*MM binder labels. 30mm Halfwidth Note! This page is generated **automatically**. using the **variable definitions** made in the **front page** file!!*

Tetra Cardboard Packer 70
MED infeed
Issue 9510 Doc No. MM-84842-1

Tetra Cardboard Packer 70
MED infeed
Issue 9510 Doc No. MM-84842-1

Tetra Cardboard Packer 70
MED infeed
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Issue 9510 Doc No. MM-84842-1

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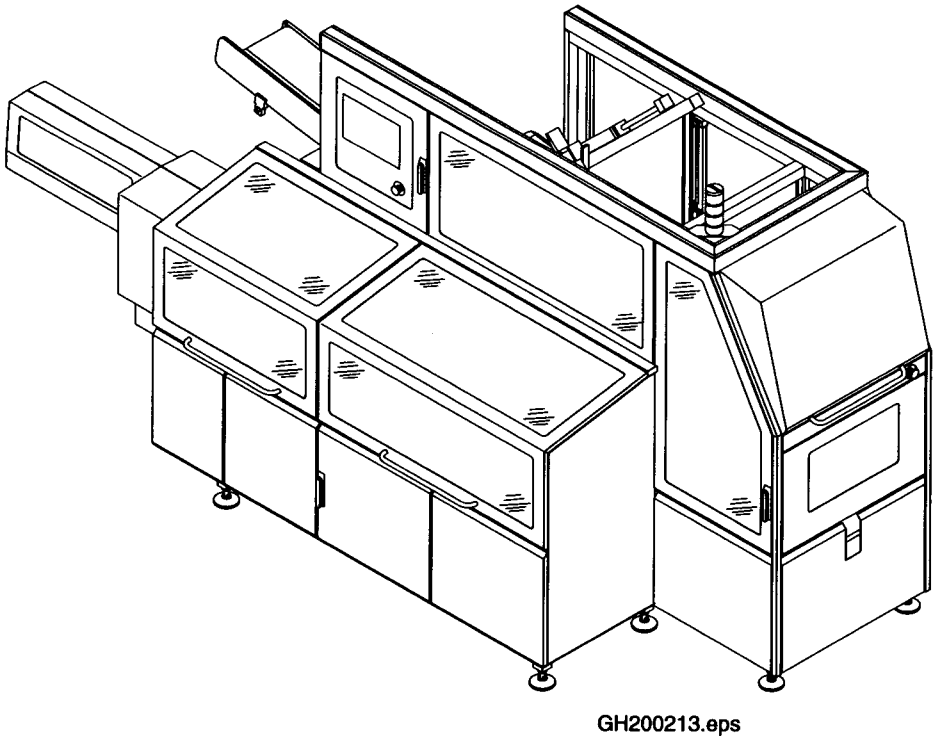
Issue 9510 Doc No. MM-84842-1

MM

Maintenance Manual

Tetra Cardboard Packer 70

MED infeed



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Tetra Pak

Doc No. MM-84842-1

This document is valid for:

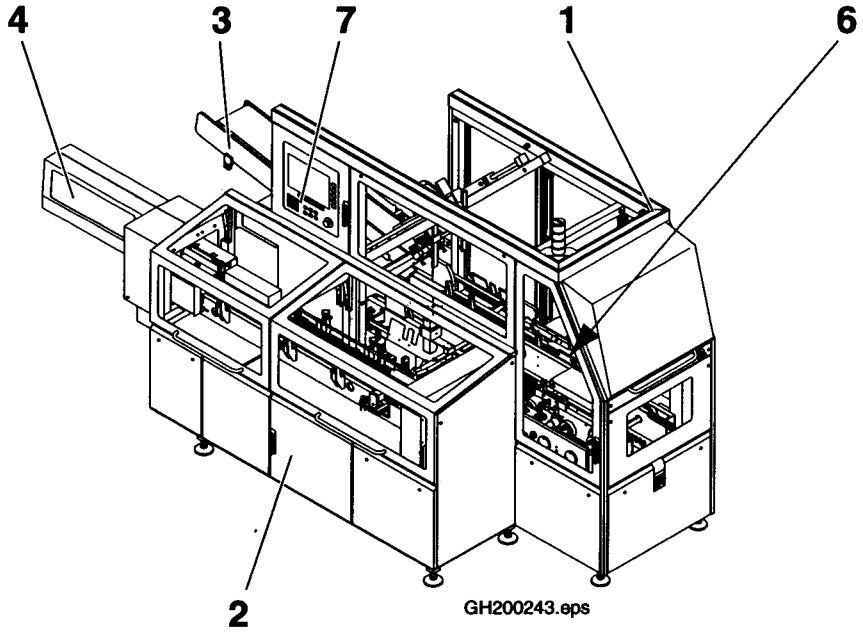
Series No/ Machine No Sign.

Tetra Cardboard Packer 70
670272-060V

Equipment included:

MED infeed
670292-0402

Wrap around unit
670375-040V



2.1b8484201.fro

1 Base unit
2 Infeed unit
3 Magazine unit
4 Regular accessories
(No actions described)
5 Extra equipment
(No actions described)
6 Wrap around unit
7 Electric equipment
8 Rebuilding kit
(No actions described)
9 General
10 Checklist overview

Issue 9510

Doc No. MM-84842-1

Tetra Pak

Tetra Pak Distribution AB

Introduction

Safety precautions

1 Base unit

2.1b8484201TOC

3 Magazine

2.1b844201TOC

6 Wrap around unit

7 Electrical equipment

2.1b8484201TOC

9 General

10 Checklist overview

Table of contents

Introduction

WARNING! **Risk of personal injury!**
To ensure maximum safety for the technicians, always read the **"Safety precautions"** section before doing any work on the machine or making any adjustments.

2.1bTH200013.en

Machine introduction

Intended use of this Tetra Pak equipment

To place Tetra Brik packages or other packages approved by Tetra Pak Distribution AB into units made of corrugated cardboard.

Manufacturer

This Tetra Pak equipment was manufactured by:

Tetra Pak Distribution AB
Ruben Rausings gata
221 86 Lund
Sweden

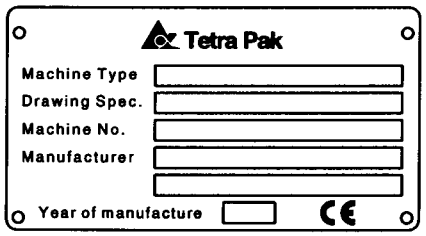
Service

For service, contact the nearest Tetra Pak service station.

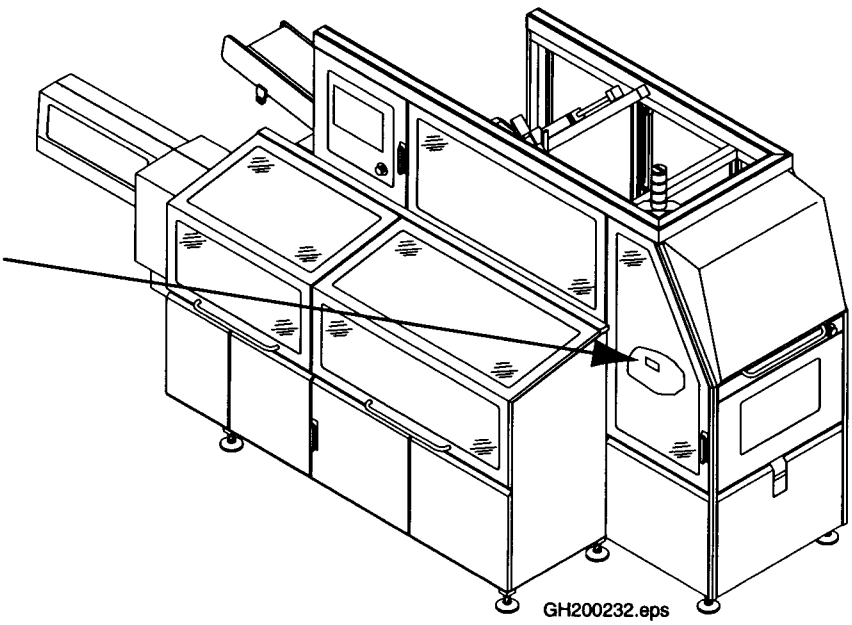
Machine specification

The machine plate below is the type of machine plate attached to the machine frame. The plate carries data needed when contacting Tetra Pak concerning this specific machine.

The plate is marked with a **CE sign**. It means that this machine complies with the **basic health and safety regulations** of the **European Economic Area (EEA)**.



Example of machine plate



2.1bTH200013.en

Document information

About this Maintenance Manual (MM)

The Maintenance Manual contains:

- All **scheduled maintenance** procedures listed in the checklists.
- Information for **unscheduled maintenance** such as:
  - additional maintenance procedures
  - system descriptions

The same **structure, codes**. and **denominations** used in this MM, are used in the Spare Part Catalogue (SPC) and in the checklists.

Document producer

This document has been produced by:

Tetra Pak Distribution AB
Development Support
Ruben Rausings gata
221 86 Lund
Sweden

Design modifications

The directives in this document are in accordance with the design and construction of the machine at the time it was released by a Tetra Pak machine production facility.

2.1bTH200013.en

Corresponding documents

The technical documentation for this machine includes also the following type of documents:

- Electrical Manual (EM)
- Installation Manual (IM)
- Operation Manual (OM)
- Spare Parts Catalogue (SPC)

It is important that you keep these manuals for the life of the equipment, and pass the manuals on to any subsequent holder or user of the equipment.

Additional copies

Additional copies can be ordered from nearest Tetra Pak service station.

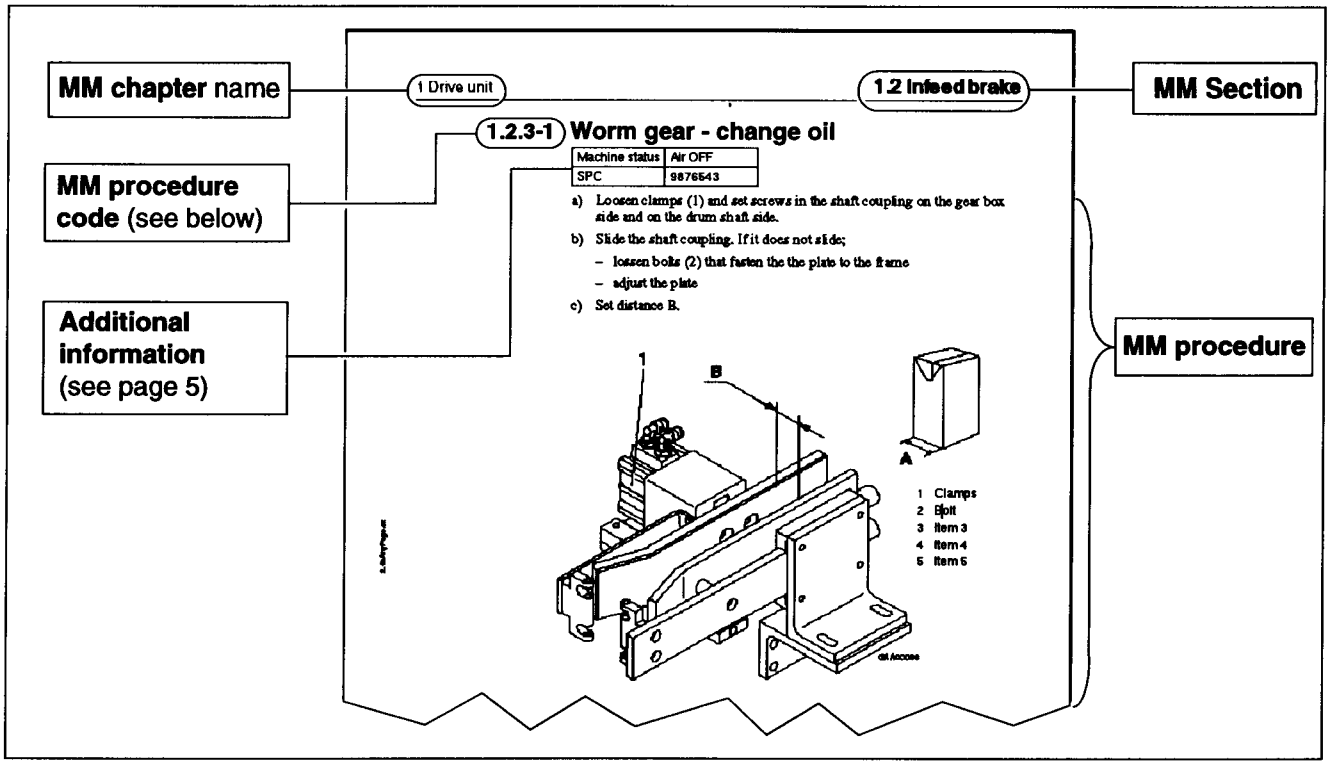
When ordering technical publications, always quote the **document number** printed on the front cover of the document concerned.

Number of pages

This document contains a total of 182 pages.

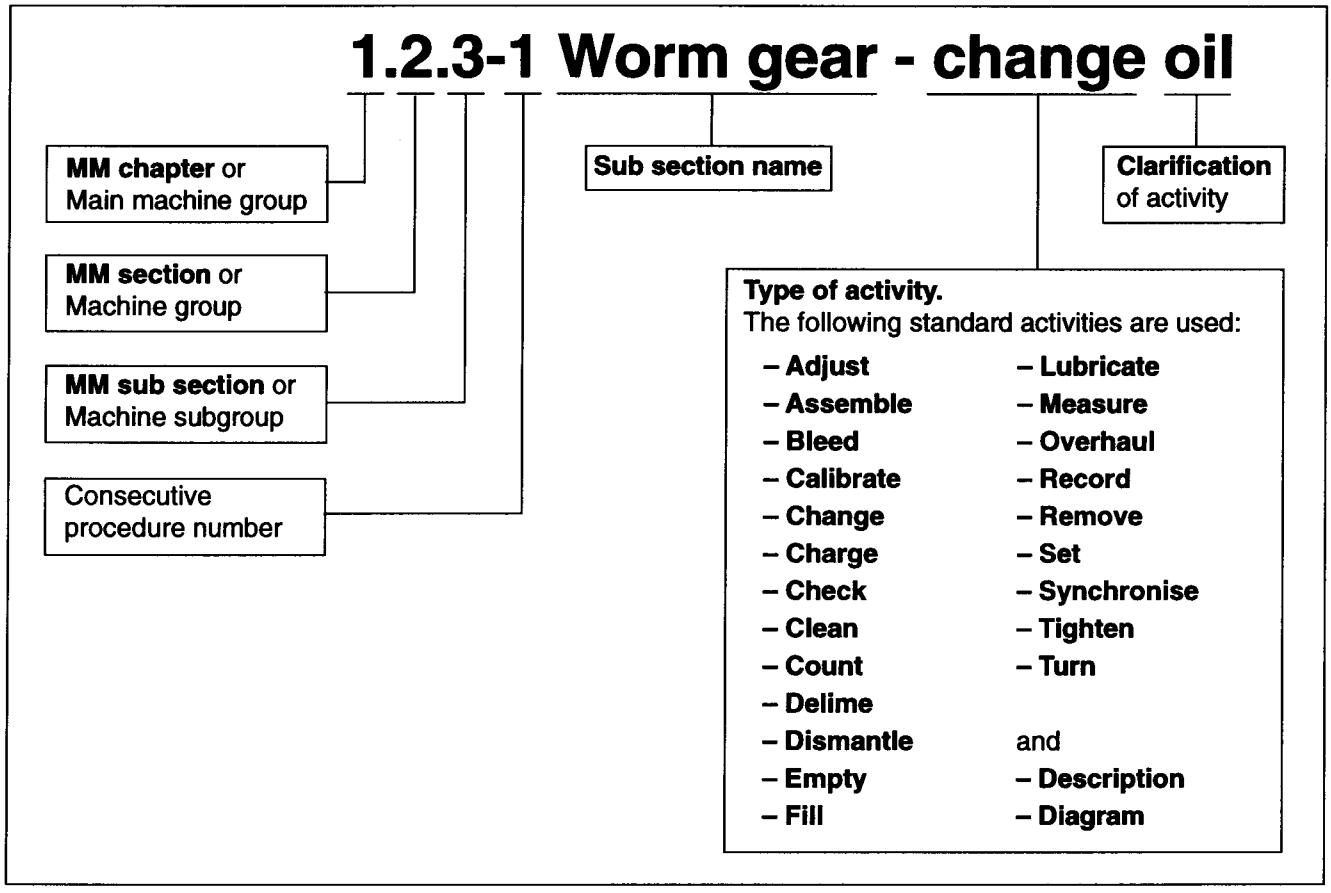
How to use this manual

Page layout



MM procedure codes

The maintenance procedures are indicated as shown by the example below:



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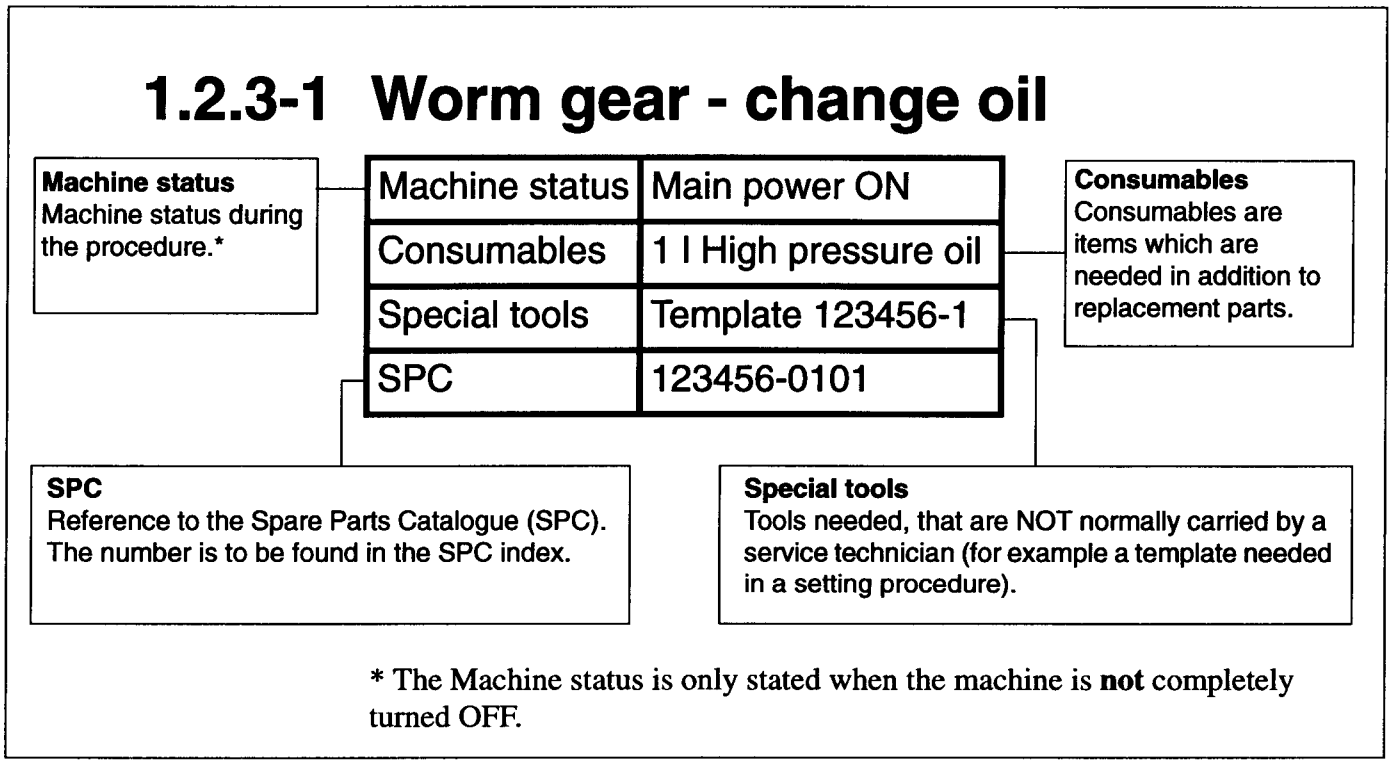
Additional information

The following additional information is included in each MM procedure as applicable.



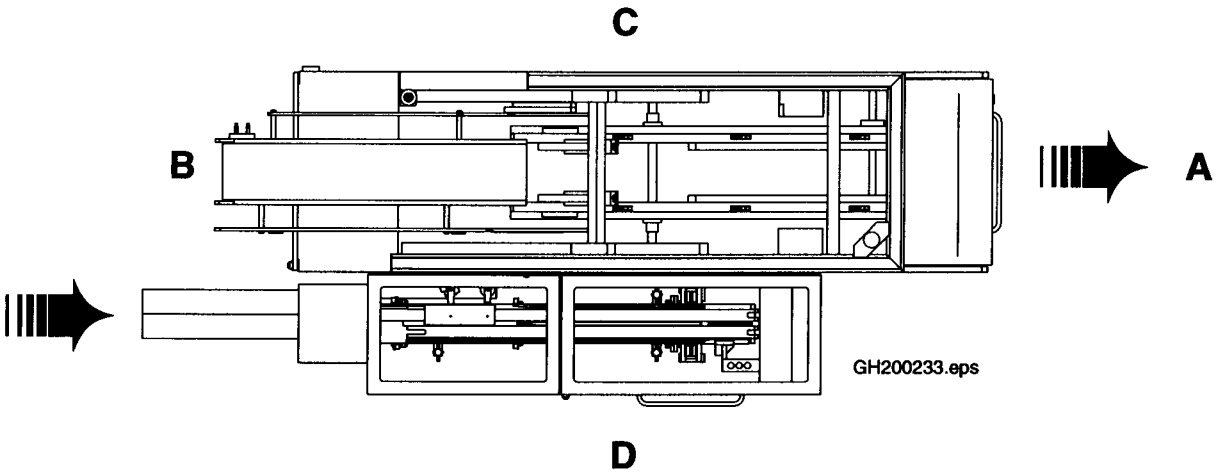
* The Machine status is only stated when the machine is **not** completely turned OFF.

2.1bTH200013.en

Abbreviation used in this manual

SPC	Spare Parts Catalogue
TPMS	Tetra Pak Maintenance System

Machine orientation



A indicates the **FRONT** of the machine

B indicates the **REAR** of the machine

C indicates the **LEFT** hand side of the machine

D indicates the **RIGHT** hand side of the machine

2.1bTH200013.en

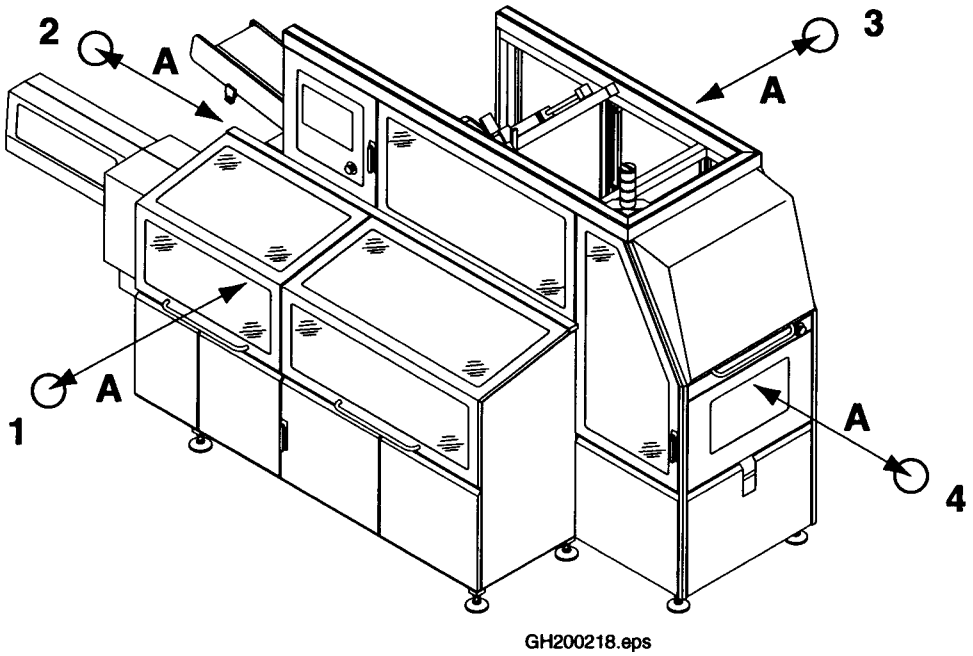
Noise level specification

Machine type

Document:	DE 94-854
Date:	941024
Machine no.:	38001/2
Drawing spec.:	670270
Mech. ECN:	19307
El. ECN:	21796

Noise level

Position	dBA, Production	dBA, Production no packages
1	65	62
2	69	-
3	67	-
4	65	-



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A=1 meter
Microphone placed 1.6 meters up.

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Safety precautions

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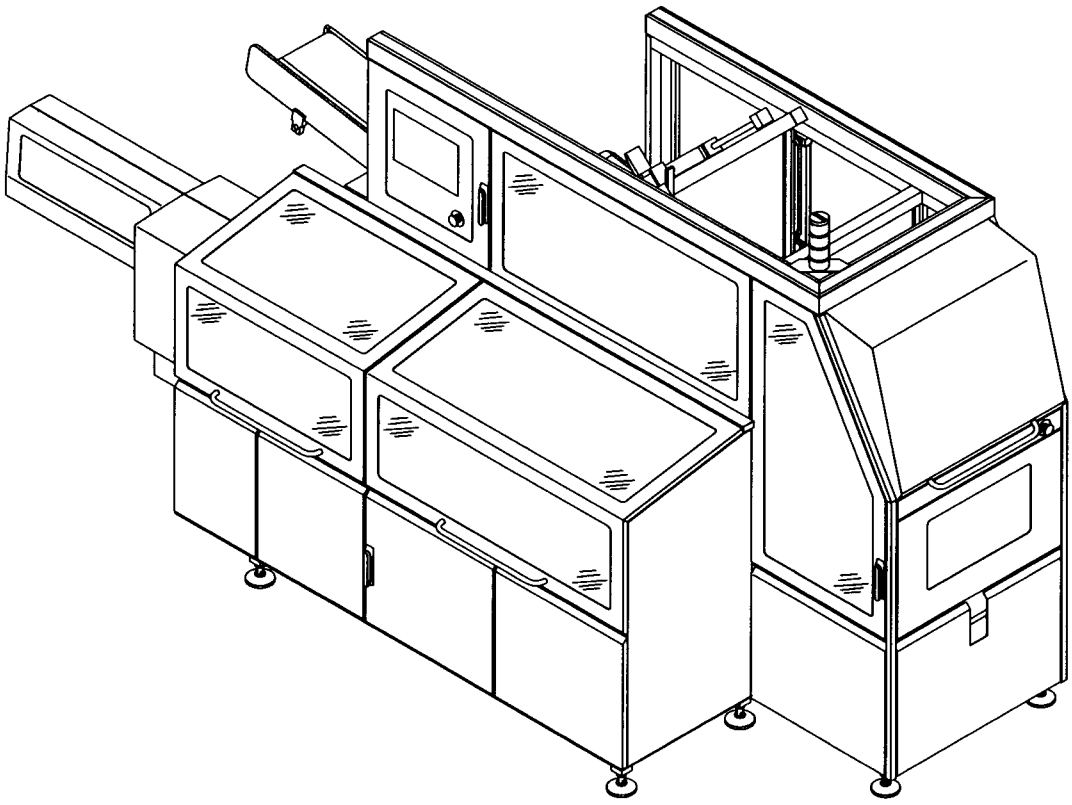

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Hazard information

Hazard information in this document has the following significance:

⚠ DANGER!	Failure to observe information marked with this symbol, puts **your life in danger!**
⚠ WARNING!	Failure to observe information marked with this symbol, can result in **personal injury!**
Caution!	Failure to observe this information marked with "Caution", can result in **damage** to or **destruction of equipment!**

Skilled personnel

Service technicians

Maintenance staff, specialists etc

Electricians

An individual with technical knowledge or sufficient experience to enable that individual to avoid hazards which electricity can create.

Operators

An individual that has required sufficient knowledge about operating the machine by reading the Operation Manual, OM.

2.1bTH200222.en

Service technician

⚠ **WARNING!**

Risk of personal injury!
If safety precautions are not followed, there is risk of personal injury.

Only skilled service technicians are allowed to work on the machine.

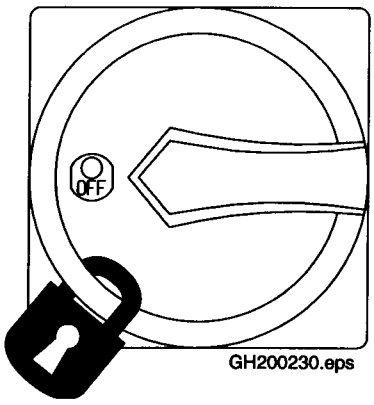
The Maintenance Manual (MM) describes the authorized way to service the machine, and it may only be serviced in accordance with these instructions. Tetra Pak will take no responsibility for injury or damage, if the machine is serviced in any other way.

During maintenance or service work, the service technician is responsible for:

- the machine and the working area around the machine,
- the personnel in the vicinity of the machine,
- assuring that the machine safety devices are fully operational before finishing the maintenance or service work.

Main switch

DANGER! Before starting service work the machine must be depressurized and the main switch turned OFF (position 0) and locked in this position.



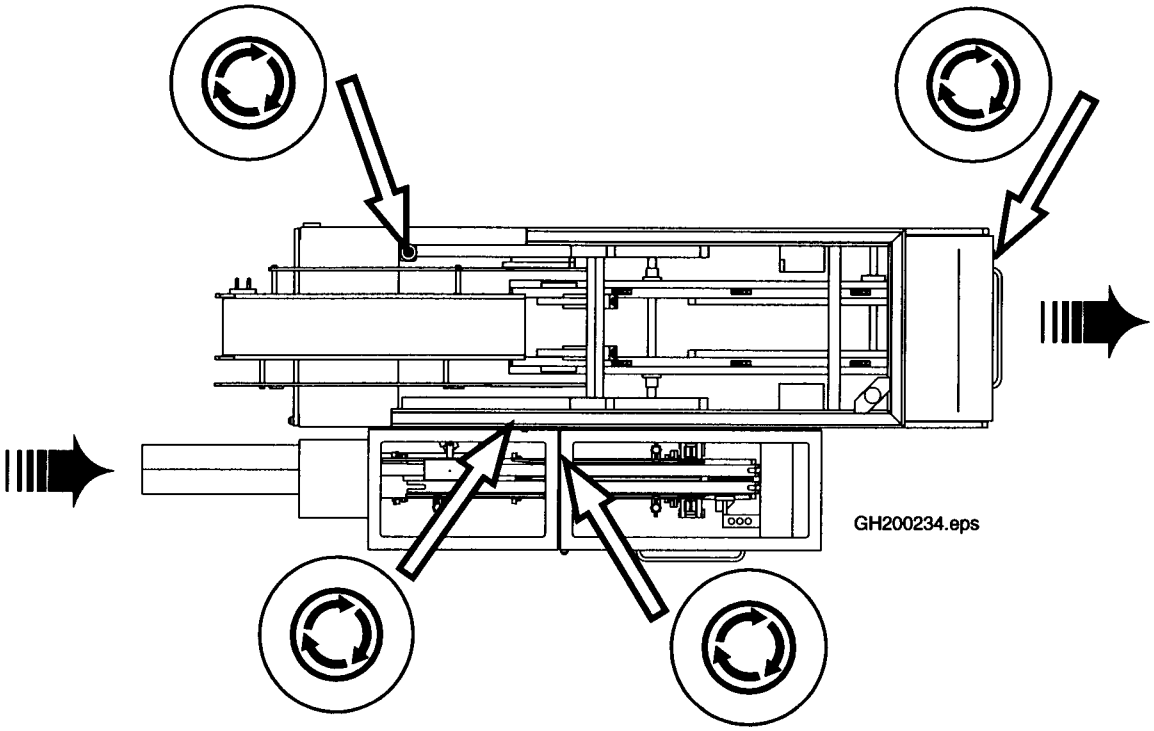
Emergency stop

In case of danger to people or risk of damage to the machine, one of the four emergency stop buttons must immediately be pressed.

In order to stop the machine immediately in an emergency situation, you must know the exact location of the emergency stop buttons.

Emergency stop must only be used in case of danger to people or machine. To stop production in the normal way, see the **Stop**-section in the OM-book.

Note! Emergency stops do not cut the "Mains Power Switch" OFF:



2.1bTH200222.en

Signs

The sign below indicates that water must not be flushed towards the area with the sign.

DANGER! Failure to observe may result in danger to your life.

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The sign below indicates that there is a hot surface. The temperature may exceed 60° C.

WARNING! Failure to observe may result in injuries caused by burning.

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(Cont'd)

2.1bTH200222.en

(Cont'd)

The sign below indicates that there is a risk of injuries in the area where the sign is placed.

WARNING! Failure to observe my result in loss of fingers or other body parts.

GH200235.eps

The sign below indicates that there is entrapped heat in the area where the sign is placed. The temperature may exceed 60° C.

WARNING! Failure to observe may result in injuries caused by burning.

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(Cont'd)

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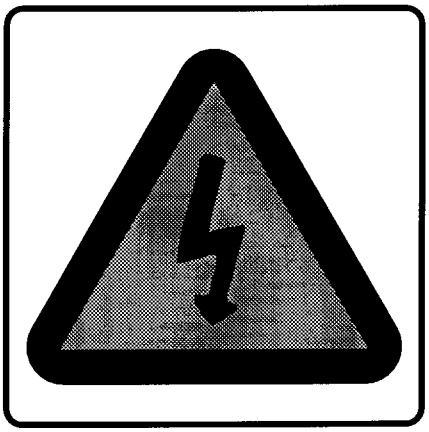
(Cont'd)

The sign below indicates that there is a risk of electrical shock that may cause injury or death in the area where the sign is placed.

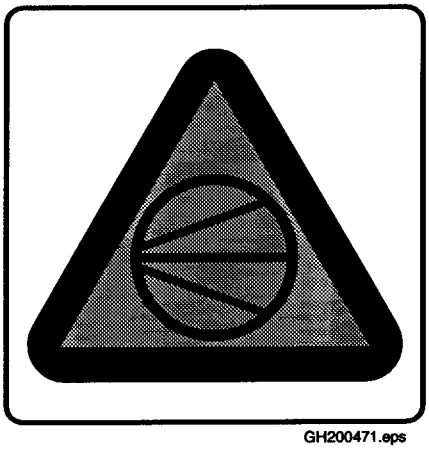
DANGER! Failure to observe may result in danger to your life.



GH100276.eps

The sign below indicates that there is entrapped compressed air in the area where the sign is placed.

WARNING! Failure to observe may result in injuries caused by moving parts.



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Wrap around unit

Note! This manual covers both machines with and without wrap around unit. Where the information differs, it is noted if it applies to machines equipped with wrap around unit or not.

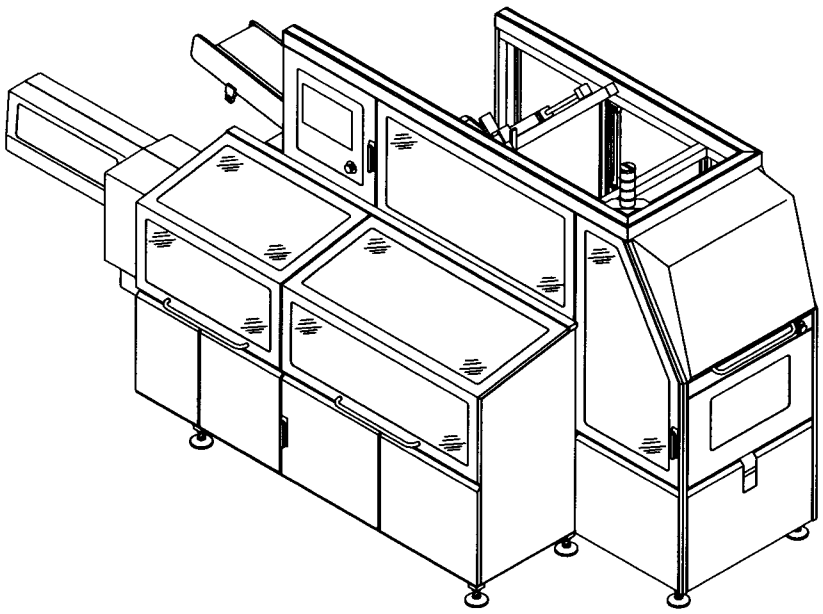
Doors, hatches, and safety covers

WARNING! **Moving parts and hot surfaces can cause serious injuries!**
Never run the machine if any safety switch is non-operational or any safety cover is not fitted.

The doors leading to risk areas are provided with safety switches. These switches form part of the safety system of the machine and **must under no circumstances be bridged or by-passed or otherwise mad non-operational.**

Do not open doors or remove covers during production. Never stop the machine by opening a door with a safety switch. The machine may perform a reciprocating movement during the first few seconds after a stop; also some machine parts may still be hot.

After maintenance, check that all safety covers are fitted to the machine before it is inched or run.



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Infeed conveyor

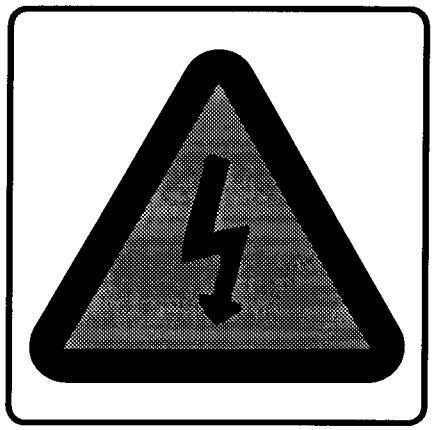
WARNING! If a safety cover is opened, the infeed conveyor will still be in motion. Risk of injuries.
The conveyor only stops when an Emergency stop button is pushed or when the machine is completely turned OFF.

Electrical cabinet

DANGER!

Risk of electrical shock!
The voltage is 400V inside the electrical cabinet. Can cause electrical shock or serious injury. In case of accident, immediately call for medical attention.

Work inside the electrical cabinet must be performed by skilled persons only.



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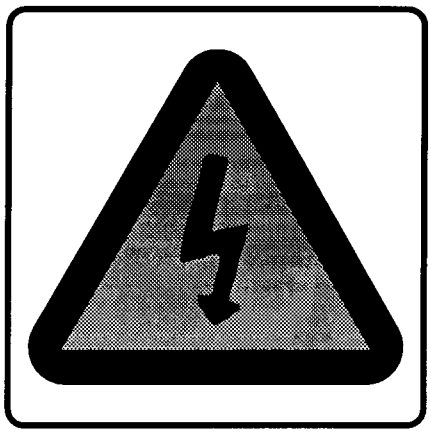
Frequency inverter

DANGER!

Risk of electrical shock!
The capacitors of the frequency inverters G022 and G023 remain charged to dangerous voltages even when the Main switch is OFF. Discharge time is approximately 5 minutes. Risk of electrical shock that may cause injury or death.



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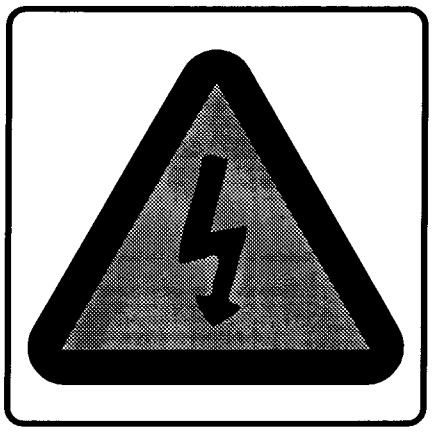
Servo control unit

DANGER! **Risk of electrical shock!**

The servo control unit G024 remains charged to dangerous voltages even when the Main switch is OFF. Discharge time is approximately 5 minutes. Risk of electrical shock that may cause injury or death.



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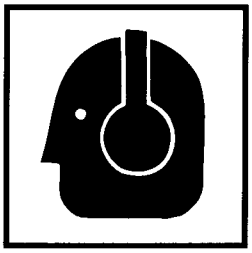
Hearing protection

WARNING! **Risk of impaired hearing!**

Use hearing protection to minimize the risk of impaired hearing.

Always wear hearing protection while the machine is running.

Note! Always keep the ear protectors clean.



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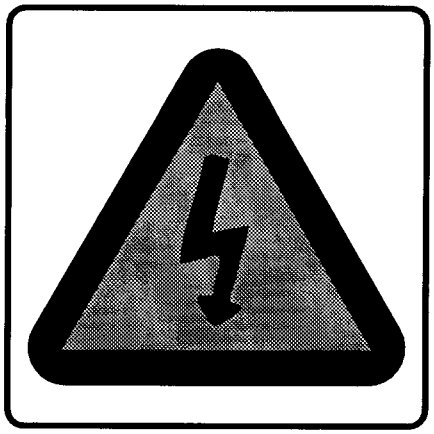
Hot melt equipment



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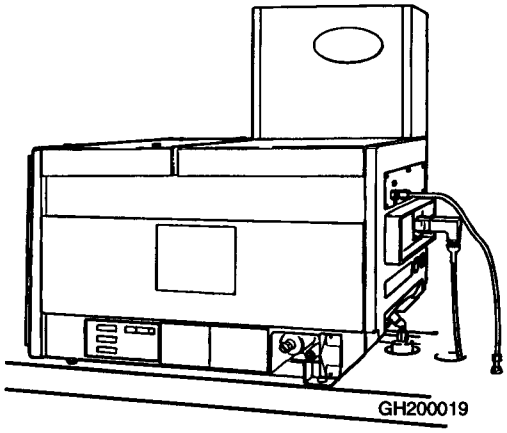

DANGER! There is high voltage inside the hot melt unit. Risk of electrical shock that may cause injury or death.

Always wear safety glasses, protective gloves, and other protective clothing to avoid injuries caused by splashing hot melt material.
Never remove any part or component until air and electric power have been disconnected and the pressure of the hot melt in the system has been relieved.

Failure to relieve any remaining air or liquid (adhesive) pressure may cause serious injuries through burning.

All service work on the hot melt unit must be carried out by skilled personnel.

Note! Always refer to the documentation provided from Nordson Corporation before doing any kind of work on the hot melt equipment. The Nordson Series 3000 Technical Manual is included at delivery from Tetra Pak.
The section "Hot melt equipment" in this manual only deals with what is specific for this machine.

2.1bTH200222.en

Hot melt unit

WARNING! Risk of burning! During heating and production the unit gets hot. Do not touch the unit!

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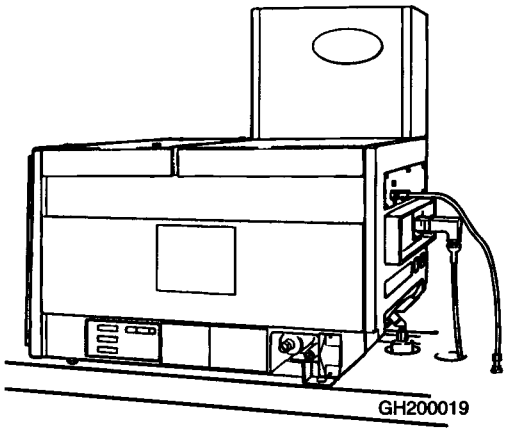

Hot melt unit

DANGER! Danger of electrical shock. Never flush water towards the hot melt unit when cleaning the machine. Failure to observe may result in danger to your life.

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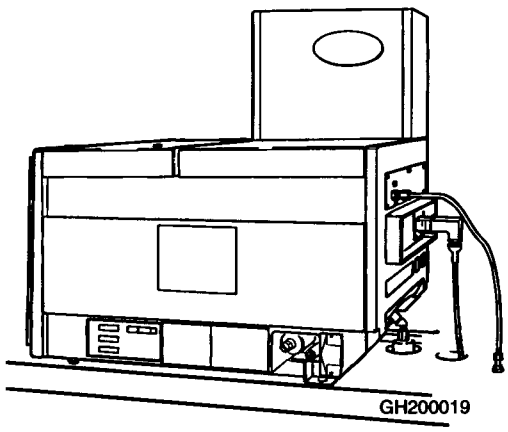

2.1bTH200222.en

Hot melt

WARNING! The hot melt tank contains heated hot melt which can cause serious injuries. Do not touch the hot melt!

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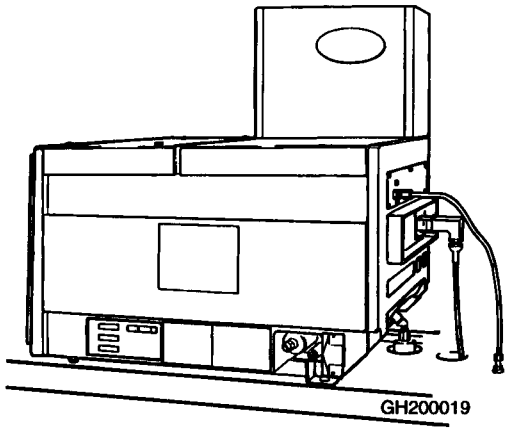

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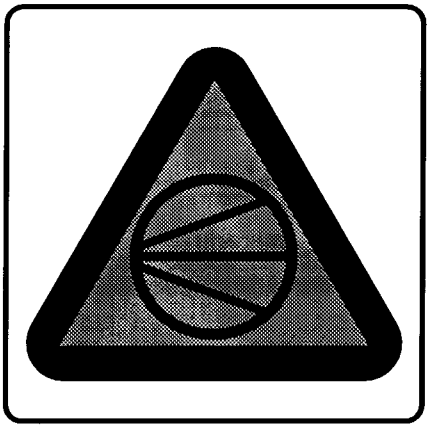
Infeed brake

WARNING! The infeed brake contains entrapped compressed air which can cause serious injuries.



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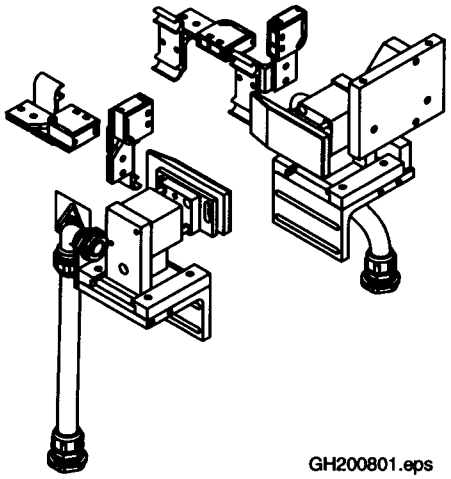

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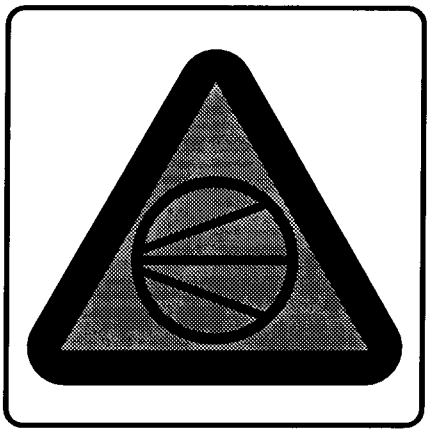
2.1bTH200222.en

Wrap around unit

WARNING! The wrap around squeezer cylinder contains entrapped compressed air which can cause serious injuries.



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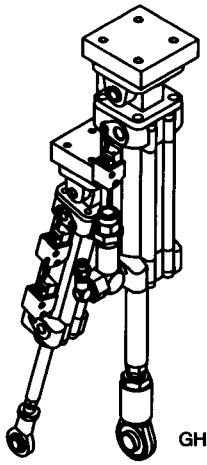

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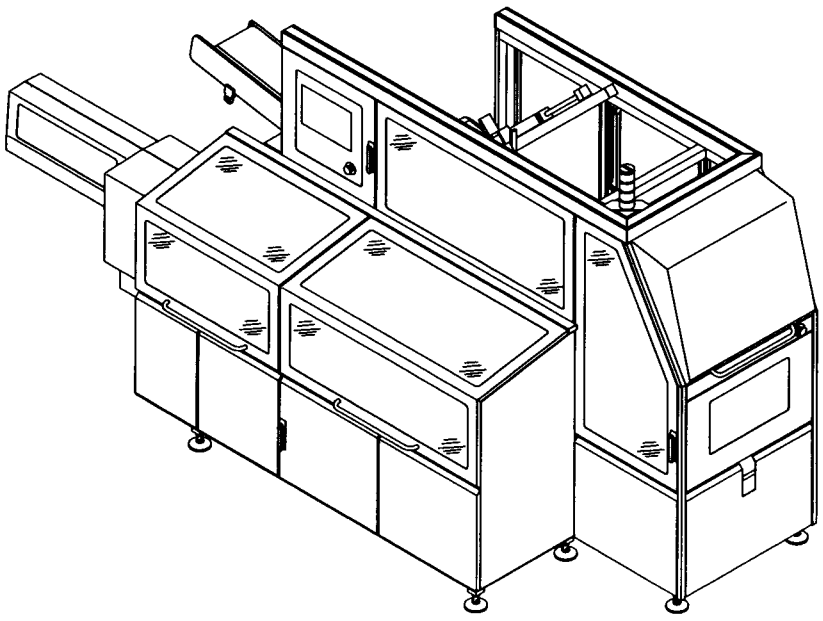
Note! This warning only applies for machines equipped with a wrap around unit.

Access to risk areas

WARNING! Do not reach into the machine neither from above or below, risk of injuries caused by crushing.



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Holes in the conveyor frame

WARNING! Do not reach into the machine through the holes. These holes are only used when washing the machine.

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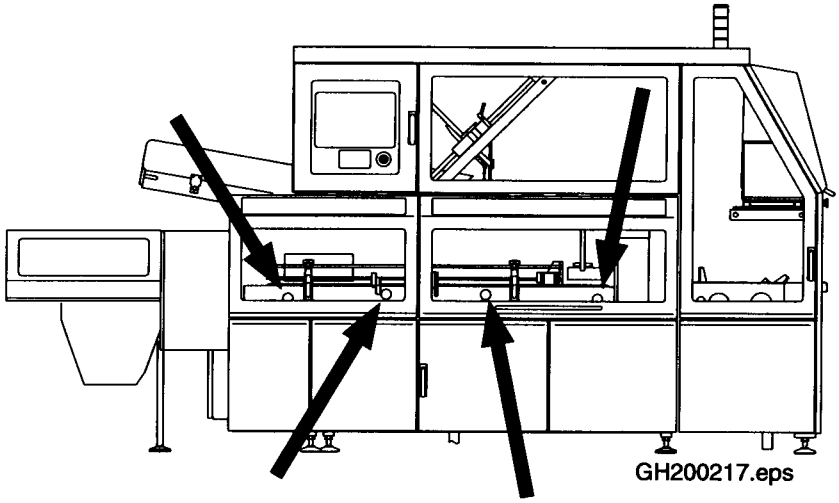

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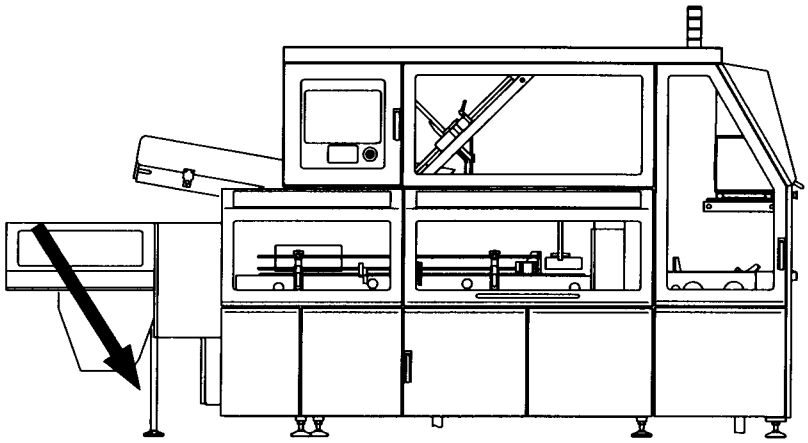
Support for infeed brake

The machine must not be started unless the support for the infeed brake is mounted. The support is part of the security system and must under no circumstances be dismounted.



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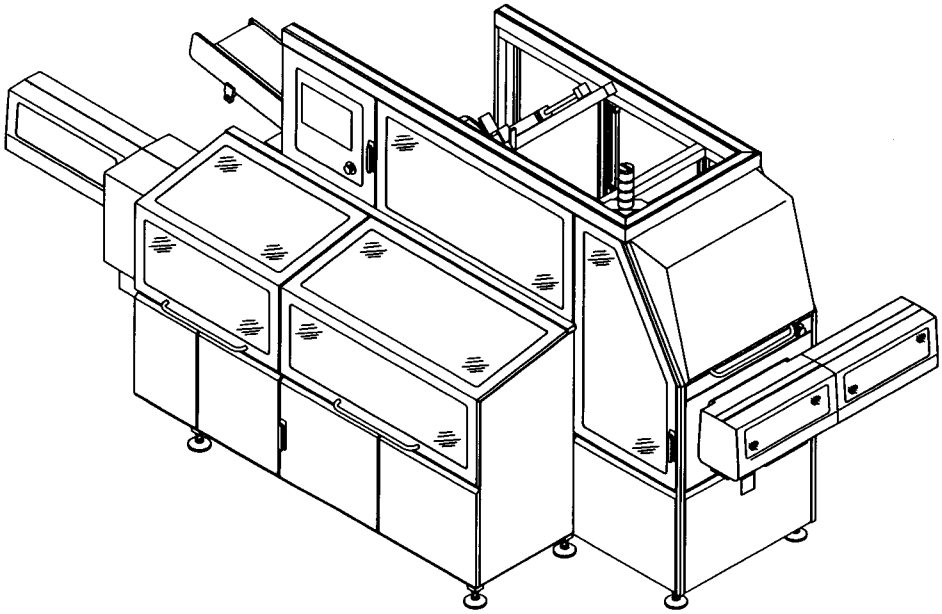
Discharge unit

The machine fulfils the safety demands only when a discharge unit with covers Tetra Pak no. C-1074350 or C-1074388 is mounted or similar equipment which fulfils Machinery directive 89/392/EEC and subdirectives.



