

Customer P.O. No. :
Project No. :0000
Date: March 5, 2002

Your logo (if available)
Company name and
Location

Inspection & Alignment Report of Various Sections
Paper, Board or Tissue Machine N° ?

Executive summary

In this box, you will generally find an overview of what was done during the project.

The following pages of this sample report contains information that is setup in a usual customer report. In addition, we have included several examples of what **MASI** can do for you and your machine.

For your next shutdown, please consider a team of professional with over 50 years of combined experience in the paper mill industry and alignment business. Call us at (514) 933-MASI (6274).

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Introduction

A short paragraph is usually found in this section containing information on the mill contact and a brief description of the reason for our visit.

References

The references usually used by our optical team are:

- **Level (Vertical) Attribute** - Level to earth
- **Square (Horizontal) Attribute** – The monuments of the machine that represents the offset machine centerline. You are not sure that you have such a line, no problem, **MASI** can help you establish such a line. Please ask us for details.

Throughout this report, data may be shown with arrows (\uparrow , \downarrow , \leftarrow , \rightarrow). The data indicates the position of the operator (tending) side of the component with respect to the drive side, as viewed from the tending side.

Red data represents the alignment of the component as initially inspected.

Green data represents the alignment of the component after alignment.

Inspection & Alignment Results

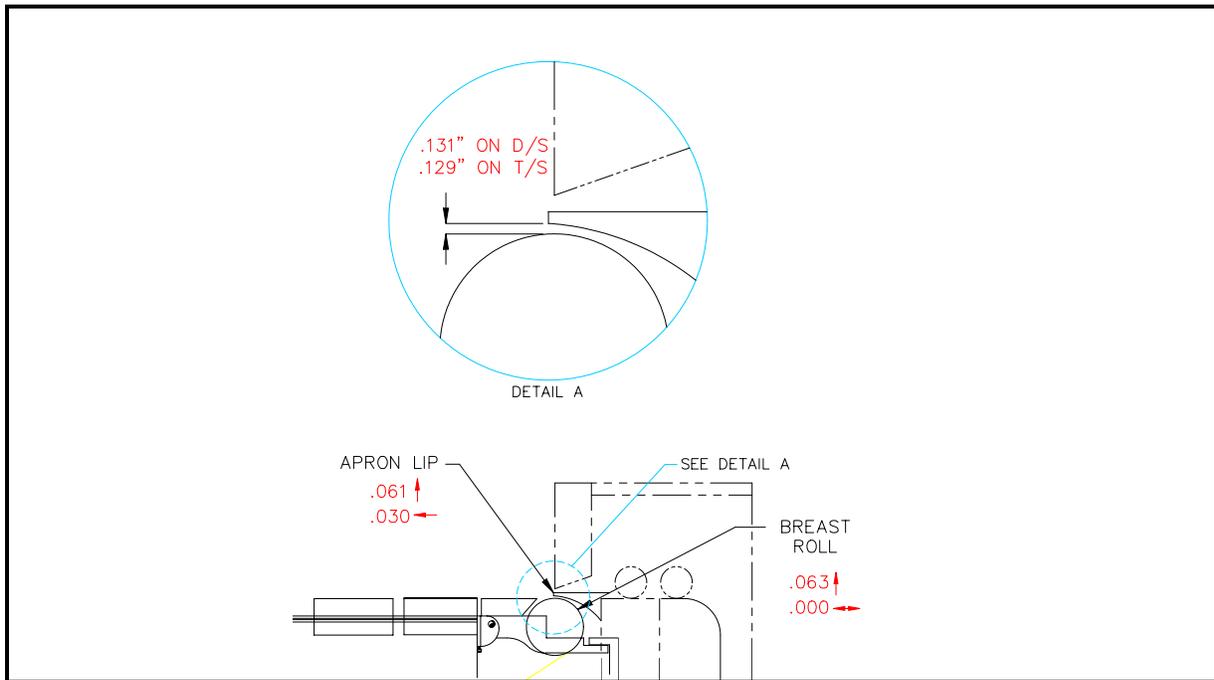
Section: Fourdrinier

(Refer to Drawing No. 0000-1 to 0000-5)

Whether your fourdrinier is horizontal, vertical, with a top former or multiple tables, **MASI's** optical team has knowledge of all these types of fourdrinier, and we can setup easily any of our instruments to inspect any components. You are having problems with sheet formation or wire tracking, an inspection of the headbox, the breast roll, the couch, the wire turning rolls or table elements could help you find what the problem is. You are setting up new equipment, let us help you by making sure all proper steps for erection are followed.

The following is the typical information format you would see in our report:

- An initial inspection of the apron lip showed that it was 0.061"↑ and 0.030"←. The breast roll was found to parallel to the breast roll for the level and perfectly perpendicular to the centerline of the machine. The following sketch is inserted for details:



- Please refer to drawings for more details of what **MASI** can do for you in this section of your machine.

Inspection & Alignment Results (cont'd)

Section: Wet Press

(Refer to Drawing No. 0000-6 and 0000-7)

Straight thru press, “Twinver”, “Tri-Nip”, shoe press, whatever the type of press you have doesn’t matter to **MASI’s** optical team, because we have seen them all and know the particularities of inspecting and aligning each and everyone of them.

If you are experiencing dewatering problems, premature wear on coverings, web or felt tracking problems, you should make **MASI’s** optical team part of your troubleshooting diagnostics. Optical inspection of presses can pin point the exact location where nips are in a scissor condition and eliminate this condition by proper alignment.

The following is the typical information format you would see in our report:

- The granite roll of the first press was found to 0.008”[↑] and perfectly perpendicular to the machine centerline. The suction roll, which nips horizontally with the fix roll, was 0.023”[↑]. A scissor condition of 0.015” is present in the first press. With proper roll diameter, the optical team can identify where the scissor condition occurs.

See the attached drawings for details.

Section: Dryer Section

(Refer to Drawing No. 0000-8 and 0000-9)

Although the dryer section appears to be straight forward, several alignment related problems can be found in this area. Amongst them you have: poor web and felt tracking, premature wear in felts, wear on gears and pinion, etc.. **MASI** as seen it all, let us help you in troubleshooting this area.

Attach you will find a drawing, which depicts alignment condition in a dryer section and the proposed action to correct these. Also you will find the alignment portrait of a complete section.

Section: Coater and Calender

(Refer to Drawing No. 0000-10 to 0000-12)

A regular size press, transfer roll coater or gate coater alignment is not to be taken lightly. Especially when you consider the fact that you are about to wet the sheet once more. If any residual stress is found in the sheet, due to web tracking problems prior to the coater, the quality of the finish product will be affected. **MASI** will help you ensure that the your finish product is the best, by optimizing alignment of paper rolls and coater rolls to eliminate any undue stress in the sheet.

Inspection & Alignment Results (cont'd)

Calendering will transfer to your product the final physical properties wanted. It is very important to your client to respect this for his end-use, so you want to make sure that your equipment is optimized and up to the task. **MASI's** optical team has several years of experience with hard nip calenders, soft nip calenders and gloss calenders. We can help you optimize your calendering process and also help you track the history of your rolls in the calender. Typical analysis would be as such:

- The “King” roll was perfectly aligned to the machine centerline and the level was 0.010”↑.
- Using a parallel line of sight to the “King” roll, the remainder of the calender was aligned parallel to it. You will also find the calculated offset of the centerline on the drawing

See drawings for examples.

Section: Reel

(Refer to Drawing No. 0000-13)

You finally have a machine that has been optimized due to alignment, but once your product arrives at the reel you have poor spool start-up. You are losing a lot of paper during spool transfer. This is generally due to the primary arms being out of synchronization with the reel drum. **MASI** is once again one of the cheapest solutions for you to troubleshoot the problem in this area. A simultaneous inspection of the reel and the spool will reveal if synchronization is good or not. Proper tension in the spool is also important, that is why you need to know if the secondary arms are also synchronized. Optical method is still the best way to find out this condition.

Section: Winder

(Refer to Drawing No. 0000-14)

Paper machines are going faster everyday and that is why winders are also going faster. You need your winder to be fully optimized to prevent any unexpected downtime. So you want to eliminate poor winding start-up, dishing, interweaving between rolls, dusting, etc.. **MASI** will help you in obtaining a proper alignment overview of the winder and will also help you set up the winder to tight alignment tolerances to ensure proper running of the winder.

Observations and Recommendations

In this section, the client will find observations made by the optical team during our visit, pertaining to the machine. Also, since **MASI** has over 50 years of experience in the industry, we will make specific or general recommendations for any section that was inspected during our visit. **MASI** feels that the client deserves more than just numbers on paper and that is the purpose of this report: to let our client benefit from our experiences with similar problems found throughout our numerous visit to paper machines.

The following appendix contains general tolerances for alignment of several rolls and components of the paper machine. These are sensible to the grade produce and the speed of the machine. In this example, a coated grade machine with speeds up to 3000 FPM was used.

