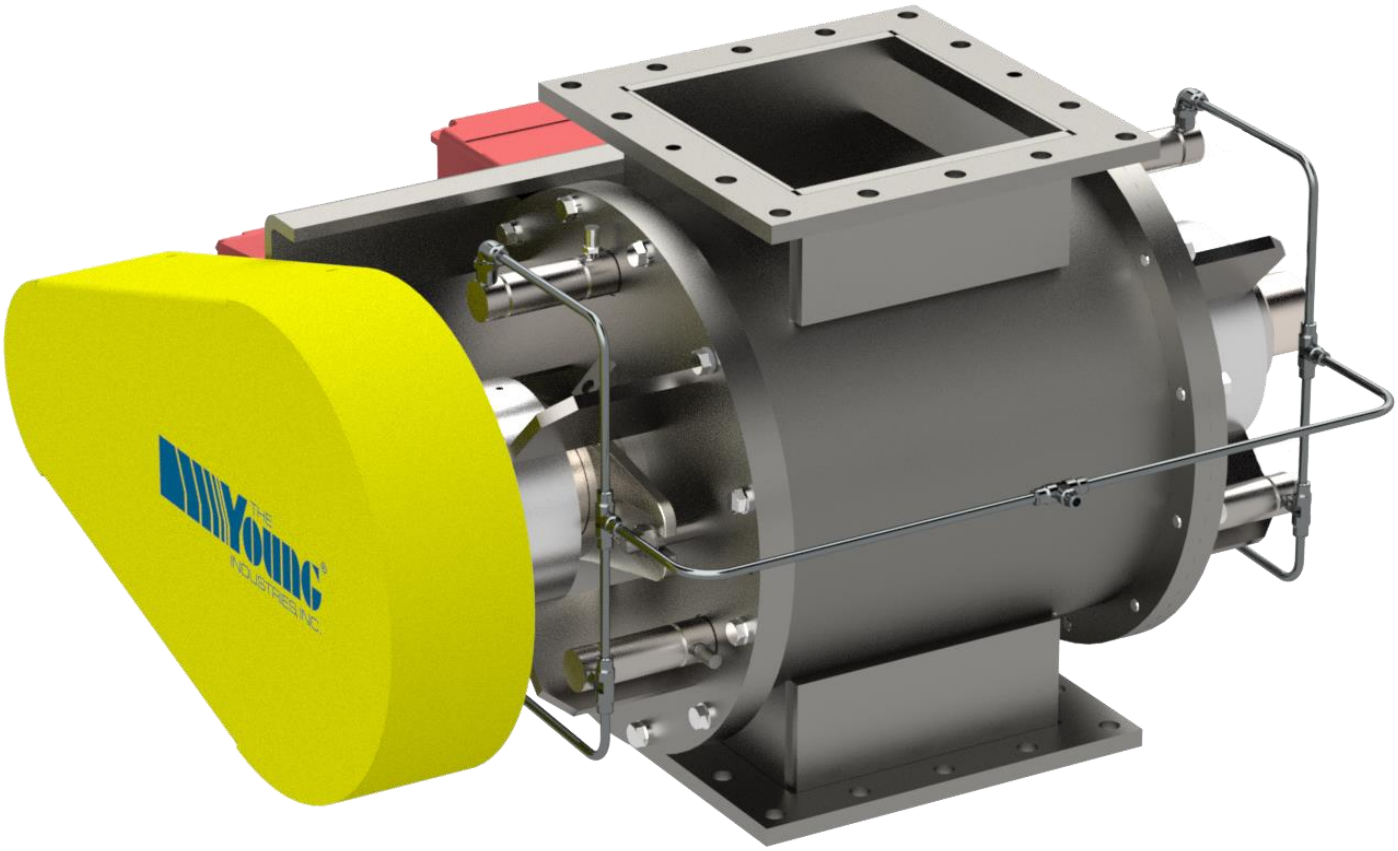
IOM 225-250.02

END-SEAL ROTARY VALVES

Supplemental Installation, Operation, and Maintenance Manual (Supplement to I.O.M. 220.220)



THE Young® INDUSTRIES, INC.

