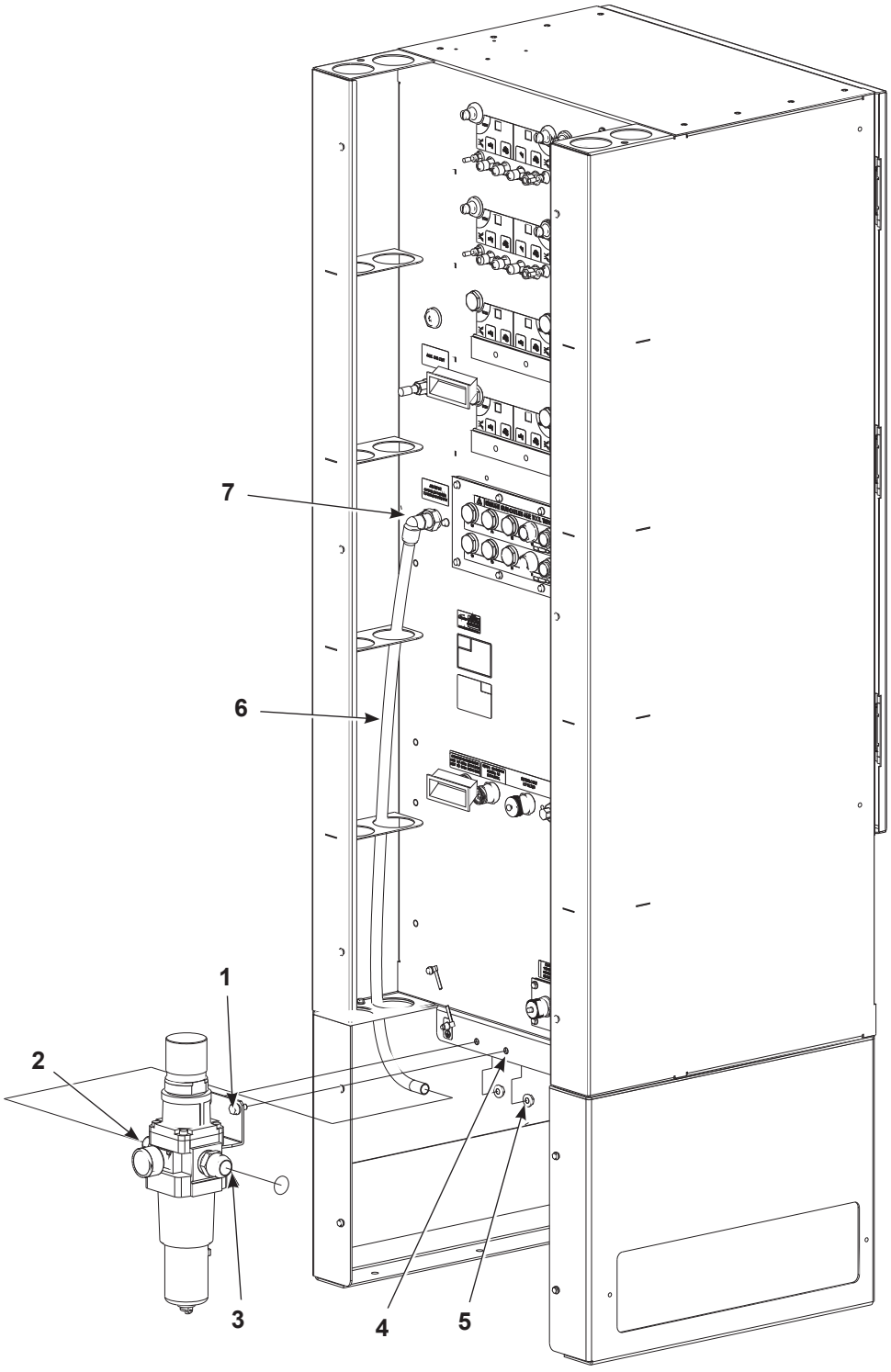


Figure 3-4 Encore Engage External Controller with Optional Air Prep Kit

1. M8 serrated hex screw
2. Air prep unit outlet fitting
3. Air prep unit inlet fitting
4. Mounting holes
5. M8 serrated nut
6. 16 mm tubing
7. Controller air inlet fitting

CAN Network Connections and Settings

Engage communicates with the automatic spray gun controllers and pump control cards through a CAN network. See Figure 3-5 for connections shown with auxiliary cabinet and 32 automatic spray guns. Make sure each cable shield is connected on one end only.

NOTE: Terminating resistors must be installed for dust tight connection

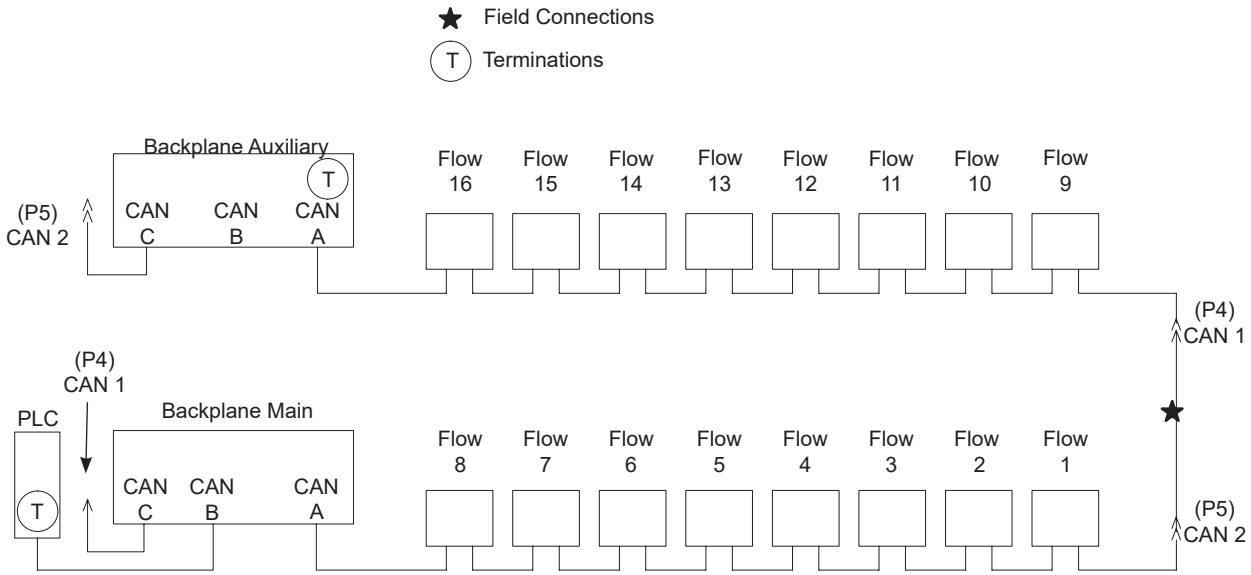


Figure 3-5 CAN Network Cable Connections

Terminations

Terminations are determined by the system configuration. Figure 3-5 shows terminations for a system with an auxiliary cabinet and 4 manual spray guns. Refer to Table 3-3 for terminations on other types of system configurations.

NOTE: If there are no connections to P4 or P5, the termination jumper must be installed on JP1 on the flow module in the main controller.

Table 3-3 CAN Termination Locations

System Configuration	CAN Termination Locations
32 Automatic Spray Guns (includes main and auxiliary cabinets)	PLC CAN A on Auxiliary Backplane (SW1-3 – See Figure 3-6)
16 Automatic Spray Guns (main cabinet only)	PLC Flow Module 1 (see JP1 – See Figure 3-5)

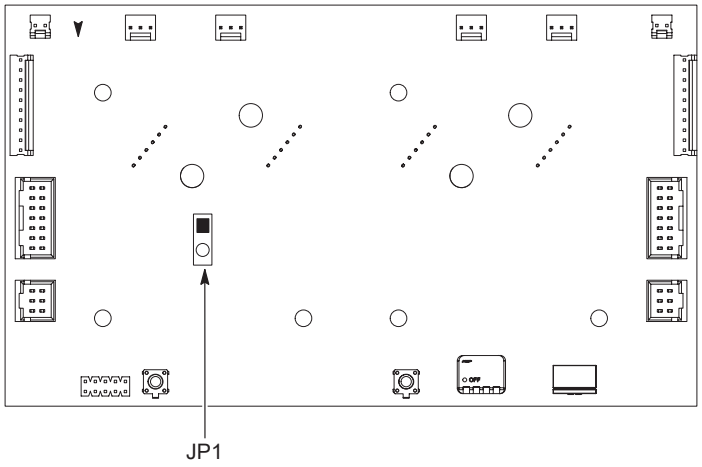


Figure 3-6 iFlow Board

CAN Address and Termination Settings

The backplane address dipswitches are set at the factory:

1. Network terminator switch SW1-3 is set at factory per system configuration. SW1-3 will need to be adjusted.
2. Network address switches SW1-1 and 2 are set to Spray Guns 1−16 for the lower backplane and to 17−32 for the upper backplane (if used).

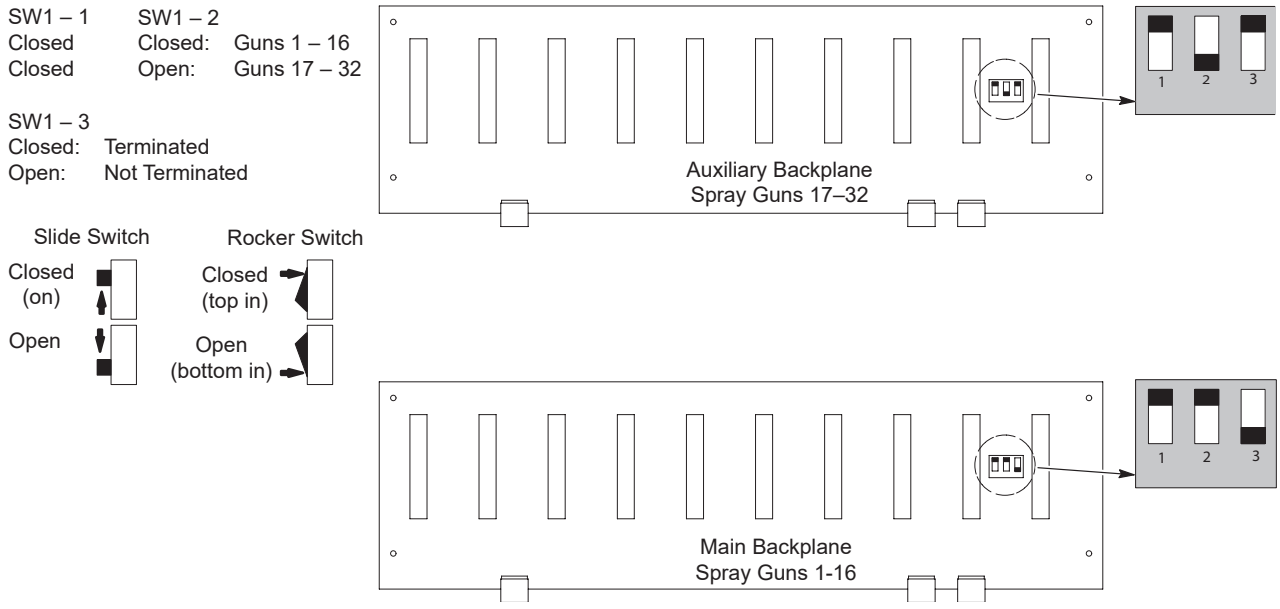


Figure 3-7 System Interconnect Cable Connections

Pump iFlow Module Addresses

Addresses on the iFlow module are factory set.

Relay Board

See Figure 3-8.

Pin	Function	Pin	Function
J1 − AC/DC Signals		**J7 − Low Voltage Connections**	
1	Conveyor +	1	No Connection
2	Conveyor −	2	No Connection
3	Lockout +	3	+24V PC Supply
4	Lockout −	4	+24V PC Supply
5	Alarm Relay 250V 1A	5	+24V PC Supply
6	Alarm Relay 250V 1A	6	Common PC Supply
7		7	No Connection
J2 − Low Voltage External Connections		8	Common PC Supply
1	Encoder +	9	Keyswitch Conveyor Bypass
2	Encoder −	10	Keyswitch Lockout
3	Gun Power OK +	11	Main Backplane Lockout − (P2−4)
4	Gun Power OK −	12	Main Backplane Lockout − (P2−3)
J4 − Low Voltage PC Connections		13	AUX Backplane Lockout − (P2−4)
1	Conveyor Interlock Signal	14	AUX Backplane Lockout − (P2−3)
2	No Connection	15	Alarm Input +24 (P2−5)
3	Encoder	16	Alarm Input Sig (P2−6)
4	No Connection	17	No Connection
5	Gun Power OK	18	No Connection
6	No Connection		
7	Lockout Signal		
8	No Connection		
9	No Connection		
10	No Connection		

Relay Board LEDs

LED	Description	State	Function
1	Encoder	ON (Flashing)	Conveyor moving
		OFF LED OFF or ON with solid color	Conveyor not moving
2	Gun Power	ON	Indicates proper power for the spray guns
		OFF	Improper power to the spray guns. Check wiring.
3	+12 Vdc Power	ON	12 Vdc source is functioning properly.
		OFF	12 Vdc source not functioning properly. Check wiring, relay board, and power supply.
4	+24 Vdc Power	ON	24 Vdc source is functioning properly.
		OFF	24 Vdc source not functioning properly. Check wiring, relay board, and power supply.
5	Conveyor	ON	Conveyor run signal present, or keyswitch is in bypass mode.
		OFF	Conyeyor run signal not present. Check signal.
6	Lockout	ON	Keyswitch is in ready position or bypass.
		OFF	In lockout mode.
7	Alarm	ON	No faults. Normal system operation.
		OFF	Indicates fault.

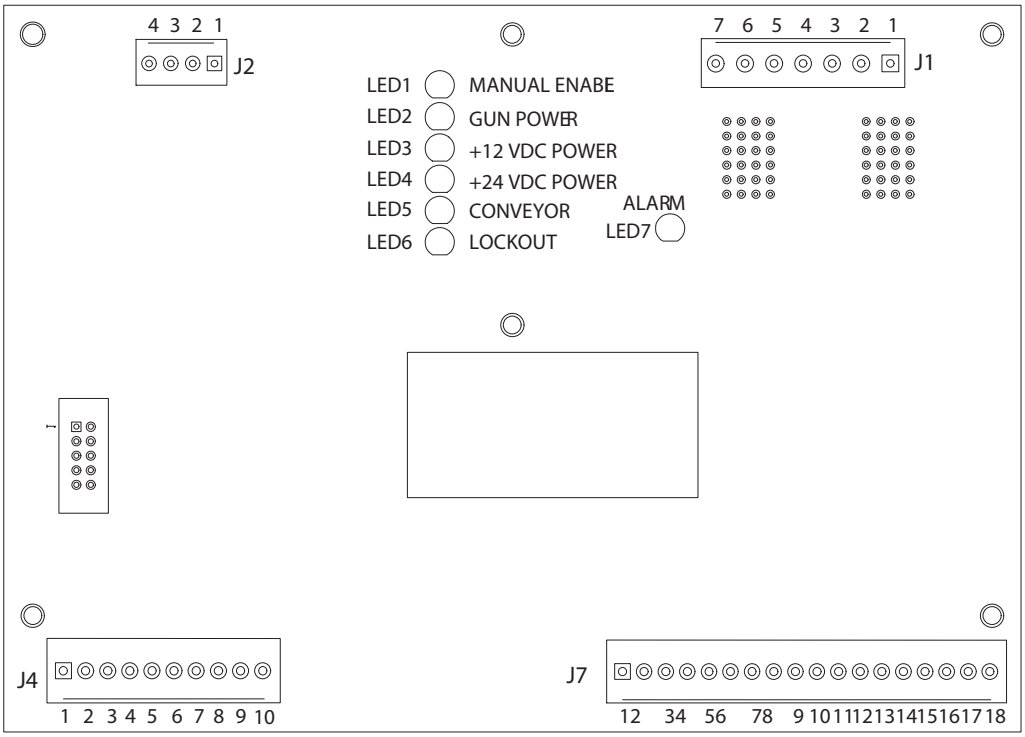


Figure 3-8 Relay Board

Power Connections

The console power cable plugs into the AC IN receptacle on the rear of the cabinet. The cable is routed to the system electrical panel and connected to a terminal block.

Table 3-4 lists the connections required for both main and auxiliary cabinets.

Console Power Cable Connections

Table 3-4 Console Power Cable Connections

Main Console Power Cable Connections		
Wire Color	**Pin**	**Function**
White/Black	1	Conveyor run AC common
Black	2	Non-interlocked AC
White	3	Non-interlocked AC common
Red	4	Interlocked AC
Orange	5	Conveyor run AC
Blue	6	Interlocked AC common
Green	7	Ground
Auxiliary Console Power Cable Connections		
Wire Color	**Pin**	**Connection**
Black	2	Interlocked AC (same as main console Red connection)
White	3	Interlocked AC common (same as main console Blue connection)
Green	1	GND

Grounding

WARNING: Consoles and all conductive equipment in the spray area MUST be connected to a true earth ground. Use the provided ground cables to ground the consoles. Mount junction boxes and control panels to grounded stands or the booth base. Failure to observe this caution could result in severe shocks to personnel, fire, or explosion.

Proper grounding of all conductive components of a powder coating system provides both shock and electrostatic discharge protection for both operators and sensitive electronic equipment. Many system components (booth, collector, color modules, control consoles, and conveyor) are connected both physically and electrically. It is important that the proper grounding methods and equipment are used when installing and operating the system.

PE (Protective Earth) Grounding

PE grounding is required on all conductive metal electrical enclosures in a system. PE grounding is provided by a ground conductor wire bonded to a true earth ground. PE grounding protects operators from electrical shock by providing a path to ground for electrical current if a conductor contacts an electrical enclosure or other conductive component. The ground conductor wire carries the electrical current directly to ground and short circuits the input voltage until a fuse or circuit breaker interrupts the circuit.

The sole purpose of the green/yellow ground wires bundled with the AC input power cable is to protect personnel from a shock. They must be used for PE grounding only. These ground wires do not protect equipment against electrostatic discharge.

Electrostatic Grounding

Electrostatic grounding protects electronic equipment from damage caused by electrostatic discharges (ESD). Some electronic components are so sensitive to ESD that a person can deliver a damaging static discharge without feeling even a mild shock.

Proper electrostatic grounding is mandatory in an electrostatic powder coating system. Powder spray guns generate electrostatic voltages up to 100,000 V. It does not take long for ungrounded system components to build up an electrical charge strong enough to damage sensitive electronic components when discharged.

Electrostatic discharges occur at very high frequencies, around 100 MHz. An ordinary ground conductor does not conduct such high frequencies well enough to prevent damage to electronic components. Special flat-braided cables are provided with Nordson powder coating equipment to protect against ESD.

Spray Gun Current Path

See Figure 3-9. All electrical circuits need a complete path for current to make its way back to the source. Electrostatic spray guns emit current (ions) and therefore require a complete circuit. Some of the current emitted by the spray gun is attracted to the spray booth, but most is attracted to the grounded parts moving through the booth. The current attracted to the parts flows through the part hangers to the conveyor and to the building ground, back to the controller through a ground braid and back to the spray gun through the spray gun driver board. The current attracted to the booth is returned through the booth ground to the controller and back to the spray gun.

It is very important to provide a complete circuit for the spray gun current. A break in the circuit conductors (conveyor, booth, braided ground cables, controller) can cause voltage to build up on the conductors up to the maximum output of the spray gun voltage multiplier (up to 100 kV). The voltage will eventually discharge in a high frequency arc, which can cause damage to the controller electronics (spray gun driver board and power supply).

