Punch and Perforating Unit

Instruction Manual

Another quality product from:

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Dear Customer

Thank you for purchasing a Punch and Perforating Unit high performance system. The Punch and Perforating Unit provides the Technology you need to print and process at high speeds. With this system, your company will increase throughput and quality.

The Punch and Perforating Unit is one of many high-quality, innovative systems available from Matti Technology AG, Switzerland. If you would like information on our other systems or require technical assistance or spare part replacement, please contact one of our field service or customer service specialists at:

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Again, thank you and welcome to the growing family of Matti Technology AG customers. We appreciate your current and continued business.

Sincerely,

Dr. Dieter Woschitz
President

Pascal Fäh
Vice President of Operations

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1.1 List of Illustrations

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1.2 List of Tables

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2 Forward

The purpose of this manual is to provide the necessary information to enable experienced personnel to safely install, operate and maintain the Punch and Perforating Unit.

It is assumed that all necessary tools, precision measuring devices and equipment for safely moving and installing this system will be available. Information and data is based on the latest product information available at the time of writing.

The right is reserved to make changes at any time, in materials, specifications, models or to discontinue models.

Note: In order to show clearly the details of this system some covers, shields, doors or guards have either been removed or are shown in an open position. All such protective devices must be installed in the closed position before operating the system.

2.1 Important

Carefully read the instructions and safety precautions given in this manual. Do not attempt to install this system until you have thoroughly read and understood the data contained in this manual.
At the time of writing, this manual was completely up-to-date. However, due to continued product development, some illustrations or descriptions contained herein may vary slightly to the system delivered to you. This merely implies that the system has been improved to better fulfil your requirements. If there are any questions, you are encouraged to contact our field service personnel for assistance at:

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2.2 Compliance statements

2.2.1. FCC Compliance Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at the users own expense.

2.2.2. European EMI Compliance Statement

This equipment generates, uses, and can radiate radio frequency energy. When this equipment is not installed in accordance with instructions in the installation chapter and is not used in accordance with the instructions in the operator safety information, the radio frequency energy may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user, at the user's own expense, will be required to take whatever measures may be required to correct the interference.

2.3 Inspection of Shipped Parts

Please inspect all packed materials carefully so that small parts are not inadvertently thrown away. Report any shortage or damage to Matti Technology AG and the carrier.

All equipment is shipped on one or two pallets and should contain the following parts:

- Punch and Perforating Unit

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3 Specification sheet

3.1 General

Name / Type	Punch and Perforating Unit
min. web width	152 mm (6“)
max. web width	521 mm (20.5“)
Weight of material	50 – 163 g/m^2
Paper input	Tension free
Output	Light weight dancer
max. speed	150 m/min. (500 ftm)
Power Supply	220 V – 240 V 50/60 Hz, 10 Amps optional by transport
Punch and die tools	TC (tungsten carbide) for highest life cycle of about 30 Millions revs.
Basic Weight	approx. 620 kg (1370 pound)
Dimensions	1240 x 1050 x 1250 mm (49” x 41” x 49”)
Features	- Longitudinal Perforation - Cross Perforations 8½"-18" Circumference - File Hole Punching 10" - 18" circumference
Features (optional)	- Duplex Centre Punching - Dust Extraction system - Confetti Extraction - Anti Static Bars - Lift on/off perf clamp bars

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4 Safety information

4.1 General

The Punch and Perforating Unit is designed for safe operation. Nevertheless, installation, maintenance and operation of the system can be dangerous for a careless operator or maintenance person. For your safety and the safety of others, please read the instructions of this INSTRUCTION MANUAL and follow these safety practices, which will help to prevent accident or injury.

4.2 Safety Information for the Owner

The owner of the system must ensure that the system is only used in good operating condition which adheres to the safety regulations.
Only trained and qualified personnel which are totally familiar with all the safety and mechanical instructions and devices should operate the system.
Supervisors must ensure that they are familiar with all the chapters of operating and safety of the equipment. Furthermore they should be familiar with the general requirements of accident prevention and preservation of the environment.

4.3 Safety Information for the Operator

The Operator of the equipment must read and understand the operating instructions, especially the paragraphs regarding safety. This is especially important for shift personal that might not be involved with this equipment on regular basis.
The Operator must be familiar with the safety and accident prevention information, and should avoid any functions on the machine that are doubtful or in violation of the operating procedures.

4.4 Specific Security Advices

Prior to any kind of repair, the MAIN SWITCH must to be turned off. The location of the main switch is to be secured with a padlock to prevent accidental switch on. Only original parts used in maintaining / repairing the machine will ensure correct functionality and protect warranties.
Any changes to the system, including components requires prior written approval from the manufacturer.

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4.5 Guarding

Main Switch:
The main switch for the transport system is located on control cabinet, drive side of the machine. This switch turns the systems on and off.

4.6 Mechanical Safety

Wear safety shoes and safety glasses at all times.
Remove or secure items that could be caught, fall into, or become entangled in the mechanisms, including jewellery, loose clothing, and long hair.
Keep all equipment covers closed when operating the printer.
After a fast stop or emergency stop, make sure all error conditions are corrected before trying to restart the machine.
In the event of leaks or breaks at pressure relief valves, automatic pressure regulators, limit sensors, and other automatic safety features, turn off all compressed air to the system.
The air expandable shafts require the same action if a leak or break occurs.
Watch your feet when loading, unloading and handling the paper roll.
Do not touch any moving parts.
Do not remove any cover of the unit.
If any unsafe situation is possible or recognized, stop the machine immediately and switch it off. Do not run the machine again until the situation is safe.

4.7 Electrical Safety

There is danger of electrical shock when servicing the transport. Even when the circuit breaker of the control cabinet is in the OFF position, there is live HIGH VOLTAGE present at the power entry of the circuit breaker.

WARNING!

ALWAYS disconnect the external power prior to servicing the system.

NEVER operate the system with the doors of the control cabinet or transport open.

DANGER!

All power terminals remain live up to 3 minutes after mains disconnection.

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5 Labels

The following chapters explains the different labels used on the transport system.

5.1 Safety Labels

5.1.1. Dangerous voltage

Illustration 1: Dangerous voltage

Dangerous voltage. Contact may cause electric shock or burn.
DANGER! Power terminals remain live up to 3 minutes after mains disconnection.

5.1.2. Burn hazard

Illustration 2: Burn hazard

Burn hazard, hot surface. Do not touch the surface of this component during equipment operation. Allow to cool down before servicing.

5.1.3. Danger of cuts from moving paper

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Illustration 3: Danger form cut of moving paper

Danger of cuts from moving paper. Keep body away form edge of moving paper.

5.1.4. Danger of crushing

Illustration 4: Danger of crushing

Danger of crushing from moving paper roll. Stand back from the lift arms and paper roll during operation.

5.1.5. Pinch pint rollers

Illustration 5: Pinch point rollers

Pinch point danger from rollers. Keep hands and clothing away from rotating rollers.

5.1.6. Pinch point from moving parts

Illustration 6: Danger from moving parts

Danger from moving parts. Moving parts can crush and cut. Do not operate with guard removed. Follow lockout procedure before servicing. Disconnect main power before servicing.

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5.1.7. Danger of entanglement from belt drive

Illustration 7: Danger of entanglement from belt drive

Danger of entanglement from belt drive. Shear hazard. Moving part can crush and cut. Keep hand clear. Do not operate with guard removed. Follow lockout procedure before servicing.

5.1.8. Danger of entanglement from rotating gear

Illustration 8: Danger of rotating gear

Danger of rotating gear. Keep hands and clothing away from rotating gear.
Danger of entanglement from gear. Moving part can crush and cut. Keep hand clear. Do not operate with guard removed. Follow lockout procedure before servicing.

5.1.9. Danger of cutting blade

Illustration 9: Danger of cutting blade

Danger of cutting blade. Shear hazard. Moving part can crush and cut. Keep hand clear. Do not operate with guard removed. Follow lockout procedure before servicing.

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5.1.10. Danger of cutting of fingers or hand

Illustration 10: Danger of cutting of fingers or hand / angled blade

Danger of cutting of fingers or hand. Moving parts can crush and cut. Do not operate with guard removed. Follow lockout procedure before servicing.

5.2 Text warning Labels

5.2.1. Running with different voltages and frequencies

Illustration 11: Running with different voltages and frequencies

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5.2.2. Disconnect main switch before servicing

Illustration 12: Disconnect main switch before servicing

5.2.3. This switch does not disconnect all power of this machine

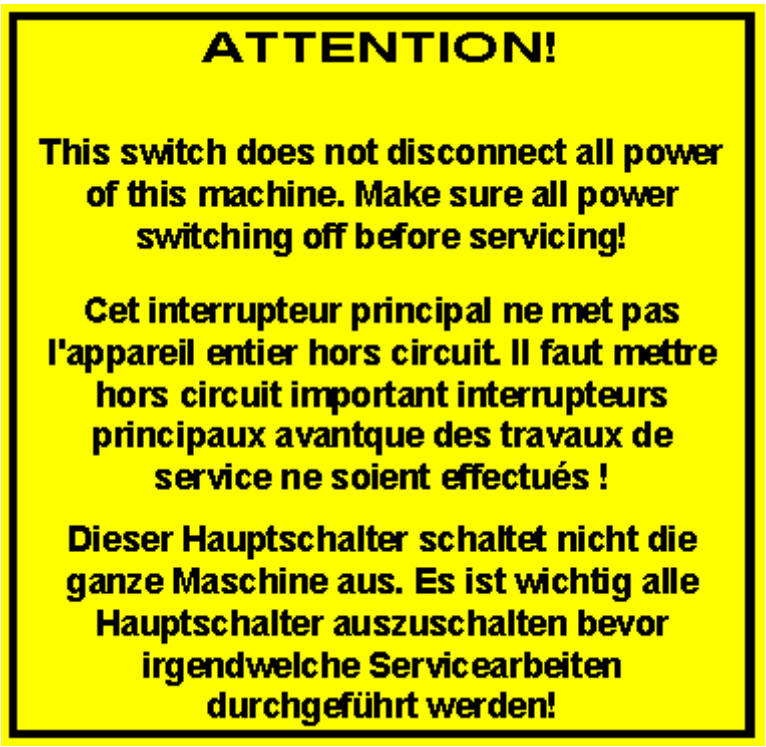

Illustration 13: This switch does not disconnect all power of this machine

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5.2.4. Inside the dryer it is may be very hot

Illustration 14: Inside the dryer it is may be very hot

5.2.5. Compressor installed under the cover

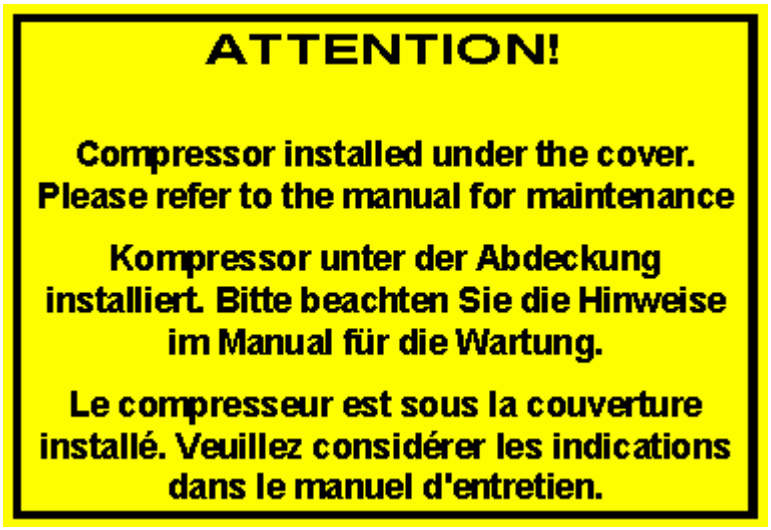

Illustration 15: Compressor installed under the cover

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6 Site preparation / Installation instruction

6.1 Electrical

Voltage	220 V - 240 V 1ph
Frequency	50 / 60 Hz ± 0.5 %
Fusing	10 A
	short circuit capacity of Breaker/Fuses 10 kA

6.2 Compressed air

Min. compressed air	5.6 kg/cm^2, 5.6 bar (80 psi)
Max. compressed air	6.5 kg/cm^2; 6 bar (94 psi)

6.3 Mechanical / Physical

Working space front side	1500 mm (59”)
Working space back side	1000 mm (40”)
Floor loading capacity	> 500 kg / m^2
Floor loading per pad	≤ 450 kg (≤ 1000 lb.)
Ambient temperature and relative Humidity	
transport	15 – 29°C (60 – 85°F) @ 10 – 90 % RH
	15 – 40°C (60 – 104°F) @ 10 – 90 % RH
operating	15 – 29°C (60 – 85°F) @ 30 – 60 % RH
best for printing	18 – 23°C (64 – 73°F) @ 50 % RH

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7 Introduction

7.1 Punch and Perforating Unit

The Punch and Perforating Unit is a compact unit designed to take plain paper and add marginal lines holes in a continuous process.
This machine has been designed to be compatible with all types of process systems and can be electronically interfaced to suit this requirement.
The unit accepts slack paper fed from any standard tension free unwind, and operates via automatic stop/start by web demand from the host device requiring minimal operator attention.
The unit is supplied with a 20" circumference punching system as standard, using clean cut tungsten carbide punches. The unit is also configured to add cross perforations. It is also possible to fit tooling for file holes and longitudinal perforations for producing standard form lengths and/or adding intermediate perforations.
A basic web cleaning system is incorporated into the unit together with a disposable bag compartment for the confetti collection. Optional confetti extraction can be supplied if required.
The processor can also be fitted with an optional web cleaning head together with a free standing dust collector unit.
The unit can be by-passed if not required, with an alternative web path through the base of the unit.
By purchasing paper direct from the mill, users of the Punch and Perforating Unit obtain an immediate saving in materials cost, directly related to volume. Other indirect cost savings are also made as a result of reductions in inventory and a lower purchasing overhead.
Operational flexibility is also improved.

