MACHINEX

REGION WATERLOO
Glass Breaker

REGION WATERLOO
925, Erb Street West
Waterloo ON N2J 3Z4

Customer #: 3077
Project #:3077180501

Machinex Industries Inc. / 2121, Olivier Street Plessisville Qc G6L 3G9 / 1 819 362-3281
www.machinextechnologies.com

Foreword

Thank you for choosing equipment manufactured by **INDUSTRIES MACHINEX INC.** Here is the Machinex operator's manual for your equipment. We sincerely hope that you will find it easy to use. We have designed it in a way that will allow you to easily find information. Make it available to operator, maintenance personnel, and to parts department.

USEFUL ADDRESS AND PHONE NUMBERS

Address: 2121, Olivier Street
Plessisville, (Quebec), Canada
G6L 3G9

Phone: (819) 362-3281 (24/7)
Fax: (819) 362-2280

Web site: www.machinextechnologies.com
E-mail: info@machinex.ca

TABLE OF CONTENTS

LIST OF CHARTS

LIST OF FIGURES

Warning

Each person involved in the operation, maintenance, and installation of this equipment should read and thoroughly understand the instructions in this manual and follow all warnings.

Any employees operating your equipment should read this manual and be instructed in the safe operation of your machine.

The employer involved in the operation, maintenance, and installation of the equipment should read and understand the most current version of the following applicable standards:

Electrical equipment

The electrical controls provided by **INDUSTRIES MACHINEX INC**. are **CSA-UL** approved under the following categories:

⇒ Class 3211 09 INDUSTRIAL CONTROL EQUIPMENT

- Miscellaneous

⇒ Class 3211 89 INDUSTRIAL CONTROL EQUIPMENT

- Certified to U.S. Standards

This manual should be referred to for any maintenance or service of your equipment. And it is advised that this manual be reviewed periodically so that maintenance and operation procedures are followed correctly.

Before proceeding further, please read the following.
Your personnel must be instructed in the safe operation of this machine.

- Do not operate if the safety devices are not functioning properly.
- Keep hands, arms and other body parts away from moving parts.
- Do not bypass or otherwise override safety devices.
- Do not service machine unless electrical power is disconnected and locked out.
- Do not clean out equipment unless machine is disconnected and locked out.

SECTION 1

GENERAL INFORMATION AND SAFETY

INTRODUCTION AND DESCRIPTION

1.1 INTRODUCTION

This manual should be read carefully. The complete listing of equipment with specification, safety measures and information on the operation and maintenance of the equipment contained in this manual should answer most of the questions.

The manual is divided as follow:

- **Section 1 : General**
- **Section 2 : Operation Non-Applicable**
- **Section 3 : Maintenance and equipment**
- **Section 4 : Spare parts of the equipment**
- **Section 5: Maintenance card**
- **Section 6: Recommended spare parts to keep in stock**

The basic safety rules mentioned in this manual must be followed to prevent risks of personal injuries or damage to the equipment. These are the minimum requirements and should be reviewed and adapted by your personnel to suit your MRF.

The maintenance program in Section 3 & 5 must be followed to keep the equipments operational and assure long lasting performance and reliability. Each operator needs to be familiar with the precision of the terms outlined in this manual.

This manual should be easily accessible to operators, maintenance personnel and parts department.

1.2 MACHINEX CONTACTS

For any information or questions, do not hesitate to contact us. It will be our pleasure to help.

Chart 1 Machinex contacts

Position/Department	Personnel	Email/Phone #
Maintenance emergency call		**1-800-463-4298**
Services	Peter Wright	servicesales@machinexrt.ca 905-420-0466
Parts	Wayne Clark	wclark@machinexrt.ca 905-420-0466
Parts & Services Coordinator	Jean Diamond Jr	jdiamond@machinex.ca
Technical Services Director	Serge Beaurivage	sbeaurivage@machinex.ca
Project Manager	Sylvain Auger	sauger@machinex.ca
President	Pierre Paré	ppare@machinex.ca

MACHINEX

Machinex Industries Head-Office
2121 Olivier Street,
Plessisville, Qc, Canada G6L 3G9
Phone: (819) 362-3281 (24/7)
Fax: (819) 362-2280
E-mail: info@machinex.ca

1.3 WARRANTY

Machinery is covered with a warranty of 12 months or 2200 hours against manufacturer's equipment material defaults while in normal use.

The warranty becomes effective from the date of delivery.

The warranty will lapse if the equipment sold is repaired or altered by personnel that has not been authorized by **INDUSTRIES MACHINEX INC**., or if operation and maintenance instructions for the machine have not been followed and approved (see section 1.3.1 to know what are the exclusions to this warranty).

INDUSTRIES MACHINEX INC. or anyone having participated to the delivery or to the installation of the equipment cannot be held responsible for damage of any kind, or from any cause, incidental or consequential (including damage caused by loss of revenue or profit, termination of activities or others) following or resulting from the use of the equipment sold under the foregoing terms and conditions, and that even if the vendor has been informed of those possible damages.

Any parts or equipment provided by **INDUSTRIES MACHINEX INC**. suppliers shall be subject only to the warranties of those suppliers.

The warranty covers replacement parts only, and does not include labor and consequential damages.

Buyer shall notify **INDUSTRIES MACHINEX INC**. in writing within fifteen (15) days of discovery, within the warranty period, of any alleged defect in order to allow **INDUSTRIES MACHINEX INC**. or its representative to make such investigation, examination and tests as it seems appropriate. If requested by **INDUSTRIES MACHINEX INC**., the buyer will return the alleged defective product to **MACHINEX**'s factory for examination and testing. If **INDUSTRIES MACHINEX INC**. determines the product defective, **INDUSTRIES MACHINEX INC**. will either repair or replace such product with a similar item of **MACHINEX**'s manufacture, F.O.B. **MACHINEX**'s factory or allow buyer credit for an amount equal to the one invoiced for the said product.

This limited warranty is in lieu of all other warranties.

WARRANTY EFFECTIVE DATE: July 26th 2018, Manual no.: (3077180501)

1.3.1 EXCLUSIONS TO THE WARRANTY INTRODUCTION

This warranty does not cover expendable parts, maintenance (alignment, adjustments etc.), wear or impact on Machinex products, including but not limited to, lubrication grease, oils, hydraulic connectors, gaskets and seals and any other items that may show evidence of negligent use or overloading, abuse, accident, improper maintenance, storage, improper use or unauthorized alterations.

As an example the following situations do not qualify for a refund pursuant to the warranty.

Exclusions:

- Product damaged during storage.
- Transportation of product or parts for inspection and/or repair purposes.
- Labor, cost of transportation and communications during repairs under warranty.
- Motors, gear reducer, PLC opened without the consent of MACHINEX.
- Parts from which the identification number or serial number has been removed.
- Parts bought and replaced by customer without the consent of MACHINEX
- Etc.

1.3.2 RETURN OF PARTS POLICY

1. All parts or merchandise that has to be returned to Industries Machinex under the warranty must bear a RMA number (return material authorization). This number will be issued by **INDUSTRIES MACHINEX** and can be obtained by contacting the after-sales service department. When you call, be sure to have the following information available:

    - Serial number of the defective part (Reference in Parts Manual)
    - Reason for returning the part,
    - Effective date of warranty and name of project.

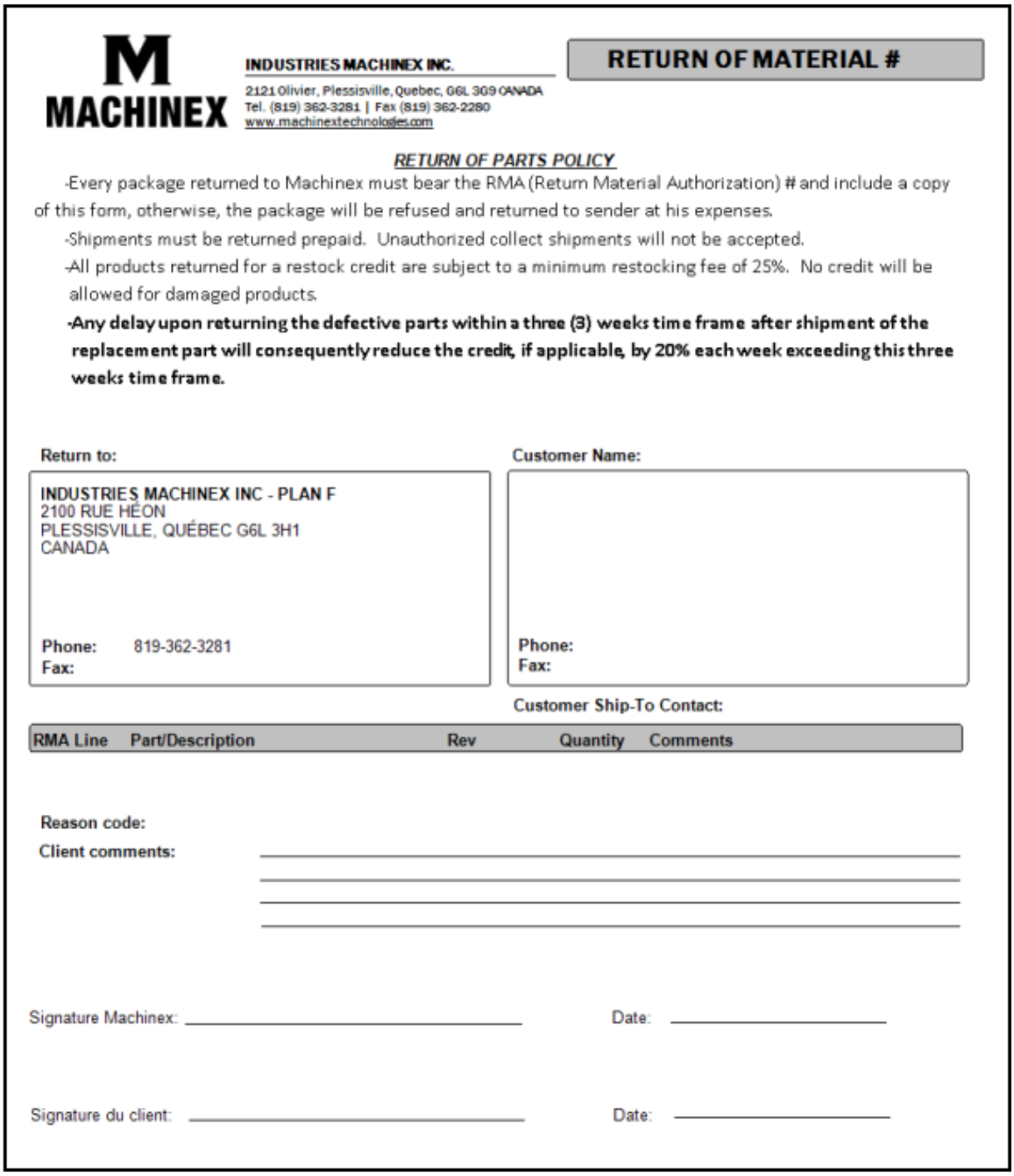
2. When the part is being returned to **INDUSTRIES MACHINEX**, make sure to include the form for the return of parts and it is very important to mention the attributed RMA number.

