KRISTAL TABLE

TECHNICAL MANUAL

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1.1 GENERAL DESCRIPTION

- **KRISTAL 90/90 TILTING**
- **KRISTAL 90/20 TILTING**

A compact and versatile Unit, tilting table remote controlled for fluoroscopy, Angio-seriographic and fluoroscopic examinations.

Due to its versatility and easy operation it is suitable for any type of routine or special examination without clinical limitations.

Thanks to its lightweight small overall dimensions and its electronic anti-collision system, it can be installed in the smallest diagnostic rooms

The wide longitudinal travel of the column allows a complete X-ray examination without need to reposition the patient.

All movements are silent, which contributes o give to the patient a great safety during the examinations.

The tilting movement facilitates to stop in any position in addition to automatic stop in horizontal, vertical and Trendelemburg positions.

The Spot film device allows automatic tomographies, universal tomographies from 0° to 40°, and additionally serio angiographies in any position. When the table is tilted it is also possible to perform oblique projections with 30° incidences.

The table tilting allows you to make examinations on external accessories only on one side (for KRISTAL 90°/20°) or on both sides (for KRISTAL 90°/90°).

All movements are controlled via a watchful microprocessor, which incorporates a self-diagnostics program. End of runs have double safety action for additional safety.

The control console has an ergonomic design with touch screen panel. This intuitive control panel allows a simple user interface to operational parameters and control commands supported by a large selection on display graphics.

Parameters such as focus film distance, tilting angles, incidence, tomo layer height with self-increase, execution time, cassette size with its programs, are also shown on the graphic display.

The main functions of the system are also selectable on the push button panel, which is located on the spot film device.

The auto-centring cassette system of S.F.D. can select all cassette sizes from 18x24 cm to 35x43 cm with longitudinal division of the format with mixed divisions.

Preset for digital system, spot film device and image intensifier from 9” to 16”.

- **General Technical Features**

Type:

- ❑ KRISTAL 90/90
- ❑ KRISTAL 90/20

Power supply:	3x230V~ (400V~) 7kVA
Power output of auxiliary mains socket-outlets	230V~ 1.4kVA 50Hz

- **Technical Data:**

Tilting table with progressive starting	+ 90°/-90°, +90°/-20°
Tilting speed	4 °/sec
Tabletop	73 x 240 cm
Absorption coefficient	≤ 0,8 mm Al.
Max patient weight	140Kg
Lateral movement	±11,5 cm (Max speed 3 cm/sec)
Plane-film distance	7,5 cm
Film – I.I. distance	7.5 cm
Movement column	1400 mms (Max speed 13 cm/sec)
X-ray tube assembly rotation	+ 90° manually
Focus-film distance	from 107 to 153 cm (Max speed 3 cm/sec)
Tube angulation	± 30°
Compression	Motorized
Angiography	Step by step
Prepared to receive Image Intensifier	9", 12", 14", 16"

- **Tomographic Function**

Linear tomography plain plain	
Tomographic angles	8°, 15°, 30°, 40°
Tomographic speeds	4 speeds
Layer height adjustment	1 → 300mm
Fixed SID	110cm

- **SFD**

S.F.D. electronic automatic
Film divisions only in vertical sense; Division for 2/3/4/5/6
Prepared for3 fields ionisation camera (5 mm. max thick.)
S.F.D. allows rapid series exposures
Cassettes from 18x24 to 35x43 cm in both directions
Transition time between fluoro and radiography about 1 sec.
Motorized scattering grid
Possibility to have radio and tomo exposures on the same film

- **Tube Features**

Max. Weight of X-ray tube	24Kg

- **Weight** 950 kg

- **Optional**

Compression band
Lateral cassette holder

- **Electric Classification**

Class:	I with applied part of B type

- **Required environmental features**

Temperature:	Operative +10°C to +35°C Storage –10°C to +40°C
Maximum Humidity	80% without dew
Maximum Altitude for using	3500 meters

Note: Do not use the equipment in flammable or explosive environments.
Equipment not protected against water.

- **Use Conditions:**

Continuous functioning with intermittent charge.

Manufactured for
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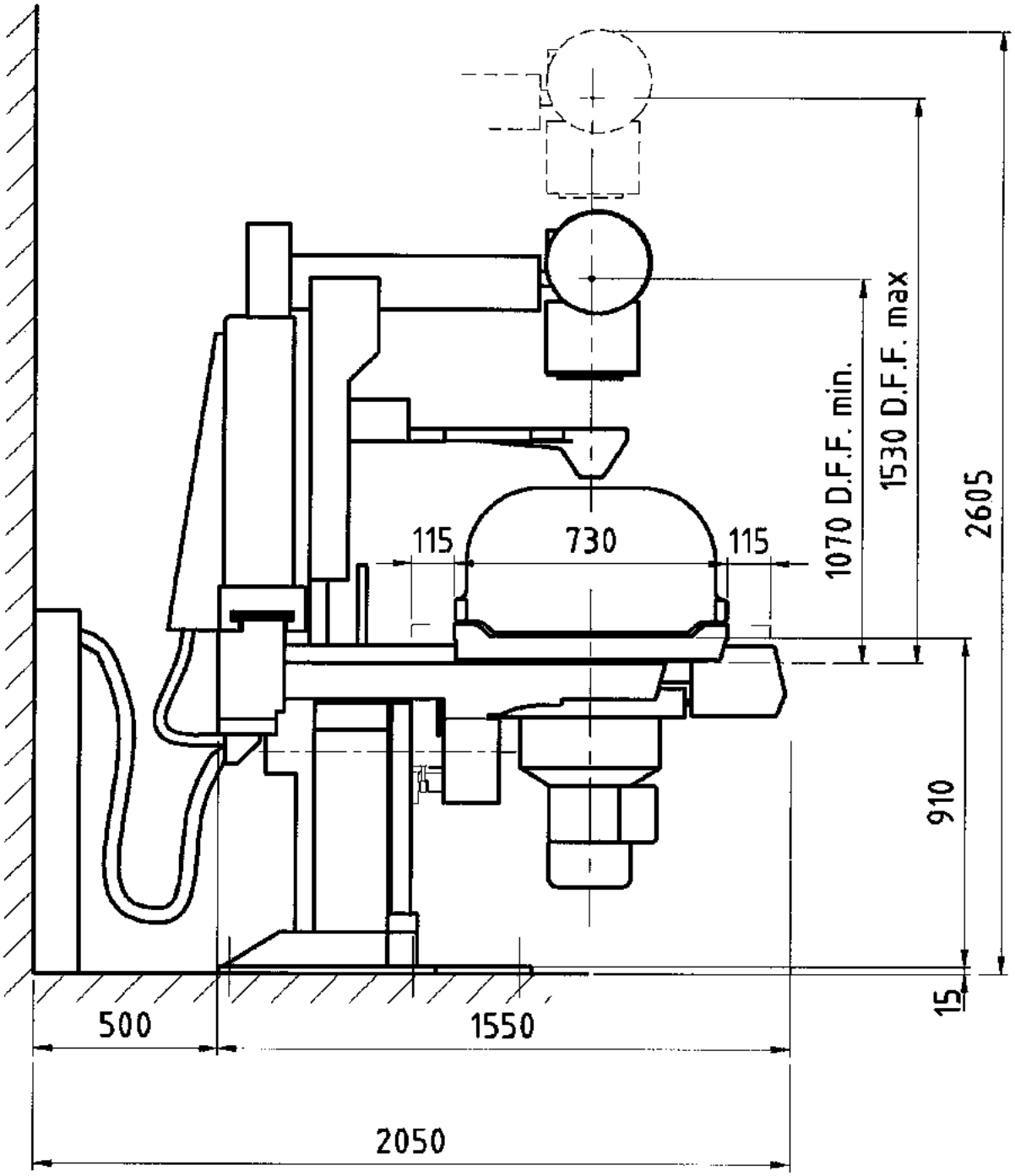
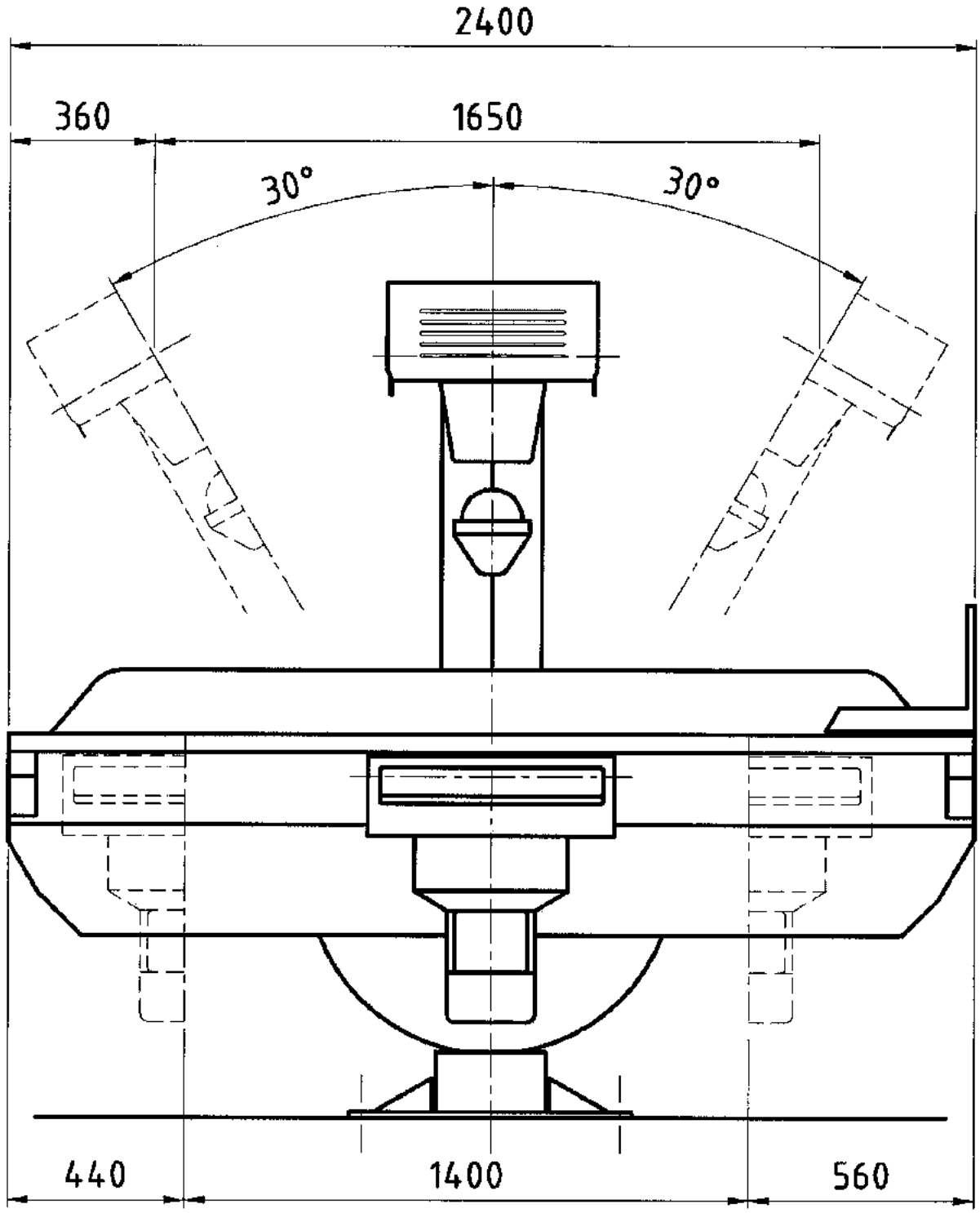
1.2 DIMENSIONS

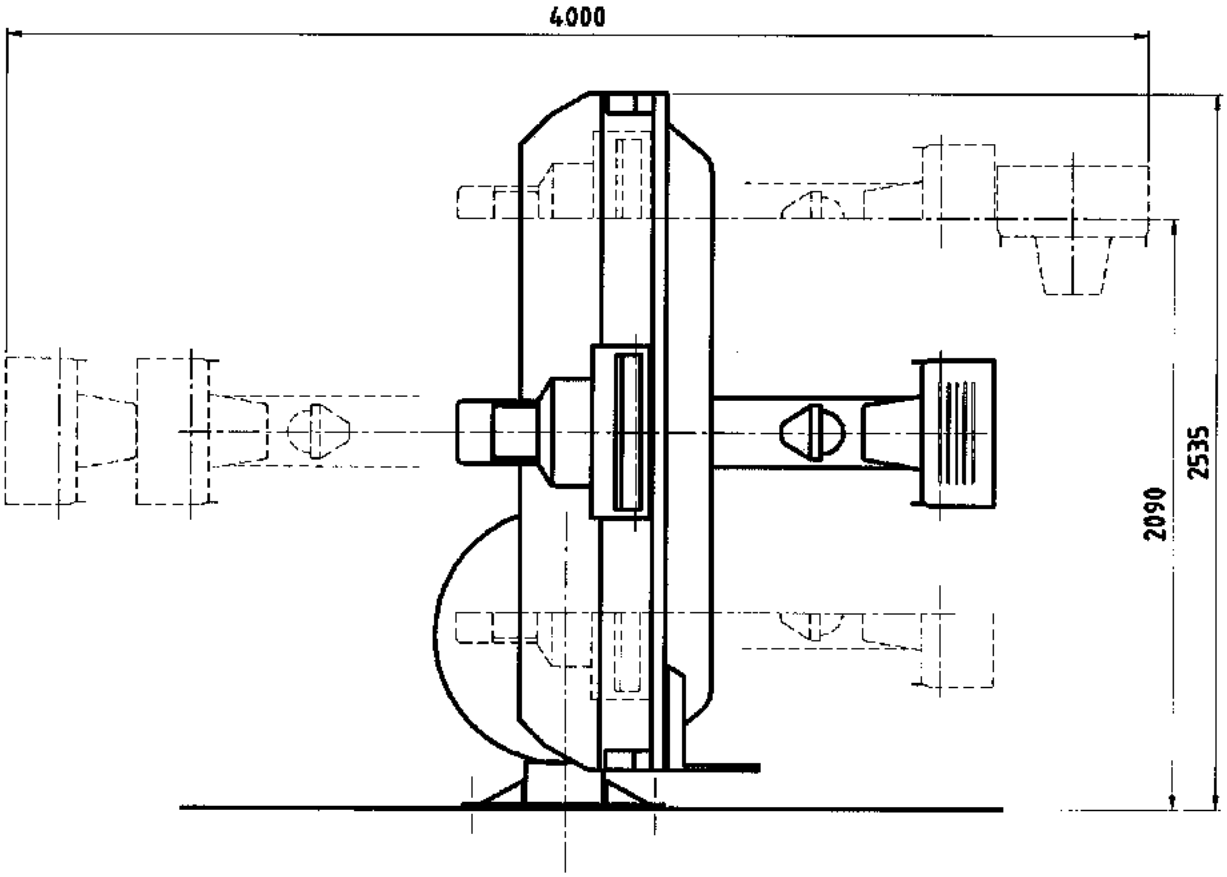
- **Lateral view KRISTAL 90/90 tilting**



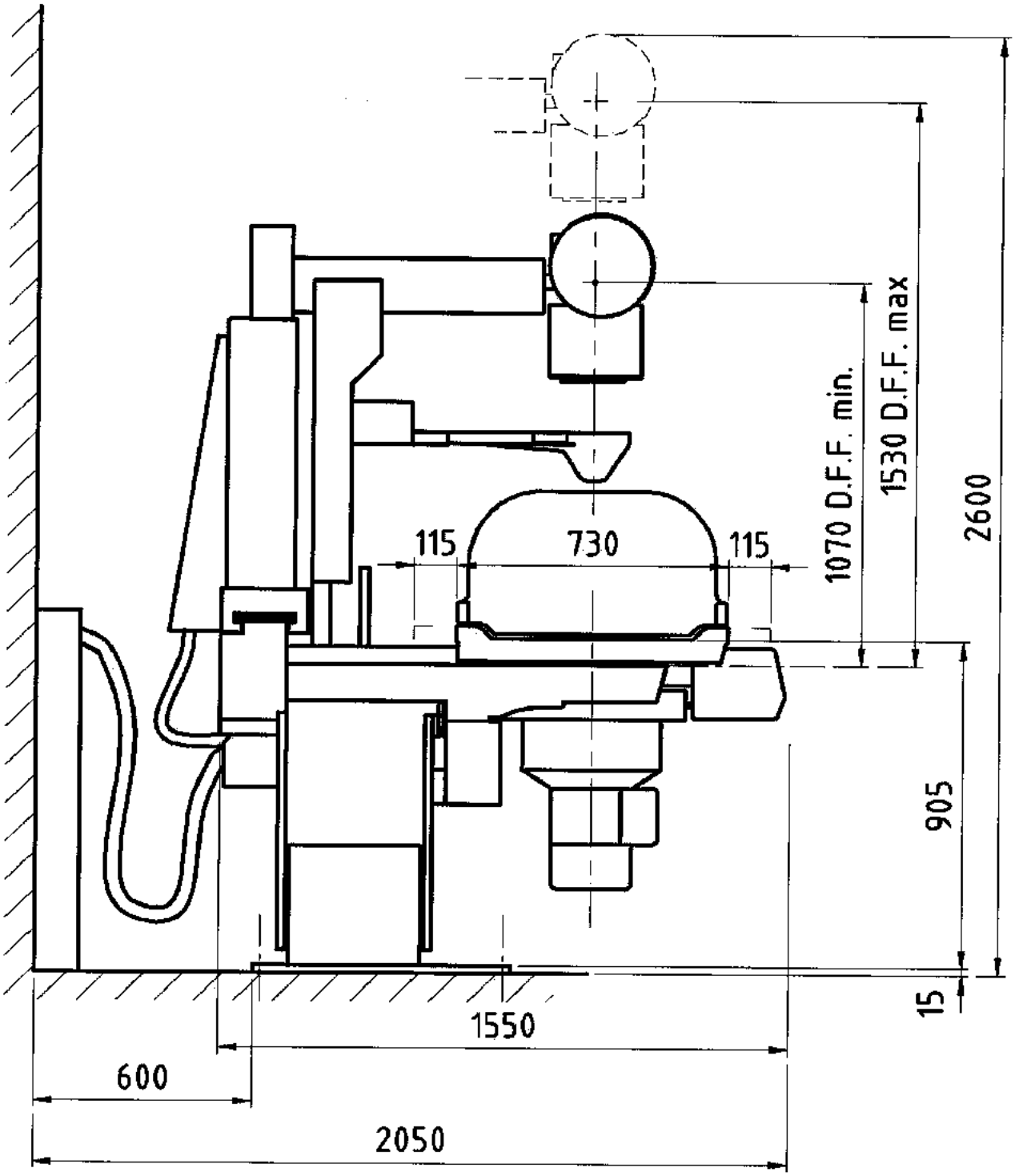
- **Frontal view KRISTAL 90/90 tilting**



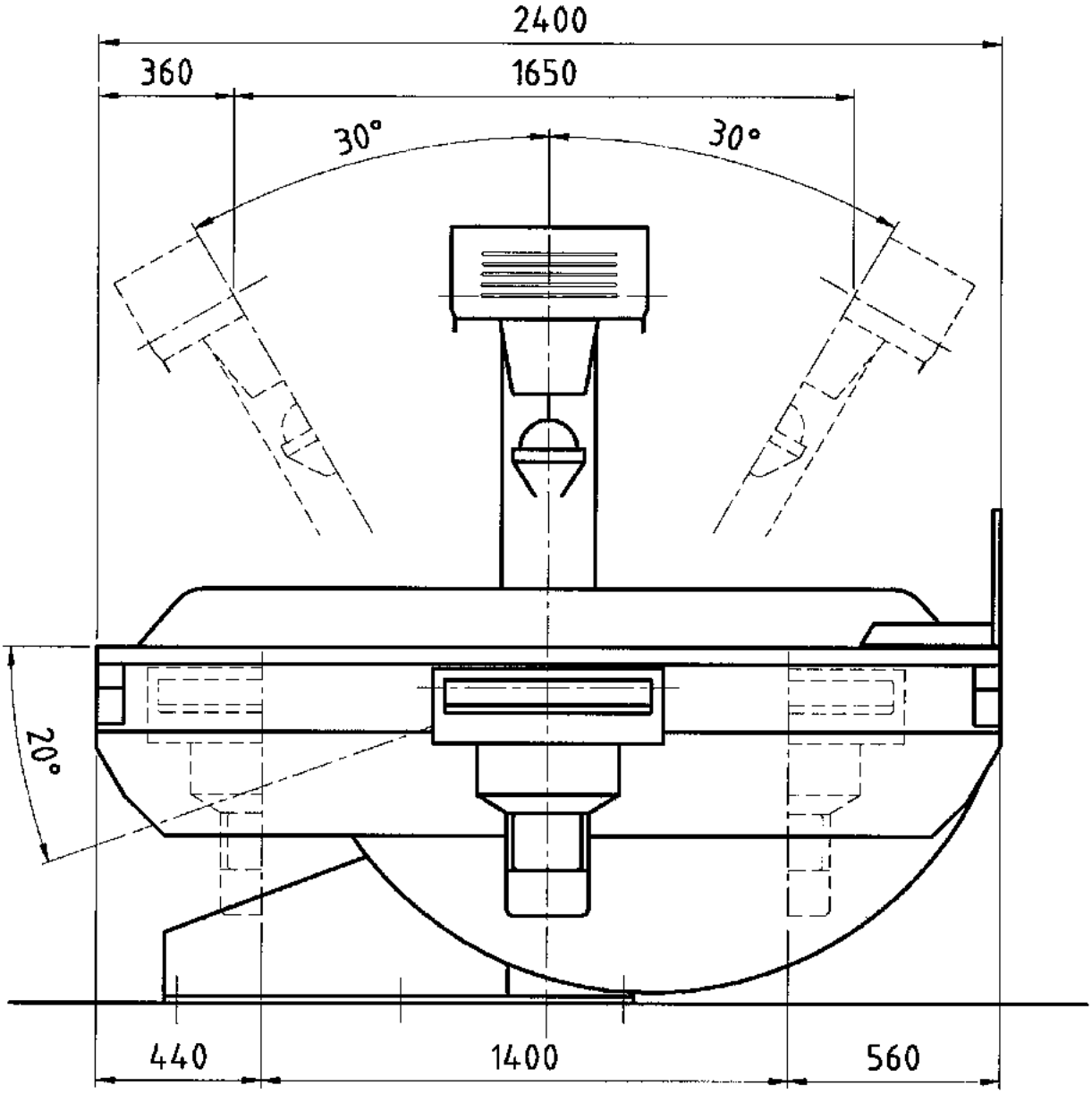
- **Frontal view KRISTAL 90/90 tilting**



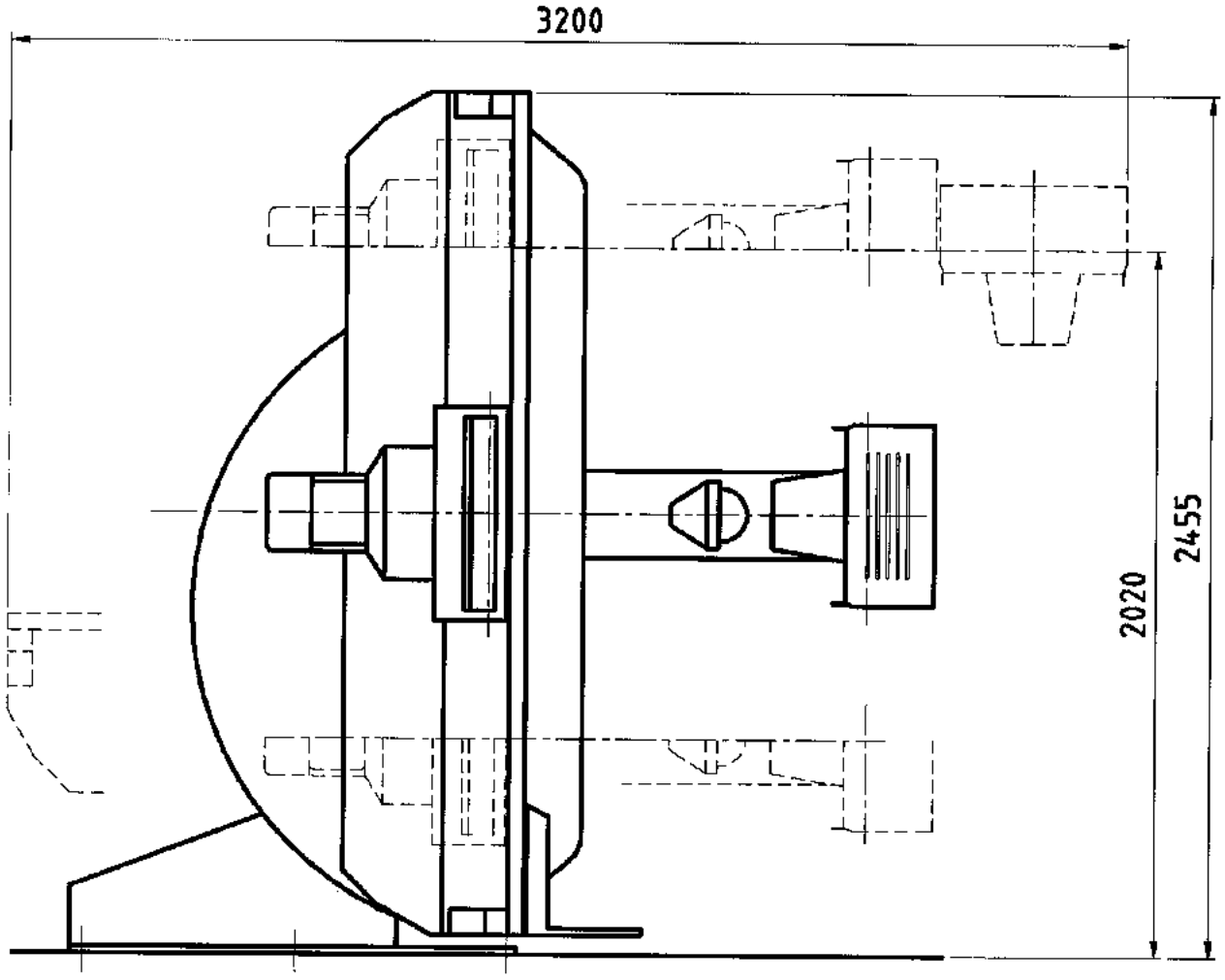
- **Lateral view KRISTAL 90/20 tilting**



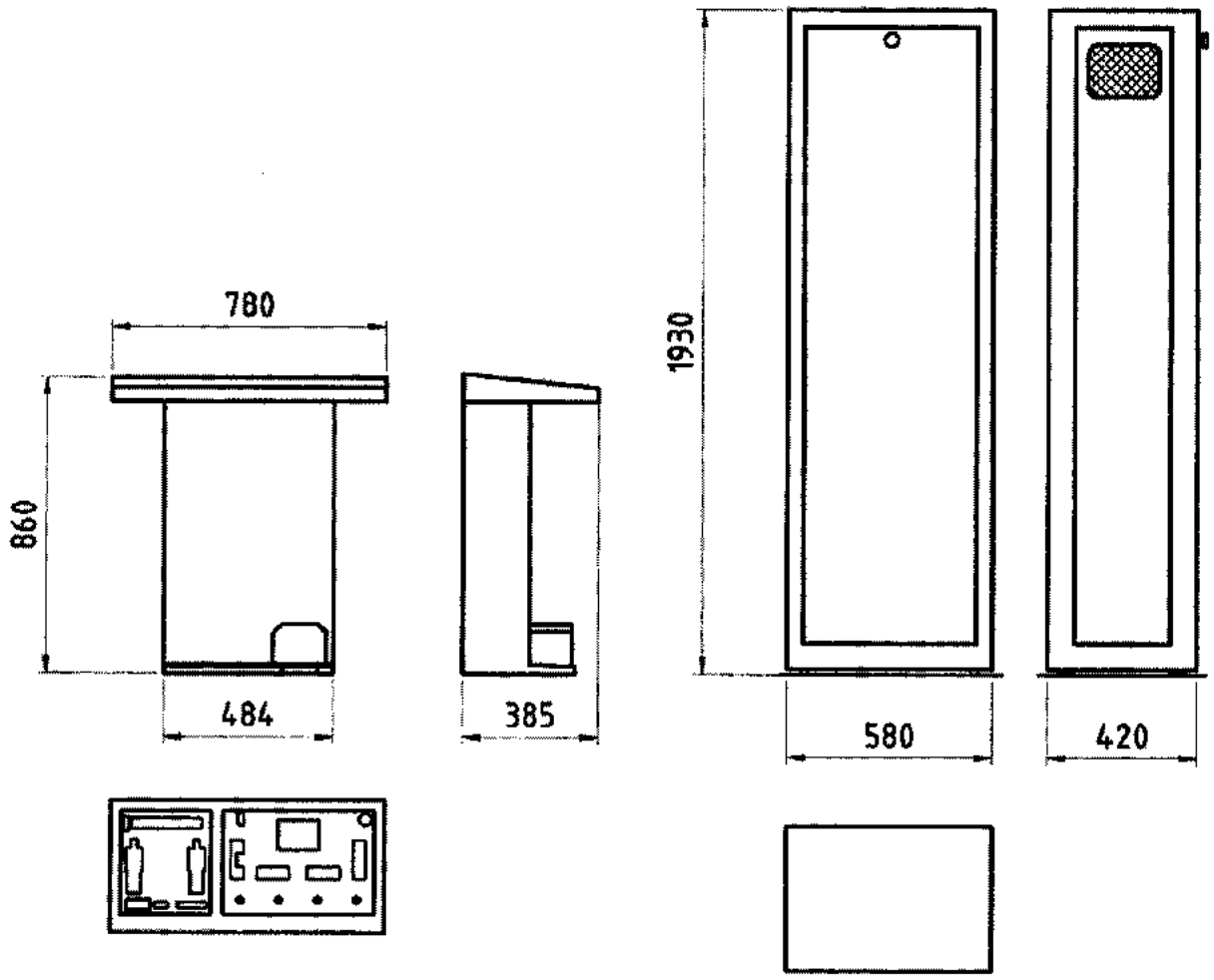
- **Frontal view KRISTAL 90/20 tilting**



- **Frontal view KRISTAL 90/20 tilting**



- **Console – Rack**



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2.1 PACKING LIST

The standard packing includes N° 5 wooden boxes with tarred paper inside.
On request (option) you can have protection insulating bags.
All boxes are type "ON PALLETTE".

- **Box 1**

Contents:
Complete plinth of anterior beam, S.F.D. support and technical documentation
Size (cm): 258x98x112
Net weight 465 Kg. (gross 622)

- **Box 2**

Contents:
Rear beam support, covers and table top assembly
Size (cm): 258x58x147
Net weight 257 Kg. (gross 386)

- **Box 3**

Contents:
Electronic rack and operator console
Size (cm): 98x78x192
Net weight 187 Kg. (gross 291)

- **Box 4**

Contents:
Column, Image intensifier Support, cables support, collimator, mylard and accessories
Size (cm): 128x88x137
Net weight 131 Kg. (gross 236)

- **Box 5**

Contents:
S.F.D. device, tomographic rod assembly and compressor arm
Size (cm): 148x90x62
Net weight 114 Kg. (gross 184)

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2.2 PRE-INSTALLATION

Perform the necessary building works before the installation of the unit (canalization for the cables LT and HT and respective grits).

Check the resistance of the floor that must be at least 1200 Kg/mq.
If the resistance is not enough sufficient, it will be necessary to put a plate for weight distribution.

Check that the dimensions of the access doors allow the entrance of respective unit parts (min. 80cm)

Before starting the installation check the minimum dimensions of the room.

On request, the manufacturer can furnish a plate for the division of the weights to place on the floor

Minimum dimensions of the room (for a correct utilization of the table)

- **KRISTAL 90/90 Tilting**

Measures not including the rack and the generator in the room
- Length.....4.5 m.
- Width.....3 m.
- Height.....2.7 m.

- **KRISTAL 90/20 Tilting**

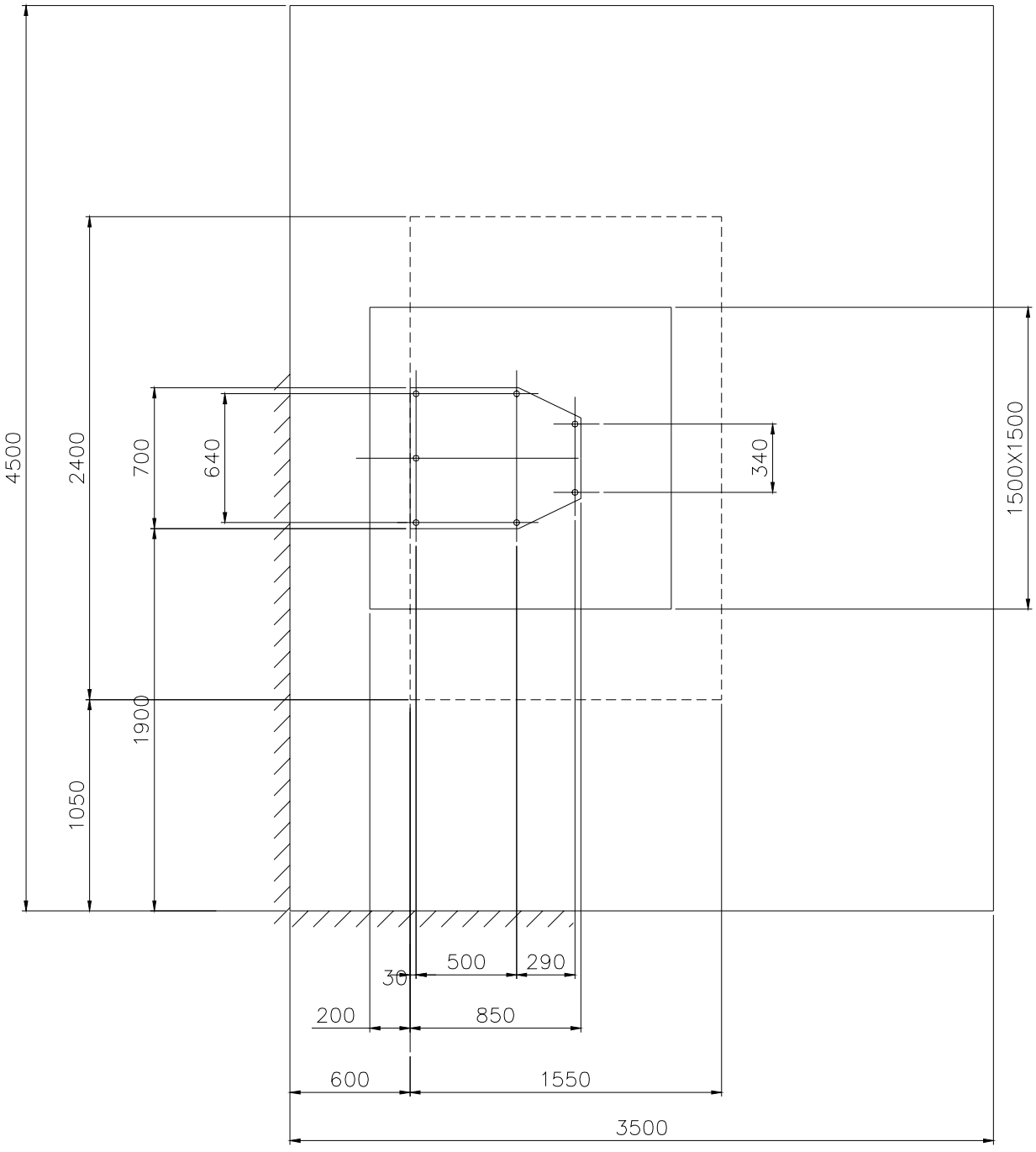
Measures not including the rack and the generator in the room
- Length .....4 m.
- Width.....3 m.
- Height.....2.7 m.

If case the ceiling height is not suitable, a security option can be required.
If you must put an electronic rack and the generator in the room, the minimum width will be 3.5m.

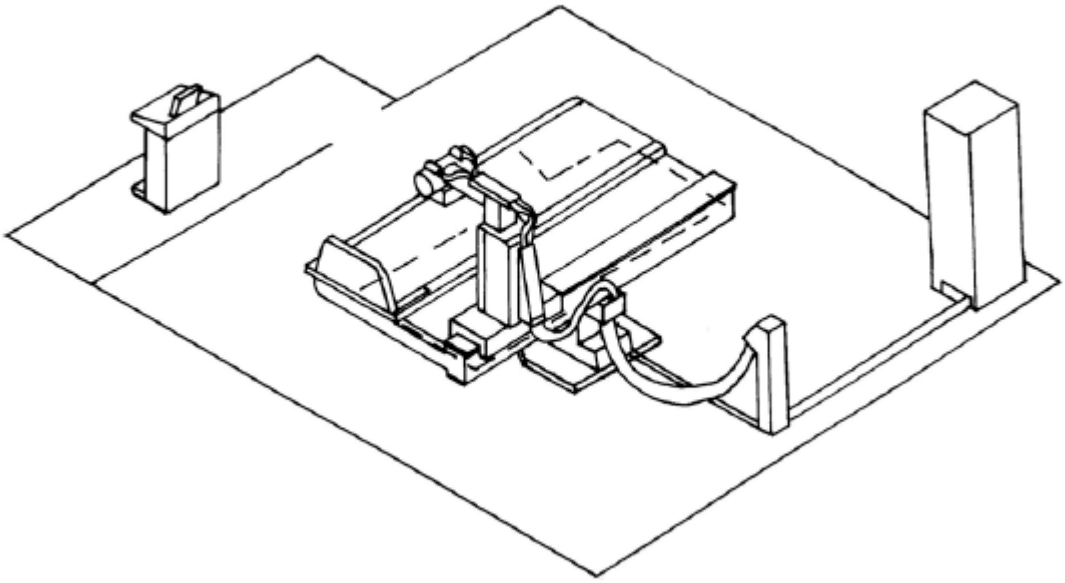
Control the necessary space for the positioning of the console.
According to the norm. EN 60601-1-1 CANNOT BE positioned in the same area of tilting table.
It must be fixed to the floor with two screws.

The equipment installation must be performed by APELEM-DMS Group company, or by qualified personnel.

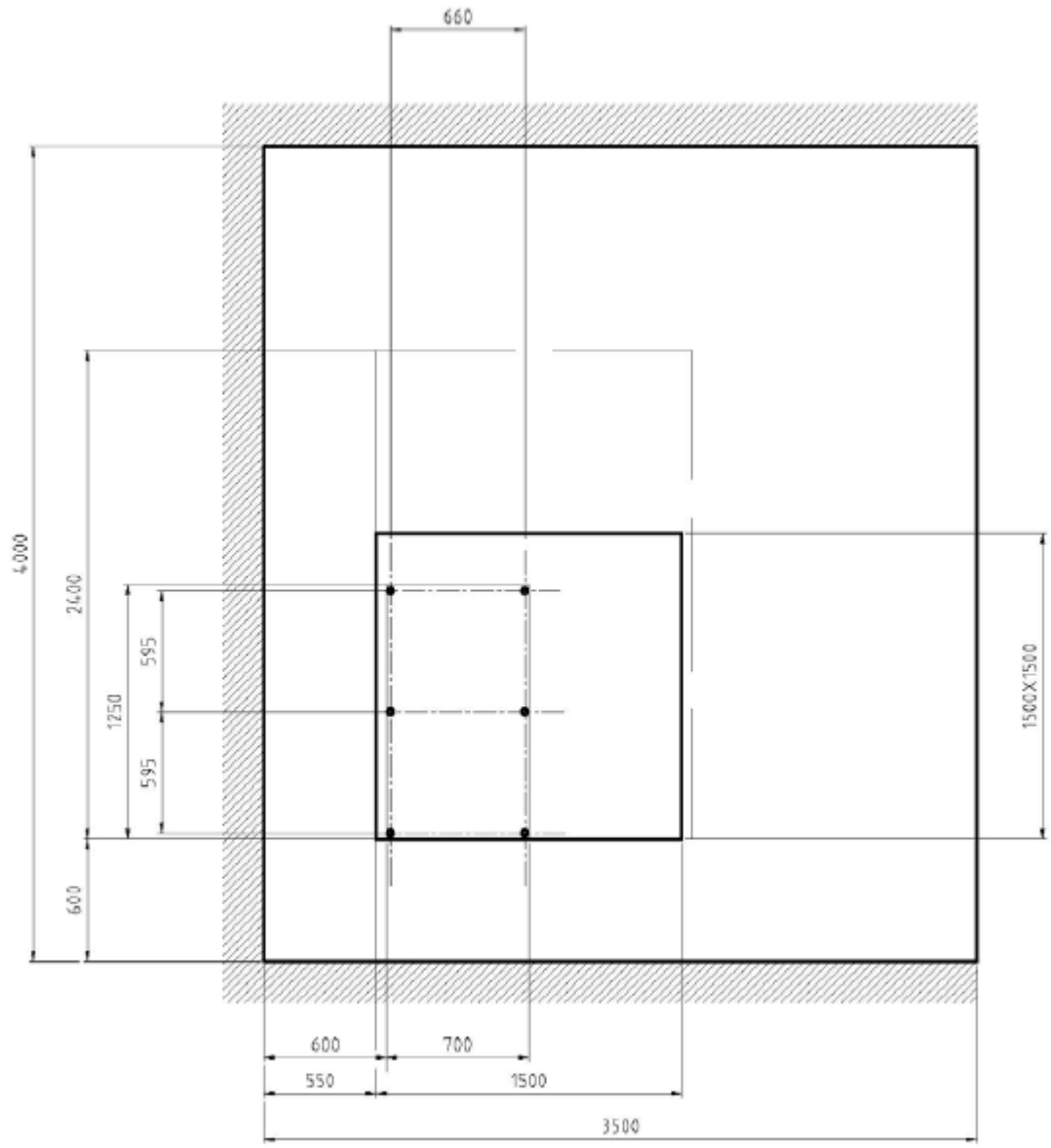
- **Fixing plan of a KRISTAL 90/90 Tilting table**



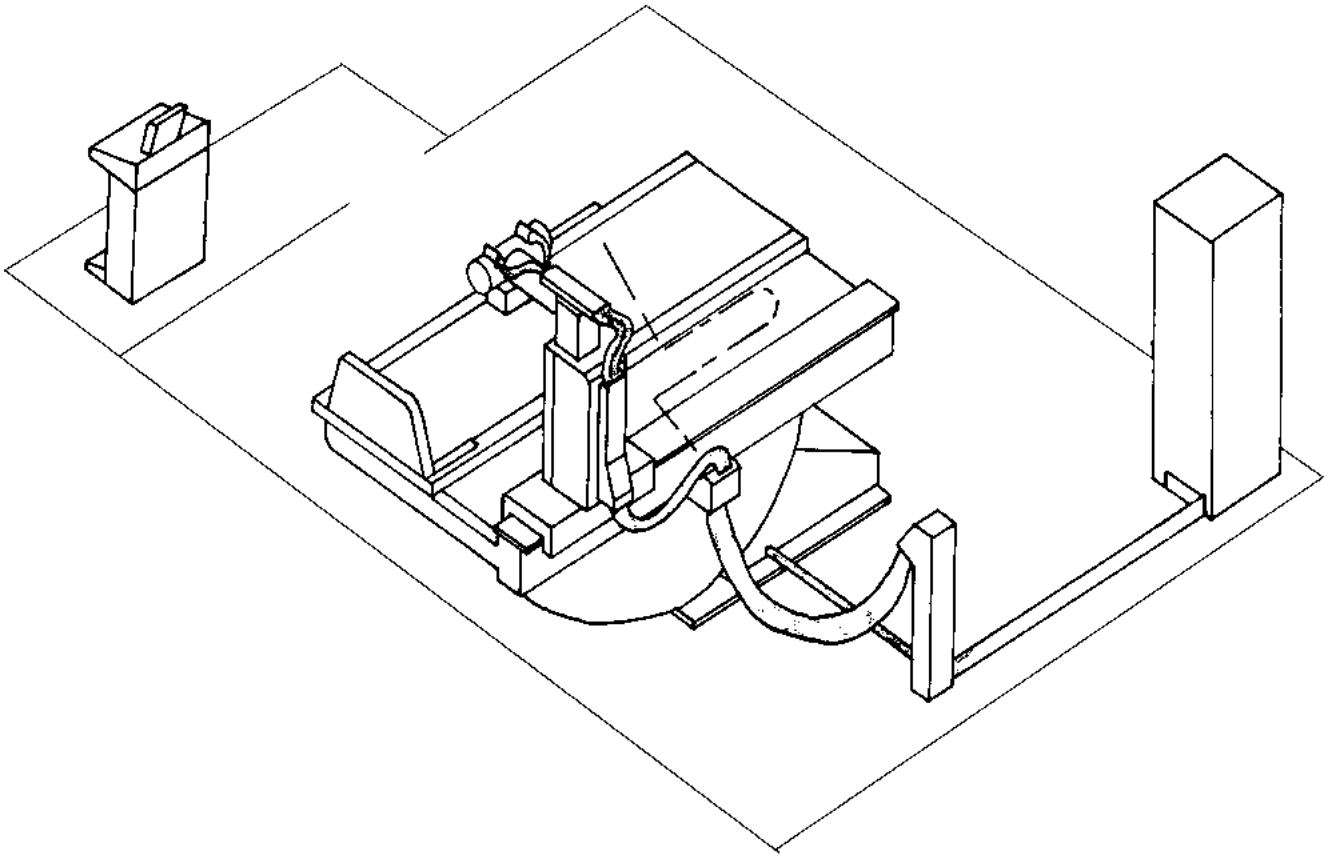
- **Example of positioning of a KRISTAL 90/90 Tilting table**



- **Fixing plan of a KRISTAL 90/20 Tilting table**



- **Example of KRISTAL 90/20 Tilting table positioning**



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2.3 ASSEMBLING

2.3.1 90/90 TILTING TABLE

Inspect the contents of the wooden cases and carefully check the integrity of every single part.

The equipment is delivered pre-assembled, so you just have to assemble its various groups.

NOTE: The tensions of the chains and the bearings adjustment have been done before the delivery. So, these parts do not need any necessary intervention, which might cause a bad functioning of the equipment.

- **BASE FIXING**

Position the base with its main support beam respecting the minimum distance from the wall (see fig.1) that is necessary to keep a correct movement of the cables and a safety area.

Pay attention not to crawl the group on the floor.

Carry on fixing by means expansion steel wedges without blocking them (n. 7 = 12x120 mm suitable solution for high consistence floors).

For higher story floors fix the base by means of n.7 steel wedges ∅ 10 mm and chemical solution.

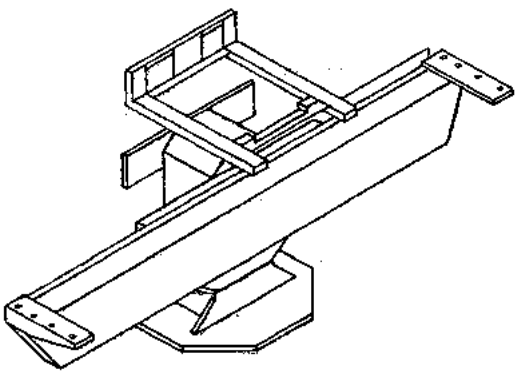
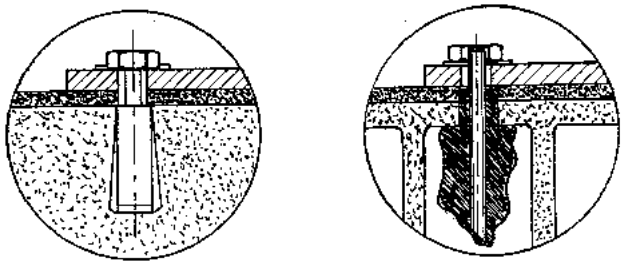


Fig.1



Check flatness of the base, put some thickness if necessary, and finally block the wedges of fixing.

- **BACK CROSS MEMBER ASSEMBLING**

In order to install the cross member, you have to use eight inclusive TBCI M8 screws.

Take off the screws from the back cross member and place it on the base, minding to insert the bearings of the Spot Film Device chariot in their guide as shown in the fig. 2.

Fix the back cross member with the screws that previously taken off.

Hook the chain of the back cross-member fixing it in both sides and paying attention not to pull it too much

Finally put the four closing caps of the frame and remove the n.2 protection bars from the rear.

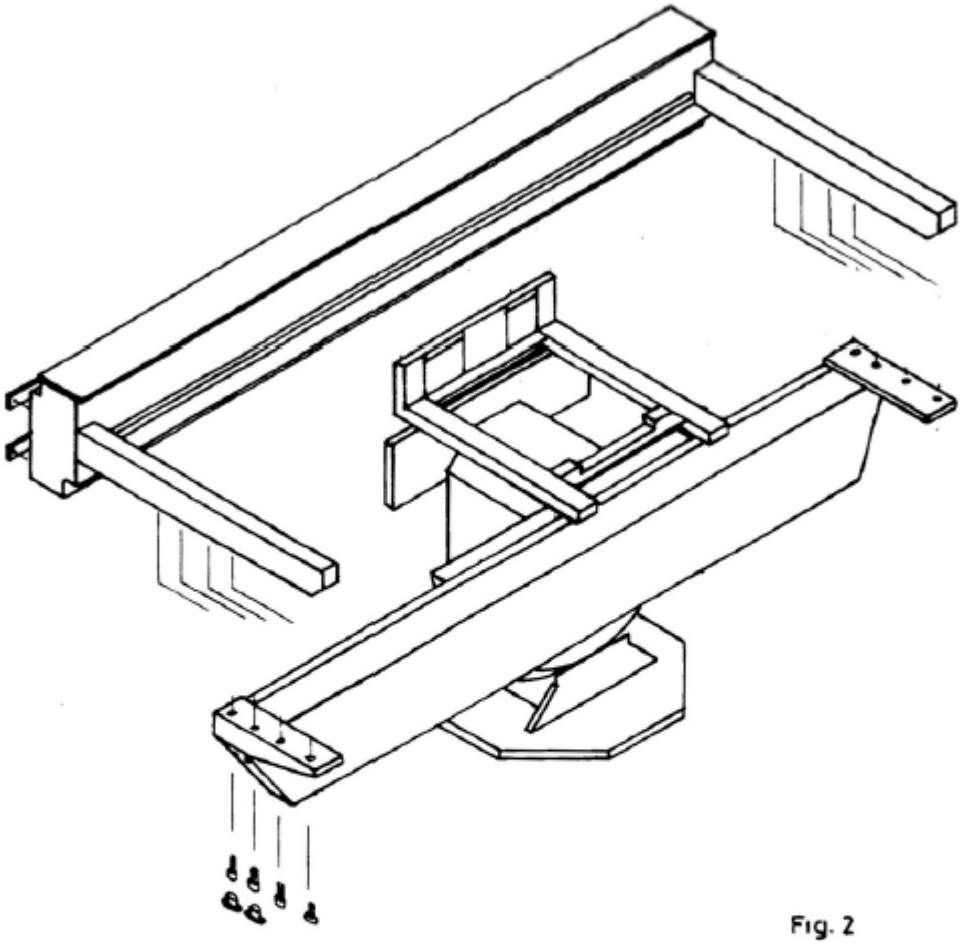
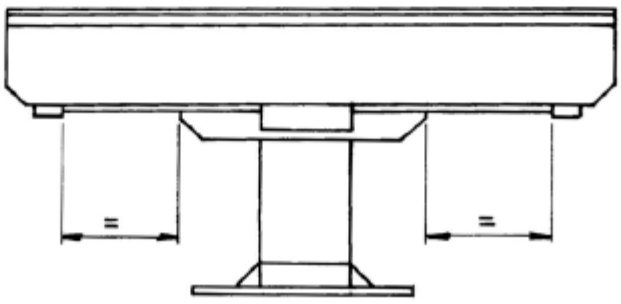
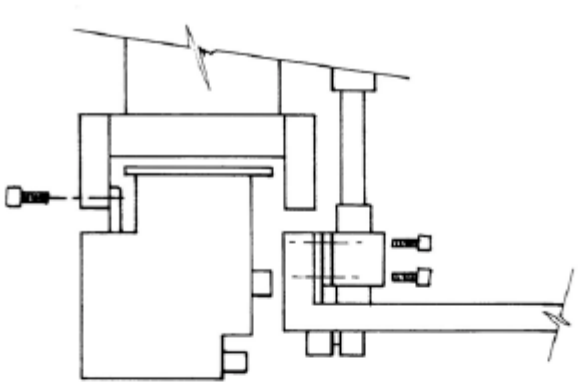


Fig. 2



- **COLUMN ASSEMBLY & TOMOGRAPHIC ROD ASSEMBLY**

Take off covers and insert the column as shown in fig.3.
Connect it to the transmission chain using two TCEI M8 screws that provided with the equipment. Block them and reassemble the covers.
Place the tomographic rod in position, connect its plug to the socket mounted on the tube support and fix the two TCEI M8 screws.
Connect the lower part of the tomographic rod to S.F.D. chariot and fasten it by means of TE M8 screws.
Fix the cables support on the upper part of the stand.
Finally the rear cover will be mounted.



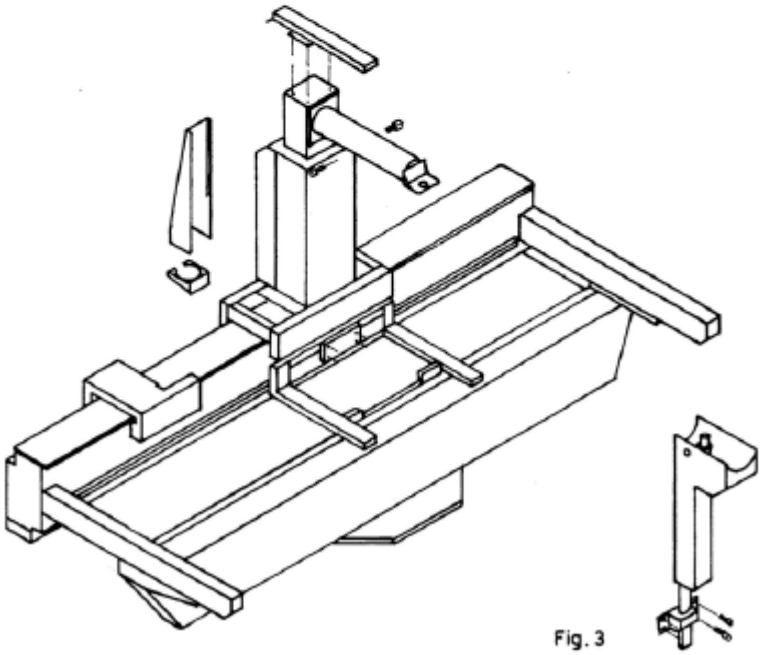


Fig. 3

- **IMAGE INTENSIFIER CHARIOT ASSEMBLY**

Remove the bearing Pos.1 fig.4 and position the image intensifier chariot on its guide, minding to insert the Pos.2 bearing of fig. 4 into the slot.

Reassemble and adjust the two bearings.

As far as I.I. assembling is concerned, you should remove the adaptation plate and fix it on the upper part. Hold the TV camera towards the front of unit. Load I.I. on the chariot and use the n.6 CH 10 nuts keeping it in the central position.

Finally insert cables and fix cables support.

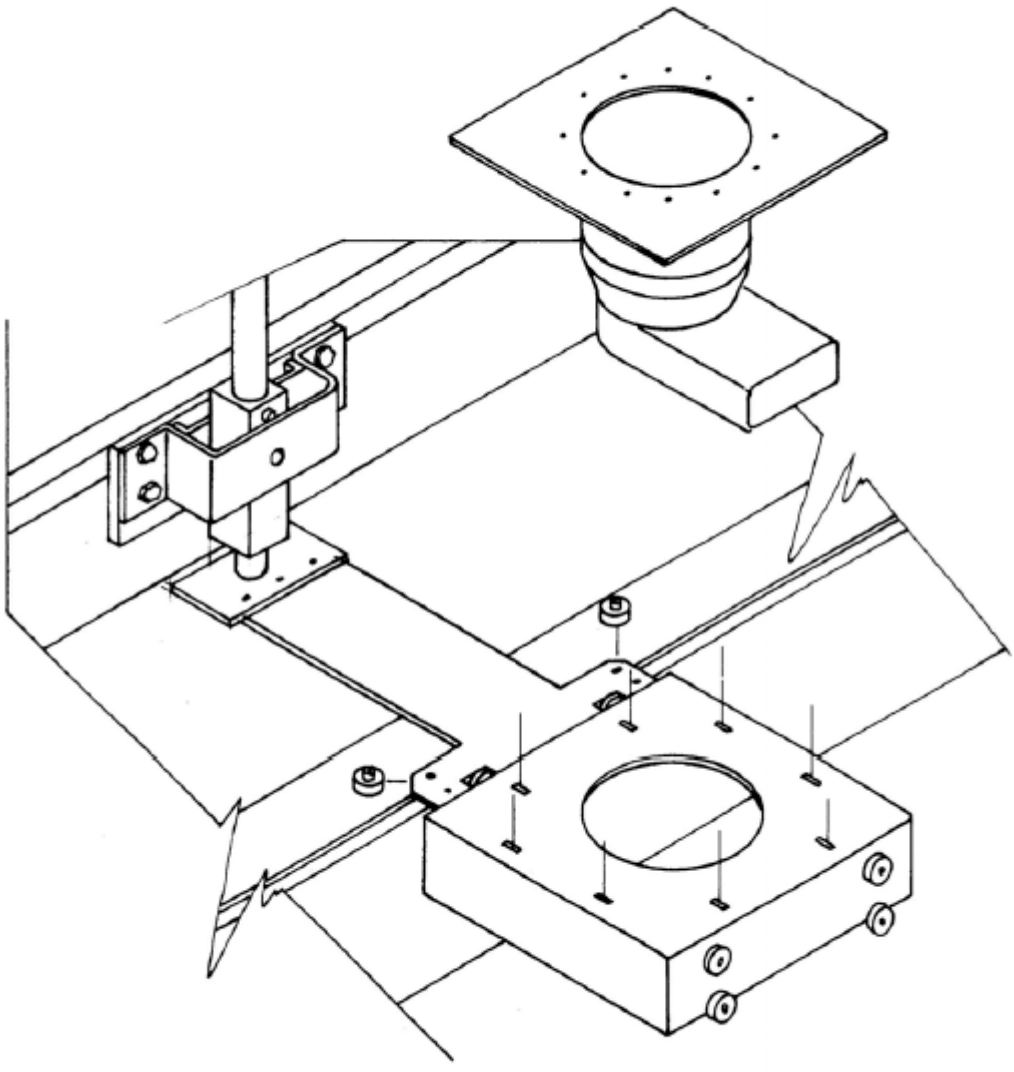


Fig.4

- **S.F.D. & AEC ASSEMBLING**

Remove the front cover of spot film device. Remove flat cable and emergency push button wire.

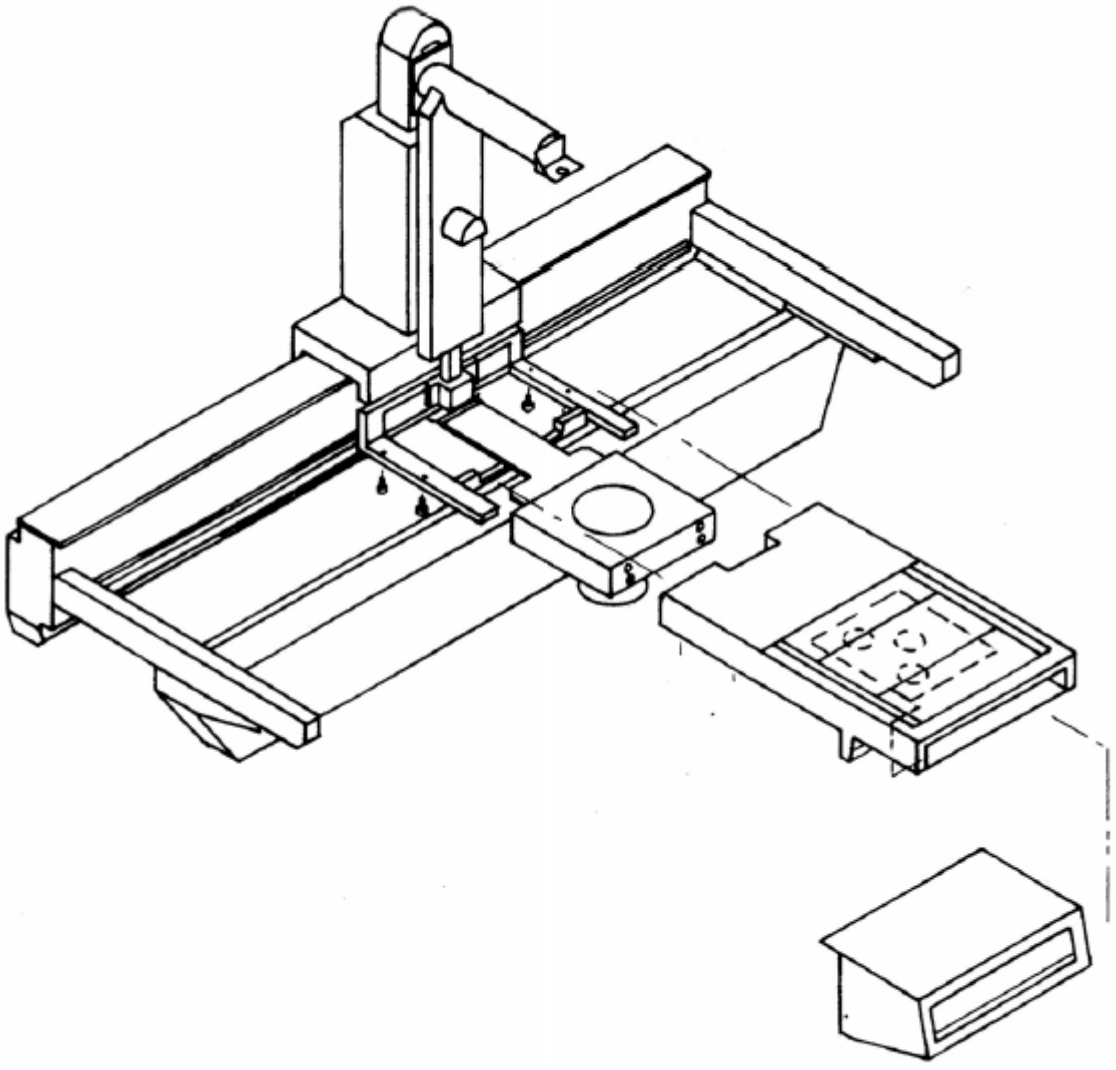
Place the S.F.D. on its trolley (see fig. 5) and fix it by means of four TE screws.

Connect the power supply cable to its socket and fix the housing to the entry window.

In case you have to assemble an AEC device: place it on its holder between the grid and the diaphragm shutters. The wire should follow the trajectory as indicated on the drawing.

Check that the cable doesn't interfere any movement.

Reassemble the front cover replacing the flat cable and the emergency push button wire



2.3.2 90/20 Tilting Table

Inspect the contents of the wooden cases and carefully check the integrity of every single part.

The equipment is delivered pre-assembled, so you just have to assemble its various groups.

NOTE: The tension of chains and the bearings adjustment have been done before the delivery. So, these parts do not need any necessary intervention, which might cause a bad functioning of the equipment.

- **BASE FIXING**

Position the base with its main support beam respecting a minimum distance from the wall (see fig.1A) that is necessary to keep a correct movement of the cables and a safety area.

Pay attention not to crawl the group on the floor.

Carry on fixing by means of the expansion steel wedges <u>without blocking</u> them (n. 7 = 12x120 mm suitable solution for high consistence floors).

For higher story floors, fix the base by means of n.7 steel wedges ∅ 10 mm and chemical solution.

Check flatness of the base, put some thickness if necessary, and finally block the wedges of fixing.

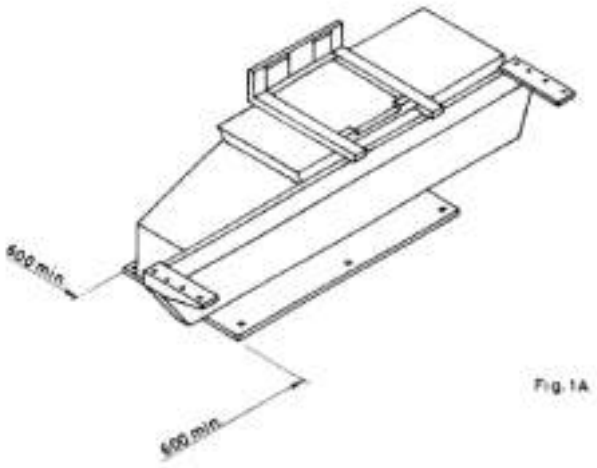
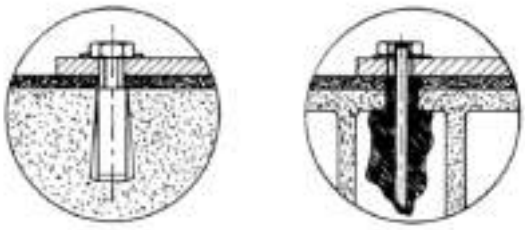


Fig. 1A



- **BACK CROSS MEMBER ASSEMBLING**

Use ten inclusive TBCI M8 screws in order to install the cross member.

Take off the screws from the back cross member and place them on the base, minding to insert in their guide the bearings of the Spot Film Device chariot as fig. 2A.

Fix the back cross member with the screws that you have previously taken off.

Finally put the four closing caps of the frame and remove the n.2 protection bars from the rear.

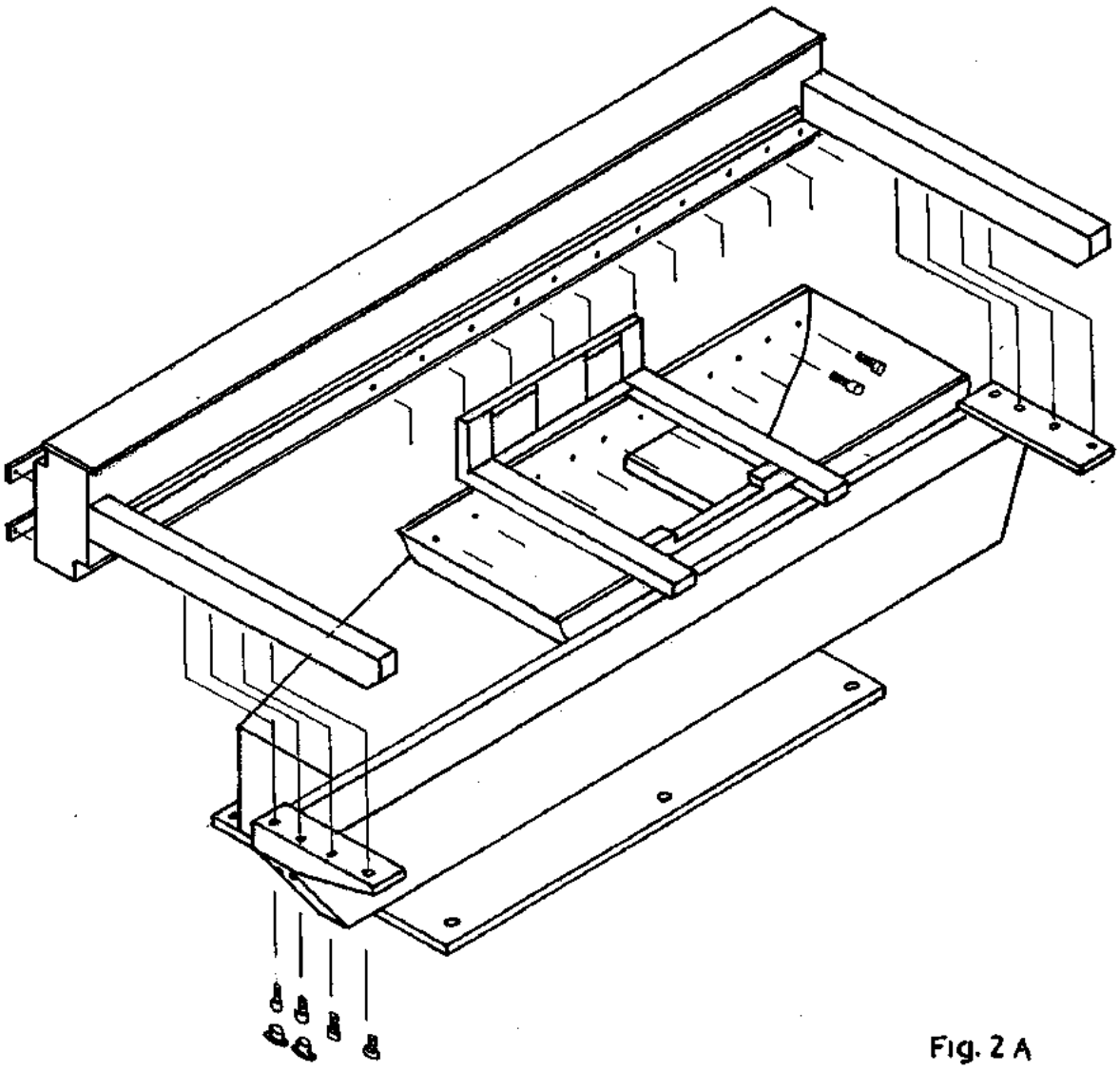


Fig. 2 A

- **COLUMN ASSEMBLY & TOMOGRAPHIC ROD ASSEMBLY**

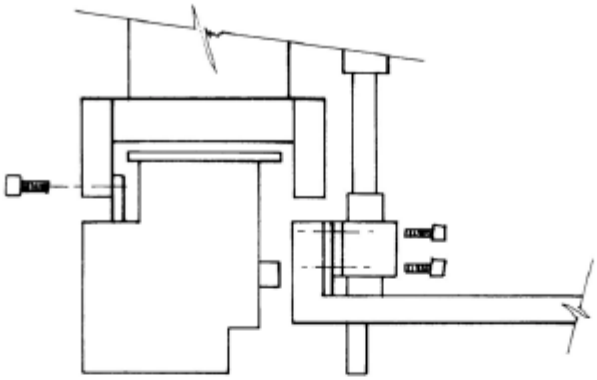
Remove the covers and insert the column as per fig.3A.

Connect it to the transmission chain using two TCEI M8 screws that are provided with the equipment. Block them and reassemble the covers.

Position the tomographic rod, connect its electric plug to the socket mounted on the tube support and fix the two TCEI M8 screws.

Connect the lower part of Tomographic rod to S.F.D. chariot and fasten it by means of TE M8 screws. Fix on the upper part of stand the support of cables.

Finally the rear cover will be mounted.



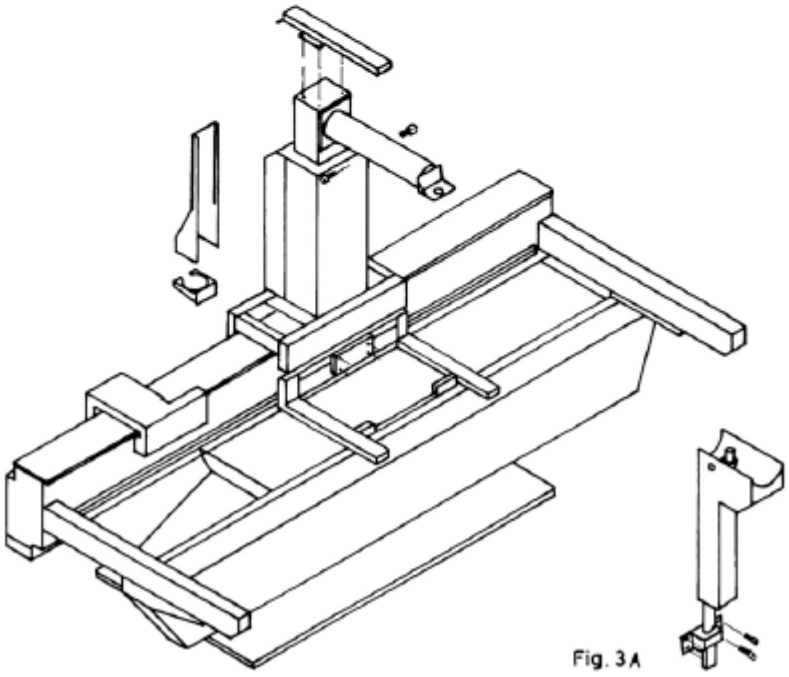


Fig. 3A

- **IMAGE INTENSIFIER TROLLEY ASSEMBLY**

Remove the bearing Pos.1 fig.4A and position the image intensifier chariot on its guide, minding to insert the Pos.2 bearing of fig.4A into the slot.

Reassemble and adjust the two bearings.

As far as I.I. assembling is concerned, you should remove the adaptation plate and fix it on the upper part.

Hold the TV camera towards the front of unit. Load the I.I. on the chariot and use the n.6 CH 10 nuts keeping it in the central position.

Finally insert cables and fix the cables support.

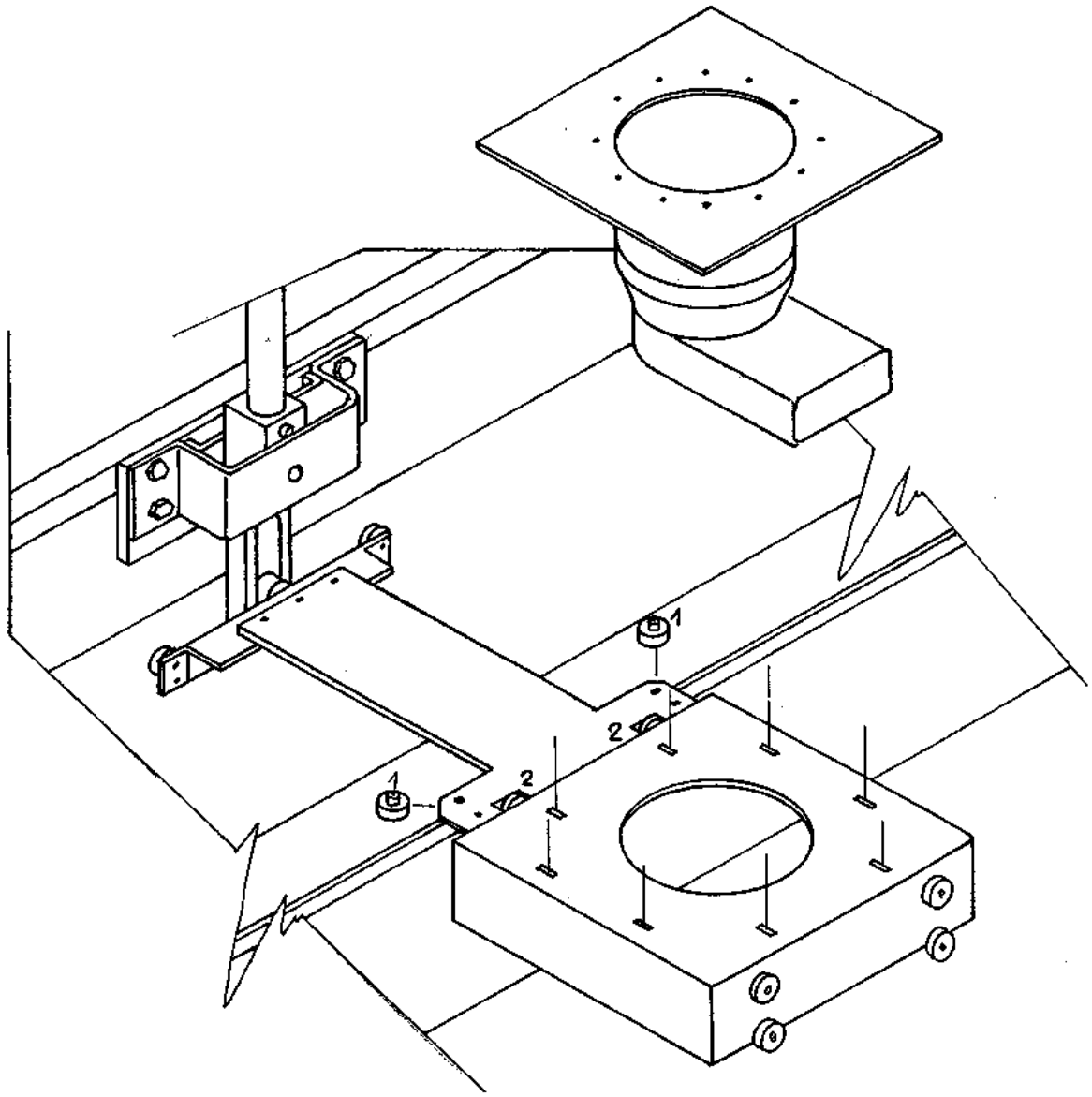


Fig.4A

- **S.F.D. & AEC ASSEMBLING**

Remove the front cover of the spot film device. Remove the flat cable and the emergency push button wire.

Place the S.F.D. on its chariot (see fig.5A) and fix it by means of four TE screws.

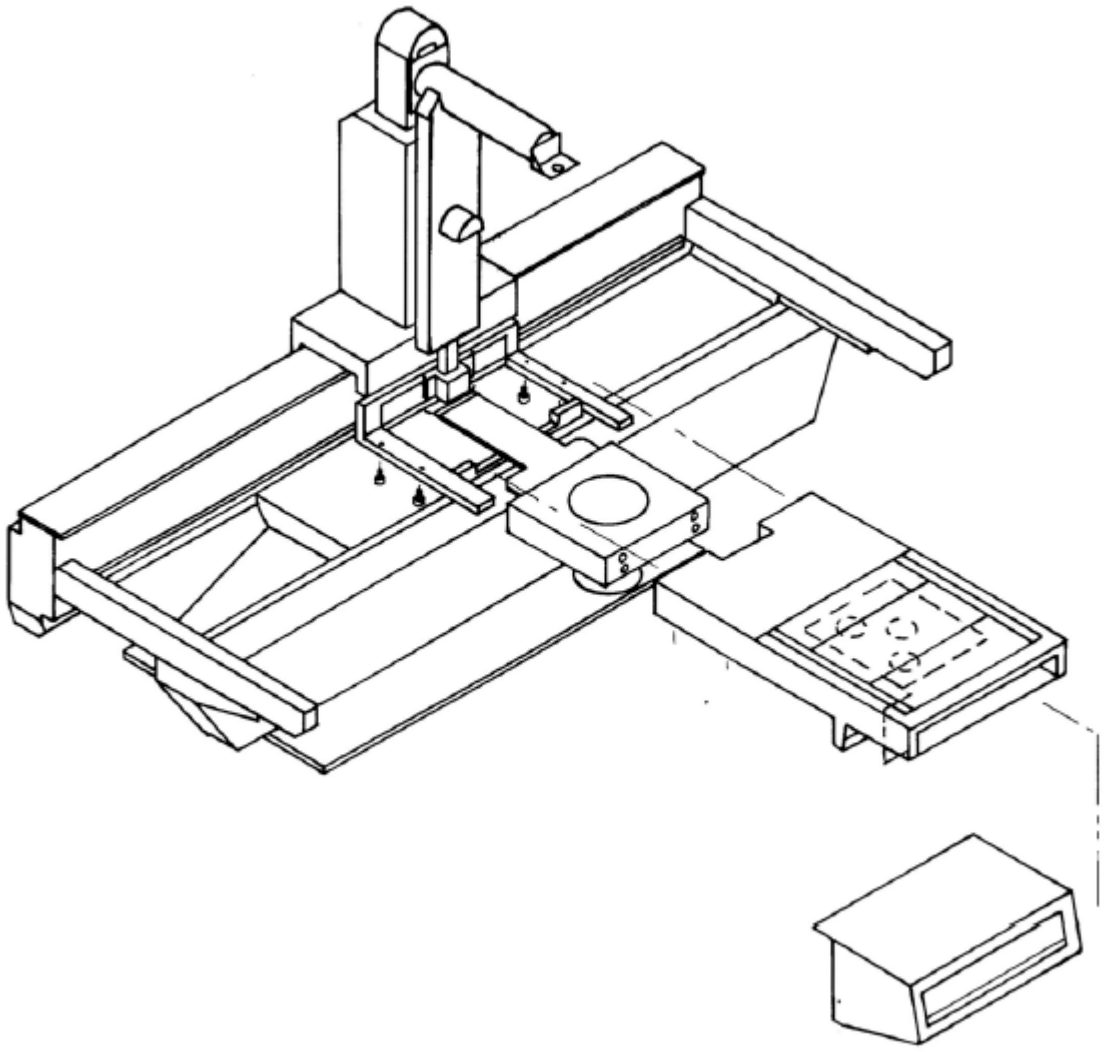
Connect the power supply cable to its socket and fix the scabbard on the entry window.

If you have to assemble an AEC device: place it on its holder between the grid and the diaphragm shutter

The wire should follow the trajectory indicated on the drawing.

Check that the cable doesn't interfere any movement.

Reassemble the front cover replacing the flat cable and the emergency push button wire



- **X-RAY TUBE AND COLLIMATOR ASSEMBLING**

FOR TILTING 90/90 & TILTING 90/20 TABLES

Position the X-Ray tube on its holder as per fig.6A and screw it by means of four TCEI M6-screws together with the collimator attachment.

Fix the cover of X-Ray tube.

Mount the collimator on its attachment and fix it with the respective screws (pos. **A**).

In order to adjust the X-Ray tube transversally, loosen the six TSBI screws (pos. **B**).

In order to adjust the inclination angle of the X-Ray tube, loosen two TBI dowels (pos. **C**) situated behind the X-Ray tube holder.

Fix the cover of the X-Ray collimator

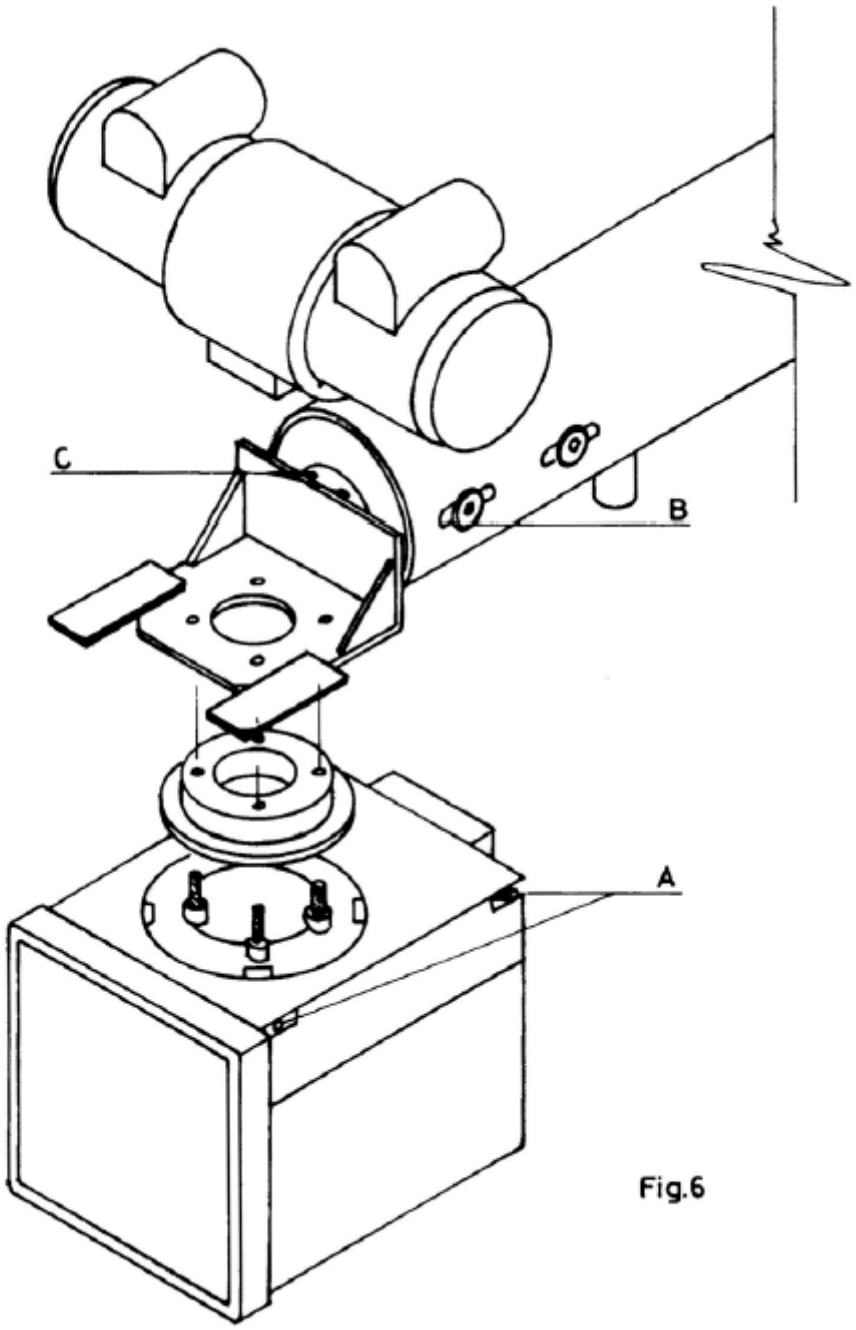


Fig.6

- **TABLE TOP ASSEMBLING**

FOR TILTING 90/90 & TILTING 90/20 TABLES

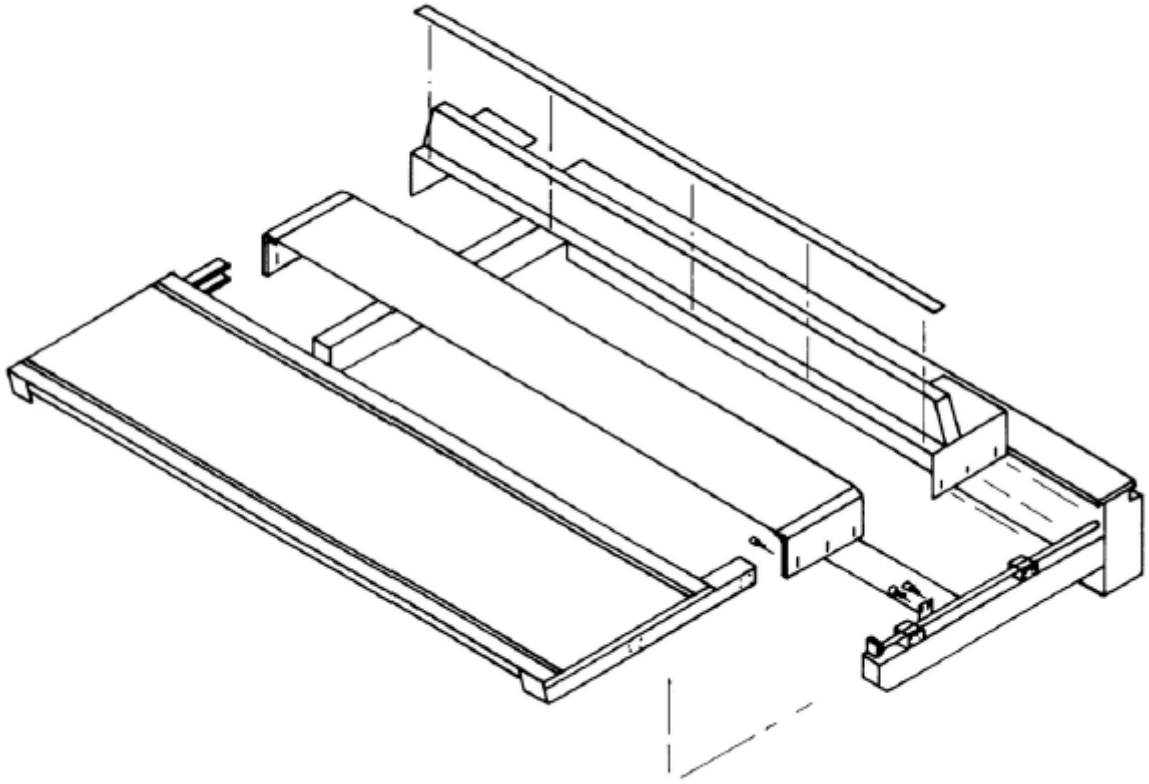
Position the back cover and fix it with six screws and washers.

Install the Mylard fixing the attachments from head side and feet side and inserting between the back cover and the blocking plate.

If the mylard is loosened, disconnect from one side to move the attachment.

Insert the tabletop panel and fix screws.

Test the good sliding then hook chains. Attachments are under the table top from head side and feet side.



- **FOOT BOARD ASSEMBLING**

FOR 90/90 AND 90/20 TILTING TABLES

After having finished all connections, turn on the equipment and set it in vertical position.
Position the footboard under the table in the centre of the main base.
Check that the S.F.D. and the table top, DO NOT INTERFERE during the movements
Fix the footboard to the floor using two expansion wedges (∅ 10 mm).

Note

Note

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2.4 CABLES & WIRING

Once you have carried out the mechanical assembly, it's time to start the electric wiring according to the following indications:

Mind to position the cables as per fig. 8.

After having fixed the cable holder by means of dowels or floor fixings, place the rack and the console in the most suitable place in the room.

Now only connect the cables and wires of the table with the grounding wires minding to fix them in the correct points. Avoid to insert in the rack accessories that might interfere with the functioning of the unit.

2.4.1 Column

1) D.F.F. motor /compressor motor	→	K901509 PCB → M4
2) D.F.F. signals	→	K901509 PCB → J4
3) Tube rotation and compressor signal	→	K901509 PCB → J3

2.4.2 Frame

1) Tube-stand motor	→	CVS 22 MASTER X 13
2) S.F.D. motor	→	CVS 22 SLAVE X 13
3) Column signals/ S.F.D.	→	K901509 PCB → J1
4) Table-top motor	→	K901509 PCB → M7
5) Table-top signals	→	K901509 PCB → J5
6) Tube-stand resolver	→	CVS 22 MASTER X3
7) S.F.D. resolver	→	CVS 22 SLAVE X3
1) Power supply cable	→	K901509 PCB → M9
2) Serial bus CAN	→	K901509 PCB → J6
3) X-Ray Collimator cable	→	X-RAY COLLIMATOR

2.4.3 Base

1) Tilting signals	→	K901509 → J2
2) Tilting motor	→	CS 12

2.4.5 S.F.D.

1) S.F.D. power supply	→	K901510 PCB → M2
2) Serial bus CAN	→	K901506 PCB → J12
3) X-Ray collimator	→	K901510 PCB → M5

2.4.6 Console

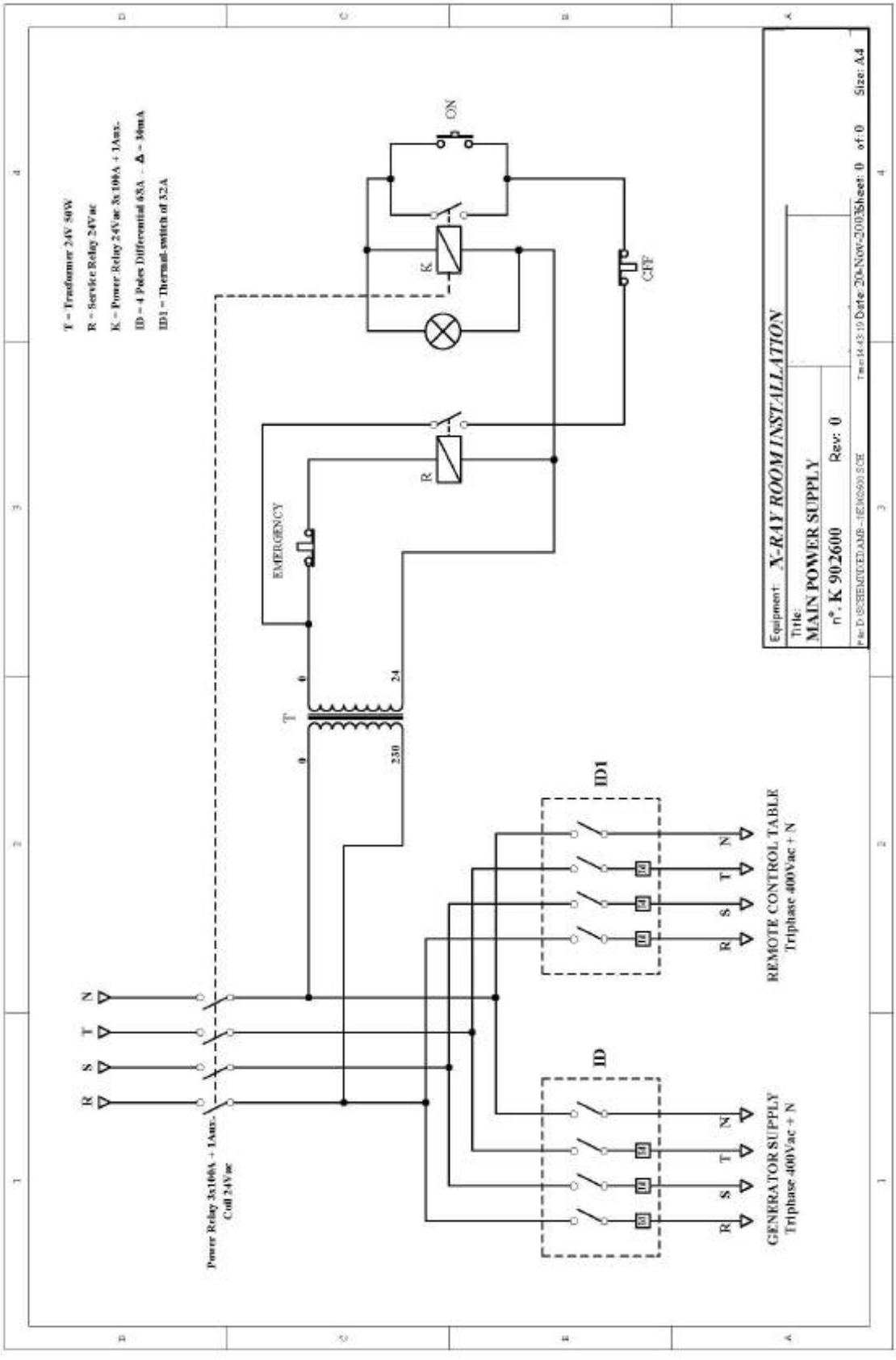
1) Console power supply	→	K901509 PCB → M10
2) Serial bus CAN	→	K901509 PCB→ J7
3) Serial RS485	→	K901509 PCB → M13
4) Signals cable	→	K901509 PCB → FL4

2.4.7 Power –Line

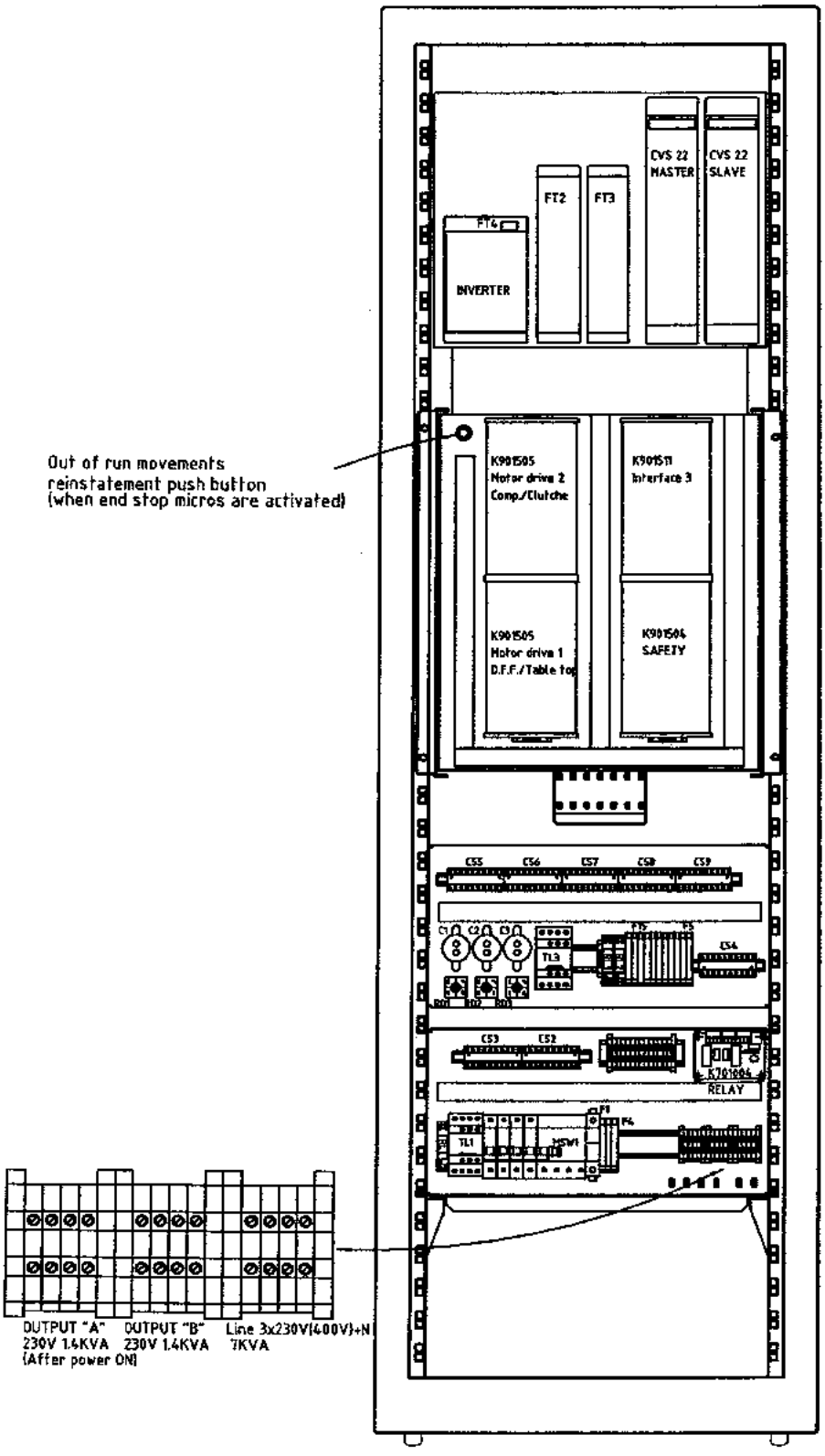
1) Power supply cable 3 poles + N + grounding wire,
   minimum advisable section 2.5 mm² 400V 10A → 230 Vac.

2.4.8 X-Ray tube & collimator

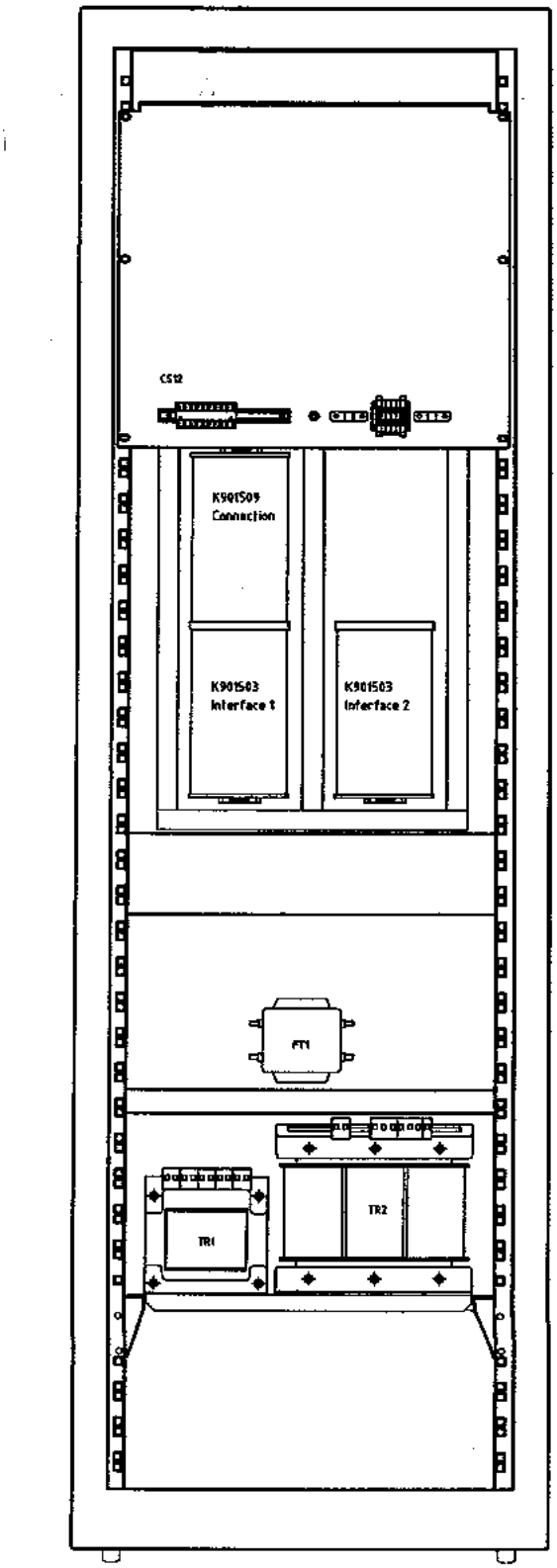
1) Rotating anode → (to generator)
2) High voltage cables with three pins Federal cable heads, complying to the corresponding regulations and having a maximum length of 24m → to generator
   For each cable, build up a thick layer of silicon grease on the terminal extremity, and coat the lateral surface completely. Insert the cable termination into the socket, find the locating key, insert the cable nut into the fist threads and tighten slowly. The purpose is to draw the grease from the terminal extremity up to the outside, pushing out all the air remaining between the cable termination and the socket. Complete tightening at intervals during calibration, to compensate for grease setting with heating.