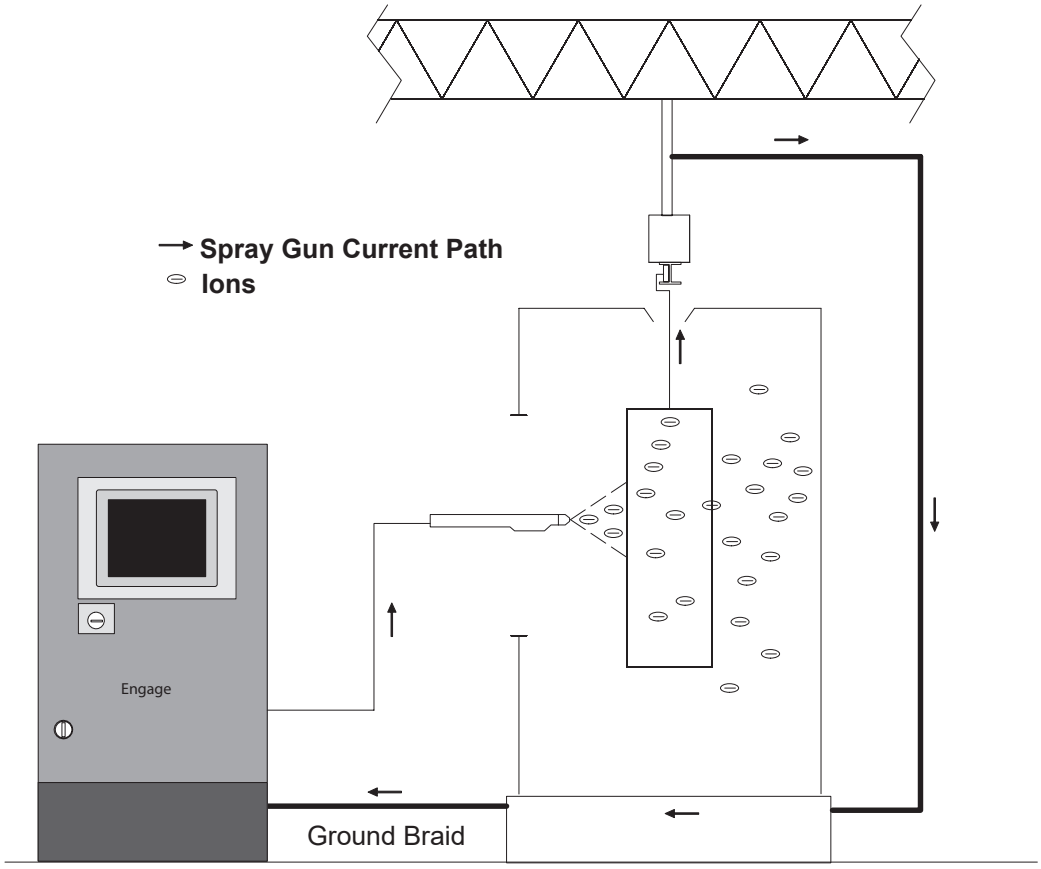


Figure 3-9 Electrostatic Current Path

ESD Ground Procedures and Equipment

The best protection against ESD is to keep the ground braids as short as possible and connect them to a central point on the booth base as shown in the Star diagram. Under normal conditions making Star connections is not a problem, but in some systems, such as roll-on/roll-off booths, the ground braids required for a Star connection are too long to be effective against ESD. In this case, a Daisy Chain ground configuration is acceptable.

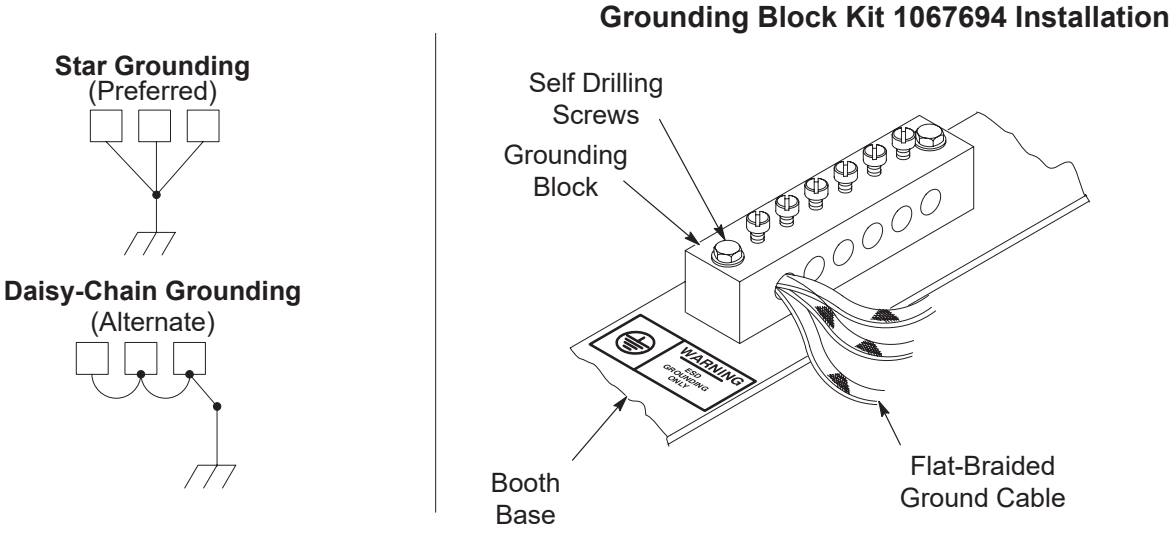


Figure 3-10 ESD Grounding Procedures and Equipment

Always use the special flat-braided copper ESD ground cables furnished with all Nordson spray gun controllers to ground them. The ESD ground cables should always be attached to the booth base, not to a panel, enclosure, or other component bolted to the base. Keep the cables as short as possible. If using a grounding block kit, make sure the block is installed directly to the base with the included self-drilling screws.

An ESD grounding block kit is available for connecting the ground braids to the booth base. The kit contains two 6-position grounding blocks, fasteners, terminals, and 15 meters (50 feet) of braided ground cable. If additional kits are required, order:

1067694 Kit, ground bus bar, ESD, 6-position, with hardware.

Spray Gun Cable Connections

See Figure 3-11. Connect the automatic spray gun cables to the receptacles on the rear panel of the Engage console. Connect spray gun 1 cable to receptacle 1, spray gun 2 cable to receptacle 2, and so on.

Number of Spray Guns

Engage systems are sold configured so the number of spray guns is always a multiple of four (4, 8, 12, with a maximum of 16 per console). Each spray gun controller card in the console controls two spray guns.

If the system requires 1, 5, 9, or 13 spray guns the fault LED on the card with one spray gun connected will light. The fault LED on the card with no spray guns will also light.

If the system requires 2, 6, 10, or 14 spray guns, the fault LED on the card with no spray guns will light.

If the system requires 3, 7, 11, or 15 spray guns, the fault LED on the card with one spray gun connected will light.

The unused spray guns must be the highest-number spray guns. For example, if only 7 guns are used in an 8-gun system, then number 8 must be the unused spray gun. The spray gun card receptacles are labeled on the circuit boards as A (odd-number spray gun) and B (even-number spray gun).

Included in the bag with the console keys is a bulkhead seal and jumper. The jumper disables the spray gun not detected fault LED on the spray gun card.

Cap the unused cable receptacle with the bulkhead seal, then open the console door and unplug the receptacle harness from the spray gun card. Install the jumper in the card receptacle.

Refer to the Parts section for seal and jumper part numbers.

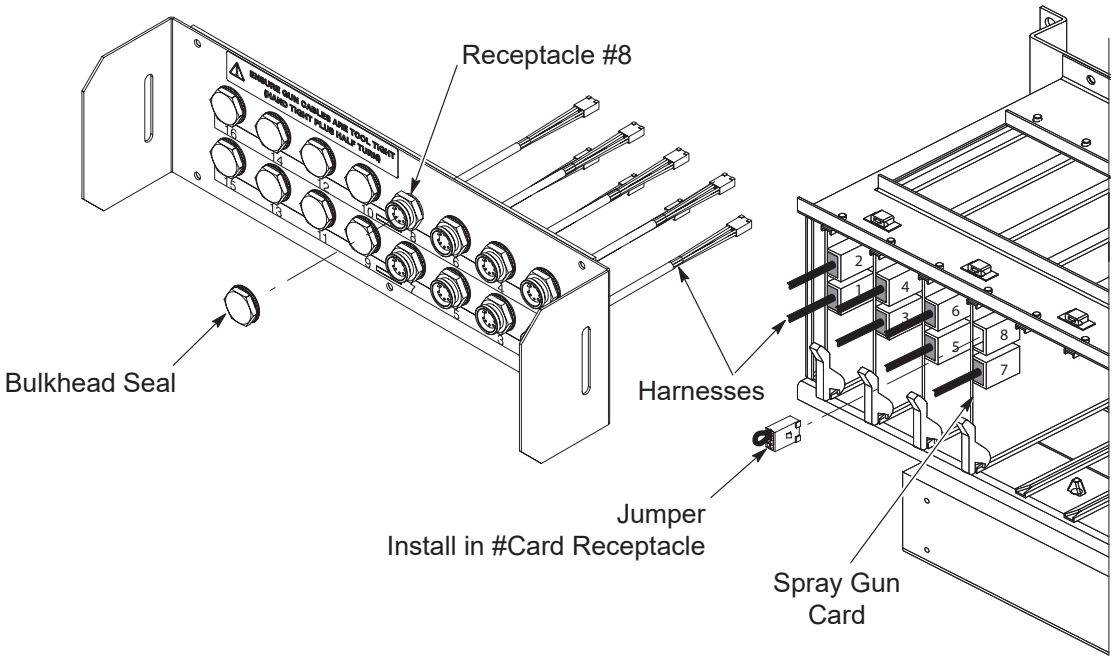


Figure 3-11 Seal and Jumper Installation – Example Showing 8-Spray Gun System Using Seven Spray Guns

System Upgrades

Certain upgrades require updates to the spray gun control card and iFlow module firmware. These upgrades should only be done by a Nordson representative.

Section 4

Operation

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

Most of the operation of the Encore Engage system controller is performed through the Encore Engage controller touchscreen. Onscreen help support is available on the controller by selecting the **Help** button on the upper **Navigation** bar.

Air Conditioner

This section covers common operation of the air conditioner as it applies to the Encore Engage controller. For more information on the air conditioner unit, refer to the air conditioner vendor manual included with the system.

Refer to the Troubleshooting section of this manual for alarm codes for the air conditioner.

WARNING: The door of the Encore Engage controller must remain closed when the air conditioner is running. The controller door includes gaskets and seals to prevent ambient air from entering the cabinet and causing condensation on electrical components. Condensation on these electrical componenents can damage equipment or cause serious harm to operator.

Display LEDs

See Figure 4-1 and Table 4-1 for description of display LEDs. Only LEDs applicable to the Encore Engage controller are noted.

Figure 4-1 Air Conditioner Display LEDs

Table 4-1 Display LEDs

Item	Color	LED ON	Icon Flashing
1	Amber	Controller Active	ON indicades power and activates all functions. OFF indicates controller is in standby mode and all functions are OFF
2	Amber	Evaporator Fan ON	Active when evaporator fan is ON
3	Amber	Compressor ON	Active when compressor is ON

Display States

Figure 4-2 shows the two common display states for the air conditioner

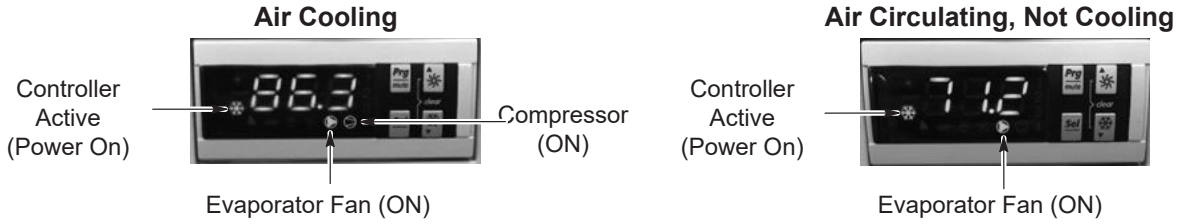


Figure 4-2 Air Conditioning Status

Operating Parameters

Refer to Table 4-2. For factory set values, cooling with turn OFF at 85°F (30°C) and turn ON at 100°F (38°C).

NOTE: When the compressor turns off, there is a delay of five minutes before it turns back on to protect the compressor.

Table 4-2 Display LEDs

Parameter	Description	Factory Set Value	Range
r01	Cooling setpoint	85°F	72°F to 120°F
r02	Cooling differential	15°F	0−50°F

Adjusting Parameters

If the compressor is cycling too often adjustments to parameters may be required. Use the following steps to navigate to the parameter menu for adjusting cooling setpoint or cooling differential.

1. See Figure 4-3. Press and hold **Prg** and **Sel** for more than 5 seconds until display reads **00**.
2. Use the **Up/Down arrows** to scroll to **22** on the display and press **Sel**.

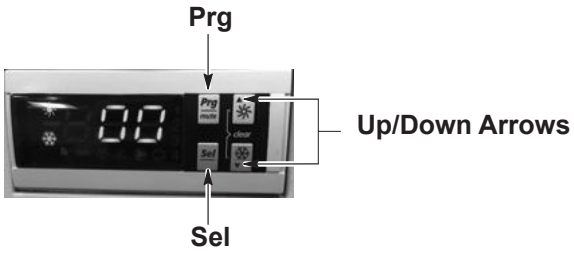


Figure 4-3 Air Conditioner Display 00

3. **S−P** will display on the screen. Press **Sel**.
4. See Figure 4-4. Use the **Up/Down arrows** until the display reads **−r−** and press **Sel**.

Figure 4-4 Air Conditioner Display −r−

5. Use the **Up/Down arrows** the applicable parameter is displayed (**r01** or **r02**) and press **Sel**.
6. Use the **Up/Down arrows** to adjust to the desired value press **Sel** to save the value.
7. Press **Prg** to back out of the current menu. Continue to press **Prg** to return to the main display.

   NOTE: The display will revert back to the main display if no other buttons are pressed after 60 seconds.

Maintenance

Refer to Table 4-3. The following maintenance tasks should be performed on a biannual basis or more frequently depending on the operating environment.

For air conditioner replacement parts, refer to the air conditioner vendor manual shipped with system.

Table 4-3 Maintenance Tasks

Visual Inspection	Visually inspect unit for damage, cleanliness, missing, loose, and/or broken parts.
Filter Maintenance	Inspect, clean, and replace filter as necessary.
Clean Unit	Inspect and clean coils, fans/blowers, louvers, air inlets/outlets, interior and exterior of the unit as required.
Air Flow and Circulation	Inspect air conditioning unit, cabinet, and surrounding area to ensure adequate airflow to and from the unit on both the inlet and outlet air channels for the ambient air and cabinet air.
Seals, Gaskets, and Leaks	Inspect and repair the seals, gaskets, and access holes around the unit and/or cabinet that show signs of leaking air and/or cabinet that show signs of leaking air and/or moisture
Condensate and Drains	Inspect and clean the condensate pans and drains to ensure proper drainage and dissipation of moisture. Inspect gaskets and seals on door to ensure condensation is not forming on inside of the cabinet. Door must remained closed while air conditioner is running. Inspect for any condensation on the outside of door. To reduce condensation, raise the setpoint of the air conditioner above the ambient air dew point. **NOTE:** When raising setpoint, make sure to maintain system cooling requirements.
Electrical/Wiring	Inspect for loose, damaged, corroded, or chaffing wiring and connections. Tighten, insulate, or tie-up wires as required.
Maintenance Records	Update maintenance records on the unit and in the management system.

Section 5

Troubleshooting

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

CAUTION: Do not turn off console power without first performing a program shutdown. Doing so could corrupt the Engage program and operating system on the program card.

The troubleshooting in this manual relates to LED and hardware checks for the Engage controller. The Engage controller interface software offers operation, alert, and alarm troubleshooting through the touch screen interface.

NOTE: If the troubleshooting procedures in this section do not solve your problem, contact the Nordson Industrial Coating Systems Customer Support Center at (800) 433−9319 or your local Nordson representative.

Spray Gun Card LEDs

See Figure 5-1 and refer to Table 5-1. Use the card LEDs to help diagnose problems.

Table 5-1 Spray Gun Card LEDs

LED and Description	Color	LED State	Fault Cause	Corrections
DS1: Power	Green	Normal: ON Fault: OFF	Gun card has no power	Make sure gun card is properly seated in backplane. Replace the gun card if other gun cards have power.
DS2: Fault	Red	Normal: OFF Fault: ON	Communication Fault	If the DS3 LED is not blinking check PLC and check CAN Network Topology/ Terminations.
			Hardware Fault	If DS3 LED is blinking check gun cables plugged into the gun card and plugged into cabinet.
DS3: Communication	Green	Normal: Blinking Fault: OFF	Communication Fault	Make sure gun card is properly seated in backplane. Replace the gun card if other gun cards have power.
DS4: GUN A Current Limit	Yellow	Normal: OFF Fault: ON	Gun drive current exceeded maximum limit	Check gun cable for damage. Check multiplier impedance. Check gun to part distance. Check the part grounding for open circuit is less than 1 MΩ. Check high voltage arcing.
DS5: GUN B Current Limit	Yellow	Normal: OFF Fault: ON		

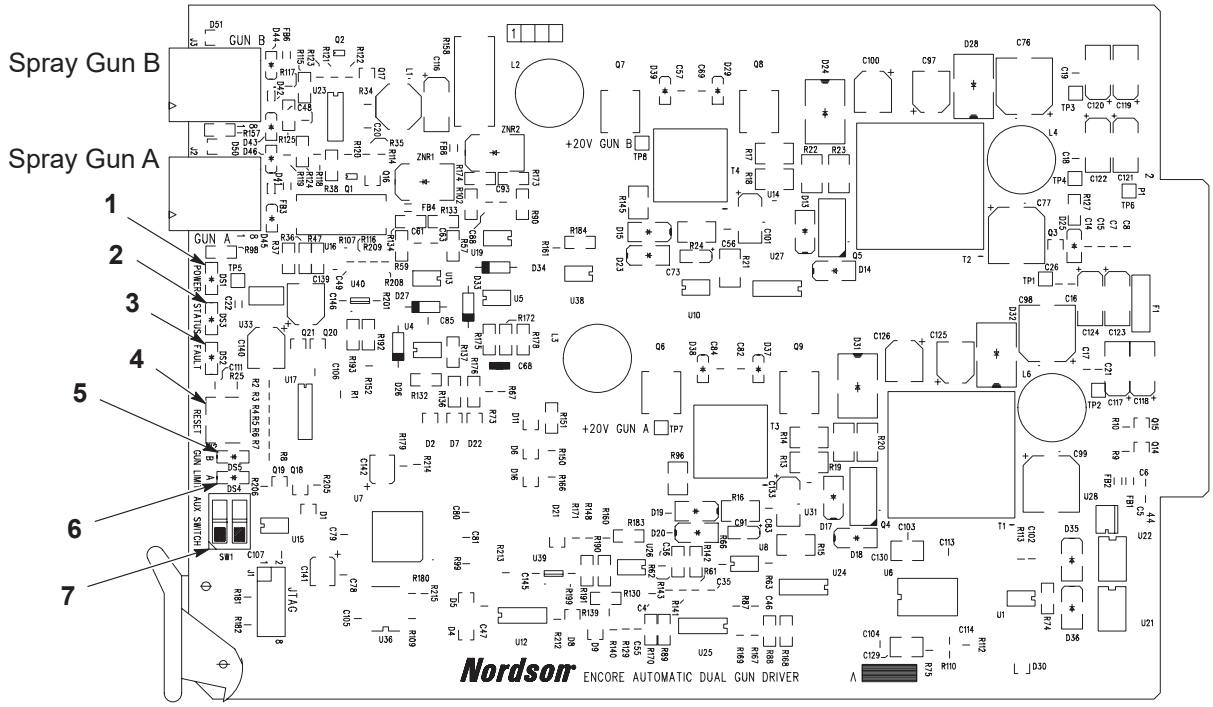


Figure 5-1 Spray Gun Control LEDs and Switches

1. DS1: Power (green LED)
2. DS3: Communication (green LED)
3. DS2: Fault (red LED)
4. Reset switch (reboots on-board processor)
5. DS5: GUN B current limit (yellow LED)
6. DS4: GUN A current limit (yellow LED)
7. SW1 (2 position DIP switch for future use)

Air Flow Re-Zero Procedure

Perform this procedure if the Engage spray gun control screens are indicating pattern air flow when a spray gun is off and no air is actually flowing. This procedure re-zeros the pump control cards to eliminate false air flow indications.

Before performing a re-zero procedure:

- Make sure the air pressure being supplied to the pump cabinet is higher than the minimum 5.86 bar (85 psi).
- Each pump circuit board in the pump cabinet controls two pumps and the pattern air for two spray guns. Make sure no air is flowing through the pumps, around the pump control manifold gaskets, or from around any of the solenoid valves on the manifold. Re-zeroing boards when leaks are present in the control manifolds will result in additional errors.

Re-Zero Procedure

See Figure 5-2. For each pump board that is being re-zeroed:

1. Disconnect the atomizing and flow air tubing from all four of the 8-mm output ports and plug the ports with tube plugs.
2. Record the board number and address settings of SW4 for each pump board.
3. Set each address switch to zero.
4. Press the pushbutton switch SW1 to reset the module. The red LED should be off.
5. Press and hold pushbutton switch SW2 for about two seconds, until the red LED turns on. Release the button. The LED will turn off again in about seven seconds. The module is now re−zeroed.
6. Move the SW4 address switches back to their original positions.
7. Press pushbutton switch SW1 again. The red LED should shut off.
8. Remove the tube plugs from the output ports.
9. On the Engage screen, check each spray gun control screen that was previously indicating air flow when the spray gun was off. No air flow should be indicated.

