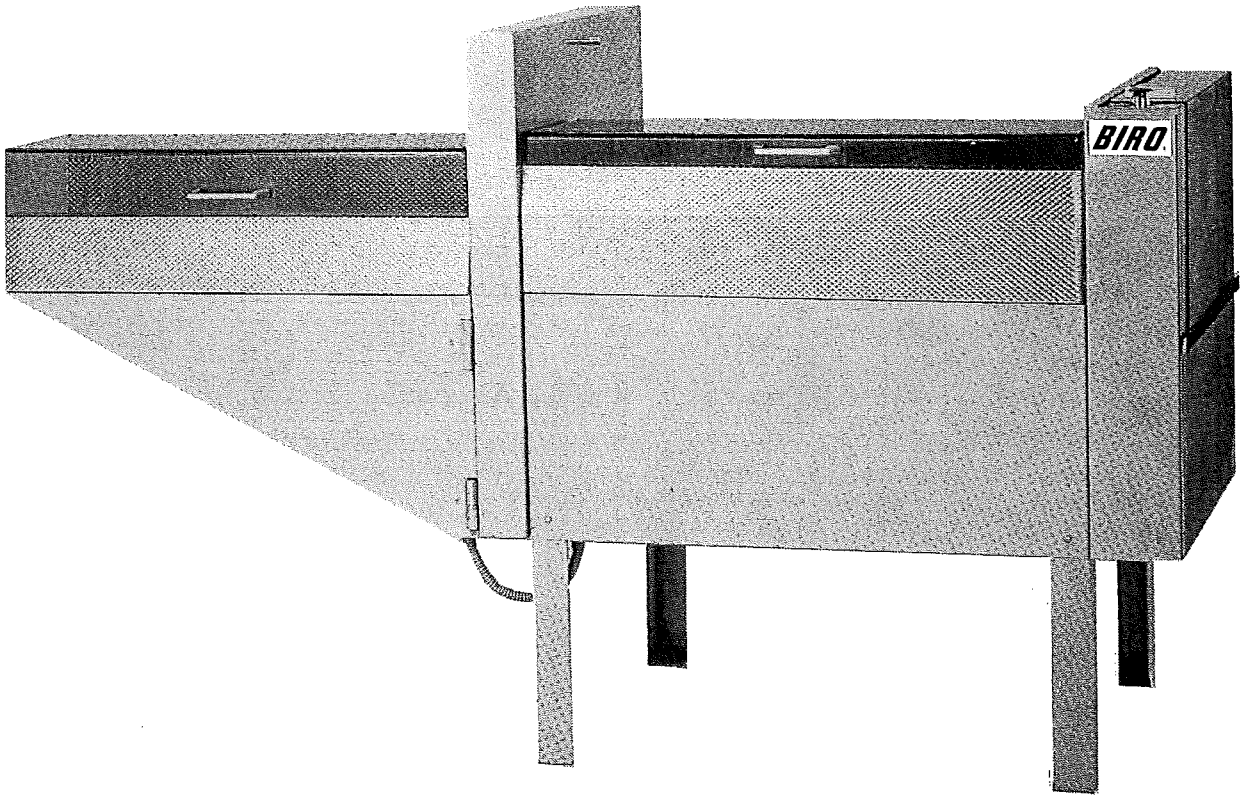
BIRO®

MODEL 31 PRO CUT HORIZONTAL SLICER

OPERATING AND SERVICE MANUAL



THE BIRO MANUFACTURING COMPANY
MARBLEHEAD, OHIO 43440-2099
Power Cutters Since 1921

PTC
Model 3
206-6-89

MODEL 31 PRO-CUT HORIZONTAL SLICER

WARNING TO ALL PURCHASERS, OPERATORS AND OPERATION SUPERVISORS:

FAILURE TO READ AND ADHERE TO THE FOLLOWING IMPORTANT INSTRUCTIONS COULD RESULT IN BODILY INJURY.

(1) Do not electric wire this horizontal slicer. Have only a qualified and certified electrician wire this horizontal slicer as required. Be sure machine is grounded. Failure to ground this machine could result in electric shock.

(2) Do not place machine on sloping floor. Always place machine on flat non-skid floor.

(3) Do not use this horizontal slicer for non-food products.

(4) Do not attempt to operate this horizontal slicer until this machine has been inspected and demonstrated by the seller — recognized BIRO Representative.

(5) Do not attempt to operate this horizontal slicer unless you or the operator has been properly trained. Improper use or operation of this horizontal slicer could result in bodily injury.

(6) Do not leave horizontal slicer in operation — unattended.

(7) Do not tamper, bypass, remove fixed guards, safety interlock electrical switches or any other safety device.

(8) Do not at any time force feed product through this horizontal slicer.

(9) Do not alter or modify this horizontal slicer in any way from its original form.

(10) Do not touch any moving parts.

(11) Always disconnect power supply before removing shrouds, removable guards, covers, doors, fences, panels for servicing, cleaning or any other reason.

(12) Use only BIRO parts and accessories properly installed. Contact your nearest service agency or The BIRO Manufacturing Company for authorized referral assistance.

(13) Horizontal slicer operating manuals as supplied with this horizontal slicer are available from BIRO.

FAILURE TO COMPLY WITH THIS WARNING NOTICE COULD RESULT IN BODILY INJURY.

THE BIRO MANUFACTURING COMPANY, 1114 WEST MAIN STREET, MARBLEHEAD, OHIO 43440-2099 U.S.A. — Phone (419) 798-4451 — Telex No. 241103 BIRO MBLE UD

LIMITED WARRANTY

WARRANTY: The BIRO Manufacturing Company warrants that Model 31 Pro-Cut Horizontal Slicer will be free from defects in material and workmanship under normal use and with recommended service. BIRO will replace defective parts, which are covered by this limited warranty, provided that the defective parts are authorized for return, shipping charges prepaid, to a designated factory for inspection and/or testing.

DURATION OF WARRANTY: The warranty period for all parts covered by this limited warranty is one year from the date of purchase, except as noted below.

PARTS NOT COVERED BY WARRANTY: The following are **NOT** covered by this limited warranty: knife blade, item number 30; compress spring, item number 39; slice holder end weight number 43; and claw attachment number 36. This limited warranty does not apply to machines sold as used, rebuilt, modified, or altered from the original construction in which the machine was shipped from the factory. Water contaminated electrical systems are not covered under this limited warranty. BIRO is not responsible for electrical connection of equipment, adjustments to switch gear or any other electrical requirements, which must be performed only by a certified electrician. BIRO is not responsible for service charges or labor required to replace any part covered by this limited warranty or for any damages resulting from misuse, abuse, lack of proper or recommended service.

EXCLUSION OF WARRANTIES AND LIMITATION OF REMEDIES: BIRO gives no warranties other than those expressly stated in this limited warranty. THE IMPLIED WARRANTY OF MERCHANTABILITY, THE IMPLIED WARRANTY OF FITNESS FOR PROCESSING OF FOOD PRODUCTS, AND ALL OTHER IMPLIED WARRANTIES ARE SPECIFICALLY EXCLUDED. BIRO IS NOT LIABLE FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES, EXPENSES, OR LOSSES. THE REMEDIES PROVIDED IN THIS BIRO LIMITED WARRANTY ARE PURCHASER'S SOLE AND EXCLUSIVE REMEDIES AGAINST BIRO.

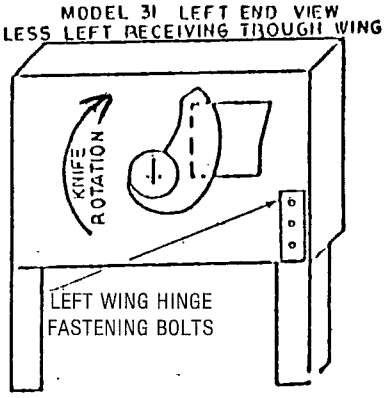
REGISTRATION CARDS: You must sign, date and complete the warranty card supplied with each machine. The warranty card must be returned to The Biro Manufacturing Company for proper registration. If no warranty card is returned to BIRO, the warranty period will begin from the date the machine was originally shipped from the factory.

