


UNDERWRITERS LABORATORIES

FOLLOW-UP SERVICES - VARIATION NOTICE

E123456 1210201133511

MANUFACTURER INFORMATION

Date	02/01/2021	Subscriber / Party Site	567890
Project Number		File Number	E12345
CCN	NITW	Manufacturer Name	Acme Panel Builders
Product Type	Industrial Control Panels	Manufacturer Email	Joe@acmepanelbuilders.com
Deliverable Type	Listed	Manufacturer Address	123 Main Street Suite 100 Springfield MI 49444
Responsible Office	Northbrook	Factory Representative	Joe Jones
Inspection Center	111	Factory Rep Phone	867-5309
UL Rep Name	Tommy Tone II	Factory Rep Email	joe@acmepanelbuilders.com
UL Rep ID	88888		

By having my name entered below, I acknowledge that I have discussed this VN with the UL Representative named above and I will forward a copy to the Applicant. 

Name	Joe Jones	Title	Engineer
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APPLICANT INFORMATION

Applicant Name	Acme Panel Builders	
Applicant Address	123 Main Street Suite 100 Springfield MI, 49444	Applicant Email

VARIATION ITEMS

VN ITEM	MODEL	VOL. / SECTION	REVISION DATE	STANDARD	CLAUSE
1	TT-SE-1001-A	1 /	2020/8/6	508A	60.2

Disposition: Do not continue to use the UL Mark with current construction. Rework, scrap, and/or remove UL Marks from existing products.
Variation: Manufacturer did not include statement on the field wiring diagram or print that the branch circuit protection is omitted and marked to indicate that these devices shall be provided by the installer.
Requirements: An industrial control panel provided with a separately supplied control circuit where the disconnecting means and/or branch circuit protection is omitted shall be marked to indicate that these devices shall be provided by the installer.

VARIATION NOTICE CORRESPONDENCE

Letter Date	Letter Type	Version	Email To	Status
02/01/2021	Closure	V01	joe@acmepanelbuilders.com	
	Processed			

[View Correspondence](#)

Please refer to the letter that accompanies this VN for further instructions regarding these Variations.

Changes to the procedure may be requested from UL's Commercial Team or through your MyHome account.

Phone	555-345-9876	Phone	1-877-UL Helps (877-854-3577)
Email	Tommy.Tone@ul.com		www.ul.com/quote
			www.myul.com



Top 508A 3rd Edition Errors and Oversights

1. **Supplementary protectors as Branch Circuit Protection** - Supplementary protectors, better known as “miniature circuit breakers”, are not suitable for branch circuit protection. These devices, which are evaluated to UL 1077, Supplementary Protectors for use in Electrical Equipment, have undergone short circuit testing in which an inoperable device following the testing does not necessarily constitute unacceptable test results. Supplementary protectors are ONLY suitable for overcurrent protection in control circuits, must comply with all requirements for supplementary protector in the SA table (31.1.7).
2. **Manual Motor Controllers vs. Combination Motor Controllers** –Manual Motor Controllers are often used as a disconnecting means and branch circuit protection for motor circuits. However, many individuals are unaware manual motor controllers ARE NOT suitable as a branch circuit protection device. These controllers are ONLY suitable as a motor disconnecting means and an overcurrent device. On the other hand, Combination Motor Controllers ARE suitable as a disconnecting means and branch circuit protection device. If there is ever a question as to whether a controller is a Manual Motor Controller or Combination Motor Controller, look at the category description on the device, it's printed next to the UL Listing Mark (31.14 SA notes).
3. **Nema enclosure rating vs. UL enclosure Type rating** - A Nema enclosure rating is not the same as a UL enclosure Type rating. The difference between the two ratings comes from the means by which they were evaluated. NEMA writes construction specifications and if a manufacturers design meets those specifications, it can be designated with the applicable NEMA rating. A UL Type rated enclosure undergoes a construction as well as a performance evaluation. For the UL 508A program, panels will need to have a UL Type Rating.
4. **IP vs. UL enclosure Type rating** - ANSI/IEC Publication (IP) 60529 Classification of Degrees of Protection Provided by Enclosures provides a system for specifying the enclosures of electrical equipment on the basis of the degree of protection provided by the enclosure. ANSI/IEC 60529 does not specify degrees of protection against mechanical damage of equipment, risk of explosions, or conditions such as moisture (produced for example by condensation), corrosive vapors, fungus, or vermin. The NEMA Standard for Enclosures for Electrical Equipment does test for environmental conditions such as corrosion, rust, icing, oil, and coolants. For this reason, and because the test and evaluations for other characteristics are not identical, the ANSI/IEC Enclosure Classification Designations cannot be exactly equated with the enclosure type numbers in this Standard.
5. **Putting holes in enclosures** - Manufacturers are often unaware that cutting or puncturing any hole, regardless of size, alters the environmental integrity of an enclosure. A good example would be drilling holes to mount a nameplate on an enclosure. Although small and inconspicuous, these holes alter the environmental