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8 Mechanical Installation

8.1 Install of Punch and Perforating Unit

The installation of the Punch and Perforating Unit is relatively straight forward if the following procedures are undertaken.

8.2 Positioning of the unit

The Punch and Perforating Unit must be positioned in conjunction with the other process units being used. However, the following factors should also be taken into consideration:

a) Sufficient space for safe operation of the machine.
b) Paper path to subsequent operations.
c) Adequate space for operator.
d) Proximity of auxiliary equipment i.e. optional perf cassettes, work benches etc.
e) Sufficient space for the removal of guards to enable maintenance on the machine.

See Illustration 16: Top view of the Punch and Perforating Unit and Illustration 17: Side view of the Punch and Perforating Unit for recommended clearances from walls.

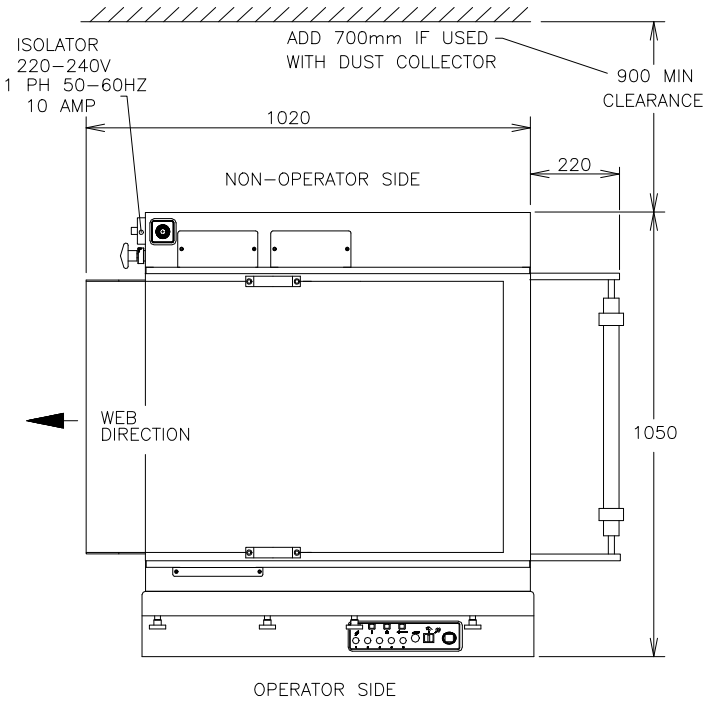

Illustration 16: Top view of the Punch and Perforating Unit

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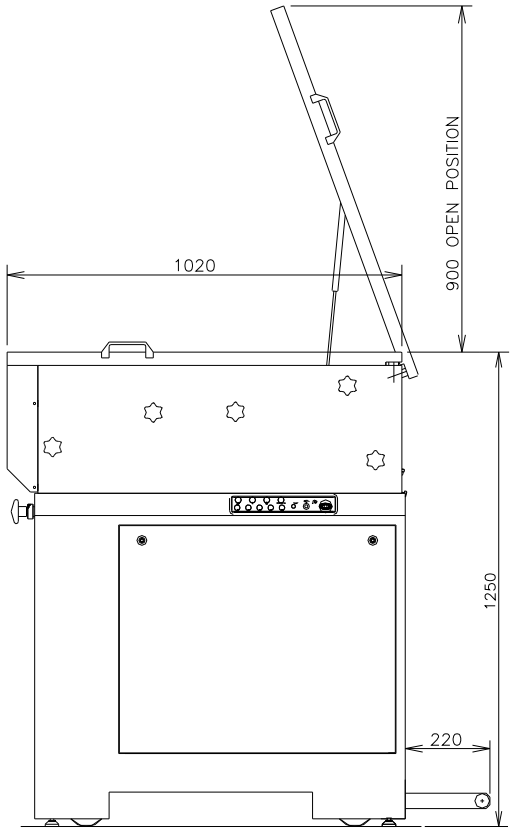

Illustration 17: Side view of the Punch and Perforating Unit

8.3 Preparation

Remove all protective covers (sheeting etc.) and clean down the machine. To remove protective wax from metal parts use a suitable solvent such as white spirit.

Pay special attention to the following:

a) Punch and die shafts must be absolutely clean. Wax tends to trap dirt and may cause the rings to pick-up foreign matter. Ensure there is no wax under the punch and die rings. When clean lightly oil.
b) Check all dies are clear of confetti by pushing a small Allen Key through each die in turn.
c) The gripper rollers must be free of wax.
d) All path rollers and shafts are clear of wax “drips” on their undersides.
e) Web cleaning brushes are clean and free of dirt and grease.
f) Remove all guards; check that no foreign matter is in the gears or belts etc. Then check all screws are tight, belt tensions are correctly adjusted and gears are still properly lubricated, if not, brush on Molybdenum based open gear grease (we recommend Molyslip OGL).
g) All bare metal shafts such as grippers, shafts, punch and die shafts, etc., should now be lightly oiled with good quality anticorrosive light oil. This is easily achieved by wiping with an oiled cloth.

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8.4 Positioning and leveling of Punch and Perforating Unit

a) The machine can be lifted using slings positioned as shown on Illustration 18: Lifting points. Alternatively, the machine can be lifted using a pallet truck or fork lift.
b) With the machine in its final position and the slings and lifting brackets removed, leveling can be carried out.
c) Leveling should be carried out using a quality precision engineer level. The machine should be leveled by placing the level on the anvil cylinder.

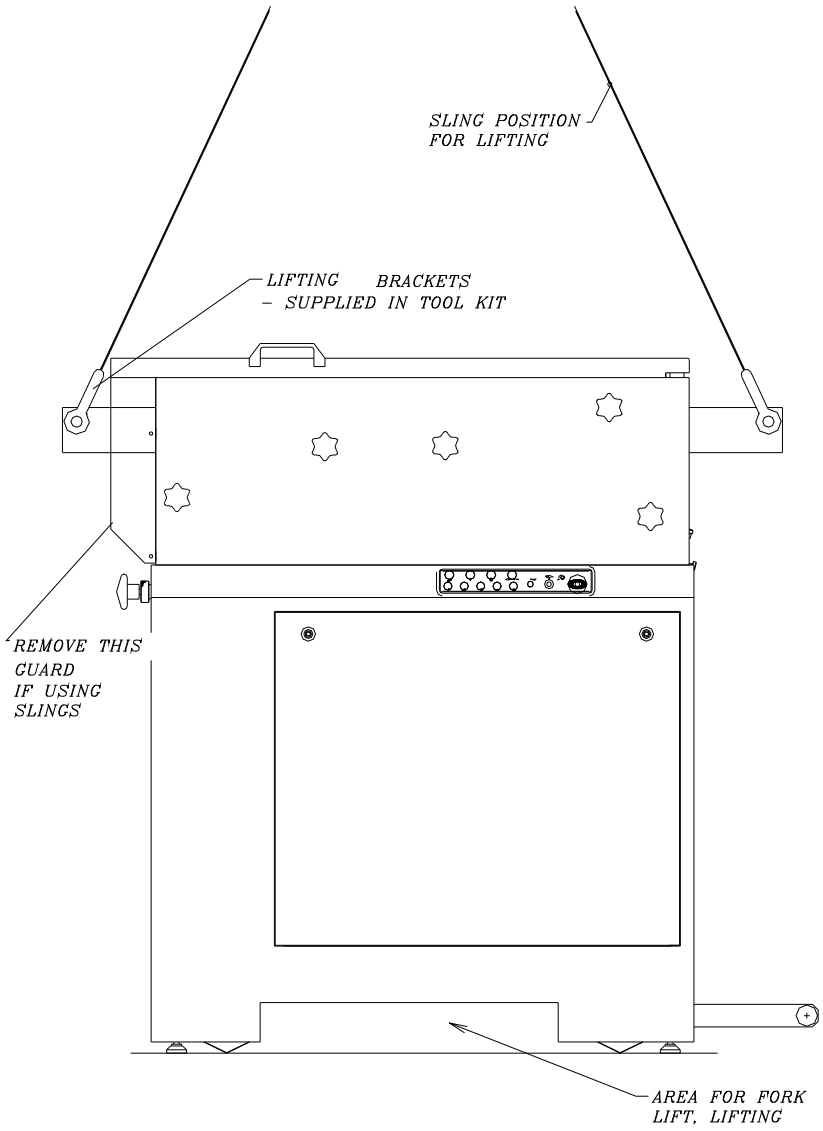

Illustration 18: Lifting points

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9 Electrical Installation

9.1 Main control cabinet

The electrical control cabinet is on the operator side of the unit. See Illustration 19: Overview electrical cabinet for a layout of the control cabinet.

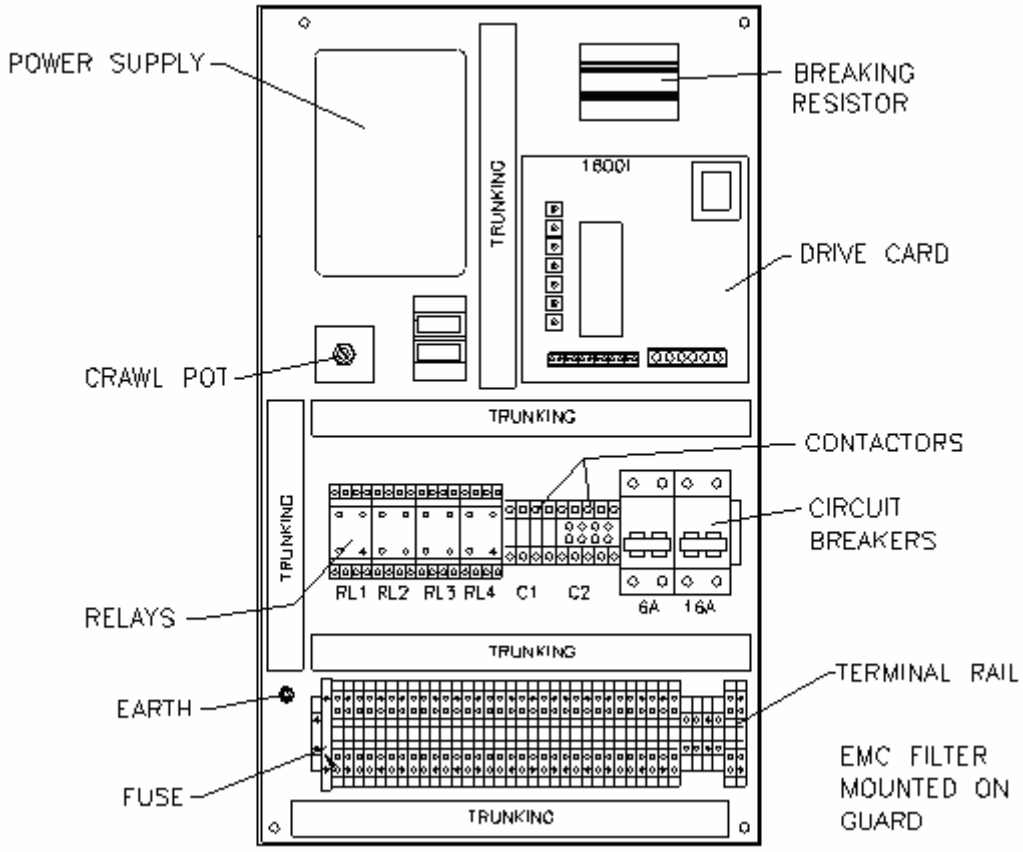

Illustration 19: Overview electrical cabinet

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9.2 Main power and electrical interface

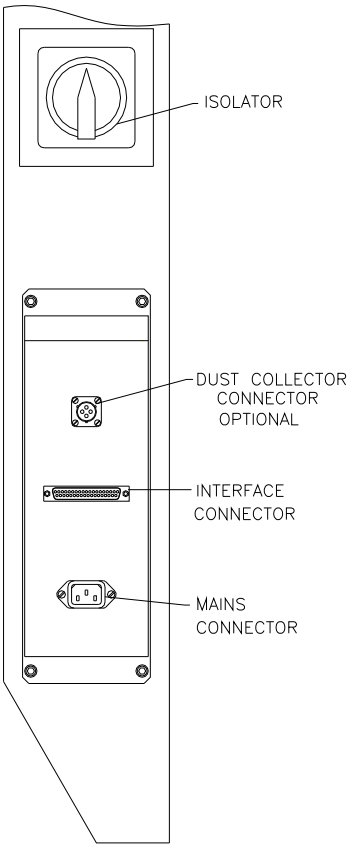

Illustration 20: Interface to internal (optional) components

a) The machine requires a power supply of 220 - 240 Volts, 50 / 60 hertz, single phase plus earth with a current capacity of 10 amps fitted as per NFPA 70 and / or local regulations.
b) The connection for the dust collector is only used when the dust collector option is fitted.

1) Before switching on check all electrical connections.
2) Make sure machine turns over. Note: turn over by hand to ensure there are no obstructions that may cause damage to the machine.
3) Inspect the machine for any loose bolts.
4) Make sure all gears are greased and all moving parts are lightly oiled.

The Punch and Perforating Unit can be supplied with an interface box or cable to suit other machines in the process line.
The interface box is supplied with the appropriate cables to connect to the other equipment being used. The connection for the interface cable is situated on the power panel.

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9.3 External electrical interface

Types of interface available are:

Interface Type 1 (VJ1000; VT3000; ReelRunnar; StarCut; etc.).
Unwind to printer (simple) to processor
Unwind to rewind plus other machines (Interface 2000) to processor.