3. Every part under warranty will be invoiced. A quote must be signed. If warranty applies, a credit will be issued after reception and inspection of the defective part. Please note that any delay for returning the part within three (3) weeks after shipment of the replacement part will reduce credit, if applicable, by 20% each week.

4. New parts ordered and then returned will be subject to restocking charges of 25%.

5. The RMA number has to be inscribed on the packing slip or bill of lading.

Return of parts policy (continued)



MACHINEX

INDUSTRIES MACHINEX INC.
2121 Olivier, Plessisville, Quebec, G6L 3G9 CANADA
Tel. (819) 362-3281 | Fax (819) 362-2280
www.machinextechnologies.com

RETURN OF MATERIAL #

RETURN OF PARTS POLICY

-Every package returned to Machinex must bear the RMA (Return Material Authorization) # and include a copy of this form, otherwise, the package will be refused and returned to sender at his expenses.

-Shipments must be returned prepaid. Unauthorized collect shipments will not be accepted.

-All products returned for a restock credit are subject to a minimum restocking fee of 25%. No credit will be allowed for damaged products.

-Any delay upon returning the defective parts within a three (3) weeks time frame after shipment of the replacement part will consequently reduce the credit, if applicable, by 20% each week exceeding this three weeks time frame.

Return to:

INDUSTRIES MACHINEX INC - PLAN F
2100 RUE HÉON
PLESSISVILLE, QUÉBEC G6L 3H1
CANADA

Phone: 819-362-3281
Fax:

Customer Name:

Phone:
Fax:

Customer Ship-To Contact:

RMA Line	Part/Description	Rev	Quantity	Comments

Reason code:

Client comments: _____

Signature Machinex: _____ Date: _____

Signature du client: _____ Date: _____

Figure 1 Return of Material

1.4 HOW TO ORDER PARTS

Figure 2 Serial Number tag on the equipment

Please follow the steps bellow to help getting a better service when ordering spare parts:

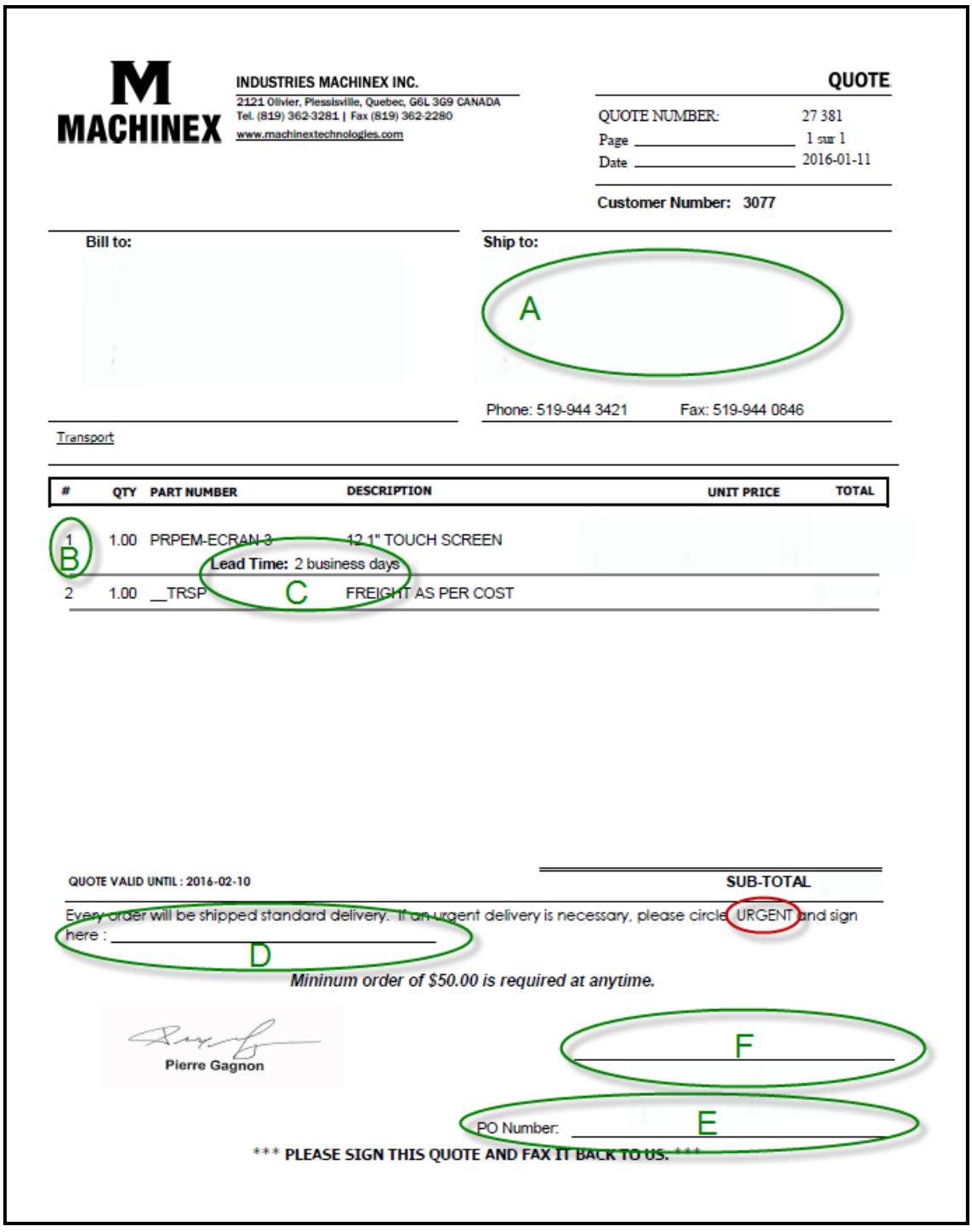
1) Have your service manual on hand,
2) Identify the parts with the following information:
    a) Equipment serial number (refer on the serial number tag on the equipment) ,
    b) Service manual number,
    c) Part number and description of the part,
    d) Quantity of parts required.
3) Give the complete address of delivery, telephone number and a contact on delivery site. Keep in mind that parts cannot be delivered to a Post Office box.
4) Specify the shipping method desired and the date the package is required. When no instructions are given, material will be shipped regular ground and according to the lead time on the quote. Freight costs are prepaid and charged unless otherwise specifications.

How to order parts (continued)

5) A quote will be sent. Upon reception of the quote, the following steps must be followed (see quote example on next page):
    A) Verify the ship to address
    B) Verify quantity of each item on the quote. Cross out the unnecessary parts.
    C) Verify lead time (if inadequate, the schedule may be changed on certain occasions to get an earlier shipment. Rush charges may applied)
    D) Every shipment will ship standard ground. For rush delivery, please circle Urgent and sign in the appropriate space. Please note this will only affect the type of freight and not the shipping date.
    E) Write a PO number if available
    F) Sign the quote
6) If the parts ordered are missing, contact us immediately

Please note that no parts or service will be proceeded without a signed quote sent back to us.

How to order parts (continued)



MACHINEX

INDUSTRIES MACHINEX INC.
2121 Olivier, Plessisville, Quebec, G6L 3G9 CANADA
Tel. (819) 362-3281 | Fax (819) 362-2280
www.machinextechnologies.com

QUOTE

QUOTE NUMBER: 27 381
Page 1 sur 1
Date 2016-01-11

Customer Number: 3077

Bill to:

Ship to:

A

Phone: 519-944 3421 Fax: 519-944 0846

Transport

#	QTY	PART NUMBER	DESCRIPTION	UNIT PRICE	TOTAL
1	1.00	PRPEM-ECRAN-3	12.1" TOUCH SCREEN		
		Lead Time: 2 business days			
2	1.00	__TRSP	FREIGHT AS PER COST		

B

C

QUOTE VALID UNTIL : 2016-02-10

SUB-TOTAL

Every order will be shipped standard delivery. If an urgent delivery is necessary, please circle URGENT and sign here : _____

D

Mininum order of $50.00 is required at anytime.

Pierre Gagnon

F

PO Number: E

*** **PLEASE SIGN THIS QUOTE AND FAX IT BACK TO US.** ***

Figure 3 Quote example

1.5 LIST OF EQUIPMENT

Since each piece of equipment has to answer to specific material type condition that is to be conveyed, **MACHINEX** uses a design appropriate for each installation to the needs of your application.

Chart 2 List of equipment

Equip. No*	Model*	Dimensions*	Information**	Reducer***	Serial No****
C-5	Conveyor transfer existing	N/A	N/A	N/A	3077-085L (was CSR3-190L)
GB-8	Glass breaker screen	48" WD X 17 shaft	Sect. 3.7 P. 52	SK1282//SK 9032.1 M3//M5	SGV-010L
PP-10	Plastic perforator existing	N/A	N/A	N/A	3077-086L (was EP-033L)

For the general arrangement of the equipment described above, check figure 4 on the next page.

* The number, the model and the dimensions of the machine will help you identify your equipment.

** You will find specific information of the machine in the column entitled "Information". The section information corresponds to the general information about the equipment and the page # refers to the specific spare parts information.

*** The column entitled "Reducer" tells you the model and the mounting position of the speed reducer; you will find the information in section 3.2.

**** The column entitled "Serial No. «indicates the number of the "spare part listing" of this equipment. You will find this list in section 4.

Figure 4 General layout (MR-2342A-1)

1.6 SAFETY

1.6.1 WARNING TERMS

In this manual and on warning signs located on the equipment, key signals are used to draw your attention to important information. All warning signs must remain in place on the equipment at all times. If any warming signs are removed, the machine must be shut down and the proper sign must be replaced immediately. The equipment should not be operated without the proper warning signs due to the safety of the personnel operating the equipment.