Appendix: Tolerances & Benefits of Alignment

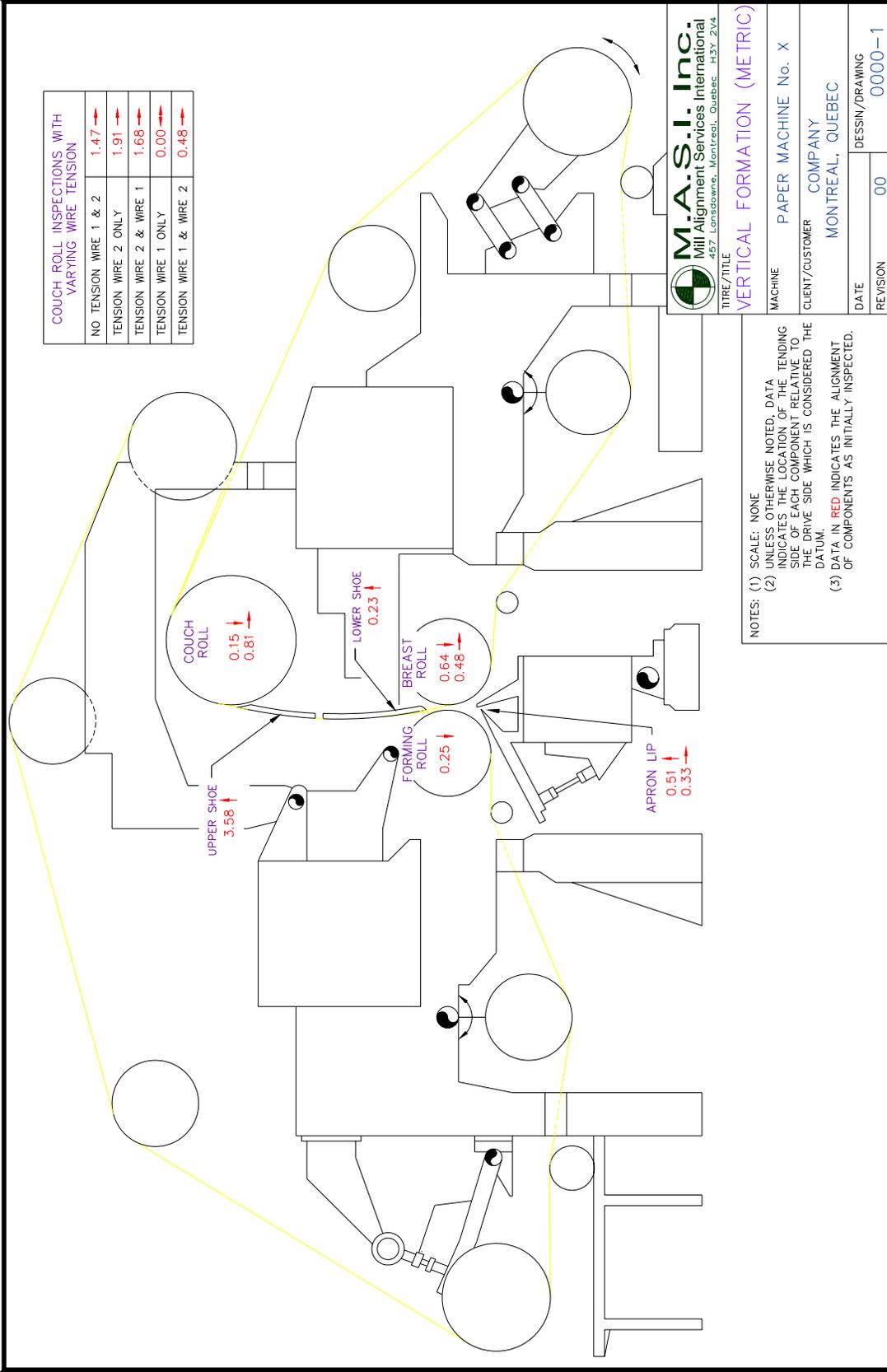
MASI generally recommends the following tolerances for alignment of (coated grade) paper machine components when the manufacturer's tolerances are not available:

- ❑ **Apron Lip:** ± 0.001 "/foot of width, for both attributes. The apron should be adjusted to eliminate out-of-flat conditions of more than 0.002" between adjacent actuator locations. These adjustments will help the operator to produce a web that is more uniform in basis weight and caliper across the width of the machine.
- ❑ **Couch, Pick-up roll, Breast roll:** ± 0.001 "/foot of effective roll face, for both attributes. The breast roll should be aligned parallel to the apron lip, and should be positioned at the proper location with respect to the apron lip. Proper alignment and positioning of this roll relative to the apron will help to ensure that desired stock delivery conditions are maintained.
- ❑ **Tension rolls, guide rolls, return rolls:** ± 0.0015 "/foot of effective roll face, for both attributes, and centered within ± 0.125 " with machine centerline.
- ❑ **Press (nipping) rolls, calender rolls:** ± 0.001 "/foot of effective roll face up to 0.010" for level-to-earth and perpendicular to the machine centerline. Nipping or adjacent rolls should be parallel to each other in order to minimize the "scissors" condition to no more than 0.005".
- ❑ **Turning rolls, Pressure rolls, and Bowed rolls:** ± 0.0015 "/foot of effective roll face, for both attributes and/or parallel to its adjacent component within a maximum of ± 0.007 ", and centered within ± 0.125 " with machine centerline.
- ❑ **Dryer cans, felt tension/stretch rolls, felt guide rolls, carrier felt return rolls:** ± 0.0015 "/foot of effective roll face, for both attributes, and centered within ± 0.125 " with machine centerline.
- ❑ **Dryer pinion and gears:** gear root clearance should be set at 0.05 – 0.07" in order to minimize gear backlash.
- ❑ **Reel drum, primary & secondary arms:** ± 0.001 "/foot of effective roll face, for both attributes; primary and secondary arms to be parallel to the reel drum up to a maximum of ± 0.007 ".

The benefits of proper paper machine alignment are:

- ❑ Increased dewatering efficiency, and hence reduced operating costs in the dry end
- ❑ More consistent product formation
- ❑ Improved product transfer to the press section, and thus fewer web breaks
- ❑ Improved wire tracking
- ❑ Increased wire life
- ❑ Decreased wear of bearings, bushings, dryer gears, and other mechanical parts
- ❑ Decreased foil and suction box wear
- ❑ Improved microturbulence on the wire, which reduces flocculation and improves formation
- ❑ Less tension on the wire so that the designed weave is not distorted
- ❑ Elimination of baggy edges and wrinkles
- ❑ Decreased felt wear
- ❑ Minimization of rewetting
- ❑ Elimination of stresses which tend to close the felt void spaces
- ❑ Maintained felt porosity, which increases water removal efficiency

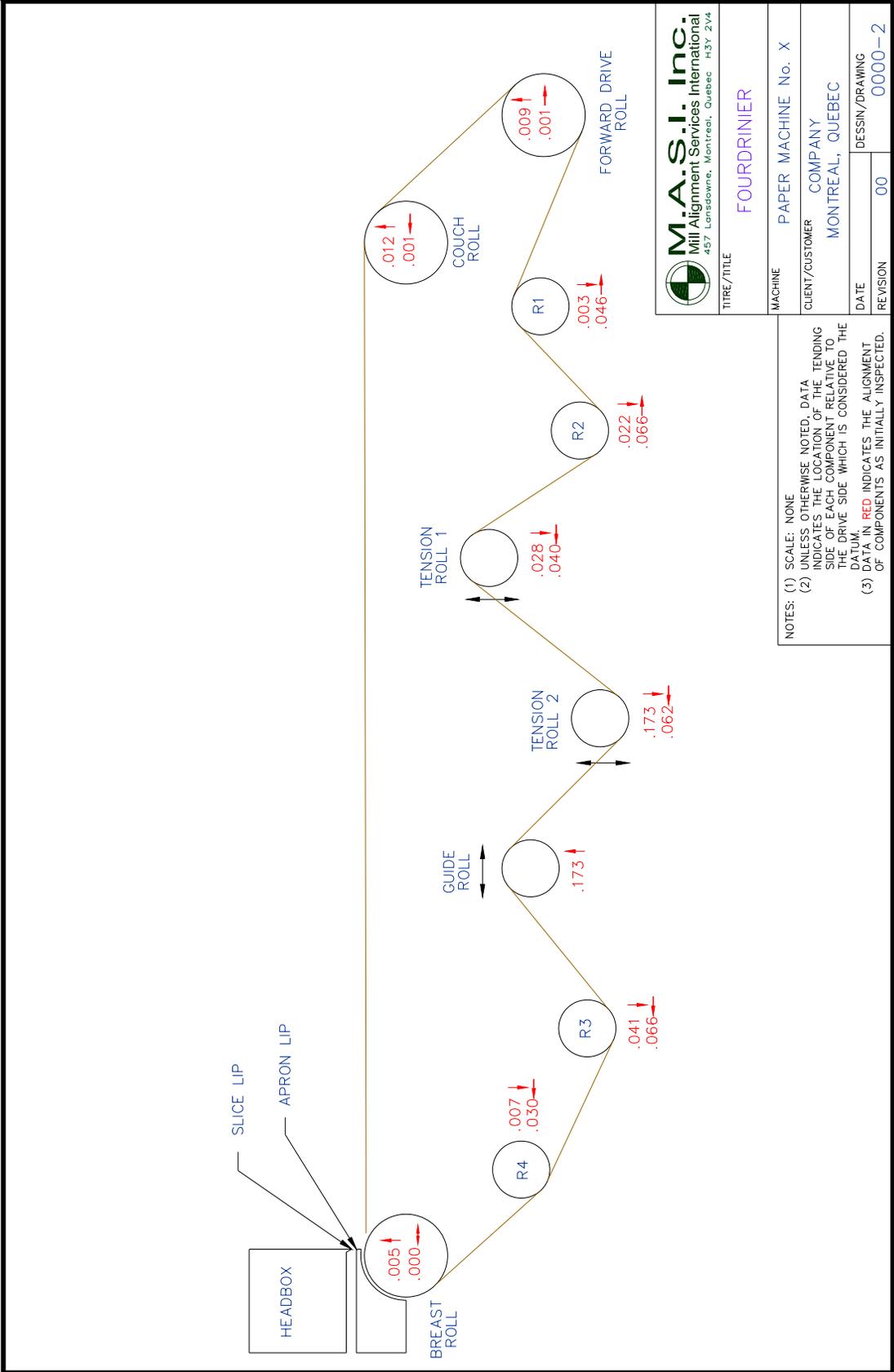
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NO TENSION WIRE 1 & 2	1.47 →
TENSION WIRE 2 ONLY	1.91 →
TENSION WIRE 2 & WIRE 1	1.68 →
TENSION WIRE 1 ONLY	0.00 →
TENSION WIRE 1 & WIRE 2	0.48 →



