

**DAVI**®

**MFD**

**Folding machine  
User's manual**



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# FOLDING MACHINE USER'S MANUAL



# **1 FIRST START UP**

## **1.1 HYDRAULIC OIL**

The hydraulic oil is the "life-blood" of the press. In order to gain a long trouble free life for the press several conditions have to be carefully observed:

- 1:** Is the oil clean?
- 2:** Is it the correct type of oil?
- 3:** Is the oil level correct?
- 4:** Is the oil temperature correct?

**1:** When the press has been operating for some time, one starts to wonder if the oil is still clean. There is only one-way to be sure. One will have to take a sample from the oil tank, and send it to the hydraulic oil supplier. They will test the oil for water content, particles etc. The hydraulic oil may look clean, but it could be heavily contaminated. Anyway, if the oil changes colour, then it certainly is time to change it.

**2:** There is a great choice of hydraulic oils. These oils contain a great variety of additives. The press should run with high-pressure hydraulic oil with anti-wear additive as a minimum. At working temperature, the oil should have a viscosity about 30 centistokes. When in doubt, contact your supplier.

**3:** Check the oil-level glasses on each oil tank, every day. The oil level must be between the maximum- and the minim level when the press is open.

**4:** When the choice of hydraulic oil was taken, temperature was one the parameters. The working temperature of the hydraulic oil is therefore essential. Make sure that the temperature, from which the choice was taken, stands.

Store your hydraulic oil in a clean environment preferably at a workshop temperature to avoid the formation of condensation. Barrels should rest on the side to avoid collection of contamination on top of the barrel.



## **1.2 HYDRAULIC SYSTEM MAINTENANCE**

### **1.2.1 INSTALLATION:**

Your package system is provided with lifting points, but make sure that slings do not strain the pipe work and never lift a system by the pipe work, or the motor.

The location of the package system should be indicated on the machine lay-out, but make sure that there will be good access for the maintenance when all adjacent equipment and pipe work is finally installed.

Pay particular attention to access for routine maintenance such as checking filters and pipe work, and if a water cooler is fitted, leave enough room for the pipe fitter who has to install water pipes and control valves.

Try to keep your system in a well-ventilated atmosphere. In difficult environments where it could be subjected to coolant spray, dirt or radiated heat, some special protection may be necessary, and make sure that mountings for the tank and pipe work do not amplify noise.

When the package system is finally located in position make sure that it is on a level main firm foundation and that it is not distorted. Only use shims or wedges that cannot work loose.

### **1.2.2 ALIGNMENT:**

If you are fitting your own electric motor(s), make sure that the pump half of the coupling is a push/fit type. Hammering or pressing the shaft will damage the pump. When the factory has fitted the motor, the coupling will have been correctly aligned at the factory, but, unless the pump is mounted on a bell housing, this alignment could have been disturbed during transport, so before running the system, check that the alignment is between 0,005 and 0,1 mm. This should be checked with all the pipe work in position and tightened up.

### **1.2.3 ELECTRIC SUPPLY:**

If you are fitting your own electric motor(s), check that the voltage and current specified on the electric motor and other electro-hydraulic components correspond with the supply. Running the pump dry or turning the wrong way for more than a few seconds can severely damage the pump, so jog start the motor for the shortest possible time to check the direction of rotation and correct if necessary.

#### **1.2.4 FILLING THE SYSTEM:**

Ensure that the system is thoroughly cleaned internally before filling it with oil. Examine the tank, the suction line, strainer or filter and especially the suction line between the strainer and the pump inlet. Ensure that the tank cover and the air filter are fitted in such a way that unfiltered air cannot enter the hydraulic system. The cleaner the system is when it is put into service, the greater will be the life expectancy of the parts liable to wear.

When transferring fluid from the barrel to the system every possible precaution should be taken to prevent dirt entering the system. Start by cleaning around the end/top of the barrel before moving the cap and then inspect the contents to see that it has not already been contaminated. If you are not sure whether the oil is clean or not, do not use it. (See under hydraulic oil). Check that the tank filler entry and the equipment to be used for the fluid transfer are completely clean. The best (should be the only) way to transfer oil to the pump unit is by using a portable pumping unit incorporating an efficient and fine filter. After filling make sure that the filler caps are correctly replaced.

