ATTENTION

DURING THE MANUFACTURING PROCESS OF THIS MACHINE, ALL NUTS, BOLTS, SET SCREWS, ETC. WERE TIGHTENED TO THE SPECIFICATIONS OF THE MANUFACTURER. HOWEVER, SHIPMENT OF THIS MACHINE MAY HAVE LOOSENED ONE OR MORE OF THESE FASTENERS.

YOU ARE ADVISED TO **CHECK THESE FASTENERS** AS PART OF THE SET UP PROCEDURE.

IF YOU HAVE ANY QUESTIONS PLEASE CALL MUNSON MACHINERY CO.

THANK YOU

MUNSON

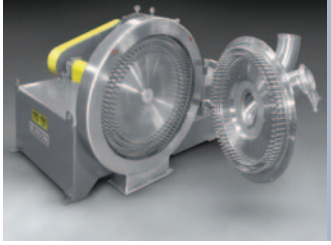
210 SEWARD AVE. UTICA, NY 13502 USA
COUNTRY CODE 001
VOICE (315) 797-0090 OR (800) 944-6644 FAX (315) 797-5582
WEB PAGE: www.munsonmachinery.com
E-MAIL: info@munsonmachinery.com

MUNSON

EQUIPMENT FOR SIZE REDUCTION OF BULK SOLID MATERIALS

MIXING/BLENDING
LINE CARD

CENTRIFUGAL IMPACT MILLS (PIN MILLS)



- Rotating impactor pin/disc assembly for fine and ultra-fine particle reduction and de-agglomeration, as well as intensive inline blending applications
- Design efficiency produces high throughput rates per hp/kw with minimal heat transfer
- Disc diameters from 8 to 34 in. (20.3 to 86.4 cm)
- 15 hp (11.2 kw) direct drive to 100+ hp (74.6+ kw) V-belt drives
- Typical applications: sugars, salts, starches, trona, friable powders, sodium bicarbonate, spices, vitamin powders, grains

SCC SCREEN CLASSIFYING CUTTERS

- Rapid throughput, minimum fines, precise sizing
- Advanced helical rotor design with interconnected parallelogram cutters and replaceable tungsten carbide, tool steel or hardened stainless steel inserts
- 10 to 72 in. (25.4 to 182.9 cm) wide housings, with magnum sizes also available
- 5 to 75 hp (3.7 to 55.9 kw) gear-reduced or belt drives
- Typical applications: ceramics, chemicals, paper, fiberglass, wood, unsintered powder metals, trim stock, herbs, spices

ROTARY LUMP BREAKERS

- Reduces agglomerates and compacted materials. Precise particle sizing
- Low-profile allows inline or stand-alone applications
- Models with 1 to 4 rotors in sizes from 12 x 12 to 48 x 48 in. (30.5 x 30.5 to 121.9 x 121.9 cm)
- Single 3 hp (2.2 kw) drives to 20+ hp (14.9+ kw) dual redundant drives
- Typical applications: agglomerated sugars, salts, sodium/calcium carbonates, chemicals, fertilizers, flakes, cement powders, hygroscopic products

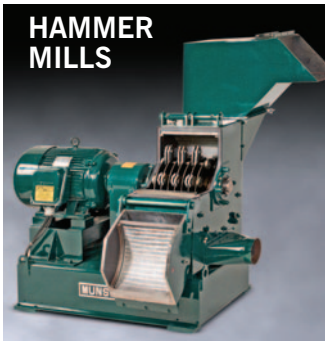
ATTRITION MILLS

- Rotating powered disc mill for precise medium- to fine-grinding of both friable and non-friable materials
- Shaft-mounted grinding plates with adjustable, constant spring-pressure achieves product uniformity within narrow particle size ranges down to 100 mesh
- Disc diameters from 18 to 36 in. (45.7 to 91.4 cm)
- Belt drives from 20 to 125 hp (14.9 to 93.2 kw)
- Typical applications: powder metals, grains, regrind, scrap products and chemicals, including wet milling

ROTARY KNIFE CUTTERS

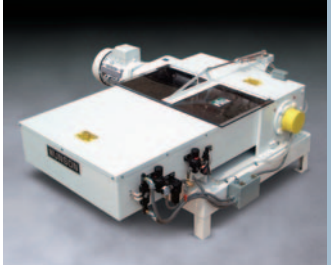
- Cutter/cracker with 5 rotating blades cutting against 4 stationary blades, propelling on-size particles through a perforated screen
- Extensive selection of screen sizes delivers controlled end product sizes with minimum fines.
- Sizes from 24 to 48 in. (61.0 to 121.9 cm)
- 20 to 50 hp (14.9 to 37.3 kw) belt drives
- Typical applications: spices, roots, corn (cutting/cracking), grains, other food products and potpourri

HAMMER MILLS



- Industrial-duty hammer mill for coarse and fine grinding of fibrous and friable materials at high rates with controllable sizing
- Replaceable hammers impact at high speeds. 270° screens maximize area/capacity and are easily removed through a hinged door
- 14.5 and 18 in. (36.8 and 45.7 cm) wide housings
- 20 to 150 hp (14.9 to 111.9 kw) direct drives
- Typical applications: plastics, chemicals, wood products, fertilizers, fibrous products, grain/corn, spices

CX HEAVY DUTY CUTTERS



- Single-rotor, high-torque cutter/hog with gravity feed or pneumatic ram for primary size reduction of larger, bulky materials
- Solid rotor mass with replaceable tips in a variety of configurations
- Widths from 12 to 48 in. (30.5 to 121.9 cm)
- Gear reduced or belt drives to 75 hp (55.9 kw)
- Typical applications: EPDM/synthetic rubber, wood, chemicals, plastics, detergent blocks, scrap products, fertilizer, resins, chocolate blocks

BULK MATERIAL SHREDDERS

- Twin-shaft, ultra-heavy duty shredder with heat treated, resharpenable shredder heads reduces volume of diverse materials
- Low speed, high torque shredding with positive feeding and self-clearing action
- 6- to 12-in. (15.2- to 30.5-cm) diameter shredder heads, 28 to 60 in. (71.1 to 152.4 cm) chamber lengths
- Gear-reduced single 20 hp (14.9 kw) to 100 hp (74.6 kw) dual drives
- Typical applications: pallets, fiber drums, computer parts, plastics, rubber compounds, cardboard, regrind

FOR OBJECTIVE ADVICE, ASK THE ONLY MANUFACTURER OF ALL EIGHT TYPES

MUNSON MACHINERY CO., INC.
1-800-944-6644
1-315-797-0090
INFO@MUNSONMACHINERY.COM
WWW.MUNSONMACHINERY.COM

MUNSON

EQUIPMENT FOR DRY BULK BLENDING AND LIQUID ADDITIONS

SIZE REDUCTION LINE CARD

ROTARY BATCH MIXERS

- Gentle mixing action achieves uniform blends in less than 3 minutes. Excellent for liquid additions and coatings.
- Total discharge, rapid sanitizing
- Capacities from 5 to 600 cu ft (142 to 16,990 ℓ)
- 2 to 75 hp (1.5 to 55.9 kw) single or dual gear reduced drives
- Typical applications: nutraceuticals, foods, coffee/tea, tobacco, chemicals, refractories, glass, metal powders, fertilizers, herbicides/pesticides, plastic pellets, concrete/mortar, mineral feeds, drink mixes, detergents

RIBBON/PADDLE/ PLOW BLENDERS

- Ultra-heavy duty, horizontal, double helical ribbon, paddle or plow blenders with removable agitator shaft
- Optional internal spray line, heating and cooling jackets, multiple cover and discharge designs
- Capacities from 1 to 1000 cu ft (28 to 28,317 ℓ)
- 1 to 200 hp (0.75 to 149.1 kw) in direct or foot-mounted drives
- Diverse applications: chemicals, pharmaceuticals, cosmetics, spice and food products, gypsum/stucco, plastics, pigments, resins, dairy products, tobacco

ROTARY BATCH MINI MIXERS

- Pilot/lab version of Rotary Mixer gently achieves uniform blends in less than 3 minutes. No segregation upon discharge.
- Optional liquid spray line, discharge hood, intensifier
- Capacities from .25 to 15 cu ft (0.2 to 425 ℓ)
- 2 to 5 hp (1.5 to 3.7 kw) gear reduced drives
- Typical applications: nutraceuticals, foods, coffee/tea, tobacco, chemicals, refractories, glass, metal powders, fertilizers, herbicides/pesticides, concrete/mortar, plastic pellets

FLUIDIZED BED MIXERS

- Twin, counter-rotating agitator shafts rotate rapidly to gently fluidize low- to medium-density bulk materials (including liquid additions)
- Achieves uniform blends in 30 seconds (typical) with little or no degradation of friable materials
- 0.2 to 283 cu ft (6 to 8014 ℓ)
- Single 5 hp (3.7 kw) drives to dual 75 hp (55.9 kw) drives
- Typical applications: cereal/foods, pet foods, coffee/tea, pharmaceutical products, plastics, fibrous products

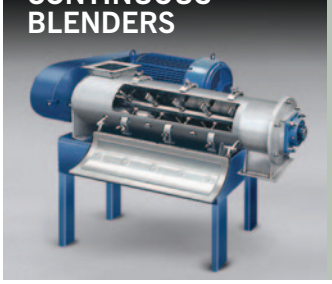
CYLINDRICAL PLOW BLENDERS

- High-intensity batch blending of bulk materials that do not readily intermix, faster than with conventional ribbon/paddle/plow blenders
- Jackets, choppers, and ports or spray heads for liquid additions/injections
- 1 to 400 cu ft (28 to 11,327 ℓ) useable capacity
- 1 to 200 hp (0.75 to 149.1 kw) in direct or foot-mounted drives
- Typical applications: foods, pharmaceuticals, nutraceuticals, wood, plastics, bakery products, detergents

VEE CONE BLENDERS

- Dry, granular materials fall, converge, and divide for gentle, uniform blending with low energy usage. Optional liquid addition bar with intensifier
- Complete discharge, thorough sanitizing
- 0.25 to 200 cu ft (7 to 5663 ℓ) useable capacity
- 0.5 to 100 hp (0.4 to 74.5 kw) gear reduced drives or direct chain and sprocket drives
- Typical applications: pharmaceuticals, nutraceuticals, spices, chemicals, plastics, ceramics, metal powders

HI-INTENSITY CONTINUOUS BLENDERS



- High- or low-speed shaft with 180° adjustable paddles. Optional spray/injection ports for liquid additions or creation of slurries
- High-speed operation for intensive mixing, or low speed, lower shear operation
- Vessel diameters from 8 to 36 in. (20.3 to 91.4 cm), lengths to 8 ft (2.4 m)
- 10 to 125 hp (7.5 to 93.2 kw) with gear reduced or belt drives
- Typical applications: chemicals, foods, fertilizers/herbicides/pesticides, concrete/mortar, fly ash, asphalt, tobacco, slurries, clays

ROTARY CONTINUOUS MIXERS

- Rotary style continuous mixer with fixed internal mixing flights
- Gentle, thorough mixing action with little or no product degradation. Excellent de-dusting and spray coating capabilities
- Vessel diameters from 16 to 72 in. (40.6 to 182.9 cm), lengths to 24 ft (7.3 m)
- 0.5 to 50 hp (0.04 to 37.3 kw) gear reduced drives
- Typical applications: snack foods, pet foods, drink mixes, detergents, carbons, pharmaceuticals, nutraceuticals, clays, fertilizers, coating granules, aggregates, plastic pellets, herbicides/pesticides

FOR OBJECTIVE ADVICE, ASK THE ONLY MANUFACTURER OF ALL EIGHT BLENDERS

MUNSON MACHINERY CO., INC.
1-800-944-6644
1-315-797-0090
INFO@MUNSONMACHINERY.COM
WWW.MUNSONMACHINERY.COM

MUNSON

MODEL MX-15-S316 SN 160033

VOLT 208 PH 3 CYCLE 60

MUNSON MACHINERY CO. INC.
UTICA, NEW YORK 13503


CAUTION
DO NOT OPERATE
THIS MACHINE
WITHOUT
GUARDS IN PLACE
MUNSON
MODEL
SN
VOLT
PH
CYCLE
MUNSON MACHINERY CO. INC.
UTICA, NEW YORK 13503
MADE IN U.S.A.

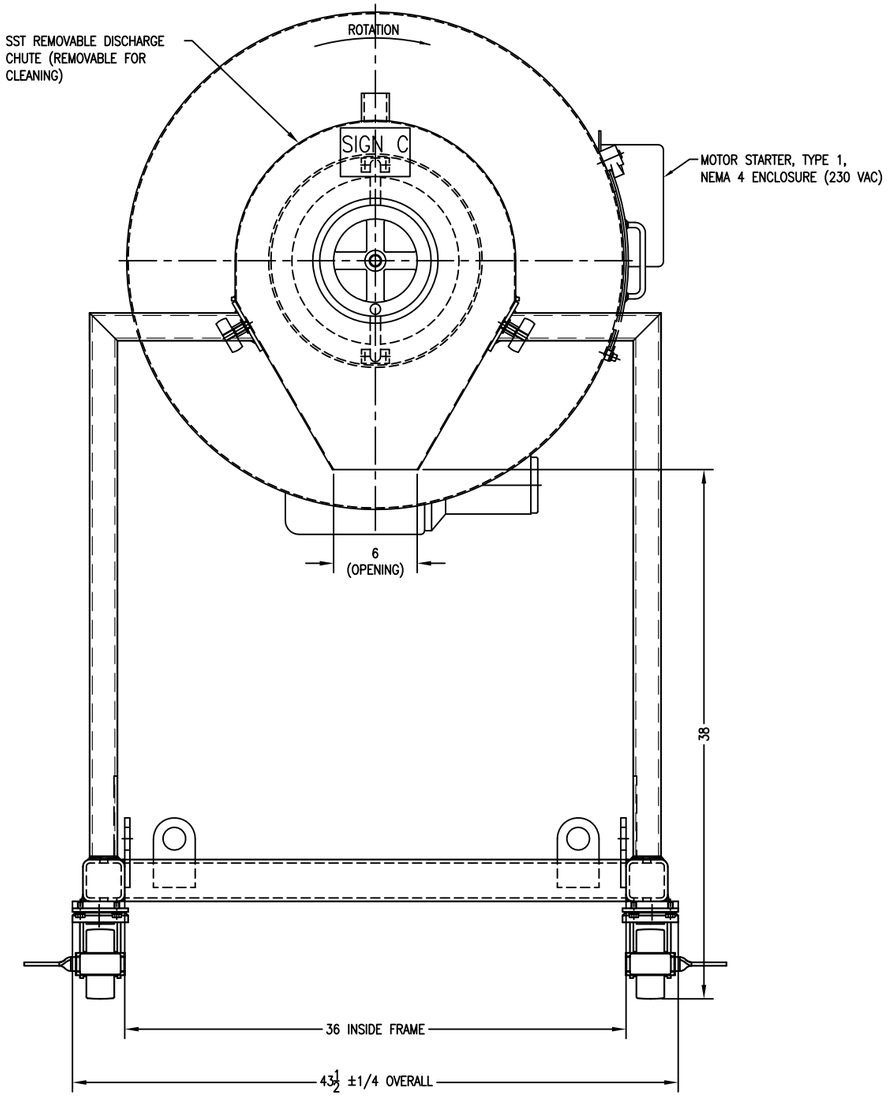

CAUTION
LOCK OUT POWER
BEFORE OPENING
GUARDS, ACCESS DOORS
or COVERS
CAUTION
LOCK OUT POWER
BEFORE OPENING
GUARDS, ACCESS DOORS
or COVERS
MUNSON

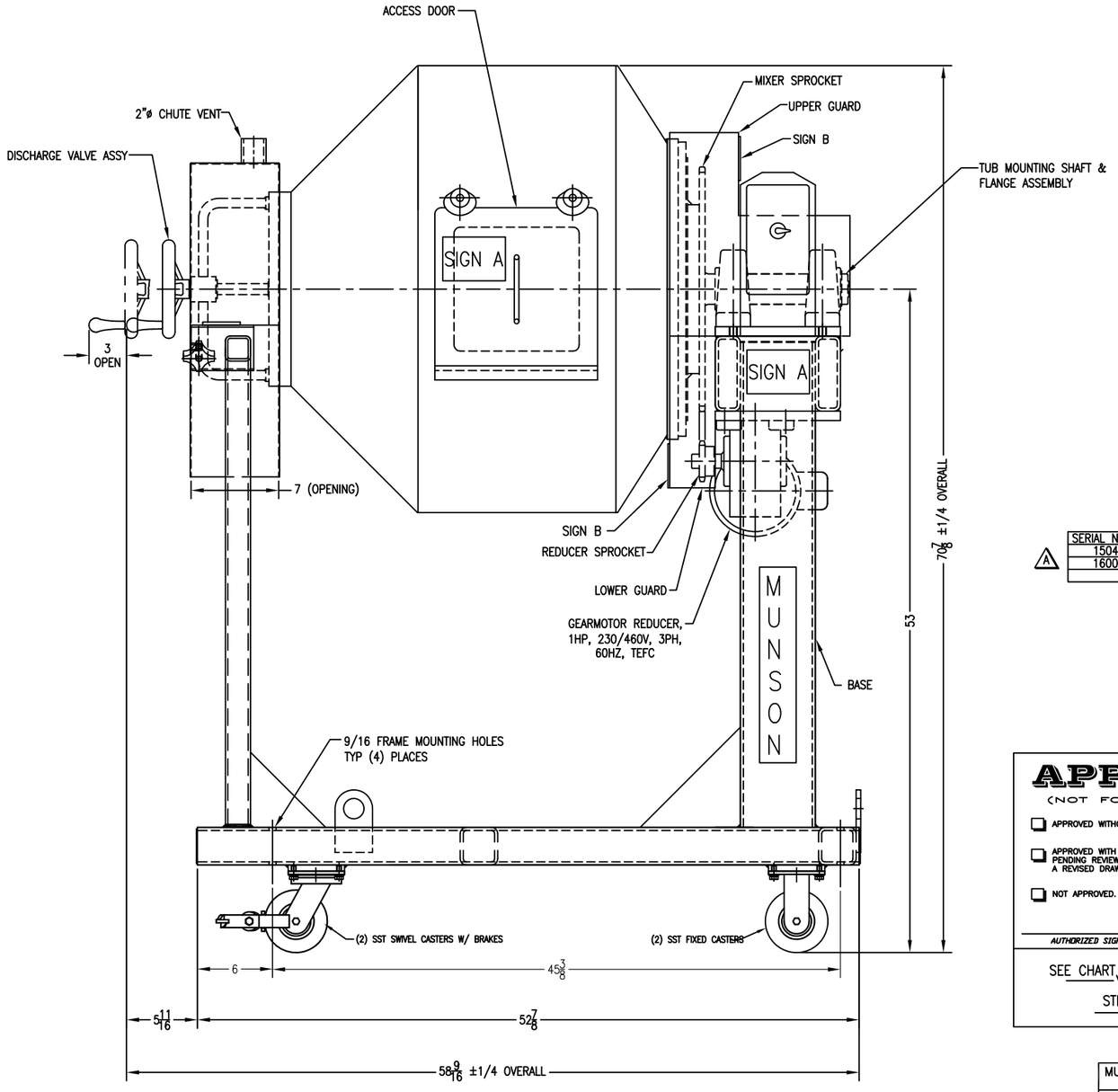

BE
CAREFUL
KEEP HANDS
OUT OF
MACHINERY


CAUTION
LOCK OUT POWER
BEFORE OPENING
GUARDS, ACCESS DOORS
or COVERS
MUNSON

REV	BY	DATE	CHANGE DESCRIPTION
A	M.W.	1-21-16	ADDED CHART

SIGN A	SIGN B	SIGN C
CAUTION LOCKOUT POWER BEFORE OPENING GUARDS, ACCESS DOORS OR COVERS	CAUTION DO NOT OPERATE THIS MACHINE WITHOUT GUARDS IN PLACE	BE CAREFUL KEEP HANDS OUT OF MACHINERY





⚠A	SERIAL NUMBER	STARTER VOLTAGE
	150479	230 VAC
	160033	208 VAC

APPROVAL
(NOT FOR CERTIFICATION)

- ☐ APPROVED WITHOUT CHANGE.
- ☐ APPROVED WITH CHANGE(S) NOTED. PENDING REVIEW OF CHANGE(S), MUNSON MAY SUBMIT A REVISED DRAWING FOR FINAL CUSTOMER APPROVAL.
- ☐ NOT APPROVED. RESUBMIT WITH CORRECTIONS.

