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1.1 MACHINE IDENTIFICATION

Spare parts and service help is easier to obtain when you have serial numbers and model types of important components. The serial number of your A8 debarker can be found on the cover of this manual. Please refer to this serial number when requesting service information or when ordering parts. Actual part numbers for parts used on this machine may be found in section 9 of this manual.

1.2 GENERAL MANUAL INFORMATION

1.2.1 PURPOSE FOR THIS MANUAL

The purpose for this manual is to familiarize you with the installation, operation, safety and maintenance of your A8 Debarker. Understanding how your A8 Debarker operates and how to correctly care for it will insure that you get maximum debarking performance. We have attempted to include information that will help you get the best performance from your A8. Please read this manual before installing or operating your A8 Debarker.



1.2.2 WHO SHOULD READ THIS MANUAL

This manual is intended for anyone who installs, operates, or maintains an A8 debarker. The information in this manual is important. The A8 is a large and powerful industrial machine. Failure to read and understand the information contained in this manual could result in damage to the debarker, personal injury, or death. It is good practice to re-read sections pertaining to operation, maintenance and safety on a regular basis to stay as completely informed about the debarker as possible.

1.2.3 HOW TO CONTACT NICHOLSON

Nicholson Manufacturing provides service and parts support world-wide on a 24 hour a day basis. If you have any problems or need replacement components, please contact us immediately and we will do our best to help satisfy your requirements.

We also offer special maintenance programs and seminars to help increase the productivity and cost efficiency of your Nicholson A8 debarker.

Replacement exchange programs for consumable components such as knife tips and knife arms may also be available, depending on your location and the particular arm configuration your machine uses. Contact our Parts Department for details.

Parts and Service contact information:

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Nicholson Manufacturing Ltd.
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Parts: 1-888-656-3131
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Fax: 250-656-3111
E-mail: partsales@nmbc.com

Eastern Canada

Nicholson Manufacturing Ltd.
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Alma, QC G8C 1M6
Parts: 1-888-656-3131
Service: 1-800-513-6180
Fax: 418-668-7799
E-mail: partsales@nmbc.com

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1.3 A8 DEBARKER INTENDED USE

1.3.1 WHAT THE A8 DEBARKER DOES

The A8 Debarker is intended to remove tree bark from logs at the cambium layer without removing the wood fiber. Both hardwood and softwood can be processed by the same machine. The A8 can debark tree length logs as well as shorter wood. The debarker processes logs automatically, in a continuous stream. Direct operator control is allowed at any time, but is normally not required.

1.3.2 HOW THE A8 DEBARKS LOGS

The A8 is a fixed ring debarker (i.e. The ring does not move up or down to center to the log). A log conveyed into the infeed of the machine is picked up by the first set of fluted, powered feedrolls. These feedrolls begin to drive the log into the debarker. The first set of feedrolls along with a second set of feedrolls then advance the log to the debarking ring, with the rolls centering the log vertically to the center of the ring. An air cylinder applies force to the lower feedroll which lifts the log. The upper feedroll is linked to the lower feedroll in such a way that as the lower feedroll is lifted, the upper feedroll comes down against the log, thus bringing the log to the horizontal centerline of the debarking ring. Helical flutes on the feedrolls assist in centering the log horizontally to the debarking ring. The pressure of the rolls drives the log through the debarking ring, as well as preventing the debarking ring from causing the log to spin.

The log is pushed through a rotating debarking ring by the feedrolls. The debarking ring has six pivoting knife arms with carbide insert knife tips. Air pressure from within the rotating ring causes the arms to move toward the center of the ring, and thus the knife tips to bear down against the log. As the ring rotates, the knife tips scrape the bark off the log at the cambium layer. The debarking ring is designed to apply only the minimum amount of pressure to remove the bark. This keeps the knife tips from damaging the wood fiber of the log.

After the log passes through the debarking ring, two additional sets of opposed rolls assist in pulling it through the ring and then propelling it to an outfeed conveyor. Like the first two rollsets, these rollsets also help in preventing the debarking ring from causing the log to spin.

1.3.3 FACTORS THAT CAN AFFECT DEBARKING

Log length (longer logs have fewer end gaps).
Log contour (very crooked logs may process more slowly).
Log shape (round logs may process more quickly and debark more cleanly than irregular shapes).
Log age (dried out logs may be brittle and difficult to debark).
Bark thickness (usually based on individual species).
Bark fiber length (long, stringy bark may need preprocessing).
Burned wood (may require higher tool pressures).
Insect killed trees (may need higher tool pressures).
Green wood (may be easier to debark).
Wet wood (may be easier to debark).

