## PFAFF

## 3557

## Service Manual

## -3/01

-3/11
-3/02
-3/12

For adjustments to the Sensewmat use the instruction and service manual "SENSEWMAT 1".

For adjustments to the thread trimmer, use Service Manual -900/51 for series 480 machines

## Notes on safety

- The machine must only be commissioned in full knowledge of the instruction book and operated by persons with appropriate training.
- The machine must only be used for the purpose intended.
- Use of the machine without the safety devices belonging to it is not permitted.
- When gauge part are exchanged (e.g. needle, presser foot, needle plate, feed dog and bobbin) during threading, when the workplace is left, and during service work, the machine must be isolated from the mains by switching off the main switch or disconnecting the mains plug.
On mechanically operated clutch motors without start inhibitor it is necessary to wait until the motor has stopped.
- General servicing work must only be carried out by appropriately trained persons.
- Repairs, conversion and special maintenance work must only be carried out by technicians or persons with appropriate training.
- For service or repair work on pneumatic systems the machine must be isolated from the compressed air supply system.
Exceptions to this are only adjustments and function checks made by appropriately trained technicians.
- Work on the electrical equipment must only be carried out by electrical engineers or appropriately trained persons.
- Work on parts and systems under electric current is not permitted, except as specified in regulations DIN 57105 or VDE 0105.
- Conversions or changes to the machine must be authorized by us and only be made on adherence to all safety regulations.
- For repairs, only replacement parts approved by us must be used.

1This symbol draws attention to special danger of injury.
It is imperative to read and adhere to these notes and all generally applicable safety regulations.

|  | For safety instructions, see inside front cover Tools, gauges, and other aids for adjustment Control elements |
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For the following adjustments, please use the instruction- and service manual for Sensewmat 1 .

Bottom feed dog height
Torsion spring for feed dropping lever
Feed dropping linkage lever
Feed dropping depth
Feed dropping cylinder
Distance between vibrating presser lifting lever and actuating lever
Stroke limitation of vibrating presser lifting cylinder
Light emitter for needle plate
Setting the motor speeds
Synchronizer

Tools, gauges, and other equipment needed for adjustment
Set of screwdriver with blades from 2 to 10 mm wide
Set of open-ended wrenches
Set of open-ended wrenches with openings from 7 to 14 mm
Socket wrench, 22 mm
Allenkeys from 1.5 to 6 mm
Metal rule
Adjustment pin ( 5 mm _), part No. 13-030 341-05
Adjustment gauge, part No. 61-111 642-19 or 08-880 179-00
Adjustment link, part No. 91-069 375-15
(gauge foot, part No. 61-111 639-20)
Packet of needles (system 134 KK)
Strip of white paper, sewing thread and testing material
Circuit tester

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master switch
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program start

"1" - rest position
"2" - sewing

- without program at Sensewmat switch position "Manual"
- with the Sensewmat program selected at Sensewmat switch position "Auto"
"3" - presser foot up
"4" - presser foot up, thread trimming


For explanation of control panel, see instruction- and service manual for Sensewmat 1

potentiometer for position
"turning head center"
one -piece collar

diagonal cuffs

shoulder straps

pocket flaps
no program
tey pressed - two jlece collar
automatic control on
reset

re-sewing after thread breakage

seam depth 1 or 2 (as required)

workpiece retainer down,
key depressed - at all seams
key not depressed - only at
long seams

loading guide up
(for working w/o loading guide)

Setting the machine up
Set the machine up at its intended place and level it out.

### 1.1 Conversion from side operation to front operation

The machine has been assembled at the factory in such a way that it can be operated from position " A " (Fig. 1).

If necessary, the machine can also be operated from position " B ".
To this effect, convert the machine as follows:
Unscrew pedal 1 (Fig. 2) at cross member 2 (Fig. 3) of the stand.
Remove cross member 2.
Remove bracket 3 at the pedal (Fig. 2), turn it by $180^{\circ}$, and screw it on again at the left side.
Attach the pedal to the left foot of the stand (Fig. 3), using the two retaining screws.
Turn the master switch under the tabletop by $90^{\circ}$ and attach it at the front side.
Fix the operating panel in the two front holes on the tabletop.

* In case of transportation damage, notify the forwarding agent and the the Pfaff agency responsible.


Connection of power and compressed air
2.1 Compressed air

Connect compressed-air hose ( 6 mm inside diameter) to coupling 1 (Fig. 1).
Minimumpressure in feed system: 7 bar
Working pressure: 6 bar
Pressure regulation: valve 2
2.2 Electrical power
2.2.1 Machines with specification plate

Safe operating voltage: see line 3 (Fig. 2)
Operating- and mains voltage the same: connect machine to an earthed socket.

### 2.2.2 Machines without specification plate

Safe operating voltages: see motor rating plate
Check:
Open motor connection box.
Delta connection = lower voltage
Star connection = higher voltage
Note circuit diagram!
Operating- and mains voltage the same: connect machine to an earthed socket.


3 Checks
3.1 Air filter/lubricator

For correch oil level, seo matingos on container \&Fig, I)
If necessary, top up oil according to section 41.3.