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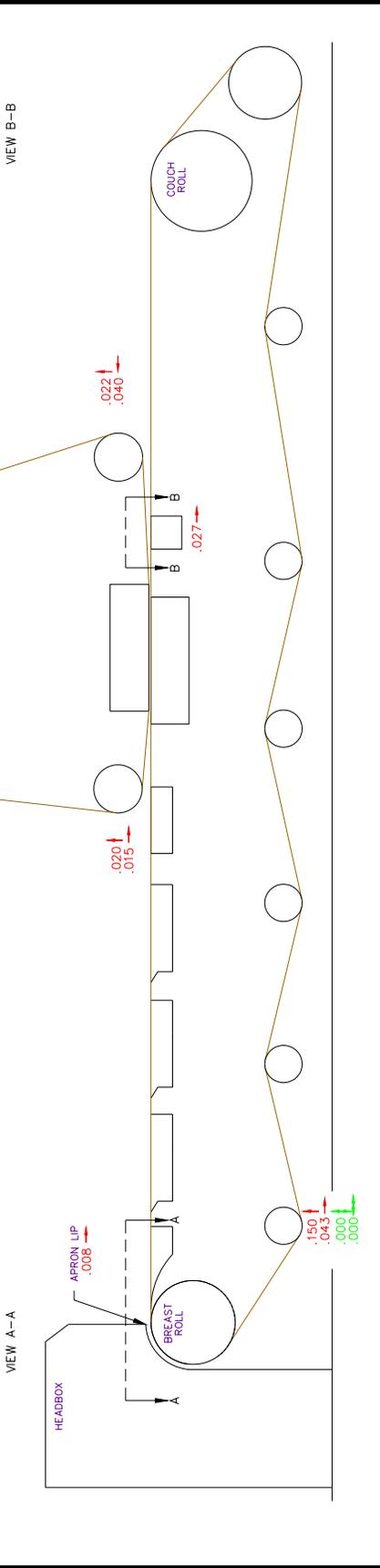
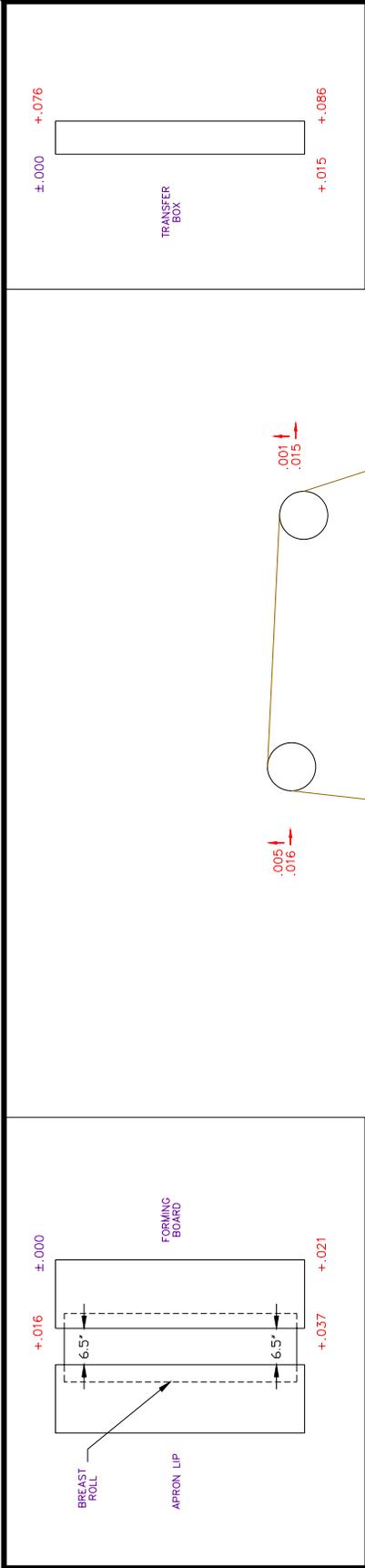
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CLIENT/CUSTOMER	COMPANY MONTREAL, QUEBEC	
DATE		
REVISION	00	0000-1

NOTES: (1) SCALE: NONE
 (2) UNLESS OTHERWISE NOTED, DATA INDICATES THE LOCATION OF THE TENDING SIDE OF EACH COMPONENT RELATIVE TO THE DRIVE SIDE WHICH IS CONSIDERED THE DATUM.
 (3) DATA IN RED INDICATES THE ALIGNMENT OF COMPONENTS AS INITIALLY INSPECTED.



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TITRE/TITLE	FOURDRINIER
MACHINE	PAPER MACHINE No. X
CLIENT/CUSTOMER	COMPANY MONTREAL, QUEBEC
DATE	DESSIN/DRAWING
REVISION	00 0000-2

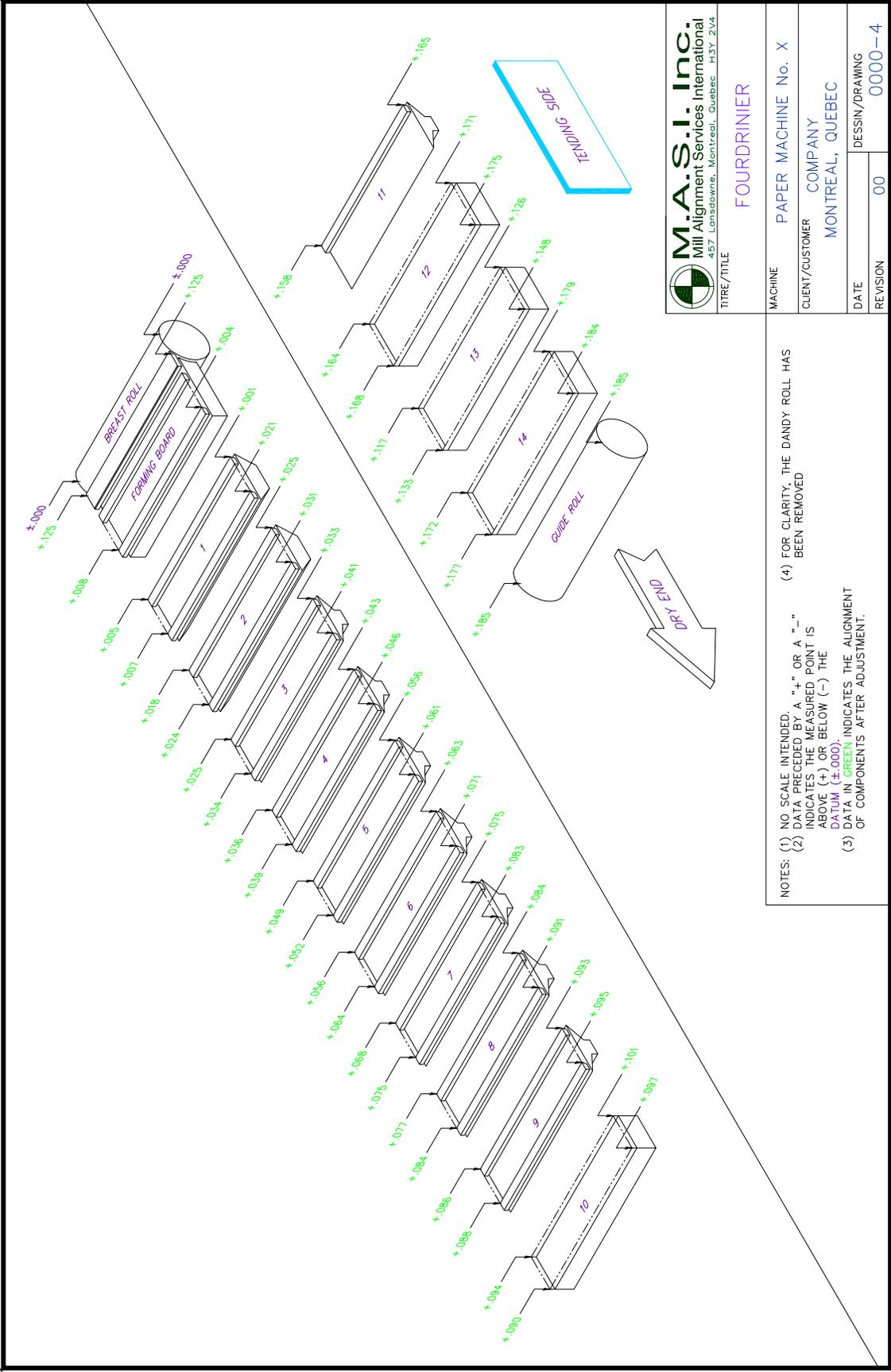
NOTES: (1) SCALE: NONE
 (2) UNLESS OTHERWISE NOTED, DATA INDICATES THE LOCATION OF THE TENDING SIDE OF EACH COMPONENT RELATIVE TO THE DRIVE SIDE WHICH IS CONSIDERED THE DATUM.
 (3) DATA IN RED INDICATES THE ALIGNMENT OF COMPONENTS AS INITIALLY INSPECTED.