#### **1.2.5 FLUSHING THE SYSTEM:**

Flush all parts of the system thoroughly before putting the system on full load. Ideally, flushing should be carried out with the same type of fluid that is going to be used when the system is in normal use and if possible a flushing pump should be used which will create fluid velocities higher than those which would normally be present in the system. No matter how carefully constructed, most of the dirt will be in the pipe work and during the process of flushing this out, temporary bridging loops must be used at the end of the cylinders. Sensitive valves should be replaced by bridging plates so that the contaminant is not flushed into these parts. If it is possible, install temporary filters in the bridging loops. This will help to speed up the flushing process.

If the package system pump has to be used for the flushing operation make sure that it pumps only clean fluid and operates at low pressure. If a flushing fluid, compatible with the working fluid has been used, the majority of it must be drained from the system. If the correct working fluid has been used for the flushing, there is no need to change the fluid again, as a new fluid could introduce additional contaminants into the oil tank.

During flushing make sure that filters are not bypassed and after flushing fit new filter elements. Make sure that there is no dirty fluid left in the bottom of the filter bowl.

#### **1.2.6 FLUID LEVEL:**

When a system is first started the fluid level will fall as the pipe work and cylinders are filled with oil. The oil tank should be refilled at once. Subsequently the fluid level should be checked at regular intervals, it should never be allowed to drop below the minimum level.





### **1.3 PRIOR TO STARTING UP:**

- 1: Check the fluid level in the tank(s)
- 2: If there are shut off valves in the suction lines, check that they are fully open.
- 3: Make sure that the machine is safe to start and that personnel are clear of possible hazard areas.

#### **1.3.1 STARTING UP:**

- 1: Jog start the electric motor and check that the direction of rotation is correct for the pump(s).
- 2: If automatic air bleed is not fitted, loosen a joint in the pump discharge line or open bleed valves to facilitate pump priming and bleeding of air from the system.
- 3: Operate the system manually at low pressure to expel air. Bleed points should emit a steady stream of fluid free from bubbles.
- 4: If the pump unit is equipped with a filter pump, only this pump should run for a period of time to clean the oil, before the entire hydraulic system is started up.
- 5: Set pressure controls at the lowest possible setting compatible with satisfactory operation. Allow the press to run at this setting for a while, and then gradually increase the pressure.
- 6: Re-check the oil level in the tank(s).
- 7: When normal operating temperature is reached check all pipe work, couplings and fixing bolts and tighten where necessary. Some of the equipment on the package system may have become slack during transportation and handling.
- 8: When the system has been running for a short period check that the filters are still clean. If they are bypassed, change the elements. Once a system is properly cleaned the time between element changes will be greatly increased.
- 9: Record timings, temperature, pressure and other information which will be required for future maintenance records.



## **1.4 TROUBLE SHOOTING**

### **1.4.1 EXCESSIVE NOISE:**

In a new system the most likely cause of a noisy pump is the presence of air in the fluid. Aeration may be caused by:

- 1: The fluid level being too low.
- 2: Inadequate bleeding allowing air bubbles to circulate. Air is sometimes trapped in external suction line strainers.
- 3: Small air leaks into suction lines. Look first at the pipe joints, particularly if an external strainer is fitted. A temporary check can be made by covering suspect joints with heavy grease.
- 4: During start-up, pockets of air will gradually be cleared from the system and will enter the tank as fine bubbles. These can usually be seen. Allow time for them to settle out.

Pump cavitation or starvation can also cause noise, the likely causes are:

- 1: The fluid is too viscous. This could be caused by the selection of the wrong viscosity grade or because the fluid temperature in the tank is too low for a satisfactory start-up.
- 2: With water based fluids the viscosity can be adversely affected if the oil-to-water ratio is incorrect.
- 3: If inadequate precautions are taken during commissioning the suction strainers can easily become heavily contaminated- remove them and clean them and be sure you replace them properly.

Noise may also be caused by a misalign or out-of-balance coupling, and loose coupling guards can produce a rattle that is sometimes difficult to trace.

Relief valves blowing continuously can cause unnecessary noise which can be due to incorrect setting.