AUTHORIZED SIGNATURE _____ DATE (MM/DD/YY) _____

SEE CHART VOLTS AC 60 Hz

STEEL-IT PAINT COLOR

(SN150479, 160033)

MUNSON MACHINERY COMPANY, INC.
UTICA, NY 13503

APPROVAL, MUNSON
#MX5S316 MINI MIXER

DO NOT SCALE DRAWING
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES ARE:
X ±.03 FRACTIONAL ±1/32
.XX ±.01 ANGLES ±1/2°
.XXX ±.005 BREAK SHARP EDGES

DRAWN BY: DSS 7/20/2015
APPROVED BY:
SUPERSEDES:
MATERIAL
RAW STOCK

SCALE	DWG NO	REV	SHEET
3:16	D-9595-S316	A	1 OF 1

MUNSON MACHINERY

MINA MIXER MANUAL

February 2003

Introduction & Safety

IMPORTANT !!

Most industrial machinery inherently contains rotating elements, which are potentially hazardous, and this equipment is no exception. Consequently, your machine is supplied with a combination of covers, guards limit switches and warning signs designed to minimize these hazards. However, these devices are only effective when securely fastened in place and properly maintained. Since the machine is employed in various applications, it may occasionally require modifications to comply with certain safety standards. Never operate the machine unless it complies with all applicable OSHA, State and local regulations, as well as current national safety standards.

It should be noted that the above provisions are in no way a substitute for safe operating procedures. Serious injury or death could occur as the result of unsafe operating, cleaning, maintaining or servicing procedures, and therefore all employees involved with the machine should read this manual thoroughly and be instructed in the machine's function and control.

Always follow OSHA Lockout\Tagout procedure and never allow employees to open covers, remove guards, clean or perform maintenance on the machine without first disconnecting and physically locking out electrical and pneumatic power.

The following pages in this section depict the correct location of guards, accessories and warning signs as well as the potential hazards associated with them. The machine should be checked before operation and periodically thereafter to ensure that all guards are effectively in place and secured.

Some Safety Checks to observe before operating the Munson Rotary Mixer:

1. **IMPORTANT: Never lubricate, clean, adjust or perform service on the machine unless all power (electrical and air) is Locked out & Tagged out, and there is no possibility of the machine operating!**
2. Always wear eye protection when in the area of this machine. Never wear loose clothing. Long hair must be tied up and covered to prevent entanglement.
3. Clear any obstructions from the work area and allow ample space around the machine for free movement.
4. Make sure all guards are in place and secured.

IMPORTANT POINTS

I **Chain Guards:** Guard hands from being pinched or severed by action of sprockets and chain. See attached drawings showing the location of guards and warning signs.

II **Belt Guards:** Guard hands from being pinched or severed by action of sprockets and chain. See attached drawings showing the location of guards and warning signs.

****

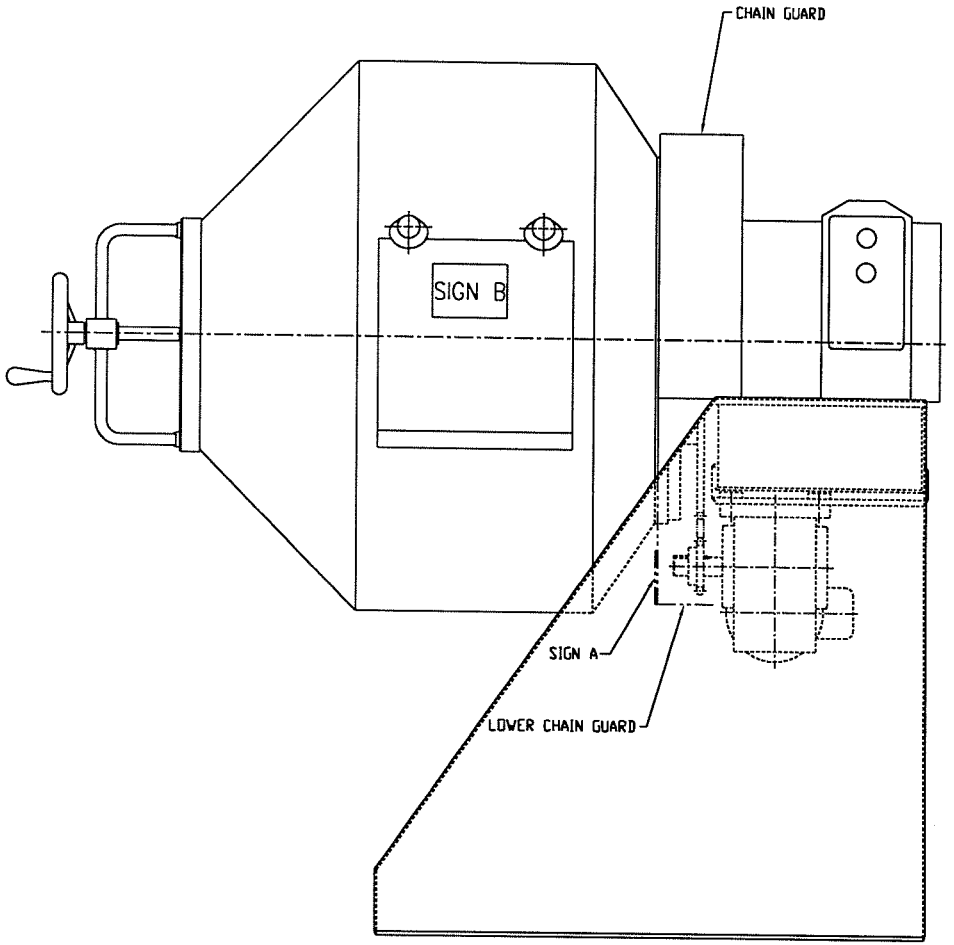
IF YOU HAVE ANY QUESTIONS REGARDING THE SAFE OPERATION OF THIS EQUIPMENT, CALL MUNSON MACHINERY AT (315) 797-0090.

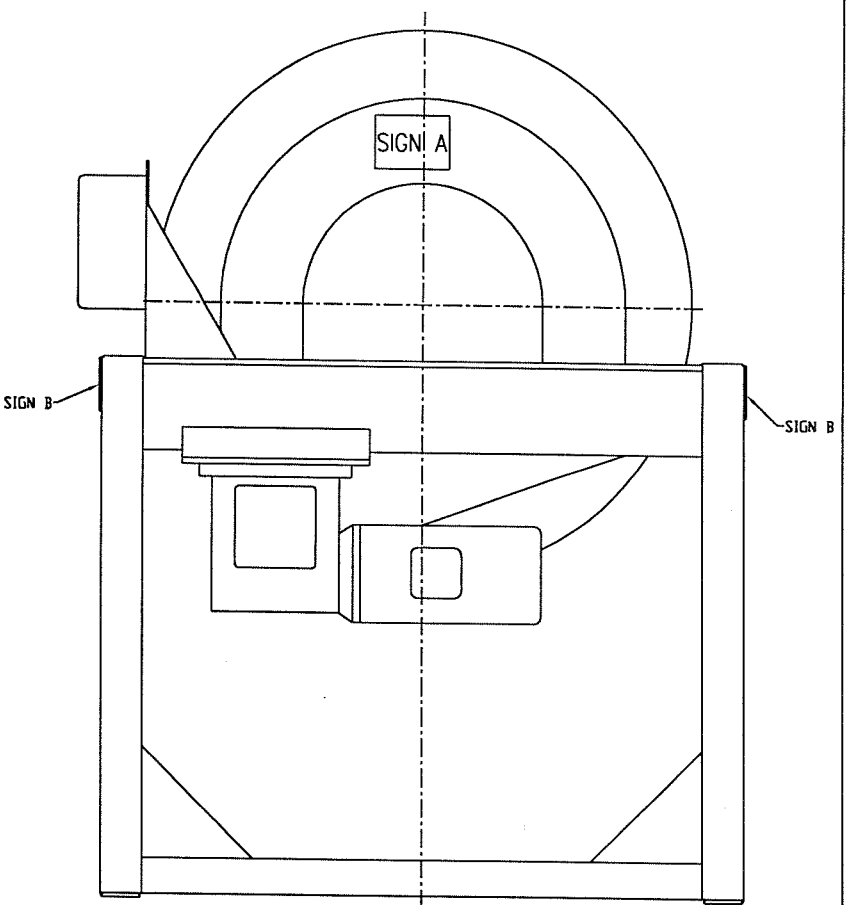
****

MUNSON MACHINERY COMPANY, INC.

P.O. BOX 855 – 210 SEWARD AVE. UTICA, NY 13503-0855
VOICE (315) 797-0090 OR (800) 944-6644 FAX (315) 797-5582
WEB PAGE: http://www.munsonmachinery.com
E-MAIL: info@munsonmachinery.com

SIGN A	SIGN B
CAUTION DO NOT OPERATE UNLESS SAFETY GUARDS OR DEVICES ARE IN PLACE AND PROPERLY ADJUSTED	CAUTION DISCONNECT & LOCKOUT POWER BEFORE OPENING, CLEANING, MAINTAINING OR REPAIRING THIS MACHINE

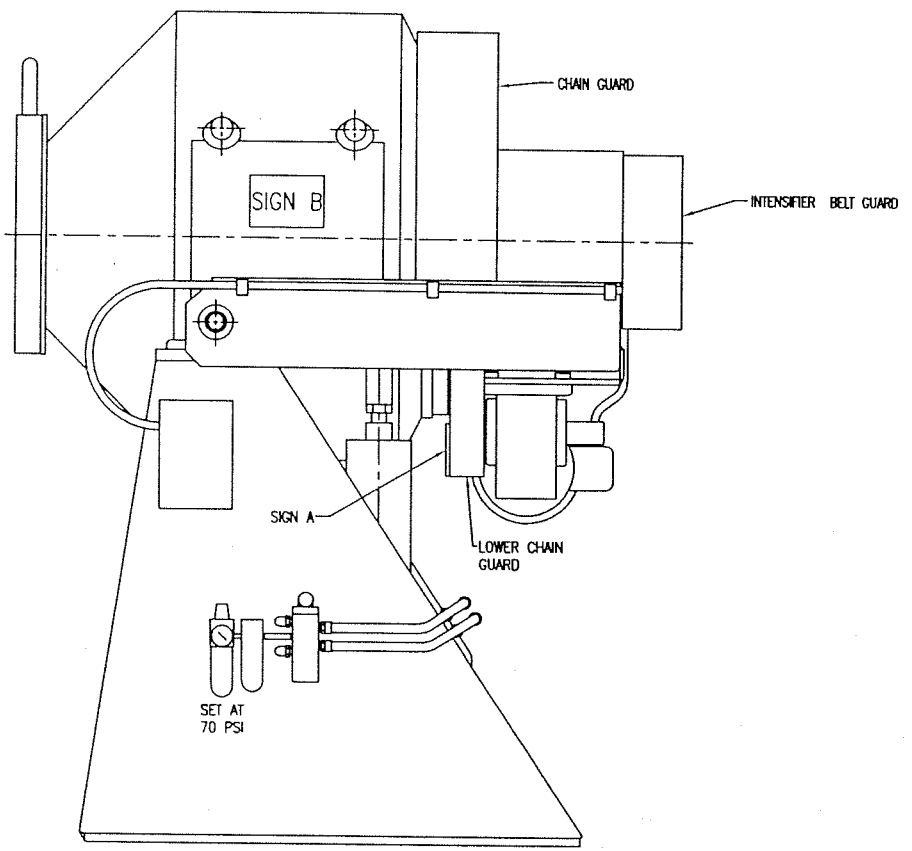


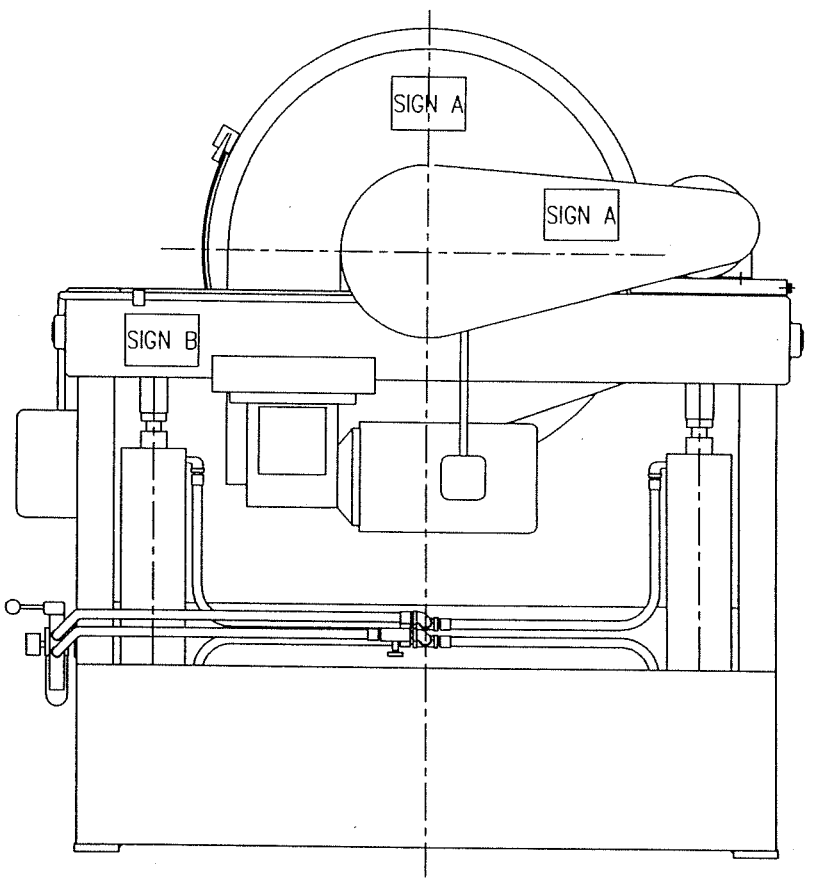


REV	BY	DATE	CHANGE DESCRIPTION

MUNSON MACHINERY COMPANY, INC.
UTICA, NY 13502
SAFETY SKETCH
NON-TILT MINA-MIXER
D-7001
SHEET 1 OF 1

SIGN A	SIGN B
CAUTION DO NOT OPERATE UNLESS SAFETY GUARDS OR DEVICES ARE IN PLACE AND PROPERLY ADJUSTED	CAUTION DISCONNECT & LOCKOUT POWER BEFORE OPENING, CLEANING, MAINTAINING OR REPAIRING THIS MACHINE

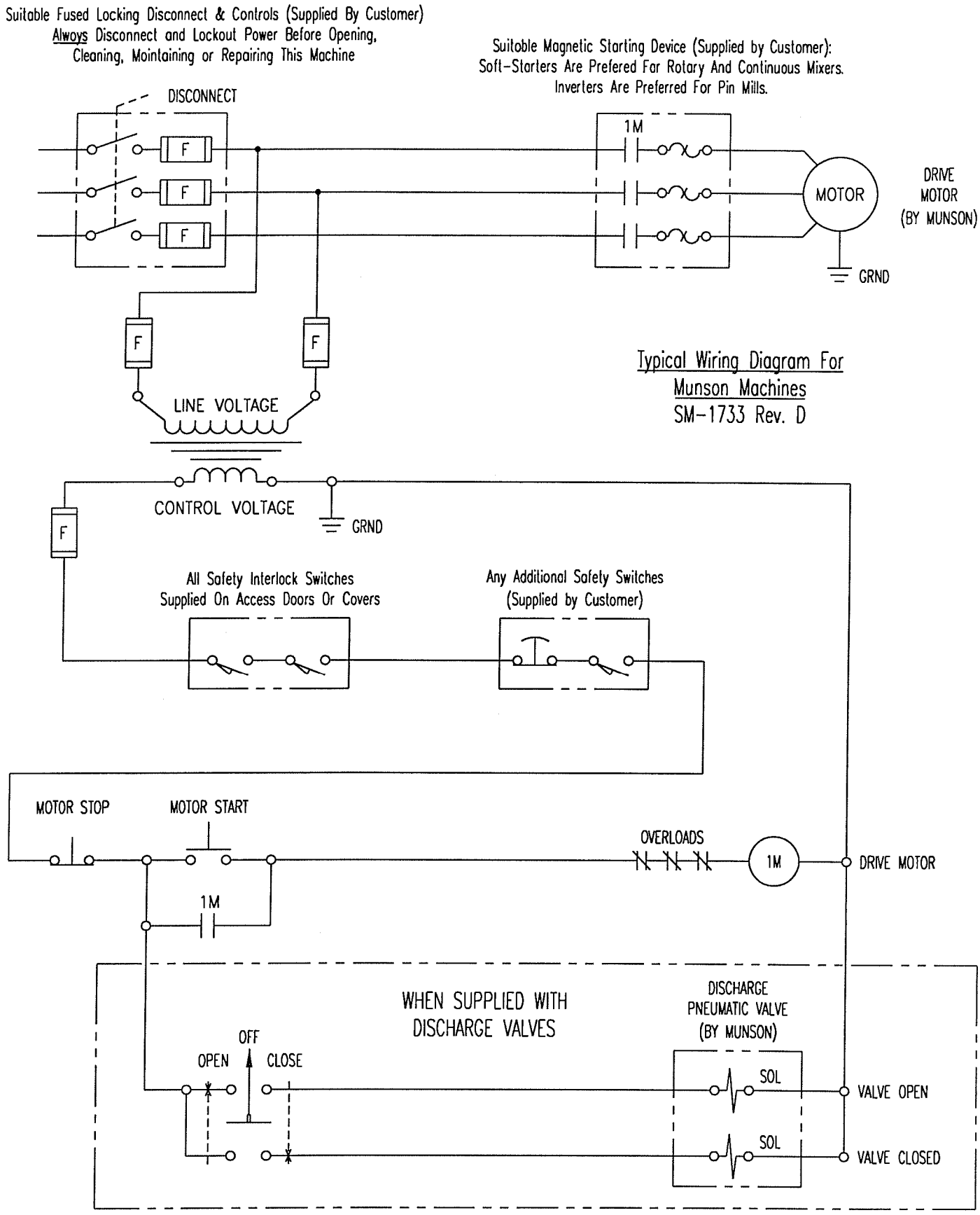




MUNSON MACHINERY COMPANY, INC.

SAFETY SKETCH
TILT MINA-MIXER

D-7000



Typical Wiring Diagram For Munson Machines
SM-1733 Rev. D

IMPORTANT!

This machine MUST be electrically grounded; failure to do so could result in serious injury or death. Be sure all wiring and components comply with applicable Federal, State and local regulations, as well as current national safety standards.

MUNSON MINA-MIXER

OPERATING AND MAINTENANCE INSTRUCTIONS

YOUR MUNSON MIN-MIXER HAS BEEN CAREFULLY ALIGNED AND TEST RUN AT THE FACTORY PRIOR TO SHIPMENT. UNLESS THE YNIT HAS BEEN DAMAGED IN TRANSIT (WHICH SHOULD BE IMMEDIATELY REPORTED TO THE CARRIER), IT IS READY FOR OPERATION AFTER INSTALLATION WITHOUT ANY IMMEDIATE ADJUSTMENT.

INSTALLATION:

Move mixer to installation site with skids attached. When elevating mixer, place slings under the drum mounting pedestal. Never lift with the slings around the mixer drum.

Mount on a solid foundation, free from vibration.

To be certain unit is perfectly level, use a precision level.

Connect electrical power to motor and starter. Check direction of rotation with arrow on mixer drum.

Prior to spouting ingredients into mixer, allow unit to run with discharge gate open long enough to clear any foreign objects which may be inside mixer drum. It will not be necessary to lubricate the machine at this point, unless it has stood for a considerable time.

Close discharge gate and proceed to load mixer through the access door on the side of the drum. Actual blending time depends upon individual requirements, characteristics and fluidity of materials.

LUBRICATION:

Bearings and roller chain: refer to "Lubricants Recommendation" chart.

Two anti-friction type bearings on drum shaft: lubricate every 200 hours of operation. Add grease slowly, until a slight bead forms around the seals.

NOTE:

Wipe grease fitting clean before re-lubrication to prevent foreign matter from being worked into bearing.

Roller chain on drive between gear motor reducer and mixer drum should be kept clean and given a few drops of oil monthly. (Excess oil will attract dirt).

LUBRICANTS RECOMMENDATION CHART:

Keystone Lubrication Company	-	#84 medium or light
Sinclair Oil Company	-	Litholine
Standard Oil of Indiana	-	Stanolith

Periodically inspect roller chain for wear and excess slack.

Gear reducer – refer to lubrication instructions attached to same.