HOW TO GET SERVICE:

1. Contact the agency from whom you purchased the machine.
2. Consult the yellow pages of the phone directory for the nearest authorized dealer.
3. Or call BIRO Service Department (419) 798-4451 who will put you in contact with the nearest service agency.

OPERATING INSTRUCTIONS — MODEL 31 PRO-CUT HORIZONTAL SLICER

1. UNCRATING: After uncrating is completed, check for damage. Contact freight carrier and file a freight claim.
2. LEFT RECEIVING TROUGH WING: If the left wing (product receiving trough) is received removed, installation can be made by fastening the hinge of the left wing to the main body of the machine using the (3) hex head bolts supplied with the unit. See diagram below.



3. LEFT WING (RECEIVING TROUGH) SAFETY SWITCH: If the machine is received with the left wing removed, the receiving trough safety switches (Item Nos. S1 and S2) will also be disconnected. The leads from these safety switches will have to be connected directly to the electrical enclosure (Item No. 50) inside the front of the machine. Connect the numbered safety switch leads #1 thru #8 to the corresponding numbered terminals on the side of the safety switch monitor, #A1.
4. FLOOR SET-UP OF MACHINE: The machine must be installed level on the floor, so that no vibrations or distortions develop during cutting operation (shims may have to be placed under legs). Floor lag mounting is optional. Two leg adjusting pads are provided, see Item No. 23.
5. ELECTRICAL CONNECTION OF MACHINE: The machine is wired for a voltage of 220 volt 3-phase and supplied less plug. Plug and socket have to be installed to match electrical wiring of the facility. See connecting diagram. Use No. 12 wire.

   With other than 220 volt supplies, the adjustable safety thermal overload relay must be set to the amperage value shown on the name plate of the motor.

   It may be necessary to install a thermal overload relay with a higher range. A corresponding transformer to match the line voltage must also be fitted.
6. DIRECTION OF ROTATION — TEST RUN: Observe correct direction of rotation. A test run of the machine must be carried out without cutting material. Knife blade (ITEM No. 30) must rotate clockwise when looking at machine from left side. See diagram above.

   REVERSING DIRECTION OF ROTATION — Reverse rotation is achieved by interchanging any two wires in the plug. This work should be carried out only by a certified electrical technician.
7. FEEDING AND CUTTING: The material to be cut has to be placed with its straight side against the front face of the feed chamber and pressed hard against the spikes (ITEM NO. 31) of the transporter (ITEM NO. 31). Claws (ITEM NO. 36) are fitted to the transporter (ITEM NO. 31). The claws (ITEM NO. 36) are pierced into the material to be cut. The supplied slice holder (ITEM NO. 43) must be placed inside the left receiving chamber so that the cut slices rest against each other as the product is being sliced.

   When cutting chops, care must be taken so the rib bone rests against the front face of the feed channel. See Diagram.

8. LEAF SPRINGS: Leaf springs (ITEM NO. 51 & ITEM NO. 52) are used to press the product to be cut against the front face of the feed chamber.

   When cutting varying sizes of material — i.e., fillet — the springs (ITEM NO. 51 & ITEM NO. 52) should be removed.

   REMOVAL OF LEAF SPRINGS (ITEM NO. 51 & ITEM NO. 52): The springs are removed by depressing knobs (1) (ITEM NO. 53) and sliding spring to the right.
9. THE PRODUCT TO BE CUT: Is fed automatically by the transporter (ITEM NO. 31) in conjunction with the worm shaft (ITEM NO. 25). After lifting the right safety cover (ITEM NO. 42) of the feed chamber, the transporter (ITEM NO. 31) can be pushed back to the right by lifting the lever (ITEM NO. 33) and disengaging and moving the transporter (ITEM NO. 31) to the right end of the feed chamber.
10. ADJUSTMENT OF CUTTING THICKNESS: After opening the sliding gate (ITEM NO. 44) on the right hand side (top) of the machine, the thickness of cut can be infinitely varied in thickness on an **overall** scale from $^1/_{16}$ inch to approximately $1^1/_8$ inch or from 1.5 mm to 29 mm.

    There are two thickness setting scales (ITEM NO. 11-04) which is fastened to the overrunning clutch. The A Scale or inside thickness scale ranges from 1.5 mm ($^1/_{16}$ inch) to 6 mm or approximately ¼ inch. The

outside scale (B Scale) ranges from 7 mm or approximately $^{9}/_{32}$ inch to 29 mm or approximately $1^{1}/_{8}$ inches.

It is important to understand how to achieve thickness settings for Scale A and for Scale B.

For thickness ranges from $^{1}/_{16}$ to ¼ inch on Scale A, loosen hexagon screw (ITEM NO. 18-04) located on the eccentric sleeve (ITEM NO. 18). The hexagon screw is a sliding screw, therefore, move the hexagon screw **inward** toward the center of the eccentric sleeve until the bolt stops. Retighten the hexagon screw (ITEM NO. 18-04).

EXAMPLE 1: To obtain a ¼ " thickness (6 mm) setting on the A Scale, loosen the adjusting wing screw (ITEM NO. 16) and slide the pointer (ITEM NO. 17), attached to the draw lever arm (ITEM NO. 14), to No. 26 or ¼ " setting on the scale and retighten the adjusting wing screw.

EXAMPLE 2: To obtain a 1 " cut or approximately 25 mm on the outside B Scale, the machines overrunning clutch setting must be changed from A Scale to B Scale. Therefore, loosen the hexagon screw (ITEM NO. 18-04) on the eccentric sleeve (ITEM NO. 18) and slide the hexagon screw **OUTWARD** or away from the center of the eccentric sleeve and retighten the hexagon screw (No. 18-04).

Loosen the adjustable wing screw (No. 16) and slide the pointer to No. 25 on the B Scale and retighten the adjusting wing screw (No. 16).

The machine is now ready to cut 1 " thick product.

11. LUBRICATION: The worm shaft (ITEM NO. 25) and slide bar (ITEM NO. 47-07) must be **lubricated daily** with resin free grease, so that the transporter (ITEM NO. 31) can be moved easily. An approved food machine oil is recommended. See oil drop label and holes for oil drops to enter slide bar. Oil entrance holes are located on top cover of machine.
12. SAFETY SYSTEM: The machine can be switched on only after the two protective lids (ITEM NO. 40 and ITEM NO. 41), (on left side and right side), thickness adjusting cover door on the right side, and left blade cover door assembly have been closed.

    The machine will not operate with any one of the four (4) safety covers in the open position.
13. REMOVAL OF CUTTING BLADE: With the left blade cover assembly open and by depressing the motor brake release push switch (ITEM NO. 7) located on the back side "Brake Release", the blade (ITEM NO. 30) can be moved into the most advantageous position for installing or removing the blade (ITEM NO. 30). Note: Always wear safety mesh gloves when removing knife blade.
14. CLEANING OF MACHINE AFTER USAGE: All machine parts can be cleaned with a damp cloth, sponge, brush or power washer. **ALWAYS DISCONNECT MAIN POWER SUPPLY BEFORE DISMANTLING AND/OR CLEANING.**
15. CUTTING BLADE: The steel of the cutting blade (ITEM NO. 30) is 4 mm thick and must be the same for all replacement blades.

    The regrinding of the blade (ITEM NO. 30) is done on an exchange basis if so desired.

    A clean cut is only achieved with well ground and cleanly honed blades.

    Claims which are caused through non-observance of the Operating Instructions, are not covered by guarantee.