### 3.2 Sewing machine

For comect olliovei, seo markings on oil sight glass 2 (fig, 2)
If necessary, top up oil through the hole (see arrow in Fig. 2).
We recommend Pfaff sewing machine oil, part No. 280-1-120 144, or oil with a mean viscosity of 22 $\mathrm{mm}^{2} / \mathrm{s}$ at $40^{\circ} \mathrm{C}$ and a density of $0.865 \mathrm{~g} / \mathrm{cm}^{3}$ at $15^{\circ}$.

### 3.3 Direction of rotation

The balance whech musimumin the difection of the arrow (Fig. Sis.
Check:

- switch on machine
- set rotary switch 3 (Fig. 4) at MANUAL
- raise presser foot by means of lifting lever
- press pedal slightly forwards and watch balance wheel

If the direction of rotation is wrong, exchange the poles in the mains plug.


Oistond max.
Maximum oil level
Niveau d'huile max.
Nivel de oceite max.

Olstand min
Minimum oil level
Niveau d'huile min.
Nivel de oceite minimo


3

3.4 Mook lubrication

On machines that are operated for the first time or that have not been in use for a longer period of time ( 1 to 2 months), check the oil leod by all means.

Check oil level according to section 3.2.
Switch off machine.
Raise presser foot by means of lifting lever.
Unscrew needleplate.
Fully close oil regulating screw 4 (Fig. 5), then open it again by 2 to 3 turns.
Switch on machine.
Press pedal forwards

- machine runs.

Run the machine until the sewing hook starts to emit oil.
Fully close oil regulating screw 4 again, then open it by half a turn.
Run the machine for about a minute.
Place a piece of paper on the needie plate cutout.
Run the machine for 10 seconds; a fine trace of oil must appear on the piece of paper opposite the hook raceway.

If necessary, re-adjust oil feed accordingly at oil regulating screw 4.


For most of the adjustments, the sewing machine can remain installed in the machine stand. To carry out work below the baseplate, tilt the machine back.

For a number of adjustments, however, it is recommendable to take the sewing machine out of the machine stand.

### 4.1 Tilting the sewing machine over

Switch off machine.
Move turning head 1 (Fig. 1) in the position shown in Fig. 1 by turning adjusting wheel 2.
Tilt sewing machine back and place it on sewing head rest 3 (Fig. 2).

### 4.2 Removal of the sewing machine

Switch machine off and remove compressed air hose at the air fitter/lubricator.
Unscrew belt guard above the table top and remove the $V$-belt.
Pull out the following plugs:

- synchronizer plug b1 (Fig. 3) at motor control board
- plug b13 for thread trimmer at motor control board
- sensor plug j103 at power unit below table top
- light emitter plug j104 at power unit below table top
- thread monitor plug (0)
- plug for bobbin-thread-end sensor (U)
- plug y13 from distributor to b15 at motor control board
- plug b6 for proximity switch of -900 at front side of control box
- plug b7 for proximity switch of automatic presser foot lift at front side of control box
- photocell plug at amplifier 4 (Fig. 2)
- multi-contact plug 5 (Fig. 2)

Remove pneumatic feed lines from cylinders for automatic presser foot lift and for forward/reverse feed.

Loosen knurled ring 6 (Fig. 2) and remove coupling 7.
Lift machine out of its bearing.


### 4.3 Blocking the sewing machine at different positions for adjustment

> No C-clamp must be used on the needle bar of a flaff series 480 machine as this would damage the special coating.
> For biocking the machine at itherequired necdile bat pessition the adiustment pin must be thesertedin the respoctive hoties so inatit reliably enters the recess behind the beaning plate, Ifus biacking themachine.

### 4.4 Functions of the adjustment holes

Adjustment hole 1
$=0.6 \mathrm{~mm}$ past top dead center of needle bar.
Adjustment hole 3
$=0.6 \mathrm{~mm}$ past bottom dead center of needle bar.
Adjustment hole 4
$=1.8 \mathrm{~mm}$ past bottom dead center of needle bar (needle rise position).

Adjustment hole 5
= top dead center of needie bar.
Adjustment hole 6
$=4 \mathrm{~mm}$ past bottom dead center of needle bar.


A straight needle must enter the needle hole exactly in the center:

Loosen screws 1, 2, and 3.
Position the needle bar frame so that the needle stitches exactly in the center of the needle hole.

Tighten screw 3 firmly and screw 2 just lightly.
Use screw 1 to pull the guide pin behind it towards the eye of the needie bar frame, then tighten screw 1.

Remove the needle.
Loosen screw 2, turn the balance wheel a few times (to eliminate any distortion) and tighten screw 2 again.


When the stich length is 0 " and the balance wheet is tumed, the bottom feed dog must make no feeding movement.
6.1 Adjustment with the gearcase closed

Position feed regulating lever 1 fully down (Fig. 1).
Loosen screw 2.
Turn eccentric bushing 3 so that marking 4 faces down and the edge of the flat is at angle of about $45^{\circ}$ to the front of the machine (= preliminary adjustment, for final adjustment see section 19).

Tighten screw 2.
Insert a big screwdriver in the slot of circlip 5 (Fig. 2) and hold feed rock shaft 6 fast with it.
Loosen screw 7.
While tuming the balance wheel, turn circlip 5 with the big screwdriver so that the feed dog makes no feeding movement.

In this position, tighten screw 7.


### 6.2 Adjustment with the gearcase open

Position feed regulating lever 1 fully down (Fig. 3).