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TITRE / TITLE	FOURDRINIER
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CLIENT/CUSTOMER	COMPANY MONTREAL, QUEBEC
DATE	DESSIN/DRAWING
REVISION	00
	0000-3

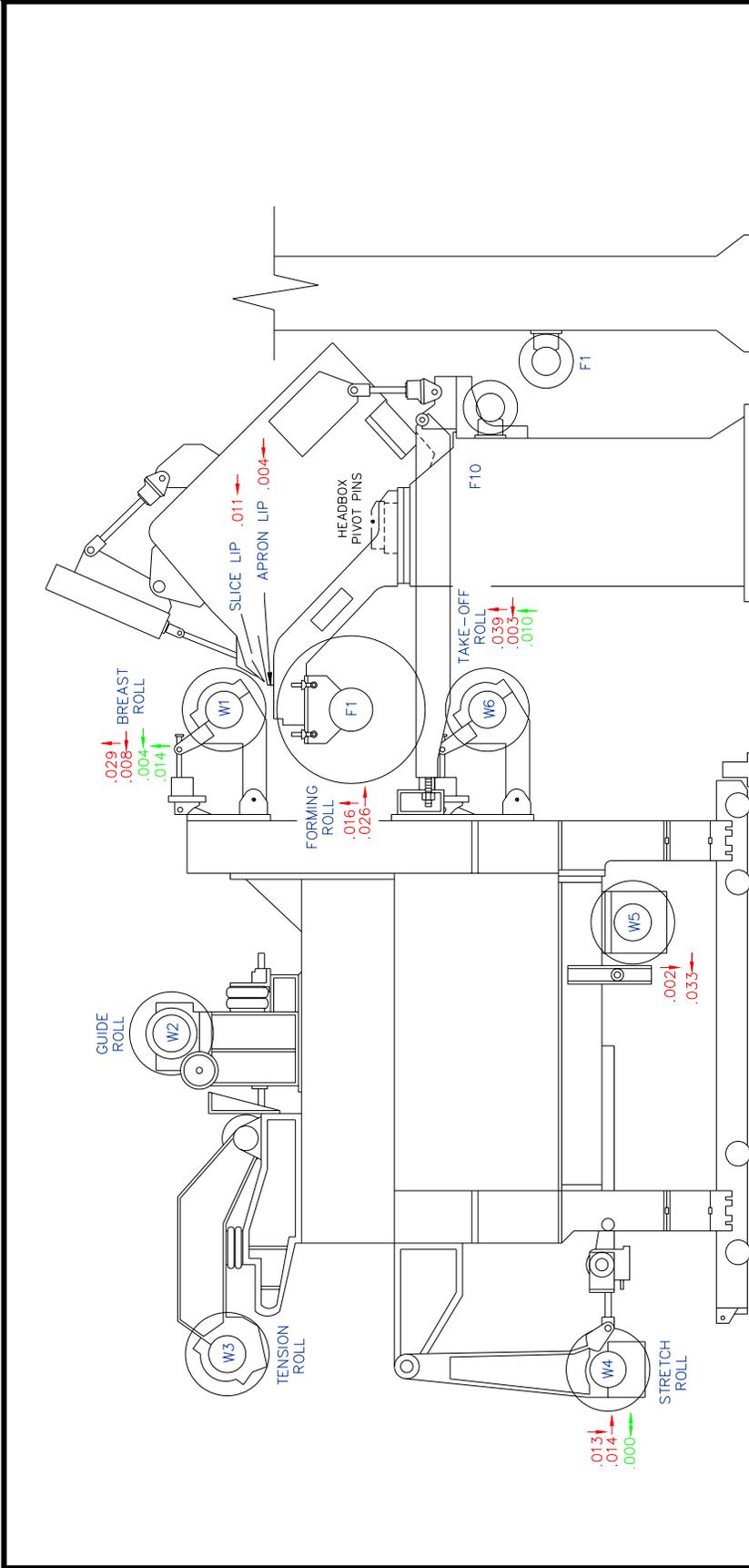
- NOTES: (1) SCALE: NONE
 (2) UNLESS OTHERWISE NOTED, DATA INDICATES THE LOCATION OF THE TENDING SIDE OF EACH COMPONENT RELATIVE TO THE DRIVE SIDE WHICH IS CONSIDERED THE DATUM.
 (3) DATA IN RED INDICATES THE ALIGNMENT OF COMPONENTS AS INSPECTED.
 (4) DATA IN GREEN INDICATES THE ALIGNMENT OF COMPONENTS AFTER ADJUSTMENT.
 (5) DATA PRECEDED BY A "+", "-" OR A "-" INDICATES THE MEASURED POINT IS ABOVE (+) OR BELOW (-) THE DATUM (±.000).



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TITRE / TITLE		FOURDRINIER	
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DATE	00	DESSIN/DRAWING	0000-4
REVISION	00		

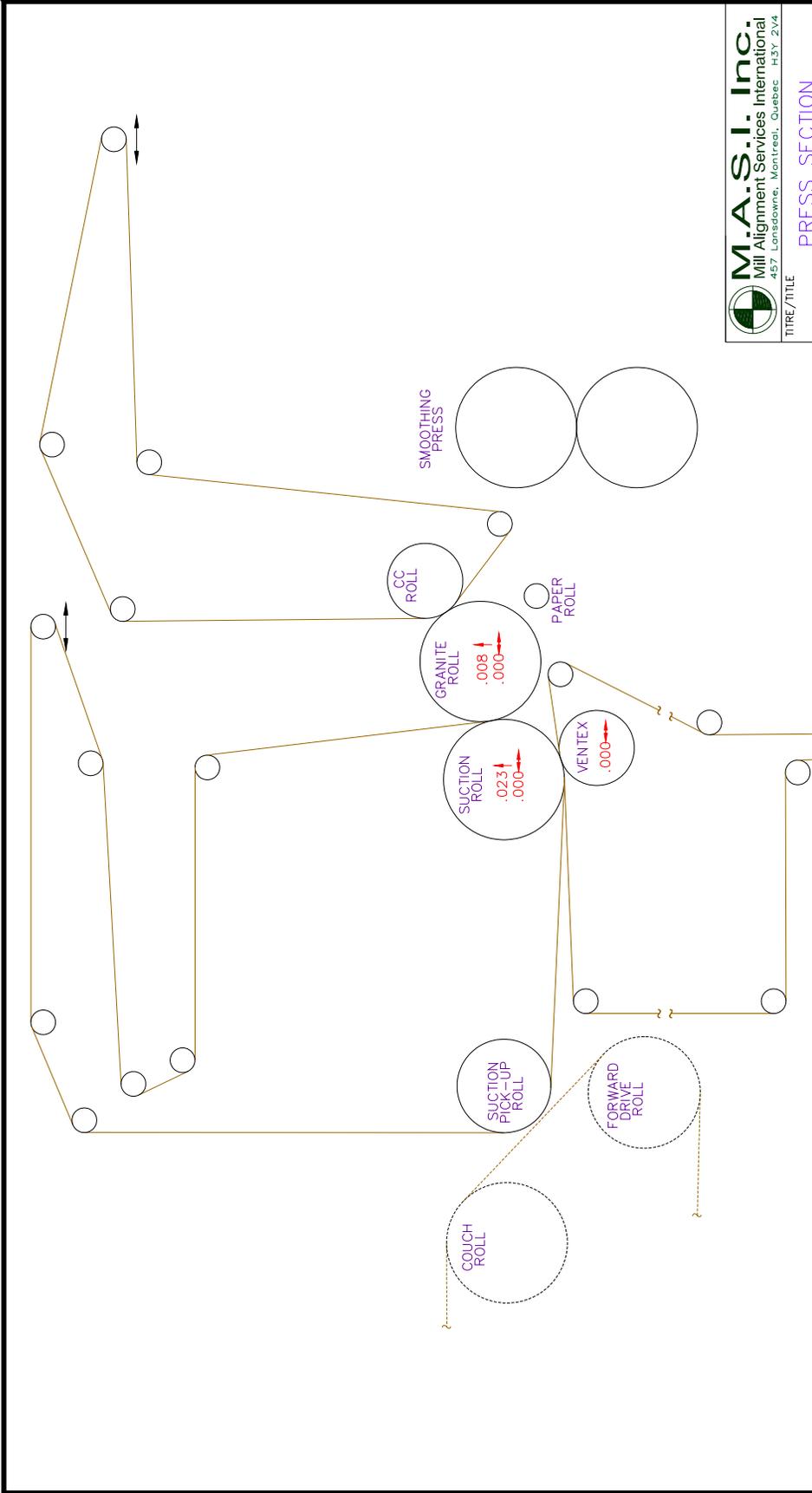
NOTES: (1) NO SCALE INTENDED.
 (2) DATA PRECEDED BY "A", "+" OR "-" INDICATES THE MEASURED POINT IS ABOVE (+) OR BELOW (-) THE DATUM (±.000).
 (3) DATA IN GREEN INDICATES THE ALIGNMENT OF COMPONENTS AFTER ADJUSTMENT.
 (4) FOR CLARITY, THE DANDY ROLL HAS BEEN REMOVED



