PLEASE TAKE THE TIME TO READ AND UNDERSTAND THIS MANUAL AS IT GIVES
THE BASIC REQUIREMENTS FOR MAINTAINING AND SERVICING THE SLAT
SCANNING SYSTEM AND WILL BE TO YOUR ADVANTAGE AS WELL AS TO THE
EFFICIENT RUNNING OF THE UNIT.

THE KING INFRA-RED SLAT

SCANNING SYSTEM TYPE 2A

FOR THE SC10,SC15 or SC20 SLAT COUNTERS
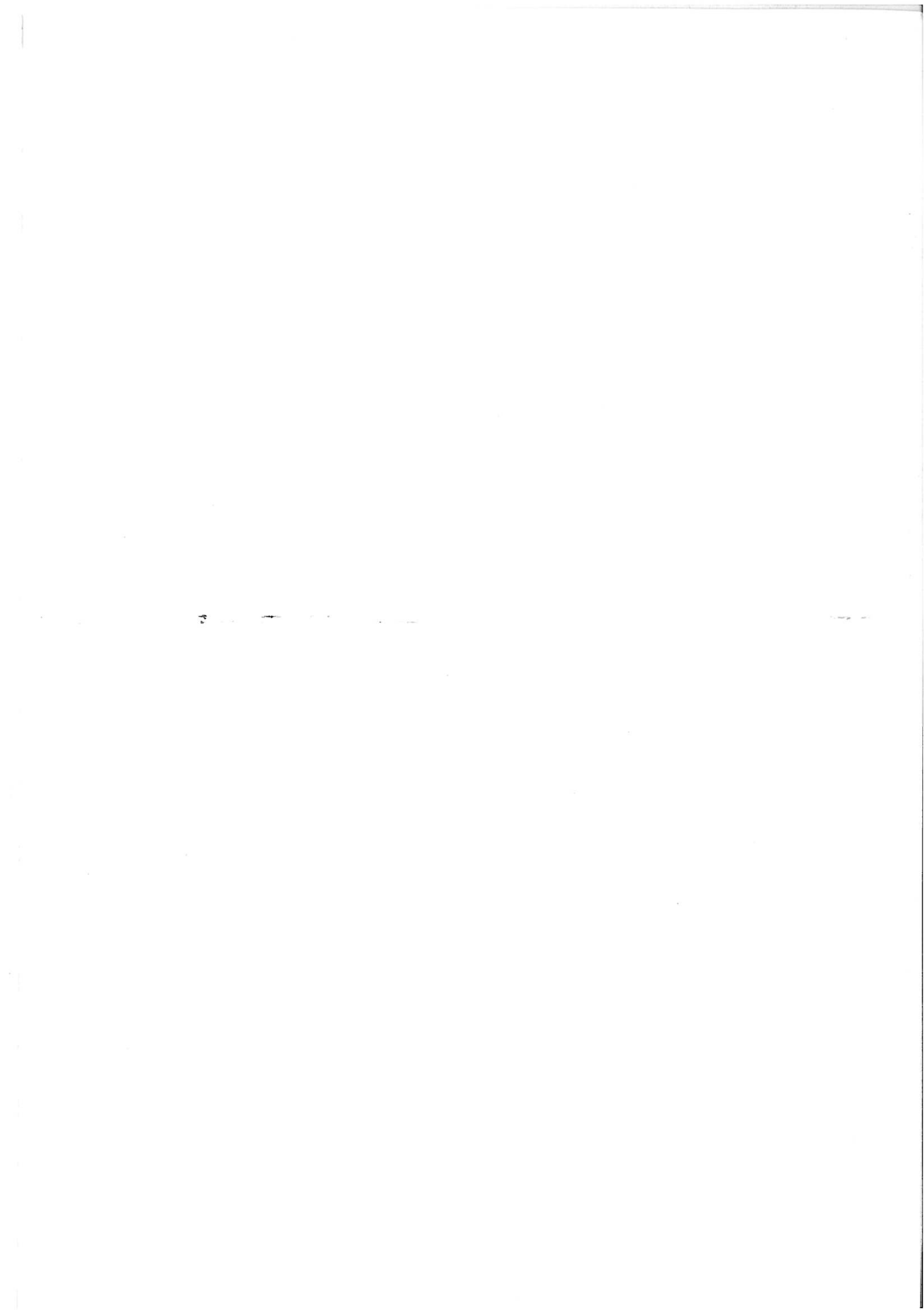
WARNING:-

1) THIS MANUAL IS THE ONLY OFFICIAL GUIDE TO THIS MACHINE AND ALL
    VERBAL ADVICE OR INSTRUCTION ARE TO BE DISREGARDED EXCEPT THOSE
    FROM C. E. KING LTD OR ITS AUTHORISED REPRESENTATIVES.

2) DISCONNECT POWER SUPPLIES BEFORE CARRYING OUT MAINTENANCE ETC.

NOTE:-

DUE TO OUR POLICY OF CONTINUOUS DESIGN DEVELOPMENT WE RESERVE THE RIGHT
TO INTRODUCE ALTERATIONS AT ANY TIME.

PLEASE NOTE:
   This machine has been inspected and every effort has been made
to ensure that no contaminant is present so as to affect your product.
You are requested,however,to make a thorough check that all product
lines etc.are cleaned and scoured before putting the equipment into
operation.

SLAT SCANNING SYSTEM

(SC 10/15/20)

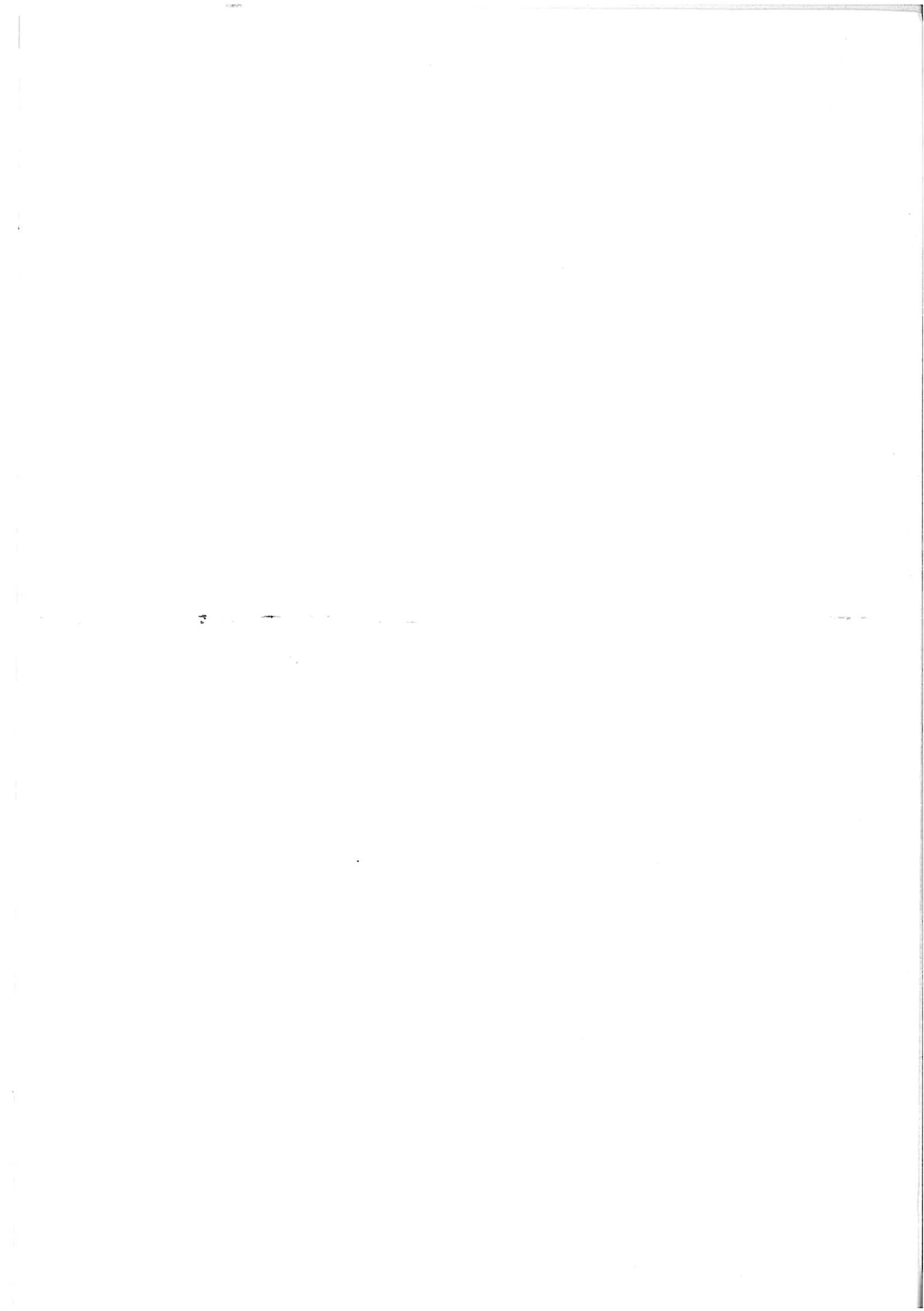CONTENTS:-   PAGE:-

COMPUTER SCAN SYSTEM

The system uses infra-red detection pulsed through holes in the slat cavities for a short period of time. This enables detection of empty pockets during the counting process.

Each slat has a sensor block fitted into its left hand end (one for a single row of pockets or two for two rows).

A "look now" signal is sent when these blocks pass a proximity sensor and the slat is scanned. The holes in the slats are 2.5mm diameter which means that this is the minimum width of tablet than can effectively be checked.

The computer is checked after each machine cycle by a master blank slat. A sensor on its chain link is used to tell the computer that this is the master slat.

The computer knows after the master check that it should not see light when the counting slats pass and disregard any signals from blank slats (except master).

The main head speed for effective slat scanning has been based on 4 r.p.m. allowing approximately 0.2 second per single row cavity slat for information transfer and resolution.

Double row cavity slats impose tighter tolerance for stopping accuracy of the scanning unit. The machines stop position has to be controlled by computer to stop when the scanning system is not in "look now" mode. The response time of two relays and clutch/brake can combine with wear and inertia considerations to make controlled stopping only possible at 3 r.p.m. and below when using double row slats.

The infra-red light source is transmitted upwards from the transmitter to the upper receiver.

The count that has been scanned is dropped into the waiting containers. If light was seen by the computer in a counting slat it will remember the position, and therefore the relative container.

As the scroll is started, (a proximity sensor on the right hand end of a slat starts the scroll which runs for a pre-determined length of time), the computer is ready to reject the miss-filled container as they are counted out of the scroll.

Please read the following pages for a more detailed explanation of the computer operation.

SCAN DETECTION

8TH SLAT
UNDER SCAN

7 BLANKS

SCROLL DETECTION

FUNNELS

DELAY SHELF TO COLLECT TABLETS
AT BEGINNING OF COUNT TO GIVE
LONGER SCROLLING TIME

GUIDE RAIL

SCROLL

CONVEYOR

CONTAINERS

TYPICAL SLAT

SLAT POCKET

BLOCK FOR "LOOK NOW" SENSOR.
ONE FOR SINGLE ROW OF POCKETS,
TWO FOR TWO ROWS.

BLOCK FOR SCROLL
DETECTION SENSOR
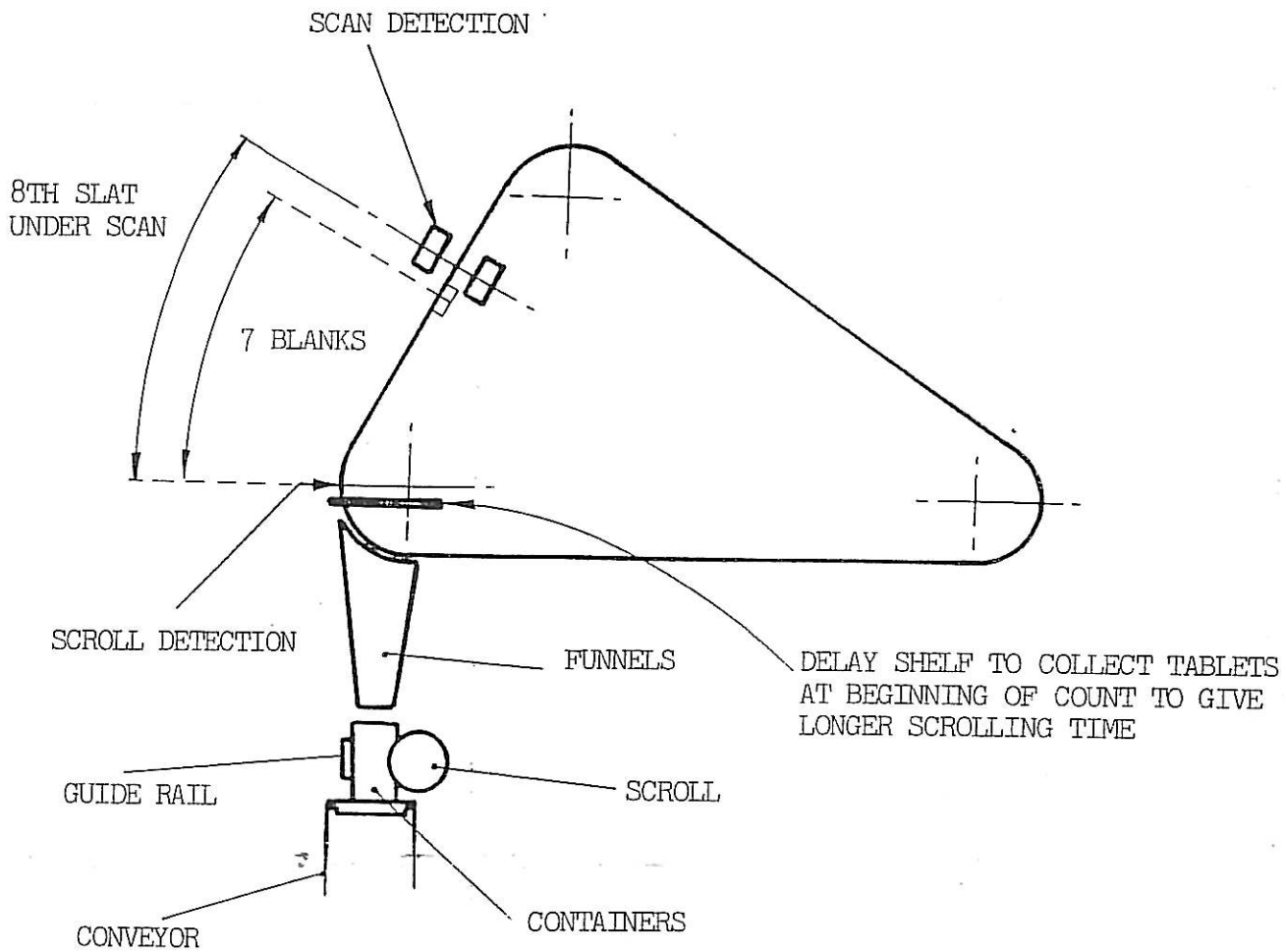
2.5MM HOLE THROUGH
EACH POCKET
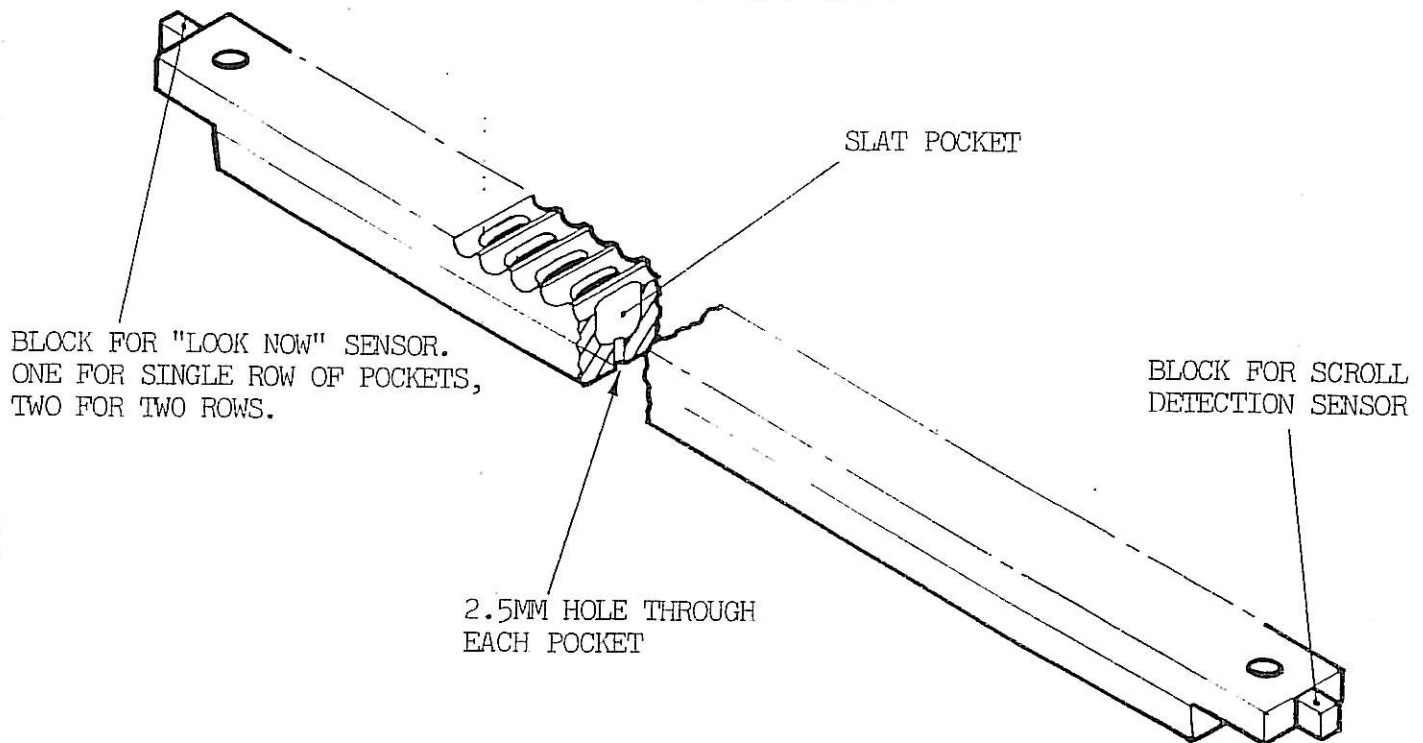
SETTING UP OF MASTER SLAT AND "LOOK NOW" SENSOR