Loosen screw 2.
Turn eccentric bushing 3 so that marking 4 faces down and the edge of the flat is at an angle of about $45^{\circ}$ to the front of the machine (= preliminary adjustment, for final adjustment see section 19).

Tighten screw 2.
Unscrew the gearcase cover; watch for leaking oil.
Take out the oil pad.
Loosen screw 8 (Fig. 4) so that crank 9 can just be turned on the shaft.
Turn the crank so that at stitch length " 0 " the bottom feed dog makes no feeding movement when the balance wheel is turned.

## Tighten screw 8.



# With the longest stith length set and the needie bar 0.6 mm past tid.c. ( adjustment hole 1), the botiom feed dog must not move when the reverse leed lever is actuated. 

Set the max. stitch lenght of 4.5 mm at lever 1 (Fig. 1).
Loosen screws 2 (Fig. 2).
Set the needle bar 0.6 mm past t.d.c. and insert the adjustment pin in hole " 1 ".
To facilitate adjustment, insert a screwdriver in the slot of feed driving crank 3 (Fig. 3).
Insert an allen key in the clamp screw of fixing collar 4 (Fig. 1).
Move the shaft forwards and backwards by means of the allen key and turn feed driving eccentric 5
(Fig. 2) so that

- cutout 6 in fedd driving eccentric 5 is visible
- the bottom feed dog, i.e. the screwdriver is completely motionless.

In this position, tighten the accessible screw 2.
Take out the adjustment pin.
Tighten the second screw 2.
Check this adjustment.
Remove screwdriver and allen key.


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When the stich length is sel at "O" and the needle bar 0.6 mm
past ton dead center (m adjustmen hole "Il/, the bottom feed dog
musi be मt is licic. The groove in liting eccentric 1 must
face domnitig,|!.
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Set stitch length " 0 ".

Loosen screws 2 (Fig. 1).
Set the needle bar 0.6 mm past t.d.c. and insert the adjustment pin in hole " 1 ".
Turn lifting eccentric 1 so that the feed dog is at its highest position; the groove of the eccentric must face down.

Tighten the accessible screw 2. Make sure there is a small amount of play between lifting eccentric 1 and the connecting rod behind it.

Take out the adjustment pin and tighten the second screw 2.


With the presser foot lifting lever raised, the labric clearance must be 7 mm

Lower the presser foot onto the needle bar.
Set the head of regulating screw 1 (Fig. 1) flush with the beginning of the screw thread in the sewing head.

Adjust a light pressure on the presser foot by turning screw 2 (Fig. 1) in or out, respectively.
Loosen screw 3 (Fig. 2) and push out bearing pin 4.
Swivel link 5 (Fig. 3) out of the yoke of driving lever 6.
Turn balance wheel to set vibrating presser 7 (Fig. 1) up and raise the presser foot by means of the lifting lever.

Lift presser bar 9 (Fig. 3) and place the 7 -mm adjustment gauge under the presser foot hinge from the rear.

Loosen screw 10 (Fig. 2) and push out pin 11.
Loosen screw 12 (Fig. 1).
Adjust presser foot 8 (Fig. 1) so that its edge is parallel to the feed slots.
Move lifting piece 13 (Fig. 1) fully down and tighten screw 12.
Pins 4 and 11 (Fig. 2) are replaced in the following adjustment (see section 10).


Top feed driving- and connecting lever
Al moving parks of the top leod must move treely and withoul
play:
Move lifting lever 1 (Fig. 1) down.
Loosen screw 2.
Swivel link 3 (Fig. 1.1) into the yoke of driving lever 4.
Push bearing pin 5 (Fig. 1.1) into driving lever 4 and through link 3; make sure this can be done easily and re-adjust driving lever 4, if necessary.

Set stitch length " 0 " at lever 6 (Fig. 2).
Set the vibrating presser central to the presser foot cutout as seen in sewing direction and tighten screw 2 (Fig.1).

Check that bearing pin 5 and link 3 do not bind; re-adjust driving lever 4, if necessary.
Loosen screw 7 (Fig. 1).
Set the hole of linking lever 8 exactly opposite the hole of pull rod 9 ; if necessary, adjust linking lever 8 accordingly.

Push eccentric pin 10 through the hole of pull rod 9 into the hole of linking lever 8 in such a way that its lobe faces down.

Tighten screw 11.
Push linking lever 8 back (feed direction) until a stop is felt, and tighten screw 7.
Tighten screw 12.
Loosen screw 13.
Adjust the vibrating presser crosswise to sewing direction so that it does not contact the presser foot; in this position, tighten screw 13.


With the stich length and top teed stroke set at " 0 " and with adjustment link 1 (Fig, 1) attached, driving lever 2 (Fig. 2) must nol move when the balance wheet is tumed.

## Remove link 3 (Fig. 3).

Attach adjustment link 1 (Fig. 1).
Loosen screws 4 (Fig. 1), 5 and 6 (Fig. 3), as well as nut 7 (Fig. 2).
Set feed regulating lever 8 (Fig. 4) at " 0 ".
Loosen screw 16 (Fig. 2) and push out bearing pin 17.
Unscrew upper part of the belt guard.
Move pull rod 9 repeatedly up and down in the elongated hole of lever 10 (Fig. 2); driving lever 2 must then remain motionless.

