FRANKLIN MODEL 164
OPERATION AND PARTS MANUAL
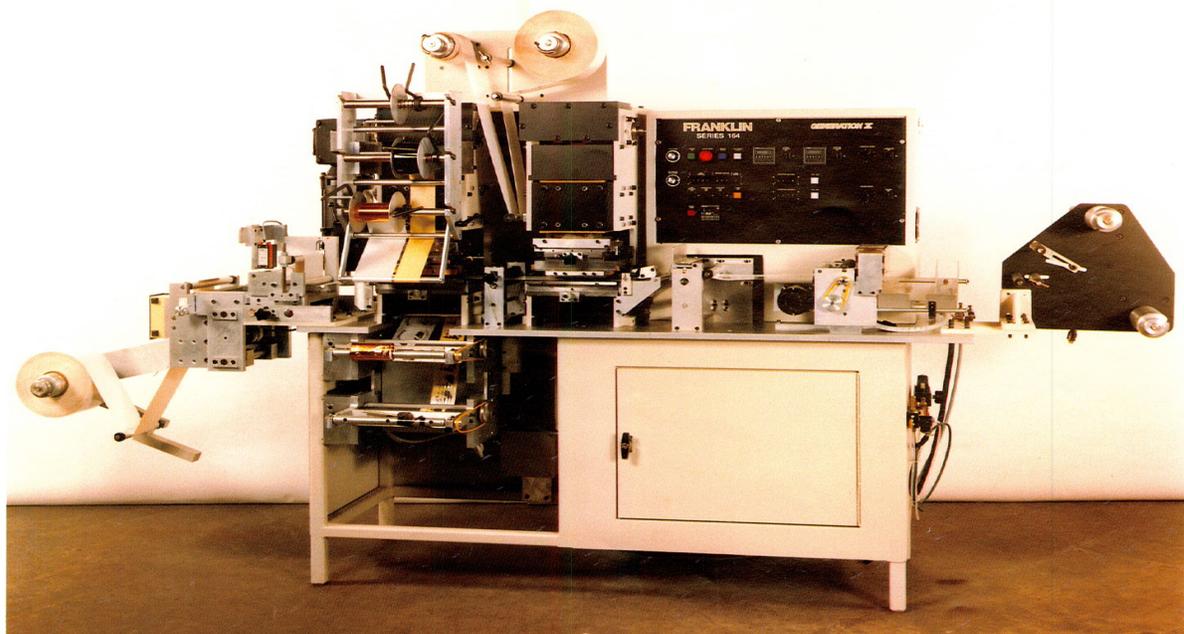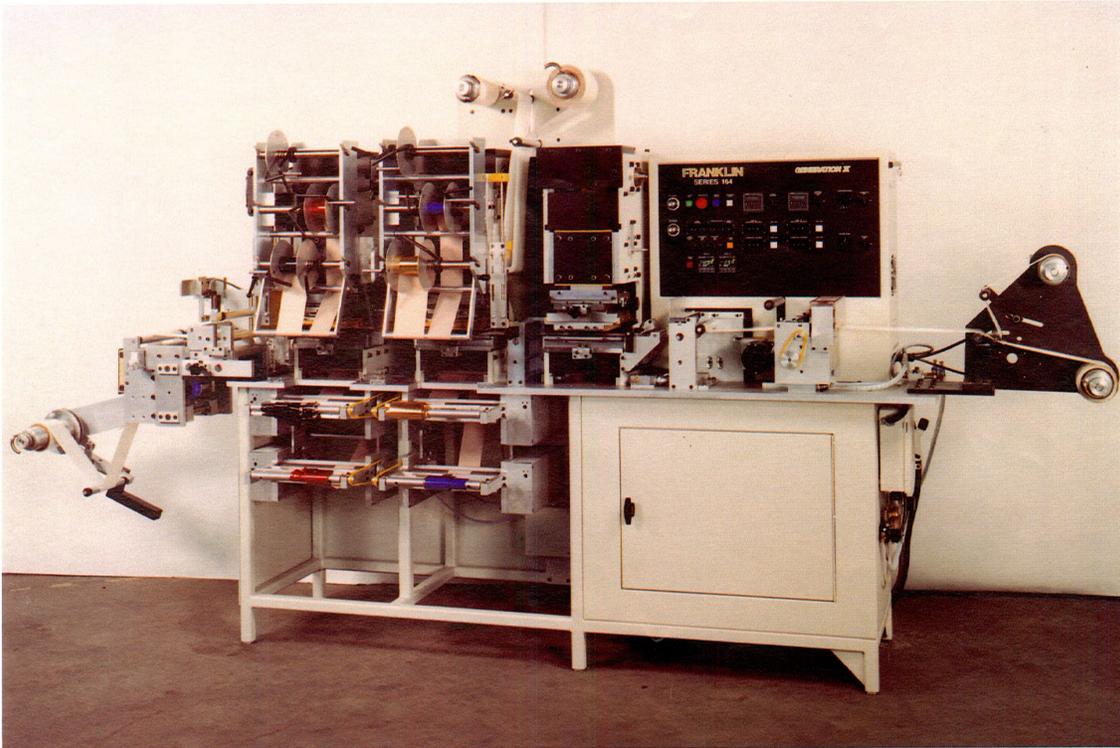
I. WARNING:

The Franklin Model 164 Generation II Label Maker is driven by a powerful 1 horsepower motor at the stamping and die cutting heads and by a heavy duty, high powered stepping motor at the web feed. If your machine is equipped with a Sheeter-Stacker it has a sharp bladed guillotine cutter operated by a fast and forceful air cylinder. All moving parts are carefully guarded to prevent accidents. <u>Any attempt to alter, defeat, modify, remove, or otherwise circumvent these safety devices is unauthorized, specifically warned against, and will probably result in serious injury or even death.</u>

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Franklin Model 164 Instructions

II. Electrical Information:

    A.   Power Connection:

The Franklin Model 164 Label Maker is designed to operate on 208/230 volts, 50/60 hertz, Single Phase. A 15 amp circuit breaker protects the entire unit from overcurrent conditions. Individual internal circuits are properly fused for component protection. Please check the circuit diagram for the correct value of each fuse and if there are any questions, consult our electrical engineering staff for assistance at 714-547-0194.

    B.   Safety:

A special key is required to gain access to the inside of the control enclosure. Additional controls are located in the cabinet below the main control box. This unit is accessed by removing the screws that hold the panel at the rear of the machine. All power should be disconnected before opening either electrical enclosed. Failure to do so could result in a serious, possibly lethal, electric shock.

    C.   Controls:

        A.   <u>Main Breaker</u>:

The main breaker protects the entire electrical apparatus of the equipment from over current situations. It is designed to be used to power up and power down the entire unit.

        B.   <u>Lockout</u>:

Lockout is in compliance with Federal regulations. When working on the equipment, the lockout should be placed in the Off position and the key removed to prevent accidental operation of the machine while working on, repairing, or setting up the machine.

        C.   <u>Run Speed</u>:

This control is used to govern the number of cycles per minute. The higher numbers result in higher speeds.

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D.   Power On Light:
The Power On Light glows when power is supplied to the unit
and the   breaker is on.

E.   Single Cycle:
The Single Cycle button is used to operate the machine for
one cycle. Pressing and releasing the Single Cycle button
will cause one cycle to occur. Pressing and holding the
Single Cycle buttons will cause cycles to repeat until the
button is released. Pressing the Single Cycle button while
the machine is running on Automatic will cause the machine
to stop after 'the next cycle.

P. Cycle Stop:
Presssing the cycle stop causes the operation of the machine
to stop when it is running on automatic cycle. The circuit
is designed so that the press will stop in the Up position.

G.   Automatic Cycle:
Depressing the Automatic Run button will cause the machine
to run until it is stopped by the operator, a safety gate is
opened or until the counter reaches zero.

H.   Web Draw Jog (One Length - No Print or Cut:
Depressing this button advances the web (and laminate - if
laminating) one length. (Whatever is set in "P" below.)

I.   Cycle Counter (Predetermined):
This solid state digital predetermining counter is set by
pressing the "I" button with one hand and holding the button
under the digit to be changed until the desired digit shows
in that position. This process is repeated for each digit.
Before starting operations, the "R" Button (Reset) a must be
depressed to enter the new count into the memory. The
predetermining counter resets itself automatically every
time it reaches zero and shuts the machine down.

J.   Cycle Counter (Off/On:
This switch can be used to disable the cycle counter. It is
especially useful when splices are detected passing through
the machine and it is known that a certain number of labels
will have to be removed from the web and then replaced.

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K.   Sheeter/Stacker Counter:

This counter is used to determine the number of labels on a sheet (assuming one label per cycle of the machine). If there are two labels per cycle, and the counter is set for four, there will be eight labels on the sheet. It is set in the same manner as the Batch /Predetermining Counter.

L.   Sheeter/Stacker On/Off Switch:

This switch is used to turn the Sheeter/Stacker system On and Off.

M.   Laminator Speed:

This control allows flexibility of laminator takeup speed and can be controlled while the machine is in operation or while it is stopped.

N.   Laminator Takeup Motor (On-Off)

This switch supplies power to the laminator takeup motor. It provides a convenient way to start and stop the motor when threading laminate, and when changing webs, etc.

`   0. Secondary Run Speed:

Controls the number of cycles per minute when the press is used with the optional thermal transfer printer interface. With the thermal transfer printer interface, the system is designed to run at two distinct speeds depending upon the length of the looped label stock between the thermal transfer printer and the hot stamper. The run speed should be set to the higher of two values. The secondary run speed should be set to the lower of two values so that the interface can keep the thermal transfer printer and the Franklin hot stamp label maker in synchronization.

P. Label Spacing:

This reads directly in inches and is used to adjust the length of label stock pulled with each stroke of the press. Maximum pull length is 9.999". Label spacing is in either .001" or .005" increments. .001" increments are used for higher resolution; .005" increments can be used for higher speed. In either case, the label spacing reads directly. There is a toggle switch located inside the control cabinet. When changing the belts from .001" to .005" increments, this switch should be in the proper position as determined by the belt configuration.

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Q.   Re-Registration:

Re-registration of preprinted labels with registration marks can be accomplished. The value of the thumbwheel switches in the re-registration section determines the distance that the registration mark will travel after it has been recognized by the photocell. The position of the item to be re-registered can be adjusted by adjusting these thumbwheel switches. These adjustments can be made while the press is in operation or when it is at rest.

R.   Label Speed:

There are ten label speeds available by setting the single digit thumbwheel switch to values from 0-9. Nine is the fastest, zero,is the slowest. This setting can be changed while the press is in operation.

S.   Foil Advance(s)

These thumbwheel switches determine the length of the foil pull, the upper foil advance. The highest pull value is 9.99"; increments are .010".

T.   Foil Jog(s):

This button causes the foil feed indicated to feed foil whenever it is depressed.

U.   Label Advance Off/On:

This switch supplies power to the Web Draw System. It should generally be in the On position. It should be in the Off position when wishing to manually rotate the nip rolls, i.e., for cleaning, etc.

V.   Continuous Feed Off/On:

In the Off position, this control allows the machine to operate normally. In the On position, pressing the Label Jog Button will cause the label stock to feed continuously until the continuous feed switch is turned to the Off position. This is useful when using the machine as a rewinder or a slitter, or when threading the machine up.

W.   Electric Eye On/Off

When re-registering, this switch should be in the On position When not re-registering,this switch should be in the Off position.

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X.   Rewind Speed:
This control allows flexibility of web takeup speed and can
be controlled while the machine is in operation or while it
is stopped.

Y.   Rewind Off/On:
This switch supplies power to the web and scrap takeup
motor. It provides a convenient way to start and stop the
motor for threading finished product and scrap.

Z.   Check Temperature Light:*
This light glows when a serious over temperature situation
is detected by the temperature controller. In the event
that this light glows, stop operation of the equipment and
check for electrical problems in the heat control system.

*See Manufacturer's Instruction Manual enclosed as part of
this manual.

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III. <u>Uncrating and Placement</u>

Upon receipt of the equipment, please check for visible or hidden transit damage and, if any is found, notify the transport company immediately.

Carefully remove the machine from the skid and reassemble the components removed for safe shipping. <u>(See Diagram)</u>

The machine should be placed so that all sides can be accessed for service, enough room is allowed for the loading and unloading of label stock, laminate, dies, and foil.

IV. <u>Purpose</u>

The Model 164 is designed to produce quality hot stamped labels, <u>reregister</u> to add hot stamped graphics to roll form labels already run one or more times through the press, or produced by other means, (flexographics, serigraphics, offset, etc. set, etc.) utilizing properly conceived and applied re-registration marks, to apply <u>holograms</u> to labels, <u>slit</u>, <u>sheet</u>, and <u>stack.</u>

Note: <u>Under Lined items in this section require optional accessories.</u>

V. <u>Theory</u>

A roll of material is unwound with proper control of tension, passed under a hot stamping head capable of applying one or more colons, passed through a laminating roll set, under a die cutting station capable of cutting with steel rule dies, through a precision nip roll set which controls feed length, and on to re-roll, ladder off, sheet, etc., as required.

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VI. Hot Stamping Dies

WARNING: <u>Hot stamping heads and newly removed dies are hot enough</u> <u>to burn. Gloves or hot pads should be used to protect hands.</u>

A.   Material and Thickness:

Hot stamping dies can be made from many materials including zinc, magnesium, brass, copper, steel, silicone rubber, and photo-polymer. For label production, zinc and magnesium are most common because of their relatively low cost. These are available in several thicknesses. Short runs are usually done with 16 gauge (.016 inch) material, again because of cost. Thicker plates (.125 inch and .250 inch) as well as longer lasting materials may be desirable when considering repeat and long run jobs.

B.   Mounting:

Dies may be mounted using screws (suggested for thicker materials), clamp rails (suggested for frequent changes with thinner dies), heat or pressure sensitive adhesives. Only your experience will determine the best method for your needs. A word of caution: If heat or pressure sensitive adhesive such as Scotch #468 is used, the die should be removed and the residue cleaned as soon as the die holder is removed from the machine and before cooling.

C.   Numbering Heads:

Many jobs require the application of a consecutive number. Standard type high typographic numbering heads can be used in the Model 164. Internal or external plunger operated models are available from a number of suppliers. Those with external plungers and center drive shafts are sturdier, more expensive, and take up more room in the holder. (A consideration if combining a number with artwork).

When using a numbering head extreme care must be employed to avoid damage. The smaller numbers, especially, are supported by very small shafts which are easily bent. In some cases, it may be necessary to add or subtract layers of makeready (shims) under the numbers or the plunger to obtain proper results without damage to the numbering head.

D.   Care of:

Dies, numbering heads, and other printing elements are very delicate and easily damaged. They should be handled carefully at all times. Only soft items should be allowed to touch the printing surface. Numbering heads should be regularly cleaned and lubricated to avoid jam-ups and misnumbering.

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VII. <u>Die Cutters</u>
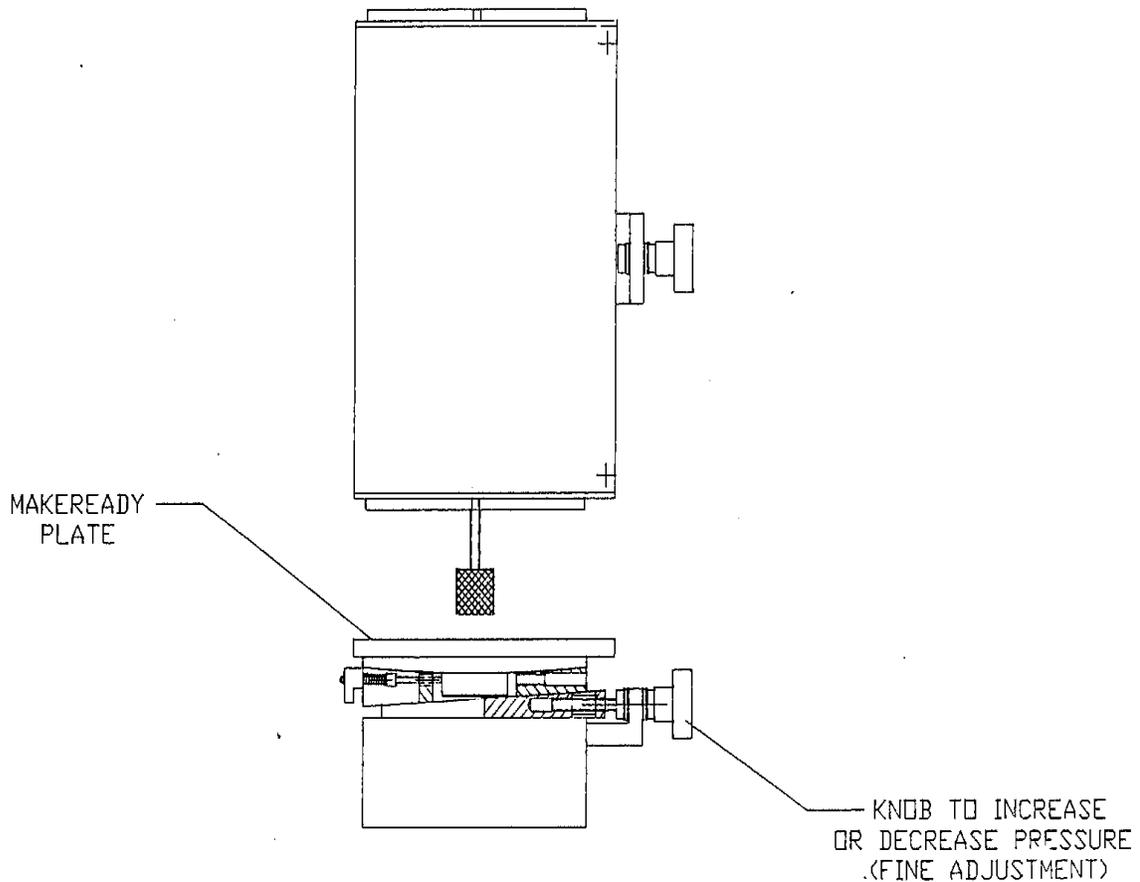
    A. Shapes and Difficulty:

    Various shapes, sizes, and designs of die out are possible. A simple straight blade of greater length than the width of the stock to be cut will produce a "butt cut" and is the easiest to set up and run. A rectangle that is shorter across the web than the width of the web and shorter in the direction of web travel than the amount of travel will produce a rectangular label leaving a ladder shaped (hence the term, "laddering off") area of scrap to be removed, yielding a roll of discrete labels on a liner. Label appearance, the ease of laddering off, and the tendency for many materials to lift at sharp points when applied to final products, suggests radiused corners whenever possible.

    Circles, ellipses, triangles and designed shapes can all be achieved keeping in mind that laddering off becomes more difficult as shapes become more intricate, have large areas connected by small ones, etc.

    B. Mounting:

    Die cutting dies are usually "type high" (.918 inch). They may be screwed to a flat dovetail die holder or clamped into the optional lockup chase.

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MAKEREADY
PLATE

KNOB TO INCREASE
OR DECREASE PRESSURE
.(FINE ADJUSTMENT)

LEVELING STRIKER PLATE
130-16468-68

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VIII. Makeready:
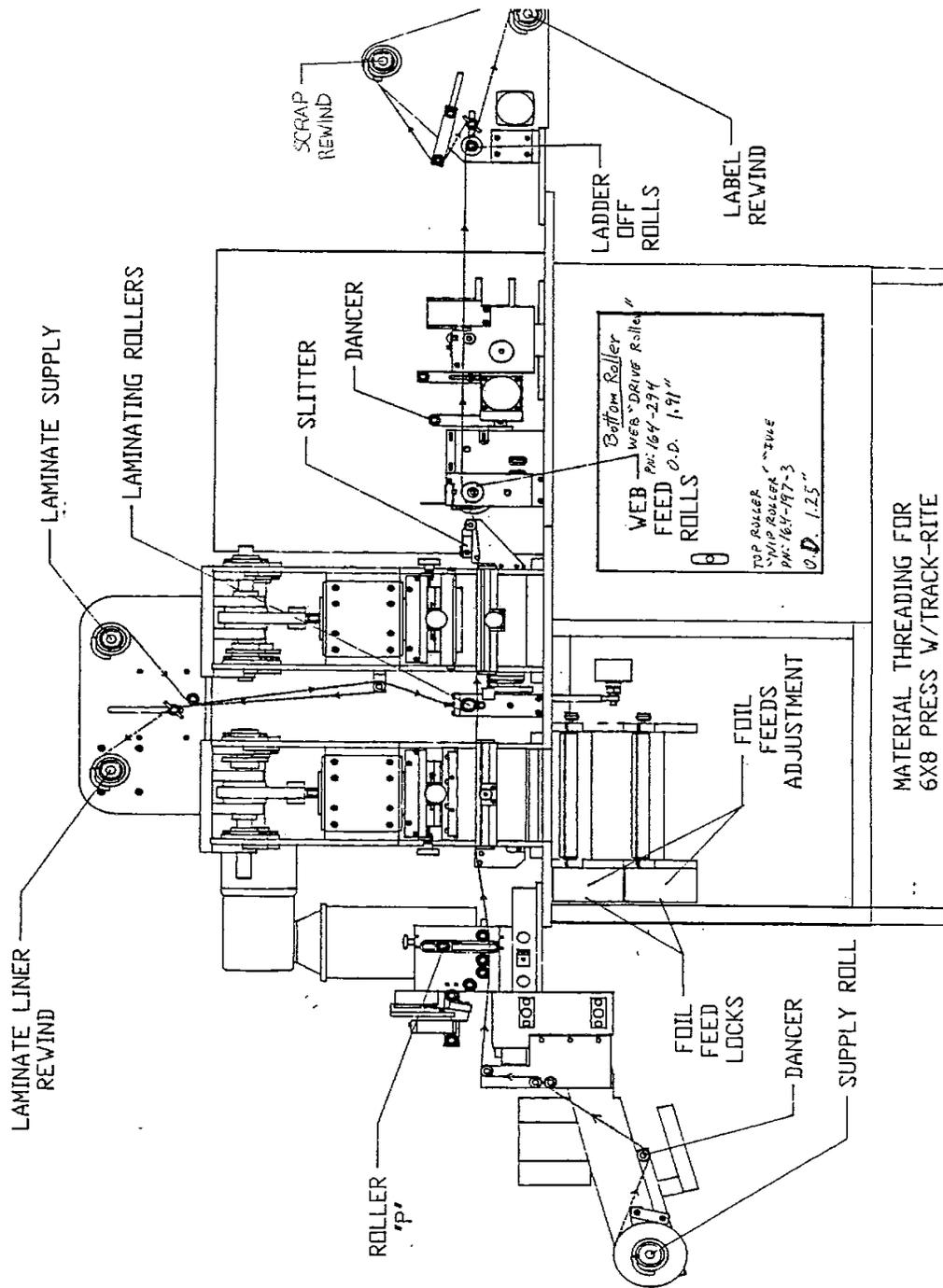
     A. Need for:

     Makeready is defined as the material under the web being hot stamped or die cut. If the hot stamping die were infinitely hard and everything perfectly flat and uniform, a "kiss" with little pressure against a steel backup would produce perfect re¬sults. In the real world, dies are soft and uneven, stock varies in thickness, and bed plates (that piece of steel under the web), not perfectly flat. To compensate, a material with some give is placed on the bed of the press. This can be any-thing from several layers of paper, cut up pieces of manilla file folders, chipboard (the material on the back of pads of paper), rubberized cork, offset blankets, (thin sheets of rubber or plastic bonded to fabric), floor tile, drawing board covering, and others too numerous to mention. The general rule is, if it works, use it.

     With this soft material in place, the thickest parts of the die can compress the makeready to allow the thin or worn spots to contact and print. Sometimes, when a die is especially worn, a piece of transparent tape Is placed on the makeready at the exact position of the worn spot to enhance the image at that point. A good way to do this is to place a piece of carbon paper under the web and single cycle the press. It will be easy to see the exact areas that need a buildup. Use a sharp razor knife to shape the piece of tape required. Experience will teach the proper technique.

     Makeready is applied to removable bedplates. Removal for application or alteration of makeready and subsequent reinsertion into the machine is facilitated by the positive location of the bedplate upon reinsertion.

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Franklin Model 164 Instructions

SCRAP REWIND

LADDER OFF ROLLS

LABEL REWIND

LAMINATE SUPPLY

LAMINATING ROLLERS

SLITTER

DANCER

Bottom Roller
WEB "DRIVE Roller"
PW: 164-294 O.D. 1.91"

WEB FEED ROLLS

TOP ROLLER "NIP ROLLER" "IVLE
PW: 164-197-3
O.D. 1.25"

MATERIAL THREADING FOR
6X8 PRESS W/TRACK-RITE

LAMINATE LINER REWIND

FOIL FEEDS ADJUSTMENT

FOIL FEED LOCKS

DANCER

SUPPLY ROLL

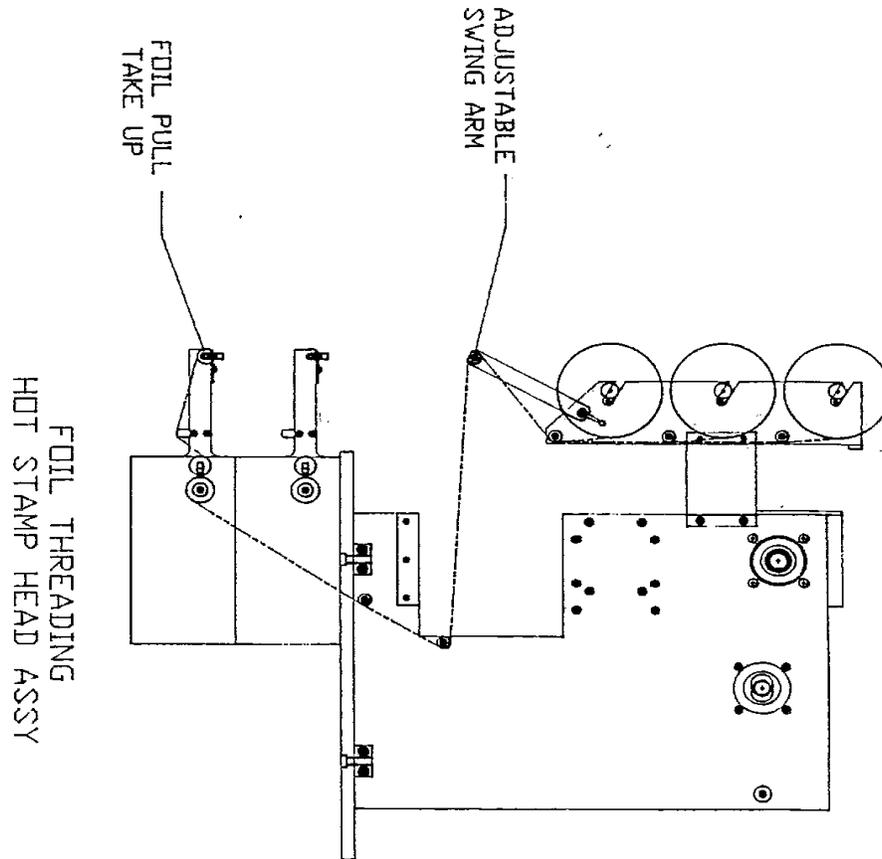ROLLER "P"

IX. <u>Label Stocks:</u>

    A.   Types:

    Materials selection should be based on the requirements of the labels to be produced. The Model 164 is capable of handling paper, vinyl, polyester, acrylic, fabric and many other substrates. In each case, a material should be selected that can be printed with hot stamping foils. Polyester, for example, must often be specially treated to accept any kind of printing. Be certain to inform the vendor that you will be lot stamping and die cutting so that your selection will be proper.

    B.   Threading:

    Material to be used in the Model 164 should be threaded according to the diagram below. If reregistration is to be done, all of the infeed rollers must be utilized. For first pass print operations, only the last roller need be used.

    Laminate should be threaded as shown. The extra strength of laminate material often increases the difficulty of die cut makeready but simplifies the laddering off process.

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FOIL PULL
TAKE UP

ADJUSTABLE
SWING ARM

FOIL THREADING
HOT STAMP HEAD ASSY

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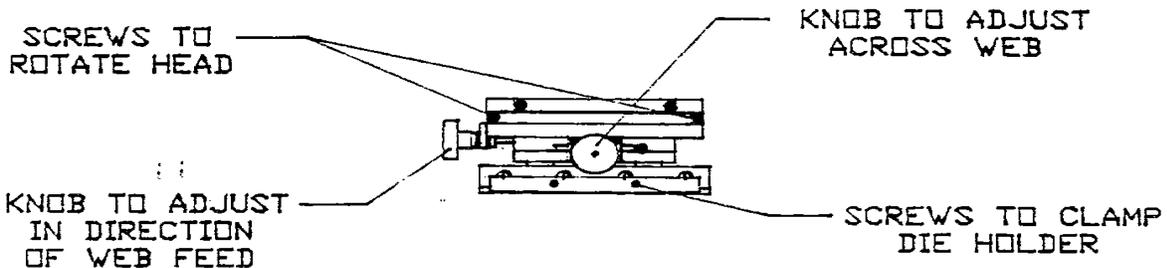
X.   <u>Foil:</u>
   A.   Types:

     As with material to be processed, foil should be carefully selected for the substrate to which it must adhere. The vendor should know if the label will be used outdoors or indoors; whether fine line or heavy solid graphics are involved. If special properties are required, you should make certain that they are adequate in the foil selected before running the job, to insure satisfactory results.

   B.   Threading:
     Foil to be used in the Model 164 should be threaded according to the diagram below. If your machine is equipped with more than one foil feed system and you are setting up a multi-color job, the longer pull lengths should be threaded through one feed while the shorter pull lengths should be threaded through the other.

WARNING: <u>Hot stamping head is hot enough to burn. Gloves</u>
         <u>or hot pads should be used to protect hands.</u>

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SCREWS TO
ROTATE HEAD

KNOB TO ADJUST
ACROSS WEB

KNOB TO ADJUST
IN DIRECTION
OF WEB FEED

SCREWS TO CLAMP
DIE HOLDER

ADJUSTABLE HEATER HEAD ASSY.
130-16468-70

SCREWS TO
ROTATE DIE

SCREWS TO
CLAMP DIE
HOLDER

KNOB TO ADJUST
IN DIRECTION
OF WEB FEED
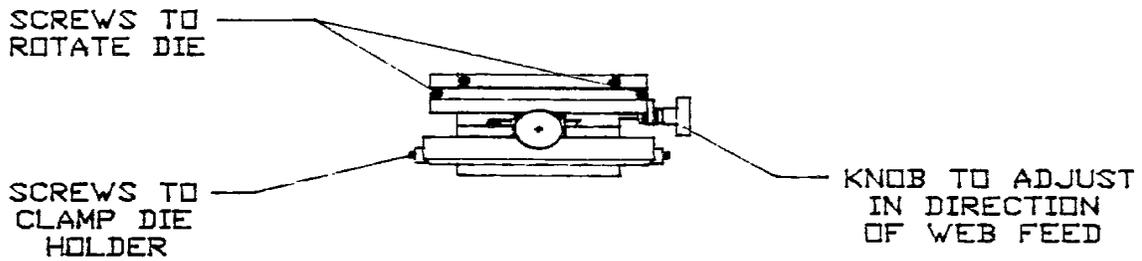
ADJUSTABLE DIE CUT HEAD ASSY.
130-16468-75

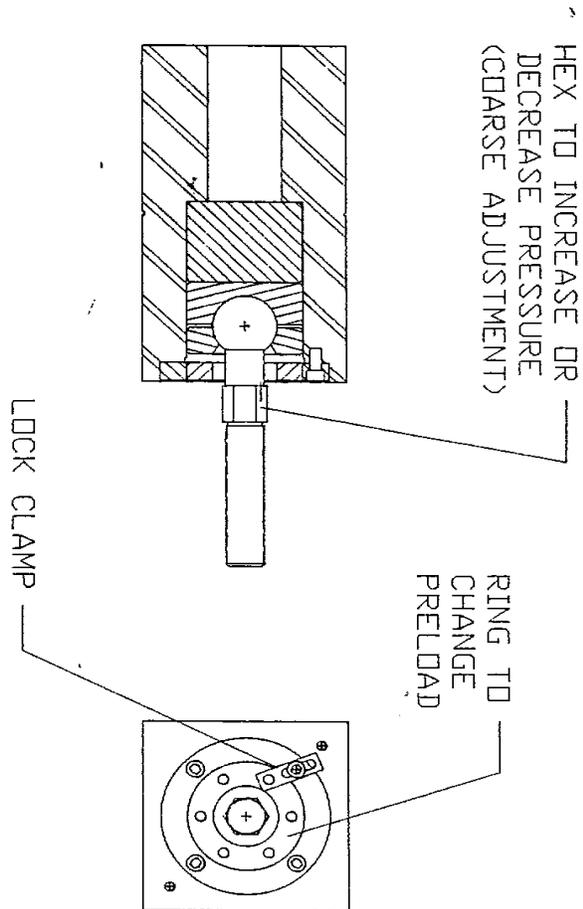| Reprinted by | Page 16 | Phone: 714.547.0194 |
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XI. <u>Inserting Dies (Both)</u>

Once the printing and die cutting elements are mounted to dovetail slide plates, they can be inserted into the heads. To increase flexibility of position adjustment, the press has been designed so that the printing die slides in from the left and the cutting die from the front. The dovetail plates should be placed flush with the first edge of the lead and locked into place. The left-right, front-back, and rotational positions of the dies with respect to the web, and each other, can then be adjusted using the knobs and screws provided for that purpose. If extra adjustment is needed, the dovetail slides can be re-positioned with respect to each other and the setup process repeated.