## **1.5 ROUTINE MAINTENANCE**

The practice of planned maintenance at fixed intervals using a logbook is strongly recommended. The following list suggests some of the items, which should be checked regularly.

### **1.5.1 CHECK AND RECORD:**

- 1: The machine time cycle.
- 2: The running temperature of the hydraulic oil.
- 3: The readings of the various pressure gauges.
- 4: Unusual noise.
- 5: Measure the leakage rate from the piston unit casings under identical pressure and temperature conditions. Changes in this leakage give a good indication of the condition of the unit.

Significant changes in any of the above five items may require further investigation regarding their cause and the service necessary to correct them.

- 6: Clean the exterior of all equipment to check for leakage. Tighten joints where necessary and replace any fittings and associated pipes, which leak.
- 7: Check the cooling system, if such is fitted, for cleanliness and leakage.
- 8: Sample the hydraulic fluid and check for chemical condition and level of contamination.
- 9: Clean or replace filters as necessary.
- 10: Inspect air breather elements for build-up of contaminant and clean or replace.

## **1.6 PERIODIC MAINTENANCE**

If after several years of use, routine service inspections show that the equipment performance is no quite up to the specified standard, a thorough overhaul of the equipment may prove economically desirable.

This is a good opportunity for a really thorough clean up of all the equipment, especially the inside of the tank. The use of a soft plastic scraper is to be recommended for cleaning flat surfaces, as cloth can leave particles of lint which will clog up strainers and generally cause trouble when the system is refilled.

Before undertaking a major overhaul, it may be prudent to contact your local hydraulics organisation to obtain advice on the servicing or replacement of suspect equipment and to obtain a new set of seals as, after several years these tend to harden, and their replacement will greatly reduce the risk of future leaks.

Hoses in pump inlet and seals preventing the entry of dirt around pipes returning to unit, are often overlooked and can have worn or contain surface cracks.

When reassembling the equipment make sure you follow all the service instructions and take every possible precaution to keep the inside of the hydraulic equipment spotlessly clean.

## 1.7 SAFETY

- 1.7.1 Allowed and forbidden operations
- 1.7.2 Control devices
- 1.7.3 Safety devices
- 1.7.4 Authorized personnel

When starting or servicing any machinery always take every reasonable safety precaution. The following hints may serve as reminders.

- Be sure that lifting tackle is strong enough for the job and is safely applied.
- See that coupling or belt guards are in place and securely fastened.
- Securely prop or wedge slides or weights that could fall or move when hydraulic power or pipe work is removed.
- Removing the main fuses eliminates many risks during servicing.

### 1.7.1 ALLOWED / FORBIDDEN OPERATIONS

**1.7.1.1.** A MFD folding is used to bend plates of different thickness and length, that must remain inside the capacity range foreseen for that specific machine. This result is achieved loading the plate on the in feed conveyor where the back gauge will position at the starting bending point.

**1.7.1.2.** This process includes main phases:

- 1- Plate loading
- 2- Plate bending
- 3- Finished part unloading

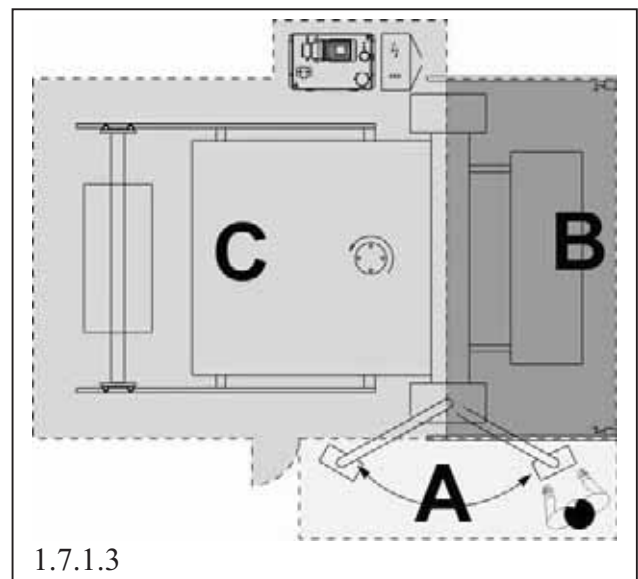
#### 1.7.1.3. ALLOWED OPERATIONS

Phases 1 - 2 - 3 are usually managed by only one operator, who stands in front of the control board of zone "A" (1.7.1.3)

IT IS ABSOLUTELY FORBIDDEN TO ANY PERSON TO STAND, FOR ANY REASON, IN THE "B" AND "C" ZONES DURING THE BENDING PHASE (PHASES 2).

