

CR Series Filter

Operators Manual



Special execution, intended for use in potentially explosive atmosphere (zone 22) in conformity with category 3 of group II, according to the European ATEX Directive 94/9/EC. The equipment has the following marking:



II 3 D c

1. INTRODUCTION

TO THE NEW OWNER

When you purchased your Kice CR Series Filter, you bought a high efficiency filter of a proven design based on the most economical method of removing particulate from large air volumes.

We are proud of our products and the people at Kice Industries who craft them. At Kice, we use high manufacturing standards and processes to produce superior quality products, which have been a trademark of our organization for over 60 years.

The result of our development work, driven by input from our customers, has resulted in the present design of the Kice CR Series Filter.

This owner’s manual is intended as a guide for proper installation, operation and maintenance to keep your Kice CR Series Filter operating safely and efficiently on the job. Service and spare parts information is also included for your benefit.

Sincerely,

Drew Kice
President
Kice Industries, Inc.

USING THIS MANUAL

The Company warrants the equipment manufactured by the Company to be free of defects in material and workmanship for a period of one (1) year from the date of shipment. Kice agrees to repair or replace, at its option, any parts found to be defective in the opinion of the Company. Kice is not liable for any costs in connection with the removal, shipment or reinstallation of said parts. This warranty does not apply to abrasion, corrosion, erosion, abuse or misuse of the product. Assistance from Kice with system layout or equipment selection does not imply Kice’s responsibility.

Buyer agrees to look to the warranty, if any, of the manufacturer or supplier of equipment manufactured by others and supplied by Kice for any alleged defects in such equipment and for any damages or injuries caused thereby or as a result thereof. Where work is made to measurements or specifications furnished by the Buyer, Kice does not assume any responsibility for the accuracy of Buyer’s specifications. Kice will not assume responsibility for alteration or repairs unless the same are made with the written consent and approval of Kice.

PURCHASER SHALL BE RESPONSIBLE FOR COMPLIANCE WITH ELECTRICAL MANUFACTURER’S RECCOMENDATIONS, UNDERWRITERS CODE AND ALL SAFETY PRECAUTIONS

Kice extends no other warranty for any of its products other than the above express warranty and there are no other warranties, express or implied, including warranties of merchantability, fitness for a particular purpose or otherwise which extend beyond the above limited express warranty. Kice and its dealers shall not in any event be liable for consequential or incidental damages and the terms and conditions stated herein provide Buyer’s sole and exclusive remedy. Any actions for breach of this agreement or warranty must be commenced within one year after the cause of action has occurred.

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IMPORTANT:

Write down the **MODEL** and **SERIAL NUMBER** of the Kice CR Series Filter.

For additional information, application assistance or special service, you should contact the factory. We will need to know the **MODEL** and **SERIAL NUMBER** of your Kice CR Series Filter. For ready reference, please record this information and the date of delivery or installation on the lines below. See the General Information section for the location of the model and serial number.

Model:_____

Serial Number:_____

Date of Delivery or Installation_____/_____/_____

2. GENERAL INFORMATION

The purpose of this manual is to assist owners and operators in maintaining and operating the Kice CR Series Filter. Please read it carefully; information and instructions furnished can help you achieve years of dependable performance. Separate manuals are included for auxiliary equipment that makes up an air system, such as airlock valves, cyclones and fans. They contain additional information that may not be repeated in this manual. You are urged to read all manuals before attempting any operation or repair of the equipment in the system. If these manuals are not included in your owner’s packet, contact our customer service department.

USING THIS MANUAL

General operation, adjustment and maintenance guidelines are outlined for owners and operators of the Kice CR Series Filter. Operating conditions vary considerably and cannot be addressed individually. Through experience, however, operators should have no difficulty in developing good operating, safety and monitoring skills.

The term “**disconnect and lockout**” as used in this manual means that power to the equipment has been completely disconnected through the use of “**Lockout and Tagout Procedures**”.

Directions used in this manual, for example **RIGHT** or **LEFT. CLOCKWISE** or **COUNTERCLOCKWISE**, refer to directions when facing the access door located in the clean air chamber of the CR Series Filter.

Photographs and illustrations were current at the time of printing, but subsequent production changes may cause your Kice CR Series Filter to vary slightly in detail. Kice Industries, Inc., reserves the right to redesign and change the equipment as deemed necessary, without notification. If a change has been made to your Kice CR Series Filter that is not reflected in this owner’s manual or the Illustrated Parts List, write or call Kice Industries, Inc., for current information and parts.

MODEL AND SERIAL NUMBER

The model of the Kice CR Series Filter, serial number and date of manufacture can be found stamped on the metal identification plate located on the housing, next to the access door.



GENERAL INFORMATION CONTINUED

KICE CR SERIES FILTER PARTS AND SERVICE

Use original Kice CR Series Filter replacement parts only. These parts are available from Kice Industries, Inc. To obtain prompt, efficient service, always provide the following information when ordering parts:

- Correct part description and number, as given in the Illustrated Parts List section of this manual.
- Correct model number.
- Correct serial number.

For assistance in service or ordering parts, contact the customer service department:

Kice Industries, Inc.
5500 Mill Heights Drive
Park City, KS 67219-2358
Phone 316-744-7151; Fax 316-744-7355

IMPORTANT: Any unauthorized modification, alteration, or use of non-approved attachments or drive units voids the warranty and releases Kice Industries, Inc., from any liability arising from subsequent use of this equipment. Each type of CR Series Filter is designed to be used in a specific type of system. Using the Kice CR Series Filter for a purpose other than that for which it was designed could result in personal injury, as well as product or property damage.

Kice equipment is designed and built to provide years of operation. As with any equipment, the following rules are essential for trouble-free operation:

- Proper installation
- Regular maintenance
- Correct operation within original design parameters
- Proper application within a process

Failure to properly install, maintain or operate Kice equipment can result in a variety of problems, including but not limited to: poor equipment performance, decreased equipment life, equipment failure, or dangerous operating conditions.

The Kice Industries product line includes a variety of equipment, all of which can be custom-made to suit your application. Your Kice equipment was chosen based on your specification of process, product and your application requirements for capacity, operating conditions, operating parameters, etc. It is essential that your Kice equipment be installed, maintained and operated under the conditions for which it was originally designed and specified. Should your process needs change, please consult with Kice Industries prior to utilizing the equipment under different conditions.

FOR MOTOR AND SPEED REDUCER PARTS AND SERVICE

Any motor or speed reducer associated with the Kice CR Series Filter is covered by the manufacturer’s warranty. If there is a problem, check with the local supplier or service representative.

EXPLOSION PROTECTION

Many dusts collected by filters are combustible under the right conditions. For combustion to take place there must be three components present: fuel, oxygen, and an ignition source. The dust can act as the fuel, air supplies the oxygen, and the ignition source can come from a variety of places. Efforts are made to control ignition sources but all ignition sources cannot be controlled all of the time.

A deflagration is the propagation of a combustion zone at a velocity less than the speed of sound. An explosion is the bursting or rupturing of an enclosure due to internal pressure created from a deflagration.

To prevent an explosion, there are a few methods to prevent the internal pressure from exceeding the maximum allowable pressure of the enclosure during a deflagration. Explosion vents and suppression are two common methods used for explosion protection on filters. The size of the explosion vents and the design of the suppression system are dependent of several factors pertaining to the enclosure but also to the dust being handled. The deflagration index (Kst) and maximum deflagration pressure (Pmax) of the dust are two factors that need to be supplied by the operator to insure proper sizing of the explosion protection devices.

The National Fire Protection Association (NFPA) provided comprehensive guidelines and standards for dealing with explosive dusts and fires. The following publications provide valuable information on fire and explosion protection and can be helpful to insure your facility is properly equipped.

- NFPA 652 - Standard on the Fundamentals of Combustible Dust
- NFPA 61 - Standard for the Prevention of Fires and Dust Explosions in Agricultural and Food Processing Facilities
- NFPA 68 - Standard on Explosion Protection by Deflagration Venting
- NFPA 69 - Standard on Explosion Prevention Systems
- NFPA 77 - Recommended Practice on Static Electricity
- NFPA 654 - Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids
- NFPA 664 - Standard for the Prevention of Fires and Explosions in Wood Processing and Woodworking Facilities

This is not a comprehensive list of standards for all applications. These and other standards and guidelines from the NFPA that may be applicable for your facility can be ordered or viewed at <http://www.nfpa.org>.

3. SAFETY PRECAUTIONS



This safety alert symbol is used on equipment, safety decals and in manuals to call your attention to an important safety message warning you of possible danger to your personal safety. When you see this symbol, be alert; your personal safety or the safety of other persons is involved. Follow the instructions in the safety message.

HAZARD LEVELS



DANGER (RED) – Danger is used to indicate the presence of a hazard that WILL cause SEVERE personal injury, death, or substantial property damage if the warning is ignored.



WARNING (ORANGE) – Warning is used to indicate the presence of a hazard that CAN cause SEVERE personal injury, death, or substantial property damage if the warning is ignored.



CAUTION (YELLOW) – Caution is used to indicate the presence of a hazard that WILL or CAN cause MINOR personal injury or property damage if the warning is ignored.



NOTICE (BLUE) – Notice is used to indicate installation, operation, or maintenance information that is important, but not hazard-related. Hazard warnings should never be included under the Notice signal word.



WARNING: All owners and operators should read this manual, or be instructed in safe operating and maintenance procedures, before attempting to uncrate, install, operate, adjust, or service this equipment.

SAFETY DECALS

The safety decals on the CR Series Filter should not be removed, covered over, painted, or otherwise become illegible. If this occurs, the decals should be replaced immediately. Contact our customer service department for replacements.