<u>CAUTION: Use heat protected gloves to handle hot dies.</u>

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HEX TO INCREASE OR
DECREASE PRESSURE
(COARSE ADJUSTMENT)

RAM ASSY. (DIE CUTTING)
130-16408-51

LOCK CLAMP

RING TO
CHANGE
PRELOAD

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XII. <u>Manually Cycling for Safety:</u>

Once the dies and the makeready plates are in position, the press should be cycled once manually to insure adequate clearance to prevent damage to the dies. To cycle manually, turn the wheeel at the bottom of the main drive motor clockwise until the heads descend and return to their original position. If the turning becomes very hard or stiff, reverse direction and increase clearance between die and makeready plate by turning the table elevation knob, or adjusting ram stroke using the wrench provided.

Once the proper clearance has been established, a single cycle will demonstrate the result that can be expected in production.

Pressure can be coarsely adjusted at the hex and then Fine adjusted with the incline plane plate under the makeready bed.

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XIII. <u>Label Feed Length</u>:

Label feed on the Model 164 is powered by a precision stepping motor. Two power ratios are available. The standard drive is in .500 inch increments. The optional drive allows selection of .005 inch or .001 inch by means of changing belts.

If you are using the standard .005 inch resolution drive, the smallest change you can make in the label feed is .005 inch. Thus, a setting of 200 on the thumb wheel switches feeds 1 inch, 400 feeds 2 inches, 500 feeds 2 1/2 inches (200 times .005 = 1.0000, 400 times .005 = 2.000, 500 times .005 = 2.5000 etc.)
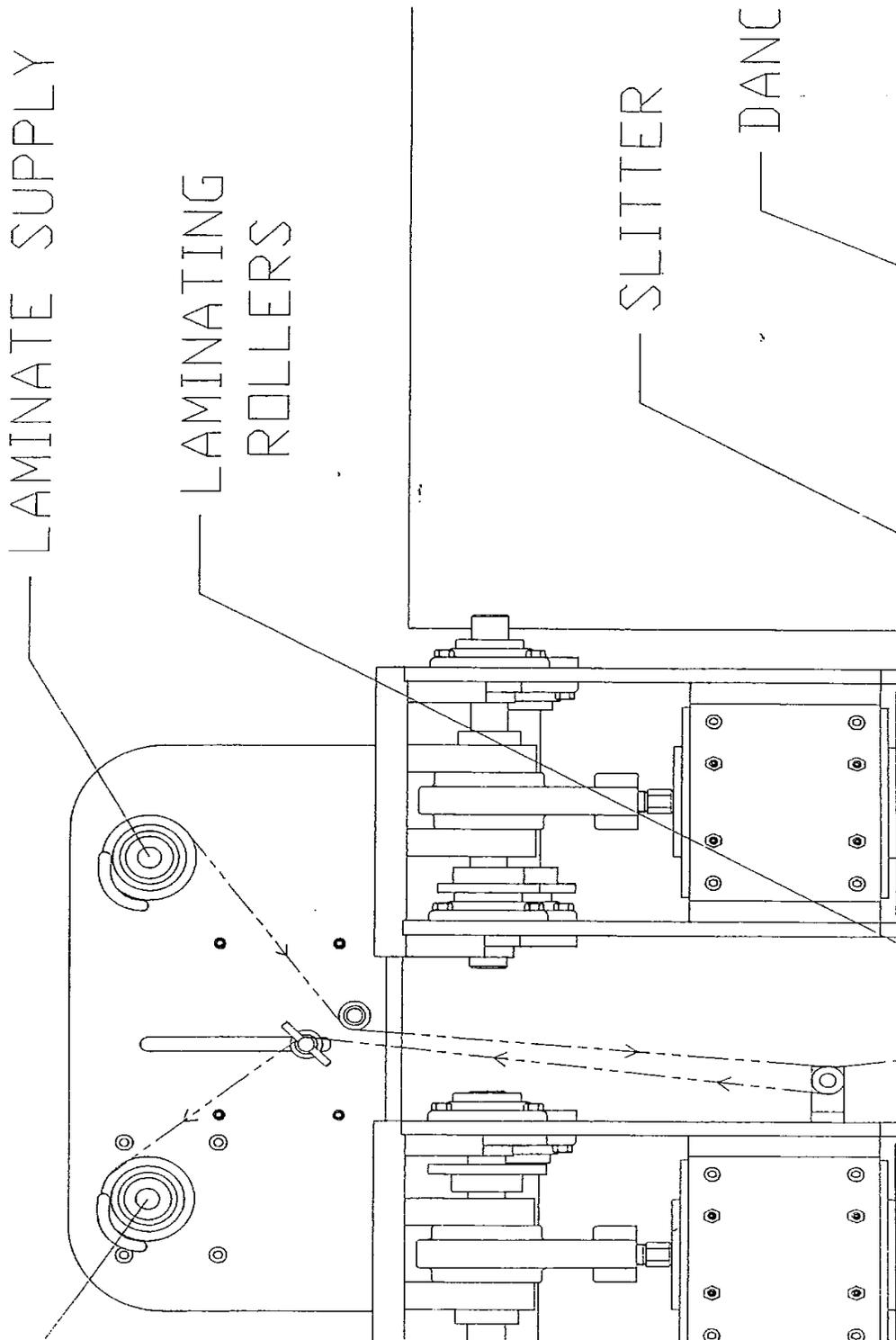
To set any length, divide that length by .005. (For 3.250 inches, 3.25 divided by .005 = 650). A few quick tests will tell 12 the spacing is correct. If not, it can be adjusted up or down while the press is running or stopped. (The chart enclosed will aid in making setups).

If you are using the .001 Inca resolution drive, the smallest change you can make is .001 inch. To set any length, merely select that number on the thumb wheel switch set. (Thus 1 inch is 1.000 on the wheels, 1.670 Luca is 1670, etc.) Higher speeds are attainable with the .005 drive. Higher accuracy is offered by the .001 drive.

A word here about the operating characteristics of a stepping motor would help in the operation of the machine. There are two cotrols on the face of the cabinet labelled "velocity" and "acceleration". The higher numbers on the velocity control are the faster web speeds. The acceleration control works the other way. The higher the number, the shorter it takes to accelerate to top speed and to brake to a stop. For best results,highest accuracy and production speed, you will want to adjust these controls for the highest speed and quickest acceleration without jerking or snapping the web. There is a limit on these imposed by the characteristics of all stepping motors, and this is that if stepped too fast or accelerated too quickly, they stall. If the stepping motor stalls, it will lose track of where it is and lose registration. Using the "Label Jog" control with no web in place, you can experiment with different label lengths sat on the thumbwheels and different velocities and accelerations of the web. Make it stall to see how it acts. Notice that in the .005 inch drive mode, if you set 9000 or mores the drive pulls 45 inches or more. Being careful to reduce velocity and acceleration when doing so, this provides an easy way to thread new stock through the press after a splice or when changing materials, colors, etc. In .001 inch drive mode, the same setting produces 9 inches or more. Threading requires several jogs.

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LAMINATE SUPPLY

LAMINATING ROLLERS

SLITTER

DANC

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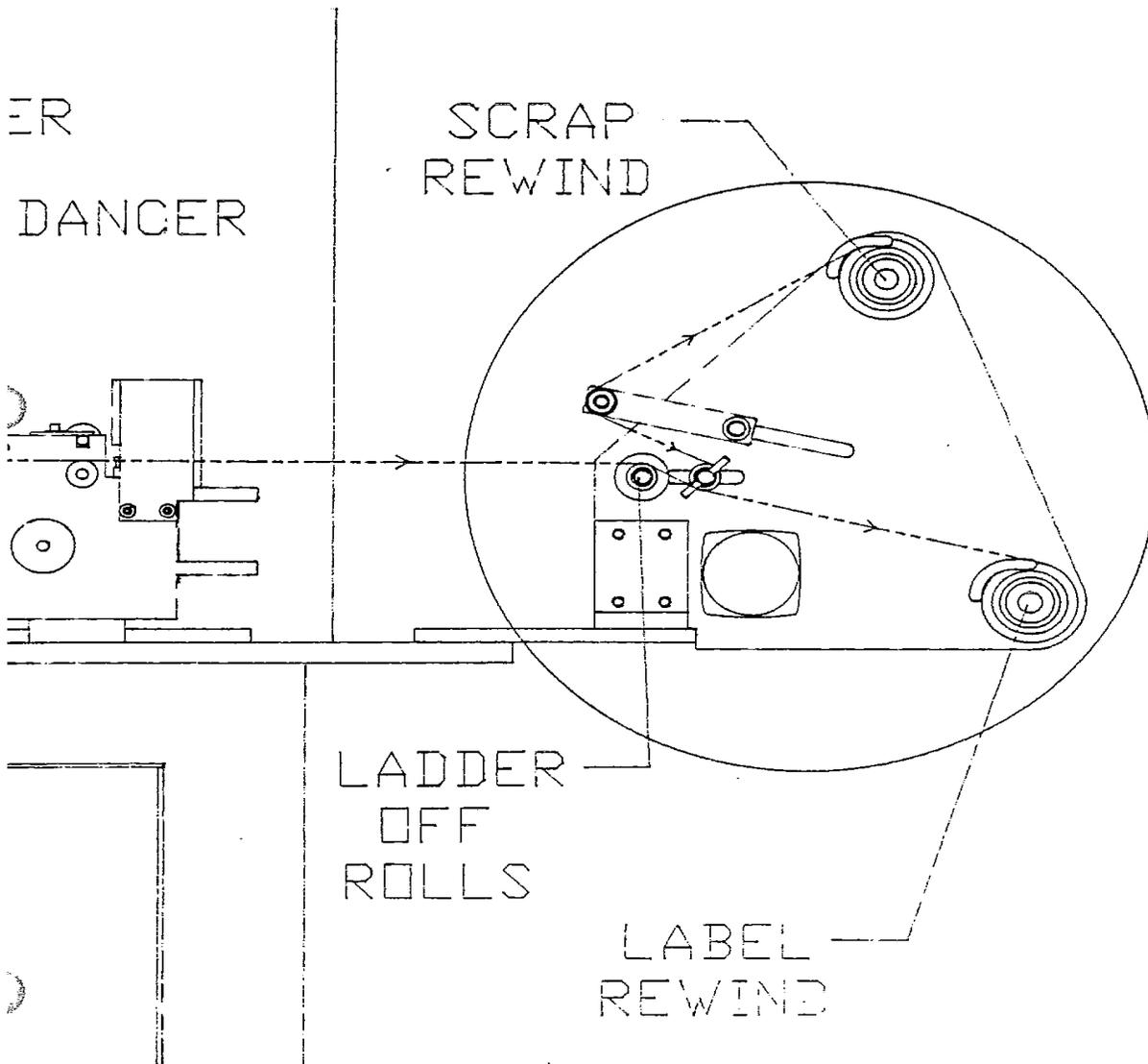
XIV. Laminating:

When an overlaminate is required, thread the laminate according to
the diagram, separate the laminate from the liner at roller "R", start
the lamination process by tacking the laminate to the printed label stock
at the nip rolls "N", and wind the spent liner onto the takeup spindle.

Proper balance of unwind and windup tensions will come with practice and
provide outstanding results. Proper adjustment of the nip pressure between
the upper and lower laminating rolls will provide a secure adhesion of the
laminate to the substrate.

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SCRAP
REWIND

ER

DANCER

LADDER
OFF
ROLLS

LABEL
REWIND

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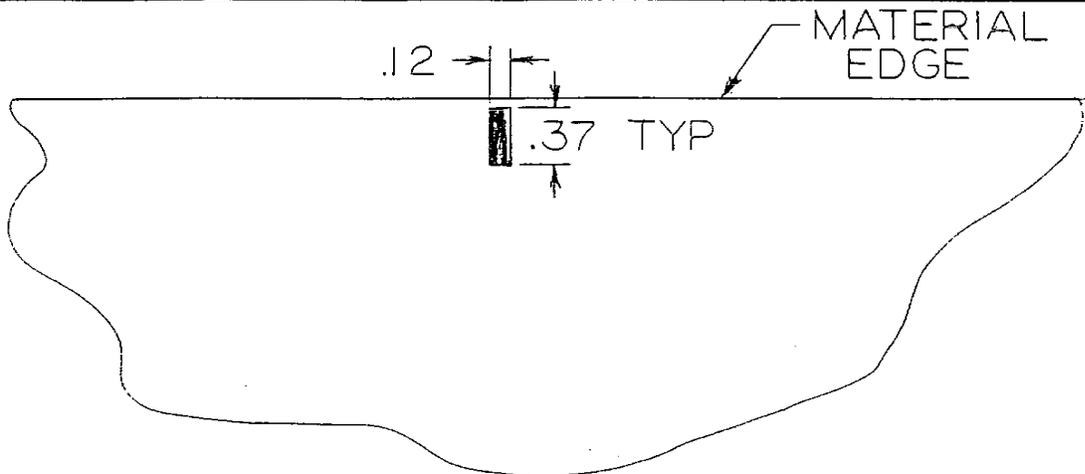Email info@afmeng.com

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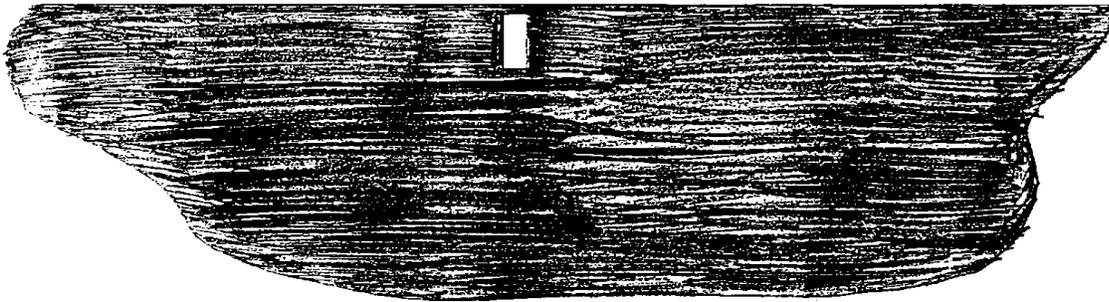
XV. Kindup and Ladderoff:

     Winding up the finished labels on the lower takeup, laddering off and winding up the scrap (skeleton) an the upper takeup, involves some trial and error. Sometimes, with some materials, it is necessary to ladder off by adjusting the knurled roller so that the ladder mores at 90 degrees to the labels, sometimes 180 degrees. As die cutting dies wear and become dull, it is sometimes necessary to "encourage" the label to stay on the liner while the scrap ladders off by wrapping masking tape around the laddering roller. This has the effect of holding down the label a little longer than the ladder. Some press operators use "0" rings. Again, whatever works ....!

     Critical to successful laddering are tension and speed at both take ups. Tension can be adjusted by means of the two knurled nuts on each take up shaft. Speed is controlled by the setting at the control box labelled "take up speed".

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.12 → ← MATERIAL EDGE

.37 TYP

BLACK MARK ON WHITE MATERIAL

WHITE MARK ON BLACK MATERIAL

RECOMMENDED EYE MARK (SIZE AND LOCATION) WHEN USING REREGISTER DEVICE.

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XVI. Re-registration:
Re-registration of previously printed labels is
accomplished by means of a photoelectric detector sensing
the presence of a properly placed, designed, and executed
registration mark. In general, this mark should be 3/8
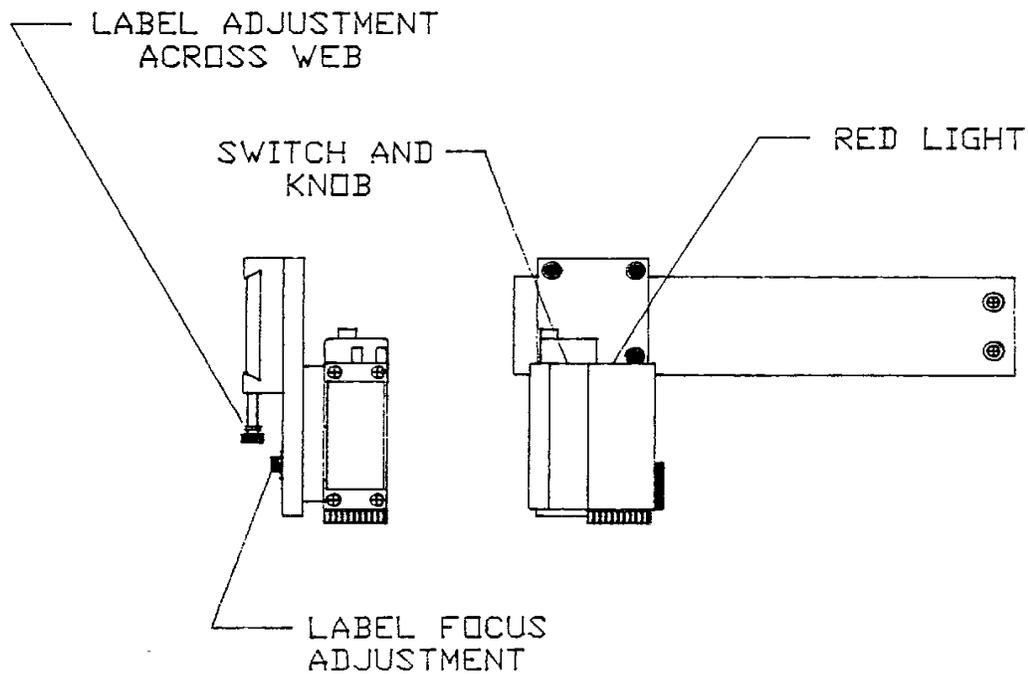inch or more across the web and 1/8 inch in the direction
of feed.

In order to begin, here is a description of how the
re-register system works and the theory behind it.

Ordinarily when feeding label stock through the press, the
stepping motor makes a number of pulsed steps as set on the
thumbwheels. When re-registering, the stepping motor must
make steps until the photocell sees the register mark.
At that point the stepping motor will make an additional
number of steps as indicated on the re-registration
thumbwheel switch step. In order for the stepping motor
not to stop on its own before sensing the registration mark,
the total feed length must be set for a distance slightly
longer than the distance between register marks. We
recommend adding one/half inch to the distance between
register marks and setting thumbwheel switches to that
value. i.e., if the register marks are 1" apart, the
thumbwheel switches should be set at 1500; if they are 3"
apart, they should be set at 3500.

Because of the nature of the stepping motor system, the
following table gives the minimum setting on the re-register
thumbwheel switches at the various label speeds 0-9.

Minimum Registration Distance for Label Speed

At Label Speed #	Minimum Re-registration Setting
0	019
1	038
2	064
3	100
4	170
5	260
6	370
7	500
8	650
9	820

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LABEL ADJUSTMENT
ACROSS WEB

SWITCH AND
KNOB

RED LIGHT

LABEL FOCUS
ADJUSTMENT

ELECTRIC EYE ASSY.
130-16403-26

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In Section IX-B it stated that for re-register the web should allow the threading diagram over all infeed rollers. This is so that in positioning previously printed graphics with respect to the graphics to be added, the path length between the photocell and the printing die can be varied to achieve Coarse position. To do this, loosen the lock and adjust Roller "P". The thumbwheel switches can then be used to achieve Fine positioning of the re-registered label.

A critical concept is the setting of the photocell sensitivity and mode. The photocell can be set to respond to a dark mark in a light background or a light mark in a dark background. The switch on the photocell should be set to the solid silver circle for a light mark on a dark background, and to the silver outline circle with the dark center for a dark mark on a light background. In the case of a dark mark on a light background, the sensitivity adjustment should be set as follows:

a.   Set the switch to the silver outline with the dark center.

b.   Turn the "Electric Eye" switch to the On position. With light background under the photocell, loosen the thumbnut to permit raising and lowering the photocell unit so that it can be focused to the smallest possible light pattern on the material with the back wound material (not the register material in the light spot.

c.   Turn the sensitivity control (round knob with dark and light circles) until the red light on the photocell unit comes on.

d.   Now turn the knob the other way until the red light goes off.

e.   Now, manually place a register mark under the photocell (in the light spot on the web). The red light should come on. Turn the knob in same direction as in "d", counting turns until the light goes off. Turn it back to half way between the two settings (red light glows at light background - red light glows at registration mark).

f.   The photocell should now respond to the presence of the registration mark while feeding web. Test this with label jog several times. Registration marks should stop in the same place every time.

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g. To increase the discrimination between the registration mark and the background, turn the knob in the same direction as "d" above.

h. For a light mark on a dark background, reverse the procedure.

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XVII. Maintenance & Lubrication:

    The Franklin Model 164 Label Maker is a precision machine. Periodic inspection and attention to the various systems will ease operation and prolong life. All screws, especially set screws, should be checked for tightness. Gib adjustment screws on head rams, cross slide adjusters, and web position dovetails should be maintained for proper fit, ease of motion, and life.

    Grease fittings are provided on rams, major bearings, etc., throughout the machine and should be tended to regularly. (Once a week.) Since the rams are hardened and ground and are running against meehanite gibs, this reduced maintenance schedule is permissable and should produce good long life results. The rubber nip rolls will need to be cleaned from time to time. A cloth damped with denatured alcohol produces best results without attacking the roll material.

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XVIII. <u>Balance of Speeds</u>:

There are two independent speed controls provided
on the Franklin Model 264. The main motor speed control determines how
fast the stamping and die cutting heads will go up and down and
how fast the hot stamping foil will pull. This speed is usually
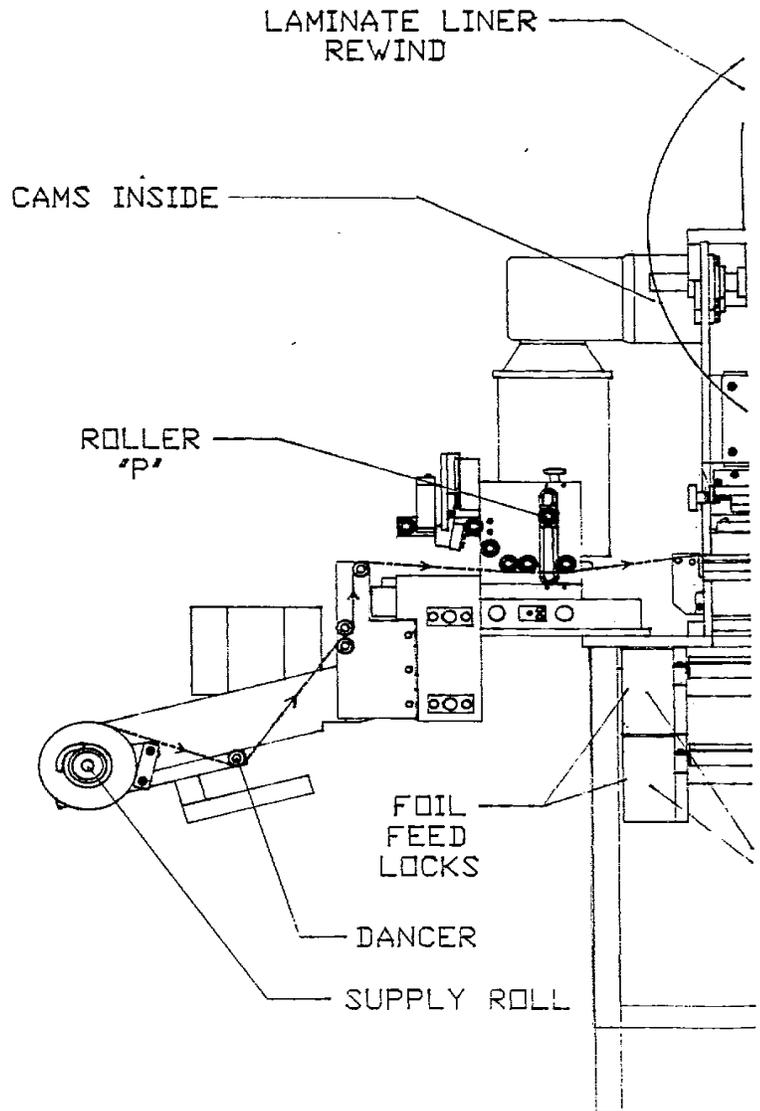determined by the following factors:

1) The transfer characteristics of the foil onto the
materia/ you are stamping. Some materials require more dwell;
some require less and some adjustment of that dwell is possible
by increasing the basic press speed for less dwell and decreasing
it for more dwell.

2) A need for enough time for the stepping motor to pull
the label stock and have it completely stopped before the next imprint
and die out take place.

Because of this it is usually advisable to start with the
main motor speed in mid-range, observe whether the imprint quality will
allow or whether it demands higher speeds (sometimes the small openings
in e's and a's will fill in when the press is running too slowly or
when it is too hot). This can be cured either by increasing the press
speed or decreasing the temperature. Or too fast (sometimes large areas
do not completely print when the press is running too fast or the
temperature is too low.) This can be cured by slowing down the press
or raising the temperature.

The critical thing to notice at this point is the relative
timing of the end of the label transport index and the beginning of the
next imprint/die out. If there is adequate time between the end of the
index and the beginning of the next imprint, the press speed can be in-
creased. As the two events get closer together, the index speed can be
increased creating an additional opportunity to increase the basic
press speed. This can be repeated until the maximum speed and optimum
results are achieved.

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LAMINATE LINER
REWIND

CAMS INSIDE

ROLLER
"P"

FOIL
FEED
LOCKS

DANCER

SUPPLY ROLL

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XIX. Timing Proximitv Switches:
    The standard Franklin Yodel 164 Label Makers are equipped
two proximity switches located at the upper left hand front of the
machine at the end of the main crank shaft, under a sheet metal
cover. The sheet metal cover may be removed with an Allen wrench.
There are three screws holding the cover in place.

    The outer proximity switch controls the position at which
the machine stops when:
    a.   A single cycle has ended.
    b.   The Stop button has been depressed.
    c.   One of the safety gates has been opened.
    d.   The predetermimg counter has run out of count.

    The inner proximity switch signals the stepping motor to
advance label stock.

    Timing of either of these events can be adjusted by loosening
the Allen screw clamping the clamp collar and disc to the shaft and
rotating clockwise to make the event occur sooner in the cycle;
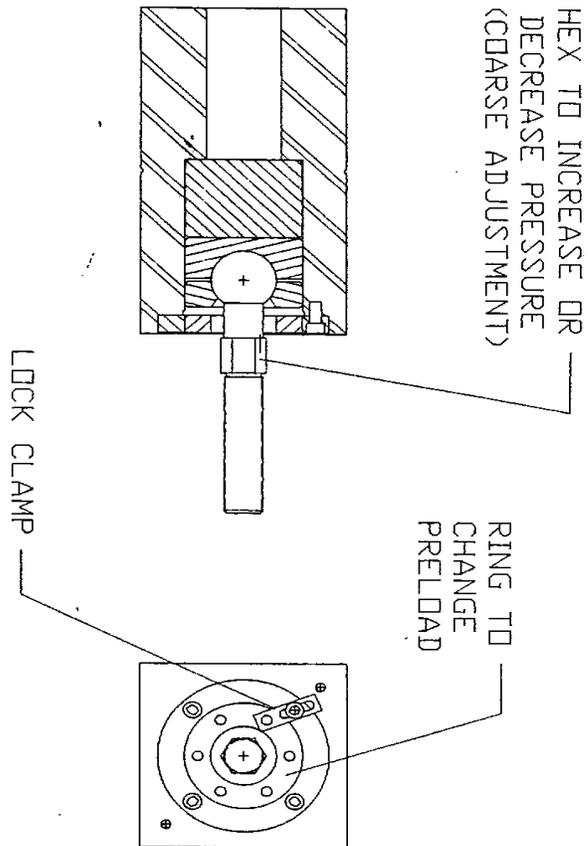counterclockwise to make the event occur later in the cycle.

    The event will take place when the steel pin, driven into
the rotating disc (there is a line on the face of the disc indicating
the pin location) passes by the proximity switch.
    In general, these adjustments should be as follows:
    a.   The Stop proximity switch should be activated when the
head is approximately half way up. If the press is running
extremely fast, it may be necessary to advance this disc; if it is
running extremely slow It may be necessary to retard this disc
in order to have the press stop at full Up position.
    b.   The Label Stock Index proximity switch should be tripped after
the dies have cleared the label stock at both stamping and cutting heads,
before the hot stamping foil has started to pull, and early enough in the
cycle to allow maximum speed of operation. In general, If high speed op-
eration Is required, the Index Disc will have to be set to trip as early
as possible in the cycle without creating an undesirable situation because
the die is still in contact with the foil and the pressure sensitive label
stock or because the foil has not had enough time to cool sufficiently to
make a good transfer. The label stock should usually feed before the foil
to avoid laving the foil pull the stock to the rear, causing web wander of
the stock as this will affect reregistration.

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HEX TO INCREASE OR
DECREASE PRESSURE
(COARSE ADJUSTMENT)

RAM ASSY, (DIE CUTTING)
130-16408-51

LOCK CLAMP

RING TO
CHANGE
PRELOAD

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XX. <u>Adjustment of Pressures and Hot Stamping Head Dwell</u>

As mentioned in Section XII, the pressure applied by each head can be adjusted by using the hex nut attached to the crank (as illustrated) for Coarse adjustment; or by using the knob in front of the bed plate to achieve Fine adjustment. Looking again at the area of the hex nut on around hot stamping head, you will notice that there is a ring around the opening into which the hexed piece descends. This ring has six small holes drilled in it.

The time required for the compression of the elastomeric spring creates the slight amount of dwell that is often so helpful for good hot stamping.

The amount of pressure applied at the maximum compression of the elastomeric spring is determined by the setting of the hex nutted stud and the Fine pressure adjustment of the bed. The amount of pressure applied at the beginning of the compression can be adjusted by means of the ring mentioned above with a spanner wrench. This starting pressure can be reduced by turning the ring counterclockwise. Decreasing the starting pressure and increasing the final pressure has the effect of increasing the dwell. Increasing the starting pressure and decreasing the final pressure has the effect of reducing the dwell. Increasing the starting pressure and increasing the final pressure has the effect of increasing the pressure without changing the dwell.

In most instances, adjustment of the ring will not be necessary. Should this occur follow these steps:
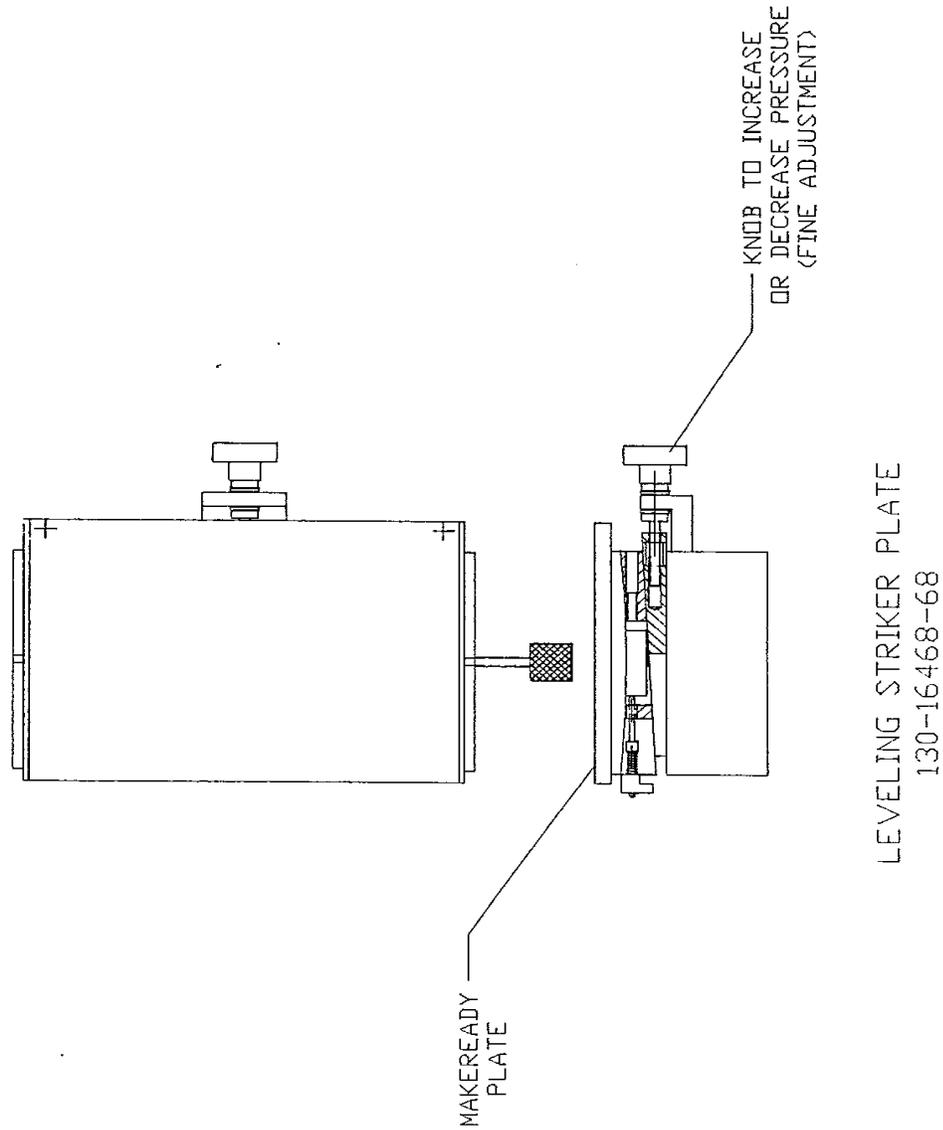
    1) Remove the die from the stamping head or remove the bed plate from under the stamping head.
    2) Manually cycle the machine to the lowest part of the cycle and measure the gap between the bottom of the stamping head and the top of the adjustment device under the bed plate.
    3) Raise the stamping head manually to the Up position.
    4) Place a piece of metal or wood on the under bed of the machine and manually put the machine through a cycle. You will feel resistance as the ram near the bottom. This resistance is the compression of the elastomeric spring. When the crank is at its lowest point (the head will have stopped moving down when it meets the resistance of the material you have placed under it.) Use a spanner wrench and rotate the ring clockwise to increase pressure; counterclockwise to decrease pressure. The clamps that hold the ring in place will have to be loosened before adjustment and tightened after the adjustment.