**ONLY** during the loading and removing phases 1 and 3 (**NEVER DURING THE BENDING PHASE**) the operator or other persons can stand in the B zone.

Only to check the bent plate, the operator is allowed to enter in the "B" and "C" but it is



ABSOLUTELY REQUIRED that the machine BE SWITCHED OFF, or powered (white light or display on), and STOPPED IN SAFETY CONDITIONS (red light on, on the control panel).

#### **1.7.1.4. FORBIDDEN OPERATIONS**

The machine can't be run without the direct surveillance of the operator and **ONLY** one operator at the time can use the machine.

**No operations that should need two operators can be executed.**

It is **ABSOLUTELY FORBIDDEN** to any person, for any reason, to stand in “B” and “C” zones (3.1.3-) **DURING THE BENDING CYCLE** (phases 2).

The higher risk during the first bending phase, when the **CLAMPING BEAM** drops to clamp the plate (crushing risk) and then when the top or bottom beams move itself to bend the plate.

It's forbidden to perform any service on the machine while it's “powered”.

Eventual interventions to the “C” zone (for setup or check) **ARE ABSOLUTELY FORBIDDEN** if the machine is running; they are allowed **ONLY** with the machine **STOPPED IN SAFETY CONDITIONS** (red light flashing), and can be done **EXCLUSIVELY** by the qualified operator.

All the adjustment and/or maintenance operations on the machine **MUST BE DONE** without the plate, with the machine turned off and empty, with all the movable devices kept at their lowest position, (to avoid collapse risk) .

The loading and unloading of the finished piece from the machine must be done in conformity with the safety rules on loads handling and **ONLY WHEN THE MACHINE IS TURNED OFF**.

For tools replacement or exchange, the machine **MUST TO BE TURNED OFF**.

When the machine is functioning or during the working procedures, it is **ABSOLUTELY FORBIDDEN** to enter in the **A – B – C zones (1.7.1.3)**

The machine **MUST BE USED** by an authorized operator, that must follow very strictly the instructions in the operation manual.

#### **1.7.1.5. MAINTENANCE**

The features allow all the ordinary and extra-ordinary maintenance operations (in reality very few) to be made **ABSOLUTELY** with the machine completely **SWITCHED OFF**. For the start-up and the eventual further set-up, all of them remain valid.

### **1.7.2. CONTROL DEVICES**

The machine is controlled by a CNC. Read the “Controls and Commands” MANUAL.

## 1.7.3. SAFETY DEVICES

**1.7.3.1.** On the machine are placed some safety devices, represented by some “emergency STOP buttons”, placed on the console, on the electric cabinet door, on the gantry loader. Moreover the machine is equipped with photocells that control the access to forbidden zones during the machine working.

The action of one of these devices makes the stop of all the movements, the motors and the red emergency light will flash.

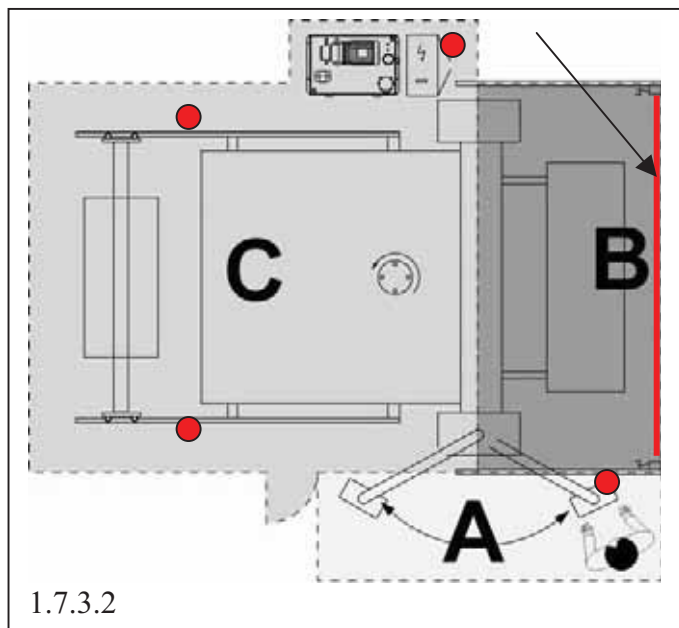
To restart the machine reset the red Stop push button (turning it clockwise or lifting it up) press the BLUE push button on the console, reset the alarm on the CNC (see CONTROLS and COMMANDS paragraph), switch on the electric motor.