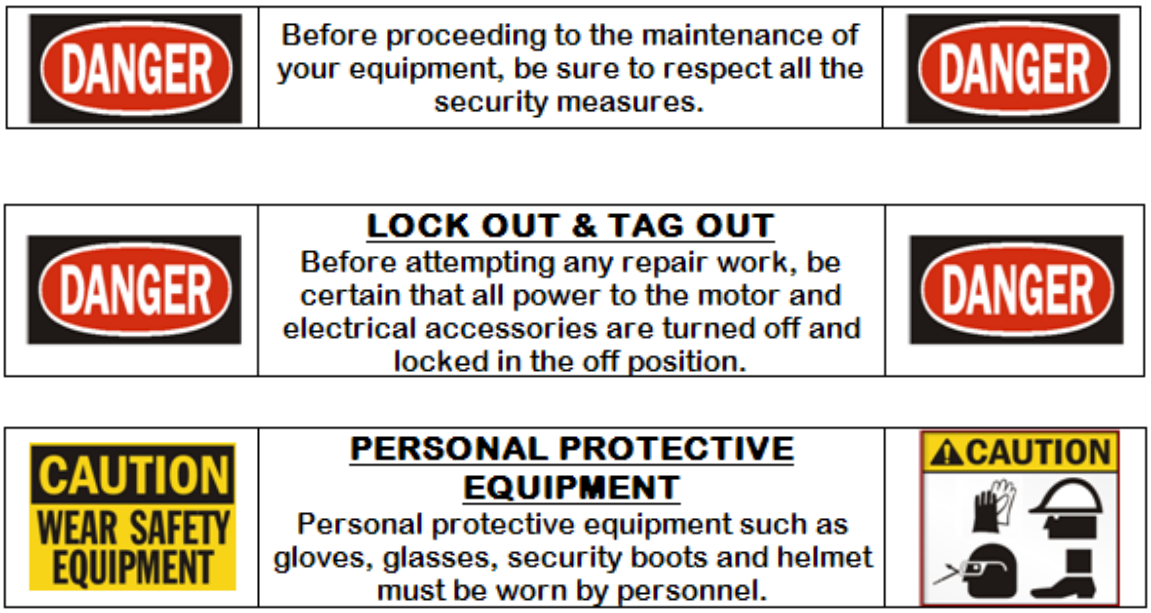


Figure 5 Manual's warning signs

1.6.2 SAFETY RULES

⇒ It is the employer's responsibility to ensure that the employees are qualified on the equipment's operations and safety measures before working with this equipment.

⇒ It is the employee's responsibility to apply proper procedures and safety measures at all times.

⇒ The equipment should never be used unless the personnel has read and understood completely this manual.

⇒ Never start, move or operate the equipment when stepping into it, even after a short time away, without ensuring that the surrounding area is clear of any person or object preventing safe movement or operation.

⇒ Before starting a machine, be sure that nothing or nobody is near the mobile parts of the machine.

⇒ Before starting a machine, be sure that all the safety guards are in place.

⇒ Do not use a machine if the safety system is not operational as designed by Machinex.

⇒ Cut the power supply to the equipment at first appearance of malfunction.

⇒ Properly lockout electrical power of equipment before carrying out repairs or maintenance.

⇒ Never walk, stand, sit or lie on an equipment.

⇒ Keep the signal safety stickers visible and in good condition.

⇒ Equipment must transport only the material that it was designed for.

⇒ Do not overload a machine.

⇒ Do not load equipment when it is not running, unless it was designed for this purpose.

⇒ Never use equipment with damaged or defective parts.

⇒ Never operate equipment in any other way except for what it was designed for.

⇒ Only qualified staff may perform maintenance and repairs on the equipment.

⇒ Nobody should ever climb or hang on a machine or on a structure support.

1.7 EMPLOYER'S GENERAL RESPONSIBILITIES

It is the employer's responsibility to be familiar with and ensure that operation is in accordance with safety requirements and codes including all applicable regulations, including the Occupational Safety and Health Act (OSHA) and the American National Standards Institute (ANSI).

It is also the employer's responsibility to properly maintain all equipment to meet all provincial/state and federal safety standards. The employer also has the responsibilities of supplying adequate instructions and training for the safe use of the equipment prior to assign an employee to such equipment.

The employer is responsible for ensuring that the equipment is installed and operated in a safety conscious manner. Making sure that prior to putting the equipment into service that all malfunctions or breakdowns that endanger the safe operation of the equipment are repaired and ensuring that only authorized and trained personnel (over the age of 18) operate, maintain or use the equipment.

1.8 EMPLOYEE'S GENERAL RESPONSIBILITIES

1. The employee must enforce all of the safety requirements supplied by the employer.

2. Equipment is to be operated only after having received instructions and training in accordance to chapter 3.0.

3. The employee has the responsibility to report any damage or malfunction of the equipment to his employer or his supervisor immediately. The employer will then take the necessary measures prior to the reoperation of the equipment to insure its safe operation.

4. Do not operate this equipment if there are any signs of damage or incomplete repairs

5. The employee must make sure that there is no one near the equipment before activating any of the controls and must be prepared to stop operation in case of danger.

SECTION 2

SYSTEM'S OPERATION-NON-APPLICABLE

SECTION 3

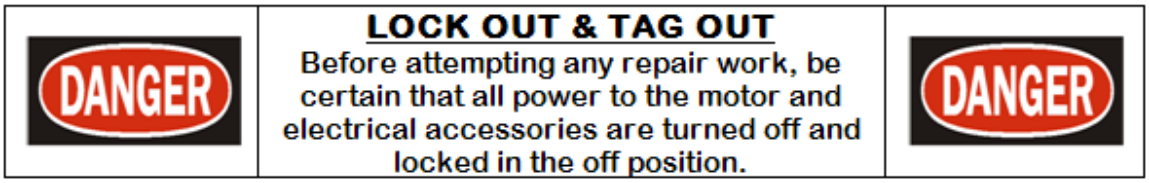
MAINTENANCE AND EQUIPMENT

3.1 INTRODUCTION

This section contains all the relevant information about the features of the equipments, mechanical operation, maintenance, adjustment and safety.

Following the "continuous" and "periodical" maintenance specifications of this section and the maintenance card of section 5 will extend the life span of the equipment and maintain the quality of operation. However, it is important to note that the condition of the equipments may be altered if the tonnage and type of input material differ from what is described in the contract. The continuous maintenance refers to the maintenance, cleaning or visual inspection done on a daily basis to assure a smooth operation of the equipment while the periodical maintenance consists of adjustments and verifications done at certain intervals to prevent the equipment failures. The maintenance cards presented in section 5 must be used to follow the progression of maintenance done on equipment. These cards presents each maintenance point and intervals of application adapted to each equipment. Maintenance personnel should print copies of these cards, fill these up and keep a record of this maintenance for an adequate follow up on equipment.

3.1.1 LOCK-OUT & TAG-OUT INSTRUCTIONS



Before entering any part of the equipment, all sources of energy must have been shut off and all potential hazards eliminated. The equipment must be locked-out and tagged-out in accordance with OSHA and ANSI requirements. Any technician who has to operate equipment must be sure the equipment is cleared before starting the equipment.

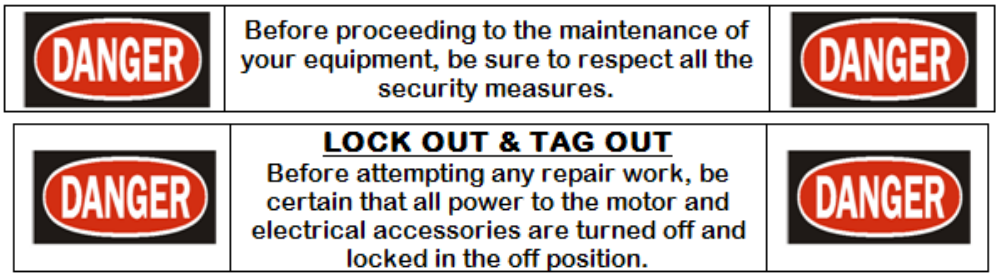
Lock-out & tag-out instructions (continued)

The specific lock-out and tag-out instructions may vary from company to company (i.e. Multiple locks may be required or other machinery may need to be locked-out and tagged-out.) The following instructions are provided as a minimum recommended guideline.

3.1.2 SERVICING

Only a factory authorized service representative should make adjustments to the equipments or perform maintenance further than the maintenance explained in this manual. The following pages contain recommendations for correcting minor problems. If the equipments do not operate properly, consult Machinex after sales department.

Prior to performing any maintenance on any of the machines, **review all the sections of this manual**. **SAFETY IS THE FIRST AND UTMOST CONCERN.**



These points should be carefully observed:

1. Never work alone.
2. Always use proper lock-out and tag-out procedures.
3. Never use the Emergency Stop switches as the only protection while servicing the machine or any associated equipment.
4. DANGER – Control panels contains HIGH VOLTAGE.
5. CAUTION – Hydraulic system operates under HIGH PRESSURE. Hydraulic fluids leaking in a fine spray can cause serious injury.
6. Never place hands, feet or body into any opening on the equipment unless ELECTRICAL POWER IS DISCONNECTED AND LOCKED OUT.
7. When protective guards or cover plates are removed for servicing or cleaning, reinstall them before putting machine in operation.
8. When servicing or cleaning requires getting into the machine or placing any part of your body into the machine, DISCONNECT ELECTRICAL POWER AND LOCK-OUT. Any associated equipment used in conjunction with the equipment should also be LOCKED OUT.
9. The operator at the controls SHALL ASSURE THAT ALL PERSONNEL ARE CLEAR OF THE MACHINE PRIOR TO ACTUATING ANY CONTROL SWITCH OR DEVICE.
10. Never attempt to service or perform maintenance if you are not qualified or have not received proper instructions.

ALWAYS DISCONNECT EQUIPMENT BEFORE SERVICING.

3.1.3 RISKS ASSESSMENTS

Chart 3 Risks assessment for general maintenance

Potential Hazards	Associated risks	Initial risk rating	Precautions / Controls	Revised risk rating
• Unfamiliarity with the site/or uncertainty about the job	• Workers may suffer injuries or illnesses if they are unfamiliar with the hazards on site, such as transport and machinery, or if they are uncertain about the best way to do a job.	High	• Prepare training to assure that workers are familiar with layout, significant risks of the job, how to control those risks etc. • Discussion about the different areas affected, and key issues such as safe work systems (eg isolation procedures, control of flammables etc.), who will supply necessary kits (eg access equipment), and any necessary personal protective equipment. • Finalize safety procedure (eg trapped key system, safety gears, etc.)	Low
• Performing maintenance	• Workers may suffer serious injuries whilst performing maintenance.	High	• Always lock-out / tag-out whilst performing maintenance or cleaning the equipment. • Competent maintenance personnel only should perform maintenance on equipment. • Use correct PPE • When proceeding maintenance considered difficult or risky, never work alone.	Medium
• Access door leading to dangerous part of equipment.	• Workers may suffer injuries due to lack of protection	High	• Follow trap key systems procedure.	Very low

Risks assessments (continued)

Potential Hazards	Associated risks	Initial risk rating	Precautions / Controls	Revised risk rating
• Lack of training in specific/general tasks	• All operators; users of area/maintenance personnel may be severely hurt by working without full comprehension of the safety measures and operation of the equipment.	High	• Training sessions to be developed for all tasks and general movement within the plant area.	Medium
• Electricity	• Workers may suffer shock and burns injuries from faulty electrical equipment or installation.	High	• Maintenance personnel to discuss electrical safety, before each job begins, to ensure that relevant machinery; circuits, power supply, etc. are isolated, discharged and locked off throughout the job. • Electrical installation and all equipment are to be inspected to a planned schedule. • Use correct PPE	Low
• Lack of maintenance	• Workers may suffer serious injuries from worn or damaged equipment.	Medium / significant	• Regular maintenance must be done in accordance with maintenance schedule and documents supplied in manufacturer's manual. • Competent maintenance personnel only should perform maintenance on equipment. • Log maintenance works done in the maintenance log book.	Low
• Falling objects	• Workers may be hit by falling objects and severely injured.	Medium / significant	• Use correct PPE outside enclosures.	Medium
• Removed guards	• Workers may suffer injuries due to lack of protection	Medium	• Maintenance personnel should correctly reinstall the guards. • Competent maintenance personnel only should remove and reinstalls guards.	Very Low