T = Trasformer 24V 50W
R = Service Relay 24Vac
K = Power Relay 24Vac 3x 100A + 1Aux.
ID = 4 Poles Differential 63A - Δ = 30mA
ID1 = Thermal-switch of 32A
ON
OFF
K
R
EMERGENCY
T
0
24
230
ID1
ID
N
T
S
R
REMOTE CONTROL TABLE
Triphase 400Vac + N
GENERATOR SUPPLY
Triphase 400Vac + N
Power Relay 3x100A + 1Aux.
Coil 24Vac
Equipment: X-RAY ROOM INSTALLATION
Title:
MAIN POWER SUPPLY
n°. K 902600
Rev: 0
Size: A4

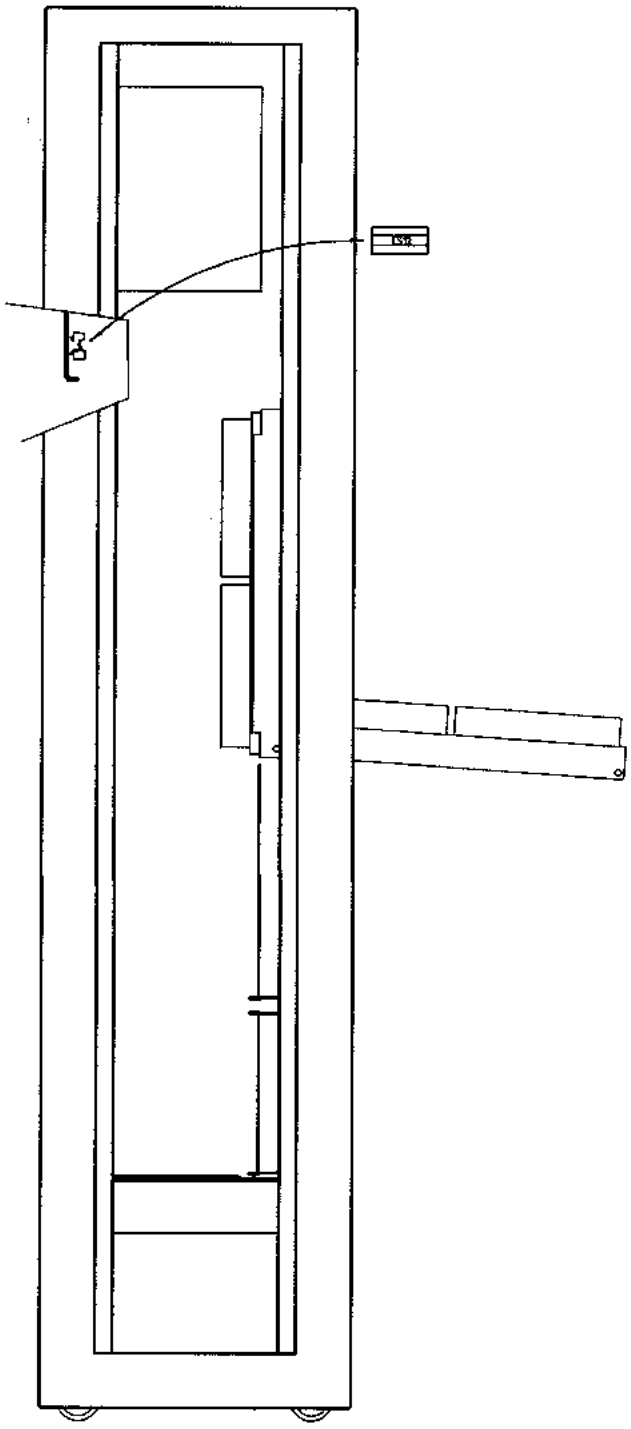
RACK
FRONT VIEW



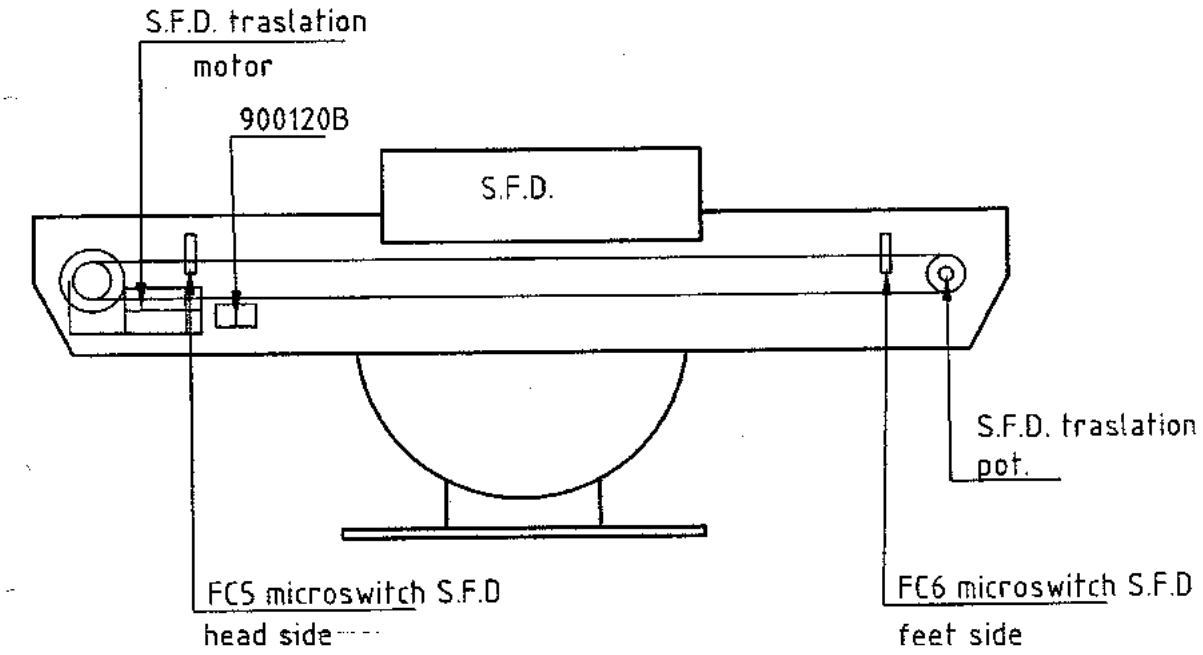
RACK
REAR VIEW



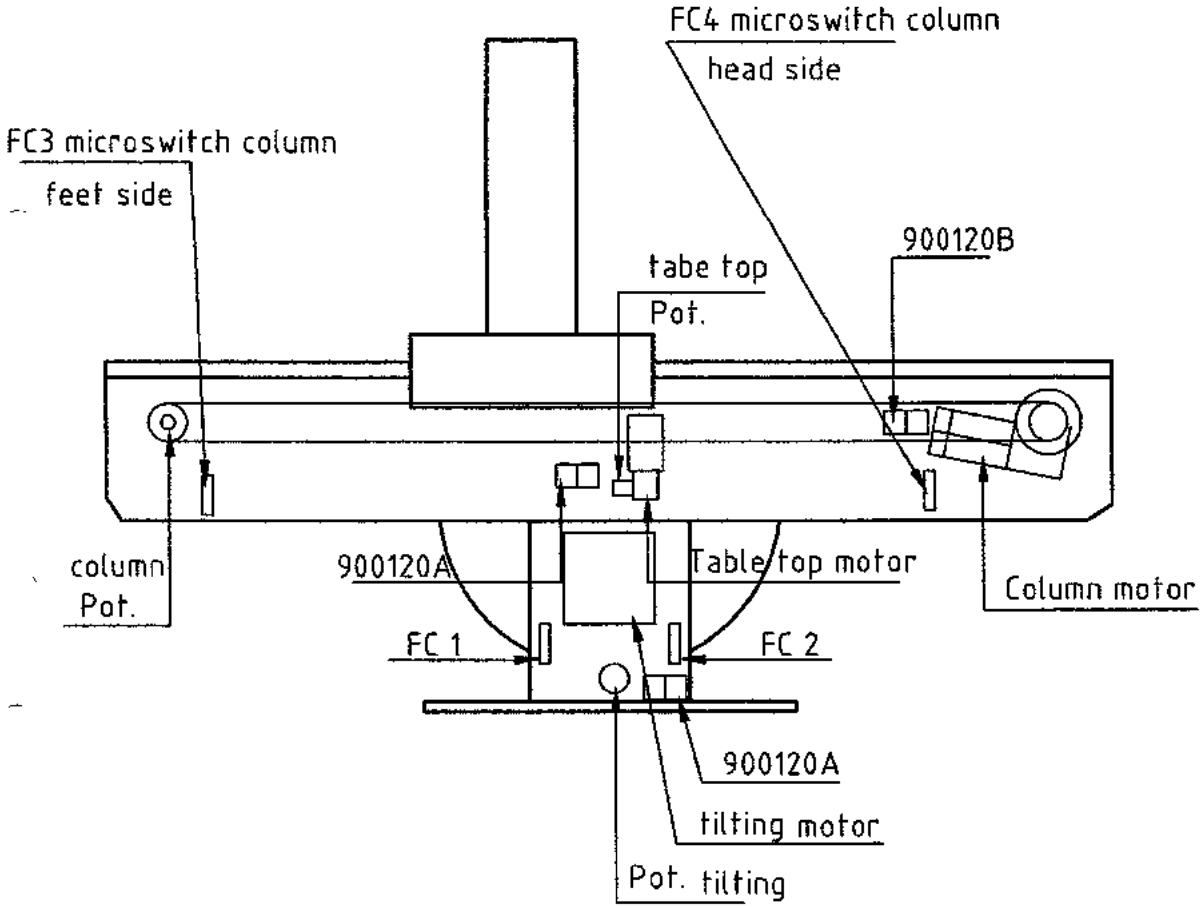
RACK
LATERAL VIEW



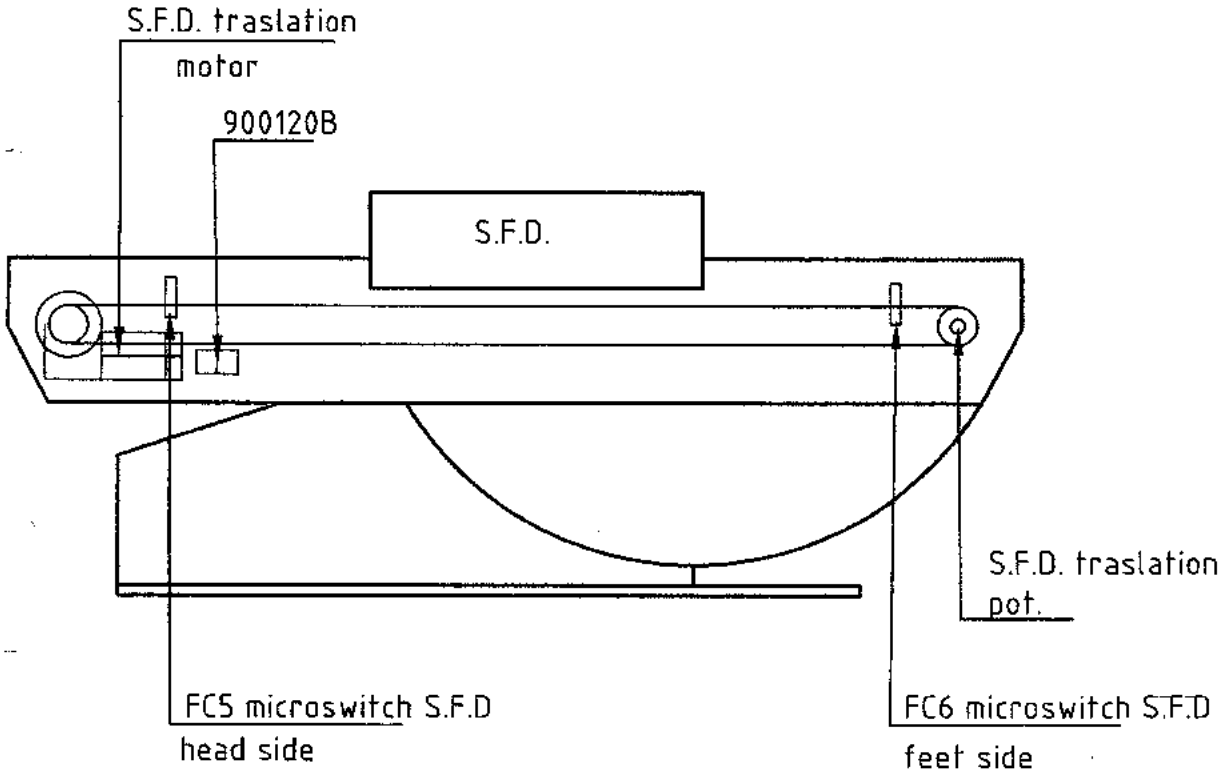
KRISTAL 90/90 TILTING TABLE
FRONT VIEW



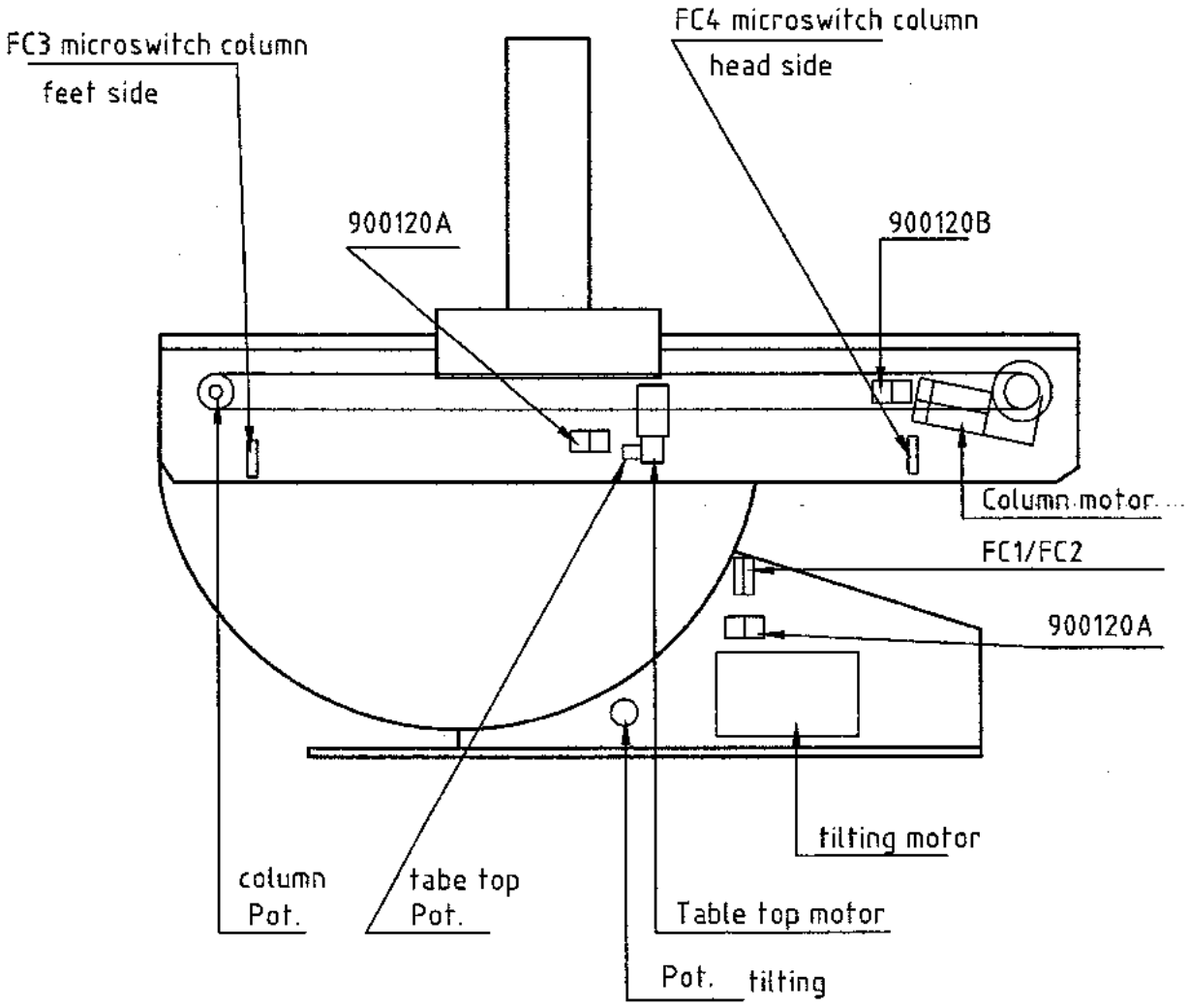
KRISTAL 90/90 TILTING TABLE
REAR VIEW



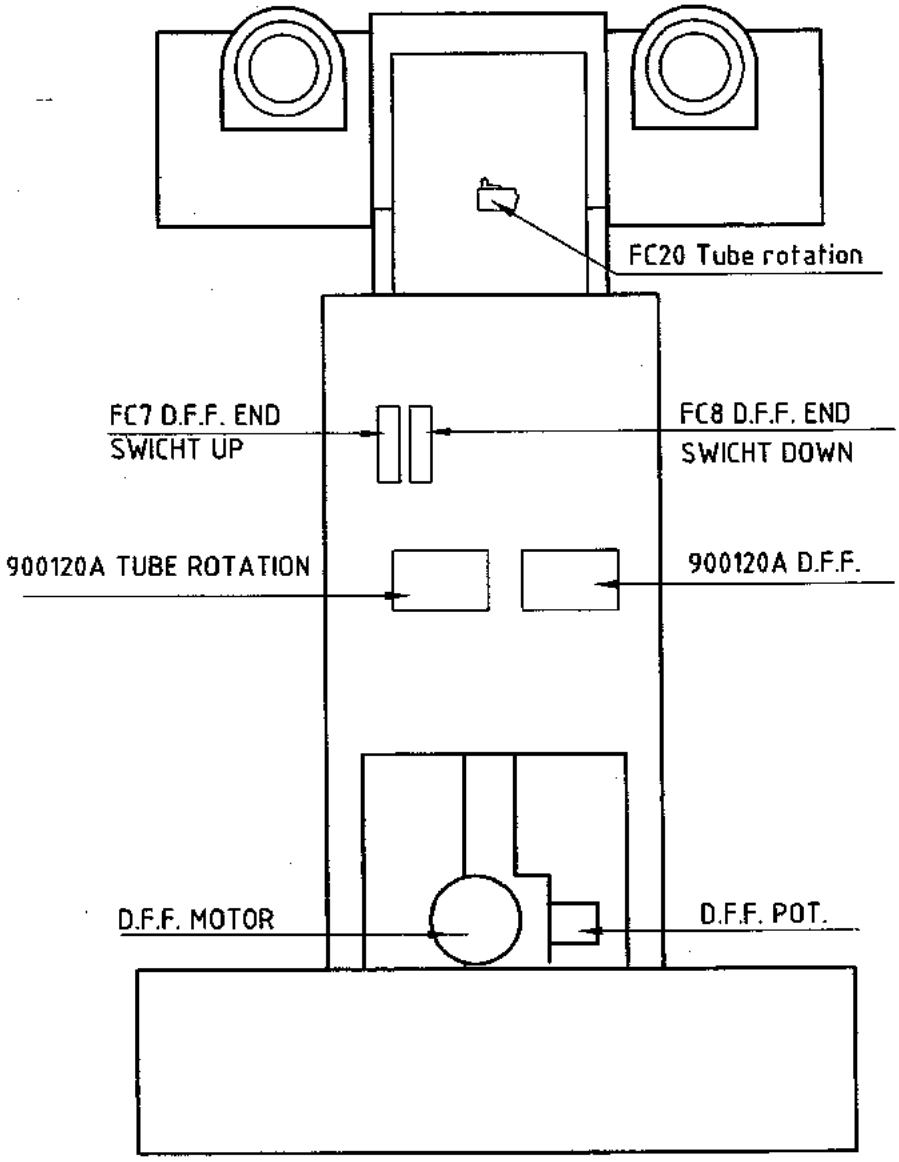
KRISTAL 90/20 TILTING TABLE
FRONT VIEW



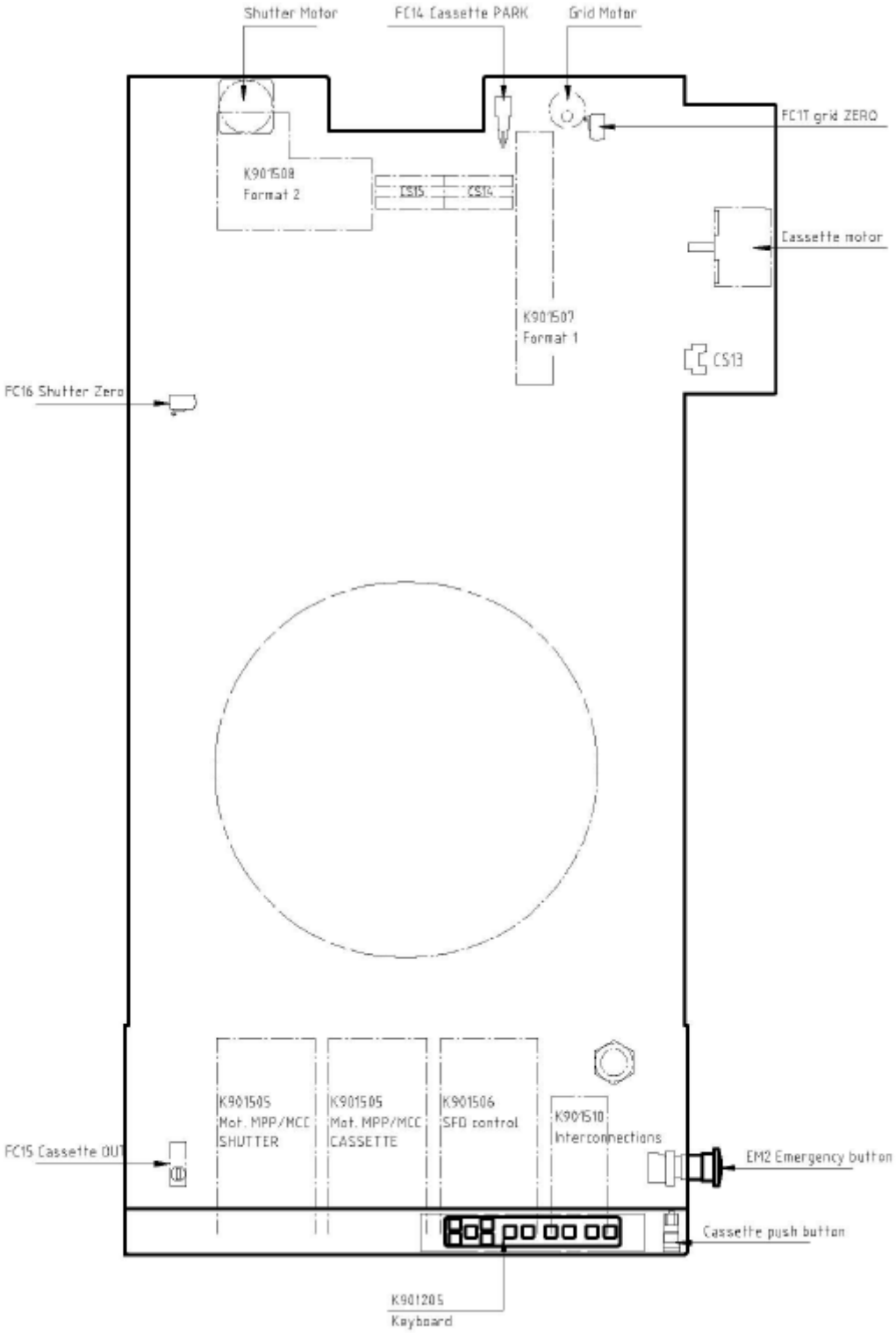
KRISTAL 90/20 TILTING TABLE
REAR VIEW



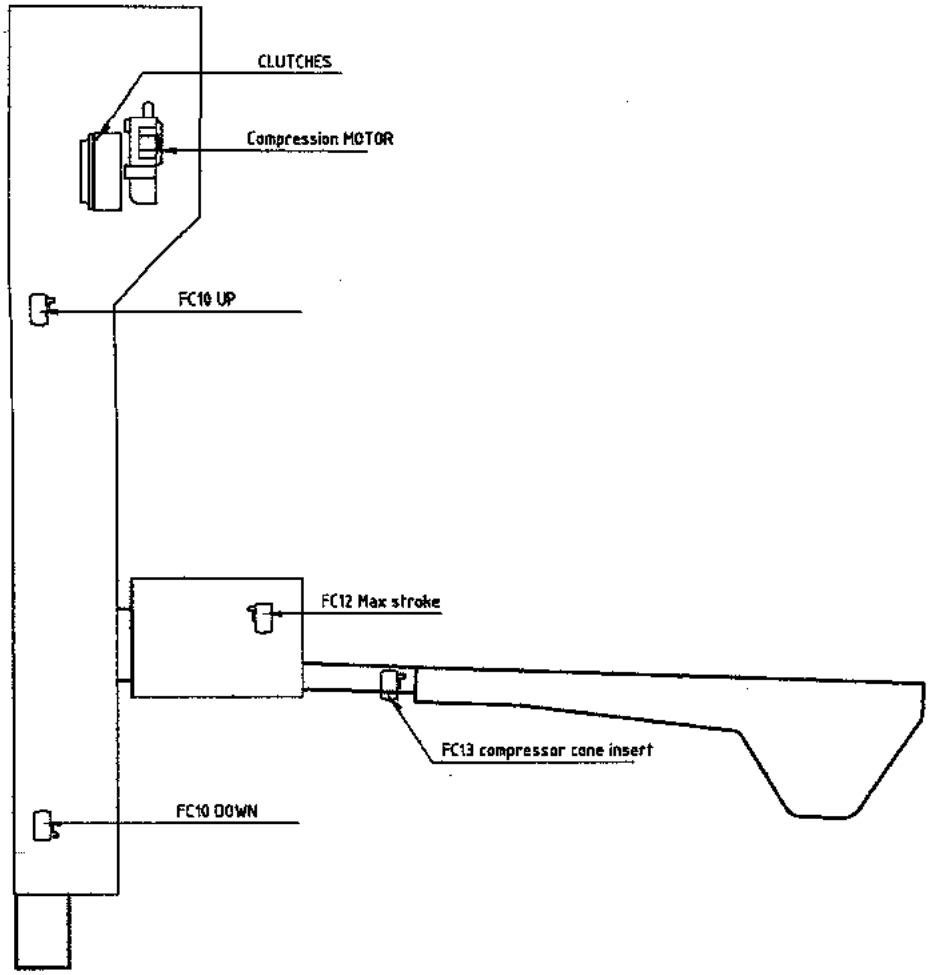
COLUMN
REAR VIEW



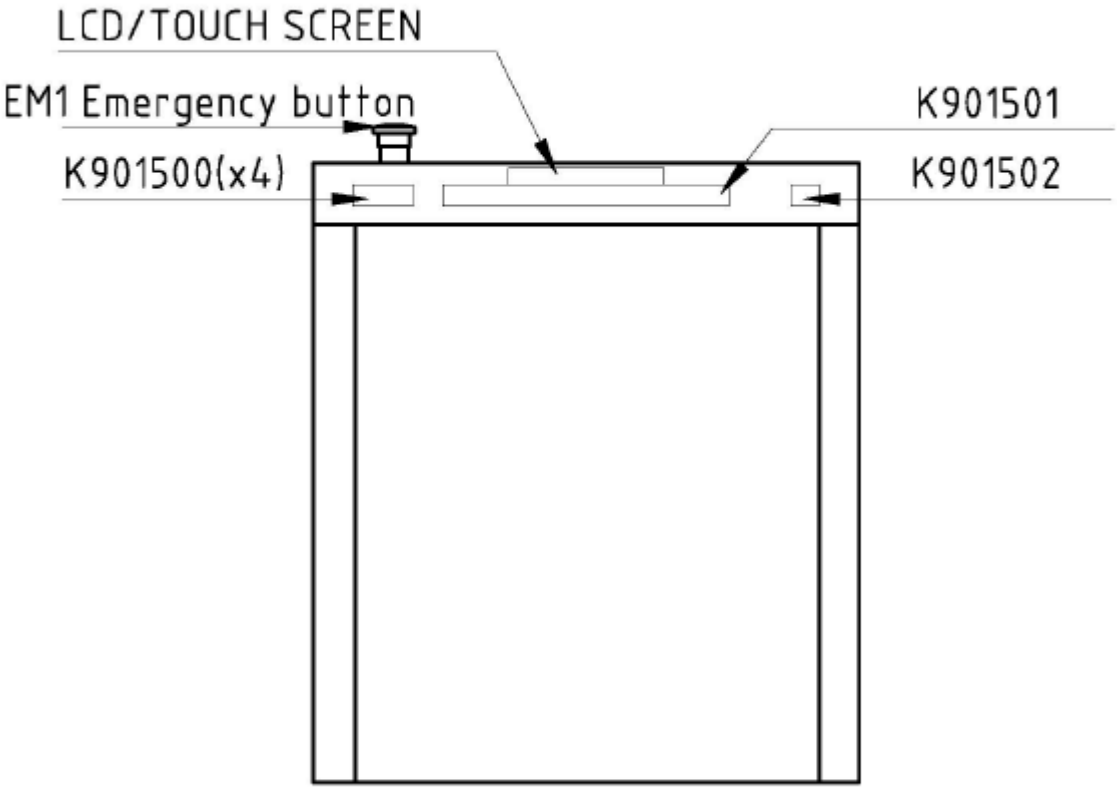
S.F.D.


Shutter Motor
FC14 Cassette PARK
Grid Motor
FC1T grid ZERO
K901508
Format 2
CS15
CS14
Cassette motor
K901507
Format 1
CS13
FC16 Shutter Zero
K901505
Mot. MPP/MCC
SHUTTER
K901505
Mot. MPP/MCC
CASSETTE
K901506
SFD control
K901510
Interconnections
FC15 Cassette OUT
EM2 Emergency button
Cassette push button
K901205
Keyboard

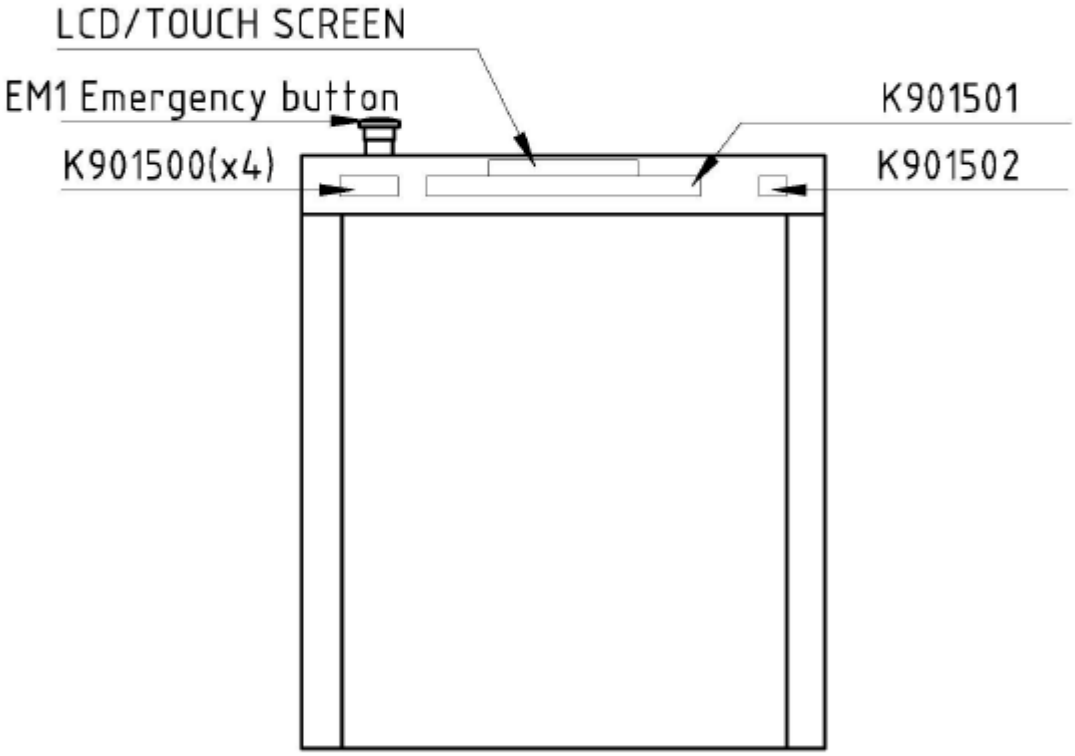
COMPRESSION SYSTEM
LATERAL VIEW



CONSOLE
REAR VIEW



CONSOLE (with generator)
REAR VIEW



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2.5 ACCESSORIES ASSEMBLING

In order to assemble any optional accessory with this unit, check their documentation to control the compatibility.

In case adaptors or modifications to the table are requested, please absolutely consult the manufacturer. Any unauthorized modification will cause the invalidation of the warranty period.

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2.6 GENERATOR CONNECTIONS

In order to connect the generator, please follow the instructions as described in the diagram

To perform the interface, use a cable with a minimum advisable section of 0.22mm², with a length not exceeding 25meters.

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2.7 ENVIRONMENTAL CONDITIONS

- Functioning temperature of the unit: from + 10°C to + 35°C
- Maximum humidity 80% without condensation
- Maximum Altitude for using the unit 3500 meters

Do not use the unit in inflammable or explosive areas.

SYMBOLS ON PACKING

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3.1 FUNCTIONAL CONTROLS

TO PERFORM ONLY AFTER HAVING INSERTED THE FOLLOWING FUNCTIONS IN SET UP:
- **I.I. DIMENSIONS**
- **CEILING HEIGHT**

- Switch on the system:
- Check the correct tilting direction, by keeping the column and S.F.D. group in central position.
- It must be the same as the symbol indicated on the on the console.
- The tilting speed is already preset.
- Check all anti-collision safeties compared with the floor, the ceiling and the walls of the room.
- In order to enter the limit-setting program of the unit, look at Set-up. It has been already preset and the values are reported on the final control report form.
- Check the perfect X-Ray beam alignment.
- Control the alignment of the X-Ray tube, with the Collimator, the S.F.D, I.I., the TV camera and the monitor.
- Check the correspondence between the light beam and the irradiated field. In case of error, check the fixing of the collimator or the position of the mirror.
- Check the movement of column-S.F.D. These movements already have a preset speed and acceleration ramp.
- The limits of the unit movements are preset by software.
- Control the S.F.D functions.
- Check the controls of the S.F.D. and all its functions.

***TOMO* function Control:**

- Load a cassette in S.F.D and enter the *TOMO* function on the console. Check the functions of: Tomo angle, time/speed and layer height.

NOTE: The operator **must** set the an exposure time on the generator desk equal or longer then the time of the tomo displayed on the console. The unit is delivered yet preset, if you have to change the preset values, please contact the manufacturer. The sharpness of the values reported on the display is of +/- 1 mm.

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3.2 COMPRESSOR SETTING

To check the functioning, first insert the compressor support.

A friction located on the motor transmission gives the compression force setting

And has an approximate value of 6-10-14 Kg.

In case you want to increase the set compression force, you can do it by entering in the Set up program.

The maximum limit is 17 kg.

If you change the value of the compression stroke, you must also change the position of the maximum stroke end-stop in order to enable it to act when the system reaches the maximum limit you have set.

In order to change the regulation you need a dynamometer to measure the stroke.

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4.1 SPOT FILM DEVICE

- **Functions on the push button pannel**

1) Collimator control
2) Table top
3) Movement of: the column and the S.F.D. (head / feet)
4) Tilting
5) IN / OUT cassette
6) Emergency push button (STOP)

- **Instructions of use**

The S.F.D. has a self-centring device.

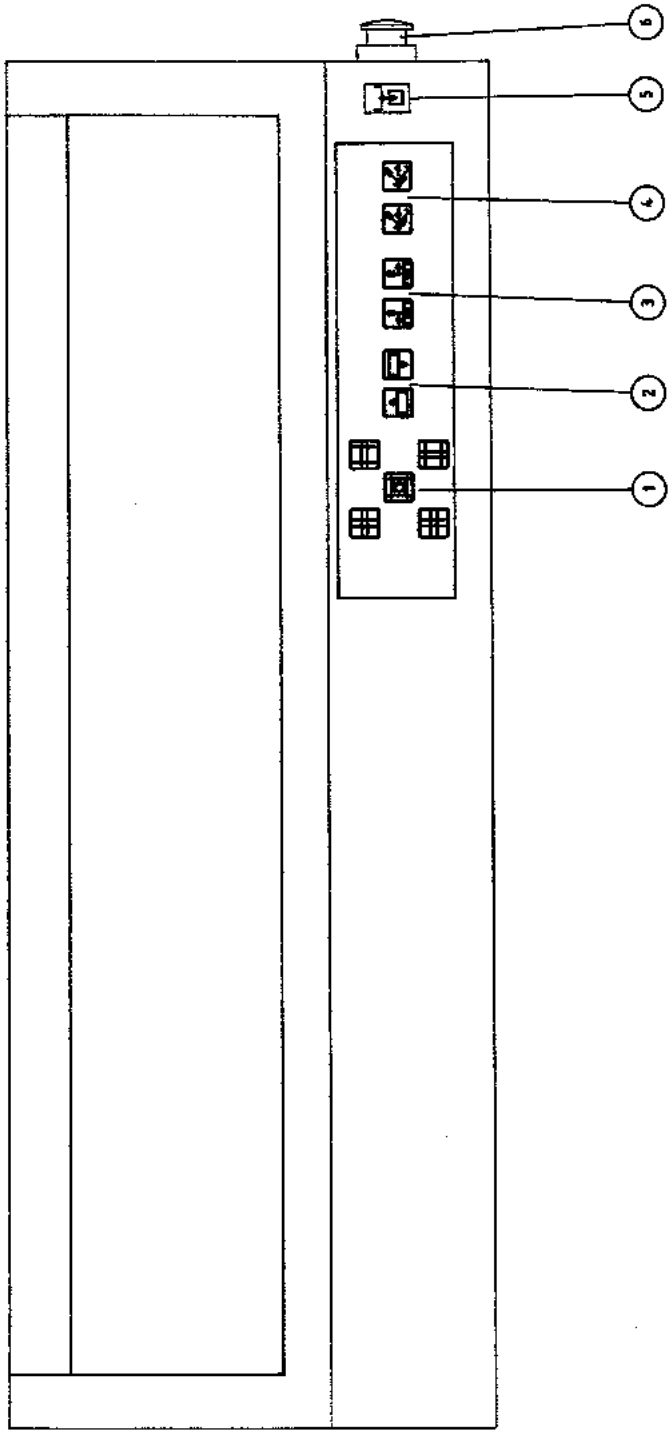
To load the cassette:
Introduce the cassette inside the S.F.D. and hook it with the front jaw of the cassette holder.

To pull out the cassette:
Push inside and pull up, then extract out carefully.
By means of key **5** (on the panel) you can insert or extract it.

Pay attention to not keep your hands on the Spot Film Device trolley while you are activating the IN/OUT push button.
Do not place objects outside the cassette as they might compromise the functioning of the Spot Film Device.

Once you have inserted the cassette, you can read its format on the display.
After each exposure the display indicates the number of exposures that you still have to make
Do not insert the cassette if you did not hook it properly.

S.F.D. FRONT PANEL

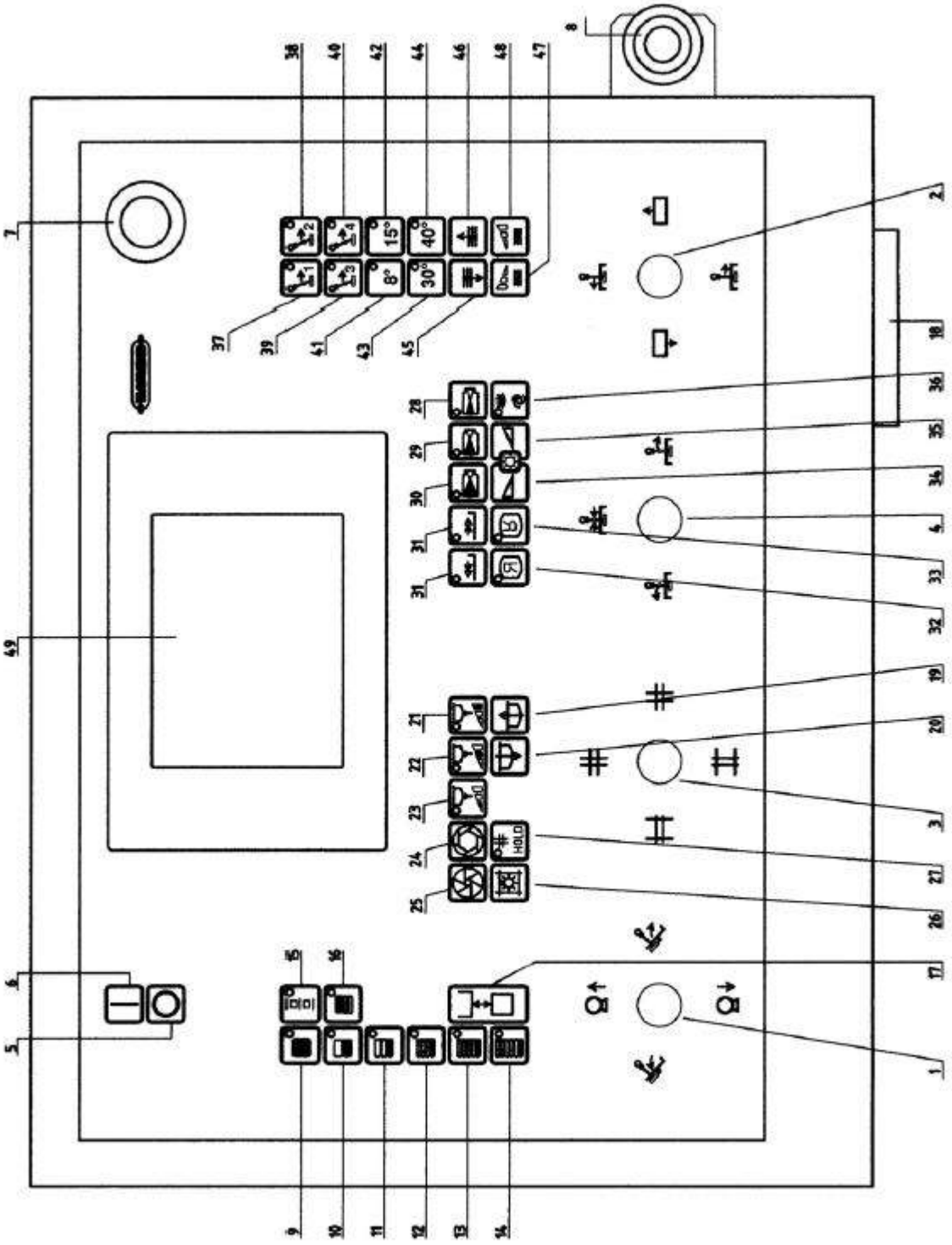


4.2 CONSOLE

4.2.1 Push buttons description and functionalities

1) Tilting / Focal Distance movement joystick
2) Table top / X-ray tube - S.F.D. movement joystick
3) Square field collimator manual control joystick
4) Inclination centre / tube angulation joystick
5) ON push button
6) OFF push button
7) Emergency push button
8) Push button for: graphy 1° time (preparation) / graphy 2° time (X- ray)
9) Panoramic Exposure
10) Division 2 Selection
11) Division 3 Selection
12) Division 4 Selection
13) Division 5 Selection
14) Division 6 Selection
15) Rapid Seriography
16) Differentiated division selection
17) IN – OUT cassette
18) Scopy Pedal
19) Compressor UP control
20) Compressor DOWN control
21) Compressor maximum force selection
22) Compressor medium force selection
23) Compressor minimum force selection
24) Iris collimator manual opening
25) Iris collimator manual closing
26) Collimator light ON control
27) Hold
28) I.I. 4” 6” 9” 12” (min) field
29) I.I. 6” 9” 12” 14” (med) field
30) I.I. 6” 9” 12” 14” (med) field
31) Table top step control
32) Right / Left monitor image inversion
33) Head / Feet monitor image inversion
34) – Brightness monitor control
35) + Brightness monitor control
36) Automatic Fluoroscopy
37) 1st tomography speed selection
38) 2nd tomography speed selection
39) 3rd tomography speed selection
40) 4th tomography speed selection
41) 8° tomography angle selection
42) 15° tomography angle selection
43) 30° tomography angle selection
44) 40° tomography angle selection
45) Tomography layer decrease control
46) Tomography layer increase control
47) Automatic layer decrease control
48) Automatic layer increase control
49) Touch screen / Display

Fig.2



4.2.2 User's Instructions

The console controls the unit (fig. 2), but you can also operate by using the spot film device panel.

TURNING ON THE UNIT

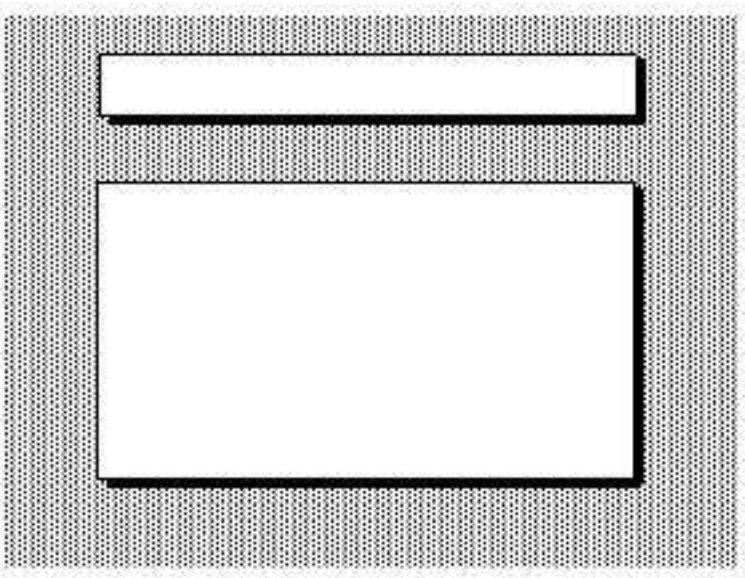
You can turn on the unit by means of the push button "6" which activates all movements after 20 seconds.

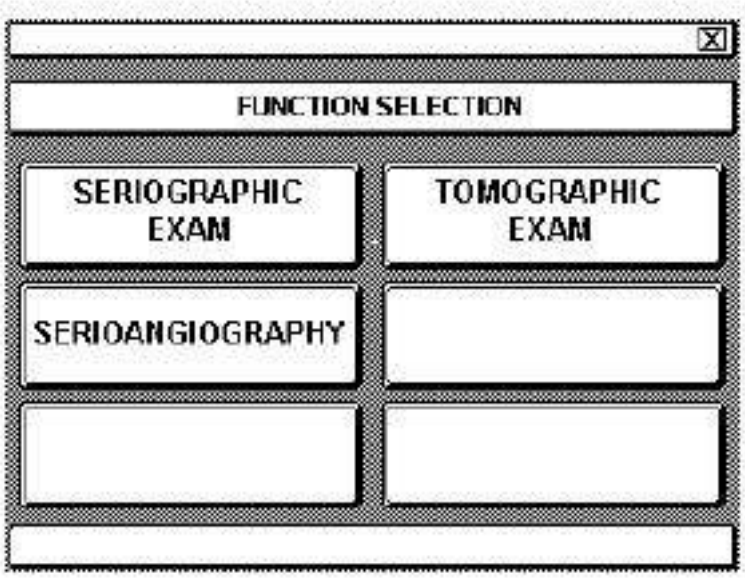
To turn OFF the unit use the push button "5"

You also have an emergency push button "7" located both on the console and laterally on the S.F.D. (= spot film device).

This push button deactivates all functions of the unit; in order to reactivate it you must turn OFF the unit and turn the emergency push button "7" in the sense of the arrows.

At this point you can perform all movements.





MOVEMENTS

- You can activate the controls by following the symbols on the console:
- Tilting (with horizontal stop position) and focal distance by means of joystick “1”
- Table top movement, S.F.D. and X-ray tube longitudinal movement by means of joystick “2”
- Inclination movement by means of joystick “4”
- Manual X-ray tube rotation by means of an-hooking lever located on the back of collimator.
- Compression movement by means of the push buttons: “19-20”.

To move the compressor you must first insert the compression cone.

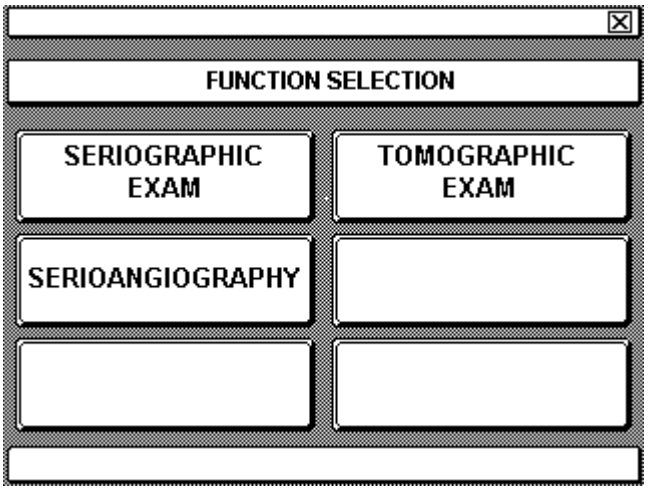
If the compressor is in the working area, it might prevent the movements of X-Ray tube (longitudinal movement, inclination) and of the tabletop.

If, during movements, the system finds itself in a probable collision situation, the unit will disenable the relevant movement, and the disturbing element should be removed from the probable collision situation.

RADIOGRAPHY WITHOUT SPOT FILM DEVICE

- Adjust the X-ray beam according to the cassette size by turning on centring light beam.

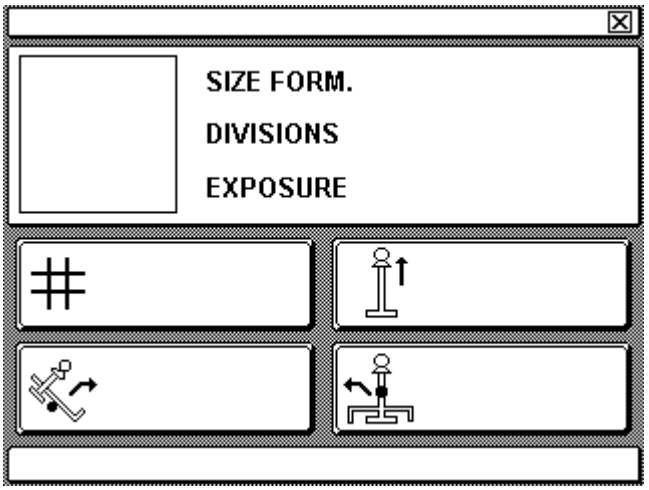
On the main screen menu you will find all system's functions divided into function groups.



The screen is divided into 3 parts concerning a single function:
- SPOT FILM DEVICE EXAMINATION
- TOMOGRAPHIC EXAMINATION
- SERIO ANGIOGRAPHY

You can enter various functions by means of "TOUCH SCREEN" panel.

SELECTION SPOT FILM DEVICE EXAMINATIONS



On the screen you will find the following parameters:

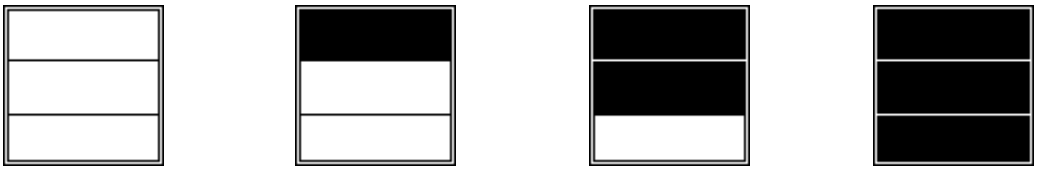
- **SIZE:**

Lateral x Longitudinal dimension in cm of inserted cassette.
In case you see some symbols, it means no cassette or format is inserted.

- **DIVISIONS:**

Normal/Fast.
(After having inserted cassette)
Selection is done by "15 Rapid Seriography " push button.
By pushing it once, you will read "Rapid" on the dial and the relevant led will turn ON.
To go to normal function, you must push once again "15 Rapid Seriography" push button.
If you push it once, on the dial you will read "Normal" and the push button led will turn OFF.

In order to select division (after having inserted a cassette), the leds of possible division push buttons will light up.
By pushing one push button, only the led concerning the possible division will stay lighted up and all the others will turn OFF.
In order to change the selected division, you must push again the push button, which has the led turned ON.
At this point all the possible divisions will be activated.
When you make radiographies, the graphic parts concerning the exposures you made, will become black.



- **EXPOSURES:**

Standard/Digital.
The selection is operated from the generator.

- **COLLIMATOR dial:**

Auto Collim./Hold Collim.
Pushing the dial on the touch screen panel operates the selection.

- **FFD dial:**

It displays the focal film distance in mm, from the absolute position of the focus of X-Ray tube to the X-Ray film.
You will then always have a positive value expressed in mm.
During inclination variations, the focal distance is kept unchanged, unlike tomography, which works with variable focal distances and variable speeds.

- **TILTING dial:**

Tilting angle in degrees, from the angular position of tabletop in comparison to floor level.
You will then have a positive value expressed in angular degrees (°) which, will be positive towards head-side and negative towards feet-side.
During inclination variations, the software activates some security blocks in order to avoid a collision with other components (such as image intensifier) and floor.

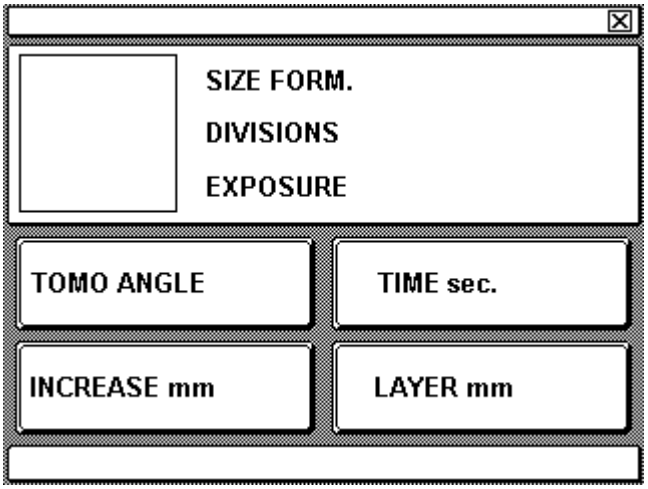
- **INCIDENCE dial:**

It shows the incidence angle in degrees from S.F.D. alignment angular position to X-ray tube column.
You will then have a value expressed in angular degrees (°) in comparison to the centre, which will be positive towards head-side and negative towards feet-side.
The maximum inclination is +/- 30°, except the case in which you have some limits due to the position of column or S.F.D. chariots.

- **SERIOGRAPHIC PROGRAM:**

Film	P	2	2D	3	3D	4	4D	5	5D	6
18-24	*	*		*						
18-43	*	*		*						
20-40	*	*		*		*				
24-18	*	*		*		*				
24-30	*	*		*		*				
30-24	*	*		*		*		*		
30-30	*	*		*		*		*		
30-40	*	*		*		*		*		
35-35	*	*		*		*		*		*
35-43	*	*		*		*		*		*
40-30	*	*		*		*		*		*
40-20	*	*		*		*		*		*
43-18	*	*		*		*		*		*
43-35	*	*		*		*		*		*

SELECTION TOMOGRAPHIC EXAMINATIONS



The following parameters appear on the display:

- **FORMAT:**

Lateral x Longitudinal dimension in cm of the inserted cassette.
In case you see some symbols, it means that any cassette or format is inserted.

- **DIVISIONS:**

Normal / Fast.
(After having inserted the cassette)
The selection is operated by the "15 Rapid Seriography " push button.
By pushing it once, you will read "Fast" on the dial and the relevant led will turn ON.
To return to the normal function, push once again "15 Fast Seriography " push button.
If you push it once, on the dial you will read "Normal" and the push button led will turn OFF.

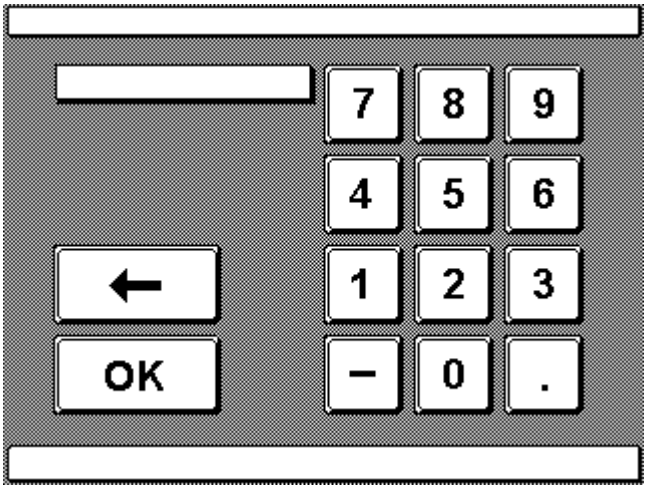
In order to select division (after having inserted a cassette), the leds of possible division push buttons will light up.
By pushing one push button, only the led concerning the possible division will stay lighted up and all the others will turn OFF.
In order to change the selected division, you must push again the push-button, which has the led turned ON.
At this point all the possible divisions will be activated.
When you make radiographies, the graphic parts concerning the exposures you made, will become black.

- **EXPOSURES:**

Standard / Digital.
Selection is made from the generator.

- **TOMO ANGLE dial:**

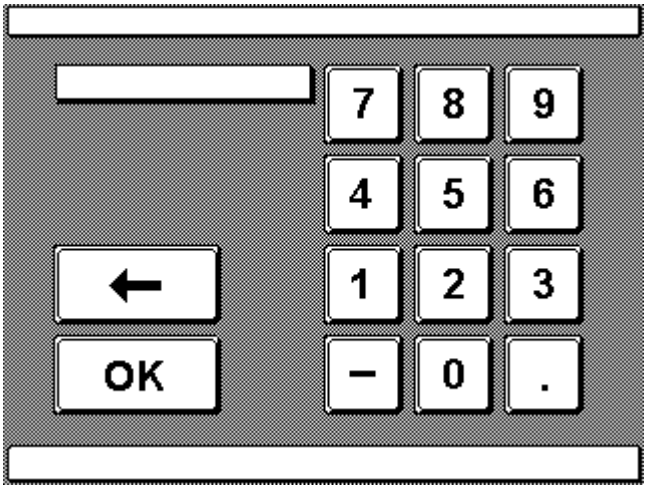
The Selection is made from the touch screen panel by pushing on the relevant dial, or by selecting the push buttons “41-42-43-44” (8°,15°,30°,40°) from the console.
By pushing on the touch screen panel you will see:



You can select all values included between 8 and 40°
After the selection you must press OK to confirm or ✍ to cancel the value.

- **mm. INCREASE dial:**

You can make it only from the bottom to the top.
The selection is made by pushing the relevant dial on the touch screen panel, or by choosing push buttons “47-48” on the console.
By using the touch screen panel you will see:



You can select a value between 0 and 25 mm
After the selection you must press OK to confirm or ✍ to cancel the value.

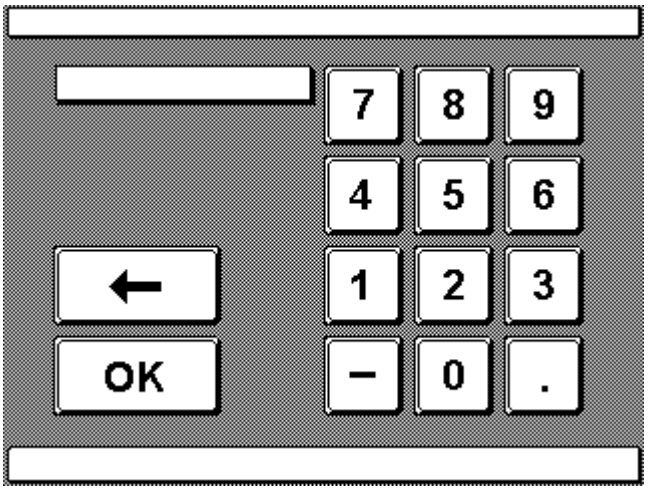
- **TIME sec. dial:**

The combination between tomography angle and speed determines exposure time
See the table below:

Angle	Speed 1	Speed 2	Speed 3	Speed 4
8°	0.8 sec.	0.6 sec.	0.5 sec.	0.4 sec.
15°	1.4 sec.	1.1 sec.	0.9 sec.	0.7 sec.
30°	2.9 sec.	2.2 sec.	1.7 sec.	1.5 sec.
40°	3.9 sec.	3.0 sec.	2.4 sec.	2.0 sec.

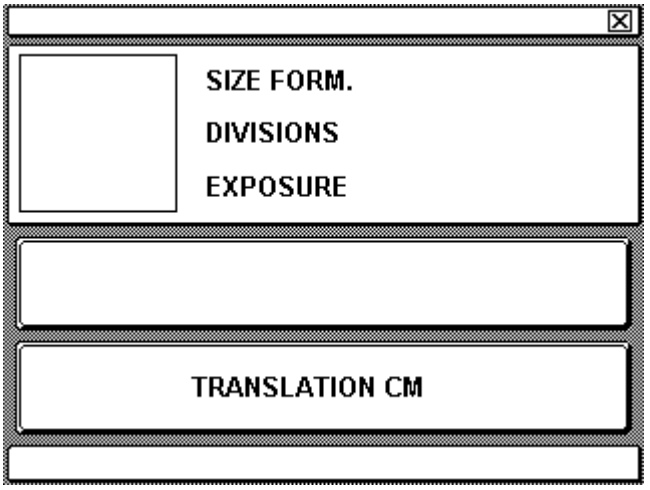
NOTE:
During a tomography the focus film distance changes.

The selection is made from the touch screen panel by pushing on the relevant dial, or by selecting push buttons “45-46” from the console.
By pushing on touch screen panel you will see:



You can select a value included between 001 and 300 mm
After the selection you must press OK to confirm or ✍ to cancel the value.

SELECTION SERIO ANGIOGRAPHY



The display shows the following parameters:

- **FORMAT:**

Lateral x Longitudinal dimension in cm of inserted cassette.
In case you see some symbols, it means that any cassette or format is inserted.

- **DIVISIONS:**

Normal / Fast.
(After having inserted cassette)
Selection is done by "15 Fast Seriography " push button.
By pushing it once, you will read "Rapid" on the dial and the relevant led will turn ON.
To return to normal function, you must push once again "15 Rapid Seriography " push button.
If you push it once, on the dial you will read "Normal" and the push button led will turn OFF.

In order to select division (after having inserted a cassette), the led of possible division push buttons will light up.
By pushing one push button, only the led concerning the possible division will stay lighted up and all the others will turn OFF.
In order to change the selected division, you must push again the pushbutton, which has the led turned ON.
At this point all the possible divisions will be activated.
When you make radiographies, the graphic parts concerning the exposures you made, will become black.

- **EXPOSURES:**

Standard / Digital.
Selection is made from the generator.

- **VENOUS ANGIOGRAPHY / ARTERIAL ANGIOGRAPHY dial:**


VEIN ANGIOGRAPHY

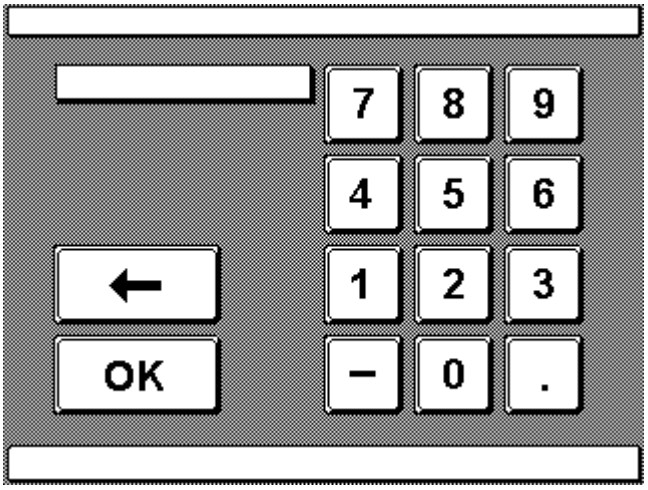

ARTERY ANGIOGRAPHY

The unit makes exposures by moving from feet-side to head-side.

The unit makes exposures by moving from the body towards feet.

- **TRANSLATION in cm dial:**

The selection is made from the touch screen panel by pushing on the relevant dial.
By acting on the touch screen panel you will see:



You can select a value included between 5 and 30 cm
After the selection you must press OK to confirm or ✍ to cancel the value.

- **IMAGE INTENSIFIER:**

You can have 1/2/3/4 zooms according to the Image Intensifier you have assembled.
If any I.I. zoom type is selected, the unit will be on the I.I. nominal field and the led of push buttons "28,29,30" will be turned OFF.
By pushing the "30" push button you activate the 1st zoom.
By pushing the "29" push button you activate the 2nd zoom.
By pushing the "28" push button you activate the 3rd zoom.

- **IMAGE INVERSION:**

By selecting the"32" push button you activate a horizontal image inversion on the monitor.
By selecting the "33" push button you activate a vertical image inversion on the monitor.

- **MONITOR BRIGHTNESS:**

You can adjust the monitor brightness by means of the "34,35"push buttons.

- **AUTOMATIC FLUOROSCOPY:**

Only for preset generators
Fluoroscopy automatic kV insertion

- **COMPRESSOR:**

By inserting a compression cone you can make compression by means of push buttons "19,20"
You can select the compression force by means of push buttons "21,22,23".
The Push button "21" is for maximum stroke
The Push button "22" is for medium stroke
The Push button "23" is for minimum stroke
If the compressor is in working position, the software will prevent some movements of the machine such as for instance: tilting, column, S.F.D., table top, etc.... in order to avoid risks to the patient. Removing the compression cone can reactivate all these movements.

- **COLLIMATOR LIGHT:**

By pushing the push button "26", the collimator light is activated for about 20 sec.
By pressing again on this push button "26", you turn it OFF.

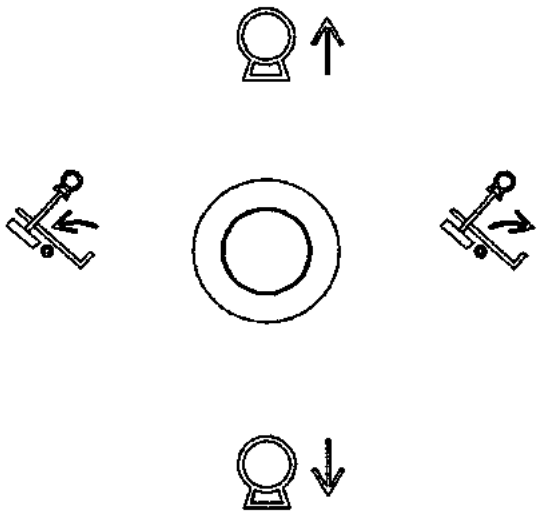
- **HOLD:**

By pushing the push button "27" you activate the Hold function.
The collimator's opening is automatic and depends on the Image Intensifier you have selected and on the cassette you have inserted in the S.F.D.
You can change the collimator's opening by means of joystick "3" (only size format reduction) during fluoroscopy.
When you make a graphy, the collimator automatically positions itself according to the cassette size; you can block this function by means of Hold pushbutton which, blocks collimator to fluoroscopy format.

- **IRIS:**

Optional
Round field collimator: you can change it by means of push buttons "24,25

- **JOYSTICK 1:**



1. TILTING control:

You can tilt the table from vertical to trendelemburg by means of joystick “1” with automatic stop in horizontal position.
The value given on the display shows the angular position of tabletop in comparison to the floor.
The value is expressed in angular degrees with positive sign (feet side inclination) or negative value (head side inclination). The maximum inclination is + 90°, -20° (KRISTAL 90/20) or +90°, -90° (KRISTAL 90/90).
Tilting is prevented in case I.I. position is critical in comparison to floor and in any case if focal distance exceeds cm 110.

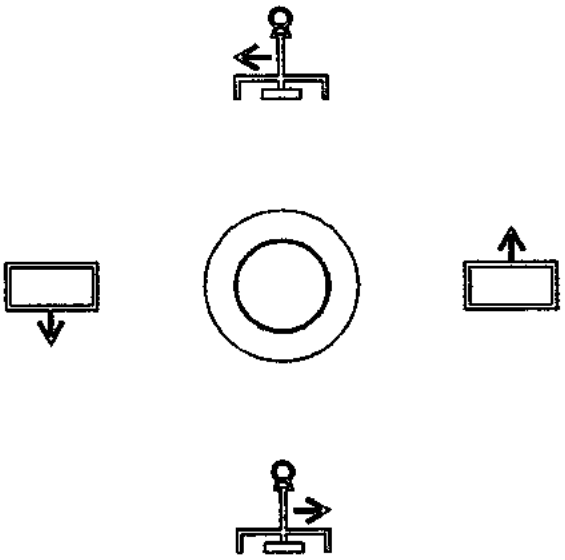
F.F.D. control:

This movement is controlled with the joystick “1”
This movement gives the distance in mm from the focus of X-ray tube position to X-ray film.

NOTE:

This movement is prevented in case its position is critical in comparison to ceiling.

- **JOYSTICK 2:**



2. X-RAY TUBE / SPOT FILM DEVICE control:

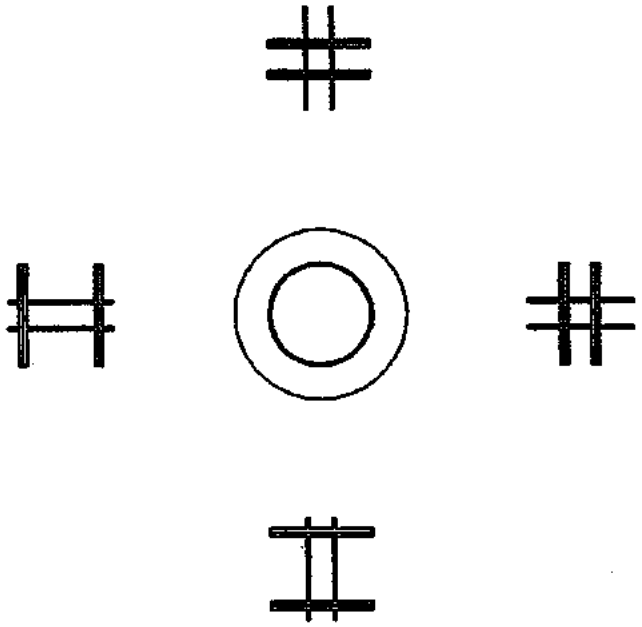
This movement is made from joystick "2".
Moving in patient's longitudinal direction.

NOTE:
This movement is prevented in case I.I. position is critical in comparison to floor.

TABLE TOP control:
This movement is made from joystick "2".
Moving in patient's transversal direction.

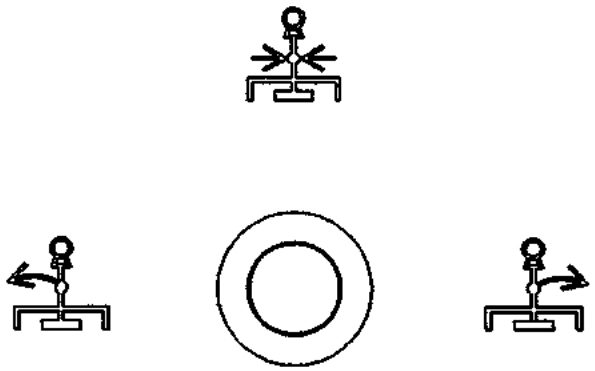
- **JOYSTICK 3:**

COLLIMATOR control:



Collimator opening is automatic and depends on I.I. selected type and the cassette inside the SFD.
You can vary collimator's opening by means of joystick "3" (only size format reduction) during fluoroscopy.
When you make graphy collimator automatically positions itself to cassette size.

- **JOYSTICK 4:**



TUBE ANGULATION control:
This movement is controlled by constantly holding joystick "4"(without releasing it)
The maximum travel is +/- 30° except limitations due to column or SFD trolleys position.
The value is expressed in angular degrees with positive sign if the inclination is towards head-side, or negative sign if the inclination is towards feet-side. The inclination is +/- 30°.

By moving the joystick towards the upper part, you reach the X-ray centre position.
The display will show a value of 0°.

During inclination variations the focus film distance changes.

- **X-RAY CONTROL:**

Pressing the double release push button “8” allows to take X-rays.
- 1st stepping: Preparation
- 2nd stepping: Graphy

RAPID SERIOGRAPHY:
If you make a rapid seriography exposure, the two stepping must be kept pushed until the whole exposure is completed.
When graphy is finished, the cassette is automatically ejected.

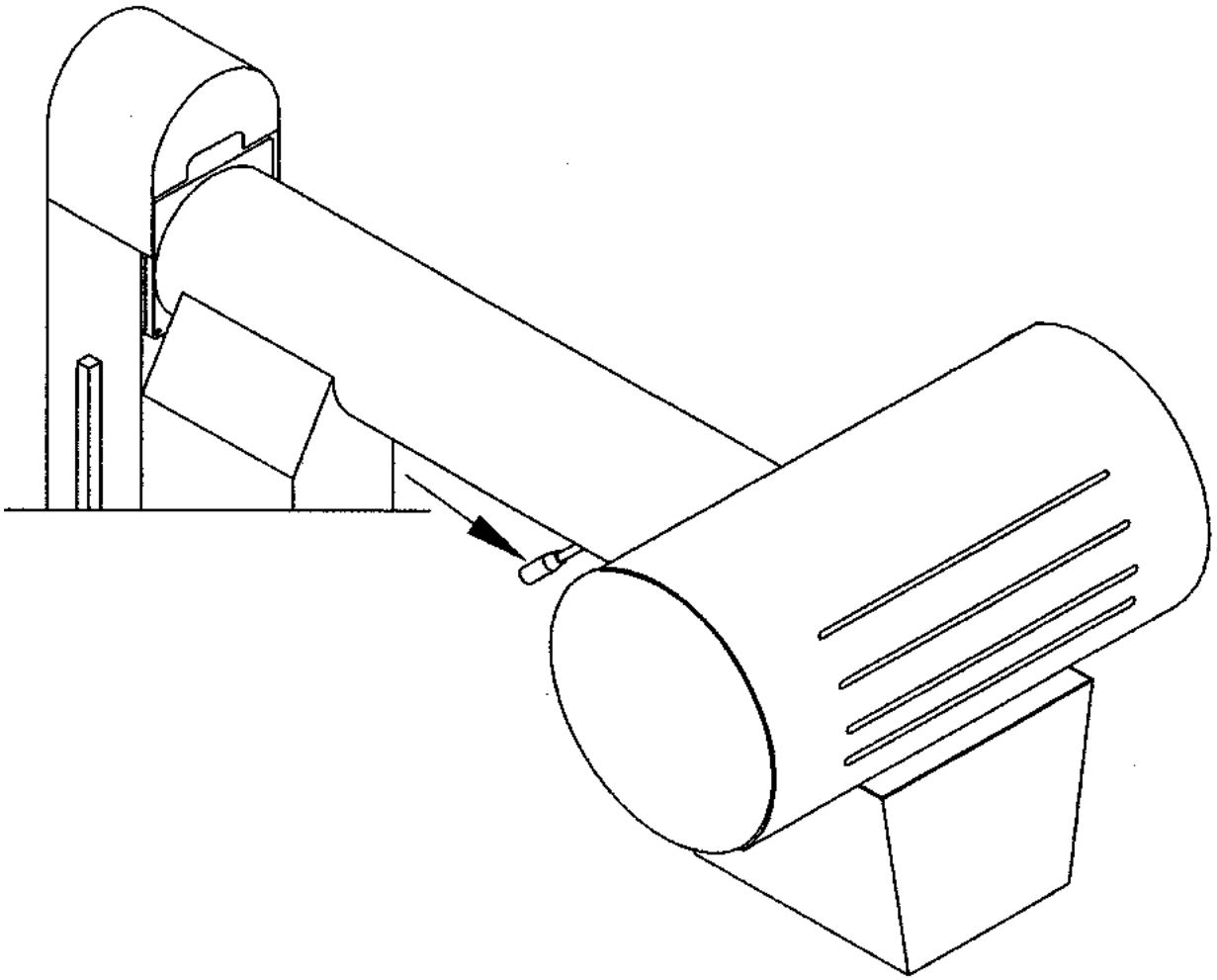
TOMOGRAPHY:
After having set: the ANGLE, SPEED, LAYER and INCREASE parameters, you can perform a tomography exposure by pressing the double release push button “8“.

NOTE:
You must release double release push button “8“ only when the exposure is finished in order to let the column replace itself.
In case you make rapid tomography, both stepping must be kept pushed until the whole program series are completed.

SERIOANGIOGRAPHY:
After having set: ARTERY, VENOUS and TRANSLATION parameters, you can take exposure by pressing the double release push button “8“.
The two stepping must be kept pressed until the beginning of translation movement.
In case you make rapid sequence, both stepping must be kept pushed until the whole program is completed.

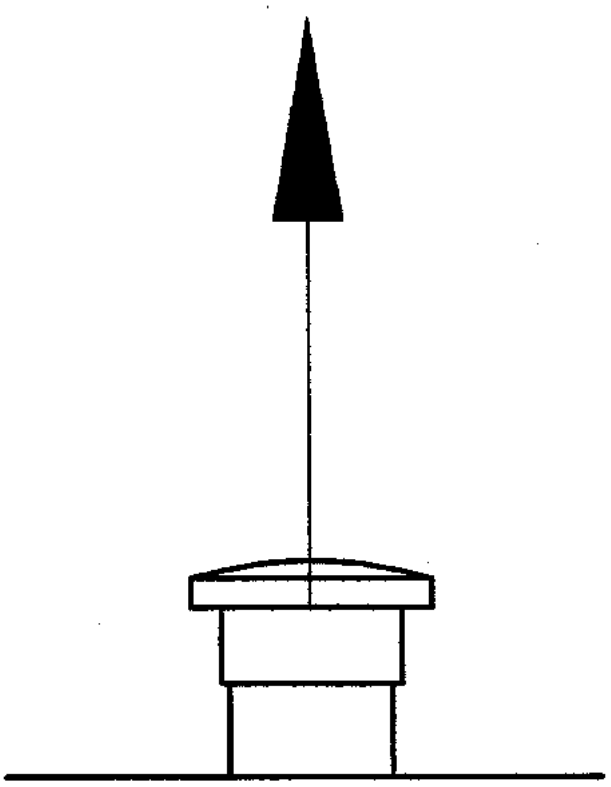
- **EXPOSURE WITHOUT SPOT FILM DEVICE:**

If you rotate the X-ray tube without blocking it with its lever, you cannot use the graphy “8” and the Fluoroscopy “18” keys from the console.
Display lower dial will indicate TUBE ROTATION ERROR.
Direct radiography can be made anyway from the generator.



- **EMERGENCY PUSH BUTTONS**

By pushing an emergency push button, you deactivate the system movements and the X-ray control.
The console is still active, you will see an alarm message and an acoustic sign will indicate emergency.
Display lower dial will show:
EMERGENCY PUSH BUTTON PRESSED
To unblock it you must pull it upwards.



4.2.2 Error messages

✍✍Errors of the functioning parameters loading

- COLUMN and / or SPOT FILM DEVICE SETTING ERROR
- TILTING SETTING ERROR
- FOCUS FILM DISTANCE SETTING ERROR
- TABLE TOP SETTING ERROR
- COMPRESSOR SETTING ERROR
- IMAGE INTENSIFIER SETTING ERROR
- FRICTION SETTING ERROR
- COLLIMATOR SETTING ERROR
- PARAMETRS LOADING ERROR

✍✍Anomalies of movement implying to restart the unit

- EMERGENCY PUSH BUTTON PRESSED
- COLUMN END-STOP ANOMALY
- SPOT FILM DEVICE END-STOP ANOMALY
- TILTING END-STOP ANOMALY
- MOTORS END-STOP ANOMALY

✍✍Movement Errors

- MAX FFD END-STOP ANOMALY
- MIN FFD END-STOP ANOMALY
- INT. TABLE TOP END-STOP ANOMALY
- EXT. TABLE TOP END-STOP ANOMALY

✍✍Performance Errors

- TOMOGRAPHY OUT OF SET POINT
- ANGIOGRAPHY OUT OF SET POINT
- ROTATION TUBE ERROR

✍✍Communication Errors

- CVS22 COMMUNICATION ERROR
- CAN COMMUNICATION ERROR
- SPOT FILM DEVICE ERROR

NOTES

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4.3 PATIENT POSITIONING

It must be determined each time.
First of all verify the physical condition of the patient.
Use of a shoulder rest is available depending on the type of examination.
You can fasten him by means of the compression band.
The patient may have access to the tabletop in both positions: vertical and horizontal.
The patient must hold the handles mounted on the tabletop.
Carefully position the patient in the middle of tabletop.
Now you can position all the system according to the type of examination.
At the end release the patient following the above-mentioned instruction in the opposite way.

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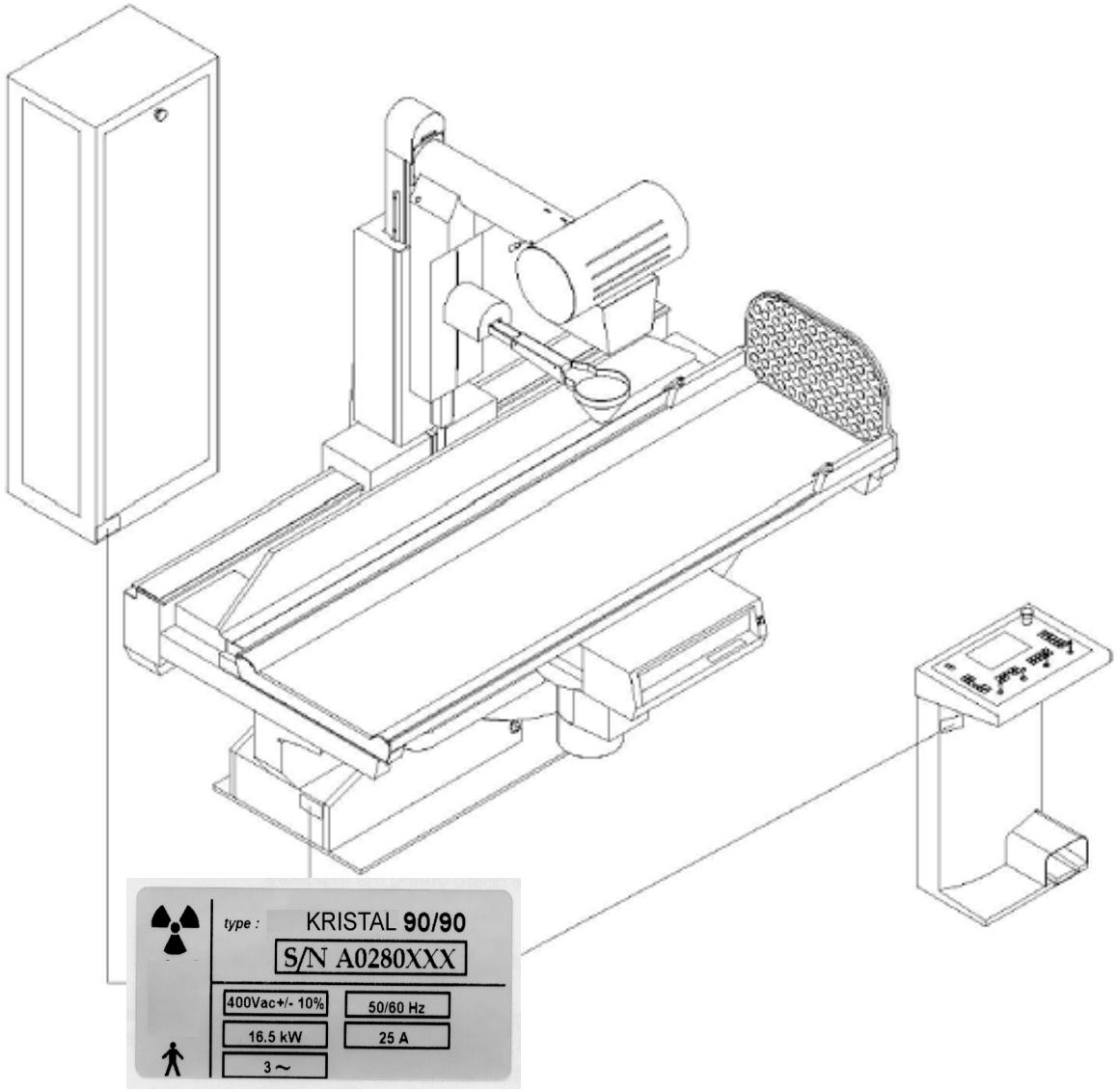
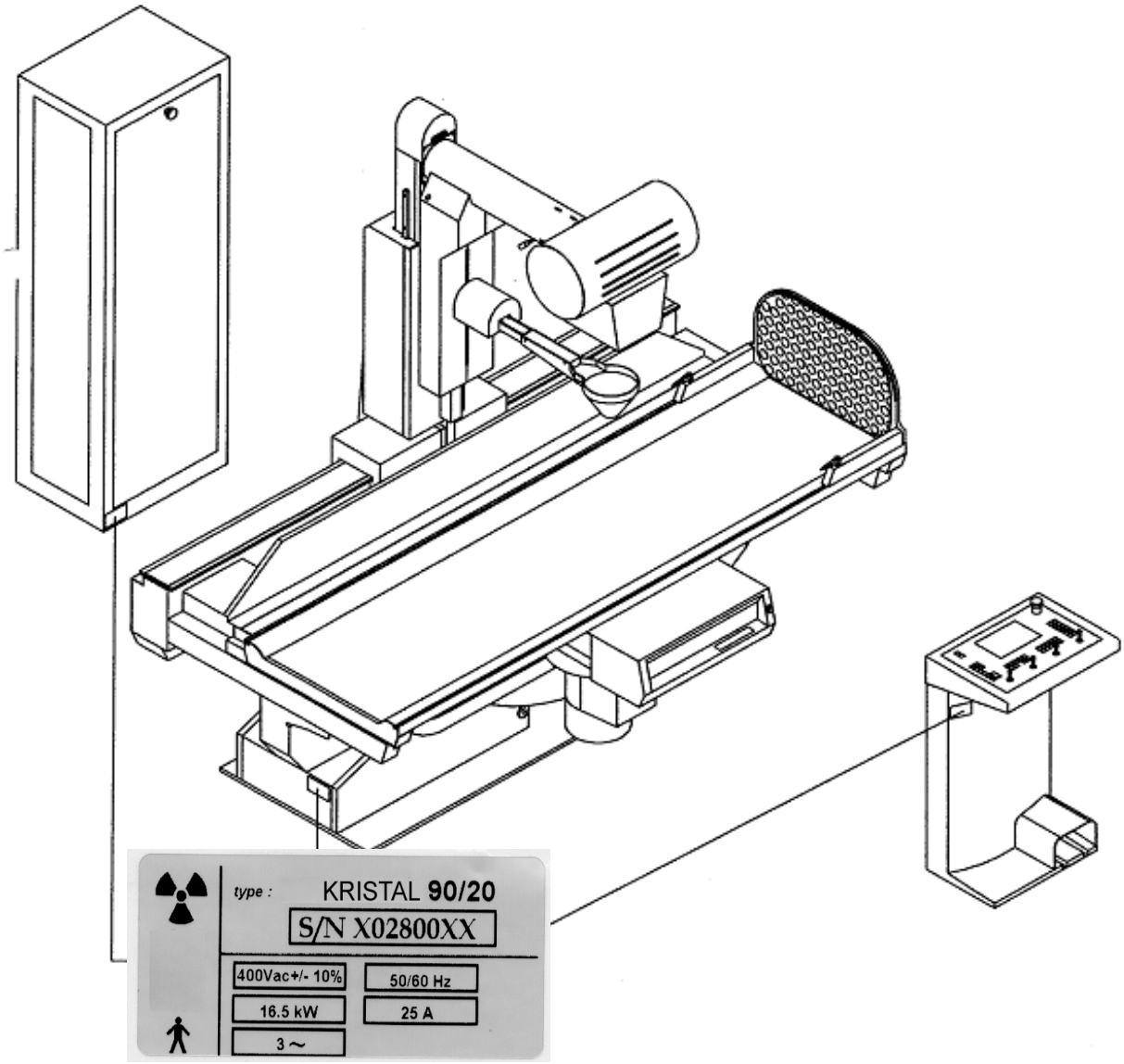
4.4 SYMBOLS

Location of the identification labels.
The meaning of the symbols is specified in the page 4

90/90 TILTING TABLE



90/20 TILTING TABLE



Symbol	Definition
	878-02-02 Apparatus type **B**
	878-03-02 Attention to the attached documentation
	878-01-20 Earth protection
	878-01-21 Earth
	878-03-01 Dangerous Voltage

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4.5 GUARANTEE

The validity of DMS-APELEM guarantee is 12 months from certificate receipt date and it covers mending or free replacement of spare parts as well as handwork (except for the unload tubes which have a warranty in proportion to 12 months).

DMS-APELEM warranty is not valid for operations and mending caused by externals factors:

- Fire, explosion, floods, subsidence of buildings,
- Default of the device relative to the environmental conditions,
- Non respect or non observance of the prescriptions given by the manufacturer in the User manual,
- Operations or mending carried out by a staff non qualified and non-agreed by DMS-APELEM.

DMS-APELEM
Parc Scientifique Georges Besse
175, allée Von Neumann
30035 NIMES CEDEX 9 - FRANCE
Tel + 33 (0)4 66 29 09 07 - Fax +33 (0)4 66 29 71 23
email: export@apelem.com

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5.1 MAINTENANCE

The Program of maintenance must ONLY be carried out by technically prepared and authorized personal.

- First maintenance: 90 days from installation
- Second maintenance: One year from installation
- Following: Every year

The use and environmental conditions can modify this default maintenance program.

During maintenance you must check:

- The closing of the screws of the base
- All the sliding parts including the chromed rails
- All moving parts (belts and chains)

IN CASE ONE OF THESE PARTS IS WEARED OR HAS ANY FAULT, YOU MUST REPLACE OR ADJUST IT.

Check the correct centring of the X-ray beam and adjust it as it is indicated in paragraph 7 (X-Ray Collimator)

Our Service Department is at your complete disposition for programmed interventions or direct calls.

Malfunctions:

If malfunctions are detected the operator must inform immediately the service department.

A detailed description of the malfunctions and anomalies is recommended.

Avoid to use the system in case dangerous conditions are detected.

Contact as soon as possible the technical service, which is at your whole disposition for intervention or suggestions.

Telephone number for Service & maintenance: **00 33 (0)4 66 29 09 07**
Fax number for Service & maintenance: **00 33 (0)4 66 29 71 23**

WARNING: Before performing any intervention, always switch the unit off. Moreover, pay special attention to the sliding bearings of the transversal movement of table top.

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5.2 CLEANING

Before reading these instructions, check par.2.7 concerning required environmental conditions.

The cleaning must always be performed at regular intervals, keeping the unit in horizontal position.

Every day clean all parts that are in a close contact with the patient, using a cleaning product approved in your country by the Health Ministry.

Every week clean the painted metallic parts, the chromed sliding profiles using non aggressive cleansers.

Do not position near the unit items that might damage it, or interfere with its functioning.

Use cleaning products properly avoiding to let them penetrate inside the unit.

In case you note any leakage, please inform your technical assistance.

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5.3 DISPOSAL

This unit contains parts, which can be recycled or re-used.

At the end of the operating life of the unit, contact specialized companies, which will exploit all the materials and will reduce to the minimum, parts to be eliminated.

The unit does not contain polluting materials, except the lead of the diaphragm.

In case you meet problems, call our technical assistance, which will give you information to know the procedures for disposal.

In any case, follow carefully the regulations of your country.

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6 ELECTRIC DIAGRAMS

6.1 Block diagrams

6.2 Electric panel connections

6.3 Cabinet internal connections

Cabinet internal connections Continuation

- K905230 sheet 2 of 4
- K905270 sheet 2 of 4
- K905271 sheet 2 of 4
- K905272 sheet 2 of 4
- K905280 sheet 2 of 4
- K905281 sheet 2 of 4
- K905282 sheet 2 of 4

6.4 SFD internal connections

- K906320 sheet 1 of 3
- K906330 sheet 1 of 3
- K906340 sheet 2 of 3
- K906350 sheet 1 of 3
- K906360 sheet 3 of 3
- K906370 sheet 3 of 3
- K906380 sheet 3 of 3
- K906390 sheet 3 of 3

6.5 Console internal connections

- K907100 sheet 1 of 2
- K907110 sheet 2 of 2

6.6 Table internal connections

- K906100 sheet 1 of 5
- K906120 sheet 2 of 5
- K906130 sheet 3 of 5
- K906140 sheet 4 of 5
- K906150 sheet 5 of 5

6.7 Cables

K904100P sheet 1 of 15
K904100R sheet 2 of 15
K904100S sheet 3 of 15
K9041 l OP sheet 4 of 15
K9041 l OR sheet 5 of 15
K904120P sheet 6 of 15
K904120S sheet 7 of 15
K904130S sheet 8 of 15

Cables Continuation

K904140P	sheet 9 of 15
K904140S	sheet 10 of 15
K904150P	sheet 11 of 15
K904150S	sheet 12 of 15
K904200	sheet 13 of 15
K904210	sheet 13 of 15
K904220	sheet 13 of 15
K904230	sheet 13 of 15
K904220	sheet 13 of 15
K904300	sheet 14 of 15
K904310	sheet 14 of 15
K904400	sheet 15 of 15

6.8 Interface signal

6.9 Fuse list

6.10 PCBs

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6.1. BLOCK DIAGRAMS

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6.2. ELECTRIC PANEL CONNECTIONS

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6.3. CABINET INTERNAL CONNECTIONS

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6.4. SFD INTERNAL CONNECTIONS

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6.5. CONSOLE INTERNAL CONNECTIONS

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6.6. TABLE INTERNAL CONNECTIONS

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6.7.CABLES

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6.8. INTERFACE 1 SIGNAL DESCRIPTION

Outputs:

PREPERATION: Active when first step of the X-ray pushbutton is pressed

XRAY REQ: Active when second step of the X-ray pushbutton is pressed, collimator and SFD shutters are in good position and GEN READY input is on.

AUTOMATIC FLUORO: Active when Automatic fluoro console key is on.

ZOOM 1: Active when second magnification field is selected on the console

ZOOM 2: Active when third magnification field is selected on the console

ZOOM 3: Active when fourth magnification field is selected on the console

PREPERATION: Active when first step of the X-ray pushbutton is pressed

X-RAY REQ: Active when second step of the X-ray pushbutton is pressed, collimator and SFD shutters are in good position and GEN READY input is on

FLUORO: Active when fluoro pedal is pressed and collimator and SFD shutters are in good position

RX P.B. OUTPUT: Active each time the second step of the X-ray pushbutton is pressed without any control of collimator and SFD shutters position

DIGITAL ON: Active when DIGITAL REQ is on and SFD Carriage is in park position

TOMO ON: Active when Tomo function is selected on the remote control table

K13-K14-K15-K16 RESISTOR LADDER: These four relays are activated with a four bits binary sequence, K13 is the LSB and K16 is the MSB controlled by the brightness key on the console.
Is possible to create a digital potentiometer to adjust monitor brightness by choosing the right value of resistor R22-R19-R21-R24-R26.

Inputs:

GEN READY: When this input is off (Opto isolator led off) the remote control table cannot activate the XRAY REQ relay output.

X-RAY ON: The remote control table to know if exposure is done uses this input. If this input detect a lo to high transition (opto isolator led turn on),table know that the film is impressed. When detect a high to low transition (opto isolator led turn off), allow the SFD carriage to come back in park position, in normal seriograph mode, and to go to the next division in quick mode.

DIGITAL REQ: When this input is on (Opto isolator led on) SFD is disabled, the carriage goes automatically in park position and DIGITAL ON output relay is activated.

EXTERNAL LOCK: When this input is on (Opto isolator led on) all movement are disabled.

TUBE OUT OF POS: When this input is off (Opto isolator led off) XRAY REQ relay output is disabled

DFF CEILING SWITCH: When this input is on (Opto isolator led on) all movement are disabled but is possible to move down the tube stand.

INTERFACE 2 SIGNAL DESCRIPTION

Outputs:

HORIZZONTAL INV: Active when horizontal inversion is selected on the console

VERTICAL INV: Active when vertical inversion is selected on the console

FLUORO: Active when fluoro pedal is pressed and collimator and SFD shutters are in good position

TOMO ON: Active when tomo function is selected on the remote control Table

RX P.B. OUTPUT: Active each time the second step of the X-ray pushbutton is pressed without any control of collimator and SFD shutters position

ANGIO ON: Active when angio function is selected on the remote control table

ANGIO STEP: Active during automatic column and SFD movement in angio mode.

TOMO TIME1: Active in tomo mode if tomo time is less than 1 sec.

TOMO TIME2: Active in tomo mode if tomo time is between 1sec. and 2 sec.

TOMO TIME3: Active in tomo mode if tomo time is between 2sec. and 3 sec.

TOMO TIME4: Active in tomo mode if tomo time is greater than 3 sec.