### 1.7.3.2. PERIMETRAL BARRIERS IN DANGEROUS ZONES

The “B” (rif. 1.7.3.2) zone is protected by a “photocell barrier” that, if activated during the working phases, stops instantly all the movements. To reset it, press the BLUE push button on the console, reset the alarm on the CONTROL panel and restart the electric motor.

The “C” zone protection uses a User Duty. The machine is equipped with a micro switch that must be connected to the SAFETY BARRIER (SUPPLIED AND MOUNTED by the user) to **allow the start up of the machine.**

**The manufacturer is relieved from any responsibility.**



The manufacturer is available, upon request, to take care of this matter. If the request is not done in writing and in a timely fashion by the buyer, the manufacturer will be fully relieved by the latter from any present and future responsibility as regards the system safety.

**1.7.3.4.** As soon as the machine and equipment are delivered to the site, the buyer's first priority is to test all the safety devices and check their perfect efficiency and effectiveness.

Every 20 working hours or every week, **but immediately in case inefficiency is suspected**, the buyer must perform an extremely accurate check and test of all the eventual emergency devices installed on the machine. The whole machine must always be kept perfectly efficient and safety rules must be followed daily by all the personnel involved in the use or however in the machine's area.

**1.7.3.5.** It is the exclusive and complete responsibility of the buyer to always keep informed and updated on safety norms, all the personnel involved with the use or however operating in the area of the machine. The Manufacturer is available, if requested, to train the buyer's personnel. If not called to do such training in a timely fashion, he will be relieved by the buyer from any responsibility.

At any time, as soon as the lack of efficiency on any emergency device is suspected, the buyer **MUST STOP IMMEDIATELY** the machine at his own and full responsibility and reset the perfect effectiveness of the safety of the entire machine.

**1.7.3.6.** Hydraulic powered and built with silent components, the machines are low noise, and in many cases, they don't need further applications to remain within the standards. But unfortunately, in many cases, the noise emission is not related only to the machine itself, but it depends also by its operating system, its fixing at the ground, the acoustics of the plant and the global environment. It is the responsibility of the buyer to keep the noise emission around the installation below the standard level admitted by the laws, rules and regulations.

Sometimes very simple acoustic barriers should be sufficient; in other situations the use of acoustic protections must be imposed to the personnel; in other seldom instances it could be required to build efficient and specific acoustic barriers or also to soundproof the machine itself inside a cabin.

**FOR ALL THE REGULATIONS OF THE PRESENT CHAPTER 1.7 "SAFETY", THE BUYER, IF NOT SUFFICIENTLY INFORMED OR EXPERT, AND IN ANY CASE OF NEED, CAN CONSULT SPECIALIZED COMPANIES.**

**THE MANUFACTURER IS AVAILABLE, UPON REQUEST, TO TAKE CARE OF THIS MATTER. IF THE REQUEST IS NOT DONE IN WRITING AND IN A TIMELY FASHION, HE WILL BE FULLY RELIEVED BY THE BUYER FROM ANY RESPONSIBILITY REGARDING THE SAFETY OF THE MACHINE.**

**NO CLAIMS SHOULD BE ACCEPTED LATER ON REGARDING THE EFFICIENCY OF THE SAFETY AND EMERGENCY DEVICES.**



## 1.7.4 MACHINE PERSONNEL

The personnel who will work on the machine must be trained for the job to do on the machine and follow carefully what written on the user manual.

Never do any maintenance if not foreseen in the user manual, prior to have contacted the nearest Promau service center.