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Franklin Model 164 Instructions

KNOB TO INCREASE
OR DECREASE PRESSURE
(FINE ADJUSTMENT)

LEVELING STRIKER PLATE
130-16468-68

MAKEREADY
PLATE

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XXI. <u>LEVELLING BEDS</u>

A spherical levelling bed is provided under each head to make the proper overall makeready easier. Turning the screw at the side will raise one side of the bed and lower the other. Turning the screw at the front will raise the front or rear while lowering the opposite. Combinations of these adjustments can raise or lower a corner, i.e. to raise the right rear corner, raise the right slightly with the side screw and the rear slightly with the front screw. To raise the left front, raise the left and front, etc.

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FRANKLIN

April 6, 1992

MANUFACTURING CORPORATION

IMPORTANT INFORMATION-
CONCERNING THE SETUP AND USE OF NUMBERING HEADS IN THE FRANKLIN
164 SERIES LABEL PRESS.

- The 164 Press will accept any plunger type numbering device which does not exceed .937 in height.
- Extreme care should be taken during installation. Please observe the following steps:
- Shut off power to press with circuit breaker or key switch (if so equipped).
- When mounting these devices on a dovetail or in a chase, do not allow clamp screws to bear directly on the device. Always use furniture (metal strips) to absorb the clamping pressure and distribute it evenly.
- When changing over from print plates, 16 gauge, 11 Pt. or .250 thick, to a .918 High Numbering Device, it is necessary to increase the press daylight opening by adjusting the ram upward. When doing this, first adjust the lower platen to its full Down position by rotating the adjusting knob counterclockwise. Using the wrenches provided with the press, turn the screw in the top if the ram further into the Orange connecting rod casting on the press crankshaft, thereby raising the head until the dovetail plate containing the numbering device will slide into place, leaving 1/2" between the lower platen and the face of the characters on the numbering device.
- Using the hand wheel on the main drive motor of the press, manually advance the press through one complete cycle while observing the relationship of the numbering device to the lower platen. If contact is made, adjust the ram further up until the press can be turned through a complete cycle without interference. "DO NOT" attempt to run the press under power until these steps have been taken!
- If the hot stamping foil being used is compatible with the basestock (substrate) and sufficient heat is available for transfer, the minimal pressure should be necessary. If more than a "slight" debossing of the stock is noted, without full transfer of the foil, then it may be necessary to elevate the temperature somewhat or try an entirely different foil. "DO NOT" continue increasing pressure which will damage the numbering device!

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Indications that damage has occurred are:
    -The wheels fail to rotate as required in sequence.
    -They rotate part way, causinq a portion of the
    character(s) to print very light, or not at all.

    In either case, an indication that the center shaft
    has been bent and the unit should be taken out of
    service, repaired, or replaced.

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```
BILL OF MATERIALS  #160-26468-99 TOTAL MACHINE ASSY 164
                                 GENERATION 2 - 2 HEAD
 ITEM NUMBER            DESCRIPTION            QUANTITY
130-16402-22    .001/.005 PAPER PULL              1
130-16403-25    PAPER SUPPLY ASSY.                1
130-16404-30    REWIND ASSY                       1
130-16468-35    LAMINATION SUPPLY ASSY.           1
130-16406-40    LAMINATION STATION                1
130-16408-51    RAM ASSY - HOT STAMP/DIE CUT      2
 130-16468-68   LEVELLING STRIKER PLATE           2
130-16468-70    ADJ. HEATER HEAD                  1
130-16468-75    ADJ. DIE CUT HEAD                 1
130-16468-80    HOT STAMP FRAME ASSY.             1
130-16468-40    GUARD ASSY.                       1
130-26416-10    GEN. 2 CONTROL BOX ASSY - 2 HEAD  1
130-26468-10    FOIL PULL ASSY. - GEN 2           2
130-26468-85    DIE CUT FRAME - GEN. 2            1
130-26468-86    FRAME ASSY. - 2 HEAD 6X8          1


OPTIONS
130-16401-13    SLITTER ASSY.                     1
130-16401-14    SHEETER/STACKER ASSY.             1
130-26401-15    ELEC. APPL. (SHTR/STKR GEN.2      1
130-16403-23    ELECTRIC EYE MOUNTING ASSY.       1
130-16403-24    ROLLER ASSY.(DAT-1) ELEC. EYE     1
130-16403-26    ELECTRIC EYE. ASSY                1
130-16403-29    TRACK-RITE COMPLETE SYS.          1
```

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ITEM NUMBER	DESCRIPTION	U/M	QUANTITY
1 6-09640-1	NYLON WASHER	EA	2
2 6-09680-2	CLAMP COLLAR 1/2" 1D 1-1/8 PART # 8S	EA	3
3 164- 197-	IDLER ROLLER	EA	1
4 164- 199-	IDLER ROLLER SHAFT	EA	1
5 164- 202-	CLAMP	EA	2
6 164- 208-	BRIDGE	EA	1
7 164- 236-1	GUIDE ROLLER	EA	3
8 164- 294-	RUBBER DRIVE ROLLER	EA	1
9 164- 297-	PULLEY, MOTOR REWORK	EA	1
10 164- 298-	OUTER SIDE PLATE	EA	1
11 164- 307-	SHAFT BASE	EA	1
12 164- 361-	INNER SIDE PLATE	EA	1
13 164- 364-	ROLLER PULLEY ASSEMBLY	EA	1
14 164- 365-	REDUCTION PULLEY ASSEMBLY	EA	1
15 164- 366-	PULLEY SHAFT	EA	1
16 164- 367-	FLANGE WASHER	EA	1
17 164- 368-	MOTOR BRACKET	EA	1
18 164- 491-	GUARD, PAPER PULL	EA	1
19 164- 498-	PIVOT PIN	EA	1
20 164- 499-	PIVOT MTNG BLOCK	EA	1
21 164- 500-	DANCER ARM	EA	1
22 164- 605-2	ROLLER SHAFT 9.50	EA	1
23 164- 605-3	ROLLER SHAFT 9.00 LG	EA	1

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ITEM NUMBER	DESCRIPTION	U/M	QUANTITY
24 164-688-	GUARD, PAPER PULL	EA	1
25 164-764-	SETTIGN PLATE	EA	1
26 EMX- 9-	802D3451B026-W MOTOR	EA	1
27 FAF- 1-	NMB SSRIF14382Z BEARING	EA	2
28 S/D- 7-	TIMING BELT 663-70-037	EA	1
29 S/D- 11-	170XL037UKBK BELT 3/8	EA	2
30 SOU- 5-	DRAW LATCH 97-30-165-11	EA	2
31 TOR- 10-	NTA-815 TORR THRUST BRG	EA	4
32 TOR- 12-	TRA-815 TORR THRUST RACE	EA	10
33 TOR- 26-	B-88 NEEDLE BEARING- TORR	EA	2
34 TOR- 64-	B-66 BEARING	EA	2
35 WAL- 14-	RET TING EALDER 5555-37	EA	2
36 WDR- 1-	WOODRUFF KEY AMER STD 304 1/2" X 3/32	EA	1

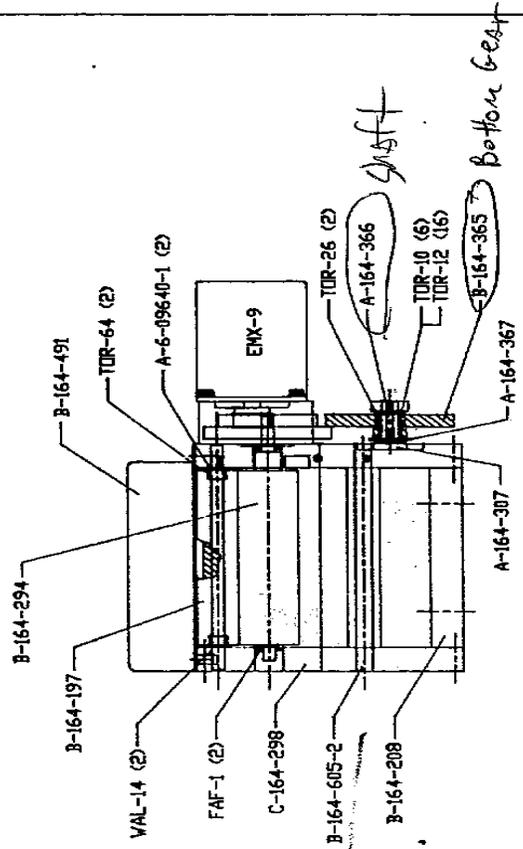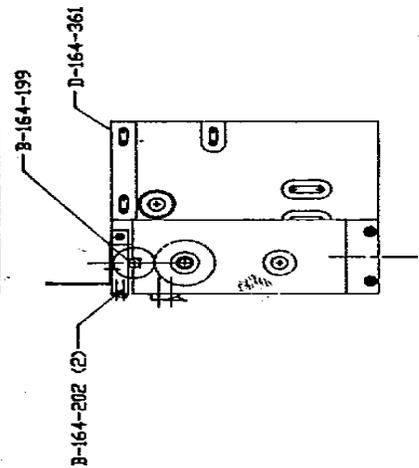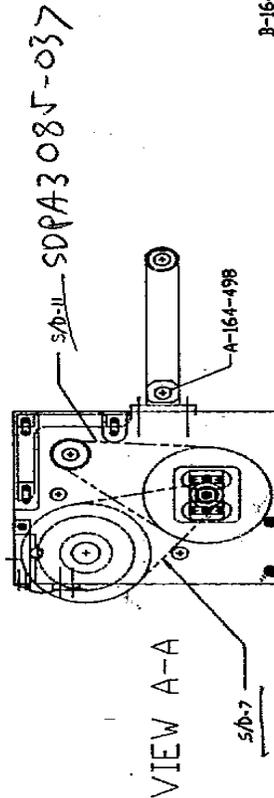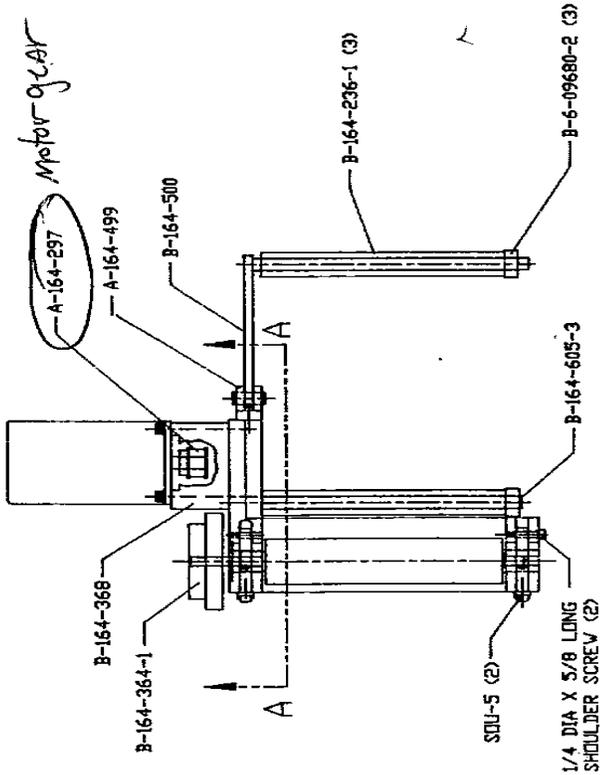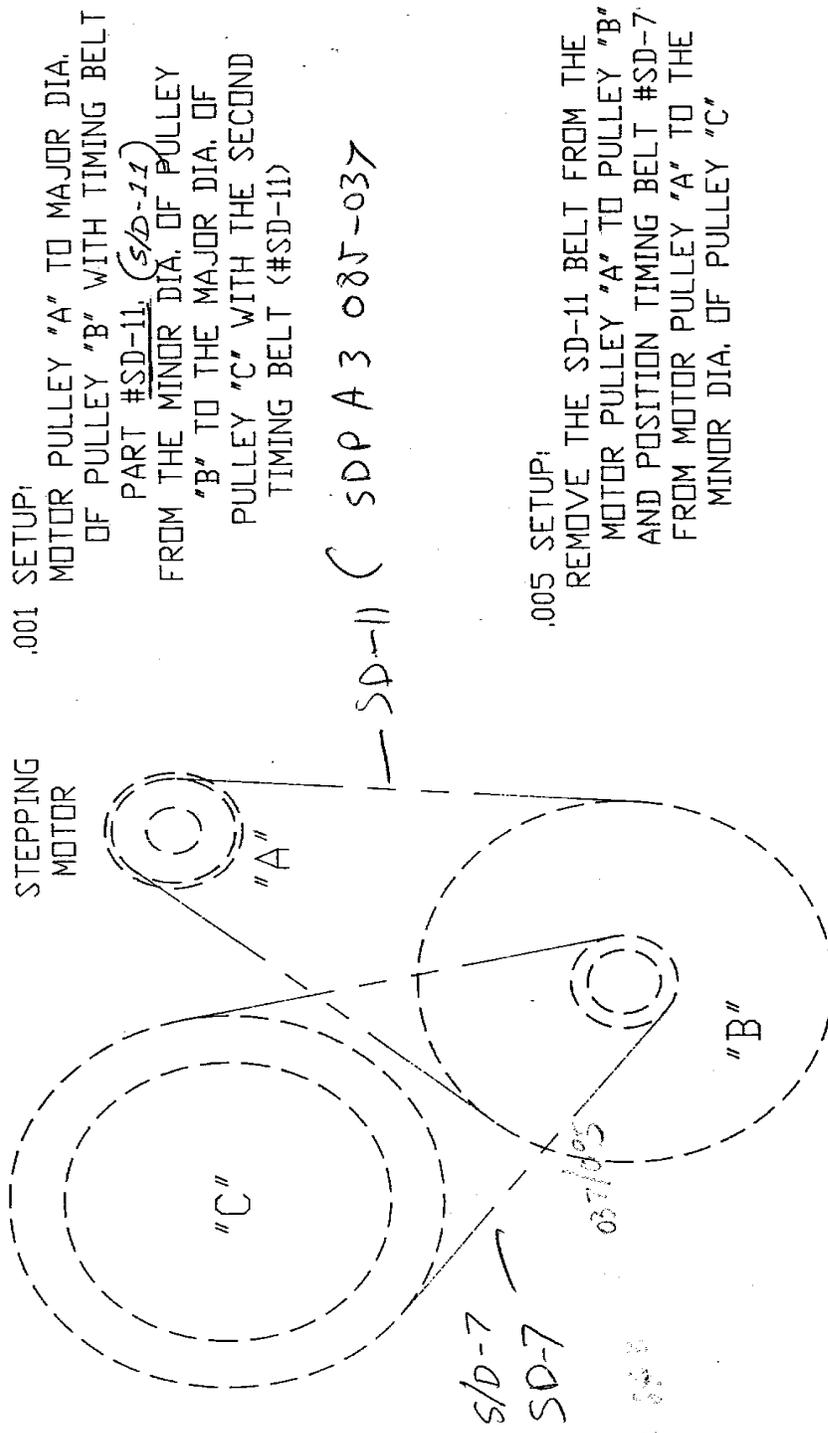| Reprinted by	Page 42	Phone: 714.547.0194
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PARTS NOT SHOWN

C-164-688
B-164-764

VDR-1

NOTE: ROLLER B-164-294 IS ALLOWED NO MORE
THAN .010" MOVEMENT FROM SIDE TO SIDE.
WHEN NECESSARY,SHIM WITH NYLON WASHER
A-6-09640-1 AT ASSEMBLY.

NO.	USED	6X6,6X8,3 HEAD	SCALE 1/2 ("D" SIZED)
REQ. 1	ON		1/4.25 ("B" SIZE)

TITLE
PAPER PULL ASSEMBLY

FRANKLIN D.B.8/28/89
MANUFACTURING CO. 130-
NORWOOD, MASS 02062   16402-22

B-164-491
TDR-64 (2)
A-6-09640-1 (2)
TDR-26 (2)
A-164-366
TDR-10 (6)
TDR-12 (16)
B-164-365
A-164-367
EMX-9
Shaft
Bottom Gear

B-164-294
B-164-197
WAL-14 (2)
FAF-1 (2)
C-164-298
B-164-605-2
B-164-208
A-164-307

Motor gear
A-164-297
A-164-499
B-164-500
B-164-236-1 (3)
B-6-09680-2 (3)

B-164-368
B-164-364-1
SQU-5 (2)
1/4 DIA X 5/8 LONG
SHOULDER SCREW (2)
B-164-605-3

A

A

SDRA3085-037

S/D-11
A-164-498
B-164-199
D-164-361
S/D-7
B-164-202 (2)

VIEW A-A

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BELT CONFIGURATION FROM FRONT OF MACHINE

.001 SETUP:
MOTOR PULLEY "A" TO MAJOR DIA. OF PULLEY "B" WITH TIMING BELT PART #SD-11 (SD-11) FROM THE MINOR DIA. OF PULLEY "B" TO THE MAJOR DIA. OF PULLEY "C" WITH THE SECOND TIMING BELT (#SD-11)

.005 SETUP:
REMOVE THE SD-11 BELT FROM THE MOTOR PULLEY "A" TO PULLEY "B" AND POSITION TIMING BELT #SD-7 FROM MOTOR PULLEY "A" TO THE MINOR DIA. OF PULLEY "C"

COMPUTER DWG. NO. - BELTS

STEPPING MOTOR

"A"

"B"

"C"

SD-11 (SDP A3 085-037)

SD-7

SD-7

087/005

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```
              FRANKLIN MANUFACTURIMNG CORP.              PG 1
        BILL OF MATERIALS FOR 130-16403-25  PAPER SUPPLY ASSY
                    EFFECTIVE DATE 06-AUG-92
```

ITEM	NUMBER	DESCRIPTION	U/M	QUANTITY
1	6-09640-1	3/8 CLAMP COLLAR 6S	EA	1
2	6-09680-2	CLAMP COLLAR 1/2″ 1D 1-1/8 PART # 8S	EA	6
3	10- 098-	FRONT FOIL GUIDE SPRING	EA	1
4	164- 130-	SUPPLY ARM WELDMENT CASTING WEIGHT APPROX 7 1/2 LB	EA	1
5	164- 147-	CORE LOCK	EA	1
6	164- 182- 2	FELT DISC	EA	1
7	164- 212-	ADJ SCREW	EA	1
8	164- 218-	DANCER SUPPORT SHAFT	EA	1
9	164- 220-	END BLOCK SUPPORT	EA	2
10	164- 223-	DANCER LINKAGE	EA	1
11	164- 225-	ADJ KEY BLOCK	EA	1
12	164- 226-	END SUPPORT DANCER ARM	EA	1
13	164- 227-	KEY SUPPORT BLOCK	EA	1
14	164- 228-	DRIVE CAM	EA	1
15	164- 229-	CAM DRIVE ARM	EA	1
16	164- 232-	DRIVE DISC	EA	1
17	164- 235-	ADJ SCR SUPPLY ROLLER	EA	1
18	164- 236-	GUIDE ROLLER	EA	5
19	164- 237-	ADJ SCR BLOCK	EA	1
20	164- 238-	GIB WEAR STRIP	EA	1
21	164- 239-	WHEEL ADJ SUPPORT	EA	1
22	164- 240-	GIB FIXED	EA	1

Franklin Model 164 Instructions

ITEM	NUMBER		DESCRIPTION	U/M	QUANTITY
23	164-	242-	TOP PLATE SUPPLY DOVETAIL	EA	1
24	164-	243-	SUPPLY ROLLER	EA	1
25	164-	244-	SUPPLY SHAFT	EA	1
26	164-	245-	GIB ADJUSTABLE	EA	1
27	164-	246-	DOVETAIL SUPPLY SUPPORT	EA	1
28	164-	247-	GUIDE ROLLER MTNG PLATE	EA	1
29	164-	248-	SUPPLY SUPPORT ARM	EA	1
30	164-	270-	STANDOFF	EA	3
31	164-	280-	CAM PRESS RING	EA	1
32	164-	281-	DRIVE CAM SUPPORT RING	EA	1
33	164-	282-	STATIONARY FRICTION DISC	EA	1
34	164-	301-	TENSION NUT	EA	2
35	164-	302-	PIN DANCER ARM	EA	1
36	164-	303-	PAPER SUPPLY KEY	EA	1
37	164-	304-	SUPPLY SUPPORT HUB	EA	1
38	164-	305-	DANCER ARM	EA	1
39	164-	331-	TENSION SPRING	EA	6
40	164-	356-	COUNTERWEIGHT	EA	1
41	164-	357-	COUNTERWEIGHT ARM	EA	1
42	164-	465-	COUNTERWEIGHT	EA	1
43	164-	505-	MOUNT, DOVETAIL	EA	1
44	164-	605- 4	ROLLER SHAFT 9.50 W/TAP H	EA	4
45	164-	1092-	DOWEL SUPPORT BLOCK	EA	1
46	164-	1093-	BEARING SUPPORT BLOCK	EA	1

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Franklin Model 164 Instructions

ITEM NUMBER		DESCRIPTION	U/M	QUANTITY
47	BGW- 9-	TB- 410 THRUST BEARING	EA	7
48	BGW- 29-	B46-4 BROMZE BRUSHING	EA	2
49	BGW- 79-	BGW BEARING B-46-2	EA	2
50	BGW- 87-	FB-68-3 BRONZE BRUSHING	EA	2
51	DAV- 1-	4103-CM 3/8 INSERT-DAVIES	EA	1
52	MON- 1-	MONROE KNOB # 29612	EA	1
53	RUL- 18-	THD CLAMP COLLAR 3/8-24 UNF	EA	1
		LH TCL6LH24F		
54	TOR- 7-	NTA 1220 THRUST BEARING	EA	2
55	TOR- 10-	NTA-815 TORR THRUST BRG	EA	8
56	TOR- 12-	TRA-815 TORR THRUST RACE	EA	16
57	TOR- 15-	NTA-613 THRUST BRG-TORR.	EA	2
58	TOR- 24-	TRA-1120 TOR, THRUST RACE	EA	4
59	TOR- 48-	TRA-613 THRUST RACE TORR	EA	4
60	WAL- 11-	REATAINING RING 5555-25	EA	2

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PARTS NOT SHOWN
164-33(6)
BGW-66(2)

TITLE
PAPER SUPPLY ASSY.
(OPT.)

FRANKLIN
MANUFACTURING CO.
NORWOOD, MASS 02062

DR. D.B. DATE 6/8/89

130—
16403-25

SCALE 12 ("D" SIZE)
14.25 ("B" SIZE)

NO. REQ. 1

USED ON GEN1,GEN2,HLGM

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Franklin Model 164 Instructions

BILL OF MATERIALS FOR 130-16404-30 REWIND ASSY
EFFECTIVE DATE 13-FEB-92

ITEM NUMBER	DESCRIPTION	U/M	QUANTITY
1 6-09680- 2	CLAMP COLLAR 1/2" 1D 1-1/8 PART # 8S	EA	5
2 164- 130-	SUPPLY ARM WELDMENT CASTING WEIGHT APPROX 7 1/2 LB	EA	1
3 164- 133-	DISC SUPPLY ROLL SHAFT	EA	2
4 164- 136-	ADJ GUIDE ROLLER SHAFT	EA	1
5 164- 147-	CORE LOCK	EA	2
6 164- 153-	BEARING HUB TAKE UP SHAFT	EA	2
7 164- 182- 1	FELT DISC	EA	2
8 164- 236- 1	GUIDE ROLLER	EA	2
9 164- 236- 2	GUIDE ROLLER KNURLED	EA	1
10 164- 243-	SUPPLY ROLLER	EA	2
11 164- 255-	PULLEY CLAMP HUB	EA	2
12 164- 259-	REWIND BACK PLATE	EA	1
13 164- 300- 1	AR, WRAP ROLLER	EA	1
14 164- 332-	ELECTRIC MOTOR STANDOFF	EA	8
15 164- 333-	MOTOR MOUNTING PLATE	EA	2
16 164- 450-	ADAPTER PLATE	EA	1
17 164- 605- 4	ROLLER SHAFT 9.50 W/TAP H	EA	1
18 164- 950- 3	REWIND SHAFT	EA	2
19 164- 951-	TENSION NUT L.H.	EA	4
20 BGW- 53-	FC12-1/2 COUPLING	EA	4
21 BGW- 55-	SPIDER	EA	2
22 BGW- 16-	BODINE MOTOR 188	EA	2

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FRANKLIN MANUFACTURIMNG CORP.   PG 2
BILL OF MATERIALS FOR 130-16404-30 REWIND ASSY
EFFECTIVE DATE 13-FEB-92

ITEM NUMBER	DESCRIPTION	U/M	QUANTITY
23 C/L- 1-	CL-00-TN CARRLANE T NUT	EA	2
24 C/L- 9-	CARR LANE WASHER CL-1-FW	EA	2
25 TIM- 1-	TIMKEN CUP BRG A6157	EA	4
26 TIM- 2-	TIMKEN CONE BEARING A6062	EA	4
27 TOR- 7-	NTA 1220 THRUST BEARING	EA	2
28 TOR- 10-	NTA-815 TORR THRUST BRG	EA	6
29 TOR- 12-	TRA-815 TORR THRUST RACE	EA	12
30 TOR- 24-	TRA-1220 TOR, THRUST RACE	EA	4

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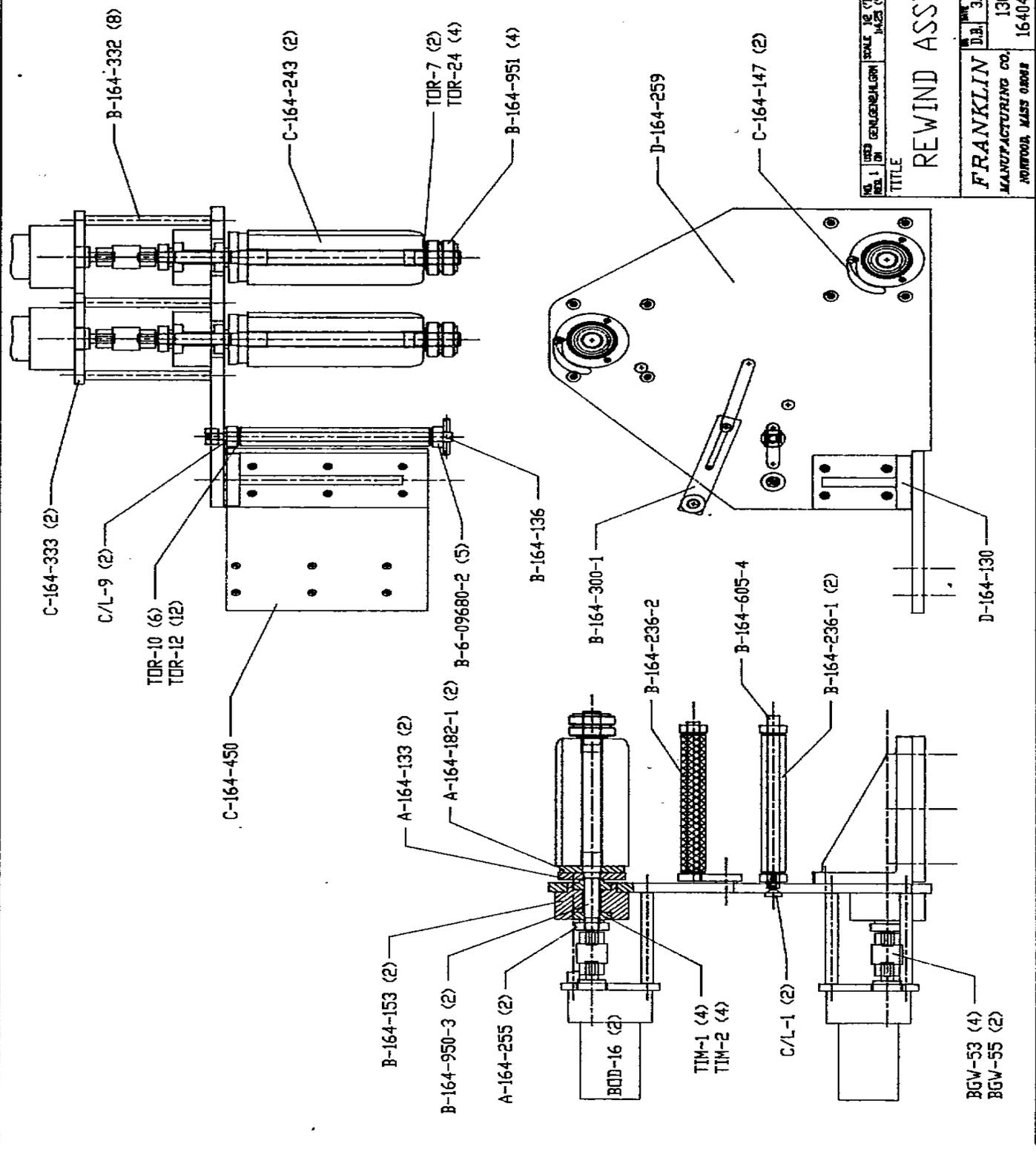
Franklin Model 164 Instructions

ITEM	NUMBER		DESCRIPTION	U/M	QUANTITY
1	6-09680-	2	CLAMP COLLAR 1/2" 1D 1-1/8 PART # 8S	EA	4
2	164- 102-		HINGE PIN SPACER	EA	2
3	164- 131-		SUPPLY HOLDER SHAFT		1
4	164- 133-		DISC SUPPLY ROLL SHAFT	EA	2
5	164- 136-		ADJ GUIDE ROLLER SHAFT	EA	1
6	164- 147-		CORE LOCK	EA	2
7	164- 153-		BEARING HUB TAKE UP SHAFT	EA	1
8	164- 166-		LAMINATOR BACK PLATE	EA	1
9	164- 167-		GUSSSET LAMINATOR	EA	2
10	164- 168-		ADAPTER BAR LAMINATOR	EA	2
11	164- 182-	1	FELT DISC	EA	2
12	164- 236-	1	GUIDE ROLLER	EA	2
13	164- 243-		SUPPLY ROLLER	EA	2
14	164- 255-		PULLEY CLAMP HUB	EA	1
15	164- 301-		TENSION NUT	EA	4
16	164- 332-		ELECTRIC MOTOR STANDOFF	EA	4
17	164- 333-		MOTOR MOUNTING PALTE	EA	1
18	164- 334-		SUPPLY HOLDER SHAFT	EA	1
19	164- 421-		BASE PLATE LAMINATOR	EA	1
20	164- 493-	1	PROXIMITY SWITCH PALTE	EA	1
21	164- 605-	4	ROLLER SHAFT 9.50 W/TAP H	EA	1
22	BGW- 53-		FC12-1/2 COUPLING	EA	2
23	BGW- 55-		SPIDER	EA	1

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Franklin Model 164 Instructions

ITEM NUMBER	DESCRIPTION	U/M	QUANTITY
24 BOD- 16-	BODINE MOTOR 188	EA	1
25 C/L- 1-	CL-00-TN CARRLANE T NUT	EA	1
26 C/L- 9-	CARR LANE WASHER CL-1-FW	EA	1
27 TIM- 1-	TIMKEN CUP BRG A6157	EA	2
28 TIM- 2-	TIMKEN CONE BEARING A6062	EA	2
29 TOR- 7-	NTA 1220 THRUST BEARING	EA	2
30 TOR- 10-	NTA-815 TORR THRUSR BRG	EA	4
31 TOR- 12-	TRA-815 TORR THRUST RACE	EA	8
32 TOR- 24-	TRA-1220 TOR. THRUST RACE	EA	4

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Parts labels (top diagram):
- C-164-167(2)
- B-6-09680-2 (4)
- B-164-236-1 (2)
- TOR-10 (4)
- TOR-12 (8)
- B-164-605-4
- B-164-136
- BOD-16 (2)
- C-164-333 (2)
- A-164-255 (2)
- TIM-1 (4)
- TIM-2 (4)
- A-164-133 (2)
- A-164-182-1 (2)

PARTS NOT SHOWN
C/J-7

Title block:
- USED ON GEN1,GEN2, HLGRM
- NO. REQ. 1
- SCALE 1:2 ("D" SIZE) 1:4.25 ("B" SIZED)
- TITLE: LAMINATION SUPPLY ASSY
- DR. BY D.B.
- DATE 6/23/89
- 130-16468-35
- FRANKLIN MANUFACTURING CO., NORWOOD, MASS 02062

Parts labels (bottom diagram):
- C/L-9
- C/L-1
- D-164-166
- B-164-421
- C-164-147
- B-164-168 (2)
- BGW-53 (4)
- BGW-55 (2)
- B-164-332 (8)
- B-164-153 (2)
- C-164-243 (2)
- TOR-7(2)
- TOR-24(4)
- B-164-301 (4)
- B-164-334 (2)

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Franklin Model 164 Instructions

BILL OF MATERIALS FOR 130-16406-40 LAMINATION STATION
EFFECTIVE DATE 10-DEC-90

ITEM	NUMBER		DESCRIPTION	U/M	QUANTITY
1	164-	169-	UPRIGHT CAP	EA	2
2	164-	170- 2	STANDOFF	EA	1
3	164-	171- 2	BOTTOM PALTE	EA	1
4	164-	172- 2	ROLLER SHAFT	EA	1
5	164-	174-	RUBBER ROLLER GUIDE	EA	2
6	164-	175-	LAMINATOR PRESS UPRIGHT	EA	2
7	164-	176- 2	RUBBER ROLLER, SHAFT	EA	1
8	164-	179- 2	RUBBER ROLLER	EA	1
9	164-	181-	RUBBER ROLLER STOP	EA	1
10	164-	262- 2	IDLER ROLLER	EA	1
11	BGW-	89-	BRONZ BUSHING B1012-4	EA	2
12	LEE-	9-	SPRING .250X.5" .32 WIRE	EA	2
13	MON-	1-	MONROE KNOB #29612	EA	1
14	WAL-	10-	RET RING TRUARC 5555-50	EA	2

A-164-169 (2)

B-164-175 (2)
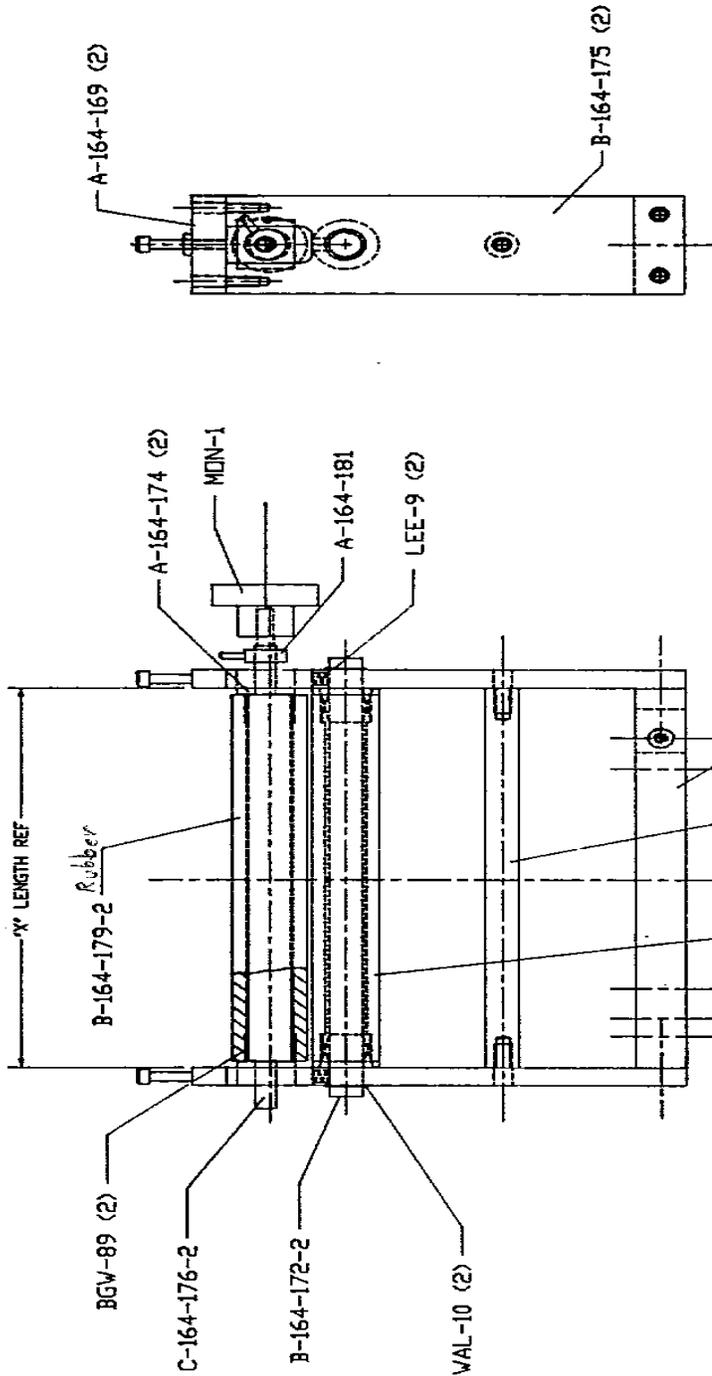
SCALE 1:1 ('D' SIZE)
1:2.15 ('B' SIZE)

TITLE
LAMINATION STATION ASSY

USED ON GEN1,GEN2,HLGRM

NO. 1
REQ.