SINGLE ROW OF POCKETS:

These two sensors are mounted on a bracket arrangement supported by pillars.
An alignment pin is passed through the upper receiver, master slat and
lower transmitter.
This pin ensures that the master slat is correctly aligned with all its
pockets directly under the infra-red scan.
With the slat set at this position, the "look now" sensor can be adjusted
on the pillars using the slots provided. The sensor should be positioned
so that it is approximately half way over the sensor block. The small LED
on the sensor will illuminate when the correct position is achieved. Lock
the fixing bolts.
The master slat sensor is automatically set by moving the lower sliding
plate to the position shown in the diagram at the end of the slots.
This will give the correct 3mm advance of the "look now" sensor. Ensure
that the bolts are locked before operating machine.
Remove the alignment pin and ensure that the sensors are set 1mm from
their respective blocks.

DOUBLE ROW OF POCKETS:

When running slats with two rows of pockets, the "look now" sensor remains
in the same position as before.
To correctly position the master slat sensor, loosen the two bolts and move
its mounting plate to the position shown,   i.e: at the end of slot.
This will give a difference of 8mm to accommodate the difference in pocket
row positions.
Lock bolts after adjustment.

When running 1½" wide slats, a different sliding sensor plate has to be used
which has longer slots to accommodate the extra width of slat.

SET UP OF MASTER SLAT

LINE OF SCAN

SLAT TRAVEL

SLAT
(DOUBLE ROW OF POCKETS)

MASTER SLAT SENSOR
MOUNTING PLATE IN FURTHEST
LEFT POSITION

MOUNTING PLATE
FOR "LOOK NOW" SENSOR

"LOOK NOW" SENSOR
BLOCK

ALIGNMENT PIN (SEE
PAGE 5)

LINE OF SCAN

NOTE SLOT
POSITIONS

"LOOK NOW" SENSOR
3mm IN ADVANCE OF MASTER
SLAT SENSOR

MOUNTING BRACKET

DIAGRAM SHOWING ALIGNMENT OF MASTER
SLAT WITH A DOUBLE ROW OF POCKETS

MOUNTING BRACKET

RECEIVER

SLAT
(SINGLE ROW OF POCKETS)

SLAT TRAVEL

MASTER SLAT SENSOR BLOCK

MASTER SLAT SENSOR
MOUNTING PLATE

TRANSMITTER
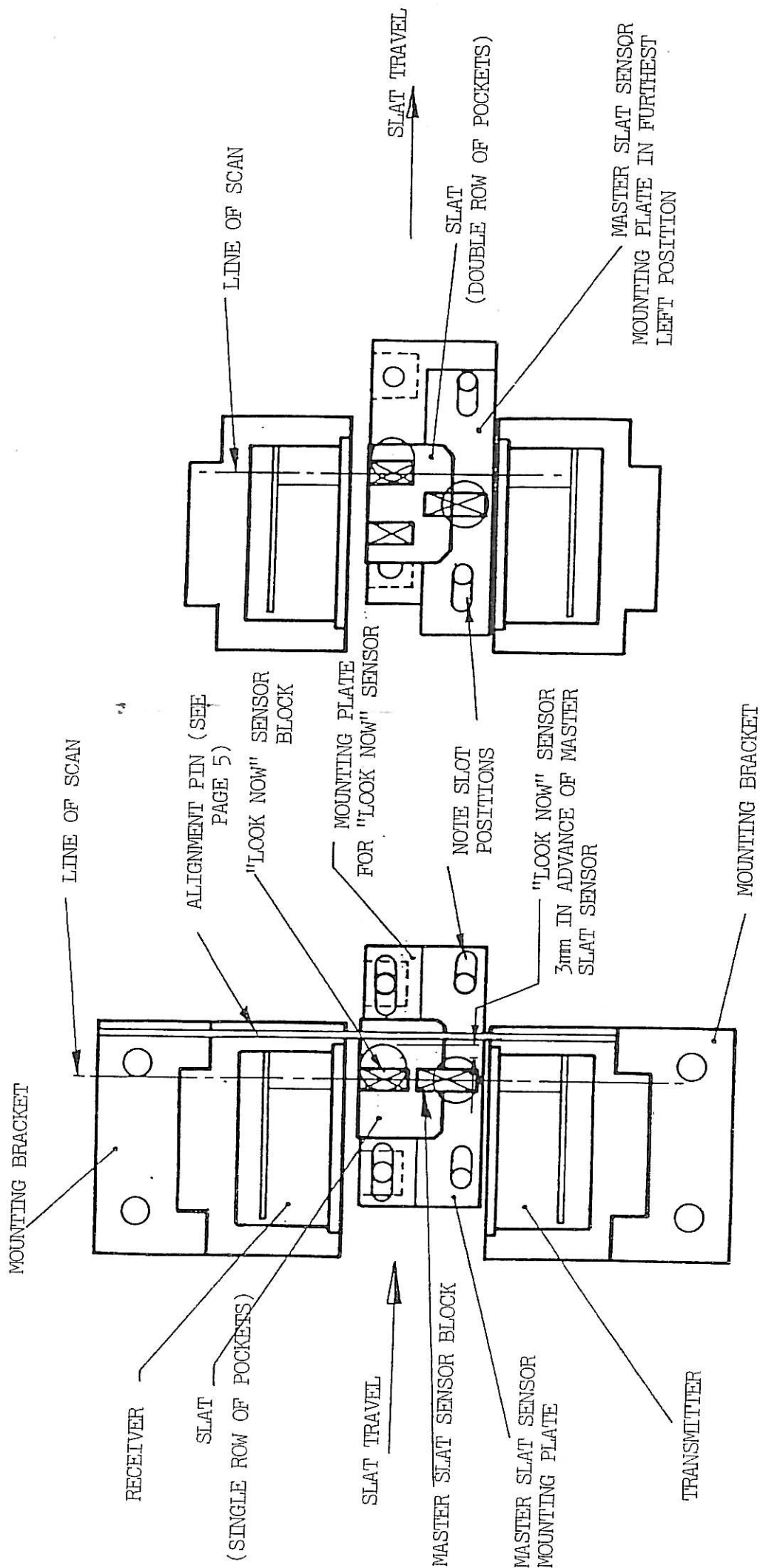
DIAGRAM SHOWING ALIGNMENT OF MASTER
SLAT WITH A SINGLE ROW OF POCKETS
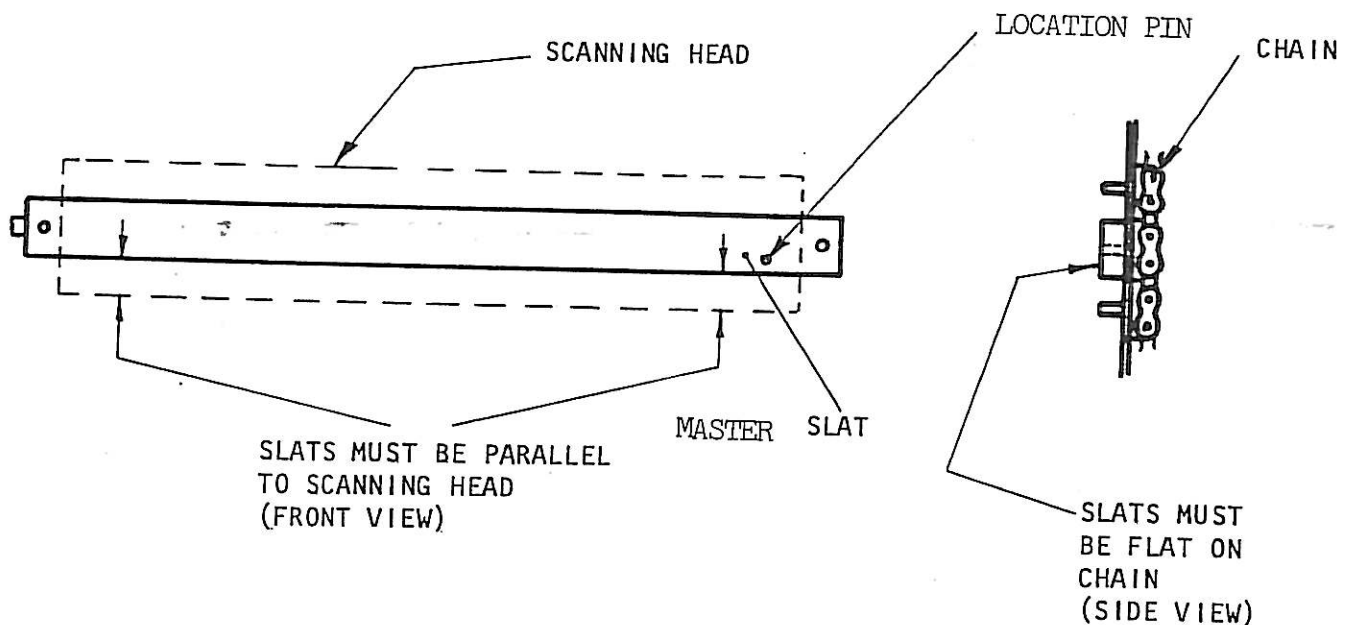
(VIEWED FROM L/H SIDE OF MACHINE
WITH SIDE PLATE REMOVED)

4

SLAT SCAN SYSTEM

FAULT FINDING AND MAINTENANCE

1. It is important to remember that if the slat drive chains are adjusted or replaced for any reason the new chains must be fitted so that the slats maintain alignment with the scanning head. Failure to ensure this will lead to scanning problems where by the master slat may not be clearly seen by the computer. This is indicated by FFFF08 on the readout. It is also important to ensure that the slats are seated properly on the chain when they move past the scanner.

   (see diagram below)

SCANNING HEAD

LOCATION PIN

CHAIN

MASTER SLAT

SLATS MUST BE PARALLEL
TO SCANNING HEAD
(FRONT VIEW)

SLATS MUST
BE FLAT ON
CHAIN
(SIDE VIEW)

2. Ensure that all three of the sensors are set at 1mm as shown to give optimum performance.

   1mm (0.040") Typical

   SLAT

3. Daily cleaning is recommended to remove any broken tablets or dust that may have settled onto the glass plates of the emitter and receiver heads. If excessive dust accumulates the master slat may not be seen properly and will show FFFF08.

   PROXIMITY SWITCH BLOCK

   PROXIMITY SWITCH

If very dusty tablets are to be run then more frequent cleaning of the scanning heads may be required. Remove dust with a soft cloth damped in warm water and finish off with a clean dry cloth.
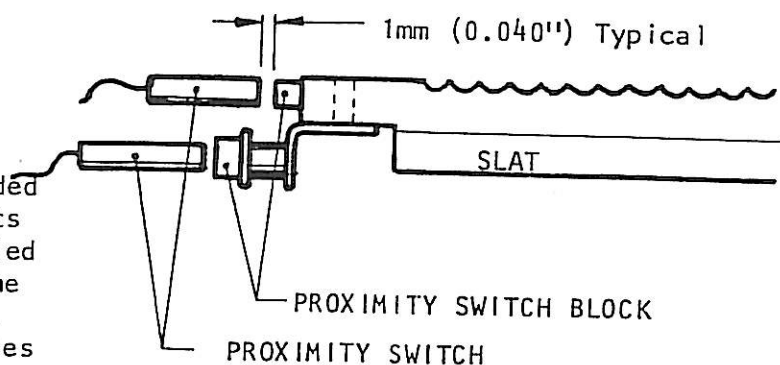
COMPUTER CONTROL BOX (type 2a)

The complete slat counter is operated from the control panel. During normal operation the L/H digital read out displays the number of correctly filled containers while the R/H display gives the total of rejected containers. Any Error Codes (see next page) are displayed in the L/H readout. To clear this press the "re-start" button this will then revert the display back to the total of passed containers and add 1 to the rejected total.
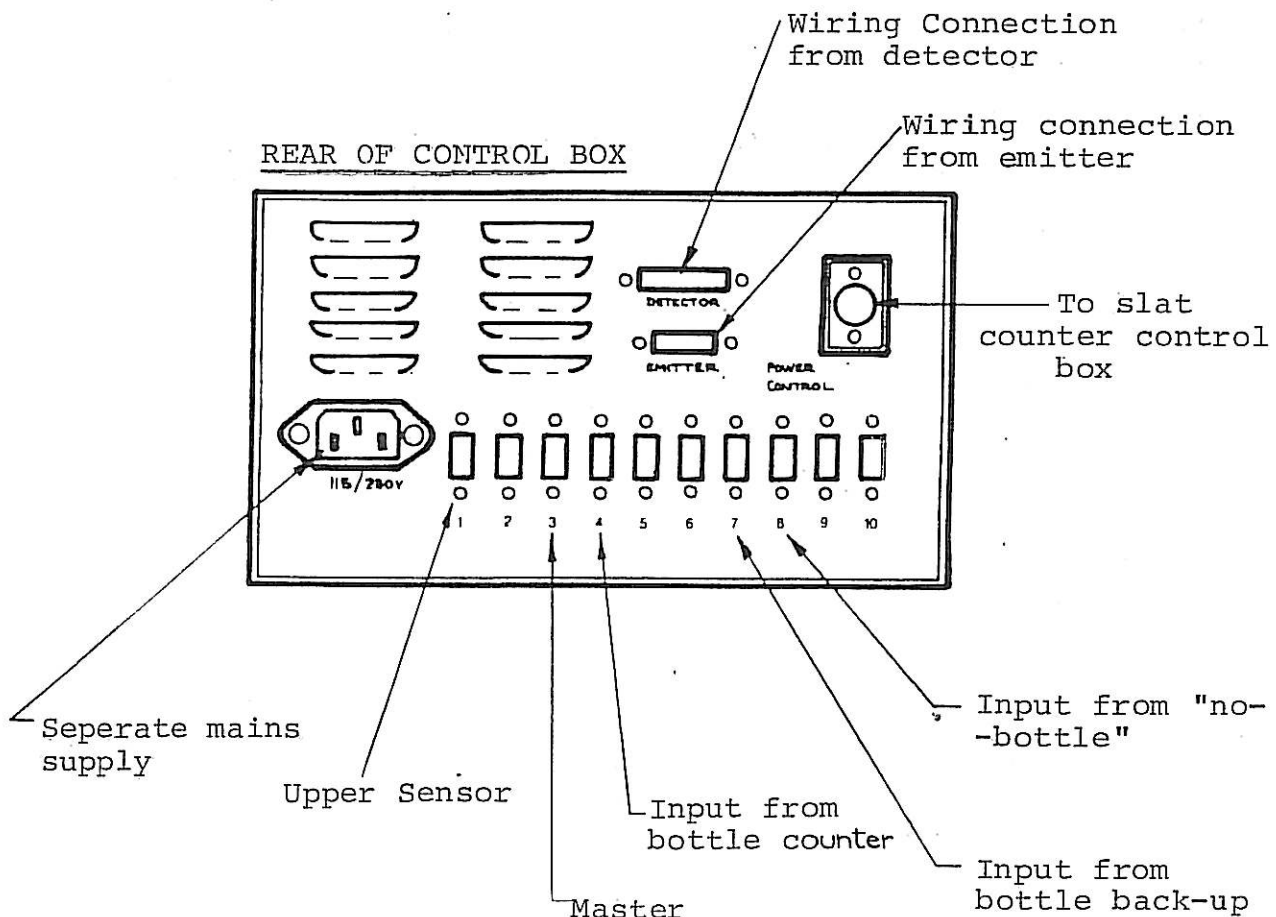Do Not press the "re-set" button during a run this will clear the computer.
This is only used when a complete new start is required.