TROUBLE SHOOTING GUIDE FOR MODEL 31K

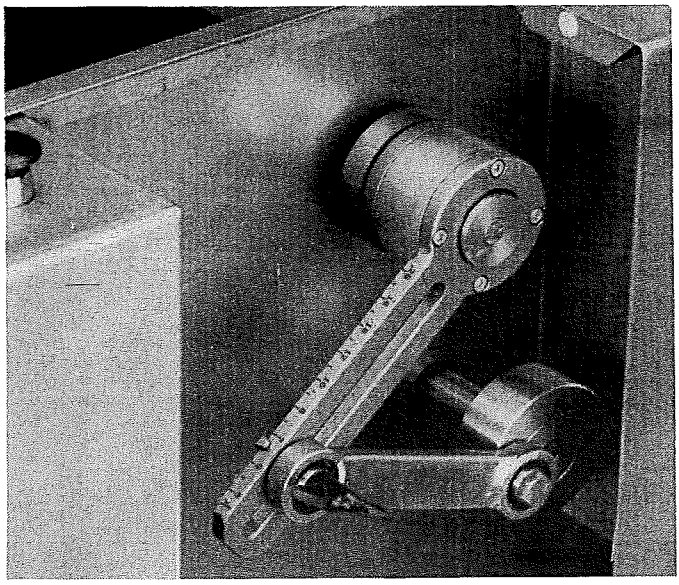
I. Machine does not have cutting speed
   - A. Several machines operating on the same electrical line.
   - B. Wire gauge used in field connection may be too small.
   - C. Three phase may be operating on two phase.
   - D. Voltage conditions.

II. Machine will not operate
   - A. Wired improperly.
   - B. Short in wiring.
   - C. Motor burned out.
   - D. Fuse blown at panel.
   - E. Magnetic safety switch not making positivie contact with safety magnet. Recycle right sliding door (ITEM NO. 44). Lift plexiglass lids (No. 40), right plexiglass lid (No. 41) and left wing assembly by opening and reclosing left wing; also, check the lighted safety switch monitor inside the front cover of the electrical panel (ITEM NO. 50). All 4 safety switch monitor lamps must be out in order for the machine to operate. If any lamp is not out, the faulty safety switch must be traced and replaced. Therefore, check magnetic safety switch 31-50-S1, S2, S3, S4 and magnet for safety switch 31-50-1A, 2A, 3A, 4A.

III. Machine operates short period/time then stops
   - A. Adjust overload relay; perhaps relay is set too low.
   - B. Short in electrical connection.

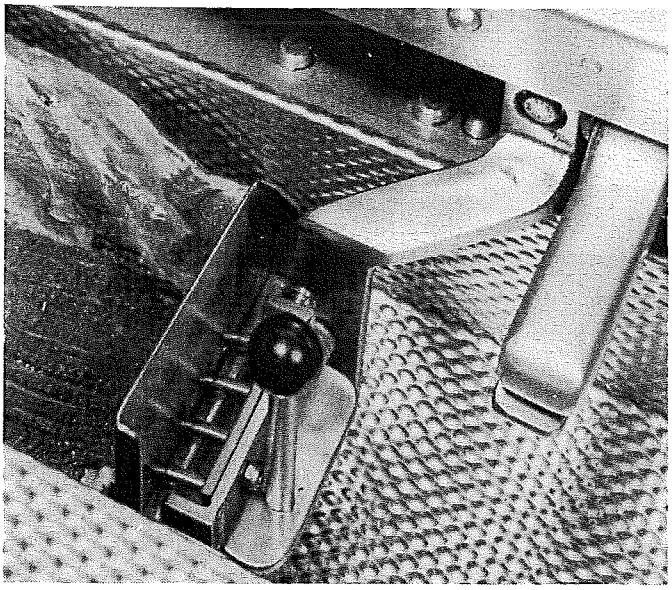
MODEL 31 OPERATIONS CHECK LIST

1. Ensure the adjustable slice thickness setting is set at the required measurement and then shut door.



Slice thickness setting and stop button

2. Attach blade springs if necessary.
3. Place product into feed chamber and secure one end in clamp of transporter.



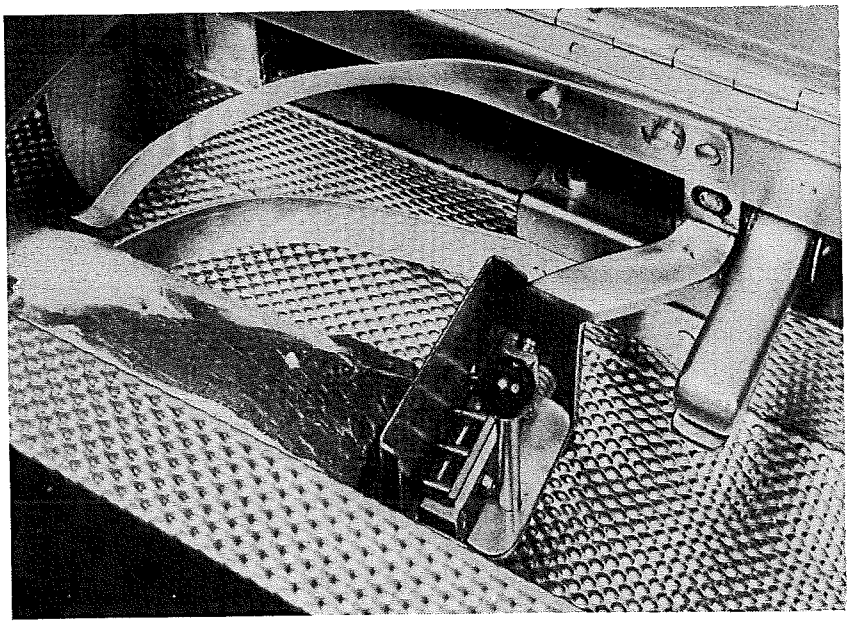
Clamp and clamp release grip.

4. Move product by means of the clamp release grip to within 1 " of the blade cutting slot in the trough.
5. Place plastic meat stop in discharge chamber, as near to the blade as possible in order to allow the sliced product to stack neatly in the chamber.
6. Check stop button is released, both plexiglass doors are closed and other safety doors secured.
7. Press start button.
8. Blade will rotate and clamp will engage onto the single worm conveyor. Product will move toward blade and start to slice.
9. 31 will stop automatically after the product has been sliced. Lift both plexiglass doors, release meat from clamp.
10. Remove sliced product from discharge chamber.

PRODUCT GUIDELINES

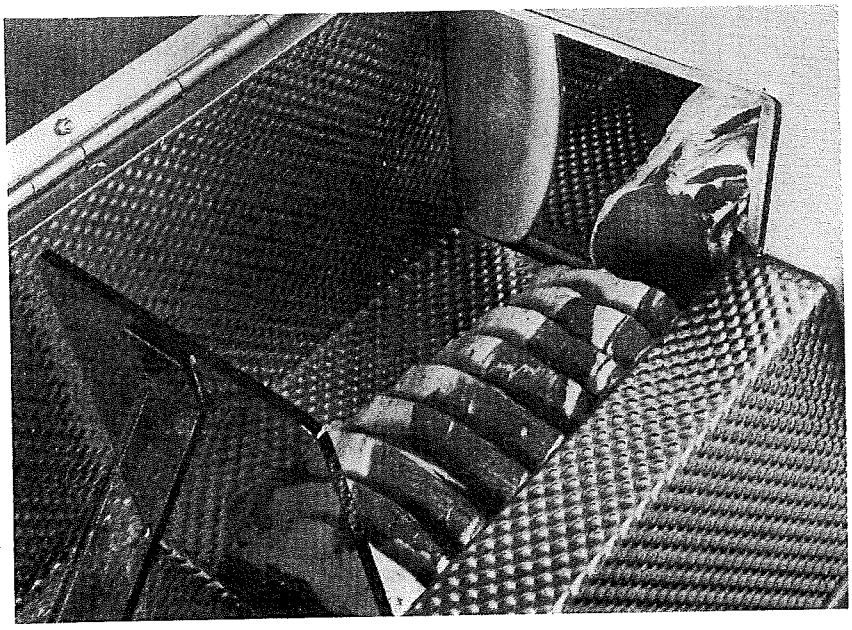
PORK LOIN BONE-IN/BELLY PORK

1. **Pork Loin**
   a) Suggest slice thickness setting 18.
   b) Remove chump from loin.
   c) Ensure all trimming of fat and excess bone (tip of spinal vertebrae) is done before slicing.
   d) Insert blade spring to assist in holding product (especially those with bone) giving stability while it is being sliced. Therefore, uniformity of the required cutting thickness will be achieved.