BRIGHTNESS INC: Active for about 100mS each time brightness increment key is pressed on the console

BRIGHTNESS DEC: Active for about 100mS each time brightness decrement key is pressed on the console

6.9 FUSE LIST

HIGH VOLTAGE PANNEL:

- F1 fuse 5 x 20 5A F TR1 Supply
- F2 fuse 5 x 20 6,3A F 230B Auxiliary output
- F3 fuse 5 x 20 6,3A F 230A Auxiliary output
- F4 fuse 10 x 38 10A G Inverter 3G3JV Supply
- F16 fuse 10 x 38 10A G Main_Line Line 3
- F17 fuse 10x 38 10A G Main_Line Line 2
- F18 fuse 10x 38 10A G Main_Line Line 1
- F19 fuse 10x 38 10A G Main Neutral

LOW VOLTAGE PANNEL:

- F5 fuse 5 x 20 6,3A F 18Vac power supply for Safety board
- F6 fuse 5 x 20 3,15A F 18Vac Boards power supply for Micro switch, opto in/out and Console display
- F7 fuse 5 x 20 3,15A F 11Vac Boards power supply for Microprocessors, CAN bus and interface relay
- F8 fuse 5 x 20 3,15A F 24Vac Contactor coil
- F9 fuse 5 x 20 10A F 24Vac Collimator lamp
- F10 fuse 5 x 20 10A F FFD, Table, Cassette and Shutter motors power supply (pre rectifier)
- F11 fuse 5 x 20 10A F Compressor motor and clutch, Grid motor and Collimator motor power supply (pre rectifier)
- F12 fuse 5 x 20 3,15A F Column and S.F.D Brushless motor Break power supply (pre rectifier)
- F13 fuse 5 x 20 10A F FFD, Table, Cassette and Shutter motors power supply (post rectifier)
- F14 fuse 5 x 20 10A F Compressor motor and clutch, Grid motor and Collimator motor power supply (post rectifier)

- F15 fuse 5 x 20 3.15A F Column and S.F.D Brushless motor Break power supply (post rectifier)

SAFETY BOARD K901504:

- F1 fuse 5 x 20 3,15A T 18Vac power supply for opto in/out Switch-on and emergency
- F2 fuse 5 x 20 3,15A T 11Vac power supply for microprocessor and CAN bus power supply

MOT DRV1 K901505(FFD and TABLE motor control):

- F1 fuse 5 x 20 3,15A T 11Vac power supply for microprocessor
- F2 fuse 5 x 20 6.3A T 60Vdc power supply for bridge drivers

MOT DRV2 K901505(Compressor motor and Clutch control):

- F1 fuse 5 x 20 3,15A T 11Vac power supply for microprocessor
- F2 fuse 5 x 20 6.3A T 30Vdc power supply for bridge drivers

MOT DRV3 K901505(Cassette motor control):

- F1 fuse 5 x 20 3,15A T 11Vac power supply for microprocessor
- F2 fuse 5 x 20 6.3A T 60Vdc power supply for bridge drivers

MOT DRV4 K901505(Shutter motor control):

- F1 fuse 5 x 20 3,15A T 11Vac power supply for microprocessor
- F2 fuse 5 x 20 6.3A T 60Vdc power supply for bridge drivers

INTERFACE1 K901503:

- F1 fuse 5 x 20 3,15A T 18Vac power supply for opto in/out
- F2 fuse 5 x 20 3,15A T 11Vac power supply for microprocessor and relay coils

INTERFACE1 K901503:

- F1 fuse 5 x 20 3,15A T 18Vac power supply for opto in/out
- F2 fuse 5 x 20 3,15A T 11Vac power supply for microprocessor and relay coils

S.F.D. CONTROL K901506(grid and collimator motor control):

- F1 fuse 5 x 20 3,15A T 18Vac power supply for opto in/out
- F2 fuse 5 x 20 3,15A T 11Vac power supply for microprocessor
- F3 fuse 5 x 20 3.15A T 30Vdc power supply for bridge drivers

CONTROL PANEL K901501:

- F1 fuse 5 x 20 3,15A T 18Vac power supply

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6.10 PCBs SCHEMATICS

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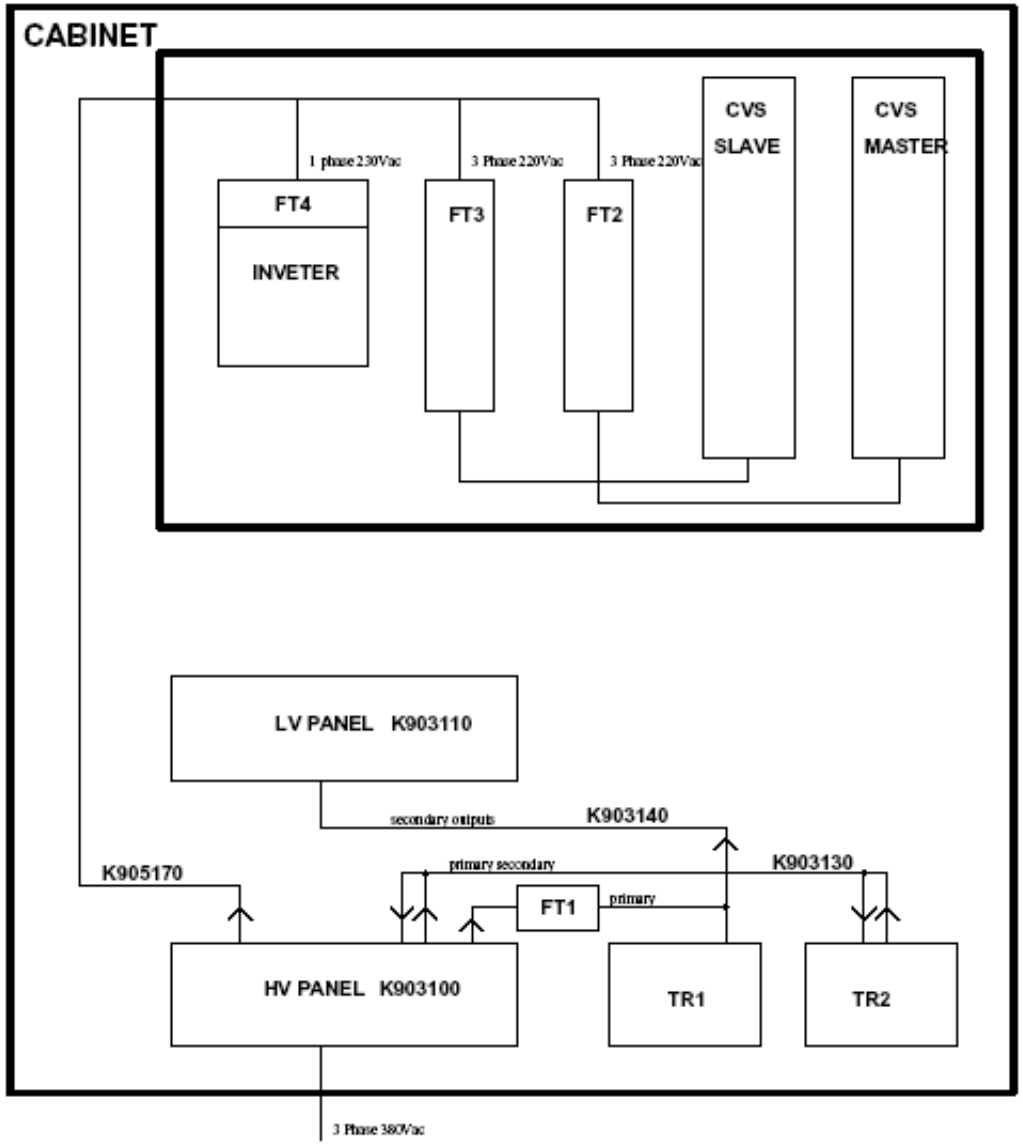
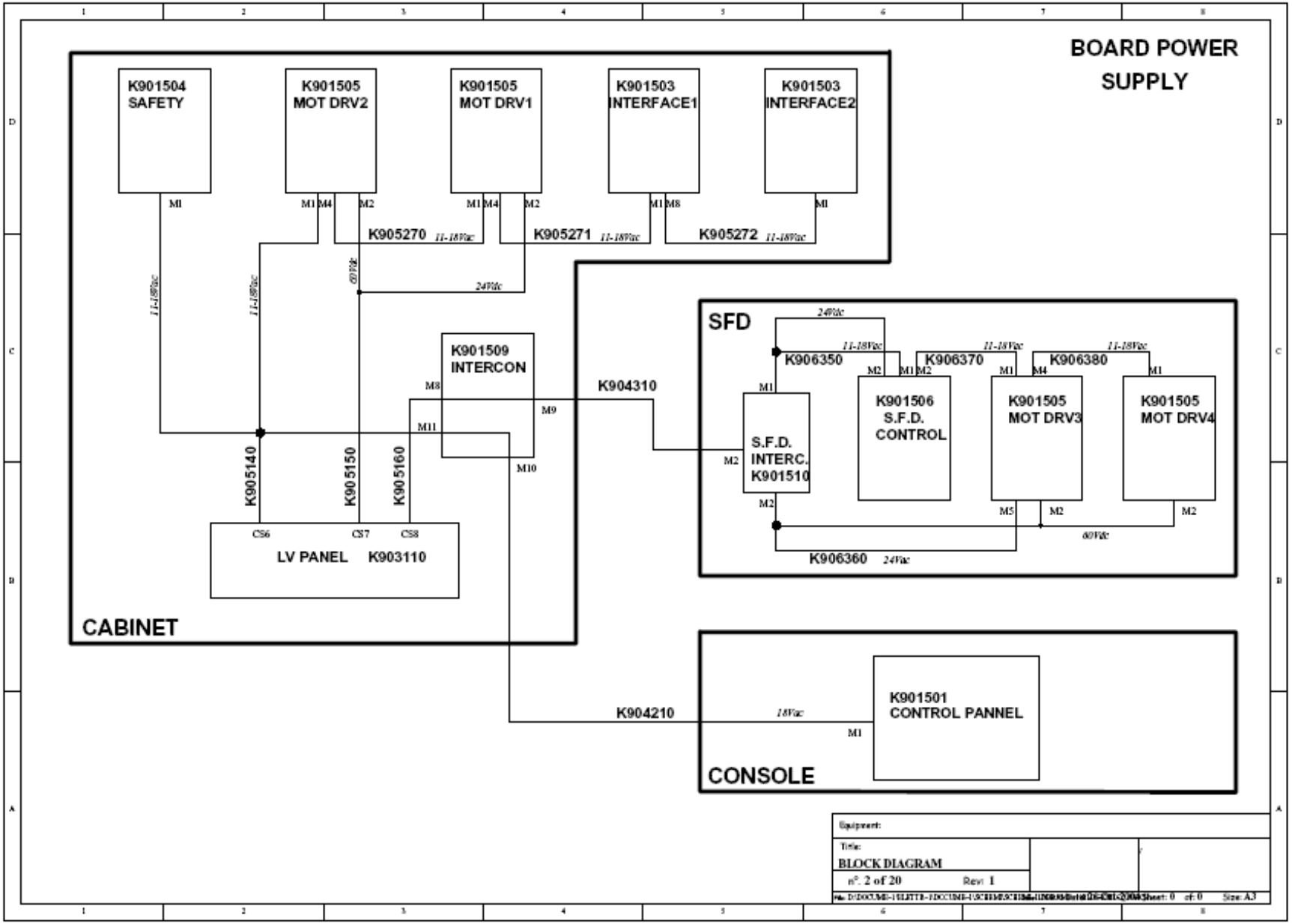


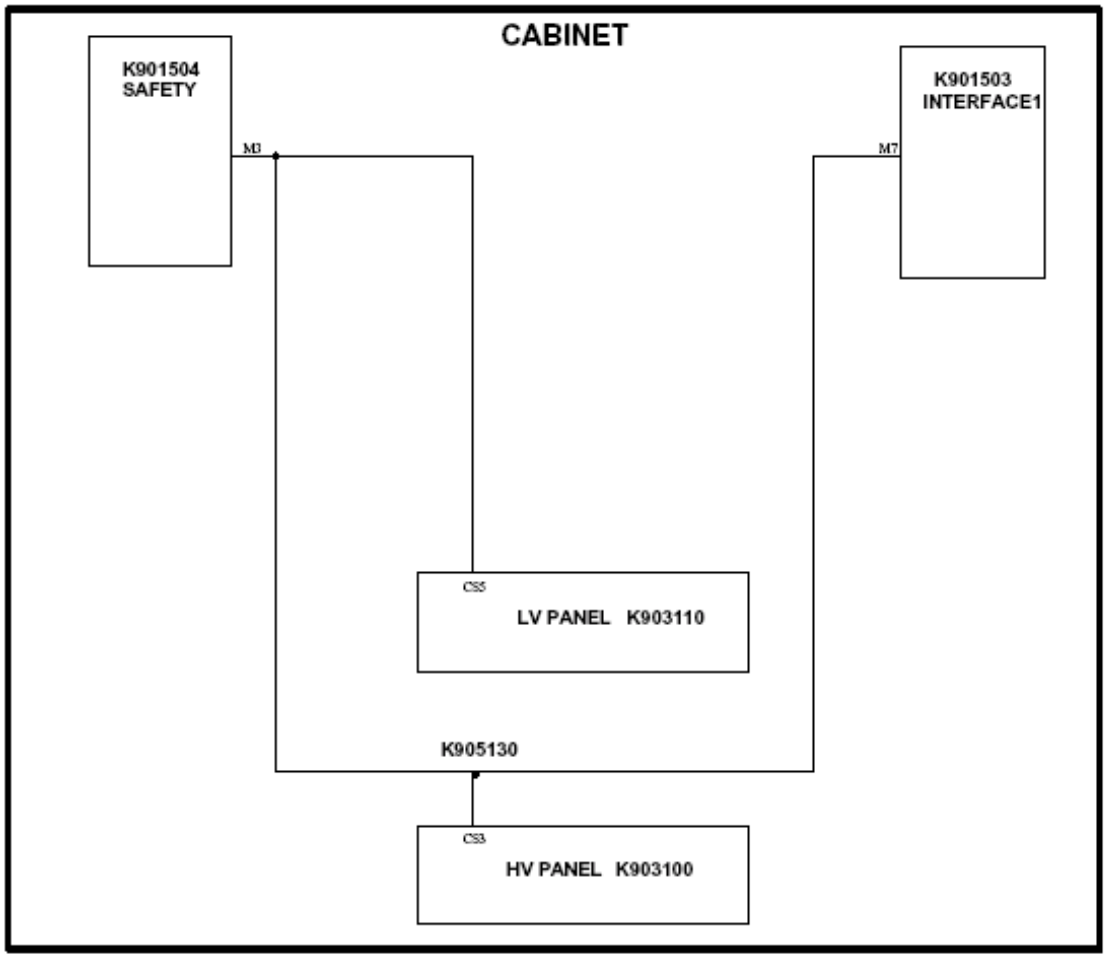
TRANSFORMER AND DRIVERS POWER SUPPLY

Equipment:	
Title: BLOCK DIAGRAM	
n°. 1 of 20 Rev: 1	

Sheet: 0 of: 0 Size: A3


BOARD POWER SUPPLY
K901504 SAFETY
K901505 MOT DRV2
K901505 MOT DRV1
K901503 INTERFACE1
K901503 INTERFACE2
K905270 11-18Vac
K905271 11-18Vac
K905272 11-18Vac
60Vdc
24Vdc
K901509 INTERCON
K904310
K905140
K905150
K905160
CS6
CS7
CS8
LV PANEL K903110
CABINET
SFD
24Vac
K906350
K906370
K906380
K901506 S.F.D. CONTROL
K901505 MOT DRV3
K901505 MOT DRV4
S.F.D. INTERC. K901510
K906360 24Vac
K904210
18Vac
K901501 CONTROL PANNEL
CONSOLE
Equipment:
Title:
BLOCK DIAGRAM
n°. 2 of 20
Rev: 1
Size: A3

CONTACTOR COILS



Equipment:

Title:
BLOCK DIAGRAM

n°. 3 of 20 Rev: 1

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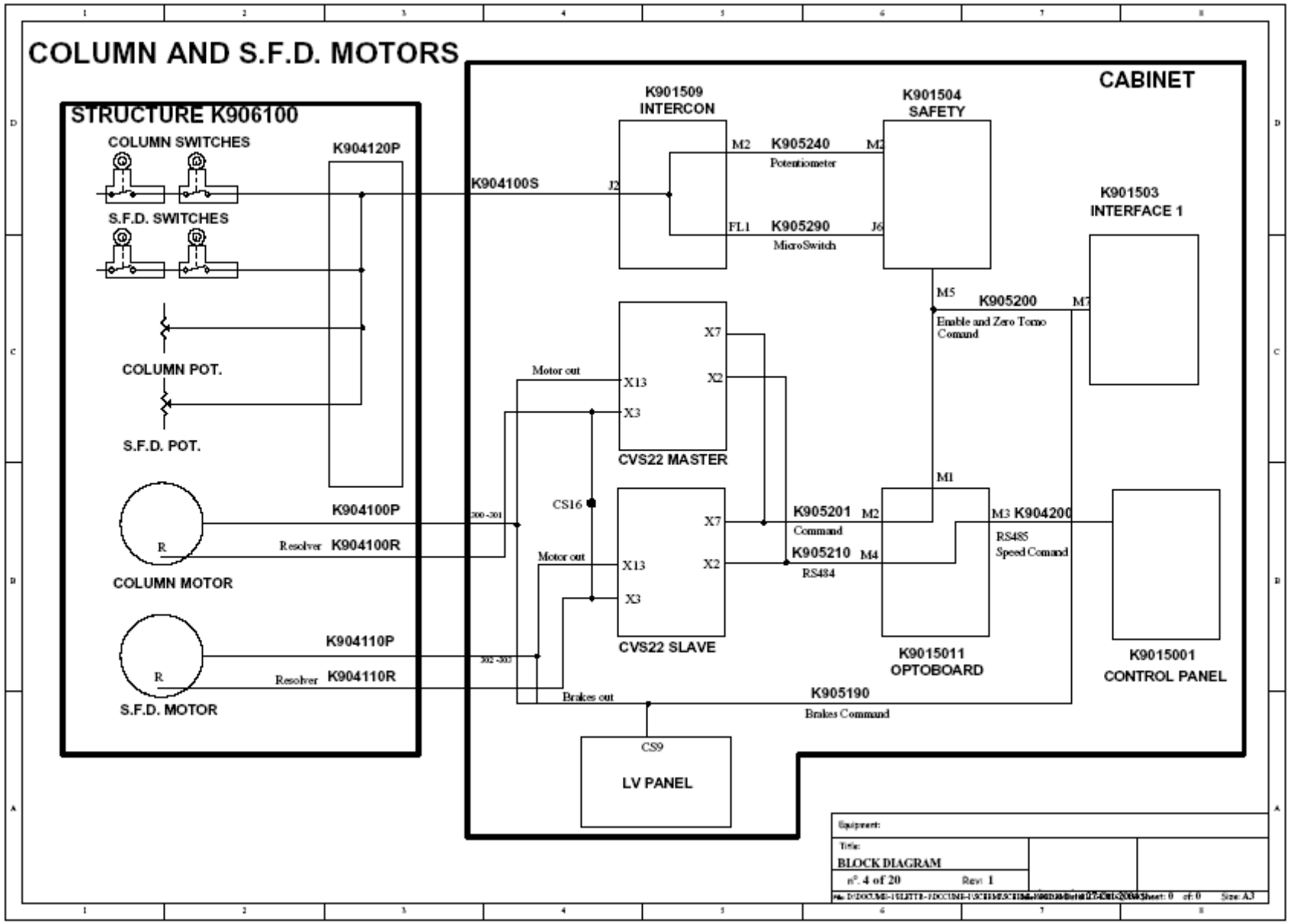
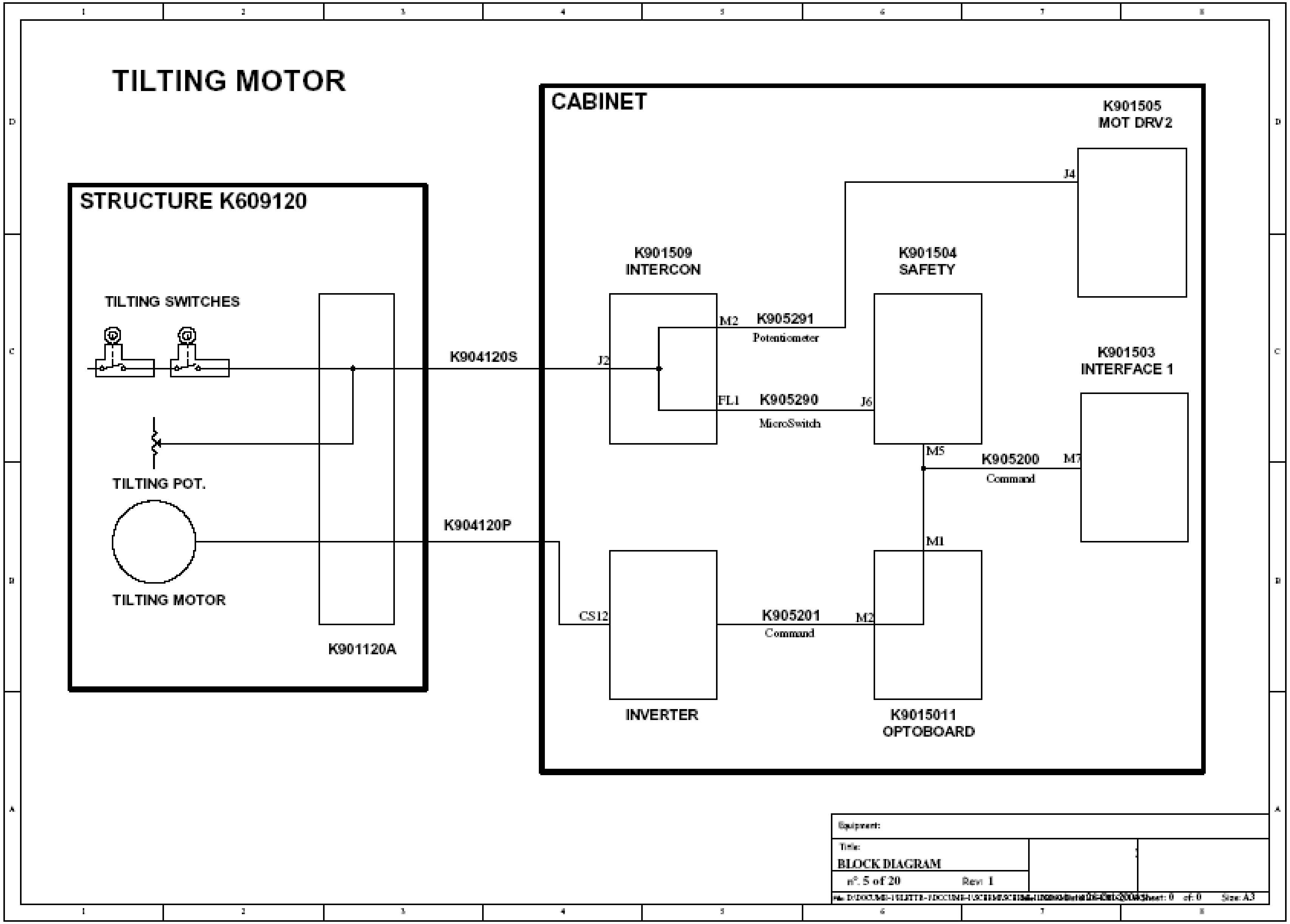
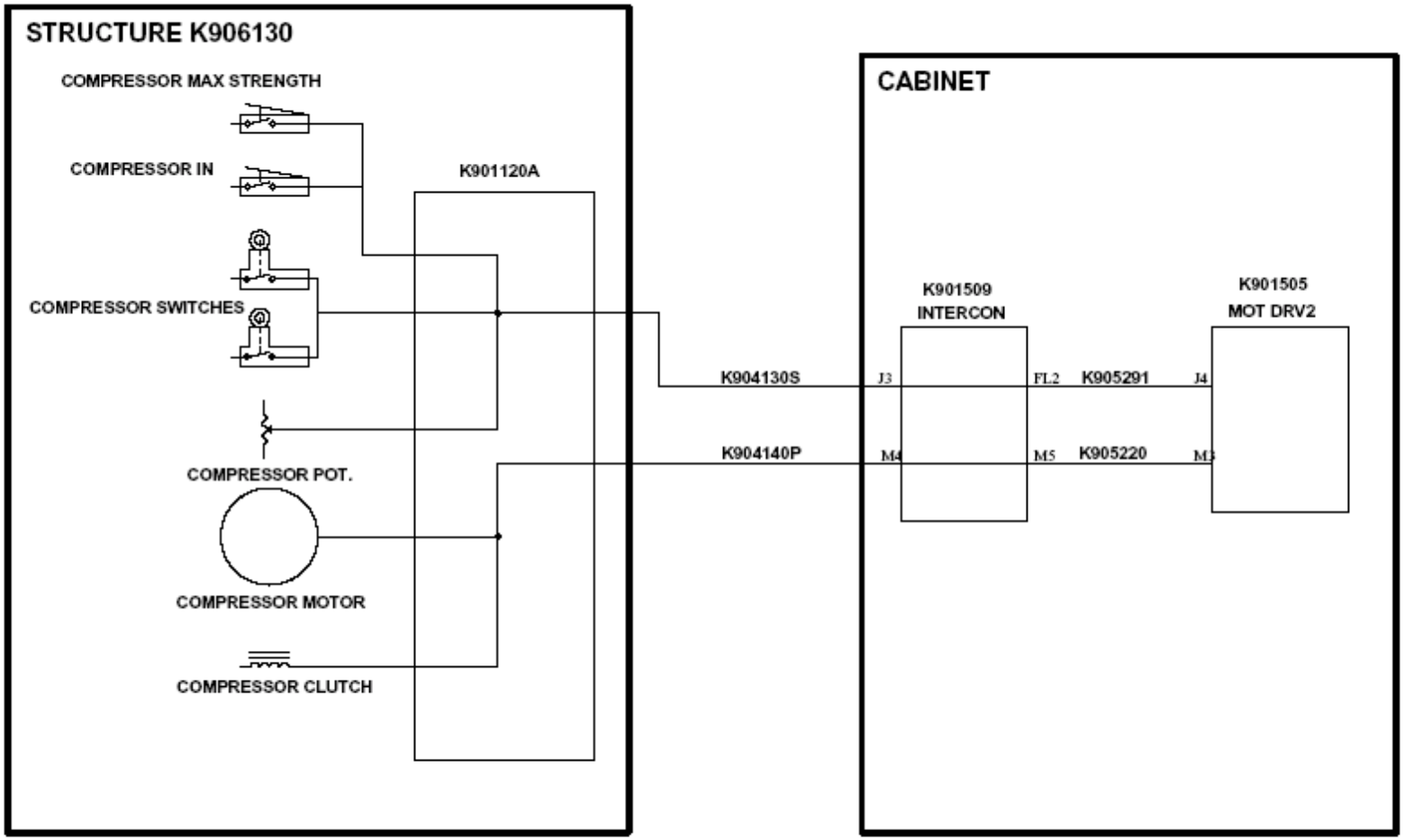
COLUMN AND S.F.D. MOTORS




TILTING MOTOR
STRUCTURE K609120
TILTING SWITCHES
TILTING POT.
TILTING MOTOR
K901120A
K904120S
K904120P
CABINET
K901509
INTERCON
J2
M2
FL1
K905291
Potentiometer
K905290
MicroSwitch
K901504
SAFETY
J6
M5
K901505
MOT DRV2
J4
K901503
INTERFACE 1
K905200
Command
M7
INVERTER
CS12
K905201
Command
M2
M1
K9015011
OPTOBOARD
Equipment:
Title:
BLOCK DIAGRAM
n°. 5 of 20
Rev: 1
Sheet: 0
of: 0
Size: A3

COMPRESSOR MOTOR AND CLUTCH



Equipment:		
Title: BLOCK DIAGRAM		
n°. 6 of 20 Rev: 1		

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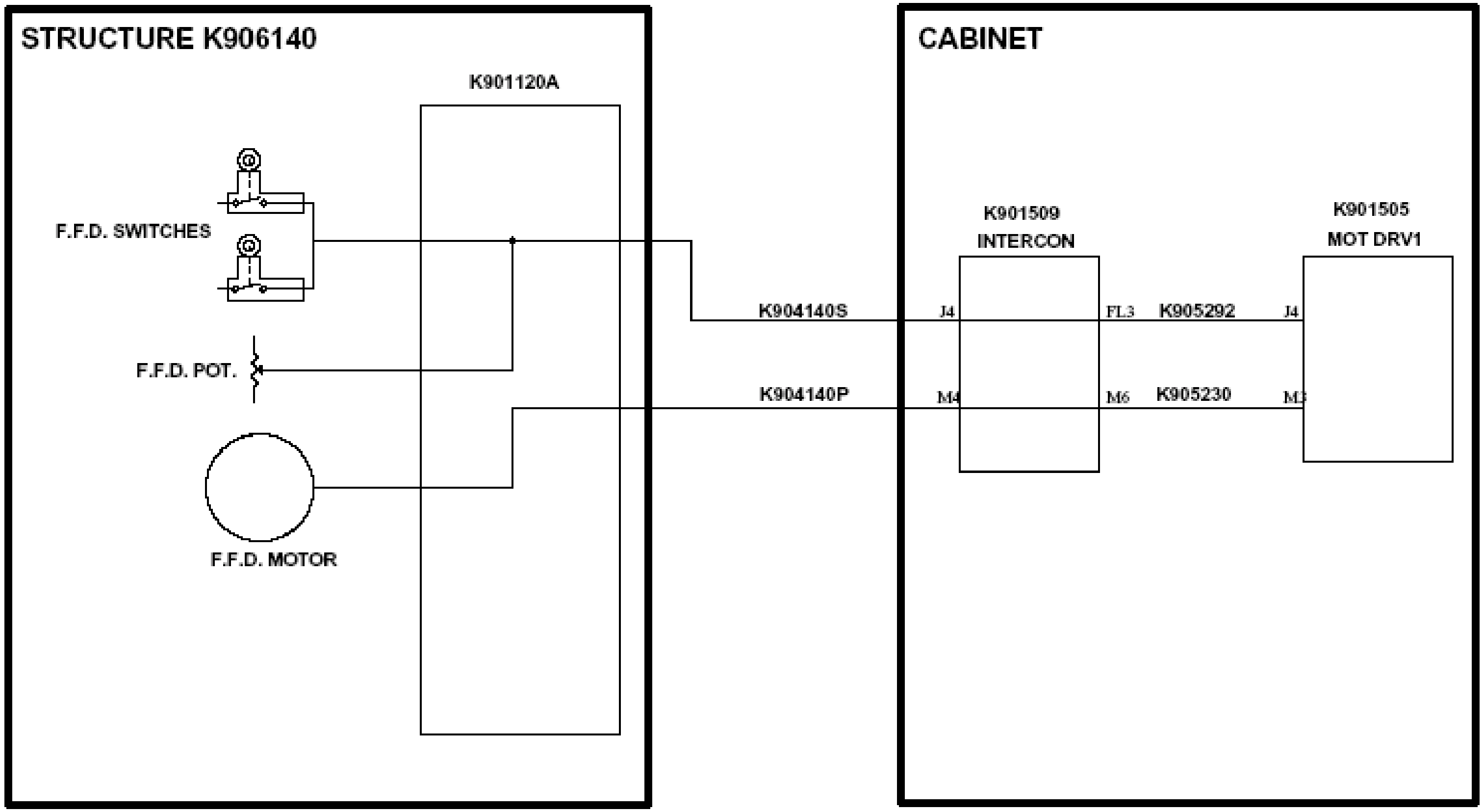
F.F.D. MOTOR



Equipment:

Title:

BLOCK DIAGRAM

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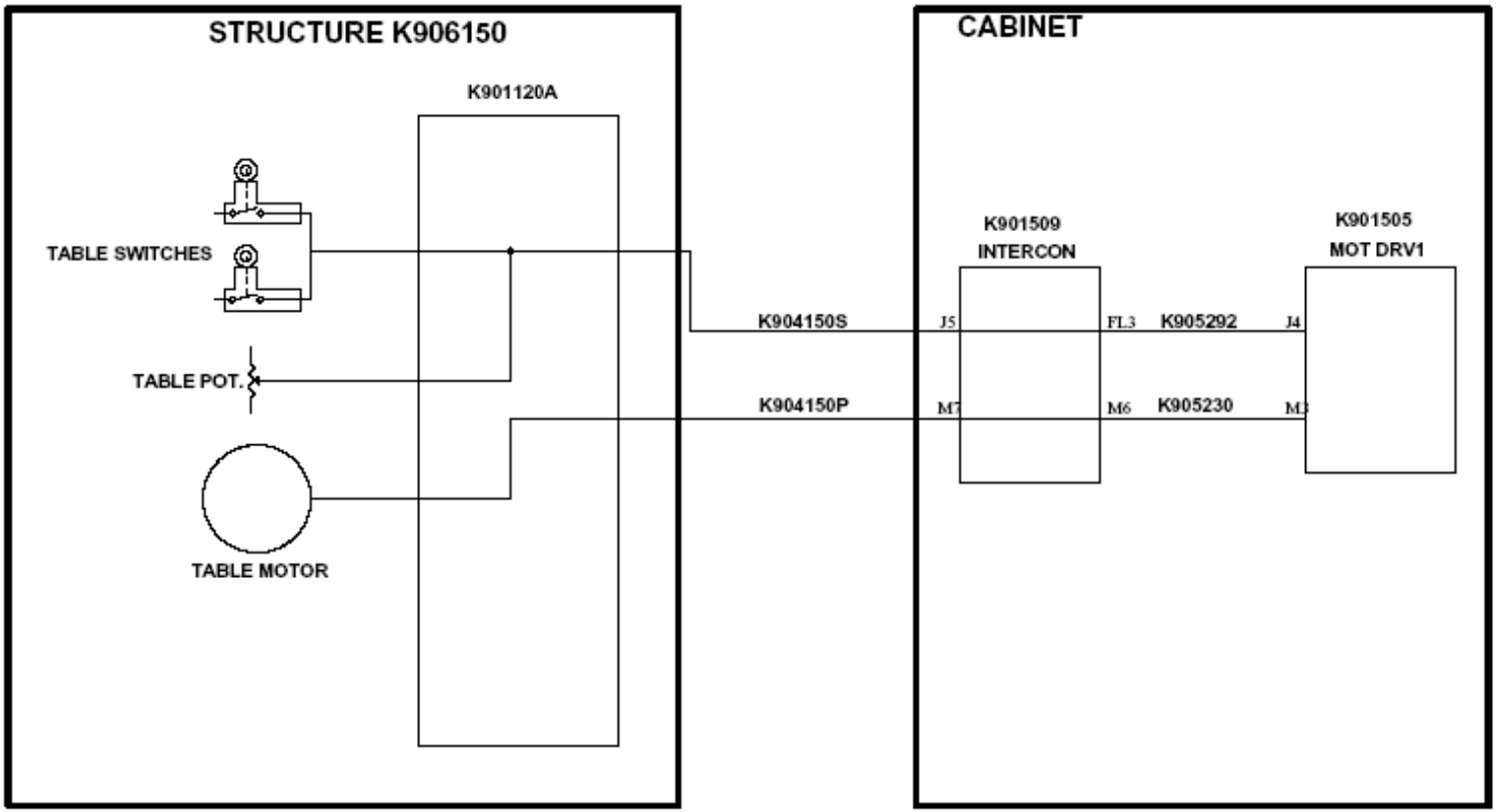
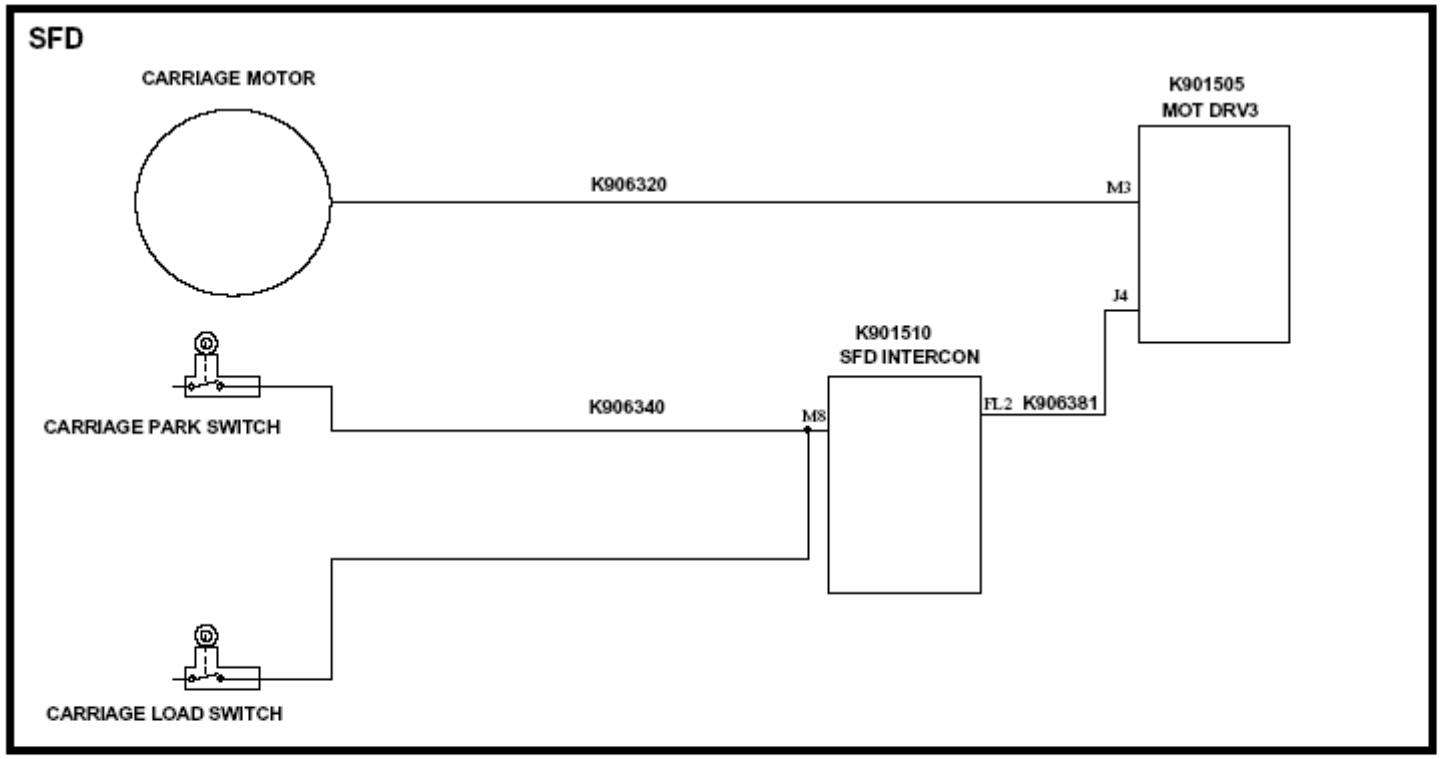
TABLE TRANSVERSAL MOTOR



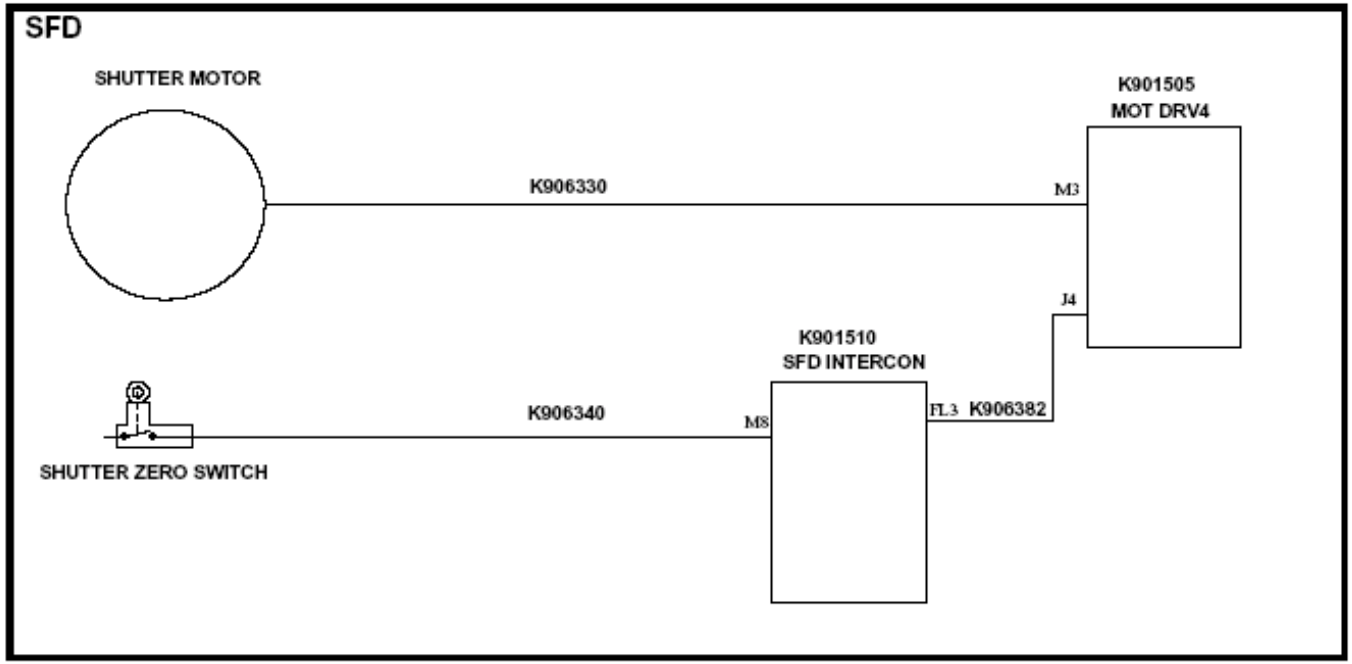
Equipment:			
Title: BLOCK DIAGRAM			
n°. 8 of 20	Revi 1		

CASSETTE CARRIAGE MOTOR



Equipment:		
Title: BLOCK DIAGRAM		
n°. 9 of 20 Rev: 1		

SHUTTER MOTOR



Equipment:		
Title: BLOCK DIAGRAM		
n°. 10 of 20 Rev: 1		

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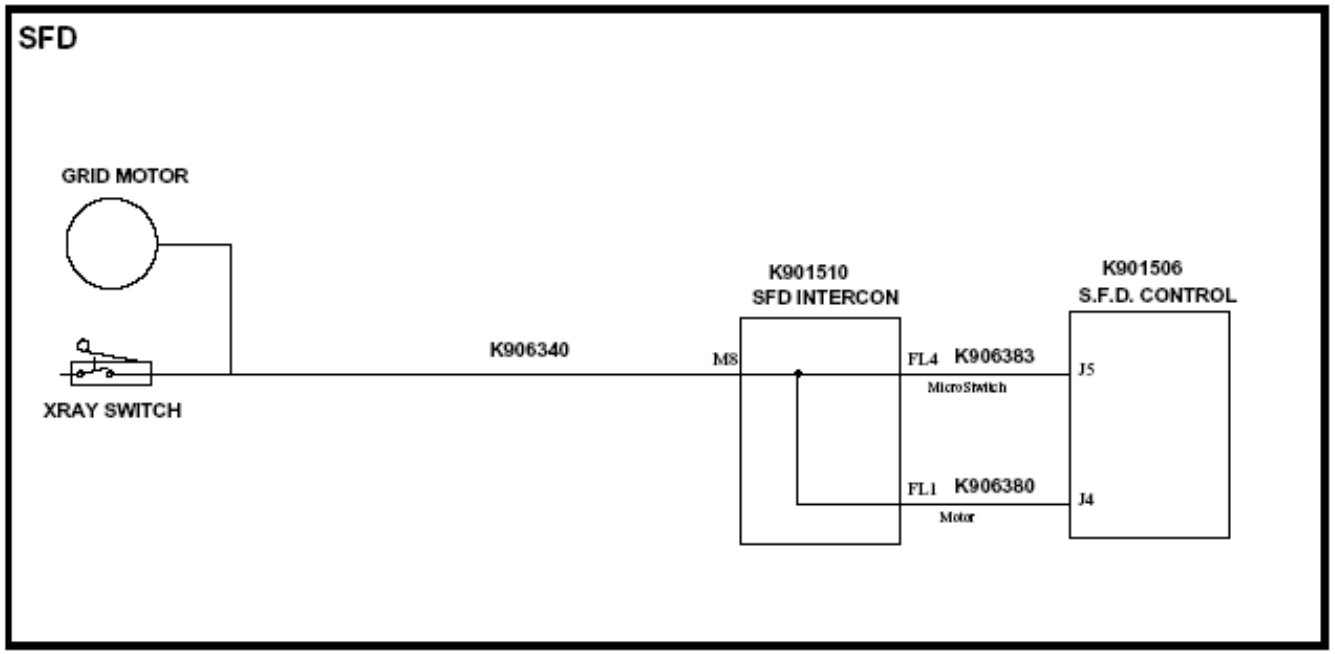
GRID MOTOR



Equipment:

Title:
BLOCK DIAGRAM

n°: 11 of 20 Rev: 1

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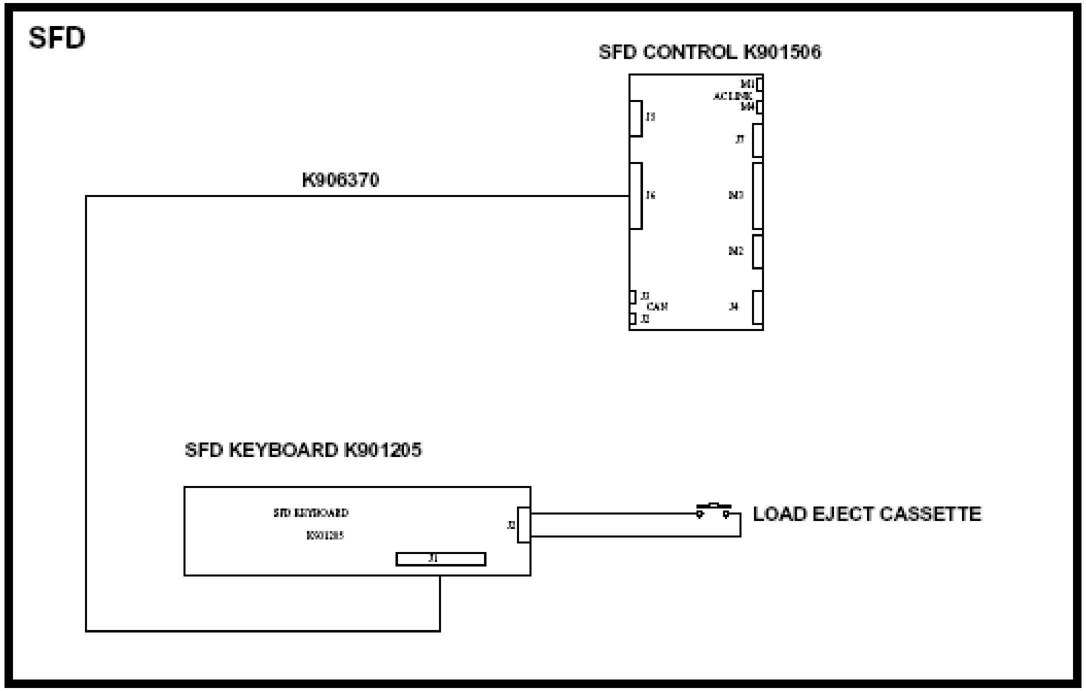
SFD KEYBOARD



Equipment:

Title:

BLOCK DIAGRAM

n°. 12 of 20 Rev: 1

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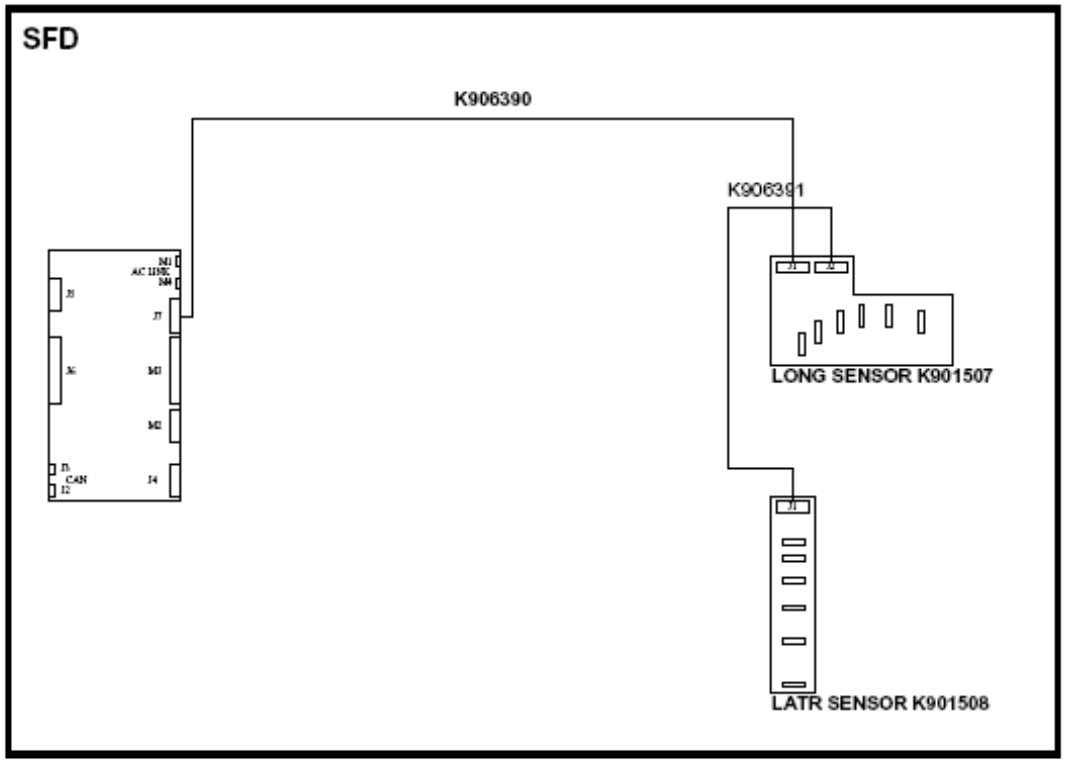
FORMAT SENSOR

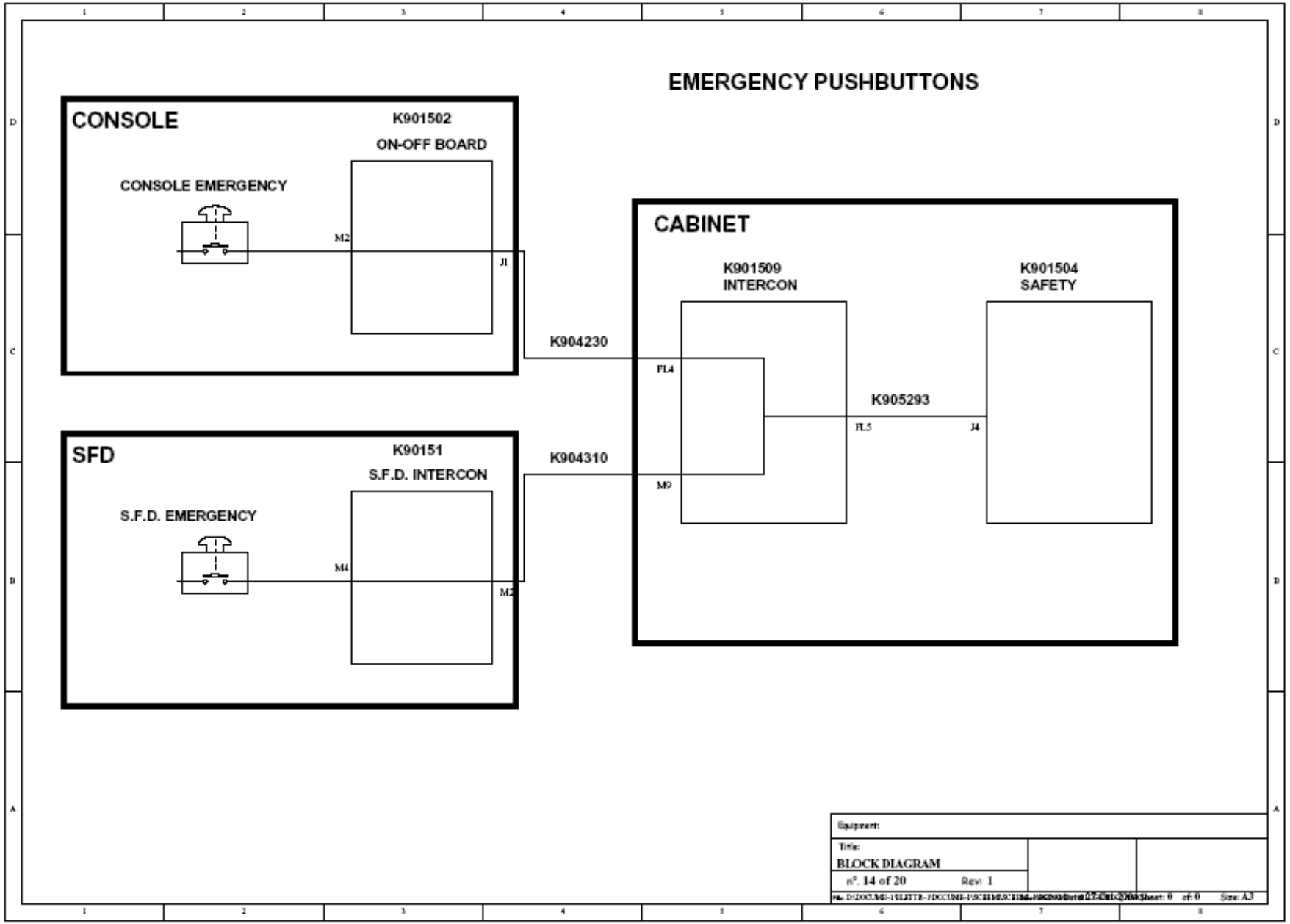


Equipment:

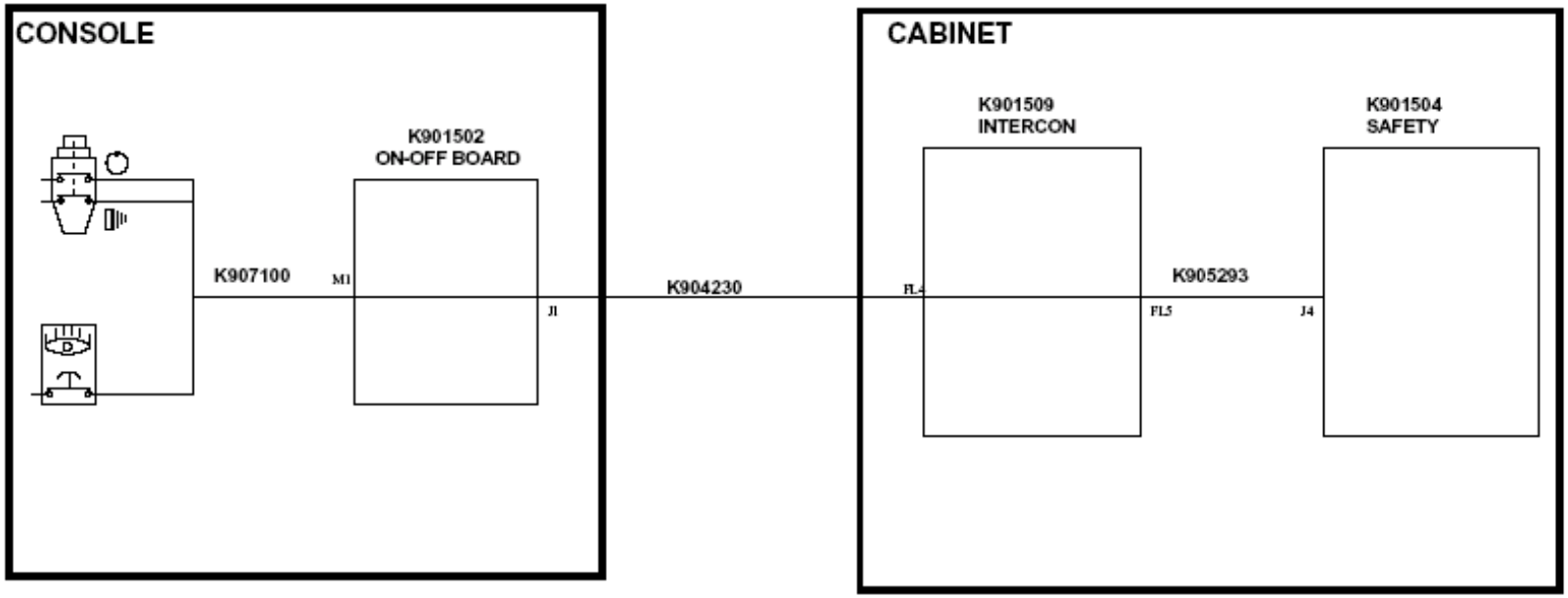
Title:
BLOCK DIAGRAM

n°. 13 of 20 Rev: 1

Sheet: 0 of: 0 Size: A3


EMERGENCY PUSHBUTTONS
CONSOLE
K901502
ON-OFF BOARD
CONSOLE EMERGENCY
M2
J1
K904230
CABINET
K901509
INTERCON
K901504
SAFETY
FL4
K905293
FL5
J4
SFD
K90151
S.F.D. INTERCON
K904310
S.F.D. EMERGENCY
M4
M2
M9
Equipment:
Title:
BLOCK DIAGRAM
n°. 14 of 20
Rev: 1
Size: A3

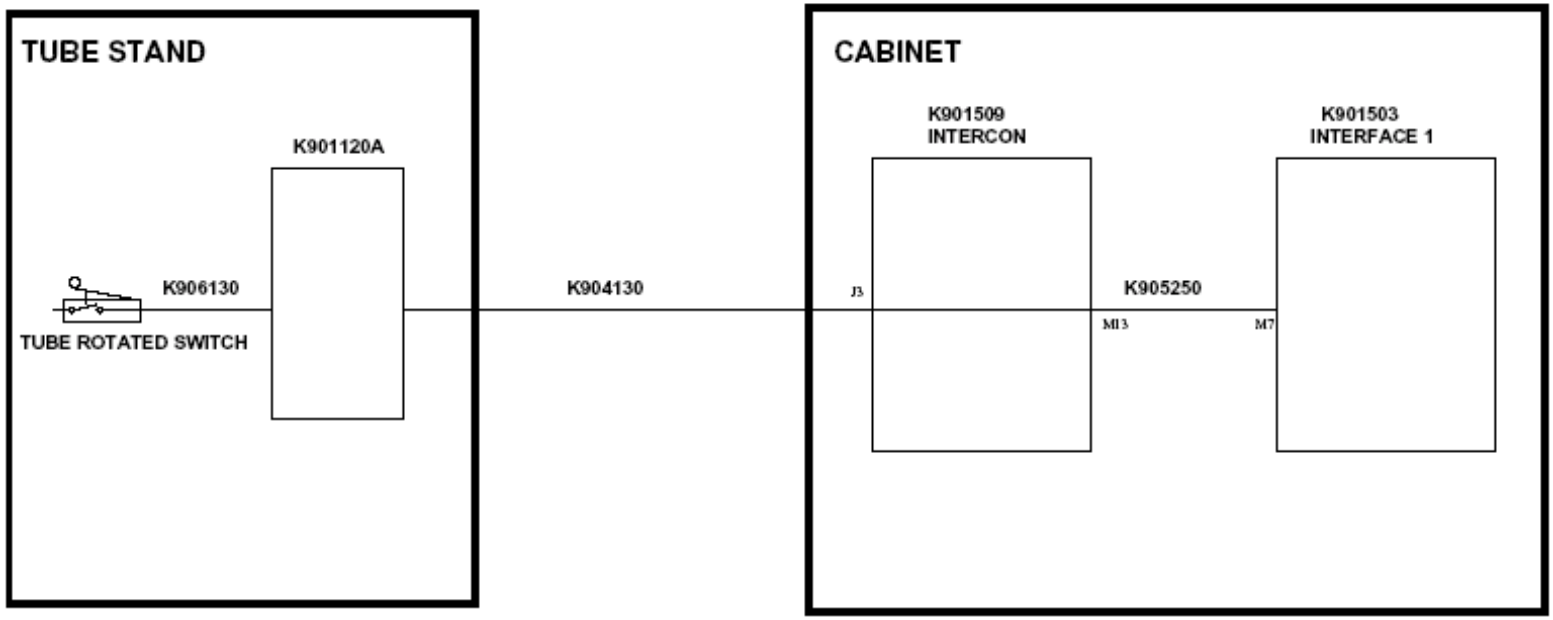
X RAY PUSHBUTTON AND FLORO PEDAL



Equipment:		
Title: BLOCK DIAGRAM		
n°. 15 of 20 Rev: 1		

Sheet: 0 of: 0 Size: A3

TUBE TOTATION SWITCH



Equipment:		
Title: BLOCK DIAGRAM		
n°. 16 of 20 Rev: 1		

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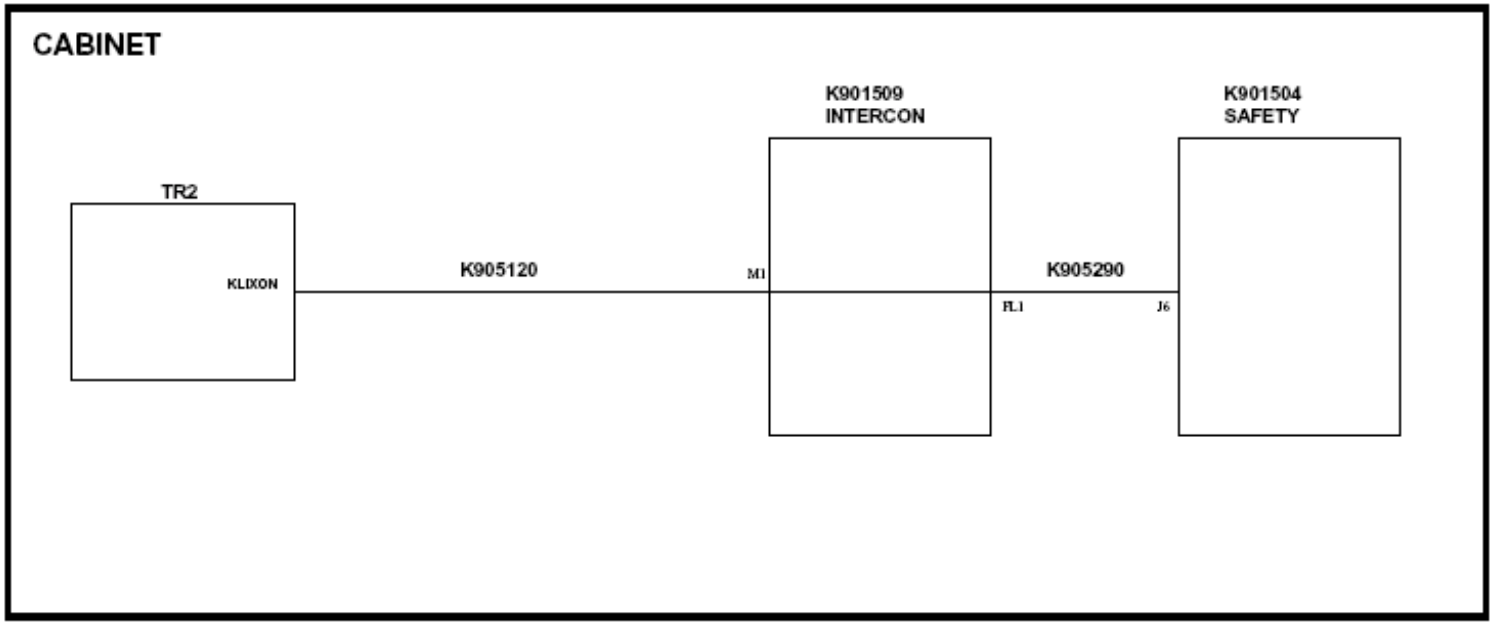
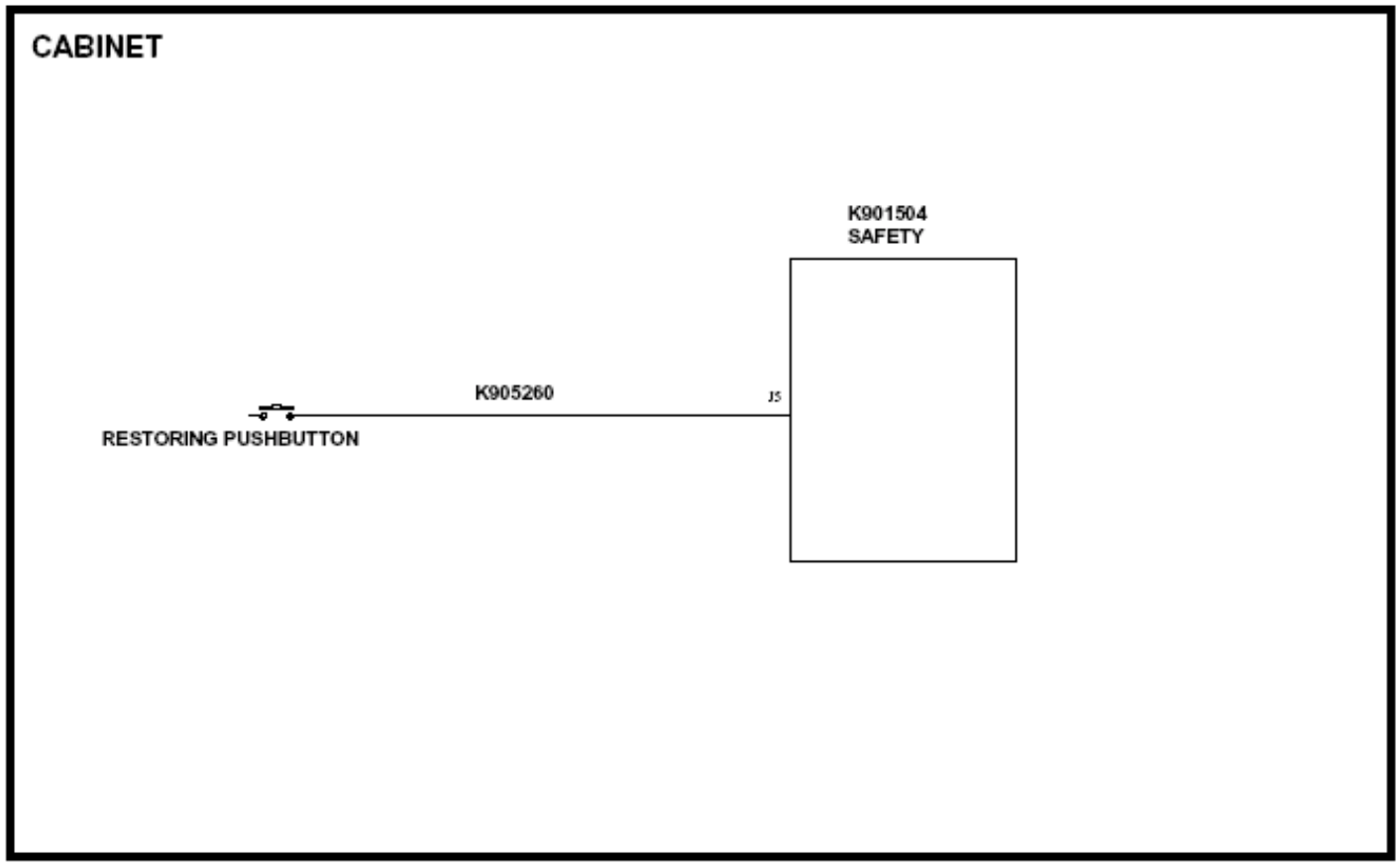
THERMIC CONTACT 3 PHASE TRANSFORMER



Equipment:	
Title: BLOCK DIAGRAM	
n°. 17 of 20 Rev: 1	
Sheet: 0 of: 0	Size: A3

RESTORING PUSHBUTTON



Equipment:

Title:
BLOCK DIAGRAM

n°. 18 of 20 Rev: 1

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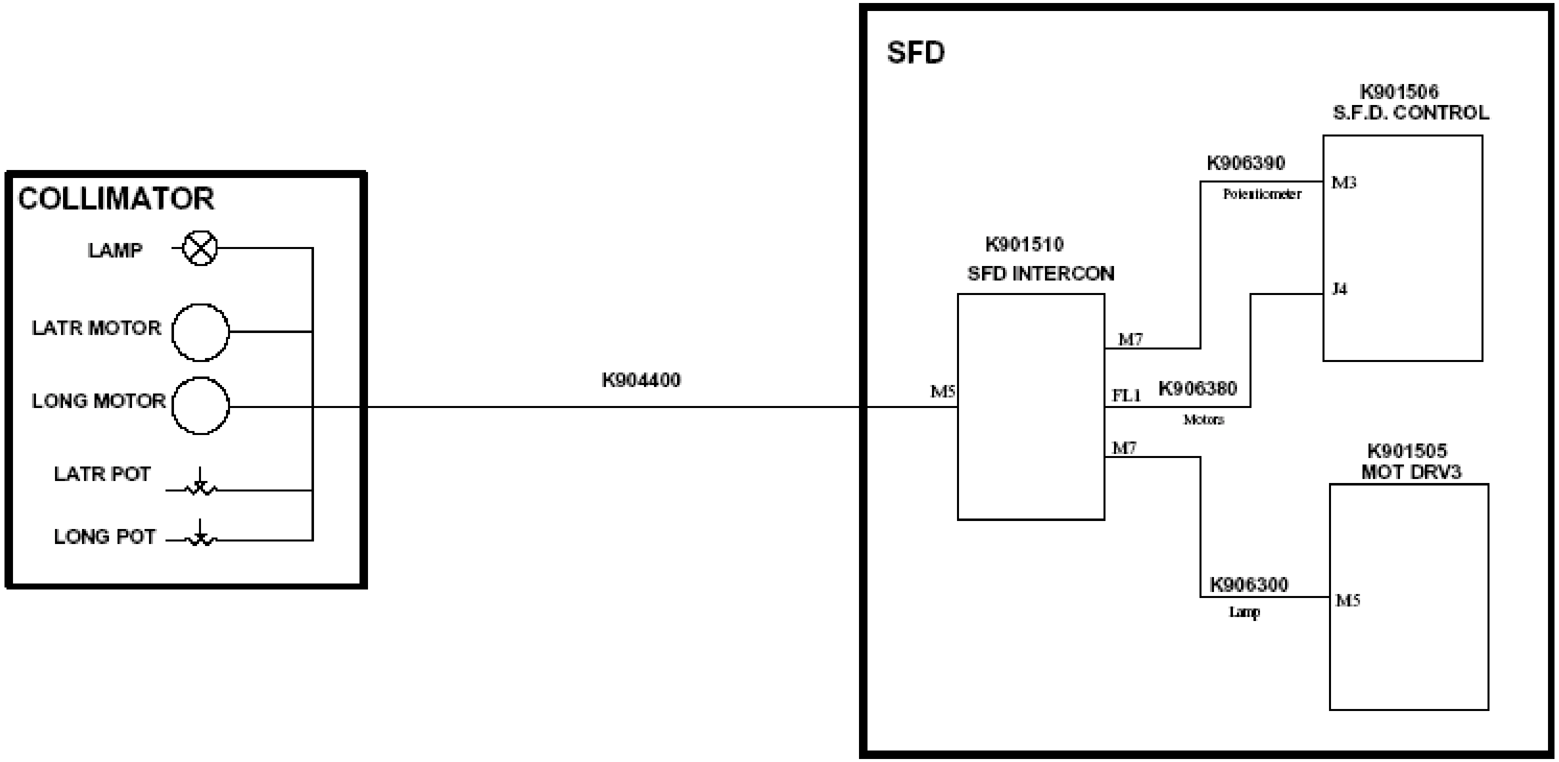
COLLIMATOR CONNECTION



Equipment:

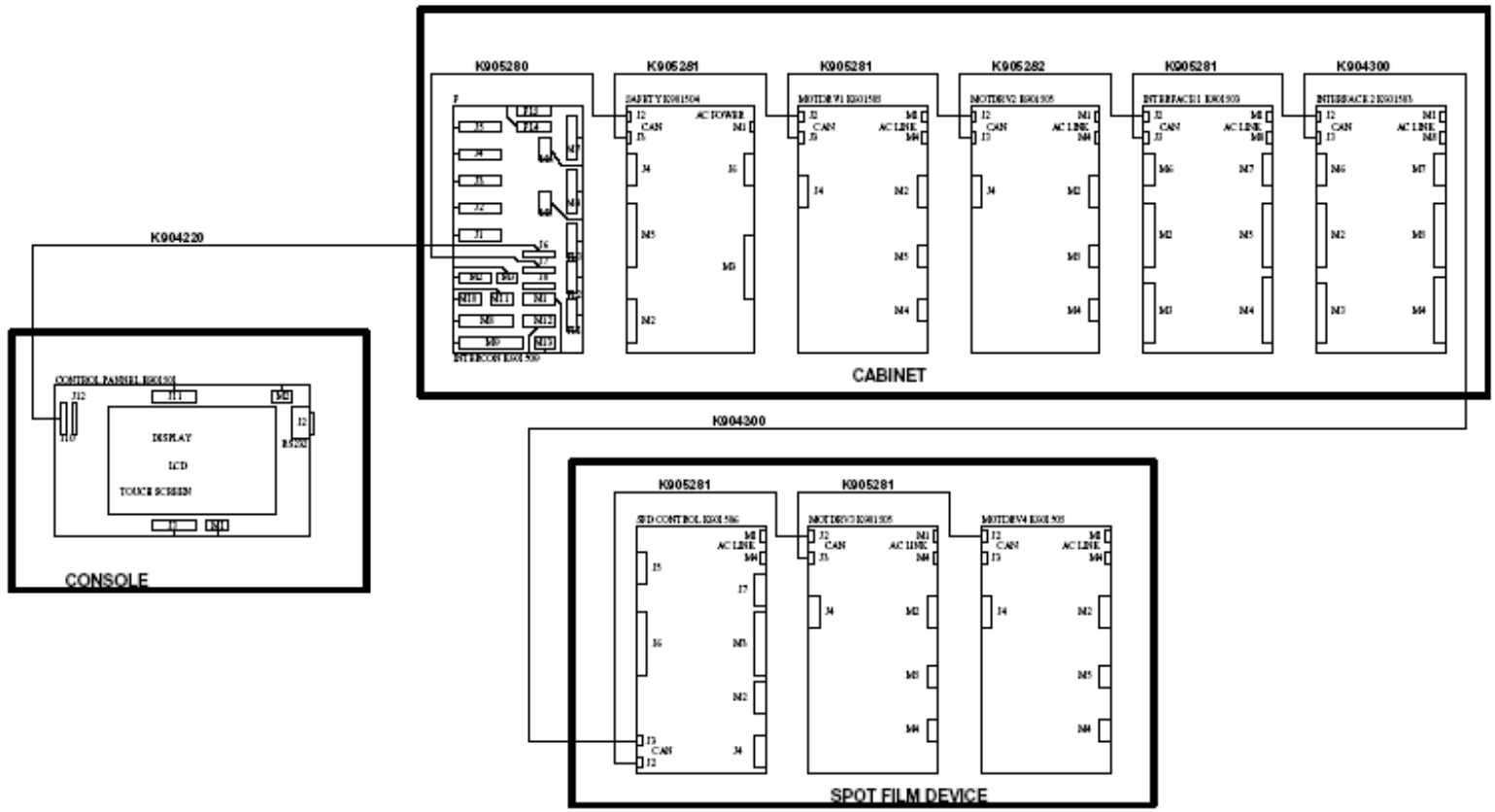
Title:

BLOCK DIAGRAM

n°. 19 of 20 Rev: 1

Sheet: 0 of: 0 Size: A3

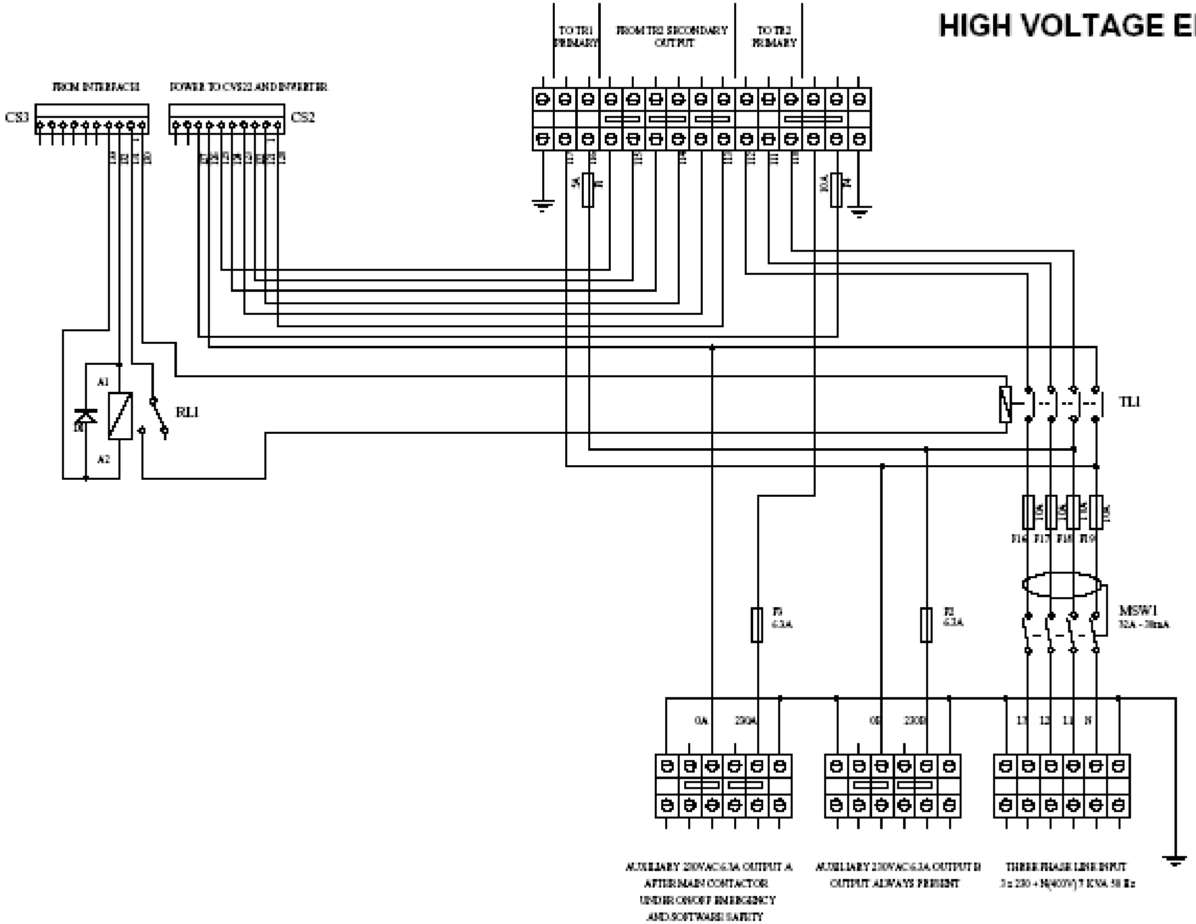
CAN BUS



Equipment:		
Title: BLOCK DIAGRAM		
n°. 20 of 20 Rev: 1		

Sheet: 0 of: 0 Size: A3

HIGH VOLTAGE ELETRIC PANEL K903100



Equipment:

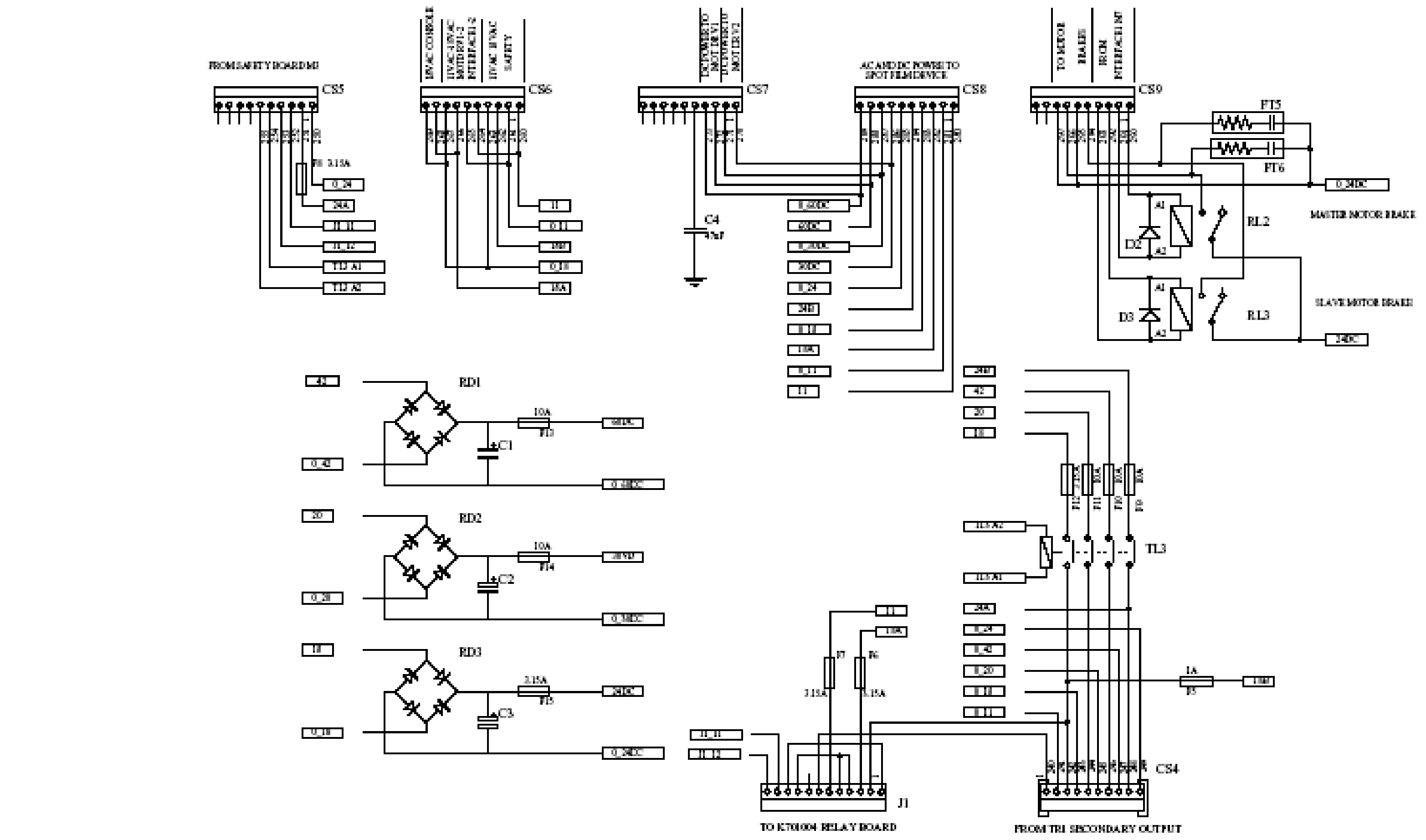
Title:

ELETTRIC PANEL CONNECTIONS

n°. 1 of 4 Rev: 0.0

Size: A3

LOW VOLTAGE ELETRIC PANEL K903110



Equipment:

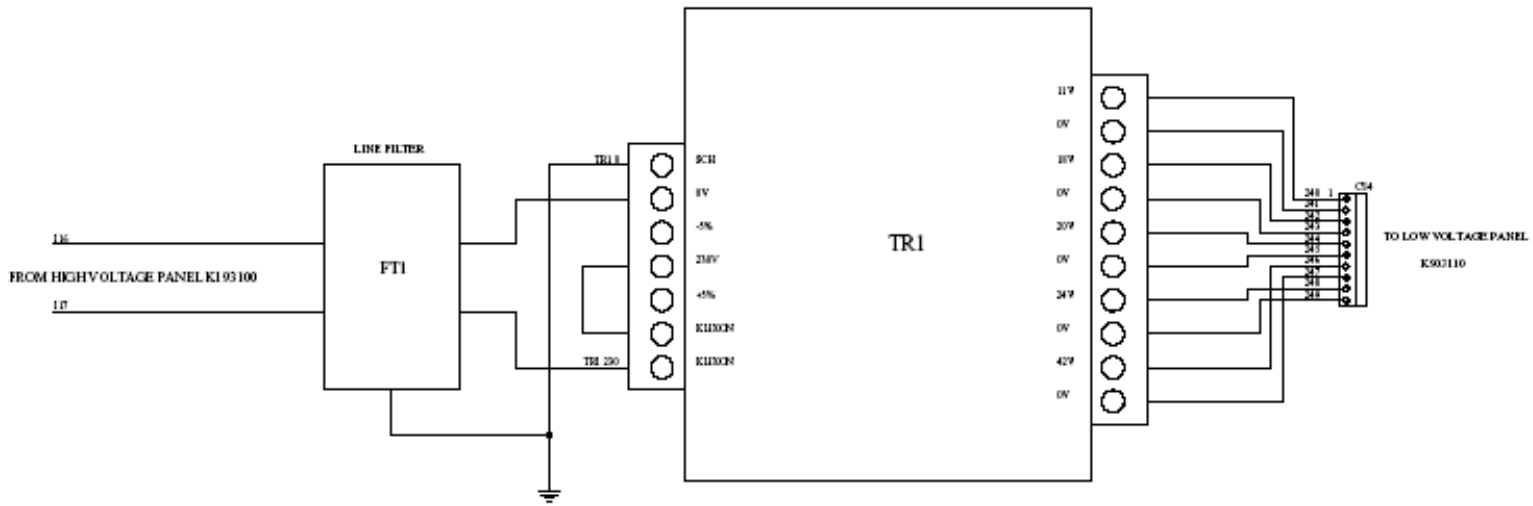
Title:

ELETRIC PANELS CONNECTIONS

n°. 2 of 4 Rev: 0.0

Size: A3

MONO PHASE TRANSFORMER K903140



Equipment:

Title:
ELETRIC PANELS CONNECTIONS

n°. 3 of 4 Rev: 0.0

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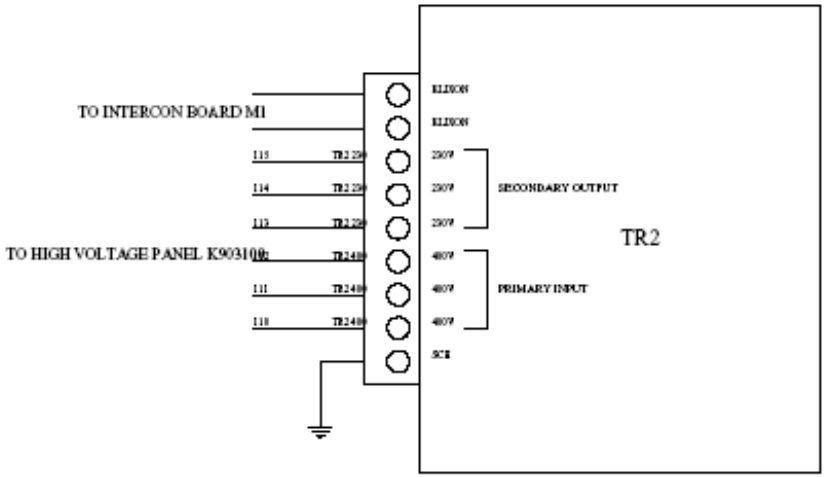
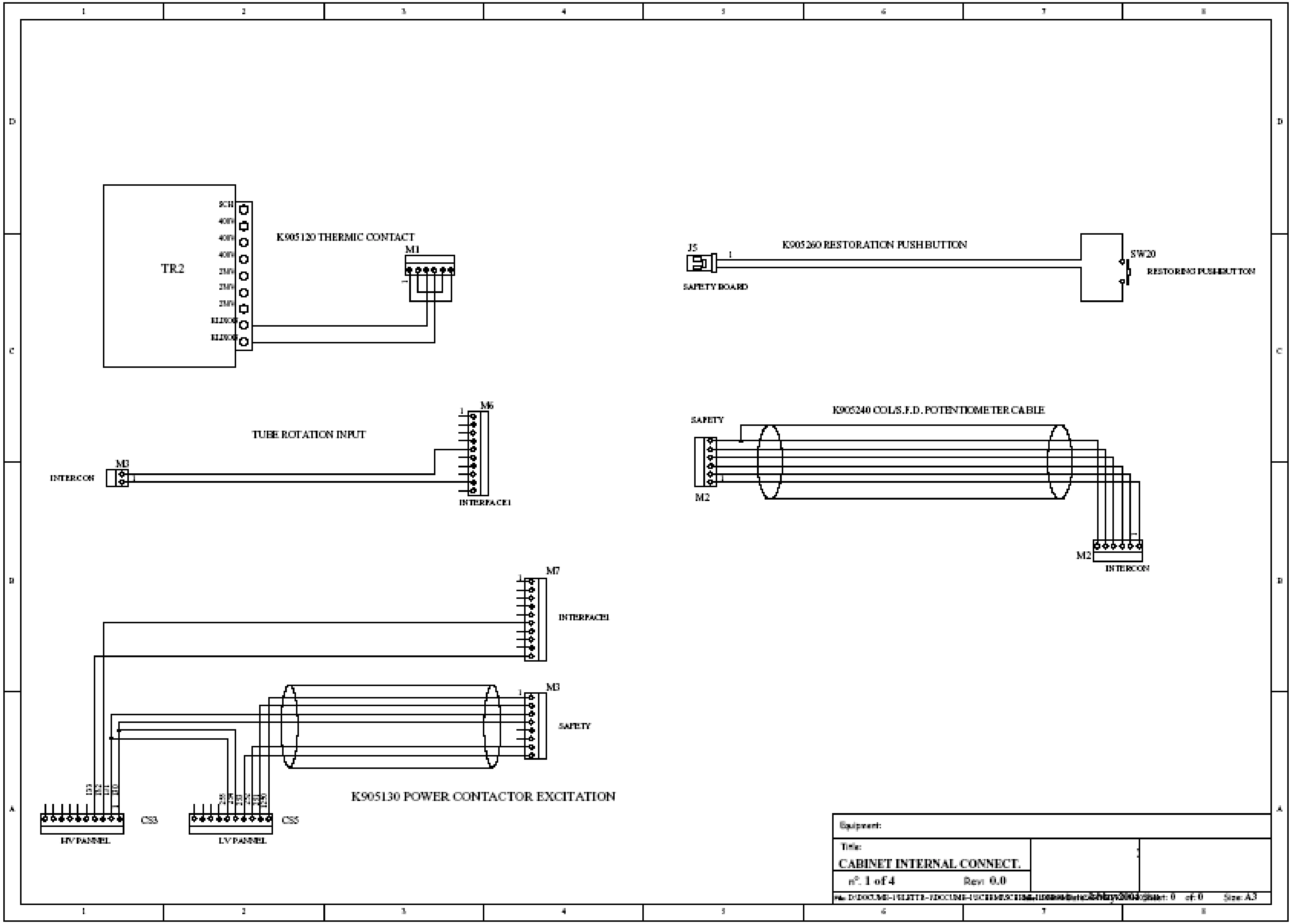
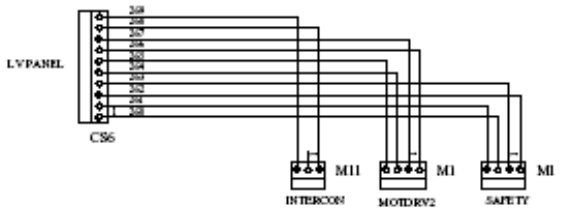
3 PHASE TRANSFORMER K903130



Equipment:	
Title: ELETRIC PANELS CONNECTIONS	
n°. 4 of 4	Rev: 0.0

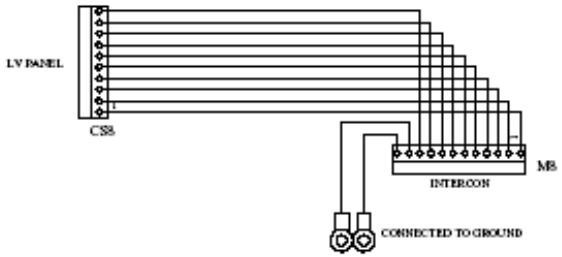

TR2
K905120 THERMIC CONTACT
M1
K905260 RESTORATION PUSH BUTTON
J5
SAFETY BOARD
SW20
RESTORING PUSHBUTTON
TUBE ROTATION INPUT
M6
M3
INTERCON
INTERFACE1
K905240 COL/S.F.D. POTENTIOMETER CABLE
SAFETY
M2
M2
INTERCON
M7
INTERFACE1
M3
SAFETY
K905130 POWER CONTACTOR EXCITATION
CS3
HV PANNEL
CS5
LV PANNEL
Equipment:
Title:
CABINET INTERNAL CONNECT.
n°. 1 of 4
Rev: 0.0
Sheet: 0
of: 0
Size: A3

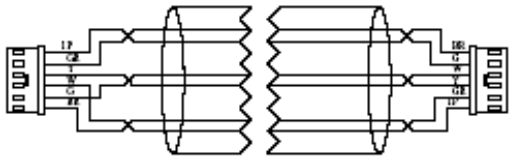
K905140 POWER AC



K905150 POWER DC

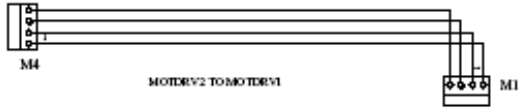
K905160 SFD POWER



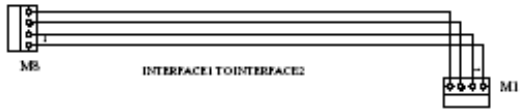


K905280 CAN INTERCON TO MOTDRV1
K905281 CAN INTERFACE1 INTERFACE2 AND MOTDRV2 TO MOT DRV1
K905282 CAN SAFETY TO INTERFACE1

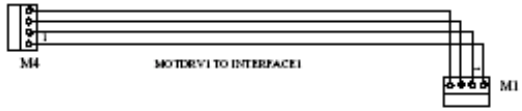
K905270 AC LINK



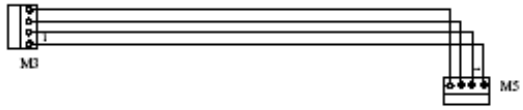
K905272 AC LINK



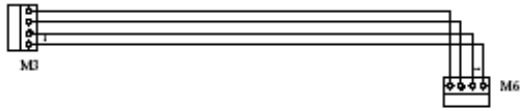
K905271 AC LINK



K905220 COMPRESSOR AND CLUTCH INTERCONNECTION



K905230 DFF AND TABLE MOTORS INTERCONNECTION

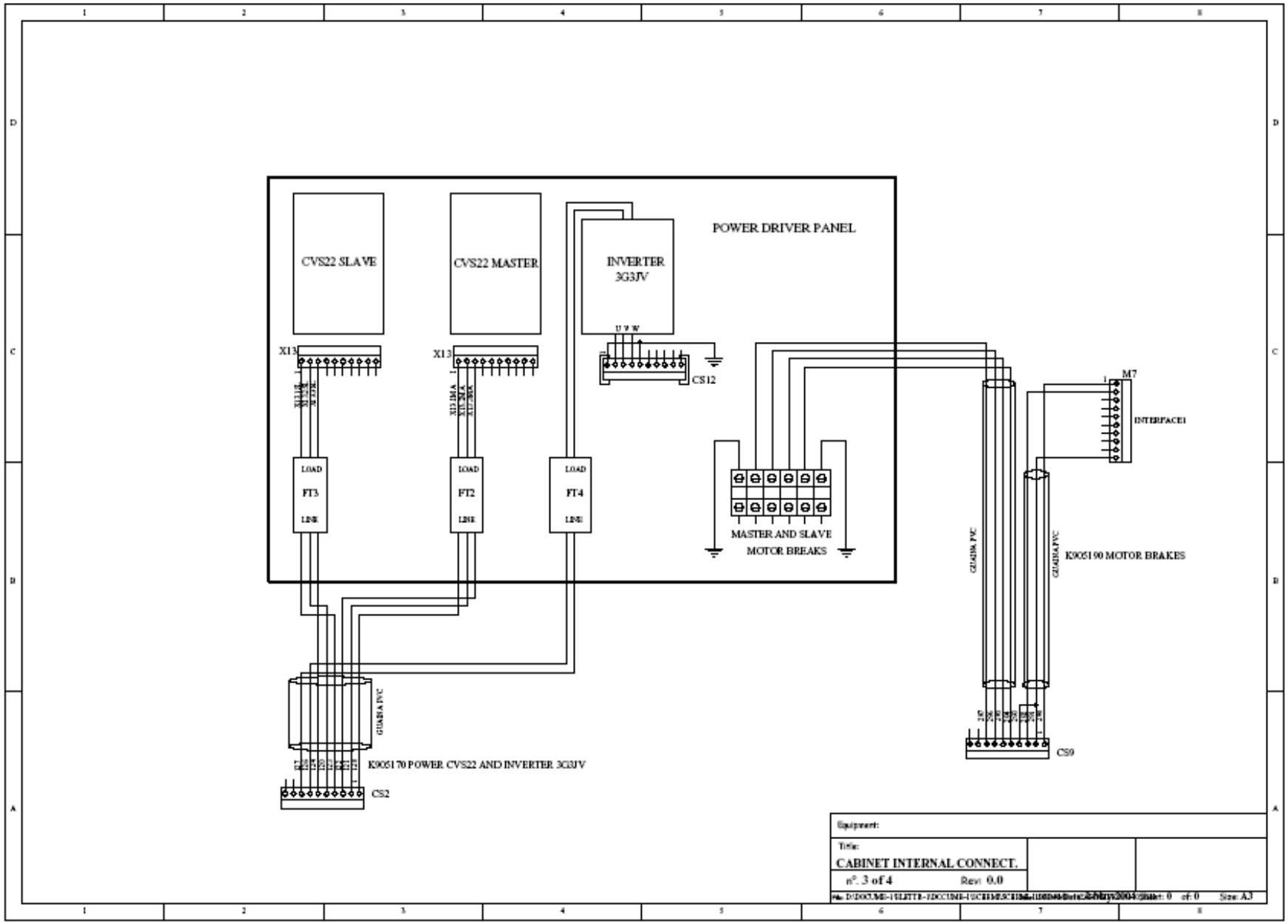


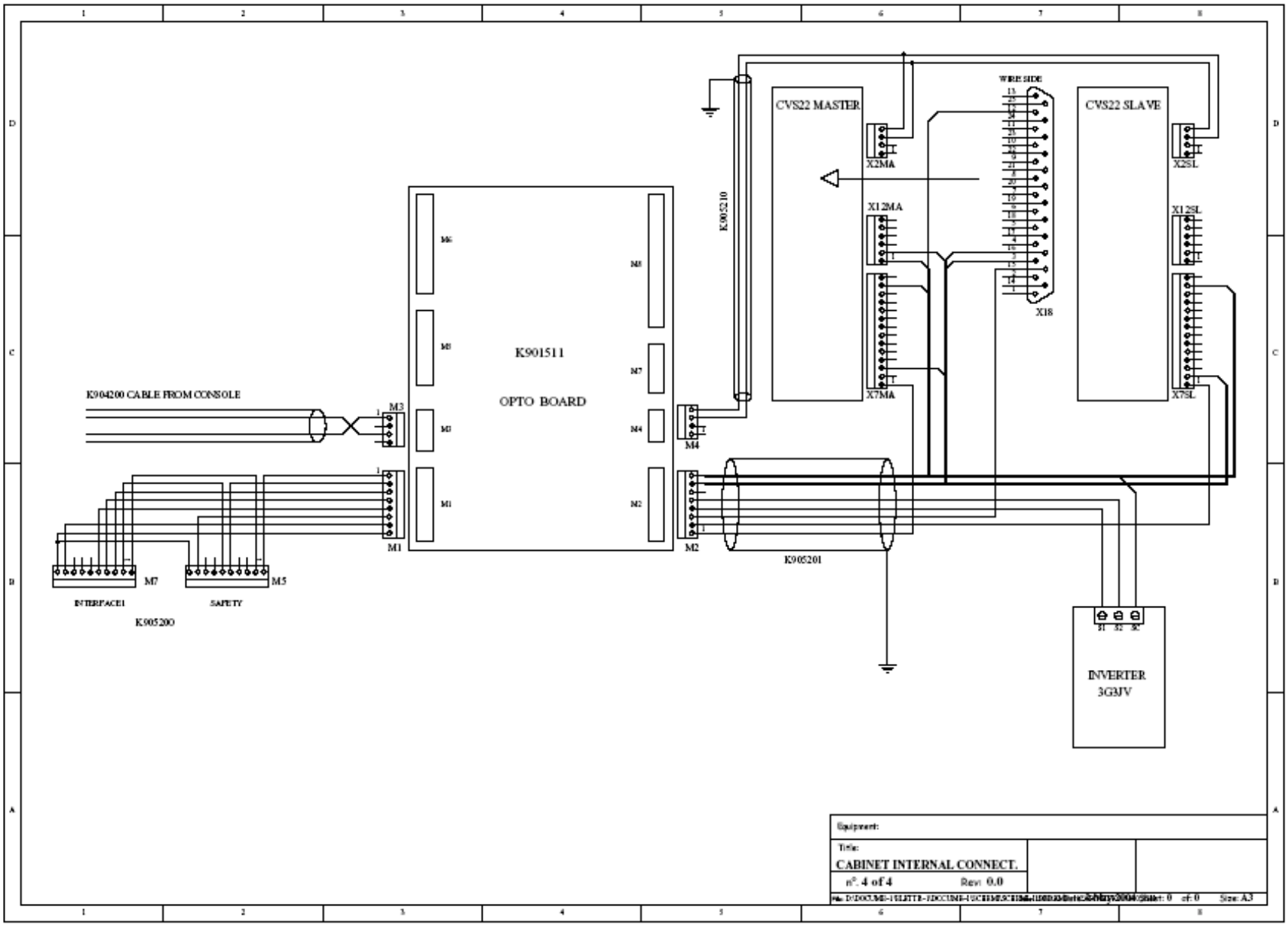
Equipment:

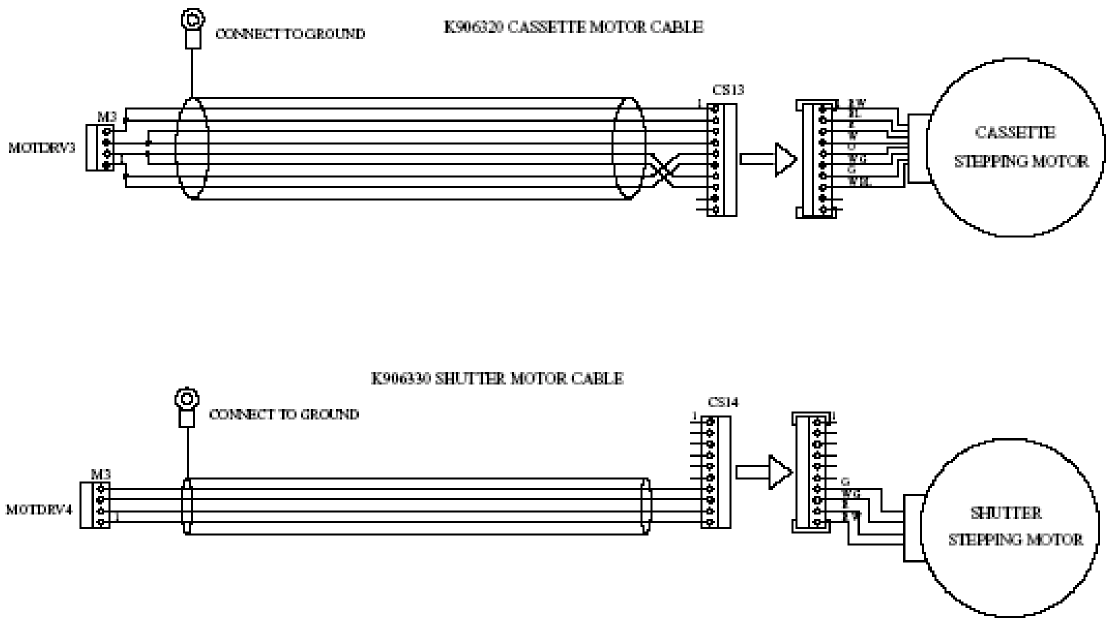
Title:
CABINET INTERNAL CONNECT.

n°. 2 of 4 Rev: 0.0

Size: A3


POWER DRIVER PANEL
CVS22 SLAVE
CVS22 MASTER
INVERTER
3G3JV
X13
X13
U V W
CS12
LOAD
FT3
LINE
LOAD
FT2
LINE
LOAD
FT4
LINE
MASTER AND SLAVE
MOTOR BREAKS
M7
INTERFACE1
GUAINA PVC
GUAINA PVC
K905190 MOTOR BRAKES
CS9
GUAINA PVC
K905170 POWER CVS22 AND INVERTER 3G3JV
CS2
Equipment:
Title:
CABINET INTERNAL CONNECT.
n°. 3 of 4
Rev: 0.0
Size: A3


CVS22 MASTER
CVS22 SLAVE
WIRE SIDE
X2MA
X12MA
X7MA
X18
X2SL
X12SL
X7SL
K900510
K901511
OPTO BOARD
M6
M8
M5
M7
M3
M4
M1
M2
K904200 CABLE FROM CONSOLE
M7
M5
INTERFACE1
SAFETY
K905200
K905201
INVERTER
3G3JV
Equipment:
Title:
CABINET INTERNAL CONNECT.
n°. 4 of 4
Rev: 0.0
Size: A3



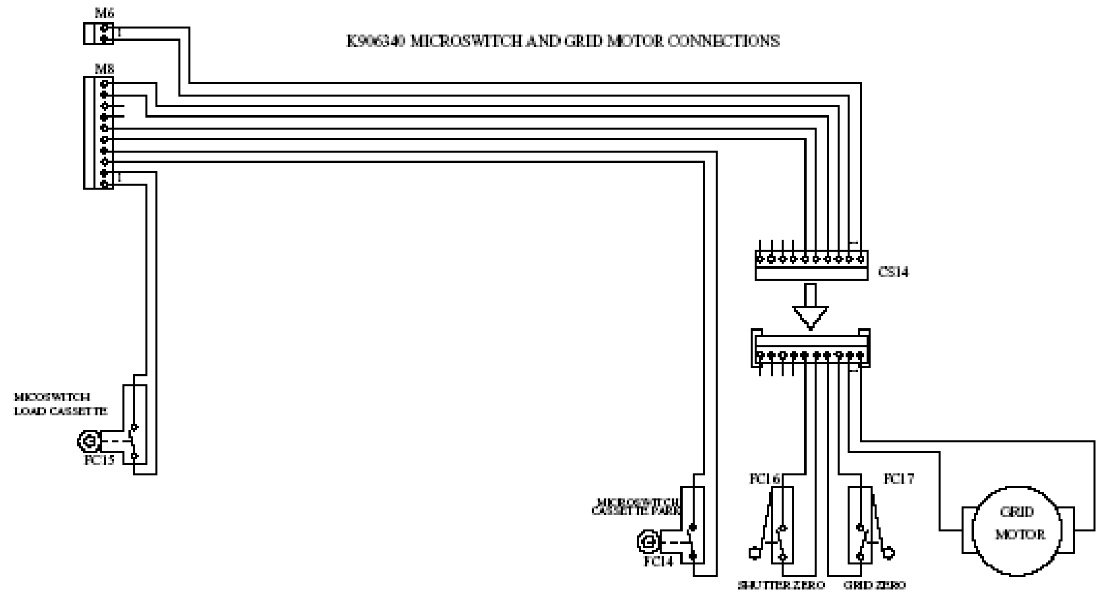
Equipment:

Title:

