Instruction Manual

Winder Operation Manual
For
Fraser Paper Ltd.
Madawaska, ME
Beloit Lenox SF Winder No. 8499

BELOIT CORPORATION
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PREFACE

This manual provides instructions for the operation and maintenance of the BELOIT Lenox SF Series Winder. The information contained in this manual may be used in conjunction with other information provided to the user by Beloit Lenox for installation and operation of the winder.

Safety precautions have been cited extensively throughout this manual in an effort to ensure that the use of BELOIT Lenox equipment will be safe and accident free. The following sections are devoted entirely to safety: "General Safety", "Operator Safety", "Slitter Safety", "Shaftless Winding Safety", "Maintenance Safety", "Danger, Warning, Caution, and Notice as Used in This Document", and "Lockout/Tagout Procedures". These sections provide a direct reference to safety information for operating and maintenance personnel, but they are also designed to provide a source of winder safety training information for incorporation into your own mill safety training programs. We urge you to use this information for that purpose.

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SAFETY MESSAGES

⚠️ DANGER ⚠️

DANGER symbols, as illustrated above, are used in this document to emphasize imminently hazardous conditions or actions that will, if not avoided, cause death or serious injury.

⚠️ WARNING ⚠️

WARNING symbols, as illustrated above, are used in this document to indicate potentially hazardous conditions or actions that can, if not avoided, cause serious injury or death.

⚠️ CAUTION ⚠️

CAUTION symbols, as illustrated above, are used in this document to indicate potentially hazardous conditions or actions that can, if not avoided, cause moderate personal injury.

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NOTICE

NOTICE symbols, when centered and formatted as illustrated above, are used in this document to call attention to technical information, which if not heeded, can result in damage to equipment or creation of potentially hazardous conditions.
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Section 1. Overview & General Safety
SYSTEMS OVERVIEW

The winder is used to unwind a continuous sheet from a parent roll, slit it into desired widths, and rewind it again into a set of smaller rolls. Since the resulting rolls will be used for further processing—often at high speed—it is important that they possess the roll structure characteristics needed for safe and efficient rewinding. This section provides a brief overview of the control devices, systems, and safety procedures used to achieve that goal.

AUTOMATIC MODES OF OPERATION: BEL-OIT AND LARS

This winder includes two automatic modes of winder operation: Bel-OIT mode and LARS (Lenox Auto Roll Structure) mode. Both modes control the roll structure systems referred to in the sections that follow. Bel-OIT is a computerized winder control system that provides a fully automatic system for running and controlling all roll structure functions. When operating in LARS mode, the winder runs automatically according to a pre-set program that permits the operator to bias tension while the set is running. See Section 2 for further information about these systems.

ROLL STRUCTURE CONTROL

A roll of paper with good roll structure is tight at the core. Its tension level gradually decreases, layer by layer, until it reaches its lowest levels at the outer layer of the roll. A roll with good structure is free of wrinkles, vibration (roll bounce), starring, ridging, and soft starts (loose cores). It will unwind smoothly and will be unlikely to fall during use. When operating in LARS or Bel-OIT, the two drum winder uses the following systems to control roll structure: automatic rider roll control, tension control, and differential torque control.

Web Tension Control System

The Web Tension-Control system automatically regulates the tension of the sheet as it passes the rolls, slitters, and spreader on its way from the unwind to the drums. This system provides an effective tool for the prevention of interweaving, soft spots, and for the maintenance of roll hardness.

The Web Tension-Control system consists of a tension roll (the after-slitter roll), load cells, and the unwind drive controller. During operation, the web wraps the tension roll, exerting a force on the roll proportional to the tension in the sheet. The load cells sense, measure, and convert that level of force into a feedback signal, which is sent to the unwind drive controller. The controller then compares the feedback signals to setpoints in the current Bel-OIT or Lars program and signals the unwind motor to increase or decrease sheet tension accordingly.

The Web Tension-Control system is designed to function automatically when the winder is building roll sets in LARS or Bel-OIT. See “Web Tension-Control” in Section 3 for further information about this system.
Automatic Rider Roll Control System

The Rider Roll Control system, which automatically controls the amount of pressure applied by the rider roll, plays an important part in forming good roll structure. During the early stages of the winding cycle, this system applies loading to the rider roll, pressing the new roll set down into the drum pocket for a tight start. Later in the cycle, as the roll set’s growing weight increases the nip between the roll set and drums, the need for rider roll loading diminishes, and the system automatically reduces the pressure applied by the rider roll.

The Automatic Rider Roll Control system is designed to function automatically when the winder is building roll sets in LARS or Bel-OIT. See "Automatic Rider Roll System" in Section 3 for further information about this system.

Differential Torque Control System

Differential Torque Control is a system that is used to proportionally vary the available torque differential between the front and back winder drums. This system can help to create a tight start by applying a higher percent of available torque at the front drum than at the back drum during the early stages of the winding cycle. Later in the cycle, as the roll set increases in size and the need for torque differential diminishes, a break-point is reached at which the system automatically starts to reduce ("taper") the proportional difference of torque provided by the two drums. This tapering then continues until the split between front and back drum torque reaches a point at which the percent of torque is only slightly higher at the front drum than it is at the back drum.

The Differential Torque Control system is designed to function automatically when the winder is building roll sets in LARS or Bel-OIT. See "Differential Torque Control" in Section 3 for further information about this system.

SAFETY

All systems on this winder must be used in keeping with sound safety practices. This manual contains safety information designed to be used in two ways: first, it is a primary reference for winder personnel, providing them with details and explanations of operational safety messages and procedures; second, it provides safety guidelines and practices for incorporation into your mill’s winder safety training program. Safety sections in this manual include: "General Safety", "Operator Safety", "Lockout/Tagout Procedures", and "Maintenance Safety". This manual also makes frequent use of safety-warning symbols and messages, which are explained in the section "Danger; Warning, Caution, and Notice as Used In This Document".
GENERAL SAFETY

The following notes provide basic safety guidelines that should be incorporated into a comprehensive safety program at your mill.

- Do not remove warning signs.
- Make certain that barriers and guards are in place before starting machine.
- Keep aisles around equipment clear of unnecessary or potentially hazardous articles.
- Wipe up spilled oil, grease, or water to minimize the risk of slips and falls.
- Keep clothing and all parts of the body away from moving parts.
- Keep all non-operating personnel outside safety lines when the system is in operation.
- Keep hands away from belt and chain drives. Maintain all drive component guards in place.
- Do not overreach. Do not stand on the machine when it is running.
- Keep clothing and all parts of the body away from ingoing nips.
- Read Winder Safety Practices, Operator Safety, Maintenance Safety, and the definitions of safety sign messages in Danger, Warning, Caution, and Notice as Used In This Document.

- NOTICE -

Do not attempt to operate, maintain, or repair the winder without reading the following sections of this manual: "Winder Safety Practices", "Operator Safety", "Maintenance Safety", "Lockout/Tagout Procedures", and "Danger, Warning, Caution, and Notice as Used In This Document".
Danger, Warning, Caution, and Notice as Used in This Document

⚠️ DANGER

DANGER symbols, as illustrated above, are used in this document to emphasize imminently hazardous conditions or actions that will, if not avoided, cause death or serious injury.

⚠️ WARNING

WARNING symbols, as illustrated above, are used in this document to indicate potentially hazardous conditions or actions that can, if not avoided, cause serious injury or death.

⚠️ CAUTION

CAUTION symbols, as illustrated above, are used in this document to indicate potentially hazardous conditions or actions that can, if not avoided, cause moderate personal injury.

– NOTICE –

NOTICE symbols, when centered and formatted as illustrated above, are used in this document to call attention to technical information, which if not heeded, can result in damage to equipment or creation of potentially hazardous conditions.
Section 2. Winder Operation
OPERATOR SAFETY

The following safety notes call attention to potentially hazardous situations. Be sure to review them frequently in conjunction with all aspects of winder operation.

- Do not start the winder if there are any leaks or worn lines.
- Interlocks should be working properly. Do not run the winder above thread speed unless:
  - Core chucks are engaged
  - Rider roll is lowered and loaded.
  - Roll ejector is retracted.
  - Cradle/barrier is fully raised
  - All personnel are clear.
- Do not operate the winder with damaged cores.
- Intermediate slitters and paper rolls should be stopped before paper is threaded into the winder.
- Disengage the slitters and disable them with the SLITTERS OPER./DISABLE key-switch before relocating slitters, changing bands and blades, or performing any inspections or maintenance in the slitter area.
- When starting the sheet on the cores, all operators must be clear before lowering the rider roll, and all hands, legs, and clothing must be clear of ingoing nips.
- After threading the sheet, the operator must not start the winder until he makes sure that everyone is outside of the safety lines. Mirrors should be provided to increase the operator's range of vision.
- Do not raise the rider roll from the rewound roll until the winder is stopped.
- Do not disengage the core chucks while the winder is running.
- Do not eject a rewound roll until the winder is completely stopped and the rider roll, cradle, and coreslides are raised.
- If two rolls interweave, do not attempt to cut them apart until the winder comes to a complete stop.

NOTICE

Do not attempt to operate the winder until you have read and fully understand all information in the following sections of this manual: “General Safety”, “Lockout/Tagout Procedures”, and “Danger, Warning, Caution, and Notice as Used in This Document”.
Operator Safety (continued)

Slitter Safety
To avoid accidents when handling slitters, be sure to observe the following safety precautions:

- Disengage the slitters and disable them with the SLITTERS OPER./DISABLE key-switch before relocating slitters, changing bands and blades, or performing any inspections or maintenance in the slitter area.
- Do not try to adjust the slitters when they are in motion.
- Use gloves and handle slitter blades carefully—they are sharp!

Safety Notes For Shaftless Winding
To avoid accidental ejection of rolls during shaftless winding, be sure to observe the following safety precautions:

- Use cores that are in good condition.
- Core ends must be cut square and butted firmly against each other.
- The chucks must be engaged.
- Use correct chuck adjustment procedures.
- All barrier guards must be in place. Shaftless operation should not be permitted without adequate barrier guards to keep the paper roll(s) in the winder.
- Personnel should not be permitted in front of the winder while it is running unless an adequate barrier is in position.
- The operator should be standing at the benchboard while the winder is running.
- All interlocks must be operational. Do not try to defeat interlocks—they have been installed for safety. Replace any damaged components immediately.
- The rider roll must be kept on the rewind roll whenever the winder is running faster than 'Thread' speed.

-- NOTICE --
Do not attempt to operate the winder until you have read and fully understand all information in the following sections of this manual: "General Safety", "Lockout/Tagout Procedures", and "Danger, Warning, Caution, and Notice as Used in This Document".
USING THIS SECTION

This section provides instructions that describe the preparation and use of the winder. It covers the following topics:

- OPERATOR SAFETY
- WINDER CONTROL PANELS
- LOADING A NEW PARENT ROLL
- THREADEDING THE WINDER
- MODES OF OPERATION
- PREPARING TO START A NEW SET AFTER THREAD-UP
- RUNNING THE WINDER
- STOPPING THE WINDER
- REMOVING REWOUND ROLLS FROM THE WINDER
  WEB SPICING
- INTERLOCKS
- OPERATOR'S TROUBLESHOOTING GUIDE

PRESENTATION OF TOPICS IN THIS SECTION

This section provide descriptions of the procedures used to operate the winder. Starting with "Loading A Parent Roll On The Unwind", these procedures follow the usual sequence of winding operations (threading, running, set changing, etc). Supplemental information about operating major machine components is provided in Section 3 Component Information.
BENCHBOARD CONTROLS

Run/Emergency-Stop/Coast Stop/Reset

EMERGENCY STOP is a red, illuminated push/pull button used for emergency stops: Push to stop/Pull to release. Sheet tension is not maintained during an emergency stop. All EMERGENCY STOP pushbuttons on this machine are illuminated, two position maintained, pull to release. They all light up when pressed, but when any one of them has been used to make an emergency stop, the EMERGENCY STOP button on the bench board will flash to indicate that the winder is in an Emergency-stop condition. See "Stopping The Winder" for a complete description of functions activated/deactivated with this control.

COAST STOP is a yellow pushbutton with a guard ring that is used to bring the winder to a stop by cutting off power to the main drive. When COAST STOP is used, the winder continues to "coast" under the power of inertial forces until it gradually comes to rest. It is used primarily as an emergency stopping method in situations where there is a risk of fire or electrical damage. (See "Stopping The Winder")

RESET is an illuminated pushbutton that is used to reset the winder drive and PLC. It is required after an "E-Stop" or "Coast Stop".

Bel-OIT Keyboard and Screen

The Bel-OIT keyboard and screen are standard PC type operator interface components used to operate the Bel-OIT winder control system. Bel-OIT is a computerized control system that provides the operator with a fully automatic means of controlling winding cycle set point values and curves. See "Running the Winder" later in this section for additional information about Bel-OIT mode. See the Bel-OIT User's Guide for instructions in use of the Bel-OIT winder control system.

Analog Meters

UNWIND LOAD is an analog meter that displays the amperage supplied to the unwind motor.

BACK DRUM LOAD is an analog meter that displays the amperage being supplied to the rear drum motor.

FRONT DRUM LOAD is an analog meter that displays the amperage being supplied to the front drum motor.

TENSION is an analog meter that displays the amount of tension presently in the sheet. Measurement is in PLI.

SPEED is an analog meter that displays the speed of the paper passing through the winder. Measurement is in feet per minute.

RIDER ROLL LOAD is an analog meter that displays rider roll load feed back in PLI.

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2 - 5 Winder Operation Manual
Panel View Screen and Keypad

The Panel View screen and keypad is used to select a mode of operation (LARS or Bel-OIT) and to display, enter, and edit the variable numerical values the winder control system uses to build a set of rolls during LARS (Lenox Automatic Roll Structure mode) operation. See "Using the Panel View" section.

Potentiometer

PERCENT UNWIND MANEUVER When used in the Maneuver Unwind mode, this potentiometer is used to control direction and speed of the unwind spool as follows: when the potentiometer is at zero, the unwind will be stationary; as the dial is rotated toward "+ 100", payout speed will increase; as the dial is rotated toward "− 100", takeup speed will increase. When in Thread mode, this potentiometer functions as follows: the unwind moves at thread speed when the dial is at the zero position; speed will be biased if the dial is rotated toward "+" or "−".

Winder Drop 1 Panel

HYD PUMP 1 ON is an illuminated pushbutton that is used to activate hydraulic pump #1. Press to start pump #1. This control lights up when that pump is running.

HYD PUMP 2 ON is an illuminated pushbutton that is used to activate hydraulic pump #2. Press to start pump #2. This control lights up when that pump is running.

HYD UNIT STOP is an illuminated pushbutton that is used to stop the hydraulic pumps. Press to stop Hydraulic Pumps. This control lights up to indicate Hydraulic Pumps off. Button has no effect on hydraulic pumps unless Web is at 0 speed.

SLITTER MOTORS is an illuminated pushbutton that is used to activate or deactivate the slitter motors. This is a toggle style control; press to activate/press to deactivate. This control lights up when the slitter motors are on; it flashes if any slitter motors are faulted.

INNER SLITTERS is an illuminated pushbutton that is used to engage or disengage the inner slitters. This is a toggle style control: press to engage; press to disengage. This control lights up when the inner slitters are engaged.

TRIM SLITTERS is an illuminated pushbutton that is used to engage and disengage the trim slitters. This is a toggle style control: press to engage; press to disengage. This control lights up when the trim slitters are engaged.

UNWIND OSCILLATION is an illuminated pushbutton that is used to activate/deactivate unwind oscillation. This is a toggle style control: press to activate oscillation; press to deactivate it. When oscillation is active, this button will light up and the unwind will oscillate whenever the winder is running above low speed.
TENSION ON is an illuminated pushbutton that is used to activate/deactivate unwind sheet tension. This is a toggle style control; press to turn tension on; press again to turn it off. This control lights up when tension is on.

MANEUVER UNWIND is a pushbutton used to activate the PERCENT UNWIND MANEUVER potentiometer.

DRUM SHEET THREADER OFF is an indicator that lights up when the drum sheet threader is off.

SPEED HOLD/REL is an illuminated, toggle type pushbutton used as a "pause" control during winder acceleration or deceleration to "hold" the winder at its current speed. When it is pressed again, this control will "release" the hold and the winder will ramp to the preset speed setpoint. This button lights up when pressed to hold.

TRIM SYSTEM ON is an indicator that lights up when the trim removal system is on.

JOG is an illuminated pushbutton that causes the winder drums to turn at a slow "jog" speed. Press to move web through winder at "jog speed". This control lights up when the winder is in Thread or Run modes or if drives are not ready.

THREAD is an illuminated pushbutton that is used to turn the winder drums and move the web through winder at thread speed. This control will not function if the drives are not ready; it lights up when Thread mode is active.

RUN is an illuminated pushbutton that is used to put the winder into "run" mode. Press to build rolls. This control lights up to indicate the winder is in Run mode. Pressing this control will have no effect unless all the interlocks required for building rolls are satisfied.

STOP is an illuminated pushbutton that is used to bring the winder to a complete, controlled stop. Press this button to stop drives and web motion through the winder. Use of this control cancels Run and Thread modes and does not permit Jogging. This control flashes to indicate winder is stopping; it remains steadily lit when the web is at 0 speed.
Unwind Panel 500 - Operator's Side
Unwind Panel 500 - Operator's Side

**EMERGENCY STOP** is an illuminated push/pull button used for emergency stops. Push to Stop. Pull to enable drive and winder reset. This emergency stop button illuminates and remains steadily lit when it is pressed, indicating that an emergency stop is active. The benchboard emergency stop button flashes when this button or any of the winder’s other emergency stop buttons (on the slitter panel, unwind panels, etc.) have been pressed to activate an emergency stop. Note: web tension is not maintained when Emergency Stop is used. See "Stopping the Winder" for a complete description of functions activated/deactivated with this control.

**UNWIND CENTER** is an illuminated pushbutton used to move the unwind automatically to its centered position for spool removal and insertion. Press to cause unwind to move to center position. Flashing indicates Unwind is centering. Lights when Unwind is at center position. Does not light if Unwind is oscillating and passes through center position.

**OSCILLATION DECREASE** is an illuminated pushbutton that is used to decrease the amount of oscillation at the unwind. Maximum amount of decrease possible is 4 inches.

**OSCILLATION INCREASE** is an illuminated pushbutton that is used to increase the amount of oscillation at the unwind. Maximum amount of increase possible is 4 inches.

**INCHES OF OSCILLATION** is an LED meter that is used to display the amount of oscillation (0 to 4 inches) in terms of the unwinds position on the stands.

**SIDEDELAY LEFT/RIGHT** is a spring-loaded, center-neutral selector switch used to move the unwind toward the operator or drive side in order to center the sheet with the trim slitters ('Front' = operator side; 'Back' = drive side). The amount of adjustment is +/- 2.0 inches from the center of the unwind stands.

**CLUTCH DISENGAGE** is an illuminated pushbutton that is used to disengage the clutch. When the clutch has been disengaged, this control lights up. The web must be at zero (0) speed for this pushbutton to be active. This control flashes when the clutch is moving toward unclutch position, and it remains steadily lit when the clutch is fully disengaged.

**CLUTCH ENGAGE** is an illuminated pushbutton used to engage the clutch. When this control is used, the unwind drive will move at "crawl" speed to aid in engagement until the clutch is fully engaged. This control flashes when the clutch is moving toward engaged position, and it remains steadily lit when the clutch is fully engaged.

**PERCENT UNWIND MANEUVER** When used in the Maneuver Unwind mode, this potentiometer is used to control direction and speed of the unwind spool as follows: when the potentiometer is at zero, the unwind will be stationary; as the dial is rotated toward "+ 100", payout speed will increase; as the dial is rotated toward "- 100", takeup speed will increase. When in Thread mode, this potentiometer functions as follows: the unwind moves at thread speed when the dial is at the zero position; speed will be biased if the dial is rotated toward "+" or "-"."
Unwind Panel 560 - Drive Side

**EMERGENCY STOP** is an illuminated push/pull button used for emergency stops. Push to Stop. Pull to enable drive and winder reset. This emergency stop button illuminates and remains *steadily* lit when it is pressed, indicating that an emergency stop is active. The bench-board emergency stop button *flashes* when this button or any of the winder’s other emergency stop buttons (on the slitter panel, unwind panels, etc.) have been pressed to activate an emergency stop. Note: web tension is not maintained when Emergency Stop is used. See “Stopping the Winder” for a complete description of functions activated/deactivated with this control.

**CLUTCH ENGAGE** is a green illuminated pushbutton used to engage the clutch. When this control is used, the unwind drive will move at “crawl” speed to aid in engagement until the clutch is fully engaged. This control flashes when the clutch is moving toward engaged position, and it remains steadily lit when the clutch is fully engaged.

**CLUTCH DISENGAGE** is a red illuminated pushbutton that is used to disengage the clutch. When the clutch has been disengaged, this control lights up. The web must be at zero (0) speed for this pushbutton to be active. This control flashes when the clutch is moving toward unclutch position, and it remains steadily lit when the clutch is fully disengaged.

**SIDELAY LEFT/RIGHT** is a spring-loaded, center-neutral selector switch used to move the unwind toward the operator or drive side in order to center the sheet with the trim slitters ('Front' = operator side; 'Back' = drive side). The amount of adjustment is +/- 2.0 inches from the center of the unwind stands.
Slitter Panels 615 & 650

EMERGENCY STOP is an illuminated push/pull button used for emergency stops. Push to Stop. Pull to enable drive and winder reset. This emergency stop button illuminates and remains steadily lit when it is pressed, indicating that an emergency stop is active. The benchboard emergency stop button flashes when this button or any of the winder's other emergency stop buttons (on the slitter panel, unwind panels, etc.) have been pressed to activate an emergency stop. Note: web tension is not maintained when Emergency Stop is used. See "Stopping the Winder" for a complete description of functions activated/deactivated with this control.

SPREADER WRAP is an LED control that indicates the current percent of wrap of the lead-in spreader. See Spencer Johnston documentation for additional information about this control.

SLITTERS ENABLED is an indicator light that illuminates when slitters are enabled.

SLITTERS DISABLED/OPER. is a "pass-key" type selector switch. When this selector is in the 'Disabled' position the slitters are locked out of the circuit, preventing them from being turned on from any other occasion.

LEAD-IN SHT. HLDR. ENG/DISENG is an illuminated selector switch that is used to engage/disengage the lead-in sheet holder. This is a spring-loaded, center-neutral selector.

LEAD-IN SHT. THFDR. ENG/DISENG is an illuminated selector switch that is used to engage/disengage the lead-in sheet threader. This is a spring-loaded, center-neutral selector.

AIR SHOWER OFF/AUTO/ON is an illuminated, three-position selector switch that is used to turn on the air at the air lubricated sheet threader pans. The center position ('Auto') is the default of this selector.
WINDER FRAME PANEL 700

The Winder Frame Panel 700 contains devices that are used to control drive related functions, the cradle, rider roll, core slides, threader, slitters, auto eject, and core chuck operations.

EMERGENCY STOP is an illuminated push/pull button used for emergency stops. Push to Stop. Pull to enable drive and winder reset. This emergency stop button illuminates and remains steadily lit when it is pressed, indicating that an emergency stop is active. The bench-board emergency stop button flashes when this button or any of the winder's other emergency stop buttons (on the slitter panel, unwind panels, etc.) have been pressed to activate an emergency stop. Note: web tension is not maintained when Emergency Stop is used. See "Stopping the Winder" for a complete description of functions activated/deactivated with this control.

RIDER ROLL LATCHED is an indicator that lights up when the rider roll assembly is fully raised and latched.

RIDER ROLL LOADED is a light used to indicate that the rider roll is loaded. When the rider roll is descending, the light remains dark. When the rider roll descends within the soft load vicinity of the roll, the light flashes. After the rider roll contacts the roll and fully loads, the light illuminates and remains steadily lit.

RIDER ROLL RAISE/LOWER is a non-illuminated selector switch used to raise and lower the rider roll. When this selector is turned to 'Raise' and released, the rider roll will continue to rise until it reaches its fully-raised and latched position. When this selector is used to lower the rider roll, the core slides must first be lowered, and then this selector must be held at 'Lower' (the rider roll will stop moving if this switch is released before loading starts). Note: the rider roll will start to load automatically when the rider roll comes into contact with the cores.

INITIALIZE RIDER ROLL is an illuminated pushbutton that is used to start the articulating rider roll wheel-initialization process.

FRONT CHUCK OUT/IN is a non-illuminated spring-return-to-center selector switch used to move the front chuck in or out. A similar control for the back chuck is located on Winder Frame Panel 760 - Drive Side. When positioning chucks, the chuck designated as the "fixed" position chuck (either front or back may be so designated) should be positioned to align with the web's trimmed edge. The "floating" chuck should be positioned to allow ease of chucking. Note: When positioning the "fixed" chuck, the chucks should be chucked without cores.

CORE CHUCKS UNCHUCK/CHUCK is an illuminated, spring-return-to-center selector switch used to engage or disengage the core chucks from the cores. When the chucks are fully engaged, this switch illuminates and remains steadily lit.

EJECT AIR SHWR OFF/ON is an illuminated selector switch used to control the air shower assist used during back drum splicing. In 'On' the threading air will come on when the drum threader is enabled. 'Off' will disable the air. The switch will illuminate and remain steadily lit when the air is on.
Winder Frame Panel 700 (continued)

DRUM THDR AIR OFF/ON is an illuminated spring-return-to-center selector switch that is used to turn the drum sheet threader air showers on and off. Note: The showers will turn on automatically whenever the winder is put into thread mode; this switch must be used to turn them off before the winding is resumed.

CORE SLIDES RAISE/LOWER is a non-illuminated spring-return-to-center selector switch used to raise and lower the core chucks. When this selector is held in its 'Lower' position the slides will lower (providing the roll ejector is retracted). When held in its 'Raise' position, the slides will raise (providing the chucks are unchucked and the rider roll is raised).

DRUM SHT. THRDR OFF/ON is an illuminated spring-return-to-center selector switch that is used to turn the sheet threader on or off. The threader can be enabled at zero to thread speed. When enabled, this button illuminates and remains steadily lit. The threader can be turned off completely by setting this control at 'Off'. When this selector is left in 'On' position, the threader will automatically turn on when the THREAD button is pressed, and it will turn off when the RUN button is pressed.

DRUM SHT. HLDR OFF/ON is a spring-return-to-center selector switch used to engage or disengage the back drum sheet holder. Note: the winder must be stopped before this control can be used to engage the holder.

ROLL EJECTOR EJECT/RETURN is a spring-to-center, non-illuminated selector switch that is used to operate the roll ejector. When this selector is held in 'Eject' position with the cradle, core chucks and rider roll are raised, the ejector will move forward to eject the rewound rolls. When held in its 'Return' position, the roll ejector will move to its fully retracted position. The ejector will stop moving if the switch is released.

INNER SLITTERS is an illuminated pushbutton used to toggle the engagement/dischengagement of the inner slitters. The button lights up when the inner slitters are engaged. The slitters must be engaged to run the winder. If the slitters are engaged and the winder is at zero speed, pressing the button will disengage the slitters.

AUTO EJECT is an illuminated pushbutton used to initiate automatic ejection and roll unloading.

Note: the winder must be stopped before this control can be used.

CRADLE LOWER/RAISE is a spring-to-center, non-illuminated selector switch that is used to operate the cradle. When this control is held at 'Raise', the cradle raises until it reaches its fully raised position; when held at 'Lower', cradle lowers until it reaches fully lowered position. This control must be held in position for motion to continue. The cradle stops moving if this selector is released at any point before the cradle reaches either fully raised or fully lowered position.

STOP is an illuminated pushbutton that is used to bring the winder to a complete, controlled stop while maintaining sheet tension. The button flashes to indicate the winder is decelerating. It illuminates and remains steadily lit when the winder is fully stopped.
THREAD is an illuminated pushbutton that is used to turn the winder at thread speed. When this button is pressed, it lights up to indicate acceptance of the command, and the winder will continue to rotate at thread speed until a stop button is pressed. This button does not need to be held for drum rotation to continue.

JOG is an illuminated pushbutton that causes the winder drums to turn slowly for as long as it is pressed; when it is released, the drums stop. When pressed, the button illuminates and remains steadily lit to indicate acceptance of the command.

CRADLE TAPE RESET is an illuminated pushbutton used to reset the cradle for normal operation after the cradle has been brought to a stop with the cradle's CRADLE TAPE SWITCH.
WINDER FRAME PANEL 760

The Winder Frame Panel 760 contains the following controls:

EMERGENCY STOP is an illuminated push/pull button used for emergency stops. Push to Stop. Pull to enable drive and winder reset. This emergency stop button illuminates and remains steadily lit when it is pressed, indicating that an emergency stop is active. The benchboard emergency stop button flashes when this button or any of the winder’s other emergency stop buttons (on the slitter panel, unwind panels, etc.) have been pressed to activate an emergency stop. Note: web tension is not maintained when Emergency Stop is used. See “Stopping the Winder” for a complete description of functions activated/deactivated with this control.

DRUM BRAKE AUTO/OFF is an illuminated selector switch used to control the back drum brake. When the selector is in the ‘Auto’ position, the brake will engage when the winder drive is at zero speed. When it is in its ‘Off’ position, the brakes will remain disengaged. This is useful for inspecting drum and roll conditions. The button will light up when the brake is engaged.

BACK CHUCK IN/OUT is a non-illuminated spring-return-to-center selector switch used to move the back chuck in or out. A similar control for the front chuck is located on Winder Frame Panel 700 - Operator Side. When positioning chucks, the chuck designated as the “fixed” position chuck (either front or back may be so designated) should be positioned to align with the web’s trimmed edge. The “floating” chuck should be positioned to allow ease of chucking. Note: When positioning the “fixed” chuck, the chucks should be chucked without cores.
LOADING A PARENT ROLL ON THE UNWIND

The instructions that follow proceed from a point when the winder is at rest, no paper, spools, or cores are on the machine, and the hydraulic unit is 'ON'. When these conditions exist, use the following procedure to load a new parent roll onto the unwind:

1. Make sure the clutch is disengaged. If necessary, disengage it by pressing the CLUTCH DIS-ENGAGE button (on 560 or 650).

2. Make sure the unwind is centered. If necessary, use the UNWIND CENTER button on Panel 500.

   - NOTICE -

   Make sure that all requirements described in "General Safety" and "Operator Safety" have been met before proceeding further. Refer to those sections in this manual.

3. Lower the new parent roll (reelspool) into the seats by crane.

4. Remove the crane hooks from the parent roll.

5. Engage the clutch by pressing the CLUTCH ENGAGE button on Panel 560; the crane hook stop will automatically raise to prevent the spool from being lifted while the clutch is engaged.