These are based on the new standard “Interface 2000”, with custom manufactured interconnecting cabling.

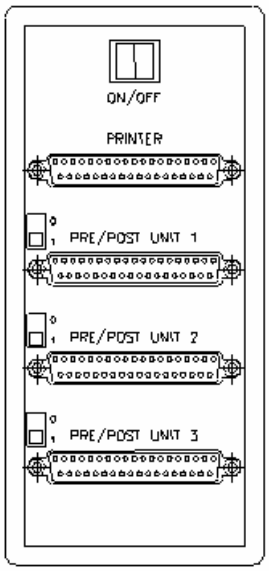

Illustration 21: Interface to external components

Switches are provided adjacent to each interface socket position to enable individual production machines to the over-ridden as necessary, therefore providing a very flexible production system.

The whole Interface 2000 control system can be disabled by use of the ON/OFF switch at the top of the box. This feature is useful in the event that a reel to reel printer set up needs to revert to use of its internal pack to pack facility.

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10 Machine functions

All the major controls and features are indicated on Illustration 22: Machine functions.

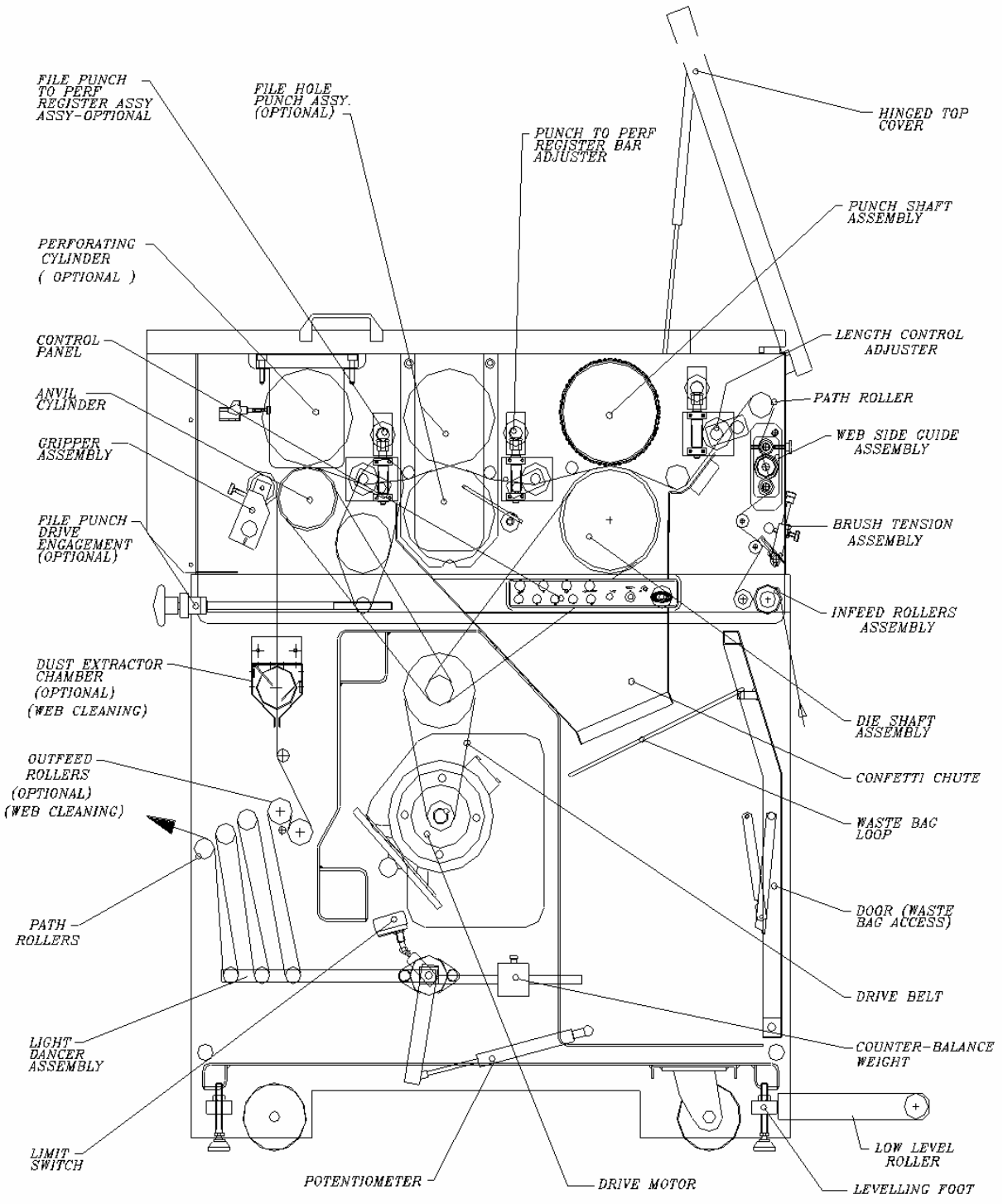

Illustration 22: Machine functions

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10.1 Infeed roller

A pair of drive infeed rollers are fitted to the input of the machine which feed the paper into the unit. Depending upon the paper path to the machine, there are two paper path options. See Illustration 25: Web path of Punch and Perforating Unit on page 32.

10.2 Brush tension arrangement

The unit is fitted with a brush strip to add a small amount of tension to the web prior to the punching section. The purpose of this device is to ensure the web has enough tension to enter the unit under control.

10.3 Web side guide arrangement

The side guide adjustment allows the web to be moved sideways to enable the operator to align the edge of the web in relation to the punch position. When the guides are in the correct position for web alignment the adjuster screw should be locked using the locknut provided. The side guide plates can also be adjusted to suit the web width being run.

10.4 Length control

The length control adjustment is positioned at the left hand end of the unit on the operator side.
The length control is achieved by altering the amount of ‘S wrap’ around the infeed bars prior to the punch and die rings.
Turning the adjuster clockwise will produce shorter paper and turning the adjuster anti-clockwise will produce longer paper.
The length can also be affected by the amount of pressure on the gripper assembly.
For checking length, a length gauge may be provided. Also see chapter 13.4 Paper lengths / checking length on page 41 in this manual.

10.5 Punch to perf register

The punch to perf register is achieved by altering the web path between the punch rings and the anvil cylinder. Moving the adjuster will either advance or retard the punch to perf register depending upon required adjustment. This adjustment should be done gradually to avoid “tearing” the punch holes.
It will generally be found convenient to adjust the punch to perforation register at crawl speed with the cover open to enable the web to be seen as this avoids wasting paper whilst waiting for the effect of an adjustment to appear at the end of the process line.
The perforation should of course, fall exactly between two sprocket holes, so that they are perfectly in line when the fold is made.

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10.6 Gripper wheels

The grippers can be positioned by loosening the shaft lock screw, and then they can be slid along the shaft. The grippers should be set approximately ¼ of the web width in from each edge of the paper and locked onto the shaft. Pressure should be set equally on both grippers using the screws provided.

Slacken the screws until the grippers turn easily by hand, and then tighten a few turns to obtain the correct pressure.

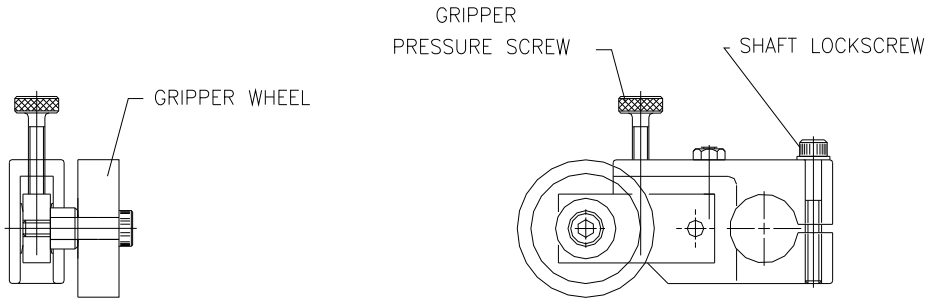

Illustration 23: Gripper holders

The grippers can be “thrown” off or on by a control knob on the operator side without upsetting the basic gripper pressure. This allows the grippers to be lifted clear of the anvil cylinder when webbing up and for the grippers to be set back on the web at the same pressure.

10.7 Dancing arm control

The dancing arm loop control acts as an accumulator by storing a quantity of paper in the three loops to ensure enough paper is available for the host device upon start up.

The amount of tension required in the loop system can be adjusted by altering the position of the counter balance weight, (see Illustration 22: Machine functions), which is accessible through the access panel on the gear side of the machine.

10.8 Interlock switch

For safety reasons an interlock switch has been fitted to the top cover of the machine. The machine will stop if this cover is opened whilst the machine is running. The machine can be inched with the cover open.

10.9 Web break

The web break sensor is mounted inside the machine and is aligned so that if the paper breaks the machine will stop.

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11 Starting up

11.1 Main control cabinet

The electrical control cabinet is on the operator side of the unit. See Illustration 19: Overview electrical cabinet for a layout of the control cabinet.
With the machine plugged in, the isolator must also be switched on to power up the machine.

11.2 Operator control panel

The main operator control panel is divided into sections to suit various functions, and for ease of use. See Illustration 24: Operator control panel.

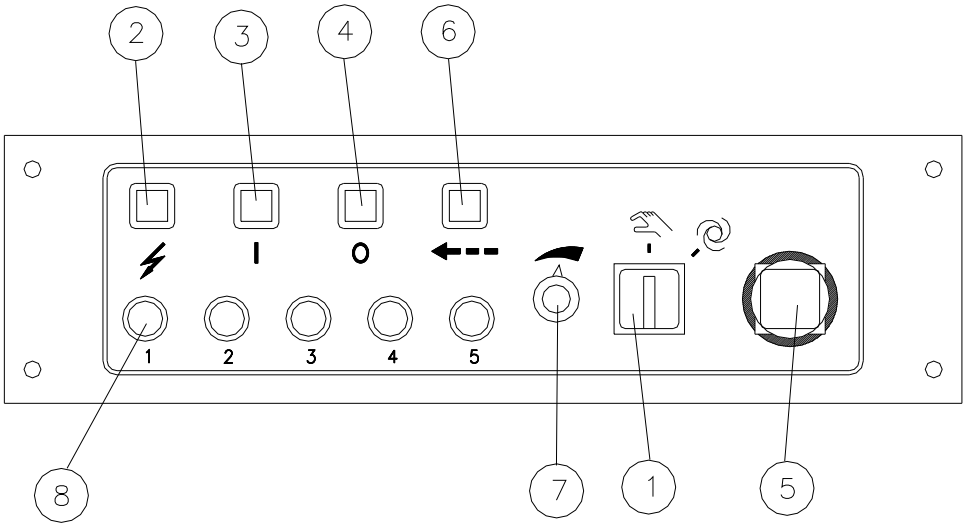

Illustration 24: Operator control panel

1. MAN/AUTO Selection	2 Position Switch
2. Power ON	White Indicator Lamp
3. Start	Green Push Button, press to run illuminates when running
4. Stop	Red Push Button, press to stop machine
5. Emergency Stop	Large Red Push Button to stop machine immediately. Pull out to reset.
6. Crawl (inch)	Yellow Push Button, press to crawl machine.
7. Speed control (manual mode)	Potentiometer
8. Fault indicator lamps	1. Ready to run 2. Circuit fault 3. Paper break 4. Guard open 5. Fan stopped (dust extraction – optional)

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11.2.1. Crawl speed

WARNING: The crawl speed must be checked before it is used. If the speed is incorrect, it should be adjusted by a suitably qualified engineer. The crawl speed potentiometer is situated on the main control panel, see Illustration 19: Overview electrical cabinet.

11.2.2. Interlock switch

For safety reasons an interlock switch has been fitted to the top cover of the machine.
The machine will stop if this cover is opened whilst the machine is running. The machine can be inched with the cover open.

11.2.3. Preparing the machine

1. Ensure the machine is clean and free from obstruction.
2. Check the punch and die rings for any worn or damaged punches or dies and replace if necessary.
3. Set the punch and die rings to the width of the job being run.

Note: The gear side punch and die ring is best left in one position and used as a reference to match the host device.

4. Check the confetti collection bag is not already full, empty if necessary.

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12 Operating

12.1 Pass the paper through the unit

The web path through the machine is as shown on Illustration 25 if using without the web cleaning option, or Illustration 26 if the web cleaning option has been fitted.

