

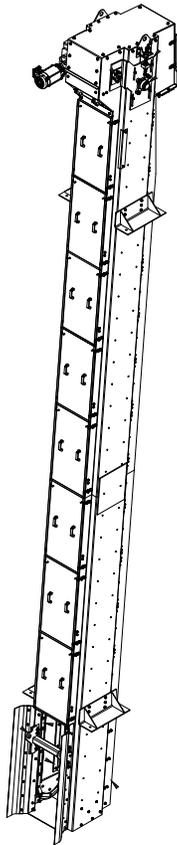


MCR024-080
JWCE#112819



OPERATION AND MAINTENANCE INSTRUCTIONS CHAIN AND RAKE WITH CONTROL PANEL

OGALLALA WWTP



Released November 2017

SOLD TO
Ogallala WWTP
411 E, 2nd Street
Ogallala, NE 69153

LOCAL REPRESENTATIVE:
Electric Pump
4280 E 14th Street
Des Moines, IA 50313
Ph: (515) 265-2222

OEM / CUSTOMER SERVICE CENTER:
JWC Environmental
2600 South Garnsey Street
Santa Ana, CA 92707
Ph: (800) 331-2277
Local: (949) 833-3888

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CUSTOMER ID		CUSTOMER P.O.		PAYMENT TERMS		FREIGHT TERMS	
6015322		LOI		95% Net 30 Days, 5% NTE 90 Days		Freight prepaid	
SALES REP ID		SHIPPING METHOD		F.O.B.		SHIP DATE	
Electric Pump		Bestway		Origin		12/11/2017	
QUANTITY							T
LI #	ORD	SHP	LOT	PART ID	DESCRIPTION		X

Trucker to contact Taylor Musselman
 308-289-2989_24 Hours Prior to shipping
 Days and Hours of Delivery Mon-Fri 7-5.

1 1 0 1 CRM
 CHAIN AND RAKE MONSTER
 Delivery by 12/31/2024
 SYSTEM FOR: 24in CHANNEL WIDTH, 60in CHANNEL DEPTH, WITH SECOND FLOOR HEIGHT OF 136in AND SINGLE SPLICE PLATE SET, 54in DISCHARGE HEIGHT, 1/4in BAR SPACING, TAPERED BARS 48" HIGH, FOR 80DEG INCLINATION, 3/16in SIDE FRAMES, 15HP BALDOR MOTOR CEM7034T, NORD SK42125-AZH-140TC (495.85:1), 2.75in BORE GEARBOX SN: 112819-1-1 JOB NAME: OGALLALA, NE DWG# MCR024-080-GA-112819 REV B DWG# MCR024-080-A-112819 REV A

PART TO BE DROP SHIPPED FROM SUPPLIER
 SN: 112819-1-1

2 1 0 2 PC2530
 PC2530-112819
 Ship Date 12/11/2017
 DWG# PC2530-112819-A
 1.5 HP Screen Motor
 460V / 3 Phase / 60 Hz
 Circuit Breaker with Rotary Handle
 Branch Motor Circuit Protection
 Islatrol IE Series Surge Suppressor
 Allen Bradley MicroLogix 1400 PLC
 Red Lion G07S Series OIT
 Siemens Unmanaged Ethernet Switch
 Allen Bradley IEC Starters
 Allen Bradley 22mm Pilot Devices
 Idec Relays with Indicator
 Emergency Stop Pushbutton
 One Set of Spare Fuses
 NEMA 4X 304SST Enclosure (48X36X12)
 Program# PC2530-112819

SN: 112819-2-1

3 2 0 SUBMITTALS
 Standard Submittals
 Ship Date 12/11/2017
 For approval:

(1) PDF to doug.flores@ogallala-ne.gov
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Electric Pump			Bestway			Origin		12/11/2017
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LI #	ORD	SHP	LOT	PART ID	DESCRIPTION		X	

4	2	0		MANUALS	O&M MANUALS HARD COPY Ship Date 12/11/2017 Electronic copy only: (1) PDF to doug.flores@ogallala-ne.gov (1) PDF to Rep.		
5	1	0		FSU	Factory Start Up Ship Date 12/11/2017		
6	1	0		Shipping	Shipping & Handling Ship Date 12/11/2017		
7	1	0		MSC0011-42125-495.85-2.75	GEARBOX, HELICAL-W NORD 2.75 Delivery by 12/31/2024 NORD HELICAL-WORM SHAFT MOUNTED GEARBOX 495.85:1 RATIO 2.750 BORE 140TC FRAME NORD BASE# SK42125AZ BH-140TC ECO# MS-0007		
8	190	0		MCC0140-MCR-174	ROLLER CHAIN, 6in PITCH LINK MC Delivery by 12/31/2024 6" PITCH ROLLER CHAIN LINK FOR MCR, WITH 316SST LINKS, 17-4SST PINS, ROLLERS, AND BUSHINGS, 0.5 FEET DWG# MCC0140-MCR-174 REV A ECO# CR-0008 (20 links per strand, including 1 hollow connector link at one end) ** 10 Strands x 19 Links **		
9	10	0		MCC0141-MCR-174	CHAIN, 6in PITCH LINK CONN MCR Delivery by 12/31/2024 6" PITCH CHAIN LINK CONNECTING FOR MCR, WITH 316SST LINK PLATES, 17-4SST HOLLOW PINS, ROLLERS, AND 303SST SNAP RINGS. DWG# MCC0141-MCR-174 REV A		



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6015322	LOI	95% Net 30 Days, 5% NTE 90 Days	Freight prepaid
SALES REP ID	SHIPPING METHOD	F.O.B.	SHIP DATE
Electric Pump	Bestway	Origin	12/11/2017
QUANTITY			T
LI #	ORD	SHIP	LOT
PART ID	DESCRIPTION		X

10	1	0	E15-022-008	LEVEL PROBE, 4-20mA, M12, FM IS Delivery by 12/11/2017 LEVEL PROBE, 2-WIRE LOOP POWERED, INSTRINSICALLY-SAFE FOR CLASS 1, DIV1, 4-20mA HART OUTPUT, NEMA 6P RATING, 4-LINE DISPLAY, 16FT RANGE WITH EUROFAST M12 4-PIN MALE RECEPTACLE ENDRESS+HAUSER# FMU40-SNB2A9 CORD CONNECTOR WIRED PER SCHEMA TSP 71175945
11	1	0	E15-011-271	CORDSET, M12, 4-PIN, 3-WIRE, 20 Delivery by 12/11/2017 CORDSET WITH EUROFAST M12, 4-PIN STRAIGHT FEMALE PLUG BODY AND 20M (66FT) GREY PVC-COATED 3-20 AWG FLEXLIFE CORD, NEMA 6P TURCK P/N: RK4T-20 ALLEN-BRADLEY P/N: 889D-F4AC-20, OR EQUAL
12	1	0	MSC1053-001-SU	SUPPORT, TRANSDUCER 1.5in NP Delivery by 12/11/2017 IN-CHANNEL ULTRASONIC TRANSDUCER SUPPORT, FLAT PLATE STYLE, WITH 1-1/2" NPT HALF COUPLING, USED WITH MODEL EH-FMU40 TRANSDUCER, 316SST DWG# MSC1053 REV B ECO# MS-0008

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SECTION 1 INTRODUCTION AND SAFETY

The JWC Environmental (JWCE) chain and rake system captures and removes plant screenings from the wastewater plant influent.

The chain and rake rotating comb carriers capture and transports solids captured by the bar screen up and out of the channel. The carriers are connected to a chain assembly rotated by the chain and rake electric drive motor. A scraper assembly removes the captured solids which exit through a discharge chute.

An ultrasonic level sensor with a weather protection hood measure the height of the influent upstream of the chain and rake.

The control panel provides controls, indicators, touch screen and control logic for manual or automatic operation and protection of the chain and rake system motors and components.

The chain and rake is delivered fully assembled. The two halves may have to be disassembled to move the equipment into place and later reassembled. Refer to the instructions in Appendix A if required.

Interconnecting wires and cables are provided and installed by others unless otherwise noted. Refer to the control panel drawing in Section 7 for wire sizes.

Refer to Table 1-1 for chain and rake system specifications, Table 1-2 for materials used and to the drawings in Section 7 for dimensions, parts lists and component location.

1.1 SYSTEM DESCRIPTION

Influent with suspended screenings enter the bottom of the channel mounted mechanical chain and rake.

Large screenings are trapped by the chain and rake assembly, smaller particles and screened wastewater continue through the channel. A bottom plate, mounted in the channel, and intakes keeps screenings from bypassing the chain and rake.

The chain and rake comb carriers are connected to two chain assemblies (one on each side) which are connected by sprockets on a common drive shaft driven by an electric motor with a speed reducer. The carriers rotate in either low (normal) or high speed (high alarm level) in a loop across the front of the barscreen, up through the top of the assembly and back down into the channel.

Chain tension is monitored by the proximity sensor which detects excessive movement by the chain and rake drive. The control panel shuts down the chain and rake motor to prevent damage if the chain tension becomes excessive.

The scraper assembly at the top of the chain and rake removes captured screenings from the rotating carriers, the screening exit through a discharge chute to be collected by equipment provided by others.

The influent level upstream is monitored by the ultrasonic level sensor. The influent level is sent as proportional 4-20mA signal to the control panel logic.

Chain and rake operation started by one of the following control inputs:

- The influent rises higher than the start setpoint, the screen runs after a preset delay.
- The influent level exceeds the high level start setting, the screen runs until the timer times out and the influent drops below the start level.

- The control panel backup timer runs a short low speed exercise cycle of the screen at timed intervals.
- The screen motor runs at high speed continuously if the level sensor fails.

The chain and rake requires periodic mechanical adjustment of the chain assembly for proper operation. Refer to Paragraph 4.1.3.

The control panel screen shock relay monitors the chain and rake operation. Power is removed from the screen motor for three seconds and then reverses for a preset time (default 30 seconds) if the shock relay detects a screen jam. Power is removed from the motor if the shock relay detects a jam during the reversal of if three reversal occur within three minutes. The operator uses the control panel forward/reverse control switch in HAND mode to rotate the jammed panel, then manually clears the jam.

The control panel current overload relay opens to remove power if a motor draws a sustained excessive current or overheats.

The chain and rake requires periodic mechanical adjustment of the chain assembly for proper operation. Refer to Paragraph 4.1.3.

1.2 LIMITATION OF USE

JWC Environmental (JWCE) considers that the buyers and users of the chain and rake system limit use to the purpose and intent defined at the time of sale. Applications of the chain and rake system other than defined must be in compliance with all applicable local, federal, and area safety rules, regulations and guidelines.

1.3 DESIGN COMPLIANCE

The chain and rake system satisfies the design criteria for same and/or similar types of equipment. JWCE considers that the buyers and users of the chain and rake system comply and ensure compliance with the warnings and cautions used in this manual to avoid the potential for personal injury and/or equipment damage.

1.4 SAFETY

Operations and maintenance personnel must review and understand all warnings and cautions in this section and throughout the manual prior to equipment installation, operation, troubleshooting and component removal.

Warnings and cautions are based on properly trained personnel using good safety practices at all times..



KEEP PERSONNEL AND UNAUTHORIZED MATERIAL CLEAR OF ROTATING COMPONENTS.



DO NOT SUSPEND LOADS OVERHEAD OF PERSONNEL.



ELECTRICAL HAZARDS EXIST WHEN THE CONTROL PANEL IS OPEN AND SUPPLY POWER IS APPLIED.



VERIFY THE AREA IS SAFE BEFORE OPENING THE CONTROL PANEL IF LOCATED IN A CLASS 1 DIV. 1 ENVIRONMENT.



REMOVE CONTROL PANEL SUPPLY POWER PRIOR TO EQUIPMENT INSTALLATION, DISLODGING OBJECTS OR REMOVING WIRING OR COMPONENTS. DO NOT USE ANY LOCAL OR REMOTE CONTROLS AS A POWER DISCONNECT.



EQUIPMENT MAY AUTOSTART AFTER POWER LOSS AND RECOVERY OR IF IDLE FOR A PRESET TIME.



REMOVE CONTROL PANEL SUPPLY POWER PRIOR TO CHAIN AND RAKE SERVICING.



USE SOLVENTS ONLY IN WELL VENTILATED NON-SMOKING AREAS.



Wear Eye And Ear Protection When Steam Cleaning Components.



Wear Appropriate Gloves When Handling chain and rake Comb Carriers and chain and rake Chain.

TABLE 1-1 SPECIFICATIONS

Weight	3,200 lbs. assembled 1,600 lbs. each segment.
Temperature Rating Operating / Storage	+23 to +104°F / -4 to +149°F.
Rotation Speed	5 rpm
Chain Pitch	6 in.
Chain Break Strength	24,000 lbs. force minimum
Supply Voltage	460VAC, 60 Hz, 3-phase.
Duty	Continuous.
Screen Motor	Refer to motor data sheets in Section 7.

TABLE 1-2 MATERIALS

Frame, Chain Tension, Drive, Cover.	304 SST
Chain Links / Rollers	316 SST / 431 SST
Tracking System, Scraper Assembly	304SST/UHMW
Control Panel Enclosure	Nema 4X 304 SST

1.5 RETURNS AND SERVICE QUESTIONS

Provide JWCE with the model number and serial number listed on the equipment nameplate for return authorization if repairs are required. Properly package and ship returns to JWCE.

Contact the JWCE Customer Support Department or a local sales/service representative for answers to service questions.

JWCE Customer Service Center

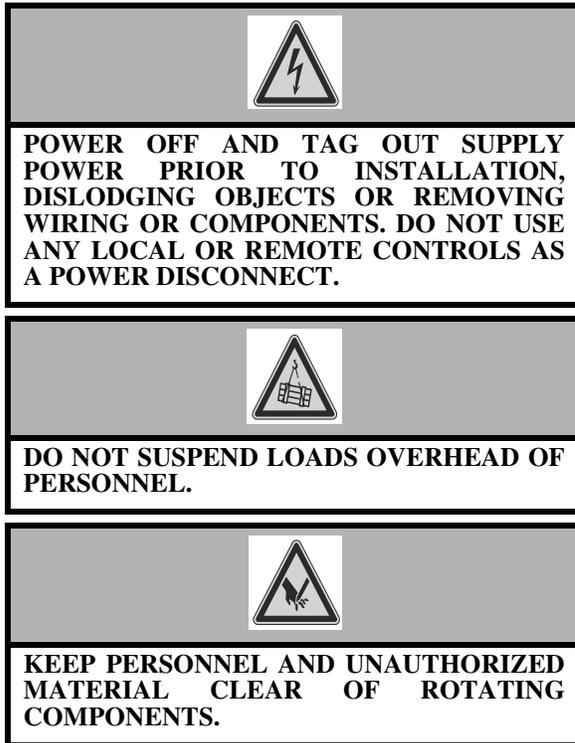
Toll Free: (800) 331-2277

Local: (949) 833-3888

Fax: (714) 751-2219

SECTION 2 RECEIVING, INSTALLATION AND STARTUP

Review all warnings and cautions prior to chain and rake system installation and startup.



JWC Environmental (JWCE) shall not be responsible for damage to the equipment or installation site or for inadequate performance due to improper installation. JWCE shall not be held liable for any ignorance or disregard of applicable OSHA, federal, state, or local regulations or for any damages due to wiring misconnections, wiring shielding errors, and/or other non-compliant wiring errors.

If required, fill out any receiving, installation or start-up records or forms.

Contact JWCE or local representative for any receiving, installation or start-up questions.

2.1 UNPACKING

Do not remove any components from the shipping crate/carton until an inventory is taken. Verify the chain and rake, control panel, local control station, E-stop station, level sensor, cord set and spares listed in the customer order and Paragraph 2.3 are included.

Inspect the shipping container. Report any shipping container damage to the carrier and send a copy to JWCE or local representative.

Inspect all delivered equipment for missing, loose, or damaged components. Contact JWCE or a local representative if parts are missing, loose, or damaged.

Some system components are shipped with a manufacturer's manual. Keep any component manuals with the system manual.

2.2 STORAGE

Store chain and rake system components in shipping containers in a dry, secure and clean location capable of supporting the equipment weight with an ambient temperature between -40°F and +149°F until installation if required.

Contact JWCE if equipment is to be stored for more than three months.

Screen drive components are factory lubricated and ready for operation. Extended storage can result in the drive leaking a small amount of light oil. Contact JWCE or local representative if oil leakage exceeds one tablespoon.

If required, manually rotate the screen drive at least 15 revolutions every three months minimum. Temporarily apply appropriate supply power if unable to rotate drives manually.

2.3 SPARES

The equipment was shipped with the following spares.

- 190 roller chain links. JWCE# MCC0140-MCR-174.
- 10 roller chain connectors. JWCE# MCC0141-MCR-174.

The control panel has a complete set of spare fuses located inside the enclosure. Refer to the control panel parts list in Section 7.

Store loose spares in a dry and secure location until needed.

Contact JWCE or the local representative as listed on the manual front cover to order any additional spares.

2.4 INSTALLATION

A minimum amount of civil work may be required during installation. No special equipment is needed for installation.

Standard lifting and handling devices should be rated for a load capacity of 3,200 lbs. minimum for lifting the chain and rake.

Refer to the general arrangement drawing in Section 7 for component weights and dimensions, component location and any user provided installation hardware or site specific installation instructions.

Interconnecting wires and cables are provided and installed by others unless otherwise noted. Refer to the control panel drawing in Section 7 for wire sizes.

If required, fill out any customer/user records and forms at completion of installation.

2.4.1 Chain and Rake and Level Sensor

Refer to the installation, general arrangement and assembly drawings in Section 7 for lift points, installation hardware provided by others or other site specific instructions.

The chain and rake is delivered fully assembled. The two halves may have to be disassembled to move the equipment into place and later reassembled. Refer to the instructions in Appendix A if required.

Verify the chain and rake will fit into the channel without any interference prior to installation.

- If required, break the chain and rake into two halves by removing the chains and the splice plates to move the equipment to the installation location, then reassemble the two sections. Refer to the instructions in Appendix A.
- Verify the removable lifting bar located near the bottom of the chain and rake is installed.
- Attach lifting equipment rated for 3,200 lbs. assembled (or 1,600 lbs each segment) minimum to

the lift points, two lifting eyes at the top of the assembly and two on the lifting bar.

- D. Lift and position the chain and rake (or the bottom half if separated) over the channel oriented as shown in the installation drawing.
- E. Slowly lower the chain and rake into the channel. Do not force the chain and rake into the channel.
- F. Verify the chain and rake is level and centered in the channel.
- G. If required, attach the top half
- H. Verify the screen drive shaft is not tilted to horizontal.
- I. Attach the chain and rake to the top of the channel using anchors provided by others.
- J. Remove the lifting equipment from the chain and rake.
- K. Remove the chain and rake lifting bar. Keep the removed lifting bar and hardware in a secure location for use in moving the chain and rake at a future time.
- L. Verify the side seals are up against the channel walls.
- M. Install the upstream level sensor bracket as shown in the installation drawing using hardware provided by others. Protect the face of the sensor from damage during installation. Check that the sensor axis of transmission will be perpendicular to the influent liquid level surface. There must be 12 inches minimum between the level sensor face and the highest expected influent level.
- N. If shipped separately, install the weather protection hoods on the top of the level sensor

2.4.2 Control Panel

Check that all connections to the control panel are as specified on the applicable drawings and in compliance with all local, state, and federal codes and standards. Power supplied to the control panel must be free of electrical noise and line voltage transients. Use wire size applicable to motor current and voltage requirements.

All signal wires leading from the control panel to any external devices must be pulled through an individual conduit. Do not leaving wire clippings inside control panel and components.

Installation of a properly sized circuit breaker on the line side of the control panel is recommended. Short-circuit protection or any remote operating features, including materials and wiring, is provided by others.

Refer to the control panel drawings in Section 7 during installation for wiring details and component locations.

- A. Verify supply power from the site to the control panel is removed.
- B. Verify the lifting rings on top of the control panel are attached and not damaged.
- C. Attach lifting equipment to the control panel lifting rings.
- D. Lift and place the control panel into position per site requirements
- E. Attach the control panel to the site using hardware provided by others,
- F. Open the control panel doors to expose the control panel terminal board/strip.

- G. Verify line voltage, horsepower and frequency match the control panel data label located inside the control panel.
- H. Connect the site supply power leads to the control panel main circuit breaker inputs. Connect ground lead to control panel ground terminal.
- I. Connect the motor power, thermostat and heater leads to control panel motor power terminals. Do not use any flammable material to seal explosion proof motor connections,
 - screen motor to 1T1-1T3.
 - ground to GND.
 - screen motor thermostat leads to terminals TB-25 and TB-26.
- J. Connect the plug of the cord set to the level sensor. Check that level sensor wiring inlets are sealed and the cover is tight if level sensor may be subject to submergence.
- K. Connect the level sensor cable wiring to the control panel terminals. Install any intrinsically safe wiring in accordance with Article 504 of the National Electrical Code and route the wiring into the bottom right of the control panel enclosure.
 - Upstream: brown (+) wire to TB3-42, blue (-) wire to TB3-43.
- L. Open the proximity sensor junction box.
- M. Connect the proximity leads to the junction box terminals.
 - brown (+) wire to terminal JB-40.
 - blue (-) wire to terminal JB-41.
- N. Connect the proximity sensor to the junction box to the control panel.: Use a shielded cable and run in a separate conduit. Install any intrinsically safe wiring in accordance with Article 504 of the National Electrical Code and route the wiring into the bottom right of the control panel enclosure
 - JB-40 to TB3-40.
 - JB-41 to TB3-41.
- O. Close the proximity sensor junction box.
- P. Connect the plant PLC panel to the control panel auxiliary relay contact terminals. Relay contacts are rated at 10A at 240VAC resistive. Verify there is no power on the lines from the remote equipment. Removing supply power to the orange wire circuits does not de-energize auxiliary connections.
 - screen run (NO) to TB-20 and TB-21.
 - screen common fail (NO) to TB-22 and TB-23.
 - screen common fail (NC) to TB-22 and TB-24.
- Q. If installing a remote emergency stop switch provided and installed by others, remove the jumper at control panel terminals TB-1 and TB-2 and connect the switch.
- R. Verify all mechanical and electrical connections are secure and the control panel enclosure is free of any wire clippings.
- S. Close the cover and secure any locking hardware.

2.5 STARTUP

Verify the following prior to startup.

- All system components have been properly installed.

CHAIN AND RAKE RECEIVING, INSTALLATION AND STARTUP



- Supply power matching the screen drive motor requirements are removed and tagged out.
- Control panel main circuit breaker CB is open
- All control panel controls are set to OFF.
- None of the emergency stop pushbuttons are active (pushed in).

Controls, indicators and touch screen are located on the control panel front panel. Refer to the control panel and local control station drawings in Section 7 for switch and indicator locations and Section 3 for switch and indicator descriptions.

Press the control panel or any optional remote emergency stop pushbuttons at any time to remove motor power or open the control panel circuit breaker to immediately remove supply power to the equipment components. The active emergency stop pushbutton actuator must be reset by turning and pulling out the switch (to reset the switch actuator) and the control panel reset pushbutton must be pressed prior to restart if the emergency stop pushbutton is used to shut down the equipment.

Perform troubleshooting per Section 5 for any startup problems or failure indicated by the control panel **FAIL** indicator and touch screen.

Perform system startup as follows:

- A. Verify the equipment is clear of unauthorized personnel and materials.
- B. Open the chain and rake front inspection covers. Refer to the chain and rake assembly drawing in Section 7.
- C. Check control panel power up and main circuit breaker operation.
 - Apply supply power to the control panel.
 - Close the control panel main circuit breaker.
 - Verify the control panel **CONTROL POWER** indicator is lit.
 - Verify the control panel touch screen shows the equipment status screen.
 - Open the control panel circuit breaker.
 - Verify none of the control panel indicators are lit and the touch screen is blank.
 - Close the control panel circuit breaker.
- D. Check the control panel chain and rake controls and rotation.
 - Set the control panel screen control switch to **HAND**.
 - Set the control panel forward/reverse control switch to **FWD**.
 - Verify the control panel **SCREEN RUN** indicator is lit, the **COMMON FAIL** indicators is not lit and the touch screen shows the chain and rake is running with no alarm messages.
 - As viewed from the upstream side of the chain and rake, verify the chain and rake is running with no unusual noises or vibration and the comb carriers are moving across the chain and rake component located in the channel from bottom to top (forward rotation). Perform Paragraph 2.5.1 if the comb carriers are not moving across the chain and rake component from bottom to top.
 - Set the control panel screen control switch to **OFF**.

- Verify the chain and rake is not rotating, the control panel **SCREEN RUN** indicator is not lit and the touch screen shows the chain and rake is not running.
 - Set the control panel forward/reverse switch to **REV**.
 - Verify the chain and rake comb carriers are rotating in reverse.
 - Set the control panel controls to **OFF**.
- E. Replace all removed inspection covers.
 - F. Check out the control panel and any remote E-stop station emergency stop pushbuttons.
 - Set the control panel screen mode control switch to **HAND**.
 - Set the control panel forward/reverse switch to **FWD**.
 - Press the control panel emergency stop pushbutton.
 - Verify the chain and rake stops rotating, the control panel **SCREEN RUN** indicator is not lit, the touch screen shows the Emergency Stop Activated message.
 - Turn, then pull out the active emergency stop switch to reset the switch actuator.
 - Press the control panel reset pushbutton.
 - Verify the control panel **RUN** indicators are lit and the touch screen shows the equipment running.
 - Repeat this step if a remote E-stop station emergency stop pushbutton provided by others has been installed.
 - G. Check **AUTO** mode operation of the system.
 - Set the control panel screen control switch to **AUTO**.
 - Verify the chain and rake does not start.
 - Slowly add influent with screenings to the system.
 - Verify the control panel equipment status screen shows the influent level is rising.
 - Verify the chain and rake starts rotating, the control panel **SCREEN RUN** indicator is lit and the touch screen shows the screen running when the influent rises above the start setpoint.
 - Allow the chain and rake system to run.
 - Verify captured screening exit the chain and rake.
 - H. Set the control panel control switches to **OFF**.
 - I. Set the control panel switches to the desired operational settings.
 - J. Raise the influent height or check during future operation that the chain and rake goes into high speed mode when the influent reaches the alarm height.