6. If necessary, re-position the reel laterally by using the SIDELAY LEFT/RIGHT selector switch on Panel 500 or 560.

7. At the benchboard, set the unwind to feed paper from the top or the bottom of the parent roll.

   The parent roll is now ready, and threading can be started (see "Threading The Winder" in this section).
THREADING THE WINDER

The instructions that follow proceed from a point when the winder is at rest, a parent roll is on the unwind, all paper rolls have been removed from the windup section, and the hydraulic unit is 'ON'. When these conditions exist, use the following procedure to thread the winder.

1. Make sure that the parent roll is secured correctly in the unwind. (See "Loading A Parent Roll On The Unwind" in this section)

2. Cut or tear the sheet so that it tapers to a leading edge in line with, and slightly narrower than, the sheet threader.

3. Disengage the slitters with the INNER SLITTERS button on panel 700 or the benchboard. The lights in this control will go out when the slitters are disengaged.

⚠️ WARNING

Slitter knife edges can cut or sever hands and fingers. If inspection, blade changing, or manual relocation of slitters is necessary, the slitters must be disabled by turning the SLITTERS DISABLE/OPERATE key-switch on Panel 610 to its 'Disable' position before anyone enters the slitter area. Do not attempt to handle slitters while the blades are turning.

4. If any adjustment, relocation, or inspection of slitters is desired, turn the SLITTERS DISABLE/OPERATE pass-key selector on the Slitter Panel 650 to its 'Disable' position before proceeding further (see Warning above).

Note: Once the slitters have been disabled, the SLITTERS DISABLE/OPERATE control must be returned to its 'OPER' position before winding can be resumed.

5. When all slitter adjustments have been completed, perform the following at the benchboard:

   a. Use the Panel View to set the winder speed to zero (0) and to turn off the tension.

   b. Turn on the trim removal system. Use the TRIM SYSTEM control on the benchboard Panel View screen.

6. Prepare the windup, using the controls on Panel 700:

   Note: At this point the pocket should still be empty following the ejection of the last roll set. Use the following procedure to make sure that the rider roll, roll ejector, cradle, and core slides are in their required positions for threading up the new set:

   a. Make sure the rider roll is fully raised. Use the RIDER ROLL RAISE/LOWER selector if necessary.
b. Make sure roll ejector is fully retracted. Use the ROLL EJECTOR EJECT/RETURN selector switch.

c. Lower the cradle to its fully lowered position. This will provide access to the pocket for loading and taping cores later on. Use the CRADLE LOWER/RAISE selector.

d. Make sure the coreslides are fully lowered. Use the CORE SLIDES RAISE/LOWER selector switch.

e. Make sure the corechucks are unchucked. Use the CORE CHUCKS UNCHUCK/CHUCK selector.
Threading The Winder (continued)

f. Turn on the drum sheet threader. Use the DRUM SHT. THRDR selector.

Note: The threader air showers will turn on automatically when the drum sheet threader is turned on if the AIR SHOWERS OFF/AUTO/ON selector has been left in 'Auto' position.

g. At Slitter Panel 650, use the LEAD-IN SHT THRDR ENG/DISENG. selector turn on the lead-in sheet threader.

h. At the benchboard or Panel 700, press the THREAD button. The winder will start to run at thread speed.

7. At the benchboard, payout paper from the unwind as follows;

a. Set the unwind to payout from the top or bottom. Use the Panel View.

b. Activate the PERCENT UNWIND MANEUVER potentiometer by pressing the MANEUVER UNWIND button on the benchboard.

c. Using the PERCENT UNWIND MANEUVER potentiometer to control the unwind payout speed, payout enough paper from the unwind for the tapered leading edge of the sheet to reach the lead-in roll with some slack left for handling.

8. Thread the sheet through the winder as follows:

a. Guide the tapered leading edge of the sheet into the nip between the lead-in threader and the lead in roll. The sheet should then pass under the before slitter spreader, over the before slitter roll, and between the top and bottom slitters.

b. Turn on the slitter motors. Press the SLITTER MOTORS button on the benchboard.

c. Engage the trim slitters. Use the TRIM SLITTERS button on the benchboard.

d. From the front drum side of the winder, pull the sheet out from between the winder drums until the full width of the sheet reaches the drums. Straighten the sheet.

e. Turn on the tension. Use the TENSION ON button on the benchboard.

9. Engage the inner slitters. Use the INNER SLITTERS button on the benchboard or Panel 700.

10. Continue to feed the sheet until the slits reach the drum pocket.
11. Press the STOP button (on Panel 700 or the Benchboard); threading will stop.

12. Engage the sheet holder. Use the DRUM SHT. HLDR selector Winder Frame Panel 700.

13. Place cores in the drum pocket. (If cores were in the pocket before threading was started, this step will be unnecessary.)

14. Use the CORES UNCHUCK/CHUCK selector on panel 700 to engage the chucks with the cores.

15. Tear off the unused leading edge and attach the remaining web to the cores.

16. Lower the rider roll until it starts to "soft load" on the cores. Use the RIDER ROLL RAISE/LOWER selector on panel 700. The rider roll will automatically load at the correct starting nip.

17. Still at Winder Frame Panel 700, use the DRUM SHT. HLDR selector on Winder Frame Panel 700 to disengage the drum sheet holder.

18. Move the cradle to its fully raised position. Use the CRADLE LOWER/RAISE selector on panel 700.

19. Take up the slack. Use the PERCENT UNWIND MANEUVER on the benchboard.

Threading has now been completed and the winder is ready to run.

⚠️ WARNING ⚠️

Moving winder components and rotating paper rolls can pinch, crush, or trap people, resulting in severe injury or death. Always make sure all personnel are out of the operating zone before starting to run the winder.
STARTING THE WINDER

New roll sets are normally started for two reasons: winding has been interrupted to rethread the winder, or a new set is to be wound from the current parent roll after a set change.

STARTING THE WINDER AFTER THREAD-UP

- NOTICE -

The following conditions must exist before starting to run a new set: cradle is raised; rider roll is lowered and loaded; no rolls are in the pocket; roll ejector is in returned position; core chucks are lowered and engaged with the cores; drum sheet holder is disengaged; the tail is properly prepared; the winder is fully stopped, but no E-Stop conditions exist. Before starting, you must also make sure that the parameters have been set, the slitter motors are on, and the sheet has been threaded correctly.

When the above requirements have been met, use the following procedure to start a new set after thread-up:

**WARNING**

Moving winder components and rotating paper rolls can pinch, crush, or trap people, resulting in severe injury or death. Always make sure all personnel are out of the operating zone before starting to run the winder.

1. With the winder fully stopped, select a mode of operation.

   Bel-OIT can be used for most normal winder operation. If you need to switch modes, use the LARS MODE control on the Panel View. (See "Running the Winder" later in this section for full descriptions of both modes.) The winder must be at zero (0) speed and not in E-Stop before changing modes.

2. If a new Bel-OIT or LARS program is to be used for the next set, select the program to be run. (See the Bel-OIT User's Guide and/or "Operating in LARS Mode" as appropriate.)

   If the program used for the set just completed is to be repeated, proceed to step 4.

3. If new setpoints and stop-to's need to be entered for the new set, enter them now. (See the Bel-OIT User's Guide and/or "Operating in LARS Mode" as appropriate.)

   Note: Bel-OIT will only downloaded setpoints after the roll set has been ejected and before the rider roll is loaded.

4. Press the RUN button the Winder Drop 1 Panel on the benchboard.

   The winder will now start to run according to the program and setpoints selected in steps 2 and 3. For information about running the winder after it has started see "Running the Winder".
STARTING THE WINDER AFTER A SET CHANGE

New roll sets are normally started for two reasons: a new set is to be wound from the current parent roll after a set change; or winding has been interrupted to rethread the winder (see "Starting The Winder After Thread-up"). This section describes the procedure used in the first instance: starting after a set change.

NOTICE

The following conditions must exist before starting to run a new set: cradle is raised; rider roll is lowered and loaded; no rolls are in the pocket; roll ejector is in returned position; core chucks are lowered and engaged with the cores; drum sheet holder is disengaged; the tail is properly prepared; the winder is fully stopped, but no E-Stop conditions exist. Before starting, you must also make sure that the parameters have been set, the slitter motors are on, and the sheet has been threaded correctly.

When the above requirements have been met, use the following procedure to start a new set after thread-up:

1. With the winder fully stopped, accept or change the set plan for the next set as follows:

   Repeat Last Set
   If the program used for the set just completed is to be re-used, proceed to step 2.

   Change Bel-OIT Program
   If a new Bel-OIT program is to be used for the next set, select the program to be run. (See Bel-OIT User's Guide.)

   Change Mode
   To switch modes (Bel-OIT to LARS or LARS to Bel-OIT), use the Panel View.

   Change Set Points
   If new setpoints and stop-to's need to be entered for the new set, enter them now (See Bel-OIT User's Guide.)

WARNING

Moving winder components and rotating paper rolls can pinch, crush, or trap people, resulting in severe injury or death. Always make sure all personnel are out of the operating zone before starting to run the winder.

2. With all drive permissives met — there must be no fault messages on the Panel View screen — press the RUN button on the benchboard.

The winder will now start to run according to the program and setpoints selected in step 1. For information about running the winder after it has started see "Running the Winder".
RUNNING THE WINDER

A new set can be run when the following conditions exist: threading has been completed (see “Threading The Winder”), a mode of operation has been selected (see below), and any desired revisions to the “step-to” values have been made (“Starting The Winder”).

MODES OF WINDER OPERATION

There are two modes of operation: Bel-OIT and LARS (Lenox Automatic Roll Structure mode). Bel-OIT is a computerized winder control system that provides the operator with a fully automatic system for controlling the winding cycle. It enables the operator to regulate all roll structure and winder operating functions from the Bel-OIT keyboard and screen. LARS mode provides the operator with a choice of twenty preset roll plans, each containing a different combination of torque, tension, and rider roll settings and roll structure curves.

Bel-OIT Mode

The Bel-OIT system is a computerized winder control system that automatically regulates the winding cycle. It is operated from the Bel-OIT computer keyboard and screen on the benchboard.

The Bel-OIT system makes use of a database of winding programs containing all information needed to wind roll sets according to the specifications of existing set plan programs, and it provides the operator with the ability to modify any of those programs or to create entirely new ones. The system includes a database containing the grade, basis weight, caliper and density of all paper grades currently loaded in the system, and it provides data entry screens that are used to change tension, torque, and nip setpoints, to permanently store newly created or edited programs in the system's memory, or to delete programs when necessary.

For description of procedure used to initiate Bel-OIT operation, see "Running In Bel-OIT Mode" later in this section. For detailed information about operation in Bel-OIT mode, see the Bel-OIT User’s Guide.

LARS Mode

LARS (Lenox Auto Roll Structure) mode, which is the default mode of operation on this winder, provides the operator with a fully automatic system for inputting winding settings and parameters. The system includes up to twenty program slots, each of which is loaded with a different set of pre-programmed setpoints. To select a set of parameters, the operator need only input a two digit code into the Panel View keypad on the benchboard. LARS mode is initiated from the LARS MODE button on the Panel View. When operating in LARS mode, the winder runs automatically, according to the pre-selected roll-structure curves and setpoints (rider roll nip, drum torque, and web tension) contained in the program selected by the operator.

During LARS operation, web tension, torque, and rider roll nip can be adjusted (biased) by the operator to limits of +/-30% of the setpoint values of the LARS program currently in use.
SELECTING A MODE OF OPERATION

Selection of Bel-OIT or LARS as the mode of winder operation is determined by use of the LARS MODE and BEL-OIT MODE functions on the Panel View on the Benchboard. These functions "toggle" with each other: when one mode is active, the other is inactive. LARS is designed to be the default mode of operation on this winder, and it can remain active at all times unless there is a need to switch over to Bel-OIT.

Note: The winder must be at zero (0) speed, but not in E-Stop before there is a change made in the mode of operation.

BIASING CURVES

The term biasing refers to the raising or lowering of a curve without changing the proportional relationship of the setpoints (the shape) of the curve. Web tension, torque, and rider roll nip loading can all be biased +/- 30% in both LARS mode and Bel-OIT mode—while the winder is operating—by use of the Biasing screen in the Panel View on the benchboard.
Bel-OIT MODE OPERATION

Bel-OIT is a computerized winder control system that provides the operator with a fully automatic system for controlling the winding cycle set point values and curves. It enables the operator to regulate all roll structure functions from the Bel-OIT benchboard.

Bel-OIT mode makes use of a database of winding programs containing all information needed to wind roll sets according to the specifications of existing set plan programs, and it provides the operator with the ability to modify any of those programs or to create entirely new ones. The system includes a database containing the grade, basis weight, caliper and density of all paper grades currently loaded in the system, and it provides data entry screens that are used to change tension, torque, nip, and speed setpoints, to permanently store newly created or edited programs in the system's memory, or to delete programs when necessary.

This section provides an overview of the following: Bel-OIT functions, initiation of Bel-OIT mode operation, and running while in Bel-OIT mode. Refer to the Bel-OIT User’s Guide for detailed description of the procedures used to operate the Bel-OIT system.

Bel-OIT Mode Functions

The Bel-OIT system consists of four major functional components, which are as follows:

- Existing Roll Sets Database
- Winder Curve and Stop Control
- Error Message System
- Maintenance Message System

The Winder Curve functions are used to regulate speed, tension, torque, and nip values involved with winding cycle curves. Curves can be loaded directly from the database into the system without editing, or their set points can be modified to meet changes desired by the operator.

Existing Roll Sets Database

The View Existing Sets screen contains a list of all existing roll sets that have been entered into the database. Each roll set on the list is described according to code, customer, order, grade, and operator notes as entered by the operator.

Viewing, Creating, and Editing Set-Point Curves

Editing screens are used to view, create and edit set-point curves. The following screens are used for that purpose: Speed Versus Diameter screen, Tension Versus Diameter screen, Torque Versus Diameter screen, and Nip Versus Diameter screen.

Creating New Roll Set Plans and Editing Existing Roll Set Plans

Screens containing entry fields for order number, customer's name, paper grade, and notes are provided to create new roll set plans or to edit plans of sets that have already been wound.
Biasing in Bel-OIT
Web tension, torque, and rider roll nip loading can all be biased +/- 30% in both LARS mode and Bel-OIT mode--while the winder is operating--by use of the Biasing screen in the Panel View on the benchboard.

Error Messages and Maintenance Messages
The Error Message and Maintenance Message systems provide automatic, on-screen warning message displays of error and maintenance conditions that require attention. The Error Message System comes pre-loaded with a list of error messages, and it provides system user’s with the ability to describe new ones. It also provides a listing of current errors and a history of past errors on the current shift. Maintenance messages can be viewed, created, and edited; they are displayed on-screen by an on-line, "Maintenance Announcer" window, which automatically displays on-screen warning messages when a maintenance item needs immediate attention.
Running In Bel-OIT Mode

Bel-OIT mode is initiated by pressing the BEL-OIT MODE function key on the Panel View on the benchboard. Once active, Bel-OIT is operated, in combination with the procedures described in the Bel-OIT User's Guide, as follows:

⚠ WARNING ⚠

Moving winder components and rotating paper rolls can pinch, crush, or trap people, resulting in severe injury or death. Always make sure all personnel are out of the operating zone before starting to run the winder.

1. When all preparations have been completed (see "Threading The Winder" and "Starting the Winder") and the winder has been put into Bel-OIT mode with the BEL-OIT MODE function key on the Panel View, press the RUN button on the bench-board. The winder will start to run automatically according to the program and setpoints selected in "Starting the Winder". (For a general description of Bel-OIT mode, see "Bel-OIT Mode" and "Bel-OIT Mode Operation" in this manual; for details about use of the Bel-OIT system, see the Bel-OIT User's Guide.)

   The winder will now start to run according to the Bel-OIT program selected by the operator, and it will continue to wind the set until stopped by one of the stop-to values in the roll plan being run or by the operator's use of one of the Stop buttons (see "Stopping The Winder").

2. Make sure that proper tension is maintained. Use the tension control functions in the Panel View.

3. Make sure the slits are not running together; adjust the spreader if they are. (See "Spreader" section for details.)

4. When the set has been completed, remove it from the winder as described in "Removing Rolls: Set Changing" in this manual.
LARS MODE OPERATION

LARS (Lenox Auto Roll Structure) provides a selection of twenty roll plan programs, each of which is loaded with a different set of pre-programmed setpoints that define a roll plan program. LARS mode is initiated and LARS programs are selected on the Panel View. When operating in LARS mode, the winder runs automatically, according to the pre-selected roll-structure curves and setpoints (inside roll nip, drum torque, and web tension) contained in the program that has been selected. The sections that follow describe this process in greater detail.

Running In Lars Mode

LARS mode is initiated by pressing the LARS MODE function key on the Panel View on the benchboard. Once active, the LARS system is operated as follows:

1. When the winder is fully stopped and all prerequisites for running have been met (see "Starting the Winder"), initiate LARS mode by pressing the LARS MODE button on the Panel View on the Benchboard.

2. At the Panel View, enter the number of the desired LARS program. The program number is all that needs to be entered. All setpoint values are automatically pre-set by the LARS program.

Note: It is possible to have LARS programs altered and/or added to your LARS system. If such changes are required, please contact the BELOIT Lenox Winder Service Center.

WARNING

Moving winder components and rotating paper rolls can pinch, crush, or trap people, resulting in severe injury or death. Always make sure all personnel are out of the operating zone before starting to run the winder.

3. Press the RUN button on the benchboard.

The winder will now run in LARS mode until stopped by one of the stop-to values in the program or by the operator's use of one of the Stop buttons (see "Stopping The Winder")

4. Make sure that proper tension is maintained. Tension can be biased while the winder is running through use of the Tension biasing INCR and DECR functions in the Panel View.

5. Make sure the slits are not running together; adjust the spreader if they are.

6. When the set has been completed, remove it from the winder as described in "Removing Rolls: Set Changing".

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Winder Operation Manual
USING THE PANEL VIEW

The Panel View is used to activate the Bel-OIT and LARS systems, to control a wide variety of basic winder functions, and to select, display, enter, and edit the setpoint values used by the LARS system.

There are eleven selections on the Main Menu: Machine Setup, Winder Control, Roll Structure Bias, Roll Structure Setup, Winder Drive Setup, Winder Running, Winder Calibration, Hydraulic system Status, Tension Feedback, and Rider Roll Control. Each of these selections are made by use of the function keys (F1 through F20) which are used to access the screens that are used to enter and edit LARS and Bel-OIT information.

The Panel View Keypad

The keypad is used to enter, edit and select LARS programs and program values. To do this, the keypad employs ten numeric keys, an "enter" key (the long left-arrow key), and a CANCEL key.

Note: Not all values displayed on the screens can be edited; some are for "viewing only". The values that can be edited are usually displayed in white. Refer to the instructions in the following pages to see which values can be edited on specific Panel View screens.
Editing Values With the Panel View Keypad

Use the following procedure to input and edit on-screen values with the Panel View keypad:

1. Press the function key of the function you want to edit. A data entry banner that will appear across the top of the screen prompting the user to enter a new value:

   Enter New Value or press CANCEL.  
   NN.N

2. Type in the new value at the numeric keypad; it will appear in the data banner. If you want to correct the value, either press the keypad’s backspace key to erase one digit at a time or press CANCEL to erase the whole entry, and then type in the corrected value.

3. Once you are satisfied with the value in the keypad display, press the keypad’s ENTER key. If the new value is within the acceptable range of the system, the PLC will accept it and load it into memory. If the value is not acceptable, an error message will display in a banner at the bottom of the keypad, prompting you to press F8 and enter an acceptable value. If such an error message occurs, press F8 as prompted, and use the procedures just described to enter an acceptable value.
The Panel View Main Menu

The Main Menu is used to select the Panel View’s data entry display screens.

Main Menu Selection Keys

The function keys are used to access the Panel View screens as listed below.

<table>
<thead>
<tr>
<th>Function Key</th>
<th>Screen</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1</td>
<td>Machine Setup Screen</td>
</tr>
<tr>
<td>F2</td>
<td>Winder Control Screen</td>
</tr>
<tr>
<td>F3</td>
<td>Roll Structure Bias Screen</td>
</tr>
<tr>
<td>F4</td>
<td>Roll Structure Setup Screen</td>
</tr>
<tr>
<td>F5</td>
<td>Winder Drive Setup Screen</td>
</tr>
<tr>
<td>F6</td>
<td>Winder Running Screen</td>
</tr>
<tr>
<td>F7</td>
<td>Winder Calibration Screen</td>
</tr>
<tr>
<td>F8</td>
<td>Hydraulic System Status Screen</td>
</tr>
<tr>
<td>F18</td>
<td>Trim Bias Control Screen</td>
</tr>
<tr>
<td>F19</td>
<td>Tension Feedback Screen</td>
</tr>
<tr>
<td>F20</td>
<td>Rider Roll Control Screen</td>
</tr>
</tbody>
</table>
Machine Setup Screen

The Machine Setup screen is a viewing-only screen that displays the maximum speed, tension range, maximum/minimum sheet width, rider roll hydraulic cylinder area and PSI/PLI ratings, maximum available torque, and calibration settings of the three tension load cells.

This screen is accessed by pressing the F1 key. To return to the Main Menu, press F16.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Speed</td>
<td>7500 FPM</td>
</tr>
<tr>
<td>Tension Range</td>
<td>1 - 4 PLI</td>
</tr>
<tr>
<td>Maximum Width</td>
<td>208 INCHES</td>
</tr>
<tr>
<td>Minimum Width</td>
<td>191 INCHES</td>
</tr>
<tr>
<td>Rider Roll Cyl. Area</td>
<td>6.8477 IN²</td>
</tr>
<tr>
<td>Rider Roll Cyl. PSI/PLI</td>
<td>30</td>
</tr>
<tr>
<td>Max. Torque Ft-Lbs</td>
<td>700</td>
</tr>
<tr>
<td>Load Cell Calibration</td>
<td>LC-----B-----LC</td>
</tr>
<tr>
<td></td>
<td>200 200 200 200</td>
</tr>
</tbody>
</table>

Press F16

MAIN
Winder Control Screen

The Machine Setup screen is used to select the mode of winder operation (LARS or Bel-OIT mode), to activate/deactivate web tension control, and to control unwind direction, oscillation, and unwind maneuver (payout/takeup) functions.

This screen is accessed by pressing the F2 key at the Main Menu. To return to the Main Menu, press F16.

Function Keys on the Winder Control Screen

F1: BEL-OIT MODE Used to activate Bel-OIT mode. This control toggles on/off with the LARS MODE function.

F9: LARS MODE Used to activate LARS mode. This control toggles on/off with the Bel-OIT mode function.

F3: UNWIND MOTOR COOLING Used to turn the unwind motor cooling blower on and off. This control will flash if the blower does not respond to the 'On' command.

F5: UNWIND OVER Used to set the unwind to feed paper from the top of the parent roll. This control toggles on/off with the UNWIND UNDER function.

F13: UNWIND UNDER Used to set the unwind to feed paper from the bottom of the parent roll. This control toggles on/off with the UNWIND OVER function.
Function Keys on the Winder Control Screen (continued)

F7: UNWIND MANVER BENCHBOARD
    Used to select the payout/takeup potentiometer on the benchboard. This control toggles on/off with the UNWIND MANVER STATION 500 function.

F15: UNWIND MANVER STATION 500
    Used to select the payout/takeup potentiometer on Unwind Control Panel 500. This control toggles on/off with the UNWIND MANVER STATION BENCHBOARD function.

F8: LAMP TEST
    Used to test the lamps on all winder panels and control stations.

F21: TRIM SYSTEM
    Toggle* style on/off function button that is used to turn slitter trim removal system on and off.

F16: MAIN
    Used to return to the Main Menu.
Roll Structure Bias Screen

The Roll Structure Bias screen is used to adjust (bias) tension, rider roll load, and torque. The INCR and DECR functions on this screen are used to raise and lower the setpoints, which are displayed graphically by the bar graphs and as text in the data fields.

This screen is accessed by pressing the F3 key at the Main Menu. To return to the Main Menu, press F17.

Roll Structure Bias Screen Display Values

The tension, torque, and rider roll loading setpoints, which, along with the current feedback for those functions, are displayed graphically on the TENSION BIAS, RIDER ROLL BIAS, and TORQUE BIAS graphs (SP = setpoint; FB = feed back). Those setpoints are also displayed as text in the fields below the graphs, e.g., TENSION SET POINT 3.7 PLI. The maximum setpoints are displayed above the graphs, e.g., TENSION BIAS 4.0 PLI 4.0 PLI, and the percentage of bias is displayed in the fields below the function buttons, e.g., BIAS = 3.0%. These fields display the current values in the system on an on-line basis.

Function Keys on The Roll Structure Bias Screen

The following function keys are used to bias tension, torque, and rider roll loading as follows:

F1 Used to increase (bias) the tension setpoint, as displayed in the "SP" column of the TENSION BIAS graph, to the unwind drive. This control allows for biasing of this setpoint by up to +30%.

F2 Used to decrease (bias) the tension setpoint, as displayed in the "SP" column of the TENSION BIAS graph, to the unwind drive. This control allows for the trimming of this setpoint by up to -30%.
Function Keys on The Roll Structure Bias Screen (continued)

F4  Used to *increase (bias) the rider roll loading pressure setpoint* to the Beloit air-over-oil valve, as displayed in the "SP" column of the RIDER ROLL BIAS graph. This control allows for biasing of this setpoint by up to +30%.

F5  Used to *decrease (bias) the rider roll loading pressure setpoint* to the Beloit air-over-oil valve, as displayed in the "SP" column of the RIDE ROLL BIAS graph. This control allows for the trimming of this setpoint by up to –30%.

F7  Used to *increase (bias) the torque setpoint*, as displayed in the "SP" column of the TORQUE BIAS graph, to the winder drums. This control allows for the biasing of this setpoint by up to +30%.

F8  Used to *decrease (bias) the torque setpoint*, as displayed in the "SP" column of the TORQUE BIAS graph, to the winder drums. It allows for the trimming of this setpoint by up to -30%.

F17 Used to exit the current screen and return to the Main Menu.
Roll Structure Setup Screen

The Roll Structure Setup screen is used to enter the LARS program number and to input setpoint values for starting rider roll loading, shipping diameter, tension, starting torque, torque break diameter, and minimum torque diameter, which are displayed on a current, on-line basis in the data fields on the screen, e.g., RR LOAD = 5.0 PLI and TORQUE = 0 FT-LBS.

This screen is accessed by pressing the F4 key at the Main Menu. To return to the Main Menu, press F17.

<table>
<thead>
<tr>
<th>CURRENT SETPOINTS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>STARTING RIDER ROLL LOAD</td>
<td>SHEET TENSION</td>
</tr>
<tr>
<td>N</td>
<td>N</td>
</tr>
</tbody>
</table>

Function Keys on the Roll Structure Setup Screen

The function keys on this screen are used to enter and edit LARS roll structure setpoints. These buttons are available for use at all times when LARS mode is active, but only one of them can be activated at a time.

F1: STARTING RIDER ROLL LOAD  Used to activate the keypad for entry of the starting rider-roll-loading setpoint.

F2: SHIPPING ROLL DIAMETER  Used to activate the keypad for entry of the final roll diameter.

F3: SHEET TENSION  Used to activate the keypad for entry of web tension setpoint.

F4: STARTING TORQUE  Used to activate the keypad for entry of the starting torque setpoint. This value represents the front/back drum torque differential at core diameter in foot pounds.
Function Keys on the Roll Structure Setup Screen (continued)

F5: TORQUE BREAK DIAMETER  Used to activate the keypad for entry of the roll diameter at which the torque differential starts to be reduced.

F6: MINIMUM TORQUE DIAMETER  Used to activate the keypad for entry of the roll diameter at which the torque differential reaches to its lowest setting for the current roll set.

F7: LARS PROGRAM NUMBER  Used in combination with the keypad to enter LARS program numbers.

F17: MAIN SCREEN  Used to exit the current screen and return to the Main Screen.

Changing LARS Program Numbers
Use the following procedure to change the LARS program number:

1. Press the F7 key. The current program no. will appear in the LARS PROGRAM NUMBER field.

2. With the winder at zero (0) speed, type in the new program number at the Panel View’s numeric keypad. The number typed in will appear in the display.

3. Press the keypad "ENTER" key. The new LARS program number will be entered into the system and will replace the previous number in the LARS PROGRAM NUMBER field.

Editing Roll Structure Setup Values at the Panel View Keypad
Use the following procedure to input and edit on-screen values with the Panel View keypad:

1. Press the function key of the function you want to edit. A data entry banner that will appear across the top of the screen prompting the user to enter a new value:

   Enter New Value or press CANCEL. \( NN.N \)

2. Type in the new value at the numeric keypad; it will appear in the data banner. If you want to correct the value, either press the keypad’s backspace key to erase one digit at a time or press CANCEL to erase the whole entry, and then type in the corrected value.

3. Once you are satisfied with the value in the keypad display, press the keypad’s ENTER key. If the new value is within the acceptable range of the system, the PLC will accept it and load it into memory. If the value is not acceptable, an error message will display in a banner at the bottom of the keypad, prompting you to press F8 and enter an acceptable value. If such an error message occurs, press F8 as prompted, and use the procedures just described to enter an acceptable value in the data entry banner.
Winder Drive Setup Screen

The Winder Drive Setup screen is used to enter the LARS stop-to values, paper data, and core outside diameter, which are displayed on a current, on-line basis in the data fields on the screen.

This screen is accessed by pressing the F5 key at the Main Menu. To return to the Main Menu, press F17.

### CURRENT SET POINTS

<table>
<thead>
<tr>
<th>CORE DIAMETER</th>
<th>STARTING UNWIND I.O.P.</th>
<th>BASIS WEIGHT</th>
<th>SINGLE SHEET CALIPER</th>
<th>STOP-TO UNWIND I.O.P.</th>
<th>STOP-TO REWIND DIA.</th>
<th>STOP-TO REWIND LENGTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>INCHES</td>
<td>INCHES</td>
<td>Mils.</td>
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<td>( r - N )</td>
</tr>
</tbody>
</table>

**Function Keys on the Winder Drive Setup Screen**

The function keys on this screen are used to enter and edit the stop-to values into the LARS system. These buttons are available for use at all times when LARS mode is active, but only one of them can be activated at a time. The screen display of the function currently active will be highlighted.

**F1: CORE DIAMETER**

Used to activate the keypad for entry of the core diameter.

**F2: STARTING UNWIND I.O.P**

Used to activate the keypad for entry of the starting inches of paper on the unwind.

**F3: BASIS WEIGHT**

Used to activate the keypad for display and entry of the basis weight of the paper being run.

**F4: SINGLE SHEET CALIPER**

Used to activate the keypad for display and entry of the caliper the paper being run.
Function Keys on the Winder Drive Setup Screen (continued)

F6: STOP TO UNWIND IOP
Used to activate the keypad for entry of the stop-to diameter, in inches, of paper on the unwind.