For correction, loosen screw 11 (Fig. 5) (always tighten it when checking the adjustment); re-position lever 10 (Fig. 2) so that with screw 11 (Fig. 5) tightened, driving lever 2 does not move when pull rod 9 (Fig. 2) is moved up and down.

Push pull rod 9 to the top of the elongated hole in lever 10 and tighten hexagon nut 7.
Set feed regulating lever 8 (Fig. 4) at " 3 ".
Loosen screw 12 (Fig. 1), set the leg of crank 13 parallel to the base plate and tighten screw 12 again.
Set feed regulating lever 8 (Fig. 4) at " 0 ".
Loosen screw 14 (Fig. 6) and tum feed regulating lever 15 so that driving lever 2 (Fig. 2) remains motionless when the balance wheel is turned; tighten screw 14 (Fig. 6).

Insert pin 17 (Fig. 2) in driving lever 2 and linkage 18; tighten screw 16.
Set stitch length " 4.5 " at feed regulating lever 8 (Fig. 4).


Automatic backtacking mechanism
When cylinder 1 (Fig. 1 ) is extended, the machine must sew in reverse.

Push link 2 (Fig. 2) on pins 3.
Set stitch length at 3 mm .
Loosen clamp screw of crank 4 (Fig. 1) and rest crank against bracket 5. Make sure that bracket 5 rests against crank 6.
In this position, tighten the clamp screw of crank 4.
Loosen screw 7, rest crank 8 against bracket 9 , and tighten screw 7 again.
Remove link 2 (Fig. 2).


Top feed advancing motion
With the stich length set at ' $4.5 \mathrm{~mm}^{\prime \prime}$ and the need b bar 0.6 mm past t.d.c. (= adjustment hole "I ), the vibrating presser must remain motionless when the shafl of the reverse feed controf is umed.

## Set stitch length " 4.5 mm " at feed regulating lever 1 (Fig. 1).

Raise the presser foot.
Loosen screws 2 (Fig. 2).
Set needle bar 0.6 mm past t.d.c. and insert adjustment pin in hole " 1 ".
Insert an allen key in the clamp screw of fixing collar 3 (Fig. 1).
While moving the allen key to and fro, turn feed driving eccentric 4 (Fig. 2) (cutout 5 must face to the front of the machine) so that vibrating presser 6 (Fig. 3) remains motionless.

Tighten the accessible screw (Fig. 2).
Remove adjustment pin and allen key.
Tighten the second screw 2.


## 14 Top feed lifting motion

With the stich length sel at "4" the vibrating presser must
contact the botiom feed dog when the latter in its upward movernent
has reachied the nescle plate surface
Set stitch length at " 4 ".
Rest presser foot on needle plate.
Set the take-up lever up and loosen screw 1 (Fig. 1), accessible from below.
Turn eccentric pin 2 so that the vibrating presser does not contact the bottom feed dog until the latter in its upward movement has reached the needle plate surface.

Tightenscrew 1.


With the presser toot resting on the needle plate and the vibrating presser at is top reversal point, there must be a clearanceo of 2 mubet ween needle plate and vibrating presserif the airea il irant of Ihe needie hole) when the stict length is ser al $0 \%$.

Attach link 1 (Fig. 1).
Set stitch length at " 0 ".
Turn threaded sleeve 2 (Fig. 2) to increase the pressure on the presser foot a little.
Rest the presser foot on the needle plate.*
Loosen screw 3, move the lobe of pin 4 so that it faces the needle bar and tighten screw 3 again.
Turn balance wheel until linking lever 5 is at its rear point of reversal.
Carefully loosen screw 6 and push linking lever 5 back so that the respective feeler gauge can be inserted between vibrating presser and needle plate.

Push the 2-mm-thick feeler gauge under the vibrating presser from the front (in the area in front of the needle hole) and tighten screw 6.

Remove the feeler gauge.
If re-adjustment is necessary, loosen screw 7, turn eccentric pin accordingly and tighten screw 7 again.

Remove link 1 (Fig. 1).
*We recommend the use of gauge foot 61-111 639-20 for the adjustment.


Whent the bottom fered dog is at its top reversal point, the vibrating presser mist be parallel to the botiom teed dog.

Turn balance wheel to set the bottom feed dog at its highest position.
Rest the presser foot on the needle plate.
Loosen screw 1 (Fig. 1).
Turn the eccentric pin (see arrow in Fig. 1) so that the vibrating presser is parallel to the bottom feed dog when the latter is at its top point of reversal.

Tighten screw 1.
Check the top feed lift (section 15) and re-adjust, if necessary.

With the regulating levers for stich length and top feed stroke
set at "3", vibrating presser and bottom leed dog must make the
same feed strokes when the balance wheel is turned.

Set the regulating levers for stitch length and top feed stroke at " 3 ", making sure the adjustments in section 6.1 or 6.2 have been made.

Insert an allen key in the clamp screw of fixing collar 1 (Fig. 1).
By means of the allen key, turn reverse feed control shaft 2 as far as it will go in the direction of the arrow and loosen nut 3 (Fig. 2) which has thus become accessible.

Re-position pivot screw 4 in its elongated hole in such a way that vibrating presser and bottom feed dog make feed strokes of the same length when the balance wheel is turned.

Tighten nut 3.

## Note:

The stroke of the vibrating presser can be increased by moving pull rod 5 (Fig. 3) down.