SAFETY REMINDER

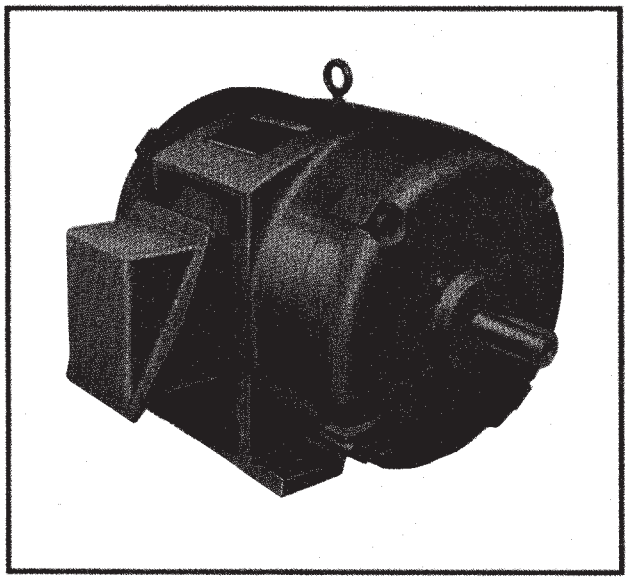
If your Munson Unit is supplied with access limit switches on covers, doors or guards, these must be wired to the motor starter. We also urgently recommend that "Emergency Stop" buttons be purchased and installed at convenient locations around the machine to ensure worker safety.

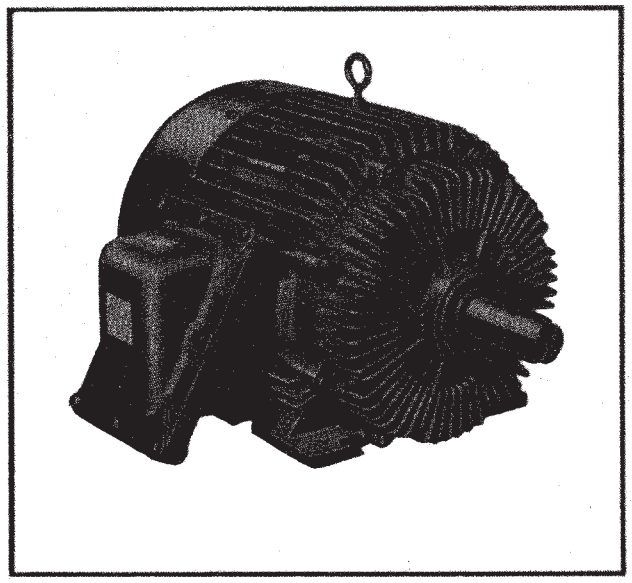
Your Munson is supplied with drive guards which are only effective when they are securely in place.

NEVER OPEN COVERS, REMOVE GUARDS OR PERFORM MAINTENANCE WITHOUT FIRST DISCONNECTING POWER

REMEMBER: SAFETY IS EVERYONE'S BUSINESS

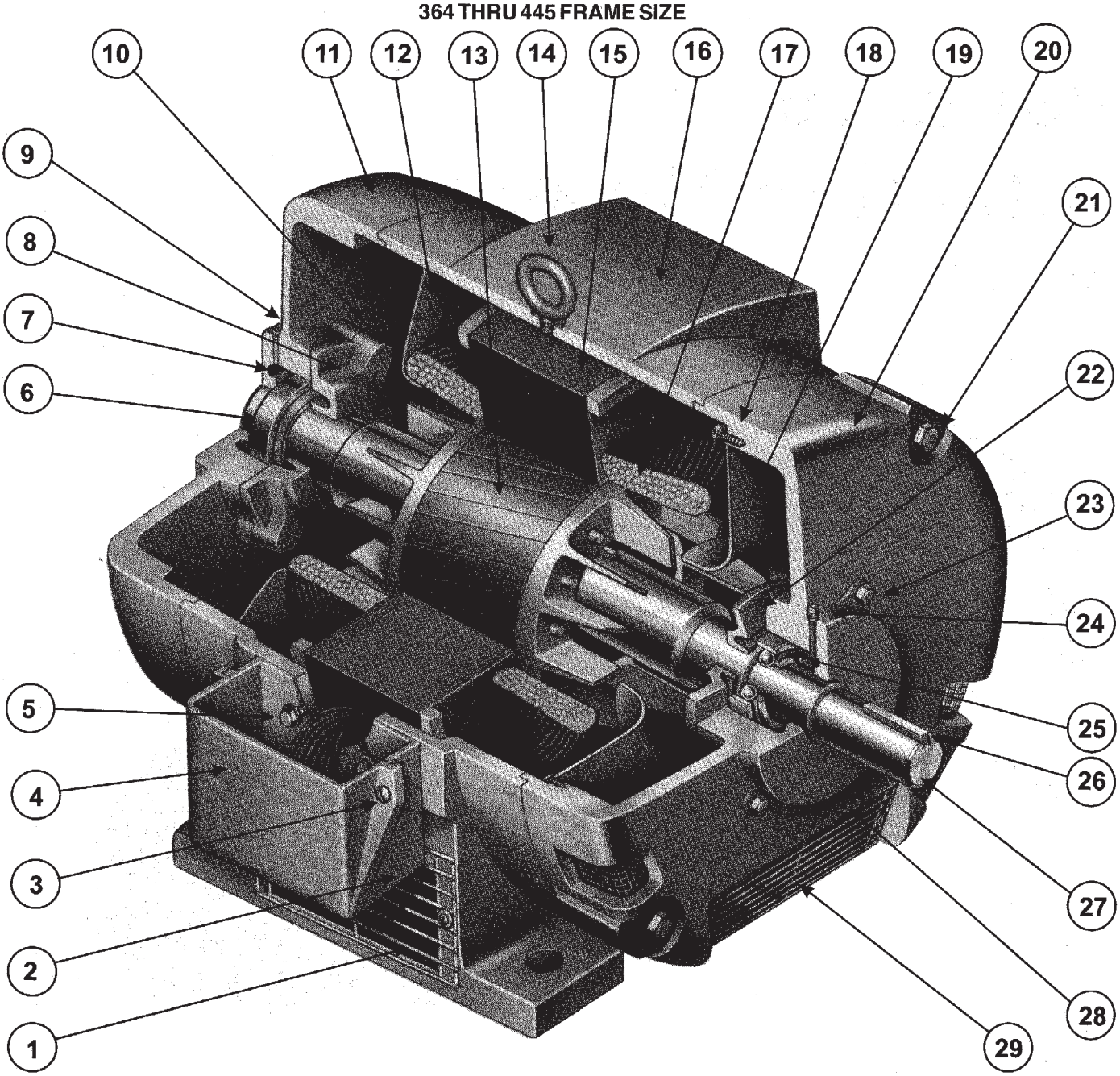
Standard Induction Motors





Installation, Operation, & Maintenance Instructions

TYPICAL CUTAWAY VIEW OF A DRIPPROOF, HORIZONTAL INTEGRAL HORSEPOWER MOTOR & PARTS DESCRIPTION 364 THRU 445 FRAME SIZE



ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION
1.	** Frame Vent Screen	11.	Bracket O.P.E.	21.	Bracket Holding Bolt
2.	Conduit Box Bottom	12.	Baffle Plate O.P.E.	22.	Inner Bearing Cap P.E.
3.	Conduit Box Top-Holding Screw	13.	Rotor Core	23.	Inner Bearing Cap Bolt
4.	Conduit Box Top	14.	Lifting Eye Bolt	24.	Grease Plug
5.	Conduit Box Bottom-Holding Bolt	15.	Stator Core	25.	*Ball Bearing P.E.
6.	*Ball Bearing O.P.E.	16.	Frame	26.	Shaft Extension Key
7.	Pre-loading Spring	17.	Stator Winding	27.	Shaft
8.	Inner Bearing Cap O.P.E.	18.	Baffle Plate Holding Screw	28.	Drain Plug (grease)
9.	Grease Plug	19.	Baffle Plate P.E.	29.	**Bracket Screen
10.	Inner Bearing Cap Bolt	20.	Bracket P.E.		

P.E. = Pulley End

O.P.E. = Opposite Pulley End

* = Bearing Numbers are shown on motor nameplate when requesting information or parts always give complete motor description, model and serial numbers.

** = Bracket and frame screens are optional.

WARNING

These instructions must be followed to ensure safe and proper installation, operation and maintenance of the motor. They should be brought to the attention of all persons who install, operate or maintain this equipment.

GENERAL INFORMATION

Motors are all fully factory tested and inspected before shipping. Damage during shipment and storage can occur. Motors not correctly matched to the power supply and/or the load will not operate properly. These instructions are intended as a guide to identify and eliminate these problems before they are overlooked or cause further damage.

ACCEPTANCE

Check carefully for any damage that may have occurred in transit. If any damage or shortage is discovered, do not accept until an appropriate notation on the freight bill is made. Any damage discovered after receipt of equipment should be immediately reported to the carrier.

STORAGE

A. Keep motors clean
   1. Store indoors
   2. Keep covered to eliminate airborne dust and dirt.
   3. Cover openings for ventilation, conduit connections, etc. to prevent entry of rodents, snakes, birds, and insects, etc.

B. Keep motors dry
   1. Store in a dry area indoors
   2. Temperature swings should be minimal to prevent condensation.
   3. Space heaters are recommended to prevent condensation.
   4. Treat unpainted flanges, shafts, and fittings with a rust inhibitor.
   5. Check insulation resistance before putting motor into service. (Consult manufacturer for guidelines).

C. Keep Bearings Lubricated
   1. Once per month, rotate shaft several turns to distribute grease in bearings.
   2. If unit has been stored more than one year, add grease before start-up. (Refer to lubrication procedure).

INSTALLATION

UNCRATING AND INSPECTION

After uncrating, check for any damage which may have been incurred in handling. The motor shaft should turn freely by hand. Repair or replace any loose or broken parts before attempting to use the motor.

Check to be sure that motor has not been exposed to dirt, grit, or excessive moisture in shipment or storage before installation.

Measure insulation resistance (see operation). Clean and dry the windings as required.

Never start a motor which has been wet without having it thoroughly dried.

SAFETY

Motors should be installed, protected and fused in accordance with latest issue of National Electrical Code, NEMA Standard Publication No. MG 2 and local codes.

Eyebolts or lifting lugs are intended for lifting the motor only. These lifting provisions should never be used when lifting or handling the motor with other equipment (i.e. pumps, gear boxes, fans or other driven equipment) as a single unit. Be sure the eyebolt is fully threaded and tight in its mounting hole.

Eyebolt lifting capacity ratings is based on a lifting alignment coincident with the eyebolt centerline. Eyebolt capacity reduces as deviation from this alignment increases. See NEMA MG 2.

Frames and accessories of motors should be grounded in accordance with National Electrical Code (NEC) Article 430. For general information of grounding refer to NEC Article 250.

Rotating parts such as pulleys, couplings, external fans, and shaft extensions should be permanently guarded.

LOCATION

In selecting a location for the motor, consideration should be given to environment and ventilation. A motor with the proper enclosure for the expected operating condition should be selected.

The ambient temperature of the air surrounding the motor should not exceed 40°C (104°F) unless the motor has been especially designed for high ambient temperature applications. The free flow of air around the motor should not be obstructed.

The motor should never be placed in a room with a hazardous process, or where flammable gases or combustible material may be present, unless it is specifically designed for this type of service.

1. Dripproof (open) motors are intended for use indoors where atmosphere is relatively clean, dry and non-corrosive.
2. Totally enclosed motors may be installed where dirt, moisture and corrosion are present, or in outdoor locations.
3. Explosion proof motors are built for use in hazardous locations as indicated by Underwriters' label on motor. Consult UL, NEC, and local codes for guidance.

Refer to manufacturer for application assistance.

FLOOR MOUNTING

Motors should be provided with a firm, rigid foundation, with the plane of four mounting pads flat within .010" for 56 to 210 frame; .015" from 250 through 500 frame. This may be accomplished by shims under the motor feet. For special isolation mounting, contact manufacturer for assistance.

V-BELT DRIVE

1. Select proper type and number of belts and sheaves. Excessive belt load will damage bearings. Sheaves should be in accordance to NEMA Spec. MG-1 or as approved by the manufacturer for a specific application.
2. Align sheaves carefully to avoid axial thrust on motor bearing. The drive sheave on the motor should be positioned toward the motor so it is as close as possible to the bearing.

3. When adjusting belt tension, make sure the motor is secured by all mounting bolts before tightening belts.
4. Adjust belt tension to belt manufacturers recommendations. Excessive tension will decrease bearing life.
5. For more information see Publication SB528.

DIRECT CONNECTED DRIVE

Flexible or solid shaft couplings must be properly aligned for satisfactory operation. On flexible couplings, the clearance between the ends of the shafts should be in accordance with the coupling manufacturer's recommendations or NEMA standards for end play and limited travel in coupling.

MISALIGNMENT and RUN-OUT between direct connected shafts will cause increased bearing loads and vibration even when the connection is made by means of a flexible coupling. Excessive misalignment will decrease bearing life. Proper alignment, per the specifications of the coupling being used, is critical.

Some large motors are furnished with roller bearings. Roller bearings should **not** be used for direct drive.

ELECTRICAL CONNECTIONS

CAUTION

Install and ground per local and national codes. Consult qualified personnel with questions or if repairs are required.

WARNING

1. Disconnect power before working on motor or driven equipment.
2. Motors with automatic thermal protectors will automatically restart when the protector temperature drops sufficiently. Do not use motors with automatic thermal protectors in applications where automatic restart will be hazardous to personnel or equipment.
3. Motors with manual thermal protectors may start unexpectedly after protector trips. If manual protector trips, disconnect motor from power line. After protector cools (five minutes or more) it can be reset and power may be applied to motor.
4. Discharge all capacitors before servicing motor.
5. Always keep hands and clothing away from moving parts.
6. Never attempt to measure the temperature rise of a motor by touch. Temperature rise must be measured by thermometer, resistance, imbedded detector, or thermocouple.
7. Electrical repairs should be performed by trained and qualified personnel only.
8. Failure to follow instructions and safe electrical procedures could result in serious injury or death.
9. If safety guards are required, be sure the guards are in use.

1. All wiring, fusing, and grounding must comply with National Electrical Codes and local codes.
2. To determine proper wiring, rotation and voltage connections, refer to the information and diagram on the nameplate, separate connection plate or decal. If the plate or decal has been removed, contact manufacturer for assistance.
3. Use the proper size of line current protection and motor controls as required by the National Electrical Code and local codes. Recommended use is 125% of full load amps as shown on the nameplate for motors with 40°C ambient and a service factor over 1.0. Recommended use is 115% of full load amps as shown on the nameplate for all other motors. Do not use protection with larger capacities than recommended. Three phase motors must have all three phases protected.

THERMAL PROTECTOR INFORMATION

The nameplate will indicate one of the following:

1. Motor is thermally protected
2. Motor is not thermally protected
3. Motor is provided with overheat protective device

For examples, refer to paragraphs below:

1. Motors equipped with built-in thermal protection have "THERMALLY PROTECTED" stamped on the nameplate. Thermal protectors open the motor circuit electrically when the motor overheats or is overloaded.
   The protector cannot be reset until the motor cools. If the protector is automatic, it will reset itself. If the protector is manual, press the red button to reset.
2. Motors without thermal protection have nothing stamped on nameplate about thermal protection.
3. Motors that are provided with overheat protective device that does not open the motor circuit directly will indicate "WITH OVERHEAT PROTECTIVE DEVICE".
   A. Motors with this type of "Overheat Protective Device" have protector leads brought out in the motor conduit box marked "P1" and "P2". These leads are intended for connection in series with the stop button of the 3-wire pilot circuit for the magnetic starter which controls the motor. See Figure 1.
   B. The circuit controlled by the above "Overheat Protective Device" must be limited to a maximum of 600 volts and 360 volt-amps.

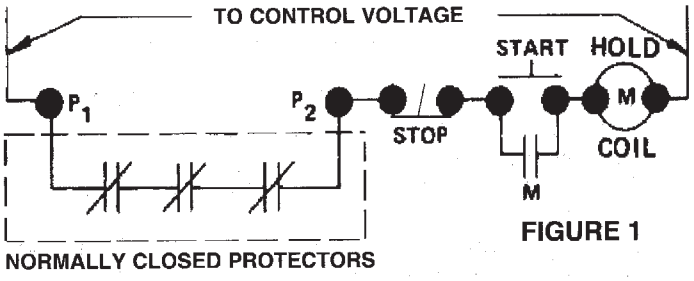
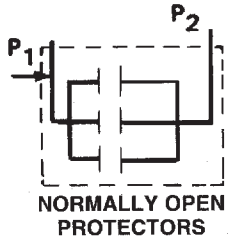


FIGURE 1



Normally Open (N/O) Motor Thermostats may be used in conjunction with controls installed by Original Equipment Manufacturers.

FIGURE 1A

CHANGING ROTATION

1. Keep hands and clothing away from rotating parts.
2. Before the motor is coupled to the load, determine proper rotation.
3. Check rotation by jogging or bumping. Apply power to the motor leads for a short period of time, enough to just get motor shaft to rotate a slight amount to observe shaft rotating direction.
4. Three phase - interchange any two (2) of the three (3) line leads. Single phase - reconnect per the connection diagram on the motor.

REDUCED VOLTAGE STARTING

Motors used on reduced voltage starting, should be carefully selected based upon power supply limitations and driven load requirements. The motors starting torque will be reduced when using reduced voltage starting. The elapsed time on the start step should be kept as short as possible and should not exceed 5 seconds. It is recommended that this time be limited to 2 seconds. Refer to manufacturer for application assistance.

OPERATION

WARNING

Disconnect and lock out before working on motor or driven equipment.

BEFORE INITIAL STARTING

1. If a motor has become damp in shipment or in storage, measure the insulation resistance of the stator winding.

$$\text{Minimum Insulation Resistance In Megohms} = 1 + \frac{\text{Rated Voltage}}{1000}$$

Do not attempt to run the motor if the insulation resistance is below this value.

2. If insulation resistance is low, dry out the moisture in one of the following ways:
   a. Bake in oven at temperature not more than 90°C (194°F).
   b. Enclose motor with canvas or similar covering, leaving a hole at the top for moisture to escape, and insert heating units or lamps.
   c. Pass a current at low voltage (rotor locked) through the stator winding. Increase the current gradually until the winding temperature, measured with a thermometer, reaches 90°C (194°F). Do not exceed this temperature.
3. See that voltage and frequency stamped on motor and control nameplates correspond with that of the power line.
4. Check all connections to the motor and control with the wiring diagram.
5. Be sure rotor turns freely when disconnected from the load. Any foreign matter in the air gap should be removed.
6. Leave the motor disconnected from the load for the initial start (see following caution). Check for proper rotation. Check for correct voltage (within ± 10% of nameplate value) and that it is balanced within 1% at the motor terminals. After the machine is coupled to the load, check that the nameplate amps are not exceeded. Recheck the voltage level and balance under load per the above guidelines.

   Shut down the motor if the above parameters are not met or if any other noise or vibration disturbances are present. Consult NEMA guidelines or the equipment manufacturer if any questions exist before operating equipment.

CAUTION

For motors nameplated as "belted duty only", do not run motor without belts properly installed.

COLLECTOR RINGS (Wound Rotor Motors Only)

The collector rings are sometimes treated at the factory to protect them while in stock and during shipment. The brushes have been fastened in a raised position. Before putting the motor into service, the collector rings should be cleaned to remove this treatment. Use a cleaning fluid that is made for degreasing electrical equipment. All of the brushes must be released and lowered to the collector surface. Keep the rings clean and maintain their polished surfaces. Ordinarily, the rings will require only occasional wiping with a piece of canvas or non-linting cloth. Do not let dust or dirt accumulate between the collector rings.

BRUSHES (Wound Rotor Motors Only)

See that the brushes move freely in the holders and at the same time make firm, even contact with the collector rings. The pressure should be between 2 and 3 pounds per square inch of brush surface.

When installing new brushes, fit them carefully to the collector rings. Be sure that the copper pigtail conductors are securely fastened to, and make good contact with, the brushholders.

ALLOWABLE VOLTAGE AND FREQUENCY RANGE

If voltage and frequency are within the following range, motors will operate, but with somewhat different characteristics than obtained with correct nameplate values.

1. Voltage: Within 10% above or below the value stamped on the nameplate. On three phase systems the voltage should be balanced within 1%. A small voltage unbalance will cause a significant current unbalance.
2. Frequency: Within 5% above or below the value stamped on the nameplate.
3. Voltage and Frequency together: Within 10% (providing frequency above is less than 5%) above or below values stamped on the nameplate.

CLEANLINESS

Keep both the interior and exterior of the motor free from dirt, water, oil and grease. Motors operating in dirty places should be periodically disassembled and thoroughly cleaned.

CONDENSATION DRAIN PLUGS

All explosion proof and some totally enclosed motors are equipped with automatic drain plugs, they should be free of oil, grease, paint, grit and dirt so they don't clog up. The drain system is designed for normal floor (feet down) mounting. For other mounting positions, modification of the drain system may be required, consult manufacturer.