F7: STOP TO REWIND DIAM
Used to activate the keypad for entry of the stop-to diameter, in inches, of the roll set in the pocket.

F8: STOP TO REWIND LENGTH
Used to activate the keypad for entry of the rewind stop-to length.

F17: MAIN SCREEN
Used to exit the current screen and return to the Main Screen.

Editing Winder Drive Setup Values At The Keypad
Use the following procedure to input and edit on-screen values with the Panel View keypad:

1. Press the function key of the function you want to edit. A data entry banner that will appear across the top of the screen prompting the user to enter a new value:

   Enter New Value or press CANCEL. NN,N

2. Type in the new value at the numeric keypad; it will appear in the data banner. If you want to correct the value, either press the keypad’s backspace key to erase one digit at a time or press CANCEL to erase the whole entry, and then type in the corrected value.

3. Once you are satisfied with the value in the keypad display, press the keypad’s ENTER key. If the new value is within the acceptable range of the system, the PLC will accept it and load it into memory. If the value is not acceptable, an error message will display in a banner at the bottom of the keypad, prompting you to press F8 and enter an acceptable value. If such an error message occurs, press F8 as prompted, and use the procedures just described to enter an acceptable value in the data entry banner.
Winder Running Screen

The Winder Running screen is used to adjust speed settings and to display current tension, speed, torque, and rewind diameter values. This screen also includes a window used for selection of stopping-modes (the 'Select Desired Stop-To Mode' window) and the Running Status display, which displays the winder drive's current run-permissive status.

This screen is accessed by pressing the F6 key at the Main Menu. To return to the Main Menu, press F16.

Winder Running Screen Data and Status Displays

At the top of this screen, current, on-line feedback is displayed for the following data fields: ACTUAL UNWIND IOP, TENSION AVERAGE, RR LOAD, TORQUE, REWIND DIAMETER, ACTUAL SPEED, and SPEED SETPOINT. A running status window, which displays the winder's current status (stopped, jogging, threading, running, or ready to run) is located at the lower left of the screen.

The tension display shows the current average tension of the three load cells (front, middle, and back). The RR LOAD display shows the current amount of loading of the rideur roll. REWIND DIAMETER displays current diameter of the roll set in the pocket. ACTUAL SPEED displays the current actual speed of the winder. The eighth field in that group, SPEED SETPOINT, displays the current speed setpoint as entered with the SPEED SETPOINT function. Temporary modifications can be made to the current actual speed with the "ramp speed" and "increase/decrease function keys described below.
Function Keys on the Winder Running Screen

The function buttons on this screen are used to enter and edit data as follows:

F1: CURSOR Used to make selections in the SELECT DESIRED STOP-TO MODE window.

F2: ENTER Used to make selections in the SELECT DESIRED STOP-TO MODE window.

F3: AUTO STOP-TO OVERRIDE Used during LARS and Bel-OIT operation to temporarily override the current stop to values. When this function is active, the winder will only stop when the operator presses a STOP button or the maximum roll diameter is reached.

F5: TENSION INCREASE Used to increase the current sheet tension.

F13: TENSION DECREASE Used to increase the current sheet tension.

F6: INCREASE SPEED Used to increase the current speed of the winder.

F14: DECREASE SPEED Used to decrease the current speed of the winder.

F19: SPEED SETPOINT Used to activate the keypad for entry of the speed setpoint, which is the speed setting that the LARS system will use as its fixed, "pre-set" running speed during this set.

F20: BEL-OIT SPEED OVERRIDE Used during Bel-OIT operation to temporarily override the Bel-OIT speed curve. When this function is active, winder speed can be controlled by the use of the Panel View controls.

F15: BIAS Used to exit this screen and go to the Roll Structure Bias screen, which is used to bias tension, torque, and rider roll settings.

F16: MAIN Used to exit this screen and return to the Main Menu.
The "SELECT DESIRED STOP-TO MODE" Window

The "Select Desired Stop-To Mode" window is used to display current stop-to values and to and select the mode for stopping the winder when operating in LARS mode: manually, stop-to inches of paper or the winder according to roll diameter, or stop-to sheet length in feet divided by 10. Selection is made in this window with the F1 CURSOR and F2 ENTER function keys.

Note: This window is not active in Bel-OIT mode.

MANUAL STOP
Selection of this function cancels all auto-stops; the winder will run until maximum diameter is reached or a manual stop is made by the operator.

REWIND DIAM
Selection of this function will set the winder to stop at the value displayed. The value displayed is the one that was set on the Winder Drive Set Up Screen.

REWIND LENGTH
Selection of this function will set the winder to stop at the value displayed. The value displayed is the one that was set on the Winder Drive Set Up Screen.

Running-Status Display

Running Status Display, which is located at the lower left of this screen, displays the winder drive's current running status. There are five possible messages, as follows:

  WNDER IS READY TO RUN
  WNDER IS IN RUN MODE
  WNDER IS STOPPING
  WNDER IS STOPPED
  WNDER IS IN THREAD
  WNDER IS IN JOG
Calibration Screen

The Calibration screen is used to calibrate the rider roll load valve. This is not an operator screen—a password is required to call this screen to the display—and it should only be used by BELOIT Lenox personnel or authorized mill personnel with full BELOIT Lenox training. This screen is accessed by pressing the F7 key at the Main Menu. To return to the Main Menu, press F16.

- NOTICE -

The calibration screen is not used during regular operation. It is for use by authorized setup personnel only. Use of this screen can cause changes in rider roll calibration. It should not be used as a part of regular winding operation. Calibration is performed during start-up by Beloit Lenox personnel. If conditions require re-calibration at some later date, that procedure should only be performed by authorized, BELOIT Lenox trained personnel.
Hydraulic System Screen

The Hydraulic System Status screen is a viewing-only screen that displays the current operating status of hydraulic system components. The viewing boxes below each of the functions display the current condition for that function. For example, the HYDRAULIC OIL TEMPERATURE will ordinarily display the message TEMP NORMAL, but if the temperature were to exceed the permissible upper limit, this control would flash and "Temp High" would be displayed instead.

In like manner, HYDRAULIC OIL LEVEL and HYDRAULIC OIL PRESSURE would flash LEVEL LOW and PRESSURE LOW messages if those conditions were to occur. HYDRAULIC PRESSURE FILTER, HYDRAULIC RECIRC FILTER, and HYDRAULIC TANK FILTER would display a FILTER CLOGGED message if that should occur.

This screen is accessed by pressing the F8 key at the Main Menu. To return to the Main Menu, press F16.
Tension Feedback Screen

The Tension Feedback screen displays the following tension information: tension setpoint of the LARS program currently being used (SETPOINT); on-line display of the actual tension at the three load cells (FRONT FEEDBACK, MIDDLE FEEDBACK, and BACK FEEDBACK); and on-line display of the average feedback level of the three load cells (AVERAGE FEEDBACK).

Note: This is a viewing-only screen. To control the tension system and to make changes in the tension level see the Machine Setup screen and the Roll Structure Bias screen.

This screen is accessed by pressing F19 on the Main Menu. To return to the Main Menu, press the F17 key.
Articulating Rider Roll Control Screen

The Articulating Rider Roll Control screen is used to initialize the rider roll and to set it for articulating or non-articulating operation.

This screen is accessed by pressing F19 on the Main Menu. To return to the Main Menu, press the F17 key.

--- NOTICE ---

Do not use the function keys on this screen without a full knowledge of Articulating Rider Roll operation. See the "Articulating Rider Roll" section in this manual.

Function Keys on the Articulating Rider Roll Screen

F1: INITIALIZE WHEELS Used to set the rider roll for operation after a new trim plan has been selected or if a wheel change has been made (see the "Articulating Rider Roll" section in this manual.

F4: STRAIGHT RIDER ROLL Used to initiate non-articulating operation.

F5: ARTICULATING RIDER ROLL Used to initiate articulating operation.

F17: Used to exit this screen and return to the Main Menu.
Trim Blower Biasing Screen

The Trim Blower Biasing Screen is used to increase or decrease the speed of the blower in the trim removal system +/- 10%.

This screen is accessed by pressing F18 on the Main Menu. To return to the Main Menu, press F17.

**Function Keys on the Trim Blower Biasing Screen**

**INCREASE F1:** Pressing F1 will increase trim blower speed by an increment of 1% each time it is pressed.

**DECREASE F3:** Pressing F3 will decrease trim blower speed by an increment of 1% each time it is pressed.

**F17:** Used to exit this screen and return to the Main Menu.
STOPPING THE WINDER

There are four ways to stop the winder: MANUAL STOP, AUTOMATIC STOP, EMERGENCY-STOP, and COAST STOP.

Manual Stop

Manual Stop is effected by pressing the STOP button on the Winder Frame Control Panel - Operator's Side or the benchboard. During normal operation, a "Manual Stop" can be used to bring the winder to a controlled stop when the operator observes the roll approaching the finished diameter. After the button is pressed, the winder decelerates to a controlled stop, maintaining the decel rate, sheet tension level, etc, that were preset in the set's parameters.

Automatic Stop

Automatic Stop is a controlled form of stopping that is invoked automatically by the drive when pre-set roll size diameter or length have been reached during winding. When Invoked, "Automatic Stop" brings the winder to a controlled stop.

Emergency-Stop

Emergency-Stop is used to bring the winder to its fastest stop for most emergencies and sheet breaks. E-STOP buttons are located on the Benchboard and all of the winder’s control panels. When E-STOP is pressed, the drive decelerates the machine at its maximum amperage rating. The sheet may or may not break as a result of using E-Stop, depending on the roll size in the unwind and other variables, but conditions requiring an emergency stop are likely to cause re-threading and splicing to be considered of relatively minor consequence.

Note: After E-STOP has been used, the RESET button must be pressed and all E-STOP buttons must be up before the winder can be restarted.

Coast Stop

Coast Stop, which is initiated by use of the COAST STOP button, is a specialized form of emergency stop that brings the winder to a gradual, non-powered, "coasting" stop by disconnecting power to the main drive and deactivating all drive controls. When COAST STOP is used, the pneumatic unwind brake automatically applies braking to prevent uncontrolled payout of the parent roll.

Because use of COAST STOP makes it impossible to make any further use of the winder controls, it should be used only in emergencies, such as fire (actual or potential), when it is imperative that all power and electrical circuits in the winder must be disconnected.

Note: When COAST STOP is used, the machine may continue running for a considerable amount of time because of the built up inertial forces within the system. After COAST STOP has been used, the coast-stop reset button (see drive manufacturer documentation) will have to be pressed before the winder can be restarted.
REMOVING ROLLS: SET CHANGING

Set changing includes two major operations: removal of the completed roll set and preparation of the new set. Removal can be assisted with the AUTO EJECT function or it can be done manually. The interlocks, designed to prevent injuries and damage to equipment, require that roll removal operations be controlled from the Winder Frame Panel 700 as described in the following procedures.

**WARNING**

Moving winder components and rotating paper rolls can pinch, crush, or trap people, resulting in severe injury or death. Always make sure all personnel are out of the operating zone before removing rolls from the winder.

Manual Set Changing

Use the following procedure when changing rewound roll sets manually.

Removing the Completed Roll Set

Steps 1 through 10 describe the first part of the procedure: removing the rolls. The procedure for preparing the new set is described in steps 11 through 17.

---

**NOTICE**

The procedure that follows is performed when the following conditions exist: the winder has come to a complete stop, no E Stop conditions exist, the rewound roll set is in the pocket, and the web is still attached to the roll set.

1. Fully raise the rider roll. Use the RIDER ROLL LOWER/RAISE selector switch. The rider roll safety latch will engage automatically and the RIDER ROLL LATCHED indicator will light up when the rider roll reaches its fully raised position.

2. Unchuck from the cores. Use the CORES CHUCKS CHUCK/UNCHUCK selector.

3. Fully raise the coreslides. Use the CORE SLIDES LOWER/RAISE selector.

4. Engage the sheet holder. Turn the DRUM SHT. HLDR OFF/ON selector to 'On'.

5. Lower the cradle to its fully lowered position in order to provide access to the pocket. Turn the CRADLE RAISE/LOWER selector to 'Lower' and hold it until the cradle is fully lowered.

6. Sever the sheet and tape the tails to the rolls.

7. Return the cradle to its fully raised position. Use the CRADLE RAISE/LOWER selector.
Manual Set Changing (continued)

8. Eject the roll-set from the winding pocket to the raised cradle by holding the ROLL EJECTOR RETURN/EJECT selector in 'Eject' position.

Note: The ejector and the cradle are designed to be moved together during ejection. Once the roll has passed over the front drum, however, the ROLL EJECTOR RETURN/EJECT selector can be used to return the ejector to its "return" position.

9. Use the CRADLE RAISE/LOWER selector to lower the cradle and discharge the rolls.

Note: The cradle will normally remain lowered until all core preparation has been completed and the next cycle is ready to start.

10. If the ejector was not returned in step 8, do so now by holding the ROLL EJECTOR RETURN/EJECT selector in 'Return' position. The ejector will move to its return position.

At this point, the old set has been discharged and the following conditions for starting the next set exist: the winding pocket is empty and ready to receive new cores; the web from the slitter section is held against the rear drum by the sheet holder with the web's leading edge ready to be attached to the cores; the cradle is still in its fully lowered position, providing access to the winding pocket to load and tape the new set of cores.

Preparing the New Roll Set

Steps 1 through 10 described removal of the completed roll sets. Steps 11 through 17 describe the procedure for preparing the new set.

11. Load new cores into the pocket.

12. Lower the core slides. Use the CORE SLIDES LOWER/RAISE selector.

13. Chuck up the cores. Use the CORES CHUCKS CHUCK/UNCHUCK selector.

14. Attach the leading edge of the web to the cores.

15. Lower the rider roll until it starts to "soft load" on the cores. Use the RIDER ROLL LOWER/RAISE selector switch.

16. Disengage the drum sheet holder. Turn the DRUM SHT. HLDR OFF/ON selector to 'Off'.

17. Raise the cradle to its fully raised position. Hold the CRADLE RAISE/LOWER selector in its 'Raise' position until the cradle reaches its fully raised position.

At this point the set change has been completed. To start up the winder for the next roll set, see "Starting the Winder" in this manual.
Set Changing With Auto Eject

Use the following procedure when set changing with Auto Eject.

⚠️ WARNING ⚠️

Moving winder components and rotating paper rolls can pinch, crush, or trap people, resulting in severe injury or death. Always make sure all personnel are out of the operating zone before removing rolls from the winder.

Removing the Completed Roll Set

Steps 1 through 6 describe the first part of the procedure: removing the rolls with Auto Eject. The procedure for preparing the new set is described in steps 7 through 13.

− NOTICE −

The procedure that follows is performed when the following conditions exist: the winder has come to a complete stop, no E Stop conditions exist, the rewound roll set is in the pocket, and the web is still attached to the roll set.

1. Lower the cradle to its fully lowered position in order to provide access to the pocket. Hold the CRADLE RAISE/LOWER selector in its 'Lower' position until the cradle is fully lowered.

2. Engage the sheet holder by turning the DRUM SHT. HLDR OFF/ON selector to 'On'.

3. Sever the sheet and tape the tails to the rolls.

4. Return the cradle to its fully raised position. Use the CRADLE RAISE/LOWER selector.

5. Press the AUTO EJECT button. The winder will perform the automatic eject cycle as follows: the rider roll will raise, the core chucks will unchuck and raise, and the roll ejector will push the roll set into the cradle (which is in its fully raised position) and the ejector, roll set, and cradle will then move together, as a unit, in discharge direction.

   The roll set and cradle will continue to move in discharge direction until they come to rest at a pre-set "hold" position slightly above the fully lowered position, but the ejector will reverse its direction and start moving toward its "returned" position.

6. With the cradle in "hold" position, make sure that all personnel are clear of the discharge area and use the CRADLE RAISE/LOWER selector to lower the cradle and discharge the rolls.

   Note: The cradle will normally remain lowered until all core preparation has been competed and the next cycle is ready to start.
Set Changing With Auto Eject (continued)

At this point, the old set has been discharged and the following conditions for starting the next set exist: the winding pocket is empty and ready to receive new cores; the web from the slitter section is held against the rear drum by the sheet holder with the leading edge ready to be attached to the cores; the cradle is still in its fully lowered position, providing access to the winding pocket to load and tape the cores.

Preparing the New Roll Set

Steps 1 through 7 described removal of the completed roll sets. Steps 7 through 13 describe the procedure for preparing the new set.

7. Load new cores into the pocket.

8. Lower the core slides. Use the CORE SLIDES LOWER/RAISE selector.

9. Chuck up the cores. Use the CORE CHUCKS CHUCK/UNCHUCK selector.

10. Attach the leading edge of the web to the cores.

11. Lower the rider roll until it starts to "soft load" on the cores. Use the RIDER ROLL LOWER/RAISE selector.

12. Disengage the sheet holder by turning the DRUM SHT. HLDR OFF/ON selector to 'Off'.

13. Raise the cradle to its fully raised position. Hold the CRADLE RAISE/LOWER selector in its 'Raise' position until the cradle reaches its fully raised position.

At this point the set change has been completed. To start up the winder for the next roll set, see "Starting the Winder" in this manual.
WEB SPLICING

Splices can be made at two places: in the winder, or at the unwind stand. The best location to use in any particular instance is determined by the conditions that make the splice necessary. Some examples are as follows:

- If the sheet breaks for some reason during the winding cycle, the splice will have to be made at the winder.

- If there is a partially rewound roll in the winder when the parent roll expires (or if there is an existing splice in the parent roll) and the winder can be stopped before the tail is pulled into the winder, the splice can be made at the unwind. This will often prove to be faster than making the splice at the winder, and it also makes it possible for the splice and the new sheet to be trimmed as they are fed through the slitters.)

In either case, the splice must be made without creating wrinkles in the sheet or offsets in the roll, which may require some practice to achieve the desired results.

Splicing at the Unwind

Use the following procedure to splice at the Unwind (see Trailing Edge and Leading Edge splicing illustrations).

⚠️ WARNING

Rotating paper rolls and unexpected movement of winder components caused by accidental startup of the equipment can pinch, crush, or trap people. Before splicing is started, the winder must be stopped, and all personnel in the area must be alerted that someone is working in the winder's operating zone. Tags should be placed on the controls to warn against accidental startup.

Trailing Edge Splice

1. While the winder is running, be aware of the upcoming splice or the end of the roll. Bring the winder to a stop far enough before the splice location in order to leave sufficient web to make the splice.

2. With the winder stopped, turn off the tension.

3. For parent rolls that pay out from the top of the roll use the following procedure: separate the web from the roll at or near the bottom of the roll and slab off enough paper to get past the splice. If the parent roll is nearly spent, separate the web from the spool, remove the spool, and replace it with a new parent roll.

4. Prepare a new leading edge on the parent roll by applying double sided tape across the face of the roll, leaving the protective covering on the tape. Then crease and tear off the paper, leaving a clean, taped leading edge. Splices can be made straight across the roll, parallel to its centerline; however, a splice made diagonally at approximately 15° is desirable if the paper is to be used in processes such as continuous run printing.
5. Make sure the new leading edge is tight against the roll. Work as near the top of the roll as is practical. Remove the protective covering from the tape.

6. Bring the tail of the rewound roll over the top of the parent roll. Make sure the sheet is straight and press it against the exposed tape on the parent roll. Crease and tear off the paper between the tape and the end of the tail.

7. Remove any excess tape that may extend beyond the ends of the roll and proceed to wind.

Leading Edge Splice

A "leading edge" splice is done by substituting the following steps in the "Trailing Edge Procedure":

4. With the new leading edge of the parent roll out of the way, but long enough to reach the top of the roll, lay the tail of the rewound roll over the top of the parent roll. Prepare the new trailing edge by applying double sided tape as described above. Crease and tear off the excess paper between the tape and the end of the sheet. Remove the tape's protective covering.

5. Pull the taped sheet until it is taut and straight with the machine. Bring the leading edge of the parent roll around the roll and over the taped tail. The sheet must be straight and tight to the roll before it is pressed against the tape.

6. Crease and tear off the excess paper between the splice and the leading edge. As noted above, this procedure applies to parent rolls that pay out from the top of the roll. The splicing technique for rolls that pay out from the bottom is essentially the same.
Splicing At The Winder: Basic Method

Use the following procedures to make splices at the winder (see splicing Figures 1 through 5). Refer to "Splicing at the Winder With Large Rolls In the Pocket" if such a condition exists when the splice is required.

▲ WARNING

Rotating paper rolls and unexpected movement of winder components caused by accidental startup of the equipment can pinch, crush, or trap people. Before splicing is started, the winder must be stopped, and all personnel in the area must be alerted that someone is working in the winder's operating zone. Tags should be placed on the controls to warn against accidental startup. No one can be permitted into the slitter area until the slitters have been disabled and locked out.

1. With the rider roll up, prepare the leading edge of the web and rethread as shown in Figure 1. Lower the rider roll. The rethreaded sheet must be aligned on the paper roll. Temporarily tape the tail of the paper roll up out of the way.
Splicing At The Winder: Basic Method (continued)

2. Apply a length of teflon type adhesive tape across the full width of the front winder drum. A helix arrangement of the tape (approx. 15°) is preferable to attaching it straight across. This tape can remain in place for future splicing operations. The durability of the tape will depend on the kind of tape used; e.g., Scotch #549 will normally remain useful for several months, whereas the less expensive #254 will have a substantially shorter life.

3. Attach a full width length of double faced adhesive tape, such as Scotch #405, to the teflon tape and remove its protective backing. See Figure 2.

4. Lay the paper roll’s tail over the front drum, align carefully, and press it to the exposed side of the double faced tape. Sever the web as shown in Figure 3.

5. Run the winder at thread speed. As the drums rotate, the web and the tape attached to it will pull free of the teflon tape on the front drum. As rotation continues, the open side of the double faced tape will become attached to the incoming web wrapping the back drum. See Figure 4.

6. Continued rotation will bring the splice to the front of the paper roll. The loose web is then creased and torn from the roll, and the splice is complete, as shown in Figure 5.
Splicing at the Winder With Large Rolls in the Pocket

This procedure provides instructions for rethreading & splicing the sheet at the winder after a sheet break. When a sheet break occurs late in the winding cycle, large diameter of the rolls in the pocket increase the difficulty of making the splice at the winder. Although the "air assist showers" usually supplied with BELOIT Lenox winders are adequate under most conditions for small diameter rolls, they may lack sufficient force to lift and hold the sheet over large diameter rolls. Heavy grades of paper may cause a similar problem. In such instances, a combination of teflon tape and double sided tape can be used to hold the leading edge of the sheet against the roll set to facilitate splicing. The procedure that follows includes a description of this method.

Note: Use of this procedure requires that the drums have been prepared with teflon tape as described in "Preparing the Drums With Teflon Tape" in this bulletin.

⚠️ WARNING ⚠️
Moving winder components and rotating paper rolls can pinch, crush, or trap people, resulting in severe injury or death. The winder must be brought to a full stop before the following operations are performed. Always make sure all personnel are out of the operating zone before operating components or starting to run the winder.

1. With the winder at a full stop, lower the cradle. Use the CRADLE LOWER/RAISE selector.

2. Raise the rider roll. Use the RIDER ROLL RAISE/LOWER selector.

3. Press the EMERGENCY STOP button.

4. Remove all broke from the winder section.

5. When all broke has been removed from the winder section, reset the E-STOP button.

   *At this point, the rethreading part of the procedure is started.*

6. Slab off paper from roll set and parent roll.

   7. Cut or tear the leading edges of the unwind sheet diagonally so that it tapers to an 18" wide leading edge opposite the sheet threader.
Splicing at the Winder With Large Rolls in the Pocket (continued)

8. Disengage the slitters by using the inner slitter and trim slitter 'Engage/Disengage' controls. If repositioning of the slitters is necessary, do so only after observing the following warning:

![WARNING]

Slitter knife edges can cut or sever hands and fingers. If inspection, blade changing, or manual relocation of slitters is necessary, the slitters must be disabled by turning the SLITTERS DISABLE/OPERATE key-switch to its 'Disable' position before anyone enters the slitter area. Do not attempt to handle slitters while the blades are turning.

9. At the Panel View on the Benchboard (see "Using the Panel View" in this manual), perform the following:

a. Set the winder speed to zero (0).

b. Turn off tension.

10. Make certain that the roll ejector is fully retracted; if necessary, use the ROLL EJECTOR EJECT/RETURN selector on Winder Frame Panel 700.

11. Enter "threading mode" by using the following procedure:

a. At Winder Frame Panel 700, turn the SHEET THREADER OFF/ON selector to 'On'.

b. For winders so equipped, turn on the vacuum drum with the VACUUM DRUM ON/AUTO/CFF selector switch. Note: If this switch is set at 'Auto' the drum vacuum will automatically activate at this point.

c. Still at Panel 700, press the THREAD button. The winder will start to run at the preset thread speed.

d. At the benchboard, use the PAYOUT/TAKEUP potentiometer to set the desired payout speed.

12. Thread the sheet, using the following procedure:

a. Engage the Lead-in Threader with the LEAD-IN SHT THRDR ENG/DIS selector. If the winder is equipped with splicing air showers, turn them on now.
b. Feed the sheet into the nip formed between the lead-in roll and the lead-in threader wheels. The sheet will be pulled over the before-slitter sectional roll and propelled through the disengaged slitters (see step 9).

c. Next, feed the sheet into the nip formed between the after slitter sectional roll and the after-slitter threader roll (if so equipped), past the spreader, and into the drum sheet threader.

d. Before the diagonally-cut leading edge of the tail widens out completely in the slitter section, start the slitter motors by pressing the SLITTER MOTORS pushbutton on the benchboard.

e. Engage the trim slitters; use TRIM SLITTERS button on the benchboard.

13. Stop thread speed operation when the leading edge of the sheet reaches the drum sheet threader.

   At this point, the tapering operation is started.

   ![image]

   **WARNING**

   The ingoing nip between the drums and rotating paper rolls can pinch, crush, or trap people, resulting in severe injury or death. The winder must be brought to a full stop before the following tapering operations are started. Make sure all personnel are clear of nip points before jogging the drums.

14. At the front of the winder, place a 2" by 36" strip of double-sided tape around the circumference of the paper roll in line with the teflon tape on the drums (see "Preparing the Drums With Teflon Tape" section of this bulletin).
Splicing at the Winder With Large Rolls in the Pocket (continued)

15. Remove the protective layer of the double-sided tape, leaving the adhesive exposed.

16. Using the JOG button, rotate the drums so that the exposed adhesive of the double-sided tape on the drum picks up the paper tail of the roll set. As the double sided tape comes into contact with the roll set, the exposed surface of the tape will adhere to the paper surface of the roll set, and the side facing the teflon will pull free.

17. Continue to jog the drums until the full width of the sheet is in contact with the roll set.

Note: Make sure that the edges of the sheet line up exactly with the edges of the paper on the roll.

18. Lower the rider roll. Use the RIDER ROLL RAISE/LOWER selector on Winder Panel 700.

19. Engage the inner slitters. Use the INNER SLITTERS button on Winder Panel 700.

20. Jog the sheet until the slits reach the drum pocket.

21. Press the STOP pushbutton.

22. Raise the rider roll. Use the RIDER ROLL RAISE/LOWER selector on Winder Panel 700.

23. Slab off excess paper until only good paper on roll is exposed.

24. With the rider roll still raised, JOG the drums until the leading edge of the web reaches the position shown in Figure 1 in the Five Part Illustration in “Splicing at the Winder”. Make certain that the resthreaded sheet is aligned properly on the paper roll.

At this point, use the taping procedure described in "Splicing at the Winder: Basic Splice".
Preparing the Drums With Teflon Tape

This section contains the teflon drum taping procedure that is used to prepare the drums for splicing with the method described in "Splicing At The Winder After a Sheet Break". Once installed, the teflon tape can be allowed to remain on the drums. Durability of the tape will depend on the grade used. For example, Scotch #5491 will normally remain usable for several months, but #254 tape will have a substantially shorter life.

— NOTICE —

This procedure should only be performed by qualified maintenance personal. Any activation/deactivation of pneumatic lines must be performed according to the specifications of the pneumatic schematics and equipment documentation. The drum pocket must be empty, the drive must be turned off, and the winder must be fully locked out before this procedure is started.

Use the following procedure to apply teflon tape to the drums:

1. With the drum pocket empty, power to the drive turned off, and the winder fully locked out, make sure the DRUM BRAKES AUTO/OFF selector on Operator Panel 760 is at its 'Off' position and the brakes are disengaged.

2. At a point in line with the center of the sheet threader, apply a 3" wide strip of teflon tape around the full circumference of the back drum. This can be accomplished by pushing (rotating) the drum away from the pocket by hand as the tape is applied. (See Illustration.)

⚠️ CAUTION ⚠️

The inertia of rotating drums, even when rotated by hand, can pinch and crush fingers and hands. Make certain that fingers and clothing are clear of the nip points at the winding pocket and front drum guard when performing this procedure.
Preparing the Drums With Teflon Tape (continued)

3. When taping of the back drum has been completed, apply a similar 3" wide strip of teflon tape to the front drum, but this time do so by pushing the drum toward the pocket. Make certain that the tape being applied to this drum (the front drum) is in line with the tape on the back drum.

4. When teflon taping has been completed, engage the drum brakes with the DRUM BRAKE AUTO/OFF selector.

--- NOTICE ---

Activation/deactivation of pneumatic lines must only be performed by qualified maintenance personnel according to the specifications of the pneumatic schematics and equipment documentation. Be certain that all pressure settings are set according to those reference materials.
INTERLOCKS

The following interlocks have been designed into the control logic of the winder in order to prevent injuries to personnel and damage to the machine.

- The rider roll cannot be raised while the winder is running.
- Core chucks cannot be unchucked while the winder is running.
- The cradle cannot be lowered while winder is running.
- The roll ejector is inoperable while the winder is running.
- The sheet threaders and holders are inoperable while the winder is running.

To Run the Winder:
- rider roll must be lowered and loaded
- cores must be chucked
- roll ejector must be retracted
- cradle must be fully raised
- hydraulic unit must be on
- sheet holder disengaged
- slitters must be engaged
- drive must be ready
- tension must be on

To Eject a Roll:
- winder must be at zero speed (stopped).
- cradle must be raised.
- rider roll must be raised.
- chucks must be unchucked.
- coreslides must be raised.
- hydraulic pumps must be on.
- winder must not be in E-Stop condition.
## WINDER TROUBLESHOOTING GUIDE

This chart contains a list of paper roll defects and their corresponding causes. For malfunctions of individual components, refer to the troubleshooting guide of the component involved.