18 Synchronisation of top- and bottom feed in reverse sewing
The feed strokes of vibrating piesser and bottom leed dog must be of the same length when seving in reverse.

Loosen screw 1 (Fig. 1).
Re-position lever 2 accordingly.
Tighten screw 1.
Turn balance wheel while watching the feed strokes.
Repeat the adjustment, if necessary.
18.1 Limitation of feed regulator for backtacking

Set feed regulating lever at "4.5". Rest lever 3 (Fig. 2) against the upper regulating shaft from below.
Tightenscrew 4.

### 18.2 Limitation of feed regulator for stitch condensation

Set feed regulating lever at "1" to "1.5". Rest lever 3 (Fig. 2) against the upper regulating shatt from above.

Tighten screw 4.


When the stitch lengthis set at "3\%, the stiches must be of the same lengithin onvard and reverse sewing.

Set stitch length at " 3 ".
Loosen screw 1.
Set the lobe of bush 2 so that it faces down; then turn the bush a little forward or back, as required, until the stitches are of the same length in forward and reverse sewing.

Tighten screw 1.


When the sewing hook is in contact with oil thrower 1 (fig. 1 . there must be a clearance of 0.4 mim between the hook point and the
 barelypercenabla backlast:

Loosen screw 2 and swivel oil tube 3 out of oil thrower 1.

## Loosen screw 4.

Turn eccentric bearing 5 so that the groove is visible from below (see arrow) and the backlasti of the gears is barely perceivable.

## Loosenscrews 6.

Rest the sewing hook against oil thrower 1.
Se the hook point opposite the center of the clearance cut of the needle.
Re-position bearing 5 so that between the hook point and the center of the clearance cut of the needle there is a clearance of 0.4 mm , making sure, however, that the bearing is not turned and the sewing hook is in contact with oil thrower 1.

Tighten screw 4 firmly.

## Loosen screws 8.

Re-position gear 7 so that it is in alignment with the small gear.
Tighten screws 8, making sure that the second screw of gear 7, as seen in the direction of rotation, is in the groove of the shaft; in doing so, watch for the gear backlash.

## Note:

Screws 6 remain loose for the following adjustment (section 21), and the oil tube remains swivelled out for the adjustment in section 25.


Push feed regulating shaft 19 (Fig. 7) up and hold it.
Turn actuating lever 20 (Fig. 8) so that there is a clearance of 3 to 4 mm between this lever and the base plate; in this position, tighten screw 6.

Replace link 3 and secure it with circlips 21.
Remove adjustment link 1.


Needle height, needie rise and hook to needle clearance
With the needie bar 1.8 mm past b.d.c. ( 4 adjustment hote "4"),
the top edge of the needle eye must be 0.8 mim below the hook point
(Fi) i. II. Also in this position, there must be aclearance of

Loosen screws 2 (Fig.1.2) if not loose yet.
Set the needle bar 1.8 mm past b.d.c.; make sure the needle does not strike against the sewing hook. Insert the adjustment pin in hole " 4 ".

Loosen screws 1 (Fig. 1).
Set the hook point opposite the needle center.
Re-position the needle bar so that the top edge of the needle eye is 0.8 mm below the hook point; make sure the needle bar is not turned.

## Tighten screws 1.

Make sure the position finger is in the groove of the bobbin case base and re-position the sewing hook so that there is a clearance of 0.1 mm max. between the hook point and the needle.

Tighten the accessible screw 2(Fig. 1.2).
Take out the adjustment pin and tighten the second screw 2.


Eccentric bearing of bobbin case opener shaft
At the left point of reversal of bobbin case opener 1 , the height of the bobbin case opener finger must be adjusted so that the
finger is exacty aligned with the thg of bobbin case base 2 (Fig:
111
H must bo easy to take the bohtin case oul of the sewing hook.
Loosen screw 3 (Fig. 1).
Turn the balance wheel to set the bobbin case opener at its left point of reversal.
Turn eccentric bearing 4 of the bobbin case opener shaft so that the bobbin case opener finger is exactly aligned with the lug of bobbin case base 2 .

Tightenscrew 3.


Bobbin case opener position
The clearance between the finger ol bobbincase openert and the
im of bolthin case base 2 must be about 0.8 mm (Fig. 1/1). Also,
at the left point of reversal of bobhin case opener 1 , bobhin case
base 2 musi be pushod aviay from position finger 3 by about 0.3 mm
(Fin. 1.2).
Stop screw 4 must then contact stop pin 5 of bobbin case opener. 1
(F19.3)

Loosen screw 4, and screw 6 just enough to allow bobbin case opener 1 to be moved.
Re-position bobbin case opener 1 on its shaft until there is a clearance of 0.8 mm between the finger of the bobbin case opener and the rim of the bobbin case base (Fig. 1.1).

Turn balance wheel to set bobbin case opener 1 at its left point of reversal.
Turn bobbin case opener 1 on its shaft until bobbin case base 2 is pushed away from position finger 5 by about 0.3 mm (Fig. 1.2).

Tighten screw 6 firmly.
Rest fixing collar 7 against bobbin case opener 1 and turn it so that stop screw 4 contacts stop pin 5 of bobbin case opener 1 (Fig. 1.3).

Tighten screw 4.