SERVICE

WARNING

Disconnect power before working on motor or driven equipment. Motors with automatic thermal protectors will automatically restart when the protector temperature drops sufficiently. Do not use motors with automatic thermal protectors in applications where automatic restart will be hazardous to personnel or equipment.

CAUTION

Overgreasing bearings can cause premature bearing and/or motor failure. The amount of grease added should be carefully controlled.

NOTE

If lubrication instructions are shown on the motor nameplate, they will supersede this general instruction.

Motors are pregreased with a polyurea mineral oil NGLI grade 2 type grease unless stated otherwise on the motor nameplate. Some compatible brands of polyurea mineral base type grease are: Chevron SRI #2, Rykon Premium #2, Exxon Polyrex EM or Texaco Polystar RB.

Motors are properly lubricated at the time of manufacture. It is not necessary to lubricate at the time of installation unless the motor has been in storage for a period of 12 months or longer (refer to lubrication procedure that follows).

LUBRICATION PROCEDURES

1. Stop motor. Disconnect and lock out of service.
2. Remove contaminants from grease inlet area.
3. Remove filler and drain plugs.
4. Check filler and drain holes for blockage and clean as necessary.
5. Add proper type and amount of grease. See the Relubrication Time Intervals table for service schedule and Relubrication Amounts table for volume of grease required.
6. Wipe off excess grease and replace filler and drain plugs (see following warning).
7. Motor is ready for operation.

WARNING

If motor is nameplated for hazardous locations, do not run motor without all of the grease or drain plugs installed.

RELUBRICATION TIME INTERVAL AND AMOUNTS

(For motors with regreasing provisions).

Service Condition	NEMA FRAME SIZE					
	140-180		210-360		400-510	
	1800 RPM and less	Over 1800 RPM	1800 RPM and less	Over 1800 RPM	1800 RPM and less	Over 1800 RPM
Standard	3 yrs.	6 months	2 yrs.	6 months	1 yr.	3 months
Severe	1 yr.	3 months	1 yr.	3 months	6 months	1 month
Seasonal	See Note 2.					

NOTE

1. For motors nameplated as "belted duty only" divide the above intervals by 3.
2. Lubricate at the beginning of the season. Then follow service schedule above.

SEASONAL SERVICE: The motor remains idle for a period of 6 months or more.

STANDARD SERVICE: Up to 16 hours of operation per day, indoors, 100°F maximum ambient.

SEVERE SERVICE: Greater than 16 hours of operation per day. Continuous operation under high ambient temperatures (100° to 150°F) and/or any of the following: dirty, moist locations, high vibration (above NEMA standards), heavy shock loading, or where shaft extension end is hot.

RELUBRICATION AMOUNTS

(For motors with regreasing provisions).

NEMA FRAME SIZE	VOLUME cu. in. (fluid oz.)
140	.25 (.14)
180	.50 (.28)
210	.75 (.42)
250	1.00 (.55)
280	1.25 (.69)
320	1.50 (.83)
360	1.75 (.97)
400	2.25 (1.2)
440	2.75 (1.5)
500	3.00 (1.7)

TROUBLESHOOTING

WARNING

1. Disconnect power before working on motor or driven equipment.
2. Motors with automatic thermal protectors will automatically restart when the protector temperature drops sufficiently. Do not use motors with automatic thermal protectors in applications where automatic restart will be hazardous to personnel or equipment.
3. Motors with manual thermal protectors may start unexpectedly after protector trips. If manual protector trips, disconnect motor from power line. After protector cools (five minutes or more) it can be reset and power may be applied to motor.
4. Discharge all capacitors before servicing motor.
5. Always keep hands and clothing away from moving parts.
6. Never attempt to measure the temperature rise of a motor by touch. Temperature rise must be measured by thermometer, resistance, imbedded detector, or thermocouple.
7. Electrical repairs should be performed by trained and qualified personnel only.
8. Failure to follow instructions and safe electrical procedures could result in serious injury or death.
9. If safety guards are required, be sure the guards are in use.

If trouble is experienced in the operation of the motor, make sure that:

1. The bearings are in good condition and operating properly.
2. There is no mechanical obstruction to prevent rotation in the motor or in the driven load.
3. The air gap is uniform. (Consult manufacturer for specifications).
4. All bolts and nuts are tightened securely.
5. Proper connection to drive machine or load has been made.

In checking for electrical troubles, be sure that:

1. The line voltage and frequency correspond to the voltage and frequency stamped on the nameplate of the motor.
2. The voltage is actually available at motor terminals.
3 The fuses and other protective devices are in proper condition.
4. All connections and contacts are properly made in the circuits between the control apparatus and motor.

These instructions do not cover all details or variations in equipment nor provide for every possible condition to be met in connection with installation, operation or maintenance. Should additional information be desired for the purchaser's purposes, the matter should be referred to the manufacturer.

MOTOR TROUBLE SHOOTING CHART

Your motor service and any trouble shooting must be handled by qualified persons who have proper tools and equipment.

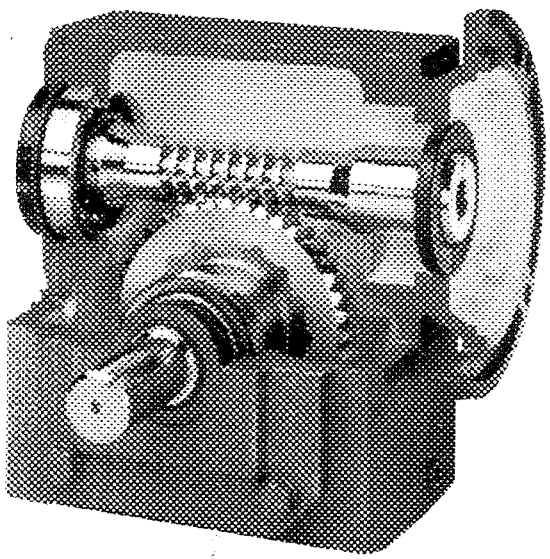
TROUBLE	CAUSE	WHAT TO DO
Motor fails to start	Blown fuses	Replace fuses with proper type and rating
	Overload trips	Check and reset overload in starter.
	Improper power supply	Check to see that power supplied agrees with motor nameplate and load factor.
	Improper line connections	Check connections with diagram supplied with motor.
	Open circuit in winding or control switch	Indicated by humming sound when switch is closed. Check for loose wiring connections. Also see that all control contacts are closing.
	Mechanical failure	Check to see if motor and drive turn freely. Check bearings and lubrication.
	Short circuited stator	Indicated by blown fuses. Motor must be rewound.
	Poor stator coil connection	Remove end bells, locate with test lamp.
	Rotor defective	Look for broken bars or end rings.
	Motor may be overloaded	Reduce load.
Motor stalls	One phase may be open	Check lines for open phase.
	Wrong application	Change type or size. Consult manufacturer.
	Overload	Reduce load.
	Low voltage	See that nameplate voltage is maintained. Check connection.
	Open circuit	Fuses blown, check overload relay, stator and pushbuttons.
Motor runs and then dies down	Power failure	Check for loose connections to line, to fuses and to control.
Motor does not come up to speed	Not applied properly	Consult supplier for proper type.
	Voltage too low at motor terminals because of line drop.	Use higher voltage on transformer terminals or reduce load. Check connections. Check conductors for proper size.
	Starting load too high	Check load motor is supposed to carry at start.
	Broken rotor bars or loose rotor	Look for cracks near the rings. A new rotor may be required as repairs are usually temporary.
	Open primary circuit	Locate fault with testing device and repair.
Motor takes too long to accelerate and/or draws high amp	Excessive load	Reduce load.
	Low voltage during start	Check for high resistance. Adequate wire size.
	Defective squirrel cage rotor	Replace with new rotor.
	Applied voltage too low	Get power company to increase power tap.
Wrong rotation	Wrong sequence of phases	Reverse connections at motor or at switchboard.
Motor overheats while running under load	Overload	Reduce load.
	Frame or bracket vents may be clogged with dirt and prevent proper ventialation of motor.	Open vent holes and check for a continuous stream of air from the motor.
	Motor may have one phase open	Check to make sure that all leads are well connected.
	Grounded coil	Locate and repair.
	Unbalanced terminal voltage	Check for faulty leads, connections and transformers.
Motor vibrates	Motor misaligned	Realign.
	Weak support	Strengthen base
	Coupling out of balance	Balance coupling.
	Driven equipment unbalanced	Rebalance driven equipment.
	Defective bearings	Replace bearing.
	Bearings not in line	Line up properly.
	Balancing weights shifted	Rebalance motor.
	Polyphase motor running single phase	Check for open circuit.
	Excessive end play	Adjust bearing or add shim.
Unbalanced line current on polyphase motors during normal operation	Unequal terminal volts	Check leads and connections.
	Single phase operation	Check for open contacts.
	Unbalanced voltage	Correct unbalanced power supply.
Scraping noise	Fan rubbing air shield	Remove interference.
	Fan striking insulation	Clear fan.
	Loose on bedplate	Tighten holding bolts.
Noisy operation	Airgap not uniform	Check and correct bracket fits or bearing.
	Rotor unbalance	Rebalance.
Hot bearings general	Bent or sprung shaft	Straighten or replace shaft.
	Excessive belt pull	Decrease belt tension.
	Pulleys too far away	Move pulley closer to motor bearing.
	Pulley diameter too small.	Use larger pulleys.
	Misalignment	Correct by realignment of drive.
Hot bearings ball	Insufficient grease	Maintain proper quantity of grease in bearing.
	Deterioration of grease or lubircant contaminated	Remove old grease, wash bearings thoroughly in kerosene and replace with new grease.
	Excess lubricant	Reduce quantity of grease, bearing should not be more than 1/2 filled.
	Overloaded bearing	Check alignment, side and end thrust.
	Broken ball or rough races	Replace bearing, first clean housing thoroughly.

Operating Instructions

for your safety, read and retain this manual.

Morse®

RAIDER®



Emerson Power Transmission
MAYSVILLE, KY 41056
www.emerson-ept.com

Form 8801 Revised 10/12/04 Printed in USA

EMERSON.
Industrial Automation

WARRANTY SERVICE

For Warranty Service call:
Emerson Power Transmission
MAYSVILLE, KY 41056
Phone (606) 564-2011 Fax (606 564-2022)
Give complete Nameplate Data, including Identification Number

Form 8801 10/12/04 Printed in USA

Installation, Operation & Maintenance Instructions

SAFETY FIRST

High voltage and rotating parts can cause serious or fatal injury. Safe installation, operation and maintenance must be performed by qualified personnel. Familiarization with and adherence to NEMA MG2, The National Electrical Code and local codes is recommended. It is important to observe safety precautions to protect personnel from possible injury. Personnel should be instructed to:

1. Avoid contact with energized circuits or rotating parts.
2. Disconnect all power sources before initiating any maintenance or repair.
3. Act with care in accordance with prescribed procedures in handling and lifting this equipment.
4. Be sure unit is electrically grounded in accordance with code requirements.
5. Be sure equipment is properly enclosed to prevent access by children or other unauthorized personnel in order to prevent possible accidents.
6. Be sure shaft key is fully captive before unit is energized.
7. Provide proper safeguards for personnel against rotating parts and applications involving high inertia loads which can cause overspeed.
8. Avoid extended exposure to equipment with high noise levels.
9. Be familiar with the equipment and read all instructions thoroughly before installing or working on equipment.

⚠WARNING Disconnect all power before adjusting units

INSPECTION

Inspect unit to make sure no damage has occured during shipment.

STORAGE

Units should be stored in a clean, dry location. If units are to be stored for over six months, refer to Emerson Power Transmission.

MOUNTING

Mount units on a firm, flat surface which is sufficiently rigid to prevent vibration. Drive belts and chains should be within recommended limits of tightness. Couplings should be properly aligned and balanced. For drive recommendations refer to drive or equipment manufacturers or to Emerson Power Transmission.

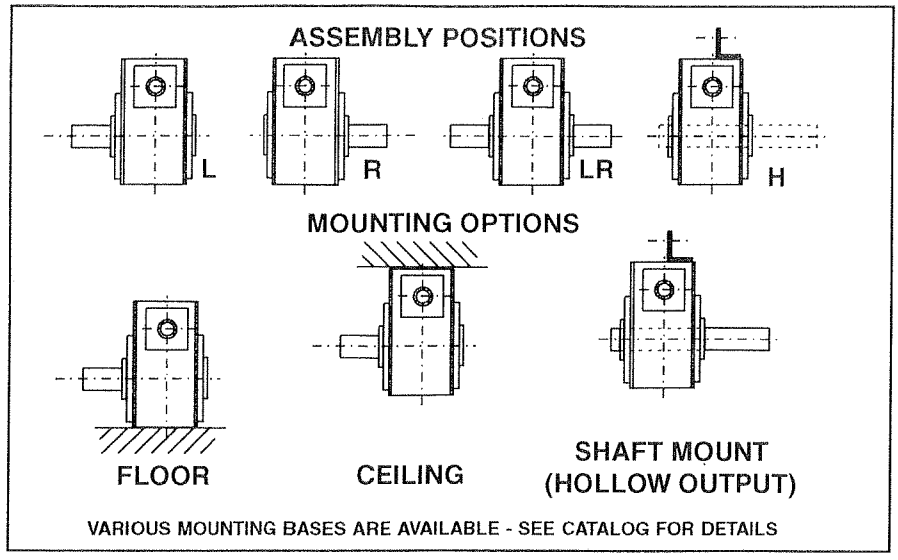
⚠WARNING Guards should be provided for all exposed rotating parts to prevent possible personal injury. Keep fingers and foreign objects away from ventilation and other openings. Applications involving HIGH INERTIA LOADS may damage this equipment due to motor overspeed during shut down. Such applications should be referred to Emerson Power Transmission.

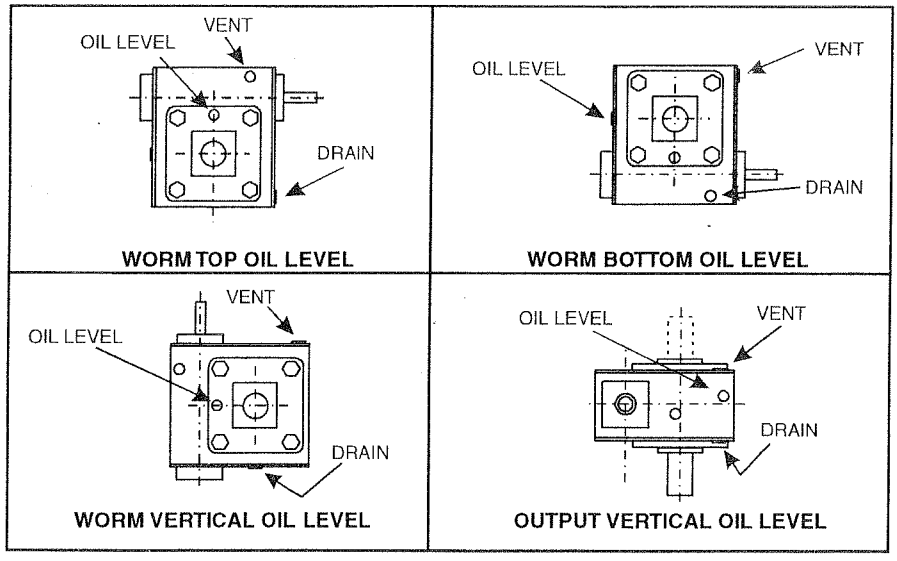
⚠CAUTION Do not force drive coupling or other equipment onto shaft, as bearing damage may result.

LUBRICATION

The normal operating temperature of a worm gear reducer may be as high as 200°F. During initial break-in higher temperatures may occur. If the temperature exceeds 200°F for longer than 100 hours contact Emerson Power Transmission.

1. Install the breather (vent plug) supplied, in correct location - see diagrams on the back of this card. Adjust the oil level if mounting other than in "Worm Top" position. Unit is shipped from EPT with AGMA #8C oil.
2. Change initial oil fill after 500 hours or 5 weeks.
3. Change oil every 2500 hours service or 6 months. If severe operating conditions exist, change oil every 1 to 3 months.
4. EP oil is not recommended.
5. For ambient temperatures -40°F to 15°F use Mobil SHC634. (This synthetic oil is acceptable for ambient temperatures up to 125°F). When changing oil type, the unit should be carefully drained and flushed prior to refilling.
6. For units running at slow speeds or under other unusual conditions, contact Emerson Power Transmission.





OIL CAPACITIES (Ounces)

Center Distance	Worm Top (1) L, R, LR	Worm Top (1) Hollow	Worm Bottom	Worm Up	Worm Down(2)	Output Vertical
1.33	6	6	8	5	5	6
1.54	16	16	18	14	14	14
1.75	15	15	20	12	12	14
2.06	22	22	22	17	17	20
2.37	31	31	30	26	26	29
2.62	46	46	46	36	36	40
3.00	81	81	80	68	68	72
3.25	81	81	70	63	63	70
3.75	138	100	115	140	140	100
4.50	205	188	180	182	182	157
5.16	324	283	216	240	240	198
6.00	512	421	366	400	400	274

Note (1): Units are filled with AGMA #8C oil with amount for this mounting position.
Note (2): Not recommended

The Company names and the names of the Lubricants mentioned in the table are the tradenames, trademarks and logotypes of the respective companies, and are not owned by EPT.

LUBRICANTS / MANUFACTURERS

The companies and oils below are typical. Any make of oil meeting American Gear Manufacturers Association (AGMA) standard #7C and #8C will be satisfactory.

Ambient Temperature	15° F to 60° F	50° F to 125° F
Viscosity Range (cSt at 40° C)	414 - 506	612 - 748
ISO Grade	460	680
SAE Gear Lubricant (Approx.)	#140	#250
AGMA Grade	#7C	#8C
Shell	Valvata Oil J460	Valvata Oil J680
Mobil	600 Super Cyl. Oil	Extra Hecla Super Cyl. Oil

Ball Bearing Units

MOUNTING AND LUBRICATION INSTRUCTIONS

Hub City Bearing Unit performance is dependent on proper installation and lubrication where required. Failure to follow instructions may result in poor performance and short bearing life.

MOUNTING INSTRUCTIONS

1. For best results use turned and ground shafting, free of rough spots and burrs. If old shafting is used, locate bearing on a smooth unworn section.
2. Clean shaft and bearing bore. Coat shaft with a small amount of oil.
3. Check bearing for freedom of alignment, before mounting bearing unit on shaft.

A — Eccentric Collar Bearings

4a. Slide bearing unit and collar on the shaft. (If projecting side of bearing is to be mounted toward the machine, put the locking collar on first). Collar should be opposing thrust load. DO NOT HAMMER THE ENDS OF THE INNER RACE. If it is necessary to apply force in mounting, use a soft metal bar or pipe against the inner race only. Tap the bearing unit into place.

5a. Fit the eccentric locking collar on the projecting inner race. TURN IT IN THE DIRECTION OF SHAFT ROTATION. Tighten the collar securely, using a spanner or setscrew wrench. Tighten the setscrew against shaft.

B — Setscrew Lock Bearings

4b. Slide the bearing unit on the shaft. DO NOT HAMMER THE ENDS OF THE INNER RACE. If it is necessary to apply some force in mounting, use a soft metal bar or pipe against the inner race only. Tap the bearing unit into place. Tighten the two setscrews securely to lock bearing to shaft.

LUBRICATION INSTRUCTIONS

All Hub City bearing units are factory lubricated and ready for use (except for unusually severe applications). Lubricated-For-Life bearings have no grease fitting and require no additional lubrication while in use. Re-lube bearing housings have a lubrication fitting mounted on the housing and should be lubricated when used in wet or dirty applications. For normal operation there is no need to relubricate bearings at all. The following table is a general guide for relubrication. Experience will determine the best interval for each specific application.

LUBRICATION GUIDE

Operating Conditions	Bearing Temperatures	Grease Interval	Recommended Grease or Equivalent
Clean	32° F to 120° F 120° F to 150° F 150° F to 200° F	6 to 12 months 1 to 3 months 1 to 4 weeks	Shell Alvania #2 Texaco Multifak #2
Dirty	32° F to 150° F 150° F to 200° F	1 to 4 weeks Daily — 1 Week	Sun Prestige #41 Humble L 100K #2
Moisture	32° F to 200° F	Daily — 1 Week	Sinclair Litholine Multi-Purpose

When lubricating bearings add grease slowly while shaft is rotating. When grease begins to come out the seals, the bearing will contain the correct amount of lubricant.

Bearings should not run in steady operation over 200° F and should not exceed 225° F for intermittent operation.

For unusual or severe applications, contact Hub City Customer Service Department.