Safety Precautions Continued

- Do not attempt to install, connect power to, operate or service your new CR Series Filter without proper instruction and until you have been thoroughly trained in its use by your employer.
- The unit must be lifted by a means with sufficient lifting capacity.
- Never stand under any kind of hoist or lifting mechanism, whether or not it is loaded or in operation. Never stand under or near a component when it is being lifted.
- Qualified personnel, before each use, must carefully inspect all lifting devices. Never use a lifting device to transport equipment. Never use a lifting device that is damaged, deteriorated, or in any way in need of repair.
- Use personal protective equipment when and where appropriate, such as hard hats, helmets, gloves, earplugs, dust masks and eye protection devices. Keep personal protective equipment in good repair and convenient to the operator.
- The CR Series Filter is fully encapsulated if properly connected during installation and should only be operated after all pipes and hoses, including upstream and downstream components, have been completely connected to the piping system. This will prevent human access while the machine is running.
- The CR Series Filter may also have factory supplied guards for rotating components. Do not connect power to or operate the CR Series Filter unless all moving parts are completely enclosed and all guards, grates and maintenance panels are in place and securely fastened.
- All protective covers, guards, grates, maintenance panels, switches and warning decals must be kept in place and in good repair. Any equipment with a damaged, malfunctioning, defective, or missing protective device must be taken out of service until the protective device can be repaired or replaced.
- Do not abuse, overload, mistreat or misuse the CR Series Filter or attempt to operate the CR Series Filter if it is in need of maintenance or repair.
- The CR Series Filter may be installed and programmed to start automatically or be controlled from a remote location. Keep clear of all moving parts on industrial equipment and on the CR Series Filter at all times, until the POWER IS TURNED OFF AND LOCKED OUT.
- Do not attempt to work on, clean or service the CR Series Filter, open or remove any protective cover, guard, grate, connection or maintenance panel until the POWER IS TURNED OFF AND LOCKED OUT.
- During installation and operation, make sure that the motor and the frame of each piece of equipment, including the CR Series Filter, is effectively and separately grounded in accordance with OSHA safety and health standards, the National Electrical Code, local codes and EN ISO 60204-1 as required for the classified area.
- High voltage and rotating electrical equipment can cause serious or fatal injury. Only qualified, trained and experienced personnel should perform installation, operation and maintenance of electrical machinery.
- If the CR Series Filter is equipped with a maintenance panel or access door incorporating a Protective Interlocking Limit Switch (PLS), the PLS must be interlocked with all electrical controls. This is to prevent all motors or powered devices associated with the unit from being energized if any protective cover, guard, grate or maintenance panel is open or removed. The interlock function of the PLS must be tested and logged daily by supervisory personnel.
- CR Series Filters must be equipped with a properly functioning Protective Interlocking Electrical Control Switch (PCS), a Pad-lockable Manual Power Lockout Switch, along with the other basic safety equipment listed above. On-Off, interlock and padlock functions of the PCS must be tested and logged periodically by supervisory personnel.
- Never attempt to manually override or electrically bypass a safety device.
- It is the owner's and the employer's responsibility to adequately train the employee-operator in the proper and safe use of the equipment. Written safety programs and formal instruction are essential. All new employees must be made aware of company policies and operating rules, especially the established safety and health procedures. Refresher training of experienced employees in the potential hazards of the job is important. Up-to-date training records must be maintained at the job site.
- Special attention must be devoted to outside contractors engaged to enter and perform work on equipment or in the workplace. Special care must be exercised to insure all such personnel are fully informed of the potential hazards and follow plant rules – with special emphasis on explosion proof electrical tools and cutting or welding in unsafe environments.
- Keep the workplace cleaned up and free of dirt and dust at all times. Do not attempt to work on slippery or unsafe ladders or work platforms when maintenance or repair work is being performed on the CR Series Filter.
- Do not climb on ladders or work on platforms unless maximum load rating is posted. Do not exceed maximum load ratings when installing or servicing equipment.
- The operator must ensure that adequate lighting conditions are provided at the location of equipment operation.
- Never allow any kind of metal or other foreign objects to enter a CR Series Filter while in operation, unless the system is specifically designed as a wire or metal reclaim system. Examined raw materials should be used through the machine to ensure proper and consistent operation.
- Free outlet of product must be guaranteed at all times. Otherwise, blockage and severe damage may result, or a dangerous situation may occur.
- Drive components must be inspected and adjusted after transportation and periodically as required by operating conditions. Check sprocket, sheave and coupling alignment and spacing, drive belt tension, setscrews, keys, fasteners, bearings, shafts, and motors as appropriate to job conditions.
- Any device powered by air or hydraulic pressure must be equipped with a properly functioning Pad-lockable Manual Pressure lockout and Internal Pressure Relief Valve (PRV).
- Any equipment that is used in the processing of explosive materials in hazardous environments requires an evaluation on the part of the user and operator of proper and adequate monitoring equipment, dust control, explosion relief venting, and electrical equipment enclosures. Do not use your equipment in hazardous environments unless it has been properly equipped for the hazard.
- It is ultimately the operator's responsibility to implement the above listed precautions and insure proper equipment use, maintenance and lubrication. Keep these instructions and list of warnings with your machine at all times.
- It cannot be assumed that every acceptable safety procedure is contained herein or that abnormal or unusual circumstances may not warrant or require future or additional procedures.

WORK SAFELY AT ALL TIMES!!!

4. GENERAL RECEIVING, HANDLING AND INSTALLATION

RECEIVING AND INSPECTION

Kice Industries, Inc., has prepared your new CR Series Filter for shipment in accordance with the Uniform Freight Classification. The CR Series Filter has been thoroughly inspected at the factory and, barring damage in transit, should be in excellent condition upon arrival.

The CR Series Filter and accessories should be inspected upon receipt for any shipping damage. Check for free operation of all moving parts before signing off on the receiver.

When a carrier signs the Kice Industries, Inc., bill of lading, the carrier accepts the responsibility for any subsequent shortages or damage, evident or concealed, and the purchaser must make any claim against the carrier. Evident shortage or damage should be noted on the carrier's delivery document before signature of acceptance. Inspection by the carrier of damage, evident or concealed, must be requested. After inspection, issue a purchase order for necessary parts or arrange for return of the equipment to Kice Industries, Inc., for repair if necessary.

HANDLING AND STORAGE

Kice CR Series Filters may be shipped in any or all of the following configurations:

- Roof section
- Tube sheet and entry section
- Main housing and inlet section
- Hopper with screw conveyor and airlock valve
- Steel support structure (unassembled)
- Inlet Horizontal Separator
- High air inlet
- Air outlet transition
- Access platform and ladder
- Bags and cages
- Rupture panels to fit explosion vents
- Electronic control system (i.e. motor starters, etc.)
- Main fan with motor, drive and guard
- Minor auxiliary items (silencers, pressure gauges, dust monitors, etc.)

Before moving the equipment from the truck, check inside the filter housing for small items such as filter bags, cages and other small components. These items need to be removed before lifting the housing into place.

Locate the supplied Kice CR Series Filter drawing(s) and inventory the components and hardware supplied. Ensure that all of the listed components are present and the hardware meets the required quantities per the drawing.

In most cases, Kice Industries will try to assemble as much of the filter as practical, making it easier for the customer to install. These units may be handled and moved using good rigging techniques, being careful to avoid concentrated stresses that will distort any of the parts. Items or parts of the CR Series Filter that are shipped knocked down will be clearly labeled for reassemble. Refer to the filter assembly drawing for detail information.

GENERAL RECEIVING, HANDLING AND INSTALLATION CONTINUED

If the CR Series Filter is not to be installed promptly, store it in a clean, dry location to prevent rust and corrosion of steel components. If outdoor storage is necessary, protection should be provided. Cover the components to prevent the accumulation of dirt and moisture in the housing. Cover motors with waterproof material. Refer to the motor maintenance information for further storage instructions.



WARNING: Use proper equipment when lifting or moving the CR Series Filter. Make sure all persons and obstructions are clear from path and installation area.

PRE-INSTALLATION

A qualified engineer should design the foundation and/or footings for the CR Series Filter. The filter footpad layout is detailed on the filter approval drawings, which must be approved before manufacturing can begin. The foundation must be capable of supporting the filter, the material that potentially could be contained in the filter housing and hopper, and must also meet all local codes pertaining to wind loads, seismic loads, etc. Anchor bolts properly sized for these loads, or anchor plates to which the support structure footpads can be welded, are acceptable. Hardware for anchoring the filter structure is generally not supplied with the filter and should be procured by the installer. If the unit is to be mounted on or in an existing building, then adequate reinforcement is required.

The foundation/pad must be ready before shipment of the filter to allow adequate time for curing in order that the base may reach maximum strength. This will also permit installation of the equipment at its time of arrival to eliminate storage and double handling of the equipment.



NOTICE: The following instruction are intended to assist the installer with the assembly and erection of their Kice CR Series Filter but should not be considered a step-by-step instruction due to variations in the supplied product. These variations could be due to application, customer specifications, location, orientations, etc. Any questions arising before or during installation should be directed to your Kice sales representative for clarification and recommendations.

INSTALLATION

- To insure proper operation, the CR Series Filter must be adequately supported and properly installed. All ductwork should be supported independently from the filter.
- Move the filter to the installation area using proper equipment (truck, forklift or large crane) depending on the size and type of equipment supplied.
- The CR Series Filter is supported by an I-beam support structure. Structure may ship assembled to the hopper or in pieces depending on filter size and configuration. A-325 structural hardware is supplied and should be used for assembling the support structure. Reference included assembly drawing as required. The structure may have tabs or braces for supporting the ladder or other equipment and attention should be paid to make sure these connection points are properly located in relationship to the rest of the filter. Verify that all fasteners are tight and secure before setting the structure in place.
- The structural support should be anchored to concrete footings designed to support the weight of the equipment and any additional live loads.
- Once the structure is properly anchored, the filter hopper can be set into place. Reference the supplied drawings to determine proper orientation of the hopper. The hopper has eight support feet that should line up with predrilled holes in the support structure I-beams. Use supplied A-325 structural hardware to fasten the hopper to the support structure. Make sure all fasteners are securely tightened before moving to the next step.