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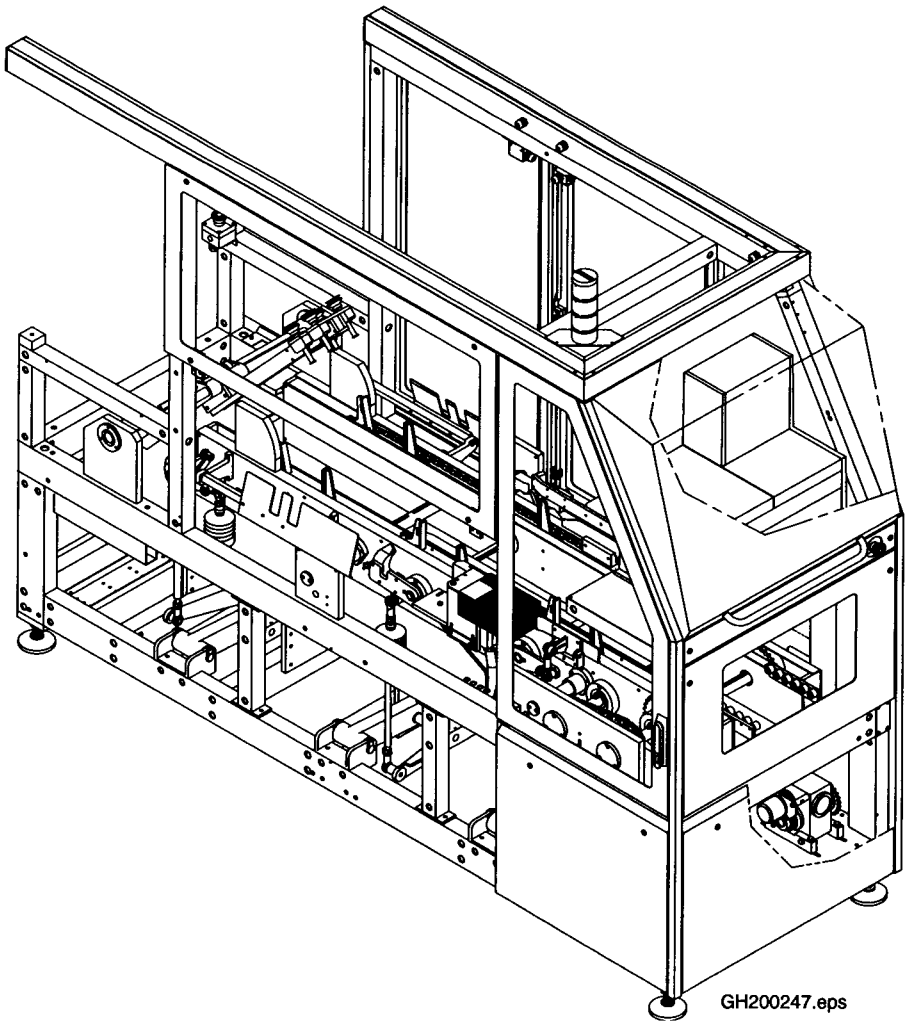
1 Base unit

2.1bTH200201.en



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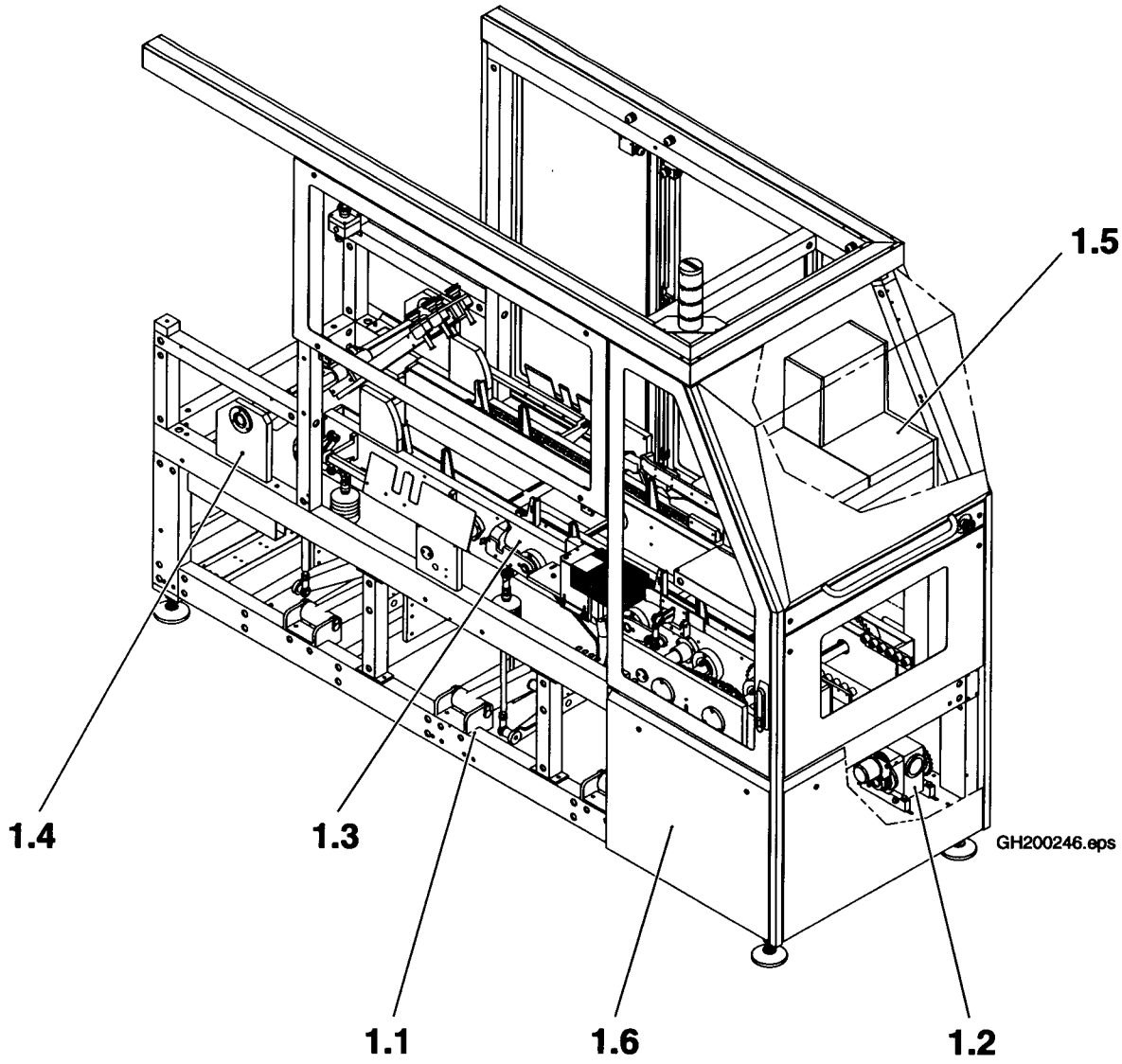
1-0 Base unit - description

SPC	670294-0401



2.1bTH200201.en

1.1 Bottom section
1.2 Drive unit
1.3 Feed unit
1.4 Superstructure
1.5 Hot melt equipment
1.6 Covering base unit

1.1 Bottom section

SPC	670280-0401

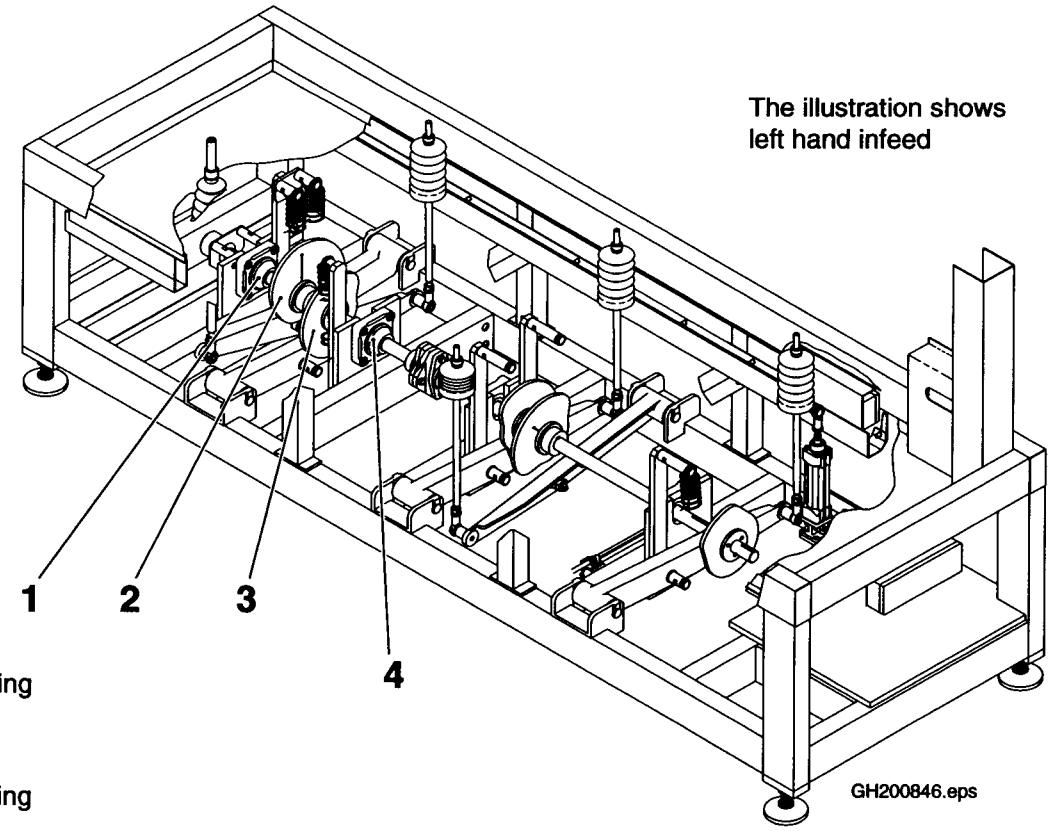
1.1.4 Main shaft rear

1.1.4-1 Main shaft rear - check

SPC	556641-0201
Consumables	Grease 90 296-68

Check and grease the bearings (1) and (4).
Use lubricant with Tetra Pak **part No 90 296-68**.

Check the condition of the cams (2) and (3).



1 Bearing
2 Cam
3 Cam
4 Bearing

2.1bTH200202.en

1.1.4-2 Main shaft rear - set

SPC	556641-0201

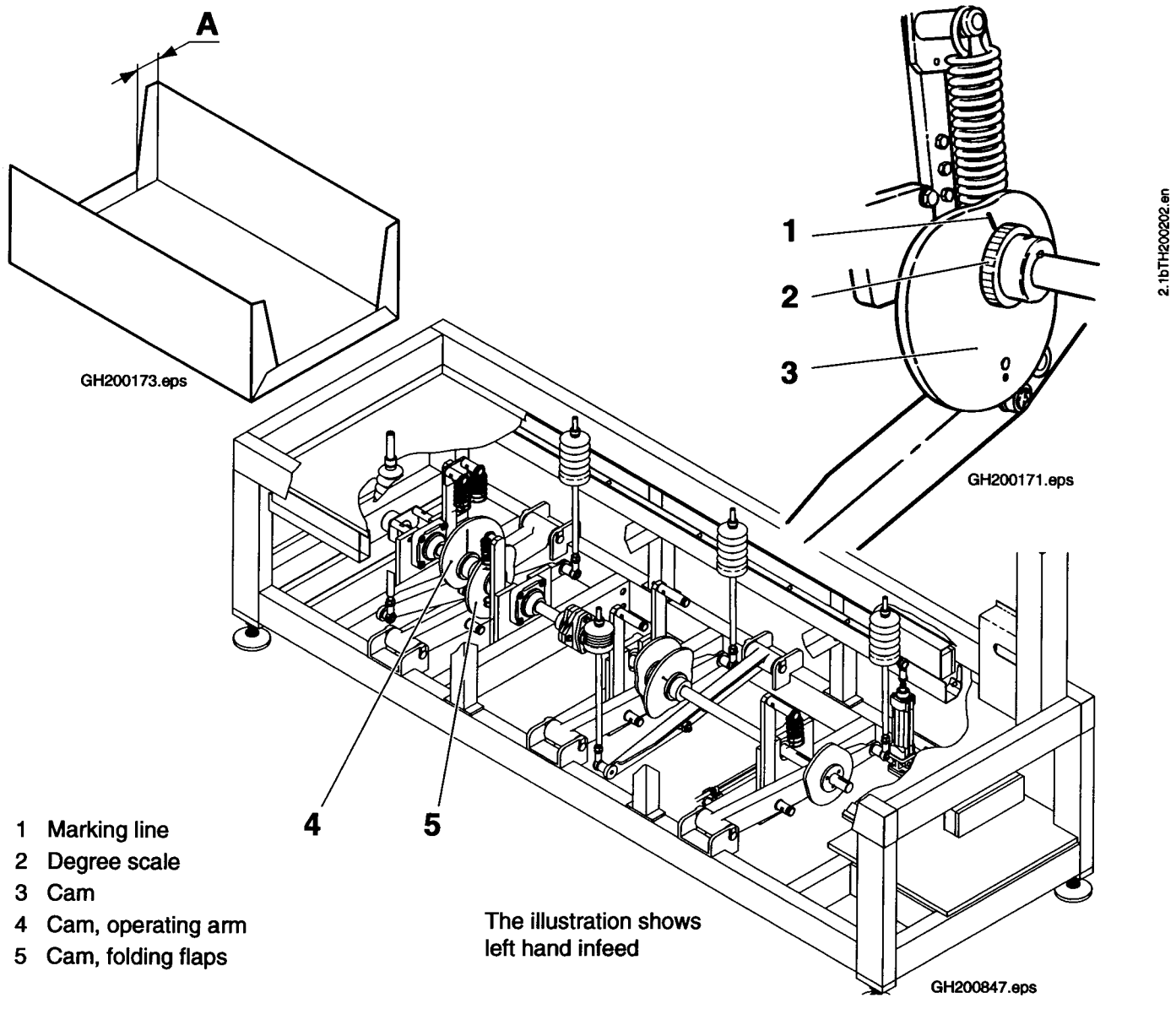
The cams are secured on the main shaft by means of three screws and a washer.

When setting, loosen the three screws and turn the cam (3) until the marking line (1) coincides with the correct value on the degree scale (2).

Tighten the screws.

Cam function	Degree
Puller arm (4)	170°
Folding flaps (5)	255° *265°

*** When measurement A exceeds 50 mm.**



1 Marking line
2 Degree scale
3 Cam
4 Cam, operating arm
5 Cam, folding flaps

The illustration shows left hand infeed

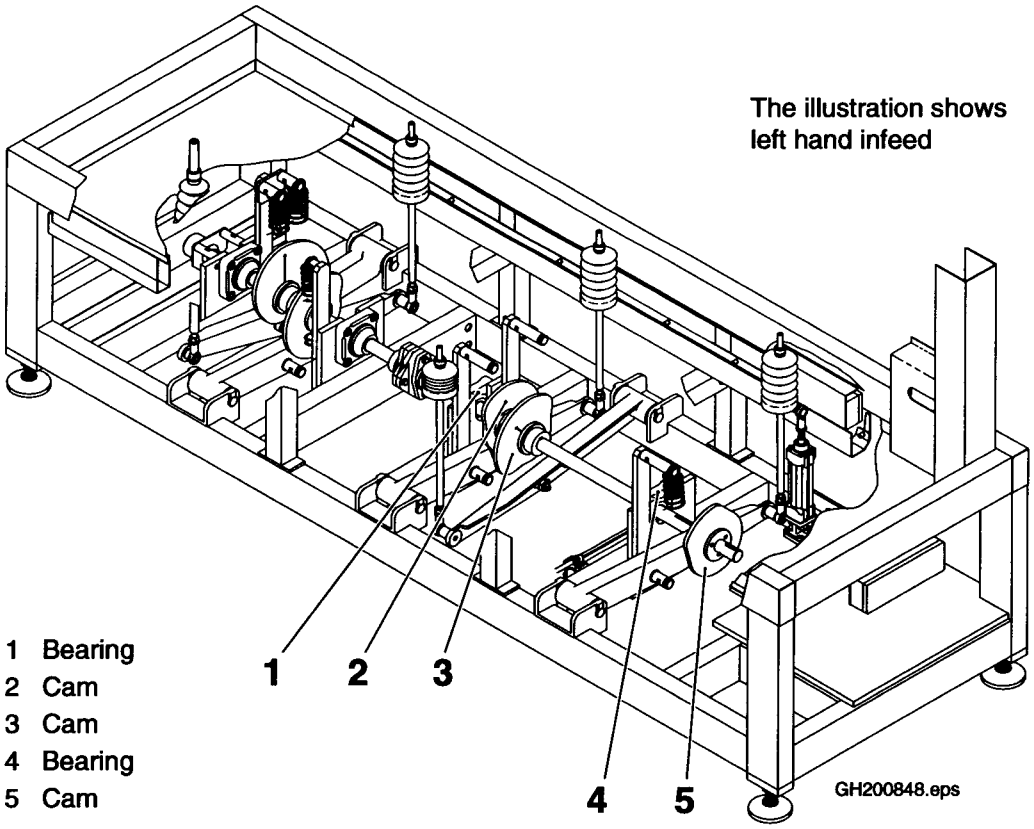
1.1.5 Main shaft front

1.1.5-1 Main shaft front - check

SPC	556654-0201
Consumables	Grease 90 296-68

Check and grease the bearings (1) and (2).
Use lubricant with Tetra Pak **part No 90 296-68**.

Check the condition of the cams (2), (3) and (5).



1 Bearing
2 Cam
3 Cam
4 Bearing
5 Cam

2.1bTH200202.en

1.1.5-2 Main shaft front- set

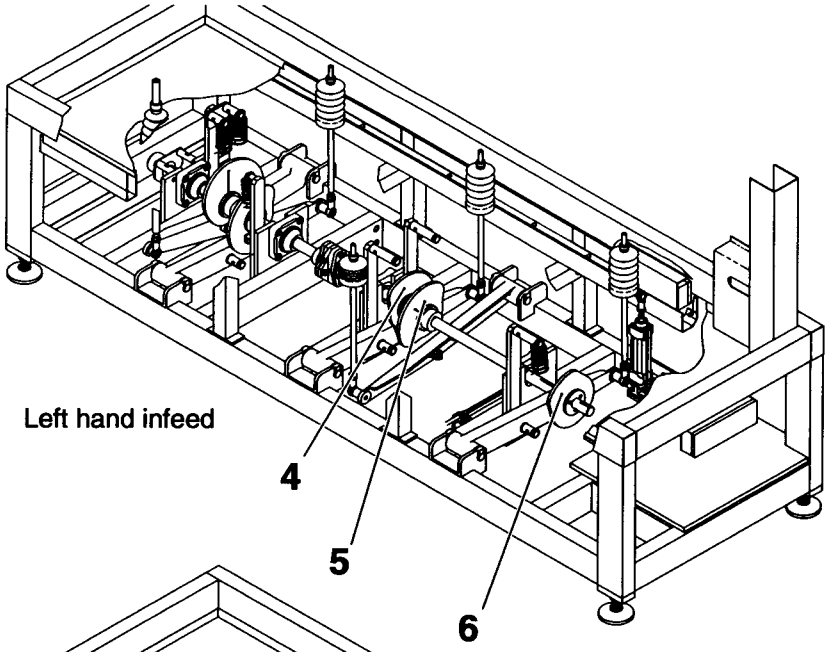
SPC	556654-0201

The cams are secured on the main shaft by means of three screws and a washer.

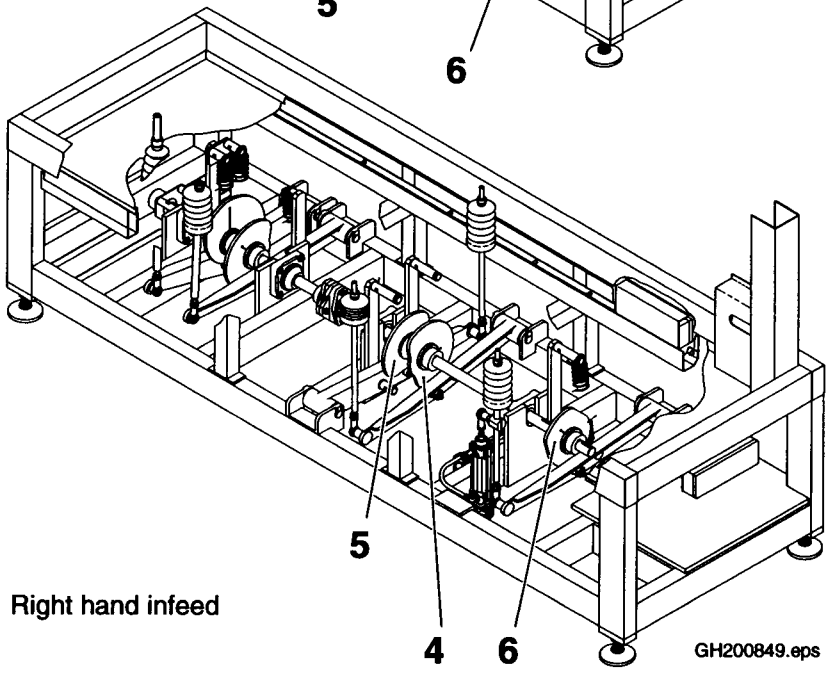
When setting, loosen the three screws and turn the cam (3) until the marking line (1) coincides with the correct value on the degree scale (2).

Tighten the screws.

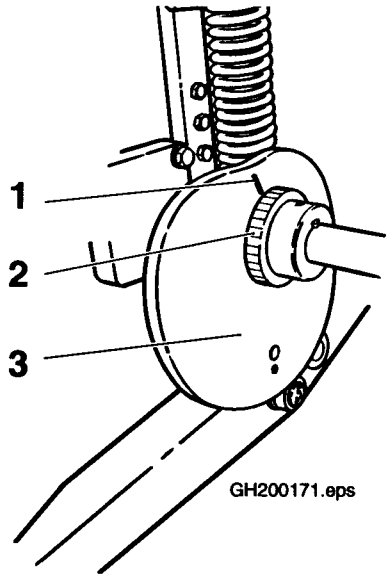
Cam function	Degree
Flap folder infeed side (4)	50°
Flap folder (5)	0°
Squeezer (6)	135°



Left hand infeed



Right hand infeed



2.1bTH200202.en

1 Marking line
2 Degree scale
3 Cam
4 Cam, flap folder infeed side
5 Flap folder
6 Squeezer

1.1.6 Operating arm magazine

1.1.6-1 Operating arm magazine - check

SPC	1021000-0101
Consumables	Grease 90 296-68

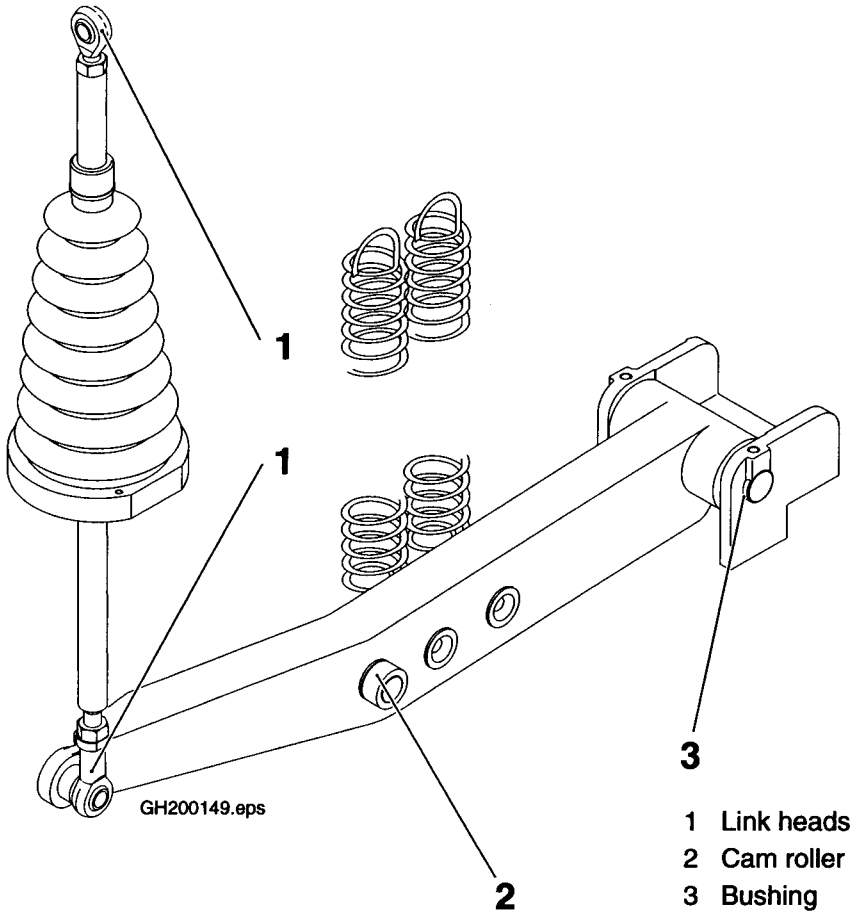
Check the following parts for wear and damages:

- link heads (1)
- cam roller (2),
- bushings (3).

Replace worn or damaged parts.

Lubricate the cam roller (2) by means of the lubrication nozzle on the opposite side. Use lubricant with Tetra Pak **part No 90 296-68**.

Check the setting of the operating arm drive. See procedure 1.1.6-2 Operating arm magazine - set on page 32 for setting instructions.



1 Link heads
2 Cam roller
3 Bushing

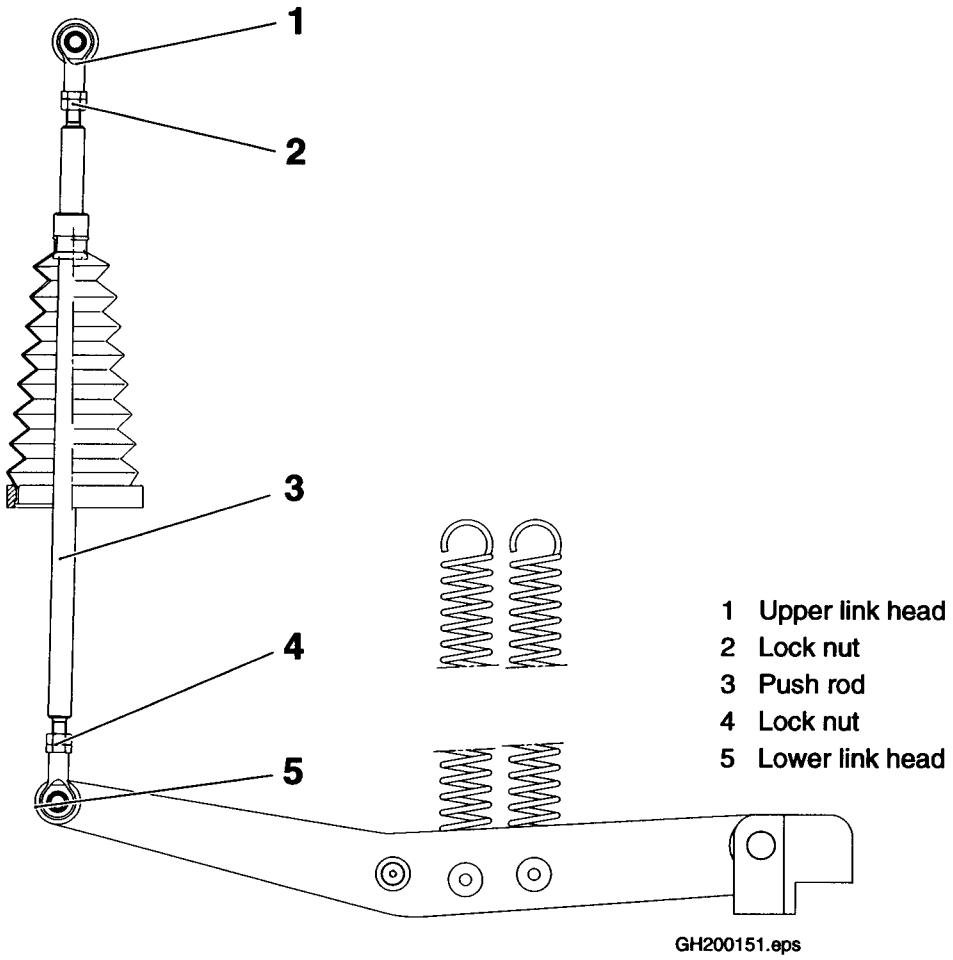
2.1bTH200202.en

1.1.6-2 Operating arm magazine - set

SPC	1021000-0101

The correct lower position of the operating arm, is when the suction cups are approx. 15 mm below the top of the slide rails.To adjust, loosen the lock nuts (2) and (4) on both upper (1) and lower (5) link heads, and set the length of the push rod (3).

Tighten the lock nuts.



2.1bTH200202.en

1.1.7 Folding flap

1.1.7-1 Folding flap - check

SPC	1021009-0101
Consumables	Grease 90 296-68

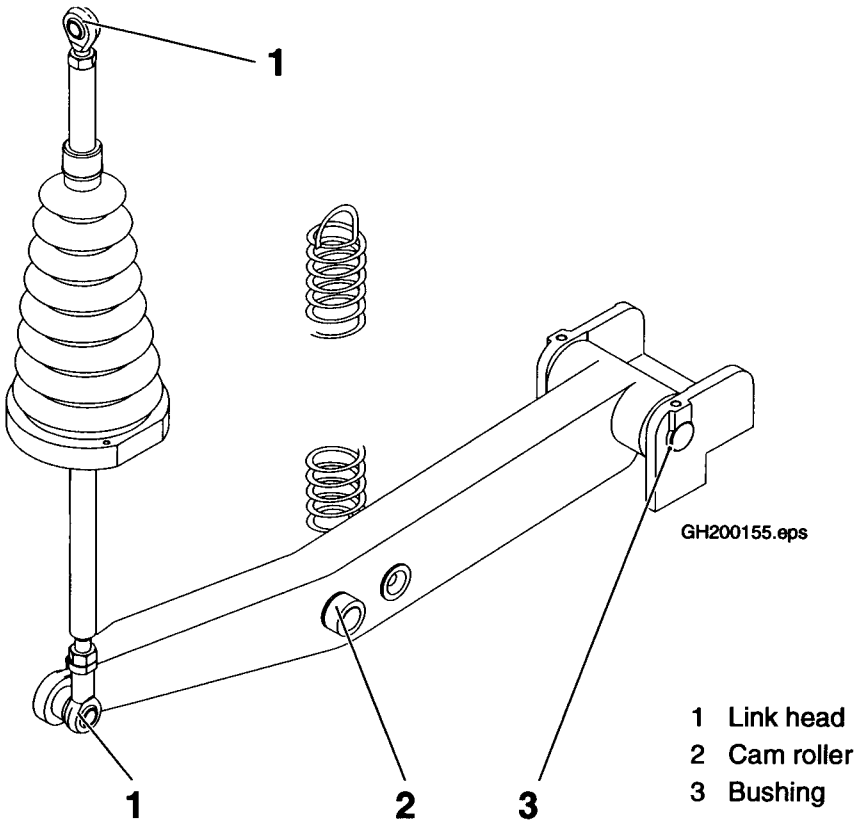
Check the following parts for wear and damages:

- link heads (1),
- cam roller (2),
- bushings (3).

Replace all worn or damaged parts.

Lubricate the cam roller (2) by means of the lubrication nozzle on the opposite side. Use lubricant with Tetra Pak **part No 90 296-68**.

2.1bTH200202.en



1.1.8 Squeezer

1.1.8-1 Squeezer - check

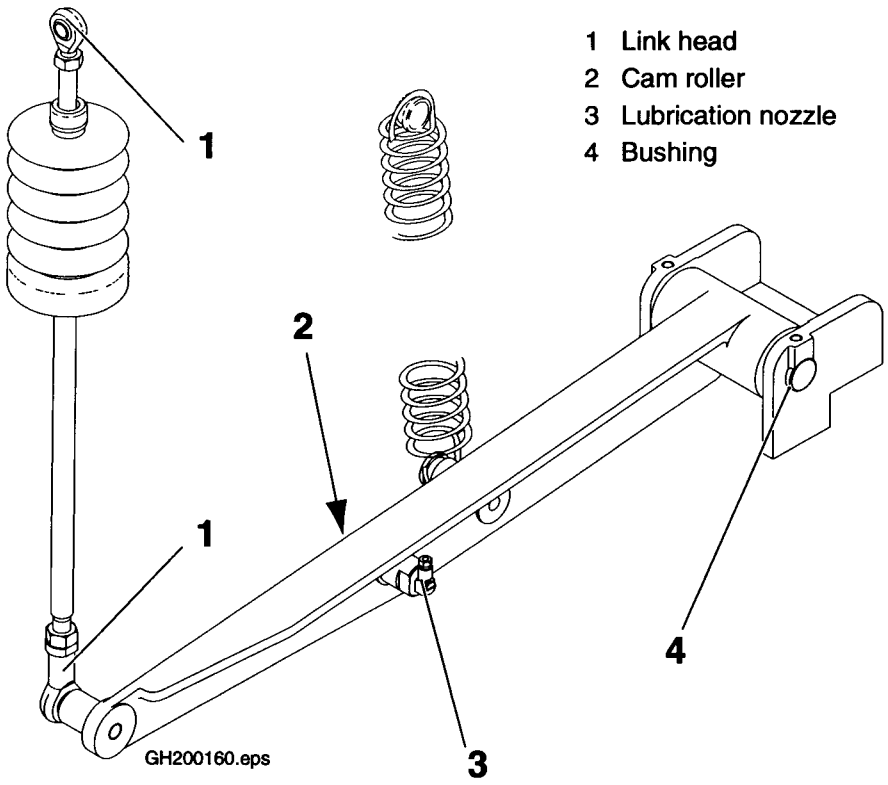
SPC	1021015-0101
Consumables	Grease 90 296-68

Check the following parts for wear and damages:

- link heads (1)
- cam roller (2),
- bushings (4).

Replace all worn or damaged parts.

Lubricate the cam roller (2) by means of the lubrication nozzle (3) on the opposite side. Use lubricant with Tetra Pak **part No 90 296-68**.



2.1bTH200202.en

1.1.9 Flap folder

1.1.9-1 Flap folder - check

SPC	1021019-0101
Consumables	Grease 90 296-68

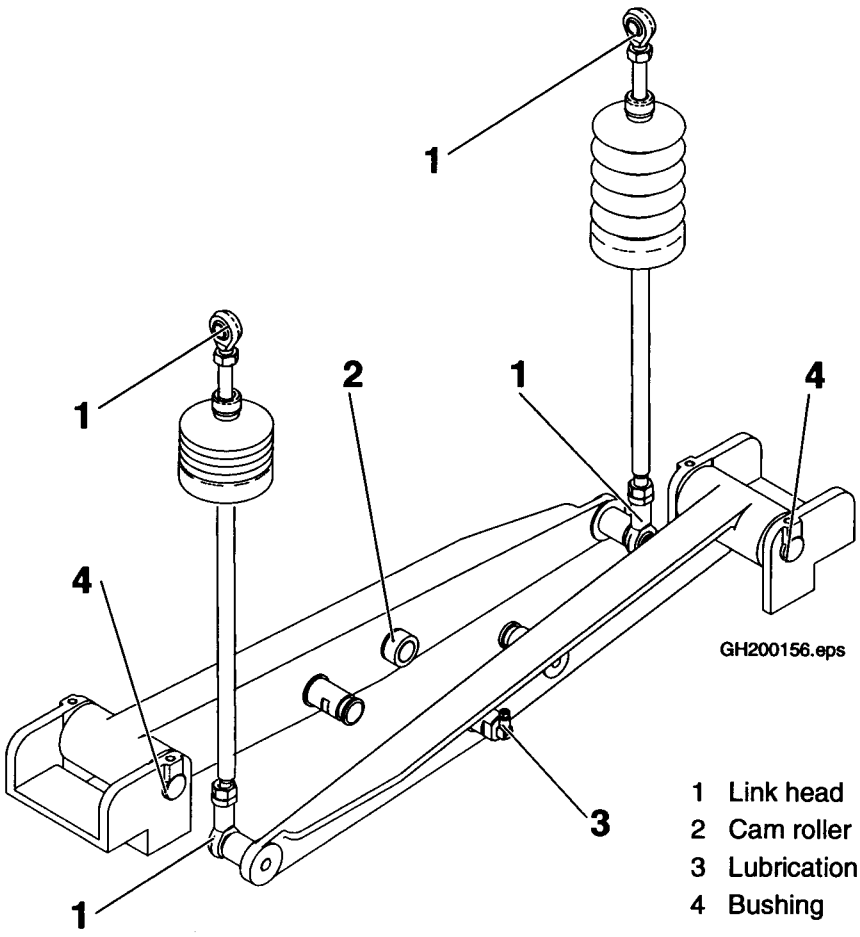
Check the following parts for wear and damages:

- link heads (1),
- cam rollers (2),
- bushings (4).

Replace all worn or damaged parts.

Lubricate the cam rollers (2) by means of the lubrication nozzles (3) on the opposite side. Use lubricant with Tetra Pak **part No 90 296-68**.

2.1bTH200202.en



1 Link head
2 Cam roller
3 Lubrication nozzle
4 Bushing

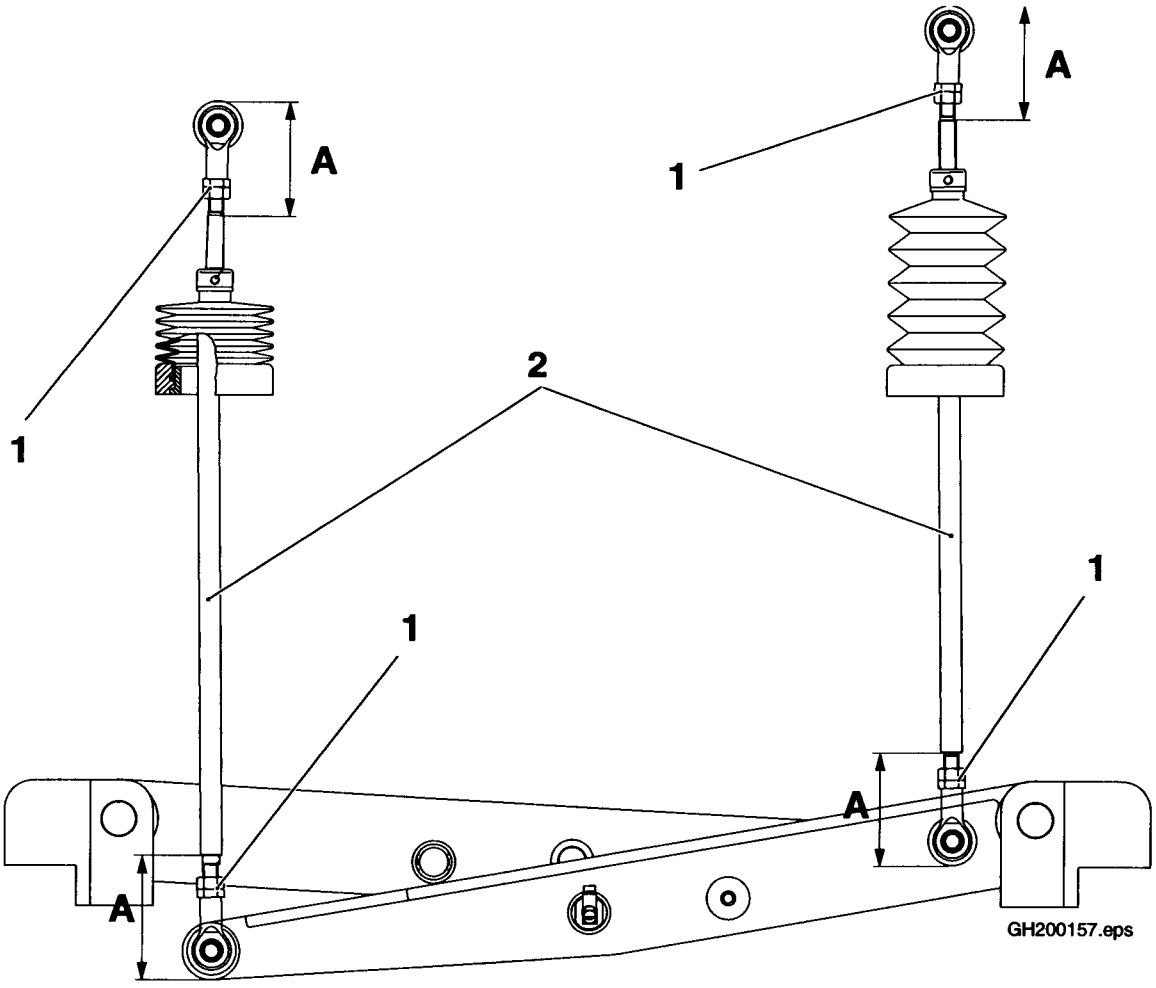
1.1.9-2 Flap folder - set

SPC	1021019-0101

Basic setting of the flap folders is done by adjusting the length of the link arms (2).

Loosen the lock nuts (1) and set distance **A=87±1 mm**.

Tighten the lock nuts.



2.1bTH200202.en

1.1.11 Pneumatic cushioning

1.1.11-1 Pneumatic cushioning - check

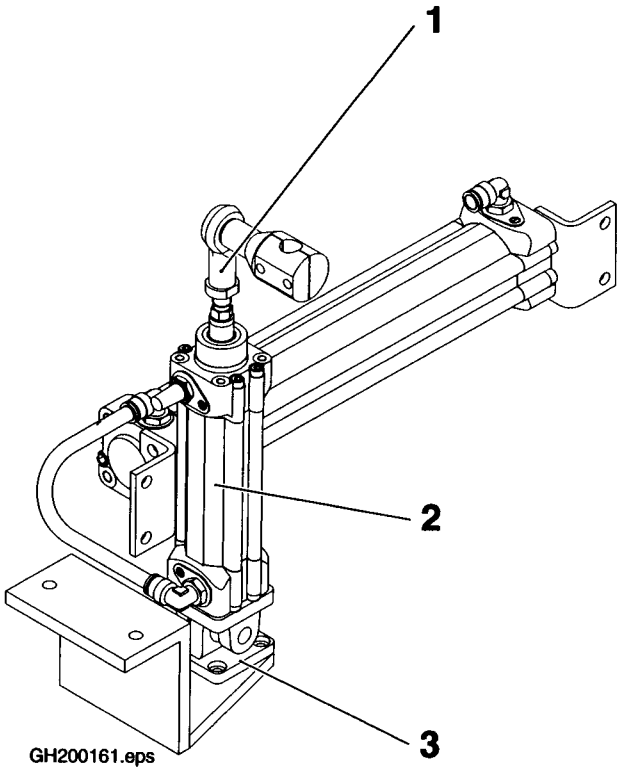
SPC	1021404-0101

Check the following parts for wear and damages:

- bracket (3),
- link head (1),
- cylinder C118 (2).

Replace all worn or damaged parts.

Check that the air pressure to the pneumatic cushioning is set acc to procedure 2.1.20-4.



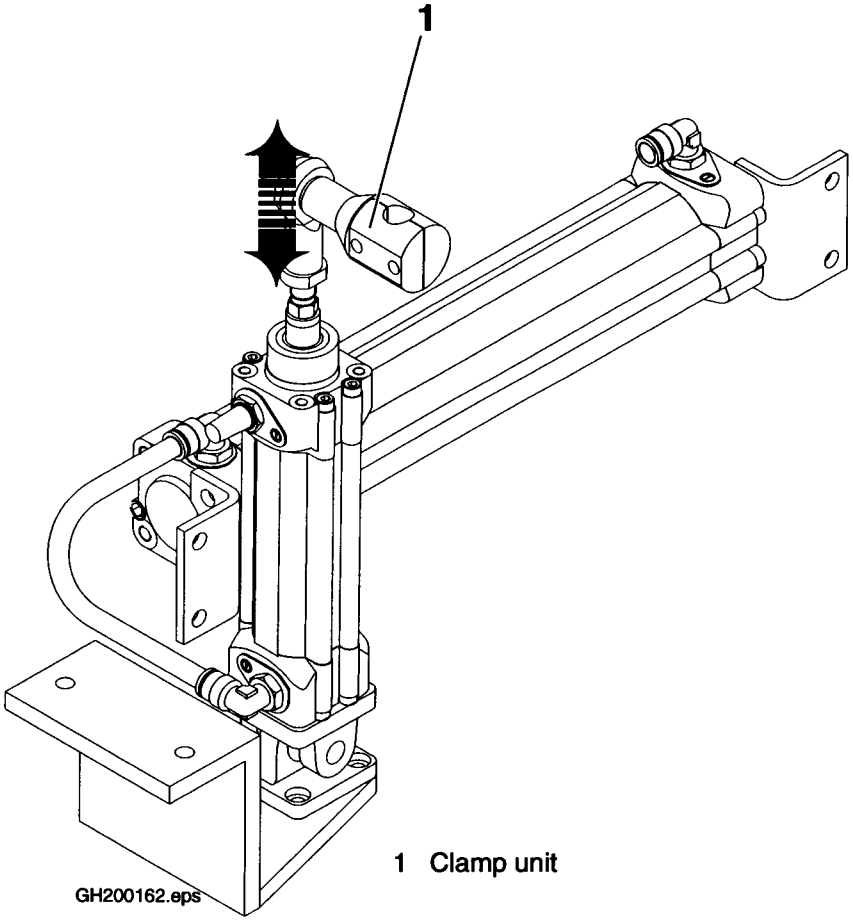
1 Link head
2 Cylinder C118
3 Bracket

2.1bTH200202.en

1.1.11-2 Pneumatic cushioning - set

Machine status	
SPC	1021404-0101

When the degree scale of the main shaft is at 0°, loosen the clamp unit (1) and move it upwards until the cylinder has reached it's end position. Then move the clamp **4 mm** down. Tighten the clamp unit.



1 Clamp unit

2.1bTH200202.en

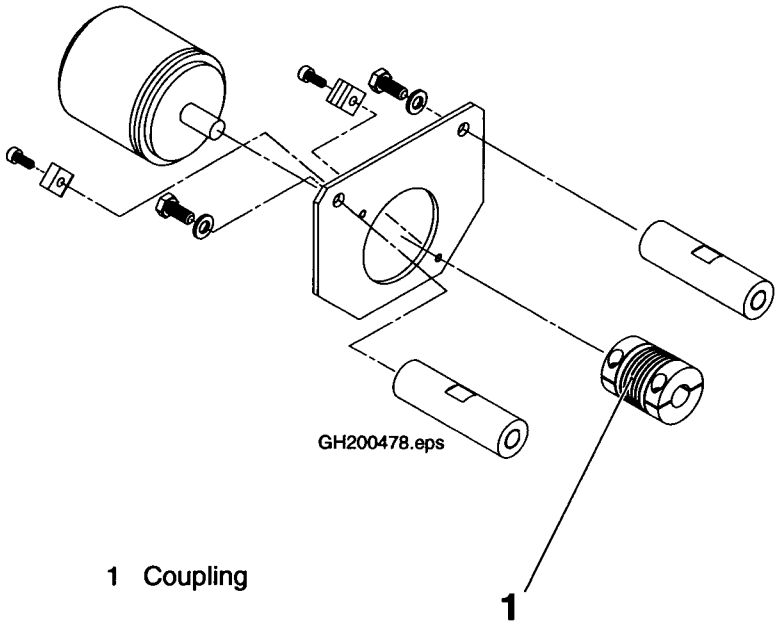
1.1.12 Angle encoder

1.1.12-1 Angle encoder - check

SPC	1021982-0201

Check the coupling (1) for play. Replace if necessary.

Check the function of the angle encoder.



1 Coupling

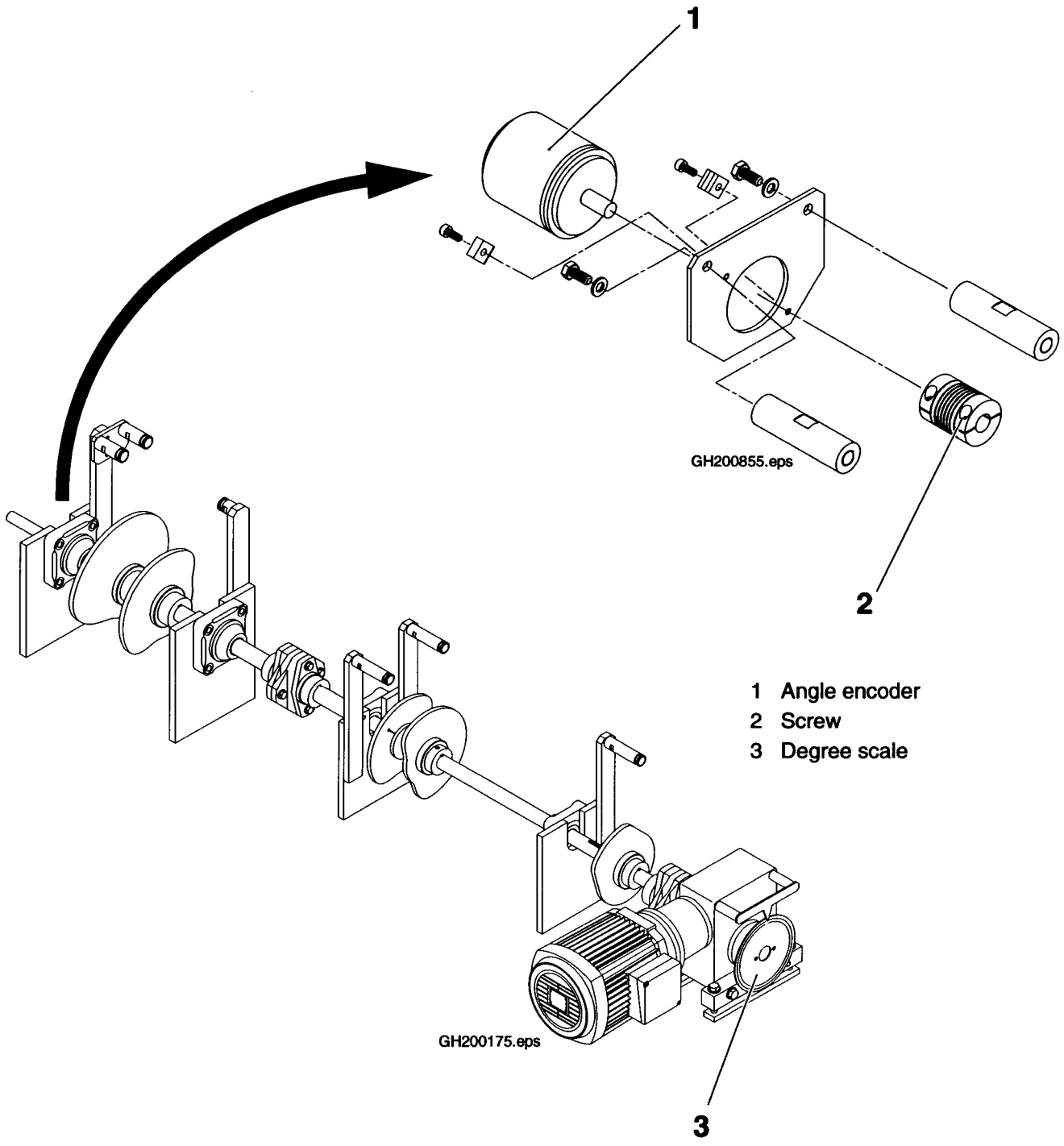
2.1bTH200202.en

1.1.12-2 Angle encoder - set

Machine status	Main power ON
SPC	1021982-0201

WARNING! Moving parts can cause serious injuries!

When the degree scale (3) is on 0°, the LEDs A1-A8 on board A002 should be out. Adjust by loosening the screws (2) and turning the angle encoder (1).



1 Angle encoder
2 Screw
3 Degree scale

2.1bTH200202.en

1.2 Drive unit

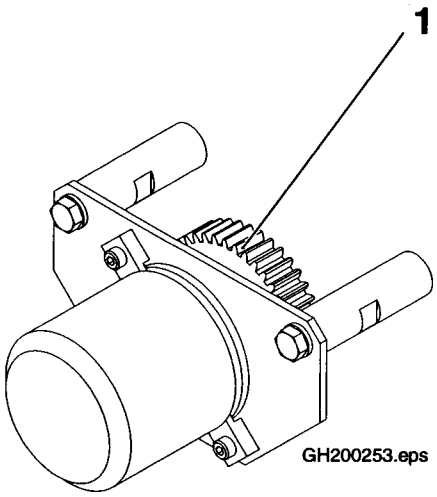
SPC	670282-0301

1.2.2 Angle encoder

1.2.2-1 Angle encoder - check

SPC	556636-0201

Check if there is any play in the gear wheel (1). Replace if necessary.



1 Gear wheel

2.1bTH200203.en

1.2.2-2 Angle encoder - set

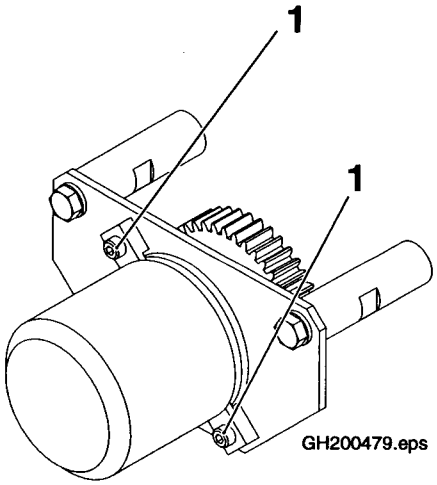
Machine status	Main power ON
SPC	556636-0201

WARNING! Moving parts can cause serious injuries!

Carry out procedure 1.3.10-1 Carrier chain inside - set on page 55.

Set the angle decoder at 255°; LED B8 lit on input module A002.

Adjust by loosening the screws (1) and turning the angle encoder.