2.5.1 Rotation Reversal

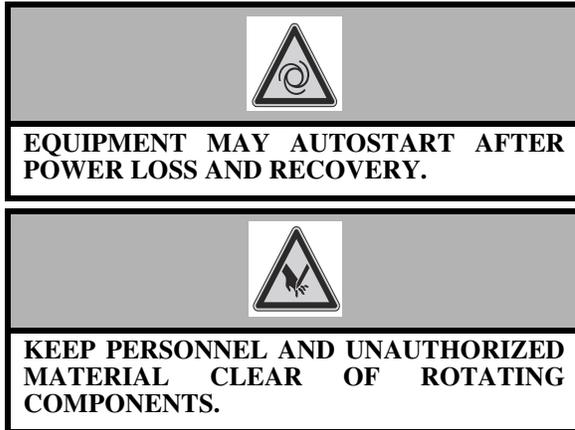
To reverse the screen rotation:

- A. Set the control panel control switches to **OFF**.
- B. Open the control panel main circuit breaker.
- C. Verify none of the control panel indicators are lit and the touch screen is blank.
- D. Remove supply power to the control panel.
- E. Open the control panel enclosure.

- F. Reverse any two of the supply power leads at the input circuit breaker.
- G. Close the control panel enclosure.
- H. Restore supply power to the control panel.
- I. Close the control panel main circuit breaker.
- J. Set the control panel screen control switch to HAND and the screen forward/reverse switches to FWD.
- K. Verify correct screen rotation.
- L. Continue startup.

SECTION 3 OPERATION

Review all warnings and cautions before operating the chain and rake system.



The control panel provides manual and automatic control and protection of the chain and rake system components.

Refer to the control panel drawing in Section 7 front panel layouts.

The chain and rake system control panel:

- Controls and protects the chain and rake motor.
- Runs the chain and rake when the influent differential exceeds the start setpoint.
- Runs the chain and rake continuously if a level sensor fails.
- Reverses the chain and rake if a jam is detected and stops the chain and rake if a jam fault fails to clear.

The influent level, starts the chain and rake system in AUTO mode when the influent rises above the start setting.

The operator can run in the screens in forward or reverse using the control panel forward/reverse control switch in HAND mode.

The control panel continues to provide power to the system components until a stop command is issued by the control logic when one of the following conditions occurs:

- The control panel or any optional remote emergency stop pushbutton is pressed at any time.
- Supply power is removed from the screen motors by opening the control panel main circuit breaker.
- Supply power is removed from the chain and rake system by a power disconnect provided by others.
- The control panel screen control switch is set to OFF.
- When enabled in HAND mode, the screen forward/reverse switches control are set to OFF.
- A failure occurs that can not be cleared without operator action.

The operator can change the chain and rake setpoints and settings using the touch screen after entering the security password. Contacting JWCE is recommended prior to changing equipment settings, Refer to the control panel drawing and screen shots in Section 7 for settings.

3.1 OPERATING MODES

Chain and rake system operating modes are OFF, HAND, AUTO, FWD, REV. The operator sets the operating mode with the control panel screen control and forward/reverse switches.

OFF: Power is removed from the motors.

HAND: The control panel forward/reverse control switch is active.

AUTO: Application of supply power to the chain and rake system is based one of the following

- The influent level rises above the start setpoint, the screen runs after a preset delay.
- The upstream influent level exceeds the high level start setting, the screen runs at high speed until the influent drops below the start level.
- The control panel backup timer runs a short low speed exercise cycle of the screen at timed intervals.
- The screen motor runs at high speed continuously if a level sensor fails.

FWD: Runs the system motors in forward rotation when enabled in HAND mode.

REV: Runs the system motors in reverse when enabled in HAND mode.

The screen can be run in HAND mode with or without control panel PLC control. JWCE does not recommend running the screen, without PLC control for extended periods of time.

3.2 CONTROLS

Control panel screen mode control three position switch SS1 allows the operator to select the screen operating mode (HAND-OFF AUTO).

Control panel screen forward/reverse control three position switch SS2 allows the operator to run the screen continuously in forward or reverse (FWD-OFF REV).

Control panel emergency stop maintained pushbutton PB1 or any optional remote E-Stop station when pressed at any time commands the control panel logic to open the screen motor contactors. The active emergency stop pushbutton switch must be turned and pulled out to reset the actuator and the control panel reset pushbutton must be pressed to restart the chain and rake system if the emergency stop pushbutton is used.

Control panel reset pushbutton PB2, when pressed, resets the control panel indicators and control logic. Any active alarm messages are moved to the alarm history queue.

Control panel main circuit breaker CB, when opened, removes power from the screen motor and the control logic

3.2.1 Touch Screen Controls

The operator must access the setup screen to reverse jog the screen or change the equipment operational settings. Contacting JWCE is recommended prior to changing setpoints.

Refer to the screen shots in Section 7 for touch screen operating instructions.

3.3 INDICATORS

The control panel front panel indicators and touch screen provide the operator with chain and rake system status.

- **CONTROL POWER** indicator LT1 lights when supply power is present in the control panel. Supply power may be available inside the control panel enclosure when the **CONTROL POWER** indicator is not lit.
- **SCREEN RUN** indicator LT2 lights when power is applied to the chain and rake motor.
- **COMMON FAIL** indicator LT3 lights when a screen failure has occurred. Check the touch screen for an alarm message.

3.3.1 TOUCH SCREEN INDICATORS

The touch screen shows the equipment status display during normal operation. An alarm banner appears if a fault occurs.

Press the buttons at the top of the screen to view read-only statistical counters, digital and analog input/output status and active alarm messages. Accessing the setup menu using the four digit security password is required to clear messages or reset counters.

Refer to the control panel drawing and screen shots in Section 7.

3.4 NORMAL OPERATION

The chain and rake system is designed to operate in automatic (AUTO) mode with minimal operator attention required during normal operation.

Normal operation:

- Control panel screen control switch is set to ON.
- The control panel screen control switch is set to AUTO.
- The influent rises above the start setting, the chain and rake starts after any preset delays time out.
- No alarm messages are displayed at the control panel touch screen and the **SCREEN RUN** indicator is lit.
- The chain and rake stops when the influent drops below the start level and any preset timer times out.

Set the control panel screen control switch to OFF to power off the chain and rake.

3.5 EMERGENCY OPERATION

Press the control panel or any emergency stop pushbutton provided by others or open the control panel main circuit breaker or open a supply power disconnect or emergency switch provided by others to remove motor power from the mechanical chain and rake system

The active emergency stop switch must be turned and pulled out to reset the switch actuator and the control panel reset pushbutton pressed prior to chain and rake system restart if the emergency stop pushbutton is used.

3.6 RESET

The control panel is reset when the control panel switches are set to OFF and the control panel reset pushbutton is pressed.

A new command cannot be accepted until the fail/overload condition is corrected and the control panel is reset.

The control panel can not be reset from a remote location.

To reset the chain and rake system:

- Note the lit indicators and the fail message at the control panel touch screen.
- Set all the control panel switches to OFF.
- Press the control panel reset pushbutton, the control panel can not be reset at a remote location.
- Verify the control panel **COMMON FAIL** indicators is not lit.
- Open the control panel main circuit breaker.
- Verify none of the control panel indicators are lit and the touch screen is blank.
- Remove supply power to the control panel.
- Correct the fail condition per the troubleshooting procedures in Section 5.
- Restore supply power to the control panel.
- Close the control panel main circuit breaker.
- Set all the control panel screen control switch to ON.
- Set the control panel screen control switch to HAND.
- Set the control panel screen forward/reverse switch to FWD.
- Verify the chain and rake is operating normally.
- AUTO operation of the chain and rake can be resumed by setting the control panel mode control switch to AUTO if the system is operating properly.

3.7 AUTOMATIC RESTART

The screen restarts immediately when supply power is restored if removed from the control panel with the screen running and the control panel main circuit breaker is closed.

3.8 CHAIN AND RAKE JAM CLEAR

The chain and rake stops when the equipment jams. To clear the jam:

- Remove the chain and rake cover panels.
- Set the control panel screen control switch to HAND.
- Use the control panel forward/reverse switch to rotate the screen to a position where any stuck solid can be cleared by site personnel.
- Set all the control panel switches to OFF.
- Open the control panel circuit breaker.
- Verify none of the control panel indicators are lit and the touch screen is blank.
- Remove supply power to the control panel.
- Carefully remove the jammed solid from the comb carriers. Do not use the forward/reverse switch to attempt to force the stuck solid out of the screen.
- Restore supply power to the control panel.
- Close the control panel main circuit breaker.
- Set the control panel screen control switch to HAND and the forward/reverse switches to FWD.
- Verify correct screen rotation.

3.9 REMOTE CONTACTS

Common fail and screen run relay contacts rated 10A at 240VAC resistive provide connection points for external equipment provided by others.

Opening the control panel main circuit breaker does not de-energize the orange wire color remote contact terminals.

3.10 PROGRAMMABLE LOGIC CONTROL (PLC)

The control panel programmable logic control (PLC) inside the control panel enclosure provides automatic control for the control panel based on internal programming, external inputs and operator commands.

The PLC LCD display normally shows the status of the inputs and outputs, an active input or output is shown as a filled in box. Refer to the control panel drawing in Section 7 for the PLC inputs and output labels.

The PLC front panel indicators are:

- **POWER** Green: Power On Off: no input power or power error condition.
- **RUN** Green: executing the user program in run mode. Green flashing: memory module transfer occurring. Off: not executing the user program.
- **FAULT** Red: controller hardware fault. Red flashing application fault detected. Check LCD display for any fault message.
- **FORCE** Amber: programming forces installed. Off: no forces installed.

RUN, FORCE and **FAULT** all flash if the operating system is missing or corrupt.

The PLC **POWER** and **RUN** indicator must be lit for the controller to operate. Check the supply power to the PLC if none of the indicators are lit.

Refer to the control panel drawing for the PLC inputs and output labels.

The PLC has three communications ports: an isolated combination RS-232/485 communication port (Channel 0), an Ethernet port EtherNet/IP (or Modbus TCP or DNP3) at 10 Mbps or 100 Mbps (Channel 1) and a non-isolated RS-232 communication port (Channel 2).

Contact JWCE for technical assistance and answers for system fault or PLC service questions.

SECTION 4 MAINTENANCE

Review all warnings and cautions prior to any chain and rake system maintenance.

Refer to the preventative maintenance plan and extended warranty prior to performing maintenance.

Table 4-1 is the recommended chain and rake system inspection and lubrication schedule. Table 4-2 lists the OEM and equivalent lubricants recommended for maintenance.

Tasks typically require 15 to 60 minutes maximum.

Maintenance tasks are based on personnel experienced in same or similar equipment and familiar with the basic

operation, safety, emergency procedures, general plant safety, and use of plant tools/maintenance equipment.

Recommended intervals based on normal operation usage. Increasing the frequency of inspections is encouraged when the chain and rake system is operating in a harsh unprotected environment.

Contact JWCE or a local service representative if any damage, defects, or suspected problems are identified or for any maintenance recommendation questions.

Refer to Section 6 for the removal/replacement instructions for chain and rake system components.

Refer to the Section 7 for drawings and parts lists.

TABLE 4-1 INSPECTION AND LUBRICATION SCHEDULE

TASK	SCHEDULE	REFERENCE
Operational inspection	Weekly	Paragraph 4.1.1
Bearing inspection.	Monthly	Paragraph 4.1.2
Screen chain condition and tension inspection.	3 months or 500 hours of operation then: monthly if running 16-24 hrs./day. every 3 months if running > 7-15 hrs/day. every 6 months if running < 7 hours/day.	Paragraph 4.1.3
Inspect control panel.	Every 3 months.	Paragraph 4.1.4
Inspect scrapers.	Every 3 months	Paragraph 4.1.5
Inspect the screen drive assemblies and couplings.	Every year.	Paragraph 4.1.6
Lubricate bearings	When required as part of bearing inspection	Paragraph 4.2.1
Lubricate chain and rake speed reducer.	2 years of service or 10,000 operating hours, whichever comes first.	Paragraph 4.2.2

TABLE 4-2 RECOMMENDED LUBRICANTS

TASK	TYPE	MANUFACTURER
General protective lubrication.	Zep 45 Aerosol Lubricant* WD-40 Aerosol Lubricant	Zep 45 Manufacturing WD-40 Corp.
Screen drive bearings	#238 Moly Supreme #2 Grease Retinax® WR Grease	Schaeffer Manufacturing Co. Shell Oil Co.
Chain and rake gearbox lubrication.	SHC636 SHC460	Exxon Mobil Mobil/Cibus
Long term service removal.	LPS 3® Rust Inhibitor*	LPS Laboratories

* OEM recommended.



ELECTRICAL HAZARDS EXIST WHEN THE CONTROL PANEL IS OPEN AND SUPPLY POWER IS APPLIED.



POWER OFF AND TAG OUT SUPPLY POWER PRIOR TO CHAIN AND RAKE SERVICING.



USE SOLVENTS ONLY IN WELL VENTILATED NON-SMOKING AREAS.



Wear Eye And Ear Protection When Steam Cleaning Components.

4.1 INSPECTIONS

Remove supply power from the equipment prior to bearing and chain tension inspections.

To remove supply power to the system

- Set all the control panel switches to OFF.
- Open the control panel main circuit breaker.
- Verify none of the indicators are lit and the control panel touch screen is blank.
- Remove supply power to the control panel.

Clean parts where noted except the drive segments or chain and rake bearings. Allow any steam cleaned parts to cool before handling.

Contact JWCE if any excessive or unusual parts wear or damage is noted during inspections.

If required, complete any customer/user inspection records and forms.

4.1.1 Operational

Check the chain and rake for leakage, vibration, noise, excessive heat buildup and for proper screenings capture.

Check level sensor for contamination or misalignment.

4.1.2 Bearings

Check the chain and rake drive shaft and scraper shaft bearings for any unusual or excessive wear. Replace bearing per Paragraph 6.2.4 if required.

Check that grease is visible at the bearing fitting. Add grease per Paragraph 4.2.1 if required.

4.1.3 Chain and Rake, Comb Carrier and Chain Assemblies.

Tensioning components are identical for the left and right sides.

Refer to the chain and rake assembly drawing in Section 7 for parts identification.

- A. Remove supply power.
- B. Verify the control panel circuit breaker is open, none of the control panel indicators are lit and the touch screen is blank.
- C. Isolate the chain and rake system from the influent source.
- D. Isolate the chain and rake from flow.
- E. Drain the channel of any remaining influent.
- F. Remove all the chain and rake inspection covers.
- G. Check the comb carriers for screenings buildup, if required, clean residue from the comb carriers.
- H. Check the comb carrier rakes for damage. Replace rakes per Paragraph 6.2.1 if required.
- I. Check that the chain is in the tracking assembly and the chain and tracking guides are not damaged or worn. Replace damaged guides per Paragraph 6.2.7
- J. Check that none of the chain links are bent or the rollers are stuck. Replace a damaged chain assembly per Paragraph 6.2.3.
- K. Check for a smooth transition of the chains through the bottom of the chain and rake. No adjustment is required if the transition is smooth. Perform the following if the chain folds upward going into the bottom guides or the chain is touching any part of the side frame.
 - Loosen the adjustment nuts at the adjustment plates and the nuts that hold the adjustment plates.
 - Tighten the top nut on the adjustment plate until there is a smooth transition of chain from the top opening to the bottom opening on the lower downstream side of the machine. Both chain

assemblies must be removed and replaced per Paragraph 6.2.3 if there is still play in the chain after maximum adjustment or the chains cannot be adjusted without the drive shaft being tilted from horizontal.

4.1.4 Control Panel Enclosure

To check the control panel enclosure:

- A. Verify supply power has been removed from the control panel.
- B. Open the control panel enclosure.
- C. Check for moisture, signs of water leakage, corrosion or dust accumulation.
- D. Inspect the enclosure seals and cable/conduit entries. Remove supply power to the control panel and repair/replace seals as necessary if contaminants are present.

4.1.5 Scraper

To check the scraper:

- A. Remove supply power from the system
- B. Remove the scraper access cover.
- C. Check the scraper for screenings buildup. Clean the scraper if required.
- D. Check the scraper for damage. Replace the scraper if damaged.
- E. Check that the scraper touches but not drag on the comb carriers. Perform the following if the scraper needs to be adjusted
- F. Adjust the contact to lightly touch the comb carriers using the adjustment assembly on the sides of the chain and rake. Adjust each side equally to avoid tilting the drive shaft from horizontal.
 - To move the scraper closer to the chain and rake rakes, back the adjustment nut away from the adjustment bracket, then tighten the locking nut against the adjustment bracket.
 - To move the scraper away from the chain and rake rakes, back the locking nut away from the adjustment bracket, then tighten the adjustment nut against the bracket.
- G. Replace the scraper access cover.

4.1.6 Screen Drive

Check that the screen drive is free of contaminants, there are no signs of damage, overheating or lubricant leakage and the drive securing hardware is tight.

Clean the drive if required, do not use steam to clean the drives.

4.2 LUBRICATION

Remove supply power from the equipment prior to reducer lubrication:

To remove supply power to the system

- Set all the control panel switches to OFF.
- Open the control panel main circuit breaker.
- Verify the control panel indicators are not lit and the control panel touch screen is blank.
- Remove supply power to the control panel.

Refer to Table 4-2 for the lubricant to be used.

Always use new lubricant, do not reuse removed lubricant.

Avoid mixing brands and/or types of lubricants.

If required, complete any site records or forms.

4.2.1 Bearings

Add bearing grease using a grease gun to the bearing zerk fitting located above the drive shaft or scraper axle until grease seeps out of the fitting.

4.2.2 Screen Speed Reducer

To change the screen speed reducer lubricant:

- A. Remove the fill plug on top of the reducer.
- B. Place a container capable of holding at least 3.8 quarts under the drain plug.
- C. Remove the drain plug on the bottom of the reducer.
- D. Drain the existing fluid and dispose in accordance with OSHA or other applicable regulations.
- E. Replace the drain plug, open the top fill plug and add 3.8 quarts of new lubricant.
- F. Replace the top fill plug.

**4.3 LONG TERM SHUTDOWNS AND
PERMANENT REMOVAL**

Contact JWCE prior to permanent removal or extended shutdowns longer than one year.

4.3.1 Long Term Shutdown

Remove the chain and rake per Section 6 and Appendix A instructions.

Clean the removed equipment in a well ventilated non-smoking area using Simple Green® or equivalent solvent. Spray comb carrier with rust inhibitor.

Manually rotate the screen drives at least 15 revolutions every three months minimum. Temporarily apply appropriate supply power if unable to rotate drives manually.

Check the drives for lubricant leakage. Contact JWCE if leakage exceeds one tablespoon.

4.3.2 Permanent Removal

Remove the chain and rake per Section 6 and Appendix A instructions.

Dispose of components and materials in accordance with all applicable safety disposal regulations and standards.

Apply warning and safety labels to materials and containers if required.

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SECTION 5 TROUBLESHOOTING

Review all warnings and cautions prior to chain and rake system troubleshooting.

The chain and rake system is designed to operate smoothly and quietly. Stop operation and inspect the chain and rake system components per Section 4 if any unusual or excessive noise or component temperature rise is noted.

Table 5-1 identifies potential chain and rake system problems and possible solutions. Table 5-2 lists the control panel breakers, fuses and relays.

Verify the control panel controls are set properly prior to troubleshooting.



KEEP PERSONNEL AND UNAUTHORIZED MATERIAL CLEAR OF ROTATING COMPONENTS.



ELECTRICAL HAZARDS EXIST WHEN THE CONTROL PANEL IS OPEN AND SUPPLY POWER IS APPLIED.



REMOVE CONTROL PANEL SUPPLY POWER PRIOR TO EQUIPMENT INSTALLATION, DISLODGING OBJECTS OR REMOVING WIRING OR COMPONENTS. DO NOT USE ANY LOCAL OR REMOTE CONTROLS AS A POWER DISCONNECT.



EQUIPMENT MAY AUTOSTART AFTER POWER LOSS AND RECOVERY OR IF IDLE FOR A PRESET TIME.

Check that the control panel controls are set properly prior to troubleshooting.

Optional push-to-test indicators can be checked anytime power is available without affecting system operation.

Refer to Section 6 for chain and rake system component removal and replacement instructions.

Contact JWCE or a local service representative for any troubleshooting questions or if any damage, defects, or suspected problems are identified.

TABLE 5-1 TROUBLESHOOTING

SYMPTOM	POSSIBLE CAUSE	SOLUTION
Chain and rake does not start, no indicators lit, touch screen blank.	Supply power disconnected.	Check that site supply power is available at the control panel.
	Circuit breaker open.	Check that the control panel main power disconnect is closed.
	Control power low/missing.	Check control panel control power fuses. Check control panel power transformer XFMR 120VAC output. Check control panel surge suppressor TVSS.
Chain and rake does not start, no indicators lit, touch screen blank.	Programmed logic control (PLC) module.	Check the PLC for proper operation. Refer to Paragraph 3.10.
	Open fuse.	Check control panel PLC power supply fuse.
	Power supply.	Check control panel PLC power supply PLC PS.
Chain and rake does not start in AUTO mode.	Switch settings	Check that the control panel control switch is set to AUTO.
Emergency Stop Activated message at touch screen.	Emergency stop pushbutton active.	Check that the control panel emergency stop switch PB1 actuator is not active (pushed in) and have been reset properly.
Chain and rake Fail to Run message on touch screen.	Motor circuit protector open	Check that control panel screen motor circuit protector MCP1 is closed, is set correctly and operating properly.

TABLE 5-1 TROUBLESHOOTING (CONTINUED)

SYMPTOM	POSSIBLE CAUSE	SOLUTION
Chain and rake Fail to Run message on touch screen. (Continued)	Motor freewheeling.	Check screen for broken chain or drive shaft. Check the screen reducer connections.
	Open fuse.	Check control panel power supply module PS2 fuse.
	Motor current transformer.	Check chain and rake motor current transformer settings and contacts.
	Intrinsically safe barrier (ISB).	Check control panel ISB1. Verify DIP switch settings are correct, refer to the control panel drawing.
	Relay not closing.	Check control panel screen running relay and contacts.
Jammed message on touch screen.	Large or dense solids trapped in the comb carriers.	Remove problem solids from waste stream. Check chain and rake comb carriers and chain drive for damage.
	Damaged/misaligned comb carrier or chain.	Check comb carriers and chain for damage and proper alignment.
	Excessive solids loading.	Reduce solids loading.
Jammed alarm does not reset after clearing fault.	Screen shock relay.	Check that control panel shock relay is operating properly.
Overload message on touch screen.	Supply power out of tolerance.	Check the supply power voltage, current and phasing. Adjust supply power if required.
	Motor damaged.	Check motor for lubricant leakage or damage. Check motor power connections. Contact JWCE if motor damaged.
	Chain and rake clogged.	Check chain and rake discharge chute for buildup of screenings. Clear buildup.
	Chain tension.	Check chain tension. Refer to Paragraph 4.1.3.
	Drive bearings,	Check the drive bearings for damage and proper lubrication. Refer to Paragraph 4.1.2 and Paragraph 4.2.1.
Overload message does not clear after clearing fault.	Overload relay not closing.	Check control panel screen overload relay. Check overload relay settings
	Motor shorted.	Check motor windings and insulation. Contact JWCE if motor shorted.
Overtemp message on touch screen only at startup.	Nuisance alarm timer not active.	Check control panel screen on-delay timer setting (default 0.5 seconds).
Overtemp message on touch screen during operation.	Motor damaged or contaminated.	Check motor for lubricant leakage or damage. Check motor for buildup of contaminants. Clean motor if required. Contact JWCE if motor damaged or leaking.
Overtemp does not reset after the motor cools.	Open fuse.	Check control panel chain and rake thermostat interposing fuse.
	Motor thermostat.	Check motor thermostat wiring connections and that the normally closed motor thermostat is not open. Contact JWCE if motor thermostat is open.
	Interposing relay.	Check control panel screen interposing relays and contacts.

TABLE 5-1 TROUBLESHOOTING (CONTINUED)

SYMPTOM	POSSIBLE CAUSE	SOLUTION
Level sensor failure message at touch screen.	Open fuse.	Check control panel power supply #2 fuse
	Level sensor fault.	Check the level sensor for misalignment or contamination. Check level sensor settings. Check level sensor wiring and connections.
	Analog module.	Check control panel analog module (ANA MOD 1) is powered on and operating properly.
	Intrinsically safe barrier	Check control panel intrinsically safe barrier ISB#1 and connections.
Unusual chain and rake noise and/or vibration.	Chain link(s) or guide	Check chain and rake chain links or guides for damage. Replace damaged chain links or guides.
	Comb carriers.	Check chain and rake carriers and rake edges for alignment and damage. Replace carriers or rake edges.
	Bearing.	Check chain and rake bearing for damage or unusual wear. Replace bearing if required.
	Speed reducer.	Check speed reducer lubricant levels. Fill reducer with lubricant per Section 4 if required. Contact JWCE if reducer is leaking or filled and still vibrating or noise.
	Inspection covers.	Check that all inspection covers are fastened down.

TABLE 5-2 BREAKER, FUSE, TIMER AND RELAY INDEX

REF.	DESCRIPTION
CIRCUIT BREAKER	
CB	Control panel supply power disconnect
MOTOR CIRCUIT PROTECTOR	
MCP1	Screen motor power disconnect
FUSES	
FU1	Supply power to step-down transformer
FU2	Supply power to step-down transformer
FU3	Logic power 120VAC supply
FU4	24VDC power supply PS1 (touch screen and Ethernet module)
FU5	Overtemp
FU6	24VDC power supply PS2 (ISB1,2)
FU7	All PLC inputs
TIMER	
TD1	Screen on delay (0.5 seconds)
RELAYS	
OL1	Overload (set at 2.2A)
SR1	Shock relay (jam detection)
CR1	Screen run status

TABLE 5-2 BREAKER, FUSE, TIMER AND RELAY INDEX (CONTINUED)

REF.	DESCRIPTION
CR2	Common fail
CR3	Emergency stop status
CR4	Screen motor overtemp, isolation
CR5	Screen overtorque isolation
CR6	Screen jam latching
CR7	Screen motor overload latching
CR8	Screen motor overtemp latching
CR9	Screen forward run command, AUTO mode

SECTION 6 REMOVAL AND REPLACEMENT

Review all warnings and cautions prior to chain and rake system component removal and replacement.



POWER OFF AND TAG OUT SUPPLY POWER PRIOR TO CHAIN AND RAKE SERVICING.



DO NOT SUSPEND LOADS OVERHEAD OF PERSONNEL.



EQUIPMENT MAY AUTOSTART AFTER POWER LOSS AND RECOVERY OR IF IDLE FOR A PRESET TIME.



USE SOLVENTS ONLY IN WELL VENTILATED NON-SMOKING AREAS.



Wear Appropriate Gloves When Handling chain and rake Comb Carriers and Chain and Rake Chain



Wear Eye And Ear Protection When Steam Cleaning Components.