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### WINDER TROUBLESHOOTING GUIDE

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d) Bouncing Roll on Drums  
e) Misaligned Rotating Components  
f) Wide Variation of Sheet Caliper or Moisture Content |
| Bursts | a) Excessive Rider Roll Load  
b) Excessive Tension  
c) Building Roll Diameters that Exceed the Capability of a Given Product to Maintain Good Roll Structure  
d) Wide Variation of Sheet Caliper  
e) Too Much Torque at Front Drum |
Section 3. Component Information
REELSPool UNWIND

The reelspool unwind is designed to hold the parent roll in place during rewinding and to provide lateral motion for side-lay of the sheet. The regenerative drive will drive the parent roll while maintaining constant tension in the sheet during acceleration and deceleration.

REELSPool UNWIND COMPONENTS AND FUNCTIONS

Both saddles are mounted on hydraulically powered slide plates, thereby enabling the unwind saddles to move laterally for side-lay and oscillation. A disc brake assembly is included in the assembly for connection to the existing regenerative drive, and a clutch assembly couples the brake with the reel spool. The brake, clutch assembly, and baseplate are mounted on a concrete pier supplied by the customer. A crane hook stop is also included in the assembly.

Sidelay & Oscillation

The saddles move laterally (cross machine), for side-lay and oscillation in teflon slides mounted on the frames with a stroke of 4”. When a reel spool is in place in the unwind saddles, all lateral motion—sidelay, oscillation, or centering—is powered by a single hydraulic cylinder attached to the backside saddle as regulated by the unwind valves USF-SV and USB-SV. The reel spool can be moved laterally (sidelay adjustment) +/- 2 inches from the center of the unwind stands, at thread speed or stop, by using the SIDELAY FRONT/BACK selector switches, which are located on the Unwind Panel 500 Operator Side or the Unwind Panel 560 Drive Side. Oscillation is also adjustable for +/- 2.0 inches, by use of the OSCILLATION INCREASE and OSCILLATION DECREASE buttons on the same control panel. The amount of oscillation is displayed on the INCHES OF OSCILLATION LED meter, also on the 560 panel. For additional information, see Unwind Framework Assembly Drawing 80-0546-0030 and Hydraulic Schematics 91-5020-0257.

Clutch

The clutch assembly is used to couple the stationary drive members with the reel spool. It is engaged by an air cylinder powered yoke assembly, and a square block is included to keep the assembly stationary during oscillation. See Clutch Drawing 80-3641-0019-0-001 and related schematics.

Payout And Takeup

The regenerative motor (provided by others), which is used to drive the parent roll (payout or takeup) and to maintain a constant tension level in the web during acceleration/deceleration, is connected to the reel spool via the sliding clutch assembly. The regenerative motor, brake, clutch assembly, and baseplate are mounted on a concrete pier supplied by the customer.

The rate of payout and takeup of paper from the unwind can be controlled with the PAY-OUT/TAKEUP potentiometer on Panel 500 and the PERCENT UNWIND MANEUVER potentiometer on the benchboard.
Stopping

During LARS and Bel-OIT operation, the regenerative drive will bring the unwind to stops automatically, as controlled by setpoints sent to the drive from the PLC. For manually initiated stops, the Benchboard contains a STOP button for controlled stops, an EMERGENCY STOP button for emergency stops, and a COAST stop button for "coast" stops. EMERGENCY-STOP buttons are located on all winder control panels; the COAST STOP button is located on the benchboard. See "Stopping The Winder" in Section 2 for a full description of the functionality of EMERGENCY-STOP, COAST, and STOP forms of stopping.

Safety Hook Stop

The pivoting safety hook stop, which is mounted on the rear (drive side) unwind saddle, is used to prevent the crane hook from engaging the reel spool bearings while the clutch is engaged. The hook stop is pivoted to its "safety-stop" position by a pneumatic cylinder. The same cylinder lowers the hook stop to provide clearance for the hook when the crane is used to lift or lower the reel spool. The hook stop automatically moves to its raised, "safety-stop" position whenever the clutch is engaged. For a detailed description of mechanical components see Drawing 80-3650-0072.

UNWIND MAINTENANCE/INSPECTION AND ADJUSTMENT

1. Inspect all pneumatic and hydraulic components for leaks. Schedule immediate repair of any leaks.

2. Inspect the brake for worn pads and disc, and for any loose fasteners.

3. Inspect pinned components to make sure pins are in place and intact.

4. Check all pressure settings and flow rates. Compare to those recorded; make adjustments as necessary.

5. Make sure all limit switches are in good working order and functioning properly.

6. Refer to the hydraulic specification sheet for traverse and oscillation speed adjustments.

7. Check teflon slides for signs of wear or excessive clearance.

Lubrication

1. Grease shaft support pillow blocks.

2. Grease main unwind ways.
UNWIND INTERLOCKS

1. The winder will not run unless the spool ejector is lowered and the clutch engaged.

2. Crane will not operate in the unwind area unless clutch is disengaged.

3. In order to eject an empty spool, the clutch must be disengaged and the unwind must be centered.

UNWIND CONTROL SETTINGS

<table>
<thead>
<tr>
<th>FUNCTION</th>
<th>RECOMMENDED INITIAL SETTING</th>
<th>FINAL SETTING AT START-UP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Raise/Lower Pressure</td>
<td>See Schematic(Hydraulic)</td>
<td></td>
</tr>
<tr>
<td>2. Sidelay Pressure</td>
<td>See Schematic(Hydraulic)</td>
<td></td>
</tr>
<tr>
<td>3. Clutch (Pneumatic)</td>
<td>45 psi</td>
<td></td>
</tr>
</tbody>
</table>

Reference Drawings & Schematics

Unwind Framework: 80-0546-0030
Hook Stop: 80-3650-0072
Clutch: 80-3641-0019-0-001
Hydraulic Schematics: 91-5020-0257
Pneumatic Schematics: 91-5088-0393
Elementary Drawings: 92-5001-0098
LEAD-IN ROLL & BEFORE SLITTER SPREADER

The lead-in roll is designed to receive the sheet from the unwind and stabilize its entry into the slitter section. In combination with the before slitter spreader, the lead-in roll provides a means of regulating the distribution of cross machine tension in the passing sheet.

Lead In Roll
The lead-in roll, which is motor driven via a coupling at its drive-side end, is mounted in bearings near the top of the slitter frame columns. The lead-in roll can be raised and lowered vertically by means of a hand operated ratchet located at the operator side of the cross beam, making it possible to skew the sheet being fed from the lead-in roll to the before slitter spreader +/- 2 inches. No adjustment can be made at the drive-side end of the roll.

Before Slitter Spreader
The before slitter spreader is a belt-driven roll located between the lead-in roll and the first slitter roll. This spreader imposes its full, curved length into the sheet, providing a means for regulating cross machine tension and orientation of the sheet into the slitters. The before slitter spreader’s bow is fixed, but its orientation into the sheet can be adjusted manually with the ratchet type mechanism at the operator-side of the slitter frame. The amount of spreader wrap is displayed on the SPREADER WRAP LED on Slitter Panel 615. For additional information about the before slitter spreader, see your Spencer Johnston documentation.

– NOTICE –
Make sure that all safety requirements listed in "General Safety and "Operator Safety" are met before operating this equipment.

Reference Drawings And Schematics
Lead-In Roll Drive: 50-2863-0024-0-001
Before Slitter Drive: 50-2859-0038-0048
LEAD-IN SHEET THREADER & HOLDER

The lead-in sheet threader is used to facilitate threading of the web from the lead-in roll, past the before-slitter pivoting threader, and into the slitter section. The lead-in sheet holder is designed to hold the sheet in place in the slitter section when splicing.

LEAD-IN THREADER

The lead-in sheet threader assembly consists of a curved metal pan, which is contoured to guide the sheet over the lead-in roll, and three non-driven rubber wheels, which are mounted along the leading edge of the pan. The sheet threader is pivoted into and out of contact with the lead-in roll by a pneumatic cylinder. When engaged with the lead-in roll, the threader, under pressure from the cylinder, forms a nip that moves the sheet past the first contoured pan, over the lead-in roll to the second pan, which guides the tail past the before slitter spreader to the slitter section. The pneumatic cylinder used to engage the threader roll is also used to pivot it out of threading position when not in use.

Lead-In Threader Operation

The basic functioning of the sheet threader is as follows. During threading, the wheels of the lead-in threader contact the lead-in roll under pressure from two pneumatic cylinders, thereby forming a nip that pushes the sheet along over the lead-in roll and the spreader pan, guiding it under the before-slitter spreader roll.
The lead-in sheet threader is controlled by the LEAD-IN SHT THRDR ENG/DISENG selector on Panel 650. For information about operating the lead-in sheet threader while threading and operating the winder, refer to "Threading the Winder" in the "Operation The Winder" section of this manual. Pneumatic pressure is registered and regulated with the gages and valves in the pneumatic control cabinet.

NOTICE

Do not confuse the LEAD-IN SHT THRDR ENG/DISENG control with the DRUM SHT THRDR OFF/ON selector switch on the Winder Frame Panel 700, which is used to control the windup threader under the back drum. Make sure that all safety requirements listed in "General Safety and "Operator Safety" are met before operating this equipment.

1. To engage the threader, turn LEAD-IN SHT THRDR ENG/DISENG to 'Eng'. The threader will lower to the lead-in roll, nipping the paper between the rollers and the lead-in roll.

2. After the sheet is through the slitters, disengage the threader by turning LEAD-IN SHT THRDR ENG/DISENG to 'Diseng'.

LEAD-IN HOLDER

The lead-in sheet holder is designed to hold the sheet in place in the slitter section when splicing at the unwind. It consists of two rubber edged holder-bars that are attached to pivoting frame assemblies, which are engaged and disengaged with the lead-in roll under power provided by air cylinders mounted on the slitter frame crossbeam. The holder bars engage the sheet and hold it in place against the top side of the lead-in roll. The sheet holder is held in its raised 'threading' position by pneumatic cylinders, which are also used to disengage the holders and pivot them out of the running position when not in use.

Using the Lead-In Sheet Holder

The lead-in sheet holder is engaged and disengaged with the LEAD-IN SHT HOLDER ENG/DISENG selector switch on Slitter panel 650. Pneumatic pressure is registered and regulated with the gages and valves at Panel 690 on the drive side of the slitter frame. For information about operating the lead-in sheet holder while threading and operating the winder, refer to "Threading the Winder" in the "Operation The Winder" section.

Reference Drawings And Schematics

Lead-In Sheet Threader: 50-1801-0150
Hydraulic Schematics: 91-5020-0257
Pneumatic Schematics: 91-5088-00393
Elementary Diagrams: 92-5001-0098
SLITTER SECTION

The slitter section is designed to receive the paper web from the unwind and cut it, cleanly and accurately, in the direction of flow. To do this, the slitter section includes positioning and tension rolls to properly orient and stress the web. Intermediate slitters sever the web into the desired roll widths; trim slitters (the end slitter on each side) cut and deflect the trimmed outer edges of the sheet into chutes for removal. The slitters on this machine are a Quickset type slitter designed for ease of movement.

SLITTER SECTION COMPONENTS

The slitter section is a vertical sheet run type. It includes the following components:

Slitter Section Rolls

As the web enters the slitter section from the unwind, it passes over three paper rolls that orient the sheet toward the slitters. They are the lead-in roll, the before slitter spreader, and the before slitter sectional roll. The lead-in roll and before slitter spreader are described in "Lead-In Section: Lead-In Roll, Threader, & Before-slitter Spread" in this manual; the before-slitter sectional roll guides the sheet to the slitters, and it is described below. A fourth roll, the after slitter sectional roll, is located under the slitters. This roll, which is also referred to as the "tension" roll (see below), has two functions: it maintains tension in the passing web, and it is fitted with load cells that send web tension readings to the control system (see "Web Tension Control System").

Before-Slitter Spreader

The before slitter spreader is a driven, fixed bowed roll spreader that extends across the full length of the slitter frame. For a full description, see "Lead-In Section: Lead-In Roll, Threader, & Before-slitter Spread" in this manual.

Before-Slitter Roll

The before-slitter roll is a grooved sectional roll that guides the sheet into the slitters.

After-Slitter Roll (Tension Roll)

The after-slitter roll (also referred to as the tension roll) is a grooved sectional roll, which has a double function: it orients and guides the sheet to the dual-roll spreader, and, in conjunction with the load cell mounted under its bearings, it functions as a tension sensing device for the web tension system. See the "Web Tension Control System" section and Slitter Arrangement Drawing for additional information.
VERTICAL SHEET RUN
SLITTER SET-UP
SHEAR SLITTERS
Frames

The above items are mounted between two side frames that support the slitter and tension systems and are independent of any other winder mountings.

Quickset Slitters

There are a total of twelve (12) top and bottom slitter assemblies in this slitter section. The two outer slitters are used as trim slitters only; the remaining ten slitters all function as "inner".

The slitter assemblies are mounted on a gear rack on the slitter frame cross beam. They are a "shear-cut" style slitter and are equipped with a "quick-set" feature. This allows the operator to engage a "rifle bolt" type index pin and move individual top and bottom slitter pairs as a unit along the gear rack, maintaining their proper orientation to each other during the move by cranking the handwheel on the top slitter. When secured at the new location, the index pin is disengaged and the slitters are ready to cut.

The slitters, as stated earlier, are arranged for a vertical sheet run. The bottom slitters are the ones on the "wind-in" side of the sheet run; they are mounted in ways on the winder side cross beam of the slitter frame; they are driven by individual AC motors. The top slitters are the ones on the unwind side of the sheet; they are mounted in ways along the unwind-side cross beam of the slitter frame, and they are moved cross machine on a gear rack. The top slitters are not driven, they are rotated by the passing sheet.
GENERAL SLITTER SECTION INFORMATION

The bottom slitters are motor driven. When the top slitters are engaged, they will be driven by the force of the blades as they press against the bottom motor driven blades. During the threading of the sheet through the winder, it is essential that the trim slitters are engaged and turning, as soon as safely possible, to trim the sheet as it passes through the slitter section. The intermediate slitters will not normally be engaged during the threading operation. Ordinarily, the slitter section will be fitted with all right hand assemblies, except for one left hand trim slitter. (Circumstances can exist where more than one left hand slitter pair will be necessary; e.g., trim patterns that require more than one slitter to serve as a trim on each side. Also, some salvage operations will require up to half the slitters to be left handed.) Even though bottom slitter bands can cut on both sides, internal construction of the bottom slitter motor prohibits combining a right hand top with a left hand bottom, or vice versa.

The bottom slitter band is fixed relative to engagement with the top knife. The top knife moves under pneumatic power in a two step motion to engage with the bottom band: 50 mm (1.97") toward the bottom band, and a maximum of 6 mm (.236") laterally to contact the band, creating the cutpoint. The top knife is internally valved so that the blade will extend fully and then side load from a single signal. The slitters disengage by reversing the above sequence: unload (lateral motion), then retract.

The bottom band angle is fixed at 0 degrees by virtue of its mounting. The top blade is preset at an angle of .5 degrees; it can be adjusted +/- .5 degrees from that original setting.

As the top slitter blade is resharpened, its diameter will decrease. To maintain a fixed amount of overlap (.6 to 1.2 mm; .031" - .047") the distance between the blade and band must be adjusted by turning the two (24mm) hex nuts found under the knurled cylindrical cover. When a new blade is put on the top slitter, adjust the nuts to give more than enough overlap to insure the blade will not be nicked or damaged when loaded by having too litte overlap, but not little enough to miss the band completely. After the blade and band are engaged, adjust the overlap to the dimension given above, lock the nuts in place and replace the cover.

⚠️ WARNING ⚠️
Exposed slitter knife edges can cut or sever hands and fingers. Do not adjust or touch slitters while the blades are turning. Make sure slitters are disabled and locked out, as described in “Changing And Relocating Slitters” in this manual, before making any close inspections or attempting to move them. If a blade falls or is dropped, do not try to catch it. Always wear protective gloves when handling slitter blades.

Pneumatic pressure is supplied to the slitters from flexible lines connected to two manifolds mounted on the slitter section cross-beam. Gauges and valves are mounted in the panels for pressure adjustments. The pneumatic pressure to the top slitter can be adjusted from 60 psi to 90 psi, yielding blade-to-band loads of 3.0 to 6.0 lb. A single pressure regulator controls pressure to all slitters (except the trims).
THE CUT POINT

The cut point is that place where the web and the arcs of the blade and band meet, and where the separating of the web begins. Ideally, this will occur at a point on the bottom band where, if a line were drawn connecting it to the center of the band, that line would be perpendicular to the 'Pass-By' sheet run. (See the "Vertical Sheet Run Slitter Set Up" illustration.) If the cut point is set too far toward the unwind, the overlap of the blade and band will be excessive, resulting in a dusty cut. If it is too far toward the winder, the overlap will be too little, resulting in inconsistent slitting and possible damage to the blades and bands.

Several factors determine the location of the cut point. When the machine is installed, the 'Pass-By' sheet run is determined and the bands are located to establish the correct sheet penetration. As shown on the illustration, sheet penetration is the maximum distance that the 'Pass-Over' sheet run deviates from the 'Pass-By' sheet run. The 'Pass-By' run is simply that which would occur if the bottom slitters were removed. The above relationship is established at installation and start-up and usually remains fixed from that point on.

The other factor in determining the cut point is the relationship of the blade to the band. As a blade is used, it will become dull and require sharpening. As the blade is repeatedly sharpened, its diameter will become smaller. The design of the knives is such that if the blade overlaps the knife by the amount stated above, the cut point will remain properly located throughout the life of the blade.

SLITTER SECTION CONTROLS SETTINGS CHART

<table>
<thead>
<tr>
<th>FUNCTION</th>
<th>RECOMMENDED INITIAL SETTING</th>
<th>FINAL SETTING AT START-UP</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGAGE/DISENGAGE</td>
<td>70 psi (4.5 bar)</td>
<td></td>
</tr>
<tr>
<td>CUTTING PRESSURE</td>
<td>70 to 90 psi</td>
<td>3 lb load to 6 lb load</td>
</tr>
<tr>
<td>POSITION CLAMPS</td>
<td>70 psi (4.5 bar)</td>
<td></td>
</tr>
</tbody>
</table>
OPERATING THE SLITTERS

The procedures below provide instructions for changing the slitter blades and relocating slitter pairs. For operation of the slitters during the threading process, see “Threading The Winder” in Section 2. Winder Operation.

Changing The Slitter Blades

⚠️ WARNING

Slitter knife edges can cut or sever hands and fingers. Do not adjust or touch slitters while the blades are turning. Make sure slitters are disabled with the SLITTERS OPER./DISABLE key switch on before making any close inspections or attempting to change or move them. If a blade falls or is dropped, do not try to catch it. Always wear protective gloves when handling slitter blades.

Top Blade
1. Turn the SLITTERS DISABLE/OPER selector key-switch to 'Disable'.
2. Unclamp the top slitter and move it away from the bottom slitter for working space.
3. Remove the capscrews holding the blade to the hub. Remove the blade.
4. Put on new blade and replace the capscrews, then check for wobble or runout. Replace blade or re-tighten if runout or wobble is evident.
5. Return slitter to its operating position, engage quick-set for alignment before clamping, then check for correct penetration. (See 'General Information' in this section of the manual.)

Bottom Band
1. Turn the SLITTERS DISABLE/OPER selector key-switch to 'Disable'.
2. Turn off and lock out power to the bottom slitter motors.
3. Unbolt the screws holding the band to the motor housing.
4. Remove the band. If the fit over the hub binds, jack the band using the four bolts in the band.
5. The band can be replaced or reversed to use the opposite cutting edge.
6. Carefully install the band in place, tightening the four bolts in steps to ensure proper seating.

Note: The cutting edge of a new bottom band is .413 (10.5mm) from the mounting surface. Shims will have to be placed behind the bottom band when more than .050 (1.25 mm) has been removed from it through sharpening.
7. When all band changes have been completed, return the SLITTERS DISABLE/OPER selector key-switch to its 'Oper' position.

Quickset Relocation Of Slitters

Use the following procedure to relocate slitters:

**WARNING**

Slitter knife edges can cut or sever hands and fingers. Do not adjust or touch slitters while the blades are turning. Make sure slitters are disabled with the SLITTERS OPER./DISABLE key switch before making any close inspections or attempting to move them. If a blade falls or is dropped, do not try to catch it. Always wear protective gloves when handling slitter blades.

1. Slide the quickset pin on the top slitter into the socket on the bottom slitter.

2. To deflate the pneumatic position clamp on the top and bottom slitter slide the ribbed blue barrel of the Festo pneumatic valve mounted on the slitters.

3. Move the slitter pair to the desired location.

4. Reinflate the pneumatic position clamps.

5. Disengage the quickset pin.

---

**NOTICE**

Any slitters not currently in use must be clamped to the beam. Unclamp them only when they are being repositioned. Slitters left unclamped can damage the equipment.
SLITTER SECTION MAINTENANCE

INSPECTION/ADJUSTMENT

![WARNING]

Slitter knife edges can cut or sever hands and fingers. Do not adjust or touch slitters while the blades are turning. Make sure slitters are disabled with the SLITTERS OPER/DISABLE key switch before making any close inspections or attempting to change or move them. If a blade falls or is dropped, do not try to catch it. Always wear protective gloves when handling slitter blades.

1. Turn the SLITTERS DISABLE/OPER selector key-switch to 'Disable'.

2. Check blades and bands for nicks and burrs. Schedule re-grinding if necessary.

3. Check proper overlap between blades and bands. The overlap should be 0.8 to 1.2 mm (.031 to .047).

4. Check the conditions of all electrical and air connections. Schedule repair of any faulty connections.

5. See that top slitter will maintain the knife loading.

6. The roundways on which both top and bottom slitters slide should be wiped clean of dust.

7. When all slitter changes have been completed, the SLITTERS DISABLE/OPER selector key-switch must be returned to its 'Oper' position before operation can be resumed. Winders with AutoTrim must also use that system's edge correction function before resuming operation.

LUBRICATION

Grease paper roll bearings. The lubrication cycle for slitters should be approximately once every two weeks, depending on use. Lubricant should have good cohesive and adhesive properties and contain both oxidation and corrosion inhibitors. Viscosity should be approximately 500 ssu at 100 degrees.

REFERENCE DRAWINGS AND SCHEMATICs

- General Arrangement: 50-2113-0180
- (See List Of Components for component drawings)
- Hydraulic Schematics: 91-5020-0257
- Pneumatic Schematics: 91-5088-0393
- Elementary Diagrams: 92-5001-0098
<table>
<thead>
<tr>
<th>PROBLEM</th>
<th>POSSIBLE CAUSES</th>
</tr>
</thead>
</table>
| Fuzzy cut at intermediate slitters. | a) Sliters set too deep.  
b) Side loading not high enough (above thread-speed).  
c) Slitter blade screws came loose.  
d) Nicked blade. |
| Fuzzy cut at trim slitters    | a) Sliters set too deep.  
b) Side loading not high enough.  
c) Slitter blade screws came loose.  
d) Trim guide hitting the blade  
e) Nicked blade. |
| Scalloped edge on trim slitters. | a) Trim not being taken away fast enough.  
b) Trim fluttering and unstable.  
c) Side loading too high. |
| Snap-off in slitter section-when starting up. | a) Slitter jammed up (loading too high).  
b) Tension applied to the sheet too late.  
c) Uneven tension across the sheet (spreader mis-adjustment).  
d) Spread roll after the slitters not adjusted correctly.  
e) Surging in the drive or braking system.  
f) Tear goes through the slitter stops |
| Snap-off in slitter section when running at speed. | a) Too much tension.  
b) Too much spreading (spread angle too great).  
c) Slitter jammed up because of too much side loading.  
d) Unstable trim.  
e) Slitter blade locknut loose  
f) Sheet flop from unwind stand |
# SLITTER SECTION TROUBLESHOOTING CHART

<table>
<thead>
<tr>
<th>PROBLEM</th>
<th>POSSIBLE CAUSES</th>
</tr>
</thead>
</table>
| Slitters jamming up                          | a) Too much penetration.  
b) Blade hitting trim guide.  
c) Blade locking nut loose.  
d) Bearings sticking.  
e) Too much side loading. |
| Slitter does not rotate freely               | a) Bearing sticking (too much or no lubrication).  
b) Blade hitting trim guide.  
c) Blade locking nut loose  
d) Too much side loading.  
e) Too much penetration. |
| Broken cutting edge on slitter blade         | a) Top blade brought down on top of bottom blade.  
b) Improper handling. |
| Top blade jumped on the bottom blade while running | a) Not set deep enough.  
b) Machine vibration. |
| Top blade does not engage the bottom blade properly | a) Top slitter blade not seated.  
b) Incorrect pressure setting |
| Bottom slitter moves while running          | a) Air clamping hoses not properly seated in the coupling  
b) Insufficient air pressure.  
c) Ruptured or leaking air clamp |
| Both top and bottom slitter assemblies do not move freely on the roundways. | a) Paper dust in roundway bearings  
b) Damaged guide rollers. |
| Intermediate slitters do not start cutting when engaged | a) Side loading to low.  
b) Slitters not engaged. |
<table>
<thead>
<tr>
<th>PROBLEM</th>
<th>POSSIBLE CAUSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trim slitters do not cut.</td>
<td>a) Trim deflector rubs against the blades,</td>
</tr>
<tr>
<td></td>
<td>preventing them from turning.</td>
</tr>
<tr>
<td></td>
<td>b) Side loading too low</td>
</tr>
<tr>
<td></td>
<td>c) Air loading leakage.</td>
</tr>
<tr>
<td>Friction in the horizontal</td>
<td>a) Insufficient lubrication -</td>
</tr>
<tr>
<td>movement of the slitter blade</td>
<td>b) Dirt in the bearings.</td>
</tr>
</tbody>
</table>

Fraser Paper Ltd. 8499

Winder Operation Manual
DUAL ROLL SPREADER

The Dual Roll spreader is used to spread the individual webs in order to prevent interweaving and other defects in roll structure. It consists of two ventagrooved, rubber covered, fixed-bow-rolls mounted in a frame located between the slitters and the winding drums; both rolls are driven by electric motors. The web passes under the first roll and over the second roll before it enters the drums. The bowed rolls can be rotated in or out of the sheet run, and adjustment of individual bow orientation is possible. A handwheel is provided to rotate the frame to adjust the amount of sheet wrap around the rolls. Adjustment ranges between 0° to 45° wrap, and it is displayed on a digital display. Threading pans are installed near the spreader to facilitate threading.

Operating The Dual Roll Spreader

Spreader wrap is adjusted from the handwheel on the operator's side. The orientation of the bowed rolls will depend on several things. The amount of wrap will increase with the number of slits being made. The ideal bow orientation is perpendicular to the incoming and outgoing sheet run. Therefore, the bow orientation may need to be reset when the wrap angle is changed. Web conditions will dictate when deviation from the "ideal" bow settings is required.

To tighten the center of the sheet, adjust the high point of the #1 roll towards the web. To tighten the edges of the sheet, adjust the high point of the #2 roll away from the web. To increase overall spreading, at any given wrap angle, adjust both rolls equal amounts in the directions stated above.

NOTICE

Make sure that all safety requirements in "General Safety and "Operator Safety" have been met before operating this equipment.

When the spreader is properly set up, the slits should be neither spread apart nor overlapped as they contact the first roll. The slits will separate between the rolls. Coming out of the second roll, the slits should be separated and parallel, with no tension strains or wrinkles. While changes in the number of slits may require readjustments, the spreader should remain unaffected by speed, tension, or sheet weight.

Setting-up And Checking Out The Spreader

1. Set the spreader for zero or near zero wrap for the checkout of the drive and tension system. Set the bows perpendicular to the incoming and outgoing sheet runs.

2. When the above have checked out satisfactorily, engage two or three slitters and increase the amount of wrap until satisfactory spreading has been achieved. Readjust orientations of bows if required.

3. As the checkout continues, gradually increase the number of slits to the maximum. Record the various positions in the space provided for future reference.
# DUAL SPREADER ADJUSTMENTS

<table>
<thead>
<tr>
<th>SETTING NUMBER</th>
<th>NUMBER OF ROLLS</th>
<th>DEGREES OF WRAP</th>
<th>WAS BOW ORIENTATION ADJUSTED SINCE PREVIOUS SETTING?</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
<td></td>
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<tr>
<td>B</td>
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<td>F</td>
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<td></td>
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<tr>
<td>G</td>
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</tr>
</tbody>
</table>
CORESLIDES

The coreslides and chucks support and align the rewind roll during winding. The chucks engage directly with the cores and are used to align them with the trim slitters. The coreslides (on which the chucks are mounted) rise vertically in machined ways in the winder frame as the roll’s diameter increases, and they pivot horizontally to compensate for variations of end to end roll caliper of the forming roll set.

Coreslide Components

The coreslide assembly moves on steel rollers in the same machined ways as the rider roll, and it is suspended from hydraulic cylinders mounted in the winder frame columns. When disengaged from the roll, the chucks can be raised or lowered hydraulically for the full range of their travel. During winding, the raise/lower cylinders are hydraulically counterbalanced, which permits the coreslides to rise freely with the growing paper roll without imparting significant vertical forces to the roll. Limit switches mounted on the frame register the upper and lower limits of coreslide travel. AC motors and handwheels are used to position the chucks. Core stops, which are located under the slides between the winder drums and the winder frame column, line up the chucks with the cores at the start of the cycle.

Core Chuck Components

Each chuck consists of a steel outer shell that rotates on ball bearings around a spindle. During normal operation, they are positioned by using the positioning motors, which move the entire sleeve and spindle assembly in or out. Handwheels are also provided, but are not used during regular operation. To engage the cores, a hydraulic cylinder moves the spindle within the sleeve; a gage is mounted near the handwheel to register hydraulic pressure. Core chucks are commonly supplied with adapters for larger core sizes. The adapters are made of aluminum and/or steel and simply slip on over the chuck. An index pin prevents relative motion and a single screw holds the adapter in place.

Pivoting Core Chuck Function

The core chucks have a manually adjustable horizontal pivoting motion, which is designed to compensate for end to end variations in roll caliper of the forming roll set. To achieve this pivoting motion, the core chuck assemblies are suspended from pivot pins installed in bearing housing on the coreslide mounting plates. The maximum amount of pivoting horizontal core chuck travel is one half inch, with manual adjustment made via adjustment screws located in the underside of the core chuck barrel.

A centering device is included in the assembly to ensure that the core chucks will be returned to a centered position at the start of each set and will remain there until the sets build to a pre-set minimum. The centering device consists of a centering pin on the core chuck barrel, which slides into a slotted plate mounted in the frame. Centering is automatically achieved each time the corechucks are lowered into position to engage a new set of cores.
OPERATING THE CORESLIDES & CORE CHUCKS

The coreslides are operated by the operator from controls on Winder Frame Panel 700.

⚠️ WARNING ⚠️

Moving coreslides or core chucks can hit, pinch, or crush, and are capable of causing severe injury or death. Keep people away from the coreslides and core chucks while the winder is operating. Stop winder operation if people enter the operating area of the coreslides or core chucks.