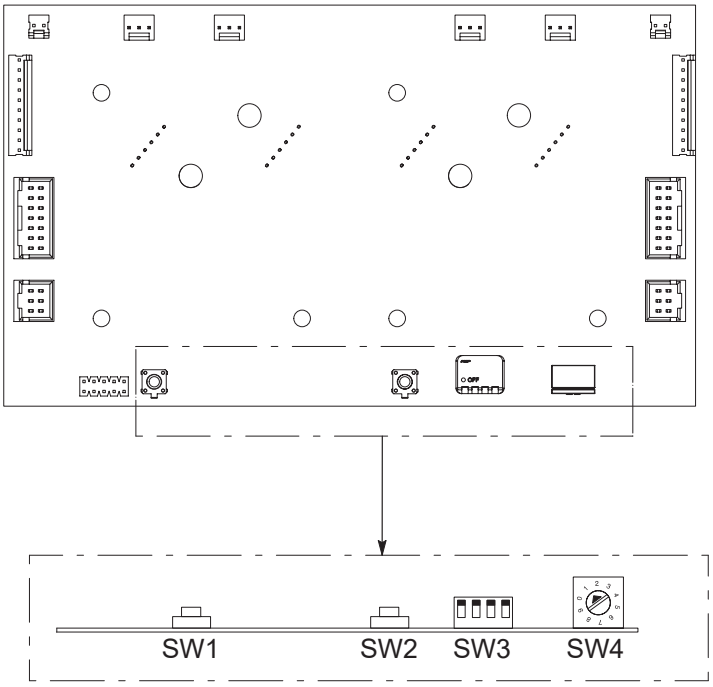


Figure 5-2 Dual Pump Control Board

Backplane

See Figure 5-3 and Table 5-2. Use the backplane LEDs to help diagnose problems.

Table 5-2 Backplane LEDs

LED	Function	LED Color	LED State	Fault Corrections
−12V	Power	Green	Normal: ON Fault: OFF	Check +24 V on P4 (+24 V LED ON). Check fuse F1. Check jumpers J12 and J13 are in place. Remove all gun cards. If +/−12 V LED turns ON, replace one gun card at a time.
+12V	Power	Green	Normal: ON Fault: OFF	
+24V	Power	Green	Normal: ON Fault: OFF	Check +24 V on P4 (+24 LED ON). Check power supply PS1, DC OK green LED ON. Check power supply PS1, AC OK green LED ON, LED OFF, refer to PS1 in troubleshooting section Power Supplies.
+5V	Power	Green	Normal: ON Fault: OFF	Check +24 V on P4 (+24 V LED ON). Check fuse F2. Check jumpers J11 and J14 are in place. Remove all gun cards. If +5 V LED turns ON, replace one card at a time.

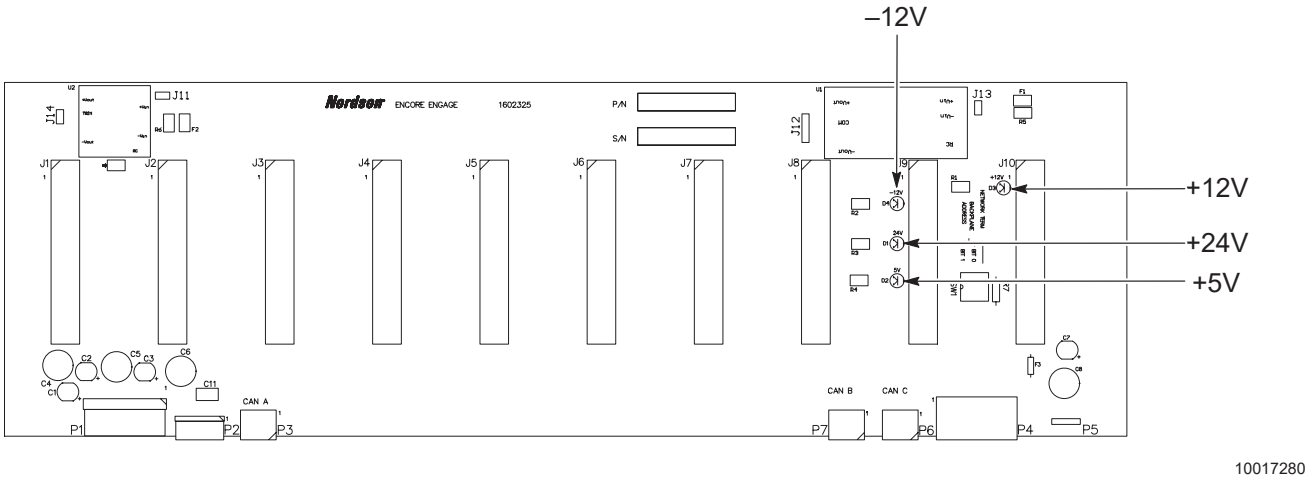


Figure 5-3 Location of Backplane LEDs

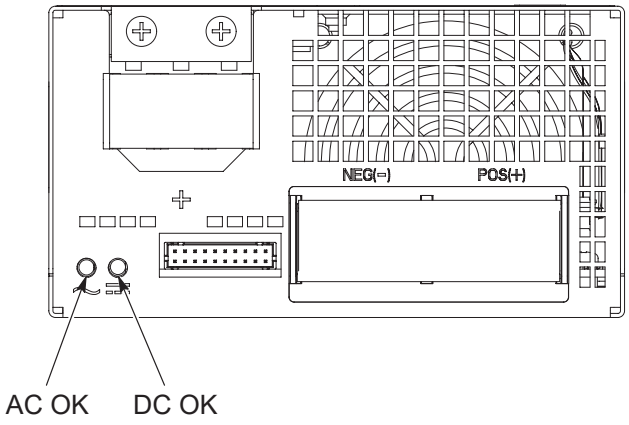
Power Supplies

See Figure 5-6 and refer to Table 5-3. Use the Power Supply LEDs to help diagnose problems.

Table 5-3 Power Supply LEDs

LED	Function	LED Color	LED State	
PS1 – 600 W 24 Vdc				
AC OK	Power	Green	Normal: ON Fault: OFF	Check input power to PS1 blue and brown wire 100−250 Vac 50/60 Hz. Check fuse L1A and L2A. Check disconnect switch. Check input power to controller L1A red and L2A blue 100V−250 Vac 50/60 Hz. Replace PS1.
DC OK	Power	Green	Normal: ON Fault: OFF	Check output voltage from PS1 red and black wire +23.5 V to +24.5 Vdc Remove connector P4 from backplane. If DC OK LED turns ON refer to troubleshooting for backplane on page 5-6. Remove connector P4 from backplane. If DC OK LED remains OFF, replace PS1.
PS2 – 120 W 24 Vdc				
DC OK	Power	Green	Normal: ON Fault: OFF	Check input power to PS2 black and white wire 100−250 Vac 50/60 Hz. Check fuse L1B and L2B. Check disconnect switch. Check input power to controller L1B black and L2B white 100V−250 Vac 50/60 Hz. Check output voltage on PS2 red and black wire +23.5 V to +24.5 Vdc. Remove red wire +24 V from terminal block. If DC OK LED turns ON, check short in loads. Return red wire +24 V from terminal block and check loads. Open +24 V 4A fuse block. If DC OK LED turns ON, check P4. Remove PLC power X6 and UL. If DC OK LED turns ON, check PLC. Remove eWON power. If DC OK LED turns ON, check eWON. Remove relay board power J7−5. If DC OK LED turns ON, check relay board. All loads removed. If DC OK LED remains OFF, replace PS2. Return all loads to circuit except the faulted load and check if DC OK LED turns ON.

600W 24 Vdc Power Supply



100W 24 Vdc Power Supply

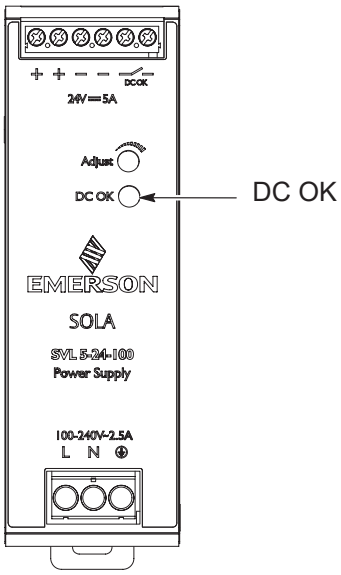


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Figure 5-4 Location of LEDs on Power Supplies

Flow Node

See Figure 5-5 and refer to Table 5-4. Use the Flow Node LEDs to help diagnose problems.

Table 5-4 Flow Node LEDs

LED	Function	LED Color	LED State	Fault Correction
LED1	+24 V Power	Green	Normal: ON Fault: OFF	If LED1 is OFF on all flow nodes, check PS1 for +24 Vdc (refer to Power Supplies troubleshooting on page 5-8). If LED1 OFF only on singlet flow node, check for shorted valve wiring.
LED2	+5 V Power	Green	Normal: ON Fault: OFF	If LED2 is OFF and LED1 is ON, either defective LED or replace flow module.
DS1	Communication	Green	Normal: ON Fault: OFF	Check CAN network terminations are correct (Measure 60 Ω). Check for PLC fault. Check flow node cabling. Check manual gun connections P4.
DS2	Fault	Red	Normal: OFF Fault: ON	Check Alerts screen through Engage controller touchscreen for fault codes. High flow fault. Low flow fault.

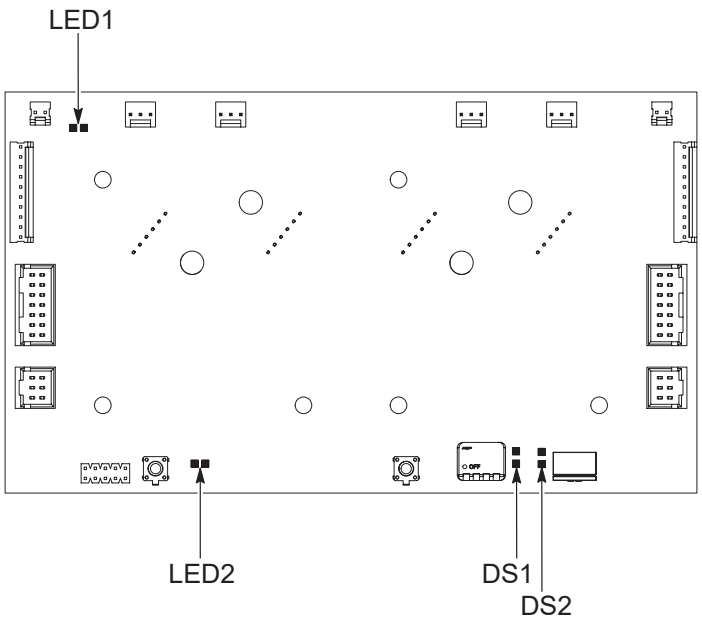

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Figure 5-5 Location of LEDs on Flow Node

Relay Board

See Figure 5-6 and refer to Table 5-5. Use the Relay Board LEDs to help diagnose problems.

Table 5-5 Relay Board LEDs

LED	Function	LED Color	LED State	Fault Correction
LED1	Encoder (labeled as Manual Enable)	Green	Normal: Blinking Fault: OFF	Check if conveyor is moving. Check if connector PC2 is plugged in. Check encoder power.
LED2	Spray Gun Power	Green	Normal: ON Fault: OFF	Booth is running. Check wiring to PC1. Check voltage on J2−3 and J2−4 (red and black). Voltage should be +24 V. Check 4A fuse. Check PS1.
LED3	+12 V	Green	Normal: ON Fault: OFF	
LED4	+24 V	Green	Normal: ON Fault: OFF	Check power on J7−5 and J7−8. Should be 23.5−24.5 Vdc. Check PS2.
LED5	Conveyor	Green	Normal: ON Fault: OFF	Check external wiring to PC1. DC/AC signal 24V−230 Vac or Vdc. Check J7−9, voltage should change with conveyor signal 0/24 V. Check keyswitch wiring. Check keyswitch contacts are assembled correctly.
LED6	Lockout	Green	Normal: ON Fault: OFF	Check external wiring to PC1, DC/AC signal 24 V−230 Vac or Vdc. Check J7−11 and J7−12. Voltage should change with lockout signal 0/24 V. Check keyswitch wiring. Check keyswitch contacts are assembled correctly.
LED7	Alarm	Red	Normal: ON Fault: OFF	Check voltage on J7−15 and J7−16. Should be +24 V when system is OK. Clear faults on Engage controller touchscreen.

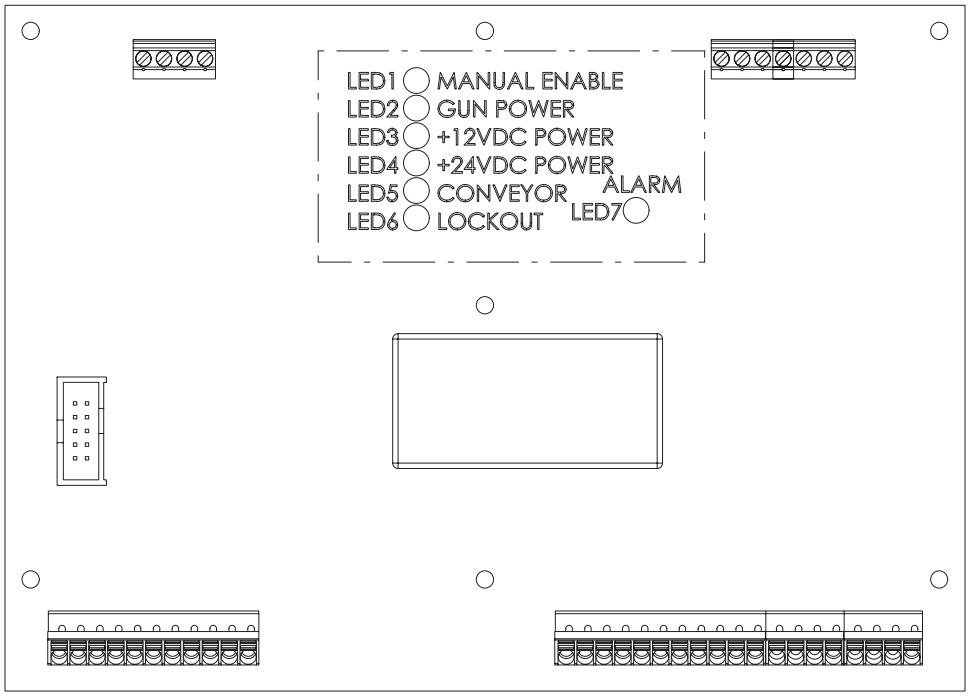

Figure 5-6 Location of LEDs on Relay Board

PLC

See Figure 5-7 and refer to Table 5-6. Use the PLC LEDs to help diagnose problems.

Table 5-6 PLC LEDs

LED	LED Status		Description	Correction
	Red	Green		
PLC	OFF	OFF	Runtime not started No power at X6	Check power supply PS2 for +24 V
	OFF	Flashing	Communication	
	OFF	ON	PLC runtime started	
	ON	—	Error in runtime Flash error Checksum error SSL connection (inspect log file)	
	ON	ON	PLC runtime started and has error	
PRG	OFF	OFF	No application found on device	Program needs to be reloaded.
	OFF	ON	Application running	
	—	Flashing	Communication (green flashing)	
	ON	Flashing	Application has stopped Program error	
	OFF	Flashing	Application is stopping	
SD	—	OFF	No micro SD card found	Replace Micro SD card.
	—	ON	Micro SD card found	
USB	OFF	OFF	No USB host found	
	OFF	ON	USB host inserted	
RS485	OFF	OFF		
	OFF	ON	Communication channel opened	
	OFF	Flashing	BUS activity	
CAN1/ CAN2	OFF	OFF	No BUS activity	Check CAN network topology/ terminations (60 Ω) Check CAN wiring.
CAN1/ CAN2	OFF	Flashing	BUS activity okay (CAN) Flash for each message	
	ON	OFF	BUS error	Check CAN network topology/ terminations (60 Ω) Check CAN wiring.
	Flashing	Flashing	Warning	Check CAN network topology/ terminations (60 Ω) Check CAN wiring.
X6 (+24 V)		OFF		Check voltage to X6, should be 23.5 to 24.5 Vdc. Check PS2.
		ON	24 Vdc found	

Continued...

LED	LED Status		Description	Correction
	Red	**Green**		
ETH0-2	OFF	OFF	No active connection	ETH0 check connection from PLC to eWON. Check eWON power. ETH1 no connection. ETH2 check for remote HMI connection P2. Check remote HMI power P3. Check remote HMI IP address.
	OFF	ON	Active connection found	
	Flashing	ON	Active connection and data is being received or sent	
Ethernet Activity	OFF	OFF	Ethernet communication/link status	
	OFF	ON		
	ON	OFF		
	ON	ON		
	GREEN LED			
I/Q1 (Encoder)	OFF		Encoder signal low	Encoder signal not changing, check if conveyor is running. Check for power on UL. Check relay board.
	ON		Encoder signal high	Encoder signal not changing, check if conveyor is running. Check for power on UL. Check relay board.
	Blinking		Encoder signal running	
I/Q2 (Conveyor)	OFF		Conveyor running	
	ON		Conveyor not running	Check for power on UL. Check relay board.
I/Q3 (Booth ON)	OFF		Booth OFF	Check power on UL. Check relay board.
	ON		Booth ON	
I/Q4 (Lockout)	OFF		System locked out	Check for power on UL. Check relay board.
	ON		System ready	
POW	OFF		No power on X6	Check for power on UL. Check relay board.
	ON		+24 V found at X6	
UL at Q1-Q4	OFF		No power supply	Check for power on UL. Check relay board.
	ON		+24 V found at UL	

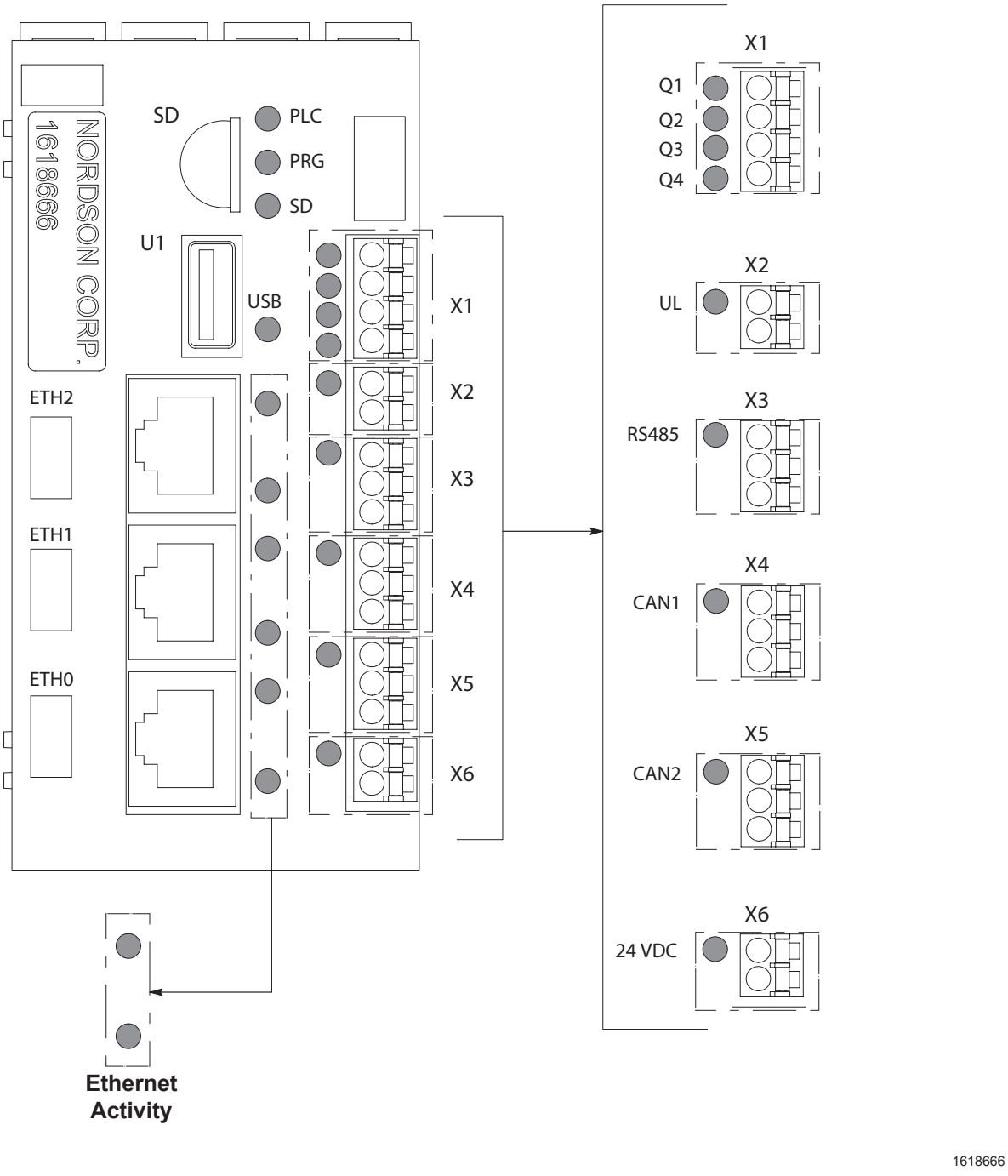

Figure 5-7 PLC LED Locations

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eWON

See Figure 5-8 and refer to Table 5-7 and Table 5-8. Use the eWON and Ethernet LEDS to help diagnose problems.