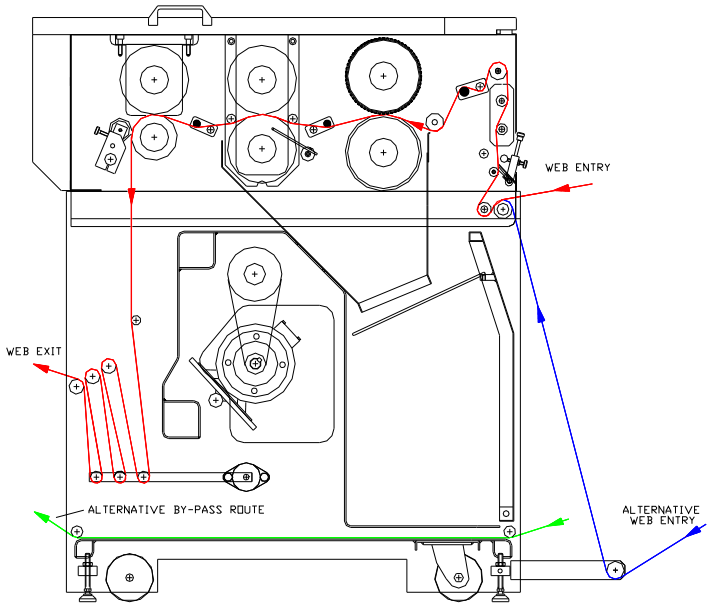

Illustration 25: Web path of Punch and Perforating Unit without web cleaning

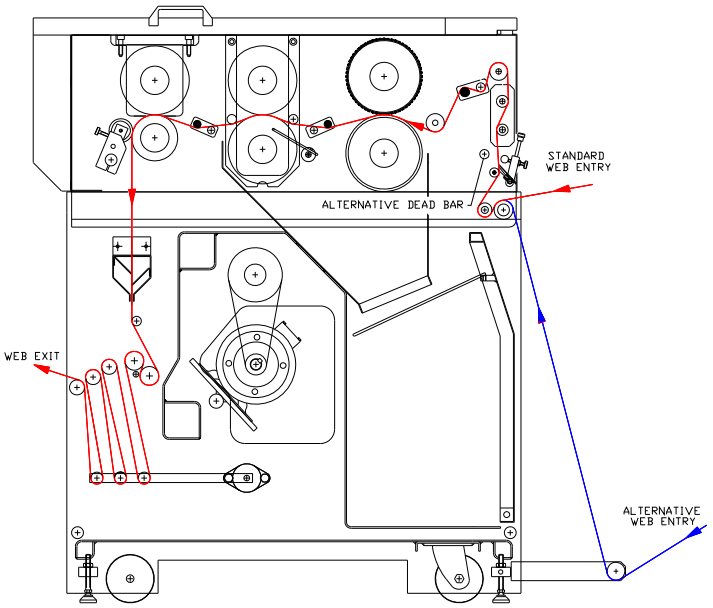

Illustration 26: Web path of Punch and Perforating Unit with web cleaning

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Note: There are two options for the paper when entering the machine, depending upon the approach of the paper path. These are both shown in the illustrations.
There is also a paper route through the base of the machine, which can be used if the need occurs to bypass the unit, as shown on Illustration 25: Web path of Punch and Perforating Unit.

To thread the web through the unit the following procedure should always be adhered to:

1) Tear a 'tail' on the web sufficient to pass through the centre of the punch unit leaving about 8" - 10" of paper free to hold on the output side of the unit. The tail should be narrow enough to miss the punch heads completely when pulled taught against the infeed bars.
2) **Route A:**
   This is the standard route into the processor when being fed from a unwind stand or similar process machine.
   Thread the paper over the top of the first infeed roller and then under the smaller infeed roller.
   Route B:
   This route is used if the paper path approaching the processor is at a lower level. Thread the paper via the low level path roller and then up and over the first infeed roller and then pass the paper under the smaller infeed roller.
3) With the tension brush in its open position thread the paper between the tension bar and brush.
4) Next pass the paper behind the first side guard tension bar and over the front of the second tension bar.
5) Now pass the paper over the first path roller and under the first register swan neck. Then the paper should go over the pivot bar of the swan register and under the second path roller just before the marginal punch unit.
6) The paper should then be passed between the punch and die rings. Whilst pulling the tail with one hand upwards and away from the punch and die rings, press the crawl button with the other hand and run sufficient paper through the unit to paper right through the perforating section of the press.
   NEVER attempt to feed the paper through from the infeed side of the punch unit whilst using the inch button as this is EXTREMELY DANGEROUS.
7) When the paper is past the punch and die rings it should now pass through the punch to perf register bar and then onto the anvil cylinder.
8) If the file hole option is added, the paper must then thread through the file hole punch and die rings using the same procedure as described in paragraph 4), but ensuring the paper passes under both the stripper rollers.
9) After the file hole punching rings, the paper will also need to be threaded through the second register device prior to the anvil cylinder.
   Note: The second register is only fitted if the file hole punching option is added.
10) For maximum safety, threading through the perforating unit (if fitted) should be carried out with an emergency stop button depressed so that the machine cannot run or crawl.
    Follow the webbing diagram provided and ensure that there is no perforating blade close to the anvil cylinder, as this will hinder threading.
11) Once the paper has passed over the anvil cylinder the grippers can then be thrown 'on' the paper then inched to pass the paper down to the first dancing arm roller.
12) If the web cleaning option has been fitted, the web must be fed through the web cleaning head.

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13) Pass the web down behind the lower tendency roller and pull the web up through the gap between the tendency rollers. Now feed the web over the top of the outer tendency roller and pass the paper down to the first dancing arm roller.
14) Now weave the paper through the dancing arm arrangement depending on which set-up is being used.
15) The paper can be fed from over the top of the last exit roller and taken on to the next unit in the process line as required.

Note: If more tension is required to run the paper being processed than this set-up provides, the paper path can be altered by threading the paper behind the additional dead bar after the brush tension bar.

12.2 By-pass option

If the paper being run is not required to be processed in the unit, the paper can by-pass the machine by passing the paper under the two lower tie bars as shown on Illustration 25: Web path of Punch and Perforating Unit without web cleaning on page 32.

12.3 Running the unit

With the machine webbed up, the unit is now ready to be run in conjunction with the rest of the production line.

The Manual / Auto switch should now be switched to the Auto position and the run button pressed.

The unit will now operate “on demand” from the host device.

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13 File hole punch

13.1 Calculated life time of punches and dies

Dies and punches are normally changed at the same time, after the punches have been turned once to use both ends.

We can confidently expect, even on difficult materials, to achieve the minimum life of 20'000'000 revolutions (33'350'000 documents with 12" length).

Therefore at speed up to 150 m/min, with the unit at maximum utilization, the interval between tool changes will be approximately 60 days.
This is calculated on 80% uptime, 24 hours per day, on 75 gr/m2 paper.
In practice, production is likely to be less, and punch life could be longer, so intervals will almost certainly be greater.

13.2 Punch and die settings

The Punch and Perforating Unit use 20" circumference long life punching system. This system offers high reliability and long service life with clean and precise punching.
In normal use, the only operations required will be width adjustments for various jobs, and replacement of worn punches and dies.
The construction of the punching system consists of a driven shaft; in witch the dies are mounted. When the punch ring is engaged, it is driven from the die ring.

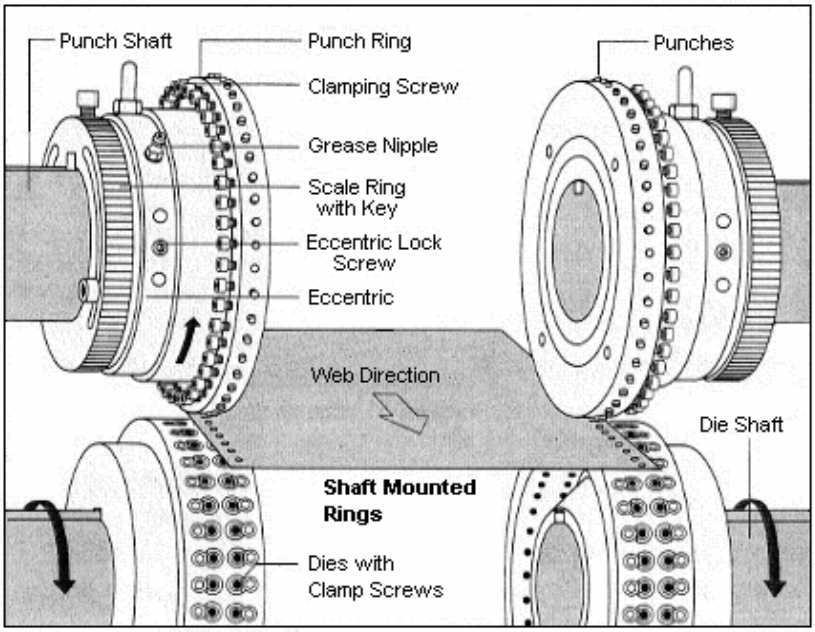

Illustration 27: Punch and die rings

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The die rings are fitted with individual dies manufactured from tungsten carbide, which are locked in the ring by a separate clamp screw for each die. The punches are held in the punch ring by individual lock screws. When the punch ring is correctly positioned, the wide part of the eccentric is positioned on the outgoing side of the rings. This construction feature ensures that if a critical situation occurs, the punch ring is forced up lifting the punches from the dies, rather than forcing them in deeper. The eccentric is locked internally via the eccentric locking screws.

A scale ring is mounted onto the side of the eccentric. The scale ring is keyed on to the top shaft and locked into position via a clamp screw. After setting the punch and die rings, the scale ring is clamped to the eccentric ring with screws. The eccentric ring is marked with a depth setting which, under running conditions, can be used as a guide to the depth the punch is penetrating into the die (1 division on the scale ring = 0.05 mm punch penetration).

An increase in the punch depth setting is only required when the punches are turned or renewed and no punching improvement results.

13.2.1. Brief installation guide lines

1. Move the die ring to the desired form width, and lock into place.
   When more than one ring is mounted on the same shaft, dies must be disengaged from punches. On machines having side register adjustment via the machine side frame, this should only be used when the punch and die rings are rotating.
2. Move the punch ring into position for desired form width.
   Mount scale ring loosely onto the eccentric ring. Insert the setting punch provided (punch with tapered end) into punch No. 1 (Identified by red marking). Gently engage the setting punch into die No. 1 (identified by red marking) as far as possible (without force). Finally, check that the eccentric ring has no side play.
3. Locking of punch and die ring.
   a. Clamp the eccentric ring lightly using the eccentric locking screw.
   b. Clamp scale ring to side of eccentric using lock screws.
   c. Lock scale ring onto the shaft by tightening the clamp screw.
   d. Loosen lock screws clamping the scale ring to the eccentric.
   e. Loosen eccentric and withdraw punch to 0.5 position, this equals the thickness of the 1.65 mm and sets the distance between the punch and die rings. Lastly, lock eccentric ring again.
   f. Lock scale ring onto eccentric ring again.
   g. Remove setting punch from No.1 drilling and insert a standard punch.
4. Punching Test.
   Run a strip of paper through the punch and die rings whilst turning by hand.
5. Check punches and dies mate correctly.
   Check by eye that all is in order during the punching test.
6. Test run.
   Only run tooling with paper, never without.

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13.2.2. Installation of punch tools

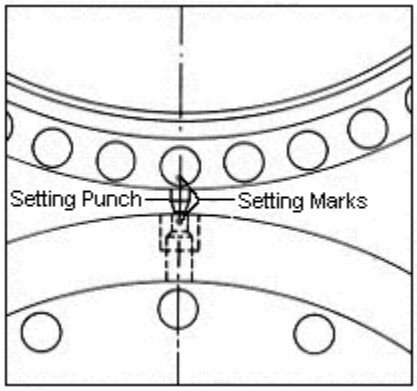

Illustration 28: Installation of punch tools

The first step is to secure the die ring on the shaft. Vertical run out and face run out should then be checked. Following this, the punch rings with the eccentric ring and scale ring are slid onto the top shaft. Where the punch ring is marked with a red screw, a punch is removed and replaced by a tapered setting punch. The die ring is likewise marked with a red dot. By rotating the bottom shaft this mark is brought to the top and aligned with the red mark on the punch ring. The punch ring is then slid over into position and by using the operating lever on the eccentric ring; the punch can be lowered into the die, the eccentric lock screw is then lightly tightened. The punch and die ring should not be rotated in this position.

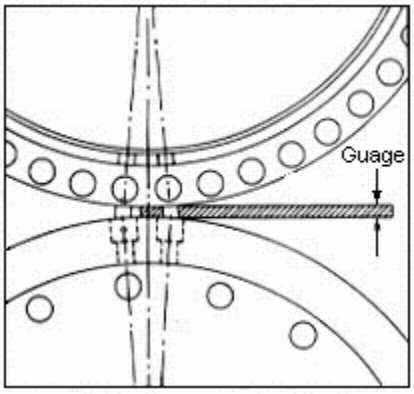

Illustration 29: Installation of punch tools

The scale ring is then tightened lightly to the eccentric ring and locked with the key. Ensure that the key is seated properly in the top shaft keyway.
The eccentric ring is now unlocked and turned back until the setting gauge (1.65 mm) can be slid between the punch and die ring. After this, the eccentric is locked in position via the locking screw and all locking screws are finally tightened. The rings are rotated half a turn forwards and the setting punch removed and replaced by a normal punch. In line with the divisions on the scale ring, the eccentric is marked "1.

This mark identifies the first punch depth setting. As required, the punches can be lowered further into the dies when changing punches does not improve punching results.

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13.2.3. Commissioning of punch ring

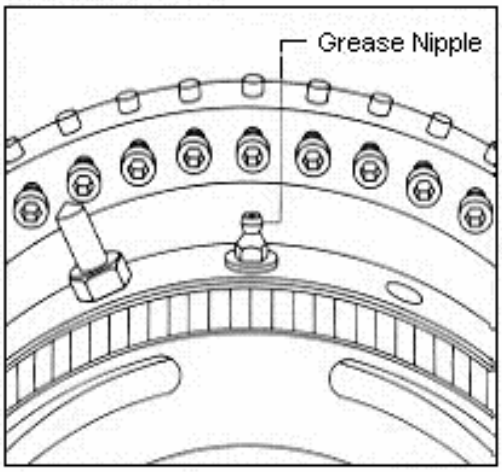

Illustration 30: Commissioning of punch ring

After installation, and setting of the tooling they should be run in. Changing to different sorts of paper will not require any alteration of the depth setting. The die ring bearings should be greased once weekly with good quality ball bearing grease.

