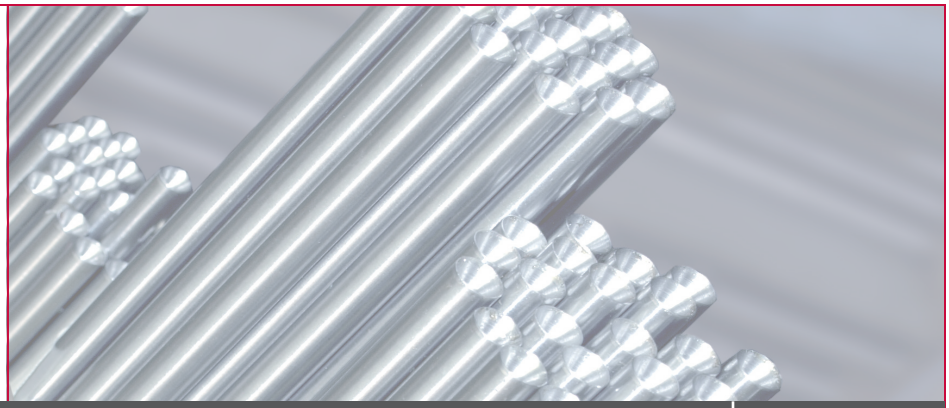


Instruction Manual

ENG

HYDROBAR SPRINT S3

LNS America
4621 East Tech Drive
Cincinnati, Ohio 45245

9.014.31.US

V1.05

TABLE OF CONTENTS

This instruction manual is written for a Sprint S3 with left/front loading system. Drawings and pusher / loading flag control will be opposite for a rear loading system

1. SAFETY INSTRUCTIONS

- Follow all operating and safety instructions of the manufacturer.
- Do not override any of the safety switches or devices either on the lathe or the bar feeder.
- Do not service, perform maintenance or handle any parts of the bar feeder during automatic cycling.
- Do not touch the bar stock while in rotation or any part in motion.
- Before operating the bar feeder and the lathe in automatic cycle, always close the main cover of the bar feeder.
- Spindle reduction tubes must be mounted when running barstock of a smaller diameter than the maximum capacity of the spindle.
- Do not wear any loose fitting clothing near any rotating parts.

Failure to follow the above safety instructions can result in serious personal injury or bar feeder damage.

2. PREPARATION FOR INSTALLATION

It is recommended the bar feeder to be installed by LNS or by one of its representatives.

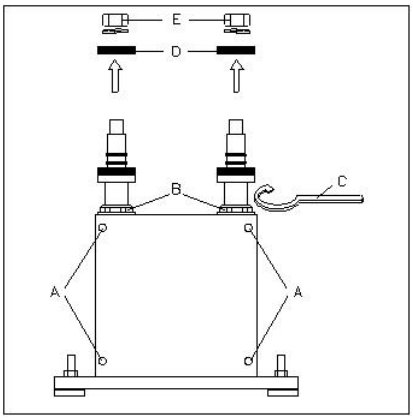
The Sprint S3 will be delivered either in two separate crates or on two pallets.

To prevent serious damage to the bar feeder, thoroughly follow the hoisting instructions provided with the bar feeder. Do not lift the unit other than at the indicated hoisting points.

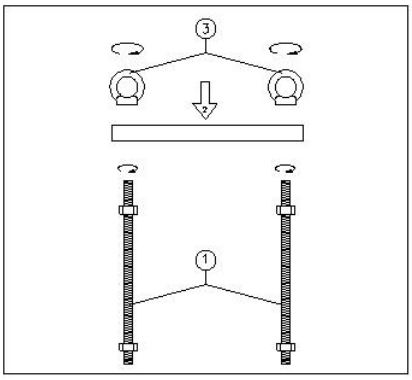
Prior to installation the customer must provide the following :

- Air supply and connections (see point 4)
- Anchoring bolts (see point 6)
- Hydraulic oil (see point 8.1)

3. ASSEMBLING INSTRUCTIONS

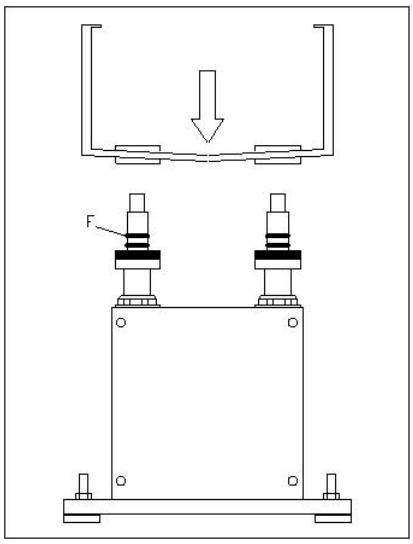


- Open the crate containing the stands and the bar loader (tall rectangular crate).
- Unbolt the loader and other components fastened to the crate for transportation purposes.
- Position the stands behind the lathe in approximate alignment with the spindle (refer to floor plan). Remove nuts (E) and upper seals (D) only.
- Place the 16 leveling pads under the stands and set the leveling screws to allow 3 mm (1/8") gap between the top of the leveling pads and the bottom of the base plate (refer to point 6). Level the stands with the leveling screws maintaining equal pressure on all leveling screws.
- Loosen the 8 set screws (A) located on the side of the 2 stands. Using the provided spanner wrench (C) raise or lower the threaded columns by rotating the lock nuts (B) evenly. Adjust so that the lower seals (lower half of D) are located at 230 mm (9") from the centerline of the spindle.

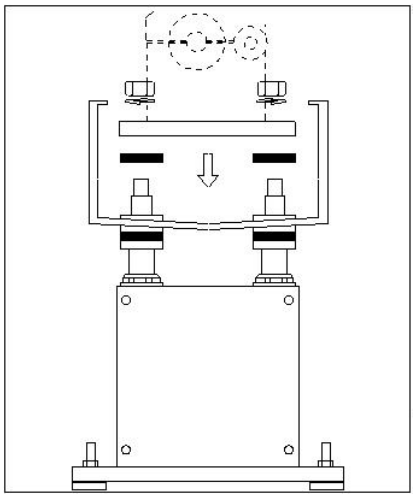


- Open the long crate by removing the top panel. Remove the pins of the hinges on the bar feeder main cover. Carefully remove the main cover of the bar feeder and take out of crate by hand.
- Remove the 4 screws holding the main body to the bottom of the crate and located inside the main body. Assemble the provided hoisting kit :

  1: the threaded rods (1) must be mounted in the lifting plate located in the center of the main body.
  2: install the rods connecting plate (2)
  3: lock plate with eyed lock nuts (3)



- Carefully raise the main body of the Sprint out of the crate. The lower part of the body will remain in the crate.
- Remove lower part out of the crate and carefully lower it on top of the stands verifying that all O'ring (F) remain seated in their groves.
- Install the 4 upper seals (D) inside the lower part of the body..
- Lower the main body into the lower part of the body.
- Secure with nuts (E) using the provided hexagonal tube wrench.



4. AIR REQUIREMENTS AND CONNECTIONS

Air pressure is necessary for installation to operate the bar feeder. A minimum pressure of 5 bar (75 psi) is required. Maximum pressure : 6 bar (90 psi).

Air must be clean and dry. The Sprint is equipped with a filtering device to provide maximum air cleaning (see point 17.1).

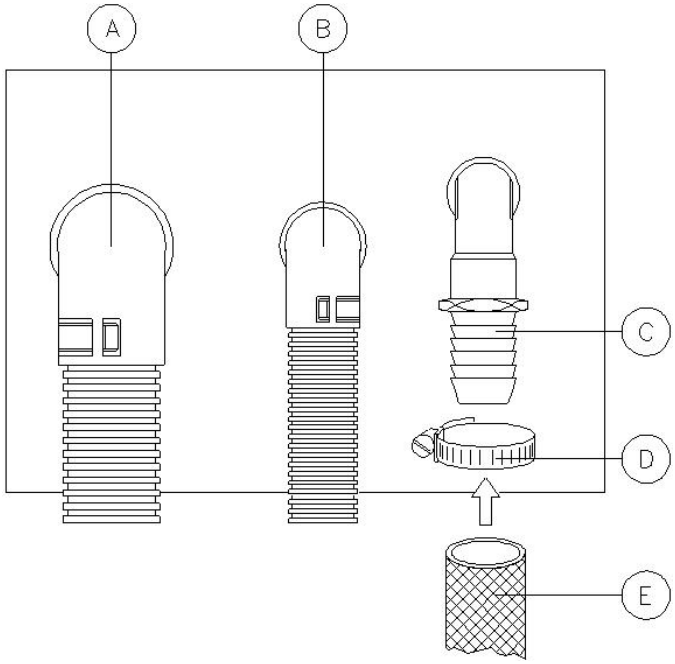
1/2" standard air hose must be provided by the customer.

Connection :

The connection piece (C) islocated at the rear of the barfeeder near the support platefor electrical connection (A) for junction box and the hydraulic pump (B).

With collar (D) secure hose (E) tightly.

The air hose must be connected and air present before final alignment of the bar feeder.



Air consumption :

- Production cycle : 9 l / min
- Loading cycle : 20 l

5. ALIGNMENT

- To obtain optimum rpm performance, position the front of the bar feeder as close as possible from the rear of the spindle.
- Align the centerline of the bar feeder with the centerline of the spindle by adjusting the height with the nuts (B, see point 3) and sideways by moving the front and rear stands.
- The alignment can be done by using either a nylon string or an optical unit.

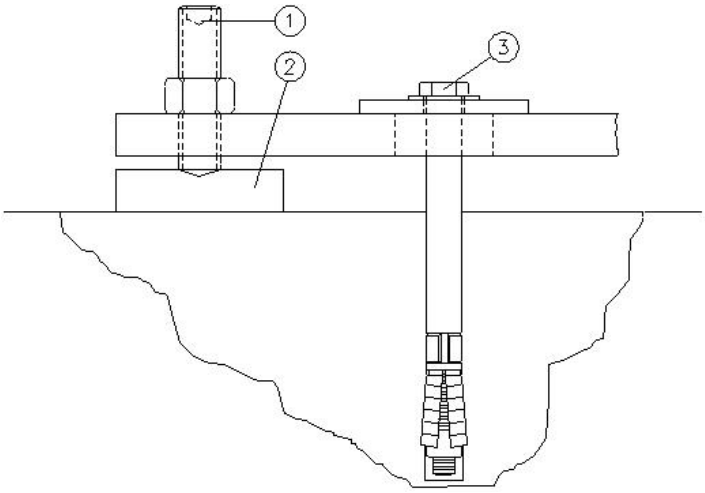
Prior to aligning the bar feeder, the lathe must be leveled.

IMPORTANT : To obtain optimum rpm performance, the bar feeder must be ccurately aligned. Should the bar feeder not be aligned properly, the bar stock guidance will be affected and vibrations will result.

6. ANCHORING

After alignment, to secure the bar feeder, it is strongly recommended to anchor the unit to the floor by using eight M10 x 120 mm (1/2" x 5") wedge type anchors.

Both front and rear stands as well as the loader must be anchored.



1 : Leveling screw

2 : Leveling pad

3 : Anchor bolt

After the bar feeder has been lagged down, the alignment must be checked and eventually corrected. During anchoring, the stands may have moved and mis-aligned the bar feeder.

Lock the columns in position with set screws (A, see point 3).

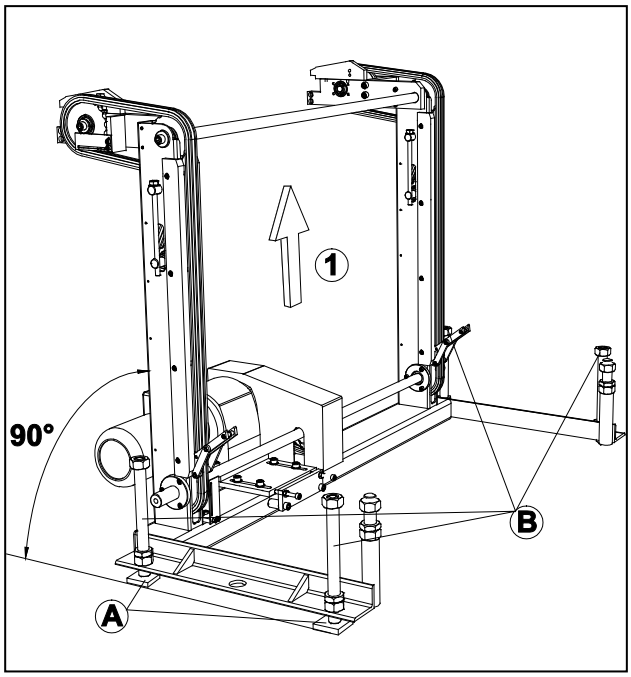
Once the bar feeder is secured, the bar loader must be mounted (see point 7).

7. ASSEMBLING

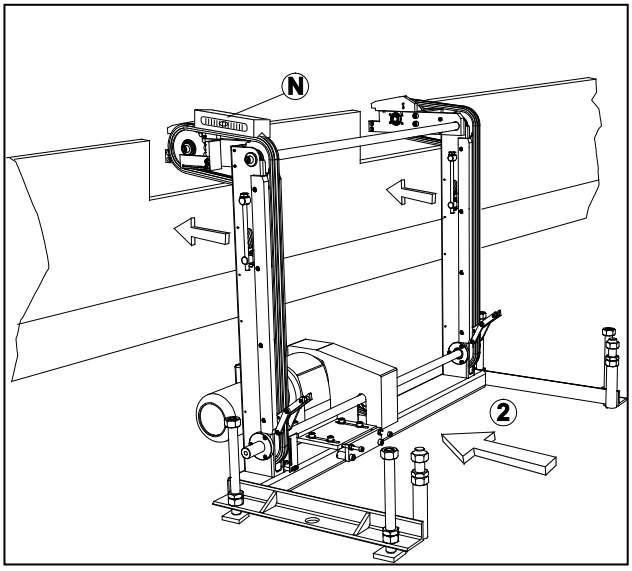
7.1. LOADER ASSEMBLING

Care must be taken that the bar loader does not topple over.

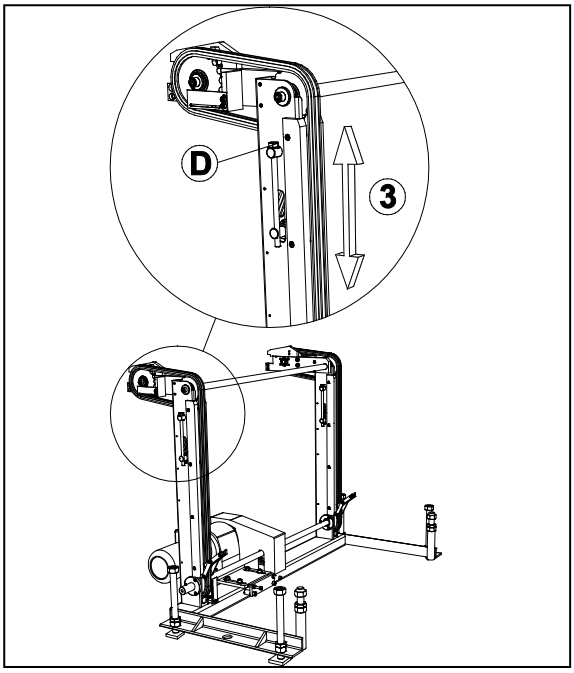
- Remove the bar loader from the crate and position on the side of the Sprintbody.
- Install the 4 leveling pads (A) under the 4 leveling screws (B).
- With screws (B), adjust approximatively the height (1). The bar loader must be perpendicular.
- Remove the protection sheets on side of the Sprint.
- Position (2) the bar loader towards the body of the Sprint.



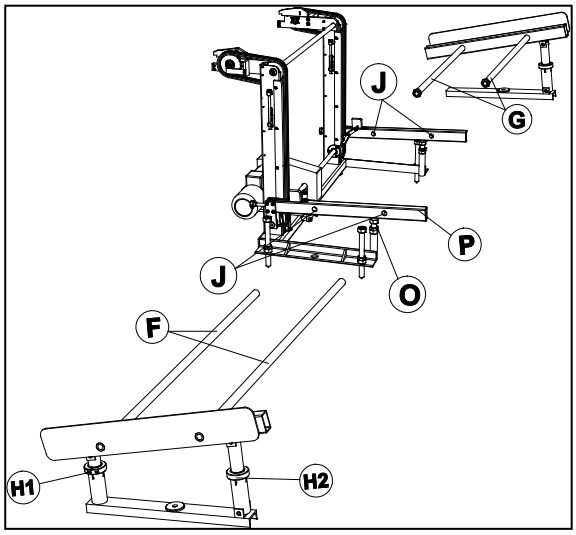
- Adjust height and level (N) in order to allow an easy mounting of the support arms with their respective screws (C).
- Verify the perpendicularity of the loader. Also an equal pressure of the leveling screws on their leveling pads must be present.
- Fasten the small protection sheets on the loader, then the larges.



- Adjust the chain tension (3) with screws (D)

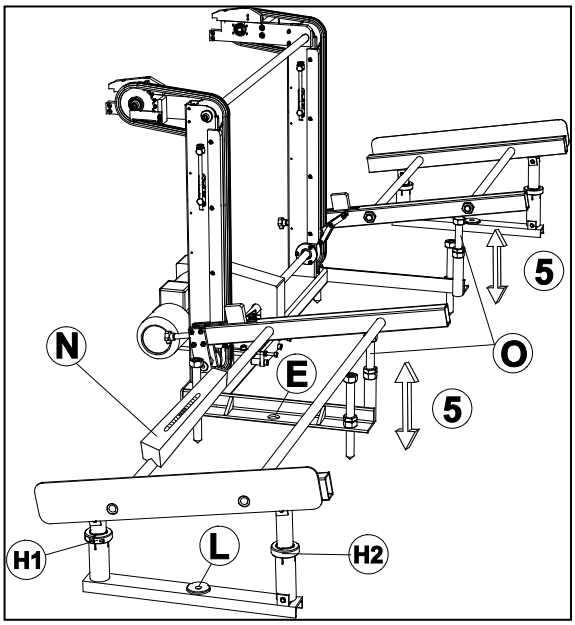


- Loosen the clamps (H1) and (H2)
- Position the lateral supports (G) (F) and pass them through the holes (J) of the supports. Secure with the provided nuts.
- Adjust (5) both supports evenly to desired slant with screws (O).



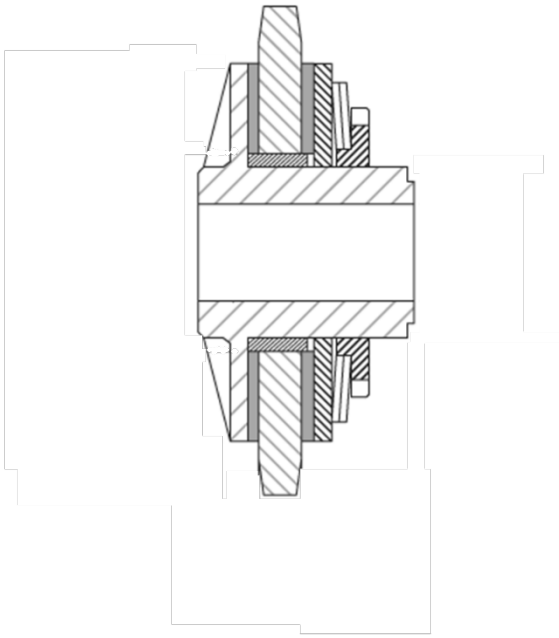
- Adjust the level (N) on both lateral supports, secure with clamps (H1) and (H2).

- Anchor the magazine and the lateral supports to the floor, with anchor bolts through holes (E) and (L).



- If unit does not load a heavy bar, friction clutch located inside chain guard can be adjusted manually by tightening to create more friction on toothed sprocket.

  Cross section of clutch is shown at right.



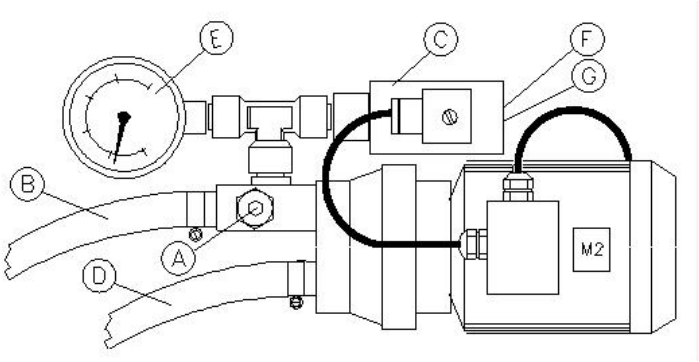
8. HYDRAULICS

The Sprint is equipped with a hydraulic pump to provide oil pressure to the bearing elements. This oil will allow ideal guidance and support of the bar in rotation.

A flow adjusting valve is located inside the body of the Sprint next to the hydraulic pump motor (rear of the bar feeder, see point 9.

Description of components).

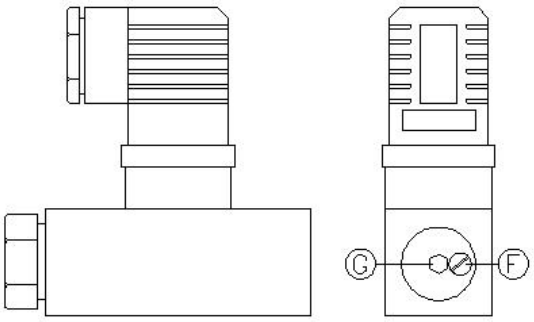
M2: Hydraulic pump and motor.
A: Flow adjustment.
B: Oil return hose (OUT).
C: Pressure switch.
D: Oil supply hose (IN).
E: Pressure gauge
F: Stop screw
G: Switching point adjustment



The switching points may be set even during operation. Proceed as follows :

1. Loosen stop screw (F) with a screwdriver.
2. Adjust switching points by means of a 5 mm Hexagon spanner (G). Depending on the sense of rotation the switching point moves upwards or downwards Clockwise rotation means a higher switching value as originaly set.

   Counter clockwise rotation means a lower switching value as originaly set.
3. Retighten stop screw.



8.1. Hydraulic oil requirements

The Sprint is delivered without oil. 80 liters (22 US gal.) of hydraulic oil must be provided by the customer. Oil must comply with ISO 100 standards.

Oil will be poured inside the lower part of the SPRINT S3.

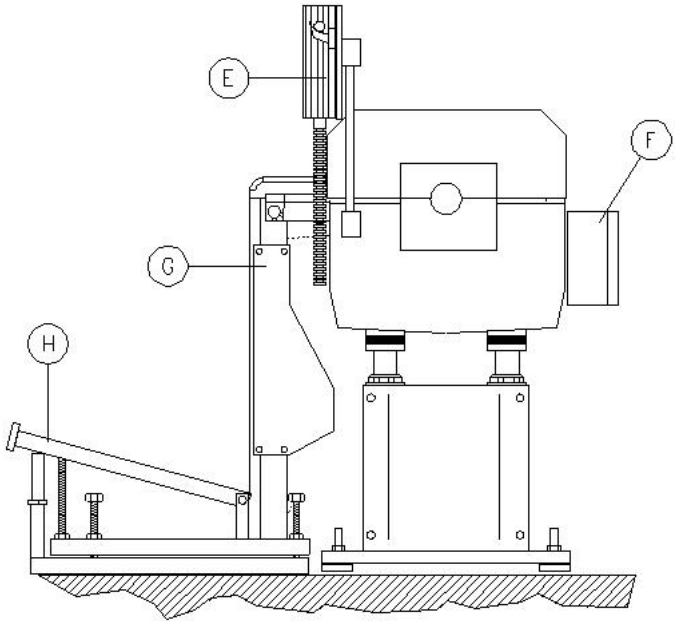
List of suppliers and brand names :

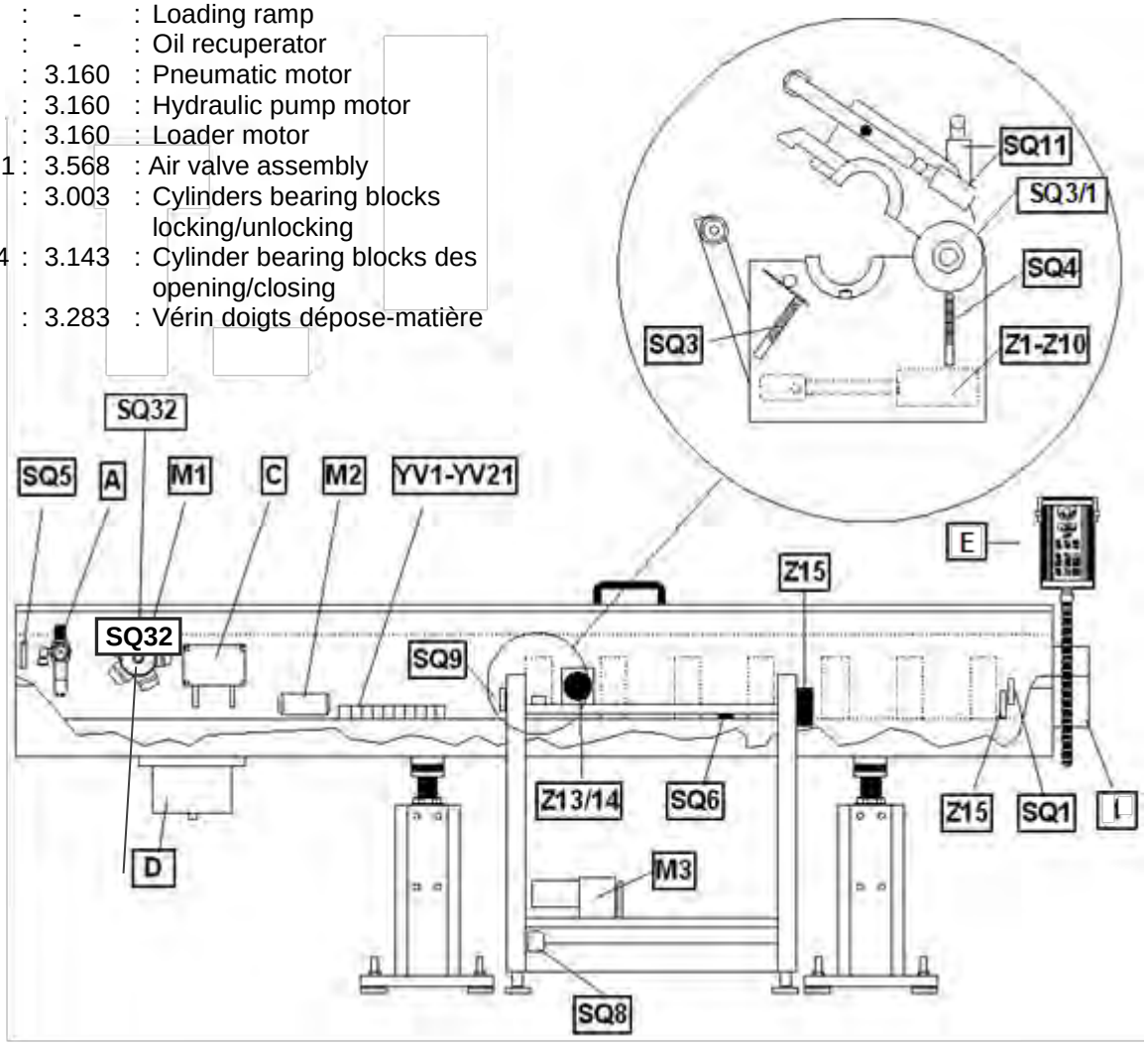
BP	HLP 100	MOTOREX	COREX HLP 100
CASTROL	HYSPIN AWS 100	SHELL	TELLUS 100
ESSO	NUTO 100	STANDARD OIL	HL-100
EXXON	NUTO H-100	TEXACO	RANDO OIL HD 100
GULF	ARMONY AW 100	TOTAL	AZOLLA 100
MOBIL	HEAVY / DTE 27		

These oils are just a few of the suppliers that could be used.