GENERAL RECEIVING, HANDLING AND INSTALLATION CONTINUED

- Check the mating surfaces of the filter hopper flange and the filter housing flanges. They should be free of any foreign materials. Place two strips of supplied butyl tape on one of the flanges at each joint (on each side of the bolt holes, see figure) and assemble the filter with the inlet, outlet, and access door in the proper location. Use the supplied hardware as designated on the drawing and make sure to tighten all fasteners securely.



NOTE: The butyl tape may compress over time. After the filter has been completely assembled for four or five days, check and retighten the fasteners as required. Remove excess butyl tape squeezed out of the mating flanges on the inside and outside of the filter.

- Apply strips of butyl tape to the air outlet flange located on the top section of the filter in the same manner as the housing flanges. Use the supplied hardware to fasten the air outlet transition to the top housing. In some cases, it may be easier to attach the air outlet transition to the top section prior to connecting the top section to the rest of the housing.
- On most CR Series Filters, the entry section ships with a platform pre-installed. Typically, two ladders and one rest platform are shipped unassembled. The rest platform is mounted to tabs that are located on the filter housing, structure, or combination of the two. See drawing for orientation. Attach the rest platform and make sure all the hardware is tight.
- Once the rest platform is assembled, the lower ladder can be lifted into place and bolted to the mounting tabs on the rest platform. The mounting tab holes are slotted to allow adjustment for the base of the ladder to sit flush on the pad, use shims as required. Depending on the span of the ladder, there may be support bracing that will attach the ladder to the filter housing or structure. Make sure all of the support braces are connected and secure before using the ladder. Anchor the base of the lower ladder to the pad.
- Next, the upper ladder can be set by bolting its base plate to the rest platform. Then bolt the top ladder tabs to the top platform connected to the entry section. Lastly, attach any additional braces and make sure all of the hardware is tight.



CAUTION: Ladder is not safe to use until all components and braces are properly installed.

- The internal media cleaning manifold is bolted to the housing to limit movement during shipment. The rotating cleaning arm assembly must be released from the shipping mounting bracket prior to start-up. (See figure)



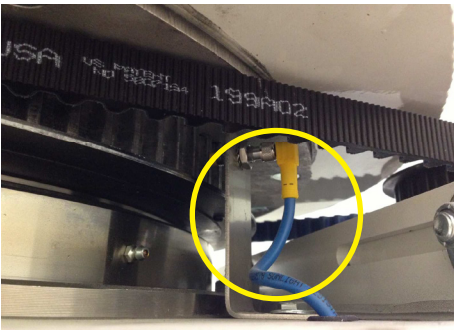
- The internal components of the CR Series Filter are prewired at the factory. A local electrician must run the required power connections to the control box located near the entry door of the filter. Reference the CR Filter Terminal Schematic at the end of this manual for field wiring instructions.



WARNING: High voltage and rotating parts can cause serious or fatal injury. Only qualified personnel should perform installation, operation and maintenance of electrical machinery. Make sure that any motor and the frame of the CR Series Filter are effectively grounded in accordance with OSHA standards, the National Electrical Code (NFPA 70) and local codes.

GENERAL RECEIVING, HANDLING AND INSTALLATION CONTINUED

- Check that the table top bearing speed switch is properly connected and functioning so as to detect when the cleaning mechanism is not rotating. (See figure)
- Connect the supplied pressure differential gauge (Magnehelic gauge) with the high pressure port connected to the dirty air chamber and the low pressure port connected to the clean air chamber using the supplied tubing. Mount the pressure differential gauge in an easily accessible location. When a support structure is included, a tab is normally provided for attaching the differential pressure gauge.
- Some systems will have additional equipment to be connected (such as a level sensor in the filter hopper). Reference drawings and equipment instructions to properly locate and connect these items. Lock out all power sources prior to connecting any sensors, switches, or other equipment.
- Install the filter bags and cages (see Filter Maintenance and Service, Section 6).
- Reattach any doors, covers or guards removed during installation.



INSTALLATION OF AUXILIARY COMPONENTS

• Horizontal Separator (Optional)

Caulk the air outlet flange of the horizontal separator (if supplied) and bolt it to the air inlet flange of the filter. Install the product discharge spout that connects the stock outlet of the horizontal separator to the screw conveyor mounted to the filter hopper. Fasten the supplied structural supports to the Horizontal Separator.

• High Air Inlet (Optional)

Caulk the connecting flange of the high air inlet (if supplied) and bolt it to the air inlet flange of the filter.

• Product Discharge

Several different options exist for the product discharge of the CR Series Filter. Refer to the supplied drawings and schematics for the application. A transition to a screw conveyor and airlock is the most common. Apply caulking between each flange connection and make sure all hardware is properly tightened. Any motors on the discharge equipment must be wired by a local electrician.

• Explosion Vents

GENERAL RECEIVING, HANDLING AND INSTALLATION CONTINUED

If your CR Series Filter includes provisions for mounting explosion panels then the panels themselves will arrive in a wooden crate to avoid damage during shipping and handling. Inspect the panels prior to assembly and notify your Kice salesman if you find any signs of damage or quantity discrepancies. Once the filter is in place and assembled, the explosion panels can be installed. Locate the vent openings on the filter, reference the drawing as needed. The filter will ship with a flange to secure the explosion panel already in place. Remove the flange from the filter. Apply a bead of silicone caulking to the panel mounting plate where the flange was.

Carefully position the explosion panel on the mounting plate with the serial plate facing out. If the panel includes a burst indicator (see image), make sure it is located appropriately for wiring. See included wiring instructions for the burst sensor if supplied. Place the flange over the explosion panel and secure it in place with the included fasteners. The mounting frame may require a combination of weld studs and bolts that are supplied with the filter. Affix the included “Danger” sticker to the rupture panel.



WARNING: Vent area may differ between explosion panel manufacturers. The required vent area should be verified when replacing panels. Contact Kice Industries for explosion vent replacement and information.



5. FILTER OPERATION AND START-UP PROCEDURE

The Kice CR Series Filter is designed especially for the filtering of large volumes of air. Its application has been successfully extended to different industries and materials. The CR Series Filter has proven to be very cost effective because of its unique design, simple operation, ease of maintenance, and ease of installation.

The type of filter media that is selected varies depending on dust characteristics (particle size, moisture or oil content, etc.), air temperature, and the type of application. For example, the filter bags may need to have a singed outer surface for sticky material or the media may have to be changed because of the air temperature.

The dust laden air flows from the dirty air chamber, through the filter bags (depositing the dust on the outer surfaces of the bags), and into the clean air chamber from which the clean air is exhausted through a suction fan into the atmosphere.

The reverse air flow created by the cleaning fan is designed to remove the dust buildup on the outer surfaces of the filter bags. The “dust cake” will normally be knocked off in chunks and fall into the hopper for discharge. Over an extended period of time, the fine dust particles will work their way into the filter media, resulting in an increase in resistance and reduced air flow. The Magnehelic gauge is used to monitor the differential pressure across the bags. As the differential pressure increases, the air volume will decrease. The air volume can be regulated by opening or closing the suction fan damper to increase or decrease the airflow. When the differential pressure rises to 6” w.c., the filter bags will need to be replaced with clean bags. Be sure to replace all of the filter bags at the same time. If only some of the bags are replaced, the clean bags will have greater airflow and this will shorten their lifespan. The dirty bags can be cleaned (recycled) and reused.

The bag cleaning action is accomplished through the use of a rotating swing arm assembly that consists of an air plenum rotating above the filter bags. The plenum swing arm assembly continuously rotates 360 degrees. As the plenum slides over the filter bags the fan mounted inside the clean air chamber

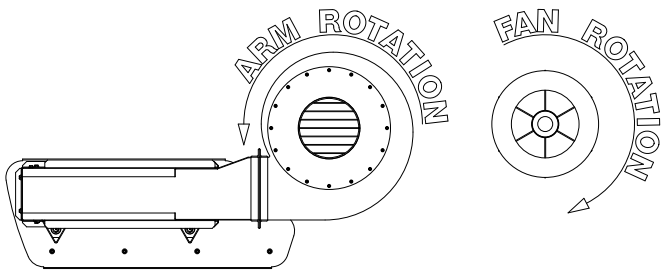
FILTER OPERATION AND START-UP PROCEDURE CONTINUED

continuously supplies air to flush the dust off the outside surface of the filter bags. The dust then falls into the collecting hopper at the bottom of the filter and is discharged through a screw conveyor and airlock valve.

The cleaning system rotates around the center of the filter tube sheet. The speed reducer driving the rotating unit is shipped filled with lubricant. There is virtually no maintenance required for the speed reducer. The drive used to rotate the cleaning manifold is a synchronous belt that does not require any lubrication. The reverse cleaning system was designed to minimize maintenance. The fan is direct driven by either a 20 hp or a 25 hp motor, thus requiring no V-belt drive or additional turning bearings. Air to clean the dust from the filter bags is air from the clean air side of the filter. Therefore, there is no additional air introduced into the system that needs to be filtered or added to the total volume of air exhausted to the suction fan.

STARTUP ITEMS TO CHECK

- Discharge screw or rotary airlock valve (if provided) is turning the proper direction.
- Filter bags are properly installed and the hold-down skid plates are fastened down with no bolt heads protruding that the cleaning arm may catch on.
- The rotating cleaning arm shipping bracket has been removed.
- Rotating cleaning arm is turning the proper direction (see image).
- Cleaning fan is turning the proper direction (see image).
- Suction fan is turning proper direction.
- The access door to the filter clean air chamber utilizes a contact switch to shut down the motors in case the door is opened during operation. Verify this switch is connected and functions properly.
- Make sure all access doors are closed, all guards are in place, and all ductwork is connected prior to turning on the any of the motors associated with the filter or the system it is connected to.