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TITRE / TITLE	WIRE SECTION	
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CLIENT/CUSTOMER	COMPANY MONTREAL, QUEBEC	
DATE		
REVISION	00	0000-5

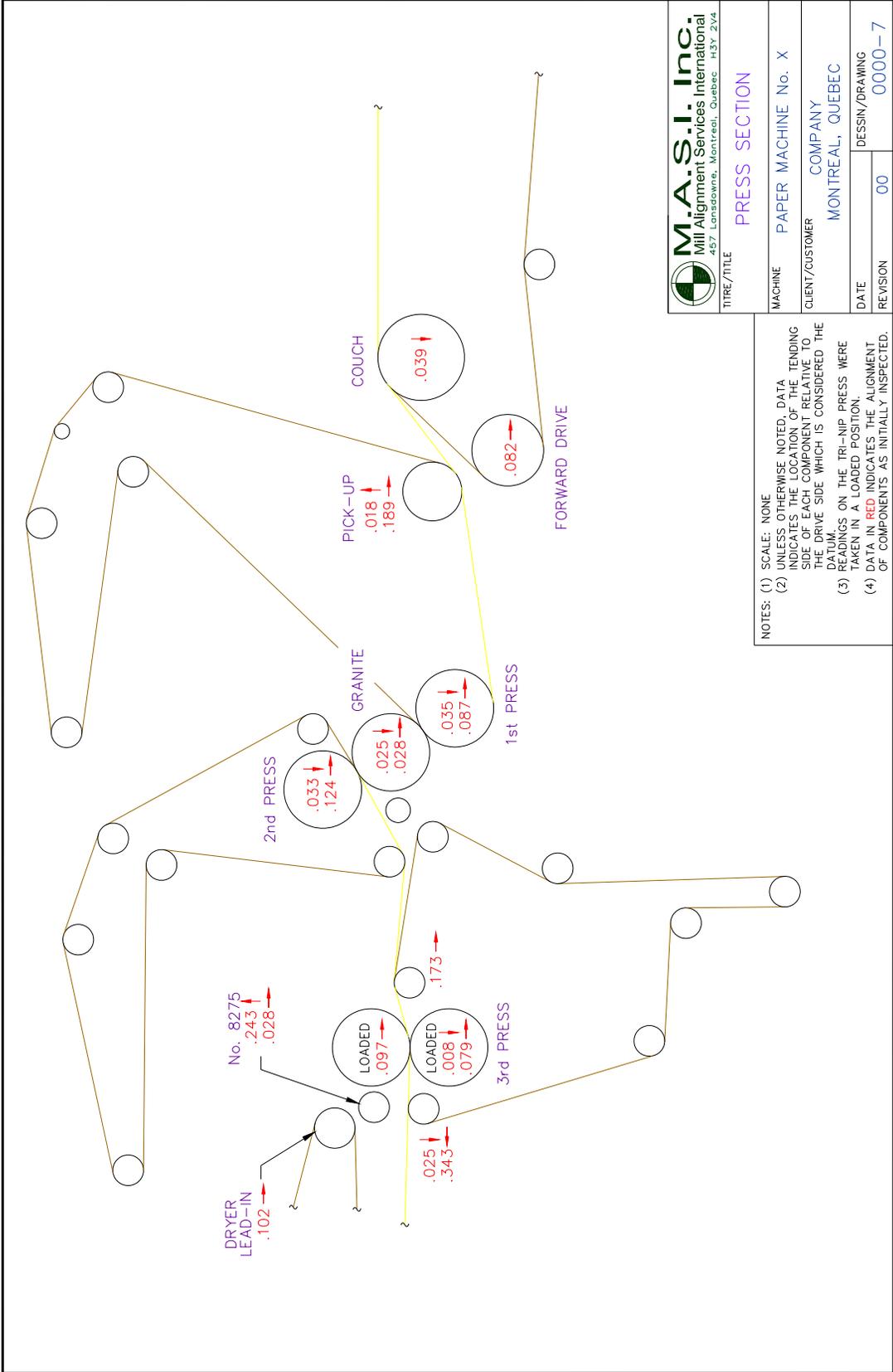
- NOTES: (1) SCALE: NONE
 (2) UNLESS OTHERWISE NOTED, DATA INDICATES THE LOCATION OF THE TENDING SIDE OF EACH COMPONENT RELATIVE TO THE DRIVE SIDE WHICH IS CONSIDERED THE DATUM.
 (5) DATA IN RED INDICATES THE ALIGNMENT OF COMPONENTS AS INITIALLY INSPECTED.
 (6) DATA IN GREEN INDICATES THE ALIGNMENT OF COMPONENTS AFTER ADJUSTMENT.



NOTES: (1) SCALE: NONE
 (2) UNLESS OTHERWISE NOTED, DATA INDICATES THE LOCATION OF THE TENDING SIDE OF EACH COMPONENT RELATIVE TO THE DRIVE SIDE WHICH IS CONSIDERED THE DATUM.
 (3) READINGS ON THE TRI-NIP PRESS WERE TAKEN IN A LOADED POSITION.
 (4) DATA IN RED INDICATES THE ALIGNMENT OF COMPONENTS AS INITIALLY INSPECTED.

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TITRE / TITLE		PRESS SECTION	
MACHINE	PAPER MACHINE No. X	CLIENT/CUSTOMER	COMPANY
DATE		REVISION	00
		DESSIN/DRAWING	0000-6