S.F.D. INTERNAL CONNECTIONS

n°. 1 of 3 Rev: 0.0

Sheet: 0 of: 0 Size: A3



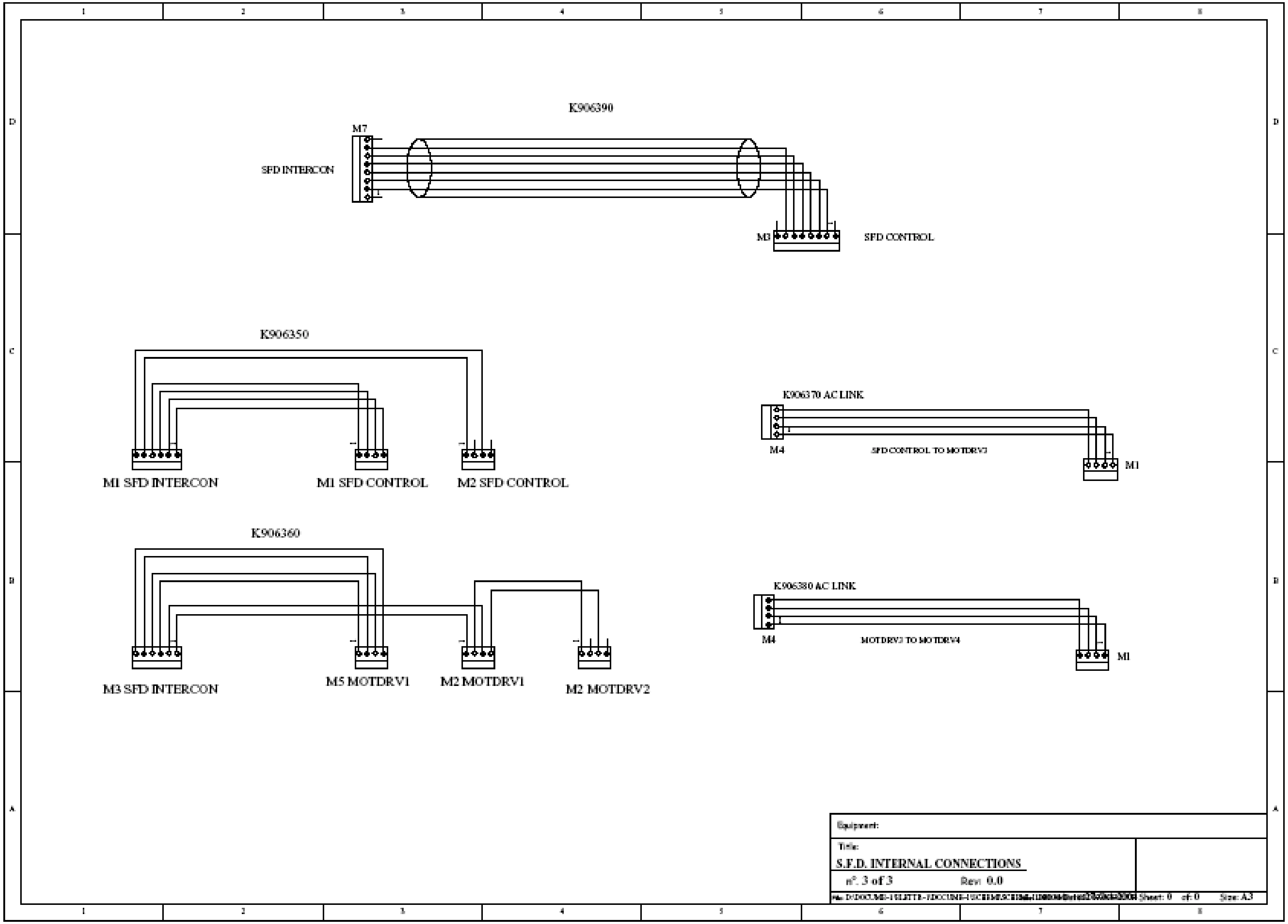
Equipment:

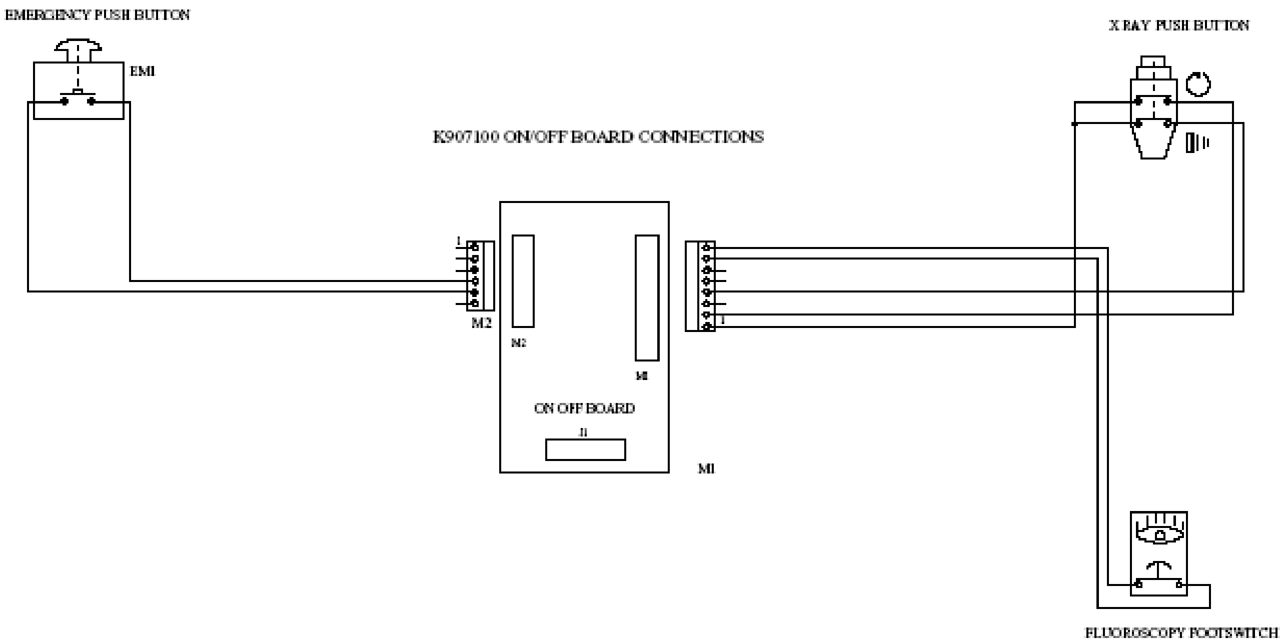
Title:

S.F.D. INTERNAL CONNECTIONS

n°. 2 of 3 Rev: 0.0

Sheet: 0 of: 0 Size: A3


K906390
M7
SFD INTERCON
M3
SFD CONTROL
K906350
M1 SFD INTERCON
M1 SFD CONTROL
M2 SFD CONTROL
K906370 AC LINK
M4
SFD CONTROL TO MOTDRV3
M1
K906360
M3 SFD INTERCON
M5 MOTDRV1
M2 MOTDRV1
M2 MOTDRV2
K906380 AC LINK
M4
MOTDRV3 TO MOTDRV4
M1
Equipment:
Title:
S.F.D. INTERNAL CONNECTIONS
n°. 3 of 3
Rev: 0.0
Sheet: 0 of: 0 Size: A3



Equipment:

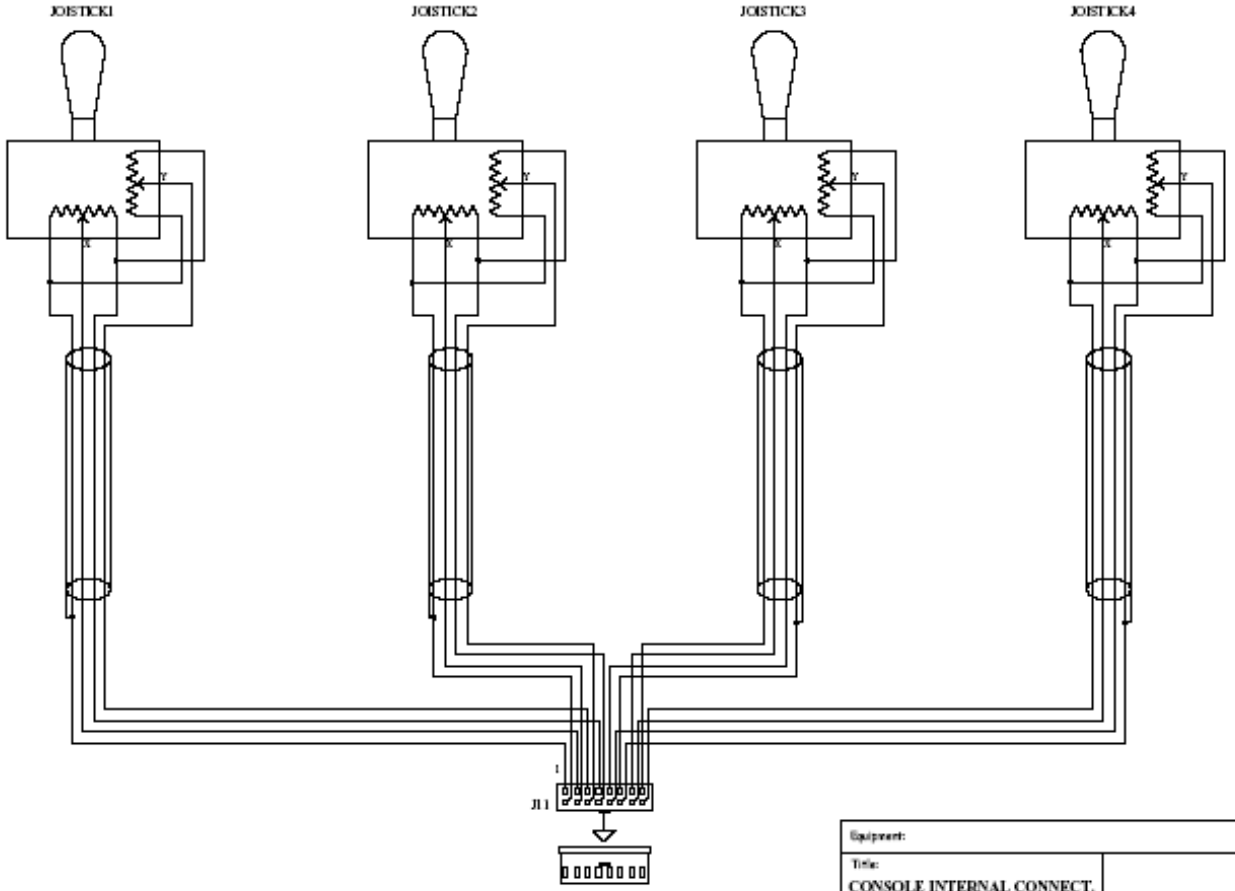
Title:

CONSOLE INTERNAL CONNECT.

n°. 1 of 2 Rev: 0.0

Size: A3

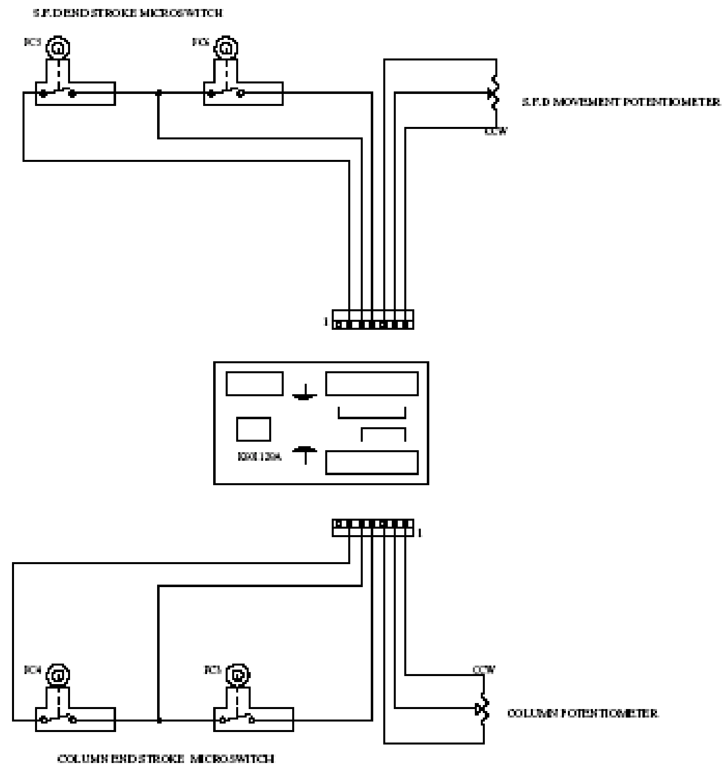
K907110 JOYSTICK CONNECTIONS



Equipment:	
Title: CONSOLE INTERNAL CONNECT.	
n°. 2 of 2 Rev: 0.0	

Sheet: 0 of: 0 Size: A3

K906100 COLOUMN SERIOGRAPH MICROSWITCH AND POTENTIOMETER CONNECTIONS



Equipment:

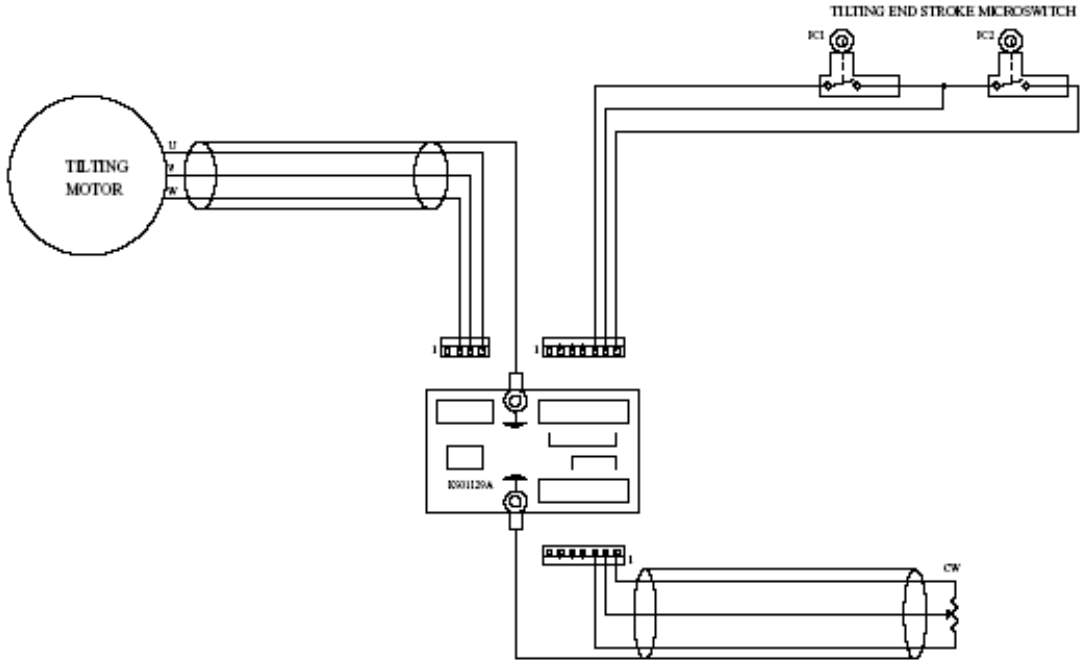
Title:

TABLE INTERNAL CONNECT.

n°. 1 of 5 Rev: 0.0

Sheet: 0 of: 0 Size: A3

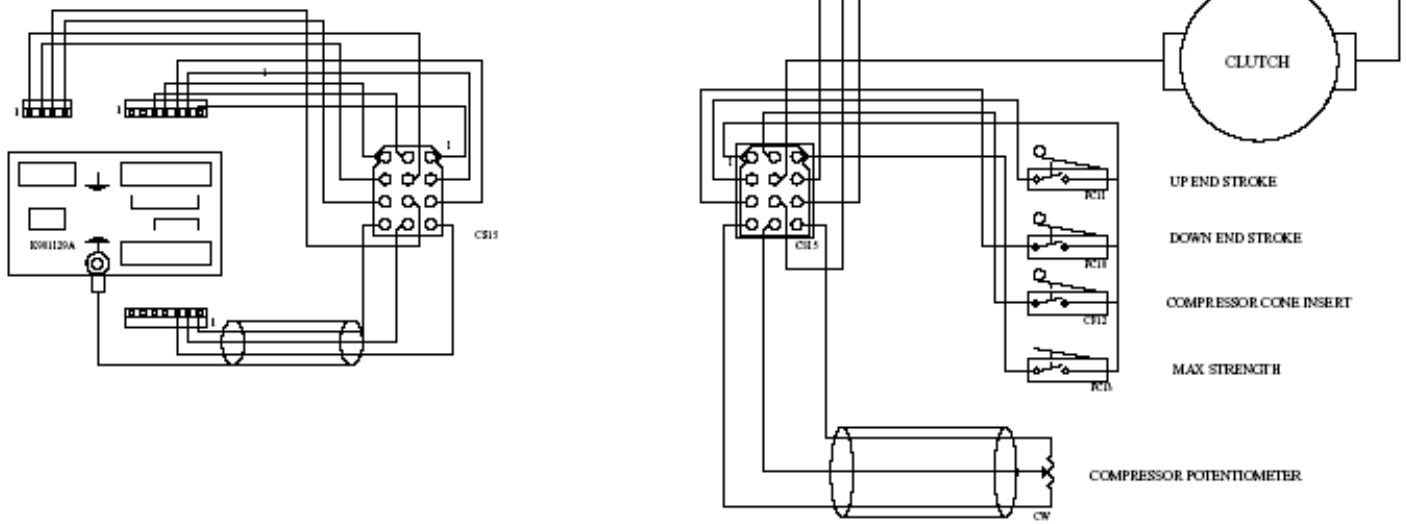
K906120 TILTING MICROSWITCH AND POTRNTIOMETER CONNECTIONS



Equipment:	
Title: TABLE INTERNAL CONNECT.	
n°. 2 of 5 Revi 0.0	

Size: A3

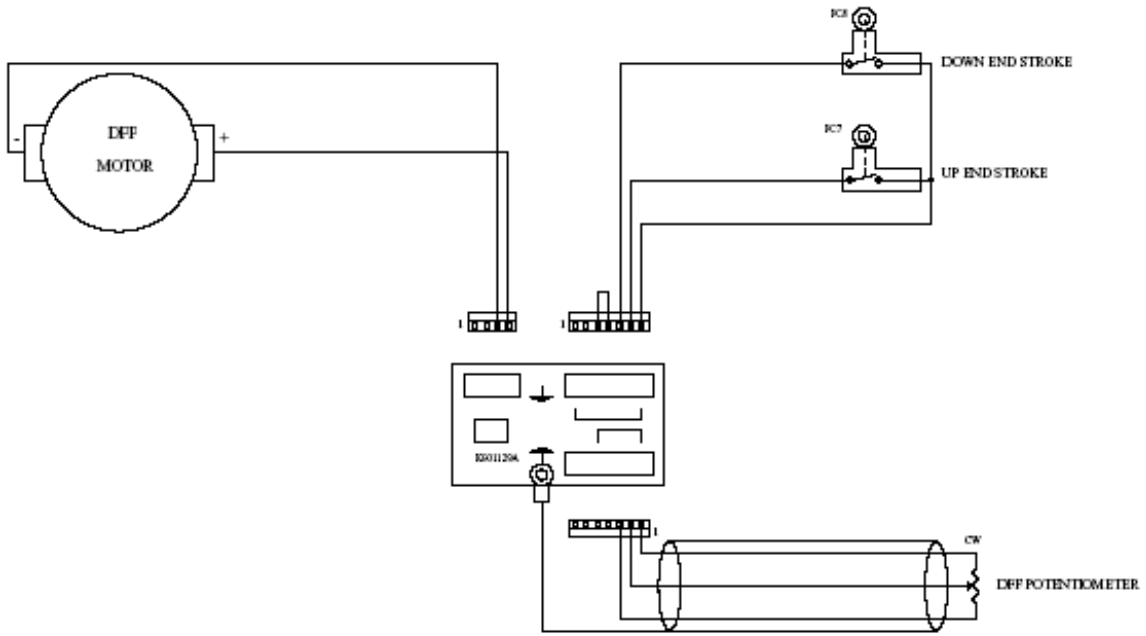
K906130 COMPRESSOR MICROSWITCH AND POTENTIOMETER CONNECTIONS



Equipment:		
Title: TABLE INTERNAL CONNECT.		
n°. 3 of 5 Rev: 0.0		

Size: A3

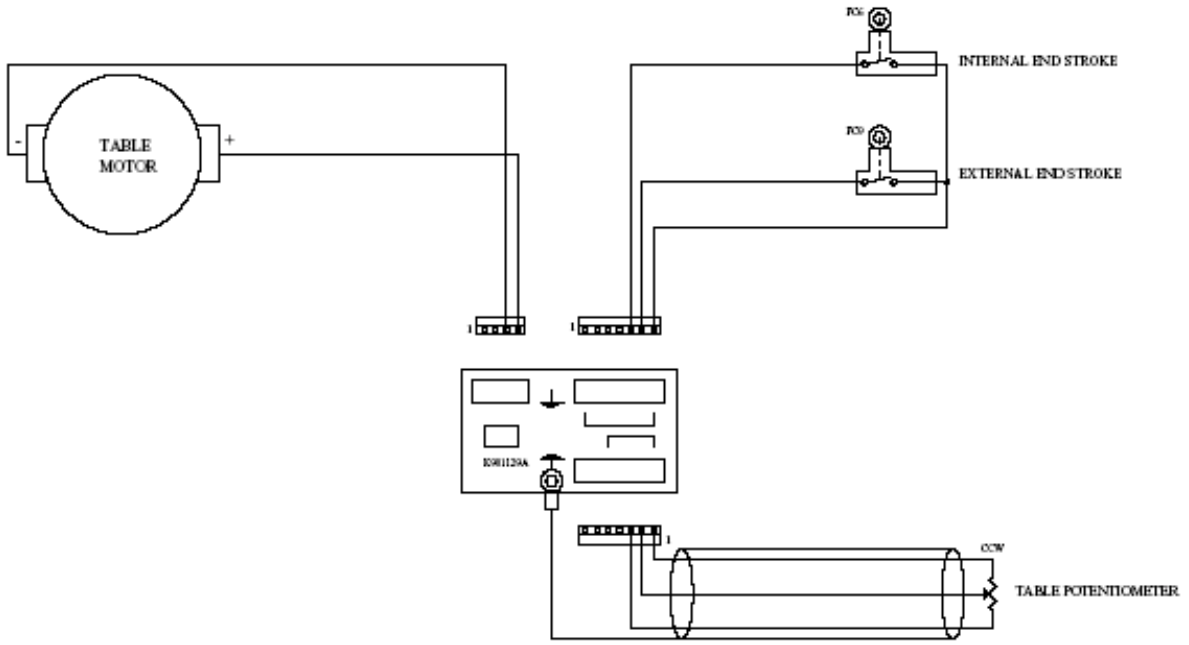
K906140 DFF MICROSWITCH AND POTRNTIOMETER CONNECTIONS



Equipment:	
Title: TABLE INTERNAL CONNECT.	
n°. 4 of 5	Rev: 0.0

Size: A3

K906140 TABLE MICROSWITCH AND POTRNTIOMETER CONNECTIONS



Equipment:

Title:

TABLE INTERNAL CONNECT.

n°. 5 of 5 Rev: 0.0

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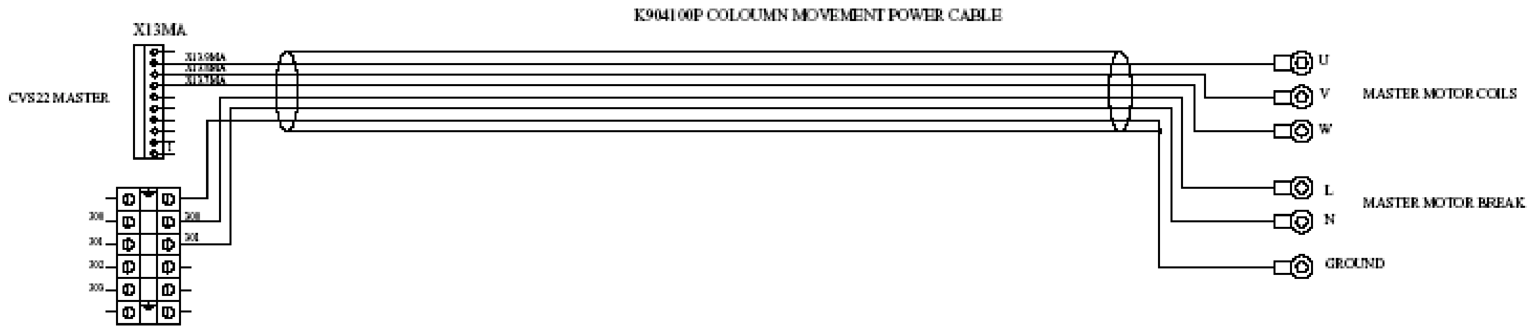
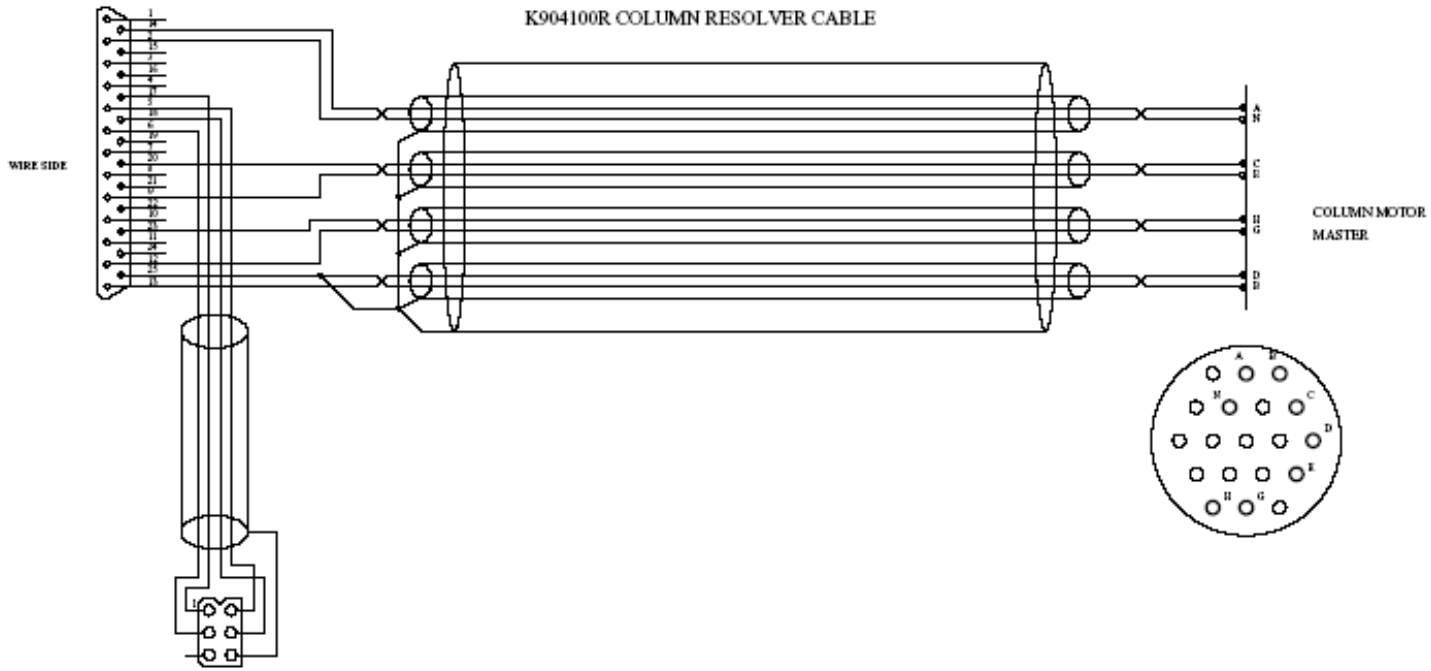


Equipment:		
Title: CABLES		
n°. 1 of 15 Rev: 0.0		
Sheet: 0 of: 0 Size: A3		

X3 CVS22 MASTER

K904100R COLUMN RESOLVER CABLE



Equipment:	
Title: CABLES	
n°. 2 of 15 Rev: 0.0	
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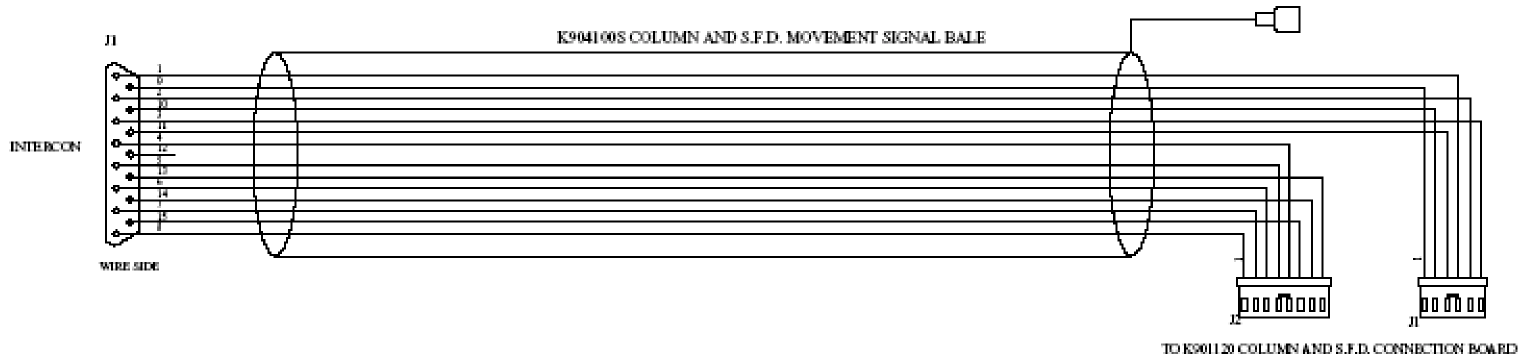


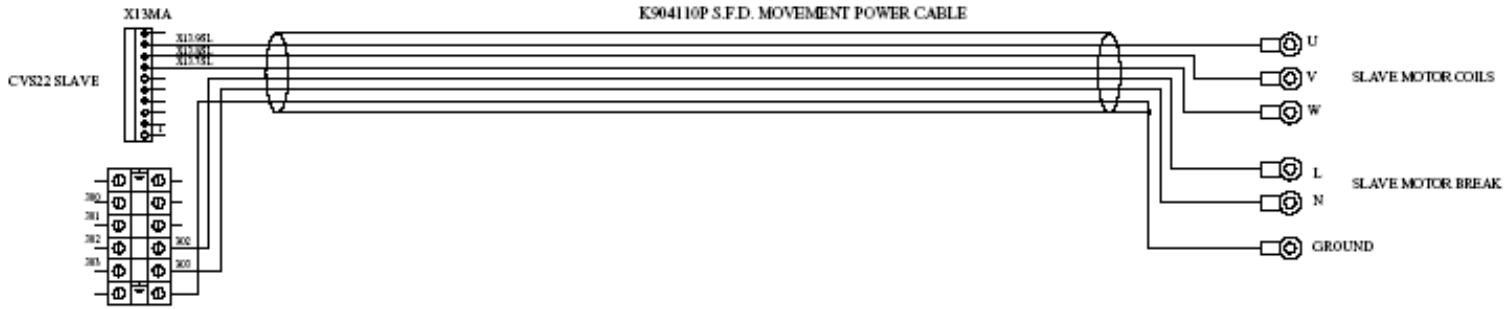
Equipment:

Title:

CABLES

n°. 3 of 15 Rev: 0.0

Size: A3



Equipment:

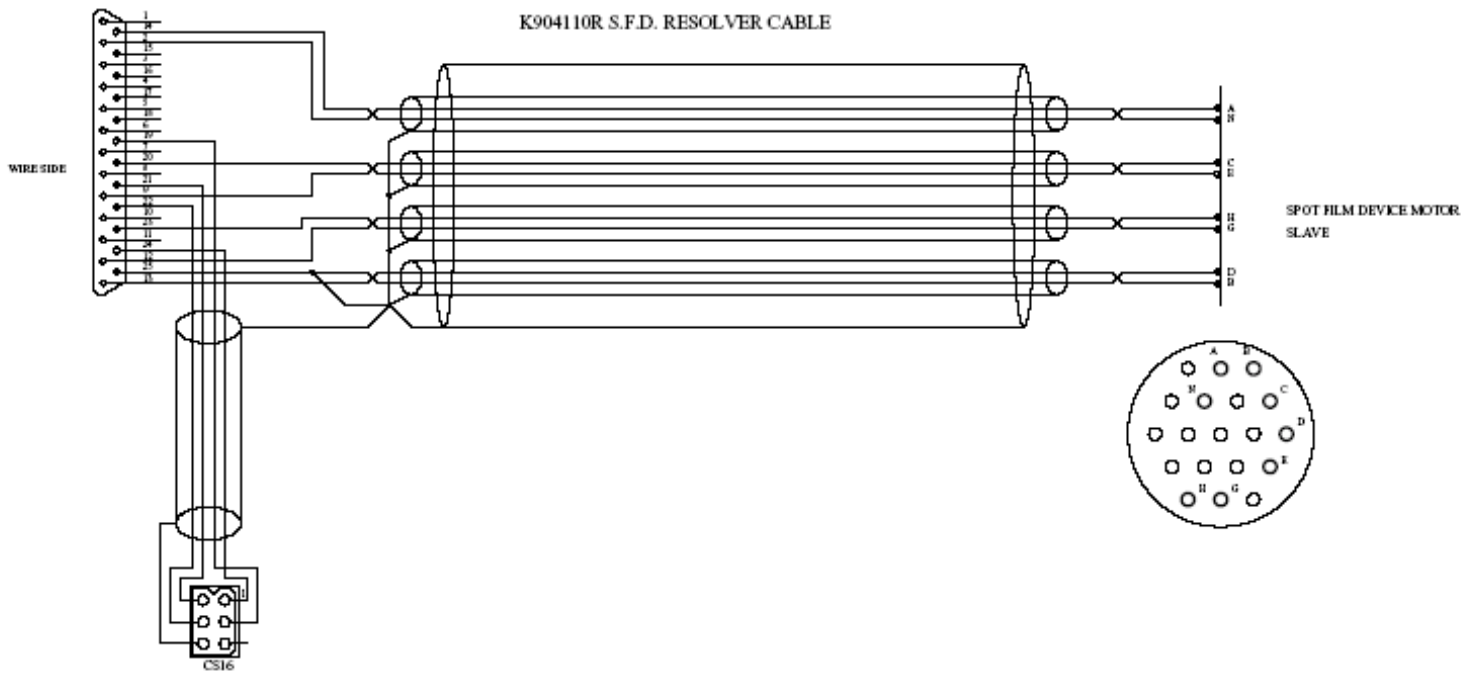
Title:
CABLES

n°. 4 of 15 Rev: 0.0

nr: 0 nf: 0 Size: A3

X3 CVS22 SLAVE

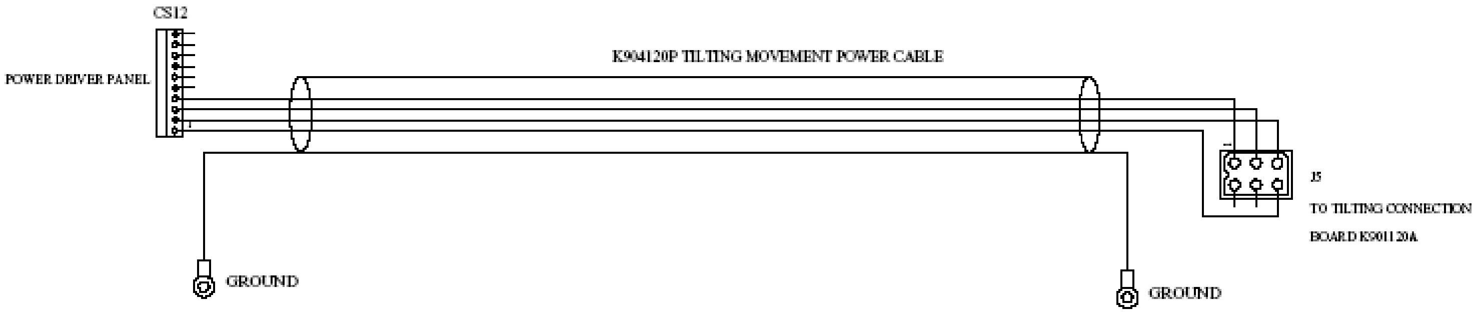
K904110R S.F.D. RESOLVER CABLE



Equipment:

Title:
CABLES

n°. 5 of 15 Rev: 0.0



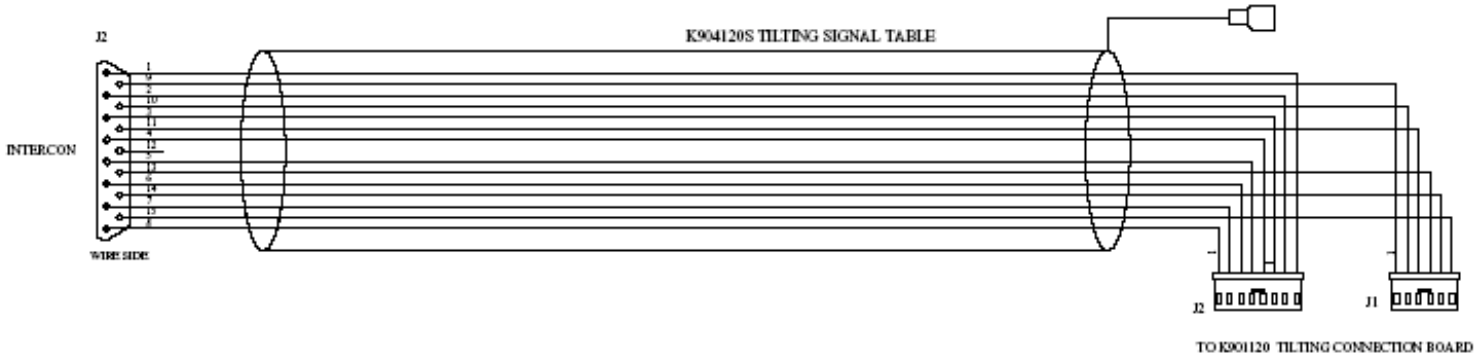
Equipment:

Title:

CABLES

n°. 6 of 15 Rev: 0.0

Sheet: 0 of: 0 Size: A3



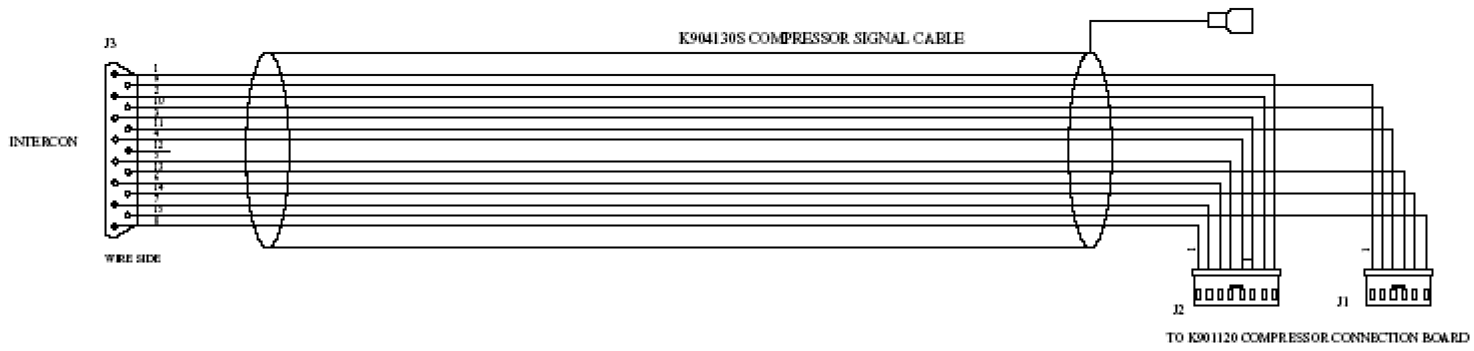
Equipment:

Title:

CABLES

n°. 7 of 15 Rev: 0.0

Size: A3



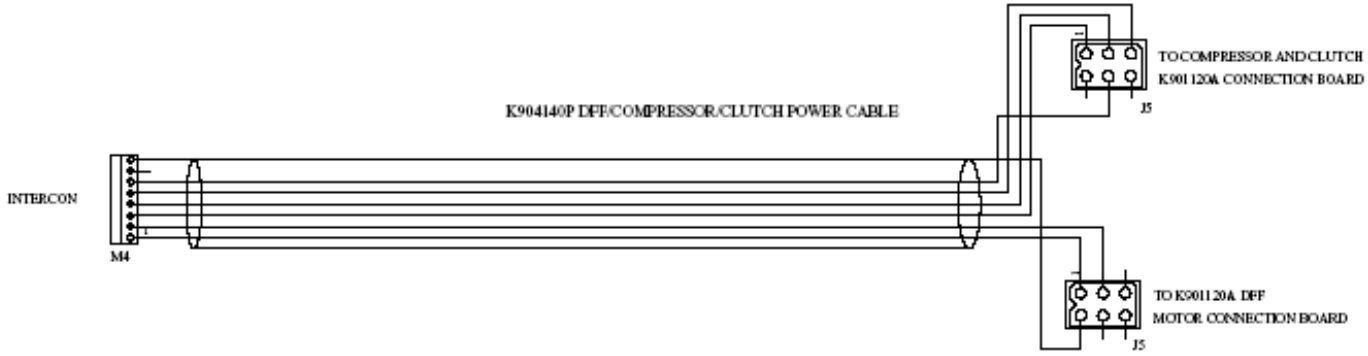
Equipment:

Title:

CABLES

n°. 8 of 15 Rev: 0.0

Size: A3

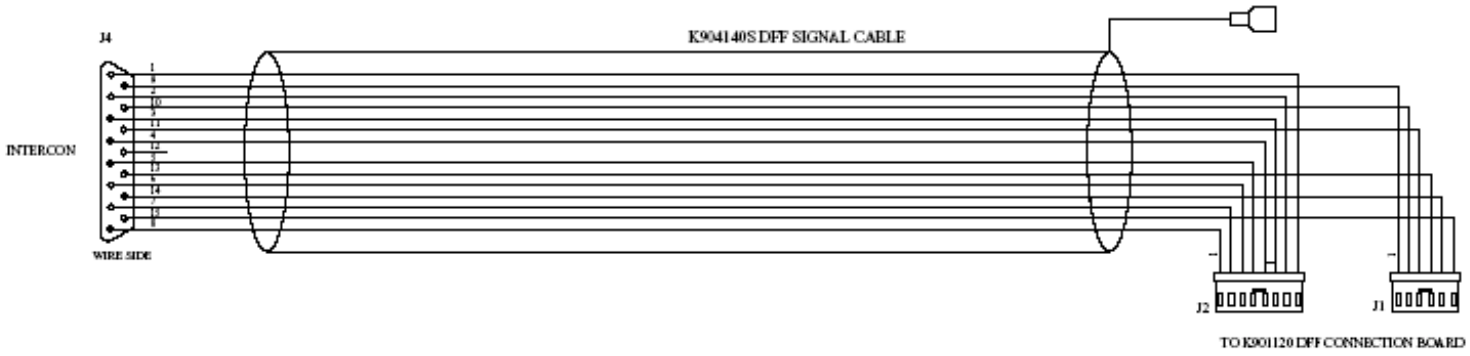


Equipment:

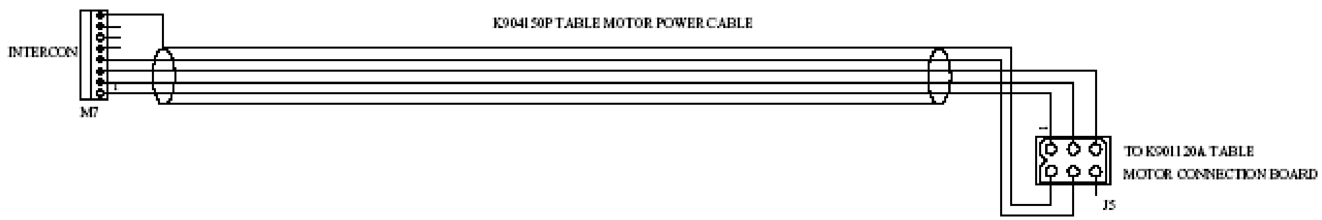
Title:
CABLES

n°. 9 of 15 Rev: 0.0

Size: A3



Equipment:			
Title: CABLES			
n°. 10 of 15	Rev: 0.0		
File: D:\DOCUME~1\ELITE~1\DOCUME~1\SCHEMI\SCHEM~1\[illegible]		Sheet: 0 of: 0	Size: A3



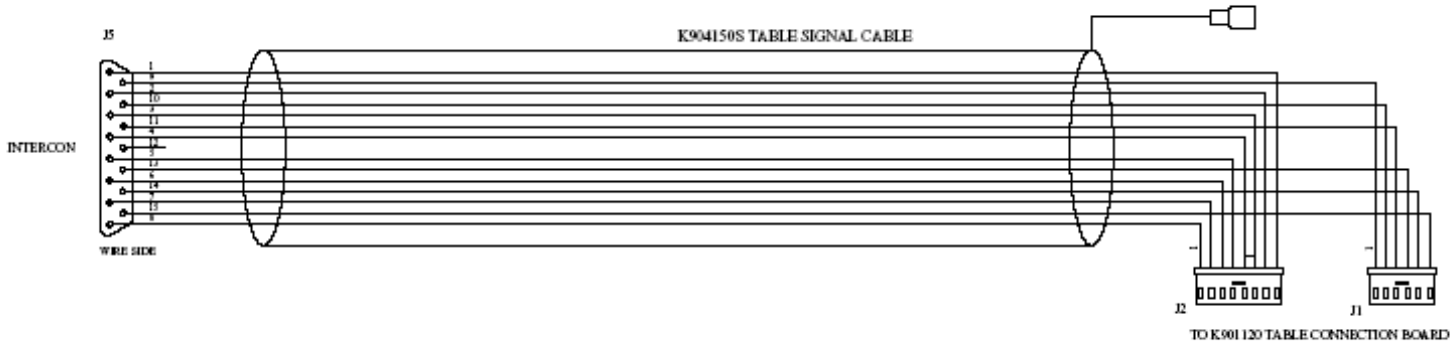
Equipment:

Title:

CABLES

n°. 11 of 15 Rev: 0.0

Sheet: 0 of: 0 Size: A3



Equipment:			
Title: CABLES			
n°. 12 of 15	Rev: 0.0		
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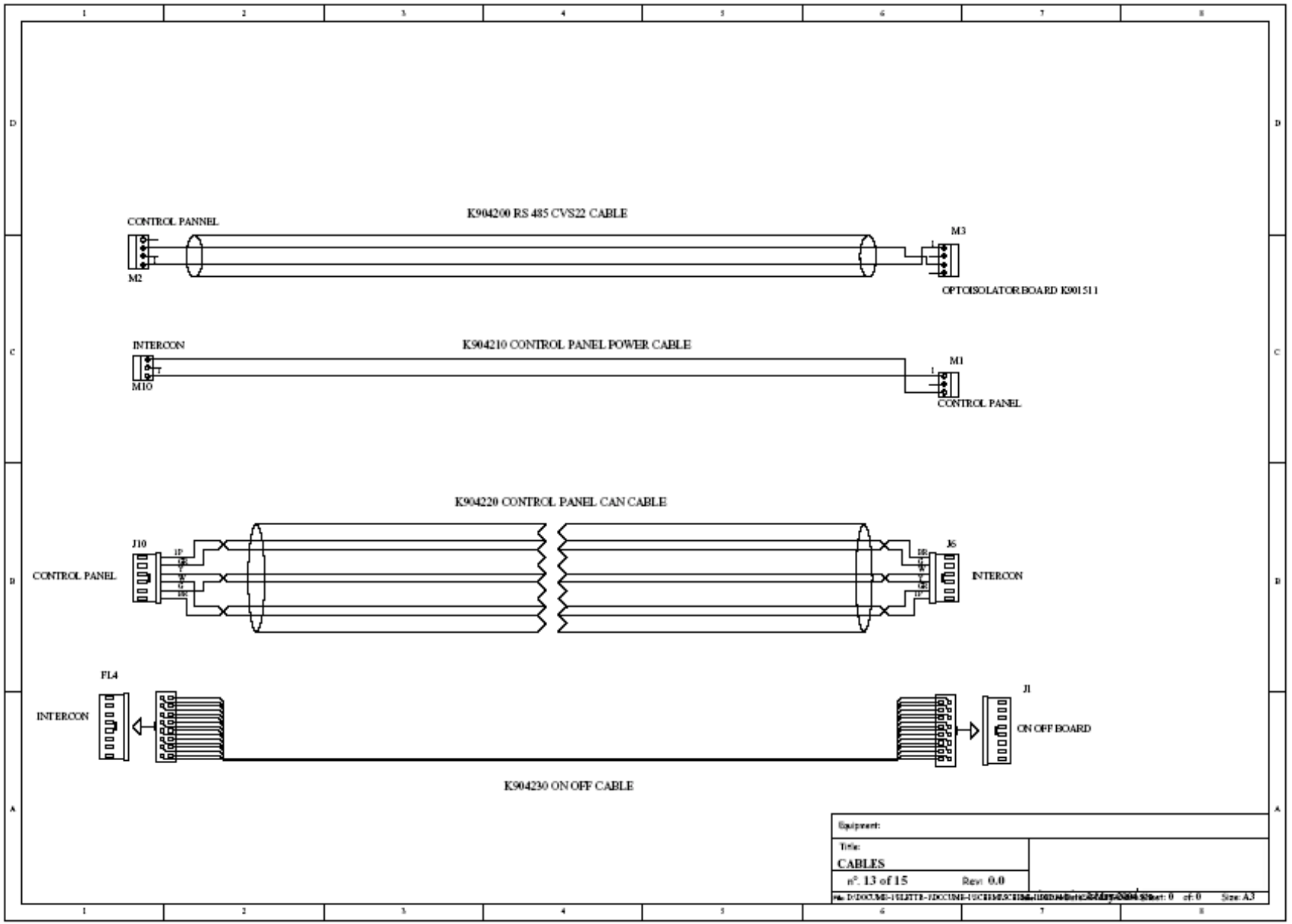
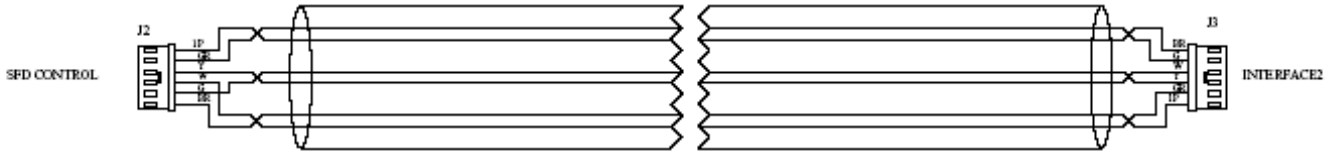
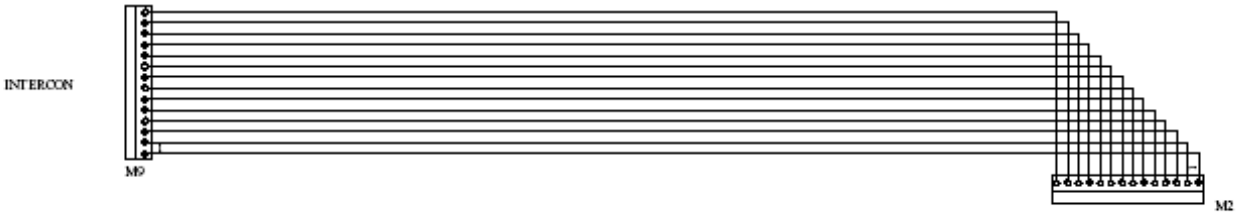

K904200 RS 485 CVS22 CABLE
CONTROL PANNEL
M2
M3
OPTOISOLATOR BOARD K901511
INTERCON
M10
K904210 CONTROL PANEL POWER CABLE
M1
CONTROL PANEL
K904220 CONTROL PANEL CAN CABLE
J10
CONTROL PANEL
J6
INTERCON
FL4
INTERCON
J1
ON OFF BOARD
K904230 ON OFF CABLE
Equipment:
Title:
CABLES
n°. 13 of 15
Rev: 0.0
Size: A3

K904300 SFD CAN CABLE

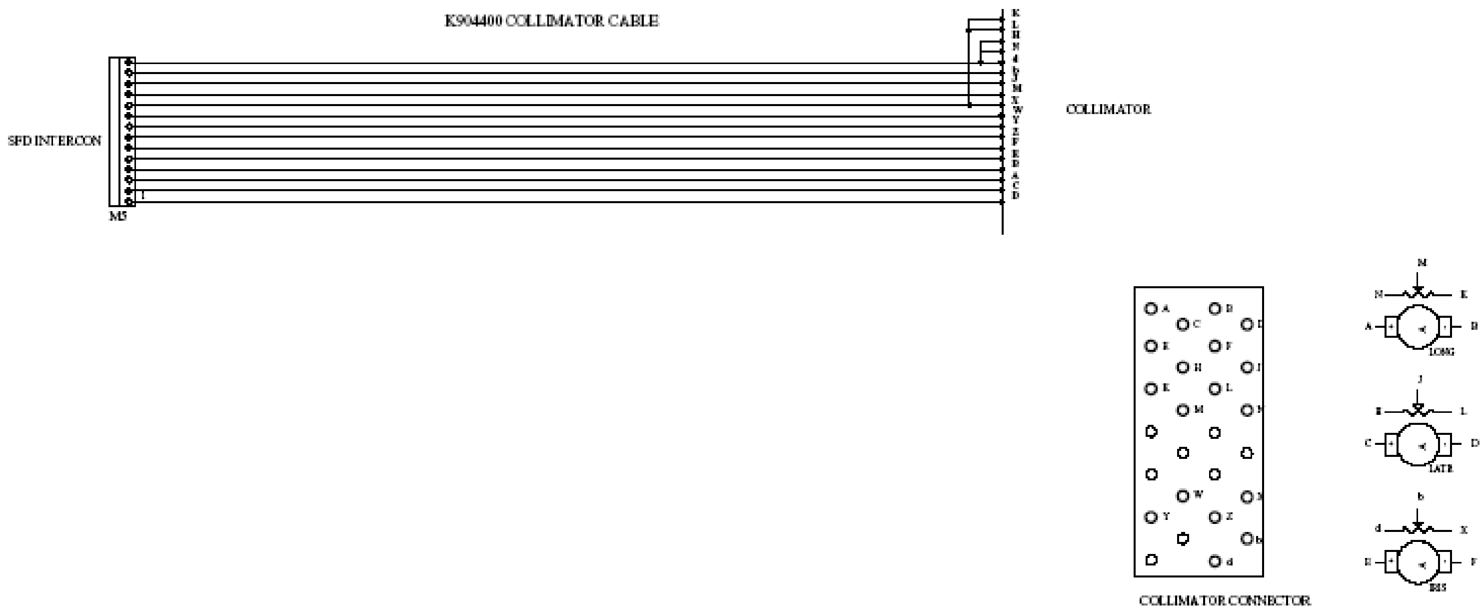


K904310 SFD POWER CABLE



Equipment:	
Title: CABLES	
n°. 14 of 15	Rev: 0.0

Sheet: 0 of: 0 Size: A3



Equipment:

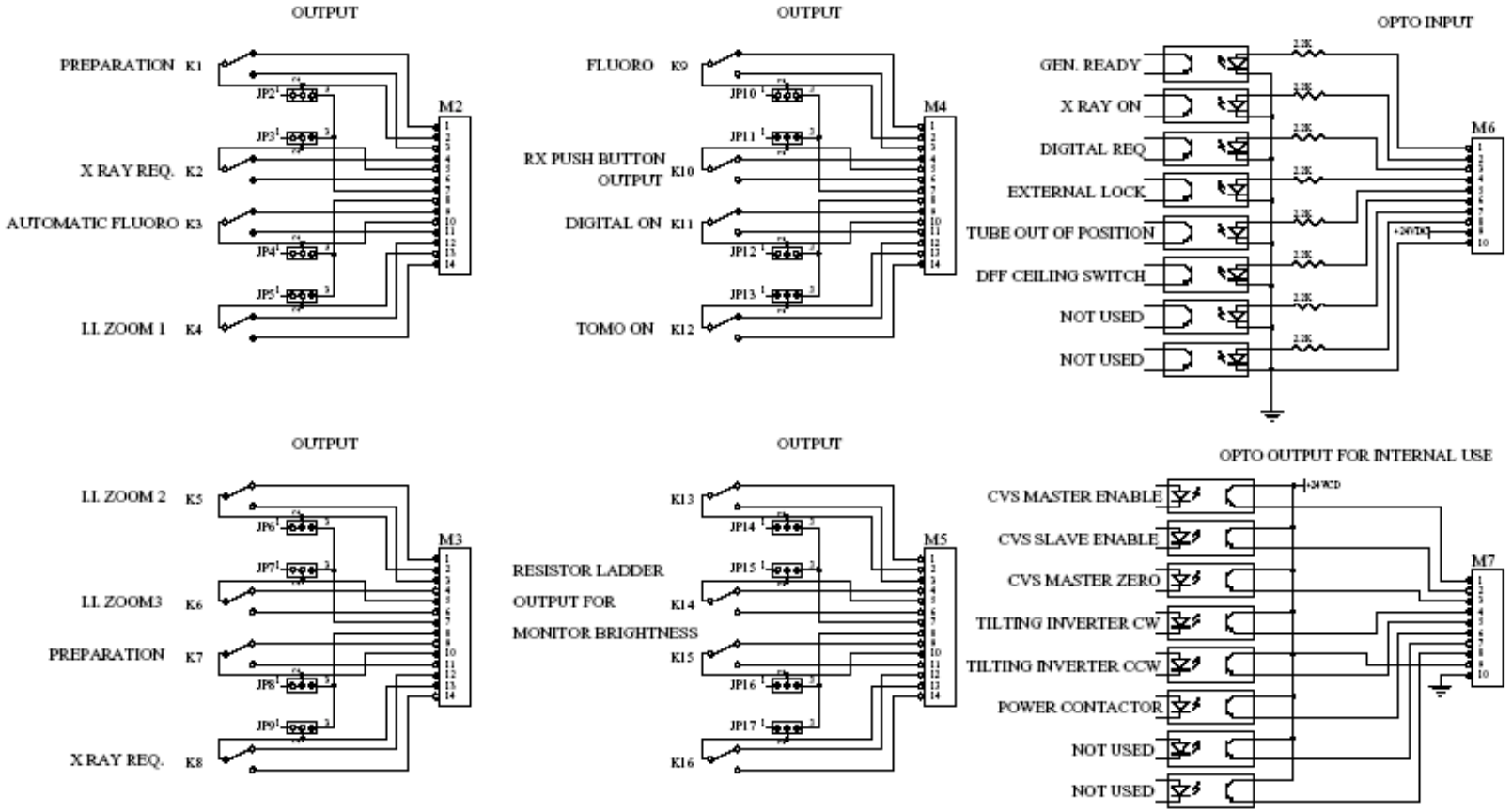
Title:

CABLES

n°. 15 of15 Rev: 1.0

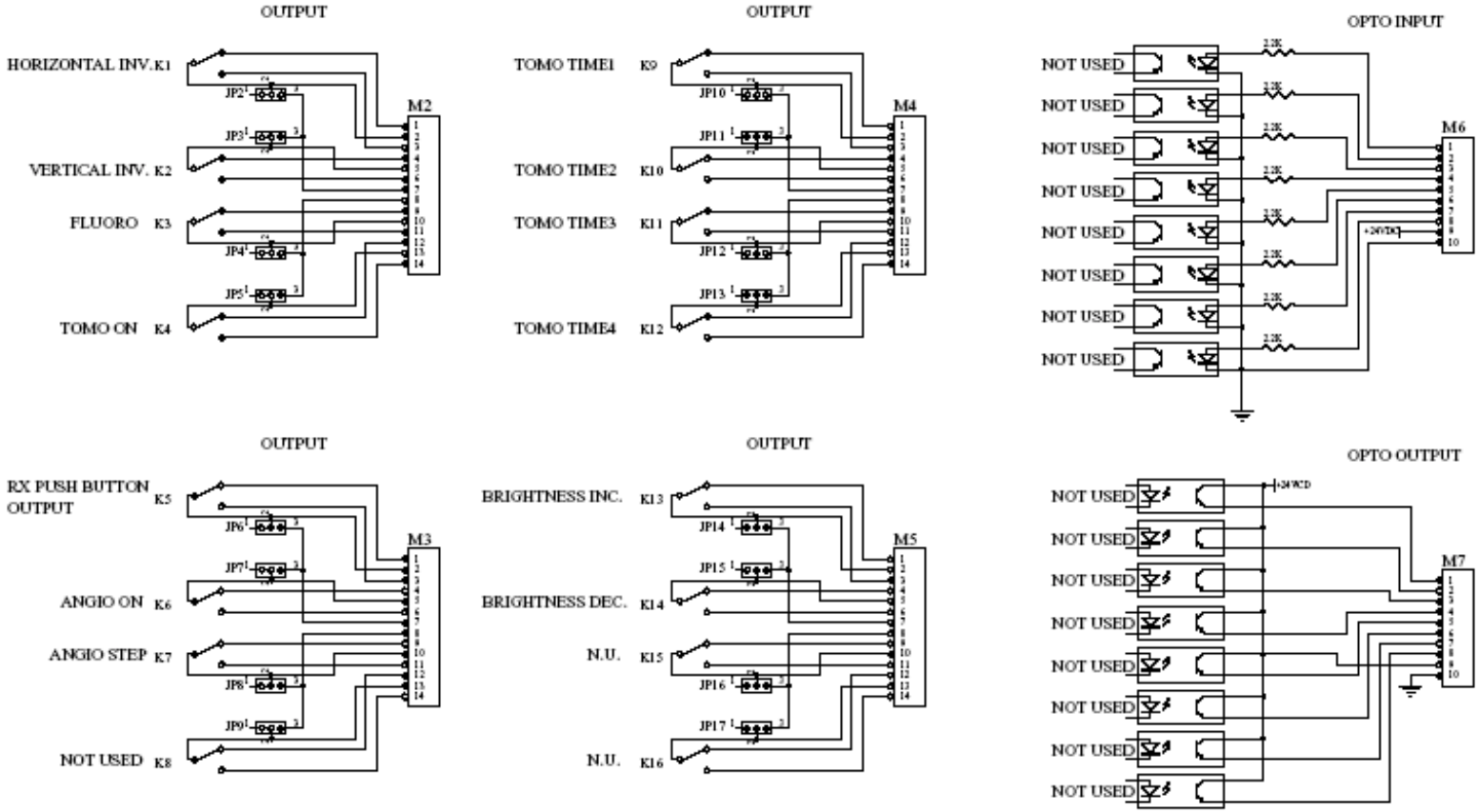
Sheet: 0 of: 0 Size: A3

INTERFACE 1



Equipment:	
Title: INTERFACE SIGNAL	
n°. 1 of 2 Rev: 0.0	

INTERFACE 2

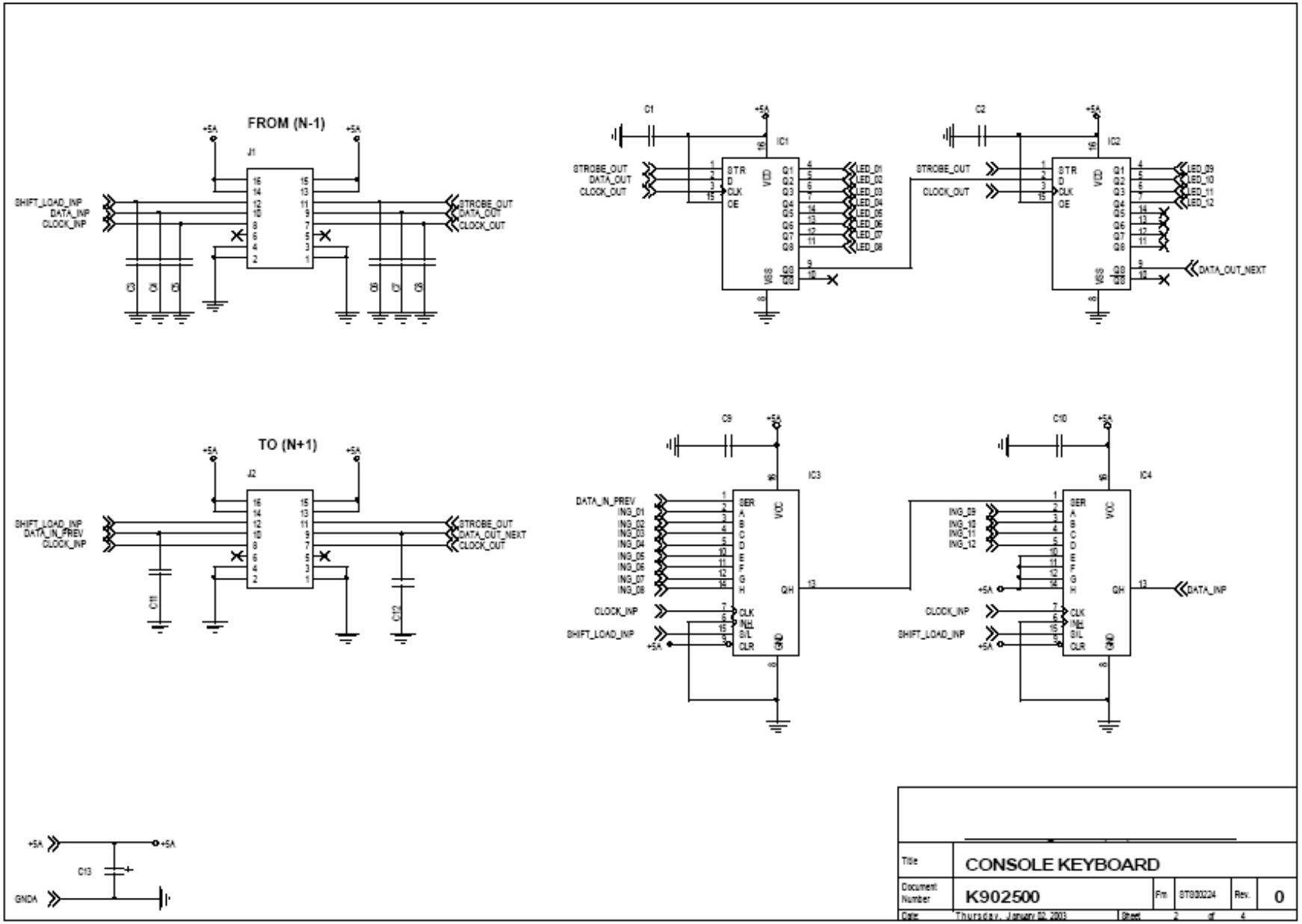


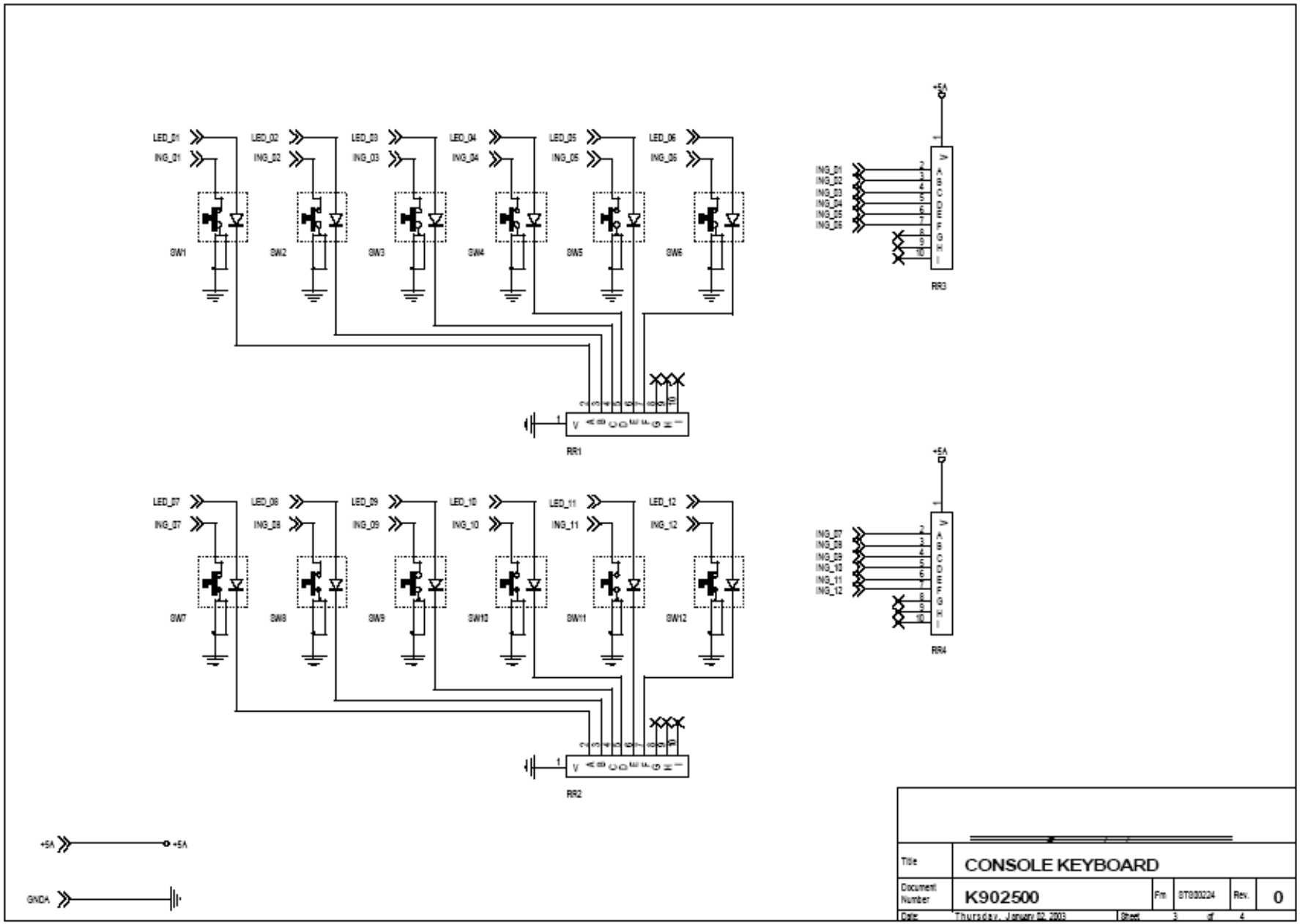
Equipment:		
Title: INTERFACE SIGNAL		
n°. 2 of 2 Rev: 0.0		

Size: A3

CONSOLE KEYBOARD

Title	CONSOLE KEYBOARD				
Document Number	K902500	Fm	BT800224	Rev.	0
Date	Thursday, January 02, 2003	Sheet	1 of 4		


FROM (N-1)
J1
+5A
SHIFT_LOAD_INP
DATA_INP
CLOCK_INP
STROBE_OUT
DATA_OUT
CLOCK_OUT
C3
C4
C5
C6
C7
C8
C1
IC1
STR
D
CLK
OE
VDD
VSS
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
LED_01
LED_02
LED_03
LED_04
LED_05
LED_06
LED_07
LED_08
C2
IC2
LED_09
LED_10
LED_11
LED_12
DATA_OUT_NEXT
TO (N+1)
J2
SHIFT_LOAD_INP
DATA_IN_PREV
CLOCK_INP
STROBE_OUT
DATA_OUT_NEXT
CLOCK_OUT
C11
C12
C9
IC3
SER
A
B
C
D
E
F
G
H
QH
VCC
GND
CLK
INH
S/L
CLR
ING_01
ING_02
ING_03
ING_04
ING_05
ING_06
ING_07
ING_08
C10
IC4
ING_09
ING_10
ING_11
ING_12
DATA_INP
C13
GNDA
Title
CONSOLE KEYBOARD
Document Number
K902500
Pn
ST800224
Rev.
0
Date:
Thursday, January 02, 2003
Sheet
2
of
4


LED_01
ING_01
LED_02
ING_02
LED_03
ING_03
LED_04
ING_04
LED_05
ING_05
LED_06
ING_06
SW1
SW2
SW3
SW4
SW5
SW6
RR1
LED_07
ING_07
LED_08
ING_08
LED_09
ING_09
LED_10
ING_10
LED_11
ING_11
LED_12
ING_12
SW7
SW8
SW9
SW10
SW11
SW12
RR2
+5A
RR3
RR4
GNDA
Title
CONSOLE KEYBOARD
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K902500
Fm
DT000224
Rev.
0
Date
Thursday, January 02, 2003
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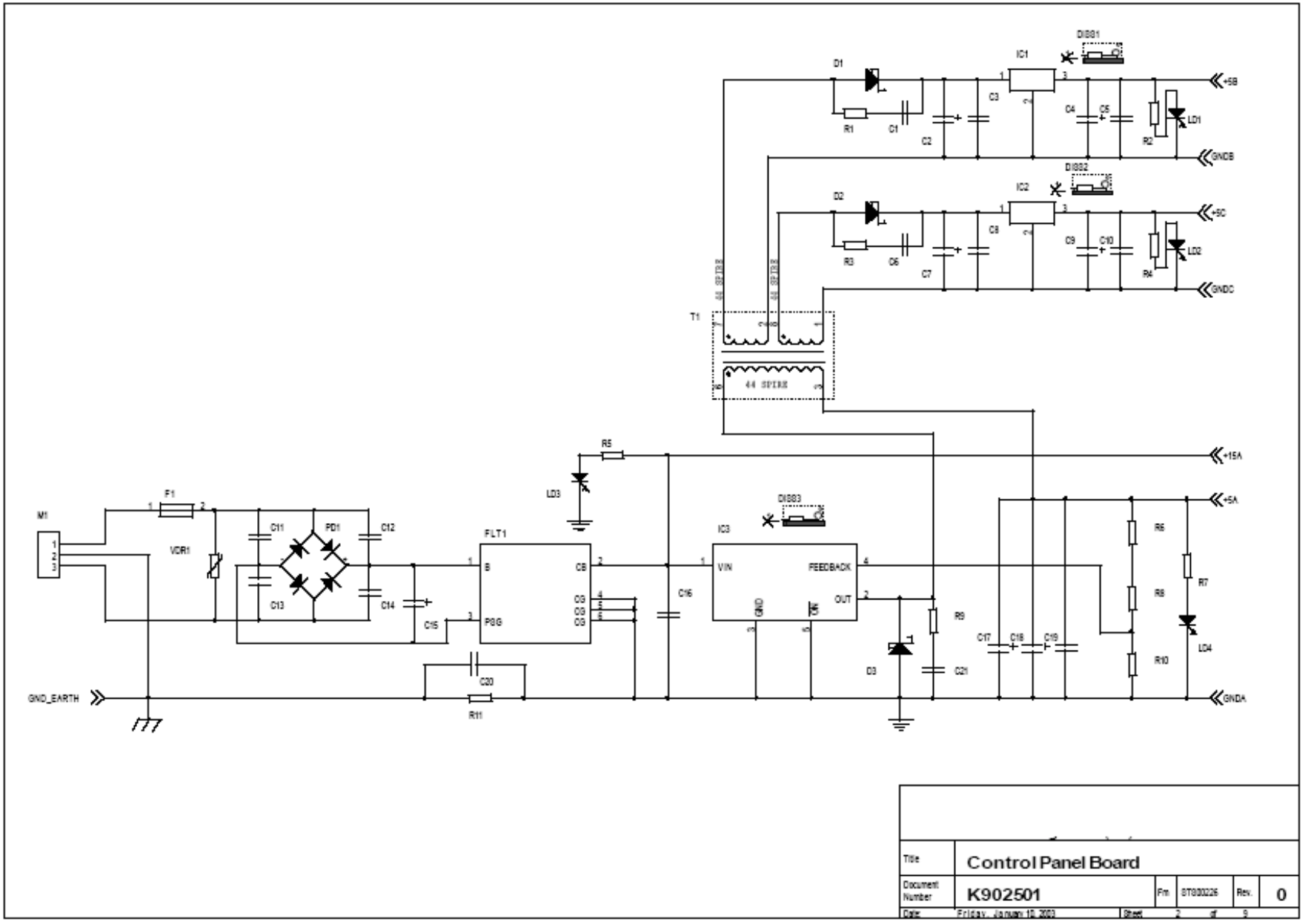
of
4

CONTROL PANEL

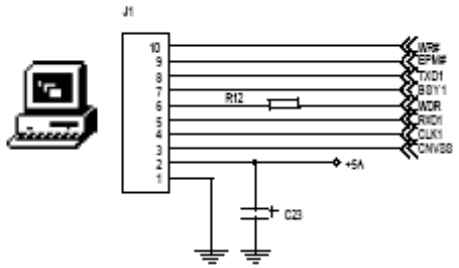
- LCD 5,4" 1/4 VGA
- Touch screen
- RAM 128 KB
- FLASH 128 KB
- RS232 Port
- Optoisolated RS485 Port
- Optoisolated CAN Bus
- 4 Joystick input (2 axis)

Title	Control Panel Board				
Document Number	K902501	Fm	ST000226	Rev.	0
Date	Thursday, January 02, 2003	Sheet	1 of 9		

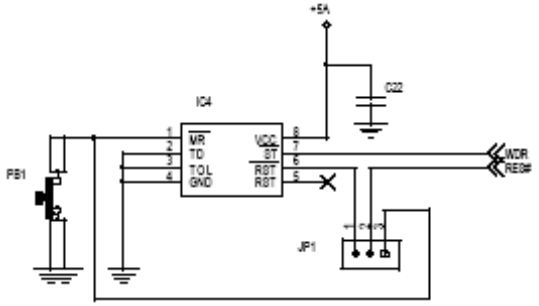


Title	Control Panel Board				
Document Number	K902501	Fm	ST800226	Rev.	0
Date	Friday, January 10, 2003	Sheet	2 of 9		

PROGRAMMING TOOLS

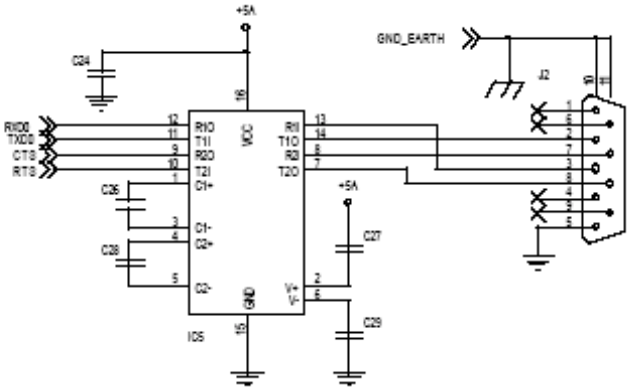


RESET & WATCH DOG



RESET Selection	
Pos.	Description
1-2	By watch-dog
2-3	By push button

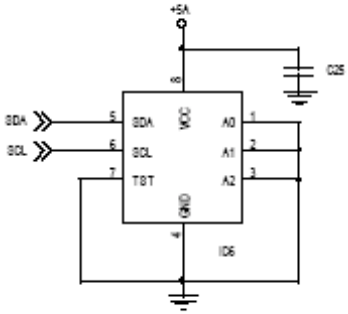
RS232 INTERFACE

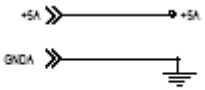


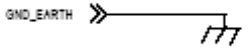
Router VIEW		
Name	Pin	Dir
DCD	1	OUT
DTR	6	OUT
TXD	2	OUT
CTS	7	INP
RXD	3	INP
RTS	8	OUT
DSR	4	INP
RI	9	OUT
GND	5	---

PC VIEW		
Name	Pin	Dir
DCD	1	INP
DSR	6	INP
RXD	2	INP
RTS	7	OUT
TXD	3	OUT
CTS	8	INP
DTR	4	OUT
RI	9	INP
GND	5	---

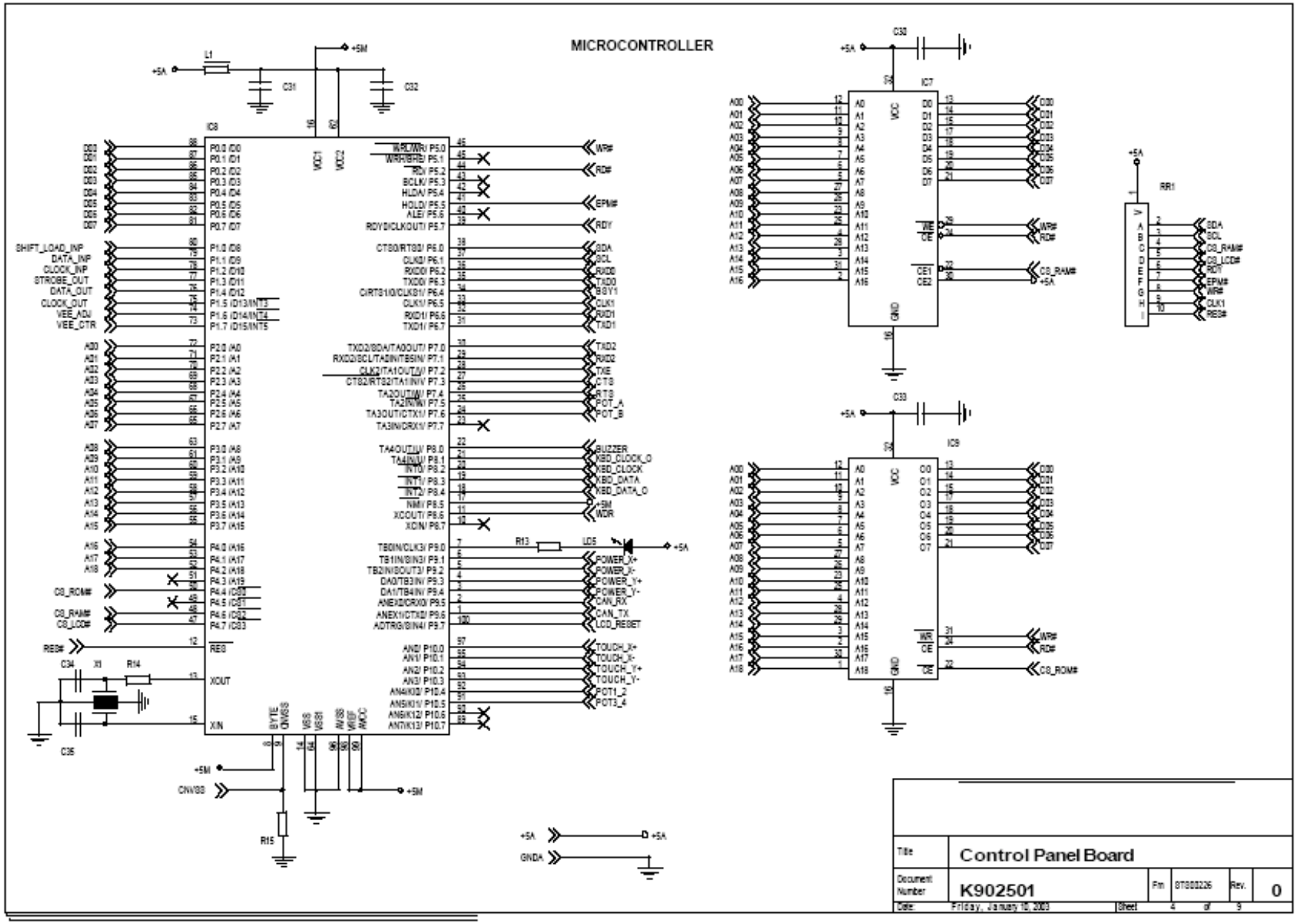
EEPROM







Title	Control Panel Board				
Document Number	K902501	Fm	ST000226	Rev.	0
Date	Friday, January 10, 2003	Sheet	3 of 9		


MICROCONTROLLER
IC8
IC7
IC9
RR1
L1
C30
C31
C32
C33
C34
C35
C36
X1
R13
R14
R15
LD5
+5A
+5M
CNVSS
GNDA
WR#
RD#
EPM#
RDY
BUZZER
TOUCH_X+
TOUCH_X-
TOUCH_Y+
TOUCH_Y-
POWER_X+
POWER_X-
POWER_Y+
POWER_Y-
CAN_RX
CAN_TX
LCD_RESET
CS_RAM#
CS_ROM#
CS_LCD#
SDA
SCL
CLK1
RES#
Title
Control Panel Board
Document Number
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0
Date:
Friday, January 10, 2003
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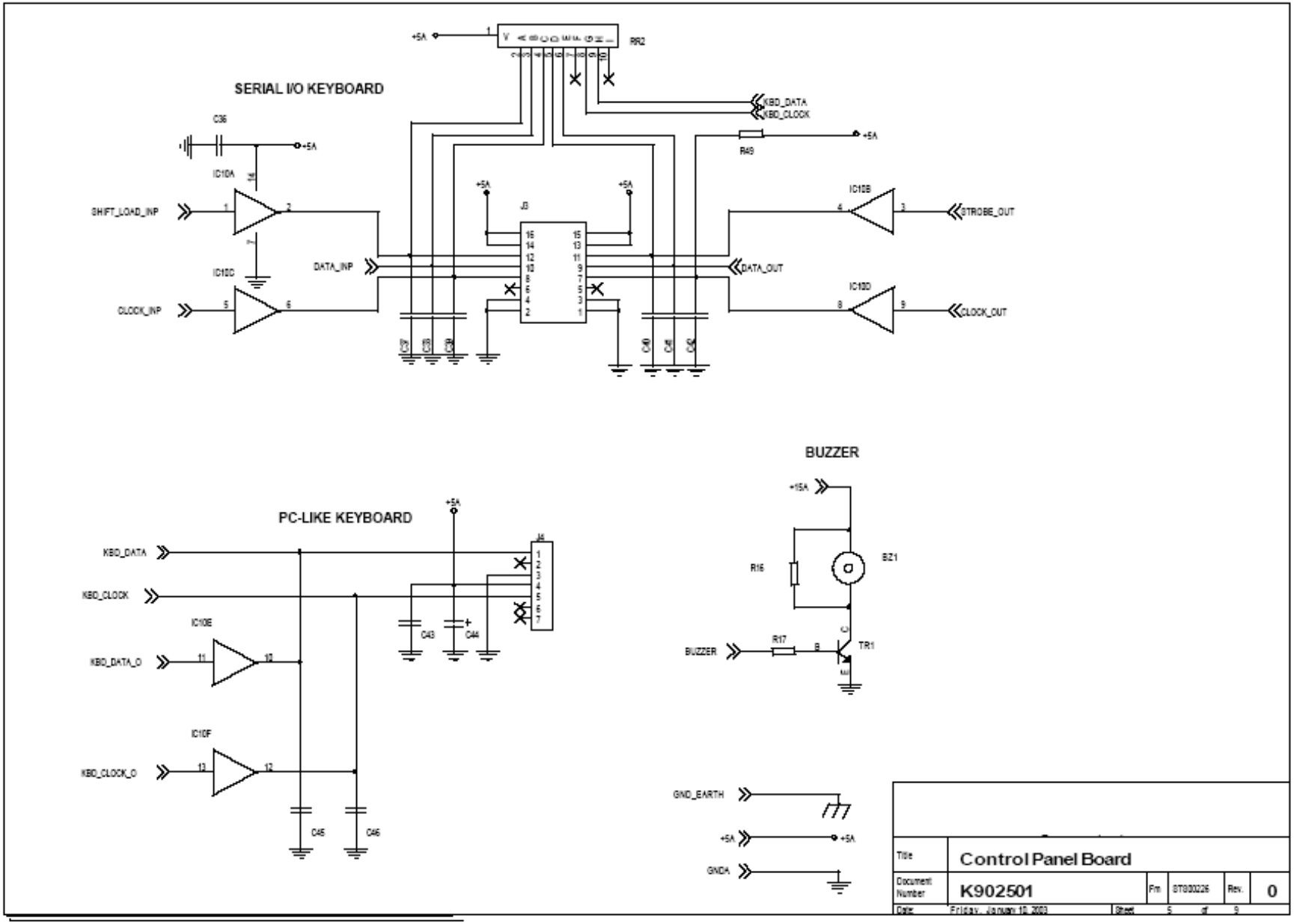
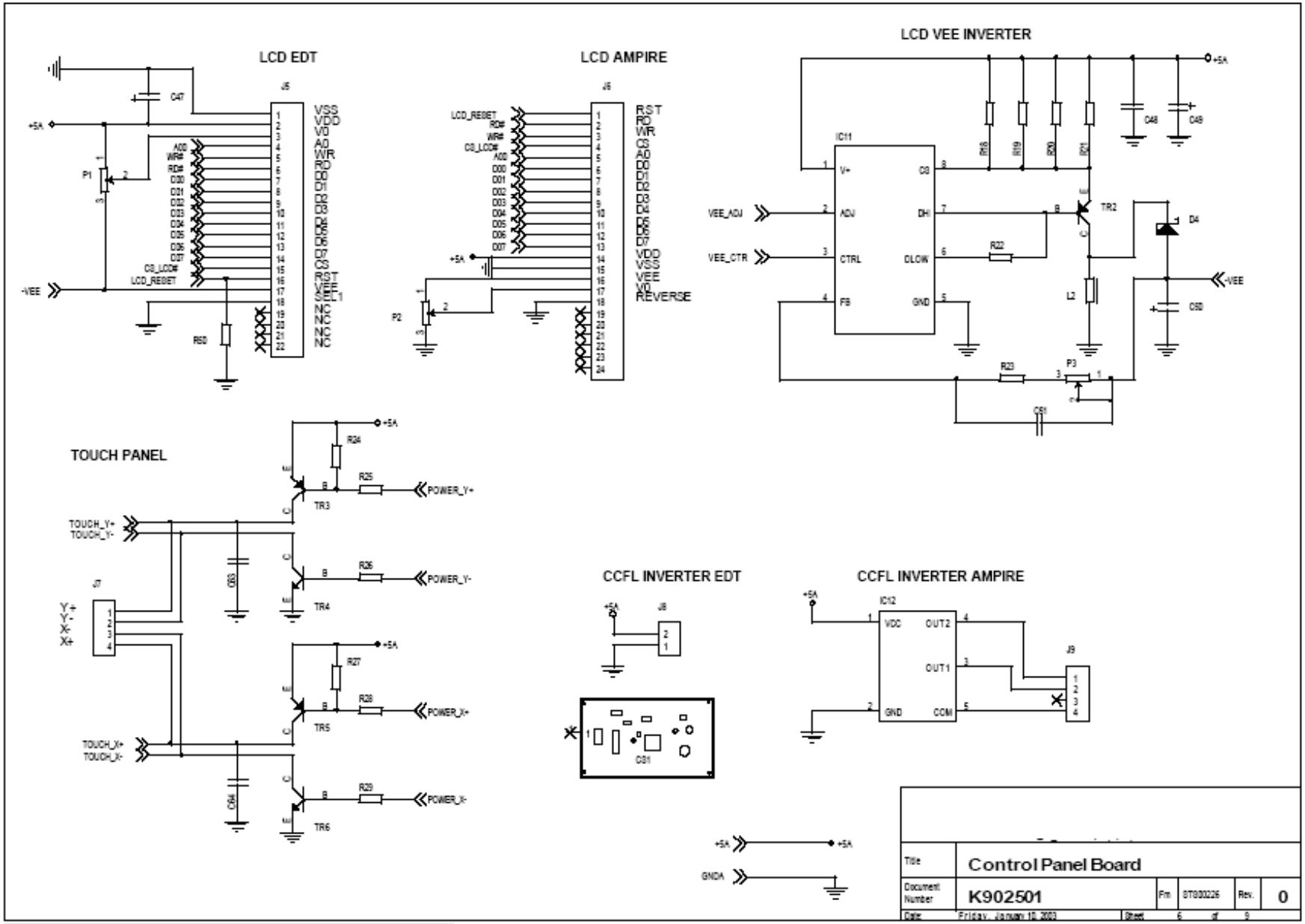
of
9


SERIAL I/O KEYBOARD
PC-LIKE KEYBOARD
BUZZER
+5A
RR2
KBD_DATA
KBD_CLOCK
R49
C36
IC10A
IC10B
IC10C
IC10D
IC10E
IC10F
J3
J4
SHIFT_LOAD_INP
DATA_INP
CLOCK_INP
DATA_OUT
STROBE_OUT
CLOCK_OUT
KBD_DATA_O
KBD_CLOCK_O
C43
C44
C45
C46
R16
BZ1
R17
TR1
BUZZER
GND_EARTH
GNDA
Control Panel Board
K902501
Rev.
0
Friday, January 10, 2003


LCD EDT
LCD AMPIRE
LCD VEE INVERTER
TOUCH PANEL
CCFL INVERTER EDT
CCFL INVERTER AMPIRE
Title
Control Panel Board
Document Number
K902501
Rev.
0
Date
Friday, January 10, 2003
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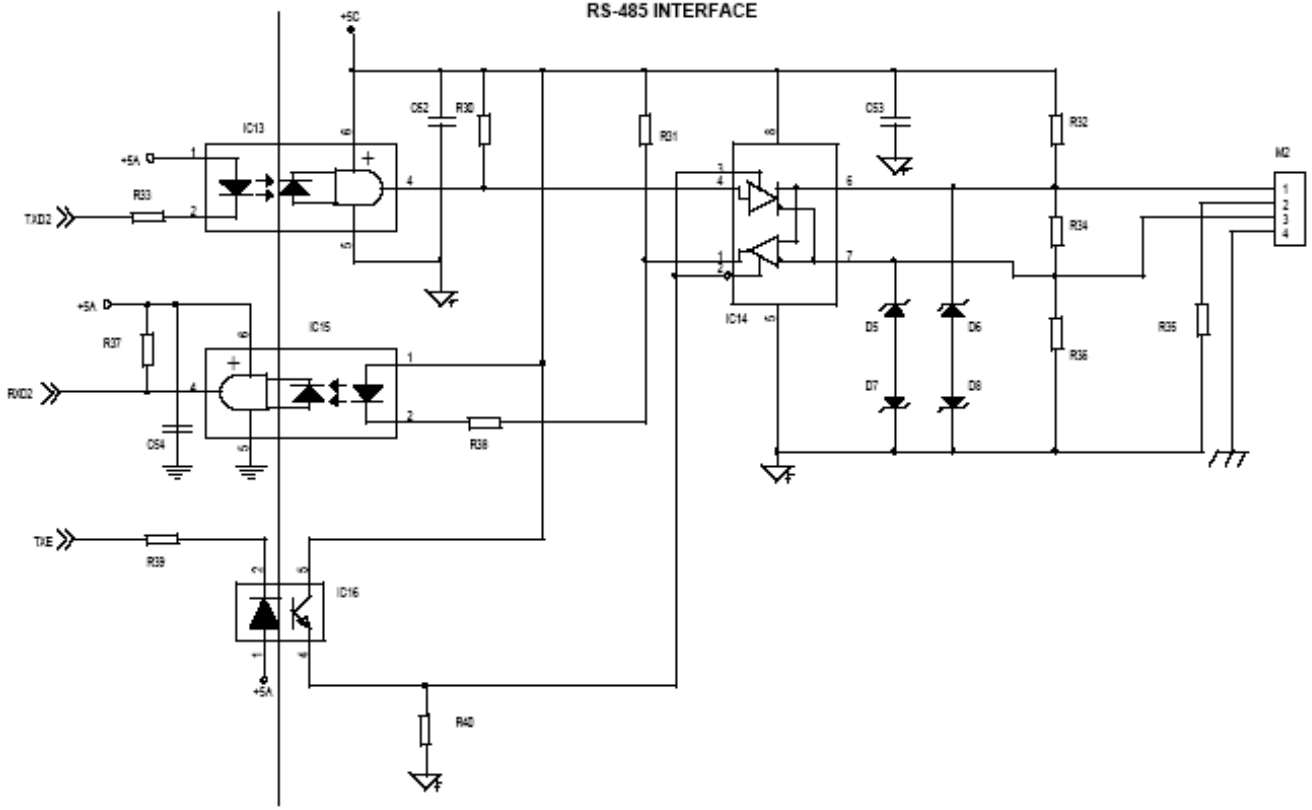
of
9

RS-485 INTERFACE



GND_EARTH

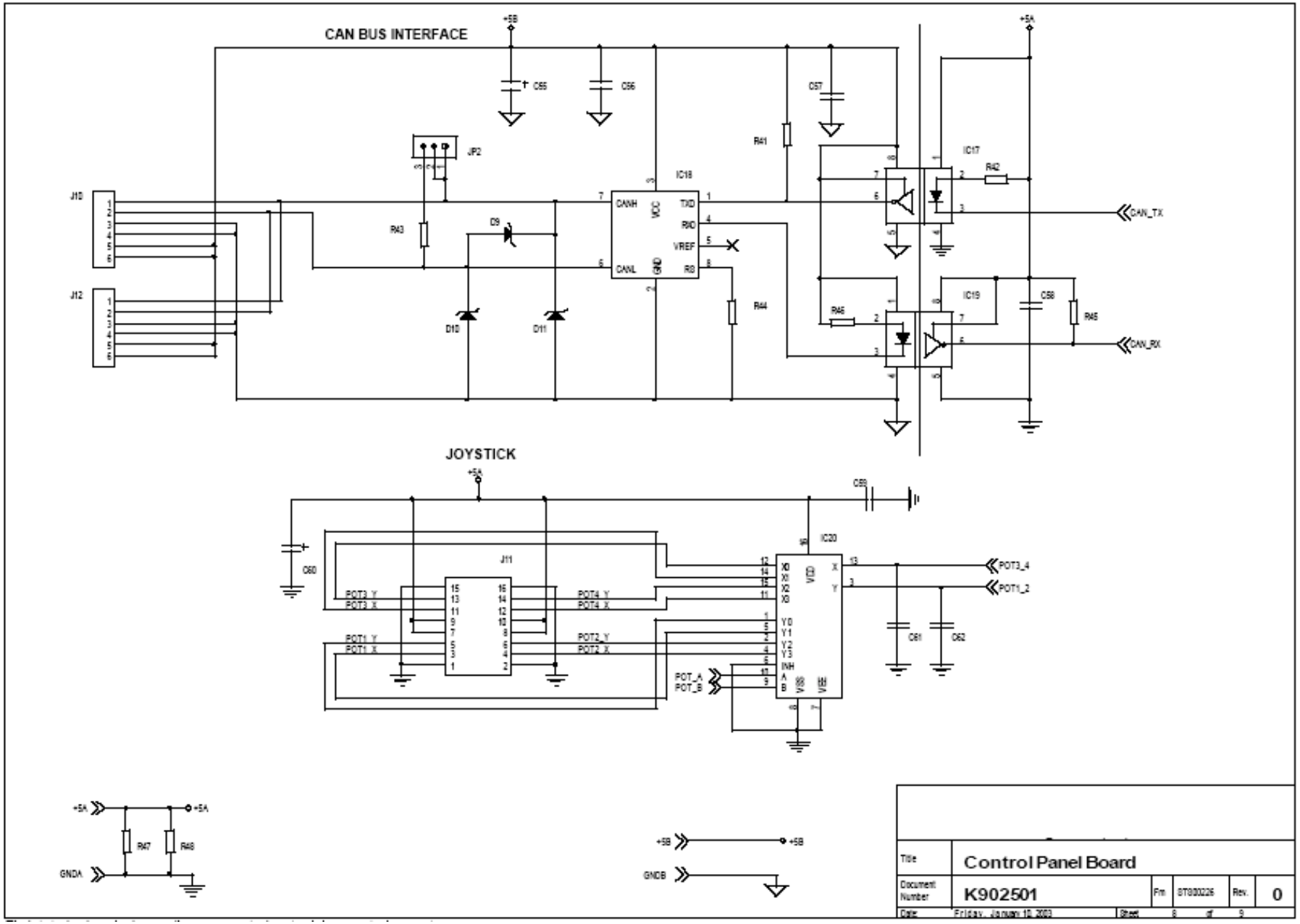
+5A +5A

+5C +5C

GNDA

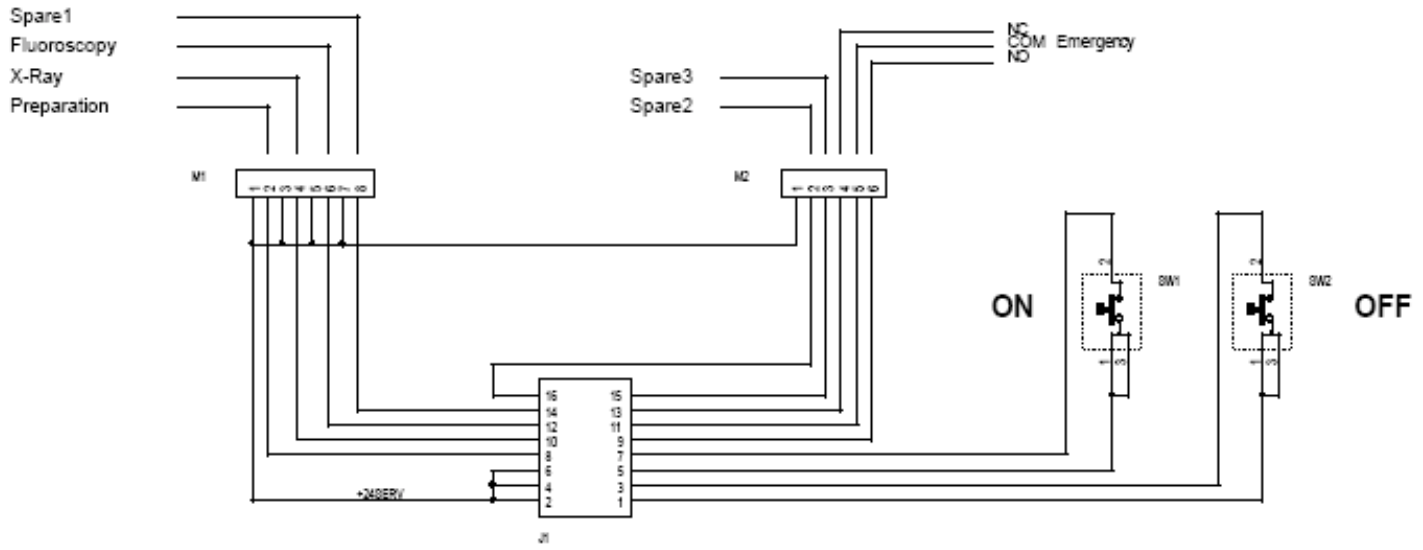
GNDC

Title	Control Panel Board				
Document Number	K902501	Fm	97930226	Rev.	0
Date:	Friday, January 10, 2003	Sheet	7 of 9		


CAN BUS INTERFACE
+5B
+5A
C55
C56
C57
JP2
IC18
IC17
IC19
R41
R42
R43
R44
R45
R46
D9
D10
D11
J10
J12
CANH
CANL
VCC
GND
TXD
RXD
VREF
RS
CAN_TX
CAN_RX
C58
JOYSTICK
C59
C60
C61
C62
IC20
J11
POT3_Y
POT3_X
POT4_Y
POT4_X
POT1_Y
POT1_X
POT2_Y
POT2_X
POT_A
POT_B
POT3_4
POT1_2
R47
R48
GNDA
GNDB
Control Panel Board
K902501
Rev.
0
Friday, January 10, 2003