integrity of the enclosure. If holes are cut in an enclosure and not filled with a component with a suitable type rating, there are alternate ratings that can be applied. See Tables 19.2 and 19.3 in UL 508A (there are exceptions to this requirement).

6. **Recognized Component power supplies used at 100%** - Recognized Component power supplies cannot be used at more than 50% of their ampere rating, and where there are multiple secondaries, each secondary cannot be loaded at more than 50% of the secondary ampere rating. Recognized Component power supplies that have been evaluated and tested to UL 508, the Standard for Industrial Control Equipment, can be used at 100% of the device's ampere rating. The power supplies that have not been tested to UL 508, may not be suitable for use in industrial environments where temperatures are a major concern (42.2.3.1).
7. **Overload protection provided by drives** - Manufacturers sometimes rely on UL Listed drives to provide overload protection for motor loads. The only way a drive can be relied upon to provide the overload protection required in UL 508A is if the drive manufacturer's instructions explicitly state the degree of protection provided and indicate the protection level in percent of full-load current. When the protection level is adjustable, the marking shall be provided with instructions for adjustment, or make reference to the manual for adjustment instructions. If this marking is not provided, external overload protection will need to be used.
8. **Routing conductors of different circuits together** - Conductors are often routed in Panduit or raceways for multiple circuits, which involve different voltages (28.4.1c). If the conductors of all circuits are not rated for the highest voltage involved, they will need to be separated and segregated within the panel. This can be accomplished by providing a barrier or complying with the minimum spacing requirements (29.5.1 a.).
9. **Recognized Component Instantaneous Trip CB with specific starter** - Manufacturers often use Recognized Component Instantaneous Trip Circuit Breakers in conjunction with starters to provide motor branch circuit protection. (This is a construction that is often copied from UL Listed Motor Control Centers). This combination is not suitable to provide branch circuit protection. Recognized Component Instantaneous Trip Circuit Breakers intended to be used for branch circuit protection can only be used with a specific starter(s) after the combination has been tested because a combination of the two specific devices together provide the thermal and magnetic properties of branch circuit protection as well as short circuit interrupting capacity.
10. **Not providing "customer installed equipment" marking** - Main branch circuit protection, disconnect and motor overload are allowed to be omitted in UL Listed Industrial Control Panels. But often manufacturers do not provide the required markings for omitting these devices. When one of these components is omitted and expected to be provided by the installer, a marking will need to be placed on the schematics showing where the device will need to be provided, along with whether it is



a UL Listed or Recognized component and the ratings of that component (60.1 60.2 and 60.3).

11. **Other NRTL Components:** FOR PANELS BEARING THE UL, cUL or cULus MARK:
All components certified by another OSHA Nationally Recognized Testing Laboratory (NRTL) shall either comply with Section 3 of the UL 508A Supplement SA Specific Component Requirements”, or be Procedure described as in L12.



Frequently Asked Questions

1) Once I become a panel shop, will I be required to build only UL Listed panels?

No, being a UL Listed Panel Shop allows you to build UL Listed Panels but does not **require** you to build UL Listed Panels. However, if you put a UL Listing Mark on a panel, the panel will need to be built in accordance with UL 508A, the Standard for Industrial Control Panels.

2) What is the difference between a UL Listed device and a Recognized Component?

- a) A listed device is a device, based on its design, that fully complies with all the construction and performance requirements of the Standard to which it was evaluated. These devices can be for field and factory installation.
- b) A Recognized Component, based on its design, is incomplete in its construction or restricted in its performance capabilities. Due to these limitations, the component could not fully meet the construction and/or the performance requirements of the Standard to which it was evaluated. These components are assigned conditions of acceptability and will be evaluated entirely when used in the construction of other equipment. These components are for factory installation only.