13.2.4. Form width setting

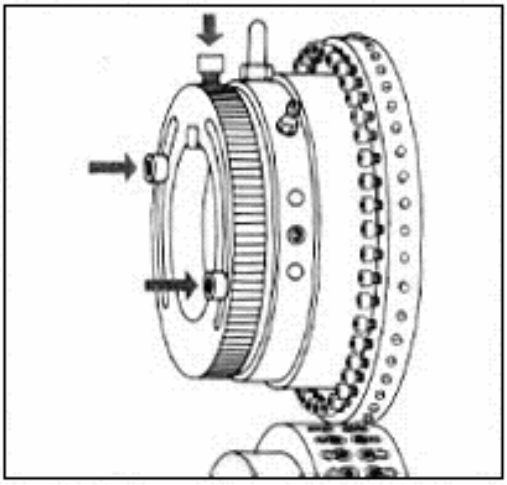

Illustration 31: Form width setting

The steps required to perform a width change depend on the machine design, when several rings are on one shaft, the punches must be lifted from the dies by loosening the eccentric and scale ring lock screws and rotating the eccentric ring. The die rings can then be loosened and moved to the desired position. The punch ring will need to be fully set up again, see chapter 13.2.1 Brief installation guide lines on page 36 or chapter 13.2.2 Installation of punch tools on page 37.

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13.2.5. Adjusting of punch ring

Place one punch into position and inch the machine to sheer the punch into the die. When the punch is back to an accessible position remove the sheared ring and check that it has sheared evenly all rounds. See Illustration 32: Adjusting of punch ring.

Illustration 32: Adjusting of punch ring

If the shear ring is uneven towards the back or front, the punch ring will need to be re-phased to the die ring.

To adjust the phasing of the punch and die rings, slacken the 3 locking bolts on the outer hub of the punch gear and adjust the eccentric screw to either advance or retard the alignment of the punch and dies.

Re-tighten the locking bolts and shear in a new punch and re-check the sheared ring.

Note: When shearing in the remaining punches, check all the shear rings are even, to achieve this, some compromise may be needed to average out any errors. When using clean cut punches and dies, the punch will need 2 revolutions for the punch to be sheared correctly.

13.2.6. Changing dies

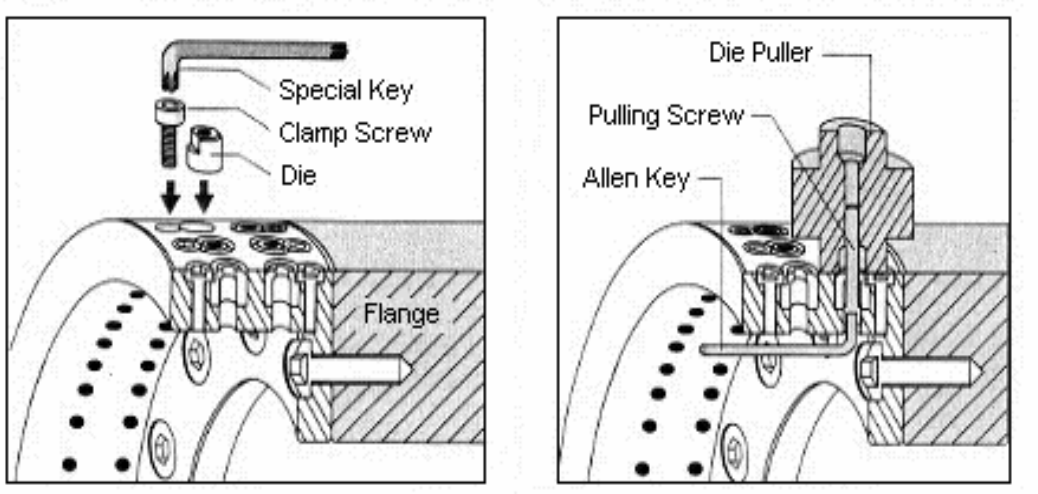

Illustration 33: Changing dies

The dies are secured in the die ring via a locking screw. They are manufactured from hard sintered metal specially developed for rotary punching.

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A Allen key is required to loosen the clamping screws when changing the dies. The die can then be easily pressed upward from underneath and out of the ring. It is recommended that the clamp screws are also changed when the dies are changed.
Only use the proper original flange type clamping screw which is required for optimum performance without blocking or deforming the dies. If a die should be hard to remove, a special die puller is supplied. A screw is passed up through the die from underneath and held from rotating by a Allen key. The puller is then threaded onto the screw and by rotating the puller body by hand, the die is pulled out.

Before fitting new dies the die bore in the ring must be thoroughly cleaned. The die is then clamped into place with a new clamp screw. The clamp screw is tightened to 5-6 Nm.
Please do not use excessive force otherwise the ring can be damaged.

13.2.7. Punches

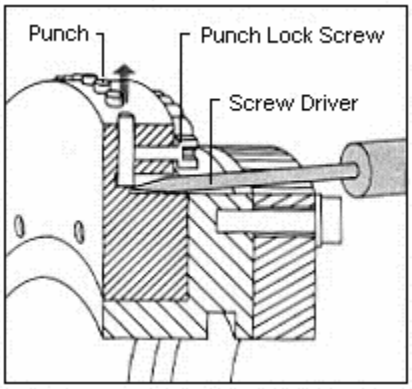

Illustration 34: Changing Punches

The sketch shows a punch seated in the punch ring.
The punches are manufactured from a special sintered hard metal and are exactly dimensioned and matched to the rings to give optimum punching results.
The punch is made without milled flats or holding notches. This ensures the punch is easy to remove from the ring. The punch is removed by simply loosening the clamping screw and pushing the punch up from underneath using a screwdriver. When one end of the punch is worn it is simply turned 180° - a punch change is not required.

When installing the punches, the punch bore in the ring must be thoroughly cleaned. The punch is then inserted and pushed down onto its seat and the clamp screw tightened to 5-6 N.M. It is then a good idea the check with a dial indicator on the punch faces to ensure all punches are seated properly (limit 0.05 mm). The next step is the setting of the punch depth in the dies. The rings are always run on depth setting No. 1 unless turning or replacing the punches does not give a punching improvement. Depth setting No. 2 is then used and the procedure repeated for depth setting No. 3. The dies would then be changed.

Tip for cost saving on punching: When the sprocket holes are no longer being punched cleanly or hangers develop, do not go immediately to the next depth setting. Mostly it is caused by punch wear or damage. As the dies cost several times more than the punches, it always pays to check whether the dies still cut cleanly. This is easily done by turning or replacing the punches.

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13.3 Confetti collection

The confetti waste from the punching falls through the collection chute beneath the die shaft and into a disposable plastic bag. The plastic bag is removed when full by opening the access door. The bags are attached to a bag loop attached to the access door.
NOTE: This should be emptied daily or as frequently as necessary to avoid spillage inside the unit.

13.4 Paper lengths / checking length

The length should be checked whenever the paper is changed.
Run a length of paper through the machine (preferably at near production speed) allowing the paper to exit the machine onto the floor.
Lay the paper on the length measuring strip, fitting the holes at one end over the pins in the strip. Smooth the paper gently towards the other end of the strip, avoiding pulling or stretching the paper as this will give a false reading.
Check the position of the sprocket holes relative to the five holes at the end of the strip. These holes indicate the following lengths, measured over six feet.

First hole	1/16" under length
Second hole	1/32" under length
Third hole	exact length
Fourth hole	1/32" over length
Fifth hole	1/16" over length

Most companies run their paper to an exact length or +1/32": the latter standard is often adopted to reduce the possibility of subsequent shrinkage causing the paper to become short, which is likely to cause problems.

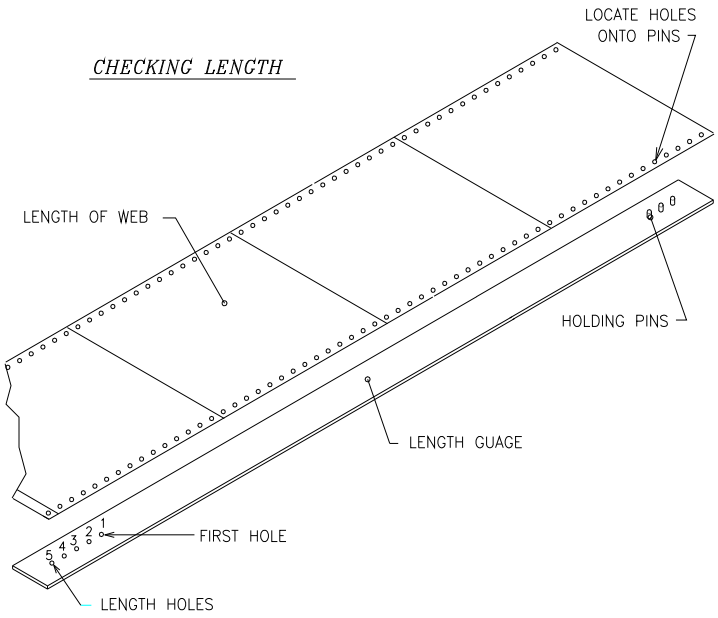

Illustration 35: checking paper length

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Once the pitch or throw length of the paper has been determined it can be adjusted as follows:

a) Run the machine at minimum speed.
b) Turn the length control handle slowly in the required direction
c) Run the unit to speed and take another sample for checking.

Length adjustments should always be made before peroration to hole adjustments, as the perforations will be affected by length changes.

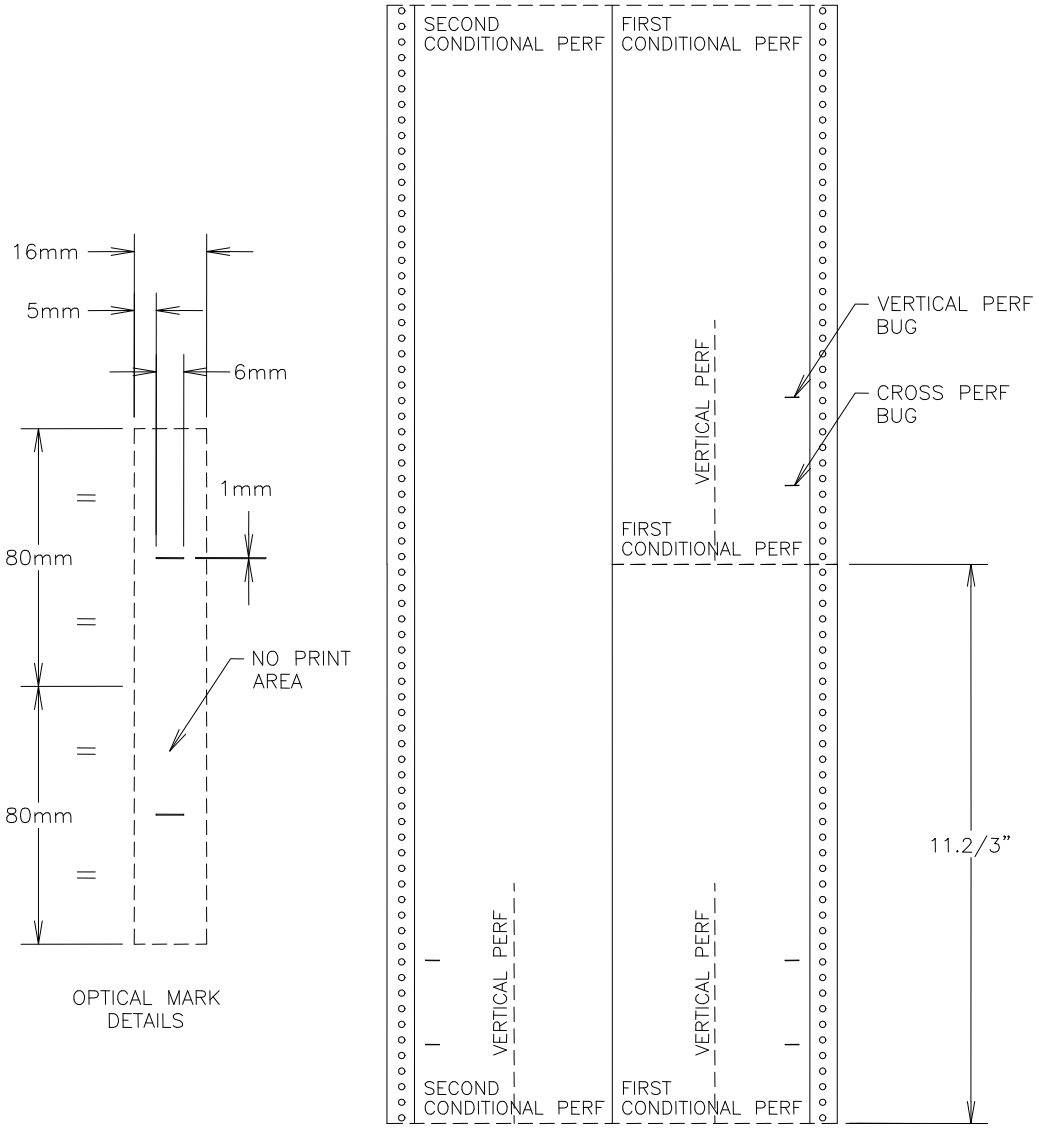

Illustration 36: Definition of Cue Mark for punch and perforating

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14 Perf cylinder

14.1 Perforation Cylinders

The cross perf cylinders are provided in the form of a "cassette" which can be changed to suit the form size required.
The unit is designed to use a range of perf cassettes from 10" - 18" with a variety of slot configurations.
Perf cylinders 10"-12" have 1 slot as standard.
Perf cylinders 13"-18" have 2 slots as standard.