Once proper direction of rotation of the cleaning arm and cleaning fan is checked, allow the cleaning system to run for approximately two minutes (two revolutions of the cleaning arm). Listen for any unusual sounds or any components hitting. A sight glass in the access door to the clean air chamber allows the cleaning arm to be viewed from outside of the filter. Watch the cleaning arm as it travels around and verify that it operates smoothly and doesn't catch or hang up on any protruding or loose items.

6. FILTER MAINTENANCE AND SERVICE

The key to long and trouble-free operation is good maintenance. Periodically inspect the CR Series Filter for damage from foreign materials. Also, service the motors, turntable bearing, and double reduction speed reducer as specified by the manufacturer.



WARNING: Prior to performing any maintenance on the CR Series Filter or any of its components, make sure that all energy sources are disabled and locked-out.

FILTER MEDIA INSTALLATION AND REPLACEMENT

1. Locate the filter bags and cages. Before entering through the access door, the electrical power to the cleaning fan, speed reducer motor and the suction fan **MUST** be disconnected and locked out. Perform an OSHA approved lockout/tagout procedure on these and any other energy sources associated with the filter.
2. Open the access door and swing it fully open.
3. The cleaning mechanism synchronous belt can be disengaged to allow the cleaning arm to be more easily moved manually.
4. The tube sheet is divided into 90 degree quadrants with two or more hold-down skid plates per quadrant. To install or replace the filter media, the hold-down skid plates must be removed. The skid plate screws are captive to the cover, so do not thread the screw out of its retainer. After a skid plate has been removed, lift the filter cages out of the dirty media and store to one side. The design of the clean air chamber allows ample room to remove the cages without any interference. It is important that only one skid plate be removed at a time, thus permitting the removal and replacement of the bags and cages underneath, and that the skid plate be replaced before moving to the next skid plate. This will insure that the skid plates are reinstalled in their original position. It will also limit contamination of the clean air chamber by dust in the dirty air chamber below.
5. Remove the dirty filter bags by squeezing the filter bag spring clip top together and pushing the bag through the tube sheet hole into the dirty air chamber. The bag will fall into the hopper to be retrieved after all the bags have been changed. As the dirty bags are removed from the filter hopper, it is a good idea to tie the bags in bundles of 10 in order to keep track of all of the bags and not leave one or two in the hopper.



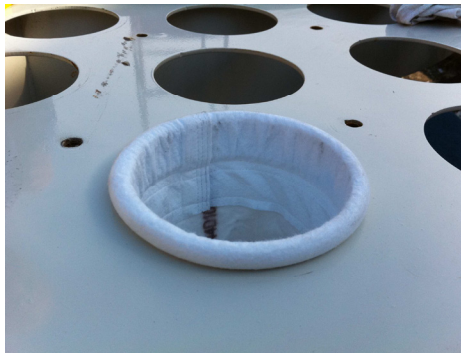
NOTE: Pulling the dirty bags up into the clean air chamber will cause contamination and allow dust to be exhausted into the atmosphere upon start-up.

FILTER MAINTENANCE AND SERVICE CONTINUED

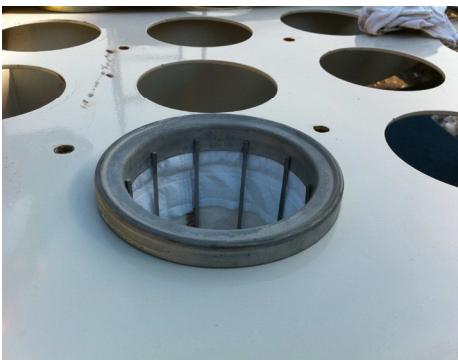
6. Install a clean bag into the tube sheet hole in place of the dirt bag just removed. Compress the top ring of the filter bag to allow it to snap in place. Make sure the groove around the top collar of the filter bag is located in the tube sheet as shown in the following figures. Slide the cage down through the bag until the top of the cage rests against the tube sheet, locking the bag into the tube sheet. With the bags and cages installed, reinstall the skid plate and torque each skid plate screw to 30 ft-lbs. Carefully inspect the reinstallation to insure that no skid plate screws are protruding above the surface of the skid plate. Then move to the next section to be replaced. Repeat this procedure until all the bags are replaced.



1. Clean bag in tube sheet



2. Bag installed



3. Cage inserted



4. Tubesheet cover

7. Rotate the bag cleaning manifold manually after bag installation to check for manifold obstructions.
8. Bags with static grounding strips must be grounded to the filter tube sheet. The ground wire is normally positioned in the area close to the seam of the bag. The wire must be sandwiched between the media and the tube sheet hole. The edge of the tube sheet hole should be free of dust and corrosion in order to effectively conduct the static charge to the ground.
9. If the synchronous belt was disengaged then it must be reengaged and tensioned prior to operation. Check that all tools are collected and all fasteners are tight before exiting the filter.

SCHEDULED MAINTENANCE

Daily

1. Check and note the pressure drop across the filter media (under normal operating conditions, the pressure drop should range from approximately 3” w.c to 6” w.c.)
2. Check the amperage on each motor and watch for any variations that could indicate a change in performance or a problem.

FILTER MAINTENANCE AND SERVICE CONTINUED

Monthly

1. Check the cleaning manifold and verify proper operation.
2. Check the drives, including the timing belt drive from the speed reducer for damage or excessive wear.
3. Check the fan motor and turntable bearings in the clean air chamber for proper operation. Add grease as recommended by the motor and bearing manufacturers.
4. Check the general suction fan, motor and bearings for proper operation. Add grease as recommended by the motor and bearing manufacturers.
5. If the filter is equipped with explosion vents, inspect the panels to verify that they are in good operating condition.

Yearly

1. Check the grease in the speed reducer.
2. Inspect the cleaning manifold UHMW skid plate for wear, and replace as necessary.
3. Inspect the turntable bearing for wear, and replace as necessary.

7. TROUBLESHOOTING

Filter discharging dust from the clean air chamber

- Check for holes in the filter media.
- Check the filter bag installation (reference Filter Maintenance and Service section).

Pressure drop starts to increase

- Check that the cleaning mechanism is functioning properly.
- Check that the volume of air being supplied to the filter has not increased.
- Over time, dust will penetrate into the filter media and reduce the effectiveness of the cleaning system. Eventually, the bags will need to be replaced.

Dust escaping from dust control points in the process

- Check the dust control system; make sure the fan is operating.
- Check the dust conveying system; make sure the fan is on.
- Check the hopper for material bridging.
- Check the pressure drop across the filter bags and verify the cleaning system is operating.

Product does not discharge from filter hopper

- Check the hopper for material bridging.
- Check that the pneumatic conveying system from the filter discharge is operating.
- Check the direction of rotation of the airlock and/or screw conveyor.

A thorough understanding of the system is a must if the operating problems are to be corrected satisfactorily. A good rule to follow when troubleshooting a problem is to never make more than one adjustment at a time, thereby isolating the problem by a process of elimination. The cause of a problem is usually simple and is easy to pinpoint if you systematically check each system and function.

REPLACEMENT PARTS

It is recommended that only Kice supplied replacement parts be used. Kice CR Series Filter parts are built to be fully compatible with the original filter, using specific alloys and tolerances. These parts carry a standard Kice warranty.

When ordering replacement parts, specify the part name, the Kice filter serial number and the filter model. Most of this information is on the metal nameplate attached to the filter housing next to the access door.



WARNING: Vent area may differ between explosion panel manufacturers. The required vent area should be verified when replacing panels. Contact Kice Industries for explosion vent replacement and information.

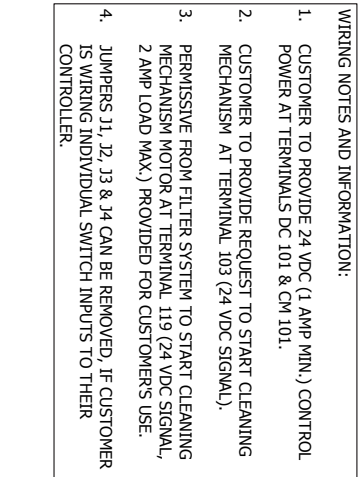
8. TORQUE VALUES FOR MAINTENANCE AND INSTALLATION

Recommended U.S. BOLT TORQUE Coarse thread only							
		SAE Grade 5	SAE Grade 5	SAE Grade 8	SAE Grade 8	Socket head cap screw	Socket head cap screw
Bolt Dia.	Thread Size	lb - ft	N - m	lb - ft	N - m	lb - ft	N - m
1/4	20	8.4	11	12	16	11	15
5/16	18	17	24	25	33	23	31
3/8	16	31	42	44	59	41	55
7/16	14	49	67	70	95	65	89
1/2	13	74	100	110	140	100	140
9/16	12	100	140	150	210	140	200
5/8	11	140	190	210	290	200	270
3/4	10	240	330	380	510	350	480
7/8	9	390	520	610	820	570	770
1	8	570	780	910	1100	850	1200
1-1/8	7	790	1100	1300	1700		
1-1/4	7	1100	1500	1800	2500		
1-3/8	6	1500	2000	2400	3200		
1-1/2	6	1900	2600	3200	4300		
1-5/8	5.5	2400	3300	4300	5900		
1-3/4	5	3000	4100	5000	6800		
2	4.5	4500	6100	7500	10000		

9. ILLUSTRATED PARTS LIST

1. REVERSE FLOW CLEANING ASSEMBLY.....20

2. WIRING DIAGRAM.....21



1883

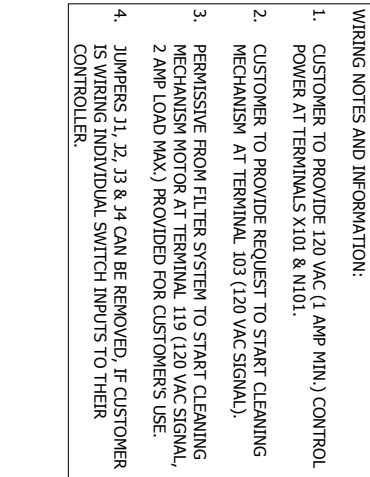
CR FILTER ENCLOSURE
(CRWIREKT)