Raising And Lowering The Coreslides

To raise the coreslides, rotate CORES SLIDES LOWER/RAISE to the "Raise" position. To lower the coreslides, rotate that selector to its 'Lower' position.

Engaging The Chucks

1. To engage the chucks, turn the CORE CHUKS CHUCK/UNCHUCK selector to 'Chuck'; this energizes hydraulic valve WCCC-SV, extending the chuck cylinders.

2. To disengage the chucks, turn the CORE CHUKS CHUCK/UNCHUCK selector to 'UnChuck'. This energizes valve WCCU-SV, retracting the chuck cylinders.

Positioning The Chucks

To position the chucks, use the FRONT CHUCK IN/OUT selector on the Winder Frame Panel 700 and the BACK CHUCK OUT/IN selector on the Winder Frame Panel 760. Use the following procedure to position the chucks:

Note: A removable hand-knob is supplied with each chuck in the event the locating system becomes inoperable.

1. With the chuck cylinder extended, manually position the 'Index' chuck surface to be in line with the trim slitter.

2. With the chuck cylinder extended, manually position the 'Floating' chuck to be .5 inches inboard of the trim slitter.

HYDRAULIC CIRCUIT

The fixed, or indexing, chuck extends at system pressure. The floating one extends at 125-200 psi, and is slower than the fixed chuck. Flow from the cylinders returns to tank through valve WCCC-SV. Coreslide pressure setting procedures are described in the hydraulic schematics.
## CORESLIDES CONTROLS SETTINGS CHART

<table>
<thead>
<tr>
<th>FUNCTION</th>
<th>RECOMMENDED INITIAL SETTING</th>
<th>FINAL SETTING AT START-UP</th>
</tr>
</thead>
<tbody>
<tr>
<td>CORESLIDE RAISE/COUNTERBALANCE PRESSURE</td>
<td>790/680 psi</td>
<td></td>
</tr>
<tr>
<td>INDEX CORE CHUCK PRESSURE</td>
<td>Set At Start-up</td>
<td></td>
</tr>
<tr>
<td>FLOATING CORE CHUCK PRESSURE</td>
<td>Set at start-up</td>
<td></td>
</tr>
</tbody>
</table>

### Reference Drawings And Schematics

- Arrangement Drawing: 50-5436-0149-0-003
- Core Stop Drawing: 50-5478-0072
- Hydraulic Schematics: 91-5020-0257
- Pneumatic Schematics: 91-5088-0393
- Elementary Diagrams: 92-5001-0098
<table>
<thead>
<tr>
<th>PROBLEM</th>
<th>POSSIBLE SOLUTION</th>
<th>REFERENCE</th>
</tr>
</thead>
</table>
| Coreslides won’t raise                | a) Check for proper setting and adjustment of valves WCSR-F-SV & WCSRBSV and pressure reducing valve.  
b) Check that chuck is disengaged  
c) The winder cannot be running.  
d) Check that rider roll is fully raised  
e) Check that ejector is fully retracted | Hydraulic Schematics |
| Coreslides won’t lower                | a) Check for proper operation and setting of valves WCSLF-SV and WCSLB-SV  
b) Check that ejector is fully retracted | Hydraulic Schematics |
| Coreslides lower too fast             | Adjust flow control on cylinder in frame                                           |                    |
| Chucks are not properly counterbalanced | Check for proper setting & operation of counterbalance reducing valves-            | BELOIT Manual & Schematics |
| Chucks won’t engage                   | a) Check for proper setting and operation of valve WCCC-SV  
b) Check operation of hydraulic unit | Hydraulic Unit Manual and Schematics |
| Chucks won’t disengage                | a) Check for proper setting and operation of valve WCCU-SV  
b) Check that winder is stopped. | Hydraulic Unit Manual |
| Floating chuck comes in too hard or too soft | Check for proper setting and operation of pressure reducing/relieving valve | Hydraulic Schematics |

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Winder Operation Manual
DRUM SHEET THREADER & HOLDER

The drum sheet threader and holder (also referred to as the windup sheet threader and holder) are designed to facilitate threading of the web under and between the drums. The sheet is guided by the configuration of the sheet threader and strategically placed air showers. When the sheet remains threaded between sets, the sheet holder is engaged. It clamps the sheet against the back drum, preventing it from slipping out of reach and maintaining the tension level.

COMPONENTS

The drum sheet threader consists of a ribbed metal pan shaped to guide the sheet under the first winder drum. A set of wheels protrude through the pan to contact the drum and form a driven nip to move the sheet up between the drums. Air showers hold the sheet against the drum as it turns. The pan assembly is pivoted out of position by two air cylinders when it is not in use. The threading pan is located at the center of the drum.

The drum sheet holder consists of one or more inverted "U" shaped frames. Across the horizontal portion is a cylindrical rubber strip which holds the sheet against the drum. The clamp frame is pivoted in and out of position by an air cylinder. The vertical portions of the holder frame attach to pivot brackets which are anchored to the floor.
OPERATION
The windup sheet threader and holder are engaged and disengaged with the DRUM SHT THRDR OFF/ON and DRUM SHT HLDR OFF/ON selectors on Winder Frame panel 700. During regular operation, both the threader and holder will automatically retract to their disengaged positions when the winder leaves thread mode. Because the threading pan is located at the center of the drum, the sheet must be cut or torn on a diagonal to form a tail at the center to be engaged by the threader and holder. See "Threading The Winder" in Section 2 for descriptions of the use of the sheet threader and holder during actual threading operations.

NOTE: Do not set air pressure higher than 60 psig.

– NOTICE –
Make sure that all safety requirements listed in "General Safety and "Operator Safety" are met before operating this equipment.

MAINTENANCE: INSPECTION/ADJUSTMENT
1. Check the condition of the sheet threader wheels. Make sure they turn freely.

2. Check the air pressure. It should not exceed 60 psig.

3. Check the condition of the air showers. See that the holes point in the right direction and have not become plugged.

4. Inspect the pneumatic components for leaky seals. Schedule repairs or replacement if necessary.

5. Engage the threader. Check for smooth action. Adjust the flow rate if necessary.


7. Check the condition of the rubber clamping member. Schedule replacement if necessary.

8. Check the condition of the sheet threader and clamp pivot bushings. Schedule replacement if worn.

Reference Drawings and Schematics
Assembly Drawings: 50-1801-0083
Hydraulic Schematics: 91-5020-0257
Pneumatic Schematics: 91-5088-0393
Elementary Diagrams: 92-5001-0098
## CONTROLS SETTINGS CHART

<table>
<thead>
<tr>
<th>FUNCTION</th>
<th>RECOMMENDED INITIAL SETTING</th>
<th>FINAL SETTING AT START-UP</th>
</tr>
</thead>
<tbody>
<tr>
<td>THREADER ENGAGE/DISENGAGE</td>
<td>40 psi</td>
<td></td>
</tr>
<tr>
<td>HOLDER ENGAGE/DISENGAGE</td>
<td>50 psi</td>
<td></td>
</tr>
</tbody>
</table>

## SHEET THREADER/HOLDER TROUBLESHOOTING CHART

<table>
<thead>
<tr>
<th>PROBLEM</th>
<th>POSSIBLE SOLUTION</th>
<th>REFERENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Threader does not engage</td>
<td>a) check for proper operation of pneumatic valves.</td>
<td>Pneumatic Schematic</td>
</tr>
<tr>
<td></td>
<td>b) Check pressure and flow settings.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>c) Winder must be below 'Low Speed'.</td>
<td>Drive Manual</td>
</tr>
<tr>
<td>Air showers do not work.</td>
<td>a) Check the air shower pressure and flow rate.</td>
<td>Pneumatic Schematic</td>
</tr>
<tr>
<td></td>
<td>b) Check for plugged holes in the shower tubes.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>c) Threader must be activated.</td>
<td></td>
</tr>
<tr>
<td>Holder does not engage</td>
<td>a) Check for proper operation of pneumatic valves</td>
<td>Pneumatic Schematic</td>
</tr>
<tr>
<td></td>
<td>b) Check pressure and flow settings.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>c) Winder must be stopped.</td>
<td>Drive Manual</td>
</tr>
</tbody>
</table>
Articulating Rider Roll & Compliant Front Drum

This order includes an articulating rider roll and a compliant front drum. One of the primary functions of a rider roll is to provide the tight start essential for creation of proper roll structure. Later in the cycle, as the roll set's growing weight increases the nip between the roll set and drums, the need for rider roll pressure diminishes, and the system controlling the rider roll can gradually reduce the amount of loading. The articulating rider roll performs this loading regulation function automatically, and because of the flexibility of its construction, it maintains a highly uniform degree of nip control over the full width of the roll set. As a result, the articulating rider roll is capable of producing a high level of roll-to-roll structural consistency within each set. The front drum, which is coated with an elastomer covering, provides a compliant surface that conforms the profile of the roll set. This produces more even nip loading, reduced nip related defects, and increased roll diameter capacity.

Rider Roll Components

The articulating rider roll consists of a series of wheels covered with a resilient urethane material. The wheels are web driven, and they are mounted on anti-friction bearings attached to a full width beam. Individual wheels can be enabled or disabled independently. The suspension system for the wheels employs a combination of pneumatic and hydraulic controls that are designed to ensure that each wheel applies identical force to the rewinding roll set, regardless of roll-to-diameter variations of up to 1.5 inches within the set. Unlike a conventional rider roll, which concentrates the nip load at one or two of the highest points of the roll set, the articulating rider roll conforms to the profile of the entire roll set, distributing the nip load evenly across all rolls in the set. The articulating rider roll uses a closed loop, force-controlled nip loading system that measures the force where it is actually being applied - at the rider roll. As a result, the desired nip command curve is applied evenly and accurately across the entire set, from core to finished roll diameter.

Because of its ability to conform to variations in roll set diameter, the articulating rider roll improves roll-to-roll consistency within the set and eliminates the source of many defects caused by the uneven rider roll nip of conventional rider rolls. This is so, because even when properly maintained and aligned, conventional rider rolls cannot produce uniform nip loading across the entire set from the very start of winding, since even relatively minor variations in core diameter are capable of causing uneven roll structures within the same set as the rolls reach finished diameter. Consequently, as roll set diameter increases during winding with a conventional rider roll, caliper and other variations across the web add to the problems caused by the initial variations in core diameter, creating further inconsistency of roll structure in rolls within the set. In contrast, the evenly distributed nip load and uniform contact produced by the articulating rider roll's ability to conform to irregularities in the roll set's profile - for variations of up to an 1.5" in diameter - compensates for variations in the diameters of individual rolls, resulting in smoother, safer operation and improved roll structure of all rolls within each set.
The Articulating Rider Roll

GYLCOL CYLINDER

AIR CYLINDER
Compliant Front Drum

The front drum is covered with a 25 mm elastomer coating. This provides a compliant surface that conforms to variations of roll diameter as the roll set is wound, effectively reducing nip load as roll diameter increases. The surface of the coating is finished with a special grooved pattern that reduces wound tension. The roll data drawings and specifications for the compliant drum coating are listed in the List of Components appendix of this manual.

Reference Drawings And Schematics

See List of Components Appendix.

RIDER ROLL OPERATION

Once the articulating rider roll’s wheels are selected and initialized it can be operated in the same way as a conventional rider roll: the RIDER ROLL RAISE/LOWER selector is used to raise and lower the rider roll and the RIDER ROLL LOAD and RIDER ROLL LATCHED indicators monitor latch and load functions. The primary difference between conventional and articulating rider roll operation is the initialization procedure of the rider roll wheel cylinder’s fluid volume and pressure required by articulating rider roll. The initialization procedure is based on the number of wheels required for the set being run - the more wheels in operation, the more fluid (glycol) that is required and vise-versa. The reservoir tank has enough glycol capacity to fill all cylinders when they are in mid-stroke (running position).

⚠️ WARNING ⚠️

The rider roll must be kept on the rewind roll whenever the winder is running faster than ‘Thread’ speed. Do not attempt to operate, maintain, or repair the rider roll without reading the following sections of this manual: “Winder Safety Practices”, “Operator Safety”, “Maintenance Safety”, “Lockout/Tagout Procedures”, and “Danger, Warning, Caution, and Notice as Used In This Document”.

Rider Roll Initialization

Initialization is an automatic process, initiated by the operator’s use of the RIDER ROLL INITIALIZE button, by which the rider roll’s computer prepares the rider roll for the set to about to be run. This process should be performed each time a new trim plan is selected or if the number of wheels selected has changed. After initialization has been completed, subsequent roll sets can be run without re-initialization until the next trim plan change or wheel change is started.

During Initialization the computer keeps track of the number of wheels selected for the set to be run, and it controls an automatic process that raises the wheels to their mid-stroke position and brings them into equilibrium. If the winder has an automatic slitter positioning system that communicates with the winder controller, slitter positions are downloaded to the winder controller from the slitter positioning system for use in this process of automatic wheel selection, and the controller utilizes this data to determine which wheels are to be raised from a slit and which ones are to be lowered into contact with the roll set (see illustration next page).
The initialization sequence occurs automatically if the RIDER ROLL INITIALIZE button is pressed when the following conditions are in effect: a new trim plan has been selected or a wheel change has been made; the rider roll is not loaded and is raised 10 to 20 inches above the cores or rolls (if the rider roll is loaded and on the cores or roll set, it will lift off automatically before auto initialize procedure starts).

**Automatic Operation: The Auto Initialization Sequence**

In this sequence the computer automatically brings the wheels into equilibrium at their mid-stroke position by controlling the flow of glycol to the wheel cylinders. It determines the number of wheels selected for the current trim plan, and it signals the glycol system to fill the wheel cylinders with the correct amount of glycol required for the set. To achieve this, the following sequence of functions is automatically performed:

1. Half of the selected wheels, on an alternate basis, are disabled and moved to a fully raised position. Wheels that would be in line with a slit are raised out of contact with the act and are left disabled during the running of the set; they are not included in the number of wheels selected for the trim plan.
The wheels are raised as follows: the air cylinders of the wheels to be raised are switched to high pressure, which pushes the wheels up to a fully raised position, bottoming out the cylinder diaphragms and thereby preventing fluid from entering the fluid cylinders.

Note: Each wheel has an individual valve that controls air to the cylinder. Valves turn on to enable at approximately 10 psi counterbalance (varies depending on friction in the linkage). Valves turn off to disable at 60 psi fully up.

2. The glycol tank valve opens to fill the remaining half of selected wheel cylinders with fluid. The fluid pushes these wheels down from their midstroke (counterbalanced) position into contact with the roller set.

Note: To facilitate this filling function, the glycol head pressure automatically switches to a "high/fill" setting to decrease time required to fill selected wheels.

3. When glycol filling of all selected wheels is complete, the fluid manifold pressure will stabilize at 5 psi, which acts as a setpoint for the computer to signal the glycol tank valve to close, trapping and retaining the fluid in the wheel cylinders.

4. At this point, the rider roll lowers and softloads on the cores, and the wheels raised in step 1 are permitted to accept entry of fluid into their cylinders. As the rider roll settles on the cores, its weight causes the fluid to flow into these empty cylinders from those filled in steps 2 through 4.

5. As the fluid distributes itself evenly between both groups of wheel cylinders, the rider roll beam moves to its counterbalanced, mid-stroke position and equilibrium is reached.

   At this point the rider roll is ready to operate.
RAISING AND LOWERING THE WHEELS MANUALLY

The wheels can be raised and lowered individually on a manual basis through use of the WHEEL UP/DOWN switches. These controls are mounted on the beam above the wheels. Each switch is numbered according to the wheel it controls, and each panel of seven is located close to the wheels controlled from that panel.

-- NOTICE --

Before running, make sure that wheels are not left in contact with the cores over slits.

WHEEL GAP: VERIFYING MID-STROKE POSITION

It is important that the wheels are at mid-stroke position at the start of winding. Starting at mid-point makes it possible to utilize the full 1.5 inch stroke of the cylinders to achieve the greatest possible range of articulation. When the wheels are properly centered at mid-stroke position, the maximum articulation of 0.75 inches of travel is available in both directions. As a result, individual rolls in the set can differ in diameter from their immediate neighbors by as much as 0.75 inch and still receive the same amount of nip loading from the rider roll. Note: If the wheels are not centered properly, that potential range of wheel travel for nip loading will be shortened.

To check the gap, use block of wood 0.75 inches thick with a wedge shaped edge (see illustration). Wheel gap should be checked at least once a day.
OPERATING IN ARTICULATING OR NON-ARTICULATING MODE

The articulating rider roll can be used in either articulating mode (closed loop mode) or in non-articulating (open loop) mode. With the exceptions cited in "Operating in Non-Articulating Mode" (below) the articulating rider roll should be operated in articulating mode (closed loop mode). When in non-articulating mode, the rider roll functions as a standard rider roll. Use the drive controls to set rider roll for closed loop operation (see drive documentation.)

Articulating Operation

The articulating rider roll should be used in articulating mode during all normal winding conditions (see exceptions in "Operating in Non-Articulating Mode" below). Once the articulating rider roll's wheels are selected and initialized in preparation for operation in articulating mode, it is operated the same as a conventional rider roll: the raise, latch, lower, softload and load functions are all the same as during conventional rider roll operation.

Operating In Non-articulating Mode

The rider roll is ordinarily operated in articulating mode (closed loop mode). It should only be used in non-articulating (open loop) mode when one of the following conditions exists:

- Rider Roll pressure transducer failure
- More than 50% of the cylinders on any roll have been damaged or are not operating.

To operate the rider roll in non-articulating mode, the following procedure must be performed:

1. Open the glycol valve by turning the SYSTEM NORMAL/FILL selector to 'FILL' position. This will cause all wheels drop to a uniform, fully lowered position.

   ![SYSTEM NORMAL/FILL Selector](image1)

2. Raise all wheels to their fully raised position. Use the WHEEL UP/DOWN selector on each wheel. Note: All wheels must be raised until they lock into their fully raised position.

   ![WHEEL UP/DOWN Selector](image2)
Operating In Non-articulating Mode (continued)

3. Use the drive controls to set rider roll for closed loop operation (see drive documentation.)

4. With a straight edge of at least 3 feet placed at the bottom of the wheels, check to make sure that all wheels are level. If there are wheels that vary in height more than .005 inch, reset the linkage (refer to linkage adjustment instructions).

The winder will now run in open loop mode, with the rider roll functioning as a solid roll, non-articulating rider roll.
# RIDER ROLL TROUBLESHOOTING CHART

<table>
<thead>
<tr>
<th>PROBLEM</th>
<th>POSSIBLE SOLUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheels not maintaining position. Beam movement when rider roll is loaded on cores.</td>
<td>Check for bleed through at the glycol tank isolation valve RRGT-PSV.</td>
</tr>
<tr>
<td></td>
<td>Check to see if valve selector switch SYSTEM NORMAL/FILL is set at 'FILL'.</td>
</tr>
<tr>
<td></td>
<td>Check for leaks at system relief valve.</td>
</tr>
<tr>
<td>When all or some wheels are in raised (disabled) position no fluid is seen in sight glass.</td>
<td>Check level of P-glycol in the air/oil tank (reservoir). The level should be at the top line of the sight glass. Level will vary based on the number of wheels in use. See Fill/Bleed if low.</td>
</tr>
<tr>
<td></td>
<td>Check for leaks and broken lines.</td>
</tr>
<tr>
<td>Wheel gap too small or too large.</td>
<td>Check wheel initialization and selection procedure.</td>
</tr>
<tr>
<td></td>
<td>Check validity of slitter cut position data from slitter positioning system.</td>
</tr>
<tr>
<td>Wheels bouncing during operation (while winder is running)</td>
<td>Air in hydraulic system. Air needs to be bled from system. Use bleed ports located at top of accumulator block or manually operate cylinders up and down to work air out of system. See Fill/Bleed procedure.</td>
</tr>
<tr>
<td></td>
<td>Check for mechanical damage.</td>
</tr>
<tr>
<td>PROBLEM</td>
<td>POSSIBLE SOLUTION</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Wheels bounce up when selected to go up</td>
<td>Air in hydraulic system. Air needs to be bled from system. Use bleed ports located at top of accumulator block or manually operate cylinders up and down to work air out of system. (See Fill/Bleed procedure.) Check for mechanical damage.</td>
</tr>
<tr>
<td>Wheels raise up after initialization is complete. Wheel counterbalance valve is energized.</td>
<td>Wheel counterbalance pressure set too high. See control setting chart.</td>
</tr>
<tr>
<td>Rider Roll nip feedback not following setpoint.</td>
<td>Check calibration and operation of rider roll manifold pressure transmitter (Viatram Pressure Transmitter). Fluid system not initialized at 5 psi. Check regulator and air supply.</td>
</tr>
<tr>
<td>Rider roll bounces or pressure spikes in feedback signal while running.</td>
<td>Tune controller constants - proportional gain and integral gain.</td>
</tr>
<tr>
<td>Wheel instability or binding.</td>
<td>Check for tread wear, mechanical damage, and unbalanced wheels.</td>
</tr>
<tr>
<td>Fluid on rolls or equipment.</td>
<td>Check for leaks and broken lines.</td>
</tr>
<tr>
<td>Glycol system pressure goes to 0 psi (0 bar) or possibly lower.</td>
<td>Wheel counterbalance set too low. See pneumatic/hydraulic circuit setup.</td>
</tr>
</tbody>
</table>
### RIDER ROLL TROUBLESHOOTING CHART

<table>
<thead>
<tr>
<th>PROBLEM</th>
<th>POSSIBLE SOLUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheel initialization procedure does not work.</td>
<td>Glycol tank selector switch in closed position. Change setting to 'Auto'.</td>
</tr>
<tr>
<td></td>
<td>PLC not in run mode.</td>
</tr>
<tr>
<td></td>
<td>Failure of valve RRW (1-68) U_PSV, hose or fitting leak or disconnection.</td>
</tr>
<tr>
<td></td>
<td>Fluid side air pressure too high.</td>
</tr>
<tr>
<td></td>
<td>Rider roll not loaded.</td>
</tr>
<tr>
<td>Wheel won't go up</td>
<td>Shutoff valve closed on fluid side.</td>
</tr>
<tr>
<td></td>
<td>WRRGT_PSV closed - no fluid can return to tank/reservoir.</td>
</tr>
<tr>
<td></td>
<td>Air pressure too low on air side.</td>
</tr>
<tr>
<td></td>
<td>Valve RRW (1-68) U_PSV stuck or failed.</td>
</tr>
<tr>
<td></td>
<td>Selector switch failure.</td>
</tr>
<tr>
<td></td>
<td>Hose, line or fitting leaking or disconnected.</td>
</tr>
<tr>
<td></td>
<td>Fluid side air pressure too high.</td>
</tr>
<tr>
<td></td>
<td>Mechanical binding.</td>
</tr>
<tr>
<td>Wheel won't go down</td>
<td>Counterbalance air pressure too high.</td>
</tr>
<tr>
<td></td>
<td>Mechanical friction/binding.</td>
</tr>
<tr>
<td></td>
<td>Bad regulator - not relieving pressure.</td>
</tr>
<tr>
<td></td>
<td>Valve RRW(1-68) U_PSV stuck or failed.</td>
</tr>
</tbody>
</table>
# RIDER ROLL TROUBLESHOOTING CHART

<table>
<thead>
<tr>
<th>PROBLEM</th>
<th>POSSIBLE SOLUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheels chafing or material breaking off.</td>
<td>Replace wheel.</td>
</tr>
<tr>
<td></td>
<td>Determine interference.</td>
</tr>
<tr>
<td></td>
<td>Damaged by external forces (core chuck, knife, etc.)</td>
</tr>
<tr>
<td>All rider roll functions fail to work.</td>
<td>PLC in program mode.</td>
</tr>
<tr>
<td></td>
<td>No 24VDC power to beam.</td>
</tr>
<tr>
<td></td>
<td>No air pressure.</td>
</tr>
<tr>
<td></td>
<td>Communication loss to beam.</td>
</tr>
</tbody>
</table>
RIDER ROLL MAINTENANCE SCHEDULE

Maintenance should be performed on a periodic basis. The time intervals of the following schedules should be regarded as the suggested minimum intervals permissible.

– NOTICE –

To avoid possible damage to the wheel cylinder diaphragms, always turn the SYSTEM NORMAL/FILL selector to ‘Fill’ position before turning off pneumatic pressure or powering down.

Weekly

Check all air and fluid hoses for leaks.

Check all wheels for cuts, nicks or damage. Wheels should spin freely and true. Damaged wheel assemblies should be immediately replaced as this will cause winding problems should the wheel drag on the sheet or bind against an adjacent wheel assembly.

Check fluid level in reservoir. With all the wheels fully raised, the fluid should be very close to the glycol tank high level switch. With all the wheels lowered, the fluid should not go past the glycol tank low level switch.

Monthly

Test PH of propylene glycol mixture. If PH is below 6, add corrosion inhibitor (tripotassium hydrogen phosphate) per container directions to bring PH to between 7 and 9.

Operation of the auto initialization system should be observed for mid-stroke position of a .75 inch (+/- .25 inch) gap between enabled (lowered) and disabled (raised) wheels.

Allow the rider roll to rest down against the cores in the “Loaded” mode. The wheels should maintain their position during a ten minute period. Rider roll team should stay in the same position and not move. If beam movement occurs, check for “bleed through” at the glycol tank isolation valve (RRGT-PSV) and the system relief valve.

Check for loose bolts.

– NOTICE –

Do not attempt to maintain, repair, or operate the rider roll without reading the following sections of this manual: “Lockout/Tagout Procedures”, “General Safety”, “Operator Safety”, and “Danger, Warning, Caution, and Notice as Used In This Document”.

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Winder Operation Manual
RIDER ROLL PNEUMATIC/HYDRAULIC CIRCUIT SETUP

With the rider roll raised from the cores or roll, use the following procedure with controls on the Rider Roll Beam Gauge Panel to setup the rider roll pneumatic and hydraulic equipment:

1. Precharge the accumulators with instrument air @ 50-55 psi (3.45 bar) as follows:
   a. Remove cap from Schraeder control valve.
   b. Connect hose from regulated air supply to the Schraeder valve nipple.
   c. Shut off air supply when pressure gage reads 50-55 psi.

   **NOTICE**

   Do not exceed 55 psi when charging the accumulators. Excessive pressure can damage cylinders.

   d. Disconnect hose from the accumulator valve and put cap back on nipple.

2. At the Rider Roll Beam Gauge Panel (see illustration) make the following settings:
   a. Turn the system NORMAL/FILL selector to 'Normal' position.
   b. Set WHEE.. INITIALIZE PRESSURE regulator ('A' on schematic) to 5 psi (.34 bar)
   c. Set WHEE.. FILL PRESSURE regulator ('B' on schematic) to 30 psi (2.04 bar)
   d. Set WHEE.. DISABLE/UP PRESSURE regulator ('C' on schematic) to 60 psi (4.08 bar).
   e. Set WHEE.. COUNTERBALANCE/DOWN PRESSURE regulator ('D' on schematic) as follows:

      (1) Manually open the glycol tank valve (RRGT-PSV on the schematic).

      (2) Slowly increase the wheel counterbalance pressure regulator 'D' from 0 psi (0 bar). The pressure should be approximately 12 psi (.82 bar), but it may vary slightly due to slight weight differences and friction. When about half of the wheels start to move very slowly upwards, stop increasing the pressure.

      (3) Now reduce the pressure by .25 psi (.017 bar). Being closer to the top of the friction "dead band" than to its bottom will ensure that the weight of the wheels does not cause a vacuum in the glycol system.

      (4) Manually close the glycol tank valve (RRGT-PSV).

3. With the supply line to all hydraulic wheel cylinders closed, set Rider Roll Pressure Sensor #1 to switch Off when pressure reaches 12 psi.
Pneumatic/Hydraulic Circuit Setup (continued)

4. Set Rider Roll Pressure Sensor #2 to switch Off when pressure reaches 60 psi.

5. Determine the fluid's low level point and mount the glycol tank level low sensor (GTLL_PX) at that location as follows:

   a. Adjust GTLL_PX so that it is touching sight glass.

   b. With fluid in sight gauge adjust GTLL_PX range screw until yellow LED comes on. The LED should be off if there is no fluid in the sight gage.

6. Repeat the procedure used in step 5 for glycol tank level high sensor GTLH_PX, determining high level point and mounting the sensor at that location.

FLUID SPECIFICATIONS
The following propylene glycol solution is specified for use with this articulating rider roll:

Freeze Ban (with rust inhibitor)
Camco Manufacturing Incorporated
Phone (919) 668-7661
Propylene Glycol Solution (C3H8O2)
50% distilled water/50% glycol solution (mixing required by purchaser)

ARTICULATING RIDER ROLL CONTROLS SETTING CHART

<table>
<thead>
<tr>
<th>FUNCTION</th>
<th>RECOMMENDED INITIAL SETTING</th>
<th>FINAL SETTING AT STARTUP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheel Initialize Pressure (psi/bar)</td>
<td>5 psi</td>
<td></td>
</tr>
<tr>
<td>Wheel Fill Pressure (psi/bar)</td>
<td>30 psi</td>
<td></td>
</tr>
<tr>
<td>Wheel Disable Pressure (psi/bar)</td>
<td>60 psi</td>
<td></td>
</tr>
<tr>
<td>Wheel Counterbalance Pressure (psi/bar)</td>
<td>12 psi</td>
<td></td>
</tr>
</tbody>
</table>
RIDER ROLL GLYCOL FILLING AND BLEEDING PROCEDURE

Tools Required:
- 10" Adjustable Wrench
- 15" Adjustable Wrench
- Funnel
- 1 gallon bucket

Materials Required:
Propylene Glycol mixture. See "Fluid Specifications". The amount varies based on the size of the machine. A rough estimate of propylene glycol mixture needed is the number of wheels x .5 gallons.

- NOTICE -
Use only non-toxic propylene glycol to fill tank.

Use the following procedure to fill and bleed the glycol fluid.

1. Place all wheels in their full raised position. Use the WHEEL UP/DOWN switches.

2. Open glycol tank valve (RRGT PSV) using switch located in the benchboard. Turn the SYSTEM NORMAL/FILL selector to the "FILL" position.

3. Turn off air pressure to the glycol tank "M", by shutting off WHEEL INITIALIZE regulator 'A' on the Rider Roll Beam Panel.

4. Carefully remove the tank plug from top of the glycol tank 'M' and add enough glycol to fill the tank to the top of the sight gauge.

   - NOTICE -
   Do not overfill tank. Do not reuse drained glycol, fluid may be aerated or contaminated and be unsuitable for use.

5. Replace and tighten plug.

6. Increase system pressure to 5 PSI by adjusting pressure regulator "A" on the rider roll beam.
Glycol Filling And Bleeding Procedure (continued)

7. Place an empty container under the manifold bleed valve on the upper end of the glycol manifold.

8. Open the manifold bleed valve and bleed system into the empty container. Allow the fluid to flow until there is a steady flow with no air bubbles, but do not permit fluid level to fall below view in the glass sight gauge on the tank.