Table 5-7 eWON LEDs

LED	Description	LED Color	LED State	Correction
PWR	Power	Green	Normal: ON Fault: Blinking	Check +24 V power PS2.
USR	User	Green and Red	Normal: Green Blinking Fault: Red ON or Blinking	eWON configuration.
DI1	Digital IN 1	Green	Normal: ON Fault: OFF	
DI2	Digital IN 2	Green	Normal: ON Fault: OFF	
DO	Digital OUT	Green	Normal: ON Fault: OFF	
T2M	Talk2M	Green	Normal: ON Fault: OFF	Check WAN connection. Check eWON configuration.
BI1	Button Input	Green	Normal: ON (reset button being pressed) Fault: OFF	

Table 5-8 Ethernet Ports

LED	Description	LED Color	LED State	Correction
1	Power User	(Rectangle) Green=LAN Orange=WAN	Normal: ON Fault: Green OFF	Check HMI power. Check HMI IP address.
		(Square) Green	Normal: ON = Link OK Blinking = Ethernet Traffic Fault: OFF	
2	Digital IN 1 Digital IN 2	(Rectangle) Green=LAN Orange=WAN	Normal: ON Fault: OFF	Check PLC power. Check PLC configuration.
		(Square) Green	Normal: ON Fault: OFF	

Continued...

LED	Description	LED Color	LED State	Correction
3	Nord Net	((Rectangle) Green=LAN Orange=WAN	Normal: ON Fault: Green OFF	Check Ethernet Connection P9. Check part ID. Check dual axis.
		(Square) Green	Normal: ON = Link OK Blinking = Ethernet Traffic Fault: OFF	
4	WAN	(Rectangle) Green=LAN Orange=WAN	Normal: ON Fault: OFF	Check WAN connection.
		Green	Normal: ON = Link OK Blinking = Ethernet Traffic Fault: OFF	

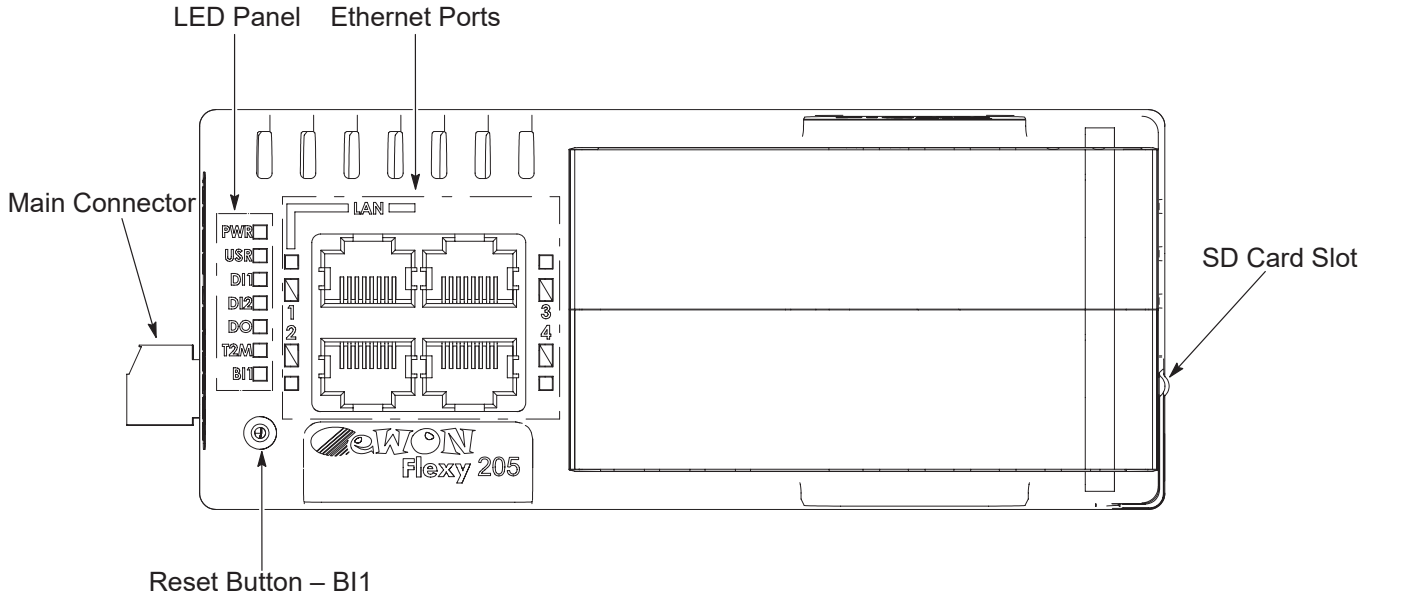

Figure 5-8 eWON LEDs and Components

Air Conditioner

Alarm Codes listed for the air conditioner are viewable through the air conditioner display.

NOTE: Relay alarms are not monitored by the Encore Engage system controller.

Alarm Code	Description	Cause	Result	Alarm Relay
tP	General Alarm	Door open and/or smoke detected	Unit turns off for duration of alarm	Relay Contact Closed
LA	High Pressure Warning	Malfunction high pressure switch opens (see Note C)	No effect on function	Not Applicable
LP	Low Pressure Alarm	Low pressure switch open (see Note D)	No effect on function	Relay Contact Closed
E1	Air Inlet Temperature Sensor Alarm	Sensor failure	See Note A	Relay Contact Closed
E2	Air Outlet Temperature Sensor Alarm	Sensor failure	See Note B	Relay Contact Closed
Ht	High Temperature Alarm Default = 131 °F	Air inlet temperature greater than 131 °F	No effect on function	Relay Contact Closed
Lt	Low Temperature Alarm Default = 57 °F	Air inlet temperature less than 57 °F	No effect on function	Relay Contact Closed
A1	Frost Alarm	Air outlet temperature less than or equal to −30 °F	Compressor and condenser fan off for duration of alarm	Relay Contact Closed
HP/HP1	High Pressure Serious Alarm	High pressure switch open (see Note E)	Unit turns OFF for duration of alarm	Relay Contact Closed

NOTE: A. Air inlet temperature sensor will default to air outlet temperature sensor. Cooling setpoint defaults to 50 °F.

B. Unit continues to operate without evaporator freeze protection.

C. The malfunction high pressure switch is optional.

D. The low pressure switch is optional.

E. The high pressure (HP) or high pressure serious (HP1) switch is optional.

Section 6

Repair

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

CAUTION: Do not turn off console power without first performing a program shutdown. Doing so could corrupt the Engage program and operating system on the program card.

WARNING: Hazardous voltages exist within the Engage console. Unless power must be on to test circuits, always shut off and lock out power before opening the console to make repairs. All repairs should be made by a qualified electrician. Failure to observe this warning could result in personal injury or death.

WARNING: Whenever replacing a component that interfaces with the exterior of the enclosures, such as an iFlow digital flow module, make sure that the dust-tight integrity of the enclosures are intact by installing the correct gaskets and seals. Failure to maintain the dust-tight integrity of the enclosures could invalidate agency approvals and create a hazardous condition.

Spray Gun Control Card Removal/Installation

Replacing a Spray Gun Control Card

WARNING: Do not remove spray gun control cards from the card cage while they are powered. Either shut off console power or shut off the booth exhaust fan so that the interlock will remove power from the spray gun control cards. Failure to observe this warning could result in damage to the cards.

CAUTION: Do not turn off console power without first performing a program shutdown. Doing so could corrupt the Engage program and operating system on the program card.

CAUTION: The spray gun control cards are electrostatic sensitivedevices (ESD). To prevent damage to the cards when handling them, wear a grounding wrist strap connected to the Engage enclosure or other ground. Handle the cards only by their top and bottom edges.

See Figure 6-1. Spray gun control cards (2) are installed in the card cage from left to right. Each card controls two spray guns: the bottom receptacle is the odd spray gun number; the top receptacle is the even spray gun number.

To remove a card, disconnect the spray gun harness connectors (3 and 4), pull down the locking tab (5), then pull the card out of the card cage.

To install a new card, slide the card into the slots in the card cage and seat the card's finger board firmly into the connector slot on the backplane (6). Push the locking tab up to lock the card into the card cage. Connect the spray gun harness to the two receptacles on the card.

Adding Spray Cards

Consoles are configured to have a number of spray guns that is a multiple of four (4, 8, 12, with a maximum of 16). Each spray gun controller card controls two spray guns.

If the console has an odd number of spray guns, it is possible to add another spray gun without adding another spray gun control card.

If the equipment has an even number of spray guns that is 14 or fewer, add more spray guns by installing a new spray gun control card in an unused slot.

Refer to System Upgrades in the Installation section for more information on adding spray guns to an existing system.

For either scenario, open the Guns and Consoles configuration screen, increase the number of spray guns, and reboot the system before the new spray guns will be recognized.

NOTE: Cards are installed in the card cage from left to right. Spray guns are numbered from left to right and bottom to top.

Replacing a Card

If replacing an existing card, turn off the booth exhaust fan first, then replace the card. When turning on the booth exhaust fan, the green watchdog LED should blink. Since the card ID has changed, the red fault LED on the card will light and a fault message will appear on the Alarm screen. To reset the fault LED, open the Alarm screen and touch the **Clear All Faults** button.

Spray Gun Connector Configuration on Card

18	**20**	**22**	**24**	**26**	**28**	**30**	**32**
17	**19**	**21**	**23**	**25**	**27**	**29**	**31**
2	**4**	**6**	**8**	**10**	**12**	**14**	**16**
1	**3**	**5**	**7**	**9**	**11**	**13**	**15**

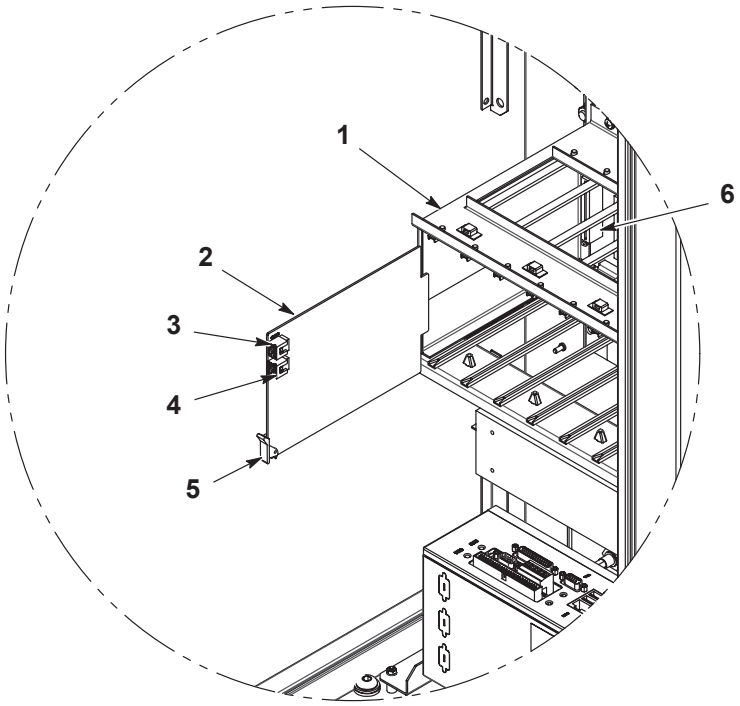

Figure 6-1 Spray Gun Control Card Replacement

1. Card cage (slot 1)
2. Gun control card
3. Spray gun 2 connector
4. Spray gun 1 connector
5. Locking tab
6. Backplane

WARNING: Do not remove the PLC from the cabinet while power is ON. Remove power from system or turn off the main power switch on main cabinet. Failure to observe this warning could result in damage to the equipment or personal injury.

CAUTION: Do not turn off cabinet power without first performing a program shutdown. Doing so could corrupt the Engage program and operating system on the program card.

See Figure 6-2.

1. Open main cabinet and locate PLC.
2. Disconnect any Ethernet connections, connectors (X1−X6), and remove the micro SD card. Retain micro SD card for installation into new PLC.
3. Pull up on the PLC clips to release PLC from DIN rail.
4. Install new PLC onto the DIN rail.
5. Install retained micro SD card.
6. Remove the factory installed connectors provided on the new PLC to allow use of existing connectors.
7. Install connectors (X1−X6) and Ethernet connections onto new PLC.

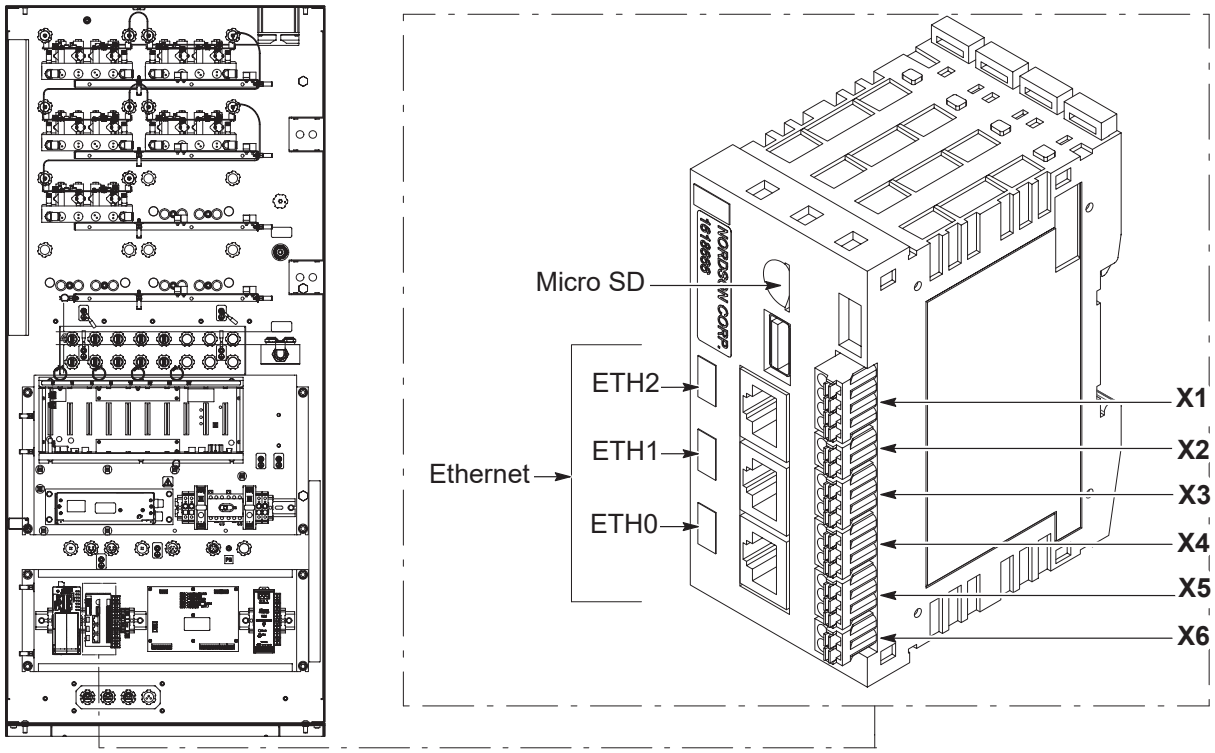

Figure 6-2 PLC Replacement

Touchscreen Replacement

WARNING: Do not remove the touchscreen while power is ON. Remove power from system or turn off the main power switch on main cabinet. Failure to observe this warning could result in damage to the equipment or personal injury.

CAUTION: Do not turn off cabinet power without first performing a program shutdown. Doing so could corrupt the Engage program and operating system on the program card.

NOTE: Gaskets are glued to the cabinet and remote display case around the opening. Do not damage or remove these gaskets as that will destroy the dust-tight integrity of the enclosure and void agency approvals.

1. Open main cabinet door or the remote display case.
2. See Figure 6-3. Note which IP address is checked on the IPS label (1) on back of the current touchscreen for later use.
3. Disconnect the ground connection (2).
4. Disconnect Ethernet (3) and power harness connection (4).

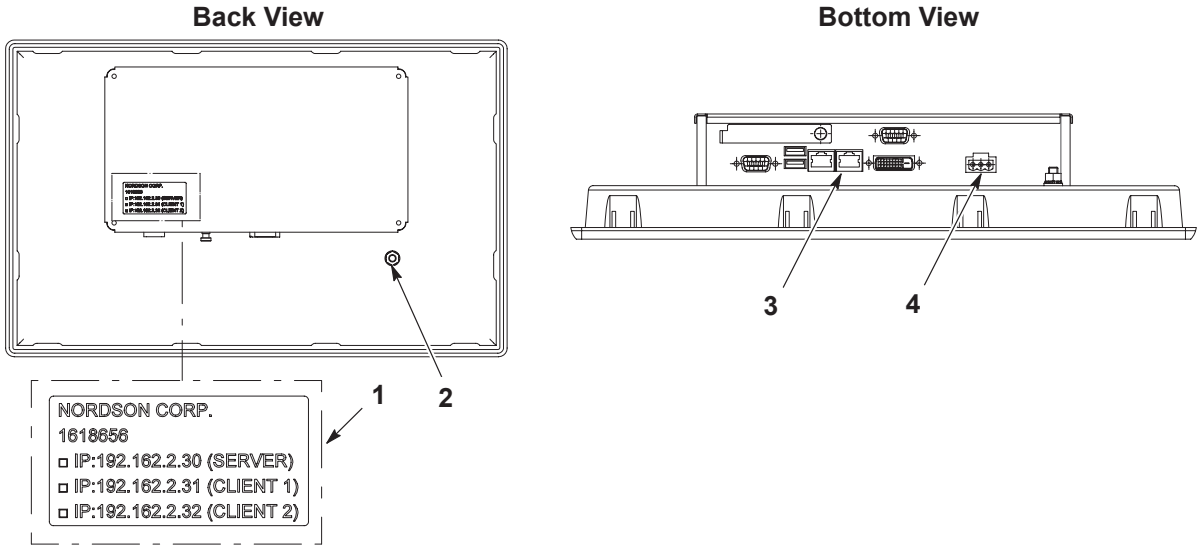

Figure 6-3 Touchscreen IP Label and Connections

1. IPS label
2. Grounding connection
3. Ethernet
4. Power harness

Touchscreen Replacement *(contd)*

See Figure 6-4.

5. Support touchscreen (5) from front of door or remote display case while removing the allen screws (6) and brackets (7) securing the touchscreen.
6. Remove the touchscreen out the front of the door or remote display case.
7. Place the new touchscreen through front opening of door or remote display case.
8. Support the touchscreen in the opening while installing brackets and allen screws. Torque allen screws to 5.5−6.0 in-lb (0.6−0.7 N•m).
9. Reconnect ground, Ethernet, and power harness connections.
10. Mark the matching IP address noted earlier on the IP label (shown in Figure 6-3) of the new touchscreen before closing cabinet or remote display.
11. Complete software update using USB.

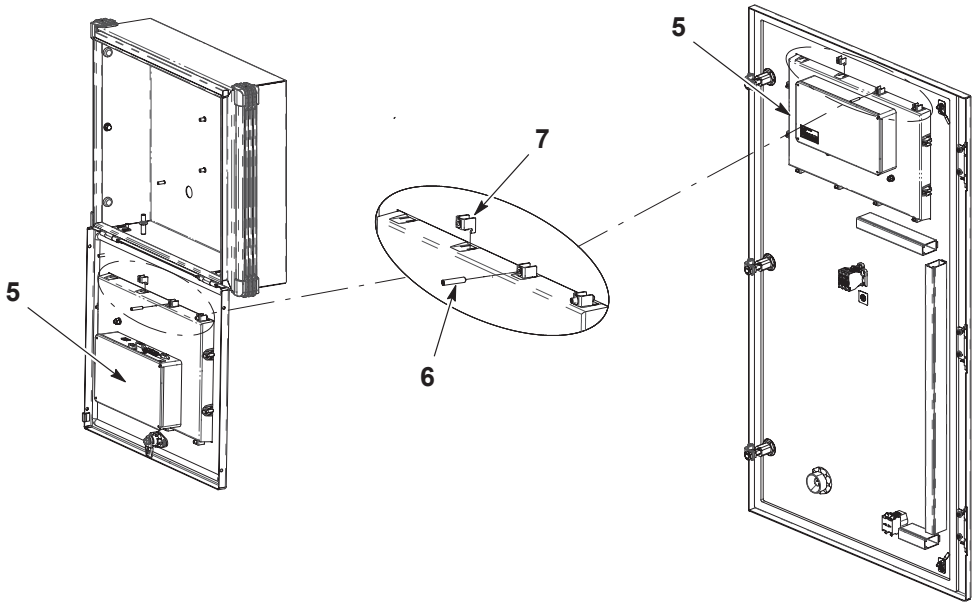

Figure 6-4 Replacing Touchscreen

5. Touchscreen
6. Allen Screw
7. Bracket

iFlow Module Repair

Repair of the iFlow module is limited to:

- cleaning or replacing the proportional valve
- replacing the gun air solenoid valve

Field replacement of other parts is not possible, due to the need to calibrate the module at the factory using equipment not available to the field.