ON-OFF BOARD

Title	ON-OFF BOARD				
Document Number	K900502	Fm	ST800229	Rev.	0
Date:	Thursday, January 02, 2003	Sheet	1 of 3		



Title	ON-OFF BOARD				
Document Number	K900502	Fm	ST800229	Rev.	0
Date	Thursday, January 02, 2003	Sheet	2 of 3		

INTERFACE BOARD

- OPTOISOLATED DIGITAL INPUT X 8
- PNP OPTOISOLATED DIGITAL OUTPUT X 8
- RELAY OUTPUT X 16
- CAN OPTOISOLATED BUS
- I2C EEPROM

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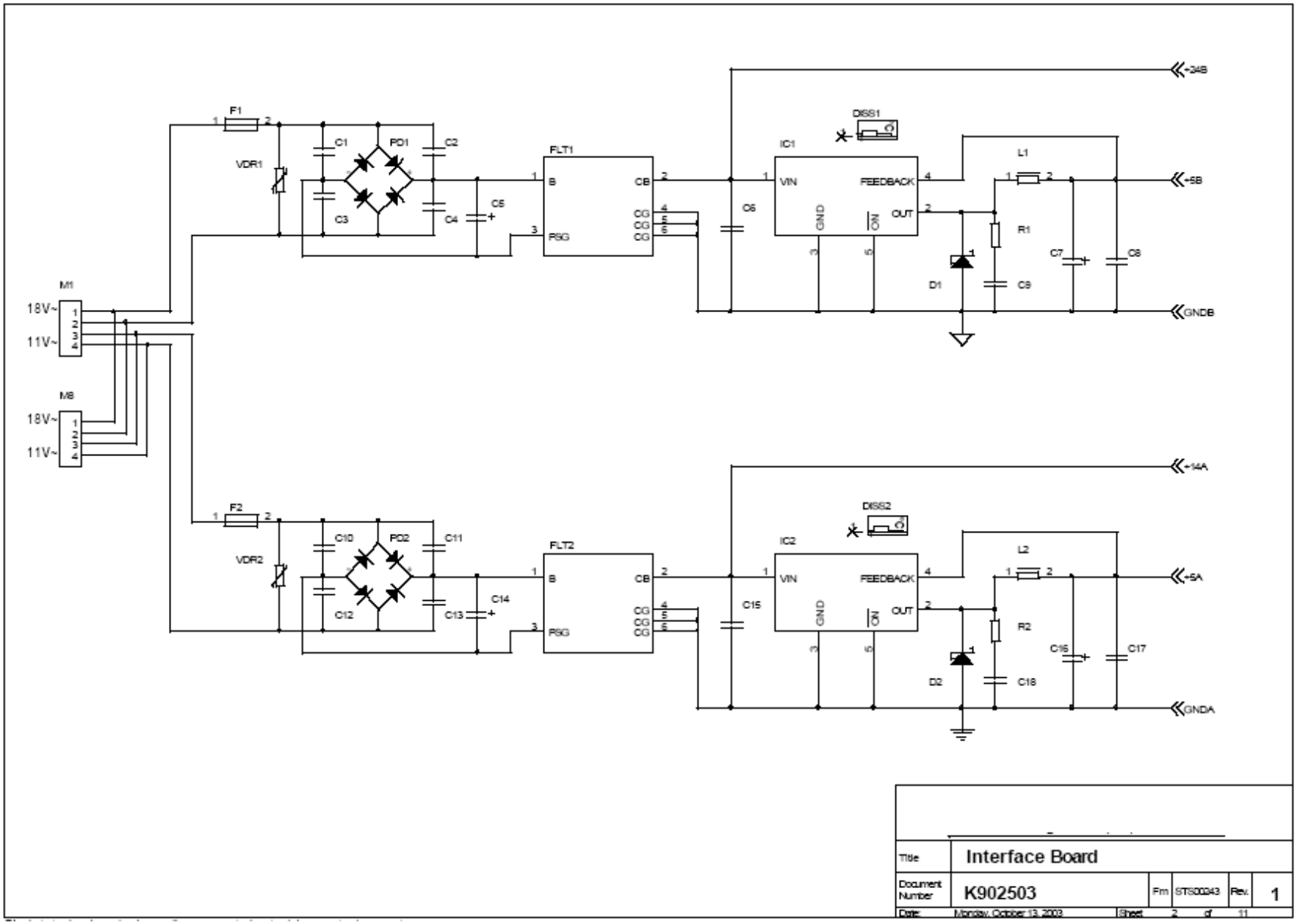
+24B
F1
VDR1
C1
PD1
C2
C3
C4
C5
FLT1
B
CB
PSG
CG
CG
CG
C6
DISS1
IC1
VIN
FEEDBACK
GND
ON
OUT
L1
R1
C7
C8
C9
D1
+5B
GNDB
M1
18V~
11V~
M8
18V~
11V~
+14A
F2
VDR2
C10
PD2
C11
C12
C13
C14
FLT2
C15
DISS2
IC2
L2
R2
C16
C17
C18
D2
+5A
GNDA
Title
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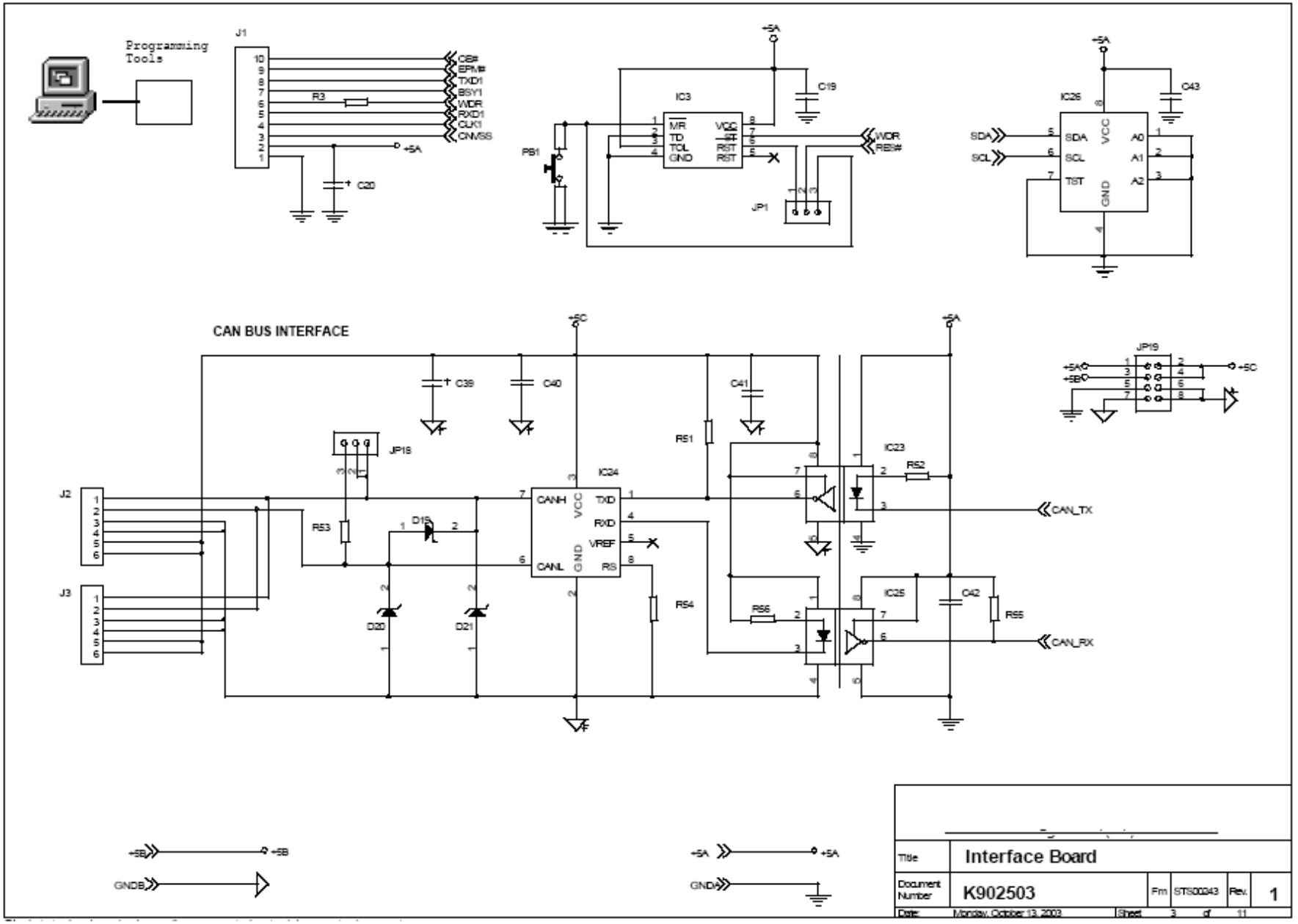
Programming Tools
J1
CB#
EPM#
TXD1
BSY1
WDR
RXD1
CLK1
CNVSS
R3
+5A
C20
IC3
C19
MR
TD
TCL
GND
VCC
RST
WDR
RBS#
PB1
JP1
IC26
C43
SDA
SCL
TST
VCC
GND
A0
A1
A2
CAN BUS INTERFACE
+5C
C39
C40
C41
JP18
JP19
IC24
IC23
IC25
J2
J3
R51
R52
R53
R54
R55
R56
D15
D20
D21
CANH
CANL
TXD
RXD
VREF
RS
CAN_TX
CAN_RX
+5B
GNDB
GNDA
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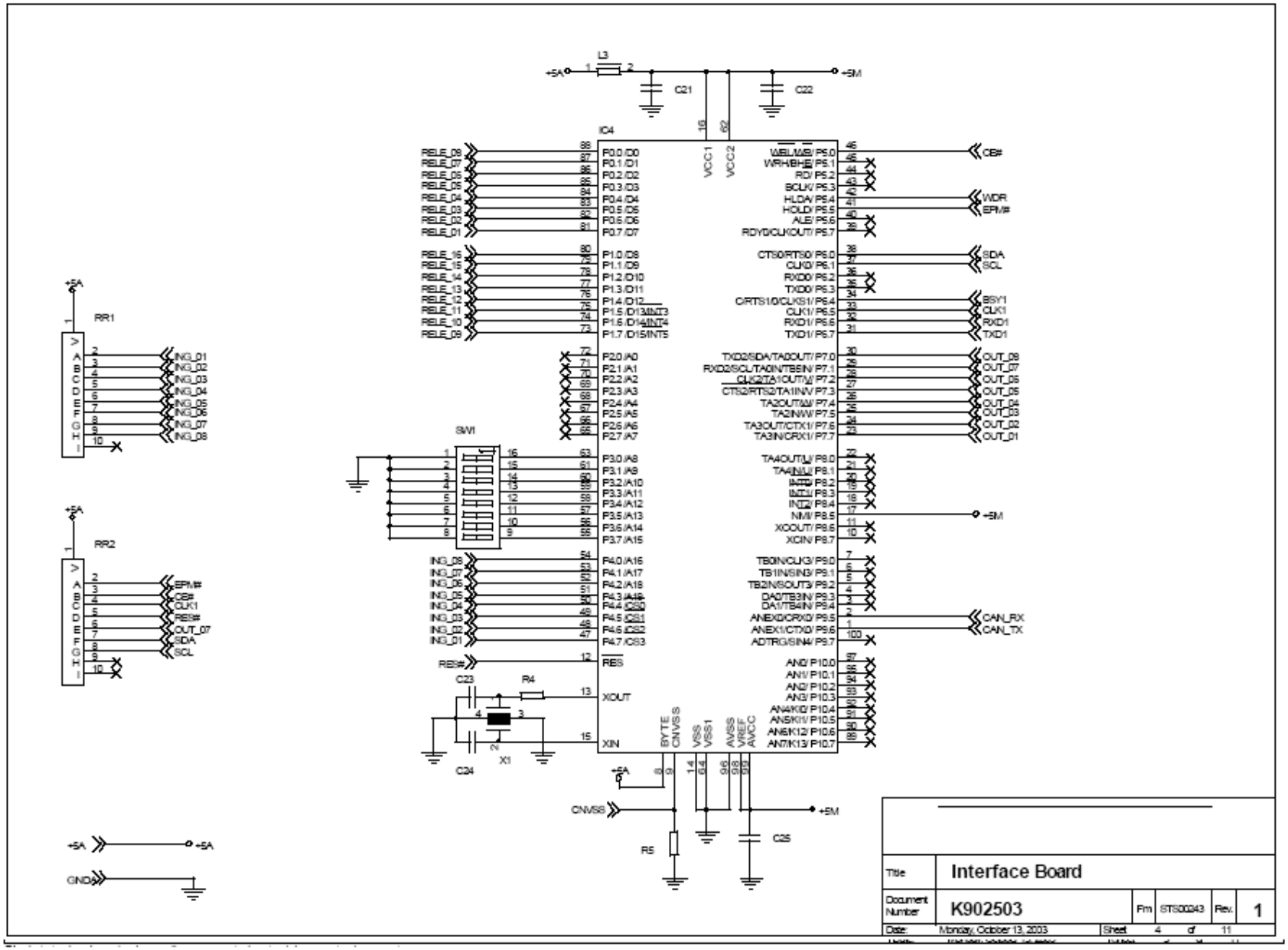
L3
+5A
+5M
C21
C22
IC4
VCC1
VCC2
RELE_08
RELE_07
RELE_06
RELE_05
RELE_04
RELE_03
RELE_02
RELE_01
RELE_16
RELE_15
RELE_14
RELE_13
RELE_12
RELE_11
RELE_10
RELE_09
P0.0/D0
P0.1/D1
P0.2/D2
P0.3/D3
P0.4/D4
P0.5/D5
P0.6/D6
P0.7/D7
P1.0/D8
P1.1/D9
P1.2/D10
P1.3/D11
P1.4/D12
P1.5/D13/INT3
P1.6/D14/INT4
P1.7/D15/INT5
P2.0/A0
P2.1/A1
P2.2/A2
P2.3/A3
P2.4/A4
P2.5/A5
P2.6/A6
P2.7/A7
P3.0/A8
P3.1/A9
P3.2/A10
P3.3/A11
P3.4/A12
P3.5/A13
P3.6/A14
P3.7/A15
P4.0/A16
P4.1/A17
P4.2/A18
P4.3/A19
P4.4/CS0
P4.5/CS1
P4.6/CS2
P4.7/CS3
RES
XOUT
XIN
BYTE
CNVSS
VSS
VSS1
AVSS
VREF
AVCC
WEL/WR/ P5.0
WRH/BHE/ P5.1
RD/ P5.2
BCLK/ P5.3
HLDA/ P5.4
HOLD/ P5.5
ALE/ P5.6
RDY/CLKOUT/ P5.7
CTS0/RTS0/ P6.0
CLK0/ P6.1
RXD0/ P6.2
TXD0/ P6.3
CRTS1/0/CLKS1/ P6.4
CLK1/ P6.5
RXD1/ P6.6
TXD1/ P6.7
TXD2/SDA/TA0OUT/ P7.0
RXD2/SCL/TA0IN/TB5IN/ P7.1
CLK2/TA1OUT/W/ P7.2
CTS2/RTS2/TA1IN/V/ P7.3
TA2OUT/W/ P7.4
TA2IN/W/ P7.5
TA3OUT/CTX1/ P7.6
TA3IN/CRX1/ P7.7
TA4OUT/U/ P8.0
TA4IN/U/ P8.1
INT2/ P8.2
INT1/ P8.3
INT0/ P8.4
NMI/ P8.5
XCOUT/ P8.6
XCIN/ P8.7
TB0IN/CLK3/ P9.0
TB1IN/SIN3/ P9.1
TB2IN/SOUT3/ P9.2
DA0/TB3IN/ P9.3
DA1/TB4IN/ P9.4
ANEX0/CRX0/ P9.5
ANEX1/CTX0/ P9.6
ADTRG/SIN4/ P9.7
AN0/ P10.0
AN1/ P10.1
AN2/ P10.2
AN3/ P10.3
AN4/KI0/ P10.4
AN5/KI1/ P10.5
AN6/KI2/ P10.6
AN7/KI3/ P10.7
CB#
WDR
EPM/#
SDA
SCL
BSY1
CLK1
RXD1
TXD1
OUT_08
OUT_07
OUT_06
OUT_05
OUT_04
OUT_03
OUT_02
OUT_01
+5M
CAN_RX
CAN_TX
RES#
R4
C23
C24
X1
CNVSS
R5
C25
SW1
RR1
RR2
ING_01
ING_02
ING_03
ING_04
ING_05
ING_06
ING_07
ING_08
EPM#
CB#
CLK1
RES#
OUT_07
SDA
SCL
GND
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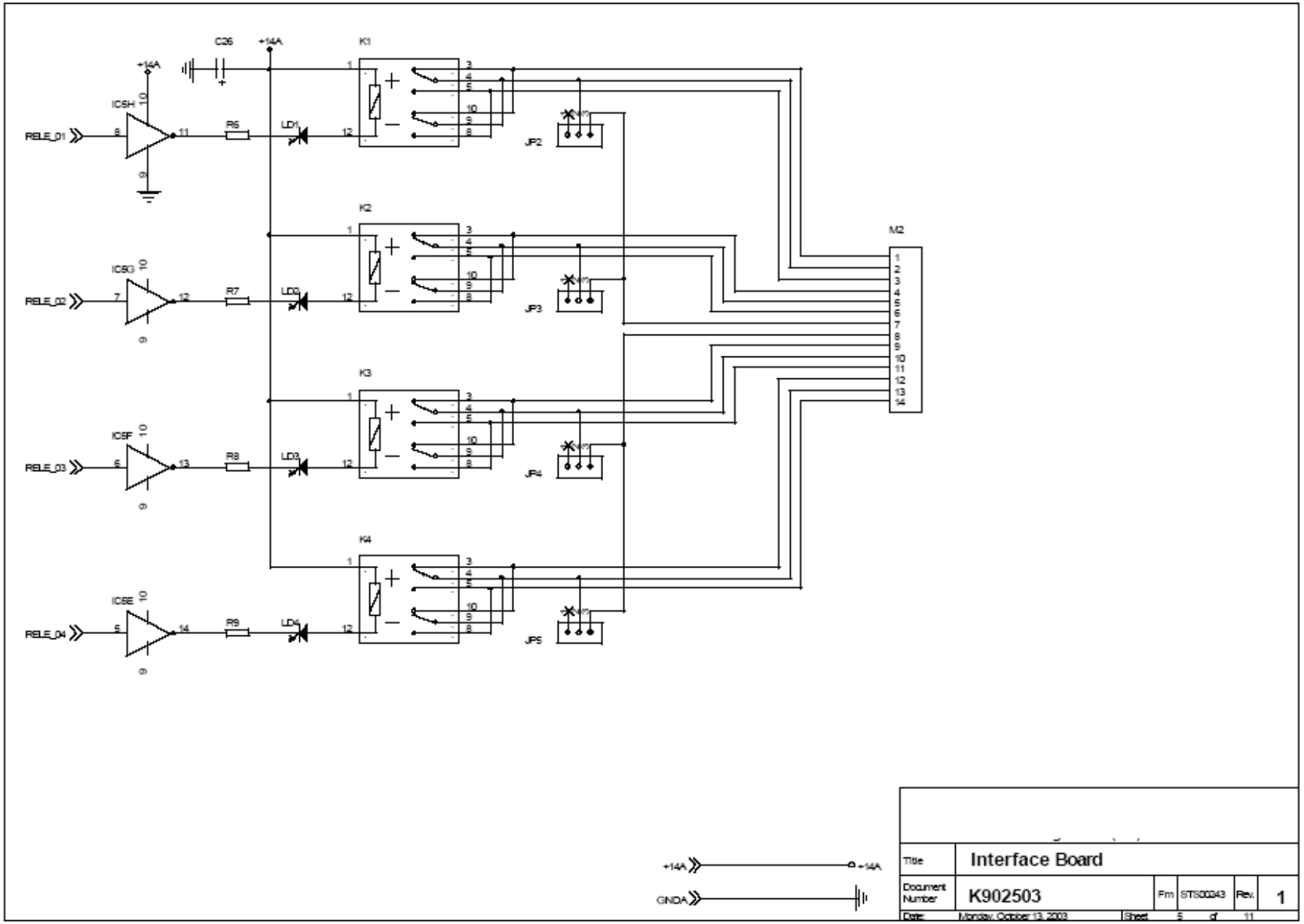
C26
+14A
K1
K2
K3
K4
ICSH
ICSG
ICSF
ICSE
RELE_01
RELE_02
RELE_03
RELE_04
R6
R7
R8
R9
LD1
LD2
LD3
LD4
JP2
JP3
JP4
JP5
M2
GNDA
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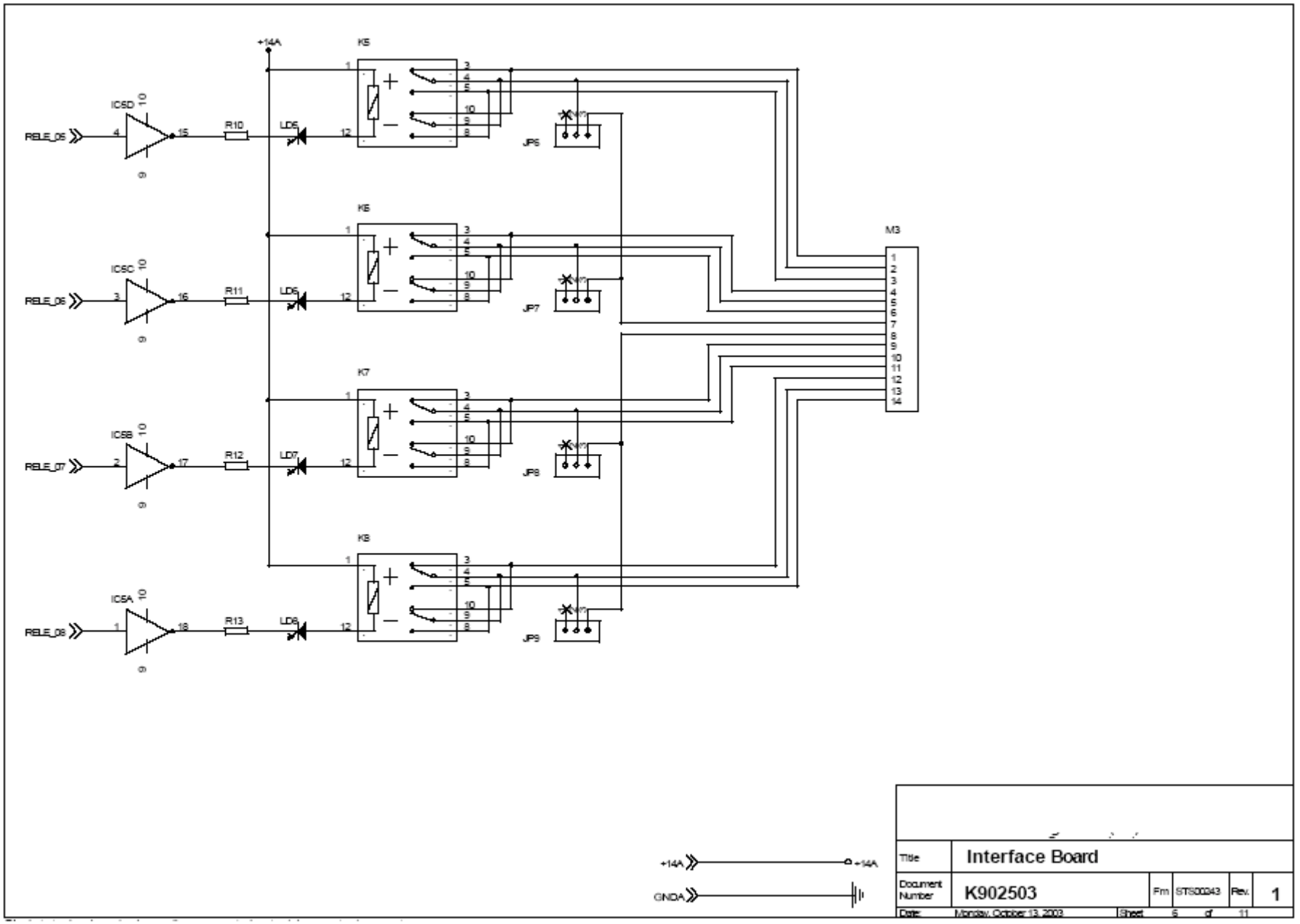
+14A
K5
K6
K7
K8
IC5D
IC5C
IC5B
IC5A
RELE_05
RELE_06
RELE_07
RELE_08
R10
R11
R12
R13
LD5
LD6
LD7
LD8
JP6
JP7
JP8
JP9
M3
+14A
GNDA
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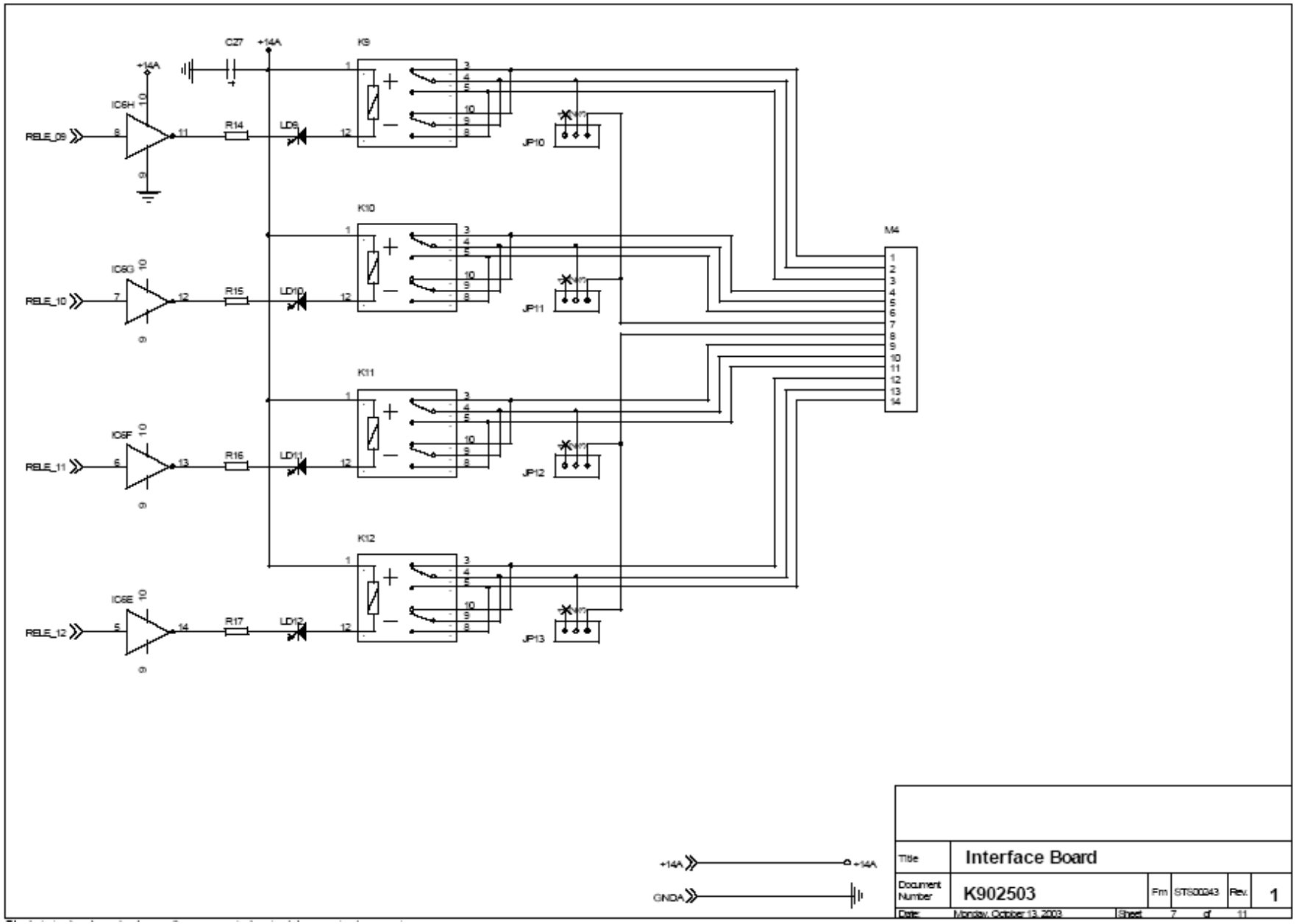
C27
+14A
K9
K10
K11
K12
M4
IC6H
IC6G
IC6F
IC6E
RELE_09
RELE_10
RELE_11
RELE_12
R14
R15
R16
R17
LD9
LD10
LD11
LD12
JP10
JP11
JP12
JP13
GNDA
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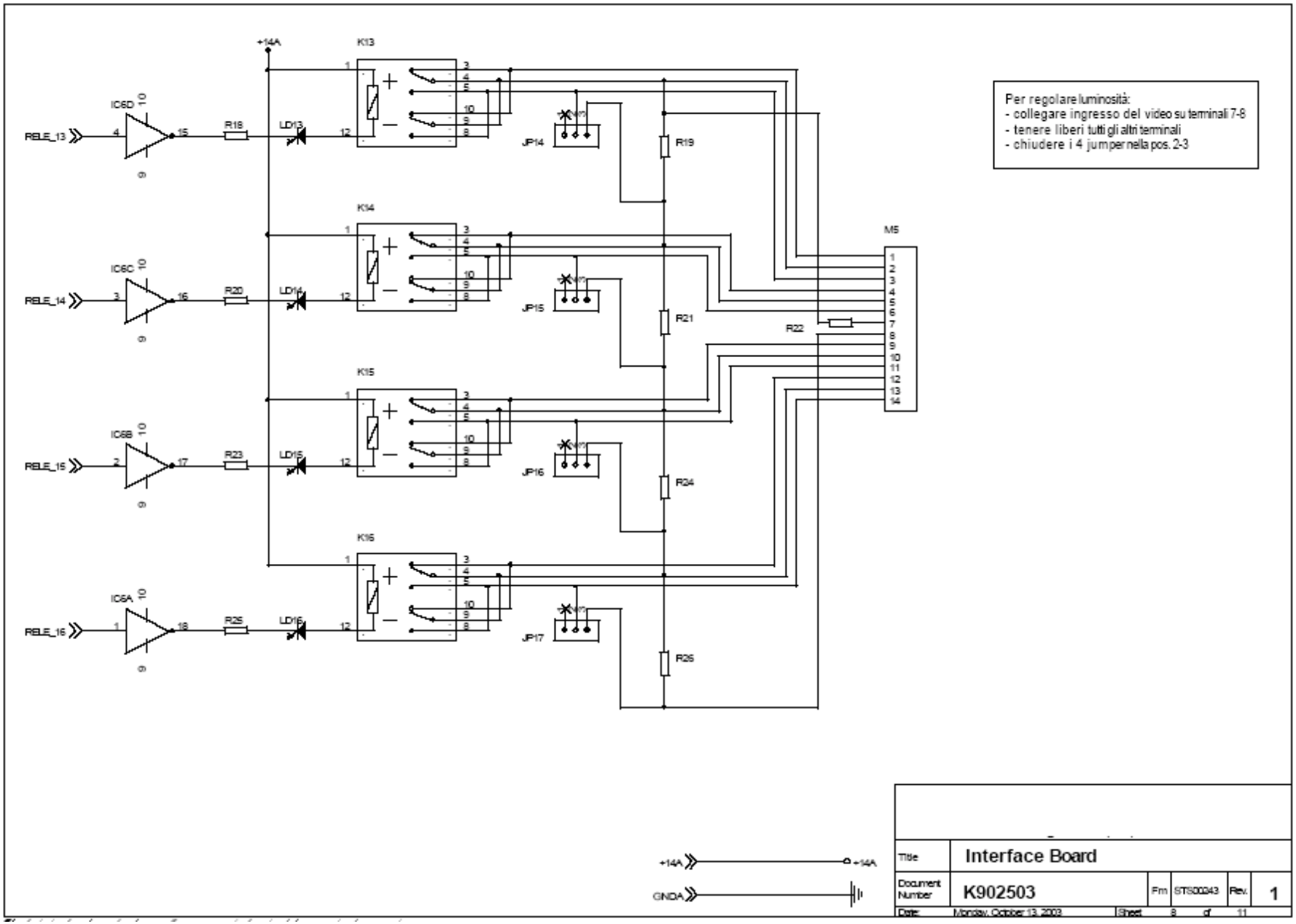
Per regolare luminosità:
- collegare ingresso del video su terminali 7-8
- tenere liberi tutti gli altri terminali
- chiudere i 4 jumper nella pos. 2-3
+14A
K13
K14
K15
K16
IC6D
IC6C
IC6B
IC6A
RELE_13
RELE_14
RELE_15
RELE_16
R18
R20
R23
R25
LD13
LD14
LD15
LD16
JP14
JP15
JP16
JP17
R19
R21
R22
R24
R26
M5
GNDA
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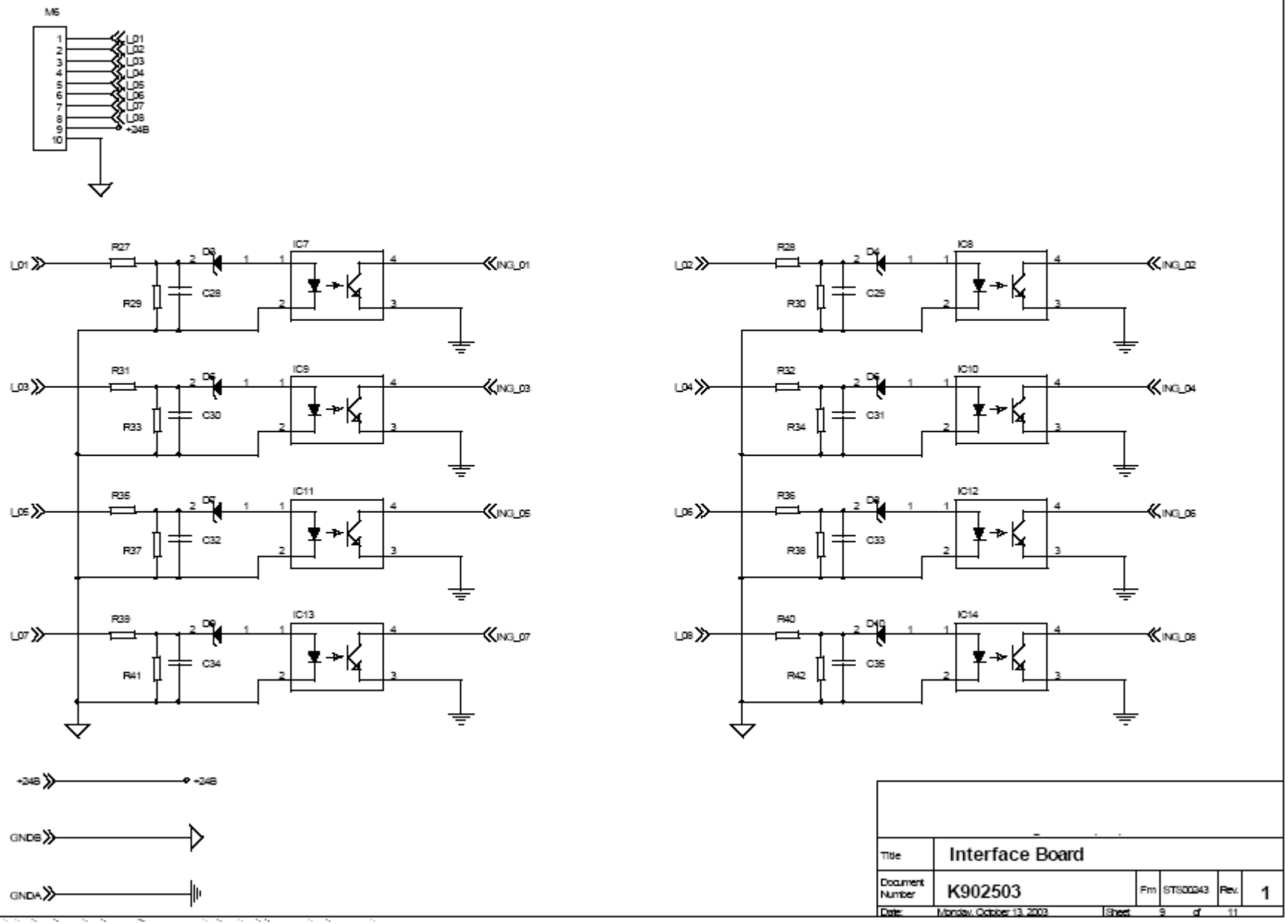
M6
1
2
3
4
5
6
7
8
9
10
L01
L02
L03
L04
L05
L06
L07
L08
+24B
R27
D3
IC7
C28
R29
ING_01
R31
D5
IC9
C30
R33
ING_03
R35
D7
IC11
C32
R37
ING_05
R39
D9
IC13
C34
R41
ING_07
R28
D4
IC8
C29
R30
ING_02
R32
D6
IC10
C31
R34
ING_04
R36
D8
IC12
C33
R38
ING_06
R40
D10
IC14
C35
R42
ING_08
+24B
GNDB
GNDA
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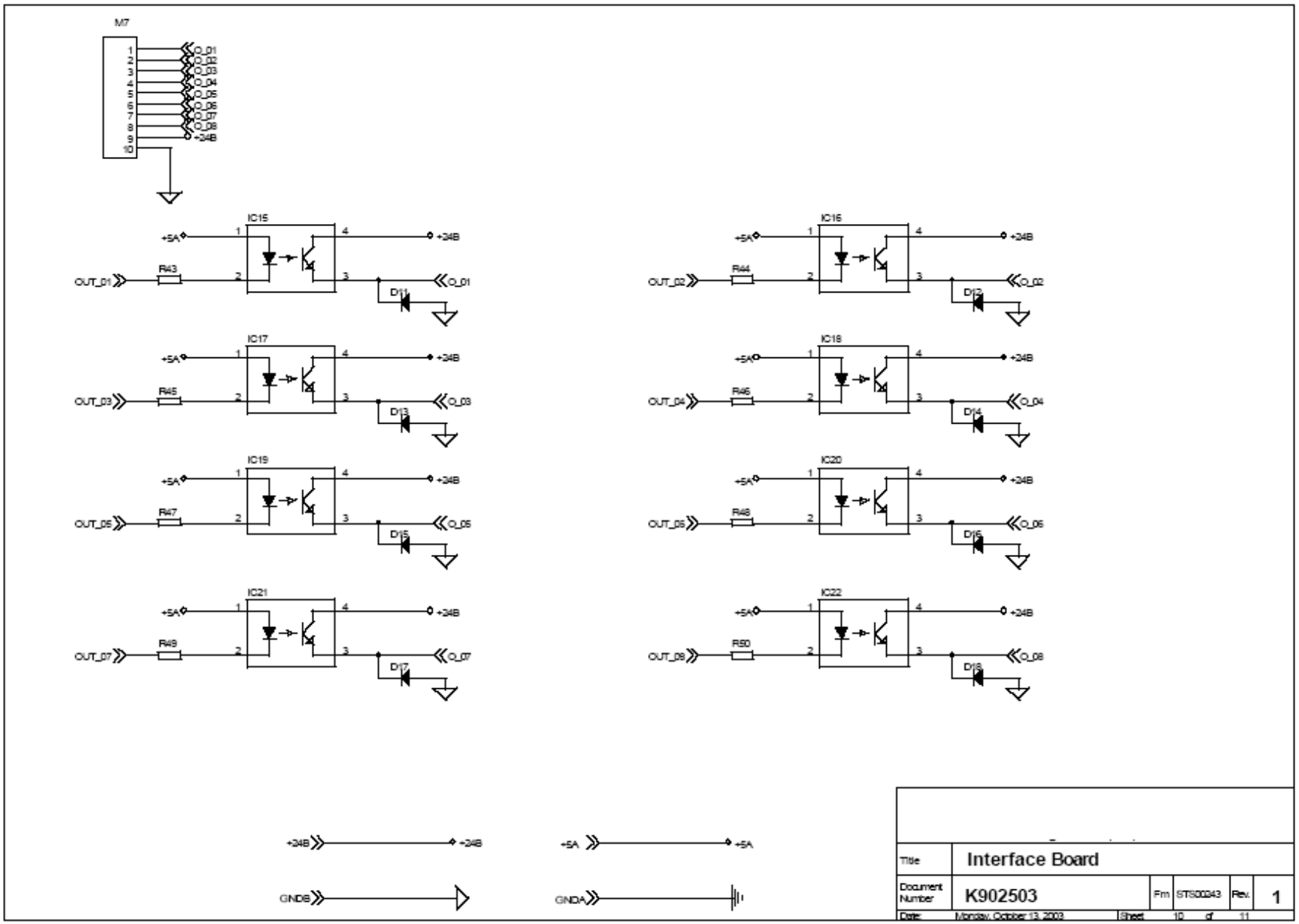
M7
1
2
3
4
5
6
7
8
9
10
O_01
O_02
O_03
O_04
O_05
O_06
O_07
O_08
+24B
IC15
IC16
IC17
IC18
IC19
IC20
IC21
IC22
+5A
+24B
R43
R44
R45
R46
R47
R48
R49
R50
OUT_01
OUT_02
OUT_03
OUT_04
OUT_05
OUT_06
OUT_07
OUT_08
D11
D12
D13
D14
D15
D16
D17
D18
GNDB
GNDA
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SAFETY BOARD

- POWER CONTROL
- CAN OPTOISOLATED BUS
- ANALOG INPUT (0-5/10V) ADC 12BIT X 2
- ANALOG OUTPUT 0-10V X 2
- OPTOISOLATED INPUT

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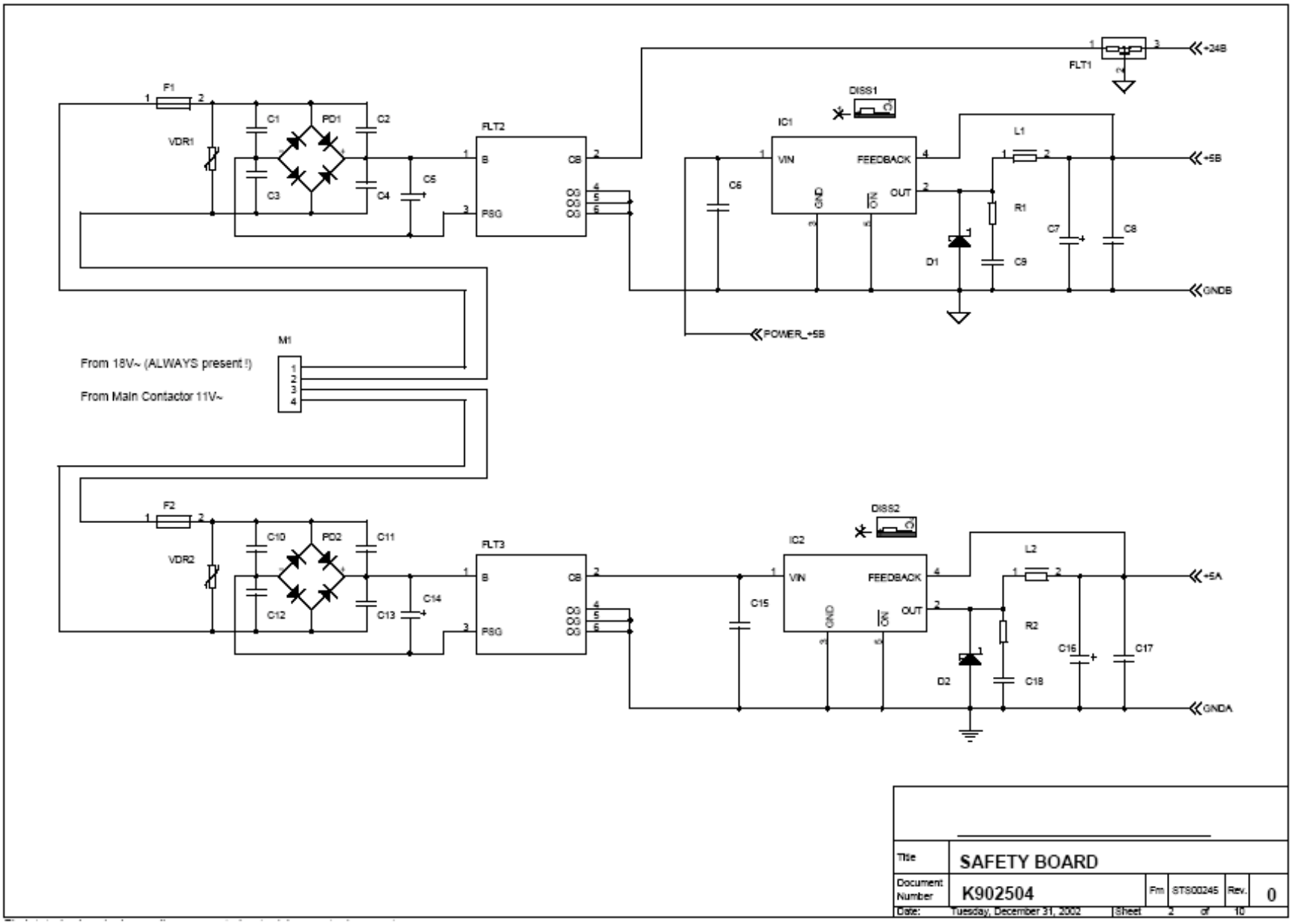

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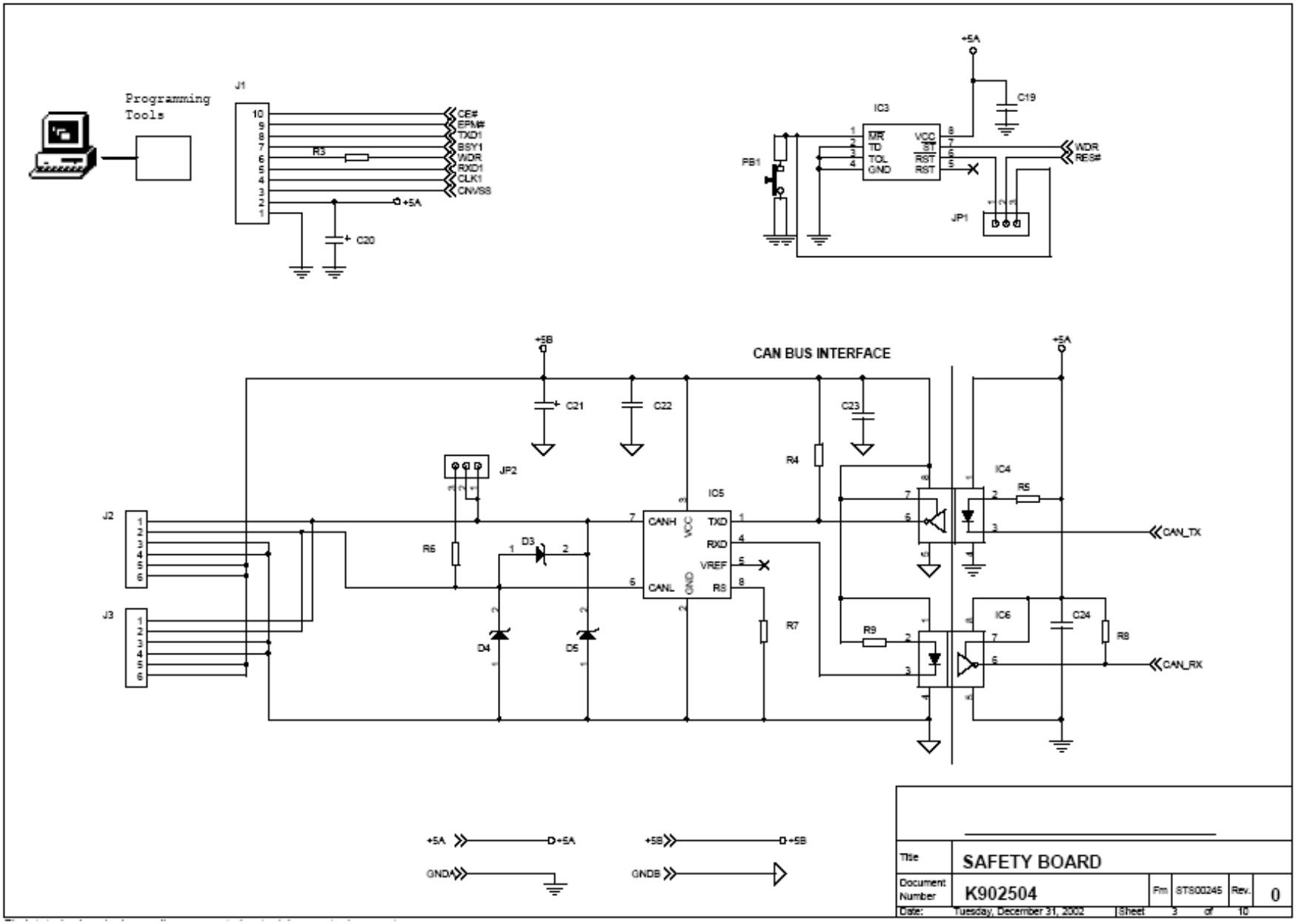
Programming
Tools
J1
CE#
EPM#
TXD1
BSY1
WDR
RXD1
CLK1
CNVSS
R3
+5A
C20
+5A
C19
IC3
MR
TD
TOL
GND
VCC
RST
RST
WDR
RES#
PB1
JP1
CAN BUS INTERFACE
+5B
C21
C22
C23
JP2
R4
IC4
R5
IC5
J2
J3
CANH
CANL
VCC
GND
TXD
RXD
VREF
RS
R6
D3
D4
D5
R7
R9
IC6
C24
R8
CAN_TX
CAN_RX
+5A
+5A
GNDA
+5B
+5B
GNDB
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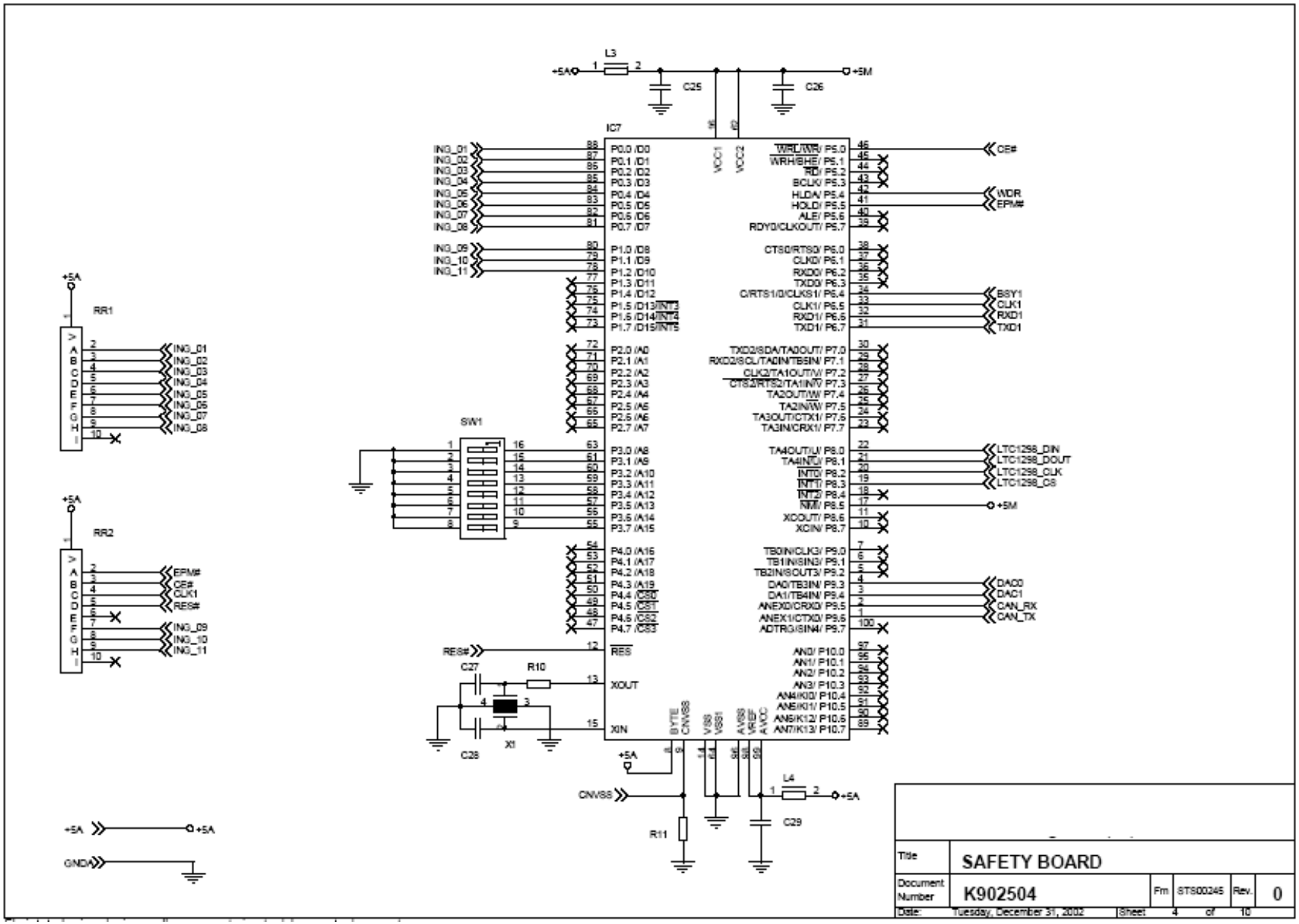
L3
+5A
+5M
C25
C26
IC7
VCC1
VCC2
ING_01
ING_02
ING_03
ING_04
ING_05
ING_06
ING_07
ING_08
ING_09
ING_10
ING_11
P0.0 /D0
P0.1 /D1
P0.2 /D2
P0.3 /D3
P0.4 /D4
P0.5 /D5
P0.6 /D6
P0.7 /D7
P1.0 /D8
P1.1 /D9
P1.2 /D10
P1.3 /D11
P1.4 /D12
P1.5 /D13/INT3
P1.6 /D14/INT4
P1.7 /D15/INT5
P2.0 /A0
P2.1 /A1
P2.2 /A2
P2.3 /A3
P2.4 /A4
P2.5 /A5
P2.6 /A6
P2.7 /A7
P3.0 /A8
P3.1 /A9
P3.2 /A10
P3.3 /A11
P3.4 /A12
P3.5 /A13
P3.6 /A14
P3.7 /A15
P4.0 /A16
P4.1 /A17
P4.2 /A18
P4.3 /A19
P4.4 /CS0
P4.5 /CS1
P4.6 /CS2
P4.7 /CS3
RES
XOUT
XIN
BYTE
CNVSS
VSS
VSS1
AVSS
VREF
AVCC
WRL/WR/ P5.0
WRH/BHE/ P5.1
RD/ P5.2
BCLK/ P5.3
HLDA/ P5.4
HOLD/ P5.5
ALE/ P5.6
RDY/CLKOUT/ P5.7
CTS0/RTS0/ P6.0
CLK0/ P6.1
RXD0/ P6.2
TXD0/ P6.3
C/RTS1/0/CLKS1/ P6.4
CLK1/ P6.5
RXD1/ P6.6
TXD1/ P6.7
TXD2/SDA/TA0OUT/ P7.0
RXD2/SCL/TA0IN/TB5IN/ P7.1
CLK2/TA1OUT/W/ P7.2
CTS2/RTS2/TA1IN/V/ P7.3
TA2OUT/W/ P7.4
TA2IN/W/ P7.5
TA3OUT/CTX1/ P7.6
TA3IN/CRX1/ P7.7
TA4OUT/U/ P8.0
TA4IN/U/ P8.1
INT0/ P8.2
INT1/ P8.3
INT2/ P8.4
NMI/ P8.5
XCOUT/ P8.6
XCIN/ P8.7
TB0IN/CLK3/ P9.0
TB1IN/SIN3/ P9.1
TB2IN/SOUT3/ P9.2
DA0/TB3IN/ P9.3
DA1/TB4IN/ P9.4
ANEX0/CRX0/ P9.5
ANEX1/CTX0/ P9.6
ADTRG/SIN4/ P9.7
AN0/ P10.0
AN1/ P10.1
AN2/ P10.2
AN3/ P10.3
AN4/IKI0/ P10.4
AN5/IKI1/ P10.5
AN6/IK12/ P10.6
AN7/IK13/ P10.7
CE#
\WDR
EPM#
BSY1
CLK1
RXD1
TXD1
LTC1298_DIN
LTC1298_DOUT
LTC1298_CLK
LTC1298_CS
+5M
DAC0
DAC1
CAN_RX
CAN_TX
SW1
RR1
RR2
EPM#
CE#
CLK1
RES#
RES#
C27
R10
X1
C28
+5A
CNVSS
R11
L4
C29
+5A
GNDA
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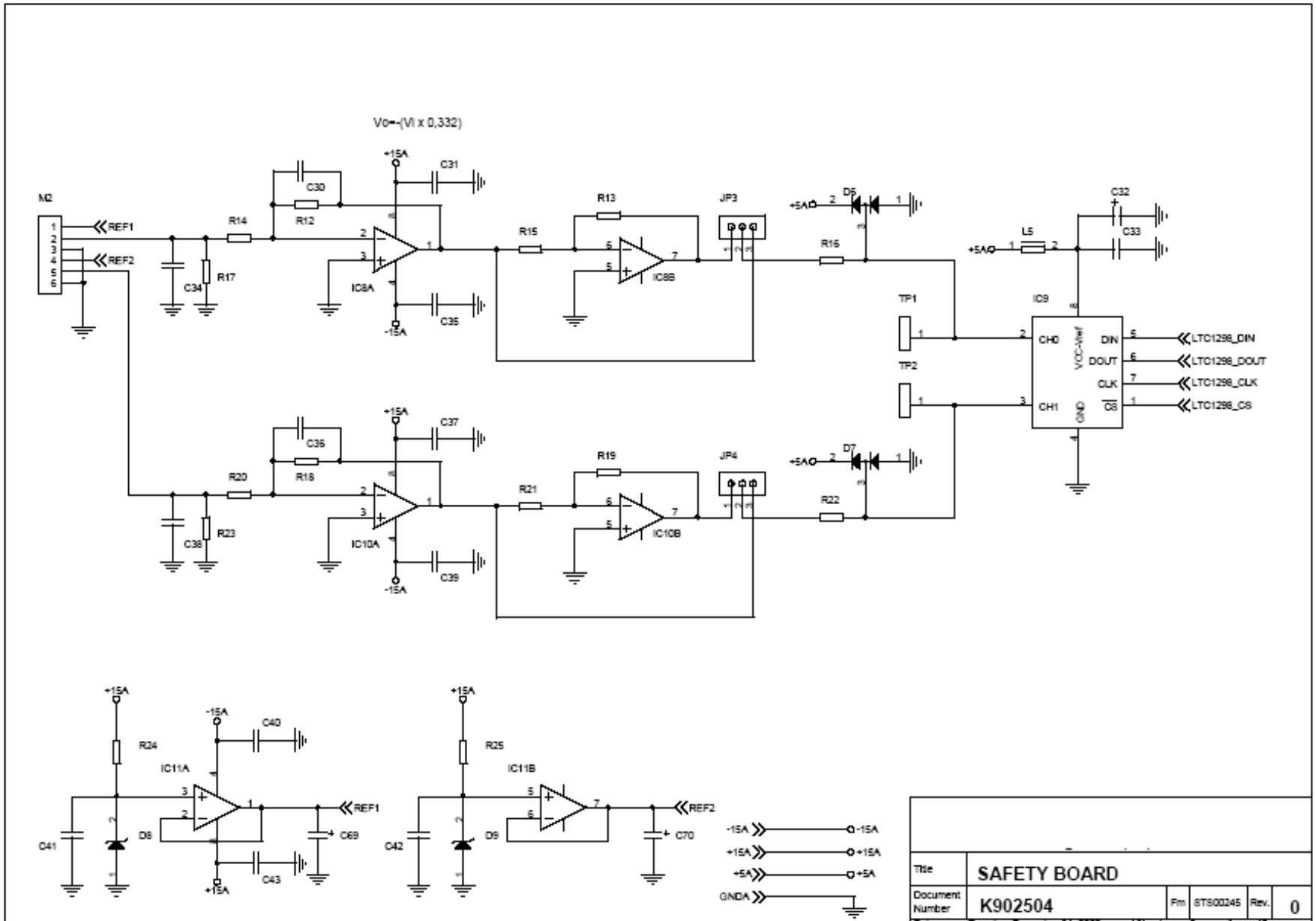
Vo=-(VI x 0,332)
M2
REF1
REF2
R14
R12
C30
C31
+15A
-15A
C34
R17
IC8A
C35
R15
R13
IC8B
JP3
D5
+5A
R16
L5
C32
C33
TP1
TP2
IC9
CH0
CH1
VCC-Vref
DIN
DOUT
CLK
GND
CS
LTC1298_DIN
LTC1298_DOUT
LTC1298_CLK
LTC1298_CS
C36
C37
R18
R20
C38
R23
IC10A
C39
R21
R19
IC10B
JP4
D7
R22
R24
IC11A
C40
C41
D8
C69
C43
R25
IC11B
C42
D9
C70
-15A
+15A
+5A
GNDA
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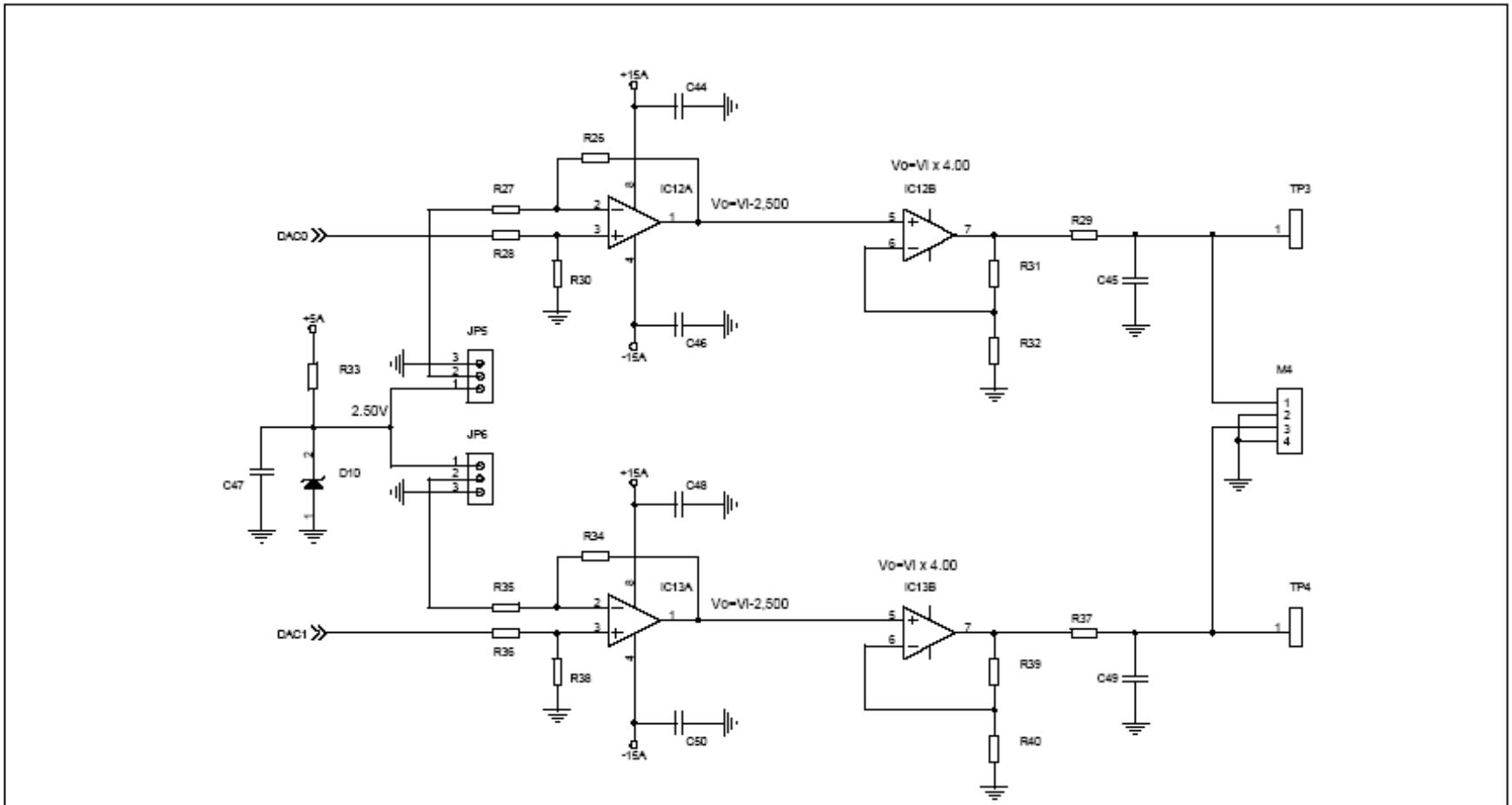

-15A -15A

+15A +15A

+5A +5A

GNDA

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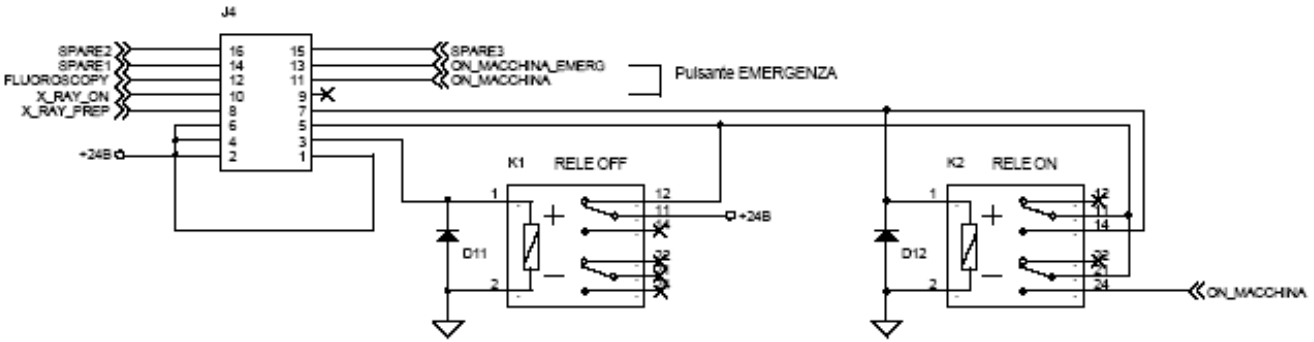

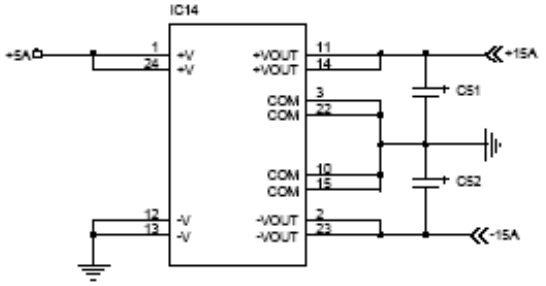

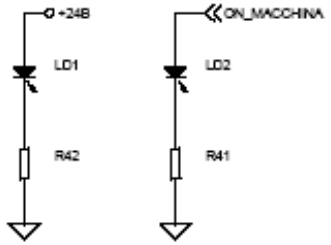

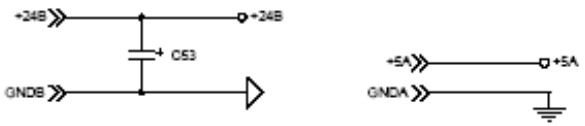

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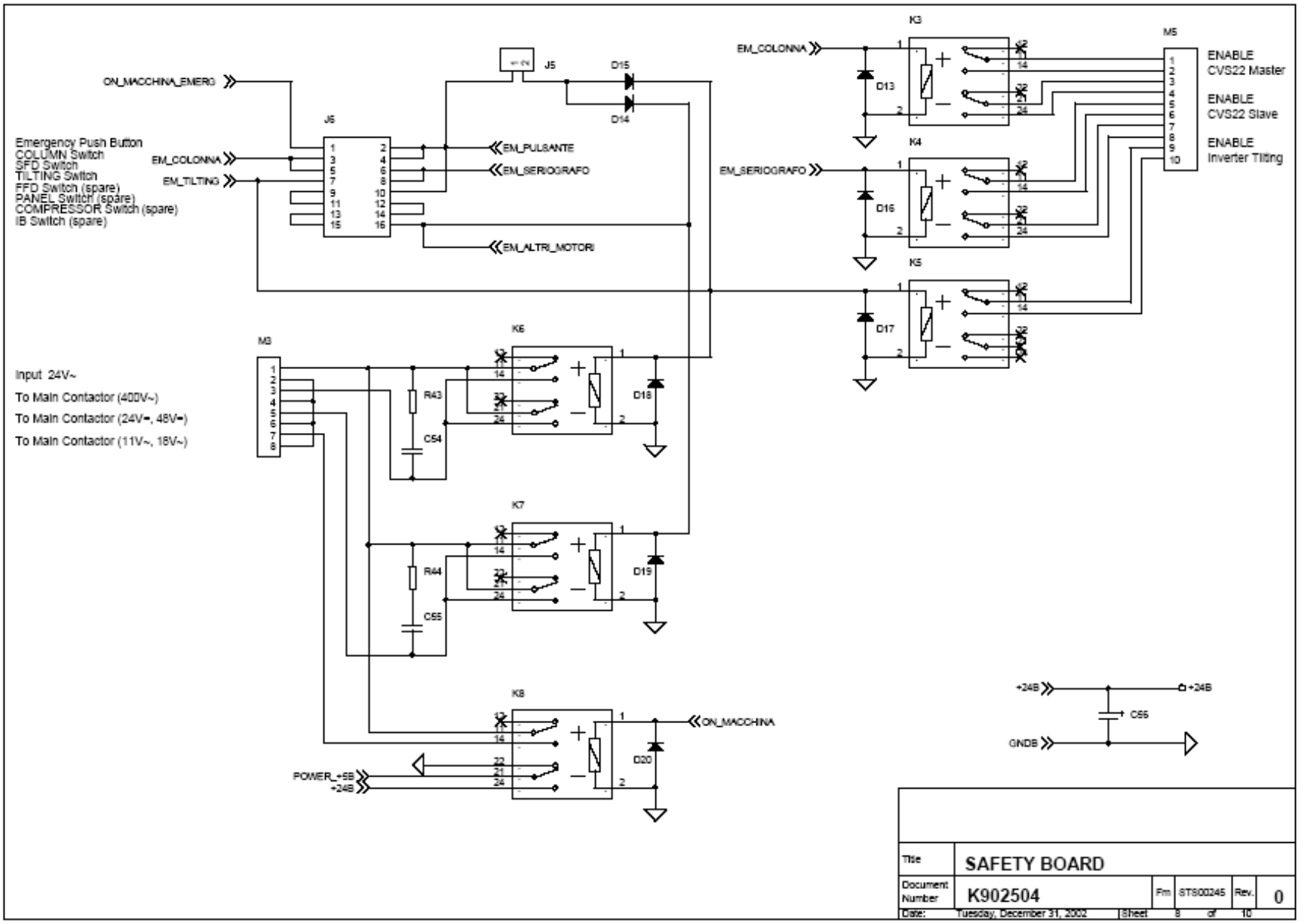
ON_MACCHINA_EMERG
J5
D15
D14
J6
Emergency Push Button
COLUMN Switch
SFD Switch
TILTING Switch
FFD Switch (spare)
PANEL Switch (spare)
COMPRESSOR Switch (spare)
IB Switch (spare)
EM_COLONNA
EM_TILTING
EM_PULSANTE
EM_SERIOGRAFO
EM_ALTRI_MOTORI
K3
EM_COLONNA
D13
K4
EM_SERIOGRAFO
D16
K5
D17
M5
ENABLE
CVS22 Master
ENABLE
CVS22 Slave
ENABLE
Inverter Tilting
M3
Input 24V~
To Main Contactor (400V~)
To Main Contactor (24V⎓, 48V⎓)
To Main Contactor (11V~, 18V~)
K6
R43
C54
D18
K7
R44
C55
D19
K8
ON_MACCHINA
D20
POWER_+5B
+24B
+24B
C56
+24B
GNDB
Title
SAFETY BOARD
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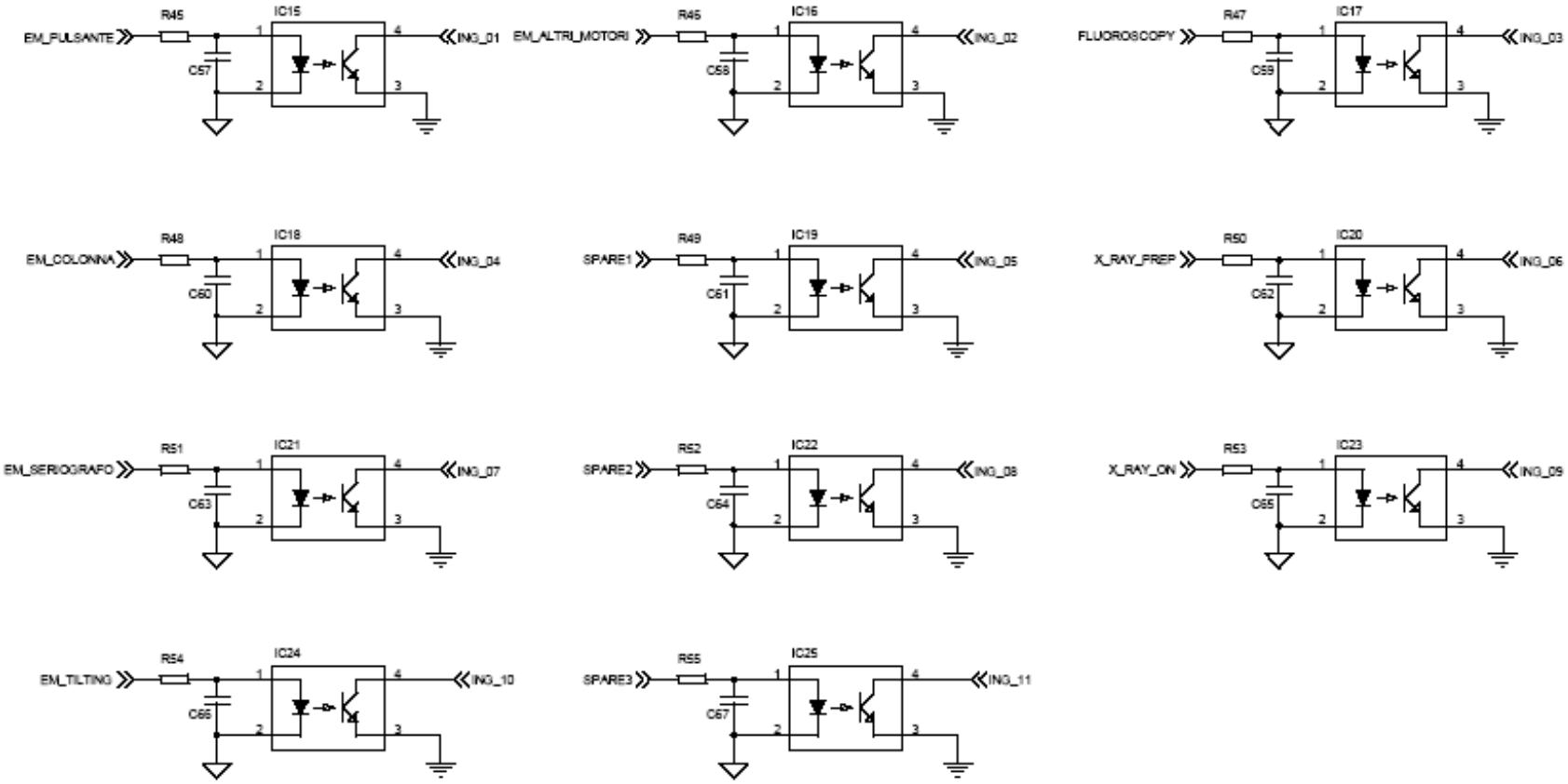

Title	SAFETY BOARD				
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MOTOR DRIVER

- SINGLE STEPPING MOTOR DRIVER or
- DUAL DC MOTOR DRIVER
- CAN OPTOISOLATED BUS
- POTENTIOMETERS ANALOG INPUT X 3
- OPTOISOLATED INPUT X 4
- OPTOISOLATED OUTPUT X 2
- RELAYS OUTPUT X 2

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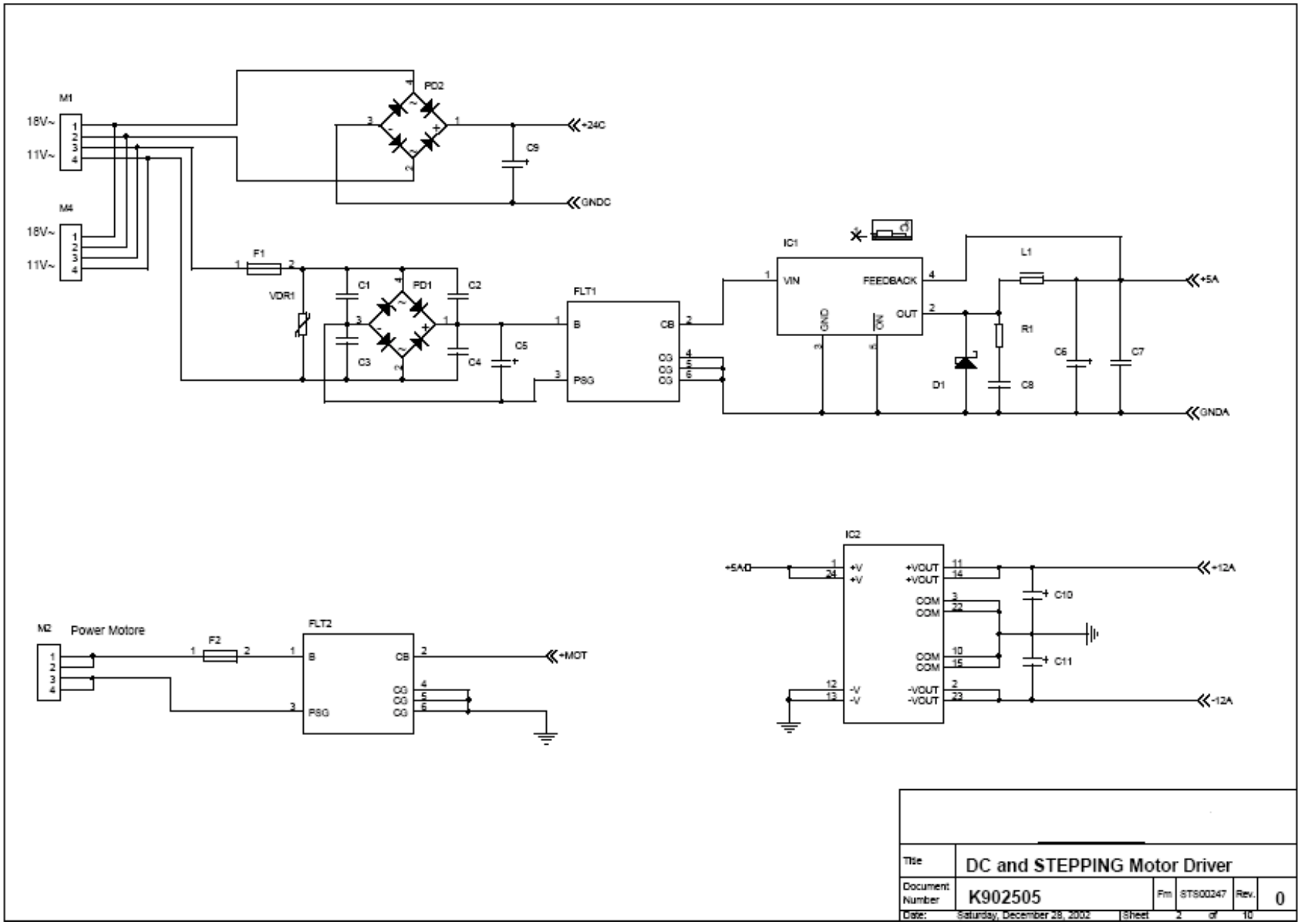
M1
18V~
11V~
M4
18V~
11V~
PD2
+24C
C9
GNDC
F1
VDR1
C1
C2
C3
C4
C5
PD1
FLT1
B
CB
PSG
CG
IC1
VIN
FEEDBACK
GND
ON/OFF
OUT
L1
+5A
R1
C6
C7
C8
D1
GNDA
M2
Power Motore
F2
FLT2
+MOT
IC2
+5A
+V
+VOUT
COM
-V
-VOUT
C10
C11
+12A
-12A
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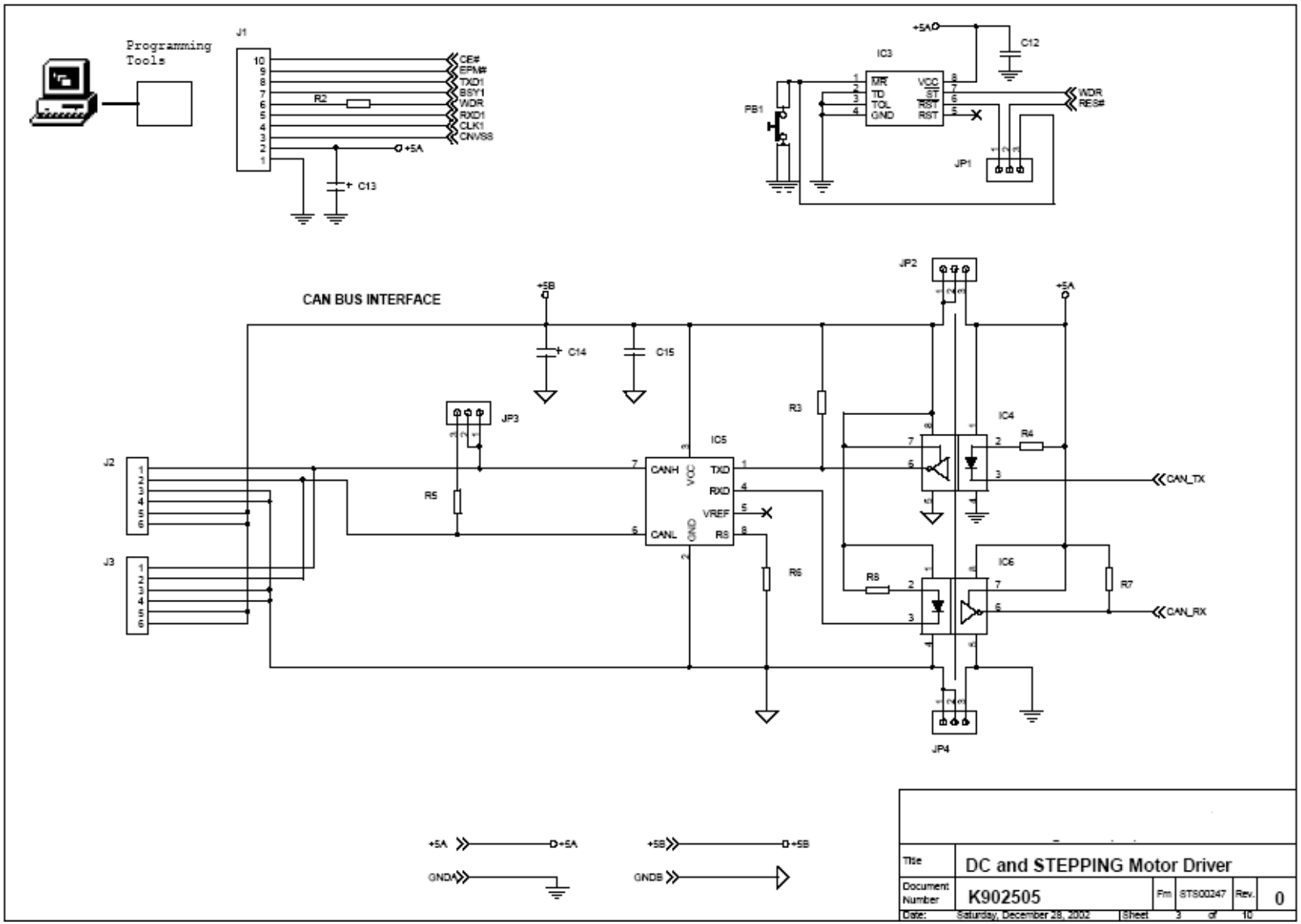
Programming Tools
J1
CE#
EPM#
TXD1
BSY1
WDR
RXD1
CLK1
CNVSS
R2
+5A
C13
IC3
MR
TD
TOL
GND
VCC
ST
RST
RST
C12
WDR
RES#
PB1
JP1
CAN BUS INTERFACE
+5B
C14
C15
JP3
JP2
+5A
R3
IC4
R4
IC5
J2
J3
CANH
CANL
VCC
GND
TXD
RXD
VREF
RS
R5
R6
CAN_TX
IC6
R8
R7
CAN_RX
JP4
+5A
GND4
+5B
GND8
Title
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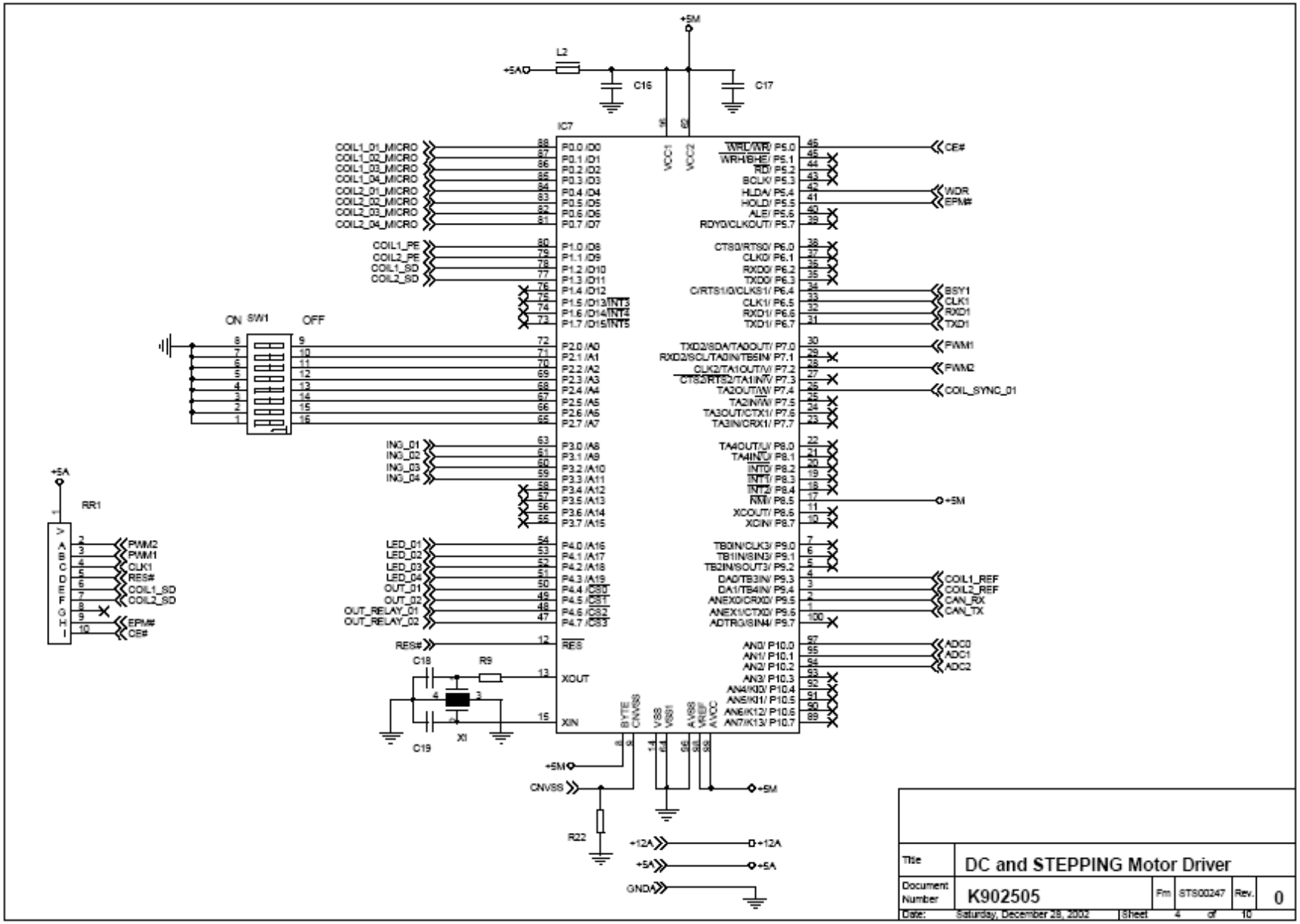
+5M
L2
+5A
C16
C17
IC7
VCC1
VCC2
COIL1_01_MICRO
COIL1_02_MICRO
COIL1_03_MICRO
COIL1_04_MICRO
COIL2_01_MICRO
COIL2_02_MICRO
COIL2_03_MICRO
COIL2_04_MICRO
P0.0 /D0
P0.1 /D1
P0.2 /D2
P0.3 /D3
P0.4 /D4
P0.5 /D5
P0.6 /D6
P0.7 /D7
COIL1_PE
COIL2_PE
COIL1_SD
COIL2_SD
P1.0 /D8
P1.1 /D9
P1.2 /D10
P1.3 /D11
P1.4 /D12
P1.5 /D13/INT3
P1.6 /D14/INT4
P1.7 /D15/INT5
ON
SW1
OFF
P2.0 /A0
P2.1 /A1
P2.2 /A2
P2.3 /A3
P2.4 /A4
P2.5 /A5
P2.6 /A6
P2.7 /A7
ING_01
ING_02
ING_03
ING_04
P3.0 /A8
P3.1 /A9
P3.2 /A10
P3.3 /A11
P3.4 /A12
P3.5 /A13
P3.6 /A14
P3.7 /A15
+5A
RR1
PWM2
PWM1
CLK1
RES#
COIL1_SD
COIL2_SD
EPM#
CE#
LED_01
LED_02
LED_03
LED_04
OUT_01
OUT_02
OUT_RELAY_01
OUT_RELAY_02
P4.0 /A16
P4.1 /A17
P4.2 /A18
P4.3 /A19
P4.4 /CS0
P4.5 /CS1
P4.6 /CS2
P4.7 /CS3
RES#
RES
C18
R9
XOUT
XIN
XI
C19
BYTE
CNVSS
VSS
VSS1
AVSS
VREF
AVCC
+5M
CNVSS
+5M
R22
+12A
+5A
GNDA
WRL/WR/ P5.0
WRH/BHE/ P5.1
RD/ P5.2
BCLK/ P5.3
HLDA/ P5.4
HOLD/ P5.5
ALE/ P5.6
RDY0/CLKOUT/ P5.7
CE#
WDR
EPM#
CTS0/RTS0/ P6.0
CLK0/ P6.1
RXD0/ P6.2
TXD0/ P6.3
C/RTS1/0/CLKS1/ P6.4
CLK1/ P6.5
RXD1/ P6.6
TXD1/ P6.7
BSY1
CLK1
RXD1
TXD1
TXD2/SDA/TA0OUT/ P7.0
RXD2/SCL/TA0IN/TB5IN/ P7.1
CLK2/TA1OUT/V/ P7.2
CTS2/RTS2/TA1IN/V/ P7.3
TA2OUT/W/ P7.4
TA2IN/W/ P7.5
TA3OUT/CTX1/ P7.6
TA3IN/CRX1/ P7.7
PWM1
PWM2
COIL_SYNC_01
TA4OUT/U/ P8.0
TA4IN/U/ P8.1
INT0/ P8.2
INT1/ P8.3
INT2/ P8.4
NMI/ P8.5
XCOUT/ P8.6
XCIN/ P8.7
+5M
TB0IN/CLK3/ P9.0
TB1IN/SIN3/ P9.1
TB2IN/SOUT3/ P9.2
DA0/TB3IN/ P9.3
DA1/TB4IN/ P9.4
ANEX0/CRX0/ P9.5
ANEX1/CTX0/ P9.6
ADTRG/SIN4/ P9.7
COIL1_REF
COIL2_REF
CAN_RX
CAN_TX
AN0/ P10.0
AN1/ P10.1
AN2/ P10.2
AN3/ P10.3
AN4/KI0/ P10.4
AN5/KI1/ P10.5
AN6/KI2/ P10.6
AN7/KI3/ P10.7
ADC0
ADC1
ADC2
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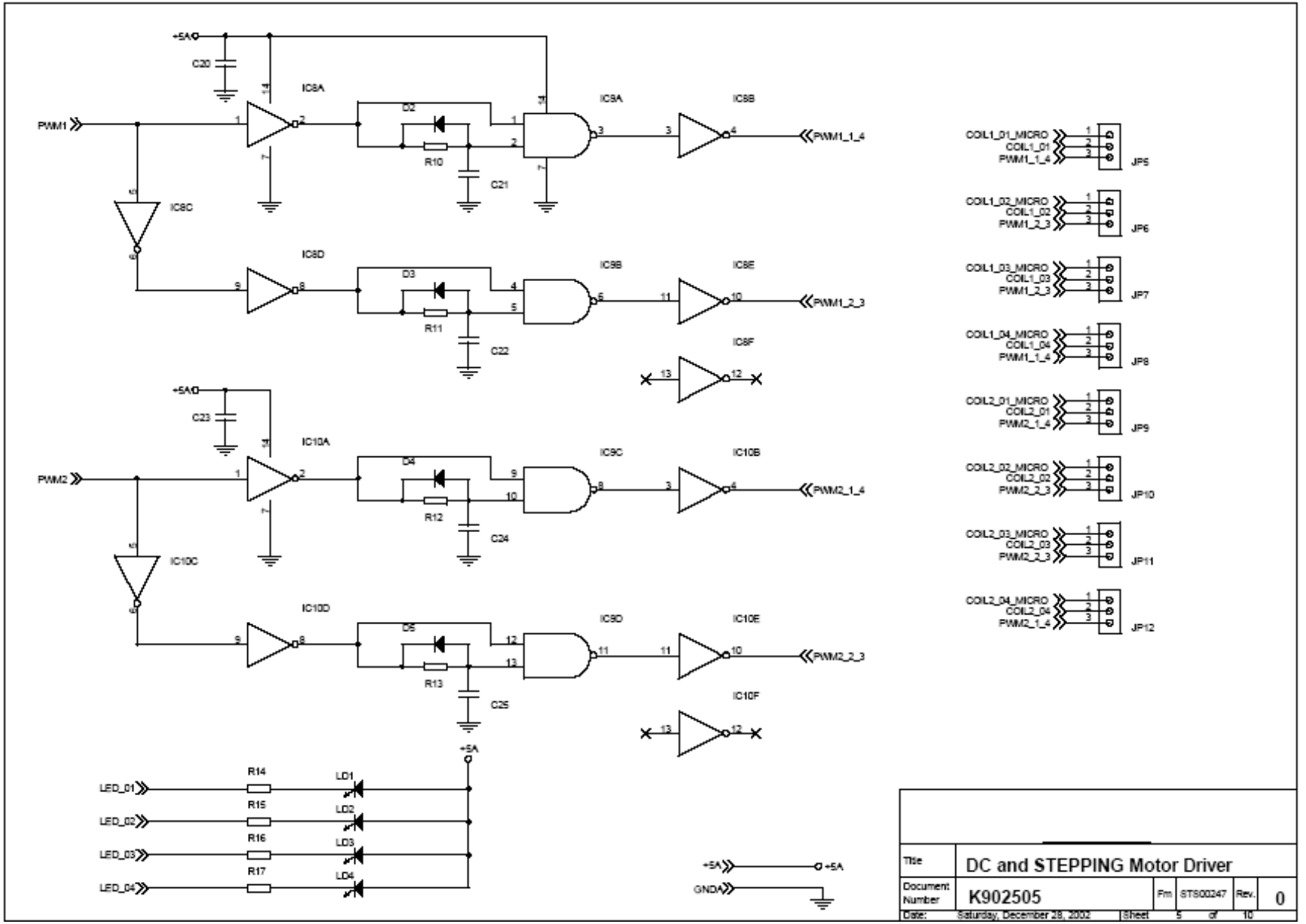
+5A
C20
IC8A
PWM1
D2
R10
C21
IC8B
PWM1_1_4
IC8C
IC8D
D3
R11
C22
IC8E
PWM1_2_3
IC8F
C23
IC10A
PWM2
D4
R12
C24
IC10B
PWM2_1_4
IC10C
IC10D
D5
R13
C25
IC10E
PWM2_2_3
IC10F
R14
R15
R16
R17
LED_01
LED_02
LED_03
LED_04
LD1
LD2
LD3
LD4
+5A
GNDA
COIL1_01_MICRO
COIL1_01
PWM1_1_4
JP5
COIL1_02_MICRO
COIL1_02
PWM1_2_3
JP6
COIL1_03_MICRO
COIL1_03
PWM1_2_3
JP7
COIL1_04_MICRO
COIL1_04
PWM1_1_4
JP8
COIL2_01_MICRO
COIL2_01
PWM2_1_4
JP9
COIL2_02_MICRO
COIL2_02
PWM2_2_3
JP10
COIL2_03_MICRO
COIL2_03
PWM2_2_3
JP11
COIL2_04_MICRO
COIL2_04
PWM2_1_4
JP12
Title
DC and STEPPING Motor Driver
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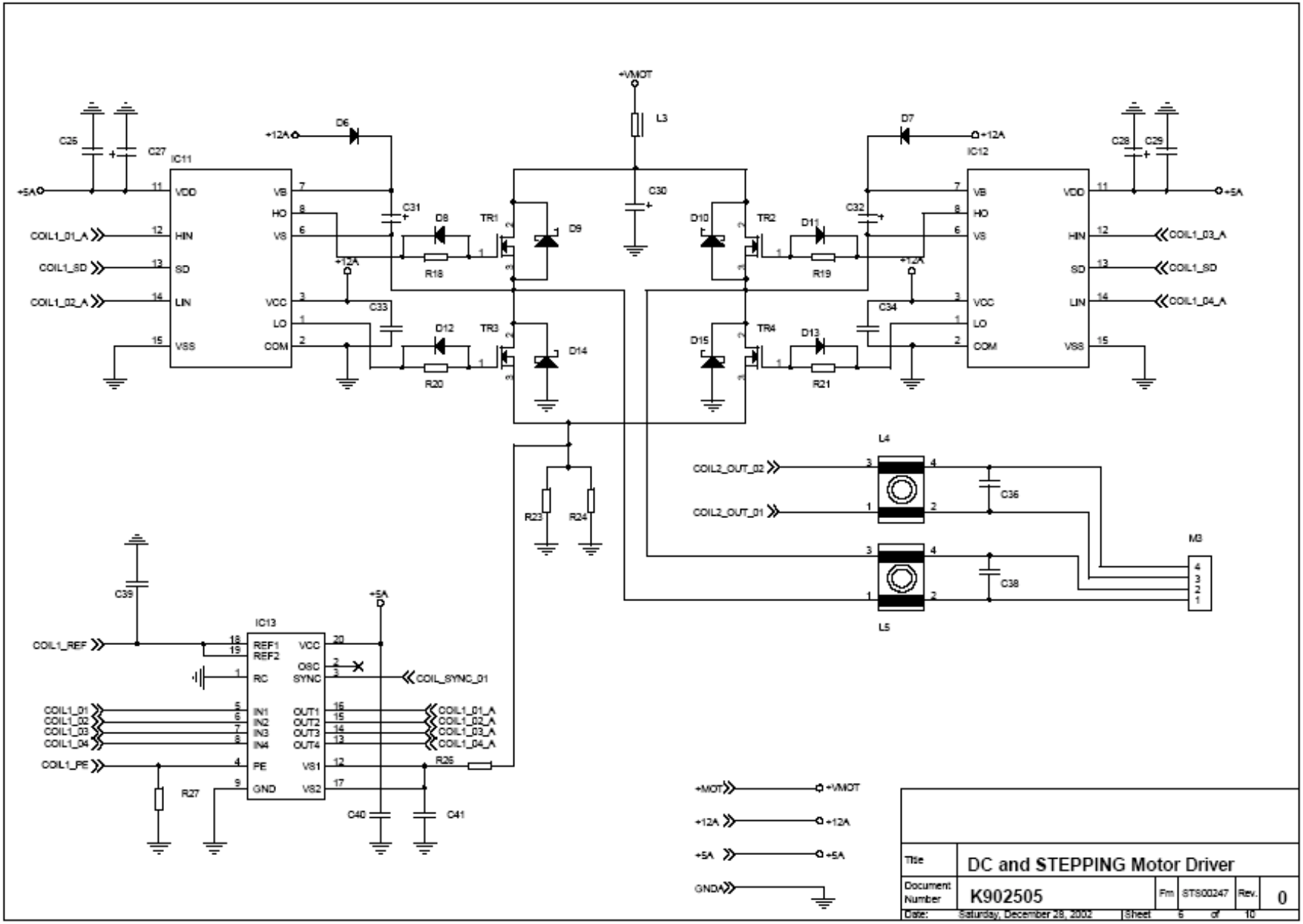
+VMOT
L3
C30
+12A
D6
D7
IC11
IC12
C25
C27
C28
C29
+5A
C31
C32
D8
D9
D10
D11
TR1
TR2
R18
R19
COIL1_01_A
COIL1_SD
COIL1_02_A
COIL1_03_A
COIL1_SD
COIL1_04_A
C33
C34
D12
D13
D14
D15
TR3
TR4
R20
R21
R23
R24
L4
L5
M3
C36
C38
COIL2_OUT_02
COIL2_OUT_01
C39
IC13
COIL1_REF
COIL_SYNC_01
COIL1_01
COIL1_02
COIL1_03
COIL1_04
COIL1_PE
COIL1_01_A
COIL1_02_A
COIL1_03_A
COIL1_04_A
R26
R27
C40
C41
+MOT
+12A
+5A
GNDA
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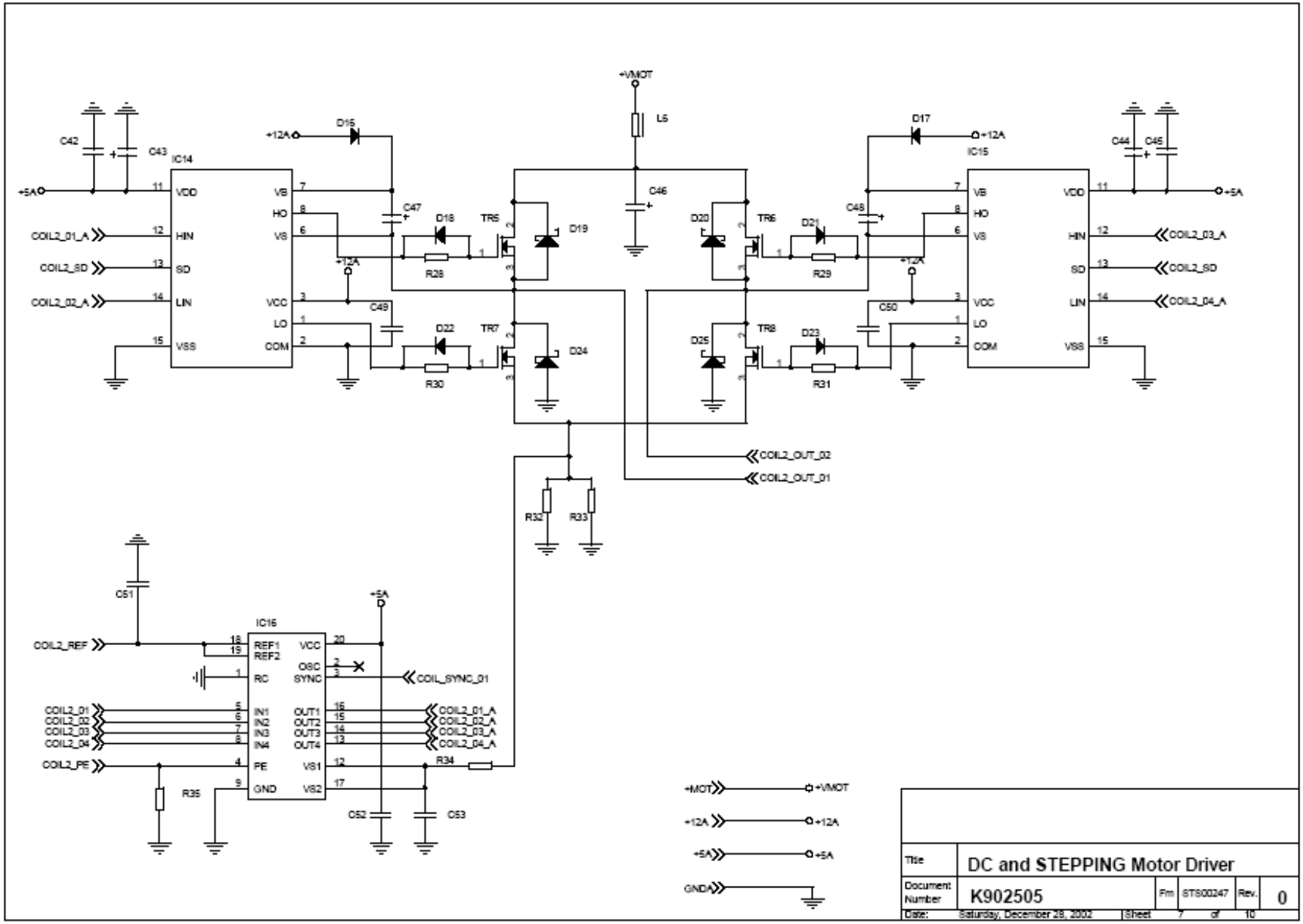