   – NOTICE –

   Do not let the fluid disappear from the sight gauge. If the fluid is at bottom of the sight gauge and air bubbles are still present in the fluid flowing from the bleed valve on the upper end of the glycol manifold, close the valve and repeat steps 3-8 until there is a steady, bubble free stream of fluid.

9. After completing the bleeding procedure in steps 3 through 8, check the fluid level in the tank sight gauge. If the fluid is not at the top of the gauge, add glycol, as described in steps 3, 4, & 5. (See illustration)

10. Close all cylinder segment shutoff valves to prevent fluid from being drawn from anywhere in the system other than the main header.

11. Open bleed port on top of #1 junction block.

12. Open cylinder segment #1 shutoff valve.

13. Wait for glycol to come out and then close the bleed port. Wipe off any excess glycol off.

14. Close cylinder segment #1 shutoff valve.

15. Open bleed port on top of #2 junction block.

16. Open cylinder segment #2 shutoff valve.

17. Repeat steps 12 and 13.

18. Close cylinder segment #2 shutoff valve.

19. Repeat Step #8 after 25%, 50%, 75% and 100% of the system has been bled.

20. Repeat this procedure until all the segments have been bled.

21. After completing all segments, open all cylinder segment shutoff valves.

22. Starting with wheel #1, lower and raise each wheel 3 times to check to see if any wheel consistently bounces up. If a wheel does consistently bounce, there will either be air in that segment or the accumulator is not charged. If there is a need to bleed a segment, all cylinder segment shutoff valves except the one being bled must be closed.
23. Check the fluid level in the glycol tank again to make sure it is filled almost to the glycol high level switch.

24. Use the WHEEL UP/DOWN switches to lower all wheels to their 'Down' position. The wheels will move to their fully lowered position and the glycol level will lower to somewhere just above the tank level low switch. If the level does not go below the switch, there is an acceptable amount of glycol in the system.

25. Close glycol tank valve RRGT,PSV by turning the SYSTEM NORMAL/FILL selector to its 'NORMAL' position.
   Note: The level of fluid in the sight gauge during production will vary according to the number of wheels raised or lowered.
RIDER ROLL REAR FLUID CYLINDER REPLACEMENT

Use the following procedure to replace a single fluid diaphragm cylinder on the rear of the beam.

1. Turn SYSTEM NORMAL/FILL switch the 'FILL' position.

⚠️ CAUTION

Air supply to rider roll beam must be off before proceeding further.

2. Disconnect the loading linkage to the segment to be worked on. Hold the hex link while turning the cylinder rod until they separate. (Ref. Drawing 50-2703-0011)

3. Remove the four 1/4 inch screws holding the cylinder to the frame. (Ref. Drawing 50-2703-0011.)

4. Close the segment shutoff valve to prevent fluid from draining from open manifold port.

5. Disconnect the cylinder's tubing at the manifold shutoff.

6. Remove the cylinder from the beam and disconnect the tubing from the cylinder.

7. Extend the new cylinder; hold and fill with fluid. This will eliminate virtually all air from the cylinder.

8. Attach the tubing to the replacement cylinder.

9. Install the cylinder to the frame and attach with four 1/4 inch screws.

10. Compress the cylinder slightly to force fluid through the tubing, displacing any air in the tubing.

11. Reconnect the cylinder tubing and open manifold shutoff valve. Starting with the fitting slightly loose, slowly compress the cylinder as you tighten the fitting.

12. Reconnect the linkage to the segment and adjust it as described in "Linkage Adjustment Instructions".

13. Check the glycol tank fluid level with all the wheels in the 'UP' position. Fluid level as seen in sight glass should be just below glycol tank high level sensor. If it is not, refer to "Glycol Filling and Bleeding Procedure."
RIDER ROLL LINKAGE ADJUSTMENT INSTRUCTIONS

The linkage must be kept in vertical alignment for the following reasons:

- To prevent the diaphragm cylinders stroke from bottoming out. Failure to adjust the diaphragm cylinders may result in diaphragm damage due to pinching.
- Maximum segment travel, necessary for handling the more extreme profile variations, will only be obtained when all segments are properly adjusted.
- In order for use the rider roll in conventional, non-articulated mode (which must be kept available for back-up operation) all wheels must be in horizontal alignment with each other.

WARNING

Always block the rider roll when working beneath it.

Use the following procedure to adjust the linkage (Refer to Drawings 50-2703-0011-0-001 and 91-5088-0397).

1. Set rear cylinder rod shoulder to segment eye dimension.

2. Using a gage block, set the distance from the face of the segment block, which accepts the linkage pin, to the shoulder on the end of the rear cylinder rod. The distance should be 3.82 inches. The adjustment is made by holding the connecting hex link and rotating the rod of the cylinder. A lock nut is provided to secure the adjustment.

3. Using WHEEL DISABLE regulator on the gauge panel ("C" on the schematic), reduce the dis-engage pressure to approximately 20 PSI.

   Note: Lowering the pressure prevents damage to the diaphragm at the bottom of the stroke.

4. Retract the stop screws, on the rear of the beam, which are used to limit the upward stroke of the segments.

5. Lift up the segment with its WHEEL UP/DOWN switch. The segment’s rear cylinder should now be at the bottom of its stroke.

6. Check to see if the front cylinder is preventing the rear cylinder from bottoming out. Do this by loosening the front cylinder’s lock nut and checking to see if the cylinder rod rotates freely. If it doesn’t, lengthen the rod until it moves freely.

7. Adjust the stop screws on the rear of the beam as follows: screw the stop screw into contact the segment block or until the assembly moves. Then turn screw exactly 2 turns more. This should be within half a flat on the hex head of the stop screw.
8. Set the front cylinder linkage length. Use the following procedure:

a. Lower the segment by turning the WHEEL UP/DOWN selector switch to ‘Down’.

b. Proceed to shortening the linkage while monitoring the position of the rear cylinder rod or wheel as follows: When the unit just stops dropping, shorten the front linkage 1 turn more. As the front link is shortened, the rear piston will reach the end of its extended stroke. Stop shortening at this point. Further shortening will pull the front cylinder from its fully bottomed position.

c. Lock the lock nut.
RIDER ROLL SEGMENT REMOVAL/INSTALLATION

These procedures are used when a segment must be repaired, maintain, or replaced. They describe only the removal of the segment as a unit; bearing replacement and repairs that requires disassembly of the segment side plates must be performed at Beloit Lenox. It is recommended that you keep enough spares in stock to replace 20% of the segments on the rider roll.

Segment Removal Procedure

Use the following procedure to remove a complete segment:

⚠️ WARNING

Personnel can be struck and crushed if the Rider Roll falls. Always block the rider roll when working beneath it.

1. Turn SYSTEM NORMAL/FILL switch the 'FILL' position.

2. Shutoff the air supply to the rider roll beam.

3. Lower all the wheels to their fully lowered position.

⚠️ CAUTION

Open air lines can cause damage to eyes and exposed skin. The air supply to the rider roll must be turned off before working on the segment.

4. Disconnect the linkage to the rear cylinder by loosening the lock nut.

5. Hold the hex link body and turn the cylinder rod until the rod separates from the body.

6. Support the segment with blocking.

7. Disconnect the linkage to the front cylinder by loosening the locknut.

⚠️ CAUTION

Hands and feet can be struck if the segment falls. Always make sure the segment is adequately blocked before separating the segment from the beam.

8. Hold the hex link body and turn the cylinder rod until it separates from the body.

9. Remove the two 1/2 inch bolts holding the pivot block to the keyed mounting surface on the beam. The segment is now free of the beam. If necessary, apply lateral force to the segment to remove it from the keyed surface.

At this point the segment is free of the rider roll and, if necessary, can be removed from the rider roll area.
Segment Installation Procedure

Use the following procedure to remove a complete segment:

⚠️ WARNING

Personnel can be struck and crushed if the rider roll falls. Always block the rider roll when working beneath it.

1. Support the wheel segment with appropriate blocking at the drum.

⚠️ CAUTION

Hands and feet can be struck if the segment falls. Always make sure the segment is adequately blocked before separating the segment from the beam.

2. Move the segment into place on the keyed surface on the beam. It may be necessary to apply lateral force to get the segment into position.
3. Install the two half inch bolts that hold the pivot block to the keyed mounting surface.
4. Connect the linkage to the front cylinder and set the gap per drawing 50-2703-0011.
5. Tighten the lock nut.
6. Connect the linkage to the rear cylinder and set the gap per drawing 50-2703-0011.
7. Tighten the lock nut.

The segment is now ready for use.
RIDER ROLL CALIBRATION

MANIFOLD PRESSURE FEEDBACK

Constants:

Glycol Initialize Pressure (GLY_IP) = 5.0 PSI
Glycol PLI/PSI (GLY_PLI_PSI) = 1.00 PLI/PSI
Maximum Rider Roll Load (MAX_NIP) = 20.0 PLI

Pressure Transmitter Scaled (0-50 psi) ARR PSI_JN

Output
4 mA = 0 psi / 0 bar
20 mA = 50 psi / 3.4 bar

Converting pressure feedback to PLI feedbacks units:

\[ \text{NIP}_{\text{PLI_FB}} = \left( \text{ARR}_\text{PSI_JN} - \text{GLY_IP} \right) \times \text{GLY_PLI_PSI} \]
If Pressure Feedback = 25 psi
\[ \text{NIP}_{\text{PLI_FB}} = \left( 25 \text{ psi} - 5 \text{ psi} \right) \times 1.00 = 20 \text{ PLI} \]

If Pressure Feedback = 7 psi
\[ \text{NIP}_{\text{PLI_FB}} = \left( 7 \text{ psi} - 5 \text{ psi} \right) \times 1.00 = 2.0 \text{ PLI} \]

RIDER ROLL CONTROL LOOP

Control Loop Setup Chart Using PID ISO Equation

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Initial Settings</th>
<th>Final Settings at Start UP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportional Gain</td>
<td>.04</td>
<td></td>
</tr>
<tr>
<td>Integral Response</td>
<td>80 rep/min</td>
<td></td>
</tr>
<tr>
<td>Derivative Time</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>
DIFFERENTIAL TORQUE CONTROL

Differential torque control is a method of proportionally varying the available torque between the front drum and back drum. A tighter start is created by transferring some of the torque from the back to the front drum at the start of the winding cycle. This, of course, is done in conjunction with the force applied by the rider roll as described in the "Articulating Rider Roll" section. Differential torque control is an automatic function of the Bel-OIT and LARS (Lenox Auto Roll Structure) systems. The mechanisms that vary the torque are electrical - they are contained within the circuitry of the winder drive itself.

DIFFERENTIAL TORQUE OPERATION AND ADJUSTMENT

The differential torque control system is designed to function automatically during Bel-OIT and LARS operation. During Bel-OIT operation it is possible to create and edit tension curve setpoints when the winder is stopped, and biasing (see below) is permitted while the winder is running. (See "Starting the Winder" and "Running the Winder" in Section 2 for instructions about when to make such adjustments, and see Bel-OIT User's Guide for instruction in how to make them.) When operating in LARS, torque curve setpoints are fixed, but they can be biased.

Biasing (raising and lowering) of the current differential torque curve can be achieved on an on-line basis while the winder is running, in both Bel-OIT and LARS, by use of the torque biasing controls on the Panel View on the benchboard. (See "Using the Panel View" in Section 2.)

Note: During biasing, the whole curve is raised or lowered, while the relative position of setpoints in curve remain unchanged.

For information about operation, setting of parameters, and procedures for making "fine tuning" adjustments to torque settings when operating in Bel-OIT mode, see the Bel-OIT User's Guide. For descriptions of LARS, see "Running the Winder" in Section 2.
MONITORING THE SYSTEM

Analog meters are located on the benchboard for the front and the back drum motors. Because the amount of amperes consumed is directly related to torque output, the Analog can be used to monitor the torque output of each motor. Early in the run mode, if the starting torque is set at or near 100%, the front drum Analog meter will, as expected, read substantially higher than the back drum Analog meter. When the differential rate setting is reached, both meters will be giving nearly the same reading, although the front drum is commonly set up to read just slightly higher than the back drum at the nominal 50/50 ratio.

DIFFERENTIAL TORQUE CONTROL - MAINTENANCE

Inspect all electric connections and components for proper operation. Schedule repairs if required. (See drive manual under separate cover.)

Reference Schematics
Elementary Diagrams: 92-5001-0098

<table>
<thead>
<tr>
<th>PROBLEM</th>
<th>POSSIBLE SOLUTION</th>
<th>REFERENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not getting a tight start</td>
<td>Check output signal from the diameter transducer; check for proper operation of roll hardness and drive control system</td>
<td>BELoit Manual &amp; Drive Manual</td>
</tr>
</tbody>
</table>

<p>| |</p>
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Too much wound-in tension. (See also &quot;Tension Control&quot; and &quot;Rider Roll&quot; sections.)</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Same as above</td>
</tr>
</tbody>
</table>

<p>| |</p>
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Too little wound-in tension. (See also &quot;Tension Control&quot; and &quot;Rider Roll&quot; sections.)</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Same as above</td>
</tr>
</tbody>
</table>
AUTOMATIC WEB TENSION CONTROL SYSTEM

The web tension control system is designed to maintain constant sheet tension automatically during acceleration, steady speed, deceleration, and through diminishing parent roll diameters (see illustration).

The hardness of rewound rolls is affected by sheet tension, which is a function of the parent roll's resistance to being unwound. A constant tension level is maintained throughout the winding cycle in order to maintain control over the slit sheets and prevent soft spots in the roll, interweaving, and other types of roll defects.

TENSION CONTROL SYSTEM COMPONENTS AND OPERATION

The web tension control system includes the following parts (see illustration for configuration):

1. A tension roll over which the web travels. The web wraps the tension roll and, in doing so, exerts a force on it proportional to the amount of tension in the sheet.

2. Three load cells, which support the tension roll. They measure the force exerted on the roll and convert it into a proportional measured output.
TENSION CONTROL COMPONENTS AND OPERATION (continued)

The system operates in the following way. Setpoints (in actual foot pounds) are sent to the Unwind Drive Controller from the program being run. The load cells send a 4-20 mA feedback signal to the unwind drive controller, which compares the two signals and accelerates or decelerates the unwind motor to regulate the sheet tension.

The web tension system is designed to function automatically during Bel-OIT and LARS operation. During Bel-OIT operation it is possible to create and edit tension curve setpoints when the winder is stopped, and biasing (see below) is permitted while the winder is running. (See "Starting the Winder" and "Running the Winder" in Section 2 for instructions about when to make such adjustments, and see Bel-OIT User’s Guide for instructions in how to make them.) LARS does not permit creation or editing of its web tension curve, but it does permit biasing.

Biasing (raising and lowering) of the current web tension curve can be achieved on an on-line basis while the winder is running, in both Bel-OIT and LARS, by use of the tension biasing controls on the Panel View on the benchboard. (See "Using the Panel View" in Section 2.)

Note: During biasing, the whole curve is raised or lowered, while the relative position of setpoints in curve remain unchanged.

Reference Drawings and Schematics

Elementary Diagrams: 92-5001-0098

<table>
<thead>
<tr>
<th>PROBLEM</th>
<th>POSSIBLE SOLUTION</th>
<th>REFERENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instability</td>
<td>a) Check operation of load controller</td>
<td>Complotrol</td>
</tr>
<tr>
<td></td>
<td>b) Check unwind core or roll for out-of-round.</td>
<td>Manual</td>
</tr>
<tr>
<td></td>
<td>c) Check for proper operation of the controller.</td>
<td></td>
</tr>
</tbody>
</table>

| No signal or no change in signal | a) Check floating bearing on tension roll for alignment. | Complotrol Manual |
|                                  | b) Check operation of load cell controller.            |                |

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3 - 57 Winder Operation Manual
ROLL EJECTOR

The rear-drum roll ejector is a drum width beam, mounted on the back drum bearing housings, that is used to push ("eject") rolls from the drum pocket into the cradle. It is powered by two hydraulic cylinders; the rods are attached to pads on the ejector, and the base of the cylinder is attached to the cross-beam of the winder frame. To perform its roll-ejection function, the roll ejector pivots around the back drum toward the front drum and pushes completed roll-sets from the drum pocket into the cradle. Upon completion of an ejection, the roll ejector is pivoted back to the fully retracted ("Return") position behind the rear drum that it occupies while sets are being run. The cylinders retract to rotate the ejector to "eject" position; they extend to move the ejector to its "Return" position. The roll ejector also contains air showers, which are used during threading (see "Threading the Winder" in Section 2 of this manual.)
Ejector Operation

⚠️ WARNING ⚠️

Unexpected operation or movement of the ejector can pinch and crush, causing severe injury or death to personnel inspecting, adjusting, or lubricating the equipment. Before starting any work on the ejector shut down the winder; place lockout tags on the controls and alert all personnel in the general area that someone is working on the equipment. Do not operate the ejector until all personnel are out of its operating zone.

The ejector can be operated manually with the ROLL EJECTOR EJECT/RETURN selector switch on Winder Frame Panel 700, but it functions automatically when the Auto Eject sequence is used. During manual operation, the ejector stops at any point in its travel when ROLL EJECTOR EJECT/RETURN switch is released, or when the ejector reaches the extreme-travel limit switch. The ejector can be used to eject rolls twelve inches or larger in diameter from the winding pocket into the cradle, and it can be used to move rolls between eight and twelve inches in diameter to the top of the front drum for removal by hand.

Note: Do not attempt to use the roll ejector to remove rolls that are less than eight inches in diameter. The ejector will crush any cores that are less than that diameter. Such rolls must be removed from the drum pocket by hand.

Interlocks

To operate the ejector, the following Interlocks are in force:
- The winder must stopped
- The roller must be fully raised.
- The core chucks must be disengaged and fully raised.
- The cradle must be fully raised.
- No E-Stop conditions are in effect.

For descriptions of the roll ejector's use in conjunction with overall winder operation, see "Starting the Winder", "Running the Winder", and "Removing Rewound Rolls from the Winder" in Section 2. For specifications and technical data refer to the drawings and schematics listed under "Reference Drawings And Schematics" below.

Roll Ejector Controls Setting

The recommended initial hydraulic system pressure setting is 1600 psi (system pressure). The final setting is determined during start-up by the Beloit Lenox start-up personnel.

Roll Ejector Reference Drawings And Schematics

<table>
<thead>
<tr>
<th>Roll Ejector Assy:</th>
<th>50-8048-0012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydraulic Schematics:</td>
<td>91-5020-0257</td>
</tr>
<tr>
<td>Pneumatic Schematics:</td>
<td>91-5088-0393</td>
</tr>
<tr>
<td>Elementary Diagrams:</td>
<td>92-5001-0098</td>
</tr>
</tbody>
</table>
NIP CRADLE

The nip cradle is a drum width fabrication, mounted from the second (front) drum bearings, that pivots around the second drum. It is used to receive the finished rolls pushed from the drum pocket by the ejector and lower them to the floor. The cradle is powered by two hydraulic cylinders attached to the main horizontal cross member. The cradle also acts as a safety barrier: when fully raised, it provides a barrier between the operator and the ingoing nip, and it prevents the paper rolls from accidental ejection from the pocket during winding.

CRADLE OPERATION

The cradle is designed to be used for discharging rolls in conjunction with the auto-eject function or under full operator control with the CRADLE RAISE/LOWER selector switch on Winder Frame Panel 700 (see "Starting After a Set Change: Using Auto Eject" and "Removing Rewound Rolls From the Winder" in Section 2).

⚠️ WARNING ⚠️

The cradle can hit, trap, or crush, resulting in severe injury or death. Make sure no one is in the cradle's operating area before raising or lowering the cradle. Keep all personnel away from the cradle while it is moving, and stop operation of the cradle if anyone enters its operating zone. Make sure that all safety requirements listed in "General Safety", "Operator Safety" and "Maintenance Safety" have been met before operating the cradle.

Manual Operation of the Cradle

The cradle is raised and lowered with the CRADLE RAISE/LOWER selector on Winder Frame Panel 700. During regular winder operation, the cradle is usually used in combination with the auto-eject cycle (see "Cradle Operation with Auto Eject", below). If auto-eject is not being used, the CRADLE RAISE/LOWER selector can be used during manual set changes when the following conditions exist:

- The winder is stopped
- The ride roll is fully raised.
- The core chucks are disengaged and fully raised.
- No E-Stop conditions are in effect.
- The hydraulic unit is on.

When the above conditions exist, roll sets can be discharged with the cradle as described in "Removing Rewound Folds From the Winder" in Section 2 of this manual. If necessary, the cradle can be lowered during the winding cycle without ejecting the roll set from the pocket, providing the winder is fully stopped and the proper tagout warnings have been made to prevent accidental start up.

Cradle Tape Switch

A pressure sensitive tape switch is mounted across the outside face of the cradle. Any pressure applied to this tape switch while the cradle is lowering will stop the cradle's movement. When
this switch has been used to stop the cradle, the CRADLE TAPE RESET button on Winder Frame Panel 700 must be pressed before lowering can be resumed.

**Cradle Operation with Auto Eject**

The cradle can raised and lowered on a manual basis with the CRADLE RAISE/LOWER selector on Winder Frame Panel 700 during manual operation. During regular winder operation however, the cradle is usually used in combination with the auto eject cycle to discharge rolls from the winder. During the first part of that cycle — removal of the roll set from the pocket — the cradle, ejector, and roll set automatically move together, in discharge direction, until they come to a stop at a pre-set "hold" position located at a point slightly higher than the fully lowered position. At that point, the 'Lower' position of the selector is used to complete the discharge through the roll set.

For descriptions of unloading procedures, see "Starting After a Set Change: Using Auto Eject" and "Removing Rewound Rolls From the Winder" in Section 2. For use of the unwind in connection with other operating procedures, see "Threading The Winder", also in Section 2.

**REFERENCE DRAWINGS AND SCHEMATICS**

- Cradle Assembly: 50-8312-0008
- Hydraulic Schematics: 91-5020-0257
- Pneumatic Schematics: 91-5088-0393
- Elementary Diagrams: 92-5001-0098

| DISCHARGE CRADLE CONTROLS SETTING CHART |
|-------------------------------|------------------|------------------|
| FUNCTION                      | RECOMMENDED INITIAL SETTING | FINAL SETTING AT START-UP |
| CRADLE RAISE PRESSURE         | 1200 psi          |                  |
| (SYSTEM PRESSURE)*            |                   |                  |
| EJECTOR                      | 1200 psi          |                  |
| (SYSTEM PRESSURE)             |                   |                  |
# CRADLE TROUBLESHOOTING CHART

<table>
<thead>
<tr>
<th>PROBLEM</th>
<th>POSSIBLE SOLUTION</th>
<th>REFERENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cradle will not lower</td>
<td>a) Check for proper operation and setting of valve WCL-HSV</td>
<td>Hyd. Schem. &amp; Manual</td>
</tr>
<tr>
<td></td>
<td>b) Check for proper operation of the pilot check valve mounted to the cylinder.</td>
<td></td>
</tr>
<tr>
<td>Cradle will not raise</td>
<td>Check for proper operation and setting of valve WCR-HSV</td>
<td></td>
</tr>
<tr>
<td>Ejector will not push</td>
<td>a) Check all interlocks, chucks raised, rider roll raised, cradle up.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>b) Check for proper operation and setting of valve WREE-HSV</td>
<td></td>
</tr>
<tr>
<td>Ejector will not return</td>
<td>Check for proper operation and setting of valve WRER-HSV</td>
<td></td>
</tr>
</tbody>
</table>
HYDRAULIC UNIT

This section provides instructions for the operation, troubleshooting, and maintenance of Beloit Lenox hydraulic units. If additional information is needed, contact the Fluid Power groups at Beloit Lenox.

The hydraulic power unit consists of a reservoir that incorporates a baffle, 3/4 NPT sump drain, oil level gage, filter/breather assembly and spare return connections. The pump is coupled to the motor using a flexible shaft coupling and is to be mounted using a boll housing (requires NEMA "C" Motor) and pump/motor mounting plate. Also included on most standard units is a Pump Suction Filter (or Suction Strainer), Relief Valve, and a Pressure Gauge.

Some units have heat exchangers for oil cooling, pressure and return filters, directional valves, and other pressure and flow control valves, or monitoring instrumentation, may have oil immersion heaters.

--- NOTICE ---

Do not operate the hydraulic unit until all mill personnel involved in the installation, service, and operation of the hydraulic unit have read this section of the manual and are familiar with how the equipment is to be operated; they must understand the limitations of the hydraulic system, its component parts, and have full knowledge of hydraulic safety practices and maintenance procedures. Make sure that all personnel are out of the operating zone and all safety requirements listed in "General Safety" and "Operator Safety", and "Maintenance Safety" have been met before operating this equipment.

INSTALLATION PROCEDURES

Observe the following guidelines and refer to the hydraulic schematics when installing the unit.

Unpacking And Checking

The Power Unit was mounted on skid and carefully packed for shipment. Do not remove it from skid until it has been carefully checked for damage occurred during transit. Report all damage immediately to the carrier and send a copy to Beloit. All open ports on the Power Unit were plugged at the factory to prevent the entry of contamination. These plugs must not be removed until piping connections are being made to the unit.

Removing From Shipping Skids

Small "JIC" type power units should be moved with a fork-lift truck, with 2 X 4 boards placed under the reservoir belly to distribute weight and steady the load. Larger "JIC" style units have lifting holes in the reservoir end plates, into which extra-heavy 1-1/2" pipes can be inserted to facilitate handling with a fork-lift truck. L-shaped reservoirs are provided with clearance and cross braces under the base plate for fork-lift truck handling.
Storage
If the Power Unit is not being installed immediately, it should be stored indoors, covered with plastic sheet, and all open ports plugged. If long term storage is expected (6 months or more) we recommend filling the reservoir completely with clean hydraulic fluid to prevent the entry of moisture.

Locating Power Unit
The unit should be installed indoors, preferably in a clean, dry environment with an ambient temperature of 60 degrees to 100 degrees F. The reservoir can be secured to the floor or the base via the mounting holes in the platform supports.

Service Connections
Connect the water supply to the inlet of the heat exchanger with a shut-off valve and strainer. A temperature control valve has been installed on the inlet side. The outlet of the heat exchanger should be connected directly to the drain system. The water flow direction is not important on multi-pass heat exchanger.

Make all pump motor electrical connections to the mill's power source in accordance with the National Electric Code Standards and any applicable codes. Verify that the available voltage is the same as the voltage identified on the motor nameplate.
Note: Most motors have dual voltage ratings. Refer to the motor nameplate to verify that the leads in the conduit box have been connected to the correct mill power voltage supply. If Solenoid valves, pressure/temperature switches or oil immersion heaters have been provided with this power unit, refer to the component name tag or service information in this manual for operating voltage and ratings.

Reservoir Inspection
The reservoir was thoroughly cleaned and coated with oil at Beloit Lenox prior to shipping. It is suggested, however, that you re-inspected for cleanliness before starting up the unit.

Reservoir Filling
Fill the reservoir with clean fluid—Mobil DTE 24 or equivalent. Use the filler cap on the reservoir. The cleanliness of the fluid going into the reservoir is very important, and in some cases, even new oil out of the drum is not clean enough. To ensure that fluid is sufficiently clean, make sure that all fluid is transferred into the reservoir with a transfer pump with a 10 micron filter installed.

NOTICE
The type of fluid you use must be compatible with the seals used on the power unit, and must comply with the recommendations of the manufacturers of the component parts. Refer to component manufacturer’s catalogs for fluid requirements.
Supply And Return Connections

Complete all necessary interconnecting piping between the power unit and hydraulic actuators. Line sizes should be determined according to oil flow, operating pressure and allowable pressure drop between the power unit and actuator.

One of the key ingredients for good service and long life of a hydraulic system is cleanliness, and since it has been our experience that most dirt infiltrates a hydraulic system during installation, we recommend the following rules be adhered to:

Keep all open ports on the power unit (cylinders, etc.) plugged with tape or plastic plugs until the hydraulic connections are ready to be made.

Make sure that all interconnecting tubing pipe or hose is clean and free of rust, scale and dirt. The ends of all connectors should be kept plugged until they are ready to be installed in the system.

All openings in the reservoir such as the filler breather or access end covers holes must remain closed during installation.

Use a high quality, non-teflon hydraulic pipe sealant on pipe threads.

– NOTICE –

When installing or replacing pressure lines, make sure that only hose or pipe with correct specs and ratings are installed.

Coupling Alignment

Make sure that the pump's motor shaft is aligned correctly. It is possible for pump/motor shaft to be misaligned because of shock incurred during shipping. The alignment should be re-checked before start-up.

Also verify that the coupling halves have adequate clearance and that the coupling set-screws are tight. A slot in the bell housing is provided for this purpose.
HYDRAULIC UNIT START-UP PROCEDURE

Use the following procedure when starting up the unit:

1. Fill reservoir with clean fluid.

2. Open any ball or gate valves in the pump suction line.

3. Back out the system relief valve (CCW) and/or pump pressure compensator adjustment knob out, so that the pressure will be near zero during the initial start.

   **NOTICE**
   
   If the power unit has been provided with a variable displacement pump (or any piston pump), the pump case should be filled with clean oil prior to priming. In most cases this can be accomplished by disconnecting the pump case drain line and pouring the oil into the pump case drain port.

4. If the system has been provided with an open center directional valve, the oil during the start-up will flow directly back to tank. If the system has a closed centered valve, it may be necessary to loosen a fitting momentarily at the pump discharge, to bleed any air in the pump during the priming operation.

5. Jog the pump motor once, and verify that the pump is rotating in the same direction as the arrow tag on the pump case. If the direction is incorrect, reverse two (2) of the three (3) motor leads ard, with the power disconnected, recheck the rotation.

6. Jog the pump motor three to six times to prime the pump, and allow the pump to run for several minutes at zero pressure. Check the piping for any leaks in fittings and tubing incurred during shipment, and repair them immediately.

7. Use the relief valve and/or pump compensator to gradually increase the pressure. Note: On systems with open center directional valves, actuate the valve to build pressure.

8. Continue increasing pressure until normal operating pressure is obtained, re-check the system for leaks, and lock adjustment screws in place. Note: For systems with compensated pump & relief valve, adjust valve to approx. 2500 PSI.

9. During the start up sequence, monitor all filters closely. Immediately replace any filter element that goes into a "by-pass" condition. Watch the benchboard fault indicator.

10. After the entire system has been "wetted" with fluid, refill the reservoir to the normal operating level.

11. For units with a heat exchanger, verify that the cooling water to the heat exchanger is flowing. If the unit has been provided with a water control valve, use it to increase the water flow if the oil temperature exceeds 135 degrees F.
MAINTAINING PROPER OIL TEMPERATURE

Hot oil is one of the primary causes of poor operation, component failure and downtime. The oil in your hydraulic system was designed for operation within a specified temperature range. Although you may be able to run it at hotter temperatures for short periods of time without bad effects, continuous operation with oil that's too hot cause the unit to operate poorly, and eventually will cause the failure of key components. Be sure to observe the following oil temperature guidelines.