Blade springs inserted.

   e) Place product in feed chamber. Note the spinal vertebrae lies flat onto base of chamber and the rib bones stand against the near side wall of feed chamber.



Pork chops in feed and discharge chambers.

2. **Belly Pork Bone-in**
   a) Suggested slice thickness setting 18.
   b) Place in feed chamber rind upwards and secure chump end in clamp.
   c) If boneless end is floppy it is best to cut it off first and then slice the rest in the 31K.

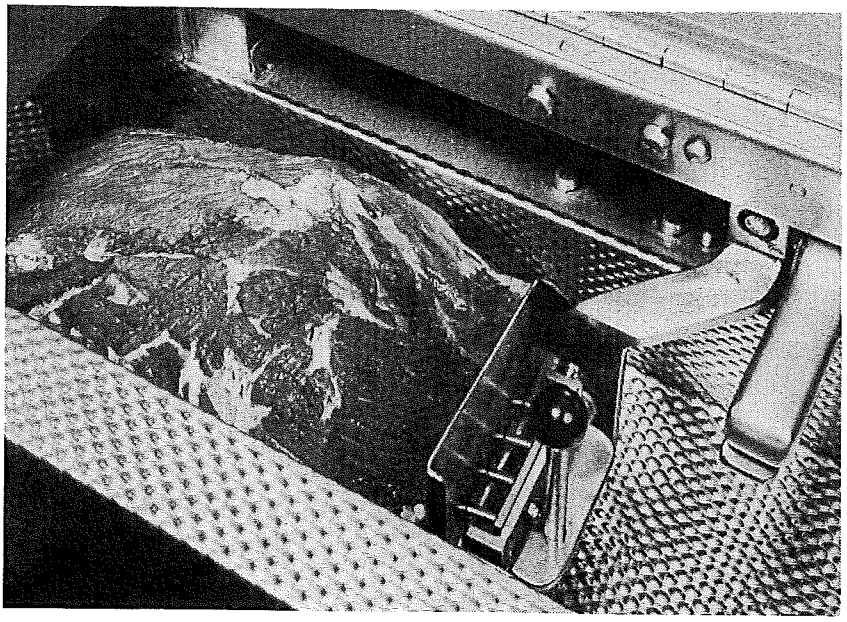
Beef Boneless

Striploin/Rump/Chuck Steak/Beef Topside/Buttock.

General Guide

With any of these products ensure that any trimming of fat, gristles or veins is done prior to slicing on the 31K.

1. **Striploin**
   a) Suggested slice thickness setting 17.
   b) Always ensure that the fat covering is facing upwards in the feed channel.
2. **Rump**
   a) Suggested slice thickness setting 17.
   b) Cut rump in half. (Sirloin end to hip joint.)
   c) Traditionally cut rump will not fit in channel therefore has to be cut. As with striploin fat covering must be facing upwards.
   d) If product is wedge shaped place thicker end nearest the blade when placing in feed chamber. This is important if product is to be cut fresh 3° to 4°C (37°-39°F).
3. **Chuck Steak**
   a) Suggested slice thickness 18.
   b) Cut chuck lengthways in order for product to fit chamber.
   c) If product has **no** fat covering and has a clean cut surface place that surface at bottom of feed chamber. If there are thin membranes of gristle on upper surface the cut is far superior.
4. **Beef Olives (Topside)**
   a) Suggested slice thickness setting 5.
   b) To achieve thin slices ensure that the product is firm. The nearer to 0° to 0.5° (32°-33°F) the material is the better the slice.

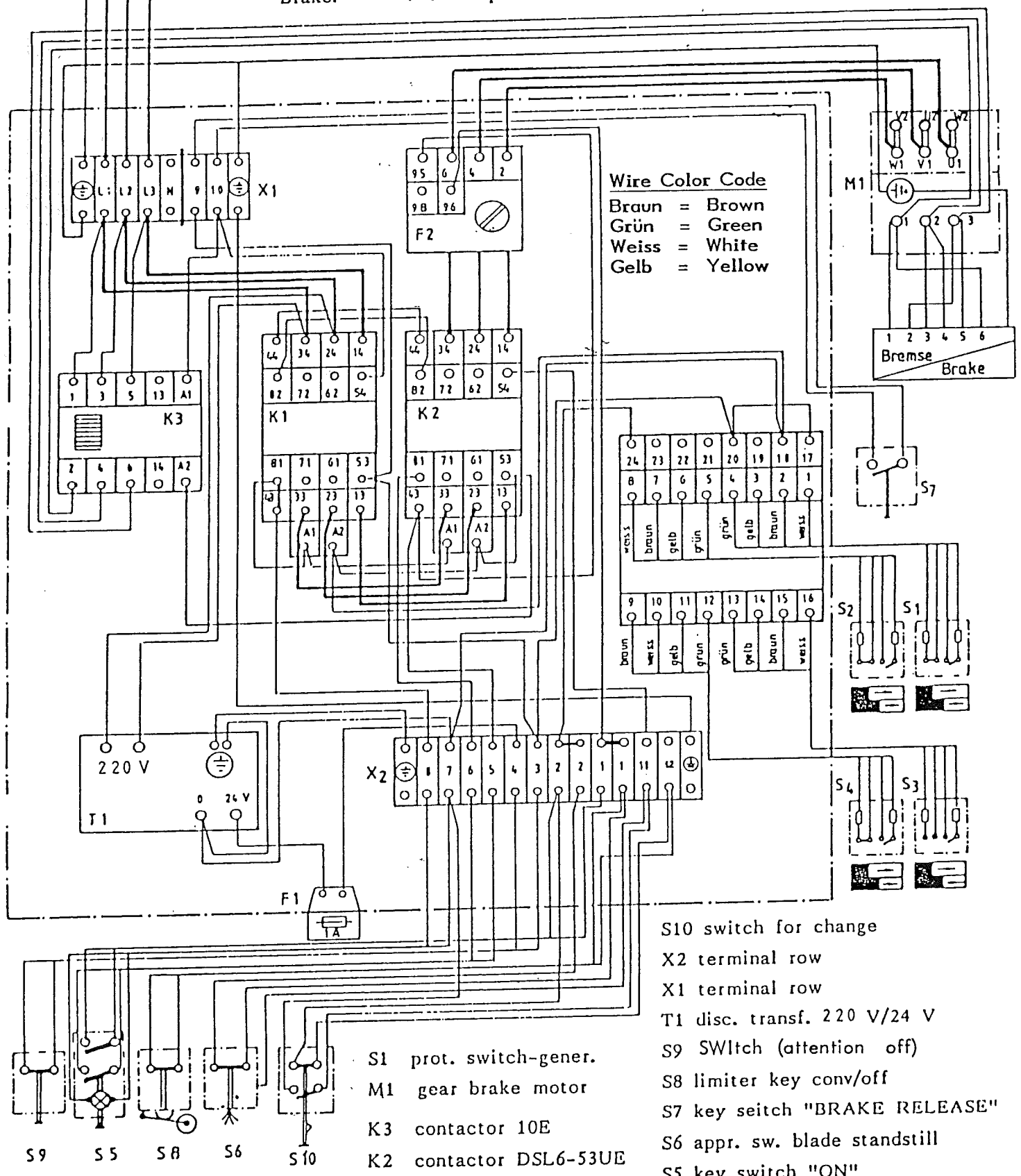


No clamps needed if product is fresh or fills feed chamber.

5. **Buttock (Top Rump, Thick Flank)**
   a) Suggested slice thickness 16.
   b) Place knuckle end in clamp. This ensures maximum yield.
   c) Ideal for thin slices.