16 PAINTER STREET
MUNCY, PA 17756

FOREWORD

This supplemental manual contains instructions for installation, operation and maintenance of Young Industries end seal rotary valves. This manual must be used only as a source of supplemental information and in conjunction with the most recent revision of the Rotary Valve Installation, Operation and Maintenance Manual, Young Industries I.O.M. 220.220. If you do not have a copy of the Rotary Valve Manual, you may request a free copy from The Young Industries at 570/546-3165.

This manual should be read and understood in its entirety by the person performing maintenance upon the rotary valve. If you do not fully understand any part of the instructions in this manual, contact The Young Industries' Director of Engineering at 570/546-3165 for assistance.

WARNING: ALWAYS FOLLOW SAFE WORK PROCEDURES WHEN OPERATING OR SERVICING MACHINERY. DISCONNECT AND LOCK OUT THE POWER SOURCE TO THE MACHINE BEFORE REMOVING GUARDS OR OPENING COVERS. ALWAYS BE CERTAIN THE PROCESS SYSTEM IN WHICH THE MACHINE IS INSTALLED IS MADE SAFE BEFORE OPENING ANY COVER ON THE MACHINE. SERIOUS INJURY OR DEATH MAY RESULT IF SAFE PROCEDURES ARE NOT USED.

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UNGROUNDED MACHINERY PRESENTS A POTENTIAL HAZARD OF FATAL ELECTRICAL SHOCK FROM ELECTRICAL POWER SOURCES. STATIC ELECTRICITY MAY ALSO ACCUMULATE ON UNGROUNDED/UNBONDED EQUIPMENT. STATIC ELECTRICITY DISCHARGE FROM UNGROUNDED EQUIPMENT OR BETWEEN UNBONDED PIECES OF EQUIPMENT MAY CAUSE EXPLOSION OR FIRE IFFLAMMABLE VAPOR OR DUST IS PRESENT.

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TO AVOID HAZARDOUS STATIC DISCHARGE, MOBILE, MOVABLE OR PORTABLE EQUIPMENT WHICH MAY ATTACH TO OR COME NEAR TO OTHER EQUIPMENT AND WHICH IS NOT PROHIBITED BY CODES FROM BEING CONNECTED TO GROUND MUST BE SAFELY GROUNDED AND BONDED BEFORE CLOSE APPROACH OR CONTACT IS MADE. THIS WARNING ALSO APPLIES TO MOVABLE CONTAINERS SUCH AS DRUMS, TOTES, BOXES AND BAGS.

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INSTALLATION

1. AIR SUPPLY

- Connect filtered & dry air supply for End Seal Air Cylinders with a regulator in the air line.
- Connect (separate) filtered & dry air supply for End Seal Gas Purge with a regulator in the air line.
- Note:
  - Young Industries supplying regulators is an option.
  - Flow Meter recommended for Rotor Packing Purge and End Seal Gas Purge (will help to determine when packing needs to be replaced)

2. PRESSURE SETTINGS

- Air supply pressure for End Seal Air Cylinders should be set to 20 PSIG.
- Connect End Seal Gas Purge lines. PSI to be set 1-3 PSIG above maximum anticipated normal operating pressure of the process system at the rotary valve.
- Connect Rotor Packing Purge per IOM 220.220

OPERATION

1. AIR SUPPLY

- Air pressure for End Seal Air Cylinders must always stay pressurized, whether in operation or not. Except when under maintenance.

PACKING INSTRUCTIONS

1. Equipment and personnel required

- Lockout/tagout equipment for the rotary valve power supply, air supply valves, and any other adjacent equipment or process-related equipment as required by plant safety procedures and by OSHA.
- Any other personnel safety equipment as required by plant safety rules and OSHA.
- Wrenches suitable for 7/16" to 1" size hex fasteners.
- Torque wrench with a 50 to 100 ounce-inch maximum range.
- Putty knife or suitable scraper for removing old packing residue.
- Container for waste materials.
- Allen wrenches up to 5/16" hex size.
- Chain hoist or other lifting equipment suitable for supporting the weight of the valve end plates in the work location.
- Clean cardboard or plywood on which to place removed valve components.
- A minimum of two trained mechanics, each having his/her own lockout/tagout and personal safety equipment.