GH200479.eps 1 Screw

2.1bTH200203.en

1.2.3 Motor feeding

1.2.3-1 Motor feeding - check

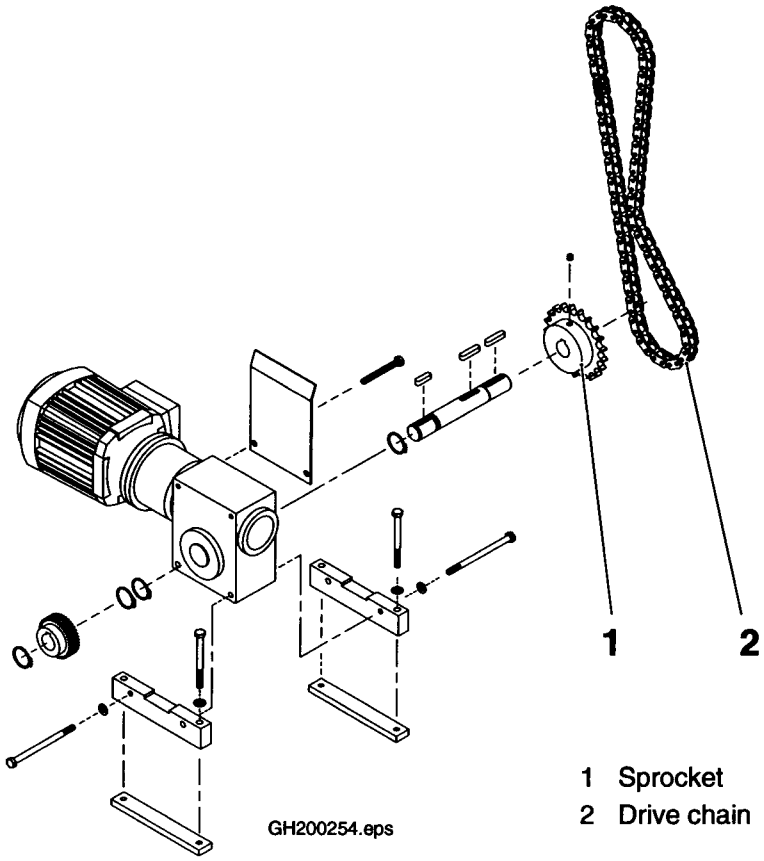
Machine status	
SPC	556626-0301

Check the following parts for wear and damages:

- sprocket (1),
- drive chain (2).

Replace all worn or damaged parts.

Check the tension of the drive chain (2).
See procedure 1.2.3-2 Motor feeding - set chain tension on page 44 for setting instructions.



1 Sprocket
2 Drive chain

2.1bTH200203.en

1.2.3-2 Motor feeding - set chain tension

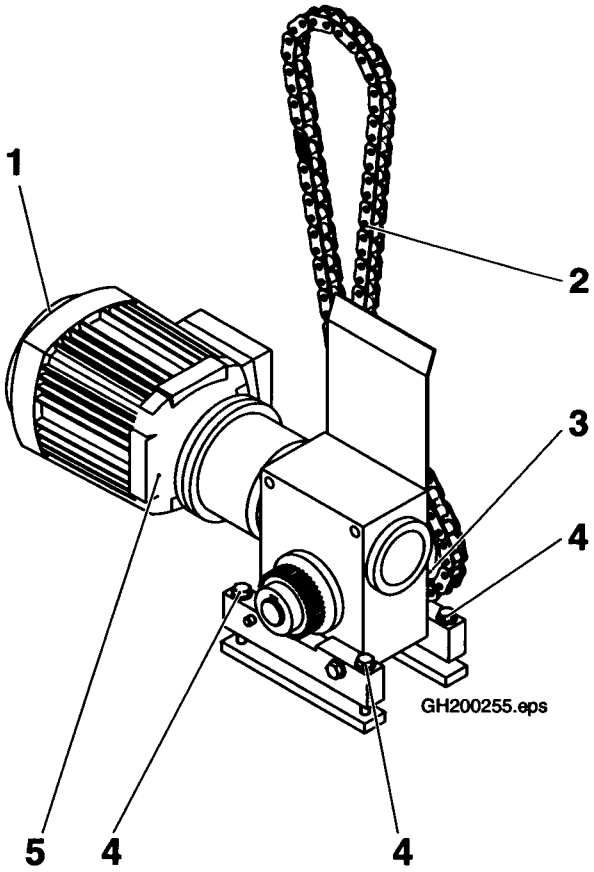
Machine status	
SPC	556626-0301

a) Loosen the screws (4).

b) Remove the cover (1).

c) Move the fan of the drive motor (5) until the drive chain (2) has the same slack on both sides of the sprocket (3).

d) Move the drive motor and gear box until the drive chain is tensioned.



1 Cover
2 Drive chain
3 Sprocket
4 Screw
5 Motor

2.1bTH200203.en

1.2.4 Safety clutch

1.2.4-1 Safety clutch - set

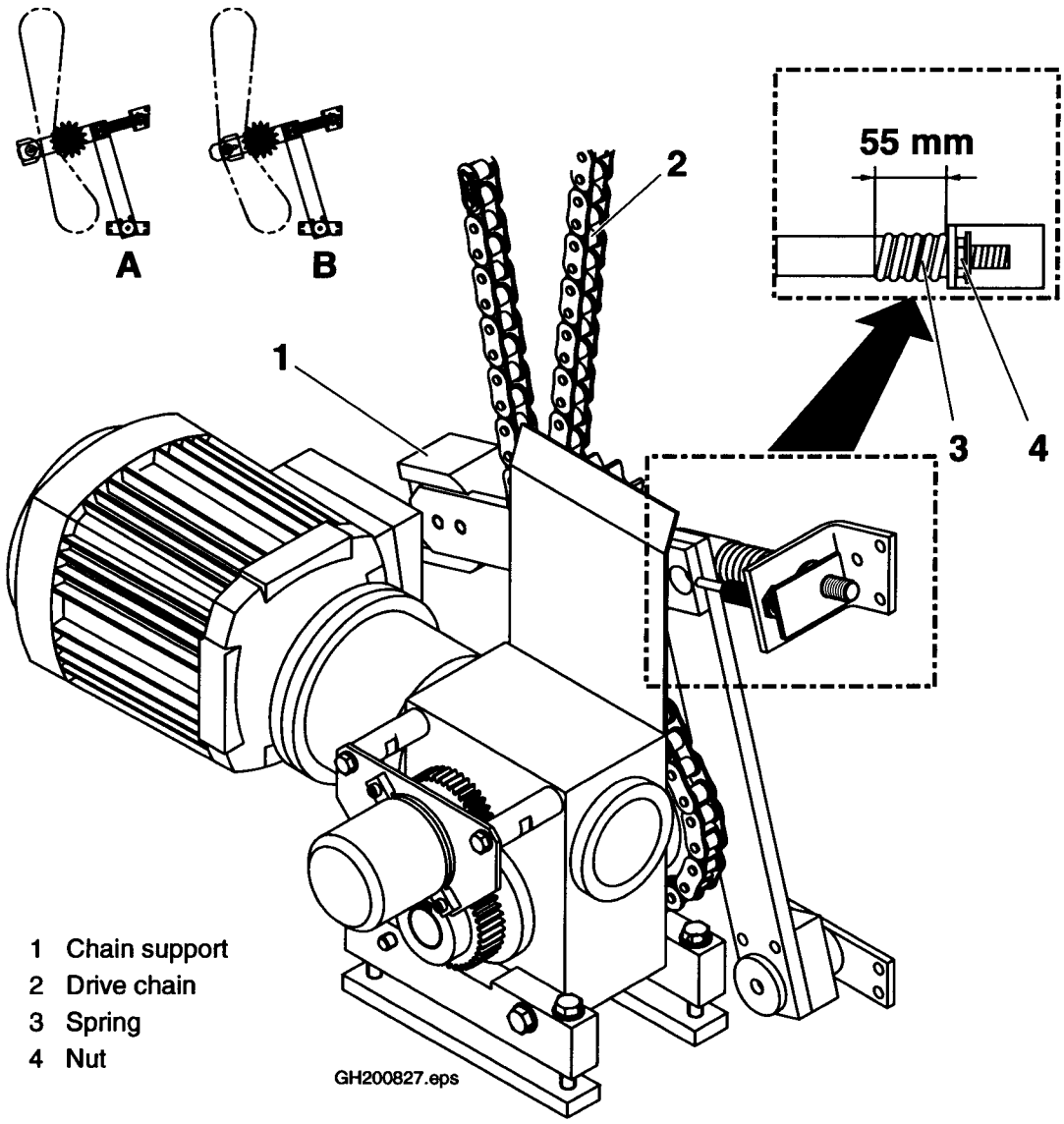
Machine status	
SPC	1021996-0301

Move the chain support (1) until it touches the drive chain (2), see picture A. If necessary turn the chain support (1) and tighten the chain from inside and out, see picture B.

Loosen the nut (4) and screw the nut (4) until the distance at the spring (3) is 55 mm. Tighten the nut.

If the overload protection still is released, it is necessary to tighten the spring harder.

Check the settings of the carrier chains acc to procedures 1.3.11-1 Carrier chain outside - set on page 56 and 1.3.10-1 Carrier chain inside - set on page 55.



1 Chain support
2 Drive chain
3 Spring
4 Nut

2.1bTH200203.en

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1.3 Feed unit

SPC	670284-0401

1.3-1 Feed unit - check

SPC	670284-0401

Check the following parts for wear and damages:

- inner carrier chains (1),
- outer carrier chains (2),
- carriers (3),
- bearing (6).

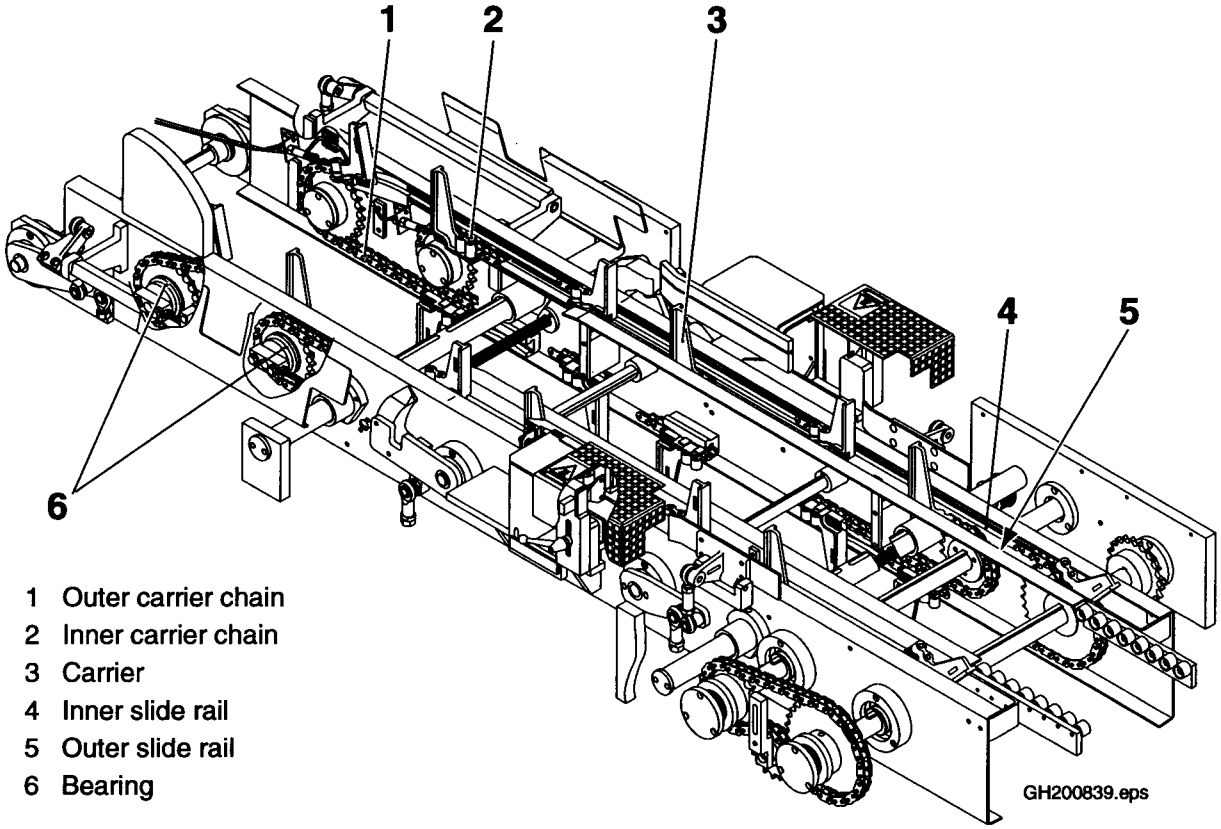
Replace all worn or damaged parts.

Check the setting of the carrier chains. See procedure 1.3.11-1 Carrier chain outside - set on page 56 and procedure 1.3.10-1 Carrier chain inside - set on page 55 for setting instructions.

Check that the inner (1) and outer carrier chains (2) and the slide rails (4 and 5) are clean.

Check that the chain lubrication works properly.

2.1bTH200204.en



1 Outer carrier chain
2 Inner carrier chain
3 Carrier
4 Inner slide rail
5 Outer slide rail
6 Bearing

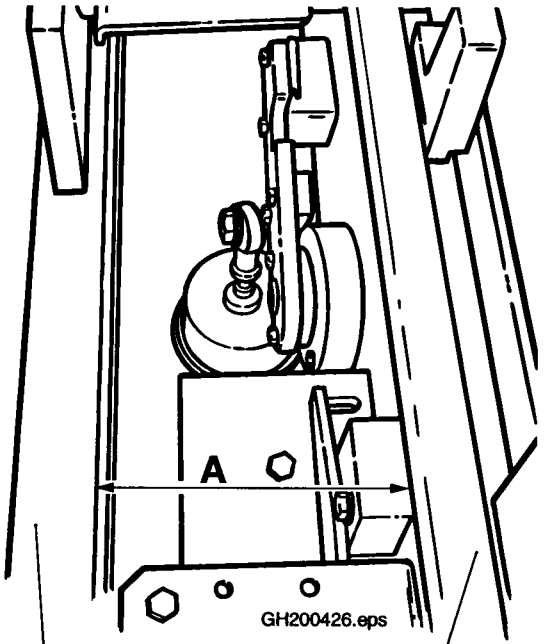
1.3-2 Feed unit - set

SPC	670284-0401

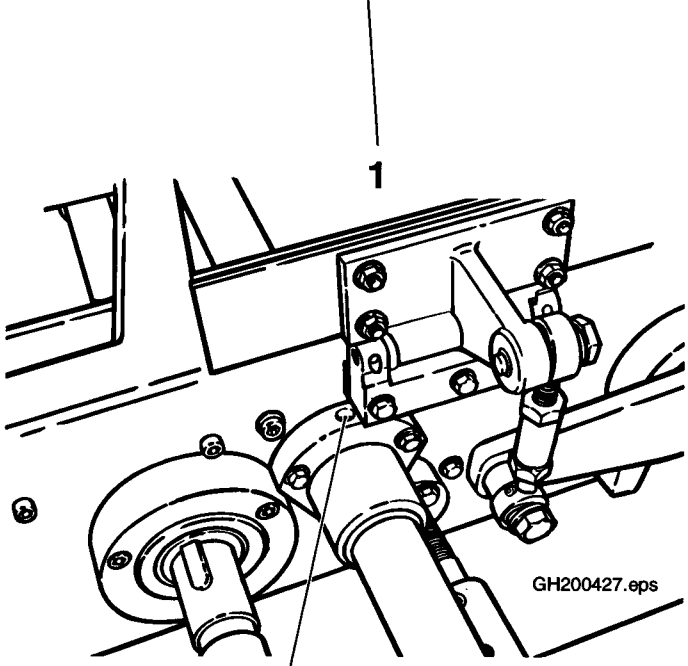
Infeed side

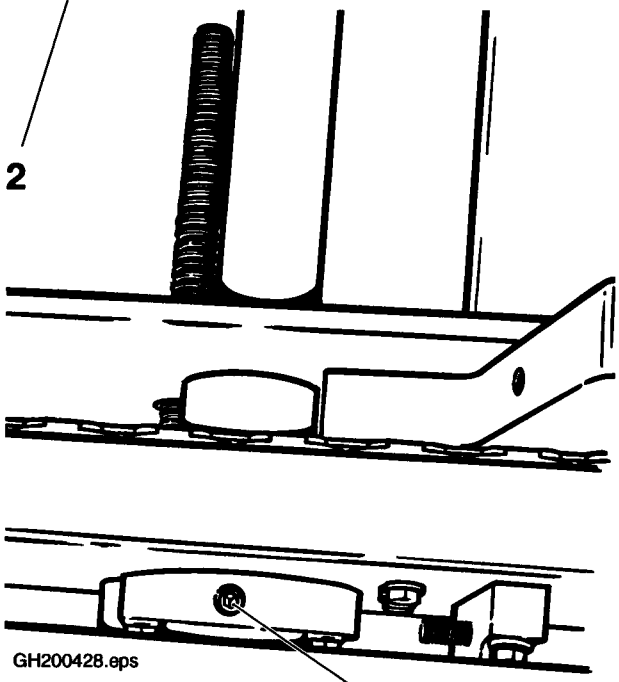
The distance A between the slide rail (2) on the infeed side, and the frame (1) should be 150 mm.

Loosen the grub screws (3) in the front and rear shafts.



1 Frame
2 Slide rail
3 Grub screw





2.1bTH200204.en

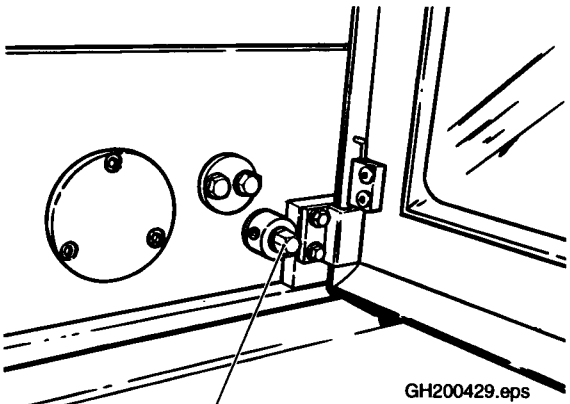
(Cont'd)

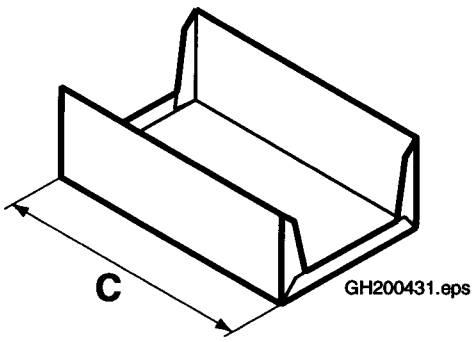
(Cont'd)

Opposite infeed side

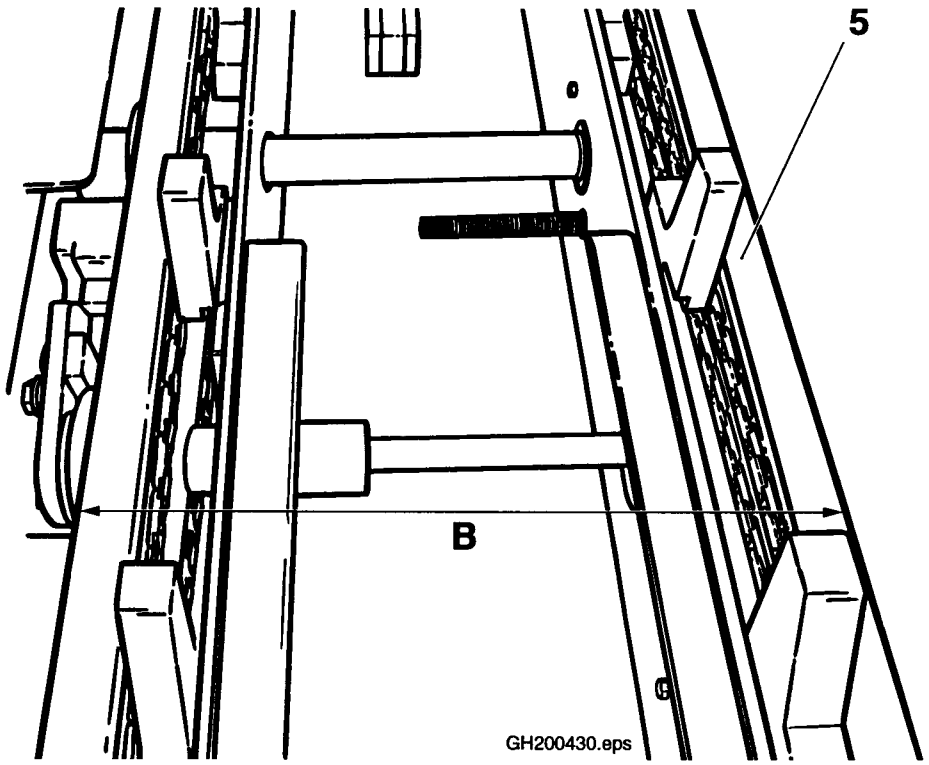
Adjust by cranking the slide rail opposite the infeed side (5) until the distance **B** between the slide rails is the same as the distance **C**.

Tighten the grub screws.





4 Crank connector
5 Outer slide rail



2.1bTH200204.en

1.3.7 Shaft folding flap

1.3.7-1 Shaft folding flap - check

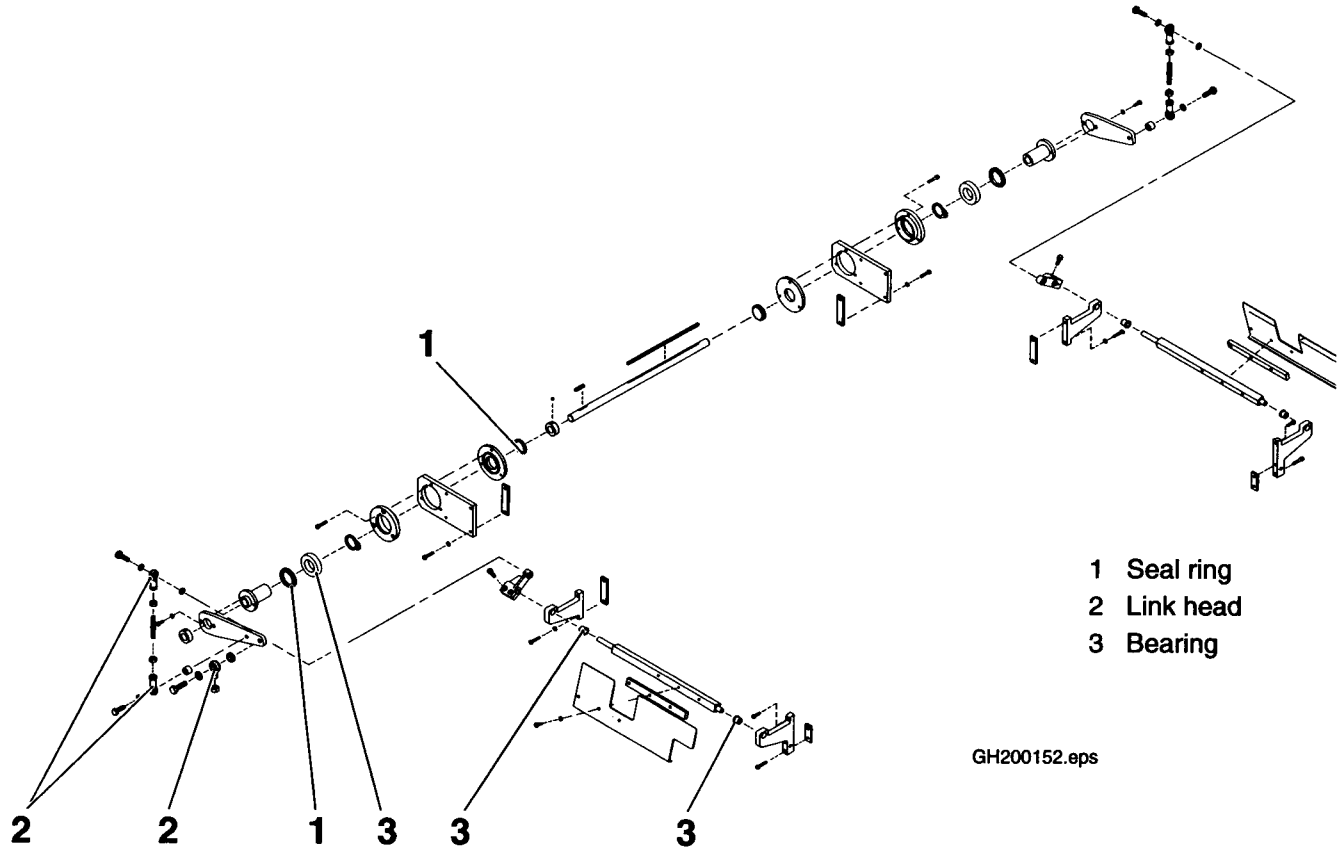
SPC	1021098-0101

Check the following parts for wear and damages:

- bearings (3),
- seal ring (1),
- link heads (2).

Replace all worn or damaged parts.

Check the setting of the folding flaps.
See procedure 1.3.7-2 Shaft folding flap - set on page 51 for setting instructions.



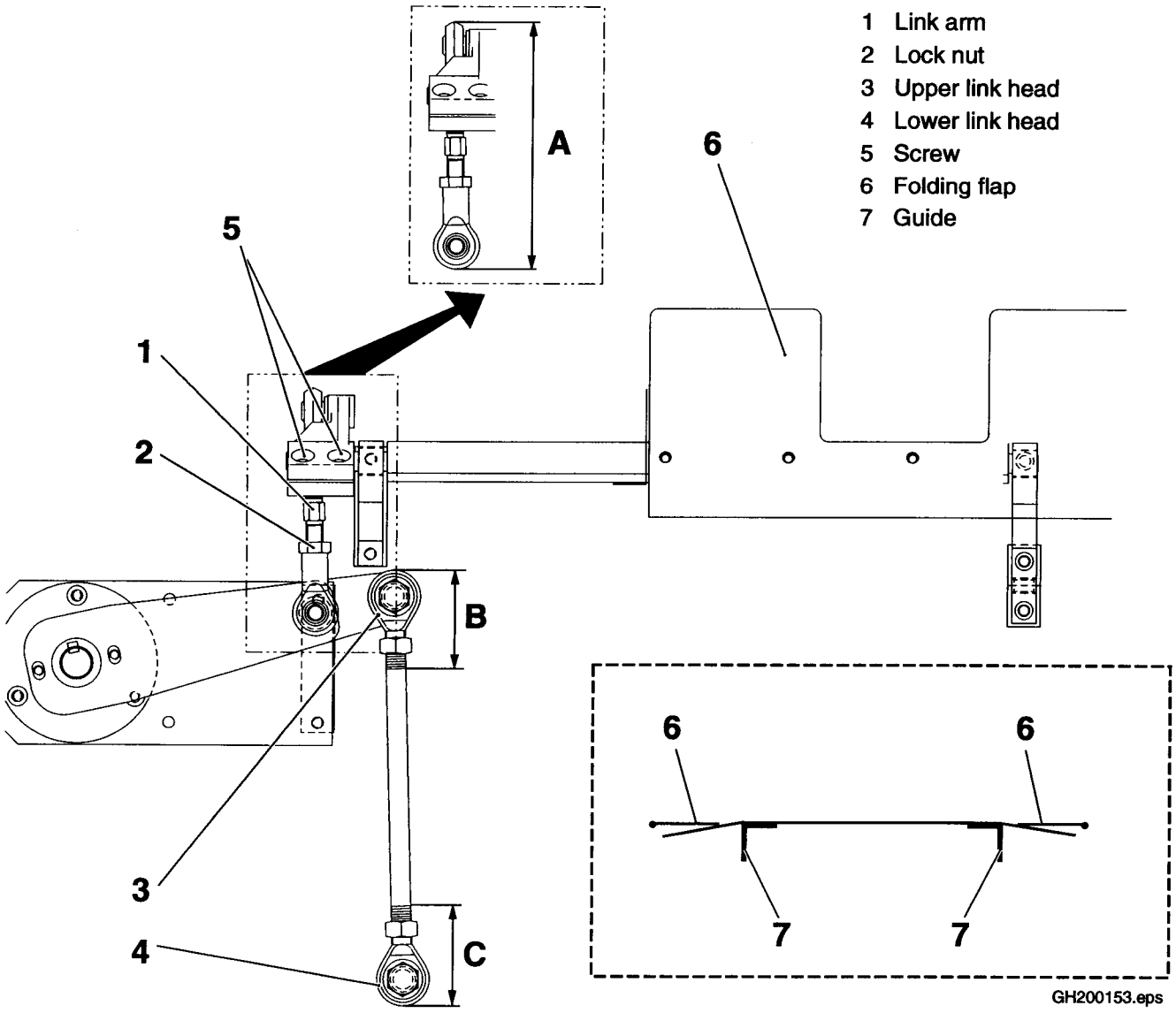
1.3.7-2 Shaft folding flap - set

SPC	1021098-0101

Basic setting is done by adjusting the length of the link arms (1). Loosen the lock nuts (2) and set distance A =165±1 mm. Tighten the lock nuts.

Loosen the lock nuts and set the distance B = 50±2 mm on the upper link head (3), and C = 90±2 mm on the lower link head (4).
Tighten the lock nuts.

Loosen the screws (5), and turn the folding flaps (6), so they are aligned with the upper edge of the guides (7).
Tighten the screws.



2.1bTH200204.en

1.3.8 Shaft squeezer

1.3.8-1 Shaft squeezer - check

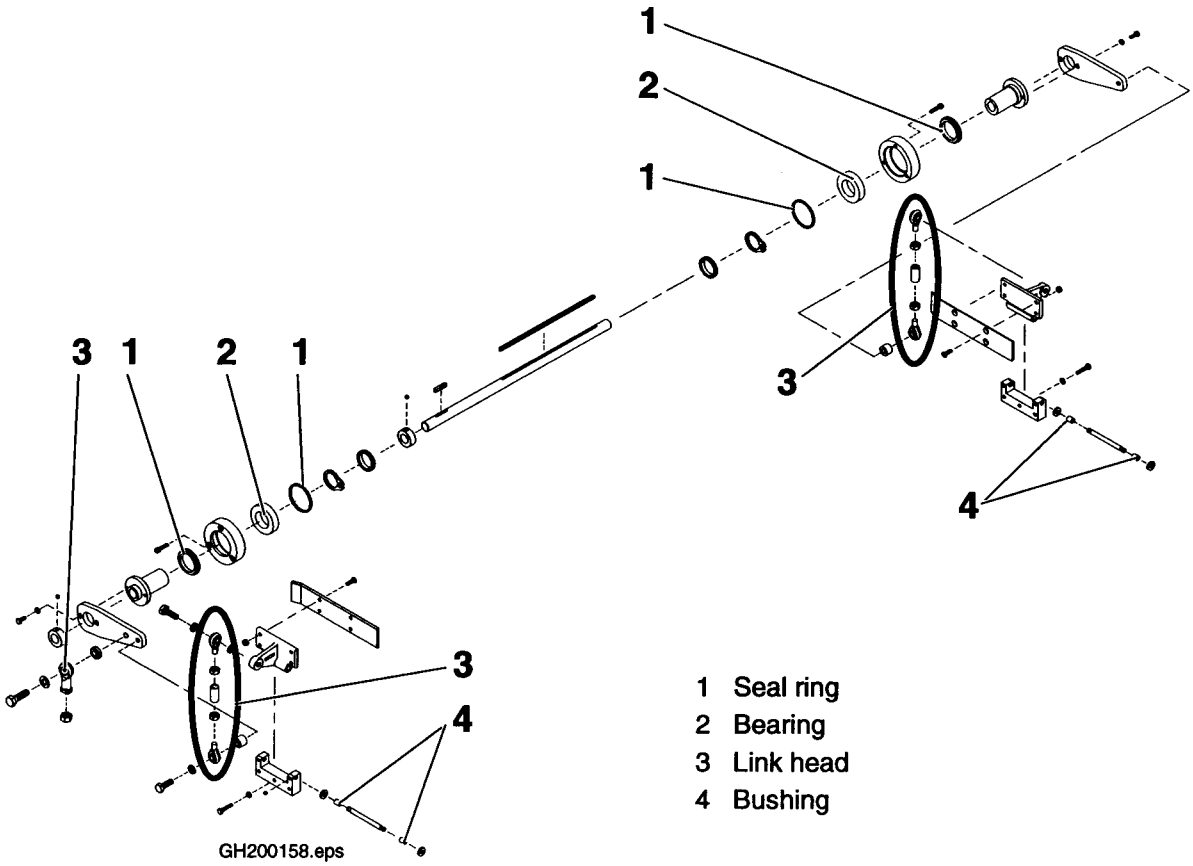
SPC	1021118-0101

Check the following parts for wear and damages:

- bearings (2),
- bushings (4)
- seal rings (1),
- link heads (3).

Replace all worn or damaged parts.

Check the setting of the squeezer. See procedure 1.3.8-2 Shaft squeezer - set on page 53 for setting instructions.



1 Seal ring
2 Bearing
3 Link head
4 Bushing

2.1bTH200204.en

1.3.8-2 Shaft squeezer - set

SPC	1021118-0101

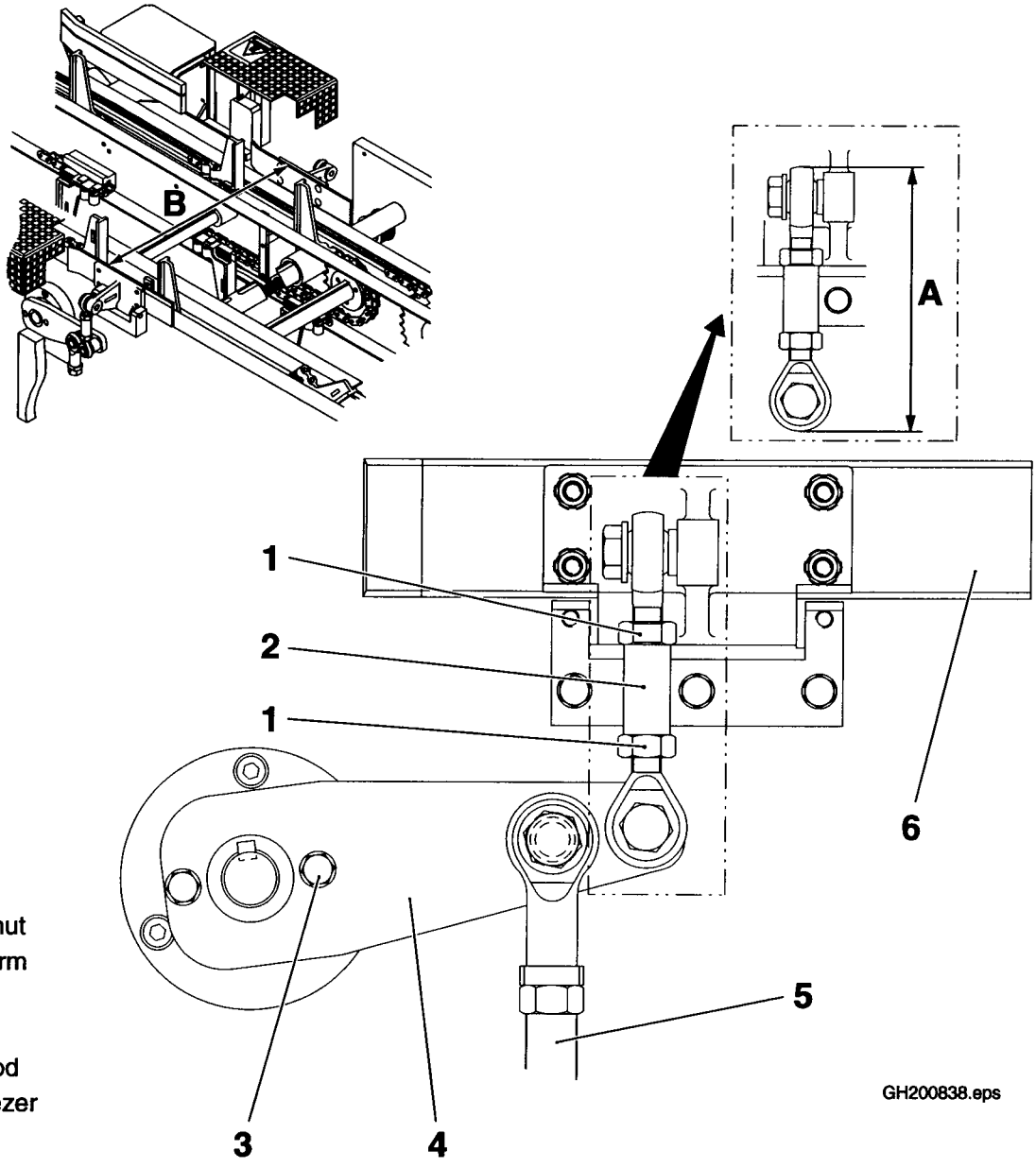
Basic setting of the squeezers is done by adjusting the length of the link arms (2). Loosen the lock nuts (1), and set the length A = 130 mm.
Tighten the lock nuts.

Loosen the screws (3), and turn the arm (4) to position the screws in the middle of the long holes. Tighten the screws.

Adjust the length of the link rod (5) to set the squeezers at 90° to the bottom surface of the blank. When this is not possible, the screws (3) can be loosened, and the arm turned. Both squeezers must be set in the same way.

Measure the **distance B** between the top edges of the squeezers. Reduce this distance by 4 mm by adjusting the length of the link rod (5).

2.1bTH200204.en



1 Lock nut
2 Link arm
3 Screw
4 Arm
5 Link rod
6 Squeezer

1.3.9 Shaft flap folder

1.3.9-1 Shaft flap folder - check

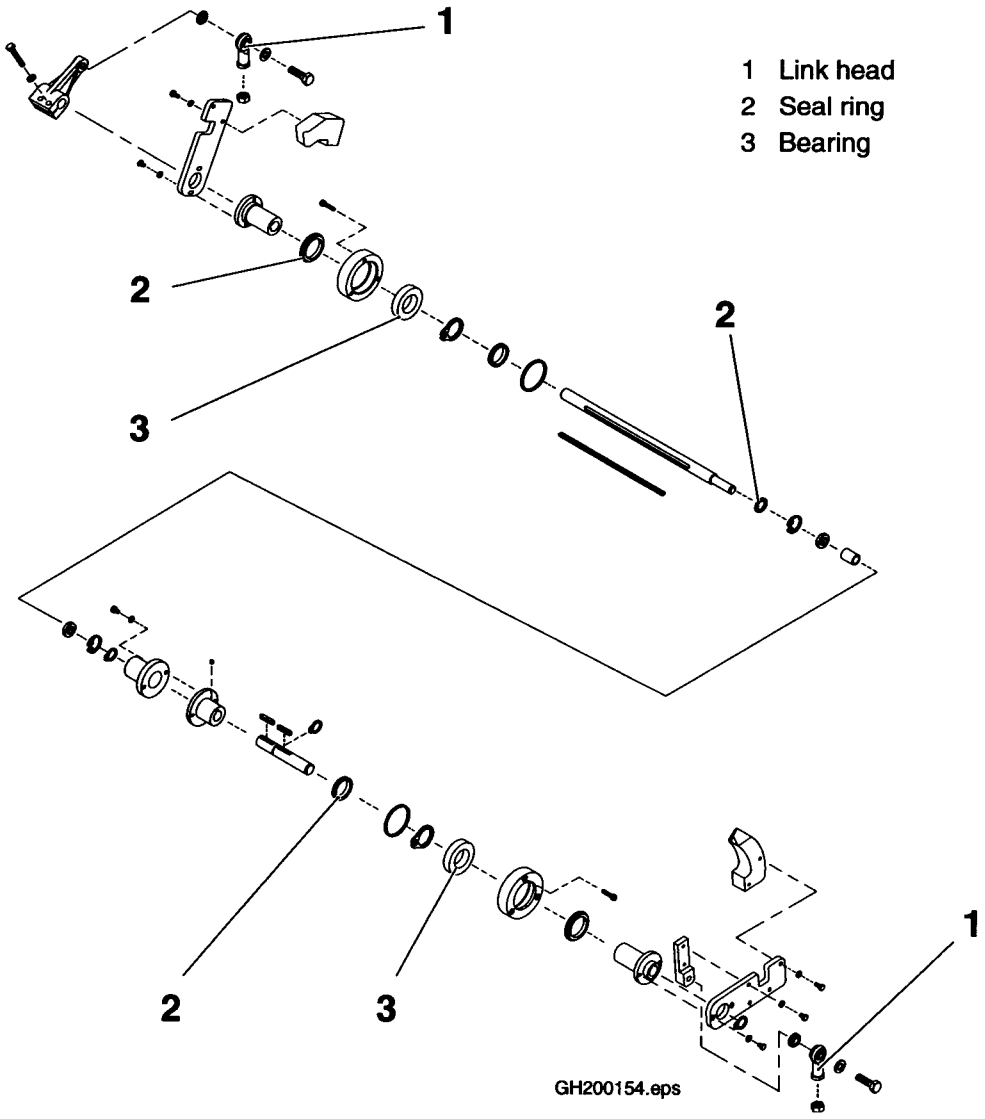
SPC	1021119-010V

Check the following parts for wear and damages:

- seal rings (2),
- bearings (3),
- link heads (1).

Replace worn or damaged parts.

Check the setting of the flap folders. See procedure 1.1.9-2 Flap folder - set on page 36 for setting instructions.



2.1bTH200204.en

1.3.10 Carrier chain inside

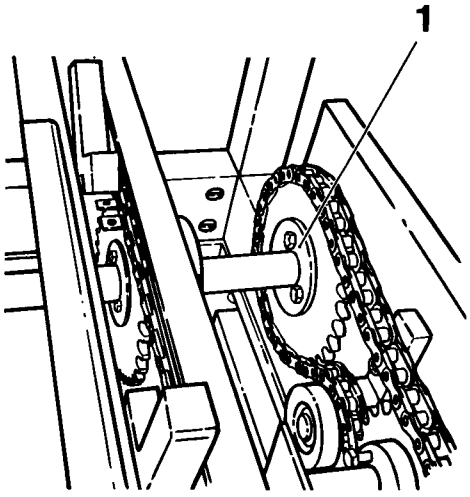
1.3.10-1 Carrier chain inside - set

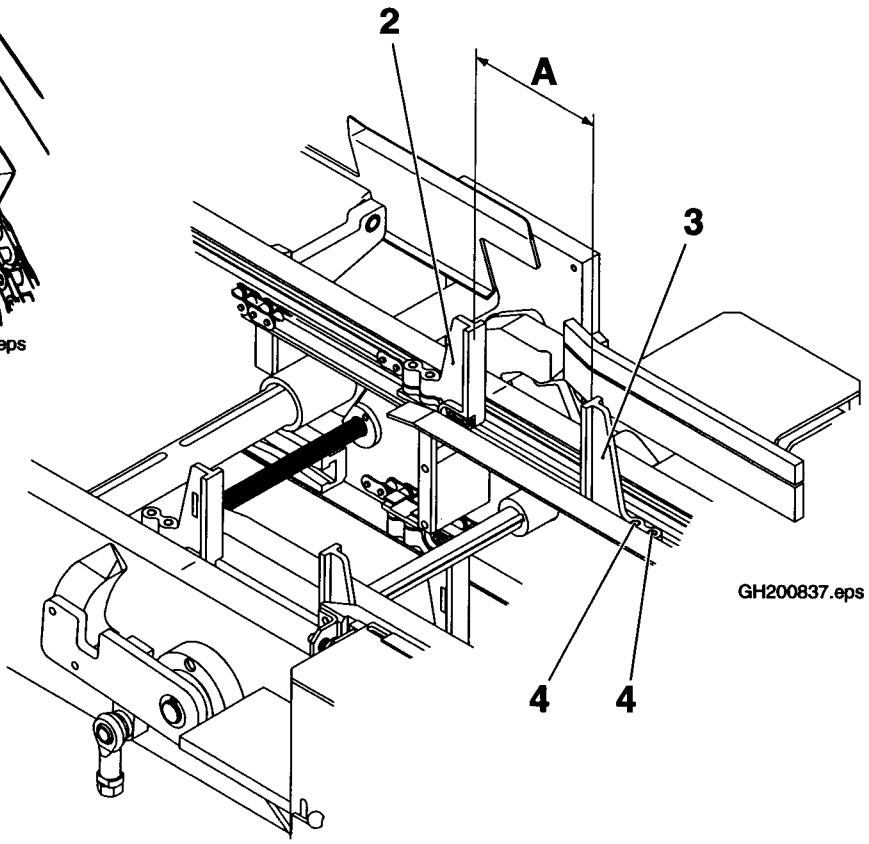
SPC	1021093-0101

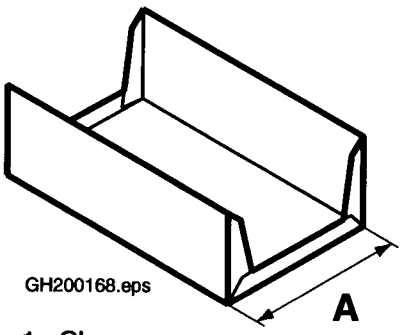
Loosen the clamps on the chain wheels for the inner chains, and set the chains parallel. Tighten the clamps.

Loosen the clamps (1) and move the inner chains so the distance **A** between the carriers (2) and (3) is the same as the distance between the outer edges of the folded blank. Tighten the clamps.

The carriers should be set at 90° angle, adjust on the screws (4).







1 Clamp
2 Carrier
3 Carrier
4 Screw

2.1bTH200204.en

1.3.11 Carrier chain outside

1.3.11-1 Carrier chain outside - set

SPC	1021096-0101

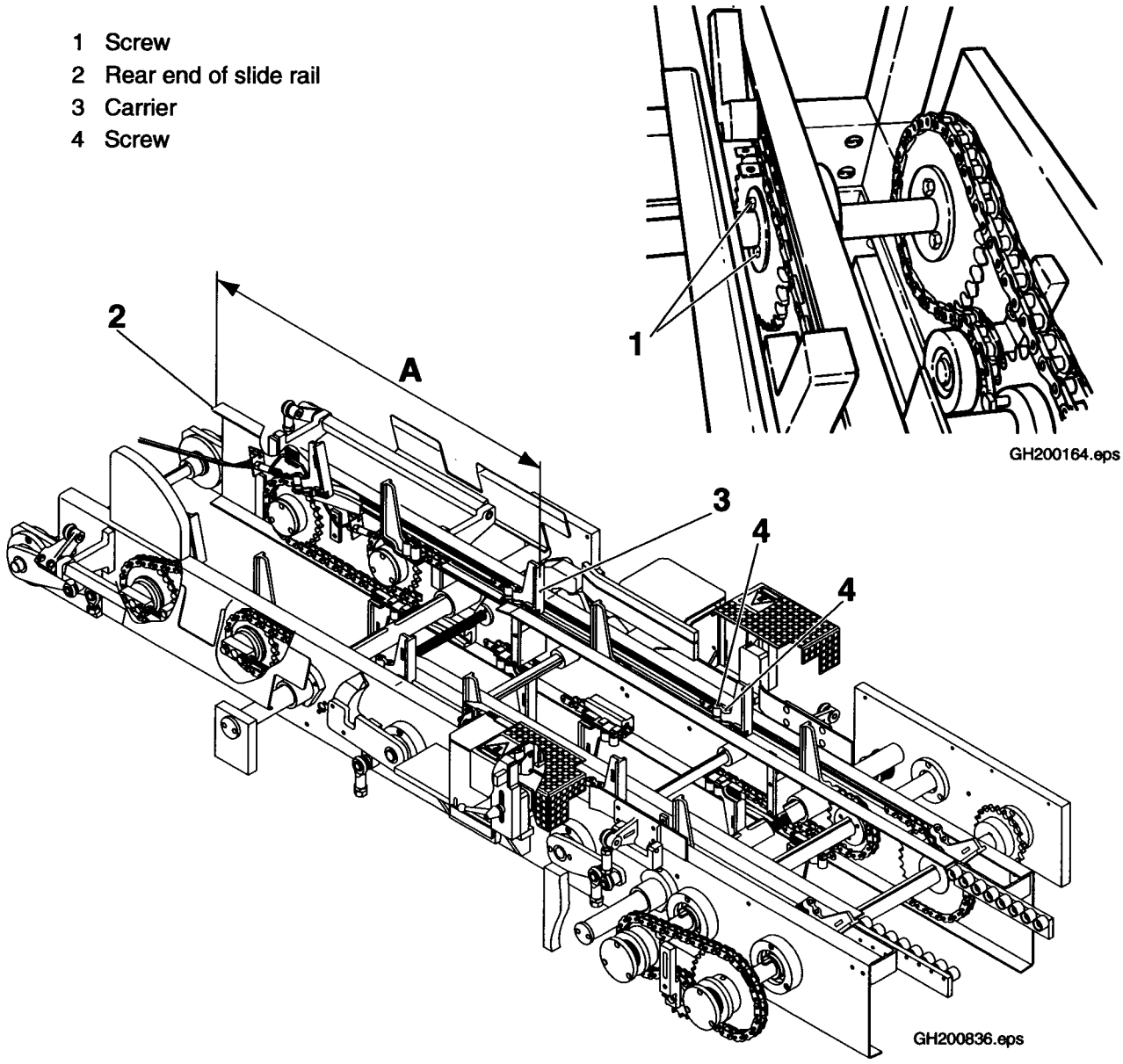
Loosen the screws (1) on the chain wheels for the outer chains.

Move the outer chains so the distance from the rear end of the slide rails (2) to the carriers (3) at the forming station is A = 807 mm. There is a mark in the plate at 807 mm.

Tighten the screws.

The carriers should be set at 90° angle, adjust on the screws (4).

1 Screw
2 Rear end of slide rail
3 Carrier
4 Screw



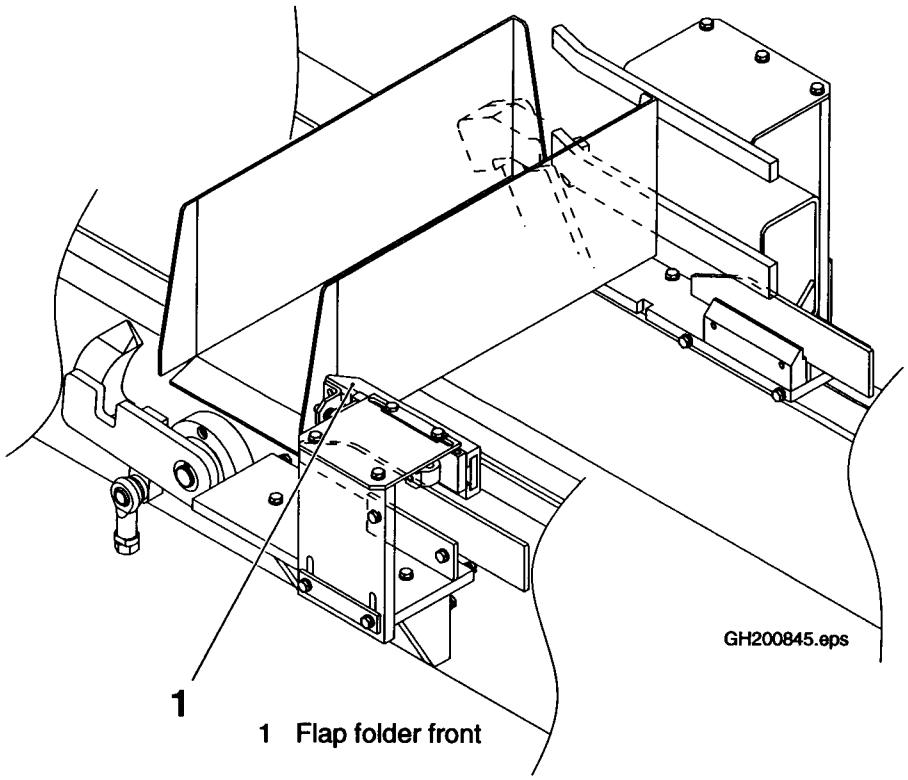
2.1bTH200204.en

1.3.14 Folding bar

1.3.14-1 Folding bar - check

SPC	1021278-040V

Check the function of the folding bar (1).



1 Flap folder front

2.1bTH200204.en

1.3.14-2 Folding bar - set

SPC	1021278-040V

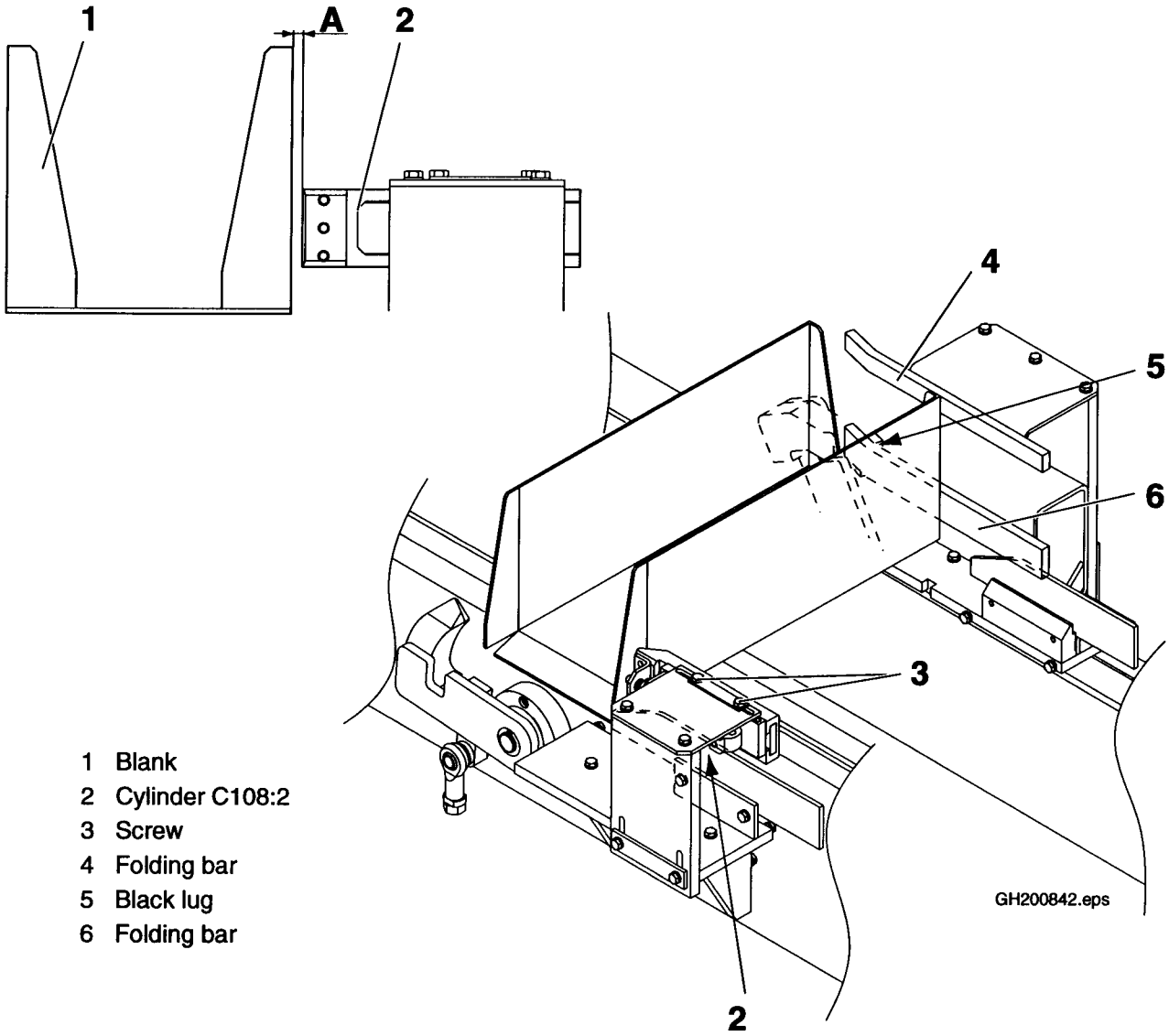
The blank should be in pack position when the settings are carried out.

a) When the cylinder C108:2 (2) is in its minus position the **distance A** between the blank (1) and the flap folder should be **5 mm**. Adjust by loosening the screws (3) and moving the flap folder.

b) The folding bar (4) should just hold one side of the blank acc to the picture. It should be positioned as high up on the blank as possible.

c) The folding bar (6) should be aligned with the bar (4) (lengthwise). The black lug (5) should be positioned so that the bottom flap is bent down approx. 1 mm.