1.4 LIMITS OF DEBARKER USE

1.4.1 LOG DIAMETER

The size of the debarker ring is not the size of the maximum log that should be run through it. The maximum log diameter should be slightly less than the ring diameter in order to avoid potential jamming from the combination of log diameter and log contour. Additional size allowance should be provided when debarking extremely crooked or extremely knotty logs.

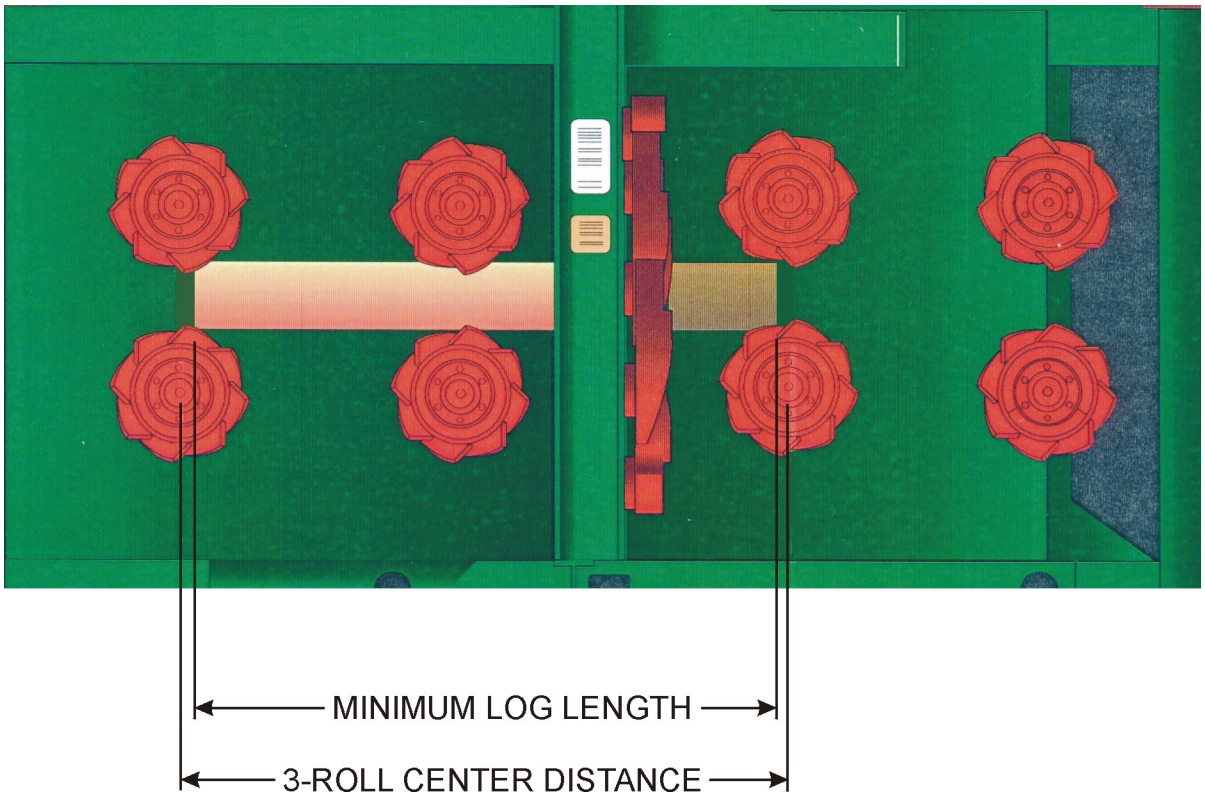
Logs which are smaller in diameter than the recommended minimum will not be completely debarked. Because they will not be held properly in the rollsets, more log breakage will also occur.

Typical debarker ring / log diameter limits:

17” (432 mm) A8	Minimum log diameter	3.0” (76 mm)
	Maximum log diameter	15.0” (381 mm)
22” (559 mm) A8	Minimum log diameter	3.0” (76 mm)
	Maximum log diameter	20.0” (508 mm)
27” (686 mm) A8	Minimum log diameter	3.5” (89 mm)
	Maximum log diameter	25.0” (635 mm)
31” (787 mm) A8	Minimum log diameter	3.5” (89 mm)
	Maximum log diameter	29.0” (737 mm)
35” (889 mm) A8	Minimum log diameter	4.0” (102 mm)
	Maximum log diameter	33.0” (838 mm)

1.4.2 LOG LENGTH

Although the A8 Debarker has no maximum log length which can be processed through it, there is a minimum log length As any log goes through the debarking ring, it must always be held by a minimum of two rollsets. In order to insure that the log will be properly held, it must be solidly held in a second rollset and entering a third rollset prior to exiting the first rollset. The minimum log length is slightly less than the 3-roll center distance.