2. Remove old packing

- **CAUTION:** Observe safe lockout/tagout procedures for both equipment and process.
- Remove the drive guard and drive from the rotary valve.
- Scribe a reference line on each end of the rotary valve shaft next to the inner raceways of the bearings. These reference marks are needed to ensure correct centering of the rotor between the housing ends when the valve is reassembled.
- Match-mark each end plate to its position on the rotary valve housing.
- Loosen the bearing raceway lock collars.
- Shut off air to End Seal Air Cylinders air lines.
    - Disconnect the air lines at first Air Cylinder in flow path using wrenches to loosen tube clamps. Air cylinders have spring returns so should retract enough to relieve pressure on End Seal Follower Plate
- Disconnect End Seal Gas Purge air lines.
- Remove end plate fastening screws and remove the end plates.
- END PLATE REMOVAL NOTES:
    - Tapped holes are provided in each end plate into which jacking screws may be inserted to assist in the removal of the end plate. Be certain to tighten jacking screws as evenly as possible to prevent binding of the end plate pilot during removal. Also be certain to remove all jacking screws before reassembly of the valve is attempted. It is a good idea to use hardened jacking screws with a cup point or with a flat point ground such that the tip of the screw is slightly smaller than the minor diameter of the threads. This makes the jacking screw easier to remove from the end plate if its tip becomes mushroomed.
    - Use caution when removing the end plates from the valve, as they may be heavy. A mechanical hoist or at least two persons are recommended for end plate removal from large valves.
    - Carefully remove any residue of old packing from the interior of the valve bore, the face of the rotor shroud plates and from the end plate surfaces. The rubbing surfaces of the shroud plates must be carefully cleaned to prevent damage to the new packing.
- Carefully remove existing packing material (End Seal Packing and Rotor Packing)
    - NOTE: Refer to IOM 220-220 Rotary Valves for Rotor Packing procedures
- May be advisable to clean between end plate and End Seal Packing Follower Plate if experiencing excessive wear and/or leakage.
    - NOTE: Doing so requires removing shoulder bolts and springs in End Seal Packing Follower Plate

3. Prepare replacement End Seal Packing for installation.

- End Seal Packing rings must be cut accurately for correct fit in the bore of the rotary valve.

- Refer to IOM 220-220 Rotary Valves for Rotor Packing procedures
- NOTE: A guillotine-type packing cutter (available from packing manufacturers or distributors) may be used also. In all cases, the type of end cut used must be compatible with the packing's braid design. If using a guillotine cutter, the packing should be double-checked before installation for proper length fit inside the valve's bore.
- Obtain a length of packing long enough to overlap its ends by about two inches when inserted snugly into the bore of the rotary valve before the packing is cut to final size.
- With the packing fitted squarely and snugly into the bore of the rotary valve, use a sharp, thin-bladed knife to cut both ends of the packing. A simple square butt cut is recommended. This type of cut is easy to make and causes less damage to the packing braids than a bias cut.

4. Install the New End Seal Packing Rings

- Using pieces of packing prepared in the previous section insert into rotor and ensure tight butt cut fitment.
- Make sure Air Cylinders fully retracted.
- Carefully insert the end plate assembly into the rotary valve housing at the same end of the valve housing from which that end plate was removed. Be certain to observe and to use the bearing raceway reference scribe line marked on the rotor shaft and the end plate/housing match marks made when the valve was disassembled.
- Tighten the capscrews which fasten the end plate to the valve housing. If using a torque wrench, apply torque suitable for grade five capscrews.
- Repeat this procedure for the opposite End Seal and End Plate assembly.
- Check the alignment of the reference lines on the shaft with the inner races of the bearings and lock the bearings to the shaft with the bearing set screws.
- Reconnect all air lines, tightening tube clamps where applicable.
- Finish by re-installing the roller chain drive and the drive guard.