CONNECTING DIAGRAM FOR MD 31 SLICER

Motor: 220 V three-phase current
Brake: 220 V three-phase current



S1 prot. switch-gener.
M1 gear brake motor
K3 contactor 10E
K2 contactor DSL6-53UE
K1 contactor DSL6-53UE
F2 overcurrent relay
F1 control fuse
A1 central unit for 4 gens

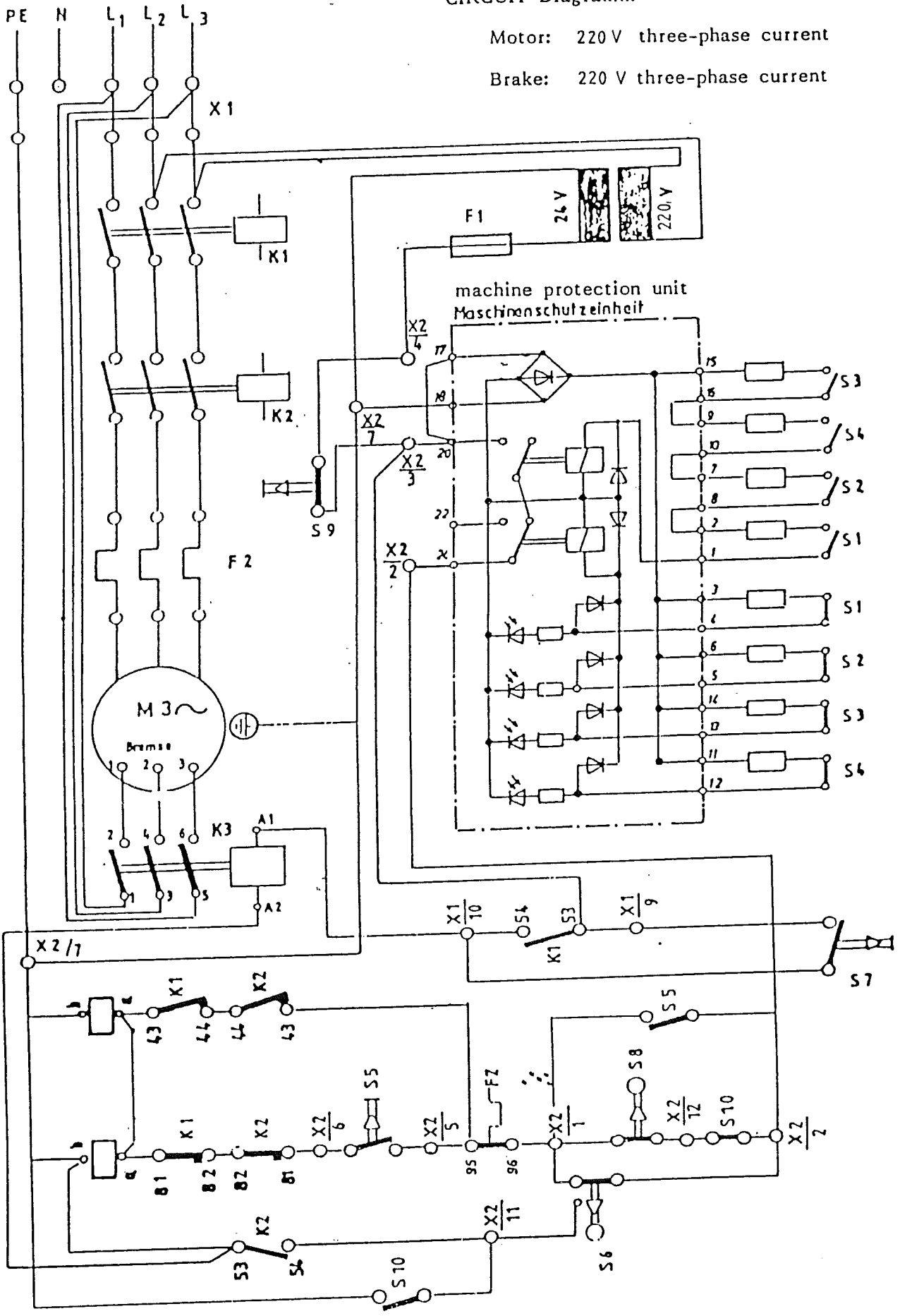
S10 switch for change
X2 terminal row
X1 terminal row
T1 disc. transf. 220 V/24 V
S9 SWItch (attention off)
S8 limiter key conv/off
S7 key seitch "BRAKE RELEASE"
S6 appr. sw. blade standstill
S5 key switch "ON"
S4 prot. sw.-generator
S3 prot. sw.-generator
S2 prot.sw.-generator

Model 31 K

CIRCUIT Diagramm

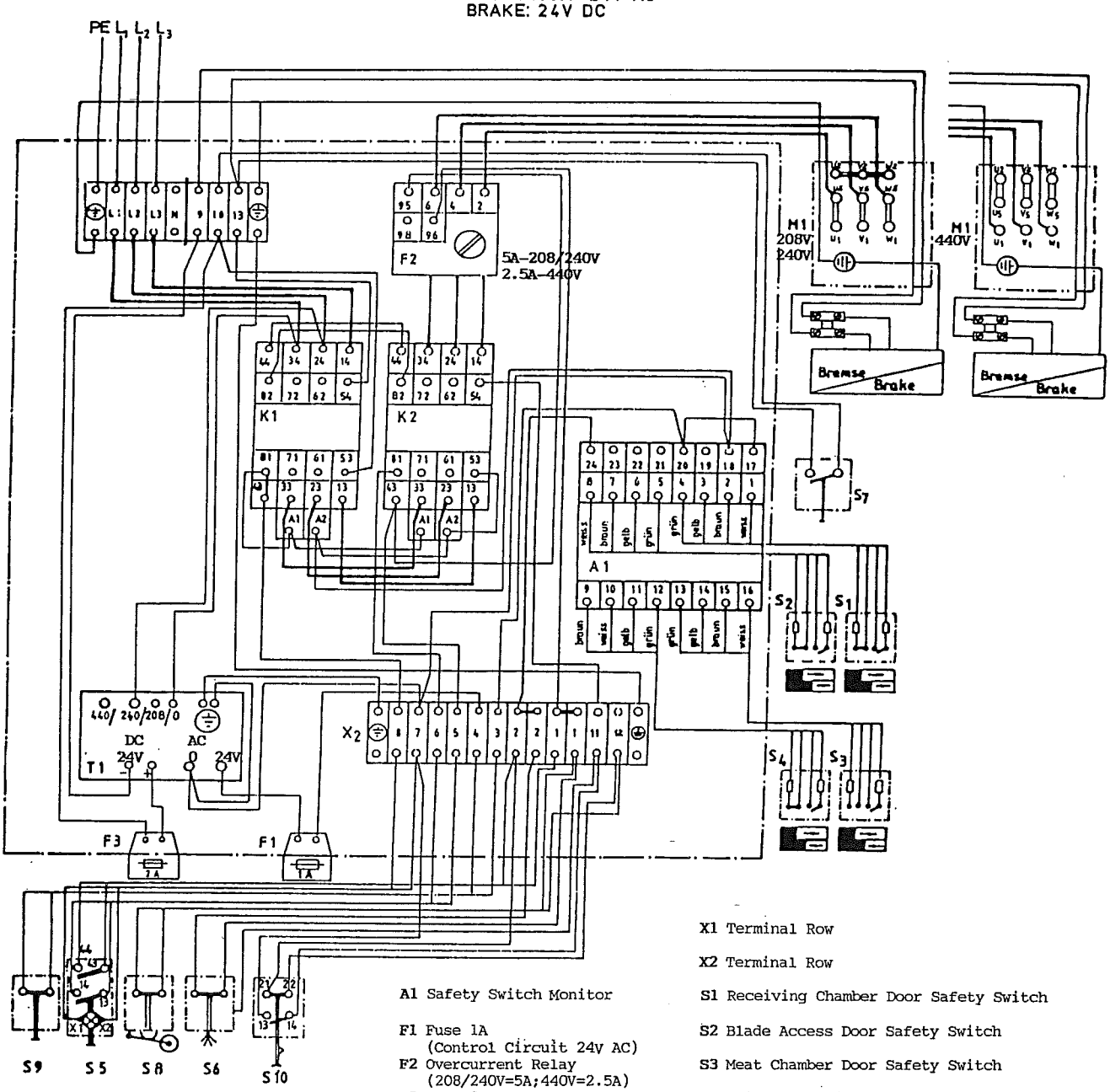
Motor: 220 V three-phase current

Brake: 220 V three-phase current



WIRING DIAGRAM

MOTOR: 208/240/440—60—3
CONTROL CIRCUIT 24V AC
BRAKE: 24V DC



A1 Safety Switch Monitor

F1 Fuse 1A
(Control Circuit 24V AC)