3) Is there a difference between a UL Rated enclosure and a NEMA rated enclosure?

YES, A NEMA rated enclosure has been evaluated to a NEMA document for construction requirements only.

A UL rated enclosure has been evaluated to both construction and performance requirements of a particular UL Standard. Under this program, all enclosures will be referred to as UL type enclosures.

4) Can I use IP rated devices to complete an opening in my enclosure?

No, I will look for a document from John.

5) Do I need to verify that the spacings within each device used in the panel comply with the spacings in Table 10.1 and 10.2 of 508A?

No, the spacings of UL Listed Devices and Recognized Components have already been evaluated for that device or component. This table refers to the spacings between uninsulated live parts of different components or a spacing between an uninsulated live part and the enclosure. The spacings need to be maintained when mounting components in your panel enclosure.

6) Can I use power conversion equipment (VFD) in my panel?

Yes. You have free substitution on a device if it is UL Listed. However, you must use it within its marked rating. This rating includes any markings associated with the UL Listing. Pay careful attention to markings that state what additional overload protection is provided by the drive itself. If the drive has no such markings, you will be required to provide additional overload protection for all motors that are controlled by this drive.

7) I often use less than the required 14 AWG size wire for my control circuits, is this OK?

Yes, see (38.2.1). There are many applications in which you can use less than the internal wiring requirement of 14 AWG.

8) Markings need to be permanently adhered to the panel. What does “permanently adhered” mean?



- a) The easiest way to comply with this requirement is to use a Recognized Component Marking and Labeling System. Refer to the UL Product iQ for information concerning this. Otherwise UL will need to determine the permanence of the marking.
- b) If a tool is required to remove the marking, the marking is considered permanent. If the marking cannot be removed without tearing or deformation occurring, the marking may be considered permanent.

9) Paragraphs 42.2.2.1 refer to the panel enclosure as being nonventilated. Are there any exceptions to this requirement?

YES. UL is concerned about disturbances (arcs, sparks, molten metal, etc.) of the power supply or the unevaluated component leaving the panel enclosure.

For unevaluated components, refer to Fig. 22.1 for examples of acceptable openings in the panel. Barriers can also be an effective way of preventing disturbances from exiting the panel. Submit a design that you feel will meet the intent of this requirement and if it is acceptable, we will add it your procedure report.

For power supplies, a barrier Sec.22 (another component, heatsink, plexiglass, etc.) will need to be provided if the power supply is 12 inches or less from the ventilating opening. See 22.1. If greater than 12 inches from the opening, no barrier is required. However, if the panel utilizes forced ventilation, the fans will be required to contain filter assemblies.

10) IS THERE ANY OTHER WAY TO GET A LOW VOLTAGE LIMITED ENERGY CIRCUIT OTHER THAN BY USING A CLASS 2 CIRCUIT?

YES. Refer to Section 43. Also, if you use a UL Recognized Component Transformer with a secondary rated no more than 30 Vrms ac 42.4 peak and 60V dc open circuit and the secondary is fused to less than 100VA. See Table 43.1.

11) WHAT COMPONENT INFORMATION DO I NEED TO SUBMIT TO UL SO THEY CAN COMPLETE THE PAPER WORK (PRODUCE THE PROCEDURE REPORT)?

- A. All components in the UL product iQ that fall outside the “Industrial Control Equipment” category except the categories given to you in the Supplement SA.
- B. All other panel constructions that deviate from the requirements in UL 508A, the Standard for Industrial Control Panels.
- C. All components in the Supplement SA that indicate in the Notes Column “procedure description require” or equivalent



When Is A Circuit Breaker Not A Circuit Breaker?

By: John W. Young and Ray Clark

Electrical Construction & Maintenance, Jan 1, 1998

Not all resettable overcurrent protective devices are circuit breakers; some are supplementary protectors. So how do you know one from the other?

When is a circuit breaker not a circuit breaker? No, this isn't a trick question. Not all resettable overcurrent devices, even those that look very much like circuit breakers (CBs), can actually be applied as CBs under present requirements. You need to know the difference between overcurrent protective devices and supplementary protectors so you don't misapply the latter devices. Most major breaker manufacturers make both products, so you'll see both in their catalogs. In addition, foreign standards don't use these terms in the same way, so you'll often see imported equipment with these terms used incorrectly.