Total of passed containers or error code display

re-start button

Total of rejected containers.

On/Off power switch

Machine Start button

PASS (FAIL CODE)

REJECT

RUN   STOP   RE-START

POWER

RESET

PROGRAM

Machine stop button

Reset button for clearing computer

Pre-set plug-in programme as required.

Wiring Connection from detector

Wiring connection from emitter

REAR OF CONTROL BOX

DETECTOR

EMITTER   POWER CONTROL

To slat counter control box

115/230V

1   2   3   4   5   6   7   8   9   10

Input from "no-bottle"

Seperate mains supply

Upper Sensor

Input from bottle counter

Input from bottle back-up

Master

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TYPE 2/A

The Scanning System described below has been specifically
designed for use with the C.E. KING packing equipment type
SC10 - SC15 - SC20.

The Microprocessor based scan control unit will check for
and indicate any of the following fault conditions:

ERROR CODE	PROBABLE CAUSE
'FFFF01'	Container feed missing in scroll
'FFFF02'	Backup, No bottle conditions
'FFFF05'	Scanning System memory failure
'FFFF08'	Fault on upper sensor
'FFFF10'	Slat Count error
'FFFF11'	Master Slat Sensor error

The system will automatically reject any containers where
there is a possibility of an incorrect count.
The error codes are explained in greater detail on Page 5.

The Scan System comprises of 2 main components, the
microprocessor based control unit, the upper sensor block.
Several external sensors also supply system control signals.
The function of the various units will be described in more
detail below.

1) UNDERLINED CONTROL UNIT

The control unit may be sub-divided into 3 blocks, the
microprocessor P.C.B., the display P.C.B. and the interface
card.

KINGSCN1/1

1A)   MICROPROCESSOR P.C.B.

A full description of the microprocessor operation is not
within the scope of this document, but the sequence of
operation may be summarised as follows:-

The microprocessor unit (MPU) will read an instruction from
the operating program which is held in 'read only memory'
(ROM). This instruction will take one of three basic forms,
read data from an external source, write data to an external
source or perform a logical or mathematical operation on the
data. After the MPU has executed the instruction it will
fetch a further one. The next instruction fetched may be
dependant upon the result of a previous one and so the MPU
can make 'decisions' and change the sequence of operations
accordingly, in this way varying conditions can be dealt with.

The external source's of/for data in this particular application
are:-

1)   Input from external sensors via the interface card.
2)   Input from the front panel switches via the display P.C.B.
3)   Read data that has been saved for future reference in
     read/write memory (random access memory or ram).
4)   Write data to ram for future use.
5)   Output signals to external control devices (relays or
     solenoids) via the interface card.
6)   Write information to the front panel displays via the
     display P.C.B.

At power on the MPU will execute a short self test routine.
This consists of writing data into all available memory locations,
reading data back from all locations and checking that the
recovered data is as written. All memory locations are then set
to zero or initialized to a required value. If the initial
write/read test fails at any point then the left hand display
window will show 'FFFF05'. This is a fatal error and all
further execution is aborted.

1B)   DISPLAY P.C.B.

The display P.C.B. contains two 6 digit displays and associated
control and driver circuitry, six system control switches with
data encoder and a plug in pattern module.

Under normal conditions the left hand display will indicate the
number of containers accepted by the system while the right hand
display will show the number of containers rejected for any reason.
This figure excludes containers rejected during the start up cycle
at switch on.

KINGSCN1/2

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Under fault conditions the left hand display will indicate 'FFFFxx' where 'xx' is a fault code as detailed on Page 1. The fault codes are explained in greater detail on Page 5. If the 'Fault Analysis' switch is depressed the left and right hand displays will indicate the number of containers rejected for an empty pocket or a blocked pocket respectively. The displays will stay in this condition until the 'Fault Analysis' switch is pressed again. If the reset switch is operated all of the display counters will be cleared to zero and the data lost, and the unit will execute a restart cycle. The operation of the reset switch is analogeous to switching the unit off and on again, and should only be used after a record has been made of any display contents that may be required for reference purposes.

The run (Marche) switch will operate in two slightly different ways depending on previous conditions. After power on or reset the unit will perform a 'start up cycle'. This consists of not less than one, but not more than two, complete cycles of the slat drive system. During this cycle all containers will be rejected. The reason for the start up cycle is that at switch on the control unit has no record of which slat is under the sensors, and consequently cannot reach any decision regarding which containers should be rejected. The start up cycle is used as a synchronising period for the internal slat counter. (This counter is invisible to the operator.)
If the run switch is used after operation of the stop (arret) switch then the system will continue to operate from the point at which it was stopped. This is possible due to the fact that all stop functions other than power off or reset are regulated by the control unit. If at any time it is required to stop the unit temporarily it can only be accomplished using the stop switch not reset.

In the event of an error occuring the control unit will display the appropriate error code and remove the power from the machine. The indicator on the restart switch will also be illuminated. If the error requires a manual restart this is entered using the restart switch. Certain error conditions will re-start automatically, and although the restart indicator will be illuminated the unit will not respond to operation of the switch. The auto-restart conditions are set out on Page 5. "DO NOT ATTEMPT TO RESTART THE UNIT WITH THE RUN SWITCH IF THE RESTART INDICATOR IS ON".

The program (format) module is a pre-programmed memory device
holding data on the different pattern formats available.
At switch on the data from this module is transfered into ram
on the MPU Board.

"THE PROGRAM MODULES ARE INTERCHANGEABLE, BUT CARE MUST BE
TAKEN TO INSERT THEM INTO THE SOCKET WITH THE ARROW POINTING
UPWARDS. IRREPAIRABLE DAMAGE WILL OCCUR IF THEY ARE INCORRECTLY
INSERTED".

INTERFACE CARD

The function of the interface card is to take signals from any
external sensors and change them into the format required by
the MPU, or change signals from the MPU into the forat required
by any external devices.

There are 5 input signals to the card, as listed below:

1)   Upper slat sense
2)   Master slat sense
3)   Bottle sense
4)   Bottle backup sense
5)   No bottle sense

The input signal numbers as shown above correspond to the
connector numbers on the rear panel.

Input 3 is a low priority signal read by the MPU when it requires
information on system status.
All other inputs are of high priority and will signal the MPU
when they go into an active state. These inputs are filtered
to provide a degree of noise immunity on the system. The signals
are buffered by Schmitt input inverters to increase noise immunity
still further before going to the inputs of Tri-State BUS buffers.
These buffers can be addressed by the MPU allowing it to read the
data on the input lines.
The inputs from the upper slat sensors are read in groups of up
to six pockets at a time. The groups are multiplexed onto six
common signal lines. The signals from the sensors are not filtered
due to the high reading speeds required, but are buffered by Schmitt
input inverters before being input to an addressable Tri-State BUS
buffer which may be read by the MPU.

The receive sensor cards for both the upper and lower sensors are
addressed at the same time by the sensor select lines, the data
read by the MPU being selected by which buffers are being addressed,
which is in turn decided by which control input (1 or 2) is in an
active state. The solid state light sources (light emmiting diodes
or LED's) used to scan the pockets are not turned on continuously
but are activated by control inputs 1 or 2.

The outputs from the MPU to the interface card are of a very short
duration (0.000001 second) and so the air control solenoid signals
(used for rejecting containers) are extended by the use of
monostables to approximately 30 ms.

The power control transistor and monostables are configured such
that the MPU must continuously switch the monostable on to run the
machine. If for any reason an MPU failure were to occur the system
would shut down after a period of approximately 10 seconds.

UPPER SENSOR BLOCK

The upper sensor block may be sub-divided into 4 separate components, the slat sensor, the master slat sensor, the slat scanning transmitters and the slat scanning receivers.

SLAT SENSOR

The slat sensor is a simple inductive proximity switch (with visual LED display). It is operated by a small stainless steel tab mounted on the end of every slat.

MASTER SLAT SENSOR

The master slat sensor is a simple proximity switch (as above) but is operated by a special lug mounted to the left hand chain at one position of the chain loop (master reference position). This is used for slat counter synchronisation at start-up and for ensuring that no slat counts are missed during normal operation.

SCANNING TRANSMITTERS

The scanning transmitter card consists of high intensity infra-red LED's wired in series. The LED's are switched on by application of +5v to the base of a transistor used in a constant current mode. The supply current is in the order of 200 ma.

SCANNING RECEIVERS

The scanning receiver card employs high sensitivity infra-red photo transistors as the receiving elements. The outputs of these devices are input to a Tri-State output buffer. The enable signal for the buffer outputs is selected from the sensor select lines (from the interface card) by a miniature 12 pole switch. The sensor groups must be numbered from 1 to 12, from left to right, when looking from the front of the machine.

NORMAL DISPLAY CODES FOR OPERATOR INFORMATION

'FFFF01' CONTAINER FEED MALFUNCTION IN SCROLL. Missing pocket in scroll - operator rectification and restart.

'FFFF02' CONTAINER BACKUP/NO BOTTLE ON CONVEYOR. Automatic start up when conditions are corrected.

WARNING CODES FOR OPERATOR ANALYSIS BEFORE PRODUCTION RESTARTED

'FFFF05' MEMORY FAILURE. This is a fatal error. It is recommended that the unit is switched off and a restart attempted but if the error occurs again the control unit must be returned for service.

'FFFF08' UPPER SENSOR FAULT. The master slat is used to verify correct operation of the sensors. If a fault is found when the master slat is being scanned the 'FFFF08' will be displayed. This will be caused either by mechanical mis-alignment of the sensors or failure of a transmitter or receiver card. This error should be considered fatal until the reason for the failure is ascertained, although the unit may be restarted using the re-start switch. Dust on master slat or blocked holes will also cause this condition in this instance cleaning of master slat is the only attention required before restarting.

'FFFF10' SLAT COUNT ERROR. The control unit will check that 72 series pass the sensor for every cycle of the drive system. This failure mode will occur if the test fails. The fault will be caused either by failure of the upper slat 'slat sensor' (section 2A) or by the sense tabs being bent out of alignment. Re-start is possible but the fault should be considered fatal until the cause is ascertained.

'FFFF11' MASTER SLAT SENSOR ERROR. In conjunction with the test carried out above (FFFF10) the control unit will ensure that no more than 72 slats are counted without a master slat being found. If this test fails then 'FFFF11' will be displayed. The two possible causes of this error are failure of the master slat sensor (section 2B), or mis-alignment of the master slat tab, as above re-start is possible but the fault should be considered fatal until the cause is ascertained.

The causes for any fault above are not exhaustive but give an indication of the area where any fault will be found.

KINGSCN1/6

OPERATING INSTRUCTIONS

READY STATE FOR PRODUCTION

In conjunction with the counting machine control panel,
when the computor is switched on and scroll, conveyor
main head buttons are also on (i.e. the three green
lights are illuminated) but the slats will not turn as
the computor panel now controls the slat counters operation
and the computor panel shows off.

In this condition the vibrators for the slats are operative
and the top brush on the SC10 head is turning.

The machine is now in the ready production state, subject
to computor control. It must be remembered for operator
safety that whilst the three green lights are lit on the
main panel of the slat counter the machine is in the
automatic state and may restart on the no bottle/queue back
automatic controls.

The machine is now ready for operation but the computor,
although energised, does not have a reference position of
its' scanning head relative to the overall slat pattern on
the machine.

PRODUCTION STARTS - REJECTS

Therefore, when operating the production button on the
computor panel (all readouts showing 000s) the scanning
system will be searching the slats for a positional reference
point (MASTER SLAT) in order to start verifying the count.

Under these conditions the computor will automatically reject
all production until it is satisfied that:-

a)   The slat pattern is correct to the computor program.

b)   It has registered the position of the pattern for checking.

Depending on the count patterns and the start up position will
determine how many rejects will be taken out until the computor
has registered its' position.

PRODUCTION - ACCEPTED

This system is automatically controlled and the accepted packs
will be indicated in the panel left hand display. From this
point in production all good/bad packs will be displayed providing
the 'ZERO' (wipe button) RESET is not depressed.
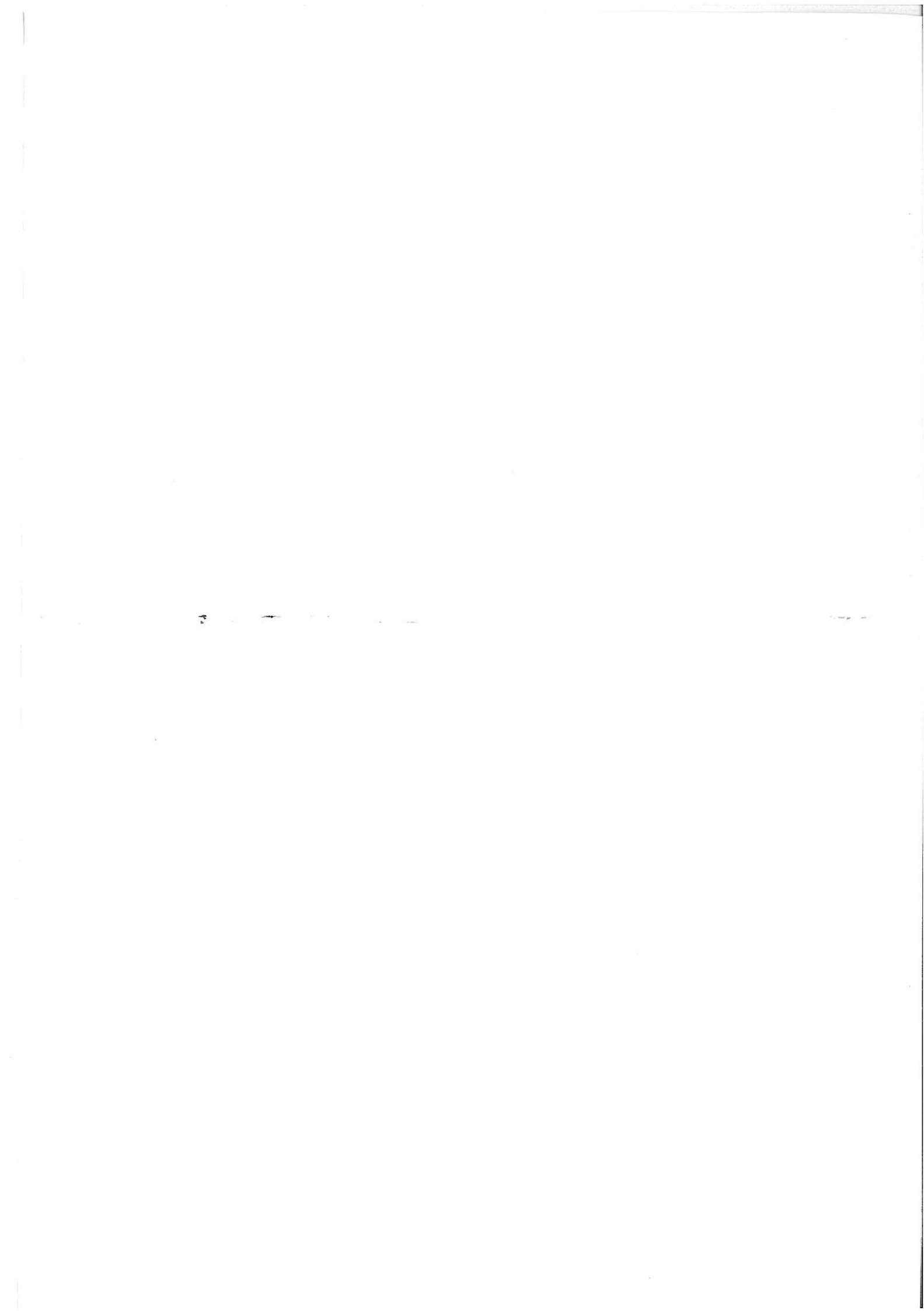
If the reset is pressed the totals are lost with the memory and the computor will revert to a start up proceedure to locate its' position before accepting production again.