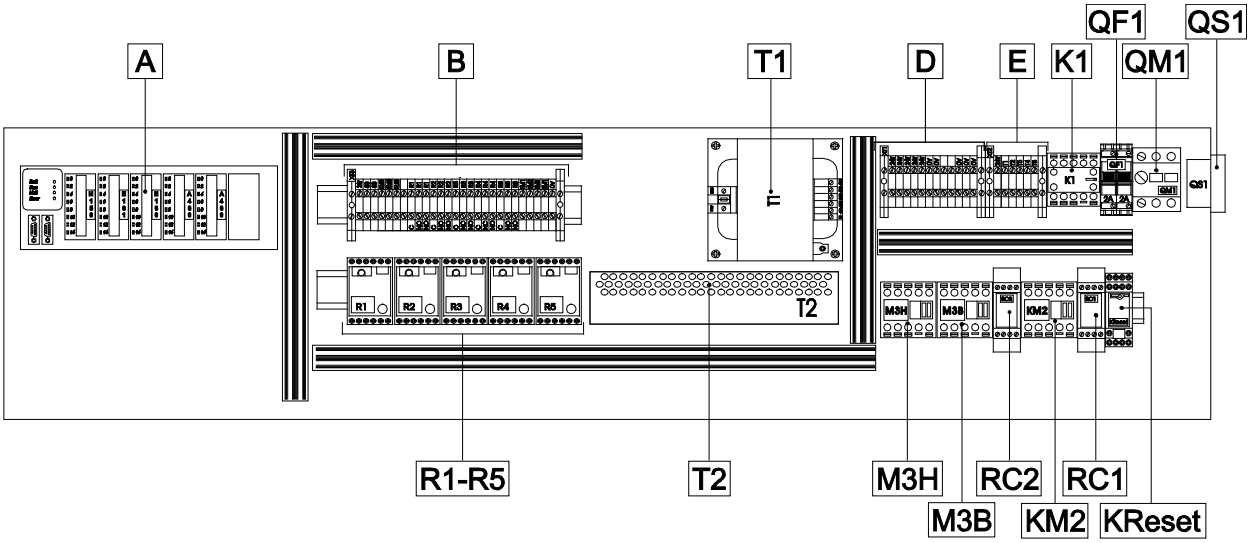
9. DESCRIPTION OF COMPONENTS

A	:	3.192	: Air control unit
SQ5	:	4.393	: Pusher home position prox. switch
SQ8	:	4.393	: Loader down prox. switch
SQ9	:	4.393	: Loader up prox. switch
SQ4	:	4.391	: Bearing blocks closed prox. switch
SQ3	:	4.391	: Bearing blocks locked prox. switch (SQ3/1 : 4.005)
SQ1	:	4.772	: Positioner stop prox. switch
SQ11	:	4.284	: Main cover closed micro - switches (SQ11/1: 4.005)
SQ6	:	4.005	: Dropping fingers switch
SQ32	:	4.005	: Breaking chain
C	:	-	: Connection box
D	:	-	: Hydraulic filter
E	:	4.869	: Remote control station
F	:	-	: Control box
G	:	-	: Loader
H	:	-	: Loading ramp
I	:	-	: Oil recuperator
M1	:	3.160	: Pneumatic motor
M2	:	3.160	: Hydraulic pump motor
M3	:	3.160	: Loader motor
YV1-21	:	3.568	: Air valve assembly
Z1-10	:	3.003	: Cylinders bearing blocks locking/unlocking
Z13/14	:	3.143	: Cylinder bearing blocks des opening/closing
Z19	:	3.283	: Vérin doigts dépose-matière





9.1. ELECTRICAL CONTROL COMPONENTS LAYOUT



Désignation	Article No	Description
A	4.887	Programmable controller PCD3 (PLC)
B	-	Interface terminal blocks (XT3
C	-	Power supply terminal block (XT1)
D	-	Safety terminal blocks (XT2)
K1	4.507	Safety chain control
KReset	4.606	Kreset relay (M2 motor encoder reset)
KM2	4.606	KM2 relay (hydraulic motor M2
M3B	4.606	KM3B relay (bar loader is moving down)
M3H	4.606	KM3H relay (bar loader is moving up)
QF1	4.815	Circuit breaker 2 x 2A
QM1	4.503	Circuit breaker 2.5 to 4 A
QS1	4.380	Main disconnect switch
RC1	4.352	RC1 relay (filtre)
RC2	4.352	RC2 relay (filtre)
R1	4.194	Alarm relay
R2	4.194	Bar feeder loading cycle relay
R3	4.194	End of bar relay
R4	4.194	Headstock release relay
R5	4.194	Headstock release relay
T1	4.769	Transformer with 24 VDC power supply
T2	4.779	24 VDV Power supply 150W

10. ELECTRICAL CONNECTIONS

The necessary conduits and cable for the electrical connections to the lathe are provided.

Always refer to the interface electrical diagram located inside the electrical control box.

The factory voltage connection is indicated on the cover of the electrical control box.

Electrical income power must be checked before turning the power on.

Bar feeder arrangements may need to be changed accordingly.

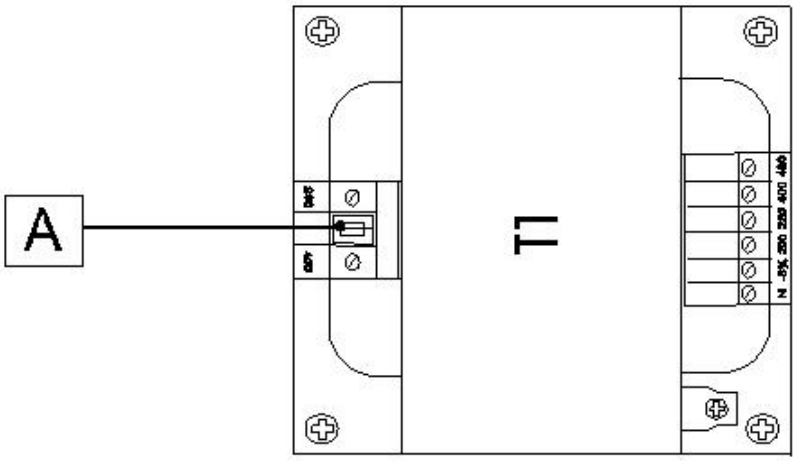
Any damaged components due to mis-connections will not be covered by the factory's warranty.

Should the bar feeder electrical arrangements be changed, the following steps must be taken :

Control box

At the transformer terminal block connect the wire according to the income voltage

A : Fuse (3.15 A)



Electric motors

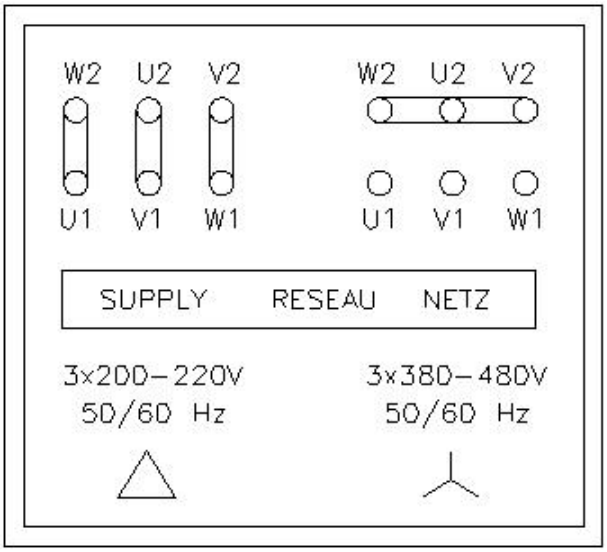
The hydraulic pump motor as well the bar loader motor can be arranged to receive 3x200-220V or 3x380-480V, 50/60 Hz. Refer to the electrical diagram located in the motor connection box.

Hydraulic motor :

200 - 220 V 50/60 Hz 1,07 A
380 - 480 V 50/60 Hz 0,62 A

Bar loader motor :

200 - 220 V 50/60 Hz 1,4 A
380 - 480 V 50/60 Hz 0,8 A

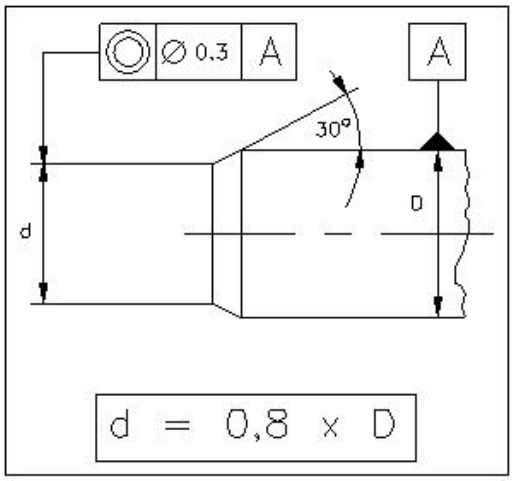


11. BAR STOCK PREPARATION

SOLID BARS

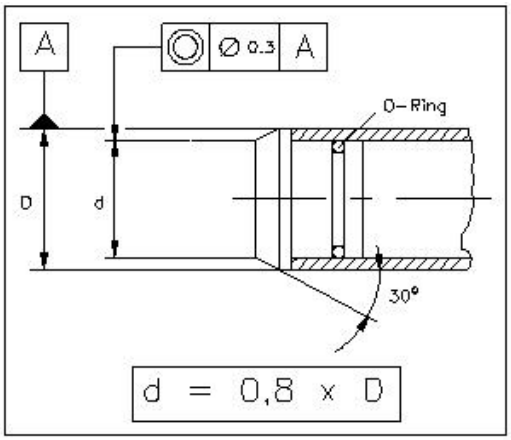
LNS recommends to chamfer the back end of the bar stock with a 30 degrees concentric chamfer (60 degrees included). This will provide a concentric rotation of the pusher and a safe contact bar stock/pusher cone after the bar stock leaves the bar feeder.

The front of the bar stock must be free of burrs to feed smoothly through the clamping system and the spindle of the lathe.



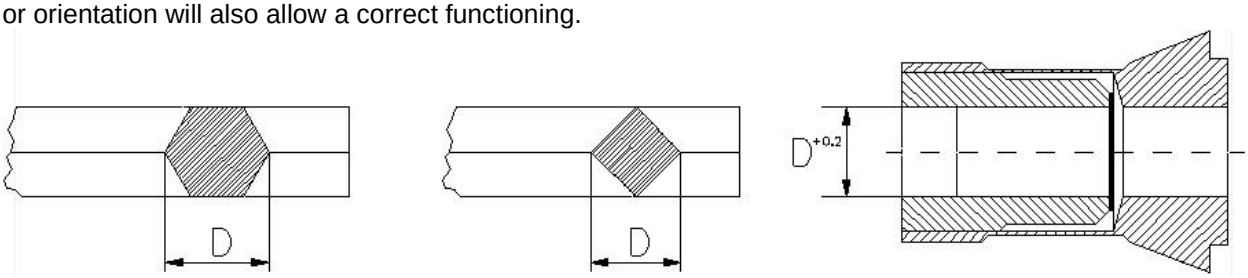
TUBING

To prevent any mixing between the hydraulic oil and the coolant of the lathe, a sealed plug must be mounted at the rear of the tubing.



HEXAGONAL- SQUARE BAR STOCK

To allow the feeding of the material through the profile of the collet, an adapter bushing will be mounted in the collet of the lathe. The inside hole of the adapter must be identical to the profile of the bar stock + 0.2 mm (+ .0078").
When loading a new bar stock, the spindle of the lathe must rotate at low rpm (30 rpm). Spindle inching or orientation will also allow a correct functioning.



IMPORTANT: To improve RPM performance when running profiled bar stock (hex., square), a rotating element (with I.D. = barstock dia. across the corners+0,2mm/+.0078") can be installed in the front outboard support, as well as elongated bearing elements must be mounted. Refer to point 12.2 for installation.

Please contact LNS or one of its representatives for further information.

11.1. BAR STOCK REQUIREMENTS

For optimum results, the bar stock must be straight.

Should the bar stock exceed 0.5 mm/m (.020" / 3Ft) straightness, RPM performance may decrease depending on the material type, length, etc...

Bar stock must be preferably clean to minimize maintenance and free of burrs.

12. DIAMETER CHANGEOVER

For optimum performance, it is recommended to equip the Sprint with the corresponding accessories to each bar stock diameter. These elements are also designed to operate in a certain diameter range. To obtain optimal rpm performance, it is recommended not to exceed 6 mm (.23") gap between the O.D. of the bar stock and the I.D. of the bearing elements. 1 mm (.04") provides ideal guidance.

To order supplies, please use the following ordering numbers.

Ref.(*)	Element	Diameter	Ordering Nr 3m	12'	4m
I	Bearing elements	14 - 81	014.011.253/ + Diameter	014.011.263/ + Diameter	014.011.273/ + Diameter
II	Pusher	13 - 80	014.011.223 / + Diameter		
III	Rotating sleeve	13	014.011.103		
III	Rotating sleeve	18	014.011.113		
III	Rotating sleeve	25	014.011.243		
III	Rotating sleeve	36	014.011.133		
III	Rotating sleeve	50	014.011.143		
IV	Flag	13	GAV - 014.011.513	GAR - 014.011.543	
IV	Flag	18	GAV - 014.011.523	GAR - 014.011.553	
IV	Flag	36	GAV - 014.011.533	GAR - 014.011.563	

(*) Please refer to the chart (point 12.8) to ensure correct part selection.

In addition, a spindle reduction tube (spindle liner) must be mounted in the spindle of the lathe. Its I.D. must be identical to the I.D. of the bearing elements. The bar loader must be adjusted for different bar stock diameters to select one bar stock at a time (see point 12.5).

12.1 PUSHER CHANGEOVER

The pusher will always match the I.D. of the bearing elements - 1 mm (.040").

Procedure:

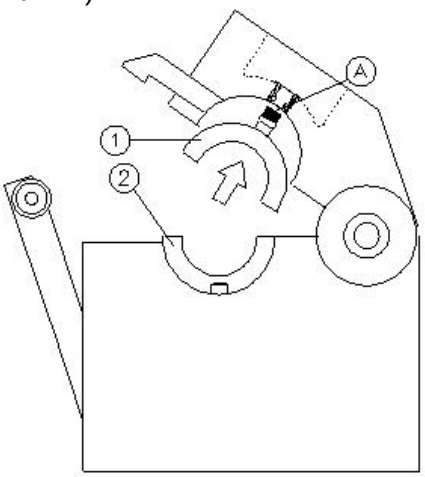
Refer to point 15.2/7, DIAMETER CHANGEOVER

- Manually open the main cover.
- Remove the pusher.
- Change the bearing elements (point 12.2)
- If required, change the rotating sleeve (point 12.3)
- If required, change the flag (point 12.4)
- Install new pusher (verify correct overall length which must correspond to all other pushers).
  Close the main cover.

Refer to point 12. DIAMETER CHANGEOVER

12.1 BEARING ELEMENTS CHANGEOVER

Procedure (Open the bearing blocks, remove the pusher. Refer to point 12.1)

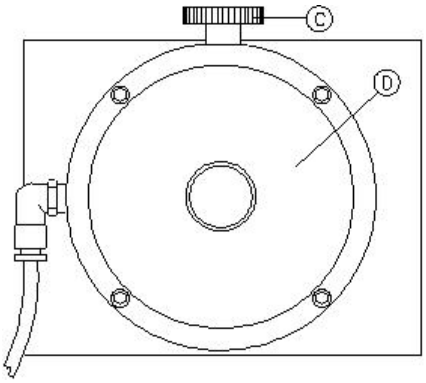


1: Upper half bearing element

The upper elements (1) are secured in the upper half of the bearing blocks by a quick disconnect system (A). To remove them, push down the bearing elements. Install new elements. When installing elongated bearing blocks to run profiled material (hex., square, etc...), a special care must be taken due to the dissimilarity of the bearing elements. Please refer to the indication on each element (note : block #1 is located at the rear of the Sprint S2) (The upper elongated elements are secured with a screw).

2: Lower half bearing element

Using a standard screw driver, pop-out the lower bearing element (2) to extract them from their location.A locating pin will seat the new bearing element into the correct position.



3: Outboard support bearing element

Loosen set screw (C), remove bearing element (D), place new element into the front extended guiding support and secure with set screw (C).

4: Pusher supports bearing element

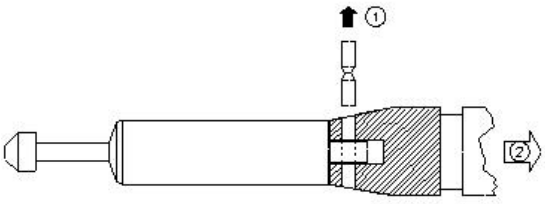
Identical to 3.

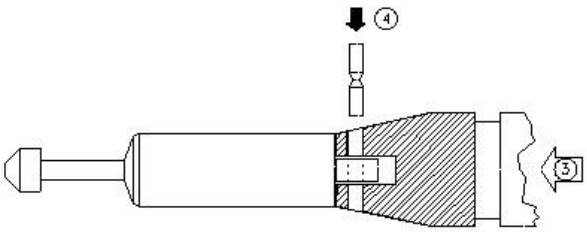
12.3. ROTATING SLEEVE CHANGEOVER

Each rotating sleeve covers a pusher diameter range (refer to chart point 12.8).

Sleeves for dia. 13mm (1/2") to 35 mm (1-3/8")

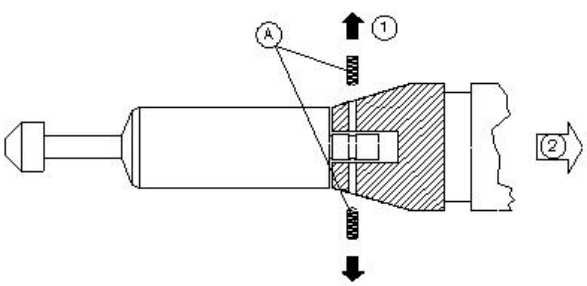
1. Remove lock pin
2. Remove pusher
3. Install new pusher
4. Secure with lock pin

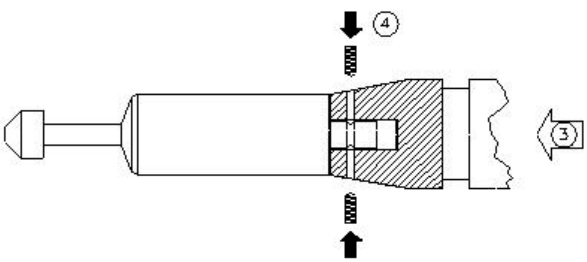




Sleeves for dia. 36mm (1-3/8") to 80 mm (3-1/8")

1. Remove set screws (A)
2. Remove pusher
3. Install new pusher
4. Secure with set screws





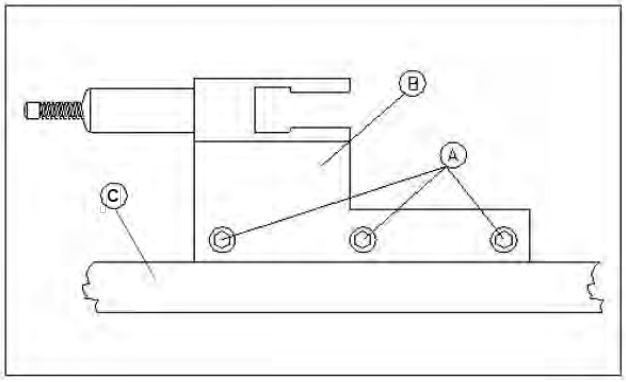
12.4. FLAG CHANGEOVER

Each flag covers a range and can be used for different size of rotating sleeves. The range is indicated on each flag.

Before replacing the flag, remove the pusher and the rotating sleeve.

Unscrew lock screws (A) and remove flag. Select appropriate flag (B) and install on chain. Secure with lock screws (A).

C : Chain guiding rail.



12.5. LOADER ADJUSTMENT

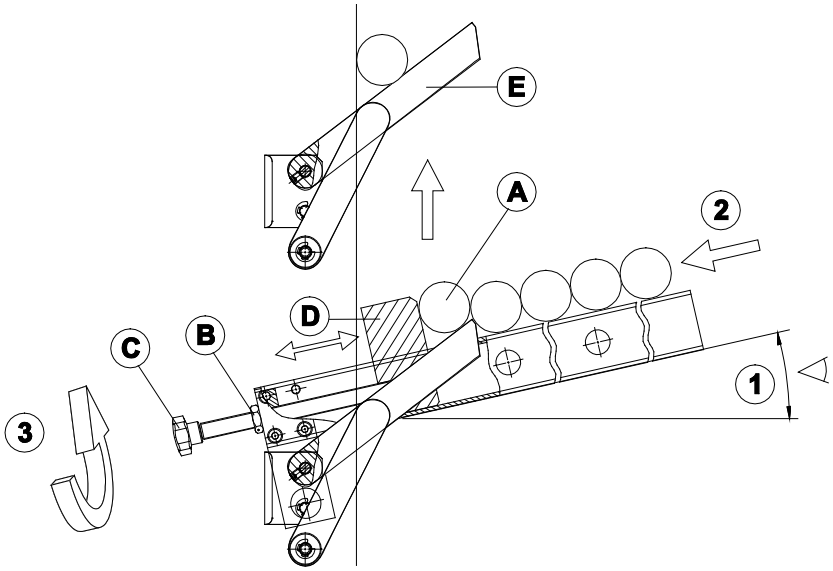
Place three to six bars (same diameter) on the magazine ramp (2).

Adjust slant of the ramp (1) with adjusting screws (refer to point 7.1) so that the bars roll down (2) towards the elevator.

Excessive slant will cause loading problems.

Loosen lock nuts (B) and adjust (3) bar stoppers (D) with knob (C) so that only one bar stock (A) is being selected by the lifting fingers (E).

Secure with lock nuts (B)

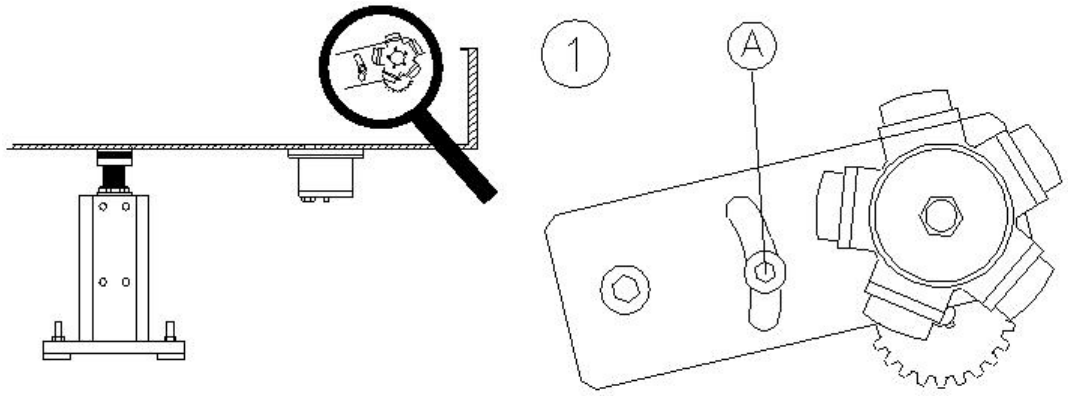


12.6. GEAR RATIOS

The pushing force of the pusher must be adjusted according to the bar stock diameter. The pushing force can be adjusted with the air adjusting valve (refer to 17.2, Pushing force).
For more flexibility and for wider adjusting range, the motor gear ratio can be changed. The gear ratio 1/6 is recommended for bar stock over 58mm (2") diameter.
To prevent small diameter bar stock to bent due to an excessive pushing force, the gear ratio 1/4 (standard ratio) is recommended.
An excessive pushing force could also cause bearing failures (refer to point 12.7).

RATIO	PUSHING FORCE in Newton						PUSHING FORCE in LBS (US)					
	2,5	3 BAR	3,5	4BAR	3,5	5 BAR	31.5	45 PSI	52.5	60 PSI	67.5	75 PSI
1 : 4 (014.08.244)	150	220	280	350	420	480	31.20	45.76	58.24	72.80	87.36	99.84
1 : 6 (014.08.164)	260	360	460	560	660	760	54.08	74.88	95.68	116.48	137.28	158.08

The air motor is located at the rear of the SPRINT S3.



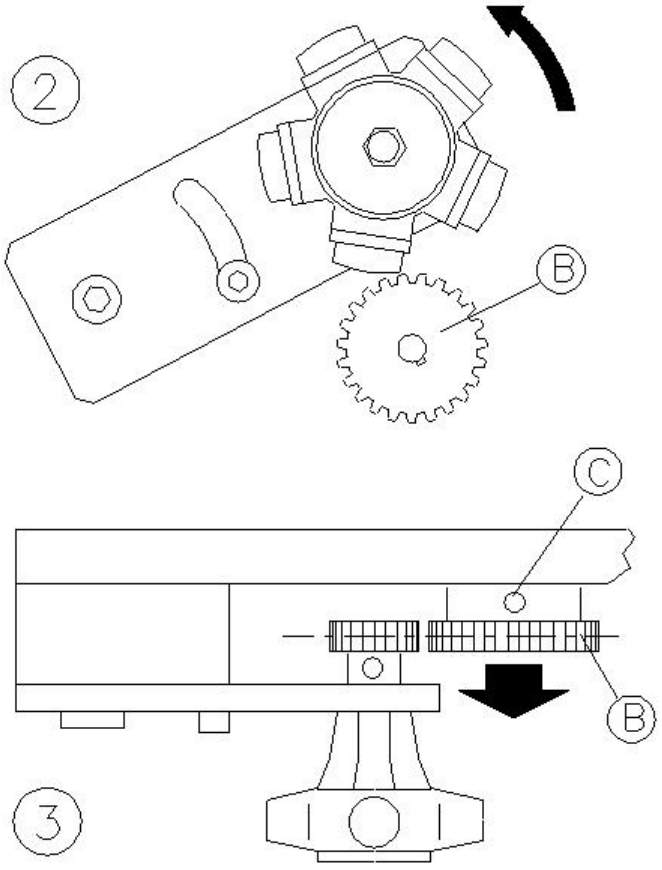
Changing the gear ratios :

1: Loosen the bolt (A).

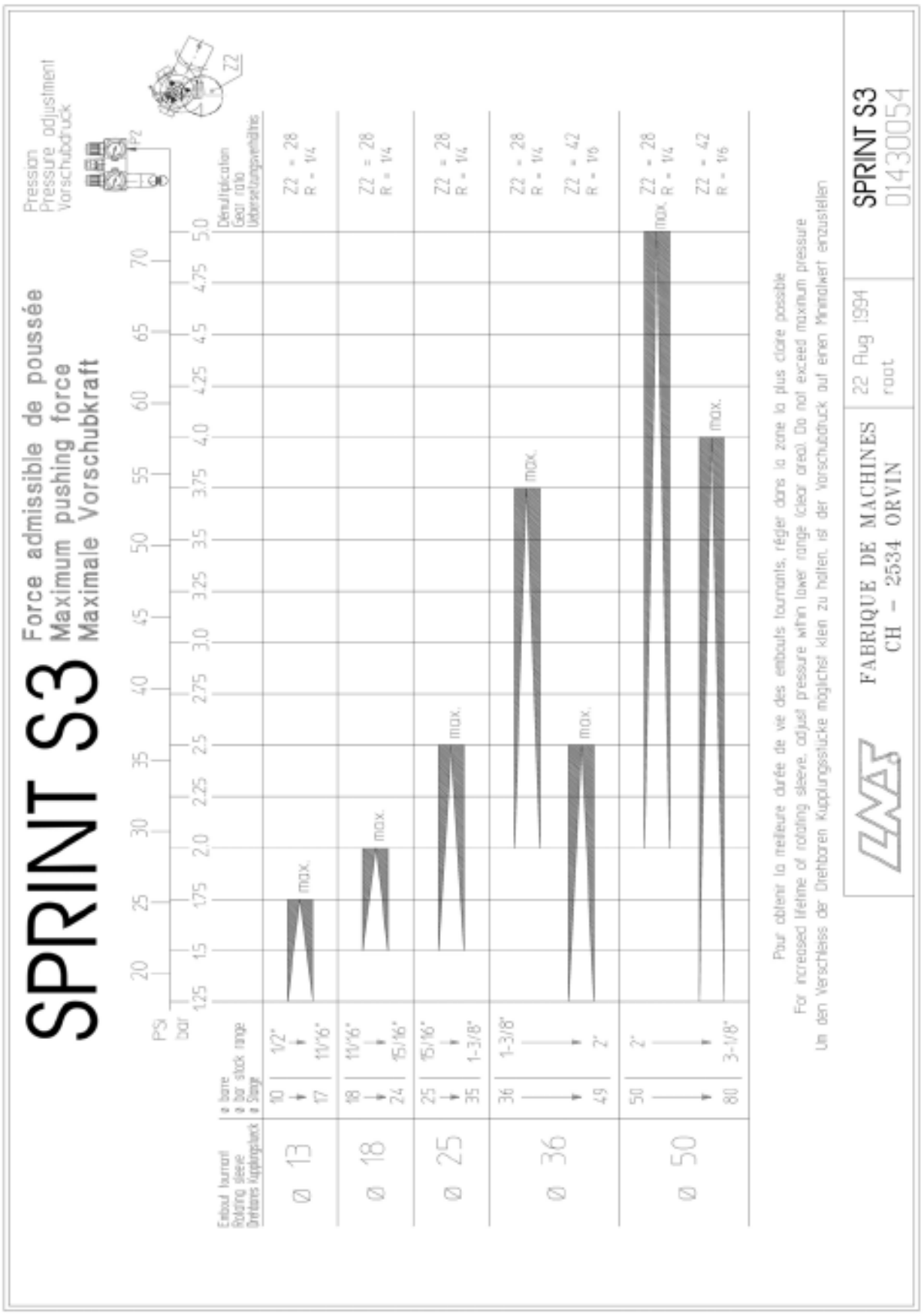
2: Swing up the motor mounting plate to free the ratio gear (B).

3: Lock in position with bolt (A).
Loosen the gear set screw (C).