REPLACEMENT OF ADAPTOR BEARINGS IN BEARING UNITS

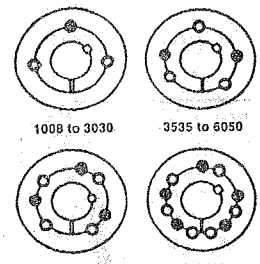
All Hub City bearing units are fitted with self-aligning adaptor bearings which can be replaced in case of wear or damage to the original adaptor bearing. To replace bearing:

1. Loosen setscrew in locking collar or bearing.
2. Loosen locking collar, if any, from shaft by turning in direction opposite to shaft rotation.
3. Remove unit from shaft.
4. Remove collar, if any, from inner race of bearing unit.
5. Rotate bearing 90° in the housing.
6. Withdraw along the slots in the sides of the housing.
7. Inspect housing for wear or damage and replace if necessary.
8. Clean inside of housing with solvent and dry with lint-free cloth or paper towel.
9. Insert bearing in the slots.
10. Rotate bearing 90° in the housing to operating position. If the fit between the housing and bearing is loose, the housing should be replaced.
11. Replace collar, if any.
12. Remount unit on shaft following the procedure outline above.

2914 Industrial Dr., P. O. Box 1089, Aberdeen, SD 57402-1089, U.S.A.
Phone (605) 225-0360 • Telex 29-2236 • FAX 605-225-0567

LITHO IN U. S. A.

TAPER-LOCK® BUSHINGS



O INSERT SETSCREWS TO INSTALL

● INSERT SETSCREWS TO REMOVE

WARNING

To ensure that drive is not unexpectedly started, turn off and lock out or tag power source before proceeding. Failure to observe these precautions could result in bodily injury.

TO INSTALL

1. Clean Shaft, bore of bushing, outside of bushing and hub bore of all oil, paint and dirt. File away burrs.
2. Insert bushing in hub. Match the hole pattern, not threaded holes (each complete hole will be threaded on one side only). ▲
3. "LIGHTLY" oil setscrews and thread into those half-threaded holes indicated by o on above diagram.

CAUTION

Do not lubricate the bushing taper., bushing bore, hub taper or the shaft. Doing so could result in breakage of the product.

4. Position assembly onto shaft allowing for the small axial movement which will occur during tightening procedure.
5. Alternately torque setscrews to recommended torque setting in chart below.

CAUTION

Do not use worn hex key wrenches. Doing so may result in a loose assembly or may damage screws.

6. To increase gripping force, hammer face of bushing using drift or sleeve. (Do not hit bushing directly with hammer.)
7. Re-torque screws after hammering.

CAUTION

Where bushing is used with lubricated products such as chain, gear or grid couplings be sure to seal all pathways (where lubrication could leak) with RTV or similar material.

8. Recheck screw torques after initial run-in, and periodically there after. Repeat steps 5, 6 and 7 if loose.

TO REMOVE

1. Remove all screws.
2. Insert screws in holes indicated by ● on drawing. Loosen bushing by alternately tightening screws.

Recommended Installation Wrench Torque

Bushing No.	Lb.-In *	Nm *
1008, 1108	55	6,2
1210, 1215, 1310	175	19,9
1610, 1615	175	19,9
2012	280	31,8
2517, 2525	430	48,8
3020, 3030	800	90,8
3535	1,000	114
4040	1,700	193
4545	2,450	278
5050	3,100	352
6050, 7060, 8065	7,820	888
10085, 12010	13,700	1556

▲ If two bushings are used on same component and shaft, fully tighten one bushing before working on the other.

* When installing bushing in sintered steel product (sheave, coupling, etc.) follow torque recommendation shown on product hub if present.

When using TAPER-LOCK bushings with conveyor pulleys, refer to instruction manual 499657 titled "DODGE Instruction Manual for TAPER-LOCK, H.E., and QD Conveyor Pulley Bushings."

WARNING: Because of the possible danger to person(s) or property from accidents which may result from the improper use of products, it is important that correct procedures be followed. Products must be used in accordance with the engineering information specified in the catalog. Proper installation, maintenance and operation procedures must be observed. The instructions in the instruction manuals must be followed. Inspections should be made as necessary to assure safe operation under prevailing conditions. Proper guards and other suitable safety devices or procedures as may be desirable or as may be specified in safety codes should be provided, and are neither provided by Rockwell Automation nor are the responsibility of Rockwell Automation. This unit and its associated equipment must be installed, adjusted and maintained by qualified personnel whoa re familiar with the construction and operation of all equipment in the system and the potential hazards involved. When risk to persons or property may be involved, a holding device must be an integral part of the driven equipment beyond the speed reducer output shaft.

Printed in USA

599 5C-K

IM499737

Manual Motor Starter / Circuit Breaker - Installation instructions

The Bulletin 140 meets the requirements of IEC/EN 60947-2 as a circuit breaker. This device, however does not meet UL and CSA circuit breaker requirements. The Bulletin 140 is UL listed (UL508) and CSA certified as a Manual Motor Controller and is rated for Group Motor Installation. All installations, commissioning and maintenance must be carried out by qualified personnel,taking local regulations into account.

Allen-Bradley

Bulletin 140-MN

Leistungsschalter - Montageanleitung

Alle Montage-, Inbetriebnahme- und Wartungsarbeiten müssen durch Fachpersonal, unter Berücksichtigung der örtlichen Vorschriften, ausgeführt werden.

Disjoncteur - Instructions de montage

Tous les travaux de montage, de mise en service et de maintenance ne doivent être exécutés que par du personnel spécialisé en respectant les prescriptions locales.

Interruttore automatico - Instruzioni per il montaggio

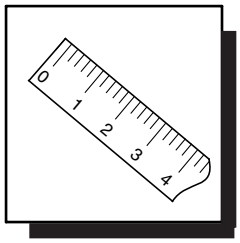
Tutti i lavori di montaggio, messa in funzione e manutenzione devono essere eseguiti da personale specializzato, conformemente alle norme vigenti localmente.

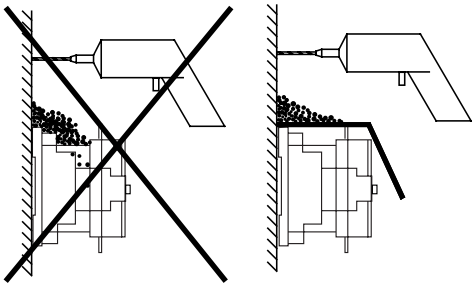
Interruptor automático - Instrucciones de montaje

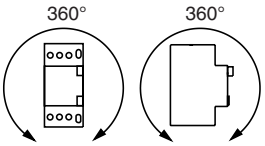
Todos los trabajos de montaje, de puesta en servicio y de mantenimiento deberán ser efectuados por personal especializado, considerando las prescripciones locales.

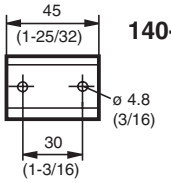
CE

IEC/EN 60947-1/-2/-5-1
UL 508; CSA 22.2 Teil 14;



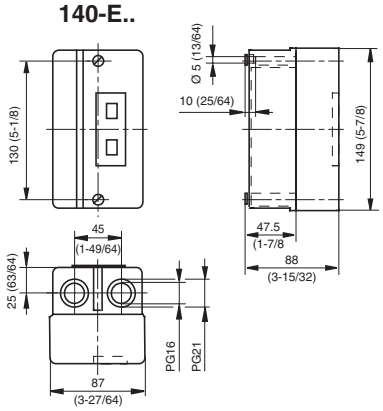






140-N12

140-E..

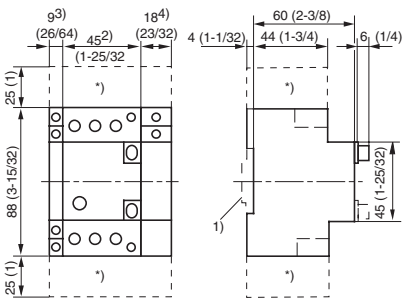


Dimensions in mm (inches)

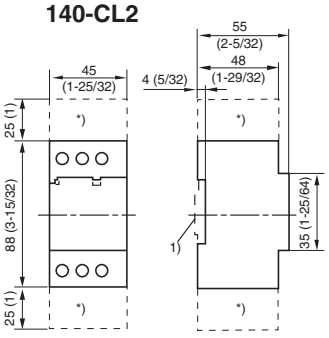
*) - Minimum distance to grounded parts or walls
- Minimaler Abstand gegen geerdete Teile oder Wände
- Distance minimale envers pièces mises à terre ou parois.
- Distanza minimale per pezzi a massa o pareti.
- Distancia mínima a chasis o paredes.

1) EN 50 022-35
2) 140-MN
3) -PA
4) -UA/-AA
5) 140-LD/140-CL2

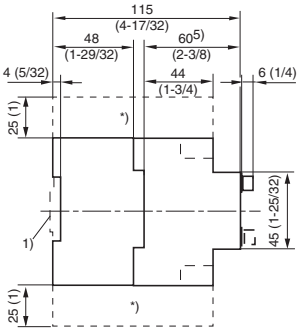
140-MN

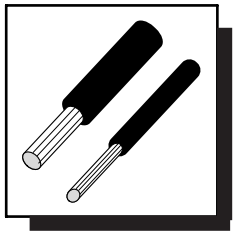


140-LD
140-CL2



140-LD + 140-MN
140-CL2 + 140-MN





140-MN

L1 L2 L3 1 3 5 2 4 6 T1 T2 T3	1, 3, 5	15 mm 2 x 1...4 mm² 2 x 1...6 mm² No.16...10 AWG	2...2,5 Nm 18...22 lb-in
	2, 4, 6	11 mm 2 x 1...4 mm² 2 x 1...6 mm² No. 16...10 AWG	2...2,5 Nm 18...22 lb-in

140-CL2/140-LD

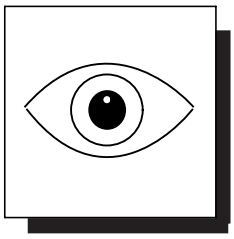
	2, 4, 6	11 mm 2 x 1...4 mm² 2 x 1...6 mm² No.14...10 AWG	2,3...2,9 Nm 20...26 lb-in
	1, 3, 5	13 mm 1 x 4...16 mm² 1 x 6...25 mm² No. 14...6 AWG	2,8...3,3 Nm 25...29 lb-in

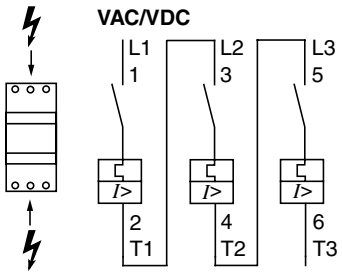
140-L2

	1, 3, 5	13 mm 1 x 4...16 mm² 1 x 6...25 mm² No.14...6 AWG	4 Nm 36 lb-in

140-A../T../UV/RT

	D1, D2	9 mm 1x0,75...2,5 mm² 1 x 0,75...4 mm² No.18...14 AWG	1...1,5 Nm 8,8...13,3 lb-in





For single-phase applications, the three poles have to be connected in series.

Bei einphasigem Betrieb müssen alle 3 Phasen in Serie geschaltet werden.

En service monophasé, les 3 phases doivent être connectées en série.

Per il funzionamento monofase devono essere collegate le 3 poli in serie.

Para aplicaciones monofásicas, los tres polos deben conectarse en serie.

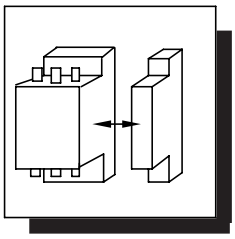
Install accessories to 140-MN before mounting on hat-rail.

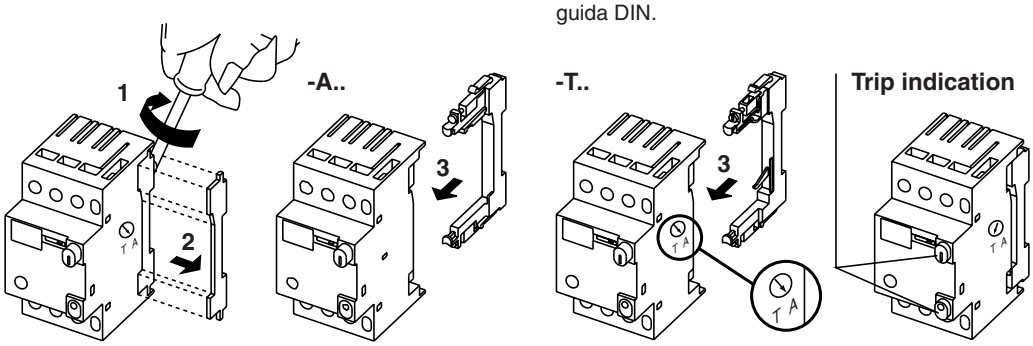
Die Montage oder Demontage der Zubehörteile darf nicht auf der Hutschiene erfolgen.

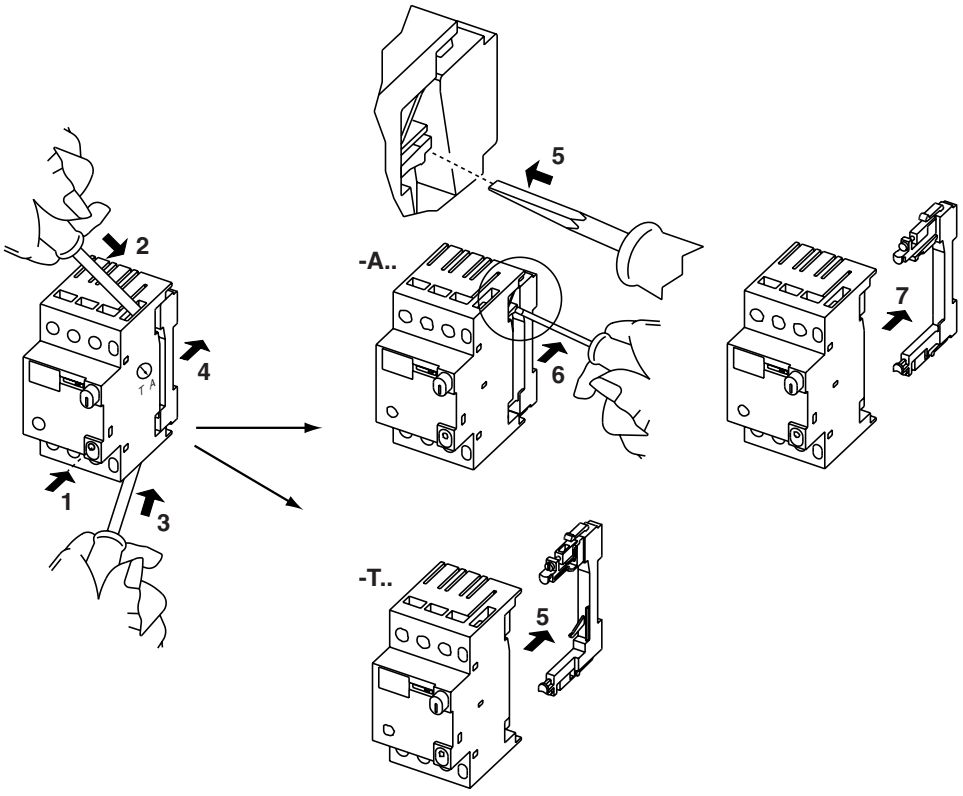
Le montage et le démontage des accessoires ne dois pas être effectué directement sur le rail-chap.

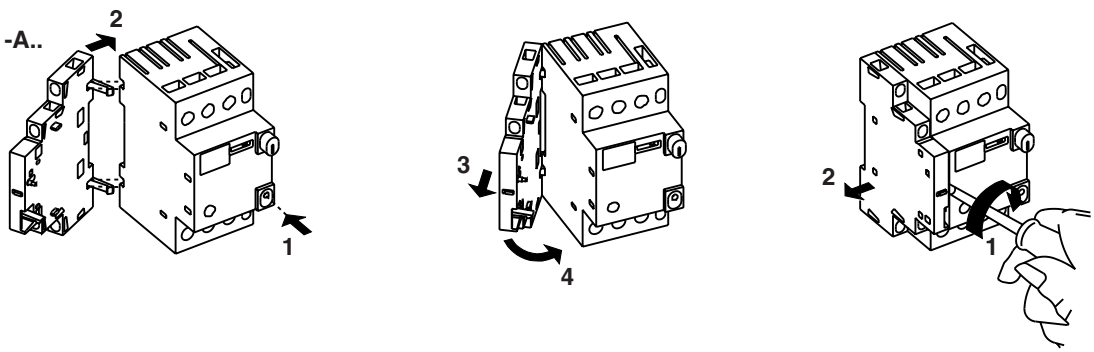
Il montaggio o lo smontaggio degli accessori non deve essere effetuato con l'apparecchio sulla guida DIN.

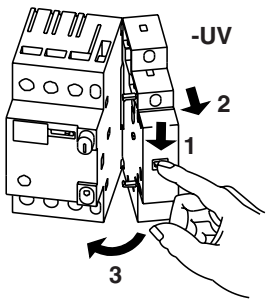
El montaje y desmontaje de los accesorios no deben ser efectuados sobre el perfil omega DIN.

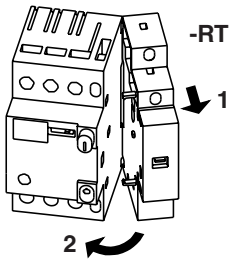


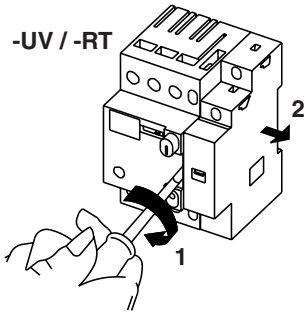


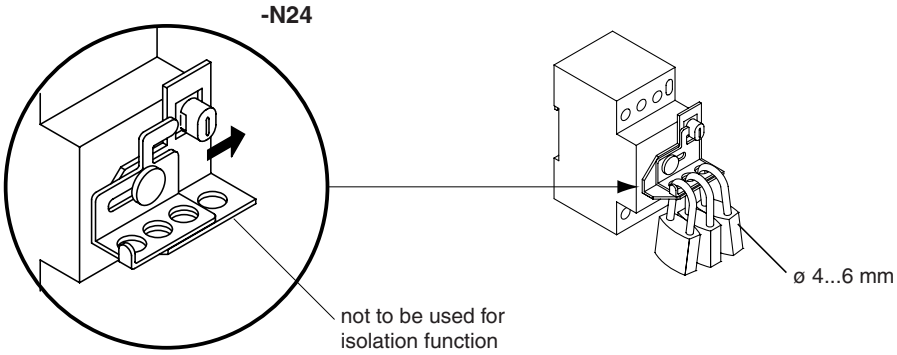


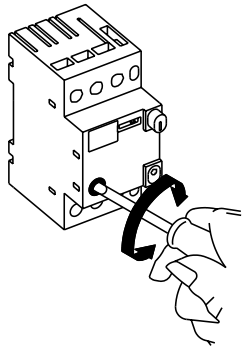




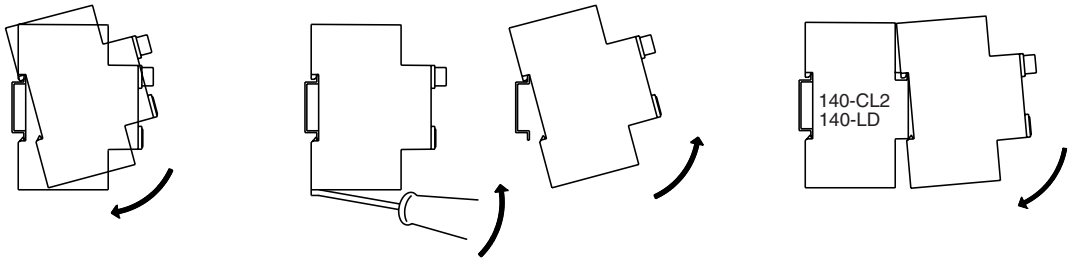


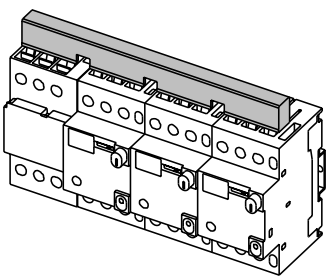


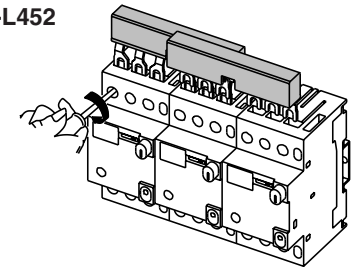


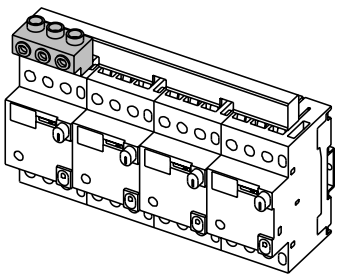


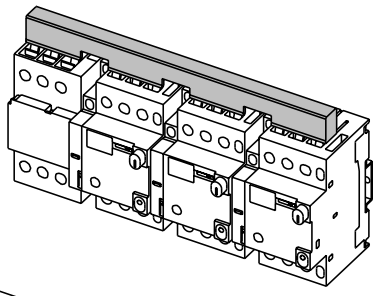
140-MN		230/240 V gG max.	400/415 V gG max.	500 V gG max.	690 V gG max.
0,16	0,1-0,16 A				
0,25	0,16-0,25 A				
0,4	0,25-0,4 A				
0,63	0,4-0,63 A				
1	0,63-1A				
1,6	1-1,6 A				
2,5	1,6-2,5 A				50 A
4	2,5-4 A				50 A
6,3	4-6,3 A			100 A	63 A
10	6,3-10 A		125 A	100 A	80 A
16	10-16 A	125 A	125 A	100 A	80 A
20	16-20 A	125 A	125 A	100 A	80 A
25	20-25 A	125 A	125 A	100 A	80 A