The computor when in control is the master of the SC10.

The SC10 panel and machine work as a slave to computor instructions.

The computor on/off button must be the only controls for the operators otherwise errors in computor memory positions can arise and false rejects will occur.

IMPORTANT

Computor/Machine should not be switched off during scroll cycle.

Production may stop for the following conditions where restart will be automatic:-

1)   No bottle FFFF02.

2)   Back up from capper FFFF02.

Production may stop for the following, operator restart assistance is necessary:-

1)   FFFF01 No bottle in scroll, missing pocket in scroll shuts off scroll and head motors on computor immediately. Operator assistance to correct missing pocket, restart scroll and head.

2)   FFFF02 upside container or jammed bottle at container selector on SC10 infeed. Operator required to rectify stoppage, machine restart is then automatic.

3)   Scroll jam FFFF01, cause possible distorted bottle, jammed bottle under funnel or fallen container. Operator correction, restart scroll. Note reject abort proceedure to bottles in filling process. Restart production on computor.

4)   FFFF08 on dusty products if there is a build up of powder on the scanning optics.

5)   Other stop codes indicated on computor are serious stoppages and should be dealt with by senior technical staff to ensure against damage. These fault codes may lead to damage to the computor and/or lost security of the verification unit.
In these conditions where count security is in question it is the users decision to isolate the computor and proceed with production using manual verification. Whilst at the same time contacting C.E. KING for guidance or clarification of the fault.
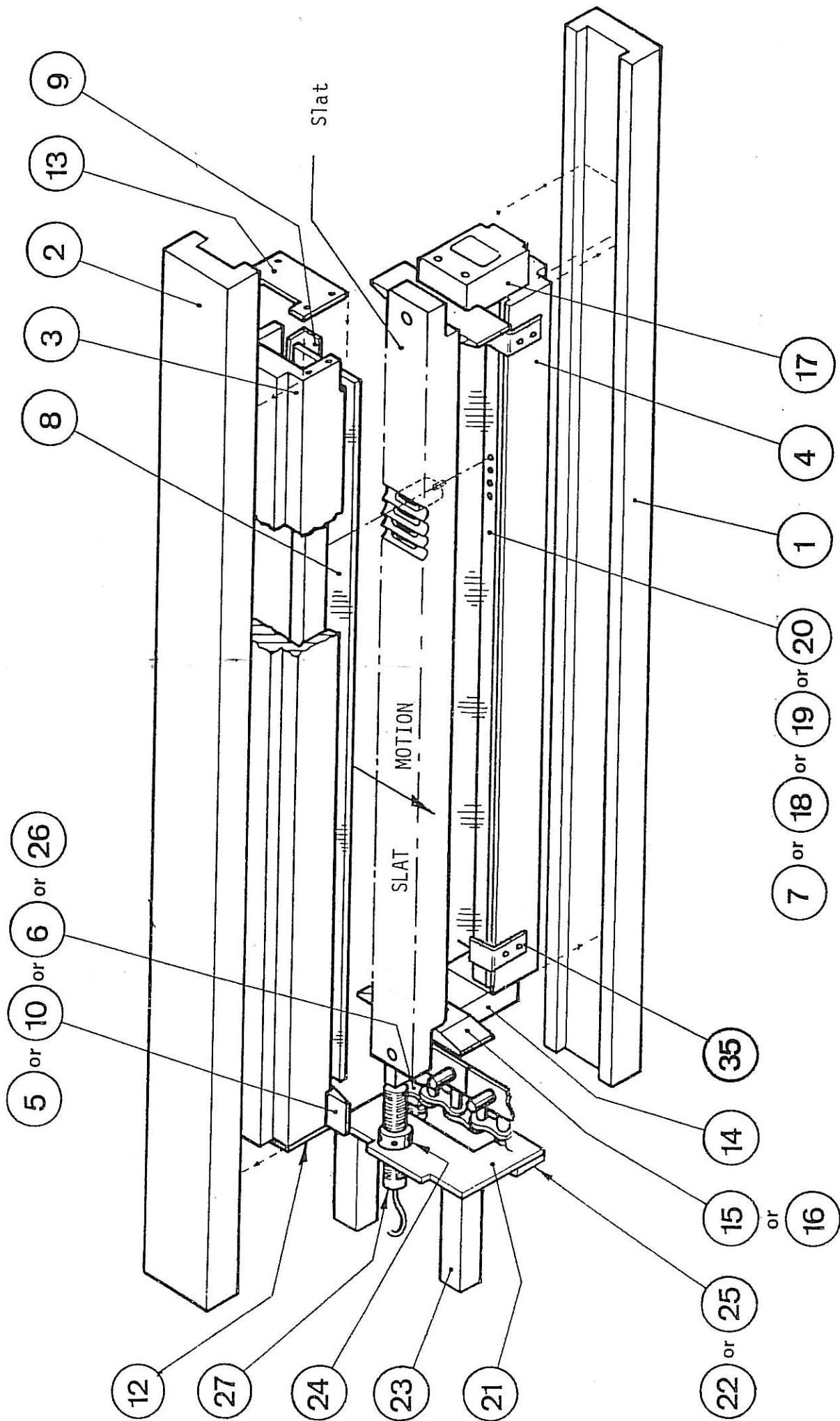
SLAT SCANNING SYSTEM SC10

21/12/93

(viewed from underneath)

REF NO.	PART NO.	NOMENCLATURE	UNIT PER ASSY
1	D.OSU 26112	Carrier bar (item A)	1
2	D.OSU 26112	Carrier bar (item B)	1
3	D.OSU 26062	Emitter bar (item A)	1
4	D.OSU 26062	Emitter bar (item B)	1
5	A.OSU 26027	Rubbing pad (plastic) for aluminium slats	1
6	A.OSU 26030	Detector Block (for 5/8" pitch chain)	1
7	C.OSU 26031	Emitter strip (6 drops per channel)	2
8	B.OSU.6131000	Glass window	2
9	C.OSU 26033	Glass retaining angles	3
10	A.OSU 26036	Rubbing Pad, st/stl. (for plastic slats)	1
11 *	A.OSU 26038	Cable clip	1
12	A.OSU 26039	End cover L.H.	1
13	A.OSU 26040	End cover R.H.	1
14	B.OSU 26050	Guide block L.H.	1
15	A.OSU 26051	Guide Bar (plastic) for aluminium slats	1
16	A.OSU 26052	Guide Bar)St.Stl.) for plastic slats	1
17	B.OSU 26056	Guide Block R.H.	1
18	C.OSU 26057	Emitter Strip (5 drops per channel)	2
19	C.OSU 26058	Emitter Strip (4 drops per channel)	2
20	C.OSU 26059	Emitter Strip (3 drops per channel)	2
21	A.OSU 26076	Proximity Switch plate (upper)	1
22	A.OSU 26077	Proximity Switch plate (lower) 1 1/4" wide slats	1
23	A.OSU 26078	Proximity Switch pillar	2
24	A.OSU 26079	Proximity Switch ring nuts	2
25	A.OSU 26081	Proximity Switch plate (lower) 1½" wide slats	1
26	A.OSU 26085	Detector Block (for 3/4" pitch chain)	1
27	+ E.5620	Proximity Switch Omron TL-X2E1	2
28	--	----	-
29	--	----	-
30	E.5674	Proximity Switch Omron TL-X5E1-G (for scroll)	1
31	E.5702	10 way Plug	1
32	E.5703	20 way Plug	1
33	E.10605	10 way Socket	1
34	E.10606	20 way Socket	1
35	A.OSU 26102	Glass Retaining Bracket	2

+ Note. E.5620 2-off for fully programmed system
   1-off for non programmed system

(*=not illustrated)

REF NO.	PART NO	NOMENCLATURE	NO OFF
1*	A.OSU.26030	Detector Block (welded to chain)	1
2*	A.OSU.26038	Cable Clip	1
3*	B.OSU.26050	Guide Block L/H	1
4*	A.OSU.26051	Guide Bar (Plastic) for Aluminum Slats	2
5*	A.OSU.26052	Guide Bar (ST.STL.) for plastic slats	2
6*	B.OSU.26056	Guide Block R/H	1
7*	D.OSU.26064	Carrier Bars A and B	1 each
8*	D.OSU.26065	Emitter Bars A and B	1 each
9*	C.OSU.26066	Glass Retaining Angles	3
10*	B.OSU.6131001	Glass Windows	2
11*	D.OSU.26068A	Emitter Strip for 6 drop	2
12*	D.OSU.26068B	Emitter Strip for 5 drop	2
13*	D.OSU.26068C	Emitter Strip for 4 drop	2
14*	D.OSU.26068D	Emitter Strip for 3 drop	2
15*	A.OSU.26072	Rubbing Pad(Plastic) for Aluminum Slats	2
16*	A.OSU.26073	Rubbing Pad(St.STL) for Plastic Slats	2
17*	A.OSU.26074	End Cover L/H	1
18*	A.OSU.26075	End Cover R/H	1
19*	A.OSU.26076	Proximity Switch Plate - Upper	1
20*	A.OSU.26077	Proximity Switch Plate-Lower(1¼"wide slats	1
21*	A.OSU.26078	Proximity Switch Pillars	2
22*	A.OSU.26079	Proximity Switch Ring Nuts	2
23*	A.OSU.26081	Proximity Switch-Lower-(1½" wide slats)	1
24*	A.OSU.26085	Detector Block (welded to chain)	1
25*	E.05620	Proximity Switch(non programmed system)	1
26*	-	Proximity Switch Omron TL-X2E1 (fully prog.system)	9
27*	E.05674	Proximity Switch Omron TL-XE1-G (11 with scroll)	1
28*	E.5702	10 Way Plug	1
29*	E.5704	26 Way Plug	1
30*	E.10605	10 Way Socket	1
31*	E.10607	26 Way Socket	1
32*	A.OSU.26102	Glass Retaining Angle	2