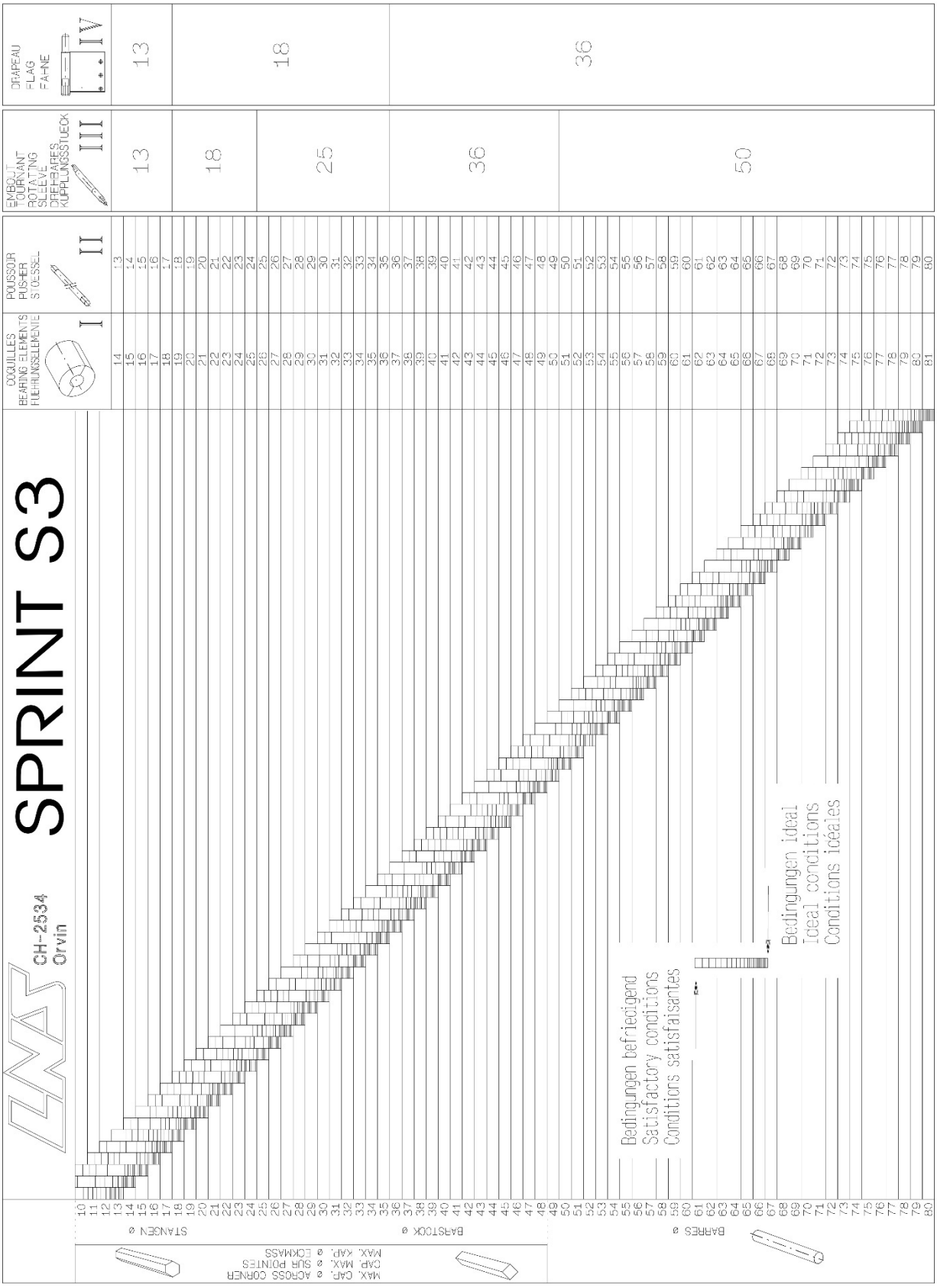
- Remove gear and install new gear.
- Align (by sight) the new ratio gear with motor gear.
- Secure with set screw (C).
- Loosen the bolt (A) and swing the motor mounting plate down into position. Secure with bolt (A). To prevent gear binding, Position the mounting plate to allow a small play between the gears.



12.7. PUSHING FORCE CHART

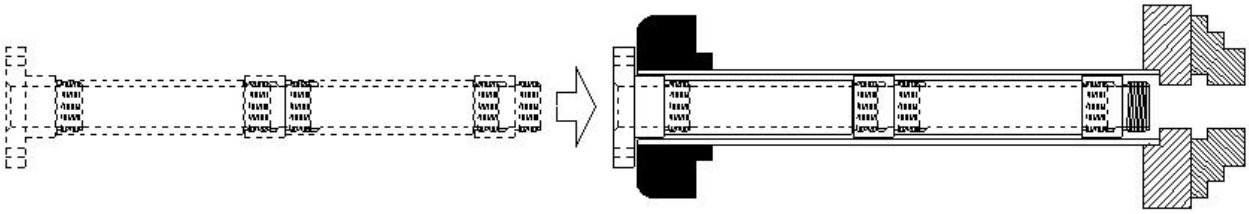


12.8. DIAMETER CHANGEOVER CHART



13. SPINDLE REDUCTION TUBES CHANGEOVER

To allow proper feeding of the bar stock through the clamping cylinder and the headstock, it is recommended to mount spindle reduction tubes (spindle liners). Ideally, the I.D. of the spindle liner must correspond to the I.D. of the bearing elements.
To remove or to install the spindle liner, the bearing element of the front extended support and the air blast (unscrew screws (D)) must be removed.



14. GUIDING ELEMENTS CHANGE

Conditions :
- *No bar stock in the magazine*
- *Pusher in home position*
- *Barfeed in STOP mode*

1. Enter the manual mode by pushing F1

2. Manual mode:

   Select the pusher changeover procedure.by pushing F4 [SET].

   The text " READY TO START PUSHER CHANGEOVER FUNCTION " is displayed on the screen.

   Start the function.by pushing F1 [START].

   The pusher goes to its changeover position. Follow the instructions on the remote control.

3. Open the protection grid and the main cover of the bar feeder.

   Remove the pusher.

   Upper half bearing elements:
   a. To extract the upper half bearing elements, press on the lever of the Quick Change system and pull down the element.
   b. Install the new elements by pushing the elements inside the supports. A click confirms that the element is secured.

   Lower half bearing elements:
   a. Extract the lower half elements (2) by pulling them out of the bearing supports
   b. Adjust the new elements on the shaft, and push down the elements inside the support.

   Outboard support bearing element:
   a. Loosen the lock screw (A)
   b. Remove the guiding element (B).
   c. Install the new guiding element. Take care of the side nuthole
   d. Plae back the holding plate

   Pusher support bearing elements:
   a. Remove the holding plate.
   b. Remove the guiding element
   c. Install the new guiding element, slit towards the back.
   d. Place back the holding plate.

   Install the new pusher

4. Close the main cover and the protection grid of the bar feeder.

5. Press 2x the button F1 [START] on the remote control.

   The pusher is engaged in its home position.

   Once the bar feeder has completed the pusher changeover cycle, the bar feeder is ready to work.

   At this point, it is necessary to check the parameters like bar stock diameter, guiding elements diameter, feeding length, etc. See point 3.1 of this manual for further information.

15. END OF BAR

Principle:

In automatic cycle, when the pusher reaches the end of bar position, the remaining material is too short to machine another part and the lathe will hold its production cycle and a new bar is loaded. The production cycle (program) will resume once the new bar has reached the top-cut position.

The end of bar position must be adjusted to obtain minimum bar stock remnant. The front of the pusher will be located 12 mm (1/2") behind the collet pads or the chuck jaws of the lathe.

To minimize the loading cycle time, it is possible to load a new bar while machining the last part. The end of bar position must be adjusted 12 mm (1/2") + one part length behind the collet pads or the chuck jaws

End of bar adjustment

Conditions :
- *Main cover closed.*
- *Bearing blocks closed.*
- *No bar stock in the bearing blocks.*
- *The position of the pusher does not matter.*

Procedure :

1. Press the key [STOP].

2. Enter the main menu by pushing F4.

3. Enter the menu "positions / torques".by pushing F3 [ENTER].

4. Screen "End of bar position":
   Press the key corresponding to the icon [SET] (F3).
   Depending on which sequence the bar feed is in when the parameter is selected, the available functions and icons can change

5. [+/-] By offset correction:
   - Presser la touche correspondant à l'icône [+/-].
   - La position de tronçonnage (Z) actuelle est affichée.
   - Introduire à l'aide des touches numériques la correction à apporter, puis presser la touche correspondant à l'icône [+] si vous souhaitez ajouter la correction, ou la touche correspondant à l'icône [-] si vous souhaitez la soustraire. La nouvelle valeur est mémorisée et affichée à l'écran.
   - Pour quitter ce mode de réglage, presser la touche correspondant à l'icône [ESC].

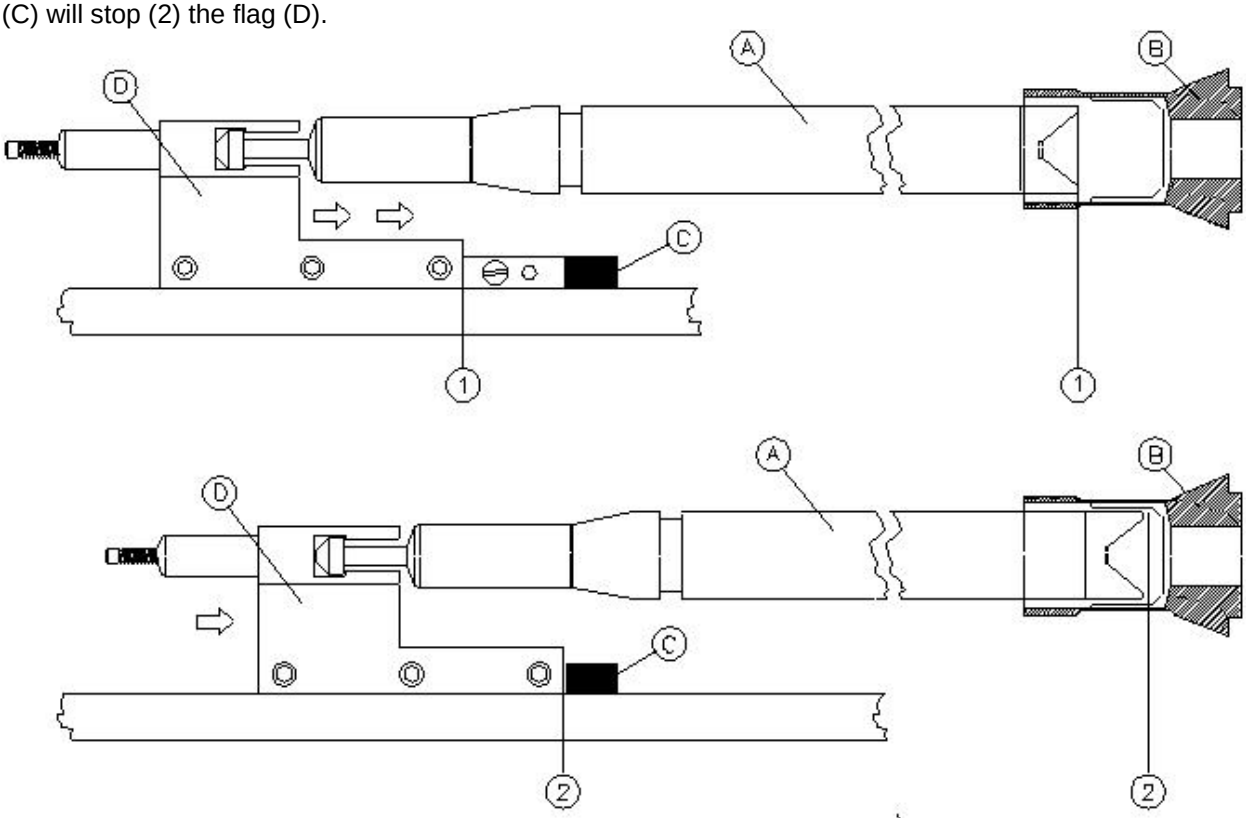
6. [TEACH IN] Apprentissage:
   - Presser la touche correspondant à l'icône [TEACH IN]. La position de fin de barre actuelle est affichée.
   - Presser la touche [FWD] et amener le poussoir à la position de fin de barre souhaitée (voir page précédente).
   - Pour mémoriser la valeur, maintenir la touche correspondant à l'icône [ENTER] pressée jusqu'à ce que l'icône disparaisse.

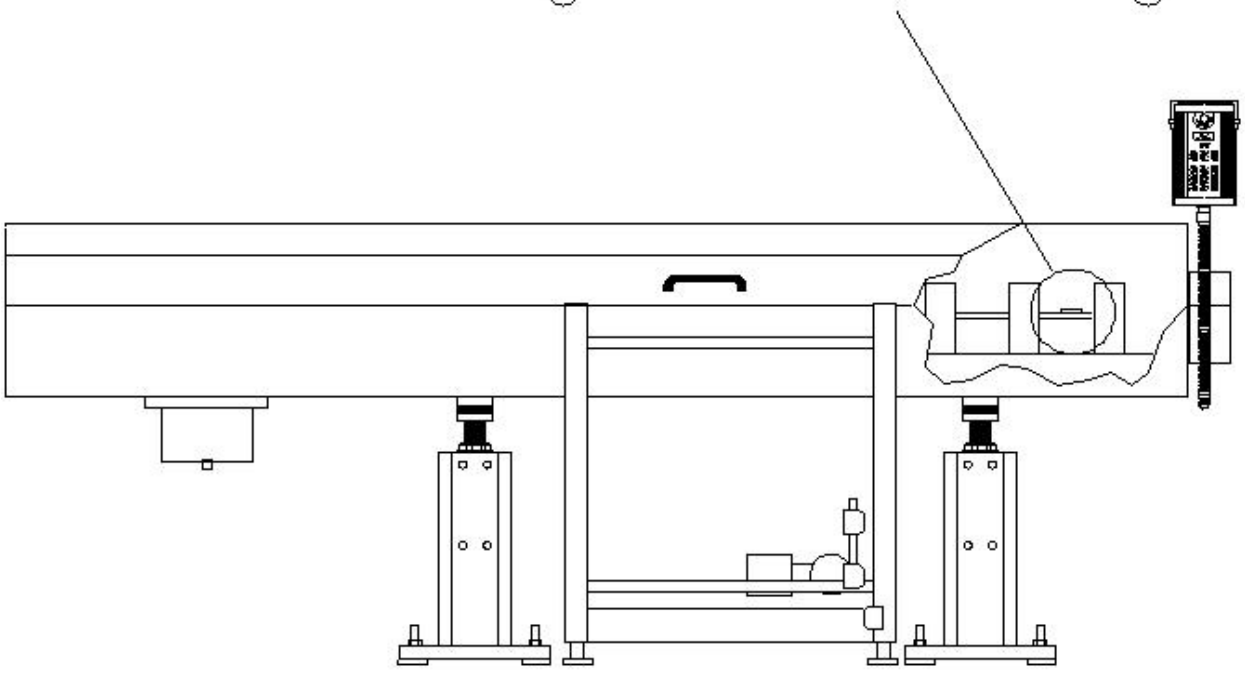
7. To exit the set mode, press the keys [ESC] or [STOP].

16. MECHANICAL STOP

To prevent damage to the pusher and to the tools of the lathe, a mechanical stop is mounted in front of the bar feeder.
This stop must be adjusted during initial installation. It must be positioned so that the front of the pusher cannot reach the inside of the collet of the lathe.

During end of bar (1), the pusher (A) will stop before touching (2) the collet of the lathe (B). The stopper (C) will stop (2) the flag (D).



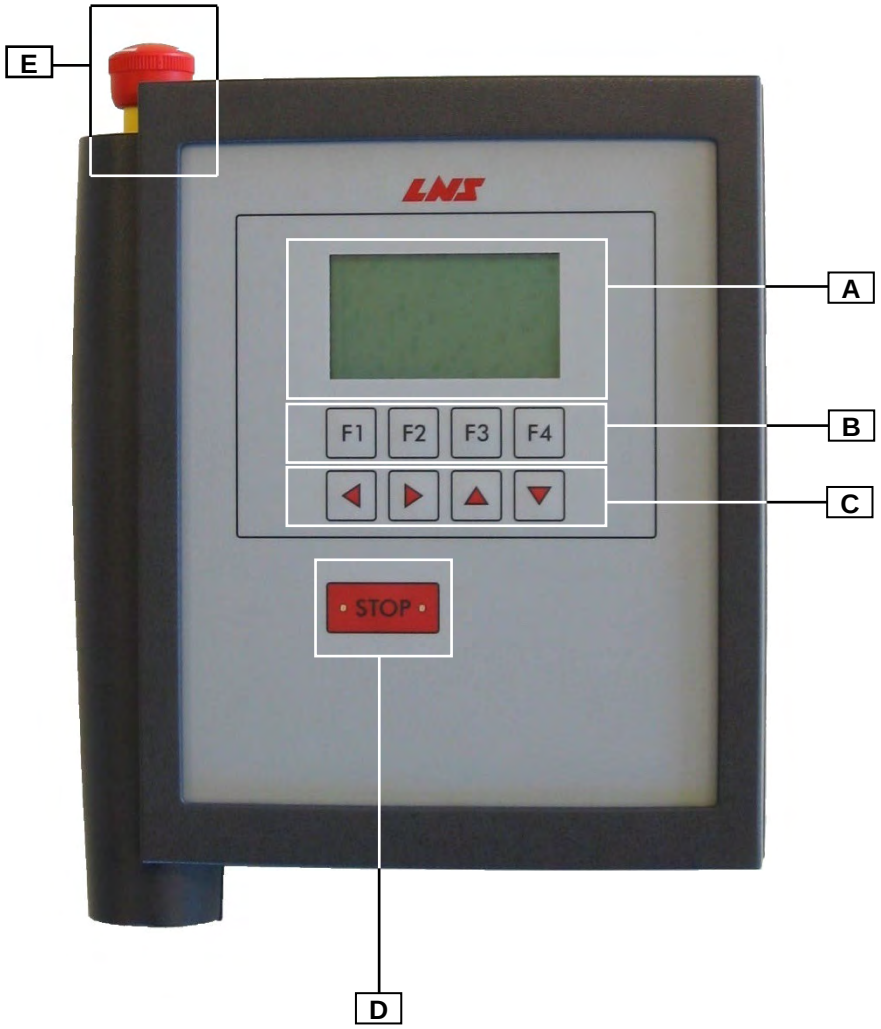


17. REMOTE CONTROL

The ergonomic and user-friendly remote control with a clear built-in display facilitates the handling of the bar feed system. Depending on the sequence under way, the bar feed system gives access only to those functions which are available, thus avoiding any incorrect handling, and reducing the access time to the necessary functions.

The display reads, continuously and clearly, the status of the bar feed system and the production, allowing one to verify at all times the functions, diagnostics, error signals, or their analysis. The most recent error signals are saved in a register and can be recalled to establish the diagnostics.

The remote control has five distinct segments, namely: display (A), function keys (B), left / right / up / down keys (C), STOP key (D) and the emergency button (E).



17.1. Display

The liquid crystal display provides the operator with all the necessary data, both for handling the bar feed system and for maintenance.

- The upper portion of the display has eleven lines and is reserved for the reading of text.
- Error messages are usually displayed with their diagnostics.
- The lower portion of the display is reserved for the display of icons. The icons indicate to the operator which functions are attributed to keys F1 through F4

  The icons available are the following:

Icon	Signification
	Referencing position
	Switch to automatic mode
	Stop after machining one bar stock
	Switch to manual mode
	Pusher forward (picture may be reversed)
	Pusher reverse (picture may be reversed)
	Automatic Top-Cut positioning in manual mode
	Extract the bar out of the clamping device of the lathe (picture may be reversed)
	Setup menu

Icône	Signification
	Confirm
	Start sequence
	Set up
	Escape
	Return to previous menu
	Jump to next menu
	Load a bar stock in the guiding elements
	Confirm the unloading of a bar stock out of the guiding elements
	Validate
	Cancel
	Teach data
	Offset correction
	Increment data in offset correction mode
	Decrement data in offset correction mode

17.2. Function keys F1 - F4

These keys are located right below the display. The functions attributed to them are indicated on the display by icons.

As the operator advances in the handling, the functions of the keys are automatically reattributed to correspond to the circumstance and availability of the bar feed system.

17.3. Left / right / up / down keys

These keys allow entering values (bar stock diameter, part length, etc.) or parameters.

17.4. Emergency stop button

When a dangerous situation arises, pressing the emergency stop switch interrupts immediately all bar feed system and lathe functions (if interface is wired accordingly).

To cancel the alarm, release the switch by rotating its red knob counter-clockwise, then press [STOP].

17.5. STOP key

The STOP key allows interrupting the sequence under way.

Important: the automatic cycle of the lathe must first be interrupted.

By pressing the STOP key, allows to exit the setting mode, regardless of the level reached, and to return to the work screen.

18. POWERING UP

Please read the safety instructions described at the start of this manual before handling the equipment.

18.1. Description

The motor of the Hydrobar Sprint S3 bar feed system is equipped with a built-in absolute encoder that continually controls the position of the carrier.

When the bar feed system is powered down or there is a power failure, this position is kept in the memory by the PLC.

When powering up, the value saved is immediately taken into account, thus avoiding any input from the beginning. The status saved in the PLC prior to powering are then checked by the PLC which analyses them. The latter then gives the operator access only to those handling operations, which should be undertaken.

This chapter shows the various functions of the bar feed system and indicates how to access them.

The conditions to be fulfilled to proceed with the handling are systematically displayed on the screen, and, therefore, are not reproduced in this manual.

Given that the handling may vary depending on the status and configuration of the bar feed system, a standard procedure cannot always be described.

19. AUTOMATIC SEQUENCE

Please read the safety instructions described at the start of this manual before handling the equipment.

19.1. Description

The autonomy of the bar feed system is directly connected to the frequency at which the operator feeds the magazine.

Each time the automatic sequence of the bar feed system needs to be started up, it is advisable to check the following elements:

- In the storage unit, the end of the bars must be resting against the rear limiter.
- The guiding elements must be adapted to the diameter of the bar.
- The front rest guiding elements must be adapted to the profile of the material.
- The installed pusher must be adapted to the diameter of the guiding elements and to the inside diameter of the spindle.
- The collet of the bar feed system must correspond to the diameter of the bar.
- The pushing torque must correspond to the material to be loaded.
- On the lathe, the clamping device must correspond to the material to be loaded.

20. SETTINGS

Please read the safety instructions described at the start of this manual before handling the equipment.

20.1. Description

The Sprint S3 bar feed system has different parameters and functions allowing the operator to configure it in the manner best adapted to the lathe on which it is installed, and to the mode of production in progress.

These parameters permit the positioning of the material in the clamping system of the lathe during the feeding process. Then, during the production cycle, the material is advanced with precision at every opening of the clamping system.

The position of the flag, or the quantity of material remaining to be machined, may be known at any time by simply consulting the remote control.

The pushing torque of the motor is adjusted automatically in relation to the material to be loaded

20.2. Access to the functions

The functions are structured as follows :

By pressing the MENU key it is possible to visualize the values of the settings, regardless of the position of the bar feed system (automatic sequence, manual sequence, etc.).

Note :
To change or modify any parameter, the bar feeder must be in STOP mode.

1	**Part setup**
1.1	Total part feed out length
1.2	Number of clamping device openings for overall part length
1.3	*Top Cut Position*
1.4	*Auxiliary end of bar position*

2	**Position**
2.1	End of bar position
2.2	Top Cut position
2.3	Top Cut brake position
2.4	*Auxiliary end of bar position*

Note :
The parameters in italic are optional.

3	**Misc. functions**
3.1	Language
3.2	Unit of measure
3.3	Request for reference point
3.4	*Clamping mode reversed*
3.5	*Time for clamping device to close*
3.6	*Time for clamping device to open*

4	**Service**
4.1	Bar feeder setup
4.2	Interface
4.3	Special functions
4.4	Parameter masking

Depending on the sequence at which the bar feed system is positioned, certain functions may not be accessible, and therefore, not displayed.

To exit the setting functions and return to the work display, press MENU or STOP key.

For data collection values as well as to navigate in the various menus, please see point 1.1, Display (meaning of the icons).

20.2.1. Part setup

Note :
To validate a new parameter or a new value, keep the [ENTER] key pressed until its icon disappears

The manipulations, adaptations, and settings, specific to the machining of a part, and which must be made to the bar feed system are part of the start-up.
The mechanical settings which must performed on the bar feed system are presented in the Start Up manual. This point presents the most common parameter settings.

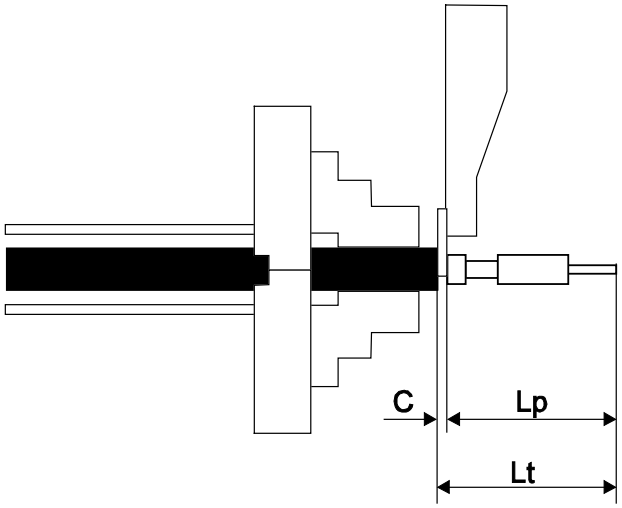
IMPORTANT: Prior to changing the bar feed parameters, please make sure that the guiding channel is open. Parameters will not be accepted with the channel closed.

1.1. Total part feed out length

Used to check that the turret movement is according to the needed feeding value.

The feed-out length (Lt) includes the part length (Lp), the cut-off tool width (C) and the face-off length.

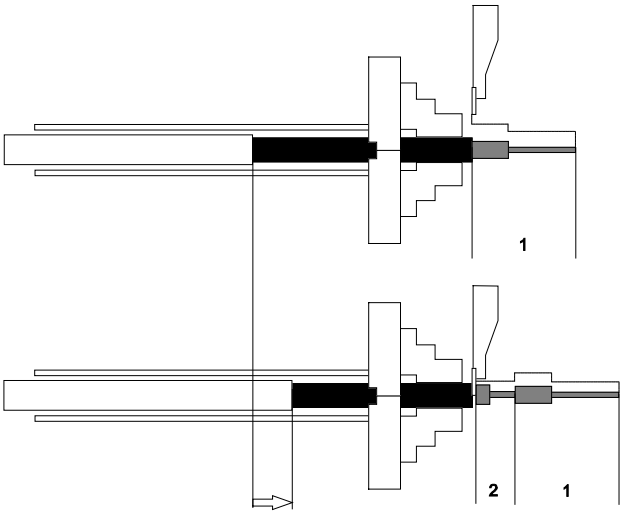
To validate the new value, press the [ENTER] key twice.



1.2. Number of clamping device openings for overall part length

When the machining of a part requires several openings of the clamping device
(for ex.: a long part, or transfer of the part to the sub-spindle), some interface conflicts may occur during the feeding process.
It is important for the bar feed system to be “informed” of the number of times the clamping device must open for the machining of a part.

NB : The bar feed system only carries out the first positioning for a single part. The following positioning (if any) must be done by the turret.



1.3. Top Cut position

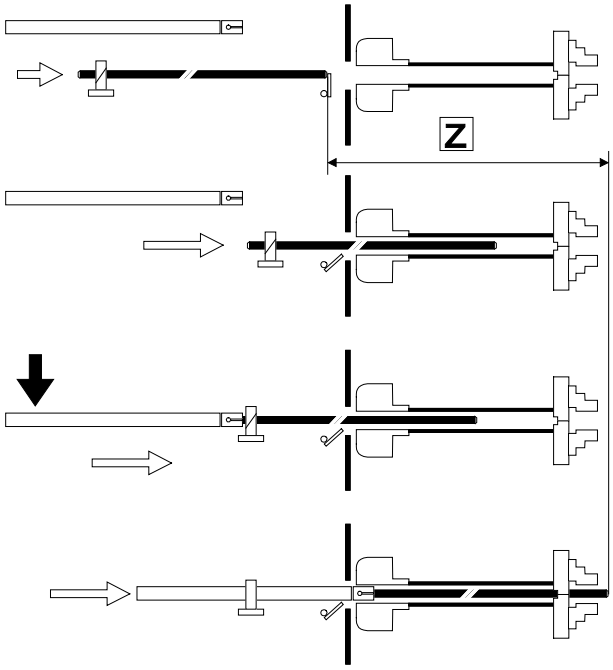
During the loading cycle, the bar is automatically loaded and positioned into the spindle, outside the clamping device of the lathe (chuck or actuator).

This positioning corresponds to a value (Z) programmed by the operator, which is equal to the distance between the measuring cell and the position of the material in the lathe clamping device.

With this system, the setting is the same for any bar length.

The setting for the Top-cut position may be adjusted at any time, in one of two ways :

- By correcting the setting itself
- By teach-in



Top cut position setting

Before handling the bar feeder, stop the lathe at the end of part cycle

1	 [STOP]	Press the key [STOP].
2		Enter the main menu.
3	 [ENTER]	Enter the menu "positions / torques".
4	 [PG DOWN]	Go to the screen "top cut position".

5	F3 [SET]	Screen "Top cut position": Press the key corresponding to the icon [SET]. Depending on which sequence the bar feed is in when the parameter is selected, the available functions and icons can change : Table setting: see next page **By offset correction: Jump to point 6** **By teach in: Jump to point 7**
6	F1 [+/-]	[+/-] By offset correction: • Press the key attributed to the icon [+/-]. • The current top-cut position (Z) is displayed. • Enter with the direction keys the correction to insert, and press the [+] icon to add the value, or the icon [-] to subtract it. The new value is stored. • To exit the top-cut position set mode, press the key attributed to the icon [ESC]. **Jump to point 8.**
7	F2 [TEACH IN] F1 [START] F4 [FWD] F3 [ENTER]	[TEACH IN] By teaching: • Press the key attributed to the icon [TEACH IN]. • Press the key attributed to the icon [START]. • A bar is loaded and the guiding channel is closed. The feeding pusher inserts the bar into the lathe spindle. The feeding pusher is now facing the spindle. • Press the key [FWD] and advance the bar stock to the desired position (see previous page). • To validate the new top cut position, keep [ENTER] pressed until the icon disappears.
8	F2 [TEACH IN] • STOP • [STOP]	To exit the set mode, press the keys [ESC] or [STOP].