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When the needle bar is 1.8 mm past \(b\) d. . ( 4 adjustmenil hote "4"),
bobbin case opener 1 must be at its right point ol reversal fig.
41)
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Loosen screws 2 (Fig. 1).
Set the needle bar 1.8 mmpast b.d.c.
Insert the adjustment pin in hole "4".
For exact determination of the reversal point, insert a small screw driver in the clamp slot of bobbin case opener 1.

Turn eccentric 3 so that bobbin case opener 1 is at its right point of reversal.
Tighten the accessible screw 2, watching for the play between eccentric 3 and the lifting eccentric.
Remove the adjustment pin and the screwdriver and tighten the second screw 2.


25 Oil tube in oil thrower
Oil tube 1 must be in the hole of ail thrower 2 (Fig. 1).
Loosen the screws of oil thrower 2.

Turn oil thrower 2 so that oil tube 1 can be inserted in the hole.
Insert oil tube 1 in the hole by turning it.
Tighten screw 3.
Tighten the screws of oil thrower 2.


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Between actuating plunger 1 of the centrifugal govermor and vatve
rod 2 of the oll check valve there must be 1 mm of play (see Fig.
1.1).
```

Loosen screw 3 (Fig. 1).
Push actuating plunger 1 into the centrifugal governor as far as it will go.
Push valve rod 2 into check valve 4 until a resistance is felt.
Re-position check valve 4 so that there is a distance of 1 mm between actuating plunger 1 and valve rod 2.

Tighten screw 3.
Push the soaked lubricating pad (with the big cutout facing left down) between the oil tube and the gearing.

Clean the gasket and gasket surface of the gearcase.
Screw on the gearcase cover and both sewing head supports.


Needle thread tension release
When the liting lever is raised, the two tension discs must be at loast 0.5 mm apan.

Raise the presser foot by means of the lifting lever.
Loosen screw 1.
Adjust tension release lever 2 so that the two tension discs are pushed apart by at least 0.5 mm .
Tighten screw 1.
When the presser foot touches the needle plate, the tension must be fully activated.


28 Thread check spring and thread regulator
The stroke of the thread check spring must be about 5107 lrm
(Fis. 11).

## Note:

Both the stroke of the thread check spring and the position of the thread regulator depend on the material and thread used, and have to be adjusted according to the appearance of the seam.

Loosen screws 1 (Fig. 1) just enough to allow the thread tension to be turned.
Turn the thread tension so that the stroke of the thread check spring is about 5 to 7 mm .
Tighten screws 1 evenly.
Loosen screws 2.
Push the thread regulator up as far as it will go and tighten screws 2.

When the bobbin winder is engaged, the winder spindle must be
driven reliably, when the winder is disengaged, friction wheelt
(Fi: I) must not comact winder drive wheel 2. Also, the bobbin
Winder inusi be aitomatically disengaged when the thread wound on
the bobtin has reached a poinl about in bethe the in ifigs
11)

Raise the presser foot by means of the lifting lever and engage the bobbin winder.
Loosen screws 3 (Fig. 1).
Re-position winder drive wheel 2 sideways so that the winder spindle is reliably driven when the bobbin winder is engaged, and that there is no contact between winder drive wheel 2 and friction wheel 1 when the bobbin winder is disengaged.

Tighten screws 3.
Place an empty bobbin on the winder spindle, thread the machine for bobbin winding, engage the bobbin winder, and switch on the machine.

If the bobbin winder is disengaged too soon or not at all, loosen screw 4.
If the bobbin is too full, push adjusting pin 5 in, or push it out if the bobbin is not full enough, and tighten screw 4.

If the thread piles on one side, adjust the thread guide on the machine arm accordingly.


30 Pressure of vibrating presser and presser foot
The pressure of vibrating presser and presser foot on the material sevn must be adiustod so that proper teeding is ensured even at sppspeted:

### 30.1 Basic adjustment

Set the head of regulating screw 1 (Fig. 1.1) flush with the beginning of the screw thread.
Turn in knurled sleeve 2 (Fig. 1.2) until there is a distance of about 12 mm between its collar and the machine housing.

### 30.2 Pressure of vibrating presser

Turning regulating screw 1 in increases the pressure on the vibrating presser; turning the screw out decreases the pressure.

### 30.3 Pressure of presser foot

Turning knurled sleeve 2 in increases the pressure; turning it out decreases the pressure.


Depending on the limitation value, loosen screw 1 (Fig. 1.1) or remove it altogether.
Set stitch length 4.5 mm at regulating lever 2 (Fig. 1).
Rest stop 3 (Fig. 1.1) against regulating lever 2 from above and fix it with screw 1 in the upper or lower hole.


Automatic presser foot lift
The clearance between raised presser fool and needte plate must be
7 mm
Raise presser foot with litting lever and place a gauge of 9 mm between presser foot and needle plate.
Loosen screws 1 (Fig. 1).
Extend cylinder 2 (Fig. 2).
(With machine removed: connect compressed air to cylinder.
With machine fitted: switch on machine and press key
Press crank 3 (Fig. 1) in the direction indicated by the arrow until lifting lever 4 (Fig. 3) rests against block 5.

In this position, tighten screws 1 (Fig. 1).