(* = not illustrated)
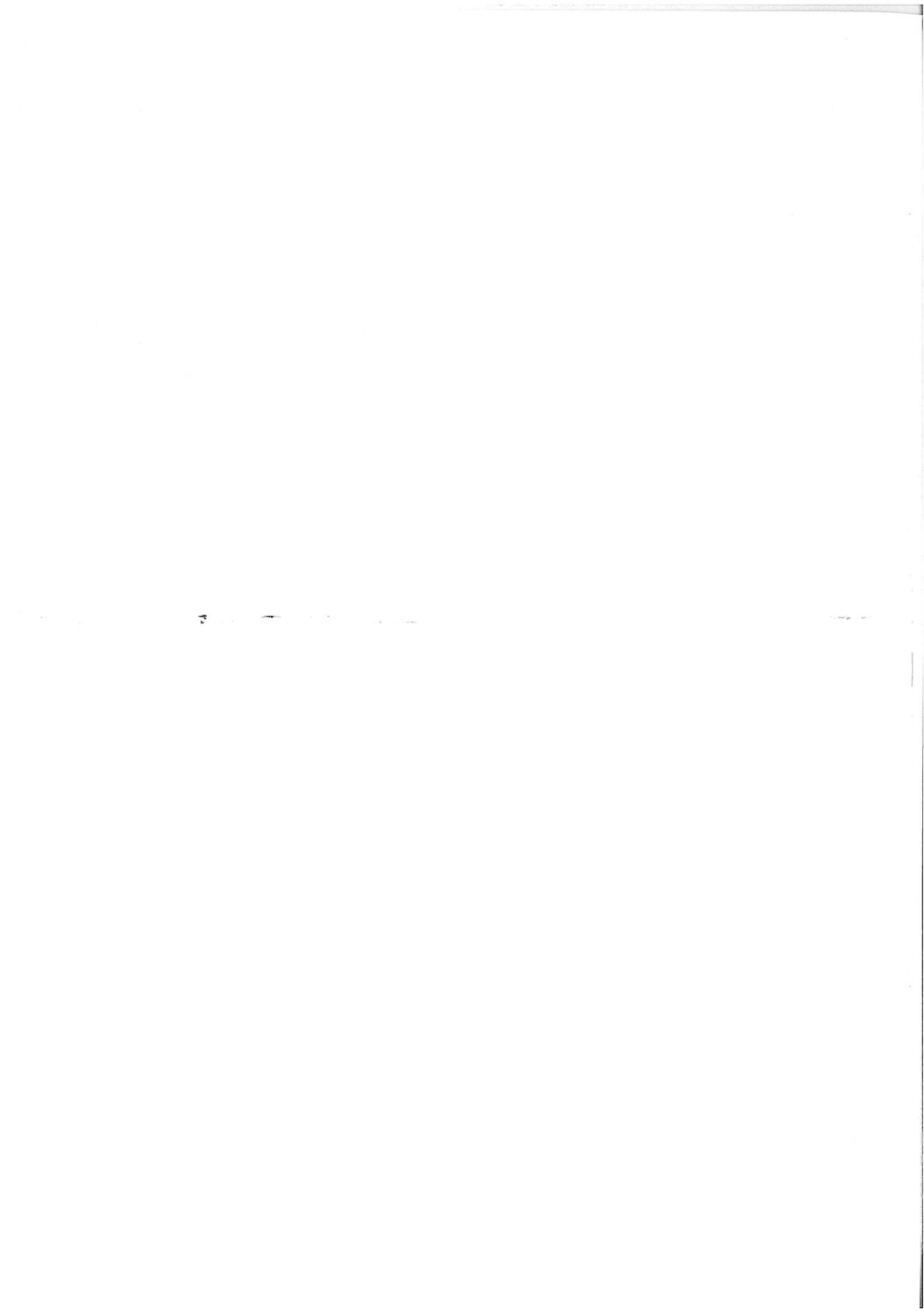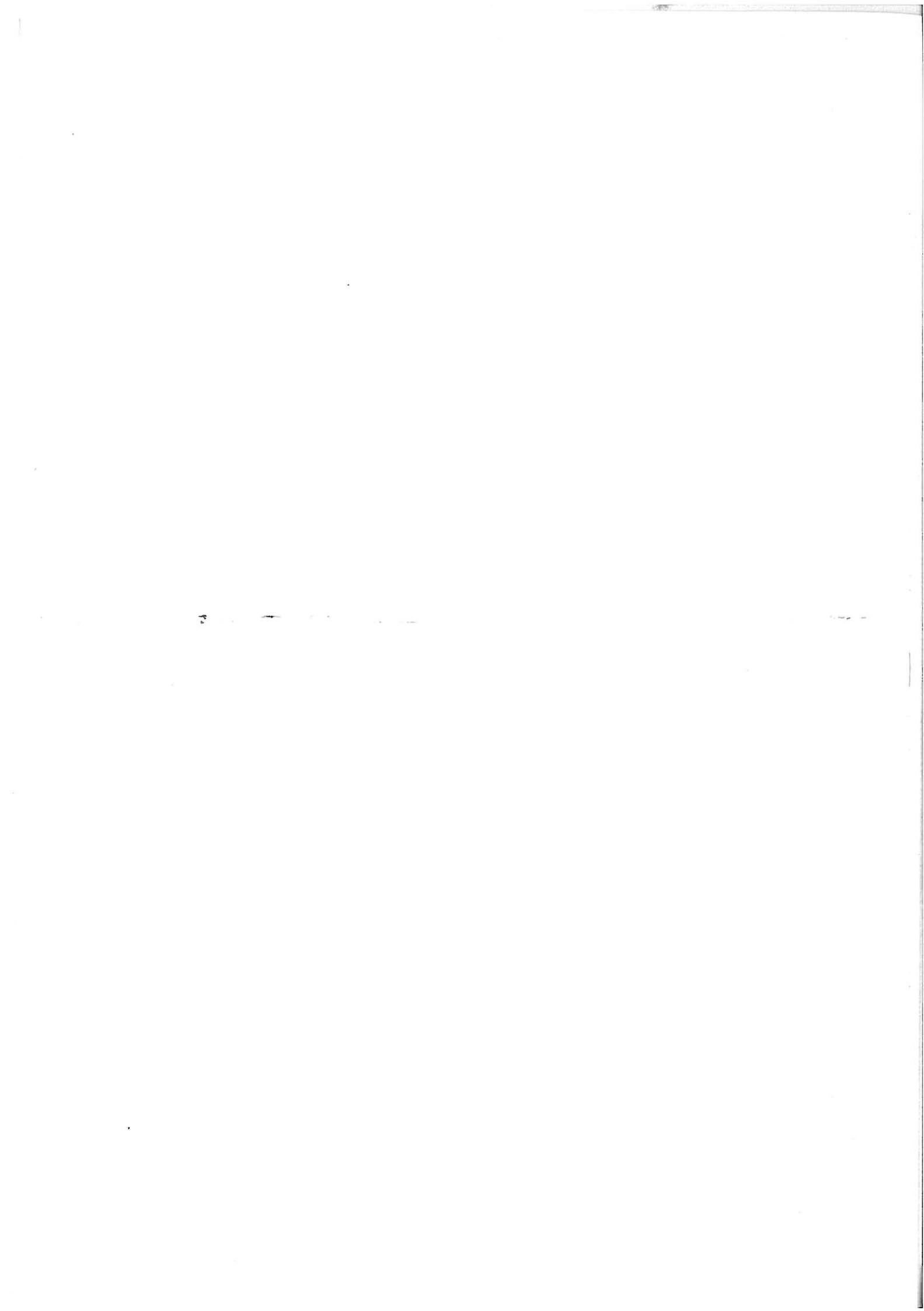
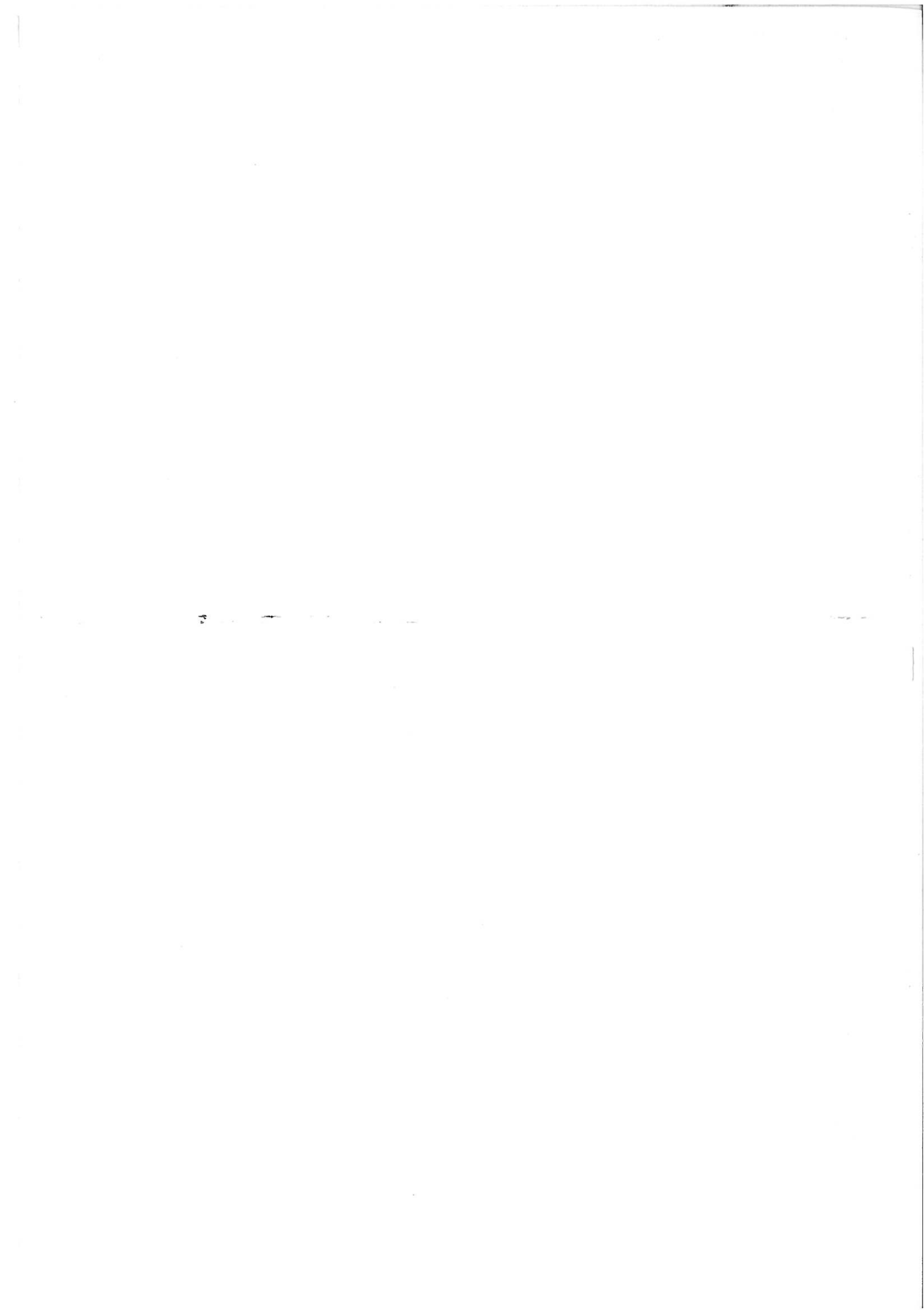| REF NO.	PART NO	NOMENCLATURE	NO OFF
1ˣ	A.OSU.26064	Pillar	
2ˣ	A.OSU.26030	Detector Block (5/8" pitch Chain)	1
3ˣ	D.OSU.26097	Carrier Bars A & B	1 each
4ˣ	D.OSU.26098	Emitter Bar - Upper	1
5ˣ	D.OSU.26099	Emitter Bar - Lower	1
6ˣ	C.OSU.26100	Glass Retaining Angle	3
7ˣ	C.OSU.6131003	Glass Windows	2
8ˣ	A.OSU.26102	Glass Retaining Bracket	2
9ˣ	D.OSU.26103	Emitter Card Strip:-	
10ˣ	D.OSU.26103A	For 6 drop	2
11ˣ	D.OSU.26103B	For 5 drop	2
12ˣ	D.OSU.26103C	For 4 drop	2
13ˣ	D.OSU.26103D	For 3 drop	2
14ˣ	B.OSU.26050	Guide Block L/H	1
15ˣ	B.OSU.26056	Guide Block R/H	1
16ˣ	A.OSU.26051	Guide Bar Plastic (for aluminum slats)	2
17ˣ	A.OSU.26052	Guide Bar St steel (for plastic slats)	2
18ˣ	A.OSU.26072	Rubbing Pad Plastic (aluminum slats)	2
19ˣ	A.OSU.26073	Rubbing Pad St.Steel (plastic slats)	2
20ˣ	A.OSU.26074	End Cover L/H	1
21ˣ	A.OSU.26075	End Cover R/H	1
22ˣ	A.OSU.26076	Proximity Switch Plate Upper	1
23ˣ	A.OSU.26077	Proximity Switch Plate Lower(1¼"wide slat)	1
24ˣ	A.OSU.26081	Proximity Switch Plate Lower(1½"wide slat)	1
25ˣ	A.OSU.26078	Proximity Switch Pillars	2
26ˣ	A.OSU.26079	Proximity Switch Ring Nuts	2
27ˣ	A.OSU.26085	Detector Block (3/4" pitch chain)	1
28ˣ	A.OSU.26038	Cable Clip	1
29ˣ	+E.5620	Proximity Switch TL-X2 E1 (Omron)	2
30ˣ	E.5674	Proximity Switch TL-X5E1-G(for scroll feed)	1
31ˣ	E.5702	10 Way Plug	1
32ˣ	E.5703	20 Way Plug	1
33ˣ	E.10605	10 Way Socket	1
34ˣ	E.10606	20 Way Socket	1

+ Note E5620 2 off for fully programmed system
     1 off for non programmed system

ˣ = not illustrated

REF NO.	PART NO	NOMENCLATURE	NO OFF
1*	A.OSU.26030	Detector Block	1
2*	A.OSU.26038	Cable Clip	2
3*	B.OSU.26050	Guide Block L/H	1
4*	A.OSU.26051	Guide Bar (Plastic) for Aluminum Slats	2
5*	A.OSU.26052	Guide Bar (st.stl) for Plastic Slats	2
6*	B.OSU.26056	Guide Block R/H	1
7*	C.OSU.26046	Carrier Bar (Lower)	1
8*	C.OSU.26048	Emitter Bar (Lower)	1
9*	C.OSU.26010	Glass Retaining Angle	4
10*	B.OSU.6131002	Glass Window	2
11*	C.OSU.26015	Emitter Strip 6 Drop	2
12*	C.OSU.26008	Emitter Strip 5 Drop	2
13*	C.OSU.26054	Emitter Strip 4 Drop	2
14*	C.OSU.25055	Emitter Strip 3 Drop	2
15*	A.OSU.26027	Rubbing Pad (Plastic) for Aluminum Slats	2
16*	A.OSU.26036	Rubbing Pad (St.Stl) for Plastic Slats	2
17*	A.OSU.26039	End Cover	1
18*	A.OSU.26040	End Cover	1
19*	A.OSU.26028	Proximity Switch Plate	1
20*	—	—	—
21*	A.OSU.26029	Proximity Switch Spacers	2
22*	—	—	—
23*	—	—	—
24*	—	—	—
25*	E.05620	Proximity Switch Omron TL-X2E1	1
26	—	—	—
27	—	—	—
28	—	—	—
29 *	B.OSU.26044	Mounting Plate L.H	1
30 *	B.OSU.26045	Mounting Plate R.H	1
31 *	C.OSU.26047	Carrier Bar (upper)	1
32 *	C.OSU.26095	Emitter Strip (5 card 6 drop)	2
33 *	A.SKZ.6407	Card (Emitter & Receiver)	10

(* = not illustrated)

REF NO.	PART NO	NOMENCLATURE	NO OFF
1*	C.OSU.26004	Mounting Bar - Lower	1
2*	C.OSU.26005	Emitter Carrier - Lower	1
3*	C.OSU.26006	Emitter Carrier - Upper	1
4*	B.OSU.26007	Bridge Pieces	2
5*	C.OSU.26008	Emitter Strips (5 drops per channel)	2
6*	C.OSU.26010	Clips for Windows	4
7*	A.OSU.26012	Rubbing Pads (Aluminum slats)	2
8*	C.OSU.26015	Emitter Strips (6 drops per channel)	2
9*	A.OSU.26016	Plate for Proximity Switch	1
10*	A.OSU.26017	Distance Piece for Switch	2
11*	A.OSU.26018	Plate for positioning of proximity switch (setting up)	1
12*	A.OSU.26041	Guide Plates (Aluminium slats)	2
13*	A.OSU.26114	Guide Plates (Plastic Slats)	2
14*	A.OSU.26115	Rubbing Pads (Plastic Slats)	2
15*	A.OSU.26116	Cable Clamp	2
16*	A.OSU.26117	End Cover for Top Bar	1
17*	A.OSU.26118	End Cover with Aperture	1
18*	B.OSU.6131002	Glass Window	2
19*	E.05620	Proximity Switch (Omron TL x 2 E1)	1

(Similar to Page 19)

(* = not illustrated)
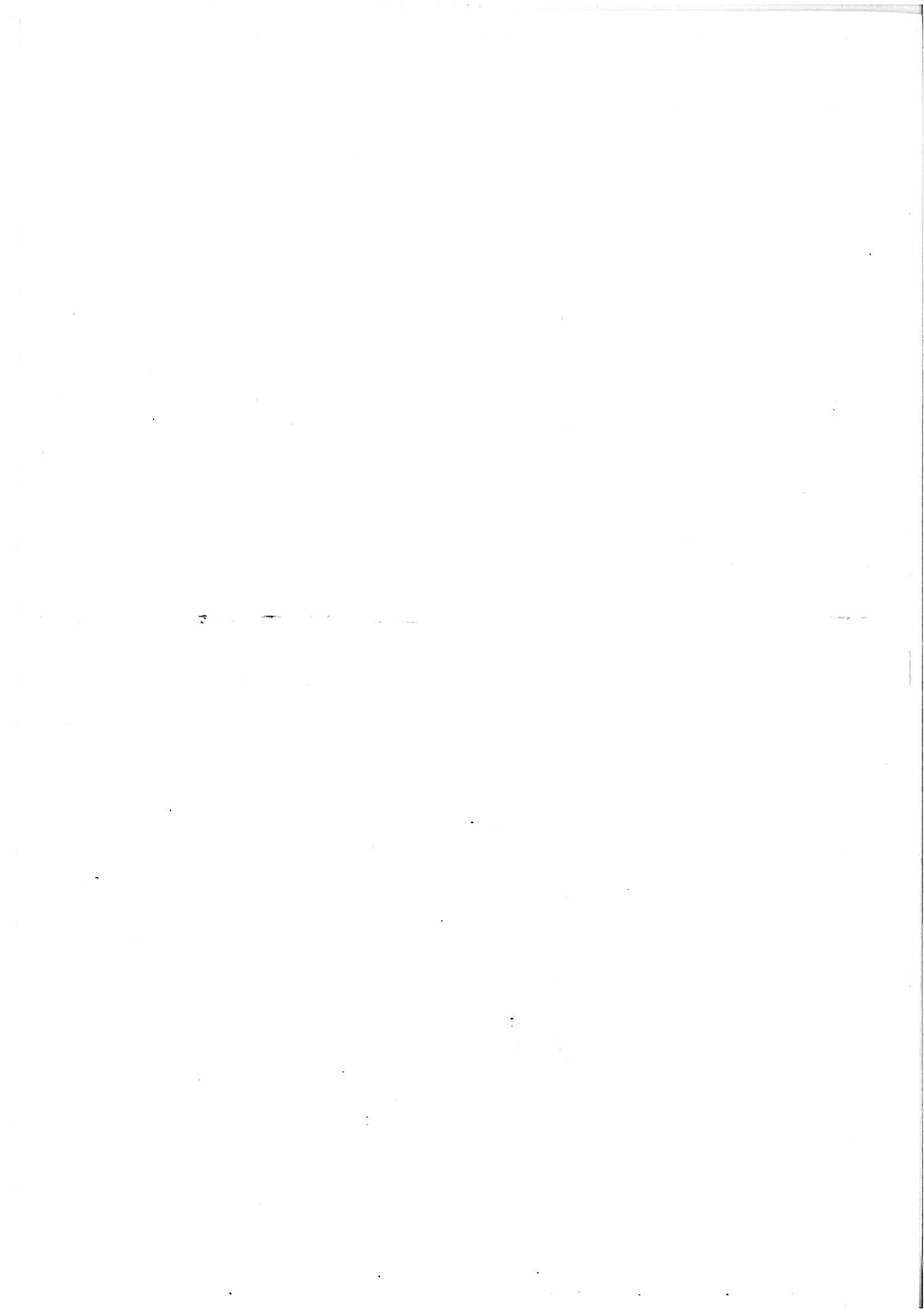
REF NO.	PART NO	NOMENCLATURE	NO OFF
	D.OSU.26063A	Scan System(15 Channels)Basic Parts(10303)	1
	SCM.52523	Options–Scan System 15 Channels(12855)	1
	D.OSU.26063B	Scan System(16Channels)Basic Parts (10308)	1
	SCM.52524	Options – Scan System 16 Channels(12856)	1
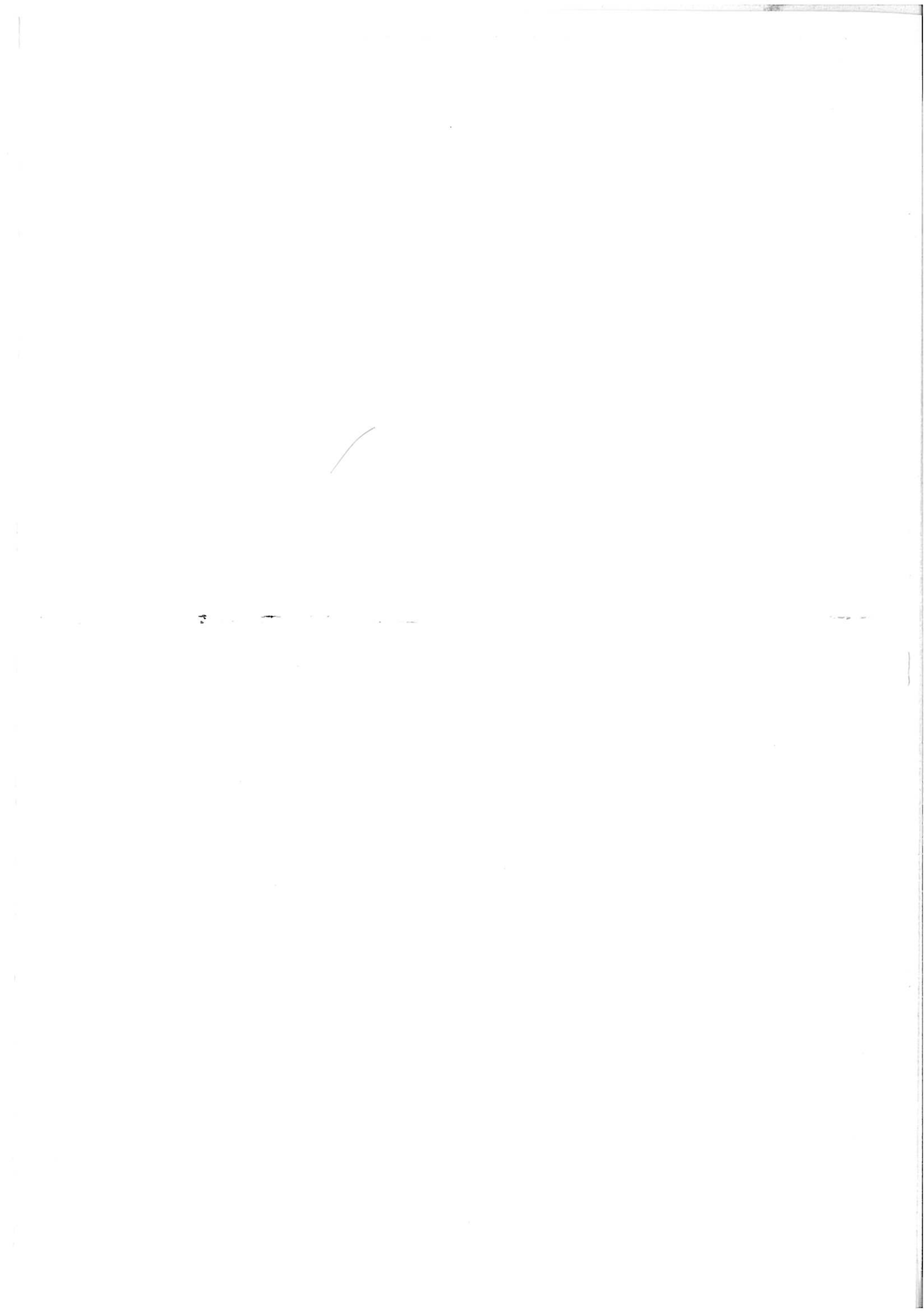
REF NO.	PART NO	NOMENCLATURE	NO OFF
	A.OSU.26030	Detector Block (welded to chain link) 5/8 chain	1
	A.OSU.26051	Guide Bar Plastic for Aluminum Slats	2
	A.OSU.26052	Guide Bar ST.STL for Plastic Slats	2
	D.OSU.26068A	Emitter Strip 6 Drop/Channel }	2
	D.OSU.26068B	Emitter Strip 5 Drop/Channel }	2
	D.OSU.26068C	Emitter Strip 4 Drop/Channel }	2
	D.OSU.26068D	Emitter Strip 3 Drop/Channel }	2
	A.OSU.26072	Rubbing Pad(Plastic) for Aluminum slats	2
	A.OSU.26073	Rubbing Pad(ST.STL) for Plastic slats	2
	A.OSU.26077	Proximity Switch Plate (Lower) 1¼" wide slats	1
	A.OSU.26081	Proximity Switch Plate (Lower) 1½" wide slats	1
	A.OSU.26085	Detector Block (welded to chain link 3/4 chain	1
	E.05620	Proximity Switch (1 off non programme) (2-off Full prog)	A/R
	E.5674	Proximity Switch (for scroll feed)	1