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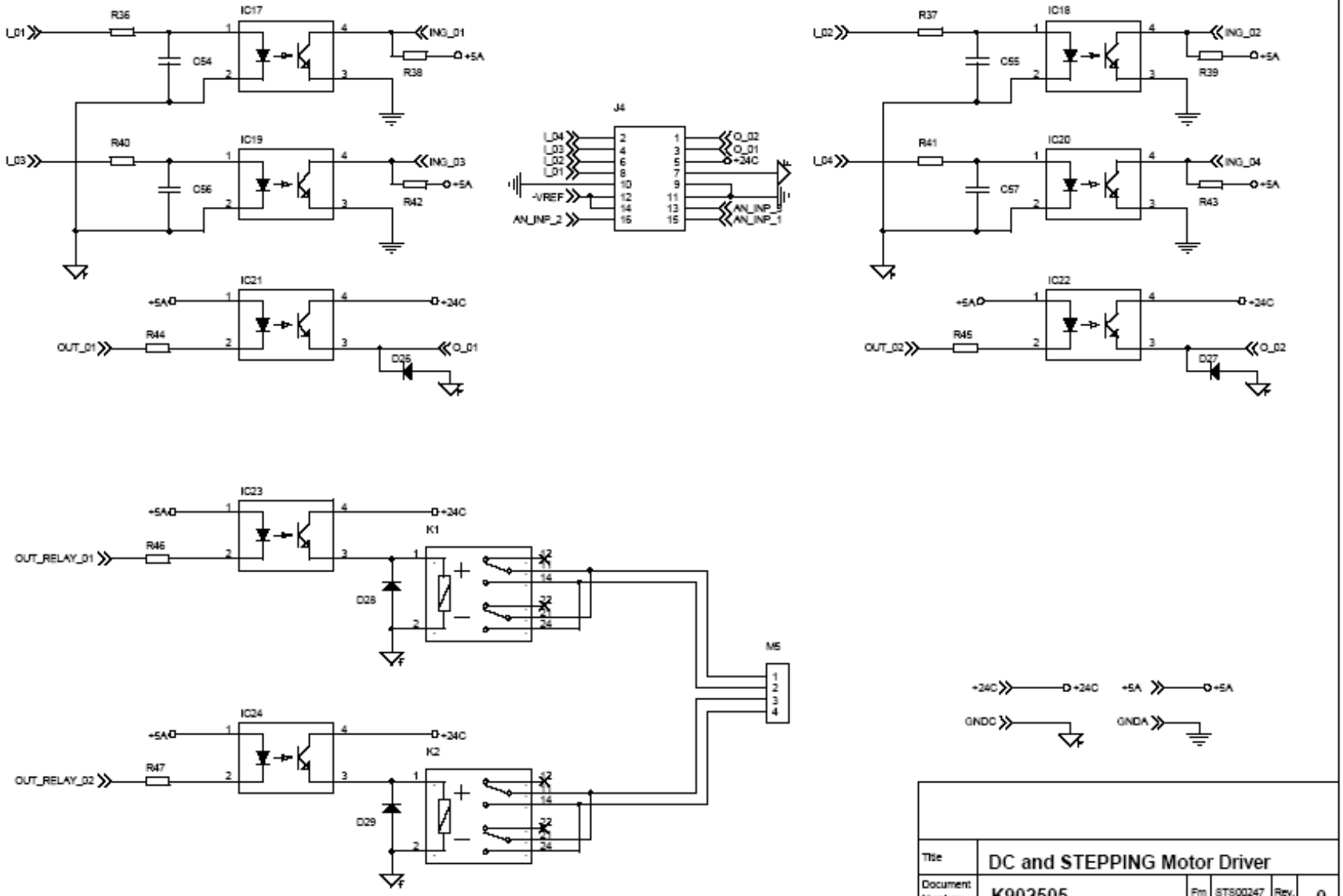
I_01
R36
IC17
C54
ING_01
+5A
R38
I_03
R40
IC19
C56
ING_03
+5A
R42
J4
I_04
I_03
I_02
I_01
-VREF
AN_INP_2
O_02
O_01
+24C
AN_INP_3
AN_INP_1
I_02
R37
IC18
C55
ING_02
+5A
R39
I_04
R41
IC20
C57
ING_04
+5A
R43
IC21
+5A
+24C
OUT_01
R44
O_01
D25
IC22
+5A
+24C
OUT_02
R45
O_02
D27
IC23
+5A
+24C
K1
OUT_RELAY_01
R46
D28
M5
IC24
+5A
+24C
K2
OUT_RELAY_02
R47
D29
+24C
+24C
+5A
+5A
GNDC
GNDA
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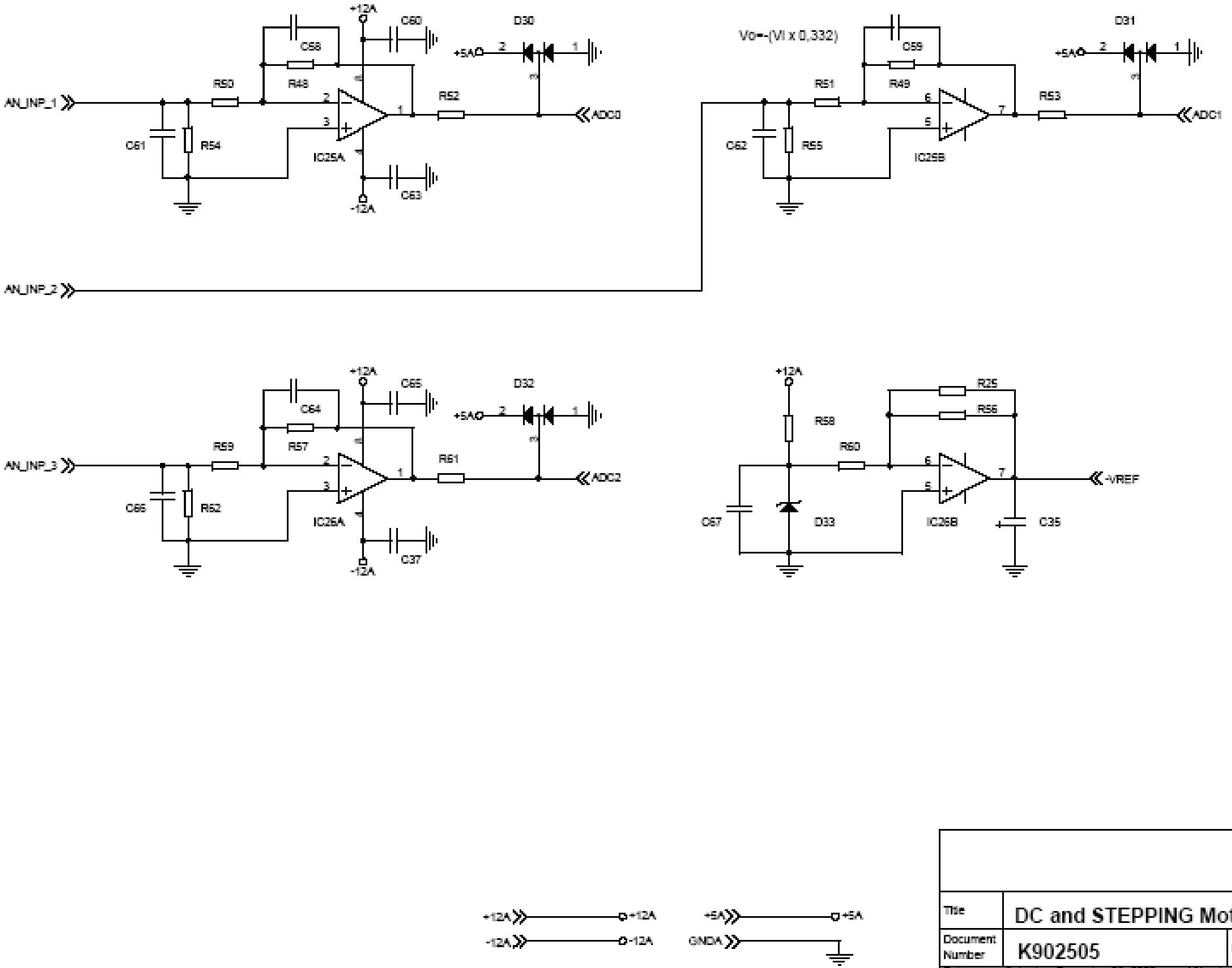

Title	DC and STEPPING Motor Driver							
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SPOT FILM DEVICE AND COLLIMATOR CONTROL BOARD

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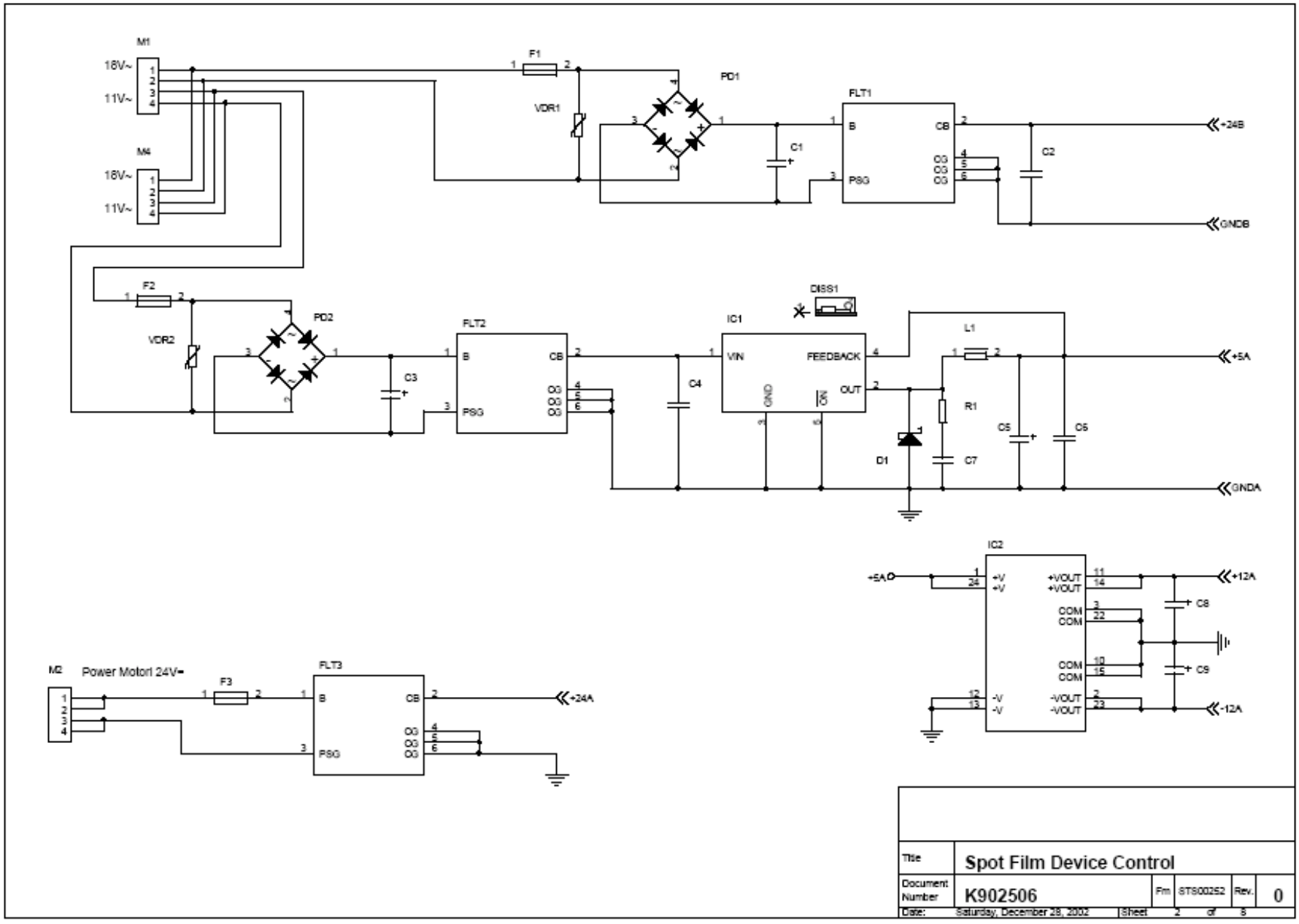

Title	Spot Film Device Control				
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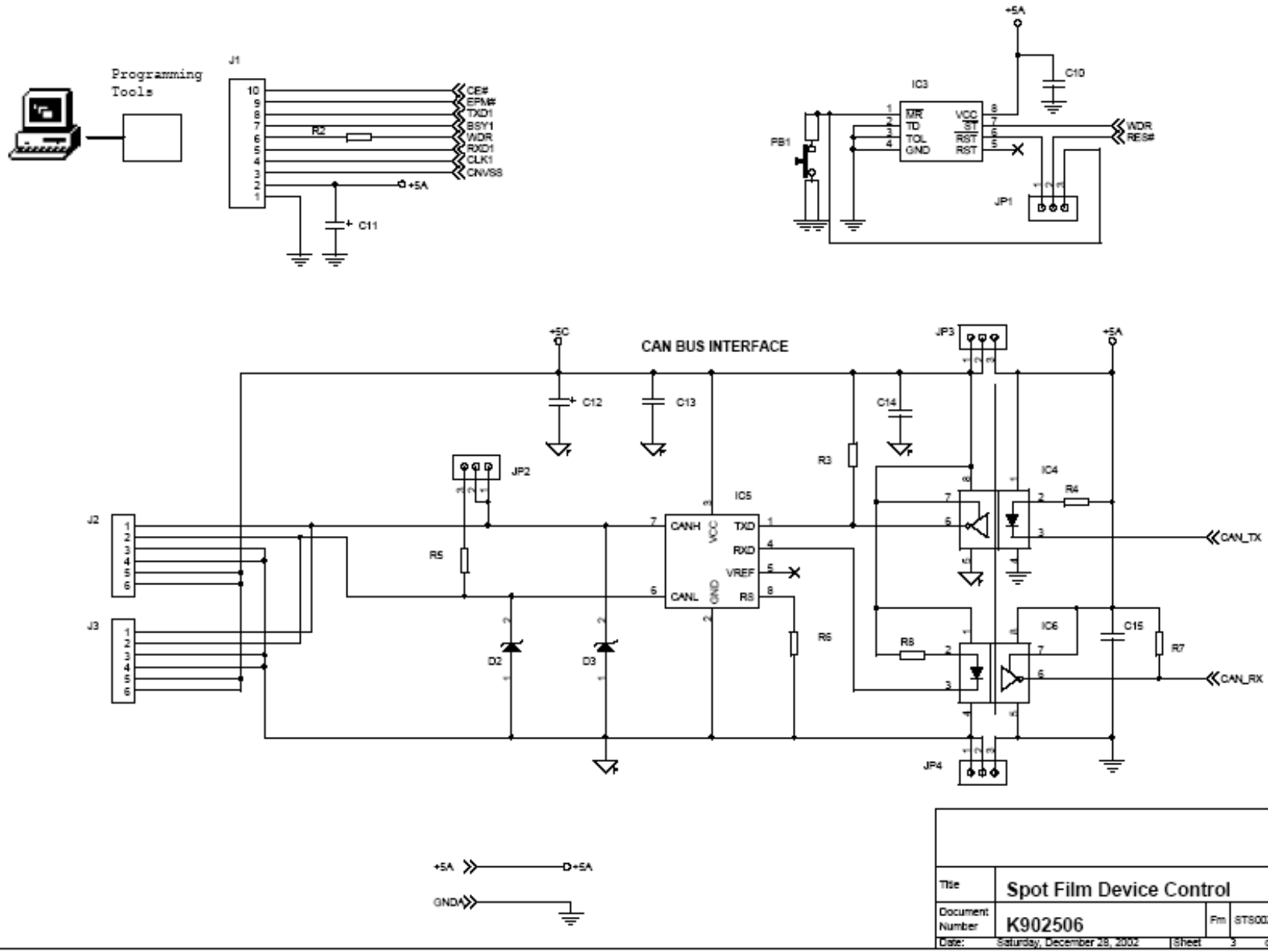
Programming Tools
J1
10
9
8
7
6
5
4
3
2
1
CE#
EPM#
TXD1
BSY1
WDR
RXD1
CLK1
CNVSS
R2
+5A
C11
+5A
C10
IC3
MR
TD
TOL
GND
VCC
ST
RST
RST
WDR
RES#
PB1
JP1
CAN BUS INTERFACE
+5C
C12
C13
C14
JP3
+5A
JP2
IC5
R3
IC4
R4
J2
J3
CANH
CANL
VCC
GND
TXD
RXD
VREF
RS
R5
R6
CAN_TX
D2
D3
R8
IC6
C15
R7
CAN_RX
JP4
+5A
+5A
GNDA
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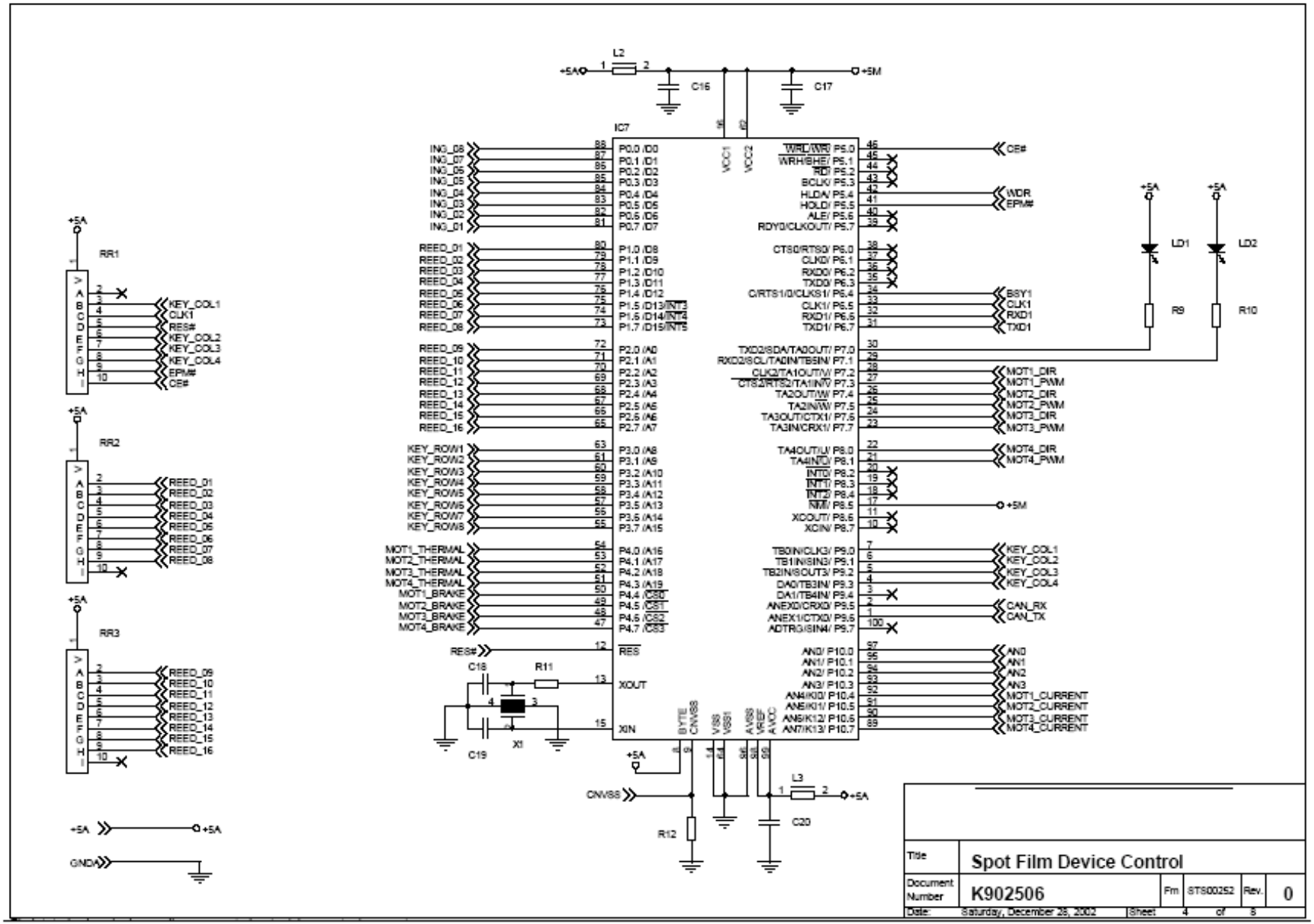
L2
+5A
+5M
C16
C17
IC7
VCC1
VCC2
P0.0 /D0
P0.1 /D1
P0.2 /D2
P0.3 /D3
P0.4 /D4
P0.5 /D5
P0.6 /D6
P0.7 /D7
P1.0 /D8
P1.1 /D9
P1.2 /D10
P1.3 /D11
P1.4 /D12
P1.5 /D13/INT3
P1.6 /D14/INT4
P1.7 /D15/INT5
P2.0 /A0
P2.1 /A1
P2.2 /A2
P2.3 /A3
P2.4 /A4
P2.5 /A5
P2.6 /A6
P2.7 /A7
P3.0 /A8
P3.1 /A9
P3.2 /A10
P3.3 /A11
P3.4 /A12
P3.5 /A13
P3.6 /A14
P3.7 /A15
P4.0 /A16
P4.1 /A17
P4.2 /A18
P4.3 /A19
P4.4 /CS0
P4.5 /CS1
P4.6 /CS2
P4.7 /CS3
RES
XOUT
XIN
BYTE
CNVSS
VSS
VSS1
AVSS
VREF
AVCC
WRL/WR/ P5.0
WRH/BHE/ P5.1
RD/ P5.2
BCLK/ P5.3
HLDA/ P5.4
HOLD/ P5.5
ALE/ P5.6
RDY0/CLKOUT/ P5.7
CTS0/RTS0/ P6.0
CLK0/ P6.1
RXD0/ P6.2
TXD0/ P6.3
CTS1/RTS1/0/CLKS1/ P6.4
CLK1/ P6.5
RXD1/ P6.6
TXD1/ P6.7
TXD2/SDA/TA0OUT/ P7.0
RXD2/SCL/TA0IN/TB5IN/ P7.1
CLK2/TA1OUT/V/ P7.2
CTS2/RTS2/TA1IN/V/ P7.3
TA2OUT/W/ P7.4
TA2IN/W/ P7.5
TA3OUT/CTX1/ P7.6
TA3IN/CRX1/ P7.7
TA4OUT/U/ P8.0
TA4IN/U/ P8.1
INT0/ P8.2
INT1/ P8.3
INT2/ P8.4
NMI/ P8.5
XCOUT/ P8.6
XCIN/ P8.7
TB0IN/CLK3/ P9.0
TB1IN/SIN3/ P9.1
TB2IN/SOUT3/ P9.2
DA0/TB3IN/ P9.3
DA1/TB4IN/ P9.4
ANEX0/CRX0/ P9.5
ANEX1/CTX0/ P9.6
ADTRG/SIN4/ P9.7
AN0/ P10.0
AN1/ P10.1
AN2/ P10.2
AN3/ P10.3
AN4/KI0/ P10.4
AN5/KI1/ P10.5
AN6/K12/ P10.6
AN7/K13/ P10.7
IN0_D8
IN0_D7
IN0_D6
IN0_D5
IN0_D4
IN0_D3
IN0_D2
IN0_D1
REED_01
REED_02
REED_03
REED_04
REED_05
REED_06
REED_07
REED_08
REED_09
REED_10
REED_11
REED_12
REED_13
REED_14
REED_15
REED_16
KEY_ROW1
KEY_ROW2
KEY_ROW3
KEY_ROW4
KEY_ROW5
KEY_ROW6
KEY_ROW7
KEY_ROW8
MOT1_THERMAL
MOT2_THERMAL
MOT3_THERMAL
MOT4_THERMAL
MOT1_BRAKE
MOT2_BRAKE
MOT3_BRAKE
MOT4_BRAKE
RES#
C18
R11
C19
X1
CNVSS
R12
L3
C20
CE#
WDR
EPM#
BSY1
CLK1
RXD1
TXD1
MOT1_DIR
MOT1_PWM
MOT2_DIR
MOT2_PWM
MOT3_DIR
MOT3_PWM
MOT4_DIR
MOT4_PWM
KEY_COL1
KEY_COL2
KEY_COL3
KEY_COL4
CAN_RX
CAN_TX
AN0
AN1
AN2
AN3
MOT1_CURRENT
MOT2_CURRENT
MOT3_CURRENT
MOT4_CURRENT
LD1
LD2
R9
R10
RR1
RR2
RR3
KEY_COL1
CLK1
RES#
KEY_COL2
KEY_COL3
KEY_COL4
EPM#
CE#
GNDA
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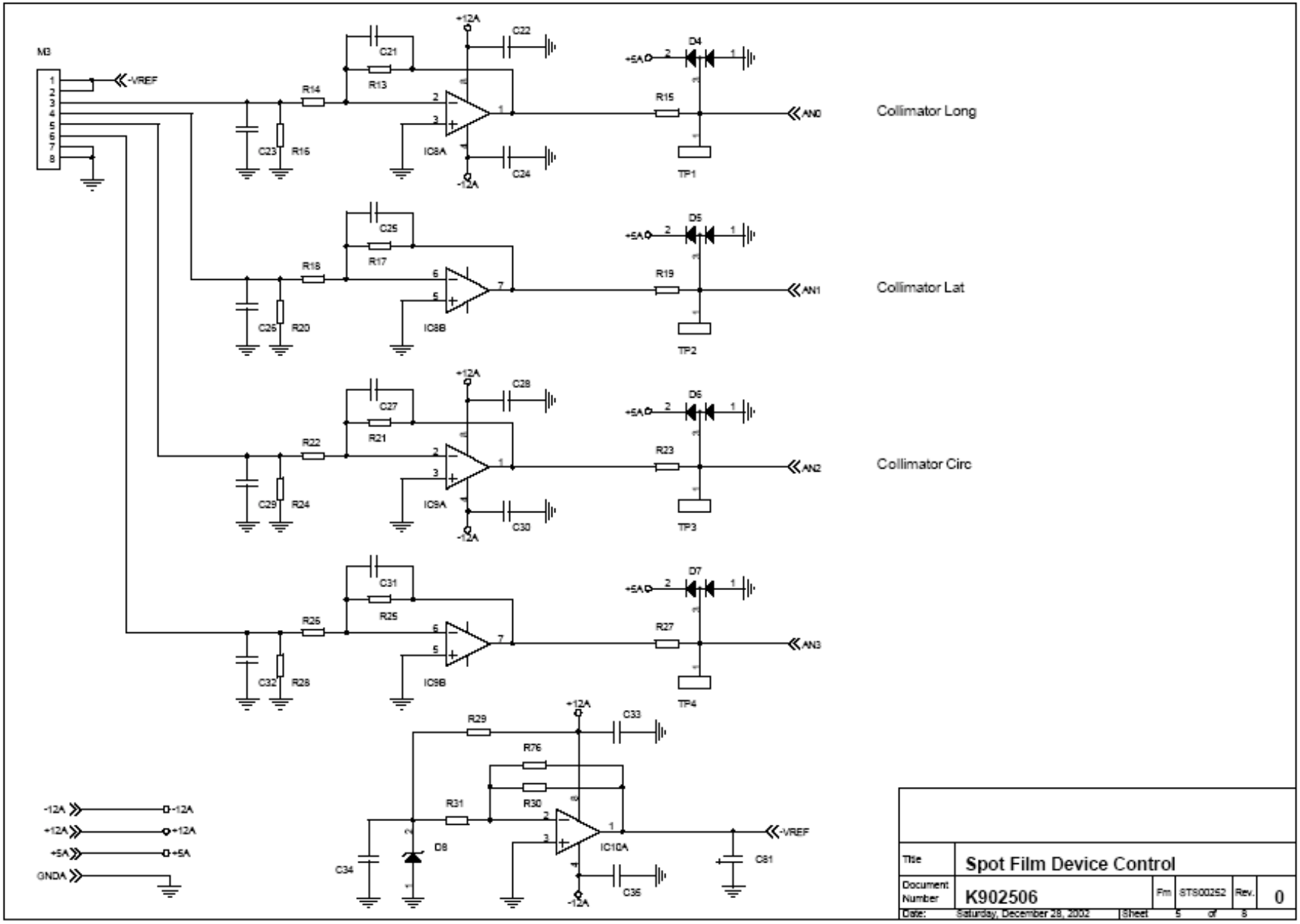
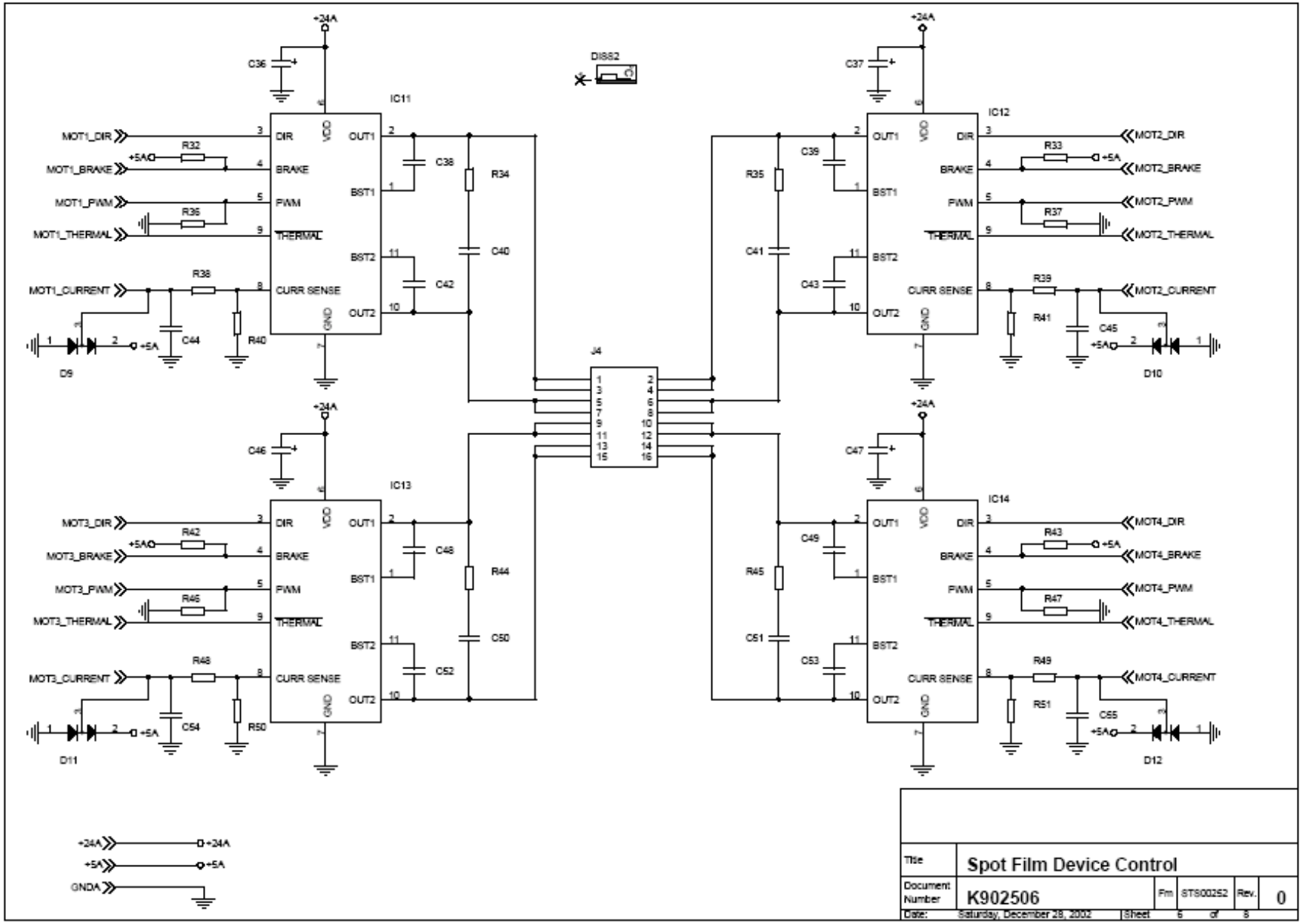

M3
-VREF
R14
C21
R13
+12A
C22
IC8A
C23
R16
C24
-12A
D4
+5A
R15
AN0
TP1
Collimator Long
C25
R17
R18
IC8B
C26
R20
D5
R19
AN1
TP2
Collimator Lat
C27
R21
R22
IC9A
C29
R24
C28
C30
D6
R23
AN2
TP3
Collimator Circ
C31
R25
R26
IC9B
C32
R28
D7
R27
AN3
TP4
R29
C33
R76
R31
R30
IC10A
C34
D8
C36
C81
-VREF
-12A
+12A
+5A
GNDA
Title
Spot Film Device Control
Document Number
K902506
Fm
STS00252
Rev.
0
Date:
Saturday, December 28, 2002
Sheet
5
of
8


+24A
C36
IC11
MOT1_DIR
R32
+5A
MOT1_BRAKE
MOT1_PWM
R36
MOT1_THERMAL
R38
MOT1_CURRENT
DIR
BRAKE
PWM
THERMAL
CURR SENSE
VDD
GND
OUT1
BST1
BST2
OUT2
C38
C40
C42
R34
C44
R40
D9
DIS82
C37
IC12
R35
C39
C41
C43
MOT2_DIR
R33
MOT2_BRAKE
MOT2_PWM
R37
MOT2_THERMAL
R39
MOT2_CURRENT
R41
C45
D10
J4
C46
IC13
MOT3_DIR
R42
MOT3_BRAKE
MOT3_PWM
R46
MOT3_THERMAL
R48
MOT3_CURRENT
C48
C50
C52
R44
C54
R50
D11
C47
IC14
R45
C49
C51
C53
MOT4_DIR
R43
MOT4_BRAKE
MOT4_PWM
R47
MOT4_THERMAL
R49
MOT4_CURRENT
R51
C55
D12
+24A
+5A
GNDA
Title
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Document Number
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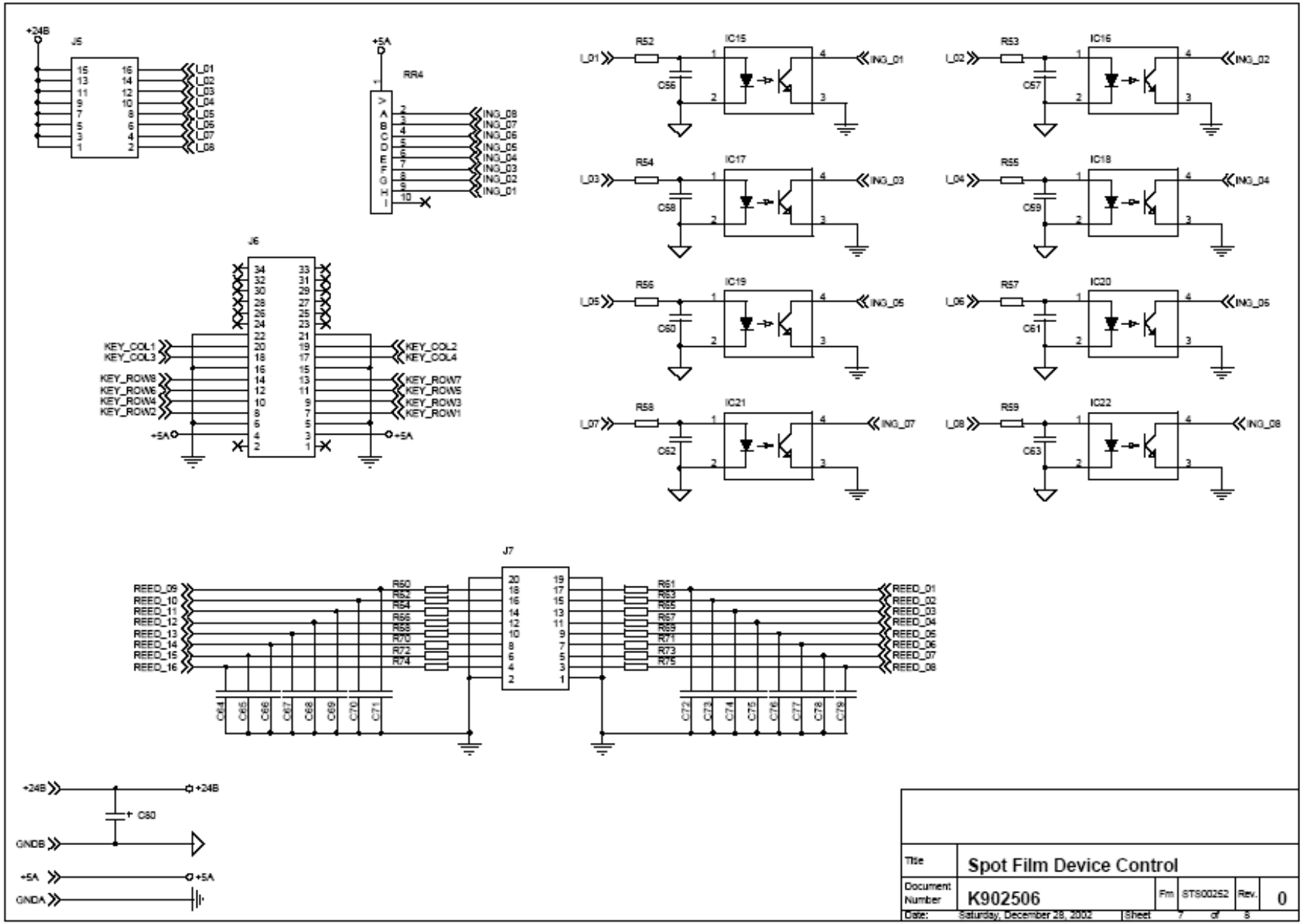
8


+24B
J5
I_01
I_02
I_03
I_04
I_05
I_06
I_07
I_08
+5A
RR4
ING_08
ING_07
ING_06
ING_05
ING_04
ING_03
ING_02
ING_01
J6
KEY_COL1
KEY_COL3
KEY_COL2
KEY_COL4
KEY_ROW8
KEY_ROW6
KEY_ROW4
KEY_ROW2
KEY_ROW7
KEY_ROW5
KEY_ROW3
KEY_ROW1
R52
IC15
C56
R53
IC16
C57
R54
IC17
C58
R55
IC18
C59
R56
IC19
C60
R57
IC20
C61
R58
IC21
C62
R59
IC22
C63
J7
REED_09
REED_10
REED_11
REED_12
REED_13
REED_14
REED_15
REED_16
R50
R52
R54
R56
R58
R70
R72
R74
R51
R53
R55
R57
R59
R71
R73
R75
REED_01
REED_02
REED_03
REED_04
REED_05
REED_06
REED_07
REED_08
C64
C65
C66
C67
C68
C69
C70
C71
C72
C73
C74
C75
C76
C77
C78
C79
+24B
C80
GNDB
+5A
GNDA
Title
Spot Film Device Control
Document Number
K902506
Rev.
0
Date:
Saturday, December 28, 2002
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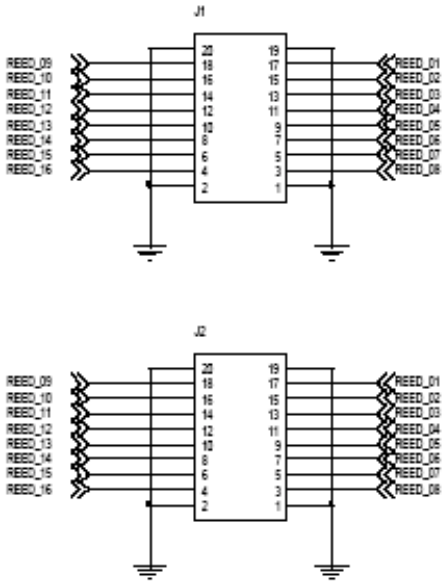
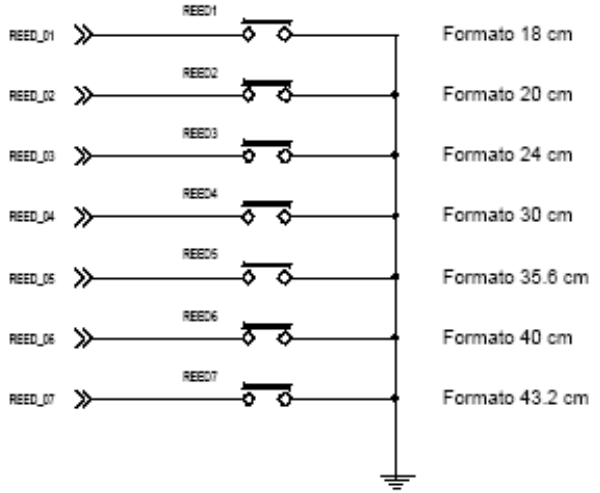
CASSETTE FORMAT 1

Title	Cassette Format 1				
Document Number	K902507	Fm	8T800254	Rev.	0
Date:	Wednesday, August 21, 2002	Sheet	1 of 3		

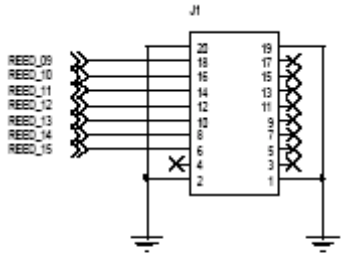


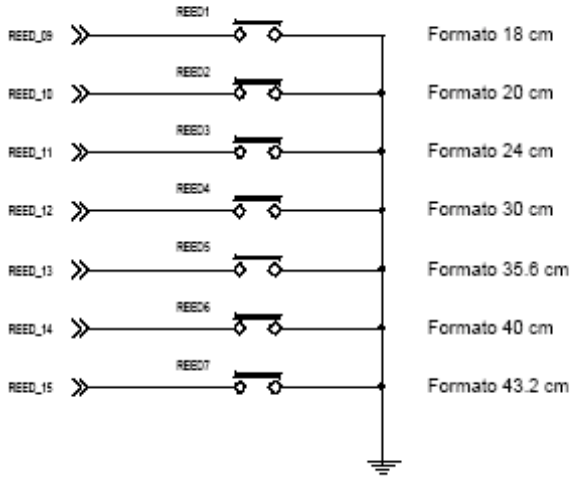


Title	Cassette Format 1				
Document Number	K902507	Fn	0T000254	Rev.	0
Date:	Friday, August 23, 2002	Sheet	2 of 3		

CASSETTE FORMAT 2

Title	Cassette Format 2				
Document Number	K902508	Fm	0T800256	Rev.	0
Date:	Thursday, January 02, 2003	Sheet	1 of 3		

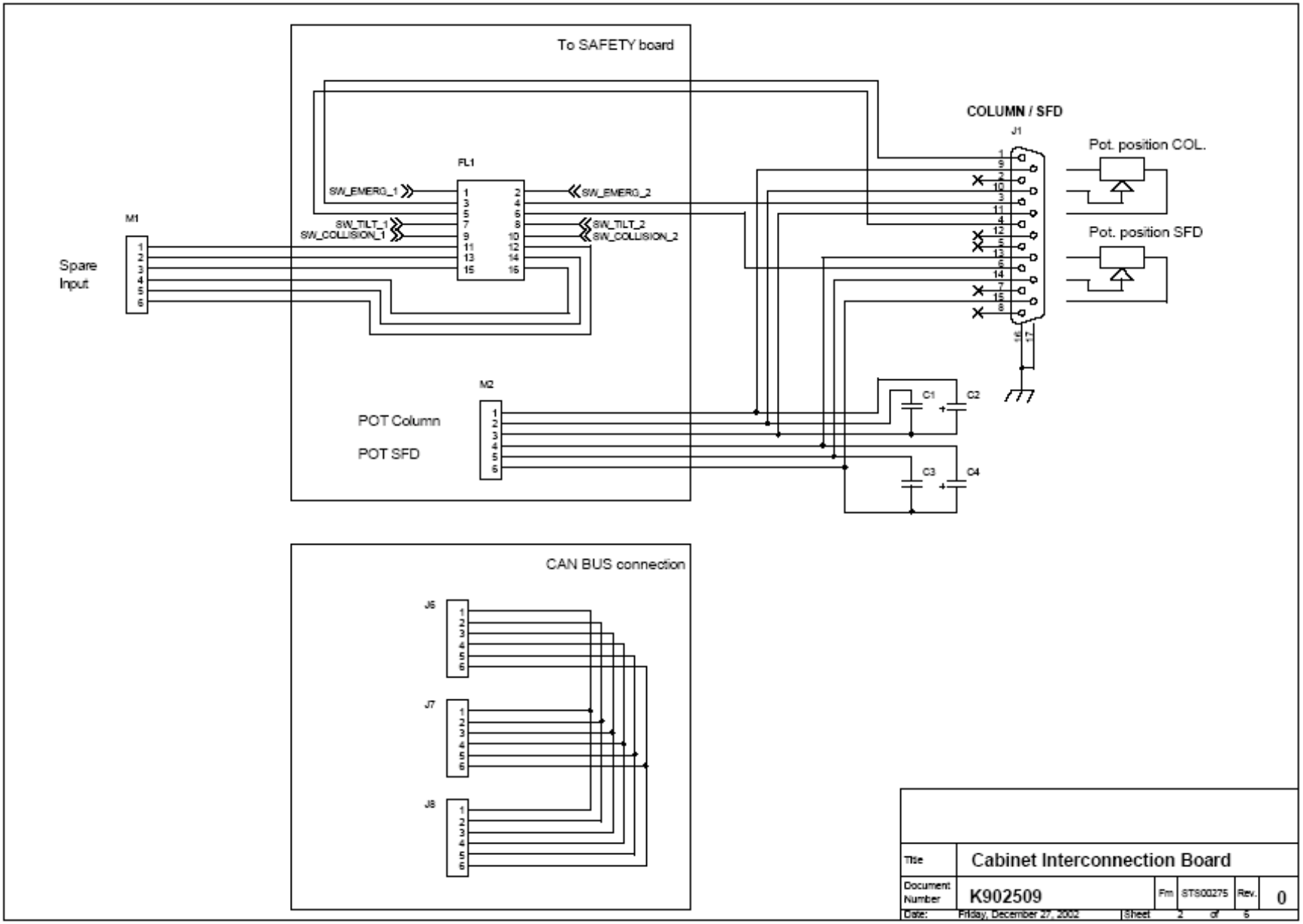


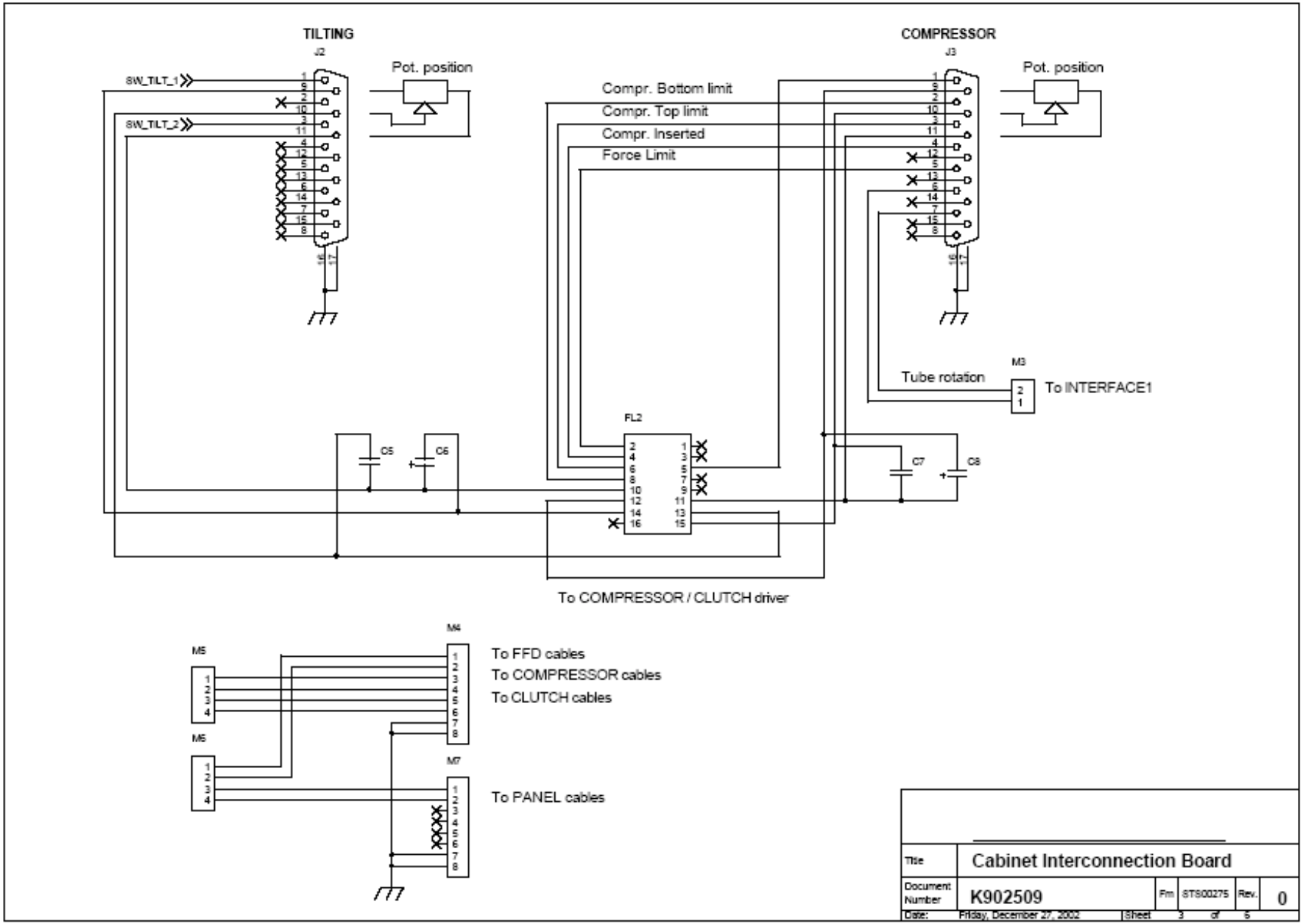


Title	Cassette Format 2				
Document Number	K902508	Fn	0T800256	Rev.	0
Date:	Friday, August 23, 2002	Sheet	2 of 3		

CABINET INTERCONNECTION BOARD

Title	Cabinet Interconnection Board				
Document Number	K902509	Fm	ST800275	Rev.	0
Date:	Friday, December 27, 2002	Sheet	1 of	6	


To SAFETY board
COLUMN / SFD
J1
Pot. position COL.
Pot. position SFD
FL1
SW_EMERG_1
SW_EMERG_2
SW_TILT_1
SW_COLLISION_1
SW_TILT_2
SW_COLLISION_2
M1
Spare
Input
M2
POT Column
POT SFD
C1
C2
C3
C4
CAN BUS connection
J6
J7
J8
Title
Cabinet Interconnection Board
Document Number
K902509
Fm
STS00275
Rev.
0
Date:
Friday, December 27, 2002
Sheet
2
of
5


TILTING
J2
Pot. position
SW_TILT_1
SW_TILT_2
COMPRESSOR
J3
Pot. position
Compr. Bottom limit
Compr. Top limit
Compr. Inserted
Force Limit
M3
Tube rotation
To INTERFACE1
FL2
C5
C6
C7
C8
To COMPRESSOR / CLUTCH driver
M4
M5
M6
M7
To FFD cables
To COMPRESSOR cables
To CLUTCH cables
To PANEL cables
Title
Cabinet Interconnection Board
Document Number
K902509
Fm
STS00275
Rev.
0
Date:
Friday, December 27, 2002
Sheet
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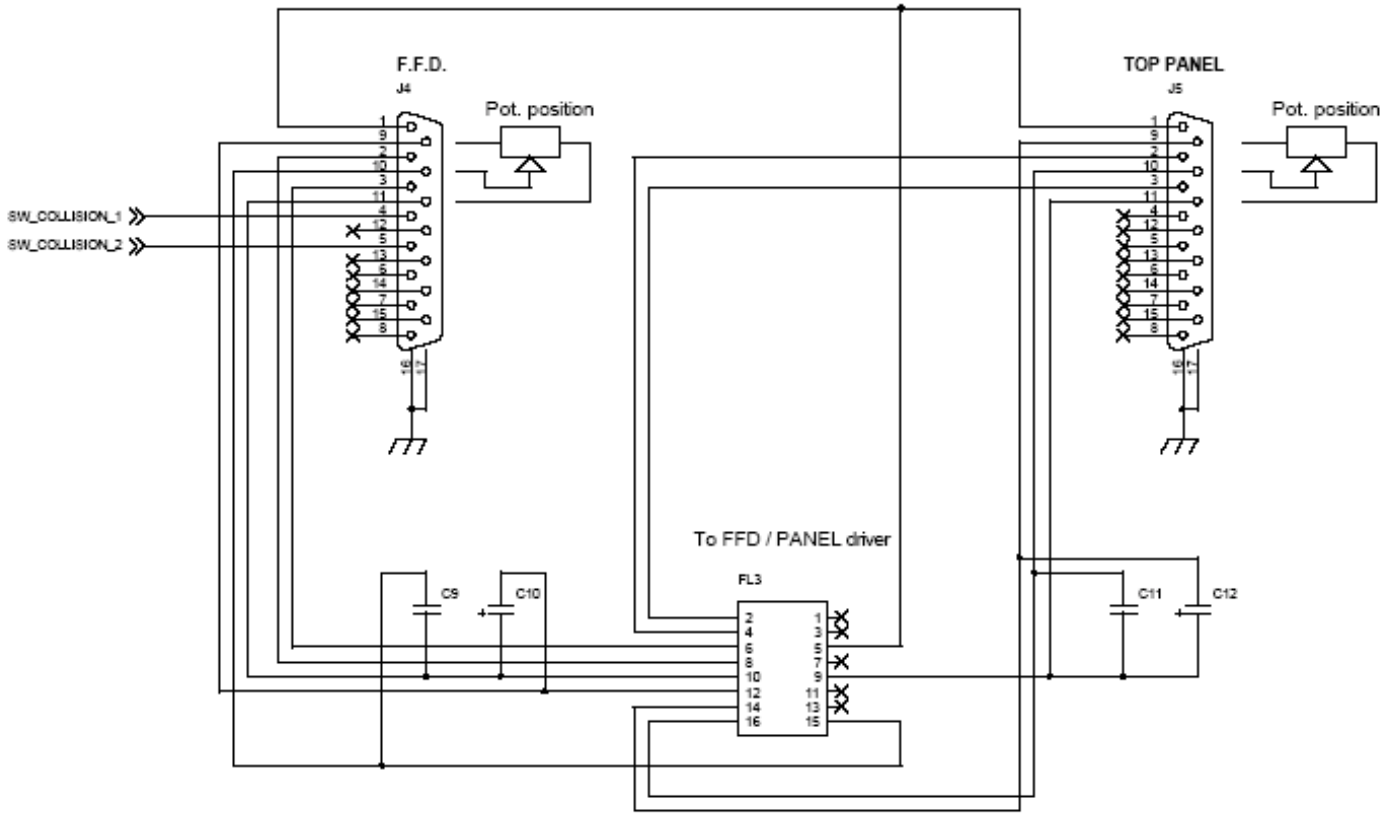
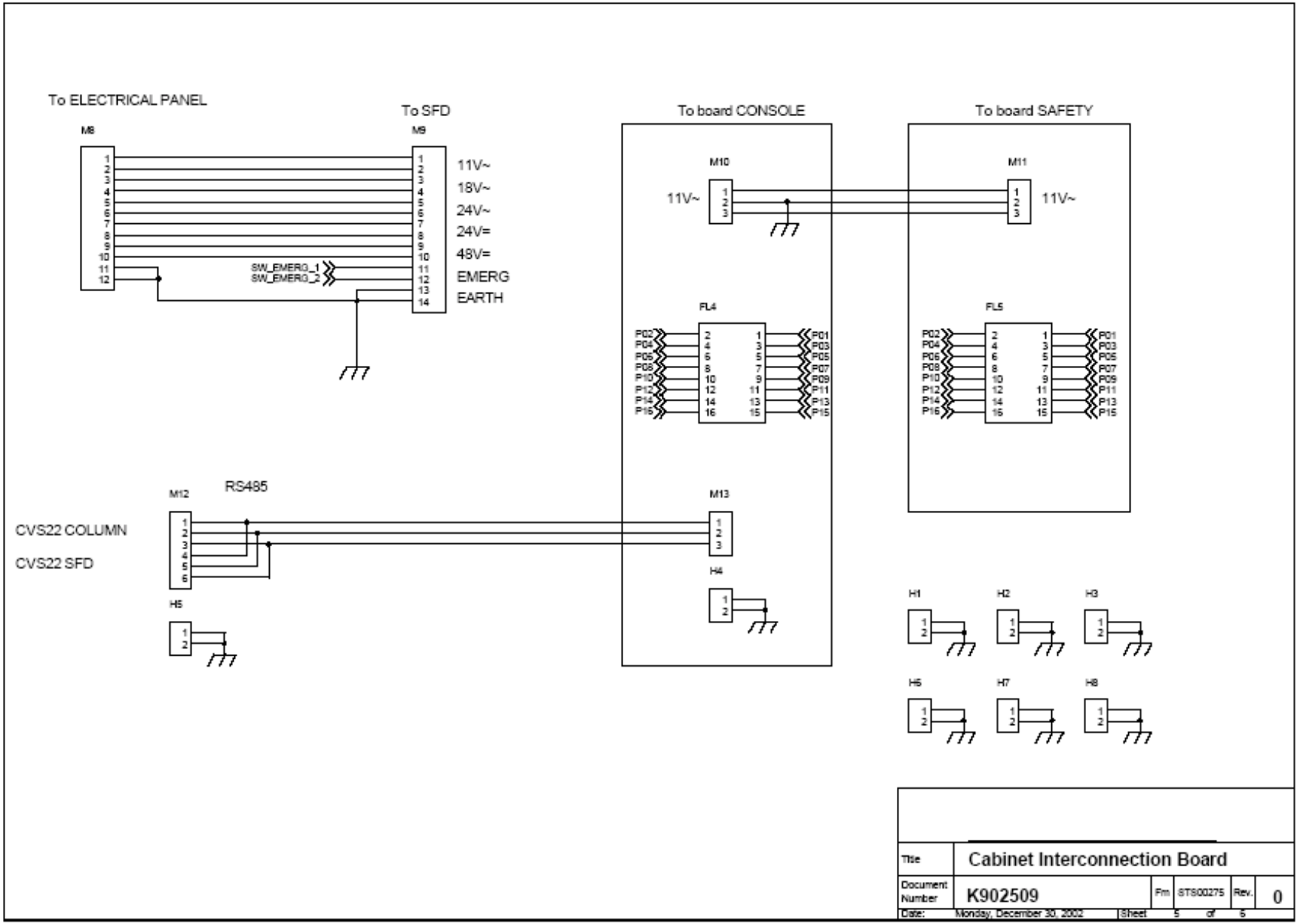
of
5



Title	Cabinet Interconnection Board				
Document Number	K902509	Fm	STS00275	Rev.	0
Date:	Friday, December 27, 2002	Sheet	4 of 5		


To ELECTRICAL PANEL
To SFD
To board CONSOLE
To board SAFETY
M8
M9
M10
M11
11V~
18V~
24V~
24V=
48V=
EMERG
EARTH
SW_EMERG_1
SW_EMERG_2
FL4
FL5
M12
M13
H4
H5
RS485
CVS22 COLUMN
CVS22 SFD
H1
H2
H3
H5
H7
H8
Title
Cabinet Interconnection Board
Document Number
K902509
Fm
STS00275
Rev.
0
Date:
Monday, December 30, 2002
Sheet
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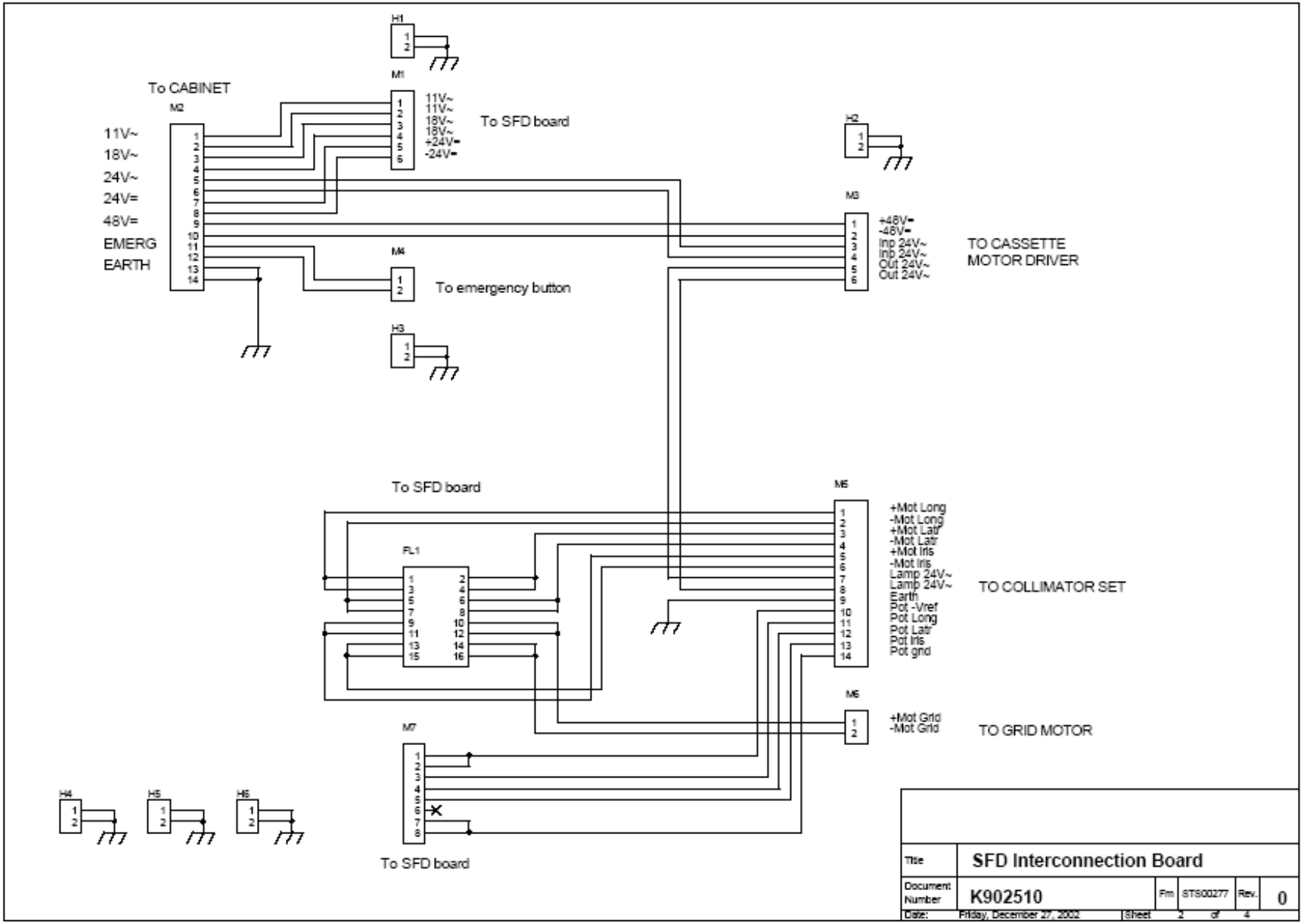
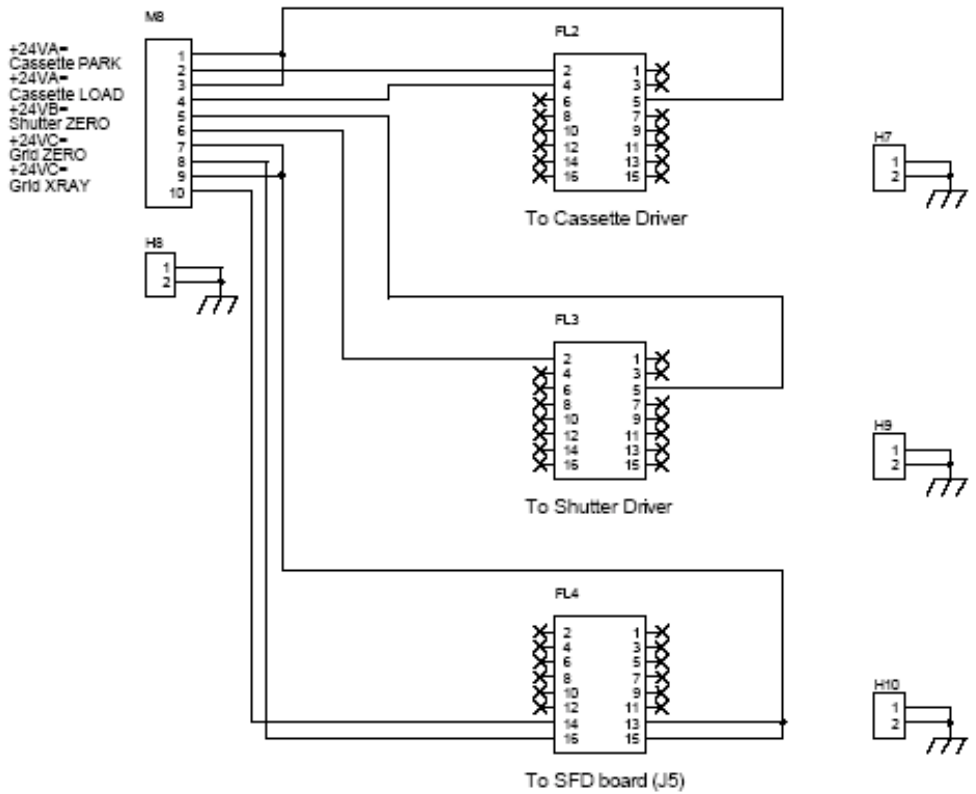
of
6

SPOT FILM DEVICE INTERCONNECTION BOARD

Title	SFD Interconnection Board				
Document Number	K902510	Fm	STS00277	Rev.	0
Date:	Friday, December 27, 2002	Sheet	1 of 4		


H1
M1
To CABINET
M2
11V~
18V~
24V~
24V=
48V=
EMERG
EARTH
11V~
11V~
18V~
18V~
+24V=
-24V=
To SFD board
H2
M3
+48V=
-48V=
Inp 24V~
Inp 24V~
Out 24V~
Out 24V~
TO CASSETTE
MOTOR DRIVER
M4
To emergency button
H3
To SFD board
M5
FL1
+Mot Long
-Mot Long
+Mot Latr
-Mot Latr
+Mot Iris
-Mot Iris
Lamp 24V~
Lamp 24V~
Earth
Pot -Vref
Pot Long
Pot Latr
Pot Iris
Pot gnd
TO COLLIMATOR SET
M6
+Mot Grid
-Mot Grid
TO GRID MOTOR
M7
H4
H5
H6
To SFD board
Title
SFD Interconnection Board
Document Number
K902510
Rev.
0
Date:
Friday, December 27, 2002
Sheet
2
of
4

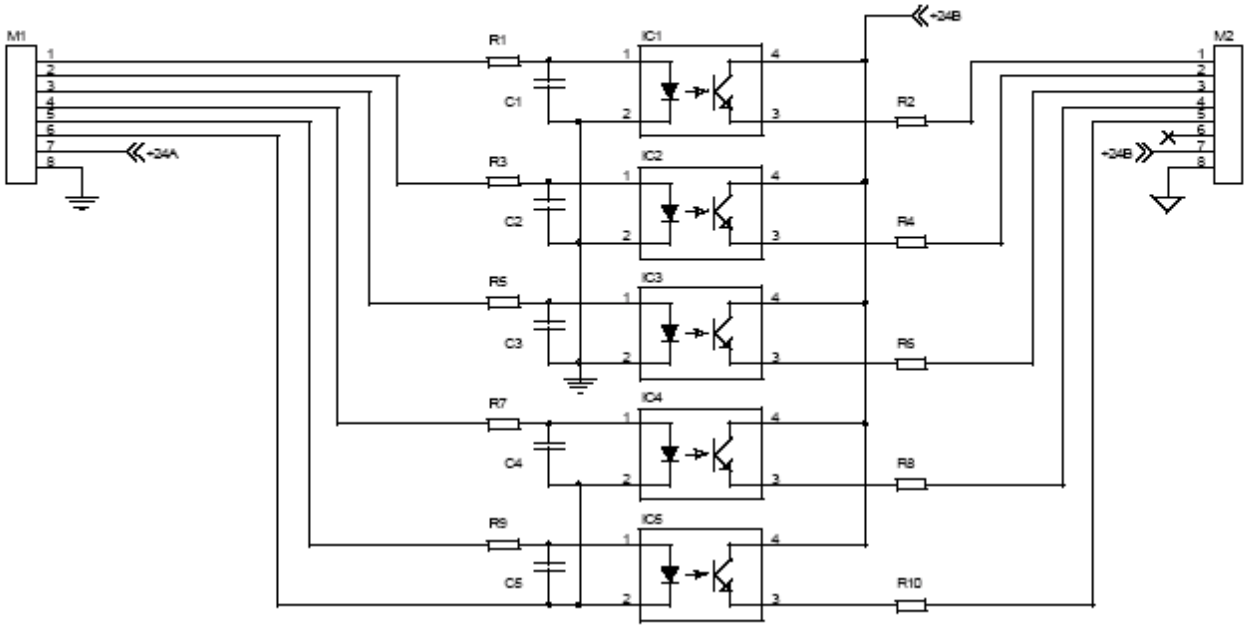


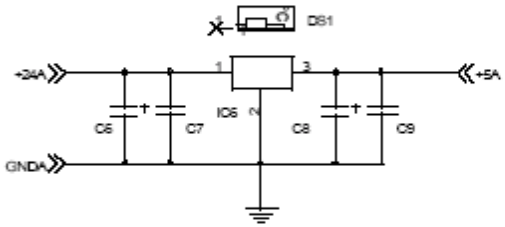
IMAGO Radiology S.R.L. Abbiategrasso (MI) - ITALY					
Title	SFD Interconnection Board				
Document Number	K902510	Fm	STS00277	Rev.	0
Date:	Friday, December 27, 2002	Sheet	3 of 4		

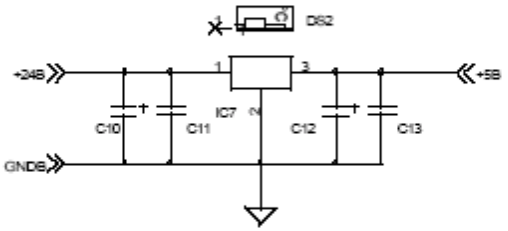
CVS INTERFACE BOARD

- OPTOISOLATED DIGITAL INPUT X 9
- RELAY OUTPUT X 4
- RS485 OPTOISOLATED BUS

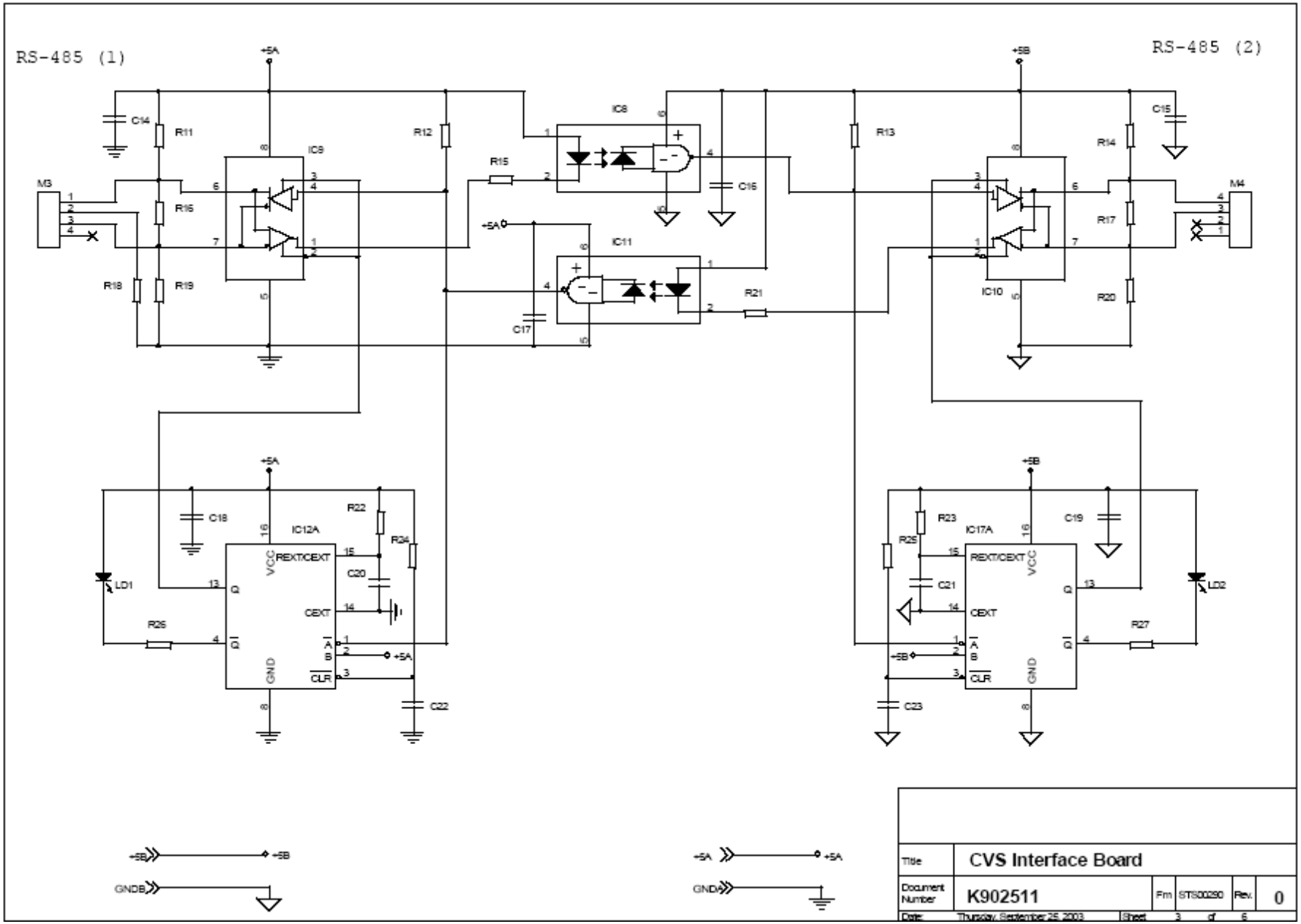
Title	CVS Interface Board				
Document Number	K902511	Fm	STS00290	Rev.	0
Date:	Thursday, September 25, 2003	Sheet	1 of 6		







Title	CVS Interface Board				
Document Number	K902511	Fm	STS00290	Rev.	0
Date:	Thursday, September 25, 2003	Sheet	2 of 6		


RS-485 (1)
RS-485 (2)
+5A
+5B
C14
R11
IC9
R12
IC8
R15
C16
R13
C15
R14
M3
R16
R17
M4
R18
R19
IC11
R21
IC10
R20
C17
C18
IC12A
R22
R24
LD1
C20
R26
C21
IC17A
C19
R23
R25
LD2
R27
C22
C23
VCC
REXT/CEXT
CEXT
GND
CLR
Q
A
B
GNDB
GNDA
Title
CVS Interface Board
Document Number
K902511
Rev.
0
Date:
Thursday, September 25, 2003
Sheet
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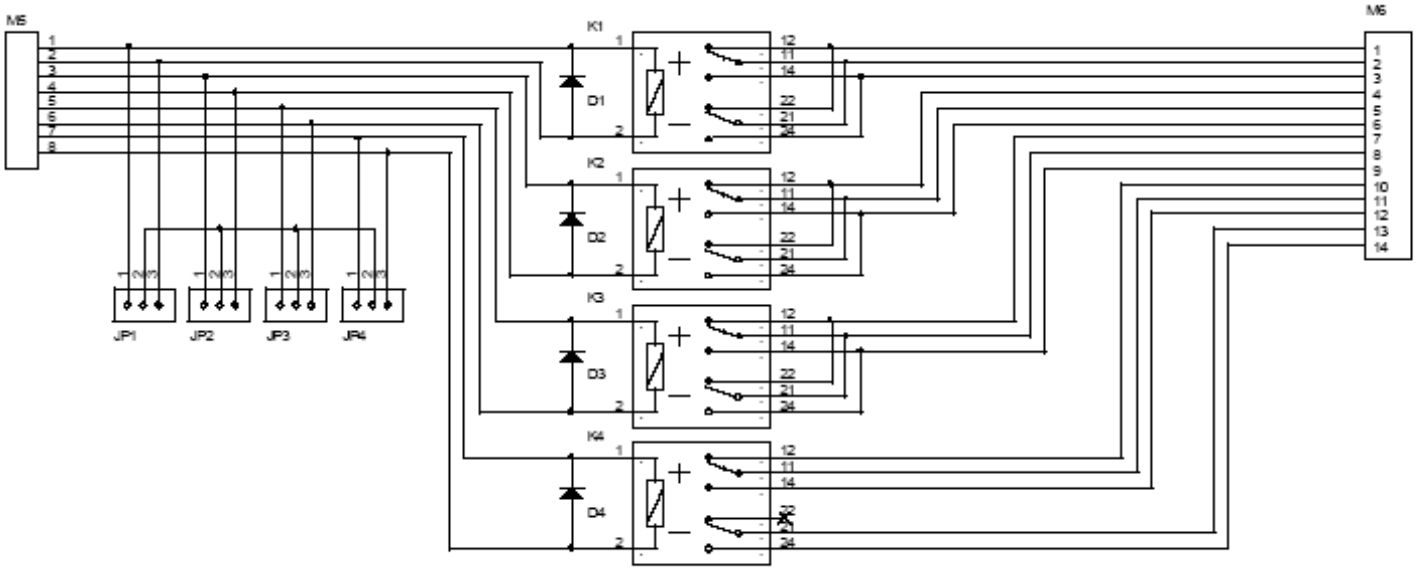
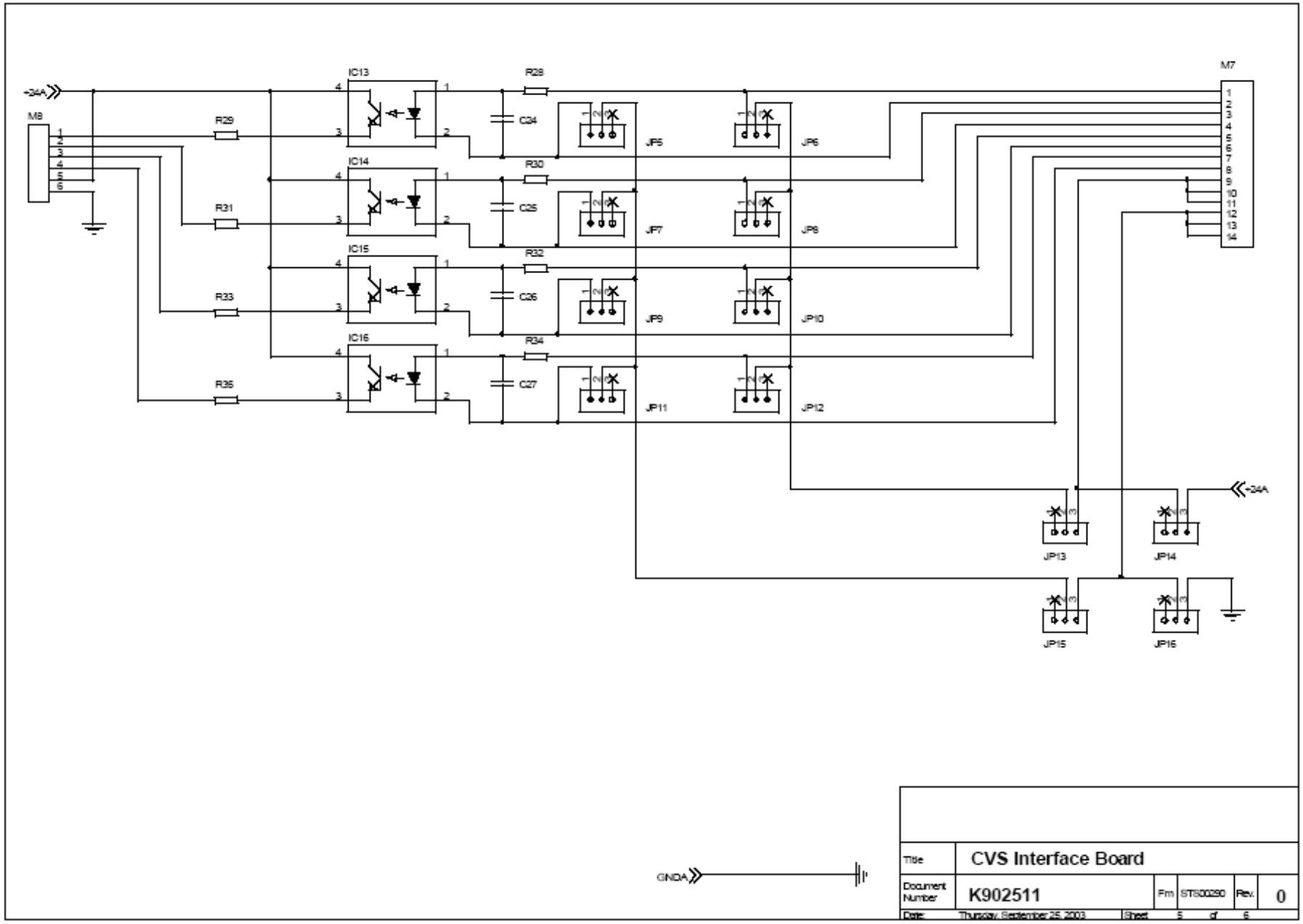
of
6



Title	CVS Interface Board				
Document Number	K902511	Fm	STS00290	Rev.	0
Date:	Thursday, September 25, 2003	Sheet	4 of 6		


+24A
M8
R29
R31
R33
R35
IC13
IC14
IC15
IC16
R28
R30
R32
R34
C24
C25
C26
C27
JP5
JP6
JP7
JP8
JP9
JP10
JP11
JP12
M7
JP13
JP14
JP15
JP16
+24A
GNDA
Title
CVS Interface Board
Document Number
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Thursday, September 25, 2003
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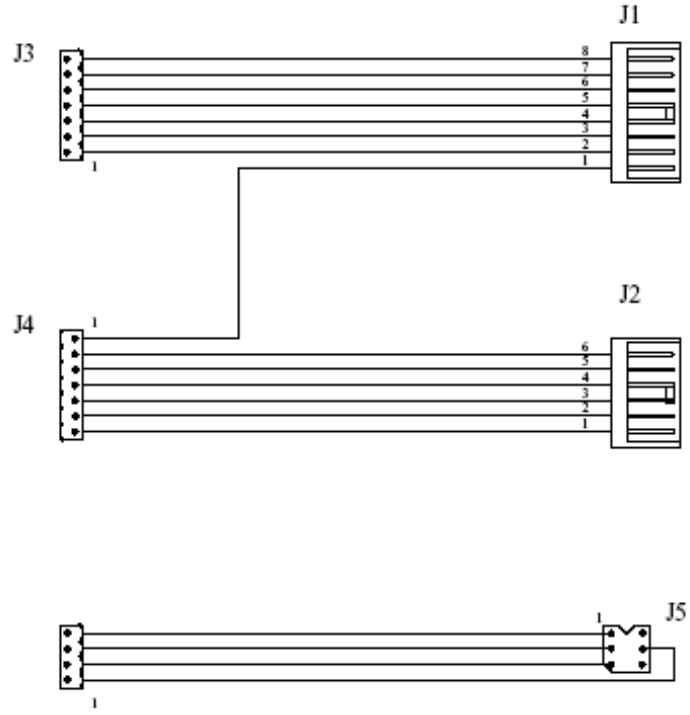
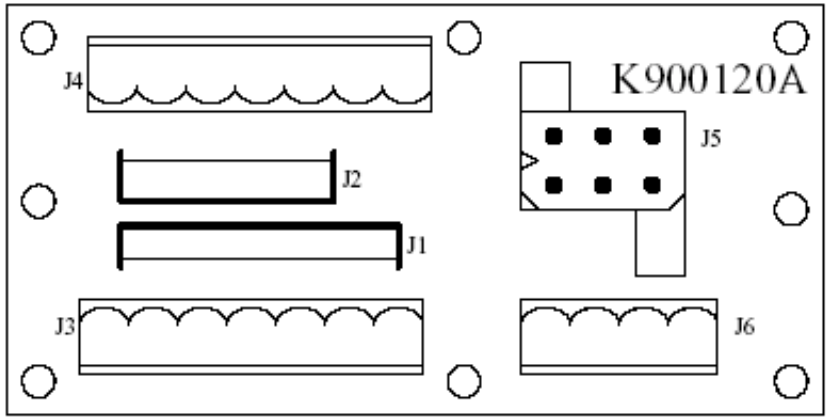


Equipment:			
Title: K900120			
n°. 1 of 1	Rev: 3		
File: G:\REPART~1\DOCUME~1\SCHEMI\SCHEMI~1.DED		4-May-2004	Sheet: 1 of: 1 Size: A4



Equipment:			
Title: **K900120 PCB**			
n°. 1 of 1	Rev: 1		
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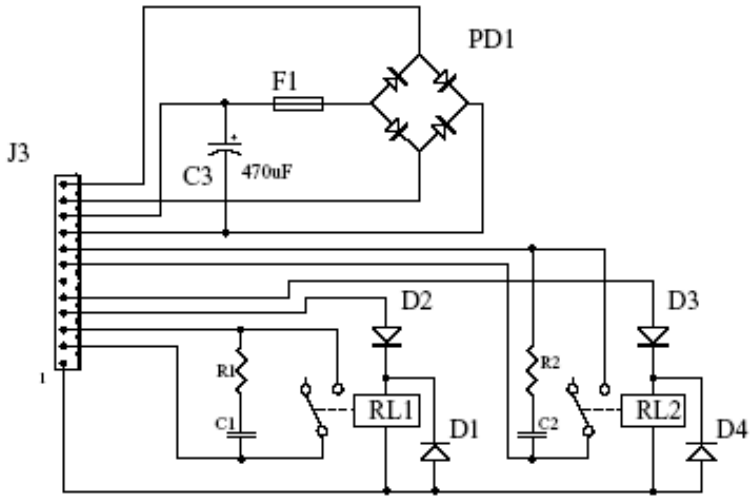

R1 - R2 - C1 - C2 Not used

Equipment:			
Title: K700004			
n°. 1 of 1	Rev: 1		
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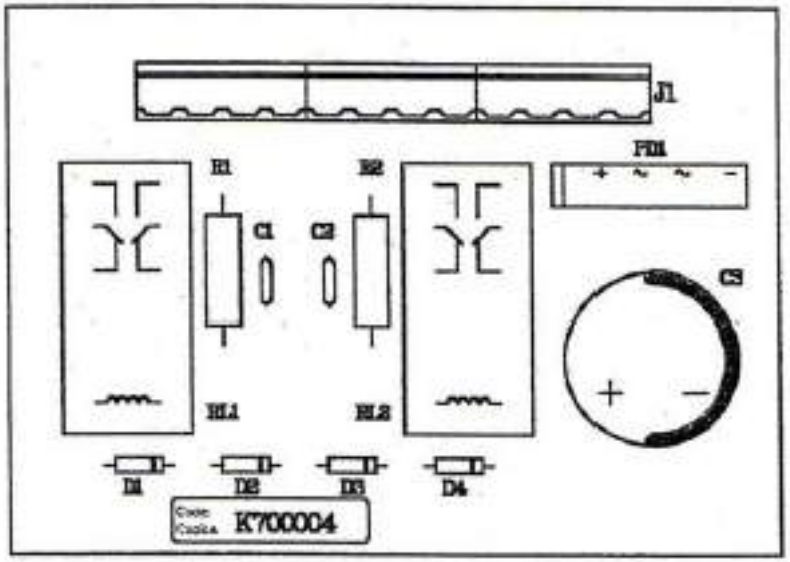
J1
R1
R2
C1
C2
HL1
HL2
FU1
+ ~ ~ −
C3
+
−
D1
D2
D3
D4
K700004

6 ELECTRIC DIAGRAMS

6.1 Block diagrams

- Transformer and driver power supply — sheet 1 of 20
- Board power supply — sheet 2 of 20
- Contactor coils — sheet 3 of 20
- Column and SFD motors — sheet 4 of 20
- Tilting motor — sheet 5 of 20
- Compressor motor and clutch — sheet 6 of 20
- FFD motor — sheet 7 of 20
- Transversal table motor — sheet 8 of 20
- Cassette carriage motor — sheet 9 of 20
- Shutters motor — sheet 10 of 20
- Grid motor — sheet 11 of 20
- SFD keyboard — sheet 12 of 20
- Format sensor — sheet 13 of 20
- Emergency pushbutton — sheet 14 of 20
- X-Ray pushbutton and fluoro pedal — sheet 15 of 20
- Tube rotation switch — sheet 16 of 20
- Thermal contact 3 phase transformer — sheet 17 of 20
- Restoring pushbutton — sheet 18 of 20
- Collimator connection — sheet 19 of 20
- CAN bus — sheet 20 of 20

6.2 Electric panel connections

- K903100 — sheet 1 of 4
- K903110 — sheet 2 of 4
- K903130 — sheet 4 of 4
- K903140 — sheet 3 of 4

6.3 Cabinet internal connections

- K905120 — sheet 1 of 4
- K905130 — sheet 1 of 4
- K905240 — sheet 1 of 4
- K905250 — sheet 1 of 4
- K905260 — sheet 1 of 4
- K905140 — sheet 2 of 4
- K905150 — sheet 2 of 4
- K905160 — sheet 2 of 4
- K905170 — sheet 3 of 4
- K905190 — sheet 3 of 4
- K905200 — sheet 4 of 4
- K905201 — sheet 4 of 4
- K905210 — sheet 4 of 4
- K905220 — sheet 2 of 4

Cabinet internal connections Continuation

- K905230 sheet 2 of 4
- K905270 sheet 2 of 4
- K905271 sheet 2 of 4
- K905272 sheet 2 of 4
- K905280 sheet 2 of 4
- K905281 sheet 2 of 4
- K905282 sheet 2 of 4

6.4 SFD internal connections

- K906320 sheet 1 of 3
- K906330 sheet 1 of 3
- K906340 sheet 2 of 3
- K906350 sheet 1 of 3
- K906360 sheet 3 of 3
- K906370 sheet 3 of 3
- K906380 sheet 3 of 3
- K906390 sheet 3 of 3

6.5 Console internal connections

- K907100 sheet 1 of 2
- K907110 sheet 2 of 2

6.6 Table internal connections

- K906100 sheet 1 of 5
- K906120 sheet 2 of 5
- K906130 sheet 3 of 5
- K906140 sheet 4 of 5
- K906150 sheet 5 of 5

6.7 Cables

- K904100P sheet 1 of 15
- K904100R sheet 2 of 15
- K904100S sheet 3 of 15
- K9041 I OP sheet 4 of 15
- K9041 I OR sheet 5 of 15
- K904120P sheet 6 of 15
- K904120S sheet 7 of 15
- K904130S sheet 8 of 15

Cables Continuation

6.8 Interface signal

6.9 Fuse list

6.10 PCBs

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6.1. BLOCK DIAGRAMS

Page intentionally left blank

6.2. ELECTRIC PANEL CONNECTIONS

Page intentionally left blank

6.3. CABINET INTERNAL CONNECTIONS

Page intentionally left blank

6.4. SFD INTERNAL CONNECTIONS

Page intentionally left blank

6.5. CONSOLE INTERNAL CONNECTIONS

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6.6. TABLE INTERNAL CONNECTIONS

Page intentionally left blank

6.7.CABLES

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6.8. INTERFACE 1 SIGNAL DESCRIPTION

Outputs:

PREPERATION:	Active when first step of the X-ray pushbutton is pressed
XRAY REQ:	Active when second step of the X-ray pushbutton is pressed, collimator and SFD shutters are in good position and GEN READY input is on.
AUTOMATIC FLUORO:	Active when Automatic fluoro console key is on.
ZOOM 1:	Active when second magnification field is selected on the console
ZOOM 2:	Active when third magnification field is selected on the console
ZOOM 3:	Active when fourth magnification field is selected on the console
PREPERATION:	Active when first step of the X-ray pushbutton is pressed
X-RAY REQ:	Active when second step of the X-ray pushbutton is pressed, collimator and SFD shutters are in good position and GEN READY input is on
FLUORO:	Active when fluoro pedal is pressed and collimator and SFD shutters are in good position
RX P.B. OUTPUT:	Active each time the second step of the X-ray pushbutton is pressed without any control of collimator and SFD shutters position
DIGITAL ON:	Active when DIGITAL REQ is on and SFD Carriage is in park position
TOMO ON:	Active when Tomo function is selected on the remote control table
K13-K14-K15-K16 RESISTOR LADDER:	These four relays are activated with a four bits binary sequence, K13 is the LSB and K16 is the MSB controlled by the brightness key on the console. Is possible to create a digital potentiometer to adjust monitor brightness by choosing the right value of resistor R22-R19-R21-R24-R26.

Inputs:

GEN READY:	When this input is off (Opto isolator led off) the remote control table cannot activate the XRAY REQ relay output.
X-RAY ON:	The remote control table to know if exposure is done uses this input. If this input detect a lo to high transition (opto isolator led turn on),table know that the film is impressed. When detect a high to low transition (opto isolator led turn off), allow the SFD carriage to come back in park position, in normal seriograph mode, and to go to the next division in quick mode.
DIGITAL REQ:	When this input is on (Opto isolator led on) SFD is disabled, the carriage goes automatically in park position and DIGITAL ON output relay is activated.

EXTERNAL LOCK: When this input is on (Opto isolator led on) all movement are disabled.

TUBE OUT OF POS: When this input is off (Opto isolator led off) XRAY REQ relay output is disabled

DFF CEILING SWITCH: When this input is on (Opto isolator led on) all movement are disabled but is possible to move down the tube stand.

INTERFACE 2 SIGNAL DESCRIPTION

Outputs:

HORIZZONTAL INV: Active when horizontal inversion is selected on the console

VERTICAL INV: Active when vertical inversion is selected on the console

FLUORO: Active when fluoro pedal is pressed and collimator and SFD shutters are in good position

TOMO ON: Active when tomo function is selected on the remote control Table

RX P.B. OUTPUT: Active each time the second step of the X-ray pushbutton is pressed without any control of collimator and SFD shutters position

ANGIO ON: Active when angio function is selected on the remote control table

ANGIO STEP: Active during automatic column and SFD movement in angio mode.

TOMO TIME1: Active in tomo mode if tomo time is less than 1 sec.

TOMO TIME2: Active in tomo mode if tomo time is between 1sec. and 2 sec.

TOMO TIME3: Active in tomo mode if tomo time is between 2sec. and 3 sec.

TOMO TIME4: Active in tomo mode if tomo time is greater than 3 sec.