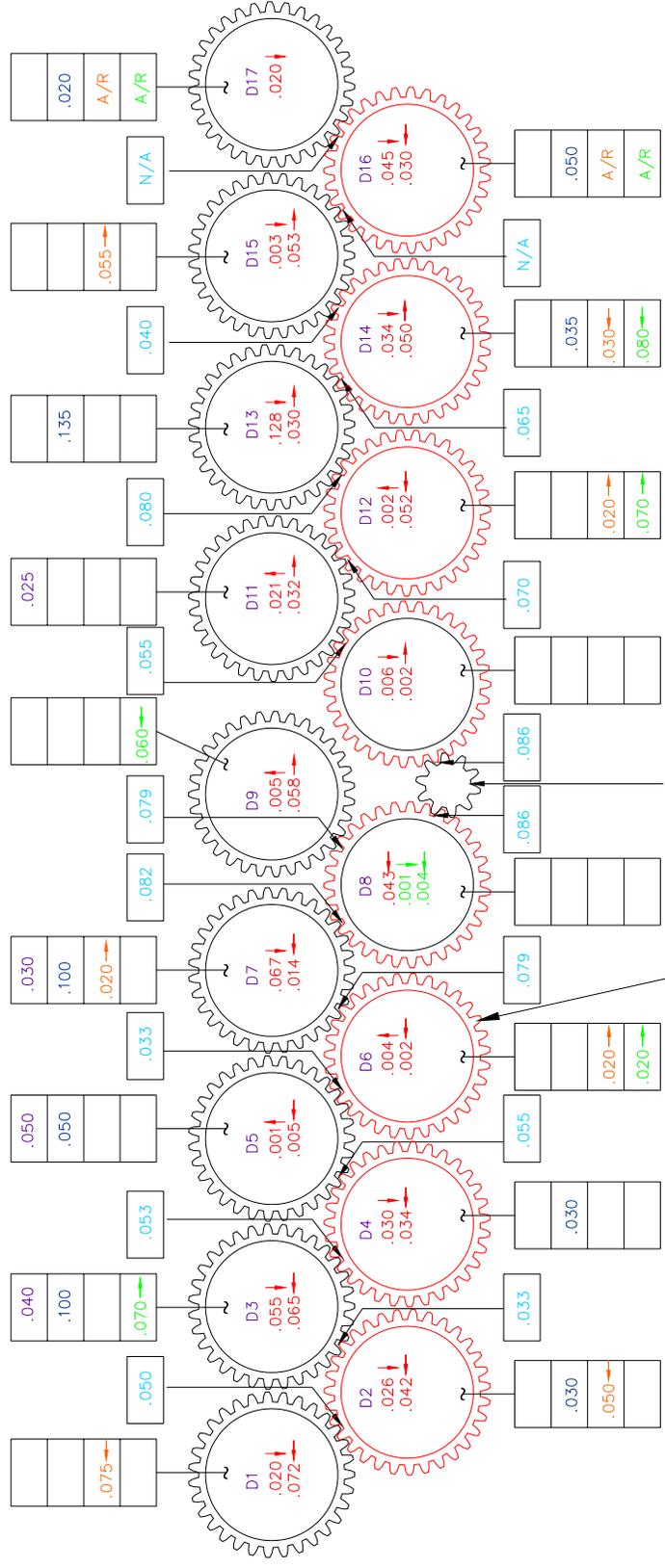
NOTES: (1) SCALE: NONE
 (2) UNLESS OTHERWISE NOTED, DATA INDICATES THE LOCATION OF THE TENDING SIDE OF EACH COMPONENT RELATIVE TO THE DRIVE SIDE WHICH IS CONSIDERED THE DATUM.
 (3) READINGS ON THE TRI-NIP PRESS WERE TAKEN IN A LOADED POSITION.
 (4) DATA IN RED INDICATES THE ALIGNMENT OF COMPONENTS AS INITIALLY INSPECTED.

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TITLE/TITLE		PRESS SECTION	
MACHINE	PAPER MACHINE No. X	CLIENT/CUSTOMER	COMPANY
DATE		REVISION	00
		DESSIN/DRAWING	0000-7

← PRESS SECTION

SECOND DRYER SECTION →



- G.B. "GEAR BACKLASH" MEASURE (WITH GEAR WEAR INCLUDED), TYP.
- SHIMS TO BE INSERTED ON DRIVE SIDE
- SHIMS TO BE INSERTED ON TENDING SIDE
- SLIDE ADJUSTMENT FOR ALIGNMENT ON DRIVE SIDE
- SLIDE ADJUSTMENT FOR ALIGNMENT OF TENDING SIDE
- AS REQUIRED

PINION GEAR
NYLON GEARS (RED TYP.)



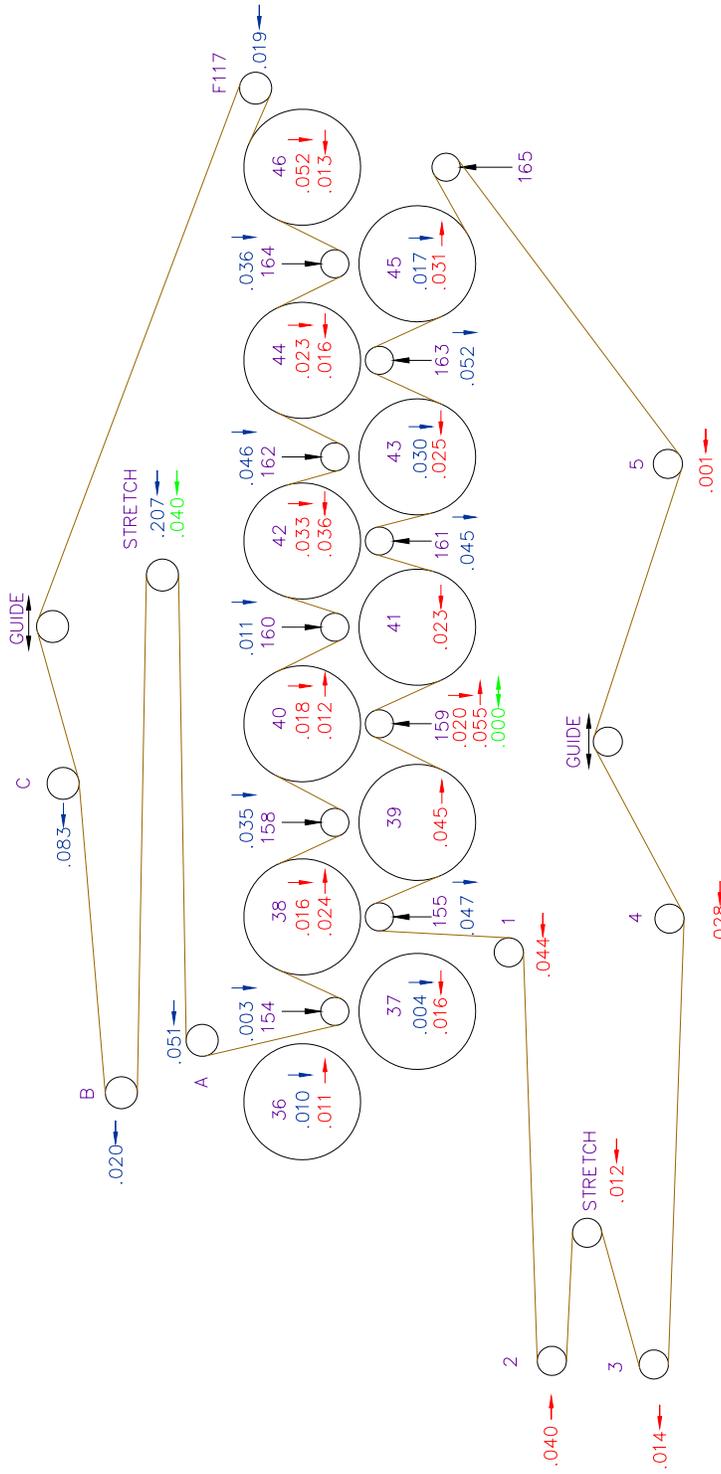
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CLIENT/CUSTOMER	COMPANY MONTREAL, QUEBEC
DATE	DESSIN/DRAWING
REVISION	00 0000-8

NOTES: (1) SCALE: NONE
 (2) UNLESS OTHERWISE NOTED, DATA INDICATES THE LOCATION OF THE TENDING SIDE OF EACH COMPONENT RELATIVE TO THE DRIVE SIDE WHICH IS CONSIDERED THE DATA IN RED. INDICATES THE ALIGNMENT OF COMPONENTS AS INSPECTED.
 (3) DATA IN RED INDICATES THE ALIGNMENT OF COMPONENTS AS INSPECTED.
 (4) DATA IN GREEN INDICATES THE ALIGNMENT OF COMPONENTS AFTER ADJUSTMENT.

A/R

CALENDER & REEL

COATER

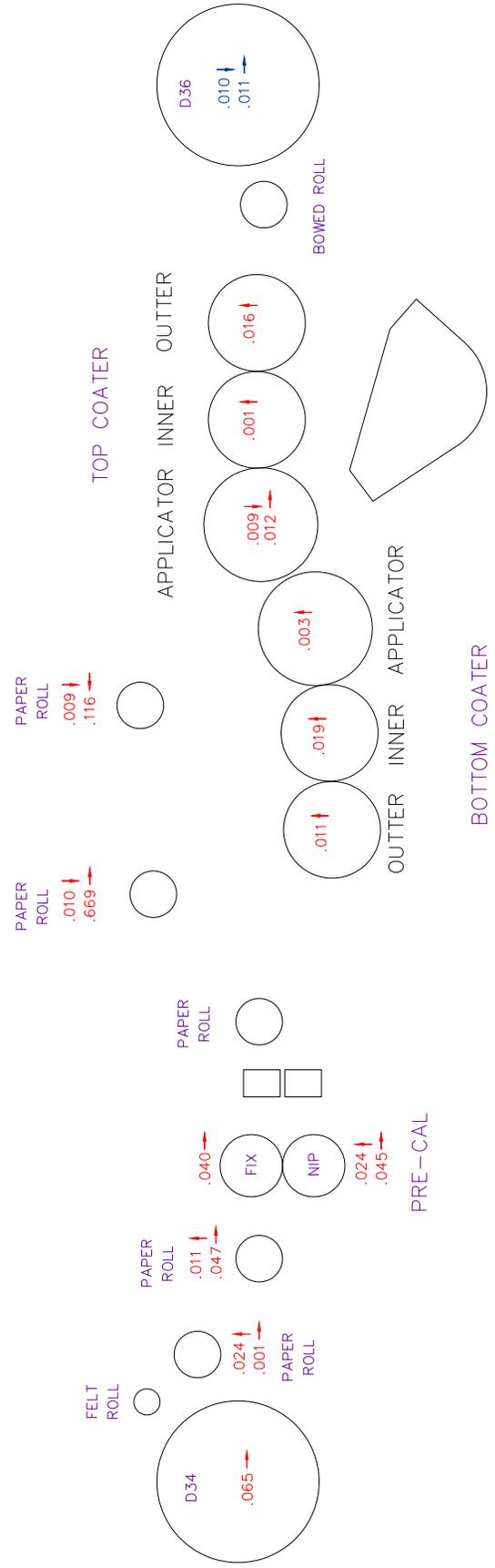


 M.A.S.I. Inc. Mill Alignment Services International 457 Lansdowne, Montreal, Quebec H3Y 2V4	FOURTH DRYER SECTION	
	TITRE/TITLE	
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CLIENT/CUSTOMER	COMPANY	
	MONTREAL, QUEBEC	
DATE	DESSIN/DRAWING	
REVISION	00	0000-9