Remove gauge from under the presser foot.
Lower presser foot, then raise it again by means of the automatic presser foot lift.
In this position, the clearance between presser foot and needle plate must be 7 mm and the hand lifting lever must drop by its own weight.

33 Proximity switch of automatic presser foot lift
Winh the presser hoot loweredi, swich vane 6 (Fig. 4) must be
above the proxirity, switch:
Loosen screw 7 and adjust switch vane 6 with the presser foot lifting cylinder retracted so that the vane is above the proximity switch at a distance of 0.5 mm .

Tighten screws 7 again.


With the thread trimmer at rest position, tip I (Fig. 1 ) must
be above proximity suilich 2 at a distance of 0.5 mm .
Loosen nuts 3 and adjust proximity switch 2 accordingly.
Tighten nuts 3 , making sure there is a distance of 0.5 mm between trip and proximity switch.


Take-up lever

## Dismantling

Take out screws 1
Loosen screw 2.
Pull off bearing plate 3 together with crank 4.
Loosen screws 5.
Pull out bearing pin 6 with an M4-screw (of the housing cover), pressing against take-up link 7.
Unscrew cover plate 8.
Loosen the clamp screws in arm shaft crank 10 through hole 9.
Set the needle bar at its appproximate b.d.c.
Carefully pull off take-up lever 11 together with needle bar connecting rod 12, holding them parallel.

## Refitting

Push take-up lever 11 together with needle bar connecting rod 12 in arm shaft crank 10 and on the needle bar stud.
Move take-up link 7 up, insert pin 6, and tighten screws 5 securely.
Turn the arm shaft so the needle bar is at b.d.c.
In this position, tum crank pin 13 so that its lobe faces rear (see arrow in Fig. 1). Make absolutely sure the lobe is positioned as indicated!
Tighten the clamp screws in arm shatt crank 10 through hole 9.
Replace bearing plate 3 together with crank 4. It must be easy to turn the bearing plate back and forth, as otherwise take-up lever 11 will bind.

Tighten screws 1.
Tighten clamp screw 2 securely.


## 36 Fitting the sewing machine

Place the machine in its bearing in the table top.
Replace all pneumatic and electrical connections at the proper points (see section 4.2 "Removal of the sewing machine").

Replace V-belt.
Connect compressed-air hose to the air filter/lubricator.

### 37.1 Adjusting the turning head

The distance betweenturing ptate of ( 5 ; 1 ) and he neede must be the same inthe enilio turning area.

Switch off machine.
Raise presser foot with the litting lever.
Set needle at its lowest position.
Press turning plate 1 with your hand on the table top.
Measure the distance between needle and tuming plate.
Vary the position of the furning head by turning adjusting knob 2 (Fig. 2).
Measure the distance at every position.
In case of deviation, loosen screws 3 and 4 a little and adjust the whole turning head system.
Tighten screws 3 and 4 again.

### 37.2 Turning head pressure

 pressure.

Loosen screw 5 (Fig. 2) and press bush 6 down until turning plate 1 just touches the table top.

## Tighten screw 5.

Loosen screw 7 and reposition retaining collar 8 according to the turning head pressure required.

- retaining collar up - pressure increased
- retaining collar down - pressure decreased.

Tighten screw 7.


Switching point.
Cirosswise to sewing direction about 2 mm beiore stiop 1 (Fig: 1 ).
In seruino directionabout 18 inm betore the needie.
Dining sewing, the luming head misit then ine workpieco. Iftaby
against stor 1 .
The fibratiog presser at its fonl poail oil ieversal must have no inluence on the photocell.
38.1 Preliminary adjustment

Switch on machine.
Move a piece of paper under photocell 2 in sewing direction until the LED of the photocell goes out. In this position, the front edge of the paper must be about 18 mm away from the needle.

Loosen screw 3, reposition the photocell in sewing direction accordingly, then tighten screws 3.
Move a piece of paper under the photocell crosswise to sewing direction until the LED of the photocell goes out.

In this position, the front edge of the paper must be about 2 mm away from the needle.
Loosen screws 4, reposition the photocell accordingly, then tighten screws 4.

### 38.2 Final adjustment

Switch on machine, set selector switch 5 (Fig. 2) at AUTO and press key 6.
Enter the required program at the control panel. Insert the workpiece.
Press the start key,

- the sewing pocedure with turning runs off automatically.

During sewing, make sure that the workpiece is reliably turned against stop 1.
Re-adjust the photocell, if necessary.


39 Proximity switches for turning head limitation
The turning head must turn through about $180^{\circ}$ Start and end positions must be on a line drawn through the needie center in seving direction (Fig. 1):

## Position "A"

Loosen screw 2 and re-position switch vane 1 (Fig. 2) so that the furning head moves to position "A" (Fig. 1).

## Position "B"

The position is determined by the photocell at the machine head (see section 38).
Proximity switch 3 (Fig. 3) serves as a safety switch if the photocell does not signal the end position.

## IMPORTANT:

Proximity switch 3 must not switch off the turning head before the latter has reached the position determined by the photocell.

Loosen screw 4 and adjust switch vane 5 accordingly.