14.2 Changing Cylinders

Cylinders are readily changed by removing the four M.10 clamping screws which clamp the perf blocks in position, and releasing the two pressure clamps.
The perf cylinder cassette can then be lifted out of the machine and onto a suitable work bench. The new perf cylinder should then be lifted into position. Ensure the stamped edge of the end block is in the "up" position.
Take special care to engage the perf cylinder gear with the anvil cylinder gear when inserting, to avoid damage to the gear teeth.
When fitting a perf cylinder, position the "cassette" so that the blocks are pushed up against the datum faces and then engage the clamps to hold them against the datum face. The top clamps should now be replaced to secure the cassette.
If the perf cylinder is not set square to the anvil cylinder this may cause a sideways leaning pack if folding at the end of the process. If this occurs, refer to chapter 14.2.1 Sideways lean on page 45.
Larger size cylinders may require lifting from both sides of the machine which will require 2 people. Suitable lifting equipment should be used in conjunction with the eye bolts provided, which should be fitted to the top of the perf blocks.
If the conditional perf cylinders are being changed take care to position the perforating blades in the right position relative to each other. A scale is found on the cylinders which should correspond to enable this. For example if perf station 1 reads 3, turn the perf station 2 cylinder to show 3 against the pointer.

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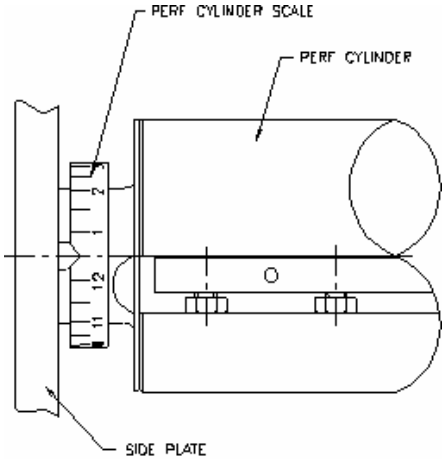

Illustration 37: Perforating cylinder scale

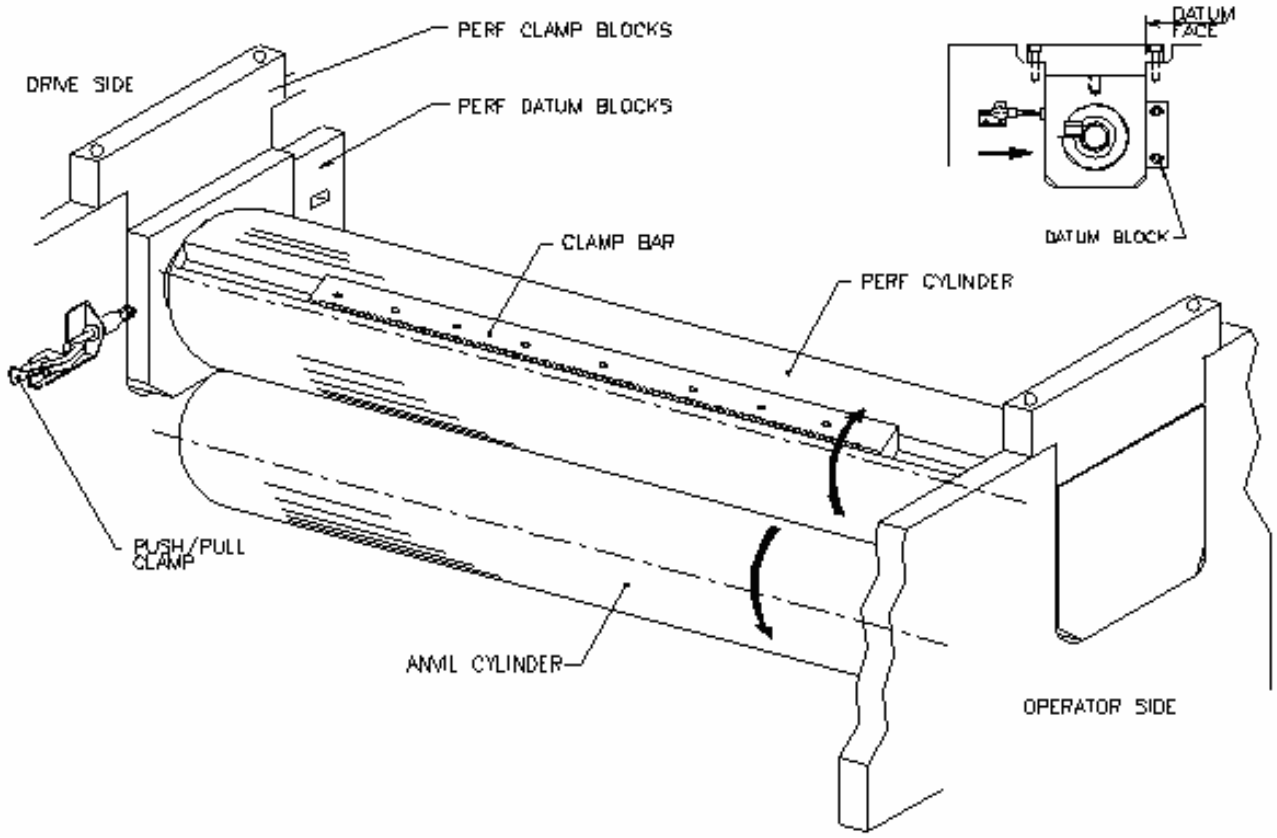

Illustration 38: Perforating cylinder set-up

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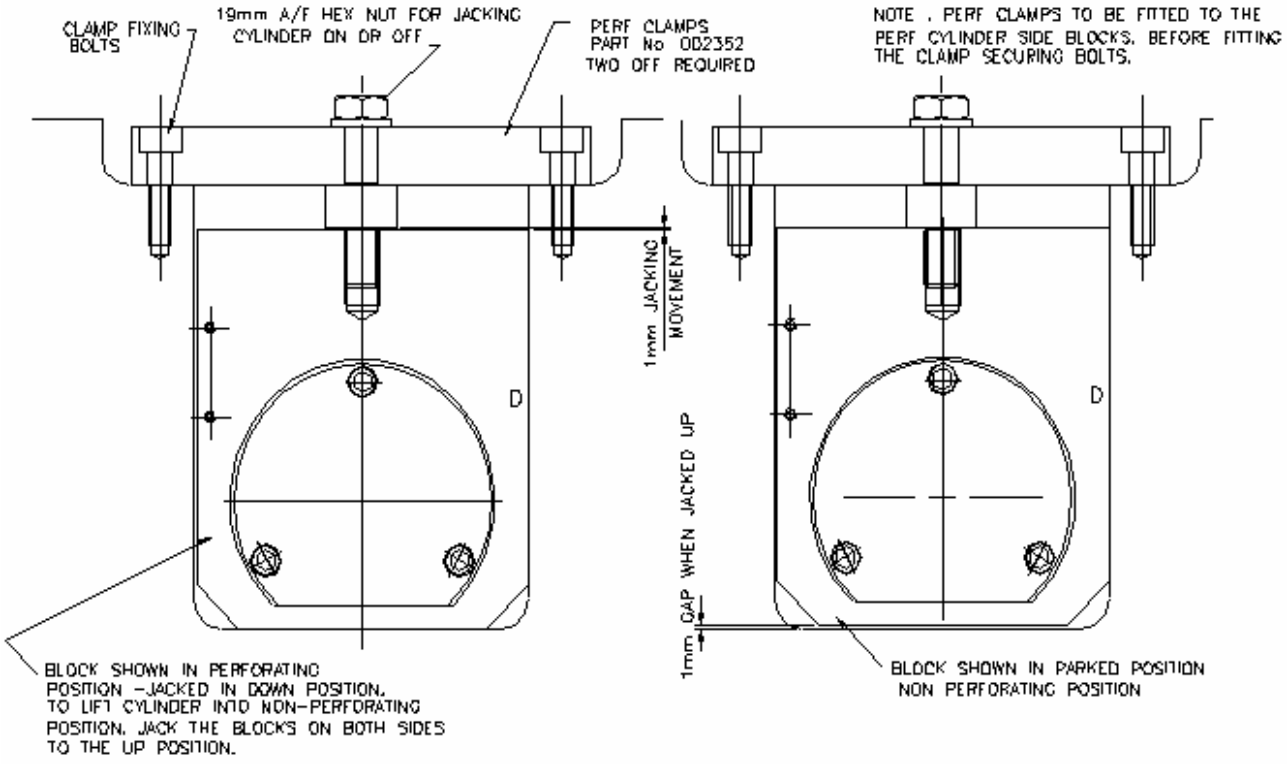

Illustration 39: Perforating cylinder set-up

14.2.1. Sideways lean

The cassette datum blocks are adjustable to permit some compensation for baggy edge reels, which sometimes give rise to sideways leaning packs when folding.
The blocks are mounted on the side plates and are adjustable forwards or backwards as required to "square up" the perf blade in relation to the axis of the anvil.
If a leaning pack is being produced slightly slacken the perf cylinder clamp bolts and adjust the datum block on the operator side only to push the perf block forward or tap the block backwards as required to overcome the problem. If the lean becomes worse, move the datum plate on the opposite side of the machine and re-adjust to suit.
Re-tighten the perf cylinder block and run about 100 forms to check the effect on the pack. Trial and error is usually quicker than trying to calculate which way the device should be moved as this depends on the paper fault.
It is sometimes quicker to reverse the reel thus removing the "loose" edge to the other side of the machine - this will often improve the pack sufficiently to run the job.

14.2.2. Forward or backward lean of paper pack

Under some circumstances the pack produced may lean forward or backward. This is due to alternate forms being slightly short or long, and may have a variety of causes.

1. With multi-slot cylinders only certain slots may be machined to the accuracy required for folding - it is essential that these slots are used.
2. Variations in blade settings e.g., one blade set hard, one light can affect perforation accuracy - cure by resetting blades.

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3. If no other cure is effective with cylinders using two blades it is possible to pack the blades using adhesive tape stuck onto the blade on the side which contacts the cylinder slot.

Mark a blade and mark the perforation produced by it and then run paper through into the folder. This will allow identification of which blade produces the front fold and which the rear. The rule for packing blades is as follows:
Pack leaning FORWARD; (i.e., away from folder) pack blade which produces the FRONT fold (i.e., nearest delivery table) and vice-versa.

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14.3 Setting Perf blade

14.3.1. Installing the clamp bar

The perforating blades are retained in the cylinder by using a quick release clamp.
To install the clamp bar the following procedure should be carried out.

1. Make sure the slot is clean of any burrs and high spots.
2. Retract all the adjusting screws in the clamp bar, so that the ends are flush with the underside of the clamp bar.
3. Compress one end of the bar by hand and insert it into the slot at roughly a 30 degree angle, push the remainder of the bar down evenly and seat it in the slot.
4. Fit the two safety retaining screws at both ends of the clamp bar.

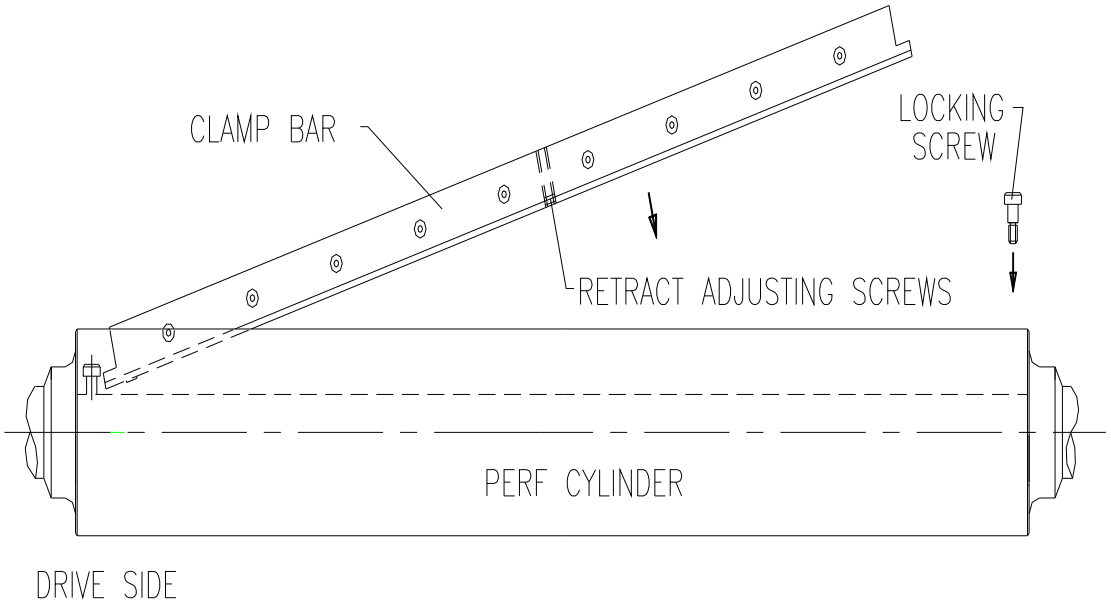

Illustration 40: Installing the clamp bar

14.3.2. Adjusting the perforation blade

Two special tools are required to install the perf blade which is provided with the tool kit supplied. To install the perf blade the following procedure should be carried out.

1. Ensure the machine is stopped with the brake on.
2. Place the anti-rotation tool in position over the front tie bar of the machine and into the clamp bar slot (see Illustration 42: Perforating blade installing on page 49).
3. Insert the engagement tool into the holes on the clamp bar and lever the tool to open the clamp bar.

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4. Drop the blade into the gap making sure it sits down onto the lip of the bar.
   Note: Blades should be fitted so that the beveled side of the cutting edge is next to the clamp.
5. Remove both setting tools from the machine.
6. Back up the end adjusting screws in the clamp bar to their original position and using the inch button; rotate the cylinder once without paper threaded in the machine to strike the anvil with the blade to seat the bar. The blade will be heard to hit the anvil cylinder as it is pushed back. If no noise is heard the blade was not raised enough. Loosen the clamp bolts and repeat this step. If the machine stalls when the blade hits the cylinder, there are two possible reasons:
   a) The blade has been raised too high.
   b) The clamp screws have been over tightened, preventing the blade from moving back.