REF NO.	PART NO	NOMENCLATURE	NO OFF
	A.OSU.26030	Detector Block (welded to chain link) 5/8"chain	1
	A.OSU.26051	Guide Bar Plastic for Aluminum Slats	2
	A.OSU.26052	Guide Bar ST.STL for Plastic Slats	2
	A.OSU.26072	Rubbing Pad(Plastic) for Aluminum slats	2
	A.OSU.26073	Rubbing Pad(ST.STL) for Plastic slats	2
	A.OSU.26077	Proximity Switch Plate (Lower) 1¼" wide slats	1
	A.OSU.26081	Proximity Switch Plate (Lower) 1½" wide slats	1
	D.OSU.26082	Emitter Strip 4 drop/channel	2
	A.OSU.26085	Detector Block (welded to chain link) 3/4" chain	1
	E.05620	Proximity Switch (1 off non programme) (2 off Full programme)	A/R
	E.05674	Proximity Switch for Scroll Feed	1
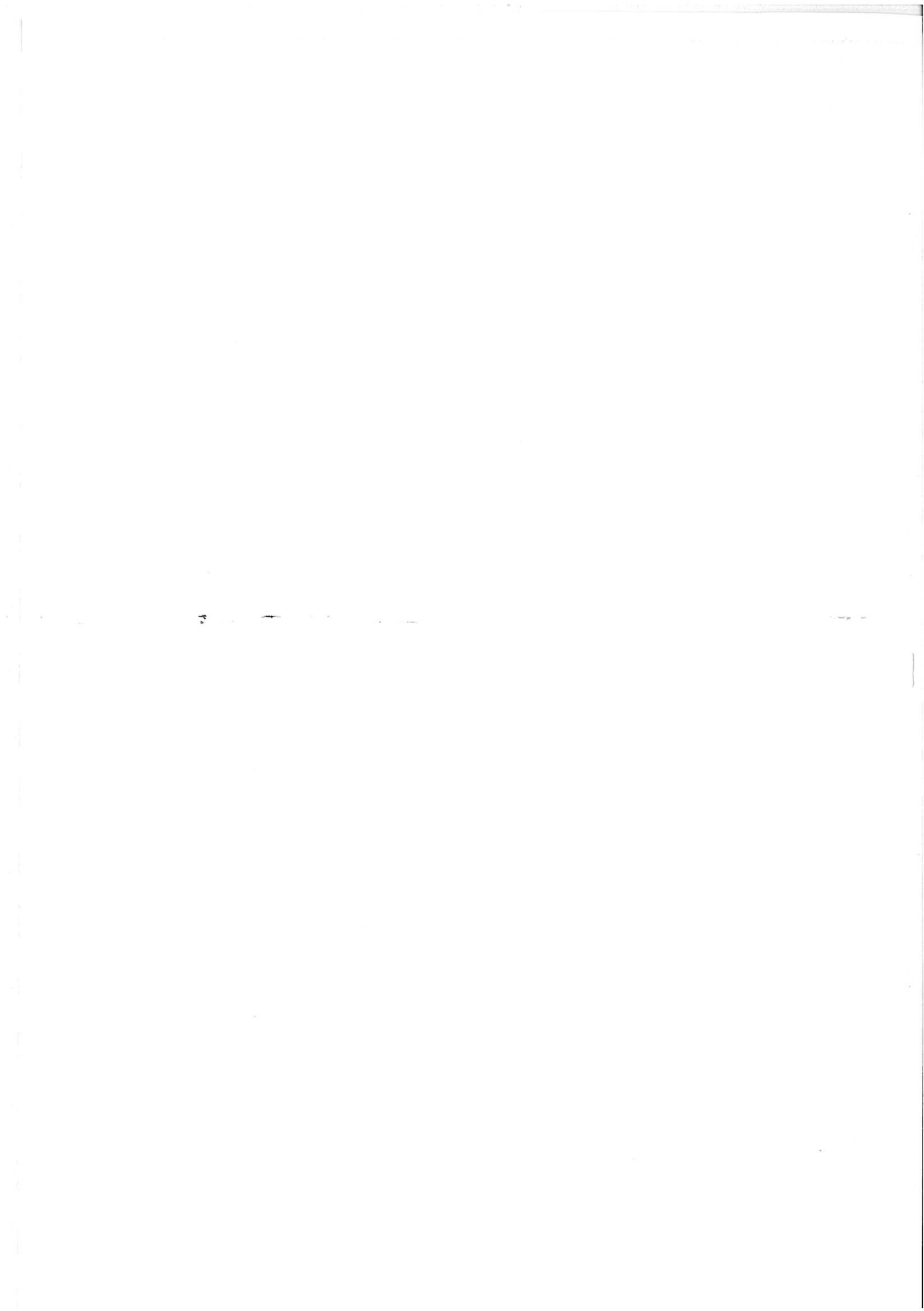
REF NO.	PART NO	NOMENCLATURE	NO OFF
	A.OSU.26030	Detector Block (welded to chain)	1
	A.OSU.26038	Cable Clip	1
	B.OSU.26050	Guide Block L/H	1
	A.OSU.26051	Guide Bar (Plastic) for Aluminum Slats	2
	A.OSU.26052	Guide Bar (ST.STL.) for plastic slats	2
	B.OSU.26056	Guide Block R/H	1
	D.OSU.26064	Carrier Bars A and B	1 each
	D.OSU.26083	Emitter Bars A and B	1 each
	C.OSU.26084	Glass Retaining Angle	3
	C.OSU.26067	Glass Windows	2
	A.OSU.26102	Glass Retaining Bracket	2
	—	—	—
	—	—	—
	—	—	—
	A.OSU.26072	Rubbing Pad(Plastic) for Aluminum Slats	2
	A.OSU.26073	Rubbing Pad(St.STL) for Plastic Slats	2
	A.OSU.26074	End Cover L/H	1
	A.OSU.26075	End Cover R/H	1
	A.OSU.26076	Proximity Switch Plate - Upper	1
	A.OSU.26077	Proximity Switch Plate-Lower(1¼"wide slats	1
	A.OSU.26078	Proximity Switch Pillars	2
	A.OSU.26079	Proximity Switch Ring Nuts	2
	A.OSU.26081	Proximity Switch-Lower-(1½" wide slats)	1
	A.OSU.26085	Detector Block (welded to chain)	1
	E.05620	Proximity Switch(non programmed system)	1
	—	Proximity Switch Omron TL-X2E1 (fully prog.system)	9
	E.05674	Proximity Switch Omron TL-XE1-G (" with scroll)	1
	E.5702	10 Way Plug	1
	E.5704	26 Way Plug	1
	E.10605	10 Way Socket	1
	E.10607	26 Way Socket	1