NOTES: (1) SCALE: NONE
 (2) UNLESS OTHERWISE NOTED, DATA INDICATES THE LOCATION OF THE TENDING SIDE OF EACH COMPONENT RELATIVE TO THE DRIVE SIDE WHICH IS CONSIDERED THE DATUM.
 (3) DATA IN RED INDICATES THE ALIGNMENT OF COMPONENTS AS INITIALLY INSPECTED.
 (4) DATA IN GREEN INDICATES THE ALIGNMENT OF COMPONENTS AFTER ALIGNMENT.
 (5) DATA IN BLUE INDICATES THE ALIGNMENT OF COMPONENTS AS INITIALLY INSPECTED ON JULY 17, 2001.

TO AFTER DRYERS

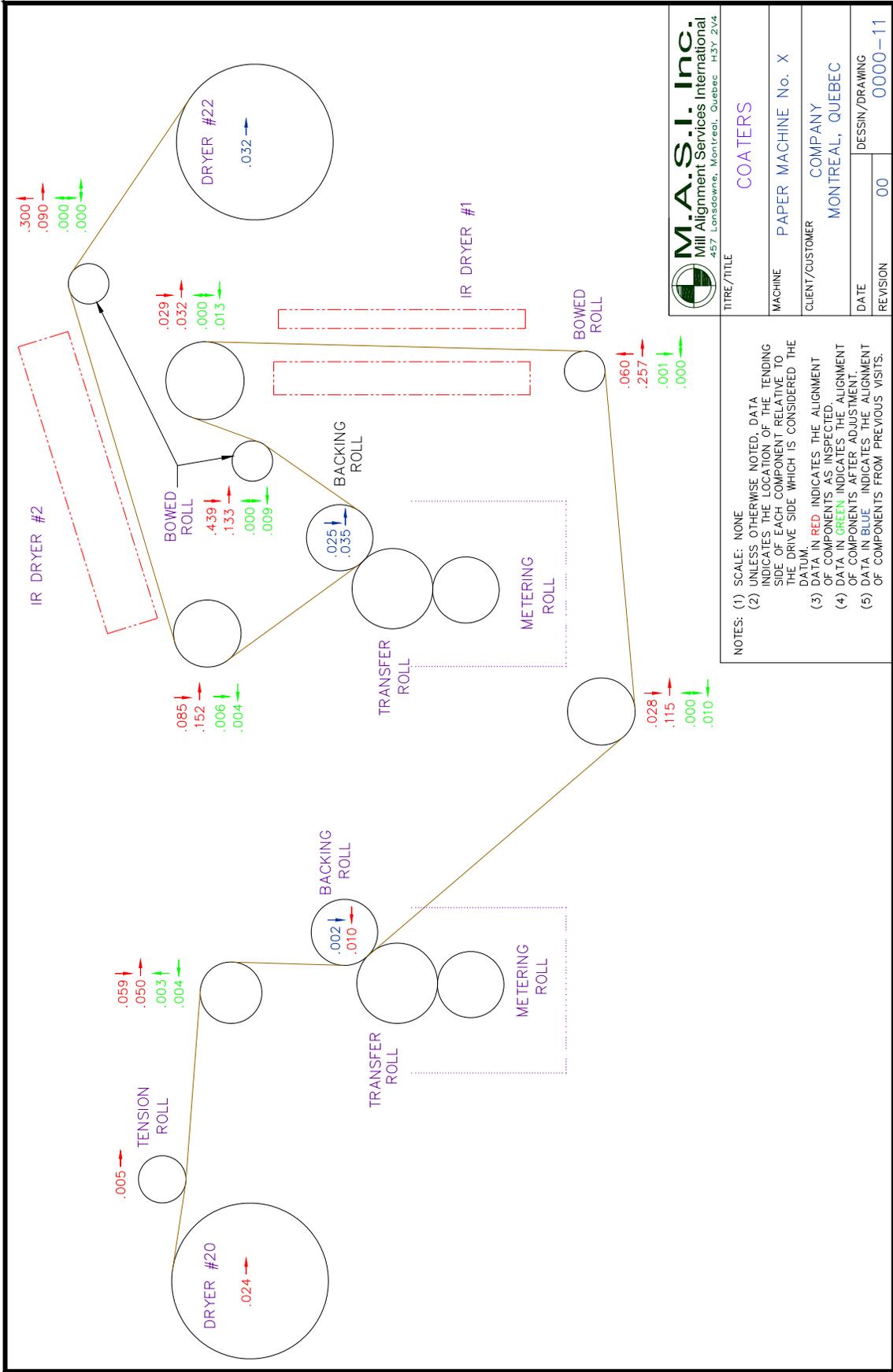
TO MAIN DRYERS



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PRE-CALENDER & COATER

TITRE/TITLE	MACHINE	PAPER MACHINE NO. X
	CLIENT/CUSTOMER	COMPANY
		MONTREAL, QUEBEC
DATE	DESSIN/DRAWING	
REVISION	00	0000-10

NOTES: (1) SCALE: NONE
 (2) UNLESS OTHERWISE NOTED, DATA INDICATES THE ALIGNMENT OF COMPONENTS AS INITIALLY INSPECTED ON SEPT. 3, 2001.
 (3) DATA IN RED INDICATES THE ALIGNMENT OF COMPONENTS AS INITIALLY INSPECTED.
 (4) DATA IN BLUE INDICATES THE ALIGNMENT OF COMPONENTS AS INITIALLY INSPECTED ON SEPT. 3, 2001.



TITRE/TITLE	COATERS		
MACHINE	PAPER MACHINE No. X		
CLIENT/CUSTOMER	COMPANY		
DATE	MONTREAL, QUEBEC		
REVISION	00	DESSIN/DRAWING	0000-11

NOTES: (1) SCALE: NONE
 (2) UNLESS OTHERWISE NOTED, DATA INDICATES THE LOCATION OF THE TENDING SIDE OF EACH COMPONENT RELATIVE TO THE DRIVE SIDE WHICH IS CONSIDERED THE DATUM.
 (3) DATA IN RED INDICATES THE ALIGNMENT OF COMPONENTS AS INSPECTED.
 (4) DATA IN GREEN INDICATES THE ALIGNMENT OF COMPONENTS AFTER ADJUSTMENT.
 (5) DATA IN BLUE INDICATES THE ALIGNMENT OF COMPONENTS FROM PREVIOUS VISITS.