CUSTOMER NAME & LOCATION	KICE INDUSTRIES, INC. PARK CITY, KS
SITE NAME & LOCATION	KICE INDUSTRIES, INC. PARK CITY, KS

START	LAST REV.
12/15/06	2020-4-7 BGH
SCALE	PLOT SCALE
NOT TO SCALE	1
APPROVED BY	DRAWN BY
SA	JWS
SALES ORDER NO.	
STANDARDS	

DWG TITLE 24V CONTROL WIRING SCHEMATIC	DWG NO C-1B
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FINAL - 06/05/20



WORK TIME

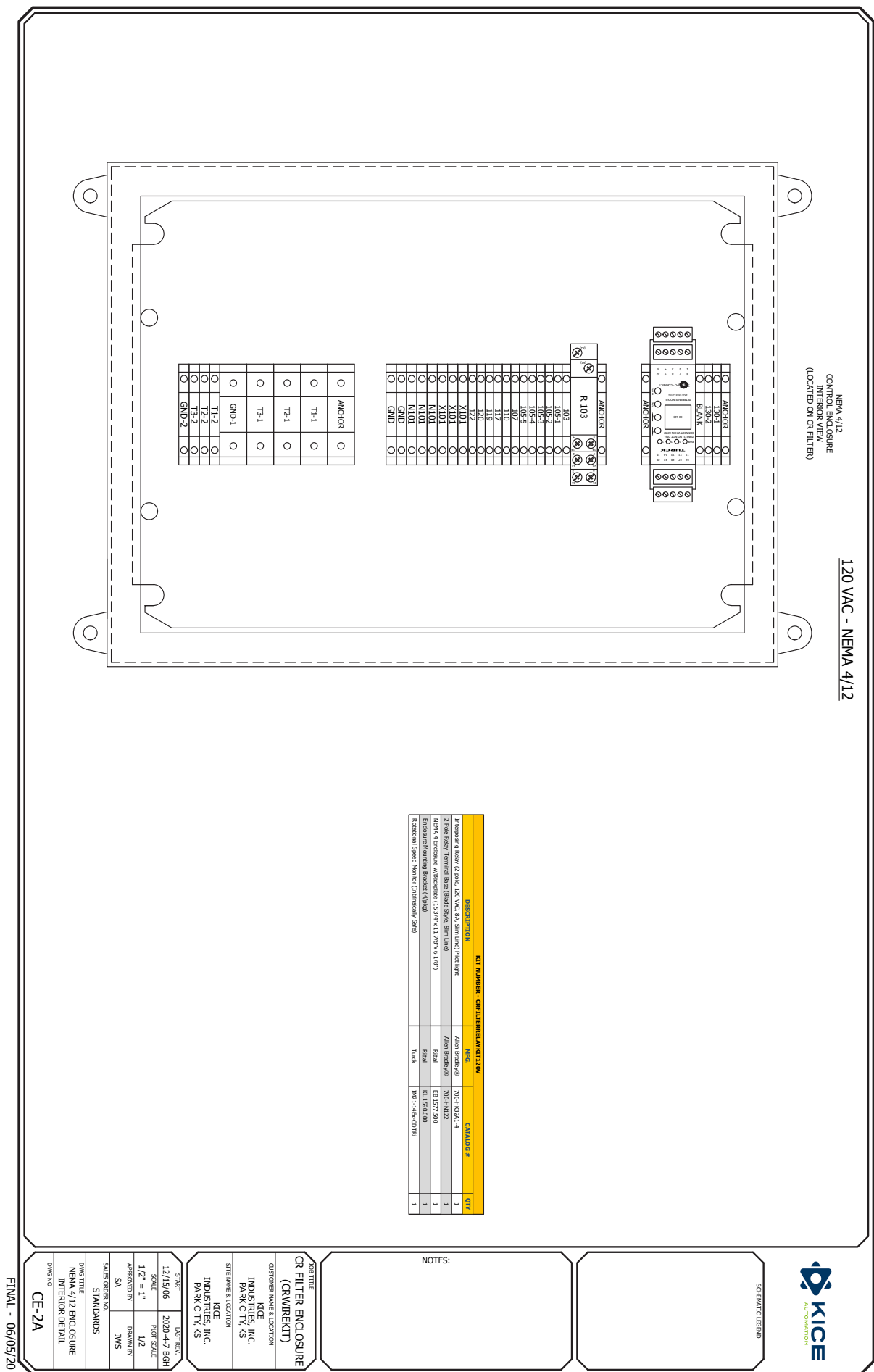
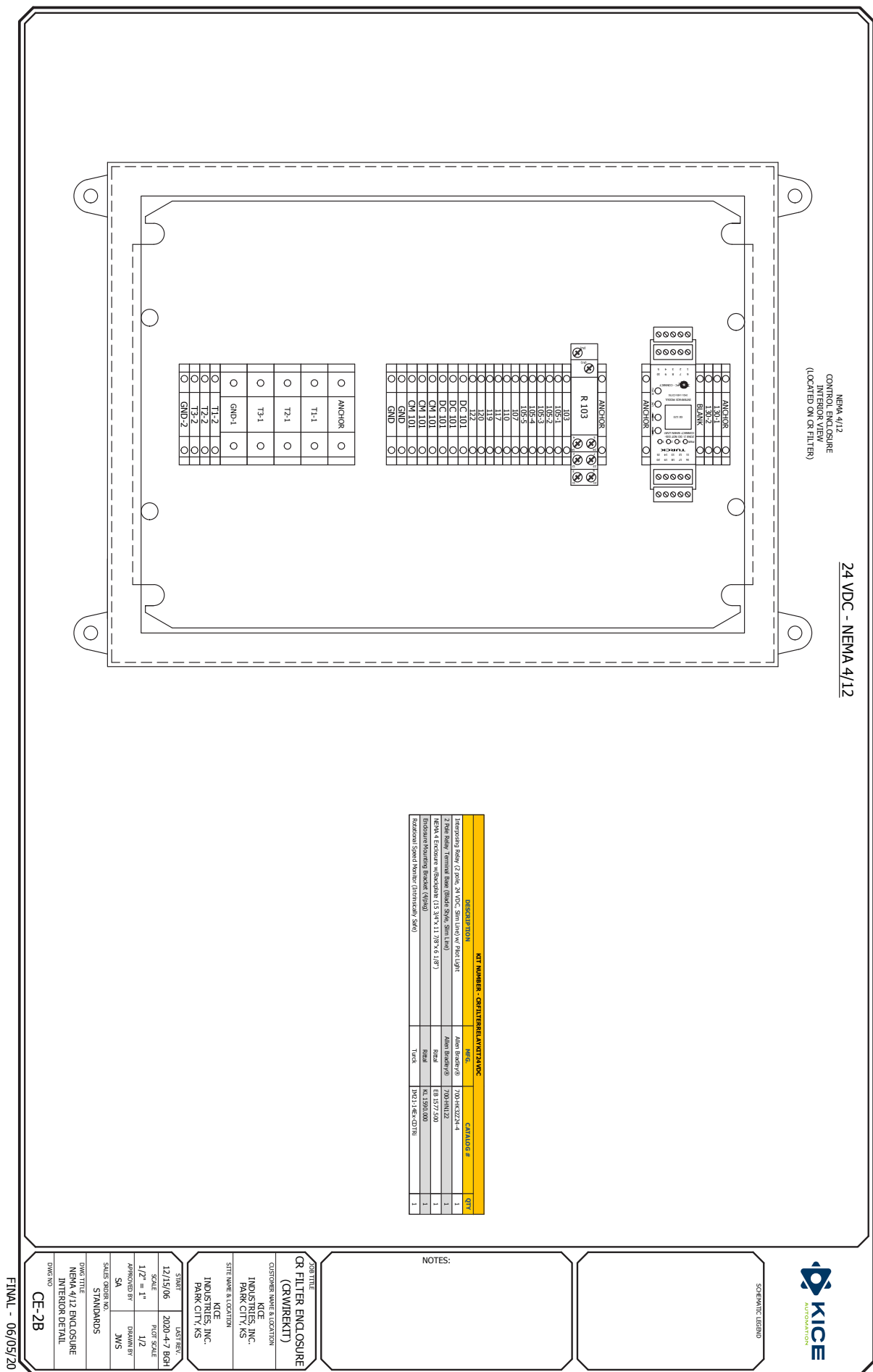
CR-FILTER ENCLOSURE
(CRWIREKIT)