Set the movements of cylinder C108:2 acc to procedure 9.1-1 Cylinders - set.



1 Blank
2 Cylinder C108:2
3 Screw
4 Folding bar
5 Black lug
6 Folding bar

2.1bTH200204.en

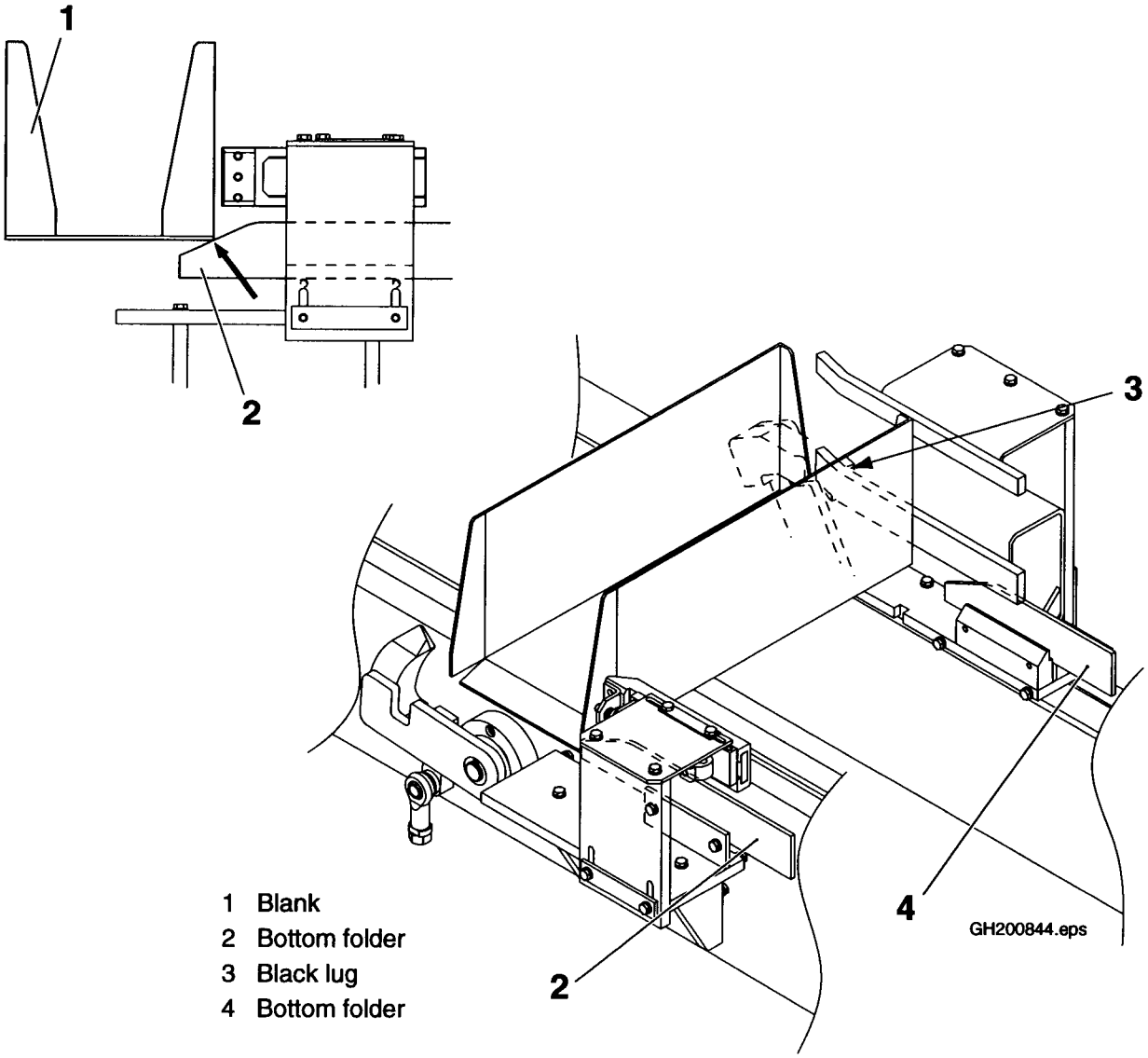
1.3.15 Bottom folder

1.3.15-1 Bottom folder - set

SPC	1021290-0101

When the blank (1) is in its pack position, the bottom folder (2) should just touch the bottom flap. See picture.

The bottom folder (4) must not start folding until the bottom flap has passed the black lug (3).



1 Blank
2 Bottom folder
3 Black lug
4 Bottom folder

2.1bTH200204.en

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1.4 Superstructure

SPC	670283-0401

1.4.2 Magazine shaft

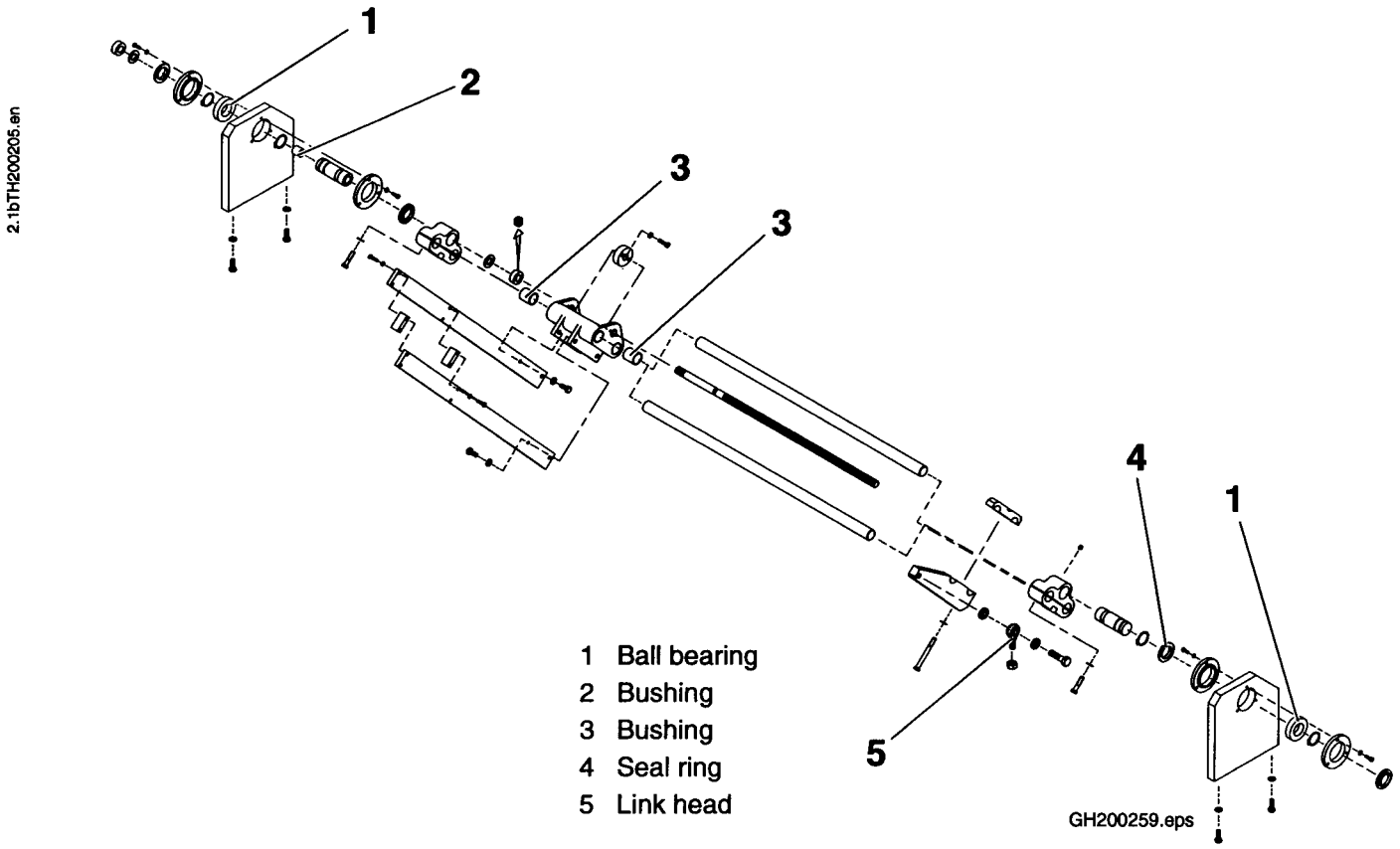
1.4.2-1 Magazine shaft - check

SPC	1021143-0101

Check the following parts for wear and damages:

- ball bearings (1),
- link head (5),
- bushing (2)
- seal ring (4) and
- bushing (3).

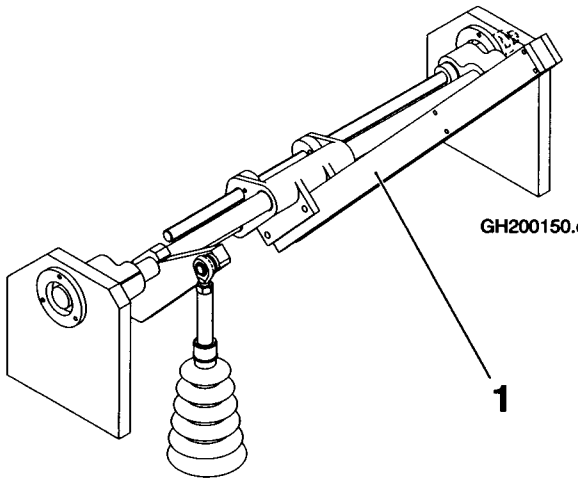
Replace any worn or damaged part.



1.4.2-2 Magazine shaft - set

SPC	1021143-0101

Centre the operating arm (1) between the carrier chains.



1 Operating arm

1.4.3 Suction cup

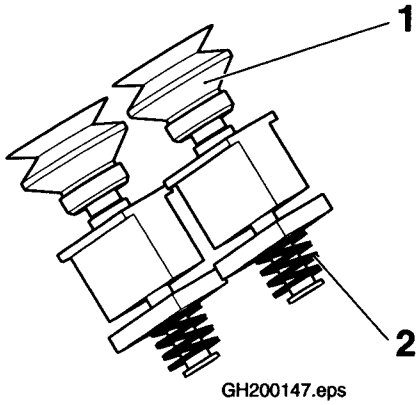
1.4.3-1 Suction cup - check

SPC	1021160-020V

Check the following parts for wear and damages:

- suction cups (1),
- springs (2).

Replace worn or damaged parts.



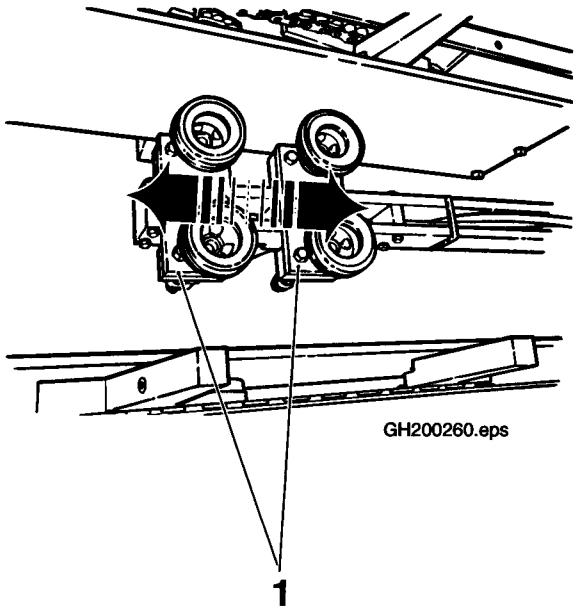
1 Suction cup
2 Spring

2.1bTH200205.en

1.4.3-2 Suction cup - set

SPC	1021160-020V

Centre the suction cups (1) to the bottom creases of the blank.



1 Suction cup

2.1bTH200205.en

1.4.5 Folding support

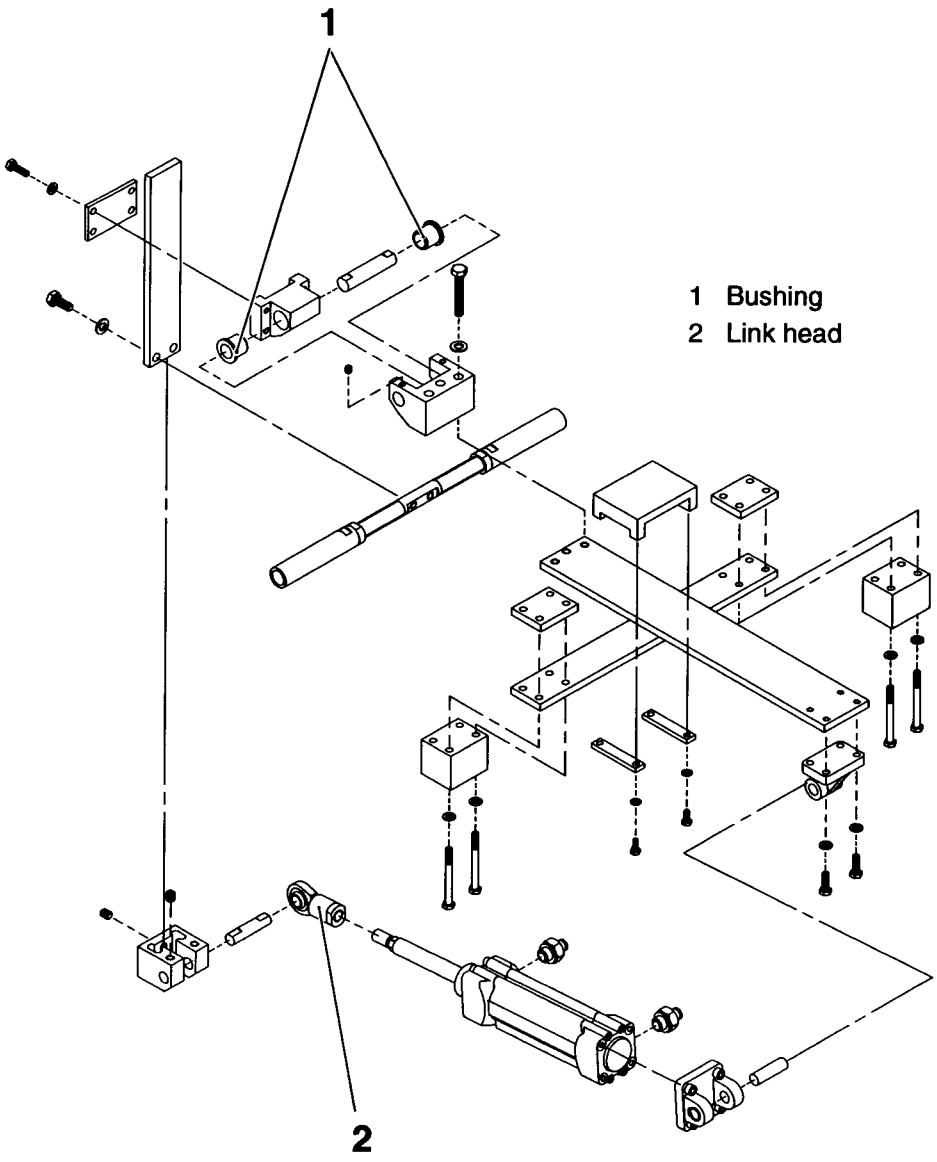
1.4.5-1 Folding support - check

Machine status	
SPC	1065360-020V

Check the following parts for wear and damages:

- bushing (1),
- link head (2).

Replace any worn or damaged part.



1.4.5-2 Folding support - set

Machine status	
SPC	1065360-020V

When the cylinder C108:1 (2) is in its plus position the support should be positioned as high as possible on the box (3) (see figure). Adjust by loosening the screws (4) and moving the support.

Loosen the screws (1) to set the **angle** β to 90°. If necessary also adjust on piston rod.

Make sure that the **angle** α between the bottom and the side of the box is 90°. Adjust by loosening the screws (5).

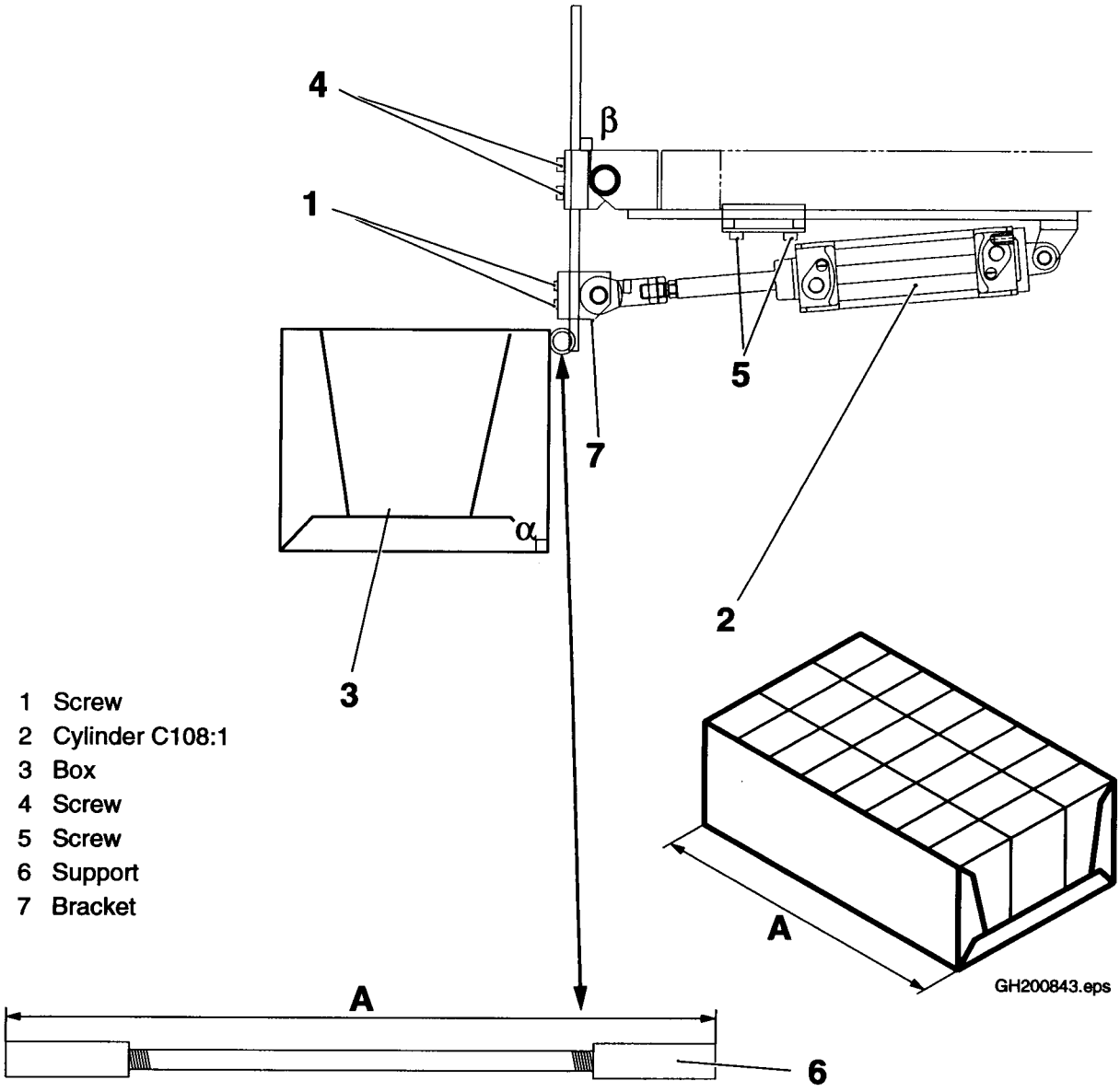
Make sure that the support (6) is centred to the box adjust by loosening the screws (5), and that the distance between the edges of the support (6) is equal to the width of the box, **measurement A**.

Set the movements of the cylinder C108:1 according to procedure 9.1-1 Cylinders - set.

The bracket (7) is turned 180° for Tetra Brik 1000 sq.

(Cont'd)

(Cont'd)



1 Screw
2 Cylinder C108:1
3 Box
4 Screw
5 Screw
6 Support
7 Bracket

2.1bTH200205.en

1.5 Hot melt equipment

SPC	670281-0401

1.5-1 Hot melt equipment - General

WARNING! Always wear safety glasses, protective gloves and other protective clothing to avoid injuries caused by splashing hot melt material.

WARNING! Failure to relieve any remaining air or liquid (adhesive) pressure may cause serious injuries through burning when the hot melt filter is detached or flushed.

DANGER! Never remove any part or component until air and electric power have been disconnected and the pressure of the hot melt in the system have been relieved.

Note! Always refer to the documentation provided from Nordson Corporation before doing any kind of work on the hot melt equipment. The Nordson Series 3000 Technical Manual is included at delivery from Tetra Pak.
The section "Hot melt equipment" in this manual only deals with what is specific for this machine.

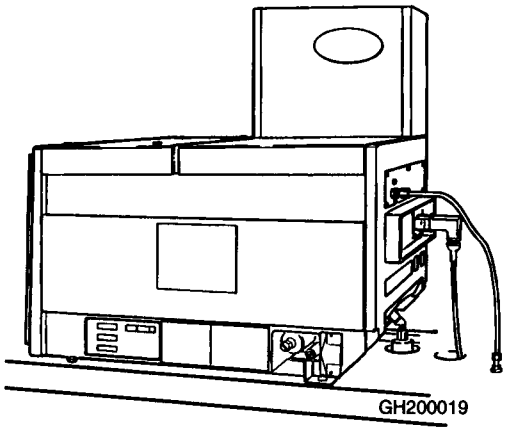
2.1bTH200206.en

1.5.1 Hot melt unit

1.5.1-1 Hot melt unit - check hot melt pump

SPC	670281-0401

Check the function of the hot melt pump.



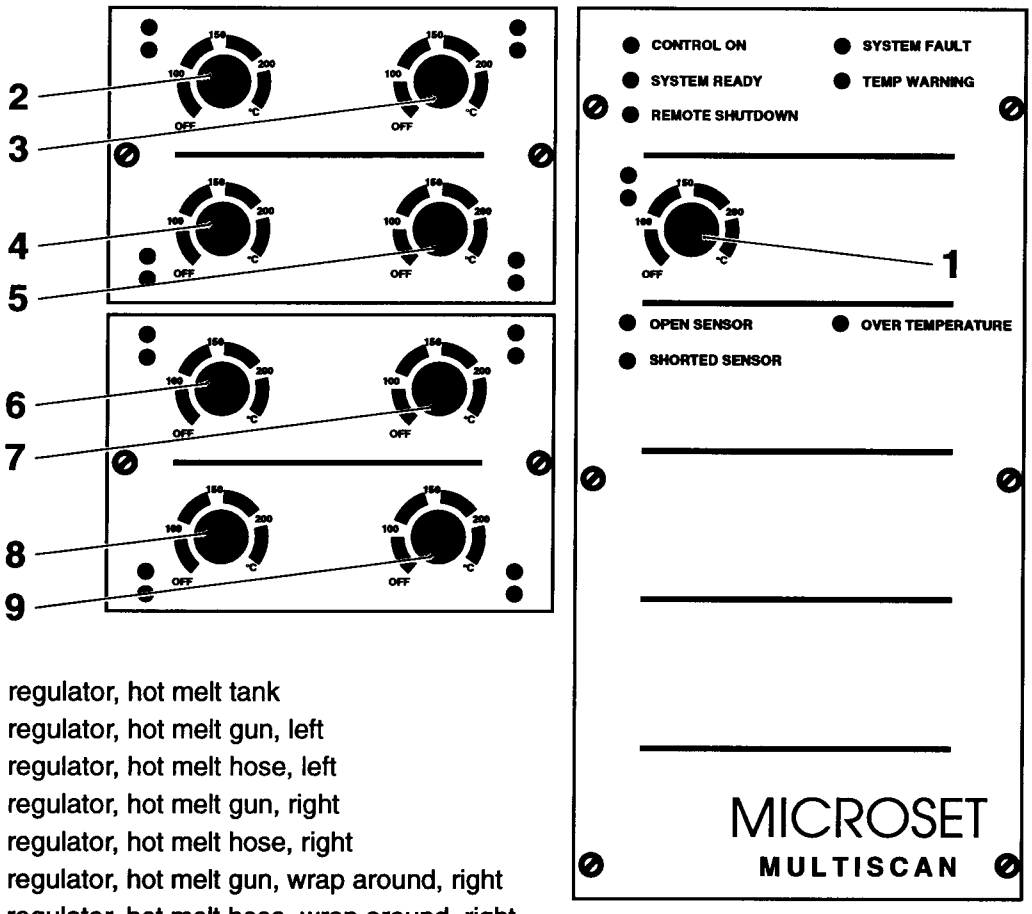
1.5.1-2 Hot melt unit - set

Machine status	Main power ON Air ON
SPC	670281-0401

WARNING! Moving parts and hot surfaces can cause serious injuries!

a) Set the temperature of tank, hose and hot melt guns acc to the table below:

Recommended types of hot melt	Ambient temperature	Tank temperature	Hose temperature	Gun temperature
Jowatherm 25900 TP No. 90153-36	5-30°C	150°C	150°C	165°C
National Instant Pak 2300	5-30°C	150°C	150°C	165°C
National Instant-LOK 9657	25-50°C	175°C	175°C	175°C



GH200841.eps

2.1bTH200206.en

1 Temperature regulator, hot melt tank
2 Temperature regulator, hot melt gun, left
3 Temperature regulator, hot melt hose, left
4 Temperature regulator, hot melt gun, right
5 Temperature regulator, hot melt hose, right
6 Temperature regulator, hot melt gun, wrap around, right
7 Temperature regulator, hot melt hose, wrap around, right
8 Temperature regulator, hot melt gun, wrap around, left
9 Temperature regulator, hot melt hose, wrap around, left

(Cont'd)

(Cont'd)

b) Check that there is adhesive in the tank and switch on the hot melt unit.

c) Reduce the air pressure to the hot melt guns with the pressure regulators T120 and T121 to read max 0.1 MPa on the gauges U120 and U121.

d) Unscrew the nozzles (8) from the hot melt guns.

e) Pressurize the machine.

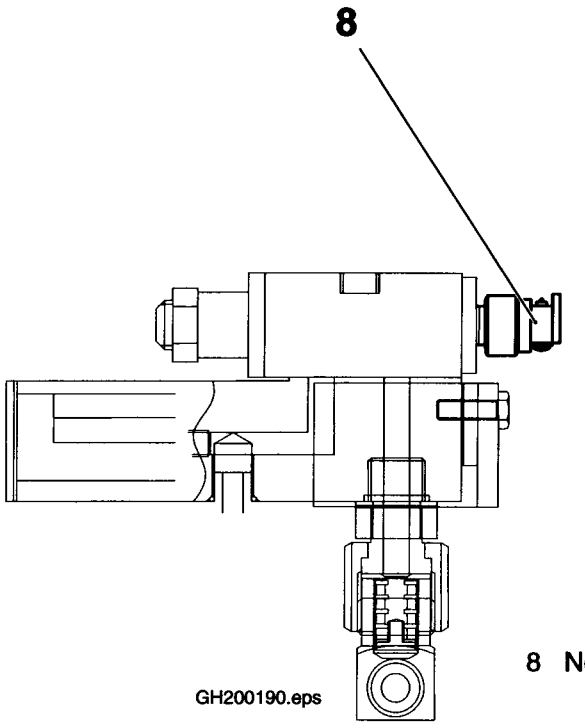
WARNING! Moving parts and hot surfaces can cause serious injuries!

f) Test the guns by pushing the manual buttons on valve Y120 and Y121 and for machines with wrap around unit also Y122 - Y125.
Keep pushing until the adhesive is clean and without air.

Refit the nozzles (8) and reset the air pressure of the hot melt pump, indicated on the pressure gauge U150, to appr 0.3 MPa by means of the pressure regulator T150.

Note! If the machine is equipped with a wrap around unit and the cardboard unit type Tetra Tray will be used in production for more than some days, then the following actions must be performed before production starts. Otherwise there is a risk that the hot melt will become carbonized. Turn off the temperature in the hot melt hoses and guns mounted in the wrap around unit (temperature regulators 6, 7, 8, and 9). Replace the upper side guns with a blind plate (Tetra Pak **part No 90 439-232**).

2.1bTH200206.en



8 Nozzle

1.5.1-3 Hot melt unit - clean filter

Machine status	Main power ON Air ON
SPC	670281-0401

WARNING! Moving parts and hot surfaces can cause serious injuries!

WARNING! Always wear safety glasses, protective gloves, and other protective clothing to avoid injuries caused by splashing hot melt material and hot parts of the hot melt equipment.

a) The machine must be preheated.

b) Reduce the pump air pressure to zero.

WARNING! Failure to relieve any remaining air or liquid (adhesive) pressure may cause serious injuries through burning when the hot melt filter drain valve (1) opened.

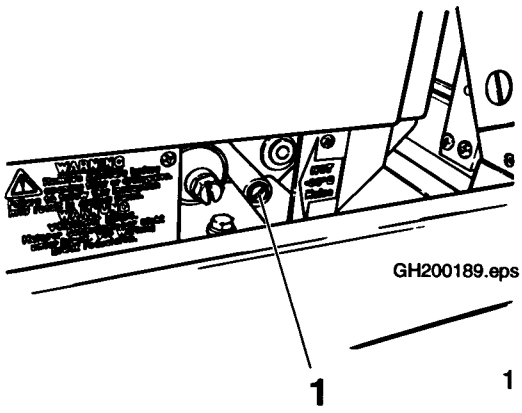
c) Using a screwdriver, open the drain valve (1) over an open container.

d) Increase the pump air pressure until adhesive material flows out of the drain. Allow material to flow until it is clean and free from all contaminants.

e) Reduce the pump air pressure to zero.

f) Close the drain valve (1).

g) Reset the pump air pressure.



1 Drain valve

2.1bTH200206.en

1.5.1-4 Hot melt unit - replace filter

SPC	670281-0401

WARNING! Always wear safety glasses, protective gloves, and other protective clothing to avoid injuries caused by splashing hot melt material and hot parts of the hot melt equipment.

a) The machine must be preheated.

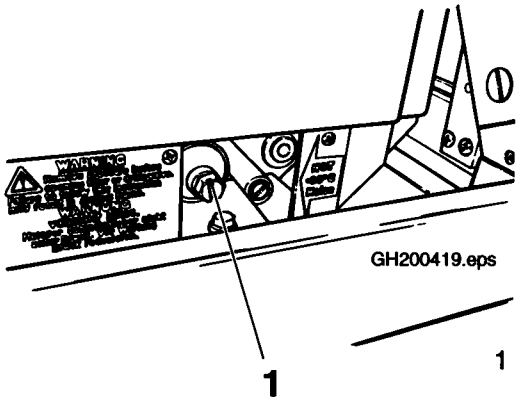
b) Reduce the pump air pressure to zero.

WARNING! Failure to relieve any remaining air or liquid (adhesive) pressure may cause serious injuries through burning when the hot melt filter drain valve opened.

c) Hold the filter adapter (1) and unscrew the filter.

d) Wipe the inside of the adapter with a lint-free cloth.

e) Fit the exchange filter. Screw it in fingertight only. When the filter has become hot, it should be tightened a bit more.
DO NOT OVER-TIGHTEN!



1 Filter adapter

2.1bTH200206.en

1.5.2 Hot melt gun

1.5.2-1 Hot melt gun - replace

SPC	670281-0401

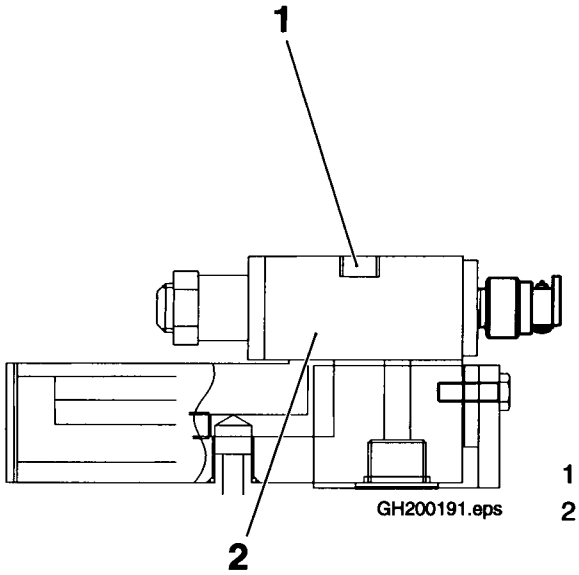
WARNING! Never remove any part or component until air and electric power have been disconnected and the pressure of the hot melt in the system has been relieved (zeroed) by triggering a gun.

WARNING! Wear safety glasses, protective gloves and other protective clothing to avoid injuries from splashing hot adhesive.

a) Undo the screws (1).

b) Replace the hot melt guns (2).

Reassemble in reverse order.



1 Screw
2 Hot melt gun

2.1bTH200206.en

1.5.2-1 Hot melt gun - replace nozzle

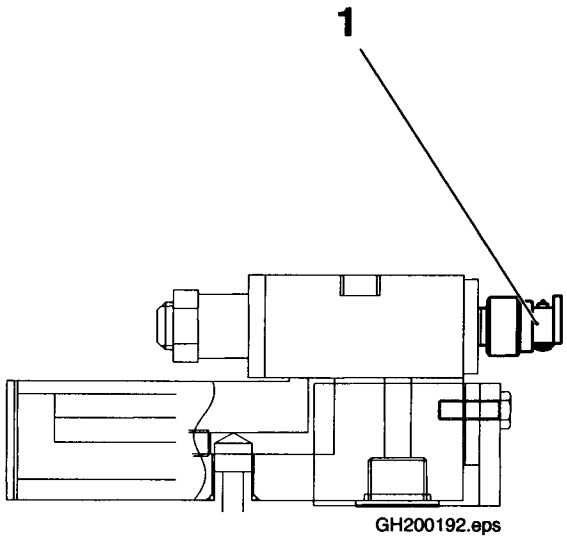
SPC	670281-0401

WARNING! Wear safety glasses, protective gloves and other protective clothing.

Note! The gun must be heated to working temperature.

a) Unscrew the nozzles (1).

b) Fit the replacement nozzle.



1 Nozzle

2.1bTH200206.en

1.5.2-3 Hot melt gun - set

SPC	670281-0401

WARNING! Wear safety glasses, protective gloves, and other protective clothing to avoid injuries caused by splashing hot melt material.

The hot melt dots (3) should be placed on the blanks as shown in the picture on the next page.

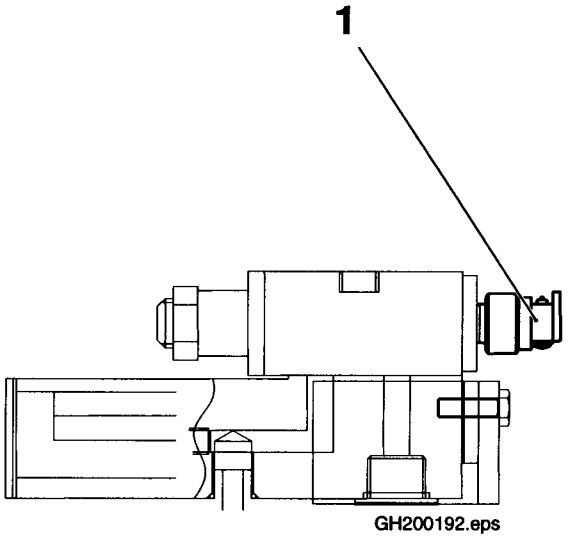
Note! The hot melt dots on **Tetra wrap around box with side flap** and **Tetra wrap around box with inside top flap** are placed differently if the machine is equipped with L infeed than they would be on a MAX, MED or MIN machine.

Adjust by moving the hot melt gun and fine tune by turning the nozzle (1) to deposit the hot melt in different way.

No hot melt should be visible when the blank is folded and has left the machine.

Check that the hot melt guns have the correct working pressure 0.3 MPa.

Also check that the guns have the correct working temperature (according to procedure 1.5.1-2 Hot melt unit - set on page 68).



1 Nozzle

2.1bTH200206.en

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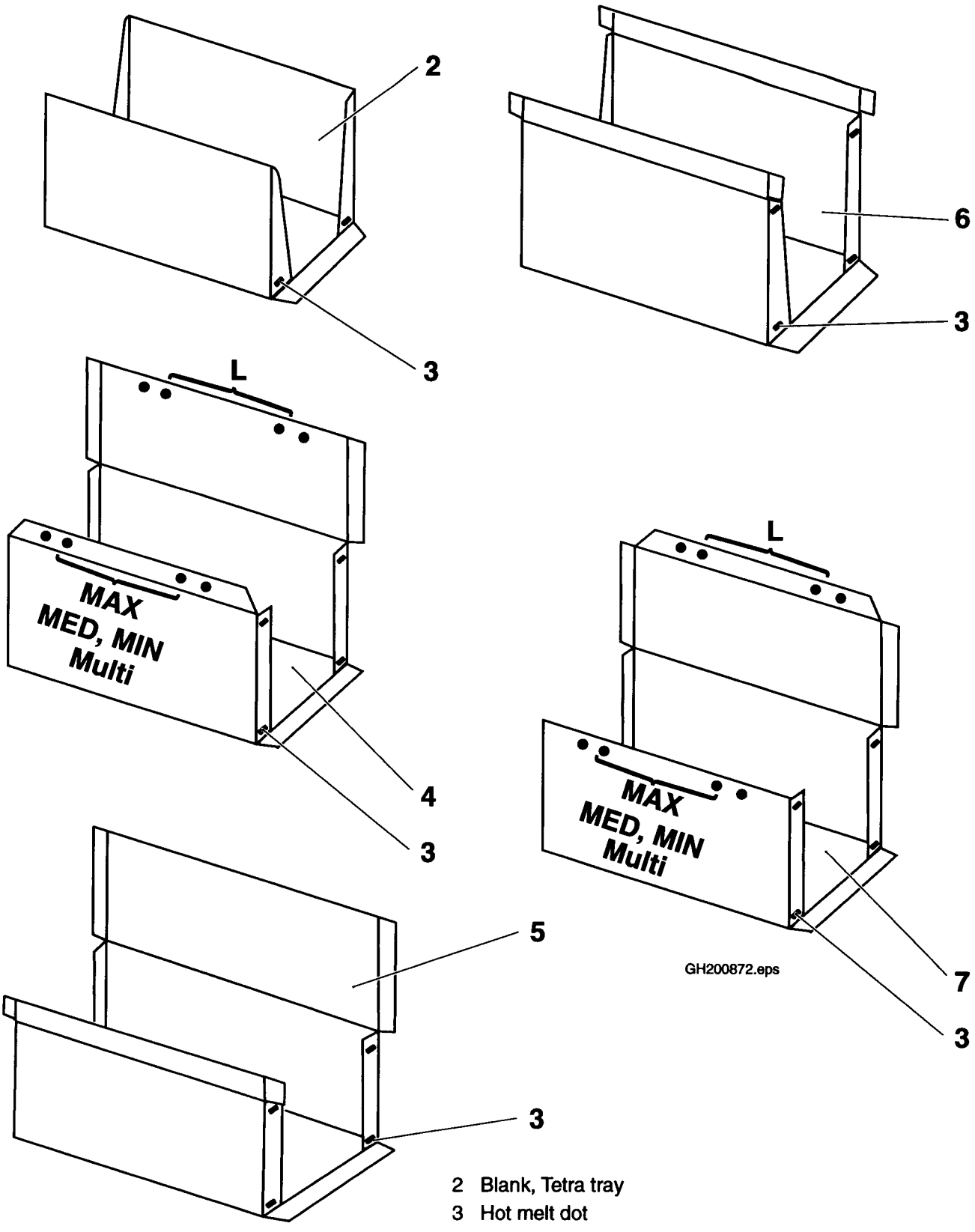

2.1bTH200206.en

2 Blank, Tetra tray
3 Hot melt dot
4 Blank, Tetra wrap around box with inside top flap
5 Blank, Tetra wrap around box with meeting flaps
6 Blank, Tetra Tray with over flaps
7 Blank, Tetra wrap around box with side flap

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1.6 Covering base unit

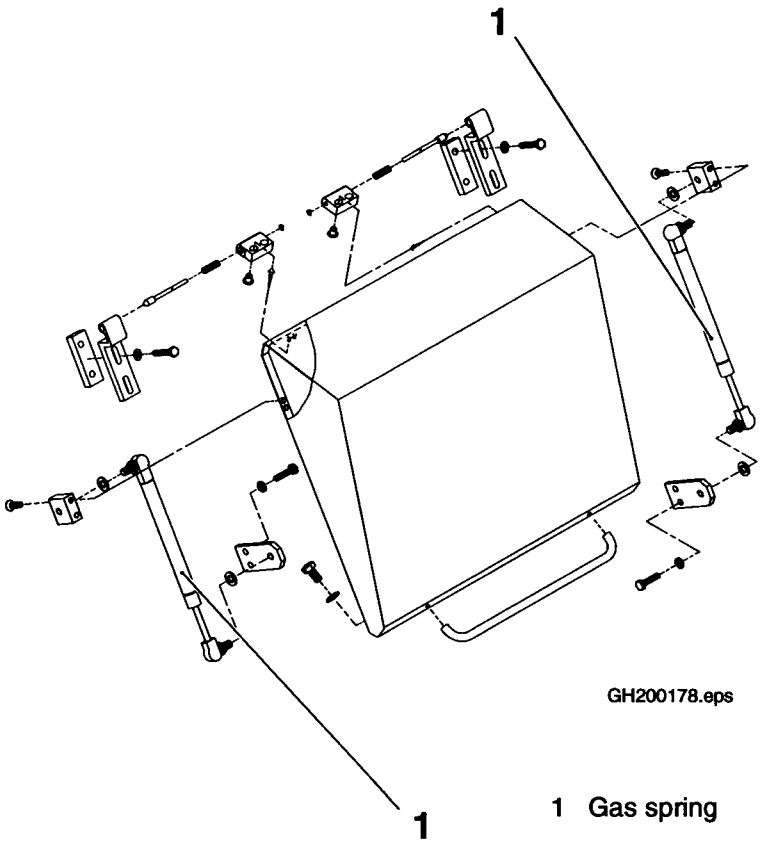
SPC	670296-020V

1.6.1 Hood

1.6.1-1 Hood - check gas springs

Machine status	
SPC	1021587-0101

Check the condition of the gas springs (1). replace if necessary.



1 Gas spring

2.1bTH200024.en

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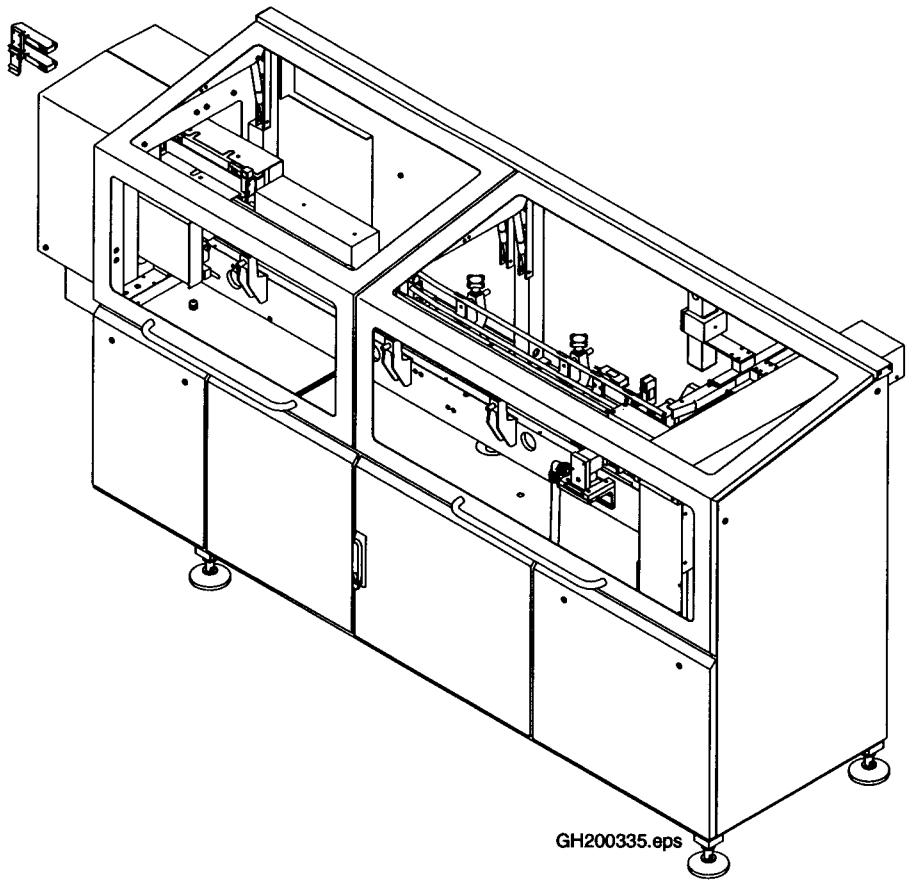
2 Infeed unit

2.1bTH200223.en



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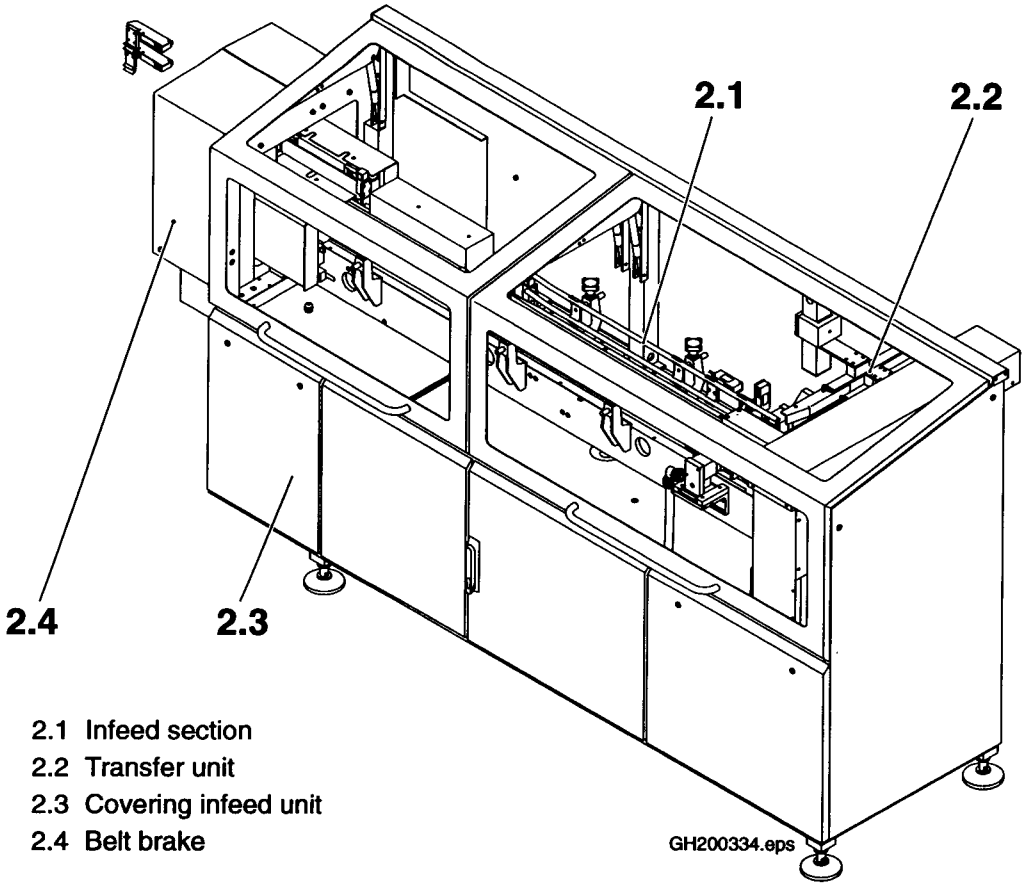
2-0 Infeed unit - description

SPC	670292-040V



2.1 Infeed section
2.2 Transfer unit
2.3 Covering infeed unit
2.4 Belt brake

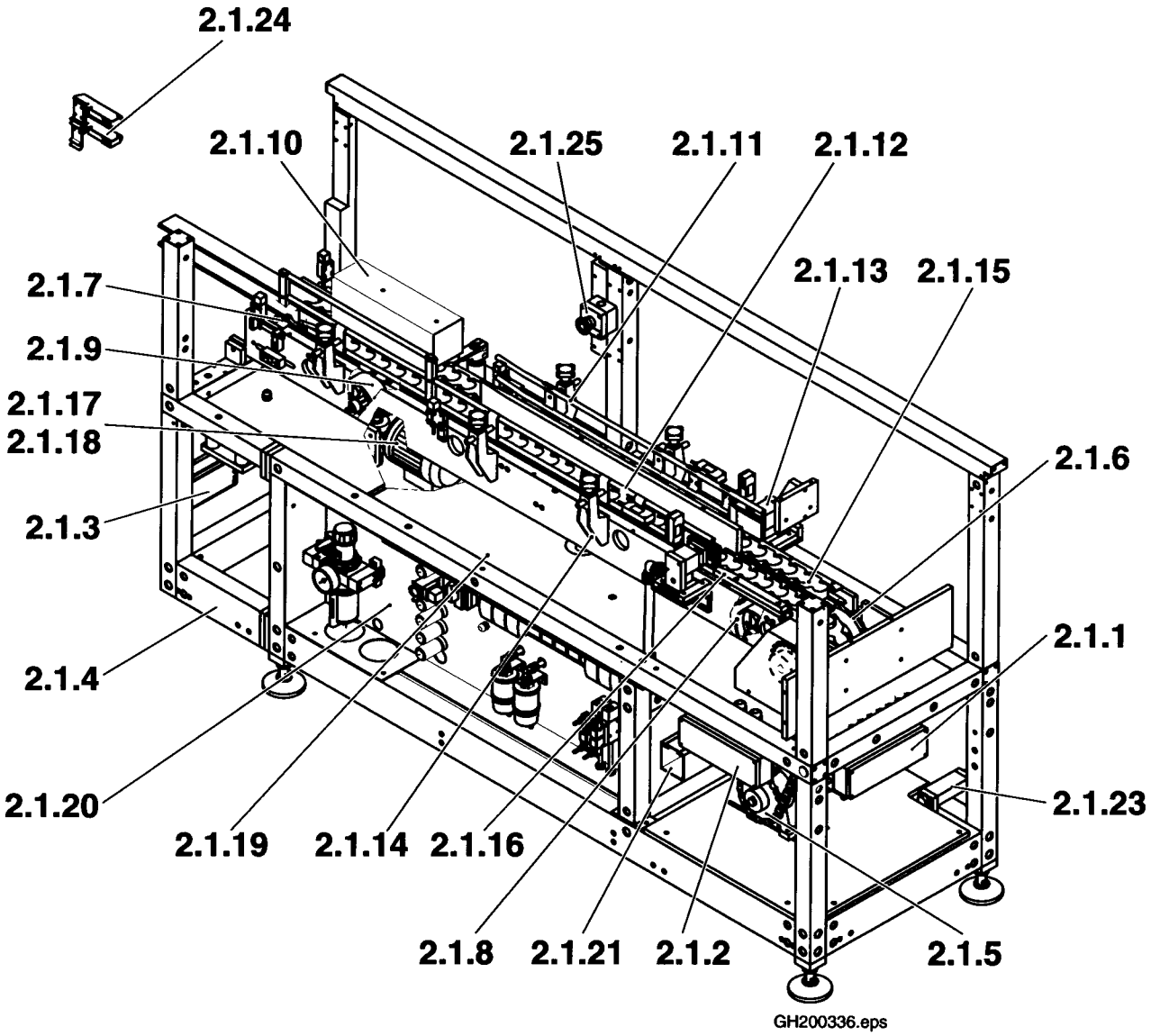
2.1bTH200223.en

2.1 Infeed section

SPC	670367-0401

2.1-0 Infeed section - description

SPC	670367-0401



2.1bTH200224.en

2.1.1	Connection box	2.1.10	Distributor	2.1.19	Covering plate
2.1.2	Connection box	2.1.11	Steering rail	2.1.20	Pneumatic cabinet
2.1.3	Connection box	2.1.12	Steering rail	2.1.21	Cable duct
2.1.4	Frame infeed	2.1.13	Brake side	2.1.22	Frame infeed upper
2.1.5	Drive motor infeed	2.1.14	Frame transport line	2.1.23	Bracket
2.1.6	Drive shaft	2.1.15	Chain	2.1.24	Queue guard, double
2.1.7	Guide sprocket outside	2.1.16	Slide rail	2.1.25	Emergency stop
2.1.8	Guide sprocket	2.1.17	Motor distributor		
2.1.9	Guide sprocket	2.1.18	Idler		

2.1.5 Drive motor infeed

2.1.5-1 Drive motor infeed - check

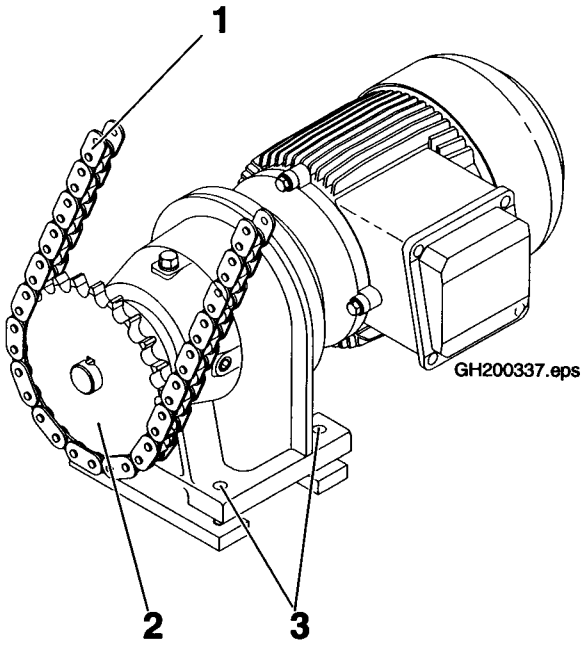
SPC	1065238-030V

Check the following parts for wear and damages:

- sprocket (2),
- chain (1).