DR. D.B.
DATE 6/26/89

130-
16406-40

FRANKLIN
MANUFACTURING CO.
NORWOOD, MASS 02062

A-164-174 (2)
MON-1
A-164-181
LEE-9 (2)

B-164-171-2
B-164-170-2
B-164-262-2

B-164-179-2 Rubber

'X' LENGTH REF

BGW-89 (2)
C-164-176-2
B-164-172-2
WAL-10 (2)

PART NO.	'X'	ASS'Y NO.
B-164-262-1	7'	OBSOLETE ASSY
B-164-170-1	7'	
B-164-171-1	7'	
B-164-172-1	7'	
C-164-176-1	7'	
B-164-179-1	7'	
B-164-262-2	7.782	D-130-16406-40
B-164-170-2	7.782	
B-164-171-2	7.782	
B-164-172-2	7.782	
C-164-176-2	7.782	
B-164-179-2	7.782	

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Franklin Model 164 Instructions

BILL OF MATERIALS FOR 130-16408-51 RAM ASSEMBLY DIE CUTTING
EFFECTIVE DATE 22-SEP-89

ITEM NUMBER	DESCRIPTION	U/M	QUANTITY
1 164- 075-	RAM	EA	1
2 164- 081-	PLUG HOLDER	EA	1
3 164- 082-	PLUG	EA	1
4 164- 086-	DIE CUT RAM PLUG	EA	1
5 164- 292-	CLAMP	EA	1
6 164- 754-	SPHERICAL BALL STUF	EA	1
7 164- 755-	BALL SEAT	EA	1
8 164- 756-	BALL CAP	EA	1
9 ASC- 4-	WAVE SPR WASH W2132-023	EA	1

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Franklin Model 164 Instructions

A-164-292

B-164-754

B-164-082

B-164-081

ASC-4

B-164-755

B-164-756

D-164-075

6X8,3 HEAD

RAM ASSEMBLY
(DIE CUTTING)

TITLE

NO. REQ.	1	USED ON

DR. D.B. DATE 9/12/89

130-16408-51

FRANKLIN
MANUFACTURING CO,
NORWOOD, MASS 02062

Franklin Model 164 Instructions

<pre>
FRANKLIN MANUFACTURIMNG CORP.   PG 1
BILL OF MATERIALS FOR 130-16468-68 LEVELING STRIKER PLT, 6X8
              EFFECTIVE DATE 13-FEB-92
</pre>

ITEM NUMBER	DESCRIPTION	U/M	QUANTITY
1 164- 016-	NUT PLATE	EA	1
2 164- 017-	ADJ SCREW STRIKE PLATE	EA	1
3 164- 020-	SCREW HOLDER	EA	1
4 164- 556-	SLIDING TOP PLATE	EA	1
5 164- 557-	SLIDING SIDE SUPPORT	EA	2
6 164- 558-	BOTTOM PLATE	EA	1
7 164- 559- 2	MOVING PLATE W/ ANGLE	EA	1
8 164- 560-	PLATE STOP	EA	1
9 164- 561-	JACK SCREW PLATE	EA	2
10 164- 570-	ADJUSTING KNOB	EA	2
11 164- 585-	ADJ SCREW SIDE	EA	1
12 164- 671-	PIN, 6X8 LEVEL BED SIDE	EA	1
13 164- 672-	PIN, LEVEL BED REAR	EA	1
14 164- 673-	PLUG, PLUNGER	EA	1
15 164- 683-	6X8 MAKE READY PLATE	EA	1
16 164- 768-	2 PC STRIKER PLATE ASSY M/F	EA	1
	164-554,164-55-1 & 164-773	EA	1
* 164- 554-	LEVELING PLATE	EA	1
* 164- 555- 1	LEVELING PLATE W/ ANGLE	EA	1
* 164- 773-	HUB	EA	1
17 164- 773-	HUB	EA	1
18 164- 884-	SCREW CAPTIVE BLOCK	EA	1
19 164- 952-	LEAF SPRING	EA	1
20 164- 953-	LEAF SPRING PLATE	EA	1

Franklin Model 164 Instructions

ITEM NUMBER	DESCRIPTION	U/M	QUANTITY
21 164- 980-	NYLON BUSHING	EA	2
22 BGW- 99-	B-24-3 BUSHING	EA	1
23 LEE- 21-	COMP SPRING LC-038-C-14 MUSIC WIRE	EA	3
24 RUL- 17-	TCL-4LH-28-F SPLIT CLR LEFT HAND THREAD	EA	2
25 TOR- 46-	TRA-411 THRUST RACE	EA	4
26 TOR- 47-	NTA- 411 THRUST BRG. TORR	EA	2
27 VLI- 4-	VLIER BALL PLUNGER B-52	EA	2

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Franklin Model 164 Instructions

C-164-556

TOR-46 (4)
TOR-47 (2)

PARTS NOT SHOWN
B-164-561 (2)
VLI-4 (2)

B-164-884
A-164-980 (2)

B-164-672
BGW-99

B-164-557 (2)

B-164-673

B-164-671
LEE-21 (3)

B-164-560
C-164-768

A-164-016
A-164-017
B-164-570 (2)

B-164-683

B-164-953
B-164-952

RUL-17 (2)
B-164-020

A-164-585

C-164-559-2

D-164-558

NO.	USED		SCALE				
REQ. 2	ON	GEN1,GEN2,HLGRM	1/1 ("A" SIZE) 1/2,1.5 ("B" SIZE)				

TITLE

LEVELING STRIKER PLATE

D.B. 9/13/89

130-

16468-68

FRANKLIN
MANUFACTURING CO.
NORWOOD, MASS 02062

Franklin Model 164 Instructions

BILL OF MATERIALS FOR 130-16468-70 ADJ. HEATER HEAD,(6X8)
EFFECTIVE DATE 16-APR-8

ITEM NUMBER			DESCRIPTION	U/M	QUANTITY
1	164-	016-	NUT PLATE	EA	2
2	164-	026-	ADJ HEAD SCREW	EA	2
3	164-	027-	SCREW SUPPORT	EA	2
4	164-	028-	SCREW SUPPT TURNING HEAD	EA	1
5	164-	029-	3 X 6 DOVETAIL	EA	2
6	164-	030-	TURNING HEAD SUPPORT	EA	1
7	164-	033-	SLIDE KEY	EA	2
8	164-	035-	BOTTOM SLIDING PLATE	EA	1
9	164-	036-	HOLDING HEAD PLATE	EA	1
10	164-	037-	2 WAY SLIDING PLATE	EA	1
11	164-	038-	TURNING PLATE	EA	1
12	164-	039-	PLATE WITH DOVETAIL	EA	1
13	164-	329-	SHIM WEAR PLATE	EA	1
14	164-	389-	6X8 HEATER HEAD	EA	1
15	164-	418-	DOVETAIL HOLDER	EA	1
16	164-	419-	BACK GIB HEATER HEAD	EA	1
17	164-	420- 1	SUPPORTING DOVETAIL	EA	1
18	164-	467-	SPACER, HEATER HEAD	EA	4
19	MON-	1-	MONROE KNOB EVC-165	EA	2
20	RUL-	17-	TCL-4LH-28-F SPLIT CLR	EA	4
			LEFT HAND THREAD		
21	TOR-	46-	TRA-411 THRUST RACE	EA	8
21	TOR-	47-	TRA-411 THRUST BRG. TORR	EA	4

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VIEW B-B

VIEW A-A

C-164-036

B-164-030

A-164-033 (2)

C-164-037

B-164-029 (2)

B-164-419

B

B

A-164-329

D-164-389

A-164-026 (2)

B-164-418

C-164-039

A

A

A-164-467 (4)

TOR-46 (8)

TOR-47 (4)

MON-1 (2)

B-164-028

A-164-016 (2)

RUL-17 (4)

A-164-027 (2)

C-164-038

C-164-035

C-164-420-1

FRANKLIN
MANUFACTURING CO.
NORWOOD, MASS 0062?

DR D.B. DATE 9/14/89
USED 1215 "B"
GEN,GEN2,HLGRM
REQ 2 ON

TITLE
ADJUSTABLE HEATER HEAD

130-
16468-70

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Franklin Model 164 Instructions

ITEM NUMBER			DESCRIPTION	U/M	QUANTITY
1	164-	016-	NUT PLATE	EA	2
2	164-	026-	ADJ HEAD SCREW	EA	2
3	164-	027-	SCREW SUPPORT	EA	2
4	164-	028-	SCREW SUPPT TURNING HEAD	EA	1
5	164-	029-	3 X 6 DOVETAIL	EA	2
6	164-	030-	TURNING HEAD SUPPORT	EA	1
7	164-	032-	DOVETAIL HOLDER	EA	2
8	164-	033-	SLIDE KEY	EA	2
9	164-	035-	BOTTOM SLIDING PLATE	EA	1
10	164-	036-	HOLDING HEAD PLATE	EA	1
11	164-	037-	2 WAY SLIDING PLATE	EA	1
12	164-	038-	TURNING PLATE	EA	1
13	164-	039-	PLATE WITH DOVETAIL	EA	1
14	164-	329-	SHIM WEAR PLATE	EA	1
15	164-	359-	DOVETAIL DIE CLAMP RAIL	EA	2
16	164-	390- 1	SUPPORTING DOVETAIL 6X8	EA	1
17	164-	422-	DIE CUT SPACER	EA	1
18	MON-	1-	MONROE KNOB EVC-165	EA	2
19	RUL-	17-	TCL-4LH-28-F SPLIT CLR LEFT HAND THREAD	EA	4
20	TOR-	46-	TRA-411 THRUST RACE	EA	8
21	TOR-	47-	TRA-411 THRUST BRG. TORR	EA	4

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VIEW B-B

MDN-1 (2)

C-164-036

A-164-033 (2)

C-164-037

B-164-029 (2)

B

B-164-030

B-164-416 (2)

B

A-164-329

A-164-026 (2)

A-164-016 (2)

TDR-46 (8)
TDR-47 (4)

RUL-17 (4)

B-164-028

VIEW A-A

C-164-039

A

D-164-422

A-164-027 (2)

C-164-038

A

C-164-035

B-164-032 (2)

C-164-390-1

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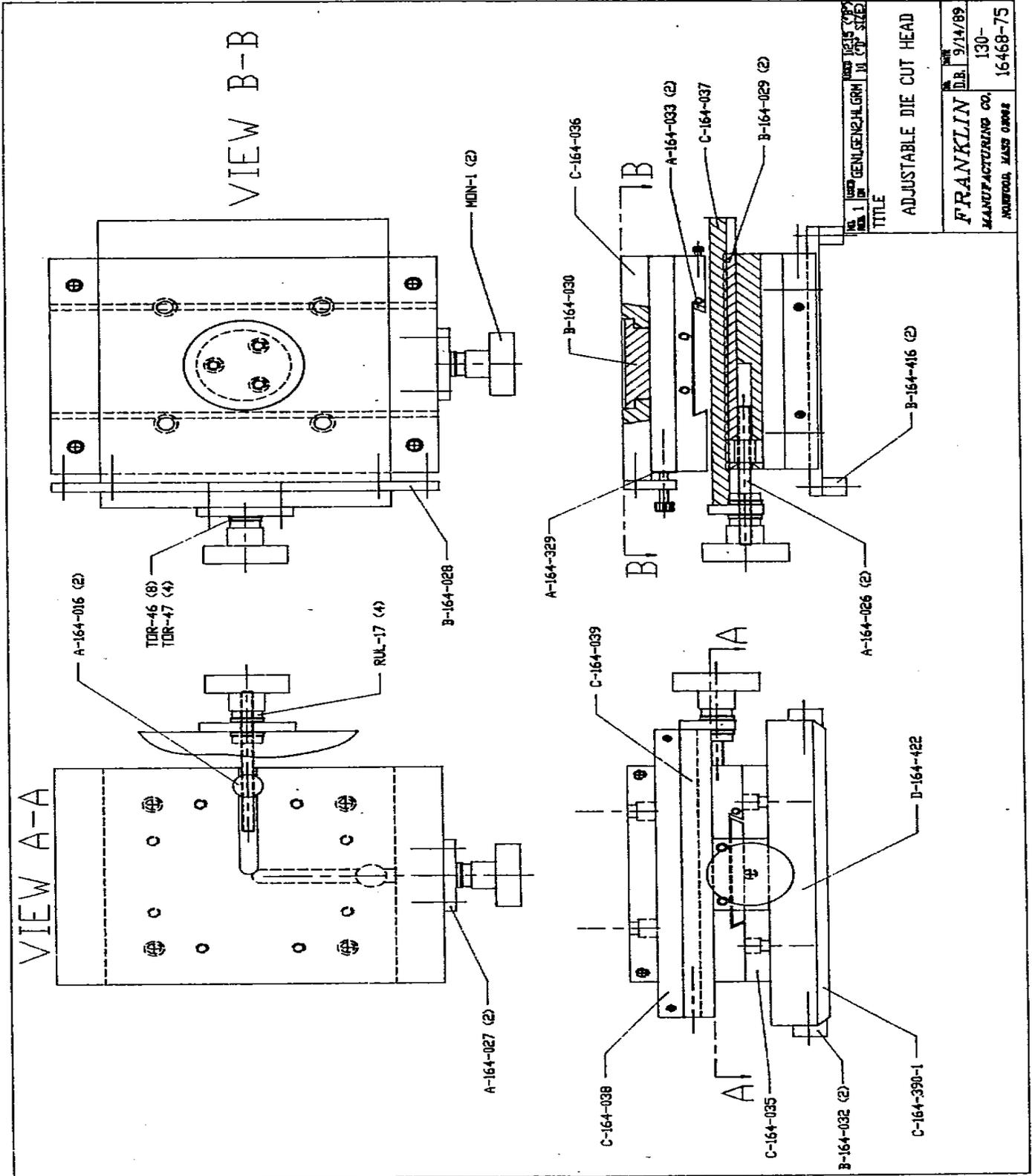
Franklin Model 164 Instructions

BILL OF MATERIALS FOR 130-16468-80 HOT STAMP FRAME ASSY
EFFECTIVE DATE 29-JUN-90

ITEM NUMBER	DESCRIPTION	U/M	QUANTITY
1 6-09640- 1	NYLON WASHER	EA	2
2 6-09640- 2	NYLON WASHER	EA	1
3 6-09680- 1	3/8 CLAMP COLLAR 6S	EA	6
4 110- 143-19	FOIL HOLDER BAR	EA	3
5 130-03710-	6" SUPPLY ROLL ASY	EA	3
* 6-09680- 4	15/16 ID CLAMP COLLAR 15L	EA	6
* 7-20330- 5	6"SUPPLY DISC TURNING	EA	3
* 7-40100- 2	6" FOIL FLANGE ASY NONTRN	EA	3
* 7-20330- 4	6" SPLY ROLL DISC NON TRN	EA	3
* 7-20341-	ROD FOIL HOLDER FLANGE	EA	3
* 6-05460- 2	1" ID COMPRESSION SPRING	EA	3
* 6-09830-	CLAMP COLLAR HANDLE MAKE FROM 6-09840	EA	6
6 164- 041-	MACHINE MING BLOCK	EA	4
7 164- 042-	FOIL ROLLER ADJ ARM	EA	2
8 164- 043- 1	ROLLER SHAFT 8.75	EA	2
9 164- 043- 5	FOIL ROLLER SHAFT 10.25	EA	2
10 164- 043- 6	FOIL ROLLER SHAFT 10.50	EA	1
11 164- 043- 7	FOIL ROLLER SHAFT 11.50	EA	3
12 164- 045-	FOIL HOLDER SUPPORT	EA	2
13 164- 051-	REDUCTOR SPACER	EA	2
14 164- 054-	FRAME CONNECTING PLATE	EA	1
15 164- 060- 3	ROLLER	EA	2

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ITEM NUMBER	DESCRIPTION	U/M	QUANTITY
16 164- 060- 4	ROLLER 7.718	EA	1
17 164- 060- 5	ROLLER 10.468	EA	3
18 164- 060- 6	ROLLER 9.968	EA	1
19 164- 061- 1	MAIN SLIDE PLATE #1	EA	1
20 164- 061- 2	MAIN SLIDE PLATE #2	EA	1
21 164- 064-	TRIPLE FOIL HOLDER	EA	2
22 164- 067-	MACHINING GIB	EA	4
23 164- 070-	INNER RACE	EA	2
24 164- 072-	HEAD MOVER	EA	1
	@ WEIGHT APPROX 5 LBS		
25 164- 073-	GIB HOLDER	EA	4
26 164- 084-	RAM HOUSING	EA	2
27 164- 085-	RAM FRONT CAP	EA	1
28 164- 188-	PAPER GUIDE SUPPORT	EA	1
29 164- 352-	CONNECTION BOX	EA	1
30 164- 379-	MOTOR HAND WHEEL	EA	1
31 164- 410-	GIB SPACER PLATE	EA	2
32 164- 413-	FRAME STANDOFF	EA	1
33 164- 415-	CAM SHAFT HEAD	EA	1
34 164- 416-	DRIVE SHAFT GOT STAMP HD	EA	1
35 164- 417-	FOIL HOLDER STRAP	EA	1
36 164- 466-	TIMING SEGMENT COLLAR	EA	1
37 164- 473-	KEY	EA	1
38 164- 474-	KEY	EA	2

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FRANKLIN MANUFACTURIMNG CORP.   PG 3
BILL OF MATERIALS FOR 130-16468-80 HOT STAMP FRAME ASSY
EFFECTIVE DATE 29-JUN-90

ITEM NUMBER		DESCRIPTION	U/M	QUANTITY
39	164- 476-	KEY	EA	1
40	164- 490-	TIMING COLLAR SPLIT	EA	3
41	164- 507-	INNER RACE	EA	2
42	164- 508-	FRONT PLATE, DIE CUT HEAD	EA	1
43	164- 509-	BEARING NUT PLATE	EA	2
44	164- 510-	THRUST BAR	EA	1
45	164- 511-	BEARING BLOCK	EA	2
46	164- 643-	GREASE FITTING SUPP BASE	EA	1
47	164- 644-	GREASE MANIFOLD	EA	1
48	164- 762-	PAPER GUIDE	EA	2
49	164- 769-	TENSIONER BRACKET	EA	1
50	164- 770-	BRACKET	EA	1
51	BGW- 72-	FLANGE MRP-1-3/16 (64660) OR DODGE 059148	EA	2
52	BGW- 73-	COUPLING CC4016-1X1 COMPLETE	EA	1
53	BGW- 82-	DC MOTOR PM18100TF-B SPEC 1 HP DOUBLE PROJECTING SHAFTS	EA	1
54	BGW- 94-	F721E- 20-B7-G6 REDUCER	EA	1
55	BGW- 102-	IDLER SPROCKET 40B1571-8	EA	1
56	BGW- 19-	40B19-1" KEY & SET SCREW	EA	1
57	BGW- 20-	SPROCKET 4019X1-3/16 W/KEY & SET SCREW 7/8 THRU BORE	EA	1
58	BGW- 22-	FLANGED BRG FB-250-1	EA	2

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Franklin Model 164 Instructions

BILL OF MATERIALS FOR 130-16468-80 HOT STAMP FRAME ASSY
EFFECTIVE DATE 29-JUN-90

ITEM NUMBER	DESCRIPTION	U/M	QUANTITY
59 DAV- 3-	5582-C DAVIES HANDLE	EA	1
60 MON- 3-	MONROE HANDLE 28200	EA	2
61 PDN- 1-	435-460-030 MALE CONN 3/16 TUBE X 1/8 NPTF	EA	18
62 PDN- 2-	ADAPTER 1/8NPT FEM.20024 X 1/4-28 MALE 3	EA	3
63 PDN- 3-	550-450-190 3/16 OD -60F HEAVYWALL LUBE LINE	EA	15
64 PDN- 4-	GREASE FITTING 1610-BL	EA	9
65 RUL- 19-	HOLOCHROME 15136 COLLAR	EA	1
66 TOR- 64-	B-66 BEARING	EA	14
67 TOR- 77-	BEARING BH3316	EA	2
68 TOR- 79-	ROLLER BEARING J-2416	EA	2
69 VLI- 4-	VLIER BALL PLUNGER B-52	EA	3

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SECTION A-A

PARTS NOT SHOWN:
C-164-352
DAV-3

LUBE INFO

Timing Segment (6l) gr

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Franklin Model 164 Instructions

BILL OF MATERIALS FOR 130-16468-40 GUARD ASSEMBLY (6X8)
EFFECTIVE DATE 21-MAR-91

	ITEM NUMBER	DESCRIPTION	U/M	QUANTITY
1	106- 049-	SLIDE TABLE STOP SW BRACK	EA	1
2	115- 097-	.25 ALUM. SPACER	EA	2
3	115- 098-	.062 ALUM. SPACER	EA	2
4	115- 100-	.010 STEEL SPACER	EA	2
5	164- 316-	SLIDE ARM	EA	1
6	164- 317-	SLIDE ARM SPACER	EA	1
7	164- 319-	SLIDE BLOCK	EA	3
8	164- 320-	SLIDE PLATE	EA	3
9	164- 321-	GUARD RAIL RISER	EA	2
10	164- 322-	GUARD BRACE	EA	1
11	164- 323-	GUARD CORNER	EA	1
12	164- 324-	PAPER PULL COVER	EA	1
13	164- 325-	VERTICAL GUARD	EA	1
14	164- 326-	SLIDING DOOR	EA	1
15	164- 335-	PAWL	EA	1
16	164- 336-	PAPER SUPPLY BOTTOM GUARD	EA	1
17	164- 428-	SWING GUARD	EA	2
18	164- 429-	GUARD RAIL	EA	1
19	164- 430-	BACK GUARD W/ DOOR 6X8	EA	1
20	164- 432-	SLIDE GUARD	EA	1
21	164- 492-	GUARD BRACE	EA	1
22	164- 494-	STABILIZER PIN	EA	1
23	164- 495-	PAWL	EA	1
24	164- 496-	STABILIZER BRACKET	EA	1

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Franklin Model 164 Instructions

BILL OF MATERIALS FOR 130-16468-40 GUARD ASSEMBLY (6X8)
EFFECTIVE DATE 21-MAR-91

ITEM NUMBER	DESCRIPTION	U/M	QUANTITY
25 164- 767-	SPANNER WRENCH	EA	1
26 EPC- 1-	DP-415A EPCO HANDLE	EA	2
27 MRY- 1-	DC118 MAKEREADY SHEET	EA	1
28 VLI- 2-	P304S LEVELING PAD VLIER	EA	4
29 WRE- 1-	WRENCH #28-036 ARMSTRONG	EA	1
30 WRE- 2-	OPEN END WRENCH 3/4 X 7/8 5401A35	EA	1

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Franklin Model 164 Instructions

ITEM NUMBER	DESCRIPTION	U/M	QUANTITY
1 105- 026-	TIME DELAY DIAL	EA	2
2 130-16416-16	SOLID STATE HEAT RELAY	EA	1
	2 HEAD MACHINE		
* 164- 766-	RELAY MTNG BRACKET	EA	1
* BUS- 2-	#4515 FUSE BLOCK BUSS	EA	1
* BUS- 3-	#6692 INSULATOR BUSS	EA	1
* IDC- 27-	ARS- 25AA SYRELEC RELAY	EA	1
* SHW- 16-	FNM-2 BUSSMAN FUSE	EA	1
3 164- 344-	INDEXER BOARD MTNG PLATE	EA	1
4 164- 352-	CONNECTION BOX	EA	2
5 164- 374-	BOARD STANDOFF	EA	9
6 164- 789-	FRONT PANEL 6 X 8 2HEAD	EA	1
7 164- 791-	CONTROL BX NEW GENERATION	EA	1
8 164- 795-	BRACKET	EA	1
9 164- 796-	MOUNTING PLATE	EA	1
10 164- 797-	MOUNTING BRACKET	EA	1
11 164- 834-	RELAY MT'G PLATE	EA	1
12 164- 835-	COMPONENT BOARD PLATE	EA	1
13 164- 957-	MOUNTING PLATE AFM BOARD	EA	1
14 164- 991-	PARTITION PLATE	EA	1
15 164- 1013- 1	WIRING THROUGH 2 HEAD	EA	1
16 ACM- 12-	ACME TRANS T-2-53011-S	EA	1
17 ACM- 13-	ACME TRANSFORMER T1-37921	EA	1
18 AFM- 1-	FRANK. PCB INDEXER	EA	1

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ITEM NUMBER	DESCRIPTION	U/M	QUANTITY
19 AFM- 2-	FRANK, ASSY	EA	2
20 AMP- 1-	AMP RECEPT 206430-1	EA	5
21 AMP- 2-	AMP PLUGS 206429-1	EA	5
22 AMP- 3-	AMP RECEPT 206043-1	EA	1
23 AMP- 4-	AMP PLUG 206044-1	EA	1
24 AMP- 7-	AMP CONTACTS 66101-1	EA	22
25 AMP- 8-	AMP CONTACT 66099-1	EA	22
26 AMP- 26-	207016-1 4 PIN RECEPTACLE	EA	4
27 AMP- 27-	207015-1 4 PIN PLUG	EA	4
28 AMP- 28-	STRAIN RELIEF 206070-1	EA	1
29 AMP- 32-	STRAIN RELIEF 206358-1	EA	5
30 APP- 1-	STB-38 3/8" STRT. CONNECTOR	EA	3
31 APP- 2-	STB-9038 3/8" 90DEG. CONN	EA	3
32 APP- 4-	LTB 5090 1/2" 90 DEG. CONN	EA	6
33 B/C- 1-	P121-33400-024402 T/C	EA	1
	WITH CABLE CLAMP #A 7124		
34 BUS- 1-	ABC10 BUSSMAN FUSE	EA	5
35 BUS- 7-	BUSS FUSE ABC1	EA	2
36 BUS- 8-	FUSE BUSSMAN ABC-2	EA	1
37 BUS- 9-	BUSSMAN FUSE ABC-12	EA	1
38 BUS- 10-	TRACOR FUSE 314008 8 AMP	EA	2
39 BUS- 12-	LITTLE FUSE 313005	EA	1
40 C/D- 2-	KKN37P3754QPI CAPACITOR	EA	1
41 C/D- 3-	30393-5 BRACKET CORNELL D	EA	1

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Franklin Model 164 Instructions

BILL OF MATERIALS FOR 130-26416-10 GEN 2 CONTROL BOX 2 HEADER
EFFECTIVE DATE 13-FEB-92

ITEM NUMBER	DESCRIPTION	U/M	QUANTITY
42 C/H/ 4-	7500K14 C.H. SWITCH	EA	2
43 C/J- 3-	P302CCT-L CINCH CONNECTOR	EA	1
44 C/J- 6-	S-3304-CCT-K CINCH OLUG	EA	4
45 C/J- 7-	P3304-CCT-L101 PLUG BEAU	EA	4
46 C/J- 12-	S-3302CCT-K CINCH PLUG	EA	1
47 C/J- 13-	CINCH PLUG P3306-CCTL	EA	1
48 C/J- 14-	CINCH SOCKET S306 CCTK	EA	1
49 C/J- 28-	CINCH 50-6A-20 EDGE CONN	EA	17
50 C/J- 29-	BEAU VERN 72510 STRIP	EA	1
51 CAL- 1-	91111F CAL TEMP CONTROL	EA	1
52 CHR- 1-	CHERRY T20-55A SWITCH	EA	9
53 CHR- 2-	CHERRY 009-0586 BLANK SPA	EA	6
54 CHR- 3-	CHERRY 099-1034 END PLATE	EA	8
55 CHR- 4-	CHERRY 3 POSIT.HARDWR.KIT	EA	1
56 CHR- 5-	CHERRY 4 POS.HRDWR.KIT	EA	4
57 CHR- 6-	CHERRY 10 POS.HDRWR.KIT	EA	2
58 CHR- 7-	T20-55A W/ DECIMAL PT CHER-RY THUMBWHEEL SWITCH	EA	2
59 CHR- 8-	CHERRY SWITCH T20-02A	EA	6
60 CRS- 1-	RV4NAYSD502A CLRSTAT POT	EA	2
61 CRS- 27-	CLARO RESISTOR CMG50	EA	1

Franklin Model 164 Instructions

ITEM NUMBER		DESCRIPTION	U/M	QUANTITY
62	DAV- 2-	1925-10 KNOB 1/4" SET SCREW, BLACK INLAY	EA	2
63	DAY- 4-	4C552 (24" CORD SET)	EA	2
64	DAY- 5-	DAYTON FAN 4C550 AXIAL	EA	2
65	DAY- 6-	DAYTON GUARD 4C551	EA	2
66	EAO- 1-	EAO 52-928.0 SQ ROT ACT	EA	7
67	EAO- 2-	EAO 52-950.0 SEL SWITCH	EA	7
68	EAO- 3-	EAO 61-421.00 SEL SWITCH	EA	7
69	EAO- 4-	EAO 61-115.00 PUSHBUTTON	EA	5
70	EAO- 5-	EAO 31-963.4 LIGHT BULB	EA	4
71	EAO- 6-	EAO 61-005.005 INDICATOR	EA	2
72	EAO- 7-	EAO 61-9251.9 WHITE LENS	EA	2
73	EAO- 8-	EAO 61-9251.2 RED LENS	EA	1
74	EAO- 9-	EAO 61-9251.6 BLUE LENS	EA	1
75	EAO- 10-	EAO 61-9251.9 WHITE LENS	EA	1
76	EA0- 11-	EAO 61-9351.4 YELLOW LENS	EA	1
77	EAO- 12-	EAO 61-9251-5 GREEN LENS	EA	1
78	EAO- 13-	EAO 61-842.012 CONT BLOCK	EA	1
79	EAO- 14-	EAO 61-541.012 CONT BLOCK	EA	9
80	EAO- 15-	61-843.012 CONTACT BLOCK	EA	2
81	EAO- 16-	EAO 61-222.10D KEY SWITCH	EA	1
82	EAO- 17-	ANTI-ROTAT.LOCKWA. 51-910	EA	14
83	EMX- 11-	MOTOR CONTROL #5645	EA	1
84	EMX- 12-	E32NRHT-LNFNS-00 ST MOTOR	EA	2