5. Check End Seal Purge Gas System

- When the valve has been reassembled and with all safety precautions necessary, turn on the End Seal Air Cylinder air supply, End Seal Gas Purge supply, and any other applicable air supply lines to the valve.
- The End Seal Gas Purge system of the End-Seal rotary valve requires that purge gas flow **must** always be toward the process side of the valve rotor shrouds. There must be no attempt made to limit the flow of purge gas to the end seals. Only a suitable pressure regulator and a pressure gauge are required. If a flow measuring device is used, its purpose must be only to monitor the amount of flow to determine seal condition.
- The End Seal Purge pressure regulator should be set to maintain a pressure in the end areas of the end seal rotary valve of 1 to 3 psi above the maximum anticipated normal operating pressure of the process system at the rotary valve.
- The piping of the End Seal Purge system from the pressure regulator to the rotary valve should be at least equal in diameter to the nominal pipe size of the purge taps in the end plates of the valve and should not exceed 10 feet in length. End Seal Purge system and End Seal Air Cylinder piping must be arranged to deliver equal flow capacity and pressure to both ends of the rotary valve.
- CAUTION - Failure to deliver equal End Seal Purge and End Seal Air Cylinder pressure to both ends of the rotary valve can result in bearing thrust overloads and endwise displacement of the rotor, resulting in internal damage.

6. Seals, In-Service

- The need to replace the End Seal Packing followers can be determined by monitoring either End Seal Purge pressure or End Seal Purge flow, or both. Failure of the End Seal Purge system to maintain 1-3 psi above process pressure in the valve ends, or a significant increase in End Seal Gas Purge flow can indicate seal replacement is needed.
  - NOTE: Flow Meter in flow lines recommended
- If direct contact between the seal follower and the valve rotor is apparent, the end seal packing must be replaced.