Minimum log lengths:

17” (432 mm) A8 Minimum log length	7’-1” (2,16 M)
22” (559 mm) A8 Minimum log length	7’-1” (2,16 M)
27” (686 mm) A8 Minimum log length	7’-5” (2,26 M)
31” (787 mm) A8 Minimum log length	7’-5” (2,26 M)
35” (889 mm) A8 Minimum log length	8’-3” (2,51 M)

1.4.3 OTHER LIMITATIONS

Great care must be taken that logs be fed into the machine singly. Allowing two or more logs to be traveling through the debarker simultaneously will interfere with efficient debarking. It may also damage the debarker or cause excessive log breakage. Broken pieces of the log could then exit from the machine in an uncontrolled manner, possibly resulting in damage to adjacent structures or causing personal injury.

1.5 TECHNICAL SPECIFICATIONS

1.5.1 WEIGHT OF THE DEBARKER

17” (432 mm) A8	65,000 lb (29,483 kg)
22” (559 mm) A8	65,000 lb (29,483 kg)
27” (686 mm) A8	80,000 lb (36,288 kg)
31” (787 mm) A8	81,500 lb (36,968 kg)
35” (889 mm) A8	116,000 lb (52,617 kg)

1.5.2 MAXIMUM ALLOWABLE FEED SPEED

17” (432 mm) A8	
Log dia. to 10” (254 mm)	600 fpm (183 mpm)
Log dia. over 10” (254 mm) to 15” (381 mm)	400 fpm (122 mpm)
22” (559 mm) A8	
Log dia. to 13” (330 mm)	550 fpm (168 mpm)
Log dia. over 13” (330 mm) to 20” (508 mm)	360 fpm (110 mpm)
27” (686 mm) A8	
Log dia. to 16” (406 mm)	500 fpm (152 mpm)
Log dia. over 16” (406 mm) to 25” (635 mm)	300 fpm (91 mpm)
31” (787 mm) A8	
Log dia. to 18” (457 mm)	400 fpm (122 mpm)
Log dia. over 18” (457 mm) to 29” (737 mm)	270 fpm (82 mpm)
35” (889 mm) A8	
Log dia. to 21” (533 mm)	325 fpm (99 mpm)
Log dia. over 21” (533 mm) to 33” (838 mm)	240 fpm (73 mpm)

1.5.3 AIRBORNE NOISE EMISSIONS

Estimated sound pressure levels at a distance of 1 meter from the side surfaces of the debarker, and at a height of 1.6 meters above the mounting surface of the debarker are:

Operating conditions	Location	Maximum sound pressure level
Debarker running, no logs in machine.	At all four sides of the debarker, at a distance of 1 meter.	93 dB(A)
Debarker running, logs being debarked.	At all four sides of the debarker, at a distance of 1 meter.	103 dB(A)

The above estimated sound pressure levels are based on a 22” A8 Debarker running at a maximum feed speed of 550 feet per minute. A8 debarkers running at maximum feed speeds lower than 550 feet per minute are likely to emit lower sound pressure levels than those shown in the above table.

Sound pressure levels taken with the Debarker running but with no logs in the machine are for the Debarker only, and do not take into account the potential of increased sound levels due to other machinery in the immediate vicinity of the Debarker.

Factors which may cause an increase in these noise levels include: Malfunctioning control system components; improper debarker operational adjustments; malfunctioning mechanical components; excessively worn or misaligned gears; or inadequate gear lubrication. Refer to machine maintenance sections for further information.