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ITEM NUMBER	DESCRIPTION	U/M	QUANTITY
85 EMX- 13-	TSD5410 DRIVER	EA	2
86 ENT- 1-	112212.14 12 POLE SOCKET	EA	10
87 ENT- 2-	112179.23 12 POLE CONN	EA	10
88 ENT- 5-	112203.24 3 POLE SOCKET	EA	1
89 ENT- 6-	112210.26 3 POLE CONN	EA	1
90 HFM- 2-	A-SO50 HOFFMAN HOLESEAL	EA	10
91 HFM- 28-	FILTER A-FLT66	EA	2
92 HFM- 29-	LOUVER PLATE KIT A-VK66	EA	2
93 HTR- 022-	230V/500W/ 1/2DIA 6" LG 28" LEADS	EA	4
94 IDC- 16-	IDEC SPRING SY2S-02F1	EA	8
95 IDC- 18-	RH3BU 120V AC IDEC RELAY	EA	1
96 IDC- 19-	RH2BU 120 V AC IDEC RELAY	EA	3
97 IDC- 20-	SY4S-51F1 HOLD DOWN SPRIN	EA	3
98 IDC- 21-	SY2S-61 P C BOARD MNT SKT	EA	1
99 IDC- 22-	SH3B-62 PC BOARD SOCKETS	EA	1
00 IDC- 23-	SH2B-62 PC BOARD SOCKETS	EA	1
01 IDC- 29-	IDEC SH1B-62 RELAY SOCKET	EA	3
02 IDC- 30-	IDEC RELAY RH4B-UAC 120V	EA	1
03 IDC- 31-	IDEC RELAY SH4B-62	EA	1
04 IDC- 32-	IDEC RELAY RH1B-UAC120V	EA	8
05 IDC- 33-	IDEC SOCKET SH1B-05	EA	5
06 K/B- 1-	KB MOTOR CONTROL KBIC-240	EA	1
07 K/B- 2-	KB RESISTOR #9841	EA	1

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ITEM NUMBER	DESCRIPTION	U/M	QUANTITY
08 K/B- 5-	KB BARRIER TERM. BOARD9884	EA	1
09 KIL- 1-	OT-1 KILLARK BOX 1/2"	EA	1
10 KIL- 2-	OL-10 KILLARK COVER 1/2"	EA	1
11 LTL- 2-	LITTLE FUSE 102074	EA	24
12 M/S- 4-	M/S BZE62RQ8 MICROSWITCH	EA	1
13 M/S- 7-	BZE6-2RQ MICROSWITCH	EA	2
14 M/S- 8-	FE-XFRN-F9-133 M.S. TRNSFR	EA	1
15 M/S- 13-	3PA1 DIE CAST ENC USE W. M/S-22 & M/S-26	EA	1
16 M/S- 14-	6PA1 ROLLER ARM MICROSWIT	EA	1
17 MAL- 3-	MALLORY CAP VTL470S16	EA	1
18 MAL- 4-	MALLORY CAP VTL1000S16	EA	1
19 MAL- 5-	MALLORY CAPAC. VTL10000-S35	EA	1
20 MDA- 1-	BRIDGE RECTIFIER #BR88D	EA	2
21 P/B- 3-	CIRCUIT BREAKER W68X2Q1020	EA	1
22 P/X- 7-	MSTB 1.5/3-ST5 .08 CONN	EA	1
23 P/X- 11-	MSTB1.5/6ST-5.08 CONN	EA	1
24 RES- 27-	RESISTOR 1 K OHM 5 WATT #VC5EIK CLAROSTAT	EA	1
25 RES- 28-	FAIRCHILD REG UA7812-UC	EA	1
26 RES- 35-	OHMITE RESISTOR 93J2K7	EA	4
27 S/C- 1-	650DC-2 NO SUB BRIDGEPORT	EA	8
28 S/C- 10-	1/2 X CL GALV CLOS NIPPLE	EA	1
29 S/C- 15-	LN-101 LOCKNUT STEEL CITY	EA	2

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BILL OF MATERIALS FOR 130-26416-10 GEN 2 CONTROL BOX 2 HEADER
EFFECTIVE DATE 13-FEB-92

ITEM NUMBER	DESCRIPTION	U/M	QUANTITY
30 SEN- 1-	SENTROL 115-6Y-06K SWITCH	EA	4
31 SHW- 1-	TRM-1 SHAWMT FUSE	EA	1
32 SHW- 3-	FNM-BUSSMAN FUSE	EA	1
33 SHW- 14-	BUSSMAN FUSE FNM-5	EA	5
34 SQD- 1-	D221N SQ D DISCON SWITCH	EA	1
35 SQD- 37-	STOP OPERATOR 9001DIBIR	EA	1
36 SQD- 38-	CONTACT BLOCKS 9001DA01	EA	1
37 STA- 1-	201 AUTO TRANSFORME. STACO	EA	2
38 STA- 2-	STANCOR TRAN P-8652	EA	1
39 SYR- 3-	COUNTER 1000 PA1 SYRELEC	EA	2
40 SYR- 5-	CA49-120/60-CS4-PO4 CONT	EA	1
41 SYR- 6-	SYRELEC IAME1204E2	EA	3
42 T/I- 1-	TI 305-02B 5 SLOT RACK	EA	1
43 T/I- 2-	TI 330-37 CPU	EA	1
44 T/I- 3-	TI 305-05N 16PT RELAY MOD	EA	1
45 T/I- 4-	TI305-05T 16PT RELAY MOD	EA	1
46 T/I- 5-	TI305-DMY FILLER MODULE	EA	2
47 VAR- 2-	NEW STYLE COMP BOARD GEN2	EA	1
48 VER- 4-	77006-50 BEAU VERNITRON	EA	1
49 VER- 7-	77013-50 BEAU VERNITRON DON NOT SUBSTITUTE MUST BE BEAU	EA	2
50 VER- 9-	77022-50 BEAU VERNITRON	EA	1
51 VER- 10-	7233-02 TERMINAL STRIP	EA	15
52 W/B- 1-	W BAYONET ADAPT # 10-0023A	EA	1

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Franklin Model 164 Instructions

ITEM NUMBER	DESCRIPTION	U/M	QUANTITY
1 6-02910-	10X15 L-R KNURL ROLLER	EA	1
2 6-03800-	LGE REROLL PULLEY	EA	1
3 6-04611-	KNURL ROLLER IDLER SHAFT	EA	1
4 6-04701-	RUBBER ROLL SHAFT	EA	2
5 6-04810-	10X15 L-R FOIL TENSION BR	EA	1
6 6-04920-	10X15 SUPPT FOIL TENS. BR	EA	1
7 6-05000-	SPRING- FOIL LEAF PULL	EA	1
8 6-05100-	FOIL PULL RELEASE DISC	EA	1
9 6-05200-	F.P. RELEASE DISC LEVER	EA	1
10 6-05500-	REROLL RETENSION SLIDE	EA	2
11 6-09640- 1	NYLON WASHER	EA	4
12 6-09680- 1	3/8 CLAMP COLLAR 6S	EA	1
13 7-20210-	TENSION FORL RUBBER ROLL	EA	2
14 SS- 18271-4	RUBBER ROLLER 11.16"	EA	1
15 130-03450-3	REWIND ROLLER ASSY 11.26"	EA	1
* 6-03900-	SMALL REROLL PULLEY	EA	1
* 6-05400-	REROLL DRIVE SHAFT	EA	1
* 6-05410-	REROLL IDLER SHAFT	EA	1
* 6-09431-	BEARING	EA	2
* 6-09790- 2	REWIND ROLL TENSION BAR	EA	1
* 6-09800- 2	10XS15 REWIND ROLLER	EA	1
* LEE- 2-	LC032E-9 COMP. SPRING-LEE .360 OD X 1.0 FREE LENGTH X .32 WIRE DIAMETER	EA	3
16 164-043-7	FOIL ROLLER SHAFT 11.50	EA	1

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ITEM NUMBER	DESCRIPTION	U/M	QUANTITY
17 164- 060- 6	ROLLER 9.968	EA	1
18 164- 091- 1	SIDE RAIL L H	EA	1
19 164- 091- 2	SIDE RAIL R H	EA	1
20 164- 104-	GUARD END PLATE	EA	1
21 164- 108-	CONNECTOR PLATE	EA	1
22 164- 109-	SIDE GUARD FOIL PULL	EA	1
23 164- 799-	MOTOR MTNG PALTE	EA	1
24 164- 833-	STANDOFF LEAFPULL STEP MO	EA	2
25 164- 925-	DEIVE SHAFT	EA	1
26 GAR- 1-	O6DU12 TEFLON BUSH GURALOC	EA	2
27 S/D- 6-	6A3-48NF-03712 PULLEY	EA	1
28 S/D- 10-	6B3-080037 TIMING BELT	EA	1
29 S/D- 13-	6A3-21DF03712 PULLEY	EA	1
30 TOR- 14-	RC-061008 TORR CLUTCH BRG	EA	2
31 TOR- 15-	NTA-613 THRUST BRG-TORR.	EA	2
32 TOR- 48-	TRA-613 THRUST RACE TORR	EA	3
33 TOR- 64-	B-66 BEARING	EA	2

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FOIL PULL ASSEMBLY

FRANKLIN MANUFACTURING CO, NORWOOD, MASS 02062

D.B. 6/2/89

130-26468-10

A-6-0470I(2)

B-164-799

S/D-13

A-6-05500 (2)

S/D-6

S/D-10

TOR-15 (2)
TOR-48 (3)

C-164-104

D-164-091-1

A-164-925

B-6-09680-1

C-164-109

B-6-05100

B-6-05200

TOR-14 (2)

B-130-03450-3

C-6-04920

B-6-05000

B-6-04810

B-7-20210 (2)

B-SS-18271-4

A-6-09640-1 (4)
GAR-1 (2)

A-6-04611

A-6-03800

B-6-02910

D-164-091-2

A-164-833 (2)

PARTS NOT SHOWN

B-164-043-7
B-164-060-6
C-164-108 (2)
TOR-64 (2)

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Franklin Model 164 Instructions

BILL OF MATERIALS FOR 130-26468-85 DIE CUT FRAME GEN 2
EFFECTIVE DATE 29-MAR-91

ITEM NUMBER	DESCRIPTION	U/M	QUANTITY
1 6-09680- 1	3/8 CLAMP COLLAR 6S	EA	2
2 6-09680- 2	CLAMP COLLAR 1/2″ ID 1-1/8	EA	1
	PART #8S		
3 164- 041-	MACHINE MTNG BLOCK	EA	4
4 164- 043- 1	ROLLER SHAFT 8.75	EA	2
5 164- 054-	FRAME CONNECTING PLATE	EA	1
6 164- 060- 4	ROLLER 7.718	EA	1
7 164- 061- 3	MAIN SLIDE PALTE #3	EA	1
8 164- 061- 4	MAIN SLIDE PLATE #4	EA	1
9 164- 067-	MACHINING GIB	EA	1
10 164- 070-	INNER RACE	EA	4
11 164- 072-	HEAD MOVER	EA	2
	@ WEIGHT APPROX 5 LBS		
12 164- 073-	GIB HOLDER	EA	1
13 164- 084-	RAM HOUSING	EA	4
14 164- 085-	RAM FRONT CAP	EA	2
15 164- 236- 1	GUIDE ROLLER	EA	1
16 164- 296-	LAMINATOR ROLLER FRAME	EA	1
17 164- 381-	SIDE FRAME ROLLER SUPPORT	EA	1
18 164- 382-	SIDE FRAME GUDE ROLLER	EA	1
19 164- 410-	GIB SPACER PLATE	EA	2
20 164- 413-	FRAME STANDOFF	EA	2
21 164- 414-	DRIVE SHAFT	EA	2
22 164- 415-	CAM SHAFT HEAD	EA	1
		EA	1

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Franklin Model 164 Instructions

BILL OF MATERIALS FOR 130-26468-85 DIE CUT FRAME GEN 2
EFFECTIVE DATE 29-MAR-91

ITEM NUMBER	DESCRIPTION	U/M	QUANTITY
23 164- 473-	KEY	EA	1
24 164- 474-	KEY	EA	2
25 164- 506-	KEY	EA	1
26 164- 507-	INNER RACCE	EA	2
27 164- 508-	FRONT PLATE, DIE CUT HEAD	EA	1
28 164- 509-	BEARING NUT PLATE	EA	2
29 164- 510-	THRUST BAR	EA	1
30 164- 511-	BEARING BLOCK	EA	2
31 164- 605- 2	ROLLER SHAFT 9.50	EA	1
32 164- 769-	TENSIONER BRACKET	EA	1
33 164- 770-	BRACKET	EA	1
34 164- 794-	TIMING DISC W/ COLLAR	EA	1
* 164- 792-	TIMING COLLAR DISC	EA	1
* 164- 793-	TIMING COLLAR	EA	1
35 BGW- 72-	FLANGE MRP-1-3/16 (64660) OR DODGE 059148	EA	2
36 BGW- 73-	COUPLING CC4016-1X1 COMPLETE	EA	1
37 BRW- 102-	IDLER SPROCKET 40B15T1-8	EA	1
38 BRW- 19-	40B19-Q" KEY & SET SCREW	EA	1
39 BRW- 20-	SPROCKET 4019X1-3/16 W/KEY & SET SCREW 7/ THRU BORE BROWNING OR BGW	EA	1
40 BRW- 22-	FLANGED BRG FB-250-1	EA	2
41 RUL- 19-	HOLOCHROME 15136 COLLAR	EA	1

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Franklin Model 164 Instructions

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           FRANKLIN MANUFACTURIMNG CORP.              PG 3
   BILL OF MATERIALS FOR 130-26468-85 DIE CUT FRAME GEN 2
                   EFFECTIVE DATE 29-MAR-91


     ITEM NUMBER              DESCRIPTION          U/M   QUANTITY
  42 TORR- 12-     TRA-815 TORR THRUST RACE         EA       2
  43 TORR- 64-     B-66 BEARING                     EA       2
  44 TORR- 77-     BEARING BH3316                   EA       2
  45 TORR- 79-     ROLLER BEARING J-2416            EA       2
```

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Franklin Model 164 Instructions

SECTION A-A

DIE CUT FRAME ASSY.

FRANKLIN MANUFACTURING CO.
NORWOOD, MASS 02062
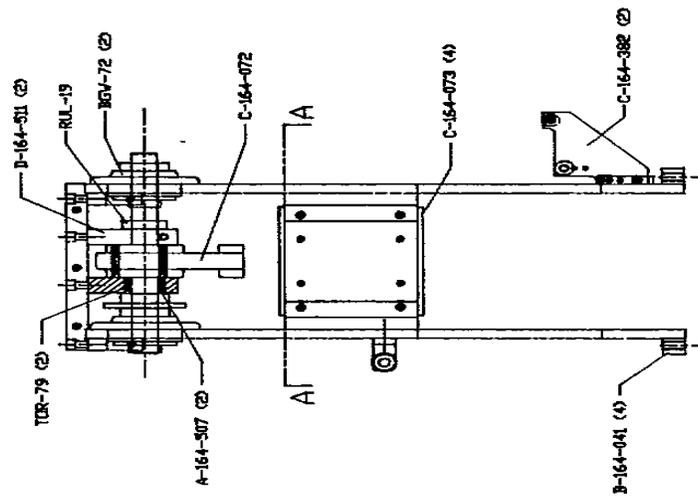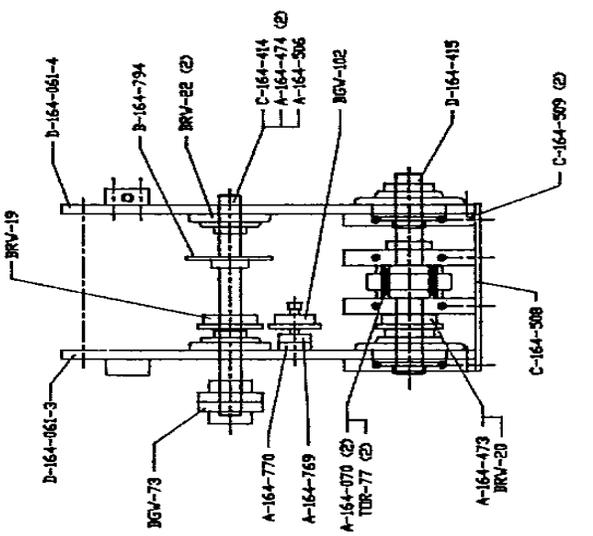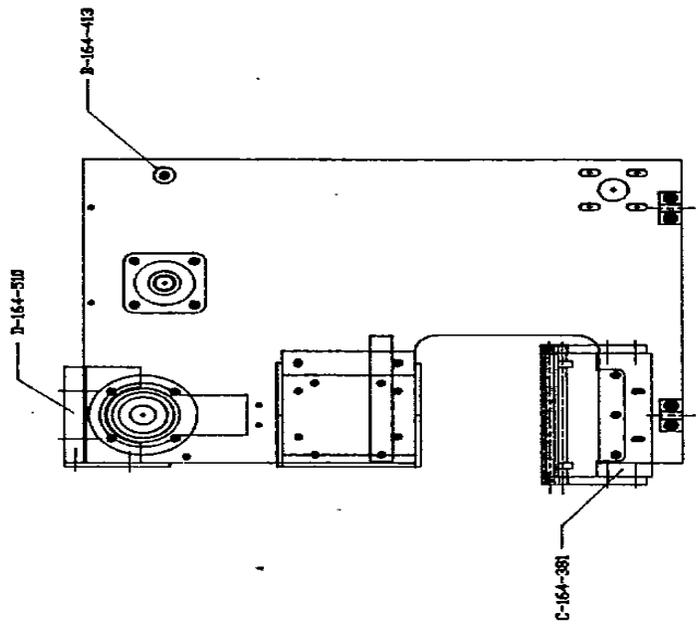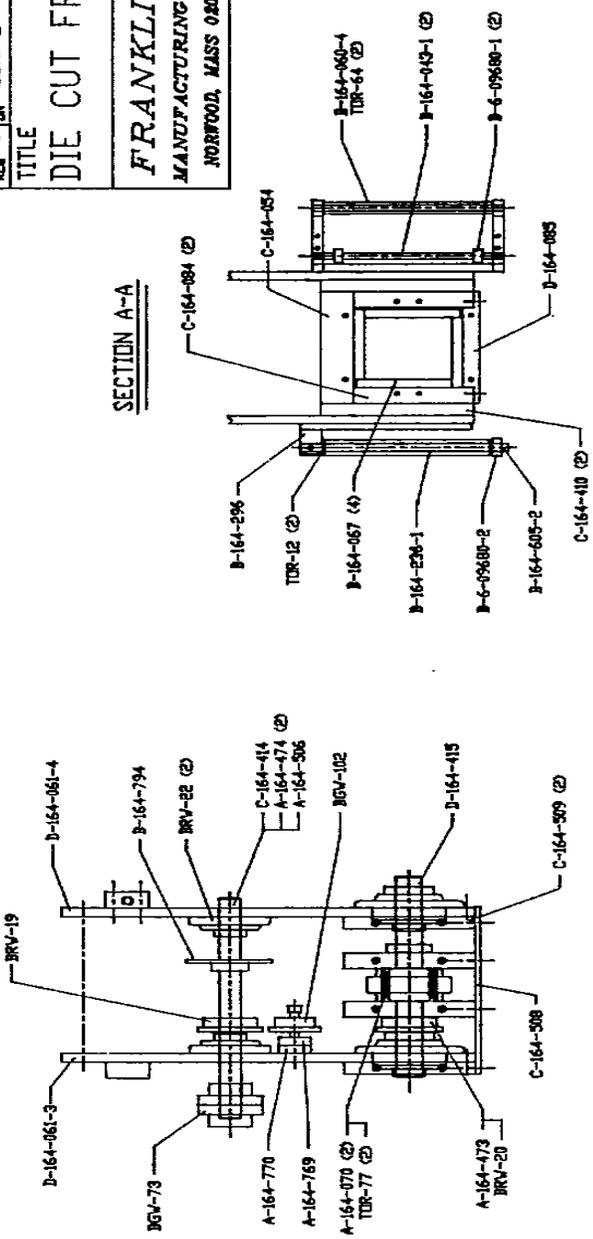
130-26468-85

Franklin Model 164 Instructions

<pre>
            FRANKLIN MANUFACTURIMNG CORP.   PG 1
  BILL OF MATERIALS FOR 130-26468-86 FRAME ASSY 2 HEADER 6X8
                  EFFECTIVE DATE 06-AUG-92

   ITEM NUMBER   DESCRIPTION   U/M QUANTITY
 1 116- 156-   TIE DOWN STRAP LARGE   EA   4
 2 164- 210-   RIGHT BASE PLATE   EA   1
 3 164- 431-   LEFT BASE PLATE 6X8 HEAD   EA   1
 4 164- 928-   2 HEAD MACHINE FRAME   EA   1
 5 164- 992-   PARTITTION GUARD PALTE   EA   2
 6 164- 1014-   CLOSURE PLATE   EA   1
 7 164- 1017-   STANDOFF   EA   1
 8 HFM- 32-   HOFF PANEL ADAPT F-44GPA   EA   1
 9 SOU- 6-   T-HANDLE E3-41-15   EA   1
10 VLI- 2-   P304S LEVELING PAD VLIER   EA   4
</pre>

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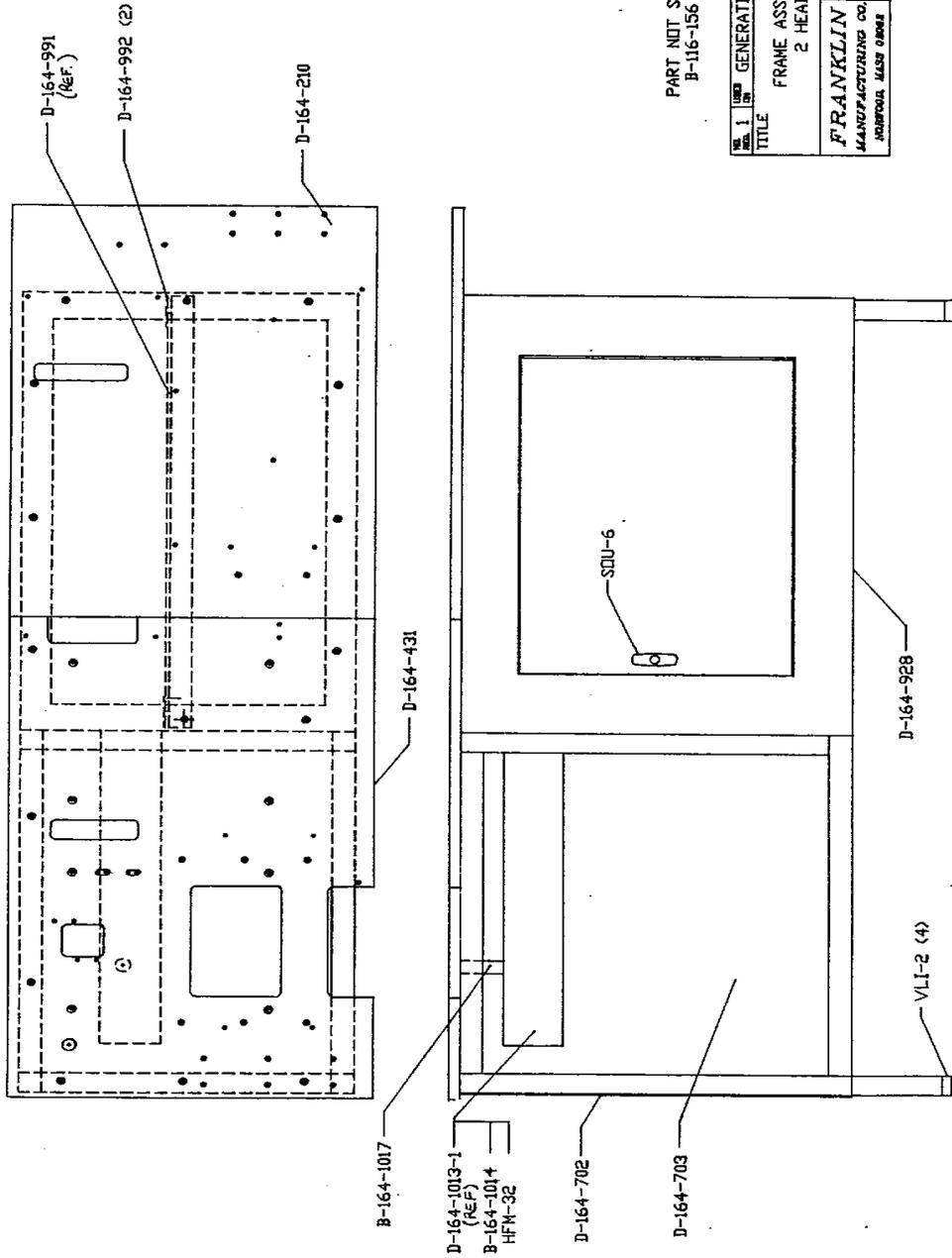
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B-116-156 (4)

GENERATION 2

TITLE
FRAME ASSEMBLY
2 HEAD

FRANKLIN
MANUFACTURING CO.

4/15/91

130-
26468-86

D-164-991 (REF.)

D-164-992 (2)

D-164-210

D-164-431

SDU-6

D-164-928

VLI-2 (4)

B-164-1017

D-164-1013-1 (REF.)

B-164-1014

HFM-32

D-164-702

D-164-703

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Franklin Model 164 Instructions

```
           FRANKLIN MANUFACTURIMNG CORP.              PG 1
     BILL OF MATERIALS FOR 130-16401-13 SLITTER ASSEMBLY
                  EFFECTIVE DATE 07-SEP-8