NEVER attempt to force the cylinder round by keeping the crawl button depressed if the machine stalls, as this could lead to damage of the drive system. Depress the "stop" button and turn the cylinder back by hand and reset the clamp bar.
Adjust all the clamp bar adjusting screws until you feel them just touch bottom. If you feel the bar rise, backup the screws just enough to take the pressure off.

7. Rotate the cylinder with some paper threaded through the machine and check the perforation. At this point you should have a light cut across the paper.
8. Make any final height adjustments required on the bar using the adjusting screws in the areas where the perforation is to light or heavy.
9. When the perforation is satisfactory, tighten the silver locking set screws in the clamp bar until it bottoms out. This will lock the adjusting screws.

Cylinders with more than two slots may have number slot identified with a stamped Figure 1. This slot is the datum slot and is machined to a higher degree of accuracy, together with the slot opposite it, these slots are used for fold perforation. This ensures better pack quality. Setting of blades is partly a matter of experience, but the aim should be to achieve the lightest setting which gives a clean tear, as this will give maximum blade life, easiest folding, and will reduce noise and loadings on the machine. Do not try to re-use old or blunt blades.

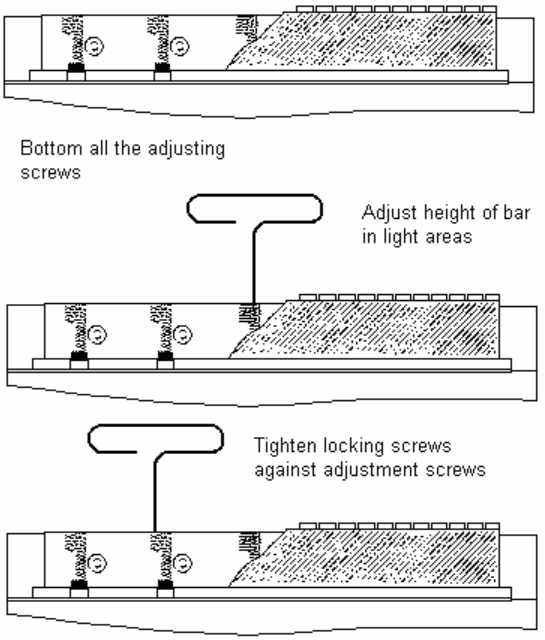

Illustration 41: Perforating blade adjusting

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Once the initial clamp bar and blade installation is completed, all that is required to change a blade is as follows.

1) Locate the anti-rotation tool.
2) Insert the engagement tool.
3) Push the engagement tool to release the pressure on the blade.
4) Remove the used blade.
5) Insert the new blade.
6) Release the pressure and remove the engagement tool.
7) Remove the anti-rotation tool.
8) Resume production.

NOTE: If minor adjustments have to be made, first take the pressure off the locking screws. Make minimum adjustments and finish by re-tightening the locking screws.

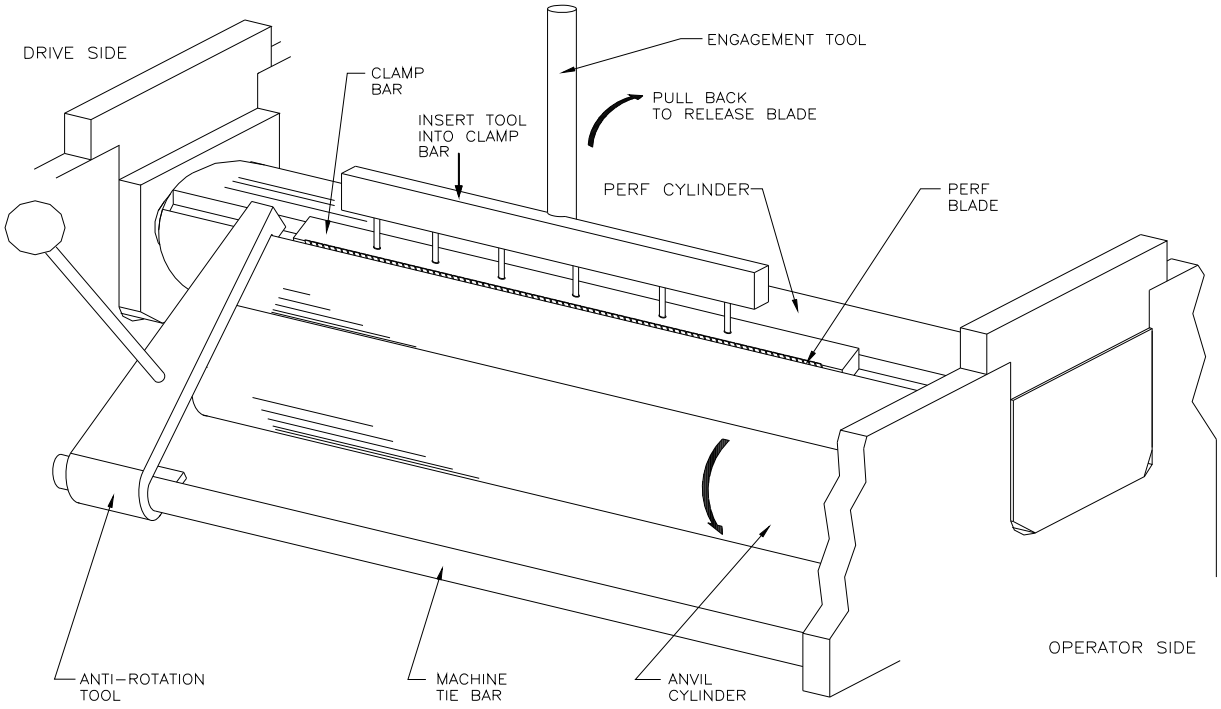

Illustration 42: Perforating blade installing

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14.3.3. Recommended blade sizes

Various perforating blades are available, depending upon the type of job being run.

The main rule is - per inch of perf rule you should have a minimum 1/4" tie in total and the edges tied back about 3/32".

Recommended blade size

4 teeth/inch	x	0.060" tie
6 teeth/inch	x	0.040" tie
8 teeth/inch	x	0.032" tie
10teeth/inch	x	0.032" tie
10 teeth/inch	x	0.030" tie
12 teeth/inch	x	0.032" tie
12 teeth/inch	x	0.030" tie

Microperf blades 48 teeth to 68 teeth.

Microperf blades must have a 0.008" tie. Note that the quality of microperf blades available varies greatly and some blades may produce weak perforations and lead to web breakages.

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15 Length perf and slitter holders (optional)

The machine can be fitted with length perf and slitter wheels as required.
These units are mounted on the same bar as the gripper wheels and are ‘thrown’ on or off using the same control knob.

The perf / slitter holders can be positioned as required by loosening the shaft lock screws and sliding the holder along the mounting shaft.
When the holder is in position, final adjustment can be made by loosening the locknut on the wheel mounting screw and turning the mounting screw forward or backward as needed.
When the perf / slitter wheel is in the correct position, re-lock the locknut.
Pressure on the perf / slitter wheels can be adjusted using the pressure screw provided (see Illustration 43: on page 51).

Note: Too much pressure may damage or shorten the life of the wheels.

When replacing perf and / or slitter wheels it is advisable to purchase wheels with bearings fitted.

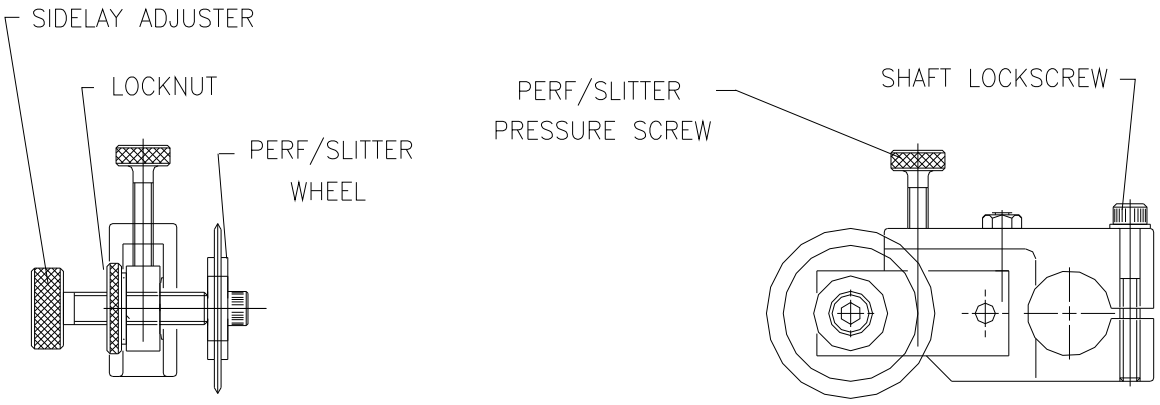

Illustration 43: Length perf and slitter holders

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16 File hole punching (optional)

Optional file hole punching which can be used on form sizes 10" - 18" can be supplied to suit the customers requirements, hole size and pitch must be specified at time of order.
File hole punching is supplied in the form of a cassette, which can be lifted in and out of the machine to enable other sizes of cassette to be fitted easily.

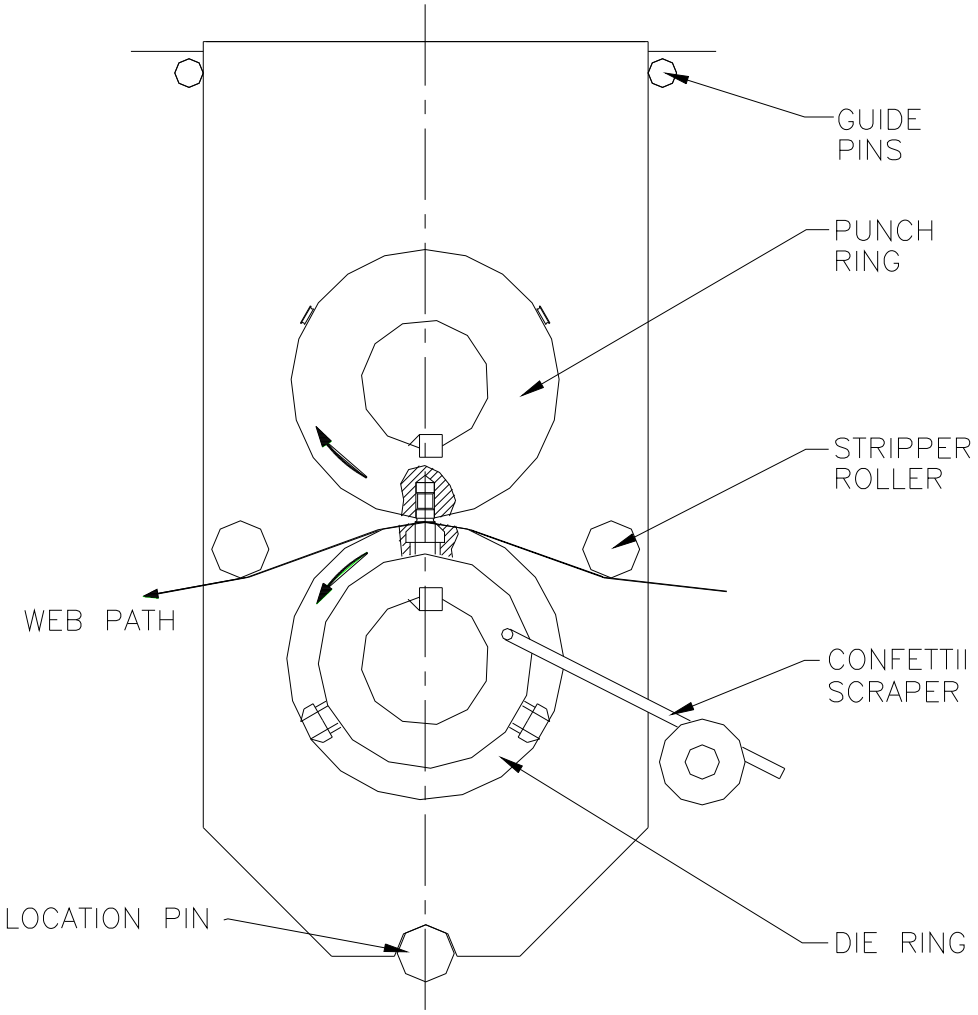

Illustration 44: File hole punching cassette

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16.1 Fitting the cassette

Before positioning the file punch cassette, the drive quadrant adjuster situated on the drive side, output end of the machine should be set to the OFF position using the screw adjuster provided.
The file punch cassette should be lifted with care using a sling, suspended by a lifting device or alternatively, by placing the perf cylinder lifting bar through eye bolts fitted into the side blocks. If using a lifting bar, two persons will be required to lift the cassette up and into position.
The cassette should be lowered carefully between the locating pins protruding from the side plates. Lower the cassette until the slot on the underside of the side blocks locate onto the large locating pins in the side plate.

When in position, remove the eye bolts and lifting equipment.
The cassette is now located and in position ready for use.

With the cassette in position the quadrant gear drive should be engaged by using the screw adjuster. The adjuster should be adjusted so that the drive gear engages fully with the cassette die gear. A window is provided in the drive side guard to enable the operator to see when the gears are fully engaged, at which point, the locknut should be tightened.

For more details please refer to the Punch Perf Unit quadrant drive manual.

16.2 Confetti scrapers

When fitted with file hole punching, the machine is also fitted with a confetti scraper which is mounted off an additional tie bar.
The scraper bar should be positioned inside the die ring but not touching the die ring so it will knock the confetti clear from the underside of the dies.
The scraper is essential when using smaller circumference punching to avoid confetti build up in the dies.