Table setting:

Conditions	Available functions	
	By offset correction	Teach in
– Guiding channel open – Bar stock in the loading rack – Pusher in home position	Icon **[+/-]**	Icon **[TEACH IN]**
– All other cases	Icon **[+/-]**	---

20.2.2. Positions

2.1. End of bar

The end of bar position determines the moment when the bar feed enters theloading cycle.

Usually, the end of bar position is adjusted
as closely as possible behind the clamping system of the lathe (approximately 5 mm or a 1/4" behind the chuck jaws or collet pads).

This will provide minimum bar stock remnant.

Regardless of the length of the bars, or parts, the end of bar position is always the same.

In very special cases, a different end of bar setting needs to be selected.

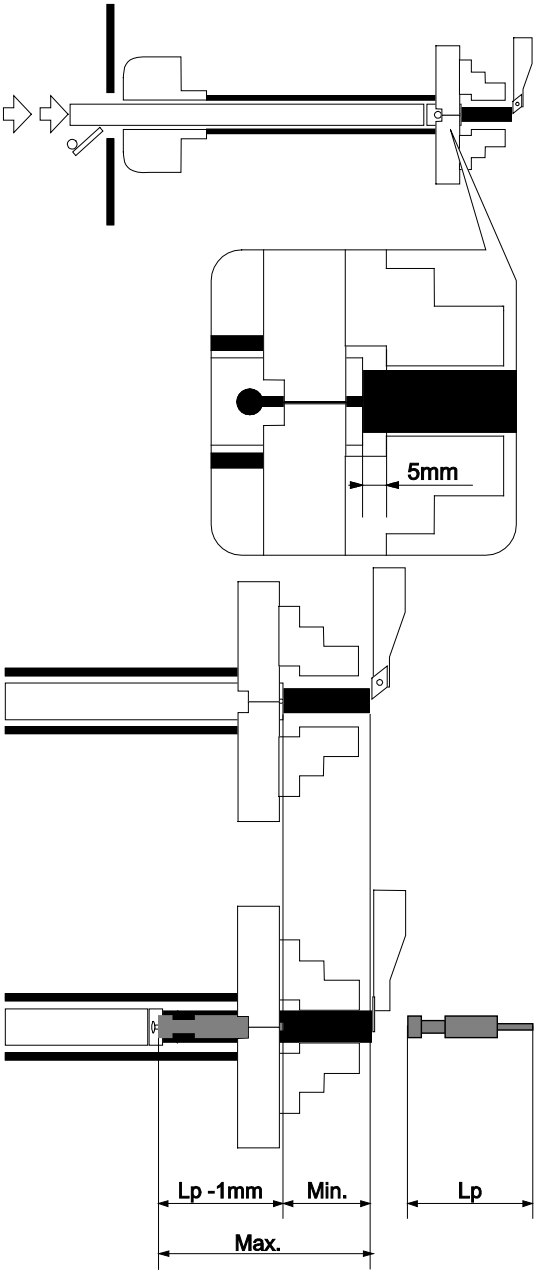
The length of the remnant may vary :

- The minimum remnant length (Min) is obtained when the feeding pusher is just behind the clamping device while the last part is being machined

- La chute maximale (Max), est obtenue lorsque la matière est légèrement insuffisante pour l'usinage d'une pièce supplémentaire (Lp - 1mm).

- The maximum remnant length (Max) is obtained when there is not enough material for machining an additional part (Lp - 1 mm)

Maximum remnant length = Lp – 1mm + Min



2.2. Top Cut brake position

In order to save time, the bar is first moved in high speed; then the pusher switches to low speed when approaching the optical cell or Top Cut position.

This switching point is defined by this parameter

2.3. Auxiliary end of bar position

Depending on the lathe and its options, the auxiliary end of bar may be used in several ways, for example for the opening of an external rest.

The procedure is the same as this for the end of bar setting.

20.2.3. Misc. functions

Note :
To validate a new parameter or a new value, keep the [ENTER] key pressed until its icon disappears.

3.1. Language

This parameter allows to adapt the language in which the messages will appear, depending on the country of destination of the bar feed system (*for practical reason, it is not necessary to stop the bar feeder to select a language*).

3.2. Unit of measure (millimetres / inches)

This parameter defines whether the measures will be indicated in millimetres or in inches..

3.3. Request for reference point

This operation allows the bar feed system to find the original position of the absolute converter and the parameters when and if these have been lost.

3.4. Clamping mode reversed

The interface signal is reversed depending on whether the clamping device functions by pushing or by pulling. It is therefore essential to know the operation of the clamping device, without this, the feeding process cannot be done correctly.

3.5. Time for clamping device to close

This is the time it takes for the clamping device to be physically closed. The majority of CNC lathes are equipped with confirmation switches to provide this signal. The time is set at a default value of zero seconds.

3.6. Time for clamping device to open

In the case of a clamping device with jaws, some time may be provided to prevent any movement before the clamping device is completely open.

20.2.4. Service

4.1 Bar feeder setup
4.2 Interface
4.3 Special functions
4.4 Parameter masking

ATTENTION! Password will be required!

The service parameters allow to configure the bar feed system in its environment and to adapt the interface connected to the lathe.

These parameters are protected with a password, because only LNS (or certified) technician is authorized to modify them.

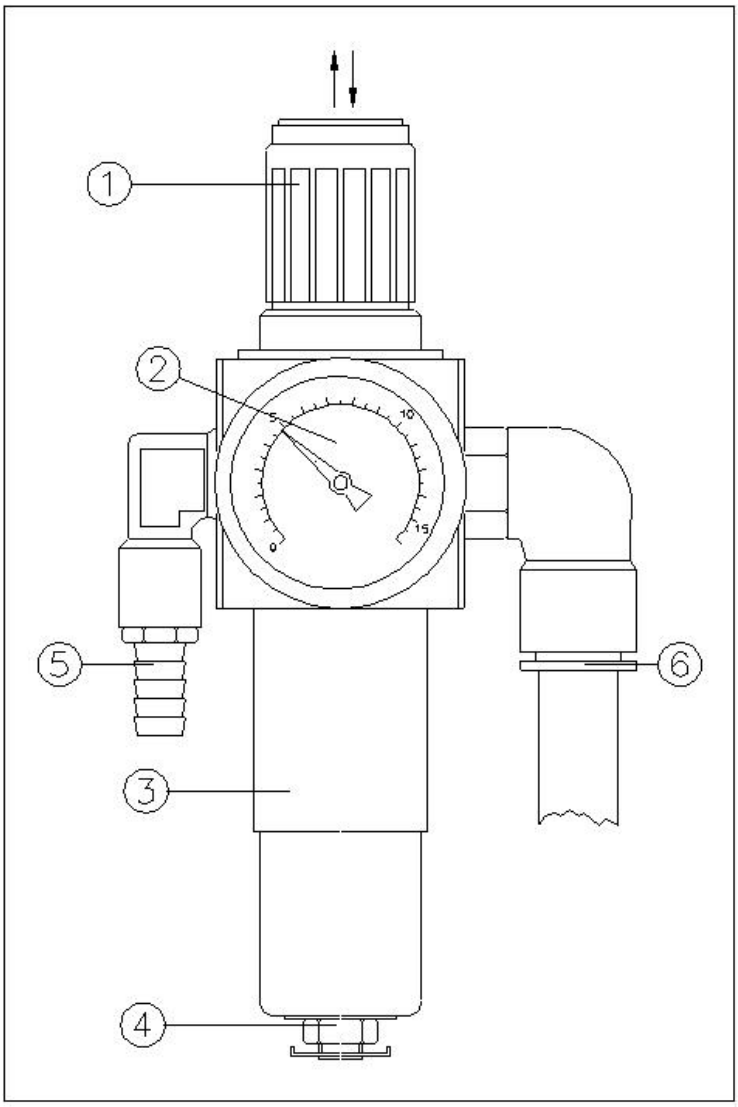
21. AIR ADJUSTMENTS

21.1. MAIN PRESSURE

For trouble free operation of the Sprint, a minimum of 5 bar (75 PSI) is required but should not exceed 6 bar (90 PSI).

Procedure :

Should an adjustment be necessary : Pull up the knob (1) and turn clockwise to increase the pressure. Turn counter-clockwise to decrease the pressure. After adjustment, push down the knob back into normal position.



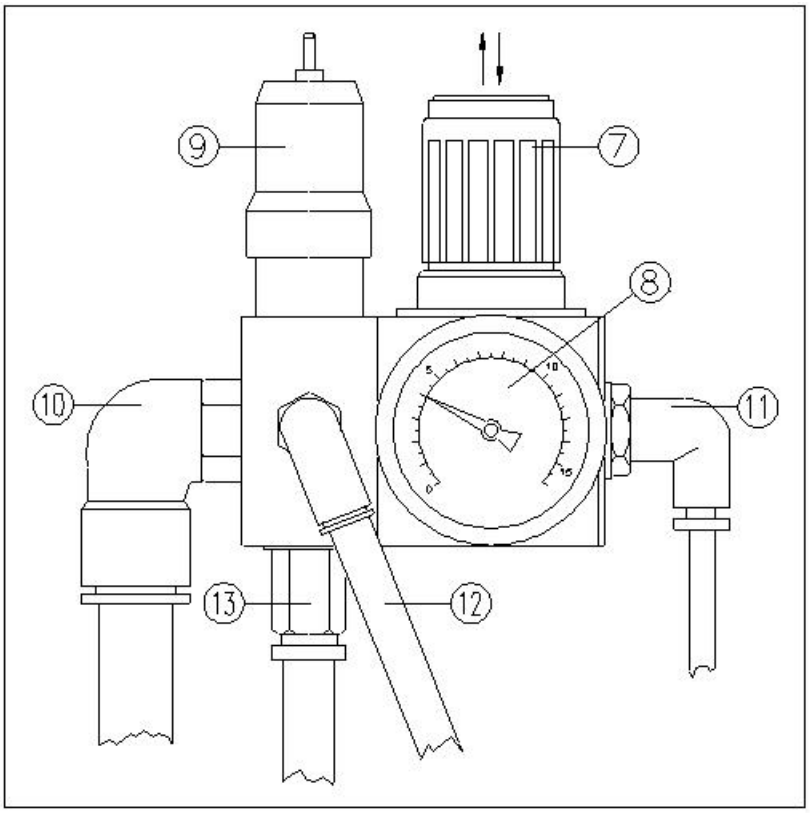
1: Main pressure adjusting valve
2: Main pressure gauge
3: Decanter/Filter
4: Drain
5: 1/2" dia. connection (air inlet)
6: Air outlet

Designation	Article No.	Description
YV1 - YV10	3M 3.568 12' 3.569 4M 3.570	Bearing blocks locking
YV13		Bearing blocks open
YV14		Bearing blocks close
YV19		Coupling for dopping fingers
YV21		Air blow

21.2. AIR MOTOR PRESSURE

The pushing force (torque) can be adjusted with knob (7). Maximum pressure allowed, 5 bar (75 PSI). To secure the connection between the bar stock and the pusher and to increase the life time of the rotating sleeves of the pusher as well as to prevent small diameter bar stock to bent, the pushing force must be adjusted accordingly.

7: Air motor pressure adjusting valve
8: Air motor pressure gauge
9: Air pressure switch
10: Air inlet
11: Air outlet to the motor (adjustable pressure)
12: Air outlet to the motor (direct)
13: Air outlet to air valves



Procedure :

Pull up the knob (7) and turn clockwise to increase the pressure. Turning counterclockwise will decrease the pressure. After adjustment, push down the knob back into normal position.

21.3. PUSHER FEED RATE ADJUSTMENTS

The feed rate can be adjusted with adusting valves 6 and 7.

An average feed rate is factory adjusted.

Should an adjustment be necessary :

Pusher fast forward

- To increase the feed rate turn adjusting valve 6 counterclockwise.
- To decrease the feed rate turn adjusting valve 6 clockwise..

Pusher slow forward (forward deceleration)

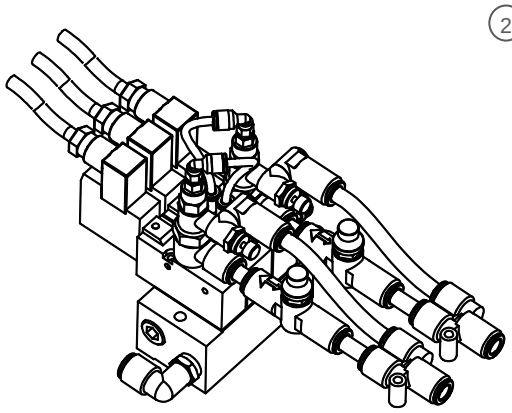
- To increase the feed rate turn adjusting valve 7 counterclockwise.
- To decrease the feed rate turn adjusting valve 7 clockwise.

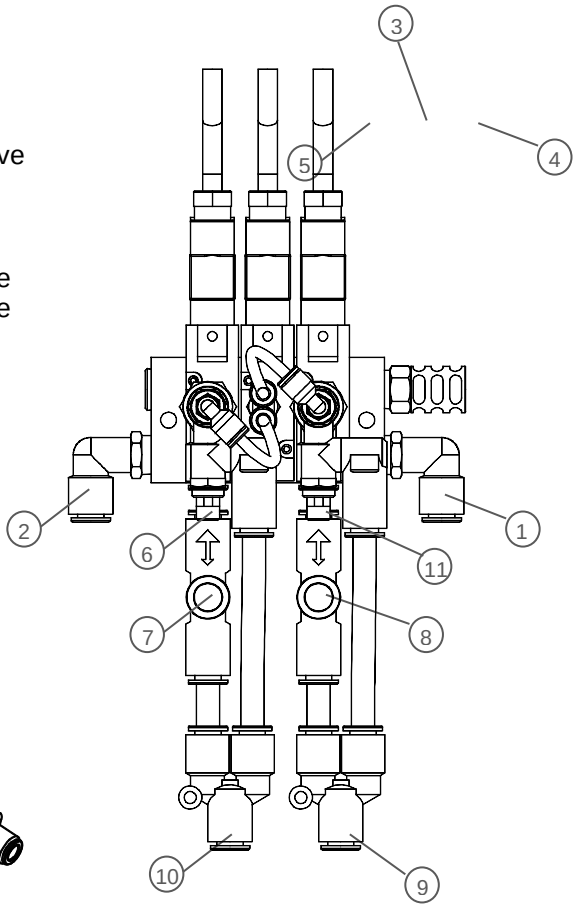
Pusher slow reverse (reverse deceleration)

- To increase the feed rate turn adjusting valve 8 counterclockwise.
- To decrease the feed rate turn adjusting valve 8 clockwise.

Note : The fast reverse speed is factory set at its maximum feed rate and cannot be adjusted.

1: Air inlet (adjustable flow)
2: Air inlet (neutral)
3: V18 Fast/slow selection electro-valve
4: V16 Pusher forward electro-valve
5: V17 Pusher reverse electro-valve
6: Pusher fast forward adjusting valve
7: Pusher slow forward adjusting valve
8: Pusher slow reverse adjusting valve
9: Outlet air motor forward
10: Outlet air motor reverse
11: Pusher fast reverse adjusting valve





22. MAINTENANCE

The bar feeder requires minimum maintenance. Howewer, the following needs to be regularly checked :

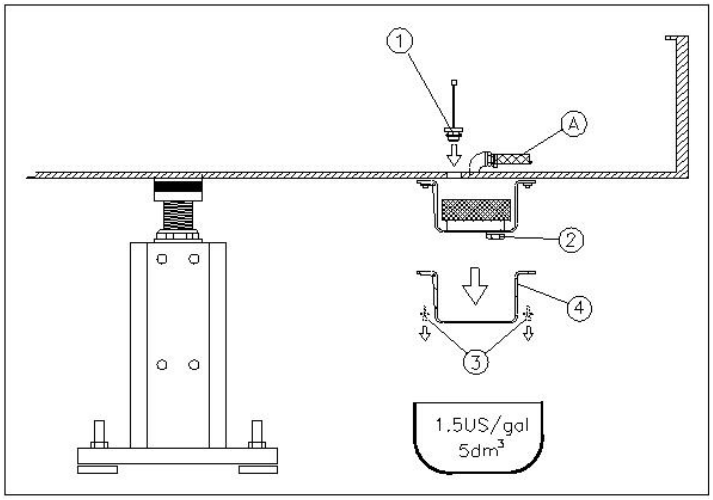
Hydraulic filter/hydraulic oil

The oil filter must be maintained clean and requires cleaning once a month.

The hydraulic oil may need to be replaced once a year depending on the cleanness of the bar stock.

Procedure :

1. Install plug (1) in bottom of the reservoir.
2. Place a container (min 5l) under the drain plug.U
3. Unscrew drain plug (2) located outside the oil filter and drain oil catcher (3).
4. Remove oil catcher cover (4) and clean filter cartridge.
5. Put back in place.
6. Remove plug inside the reservoir.



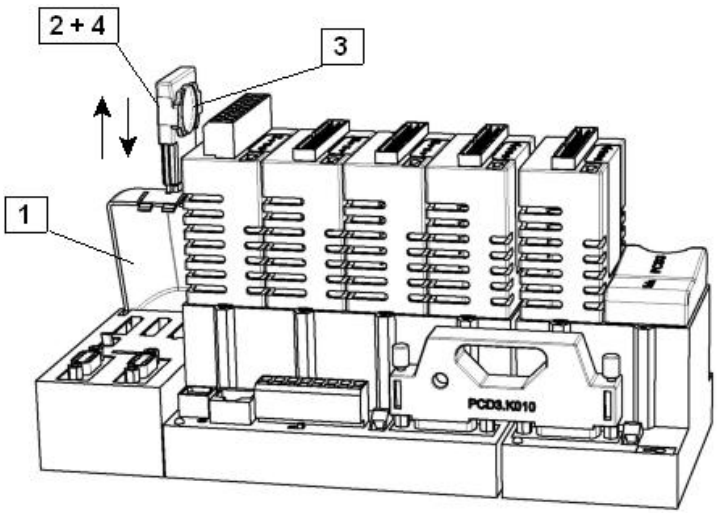
Air filtration unit

The air decanter must be checked weekly and must be free of dirt and water. Eventually drain water out of the decanter.

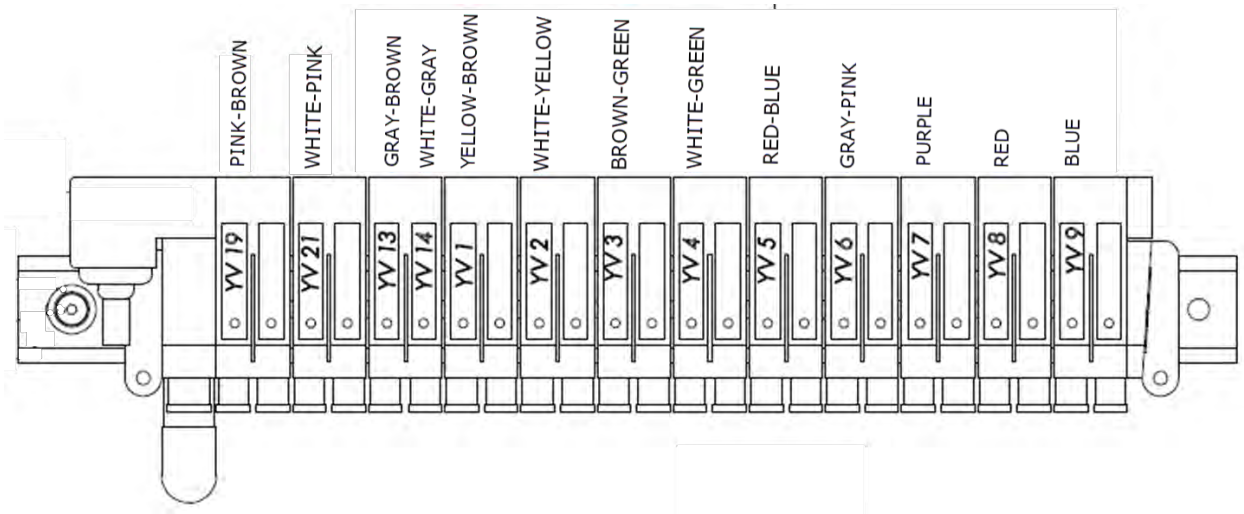
Note :
Used batterie must be disposed of in an ecologically safe manner.

Replacing the programmable logic controller battery:

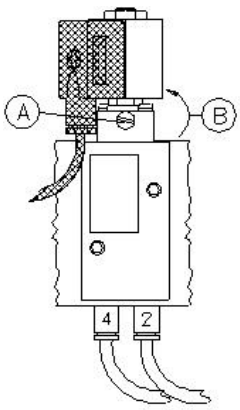
1. Open the blue cover.
2. Remove the card with LED's
3. Remove the battery. Insert the new one.
4. Insert back the card and close the cover.



23. AIR CYLINDERS, AIR VALVES



An air cylinder can be manually activated by rotating the screw "A" located on its corresponding air valve

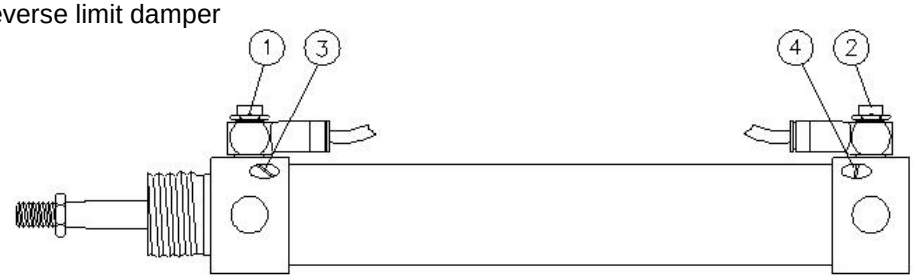


The screw "A" must be returned to its original position (B) to prevent any malfunction of the electro-valve and the Sprint.

The feed rate of the piston can also be adjusted by turning the air regulators (1) and (2).

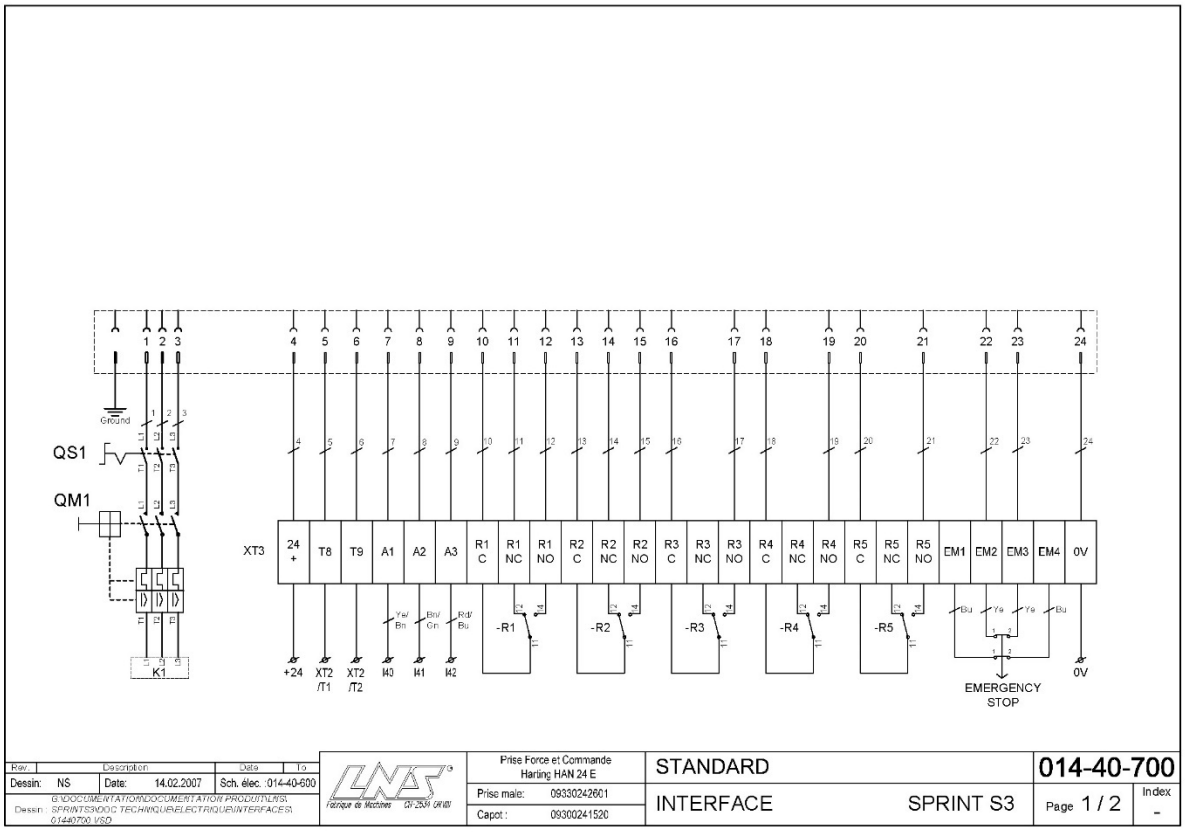
These air regulators are factory adjusted and should normally not be re-adjusted.

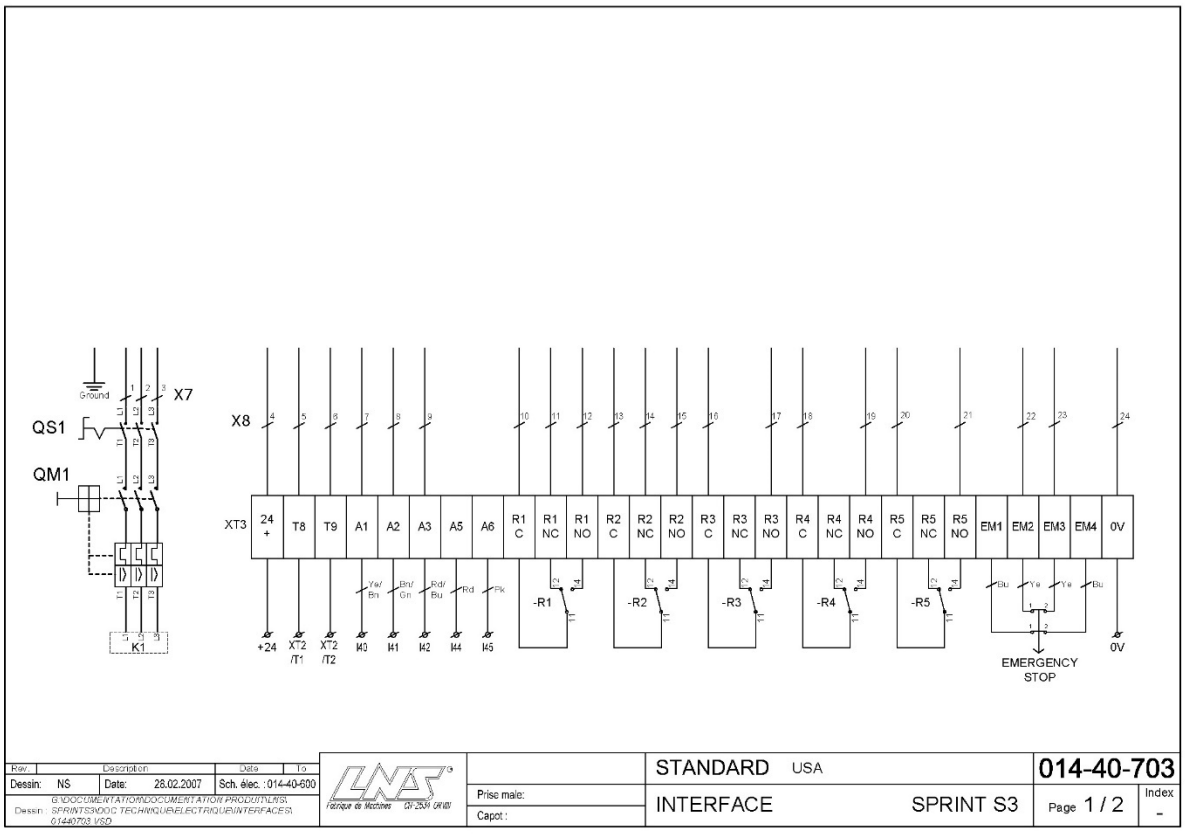
1 : Air regulator forward
2 : Air regulator reverse
3 : Forward limit damper
4 : Reverse limit damper



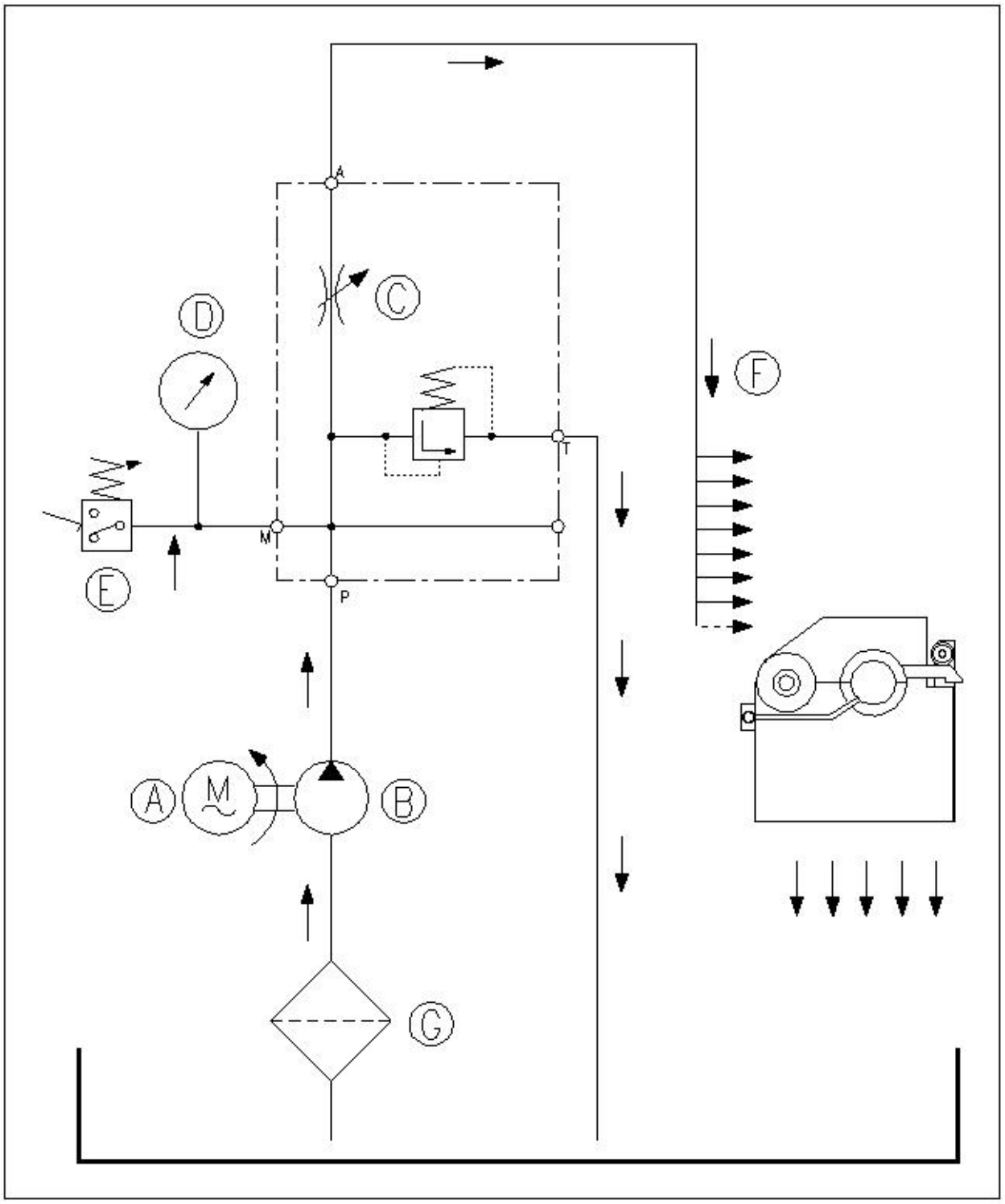
24. INTERFACE ELECTRICAL DIAGRAM

The following interface drawings are examples only.
Always refer to the electrical diagram sent with the bar feeder and located in the electrical control box.