How Hot Is "Too Hot"?

"Hot oil" is a relative term. In most cases, 120 degrees F at the reservoir is considered an ideal operating temperature. Always take an oil temperature reading at the reservoir, not at a component or any of the piping. Avoid running at temperatures above 130 degrees.

Measuring Oil Temperature

There are several ways to check the temperature of the oil. The best, most accurate method is by means of a thermometer. On some machines, this is mounted on the reservoir. Make it a habit to check the thermometer periodically, after the equipment has been running for more than an hour. If your machine doesn't have a reservoir thermometer, use the "palm test." First check the tank with your fingertip; if it's not too hot to touch, place your palm on the tank. You'll be able to hold it there without discomfort if the oil temperature is about 130 degrees F or below.

Isolating Trouble-Spots

To determine which components are "running hot" and overheating the oil, feel the outlet fittings and lines at the valves, pumps and motors. When oil temperature is normal going into a component but hot coming out, that component is a possible "trouble-spot".

A sticking valve can cause excessive heat. If a spool does not return promptly to the neutral position, the pump flow will be dumped continuously. This builds up heat rapidly. If a relief valve is set too low, part of the oil will be dumped across the valve with every cycle. This too, generates excessive heat. Even when all valves are set properly, they may not be operating well because of worn orifices or seals. Always remove and check the hot components first, before the others.

Look, Smell And Feel

Checking oil temperature frequently during daily operation is good preventive maintenance. So too is the practice of periodically taking an oil sample from the reservoir, and comparing it to a sample of clean, new oil.

Oil that has been running too hot will look darker and feel thinner than new oil. It will also smell burned. Chances are, it will also contain more contaminants, because hot oil leads to accelerated wear of component parts.
Oil Temperature Preventive Maintenance Procedures
Use the following procedures to prevent the unit from running to hot.

- Set up a regular schedule for checking the oil temperature, appearance, smell and feel. Change oil as recommended by the equipment manufacturer.
- Be prompt about checking and repairing or replacing valves, pumps or other components that are running hot.
- If relief or flow-control valves are running hot, check and adjust their settings.
- Break in new components gradually. New, close-fitting parts expand at different rates and are especially prone to seize when they get too hot.
- Keep the hydraulic equipment clean. A thick layer of dirt acts as insulation and will cause the system to run hot.
- In hot weather, check and change the oil more frequently than usual. Be sure to use an oil recommended for hot weather operation by the equipment manufacturer or oil supplier.
GENERAL HYDRAULIC UNIT MAINTENANCE

Electric Motors
Lubricate as recommended by the motor manufacturer.

Filters
Change or clean as required or as indicated on filters supplied with visual indicators.

Suction Strainers
Clean after first 10 hours of operation and at 100 hour intervals thereafter.

Reservoirs
Maintain oil levels at all times. The oil should be checked after the first 100 hours of unit use. Verify that the filtration class of the oil meets the requirements of the pump being used. Change the oil every 1000 to 2000 hours, depending on the application and operation environment.

Components
See component vendor documentation.

Recommended Spare Parts
Spare filter elements should be purchased with the power unit and be kept available during the start-up operation. Other spare parts may be required, as needed, depending on the duty cycle of the hydraulic system and the mill's operating environment.

Special Tools
All normal service and maintenance on standard power units can be accomplished with standard hand tools. No special tools are required.

Preventive Maintenance: Filter Service
Filters must be maintained on a regular basis. Even if a machine has the best filters available, failure to keep them clean will render them useless: A filter that gets dirty after five days of service and is cleaned 30 days later, provides 30 days of non-filtered service. Use the following guidelines for servicing filters:

- Change filter elements immediately after any indication of clogging.
- Inspect filter elements that have been removed from the system for signs of failure (or impending failure) to determine whether the service interval needs to be shortened.
- Do not re-use fluid that has leaked out of the system.
- Keep the supply of fresh fluid covered tightly.
- Use clean containers, hoses, and funnels when filling the reservoir. Use of a filter cart when adding oil is highly recommended.
• Use common sense precautions to prevent entry of dirt into components that have been temporarily removed from the circuit.

• Make sure that all clean-out holes, filler caps, and breather cap filters on the reservoir are properly fastened.

• Do not run the system unless all normally provided filtration devices are in place.

• Make certain that the fluid used in the system conforms to the specifications and recommendations provided by the manufacturers of system components.

• Some manufacturers offer an oil sampling kit which can be used to ascertain the condition of the system fluid.
**HYDRAULIC UNIT TROUBLESHOOTING CHART**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dirty Oil</td>
<td>Components not properly cleaned after servicing.</td>
</tr>
<tr>
<td></td>
<td>Air breather left off after filling with oil. Check for damage and correct installation.</td>
</tr>
<tr>
<td></td>
<td>Tank not properly gasketed.</td>
</tr>
<tr>
<td></td>
<td>Pipe lines not properly covered while servicing machine.</td>
</tr>
<tr>
<td></td>
<td>Filter dirty or ruptured.</td>
</tr>
<tr>
<td>Foaming Oil</td>
<td>Return of tank line not below fluid level.</td>
</tr>
<tr>
<td></td>
<td>Fluid contaminated with incompatible foreign matter.</td>
</tr>
<tr>
<td></td>
<td>Suction leak to pump aerating oil.</td>
</tr>
<tr>
<td></td>
<td>Lack of anti-foaming additives.</td>
</tr>
<tr>
<td>Moisture in Oil</td>
<td>Cooling coils not below fluid level.</td>
</tr>
<tr>
<td></td>
<td>Cold water lines in contact with hot tank, causing condensation within tank.</td>
</tr>
<tr>
<td></td>
<td>Extreme temperature differential due to geographical location.</td>
</tr>
<tr>
<td>System Overheating</td>
<td>Water shut off or heat exchanger clogged.</td>
</tr>
<tr>
<td></td>
<td>Continuous pump operating at relief setting, stalling under load.</td>
</tr>
<tr>
<td></td>
<td>Check for fluid viscosity too high or too low.</td>
</tr>
<tr>
<td></td>
<td>Excessive slippage or internal leakage: check for stall leakage past pump, motors and cylinders.</td>
</tr>
<tr>
<td></td>
<td>Case drain line from pressure compensated pump returning oil too close to suction line. (Re-pipe case drain line to opposite side of reservoir.)</td>
</tr>
<tr>
<td></td>
<td>Pipe, tube or hose I.D. too small causing high velocity.</td>
</tr>
</tbody>
</table>
HYDRAULIC UNIT TROUBLESHOOTING CHART

Improper air circulation around reservoir.

System relief valve set too high.

Power unit operating in direct sunlight; ambient temperature is too high.

Foreign Matter In The System

Pipe scale not properly removed.

Sealing compound (pipe dope, teflon tape) allowed to get inside fittings.

Improperly screened fill pipes and air breathers.

Burrts inside piping.

Components left uncovered while repaired; open lines left unprotected.

Wipers or boots not on cylinders or rams where necessary.

Repair parts and replacement components not properly protected while stored in repair depot. (Rust and other contaminants.)

Excessive Pump Noise

Check for vacuum leaks in the suction line.

If the pump is internally drained, check for vacuum leaks in the pump shaft seal, flooding connections with the fluid being pumped may cause the noise to stop or abate momentarily and will help locate the point of air entry.

Check pump alignment with drive mechanism. Misalignment will cause wear and subsequent high noise level in operation.

Check component manufacturers specifications relative to indications and identification of wear as high operating noise level, etc.

Check compatibility of fluid with component manufacturers recommendations.
HYDRAULIC UNIT TROUBLESHOOTING CHART

Relief or unloading valve set too high. Use reliable gauge to check operating pressure. Relief valve may have been set too high with a damaged pressure gauge. Check various unloading devices to see that they are properly controlling the pump delivery.

Aeration of fluid in reservoir (return lines above fluid level).

Worn or sticking vanes (vane type pump).

Worn cam ring (vane type pump).

Worn or damaged gears and housing (gear pump).

Worn or faulty bearing.

Reversed rotation.

Cartridge installed backwards or improperly.

Plugged or restricted suction line or suction strainer.

Plugged reservoir filter breather.

Oil viscosity too high or operating temperature too low.

Air leak in suction line or fittings also causing irregular movement of control circuit.

Loose or worn pump parts.

Pump being driven in excess of rated speed.

Air leak at pump shaft seal.

Oil level too low and drawing air in through inlet pipe opening.

Air bubbles in Intake oil.

Suction filter dirty.

Suction line too small or too long.

Pump housing bolts loose.
## HYDRAULIC UNIT TROUBLESHOOTING CHART

<table>
<thead>
<tr>
<th>Issue</th>
<th>Possible Causes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pump Fails To Deliver Fluid</td>
<td>Low fluid level in reservoir.</td>
</tr>
<tr>
<td></td>
<td>Oil intake pipe suction strainer plugged.</td>
</tr>
<tr>
<td></td>
<td>Air leak in suction line and preventing priming.</td>
</tr>
<tr>
<td></td>
<td>Pump shaft turning too slowly.</td>
</tr>
<tr>
<td></td>
<td>Oil viscosity too high.</td>
</tr>
<tr>
<td></td>
<td>Oil lift too high.</td>
</tr>
<tr>
<td></td>
<td>Wrong shaft rotation.</td>
</tr>
<tr>
<td></td>
<td>Pump shaft or parts broken.</td>
</tr>
<tr>
<td></td>
<td>Dirt in pump.</td>
</tr>
<tr>
<td></td>
<td>Variable delivery pumps. (improper stroke.)</td>
</tr>
<tr>
<td>Oil Leakage At Pump</td>
<td>Shaft seal worn.</td>
</tr>
<tr>
<td></td>
<td>Pump housing bolts loose or improperly torqued.</td>
</tr>
<tr>
<td></td>
<td>Case drain line restricted. (Shaft seal leaking).</td>
</tr>
<tr>
<td>Excessive Pump Wear</td>
<td>Abrasive dirt in the hydraulic oil.</td>
</tr>
<tr>
<td></td>
<td>Oil viscosity too low.</td>
</tr>
<tr>
<td></td>
<td>System pressure exceeds pump rating.</td>
</tr>
<tr>
<td></td>
<td>Pump misalignment</td>
</tr>
<tr>
<td></td>
<td>Air being drawing in through inlet of pump.</td>
</tr>
<tr>
<td></td>
<td>Solid matter being drawn into pump from reservoir.</td>
</tr>
</tbody>
</table>

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HYDRAULIC UNIT TROUBLESHOOTING CHART

Pump Parts Broken

Seizure due to lack of oil.

Excessive system pressure above maximum pump rating.

Excessive torquing of housing bolts.

Solenoid Failures

Voltage too low. If voltage will not completely shift the solenoid, it will burn out the coil.

Signal to both solenoids of a double solenoid valve simultaneously. One or both of the solenoids will be unable to complete their stroke and will burn out. (Make certain the electrical signal is interlocked so that this condition cannot exist).

Mechanical damage to leads. (Short circuit, open connections, etc.)

Tight spool or other mechanical parts of the valve being actuated can prevent the solenoid from completing its stroke and subsequently burning out.

Replacement springs too heavy in valve. Overloads solenoid and shortens life.

Wrong voltage or frequency will prevent operation. Because low voltage may be inadequate to handle the load; high voltage can burn out the coil.

Dirty contacts may supply insufficient current to solenoid to satisfy "in rush" demands.

Solenoid Valves

Do Not Operate

Is there an electrical signal to the solenoid operating device? Is the voltage too low? (Check with voltmeter. Use a test light in emergency.)

If the supply to the pilot body is orificed, is the orifice restricted? (Remove orifice and check for foreign matter. Flushing is sometimes necessary because of floating impediment).

Has foreign matter jammed the main spool? (Remove end caps and see that main spool is free in its movement. Remember that there will be a quantity of fluid escaping when the cap is removed and provide a container to catch it.)
HYDRAULIC UNIT TROUBLESHOOTING CHART

Is pilot pressure available? Is the pilot pressure adequate? (Check with gauge on main pressure input for internally piloted types and in the supply line to the externally piloted type.)

Is pilot drain restricted? (Remove pilot drain and let the fluid pour into an open container while the machine is again tried for normal operation. Small lines are often crushed by machine parts banging against them causing a subsequent restriction to fluid flow).

Is pilot tank port connected to main tank port where pressures are high enough to neutralize pilot input pressure? (Combine pilot drain and pilot tank port and check for operation with the combined flow draining into an open container. If this corrects the situation, reroute pilot drain and tank line).

Are solenoids improperly interlocked so that a signal is provided to both units simultaneously? (Put test light on each solenoid lead in parallel and watch for simultaneous lighting. Check electrical interlocks. This condition probably burns out more solenoids than any other factor).

Has mounting pad been warped from external heating? (Loosen mounting bolts slightly and see if valve functions. End caps can also be removed and check for tight spool).

Is fluid media excessively hot? (Check for localized heating which may indicate an internal leak. Check reservoir temperature and see if it is within machine specifications).

Is there foreign matter in the fluid media causing gummy deposits? (Check for contamination. Make certain seals and plumbing are compatible with the type of fluid being used).

Is an adequate supply of fluid being delivered to actuate the load? (Many times there is sufficient pressure to shift the valve but not enough to actuate the work load. Check pump supply pressure and volume if necessary. Physical measurement of flow through relief valve with units blocked may be necessary.)
Section 4. Winder Maintenance
MAINTENANCE SAFETY

When performing maintenance on the winding system, supplement your regular mill safety procedures with the following rules:

- Tag out or lock out all drives and controls before performing any maintenance or clean-up work. Read "Lockout/Tagout Procedures" in this manual.
- Do not depend on hydraulic or pneumatic devices to hold machine parts in a raised position while performing maintenance. Always block up or restrain these parts with an appropriate mechanical device.
- Inspect all chains and clevis pins at frequent intervals for wear and damage. Block under or around units raised by chains when performing maintenance.
- Inspect slings and cables for worn or weak spots before using them. Keep all personnel clear of loads when they are being lifted.
- Use the lifting points as specified by the manufacturers. Where provisions have been made for lifting eyes to be screwed into a tapped hole, make certain that eyebolts are tightened to the shoulder and that the eyes are parallel to the lifting plane.
- Tie slings securely when attempting to lift machine components to prevent the sudden rotation of out-of-balance pieces.
- Relieve pressure from oil and air lines before disassembly.
- Use proper precautions when applying hydraulic removal equipment to bearings, heads, gears, etc. Such items can move at high rates of speed if they have broken loose from the fit.
- Fix hydraulic/pneumatic leaks immediately.

— NOTICE —

Do not attempt to maintain, repair, or operate the winder without reading the following sections of this manual: "Lockout/Tagout Procedures", "General Safety", "Operator Safety", and "Danger, Warning, Caution, and Notice as Used In This Document".
LOCKOUT/TAGOUT PROCEDURES

Lockout/tagout procedures are used to ensure that winder controls, devices, and components are prevented from unexpected energization, startup, or release of stored energy while maintenance or service personnel are at work on the winder. Most mills today have their own lockout procedures for mill equipment, but the complexity of a winder's control system may require revision of those procedures to accommodate the many devices that require simultaneous control during operation of winder equipment. Be sure to incorporate winder lockout/tagout procedures, as described in below, into the safety program at your mill.

- NOTICE -

It is imperative that your winder safety program include thorough training of personnel in lockout/tagout procedures as outlined in ANSI Z244.1. All such training and procedures must meet the requirements of OSHA 29 CFR, parts 1910.147 and 1910.261, and their rules must be strictly enforced. Never attempt to operate a control, switch, valve or other device when it is locked or tagged out. The procedures below should always be followed whenever repair, service, or maintenance of the winder is to be performed.

1. Locks, tags and multiple locking devices must be provided as needed. "Men Working on Machinery" tags should be used to describe conditions or repairs being performed and must be signed and dated by the person responsible.

2. Only one key is allowed per safety lock.

3. Each safety lock should be obviously different from any others on the job.

4. The locks are to be used only to lockout the winder at its circuit breaker, the MCC Drive disconnect, or, with the use of chains or other safety lockout devices, to lock valves, controls, or other devices that control any part that is to be inspected, serviced, or repaired.

5. If more than one person is working on the same component, control, or device, each of those people must place their own lock on the control device of that part. No one is to assume that another person's lock will protect him. When the control device does not accommodate all locks, a multiple locking device must be used.

6. When multiple locking devices are used, their shanks must not be attached to other lockout devices, but must be attached directly to the control device that will immobilize the equipment.

7. Before work commences, and after the entire area has been inspected to make certain all personnel are safely clear and have been advised of the procedures to be performed, one person must make certain that the equipment is immobilized by trying to start the equipment with the lockout in place.
8. If anyone on the job has doubt as to the location of switches, lockout procedures, or has any other question pertaining to the job, work must stop and all questions must be answered and uncertainties removed by authorized supervisory personnel, who must also make sure that the work area is reinspected for safety before work is resumed.

9. When work recommences, the procedure in step 7 must be followed again.

10. If it becomes necessary to operate the winder or its components during repair, the following practices must be followed before the equipment is energized:

   - The area and equipment must be inspected for safe operation.
   - One person must be designated to operate the equipment.
   - A second person must be designated to prevent other personnel from approaching or entering the area while the equipment is being energized.
   - Locks must be removed only by the personnel who originally attached them.
   - A final check must be made to ensure that all personnel are clear before energizing the equipment.

11. Upon completion of the job, each person must remove his lock and notify the supervisor that the job has been completed.

12. In the event that someone forgets to remove their lock for startup, that individual, and only that individual, should be contacted and requested to remove the lock. If that person cannot be found or cannot return to the job, the lock must not be removed until the supervisor in charge has inspected the area, found the equipment to be safe to operate, and given his authorization to remove the lock. The safety department must be notified of the lock's removal and the related circumstances.

   Note: Removal of a lock as described in step 12 should only be used as a last resort. Errors made in unlocking procedures can result in serious injury or death.

13. In the event that conditions exist that prevent the equipment from being set up for lockout with the procedures listed in this section, fuses should be pulled, wires disconnected, or other methods used to disable the equipment. Tags should be attached in obvious places to prevent accidental start-up.

14. If the repairs requiring lockout have not been completed by the end of the shift, it is the responsibility of the personnel of the current crew to so inform the supervisor before they remove their locks. The supervisor must then immediately install his lock to prevent any use of the equipment until the next crew arrives to commence their own lockout procedure.
ROUTINE INSPECTION/ADJUSTMENT

1. Inspect all limit switches and valves for evidence of damage or malfunction.
2. Inspect pneumatic cylinders. Schedule rebuild or replacement if required.
3. Inspect all pneumatic connections for leaks. Schedule immediate repair of any connections found to be leaking.
4. Operate manual controls or valve overrides to make sure all motions occur smoothly and without interruption. Compare pressure settings to values recorded at start-up. Adjust flow rates if required.
5. Inspect the cradle and ejector bushings for wear. Schedule replacement if necessary.
6. Make sure that threaded fasteners have not vibrated loose.
7. Inspect any winder parts that move in metal ways, e.g., core chucks and rider roll. Excess clearance will result in uneven edges on rewound rolls. The rider roll and coreslide assemblies are equipped with adjustable rollers for this purpose.

ROUTINE LUBRICATION

If this winder is equipped with a B-Shur Lubrication system, see the B-Shur Appendix. Unless otherwise noted, use Grease 'B' and Oil 'C' as described in the BELOIT lubrication chart.

1. Grease or oil, as appropriate, the mounting bearings for the paper rolls, spreader rolls (if applicable), rider roll, drums and unwind shafts/clutch. Check bearings for excessive heat or noise.
2. Grease core chuck spindle assembly.
3. Check oil level in drive gearbox, pneumatic system lubricator, and unwind E-Stop brake bearings; add oil if necessary.
4. Grease the ejector and cradle pivot bearings.
5. Grease DC Drive motor bearings per manufacturers recommendations.

ROUTINE CLEANING

1. Clean/replace pneumatic and hydraulic filter elements.
2. Clean dust and debris away from the core chucks. Clean the core chuck spindle/sleeve threads. Grease fitting access hole.
3. If the front drum is coated, clean with soap and water to maintain drum abrasiveness.
4. Clean lens of "web break" photocell.
ALIGNMENT

With the passage of time, the close tolerances that were set when the winder was installed will begin to deteriorate. To keep the machine operating at peak performance, alignment of the following components should be rechecked at least once every two years (preferably once each year), depending on the amount of usage. Use the following procedure (refer to the Alignment Appendix for supplementary information if necessary):

1. Check that the rider roll is level with the winder drums. Use the following procedure:
   a. Position two bearings in the drum pocket, locating one each at the extreme ends.
   b. Lower the rider roll until it touches both bearings.
   c. Adjust the gear pack so that the rider roll is supported by both gears. The gap should not exceed .020 inches.

2. Check that the rider roll is centered between the drums. Use the following procedure:
   a. Position four 1-1/2" square lengths of keystock, 8" to 12" long, two at each end of the drums, forming a 'V', so that they will support the rider roll, centered between and over the drums.
   b. Lower the rider roll onto the keystock. Be careful that the downward ends of the keystock pieces do not contact the opposite drum, which can cause the rider roll to go off-center.
   c. Relieve the pressure on the cylinders. Loosen the set screws and adjust the cam rollers so that they touch the frameways.
   d. With the cam rollers adjusted, retighten the set screws. Raise the rider roll and remove the keystock.

3. Check that the chucks are level and centered on the winder drums.
   a. Remove the core chucks and extend the screw adjustment to its maximum extension.
   b. Remove the core stop and lower the coreslide so that the body of the screw is cradled between the drums.
   c. Loosen the set screws and adjust the cam rollers so that they touch the frameways.
   d. Retighten the set screws, raise the coreslides, and reassemble the chucks and core stop.
WINDER LUBRICATION RECOMMENDATIONS

This section provides specifications and general recommendations for the types and grades of lubricants to be used for BELOIT machinery. Refer to it and work closely with a reliable lubricant supplier in order to select the best oil or grease for each application. Do not mix brands of lubricants without consulting your supplier; the ingredients used in some lubricants may not be compatible with others, and they may produce destructive results when mixed in a way not intended by the manufacturers. For recommendations on any lubricants not listed below, consult operation manuals, lubrication plates, or drawing instructions. For additional information, contact your BELOIT Representative.

Abbreviations used in this manual are as follows:
- NLGI - National Lubricating Institute
- SUS - Saybolt Universal Seconds
- CS - Kinematic Viscosity Centistokes

B-Shur Lubrication System
If this winder is equipped with a B-Shur Lubrication system see the B-Shur Appendix.

BELOIT Lenox Hydraulic Unit
If this winder is equipped with a BELOIT Lenox hydraulic unit, see "BELOIT Lenox Hydraulic Unit" in Section 3.

Grease Selection
Bearings operating in dry-end applications require greases with specifications different than those used for wet-end applications. Use the following guidelines when selecting bearing greases.

Dry End Grease Lubricated Bearings - Grease B
- Lithium, Soda base, or equivalent grease, NLGI No. 2 consistency
- Worked penetration 265 - 295 at 77°F (25°C)
- Good stability in temperatures up to 300°F (148°C)
- Afford protection against rusting during shut-down periods

Note: It is recommended that the oil in the above greases have a minimum viscosity of 600 SUS at 100°F (130 CS at 38°C).
Grease-Lubricated Bearings - Wet End Applications

- Soft lime, lithium or equivalent type pressure gun grease, NLGI No. 1 consistency
- Worked penetration of 310 - 340 at 77° F. (25° C)
- Capable of being retained in the bearing housing in the presence of trace or large quantities of water with minimum change in structure
- Must lubricate and protect the bearing against rusting in the presence of moisture or clean-up chemicals under operating temperatures which may range from 50 to 200° F (10 - 94° C)

GREASING INSTRUCTIONS

For winders with B-Shur lubrication system, see the B-Shur Appendix.

Add fresh grease to bearings weekly, or at other reasonable intervals. When machine has been shut down, with bearings at standstill, remove drain plug and allow accumulated moisture or emulsified grease to run out. A soft copper wire loop inserted in the drain opening will clear out old, hardened grease and will produce a sample for inspection.

Do not over-grease. A bearing two-thirds full is ideal. A bearing completely full will run hot until excess grease is forced out. Grease extruding around the journals indicates over-greasing. Reduce future amounts accordingly. If intervals between greasing cycles are excessive, consult your lubricant supplier. For more additional instructions, see lubrication plate.

OIL SELECTION

If this winder is equipped with a BELOIT Lenox hydraulic unit, see "BELOIT Lenox Hydraulic Unit" in Section 3 for additional information and follow the guidelines below:

- For Sump Lubricated and Continuous Lubricated Plain Bearings and Anti-Friction Bearings, use Oil C
  
  Note: For sump lubricated bearings, the oil level should be maintained at the top of the oil level inlet fitting when regular inspection is made with the bearing not running. Consult your supplier for specific oil characteristics.

- High grade petroleum oil having excellent anti-rust, anti-oxidation, and film strength or load bearing qualities with a high viscosity index that will maintain a minimum oil viscosity of 150 SUS (32 CS) at the maximum bearing temperature.

- Detergent or non-detergent optional.

- 500 - 700 SUS oil measured at 100° F, (108 - 151 CS at 38° C) for machines operating at moderate conditions where oil temperature may be maintained in a 130 - 140° F, (54 - 60° C) range at the tank. General maximum oil temperature from bearing is 160° F, (71° C).
800 - 1000 SUS oil measured at 100° F. (173 - 216 CS at 38° C) for machines running continuously at high ambient temperatures with oil in a 150 - 160° F. (65 - 72° C) range at the tank. General maximum oil temperature from the bearing is 175° F. (79° C).

Worm Gear Units - Oil D

- High grade compounded steam cylinder oil or its equivalent.
- Viscosity of approximately 140 SUS at 210° F. (30 CS at 95° C).

Hypoid, Spiral, Differential and Parallel Shaft Gear Units - Oil E

(Refer to Oil E Selection Chart)

- Select oil viscosity from accompanying chart. If the unit is lubricated from a drive unit circulation system with oil cooler, the viscosity should be selected under the ambient air temperature heading of 50 - 90° F.
- In those applications where the gear units operate at varying speeds, select the viscosity based upon the lowest operating speed.
- If operating speeds are consistently less than 1/2 the minimum speed listed, it may be desirable to select an oil of the next higher viscosity.
- If oil temperature in the unit consistently exceeds 160° F. (71° C) external cooling may be required.

Slitter Bearings, Air Lubricators Wood Plug or Moccasin Bushings - Oil F

- Petroleum oil with a viscosity of 150-200 SUS at 100° F (32-43 CS at 38° C).

Gear Drive Units - Oils D, E, and F

High grade rust and oxidation inhibited petroleum based lubricating oil meeting the current AGMA specifications for lubrication of Enclosed Gear Drives. (AGMA 250.03)

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**OIL E SELECTION CHART**

<table>
<thead>
<tr>
<th>Hypoid Pinion Speed RPM</th>
<th>Spiral Pinion Speed RPM</th>
<th>Differential Line shaft Speed RPM</th>
<th>Parallel Shaft Pinion Speed RPM</th>
<th>2100 &amp; 4000 Series Pinion Speed RPM</th>
<th>Viscosity 100° F. (38° C.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Above 750</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Above 300°</td>
<td>Above 500°</td>
<td>Above 500°</td>
<td>Above 500°</td>
<td>90 - 115° F.</td>
<td></td>
</tr>
<tr>
<td>Above 400°*</td>
<td>Above 300°*</td>
<td>Above 500°*</td>
<td>Above 500°*</td>
<td>600 - 750 SSU 96 - 108 CS</td>
<td></td>
</tr>
<tr>
<td>200 - 400°</td>
<td>Below 300°*</td>
<td>Below 500°*</td>
<td>Below 250°*</td>
<td>900 - 1150 SSU 129 - 162 CS</td>
<td></td>
</tr>
<tr>
<td>Below 200°*</td>
<td></td>
<td></td>
<td></td>
<td>1300 - 1600 SSU 280 - 346 CS</td>
<td></td>
</tr>
</tbody>
</table>

* - "Mild" extreme pressure additive suggested. (Mild EP)*

---

Fraser Paper Ltd. 8499

Winder Operation Manual

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# LUBRICATION CHART

<table>
<thead>
<tr>
<th>Item</th>
<th>Lubricant*</th>
<th>Frequency</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bearings</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Winder drum†</td>
<td>Oil &quot;C&quot;</td>
<td>Check level weekly</td>
<td>Sump bearings: Each 6 month, drain and flush with kerosene or light oil. Replace plug and refill.</td>
</tr>
<tr>
<td>b. Rider roll†</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Paper roll†</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. Unwind brakes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bearings</td>
<td>Grease “B”</td>
<td>Weekly</td>
<td>Greased bearings: Usually present only on older equipment which operates at lower speeds and loads.</td>
</tr>
<tr>
<td>a. Winder drum†</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Rider roll†</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Paper roll†</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. Cross shaft</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Roll Ejector</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lowering cradle</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sliding Clutch</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mechanism</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sectional Slitter rolls</td>
<td>Grease “B”</td>
<td>Every 6 months or major down time</td>
<td>Hand pack grease into and around bearing such that 20% of cavity of assembled bearing is filled. Do not overfill.</td>
</tr>
<tr>
<td>Hydraulic Chucks</td>
<td>Oil “C”</td>
<td>Weekly</td>
<td></td>
</tr>
<tr>
<td>Slideways‡ (Not Anti-Friction)</td>
<td>Mixture of Mineral Oil and Molylube</td>
<td>Weekly</td>
<td>Slideways and slides should be wiped clean before coating with fresh lubricant</td>
</tr>
<tr>
<td>Chains and sprockets</td>
<td>Oil “C”</td>
<td>Monthly</td>
<td>Apply small quantities at bearing points</td>
</tr>
<tr>
<td>Air Cylinder Lubricators</td>
<td>Oil “F”</td>
<td></td>
<td>Keep filled and allow 3 to 5 drops per stroke to enter system</td>
</tr>
<tr>
<td>Slitters</td>
<td>Oil “F”</td>
<td>Weekly</td>
<td>3 to 5 drops of oil</td>
</tr>
</tbody>
</table>

*Detail specifications are per Beloit Lubrication 1-21-127
†May be continuous lube or sump lubrication
‡Thomson roundway slides, ball bushings and Saginaw ball bearing slides should not be lubricated. If discoloration, due to rust, becomes evident they can be wiped with a slight film of oil.
Appendices
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Alignment of Ways

Perpendicular to rider roll and core shaft slides in the cross-machine direction (figure 11-3b).