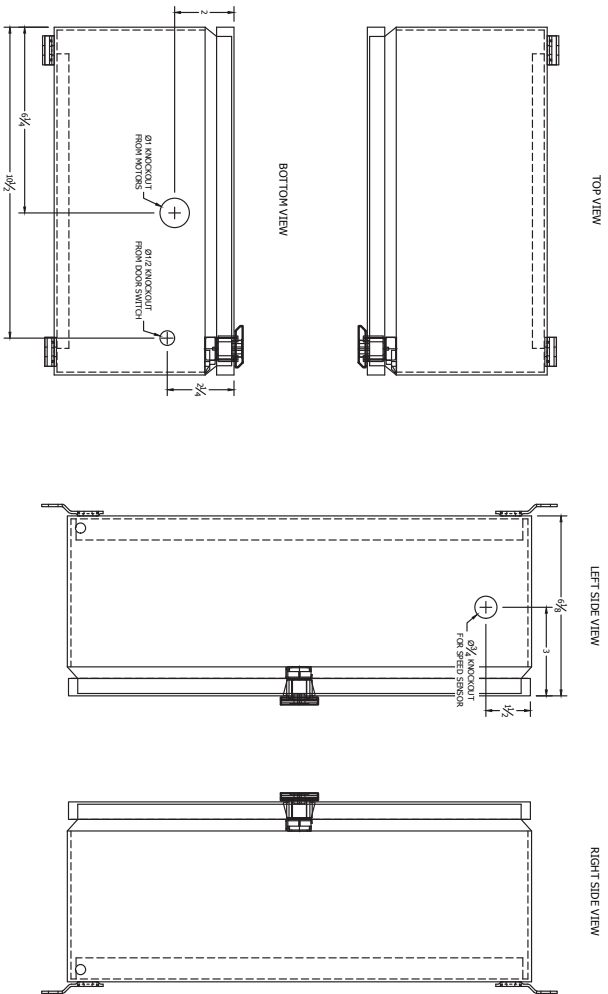
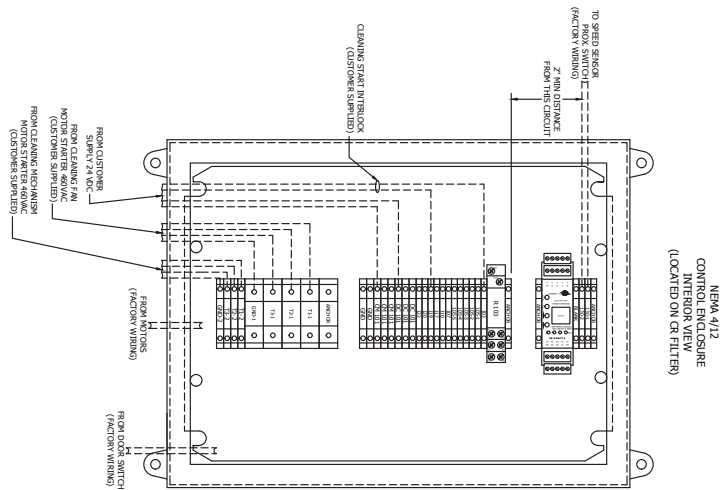
<p>KICE INDUSTRIES, INC. PARK CITY, KS</p>	<p>SITE NAME & LOCATION</p>
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NOT TO SCALE	1
APPROVED BY	DRAWN BY
SA	JWS
SALES ORDER NO.	

STANDARDS	DWG TITLE 120V CONTROL WIRING SCHEMATIC	DWG NO C-1A
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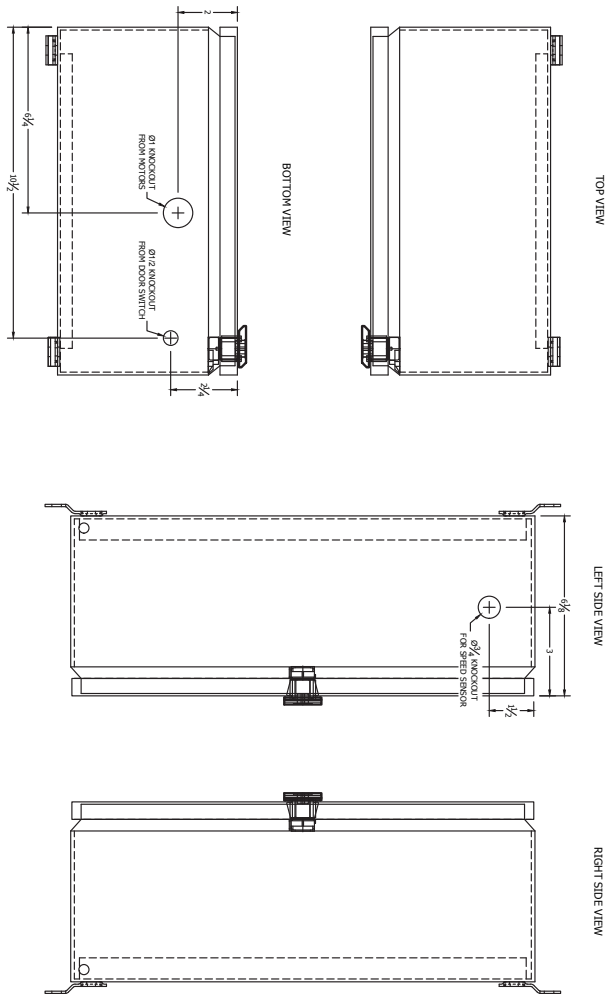
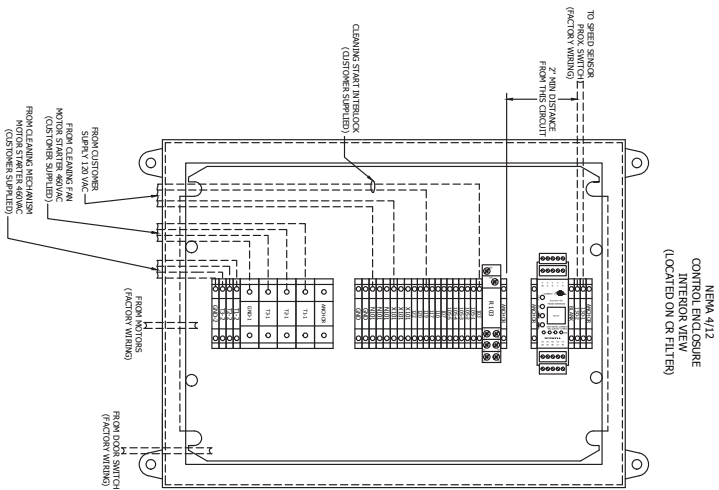
FINAL - 06/05/20





SCHEMATIC LEGEND	
NOTES:	
JOB TITLE OR FILTER ENCLOSURE (C/W/REKIT)	
CUSTOMER NAME & LOCATION KICE INDUSTRIES, INC. PARK CITY, KS	
SITE NAME & LOCATION KICE INDUSTRIES, INC. PARK CITY, KS	
START DATE 12/15/06	LAST REV. 2020-4-7 BQH
SCALE 1 1/4" = 1"	PLOT SCALE 1/4"
APPROVED BY SA	DRAWN BY JMS
STANDARDS	
DWG. TITLE NEMA 4/12 ENCLOSURE CONDUIT ENTRY DETAIL	
DWG. NO. CE-3B	

FINAL - 06/05/20

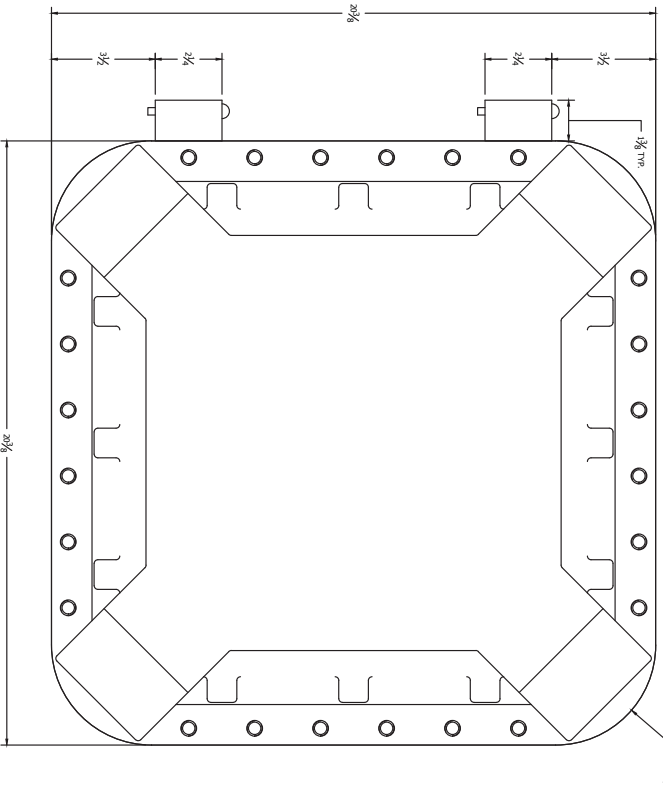


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NOTES:	
JOB TITLE OR FILTER ENCLOSURE (C/W/REKIT)	
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SITE NAME & LOCATION KICE INDUSTRIES, INC. PARK CITY, KS	
START DATE 12/15/06	LAST REV. 2020-4-7 BQH
SCALE 1 1/4" = 1"	PLOT SCALE 1/4"
APPROVED BY SA	DRAWN BY JMS
STANDARDS	
DWG. TITLE NEMA 4/12 ENCLOSURE CONDUIT ENTRY DETAIL	
DWG. NO. CE-3A	

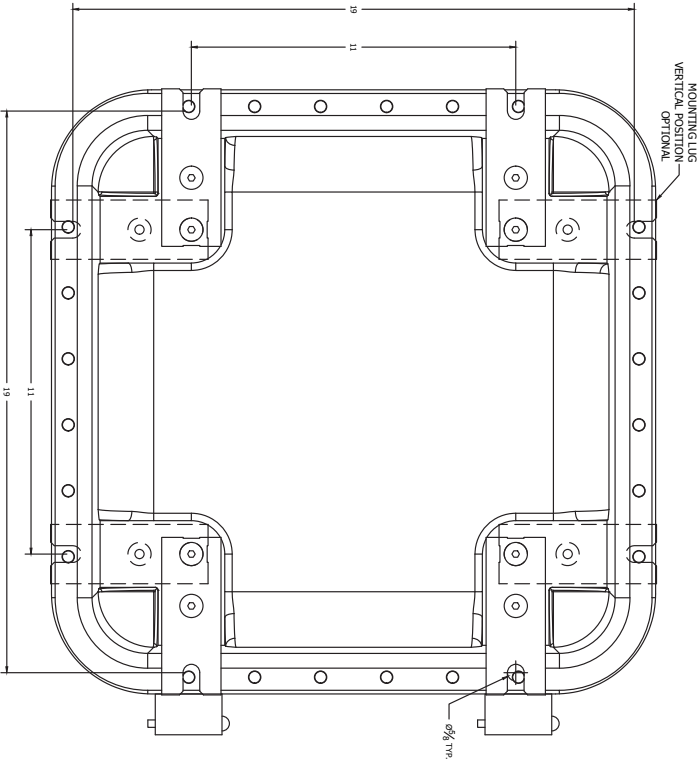
FINAL - 06/05/20



NEMA 7/9
CONTROL ENCLOSURE
EXTERIOR FRONT VIEW
(LOCATED ON CR FILTER)