   ITEM NUMBER            DESCRIPTION          U/M   QUANTITY
 1 164- 370-     FRONT SLITTER SUPPORT          EA      1
 2 164- 371-     SLITTER SHAFT                  EA      1
 3 164- 372-     BLADE HOLDER                   EA      3
 4 164- 373-     BLADE CAP                      EA      3
 5164-529-       REAR SLITTER SUPPORT MONROE    EA      1
 6 MON- 4-       HANDLE 28102                   EA      1
```

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B-164-529

B-164-372 (3)

B-164-373 (3)

B-164-371

B-164-370

MON-4
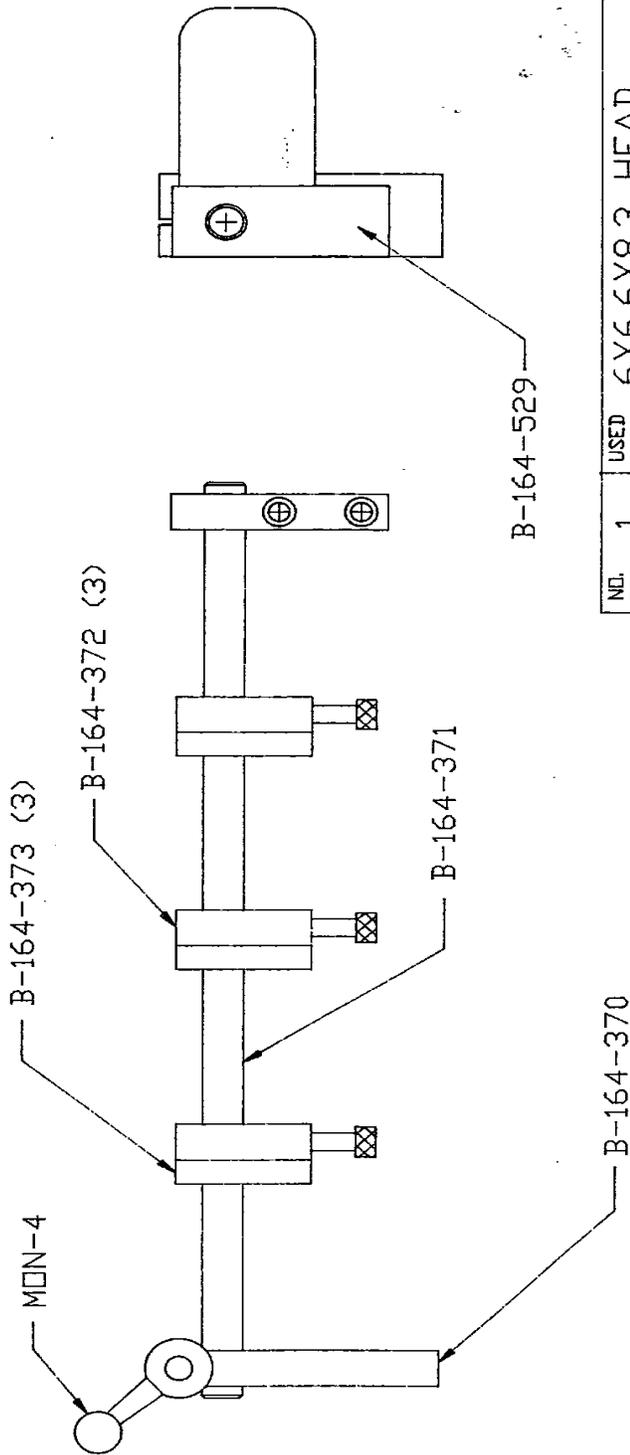
NO. REQ.	1	USED ON	6X6,6X8,3 HEAD
TITLE	SLITTER ASSEMBLY		

FRANKLIN
MANUFACTURING CO,
NORWOOD, MASS 02062

DR.	D.B.	DATE	9/18/89

130-
16401-13

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Franklin Model 164 Instructions

BILL OF MATERIALS FOR 130-26468-10 FOILPULL ASSY GEN 2

EFFECTIVE DATE 06-AUG-92

ITEM NUMBER		DESCRIPTION	U/M	QUANTITY
1	6-05500-	REROLL RETENSION SLIDE	EA	2
2	6-09680- 1	3/8 CLAMP COLLAR 6S	EA	1
3	6-09680- 2	CLAMP COLLAR 1/2" ID 1-1/8 PART # 8S	EA	1
4	130-16416-12	SHTR/STKR MTR ASSY	EA	1
*	BOD- 2-	#459 NC1-11D3 MOTOR 115V ORDER W/ C/D-2	EA	1
*	C/J- 7-	P304-CCT-L BEAU PLUG	EA	1
5	140- 286- 4	ROLLER	EA	1
6	164- 182- 1	FELT DISC	EA	1
7	164- 197-	IDLER ROLLER	EA	1
8	164- 199-	IDLER ROLLER SHAFT	EA	2
9	164- 236- 2	GUIDE ROLLER KNURLED	EA	1
10	164- 300- 1	ARM, WRAP ROLLER	EA	1
11	164- 392-	LOCK NUT	EA	1
12	164- 408-	SLIDE, GUIDE	EA	1
13	164- 436-	GUIDE ROD	EA	2
14	164- 437-	CONNECTING BAR	EA	1
15	164- 439-	BLADE ANCHOR PLATE	EA	1
16	164- 440-	STATIONARY BLADE	EA	1
17	164- 442-	CONNECTOR PLATE	EA	1
18	164- 443-	TOP PLATE, BLADE ADJ	EA	1
19	164- 447-	CHUTE	EA	1
20	164- 455-	SUPPORT ROD, CHUTE	EA	2

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Franklin Model 164 Instructions

BILL OF MATERIALS FOR 130-26468-10 FOILPULL ASSY GEN 2
EFFECTIVE DATE 06-AUG-92

ITEM NUMBER	DESCRIPTION	U/M	QUANTITY
21 164- 459-	SPACER CONN BAR	EA	1
22 164- 461-	GUARD SIDE HINGED	EA	1
23 164- 462-	GUARD FRONT	EA	1
24 164- 463-	GUARD BACK	EA	1
25 164- 464-	GUARD TOP	EA	1
26 164- 497-	SPRING CKIP, CHUTE	EA	1
27 164- 512-	GUILLOTINE ASSEMBLY	EA	1
* 164- 441-	GUILLOTINE BLADE	EA	1
* 164- 469-	GUILLOTINE EDGE, LABEL SH	EA	1
28 164- 515- 1	SIDE PLATE R H STAKCER	EA	1
29 164- 515- 2	SIDE PLATE L H STAKCER	EA	1
30 164- 524-	ROLLER SUPPORT	EA	1
31 164- 525-	SLIDE PLATE	EA	1
32 164- 527-	CHUTE WALL NUT PLATE	EA	1
33 164- 528-	ADJ WALL CHUTE	EA	1
34 164- 530-	MOTOR MOUNTING PLATE	EA	1
35 164- 535-	STANDOFF	EA	2
36 164- 538-	RUBBER DRIVE ROLLER	EA	1
37 164- 539-	DRIVE SHAFT	EA	1
38 164- 545-	BLADE GUARD	EA	1
39 164- 546-	SPACER BLADE ADJ PLATE	EA	1
40 164- 645-	ADJ IDLER BLOCK	EA	1
41 164- 646-	DRIVE PULLEY	EA	1
42 164- 647-	BELT GUARD	EA	1

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Franklin Model 164 Instructions

BILL OF MATERIALS FOR 130-26468-10 FOILPULL ASSY GEN 2
EFFECTIVE DATE 06-AUG-92

ITEM NUMBER		DESCRIPTION	U/M	QUANTITY
43	164-1324-	CLUTCH	EA	1
44	164- 1327-	PRESSURE PALTE	EA	1
45	164- 1328-	ADJ SCREW MOUNT	EA	1
46	164- 1329-	DRIVE SHAFT	EA	1
47	164- 1330-	ADJUSTMENT SCREW	EA	1
48	164- 1331-	PINCH GUARD	EA	1
49	FAB- 12-	PANCAKE FABCO CYL E-121-X	EA	1
50	S/D- 2	TIMING BELT PULLEY 6A316DF 03712	EA	2
51	S/D- 10-	6B3-080037 TIMING BELT	EA	1
52	S/D- 13-	6A3-21DF03712 PULLEY	EA	1
53	S/D- 14-	A6B3-120037 TIMING BELT	EA	1
54	S/D- 15-	6A3-40NF03712 TIMING BELT	EA	1
55	TOM- 19-	THOMSON SUPER 6 BALL RUSH	EA	1
56	TOR- 10-	NTA-915 TORR THRUST BRG	EA	4
57	TOR- 12-	TRA815 TORR THRUST RACE	EA	2
58	TOR- 15-	NTA-613 THRUST BRG TORR.	EA	48
59	TOR- 48-	TRA-613 THRUST RACE TORR	EA	16
60	TOR- 64-	B-66 BEARING	EA	11
61	QAL- 14-	RET RING WALDES 5555-37	EA	2
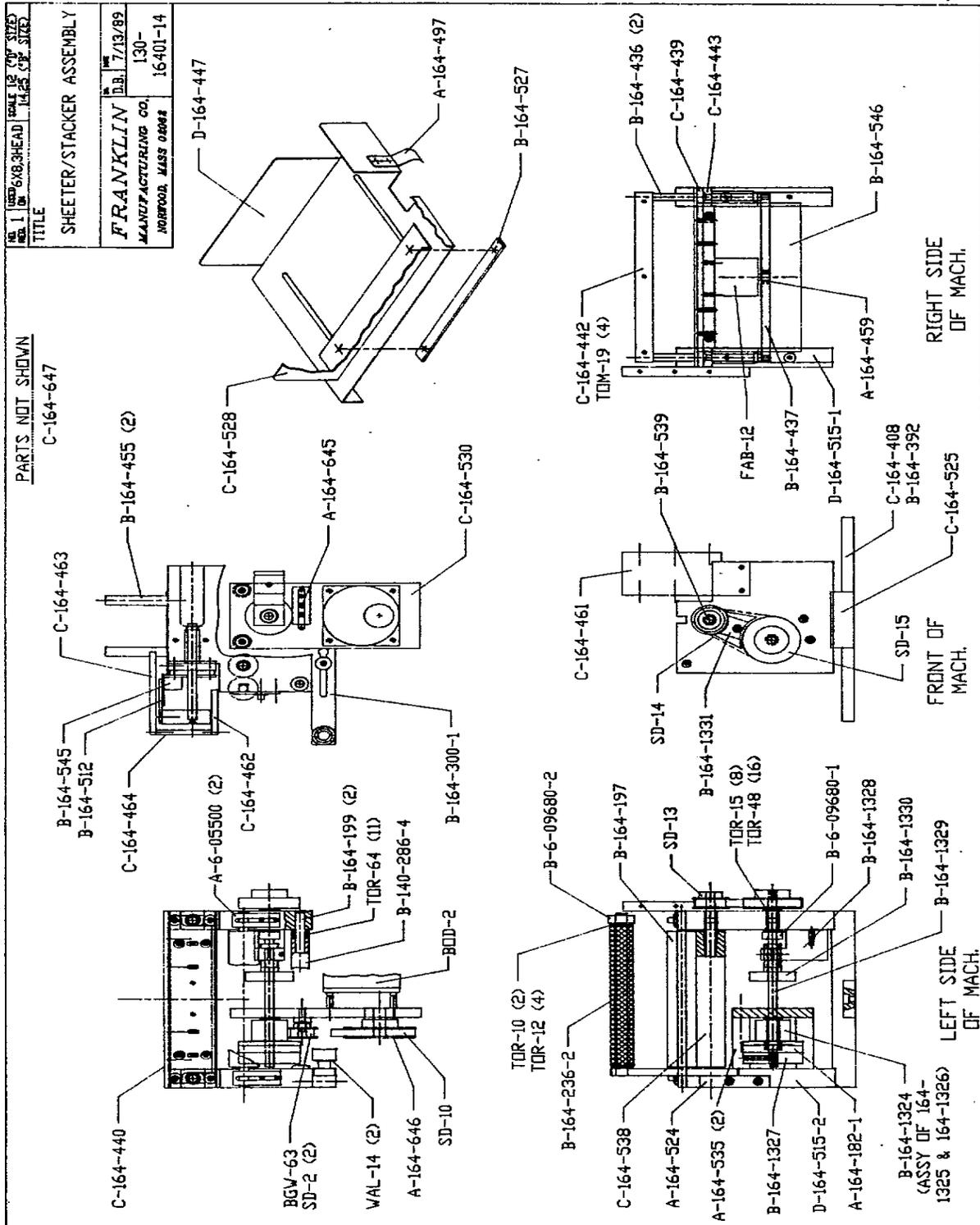
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Franklin Model 164 Instructions

SHEETER/STACKER ASSEMBLY

FRANKLIN
MANUFACTURING CO.
NORWOOD, MASS 02062

PARTS NOT SHOWN
C-164-647

RIGHT SIDE
OF MACH.

FRONT OF
MACH.

LEFT SIDE
OF MACH.

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Franklin Model 164 Instructions

BILL OF MATERIALS FOR 130-26401-15 ELEC APPL SHTR/STKR GEN 2
EFFECTIVE DATE 13-FEB-92

ITEM NUMBER	DESCRIPTION	U/M	QUANTITY
1 164- 532-	MANIFOLD	EA	1
2 A/W- 1-	BN-28 ALLIED W.MUFFLER1/4	EA	2
3 C/J- 3-	P302CCT-L CINCH CONNECTOR	EA	1
4 FAB- 6-	FVS-52 FABCO VALVE	EA	1
5 FES- 1-	GR 1/8 FESTO FLOW CONTROL W/2 ADAPTERS EA #9395	EA	2
6 IMP- 1-	IMP EAST 298P04X02 CONN	EA	2
7 S/C- 1-	650DC-2 NO SUB BRIDGEPORT	EA	1
8 WTS- 14-	QUBE #F35-02AH FILTER 1/4" WATTS	EA	1
9 WTS- 15-	QUBE #R35-02CG REGUALTOR 1/4" WATTS	EA	1
10 WTS- 16-	QUBE #L35-O2A LUBRICATOR 1/4" WATTS	EA	1
11 WTS- 23-	END PLATES PK3530-02 WATTS FRL 35 SERIES	EA	1
12 WTS- 29-	DIVERT BLOCK DK3510-3-2	EA	1

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Franklin Model 164 Instructions

BILL OF MATERIALS FOR 130-16403-23 ELECTRIC EYE MOUNTING ASY
EFFECTIVE DATE 07-MAR-89

ITEM NUMBER	DESCRIPTION	U/M	QUANTITY
1 164- 286-	EYE MOUNTING PLATE	EA	1
2 164- 763-	MOUNTING BLOCK	EA	1
3 DAT- 1-	DATALOGIC SR202 SENSOR	EA	1

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B-164-286
(SEE DWG 130-16403-26)

A-164-763

DAT-1

NO. REQ.	USED ON	
1	6X6,6X8,3 HEAD	
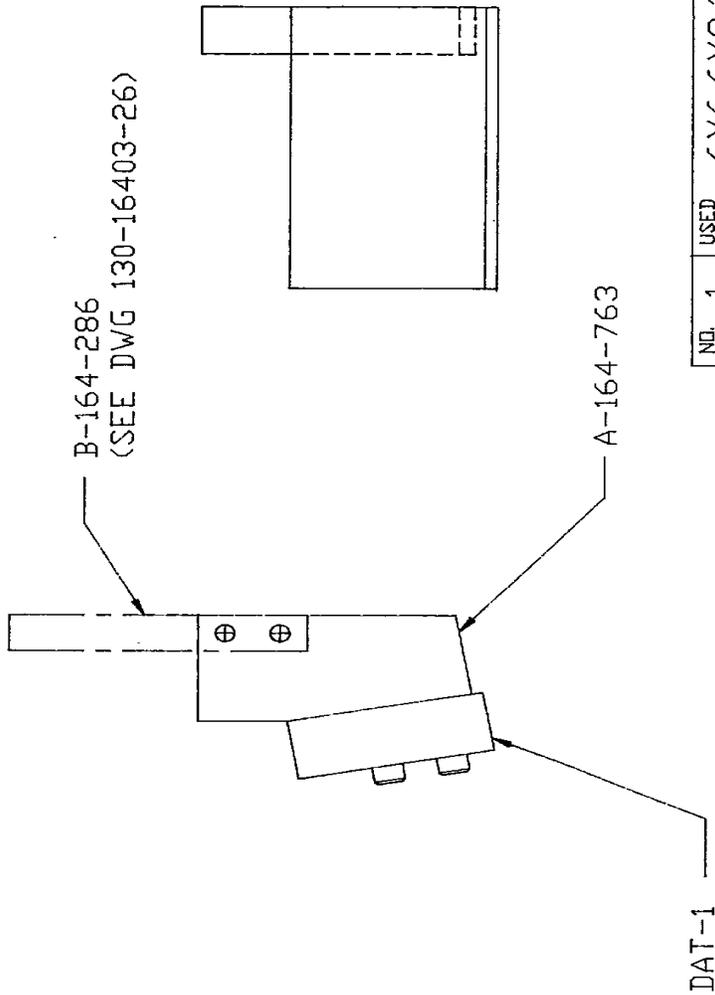
TITLE
ELECTRIC EYE & MOUNTING BLOCK ASSY.

DR.	DATE
D.B.	9/26/89

130-16403-23

FRANKLIN
MANUFACTURING CO.
NORWOOD, MASS 02062

IMPORTANT NOTES FOR ORDER ENTRY

1. HARDWARE NEEDED FOR THE ASSY.
8-32 S.H.C.S. X 3/4 LG. (4)
8-32 FLATWASHER (4)

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Franklin Model 164 Instructions

```
          FRANKLIN MANUFACTURIMNG CORP.                    PG 1
   BILL OF MATERIALS FOR 130-16403-21 RLLR ASY (DAT-A) ELEC EYE
                    EFFECTIVE DATE 07-MAR-89


    ITEM NUMBER              DESCRIPTION          U/M   QUANTITY
1 164- 219-      RUBBER ROLLER SHAFT              EA       1
2 164- 236- 1    GUIDE ROLLER                     EA       1
3 164- 765-      SINGLE ROLLER BRACKET            EA       1
4 WAL- 10-       RET RING TRUARC 5555-50          EA       1
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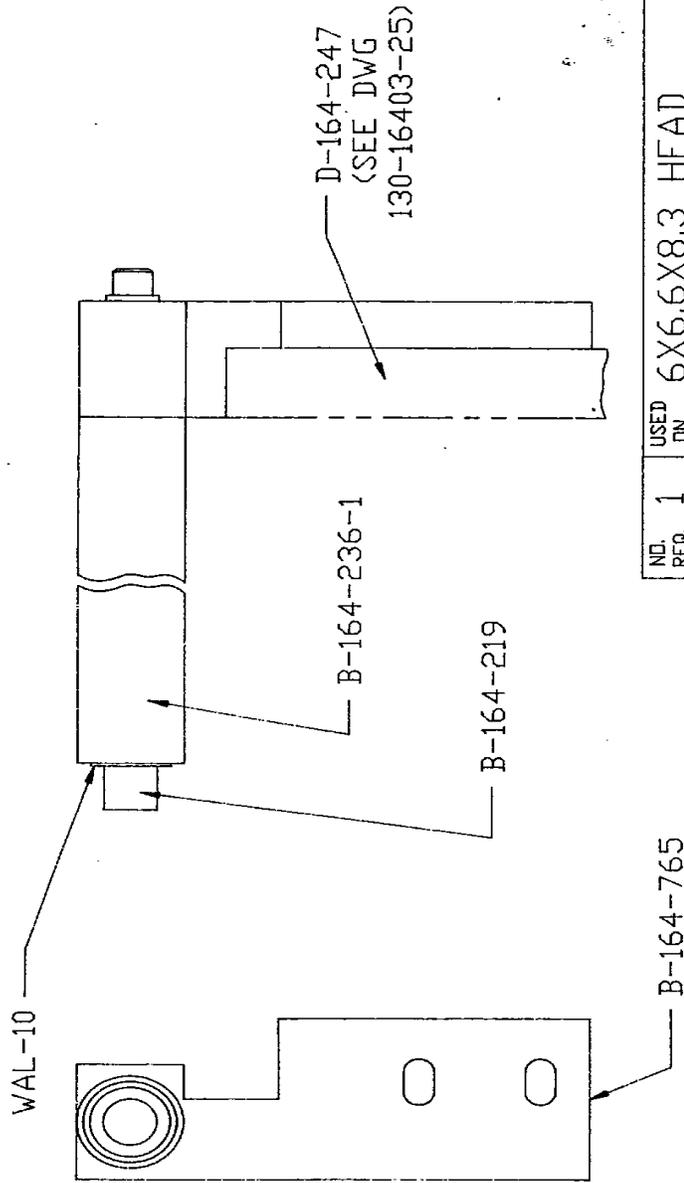
ROLLER ASSEMBLY
DAT-1 ELECTRIC EYE

USED ON: 6X6,6X8,3 HEAD
NO. REQ. 1

FRANKLIN MANUFACTURING CO.
NORWOOD, MASS 02062

DR. D.B. DATE 9/26/89
130-16403-24

D-164-247
(SEE DWG 130-16403-25)

B-164-236-1

B-164-219

B-164-765

WAL-10

IMPORTANT NOTES FOR ORDER ENTRY

1. ALSO NEEDED WITH THIS ASSY:
   ELEC. EYE MNTG. BLK. ASSY 130-16403-26
2. HARDWARE NEEDED FOR THIS ASSY.
   1/4-20 S.H.C.S. X 1" LG.
   1/4-20 S.H.C.S. X 3/4 LG. (2)
   1/4 DIA. FLATWASHERS (3)

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Web Site afmeng.com

Franklin Model 164 Instructions

ITEM NUMBER	DESCRIPTION	U/M	QUANTITY
1 124- 061-	ELEC EYE GIB BLOCK	EA	1
2 124- 062- 2	DOVETAIL (10X15)(12X24)	EA	1
3 164- 286-	EYE MOUNTING PLATE	EA	1
4 164- 289-	ADJ EYE PLATE	EA	1
5 SIC- 1-	SICK NT8-02 PHOTO SCANNER WITH #24 LENS & LIGHT BULB 1000-241	EA	1

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B-164-289

B-124-062-2

SIC-1

C-164-061

B-164-286

DOWEL PINS (2)

NYLON THUMBSCREW

NO. REQ. 1	USED ON	6X6,6X8,3 HEAD	

TITLE

ELECTRIC EYE ASSEMBLY

FRANKLIN

D.B.	DATE 9/21/89

130-16403-26

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Franklin Model 164 Instructions

ITEM NUMBER	DESCRIPTION	U/M	QUANTITY
1 6-09680-6	1 PC STEEL SPLIT HOLOCHRO #15006	EA	1
2 130-16403-27	PAPER SUPPLY GUIDE SYSTEM	EA	1
* 6-09680-2	CLAMP COLLAR 1/2" 1D 1-1/8 PART # 8S	EA	15
* 10- 089-	FRONT FOIL GUIDE SPRING	EA	1
* 164- 147-	CORE LCOK	EA	1
* 164- 182- 2	FELT DISC	EA	1
* 164- 218-	DANCER SUPPORT SHAFT	EA	1
* 164- 220-	END BLOCK SUPPORT	EA	2
* 164- 223-	DANCER LINKAGE	EA	1
* 164- 225-	ADJ KEY BLOCK	EA	1
* 164- 226-	END SUPPORT DANCER ARM	EA	1
* 164- 227-	KEY SUPPOR BLOCK	EA	1
* 164- 228-	DRIVE CAM	EA	1
* 164- 229-	CAM DRIVE ARM	EA	1
* 164- 232-	DRIVE DISC	EA	1
* 164- 235-	ADJ SCR SUPPLY ROLLER	EA	1
* 164- 236- 1	GUIDE ROLLER	EA	8
* 164- 243- 1	SUPPLY ROLLER	EA	1
* 164- 244-	SUPPLY SHAFT	EA	1
* 164- 248-	SUPPLY SUPPORT ARM	EA	1
* 164- 280-	CAM PRESS RING	EA	1
* 164- 281-	DRIVE CAM SUPPORT RING	EA	1

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Franklin Model 164 Instructions

ITEM NUMBER	DESCRIPTION	U/M	QUANTITY
* 164- 282-	STATIONARY FRICTION DISC	EA	1
* 164- 301-	TENSION NUT	EA	2
* 164- 302-	PIN DANCER ARM	EA	1
* 164- 303-	PAPER SUPPLY KEY	EA	1
* 164- 304-	SUPPLY SUPPORT HUB	EA	1
* 164- 305-	DANCER ARM	EA	1
* 164- 331-	TENSION SPRING	EA	6
* 164- 356-	COUNTERWEIGHT	EA	1
* 164- 357-	COUNTERWEIGHT ARM	EA	1
* 164- 465-	COUNTERWWEIGHT	EA	1
* 164- 603-	MOVING SUPPORT PLATE	EA	1
* 164- 604-	ELEC EYE BOT GUIDE ROD	EA	2
* 164- 605- 2	ROLLER SHAFT 9.50	EA	5
* 164- 605- 4	ROLLER SHAFT 9.50 W/TAP H	EA	2
* 164- 605- 5	ROLLER SHAFT	EA	3
* 164- 606-	DOVETAIL SUPPORT ELEC EYE	EA	1
* 164- 607-	BASE PLATE ELEC EYE	EA	1
* 164- 608-	END PLATE ELEC EYE	EA	2
* 164- 609-	ROLLER SUPPORT ARM	EA	1
* 164- 610-	BEARING BLOCK	EA	2
* 164- 611-	SUPPLY ROLLER SIDE PL LH	EA	1
* 164- 667-	ELEC EYE MOUNT TOP	EA	1
* 164- 668-	NUT PLATE	EA	1
* 164- 669-	RH SUPPLY ROLLER SIDE PL	EA	1

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Franklin Model 164 Instructions

	ITEM NUMBER	DESCRIPTION	U/M	QUANTITY
*	164- 698-	DEFLECTION BRACKET	EA	1
*	BGW- 9-	TB-410 THRUST BEARING	EA	9
*	BGW- 79-	BGW BEARING B-46-2	EA	2
*	BGW- 87-	FB-68-3 BRONZE BUSHING	EA	2
*	MON- 1-	MONRONE KNOB # 29612	EA	2
*	TOM- 3-	A162536 THOMSON BALL BUSH	EA	4
*	TOR- 7-	NTA 1220 THRUST BEARING	EA	2
*	TOR- 24-	TRA-1220 TOR.THRUST RACE	EA	4
*	WAL- 4-	5100-150 RETAIN.RING .042	EA	8
*	WAL- 11	RETAINING RING 5555-25	EA	2
3	130-16403-28	PAPER SUPPKY TRACK-RITE	EA	1
*	164- 236- 3	GUIDE ROLLER	EA	3
*	164- 571-	GUIDE ROD TRACK RITE	EA	2
*	164- 572-	CONTROL MOUNT	EA	1
*	164- 574-	BEARING BLOCK, TRACK RITE	EA	4
*	164- 576-	ADJUSTNG SCREW	EA	1
*	164- 577-	CLAMP ADJ SCREW	EA	1
*	164- 612-	SUPPLY ARM SUPPORT BLOCK	EA	2
*	164- 613-	CLAMP TRACK RITE	EA	1
*	164- 614-	END LOCK GUIDE SHAFT	EA	4
*	164- 615-	MOVING PLATE TRACK RITE	EA	1
*	164- 616- 1	SIDE PLATE TRACK RITE RH	EA	1
*	164- 616- 2	SIDE PLATE TRACK RITE LH	EA	1
*	164- 685-	MOUNTING PLATE	EA	1

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Franklin Model 164 Instructions

BILL OF MATERIALS FOR 130-16403-29 TRACK-RITE COMPLETE SYS.
EFFECTIVE DATE 07-JUL-93

ITEM NUMBER	DESCRIPTION	U/M	QUANTITY
* ACI- 1-	800 ACTUATOR CONTROLLER	EA	1
* ACI- 2-	15" QUICK ADJUST ASSEMBLY	EA	1
* TOM- 3-	A162536 THOMSOM BALL BUSH	EA	4
* WAL- 4-	5100-150 RETAIN.RING .042	EA	8
4 164- 774-	POST MTNG BLOCK	EA	1
5 164- 775-	ROLLER POST BLOCK	EA	1
6 164- 776-	ROLLER POST	EA	1
7 164- 1092-	DOWEL SUPPORT BLOCK	EA	1
8 164- 1093-	BEARING SUPPORT BLOCK	EA	1
9 BGW- 29-	B46-4 BRONZE BUSHING	EA	2
10 TOR- 10-	NTA-815 TORR THRUST BRG	EA	22
11 TOR- 12-	TRA-815 TORR THRUST RACE	EA	44

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TRACK RITE ASSY.

FRANKLIN
MANUFACTURING CO.
NORWOOD, MASS 02062

Franklin Model 164 Instructions

Franklin Model 164 Instructions

TOOLS REQ.

HEATERS 500 WATTS EACH

FRANKLIN
MANUFACTURING CORPORATION
NORWOOD, MASS. 02062

REV.

unless otherwise specified
1 fig. beyond dec. point ±.030
2 fig. beyond dec. point ±.015
3 fig. beyond dec. point ±.005

All angular dimensions ±½ degree
All finish 63√

Break all sharp corners & edges max .015
Remove all burrs
Dim. boxed indicates 100% inspection

☐ Protect against oxides prior to storage
☐ Package prior to storage

USED ON ASS'T NO.		TITLE OPTIONAL TEMPERATURE CONTROL		
		TREATMENT		
MATERIAL				
		DR. BY. DB	DATE 12/21/86	NO. REQ.
		PROJ. ENG.	DATE	B- EC-756 B
		CH. BY.	DATE	SCALE

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◖yrelec

Syrelec Corporation 2727 No. Grandview Blvd.
Waukesha, Wisconsin 53188
1-414-549-9209   1-800-447-8741

**1000 SERIES
Installation & Operating
Instructions**

1000 P1, 1000 P2, 1000 T2

INTRODUCTION

The Syrelec 1000 Series is available with one or two presets for count or rate control. They provide an output at the end of a cycle and also a prewarn output from the 1000P2 and 1000T2. Outputs consist of a SPDT 1A-250V resistive relay(s) and 30V-40ma NPN open collector transistor(s). Controls can be programmed via DIP switches on each side to count or time Up (reset to zero mode) or Down (reset to preset mode). When count or time values coincide with preset values, the control outputs will operate. Operation can be in Single or Repeat cycle mode. In Single cycle, the outputs remain ON until the control is reset. In Repeat cycle, the outputs operate for an adjustable time between .1 and 1 second. Reset can be automatic, front panel and/or remotely initiated. In the Single cycle mode, an additional feature is the ability to eliminate count over-run through the use of count "Blocking".

Six digits of 8mm, .315" LCD (liquid crystal display) with leading zero blanking are provided. Three different decimal point locations are DIP switch selectable. When programmed in the "Time" mode, four ranges are available. Times from .01 seconds to 9999.99 minutes (up to 166.67 hours) are selectable. Count speed is 800 Hz from a wide variety of input devices.

DECIMAL POINTS:	None	999999
	Tenths	99999.9
	Hundredths	9999.99
	Thousandths	999.999
SELECTABLE TIME RANGES:	99H-59M-59S	
	9H-59M-59.9S	
	99M-59.99S	
	9999.99M	

SPECIFICATIONS

Electrical

Power	115/230 VAC ± 10%
	24/48 VAC ± 10%
	50/60 Hz, 6VA or
	12/24 VDC + 15% − 10%
	1.2W for 12 VDC
	2.4W for 24 VDC
Input A	Count Input
Pulse Width	100µs ON
	1.15ms OFF
Input B	Count Direction UP or Down Input
Pulse Width	Same as Input A
Input Impedance	
A & B	1K ohm selected
High	2.5 to 8V
Low	1V
Input Impedance	4.7K ohm selected
High	4.5V to 30V
Low	2V
Count Speed	800 Hz High Speed
	30 Hz Low Speed
Reset & Inhibit Input	5ms ON
Impedance	6.8K ohm
High	5V to 30V
Low	.7V
Timer Accuracy	± 50 parts per million
Relay	Form C
	2 Amp @ 125 VAC
	1 Amp @ 250 VAC (resistive)
Transistor	Open Collector NPN
	30 VDC Max.
	40ma Max.

Output Timing	.1 to 1 second
BCD Output	400 Hz bi-directional-see details in BCD output Section of Gen. Catalog
Power Output	8V ± 10%, 20ma
	24V + 10% - − 20%, 35ma with nominal line voltage
Battery	Nickel Cadmium
	1500 Hours with full charge
	Recharge Time 48 Hours

Physical

Display	6 digit, 8mm, .315" LCD with leading zero blanking
Case material	ABS (cycolac KJB)
Bezel Material	Zamak, alloy (zinc) Silicon Rubber Push Button
Front Panel Rating	Nema 12 when mounted according to instructions. Nema 4 with Boot 1021
Connections	Screw terminal for 16 gauge wire
Operating Temp	32 to 122°F (− 0 to 50°C)
Storage Temp	14 to 122°F (− 10° to 50°C)
Operating Humidity	85% non-condensing

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Franklin Model 164 Instructions

SELECTING OPERATING MODES

Set the DIP switches on each side of the control in either the "ON or OFF" position according to the following:

Switch #1: Input Frequency Response
On: Input A pulse rate 30 Hz. This position should be used whenever possible to increase the noise immunity of the count input.
Off: Input A pulse rate 800 Hz. This position must be used when input pulse rates exceed 30 Hz.

Switch #2: Battery On/Off
On: The internal nickel-cadmium battery is connected to the memory and charging circuit. The battery is trickle charged whenever AC power is applied. When AC power is removed and the battery is charged, the display remains on and all decimal points turn on. The control does not operate in this mode, however, preset and count values will be retained for up to 1500 hours.
Off: Disconnects internal battery from memory. This position is used for storage of the control. Count and preset values are lost when power is removed.

Switch #3: Transducer Voltage Output
On: 8V @ 20ma
Off: 24V @ 35ma

Switch #4: A Input Impedance
On: 1Kohm (use with 8V sensor)
Off: 4.7Kohm (use with 24V sensor)

Switches 5 through 12 not used in 1000T2

Switch #5: B Input Impedance
On: 1K ohm (use with 8V sensor)
Off: 4.7K ohm (use with 24V sensor)

Switch #6: Manual or Auto Recycle
On: Auto Recycle
Off: Manual Recycle

Switch #7: Reset to Zero or Preset Value
On: Reset to Zero
Off: Reset to Preset Value

Switch #8: Count Blocking (Manual Reset Mode Only)
On: Control continues to count or time when Output I in 1000P1 or Output II in 1000P2 is on.
Off: Control blocks count or time when Output I in 1000P1 or Output II in 1000P2 is ON.

Switch #9, 10: Selects counter decimal point or timer range.

DEVICE FUNCTION	DIP SWITCH 9	10	COUNT OR TIMER RANGE	TIMING INCREMENTS
Timer Mode Switch 11 Off	On	On	99H-59M-59S	1 sec.
	On	Off	9H-59M-59.9S	0.1 sec.
	Off	Off	99M-59.99S	0.01 sec.
	Off	On	9999.99M	0.01 min.
			DECIMAL POINT	
Count Mode Switch 11 On	On	On	999999	.
	Off	On	99999.9	
	On	Off	9999.99	
	Off	Off	999.999	

Switch #11: Selects counter or timer mode
On: Count Mode
Off: Timer Mode

Switch #12: Not Used

FRONT PANEL
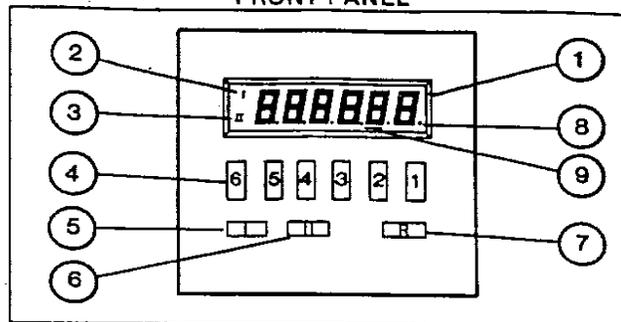
① 6-Digit, 7-Segment LCD. Used to display count or preset values.

② Preset I/Output I Indicator. Flashes when Preset I is being interrogated or changed. Turns off when Output I is on.

③ Preset II/Output II Indicator. Flashes when Preset II is being interrograted or changed. Turns off when Output II is on.

④ Digit Select Keys. Used in conjunction with the "I" or "II" keys to enter preset values. When pressed, the corresponding digit is incremented approximately twice per second.

⑤ Preset I key. Displays "next Preset I" for interrogration or modification.

⑥ Preset II key. Displays "next Preset II" for interrogration or modification.

⑦ Reset Key. Transfers "next preset" values into corresponding "current preset" registers. Also resets or presets the counter, depending on mode selected.

⑧ Transfer Indicator. Indicates that a new preset has been entered in the "next preset" register and has not been transferred to the "current preset" register.

⑨ Cursor. Indicates which digit is currently being changed.

CHANGING PRESET VALUES I & II

To change Preset I, press and hold the "I" key. The "next preset" value is displayed (same as the "current preset" value if the decimal point in the lower right corner is not lit). The corresponding indicator in the upper left corner of the display flashes.

To change any digit to a new value, press the key under that digit. A cursor appears under the digit being changed. The digit advances approximately twice per second while the key is pressed. To change Preset II, press and hold the "II" key and repeat the above steps. New preset values are transferred to the "current Preset" register:

1. By actuation of the front panel reset or remote reset input.

2. Automatically at coincidence when in the auto recycle mode.
   - A new preset value which hasn't been transferred is indicated by a decimal point on the right of the least significant digit.
   - Automatic transfer does not occur if the "I" or "II" key is being pressed.

The next Preset I and II may be modified from the keyboard without affecting the current preset values. New preset values can therefore be entered while a machine cycle is in process.