Refer to the drawings in Section 7 during chain and rake system component removal and replacement.

Remove supply power to the system as follows:

- Set the control panel switches to OFF.
- Open the control panel main circuit breaker.
- Verify the control panel indicators are not lit and the touch screen is blank.
- Remove supply power to the control panel.

Observe the following guidelines during the removal or replacement of the chain and rake system or component parts.

- Isolate the influent source to the chain and rake system as required.

- Replacement steps are the reverse of removal steps except where noted.
- Use only the lift points provided for moving the chain and rake.
- Inspect all removed parts for damage, cracks, or excessive wear. Replace gasket if damaged. Contact JWCE or a local sales/service representative for any damaged or worn parts. Replace part if necessary.
- Removed components and hardware can be reused unless damaged or worn. Always place removed components on a clean and flat work surface. Store removed components in a secure location until needed. Clean removed parts prior to replacement. Ensure all mating surfaces are clean prior to component replacement.
- Refer to Table 4-2 for recommended lubricants. Always use new lubricant, do not reuse any removed lubricant. Do not mix types or brands of lubricants.
- JWCE does not recommend disassembling the chain and rake drive motor or speed reducer. Contact JWCE or a local representative to facilitate sending the removed motor or reducer to the OEM or an approved service center.
- Performing start up per Paragraph 2.5 to verify proper operation and rotation of the equipment after reassembly is recommended.
- Verify attaching hardware such as nuts, bolts, screws, and washers are not damaged and are the size/quantity required for the assembly.
- If required, complete any required customer/user inspection records or forms.

6.1 MOVING THE CHAIN AND RAKE

Moving the chain and rake is not required to remove chain and rake components except for the chain tracking system (Paragraph 6.2.7).

Breaking the chain and rake into two halves may be required to remove the assembly from the channel. Refer to the instructions in Appendix A if required.

Refer to the chain and rake general view and assembly drawings in Section 7 for parts list and location.

- A. Verify the chain and rake is isolated from the influent source.
- B. Remove control panel supply power.
- C. Shut off the chain and rake wash water supply.
- D. Remove the chain and rake motor connections
- E. Attach lifting cables to the chain and rake six lifting points. Equipment must be rated for 3,135 lbs minimum.
- F. Position the lifting cables such that the chain and rake will lift evenly to avoid stressing chain and rake components.
- G. Remove any hardware securing the chain and rake to the channel.
- H. Carefully lift the chain and rake out of the channel.
- I. Ensure the bottom of assembly is clear of the channel, then place the chain and rake in a clean secure location capable of supporting the equipment weight,

6.2 CHAIN AND RAKE ASSEMBLY COMPONENTS

All chain and rake components can be removed with the chain and rake in place and connected to the control panel.

Removing control power is recommended if the chain and rake is still connected to the control panel unless removing comb carriers. Remove supply power to the system as follows:

- Set all the control panel control switches to OFF.
- Open the control panel main circuit breaker.
- Verify none of the indicators are lit and the touch screen is blank.
- Remove supply power to the control panel.

Replacement steps are the reverse of removal steps except where noted.

Place all removed components in a clean, protected secure location.

Refer to the chain and rake assembly drawing in Section 7 for parts list and parts location.

6.2.1 Comb Carriers / Rakes

The control panel must have supply power available to rotate the damaged panel in HAND mode into position if required.

Refer to the chain and rake main drive assembly drawing in Section 7.

- A. Remove the chain and rake safety access covers.
- B. If the damaged comb carrier is visible, skip to the next step. If the damaged comb carrier is not visible, use the control panel screen forward/reverse switch to rotate the damaged comb carrier into position.
- C. Remove supply power to the control panel.
- D. Check the comb carrier rakes for damage. Remove the hardware securing the rake to the comb carrier to remove the rake.
- E. To remove the comb carrier assembly, remove the fasteners, lock washers, and washers securing the comb carrier to the chain assemblies.

6.2.2 Screen Drive Assembly

Refer to the chain and rake main drive assembly drawing in Section 7.

To remove the screen drive assembly

- A. Attach a lifting sling to support the screen drive during removal.
- B. Remove the drive shaft retaining screw and washer from the drive end of the shaft.
- C. Move the drive assembly away from the screen drive shaft (the torque arm remains bolted to the gearbox).
- D. Remove the drive key. If the motor/gearbox assembly does not release from the shaft, use a gear puller to remove the assembly.

After replacement, perform the startup and screen rotation verification per Section 2.

6.2.3 Chain Assembly

The chain is made up of pinned chain link segments connected by master links. The master links have hollow pins and C clamps. Disassembly of individual chain links other than master links is not recommended.

The complete chain assembly is heavy. Each chain link can be removed separately if removing the full length of chain is too cumbersome.

Lifting equipment rated 1,000 lbs. minimum

Contact JWCE if the chain assembly is damaged.

6.2.3.1 Removing the Chain

- A. Remove the chain access cover.
- B. Remove the comb carriers from both chains per Paragraph 6.2.1 if not removing the full length of chain as one piece.
- C. Rotate the chain assembly to a master link (every twentieth link) which can be identified as having hollow pins with C clips.
- D. Use lifting equipment to keep the chain from dropping during removal.
- E. Remove the C clips from the master link.
- F. Pull open the master link. The links is press fitted, a crowbar might be required if the link does not open easily.
- G. Carefully remove the chain from the chain and rake using lifting equipment or an appropriately rated come along.
- H. Store the chains in a secure location capable of supporting the chain weight.

6.2.3.2 Chain Reassembly

To reinstall the chain:

- A. If using a new chain as a replacement verify that both chains are the same length (equal number of links) if replacing both chains or the new chain matches the existing chain.
- B. Attach lifting equipment to support the chain weight.
- C. Install the chain over the tracking assembly and drive sprocket.
- D. Assemble the chain lengths if broken apart using a C clamp or press. When in one length, connect the chain ends using the removed master link. If required, use a come-along (or equal) to pull the two open ends of the chain together so that there is enough slack to install the master link. Do not overtighten the chain to install the master link.
- E. Press the two halves of the master link together. Use a C clamp or press to push the halves together if required.
- F. Replace the removed comb carriers.
- G. Adjust the chain tension, refer to Paragraph 4.1.3.
- H. Verify the drive shaft is not tilted from horizontal after chain replacement.

6.2.4 Bearings

Bearings are installed at each end of the screen drive shaft and scraper assembly axle.

Contact JWCE if the bearings cannot be removed.

To remove the bearings:

- A. Support the screen drive or scraper assembly with lifting equipment.
- B. Unscrew the bearing lock nut to release the bearing.
- C. Remove the screws holding the bearing plate.
- D. Slide the bearing plate off of the drive shaft or scraper axle.

6.2.4.1 Bearing Replacement

To replace the bearings:

- A. Remove as much weight as possible from the shaft or axle before replacing the bearing using slings or jacks as necessary.
- B. Slide the first bearing into position on the shaft. Turn the lock nut counter clockwise to expand the adapter sleeve if required.
- C. Rotate the lock nut by hand until tight.
- D. Attach the bearing housing to the side frame by alternate tightening of the nuts until secure.
- E. Rotate the shaft or axle by hand, the shaft or axle should move easily with no binding or excessive drag. Repeat the above steps if the shaft binds or drags.

6.2.5 Screen Drive Shaft Assembly

To remove the screen drive shaft assembly:

- A. Remove the screen drive assembly per Paragraph 6.2.2.
- B. Remove the chain assembly per Paragraph 6.2.3
- C. Remove the screen drive shaft bearings per Paragraph 6.2.4.
- D. Remove the keys that hold the two drive sprockets in-place on the drive shaft. Make sure not to drop the keys into the channel.
- E. Remove the drive shaft and remaining installed components from the drive side using a sling or chain lift ensuring that the sprockets do not drop into the channel.
- F. Inspect the bearings and sprockets for unusual wear or damage. Contact JWCE if bearing or sprocket is worn or damaged.

6.2.6 Scraper Blade and Assembly

The scraper can be removed with the scraper assembly in place. Refer to the scraper assembly drawing in Section 7.

- A. Open the top cover
- B. Check the scraper blade for damage. If required, remove the screws securing the scraper blade to the scraper assembly bracket.
- C. To continue removing the scraper assembly, support the scraper assembly with lifting equipment and remove the scraper shaft bearings per Paragraph 6.2.4.
- D. While supporting the scraper assembly, remove the axle shaft from the scraper assembly.
- E. Lift the scraper assembly through the top of the chain and rake.
- F. Remove the lifting equipment.

6.2.7 Chain Tracking System

The chain and rake must be removed from its installation site per Paragraph 6.1 to replace or repair the chain tracking components.

- A. Remove all the inspection and safety covers. Store the covers in a secure location until needed.
- B. Remove the comb carriers per Paragraph 6.2.1.
- C. Remove drive chains per Paragraph 6.2.3.
- D. Remove the scraper assembly per Paragraph 6.2.2.

- E. Remove the screen drive assembly and shaft per Paragraph 6.2.2.

- F. Check the bracing and tracking assembly sections for damage. Replace damaged components.

6.3 LEVEL SENSOR

The initial installation level sensor is factory preprogrammed, and calibrated. Removal and replacement is not required unless the level sensor fails, is damaged or removed to support another maintenance activity.

Refer to the fine screen installation drawing in Section 7 for level sensor location and the control panel drawing for terminal to terminal electrical connections. Reinstall the level sensor in the same location if removed.

To remove the sensor:

- Remove the weather protection to access the housing cover
- Unscrew the level sensor housing cover, pull out the LCD display and remove the cover plate to access the sensor terminal module.
- Partially pull out the terminal module using the pulling loop.
- Remove external wiring at level sensor terminals 2 (L+), 1 (L1) and cable shield from the grounding terminal.
- Remove cable from packing gland.
- Unscrew the level sensor from the support.

Verify the level sensor is properly aligned after replacement. Perform a quick setup if required if installing a new sensor.

Contact JWCE or local representative before changing any level sensor settings or for any level sensor setup questions.

Level sensor parameters are:

- Start - the height (in feet) required to start the system.
- D1 - the distance from the channel bottom to the upstream transducer.
- D2 - the distance from the channel bottom to the downstream transducer.
- Min. Lg - the minimum upstream influent height for the system to start in AUTO mode (factory setting 0.66 ft./ 0.20m).
- Upstream 4mA and 20mA calibration settings (factory setting for 4mA is 9.00 ft./ 2.74m and 20mA is 1.00 ft. / 0.3m).

6.3.1 Level Sensor Quick Setup

Verify values in feet or meters for channel empty, blocking distance and full calibration from the initial installation are available.

- Empty calibration is the distance from the face of the sensor to the bottom of the channel. The blocking distance is 9.84 inches.
- Full calibration is the distance from the 4mA setpoint (bottom of channel) to the 20mA setpoint (maximum height).
- Distance is the distance from the face of the sensor to the liquid surface.
- Measured value is the height of the liquid in the channel.

Entry keys “+” (up), “-” (down) and “E” (entry) are located under the level sensor display. Press E to select value.

Perform a quick setup as follows:

- A. Verify level sensor is installed properly and displays the channel depth or liquid level height.
- B. At the level sensor display, press E, then - to enter the basic setup.
- C. “Tank Shape” then scroll down to enter “bypass”.
- D. “Medium Property” then scroll down to enter “liquid”.
- E. “Process Cond.” then scroll down to enter “calm”.
- F. Scroll to “Process Cond.” then scroll down to enter “calm”.
- G. “Empty calbr.”. Enter the empty calibration value.
- H. “Blocking Distance”. Enter the blocking distance (9.84”).
- I. “Full Calibration”. Enter the full calibration distance.
- J. “Dist/measured value”. Verify correct distance and measured value are displayed, then enter. Contact JWCE if the values are not correct.
- K. “Check Distance”, enter OK. Press “+” and “-” together to return to the initial screen Contact JWCE if OK is not displayed.

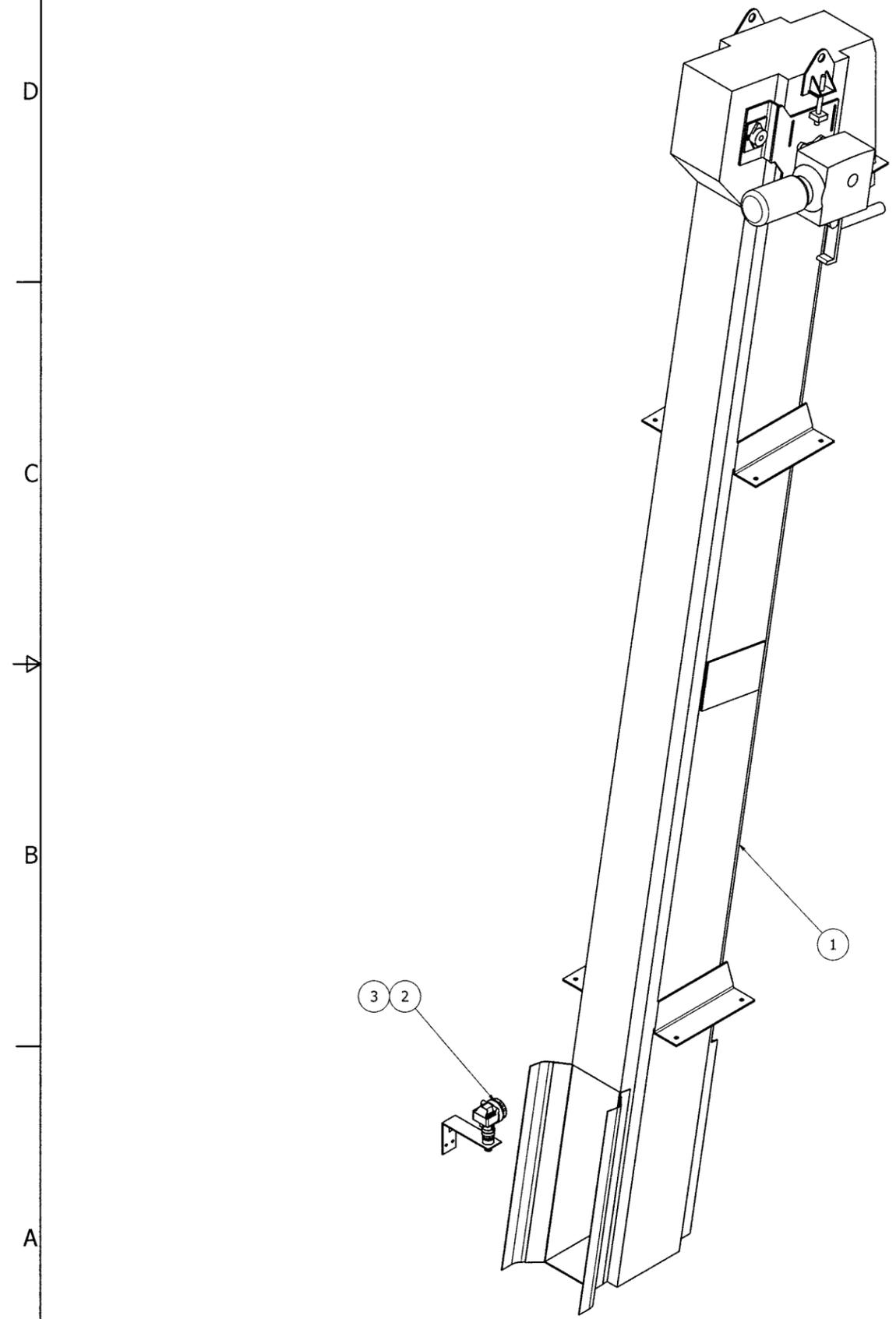
SECTION 7 DRAWINGS

The configuration and assembly drawings for the chain and rake system include:

- MCR General Arrangement
- Screen Assembly Exploded View/ Parts List
- MCR Assembly / Parts List
- Drive Assembly / Parts List
- Drive Motor Data
- Comb Carrier Assembly / Parts List
- Scraper Assembly / Parts List
- Lifting Eye Assembly / Parts List
- Splice Plate Assembly
- Roller Chain Connecting (Master) Link
- Control Panel
- Control Panel Parts List
- Screen Shots

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ZONE		REV	DESCRIPTION	ECO NO.	DATE	CHKD	PE	MFG	QC
ALL	A		INITIAL RELEASE		9/5/17	SA	PL		
ALL	B		INCREASED BAR HEIGHT, WAS 31 1/8"		9/12/17	SA	PL		



NOTES: UNLESS OTHERWISE SPECIFIED

1. FIELD MEASUREMENTS MUST BE TAKEN TO VERIFY ADEQUATE CLEARANCE AROUND THE EQUIPMENT.
2. ANCHOR BOLTS PROVIDED BY OTHERS. 8X 5/8-11 X 12, 4X 1/2-13 X 8.
3. GROUT REQUIRED UNDER ITEM 1 (OPERATING FLOOR, TOP OF CHANNEL AND CHANNEL FLOOR). PROVIDED BY OTHERS.
4. SCREENING WASHER, CONVEYORS AND/OR SLUICES TO BE MOUNTED IN SUCH A WAS AS TO CREATED A 1" MINIMUM ENGAGEMENT BETWEEN INLET AND SCREEN DISCHARGE.
5. WATER LEVELS SHOWN BASED ON 0.5 MGD WITH A 50% BLINDING FACTOR.
6. MINIMUM DISTANCE BETWEEN LEVEL SENSOR BOTTOM AND MAX WATER LEVER IS 12".
7. DRAWING FOR SUBMITTAL PURPOSES ONLY. ALL DIMS AND FIT TO BE FIELD VERIFIED BY INSTALLING CONTRACTOR PRIOR TO RELEASE FOR FABRICATION.

CONTROLLED

ITEM	QTY	PART NUMBER	DESCRIPTION	MATERIAL
4	1	E15-011-275	CORD SET, ULTRASONIC LEVEL SENSOR 66' (NOT SHOWN)	ALLEN BRADLEY
3	1	MSC1053-001-SU	SUPPORT, LEVEL TRANSDUCER	316 SST
2	1	E15-022-008	ULTRASONIC TRANSDUCER	ENDRESS HAUSER
1	1	MCR	CHAIN & RAKE MONSTER	304 SST

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UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		CONTRACT NO.	
FRACTIONS	DECIMALS	APPROVALS	DATE
± 1/16	.XX ± .03	DRAWN R. ULLON	9/1/17
	.XXX ± .005	CHECKED S. ANDERSON	9/5/17
MATERIAL	AS NOTED	MANUF.	
FINISH		Q.C.	
DO NOT SCALE DRAWING			

JWC JWC ENVIRONMENTAL
290 PAULARINO AVE, COSTA MESA, CA 92626

MCR GENERAL ARRANGEMENT
CHAIN & RAKE MONSTER
OGALLALA, NE (OGALLALA WWTP)

SIZE: **D** DRAWING NO. **MCR024-80-GA-112819** REV **B**

SCALE: NONE SHEET 1 OF 5

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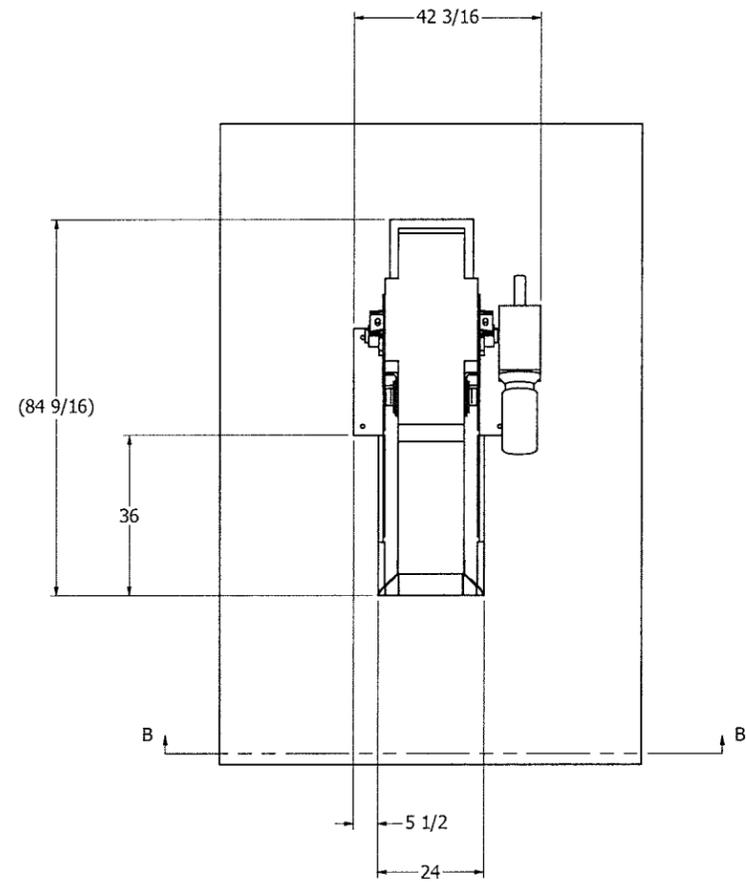
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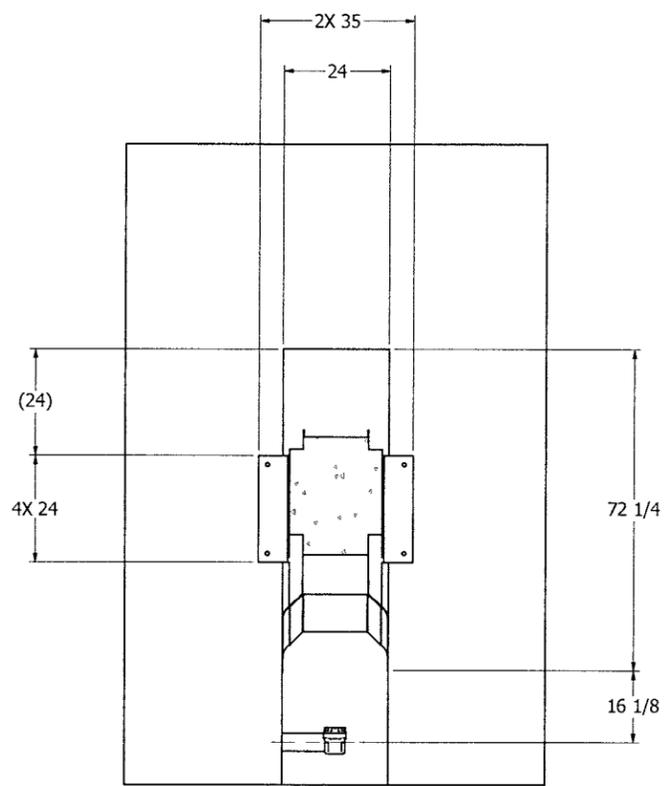
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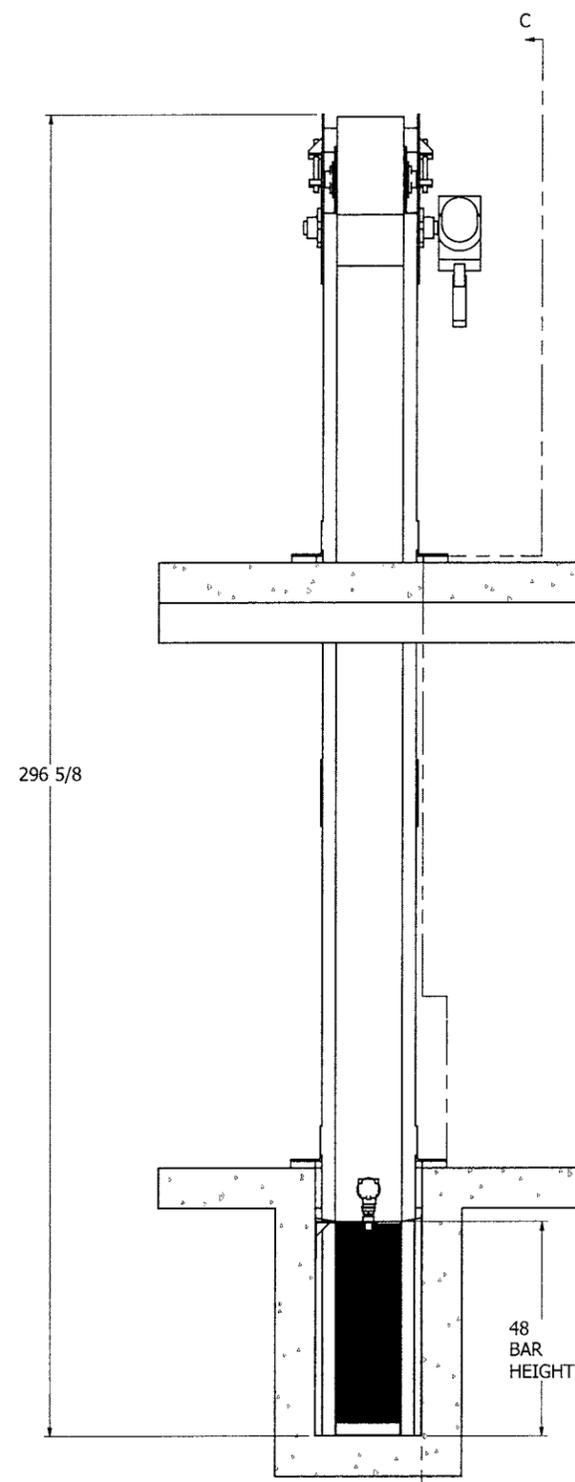