FIGURE ONE: LEAKAGE DIAGRAM WITHOUT END SEAL

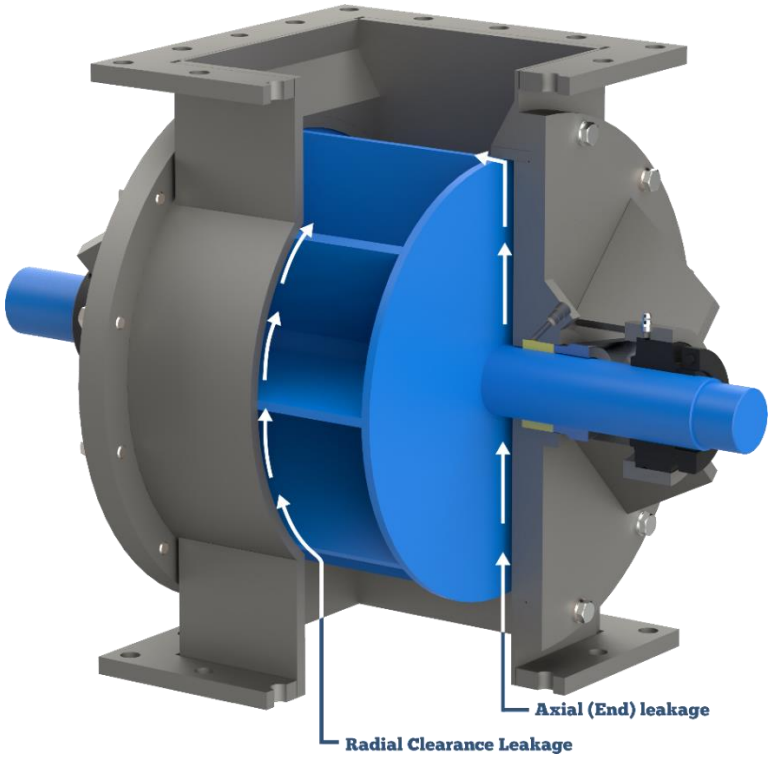


FIGURE TWO: LEAKAGE DIAGRAM WITH END SEAL

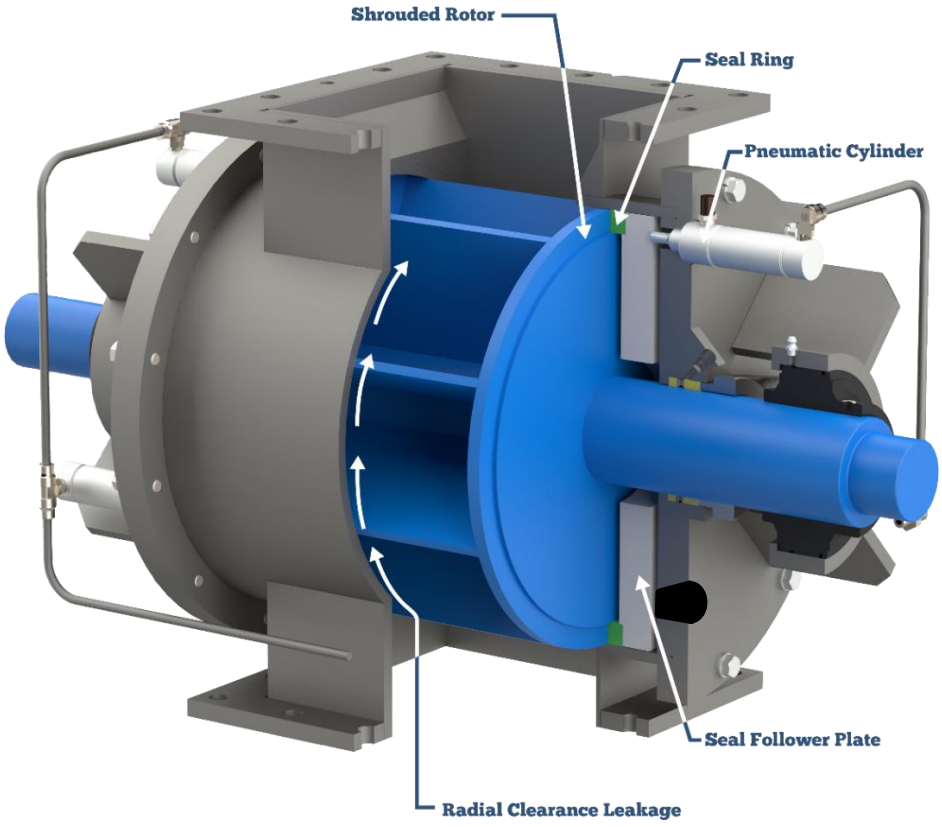
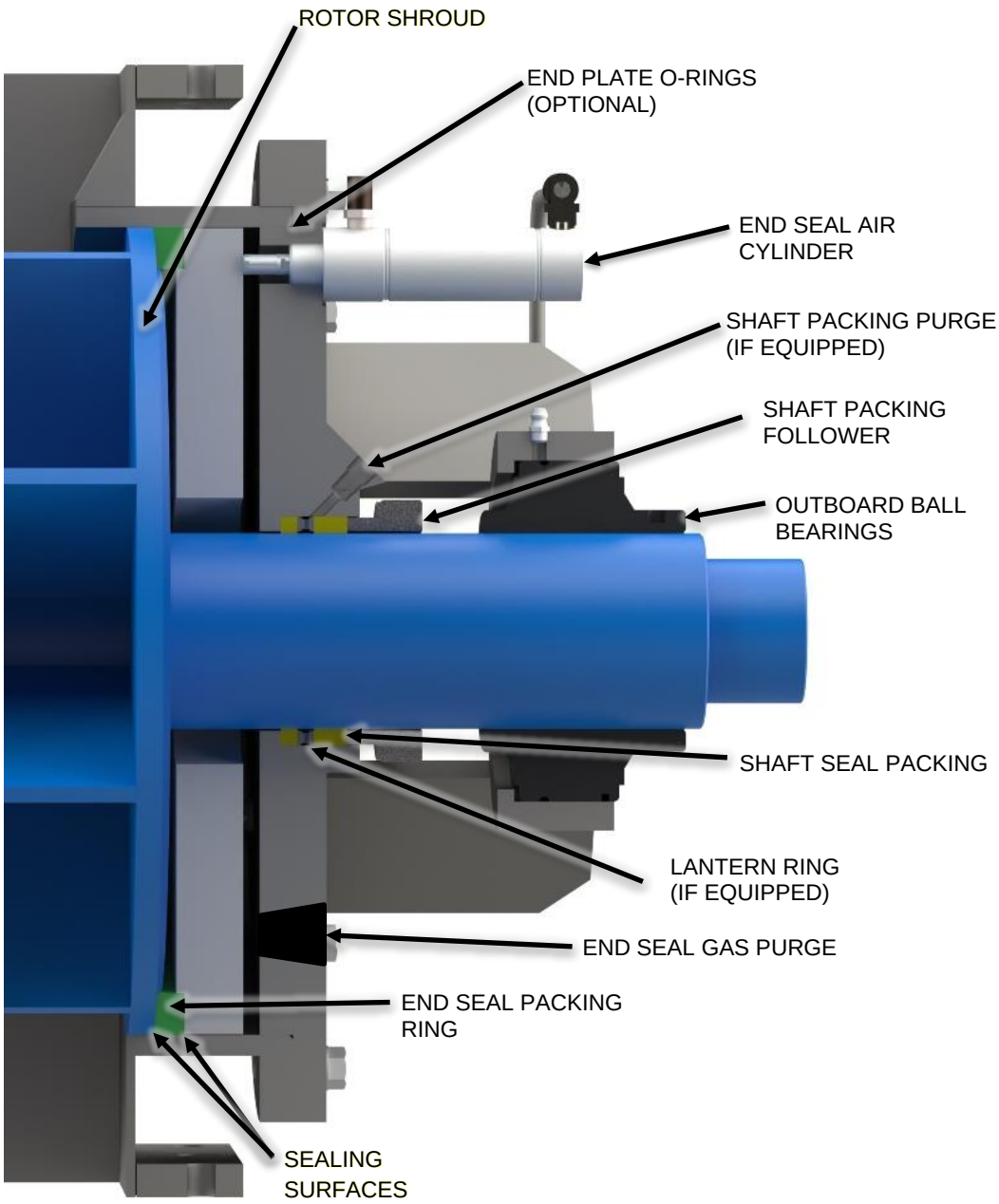