F2 Overcurrent Relay
(208/240V=5A;440V=2.5A)

F3 Fuse 2A
(Brake Coil 24V DC)

K1 Contactor DSL 6-53UE

K2 Contactor DSL 6-53UE

M1 Brake Motor With Gear Reducer

T1 Transformer 208/240/440V to 24V AC for Control Circuit & 24V DC for Brake Release

X1 Terminal Row

X2 Terminal Row

S1 Receiving Chamber Door Safety Switch

S2 Blade Access Door Safety Switch

S3 Meat Chamber Door Safety Switch

S4 Thickness Adjustment Access Door Safety Switch

S5 Main On Switch

S6 Proximity Switch (Blade Position)

S7 "Brake Release" Switch

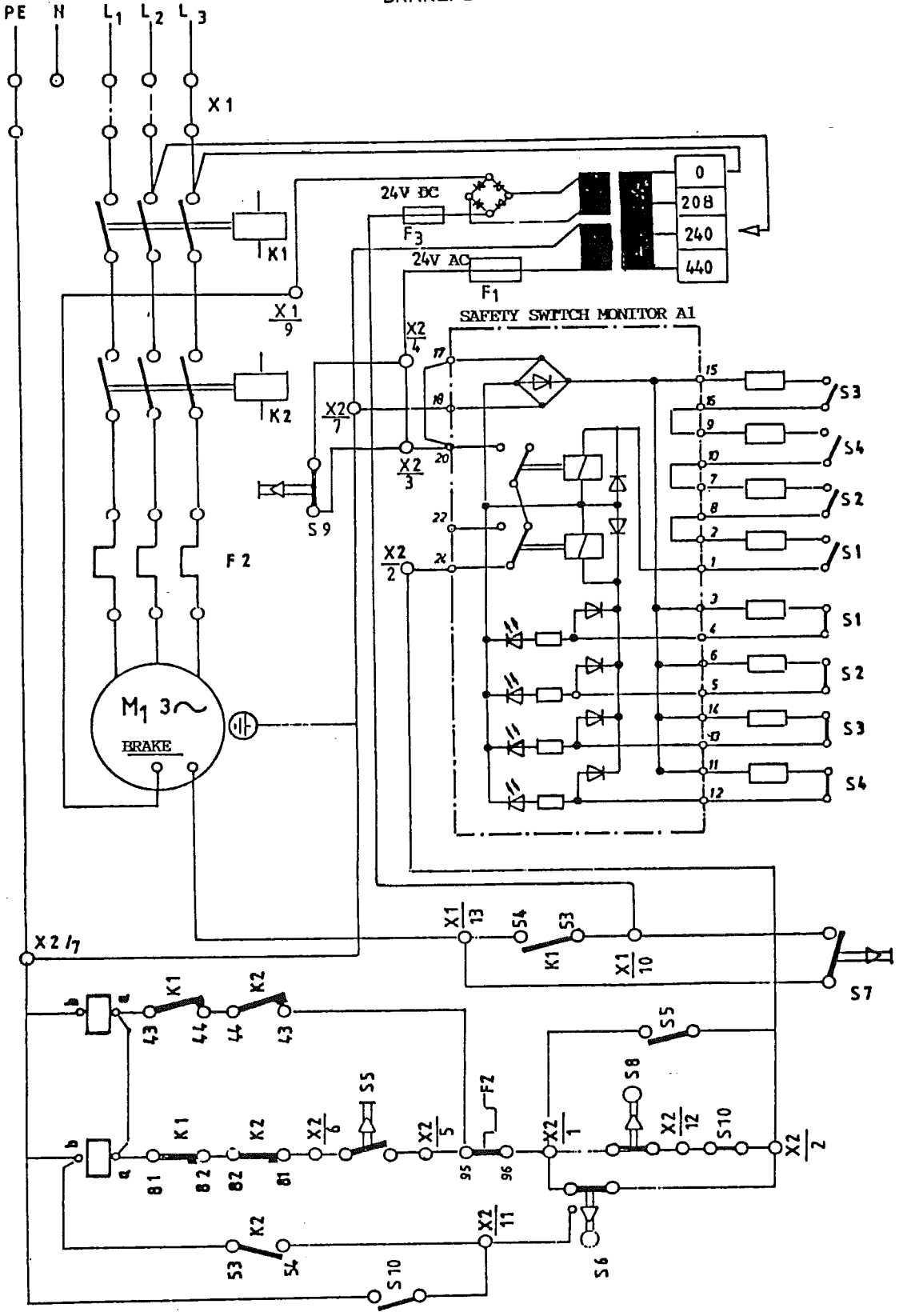
S8 Transporter Limit Switch

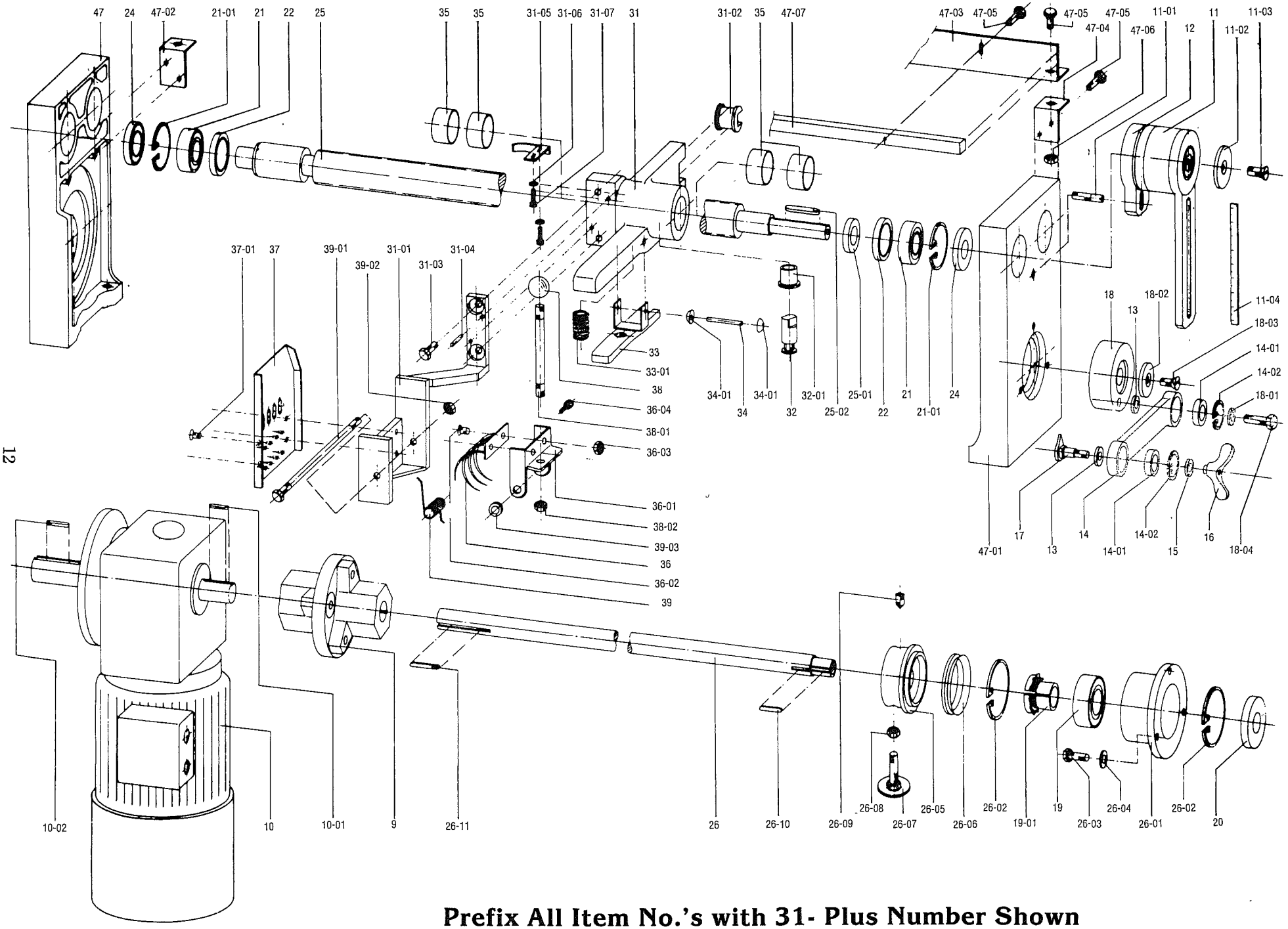
S9 Main Off Switch

S10 First Cut Selector Switch

CIRCUIT DIAGRAM

MOTOR: 208/240/440–60–3
CONTROL CIRCUIT: 24V AC
BRAKE: 24V DC

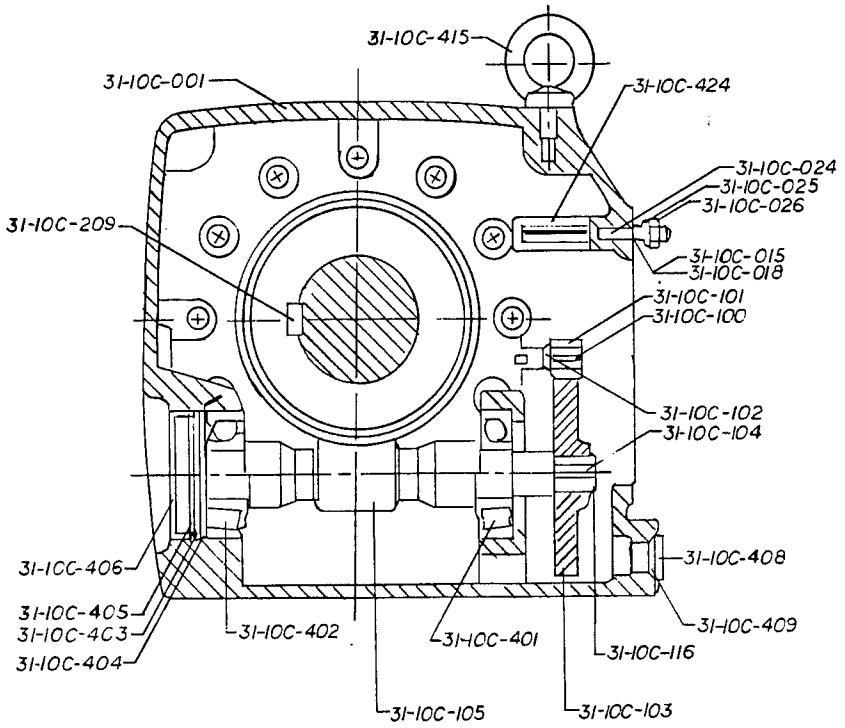


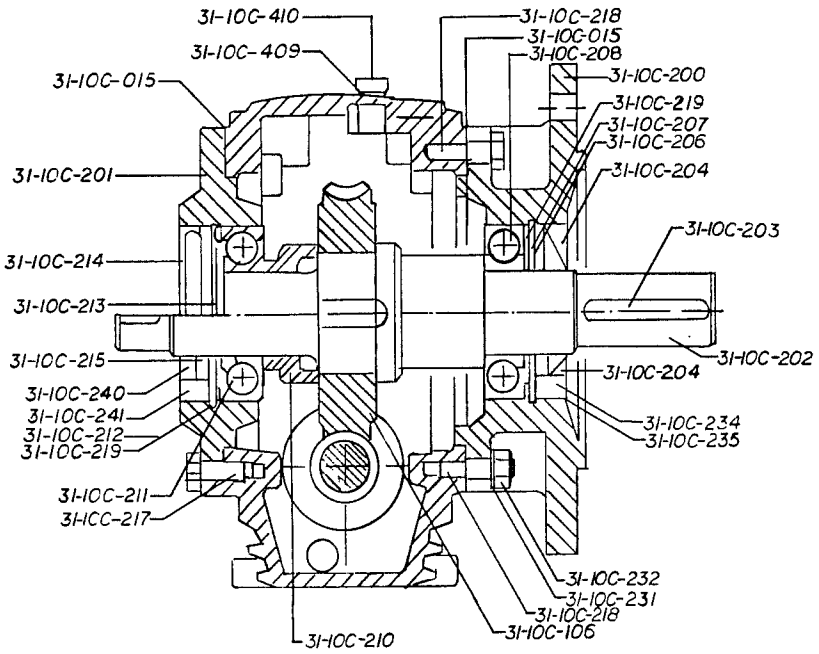


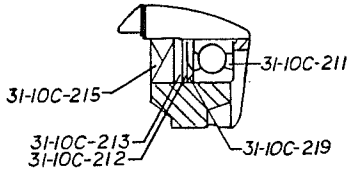
Prefix All Item No.'s with 31- Plus Number Shown

Item No.	Description
31-9	Coupling
31-10	Motor, gear box & brake
31-10A	Motor and brake
31-10B	Brake unit
31-10C	Gear box only
31-10-01	Drive key
31-10-02	Drive key
31-11	Overrunning clutch
31-11-01	Locking pin
31-11-02	Washer
31-11-03	Flathead screw
31-11-04	Scale strip
31-12	Underrunning clutch
31-13	Washer
31-14	Draw lever
31-14-01	Ball bearing