**SECTION A-A
SCALE 1/20**

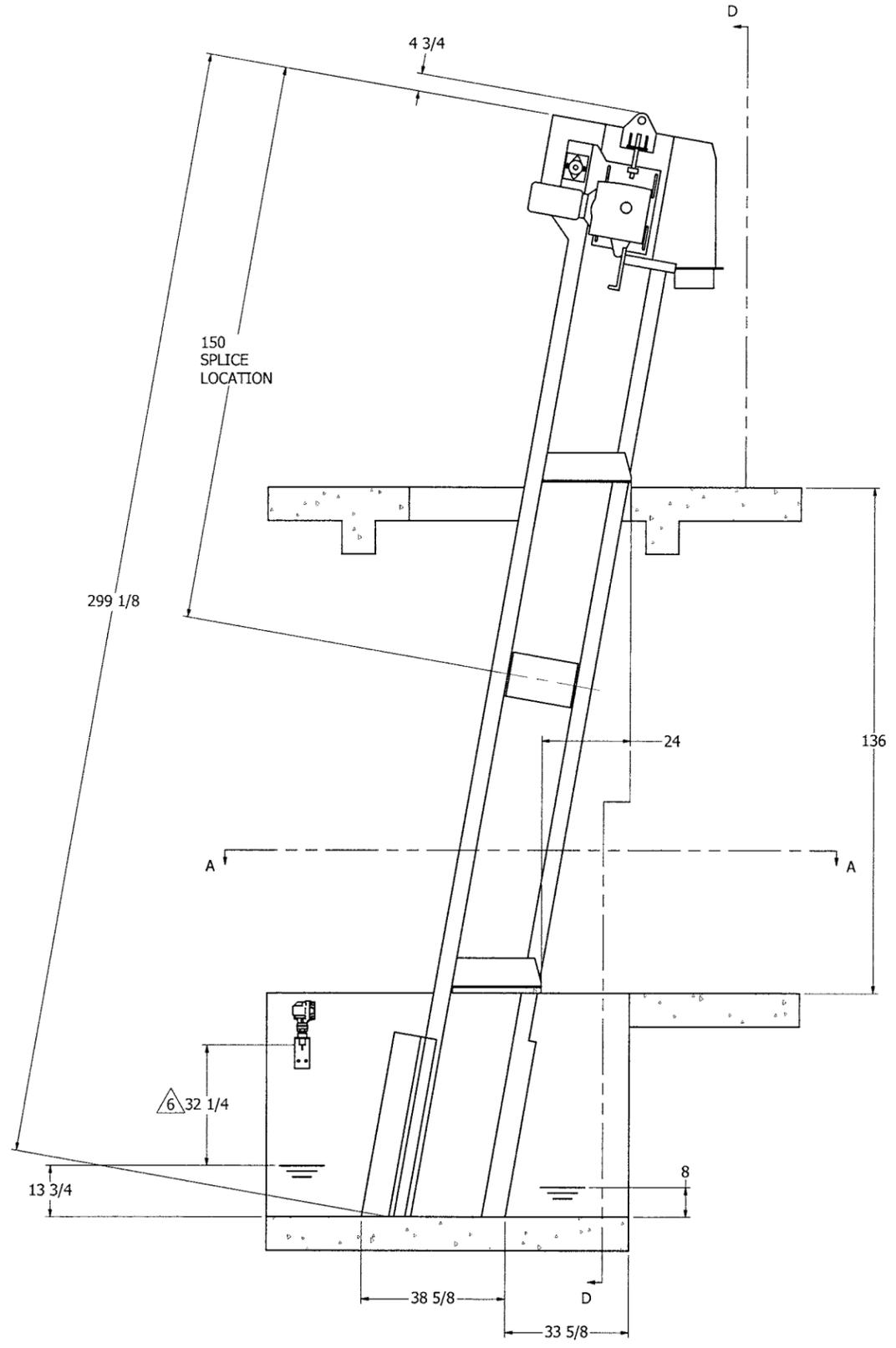
CONTROLLED

JWC JWC ENVIRONMENTAL 290 PAULARINO AVE., COSTA MESA, CA 92626			
MCR GENERAL ARRANGEMENT CHAIN & RAKE MONSTER OGALLALA, NE (OGALLALA WWTP)			
SIZE D	DRAWING NO. MCR024-80-GA-112819	REV B	
SCALE: NONE	<i>SP PL</i>		SHEET 2 OF 5

D
C
B
A



SECTION B-B
SCALE 1/20



SECTION C-C
SCALE 1/20

CONTROLLED

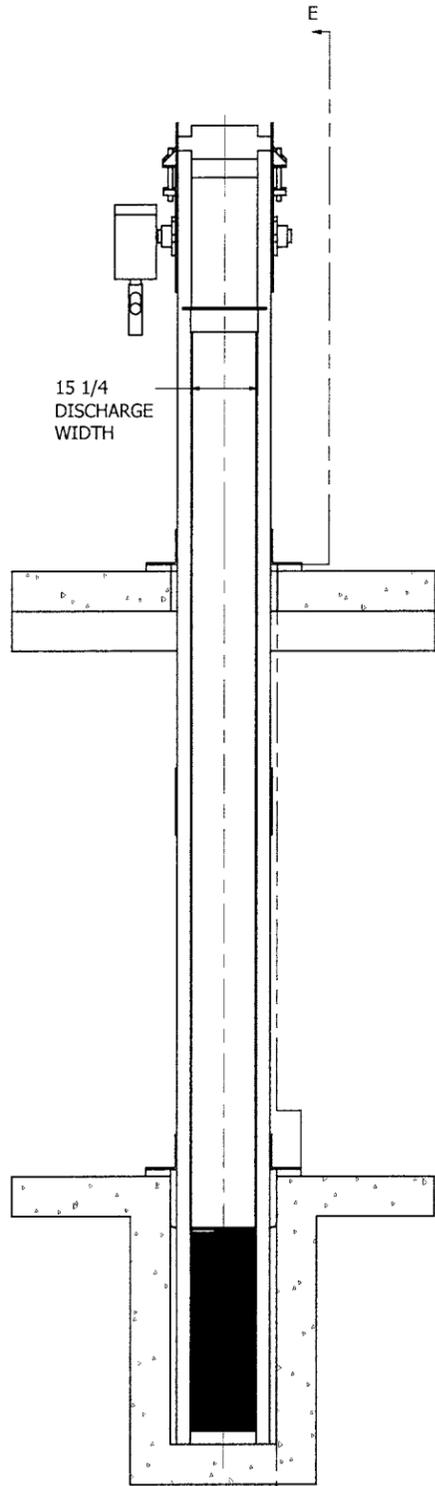
JWC JWC ENVIRONMENTAL 290 PAULARINO AVE, COSTA MESA, CA 92626		
MCR GENERAL ARRANGEMENT CHAIN & RAKE MONSTER OGALLALA, NE (OGALLALA WWTP)		
SIZE D	DRAWING NO. MCR024-80-GA-112819	REV B
SCALE: NONE	<i>SP PL</i>	SHEET 3 OF 5

D

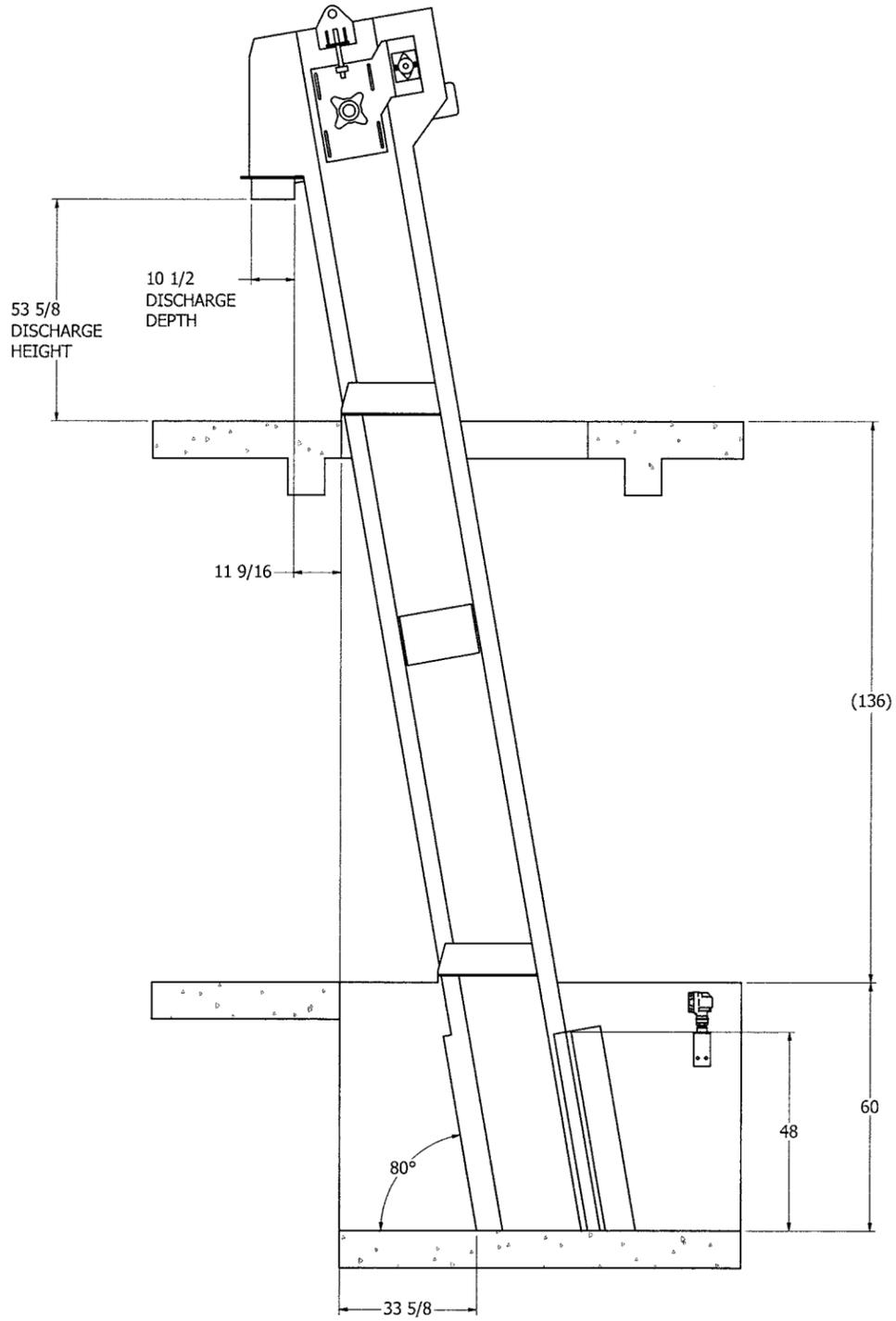
C

B

A



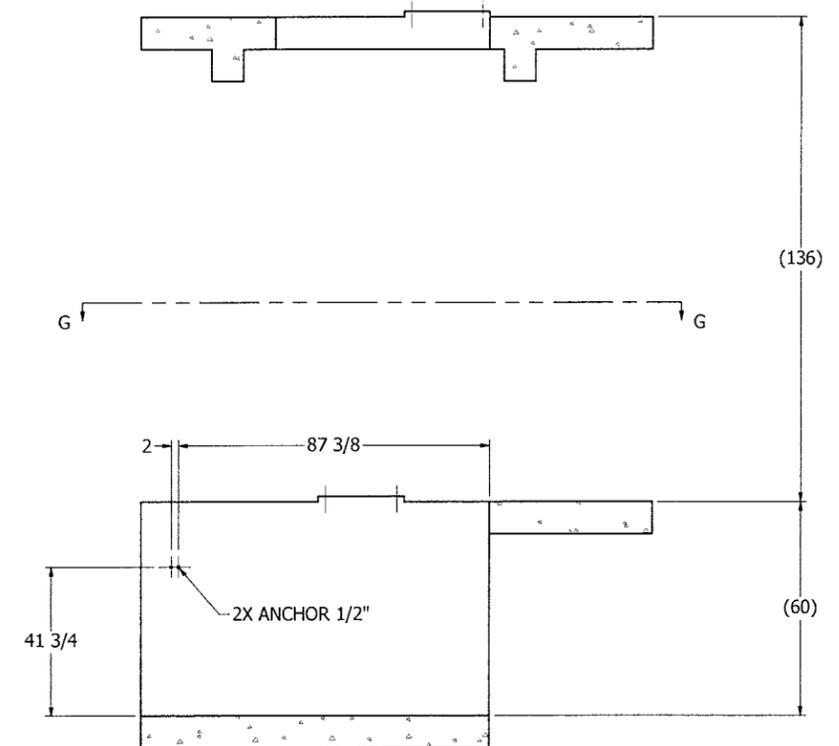
SECTION D-D
SCALE 1/20



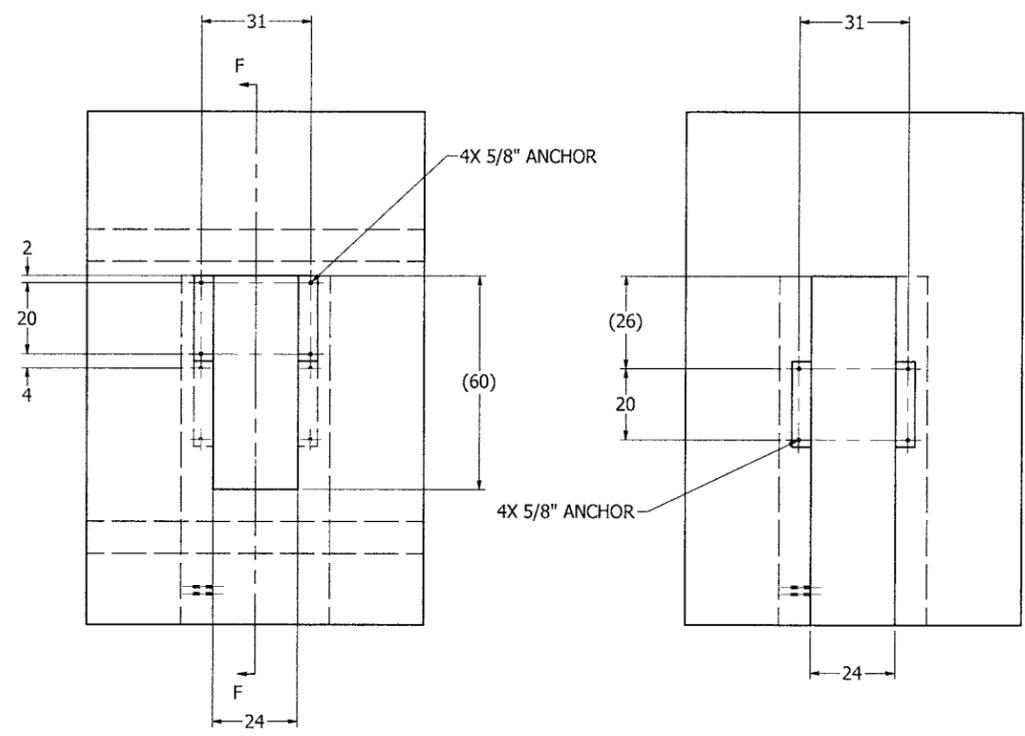
SECTION E-E
SCALE 1/20

CONTROLLED

JWC JWC ENVIRONMENTAL 290 PAULARINO AVE, COSTA MESA, CA 92626		
MCR GENERAL ARRANGEMENT CHAIN & RAKE MONSTER OGALLALA, NE (OGALLALA WWTP)		
SIZE D	DRAWING NO. MCR024-80-GA-112819	REV B
SCALE: NONE	SP PL	SHEET 4 OF 5



SECTION F-F
SCALE 1 / 25



PLAN VIEW EL: 3285.00
SCALE 1 / 25

SECTION G-G
SCALE 1 / 25

CONTROLLED

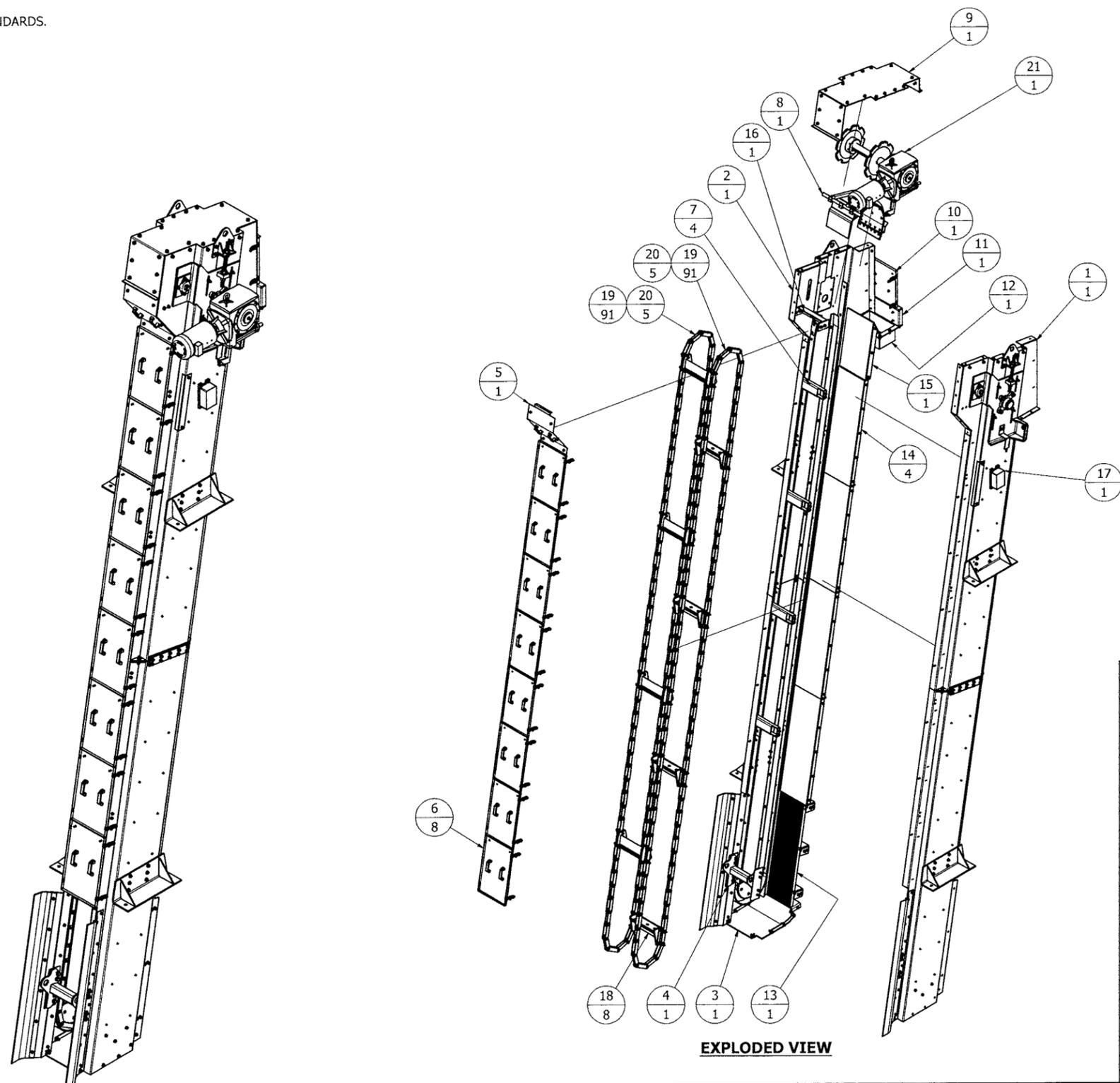
JWC JWC ENVIRONMENTAL 290 PAULARINO AVE, COSTA MESA, CA 92626		
MCR GENERAL ARRANGEMENT CHAIN & RAKE MONSTER OGALLALA, NE (OGALLALA WWTP)		
SIZE D	DRAWING NO. MCR024-80-GA-112819	REV B
SCALE: NONE	[Signature]	SHEET 5 OF 5

DRAWING NO. **MCA6800-112819**

NOTES: (UNLESS OTHERWISE SPECIFIED)

1. INTERPRET DRAWING IN ACCORDANCE WITH ASME Y14.5M-1994 STANDARDS.
2. ASSEMBLY NUMBER IS: MCA6800-112819
3. STANDARD FASTENER MATERIAL IS 18-8 SST.
4. ESTIMATED WEIGHT: 4100 lbs.

REVISION HISTORY								
ZONE	REV	DESCRIPTION	ECO NO.	DATE	CHKD	PE	MFG	QC
	A			9/23/17	RS	RS		



EXPLODED VIEW

CONTROLLED

ITEM	QTY	PART / ASSEMBLY NUMBER	DESCRIPTION
21	1	MCA0400-112819	MOTOR AND GEARBOX ASSEMBLY
20	10	MCC0141-MCR-174	6" PITCH ROLLER CONNECTING LINK FOR MCR
19	182	MCC0140-MCR-174	6" PITCH ROLLER CHAIN LINK FOR MCR
18	8	MCA0180-112819	COMB CARRIER ASSEMBLY
17	1	E01-100-514	ADALET XIFC030603 JUNCTION BOX
16	1	MCA0122-112819	SCRAPER STOP ASSEMBLY
15	1	MCA0131-112819	UPPER DEAD PLATE ASSEMBLY
14	4	MCA0130L-112819	LOWER DEAD PLATE ASSEMBLY
13	1	MCA0090-112819	BAR SCREEN ASSEMBLY
12	1	MCA0390-112819	DISCHARGE CHUTE ASSEMBLY
11	1	MCA0310-112819	LOWER REAR COVER ASSEMBLY
10	1	MCA0330-112819	DISCHARGE COVER ASSEMBLY
9	1	MCA0030-112819	TOP COVER ASSEMBLY
8	1	MCA0120-112819	SCRAPER ASSEMBLY
7	4	MCA0040-112819	FRONT CROSS BRACE ASSEMBLY
6	8	MCA0295-112819	FRONT MIDDLE COVER ASSEMBLY
5	1	MCA0270-112819	FRONT UPPER COVER ASSEMBLY
4	1	MCA0190-112819	TEMPORARY LIFTING BAR ASSEMBLY
3	1	MCA0080-112819	BOTTOM PLATE ASSEMBLY
2	1	MCA0010-112819	LEFT SIDE FRAME ASSEMBLY
1	1	MCA0020-112819	RIGHT SIDE FRAME ASSEMBLY

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	FRACTIONS ± 1/16	DECIMALS .XX ± .03 .XXX ± .005	ANGLES ± 1/2°	
	MATERIAL	304 SST GEN CONST	APPROVALS	DATE
	FINISH	✓ ✓	DRAWN B. BOWLING	9/22/17
	DO NOT SCALE DRAWING	CHECKED R. SANCHEZ	9/23/17	
		MANUF.		
		Q.C.		

JWC ENVIRONMENTAL
2850 S. RED HILL AVE, SUITE 125, SANTA ANA, CA 92705

SCREEN ASSEMBLY DRAWING
MONSTER CHAIN AND RAKE
OGALLALA, NE (OGALLALA WWTP)

SIZE: **D** DRAWING NO. **MCA6800-112819** REV **A**

SCALE: NTS CAD MODEL: MCR-112819 SHEET 1 OF 1

NOTES: UNLESS OTHERWISE SPECIFIED.

- ESTIMATED EQUIPMENT DRY WEIGHT: 3200LBS, EACH SEGMENT 1600 LBS.
- S/N 112819-1-1

REVISIONS					
ZONE	LTR	DESCRIPTION	ECO NO.	DATE	APPROVED
ALL	A	INITIAL RELEASE		9/15/17	[Signature]

D

D

C

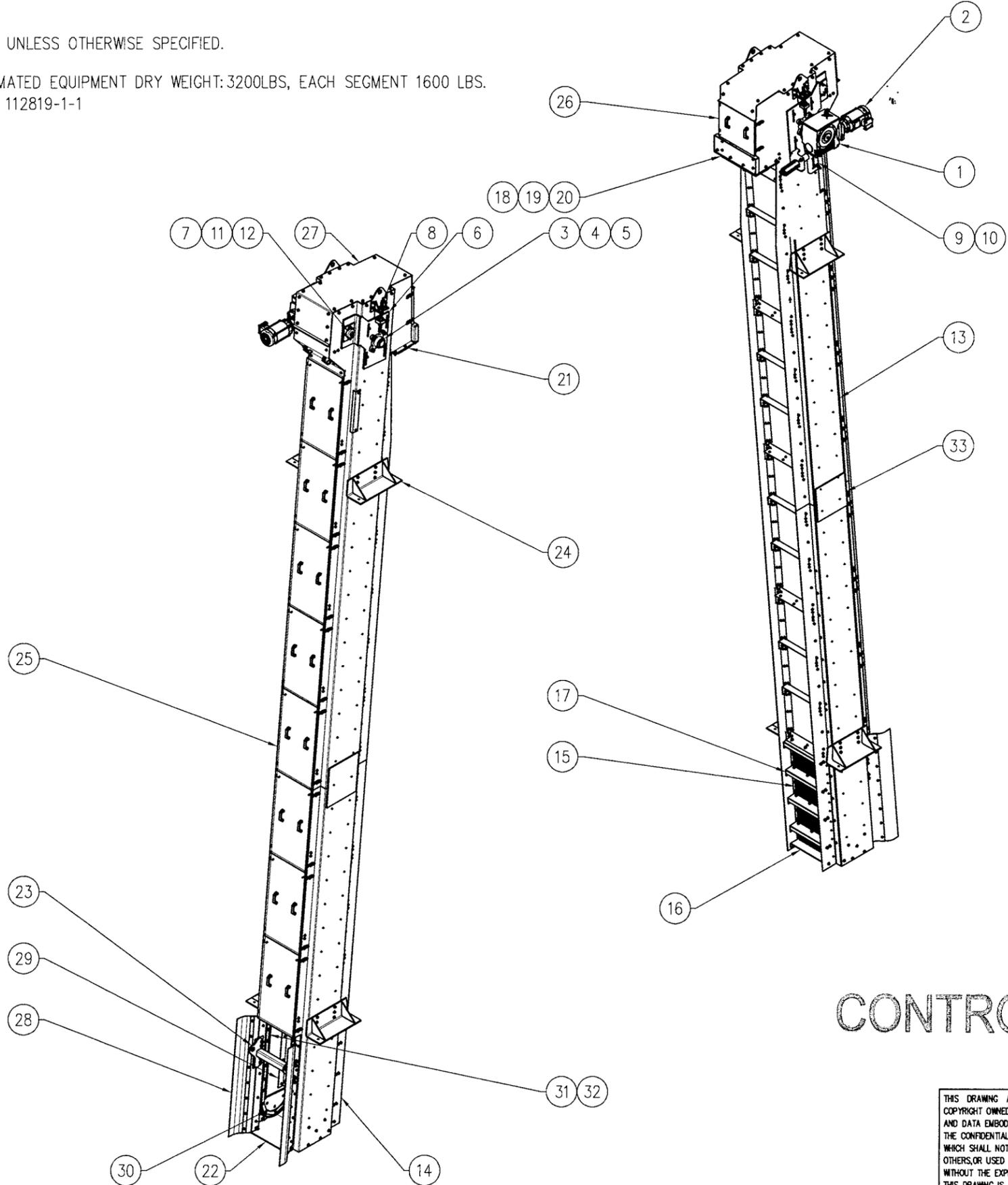
C

B

B

A

A



CONTROLLED

ITEM NO.	QTY REQD	PART NO.	NOMENCLATURE OR DESCRIPTION	SPECIFICATION OR MATERIAL
33	2		SPLICE PLATE	304 SST
32	6		RAKE ASSEMBLY	304 SST
31	2		CHAIN ASSY., 6" (100 LINKS EACH)	316/17-4 SST
30	2		BOTTOM CHAIN GUIDE	304 SST
29	1		INNER CHAIN ANGLE, SET	304 SST
28	2		INLET DEFLECTOR/SEAL	304/NEOPRENE
27	1		COVER, TOP	304 SST
26	1		SCREEN COVER, REAR	304 SST
25	1		SCREEN COVER, SET - FRONT	304 SST
24	4		MOUNTING ANGLE	304 SST
23	1		TEMPORARY LIFTING BAIL (REMOVE ON INSTALL)	STEEL (SST SHIMS)
22	1		BOTTOM PLATE	304 SST
21	1		DISCHARGE CHUTE	304 SST
20	1		DEBRIS PLATE SUPPORT ANGLE, SET	304 SST
19	1		DEBRIS PLATE.	304 SST
18	1		DISCHARGE PLATE.	304 SST
17	4		UPPER GRID SUPPORT CHANNEL	304 SST
16	1		LOWER GRID SUPPORT CHANNEL.	304 SST
15	1		BAR RACK TAPER (1/4 X 5/16 X 1 9/16 BARS, 1/4 GAP)	304 SST
14	2		SIDE PLATE, RIGHT	304 SST
13	2		SIDE PLATE, LEFT	304 SST
12	1		WIPER STOP ANGLE.	304 SST
11	1		WIPER ASSEMBLY	304 SST/UHMW
10	1		JUNCTION BOX, NEMA 7	AL
9	1		TORQUE ARM BRACKET.	AL/PEPPERL FUCHS
8	2		TAKE-UP SCREW.	304 SST
7	2		SCRAPPER BEARING - (F2B-GTM-103 #126285)	DODGE
6	2		BEARING TAKE-UP PLATE.	304 SST
5	1		DRIVE SHAFT	304 SST
4	2		SPROCKET	304 SST
3	2		MAIN DRIVE BEARING - (F4B-GTM-215 #126196)	DODGE
2	1		MOTOR, 1.5HP XPFC 460V/3PH/60HZ 145TC	BALDOR# CEM7034T
1	1		HELICAL REDUCER 380.39:1, 2-3/4" BORE	NORD# SK43125 AZH-140TC