Risks assessments (continued)

Potential Hazards	Associated risks	Initial risk rating	Precautions / Controls	Revised risk rating
• Noise	• Workers may suffer discomfort and potential hearing damage if working in noisy areas or using noisy equipment (e.g. angle grinders).	Medium	• If possible, cleaning and maintenance in production areas done when the system is not in use. • Workers to have ear defenders and know how to use them effectively and maintain them properly (specified areas). • Maintenance personnel instructed to wear suitable hearing protection when the job exposes them to high level of noise. • Enclosures will be provided where permanent sorting workstations are identified.	Low
• Fire	• Workers may suffer severe injuries as burns or suffocate from smoke	Medium	• Workers must be aware of the potential danger. • Good evacuation plan on site. • Make sure the sprinkler system is properly working.	Very low
• Dust	• Workers may suffer discomfort, breathing difficulties and potential lung damage if working in dusty areas.	Medium	• Continual review and maintenance of dust suppression and extraction systems. • Use correct PPE such as masks and safety glasses on dusty area.	Very low
• Material handling	• Workers may suffer back pain or pain elsewhere from handling heavy and/or bulky objects.	Low	• Manual handling aids – lift truck, porter's trolley, wheelbarrow etc. – to be available as required. • Appropriate lifting device to be used to move heavy parts t during maintenance or repair. • For jobs involving difficult manual handling, eg some machinery repairs, fitter, contractor and relevant others discuss beforehand and agree a safe system of work.	Very low

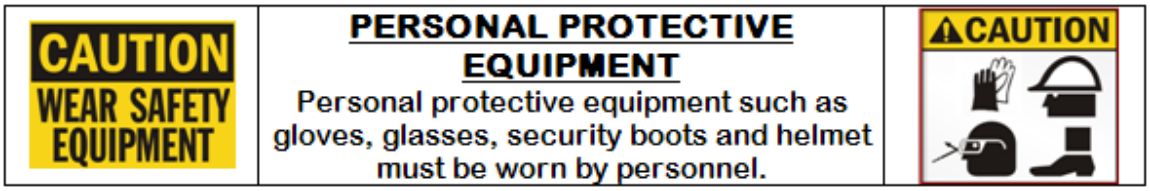
Risks assessments (continued)

Potential Hazards	Associated risks	Initial risk rating	Precautions / Controls	Revised risk rating
• Odors/ Vermin	• Staff is subject to vermin. / Ingestion of poisonous bait, bites, Weil's disease.	Low	• Incoming material is dumped directly inside the MRF • Ensure that contamination levels in incoming material is kept to a minimum. • Vermin control should be undertaken by professionals, bait laid in controlled conditions. • PPE (gloves) worn near contaminated areas to avoid contact with vermin excrement. • Bites from vermin must be attended to immediately. • Vaccination strongly suggested to staff.	Very low
Note: • Risk rating is based on the amount of people at risk, likelihood of occurrence, frequency of exposure and degree of possible harm. • Risk rating will be displayed as very low, low, medium, medium/significant and high.				

3.2 INSTALLATION AND START-UP

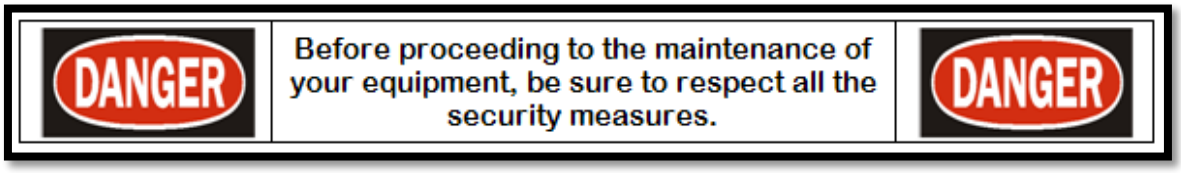
3.2.1 INSTALLATION

NOTE: **Operational check should be initiated only after all sections of this manual has been reviewed and its contents understood.**



During Installation

Before any unloading or installing of shipped equipment or components, all personnel must be wearing personal protective equipment. This includes hearing, eyes, hands and head protection. You should never let untrained or unprotected personnel unload equipment.



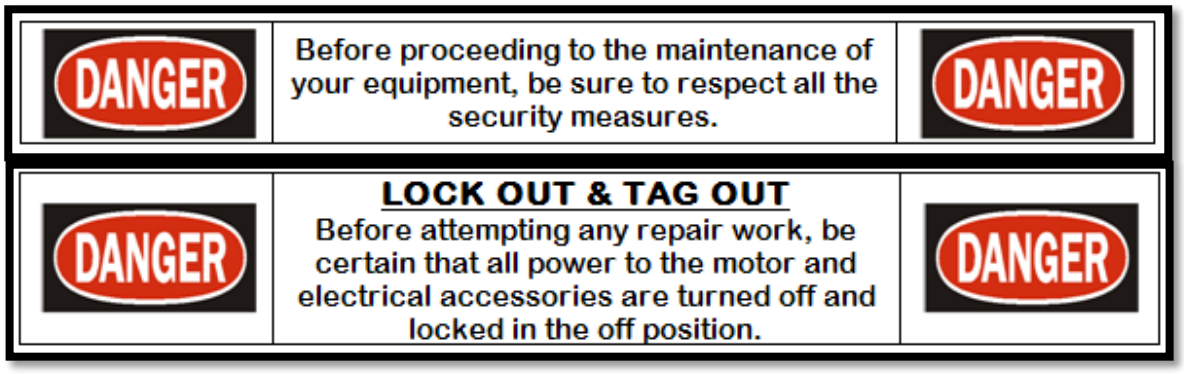
3.2.1.1 SERVICING HYDRAULIC SYSTEMS

Most of the equipment are shipped without hydraulic fluid. **Important: The proper fluid level should be attained before attempting to run the machine**. When shipped without oil, the oil quantity is either inscribed in the maintenance manual or on the reservoir of the machine itself. For further information, Machinex after sales services should be contacted. Only a premium fluid recommended on these pages should be used to increase service life of components. **Most hydraulic fluids contain impurities from the refinery and must be filtered to the indicated specifications before being added to the reservoir.**

Servicing hydraulic systems (continued)

The reservoir should be filled until oil level reaches the high mark on the site gauge. The oil level may drop slightly during operation due to the fluid inside components. Main cylinder should be in its fully retracted position when servicing tank. The reservoir must be filled again if necessary.

3.2.2 *PRE START-UP INSPECTION LIST*



The following items must be verified before the original startup:

- The hydraulic tank and reducers oil levels are adequate.
- All electrical connections and leads are properly secured.
- All bolts and anchor bolts are properly tightened.
- Every safety guards must be in place and properly fixed to the equipment.
- The shafts must be aligned and turn freely.
- The belts are correctly aligned and tensioned. (For further details on proper belt alignment, tension, see subsection 3 specific on each equipment)
- Motor/pump rotation.
- The motor amperage must be within manufacturer's specifications (descriptive plate). This check-up should also be performed once the equipment is running (full load).
- The bearings and gear motors must be securely fixed and not damaged.

The equipment can be started only after the verification of all the items mentioned above.

3.3 MOTORS AND REDUCERS

Most of the Machinex equipments are driven by hollow shaft geared motors. The most common geared motors are the parallel shaft, the helical bevel and the helical worm gear units. These are selected to obtain the proper output speed and torque for the equipment specifications. The maintenance is simple but should be properly done in order to obtain the best results and extend the equipment life span as much as possible.

3.3.1 GEAR MOTOR IDENTIFICATION

Most of the information in this section is related to the model number and the mounting position of the gear motor. This information is indicated in the List of Equipment in Section 1. Below is the correspondence between a model number and its type of reducer.

Chart 4 Models numbers list

Reducer type	Corresponding models numbers
Helical gear units	SK11 E SK21E SK31E SK41E SK51E SK02 SK12 SK22 SK32 SK42 SK52 SK62 SK72 SK82 SK92 SK102 SK03 SK13 SK23 SK33N SK43 SK53 SK63 SK73 SK83 SK93 SK103
Parallel shaft gear units	SK1282 SK1382 SK2282 SK2382 SK3282 SK3382 SK4282 SK4382 SK5282 SK5382 SK6282 SK6382 SK7282 SK7382 SK8282 SK8382 SK9282 SK9382 SK10282 SK10382 SK11282 SK11382
Helical-bevel gearboxes	SK9012 SK9013 SK9022 SK9023 SK9032 SK9033 SK9042 SK9043 SK9052 SK9053 SK9062 SK9082 SK9086 SK9092 SK92072 SK92172 SK92372 SK92672 SK92772
Helical-worm gearboxes	SK02050 SK12063 SK12080 SK13050 SK13063 SK13080 SK32100 SK33100 SK42125 SK43125

NOTE: Underline numbers are the most frequently employed.

Gear motor identification (continued)

The mounting position determines the approximate level of oil and also the plug positions. The most common mounting positions used on Machinex's equipment are M1, M3, M5 and M6.