31-14-02	Locking ring
31-15	Washer
31-16	Adjusting knob
31-17	screw indicator
31-18	Eccentric ring
31-18-01	Washer
31-18-02	Washer
31-18-03	Flathead screw
31-18-04	Hexagon screw
31-19	Self aligning ball bearing
31-19-01	Adapter sleeve
31-20	Shaft seal
31-21	Angular contact ball bearing
31-21-01	Locking ring
31-22	Shaft seal
31-23	Base adjusting leg
31-24	Shaft seal
31-25	Worm shaft
31-25-01	Spacer ring
31-25-02	Drive key
31-26	Coupling shaft
31-26-01	Collar
31-26-02	Locking ring
31-26-03	Hexagon screw
31-26-04	Washer
31-26-05	Control ring
31-26-06	V-seal
31-26-07	Control screw
31-26-08	Hexagon nut
31-26-09	Set screw
31-26-10	Drive key
31-26-11	Drive key
31-27	Door latch angle
31-28	Door handle assembly complete — top
31-28A	Door handle assembly complete — bottom
31-28A-1	Threaded stud, long (for door lock, bottom)
31-28-G	Door handle
31-28-H	Splined bushing
31-28-I	Threaded stud, short (for door lock, top)
31-28-K	Lock cam
31-29	Blade flange
31-30	Knife blade — smooth edge — 4 mm — std
31-30A	Knife blade — serrated — 4 mm
31-30B	Knife blade smooth edge — 3 mm — special
31-31	Transporter
31-31-01	Transporter bracket
31-31-02	Brass slider
31-31-03	Hexagon screw
31-31-04	Taper pin
31-31-05	Transporter stop limit angle
31-31-06	Washer
31-31-07	Socket head screw