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
 TOLERANCES ARE:
 FRACTIONS DECIMALS ANGLES
 $\pm 1/16$.XX $\pm .01$ $\pm .5$
 .XXX $\pm .005$

CONTRACT NO.		JWC ENVIRONMENTAL 2600 South Gornsey, Santa Ana, California 92707	
APPROVALS	DATE	MCR ASSEMBLY	
DRAWN R. ULLON	9/1/17	CHAIN & RAKE MONSTER	
CHECKED [Signature]		OGALLALA, NE (OGALLALA WWTP)	
MANUF.		SIZE	CODE IDENT NO.
QUALITY		D	53242
DRAWING NO.		MCR0024-80-A-112819	
REVISION		A	

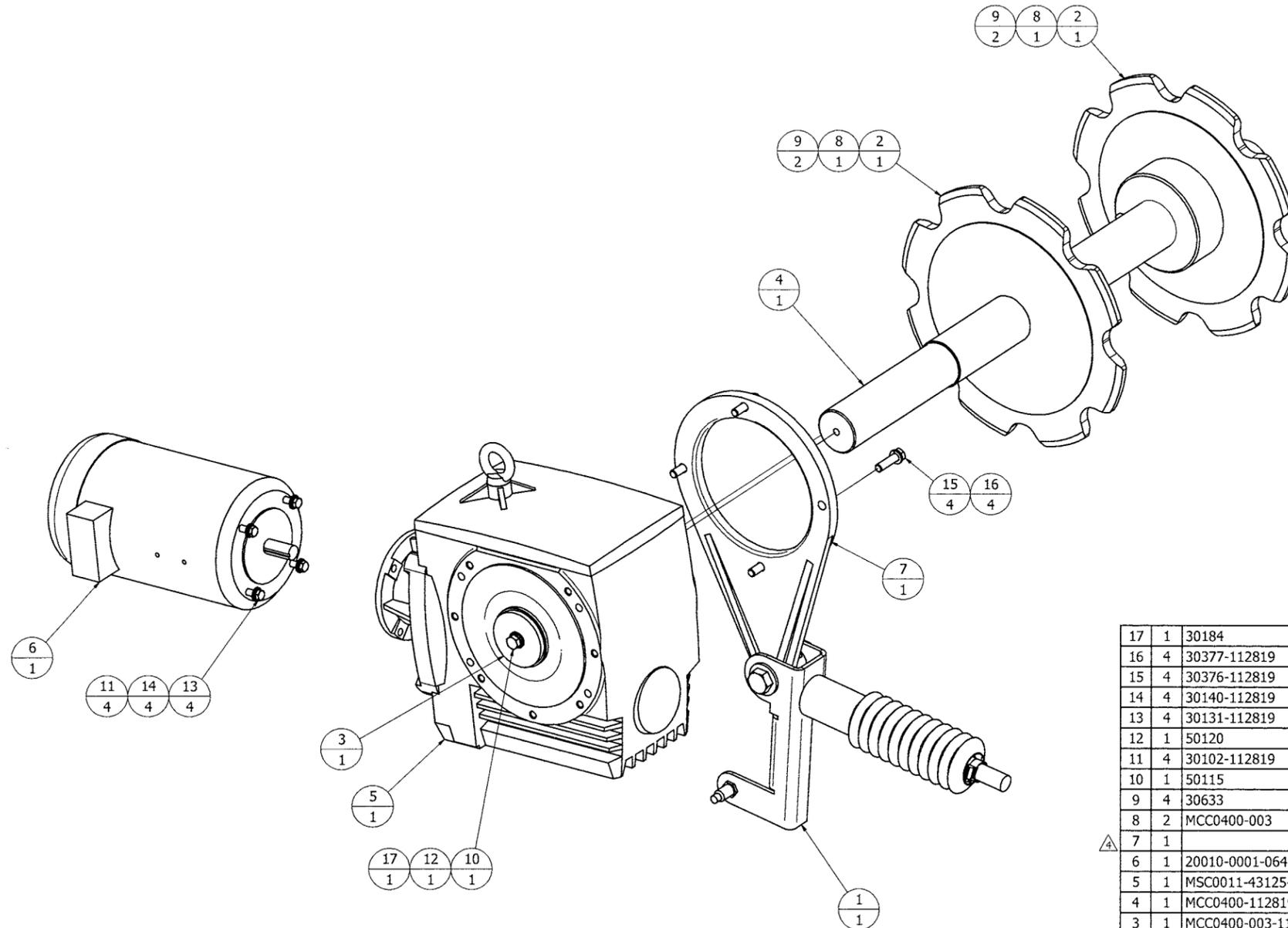
DO NOT SCALE DRAWING

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REVISION HISTORY						
ZONE	REV	DESCRIPTION	ECO NO.	DATE	CHKD	PE
ALL	A	INITIAL RELEASE		9/22/17	MS	JW

NOTES: (UNLESS OTHERWISE SPECIFIED)

1. INTERPRET DRAWING IN ACCORDANCE WITH ASME Y14.5M-1994 STANDARDS.
2. ASSEMBLY NUMBER IS: MCA0400-112819
3. STANDARD FASTENER MATERIAL IS 18-8 SST.
4. PROVIDED WITH GEARBOX (ITEM 5).



CONTROLLED

ITEM	QTY	PART / ASSEMBLY NUMBER	DESCRIPTION	MATERIAL
17	1	30184	WASHER, FLAT 1/2	SST
16	4	30377-112819	LOCK WASHER M12 SPLIT	SST
15	4	30376-112819	HHCS M12-1.75 X 45	SST
14	4	30140-112819	LOCK WASHER 3/8 SPLIT	SST
13	4	30131-112819	HHCS 3/8-16 X 1-1/4 F/T	SST
12	1	50120	WASHER, LOCK 1/2	SST
11	4	30102-112819	FLAT WASHER 3/8	SST
10	1	50115	HHCS 1/2-13 X 1 1/2	SST
9	4	30633	HEX SOCKET SET SCREW, CONE POINT, M10 X 25	SST
8	2	MCC0400-003	SQUARE TAPERED GIB KEY, REF. MC MASTER-CARR: 98471A361	304 SST
7	1		43125 TORQUE ARM	CAST AL.
6	1	20010-0001-064	1.5HP TEXP 460V 145TC 1.0SF 3PH 60HZ 1800RPM C-FACE BALDOR# CEM7034T	
5	1	MSC0011-43125-380.39-2.750-TA	GEARBOX, 2-3/4" BORE, 380.39:1 RATIO WITH TORQUE ARM	
4	1	MCC0400-112819	DRIVE SHAFT	304 SST
3	1	MCC0400-003-112819	GEARBOX RETAINING CAP	304 SST
2	2	MCC0400-001-112819	CHAIN SPROCKET, 6" PITCH	316 SST
1	1	MCA0360-01-112819	TORQUE OVERLOAD ASSEMBLY	304 SST

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	<p>MATERIAL</p> <p>AS NOTED</p>	<p>CHECKED</p> <p>MANUF.</p>		<p>SCALE: NTS</p> <p>CAD MODEL: MCA0400-112819</p>
	<p>FINISH 250/(CAST) 125/(MACHINED)</p> <p>UNLESS OTHERWISE SPECIFIED</p>	<p>Q.C.</p>		<p>SIZE</p> <p>D</p>
	<p>DO NOT SCALE DRAWING</p>	<p>DATE</p> <p>9/22/17</p>		<p>DRAWING NO.</p> <p>MCA0400-112819</p>

BALDOR® • ***RELIANCE***

Product Information Packet

CEM7034T

1.5//1HP, 1760//1460RPM, 3PH, 60//50HZ, 145T

Part Detail							
Revision:	P	Status:	PRD/A	Change #:		Proprietary:	No
Type:	AC	Elec. Spec:	35WGM493	CD Diagram:	CD0005	Mfg Plant:	
Mech. Spec:	35E377	Layout:	35LYE377	Poles:	04	Created Date:	09-27-2010
Base:	RG	Eff. Date:	10-10-2017	Leads:	9#18		

Specs			
Catalog Number:	CEM7034T	Front Shaft Indicator:	None
Enclosure:	XPFC	Heater Indicator:	No Heater
Frame:	145TC	Insulation Class:	B
Frame Material:	Steel	Inverter Code:	Not Inverter
Output @ Frequency:	1.500 HP @ 60 HZ	KVA Code:	L
	1.000 HP @ 50 HZ	Lifting Lugs:	No Lifting Lugs
Synchronous Speed @ Frequency:	1800 RPM @ 60 HZ	Locked Bearing Indicator:	Locked Bearing
Voltage @ Frequency:	460.0 V @ 60 HZ	Motor Lead Quantity/Wire Size:	9 @ 18 AWG
	190.0 V @ 50 HZ	Motor Lead Exit:	Ko Box
	230.0 V @ 60 HZ	Motor Lead Termination:	Flying Leads
	380.0 V @ 50 HZ	Motor Type:	3526M
XP Class and Group:	CLI GP D; CLII GP F,G	Mounting Arrangement:	F1
XP Division:	Division I	Power Factor:	73
Agency Approvals:	UL	Product Family:	General Purpose
	CSA	Pulley End Bearing Type:	Ball
Auxillary Box:	No Auxillary Box	Pulley Face Code:	C-Face
Auxillary Box Lead Termination:	None	Pulley Shaft Indicator:	Standard
Base Indicator:	Rigid	Rodent Screen:	None

Bearing Grease Type:	Polyrex EM (-20F +300F)	RoHS Status:	ROHS COMPLIANT
Blower:	None	Shaft Extension Location:	Pulley End
Current @ Voltage:	1.900 A @ 380.0 V	Shaft Ground Indicator:	No Shaft Grounding
	2.200 A @ 460.0 V	Shaft Rotation:	Reversible
	3.800 A @ 190.0 V	Shaft Slinger Indicator:	No Slinger
	4.400 A @ 230.0 V	Speed Code:	Single Speed
	4.500 A @ 208.0 V	Motor Standards:	NEMA
Design Code:	B	Starting Method:	Direct on line
Drip Cover:	No Drip Cover	Thermal Device - Bearing:	None
Duty Rating:	CONT	Thermal Device - Winding:	Normally Closed Thermostat
Electrically Isolated Bearing:	Not Electrically Isolated	Vibration Sensor Indicator:	No Vibration Sensor
Feedback Device:	NO FEEDBACK	Winding Thermal 1:	None
Front Face Code:	Standard	Winding Thermal 2:	None
		XP Temp Code:	T3C

Nameplate NP1426XPSLEV	
NO.	<input type="text"/> CC 010A
SER.	<input type="text"/>
SPEC.	35E377M493G1
CAT.NO.	CEM7034T
HP	1.5//1 T. CODE T3C
VOLTS	230/460//190/380
AMPS	4.4/2.2//3.8/1.9
RPM	1760//1460
HZ	60//50 PH 3 CL B
SER.F.	1.00 DES B CODE L
RATING	40C AMB-CONT
FRAME	145TC NEMA-NOM-EFF 86.5
USABLE AT 208V	4.5 PF 73
BLANK	<input type="text"/>

Parts List		
Part Number	Description	Quantity
SA203654	SA 35E377M493G1	1.000 EA
RA190914	RA 35E377M493G1	1.000 EA
34FN3002B01	EXTERNAL FAN, PLASTIC, .637/.639 HUB W/	1.000 EA
35CB3001A02SP	EXPL PROOF CONDUIT BOX, 3/4"PIPE TAP LEA	1.000 EA
11XW1032G06	10-32 X .38, TAPTITE II, HEX WSHR SLTD U	1.000 EA
HW3001B01	BRASS CUP WASHER, FOR #8 SCREW	1.000 EA
35EP3700A01SP	FR ENDPLATE, XPFC	1.000 EA
HW5100A03	WAVY WASHER (W1543-017)	1.000 EA
35EP3702A01SP	PU EP-205 BRG-35X-56C-143-5TC	1.000 EA
51XN1032A18	10-32 X 1 1/8 HX WS SL SR (ESKAY)	2.000 EA
HA3013A01	1/2-20X5/8 SPL.HX BOLT	2.000 EA
HW3021C06	3/32 DI X .625 PIN (F/S)	2.000 EA
XY3118A12	5/16-18 HEX NUT DIRECTIONAL SERRATION	4.000 EA
35FH4005A01SP	IEC FH NO GREASER W/PRIMED	1.000 EA
51XW1032A06	10-32 X .38, TAPTITE II, HEX WSHR SLTD S	3.000 EA
35CB3500A01SP	CONDUIT BOX LID, MACH	1.000 EA
51XN2520A16	SCREW, HEX WS SLT, ZN, 1/4-20 X 1.00	4.000 EA
HW2501D13	KEY, 3/16 SQ X 1.375	1.000 EA
HA7000A01	KEY RETAINER 7/8" DIA SHAFT	1.000 EA
85XU0407S04	4X1/4 U DRIVE PIN STAINLESS	6.000 EA
NP0018F	ALUM UL XP CONDUIT BOX NAMEPLATE	1.000 EA
MJ1000A02	GREASE, POLYREX EM EXXON (USe 4824-15A)	0.050 LB
51XB1214A16	12-14X1.00 HXWSSLD SERTYB	1.000 EA
MG1025G29	WILKOFAS, 789.229, DARK CHARCOAL GRAY	0.017 GA

Parts List (continued)		
Part Number	Description	Quantity
HA3104A08	THRUBOLT-5/16-18X9.375 X X	4.000 EA
LB1119N	WARNING LABEL	1.000 EA
LC0145B01	CONNECTION LABEL	1.000 EA
NP1426XPSLEV	SS XP UL CSA-EEV CC CL-I GP-D	1.000 EA
36PA1000	PKG GRP, PRINT PK1016A06	1.000 EA
MN416A01	TAG-INSTAL-MAINT no wire (1100/bx) 11/14	1.000 EA

AC Induction Motor Performance Data

Record # 35582 - Typical performance - not guaranteed values

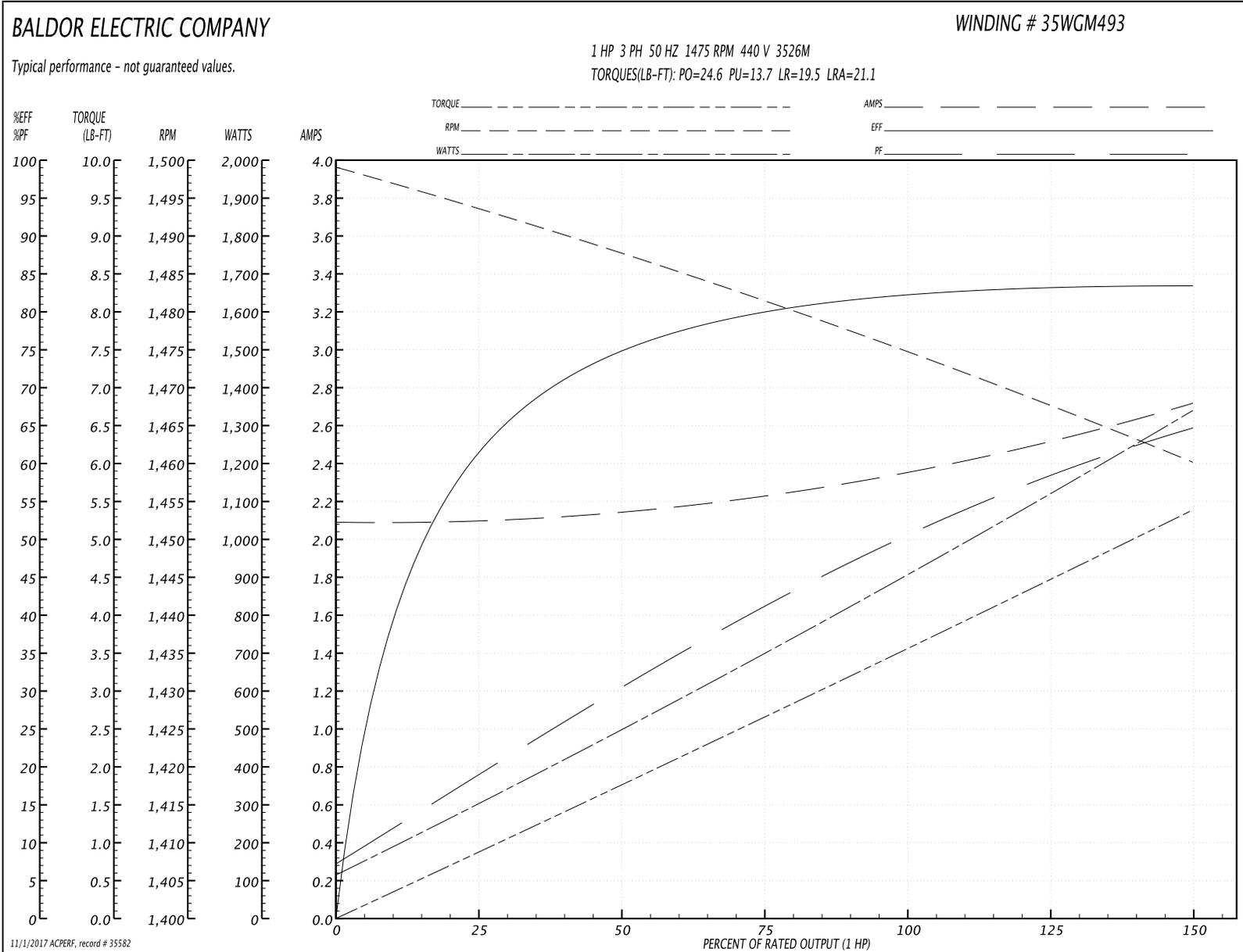
Winding: 35WGM493-R009	Type: 3526M	Enclosure: XPFC
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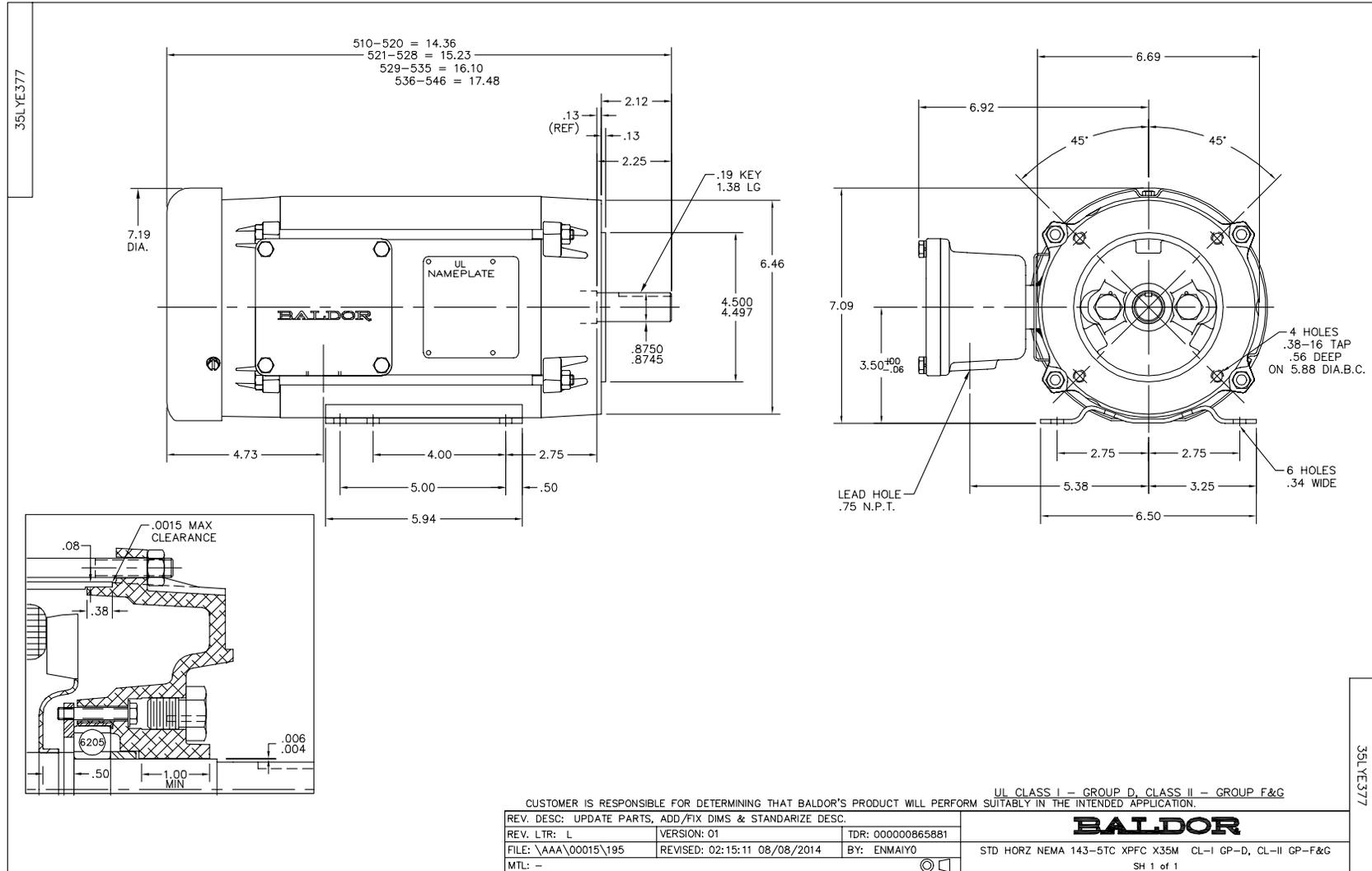
Nameplate Data				440 V, 50 Hz: High Voltage Connection	
Rated Output (HP)	1.5//1			Full Load Torque	3.56 LB-FT
Volts	230/460//220/440			Start Configuration	direct on line
Full Load Amps	4.4/2.2//4.8/2.4			Breakdown Torque	24.6 LB-FT
R.P.M.	1760//1460			Pull-up Torque	13.7 LB-FT
Hz	60//50	Phase	3	Locked-rotor Torque	19.5 LB-FT
NEMA Design Code	B	KVA Code	L	Starting Current	21.1 A
Service Factor (S.F.)	1			No-load Current	2.09 A
NEMA Nom. Eff.	86.5	Power Factor	73	Line-line Res. @ 25°C	10.1 Ω
Rating - Duty	40C AMB-CONT			Temp. Rise @ Rated Load	46°C
S.F. Amps				Temp. Rise @ S.F. Load	51°C
				Locked-rotor Power Factor	59.7
				Rotor inertia	0.154 LB-FT ²

Load Characteristics 440 V, 50 Hz, 1 HP

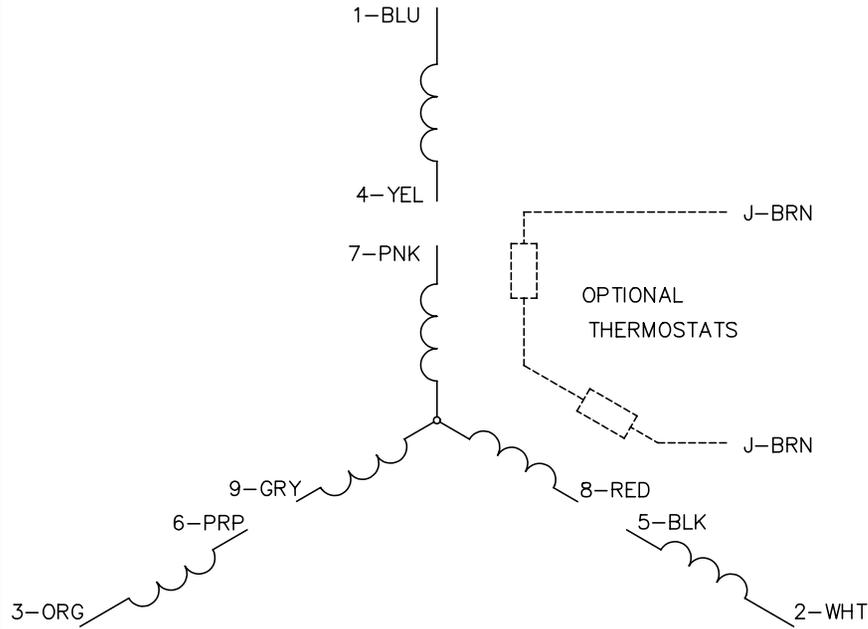
% of Rated Load	25	50	75	100	125	150
Power Factor	19	30	41	51	58	65
Efficiency	60.7	74.3	79.9	82.4	83.3	83.4
Speed	1494	1488	1481	1475	1468	1460
Line amperes	2.1	2.14	2.22	2.35	2.53	2.71

Performance Graph at 440V, 50Hz, 1.0HP Typical performance - Not guaranteed values

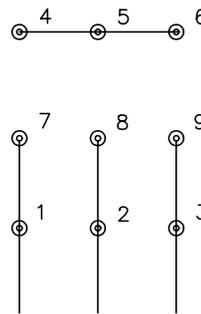




CD0005

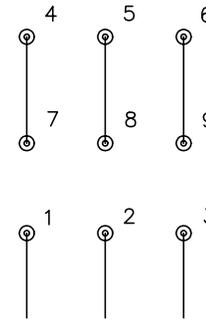


LOW VOLTAGE
(2Y)



LINE

HIGH VOLTAGE
(1Y)



LINE

NOTES:

1. INTERCHANGE ANY TWO LINE LEADS TO REVERSE ROTATION.
2. OPTIONAL THERMOSTATS ARE PROVIDED WHEN SPECIFIED.
3. ACTUAL NUMBER OF INTERNAL PARALLEL CIRCUITS MAY BE A MULTIPLE OF THOSE SHOWN ABOVE.
4. LEAD COLORS ARE OPTIONAL. LEADS MUST ALWAYS BE NUMBERED AS SHOWN.