BRIGHTNESS INC: Active for about 100mS each time brightness increment key is pressed on the console

BRIGHTNESS DEC: Active for about 100mS each time brightness decrement key is pressed on the console

6.9 FUSE LIST

HIGH VOLTAGE PANNEL:

- F1 fuse 5 x 20 5A F TR1 Supply
- F2 fuse 5 x 20 6,3A F 230B Auxiliary output
- F3 fuse 5 x 20 6,3A F 230A Auxiliary output
- F4 fuse 10 x 38 10A G Inverter 3G3JV Supply
- F16 fuse 10 x 38 10A G Main_Line Line 3
- F17 fuse 10x 38 10A G Main_Line Line 2
- F18 fuse 10x 38 10A G Main_Line Line 1
- F19 fuse 10x 38 10A G Main Neutral

LOW VOLTAGE PANNEL:

- F5 fuse 5 x 20 6,3A F 18Vac power supply for Safety board
- F6 fuse 5 x 20 3,15A F 18Vac Boards power supply for Micro switch, opto in/out and Console display
- F7 fuse 5 x 20 3,15A F 11Vac Boards power supply for Microprocessors, CAN bus and interface relay
- F8 fuse 5 x 20 3,15A F 24Vac Contactor coil
- F9 fuse 5 x 20 10A F 24Vac Collimator lamp
- F10 fuse 5 x 20 10A F FFD, Table, Cassette and Shutter motors power supply (pre rectifier)
- F11 fuse 5 x 20 10A F Compressor motor and clutch, Grid motor and Collimator motor power supply (pre rectifier)
- F12 fuse 5 x 20 3,15A F Column and S.F.D Brushless motor Break power supply (pre rectifier)
- F13 fuse 5 x 20 10A F FFD, Table, Cassette and Shutter motors power supply (post rectifier)
- F14 fuse 5 x 20 10A F Compressor motor and clutch, Grid motor and Collimator motor power supply (post rectifier)
- F15 fuse 5 x 20 3.15A F Column and S.F.D Brushless motor Break power supply (post rectifier)

SAFETY BOARD K901504:

- F1 fuse 5 x 20 3,15A T 18Vac power supply for opto in/out Switch-on and emergency
- F2 fuse 5 x 20 3,15A T 11Vac power supply for microprocessor and CAN bus power supply

MOT DRV1 K901505 (FFD and TABLE motor control):

- F1 fuse 5 x 20 3,15A T 11Vac power supply for microprocessor
- F2 fuse 5 x 20 6.3A T 60Vdc power supply for bridge drivers

MOT DRV2 K901505 (Compressor motor and Clutch control):

- F1 fuse 5 x 20 3,15A T 11Vac power supply for microprocessor
- F2 fuse 5 x 20 6.3A T 30Vdc power supply for bridge drivers

MOT DRV3 K901505 (Cassette motor control):

- F1 fuse 5 x 20 3,15A T 11Vac power supply for microprocessor
- F2 fuse 5 x 20 6.3A T 60Vdc power supply for bridge drivers

MOT DRV4 K901505 (Shutter motor control):

- F1 fuse 5 x 20 3,15A T 11Vac power supply for microprocessor
- F2 fuse 5 x 20 6.3A T 60Vdc power supply for bridge drivers

INTERFACE1 K901503:

- F1 fuse 5 x 20 3,15A T 18Vac power supply for opto in/out
- F2 fuse 5 x 20 3,15A T 11Vac power supply for microprocessor and relay coils

INTERFACE1 K901503:

- F1 fuse 5 x 20 3,15A T 18Vac power supply for opto in/out
- F2 fuse 5 x 20 3,15A T 11Vac power supply for microprocessor and relay coils

S.F.D. CONTROL K901506 (grid and collimator motor control):

- F1 fuse 5 x 20 3,15A T 18Vac power supply for opto in/out
- F2 fuse 5 x 20 3,15A T 11Vac power supply for microprocessor
- F3 fuse 5 x 20 3.15A T 30Vdc power supply for bridge drivers

CONTROL PANEL K901501:

- F1 fuse 5 x 20 3,15A T 18Vac power supply

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6.10 PCBs SCHEMATICS

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7 X-RAY COLLIMATOR

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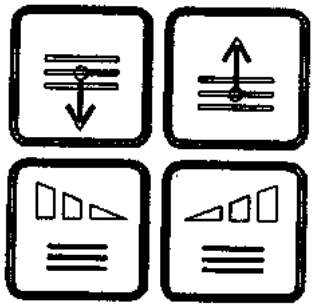
8.0 SET-UP

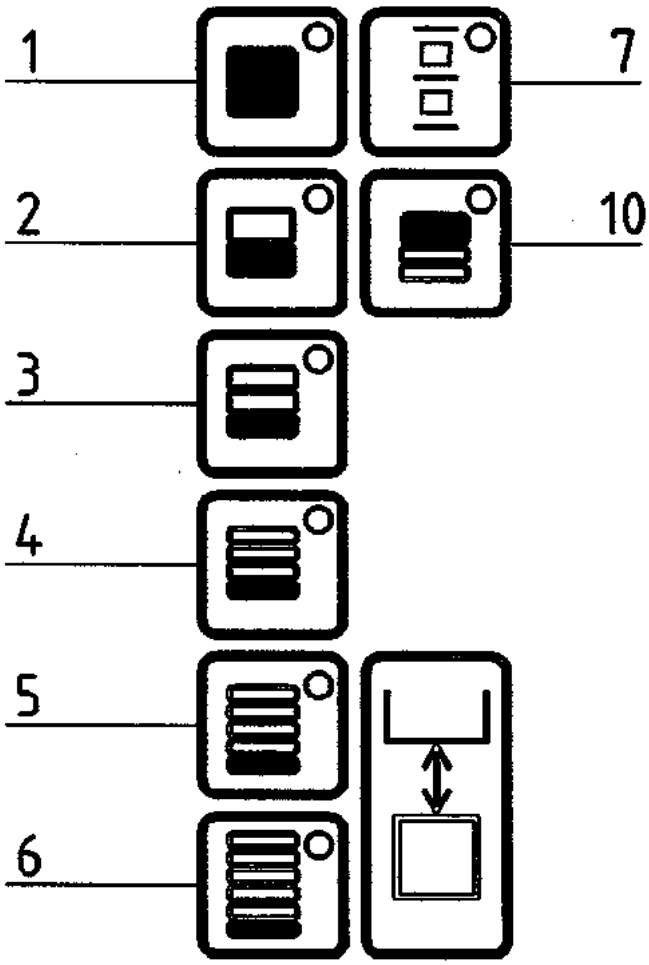
The device must be turned on:
You can enter into the Set-Up function by keeping simultaneously pressed for a time superior to 5sec. the keys indicated in the figure below.



```
************************************
************ SETUP MENU ************
************************************

01 - POTENTIOMETERS SETUP
02 – IMAGE INTENSIFIER SETUP
03 – ELECTROMAGNETIC CLUTCH SETUP
04 – COLLIMATOR SETUP
05 – SPOT FILM DEVICE SETUP
06 – ANTICOLLISION & LANGUAGE SETUP
07 – KEYBOARD TEST
10 – EXIT
```

The keys to enter further Set-Up pages are:



NOTES

NOTES

8.1 POTENTIOMETERS SET-UP

The set up has been already made in the factory, for this reason it must be done only and Exclusively if any component must be replaced or moved inside the unit.

```
***** POTENTIOMETERS SETUP MENU ****

01 - COLUMN-S.F.D. POT. SETUP
02 - TILTING POT. SETUP
03 - FOCUS FILM DISTANCE P0T.SETUP
04 - TABLE TOP POT. SETUP
05 - COMPRESSOR POT.SETUP
06 - FILM PANEL DISTANCE SETUP
07 - II-TABLE TOP DISTANCE SETUP
10 - EXIT FROM POTENTIOMETERS SETUP
```

In order to proceed use the functions keys described in par. 8.0

01 - COLUMN-SPOT FILM DEVICE POT. SETUP

```
*COLUMN-SPOT FILM DEVICE POT.SETUP *

STEP 01 – Align the column with
        the S.F.D. by means of
        JOYSTICK 3 axis X



01 – ALIGNMENT CONFIRMATION
02 – SAMPLED PARAMETERS VIEW
10 – EXIT FROM COL. SFD. POT. SETUP

COLUMN ADC Value   :####
S.F.D ADC Value  :####
```

NOTE: AFTER HAVING CONFIRMED THE FIRST STEP OF SAMPLING IT IS BETTER TO COMPLETE THE WHOLE PROCESS

By confirming the data with key "1", you enter next page
By key "2" you can visualize the sampled data without modifying them.
By key "10" you EXIT

```
*COLUMN-SPOT FILM DEVICE POT. SETUP*
STEP 02 - By JOYSTICK 4 of axis Y,
        move column and  S.F.D.
        towards head side in 760mm
        position

01 - SAVE MINIMUM PARAMETER
10 - EXIT FROM COL.-SFD. POT. SETUP


COLUMN ADC Value   : ####
S.F.D ADC Value    : ####
```

```
*COLUMN-SPOT FILM DEVICE POT.SETUP *
STEP 03 - By JOYSTICK 4 of axis Y,
        move column and S.F.D.
        towards feet side in 640mm
        position

01 - SAVE MAXIMUM PARAMETER
10 - EXIT FROM COL.-SFD. POT. SETUP


COLUMN ADC Value   : ####
S.F.D ADC Value    : ####
```

```
*COLUMN-SPOT FILM DEVICE POT.SETUP*
COLUMN SAMPLED DATA :

Max : ####
Min : ####

S.F.D. SAMPLED DATA :

Max : ####
Min : ####

10 - EXIT FROM COL.-SFD. POT. SETUP
```

02 - TILTING POT. SETUP

```
*** TILTING POTENTIOMETERS SETUP ***

STEP 01 - By JOYSTICK 1 of axis X,
        Move the table in +88
        degrees position

01 - SAVE MAXIMUM PARAMETER
02 - VIEW SAMPLED PARAMETERS
10 - EXIT FROM TILTING POT. SETUP

TILTING ADC Value  : ####
```

NOTE: AFTER HAVING CONFIRMED THE FIRST STEP OF SAMPLING IT IS BETTER TO COMPLETE THE WHOLE PROCESS

By confirming the data with key "1", you enter next page
By key "2" you can visualize the sampled data without modifying them.
By key "10" you EXIT

```
*** TILTING POTENTIOMETERS SETUP ***

STEP 02 - By JOYSTICK 1 of axis X,
        move the table in +00
        degrees position"


01 - SAVE POS. ZERO PARAMETER
10 - EXIT FROM TILTING POT. SETUP

TILTING ADC Value  : ####
```

```
*** TILTING POTENTIOMETERS SETUP ***

STEP 03 - select table Tilting
        Modality : ####


01 - SAVE PARAMETER -20 degrees
02 - SAVE PARAMETER -90 degrees
10 - EXIT FROM TILTING POT. SETUP
```

```
*** TILTING POTENTIOMETERS SETUP ***

STEP 04 - By JOYSTICK 1 of axis X,
        move the table in -17
        degrees position

01 - SAVE MINIMUM PARAMETER
10 - EXIT FROM TILTING POT. SETUP

TILTING ADC Value  : ####
```

```
************************************
*** TILTING POTENTIOMETERS SETUP ***
************************************

TILTING SAMPLED DATA :
Max +88 degrees : ####
   +00 degrees : ####
Min -88 degrees : ####

10 - EXIT FROM TILTING POT. SETUP
```

03 - FOCUS FILM DISTANCE P0T. SETUP

```
** FOCUS FILM DISTANCE POT. SETUP **

STEP 01 - By JOYSTICK 1 of axis Y,
        move the focal distance
        to 1500mm


01 - SAVE MAXIMUM PARAMETER
02 - VIEW SAMPLED PARAMETERS
10 - EXIT FROM FFD POT. SETUP MENU

FFD ADC Value  : ####
```

NOTE: AFTER HAVING CONFIRMED THE FIRST STEP OF SAMPLING IT IS BETTER TO COMPLETE THE WHOLE PROCESS

By confirming the data with key “1”, you enter next page
By key “2” you can visualize the sampled data without modifying them.
By key “10” you EXIT

```
** FOCUS FILM DISTANCE POT. SETUP **

STEP 02 - By JOYSTICK 1 of axis Y,
        move the focal distance
        to 1050mm


01 - SAVE MINIMUM PARAMETER
10 - EXIT FROM DFF POT. SETUP MENU

FFD ADC Value  : ####
```

```
************************************
** FOCUS FILM DISTANCE POT. SETUP **
************************************


FFD SAMPLED DATA:

Max 1500mm : ####
MIN 1050mm : ####

10 - EXIT FROM FFD SETUP MENU"
```

04 – TABLE TOP POT. SETUP

```
******** TABLE TOP POT.SETUP *******

STEP 01 - By JOYSTICK 4 of axis X,
        move table top to the
        internal limit

01 - SAVE MINIMUM PARAMETER
02 - VIEW SAMPLED PARAMETERS
10 - EXIT FROM TABLE TOP POT. SETUP

TABLE TOP. ADC Value: ####
```

NOTE: AFTER HAVING CONFIRMED THE FIRST STEP OF SAMPLING IT IS BETTER TO COMPLETE THE WHOLE PROCESS

By confirming the data with key "1", you enter next page
By key "2" you can visualize the sampled data without modifying them.
By key "10" you EXIT

```
******** TABLE TOP POT.SETUP *******

STEP 02 - By JOYSTICK 4 of axis X,
        move table top to the
        external limit

01 - SAVE MAXIMUM PARAMETER
10 - EXIT FROM TABLE TOP POT. SETUP

TABLE TOP. ADC Value: ####
```

```
************************************
******** TABLE TOP POT.SETUP *******
************************************

TABLE TOP SAMPLED DATA:

MAX Internal: ####
MIN External: ####

10 - EXIT FROM TABLE TOP POT. SETUP
```

05 - COMPRESSOR POT. SETUP

```
******* COMPRESSOR POT. SETUP ******

STEP 01 - By the KEY DOWN move
        compressor towards the
        inferior limit

01 - SAVE MINIMUM PARAMETER
02 - VIEW SAMPLED PARAMETERS
10 - EXIT FROM COMPRESS. POT. SETUP

COMPRESSOR ADC Value : ####
```

NOTE: AFTER HAVING CONFIRMED THE FIRST STEP OF SAMPLING IT IS BETTER TO COMPLETE THE WHOLE PROCESS

By confirming the data with key "1", you enter next page
By key "2" you can visualize the sampled data without modifying them.
By key "10" you EXIT

```
******* COMPRESSOR POT. SETUP ******

STEP 02 - By the KEY UP move
        compressor towards the
        superior limit

01 - SAVE MAXIMUM PARAMETER
10 - EXIT FROM COMPRESS. POT. SETUP

COMPRESSOR ADC Value: ####
```

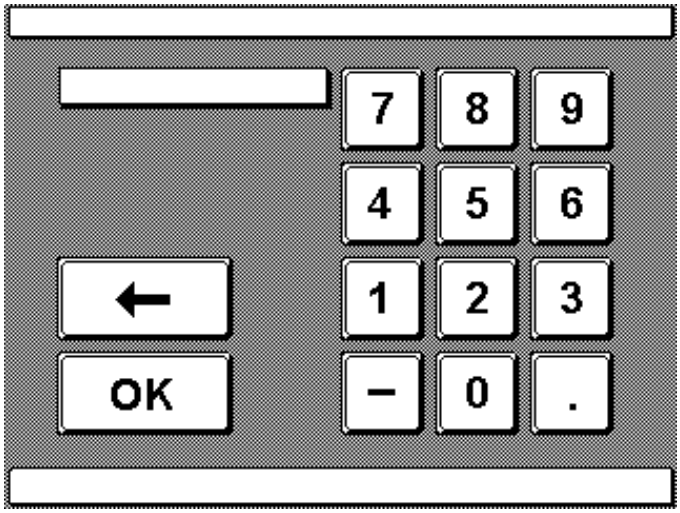
```
************************************
******* COMPRESSOR POT. SETUP ******
************************************

COMPRESSOR SAMPLED DATA

MIN - Inferior : ####
MAX - Superior : ####

10 - EXIT FROM COMPRESS. POT. SETUP
```

06 - FILM PANEL DISTANCE SETUP
07 – I.I. PANEL DISTANCE SETUP



NOTE: ONCE YOU'VE ENTERED THE PAGE, YOU CAN'T RETURN TO THE PREVIOUS ONE.
BY DIGITING A NUL VALUE YOU CAN VIZUALIZE THE PREVIOUS SET VALUES WITHOUT MODIFYING THEM.

```
**** FILM PANEL DISTANCE SETUP
*****

FILM PANEL DISTANCE SETUP : ##

10 - EXIT FROM FILM PANEL DIS.
SETUP
```

```
**** I.I. PANEL DISTANCE SETUP ****

I.I. PANEL DISTANCE SETUP : ##

10 - EXIT FROM I.I. PANEL DIS.
SETUP
```

NOTES

8.2 I.I. SET-UP

The set up has been already made in the factory, for this reason it must be done only and exclusively if you must replace the image intensifier.

NOTE: THE SETTING OF THE I.I. (IMAGE INTENSIFIER) TYPE IS CORRELATED TO THE ANTICOLLISION; A WRONG SETTING COULD CAUSE DAMAGE TO THE IMAGE INTENSIFIER !!!

```
*** IMAGE INTENSIFIER SETUP MENU ***

01 - 9 INCHES
02 - 12 INCHES
03 - 14 INCHES
04 - 16 INCHES

10 - EXIT FROM I.I. SETUP

SELECTED I.I.: ##
```

Confirming the data with one of the key “1” “2” “3” “4” you select the indicated dimension and you go to next page.
With the key “10” you EXIT

```
*** IMAGE INTENSIFIER SETUP MENU ***

01 - 1 FIELD
02 - 2 FIELDS
03 - 3 FIELDS
04 - 4 FIELDS


10 - EXIT FROM I.I. SETUP
```

Confirming the data with one of the key “1” “2” “3” “4” you select the indicated number of fields and you return to the previous page.
With the key “10” you EXIT

NOTES

8.2 I.I. SET-UP

The set up has been already made in the factory, for this reason it must be done only and exclusively if you must replace the image intensifier.

NOTE: THE SETTING OF THE I.I. (IMAGE INTENSIFIER) TYPE IS CORRELATED TO THE ANTICOLLISION; A WRONG SETTING COULD CAUSE DAMAGE TO THE IMAGE INTENSIFIER !!!

```
*** IMAGE INTENSIFIER SETUP MENU ***

01 - 9 INCHES
02 - 12 INCHES
03 - 14 INCHES
04 - 16 INCHES

10 - EXIT FROM I.I. SETUP

SELECTED I.I.: ##
```

Confirming the data with one of the key “1” “2” “3” “4” you select the indicated dimension and you go to next page.
With the key “10” you EXIT

```
*** IMAGE INTENSIFIER SETUP MENU ***

01 - 1 FIELD
02 - 2 FIELDS
03 - 3 FIELDS
04 - 4 FIELDS


10 - EXIT FROM I.I. SETUP
```

Confirming the data with one of the key “1” “2” “3” “4” you select the indicated number of fields and you return to the previous page.
With the key “10” you EXIT

NOTES

8.3 ELECTROMAGNETIC CLUTCH SET-UP

The set up has been already made in the factory, for this reason it must be done only and exclusively if you must replace a component.

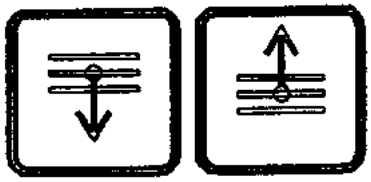
*ELECTROMAGNETIC CLUTCH SETUP MENU**

STEP 01 - Calibration to the
minimum level of the
ELECTROMAGNETIC CLUTCH
percentage
For the setting use layer
Increase and decrease keys

01 - SAVE MINIMUM PARAMETER
02 – SAMPLED PARAMETERS VIEW
10 - EXIT FROM ELECTROMAGNETIC C.

Percentage : ###%

By the keys indicated here below, you can change calibration value



By key “1” you confirm the data and you enter next page.
By key “10” you EXIT

*ELECTROMAGNETIC CLUTCH SETUP MENU**

STEP 01 - Calibration to the
medium level of the
ELECTROMAGNETIC CLUTCH
percentage
For the setting use layer
increase and decrease keys

01 - SAVE MEDIUM PARAMETER
02 - SAMPLED PARAMETERS VIEW
10 - EXIT FROM ELECTROMAGNETIC C.

Percentage : ###%

```
ELECTROMAGNETIC CLUTCH SETUP MENU**

STEP 01 - Calibration to the
          maximum level of the
          ELECTROMAGNETIC CLUTCH
          percentage
          For the setting use layer
          increase and decrease keys

01 - SAVE MAXIMUM PARAMETER
02 - SAMPLED PARAMETERS VIEW
10 - EXIT FROM ELECTROMAGNETIC C.

Percentage : ###
```

By key “1” you confirm the data and you enter next page.

```
************************************
*ELECTROMAGNETIC CLUTCH SETUP MENU**
************************************

ELECTROMAGNETIC CLUTCH SAMPLED DATA

MINIMUM Percentage : ###
MEDIUM  Percentage : ###
MAXIMUM Percentage : ###

10 - EXIT FROM ELECTROMAGNETIC C.
```

NOTES

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8.4 COLLIMATOR SET-UP

The set up has been already made in the factory, for this reason it must be done only and exclusively if you must move or replace a component inside the collimator.

```
******* COLLIMATOR SETUP MENU ******

STEP 01 - Has the Focal Distance
          (FFD) been set

01 - YES
02 - NO
03 - VIEW OF SAMPLED PARAMETERS
10 - EXIT FROM COLLIMATOR SETUP
```

NOTE: AFTER HAVING CONFIRMED THE FIRST STEP OF SAMPLING, IT IS BETTER TO COMPLETE THE WHOLE PROCESS.
- SAMPLING IS CORRECTLY MADE ONLY IF THE SETTING OF FFD POTENTIOMETER HAS ALREADY BEEN MADE.

By key “1”, you enter next page
By key “2” you exit from the whole SET UP program and you restart the unit.
By key “3” you can visualize the sampled data without modifying them.
By key “10” you EXIT

```
******* COLLIMATOR SETUP MENU ******

STEP 02 - Select the type of
          calibration


01 - AUTOMATIC CALIBRATION
02 - OFFSET COLLIMATOR
10 - EXIT FROM COLLIMATOR SETUP
```

In this phase you can choose to continue normal set up procedure or enter directly the offset collimator page
By key “1”, you enter automatic calibration
By key “2” you enter directly in the offset collimator page
By key “10” you EXIT

```
******* COLLIMATOR SETUP MENU ******

STEP 03 - Automatic Calibration of
          completely closed
          Collimator

10 - EXIT FROM COLLIMATOR SETUP

Wait Time    : ######mS
Long ADC Val : ####
Latr ADC Val : ####
```

In this phase of sampling the collimator will automatically close the shutters till the minimum dimension.

```
******* COLLIMATOR SETUP MENU ******

STEP 04 - Automatic Calibration of
          all open Collimator

10 - EXIT FROM COLLIMATOR SETUP

Wait Time    : ######mS
Long ADC Val :
Latr ADC Val :
```

In this phase of sampling the collimator will automatically open the shutters to the maximum dimension.

```
******* COLLIMATOR SETUP MENU ******

STEP 05 - Shift of the focal
        distance to 1500mm
STEP 06 - By JOYSTICK 2, place the
        Collimator with
        300mm X 300mm focus

01 - SAVE MINIMUM PARAMETER
10 - EXIT FROM COLLIMATOR SETUP

 Long ADC Val : ####
 Latr ADC Val : ####
```

In this phase of sampling the FFD will automatically places itself to 1500mm, once this position has been reached, by means of joystick you can place the collimator shutters so that at film height, the square illuminated field has a dimension of 300mm x 300mm.
By key “1” you enter next page.

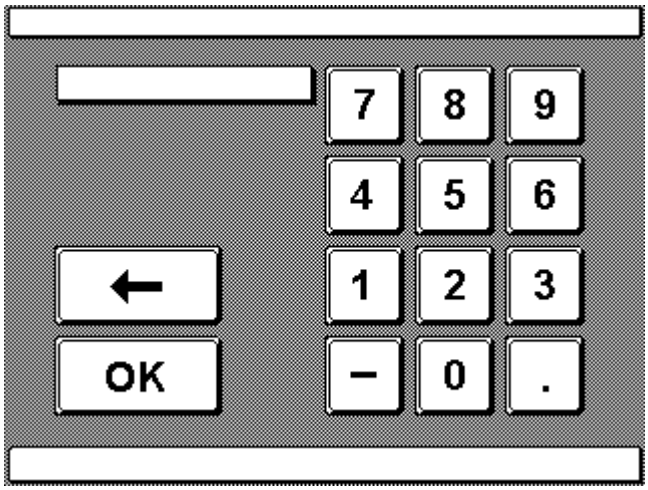
```
******* COLLIMATOR SETUP MENU ******

STEP 07 - Shift of the focal
        distance to 1050mm
STEP 08 - By JOYSTICK 2, place the
        Collimator with
        300mm X 300mm focus

01 - SAVE MAXIMUM PARAMETER
10 - EXIT FROM COLLIMATOR SETUP

Long ADC Val : ####
Latr ADC Val : ####
```

In this phase of sampling the FFD will automatically place itself to 1050mm, once this position has been reached, by means of joystick you can place the collimator shutters so that at film height, the square illuminated field has a dimension of 300mm x 300mm.
By key “1” you enter next page.



Press ok

```
************************************
******* COLLIMATOR SETUP MENU ******
************************************

COLLIMATOR SAMPLED DATA :
Long MIN        : ####
Latr MIN        : ####
Long MAX        : ####
Latr MAX        : ####
Long 1500 300X300 : ####
Latr 1500 300X300 : ####
Long 1050 300X300 : ####
Latr 1050 300X300 : ####
Offset          : ####

10 - EXIT FROM COLLIMATOR SETUP
```

NOTES

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8.4 COLLIMATOR SET-UP

The set up has been already made in the factory, for this reason it must be done only and exclusively if you must move or replace a component inside the collimator.

```
******* COLLIMATOR SETUP MENU ******

STEP 01 - Has the Focal Distance
      (FFD) been set

01 - YES
02 - NO
03 - VIEW OF SAMPLED PARAMETERS
10 - EXIT FROM COLLIMATOR SETUP
```

NOTE: AFTER HAVING CONFIRMED THE FIRST STEP OF SAMPLING, IT IS BETTER TO COMPLETE THE WHOLE PROCESS.
- SAMPLING IS CORRECTLY MADE ONLY IF THE SETTING OF FFD POTENTIOMETER HAS ALREADY BEEN MADE.

By key "1", you enter next page
By key "2" you exit from the whole SET UP program and you restart the unit.
By key "3" you can visualize the sampled data without modifying them.
By key "10" you EXIT

```
******* COLLIMATOR SETUP MENU ******

STEP 02 - Select the type of
      calibration


01 - AUTOMATIC CALIBRATION
02 - OFFSET COLLIMATOR
10 - EXIT FROM COLLIMATOR SETUP
```

In this phase you can choose to continue normal set up procedure or enter directly the offset collimator page
By key "1", you enter automatic calibration
By key "2" you enter directly in the offset collimator page
By key "10" you EXIT

```
******* COLLIMATOR SETUP MENU
******

STEP 03 - Automatic Calibration of
          completely closed
          Collimator

10 - EXIT FROM COLLIMATOR SETUP

Wait Time    : ######mS
Long ADC Val : ####
Latr ADC Val : ####
```

In this phase of sampling the collimator will automatically close the shutters till the minimum dimension.

```
******* COLLIMATOR SETUP MENU ******

STEP 04 - Automatic Calibration of
        all open Collimator

10 - EXIT FROM COLLIMATOR SETUP

Wait Time    : ######mS
Long ADC Val :
Latr ADC Val :
```

In this phase of sampling the collimator will automatically open the shutters to the maximum dimension.

```
******* COLLIMATOR SETUP MENU ******

STEP 05 - Shift of the focal
        distance to 1500mm
STEP 06 - By JOYSTICK 2, place the
        Collimator with
        300mm X 300mm focus

01 - SAVE MINIMUM PARAMETER
10 - EXIT FROM COLLIMATOR SETUP

 Long ADC Val : ####
 Latr ADC Val : ####
```

In this phase of sampling the FFD will automatically place itself to 1500mm, once this position has been reached, by means of joystick you can place the collimator shutters so that at film height, the square illuminated field has a dimension of 300mm x 300mm.
By key "1" you enter next page.

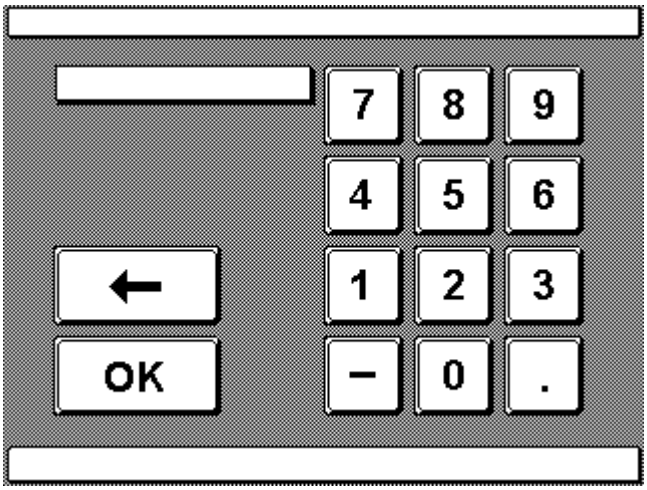
```
******* COLLIMATOR SETUP MENU ******

STEP 07 - Shift of the focal
        distance to 1050mm
STEP 08 - By JOYSTICK 2, place the
        Collimator with
        300mm X 300mm focus

01 - SAVE MAXIMUM PARAMETER
10 - EXIT FROM COLLIMATOR SETUP

Long ADC Val : ####
Latr ADC Val : ####
```

In this phase of sampling the FFD will automatically place itself to 1050mm, once this position has been reached, by means of joystick you can place the collimator shutters so that at film height, the square illuminated field has a dimension of 300mm x 300mm.
By key "1" you enter next page.



Press ok

```
**********************************
******* COLLIMATOR SETUP MENU ******
**********************************

COLLIMATOR SAMPLED DATA :
Long MIN          : ####
Latr MIN          : ####
Long MAX          : ####
Latr MAX          : ####
Long 1500 300X300 : ####
Latr 1500 300X300 : ####
Long 1050 300X300 : ####
Latr 1050 300X300 : ####
Offset            : ####

10 - EXIT FROM COLLIMATOR SETUP
```

NOTES

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8.5 S.F.D. (=SPOT FILM DEVICE) SET-UP

The set up has been already made in the factory, for this reason it must be done only and exclusively if you must move or replace a component inside the Spot Film Device.

```
************************************
******** S.F.D. SETUP MENU *********
************************************

01 - SHUTTER SETUP
02 - CASSETTE SETUP
03 - CASSETTE EJECT
04 - VIEW OF SAMPLED PARAMETER
10 - EXIT FROM SETUP
```

NOTE: ONCE YOU'VE ENTERED THE SHUTTER AND CASSETTE SET UP, IT IS BETTER TO COMPLETE THE WHOLE SAMPLING PROCESS.
By key "3" you visualize the sampled data without modifying them.
By key "10" you EXIT.

01 – SHUTTER SETUP

```
**** S.F.D. SETUP MENU - SHUTTER ***

STEP 01 - SHUTTER Calibration.
        Wait the end of search
        of ZERO point

10 - EXIT FROM SHUTTER SETUP
```

Wait that the Shutters activate FC16 “Zero Shutter” end stop micro.
By pressing key “1”you enter next page.

```
**** S.F.D. SETUP MENU - SHUTTER ***

STEP 02 – Wait the end of SHUTTER
        Positioning to 3000 feet
STEP 03 – Measure the distance
        Covered by SHUTTERS

01 - RUN INSERTION");
10 - EXIT FROM SHUTTER SETUP
```

By pressing key “1” you insert the real measure between the two, obtained by the difference of the initial distance (Zero Shutter FC16 PRESSED) to the final one (SHUTTER positioning to 3000 feet).

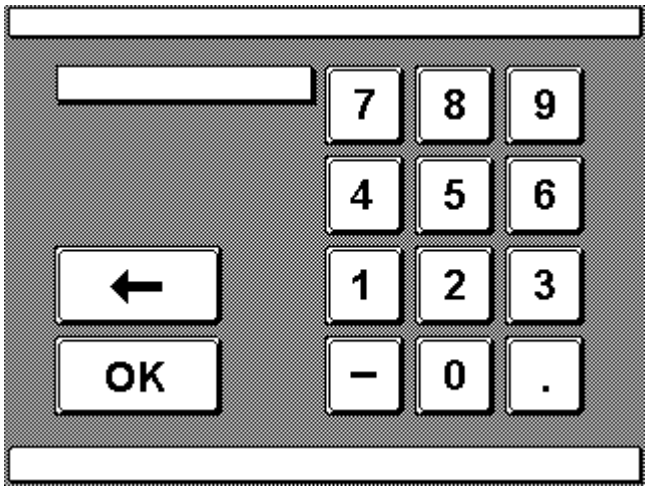
Press OK

```
**** S.F.D. SETUP MENU - SHUTTER ***

STEP 04 - Wait SHUTTERS positioning
        to 40mm
STEP 05 - Measure the difference
        with the real 40mm


01 - OFFSET INSERTION
10 - EXIT FROM SHUTTER SETUP
```

Wait that the Shutters place at a distance of 40mm between themselves.
If the distance does not correspond to 40 mm, by pressing key “1” you insert the difference between the real quote and the 40 mm.



Press OK

```
************************************
******** S.F.D. SETUP MENU *********
************************************

SHUTTER  - S.F.D. SAMPLED DATA :
OFFSET mm : ###
RUN    mm : ###

CASSETTE - S.F.D. SAMPLED DATA :
OFFSET mm : ###
RUN    mm : ###
```

02 – CASSETTE SETUP

```
*** S.F.D. SETUP MENU - CASSETTE ***

STEP 01 - CASSETTE calibration.
        Wait the end of search
        of ZERO point

10 - EXIT FROM CASSETTE SETUP
```

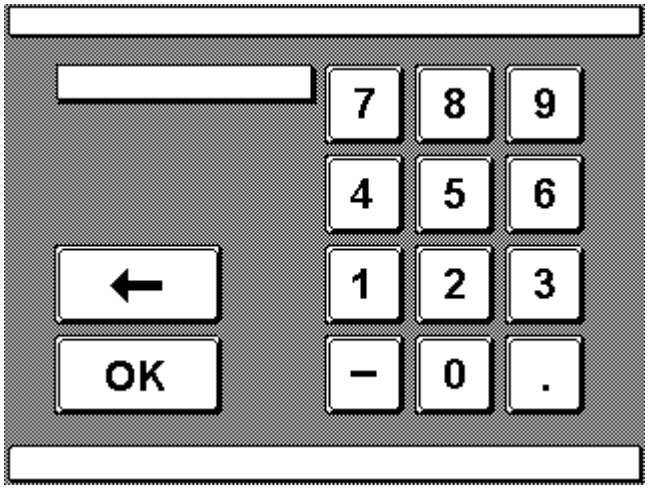
Wait that the cassette activates FC14 “Parked Cassette” end stop micro.
By pressing key “1”you enter next page.

```
*** S.F.D. SETUP MENU - CASSETTE ***

STEP 02 - Wait the end of CASSETTE
          positioning to 8000 steps
STEP 03 - Measure the distance
          Covered by the CASSETTE

01 - RUN INSERTION
10 - EXIT FROM CASSETTE SETUP
```

By pressing key “1” you insert the real measure, obtained by the difference from the initial position (FC14 Cassette Park) to the final one (CASSETTE Positioning to 8000 steps).



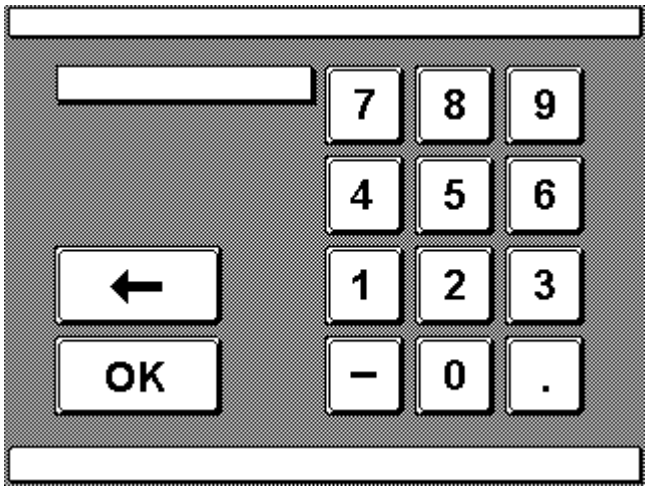
Press OK

```
*** S.F.D. SETUP MENU - CASSETTE ***

STEP 04 - Wait the CASSETTE
          Positioning to ZERO FILM
          Quote.(Edge of film)
STEP 05 - Measure the difference
          with ZERO film edge

01 - OFFSET INSERTION
10 - EXIT FROM CASSETTE SETUP
```

Wait that the Cassette places itself at ZERO FILM quote.
If the position does not correspond, by pressing key “1” you insert the difference between the real position and the ZERO FILM. (Zero film means film edge)



Press OK

```
************************************
******** S.F.D. SETUP MENU *********
************************************


SHUTTER  - S.F.D. SAMPLED DATA :
OFFSET mm : ###
RUN    mm : ###

CASSETTE - S.F.D. SAMPLED DATA :
OFFSET mm : ###
RUN    mm : ###
```

03 – CASSETTE EJEC SETUP

```
***** CASSETTE EJECT SETUP
MENU ****

01 - AUTOMATIC
02 - MANUAL
10 - EXIT FROM EJECT CASSETTE

CASSETTE EJECT : ########
```

-By pressing key “1” you select automatic cassette eject.
-By pressing key “2” you select manual cassette eject.

NOTES

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8.6 ANTICOLLISION AND LANGUAGE SET UP

The set up has been already made in the factory, for this reason it must be done only and exclusively if you must move or replace any component (image intensifier, X-ray tube).

```
************************************
** ANTICOLLISION & LANGUAGE SETUP **
************************************

01 - CEILING HEIGHT
02 - I.I. OFFSET
03 - LANGUAGE
10 - EXIT MENU ANTICOLL. & LANGUAGE
```

01 – HEIGHT OF THE CEILING

```
***** ANTICOLLISION SETUP MENU *****

01 - CEILING H. SUPERIOR to 3mt
02 - CEILING.H. INFERIOR to 3mt

TYPE OF CEILING: ###. 3mt.
```

By pressing key “1” you select a limitation of a ceiling superior to mt.3
NOT LIMITED MACHINE
By pressing key “2” you select a limitation for a ceiling inferior to mt.3

02 – I.I. OFFSET

```
***** ANTICOLLISION SETUP MENU *****

01 - OFFSET I.I. 0 degrees
02 - OFFSET I.I. 1 degrees
03 - OFFSET I.I. 2 degrees
04 - OFFSET I.I. 3 degrees
05 - OFFSET I.I. 4 degrees
06 - OFFSET I.I. 5 degrees
07 - OFFSET I.I. POS/NEG

SET I.I. OFFSET: +#

10 - EXIT FROM ANTICOLLISION SETUP
```

By pressing keys “1/2/3/4/5/6” you select the limitation value.
By pressing keys “7” you select limitation offset is positive or negative.

01 – HEIGHT OF THE CEILING

```
************************************
********** SETUP LANGUAGE **********
************************************

01 - ITALIAN
02 - ENGLISH
03 - FRENCH

TYPE LANGUAGE: #########
```

By pressing keys “1” you select Italian language.
By pressing keys “2” you select English language.
By pressing keys “3” you select French language.

NOTE: the language selection is available for operator graphic interface; set up menu is always in English language.

NOTES

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8.7 KEYBOARD SET-UP

This page allows to check the functionality of the display, of touch screen panel, of the keyboard, of joysticks, of installed memories and format sensor.

```
**** SELF TEST UTILITY AT STARTUP ****
Software Release..: STS 00228 V00.00
External RAM .....: OK
External Flash ...: OK
Eeprom ...........: NOT IMPLEMENTED
Lateral          Long
18 = #  40 = #     18 = #  40 = #
20 = #  43 = #     20 = #  43 = #
24 = #             24 = #
30 = #             30 = #
35 = #             35 = #

##-##  ##-##  ##-##  ##-##
POT1_X=####; ###    POT1_Y=####; ###
POT2_X=####; ###    POT2_Y=####; ###
POT3_X=####; ###    POT3_Y=####; ###
POT4_X=####; ###    POT4_Y=####; ###

DispX=####   DispY=####
AbslX=####   AbslY=####

 NORMAL    REVERSE    CLEAR
```

By pressing key “10” you return to main MENU.

NOTES

8.8 MECHANICAL ADJUSTING AND CENTRING

01 - Tube arm adjustment

02 - Tube rotation on column vertical axis adjustment.

03 - X-ray tube incidence adjustment.

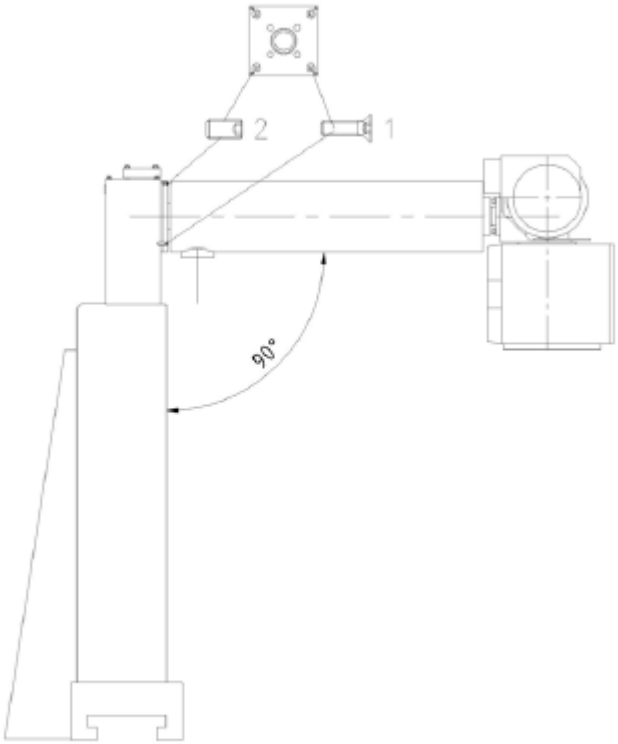
04 - X-ray tube transversal positioning

05 - SFD – Column centring alignment

06 - I.I. – SFD Centring

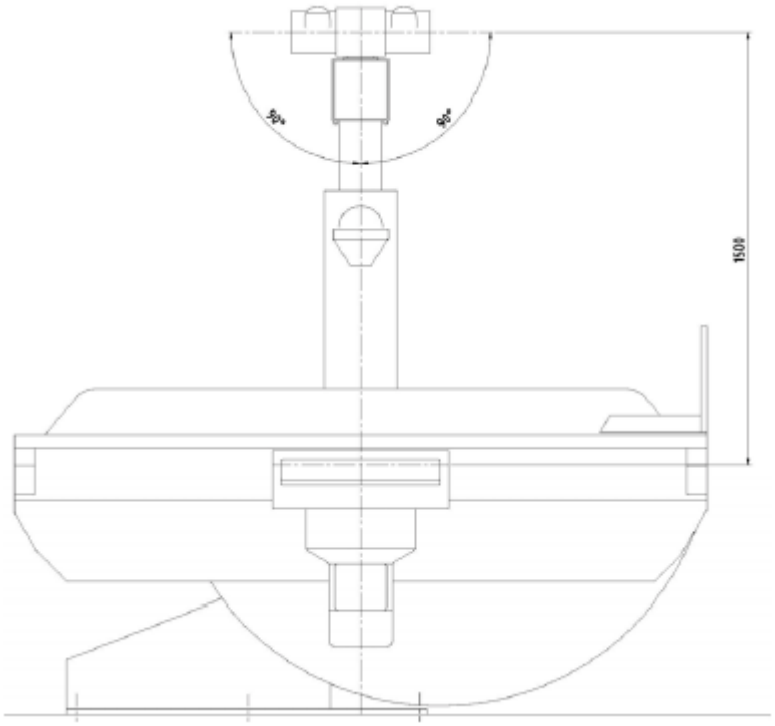
01 - X-ray tube arm Adjustment:

Adjust screws (1) and grains (2) to position tube arm at 90° in comparison to the column stand.

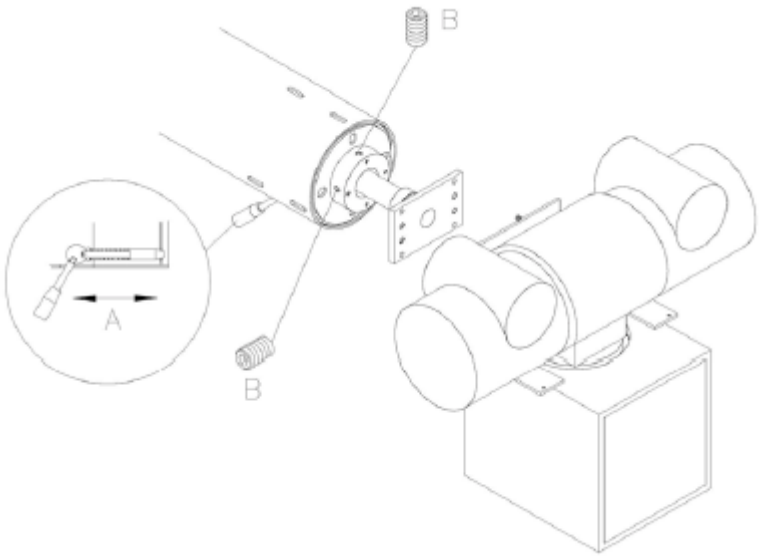


02 - X-ray tube rotation on column vertical axis adjustment:

Place the table in horizontal position. Check the perfect verticality of the column (centring at zero).

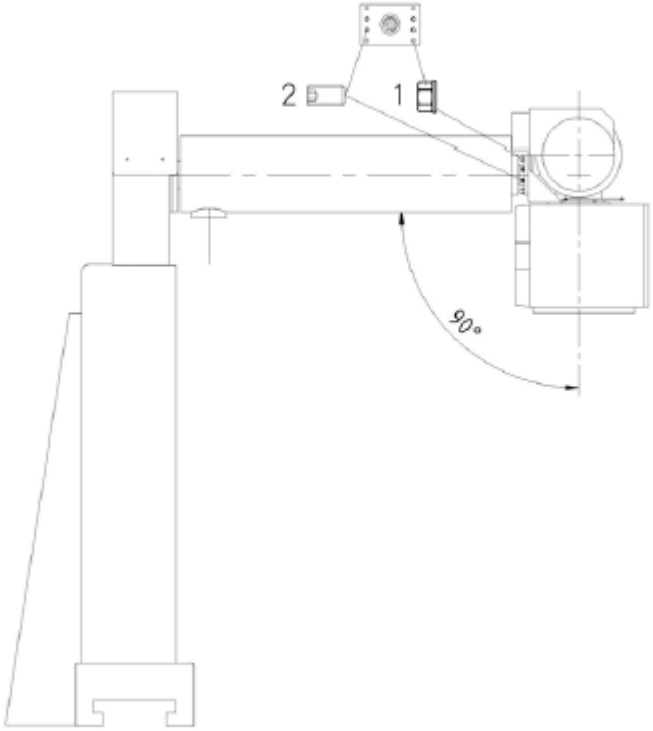


Make sure that handle (A) is inserted in working position and security micro is activated. Rotate X-ray tube till vertical position and block by grains (B).



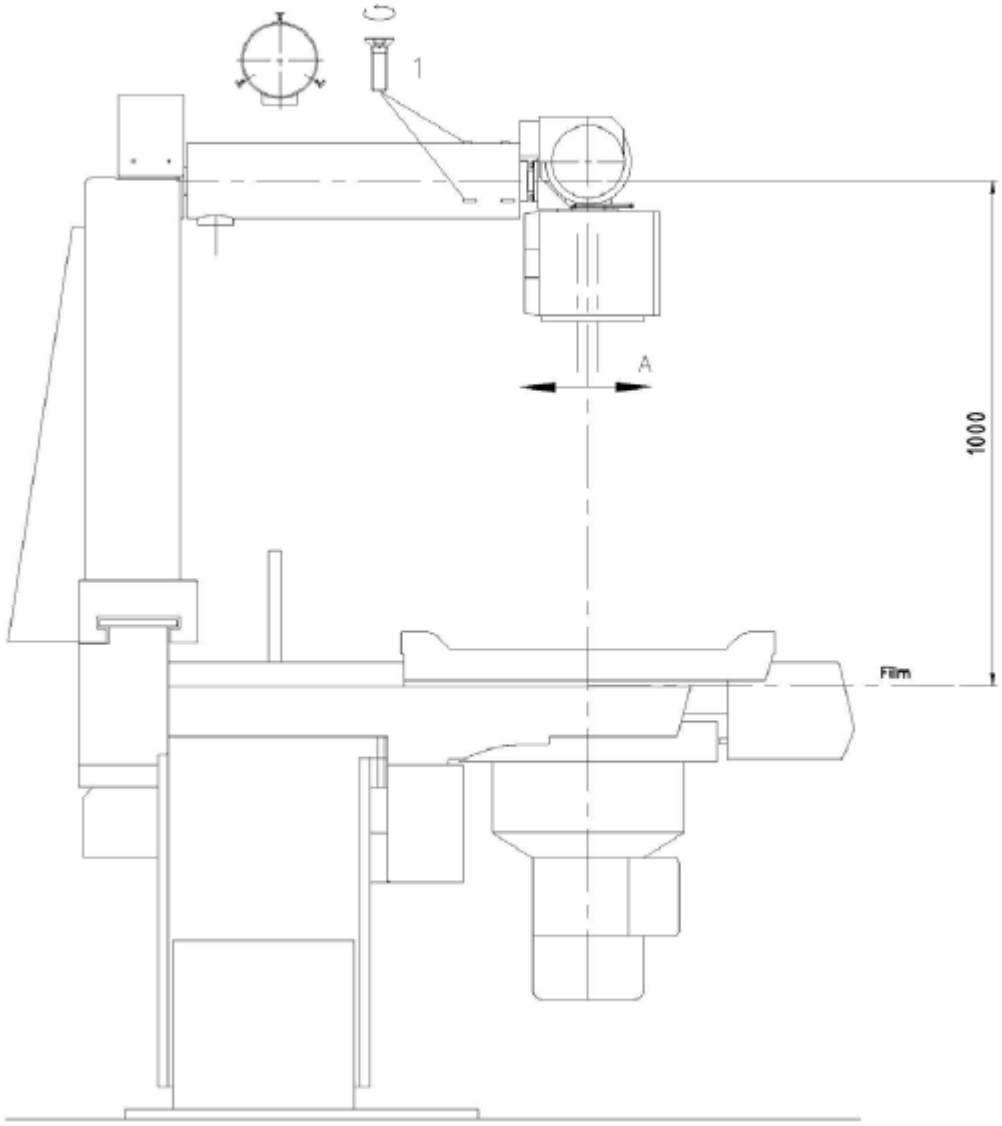
03 - X-ray tube incidence adjustment:

Adjust screws (1) and grains (2) to position X-ray tube at 90° in comparison to the tube arm.



04 - X-ray tube transversal positioning:

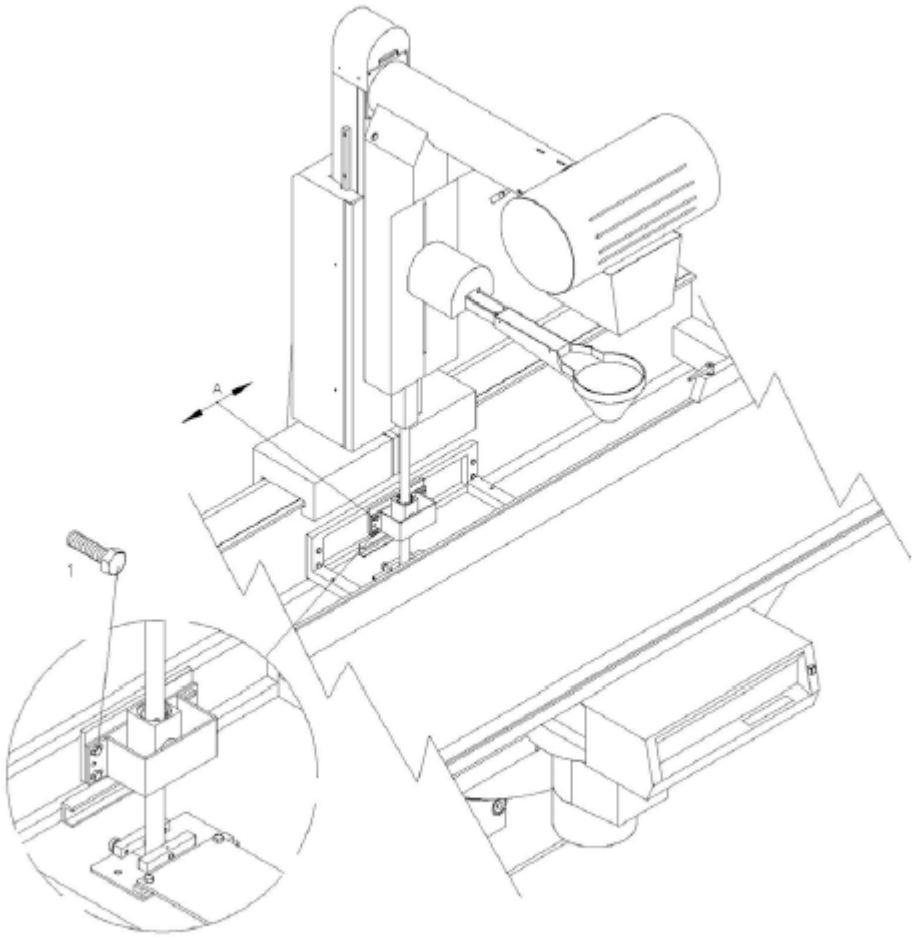
You need to place X-ray tube at the centre of SFD.
To make this adjustment, loosen screws (1), move X-ray tube as per figure and close.
Please recheck also X-ray tube incidence because these two adjustments have an influence on each other.



05 - Centring SFD on column:

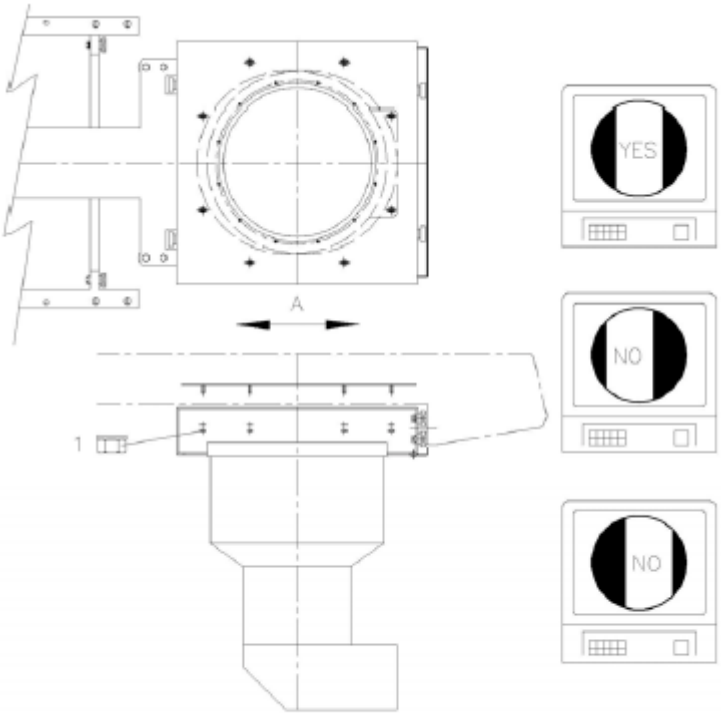
After having adjusted points: 01 – 02 – 03 – 04.

In order to align X-ray centre and SFD, you need to regulate SFD longitudinal adjustment by means of screws (1).



06 - I.I. – SFD centring:

In order to align fluoroscopy and graphy you need to centre I.I. on SFD.
Please follow this procedure:
Insert horizontally a cm 24x30 cassette in the SFD and set a program divided by 2. The SFD shutter will set itself at an opening of mm 14,3. If you make a scopy, you see a vertical band on the TV monitor. This band must be symmetrically at the centre of the monitor. If it's not, you must adjust as per figure (A) until you reach an optimal result.

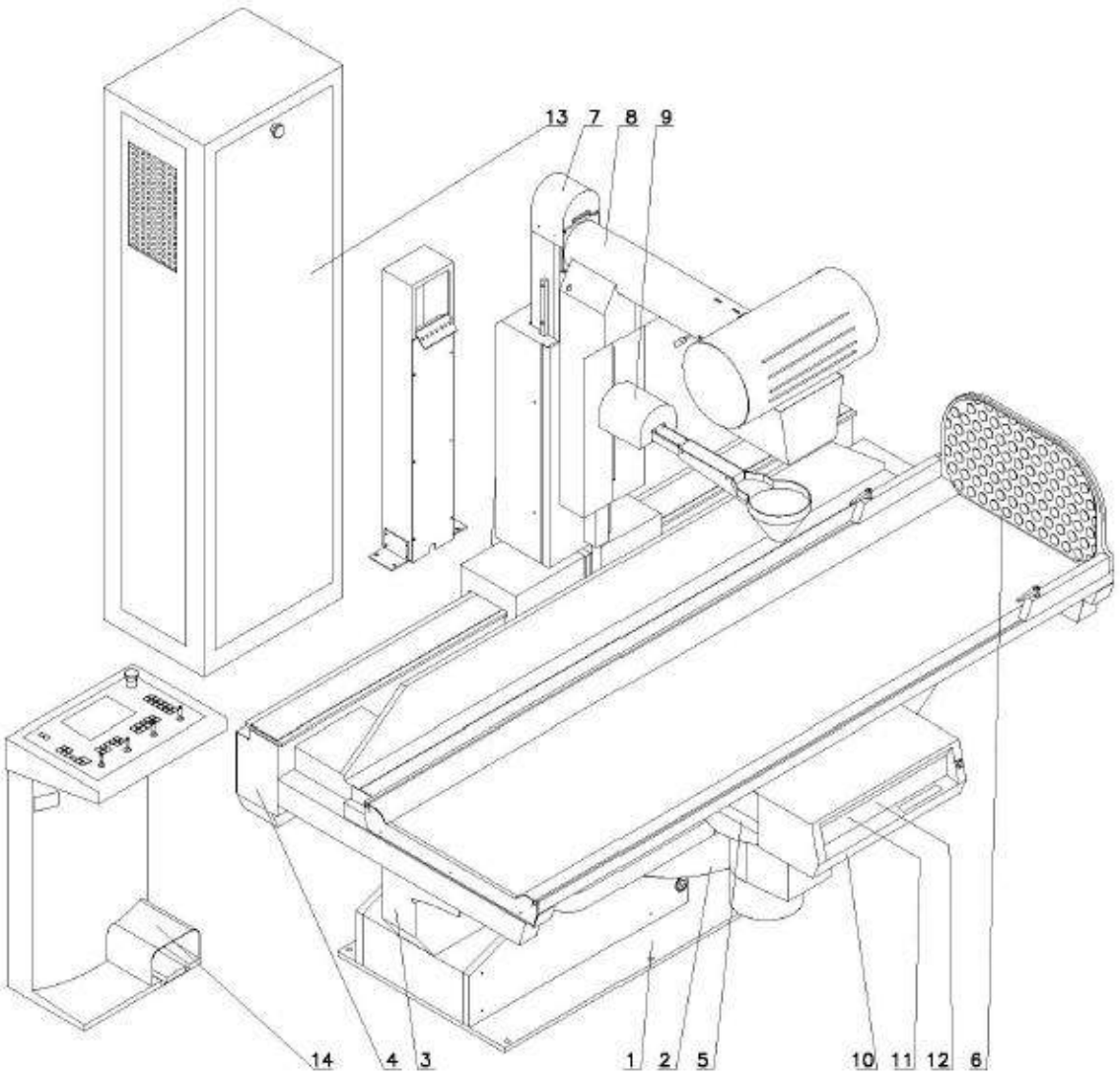


P.S.

After completing all mechanical adjusting procedure (01-06), we suggest you to check that electronic collimator X-ray beam is well centred and aligned (see fluoroscopy and graphy and the light of X-ray field)

To optimize this centring and compensate any mechanical flexion of the equipment, we advise you to work at a tilting of 45°.

9 – SPARE PARTS


13
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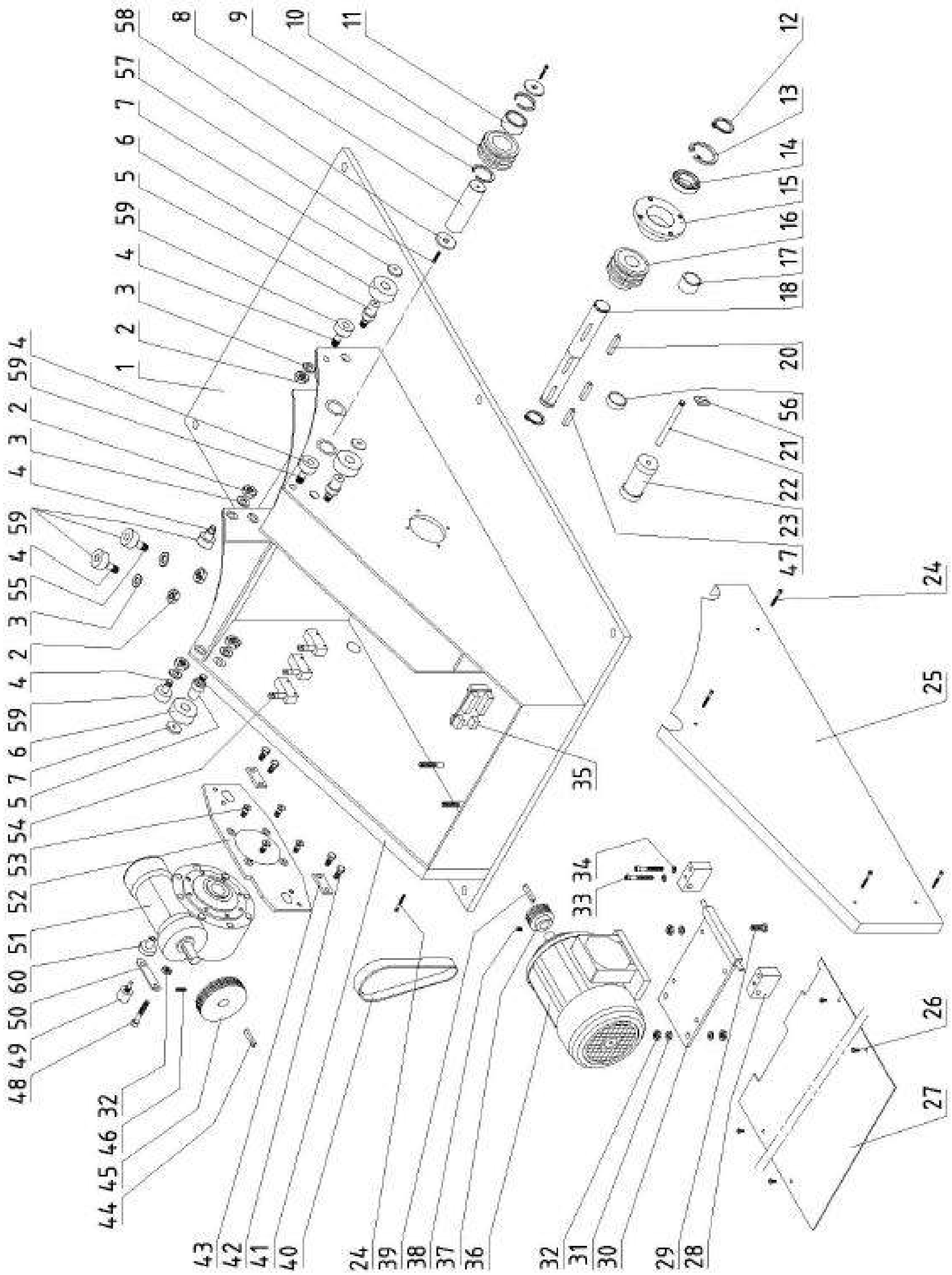
6

POSITION	CODE	DESCRIPTION	QUANTITY
1	E9001 C	90/20 BASE	1
2	E9002 A	SECTOR	1
3	E9003 B	90/20 FRONT CROSS MEMBER	1
4	E9004 B	90/20 BACK CROSS MEMBER	1
5	E9023	I.I. SFD SUPPORT	1
6	E9006	TABLE TOP	1
7	E9007	TUBE STAND	1
8	E9008	HOUSING SUPPORT	1
9	E9009 A	ROD	1
10	E9010	SFD	1
11	E9011	CARRIAGE	1
12	E9012	FIELD STOP	1
13	E9013	RACK	1
14	E9014	CONSOLE	1



58 8 9 10 11 12
57 7 6 5 59 4 3 2 1
13 14 15 16 17 18 20 56 21 22 23 47
59 4 2 3 4 59 4 55 3 2 4 59 6 7 5 54 53 52 51 60 50 49 48
24 25 35 34 33
32 46 45 44
43 42 41 40 24 39 38 37 36 32 31 30 29 28 26 27

E9001C

POS	CODE	DESCRIPTION	QUANTITY
1	901210A	BASE	1
2		NUT M12	12
3		WASHER	12
4	901221	PIN	6
5	901243	PIN	4
6	NUTR 1747	TRACK ROLLERS	4
7	901242	WASHER	4
8	901204A	PIN	2
9	BR42	RING	4
10	901203A	ROLLER	2
11	NK32/20	BEARING	2
12		SNAP RING	1
13		SNAP RING	2
14	SKF2206E	BEARING	2
15	901214A	FLANGE	2
16	901202A	PIGNON GEAR	1
17	901207	SPACER	1
18	901211	BACK GEAR SHAFT	1
19			
20		FEATHER	1
21	901226	PLAQUE	4
22	901208	PIN	4
23	901209	ROLLER	4
24		SCREW TCEI	8
25	901229	COVER	1
26		SCREW TCC	4
27	901228	COVER	1
28	901215	BLOCK	2
29		SCREW TE	4
30	901216	MOTOR PLATE	1
31		WASHER	4
32		NUT M8	4
33	TCEI M6x50	SCREW TCEI	4
34		WASHER	4
35	K901120A	PCB	1
36	T80 BL4 Kw1.1 KLF IP 55	TILTING MOTOR	1
37	901227	PULLEY	2
38		GRUB SCREW M6x8	2
39		FEATHER	1
40	POLI V 381 J8	PULLEY	1
41	901230	COVER	1
42		SCREW TE	4
43	901217	BLOCK	2
44		FEATHER	1
45	901201	PULLEY	1
46		GRUB SCREW	2
47		FEATHER	2
48		SCREW TCEI	1
49		POTENTIOMETER	1
50	901218	PLATE	1
51	VF72i=50 B3	TILTING REDUCTION GEAR	1

53		SCREW TSEI	4
54	MS20	MICRO SWITCH	3
55	901220	PIN	6
56	901213	SPACER	2
57		SCREW TSEI	4
58	900909	WASHER	4
59	MCYRR 12	TRACK ROLLERS	8
60	901208	FLANGE	1
61			
62			

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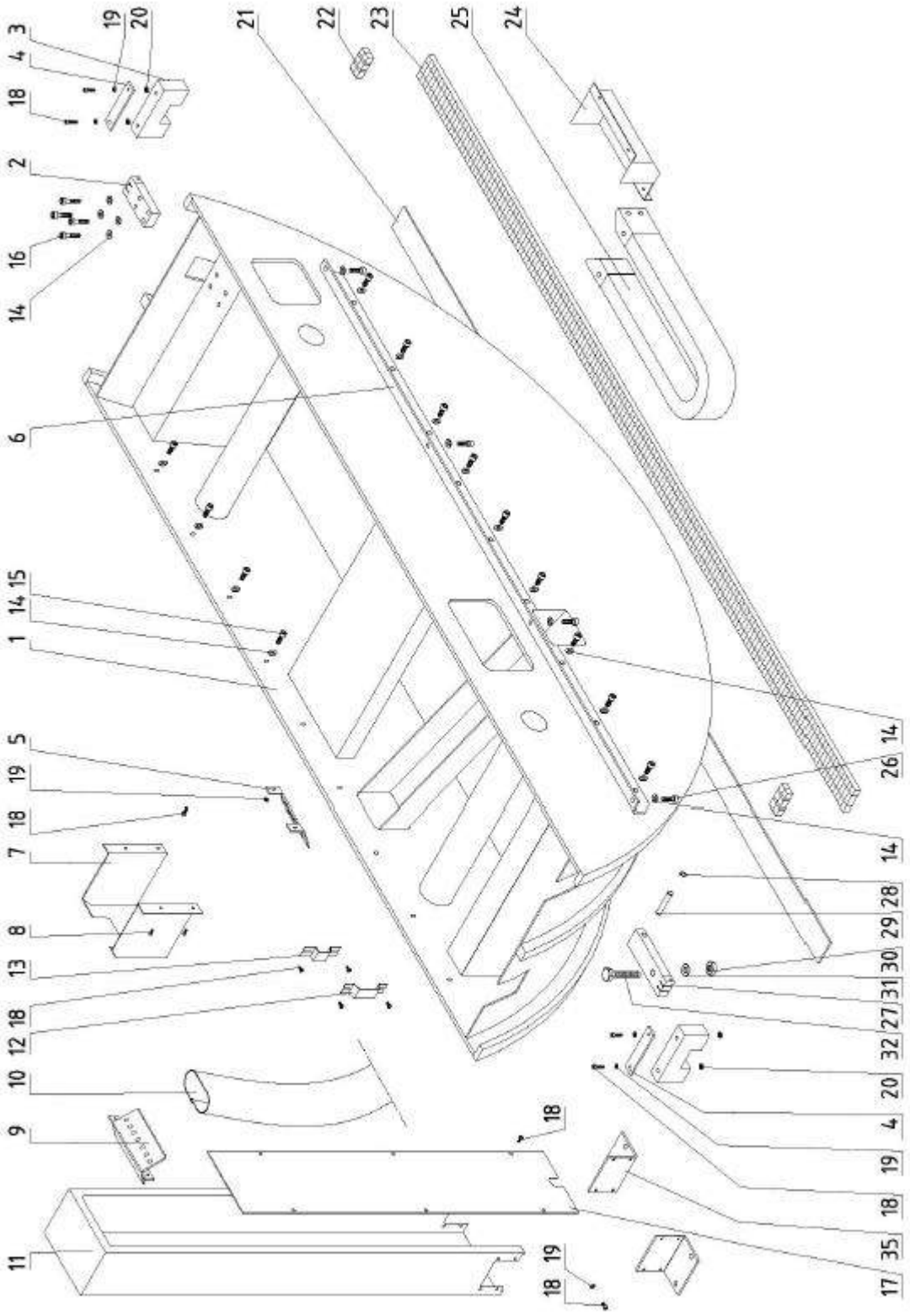
E9002A

POS	CODE	DESCRIPTION	QUANTITY
1	901212A	SECTOR	1
2	901223	PINTLE CHAIN SOCKET	1
3	901235	SOCKET	2
4	901236	PLATE	2
5	901241	CABLE SUPPORT	2
6	901231	ANGULAR	1
7	901233	COVER	1
8		SCREW TCEI	4
9	901432A	PLATE	1
10		PROTECTION	1
11	901431A	CABLE SUPPORT	1
12	901239	CAM	1
13	901240	CAM	2
14		WASHER	22
15		SCREW TCEI	14
16		SCREW TCEI	4
17	901434A	COVER	1
18		SCREW TCEI	10
19		WASHER	10
20		NUT M5	8
21	901237	PROTECTION	1
22		WELD LINK	2
23		PINTLE CHAIN	1
24	901234	COVER	1
25	900612A	CABLE CHAIN	1
26		SCREW TCEI	4
27	901222	PINTLE CHAIN SOCKET	1
28		SNAP RING	2
29	901225	PIN	1
30		NUT M12	1
31		WASHER	1
32		SCREW TE	1
33			
34			
35	901433	ANGULAR	2
36			
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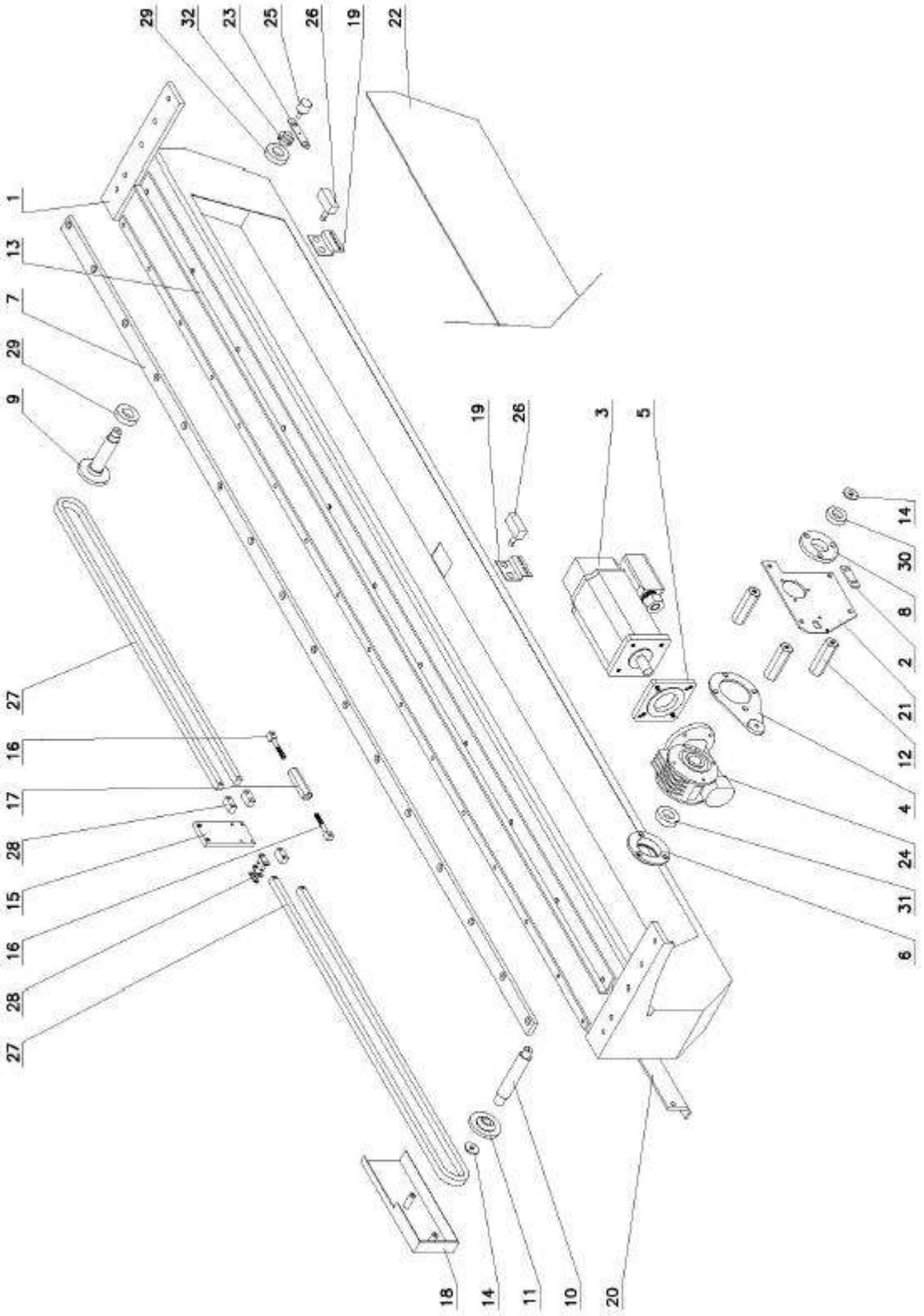
45			
46			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E9003B

POS	CODE	DESCRIPTION	QUANTITY
1	900802A	CROSS MEMBER	1
2	900803	PLATE	2
3	900804A	MOTOR	1
4	900805	LEVER ARM	1
5	900806A	FLANGE	1
6	900807A	FLANGE	1
7	900812	FRONT GUIDE	1
8	900815	FLANGE	1
9	900817A	PIN	1
10	900818	REDUCTION GEAR PIN	1
11	900819A	SPROCKET	1
12	900820	SPACER	3
13	900821A	GUIDE	1
14	900828	WASHR	2
15	900840	CHAIN SOCKET	1
16	900844	TIE ROD	1SX – 1DX
17	900845	JOINT	1
18	900853A	COVER	1
19	900855	MICROSWITCH SUPPORT	2
20	900862A	FRAME ANGULAR KEEPER	1
21	900867	PLATE	1
22	900868	COVER	1
23	901218	PLATE	1
24	MVF 49P=i28 P80 B14	REDUCTION GEAR	1
25	10k 10 giri	POTENTIOMETER	1
26	MS20	MICROSWITCH	2
27		PINTLE CHAIN	2
28		WELD LINK	4
29	SKF 6005	BEARING	3
30	SKF1203E	BEARING	1
31	SKF 1205E	BEARING	1
32	SKF KMA4	RING NUT	1
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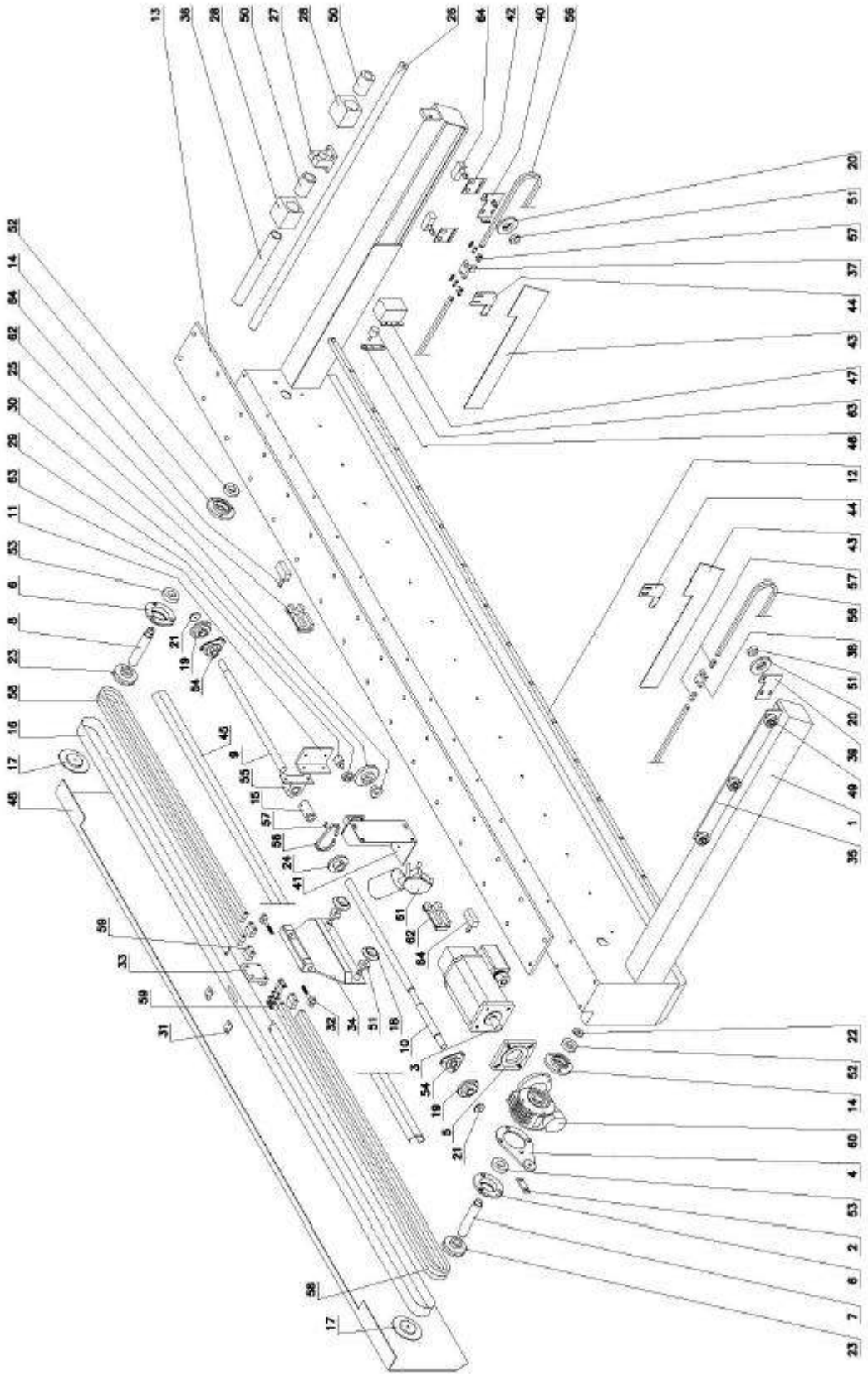

POS	CODE	DESCRIPTION	POS
1	900801	CROSS MEMBER	1
2	900803	PLATE	1
3	900804A	MOTOR	1
4	900805	LEVER ARM	1
5	900806A	FLANGE	1
6	900807A	FLANGE	2
7	900808	REDUCTION GEAR PIN	1
8	900809	DRIVING GEAR PIN	1
9	900810	TABLE TOP MOV. PIN	1
10	900810A	TABLE TOP MOV. PIN	1
11	900811	ANGULAR	1
12	900813	SFD GUIDE	1
13	900814	SLIPPING GUIDE	1
14	900815	FLANGE	2
15	900816	BUSH	1
16	900822	PROTECTION	1
17	900823	WASHER	2
18	900824	WHEEL	2
19	900825	TABLE TOP SPROCKET	2
20	900826	SPROCKET DRIVING GEAR	2
21	900827	WASHER	2
22	900828	WASHER	1
23	900829A	TUBE STAND PROCKET	2
24	900830	TABLE TOP SPROCKET	1
25	900831A	TABLE TOP MOTOR SPROCKET	1
26	900832	SLIPPING SHAFT	1
27	900833	SLIPPING SUPPORT	1
28	900834	SLIPPING SUPPORT	2
29	900835	POTENTIOMETER GEAR	1
30	900836	GEAR	1
31	900837	PLATE	2
32	900838	CHAIN SOCKET	2
33	900839	CHAIN SOCKET	1
34	900841	CARRIAGE	1
35	900842	BEARING SUPPORT	1
36	900843	COVER	1
37	900846	CHAIN SOCKET	1
38	900847	CHAIN SOCKET	1
39	900848	DRIVING GEAR SUPPORT	1
40	900849	DRIVING GEAR SUPPORT	1
41	900852	REDUCTION GEAR MOTOR SUPPORT	11
42	900856A	LIMIT SWITCH SUPPORT	2
43	900861	COVER	2
44	900863	TRANSMISSION SOCKET	2
45	900864	RAIL	1

46	900865	PLATE	1
47	900866	COVER	1
48	900869	COVER	1
49	190074-190083	BEARING + ECCENTRIC	3
50	LME 25uu	LINEAR BUSH	2
51	SKF 6200	BEARING	4
52	SKF 1203 E	BEARING	2
53	SKF 1205 E	BEARING	2
54	RHB BPFT3	SUPPORT	2
55	RHB BPP4	SUPPORT	1
56		CHAIN	3
57		WELD LINK	5
58		DOUBLE CHAIN	2
59		WELD LINK	4
60	MVF49P i=28 P80 B14	REDUCTION GEAR	1
61	ST.00.550-48V 06.03(62)	REDUCTION GEAR MOTOR	1
62	K901120A	PCB	2
63		POTENTIOMETER	2
64	MS20	MICROSWITCH	4
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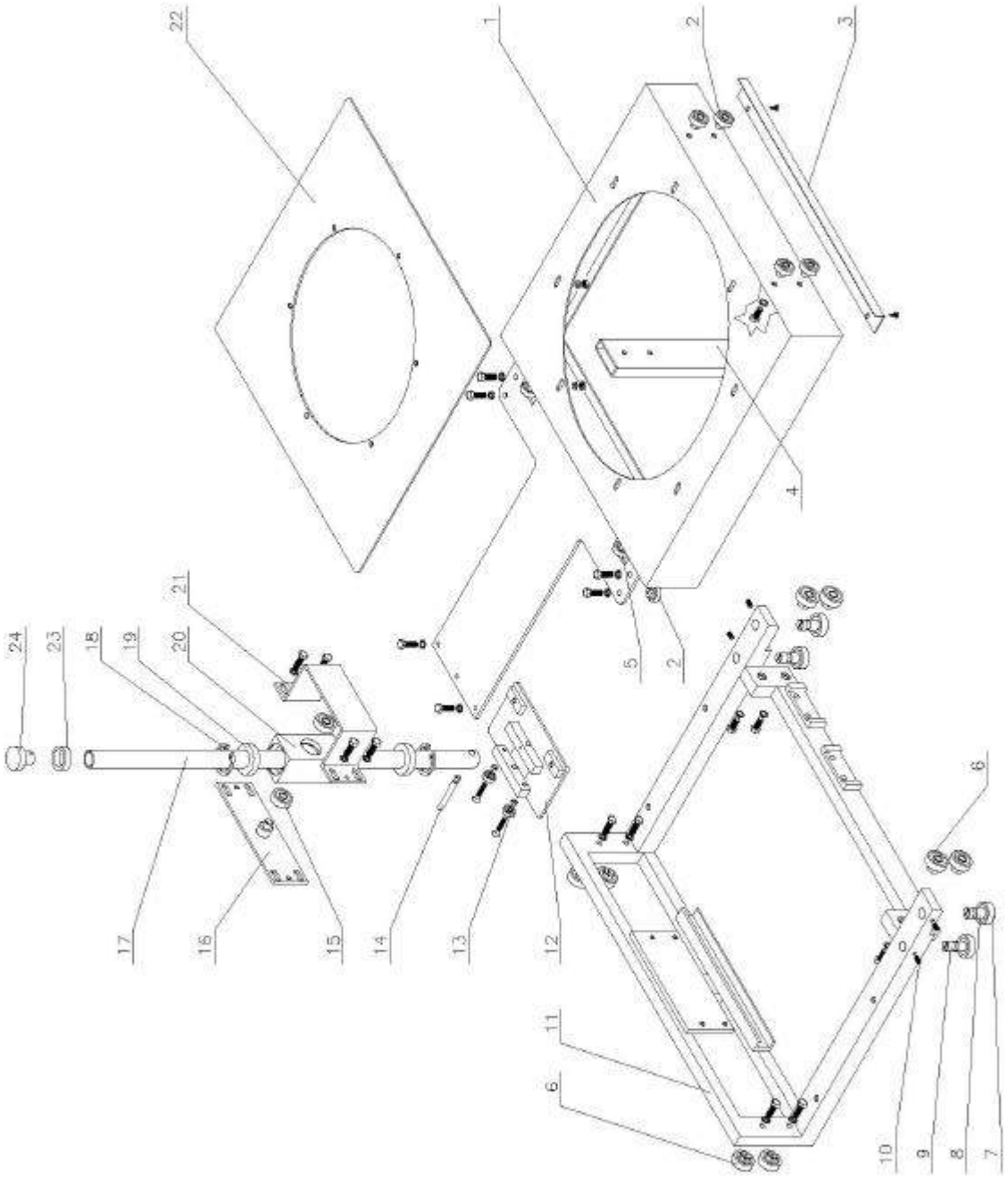

E9023

POS	CODE	DESCRIPTION	POS
1	900601	CARRIAGE	1
2	190075 + 190077	BEARING + ECCENTRIC	8
3	900616	COVER	1
4	900601/1	TUBE	1
5	190075 + 190080	BEARING + ECCENTRIC	4
6	190075 + 900706	BEARING + ECCENTRIC	8
7	SKF 305800 C-2Z	TRACK ROLLERS	4
8	900707	ECCENTRIC PIN	2
9	900512	ECCENTRIC PIN	2
10		GRUB SCREW M6x8	4
11	900701	ANGULAR	1
12	900700	CARRIAGE	1
13	900703	CARRIAGE	1
14	190076 + 190078	BEARING + ECCENTRIC	4
15	SKF KR22	TRACK ROLLERS	1
16	900705	SUPPORT	1
17	SKF 6201-2RS	BEARING	2
18	900704	ROD BUSH	1
19	900702	PIN	1
20	901029	ROD	1
21	900614/A/B/C/615	PLATE I.I	1
22	9001064	GUIDE RING	1
23	901080A	GUIDE SHOE	1
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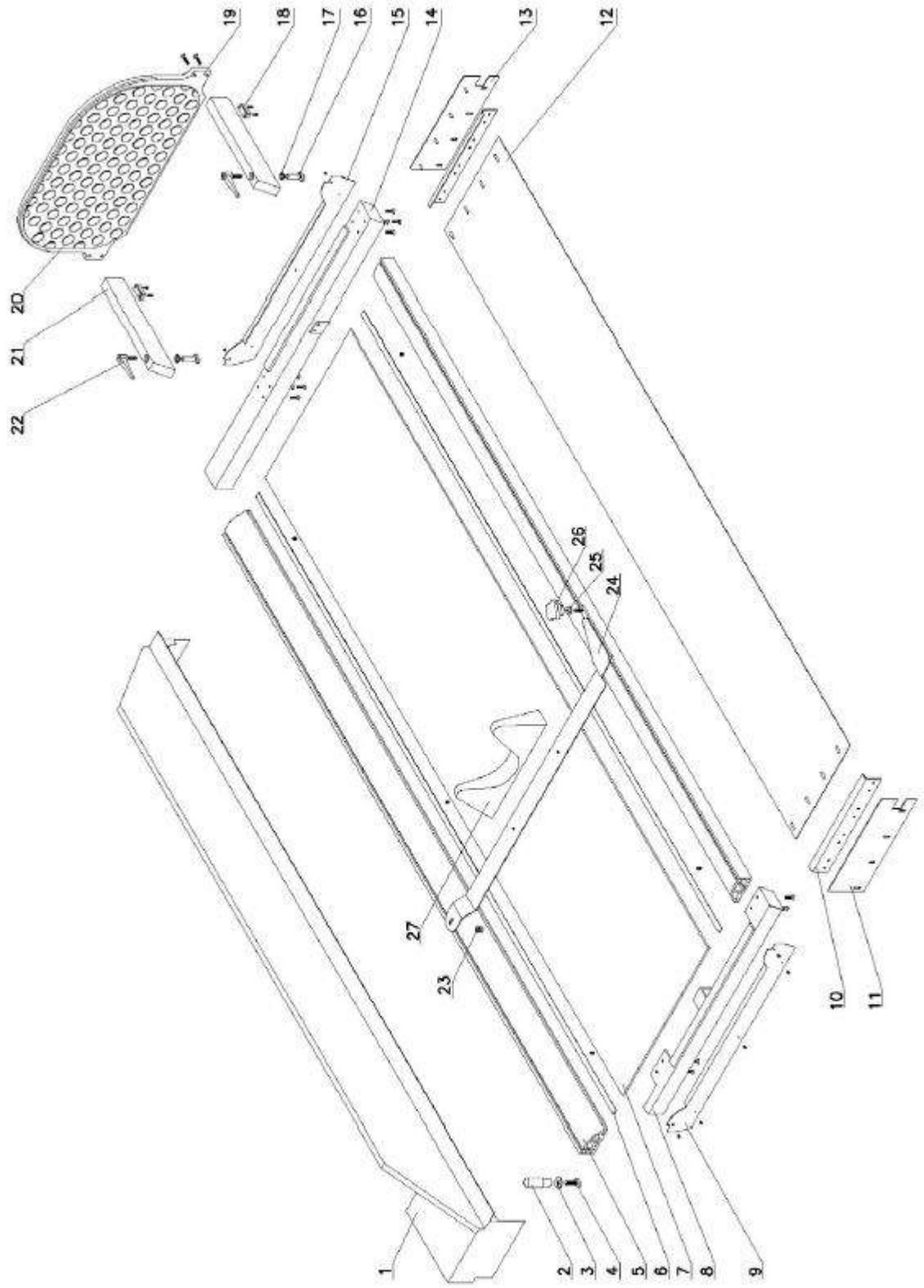

E9006

POS	CODE	DESCRIPTION	QUANTITY
1	900857	COVER	1
2	1.280180-M10	HANDLE GRIP	2
3	BUL 226	PLASTIC WASHER STANDARD	2
4	190089	PIN	2
5	901106	HOLDER	2
6	901104	SPACER	2
7	901101	PLANE	1
8	901105	GUIDE	1
9	901107	COVER	1
10	900858	SOCKET	2
11	900859	MYLARD SOCKET	1
12	900851	PROTECTION	1
13	900860	MYLARD SOCKET	1
14	901103	SUPPORT	1
15	901108	COVER	1
16	190090	PIN	2
17	BUL 273	PLASTIC WASHER	2
18	901149	NYLON PLAT	2
19	901131	PLATE	1
20	901132A	PROTECTION	1
21	901133	TUBE	2
22	MR80 P-M10X30	HANDLE-GRIP	2
23	190403	NYLON PLAT	1
24	901-121A	'SUPPORT	1
25	BUL 169	PLASTIC WASHER	1
26	VC.192-60 A-8	HANDLE GRIP	1
27	1 90093	FUSION	1
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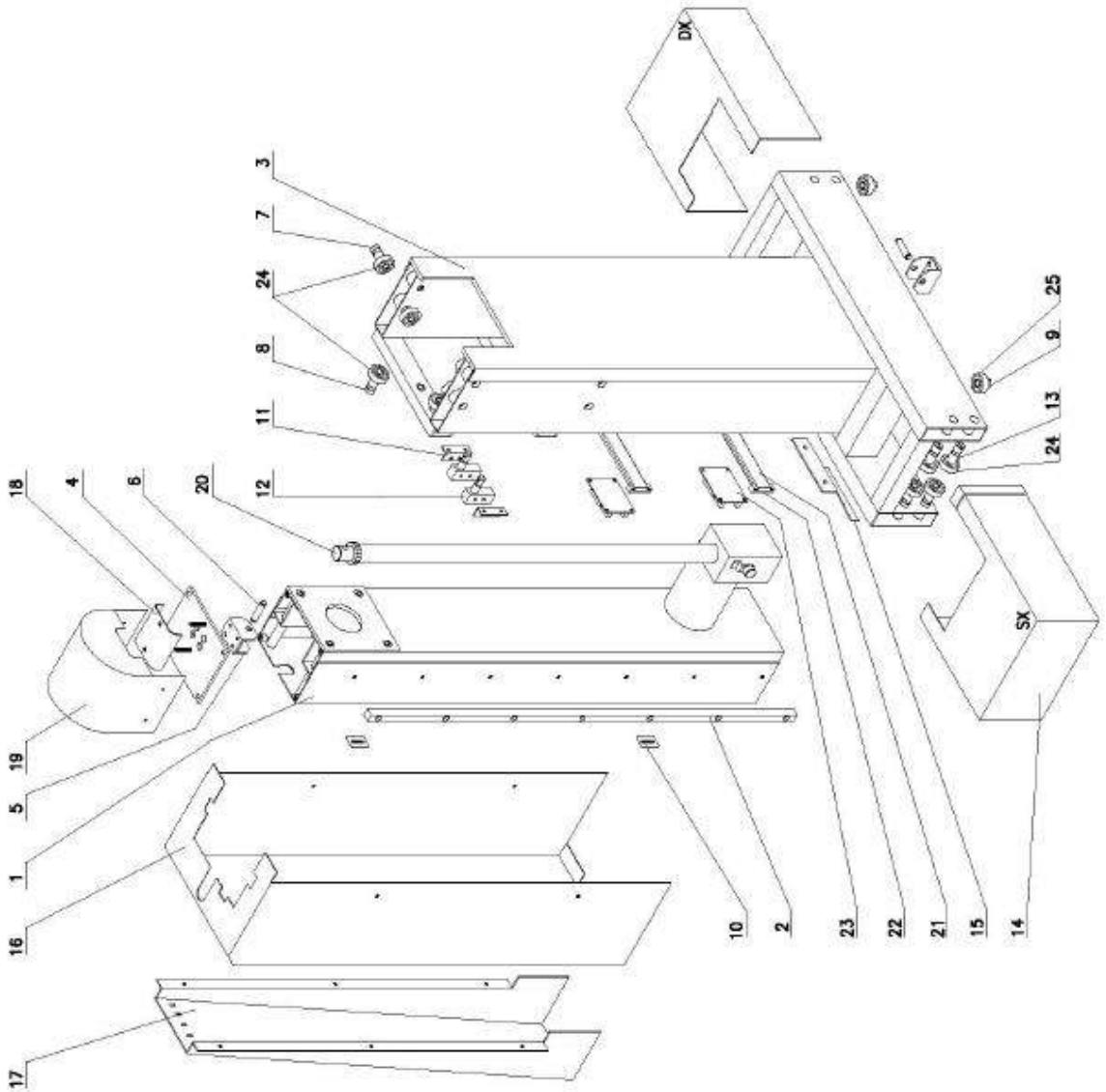

E9007

POSITION	CODE	DESCRIPTION	QUANTITY
1	900504A	SUPPORT	1
2	900503A	GUIDE	3
3	900505	STAND	1
4	900506	PLATE	1
5	900507	SOCKET	2
6	900508	PIN	2
7	900501+190074	BEARING	8
8	900502+190074	BEARING	4
9	900509	ECCENTRIC	4
10	900510	CAMME	2
11	900511	PLAQUE	2
12	MS 20	MICROSWITCH	2
13	900512A	ECCENTRIC PIN	8
14	900513	COVER	1DX-1SX
15	900514	CABLES SUPPORT	1
16	900515	COVER	1
17	900516	COVER	1
18	900517A	CABLE KEEPER	1
19	900518A	COVER	1
20	900519A	ACTUATOR	1
21	900520	OMEGA	2
22	LEGRAND 36478	GUIDE	6
23	K900120A	PCB	2
24	SKF 305800C-2Z	TRACK ROLLERS	20
25	SKF4201A	BEA RING	4
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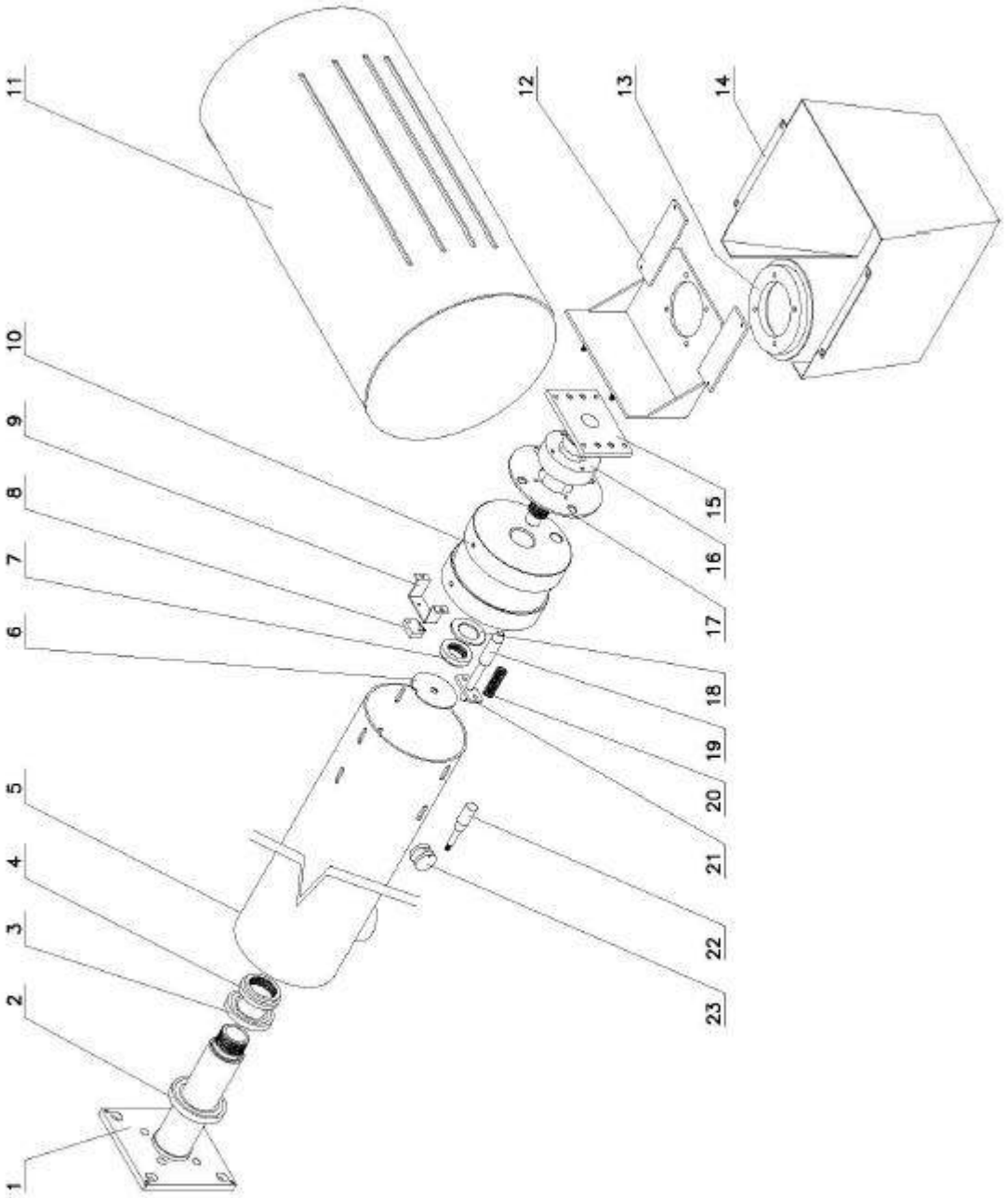

E9008

POSITION	CODE	DESCRIPTION	QUANTITY
1	900402	SUPPORT	1
2	SKF 16010	BEARING	1
3	SKF 16008	BEARING	1
4	SKF KMA8	RING NUT	1
5	900401	SUPPORT	1
6	900411	CAMM	1
7	GUA 28X1.5	RING NUT	1
8		MICROSWITCH	1
9	900412	SUPPORT	1
10	900404	ROTATION SUPPORT	1
11	900415	COVER	1
12	900403	SUPPORT	1
13	190006	FLANGE	1
14	900414A	COVER	1
15	900405	ROTATION PIN	1
16	900406	FLANGE	1
17	900407	FLANGE	1
18	900410	WASHER	2
19	900408	PIN	1
20	700150	SPRING	1
21	900409	PLATE	1
22	BL 336/10X95	HANDLE	1
23	900413	CAMM	1
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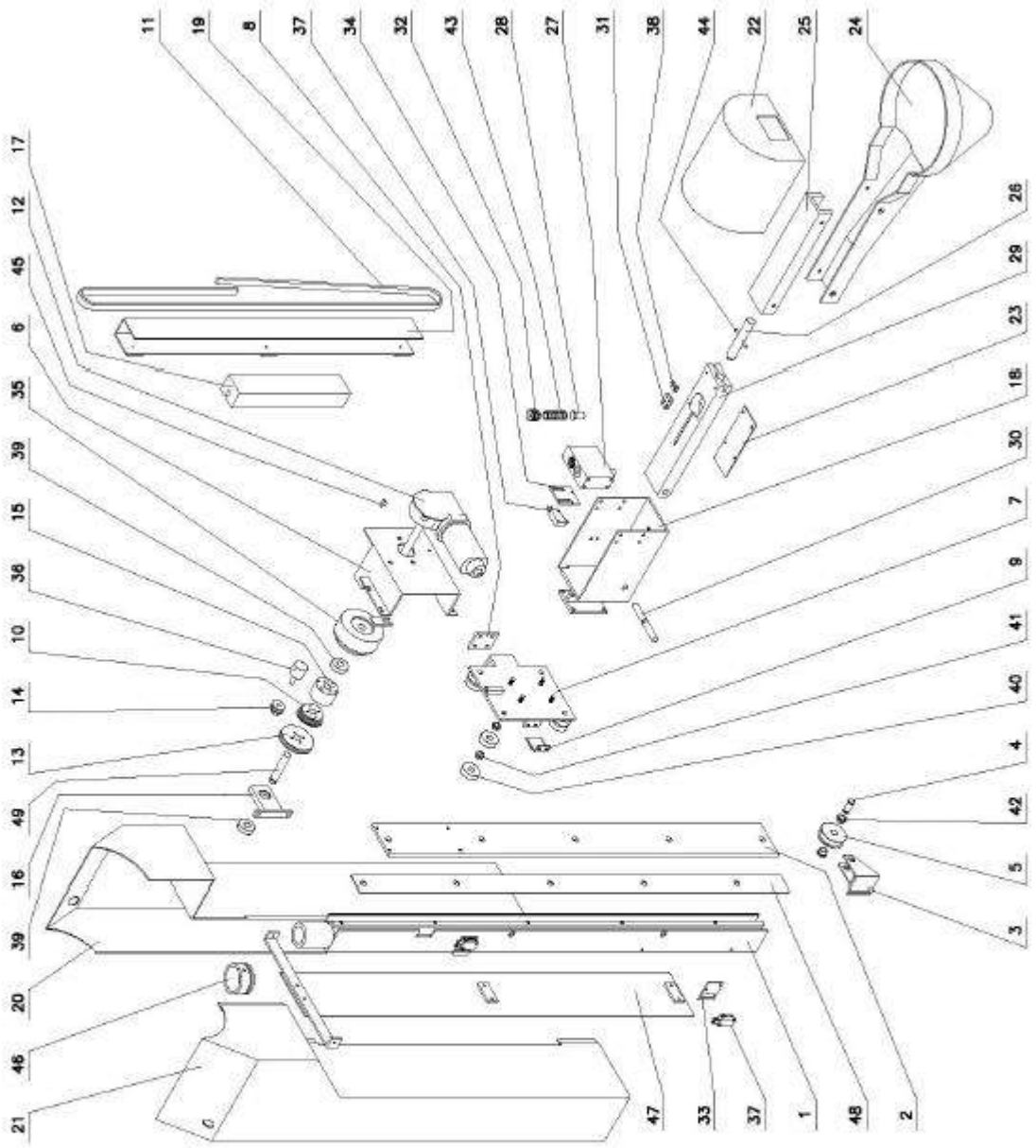
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E9009A