You'll see supplementary protectors in catalog information from most of the major overcurrent device manufacturers, but if you read the fine print, you'll see you're not supposed to use them in the field as CBs. Nevertheless, many often specify these devices in error.

The NEC (in Article 100) defines a CB as follows: Circuit Breaker: a device designed to open and close a circuit by nonautomatic means and to open the circuit automatically on a predetermined overcurrent without damage to itself when properly applied within its rating.

This definition seems pretty clear, and most people understand what a CB is intended to do. You probably have a picture in your mind of what it looks like. And, you're probably saying right now you know a CB when you see it. A CB is a CB is a CB, right? But is it always what you think?

You base part of the picture on your experience in using CBs and part on your understanding of the intent of the requirements in the installation code – the NEC. But there are some devices identified as CBs meeting this definition that do not meet the intent of the NEC.

When the NEC requires a CB, its intent is an overcurrent protective device providing overload and short-circuit protection suitable for branch circuit protection. CBs meeting this requirement are tested to comply with Underwriters Laboratories Standard UL 489, Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit-Breaker Enclosures, and are listed as a "circuit breaker." For NEC field applications, if the device isn't tested to UL 489, it isn't a circuit breaker. No matter how much it looks like one, it can't be used for branch-circuit protection.

If it looks like a CB but actually isn't, then it's probably a "supplementary protector." The NEC and U.S. product standards identify these devices as such. UL 1077 covers these devices and defines the term "supplementary protector."

Supplementary Protector: A manually resettable device designed to open the circuit automatically on a predetermined value of time versus current or voltage within an appliance or other electrical equipment. It may also be provided with manual means for opening and closing the circuit.



When you compare this definition with that of a true CB, you see similarities as well as some key differences. Yes, both devices open automatically on a predetermined value of current, but beyond that, the definitions deviate.

- The supplementary protector definition states the device may be provided with manual means for opening and closing the circuit; but, manual operability is not required. A CB, on the other hand, is a device designed to open and close the circuit by nonautomatic means. Therefore, manual operability is required.
- Supplementary protectors are intended for installation within an appliance or other electrical equipment. As such, this precludes you from using these devices as branch circuit overcurrent protective devices in distribution equipment, such as a panelboard or switchboard.

So why are these devices sometimes identified as CBs? UL clearly identifies these devices as supplementary protectors. They are not Listed products; they carry only component recognition. This means they lack features making them recognizable as equipment capable of independent field installation. Instead, they're factory-installed as components of more complex equipment, which subsequently undergoes evaluations by a test lab for a more comprehensive listing. Nevertheless, some of these devices (see photos, in the original article's page 64) do meet the NEC definition (as far as it goes), but not necessarily the NEC intent for a device providing branch-circuit overcurrent protection.

Just to make things even more interesting, some of these devices carry international recognition under foreign standards identifying them as "circuit breakers." While UL has one standard that covers all circuit breakers, there are other standards covering CBs that are quite different. The IEC (International Electrotechnical Commission), for example, has a number of standards covering products named "circuit breakers." The IEC equivalent to domestic supplementary protectors complies with IEC 934, Circuit Breakers for Equipment. Thus, you can identify devices complying with IEC 934 as a CB, and devices complying with both UL 1077 and IEC 934 as both supplementary protectors and CBs.

So what are these devices for? As noted in Sec. 240-10, supplementary protectors are not intended as a substitute for branch-circuit overcurrent devices. As the name implies, their purpose is supplementary, or additional, protection to the branch-circuit overcurrent device. For example, note the allowance in Sec. 240-4 for these devices to protect fixture wire and flexible cord.

There are other differences between supplementary protectors and Listed CBs. Since supplementary protectors are recognized components intended for use in equipment, they can be quite different and vary widely. They provide more specialized protection for a specific purpose; perhaps even for a particular type of equipment. Some have horsepower ratings and are for use with motors; some don't.

Supplementary protectors may have different ratings and functionality depending on their intended use. Some have manual switching means while others don't. Some trip on current levels while others trip on voltage levels.