REV. DESC: REVISE TO SHOW OPTIONAL COLORS			
REV. LTR: E	BY: JLP	REVISED: 01/19/99 10:15	TDR: 0171435
900000		FILE: AAA00005140	MDL: -
		MTL: -	

BALDOR ELECTRIC Co.

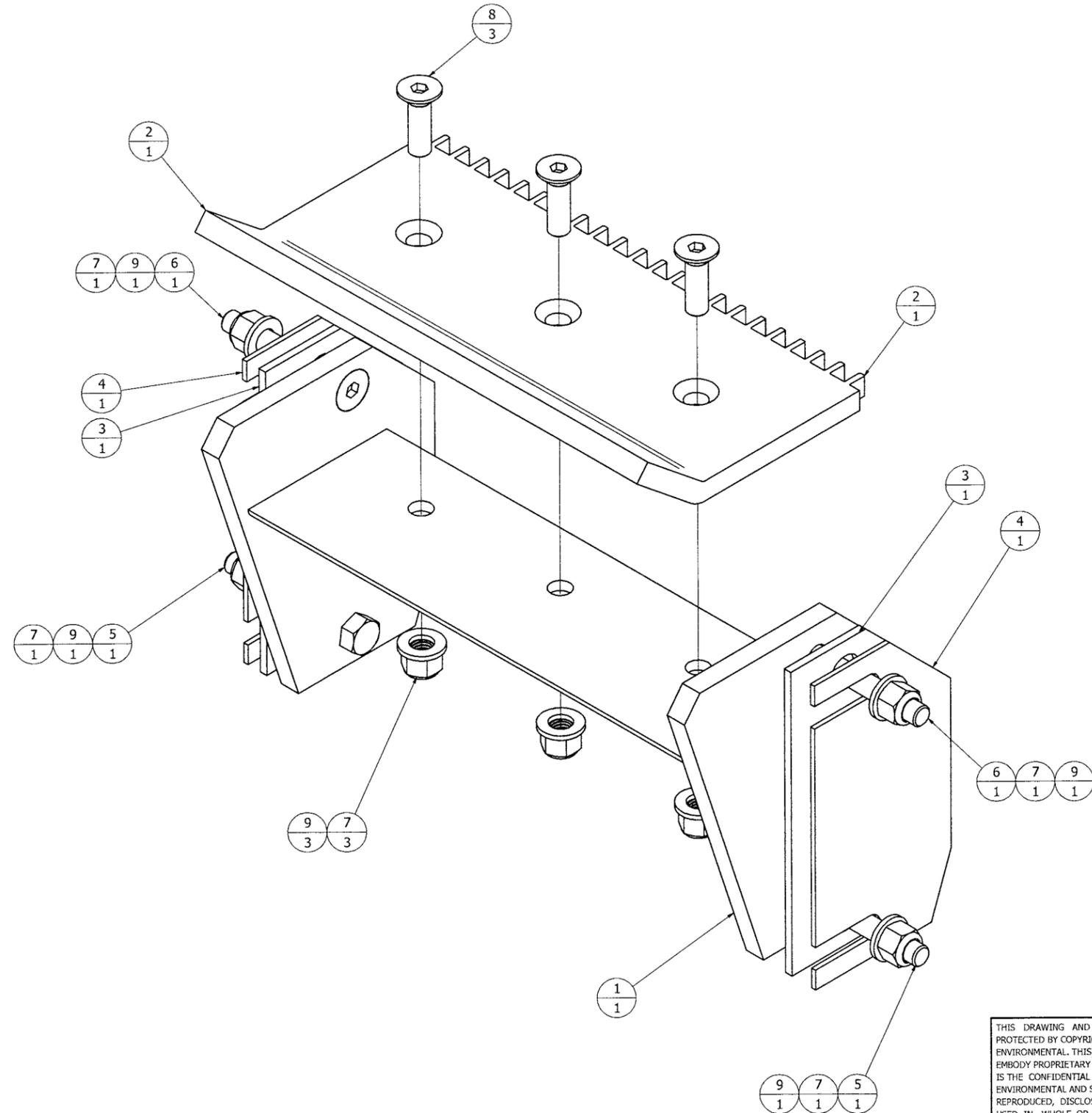
3PH, DV, 9 LEADS

CD0005

REVISION HISTORY								
ZONE	REV	DESCRIPTION	ECO NO.	DATE	CHKD	PE	MFG	QC
ALL	A	INITIAL RELEASE		9/28/17	RS	RL		

NOTES: (UNLESS OTHERWISE SPECIFIED)

1. INTERPRET DRAWING IN ACCORDANCE WITH ASME Y14.5M-1994 STANDARDS.
2. ASSEMBLY NUMBER IS: MCA0180-112819
3. STANDARD FASTENER MATERIAL IS 18-8 SST.



CONTROLLED

ITEM	QTY	PART / ASSEMBLY NUMBER	DESCRIPTION	MATERIAL
9	7	30535	FLAT WASHER, M12	SST
8	3	FHSCS M12 X 40	FHSCS, M12 X 40	SST
7	7	30534	HEX NUT, M12 NYLOCK	SST
6	2	30919	FHSCS, M12 X 90	SST
5	2	30533	HHCS, M12 X 90	SST
4	2	MCC0180-006-112819	COMB CARRIER SHIM	304 SST
3	2	MCC0180-005-112819	COMB CARRIER WEAR PLATE	UHMW
2	1	MCC0181-112819	COMB	304 SST
1	1	MCC0180-112819	COMB CARRIER WELDMENT	304 SST

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UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES [mm]			CONTRACT NO.	
FRACTIONS ± 1/16	DECIMALS .XX ± .03 .XXX ± .005	ANGLES ± 1/2°	APPROVALS	DATE
MATERIAL AS NOTED			DRAWN B. BOWLING	9/22/17
FINISH 250 / 125 (CAST) / (MACHINED)			CHECKED R. SABEL	9/28/17
DO NOT SCALE DRAWING			MANUF.	
			Q.C.	

JWC JWC ENVIRONMENTAL 2850 S. RED HILL AVE, SUITE 125, SANTA ANA, CA 92705			
COMB CARRIER ASSEMBLY MCA6800-112819 - SCREEN ASSEMBLY OGALLALA, NE (OGALLALA WWTP)			
SIZE D	DRAWING NO. MCA0180-112819	REV A	
SCALE: NTS	CAD MODEL: MCA0180-112819	SHEET 1 OF 1	

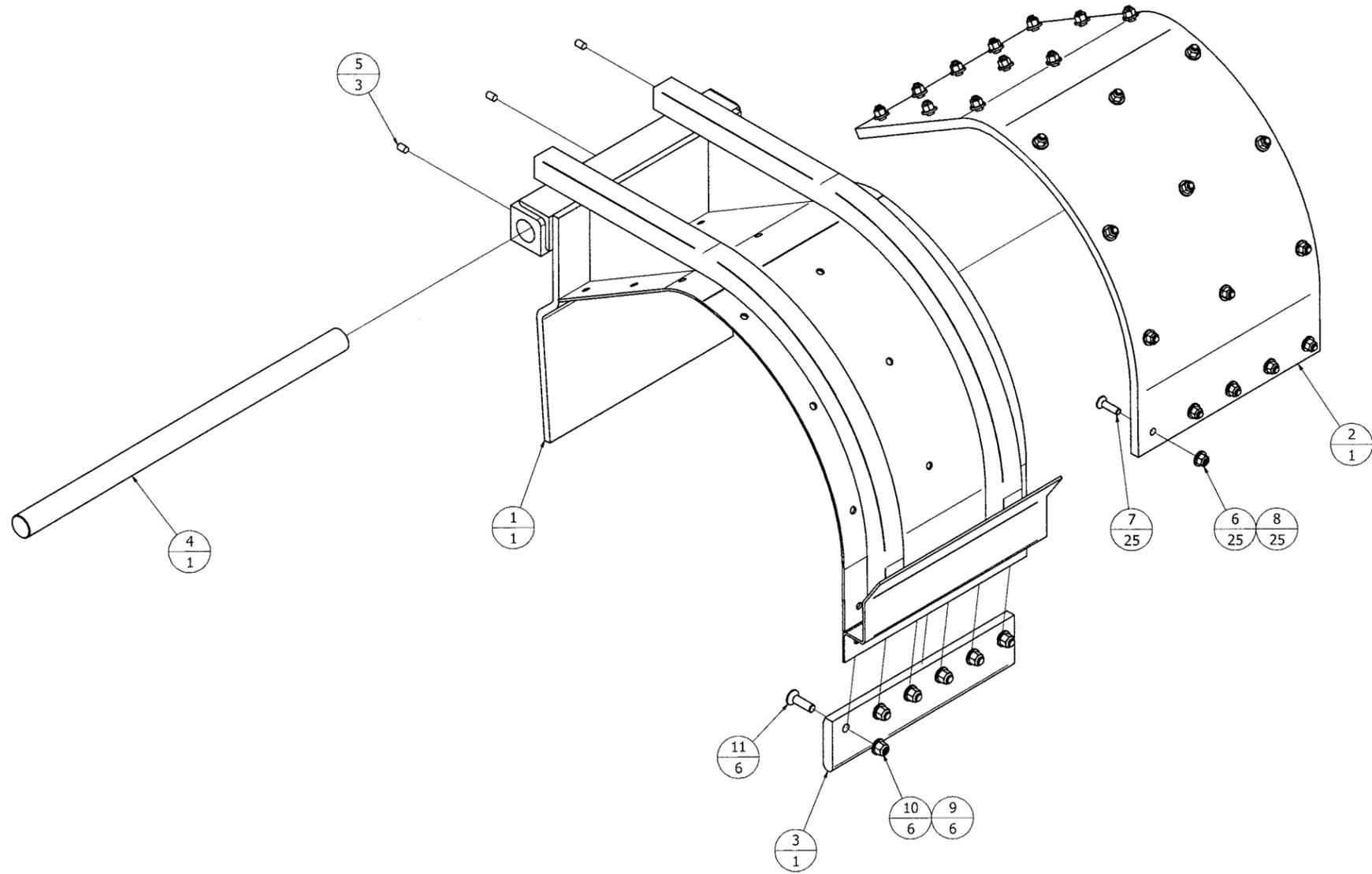
DRAWING NO. **MCA0120-112819**

6 5 4 3 2 1

REVISION HISTORY								
ZONE	REV	DESCRIPTION	ECO NO.	DATE	CHKD	PE	MFG	QC
ALL	A	INITIAL RELEASE		7/28/17	RS	RS		

NOTES: (UNLESS OTHERWISE SPECIFIED)

1. INTERPRET DRAWING IN ACCORDANCE WITH ASME Y14.5M-1994 STANDARDS.
2. ASSEMBLY NUMBER IS: MCA0120-112819
3. STANDARD FASTENER MATERIAL IS 18-8 SST.



CONTROLLED

ITEM	QTY	PART / ASSEMBLY NUMBER	DESCRIPTION	MATERIAL
11	6	21044	FHSCS, M10 X 35	SST
10	6	21045	HEX NUT, M10 NYLOCK	SST
9	6	21016-SS	FLAT WASHER, M10	SST
8	25	21009-SS	FLAT WASHER, M8	SST
7	25	21052	FHSCS, M8 X 20	SST
6	25	21040	HEX NUT, M8 NYLOCK	SST
5	3	30682	HEX SOCKET SET SCREW, CONE POINT, M8	SST
4	1	MCC0120-010-112819	AXLE BAR, SCRAPER	304 SST
3	1	MCC0120-009-112819	BLADE, SCRAPER	UHMW
2	1	MCC0121-112819	WEAR SHEET, SCRAPER	UHMW
1	1	MCC0120-112819	SCRAPER WELDMENT	304 SST

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UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES [mm]		CONTRACT NO.	
FRACTIONS ± 1/16	DECIMALS .XX ± .03 .XXX ± .005	APPROVALS	DATE
MATERIAL AS NOTED		B. BOWLING	9/22/17
FINISH 250 / (CAST) 125 / (MACHINED) UNLESS OTHERWISE SPECIFIED		CHECKED	MANUF.
DO NOT SCALE DRAWING		Q.C.	

JWC JWC ENVIRONMENTAL
2850 S. RED HILL AVE, SUITE 125, SANTA ANA, CA 92705

SCRAPER ASSEMBLY
MCA6800-112819 - SCREEN ASSEMBLY
OGALLALA, NE (OGALLALA WWTP)

SIZE **D** DRAWING NO. **MCA0120-112819** REV **A**

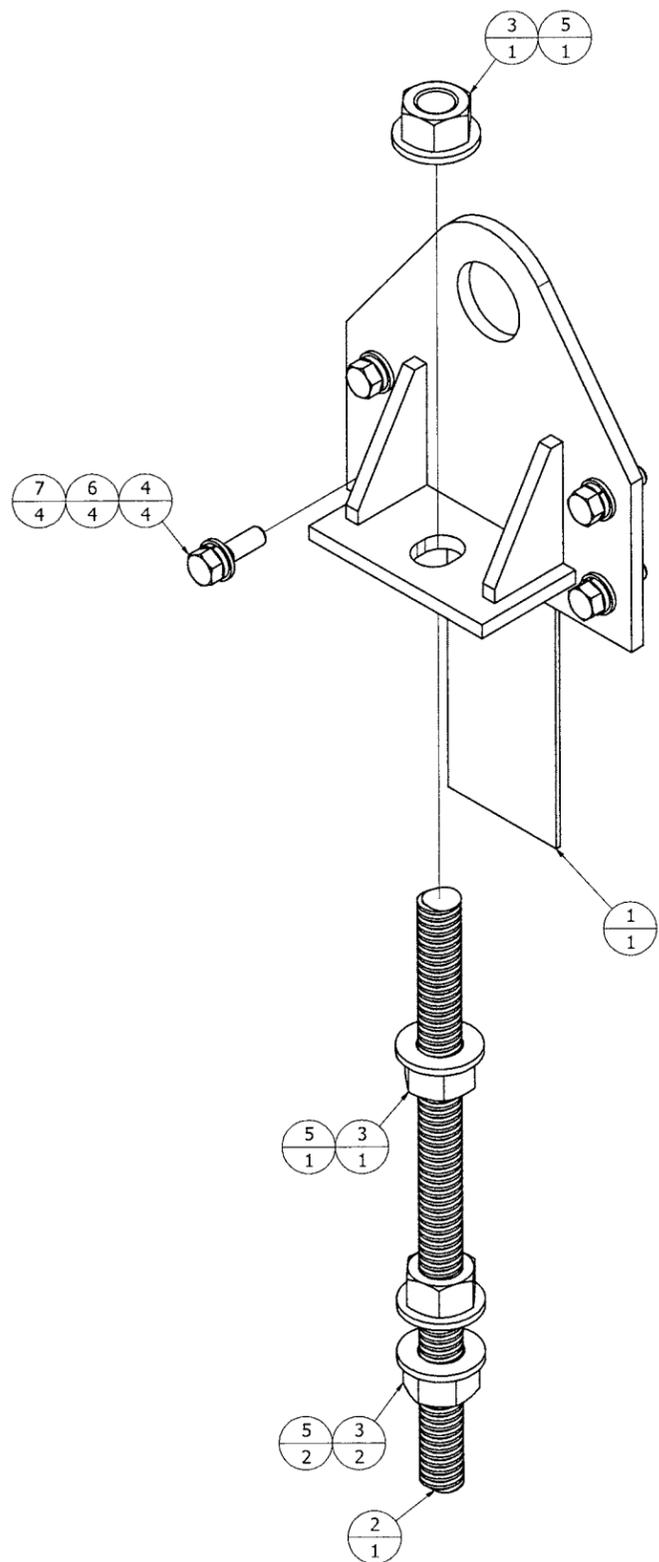
SCALE: NTS CAD MODEL: MCA0120-112819 SHEET 1 OF 1

8 7 6 5 4 3 2 1

REVISION HISTORY								
ZONE	REV	DESCRIPTION	ECO NO.	DATE	CHKD	PE	MFG	QC
ALL	A	INITIAL RELEASE		9/28/17	RS	RS		

NOTES: (UNLESS OTHERWISE SPECIFIED)

1. INTERPRET DRAWING IN ACCORDANCE WITH ASME Y14.5M-1994 STANDARDS.
2. ASSEMBLY NUMBER IS: MCA0380-112819
3. STANDARD FASTENER MATERIAL IS 18-8 SST.



CONTROLLED

ITEM	QTY	PART / ASSEMBLY NUMBER	DESCRIPTION	MATERIAL
7	4	30535	FLAT WASHER, M12	SST
6	4	30377	LOCK WASHER, M12	SST
5	4	30162	WASHER, FLAT 1	SST
4	4	30708	HHCS, M12 X 1.75 X 35	SST
3	4	30884	HEX NUT, ACME 1-5	SST
2	1	30885	THREADED ROD, ACME 1-5 X 16	SST
1	1	MCC0380-112819	LIFTING EYE BRACKET WELDMENT	304L SST

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UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES [mm]			CONTRACT NO.	
FRACTIONS	DECIMALS	ANGLES	APPROVALS	DATE
± 1/16	.XX ± .03	± 1/2°	DRAWN B. BOWLING	9/25/17
	.XXX ± .005		CHECKED R. SABOL	9/28/17
MATERIAL AS NOTED			MANUF.	
FINISH 250/(CAST) 125/(MACHINED)			Q.C.	
UNLESS OTHERWISE SPECIFIED			DO NOT SCALE DRAWING	

JWC JWC ENVIRONMENTAL 2850 S. RED HILL AVE, SUITE 125, SANTA ANA, CA 92705		
LIFTING EYE ASSEMBLY MCA0010/20-112819 - SIDE FRAME ASSEMBLY OGALLALA, NE (OGALLALA WWTP)		
SIZE	DRAWING NO.	REV
D	MCA0380-112819	A
SCALE: NTS	CAD MODEL: MCA0380-112819	SHEET 1 OF 1

DRAWING NO.

MCA0049-112819

6

5

4

3

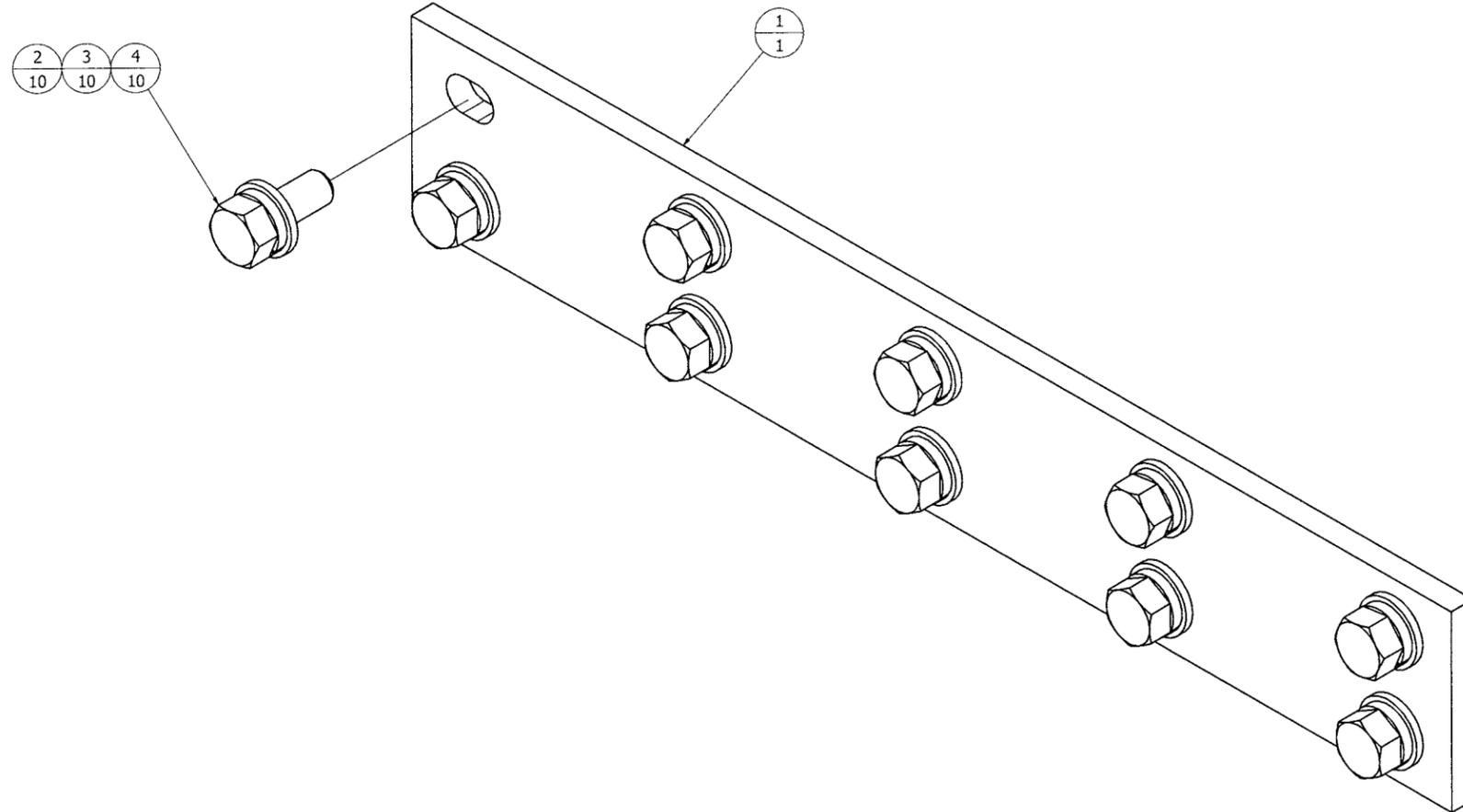
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1

NOTES: (UNLESS OTHERWISE SPECIFIED)

- 1. INTERPRET DRAWING IN ACCORDANCE WITH ASME Y14.5M-1994 STANDARDS.
- 2. ASSEMBLY NUMBER IS: MCA0049-112819
- 3. STANDARD FASTENER MATERIAL IS 18-8 SST.

REVISION HISTORY							
ZONE	REV	DESCRIPTION	ECO NO.	DATE	CHKD	PE	QC
ALL	A	INITIAL RELEASE		9/25/17	R	R	-



CONTROLLED

ITEM	QTY	PART / ASSEMBLY NUMBER	DESCRIPTION	MATERIAL
4	10	30707	HHCS, M12 X 1.75 X 30	SST
3	10	30377	LOCK WASHER, M12	SST
2	10	30535	FLAT WASHER, M12	SST
1	1	MCC0049-112819	SPLICE PLATE	304 SST

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UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES [mm]		CONTRACT NO.	
FRACTIONS ± 1/16	DECIMALS .XX ± .03 .XXX ± .005	APPROVALS	DATE
MATERIAL AS NOTED		DRAWN B. BOWLING	9/25/17
FINISH 250 √(CAST) 125 √(MACHINED) UNLESS OTHERWISE SPECIFIED		CHECKED R. SANCHEZ	9/28/17
DO NOT SCALE DRAWING		MANUF.	
		Q.C.	

JWC JWC ENVIRONMENTAL 2850 S. RED HILL AVE, SUITE 125, SANTA ANA, CA 92705			
SPLICE PLATE ASSEMBLY MCA0010/02-112819 - SIDE PLATE ASSEMBLY OGALLALA, NE (OGALLALA WWTP)			
SIZE	DRAWING NO.	REV	
D	MCA0049-112819	A	
SCALE: NTS	CAD MODEL: MCA0049-112819	SHEET 1 OF 1	

8

7

6

5

4

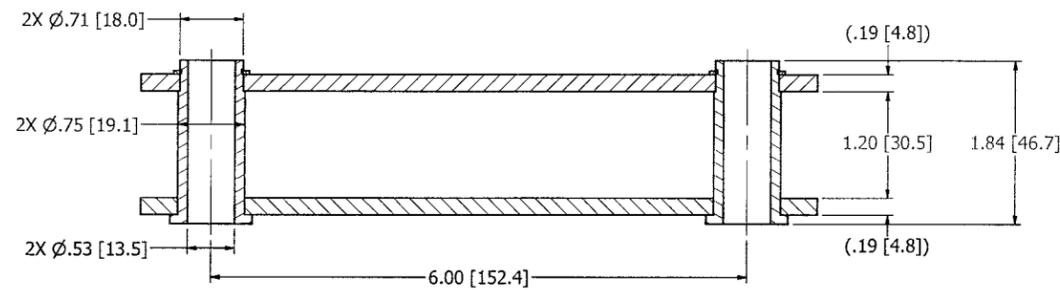
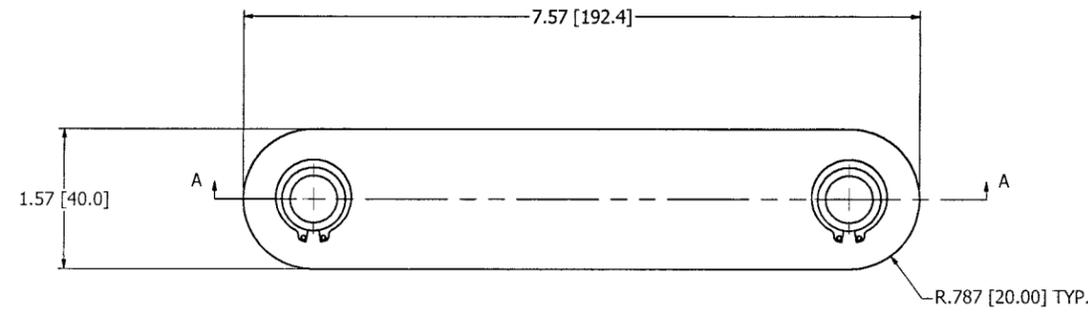
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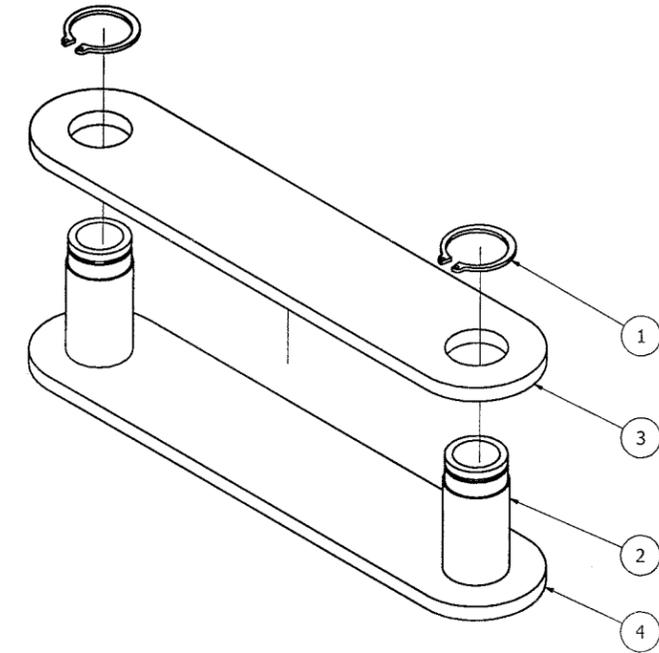
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REVISION HISTORY									
ZONE	REV	DESCRIPTION	ECO NO.	DATE	CHK	PE	MFG	BY	DATE
ALL	A	INITIAL RELEASE	CR-0007	7/30/15					

NOTES UNLESS OTHERWISE SPECIFIED:
 1. INTERPRET DRAWING IN ACCORDANCE WITH ASME Y14.5M-1994 STANDARDS.
 2. DEBURR AND BREAK ALL SHARP EDGES.