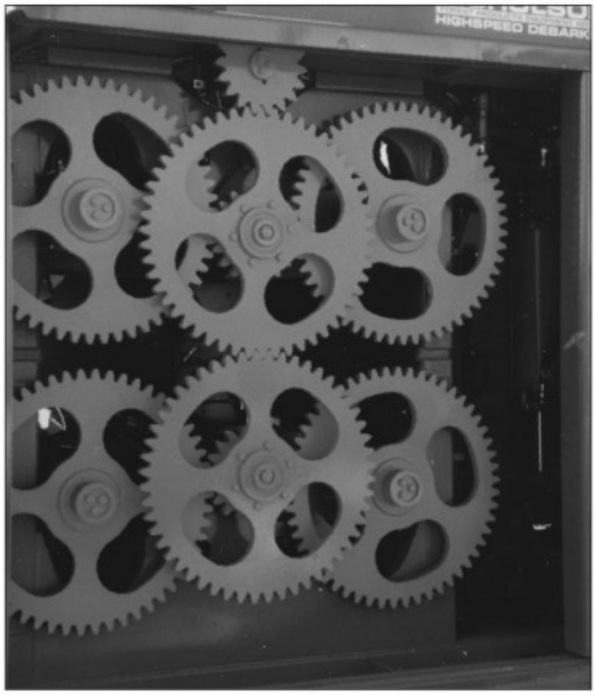
Debarker operator noise exposure may be reduced by operator control station location or by providing an isolated operator enclosure.

1.6 A8 BASIC COMPONENTS

1.6.1 FEEDWORKS

The A8 feedworks consists of four driven feedroll sets. There are two sets on the infeed of the debarker and two sets on the outfeed. Each feedroll set consists of one upper and one lower feedroll arm assembly, linked together vertically to center the log on the ring. An air cylinder connected to the lower feedroll arm activates the set to clamp the log between the feedrolls. These linked pairs allow debarking of large and small logs in any order.

Each feedroll arm has one driven, helically fluted feedroll, one on the upper feedroll arm and one on the lower arm. These feedrolls are driven through a series of hardened steel gears. The gears are driven by a simple double reduction belt drive system. The gear system is automatically lubricated by a metered drip system.



FEEDWORKS GEARS (TYPICAL)

The A8 feedrolls have helical flutes which are placed on the roll in such a manner as to assist in keeping the log on the vertical centerline of the roll, which corresponds to the vertical centerline of the ring.

1.6.2 ROLL CONTROL SYSTEM

The feedworks of your A8 Debarker may have any of four roll control systems. These systems are: “Open Roll Unloading,” “Dual Pressure Roll Unloading,” “No Roll Unloading,” and “Proportional Pressure Roll Control.” A8 debarkers are frequently set up with one style of unloading on the infeed rollsets and a different unloading system on the outfeed rollsets. The best type of roll control system for your machine will depend upon factors such as maximum feed speed, maximum and minimum log diameters, minimum log length, log sweep, etc. Consult the functional description for your specific debarker to determine which roll control system is on your machine.

OPEN ROLL UNLOADING

With no log in the rollset, the rolls are left in approximately the last log position, and have no air pressure being applied. If the diameter of an incoming log is smaller than or equal to the last log, the rolls do not have to climb the log end. If the incoming log is larger than the last, the rolls climb a short distance, but with no air pressure applied. Photocells and timers bring the roll pressure up to the preset log clamping force only after the log has entered the rollset. Just as the log leaves the rollset, the pressure drops back to zero. Since the rolls are completely vented after each log, air consumption with this system is relatively high.

DUAL PRESSURE ROLL UNLOADING

With no log in the rollset, the rolls are in the closed position, with just enough pressure to keep the rollset closed. As a log enters the rolls, the rolls climb the log end under this reduced pressure. Photocells and timers bring the roll pressure up to the preset log clamping force only after the log has entered the rollset. As the log leaves the rollset, the pressure is once again reduced to the low, holding pressure. Since the rolls are not completely vented as with the open roll unloading system, this system uses less air. This system may cause slightly more log end damage than with the open roll unloading system.

NO ROLL UNLOADING

With this system, the rolls are under the preset log clamping force at all times, and climb the log end with this pressure applied. Air consumption with this system is much less than with the open roll unloading system.