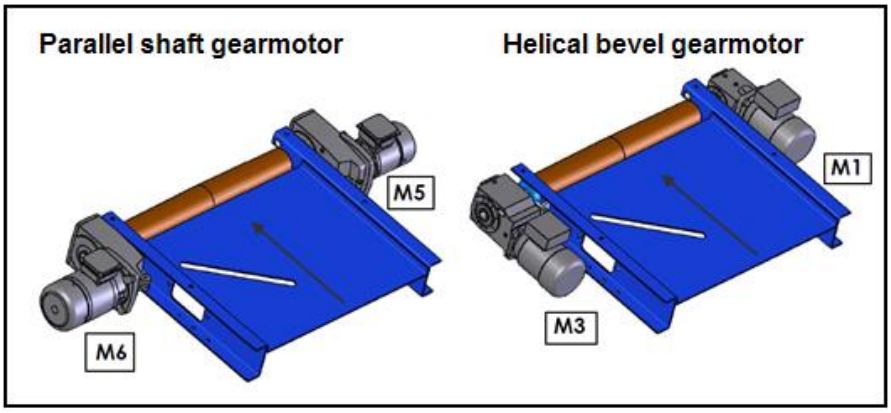
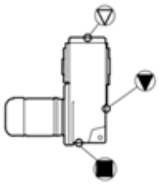
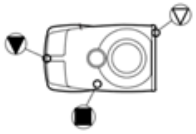
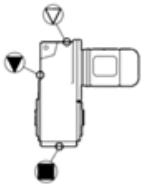
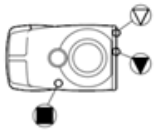
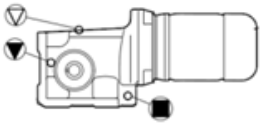
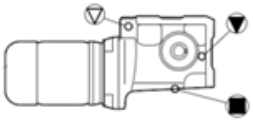
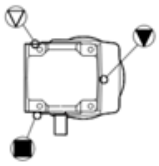
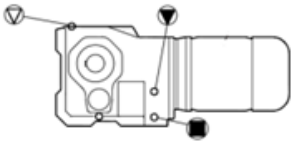
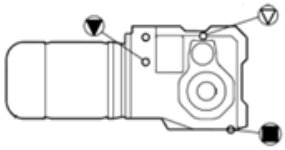
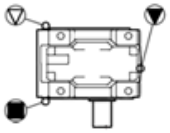
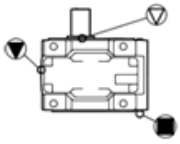
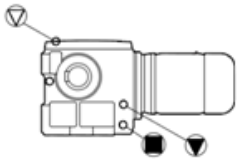
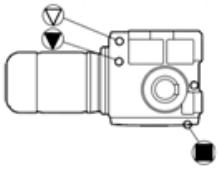
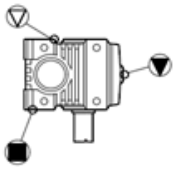
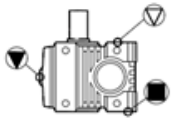


Figure 6 Mounting positions

3.3.2 PLUG POSITIONS

Depending on the mounting position of the reducer, it is important to make sure the different plugs (Ventilation, oil level and drain plug) are correctly positioned. Following is the plug position for the most common reducer used on Machinex equipment.

Chart 5 Plugs positions

MODEL	MOUNTING POSITION			
	M1	M3	M5	M6
SK1282, SK2282, SK3282, SK4282, SK5282				
SK6282*, SK6382, SK7282*, SK7382, SK8282*, SK8382, SK9282*				
SK92172, SK92372, SK92672, SK92772				
SK9012.1, SK9016.1, SK9022.1, SK9032.1, SK9042.1, SK9052.1, SK9062.1, SK9072.1				
SK02050, SK12063, SL12080, SK32100, SK42125				
	Vent	Oil level	Oil drain	

3.3.3 MAINTENANCE

	**Before proceeding to the maintenance of your equipment, be sure to respect all the security measures.**	

To maintain good performance, the motors and reducers have to be kept cleaned. A daily cleaning of the gear motor is recommended.

Noise

The gear motor's condition is easy to determine by listening to the gear motor during operation. Silent operation showing few vibrations indicates the gear motor is in good condition but noisy operation showing lots of vibration indicates maladjustment or a mechanical break. If this happens, please verify if the sound comes from the motor or the reducer and call the Service Department at **INDUSTRIES MACHINEX INC.**

Visual inspection

A visual inspection must be performed at the intervals proposed in the maintenance cards section of this manual. This inspection consists of verifying the oil level, the state of the seals and any apparent oil leaks on the unit. The external surface of the unit and the motor's fan area must be cleaned of any debris, dirt, oil film or any greasy deposit. The motor should not be exposed to water, acid materials or gas vapors. These situations may cause premature wear on the motor and expose the staff to dangers such as electrocution or explosion. In addition, the unit must be inspected for external damages or cracks on the frame, the electrical connection or the rubber buffers. In case of physical damages, the unit must be replaced. The seals should not be cracked to prevent any penetration of debris or dirt inside the geared motor's frame, which may cause a premature wear of the gears and may also contaminate the lubricant. A contaminated lubricant does not have its initial features implies that it does not fill the functions for which it was selected.

Visual inspection (continued)

Prior to verifying the oil level, the unit must have cooled down and be at standstill. The oil level screw must be screwed out. The maximum oil level is the lower edge of the oil level hole and the minimum is 4mm (5/32”) below the oil level. A lack of oil may cause premature wear of the gear teeth which would result on a diminution of the efficiency and increase the risk of break down.

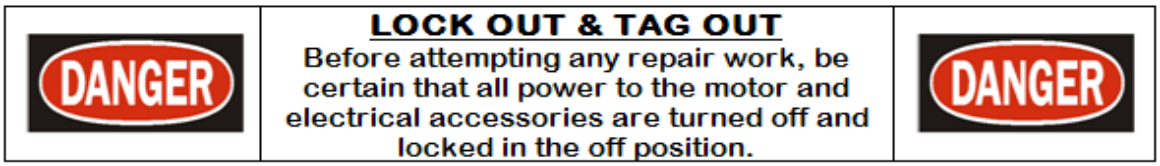
Once a month, the motor’s mounting bolt and the bolt holding the reducer to the equipment must be verify and tightened if necessary.

Maintenance (continued)

Motor

Twice every year, at the general inspection, check the amperage of the motor, and be sure that all the wires are securely installed. Loose electrical connections can cause arcing which is evident by discoloration and charring. If evidence of arcing are found, the damaged connections must be replaced.

3.3.4 OIL REPLACEMENT



The oil in the gearbox must be replaced periodically. If mineral oil is used, the manufacturer recommends replacing oil every 10 000 hours or every two (2) years. In extreme conditions (dirty or humid environment) it is recommended that oil be replaced every 5 000 hours. If synthetic oil is used, oil replacement should be done every 20 000 hours or every (4) years. In extreme conditions (dirty or humid environment) it is recommended to change oil every 10 000 hours. Following the oil replacement schedule, the vent plug must be cleaned or replaced, depending on the status.

Oil replacement Procedure

1) Clean the reducer and the area to prevent introduction of dirt or any other debris.
2) Place a drip container underneath the oil drain screw.
3) Remove the oil level screw in order to facilitate the oil flow.
4) Remove the oil drain screw and drain all the oil form the reducer.
5) Replace the drain plug back in place, put the seal joint back carefully
6) Using a suitable filling device, refill with same type of oil through the oil level hole or the vent hole until oil emerges from the oil level hole.
7) Wait for fifteen minutes and verify the oil level again.

IMPORTANT: SYNTHETIC AND MINERAL OIL CANNOT BE MIXED

Oil replacement (continued)

Chart 6 Recommended oil for reducer

Type of unit	Type of lubricant	Ambient temperature °C	ISO viscosity class	CASTROL	MOBIL	SHELL	KLOBER
Helical and Bevel reducer	**Mineral oil**	-20 to 40 °C -4 to 104°F	ISO VG 220	Alpha SP 220	Mobil/Spartan EP220	**Omala 220****	Kluberoil GEM 1-220N
Helical and Bevel reducer	**Synthetic oil**	-40 to 60°C -40 to 140°F	ISO VG 220	Alphasyn T 220	SHC 630	Omala RL 220	Klubersynth GEM 4-220N
Helical worm reducer	**Synthetic oil**	-30 to 50°C -22 to 122°F	ISO VG 680	N/A	**SHC 636****	Omala RL680	Klubersynth GEM 4-680N

** *Standard factory oil supplied*

The following charts provide the oil quantity for the most common unit used on MACHINEX equipments. **Please note the filling quantities stated in this chart are for guidance only. The exact quantities vary depending on the exact gear ratio. It is important to always observe the oil level screw hole as an indicator of the exact quantity of oil.**

Chart 7 Recommended oil quantity for Helical bevel reducer

	MOUNTING POSITION							
	M1		M3		M5		M6	
GEARMOTOR SIZE	QUARTS	LITERS	QUARTS	LITERS	QUARTS	LITERS	QUARTS	LITERS
9012.1	0.74	0.70	2.01	1.90	1.27	1.2	1.80	1.70
9016.1	0.74	0.70	2.01	1.90	1.27	1.20	1.80	1.70
9022.1	1.37	1.3	3.70	3.50	2.11	2.00	2.96	2.80
9032.1	1.8	1.7	6.76	6.80	4.33	4.10	5.39	5.10
9042.1	4.65	4.40	10.6	10.0	7.19	6.80	7.93	7.50
9052.1	6.87	6.50	20.1	19.0	11.60	11.0	16.40	15.50
9072.1	10.6	10	33.8	32.0	19.0	18.0	25.4	24.0
9082.1	18	17	66.1	62.5	34.9	33.0	49.2	46.5
92072	0.420	0.400	0.53	0.5	0.42	0.40	0.42	0.40
92172	0.580	0.550	1.00	0.95	0.79	0.75	0.66	0.620
92372	0.950	0.900	1.53	1.45	1.27	1.20	1.27	1.20
92672	1.90	1.80	3.38	3.20	2.75	2.60	2.75	2.60
92772	2.43	2.30	4.86	4.60	4.33	4.10	4.33	4.10

Note: The first measures given in the chart are in US QUARTS and the second one, in parenthesis, are in LITERS.

Oil replacement (continued)

Chart 8 Recommended oil quantity for parallel shaft reducer

GEARMOTOR SIZE	MOUNTING POSITION							
	M1		M3		M5		M6	
	QUARTS	LITERS	QUARTS	LITERS	QUARTS	LITERS	QUARTS	LITERS
1282	1.37	1.3	1.48	1.4	2.11	2	2.01	1.9
2282	1.74	1.65	2.01	1.9	1.9	1.8	1.9	1.8
2382	1.8	1.7	2.01	1.9	1.59	1.5	1.59	1.5
3282	3.33	3.15	3.44	3.25	3.33	3.15	3.33	3.15
3382	4.33	4.1	3.49	3.3	3.49	3.3	3.49	3.3
4282	4.97	4.7	5.02	4.75	4.97	4.7	4.97	4.7
4382	6.24	5.9	5.18	4.9	5.18	4.9	5.18	4.9
5282	7.93	7.5	7.93	7.5	7.61	7.2	7.61	7.2
5382	13.2	12.5	7.08	6.7	8.77	8.3	8.77	8.3
6282	18	17	12.7	12	10.6	10	14.8	14
6382	17.4	16.5	10.1	9.6	14.8	14	13.2	12.5
7282	26.4	25	21.1	20	16.9	16	22.2	21
7382	23.3	22	16.9	16	24.3	23	20.1	19
8282	39.1	37	31.7	30	32.8	31	32.8	31
8382	35.9	34	26.4	25	37	35	31.7	30
9282	78.2	74	58.1	55	72.9	69	62.4	59
9382	77.2	73	47.6	45	68.7	65	63.4	60

Note: The first measures given in the chart are in US QUARTS and the second one, in parenthesis, are in LITERS.