Replace all worn or damaged parts.

Check the tension of the drive chain (1). Loosen the screws (3) and slide the motor sideways to set the tension. Tighten the screws.



1 Chain
2 Sprocket
3 Screw

2.1bTH200224.en

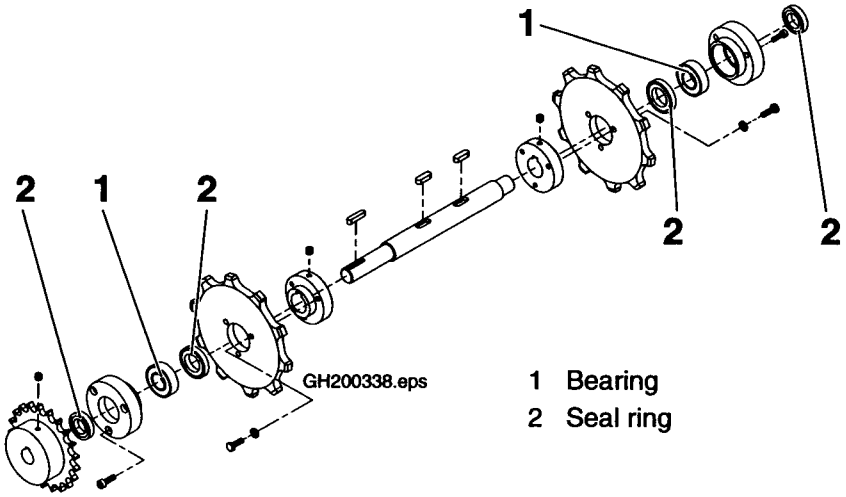
2.1.6 Drive shaft

2.1.6-1 Drive shaft - check

SPC	1065229-0101

Check the bearings (1) for play, replace if necessary.

Check the seal rings (2).



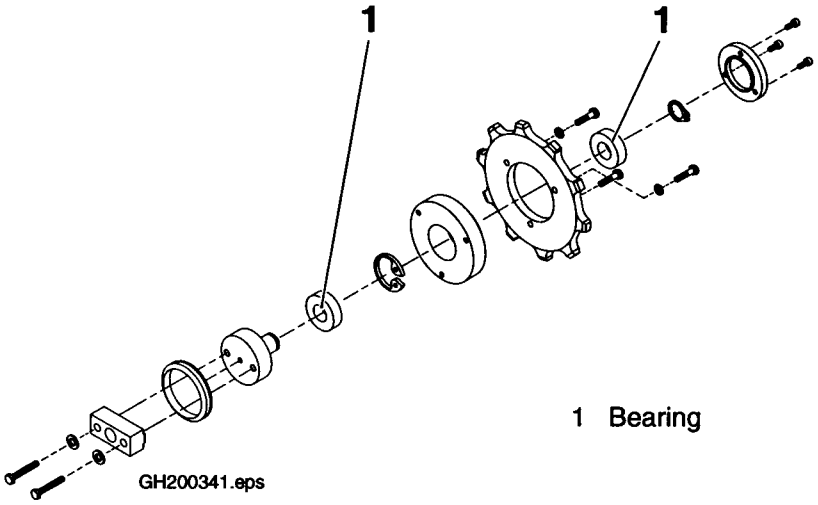
1 Bearing
2 Seal ring

2.1.7 Guide sprocket

2.1.7-1 Guide sprocket - check

SPC	1065225-0101

Check the bearings (1) for play, replace if necessary.



1 Bearing

2.1.10 Distributor

2.1.10-1 Distributor - check

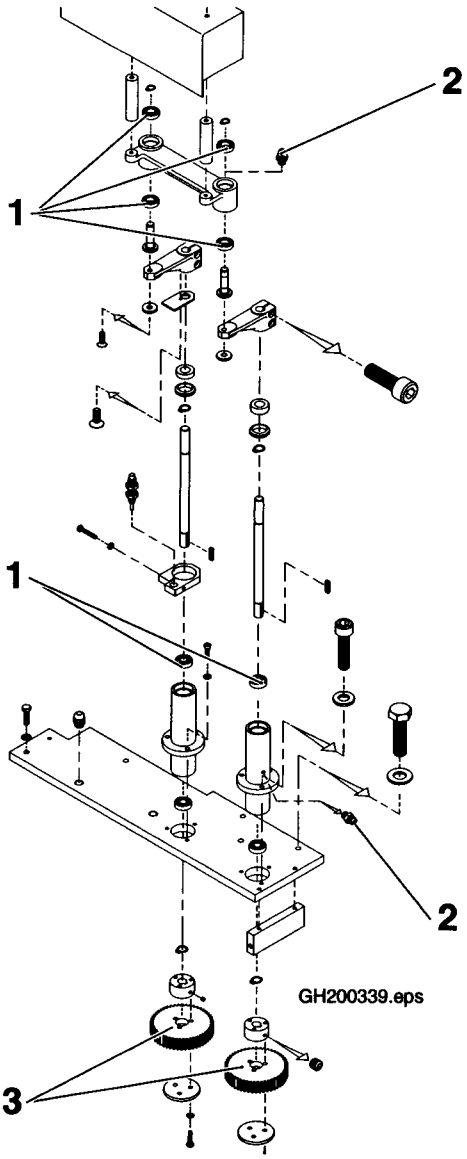
Consumables	Grease 90 296-68
SPC	1065187-030V

Check the following parts for wear and damages:

- gear wheels (3),
- bearings (1).

Replace all worn or damaged parts. Lubricate the divider through the lubrication nozzles (2). Use lubricant with Tetra Pak **part No 90 296-68**.

Check the setting of the distributor, see procedure 2.1.10-2 Distributor - set on page 85.



1 Bearing
2 Lubrication nozzle
3 Gear wheels

2.1bTH200224.en

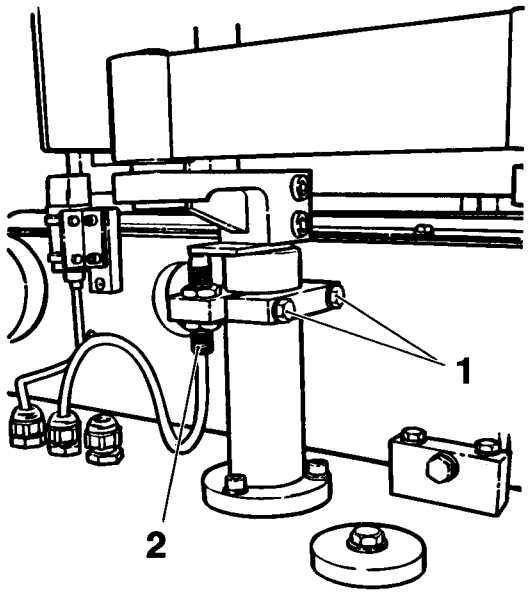
2.1.10-2 Distributor - set

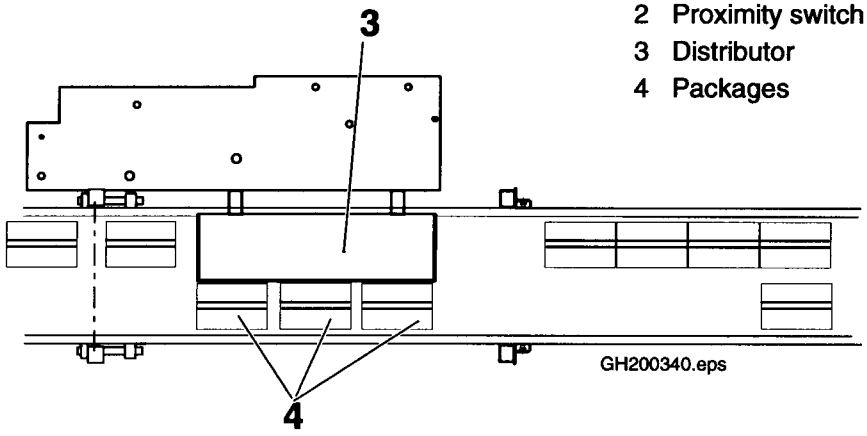
SPC	1065187-030V

The control programme of the machine determines when the distributor is to start.

By shifting the proximity switch B143 (2) it is possible to centre the distributor (3) acc to the incoming packages (4). If necessary loosen the screws (1) and shift the proximity switch (2).

Run the distributor to check that it makes contact with the packages in the right position.





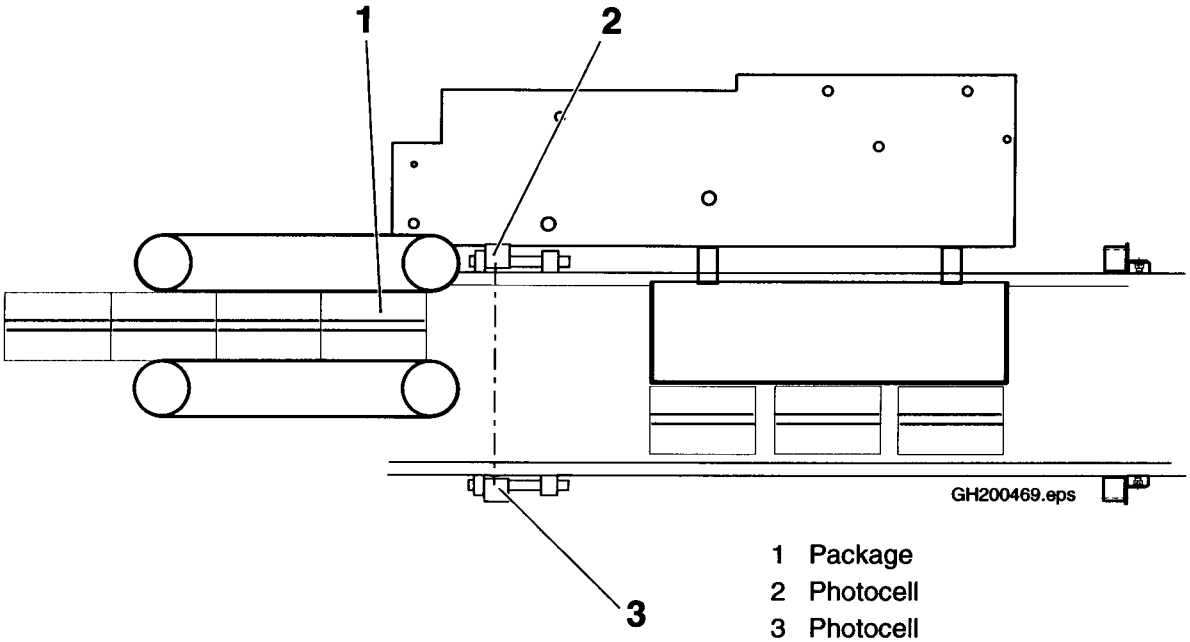
1 Screw
2 Proximity switch B143
3 Distributor
4 Packages

2.1bTH200224.en

2.1.10-3 Distributor - set photocells

SPC	1065187-030V

Set the photocells (2) and (3) so that the brake will hold the first package (1) in the packing pattern.



1 Package
2 Photocell
3 Photocell

2.1bTH200224.en

2.1.13 Brake side

2.1.13-1 Brake side - check

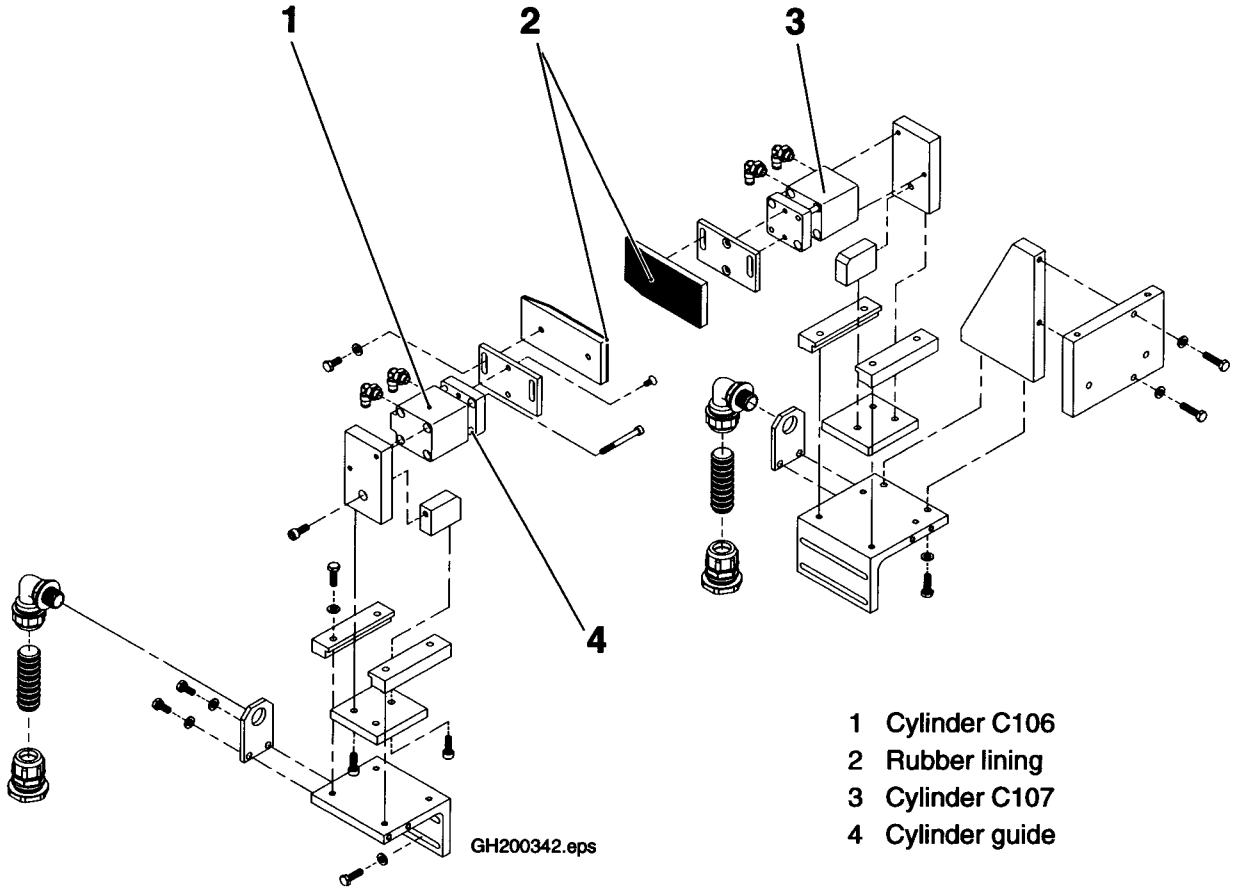
SPC	1065198-0301

Check the function of the brake.

Also check the rubber linings (2) of the brake bars for wear and damages, replace if necessary.

Clean and lubricate the cylinder guides (4).

Check the brake cylinders C106 (1) and C107 (3). Replace if necessary.



1 Cylinder C106
2 Rubber lining
3 Cylinder C107
4 Cylinder guide

2.1bTH200224.en

2.1.13-2 Brake side - set

SPC	1065198-0301

The distance between the brake bars (4) and the guide rail (2) should be 2 mm less than the width of the packages. Setting is to be made with the brake engaged.

Photocells B130 (1), B131 (3) can be placed in two different height positions depending on package volume.

Upper position	Lower position
355B	125S
400B	160S
500S	180B
750S	200S
750B	200B
1000S	236B
1000B	250S
1055B	250B
1136B	284B
	300B
	330S
	375S
	500B
	568B
	TR/Mini 125 TR/Mini 150 TR/Mini 200 TR/Mini 250 TR/Mini 300

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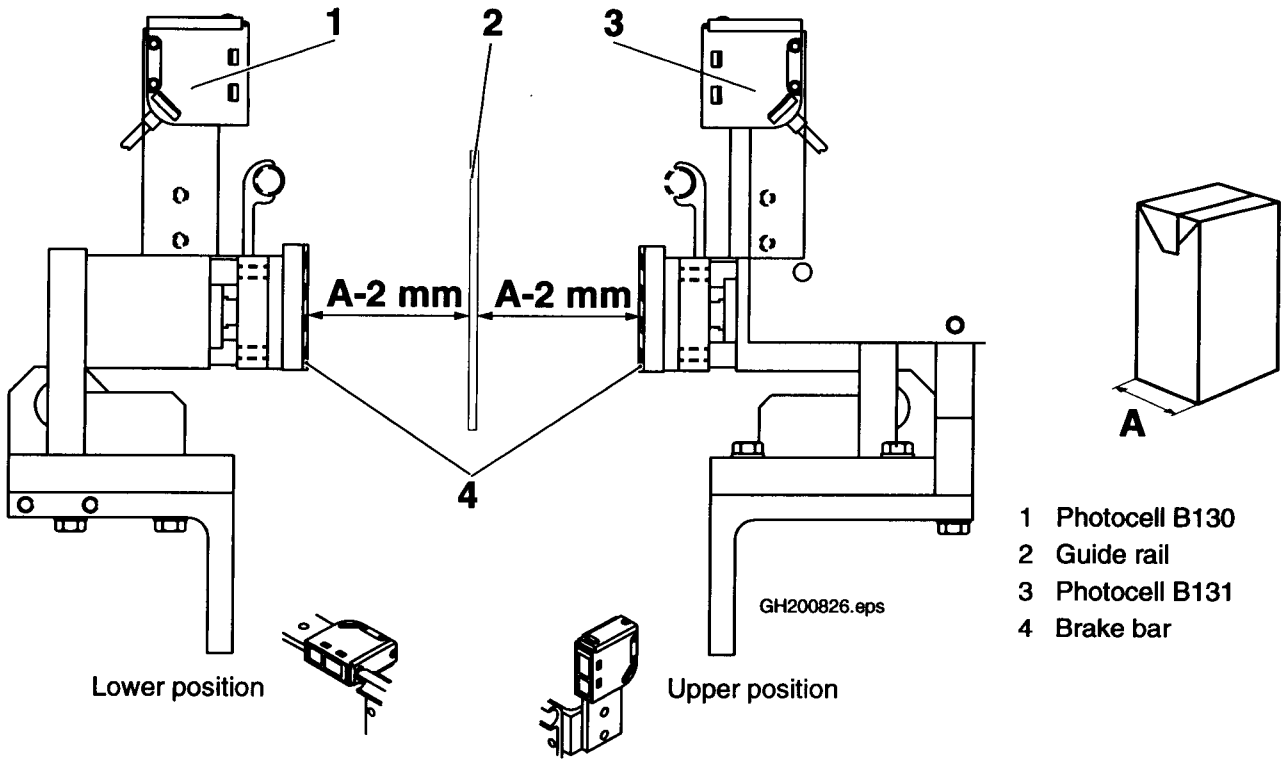
(Cont'd)

(Cont'd)



2.1bTH200224.en

The cylinder of the end stop should be in its plus position when these settings are made.

Photocell B130 (1) should be positioned as close as possible to the corner of the second package (11) from the brake (8) (see picture).Photocell B131 (3) should be placed in the middle of the second package (11) from the brake (see picture).

The above is valid for volumes 500B and larger. For volumes 500S and smaller it is the third package (7) from the brake that the photocells should be set on.

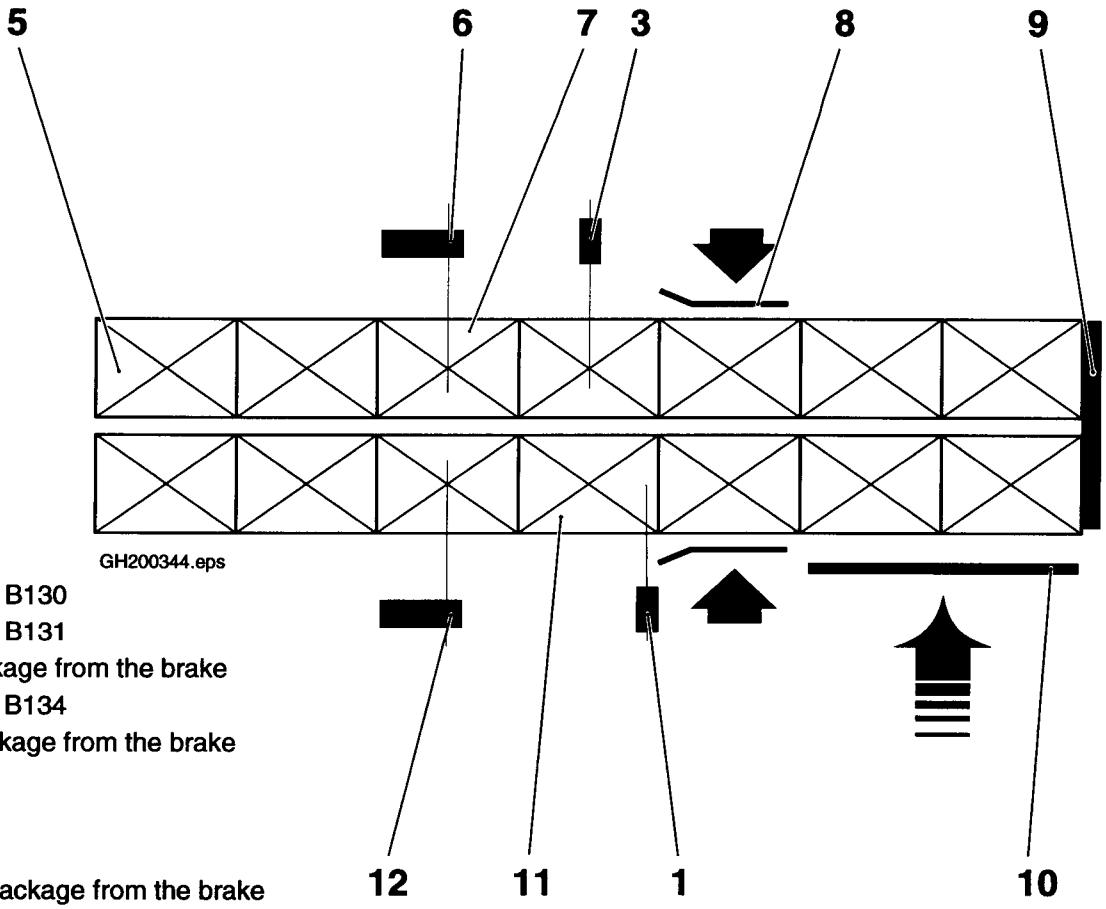
These two photocells should **not** see a fallen package.

The photocells B133 (12) and B134 (6) can be placed in two positions.
For **volumes 500B and larger place the photocells so that they see the third package (7) from the brake.**
For volumes **500S and smaller place the photocells so that they see the fifth package (5) from the brake.** These photocells **must always** see a fallen package.

Set the speed of the cylinders C106 and C107 acc to procedure
9.2-1 Cylinders - set on page 171.

(Cont'd)

(Cont'd)



1 Photocell B130
3 Photocell B131
5 Fifth package from the brake
6 Photocell B134
7 Third package from the brake
8 Brake
9 End stop
10 Pusher
11 Second package from the brake
12 Photocell B133

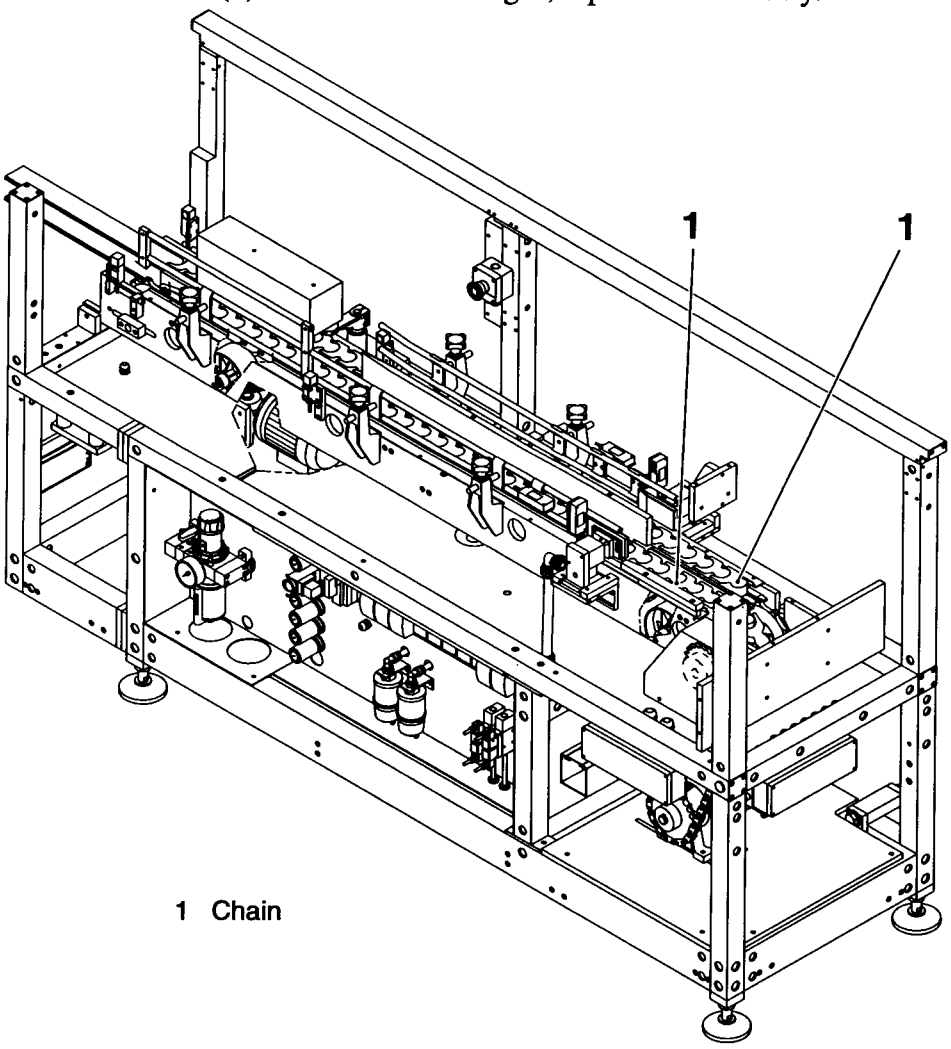
2.1bTH200224.en

2.1.15 Chain

2.1.15-1 Chain - check

SPC	1065237-0101

Check the chain (1) for wear and damages, replace if necessary.



1 Chain

GH200345.eps

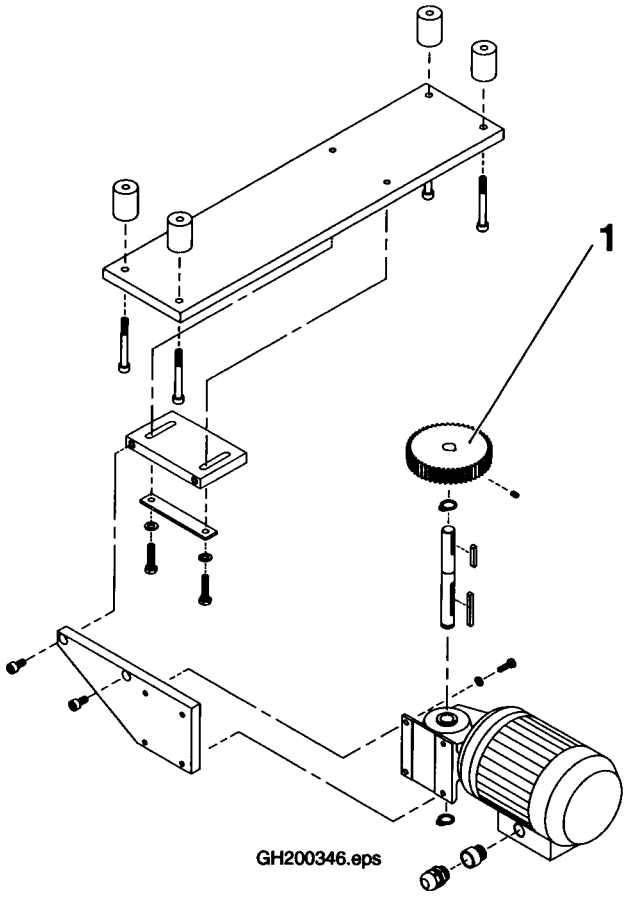
2.1bTH200224.en

2.1.17 Motor distributor

2.1.17-1 Motor distributor - check

SPC	1065185-020V

Check the gear wheel (1) for wear and damages, replace if necessary.



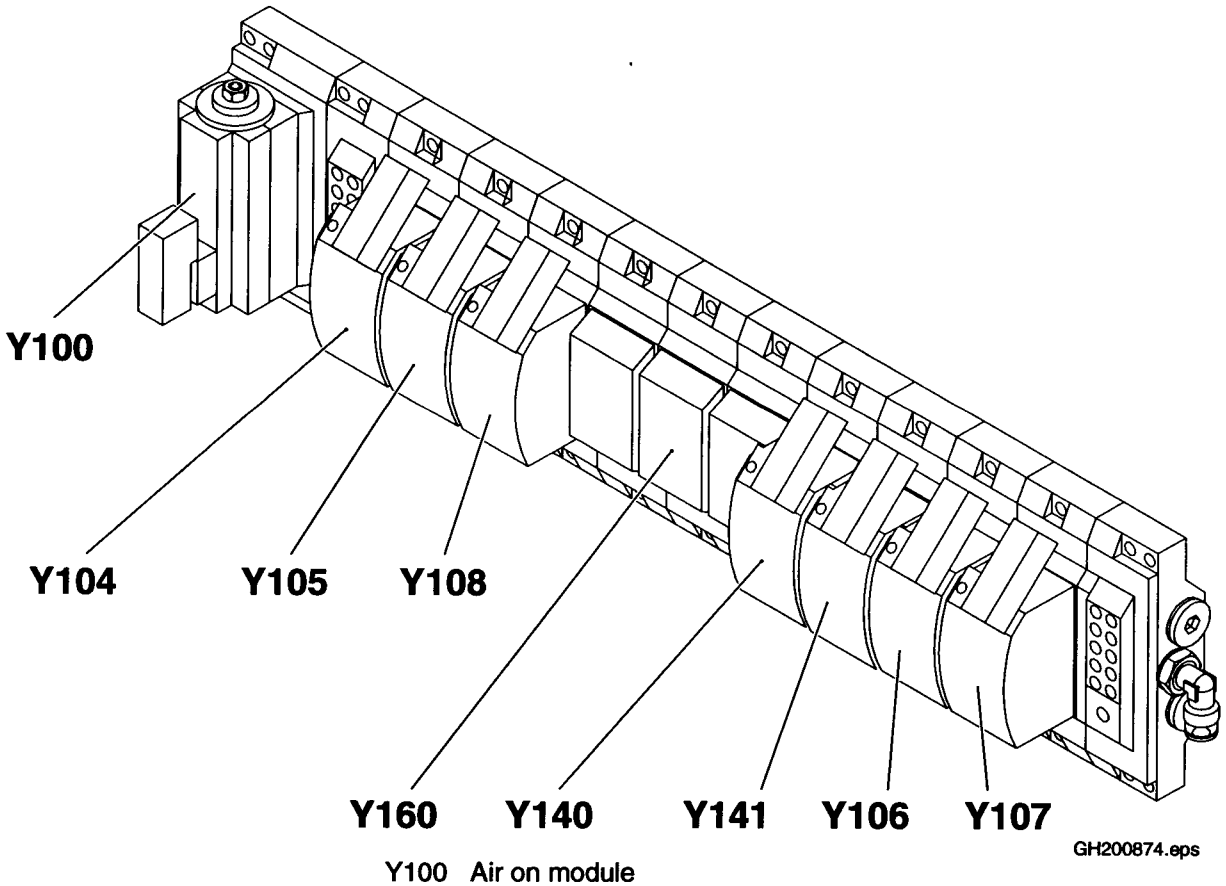
1 Gear wheel

2.1bTH200224.en

2.1.20 Pneumatic cabinet

2.1.20-1 Pneumatic cabinet - description valve ramp

SPC	1128041-0101



2.1bTH200224.en

Y100 Air on module
Y104 End stop
Y105 Transfer plate
Y106 Brake line 1
Y107 Brake line 2
Y108 Folding support/Flap folder
Y140 WA squeezer *
Y141 WA flap folder *
Y160 Bottom flap folder **

* Only applies to machines equipped with wrap around unit
** Option

2.1.20-2 Pneumatic cabinet - clean filter regulator

SPC	1021618-0101

a) Turn off the air supply.

b) Unscrew the bowl (12).

c) Undo the divider screen (8) and remove the filter insert (5), seal ring (6) and filter cover (7).

d) Clean the filter insert (5) in paraffin and blow it clear with compressed air.

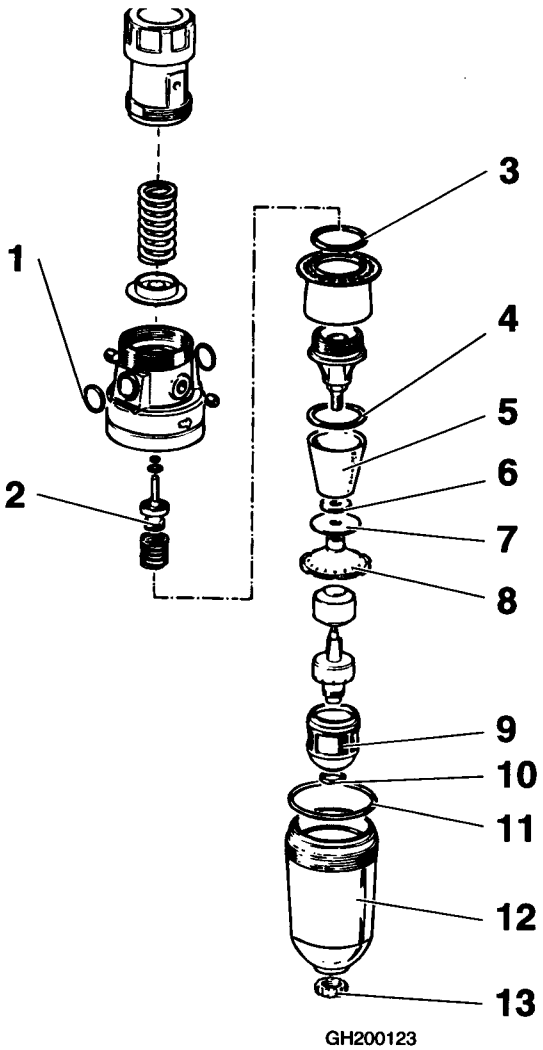
e) Check, and if required replace the seal rings (4) and (6). Fit the filter insert and the filter cover again.

f) Unscrew the nut (13) and remove the strainer (9). Blow it clear with compressed air.

g) Wash the bowl (12) with soap and water.
Solvent must not be used!

h) In fitting the strainer (9), make sure that the seal ring (10) is put in place. Fit the nut (13) and screw in the bowl (12) again.

Turn on the air supply and set the pressure at 0.55 MPa (5.5 bar).



GH200123

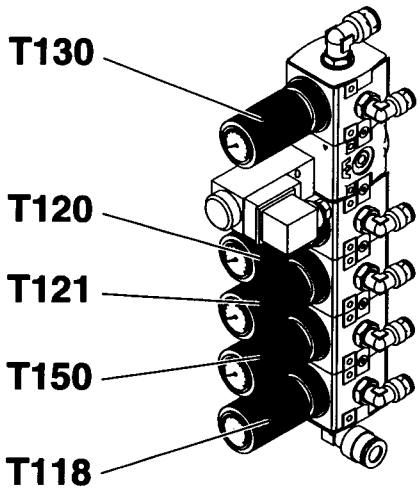
2.1bTH200224.en

1 Seal ring
2 Seal ring
3 Seal ring
4 Seal ring
5 Filter element
6 Seal ring
7 Filter cover
8 Divider screen
9 Strainer
10 Seal ring
11 Seal ring
12 Bowl
13 Nut

The parts 1, 2, 3, 4, 6, 10 and 11 are included in repair kit TP No 90113-349

2.1.20-3 Pneumatic cabinet - description pressure regulator ramp

SPC	1124059-0101



GH200322.eps

T130 Operating arm magazine
T120 Hot melt gun, left
T121 Hot melt gun, right
T150 Hot melt unit
T118 Folding station

2.1bTH200224.en

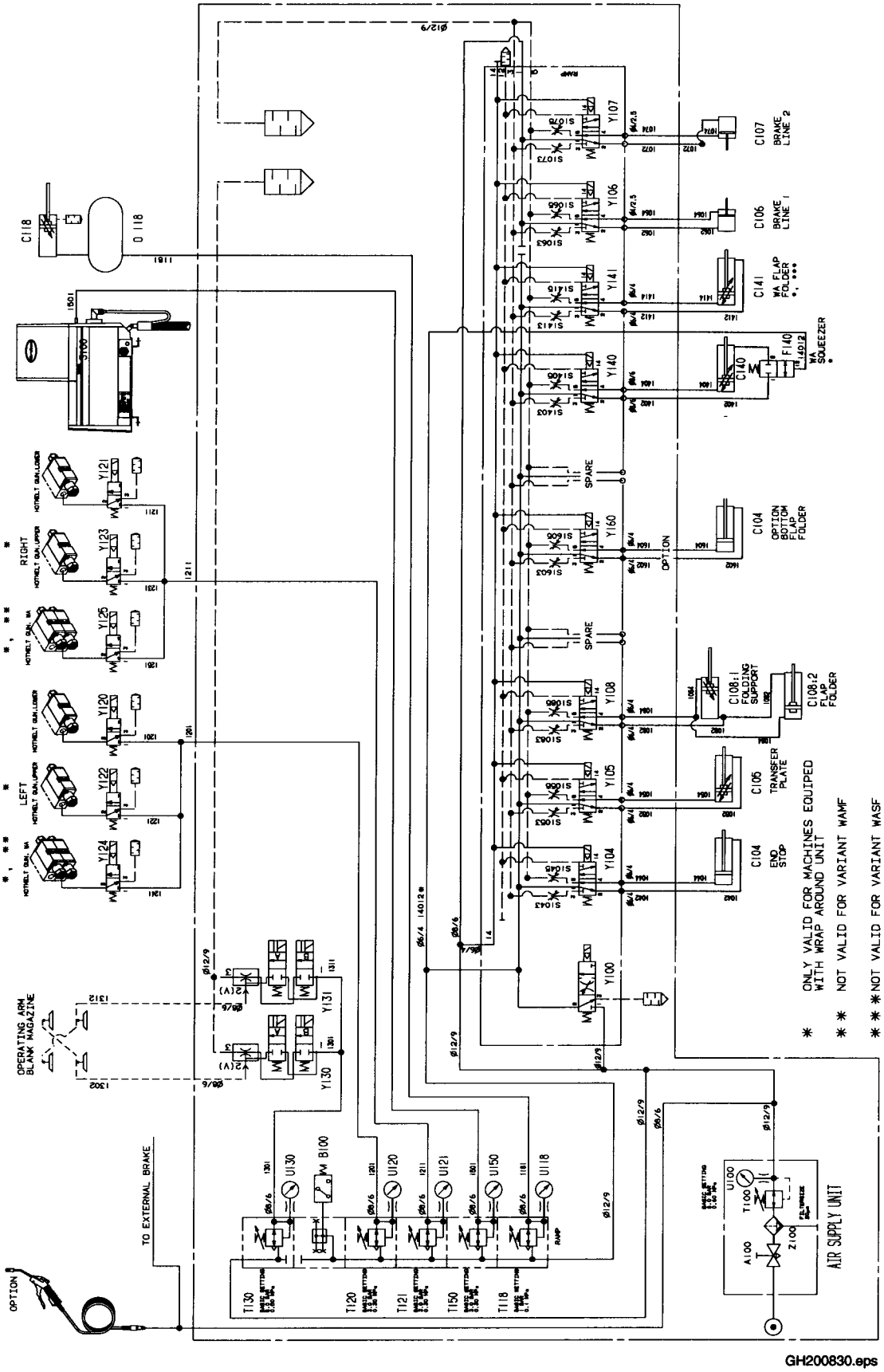
2.1.20-4 Pneumatic cabinet - set pressure regulators

Machine status	Air ON
SPC	1124059-0101

Set the pressure regulators according to the table below.

Regulator	Function	Setting
T130	Operating arm magazine vacuum	0.5 MPa
T120	Hot melt gun, left	0.3 MPa
T121	Hot melt gun, right	appr 0.3 MPa
T150	Hot melt unit	appr 0.3 MPa
T118	Folding station	0.1 MPa **Must not be set to any other value than 0.1 MPa, risk of machine damages.**

2.1.20-5 Pneumatic cabinet - pneumatic chart



2.1.20-6 Pneumatic cabinet - set pressure switch

Machine status	Air ON Main power ON
SPC	1124059-0101

WARNING! Moving parts can cause serious injuries.

How to set the pressure switch

How to set the pressure switch is described under a number of headings. Follow the description under the headings:

- Basic setting
- Check the lower switch point
- Check the pressure gauge setting during production

Basic setting

The basic setting is done as follows:

a) Turn the setting screw (3) fully counter clockwise.

b) Step up the machine in step 2.

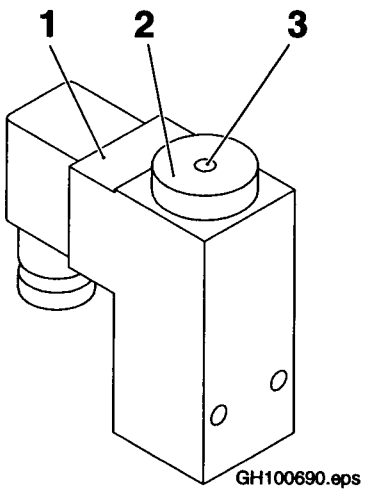
c) Set the pressure regulator (5) to 0.38 MPa (switch point).

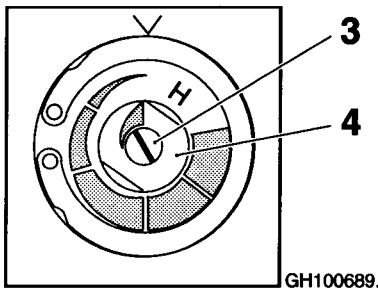
d) Slowly turn the setting screw (3) clockwise until there is an alarm.

e) Reset the alarm and set the pressure regulator to approximately 0.5 MPa and make sure that you can step up the machine to step 2.

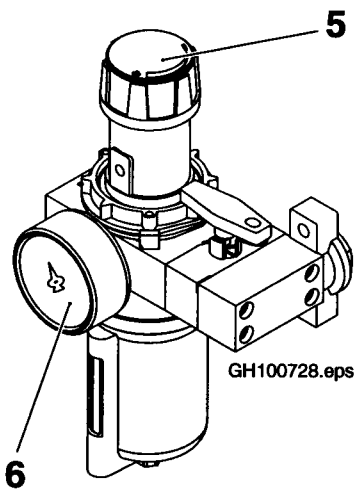
f) If not, decrease the hysteresis range of the pressure switch (1) and repeat from item **a**. To adjust the hysteresis, pop of the rubber cap (2), underneath which the hysteresis setting screw (4) is located.

Note! To decrease the range of the hysteresis, turn the hysteresis setting screw (4) counter clockwise. When the hysteresis setting screw (4) is turned, the setting screw (3) position must not be changed. Therefore the setting screw (3) should be held with a screwdriver while the hysteresis setting screw (4) is turned.





1 Pressure switch
2 Rubber cap
3 Setting screw; switch point
4 Hysteresis setting screw
5 Pressure regulator
6 Pressure gauge



(Cont'd)

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(Cont'd)

Check the lower switch point

To check the lower switch point, do the following:

a) Step up the machine in step 2.

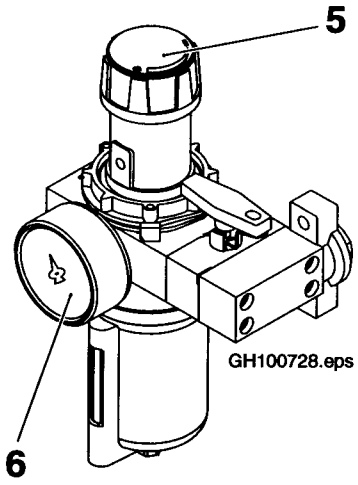
b) Slowly decrease the working pressure and notice that the alarm goes on at 0.38 MPa.

c) If necessary, adjust according to items **a** - **f** under the heading Basic setting.

d) Set the pressure regulator (5) to 0.55 MPa and reset the alarm.

Check the pressure gauge setting during production

Check the pressure gauge (6) setting during production, it should be 0.55 MPa. If necessary, adjust by means of the pressure regulator (5).



5 Pressure regulator
6 Pressure gauge

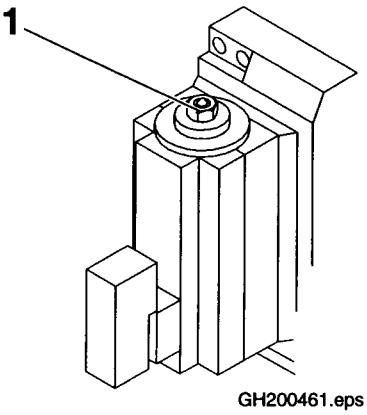
2.1bTH200224.en

2.1.20-7 Pneumatic cabinet - set air on module

SPC	1128041-0101

The throttle (1) on the air on module should be turned in so much that the cylinders will not strike into their end positions when the machine is pressurized.

If the throttle is turned in too much there will be an alarm for air, see section Alarms/trouble shooting in the Operation Manual (OM).



1 Throttle

GH200461.eps

2.1bTH200224.en

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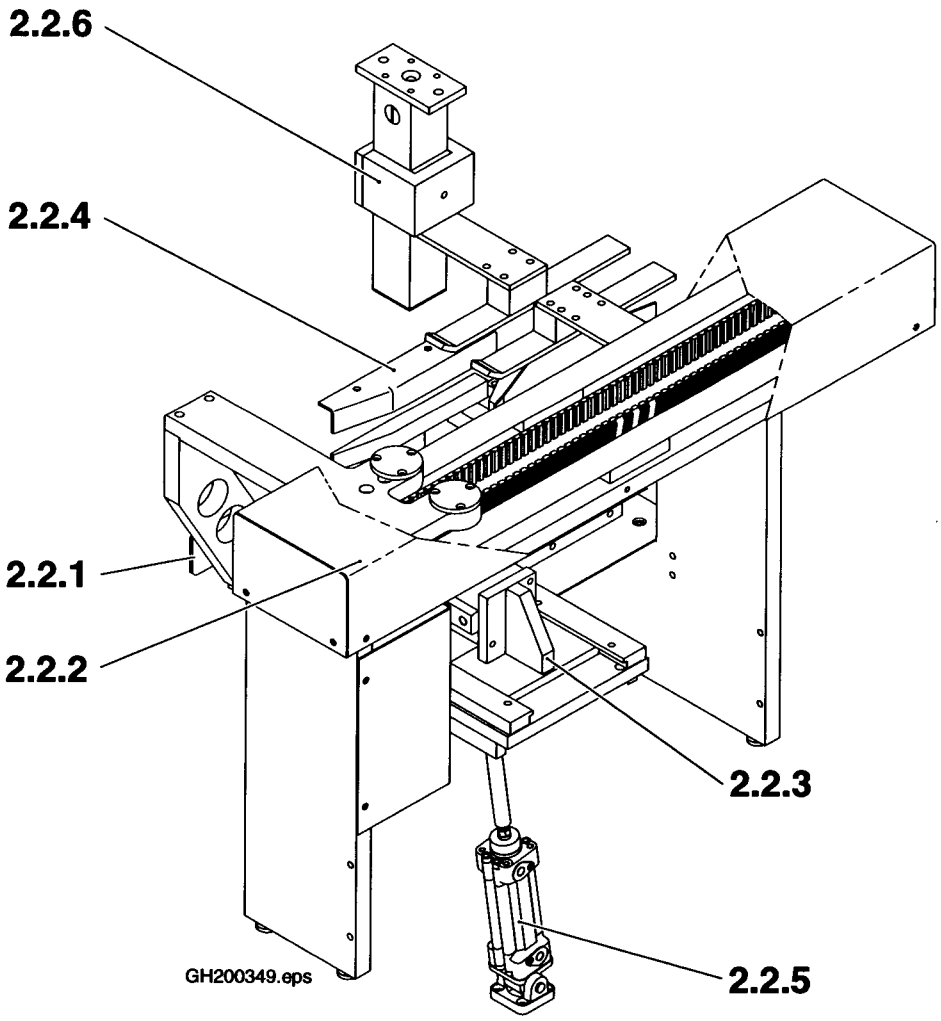
2.2 Transfer unit

SPC	670368-0401

2.2-0 Transfer unit - description

SPC	670368-0401



2.1bTH200225.en

2.2.1 Volume plate
2.2.2 Pusher
2.2.3 End stop
2.2.4 Grouping unit
2.2.5 Ruling guide
2.2.6 Top steering

2.2.2 Pusher

2.2.2-1 Pusher - check

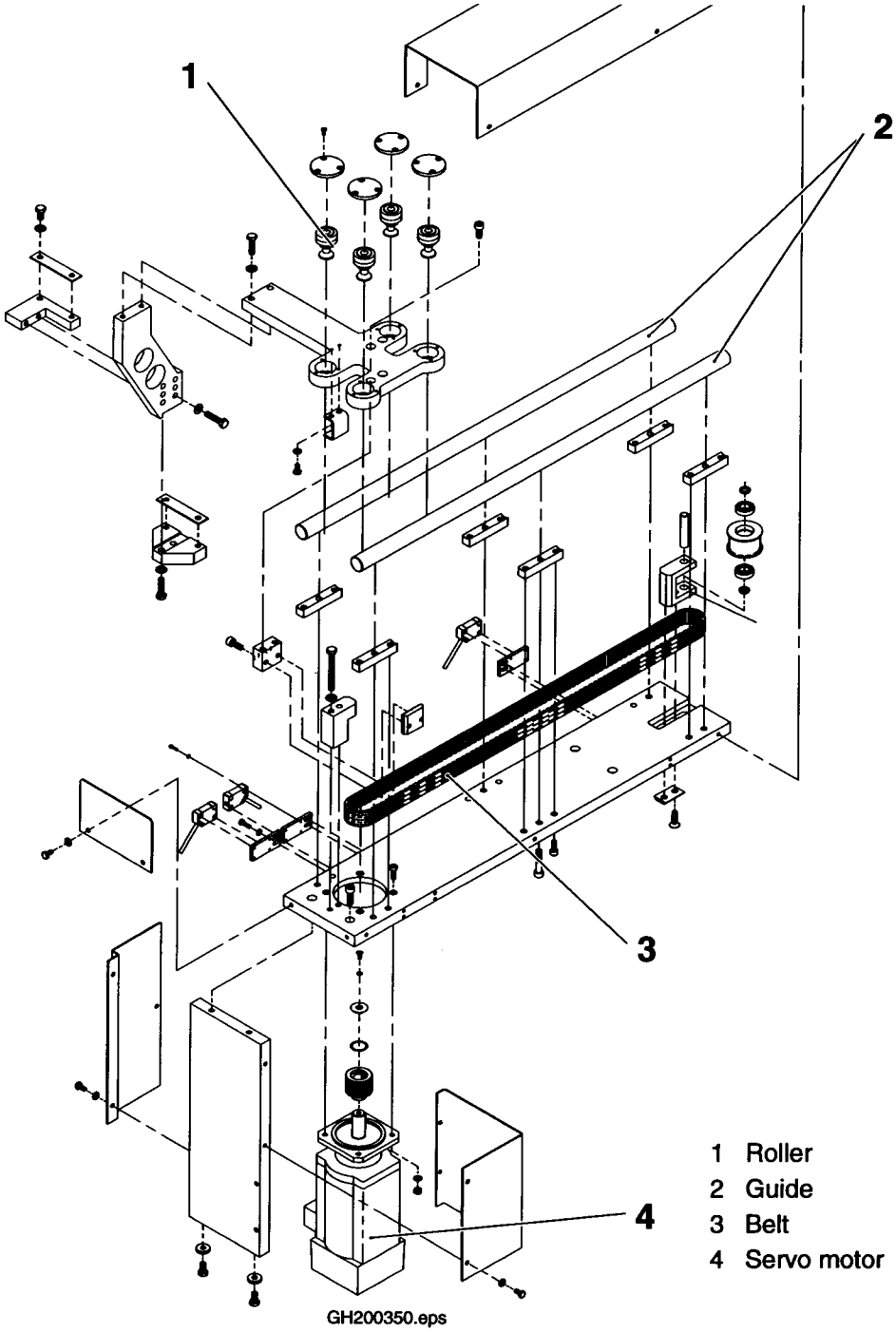
SPC	1065294-0201

Check the function of the pusher and the servo motor (4).

Check the tension and the condition of the belt (3), replace if necessary.

Also check the rollers (1) for wear and damages, replace if necessary.

Check the guides (2) for play.



1 Roller
2 Guide
3 Belt
4 Servo motor

2.1bTH200225.en

2.2.2-2 Pusher - set

SPC	1065294-0301

Caution! The proximity switches (1) and (4) should not be moved after setting the machine. If done so, the machine can go out of the programme and machine parts can be seriously damaged.