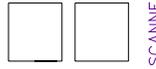
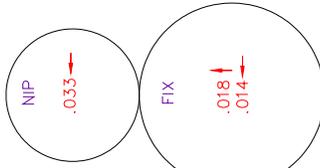
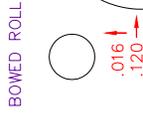
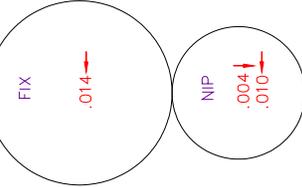
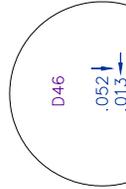
TO AFTER DRYERS

TO REEL

SNC 1

SNC 2

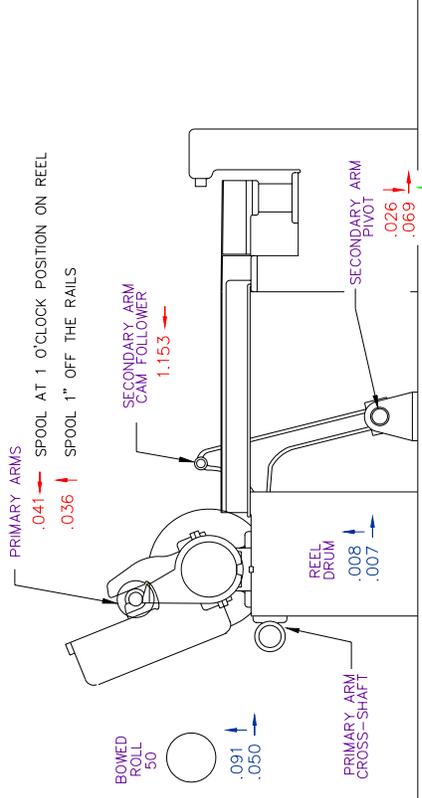
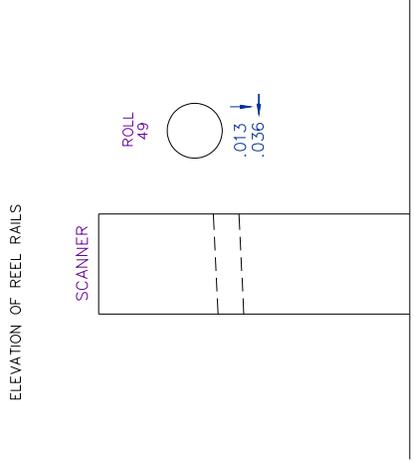
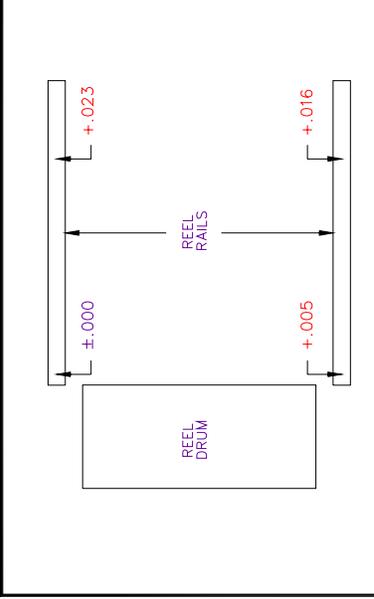
F117



NOTES: (1) SCALE: NONE
 (2) UNLESS OTHERWISE NOTED, DATA INDICATES THE LOCATION OF THE TENDING SIDE OF EACH COMPONENT RELATIVE TO THE DRIVE SIDE WHICH IS CONSIDERED THE DATUM
 (3) DATA IN RED INDICATES THE ALIGNMENT OF COMPONENTS AS INITIALLY INSPECTED.
 (4) DATA IN BLUE INDICATES THE ALIGNMENT OF COMPONENTS AS INITIALLY INSPECTED ON SEPT. 3, 2001.



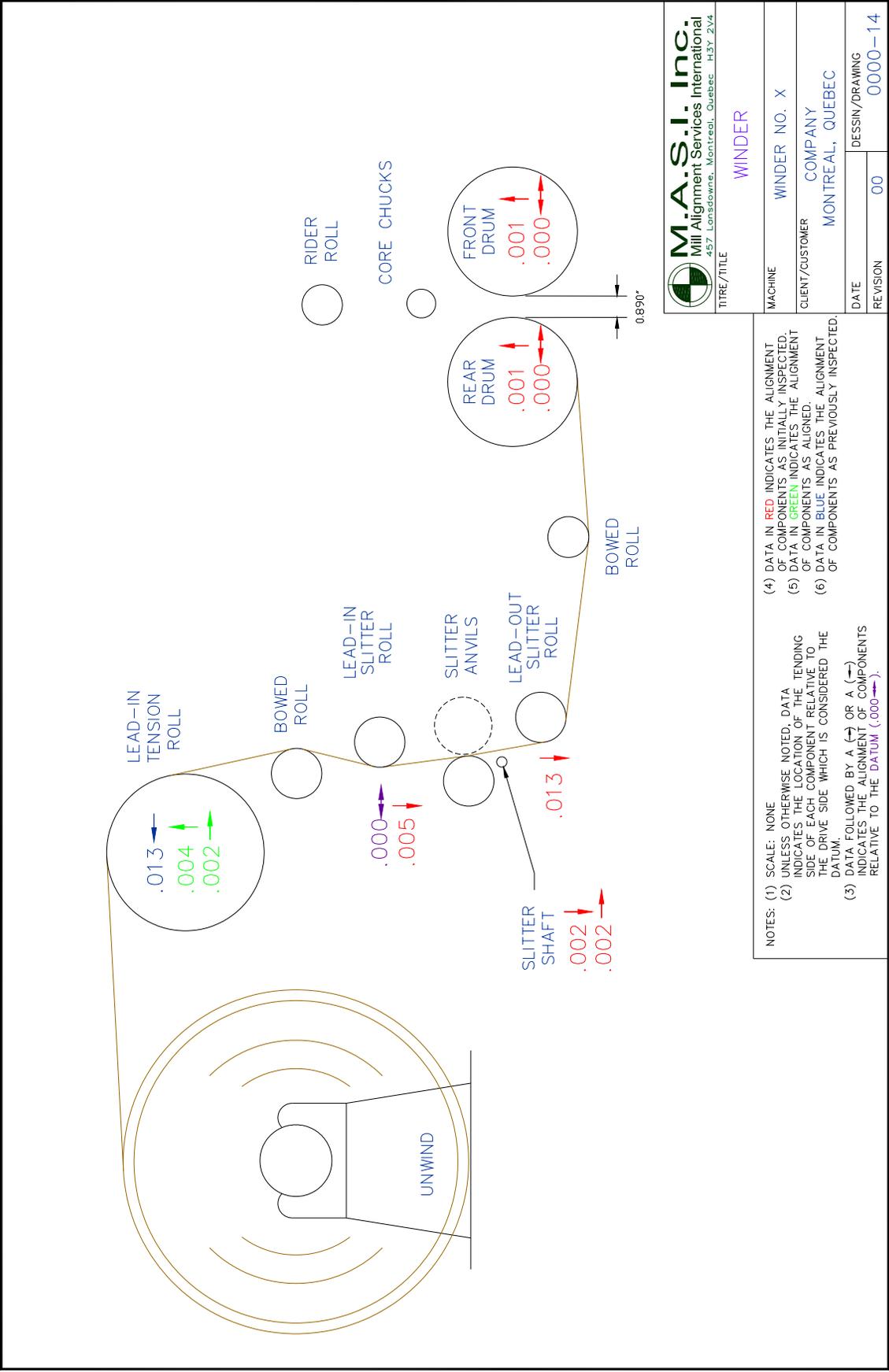
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MACHINE	PAPER MACHINE NO. X	CLIENT/CUSTOMER	COMPANY
			MONTREAL, QUEBEC
DATE		DESSIN/DRAWING	0000-12
REVISION	00		



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TITRE/TITLE	REEL
MACHINE	PAPER MACHINE No. X
CLIENT/CUSTOMER	COMPANY MONTREAL, QUEBEC
DATE	DESSIN/DRAWING
REVISION	00 0000-13

NOTES: (1) NO SCALE INTENDED.
 (2) UNLESS OTHERWISE NOTED, DATA INDICATES THE ALIGNMENT OF COMPONENTS AS INITIALLY INSPECTED.
 (3) DATA PRECEDED BY A "+", "OR A "-" INDICATES THE LOCATION OF THE TENDING SIDE OF EACH COMPONENT RELATIVE TO THE DRIVE SIDE WHICH IS CONSIDERED THE DATUM.
 (4) DATA IN RED INDICATES THE ALIGNMENT OF COMPONENTS AS INITIALLY INSPECTED.
 (5) DATA IN GREEN INDICATES THE ALIGNMENT OF COMPONENTS AS ALIGNED.
 (6) DATA IN BLUE INDICATES THE ALIGNMENT OF COMPONENTS AS PREVIOUSLY INSPECTED.
 (7) DATA PRECEDED BY A "+", "OR A "-" INDICATES THE MEASURED POINT IS ABOVE (+) OR BELOW (-) THE DATUM (±.000).



NOTES: (1) SCALE: NONE
 (2) UNLESS OTHERWISE NOTED, DATA INDICATES THE LOCATION OF THE TENDING SIDE OF EACH COMPONENT RELATIVE TO THE DRIVE SIDE WHICH IS CONSIDERED THE DATUM.
 (3) DATA FOLLOWED BY A (←) OR A (→) INDICATES THE ALIGNMENT OF COMPONENTS RELATIVE TO THE DATUM (.000 ↔).

(4) DATA IN RED INDICATES THE ALIGNMENT OF COMPONENTS AS INITIALLY INSPECTED.
 (5) DATA IN GREEN INDICATES THE ALIGNMENT OF COMPONENTS AS ALIGNED.
 (6) DATA IN BLUE INDICATES THE ALIGNMENT OF COMPONENTS AS PREVIOUSLY INSPECTED.

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TITRE/TITLE	WINDER
MACHINE	WINDER NO. X
CLIENT/CUSTOMER	COMPANY MONTREAL, QUEBEC
DATE	DESSIN/DRAWING
REVISION	00 0000-14