(similar to page 19)
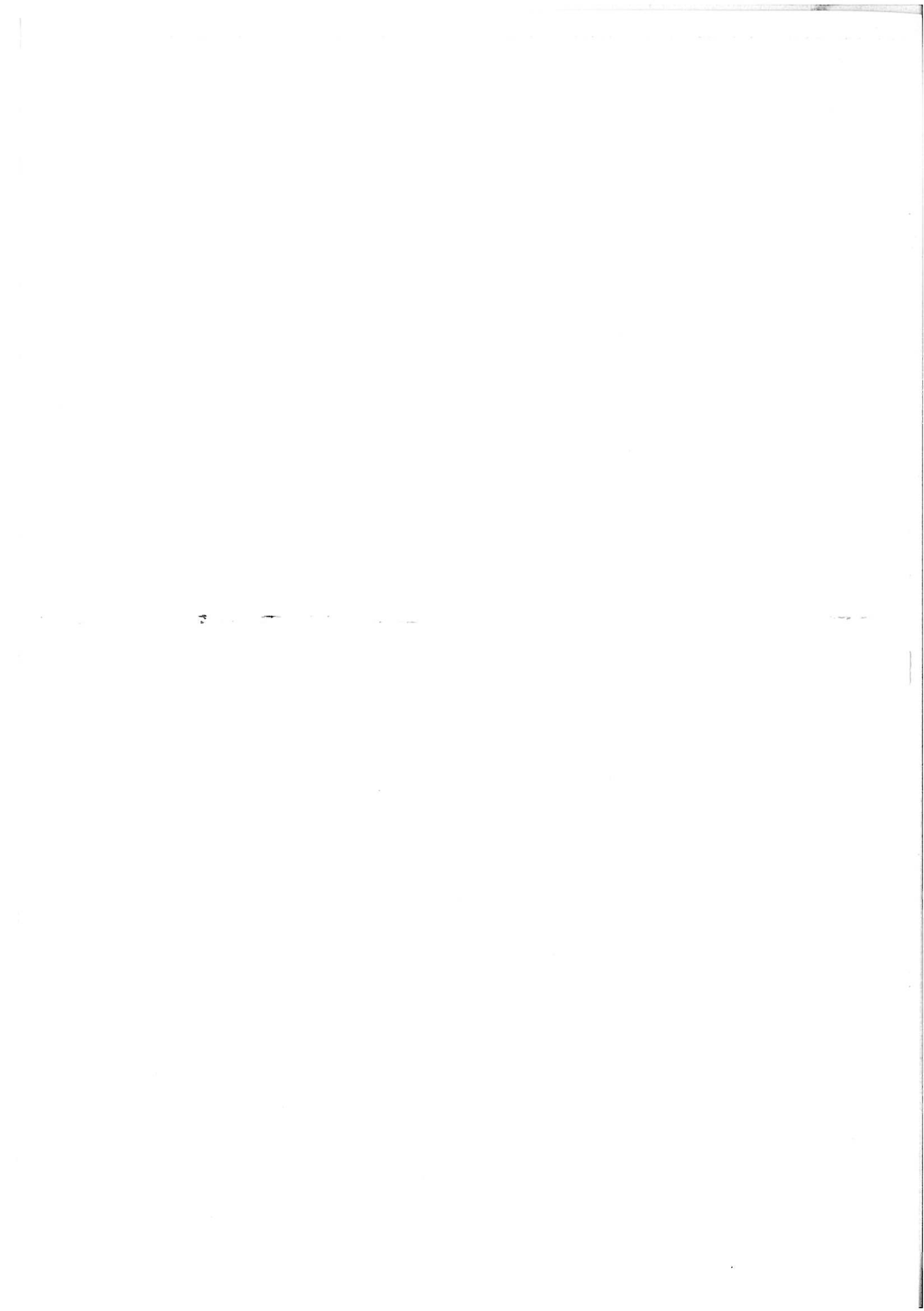
REF NO.	PART NO	NOMENCLATURE	NO OFF
	D.ECB.01046	Support Arm Assy (sch.No.6048)	1
	C.SCM.26817A	Rejection Cylinder Assy (basic parts)	1
	C.SCM.26817B	Additional Parts for Blow-Off rejection (12818)	1
	C.SCM.26817C	Additional Parts for Cylinder rejection (12819)	1
	C.SCM.26817D	Additional Parts for Blow-Off + Cylinder rejection	1
	F.SCM.26932	Scan Computer Support Arm Assy (10377)	1
	D.SCM.26983	Double Cylinder Rejection Assy (10376)	1
	SCM.52522	Options - Scan system various channels	1
	E.10111	Standard Computer (Geedev)	1
	E.10193	Special Computer (Geedev)	1
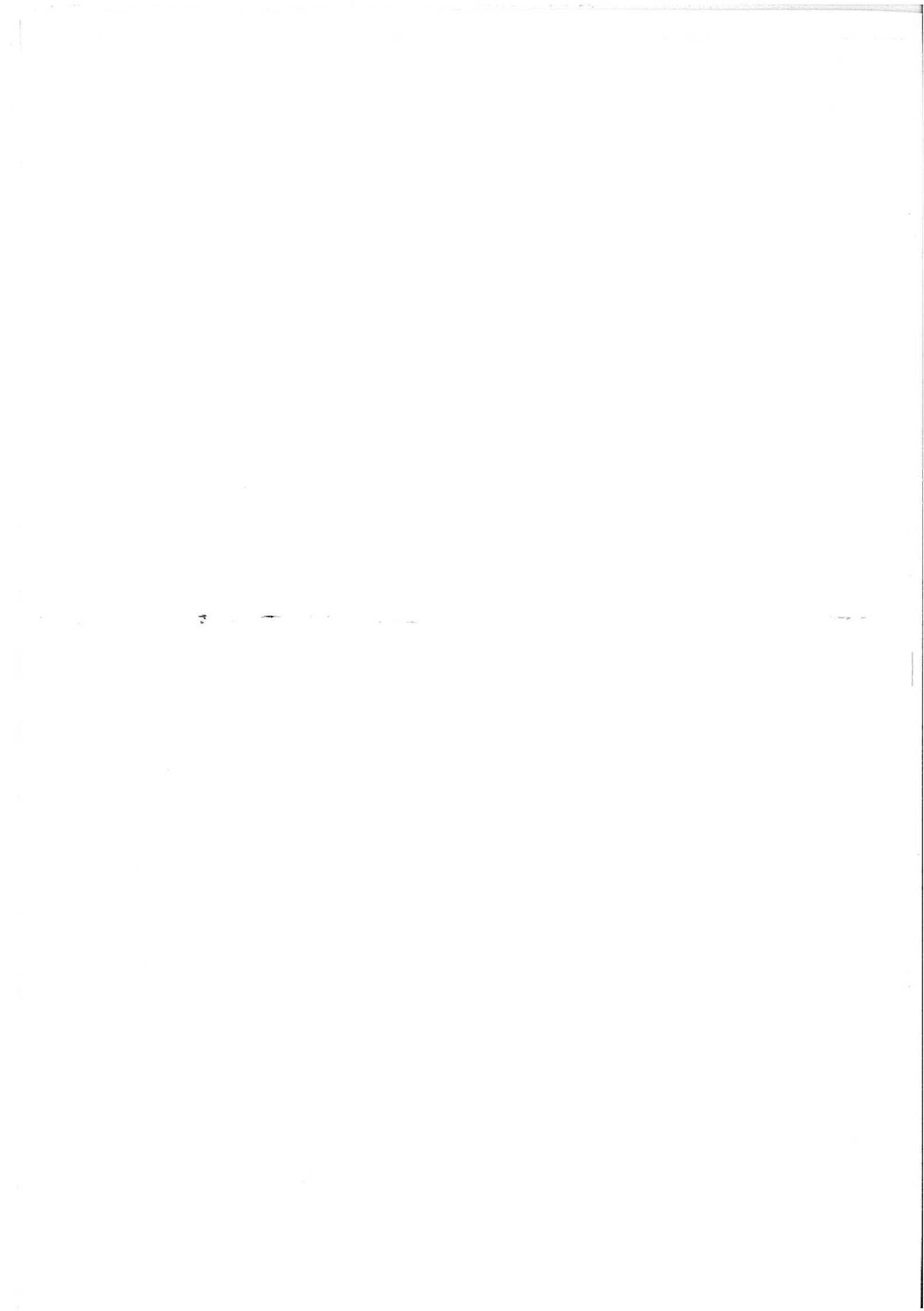
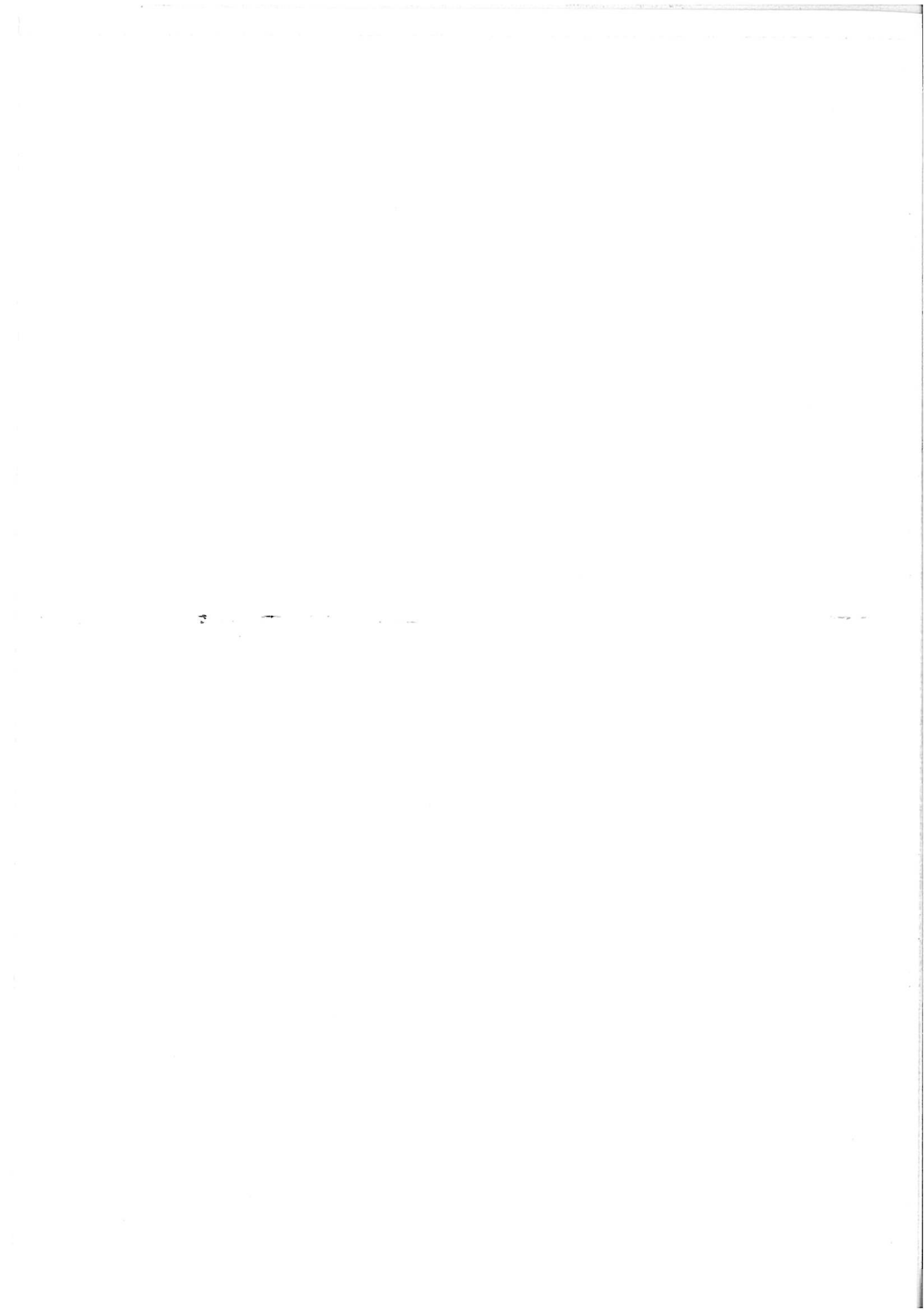| REF NO.	PART NO	NOMENCLATURE	NO OFF
	D.ECB.01046	Support Arm Assy (altvn to SCM.26932)	1
	D.OSU.26021	Scan System (Basic Parts)(sch.no.1034)	1
	C.SCM.26817A	Rejection Cylinder Assy (Basic Parts)	1
	F.SCM.26932	Scan Computer Support Arm Assy(sch.no.10377)	1
	F.SCM.52514	Options on Scan System (sch.no.12842)	1
	D.SCM.26983	Double Cylinder Rejection Assy(sch.No.12804)	1
	C.SCM.26817B	Additional Parts for Blow-Off Rejection	1
	C.SCM.26817C	Additional Parts for Cylinder rejection	1
	C.SCM.26817D	Additional Parts for both Blow-Off and Cylinder rejection	1
	E.10111	Std Computer (Geedev)	1
	E.10193	Special Computer (Geedev)	1

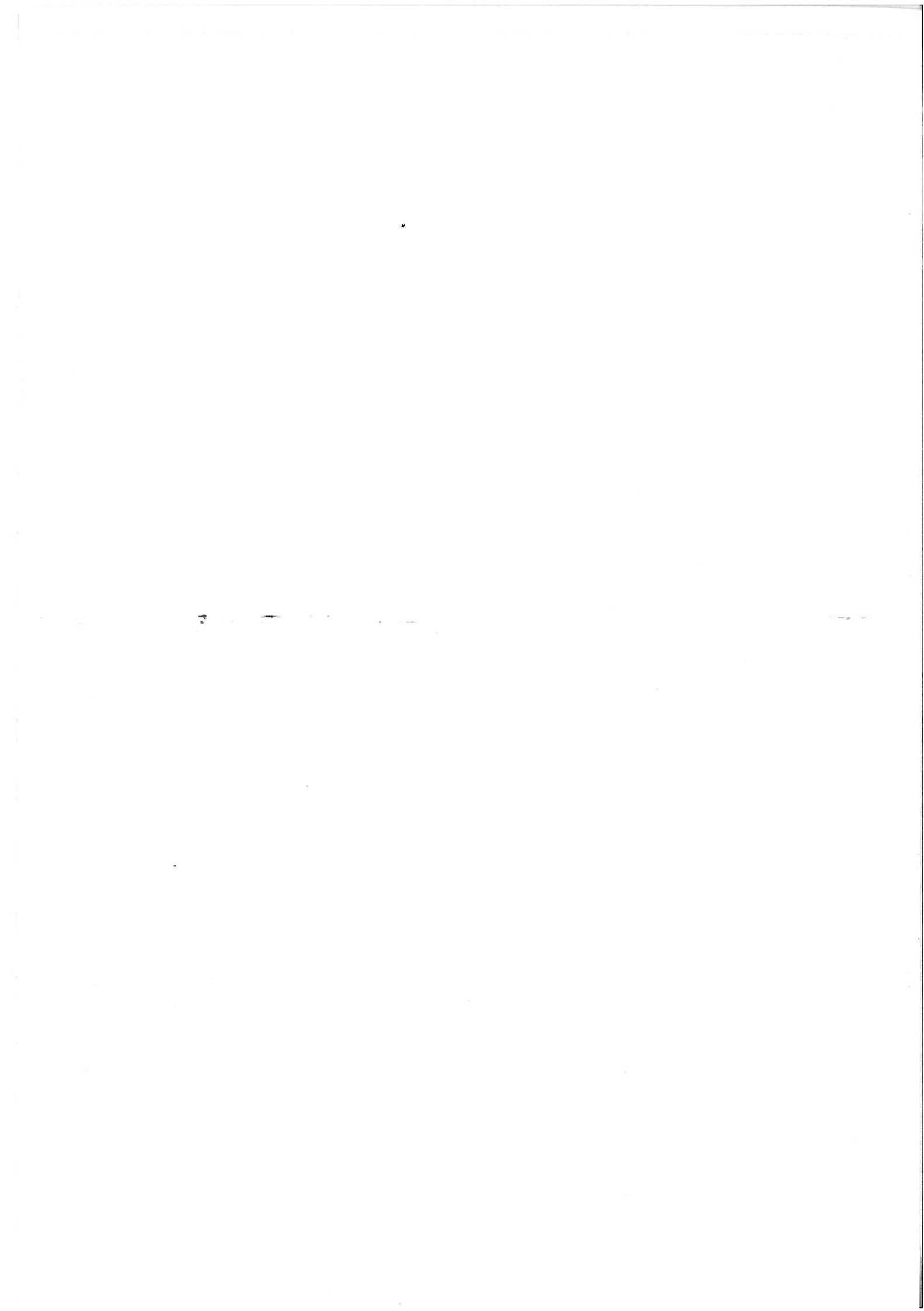| REF NO.	PART NO	NOMENCLATURE	NO OFF
	A.OSU.26027	Rubbing Pad Plastic(Used with Alum Slats)	2
	A.OSU.26030	Detector Block (welded to chain link 5/8" pitch)	1
	C.OSU.26031	Emitter Strip 6 drops/channel	2
	A.OSU.26036	Rubbing Pad Stainless Steel (used with plastic slats)	2
	A.OSU.26051	Guide Bar Plastic (used with Alum Slats)	2
	A.OSU.26052	Guide Bar Stainless Steel (used with plastic slats)	2
	C.OSU.26057	Emitter Strip 5 drops/channel	2
	C.OSU.26058	Emitter Strip 4 drops/channel	2
	C.OSU.26059	Emitter Strip 3 drops/channel	2
	A.OSU.26077	Proximity Switch Plate (Lower) 1¼"wide slats	1
	A.OSU.26081	Proximity Switch Plate (Lower) 1½" wide slats	1
	A.OSU.26065	Detector Block(welded to chain, 3/4"pitch)	1
	E.05620	Proximity Switch (1 off or 2 off for full prog.)	A/R
	E.05674	Proximity Switch (for scroll feed)	1

REF NO.	PART NO	NOMENCLATURE	NO OFF
1*	A.OSU.26085	Detector Block(welded to chain)	1
2*	A.OSU.26038	Cable Clip	1
3*	B.OSU.26050	Guide Block L/H	1
4*	–	–	–
5*	A.OSU.26052	Guide Bar (st.stl) for Plastic Slats	2
6*	B.OSU.26056	Guide Block R/H	1
7*	C.OSU.26112	Carrier Bar A and B	1 each
8*	C.OSU.26062	Emitter Bar A and B	1 each
9*	C.OSU.26033	Glass Retainer	4
10*	B.OSU.6131000	Glass Window	2
11*	C.OSU.26060	Emitter Strip (5 x 2 drop)	2
12*	–	–	–
13*	–	–	–
14*	–	–	–
15*	–	–	–
16*	A.OSU.26036	Rubbing Pad (St.Stl) for Plastic Slats	2
17*	A.OSU.26039	End Cover L/H	1
18*	A.OSU.26040	End Cover R/H	1
19*	A.OSU.26076	Proximity Switch Plate - Upper	1
20*	A.OSU.26081	Proximity Switch Plate - Lower (1½" Slats)	1
21*	A.OSU.26078	Proximity Switch Pillars	2
22*	A.OSU.26079	Ring Nut	2
23*	–	–	–
24*	–	–	–
25*	E.05620	Proximity Switch (Omron TL-X2E1)	3
26	–	–	–
27	–	–	–
28*	D.OSU.26094	Aligning Bar	1