Operating Instructions

SICK
optik
elektronik

NT 8
Registration Control Scanner

Franklin Model 164 Instructions

T 3104/1
see Table 4
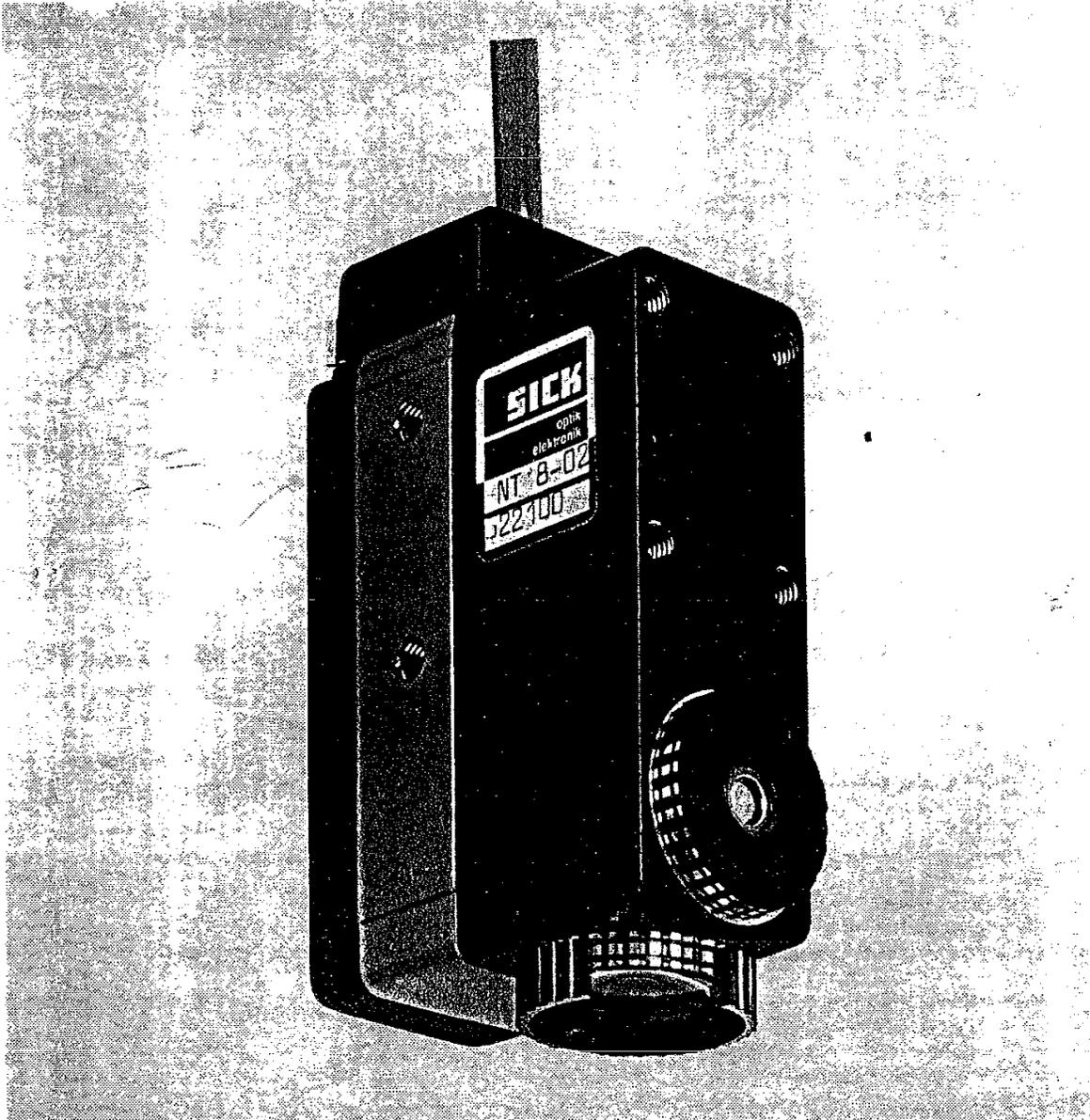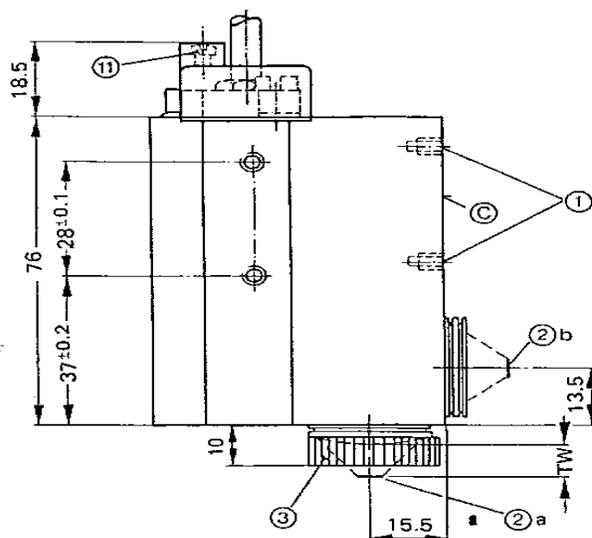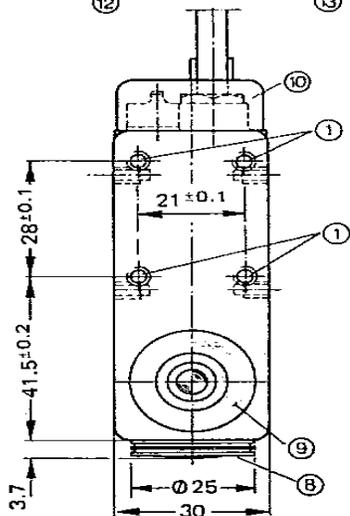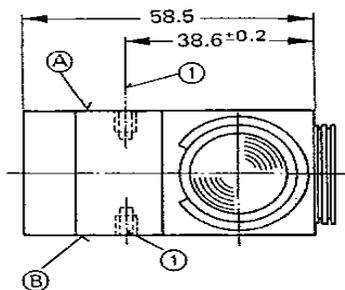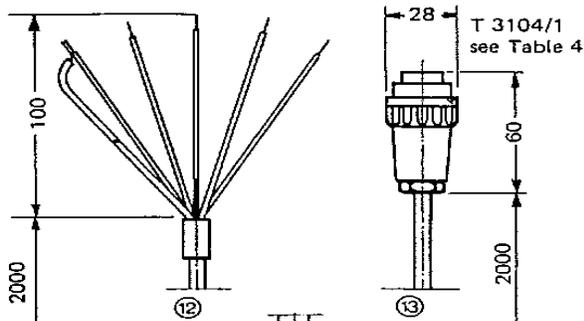
TW = operating range
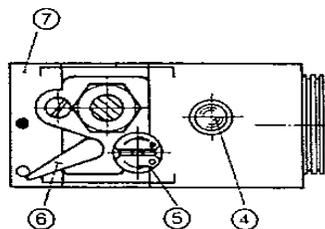
① Mounting holes, M5 x 5 mm deep
② Scanning plane, a or b (according to lens position)
③ Sunshield, adjustable/removable
④ Status indicator light
⑤ Sensitivity control
⑥ Light/dark selector
⑦ Lamp housing (remove when replacing lamp)
⑧ Objective lens (shown without sunshield) }
⑨ Desiccant   } interchangeable
⑩ Switch cover
⑪ Quick-release fastener
⑫ Connecting cable with crimp contacts
⑬ Connecting cable with connector plug

Ⓐ Ⓑ Ⓒ Mounting surfaces

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Franklin Model 164 Instructions

ELECTRICAL INSTALLATION

TERMINAL ASSIGNMENTS

COUNT INHIBIT
REMOTE RESET
UP/DOWN INPUT B
COUNT/TIME INPUT A

PREWARN OUTPUT
END OF CYCLE STATIC OUTPUT
SENSOR SUPPLY + [8 V 20 mA or 24 V 35 mA]
DC COMMON

0.1 to 1s ADJUSTABLE
TIME OF THE SIGNAL
AT THE END OF CYCLE
(except 1000 T2)

4 PIN CONNECTOR FOR
OPTIONAL BCD
SERIAL INPUT/OUTPUT

EARTH GROUND [⏚]

POWER SUPPLY
(For DC version : − on 9
+ on 10

END OF CYCLE OUTPUT
PREWARN OUTPUT (1000 P2 - 1000 T2)

Terminal #1: Input A (Count) operates with a proximity switch, contact closure or voltage input. A count is entered when Input A goes from a low to a high state. When in the Timer mode, Input A is used for Start/Stop of the control. When the input is connected to DC common, the timer stops.

Terminal #2: Input B (Up/Down Control) operates the same as terminal 1. The control operates in the "Count Up mode" when terminal 2 is "low". Jumper Terminal 2 to DC common (terminal 8) for count up mode.

Terminal #3: Reset Input: Operates with current sourcing sensors or contact closures to + V dc. "Next Preset" values are transferred to "Current Preset" registers when the Reset Input goes from low to high state. Control is reset or preset when reset input is connected to + V dc.

Terminal #4: Inhibit Input: Operates with current sourcing sensors or contact closures to + V dc. Control does not count or time when Inhibit Input is connected to + V dc.

Terminal #5: Prewarn output in 1000P2. Output is an Open Collector NPN transistor which turns on when preset I is reached. It turns off when the control is manually or automatically reset.
Underspeed output in 1000T2. Transistor turns on when speed or rate is equal to or less than ($\gtrless$) preset I. It turns off when the speed is (>) greater than preset I.

Terminal #6: End of Cycle output in 1000P1 and 1000P2. Output is an Open Collector NPN transistor which turns on when preset I in 1000P1 or preset II in 1000PII is reached. It turns off when the control is manually or automatically reset.
Overspeed output is 1000T2. Transistor turns on when preset II is reached. It turns off when the speed or rate is (<) less than preset II.

Terminal #7: +8 V dc or +24 V dc used to power external transducers. The supply is regulated and can supply 20ma or 35ma max. respectively.

Terminal #8: DC Common: Internally connected to logic Common. For maximum noise immunity, DC Common should be connected to earth ground.

Terminals #9 & 10: VAC or VDC: Connect AC or DC power to these terminals. A switch is provided, as shown below, to select the power to be used.

115/230VAC or
24/48VAC or
12/24VDC

Power selection switch

WARNING: The control may be damaged if operated with the power select switch in the wrong position.

Terminals #11, 12, & 13: Prewarn output in 1000P2. Output is a SPDT relay which pulls in when preset I is reached. It drops out when the control is manually or automatically reset.
Underspeed output in 1000T2. Relay pulls in when speed or rate is equal to or less than ($\gtrless$) preset I. It drops out when the speed or rate is (>) greater than preset I.

Terminals #14, 15, & 16: End of Cycle output in the 1000P1 and 1000P2. Output is a SPDT relay which pulls in when preset I in 1000P1 or preset II in 1000P2 is reached. It drops out when the relay is timed out or when the control is reset.
Overspeed output in 1000T2. Relay pulls in when preset II is reached. It drops out when the speed or rate is (<) less than preset II.

Earth Ground Terminal: To insure product safety and to provide maximum noise immunity, the quick connect terminal on the rear of the control MUST be connected to earth common. When sensors with shielded cable are used, the shields should also be connected to this terminal.

1000 T2 RATE CONTROL

The 1000 T2 measures a speed by counting pulses during a time selected by three rotary switches. Time range is .01 to 9.99 seconds. Input max. of 1500Hz.
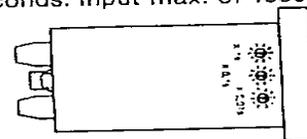
1000 T2 is a two preset device:
Preset I: under speed
Preset II: over speed
Each output consists of a relay and open collector transistor.

energized (saturated)
de-energized (blocked)
energized (saturated)
de-energized (blocked)

Preset   0   I   II
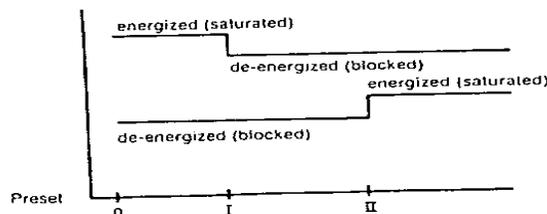
It updates the display with the total number of pulses received in that time period. The time period can be adjusted by the miniature rotary switches on the side of the unit. The programmable time base allows the user to adjust the control to display values to represent the process rate in parts per minute, feet per second, tons per hour, etc.

Franklin Model 164 Instructions

SETTING TIME BASE

When selecting the setting for the time base, the Sample Time is also the Display Update Time. The control therefore, has a practical minimum value of about 0.25 seconds to prevent a rapidly flickering display. Since it has an upper limit on the time base of 9.99 seconds, the Sample Time should be between 0.25 and 9.99 seconds. The Sample Time is selected so that the proper number will be counted and displayed for the speed being measured. The adjustable Sample Time makes it possible to adjust the display for various ratios and different units of measurement. For applications that involve a rotating shaft, the following formula may be used.

$$\text{SAMPLE TIME} = \frac{\text{DISPLAY X 60 X DECIMAL}}{\text{RPM X PULSES}}$$

DISPLAY
Desired Display Value at Typical RPM.
DECIMAL
"1" if no decimal point is used in the display,
"10" if the first decimal point from the right is lit,
"100" if the second is lit
"1000" if the third is lit.
RPM
Revolutions per minute-typical value used to pick display value.
PULSES
The number of pulses per revolution.

EXAMPLE 1:
A 30-tooth gear and a magnetic proximity sensor are being used to indicate the speed of the gear shaft on the Ratemeter. It is known that the gear shaft speed is about 75 RPM. Choose a number at or near the shaft speed and determine the pulse rate in seconds.

At 75 RPM, the display should show "75". No decimal point is programmed. The equation becomes:

$$\text{SAMPLE TIME} = \frac{75 \text{ X } 60 \text{ X } 1}{75 \text{ X } 30} = 2.00 \text{ seconds}$$

EXAMPLE 2:
A 60 tooth gear is mounted on the shaft of a motor and a proximity sensor is used to sense the teeth on the gear. The motor shaft is connected to the input shaft of a reducer with a ratio of 31.4:1. The output of the reducer has a shaft speed of 20 to 100 RPM. The reducer drives a conveyor which has a speed of 30 to 150 Feet Per Minute. The 1000T2 should indicate FPM.

First, find the maximum speed of the motor shaft, then calculate the required Time Base for the desired display. Since the conveyor speed only requires three digits for display, the first decimal point is turned on to allow the display to indicate up to 150.0 FPM.

In cases where a typical RPM cannot be established, it may be easier to calculate the Sample Time by using the formula:

$\text{RPMmotor} =$
$\quad \text{RPMreducer x ratio} = 100 \times 31.4 = 3140 \text{ RPMmax.}$

$$\text{SAMPLE TIME} = \frac{150 \times 60 \times 10}{3140 \times 60} = 0.48 \text{ seconds}$$

EXAMPLE 3:
A flowmeter is to be used which produces 1000 pulses per second at full flow of 78.3 Gallons Per Minute (GPM). The first decimal point will be used on the display, thus the desired display must be multipled by 10. The equation becomes:

$$\text{SAMPLE TIME} = \frac{\text{DESIRED DISPLAY FOR TYPICAL RATE}}{\substack{\text{NUMBER OF PULSES (per second)} \\ \text{AT TYPICAL RATE}}}$$

$$\text{SAMPLE TIME} = \frac{78.3 \times 10}{1000} = 0.78 \text{ seconds}$$

ORDERING INFORMATION:

6 Digit, Single Preset	1000P1	Specify voltage:
6 Digit, Two Preset	1000P2	115/230VAC or
6 Digit, Two Preset Rate Control	1000T2	24/48VAC or 12/24VDC
Front Cover Boot	1021	
Lockable Front Cover	1000PE	
•Modulated LED Photo Sensors	CD, CR & CB Series	
•Inductive Proximity Sensors	IA, IP, IB, IC Series	
•Shaft Encoders	1 to 1200PPR	

*Refer to the Syrelec General catalog for specifications and part numbers.

MOUNTING & DIMENSIONS mm (inches)

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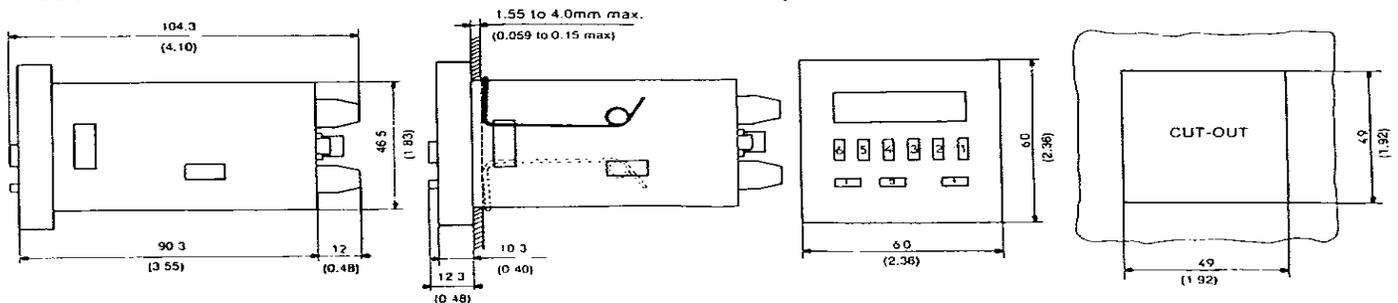
The NT 8 should be mounted where the scanned material demonstrates the least lateral and vertical movement.

The objective lens can be installed in either opening (2a) or (2b) according to the location of the scanning plane (Fig. 1). The unused opening is closed with a screw cap that contains a desiccant. The color of the desiccant is visible through the cap's viewing window.

The NT 8 has threaded mounting holes (M5, 5.5 deep) on sides A, B and C to provide several mounting options. It can be operated from any position.

Mounting brackets for the NT 8 must meet the following requirements.

-The lamp housing (7), controls (5, 6) under the switch cover (10), and the status indicator light (4), must be clearly visible and accessible.
-There must be ample clearance to remove the housing (7) when replacing the source lamp.
-The distance from the objective lens to the surface of the material must be adjustable (Fig. 2, A; see Table 3 for operating ranges).
-To position the scanning path and the light spot, the NT 8 must be horizontally adjustable across and above the web. It must also be laterally adjustable for alignment with the edge of the registration mark (Fig. 2, and C).
-To prevent interfering reflections when scanning shiny surfaces, the NT 8 must be tilted 15° to 200 from per¬pendicular to the scanned material (Fig. 2, A).
-Mounting brackets shquld be designed and installed with sufficient stability to prevent strong vibrations from affecting the NT 8.

2. Electrical Connections

The NT 8 scanner is available with NPN- or PNP-output (see Figs. 8 and 9). Models NT 8-01 to NT 8-19 have NPN-output; models NT 8-21 and NT 8-22 have PNP-output.

The-supply voltages for scanners with NPN-output are pro¬vided by the SICK Switching Amplifiers, series MV, MVE, MP and BP, as well as by the SICK Two-way Registration Control SR 2.

The supply voltages for scanners with PNP-output are pro¬vided by the MP/BP -02 and -06 switching amplifiers.

As shown in the selection table, some NT 8 models are equipped with connecting plugs and some with crimp contacts (see Table 3).

The NT 8 must be connected to the proper power supply (Figs. B or 9) according to the color of the leads or connector pin locations.

To eliminate static, at least two of the mounting screws must have a good connection to machine ground.

Adjusting the angle for reflective surfaces; unnecessary for matte surfaces

15° to 20°

TW = operating range

A
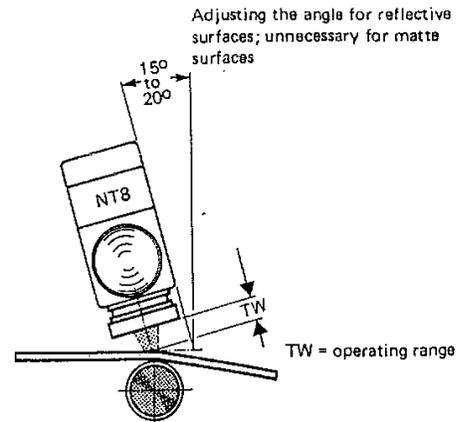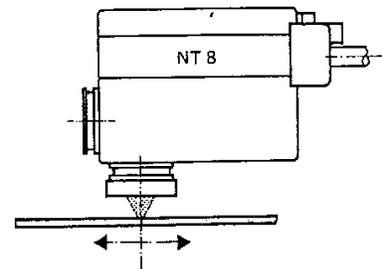
Adjusting the scanning path on the material surface

B
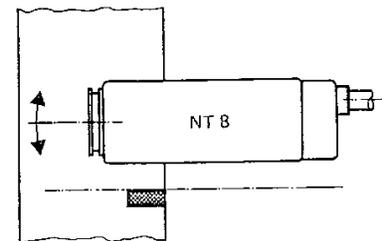
Positioning the light spot parallel to edge of registration mark

C

Fig. 2: Required NT 8 adjustments

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Franklin Model 164 Instructions

3. Setting the Switching Mode and Switching Point

3.1 Controls

The NT 8 has a light/dark selector (6) and a sensitivity control (5, Figs. 1 and 5) under the switch cover (10). The light/dark selector (6) sets the switching mode to either "light switching (O)" or "dark switching (●)". The switching point is set with the sensitivity control (5).

The symbols relating to "O" and "●" are identical. The arrows on the sensitivity control indicate increasing sensitivity (of the corresponding switching mode) for setting the switching point. The status indicator light (4) provides a visual indication of the switching point.

3.2 Contrast (Fig. 3)

The mark and the background are defined as follows:

Mark: Symbol on the scanned material that the NT 8 must detect.

Background: Area around the registration mark that must be in contrast to the mark.

In scanning the material, the different reflection properties (contrast) of the mark and the background are critical. The greater the contrast, the more positively will the mark be detected. This is also true for transparent and semitransparent materials.

For example, if a light mark (relative to the background) is to be detected, light switching (= O) should be selected (Fig. 3, a). If the registration mark is dark (relative to the background), then dark switching (= ●) should be selected (Fig. 3, b).

Since the NT 8 recognizes colors as gray-scale values, it can barely distinguish between red and green, for example, since both colors have approximately the same gray-scale value (see Fig. 4). Thus, if the contrast between registration mark and background is too weak, as in this case, other colors must be chosen (e.g., yellow and violet) or the contrast must be increased through the use of filters (possible only with lens No. 24). With the OG 530 filter, for example, the NT 8 sees green as black and red as gray (see Fig. 4).

When a lens is chosen to increase the operating range, the contrast between the mark and background must also be increased. The ideal contrast remains black/white.
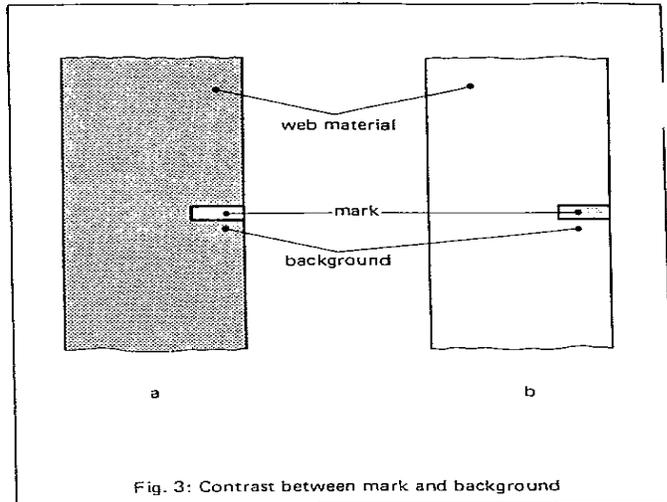
Fig. 3: Contrast between mark and background
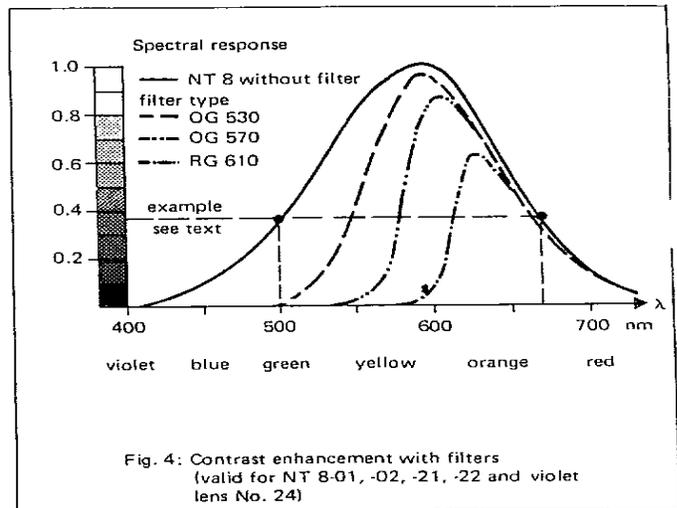
Fig. 4: Contrast enhancement with filters (valid for NT 8-01, -02, -21, -22 and violet lens No. 24)

④ Status indicator light
⑤ Sensitivity control
⑥ Light/dark selector
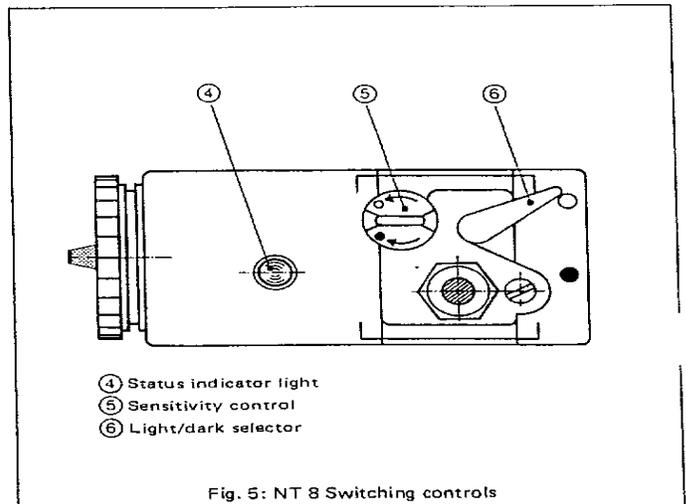
Fig. 5: NT 8 Switching controls

6. Troubleshooting

Problem	Cause	Testing and Corrections
• No light spot	• No supply voltage • Defective source lamp • Incorrect mechanical alignment • Dirty lamp contact	• Check leads; repair if necessary • Replace (see Sec. 5) • Re-align • Clean the contact
• Incorrect light--spot size	• Improper lens • Improper lamp	• Install proper lens (see Table 4) • Install proper lamp (see Table 4)
• Relay or electronic switching output in connected amplifier responds irregularly	• Improperly set sensitivity control • Dirty objective lens • Insufficient contrast between mark and background • Strong ambient light • Web material flutters excessively in scanning zone • Excessive reflection from material • Strong vibrations	• Re-align scanner • Clean objective lens with soft cloth • Add filter (see Sec. 3) • Change color of background (see Sec. 3) • Change color of mark • Shade scanning plane from ambient light • Apply tension to web • Decrease sensitivity • Mount scanner at an angle • Isolate the mounting from vibrations
• Light switching: Indicator light does not go off even when object is in the light path • Dark switching: Indicator light does not come on even when object is in the light path	• Excessive reflection from object • Scanner picks up ambient light reflected from web material	• Decrease sensitivity • Tilt scanner in opposite direction (see Fig. 2)

Table 1

7. Schematic Diagrams

Switching response	light switching		dark switching	
Light received	yes	no	yes	no
Status indicator	on	off	off	on
Switched through R_L	current	no current	no current	current
Output Q_N	LOW	HIGH	HIGH	LOW

Switching response	light switching		dark switching	
Light received	yes	no	yes	no
Status indicator	on	off	off	on
Switched through R_L	current	no current	no current	current
Output Q_P	HIGH	LOW	LOW	HIGH

Fig. 8: Connection diagram and truth table, NPN output

Fig. 9: Connection diagram and truth table, PNP output

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10. Selection table, accessories

Number	Fig. Number	Name	Part Number
1	-	Lamp, horizontal filament [1]	1 001 019
2	-	Lamp, vertical filament[1]	1 001 273
3	-	Lamp, vertical filament[1] , shorter filament for NIB-OS, -06, -18, -19	1 000 241
4	Fig. 1	Lens No. 24 for NT 8-01, -02, -16, -17, -21, -22 (all models)	1 001 324
5	Fig. 10	Lens No. 25 for NT 8-01, -02, -16, -17, -21, -22 (all models)	1 001 325
6	Fig. 10	Lens No. 26 for NT 8-03, -04 (only for -05, -06, -18, -19)	1 001 326
7	Fig. 10	Lens No. 27 for NT 8-03, -04 (only for -06, 06, -18, -19)	1 001 327
8	Fig. 10	Lens No. 19 for NT 8-05, -06	1 001 019
9	Fig. 10	Filter No. L 0108 (Filter, glass, OG 530 = 50%. ye1low)[2]	1 001 598
10	Fig. 10	Filter No. L 0109 (Filter, glass, OG 570 = 50%, orange)[2]	1 001 599
11	Fig. 10	Filter No. L 0111 (Filter, glass, RG 610 = 50%, red)[2]	1 001 600
12	Fig. 10	Lens extender, 20 mm long[3]	2 006 809
13	-	Socket (panel-mount), T 3107	6 004 196
14	-	Plug (cable-mount), T 310411 (matches items 13 and 14)	6 004 193
15	-	Socket (cable-mount), T 3105/1 (matches item 14)	6 004 194
16	-	Flanged plug (panel-mount) , 13106 (matches item 15)	6 004 195
17	-	Extension cable, 1.5 m, includes items 14 and 15	2 005 906
18	-	Extension cable, 2.0 m, includes items 14 and 15	2 002 264
19	-	Extension cable, 2.5 m, includes items 14 and 15	2 006 036
20	-	Extension cable, 3.0 m, includes items 14 and 15	2 005 907
21	-	Extension cable, 6.0 m, includes items 14 and 15	2 005 908
22	-	Extension cable, 3.2 m, includes items 14 and 15	2 005 909
23	-	Extension cable, 4.0 m, includes items 14 and 15	2 006 037
24	-	Extension cable, 5.0 m, includes items 14 and 15	2 006 810
25	-	Desiccant cartridge	2 001 133
26	-	Cable, bulk; 5-cond.; 2-cond. 0.5 mm^2, yel/grn; 2-cond., 0.14 mm^2, red/bIk; 1-cond., 0,14 mm, wht. shielded	6 000 616

1) In relation to length of NT 8   2) For lens No 24 only   3) For special applications
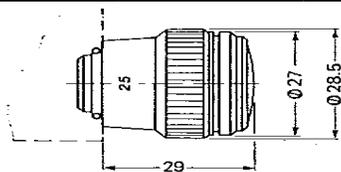
Lens No. 25
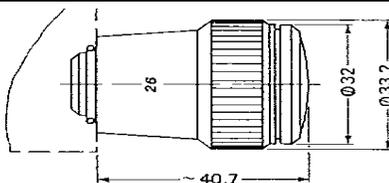
Lens No. 26
(Lens No. 27 has same dimensions.)
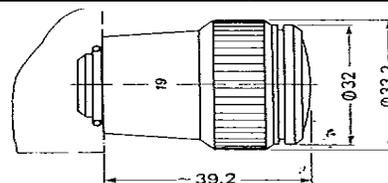
Lens No. 19
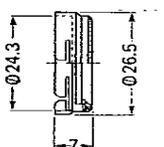
Filter (for lens No. 24 only)

Lens extender

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Page 120

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Franklin Model 164 Instructions

CAL 9900
AUTOTUNE PID TEMPERATURE CONTROLLER
INSTALLATION AND OPERATING MANUAL
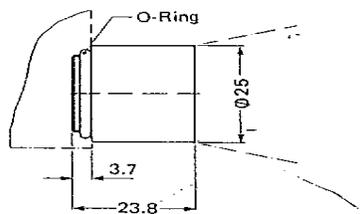
INSTALLATION

Install the 9900 controller in panel **see 10.2**
Wire up connections **see 10.1**

1 TO SELECT SENSOR AND ADJUST SET POINT

Step 1

POWER UP
Self check sequence

Step 2

ZERO FLASHES ON LEFT
Indicating no sensor selected

Note
Buttons only adjust flashing digits
(shown green)

Step 3

PRESS ▲ TO SELECT
SENSOR e.g. Type K = 2
Sensor options:
(For full table **see 8**)

J	1	R	4	E	7	RTD	9
K	2	S	5	L	8	PT100	
N	3	T	6	B	10		

Step 4

PRESS **P** TO ENTER
SENSOR INTO MEMORY
Display shows process
temperature e.g. Ambient

Step 5

PRESS ✱ TO DISPLAY
SET POINT

Step 6

PRESS AND HOLD ✱
         PRESS ▲
TO INCREASE
SET POINT

Output turns on and temperature rises

The controller is now
operational with
factory PID settings:

Prop band 2.5%
Prop time 20 sec
Derivative 25 sec
Integral 5 min
DAC approach
control 1.5

2 IMPORTANT – Please read before using Autotune AT

1 If required adjust: Range, Hi-res 0.1°, Negative temperature ranging, **see 8**
2 Proportional cycle-time: 20 sec factory set, if unsuitable change now or use Autotune calculated value after tuning run **see 6**
3 For best results use normal set point and load conditions
4 Start Autotune AT with the load cool

TO AUTOTUNE

Step 7

START AUTOTUNE 'AT'
NEAR AMBIENT

Step 8

PRESS **P** TO ACCESS
PROGRAM MODE
Function 0 flashes
on right

Step 9

PRESS ✱ TO CHANGE
TO OPTION SELECTION
Option 0 flashes
on left

Step 10

PRESS ▲ TO SELECT
AUTOTUNE 'AT'
Option 1

Step 11

PRESS **P** TO START
AUTOTUNE 'AT'

AT and Process
temperature displayed
alternately during
Autotune

3 AUTOTUNE TYPES AND USES

Two types of Autotune are provided to ensure optimum control of a wide range of applications

AUTOTUNE AT – Normal method, tunes during warm up

AUTOTUNE PT – (Push-to-Tune) – For difficult applications, tunes at set point

3.1 AUTOTUNE AT

Start Autotune AT with the load cool. A short tuning cycle occurs at 75% set point during warm up. New PID values are automatically entered and the temperature rises to set point

---

CAL Controls

The CAL 9900 microprocessor based temperature controller provides precise control with a minimum of setting up, the advanced Autotune algorithm tunes all five control parameters automatically. The simple setting up procedure below is normally sufficient, specialised applications may need the comprehensive 9900 features covered in this manual.