PROPORTIONAL PRESSURE ROLL CONTROL

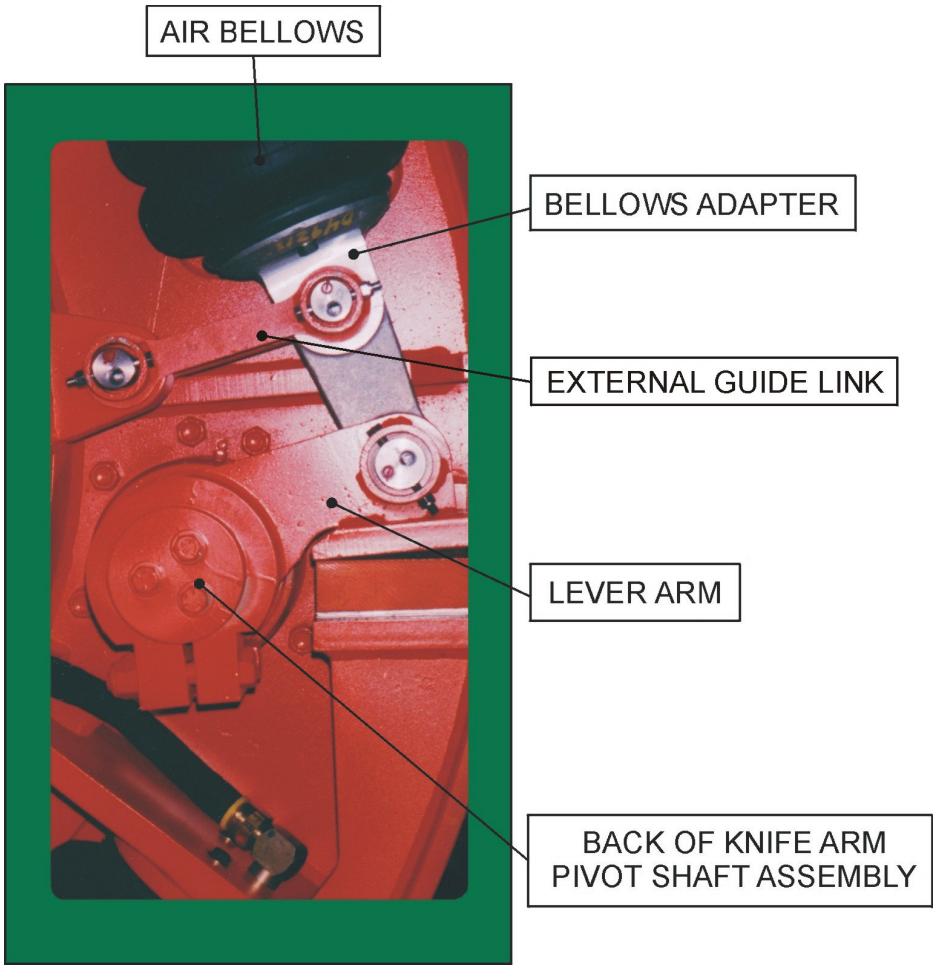
Proportional pressure roll control uses proportional valves to control the pressure on both the rod end and bore end of the roll cylinder. The PLC determines and sets the appropriate air pressures and unloading schemes for each log based on diameter. In contrast, the other unloading systems have to be preset to a pressure that will work for both maximum and minimum diameter logs.

In high speed applications, this system allows air to be used to “bump” open the rolls when sensors indicate that an incoming log is larger than the current position of the rollset. This function significantly reduces log damage and improves feeding. Because the system dynamically adjusts for the log that is currently being processed, it has the ability to reduce both air consumption and damage to the log.

1.6.3 DEBARKING RING

Your A8 Debarker is equipped with an Air Seal Debarking Ring. With this ring you have control of knife arm pressure from the operators console while the ring is rotating. You can also open the knife arms from the operator’s console. With this ring, air is transferred from the stationary to the rotating portion of the ring through a rotating air seal, and then to the knife arm actuation system.

During operation, the debarking ring is rotating in a clockwise direction (when looking toward the knife arms) on a standard ring. The air which enters the debarking ring extends the air bellows within the ring. There is one air bellows for each knife arm on the ring. These air bellows are attached through lever arms to the knife arm pivot shafts. As the bellows are filled with air they extend. This moves the lever arms, thus rotating the pivot shafts.



As the pivot shafts rotate, the knife arms which are attached to the pivot arms also rotate, moving the tip of the arms toward the center of the ring. Each arm is equipped with a replaceable carbide knife tip. The knife tips contact the log and scrape the bark off at the cambium layer.

1.6.4 RING DRIVE

The debarking ring of your A8 Debarker is driven by one electric motor. The motor is mounted above the rotating portion of the ring. The drive from the motor to the ring consists of a motor sheave and two matched, banded belts. These belts drive to the flat diameter on the outside of the rotating portion of the debarking ring. There are no belt grooves on the debarking ring.

1.6.5 KNIFE ARM PRESSURE CONTROL

Your A8 Debarker has been provided with one of two knife arm pressure control systems. Your debarker may have “discrete” or “proportional” knife arm pressure control. Look at the functional description found in section 9 of this manual to determine the knife arm pressure control system that is on your debarker.