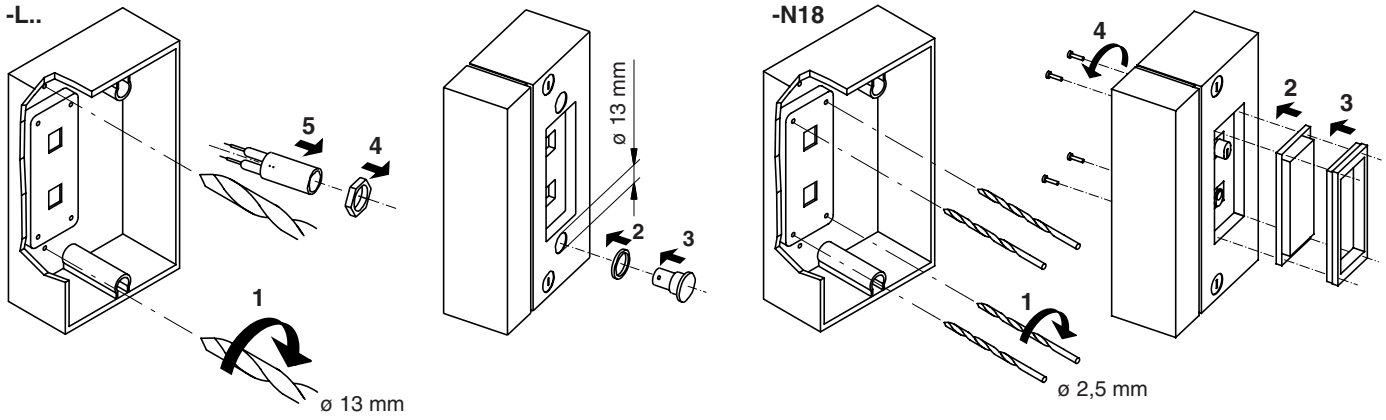


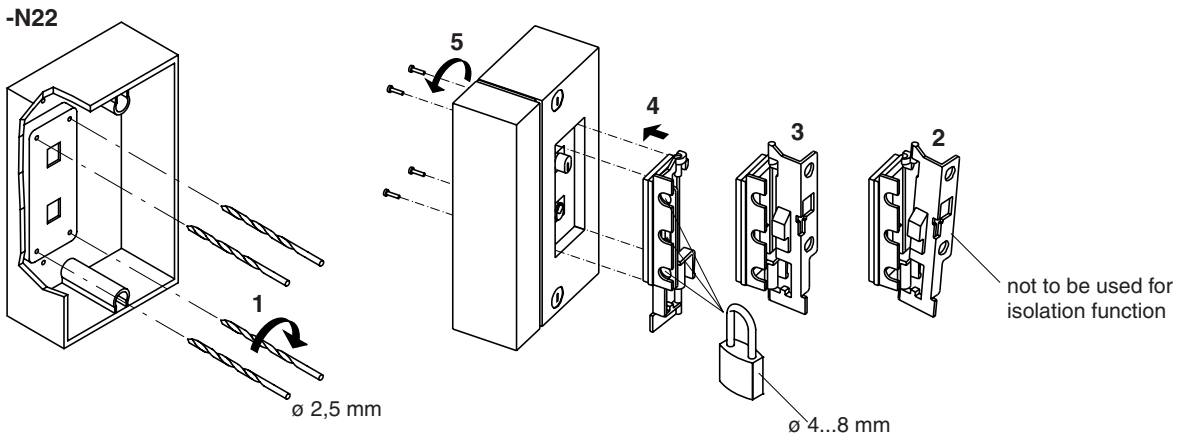












Before connecting the main and auxiliary conductors of the power switch or its accessories, e.g. auxiliary switch and circuit breaker, please ensure that all conductors, connected parts and clamps are voltage free when carrying out any tasks.

Vor dem Anschliessen der Haupt- und Hilfsleiter des Leistungsschalters oder seines Zubehörs, z. B. Hilfsschalter und -auslöser, ist sicherzustellen, dass alle Leiter, Anschlussteile und Klemmen während der Arbeiten spannungsfrei sind.

Il faut s'assurer, avant de raccorder le conducteur auxiliaire et le conducteur principal du disjoncteur ou de ses accessoires (commutateur ou sectionneur auxiliaire par exemple), que tous les conducteurs, pièces de connexion et bornes soient hors tension pendant toute la durée des travaux.

Prima di allacciare i conduttori principale e secondario dell'interruttore di potenza o dei suoi accessori, per es. interruttore e attivatore ausiliari, occorre accertare che tutti i conduttori, gli elementi di allacciamento e i morsetti non siano sotto tensione per tutta la durata dell'intervento

Antes de proceder a la conexión de los conductores principal y auxiliar del interruptor automático o de sus accesorios, por ejemplo: conmutador y desconectador auxiliar, asegúrese de que todos los conductores, piezas de conexión y bornes están sin tensión durante los trabajos.

Warning

Opening of branch circuit protective device may indiacate that a fault current has been interrupted. To reduce the risk of fire or electric shock current carrying parts or other components of the controller should be examined and replaced if demaged. If burnout of the current element of an overload relay occurs, the complete overload relay must be replaced.

CSA/UL Marking 140-MN

Suitable for use on circuits delivering not more than ... sym

140-MN-	600 V	480 V
- 0,16 ... 2,5	42 kA	42 kA
- 4	18 kA	18 kA
- 6,3	10 kA	18 kA
- 10	10 kA	10 kA
- 16	5 kA	10 kA
- 20	—	5 kA

Group installation 250 A max.

Technische Änderungen vorbehalten / Technical changes reserved
21.202.915-01 / 05. 2003
Ausgabe 13

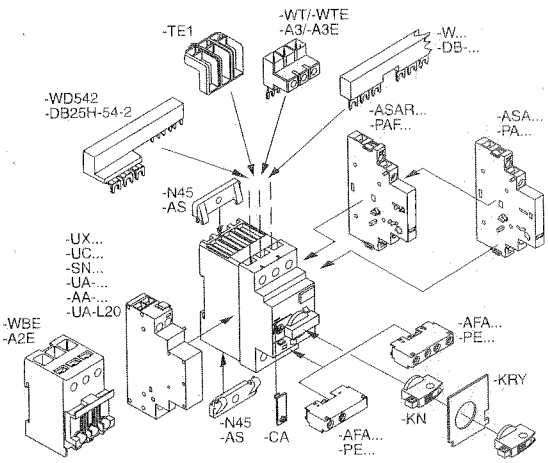
Attention: To prevent electrical shock, disconnect from power source before installing or servicing. Install in suitable enclosure. Keep free from contaminants.

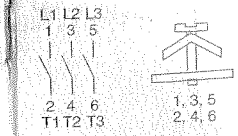
Achtung: Vor Installations- oder Serviceарbeiten Stromversorgung unterbrechen, um Unfälle zu vermeiden. Die Geräte müssen in einem passenden Gehäuse eingebaut und gegen Verschmutzung geschützt werden.

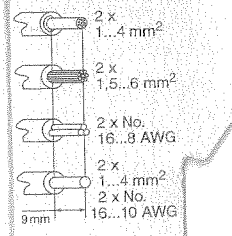
Attention: Avant le montage et la mise en service, couper l'alimentation secteur afin d'éviter tout accident. Prévoir une mise en coffret ou armoire appropriée. Protéger le produit contre les environnements agressifs.

Attenzione: Per prevenire infortuni, togliere tensione prima dell'installazione o manutenzione. Installare in custodia idonea. Tenere lontano da contaminanti.

Atención: Desconectar la alimentación eléctrica antes de realizar el montaje y la puesta en servicio, con el objeto de evitar accidentes. Instalado en una caja o armario apropiado. Proteger el producto de los ambientes agresivos.





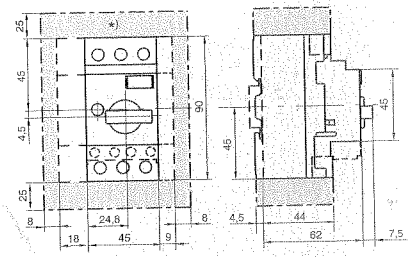


Use 75°C Cu wire only

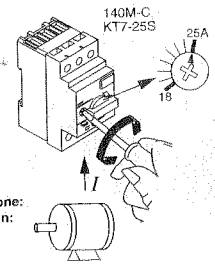
- 140M-C*N and KTB7-25S do not provide thermal protection for themselves nor for downstream components. A separate protective device against thermal overload must be installed, e.g. an O/L relay as part of a starter combination

- 140M-C*N und KTB7-25S beinhalten weder für sich selbst noch nachfolgende Teile thermischen Schutz. Gegen thermischen Überlast muss ein externes Schutzorgan installiert sein, z.B. ein Überlastrelais als Teil einer Starterkombination.
- 140M-C*N et KTB7-25S ne sont pas autoprotégés et ne comportent aucune protection contre les surcharges thermiques. Il faut donc prévoir des organes de protection externes comme par expl. des relais thermiques ou électroniques dans les ensembles démarreurs moteurs.
- 140M-C*N e KTB7-25S non prevedono alcun tipo di protezione termica, né per se stessi né per i componenti a valle. Pertanto sarà necessario installare un dispositivo di protezione termica separato, quale ad esempio un relè di sovraccarico integrato nel gruppo di avviamento.
- 140M-C*N y KTB7-25S carecen de protección térmica propia y para los componentes subsiguientes. Se debe instalar por separado un dispositivo de protección para sobrecargas térmicas, como por ejemplo, un relé de sobrecarga que forme parte de un arrancador de combinación.

PTB 04 ATEX 3039
Ex II (2) G
CE 0102
IEC 60947-1,-2,-4.1
EN 60947-1,-2,-4.1
EN 60079-14
UL 508
CSA 22.2 part 14



*) - Minimum distance to grounded parts or walls
- Minimaler Abstand gegen geerdete Teile oder Wände
- Distance minimale envers pièces mises à terre ou parois
- Distanza minimale per pezzi a massa o pareti
- Distancia mínima a chasis o paredes



-Do not set outside scale !

-Nicht ausserhalb Skala einstellen !

-Défense d'ajuster le courant en dehors de la plage indiquée !

-E vietato di regolare la corrente fuori dal campo di taratura !

-¡Prohibido de regular la corriente fuera del campo de la escala !

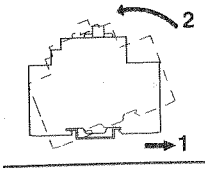
Warning: Attenzione:
Warnung: Atención:
Attention:

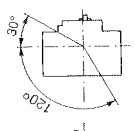
Motor Protection Circuit Breaker

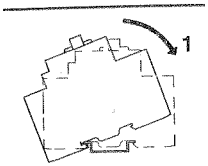
This device meets the requirements of IEC 60947-2 as a circuit breaker. It is cULus listed (UL and CSA approved) as:

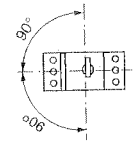
- A Manual Motor Controller with optional approvals for Group Motor, Motor Disconnect and Tap Conductor Protection.
- A Manual, Self-Protected Combination Motor Controller (Construction Typ E).

All installations, commissioning and maintenance must be carried out by qualified personnel, taking local regulations into account.



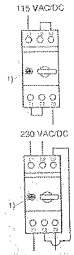






For Control Transformer Protection

- The device is to be installed only on the load side of branch circuit protection.
- Set the current adjustment not more than the rated input current of the control transformer.
- Use only in the specific supply voltage system as marked on the device.



For Single-Phase Motor Protection

1) Set to 105% of motor current.

1) Stellen Sie 105% des Motorstromes ein.

1) Régler à 105% de la valeur du courant moteur.

1) Regolare a 105% della corrente del motore.

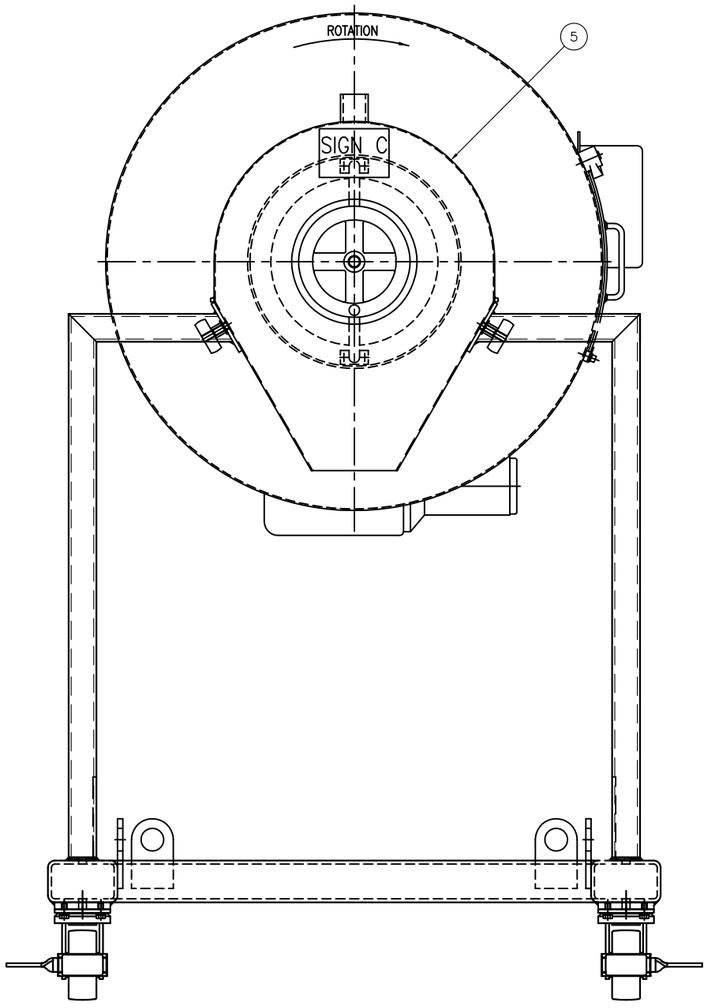
1) Ajustar a 105% de la corriente del motor.

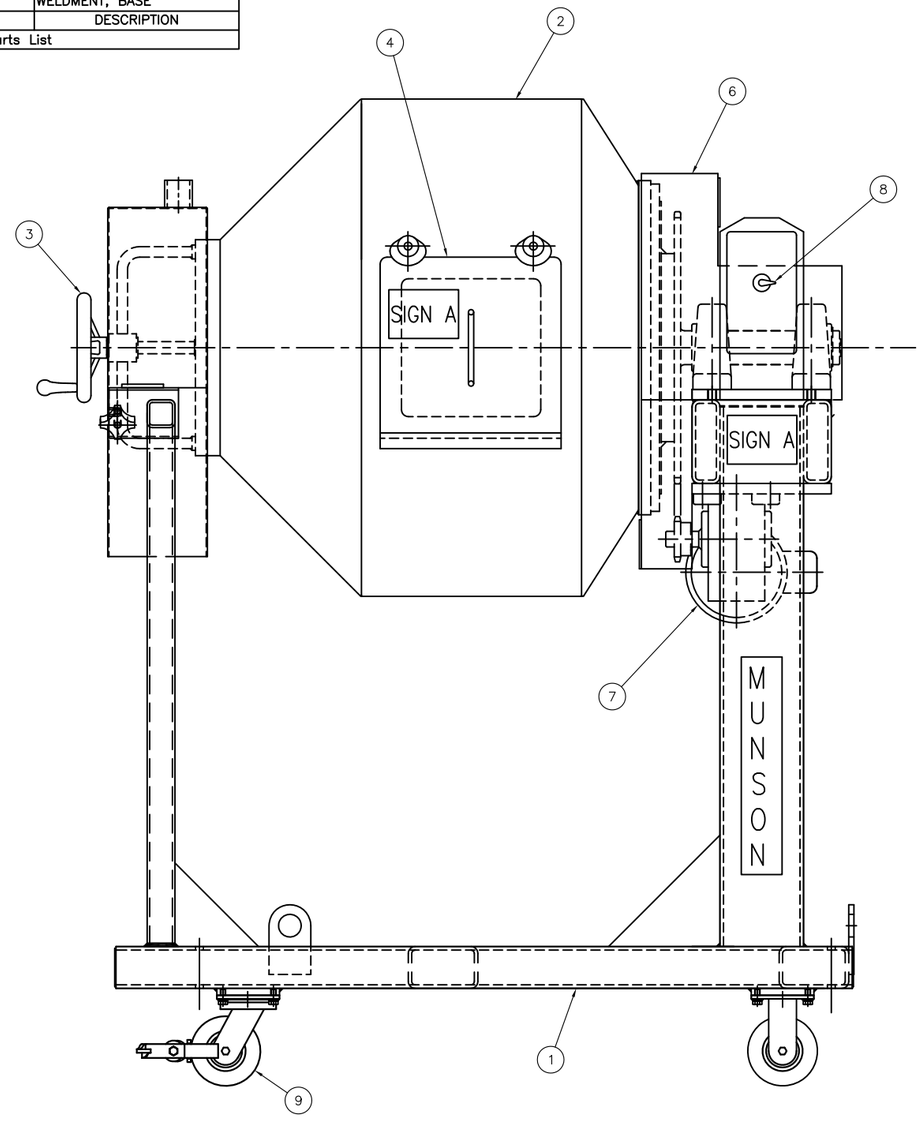
REV	BY	DATE	CHANGE DESCRIPTION
A	M.W.	6-7-16	WAS C-13681-S316

SIGN A	SIGN B	SIGN C
CAUTION LOCKOUT POWER BEFORE OPENING GUARDS, ACCESS DOORS OR COVERS	CAUTION DO NOT OPERATE THIS MACHINE WITHOUT GUARDS IN PLACE	BE CAREFUL KEEP HANDS OUT OF MACHINERY

ITEM	QTY	NAME	DESCRIPTION
9	1	D-8660-S-02	ASSY, SST CASTERS
8	1	B-15649	ASSY, ELECTRICAL STARTER
7	1	C-13683-S316	ASSY, DRIVE
6	1	C-13685	ASSY, GUARDS
5	1	C-15014-S316-01	ASSY, DISCHARGE CHUTE
A 4	1	C-6010-S316-5-U	ASSY, Q.O. DOOR
3	1	C-8083-S316-01	ASSY, DISCHARGE VALVE
2	1	D-8154-S316-02	WELDMENT, TUB
1	1	D-8153	WELDMENT, BASE

Parts List





WELD FINISH

ALL EXTERIOR WELDS

- ☐ #80 GRIT CLEANUP - NO SPLATTER
- ☐ #_____GRIT POLISH
- ☐ CONTINUOUS

(SN150479, 160033)

MUNSON MACHINERY COMPANY, INC.
UTICA, NY 13503

DO NOT SCALE DRAWING
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES ARE:
.X ±.03 FRACTIONAL ±1/32
.XX ±.01 ANGLES ±1/2°
.XXX ±.005 BREAK SHARP EDGES