Hi ▲
SP ■
Lo ▼
Error

Process temperature or set point
SP1
SP2

✱ View set point
✱ ▼ Decrease
✱ ▲ Increase
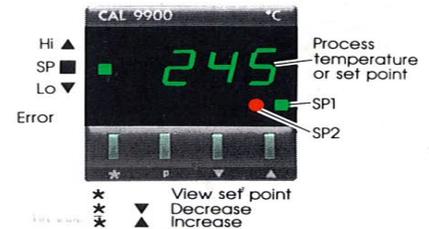
KEY CONTENTS GUIDE
9 Important caution - please read first
10 Installation **1** Setting up
2, 3, 5 Autotune **6** Prop cycle-time
Functions: **4** Selection **8** Table
7 Alarms **11** Error messages

Autotuned parameters	Autotune limits
Entered automatically:	
Proportional band/Gain	0.5 – 20 % c/range
Integral time/Reset	0.2 – 43.5 min
Derivative time/Rate	1.0 – 255 sec
DAC approach control	0.5 – 9.0 x gain
Proportional cycle time	0.8 – 819 sec

Calculated but for safety reasons needs manual acceptance **see 6**
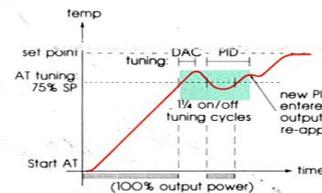
Fig. 1 Autotune AT

3.2 AUTOTUNE PT (Push-to-Tune)
Select Opt 2 at 2 step 10

Used to fine tune difficult applications at set point. Useful if the set point or thermal conditions are substantially changed. During PT tuning some overshoot will occur. If this is unacceptable, temporarily reduce set point. PT tunes the parameters listed above except DAC. Proportional cycle time is re-calculated but needs manual acceptance

Fig. 2 Autotune PT

3.3 OVERIDING AUTOTUNE VALUES

After AT/PT any Autotuned parameter may be changed to an Option from the table. The original Autotuned value is retained in memory.
Note Subsequent Autotune AT or PT run replaces manual selections with new calculated values (except Cycle time)

Franklin Model 164 Instructions

4 CONTROLLER FUNCTIONS DISPLAY AND SELECTION PROCEDURE

The facilities of the 9900 are selected from the Functions and Options Table **see 8** using program mode
Functions (Fn) – The available controller facilities
Options (Opt) – The available values for each Function e.g. Function 5 Option O (Fn 5/Opt O) = SP1 Prop band of 2.5%
Note 1   Should difficulty occur in adjusting Options check the Parameter lock **see 14**
Note 2   Normal control is maintained with existing settings during programming

4.1 Step 1
PRESS **P** TO ENTER PROGRAM MODE

    0.0
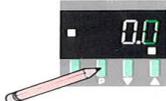
Step 2
PRESS AND HOLD ▲ INDEX TO FUNCTION e.g. Function 16 (Sensor select) flashes

    2.16

Step 3
PRESS ✱ CHANGE TO OPTION SELECTION e.g. Option 2 (Type K)

    2.16

Step 4
PRESS ▼ or ▲ SELECT OPTION REQUIRED e.g. Option 1 (Type J)

    1.16

Step 5
PRESS ✱ CHANGE TO FUNCTION SELECTION Set other Functions as required

    1.16
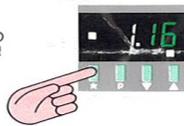
Step 6
PRESS **P** TO EXIT PROGRAM MODE WHEN SELECTIONS COMPLETE Process temperature displayed

    250

Control commences with new instructions now entered in memory

4.2 MODE B – FUNCTION/OPTION DISPLAY PROCEDURE

Used in Function 2 to set full scale alarms and Function 24 – Range adjustment. Mode B enables all digits to be used for Options values

Step 1
PRESS ▲ TO INDEX TO FUNCTION e.g. Function 24 (Range adjustment) flashes
Note 2 bars = Mode B

    - 24
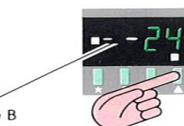
Step 2
PRESS ✱ TO DISPLAY OPTION VALUE e.g. Range 400° flashes

    400

Step 3
PRESS AND HOLD ✱
PRESS   TO INCREASE
PRESS ▼ TO DECREASE OPTION VALUE

    500

5 AUTOTUNE HINTS

5.1 Autotune error messages **see 11** (EE5-7)
(Latched: PRESS ▼▲ to reset)
AT/PT tunes most applications satisfactorily, but if tuning fails and error messages repeatedly occur, the application has unusual characteristics requiring manual tuning **see 21**

5.2 Tuning with set point near ambient
Difficult both to control and Autotune. Use PT. If tuning fails try Fn 5/Opt 1, otherwise increase set point or tune manually

5.3 In High Resolution (O.1°)
Should error message EE6 occur during tuning, select normal resolution (Fn 18/ Opt O) then Autotune and afterwards re-select Hi-res. (check range setting Fn 24)

5.4 AUTOTUNE VALUE DISPLAY
At the end of an Autotune run the AT value is automatically entered and may be displayed in Functions:
5	Prop band/Gain
6	Derivative time/Rate
7	DAC approach control
8	Integral time/Reset

Step 1
PRESS **P** TO ENTER PROGRAM MODE

    0.0
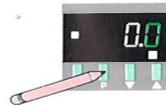
Step 2
PRESS ▲ TO INDEX TO FUNCTION e.g. Function 5 Prop band AT value = 3.5%

    3.5.5
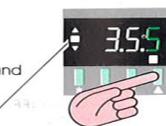
Note 3 LED's show an AT value displayed

6 PROPORTIONAL CYCLE TIME

6.1 Autotuned cycle time
Autotune calculates the optimum value but for safety reasons does not automatically implement it

6.2 If the cycle time needed is known
Applications known to require shorter times than the 2O sec factory setting, including SSR drive (1 sec), linear outputs (O.O5 sec) should select the appropriate Option in Function 4 using the procedure **see 4**. This setting will not be changed, but may be replaced with the calculated AT value if preferred after the Autotune run

6.3 Normal procedure
Run Autotune AT **see 2**. When complete (alternating AT display stops) display the AT calculated cycle time and accept if suitable, this will then replace the 2O sec factory setting

Step 1
Index to Function 4
For procedure **see 4**
Option O: 2O sec factory setting

    0.4

Step 2
PRESS ✱ TO CHANGE TO OPTION SELECTION

    0.4

Step 3
PRESS ▲ TO DISPLAY CALCULATED AT VALUE e.g. 9.8 sec
Note Flashing bar shows calculated AT value is displayed

    9.8.4

Step 4
IF AT VALUE SUITABLE
PRESS **P** TO ACCEPT AT VALUE NOW OPERATIONAL

    250
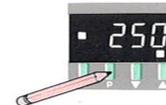
OR IF AT VALUE UNSUITABLE
PRESS ▲ TO SELECT A SUITABLE OPTION FROM TABLE e.g. Option 4: 3O sec

    4.4
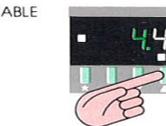
6.4 AT Cycle time values in Function 4
Two AT cycle time values are stored, to enable the current operational value to be retained, until a new value from a subsequent Autotune run is considered
Example of two AT cycle time values after a subsequent Autotune run:

Step 5
Index to Function 4
Operational AT value – 9.8 sec
As accepted previously (Step 4)   Note 3 LED's ON

    9.8.4
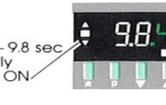
Step 6
PRESS ✱ TO CHANGE TO OPTION SELECTION

Step 7
PRESS ▲ TO DISPLAY Latest calculated AT value e.g. 7.2 sec
Note Flashing bar

    7.2.4
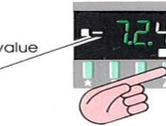
Step 8
Alternative actions:
PRESS **P** to accept the latest calculated AT value – 7.2 sec which replaces 9.8 sec as the operational AT value
OR PRESS ▼ to display current operational AT value. Then PRESS **P** to retain 9.8 secs
OR PRESS ▲ to select Option from Table

7 ALARMS

7.1 SP2 Operating mode
The operating mode must be selected at Function 19 before adjusting SP2 at Function 2

7.2 Alarm output operation
The alarm output is failsafe, SP2 relay is de-energised and SP2 red LED on during the alarm condition (Not with SP2 in Proportional mode)

7.3 LBA – Loop break alarm **see Fig. 3**
LBA detects a control loop fault, and displays an error message (EE3). The alarm relay may be configured to act also
LBA operates if the controller fails to receive the correct response to the output within a set time, technically:
LBA occurs when SP1 output is saturated O% or 1OO% and the process temperature fails to move a minimum 5O% prop band in the LBA time. SP1 output state is unaffected by LBA alarm condition
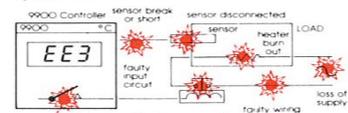
    EE3

Fig. 3 Typical faults detected by LBA

7.4 Selecting LBA – EE3 message only
1. Index to Function 12 – LBA time Option O – LBA OUT, displayed
2. PRESS ✱ to change to option selection
3. PRESS ▼ to select Option 14 The recommended initial setting (2 x Integral time in use)
4. LBA alarm condition: EE3 displayed, alternating with process temperature display latches, to reset PRESS ▼▲ together
To configure Alarm relay SP2 to LBA Select Option 6 in Function 19 (Relay latches in alarm condition, to reset PRESS ▼▲)
Note Use LBA with SP2 ON/OFF mode only (Fn 1O/Opt O). Reset EE3/Relay before any other program changes

Franklin Model 164 Instructions

8 FUNCTIONS AND OPTIONS TABLE
Please read these important notes first

1. Factory setting: is Option O
(except Functions 2 and 22)

2. Initial configuration:
Functions 16-24 must be selected first then entered into memory by exiting Program mode - **see 4** then Autotune and other Functions may be selected

3. Protected Functions:
All Functions, except User Settings (Functions 1, 2, 3) may be locked in memory after setting to prevent tampering.
See 14 Parameter lock

4. AT values (marked ⬍):
As calculated on the latest AT or PT run

5. Locating Functions:
Function O is the Program mode entry point

Pressing ▲ increments

▼ moves direct to Function 13 for access to higher Functions
Hold pressed to auto index through table (Functions 13, 14, 25 are unused)

Fn No.	Opt No.	Parameter

OPERATING MODE ... Protected

O   Operating mode

Opt	
O	Normal Operation
1	Start Autotune AT
2	Start Autotune PT
3	Park mode
4 – 100	Manual heat %

USER SETTINGS ...Unprotected

1   Manual Reset (OUT IN PID)

1° steps (max ±127°/50% prop band)

2   SP2 Adjust

1° steps   Factory setting 5°
SP2 mode must be selected in Function 19 **before** adjusting SP2

SP2 mode (Fn 19)	Option No.	Function 2 range
Deviation alarm	1 – 3	O – 127°
Full scale alarm	4 – 5	O – *
Cool strategy	7	±127°

(* Sensor range : Fn 16)

3   SP1 Lock

Opt	
O	Unlocked
1	Locked

OPERATIONAL PARAMETERS ... Protected

4   SP1 Proportional cycle time

Opt		Opt	
O	20 sec	10	3 sec
1	1 sec	11	7 sec
2	5 sec	12	14 sec
3	10 sec	13	45 sec
4	30 sec	14	⬍ Operational AT value
5	60 sec		
6	0.05 sec		
7	ON/OFF	15	▬ Latest calculated AT value
8	0.3 sec		
9	2 sec		

5   SP1 Proportional band/Gain   SP1 Hysteresis in ON/OFF mode

Opt	band/Gain	Hysteresis
O	2.5% CR	1.25%
1	0.5%	0.25%
2	1%	0.5%
3	2%	1%
4	3%	1.5%
5	5%	2.5%
6	10%	5%
7	20%	10%
8	1.5%	0.75%
9	4%	2%
10	6%	3%
11	7%	3.5%
12	8%	4%
13	14%	7%
14	100%	50%

15   ⬍ AT value

6   SP1 Derivative time/Rate

Opt		Opt	
O	25 sec	9	3 sec
1	OUT	10	7 sec
2	5 sec	11	15 sec
3	10 sec	12	20 sec
4	50 sec	13	35 sec
5	100 sec	14	75 sec
6	200 sec		
7	1 sec	15	⬍ AT value
8	2 sec		

Fn No.	Opt No.	Parameter

OPERATIONAL PARAMETERS ... continued

7   SP1 DAC approach control

Opt		Opt	
O	1.5 x prop band	5	3.0
1	0.5	6	4.0
2	1.0		
3	2.0	7	▬ AT value
4	2.5		

8   SP1 Integral time

Opt		Opt	
O	5 min	8	0.2 min
1	OUT	9	7 min
2	0.5 min	10	13 min
3	1 min	11	25 min
4	2 min	12	33 min
5	3 min	13	43 min
6	10 min		
7	18 min	14	▬ AT value

9   Sensor error correction

1° steps (±127° max)

10   SP2 Proportional cycle time

Opt		Opt	
O	ON/OFF	9	3 sec
1	1 sec	10	7 sec
2	5 sec	11	14 sec
3	10 sec	12	45 sec
4	20 sec		Non linear ranges for Cool strategy
5	60 sec		
6	0.05 sec	13	0.15–10 sec
7	30 sec	14	0.15–20 sec
8	2 sec	15	0.06–15 sec

11   SP2 Proportional band/Gain   SP2 Hysteresis in ON/OFF mode

Opt	band/Gain	Hysteresis
O	2.5% CR	1.25%
1	0.5%	0.25%
2	1%	0.5%
3	2%	1%
4	3%	1.5%
5	5%	2.5%
6	10%	5%
7	20%	10%
8	1.5%	0.75%
9	4%	2%
10	6%	3%
11	7%	3.5%
12	8%	4%
13	14%	7%
14	100%	50%

12   LBA ... Loop break alarm – time

Opt		Opt	
O	OUT	9	30 min
1	1 min	10	40 min
2	2 min	11	50 min
3	4 min	12	70 min
4	6 min	13	90 min
5	8 min		**Recommended initial setting:**
6	10 min		
7	15 min	14	2 x Operational Integral time
8	20 min		

15   Reset Functions O – 24 to factory settings

Opt	
O	Normal
1	Reset (Function 22 not reset)

Abbreviations:

Fn	– Function
Opt	– Option
SR	– Sensor range
CR	– Configured range

Fn No.	Opt No.	Parameter

INITIAL CONFIGURATION ... Protected

16   Sensor Select and Range Table

Range Table

	Type	Factory set		Sensor range (SR)	
		°C	°F	°C	°F
	T/C				
1	J	400	800	800	1470
2	K	400	800	1200	1999
3	N	400	800	1200	1999
4	R	1600	1999	1600	1999
5	S	1600	1999	1600	1999
6	T	250	500	250	500
7	E	500	1000	600	1100
8	L	400	800	800	1470
10	B	1600	1999	1800	1999
	RTD				
9	PT100	200	400	400	750

Range minimum: O°C/32°F
Except T/PT100:
Factory set O°C/32°F
Minimum available –200°C/°F

	Linear process inputs	Display
11	O – 20mV	O – 100
12	4 – 20mV	O – 100
13	O – 20mV	O – 1000
14	4 – 20mV	O – 1000
15	O – 20mV	O – 2000

17   Negative temperature ranging

Opt	
O	Disabled
1	Enabled (range min –200°)

18   Display resolution

Opt	
O	Normal (1°)
1	Hi-res (0.1°) ±199.9°

1° settings become 0.1°
Ranged O – 200° on selection of Hi-res, (reset with Fn 24)

19   SP2 Operating mode
Select and enter Function 19 **before** adjusting SP2 in Function 2

Opt	
O	OUT
1	Deviation alarm – High
2	Deviation alarm – Low
3	Deviation band alarm
4	Full scale alarm – High
5	Full scale alarm – Low
6	LBA – Loop break alarm
7	Cool strategy

20   SP1 Sensor break

Opt	
O	Upscale
1	Downscale

21   SP2 Sensor break

Opt	
O	Upscale
1	Downscale

22   °C/°F (Note Change top fascia)

Opt		
O	°C	Factory set
1	°F	not reset by Function 15

23   Software version number

24   Configured range (CR) adjustment

1° steps
Mode B adjustment **see 4.2**
(See Range Table in Function 16)

Franklin Model 164 Instructions

9 INSTALLATION: IMPORTANT SAFETY INFORMATION PLEASE REVIEW

Designed for use: UL 873 - only in products where the acceptability is determined by Underwriters laboratories Inc.
EN61010-1-Within Installation Categories II and III environment and polution degree 2.
To avoid possible hazards accessible conductive parts of final installation should be protectively earthed in accordance with EN61010 for Class 1 equipment.
Output wiring should be within a grounded cabinet. Sensor sheaths should be bonded to ground or not be accessible.
Live parts should not be accessible without use of a tool.

10 INSTALLATION

10.1 ELECTRICAL INSTALLATION
CAUTION RISK OF ELECTRICAL SHOCK.
1. Check controller label is the correct supply voltage for your application.
2. Connections are shown on the socket label.
3. For connection to socket use, 250 Faston receptacles provided in accessory kit.
4. Recommended wire size for mains voltage and outputs 32/0.2 1.0mm² (18 AWG 0.04"²) rated to 6 Amps/300V at 70ºC.
5. For use with 2 wire RTD an external link is required between connections 3 and 5.
6. IMPORTANT. It is recommended that interference suppressors are fitted across relay contacts to prolong relay life.

It is the responsibility of the installation engineer to ensure that this equipment's compliance to EN61010 is not impaired when fitted to the final installation and to use this equipment as specified in this manual, failure to do so may impair the protection provided. Follow wiring diagrams and regulations.
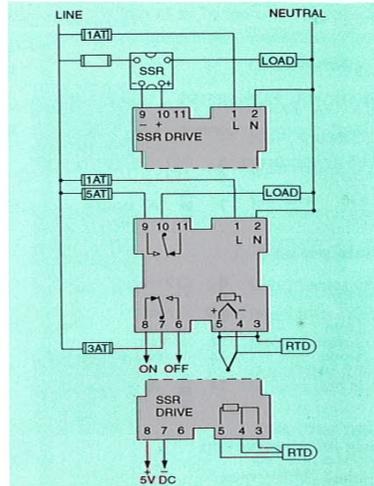
Fuses: 250VAC rated, time lag type to IEC 127.

1. CONFIGURATION
   All functions are front key selectable, it is the responsibility of the installing engineer to ensure that the configuration is safe. Remove the function lock link to protect critical functions from tampering.
2. ULTIMATE SAFETY ALARMS
   Normal safety advice: Do not use SP2 as the sole alarm where personal injury or damage may be caused by equipment failure.

10.2 MECHANICAL
1. Prepare a 1/16 DIN panel cut out: 45 x 45mm +0.6 -0 1.77" x 1.77" +0.02 -0
2. Remove the socket, pressing in the lock buttons
3. Slide the controller into the cut out
4. Fit the mounting clip see fig. pressing it firmly against the panel, jacking screws optional
5. Plug on the socket
6. After installation remove and discard the protective front window label
7. Cleaning - if required wipe with damp cloth (water only)

Fig. 6

11 ERROR MESSAGES

APPLICATION FAULTS

EE1	Sensor burnout	Check sensor	Self clearing
EE2	RTD/PT100 short	Check sensor	Self clearing
EE3	LBA Loop break	Check control loop	Latches: Reset

AUTOTUNE AT/PT TUNING CYCLE FAULTS

Autotune run is aborted:
Previous values are retained

EE5	Outside time limit	Latches: Reset
EE6	O/shoot exceeds limit	Latches: Reset
EE7	Unable to run Autotune, SP1 in ON/OFF mode	Latches: Reset

SOFTWARE FAULTS

EE8	Calibration data error	Replace unit if it persists
EE9	System error	Replace unit

PRESS ▼▲ together to reset latched message

12 9900 SPECIFICATION

INPUTS
See 8 Function 16 for Range Table
Thermocouple – 9 types

J	Iron/Constantan	T	Copper/Con
K	Chromel/Alumel	R	Pt - 13% Rh/Pt
L	Fe/Konst	S	Pt - 10% Rh/Pt
N	NiCroSil/NiSil	B	Pt - 30% Rh/
E	Chromel/Con		Pt - 6% Rh

Standards: 1PTS 68/DIN 43710
Linearity: 5 - 95% sensor range **see 8**
J/K/L/N/E ±1°C, T ±2°C, B ±6°C>500°C
R/S 0-300°C ±5°C, 300-1600°C ±2°C
CJC Rejection: 20:1 (0.05°/°C) typical
External resistance: 100 Ω maximum

Resistance thermometers
RTD/PT100 2 wire (optional 3 wire)
DIN 43760 100 Ω 0°C/138.5 Ω 100°C Pt

Linear process inputs: 0-20mV/4-20mV
Linearity: ±1.5% Impedence 100k Ω min

Applicable to all inputs
SR=sensor range, CR=configured range
Calibration accuracy: ±0.25% SR ±1°C
Sampling frequency: Input 3Hz, CJC 5sec
Common mode rejection: Negligible effect up to 140dB, 240V, 50-60Hz
Series mode rejection: 60dB, 50-60Hz
Temperature coefficient: 150ppm/°C SR
Reference conditions: 22°C ±2°C, 115/230V ±5%, after 30m settling time

OUTPUTS
OUTPUT MODULE – Dual standard
Main output: SP1
Relay standard: 5A/250Vac resistive SPDT/Form C
SSd-optional: 5V/25mA non-isolated

Alarm/Cool channel output: SP2
Relay-standard: 3A/250Vac resistive SPDT/Form C
SSd-optional: 5V/25mA non-isolated

9900 Controller output module - types

SP1 output	SP2	115V code	23OV
Relay	Relay	991.11C/F	991.12C/F
Relay	SSd	991.21C/F	991.22C/F
SSd	Relay	992.11C/F	992.12C/F
SSd	SSd	992.21C/F	992.22C/F
Relay	–	991.01C/F	991.02C/F
SSd	–	992.01C/F	992.02C/F

CONTROL CHARACTERISTICS

SP1 PID Parameters	Field selectable
Prop band/Gain	0.5-100% CR
Prop cycle-time	0.05-81s or ON/OFF
Integral time/Reset	0.2-43m or OUT
Derivative time/Rate	1.0-255s or OUT
DAC approach control	0.5-9.0 x PB
(ON/OFF Hysteresis	0.25-50ºCR)

GENERAL
Supply Voltage: 115V or 230V ±15% 50-60Hz 6VA (Link selectable)
Digital LED Display: 3½ digit 10mm high. High brightness green.
Error indicator: 3 step LED.
Output LEDs: SP1 Green SP2 Amber.
Keypad: 4 Elastomeric Buttons.

ENVIRONMENTAL
Humidity: Max. 80%
Altitude: Up to 2000M
Installation: Categories II and III
Pollution: Degree II
Safety: UL873, CSA 22.2/142-87. EN61010
Protection: IP54 (with gasket)
EMC Emission: EN50081-1 FCC Rules 15 Sub-part J Class A
EMC Immunity: EN50082-1, RF Field ±2% FS
Ambient: 0.50°C (32-130°F)
Mouldings: Flame Retardent Polycarbonate

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Santa Ana, CA 92705   Web Site afmeng.com
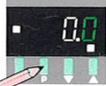
13 IMPORTANT: ADVANCED FUNCTIONS SECURITY

The advanced functions are intended for OEM's and process engineers. Access is therefore protected in the Function table

To avoid unauthorised use of these functions remove this section from the manual before supply to end user

13.1 'HIDDEN' ACCESS TO ADVANCED FUNCTIONS

Step 1

PRESS **p** TO ENTER PROGRAM MODE

`0.0`

Step 2

PRESS ▼ TO GO DIRECTLY TO FUNCTION 13

`0.13`

Step 3

PRESS & HOLD ✱ FOR 5 sec TO ACCESS ADVANCED FUNCTIONS
(Entry point Fn 38)

`0.38`

13.2 ADVANCED FUNCTIONS ... Protected

Fn No. / Opt No. / Parameter

26 SP1 Heat Power limit

O	100% max	8	60%
1	95% output	9	55%
2	90%	10	50%
3	85%	11	45%
4	80%	12	40%
5	75%	13	30%
6	70%	14	20%
7	65%	15	10%

Not in SP1 ON/OFF mode

27 SP2 Cool limit

O	100% max	4	40%
1	80% output	5	30%
2	60%	6	20%
3	50%	7	10%

Not in SP2 ON/OFF mode

Direct/Reverse mode selection

		Normal	OFF when logically ON
28	SP1 Output	O	1
29	SP1 LED	O	1
30	SP2 Output	O	1
31	SP2 LED	O	1

32 Error indicator resolution

O	Normal (2% range/segment)
1	High (1%)
2	Low (4%)

33 Temperature display sensitivity

O	Normal
1	High
2	Low

34 Derivative polling ratio

O	0.5 x derivative time
1	0.2
2	0.7
3	1.0

35 Sensor span adjust

1% steps (+15°/-16° max)

Note 'Hidden' Fn 15/Opt 5 resets ALL functions, except Fn 22

---

36 SP2 Latch alarms

O	Normal
1	Latch

Only for: SP2 ON/OFF mode, Fn 19/Opt 1-5

PRESS ▼▲ together to reset (in non alarm condition)

37 Spare

DIAGNOSTICS

Read only Functions 39-49 Mode B display **see 4.2**

PERFORMANCE MONITOR (PM)

38 Start monitor (Entry point from Fn 13)

O	OFF
1	Start

Readings are reset on subsequent monitor start or de-powering

39 Read temperature variance (0.1°)

40 Read maximum temperature (°C/°F)

41 Read minimum temperature (°C/°F)

42 Read Duty Cycle Monitor (DCM) % heat (SP1 % ON time)

AUTOTUNE TUNING DATA Fig. 8

Overshoot/Undershoot (°C/°F)
Max 255°/Hi-res 25.5°

43	OS1	45	US
44	OS2		

Quarter cycle times (sec)
Min 2 sec/max 1800 sec (30 min)

46	QCT1	48	QCT3
47	QCT2	49	QCT4

50 Spare PRESS ▲ to Fn 0

13.3 DIAGNOSTICS Functions 38 – 49

To assist with machine development, commissioning and trouble shooting

PERFORMANCE MONITOR (PM)

Monitors and displays minimum and maximum temperatures, and variance (deviation) to 0.1°C/°F
Displayed temperatures are measured values, independant of set point. This high sensitivity monitor may be affected by interference. (Fit snubber to minimise disturbance)
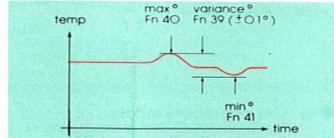

Fig. 7   Performance monitor (PM) Fns 38-41

DUTY CYCLE MONITOR (DCM)

Monitors percentage power used in the previous proportioning cycle. Average several readings for a more accurate result
Power requirements outside the range 20% – 80% may be difficult to control and autotune
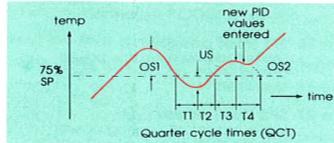
AUTOTUNE TUNING DATA (Fns 43-49)

Fig. 8

13.4 MONITOR OPERATION (PM/DCM)

Step		Select
1	To start monitor:	Fri 38/Opt 1
2	To return to normal operation	PRESS **p**
3	To view readings (PM/DCM)	Fns 39-42
4	To stop monitor: (Readings are retained)	Frn 38/Opt 0
5	**Reset**	
	Readings reset on next monitor start	Fri 38/Opt 1
	Monitor and readings reset	On de-powering

14 PROGRAM SECURITY LOCK

To be made by qualified technicain. De-power controller before proceeding using a screw driver at side of bezel remove lower fascia containing push buttons. All functions except user settings - Functions 1-3 can be protected against tampering. To protect function settings change the plastic link from unlocked to locked position.

⦁ ⦁ • LOCKED (or remove link)

• ⦁ ⦁ UNLOCKED

15 INTERNAL LINK CHANGES

These operational modifications should be made by a qualified technician before installation.

To remove the 9900A board:
1. First removethe output module, carefully lever the retaining clips from the slots in the module cover with a small screwdriver.
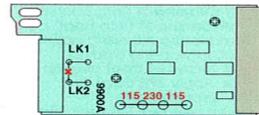

module cover   output module

2. Tap module cover on table top, as shown, to release the 9900A board. Carefully remove board, avoid damaging components on protruding tongue

9900A board
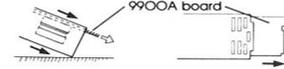
15.1 To convert to 3 wire RTD/PT100 (inhibits thermocouple operation)
Carefully cut pad at **X** avoid damage to R3. Fit solder links LK1, LK2 using 22SWG wire.

15.2 Supply Voltage Conversion (Plug in links)
IMPORTANT - check your installation operating voltage before proceeding. Wrongful conversion could damage this unit.
For 115 Volt ±15% operation fit two links (spare link in accessories bag) in positions **115** and **115**. For 230 Volt ±15% operation fit one link in position **230**.

16

9900 FUNCTION/OPTION RECORD		
Customer Ref:		
9900	model	serial no.
Function Number	Option Set date:	

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Santa Ana, CA 92705		Web Site afmeng.com

17 COOL STRATEGY FOR HEAT–COOL APPLICATIONS

Cool strategy: A change in load causes movement of the linked heat and cool prop bands
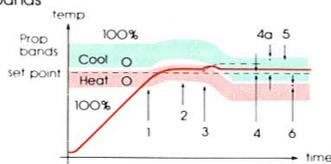

Fig. 9

1. Integral causes linked prop bands to move up
2. Stabilises e.g. 30% heat
3. Exothermic load change causes integral to move prop bands down minimising disturbance
4. Minimum offset achieved (4a = offset without cool strategy integral action)
5. Stabilises e.g. 50% cool
6. Consistent dead band throughout

17.1 SETTING UP ROUTINE FOR-HEAT COOL (Single zone procedure)

Step

1. **Run Autotune AT:** (Set normal operating temp) Accept AT proportional cycle time **Fn 4/Opt 15** Note SP1/SP2 cycle times must be compatible with switching devices used (SP2 cool output is OFF at this stage)

2. **When temperature stable at set point:**
   - Select **cool** strategy **Fn 19/Opt 7**
   - Select **cool** prop band option value from table nearest to Heat prop band value (view Fn 5) **Fn 11**
   - Select **cool** cycle time option value nearest to Heat cycle time value (view Fn 4) **Fn 10**
   - Adjust SP2 dead band to 0° (Factory set 5°) **Fn 2**

3. **Run with normal background/exothermic thermal conditions,** good results should be achieved and provide the basis for fine tuning

4. **Further adjustments:** e.g. Water cooling. Should oscillation occur try (in order):
   - Double **cool** prop band value **Fn 11** and reduce integral time value **Fn 8**
   - Halve **cool** cycle time **Fn 10**
   - Introduce **cool** overlap **Fn 2/(-)ve**

5. **Non-linear cooling** For water cooling above 100°C where flash to steam occurs. Select non-linear ranges in **cool** cycle time **Fn 10/Opt 13-15**

6. **Fine tuning** If **overshoot** (into cool) or **undershoot** (into heat) occurs, **slowly** make the following adjustments, observing the results:
   - Increase **cool** overlap **Fn 2/(-)ve**
   - Apply SP2 **cool** limit, progressively **Fn 27/Opt 1** If needed: SP1 heat limit **Fn 26/Opt 1**

7. **Contact CAL for more application advice and data if required**

18 NOTES ON OTHER FUNCTIONS

Function   Item

Fn 0   Park mode (Opt 3) Temporarily turns outputs off

Display: ▣ and Process temperature

Useful in commissioning and trouble shooting, e.g. Multizone applications **Manual heat %** (Opt 4-100) If sensor break occurs (EE1/2) SP1 output (heater power) may be manually controlled 4-100% (Not in ON/OFF mode)

Display: ▣ XXH (XX = % output)

Fn 3   SP1 Set point lock Stops unauthorised adjustment

Fn 5   Retransmission: With 100% prop band, accuracy ±5% configuration range using linear input/output

Fn 16   Linear process inputs Optional 9900-PIM Process interface module (Data from CAL) This remote module provides greater versatility when using the 9900 with linear inputs

Fn 17   Negative temperature ranging Enables type T/RTD–PT100 to be used below 0°C/32°F Note Increased range, to -200°C/F, may effect PID values

Fn 18   Display resolution Note Effect on set point and other values set in °C/°F e.g. 100.0° in hi-res = 1000° in normal

Fn 26   SP1 Heat power limit Limits maximum heater power during warm up. Useful if heaters oversized

Fn 27   SP2 Cool power limit Limits maximum cooling power outside prop band in heat-cool

## 19 RECALIBRATING TO A REMOTE STANDARD

To enable the 9900 calibration to match an external meter, data logger etc. (i.e. **'Remote'** reading).

SENSOR ERROR CORRECTION: Fn 9 Provides correction at one single temperature
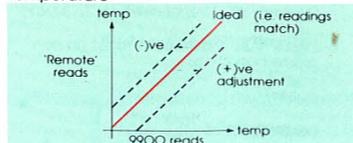
Example	Reads
9900	404°
'Remote'	400°
Error	+4° Set (-4) correction at Fn 9

Note Error polarity applies to 9900 correction

Sensor span adjust: Fn 35 Provides correction where two temperatures require differing amounts of adjustment
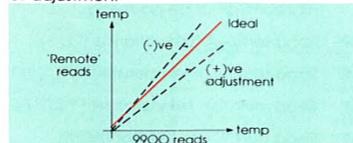
1. Choose a temperature towards the bottom of the normal operating range and one at the top
2. Run at the lower temperature T1, note the error **E1** between 9900 and 'Remote' reading
3. Repeat at upper temperature T2 and note error **E2**

Example	T1 reads		T2 reads
9900	60°		200°
'Remote'	58°		205°
Error E1 =	+2°	E2 =	-5°

4. Calculation of span adjustment for Fn 35

Formula: $Fn\ 35 = \dfrac{E2 - E1}{T2 - T1} \times CR$ (as Fn 24)

Example: $Fn\ 35 = \dfrac{(-5°) - (+2°)}{200° - 60°} \times 250°$ (Fn 24 CR)

$= \dfrac{-3}{140} \times 250$

$Fn\ 35 = -5°$ Set (-5°) in Fn 35

5. A span error entered in Fn 35 immediately changes the reading, allow time to stabilise at T2, if an error exists correct with Fn 9. Then check at T1, if an error exists check readings and calculations; repeat if necessary
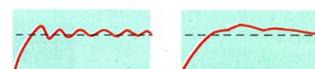
20 PID TUNING NOTES

1. **Proportional cycle time: Fns 4/10** Determines the cycle rate of the output device

| Output device	Recommended time
9900 Internal relays	10 sec minimum (5 sec with derated contacts & snubber)
SSR	1 sec
Linear output (mA/Vdc)	0.05 sec
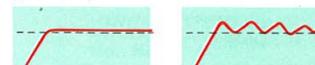
Ideal   Too long (oscillates)

2. **Proportional band/Gain: Fn 5/11** Smooths out oscillation occuring in ON/OFF control

Too narrow (oscillates)   Too wide (slow warm up and response)

3. **Integral time/Reset: Fn 8** Automatically corrects offset errors caused by proportional control
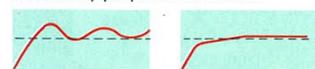
Too short (overshoots and oscillates)   Too long (slow warm up and response)

4. **Derivative time/Rate: Fn 6** Suppresses overshoot and speeds response to disturbances

Too long (oscillates and over corrects)   Too short (slow warm up and response under corrects)

5. **DAC approach control: Fn 7** Tunes warm up characteristics independant of normal operating conditions. Controls when derivative action starts on warm up, (smaller setting = closer to set point) Useful when sensor very remote from heater
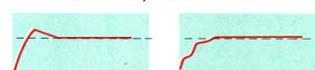
Too small (overshoot)   Too large (slow stepped warm up)

21 PID MANUAL TUNING GUIDE

For unusual applications producing error messages (EE5/6) on Autotune AT/PT

1. **Initial settings:** Fn 5/Opt 0 (or Reset funtions: Fn 15/Opt 1) Fn 4/Opt 7 (ON/OFF Mode) Normal operating set point (Then allow process to stabilise)

2. Take several readings of:

   Amplitude A

   Time period T

(Diagnostics Fns 38/39 may help)

3. **Set PID values   Set opt value**

		Set opt value
Fn 4 Prop cycle time (Ensure compatible with output device)	$\dfrac{T}{20}$ sec	Nearest
Fn 5 Prop band/Gain	$\dfrac{A \times 1.5 \times 100\%}{\text{config range}}$	Next larger
Fn 6 Derivative time/Rate	$\dfrac{T}{10}$ sec	Next shorter
Fn 8 Integral time/Reset	$\dfrac{T}{60}$ min	Next longer
Fn 7 DAC Approach control	1.5 factory set	**see 20.5**

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Page 126

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