SECTION A-A



CONTROLLED

ITEM	QTY	PART NUMBER	DESCRIPTION	MATERIAL	HT HARDNESS
4	1		5mm PLATE	316 SST	N/A
3	1		5mm PLATE	316 SST	N/A
2	2		HOLLOW PIN	17-4 SST	38-45 HRC
1	2		SNAP RING	SST	N/A

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UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES			CONTRACT NO.	
FRACTIONS	DECIMALS	ANGLES	APPROVALS	DATE
± 1/16	.XX ± .03 .XXX ± .005	± 1/2°	B. BOWLING	7/30/2015
MATERIAL	316 SST PLATES 17-4 SST PINS 303 SST CIRCLIP	CHECKED	T. RYAN	7/30/2015
FINISH		MANU	I. DULSTASA	7-30-15
		Q.C.	B. BOWLING	7/30/15

JWC ENVIRONMENTAL
 290 PAULARINO AVE, COSTA MESA, CA 92626

ROLLER CHAIN, 6", HOLLOW CONNECTING LINK
MCR CHAIN AND PANEL ASSEMBLY
MONSTER CHAIN & RAKE

SIZE: **D** DRAWING NO.: **MCC0141-MCR-174** REV: **A**

SCALE: NTS SHEET 1 OF 1

D

C

B

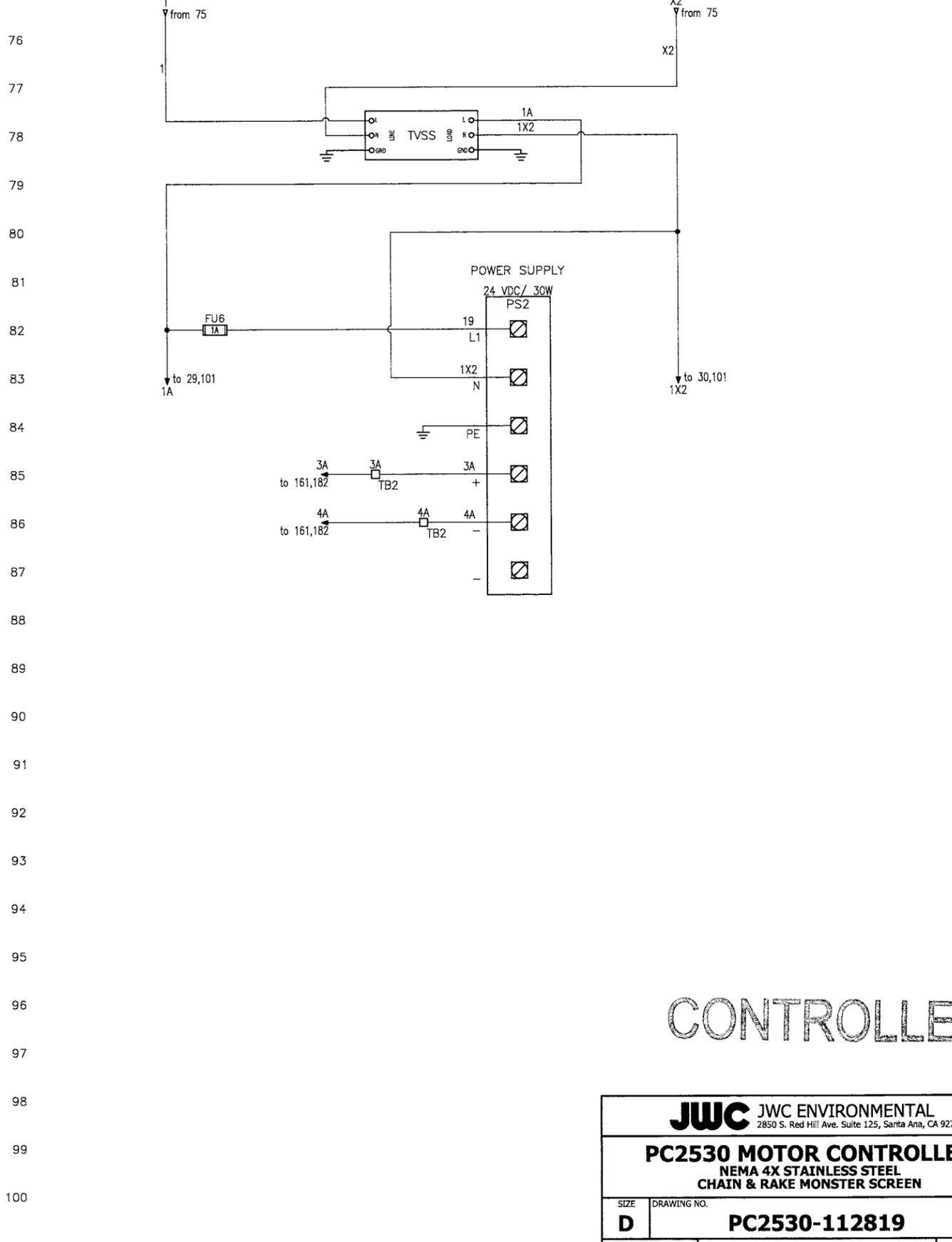
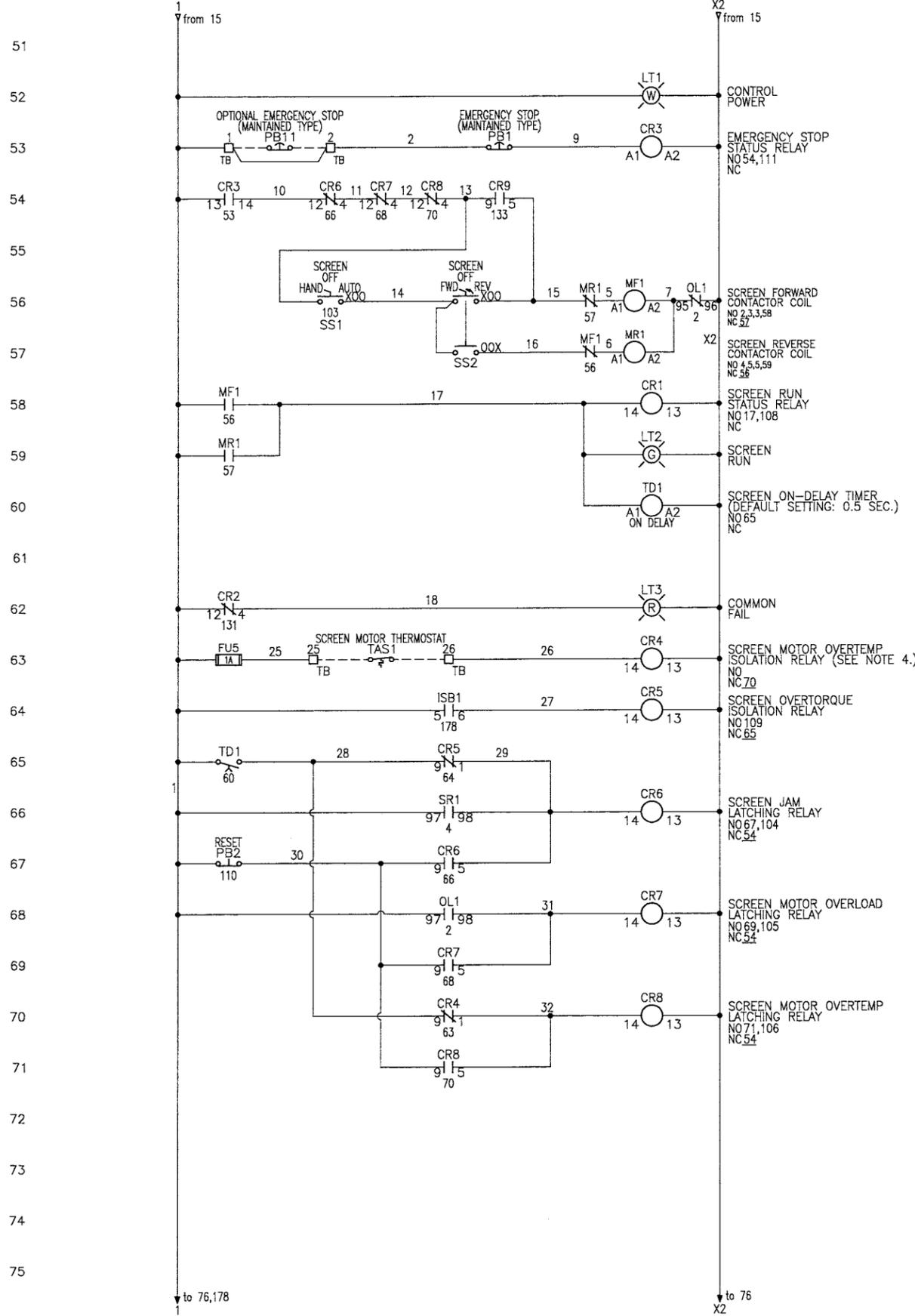
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D

C

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A



CONTROLLED

JWC JWC ENVIRONMENTAL 2850 S. Red Hill Ave. Suite 125, Santa Ana, CA 92705		
PC2530 MOTOR CONTROLLER NEMA 4X STAINLESS STEEL CHAIN & RAKE MONSTER SCREEN		
SIZE D	DRAWING NO. PC2530-112819	REV A
SCALE: NONE	2 OF 6	

D

C

B

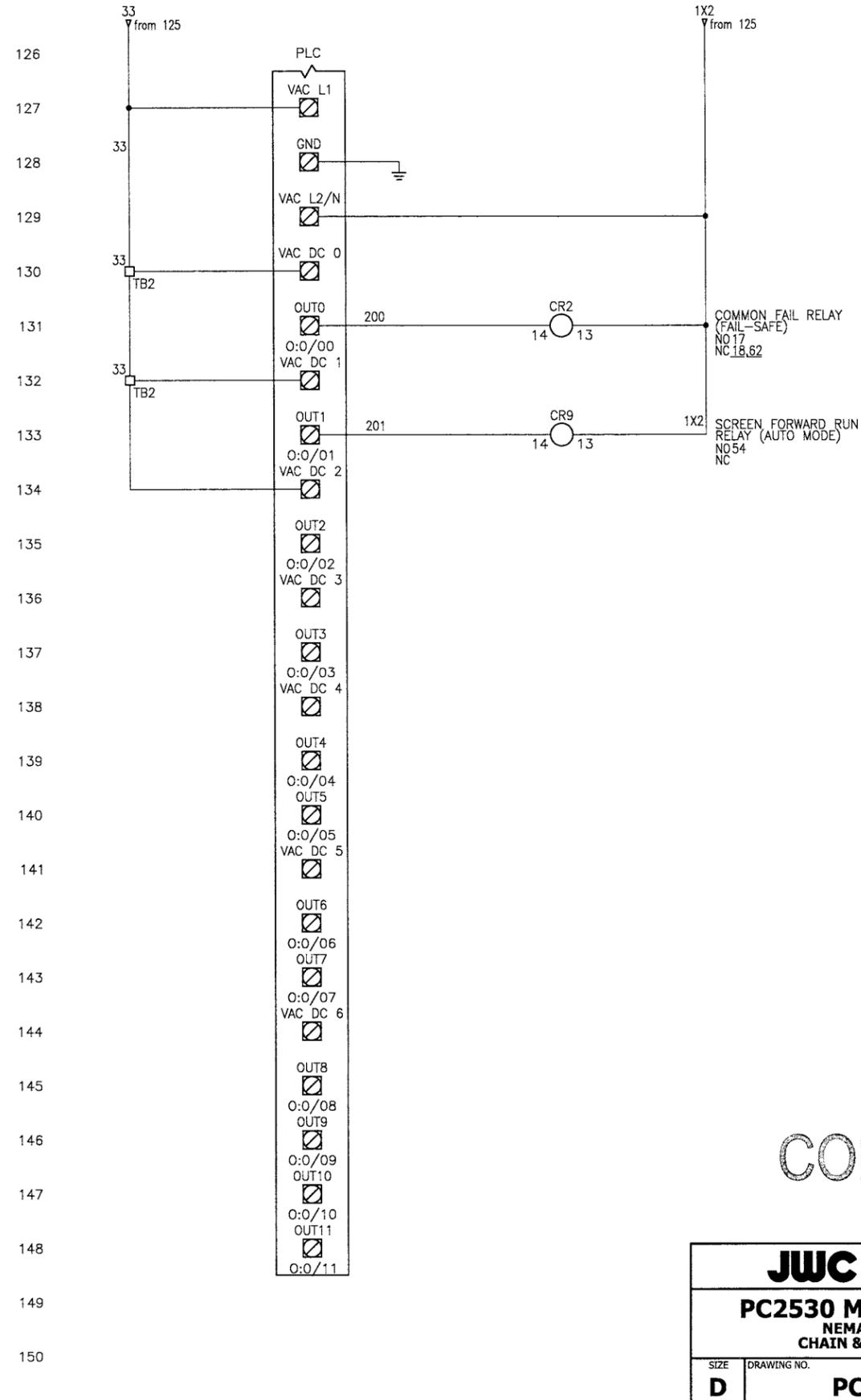
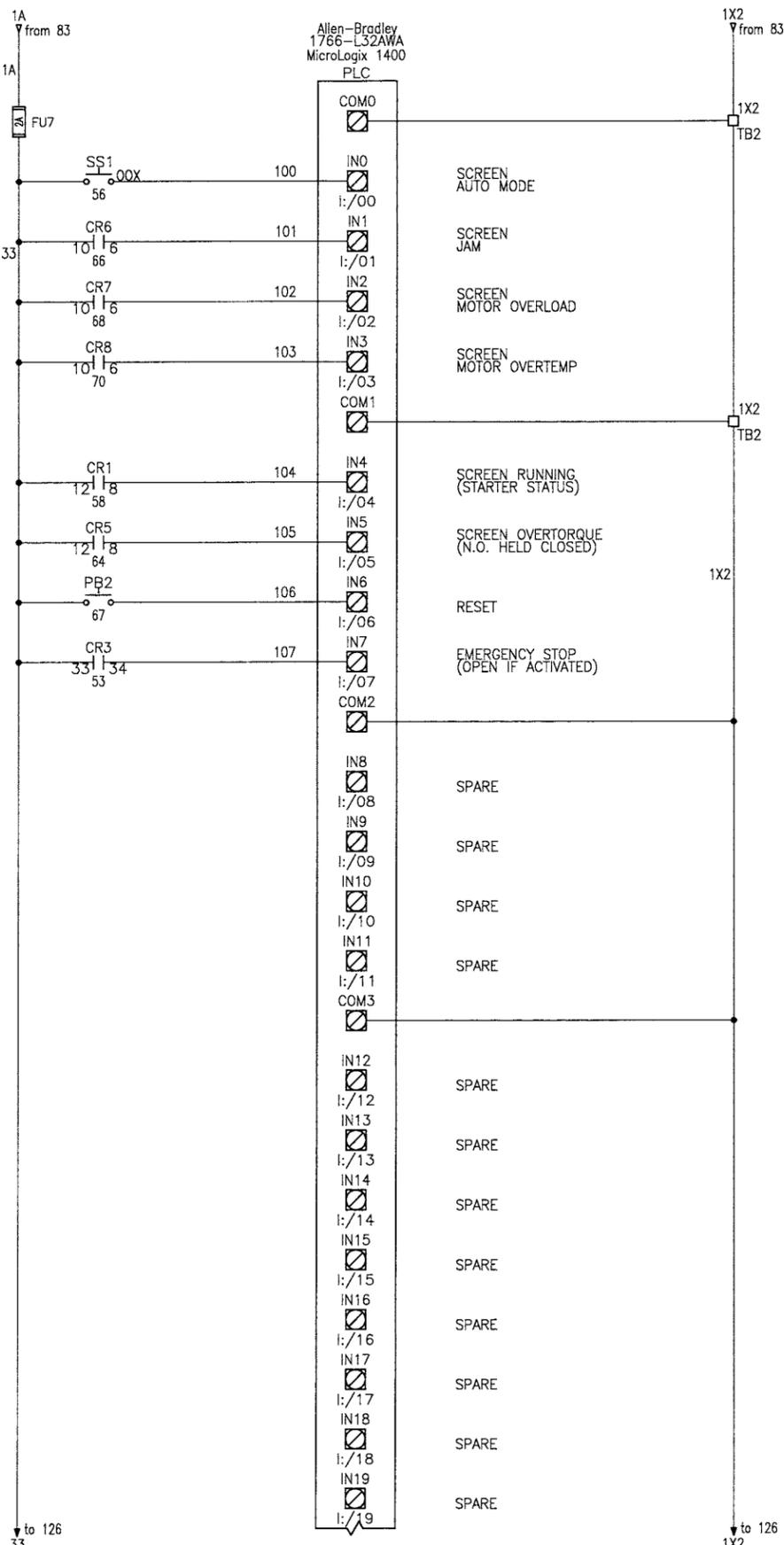
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C

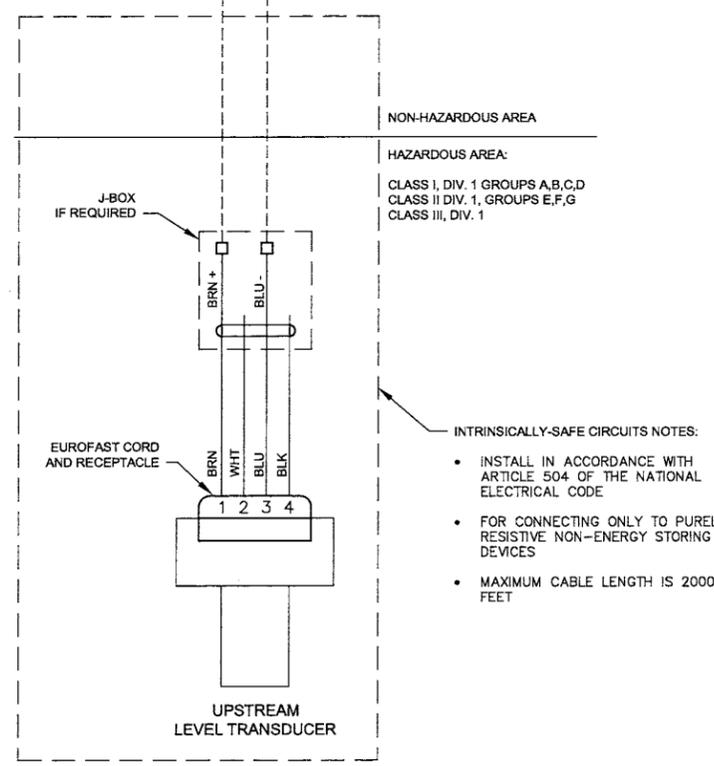
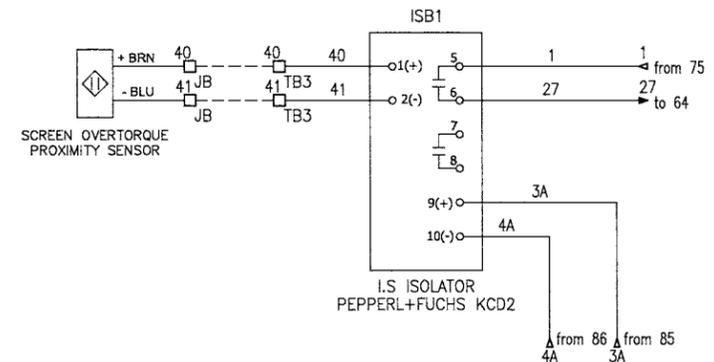
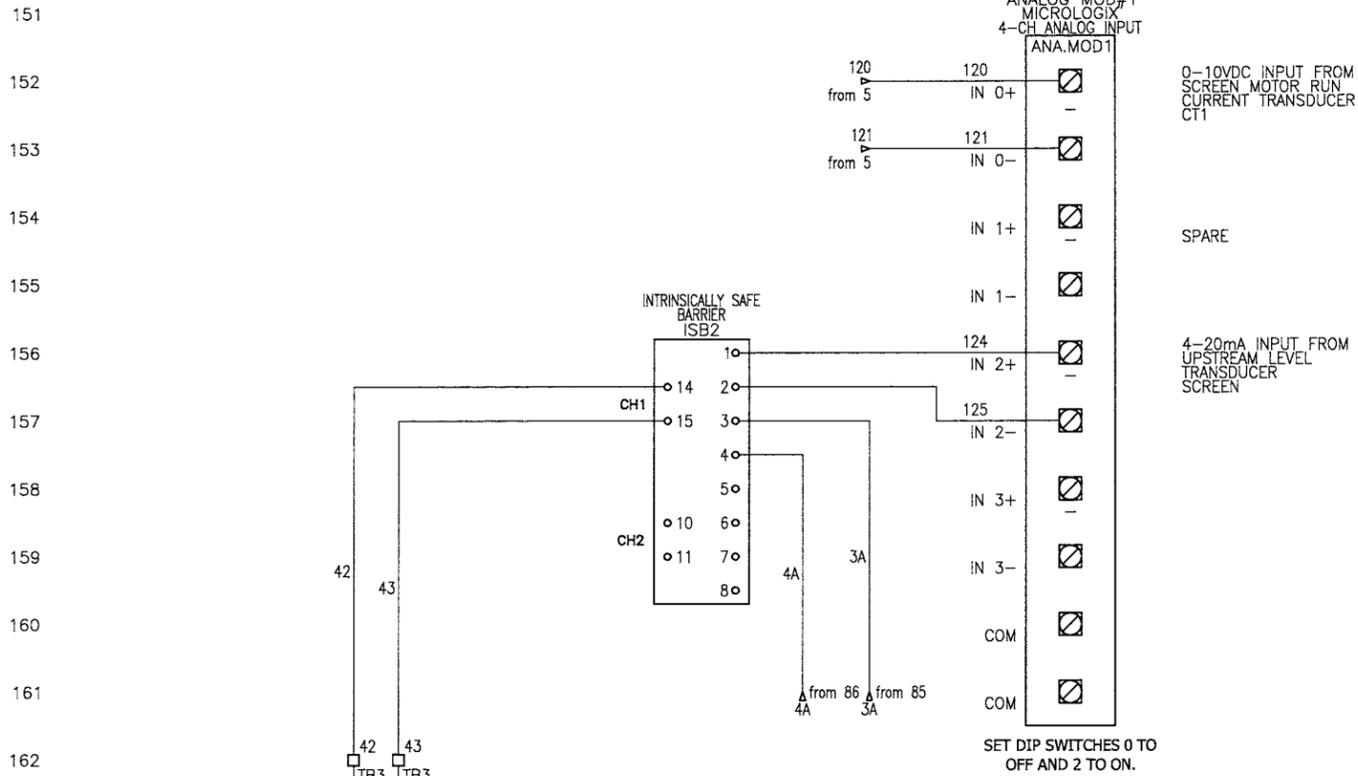
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A



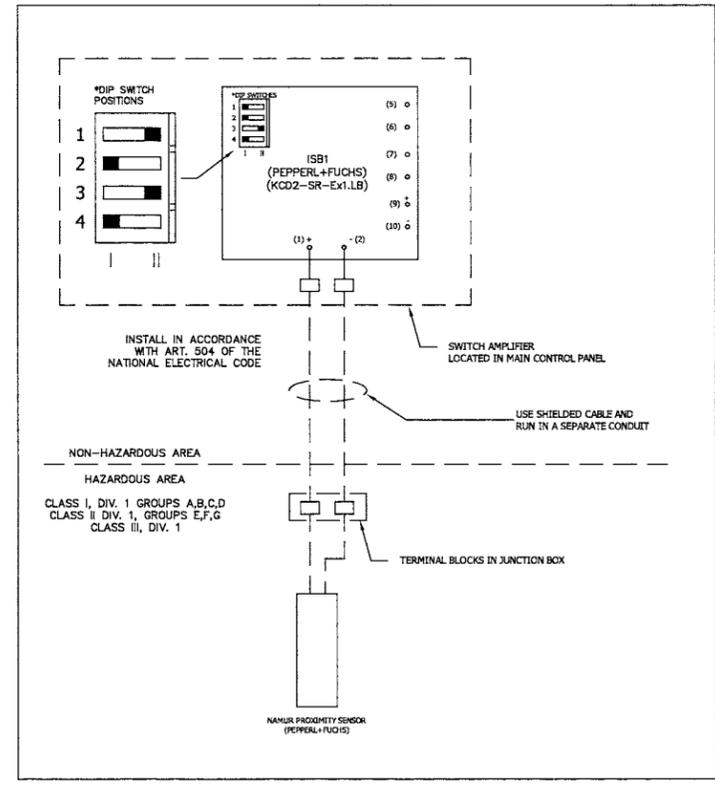
CONTROLLED

JWC JWC ENVIRONMENTAL 2850 S. Red Hill Ave. Suite 125, Santa Ana, CA 92705		
PC2530 MOTOR CONTROLLER NEMA 4X STAINLESS STEEL CHAIN & RAKE MONSTER SCREEN		
SIZE	DRAWING NO.	REV
D	PC2530-112819	A
SCALE:	NONE	3 OF 6