EXTERIOR BACK VIEW



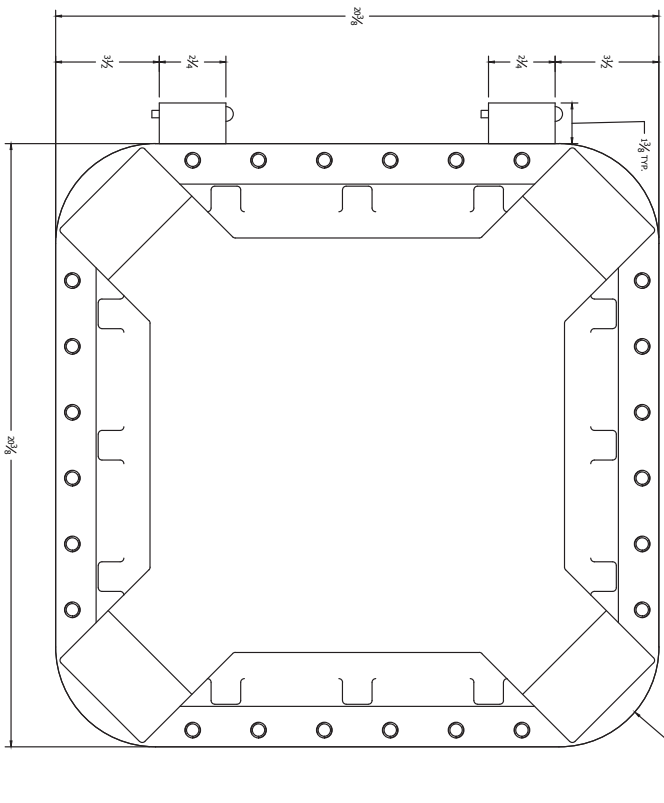
KIT NUMBER - CR-FILTER-14V24VDC			
DESCRIPTION	REF.	CATALOG #	QTY
Thermoplastic Body (2 pole, 24 VDC, 5mm Line) w/ Peak Light	After Backing	700-HC22A-4	1
2 Pole Body Terminal Block (Black 5mm, 5mm Line)	After Backing	700-HN122	1
2 Pole Body Terminal Block (Black 5mm, 5mm Line)	After Backing	700-HN122	1
NEMA 7/9 Enclosure w/ Backing (10" x 10" x 8")	Blank	100-10-08-014	1
Industrial Speed Motor (1/2HP, 1/2" x 8")	Blank	100-10-08-014	1

PROJECT TITLE	CR FILTER ENCLOSURE (CR/FILTER)
CUSTOMER NAME & LOCATION	KICE INDUSTRIES, INC. PARK CITY, KS
SITE NAME & LOCATION	KICE INDUSTRIES, INC. PARK CITY, KS
DATE	2/6/08
SCALE	AS SHOWN
APPROVED BY	SA
DRAWN BY	MAF
CHECKED BY	STANISLAW
DATE	2/6/08
PROJECT TITLE	NEMA 7/9 ENCLOSURE EXTERIOR DETAIL
DWG NO.	CE-4B

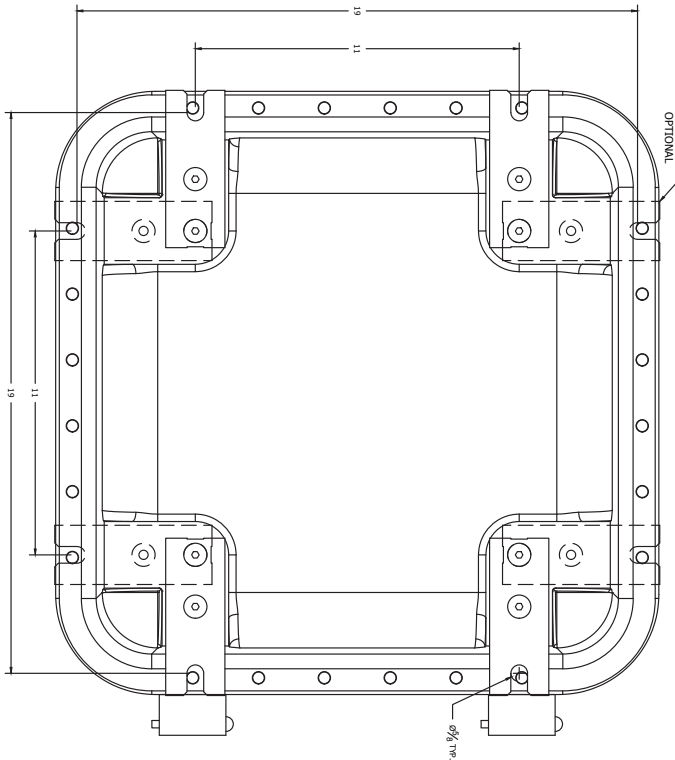
FINAL - 06/05/20



NEMA 7/9
CONTROL ENCLOSURE
EXTERIOR FRONT VIEW
(LOCATED ON CR FILTER)



EXTERIOR BACK VIEW

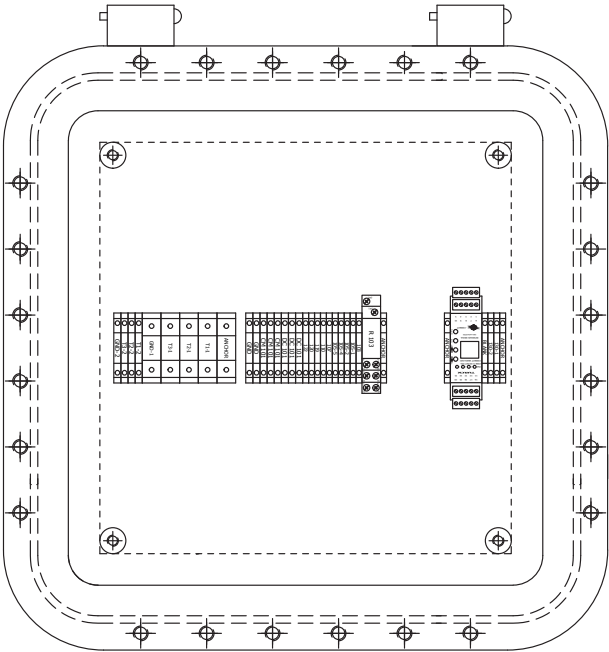


KIT NUMBER - CR-FILTER-14V24VDC			
DESCRIPTION	REF.	CATALOG #	QTY
Thermoplastic Body (2 pole, 120 VAC, 5mm Line) w/ Peak Light	After Backing	700-HC22A-4	1
2 Pole Body Terminal Block (Black 5mm, 5mm Line)	After Backing	700-HN122	1
2 Pole Body Terminal Block (Black 5mm, 5mm Line)	After Backing	700-HN122	1
NEMA 7/9 Enclosure w/ Backing (10" x 10" x 8")	Blank	100-10-08-014	1
Industrial Speed Motor (1/2HP, 1/2" x 8")	Blank	100-10-08-014	1

PROJECT TITLE	CR FILTER ENCLOSURE (CR/FILTER)
CUSTOMER NAME & LOCATION	KICE INDUSTRIES, INC. PARK CITY, KS
SITE NAME & LOCATION	KICE INDUSTRIES, INC. PARK CITY, KS
DATE	2/6/08
SCALE	AS SHOWN
APPROVED BY	SA
DRAWN BY	MAF
CHECKED BY	STANISLAW
DATE	2/6/08
PROJECT TITLE	NEMA 7/9 ENCLOSURE EXTERIOR DETAIL
DWG NO.	CE-4A

FINAL - 06/05/20

NEMA 7/9
CONTROL ENCLOSURE
INTERIOR VIEW
(LOCATED ON CR FILTER)



KIT NUMBER - CR FILTER/AVT/24VDC			
DESCRIPTION	REF.	CATALOG #	QTY
Interposing Relay (2 pole, 24 VDC, 500 mA) w/ Red Light	Relay B00470	700-HC24-4	1
2 Pole Relay Terminal Block (Red Style, 500 mA)	Relay TB0	700-HC24-4	1
NEMA 7/9 Enclosure w/Accessories (24" x 8" x 8")	Trunk	700-1008-034	1
Industrial Speed Motor (ultimately S&B)		700-1008-034	1

SCHEMATIC LEGEND

NOTES:

JOB TITLE
CR FILTER ENCLOSURE
(CRW/REKT)

CUSTOMER NAME & LOCATION
KICE INDUSTRIES, INC.
PARK CITY, KS

SITE NAME & LOCATION
KICE INDUSTRIES, INC.
PARK CITY, KS

START
2/6/08

LAST REV.
2020-4-7-BG4

SCALE
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NOT SCALE
1/4"