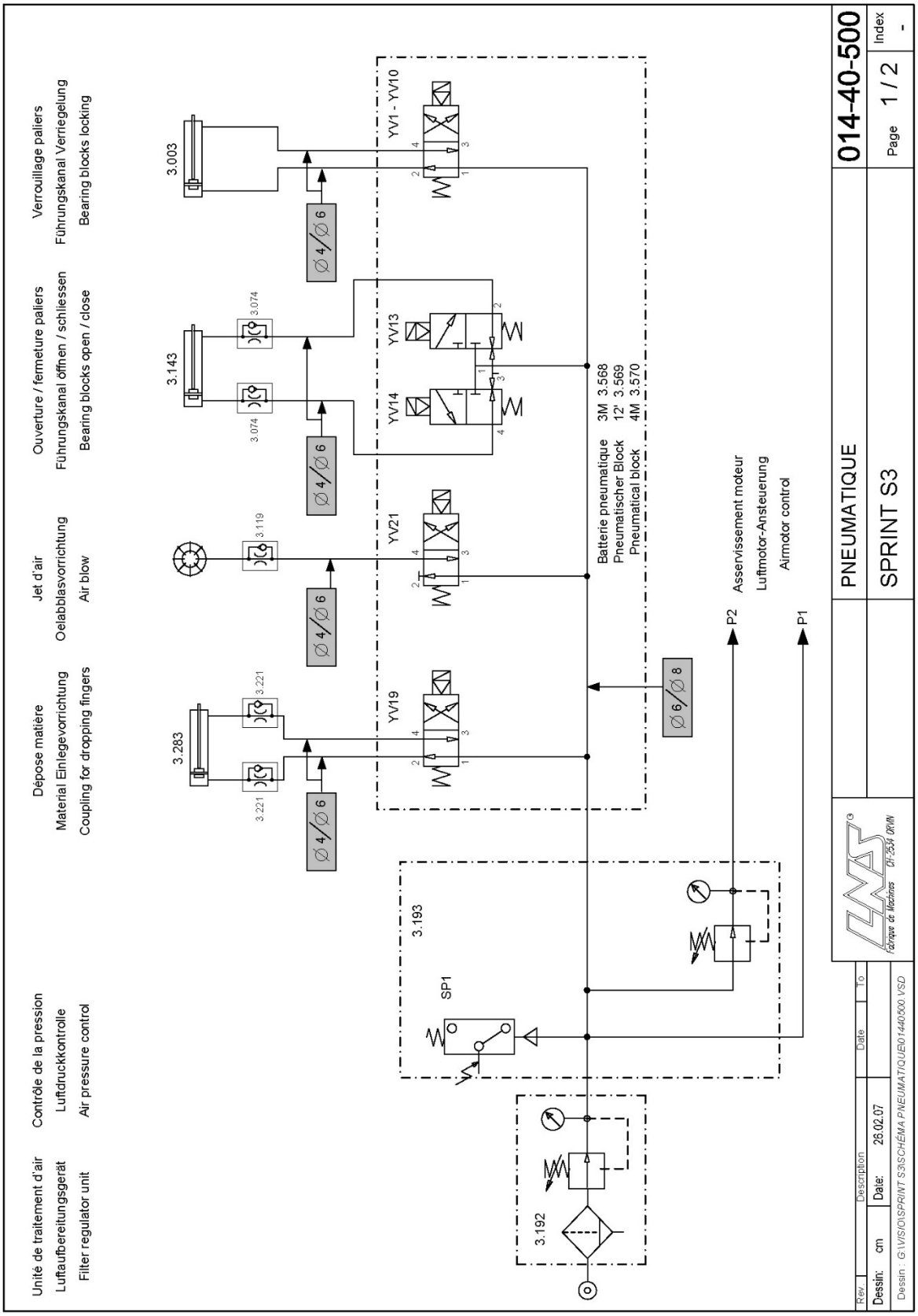


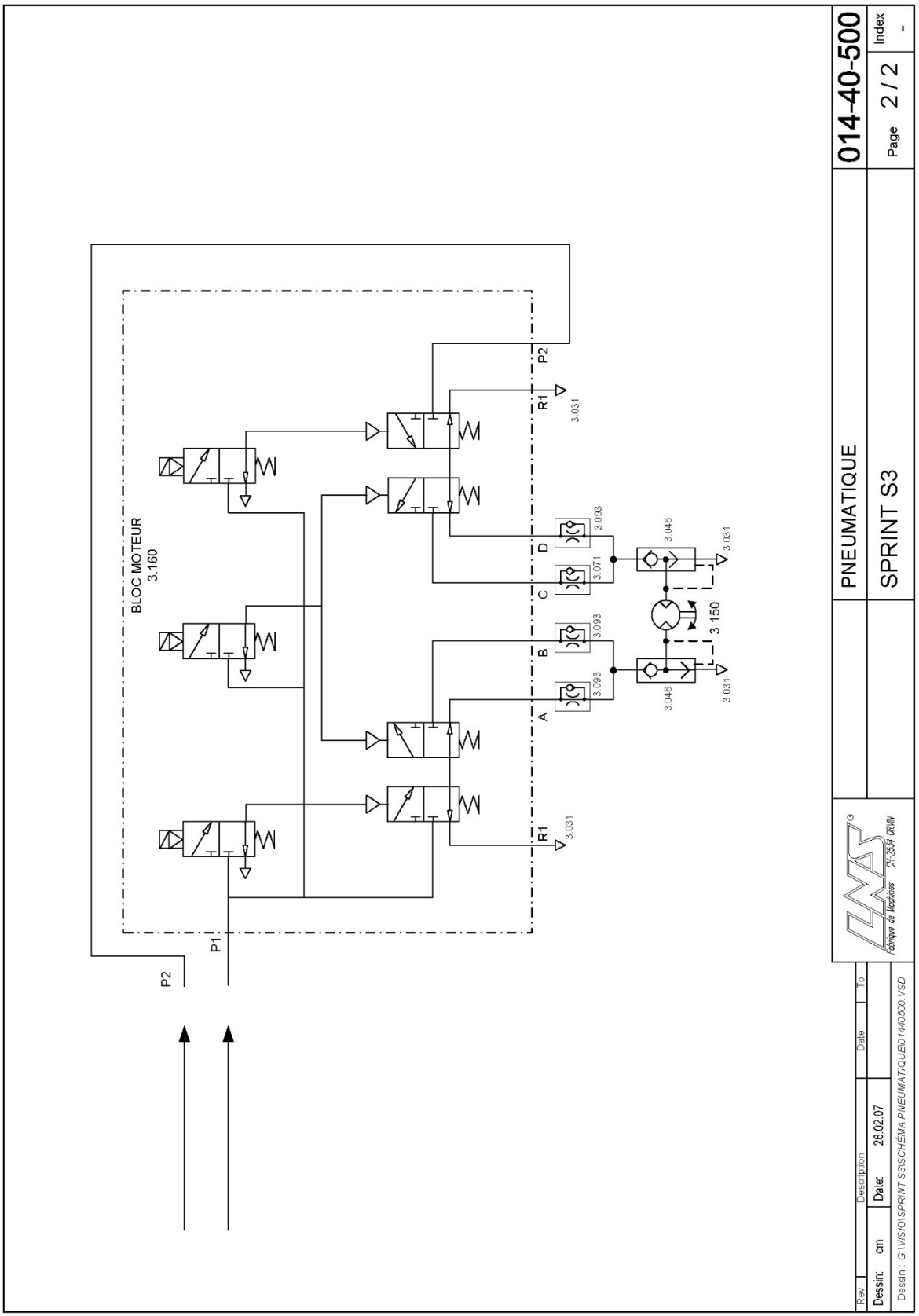
25. HYDRAULIC DIAGRAM



A	M1 / Motor 0,18 kw	**E**	B 34 / Pressure switch 0,5 Bar (12PSI)
B	Pump 15 l/min 4 Gal/min	**F**	Oil supply to bearing blocks
C	Flow adjustment	**G**	Oil filter
D	Pressure gauge		

26. PNEUMATIC DIAGRAM




BLOC MOTEUR
3.160
P1
P2
P2
R1
3.031
R1
3.031
A
B
C
D
3.093
3.093
3.071
3.093
3.046
3.046
3.031
3.031
3.150
PNEUMATIQUE
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-
Rev
Description
Date
To
Dessin: cm
Date: 26.02.07
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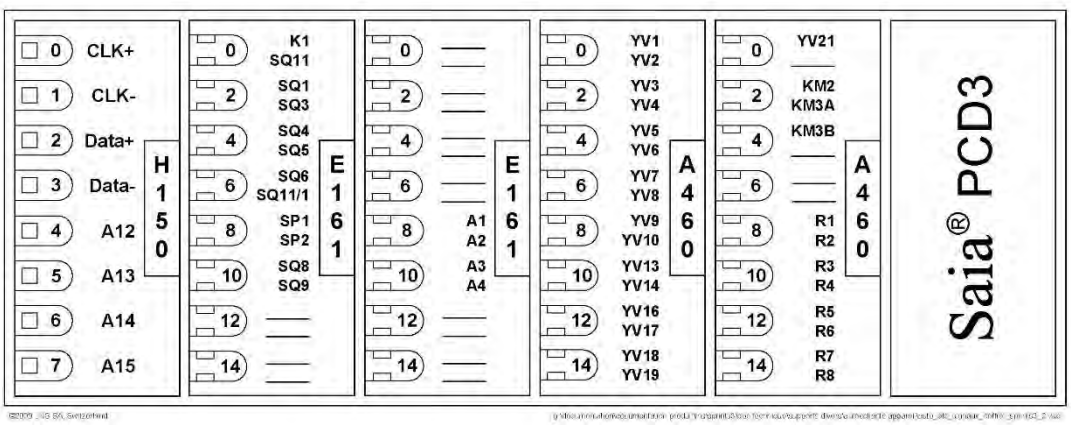
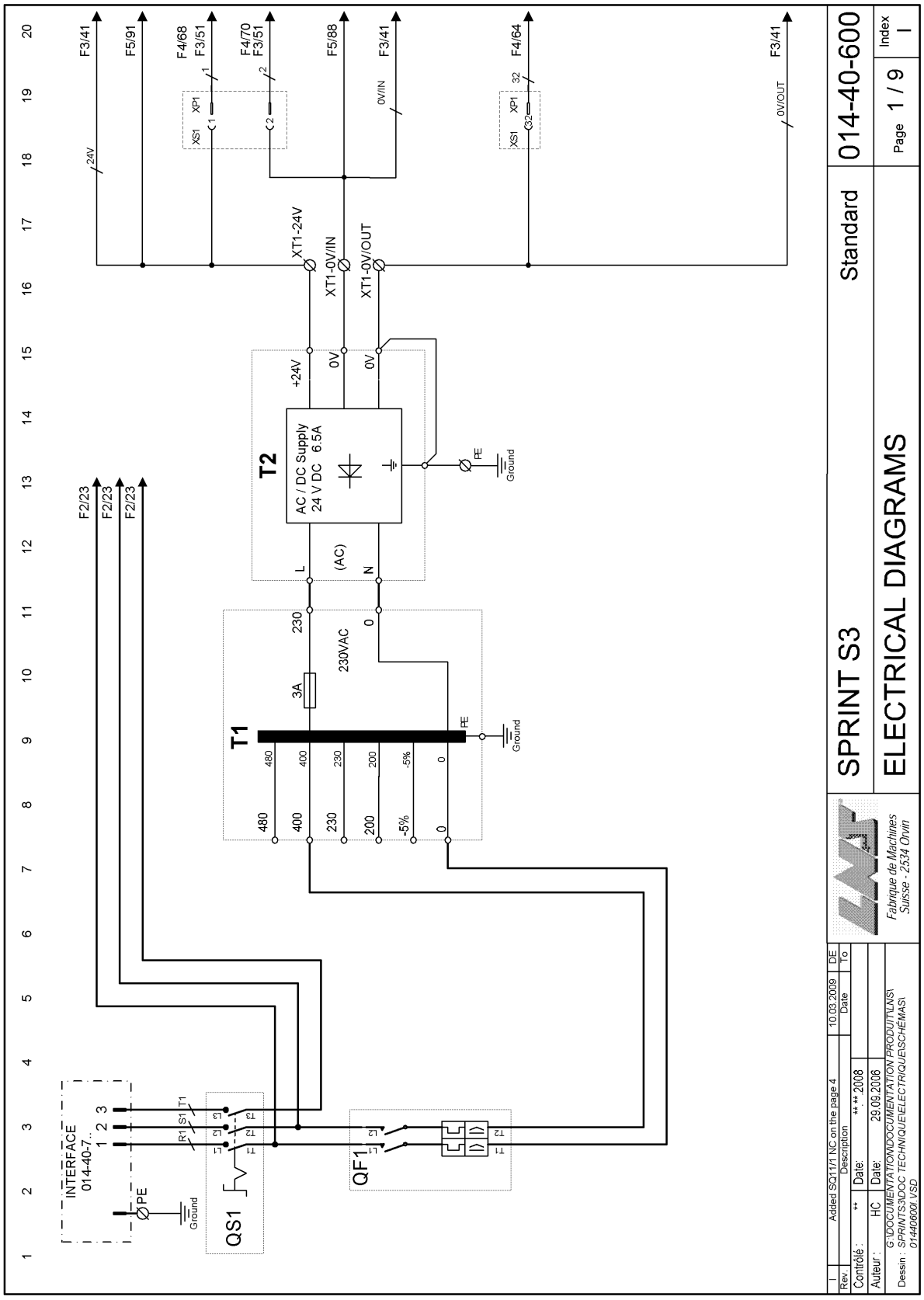
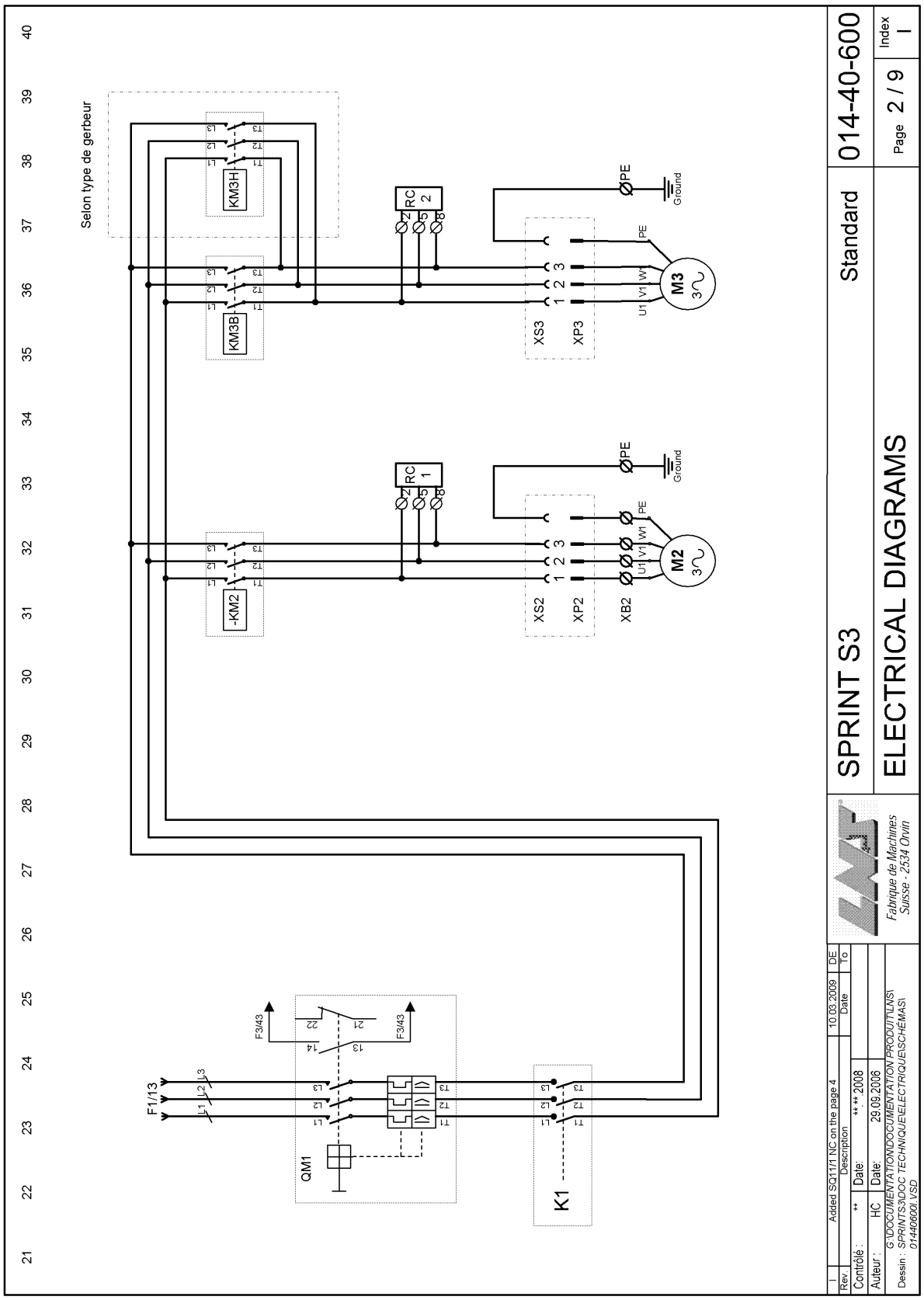
27. INPUTS AND OUTPUTS

Inputs		Outputs	
I16	Safety line relay (K1)	O48	Guiding element 1 (YV1)
I17	Main access cover safety (SQ11)	O49	Guiding element 2 (YV2)
I18	Measuring cell (SQ1)	O50	Guiding element 3 (YV3)
I19	Guiding bearings locked (SQ3)	O51	Guiding element 4 (YV4)
I20	Guiding bearings closed (SQ4)	O52	Guiding element 5 (YV5)
I21	Pusher in referencing position (SQ5)	O53	Guiding element 6 (YV6)
I22	Dropping fingers coupling (SQ6)	O54	Guiding element 7 (YV7)
I24	Air pressure switch (SP1)	O55	Guiding element 8 (YV8)
I25	Oil pressure switch (SP2)	O56	Guiding element 9 (YV9)
I26	Bar loader in lower position / Bar loader indexing (SQ8)	O57	Guiding element 10 (YV10)
I27	Bar loader in upper position / Bar presence on (SQ9)	O58	Guiding bearings opening (YV13)
I40	Clamping device signal A1	O59	Guiding bearings closing (YV14)
I41	Lathe in auto cycle A2	O60	Pusher in forward position (YV16)
I42	Feed order A3	O61	Pusher in backward position (YV17)
I43	Push order A4	O62	Low speed (YV18)
I44	Programmable interface input (option)	O63	Déposes matière (YV19)
I45	Programmable interface input (option)	O64	Air blast (YV21)
I46	Programmable interface input (option)	O66	Hydraulic motor (KM2)
I47	Programmable interface input (option)	O67	Bar loader motor for upper position / Bar loader (KM3A)
		O68	Moteur gerbeur descend (KM3B)
		O72	Relais d'alarme (R1)
		O73	Ravitailleur en chargement (R2)
		O74	Relais de fin de barre (R3)
		O75	Relais de libération de poupée (R4)
		O76	Sortie interface paramétrable
		O77	Sortie interface paramétrable
		O78	Sortie interface paramétrable
		O79	Sortie interface paramétrable