CAUTION: The module circuit cards are electrostatic sensitivedevices (ESD). To prevent damage to the cards when handling them, wear a grounding wrist strap connected to the controller enclosure or other ground. Handle the cards only by their edges.

Proportional Valve Cleaning

See Figure 6-5. A dirty air supply can cause the proportional valve (8) to malfunction. Follow these instructions to disassemble and clean the valve.

1. Disconnect the coil (11) wiring from the circuit board (3). Remove the nut (12) and coil from the proportional valve (8).
2. Remove the two long screws (9) to remove the proportional valve from the manifold.
3. Remove the two short screws (10), then remove the valve stem (13) from the valve body (16).
4. Remove the valve cartridge (15) and spring (14) from the stem.
5. Clean the cartridge seat and seals, and the orifice in the valve body. Use low-pressure compressed air. Do not use sharp metal tools to clean the cartridge or valve body.
6. Install the spring and then the cartridge in the stem, with the plastic seat on the end of the cartridge facing out.
7. Make sure the O-rings furnished with the valve are in place on the bottom of the valve body.
8. Secure the valve body to the manifold with the long screws, making sure the arrow on the side of the body points toward the outlet fittings.
9. Install the coil over the valve stem, with the coil wiring pointing toward the circuit board. Secure the coil with the nut.
10. Connect the coil wiring to the circuit board.

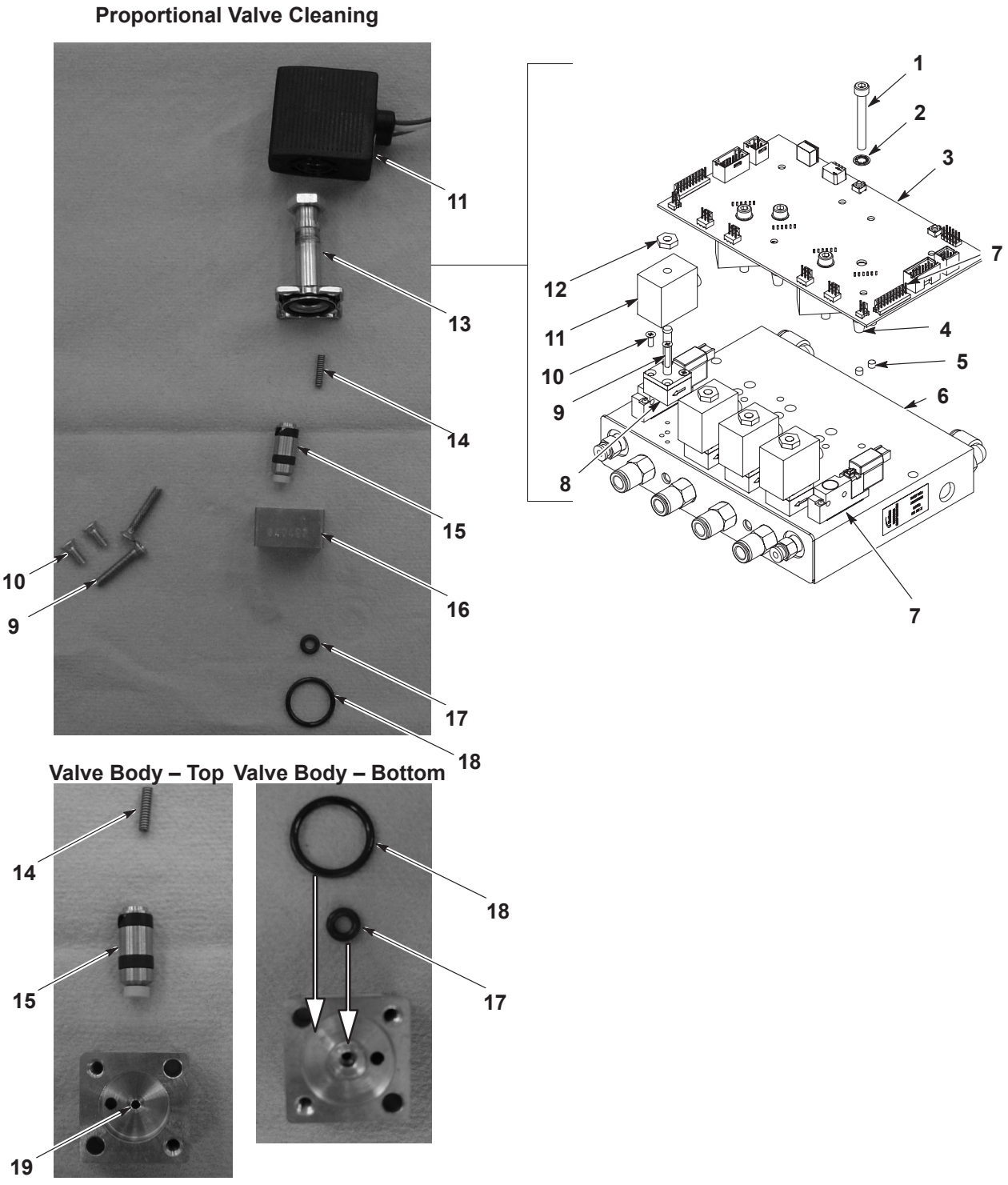

Figure 6-5 iFlow Module Cleaning and Repair

Proportional Valve Replacement

If cleaning the proportional valve does not correct the flow problem then replace the valve. Remove the valve by performing steps 1 and 2 of Proportional Valve Cleaning.

Before installing a new valve, remove the protective cover from the bottom of the valve body. Be careful to not lose the O-rings under the cover.

Gun Air Solenoid Valve Replacement

See Figure 6-5. To remove the gun air solenoid valves (7), remove the two screws in the valve body and lift the valve off the manifold.

Make sure the O-rings furnished with the new valve are in place before installing the new valve on the manifold.

Filter Replacement

See Figure 6-5.

1. Remove the screws (1) and washers (2) securing the circuit board (3) to the manifold (6), then remove the circuit board from the manifold.

   NOTE: If the seals (4) remain in the manifold port, remove them.

2. Check for filter contamination. If filters (5) are discolored, replace filters using service kit 1604436. Replacement instructions are included with kit.

Air Conditioner

For air conditioner replacement parts, refer to the air conditioner vendor manual shipped with system.

Section 7
Parts

Introduction

To order parts, call the Nordson Industrial Coating Systems Customer Support Center at (800) 433-9319 contact or your local Nordson representative.

Encore Engage Controllers

See Figure 7-1 and the following parts list. For air conditioner replacement parts, refer to the air conditioner vendor manual shipped with system.

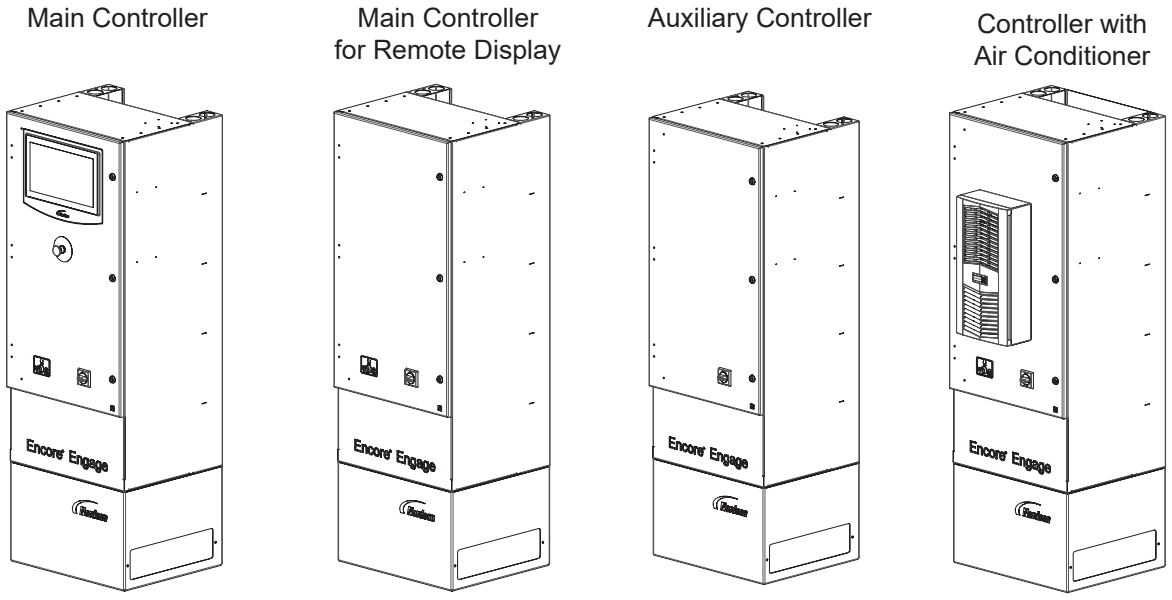

Figure 7-1 Encore Engage Controller

Controller Type	Spray Guns Per Controller			
	4	8	12	16
Main Controller		1617974	1617976	1617978
Main Controller for Remote Display		1617988	1617990	1617992
Auxiliary Controller	1617979	1617981	1617983	1617985
Main Controller with Air Conditioner		1617995		1617999
Auxiliary Controller with Air Conditioner		1618002		1618006

Remote Displays

See Figure 7-2 and the following parts list.

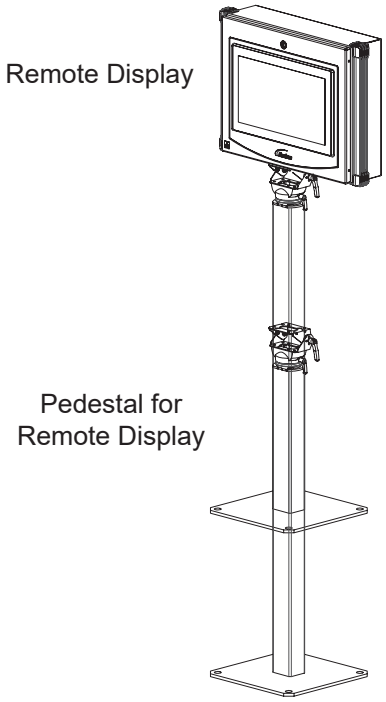

Figure 7-2 Encore Engage Remote Display (shown with double pedestal)

Part	Description	Note
1618033	KIT, remote display	
1618035	KIT, pedestal, remote display	

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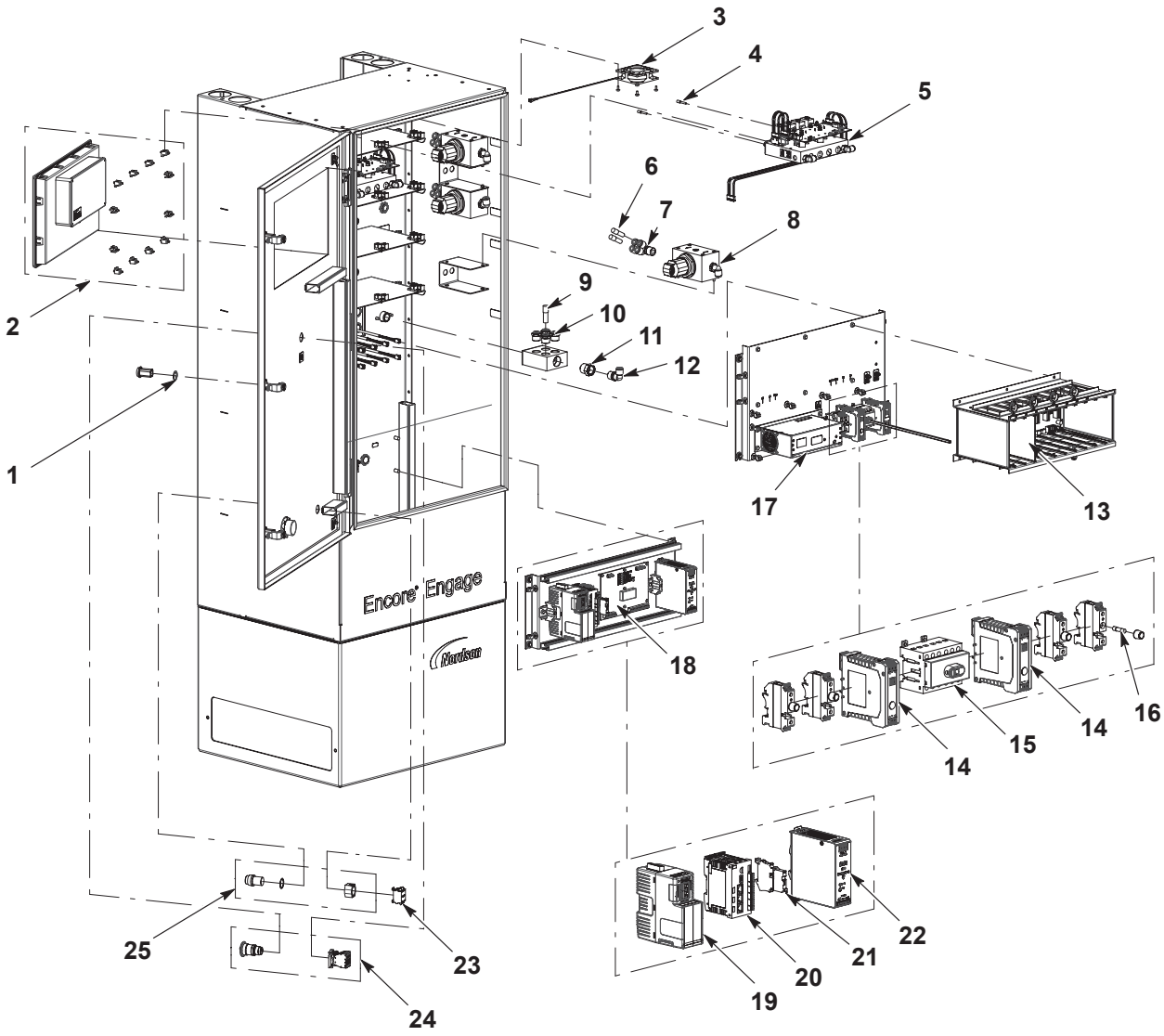
Main Controller Components

See Figure 7-3 and the following parts list.



DSP_10019246

Figure 7-3 Encore Engage Remote Displays

Item	Part	Description	Quantity	Note
1	940148	O-RING, silicone, COND, 0.875 X 1.000	1	
2	1618656	HMI, programmed, Encore Engage	1	
3	1615492	FAN ASSEMBLY, Engage	1	
4	326139	PLUG, blanking, 4 mm T	1	
5	1615880	KIT, service, iFlow module, Engage	1	
6	148256	PLUG, 10 mm, tubing	1	
7	1034000	FITTING, ½ RPT x (4)10 mm tube	1	
8	1033878	REGULATOR, rolling diaphragm, 0−120, ½ NPT	1	
9	183418	PLUG, 12 mm, tube	1	
10	1604794	CONNECTOR, male, 12 mm T x ½ RPT	1	
11	973399	BUSHING, pipe, HYD , ¾ X 1/2, steel, zinc	1	
12	972092	CONNECTOR, male elbow, 10 mm T x ½ UNI	1	
13	1615958	KIT, service, dual gun driver PCA, Engage	1	
14	1615873	FILTER, line, RFI, power, DIN rail mount	1	
15	1615896	SWITCH, disconnect, 6 pole, DIN rail mount	1	
16	1618136	FUSE, 8A, ceramic, time-delay, 5 x 20	1	
17	1615937	POWER SUPPLY, 24 Vdc, 600 W	1	
18	1603591	KIT, PCA, relay board, iControl 2	1	
19	1618667	SWITCH, LAN/WAN gateway, programmed, Engage	1	
20	1618666	PLC, programmed, Encore Engage	1	
21	939953	FUSE, 4A, ceramic, time-delay	1	
22	1609757	POWER SUPPLY, 24 Vdc, 120 W	1	
23	1000595	CONTACT BLOCK, 1-N.O. and 1-N.C. contact	1	
24	1617771	SWITCH, emergency stop, ATEX	1	
25	1000594	SWITCH, keylock, 3-position	1	

Continued...

Main Controller Components *(contd)*

See Figure 7-4 and the following parts list.

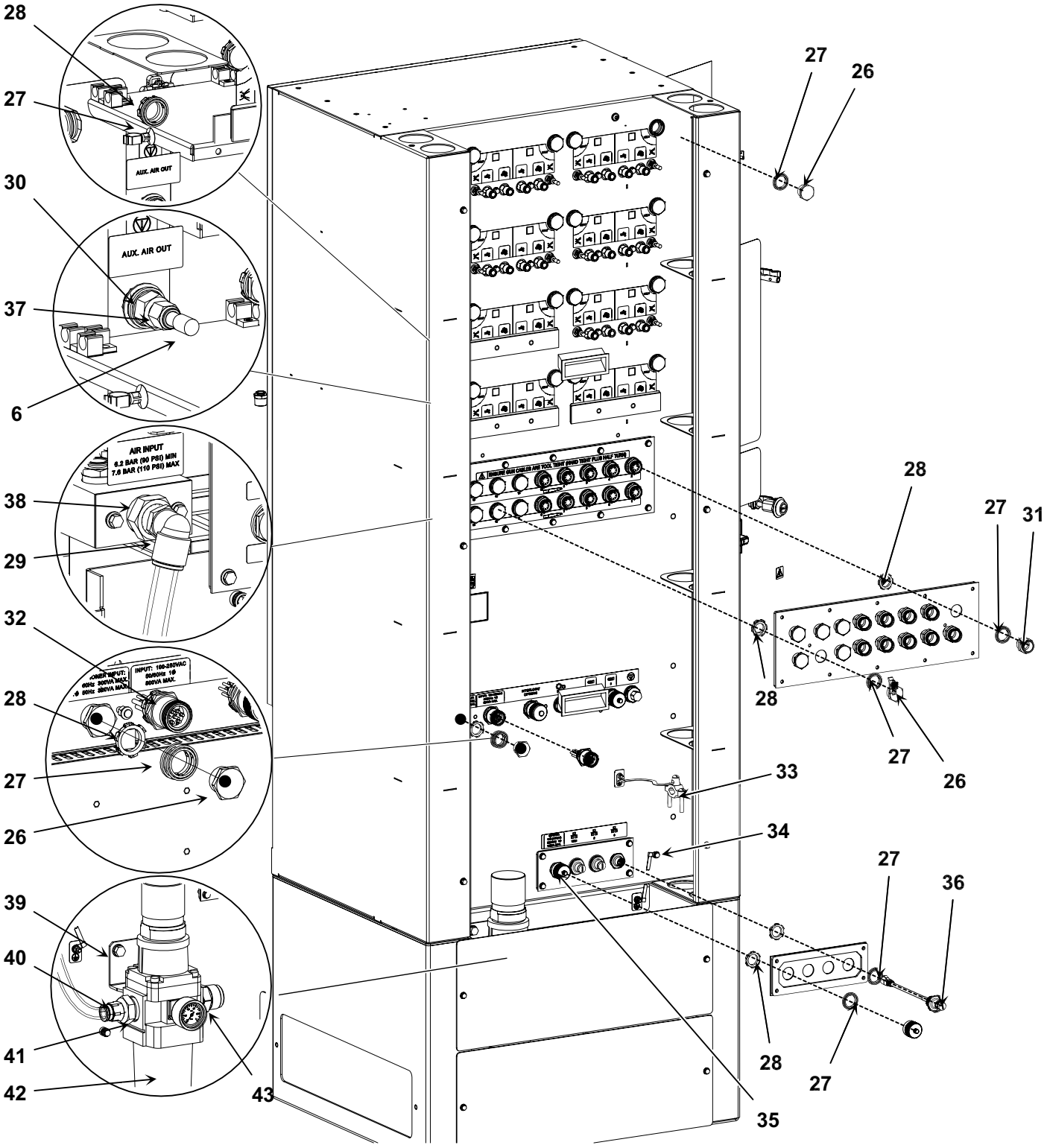


Figure 7-4 Main Controller Components 2 of 2

Item	Part	Description	Quantity	Note
6	148256	PLUG, 10 mm, tubing	1	
26	334800	PLUG, 1/2 pipe,1-in. hex	1	
27	939122	SEAL, conduit fitting, ½, blue	1	
28	984526	NUT, lock, 1/2 conduit	1	
29	1100040	CONNECTOR, male, elbow, 16 mm T x ½ RPT, with seal	1	
30	1005068	UNION, F bulkhead, 10 mm T x ¼ RPT	1	
31	1615490	RECEPTACLE, shielded, 8 position S, gun, 0.4 M	1	
32	1617803	RECEPTACLE ASSEMBLY, AC power	1	
33	240976	CLAMP, ground, with wire	1	
34	246458	JUMPER, ground, 4-in.	1	
35	1617805	RECEPTACLE ASSEMBLY, AC power, remote display, Engage	1	
36	1618010	RECEPTACLE ASSEMBLY, Ethernet, 0.5 M, Ethernet 3, Engage	1	
37	1604303	CONNECTOR, male, 10 MM T X 1/4 RPT, with seal		
38	973399	BUSHING, pipe, 3/4 x 1/2		
39	--------	SCREW, hex, serrated, M8 x 18, steel, zinc		
40	--------	CONNECTOR, male, 16 mm T x 1/2 NPT, with seal		
41	--------	BUSHING, reducing, 1 NPT x 1/2 NPT		
42	1615771	FILTER, regulator, gage, 5 micron, 100 cfm, 1 NPT		
43	--------	CONNECTOR, male		
NS	1615892	VENT PLUG, 1/2		
NS	1614705	FILTER ELEMENT, 5 micron		
NS	1091201	TUBING, 16 mm, 3 ft		
NS	900620	TUBING, poly, spiral cut, 3/8 ID	AR	
NS	900740	TUBING, polyurethane,10/6.5−7 mm	AR	
NS	226690	TUBING, polyurethane, 12/8 mm, blue	AR	

AR: As Required

NS: Not Shown

Main Controller for Remote Display Components

See Figure 7-5 and the following parts list.