All maintenance interventions, ordinary or extraordinary, can be done **ONLY WITH THE MACHINE SWITCHED OFF 1.7.4-A** (with the main switch in “OFF” position)

The machine personnel's clothing must confirm with the existing safety regulations: however avoid anything that could be fed by the moving rolls, as i.e. belts, overall parts, long hair, etc...

Pay always the maximum attention to the rolls feed danger and eventual crashing risks due to rolls, supports or guides movements. **(1.7.4-B, 1.7.4-C).**

The machine personnel will have to signal with physical barriers and signs any intervention being done on the machine. At the end of the intervention, the machine will have to be working properly, complete of each part.

It's forbidden to anybody to follow the profile or plate feeding with the hands **(1.7.4-B).**

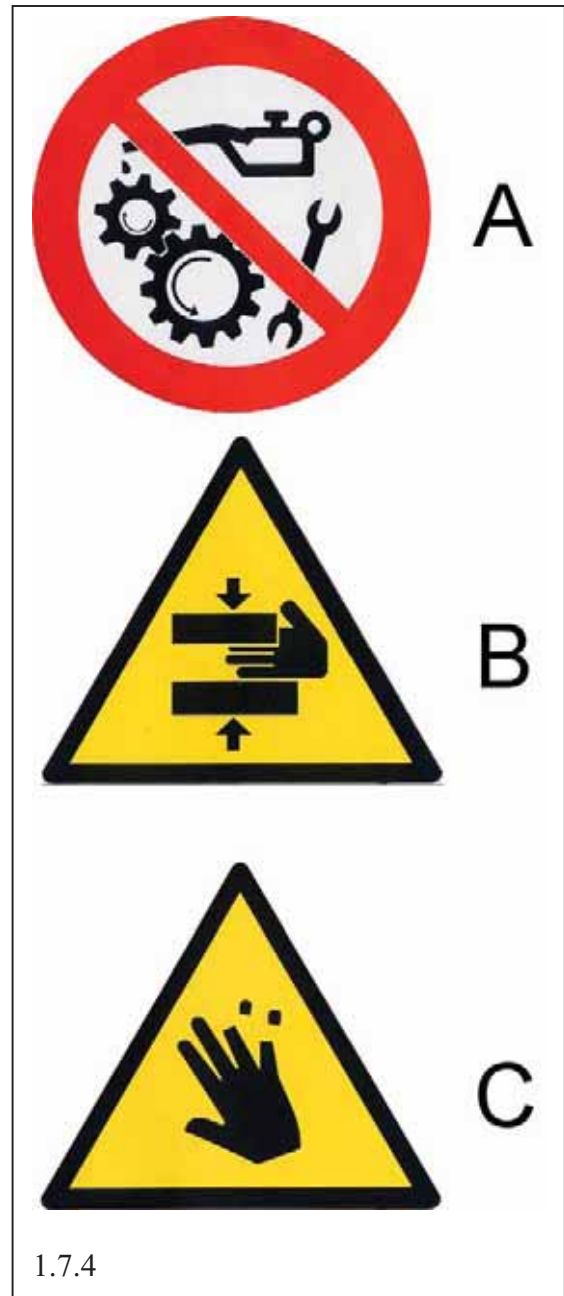
**1.7.4.1. THE OPERATOR** is the person who will use the machine so he must know how to use the rolls movements to obtain the desired shell. He will have to use all the individual protection safety devices (DPI) as foreseen by existing regulations as: overall, work shoes, glasses and gloves.

He will keep the machine perfectly clean and efficient. Before to start up the must he will make sure that **NOBODY** will stay inside the forbidden area, included the movable console (if existing) and that is possible to control the machine in all of its functions.

The machine can be stopped at any moment, by pressing the red **EMERGENCY** push button (placed on the console) or by the safety cable mounted all around the machine that should be operated instantly in case of danger conditions for people or things due to working errors or machine failure. (Noise, oil leakage, etc)

**1.7.4.2. THE MAINTENANCE operator** is the person who is in charge of the mechanical and hydraulic maintenance of the machine.

**1.7.4.3. THE ELECTRIC MAINTENANCE operator** is the person who is in charge of the electrical maintenance of the machine.