28. ELECTRICAL DIAGRAM




Selon type de gerbeur
KM3H
KM3B
-KM2
RC 2
RC 1
XS3
XP3
XS2
XP2
XB2
M3
M2
PE
Ground
F1/13
L1 L2 L3
F3/43
QM1
K1
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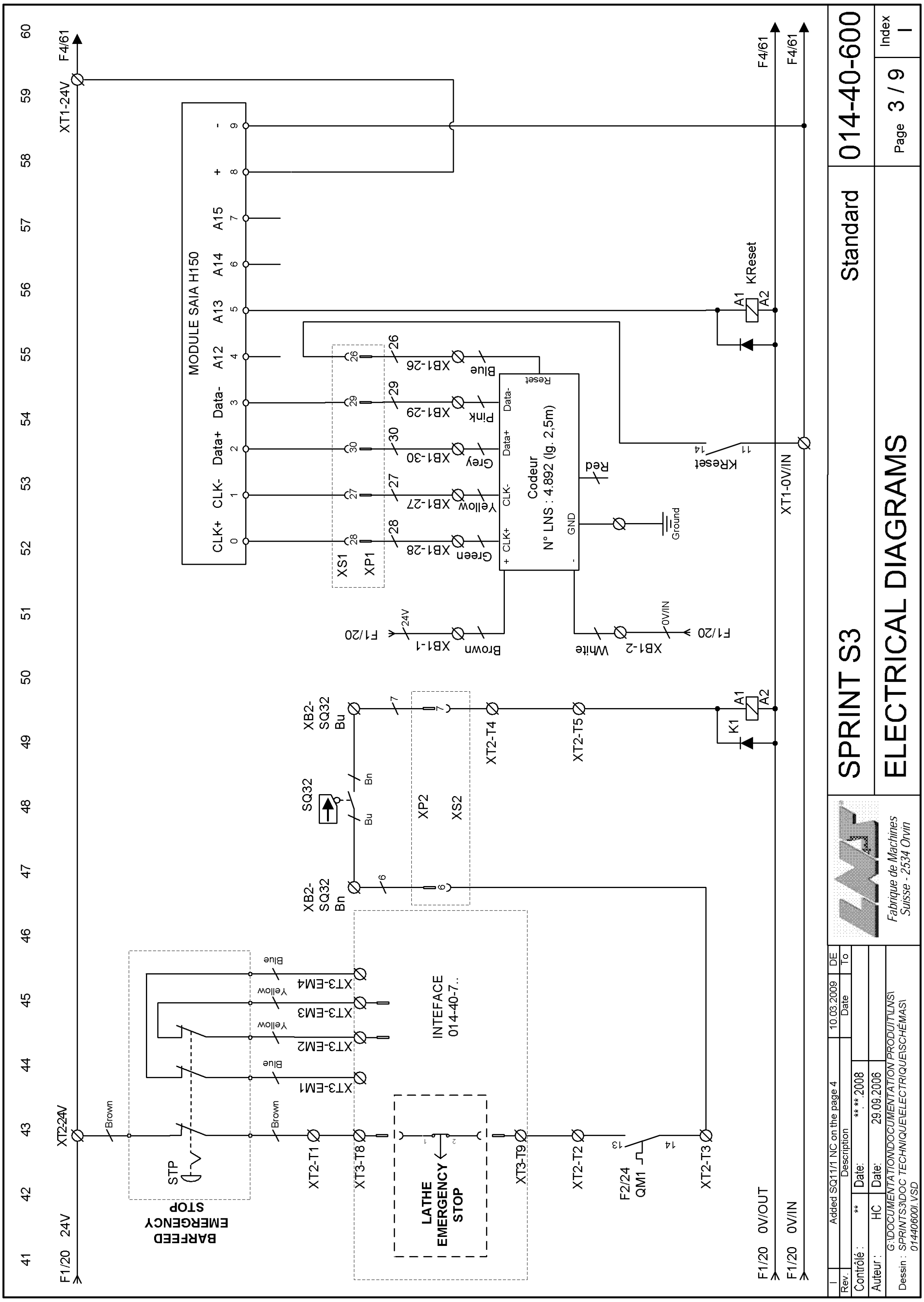
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I
Fabrique de Machines
Suisse - 2534 Orvin
MODULE SAIA H150
CLK+ CLK- Data+ Data- A12 A13 A14 A15 + -
Codeur
N° LNS : 4.892 (lg. 2,5m)
KReset
K1
SQ32
XB2-SQ32 Bu
XB2-SQ32 Bn
XP2
XS2
XS1
XP1
INTEFACE
014-40-7..
LATHE
EMERGENCY
STOP
BARFEED
EMERGENCY
STOP
STP
F2/24
QM1
Ground
XT1-24V
XT1-0V/IN
F1/20 24V
F1/20 0V/OUT
F1/20 0V/IN
F4/61
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Auteur :
HC
29.09.2006
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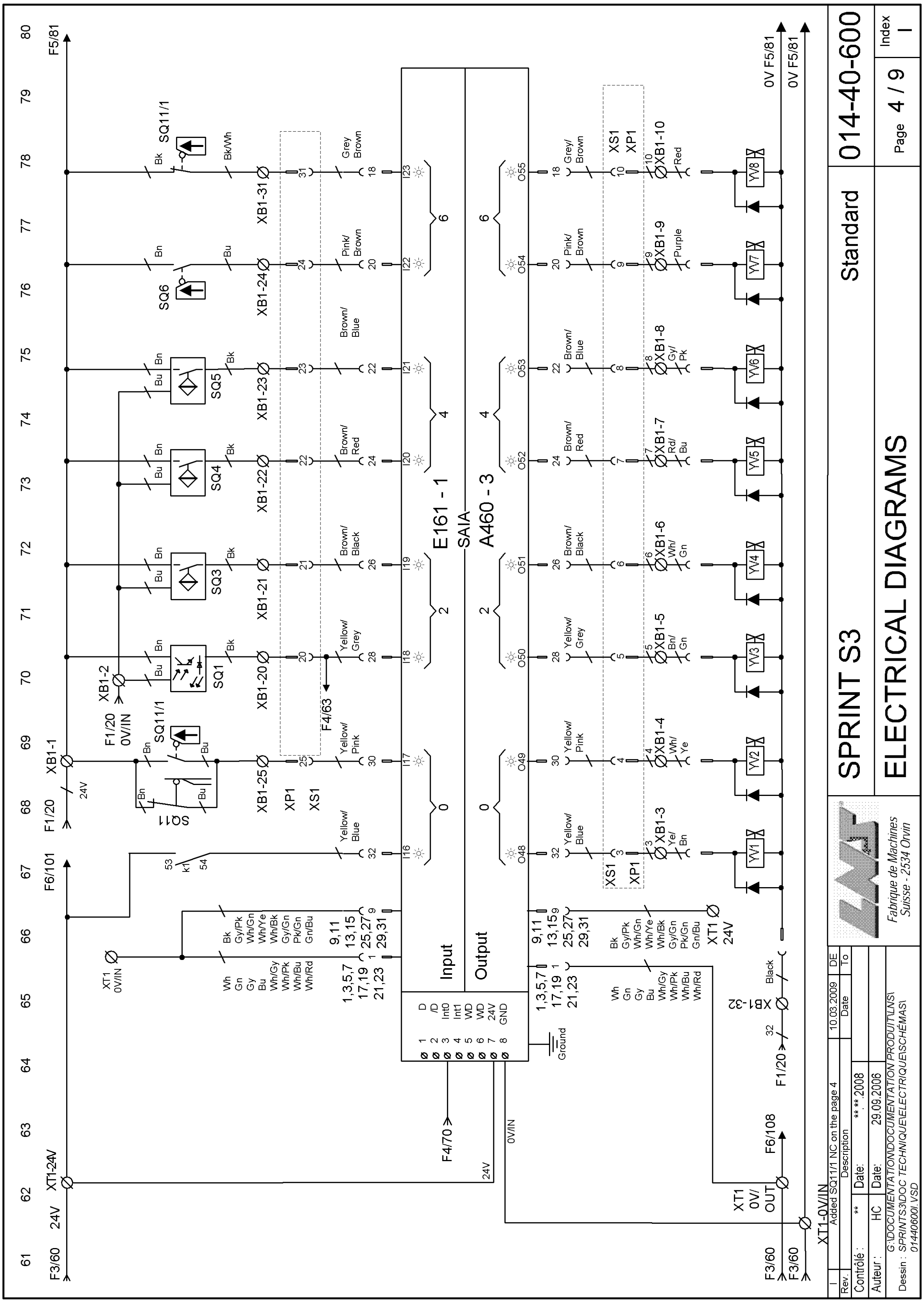
01440600I.VSD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I
E161 - 1
SAIA
A460 - 3
Input
Output
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29.09.2006
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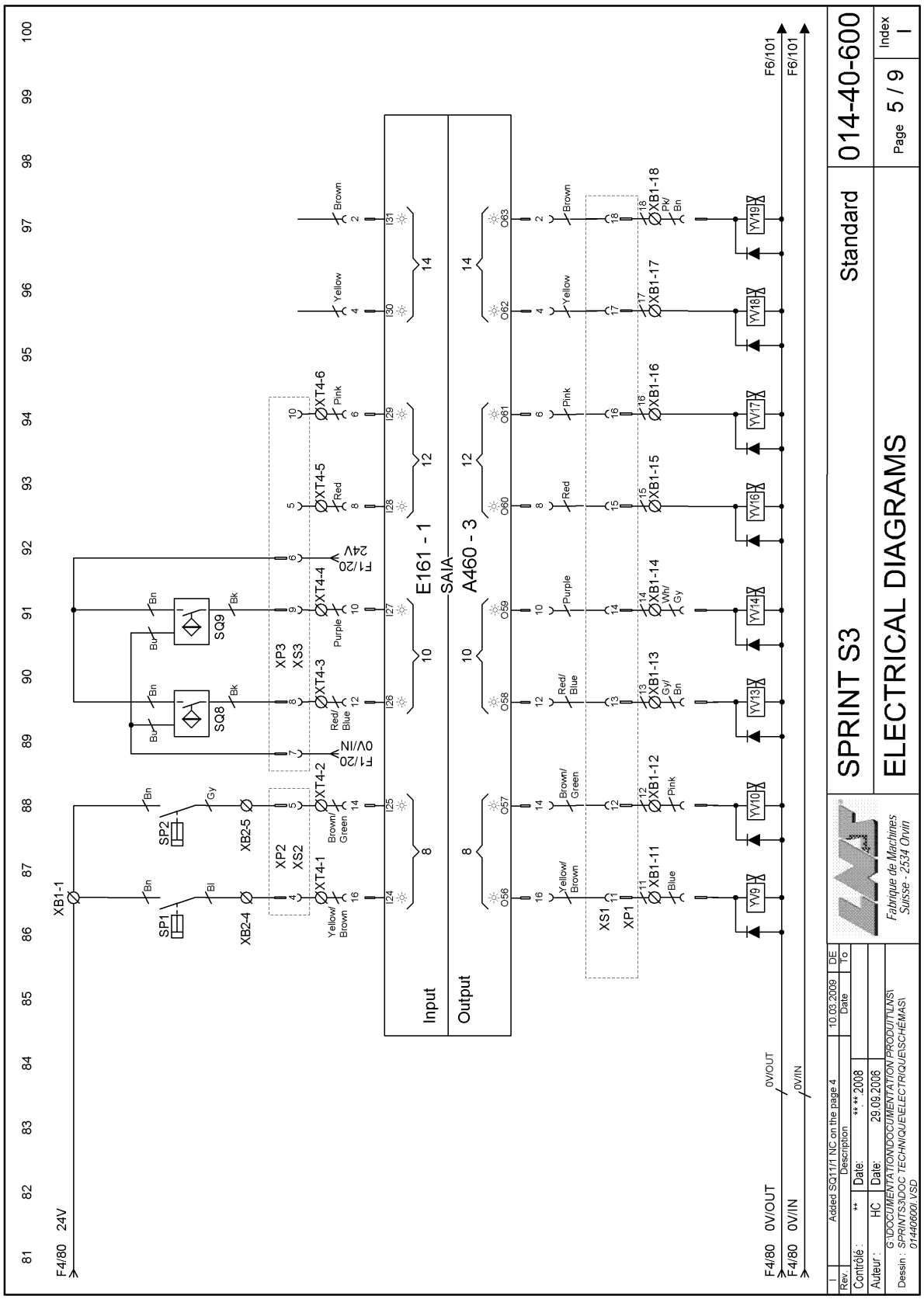
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Standard
014-40-600
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Input
Output
SAIA
E161 - 1
A460 - 3
XB1-1
SP1
SP2
XB2-4
XB2-5
SQ8
SQ9
XP2
XS2
XP3
XS3
XS1
XP1
XT4-1
XT4-2
XT4-3
XT4-4
XT4-5
XT4-6
XB1-11
XB1-12
XB1-13
XB1-14
XB1-15
XB1-16
XB1-17
XB1-18
YV9
YV10
YV13
YV14
YV16
YV17
YV18
YV19
F1/20
24V
0V/IN
F4/80 24V
F4/80 0V/OUT
F4/80 0V/IN
F6/101
0V/OUT
0V/IN
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Date
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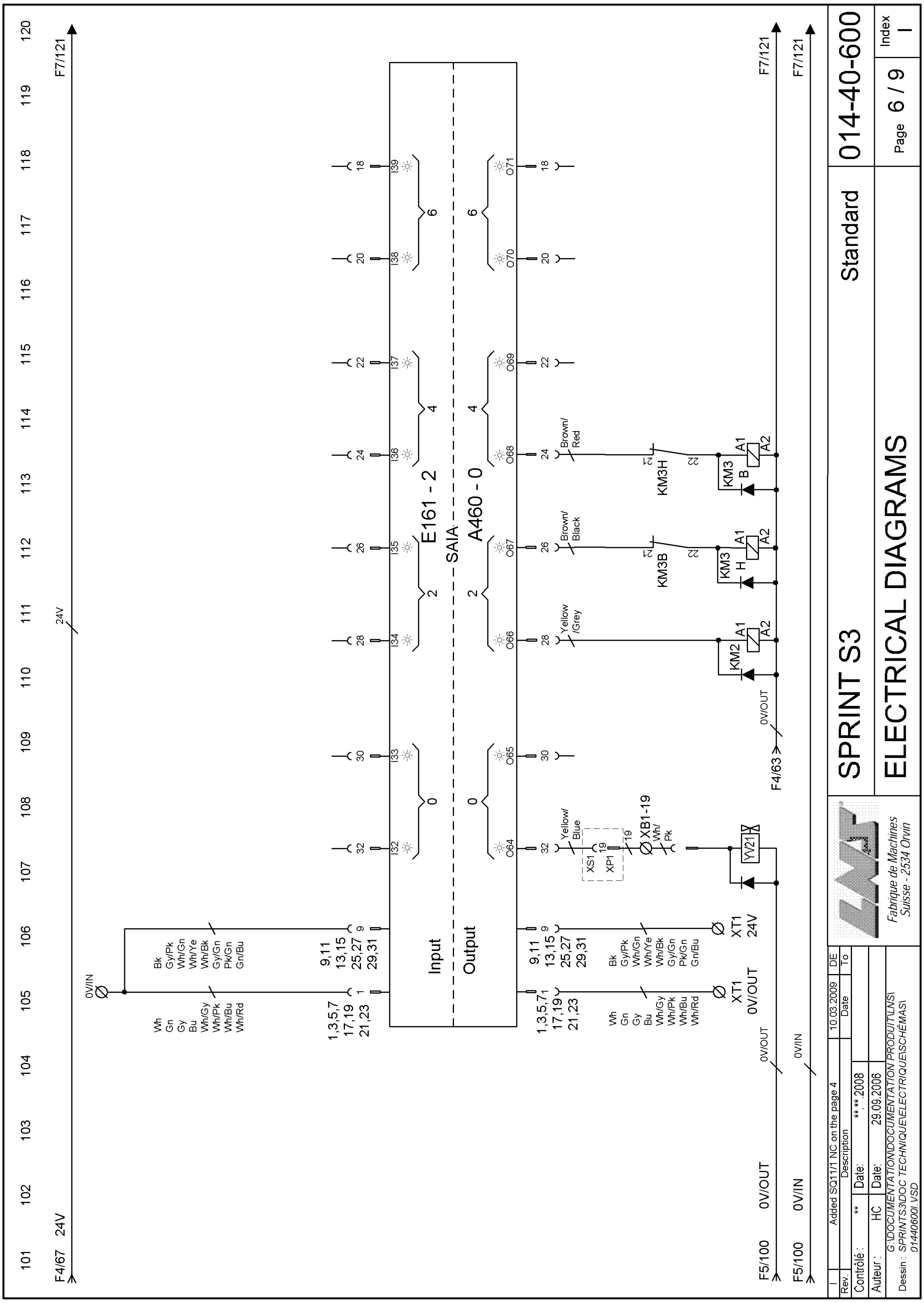

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I
Fabrique de Machines
Suisse - 2534 Orvin
SAIA
E161 - 2
A460 - 0
Input
Output
F4/67 24V
F5/100 0V/OUT
F5/100 0V/IN
F7/121
F4/63
XT1 0V/OUT
XT1 24V
KM2
KM3 H
KM3 B
KM3B
KM3H
YV21
XB1-19
XS1
XP1
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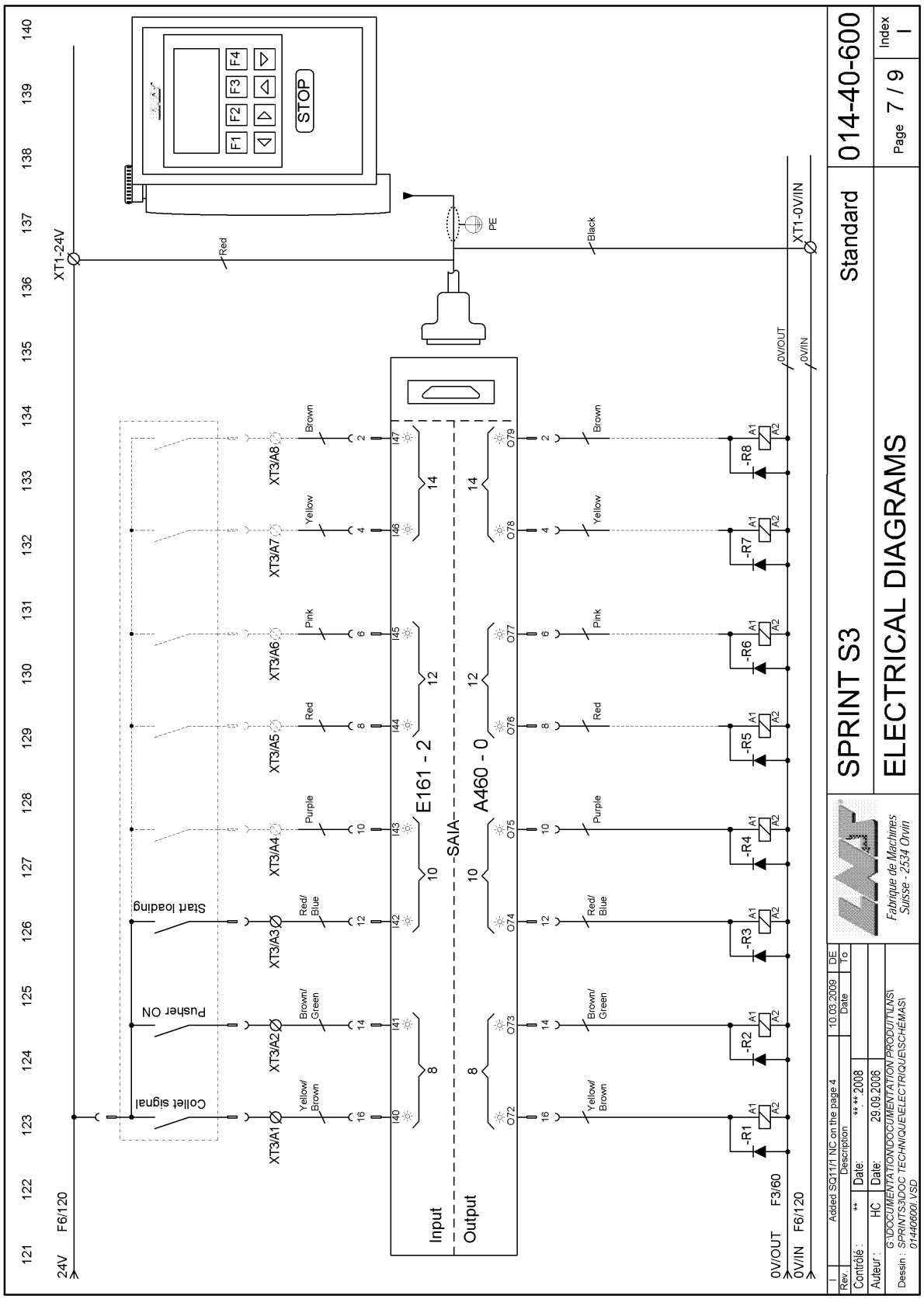
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Date:
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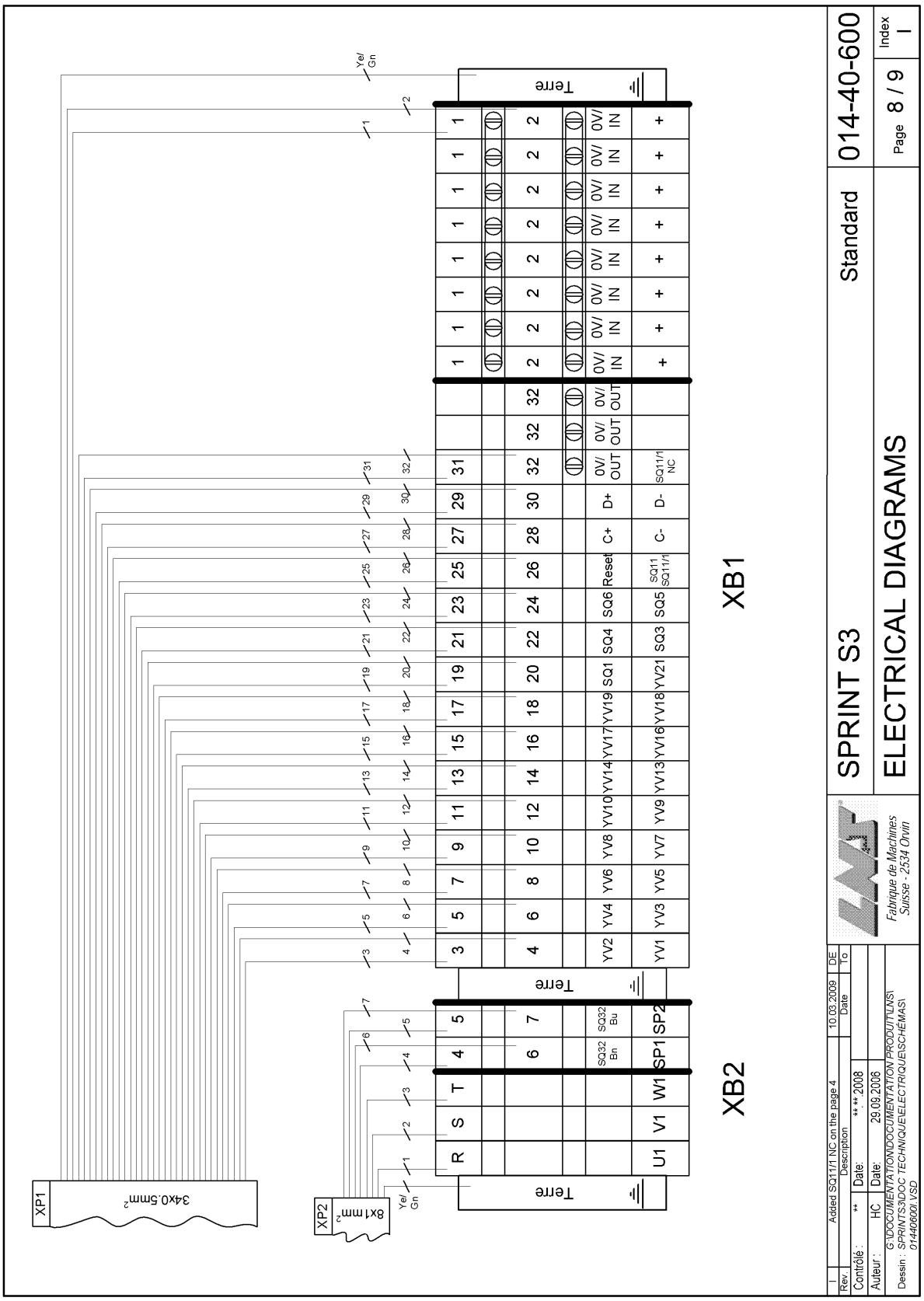
Dessin : SPRINTS3\DOC TECHNIQUE\ELECTRIQUE\SCHEMAS\
01440600I.VSD
Input
Output
E161 - 2
A460 - 0
-SAIA
Start loading
Pusher ON
Collet signal
STOP
F1
F2
F3
F4
XT1-24V
XT1-0V/IN
0V/OUT
0V/IN
PE
Red
Black
Brown
Yellow
Pink
Purple
Red/Blue
Brown/Green
Yellow/Brown
XT3/A1
XT3/A2
XT3/A3
XT3/A4
XT3/A5
XT3/A6
XT3/A7
XT3/A8
-R1
-R2
-R3
-R4
-R5
-R6
-R7
-R8


XP1
34x0.5mm²
XP2
8x1mm²
Ye/ Gn
XB2
XB1
Terre
U1 V1 W1 SP1 SP2
R S T
SQ32 Bn
SQ32 Bu
YV1 YV2 YV3 YV4 YV5 YV6 YV7 YV8 YV9 YV10 YV13 YV14 YV16 YV17 YV18 YV19 YV21 SQ1 SQ3 SQ4 SQ5 SQ6 SQ11 SQ11/1
Reset
C- C+ D- D+
SQ11/1 NC
0V/ OUT
0V/ IN
+
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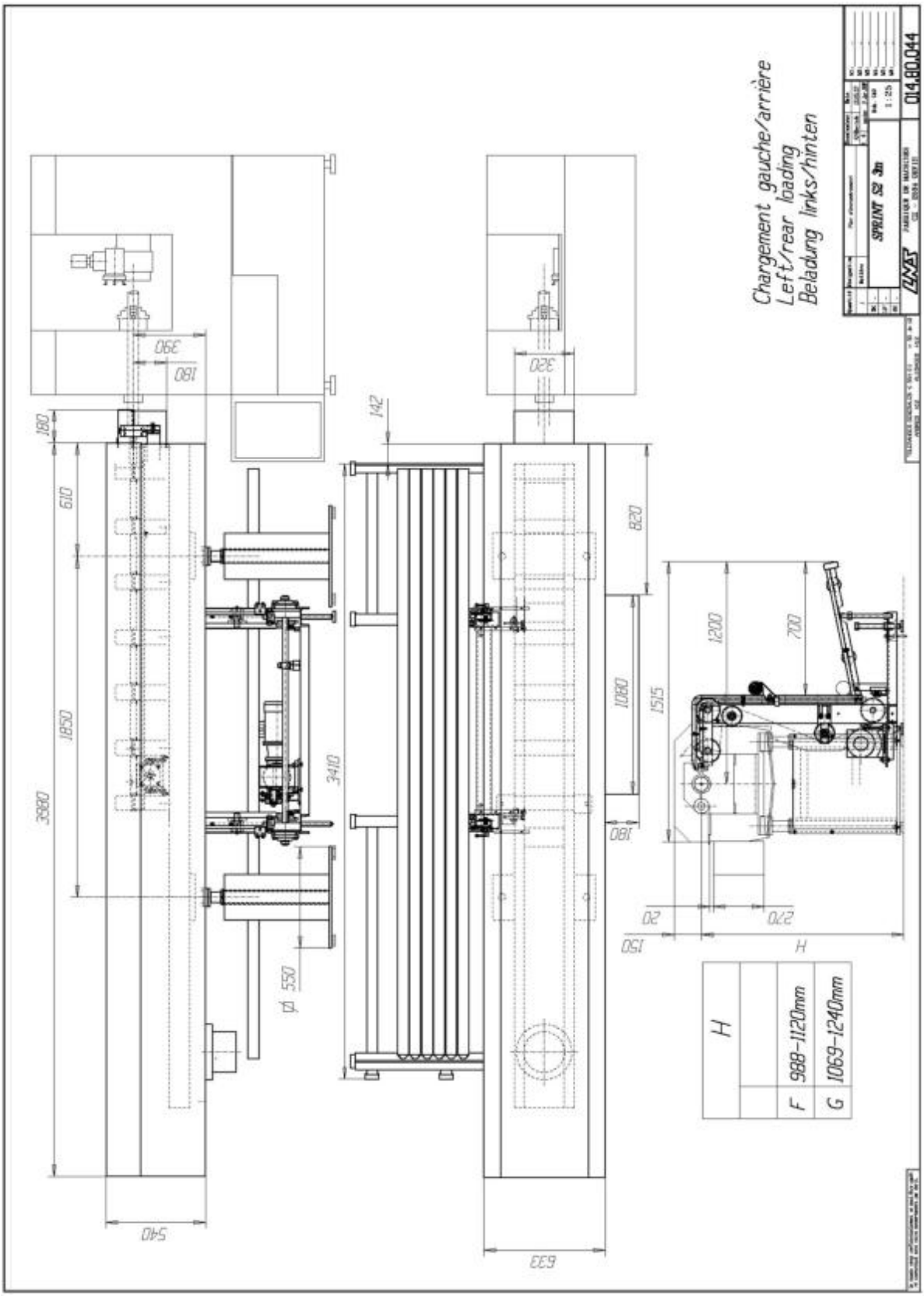
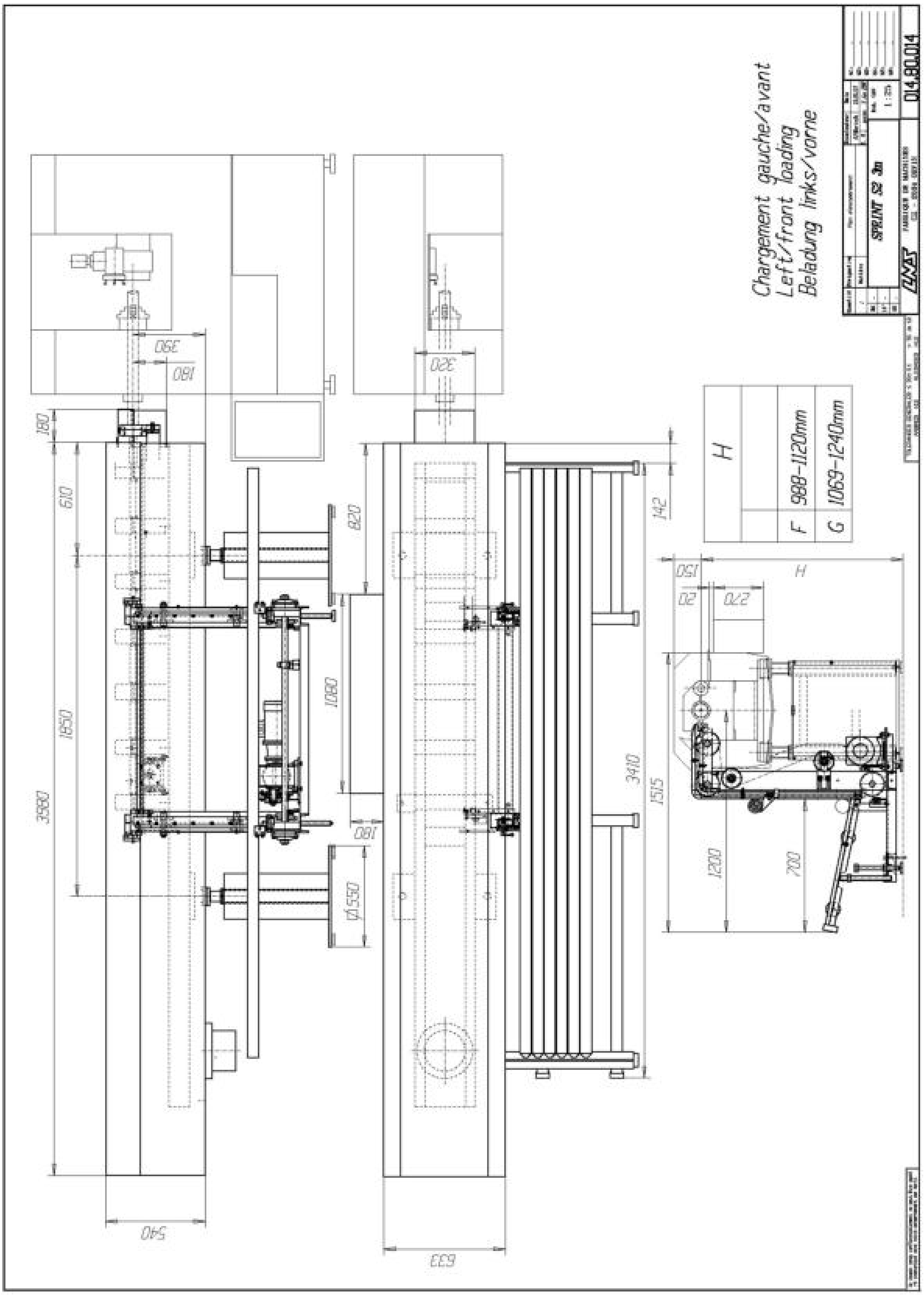
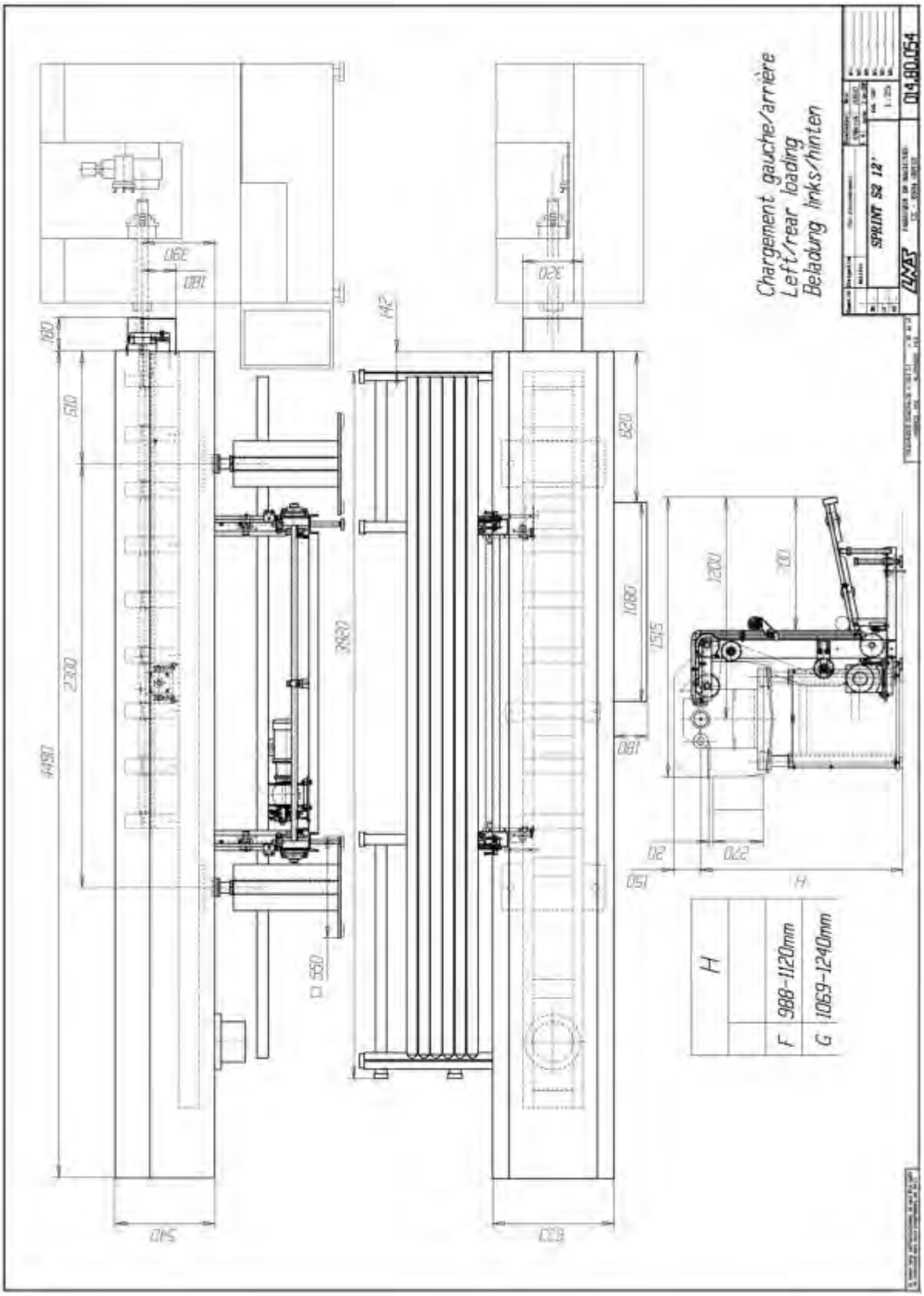
29. FLOOR PLANS