(* = not illustrated)
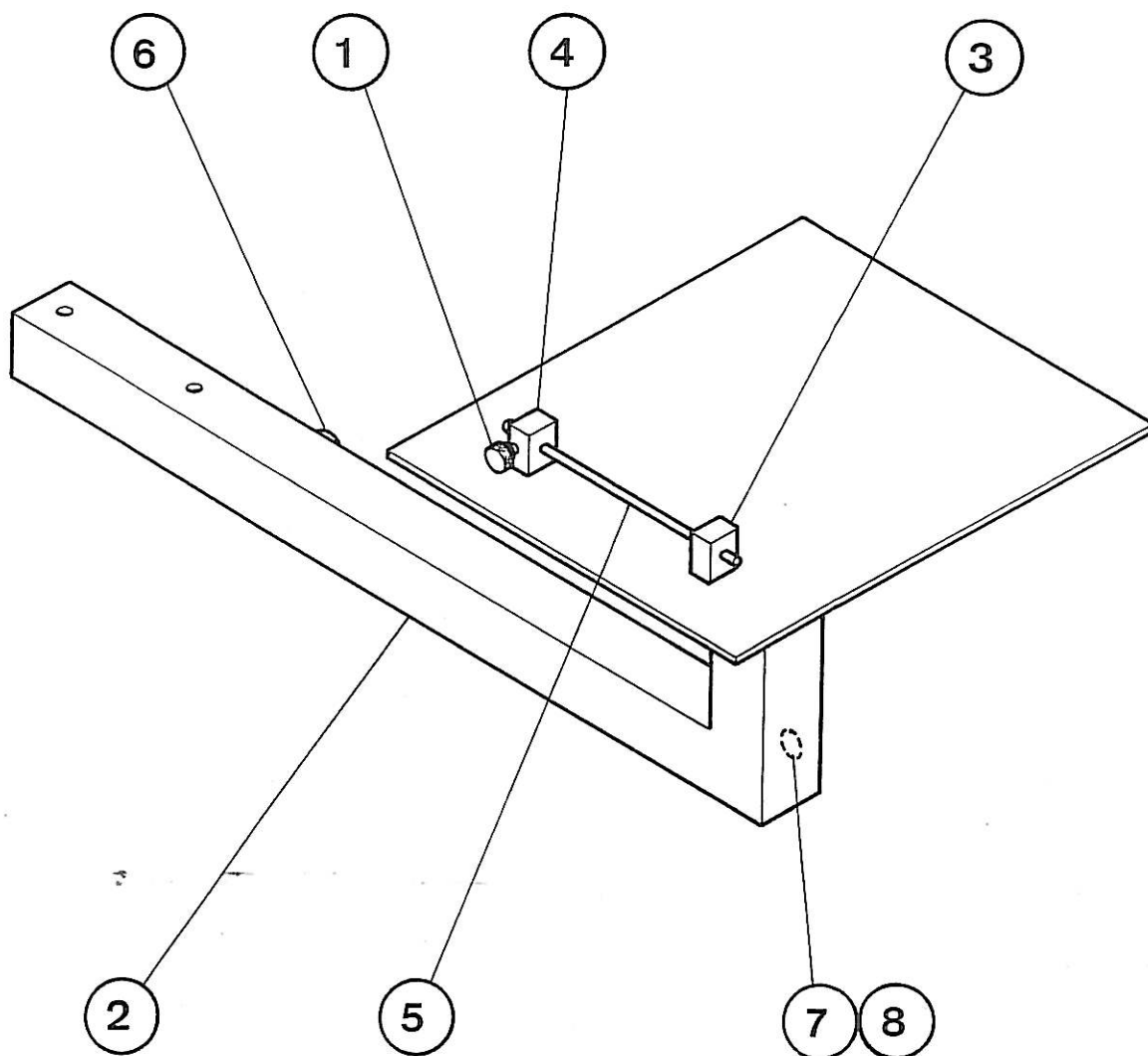
REF No	PART No	NOMENCLATURE	UNIT PER ASSY
		SUPPORT ARM ASSEMBLY — D.ECB.1046 — SCHEDULE 6038	
1	A.TB.144	Thumb Screw	1
2	D.ECB.1048	Support Arm	1
3	A.ECB.1049	Support Block L/H	1
4	A.ECB.1050	Support Block R/H	1
5	A.ECB.1052	Support Bar	1
6	E.01010	Adaptor	1
7	E.02819	Gland	1
8	E.04910	Locking Nut	1
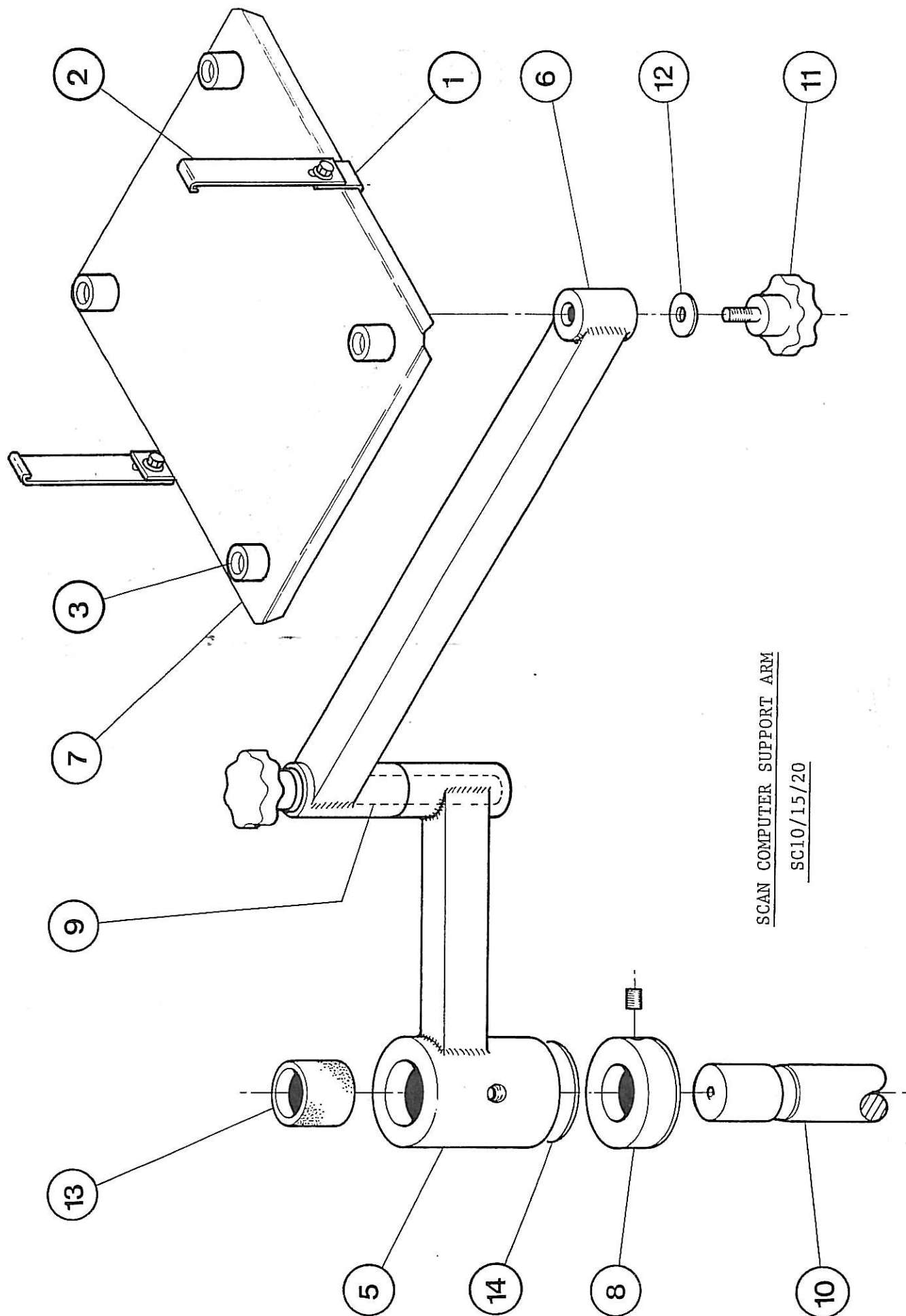
SCAN COMPUTER SUPPORT ARM
SC10/15/20

31

SCAN COMPUTER SUPPORT ARM		F.SCM.26932	SCHEDULE 10377

REF NO.	PART NO.	NOMENCLATURE	UNIT PER ASSY
1	A.SCM.6151170	Computer Clamp (lower)	2
2	B.SCM.6151171	Computer Clamp (upper)	2
3	A.SCM.6151172	Computer Mounting Foot	4
4	-	--	-
5	D.SCM.6151389	Arm	1
6	D.SCM.26825	Top Arm	1
7	C.SCM.6151121	Support Plate	1
8	B.SCM.26827	Collar	1
9	A.SCM.26828	Shaft	1
10	B.SCM.26829	Pillar	1
11	A.SCM.26830	Hand Knob	3
12	A.SCM.26831	Spacer	2
13	M.016	Bush Ø40 x Ø44 x 40 mm long	2
14	M.6432	Thrust Washer Ø 42 x Ø 66 x 1.5mm thick	1

(*=not illustrated)

OUTPUT CIRCUIT DIAGRAM

TL-X□E□-G DC switching (NPN)

Dotted line denotes the circuit when the load is transistor circuit

Detectable object	Present	Absent
Load (between Black and Blue)	Operates	Releases
Operation indicator (LED)	ON	Off

TL-X□E1-G
TL-X□E2-G

200 mA max (load current) *1.5 to 5 mA (constant current output)

TL-X□F□-G DC switching (PNP)

Dotted line denotes the circuit when the load is transistor circuit

Detectable object	Present	Absent
Load (between Black and Blue)	Operates	Releases
Operation indicator (LED)	ON	Off

TL-X□F1-G
TL-X□F2-G

200 mA max (load current) *1.5 to 5 mA (constant current output)

MAINTENANCE AND INSPECTION
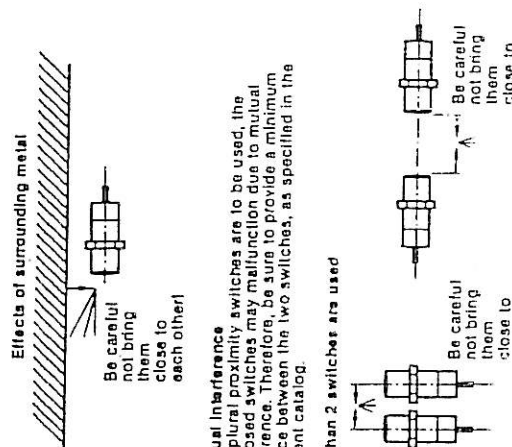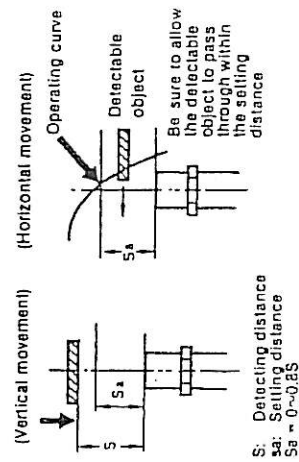
Check the following items when the proximity switch does not operate upon putting a detectable object close to the switch or when the proximity switch does not release upon keeping the detectable object away from the switch.
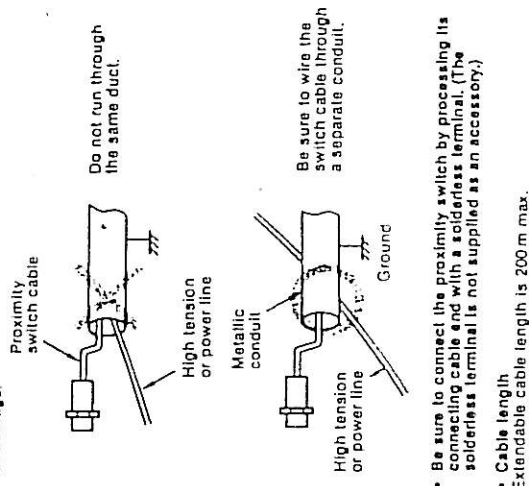

HINTS ON CORRECT WIRING

- If a high voltage or power line runs near the proximity switch cable, be sure to wire the switch cable through a metallic conduit to prevent the switch from malfunctioning or damage.

- Be sure to connect the proximity switch by processing its connecting cable and with a solderless terminal. (The solderless terminal is not supplied as an accessory.)

- Cable length
Extendable cable length is 200 m max.

- How to determine setting distance (for stable operation)
- The detecting distance and setting distance of the proximity switch will vary depending on the shape, size and material of a object to be detected. Therefore, confirm the proper detecting and setting distance beforehand.
- When a detectable object is smaller than the standard detectable object (iron), the detecting distance will become shorter. However, the detecting distance will not become longer even if an object larger than the standard detectable object is used.

S: Detecting distance
Sa: Setting distance
Sa = 0~0.8S

(For horizontal movement, refer to the operating range diagram shown in the catalog to confirm the proper setting distance)

- Effects of surrounding metals
When a metallic object other than the object to be detected exists in the area surrounding the detecting head, the proximity switch may be affected by the surrounding metal and may not release properly. Even if the proximity switch releases properly, a change in the detecting distance may occur by temperature, etc.
Therefore, be sure to provide a minimum distance from the surrounding metallic object, as specified in the pertinent catalog.

Effects of surrounding metal

Be careful not bring them close to each other!

- Mutual interference
When plural proximity switches are to be used, the juxtaposed switches may malfunction due to mutual interference. Therefore, be sure to provide a minimum distance between the two switches, as specified in the pertinent catalog.

More than 2 switches are used

Be careful not bring them close to

OUTLINE DIMENSIONS

TL-X□ME(F)□-G

Polyvinyl chloride insulated cable, 3·0.5 mm², O.D.: 6

2-clamping nuts
2-toothed washers
Connection label
LED

(unit: mm)

Dimensions Type	M	A	B	C	D	E	F
TL-X5ME(F)□-G	M12 × 1	45.5	7.5	30	17	4	7
TL-X10ME(F)□-G	M18 × 1	46.5	8.5	31	24	4	10
TL-X18ME(F)□-G	M30 × 1.5	49.5	8.5	34	36	5	13

TL-X1E(F)□-G

M8×1
2-clamping nuts
2-toothed washers
Connection label

Polyvinyl chloride insulated cable, 3·0.14 mm², O.D.: 3.5

TL-X□E(F)□-G

2-clamping nuts
2-toothed washers
Connection label
LED

Polyvinyl chloride insulated cable, 3·0.5 mm², O.D.: 6

(unit: mm)

Dimensions Type	M	A	B	C	D	E
TL-X2E(F)□-G	M12 × 1	45.5	7.5	30	17	4
TL-X5E(F)□-G	M18 × 1	46.5	8.5	31	24	4
TL-X10E(F)□-G	M30 × 1.5	49.5	8.5	34	36	5

Types available and Rating.

Outside dia.	M8	M12	M18	M30	M12	M18	M30
Detecting distance	1 mm	2 mm	5 mm	10 mm	5 mm	10 mm	18 mm
Mounting metals	Possible (shielded type)				Impossible (Non-shielded type)		
Output form NPN OFF	TL-X1E1-G	TL-X2E1-G	TL-X5E1-G	TL-X10E1-G	TL-X5ME1-G	TL-X10ME1-G	TL-X18ME1-G
Output form NPN ON	TL-X1E2-G	TL-X2E2-G	TL-X5E2-G	TL-X10E2-G	TL-X5ME2-G	TL-X10ME2-G	TL-X18ME2-G
Output form PNP OFF	TL-X1F1-G	TL-X2F1-G	TL-X5F1-G	TL-X10F1-G	TL-X5MF1-G	TL-X10MF1-G	TL-X18MF1-G
Output form PNP :ON	TL-X1F2-G	TL-X2F2-G	TL-X5F2-G	TL-X10F2-G	TL-X5MF2-G	TL-X10MF2-G	TL-X18MF2-G
Movement Differential	Under 10% of detecting distance						
Detectable object	Magnetic metals (See reference the catalogue for non-magnetic metals)						
Switching capacity	200 mA. MAX (It need to decrease in over 70°C of ambient temperature)						
Power supply	10 ~ 40V. D.C.						
Ambient temperature	−40 ~ +85°C						

*Output form indicate condition of the switching element in case of NO detectable object

Strength Type	A Dimension	A Strength (torque)	B Strength (torque)
TL-X1E(F)□-G	11 mm	20 kg-cm	30 kg-cm
TL-X2E(F)□-G	17 mm	60 kg-cm	100 kg-cm
TL-X5E(F)□-G	21 mm	150 kg-cm	500 kg-cm
TL-X10E(F)□-G	24 mm	400 kg-cm	1500 kg-cm
TL-X5ME(F)□-G	10 mm	60 kg-cm	100 kg-cm
TL-X10ME(F)□-G	11 mm	150 kg-cm	500 kg-cm
TL-X18ME(F)□-G	11 mm	400 kg-cm	1500 kg-cm

• Avoid using the proximity switch in outdoor locations (subject to direct sunlight, rainwater, etc.).

• Avoid using the proximity switch in an atmosphere of chemicals, especially strong alkali, acid (such as nitric acid, chromic acid, hot concentrated sulfuric acid, etc.).

Chemicals

• Mounting

Do not tighten the proximity switch excessively.

(Non-shielded type)
(Shielded type)

NOTE:
Tightening strength differs depending on the location of the clamping nut from the face of the detecting head. The following table show the tightening torque applicable to each type when the nut is to be tightened in location A (e.g., within 11 mm from the face of the detecting head) or in location B as shown in the drawing shown above

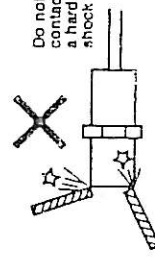## ■ HINTS ON CORRECT USE

• Handling
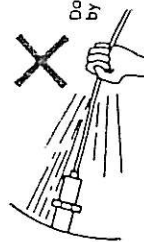
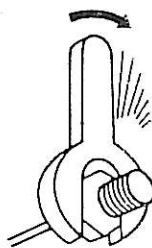Do not swing the proximity switch by its cable.
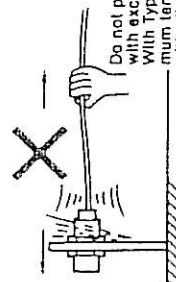
Do not pull the proximity switch with excessively large force. With Type TL-X1E(F), the maximum tensile strength is 7 kg, while with all other types, it is 16 kg.
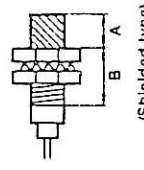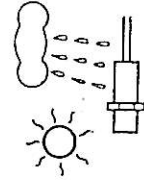

Do not allow the sensor to make contact with a detectable object or a hard substance, or do not apply shock to the sensor