1.6.5.1 DISCRETE KNIFE ARM PRESSURE CONTROL SYSTEM

If your A8 Debarker has been provided with “discrete” knife arm pressure control, it utilizes a bank of four air valves complete with air regulators to provide operator selectable knife arm pressures while debarking. The “discrete” pressure system allows you to have one preset pressure holding the knife arms in the closed position when no log is in the ring. This pressure is set so that it is the minimum pressure required to hold the knife arms closed. The “discrete” pressure system allows you to have three debarking pressures for different log diameters, species or conditions. The operator can switch from one pressure to another without slowing down the debarking process.

With this system, the actual barking pressure selected by the operator is activated when a log enters the debarker and passes through the beam of a photocell mounted on the infeed roll side door. This photocell detects the presence of a log just after it has passed through the first rollset. After an appropriate delay, the PLC sends a signal to the knife arms to go to debarking pressure. After the tail of the log passes by the same photocell, the PLC sends a signal to revert back to the knife arm holding pressure.

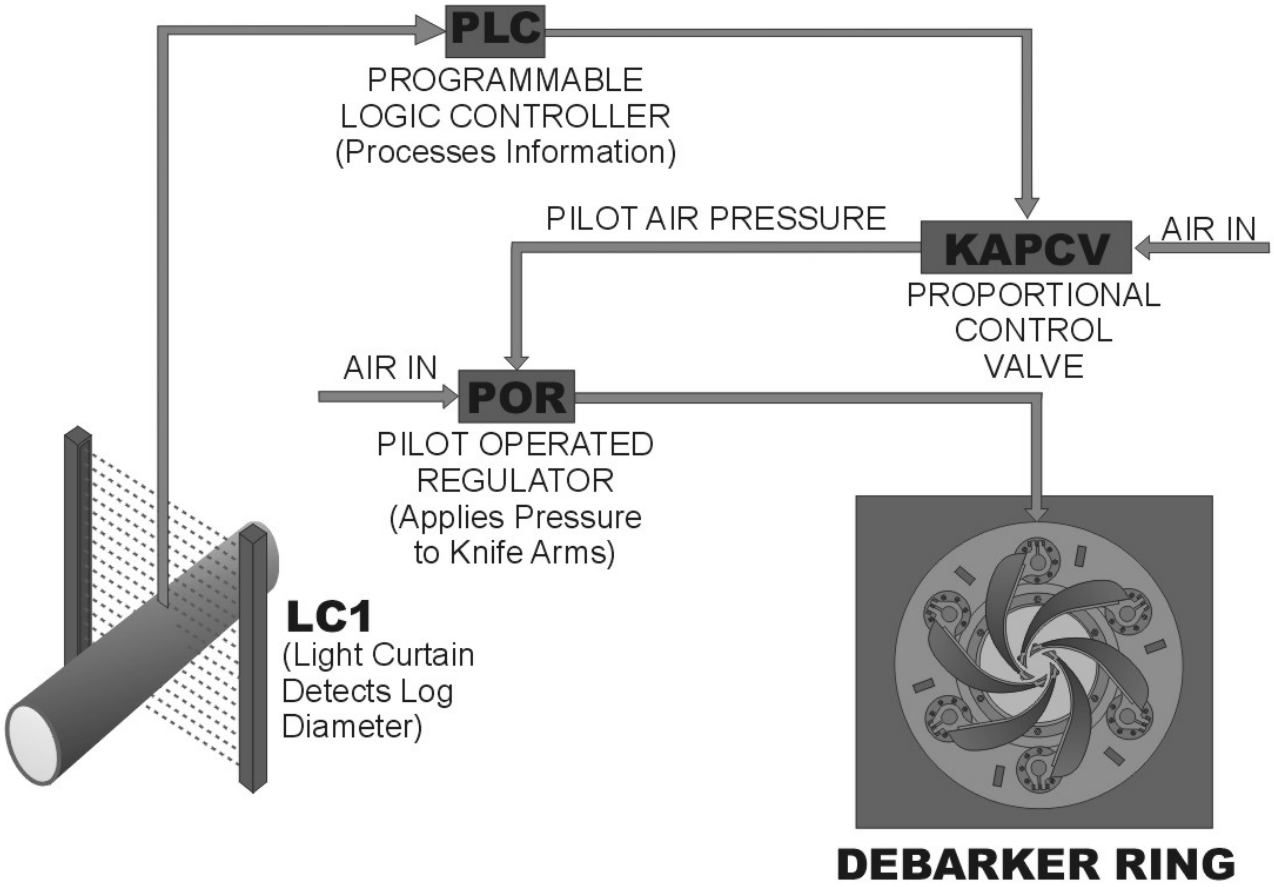
In addition, the knife arms can be opened, closed, or set on automatic arm control. When set on automatic arm control, the knife arm pressure is set so that it is the minimum pressure required to hold the knife arms closed when no log is in the ring. As a log enters the ring, the knife arms can climb the end of the log under low pressure, thus reducing log end damage and stress to the debarker. As the knife tips reach the log surface, the pressure is brought up to full barking pressure.