1. Tolerance
   a. .001 in./ft.
   b. .005 in. maximum

2. Test Equipment - Optical alignment equipment

3. Procedure
   a. Measure distance A
   b. A to be within tolerance

4. Correction - Reposition way by shimming

5. Associated Problems
   a. Vibration
   b. Excessive slide wear

Figure 11-3b. Ways Perpendicular to Rider Roll and Core Shaft
Perpendicular in the in-machine direction (figure 11-3c).

1. Tolerance - .015 inch

2. Test Equipment - Optical alignment equipment

3. Procedure
   a. Measure A
   b. A to be within tolerance

4. Correction - reposition way

5. Associated Problems
   a. Vibration
   b. Excessive slide wear

Figure 11-3c. Ways Perpendicular In-Machine Direction
Ways parallel to each other in in-machine direction (figure 11-3d).

1. Tolerance
   a. .005 in./ft. of way
   b. .015 maximum

2. Test Equipment - Optical alignment equipment

3. Procedure
   a. Measure A and B
   b. Difference between A and B should be within tolerance

4. Correction - Reposition way

5. Associated Problems
   a. Vibration
   b. Excessive slide wear

Figure 11-3d. Ways Parallel to Each Other
Winder Drum Alignment

Cross-Machine Level (figure 11-3e).

1. Tolerance
   a. .002 in./100 in. face
   b. .005 maximum

2. Test Equipment - Optical alignment equipment

3. Procedure
   a. Measure A at 90° intervals of rotation
   b. Average reading not to exceed tolerance
   c. Repeat the above for opposite end

4. Correction
   a. Shim under bearing housing
   b. Do not dowel drum bearing housing until indicated
   c. Take care so as not to misalign drive and drums

5. Associated Problems
   a. Offsets
   b. Dishing
   c. Interweaving
   d. Thrust bearing wear
   e. Poor starts
   f. Wrinkles
   g. Core chuck bearing failure

Figure 11-3e. Winder Drums Level in Cross-Machine Direction
In-machine Level (figure 11-3g).

1. Tolerance .005 inch
   a. .001 inch/100 inch face
   b. .003 inch maximum

2. Test Equipment - Optical alignment equipment

3. Procedure
   a. Measure A at 90° intervals of rotation
   b. Average reading not to exceed tolerance
   c. Repeat the above for opposite end

4. Correction
   a. Reposition second drum bearing housing
   b. Do not dowel drum bearing housing until indicated

5. Associated Problems
   a. Offsets (near core)
   b. Interweaving (near core)
   c. Poor start
   d. Wrinkles
   e. Loose cores
   f. Dishing

Figure 11-3g. Winder Drums Parallel to Each Other
Rider Roll Alignment

Rider roll level with drums (figure 11-3h).

1. Tolerance
   a. .002 inch/100 inch face
   b. .007 maximum

2. Test Equipment - Two bearings (approximately 5 inch O.D.) and feeler gauge

3. Procedure
   a. Place the two bearings in the pocket between the drums - one front and one back.
   b. Lower rider roll until it barely touches the bearings.
   c. Make sure rider roll doesn't drift.
   d. Measure gap between bearings (front & back).
   e. Difference between front and back measurement should be within tolerance.

4. Correction - Adjust level with eyebolt where the rider roll chain connects to the rider roll slide.

5. Associated Problems
   a. Offsets
   b. Wrinkles
   c. Dishing
   d. Poor starts

Figure 11-3h. Rider Roll Level with Drums
Sectional Rider Roll Centered with Drums (figure 11-31).

1. Tolerance - .010 inch.

2. Test Equipment - Feeler gauge

3. Procedure
   a. Lower rider roll to within .250 from drums. (Be careful rider roll doesn't drift.)
   b. Measure A and B with feeler gauge (front and back).
   c. Difference between A and B should be within tolerance.

4. Correction
   a. Reposition drum bearing housing.
   b. Do not dowel drum bearing housing until indicated.

5. Associated Problems
   a. Bursts
   b. Wrinkles
   c. Loose cores
   d. Rider roll vibration
   e. Excessive slide wear

Figure 11-31. Sectional Rider Roll Centered with Drums
Rider Roll Parallel with Drums (figure 11-3j).

1. **Tolerance**
   a. .002 inch/100 inch face
   b. .005 maximum

2. **Test Equipment - Optical alignment equipment**

3. **Procedure**
   a. Measure A and B. (Use 1st drum as datum and be careful rider roll doesn't drift.)
   b. Difference between A and B should be within tolerance.

4. **Correction**
   a. Reposition drum bearing housing.
   b. Do not dowel drum bearing housing until indicated.

5. **Associated Problems**
   a. Corrugations
   b. Wrinkles
   c. Soft starts
   d. Vibration
   e. Offsets

---

![Diagram of rider roll and core shaft parallel with drums]

*Figure 11-3j. Rider Roll and Core Shaft Parallel with Drums*
Sectional Rider Roll Alignment

Rider Roll Segments Level (figure 11-3k).

1. Tolerance
   a. .002 inch for intermediate bearing support
   b. .002 inch/100 in. face for opposite ends of roll assembly
   c. .007 inch maximum

2. Test Equipment - Optical alignment equipment

3. Procedure
   a. Take measurements at 90° points of rotation and use average value for comparison.
   b. Measure A and B at intermediate bearing supports.
   c. Average difference between A and B should be within tolerance.
   d. Measure C and D at opposite ends of the roll assembly.
   e. Difference between C and D should be within tolerance.

4. Correction
   a. Shim above bearing housing on intermediate bearing supports.
   b. Adjust overall level with eyebolt where the rider roll chain connects to the rider roll slide.

5. Associated Problems
   a. Offsets
   b. Wrinkles
   c. Dishing
   d. Poor starts

Figure 11-3k. Roll Segments Level
Hydraulic Core Chuck Alignment

Core Chucks, Centered, and Parallel (figure 11-3q).

1. Tolerance - .002 inch.

2. Test Equipment - Two bearings, shaft and dial indicator

3. Procedure
   a. Mount dial indicator on shaft.
   b. Place bearing assembly in the pocket between the drums.
   c. Indicate off the chuck as shown.
   d. Difference between average value for each chuck should be within tolerance.

4. Correction - Reposition drums and/or shim between cylinder and carriage.

5. Associated Problems
   a. Wrinkles at core
   b. Soft starts
   c. Excessive slide wear
   d. Vibration

Figure 11-3q. Hydraulic Core Chucks Centered and Parallel
Core Chucks Level (figure 11-3r).

1. Tolerance - .002 inch.

2. Test Equipment - Optical alignment equipment

3. Procedure for 4000 Sereis winder
   a. Measure A and B off the cylinder barrel.
   b. Difference between A and B should be within tolerance.

   a. Retract chuck so that rod is extended behind the cylinder.
   b. Measure A and B off rod.
   c. Difference should be within tolerance.

5. Correction
   a. Shim between cylinder and carriage.

6. Associated Problems
   a. Wrinkles
   b. Soft starts
   c. Excessive slide wear
   d. Vibration

Figure 11-3r. Core Chucks Level
Doweling Instructions for Drums Doweling - The drum bearing housings are now to be pin doweled. Final doweling will be done at the field erection site.

NOTE: After final doweling the first drum will be used as the datum for alignment of the rest of the winder.

Paper Roll Alignment

Paper Rolls Level (figure 11-3s).

1. Tolerance
   a. .002 inch/100 in. face
   b. .005 inch maximum

2. Test Equipment - Optical alignment equipment

3. Procedure
   a. Measure A.
   b. A should be within tolerance.

4. Correction
   a. Shim under paper roll bearing housing.
   b. Do not dowel paper roll.

Figure 11-3s. Paper Roll Level
Paper Rolls Parallel (figure 11-3t).

1. Tolerance
   a. .002 inch/100 in. face
   b. .005 inch maximum

2. Test Equipment - Optical alignment equipment

3. Procedure
   a. Measure A and B.
   b. Difference between A and B should be within tolerance.

4. Correction
   a. Reposition paper roll bearing housing.
   b. Do not dowel until roll specs are fulfilled.

Figure 11-3t. Paper Roll Parallel
Intermediate Bearing Below Roll Face (figure 11-3w).

1. Tolerance \[ \frac{.000}{.005} \text{ in.} \]

2. Equipment - Dial Indicator

3. Procedure
   a. Place indicator on edge of roll.
   b. Slowly rotate roll until maximum reading is obtained.
   c. Now using same datum indicate to top of bearing housing.
   d. Difference should be within tolerance.

4. Associated Problems
   a. Scuffing web

Doweling - Pin dowel the paper roll bearing housings to the top plate of the load cell and also pin dowel the bottom plate of the load cell to the mounting pad.

\[ \frac{.000}{.005} \text{ UNDER} \]

Figure 11-3w. Intermediate Bearing Housing Below Roll Face
### GRINDING INSTRUCTIONS FOR BOTTOM KNIVES

<table>
<thead>
<tr>
<th>Type of knife / Material</th>
<th>Carbide Insert Type Band</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rings knife - bottom knife</td>
<td>Carbide Insert Type Band</td>
</tr>
<tr>
<td>Carbide</td>
<td>Carbide Insert Type Band</td>
</tr>
</tbody>
</table>

#### Work sequence:

<table>
<thead>
<tr>
<th>Pregrinding 20°-Phases</th>
<th>Recommendation of grinding wheel:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Grain 120; hardness R</td>
</tr>
<tr>
<td></td>
<td>Concentration ≥ 75%</td>
</tr>
<tr>
<td></td>
<td>Feed 0.01 mm/stroke</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fine grinding 20°-Phases</th>
<th>Recommendation of grinding wheel:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Grain 400; hardness R</td>
</tr>
<tr>
<td></td>
<td>Concentration ≥ 50%</td>
</tr>
<tr>
<td></td>
<td>Feed 0.005 mm/stroke</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Polish grinding 20°-Phases</th>
<th>Recommendation of grinding wheel:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Grain 800; hardness R</td>
</tr>
<tr>
<td></td>
<td>Concentration ≥ 50%</td>
</tr>
<tr>
<td></td>
<td>Feed 0</td>
</tr>
</tbody>
</table>

#### Note:
In all cases use only diamond grinding wheels with synthetic resin binder. Use generous water-cooling. Knife/blade rotating speed is 70 rps.

Grinding wheel peripheral speed $v = 23...25$ m/sec.

---

**BELoit Lenox Slitters**

Appendix S-1
# Grinding Instructions for Bottom Knives

**Standard Type**

1. Clean with honing paste

2. Cutting edge with large breakouts to be rough ground with grinding wheel 60K

3. Cutting edge finish grinding with grinding wheel 40JOT, deburr by hand honing.

---

<table>
<thead>
<tr>
<th>Notes</th>
<th>Grinding Wheel</th>
<th>Hardness</th>
<th>Grain Size</th>
<th>Bonding</th>
<th>Manufacturer</th>
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<td>trouscher</td>
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<tr>
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<td>60</td>
<td>keram.</td>
<td>Norton</td>
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<td>keram.</td>
<td>Norton</td>
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<td>Ölstein India - Flachfeile - Körnung m</td>
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<td>keram.</td>
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<tr>
<td>All grinding must be wet</td>
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<td>Honing Paste</td>
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BELOIT Lenox Slitters
Appendix S-2
# GRINDING INSTRUCTIONS FOR TOP KNIVES

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<tr>
<th>Type of Knife / Material</th>
<th>Standard Type Top Blade Spec. No. 482218S</th>
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<tr>
<td>Dished knife / Top blade</td>
<td>Carbide Insert Type Top Blade Spec. No. 2B2217S</td>
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<tr>
<td>High speed tool speed ASP and 12% Cr steel</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Angle for use with Standard Type Band</th>
<th>Angle for use with Carbide Insert Type Band</th>
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</thead>
<tbody>
<tr>
<td>35°</td>
<td>25°</td>
</tr>
<tr>
<td>φ180 x 5 x φ70</td>
<td>φ160 x 2 x φ70</td>
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<table>
<thead>
<tr>
<th>Work Sequence:</th>
<th>Recommendation of Grinding Wheel:</th>
<th>Make:</th>
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<tr>
<td>Phase pregrinding</td>
<td>25AB0 - 18VBC</td>
<td>Norton</td>
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<tr>
<td>Phase fine grinding</td>
<td>EN320 - 3ot70x506</td>
<td>Niles or equivalent</td>
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*Note:*

Generous water-cooling!
Top knife holder

Sequential movements

1. "Advancing movement," brings top knife into cutting position
2. "Retracting movement" brings top knife into disengaged position
Care and Handling of Carbide Slitter Bands

The use of carbide as a cutting surface has greatly improved the life of slitter bands. Although carbide has a longer cutting life than a steel band, carbide bands require special handling and care.

1. CARBIDE BANDS ARE TEMPERATURE SENSITIVE:

Carbide bands must not be stored in areas where the temperature falls below 50°F. Care should be taken when moving carbide bands from a cool environment to a warm environment. Allow the bands to slowly normalize to the environment they are to be used in. Exposing a cold band to a heated environment could cause bonding deterioration which could create a potentially hazardous condition.

2. CARBIDE BANDS REQUIRE SPECIAL HANDLING:

Carbide bands should be stored and transported in their protective boxes. Gloves need to be used when handling carbide or any other type of slitter band or blade. Care should be taken when handling the bands to avoid contact with surfaces that may nick the carbide surface.

If the band has been dropped or bumped against another surface, closely inspect the carbide surface for small cracks or nicks. If nicks are discovered, have the band reground. If cracks are discovered, discard the band. Small cracks can spread and may result in the separation of the carbide from the metal substructure creating a potential hazard.

New bands are dipped in a protective coating to aid in the protection of the carbide surface. Make sure all the protective coating is removed before mounting the band.

3. TAKE CARE IN MOUNTING:

Carbide is fragile. Never attempt to force a carbide band onto its mounting surface. The bands are designed to fit snugly but should not be forced. Investigate the reason for an interference if the band does not fit. Do not try to force the band in place by striking it! This may damage the cutting surface, the bonding surface of the carbide, and the metal substructure causing separation of the carbide, creating a potential hazard. Remember temperature variations between the band and mounting surface may result in interferences which can cause binding.

4. CHECK BAND RUN-OUT:

Once the band is installed, inspect the run-out at the cutting surface and band outside diameter. Total indicator reading of the cutting surface is not to exceed 0.0027" (0.07 mm). Outside diameter is not to exceed 0.0039" (0.10 mm). If the band is found to be out of specification remove it and install another band. If the specification is still not met, then inspect the run-out of the band mounting surface. Both the mounting flange and the 7.401" (188 mm) diameter surfaces are not to exceed 0.0019" (0.05 mm). Replace or repair the slitter motor as required. Continued use of an out-of-spec band or motor will reduce the cutting life and cause rough and dusty cuts.
5. **Routinely Inspect the Bands:**

Inspect the top surface (outside diameter) of the bands for grooves in the bonding joint which may have been caused by the top blade coming down on the top of the bottom band. This sometimes happens if care is not taken or the positioning rod is not used during the manual positioning of the slitters. If this condition exists replace the band immediately. Continued use of a band in this condition may cause the carbide to become separated from the metal substructure. Routine inspection of this area will alert you to potential hazards. **Remember slitters must be completely stopped and the slitter disable switch turned to "disable" before inspection takes place.**

6. **Regrinding of Bands:**

Carbide bands require a special regrind process and typically can not be handled by sources that regrind steel bands and blades. Refer to Beloit drawing 77-2196-0001 for the specifications required for the regrinding of carbide bands. Drawing 77-2196-0001 shows the minimum thickness the carbide can be before the band must be discarded. Beloit Lenox offers a regrinding service or can recommend quality sources close to your mill for your regrinding needs.
LIST OF COMPONENTS

The List Of Components (L/C) provides a complete list of the assembly drawings, subordinate L/C's, system drawings, schematics, and control panel drawings that are listed on the main assembly drawing. Use it as a guide for locating and indentifying all numbered component information.

THE L/C FORMAT

Each page of the L/C contains the following sections:

- MAIN BODY
- TITLE BLOCK
- LEGEND BLOCKS

MAIN BODY

The MAIN BODY contains descriptions and drawing numbers of the machine's components and their relative documents—schematics, assembly drawings, subordinate L/C's, and Lists Of Documents (L/D's). (See the illustration below)

The most important columns in the MAIN BODY are "DESCRIPTION" and "SYMBOL".

DESCRIPTION Provides a verbal description of the item

SYMBOL Contains the identification number of the item. In most cases this will be a drawing number.

<table>
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</table>

L/C MAIN BODY

LIST OF COMPONENTS
Additional information about each item is listed in the ITEM, QUAN, CU PR, and CU PRINT RELEASE DATE columns of the MAIN BODY.

| ITEM | Used to indicate the group to which an item or assembly belongs (first two digits) and the sequence in which it is listed within that group (last two digits) |
| QUAN. | Specifies the required quantity of an item within the current group; also used to identify reference sources (REF), such as a schematics or L/C's |
| CU PR | Contains code numbers that indicate whether the drawing is new (1) or existing (2) |
| CU PRINT RELEASE DATE | Specifies the date the customer's print was issued |
| MANUFACT. RELEASE DATE | Date the drawing was released from engineering. |

Note: Other columns in the MAIN BODY will be left empty. They are used for internal processing by BELOIT Lenox during manufacture of the winder.

LIST OF COMPONENTS
TITLE BLOCK

The TITLE BLOCK contains general information about the winder and the L/C (see the illustration below).

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<th>GRADE</th>
<th>PROD. LINE</th>
<th>ORDER</th>
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</table>

CUSTOMER NAME

CUSTOMER'S NAME

Name of Customer

MILL

Mill location

ORDER

A unique BELOIT Lenox order number that identifies the winder

HAND

The correct "hand" of the machine, i.e., if the drives are on the right side of the machine when the viewer is looking in the direction of the paper flow, it is a "right-hand" machine (R); if the drives are on the left side, it is a "left-hand" machine (L).

UOM

The unit of measure used to design the machine (metric or imperial)

SPEED

The design speed of the winder

GRADE

The grade of paper the machine has been designed to produce

MACH. NO.

The specified number of the paper machine or winder

WIDTH

The face width of the winder drums

L/C TITLE BLOCK

The following headings and information fields in the TITLE BLOCK identify the winder:

LIST OF COMPONENTS
The following fields in the TITLE BLOCK are used to provide information about the L/C itself: TITLE - LIST OF COMPONENTS contains the correct title/description of the page's List Of Components, IDENTIFICATION NUMBER contains the correct drawing number of the page's List Of Components, TYPE refers to the kind of L/C being issued (REG = regular issue), PRODUCT LINE indicates the product line code, DRAWN, CHK'D, APP'D 1, APP'D 2, and REVISION indicate dates and BELOIT Lenox personnel involved with the creation of the L/C.

LEGEND BLOCKS

LEGEND - L/C ITEMS and LEGEND TOTAL L/C contain lists of the codes used to indicate the Units of Measure (UOM) in the L/C. SPECIAL INSTRUCTIONS contains a list of the codes used to indicate specific special instructions (see the illustration below).

LEGEND - L/C ITEMS

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SPECIAL INSTRUCTIONS

- O - SHIP DIRECT
- P - MUST BE IN ONE PIECE
- NM - NOTTING PARTS
- TE - THROWN ONE END
- TB - THROWN BOTH ENDS
- TF - THROWN FULL LENGTH
- CN - CERTIFIED PARTS
- CO - CURB
- F - FOR - CERTIFIED PARTS & SHIP DIRECT
- MD OR TP - MUST BE ONE PIECE & THR ONE END
- MT OR TP - MUST BE ONE PIECE & THR BOTH ENDS

RSP - RECOMMENDED SPARES

RECOMMENDED SPARE PRT FOR ITEMS OF THE L/C

L/C LEGEND BLOCKS

LIST OF COMPONENTS
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### Slitters

**Quick Trim Parts**

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**Clamping Unit Assemblies**

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**Clamping Unit Assemblies**

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**NOTES**

- [List of Components](#)
- [Diagram](#)
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**L/C Legend**
- **Function**: By Date
- **Processing**: Unit of Measure
  - **U.S. Inch**: U.S. Inch
  - **G.B. MM**: G.B. Millimeter
  - **Mtr**: Metric

**Notes**
- This page is the property of Beloit Corporation and Wisconsin Industries. The information herein is subject to confidentiality.
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## Wind-Up Module

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**Legend:**
- **U.S. ENGLISH:** English units of measurement.
- **U.S. METRIC:** English units of measurement.
- **METRIC:** Metric units of measurement.

**Notes:**
- The table above lists the components of a specific assembly or part.
- Each component includes its description, quantity, and additional details such as length and symbol.
- The table is part of a larger document that includes various sections such as processing, list of components, and other technical details.

**Additional Information:**
- The document is part of a larger technical manual or blueprint, indicating its use in industrial or manufacturing contexts.
- The page contains various sections and tables, each serving specific purposes such as listing components, technical details, and other relevant information.
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- LIST OF COMPONENTS
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**L/C LEGEND**
- L/C - UNIT OF MEASURE
  - U.S. F/E: INCH
  - E.S. M/E: MILLIMETER
  - M = METRIC
- L/C = LINEAR
- F = FACSIMILE
- 20/20 = IMPRESSION

**PROCESSING**
- FUNCTION: LIST OF COMPONENTS
- BY DATE: 18-APR-94

**BASEPLATE LC**
- Manufacturers No: 92-15000
- Class: 2
- Size: 12 x 24
- Model: BASEPLATE LC
- Date: 12-APR-94
- Material: LC-2773-94-0-0
PRE-START-UP

1. Clean and fill the pump reservoir before filling.
2. Wipe the oil with petroleum based with added viscosity.
3. Fill the reservoir with oil until the level reaches the
   full mark at the top of the gauge glass. Do not overfill.
4. Be sure the pump case is filled with oil, refer to pump manual for
   start-up procedures.
5. Make sure all relief valves are de-energized.
6. Open both the pressure relief valve.
7. Clean and check unit and winding rails.
8. Close both pressure relief valves fully closed.
9. Flush each line for at least 15 minutes or until clear
   before connecting to and filling cylinders.

10. Check pumps compressor glands for max
    pressure (turn clockwise).
11. Check and verify the proper rotation of the
    motor as indicated by the directional arrow on the
    pump.
12. While checking "static" pressure, adjust relief valves
    until pressures reach 1000 psi (turn clockwise).
13. Adjust pump compressor glands until pressures
    reach 1300 psi (turn clockwise).
14. Adjust pump compressor glands until pressures
    reach 2000 psi (turn clockwise).
15. Adjust pump compressor glands until pressures
    reach 3000 psi (turn clockwise).
16. Adjust pump compressor glands until pressures
    reach 4000 psi (turn clockwise).

SET-UP INSTRUCTION FOR SETTING PRESSURE CONTROL VALVES OF INTEGRATED CORE SLIDES

WITH THE HYDRAULIC DOFF ON AND THE CORE CHECKS CLOSED, TURN COMPLETELY
COUNTER-CLOCKWISE THE ALL PRESSURE CONTROL VALVES. IF BACF ROT (C) PL
M40-200 SL, THIS IS THE ON MACHINE REMOTE OPTICAL.

1) TURN HYDRAULIC ON
2) TURN THE BACF ROT (C) TO CLOCKWISE COMPLETELY (THE CORE SLIDE SHOULD
   NOT RISE).
3) INCREASE PRESSURE SLOWLY BY TURNING THE ADJUSTMENT ON THE M40-200 SL
   COUNTER-CLOCKWISE, UNTIL THE CORE SLIDE RAISES. NOTE THE PRESSURE AND
   HAIRPin IT TO APPROXIMATELY 50 PSI ABOVE THE INCREASE PRESSURE.
4) SLOWLY DECREASE THE PRESSURE IN THE SYSTEM BY TURNING THE BACF ROT (C)
   COUNTER-CLOCKWISE UNTIL THE CORE SLIDE CEASES TO LAGGER AND IMMEDIATELY
   BEFORE IT BEGINS TO RAISE AGAIN. THIS IS THE MOUNTAIN POINT.
5) REPEAT THE FLOW CONTROLS AT THE SELECTED VALUE FOR INCREASE SPEED
    AND THE FLOW CONTROLS ON EACH CYLINDER FOR LAGGER SPEED.

IF THE SYSTEM HAS A REMOTE OPTION CONTINUE TO STEP 5. IF THE
SET-UP IS COMPLETE.

6) SLOWLY TURN IN THE M40-200 SL UNTIL THE CORE SLIDE RAISES. THIS PROCEDURE
   SIMPLY VERIFIES THAT THE REMOTE IS FUNCTIONAL. RETURN THE M40-200 SL TO
   THE COUNTER-CLOCKWISE POSITION. WHEN INSTALLING ANOTHER CORE SLIDE
   ADJUSTMENT. THIS REMOTE IS USED TO COMPENSATE FOR THE ADDITIONAL WEIGHT
   OF ADAPTORS.

DISCILLATING UNI-MODE SET-UP INSTRUCTION

1) OPEN ITEM B, FLOW CONTROL VALVES. ONE TURN.
2) OPEN ITEM B, FLOW CONTROL VALVES. ONE TURN.
3) Adjust item A, pressure reducing valve to pressure
   resistance to the fully closed housing. ACTUATE
   IN BOTH DIRECTIONS. THE CORE SLIDE VALUE MUST
   BE ENERGY AT EXTREME AND RETURN TO OIL.
4) ALTERNATELY ENERGIZE USB-SV AND USB-SV. ADJUST ITEM B, FLOW CONTROL VALVES.
   DESIRE CROSSFIRE SPEED. AX, 1° PER SECOND.
5) ALTERNATELY ENERGIZE USB-SV AND USB-SV. ADJUST ITEM B, FLOW CONTROL VALVES.
   DESIRE DISCILLATING SPEED. RX, 1° PER SECOND.
6) LACE IN ADAPTORS.
### Pressure Filter Change

1. **Shut Down the System**
2. **Close Valve (Clockwise)**
3. **Open Valve (Counter-Clockwise)**
4. **Replace Filter Element**
5. **Turn on the Pump and Allow 2 Minutes to Bleed Air from the Filter Element and Housing**
6. **Gradually Close Valve (Clockwise)**
7. **lock Valve WIDE OPEN**

---

**Part List**

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**Notes**

- Use Beloit Corporation, as this project is submitted in confidence, for not not be copied.
- Beloit Corporation, 91-5020-0257-1

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**Diagram**

- **1" Tube**
- **1 1/4" Tube**
- **Filter Roll Tank Line**
- **Filter Roll Vent Line**
- **Cone Slice Vent Line**
- **Circular Vent Line**

---

**Location**

- **Mill**: 91-5020-0257-1
- **Department**: Beloit Corporation
- **Date**: 12-02-99
- **Title**: Hydraulic Schematic Winder
AS SHOWN FOR RIGHT HAND MACHINE
ENG. REF: THIS IS A LEFT HAND MACHINE.
### Calculating Rider Roll Weight and Determining PSI (Pa)

1. **Rider Roll Arrangement and Cylinder**:
   - Just know rider roll, hypoidic cylinder bore and rod diameter.
   - Cylinder ID = 4.5" x 0.25" = 1.125".
   - Rod ID = 0.5" x 0.25" = 0.125".

2. **Calculate Effective Cylinder Area (ECA)**:
   - ECA = 2 x [(PI x r^2) / 2] = PI x r^2 / 2

3. **Effective Cylinder Bore Area (ECA)**:
   - ECA = 2 x [(PI x r/4)^2] = PI x (r/4)^2

4. **Calculate DISPLACEMENT**:
   - DISPLACEMENT = ECA x (Rod Length - Cylinder Bore Diameter)

5. **Calculate Effort (E)**:
   - E = DISPLACEMENT x R (torque)

6. **Calculate Pressure (P)**:
   - P = E / Area

7. **Calculate PSI (Pressure)**:
   - PSI = P / Area

8. **Calculate Force (F)**:
   - F = PSI x Area

9. **Calculate Rider Roll Weight**:
   - Rider Roll Weight = F x Length

10. **Calculate Rider Roll PSI Per Unit Area**:
    - PSI/Unit Area = PSI / (Area of Rider Roll)

11. **Calculate Rider Roll PSI Per Unit Volume**:
    - PSI/Unit Volume = PSI / (Volume of Rider Roll)

12. **Calculate Rider Roll PSI Per Unit Weight**:
    - PSI/Per Lb = PSI / (Weight of Rider Roll)
**PNEUMATIC NOTES:**

1. All control devices are shown in the "static" or "off" position.
2. Refer to the machine assembly drawing for the actual location of the controlled equipment.
3. All air lines inside enclosure to be 3/4 O.D. tube and all air lines outside enclosure to be 1/2 O.D. tube or 3/4 pipe unless otherwise specified. Air lines to guides to be 1/4 O.D. tube. Air pressures are minimum. All pilot lines shown should be 3/8 O.D. tube.
4. All piping, shut-off valves, hose and quick disconnects to be supplied unless otherwise specified.
5. Locate lubrication or new actuators in a convenient location for cleaning and maintenance.
6. The primary on the flow control valve indicates the direction of controlled flow.
7. Locate control devices in an area where ambient temperature does not exceed 45 degrees Celsius.
8. Piping runs to front and back actuators must be of equal size and length.
9. Pipe all open-exposed ports for air.
10. All pressure settings given are approximate. Actual pressures to be recorded at startup.

- Indicates operator devices mounted on exterior of enclosure.
- Indicates piping terminal in enclosure and on machine frame.
- Indicates control circuit and control point location.

**INSTRUMENT AIR:**

Instrument air is the air supply which is necessary to keep the machine functioning safely. It is supplied to all critical machine control functions, must be clean and dry and delivered at a pressure no less than 80 psig. Filtration should be 10 Micron or better. Moisture content should not exceed a pressure dew point of 10 degrees Celsius at 100 psig.

**WIND**

WIND air is the air supply which is used to operate machine functions which are not vital to continuous machine operation. The temporary loss of this supply will not cause an immediate machine shutdown. Wind air supply should be clean and reasonably dry. Minimum available pressure should be 50-100 psig. Filtration should be 10 Micron. The moisture content should not exceed a pressure dew point of 10 degrees Celsius at 100 psig.

**LEGEND:**

- Unframed Clutch
- Unframed Brake
- Unframed Hook Stop
- Front Spindle Centering
- Train Slitters
- Paper Slitters Cutting
- Slitter Clamps
- Lead-In Roll Sheet Thresher
- Lead-In Roll Sheet Holder
- Spacer/Lead-In Shat Thresher Arm
- Drum Sheet Thresher
- Drum Sheet Holder
- Back Drum Brake
- Front Drum Brake
- Rider Roll Unlatch
- Cable Fixation
- Back Drum Sheet Thresh Arm Shaker
- Rider Roll Unloading
- Articulating Rider Roll
- Valve Lock Layout

**REFERENCE DRAWING SERIES:**

- Connection Diagram: 52-5021-0005
- Piping/Articulating Rider Roll: 50-8701-0069

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