Chargement gauche/avant
Left/front loading
Beladung links/vorne
H
F 988-1120mm
G 1069-1240mm
SPRINT S2 3m
D14.80.014
390
180
320
180
610
1850
3580
820
1080
180
⌀550
540
633
142
3410
1515
150
20
270
H
1200
700


Chargement gauche/arrière
Left/rear loading
Beladung links/hinten
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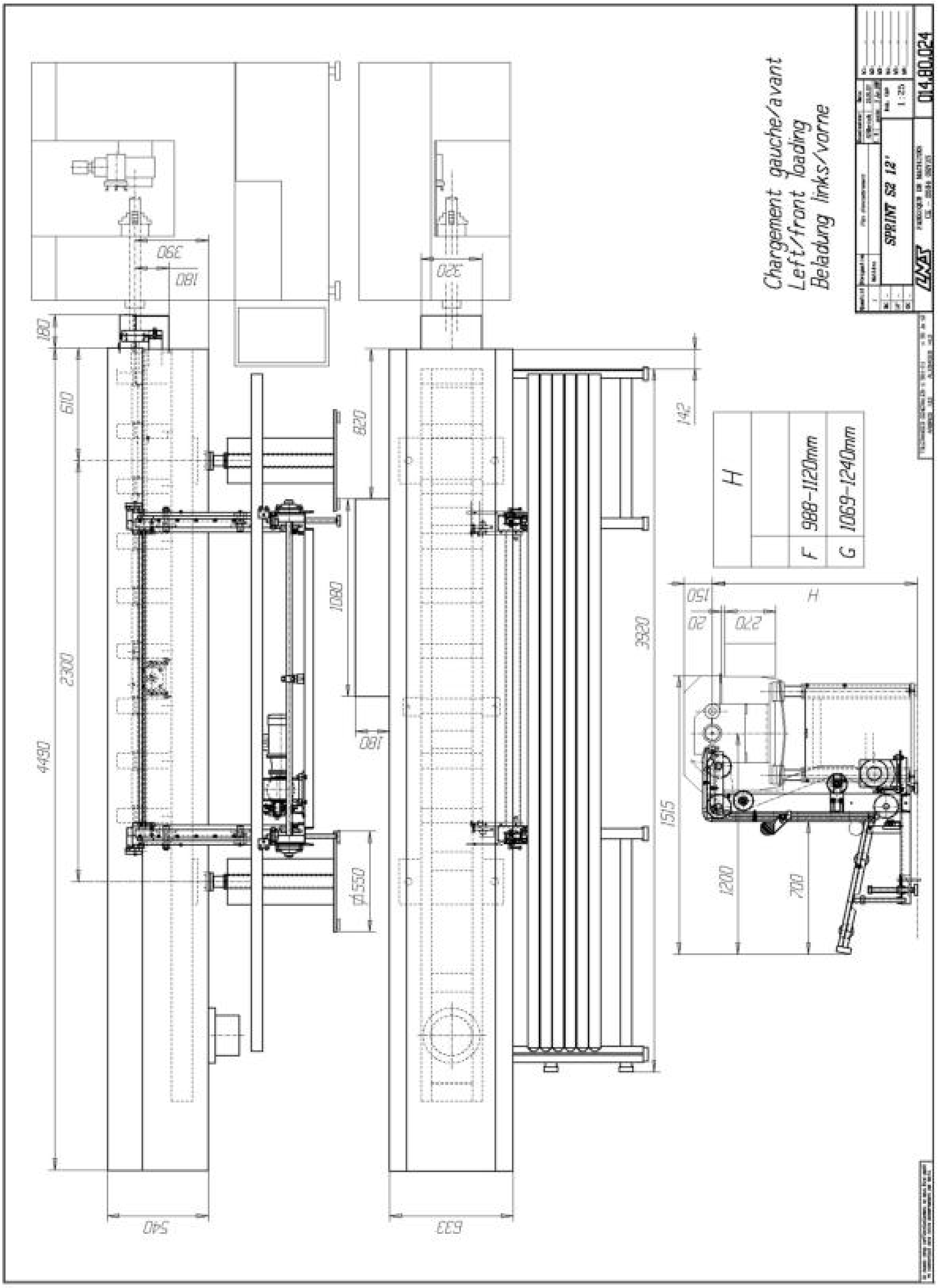
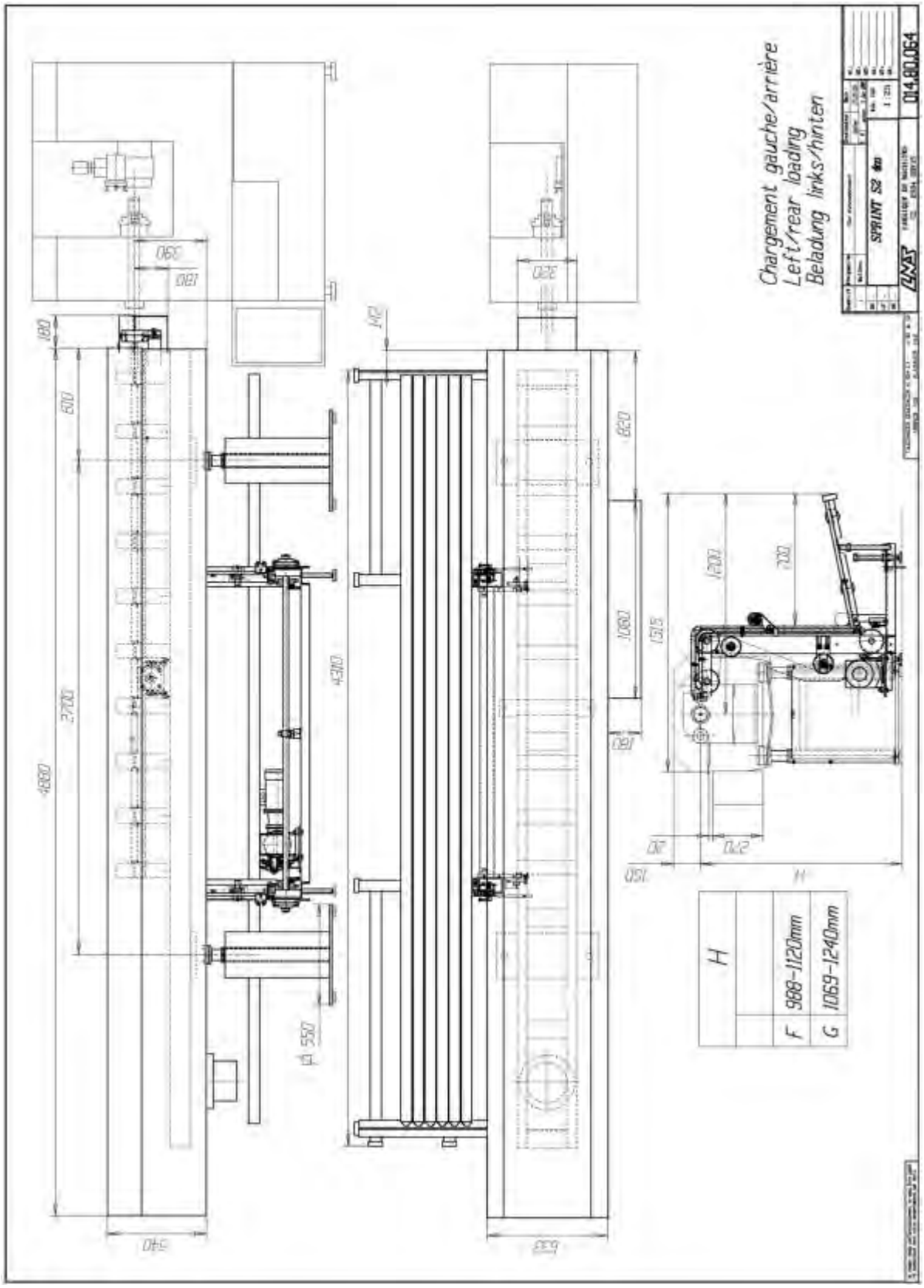
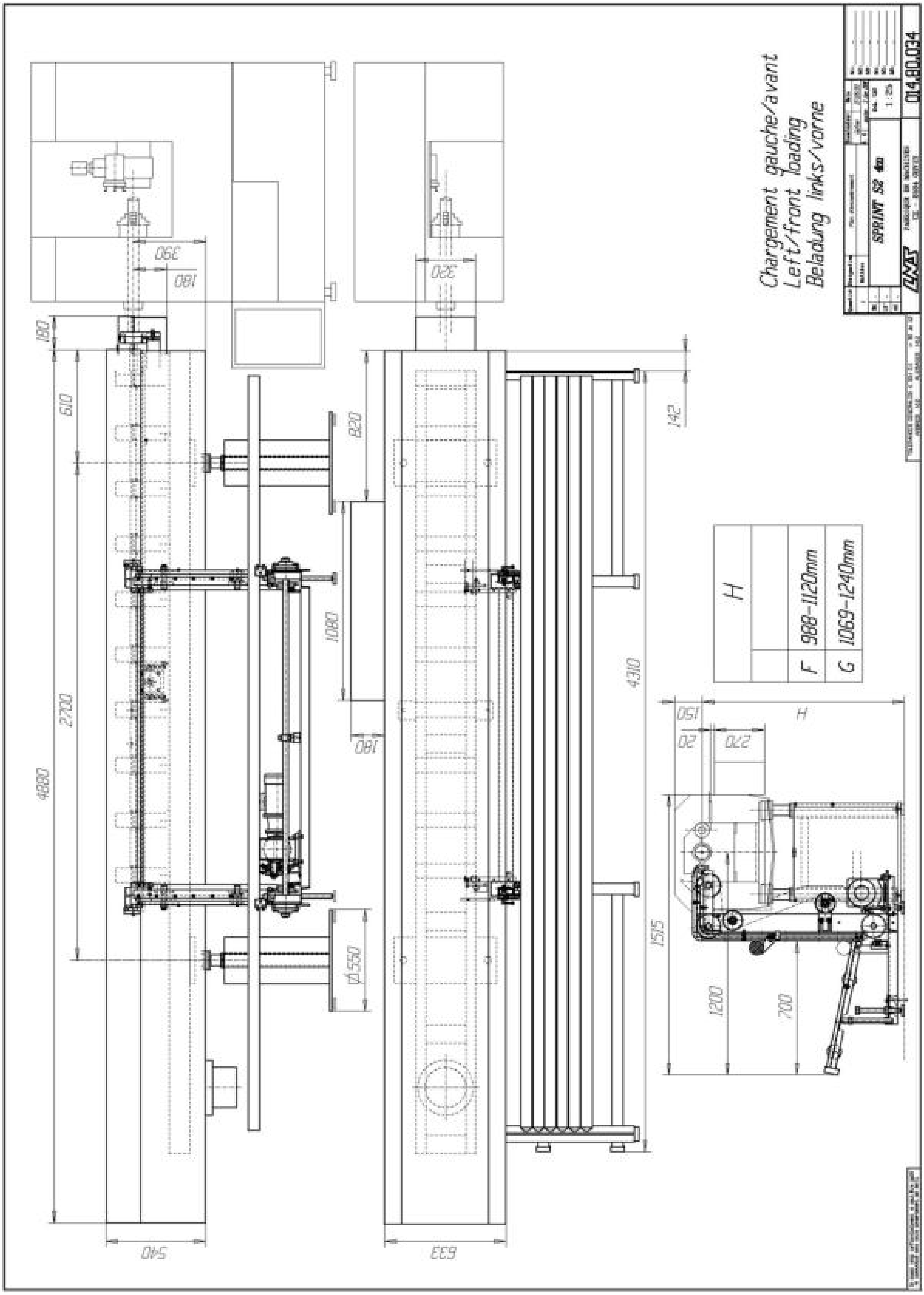
014.80.054
H
F 988-1120mm
G 1059-1240mm

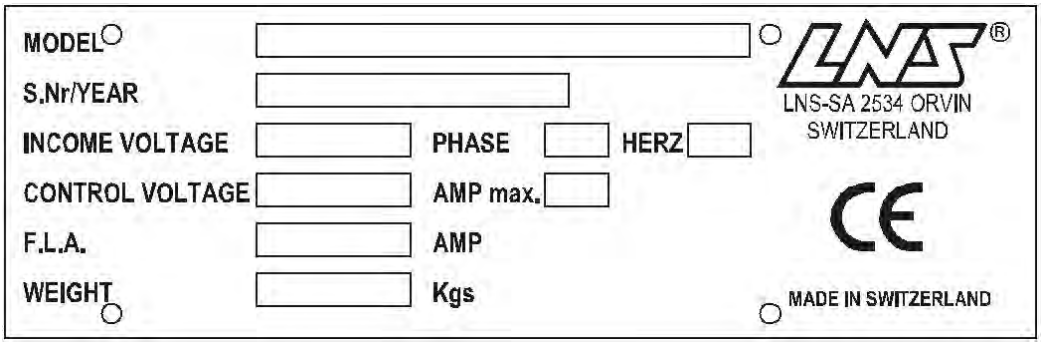

Chargement gauche/avant
Left/front loading
Beladung links/vorne
H
F 988-1120mm
G 1069-1240mm
SPRINT S2 12'
014.80.024

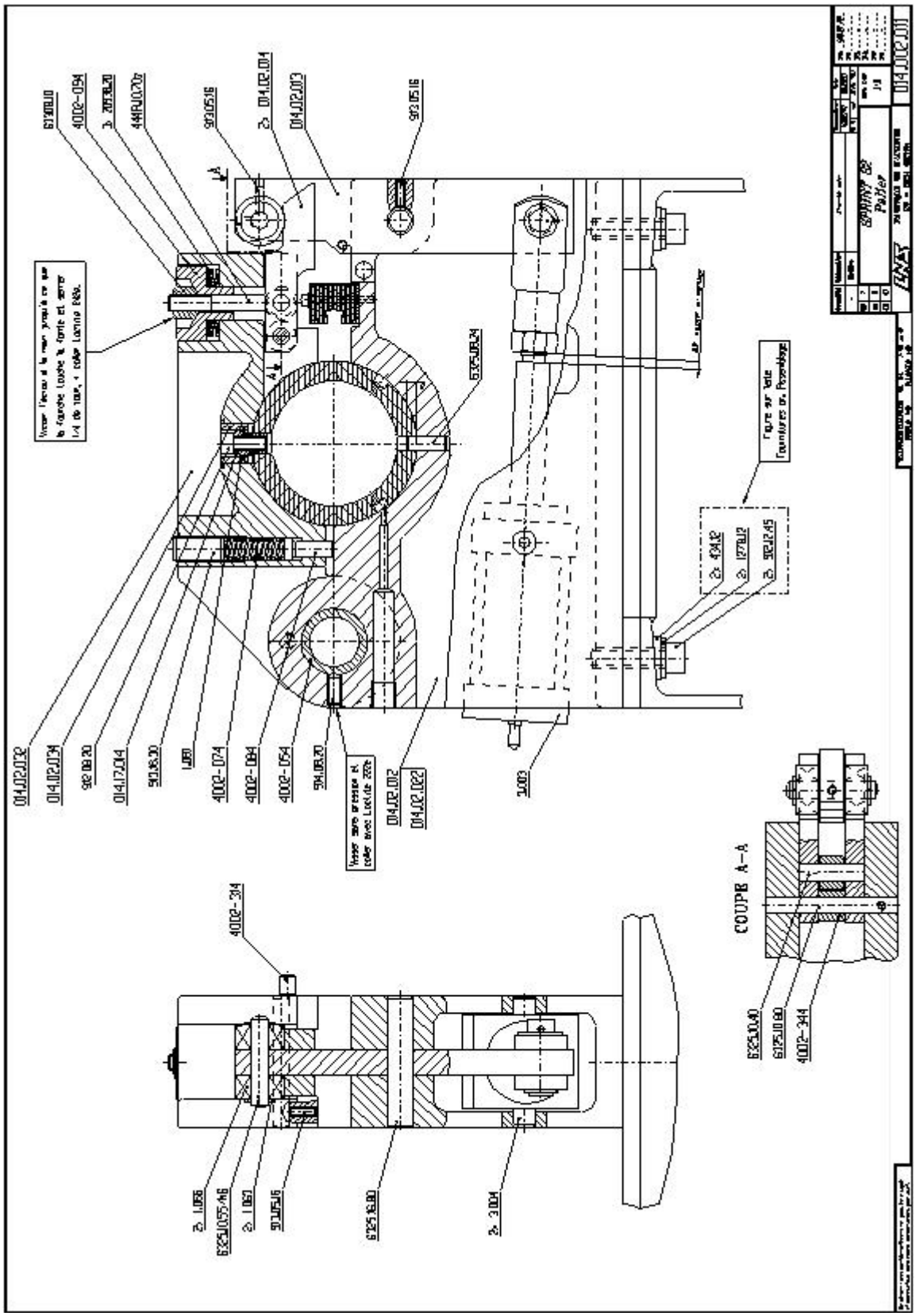

Chargement gauche/arrière
Left/rear loading
Beladung links/hinten
SPRINT S2
014.80.064
H
F 988-1120mm
G 1069-1240mm

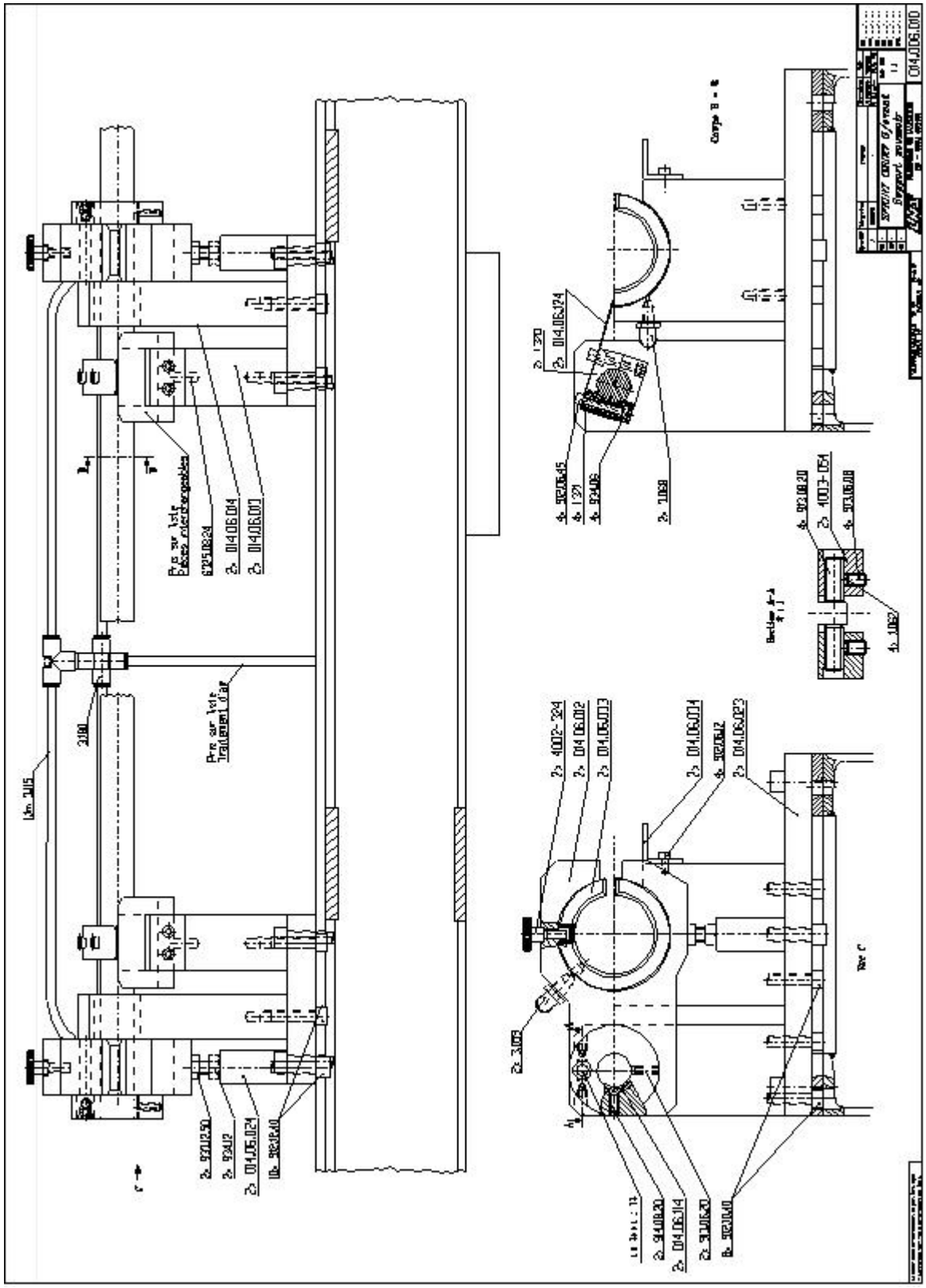

Chargement gauche/avant
Left/front loading
Beladung links/vorne
H
F 988-1120mm
G 1069-1240mm
SPRINT S2
014.80.034
4880
2700
610
180
390
320
820
1080
142
4310
1515
150
20
270
1200
700
Ø550
540
633

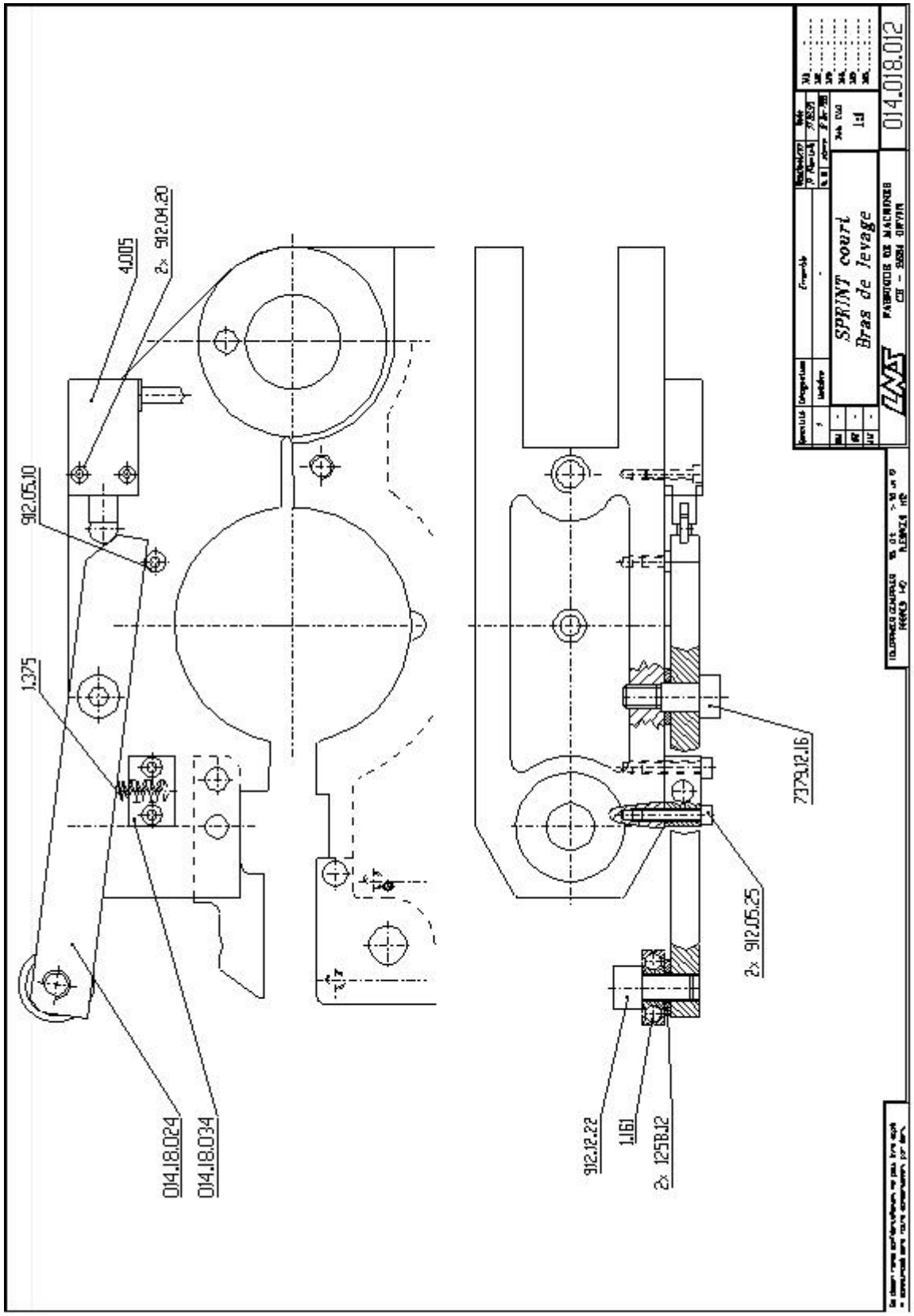
30. SPARE PARTS

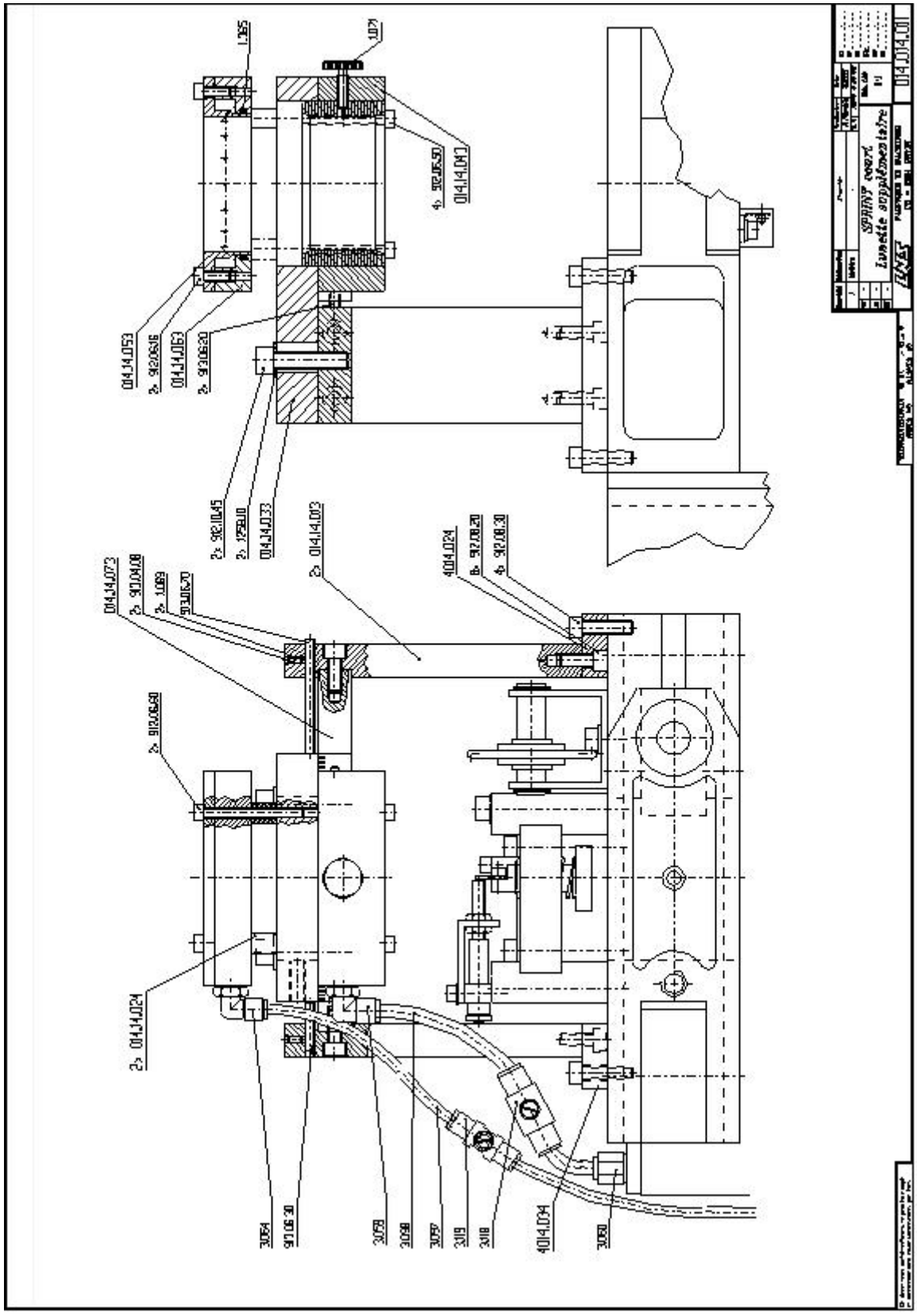
When ordering parts, always indicate the part number and the fabrication number of the bar feeder.
The fabrication number is printed on a tag located inside the SPRINT on the chassis.
The main cover must be opened to access to the tag.