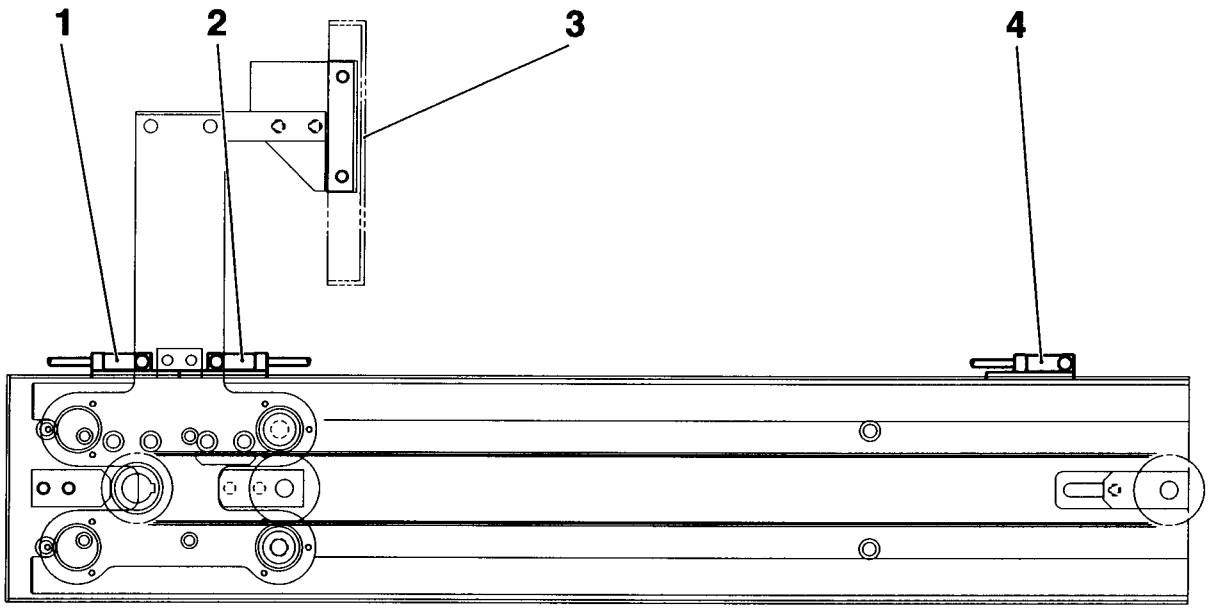
Only if necessary, adjust the proximity switches (1) and (4) so that the pusher does not reach it's mechanical stop positions.

The pusher stroke position can be adjusted by shifting the proximity switch (2). Adjust proximity switch (2) so that the pusher will position the packages **2-3 mm inside the crease line** of the blank.

After adjustment check that the flag does not touch the proximity switches (1, 2 and 4). The distance between the flag and the switches must not be less than 0.5 mm.

Check that the guides are parallel, and that the tension of the belt is very tight.

2.1bTH200225.en



GH200351.eps

1 Proximity switch B121
2 Proximity switch B122
3 Pusher plate
4 Proximity switch B123

2.2.3 End stop

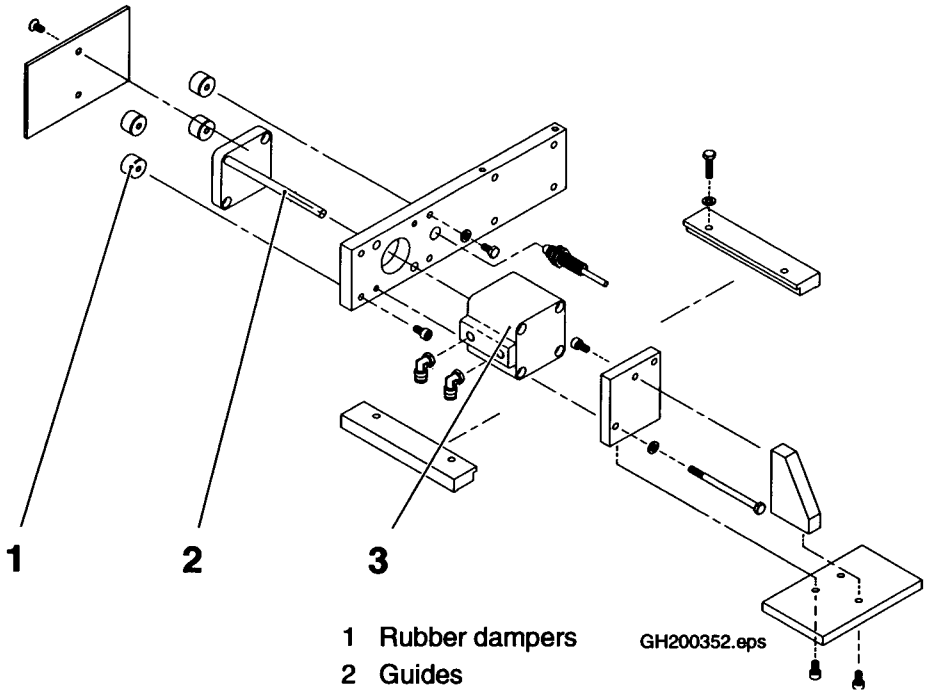
2.2.3-1 End stop - check

SPC	1065196-0201

Check:

- the condition of the cylinder C104 (3), replace if necessary,
- the movements of the cylinder C104, see procedure 9.2-1 Cylinders - set on page 171,
- the four rubber dampers (1) for wear and damages, replace if necessary.

Clean and lubricate the cylinder guides (2).



1 Rubber dampers
2 Guides
3 Cylinder C104

2.1bTH200225.en

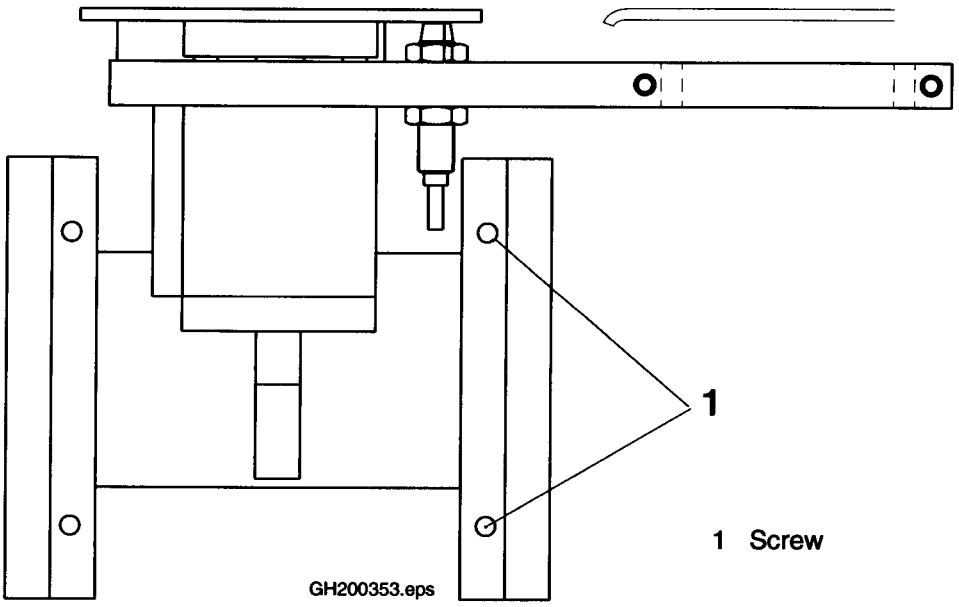
2.2.3-2 End stop - set

SPC	1065196-0201

The endstop must have reached its inner position when the short stroke pusher starts.

The screws (1) are loosened when setting the position of the end stop/guide plate unit (see procedure 2.2.3-2 End stop - set on page 105).

See procedure 9.2-1 Cylinders - set on page 171 for speed setting of the cylinder C104.



1 Screw

2.1bTH200225.en

2.2.4 Grouping unit

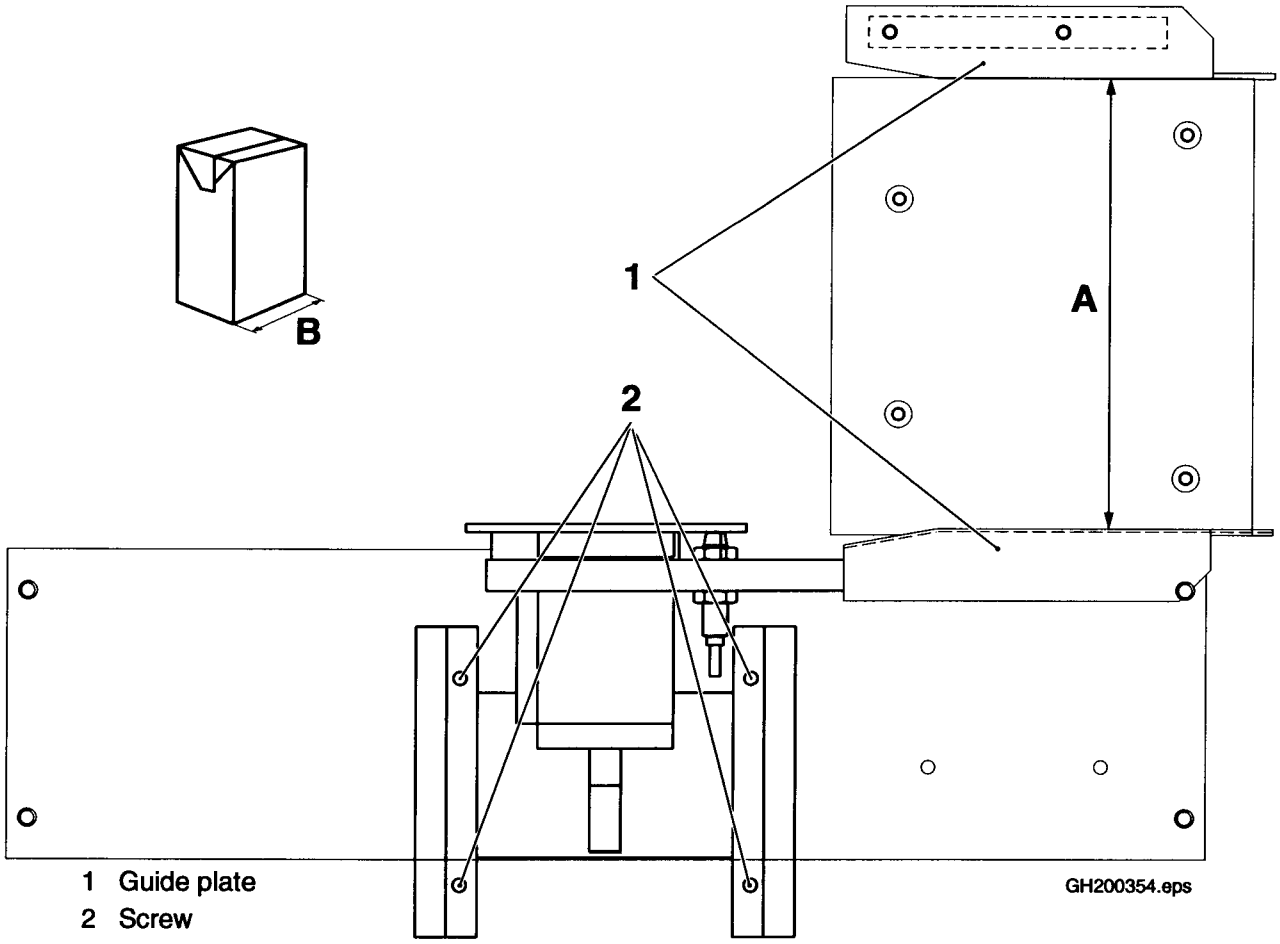
2.2.4-1 Grouping unit - set

SPC	1065242-0201

The **distance A** between the guide plates (2) should be the width of the grouped unit of packages + 2 mm, it must not be less.

The guide plates are then to be centred relative to the bottom creases of the blank, keeping the distance A intact.

If required: move the end stop and the brake.



1 Guide plate
2 Screw

2.2.5 Ruling guide

2.2.5-1 Ruling guide - check

SPC	1065291-0201

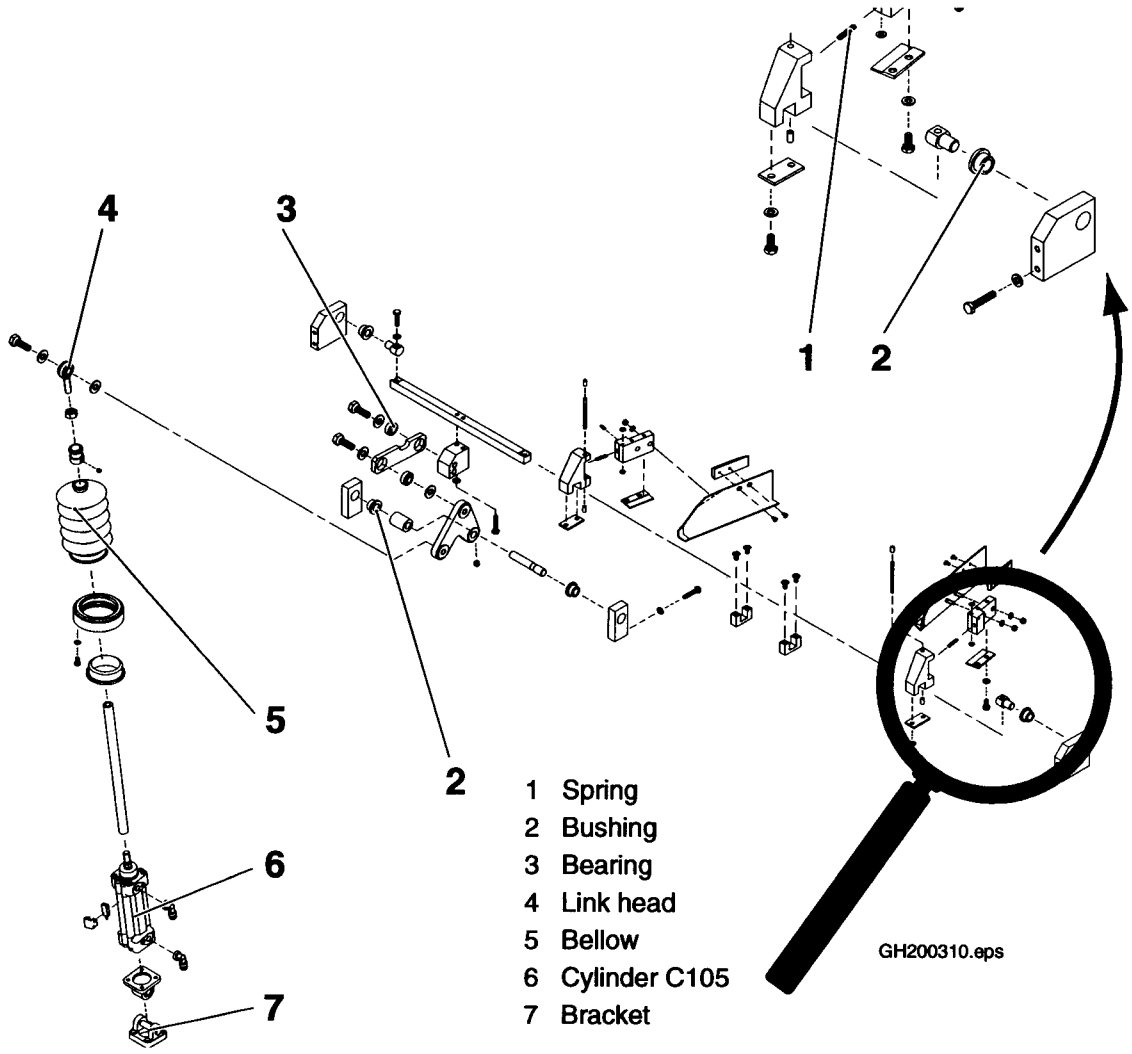
Check the following parts for wear and damages:

- bellow (5),
- bushings (2),
- link head (4),
- cylinder (6),
- bracket (7),
- bearing (3),
- spring (1).

Replace all worn or damaged parts.

Check the setting of the ruling guide, see procedure 2.2.5-2 Ruling guide - set on page 108.

2.1bTH200225.en



2.2.5-2 Ruling guide - set

SPC	1065291-0201

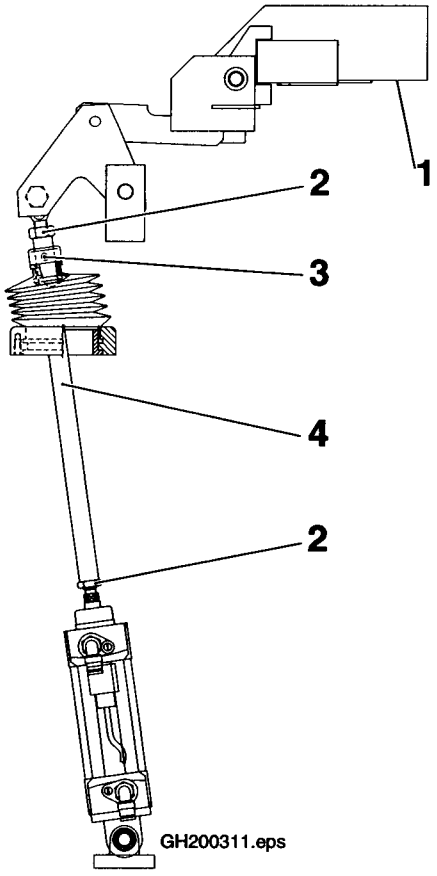
Check that the transfer plate (1), in it´s down position is horizontal, so that the packages must be transferred smoothly over to the blank. This can be set by adjusting the length of the piston rod (4).

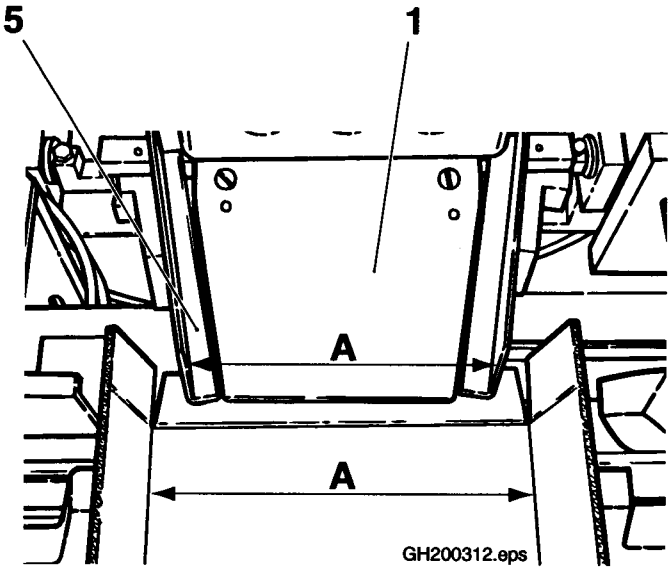
Loosen the grub screw (3), and the lock nuts (2). Adjust by means of the piston rod.

Adjust the head plates (5) so that they does not open wider than the inner measurement of the blank, distance A.

Centre the transfer plate to the head plates.

Set the speed of the cylinder C105 according to procedure 9.2-1 Cylinders - set on page 171.





2.1bTH200225.en

1 Transfer plate
2 Lock nut
3 Grub screw
4 Piston rod
5 Head plate

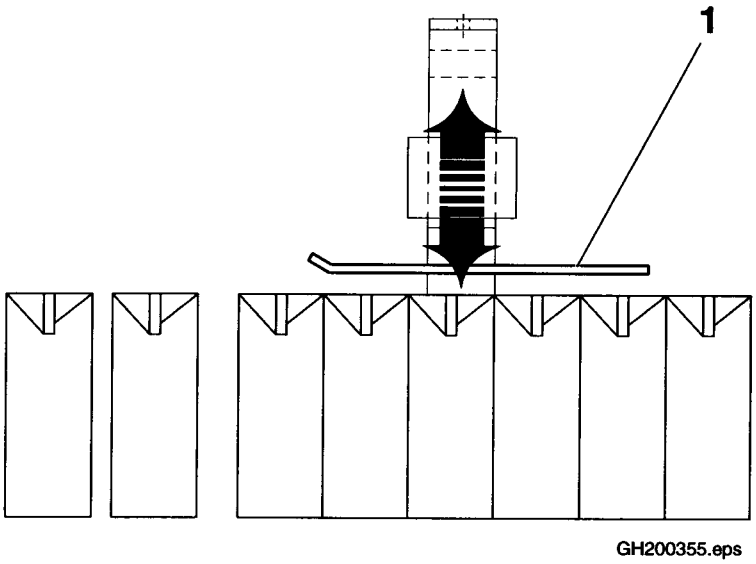
2.2.6 Top steering

2.2.6-1 Top steering - set

SPC	1065412-0101

Adjust the top steering (1) so that the packages won't fall over.

The guide must not touch the packages.



GH200355.eps

1 Top steering

2.1bTH200225.en

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2.3 Covering infeed

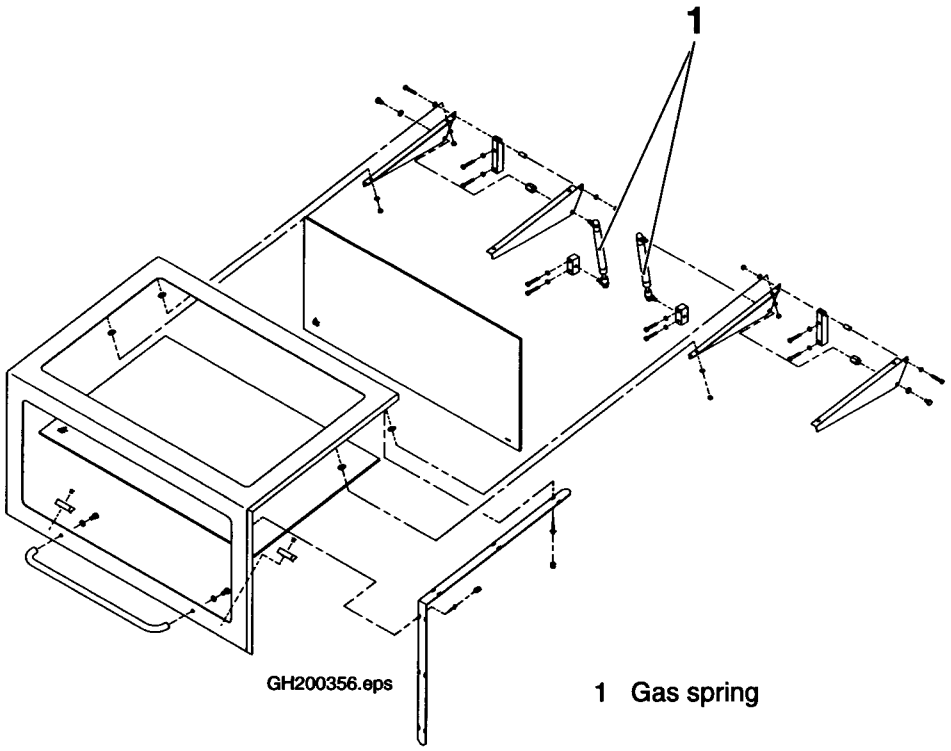
SPC	670297-040V

2.3.1 Hood infeed

2.3.1-1 Hood infeed - check

SPC	1065262-0201

Check the condition of the gas springs (1), replace if necessary.



1 Gas spring

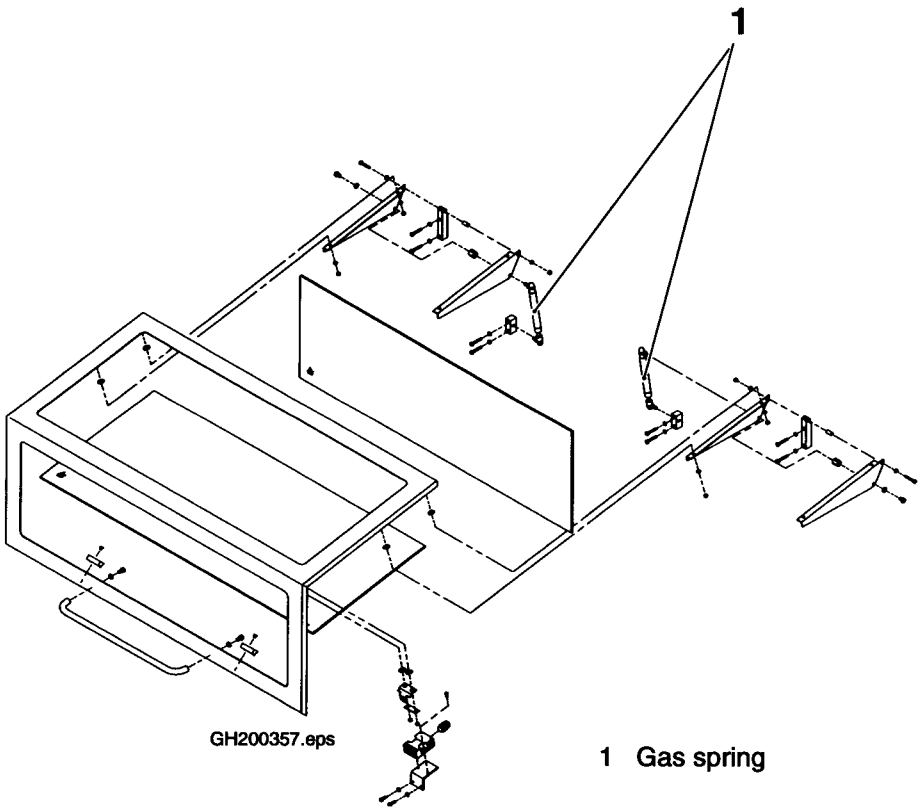
2.1bTH200226.en

2.3.7 Hood infeed

2.3.7-1 Hood infeed - check

SPC	1021691-030V

Check the condition of the gas springs (1), replace if necessary.



1 Gas spring

2.1bTH200226.en

2.4 Belt brake

SPC	1065140-030V

2.4-1 Belt brake - check

SPC	1065140-030V

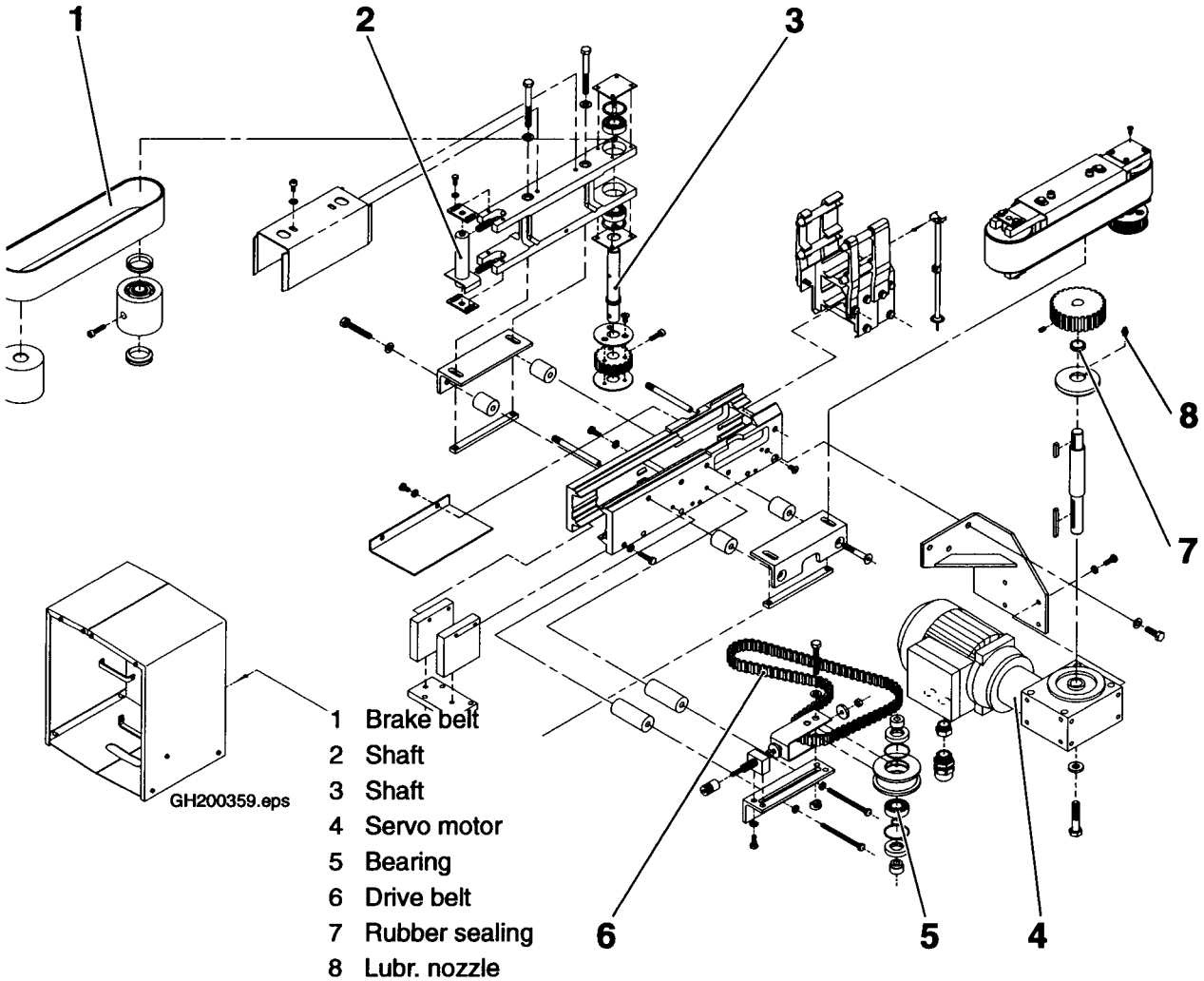
Check:

- the brake belts (1) for wear and damage,
- the shafts (2) and (3) for play,
- the drive belt (6) for wear and damages,
- the bearing (5) in belt tensioner,
- the rubber sealing (7),
- the rubber sealings of the drive motor (4).

Replace any worn or damaged part.

Lubricate the shaft through the lubrication nozzle (8). Check that the belts are very tightly tensioned.

2.1bTH200049.en



1 Brake belt
2 Shaft
3 Shaft
4 Servo motor
5 Bearing
6 Drive belt
7 Rubber sealing
8 Lubr. nozzle

2.4-2 Belt brake - set

Machine status	
SPC	1065140-030V

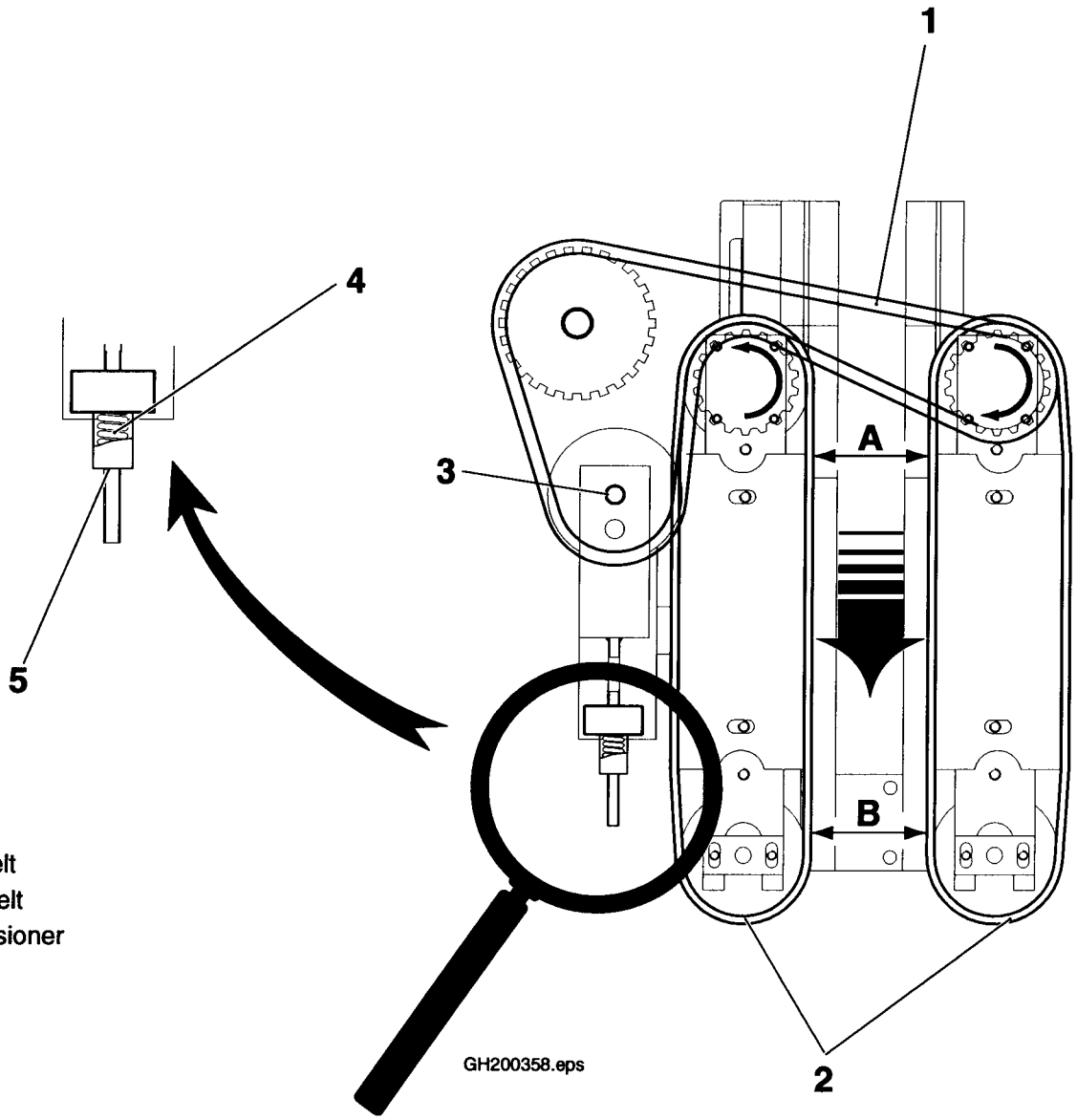
The distance between the brake belts (2) should be set so that the brake holds back the queue.

The packages must not be deformed between the belts.

Measurement A should equal the width of the packages.

Measurement B should be package width - 2 mm.

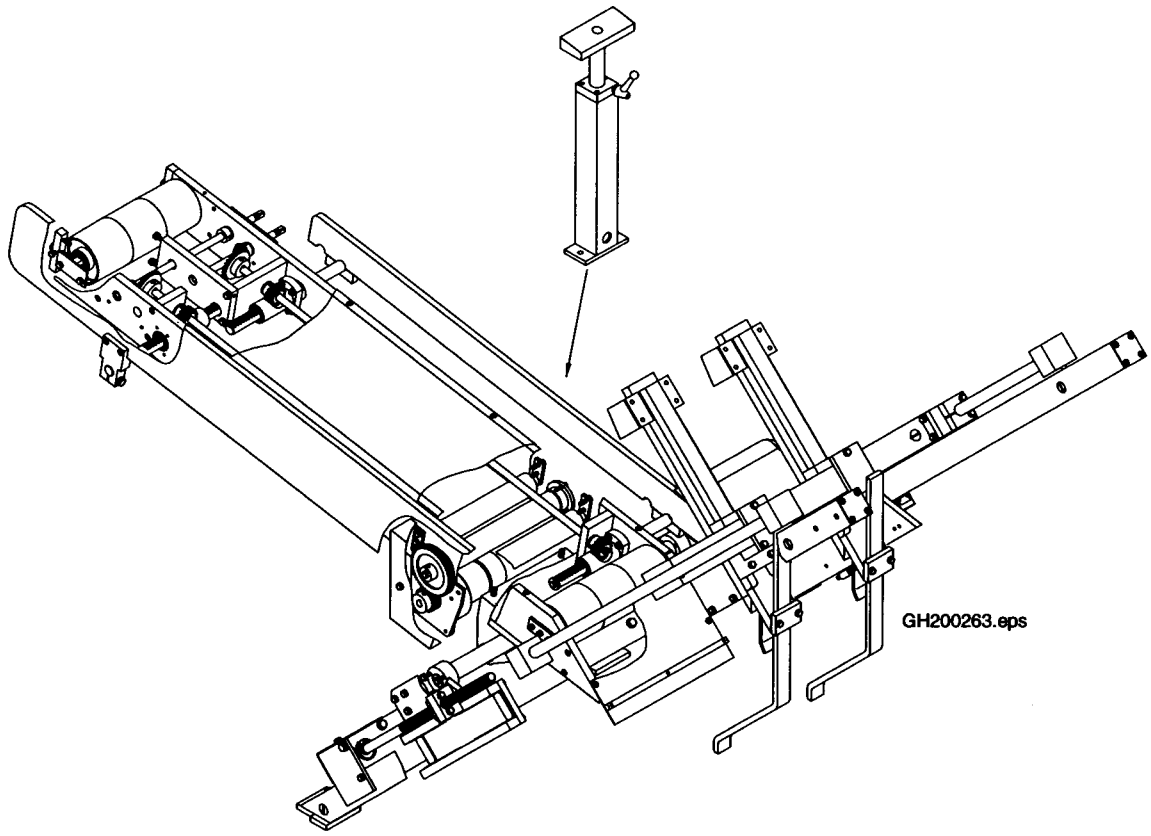
Tension the drive belt by adjusting the length of the spring (4). Adjust by loosening the belt tensioner (3). Remove the slack in the belt by turning the toothed pulleys as shown in the picture. Tighten the sleeve (4) until the spring is not visible, not any more. Tighten the tensioner.



1 Drive belt
2 Brake belt
3 Belt tensioner
4 Spring
5 Sleeve

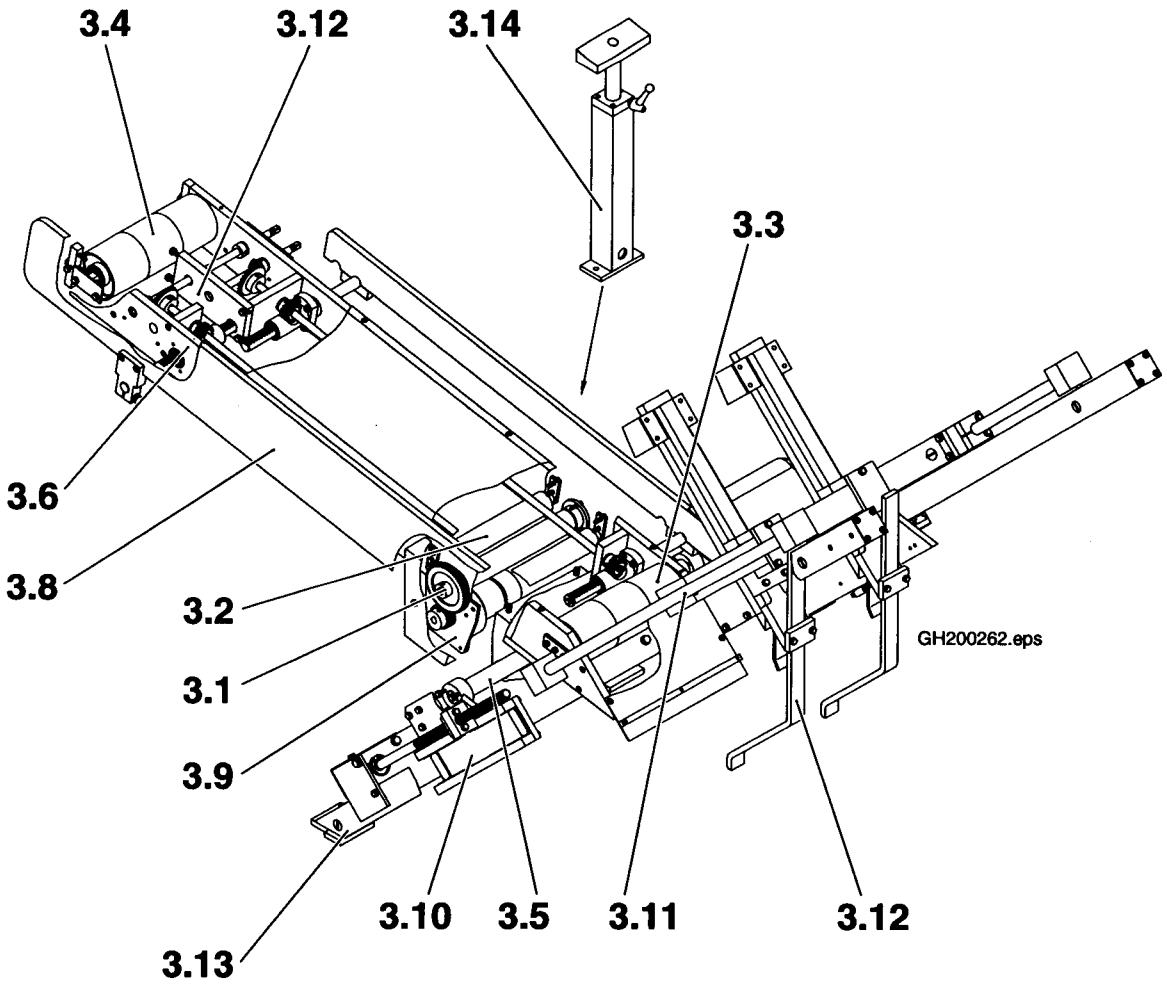
3 Magazine

2.1bTH200212.en



3-0 Magazine - description

SPC	670285-0401



2.1bTH200212.en

3.1 Drive roller
3.2 Bending roller
3.3 Bending roller front
3.4 Bending roller rear
3.5 Way bottom part
3.6 Side steering
3.7 Top steering
3.8 Magazine frame
3.9 Drive motor
3.10 Bottom flap adjustable
3.11 Top flap adjustable
3.12 Sidesteering adjustable
3.13 Frame
3.14 Support

3-1 Magazine - set

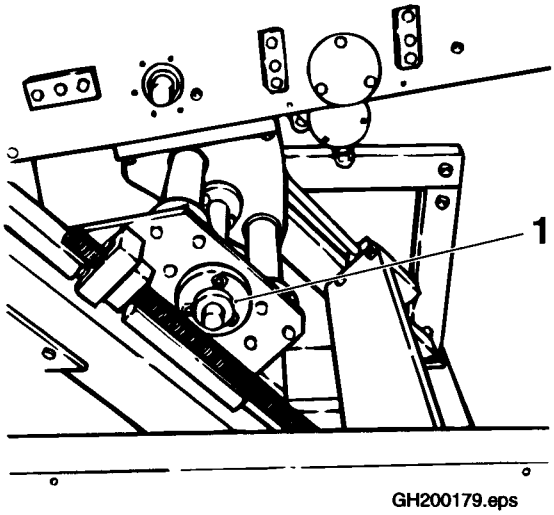
SPC	670285-0401

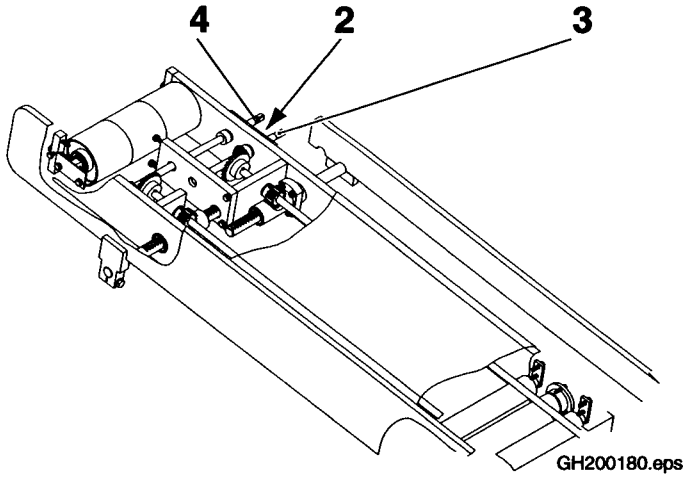
The conveyor belt of the magazine should be aligned over the slide rails. Use the crank connector (1) to adjust.

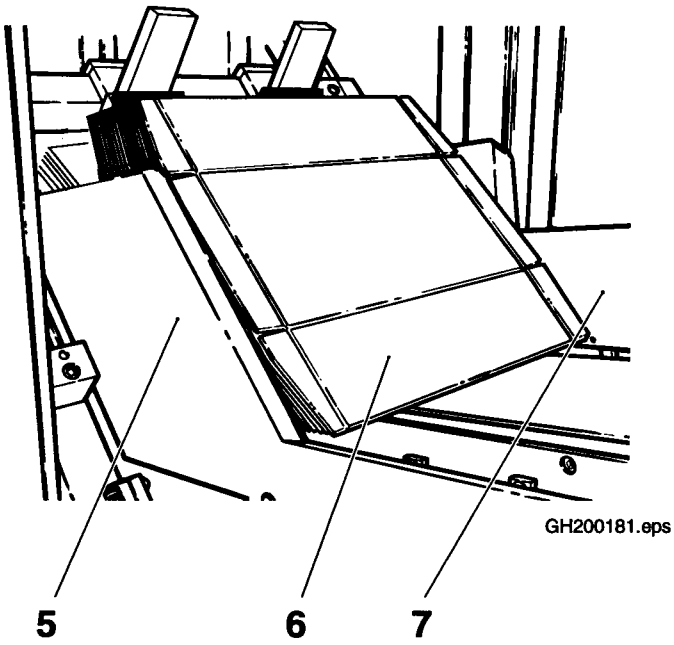
Loosen the securing screw (2) for the clamp unit. Set the side guide on the infeed side using the crank connector (3) for LH infeed machines, and crank connector (4) for RH infeed machines. When the blank (6) is close to the side guide (5 or 7), the short end crease should be in line with the outer edge of the slide rail.

Adjust the other side guide using crank connector (3) or (4), to set the distance between the side guides 2 mm larger than the length of the blank.

(Cont'd)







1 Crank connector, sideways position
2 Securing screw, side guide adjustment
3 Crank connector, LH side guide
4 Crank connector, RH side guide
5 LH side guide
6 Blank
7 RH side guide

2.1bTH200212.en

(Cont'd)

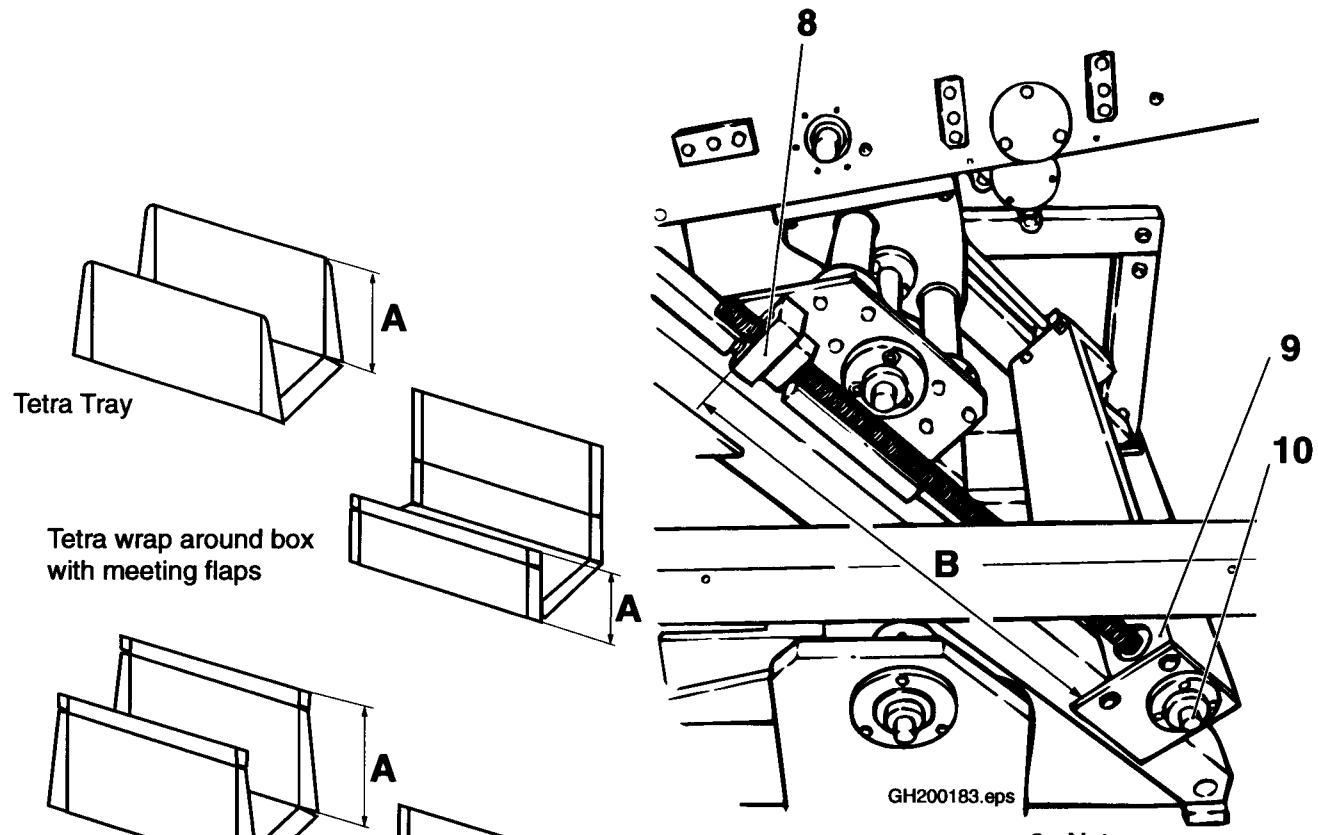
Basic setting

Example:

Use the crank connector (10) to set the height position of the magazine. For 1000 ml packages, with a height of the blank (A) of 171 mm, the distance B between the top of the nut (8) and the top of the lower member (9), results in 255 mm

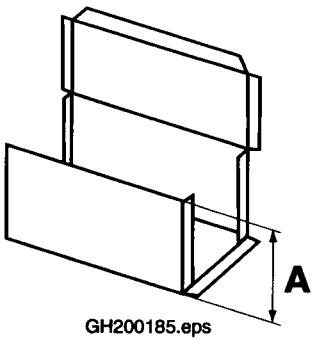
When the blank is lower than this, the distance B will be correspondingly larger, **B=426-A**

(Cont'd)



8 Nut
9 Lower member
10 Setting screw

Tetra wrap around box with inside top flap



Tetra wrap around box with side flap

2.1bTH200212.en

(Cont'd)

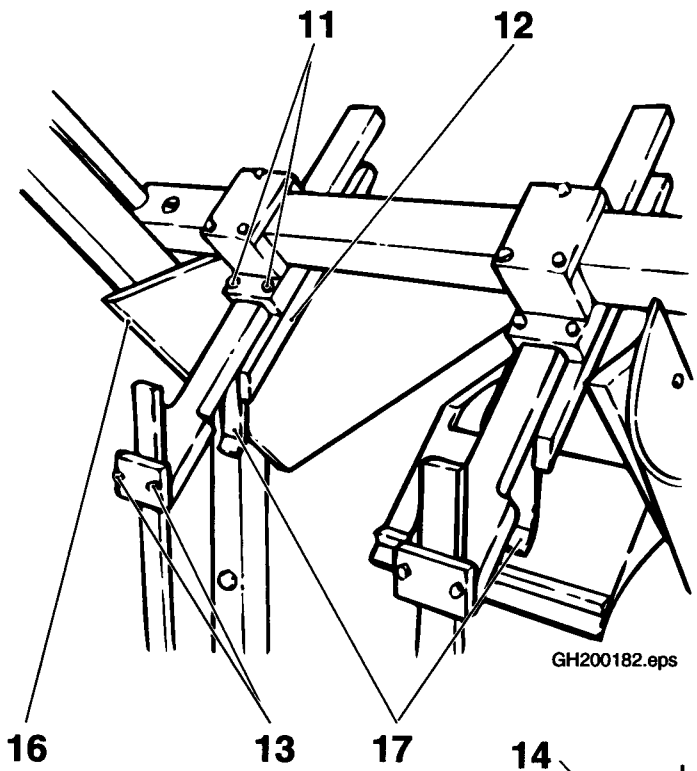
The height position of the magazine is fine adjusted to get the rear longitudinal crease to hit in the corner, formed by the rear carrier. This point is marked with an arrow in the illustration.

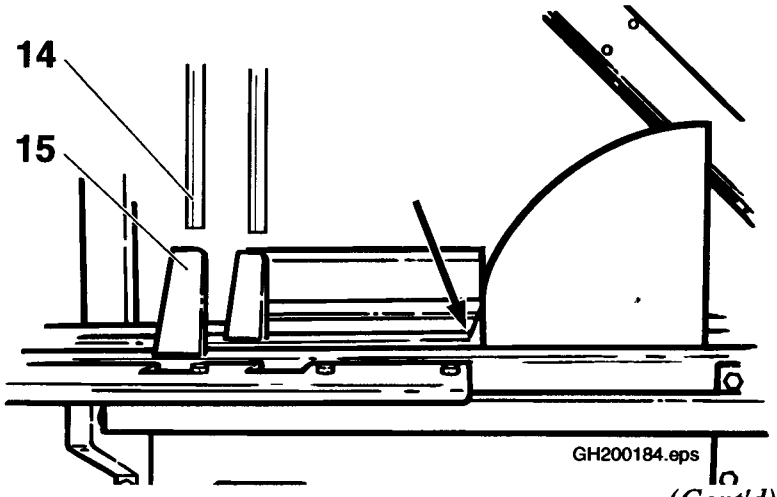
The distance between the top support (12) and the top of the blanks should be 5 mm.

The guides (17) should be set so that the blanks are parallel with the surface (16).

The vertical guide (14) of the top guide unit should be in line with the rear edge of the front carrier (15). Loosen the screws (11) (two on the front and two on the back) for adjustment.

The lower end of the vertical guide must be set high enough to let the blank pass under it. Loosen the screws (13) for adjusting.



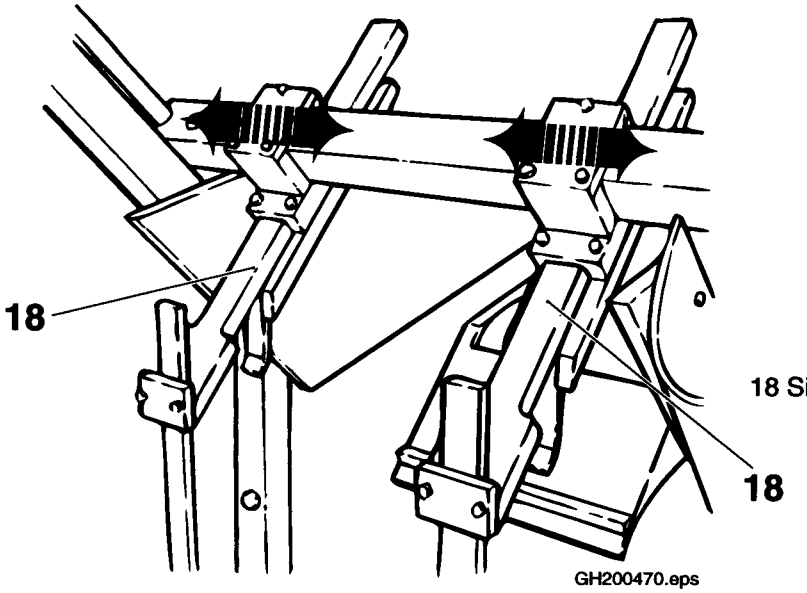


11 Screw
12 Top support
13 Screw
14 Guide
15 Carrier
16 Surface
17 Guide

(Cont'd)

(Cont'd)

Adjust the side steerings so that they are centred over the carrier chains.