There are many differences in the standards. For a general comparison in a few key specific areas, the following differences exist in the standards:

- **Spacings:** Spacing requirements in UL 489 and UL 1077 are quite different. UL 1077 spacing requirements are different depending on the application, such as general industrial use, household appliances, household kitchen appliances, or commercial appliances. For example, a 600V UL 489 CB requires a spacing of 1 in. through air and 2 in. over surface. A UL 1077 supplementary protector for 600V general industrial use only requires a spacing of 3/8 in. through air and 1/2 in. over surface.
- **Overload protection:** UL 489 requires CBs to be tested at six times rating; UL 1077 requires overload testing only at 1 and 1/2 times rating, unless they have horsepower rating. In that case, they're tested at six times rating.
- **Short-circuit interrupting ratings:** UL 489 requires a minimum short-circuit interrupting rating of 5000A for CBs rated 250V and less, and 10,000A for those rated more than 250V. UL 1077 devices do not have short-circuit ratings, but the standard does require a limited short-circuit test at a maximum current of 5000A. (The actual test value varies from 200A to 5000A, depending on the rating.) The tests and acceptable results are also quite different. UL 489 requires the CB to interrupt the circuit twice; in the first test, the faulted circuit is closed on the CB and then the same CB is closed on the fault. After these tests, the CB must still be functional and pass a dielectric test. UL 1077, on the other hand, requires supplementary protectors be subjected to three operations. However, the supplementary protector can be wired in series with a fuse or CB (the branch circuit overcurrent protection), which is allowed to open during the test. While the device cannot become a hazard, it can become inoperable during the tests.

How do you tell what you have? To use a UL phrase, “Look for the Mark.” The Listing Mark includes the information identifying what the device is. The Listing Mark for a CB identifies it as a “Listed Circuit Breaker.” (Identify an interchangeable trip unit device as a “Listed Circuit Breaker Frame or Trip Unit.”) A supplementary protector identifies with the Component Recognition Mark (the “mirror-image reverse UR), which is not a listing mark. It also may include the words “Supplementary Protector.”

These devices provide a good example of why product standards and installation codes must work in concert with each other. When the installation code (in this case, the NEC) specifies a CB, the device must be investigated to the applicable product standard based on that installation code. Even a device listed as a CB under a foreign standard won't meet the definition of “Listed” under the NEC unless it complies with the “appropriate designated standards” per Art. 100. In this case, that's UL 489.

If the product meets another standard, such as UL 1077, you must install it based on installation rules for that product, which in this case, are the rules for supplementary protectors.



Types of Enclosures

Type Number	Intended Use and Description
1	Indoor use primarily to provide a degree of protection against limited amounts of falling dirt.
2	Indoor use primarily to provide a degree of protection against limited amounts of falling water and dirt.
3	Outdoor use primarily to provide a degree of protection against rain, sleet, wind blown dust and damage from external ice formation.
3R	Outdoor use primarily to provide a degree of protection against rain, sleet, and damage from external ice formation.
3S	Outdoor use primarily to provide a degree of protection against rain, sleet, windblown dust and to provide for operation of external mechanisms when ice laden.
4	Indoor or outdoor use primarily to provide a degree of protection against windblown dust and rain, splashing water, hose-directed water and damage from external ice formation.
4X	Indoor or outdoor use primarily to provide a degree of protection against corrosion, windblown dust and rain, splashing water, hose-directed water, and damage from external ice formation.
5	Indoor use primarily to provide a degree of protection against settling airborne dust, falling dirt and dripping non corrosive liquids.
6	Indoor or outdoor use primarily to provide a degree of protection against hose-directed water, and the entry of water during occasional temporary submersion at a limited depth and damage from external ice formation.
6P	Indoor or outdoor use primarily to provide a degree of protection against hose-directed water, the entry of water during prolonged submersion at a limited depth and damage from external ice formation.
7	Enclosures constructed for indoor use in hazardous locations classified as Class I, Division 1, Groups A, B, C, or D as defined in NFPA 70 – air-break equipment.
8	Enclosures constructed for either indoor (or outdoor) use in hazardous locations classified as Class 1, Division 1, Groups A, B, C and D as defined in NFPA 70 – oil immersed equipment.
9	Enclosures constructed for indoor use in Hazardous locations classified as Class II< Division 1, Groups E, F, or G as defined in NFPA 70 – air-break equipment.
10	Enclosures constructed to meet the requirements of the Mine Safety and Healthy Administration, 30 CFR, Part 18.
12, 12K	Indoor use primarily to provide a degree of protection against circulating dust, falling dirt, and dripping noncorrosive liquids.
13	Indoor use primarily to provide a degree of protection against dust, spraying of water, oil and noncorrosive coolant.