FIGURE THREE: TYPICAL ROTOR WITH END SEAL



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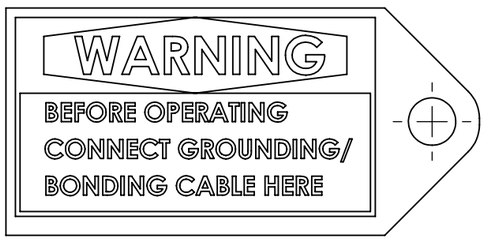
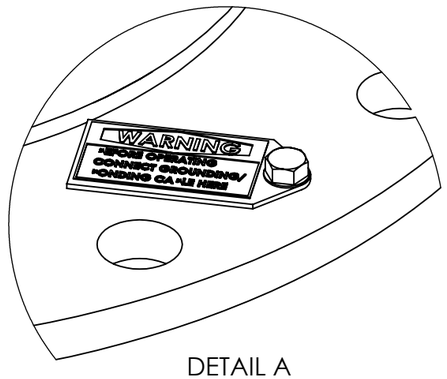
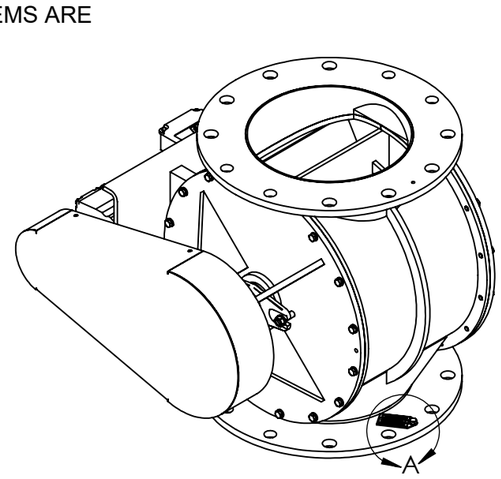
LOOK FOR THESE TAGS AND TERMINAL CONNECTING POINTS



SCALE: 1:1



DETAIL A
TYPICAL INLET AND OUTLET
SCALE 1 : 2



GENERAL TOLERANCES
UNLESS OTHERWISE SPECIFIED THE FOLLOWING SHALL APPLY
MACHINING - .XX= .02 .XXX= .005 ANGLE= .50° SURFACE ROUGHNESS HEIGHT 63 MICROINCHES OR LESS
FABRICATION - UNDER 6 6 TO 24 24 TO 60 OVER 60 ± .06 ± .12 ± .19 ± .25
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

REV. NO.	DESCRIPTION	DATE	BY

REVISIONS

CUSTOMER:

CUSTOMER PO NUMBER:

YOUNG JOB NUMBER:

TITLE
SPECIFICATION- ELECTRICAL GROUNDING AND BONDING, ROTARY VALVES

THE YOUNG INDUSTRIES, INC.
MUNCY, PENNSYLVANIA 17756
TELEPHONE: 570-546-3165

DRAWN BY: JEH	DATE: 03/19/19
CHECKED BY:	SCALE = 1:12

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