If your debarker uses this “discrete” knife arm pressure system, a more detailed description of the operation of the system can be found in the functional description in section 9 of this manual.

1.6.5.2 PROPORTIONAL KNIFE ARM PRESSURE CONTROL SYSTEM

If your A8 Debarker has been provided with “proportional” knife arm pressure control, the infeed light curtain detects the diameter of an incoming log and sends an analog signal to the PLC. The PLC calculates the correct knife arm pressure and sends an analog signal to the proportional air pressure valve. This valve sets the ring air pressure to the proper value.

PROPORTIONAL KNIFE ARM CONTROL SYSTEM



The knife arm pressure can be changed by the operator in two ways. First, he can set the basic debarking pressure by a selector switch on the control console. This switch allows him to select one of three debarking pressure ranges. A second selector switch allows the operator to change the rate at which the pressure changes from small logs to large logs.

With this system, the actual barking pressure is activated when a log enters the debarker and passes through the beam of a photocell mounted on the infeed roll side door. This photocell detects the presence of a log just after it has passed through the first rollset. After an appropriate delay, the PLC sends a signal to the knife arms to go to debarking pressure. After the tail of the log passes by the same photocell, the PLC sends a signal to revert back to the knife arm holding pressure.

In addition, the knife arms can be opened, closed, or set on automatic arm control. When set on automatic arm control, the knife arm pressure is set so that it is the minimum pressure required to hold the knife arms closed when no log is in the ring. As a log enters the ring, the knife arms can climb the end of the log under low pressure, thus reducing log end damage and stress to the debarker. As the knife tips reach the log surface, the pressure is brought up to full barking pressure.

If your debarker uses this “proportional” knife arm pressure system, a more detailed description of the operation of the system can be found in the functional description in section 9 of this manual.

1.6.5.3 KNIFE ARM PRESSURE MONITORING

A pressure transducer is installed in the knife arm air circuit of your debarker to monitor pressure being applied to the knife arms. Feedback from this pressure monitor is used to verify that the knife arm pressures are cycling properly.

If knife arm pressure remains above 40 psi for longer than two minutes, or if knife arm pressure exceeds 70 psi, the debarking ring will automatically shut down. A shut down condition is usually caused by bark or other debris blocking the infeed light curtain and/or photocell. A shut down could also be caused by a faulty light curtain or photocell, or by a malfunctioning pilot operated relieving regulator, knife arm proportional pressure control valve, or knife arm quick exhaust valve.

1.6.6 KNIFE TIPS

Three knife tip angles are available for the A8 to help you adjust to different debarking conditions such as frozen logs or baked on bark.

The steep-angle (black) tip is used primarily for frozen logs or for extremely difficult debarking conditions.