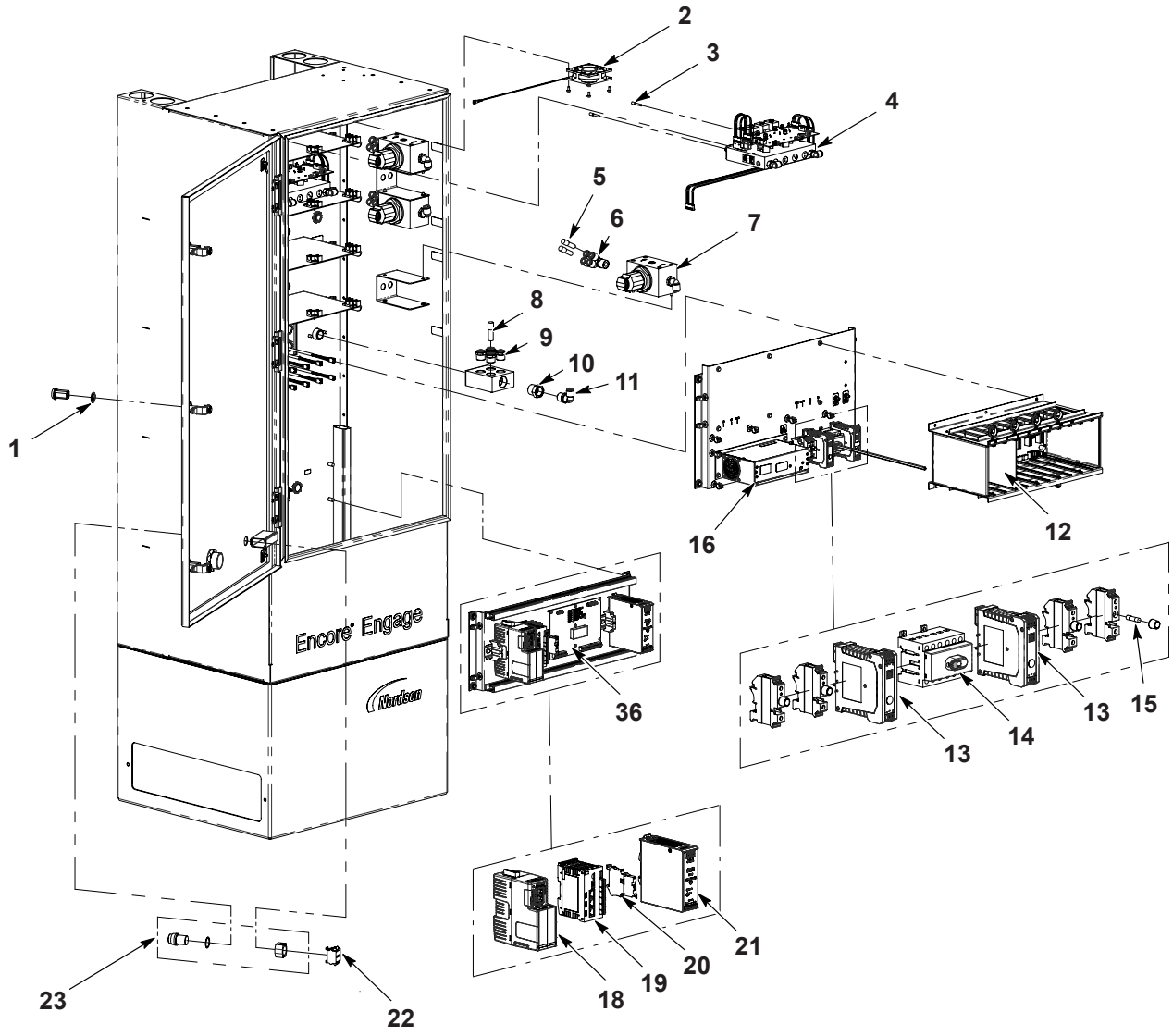


Figure 7-5 Main Controller for Remote Display Components 1 of 2

Item	Part	Description	Quantity	Note
1	940148	O-RING, silicone, COND, 0.875 X 1.000	1	
2	1615492	FAN ASSEMBLY, Engage	1	
3	326139	PLUG, blanking, 4 mm T	1	
4	1615880	KIT, service, iFlow module, Engage	1	
5	148256	PLUG, 10 mm, tubing	1	
6	1034000	FITTING, ½ RPT x (4)10 mm tube	1	
7	1033878	REGULATOR, rolling diaphragm, 0−120, ½ NPT	1	
8	183418	PLUG, 12 mm, tube	1	
9	1604794	CONNECTOR, male, 12 mm T x ½ RPT	1	
10	973399	BUSHING, pipe, HYD , ¾ X 1/2, steel, zinc	1	
11	972092	CONNECTOR, male elbow, 10 mm T x ½ UNI	1	
12	1615958	KIT, service, dual gun driver PCA, Engage	1	
13	1615873	FILTER, line, RFI, power, DIN rail mount	1	
14	1615896	SWITCH, disconnect, 6 pole, DIN rail mount	1	
15	1618136	FUSE, 8A, ceramic, time-delay, 5 x 20	1	
16	1615937	POWER SUPPLY, 24 Vdc, 600 W	1	
17	1603591	KIT, PCA, relay board, iControl 2	1	
18	1618667	SWITCH, LAN/WAN gateway, programmed, Engage	1	
19	1618666	PLC, programmed, Encore Engage	1	
20	939953	FUSE, 4A, ceramic, time-delay	1	
21	1609757	POWER SUPPLY, 24 Vdc, 120 W	1	
22	1000595	CONTACT BLOCK, 1-N.O. and 1-N.C. contact	1	
23	1000594	SWITCH, keylock, 3-position	1	

Continued...

Main Controller Remote Display Components (contd)

See Figure 7-6 and the following parts list.

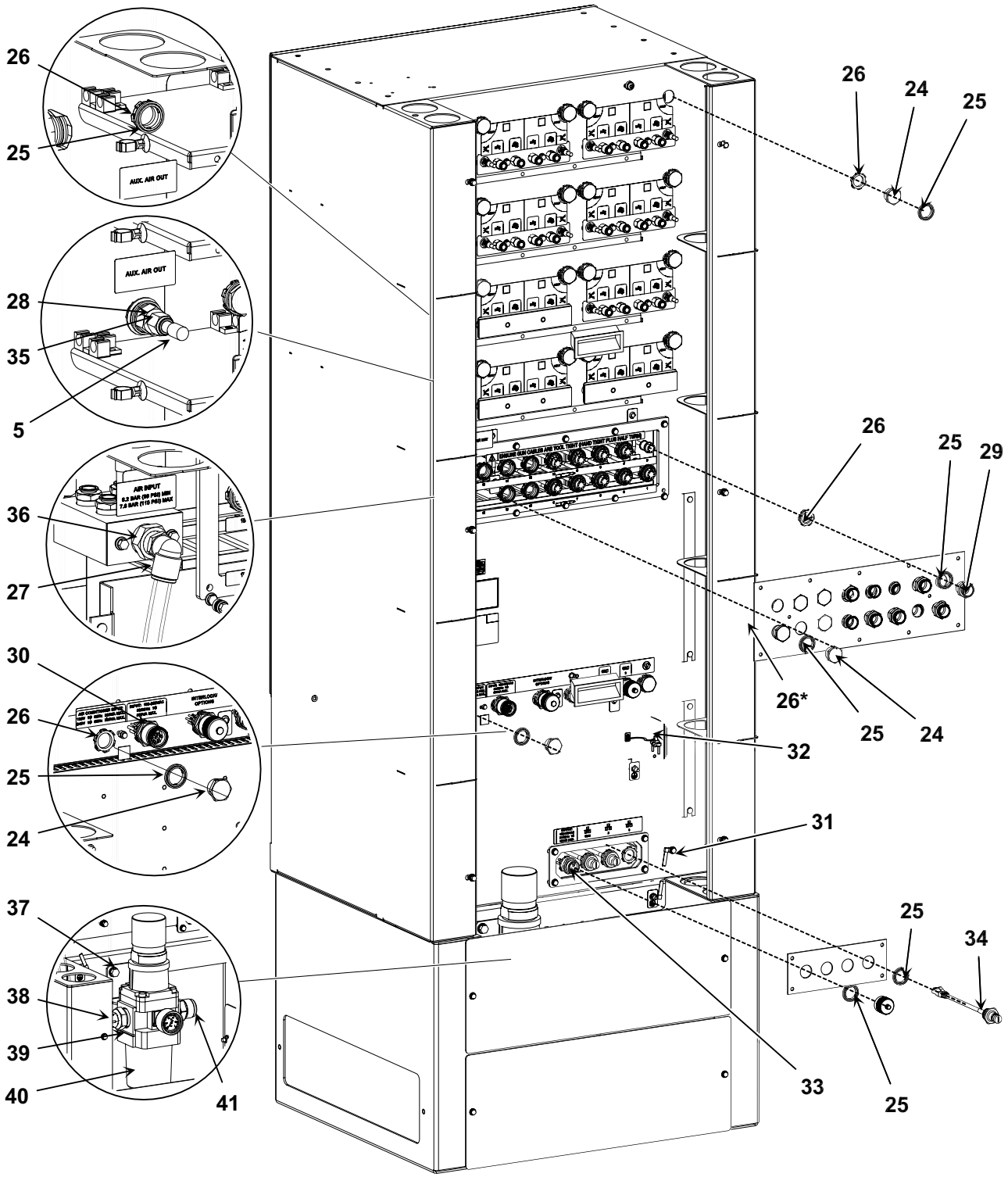


Figure 7-6 Main Controller for Remote Display Components 2 of 2

Item	Part	Description	Quantity	Note
5	148256	PLUG, 10 mm, tubing	1	
24	334800	PLUG, 1/2 pipe,1-in. hex	1	
25	939122	SEAL, conduit fitting, ½, blue	1	
26	984526	NUT, lock, 1/2 conduit (26* is hidden in this view)	1	
27	1100040	CONNECTOR, male, elbow, 16 mm T x ½ RPT, with seal	1	
28	1005068	UNION, F bulkhead, 10 mm T x ¼ RPT	1	
29	1615490	RECEPTACLE, shielded, 8 position S, gun, 0.4 M	1	
30	1617803	RECEPTACLE ASSEMBLY, AC power	1	
31	240976	JUMPER, ground, 4 in	1	
32	246458	CLAMP, ground, with wire	1	
33	1617805	RECEPTACLE ASSEMBLY, AC power, remote display, Engage	1	
34	1618010	RECEPTACLE ASSEMBLY, Ethernet, 0.5 M, Ethernet 3, Engage	1	
35	1604303	CONNECTOR, male, 10mm, T x 1/4 RPT, with seal		
36	973399	BUSHING, pipe, 3/4 x 1/2		
37	--------	SCREW, hex, serrated, M8 x 18, steel, zinc		
38	--------	CONNECTOR, male, 16 mm T x 1/2 NPT, with seal		
39	--------	BUSHING, reducing, 1 NPT x 1/2 NPT		
40	1615771	FILTER, regulator, gage, 5 micron, 100 cfm, 1 NPT		
41	--------	CONNECTOR, male		
NS	1615892	VENT PLUG, 1/2		
NS	1614705	FILTER ELEMENT, 5 micron		
NS	1091201	TUBING, 16 mm, 3 ft		
NS	900620	TUBING, poly, spiral cut, 3/8 ID	AR	
NS	900740	TUBING, polyurethane,10/6.5−7 mm	AR	
NS	226690	TUBING, polyurethane, 12/8 mm, blue	AR	

AR: As Required

NS: Not Shown

Main Controller Remote Display with Air Conditioning

See Figure 7-7 and the following parts list.

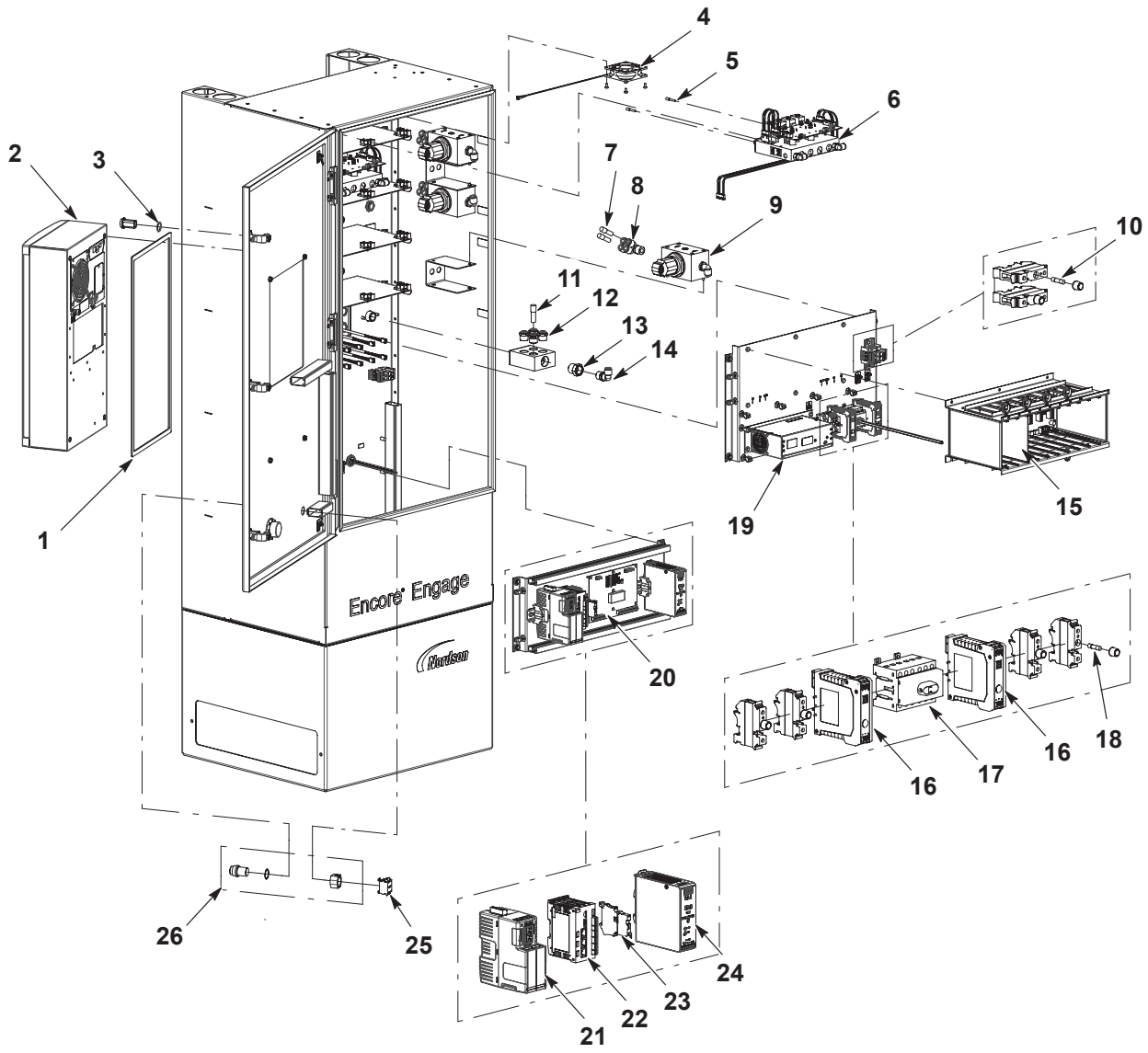


Figure 7-7 Main Controller for Remote Display Components with Air Conditioner 1 of 2

Item	Part	Description	Quantity	Note
1	1618896	GASKET, multi-gun, AC, Engage	1	
2	1618897	AIR CONDITIONER, multi-gun, Engage	1	
3	940148	O-RING, silicone, COND, 0.875 X 1.000	1	
4	1615492	FAN ASSEMBLY, Engage	1	
5	326139	PLUG, blanking, 4 mm T	1	
6	1615880	KIT, service, iFlow module, Engage	1	
7	148256	PLUG, 10 mm, tubing	1	
8	1034000	FITTING, ½ RPT x (4)10 mm tube	1	
9	1033878	REGULATOR, rolling diaphragm, 0−120, ½ NPT	1	
10	1618135	FUSE, A4, ceramic, time-delay, 5 x 20	1	
11	183418	PLUG, 12 mm, tube	1	
12	1604794	CONNECTOR, male, 12 mm T x ½ RPT	1	
13	973399	BUSHING, pipe, HYD , ¾ X 1/2, steel, zinc	1	
14	972092	CONNECTOR, male elbow, 10 mm T x ½ UNI	1	
15	1615958	KIT, service, dual gun driver PCA, Engage	1	
16	1615873	FILTER, line, RFI, power, DIN rail mount	1	
17	1615896	SWITCH, disconnect, 6 pole, DIN rail mount	1	
18	1618136	FUSE, 8A, ceramic, time-delay, 5 x 20	1	
19	1615937	POWER SUPPLY, 24 Vdc, 600 W	1	
20	1603591	KIT, PCA, relay board, iControl 2	1	
21	1618667	SWITCH, LAN/WAN gateway, programmed, Engage	1	
22	1618666	PLC, programmed, Encore Engage	1	
23	939953	FUSE, 4A, ceramic, time-delay	1	
24	1609757	POWER SUPPLY, 24 Vdc, 120 W	1	
25	1000595	CONTACT BLOCK, 1-N.O. and 1-N.C. contact	1	
26	1000594	SWITCH, keylock, 3-position	1	

Continued...

Main Controller for Remote Display with Air Conditioning *(contd)*

See Figure 7-8 and the following parts list.