### 39.1 Distance of proximity switches and switch vanes

Ine cistance must be abolito 5 min lig 4i
Loosen nuts 6 and re-position accordingly.
Tighten the nuts again.

$3$


### 40.1 Circuit board 11 (Fig. 1)

## Potentiometer 1:

Time between photocell unblocked and "stacker feed" to left.
After thread trimming and presser foot up the sewn part must be fed to the stacker without delay.

## Potentiometer 2:

Sensewmat disturbance,
Time firmly set at the factory (do not change).

## Potentiometer 4:

Time between "turning head down" and "4urning to right" on. The turning motion must not start until the turning head is lowered.

## Potentiometer 5:

Time between "turning head up" and "turning to left" on. The turning motion must not start until the turning head is raised.

## Potentiometer 6:

Time between "sewing on" 1st seam and turning head position "center"; set potentiometer so that after the first seam is sewn, the turning head gets a reliable hold for turning all workpiece shapes to be processed.*

* On machines having potentiometer 7 (Fig. 2) on the control panel, potentiometer 6 (Fig. 1) must by all means be set at " 0 ". The time between "sewing on" and "turning head position center", i.e. the point of time of the position at which the turning head takes over the workpiece for turning after the first seam has been sewn must be set at potentiometer 7 (Fig. 2) in such a way that the turning head touches the workpiece over its entire width.



### 40.2 Circuit board 12 (Fig. 3)

## Potentiometer 1:

"Stop 8 (Fig. 4) torward" ist seam, in program "one-piece collar" time between "sewing start" and "stop 8 fonward".
"Stop 8 forward" must not set in until the collar stand is fed out of the stop area.

## Potentiometer 2:*

"Stop 8 backward" 3rd seam, in program "one-piece collar" time between "sewing start 3rd seam" and "stop 8 backwards".
"Stop 8 backward" must be finished when the collar stand is fed to the stop area.

## Potentiometer 3:

## Reset stacker.

Time between "stacker start" and "stacker rest position".
The time must be set so that the stacker executes its complete stacking function without time delay.

## Potentiometer 4:

Time between "stacker slide left" and "stacker start". Stacker start must not be effected until the workpiece fed in is fully in the stacker.

## Potentiometer 5:

"Stop 9 (Fig. 4) back" 3rd seam, in program "one-piece collar" time between "sewing start 3rd seam" and "stop 9 backwards".
Stop 9 must go back when the collar stand is fed into the stop area.

## Potentiometer 6:

Loading guide 10 (Fig. 5) down (after sewing end).
The loading guide must go down as soon as the stacker slide has fed the workpiece sewn out of the loading area.

* Adjust this potentiometer after potentiometer 5 has been adjusted.



41 Work at the air fiter/lubricator
Regulary checis the air fillertubricator so that distumance firee operation can bie onsured:

### 41.1 Draining the water trap

For max. water levei, see marking at contaner (fis. I).
Open drain screw 2.
Drain water.
Close drain screw 2.

### 41.2 Cleaning the air filter


Shut off compressed air.
Unscrew container 1.
Unscrew separating plate 3.
Take out filter 4.
Clean filter and container with naphtha.
Blow through the filter with compressed air from the inside.
When re-assembling, do not forget the gasket!
Open compressed air.


### 41.3 Topping up oil

For conect oil level, see markings at container 5 (Fig 2)
We recommend Piaff oil, part No. 280-1-120 144, or another oil suitable for pneumatic systems, which causes little or no swelling or shrinking of the sealing materials used, under different operating conditions.
The mean viscosity of this oil should preferably be between 22.0 and $46.0 \mathrm{~mm}^{2} / \mathrm{s}$ at $40^{\circ} \mathrm{C}$, and its density between 0.865 and $0.875 \mathrm{~g} / \mathrm{cm}^{3} \mathrm{at} 15^{\circ} \mathrm{C}$.

Shut off compressed air.
Check container 5 for dirt (residue).
If necessary, unscrew container 5 and clean with naphtha.
Screw on container 5 again (do not forget gasket!).
Take out screw 6.
Fill in oil (note markings!).
Replace screw 6.
Open compressed air.
41.4 Drip feed rate at vaporizer jet

Adinst dip teed mate so that sumicient librication of cyilinems and vaties is ensured:
Turn regulating screw 7 accordingly.

### 41.5 Cleaning the vaporizer jet

Shut off compressed air.
Unscrew vaporizer jet 8 .
Fully open regulating screw 7.
Blow through vaporizer jet 8 with compressed air in the direction of the arrow (Fig. 2.1).
Screw on vaporizer jet (do not forget gaskets!).
Open compressed air.
Re-adjust drip feed rate.




6. Postionthg add down, needte alrblast on
5. Edge gulde 2 back, one-plece collar. Jrd seam
4. Stacker start
3. Stacker reset
2. Edge gulte 3 back, one-plece collar, $\operatorname{Fr}$ d seam 1. Edge gude 3 forward, one-plece collar ist seam


| AL |  |
| :---: | :---: |
| 0 | not connected |
| 0 |  |
| 0 |  |
| 0 |  |
| 0 | Sensewmat control |



20. - sub D 15pin B13, B15, B16
b21. = Sub D 15pin S3, B9, B10, B11, B12, B21
b22. = Sub D, 15pin, sewing head
b23. = Preh 4pin B7, foot lift
b24. = Preh 3pin, -900
b25. = staf 4pin, knee-start
b27. = Preh 3pin, needle thread monitor
b28. = Connector
b29. $=$ Hirschmann, 5pin, cube, pedal


Pneumatics diagram \# 95-748 360-95










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