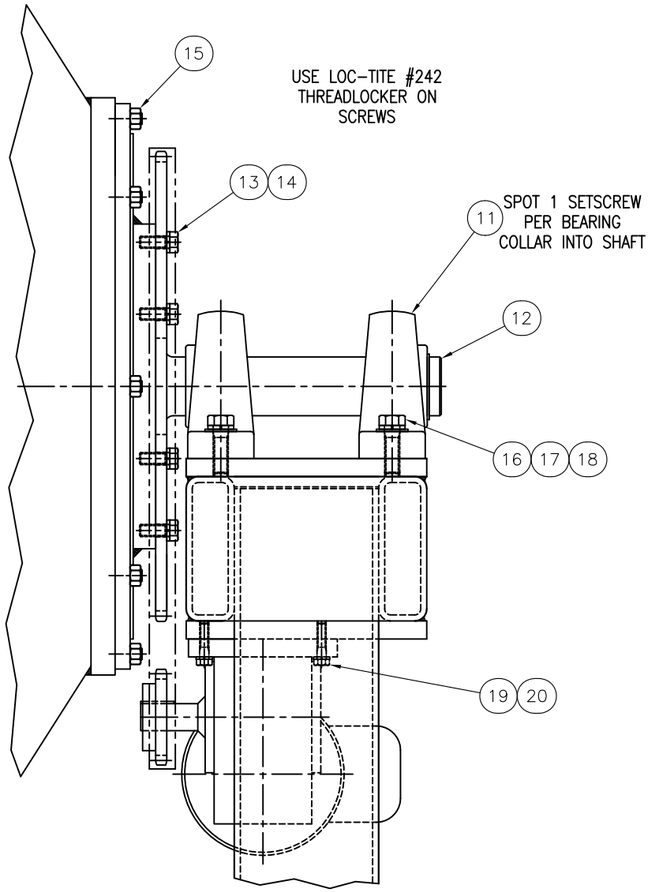
DRAWN BY: DSS 7/21/2015
APPROVED BY:
SUPERSEDES:

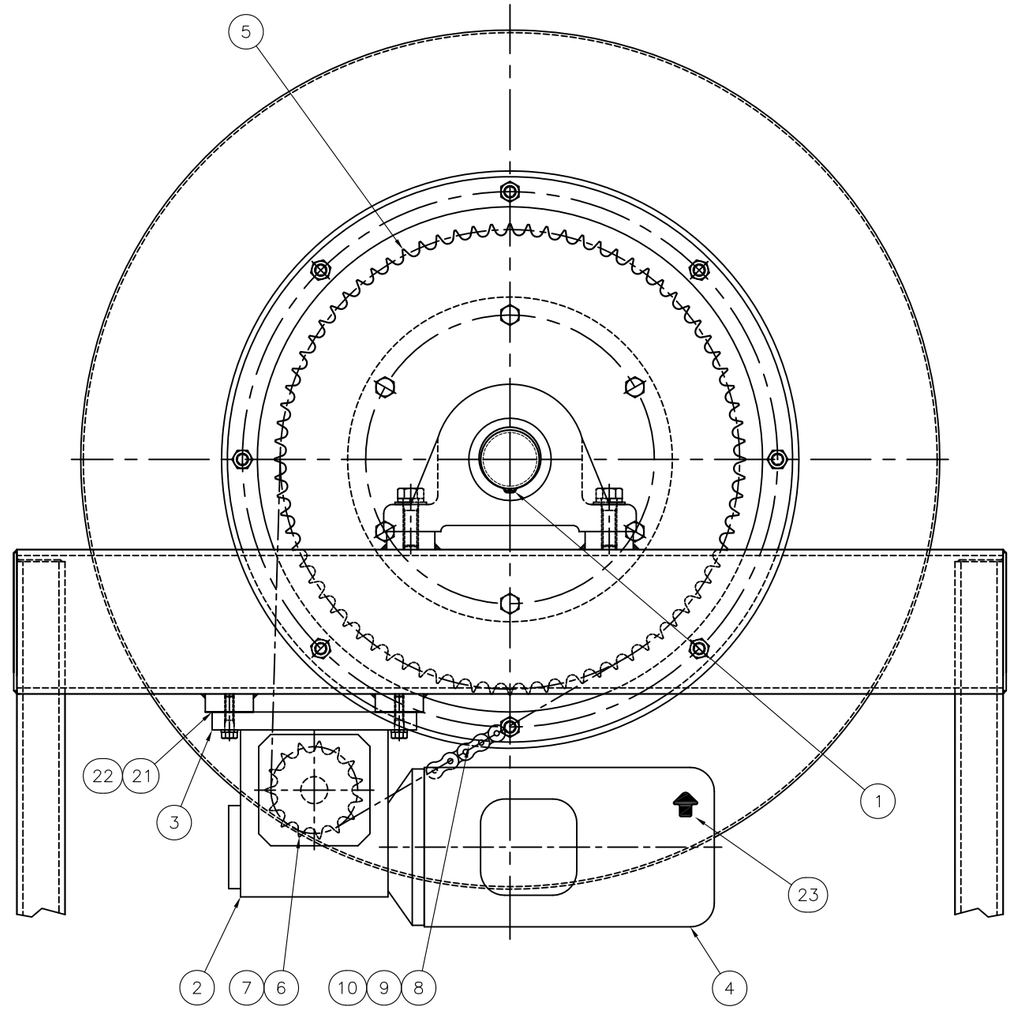
ASSY, MUNSON
#MX5S316 MINI MIXER

MATERIAL
RAW STOCK

SCALE	DWG NO	REV	SHEET
3:16	D-9596-S316	A	1 OF 1

REV	BY	DATE	CHANGE DESCRIPTION





ITEM	QTY	NAME	DESCRIPTION
23	2	P06000011	LABEL, DIRECTION ARROW
22	2	A-18239-250	SHIM, REDUCER, R237
21	2	A-18239-125	SHIM, REDUCER, R237
20	4	P05000657	WASHER, LOCK, 3/8"
19	4	P05000138	SCREW, HHC, 3/8"-16 x 1 1/2" LG
18	4	P05000646	WASHER, FLAT, 5/8"
17	4	P05000659	WASHER, LOCK, 5/8"
16	4	P05000178	SCREW, HHC, 5/8"-11 x 2" LG
15	8	P05000085	NUT, HEX, 1/2"-13
14	6	P05000658	WASHER, LOCK, 1/2"
13	6	P05000160	SCREW, HHC, 1/2"-13 x 1 1/4" LG
12	1	C-13682-S316	TUB MTG SHAFT, FLANGE, MX5S316
11	2	P01000153	BRG, BALL, PLBLK, 2.437B
10	1	P01000646	LINK, CONNECTING
9	1	P01000644	CHAIN, #60, RIVET, .750P x 95 PITCHES
8	1	P01000647	LINK, HALF
7	1	P01000362	BSHG, TPR LCK, TYPE 1610, 1.125B
6	1	P01001399	SPROCKET, DRIVE, #60, 3.607PD, 15T, TPR BSHG
5	1	B-7485	SPROCKET, DRIVEN, (MX-52)
4	1	P03000041	MOTOR, 1HP, 3PH, 60HZ, 230/460V, 1750 RPM, 56C FR
3	1	P01000005	BASE, KIT, HORIZ
2	1	P01000691	RDCR, WORM, TYPE QT, 15:1, FR 56C
1	1	P05000532	RET RING, EXT, 2.437 SFT

Parts List

DO NOT SCALE DRAWING
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES ARE:
.X ±.03 FRACTIONAL ±1/32
.XX ±.01 ANGLES ±1/2°
.XXX ±.005 BREAK SHARP EDGES

DRAWN BY: DSS 7/22/2015
APPROVED BY:
SUPERSEDES:

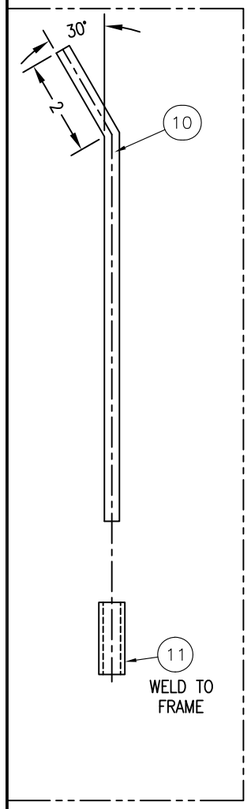
MUNSON MACHINERY COMPANY, INC.
UTICA, NY 13503

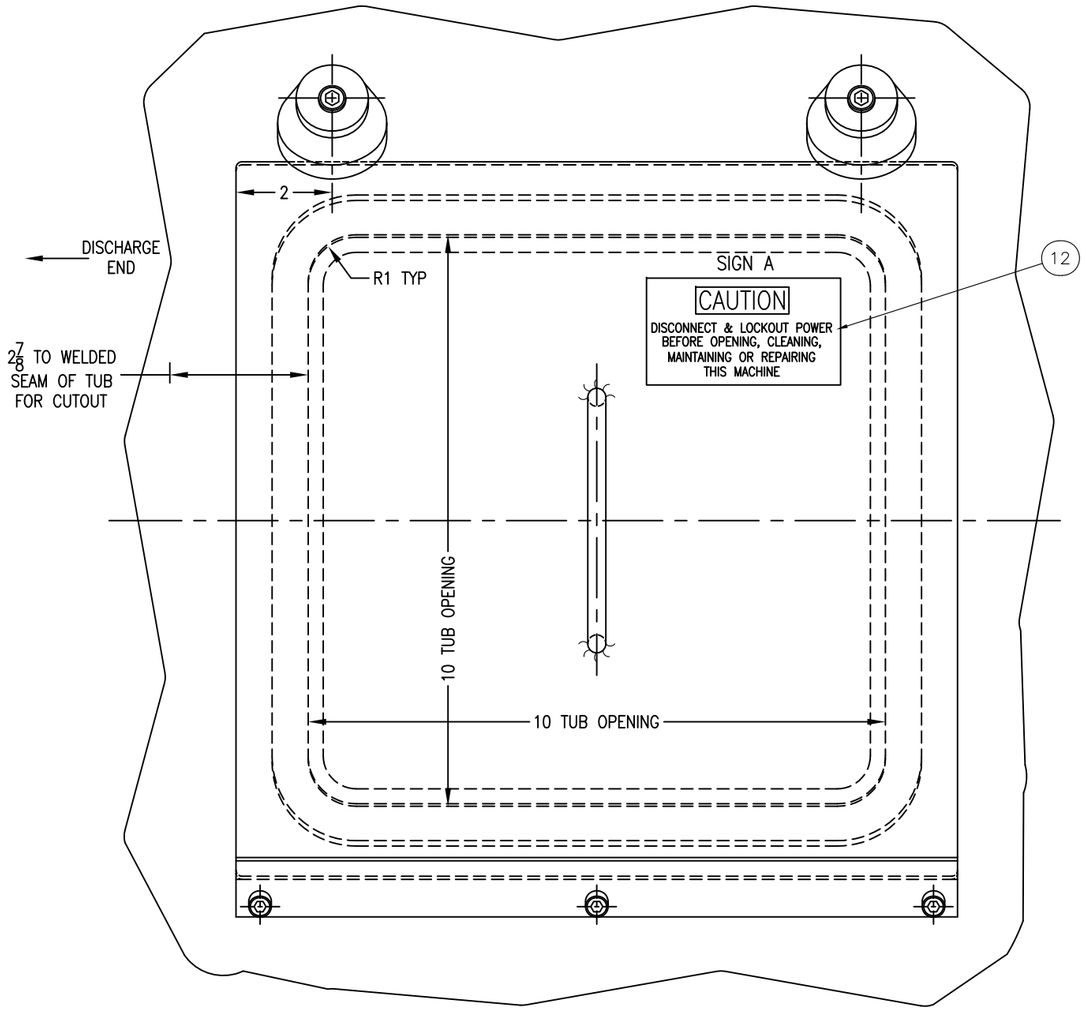
ASSY, DRIVE END #MX5 MINI MIXER

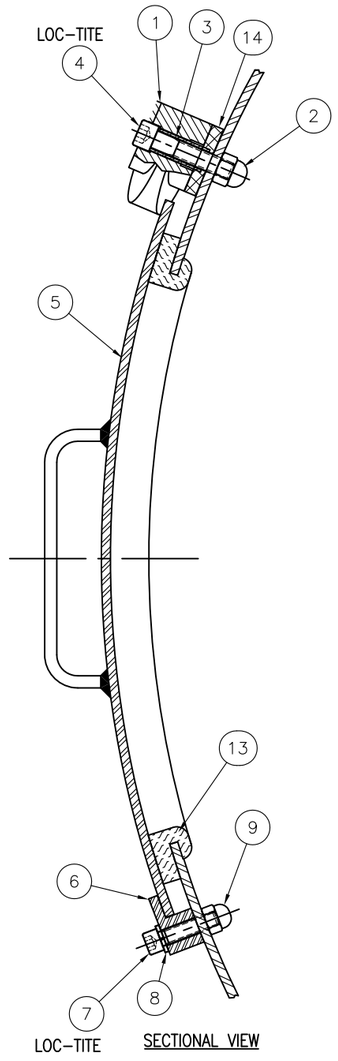
MATERIAL
RAW STOCK

SCALE	DWG NO	REV	SHEET
1:4	C-13683-S316		1 OF 1

REV	BY	DATE	CHANGE DESCRIPTION







ITEM	QTY	NAME	DESCRIPTION	MATERIAL
14	2	A–20249–S	RISER, CAM LOCK	
13	52	A–19557	GASKET, DOOR (U SHAPE)	
12	1	P06000016	WARNING LABEL, LOCK OUT POWER	
11	1	RS000463	SOCKET, STORAGE	PIPE, SCH #40, SST 304, 1/4" DIA x 1 1/2" LG
10	1	RS000977	ROD, CONTROL	SST 304 5/16" DIA x 10" LG
9	3	P05001817	NUT, ACORN, SST 316, 5/16"–18	
8	3	P05000639	WASHER, LOCK, SST 18–8, 5/16"	
7	3	P05001647	SCREW, SHC, SST 18–8, 5/16"–18 x 1 1/4" LG	
6	1	A–9082–S–U	DOOR MOUNTING BRACKET	
5	1	A–6300–S316–MX5–U	DOOR	
4	2	P05001477	SCREW, SHC, SST 18–8, 3/8"–16 x 1 1/4" LG	
3	2	A–6668–S–U	SPACER, CAM LOCK	
2	2	P05001888	NUT, ACORN, SST 316, 3/8"–16	
1	2	A–6667–G	CAM LOCK	

Parts List

INTERIOR ACORN NUTS		
YES	NO	MATERIAL
		SEAL WELD
		TACK WELD
		LOC-TITE

WELD FINISH

ALL PRODUCT CONTACT WELDS

- ☐ #80 GRIT CLEANUP - NO SPLATTER
- ☐ # _____ GRIT POLISH
- ☐ CONTINUOUS
- ☐ _____ ' RADIUS

DO NOT SCALE DRAWING
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES ARE:
.X ±.03 FRACTIONAL ±1/32
.XX ±.01 ANGLES ±1/2
.XXX ±.005 BREAK SHARP EDGES

DRAWN BY: M.W. 6–6–16
APPROVED BY:
SUPERSEDES:

MUNSON MACHINERY COMPANY, INC.
UTICA, NY 13503

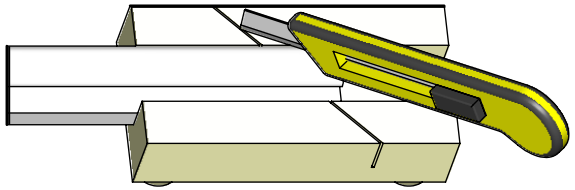
ASSY, QUICK OPENING DOOR SST MINI MIXERS (10x10 OPEN)

MATERIAL

SCALE	DWG NO	REV	SHEET
	C–6010–S316–5–U		1 OF 1

SM-3568 Rev. -

ROTARY MIXER DOOR GASKET REPLACEMENT



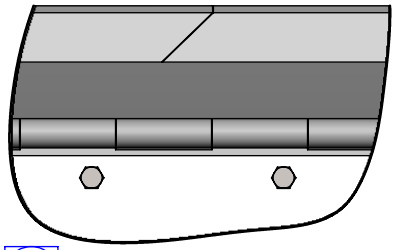
A GASKET STARTING ANGLE FACTORY CUT BY MUNSON

A) Factory cut edge by Munson Machinery using fixture T-5083.

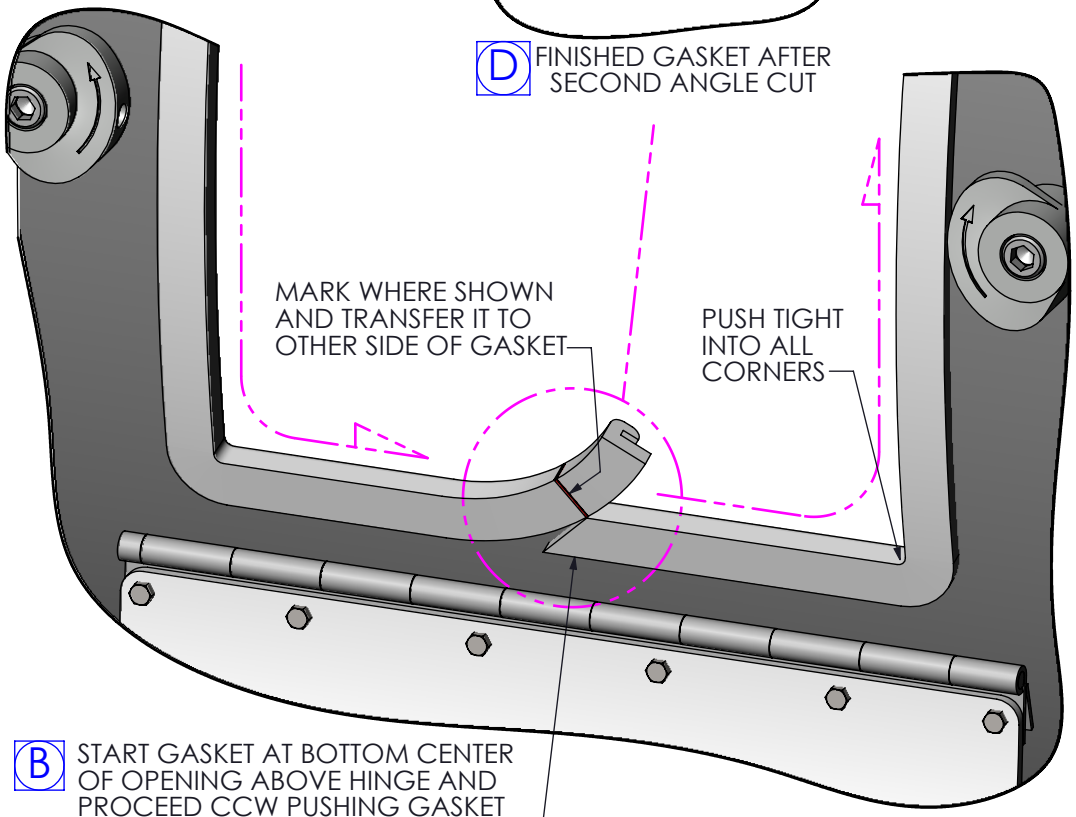
B) Start the gasket at the bottom center of the door opening above hinge and push the gasket groove onto the door cutout counterclockwise with the rounded part inside and the flat part outside. Push the gasket firmly into all corners of the door opening to make sure there are no gaps. Continue all the way around until you get back to the beginning. VERIFY GASKET IS PUSHED INTO ALL CORNERS AND IS NOT STRETCHED OR WRINKLED BEFORE CONTINUING. Mark the gasket as shown where the uncut end starts to overlap the cut end. Transfer that line to the other side of the gasket. Remove gasket for cutting.

C) Place the gasket with the flat side down and the 3/8" thick edge toward you and align the transferred mark with a straight edge or similar miter edge to make a 45° cut. Cut with a smooth motion from back to front to avoid an uneven edge.

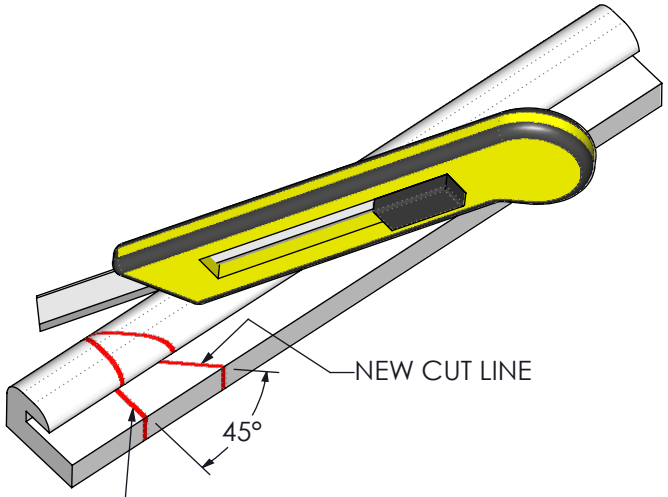
D) Reinstall the gasket in the same manner as before and when you get back to the beginning push the angled ends together. Adjust the gasket as needed by pushing/pulling so that the angled ends fit tightly together.