Terminal Blocks - Component

[See General Information for Terminal Blocks - Component](#)

Moira Terminal Blocks LLC

E123456

55 Main Street

HAMBURGER, GERMANY

Cat. No.	Wire Size	Wire Type	FW	TQ Lb In.	V	A	UG	CA
Block 1	24-10	Sol/str	2	5.3-7	600	30	B,C	2(105),4
					300	10	D	
					600	5	D	
Block 2	20-10 8-6	Sol/str Compact str	2	12.4 - 15.0	600	58	B, C	2(105),4
					300	10	D	
					600	5	D	
Block 3	24-12	Sol/str	2	4.4-5.3	300	20	B	2(105),4
					150	20	C	
					300	10	D	
Block 4	24-10	Sol/str	2	N/A	600	30	B, C	2(105),4
					300	10	D	

Factory and/or Field Wiring (FW) — These terminal blocks are rated for: Code 1, factory wiring only, or Code 2, both factory and field wiring. The suitability of the connections (including spacings between factory connectors) shall be determined in the end-use application.

Unless noted with a "CA 4" in the last column, a terminal connector suitable for field wiring has been investigated to [ANSI/UL 486A-486B](#), "Wire Connectors."

When Code 1 and Code 2 terminals are intermixed on the same terminal block, both codes will be used with suitable indication for which terminal each code applies, i.e., 1/2.

Section 28 - Power circuit field wiring devices meeting component selection requirements				
28.2.1	Recognized Terminal blocks	UL 1059	XCFR2	Terminal blocks shall be suitable for field connection, retaining the conductor size complying with Section 28, use group (other than use group B) complying with applicable spacing requirements from Section 10, electrical ratings

				and conditions of use clauses as determined from Recognized Component Information Page
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Use Group	Application	V Rating	Spacings ^a , in.	
			Through Air	Over Surface
A	Service, including dead-front switchboards, panelboards, service equipment, and the like	51 - 150	1/2	3/4
		151 - 300	3/4	1-1/4
		301 - 600	1	2
B	Commercial appliances, including business equipment, electronic data processing equipment, and the like	51 - 150	1/16 ^b	1/16 ^b
		151 - 300	3/32 ^b	3/32 ^b
		301 - 600	3/8	1/2
C	Industrial, general	51 - 150	1/8 ^b	1/4
		151 - 300	1/4 ^b	3/8
		301 - 600	3/8	1/2
D	Industrial, devices having limited ratings ^c	51 - 300	1/16 ^b	1/8 ^b
		301 - 600	3/16 ^b	3/8
E	Greater than 600 V	601 - 1000	0.55	0.85
		1001 - 1500	0.70	1.20
F	Industrial, devices using the alternative approach to spacings ^d	51 - 1500	Refer to Condition of Acceptability #7 below ^b	
G	LED lighting equipment ^c	51 - 300	1/16 ^b	1/8 ^b
		301- 600	1/16 - 3/16 ^{b, e}	1/8 - 3/8 ^e
^f	50 V and less, at field wiring terminals	0 - 50	1/8	1/4
^f	50 V and less, at other than field wiring terminals	0 - 50	1/16	1/16

Order Status & History

View Status

Click the History button on the dashboard.

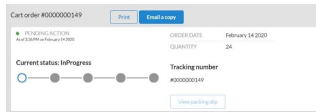


Locate the order you'd like to copy, click the three dots on the right, and click View.



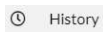
You will receive the shipping confirmation by email from your Label Center as usual. Please contact your local Label Center with questions about order status.

Please Note: Order Status, and Packing Slip, are features coming in 2021.

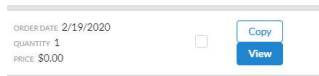


Export Order History

Click the History button from the Field Services Application dashboard.



If you'd like to export a list of multiple orders, use the checkbox to select each order, and click Export Selected to PDF.



If you'd like to export a single order, click View.



Click Email a copy and enter the email address for the export to be sent to.

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