Oil replacement (continued)

Chart 9 Recommended oil quantity for Helical worm reducer

GEARMOTOR SIZE	MOUNTING POSITION							
	M1		M3		M5		M6	
	QUARTS	LITERS	QUARTS	LITERS	QUARTS	LITERS	QUARTS	LITERS
02040	0.48	0.45	0.66	0.60	0.53	0.50	0.53	0.50
13063	0.9	0.85	1.69	1.60	1.32	1.25	1.32	1.25
12080	0.85	0.8	1.80	1.70	1.80	1.70	1.80	1.70
32100	1.69	1.60	3.59	3.40	3.38	3.20	3.38	3.20
42125	2.96	2.80	6.55	6.20	6.13	5.80	6.13	5.80
43125	8.24	7.80	7.61	7.20	7.08	6.70	7.08	6.70

Note: The first measures given in the chart are in US QUARTS and the second one, in parenthesis, are in LITERS.

3.3.5 GEARBOX ASSEMBLY

To prevent shaft from rust and help on maintenance, Machinex recommend uses of « Dry Moly Paste » on both contact surfaces. Judicious application may decrease shaft rust jam in gearbox hub.

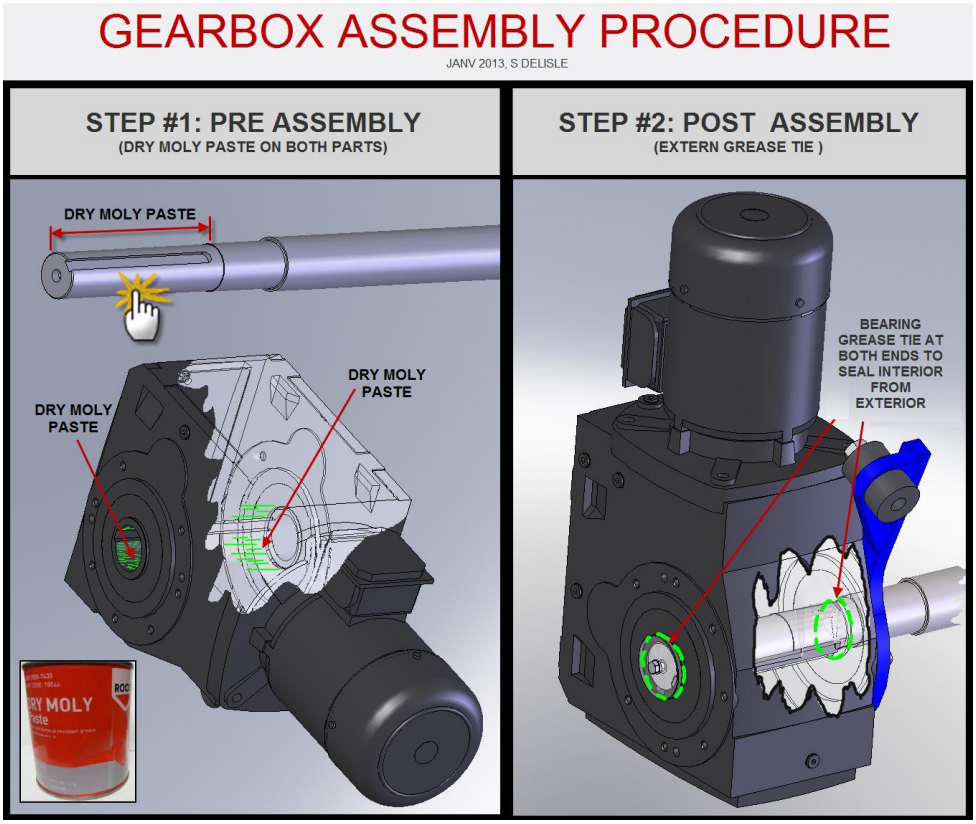


Figure 7 Gearbox assembly

3.3.6 AIR COOLING UNIT (CONTROL PANEL)

Air cooled control panel require special attention. Water Drain may be clean every 6 month using flexible steel wire.

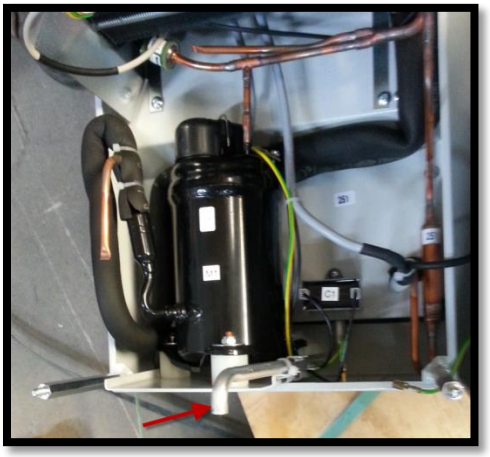


Figure 8 Cleaning drains

3.3.7 TROUBLE SHOOTING

Chart 10 Gearmotor troubleshooting

Faults	Possible Causes	Action
Unusual r noise or vibrations	Oil too low or bearing and/or gear damaged	Add oil and/or consult Machinex after sales services
Oil leaking from reducer or motor	Defective seal	The seal must be replaced. Consult Machinex after sales services
Oil leaking from pressure vent	Incorrect oil level, or contaminated oil or unfavorable operating conditions.	Oil change. Consult this document for type and quantity of oil.
Abnormal increased temperature of the reducer	Gear unit damage	Consult Machinex after sales services
Shock and vibration when the unit is switched on.	Defective motor coupling or loose reducer or defective rubber buffer.	Tighten motor and reducer bolts and/or replace rubber buffers
Motor overheated (can only be determined by measurement)	Motor connected in delta instead of in star as intended.	Correct the wiring connection.
	Main voltage deviates from the rated motor voltage by more than 5%. Too high voltage is particularly detrimental for multi-pole motors, since such motors have a "no-load" current approximately equal to the full load current even when operating on normal current.	Arrange for the correct main voltage to be applied.
	Volume of cooling air inadequate, air ducts clogged up.	Ensure the unimpeded access and discharge of cooling air.
	Cooling air is preheated.	Arrange for cool air supply.
	Overload at normal main voltage. Current excessive. Speed too low.	Install larger motor (determine the frame size by measuring the power).
	Supply cable has loose contact (temporary single phasing!). Fuse burnt out.	Correctly secure the loose contact. Replace the fuse.
Motor does not operate	Motor circuit breaker has tripped.	Reset the breaker. If the breaker trips immediately, the motor must be replaced.
	Motor contactor inoperative. Control fault.	Check contactor operation and control and rectify.
	Burnt fuses and/or overload disengaged	Replace the fuse and/or re-engage the overload relay
	Disconnect is off	Put it on position ON
	Check emergency stop button (Red Push-button)	Re-engage the button
	Verify if the pull cord system is activated	Check the cable

Motor does not start or starts with difficulty	Designed for delta connection but connected in star.	Connect motor correctly.
	Voltage or frequency of electrical supply deviates considerably from required rated value during starting conditions.	Improve mains supply conditions.
	Overload relay disengaged	Re-engage the overload relay and check for a mechanical jam
Motor does not start when connected in star, however, starts in delta	Torque insufficient from the connection in star.	If delta current is not excessive then reconnect for DIRECT-ON-LINE starting. Contact Machinex after sales services.
	Contact fault on the star/delta starter.	Rectify starter fault.
Motor hums and takes excessive current	Fault in windings.	Motor must be examined and repaired by an electrical service center
	Rotor grazing.	
Fuses blown or motor protection switch trips immediately	Short circuit on the line or motor.	Remove short circuit.
	Short circuit to motor frame or between the winding turns.	Fault to be remedied by a qualified electrical engineer.
	Motor incorrectly wired up.	Correct the connections.
Wrong direction of rotation	Motor incorrectly connected.	Interchange any two of the incoming mains phases.
For winding faults		The motor MUST be repaired at an electrical service center.

3.4 BEARINGS

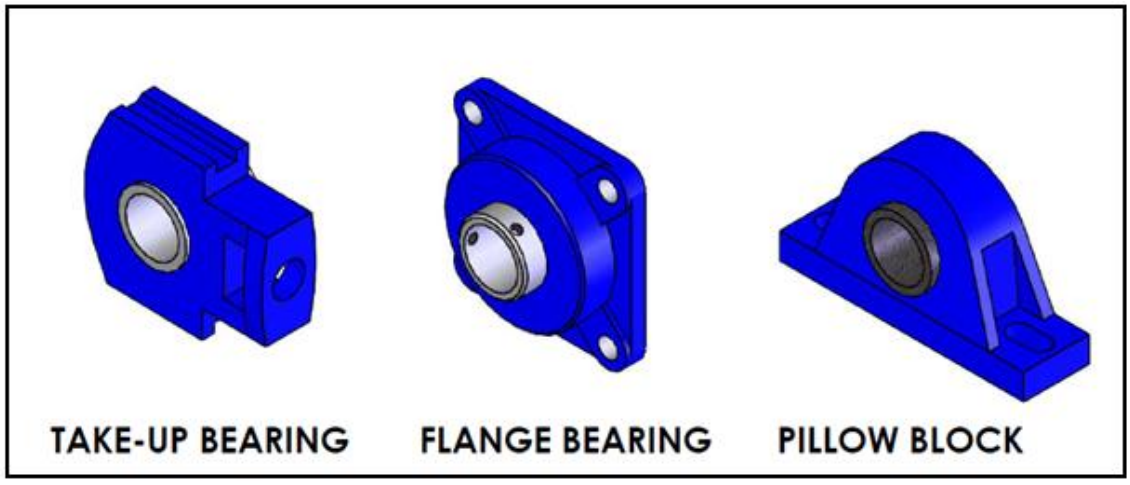


Figure 9 Bearings types

Every equipment with rotating shafts is equipped with bearings, either pillow block bearings, flange bearings or take up bearings. The size differs depending on the usage. The same type of maintenance applies on every type of bearings. Depending on the frame and application of the equipment, flange and pillow blocks bearings will usually be used. Take ups bearing will be used on some models of sliding take ups, most notably on chain conveyors.

Some equipment are equipped with an optional automatic greasing device. The same maintenance applies on these bearings also. Because these bearing are usually in difficult access area, guards should be removed at least once a month to access the bearings.

3.4.1 MAINTENANCE OF ROLLER BEARINGS

As for any essential parts on a machine, the bearings need to be checked and cleaned periodically. Generally, a good inspection will prevent failure. Changes of temperature, noise or vibration informs on the condition of the bearings. A daily clean up of the bearing area is necessary to keep the bearing in good condition.

Maintenance of roller bearings (cont'd)

Temperature

Usually, the bearing temperature gradually increases after the start of operation until reaching a steady temperature about an hour later. The usual operation temperature is about 120°F but can increase to 180°F without any problem. In the case of the temperature rising too quickly and/or over 180°F suspend the operation to find the cause.

Sound

A roller bearing in good shape makes a small purring sound and a broken or defective bearing will have an irregular and loud rumbling.

Vibrations

The vibrations usually stay at a low level. Loud vibrations may be a sign of a bad adjustment or a broken bearing. Usually, a change of vibration causes an increase of the sound.