D FINISHED GASKET AFTER SECOND ANGLE CUT



B START GASKET AT BOTTOM CENTER OF OPENING ABOVE HINGE AND PROCEED CCW PUSHING GASKET ONTO TUB CUTOUT AS SHOWN



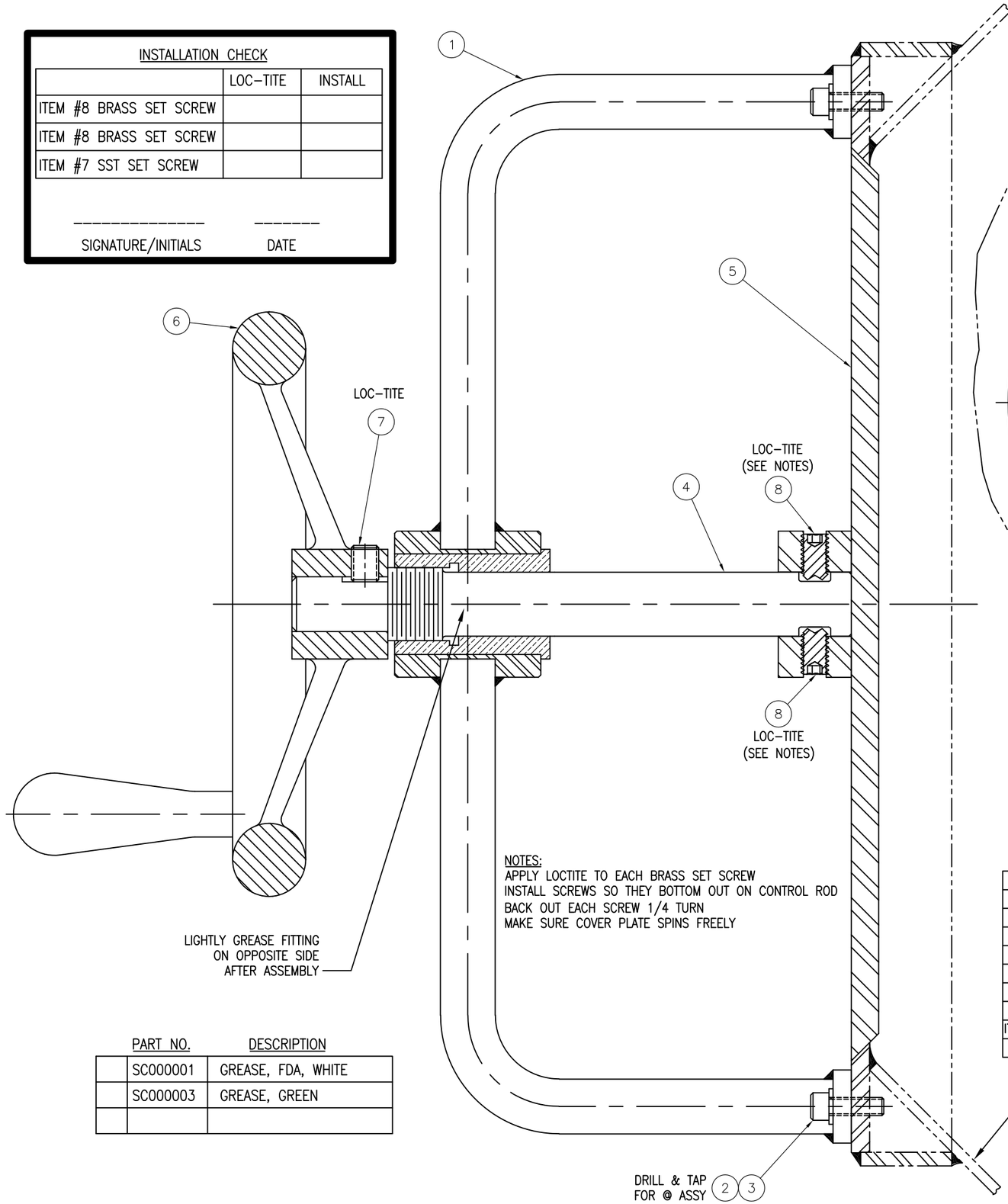
C MARK TRANSFERED FROM OTHER SIDE OF GASKET

REV	BY	DATE	CHANGE DESCRIPTION

INSTALLATION CHECK

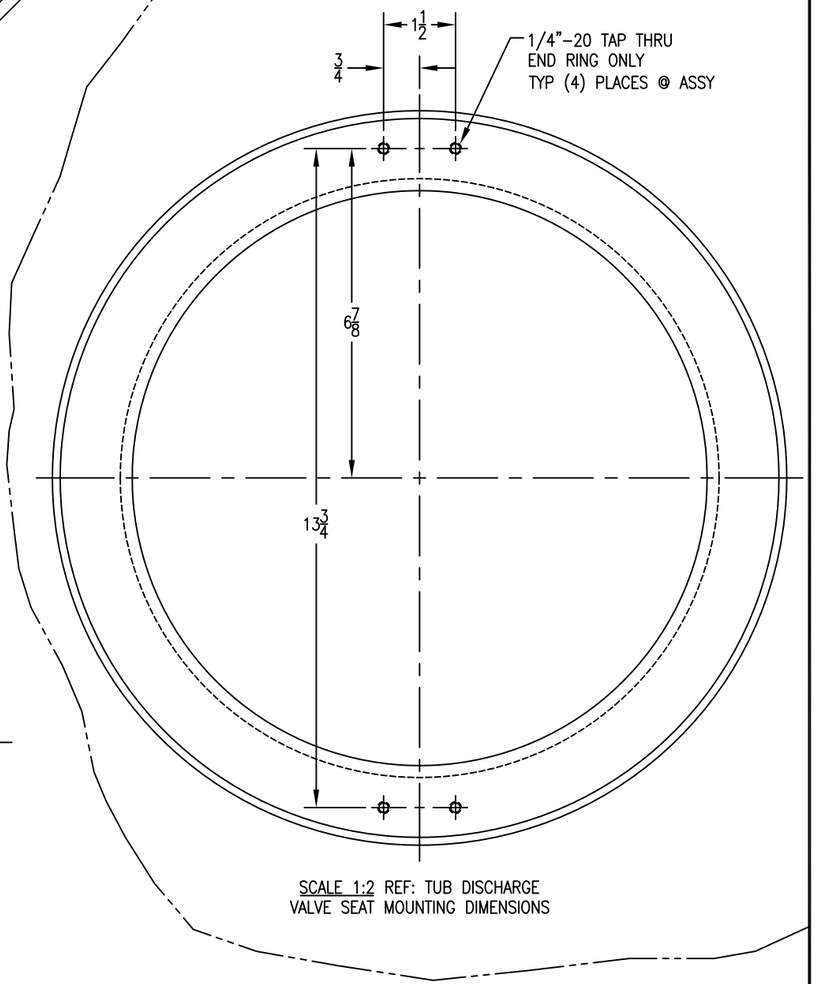
	LOC–TITE	INSTALL
ITEM #8 BRASS SET SCREW		
ITEM #8 BRASS SET SCREW		
ITEM #7 SST SET SCREW		

SIGNATURE/INITIALS _____ DATE _____



NOTES:
APPLY LOCTITE TO EACH BRASS SET SCREW
INSTALL SCREWS SO THEY BOTTOM OUT ON CONTROL ROD
BACK OUT EACH SCREW 1/4 TURN
MAKE SURE COVER PLATE SPINS FREELY

PART NO.	DESCRIPTION
SC000001	GREASE, FDA, WHITE
SC000003	GREASE, GREEN



SCALE 1:2 REF: TUB DISCHARGE
VALVE SEAT MOUNTING DIMENSIONS

ITEM	QTY	NAME	DESCRIPTION
8	2	P05001945	SCREW, SHS, BRASS, 3/8"–16 x 5/8" LG
7	1	P05000824	SCREW, SHS, SST 18–8, 3/8"–16 x 1/2" LG
6	1	B–4691	HANDWHEEL
5	1	C–8082–S316–01	(MX–91–S) WELDMENT, DISCHARGE COVER PLATE
4	1	B–10588–S–01	(MX–90–S) ROD, CONTROL
3	4	P05001522	WASHER, LOCK, SST 316, 1/4"
2	4	P05001918	SCREW, SHC, SST 316, 1/4"–20 x 3/4" LG
1	1	B–8623–S316	(MX–76–S) ASSY, DISCHARGE CONTROL MTG. BRACKET

Parts List

DO NOT SCALE DRAWING
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES ARE:
.X ±.03 FRACTIONAL ±1/32
.XX ±.01 ANGLES ±1/2°
.XXX ±.005 BREAK SHARP EDGES

DRAWN BY: DSS 6/24/2015
APPROVED BY:
SUPERSEDES:

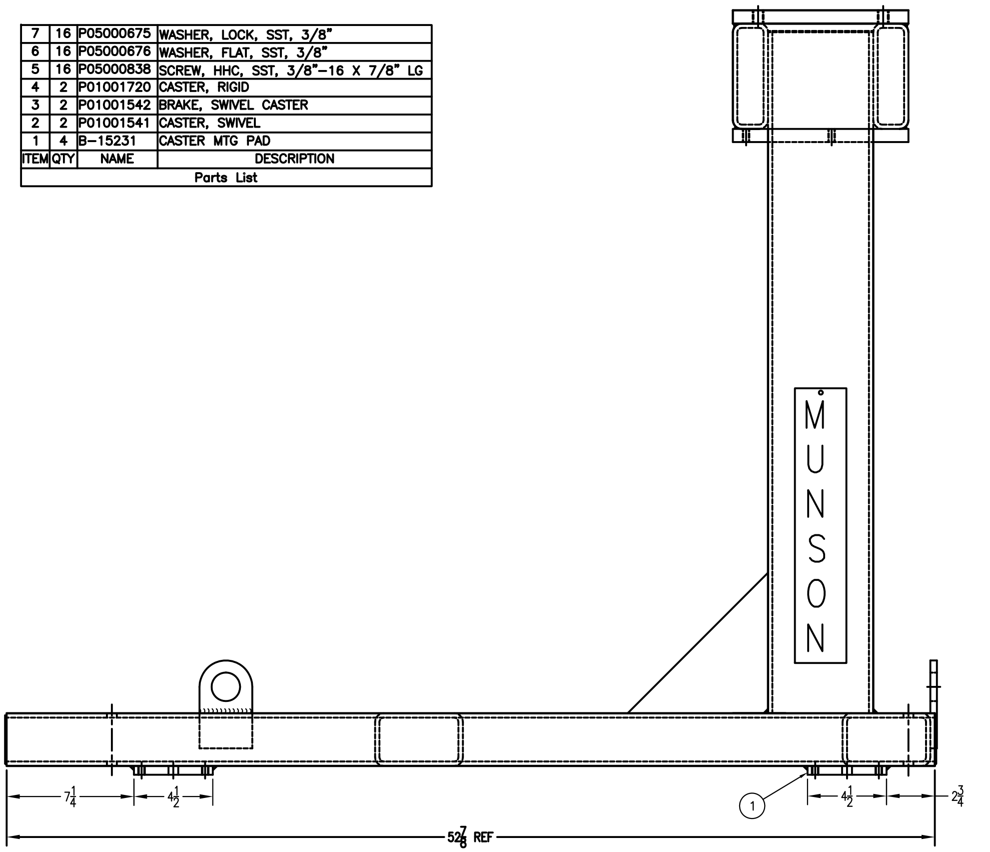
MUNSON MACHINERY COMPANY, INC.
UTICA, NY 13503

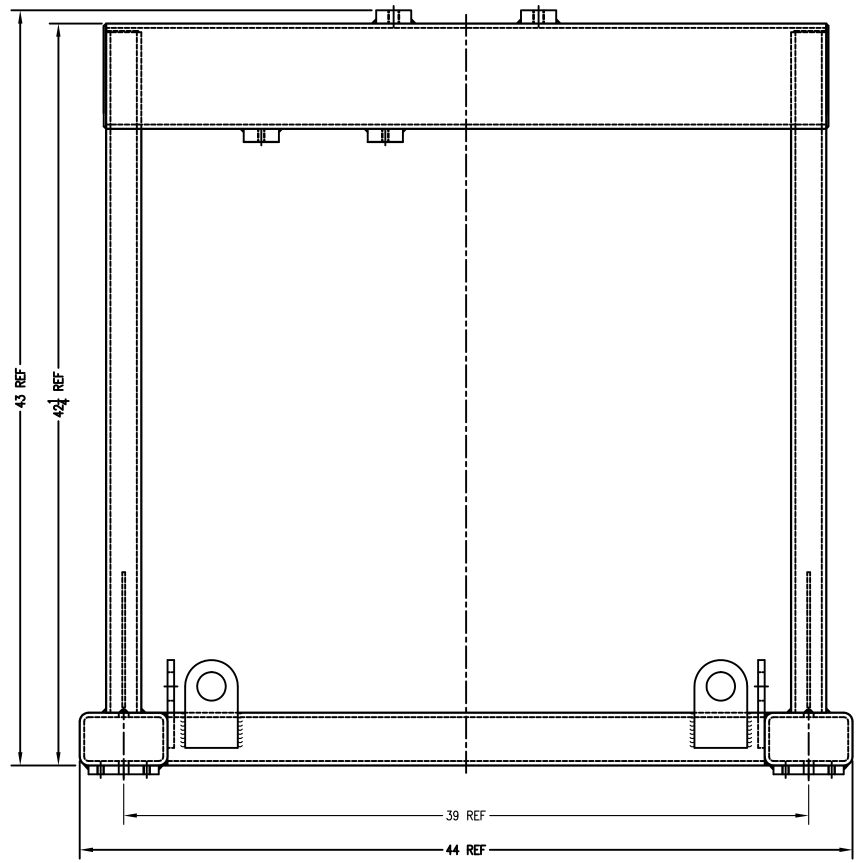
ASSY, DISCHARGE VALVE SS316 MINI MIXER

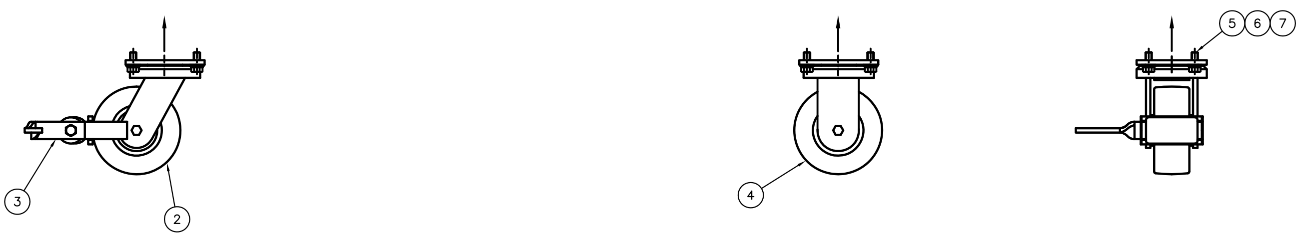
MATERIAL

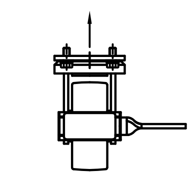
SCALE	DWG NO	REV	SHEET
1:1	C–8083–S316–01		1 OF 1

7	16	P05000675	WASHER, LOCK, SST, 3/8"
6	16	P05000676	WASHER, FLAT, SST, 3/8"
5	16	P05000838	SCREW, HHC, SST, 3/8"-16 X 7/8" LG
4	2	P01001720	CASTER, RIGID
3	2	P01001542	BRAKE, SWIVEL CASTER
2	2	P01001541	CASTER, SWIVEL
1	4	B-15231	CASTER MTG PAD
ITEM	QTY	NAME	DESCRIPTION
Parts List			









WELD FINISH

ALL EXTERIOR WELDS

- ☐ #80 GRIT CLEANUP - NO SPLATTER
- ☐ #_____GRIT POLISH
- ☐ CONTINUOUS

MUNSON MACHINERY COMPANY, INC.
UTICA, NY 13503

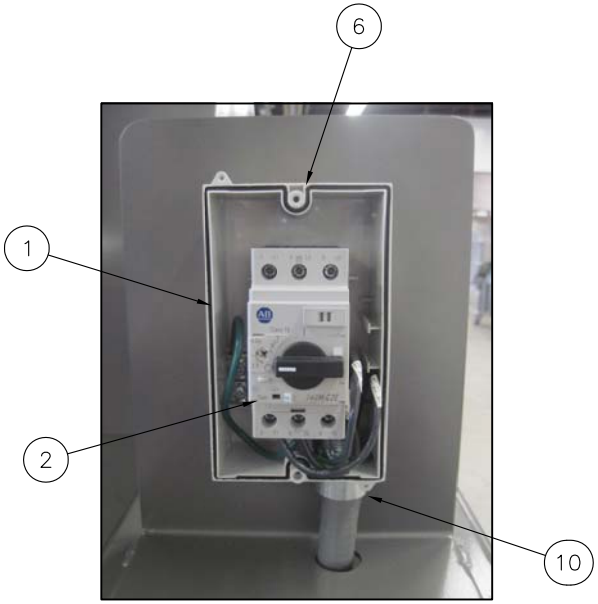
ASSY, SST CASTERS
#MX5 MINI MIXER

DO NOT SCALE DRAWING
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES ARE:
.X ±.03 FRACTIONAL ±1/32
.XX ±.01 ANGLES ±1/2°
.XXX ±.005 BREAK SHARP EDGES

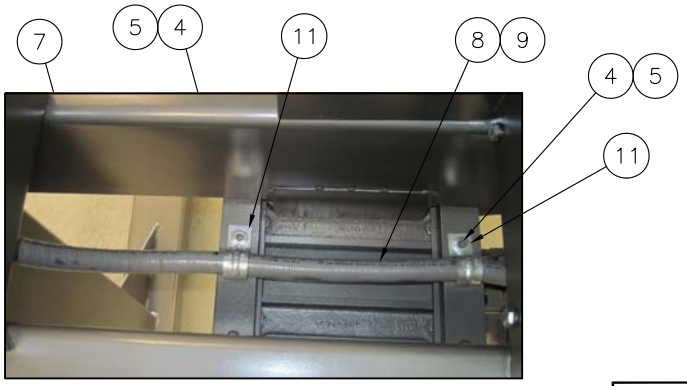
DRAWN BY: DSS 7/22/2015
APPROVED BY:
SUPERSEDES:
MATERIAL

SCALE 1:4 | DWG NO D-8660-S-02 | REV | SHEET 1 OF 1

REV	BY	DATE	CHANGE DESCRIPTION
A	DHS	10/26/10	REVISED MOTOR STARTER
B	R.T.B.	8.11.11	REVISED STARTER BRACKET



NOTE:
1. STARTER GOOD FOR 1Hp @ 230VAC OR 380VAC, OR 2Hp @ 460VAC.
2. SET STARTER HEATER TO MATCH SPECIFIC MOTOR AMPERAGE.



C TOP VIEW

ITEM	QTY	NAME	DESCRIPTION
11	2	P02000175	CLAMP, CONDUIT, 3/4"
10	2	P02000152	FITTING, STRAIGHT, LIQUID–TITE, 1/2"
9	3	P02000153	WIRE, #10GA, BLACK (36" LG)
8	1	P02000154	WIRE, #10GA, GREEN (36" LG)
7	1	P02000133	CONDUIT, LIQUID–TITE, 1/2" (36" LG)
6	2	P05000842	SCREW, SHC, #10–24 x 3/4" LG
5	2	P05000105	SCREW, HHC, 1/4"–20 x 1/2" LG
4	2	P05000655	WASHER, LOCK, 1/4"
3	1	A–16268	BRACKET, STARTER
2	1	P02000067	STARTER
1	1	P02000025	ENCLOSURE, STARTER

Parts List

DO NOT SCALE DRAWING
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES ARE:
.X ±.03 FRACTIONAL ±1/32
.XX ±.01 ANGLES ±1/2°
.XXX ±.005 BREAK SHARP EDGES

DRAWN BY: R.T.B. 8.11.06
APPROVED BY:
SUPERSEDES:

MUNSON MACHINERY COMPANY, INC.
UTICA, NY 13503

ASSY, ELECTRICAL STARTER 1Hp@230V OR 2Hp@460V, 3PH

MATERIAL: RAW STOCK

SCALE 1:2 | DWG NO B–15649 | REV B | SHEET 1 OF 1

Assembly	Qty Required	Component	Description
B-14262-S			ASSY,DISCHARGE CONTROL BLOCK
	0 EA	B-15632	BUSHING, DISCHARGE CONTROL
B-15634-S316			WELDMENT,DISCH CONT BRACKET
	1 EA	B-15632	BUSHING, DISCHARGE CONTROL
C-13683-S316			ASSY,DRIVE,MX5S316
	1 EA	B-7485	SPROCKET, DRIVEN
	2 EA	P01000153	BEARING, BALL
	95 LNK	P01000644	ROLLER CHAIN
	1 EA	P01000646	CONNECTION LINK, ROLLER CHAIN
	1 EA	P01000647	OFFSET LINK, ROLLER CHAIN
	1 EA	P01001399	SPROCKET, DRIVE
C-6010-S316-5-U			ASSY,Q.O. DOOR,MX-5-S316
	52 IN	A-19557	GASKET, QO DOOR EXTRUSION