APPROVED BY
SA

DRAWN BY
MAF

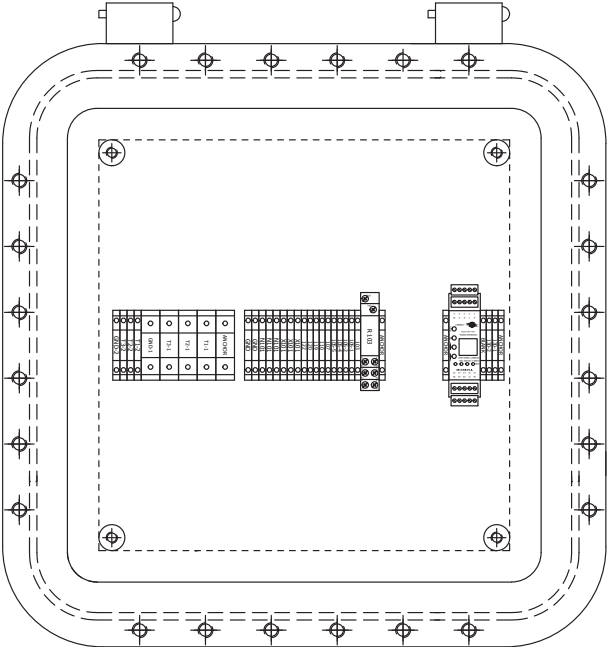
SHEET ORDER NO.
STANDARDS

DWG TITLE
NEMA 7/9 ENCLOSURE
INTERIOR DETAIL

DWG NO.
CE-5B

FINAL - 06/05/20

NEMA 7/9
CONTROL ENCLOSURE
INTERIOR VIEW
(LOCATED ON CR FILTER)



KIT NUMBER - CR FILTER/AVT/120V			
DESCRIPTION	REF.	CATALOG #	QTY
Interposing Relay (2 pole, 120 VAC, 500 mA) w/ Red Light	Relay B00470	700-HC24-4	1
2 Pole Relay Terminal Block (Red Style, 500 mA)	Relay TB0	700-HC24-4	1
NEMA 7/9 Enclosure w/Accessories (24" x 8" x 8")	Trunk	700-1008-034	1
Industrial Speed Motor (ultimately S&B)		700-1008-034	1

SCHEMATIC LEGEND

NOTES:

JOB TITLE
CR FILTER ENCLOSURE
(CRW/REKT)

CUSTOMER NAME & LOCATION
KICE INDUSTRIES, INC.
PARK CITY, KS

SITE NAME & LOCATION
KICE INDUSTRIES, INC.
PARK CITY, KS

START
2/6/08

LAST REV.
2020-4-7-BG4

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APPROVED BY
SA

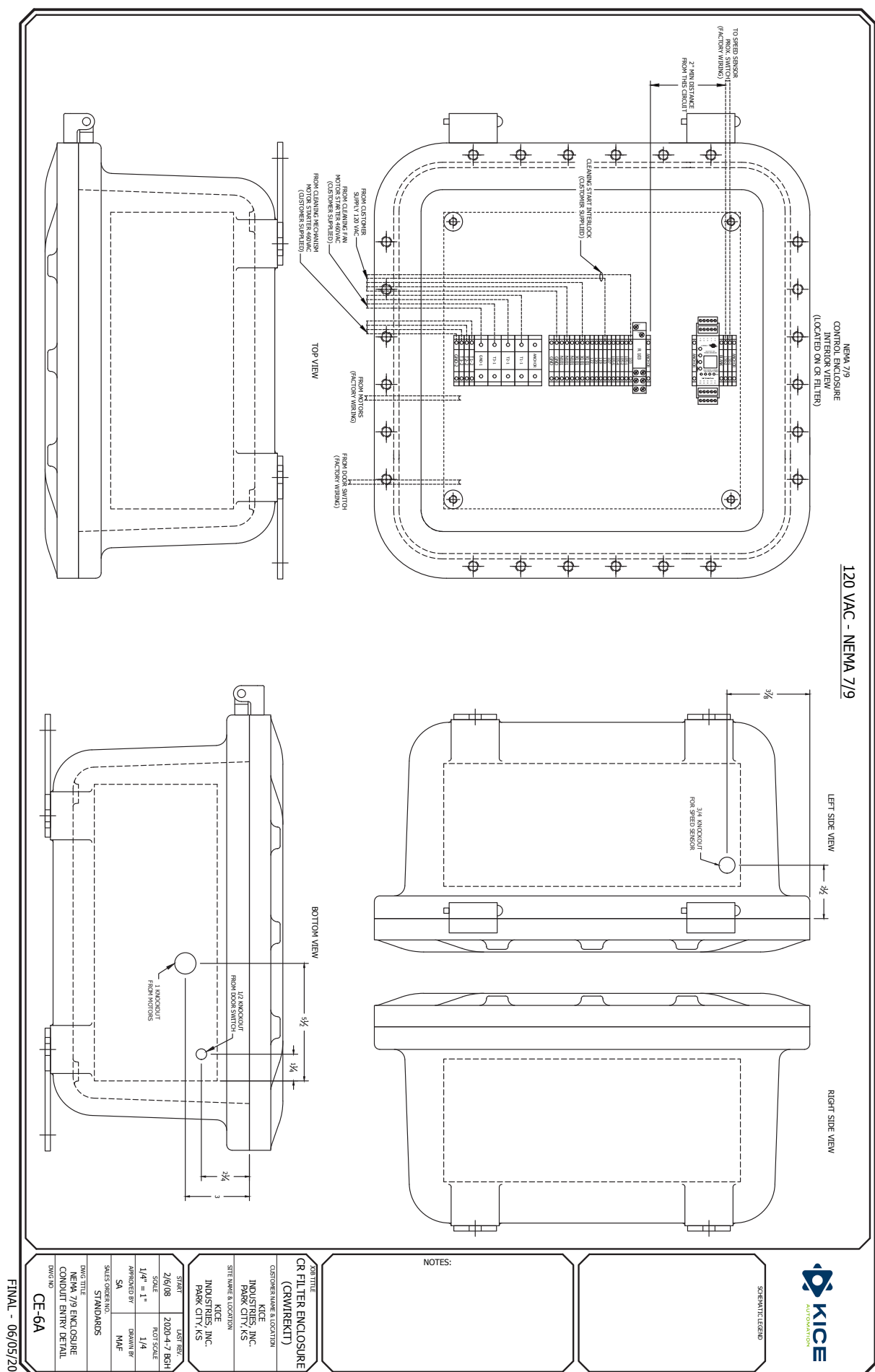
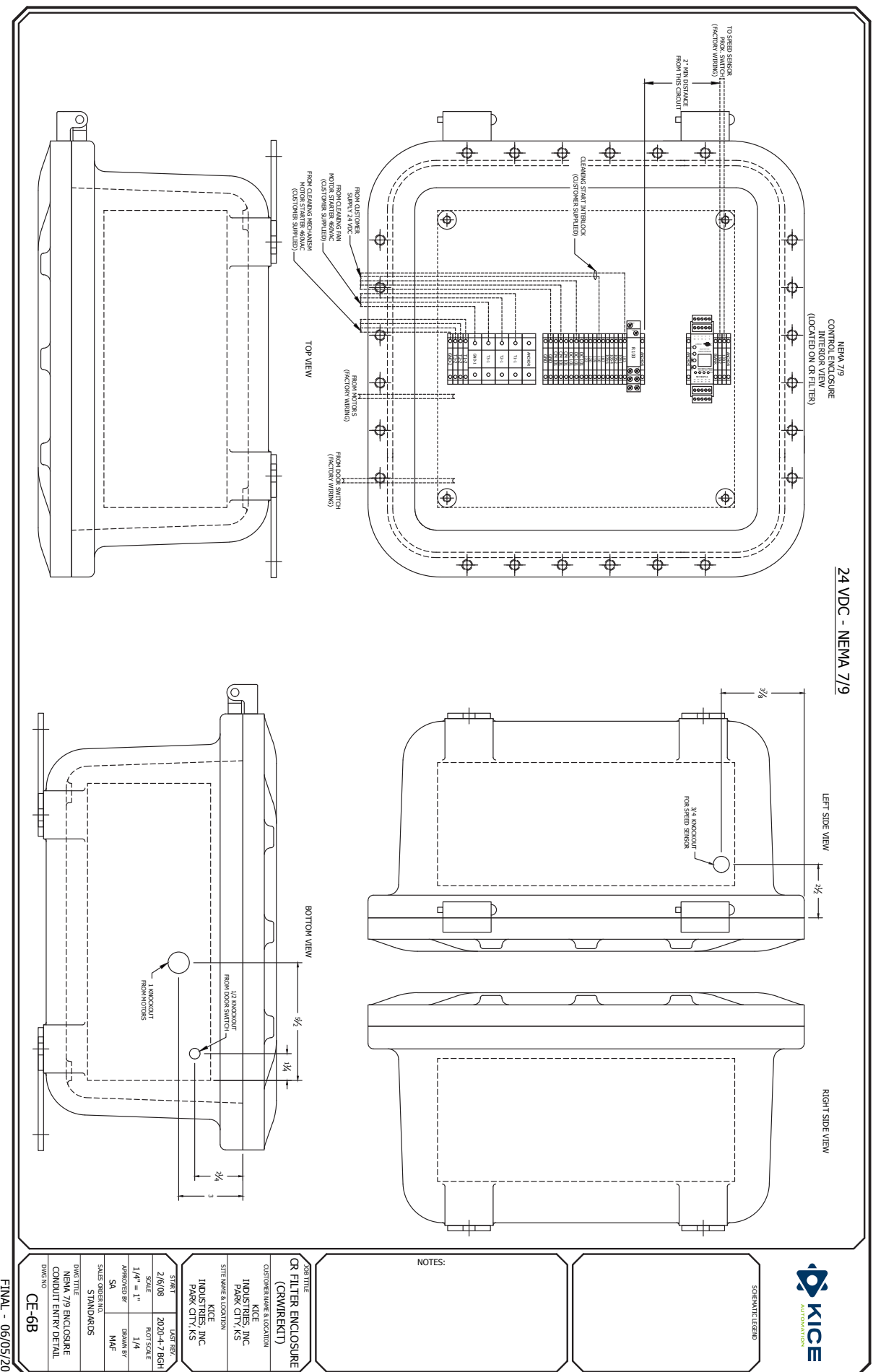
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MAF

SHEET ORDER NO.
STANDARDS

DWG TITLE
NEMA 7/9 ENCLOSURE
INTERIOR DETAIL

DWG NO.
CE-5A

FINAL - 06/05/20



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