Visual inspection

A daily visual inspection should be done to prevent failure. If damage is seen after a visual inspection the bearing must be replaced, otherwise, other problems on the machine may occur. An apparent grease leak on the seal is a sign of excessive greasing. This may cause the seal to break. A discoloration of the bearing is a sign of overheating. The bearing has to be securely fixed at any time. The retaining bolts must be tightened if necessary.

Cleaning

To clean the bearings, it is recommended to use "white spirit", petroleum of good quality, gasoline or benzol. After the cleaning, the parts need to be coated with oil or clean grease to protect them from oxidization.

Maintenance of roller bearings (cont'd)

Chart 11 Roller bearings troubleshooting chart

Problem	Possible cause	Solution
Abnormal elevation of the temperature.	Not enough grease.	Add grease of the same type and quality.
	Excessive quantity of lubricant	Reduce pressure by removing grease fitting and select a stiffer grease
	Abnormal load	Verify the cause of improper loading and apply corrective measure on the system
	Improper grease selection	Verify with a grease fabricant if compatible.
	Incorrect mounting	Verify alignment of shaft and housing.
Leakage or discoloration of lubricant	Too much lubricant	Reduce pressure by removing grease fitting
	Penetration of foreign particles or abrasion chips.	Replace or clean the bearing. Replace lubricant.
Loud metallic noise	Abnormal load	Verify the cause of improper loading and apply corrective measure on the system
	Incorrect mounting	Verify the shaft and bearings are correctly aligned
	Insufficient or improper lubricant	Replenish lubricant or select an appropriate lubricant
Loud regular noise	Burr, corrosion or scratches on raceway	Replace the bearing
Irregular noise	Penetration of foreign particles	Replace or clean the bearing and use clean lubricant. Verify the seals.
	Burr and flaking on balls	Replace the bearing
Increase of the vibrations	Bearing weariness	Replace the bearing.
	Too much lubricant	Reduce pressure by removing grease fitting
	Contamination from foreign particles	Replace or clean the bearing.
	Incorrect mounting	Verify the shaft and bearings are correctly aligned

Please contact **INDUSTRIES MACHINEX INC** parts and service department for any questions.

3.4.2 ROLLER BEARINGS LUBRICATION

	**Before proceeding to the maintenance of your equipment, be sure to respect all the security measures.**	

The bearing reliability is directly related to a proper lubrication. A proper lubrication prevents wear by avoiding a direct contact of roller on metallic surfaces and protects surfaces from corrosion.

The bearings used on Machinex's equipment are pre-greased in the factory. The bearings with greasing nipples may be greased again. **Please refer to the maintenance card in section 5 for greasing frequency.**

Procedure

1) Clean the grease nipple to avoid penetration of foreign particles.
2) Insert new grease with a grease gun. A slight rotation of the shaft is recommended while greasing.

   According to the general use of the bearings on MACHINEX equipment, it is recommended to fill the bearings between 30 % and 50 % of their capacity. Since it is difficult to evaluate the quantity of grease injected in the bearing, less grease is better than too much. One shot of grease gun a month is recommended.

   Note: A slight temperature rise may occur after greasing the bearing. However, if the temperature does not come back to normal, make sure compatible types of grease had been used or if the bearing has not been ***over greased****.* **Over greasing will shorten the bearing's life expectancy.**

Recommended grease for roller bearing

The grease recommended to fill the bearing is a **Shell Gadus S2 or Mobil Unirex EP2**. If, for any reason, it is necessary to use another type of grease, it is important to take into consideration the compatibility of the lubricants. If incompatible greases are mixed, the consistency may be greatly affected, considerably reducing the bearing's life expectancy.

3.5 AUTOMATIC LUBRICATOR (OPTIONAL)

Automatic lubricators are used on many chain driven equipment. The purpose is to lubricate chains with less manual operation. The reservoir must be filled with mixture of 50% oil, and 50% diesel. The flow can be adjusted by the flow adjustment screw.

Some lubricators are connected to the main control panel and operation intervals are preset. The operation and stand by delays must be adjust in accordance with the type of equipment. These delays are adjusted at the start up by a Machinex technician to obtain a maximum efficiency.

3.5.1 MAINTENANCE OF LUBRICATORS

The only maintenance is to make sure the lubricator's reservoirs are never empty and the oil is still dripping. If the oil doesn't come out the lubricator and the reservoir is filled with oil, unscrew the adjustment screw to let the particles out. Also a visual inspection every time the reservoir is filled is necessary to make sure the oil is dripping on the chains from the tube or the brush.

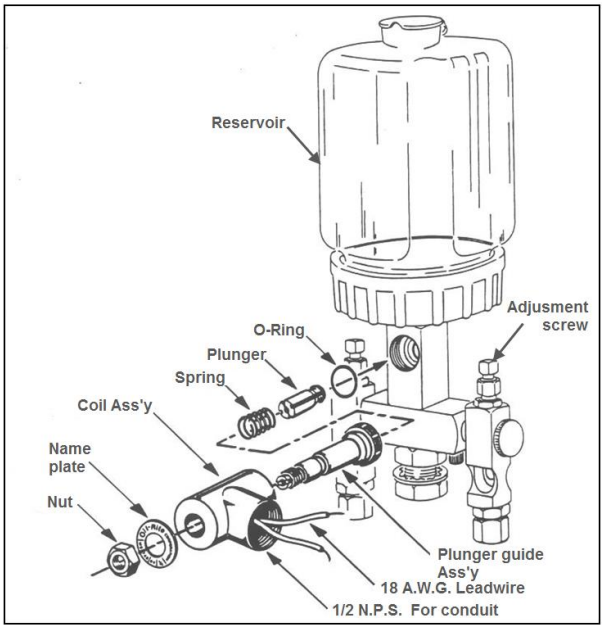


Figure 10 Lubricator components

3. 6 GLASS BREAKER SCREEN

3. 6.1 DESCRIPTION

Glass Breaker Screens are usually located after the pre-sorting on a container sorting line. The main feature is the two decks, with steel discs, used to sort fines particles from the flow and the high speed shaft used to break glass. The Glass Breaker Screen has chain guards to ensure the personnel's safety.

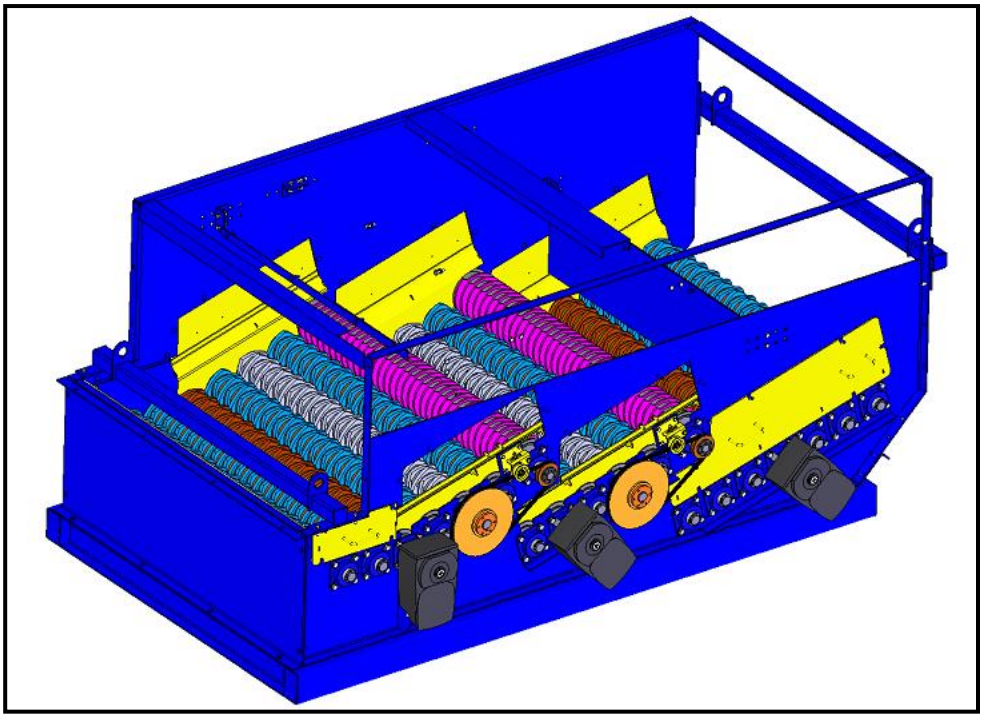


Figure 11 Glass breaker screen

3. 6.2 OPERATION

A geared motor on each deck drives the motorization shafts. Every shaft, with the exception of the two shafts at each extremity of each deck and the high speed shaft are equipped with double sprockets and connected two-by-two with chains. The speed on each deck is adjustable by a variable speed drive in order to obtain the desired sorting efficiency. A high speed shaft is used to break glass and is connected by its own motor with a system of sheaves and v-belts. The steel discs on the shafts are installed to give a small opening to sort fines particles.

Operation (Continued)

The first deck sorts fine particles by dimension while the rest of the flow goes up to the high-speed shaft. This shaft, revolving at high speed, breaks glass to obtain smaller particles. These particles are sent to the second deck for a secondary sorting, by size. Containers and larger material go up and exit at the end of the equipment.

3. 6.3 MAINTENANCE

DANGER	**Before proceeding to the maintenance of your equipment, be sure to respect all the security measures.**	DANGER

To maintain good performance, the equipment has to be kept clean. A daily cleaning of the shafts, bearings, chains, sprocket and the gear motors will allow a better control of the Glass Breaker Screen. It is important to make sure that the mobile parts are free of fragments such as paper, broken glass, crushed containers, plastic bags, etc.…

Gear motors and Roller Bearings

For the maintenance of these components, consult their respective sections on the beginning of section 3.

DANGER	**LOCK OUT & TAG OUT** Before attempting any repair work, be certain that all power to the motor and electrical accessories are turned off and locked in the off position.	DANGER

Shafts

A daily cleaning is required to prevent accumulation of contaminants around the shafts. Accumulations could increase shaft diameters and reduce openings between them, which could result in a reduction of the sorting efficiency and an increase of damage on the discs.

Maintenance (Continued)

Chains and Sprockets

Chains and sprockets should be inspected once a month to verify alignment of the sprockets, tension and the wear on the chains. A misalignment of the sprockets may cause premature wear on both chains and sprockets. Over tensioning the chain may cause a break. The tension can be adjusted only by adding or removing a half-connecting link or a connecting link. Wear on the chain can be identified by looking carefully at the inner face; a shiny surface indicates excessive friction between the chain and sprocket teeth. Inspect the sprockets to make sure no cracks are visible and that no teeth are missing. Chains should be lubricated once a week with a mixture of 50% diesel and 50% oil.

Steel Discs

The condition of the discs must be verified once a week. The discs have to be straight, without excessive wear or cracks. In order to preserve a good sorting quality, any shaft with damaged discs should be replaced.