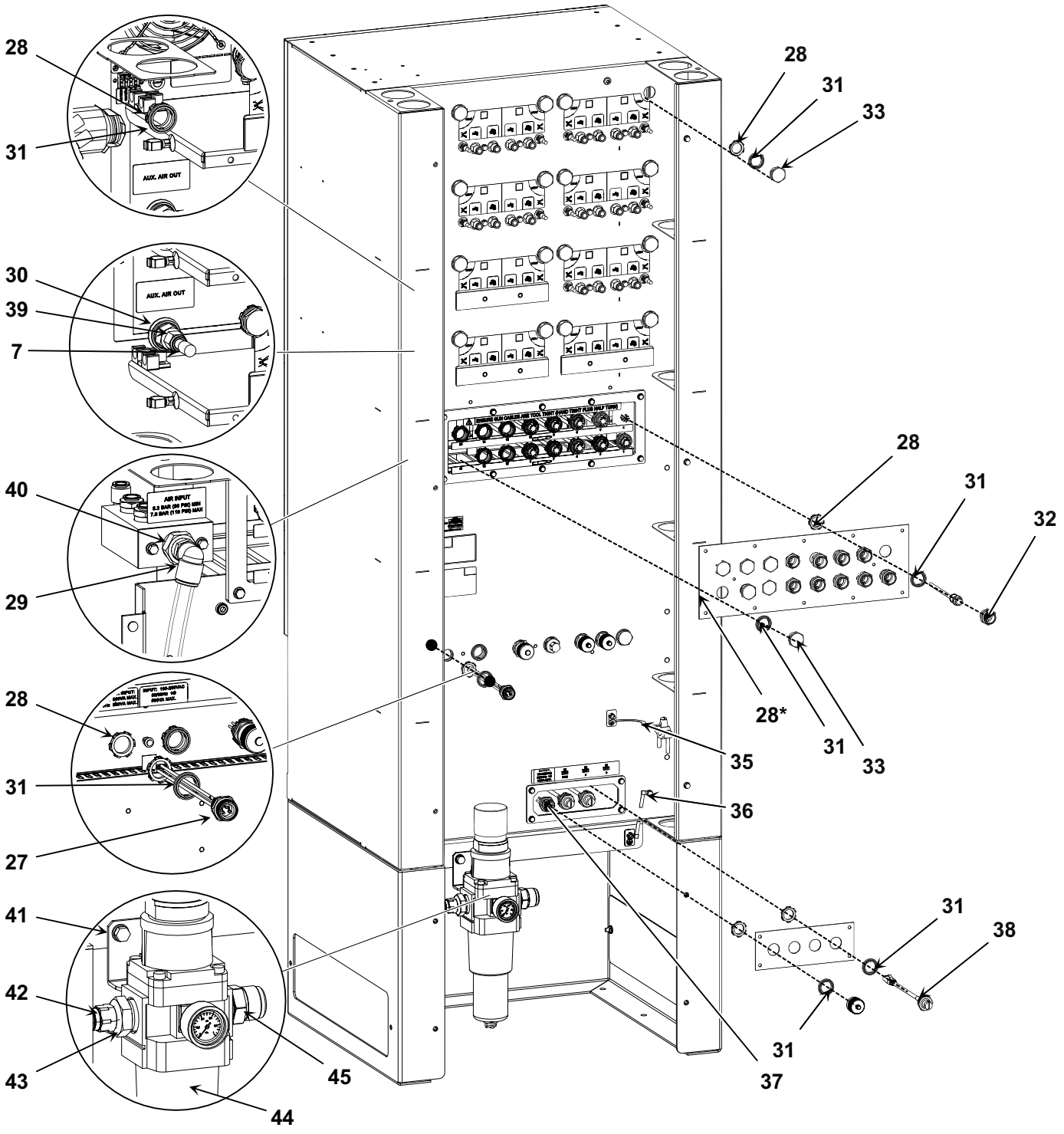


Figure 7-8 Main Controller for Remote Display Components 2 of 2

Item	Part	Description	Quantity	Note
7	148256	PLUG, 10 mm, tubing	1	
27	1615484	RECEPTACLE ASSEMBLY, air conditioning power	1	
28	984526	NUT, lock, 1/2 conduit (28* is hidden in this view)	1	
29	1100040	CONNECTOR, male, elbow, 16 mm T x ½ RPT, with seal	1	
30	1005068	UNION, F bulkhead, 10 mm T x ¼ RPT	1	
31	939122	SEAL, conduit fitting, ½, blue	1	
32	1615490	RECEPTACLE, shielded, 8 position S, gun, 0.4 M	1	
33	334800	PLUG, 1/2 pipe,1-in. hex	1	
34	1617803	CORD SET, mini-fast, 7 COND, 90 degree,10 M	1	
35	240976	CLAMP, ground, with wire	1	
36	246458	JUMPER, ground, 4-in.	1	
37	1617805	RECEPTACLE ASSEMBLY, AC power, remote display, Engage	1	
38	1618010	RECEPTACLE ASSEMBLY, Ethernet, 0.5 M, Ethernet 3, Engage	1	
39	1604303	CONNECTOR, male, 10mm x 1/4 RPT, with seal		
40	973399	BUSHING, pipe, 3/4 x 1/2		
41	--------	SCREW, hex, serrated, M8 x 18, steel, zinc		
42	--------	CONNECTOR, male, 16 mm T, x 1/2 NPT, with seal		
43	--------	BUSHING, reducing, 1 NPT x 1/2 NPT		
44	1615771	FILTER REGULATOR, gage, 5 micron, 100 cfm, 1NPT		
45	--------	CONNECTOR, male		
NS	1615892	VENT plug, 1/2		
NS	900620	TUBING, poly, spiral cut, 3/8 D	AR	
NS	1615899	FILTER ELEMENT, 1/8 R, 5 micron, sintered bronze		
NS	1091201	TUBING, 16 mm, 3 ft		
NS	900740	TUBING,polyurethane,10/6.5−7 mm	AR	
NS	226690	TUBING, polyurethane, 12/8 mm, blue	AR	

AR: As Required

NS: Not Shown

Remote Display Components

See Figure 7-9 and the following parts list.

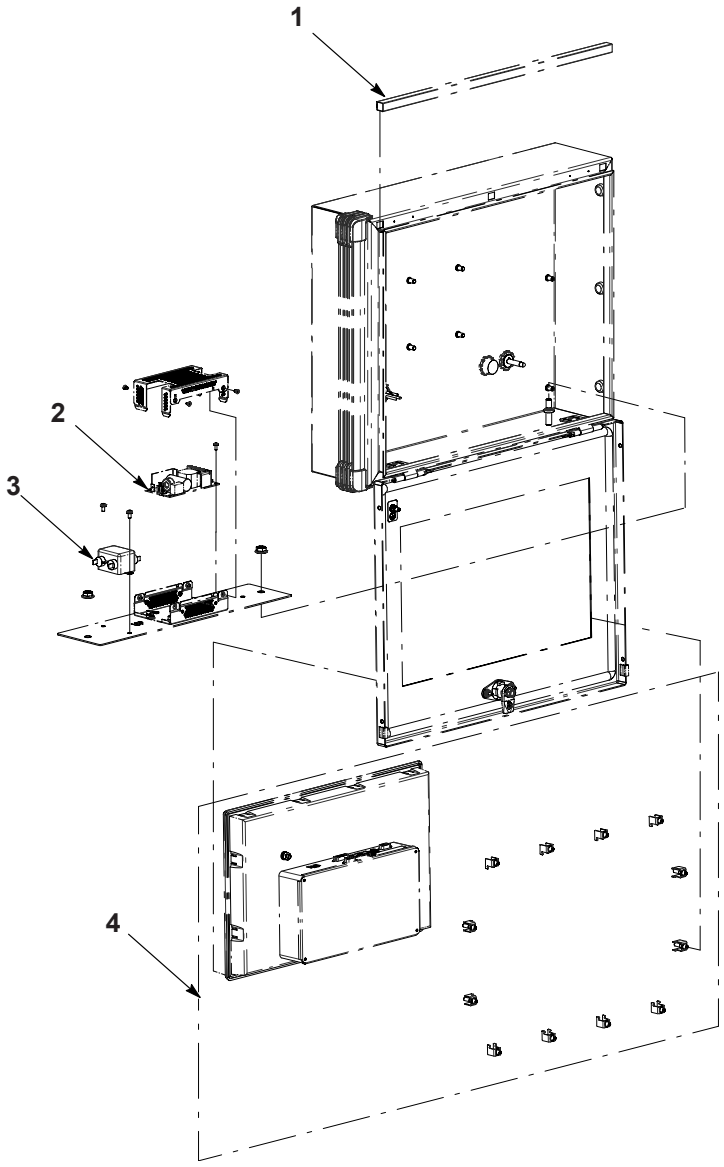


Figure 7-9 Remote Display Components

Item	Part	Description	Quantity	Note
1	1618448	GASKET, foam, conductive, ½ x1/2 x 18−1/2 in.	1	
2	1107695	POWER SUPPLY, 24 Vdc, 60 W	1	
3	334805	FILTER, line, RFI, power, 10 A	1	
4	1618656	HMI, programmed, Encore Engage	1	
31	939122	SEAL, conduit fitting, ½, blue	1	

Auxiliary Controller Components

See Figure 7-10 and the following parts list.

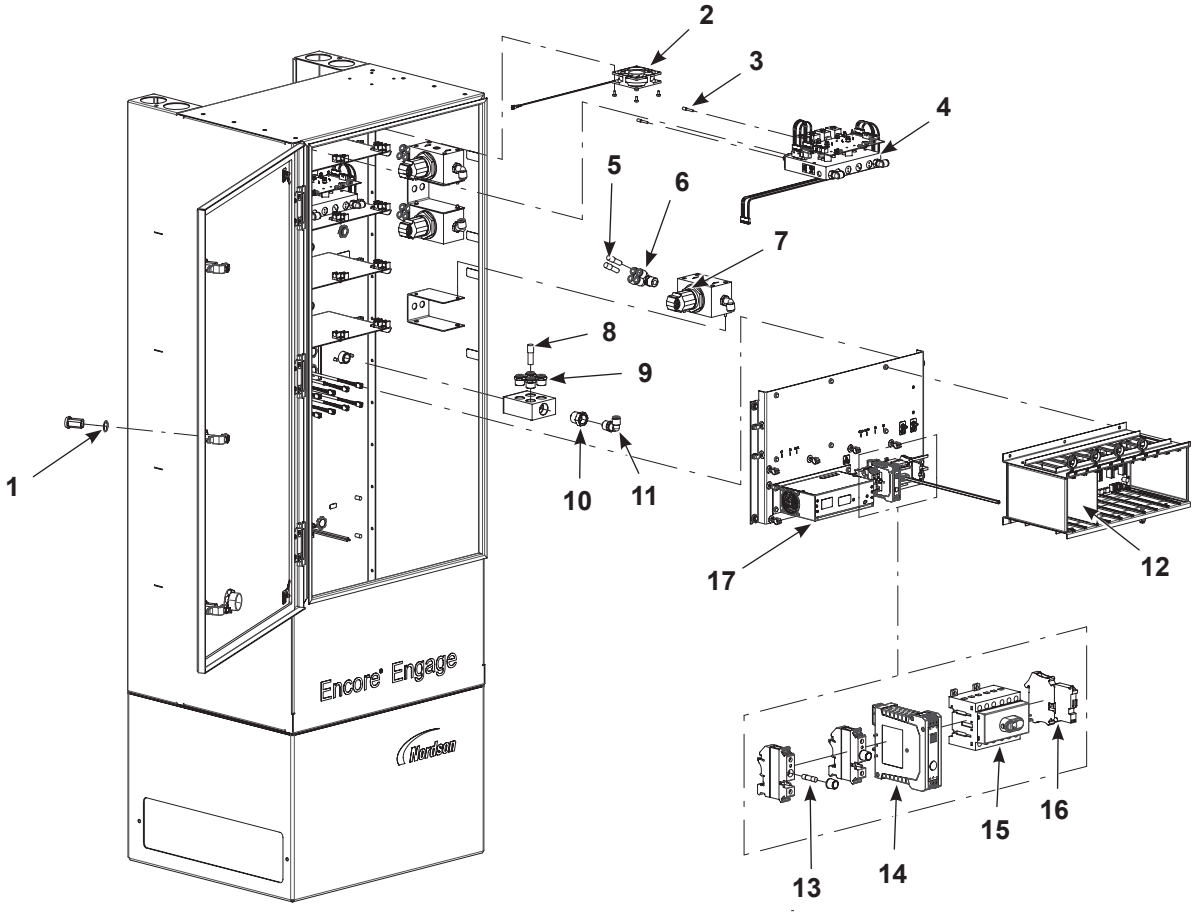


Figure 7-10 Auxiliary Controller Components 1 of 2

Item	Part	Description	Quantity	Note
1	940148	O-RING, silicone, COND, 0.875 X 1.000	1	
2	1615492	FAN ASSEMBLY, Engage	1	
3	326139	PLUG, blanking, 4 mm T	1	
4	1615880	KIT, service, iFlow module, Engage	1	
5	148256	PLUG, 10 mm, tubing	1	
6	1034000	FITTING, ½ RPT x (4)10 mm tube	1	
7	1033878	REGULATOR, rolling diaphragm, 0−120, ½ NPT	1	
8	183418	PLUG, 12 mm, tube	1	
9	1604794	CONNECTOR, male, 12 mm T x ½ RPT	1	
10	973399	BUSHING, pipe, HYD , ¾ X 1/2, steel, zinc	1	
11	972092	CONNECTOR, male elbow, 10 mm T x ½ UNI	1	
12	1615958	KIT, service, dual gun driver PCA, Engage	1	
13	1618136	FUSE, 8A, ceramic, time-delay, 5 x 20	1	
14	1615873	FILTER, line, RFI, power, DIN rail mount	1	
15	1615896	SWITCH, disconnect, 6 pole, DIN rail mount	1	
16	939953	FUSE, 4A, ceramic, time-delay	1	
17	1615937	POWER SUPPLY, 24 Vdc, 600 W	1	

Continued...

Auxiliary Controller Components *(contd)*

See Figure 7-11 and the following parts list.

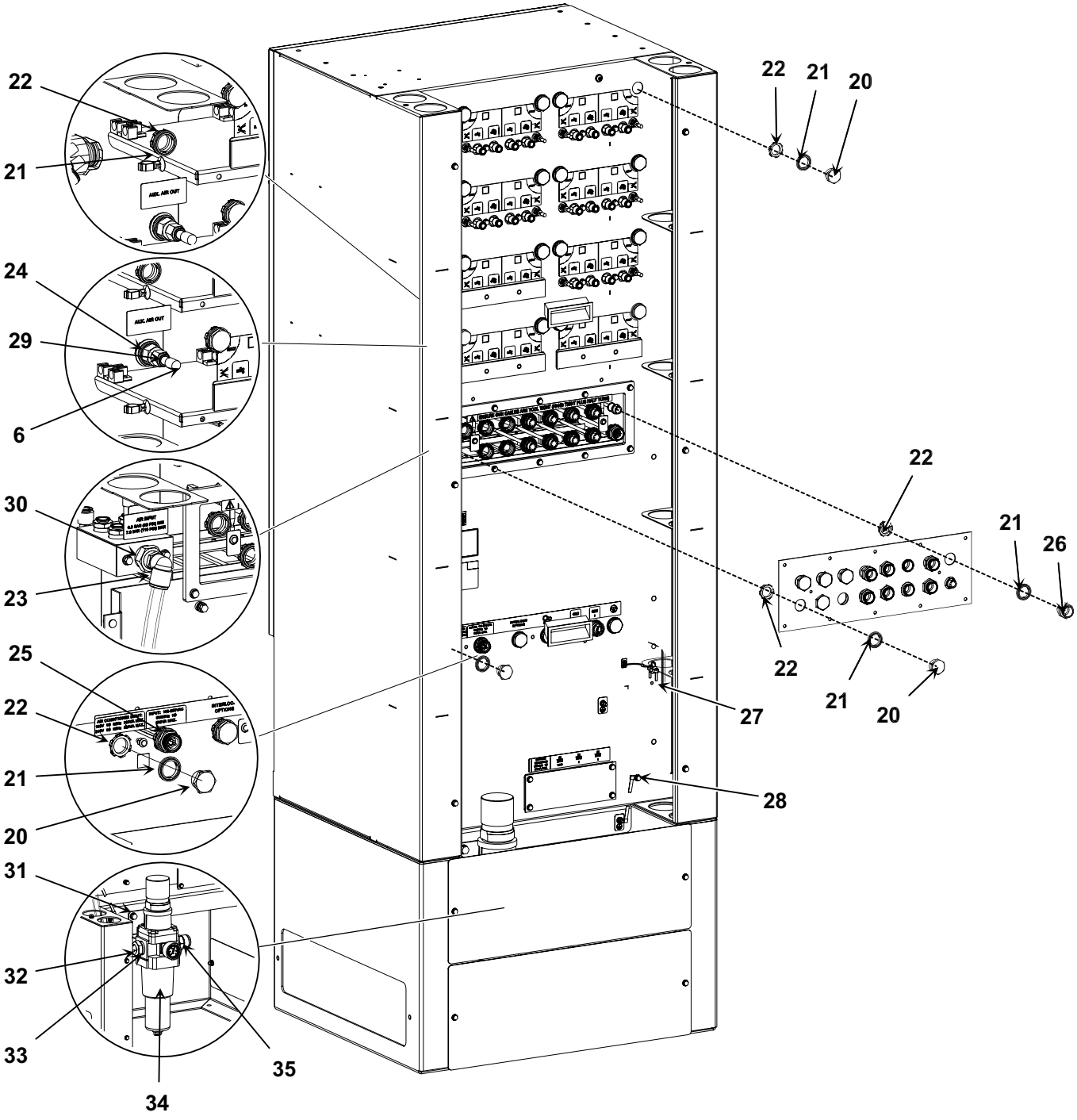


Figure 7-11 Auxiliary Controller Components 2 of 2

Item	Part	Description	Quantity	Note
6	148256	PLUG, 10 mm, tubing	1	
20	334800	PLUG, 1/2 pipe,1-in. hex	1	
21	939122	SEAL, conduit fitting, ½, blue	1	
22	984526	NUT, lock, 1/2 conduit	1	
23	1100040	CONNECTOR, male, elbow, 16 mm T x ½ RPT, with seal	1	
24	1005068	UNION, F bulkhead, 10 mm T x ¼ RPT	1	
25	--------	RECEPTACLE ASSEMBLY, AC power, switched	1	
26	1615490	RECEPTACLE, shielded, 8 position S, gun, 0.4 M	1	
27	240976	CLAMP, ground, with wire I Can’t find this clamp	1	
28	246458	JUMPER, ground, 4-in.	1	
29	1604303	CONNECTOR, male, 10m x 1/4 RPT, with seal		
30	973399	BUSHING, pipe 3/4 x 1/2		
31	--------	SCREW, hex, serrated, M8 x 18, steel, zinc		
32	--------	CONNECTOR, male, 16 mm T x 1/2 NPT, with seal		
33	--------	BUSHING, reducing, 1 NPT x 12 NPT		
34	1615771	FILTER, REGULATOR, gage, 5 micron, 100 cfm, 1 NPT		
35	--------	CONNECTOR, male		
NS	1614705	FILTER ELEMENT, 5 micron		
NS	1615892	VENT plug, 1/2		
NS	1091201	TUBING, 16 mm, 3 ft		
NS	900740	TUBING, polyurethane, 10/6.5−7 mm	AR	
NS	226690	TUBING, polyurethane, 12/8 mm, blue	AR	

AR: As Required

NS: Not Shown

Auxiliary Controller with Air Conditioning Components

See Figure 7-12 and the following parts list.

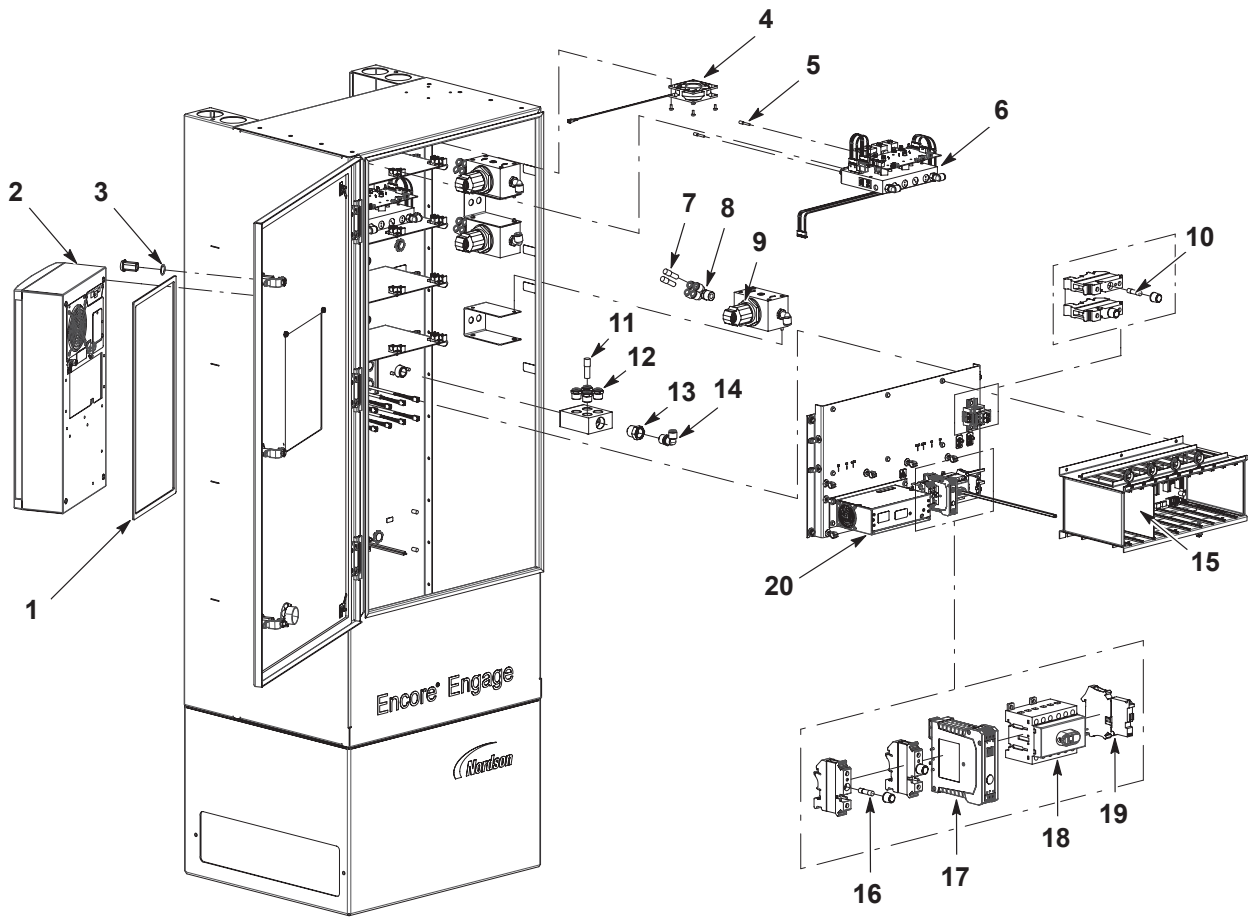


Figure 7-12 Auxiliary Controller Components with Air Conditioner 1 of 2

Item	Part	Description	Quantity	Note
1	1618896	GASKET, multi-gun, AC, Engage	1	
2	1618897	AIR CONDITIONER, multi-gun, Engage	1	
3	940148	O-RING, silicone, COND, 0.875 X 1.000	1	
4	1615492	FAN ASSEMBLY, Engage	1	
5	326139	PLUG, blanking, 4 mm T	1	
6	1615880	KIT, service, iFlow module, Engage	1	
7	148256	PLUG, 10 mm, tubing	1	
8	1034000	FITTING, ½ RPT x (4)10 mm tube	1	
9	1033878	REGULATOR, rolling diaphragm, 0−120, ½ NPT	1	
10	1618135	FUSE, A4, ceramic, time-delay, 5 x 20	1	
11	183418	PLUG, 12 mm, tube	1	
12	1604794	CONNECTOR, male, 12 mm T x ½ RPT	1	
13	973399	BUSHING, pipe, HYD , ¾ X 1/2, steel, zinc	1	
14	972092	CONNECTOR, male elbow, 10 mm T x ½ UNI	1	
15	1615958	KIT, service, dual gun driver PCA, Engage	1	
16	1618136	FUSE, 8A, ceramic, time-delay, 5 x 20	1	
17	1615873	FILTER, line, RFI, power, DIN rail mount	1	
18	1615896	SWITCH, disconnect, 6 pole, DIN rail mount	1	
19	939953	FUSE, 4A, ceramic, time-delay	1	
20	1615937	POWER SUPPLY, 24 Vdc, 600 W	1	

Continued...