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## 2 START UP OF SYSTEM

### 2.1 START UP OF THE SYSTEM

1. Turn main switch to position ON, the switch is located on main electrical enclosure.
2. Press lamp push button marked "RESET EMERGENCY" until the lamp is turned off. In case the lamp does not turn off, this may be caused by an activated "E-Stop" on The machine. "E-Stops" are located on the main electrical enclosure, on the Control Panel, on the Foot Switch and on the rear back gauge beam.
3. Start the hydraulic power pack by pressing Start button witch is located on The Control Panel
4. Each time the system has been shut down (no electrical power) the folding machine Must be recalibrated. This is also being indicated or shown by flashing lamp on. The Control Panel. The lamp is marked Calibration (see further information for the Control Panel)
5. When the calibration button is activated following will take place:
  - a. Clamping Beam will travel down until it meets Lower bolster and when the Clamping Beam encoder does not send additional pulses to the Plc, this axis has been calibrated.
  - b. Upper Bending Beam will stroke backward to its rear most position, Zero degrees, And when no further pulses from the encoder from Upper Bending Beam are not Sent to the Plc, the axis is calibrated.
  - c. Lower Bending Beam will stroke backward to its rear most position, Zero degrees, And when no further pulses from the encoder from Lower Bending Beam are sent to the Plc, the axis is calibrated.
  - d. Rear Back Gauge will go to its minimum position. Forward, towards the bend line, where a proximity switch is located. When the bar meets the proximity switch, the Back Gauge will when backing up (removing the play) until the Drive card receives Zero position from the Servomotors.
  - e. The same situation applies to powered Micrometer adjustment for Upper and Lower Bending Beams, Upper and Lower Crowning attachment. This axis will go to respective proximity switches and the then backing up (removing the play) until the respective drive card receive Zero position from the respective Servo motors.
6. Press "RESET BARRIER" button until the lamp is turned off.
7. The system is no ready to be used.

## **2.2 FOOT CONTROL**

The Folding machine is provided with a double foot control, this control has a left pedal and a right pedal.

In MANUEL MODE this control has the following functions:

- a. Left pedal activates the Clamping Beam down stroke, and Upper Bending Beam And Lower Bending Beam to swing (bending).
- b. Right pedal activates Upper Bending Beam, and Lower Bending Beam Respectively and cause them to return" home" and Clamping Beam to up position.

When the pedals are not activated (depressed) the travel will stop, When reactivating the pedal, the travel will restart.

If position "ANGLE" in the menu has been selected, and the left pedal is activated, the selected Bending Beam will stops at the selected angle, and right pedal must be used to bring Bending Beam to its "home" position.

If position "FREE" is selected in the menu and left pedal is activated, the selected Bending Beam will not stop at any fixed angle, but in this case the operator must decide by reading the angle position (degrees) on the screen when the desired angle has been reached.

When selecting "FREE", the Bending Beams will always travel at minimum speed, where as selecting "ANGLE" the Bending Beams may travel at low and high speed.

In BLOCK MODE the pedals have the following functions:

- a. Left pedal activates the Clamping Beam down stroking, and the Upper Bending Beam respectively and Lower Bending Beam to swing for bending. When the selected angle has been reached, the selected Bending Beam will stop in its position for a short while, and then return back to Zero degrees, and the Clamping Beam will now travel to preselected value in the program.

In BLOCK MODE, the left pedal will thus be used both for bend movement and return movement. With the right pedal it is always possible to make the return movement.

In "AUTO MODE" the foot control is not being used, here the cycle will take place by use of RUN button on the Control Panel.

Interrupting the bending program may take place by pushing PAUSE button and then QUIT. The bending program may pause at any time by activating PAUSE button and then resume the program by pressing the button RUN.

In order for the bending program to start when RUN button is activated, the Light barrier must be active. If Not active, an alarm signal will appear advising that the Light barrier has been interrupted.

If the Light barrier is being interrupted during the operation of the system, the system will stop at once at the position it is in the moment the Light barrier is interrupted. By resetting the Light barrier and activating the RUN button, the bending program will continue.

## **2.3 HYDRAULIC TOOL CLAMPING**

The folding machine is equipped with hydraulic tool clamping of tools on the Clamping Beam. This equipment can be controlled from the Control Panel by turning switch marked TOOL HOLDER.

By turning to position 1, the tools are locked in place and by turning to position 0 the lock is released and open.