- INTRINSICALLY-SAFE CIRCUITS NOTES:
- INSTALL IN ACCORDANCE WITH ARTICLE 504 OF THE NATIONAL ELECTRICAL CODE
 - FOR CONNECTING ONLY TO PURELY RESISTIVE NON-ENERGY STORING DEVICES
 - MAXIMUM CABLE LENGTH IS 2000 FEET

DETAIL INTRINSICALLY SAFE
CIRCUITS WIRING



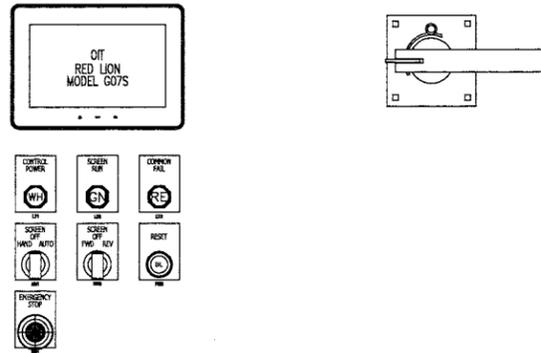
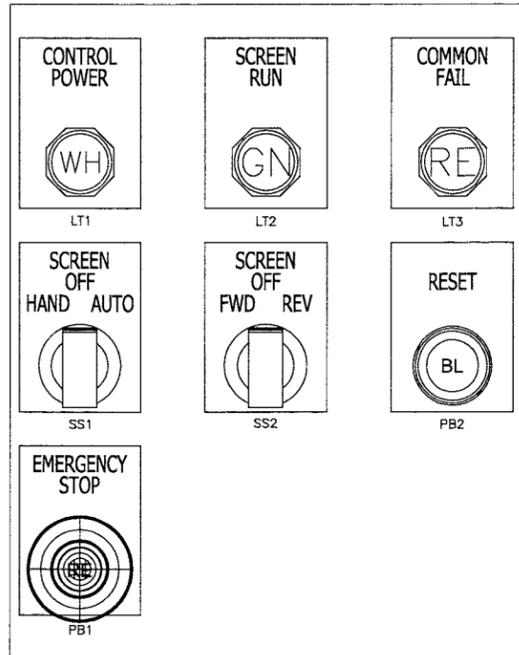
CONTROLLED

JWC JWC ENVIRONMENTAL
2850 S. Red Hill Ave. Suite 125, Santa Ana, CA 92705

PC2530 MOTOR CONTROLLER
NEMA 4X STAINLESS STEEL
CHAIN & RAKE MONSTER SCREEN

SIZE D	DRAWING NO. PC2530-112819	REV A
SCALE: NONE	4 OF 6	

FRONT PANEL
COMPONENT LOCATIONS

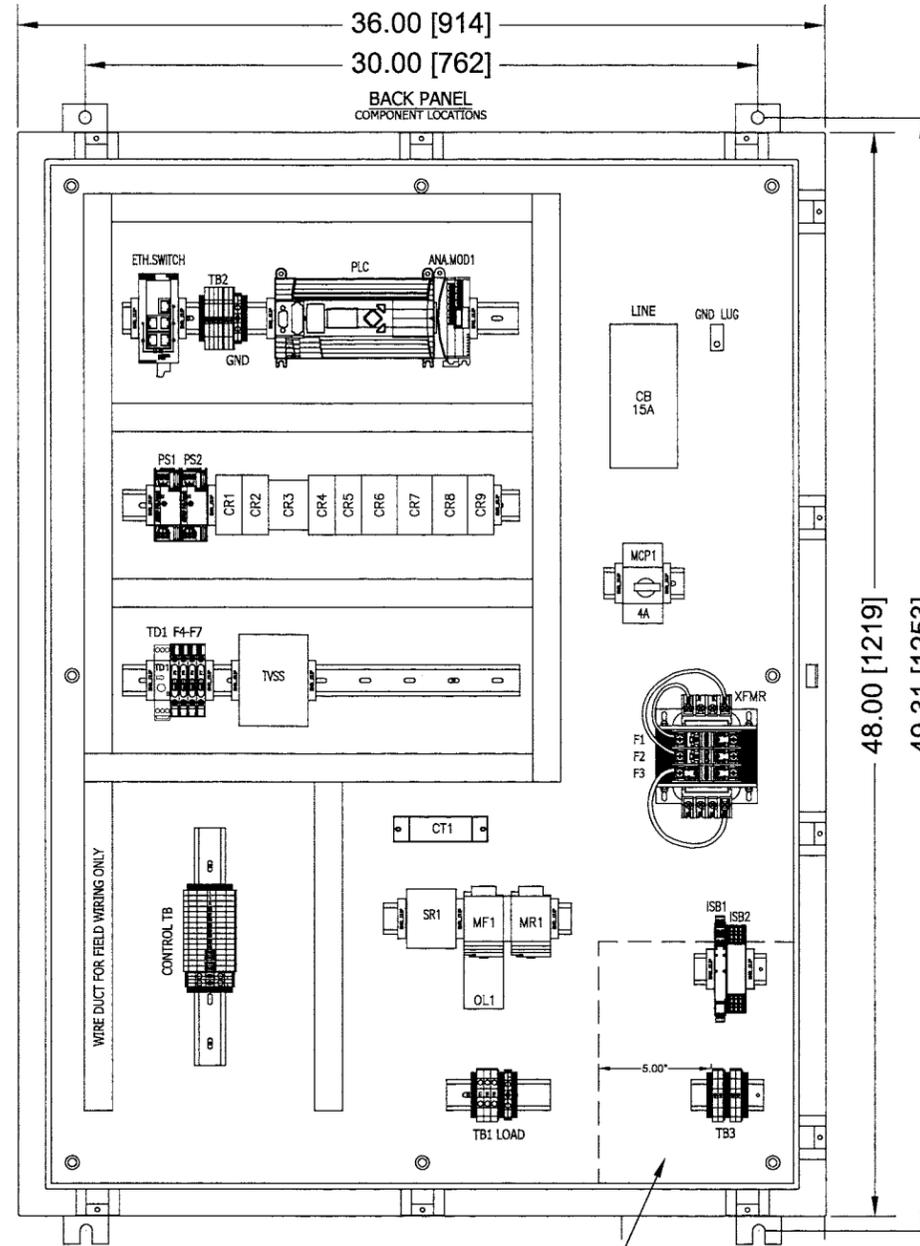


NEMA 4X 304 STAINLESS STEEL ENCLOSURE
ENCLOSURE DIM. 48X36X12

36.00 [914]

30.00 [762]

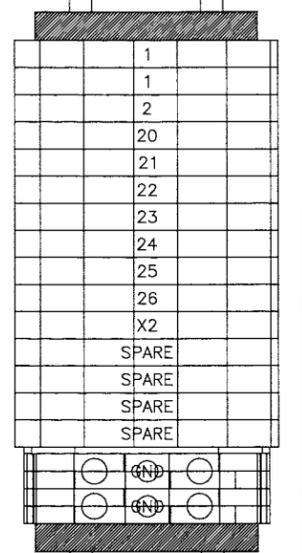
BACK PANEL
COMPONENT LOCATIONS



48.00 [1219]

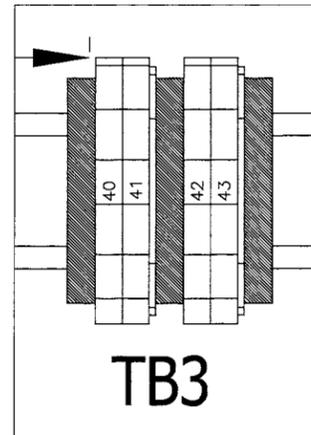
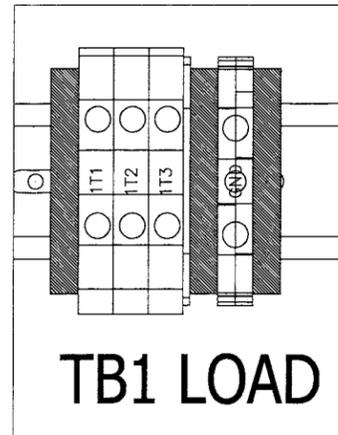
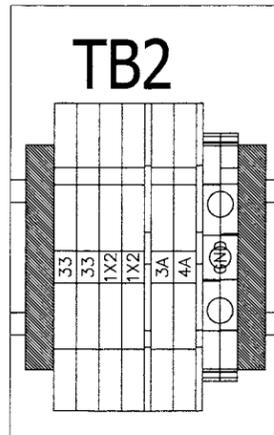
49.31 [1253]

CONTROL TB



SPACE FOR INTRINSICALLY SAFE WIRING ONLY

RECOMMENDED CONDUIT ENTRY LOCATION
FOR INTRINSICALLY SAFE WIRING



CONTROLLED

JWC JWC ENVIRONMENTAL
2850 S. Red Hill Ave. Suite 125, Santa Ana, CA 92705

PC2530 MOTOR CONTROLLER
NEMA 4X STAINLESS STEEL
CHAIN & RAKE MONSTER SCREEN

SIZE D	DRAWING NO. PC2530-112819	REV A
SCALE: NONE	5 OF 6	

SCREEN SEQUENCE OF OPERATION:

Screen HAND-OFF-AUTO selector switch:

In HAND MODE, the SCREEN FWD-OFF-REV selector switch is enabled.

In OFF MODE, the Screen will not run.

In AUTO MODE, the Screen is started by one of the following control inputs:

- Screen Start Setpoint
- High Level Start condition
- Backup Timer
- Input error from a level transducer, "Loss of Echo"

If the Screen Start Setpoint starts the Screen Cycle, the Screen will run until the level drops below the Start setpoint and the off-delay timer has timed out.

If the High Level Start set point is reached, the Screen will start. The Screen will stop when the upstream water level drops below the High Level Start set point, the off-delay timer has timed out, and when the level is below the Start set point. The High Level Start value must be set lower than the High Level Alarm value.

If the Backup Timer starts the Screen Cycle ("exercise run"), the Screen will run for a programmed period set on the backup run timer.

The Screen runs continuously if there is an error with the level transducer input.

The off-delay timer period should allow the Screen to rotate about 1/2 revolution.

OIT'S ALARM MESSAGES:

Screen Upstream Level Sensor Failure
Screen High Water Level

Screen Jammed
Screen Jammed (Overtorque)
Screen Motor Overload
Screen Motor Overtemp
Screen Fail to Start

Emergency Stop Activated

OTHER OIT FUNCTIONS:

Screen Status.
Screen Statistical Data Display.
Screen Start Setpoint Setting.
Screen High Level Start and
High Water Level Alarm Setpoint Settings.
Screen Timer Setup

Screen Level Sensor Setup
Current Transducer Setup

CONTROLLED

JWC JWC ENVIRONMENTAL
2850 S. Red Hill Ave. Suite 125, Santa Ana, CA 92705

PC2530 MOTOR CONTROLLER
NEMA 4X STAINLESS STEEL
CHAIN & RAKE MONSTER SCREEN

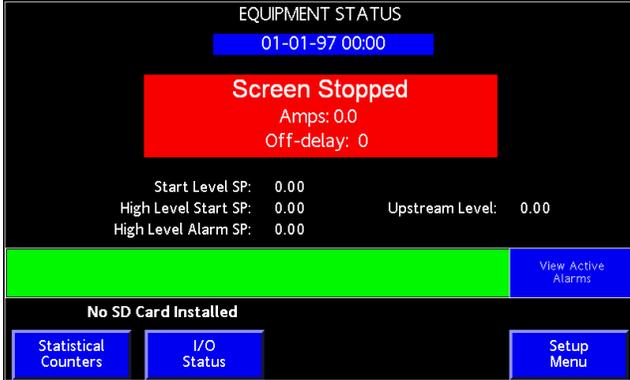
SIZE D	DRAWING NO. PC2530-112819	REV A
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SCALE: NONE	6 OF 6
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CONTROL PANEL PC2530-112819 PARTS LIST

ITEM	PART #	QTY	DESCRIPTION
ENCL.	E01-001-074	1	NEMA 4X 304SS ENCLOSURE, 48X36X12
PANEL	E01-073-002	1	PANEL 45X33
MF1/MR1	E02-020-101	1	CONTACTOR REV. 23A 3 POLE
OL1	E02-020-241	1	OVERLOAD RELAY 1-5A SOLID-STATE
CT1	E04-004-002	1	CURRENT TRANSDUCER, 0-10/20/50A, 0-10VDC OUT
SR1	E04-030-002B	1	SHOCK RELAY, CURRENT MONITOR
PS1,2	E03-102-004	2	POWER SUPPLY, 24VDC/1.3A NEC CLASS 2
TD1	E05-008-054	1	TIMER, ON-DELAY 1 N.O. 0.05 SECONDS TO 10 HOUR
ISB1	E05-026-106	1	SWITCH AMPLIFIER, ISOLATED BARRIER
ISB2	E05-026-052	1	INTRINSICALLY SAFE ISOLATOR, 2 CHANNEL 2 WIRE
CR1,2,4,5,9	E05-004-R6L	5	RELAY MIDGET DPDT 10A 120V
CR3	E05-008-014	1	INDUSTRIAL RELAY,IEC 4 N.O. 120V COIL
CR6-8	E05-004-R40	3	RELAY MIDGET 3PDT 120V COIL, INDICATOR
FU1,2	E06-110-0200	2	FUSE, 2A, 600V, TIME DELAY
FU3	E06-130-0600	1	FUSE, 6A, 250V, TIME DELAY
FU4-6	E06-160-0100	3	FUSE, 1A, 250V, GLASS, TIME DELAY
FU7	E06-160-0200	1	FUSE, 2A, 250V, GLASS TIME DELAY
For FU4-7	E06-160-001	4	FUSE HOLDER, 1 1/4X1/4 FUSE 110V
LT1	E07-001-401	1	PILOT LIGHT, WHT LED 120V 22mm, NEMA 4X
LT2	E07-001-402	1	PILOT LIGHT, GREEN LED 120V 22mm, N4X
LT3	E07-001-403	1	PILOT LIGHT, RED LED 120V 22mm, N4X
PB1	E08-001-404	1	TWIST-TO-RELEASE RED E/STOP PUSHBUTTON
PB2	E08-001-401	1	PUSHBUTTON, BLK FLUSH 1NO 22mm, N4X
For PB2	E08-001-421	1	CONTACT BLOCK, AUXILIARY, 1 N.C.
SS1	E08-001-410	1	SELECT SWITCH, 3 POSITION, MAINTAINED 22mm
SS2	E08-001-411	1	SELECT SWITCH, 3 POSITION, SPRING RETURN, RIGHT
CB	E09-036-001	1	CIRCUIT BREAKER, 15A 600V
HANDLE	E09-036-010	1	HANDLE, NEMA 4X ROTARY
OPER.	E09-036-011	1	BREAKER OPERATOR
SHAFT	E09-036-012	1	BREAKER OPERATING SHAFT
MCP1	E09-038-013	1	MOTOR CIRCUIT PROTECTOR (IEC) 4A
TB	E10-003-200	15	TERMINAL BLOCK,6mm GREY,35A 600V,22-10AWG
TB,TB2 GND	E10-003-208	3	TERMINAL BLOCK, GROUNDING 6mm 22-10AWG
TB1 LOAD	E10-003-210	3	TERMINAL BLOCK,8mm GREY,50A 600V,20-8AWG
TB1 GND	E10-003-213	1	TERMINAL BLOCK, GROUNDING 8mm 22-8AWG
TB2	E10-003-158	6	1492-J IEC TB, 4 CONNECTION POINTS, GRAY
TB3	E10-003-200-B	4	TERMINAL BLOCK, 6mm BLUE, 35A 600V, 22-10AWG
TVSS	E12-025-007	1	SURGE SUPPRESSOR, 120V 5A
ETH.SWITCH	E12-026-026	1	5-PORT UNMANAGED ETHERNET SWITCH
GND LUG	E13-100-003	1	GROUND LUG, CONDUCTOR RANGE 14-4 AWG
PLC MEM.	E19-003-403	1	MICROLOGIX-1400 MEMORY MODULE
PLC	E19-003-404	1	MICROLOGIX-1400 PLC 20 120V IN/12 RELAY
ANA.MOD1	E19-003-353	1	MICROLOGIX-1200, 4 ANALOG INPUTS
OIT	E19-018-023	1	RED LION 7" GRAPHITE COLOR TOUCHSCREEN
XFMR	E03-021-006	1	TRANSFORMER, 500VA, 230/460:115V
SPARES (LOCATED INSIDE ENCLOSURE)			
FU1, 2	E06-110-0200	2	FUSE, 2A, 600V, TIME DELAY
FU3	E06-130-0600	1	FUSE, 6A, 250V, TIME DELAY
FU4-6	E06-160-0100	3	FUSE, 1A, 250V, GLASS, TIME DELAY
FU7	E06-160-0200	1	FUSE, 2A, 250V, GLASS TIME DELAY

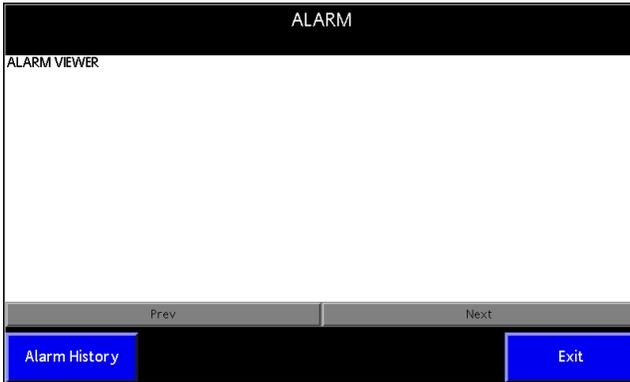
CHAIN AND RAKE MAIN CONTROL PANEL PC2530-112819 TOUCH SCREENS



Shown during normal operation. The alarm banner appears if a fault occurs. Press view active alarms to view all active alarms. The system can run without the SD card installed (stores alarm messages only).

Press the buttons on the bottom left of the screen for the read-only motor statistics and I/O status

Press Setup Menu to change system parameters, reset counters, clear alarms, change the PLC clock or Network settings or change the existing security password. Default user is user, default password is 9999.

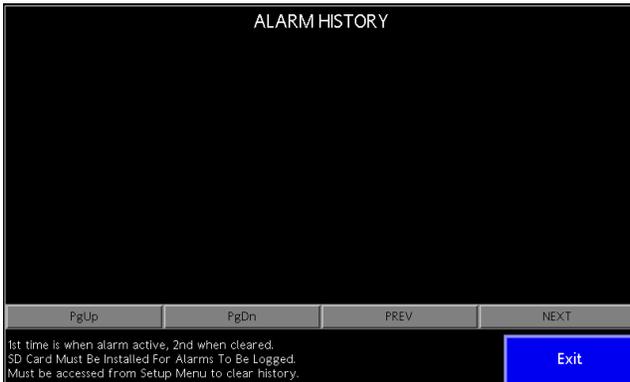


Show the active alarm messages. Use the Prev/Next buttons to scroll.

Press Alarm History to view all the alarms.

The alarm messages can be cleared only after entering the Setup Menu alarm listing screen

Exit returns to the status screen.



Show the alarm message queue.

The alarm messages can be cleared only after entering the Setup Menu alarm listing screen.

Exit returns to the status screen.



Show the read-only statistical counters. The counters can be cleared only after entering the Setup Menu statistical counters screen

Exit returns to the status screen.

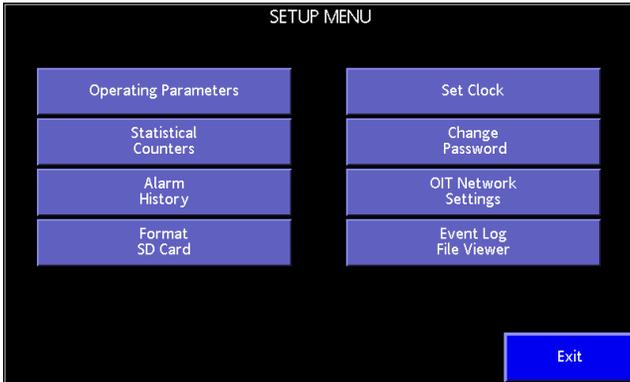
CHAIN AND RAKE MAIN CONTROL PANEL PC2530-112819 TOUCH SCREENS



First of three screens showing the real-time status of the PLC inputs and outputs and the analog module inputs.

Use Next and Back to toggle between the screens.

Exit returns to the status screen.

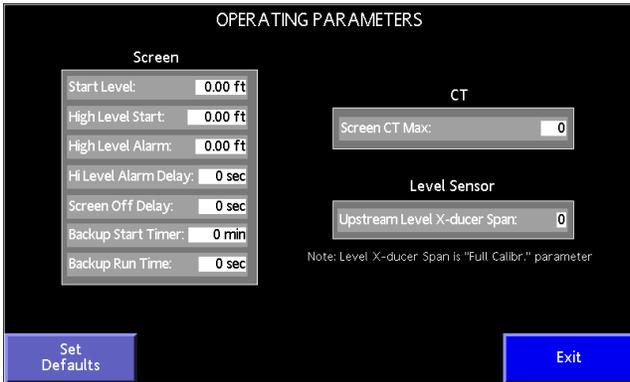


Press the button for the desired action.

Exit returns to the status screen. The password will need to be re-entered to return to this screen.

Press Set Clock to adjust the screen display brightness.

Event Log File Viewer is used by the OEM to setup the touch screen and is not used in normal operation.



Touch the field and enter a new value from the pop-up screen to adjust the screen, current transformer or level sensor settings.

Set Defaults returns the operating parameters to the factory settings.

Exit returns to the setup menu.



Press the set clock field and enter new values from the pop-up screen, then press Set Clock to change the PLC clock setting.

Press the Display Brightness to adjust the screen brightness (full 100%)

Exit returns to the setup menu.

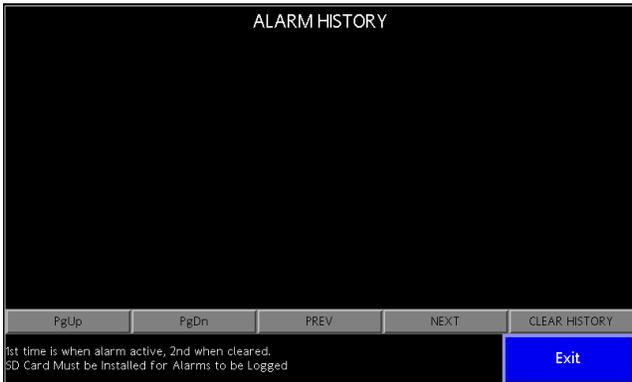
CHAIN AND RAKE MAIN CONTROL PANEL PC2530-112819 TOUCH SCREENS



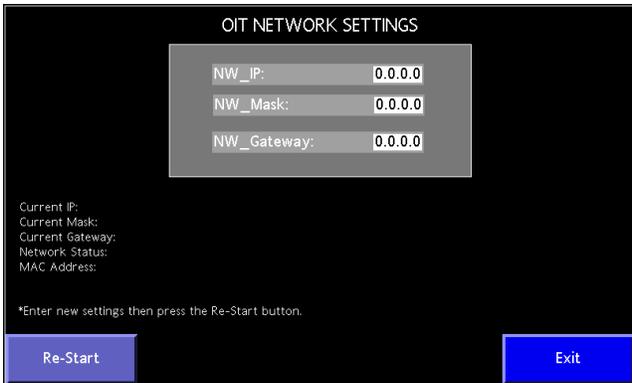
View the statistical counters. Press the button at the bottom left of the screen and follow the instructions to clear the counters and motor run time.
Exit returns to the setup menu.



Press User Manager, enter a new four digit security password from the pop-up screen and press Set Pass to change the four digit security password.
Exit returns to the setup menu.

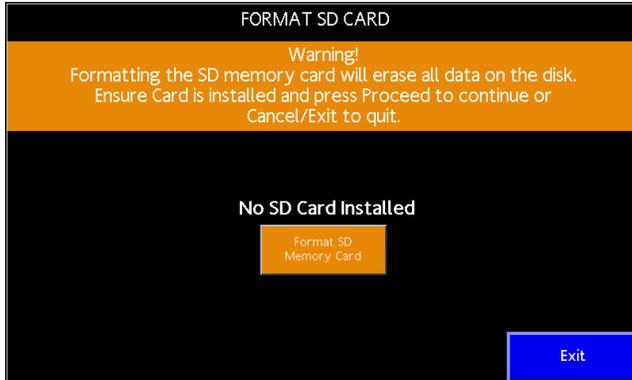


Show the active and historical alarm messages. Use the Up/Down arrow to scroll. Press Sort to arrange the messages in order.
Press Clear History to move the alarms to an external SD card if installed. The messages are permanently deleted if no SD card installed.
Exit returns to the setup menu.



Press the field and enter a new setting from the pop-up window to enter new settings, then press Re-Start to run the system with the new settings.
Exit returns to the setup menu.

CHAIN AND RAKE MAIN CONTROL PANEL PC2530-112819 TOUCH SCREENS



Press Format SD Memory Card and follow the instructions to format the alarm message memory card and erase all existing data.

Exit returns to the setup menu.

APPENDIX A

DISASSEMBLY AND REASSEMBLY OF THE CHAIN AND RAKE FOR TRANSPORT

Refer to the chain and rake assembly drawing for component locations.

The assembled weight is 3,200 lbs. Each segment weighs 1,600 lbs. Use lifting equipment rated equipment weight minimum.

Disassemble Screen

Remove the chain assemblies per Paragraph 6.2.3. The chain can be removed in one long piece or, if too cumbersome, each chain section can be removed. Lifting equipment or a come-along rated 1,000 lbs. minimum is recommended if removing the chain in one piece.

Use lifting equipment rated 1,600 lbs. minimum to support the top half of the screen to prevent movement when removing the splice plates.

The two splice plates are located at the middle of the screen, one on each side. Refer to the screen assembly and plate drawings in Section 7.

Remove the bolts securing the splice plates to the side frames.

Carefully remove the screen top section.

Place the top half of the screen in a level secure location capable of supporting the equipment weight until reassembly. Covering the removed screen is recommended if not in a protected location.

Reassemble the Screen

Install the bottom half of the screen in the channel. Refer to Paragraph 2.4.1

Lift the removed top half of the screen.

Position the top half of the screen above the bottom half.

Attach the removed splice plates until finger tight. Check that the side frames are straight and square. Tighten the splice plate bolts.

Replace the chain as one piece or one segment at a time depending on how the chain was removed and adjust the chain tension. Use a come-along to pull the chain lengths together if required. Refer to Paragraph 6.2.3.2