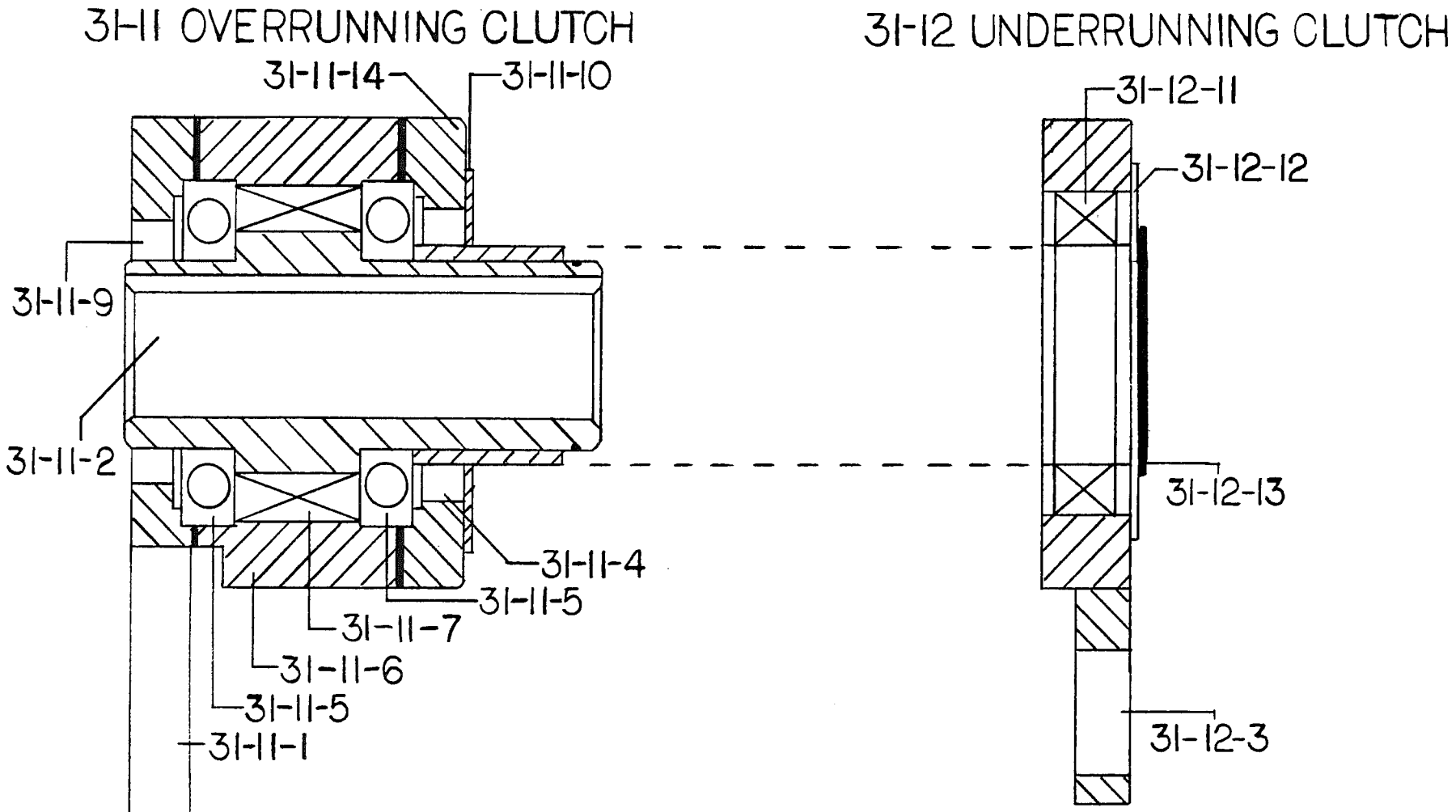
Item No.	Description
31-32	Transporter pin
31-32-01	Bushing for transporter
31-33	Transporter handle
31-33-01	Spring for transporter handle
31-34	Pin for transporter handle
31-34-01	Retainer caps
31-35	Slide bushings
31-36	Claw attachment
31-36-01	Claw bracket
31-36-02	Flat head screws
31-36-03	Locknut
31-36-04	Oval head screw
31-37	Claw plate
31-37-01	Flathead screw
31-38	Ball knob
31-38-01	Stud for ball knob
31-38-02	Hexagon nut
31-39	Torsion spring
31-39-01	Hinge bolt
31-39-02	Locknut
31-39-03	Washer
31-40	Door for receiving chamber
31-41	Door for feed chamber
31-42	Handle
31-43	End weight
31-44	Slide door handle
31-45	Base
31-46	Hinge, complete
31-47	Motor support plate
31-47-01	Clutch support plate
31-47-02	Angle (motor side) for slide bar support
31-47-03	Slide bar angle
31-47-04	Angle for slide bar support
31-47-05	Hexagon screw
31-47-06	Hexagon nut
31-47-07	Slide bar
31-48	Window frame w/chamber (feed side)
31-49	Window frame w/chamber (receiving side)
31-50	Electrical box and parts (See Electrical Component Chart)
31-50-A1	Safety switch monitor
31-50-F1	Control fuse
31-50-F2	Overcurrent relay
31-50-K1	Contactor DSL6-53UE
31-50-K2	Contactor DSL6-53UE
31-50-K3	Contactor 10E
31-50-M1	See #31-10A
31-50-S1	Magnetic safety switch w/magnet
31-50-S2	Magnetic safety switch w/magnet
31-50-S3	Magnetic safety switch w/magnet
31-50-S4	Magnetic safety switch w/magnet
31-50-S5	"ON" switch
31-50-S6	Proximity switch
31-50-S7	Brake release switch
31-50-S8	Limit switch for transporter
31-50-S9	"OFF" switch
31-50-S10	Jog switch
31-50-T1	Transformer 220V/24V
31-50-X1	Terminal strip
31-50-X2	Terminal strip
31-50-1A	Magnet for safety switch S1
31-50-2A	Magnet for safety switch S2
31-50-3A	Magnet for safety switch S3
31-50-4A	Magnet for safety switch S4
31-51	Leaf spring (top)
31-52	Leaf spring (bottom)
31-53	Leaf spring release button







31-10C-001	Housing
31-10C-015	Sealing
31-10C-018	Gasket
31-10C-024	Stud
31-10C-025	Spring washer
31-10C-026	Hex nut
31-10C-100	Key
31-10C-101	Helical pinion gear, small OD
31-10C-102	E-clip
31-10C-103	Helical gear, large OD
31-10C-104	Key
31-10C-105	Worm
31-10C-106	Worm gear, bronze
31-10C-116	E-clip
31-10C-200	Output flange
31-10C-201	Gear cover
31-10C-202	Output driveshaft w/spacer ring
31-10C-203	Key
31-10C-204	Oil lip seal 35 × 62 × 7
31-10C-206	E-clip
31-10C-207	Supporting ring
31-10C-208	Ball bearing #6007Z
31-10C-209	Output shaft key
31-10C-210	Output shaft sleeve
31-10C-211	Ball bearing #6206Z
31-10C-212	Supporting ring
31-10C-213	E-clip
31-10C-214	Locking cap
31-10C-215	Oil lip seal 30 × 62 × 7
31-10C-217	Screw
31-10C-218	Screw
31-10C-219	Shim ring
31-10C-231	Spring washer
31-10C-232	Hex nut
31-10C-234	Sleeve
31-10C-235	O-ring
31-10C-240	Sleeve
31-10C-241	O-ring
31-10C-401	Ball bearing #7203BEP 2 req.
31-10C-402	Bearing
31-10C-403	Supporting ring
31-10C-404	Shim ring
31-10C-405	E-clip
31-10C-406	Locking cap
31-10C-408	Plug
31-10C-409	O-ring
31-10C-410	Breather
31-10C-415	Eye bolt
31-10C-424	Ring



31-11-1	Cover with slotted handle
31-11-2	Input shaft
31-11-4	Seal 35 × 47 × 7
31-11-5	Bearing #16006 2 ea.
31-11-6	Main body
31-11-7	One way clutch #BF91
31-11-9	Seal 30 × 42 × 7
31-11-10	Spacer washer
31-11-14	Cap

31-12-3	Torque Arm
31-12-11	OneWay clutch #BF5007-10
31-12-12	Cover washer
31-12-13	Snap ring

Prefix All Item No.'s with 31- Plus Number Shown

IMPORTANT!
In case of spare part orders, please refer to machine number, type, and spare part number.