Auxiliary Controller with Air Conditioner Components *(contd)*

See Figure 7-13 and the following parts list.

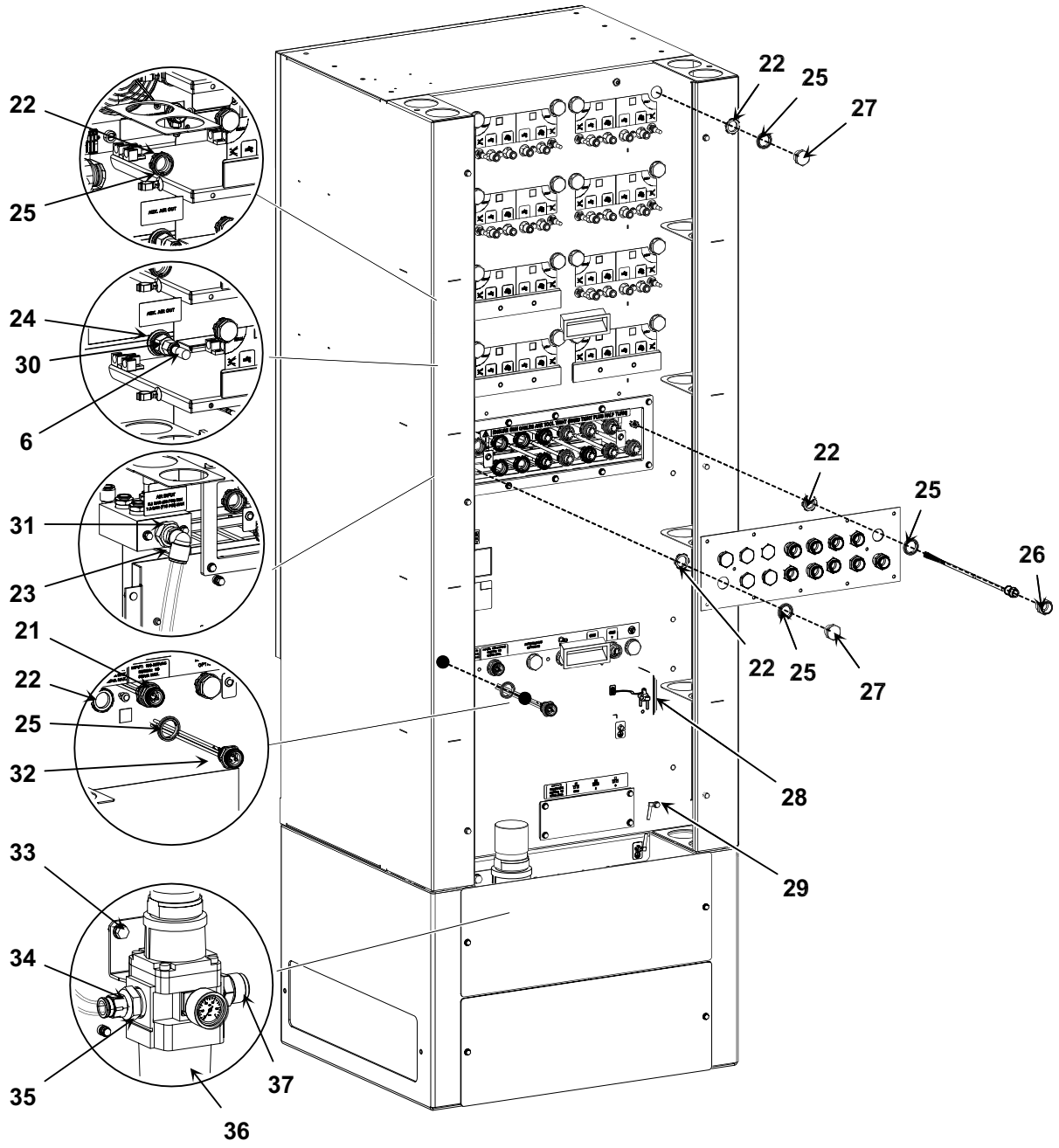


Figure 7-13 Auxiliary Controller Components with Air Conditioner 2 of 2

Item	Part	Description	Quantity	Note
6	148256	PLUG, 10 mm, tubing	1	
21	1615485	RECEPTACLE ASSEMBLY, AC power, switched	1	
22	984526	NUT, lock, 1/2 conduit	1	
23	1100040	CONNECTOR, male, elbow, 16 mm T x ½ RPT, with seal	1	
24	1005068	UNION, F bulkhead, 10 mm T x ¼ RPT	1	
25	939122	SEAL, conduit fitting, ½, blue	1	
26	1615490	RECEPTACLE, shielded, 8 position S, gun, 0.4 M	1	
27	334800	PLUG, 1/2 pipe,1-in. hex	1	
28	240976	CLAMP, ground	1	
29	246458	JUMPER, ground, 4-in.	1	
30	1604303	CONNECTOR, male, 10 mm T x 1/4 RPT, with seal		
31	973399	BUSHING, pipe, 3/4 x 1/2		
32	1615484	RECEPTACLE ASSEMBLY, air cond, power		
33	--------	SCREW, hex, serrated, M8 x 18, steel, zinc		
34	--------	CONNECTOR, male, 16 mm T x 1/2 NPT, with seal		
35	--------	BUSHING, reducing, 1 NPT x 1/2 NPT		
36	1615771	FILTER REGULATOR, gage, 5 micron, sintered bronze		
37	--------	CONNECTOR, male		
NS	1614705	FILTER ELEMENT, 5 micron		
NS	1615892	VENT plug, 1/2		
NS	1091201	TUBING, 16 mm, 3 ft		
NS	900740	TUBING, polyurethane,10/6.5−7 mm	AR	
NS	226690	TUBING, polyurethane, 12/8 mm, blue	AR	

AR: As Required

NS: Not Shown

Kits

iFlow Module

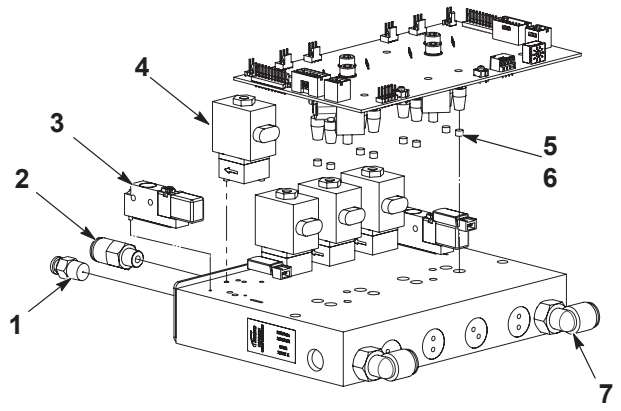


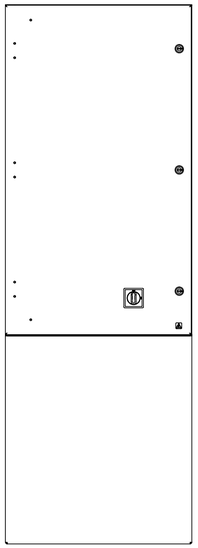
Figure 7-14 iFlow Module Kits

Item	Part	Description	Quantity	Note
—	1615880	PLUG, 10 mm, tubing	1	
1	1033171	• CONNECTOR, orifice, 4 mm x R1/8, diameter 0.4 mm	2	
2	1030873	• NUT, lock, 1/2 conduit	4	
3	1099281	• VALVE, check, M8T x R 1/8, M input	2	
4	1027547	• VALVE, solenoid, 3 port, 24 V, 0.35 W	4	
5	1604437	• VALVE, proportional, solenoid, sub-base	1	
6	1604436	• KIT FILTER, 20 micron, 0.168 DIA x .125 LG	1	
7	972125	• SERVICE KIT, filter, 20 micron, with tool	2	

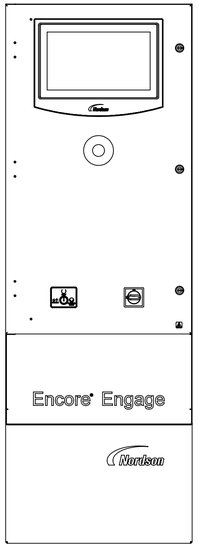
MATERIAL NO. 10018643 | REVISION 05

REVISIONS

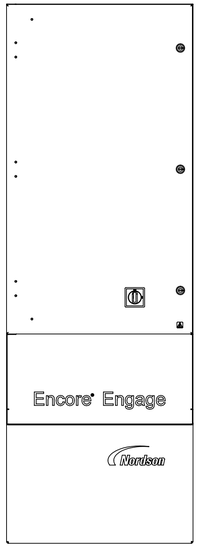
ZONE	REV.	DESCRIPTION	BY	CHK	ECO NO.	DATE
	00	ISSUED	BDM			25JAN19
	01	RELEASED TO PRODUCTION	BDM	RF	PE-101281	22FEB19
	02	ADDED SHEET 2	DRJ		PE-102174	22OCT19
	03	ADDED ENCORE HD PUMP MODULES & ENGAGE AIR CONDITIONED CONFIGURATIONS	TAL	BF	PE-102543	23JUN20
	04	REMOVED OBSOLETE CONTROLLERS & APPLICATORS, UPDATED PICTORIALLY.	FM	DS	PE-105877	27MAR23
	05	ADDED GEN3 APPLICATOR & OPTIONAL KITS	TAL	CG	PE-107163	18MAR24



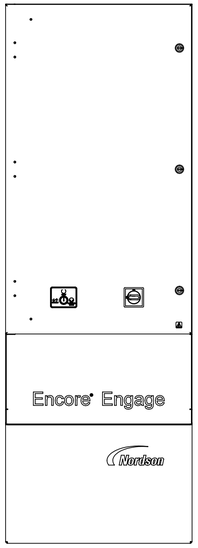
ENCORE ENGAGE EXTERNAL CONTROL CONSOLE



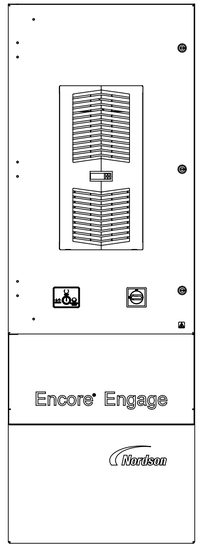
ENCORE ENGAGE LOCAL DISPLAY CONTROL CONSOLE



ENCORE ENGAGE AUXILIARY CONTROL CONSOLE

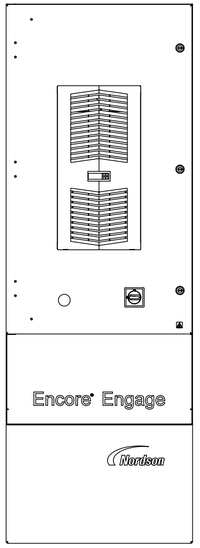


ENCORE ENGAGE REMOTE DISPLAY CONTROL CONSOLE



ENCORE ENGAGE REMOTE DISPLAY CONTROL CONSOLE W/ AIR CONDITIONER

〈03〉



ENCORE ENGAGE AUXILIARY CONTROL CONSOLE W/AIR CONDITIONER

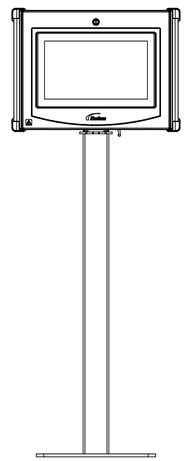
〈03〉

〈04〉

THE APPLICATORS AND CABLES ARE SUITABLE FOR CLASS II, DIV 1, GROUP F & G HAZARDOUS (CLASSIFIED) LOCATIONS, OR <Ex> II 2 D EXPLOSIVE ATMOSPHERES:	
GUNS:	
1097489	APPLICATOR,BAR MT,AUTO,ENCORE
1099824	APPLICATOR,TUBE MT,AUTO,ENCORE,5FT
1097500	APPLICATOR,TUBE MT,AUTO,ENCORE,6FT
〈05〉 1624523	APPLICATOR,AUTO,ENCORE,GEN3
OPTIONS:	
1604084	EXTENSION,SPRAY,90 DEGREE,ENCORE
1605614	EXTENSION,SPRAY,60 DEGREE,ENCORE
1605703	EXTENSION,SPRAY,45 DEGREE,ENCORE
1609048	POS MULTIPLIER
1625279	DIFFUSER,ENCORE HD AUTO,GEN3,PKG
1625160	KIT,BAR MOUNT,APPL,AUTO,ENCORE,GEN3
〈05〉 1625161	KIT,COLLECTOR,ION,AUTO,ENCORE,GEN3
1625163	KIT,TUBE MOUNT,5FT,APPL,AUTO,ENCORE,GEN3
1625164	KIT,TUBE MOUNT,6FT,APPL,AUTO,ENCORE,GEN3
1625165	KIT,TUBE MOUNT,8FT,APPL,AUTO,ENCORE,GEN3
CABLES:	
1097537	CABLE,AUTO,ENCORE,8M
1097539	CABLE,AUTO,ENCORE,12M
1097540	CABLE,AUTO,ENCORE,16M
1600745	CABLE ASSY,ENCORE XT/HD,6M
1601344	CABLE,EXTENSION,ENCORE AUTO,4M
1085168	CABLE EXTENSION,6-CONDUCTOR,SHIELDED,6M

〈04〉

THE FOLLOWING CONTROLLERS ARE FOR USE IN UNCLASSIFIED LOCATIONS AND NON-EXPLOSIVE ATMOSPHERES:	
1617974	CONTR,MAIN,8 GUN,ENCORE ENGAGE
1617976	CONTR,MAIN,12 GUN,ENCORE ENGAGE
1617978	CONTR,MAIN,16 GUN,ENCORE ENGAGE
1617979	CONTR,AUX,4 GUN,ENCORE ENGAGE
1617981	CONTR,AUX,8 GUN,ENCORE ENGAGE
1617983	CONTR,AUX,12 GUN,ENCORE ENGAGE
1617985	CONTR,AUX,16 GUN,ENCORE ENGAGE
1617988	CONTR,MAIN,REM,8 GUN,ENCORE ENGAGE
1617990	CONTR,MAIN,REM,12 GUN,ENCORE ENGAGE
1617992	CONTR,MAIN,REM,16 GUN,ENCORE ENGAGE
1617995	CONTR,MAIN,REM,AC,8 GUN,ENCORE ENGAGE
1617999	CONTR,MAIN,REM,AC,16 GUN,ENCORE ENGAGE
1618002	CONTR,AUX,AC,8 GUN,ENCORE ENGAGE
1618006	CONTR,AUX,AC,16 GUN,ENCORE ENGAGE
1623643	SYSTEM ASSY,REMOTE DISPLAY,W/PED
1615952	CONTR,EXT,8 GUN,ENCORE ENGAGE
1615954	CONTR,EXT,12 GUN,ENCORE ENGAGE



REMOTE DISPLAY WITH PEDESTAL

〈04〉

CRITICAL
No revisions permitted without approval of the proper agency.

ALL DIMENSIONS IN MM EXCEPT AS NOTED X±0.8 X.X±0.25 X.XX±0.13 MACHINED SURFACES √6 BREAK INSIDE/OUTSIDE CORNERS 0.1/0.8 THREAD LENGTH DIMENSIONS ARE FULL THREAD INTERPRET DRAWINGS PER ASME Y14.5-2009 PERFECT FORM AT MMC REQUIRED FOR INTERRELATED FEATURES THIRD ANGLE PROJECTION	NORDSON CORPORATION WESTLAKE, OH, U.S.A. 44145		
	DESCRIPTION: REF DWG,APPROVED EQUIPMENT,ENGAGE		
	DRAWN BY: BDM	DATE: 25JAN19	RELEASE NO.: PE-101281
	CHECKED BY: RF	APPROVED BY: RF	
	SIZE: D	FILE NAME: 10018643	MATERIAL NO.: 10018643 — REVISION: 05
	SCALE: 1:10	CADD GENERATED DWG.	SHEET 1 OF 1

EU DECLARATION of Conformity

Product: Encore Engage Powder Spray Systems

This Declaration is issued under the sole responsibility of the manufacture.

Models: Encore Main Controller with Display, Encore Main Controller with Remote Display, Encore Engage Auxiliary Units

Description: This is an electrostatic, powder spray system, including Manual and Auto applicators, control cables and associated controllers.

Applicable Directives:
2006/42/EC - Machinery Directive 2014/30/EU - EMC Directive 2014/34/EU - ATEX Directive

Standards Used for Compliance:
EN/ISO12100 (2010) EN61000-6-3 (2007) EN50050-2 (2013)
EN61000-6-2 (2005) EN55011 (2009) EN50177 (2012)

Principles:
This product has been designed & manufactured according to the Directives & standards / norms described above.

Type of Protection:
- Ambient Temperature: +15ºC to +40ºC
- Ex tb IIIB T60ºC / Ex II 2 D / 2mJ = (Encore XT and HD Manual Applicators)
- Ex tc IIIB T60ºC Dc / Ex II (2) 3 D = (Enhance Manual Interface Controller)
- Ex II (2) D = (Engage Controllers and Remote Display) – Located in Unclassified Location (Zone)
- Ex II 2 D / 2mJ = (Encore Auto Applicator)

Certificates:
- FM14ATEX0051X = Encore XT and HD Manual Applicators (Dublin, Ireland)
- FM18ATEX0058X = Encore Enhance Manual Interface (Dublin, Ireland)
- FM11ATEX0056X = Encore Automatic Applicator (Dublin, Ireland)
- FM19ATEX0005X = Encore Engage Controller (Dublin, Ireland)

ATEX Surveillance
- 0598 SGS Fimko Oy (Helsinki, Finland)

Date: 12Dec24

Jeremy Krone
Engineering Manager
Industrial Coating Systems
Amherst, Ohio, USA

Nordson Authorized Representative in the EU
Contact: Operations Manager
Industrial Coating Systems
Nordson Deutschland GmbH
Heinrich-Hertz-StraBe 42-44
D-40699 Erkrath

UK DECLARATION of Conformity

Product: Encore Engage Powder Spray Systems

This Declaration is issued under the sole responsibility of the manufacture.

Models: Encore Main Controller with Display, Encore Main Controller with Remote Display, Encore Engage Auxiliary Units

Description: This is an electrostatic, powder spray system, including Manual and Auto applicators, control cables and associated controllers.

Applicable UK Regulations:
Supply Machinery Safety 2008
Electromagnetic Compatibility Regulation 2016
Equipment & Protective Systems Intended for use in Potentially Explosive Atmosphere Reg 2016

Standards Used for Compliance:

EN/ISO12100 (2010)	EN61000-6-3 (2007)	EN50050-2 (2013)	
	EN61000-6-2 (2005)	EN55011 (2009)	EN50177 (2012)

Principles:
This product has been designed & manufactured according to the Directives & standards / norms described above.

Type of Protection:
- Ambient Temperature: +15ºC to +40ºC
- Ex tb IIIB T60ºC / Ex II 2 D / 2mJ = (Encore XT and HD Manual Applicators)
- Ex tc IIIB T60ºC Dc / Ex II (2) 3 D = (Enhance Manual Interface Controller)
- Ex II (2) D = (Engage Controllers and Remote Display) – Located in Unclassified Location (Zone)
- Ex II 2 D / 2mJ = (Encore Auto Applicator)

Certificates:
- FM21UKEX0129X = Encore XT and HD Manual Applicators (Maidenhead, Berkshire, UK)
- FM21UKEX0241X = Encore Enhance Manual Interface (Maidenhead, Berkshire, UK)
- FM22UKEX0006X = Encore Automatic Applicator (Maidenhead, Berkshire, UK)
- FM21UKEX0240X = Encore Engage Controller (Maidenhead, Berkshire, UK)

EX Quality System Certificate
- SGS Baseefa NB 1180 (Buxton, Derbyshire, UK)

Date: 12Dec24

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