After having activated the hydraulic lock and clamping the tools in place again, switch in 1 position, the actual locking of the tools will happen after a hydraulic function has been carried out.



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## **3 PREVENTIVE MAINTENANCE SCHEDULE FOLDING MACHINE**

### **3.1 DAILY ROUTINE**

1. Check that sufficient hydraulic oil is in the reservoir. This is checked on the oil level sight glass located  
On the side of reservoir. Oil level must always be such it can be seen in the sight glass. Never less.  
Add hydraulic oil as required.  
See lubrication chart.
2. Check that the hydraulic pressure corresponds to the pressure mentioned in the special instruction sheet #1.
3. Ensure that the Bending Beams are adjusted to the correct plate thickness. See special instruction sheet #2.
4. Check for any hydraulic leaks in the system. Repair as required.
5. Keep the machine neat and clean at all times.

### **3.2 WEEKLY**

1. Service all Grease points by one or two shots from a grease gun. Number of lubrication points 8.  
See lubrication chart.
2. Clean the Ball Screws and Guides Rails on the Back Gauge with soft cloths and apply a thin film of light oil.
3. Clean and grease the adjusting nuts and threads on the Bending Beams for the plate thickness.
4. Check that the Emergency shutdown devices are functioning by pressing the red buttons located on  
The control panel, foot pedal, main electrical enclosure and on the Back Gauge bar. Reset and start up.
5. Check the safety light curtain is functioning properly. Refer to manufacturer's manual for test procedure.



## 3.3 QUARTERLY

1. Change the hydraulic oil filter, or whenever the dirt indicator goes into the red area.
2. The guides for the Clamping Beam are self-lubricating nylon, but care must be taken that they are kept clean. Visually inspect the guides for any excessive wear. Apply a light film of grease on each gib.  
See lubrication chart.
3. Gently clean the air cooler for dust and sediment by using soap and soft brush.  
Blow and dry with air.
4. Remove all side's covers for inspection of any abnormal wear and unusual noise during operation.  
Apply chain lube on the drive chains.  
See lubrication chart.

## 3.4 ANNUALLY

1. Change the hydraulic oil and filter.  
See lubrication chart.
2. Perform an insulation and resistance test on the electrical motor and record the test reading. (This requires an OHM meter)  
**WARNING:** Be sure that the circuit under test has all power removed and any associated capacitors are fully discharged BEFORE you make a resistance measurement.

## 3.5 LUBRICATION CHART

1. Grease Points:	EP-2 Grease
2. Nylon Guides	EP-2 Grease
3. Adjusting nut and thread	EP-2 Grease
4. Drive Chains	Chain lube
5. Hydraulic reservoir	Tellus - 32 Hydraulic oil
6. Ball Screws & Guide Rails	Tellus - 32 Hydraulic oil





### 3.6 SPECIAL INSTRUCTION SHEET

#### 3.6.1 PRESSURE SETTING

The hydraulic power unit is equipped with a Pressure Gauge and it shall show maximum 3000 PSI.

The Unit has also a Pressure reduction valve for the Clamping Beam.

When the screw is turned COUNTER-CLOCKWISE, the pressure is being REDUCED.

When the screw is turned CLOCKWISE, the pressure is being INCREASED.

Reducing the pressure will result in a reduced tonnage on the Clamping Beam.

When bending short (left to right) plates - plates less than 2 ft. In length the pressure must be reduced and not exceed 700 PSI. It is also recommended to use 2 small shims of the identical thickness as what is being bent.

These shims should be located at the extreme ends of the Clamping Beam next to the piston rods. One at each end.

#### 3.6.2 ADJUSTMENT OF THE RINGS (NUTS) FOR PLATE THICKNESS

Prior to starting the bending operation, The Bending Beams must be adjusted for the correct Plate Thickness.

This adjustment is done on 4 (four) micrometers (scale rings). The adjustment pitch of these rings is set at 0.079" per 360° rotation.

SIGNS indicate the locations of these rings on the machine. The adjustment (setting) of these rings **MUST never be LESS than 1.25 times plate thickness.**

Damage to the machine can happen if the adjustment is too small as this would result in insufficient space between bending blade and sheet (plate) to be bent.