18 Side steering

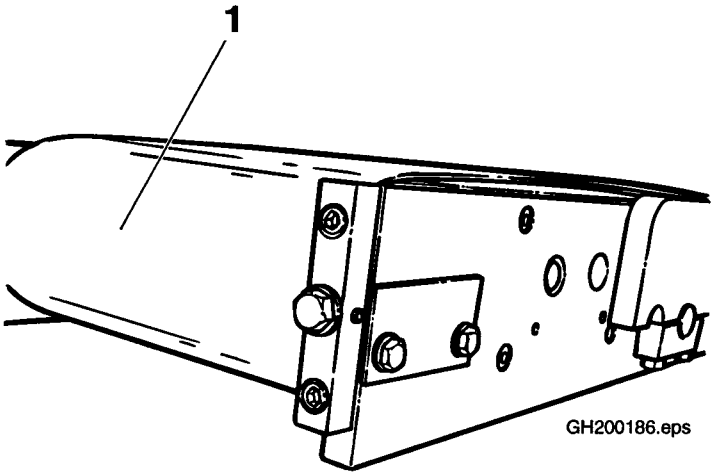
3-2 Magazine - check drive belt

SPC	670285-0401

Check if the drive belt (1) is worn or damaged.

Replace the belt if its condition could interfere with the function.

Check the tension of drive belt.



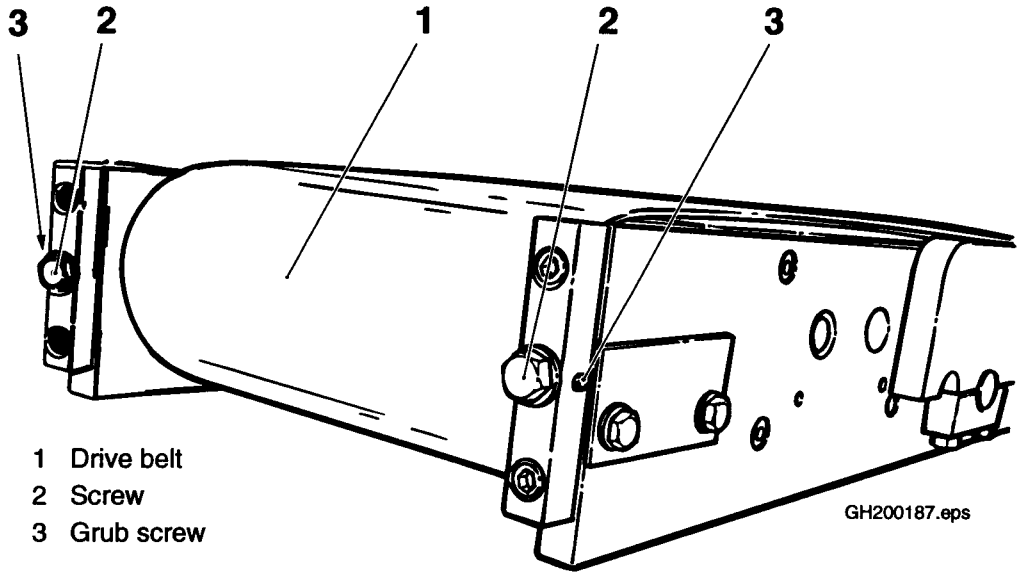
1 Drive belt

2.1bTH200212.en

3-3 Magazine - set drive belt

SPC	670285-0401

To adjust the tension of the drive belt, the grub screws (3) must be loosened. Then adjust on the screws (2). Make sure the rear bending roller is parallel with the front roller. If the bending rollers aren't parallel the conveyor belt will slide out of position. Since the belt moves very slowly it will not show immediately.



1 Drive belt
2 Screw
3 Grub screw

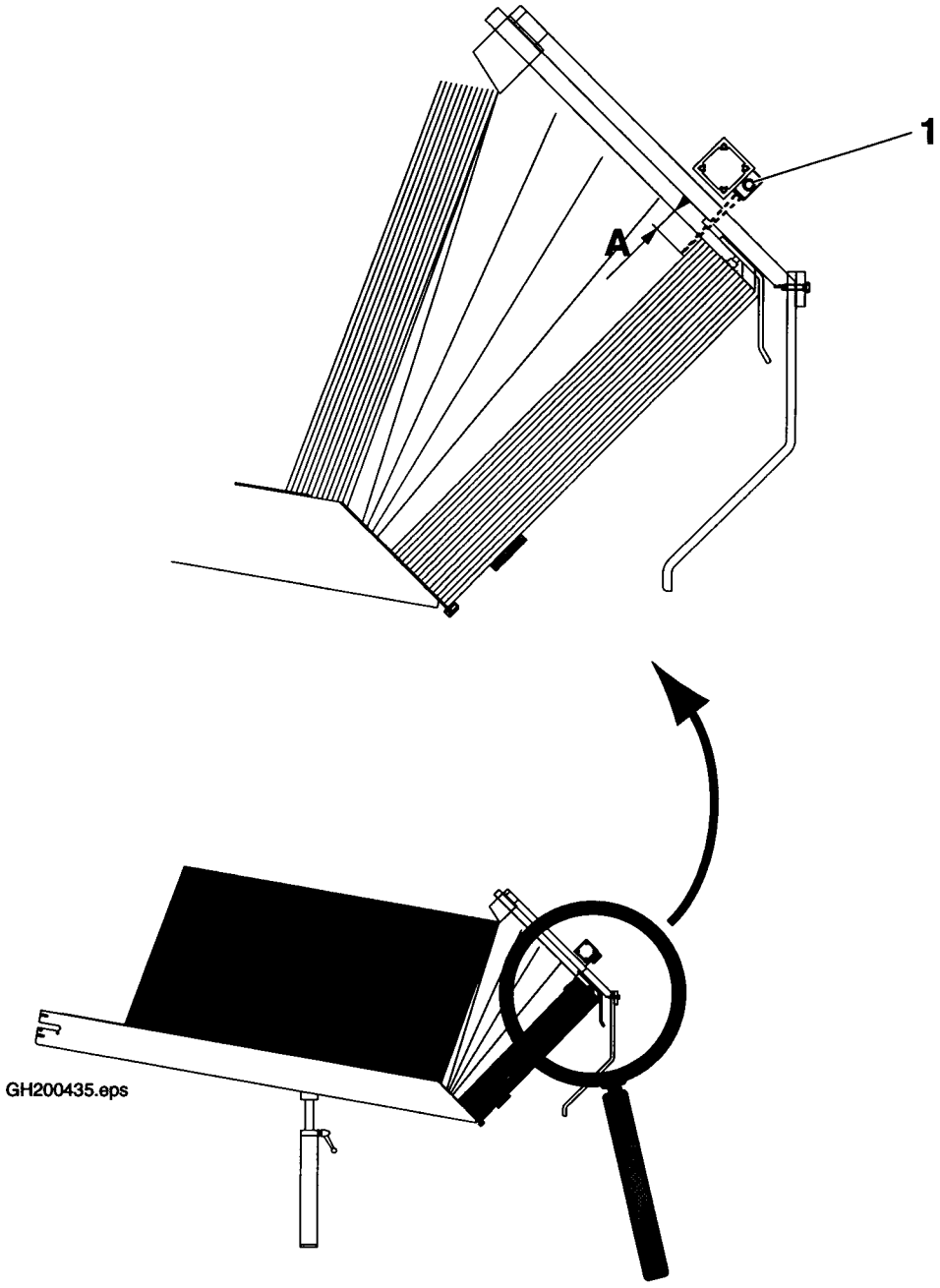
2.1bTH200212.en

3-4 Magazine - set photocell

SPC	670285-0401

Set the photocell (1) so it is activated at a distance A from the top of the blanks. **Distance A=10-20 mm.**

Set the sensitivity acc to procedure 7.1-2 Electrical components - set photocells.



2.1bTH200212.en

3.1 Drive roller

SPC	1021173-0101

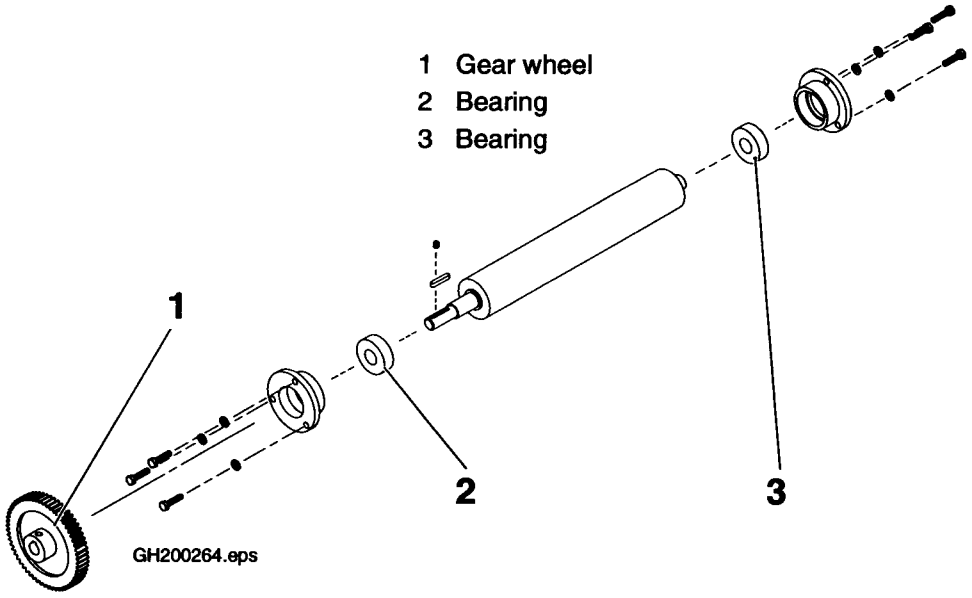
3.1-1 Drive roller - check

SPC	1021173-0101

Check the following parts for wear and damages:

- bearings (2) and (3),
- gear wheel (1).

Replace any worn or damaged part.



2.1bTH200026.en

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3.2 Bending roller

SPC	1021174-0101

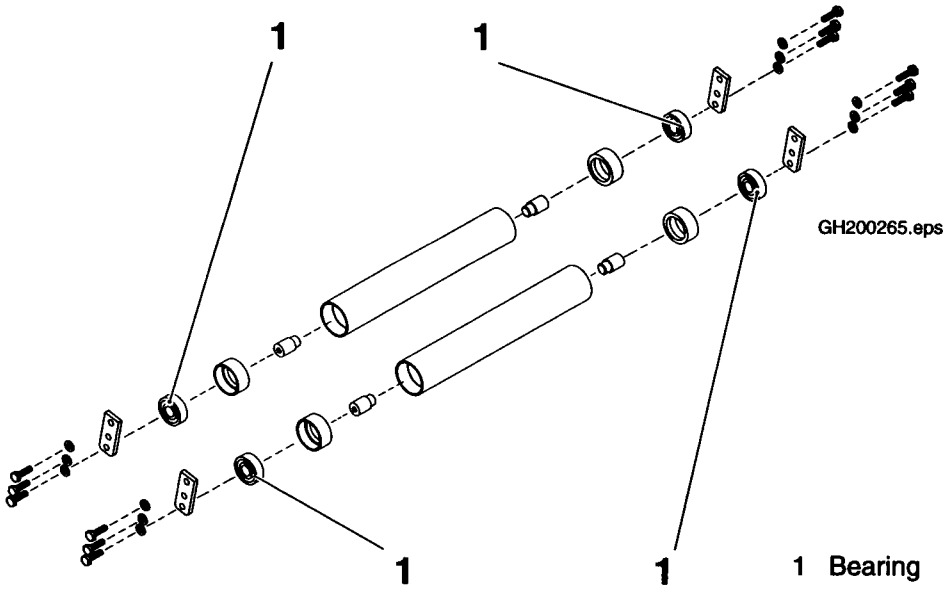
3.2-1 Bending roller - check

SPC	1021174-0101

Check the following parts for wear and damages:

- bearings (1).

Replace any worn or damaged part.



1 Bearing

2.1bTH200027.en

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3.3 Bending roller front

SPC	1021175-0101

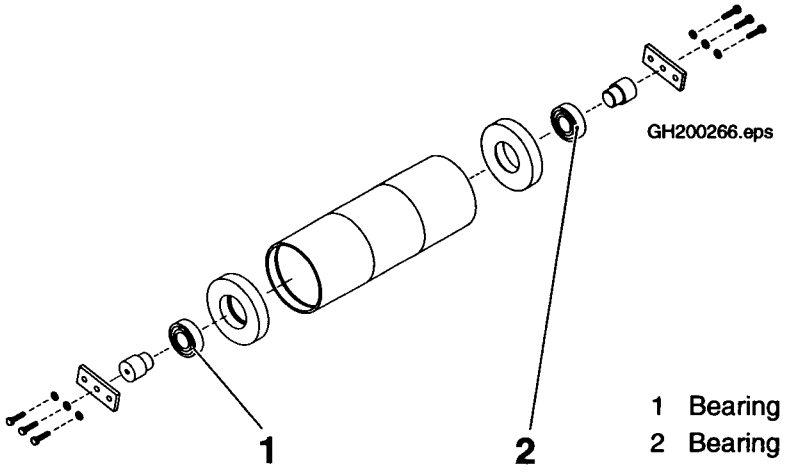
3.3-1 Bending roller front - check

SPC	1021175-0101

Check the following parts for wear and damages:

- bearings (1) and (2).

Replace any worn or damaged part.



1 Bearing
2 Bearing

2.1bTH200028.en

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3.4 Bending roller rear

SPC	1021176-0101

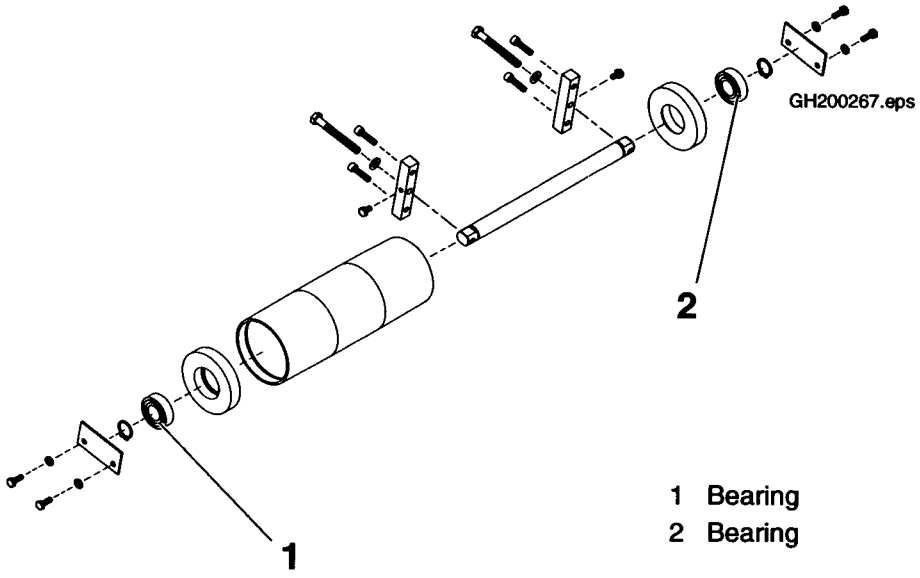
3.4-1 Bending roller rear - check

SPC	1021176-0101

Check the following parts for wear and damages:

- bearings (1) and (2).

Replace any worn or damaged part.



1 Bearing
2 Bearing

2.1bTH200029.en

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3.9 Drive motor

SPC	1021181-0201

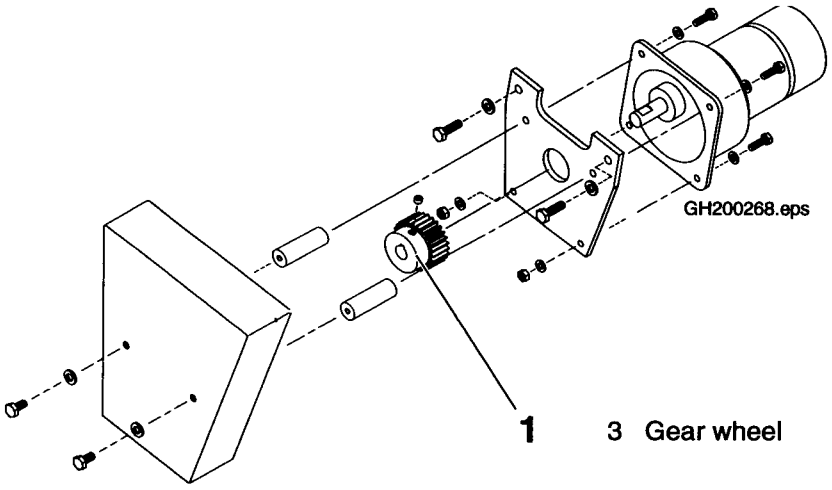
3.9-1 Drive motor - check

SPC	1021181-0201

Check the following parts for wear and damages:

- gear wheel (1).

Replace if necessary.



2.1bTH200030.en

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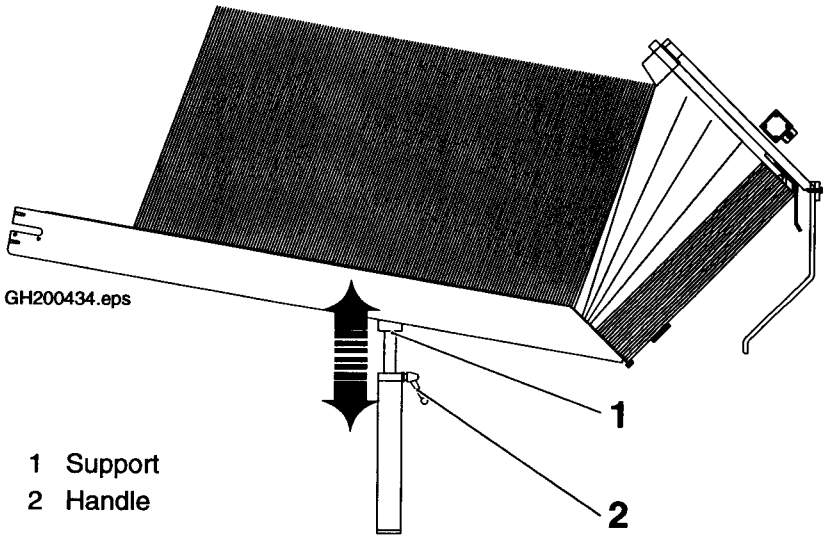
3.14 Support

SPC	1128047-010V

3.14-1 Support - set

SPC	1128047-010V

The magazine should rest on the support (1), adjust by loosening the handle (2) and shifting the support.



1 Support
2 Handle

2.1bTH200076.en

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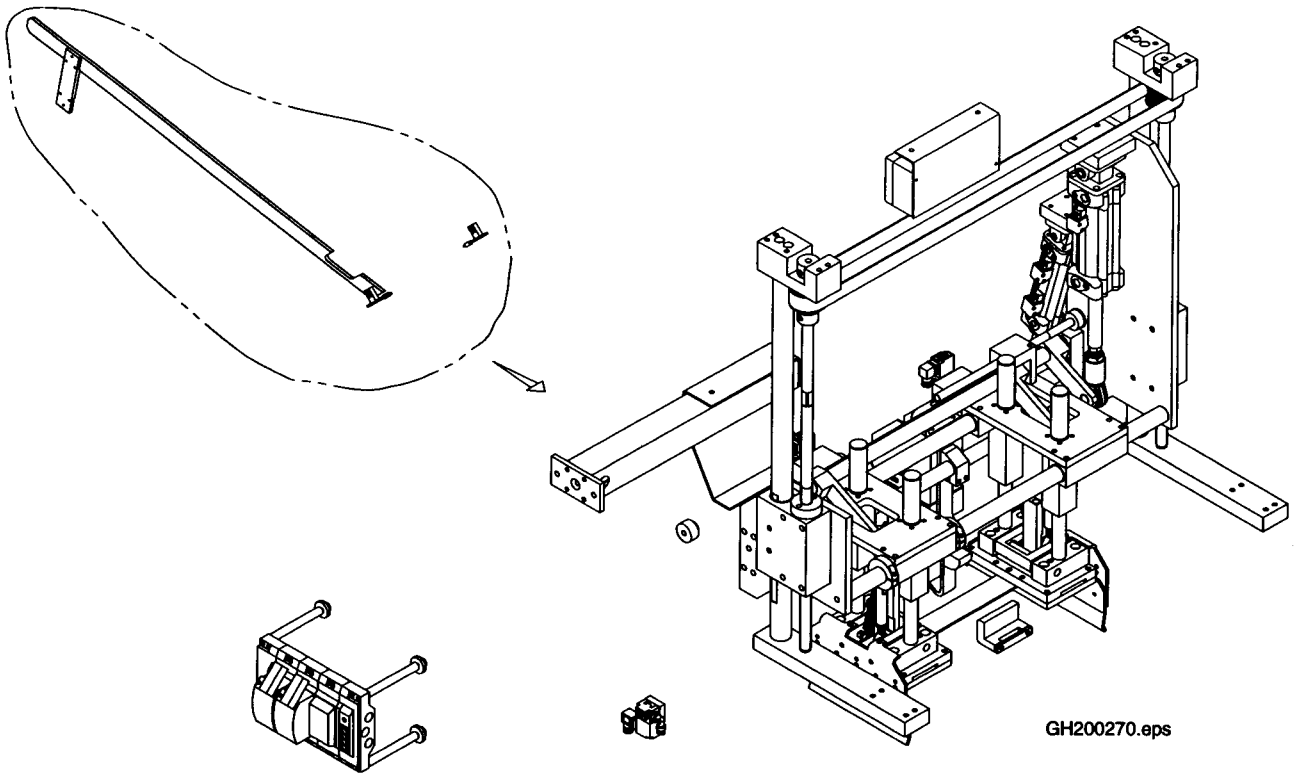
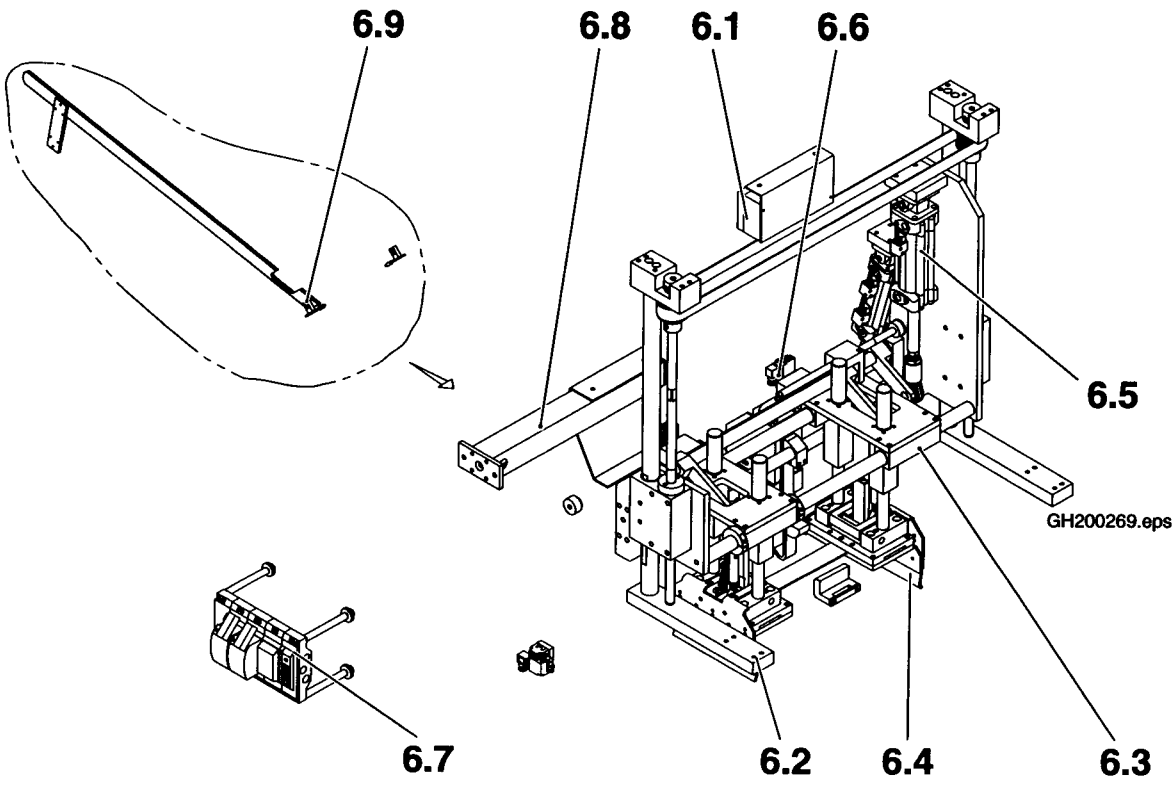
6 Wrap around unit

2.1bTH200213.en



6-0 Wrap around unit - description

SPC	670375-040V



6.1 Connection box
6.2 Frame
6.3 Adjustment plate
6.4 Squeezer
6.5 Cylinders
6.6 Hot melt equipment misc.
6.7 Valve ramp
6.8 Steering
6.9 Magazine support

2.1bTH200213.en

6-1 Wrap around unit - set

SPC	670375-040V

WA inside top flaps, Tray with over flaps and WA meeting flap

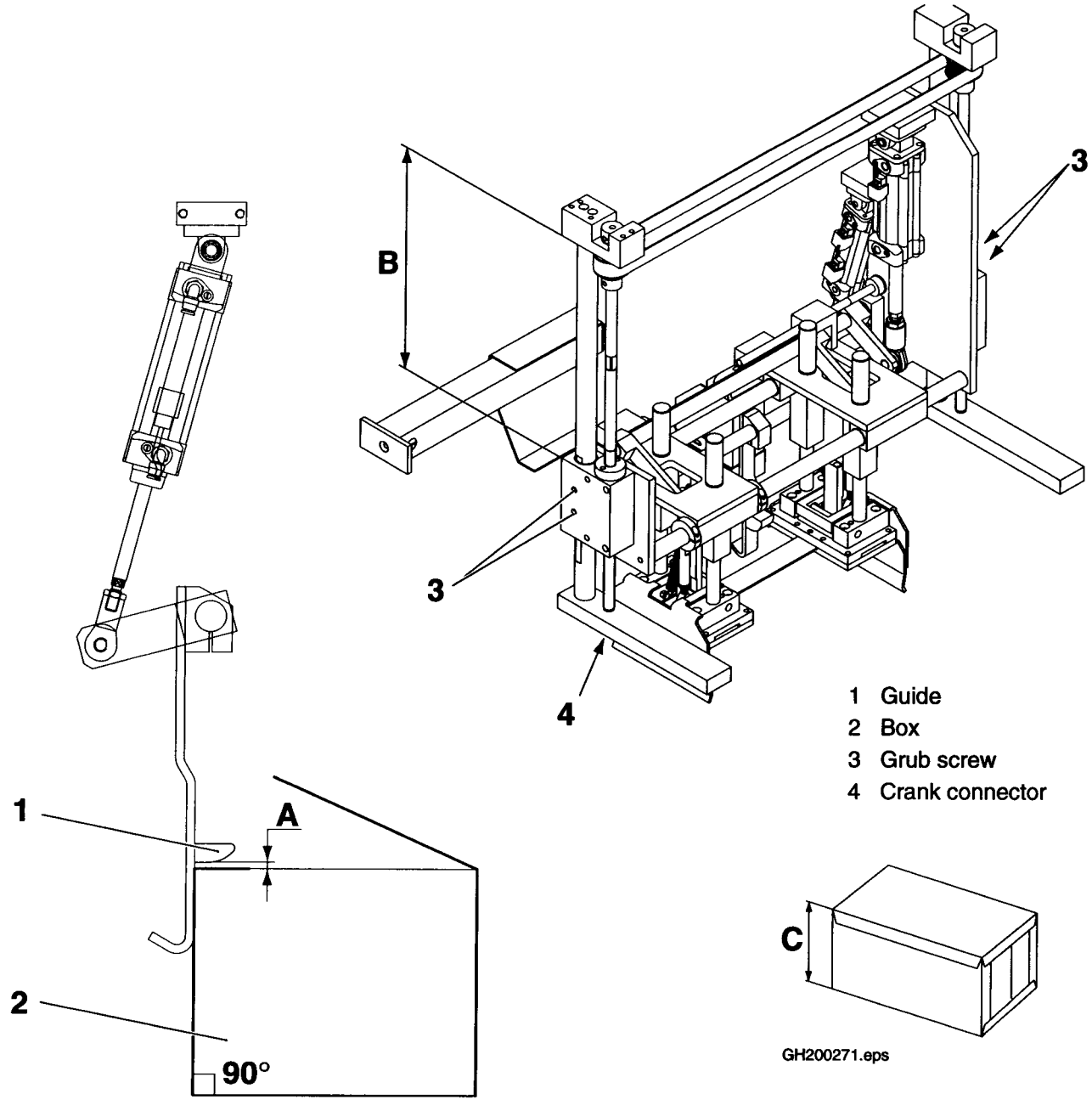
The distance **A** between the guide (1) and the box (2) is to be **2 mm**. This is set by cranking the entire wrap around unit.

WA side flap

Distance B should be set to **555 - C** (C is the height of a box). This is set by cranking the entire wrap around unit.

Cranking the wrap around unit

Set by loosening the grub screws (3). Connect a crank to the crank connector (4).



1 Guide
2 Box
3 Grub screw
4 Crank connector

2.1bTH200213.en

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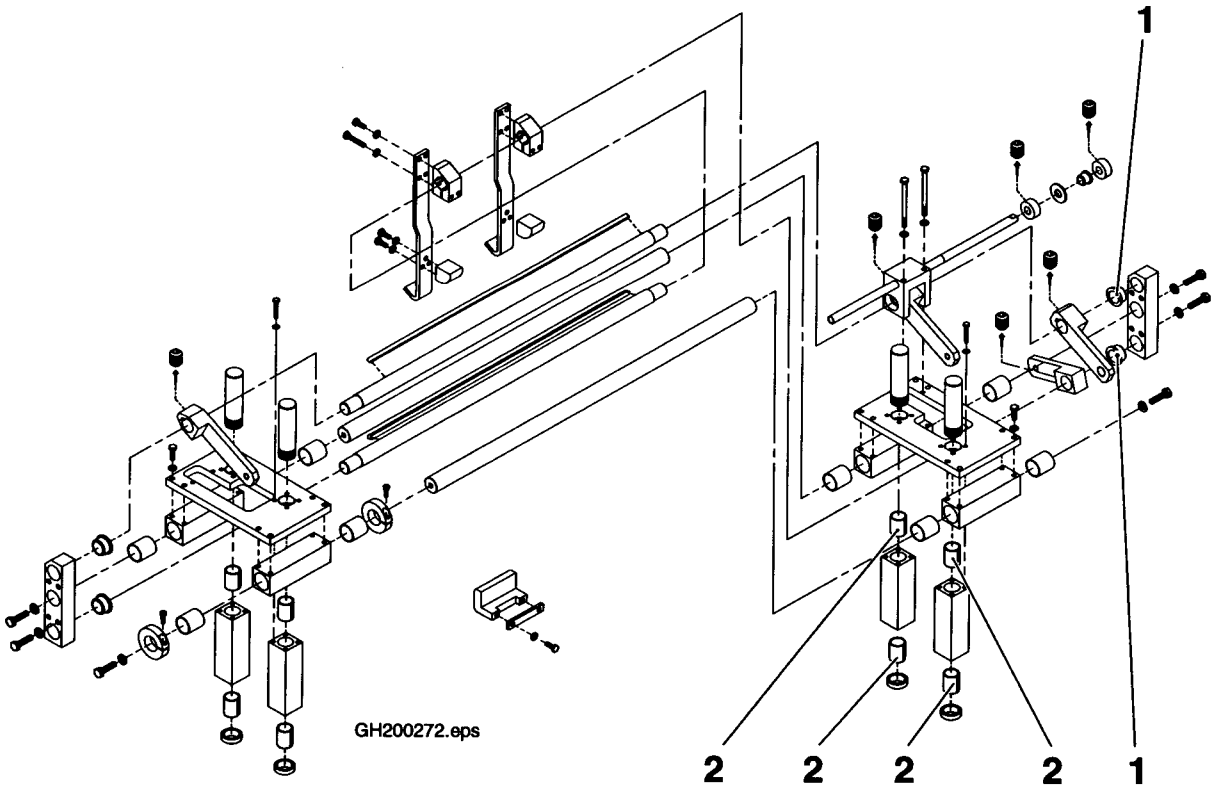
6.3 Adjustment plate

SPC	1074252-030V

6.3-1 Adjustment plate - check

Machine status	
SPC	1074252-030V

Check the bushings (1) and (2) for excessive play.



2.1bTH200214.en

1 Bushing
2 Bushing

6.3-2 Adjustment plate - set

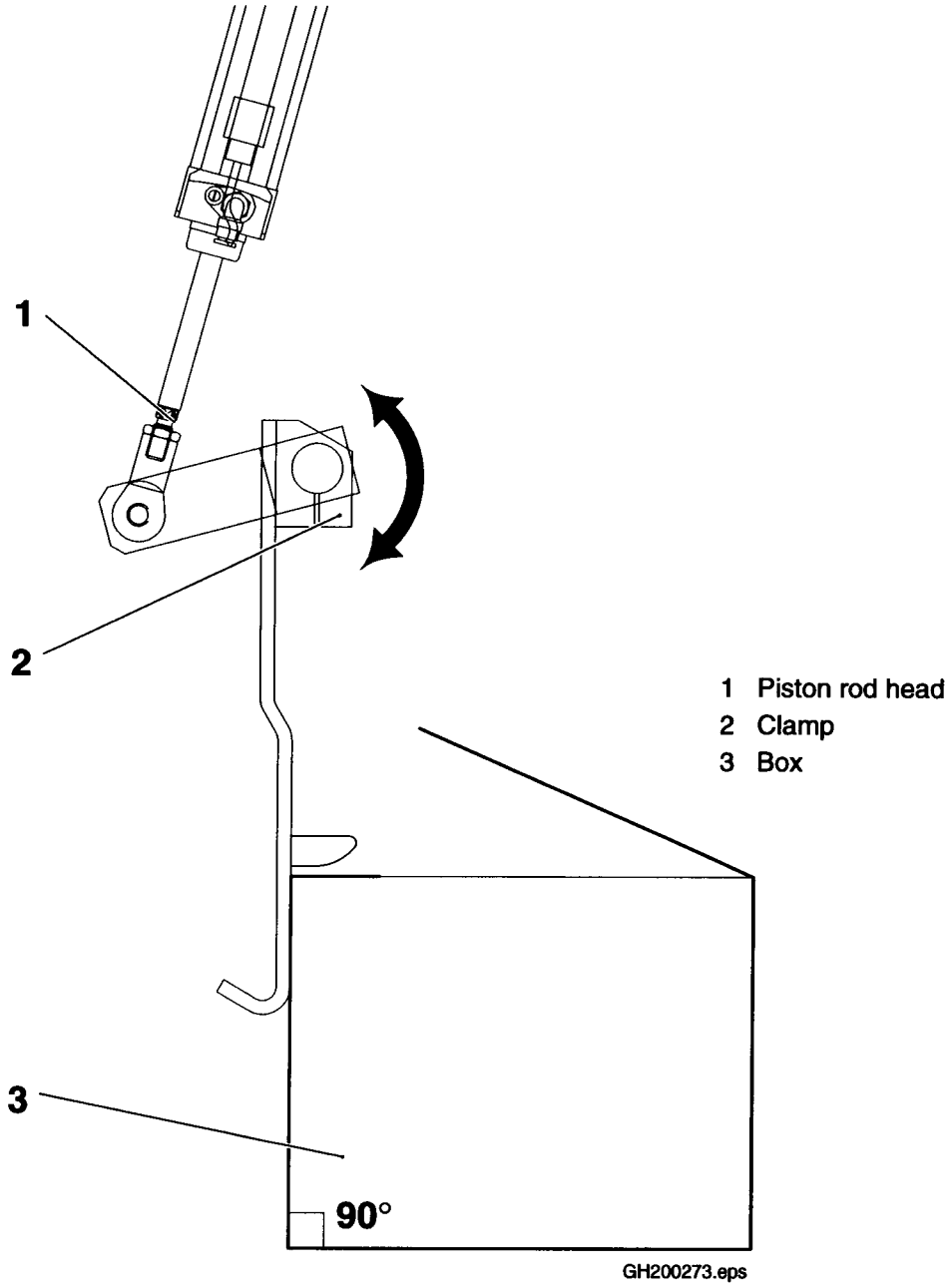
SPC	1074252-030V

Note! This instruction does not apply to machines equipped for Tetra Wrap around box with side flaps.

The prefolder should fold the box (3) so that the angle between the bottom and the side of the box is 90°.

Adjust on the piston rod head (1).

The prefolders are to be centred on the box.
Adjust by loosening the clamp (2) and moving the prefolders on the shaft.



2.1bTH200214.en

6.4 Squeezer

SPC	1074253-030V

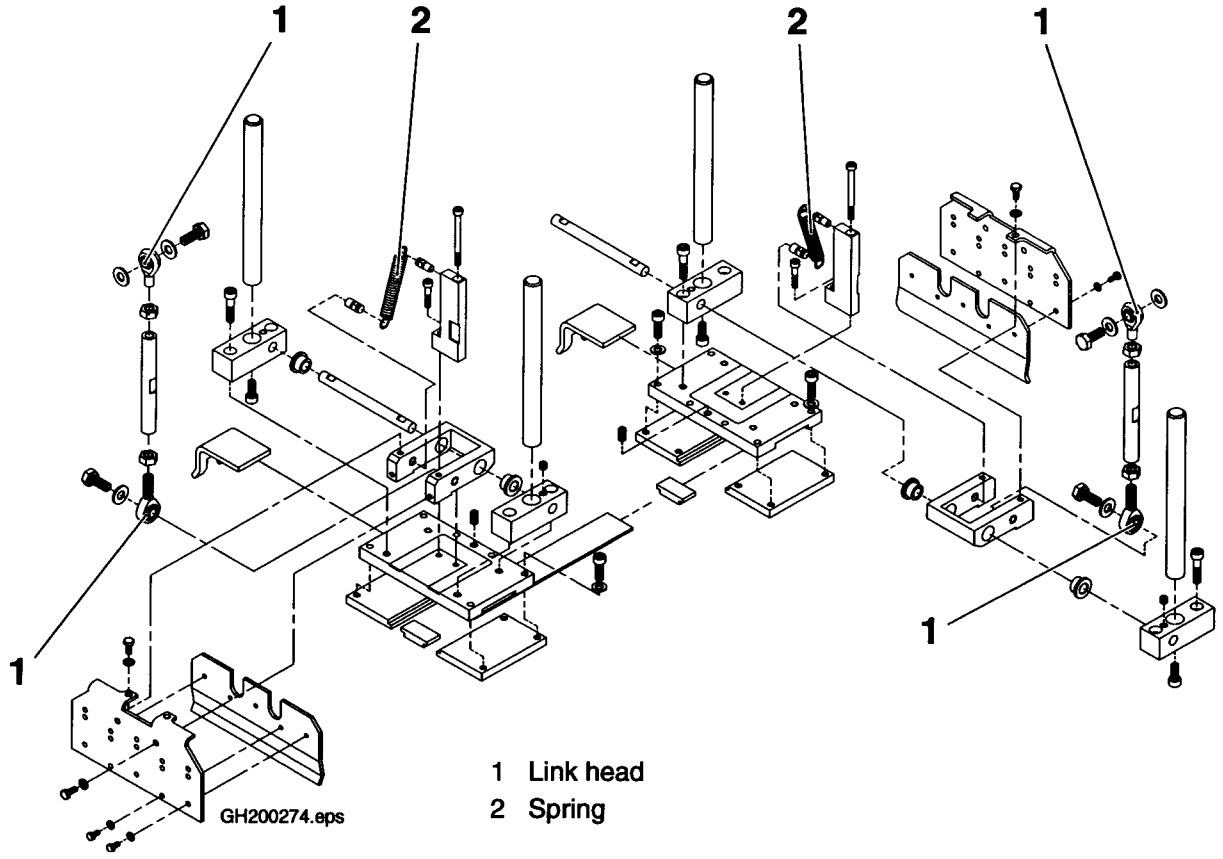
6.4-1 Squeezer - check

SPC	1074253-030V

Check the following parts for wear and damages:

- link heads (1) and
- springs (2).

Replace any worn or damaged part.



1 Link head
2 Spring

2.1bTH200215.en

6.4-2 Squeezer - set

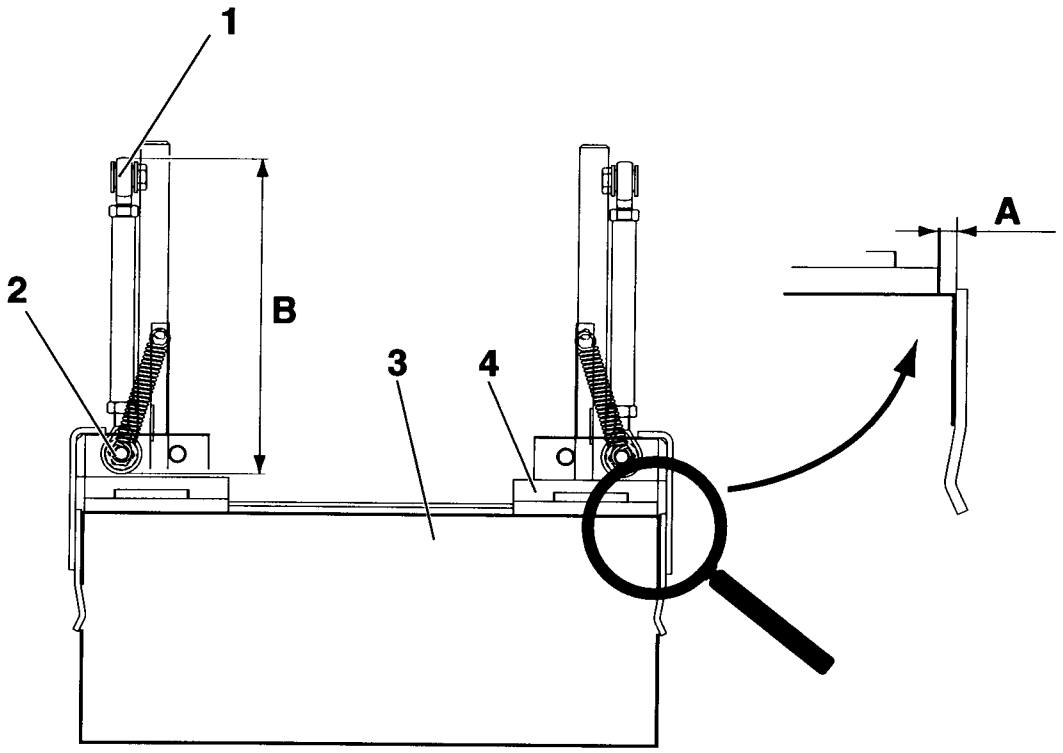
Machine status	
SPC	1074253-030V

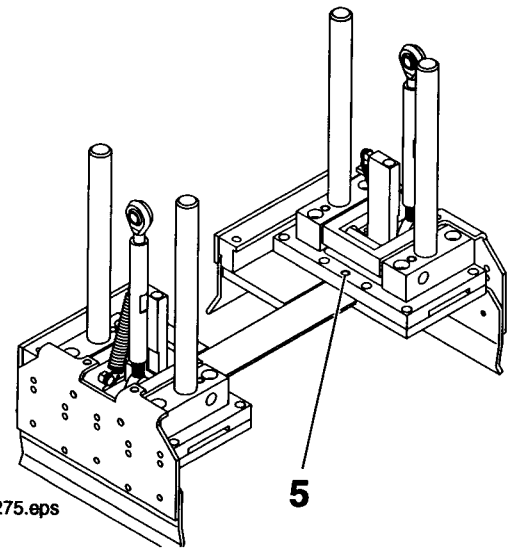
Distance **A** between the edge of the box (3) and the edge of the bracket (4) should be **4 mm**. The distance must be the same on both sides. Loosen the grub screw (5) on the side opposite the infeed to adjust.

Distance **B** between the upper and lower link heads is to be appr **222 mm**. Adjust only on the lower link head (2), the upper link head (1) must be fully screwed together. This is a basic setting, fine tune on the piston rod head (7).

If the box still won't hold together, increase measurement B.

(Cont'd)





GH200275.eps

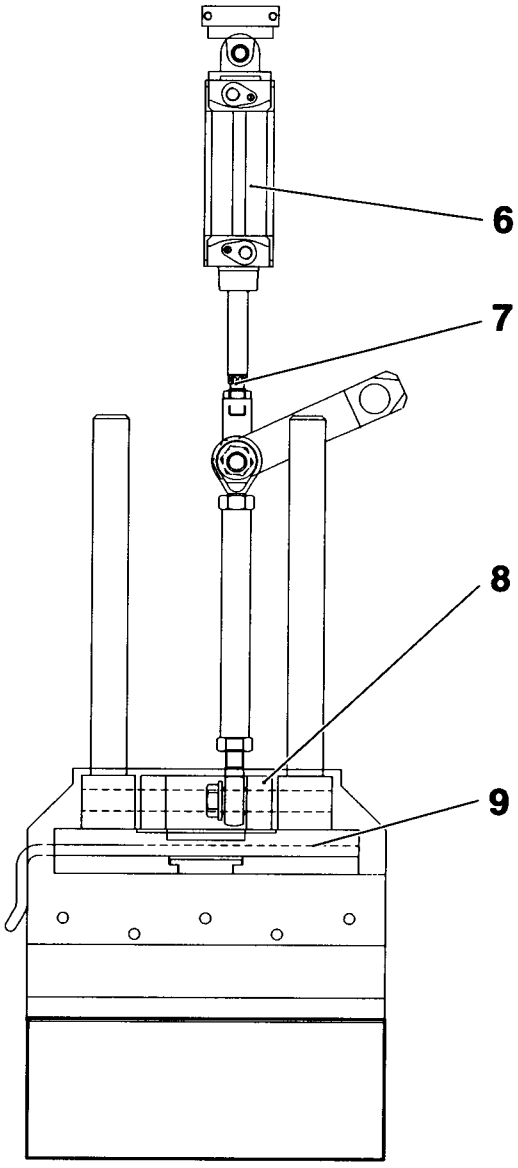
2.1bTH200215.en

1 Upper link head
2 Lower link head
3 Box
4 Bracket
5 Grub screw

(Cont'd)

The holder (8) should be parallel with the plate (9) when the cylinder C140 (6) is in its plus position. Adjust on the piston rod head (7).

Make sure the boxes are not damaged.



GH200276.eps

6 Cylinder C140
7 Piston rod head
8 Holder
9 Plate

2.1bTH200215.en

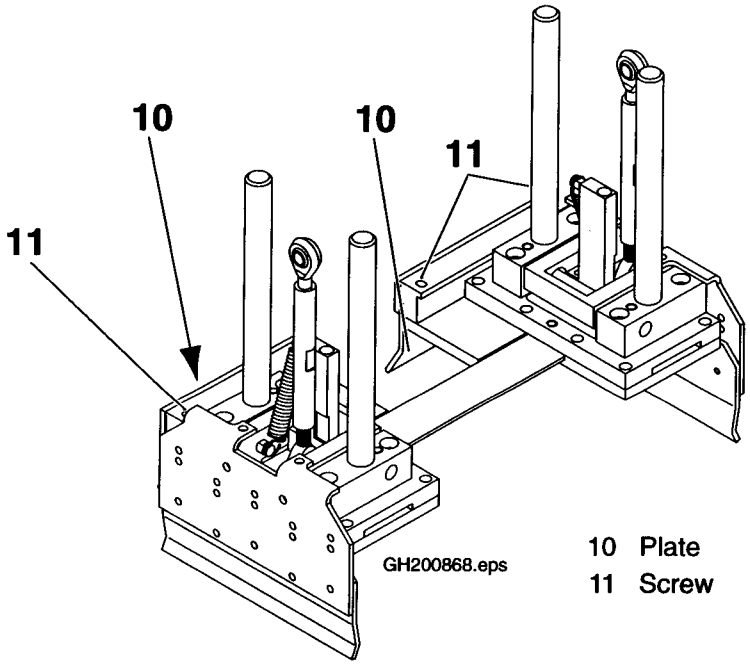
(Cont'd)

(Cont'd)

The plates (10) should be centred to the box.

Set the folding pressure by adjusting the screws (11).

Note! This only applies for machines equipped for Tetra wrap around box with side flap.



10 Plate
11 Screw

2.1bTH200215.en

6.5 Cylinders

SPC	1074254-030V

6.5-1 Cylinders - check

SPC	1074254-030V

Note! Cylinder C141 is not present on machines equipped for Tetra Wrap around box with side flaps.

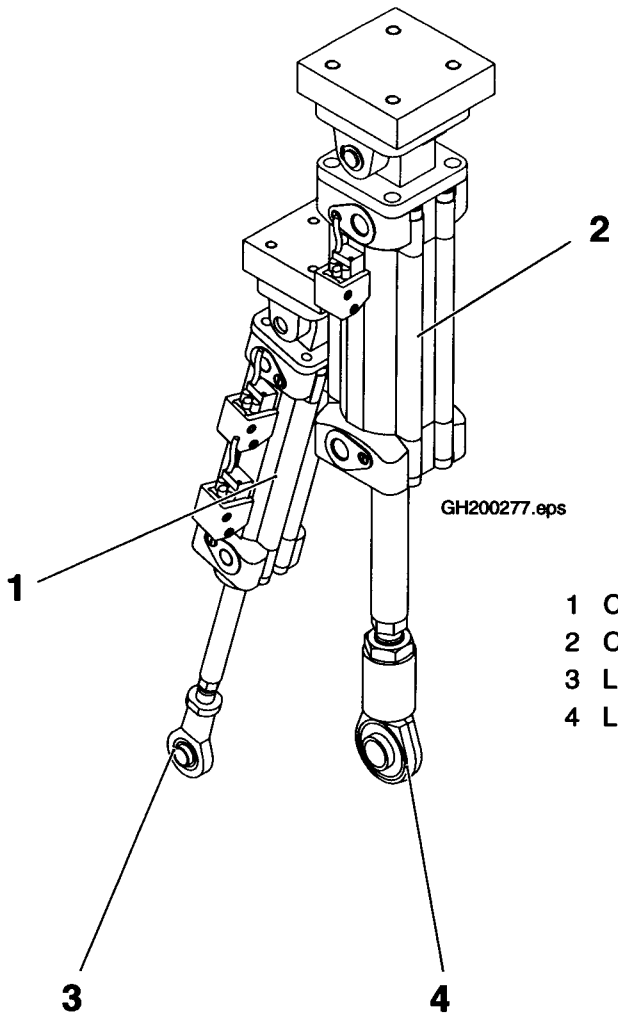
Check the following parts for wear and damages:

- link heads (3) and (4).

Replace if necessary.

Check the speed settings of the cylinders C140 (2) and C141 (1).
See procedure 9.1-1 Cylinders - set.

2.1bTH200033.en



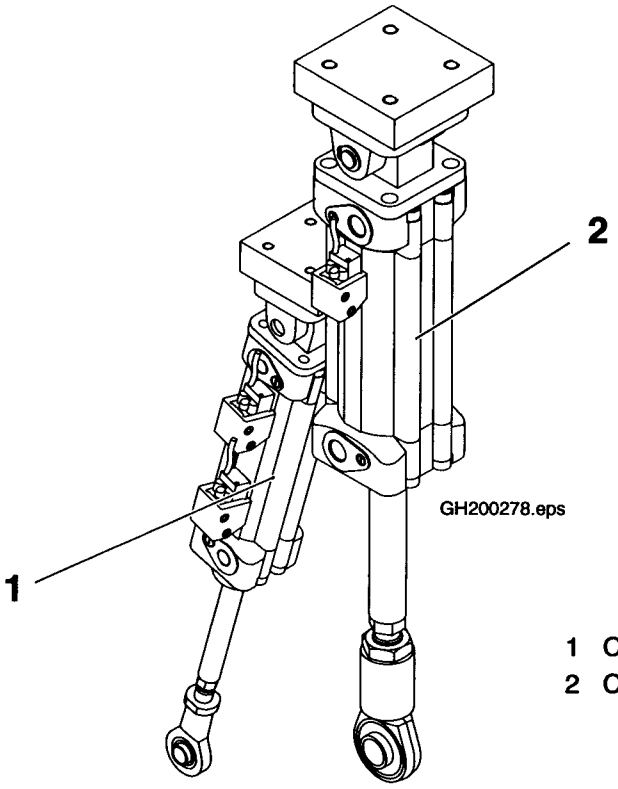
1 Cylinder C141
2 Cylinder C140
3 Link head
4 Link head

6.5-2 Cylinders - set

SPC	1074254-030V

Note! Cylinder C141 is not present on machines equipped for Tetra Wrap around box with side flaps.

Set the plus and minus movement of the cylinders C140 (2) and C141 (1) acc to procedure 9.1-1 Cylinders - set.