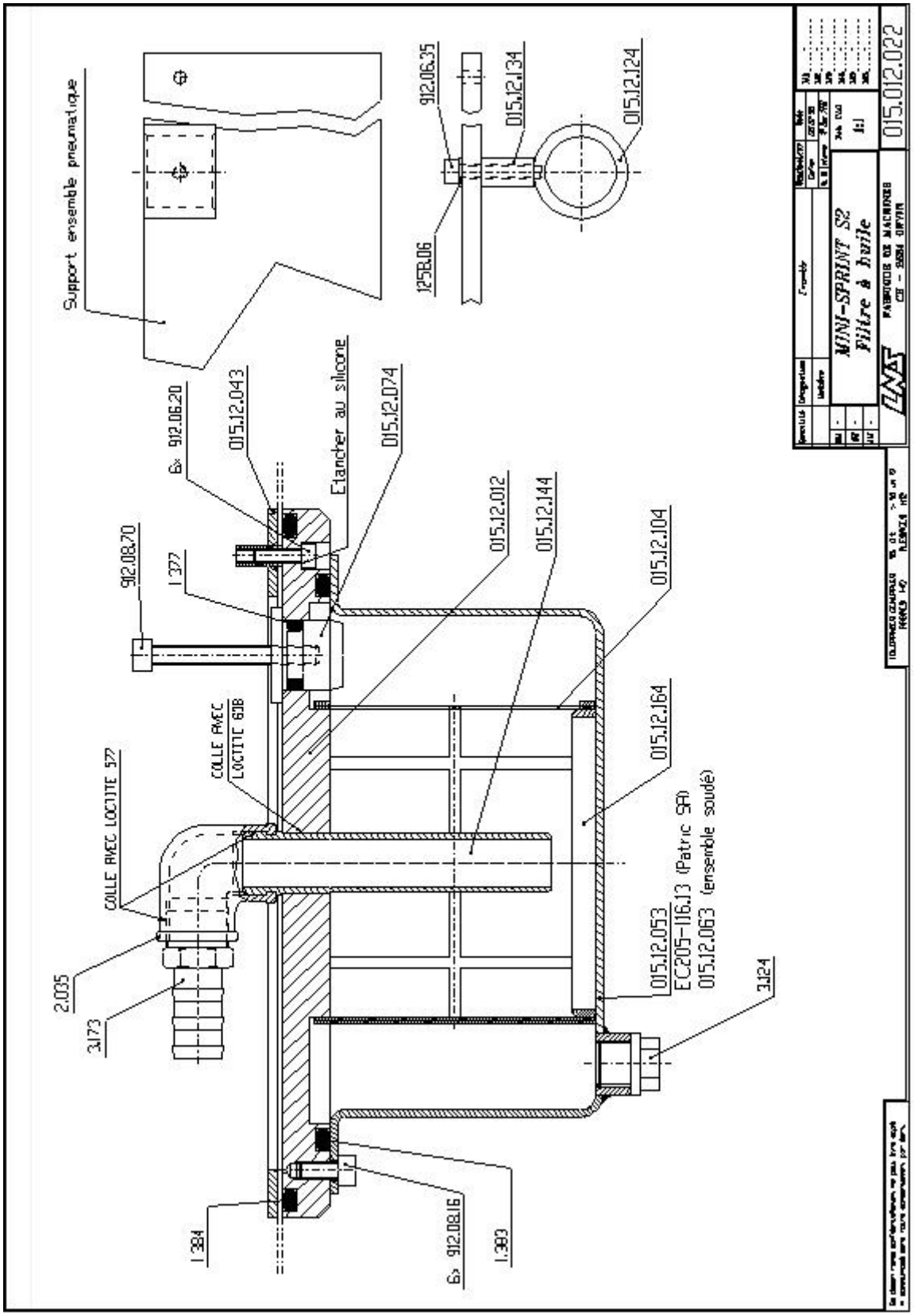


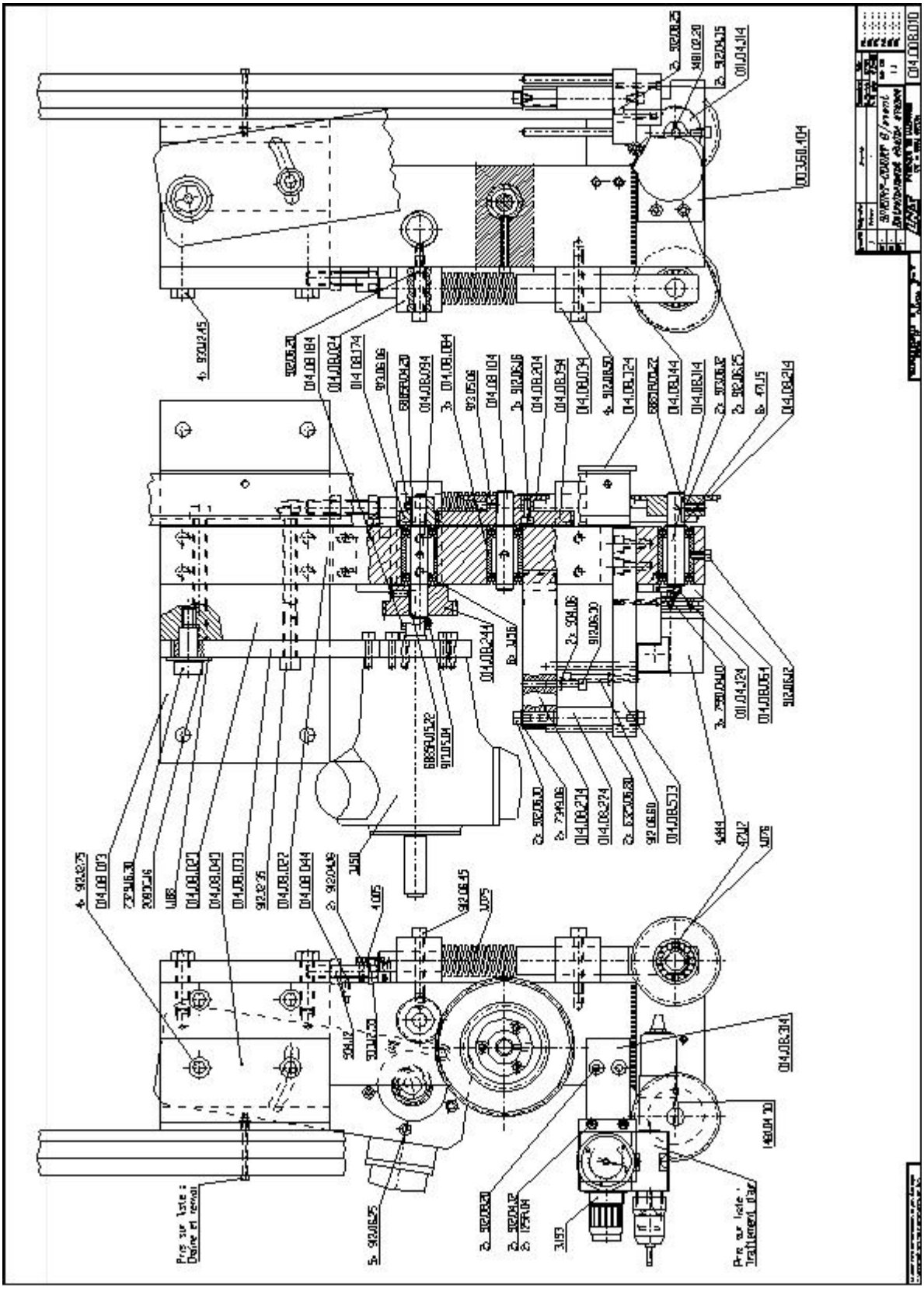

014.002.011
COUPE A-A

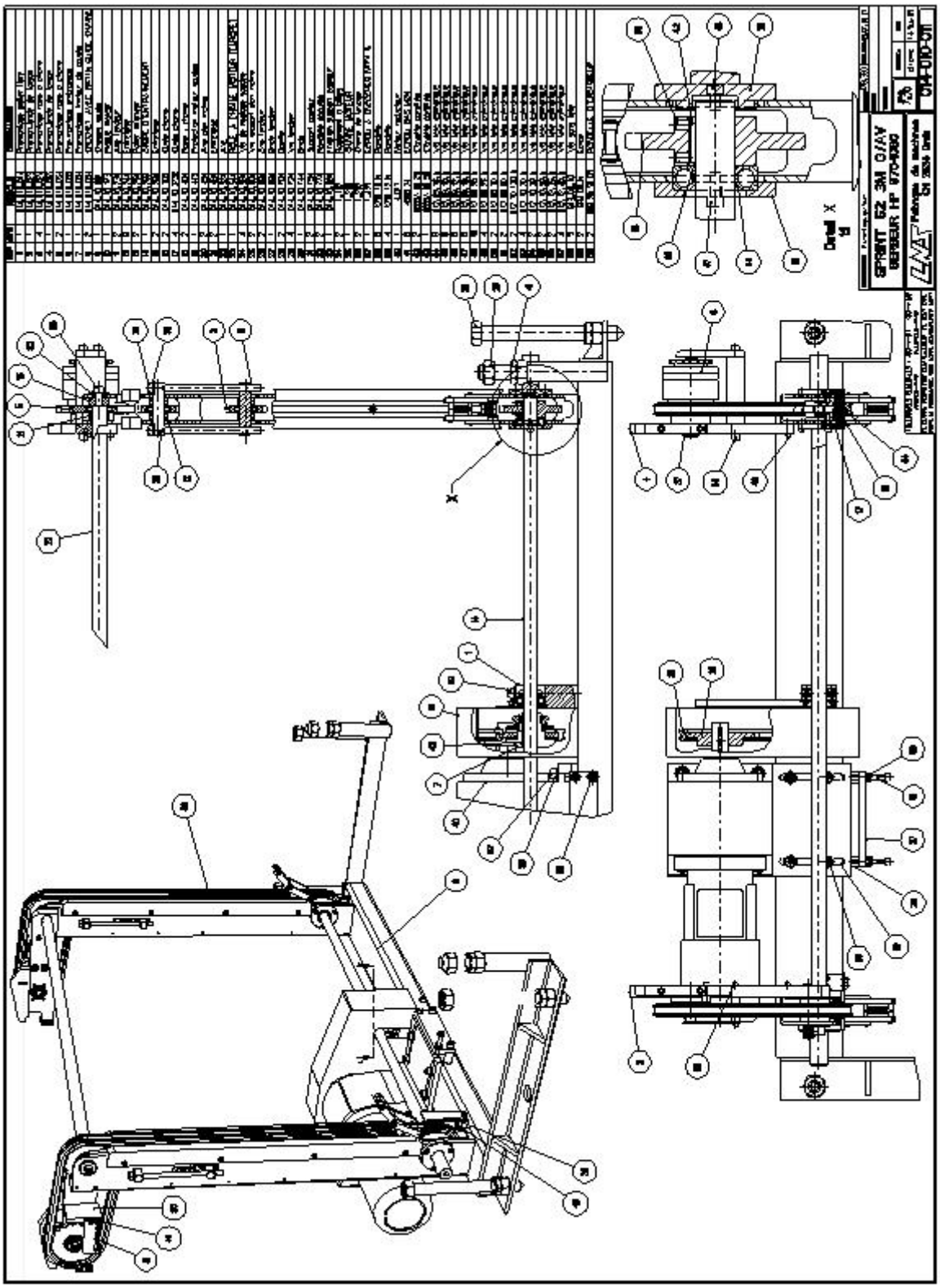


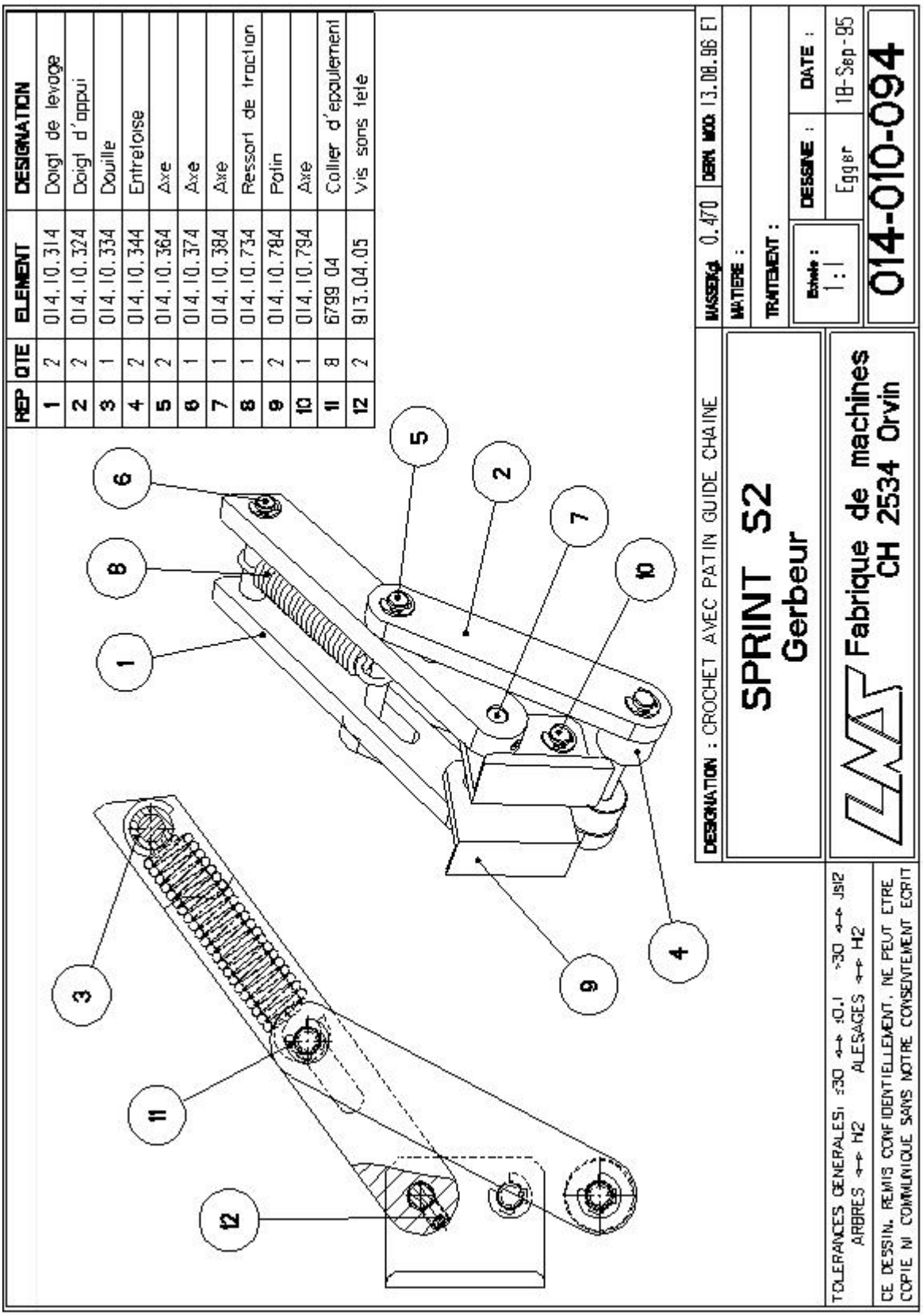

4.005
2x 912.04.20
912.05.10
1.375
014.18.024
014.18.034
912.12.22
1.161
2x 125B.12
2379.12.16
2x 912.05.25
SPRINT court
Bras de levage
014.018.012



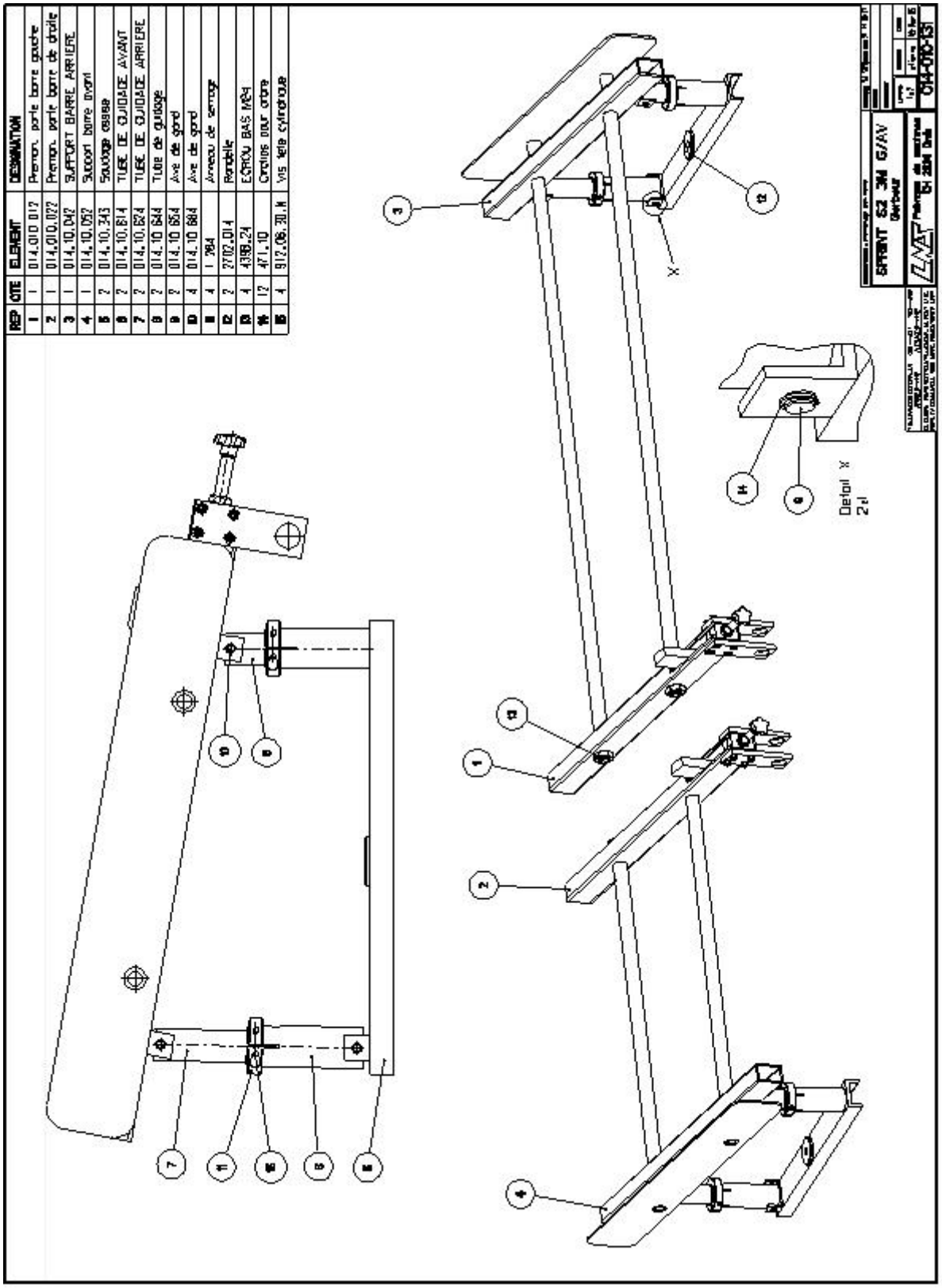

Support ensemble pneumatique
912.06.35
015.12.134
015.12.124
1258.06
6x 912.06.20
015.12.043
Etancher au silicone
015.12.074
912.08.70
1377
015.12.012
015.12.144
015.12.104
COLLE AVEC LOCTITE 638
COLLE AVEC LOCTITE 577
015.12.164
2.035
3173
015.12.053
EC205-116.13 (Patric SPA)
015.12.063 (ensemble soudé)
3124
1384
6x 912.08.16
1383
MINI-SPRINT S2
Filtre à huile
015.012.022

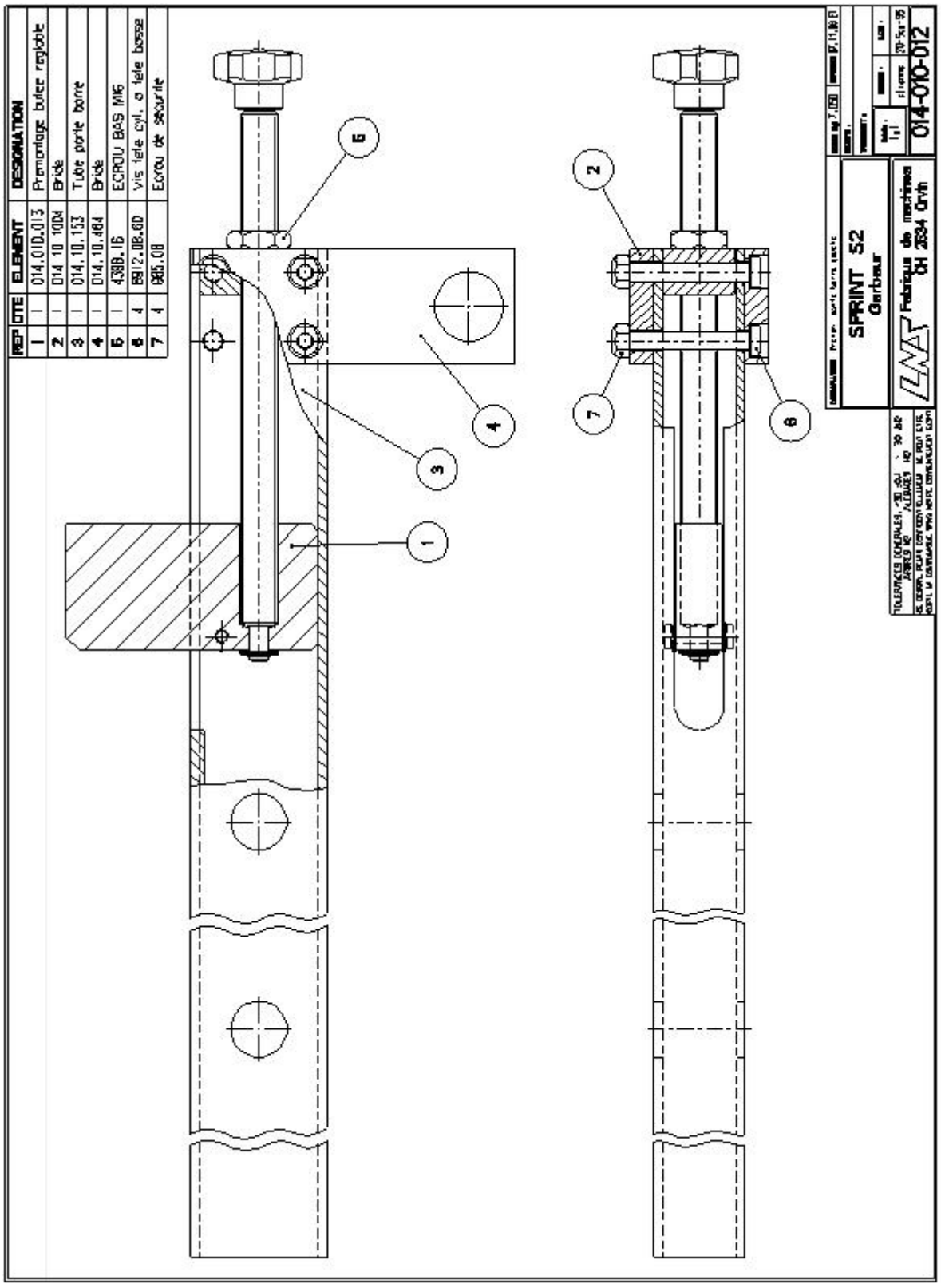


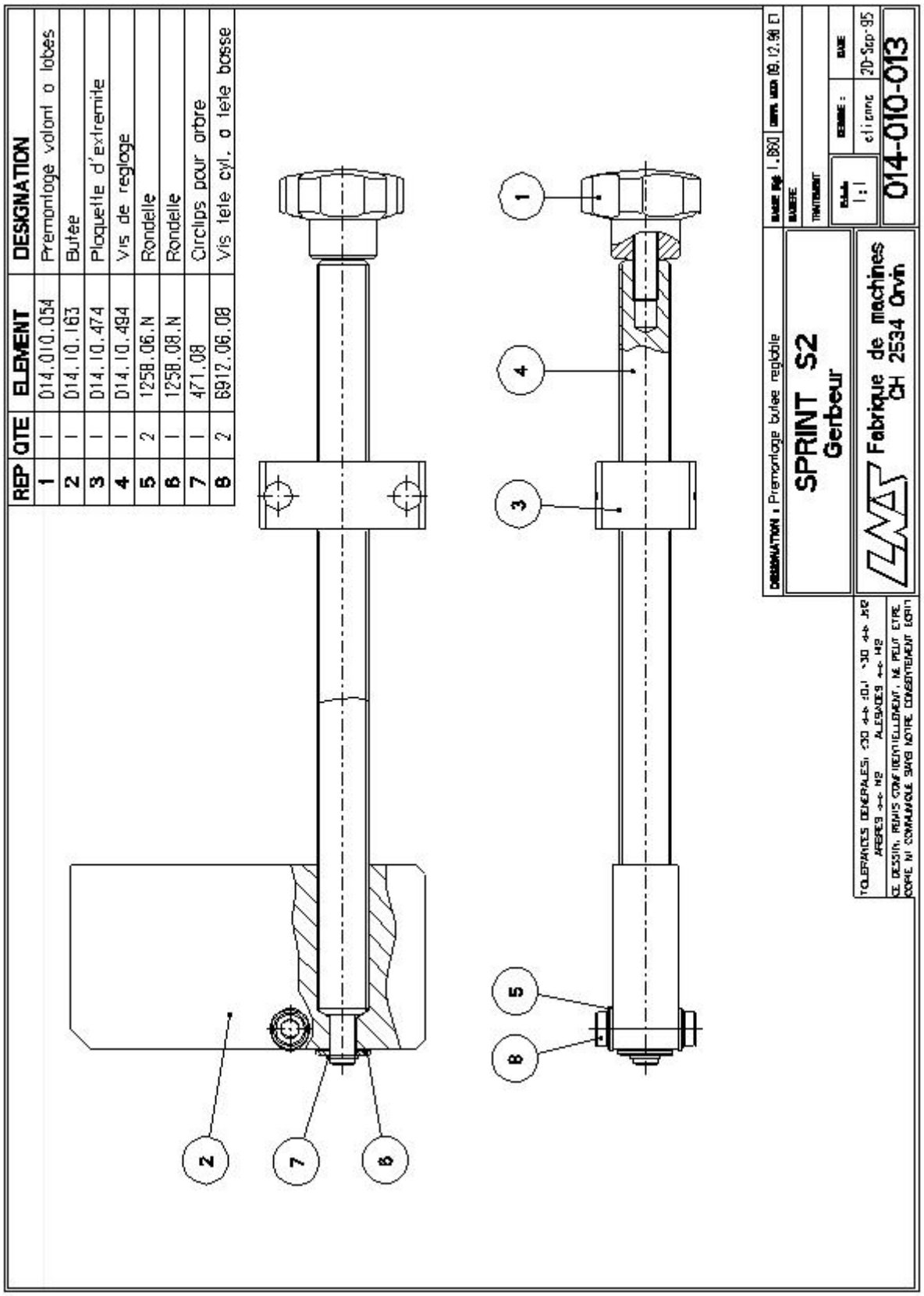




REP	QTE	ELEMENT	DESIGNATION
1	2	014.10.314	Doigt de levage
2	2	014.10.324	Doigt d'appui
3	1	014.10.334	Douille
4	2	014.10.344	Entretoise
5	2	014.10.364	Axe
6	1	014.10.374	Axe
7	1	014.10.384	Axe
8	1	014.10.734	Ressort de traction
9	2	014.10.784	Patin
10	1	014.10.794	Axe
11	8	6799 04	Collier d'epaulement
12	2	913.04.05	Vis sans tete


REP QTE ELEMENT DESIGNATION
1 1 014.010 017 Pivot. porte barre gauche
2 1 014.010.022 Pivot. porte barre de droite
3 1 014.10.042 SUPPORT BARRE ARRIERE
4 1 014.10.052 Support barre avant
5 2 014.10.343 Soudage essieu
6 2 014.10.814 TUBE DE GUIDAGE AVANT
7 2 014.10.824 TUBE DE GUIDAGE ARRIERE
8 2 014.10 844 Tube de guidage
9 2 014.10 854 Axe de pivot
10 4 014.10 864 Axe de pivot
11 4 1 784 Anneau de serrage
12 2 2702.014 Rondelle
13 4 4388.24 Ecrou BAS M24
14 12 471.10 Circlips pour arbre
15 4 912.06.30.M Vis tete cylindrique
SPRINT S3 G/AV
Detail X
2:1


REP QTE ELEMENT DESIGNATION
1 1 014.010.013 Prolongage butee reglable
2 1 D14 10 1004 Bride
3 1 014.10.153 Tube porte barre
4 1 D14.10.484 Bride
5 1 438B.16 ECROU BAS M16
6 4 8912.08.60 Vis tete cyl. a tete basse
7 4 985.08 Ecrou de securite
SPRINT S2
Gerbeur
014-010-012



REP	QTE	ELEMENT	DESIGNATION
1	1	014.010.054	Premontage volant o lobes
2	1	014.10.163	Butee
3	1	014.10.474	Plaquette d'extremite
4	1	014.10.494	Vis de reglage
5	2	1258.06.N	Rondelle
6	1	1258.08.N	Rondelle
7	1	471.08	Circlips pour arbre
8	2	6912.06.08	Vis tete cyl. o tete basse