16.3 Changing file hole punches and dies

Punches should be changed when ‘hangers’ start to appear, it will usually be found more economical to change the complete ring rather than to replace punches piecemeal to cure individual hangers.
To replace a ring of punches, loosen the lock screws and remove all the punches before fitting the new ones. Then replace the new punches, ensuring that each one is fully seated before tightening the locking screws.
Some styles of punches may be supplied with a groove for the locking screw, some punches may be supplied with a flat.
If the punches have a flat on one side, the punch should be entered into the hole with the flat in line with the locking screw position.
Dies should be replaced with every other complete punch replacement. To replace dies, unscrew the retaining screw and remove the die. Replace with a new die ensuring the die is properly seated. Refit the screw and tighten to clamp the die in position.

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Place one punch into position and inch the machine to sheer the punch into the die. When the punch is back to an accessible position remove the sheared ring and check that it has sheared evenly all around. See Illustration 32: Adjusting of punch ring.

Illustration 45: Adjusting of punch ring

If the shear ring is uneven towards the back or front, the punch ring will need to be re-phased to the die ring.

To adjust the phasing of the punch and die rings, slacken the 3 locking bolts on the outer hub of the punch gear and adjust the eccentric screw to either advance or retard the alignment of the punch and dies.
Re-tighten the locking bolts and shear in a new punch and re-check the sheared ring.

Note: When shearing in the remaining punches, check all the shear rings are even, to achieve this, some compromise may be needed to average out any errors. When using clean cut punches and dies, the punch will need 2 revolutions for the punch to be sheared correctly.

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17 Web cleaning (optional)

17.1 Specification

Length	790mm
Width	700mm
Height	950mm
Weight	63kg

17.2 Cleaning head

The optional cleaning head is fitted between the anvil cylinder and the dancing arm arrangement. The head is constructed from stainless steel with a narrow input slot for the web to enter the chamber.

Inside the chamber the web passes between two cleaning blades which scrape off the surplus dust from the web. The dust is extracted from the chamber by a free standing dust collector which is connected to the chamber via a vacuum hose.

The web then exits through the base of the chamber. The width off this exit slot can be adjusted to assist with ease of threading the web through the chamber and facilitate the cleaning of the head. There are two adjusting screws provided to adjust the width of the exit slot (see Illustration 46: cleaning head on page 55).

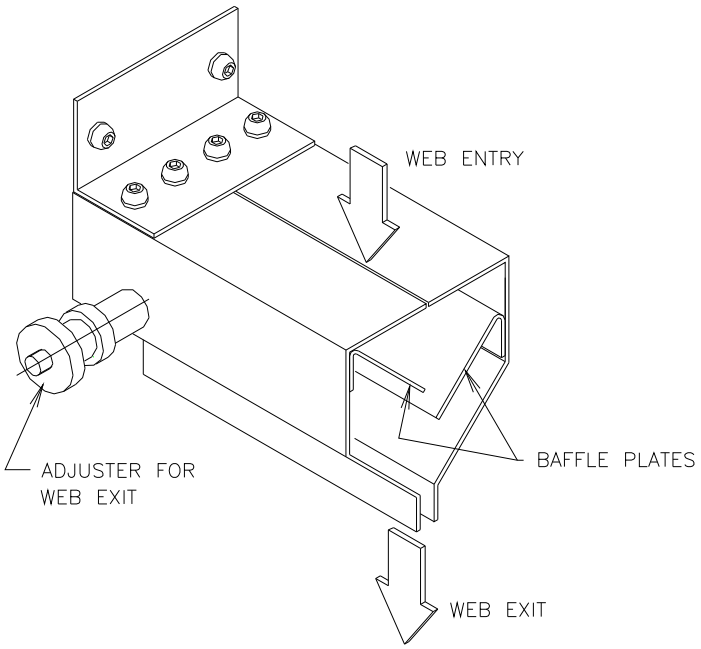

Illustration 46: cleaning head

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The exit slot should be closed using the two adjusting screws, once the web has been threaded through, until the minimum clearance is provided around the web at the exit point. This can be checked by moving the web from side to side (about 10mm) by hand, little or no resistance to the movement should be felt when the exit point clearance is set correctly. When the cleaning head is set up the unit will accommodate any paper width up to 521mm wide and all paper stock ranges without any other adjustments.

After the web exits the cleaning head, the web is threaded around two driven tendency rollers which are running at 105% of web speed. These two driven rollers maintain the tension of the web through the web cleaning head, to counteract the vacuum created in the cleaning chamber by the dust collector.

The two tendency rollers are only fitted to the Punch and Perforating Unit in conjunction with the web cleaning option.

17.3 Dust collector

The dust collector has been designed for dealing efficiently and economically with the dust problems associated with various papers together with the ability for collecting the confetti produced when punching the paper.

The dust collector is a free standing cabinet of a robust and air tight construction. Within the cabinet is a tapered multi pocket filter element of a polyester material and of 2.5m^2 of filtration area.

The filter element is clamped and sealed at its base to a sloping internal flange and supported at its top by elastic loops from a pivoted top frame, the shaft of which extends outside the cabinet and is cranked to form a shaking handle.

Beneath the filter element is a dust collection tray with either one or two dirty air inlet spigots located immediately above the tray in the cabinet back panel.

Located behind the filter element in the back panel is a backward inclined centrifugal fan, which is driven by a flanged mounted motor which projects to the rear of the cabinet. An acoustic diffuser is also located on the rear of the cabinet for expelling the clean air.

Easy access for maintenance is gained via a full width front access panel with quick release captive fasteners

With the collector clean and working under normal operating conditions, a performance of 500m^3/h (295cfm) is available at the contaminated air inlet. Under full flow conditions, the sound pressure level is a respectable 72dA. Measurements were taken under semi-reverberant conditions 1 meter from the front of the collector.

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17.3.1. Operating principle

Dust generated by the machine being served would be extracted at source and conveyed to the dust collection by the flexible hose.

Contaminated air from the dust generation source is drawn through the inlet and into the filter element chamber by the fan. On entering the chamber, heavier dust particles are carried up to, and retained on the inner surfaces of the filter pocket assembly. The cleaned air is then drawn through the filter media into the fan chamber and finally discharged to atmosphere via an acoustic diffuser at the rear of the collector.

17.3.2. Commissioning

The collection is powered by a three phase 0.72 kW 2-pole T.E.F.C motor.
Connection to the mains power supply must be in accordance with the appropriate wiring diagram.

A pre-wired plug is provided on the motor power lead, which plugs directly into the socket provided on the socket panel of the Punch and Perforating Unit.

The dust collector is controlled by a 3 phase inverter which is situated inside the control cabinet of the processor. The dust collector will start up whenever the processor is run.
The extraction hose must be fitted into place between the outlet flange of the web cleaning head and the inlet flange on the rear of the duct collector using the clips provided.

All electrical installation, maintenance and servicing work must be carried out by suitably qualified personnel.

- Do not start the fan if filter chamber front access panel, dust drawer or filter pocket assembly are not in place and fastened.
- Check the filter assembly daily and clean if necessary.
- Ensure dust drawer is not allowed to overfill or become too heavy for removal and emptying.

ALWAYS ISOLATE THE ELECTRICAL SUPPLY BEFORE SERVICING

Regular servicing is essential. At least every 1,000 hours (6 months), the filter fabric, shaker mechanism and all dust seals should be checked for wear and tear. Any defective part MUST be replaced.

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17.3.3. Filter cleaning

The filter pocket assembly is cleaned by the hand operator shaker mechanism at the top tight-hand side of the collector. After switching off the motor and the fan has been allowed to run down (approximately 60 seconds), agitate hand shaker up and down at least six times. Impinged dust on filter pocket assembly is dislodges and allowed to fall into dust drawer beneath.

17.3.3.1 Dust disposal:

1. Ensure motor and fan are stationary.
2. Release dust drawer by releasing the two quick release clips.
3. Pull dust drawer forwards until free of collector.
4. Dispose of collected dust from dust drawer.
5. Replace dust drawer and lock into place with the securing clips to ensure an air tight seal.

17.3.4. Filter pocket removal and replacement

17.3.4.1 Bag Removal

1. Isolate dust collector from power supply.
2. Release the two quick release fasteners and remove the front access panel.
3. Unclip the bag suspension bars from the shaker frame and remove.
4. Remove the clamping nuts from the studs holding the filter fixing frame to the internal flange. Lift out the element and frame assembly.
5. Remove the element from the frame by feeding out of the underside of the frame.

17.3.4.2 Bag Replacement

1. Feed the pockets of the filter through the filter fixing frame from beneath.
2. Pull the elasticized base of the element over the toe of the fixing angle.
3. Ensure the seal on the internal flange of the cabinet is satisfactory, then locate the filter assembly and fix in to position replacing the clamping nuts onto the studs. Make certain the cloth is clamped beneath the filter fixing frame at all points.
   Note: elasticized material showing on the inside of the frame will allow the passage of dust.
4. Pass the bag suspension bars transversely through the elastic loops at the top of each pocket and clip into shaker frame. Use only genuine filter elements.

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18 Maintenance

18.1 Punch and Perforating Unit

Treating your machine with care and respect will reduce the amount of major maintenance work. However, there are certain items which do need attention periodically and are listed in this section. There are also a few basic rules which should be adhered to.

1. Always keep the machine as clean as possible.
2. Always look out for loose or worn parts and report them to a supervisor.
3. Never abuse or misuse the machine.
4. Ensure parts that require lubrication do not run dry.

18.1.1. Daily

1. Check the condition of the cross perf blades, perf wheels and slitter wheels for wear or damage and replace if required.
2. Check punches and dies for wear and replace if required.
3. Clean anvil roll surface.
4. Check all equipment is securely in place.
5. Check the confetti bag and empty when required.
6. Clean the lenses of the mark readers and web break detector.
7. Clean punch and die shafts and ensure punch and die rings slide easily along.

18.1.2. Weekly

1. Grease the grease nipples on the punch and die rings.
2. Grease punch ring bearings.
3. Grease the die ring bearing housings.
4. Grease the sprocket bearings and the perf bearings via the central greasing point.

18.1.3. Every three month

1. Remove the covers and lubricate all gears on the gear side of the machine with good quality Molybdenum Disulphide based open gear grease.
   We recommend Molyslip OGL which should be brushed thoroughly into all teeth of each gear.
2. Grease the grease nipples on the flanged bearing.
3. Check all timing belts for wear and adjust as required. DO NOT OVER-TENSION, see chapter 18.1.4Belt tensioning on page 60.
4. Check perf cylinders for backlash through the drive gears and adjust if required.
5. Check file hole punch drive gears for wear and adjust backlash if required.

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18.1.4. Belt tensioning

Motor belt	belt tension 16.5lbf	MSD force 2.5lbf	deflection 0.12in
Perforation belt	belt tension 25.0lbf	MSD force 3.13lbf	deflection 0.22in
Sprocket belt	belt tension 25.0lbf	MSD force 3.13lbf	deflection 0.23in

The timing belts driving the impression cylinder should only be tensioned when the impression is in the 'ON' position.

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19 Fault Finding

19.1 Machine running problems on Punch and Perforating Unit

Problem	Possible causes	Remedy
Machine will not run	Guard not shut properly	Ensure guard is shut
	Insulator turned OFF	Turn On insulator
	Emergency stop button not released	Check Button and release
Motor runs but no drive to paper	Drive belt damaged or broken	Replace drive belt
Anvil cylinder not raising	Actuating solenoid failure or sticking	Check actuating solenoid. Replace if faulty
Perf cylinder will not rotate	Blade set too heigh	Reset perf blade
Sprocket Punching Running out of round	Cause could be punch or die rings	
	punches or dies running out of round	
Hanging chads	Dies or punches not in top condition.	Check punches and dies and change as required. If wear is the cause, check punches and dies and try next depth setting.
Paper tearing in running direction	Wrap round angle incorrect for rings.	Check guide roller setting before and after rings.
Blocked dies	Wrong clamp screw used. Chads building up on screw head.	The head will block die and not allow chads to fall through
Broken or damaged punches or dies	Punches or dies not running round.	Dirt on punches or dies could be the cause
Paper wrapping around rings		Check and repair
		Reposition paper break monitor

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19.2 Paper running problems on Punch and Perforating Unit

Problem	Possible causes	Remedy
Web / Paper breaks	Paper tension too high	Adjust tension
	Register adjustment made too quickly	Adjust slow
	Too much paper tension	Reduce tension
	Gripper wheel tensions incorrect	Reset grippers
Failure to perforate	Mark reader not reading	Clean lens on mark reader
		Ensure mark reader in line with marks
Poor perforations	Anvil cylinder not raising	Check actuating solenoids
	Damaged or worn perf blades	Replace per die plates
	Not enough pressure	Adjust per blade
Length of paper	Incorrect setting of length control	Reset and check length of paper
Paper hangers left in punch hole	Punches worn or damaged	Replace punches
Punch holes tearing	Punches / dies damaged	Replace punches and / or dies
	Punch to perf register adjustment made too quickly	Adjust slowly
	Too much paper tension	Reduce tension
	Drive belt not tension enough	Tension all drive belts (must be rather tight)

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19.3 Machine running problems on Web cleaning

Incorrect fan motor rotation	Check fan rotation and transpose electrical supply connections if necessary
Dust / air seepage	Access panel, filter assembly or dust drawer not properly sealed or seal defective. It is important that all the seals on the dust collector are effective to ensure maximum efficiency
Filter choked	Remove filter assembly and vacuum clean inside and out. Renew if damaged
Dust drawer overfilled	Remove and empty as necessary
Suction dusting or outlet restricted	Check throughout and clear
Slow fan motor speed	Check line voltage, phase and motor connections
Stationary fan motor	Check supply overload (Automatic reset after 10 minutes), motor connections and windings

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