1 Cylinder C141
2 Cylinder C140

2.1bTH200033.en

7 Electrical equipment

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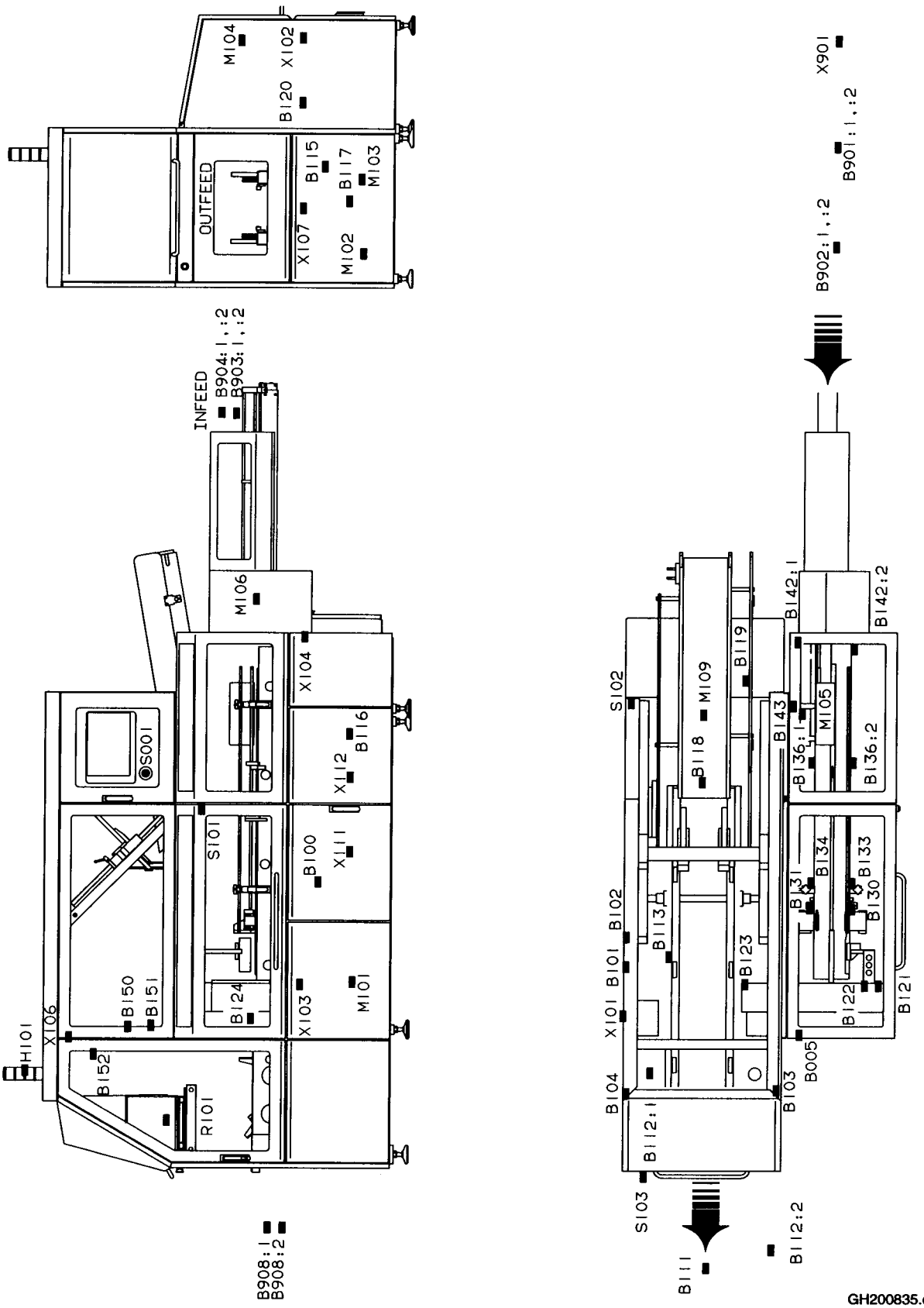
7.1 Electrical components

7.1-1 Electrical components - description



2.1bTH200227.en

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(Cont'd)

Photocells and proximity switches

B100	Pressure guard air
B111	Cover outfeed conveyor
B112:1	Queue, outfeed conveyor
B112:2	Queue, outfeed conveyor
B113	Blank in pack position
B115	Safety clutch, feeding motor
B116	Angle encoder, main shaft
B117	Angle encoder, feeding motor
B118	Stop, blank magazine motor
B119	Low level, blank magazine
B120	Transfer plate, upper position
B121	Pusher, home limit position
B122	Pusher, zero position
B123	Pusher, end limit position
B124	End stop, inner position
B130	Min queue, line 1
B131	Min queue, line 2
B133	Max queue, line 1
B134	Max queue, line 2
B136:1	Cross guard, wide conveyor (transmitter)
B136:2	Cross guard, wide conveyor (receiver)
B142:1	Package counter (transmitter)
B142:2	Package counter (receiver)
B143	Divider 1 in position
B200	Packages on single conveyor (extra equipment)
B901:1	External conv. brake (transmitter)
B901:2	External conv. brake (receiver)
B902:1	External conv. brake (transmitter)
B902:2	External conv. brake (receiver)
B903:1	Min queue into brake (transmitter)
B903:2	Min queue into brake (receiver)
B904:1	Fallen package (transmitter)
B904:2	Fallen package (receiver)
B908:1	Passage indication (extra equipment) (transmitter)
B908:2	Passage indication (extra equipment) (receiver)

Motors

M101	Infeed single packages
M102	Main shaft motor
M103	Feeding motor
M104	Servo pusher
M105	Line divider 1

2.1bTH200227.en

M106	Belt brake
M109	Blank motor

Switches

R101	Hot melt unit
S001	Emergency stop
S101	Emergency stop
S102	Emergency stop
S103	Emergency stop

B101	Cover (base machine)
B102	Cover (base machine)
B103	Cover (base machine)
B104	Cover (base machine)
B105	Cover (infeed)

Connection boxes

X101, X102, X103, X104, X107, X111, X112 and X901.

Warning lamp

H101

Equipment exclusive for wrap around machines

Proximity switches:

B150	WA flap folder, upper position
B151	WA flap folder, lower position
B152	WA squeezer, upper position

Connection box:

X106

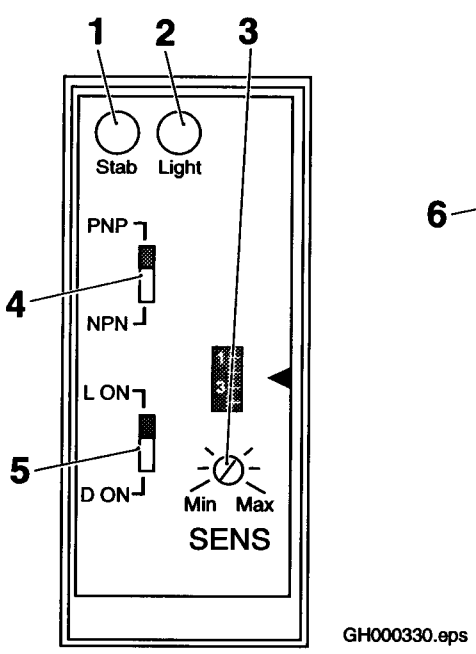
7.1-2 Electrical components - set photocells

Reflection type

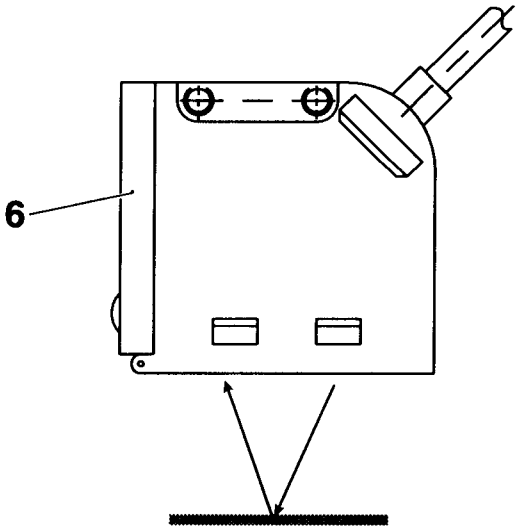
Open the cap (6) and check that the switches (4) and (5) are set to PNP and L ON.

Place the object to be detected in front of the beam path. Turn the sensitivity screw (3) to Min. Turn the sensitivity screw clockwise until the orange LED (2) and the green LED (1) light up. To secure the setting, turn the sensitivity screw just a little bit more.

Remove the object and check that the orange LED goes off and that the green LED is still on. If not, turn the sensitivity screw counter-clockwise and make a new adjustment.



GH000330.eps



2.1bTH200227.en

1 Light-emitting diode (LED), green
2 Light-emitting diode (LED), orange
3 Sensitivity screw
4 Switch
5 Switch
6 Cap

(Cont'd)

(Cont'd)

Transmitting/receiving type

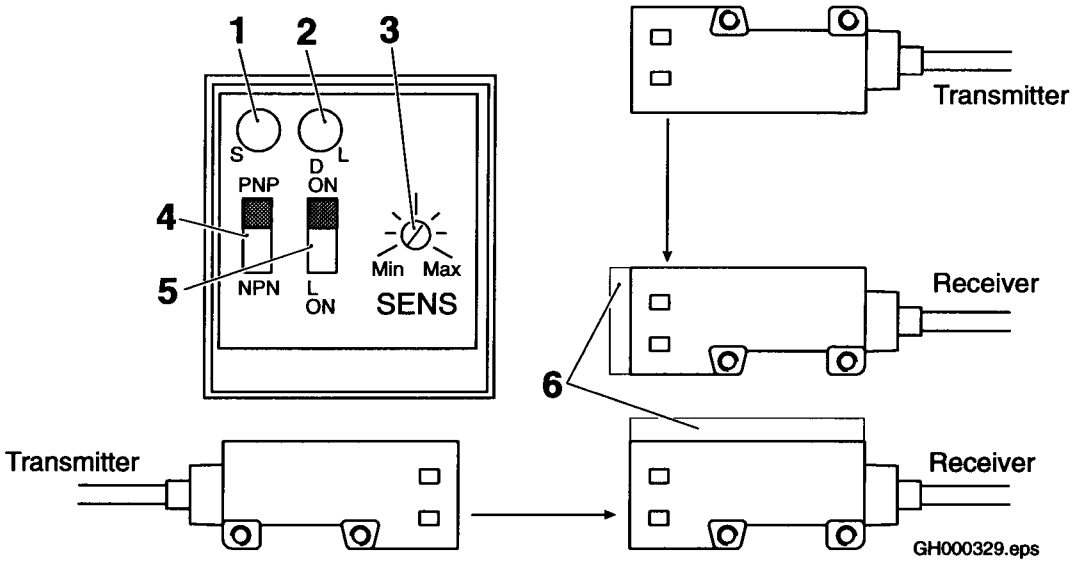
Note! There are two types, to be positioned besides each other or in front of each other.

Open the cap (6) and check that the switches (4) and (5) are set to PNP and D ON.

Position the transmitter and the receiver in line opposite each other (see picture).

Turn the sensitivity screw (3) to minimum and then turn it back where the red LED (2) and the green LED (1) light up.

When an object is being indicated, only the green LED should light up. If not, turn the sensitivity screw counter-clockwise.



1 Light-emitting diode (LED), green
2 Light-emitting diode (LED), red
3 Sensitivity screw
4 Switch
5 Switch
6 Cap

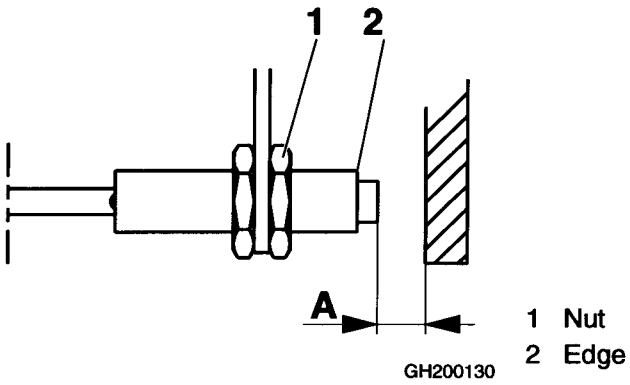
2.1bTH200227.en

7.1-3 Electrical components - set proximity switches

(Honeywell)

The gap between the transmitter and the metal surface to be sensed is to be maximum 2 mm (gap A).

The nut (1) is to be placed so that it doesn't pass the edge (2). Otherwise the setting is uncertain.



1 Nut
2 Edge

2.1bTH200227.en

7.2 GE Fanuc

7.2-1 GE Fanuc - replace battery

When the BATT lamp (1) on the power supply unit (2) lights up, the battery (5) has to be replaced. The base plate may be connected while the battery is being replaced.

a) Remove the battery cover (7) located on the lower part of the power supply unit front.

b) Detach the battery from the clips (6).

c) Replace the battery and attach the clips to the new battery.

d) Disconnect the cable connector (4) of the old battery and discard the battery.

Caution! The battery contains harmful substances and must not be thrown away in nature. Hand it in to the nearest recycle centre.

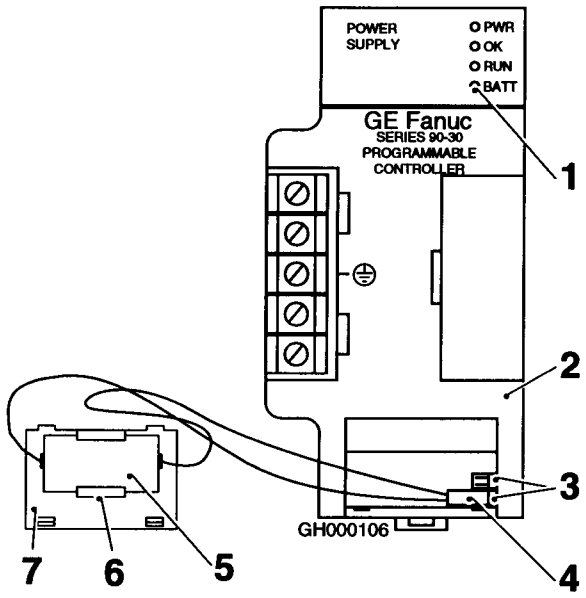
e) Carefully insert the connector of the new battery into one of the female contacts (3) on the plate with the aid of needle nose pliers.

Note! The battery replacement must be completed within 20 minutes, or else the RAM memory might be erased.

f) Reposition the battery cover.

2.1bTH2000042.en

DANGER! **Risk of explosion**
Do not burn lithium batteries!
Do not try to recharge lithium batteries!
The battery may explode, catch fire or discharge lethal substances!



1 BATT lamp
2 Power supply unit
3 Contact
4 Cable connector
5 Battery
6 Clips
7 Battery cover

7.2-2 GE Fanuc - replace modules

a) Switch off mains power.

b) If I/O module: remove the terminal (4) acc to procedure on page.

c) Grip the upper section of the module (6) firmly.

d) Push the catch (7) on the underside of the module upwards.

e) At the same time, tilt the module outwards.

f) Let go off the catch.

g) Pull the entire module upwards so that the hook is disengaged from the groove (2) in the base plate (1).

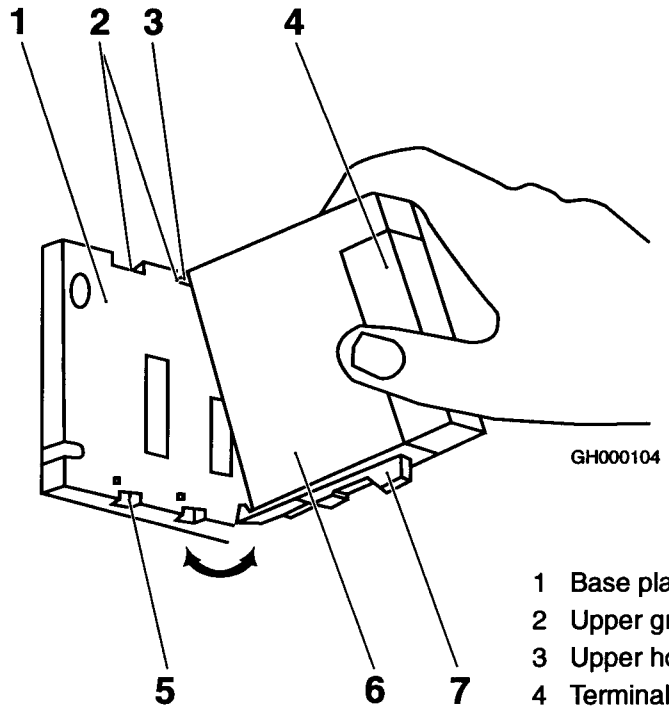
If CPU: disconnect the electrical connections.

h) Replace the module.

i) Hold the new module with the terminal (4) towards you and the hooks (3) at the back away from you.

j) Place the module in front of the contact concerned and tilt it upwards so that the upper hook (3) at the back of the module engages the groove in the base plate.

k) Press the module (6) down, until the catch (7) engages the base plate (1).



1 Base plate
2 Upper groove in base plate
3 Upper hook at back of module
4 Terminal
5 Lower groove in base plate
6 Module
7 Catch

2.1bTH200042.en

7.2-3 GE Fanuc - replace terminal

a) Switch off mains power.

b) Open the terminal (3) hatch.

c) Push the catch (2) upwards.

d) The entire terminal block now tilts outwards a little.

e) Grasp the handle (4) and pull it towards you until the terminal contacts have been disengaged from the module.

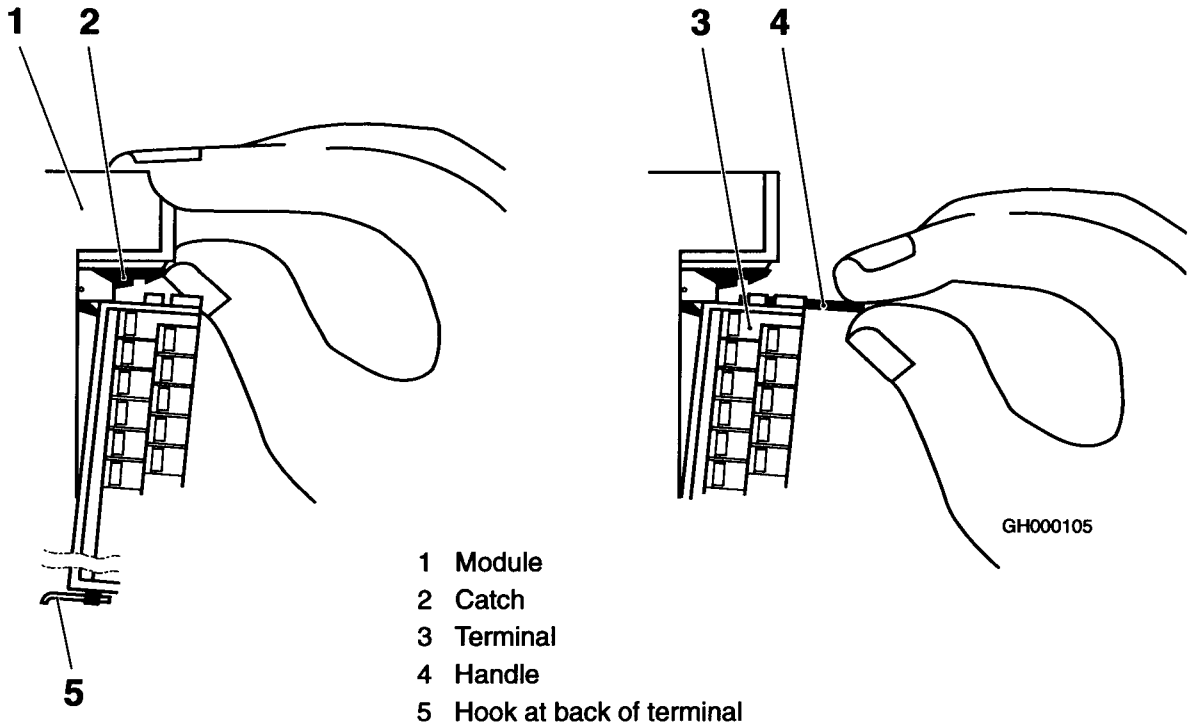
f) The catch has now been released and the entire terminal can be removed.

g) Replace the terminal.

h) Hold the new terminal with the hatch towards you and the hook (5) on the back of the terminal away from you.

i) Place the terminal in front of the module concerned and tilt it so that the hook at its back engages the groove in the module.

j) Press the terminal against the module until the catch locks into the terminal.



2.1bTH200042.en

1 Module
2 Catch
3 Terminal
4 Handle
5 Hook at back of terminal

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7.3 Frequency inverter

7.3-1 Frequency inverter - description

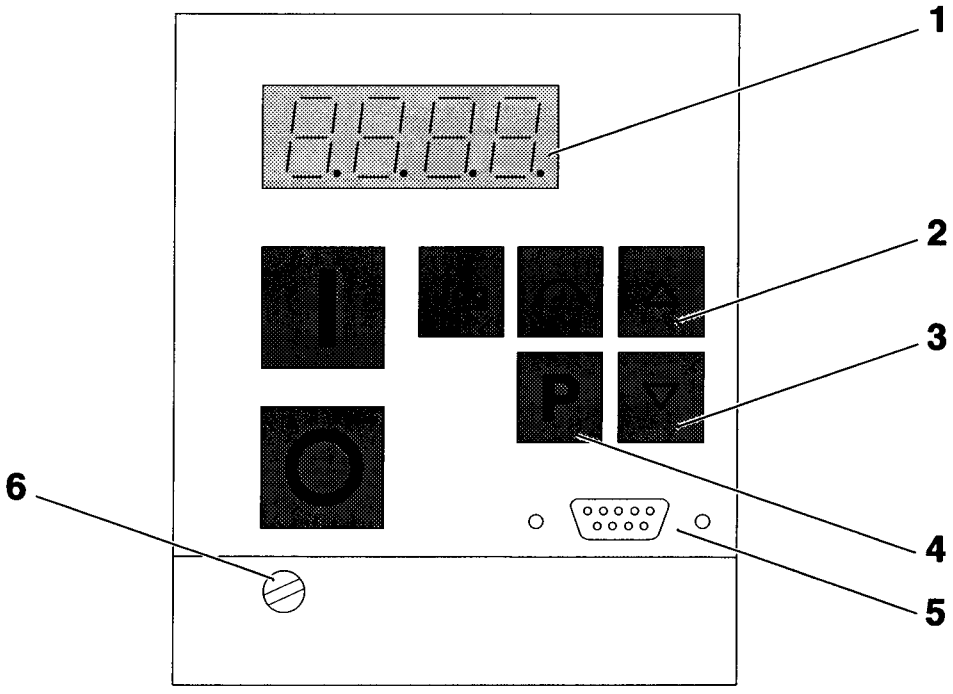
WARNING! The equipment must not be switched on until after its plastic cover has been fitted.

DANGER! **Risk of electrical shock!**
The capacitors of the frequency inverters G022 and G023 remain charged to dangerous voltages even when the Main switch is OFF. Discharge time is approximately 5 minutes. Risk of electrical shock that may cause injury or death.

The four digit LED display (1) displays parameter number (P000 – P944), parameter value (000.0 – 999.9) or fault code (F000 – F154).

The parameter settings required can be entered using the three buttons P (4), UP (2), and DOWN (3) on the front panel of the inverter.

2.1bTH200217.en



GH200805.eps

1 LED display
2 UP button
3 DOWN button
4 Parameterisation button
5 RS485 Interface
6 Cover retaining screw

7.3-2 Frequency inverter - set

Caution! All settings must be performed by skilled persons only.

Note! To be able to change parameters above P009, the parameter P009 has to be set to '002'.

Set parameter P944 to '001' to reset all parameter values to factory settings.

If the LED display already displays a parameter number, then start with step b).

a) Press the P button to display parameter number.
b) Press the UP (increase) or the DOWN (decrease) button to display required parameter number.
c) Press the P button to display parameter value.
d) Press the UP (increase) or the DOWN (decrease) button to set the parameter value.

Parameter	Function	G022	G023
P000	Operating display	-	-
P001	Display selection	2	2
P002	Ramp up time (sec.)	1.5	0.4
P003	Ramp down time (sec.)	0.1	0.2
P004	Smoothing (sec.)	0	0
P005	Digital frequency setpoint (Hz)	0	0
P006	Frequency setpoint type selection	2	2
P007	Enable/disable front panel buttons	0	0
P009	Parameter protection setting	1	1
P011	Frequency setpoint memory	0	0
P012	Minimum motor frequency (Hz)	0	0
P013	Maximum motor frequency (Hz)	100	100
P014	Skip frequency (Hz)	0	0
P015	Automatic restart	0	0
P016	Start on the fly	0	0
P017	Smoothing type	1	1
P018	Automatic restart after fault	0	0
P021	Minimum analogue frequency (Hz)	0	0
P022	Maximum analogue frequency (Hz)	50	50
P023	Analogue input type	0	0
P024	Analogue setpoint addition	0	0
P025	Analogue output	0	0
P031	Jog frequency right (Hz)	5	5
P032	Jog frequency left (Hz)	5	5
P033	Jog ramp up time (sec.)	10	10
P034	Jog ramp down time (sec.)	10	10

Factory setting

2.1bTH200217.en

Parameter	Function	G022	G023
P041	1st fixed frequency (Hz)	5	5
P042	2nd fixed frequency (Hz)	28	55
P043	3rd fixed frequency (Hz)	17	20
P044	4th fixed frequency (Hz)	40	40
P045	Inversion fixed setpoints 1 – 4	0	0
P046	5th fixed frequency (Hz)	0	0
P047	6th fixed frequency (Hz)	0	0
P048	7th fixed frequency (Hz)	0	0
P049	8th fixed frequency (Hz)	0	0
P050	Inversion fixed setpoints 5 – 8	0	0
P051	Selection control function, DIN1 (terminal 8)	2	2
P052	Selection control function, DIN2 (terminal 9), fixed frequency 4	10	10
P053	Selection control function, DIN3 (terminal 10), fixed frequency 3	6	6
P054	Selection control function, DIN4 (terminal 11), fixed frequency 2	6	6
P055	Selection control function, DIN5 (terminal 12), fixed frequency 1	15	15
P056	Digital input debounce time	0	0
P061	Selection relay output RL1	6	6
P062	Selection relay output RL2	8	8
P063	External brake release delay (sec.)	1	1
P064	External brake stopping time (sec.)	1	1
P065	Current threshold for relay (A)	1	1
P071	Slip compensation (%)	0	25
P072	Slip limit (%)	400	300
P073	DC injection braking (%)	25	25
P074	Motor derating curve as temperature protection	3	3
P075	Braking resistance (Ω)	0	0
P076	Pulse frequency	0	2
P077	Control mode	1	0
P078	Continuous boost (%)	150	100
P079	Starting boost (%)	0	0
P081	Nominal frequency for motor (Hz)	50	50
P082	Nominal speed for motor (RPM)	1400	1400
P083	Nominal current for motor (A)	3	3.4
P084	Nominal voltage for motor (V)	230	230
P085	Nominal power for motor (kW)	0.55	0.75
P086	Motor current limit (%)	200	185
P087	Motor PTC enable	0	0
P088	Automatic calibration	0	0
P089	Stator resistance (Ω)	12.2	8.4
P091	Slave address	0	0
P092	Baud rate	6	6
P093	Timeout (sec.)	0	0

Factory setting

2.1bTH200217.en

Parameter	Function	G022	G023
P094	Serial link nominal system setpoint (Hz)	50	50
P095	USS compatibility	0	0
P101	Operation for Europe or USA	0	0
P111	Power rating (kW/hp)	0.75	0.75
P121	Enable/disable RUN button	0	0
P122	Enable/disable FORWARD/REVERSE button	0	0
P123	Enable/disable JOG button	0	0
P0124	Enable/disable Δ button	1	1
P0131	Frequency setpoint (Hz)	-	-
P0132	Motor current (A)	-	-
P0133	Motor torque (%)	-	-
P0134	DC link voltage (V)	-	-
P0135	Motor RPM	-	-
P910	Local/Remote mode	0	0
P922	Software version	-	-
P923	Equipment system number	0	0
P930	Most recent fault code	-	-
P931	Most recent warning type	-	-
P944	Reset to factory default settings	0	0

Factory setting

2.1bTH200217.en

7.3-3 Frequency inverter - fault codes

In the event of a failure, the inverter switches off and an error code appears on the display.

The last error that occurred is stored in parameter P930, e.g. '0004' indicates that the last error was F004.

Fault code	Cause	Corrective action
F001	Overvoltage	Check whether supply voltage is within the limits indicated on the rating plate. Increase the ramp down time (P003) or apply braking resistor (option). Check whether the required braking power is within the specified limits.
F002	Overcurrent	Check whether the motor power corresponds to the inverter power. Check motor lead and motor for shot-circuits and earth faults. Check whether the motor parameters (P081 – P086) correspond with the motor being used. Increase the ramp-up time (P002). Reduce the boost set in P078 and P079. Check whether the motor is obstructed or overloaded.
F003	Overload	Check whether the motor is overloaded. Increase the maximum motor frequency if a motor with high slip is used.

Fault code	Cause	Corrective action
F004	Overheating of motor (monitoring with PTC)	Check whether the motor is overloaded. Check the connections to the PTC. Check that P087 has not been set to '1' without a PTC being connected.
F005	Inverter overtemperature	Check that the ambient temperature is not too high. Check that the air inlet and outlet are not obstructed.
F006	Mains phase missing (3-phase units only)	Check the mains supply and rectify.
F008	USS protocol timeout	Check the serial interface. Check the settings of the bus master and P091 – P093. Check whether the timeout interval is too short (P093).
F009	Undervoltage	Check the supply voltage.
F010	Initialisation fault	Check the entire parameter set. Set P009 to '0000' before power down.
F011	Internal interface fault	Switch off power and switch on again.
F013	Programme fault	Switch off power and switch on again.
F106	Parameter fault P006	Parameterise fixed frequency(ies) and/or motor potentiometer on the digital inputs.
F112	Parameter fault P012	Set parameter P012<P013.
F151 – F154	Digital input parameter fault	Change the settings of digital inputs P052 to P055.

2.1bTH200217.en

When the fault has been corrected the inverter can be reset. To do this press the reset button on the control panel of the machine.

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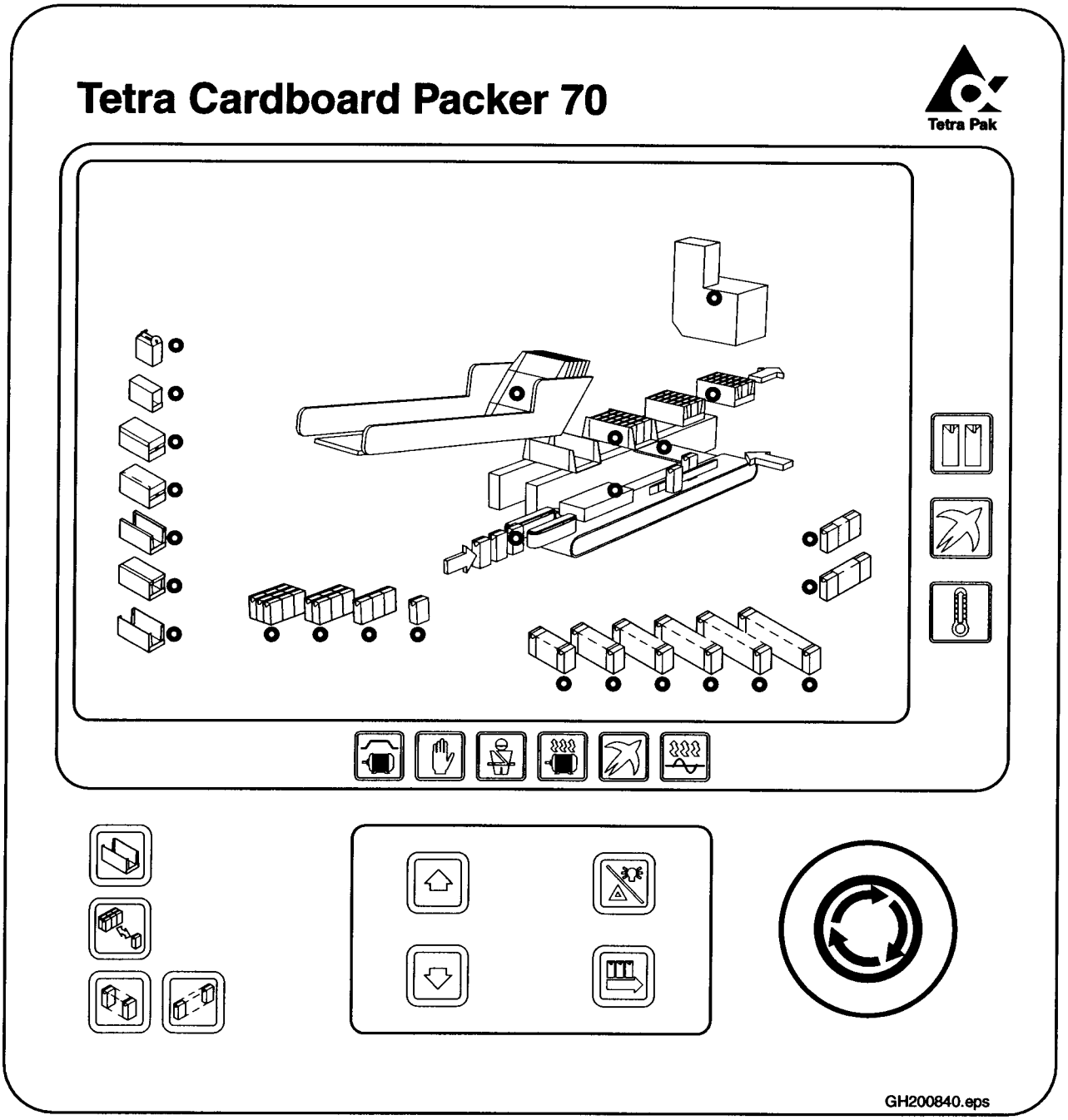
7.4 Control panel

7.4-1 Control panel - check

Press button Alarm Reset for a few seconds, check that all alarm lamps on the control panel lights up.



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9 General

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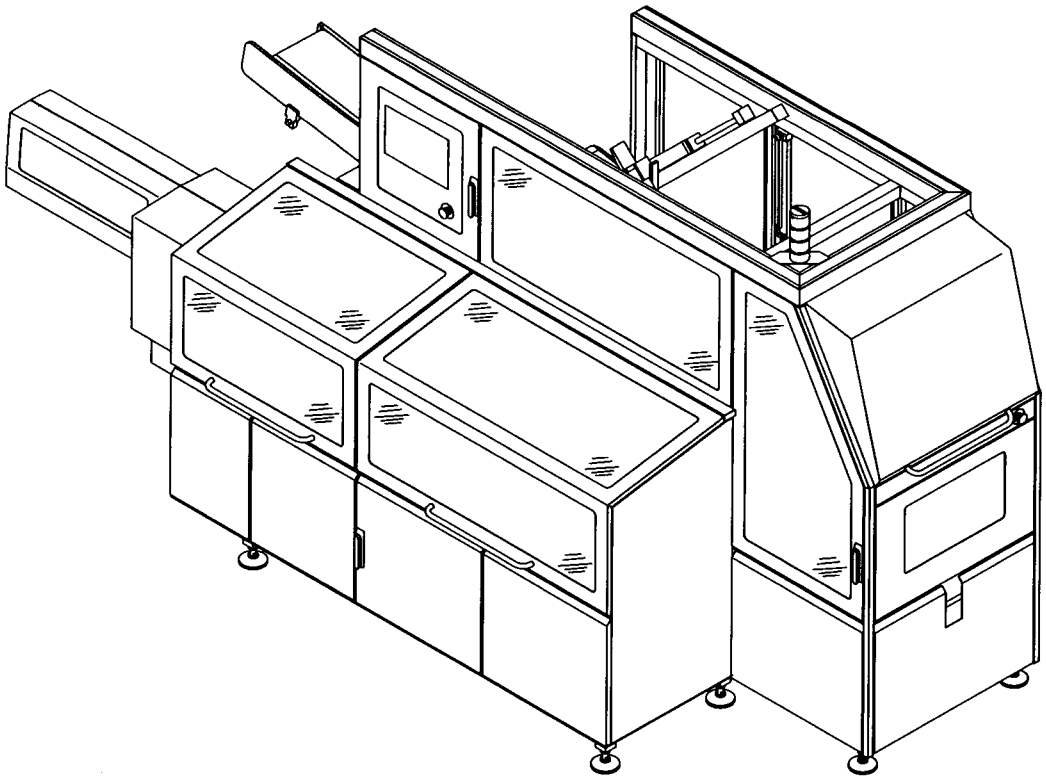

GH200213.eps

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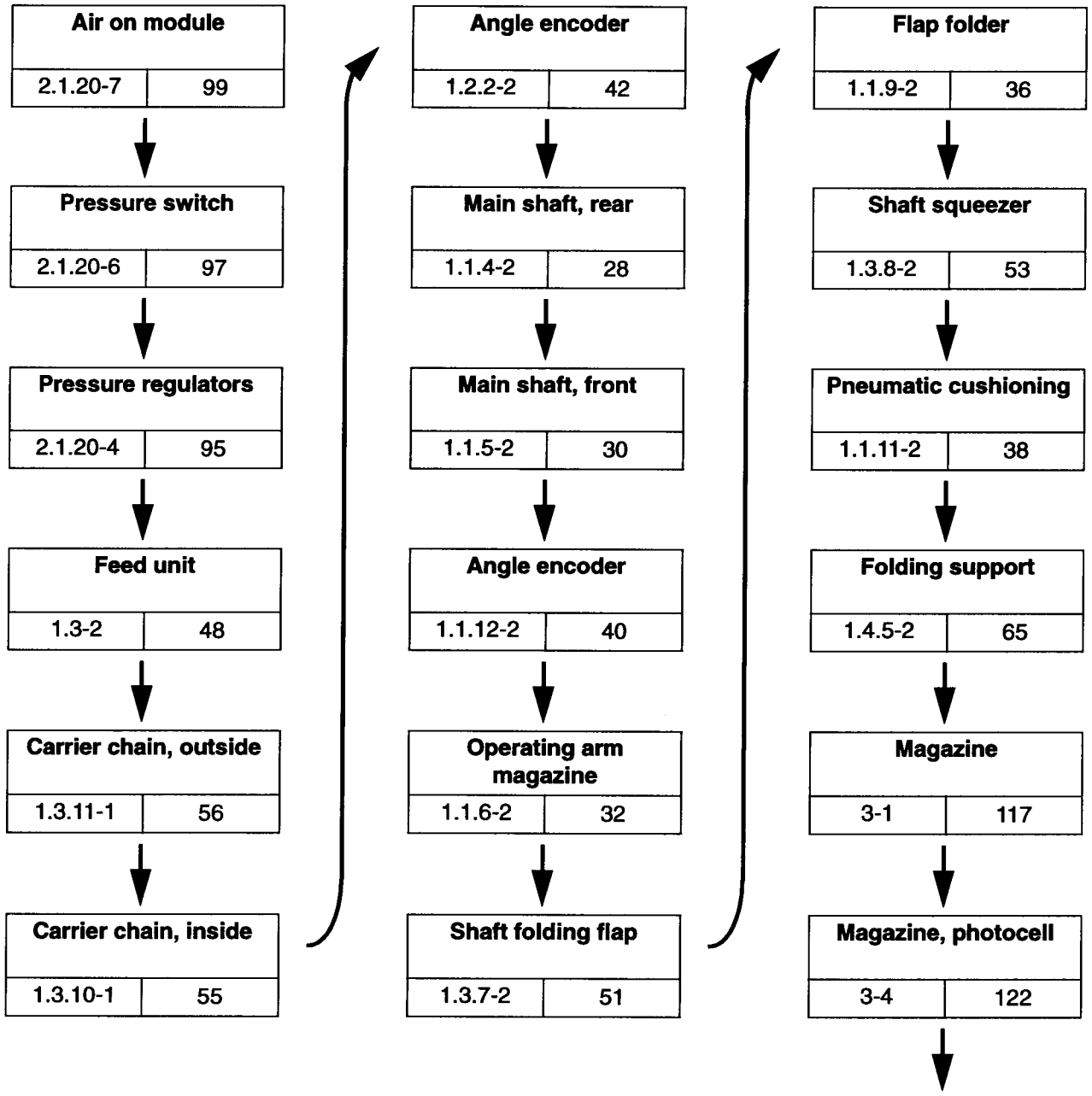
9.1 Synchronisation

9.1-1 Synchronisation diagram

Description

Pressure switch	
11.1.4-2	232
Procedure code	Page number

Procedure



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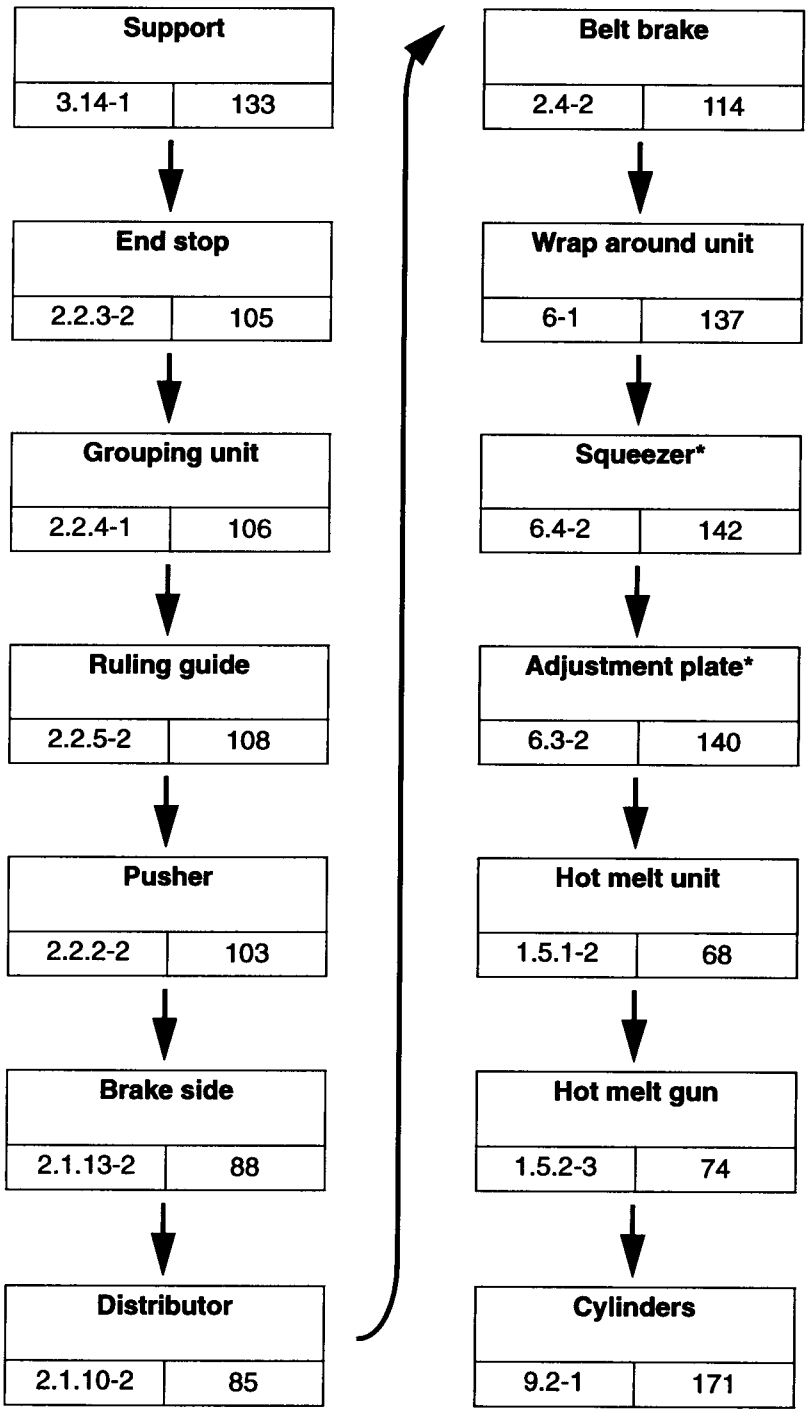
(Cont'd)

Description

Pressure switch	
11.1.4-2	232
Procedure code	Page number

Procedure



*** Only applies to machines equipped with wrap around unit.**

2.1bTH200229.en

9.2 Cylinders

9.2-1 Cylinders - set

Speed

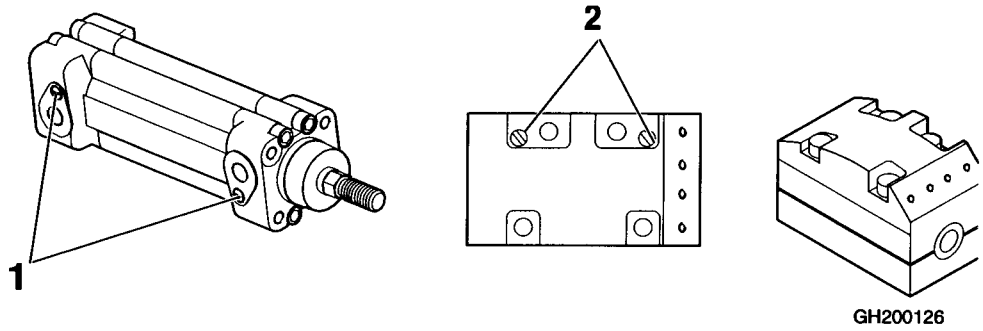
Set the plus and minus movement speeds of the cylinders with the throttles (2) of the valves concerned.

Cylinder	Unit	Plus	Minus
C104	End stop	Fast	Synchronized with the speed of the packages.
C105	Transfer plate	Normal	Normal
C106	Brake line 1	Fast	Fast
C107	Brake line 2	Fast	Fast
C108:1	Folding support	Normal	Normal
C108:2	Flap folder front	Normal	Normal
C140	WA Squeezer	Fast	Fast
C141	WA Prefolder	Fast	Fast

End position dampening

Set end position dampening by means of the screws (1). The cylinders should reach their end positions without the piston rods striking or bouncing against the cylinder end sections.

2.1bTH200052.en



Note! The cylinders C140 and C141 are only used for machines equipped with wrap around unit. C141 not for machines with Tetra Wrap around box with side flaps.

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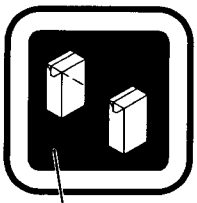
9.3 Production mode changes

9.3-1 New packing pattern length - set

Empty the machine from packages by pressing **Manual emptying** and remove the blanks from the blanks magazine.

Select the new packing pattern length by pressing the selector (1).



1 Selector, packing pattern, length

Make settings acc to the MM procedures specified below.

1.3-2	Feed unit - set
3-1	Magazine - set
1.4.5-2	Folding support - set
6.4-2	Squeezer - set

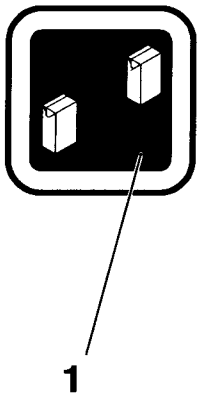
If changing between packing pattern with length between 200-264 mm and packing pattern with length between 265-400 mm, it is necessary to change the suction cups and the support of the folding support.

2.1bTH200230.en

9.3-2 New packing pattern width- set

Before this setting is done the pusher plate and transfer plate must be replaced, please refer to Spare Parts Catalogue, SPC, for the correct part numbers for the packing pattern to be produced.

Select the new packaging pattern width by pressing the selector (1).



1 Selector, packing pattern, width

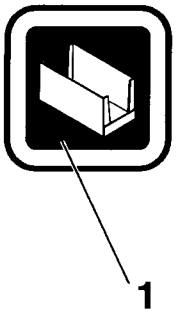
Make settings acc to the MM procedures specified below:

1.3.10-1	Carrier chains inside - set
1.3.14-2	Folding bar - set
1.3.15-1	Bottom folder - set
1.4.5-2	Folding support - set
3-1	Magazine - set
2.2.4-1	Grouping unit - set
2.2.5-2	Ruling guide - set

2.1bTH200230.en

9.3-4 Changing distribution units - set

If another packing pattern will be produced see procedure 9.3-1 New packing pattern length - set on page 173 and 9.3-2 New packing pattern width- set on page 174. Push the selector for distribution units (1).



1 Selector, distribution units

If necessary set acc to procedure 1.3.14-2 Folding bar - set, 1.3.15-1 Bottom folder - set, and 1.5.1-2 Hot melt unit - set.

9.3-5 Change of volume within the same bottom format - set

Make settings acc to the MM procedures specified below:

3-1	Magazine - set
1.3.14-2	Folding bar - set
2.2.6-1	Top steering - set
6-1	Wrap around unit - set

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10 Checklist overview

2.1TH200231.en

Checklist overview - description

This section of the MM, **is intended for customers who do NOT use the Tetra Pak Maintenance System (TPMS).** The checklist overview contains all the check points for a specified machine type or equipment which are needed in order to keep the equipment in good condition. The following items can be found in the checklist:

- **MM code** – shows where you can find more information about the check point.
- **Text** – name of unit and type of activity. For further information, see MM code.
- **Interval** – how often the check item should be performed in production hours.

Note! The checklist overview in this manual **may differ from the TPMS checklists** delivered by your local service station, due to the fact that TPMS checklists are continuously updated and adapted to local demands.

TPMS - description

The maintenance system used for equipment from Tetra Pak is called the **Tetra Pak Maintenance System (TPMS).** If you are using TPMS, the checklists will be delivered directly from your local Tetra Pak service station.

The TPMS checklists are designed to match and keep pace with the ongoing development of new and existing equipment from Tetra Pak, and to meet the demands set by our customers for even higher efficiency and better economy.

2.1TH200231.en

Some of the advantages of TPMS are:

- TPMS maintains complete production lines.
- TPMS reduces down-time to a minimum each time maintenance is carried out.
- Updates of the maintenance schedule based on experience gained, improvements, modifications and specific customer requirements are issued.
- Recommendations regarding spare parts, rotation units, tools and templates, etc. are included.

The service life of each item in the equipment is predicted and all items are checked before they affect the efficiency of the equipment. This leads to different maintenance intervals for each item and the check list is unique for each maintenance occasion.

The results of the maintenance are sent back to the Tetra Pak service station. Statistics are evaluated regularly, giving a continuously updated maintenance system.

If you require further information regarding TPMS, please do not hesitate to contact your local Tetra Pak office

Checklist overview

MM procedure code	MM procedure text	Activity	Interval
	PRE-MAINTENANCE CHECKS		
MM-84842-1	WARNING! Before starting any service work, read the safety precaution in the corresponding Maintenance Manual, Doc.No: 84842-1	Check	250
	Daily / Weekly checks. Are they being carried out? If not, then carry them out together with the operator before starting this service	Check	250
	Run machine - Check function. If machine does not function correctly inform supervisor before continuing	Check	250
	Cardboard boxes - Check quality	Check	250
	BASE UNIT		
MM-1.4.2-2	Superstructure; Suction cup - Cup, Spring	Check	250
MM-1.1.6-1	Superstructure; Magazine shaft - Function	Check	250
MM-1.3.7-1	Feed unit; Shaft folding flap - Function	Check	500
MM-1.1.9-1	Bottom section; Flap folder - Function	Check	500
MM-1.1.9-1	Bottom section - Flap folder	Lubricate	500
MM-1.3.14-1	Feed unit - Folding bar	Check	1000
MM-1.1.8-1	Bottom section; Squeezer - Function	Check	500
MM-1.1.8-1	Bottom section -Squeezer	Lubricate	500
MM-1.4.5-1	Superstructure; Folding support - Cylinder.	Check	1000
MM-1.1.4-1	Bottom section - Main shaft	Check	1000
MM-1.1.4-1	Bottom section - Main shaft	Lubricate	500
MM-1.1.6-1	Bottom section; Operating arm magazine	Check	2000
MM-1.3.7-1	Feed unit- Shaft folding flap.	Check	2000
MM-1.1.7-1	Bottom section - Folding flap	Check	2000
MM-1.3.9-1	Feed unit - Shaft folding flap	Check	2000
MM-1.1.9-1	Bottom section; Flap folder - Right	Check	2000
MM-1.1.9-1	Bottom section; Flap folder - Left	Check	2000
MM-1.3.8-1	Feed unit - Shaft squeezer	Check	2000
MM-1.1.8-1	Bottom section - Squeezer	Check	2000
MM-1.1.11-1	Bottom section - Pneumatic cushioning	Check	2000
MM-1.1.11-2	Bottom section - Pneumatic cushioning	Set	2000
MM-1.2.3-1	Drive unit - Motor feeding	Check	2000
MM-1.2.4-1	Drive unit; Safety clutch - Function	Check	1000
MM-1.3-1	Base unit - Feed unit	Check	3000
MM-1.3.10-1	Base unit; Feed unit - Carrier chain	Set	1000
	INFEED UNIT		
MM-2.1.5-1	Infeed section - Drive motor	Lubricate	500
MM-2.1.5-1	Infeed section; Drive motor - Sprocket / Chain	Check	1000
MM-2.1.10-1	Infeed section - Distributor	Lubricate	250
MM-2.1.10-1	Infeed section; Distributor - Gear wheel / Bearing	Check	500
MM-2.1.13-1	Infeed section; Brake side; Cylinder - Guide	Lubricate	250

10 Checklist overview

MM procedure code	MM procedure text	Activity	Interval
MM-2.1.13-1	Infeed section; Brake side - Rubber	Check	500
MM-2.2-0	Transfer unit	Check	500
MM-2.2.2-1	Transfer unit; Pusher - Motor / Belt	Check	500
MM-2.2.2-1	Transfer unit; Pusher - Roller / Guide	Check	500
MM-2.2.2-1	Transfer unit - Linear guide.	Lubricate	250
MM-2.2.3-1	Transfer unit; End stop - Cylinder / Rubber damper	Check	250
MM-2.2.3-1	Transfer unit; End stop - Cylinder guide.	Lubricate	250
MM-2.4-1	Belt brake - Drive belt	Check	500
MM-2.4-1	Belt brake - Motor unit	Check	500
MM-2.4-1	Belt brake; Belt tightener - Bearing	Check	2000
MM-2.1.13-1	Infeed section; Brake side - Cylinder	Check	1000
MM-2.2.2-1	Transfer unit; Pusher; Linear guide - Roller	Check	1000
MM-2.2.2-1	Transfer unit; Pusher - Belt / Bearing	Check	1000
MM-2.2.2-1	Transfer unit; Pusher - Roller / Guide	Check	3000
MM-2.2.2-1	Transfer unit; Pusher - Servo motor	Check	1000
MM-2.2.5-1	Transfer unit; Ruling guide - Spring	Change	1000
MM-2.2.5-1	Transfer unit - Ruling guide	Check	5000
MM-2.3.7-1	Covering infeed; Hood infeed - Gas spring	Check	1000
	MAGAZINE UNIT		
MM-3-2	Magazine - Drive belt	Check	1000
MM-3.1-1	Drive roller	Check	4000
MM-3.2-1	Bending roller	Check	4000
MM-3.3-1	Bending roller - Front	Check	4000
MM-3.4-1	Bending roller - Rear	Check	4000
MM-3.9-1	Drive motor	Check	4000
	WRAP AROUND UNIT		
MM-6.3-1	Adjustment plate - Bearing	Check	4000
MM-6.3-2	Adjustment plate - Cylinder / Link head	Check	4000
MM-6.5-1	Cylinder	Check	4000
MM-6.4-1	Squeezer	Check	4000
	ELECTRICAL EQUIPMENT		
MM-7.2-1	GE FANUC; Note the date!; N.B! Interval must not exceed one year	Check	1000
	AFTER-MAINTENANCE CHECKS		
	Door guards and emergency stops. Check that all switches and emergency stops are intact and operates correctly	Check	250
	Run machine - Check function	Check	250
	Cardboard boxes - Check quality	Check	250

Tetra Pak