V-belt

The V-belts should be inspected once a week by looking at every face of the belt to find cracks or weaknesses. The tension should be verified once a week and adjusted with the adjusting rods, if necessary.

For more information, do not hesitate to contact the After-Sale Service at **INDUSTRIES MACHINEX INC**.

3. 6.4 *RISK ASSESSMENTS*

Chart 12 Risk Assessments for Glass Breaker Screen

Potential Hazards	Associated risks	Initial risk rating	Precautions / Controls	Revised risk rating
• Inclined surface	• Workers may suffer injuries from falling or tripping while working on equipment.	Medium / significant	• Use correct PPE. • Maintenance personal must be attached to the equipment. • Only competent maintenance personnel should climb on equipment for maintenance.	Low
• Sharp discs	• Workers may suffer injuries due to contact with sharp discs during maintenance or cleaning.	Medium / significant	• Use correct PPE. • Only competent maintenance personnel should climb on equipment for maintenance.	Medium
• Rotating shafts	• Workers may suffer injuries from falling or tripping due to rotating shafts during maintenance or cleaning.	High	• Only competent maintenance personnel should climb on equipment for maintenance. • Use correct PPE. • Maintenance personal must be attached to the equipment.	Medium
• Glass in equipment	• Workers may suffer injuries from contact with glass	Low	• Use correct PPE.	Very low
• Slippery surfaces	• Workers may suffer injuries from slipping and falling due to oil leaks.	Medium / significant	• Appropriate maintenance and cleaning of the hydraulic system, lubricator and surrounding area. • Use correct PPE.	Very low
• Working in heights	• Workers may suffer injuries due to falling.	Medium / significant	• Maintenance personal must be attached to the equipment or the life line when available. • Only competent maintenance personnel should climb on equipment for maintenance. • Use correct PPE.	Low

Note:
- Risk rating is based on the amount of people at risk, likelihood of occurrence, frequency of exposure and degree of possible harm.

Risk rating will be displayed as very low, low, medium, medium/significant and high.

SECTION 4

SPARE PARTS

4.1 SPARE PARTS OF GLASS BREAKER SCREEN

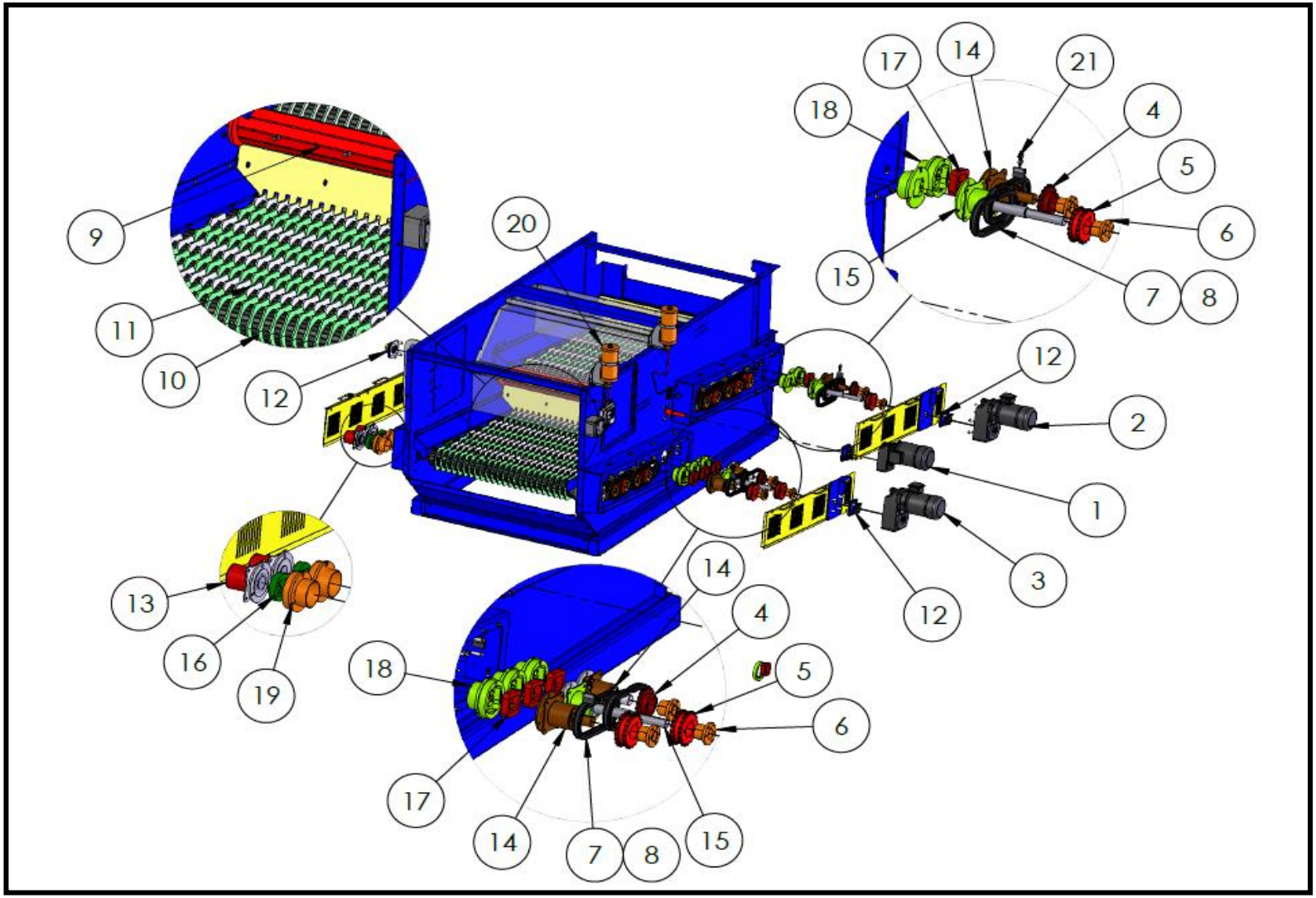


Figure 12 Spare parts drawing of Glass Breaker Screen

4.1 SPARE PARTS OF GLASS BREAKER SCREEN (CONT'D)

* According to the equipment's function, these items may not be required.
** Item not illustrated on drawing
( ) = No item of drawing

SGV-010L GLASS BREAKER (GB-8)

Item	Code	Description	Total
1	NC128-5.05-C360-M5-01-SGV-010L	GEARMOTOR	1.00
2	NB9032-5.05-C128-M3-1-SGV-010L	GEARMOTOR	2.00
4	SPRE-080S-19HSTB0Q-1	SPROCKET	3.00
5	SPRE-080DS19HSTB0Q-1	SPROCKET	14.00
6	MEBST-0Q1-115-04x08	TAPER BUSHING	17.00
7	CHRE-S-080-R-2	CHAIN	---
8	CHCL-S-00080-2	CONNECTING LINK	15.00
9	SGV-015D-014	MOTORISATION SHAFT	1.00
10	SGV-014D-018	SHAFT ASSEMBLY	17.00
12	BRRHP-F4-115-S-S-1	FLANGE BEARING	4.00
13	SEP2-020D	STUB SHAFT ASSEMBLY	17.00
14	SGV-024D-01	STUB SHAFT ASSEMBLY	15.00
15	SGV-024D-07	MOTORISATION STUB SHAFT ASS'Y	2.00
16	SEP2-033D	RUBBER COUPLING	17.00
17	SGV-033D-001	RUBBER BUSHING	17.00
18	SGV-034D-01	SQUEEZE PLATE	17.00
19	SEP2-034D-25	SQUEEZE PLATE	17.00
20	MESLU-SG-24V-1S-1G-1	LUBRICATOR	2.00
**	MESB-204-1M02P-1	SHANK BRUSH FOR LUBRICATOR	8.00
**	SEP2-066D	TORQUE WRENCH	1.00

SECTION 5

MAINTENANCE CARDS

MAINTENANCE SCHEDULE

PROJECT / LOCATION: ***REGION WATERLOO*** EQUIPMENT: **GLASS BREAKER SCREEN**

SUPERVISOR: EQUIP. NO.: **GB-8** SERIAL NO.: **SGV-010L**

MAINTENANCE EMPLOYEE: MONTH

CONTINUAL MAINTENANCE																															
	DAYS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
1	CLEAN GLASS BREAKER SCREEN AND ITS SURROUNDING																															
2	REMOVE MATERIAL WRAPPED AROUND SHAFT																															
3	VERIFY CONDITION OF THE SHAFTS																															

PERIODICAL MAINTENANCE						
	WEEKS	1	2	3	4	5
4	LUBRICATE CHAINS					
5	VERIFY CONDITION OF THE DISCS					
6	VERIFY CONDITION OF THE V-BELTS					
7	VERIFY CONDITION OF BEARINGS					
8	VERIFY WEAR ON BOTH CHAINS AND SPROCKETS					
9	VERIFY TENSION OF THE CHAIN					
10	VERIFY SPROCKETS ALIGNMENT					
11	VERIFY GEARBOX OIL LEVEL					
12	TIGHTEN ALL BOLTS					
13	LUBRICATE BEARINGS					

LEGEND

☐	MAINTENANCE REQUIRED
▩	MAINTENANCE IF REQUIRED
☑	MAINTENANCE DONE
1	REMARKS, SEE COMMENTS ON NEXT PAGE
⚠	**Before maintaining, servicing or inspecting the system, the circuit breaker and power to the circuit breaker must be off and locked.**

Any Questions?
Contact us at any time

Phone: (819) 362-3281 (24/7)
Fax: (819) 362-2280

REMARKS ON MAINTENANCE SCHEDULE

PROJECT / LOCATION: ***REGION WATERLOO*** EQUIPMENT: **GLASS BREAKER SCREEN**

EQUIP. NO.: **GB-8** SERIAL NO.: **SGV-010L**

No.	COMMENTS
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	
11.	
12.	
13.	
14.	
15.	
16.	
17.	
18.	
19.	
20.	

APPROVAL

SUPERVISOR : _____ MAINTENANCE EMPLOYEE: _____

DATE : _____ DATE : _____

SECTION 6

SUGGESTED SPARE PARTS

6.1 FIRST EMERGENCY PARTS LIST

Code	Description	Qty
BRRHP-F4-115-S-S-1	FLANGE BEARING	2
PRNG-STATOR-5-5.0-3-PR	STATOR	1
N/A	CENTRAL SHAFT ASS'Y	2
SPRE-080DS19HSTB0Q-1	SPROCKET	3
SEP2-020D	STUB SHAFT ASSEMBLY	2
SGV-024D-01	STUB SHAFT ASSEMBLY	2
MEBST-0Q1-115-04x08	TAPER BUSHING	4
SEP2-033D	RUBBER COUPLING	10
SGV-033D-001	RUBBER BUSHING	10
SEP2-034D-25	SQUEEZE PLATE	2
CHRE-S-080-R-2	CHAIN	10
CHCL-S-00080-2	CONNECTING LINK	3

LAYOUT