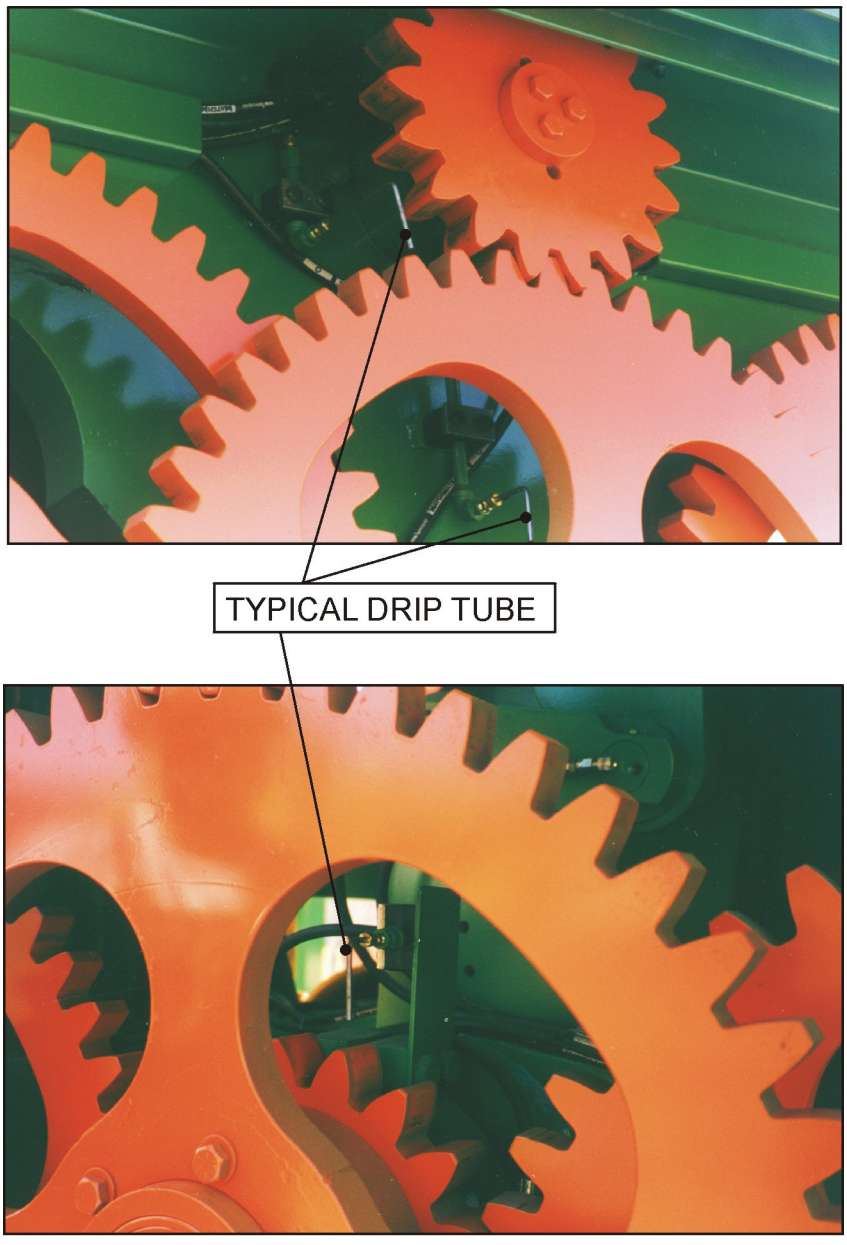
The medium-angle (yellow) tip is used for average debarking conditions. It is the tip most often supplied with the debarker.

The shallow-angle (green) tip is used for very easy debarking conditions. It is suggested where fiber damage is critical.

1.6.7 AUTOMATIC LUBRICATION

An automatic oil lubrication system to provide lubrication for the debarking ring and the feedworks gears is standard on the A8 Debarker. The remainder of the debarker is grease lubricated. A special Nicholson Failsafe Lubrication system is used for both ring and gear lubrication. The Nicholson Failsafe Lubrication system provides a metered and monitored oil flow which will shut the debarker down if flow is interrupted.

The gear lubrication system suppliesoil to the gears by a system of drip tubes. Lubricating oil only has to be supplied to some of the gears. Lubricant dripped on the teeth of one gear will be transferred to the teeth of any mating gears.



GEAR LUBRICANT DRIP TUBES (TYPICAL)

The remainder of the A8 Debarker is grease lubricated. The debarking ring must be stopped in order to lubricate the knife arm pivot shaft assemblies, bellows adapter pins and bellows link pins.

All lube points on the feedworks of the machine are lubricated from two lube manifolds, one on the infeed end and one on the outfeed end of the debarker. These manifold sites are on the outside of the debarker and can be used while the debarker is in operation if protection from logs and bark has been provided in these areas by the mill. If no protection has been provided, lubrication must be performed with the debarker stopped.

1.6.8 DEBARKER RING BEARING TEMPERATURE

The A8 Debarker is equipped with a temperature probe on the debarker ring bearing. This probe sends a signal to the ring temperature display which shows the precise temperature of the ring bearing. If the ring bearing temperature reaches a preset limit of 185^{O}F (85^{O}C), the display unit sends a signal to an audible temperature alarm. If the temperature reaches the next preset limit of 195^{O}F (91^{O}C), the debarker ring drive will automatically shut down.

1.7 FUNCTIONAL DESCRIPTION

A complete and precise description of how your A8 debarker operates can be found in section 9 of this manual.