POSITION	CODE	DESCRIPTION	QUANTITY
1	901060A	FRAME	1
2	901061A	GUIDE	1
3	901062A	SUPPORT	1
4	901063	PIN	1
5	901066	WHEEL	1
6	901067	MOTOR SUPPORT	1
7	901068	CHARIOT	1
8	901069	PLATE	1
9	901070	GAMME	1
10	901071	PULLEY	1
11	901072	VELT	1
12	901073A	MOTOR	1
13	901074	GEAR	1
14	901075	GEAR	1
15	901076	SPACER	1
16	901077A	SUPPORT	1
17	901078	COUNTERWEIGHTS	1
18	901084	SUPPORT	1
19	901085	COVER	1
20	901086B	COVER	1
21	901087B	COVER	1
22	901088	COVER	1
23	901089	COVER	1
24	901091	COVER	1
25	901092	BLOCK	1
26	901093	PIN	1
27	901094	BLOCK	1
28	901095	CAP	2
29	901096	PLATE	1
30	901097	PIN	1
31	901098	PLAT	1
32	901099	GRUB SCREW	2
33	210051	PLAT	2
34	901624	PLAT	1
35	EMS 70/S	ELECTROMAGNETIC CLUTCHES	1
36		POTENTIOMETER	1
37	LG56313	MICROSWITCH	3
38	AH 3262	MICROSWITCH	1
39	SKF 6001-2Z	BEARING	2
40	SKF 6000-2Z	BEARING	8
41	PAF 08075	COLLARED BUSH	8
42	PAF 10070	COLLARED BUSH	2
43	D13200	SPRING	2
44		FASTPIN	1
45		WODDRUFF KEY	1
46	901060A/1	RING	1
47	901060A/2	SUPPORT	1
48	901060/A3	PLATE	1
49	901079	PLATE	1
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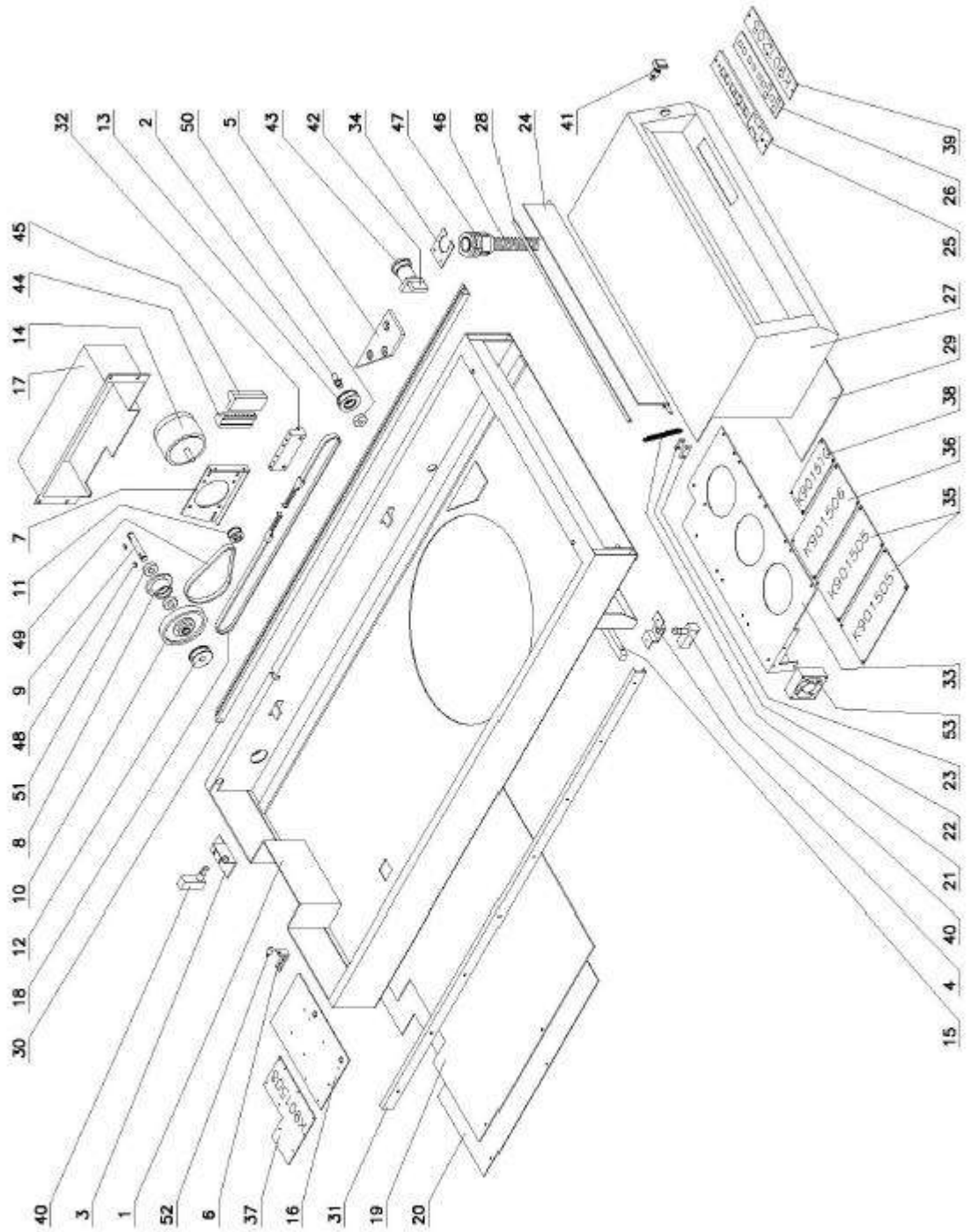
32 13 2 50 5 43 42 34 47 46 28 24 41
39 26 25 27 29 38 36 35 33 53 23 22 21 40 4 15
45 44 14 17 7 11 49 9 48 51 8 10 12 18 30
40 3 1 52 6 37 16 31 19 20
K901518
K901506
K901505
K901505
K901505

E9010

POSITION	CODE	DESCRIPTION	QUANTITY
1	901701B	FRAME	1
2	901708	PIN	1
3	901712A	SUPPORT	1
4	901713	PLATE	1
5	901714A	CAMME	1
6	901715	SUPPORT	1
7	901718A	PLATE	1
8	901719A	FLANGE	1
9	901720A	SHAFT	1
10	901721A	PULLEY	1
11	901722A	PULLEY	1
12	901723A	PULLEY	1
13	901724	WHEEL	1
14	901725	MOTOR	1
15	901726	ROD	1
16	901727	PLATE	1
17	901728A	COVER	1
18	901729	VELT	1
19	901730	PROTECTION	1
20	901731	COVER	1
21	901732	SPRING	1
22	901733	PLATE	1
23	901734	LEVER	1
24	901735	INSPECTION DOOR	1
25	901736	SUPPORT	1
26	901737	LEXAN CONTROL PANEL	1
27	901738	COVER	1
28	901739	BUMPER	1
29	901603	LEAD PLATE	1
30	900104	GUIDE	1
31	900105	GUIDE	1
32	900125	VELT ATTACHMENT	1
33	901743	SUPPORT	1
34	400041	SUPPORT	1
35	K901505	PCB	2
36	K901506	PCB	1
37	K901508	PCB	1
38	K901510	PCB	1
39	K901205	PCB	1
40	MS 20	MICRO SWITCH	2
41	BRETERPM16 RE1	PUSH BUTTONS	1
42	ZB5 AZ 102		1
43	ZB5 AT4	EMMERGENCY STOP	1
44	GMSTBHIL1767300	CONNECTOR PHOENIX	1
45	GMSTB1766961	CONNECTOR PHOENIX	1

POSITION	CODE	DESCRIPTION	QUANTITY
46	GL 028	COILED SHEATH	1
47		CABLE CLAMP D 28	1
48		WOODRUFF KEY	2
49	156 XL 037	VELT	1
50	SKF 6000-2Z	BEARING	1
51	SKF 6001-2Z	BEARING	2
52	PM 10-10 M4	BUMPER	1
53	45/09590-00	FAN	1
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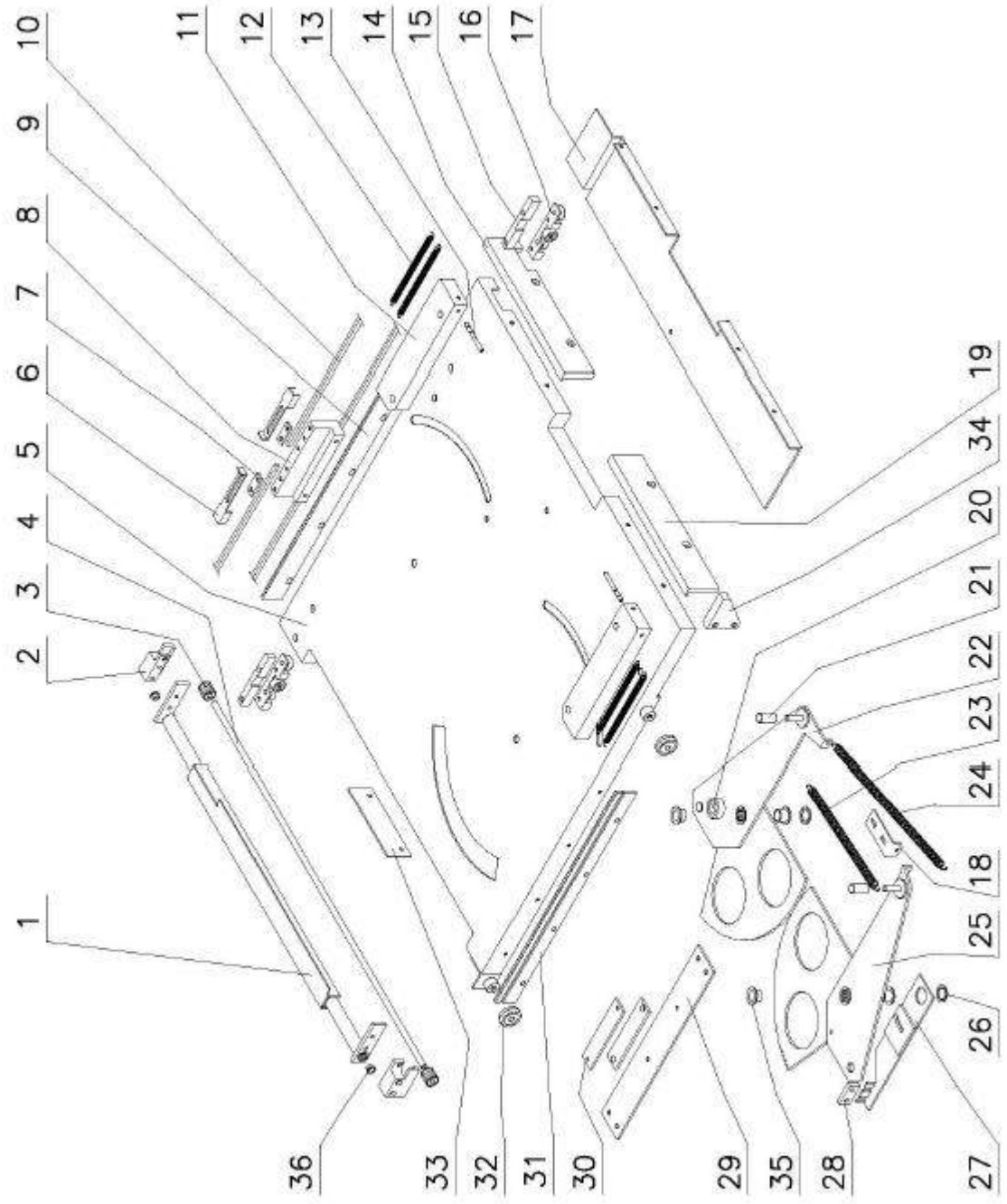
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E9011

POSITION	CODE	DESCRIPTION	QUANTITY
1	900116A	REAR JAW	1
2	900122A	GUIDE SHOE	1Dx + 1Sx
3	900103	GEAR	2
4	900102	SHAFT	1
5	900101A	PLATE	1
6	900130	BELT SOCKET	1Dx + 1Sx
7	900129	PLATE	2
8	900125	BELT SOCKET	1
9	900121	RACK	1
10	900131	BELT	1
11	900118	BACK STOP	2
12	900106	SPRING	4
13	900127	PIN	2
14	900117	BACK-STOP	1
15	900124A	SHIM	2
16	900119A	CARRIAGE	2
17	900115	COVER	1
18	900114	BUMPER SUPPORT	1
19	900117/1	BACK-STOP	1
20	SKF 608	BEARING	1
21	900123A	BUSH	2
22	900110	LEFT JAW	1
23	900108	SPRING	1
24	900107	SPRING	1
25	900109	RIGHT JAW	1
26	900128	WASHER	2
27	900113	MAGNET SUPPORT	1
28	Stem M305AA	MAGNET	1
29	900111	PLATE	1
30	900112	PLATE	2
31	900120	RACK	1
32	RA22-6DNCE	BEARING	2
33	900126	BACK-STOP	1
34	900117/2	BACK-STOP	1
35	SKF GLYPBG101207F	FLANGED BUSH	4
36	SKF GLYPBG060808F	FLANGED BUSH	2
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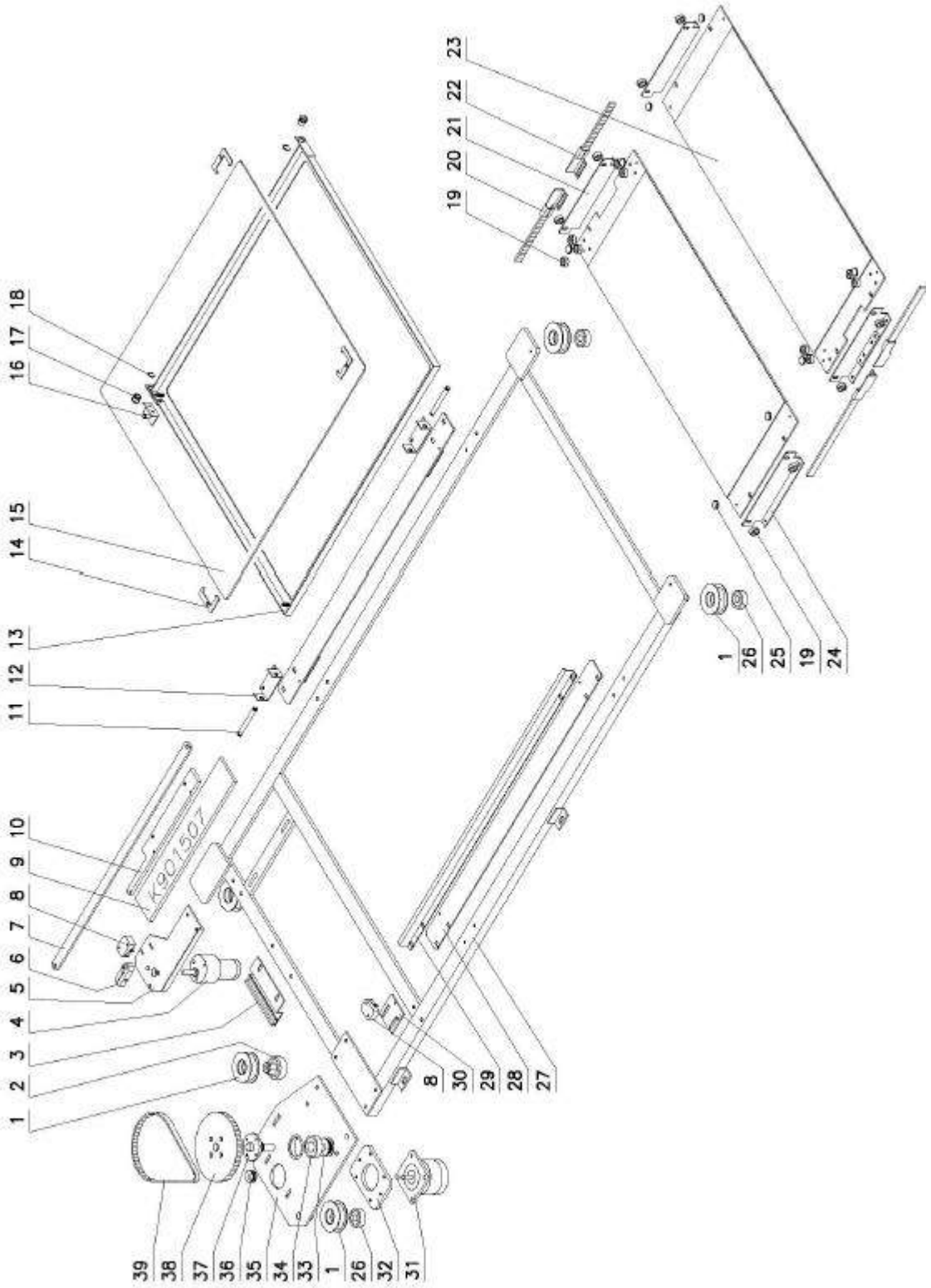
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E9012

POSITION	CODE	DESCRIPTION	QUANTITY
1	901724	ROLLER	5
2	190084=SKF 6000	ECCENTRIC BEARING	1
3	901619	CONNECTOR SUPPORT	1
4	GRB 35 GM 0100	MOTOR	1
5	901608	GRID MOTOR SUPPORT	1
6	901618A	LEVER	1
7	901611	ROD	1
8	LG56313	MICROSWITCH	2
9	K901507	PCB	1
10	901607	SENSOR SUPPORT	1
11	901616	PIN	2
12	901615	SUPPORT	2
13	901612A	FRAME PART	1
14	100004A	PLATE	4
15	901627	GRID	1
16	901617A	SUPPORT	1
17	100008	BUSH	2
18	100009	SNAP RING	2
19	SKF 624	BEARING	16
20	901626A	DRIVING BELT	1
21	901605	PLATE	2
22	901625A	DRIVING BELT	1
23	901602	FIELD STOP WITH LEAD	2
24	901604	PLATE	2
25	100035	GUIDE SHOE	8
26	SKF 6000	BERING	4
27	901601	FRAME	1
28	901613	AEC SUPPORT	2
29	901614	GUIDE	1
30	901624	PLATE	1
31	6600 R030	MOTOR SANCEBOZ	1
32	901609	MOTOR PLATE	1
33	901623	PULLEY	1
34	SKF 160002	BEARING	1
35	901606	SPROCKET SUPPORT	1
36	901622	PULLEY	1
37	901620	PIN	1
38	901621	PULLEY	1
39	130XL031	BELT	1
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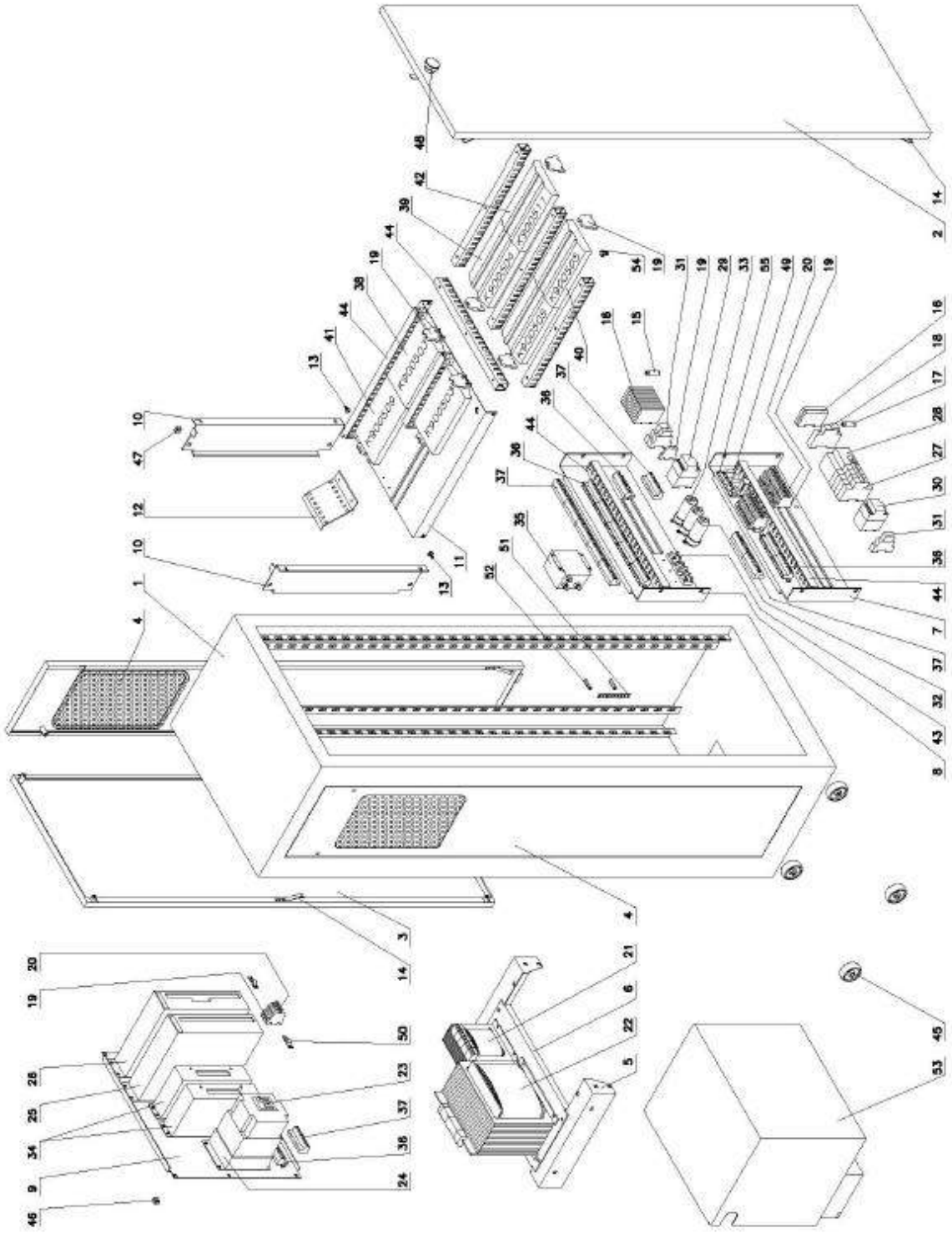

E9013

POSITION	CODE	DESCRIPTION	QUANTITY
1	901461	FRAME	1
2	901462	COVER	1
3	901463	COVER	1
4	901464	COVER	2
5	901465	SUPPORT	2
6	901466	SUPPORT	1
7	901467	SUPPORT	1
8	901468	CENTRALE SUPPORT	1
9	901469	SUPPORT	1
10	0 901470	SUPPORT	2
11	901471	SUPPORT	1
12	900514	PLATE	1
13	250044	SCREW	2
14	190009	CONTACT	10
15	6,3A – 10A 250V (5X20)	FUSE	14
16	PH3004100 UK5 EASY	FUSE HOLDER	14
17	“FCF” 10A (10X38)	FUSE	1
18	05808	“LEGRAND” FUSE HOLDER	1
19	AB1TP435U	MINI STANDARD CONNECTOR	19
20	AB1VV435U	MINI STANDARD CONNECTOR	29
21	610 VA	TRANSFORMER	1
22	3KVA	TRANSFORMER	1
23	3G3JVAB007	“OMRON” INVERTER	1
24	3G3JVPFI1020E	FILTER	1
25	CSV 22-07	CONTROL OPERATION	2
26	CSV 22-07+	CONTROL OPERATION	2
27	MEG 24301	AUTOMATIC CIRCUIT BREAKER	1
28	MEG 26606 BL.VIGI C60 4P 40A 30MACL.AC	AUTOMATIC CIRCUIT BREAKER	1
29	LC1DT20B7	REMOTE CONTROL SWITCH	1
30	LC1DT32B7	REMOTE CONTROL SWITCH	1
31	95.63+40.31	RELAY24V + SOCKET	3
32	ARX 472X063AB1 4700MF 63V	CONDENSER + SUPPORT	2
33	ASL30A472DE100 4700MF 100V	CONDENSER + SUPPORT	1
34	FN 258-7-07	LINE FILTER	2
35	AR35.14A.135	LINE FILTER	1
36	GMSTBHIL1767300	CONNECTOR PHOENIX	9
37	GMSTB1766961	CONNECTOR PHOENIX	9
38	K901503 1	PCB	2
39	K901504 2	PCB	1
40	K901505 PP-MCC	PCB	2
41	K901509	PCB	1
42	K901511 3	PCB	1
43		BRIDGE 25 A	3
44	EI 13 25X40	RACEWAY	8

46		SCREW NUT	49
47		SCREW NUT	4
48	VC.309/40.S	HANDLE	1
49	K700004	PCB	1
50	1900010	CABLE STOP	2
51	190110	PLATE	1
52	FF09 H 50100 30	PLASTIC SPACER	2
53	901472	COVER	1
54	1.01001.013/0205	PUSH BUTTON	1
55	DBB 2 A	PLASTIC SPACER	4

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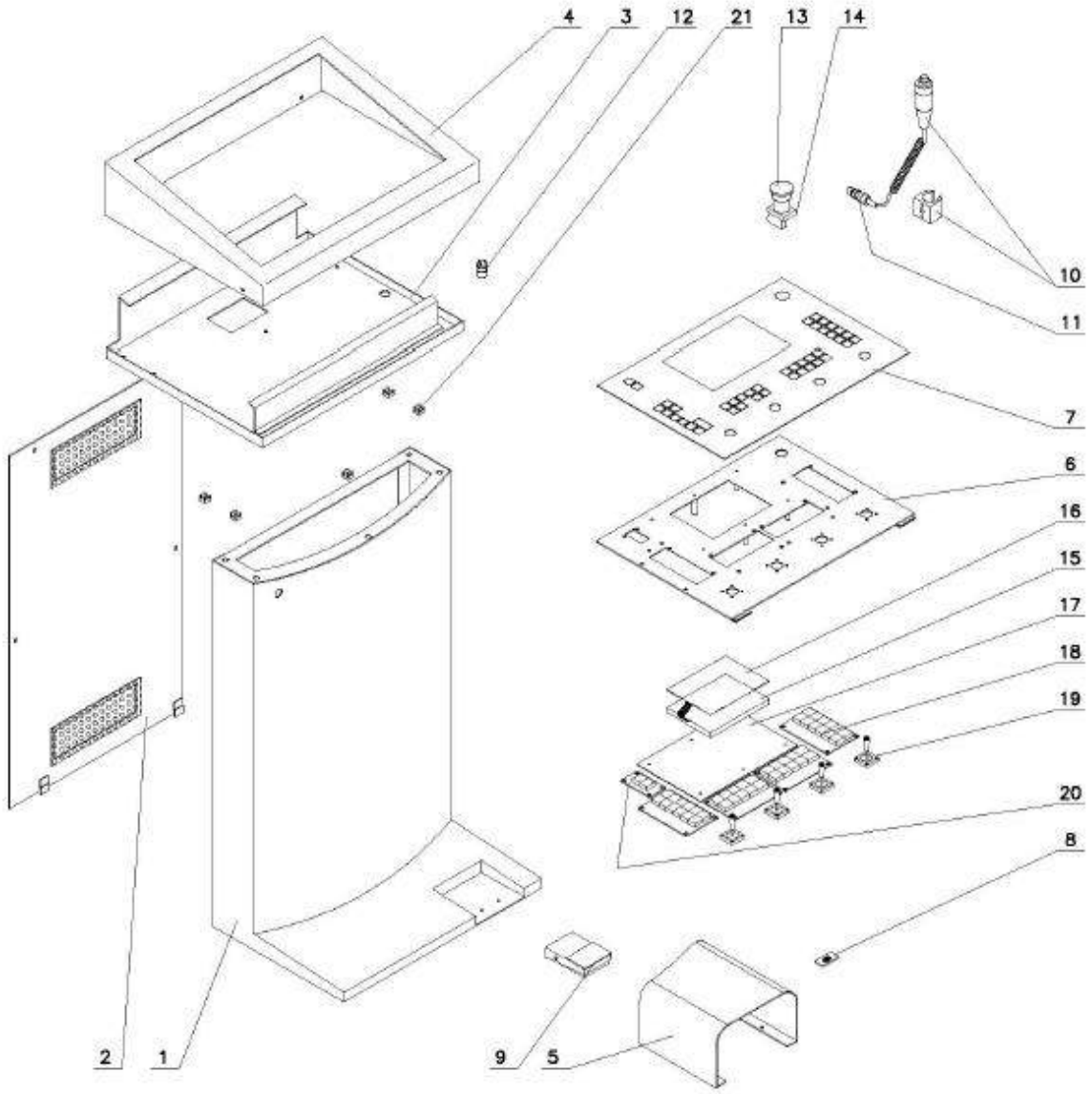

E9014

POSITION.	CODE	DESCRIPTION	QUANTITY
1	901481	SUPPORT	1
2	901482	COVER	1
3	901483	SUPPORT	1
4	901484	COVER	1
5	901485	PROTECTION	1
6	901488	SUPPORT	1
7	901489	PANEL	1
8	901490	PLATE	1
9	FS/1.1	SCOPY PEDAL	1
10	2CUE 71A 04	X-RAY HAND DOUBLE SWITCH + SUPPORT	1
11	930963-517	MAS 4100 JACK PLUG	1
12		4 POLES FEMALE PANEL PLUG	1
13	ZB5 AT4	EMERGENCY SWITCH CAP	1
14	AZ 102	EMERGENCY SWITCH HOLDER	1
15		LCD 5,4'' ¼ VGA	1
16		TOUCH SCREEN	1
17	K901501	CONTROL PANEL BOARD	1
18	K901500	PCB CONSOLE KEYBOARD	4
19	RKJXC-010KBX2-CP-PCB	JOYSTICK	4
20	K901502	PCB ON/OFF BOARD	1
21		SCREW NUT	5
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23			1
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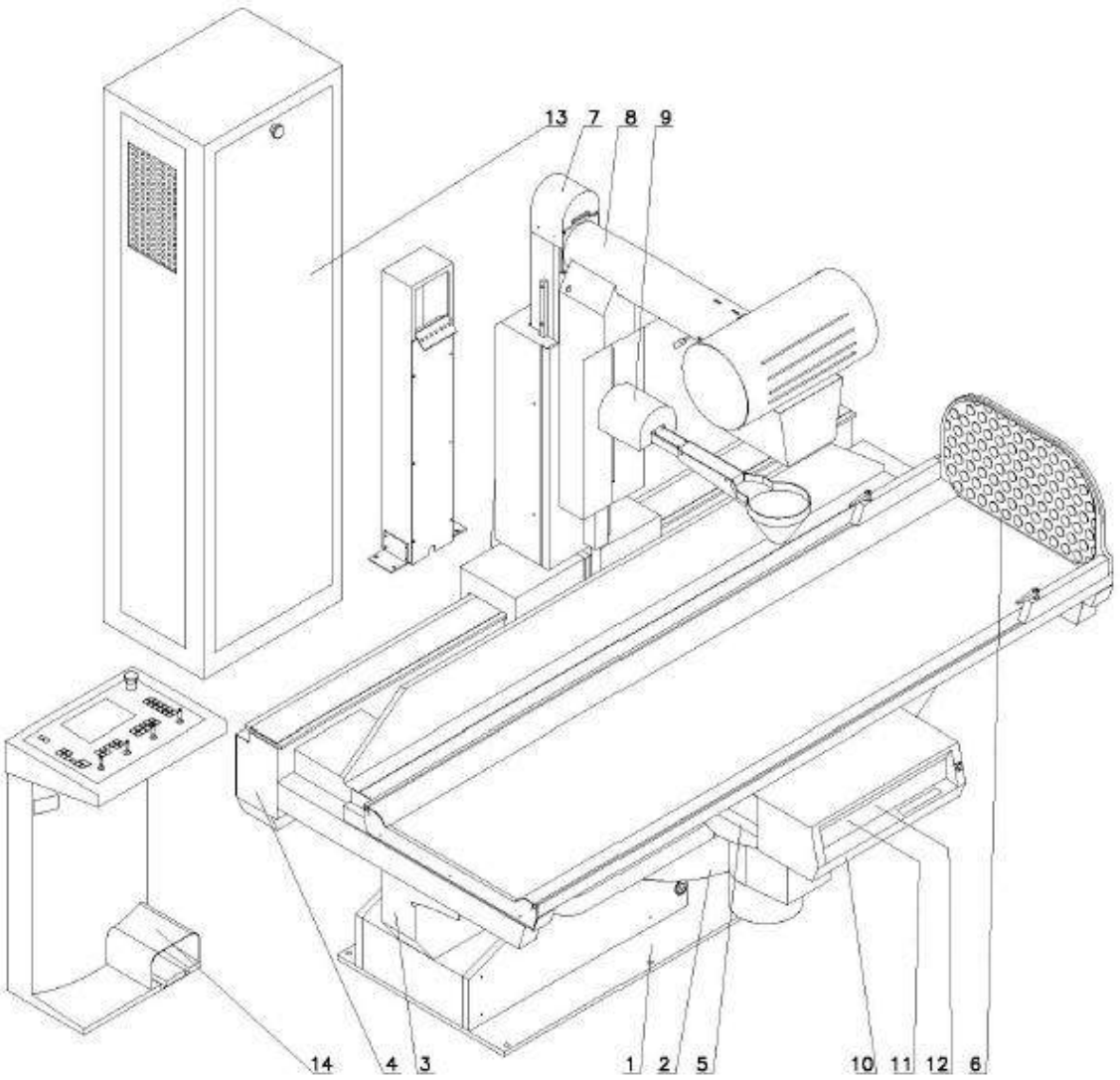
9 – SPARE PARTS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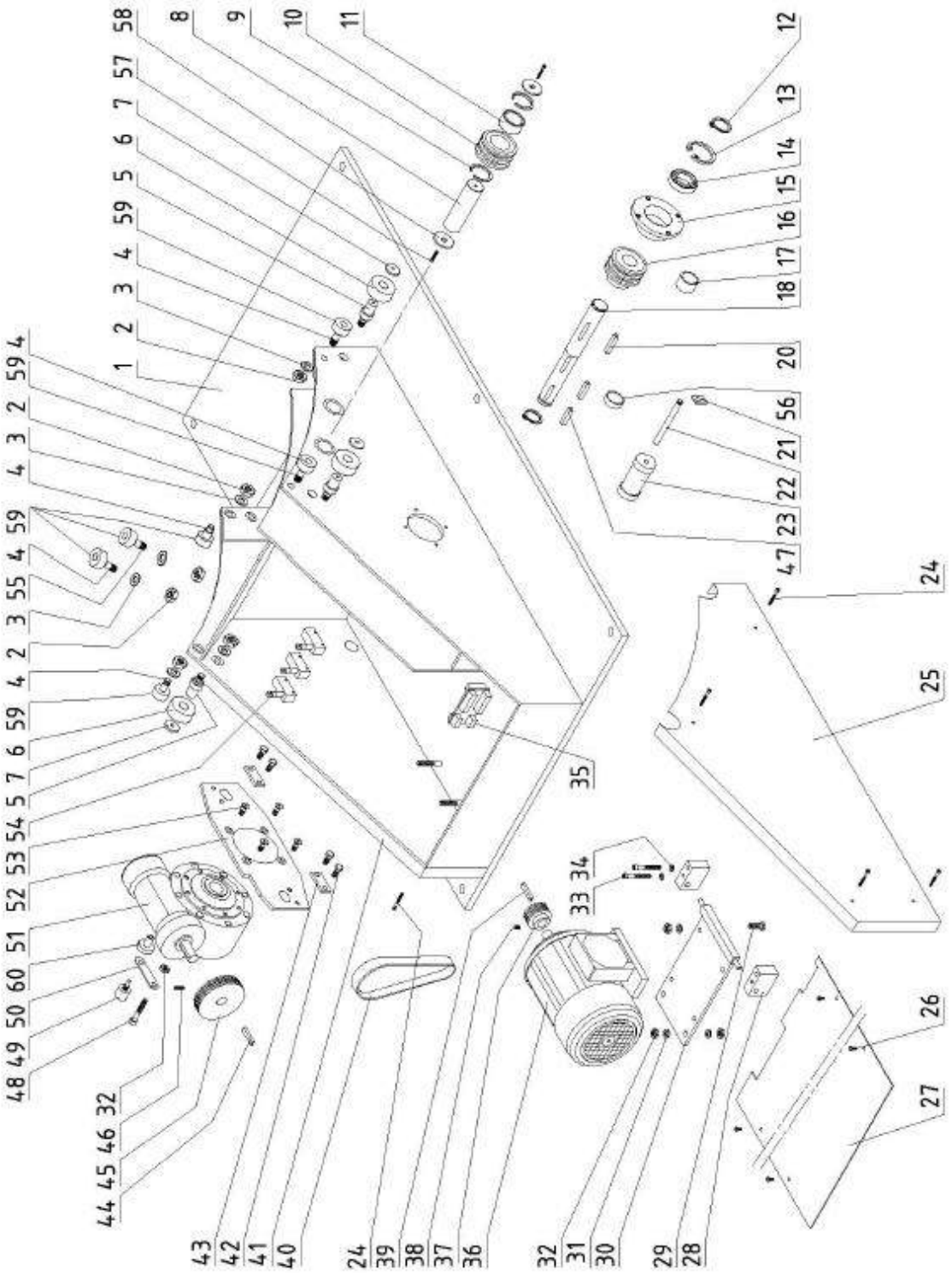
POSITION	CODE	DESCRIPTION	QUANTITY
1	E9001C	90/20 BASE	1
2	E9002A	SECTOR	1
3	E9003B	90/20 CROSS MEMBER	1
4	E9004B	90/20 BACK CROSS MEMBER	1
5	E9023	I.I. SFD SUPPORT	1
6	E9006	TABLE TOP	1
7	E9007	TUBE STAND	1
8	E9008	HOUSING SUPPORT	1
9	E9009A	ROD	1
10	E9010	SFD	1
11	E9011	CARRIAGE	1
12	E9012	FIELD STOP	1
13	E9013	RACK	1
14	E9014	CONSOLE	1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E9001C

POS	CODE	DESCRIPTION	QUANTITY
1	901210A	BASE	1
2		NUT M12	12
3		WASHER 13	12
4	901221	PIN	6
5	901243	PIN	4
6	NUTR 1747	TRACK ROLLERS	4
7	901242	WASHER	4
8	901204A	PIN	2
9	BR42	RING	4
10	901203A	ROLLER	2
11	NK32/20	BEARING	2
12		SNAP RING	1
13		SNAP RING	2
14	SKF2206E	BEARING	2
15	901214A	FLANGE	2
16	901202A	PIGNON GEAR	1
17	901207	SPACER	1
18	901211	BACK GERA SHAFT	1
19			
20		FEATHER	1
21	901226	PLATE	4
22	901208	PIN	4
23	901209	ROLLER	4
24		SCREW T.C.E.I.	8
25	901229	COVER	1
26		SCREW T.C.C.	4
27	901228	COVER	1
28	901215	BLOCK	2
29		SCREW T.E.	4
30	901216	MOTOR PLATE	1
31		WASHER	4
32		NUT M8	4
33		SCREW T.C.E.I.	4
34		WASHER	4
35	K901120A	PCBPCB	1
36	T80 BL4 Kw1.1 KLF IP 55	TILTING MOTOR	1
37	901227	PULLEY	2
38		GRUB SCREW M6X8	2
39		FEATHER	1
40	POLI V 381 J8	PULLEY	1
41	901230	COVER	1
42		SCREW T.E.	4
43	901217	BLOCK	2
44		FEATHER	1
45	901201	PULLEY	1
46		GRUB SCREW	2
47		FEATHER	2
48		SCREW T.C.E.I.	1
49		POTENTIOMETER	1
50	901218	PLATE	1
51	VF72 I=50 B3	TILTING REDUCTION GEAR	1

52	901219	REDUCTION GEAR PLATE	
53		SCREW T.S.E.I.	4
54	MS 20	MICROSWITCH	3
55	901220	PIN	6
56	901213	SPACER	2
57		SCREW T.C.E.I.	4
58	900909	WASHER	4
59	MCYRR 12	TRACK ROLLERS	8
60	901208	FLANGE	1

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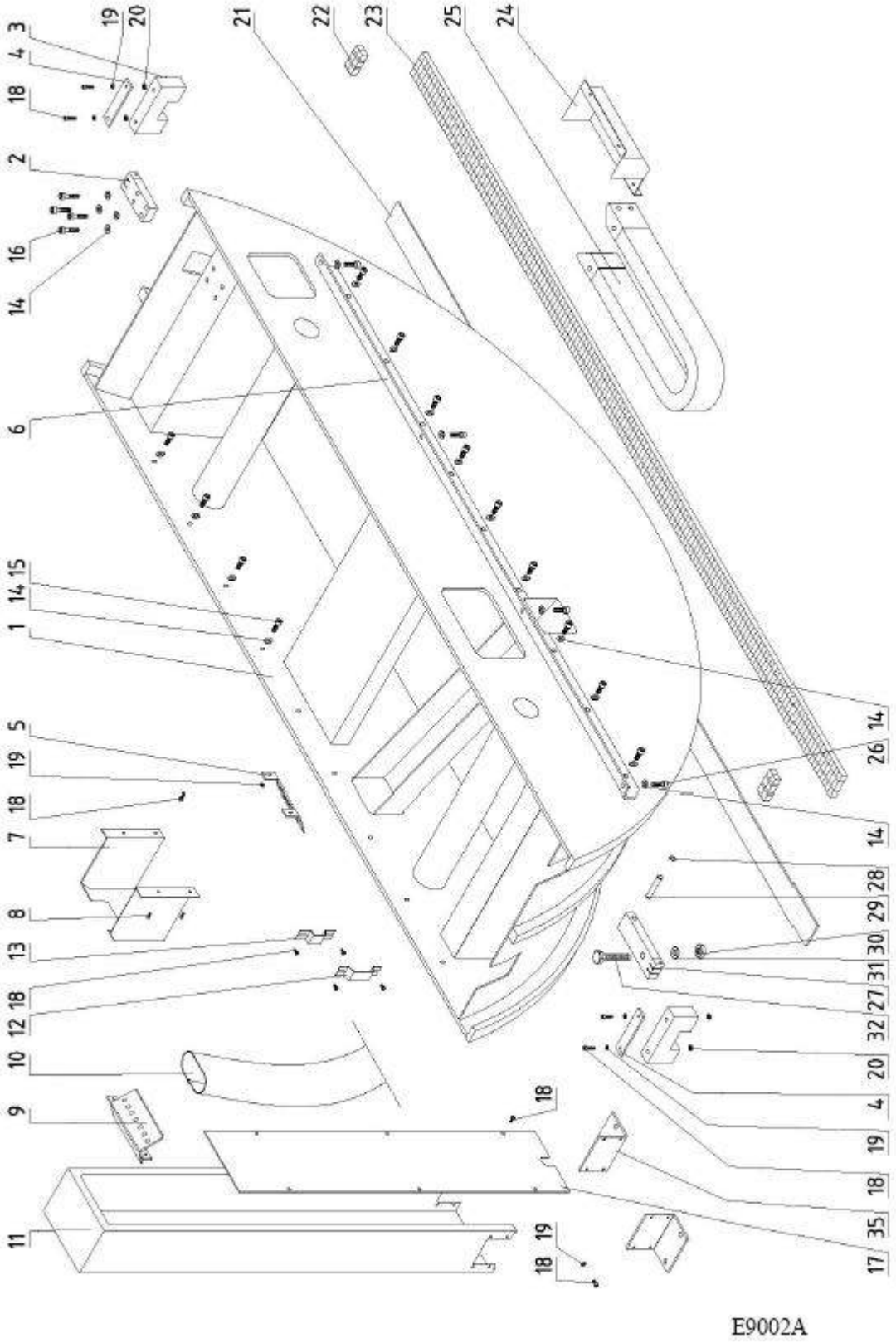
E9002A

POS	CODE	DESCRIPTION	QUANTITY
1	901212A	SECTOR	1
2	901223	PINTLE CHAIN SOCKET	1
3	901235	SOCKET	2
4	901236	PLATE	2
5	901241	CABLE SUPPORT	2
6	901231	ANGULAR	1
7	901233	COVER	1
8		SCREW T.C.E.I.	4
9	901432A	PLATE	1
10		PROTECTION	1
11	901431A	CABLE SUPPORT	1
12	901239	CAM	1
13	901240	CAM	2
14		WASHER	22
15		SCREW T.C.E.I.	14
16		SCREW T.C.E.I.	4
17	901434A	COVER	1
18		SCREW T.C.E.I.	10
19		WASHER	10
20		NUT M5	8
21	901237	PROTECTION	1
22		WELD LINK	2
23		PINTLE CHAIN	1
24	901234	COVER	1
25	900612A	CABLE CHAIN	1
26		SCREW T.C.E.I.	4
27	901222	PINTLE CHAIN SOCKET	1
28		SNAP RING	2
29	901225	PIN	1
30		NUT M12	1
31		WASHER	1
32		SCREW TE	1
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35	901433	ANGULAR	2
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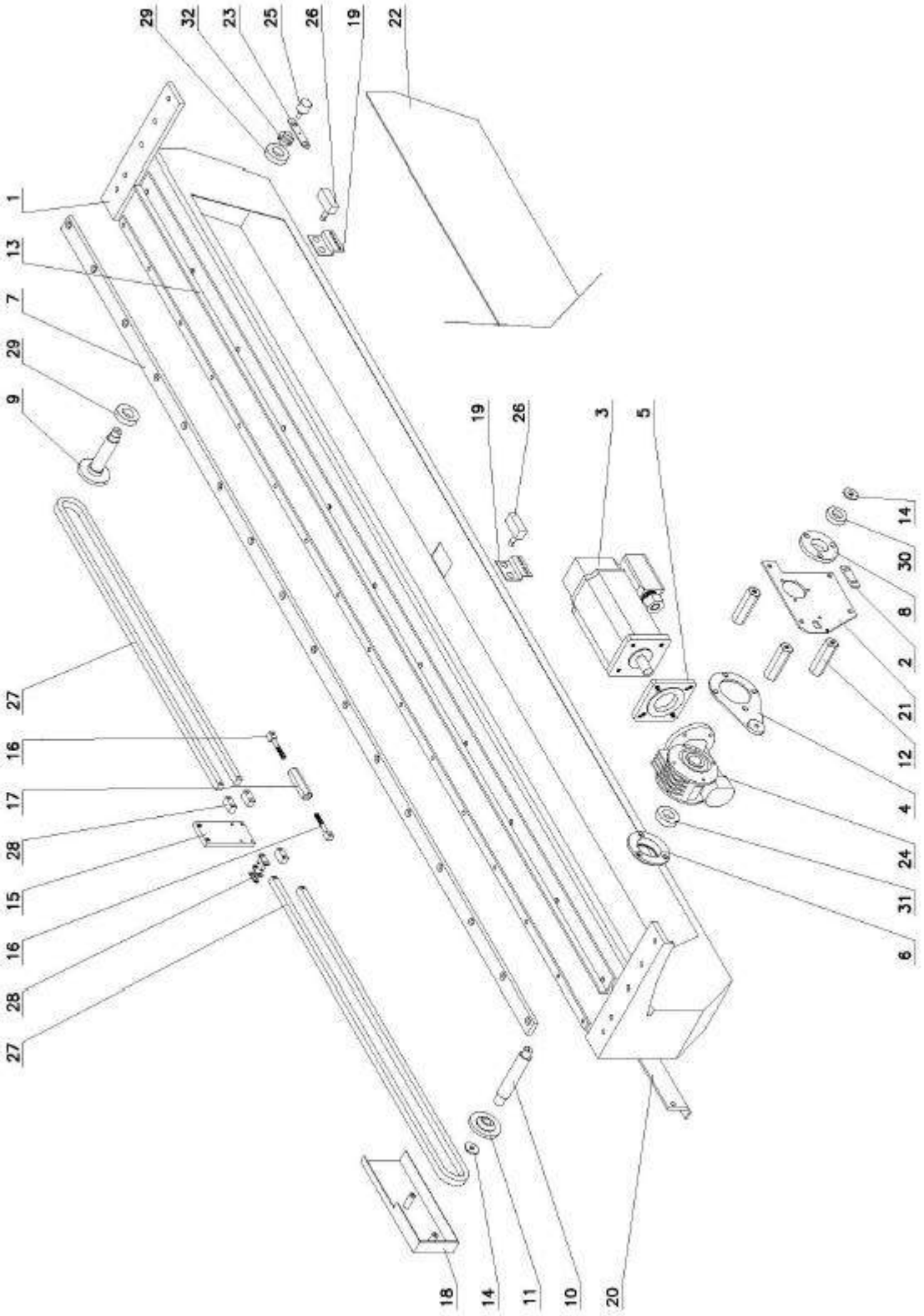
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E9003B

POS	CODE	DESCRIPTION	QUANTITY
1	900802	CROSS MEMBER	1
2	900803	PLATE	2
3	900804A	MOTOR	1
4	900805	LEVER ARM	1
5	900806A	FLANGE	1
6	900807A	FLANGE	1
7	900812	FRONT GUIDE	1
8	900815	FLANGE	1
9	900817A	PIN	1
10	900818	REDUCTION GEAR PIN	1
11	900819A	SPROCKET	1
12	900820	SPACER	3
13	900821A	GUIDE	1
14	900828	WASHR	2
15	900840	CHAIN SOCKET	1
16	900844	TIE ROD	1SX – 1DX
17	900845	JOINT	1
18	900853A	COVER	1
19	900855	MICROSWITCH SUPPORT	2
20	900862A	FRAME ANGULAR KEEPER	1
21	900867	PLATE	1
22	900868	COVER	1
23	901218	PLATE	1
24	MVF 49P=i28 P80 B14	REDUCTION GEAR	1
25	10k 10 giri	POTENTIOMETER	1
26	MS20	MICROSWITCH	2
27		PINTLE CHAIN	2
28		WELD LINK	4
29	SKF 6005	BEARING	3
30	SKF1203E	BEARING	1
31	SKF 1205E	BEARING	1
32	SKF KMA 4	RING NUT	1
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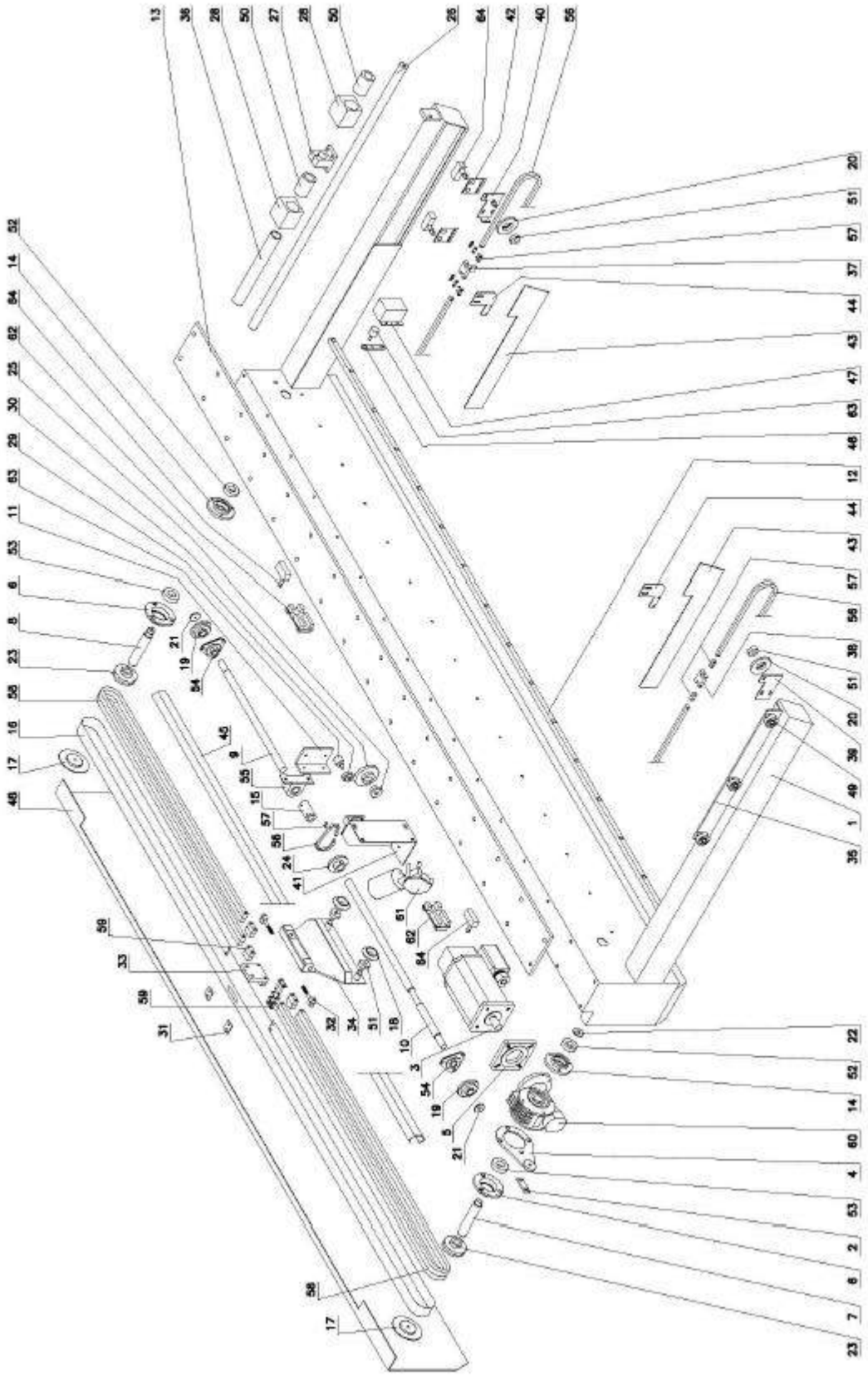

POS	CODE	DESCRIPTION	POS
1	900801	CROSS MEMBER	1
2	900803	PLATE	1
3	900804A	MOTOR	1
4	900805	LEVER ARM	1
5	900806A	FLANGE	1
6	900807A	FLANGE	2
7	900808	REDUCTION GEAR PIN	1
8	900809	DRIVING GEAR PIN	1
9	900810	TABLE TOP MOV.PIN	1
10	900810A	TABLE TOP MOV.PIN	1
11	900811	ANGULAR	1
12	900813	SFD GUIDE	1
13	900814	SLIPPING GUIDE	1
14	900815	FLANGE	2
15	900816	BUSH	1
16	900822	PROTECTION	1
17	900823	WASHER	2
18	900824	WHEEL	2
19	900825	TABLE TOP SPROCKET	2
20	900826	SPROCKET DRIVING GEAR	2
21	900827	WASHER	2
22	900828	WASHER	1
23	900829A	TUBE STAND SPROCKET	2
24	900830	TABLE TOP SPROCKET	1
25	900831A	TABLE TOP MOTOR SPROCKET	1
26	900832	SLIPPING SHAFT	1
27	900833	SHAFT SUPPORT	1
28	900834	SLIPPING SUPPORT	2
29	900835	POTENTIOMETER GEAR	1
30	900836	GEAR	1
	900837	PLATE	2
	900838	CHAIN SOCKET	2
	900839	CHAIN SOCKET	1
	900841	CARRIAGE	1
	900842	BEARING SUPPORT	1
	900843	COVER	1
	900846	CHAIN SOCKET	1
	900847	CHAIN SOCKET	1
	900848	DRIVING GEAR SUPPORT	1
	900849	DRIVING GEAR SUPPORT	1
	900852A	REDUCTION GEAR	1
	900856	LIMIT SWITCH SUPPORT	2
	900861	COVER	2
44	900863	TRANSMISSION SOCKET	2
45	900864	RAIL	1

46	900865	PLATE	1
47	900866	COVER	1
48	900869	COVER	1
49	190074-190083	BEARING + ECCENTRIC	3
50	LME 25uu	LINEAR BUSH	2
51	SKF 6200	BEARING	4
52	SKF 1203 E	BEARING	2
53	SKF 1205 E	BEARING	2
54	RHB BPFT3	SUPPORT	2
55	RHB BPP4	SUPPORT	1
56		CHAIN	3
57		WELD LINK	5
58		DOUBLE CHAIN	2
59		WELD LINK	4
60	MVF49P i=28 P80 B14	REDUCTION GEAR	1
61	ST.00.550-48V 06.03(62)	REDUCTION GEAR MOTOR	1
62	K901120A	PCB	2
63		POTENTIOMETER	2
64	MS20	MICROSWITCH	4
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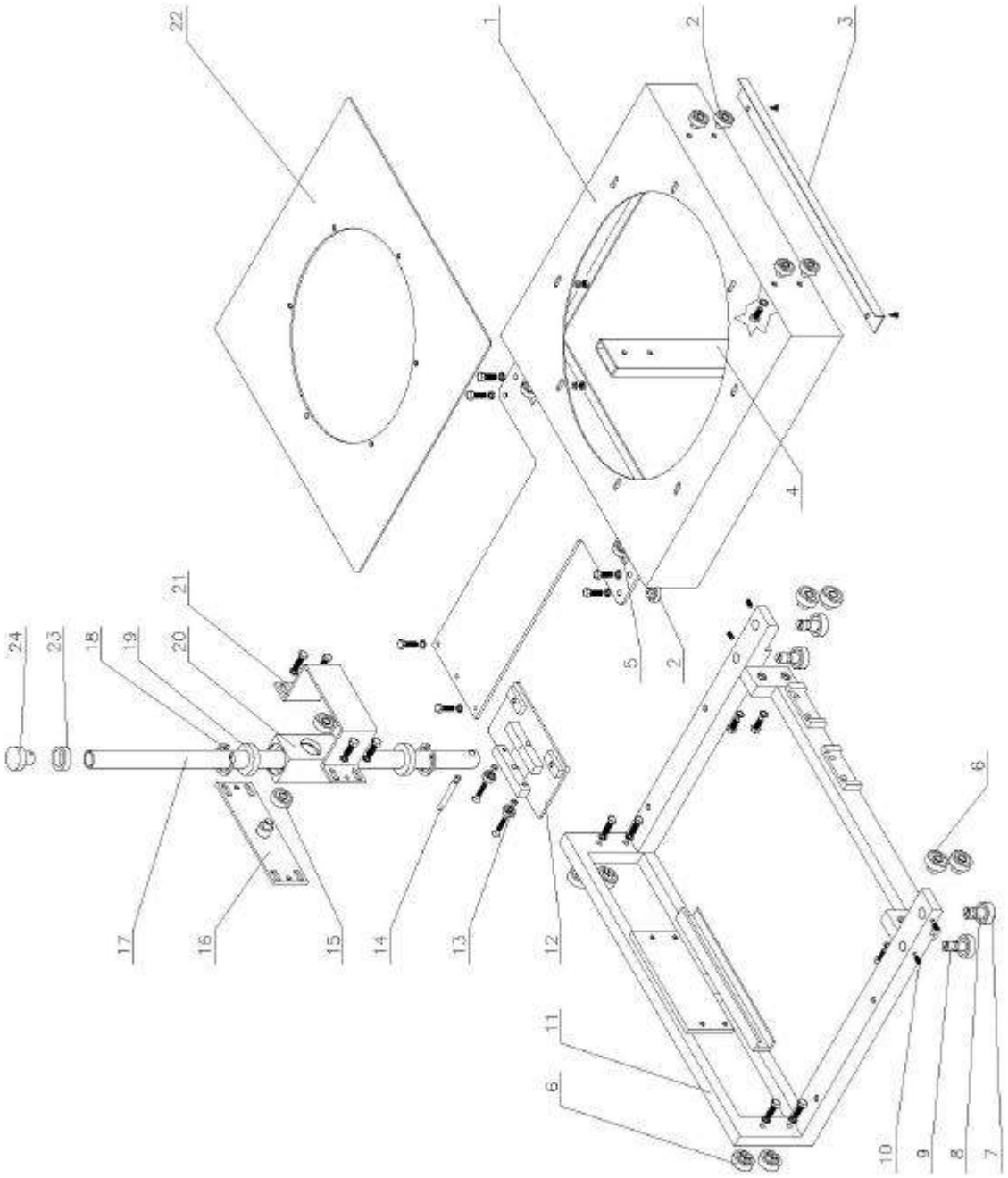

E9023

POS	CODE	DESCRIPTION	POS
1	900601	CARRIAGE	1
2	190075 + 190077	BEARING + ECCENTRIC	8
3	900616	COVER	1
4	900601/1	TUBE	1
5	190075 + 190080	BEARING + ECCENTRIC	4
6	190075 + 900706	BEARING + ECCENTRIC	8
7		TRACK ROLLERS SKF 305800 C-2Z	4
8	900707	ECCENTRIC PIN	2
9	900512	ECCENTRIC PIN	2
10		GRUB SCREW M6X8	4
11	900700A	CARRIAGE	1
12	900712	CARRIAGE	1
13		BEARING	2
14	900711	PIN	1
15		BEARING	2
16	900713	SUPPORT	1
17	901029/1	ROD	1
18		RING 45	2
19	900716	PILOT BOSS	2
20	900715	BLOCK	1
21	900714	SUPPORT	1
22	900614/A/B/C/6 15	PLATE I.I	1
23	9001064	GUIDE RING	1
24	901080	GUIDE SHOE	1
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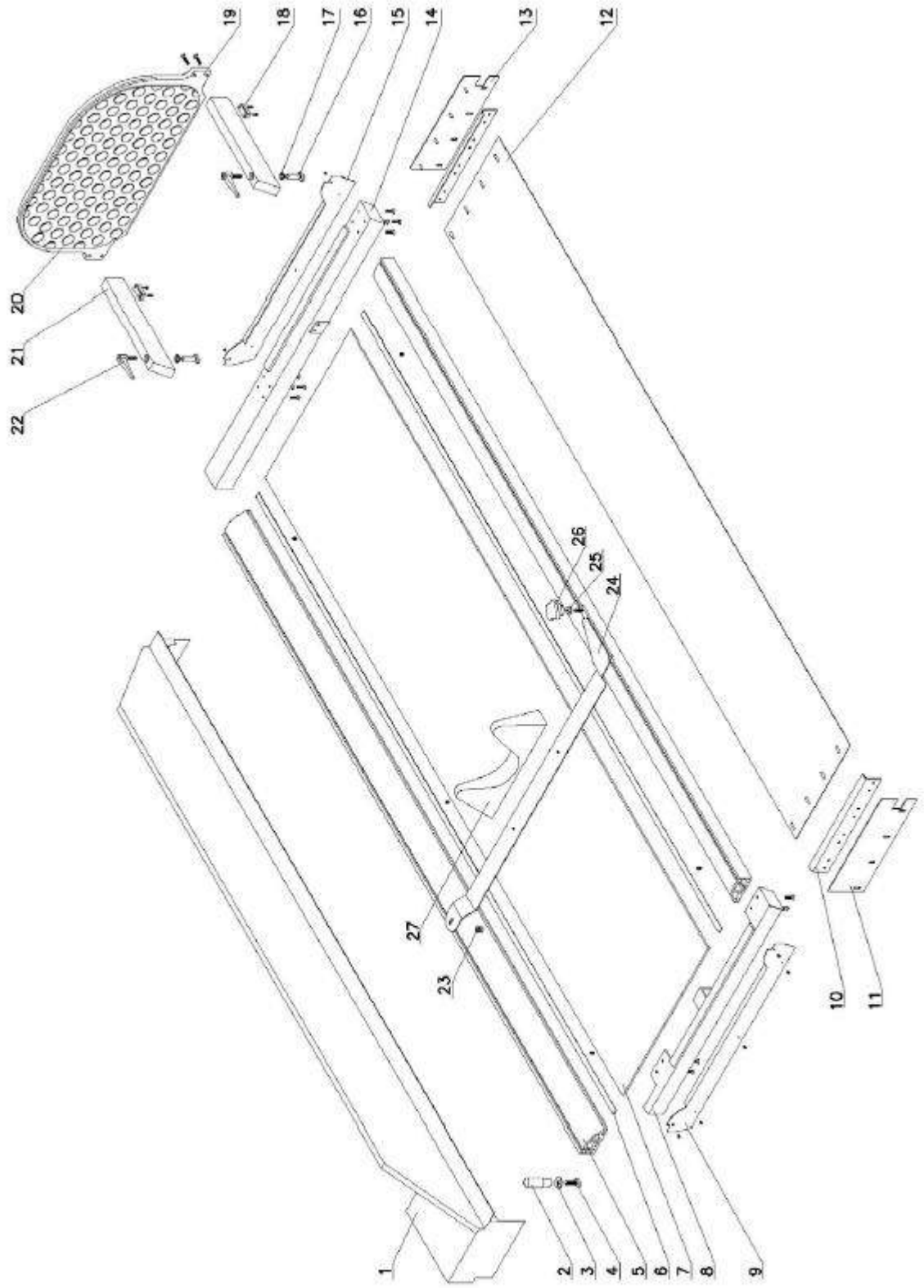

E9006

POS	CODE	DESCRIPTION	QUANTITY
1	900857	COVER	1
2	I.280/80-M10	HANDLE GRIP	2
3	BUL 226	PLASTIC WASHER STANDARD	2
4	190089	PIN	2
5	901106	Holder	2
6	901104	SPACER	2
7	901101	Plane	1
8	901105	GUIDE	1
9	901107	COVER	1
10	900858	SOCKET	2
11	900859	MYLARD SOCKET	1
12	900851	PROTECTION	1
13	900860	MYLARD SOCKET	1
14	901103	SUPPORT	1
15	901108	COVER	1
16	190090	Pin	2
17	BUL 273	Plastic washer	2
18	901149	Nylon plat	2
19	901131	Plate	1
20	901132A	Protection	1
21	901133	TUBE	2
22	MR80 p-M10x30	Handle-grip	2
23	190091	NYLON PLAT	1
24	901121	SUPPORT	1
25	BUL 169	PLASTIC WASHER	1
26	VC.192-60 A-8	Handle grip	1
27	1 90093	Fusion	1
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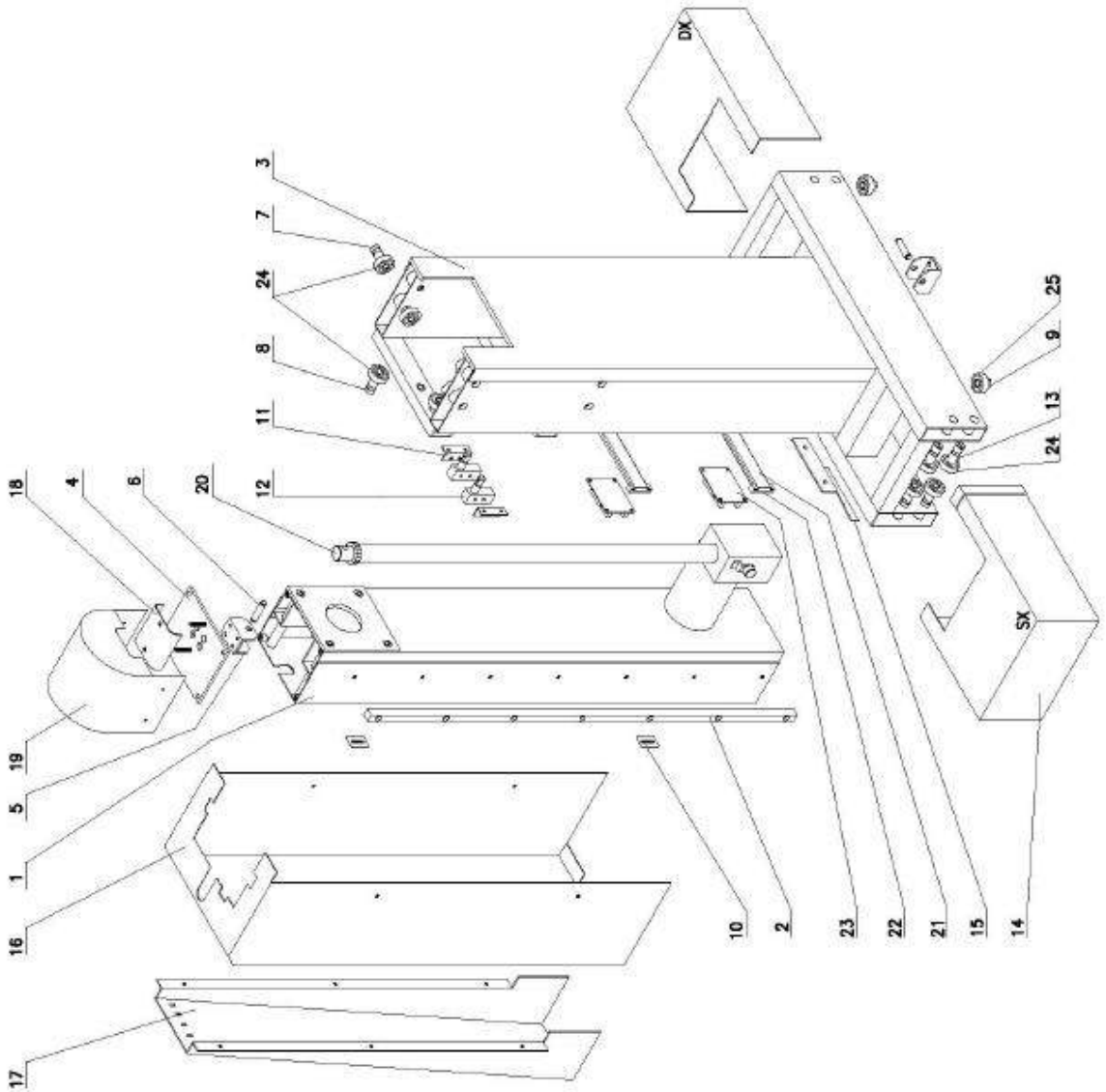

E9007

POSITION	CODE	DESCRIPTION	QUANTITY
1	900504A	SUPPORT	1
2	900503B	Guide	3
3	900505	STAND	1
4	900506	PLATE	1
5	900507	SOCKET	2
6	900508	PIN	2
7	900512	Bearing	8
8	900512B	Bearing	4
9	900509	Eccentric	4
10	900510	CAMME	2
11	900511	PLATE	2
12	MS 20	Microswitch	2
13	900512A	Eccentric pin	8
14	900513	COVER	1dx-1sx
15	900514	CABLES SUPPORT	1
16	900515	COVER	1
17	900516	COVER	1
18	900517A	CABLE KEEPER	1
19	900518A	COVER	1
20	900519A	ACTUATOR	1
21	900520	OMEGA	2
22	LEGRAND 36478	GUIDE	6
23	K900120A	PCB	2
24	SKF 305800C-2Z	Track rollers	20
25	SKF4201A	Bearing	4
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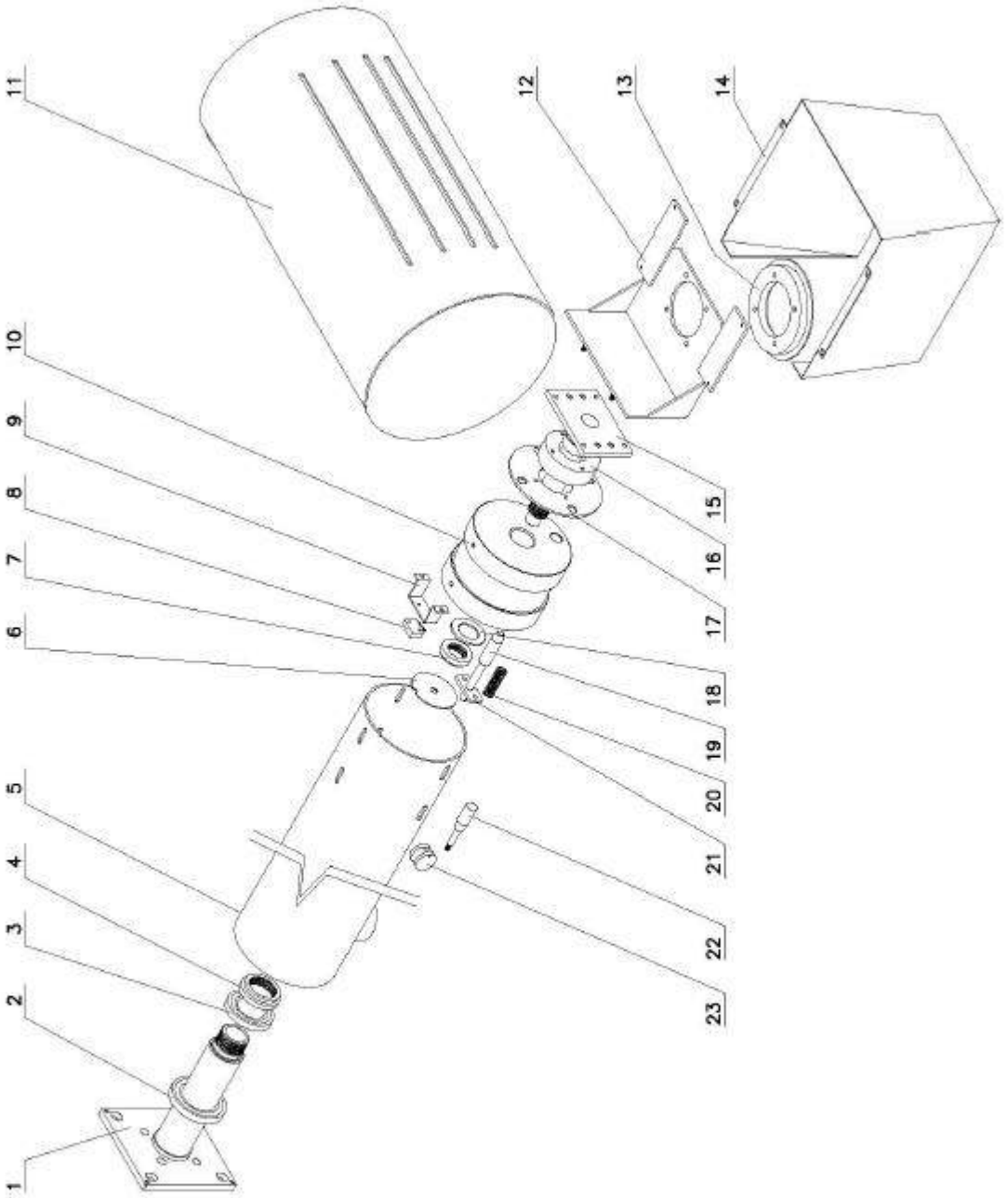

E9008

POSITION	CODE	DESCRIPTION	QUANTITY
1	900402	SUPPORT	1
2	SKF 16010	Bearing	1
3	SKF 16008	Bearing	1
4	SKF KMA8	RING NUT	1
5	900401	SUPPORT	1
6	900411	CAMME	1
7	GUA 28X1.5	RING NUT	1
8		Microswitch	1
9	900412	SUPPORT	1
10	900404	ROTATION SUPPORT	1
11	900415	COVER	1
12	900403	SUPPORT	1
13	190006	FLANGE	1
14	900414A	COVER	1
15	900405	ROTATION PIN	1
16	900406	FLANGE	1
17	900407	FLANGE	1
18	900410	WASHER	2
19	900408	PIN	1
20	700150	Spring	1
21	900409	PLATE	1
22	BL 336/10x95	Handle	1
23	900413	CAMME	1
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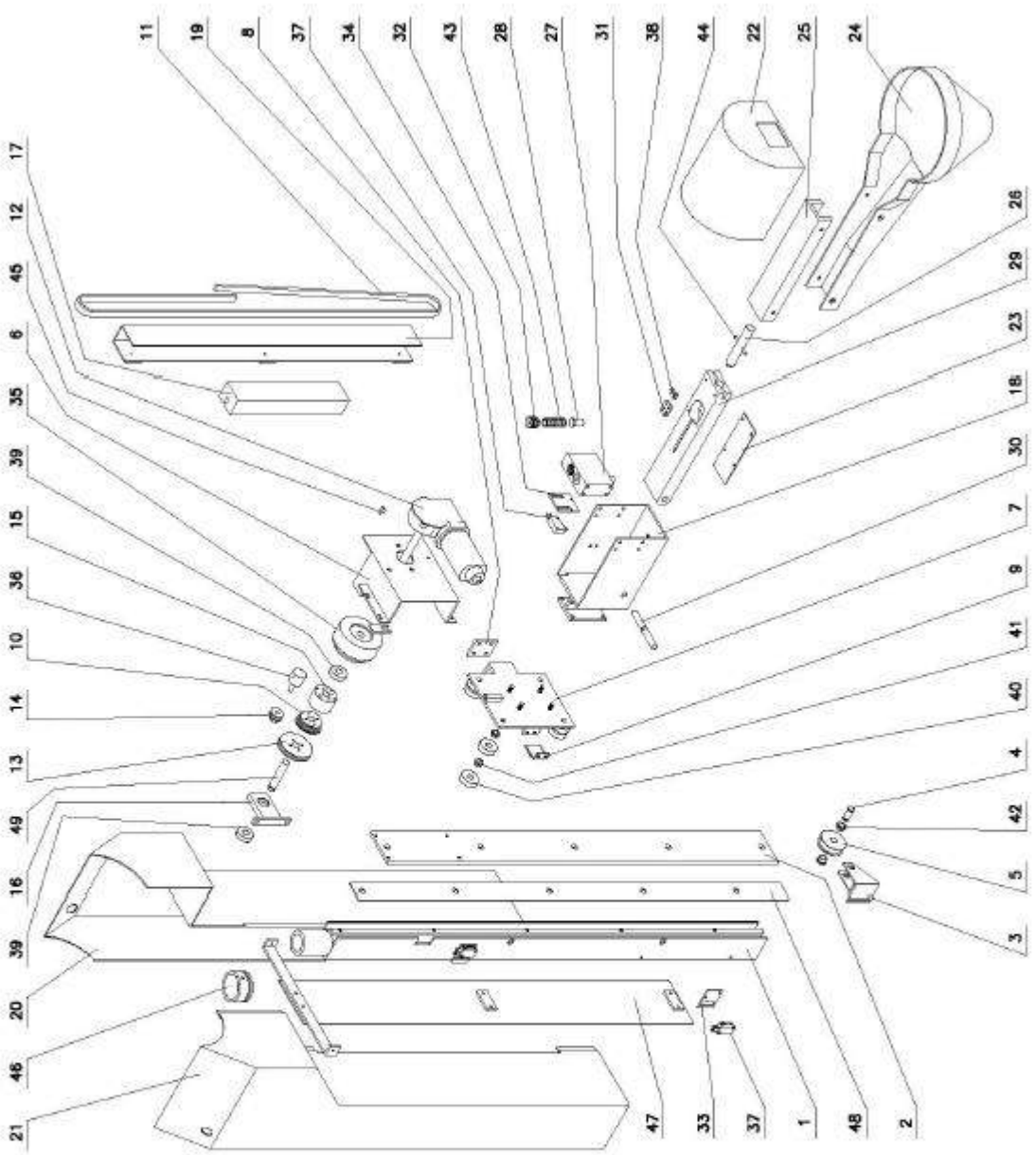
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E9009A

POSITION	CODE	DESCRIPTION	QUANTITY
1	901060A	FRAME	1
2	901061A	GUIDE	1
3	901062A	SUPPORT	1
4	901063	PIN	1
5	901066	WHEEL	1
6	901067	MOTOR SUPPORT	1
7	901068	CHARIOT	1
8	901069	PLAT	1
9	901070	CAMME	1
10	901071	PULLEYPULLEY	1
11	901072	VELT	1
12	901073A	MOTOR	1
13	901074	GEAR	1
14	901075	GEAR	1
15	901076	SPACER	1
16	901077A	SUPPORT	1
17	901078	COUNTERWEIGHTS	1
18	901084	SUPPORT	1
19	901085	COVER	1
20	901086B	COVER	1
21	901087B	COVER	1
22	901088	COVER	1
23	901089	COVER	1
24	901091	COVER	1
25	901092	BLOCK	1
26	901093	PIN	1
27	901094	BLOCK	1
28	901095	CAP	2
29	901096	PLATE	1
30	901097	PIN	1
31	901098	PLAT	1
32	901099	GRUB SCREW	2
33	210051	PLAT	2
34	901624	PLAT	1
35	EMS 70/S	ELECTROMAGNETIC CLUTCHES	1
36		POTENTIOMETER	1
37	LG56313	MICROSWITCH	3
38	AH 3262	MICROSWITCH	1
39	SKF 6001-2Z	BEARING	2
40	SKF 6000-2Z	BEARING	8
41	PAF 08075	COLLARED BUSH	8
42	PAF 10070	COLARED BUSH	2
43	D13200D13200	SPRING	2
44		FASTPIN	1
45		WOODRUFF KEY	1
46	901060A/1	RING	1
47	901060A/2	SUPPORT	1
48	901060A/3	PLATE	1
49	901079	PLATE	1
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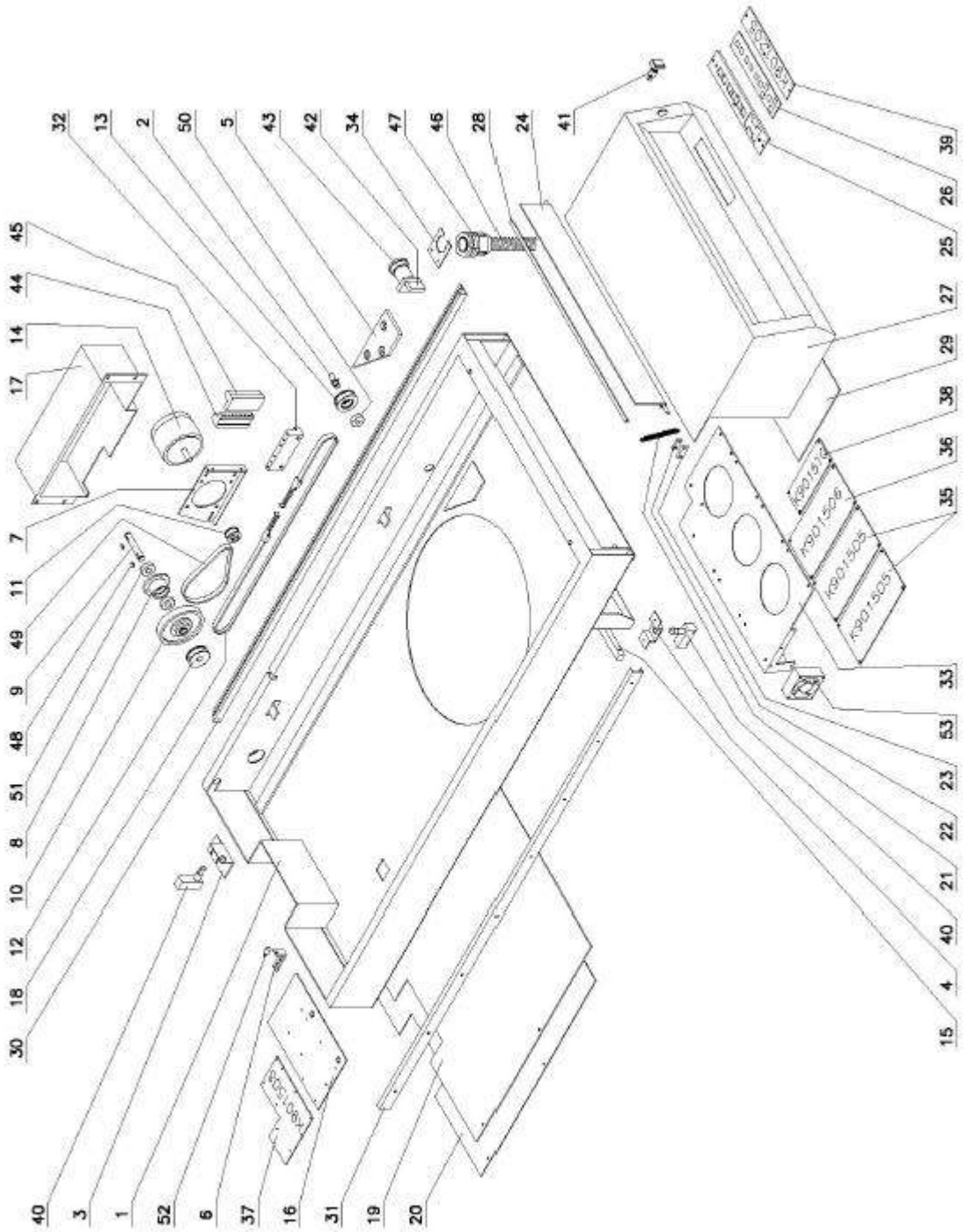
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E9010

POSITION	CODE	DESCRIPTION	QUANTITY
1	901701B	FRAME	1
2	901708	PIN	1
3	901712A	SUPPORT	1
4	901713	PLAT	1
5	901714A	CAMME	1
6	901715	SUPPORT	1
7	901718A	PLATE	1
8	901719A	FLANGE	1
9	901720A	SHAFT	1
10	901721A	PULLEY	1
11	901722A	PULLEY	1
12	901723A	PULLEY	1
13	901724	WHEEL	1
14	901725	MOTOR	1
15	901726	ROD	1
16	901727	PLATE	1
17	901728A	COVER	1
18	901729	VELT	1
19	901730	PROTECTION	1
20	901731	COVER	1
21	901732	SPRING	1
22	901733	PLAT	1
23	901734	LEVER	1
24	901735	INSPECTION DOOR	1
25	901736	SUPPORT	1
26	901737	LEXAN CONTROL PANEL	1
27	901738	COVER	1
28	901739	BUMPER	1
29	901603	LEAD PLATE	1
30	900104	GUIDE	1
31	900105	GUIDE	1
32	900125	VELT ATTACHMENT	1
33	901743	SUPPORT	1
34	400041	SUPPORT	1
35	K901505	PCB	2
36	K901506	PCB	1
37	K901508	PCB	1
38	K901510	PCB	1
39	K901205	PCB	1
40	MS 20	MICRO SWITCH	2
41	BRETERPM16 RE1	PUSH BUTTONS	1
42	ZB5 AZ 102		1
43	ZB5 AT4	EMMERGENCY STOP	1
44	GMSTBHIL 1767300	CONNECTOR PHOENIX	1
45	GMSTB1766961	CONNECTOR PHOENIX	1

POSITION	CODE	DESCRIPTION	QUANTITY
46	GL 028	COILED SHEATH	1
47		CABLE CLAMP	1
48		WOODRUFF KEY	2
49	156 XL 037	VELT	1
50	SKF 6000-2Z	BEARING	1
51	SKF 6001-2Z	BEARING	2
52	PM 10-10 M4	BUMPER	1
53	45/09590-00	FAN	1
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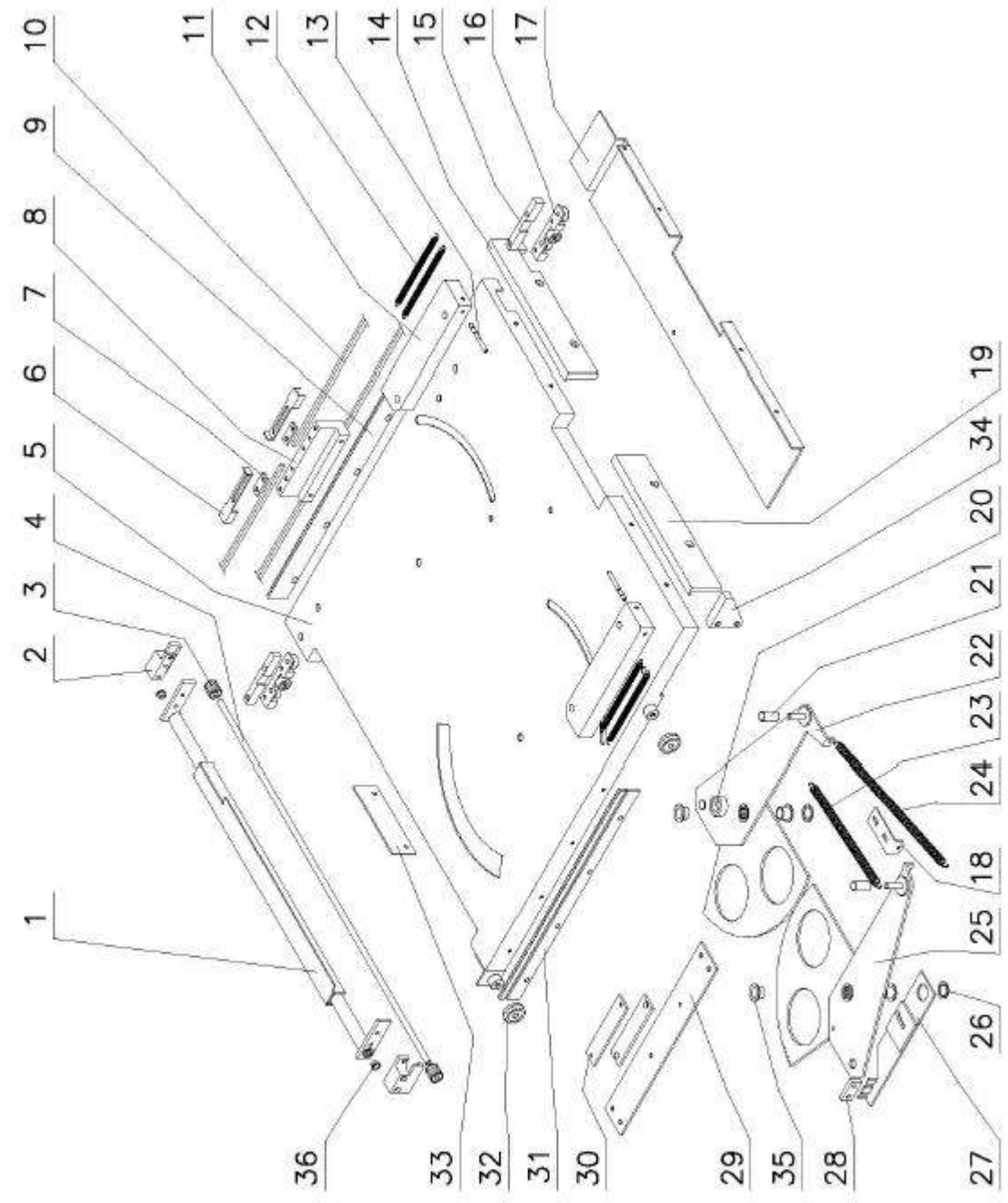
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E9011

POSITION	CODE	DESCRIPTION	QUANTITY
1	900116A	REAR JAW	1
2	900122A	GUIDE SHOE	1Dx + 1Sx
3	900103	GEAR	2
4	900102	SHAFT	1
5	900101A	PLATE	1
6	900130	BELT SOCKET	1Dx + 1Sx
7	900129	PLATE	2
8	900125	BELT SOCKET	1
9	900121	RACK	1
10	900131	BELT	1
11	900118	BACK-STOP	2
12	900106	SPRING	4
13	900127	PIN	2
14	900117	BACK-STOP	1
15	900124A	SHIM	2
16	900119A	CARRIAGE	2
17	900115	COVER	1
18	900114	BUMPER SUPPORT	1
19	900117/1	BACK-STOP	1
20	SKF 608	BEARING	1
21	900123A	BUSH	2
22	900110	LEFT JAW	1
23	900108	SPRING	1
24	900107	SPRING	1
25	900109	RIGHT JAW	1
26	900128	WASHER	2
27	900113	MAGNET SUPPORT	1
28		MAGNET	1
29	900111	PLATE	1
30	900112	PLATE	2
31	900120	RACK	1
32	RA22-6DNCE	BEARING	2
33	900126	BACK-STOP	1
34	900117/2	BACK-STOP	1
35	SKF GLYPBG101207F	FLANGED BUSH	4
36	SKF GLYPBG060808F	FLANGED BUSH	2
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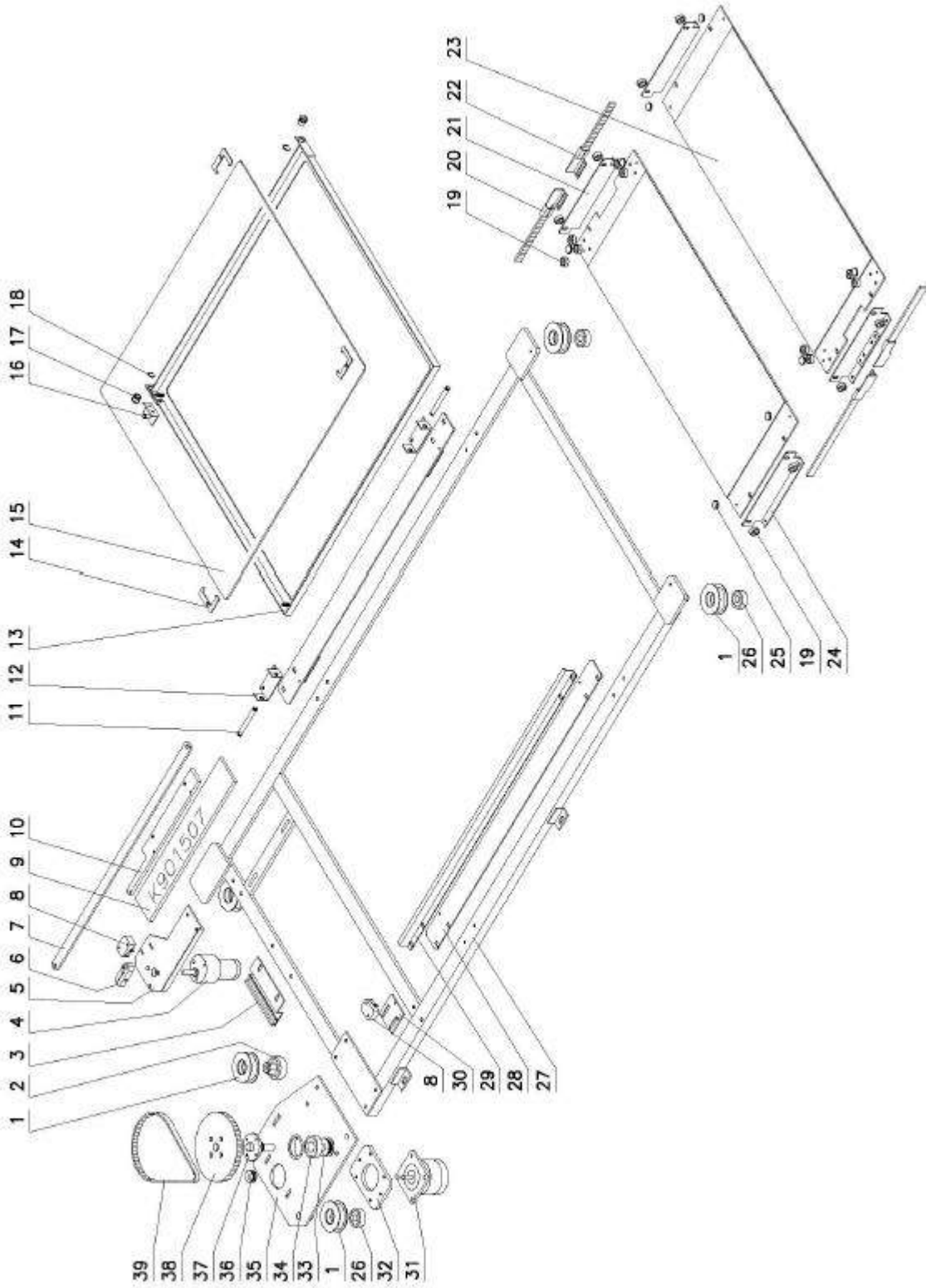
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E9012

POSITION	CODE	DESCRIPTION	QUANTITY
1	901724	ROLLER	5
2	190084=SKF 6000	ECCENTRIC + BEARING	1
3	901619	CONNECTOR SUPPORT	1
4	GRB 35 GM 0100	MOTOR	1
5	901608	GRID MOTOR SUPPORT	1
6	901618A	LEVER	1
7	901611	ROD	1
8	LG56313	MICROSWITCH	2
9	K901507	PCB	1
10	901607	SENSOR SUPPORT	1
11	901616	PIN	2
12	901615	SUPPORT	2
13	901612A	FRAME PART	1
14	100004A	PLATE	4
15	901627	GRID	1
16	901617A	SUPPORT	1
17	100008	BUSH	2
18	100009	SNAP RING	2
19	SKF 624	BEARING	16
20	901626A	DRIVING BELT	1
21	901605	PLATE	2
22	901625A	DRIVING BELT	1
23	901602	FIELD STOP WITH LEAD	2
24	901604	PLATE	2
25	100035	GUIDE SHOE	8
26	SKF 6000	BEARING	4
27	901601	FRAME	1
28	901613	AEC SUPPORT	2
29	901614	GUIDE	1
30	901624	PLATE	1
31	6600 R030	FIELD STOP WITH LEAD	1
32	901609	PLATE	1
33	901623	GUIDE SHOE	1
34	SKF 160002	BEARING	1
35	901606	SPROCKET SUPPORT	1
36	901622	PULLEY	1
37	901620	PIN	1
38	901621	PULLEY	1
39	130XL031	BELT	1
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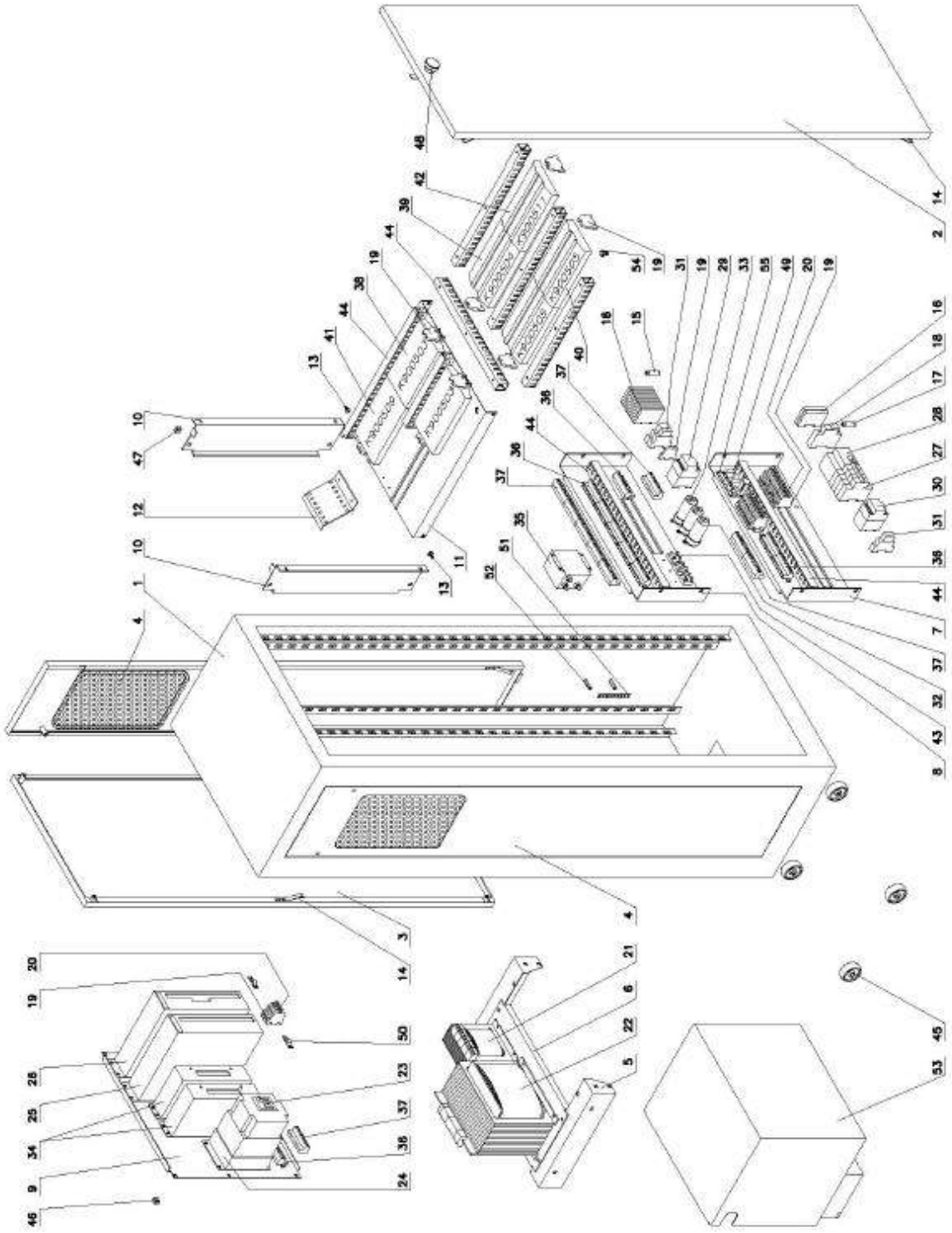

E9013

POSITION	CODE	DESCRIPTION	QUANTITY
1	901461	FRAME	1
2	901462	COVER	1
3	901463	COVER	1
4	901464	COVER	2
5	901465	SUPPORT	2
6	901466	SUPPORT	1
7	901467	SUPPORT	1
8	901468	SUPPORT	1
9	901469	SUPPORT	1
10	901470	SUPPORT	2
11	901471	SUPPORT	1
12	900514	PLATE	1
13	250044	SCREW	2
14	190009	CONTACT	10
15		FUSE	14
16	PH3004100	FUSE HOLDER	14
17		FUSE	1
18	05808	FUSE HOLDER	1
19	AB1TP435U	CONNECTOR	19
20	AB1VV435U	CONNECTOR	29
21		TRANSFORMER	1
22		TRANSFORMER	1
23	3G3JVAB007	INVERTER	1
24	3G3JVPFI1020E	FILTER	1
25	CSV 22-07	CONTROL OPERATION	2
26	CSV 22-07+	CONTROL OPERATION	2
27	MEG 24301	AUTOMATIC CIRCUIT BREAKER	1
28	MEG 26606	AUTOMATIC CIRCUIT BREAKER	1
29	LC1DT20B7	REMOTE CONTROL SWITCH	1
30	LC1DT32B7	REMOTE CONTROL SWITCH	1
31	95.63+40.31	RELAY 24V + SOCKET	3
32	ARX 472X063AB1 4700mF 63V	CONDENSER + SUPPORT	2
33	ASL30A472DE100 4700mF 100V	CONDENSER + SUPPORT	1
34	FN 258-7-07	LINE FILTER	2
35	AR35.14A.135	LINE FILTER	1
36	GMSTBHIL1766961	CONNECTOR PHOENIX	9
37	GMSTB1766961	CONNECTOR PHOENIX	9
38	K901503	PCB	2
39	K901504	PCB	1
40	K901505	PCB	2
41	K901509K901509	PCB	1
42	K901511	PCB	1
43		BRIDGE 25 A	3
44	EI 13 25x40	RACEWAY	8
45	ZE PA 060L08	WHEEL	4

46		SCREW NUT	49
47		SCREW NUT	4
48	VC.309/40-S	HANDLE	1
49	K700004	PCB	1
50	1900010	CABLE STOP	2
51	190110	PLAT	1
52	FF09 H 50100 30	PLASTIC SPACER	2
53	901472	COVER	1
54	1.01001.013/0205	PUSH BUTTON	1
55	DBB 2A	PLASTIC SPACER	4

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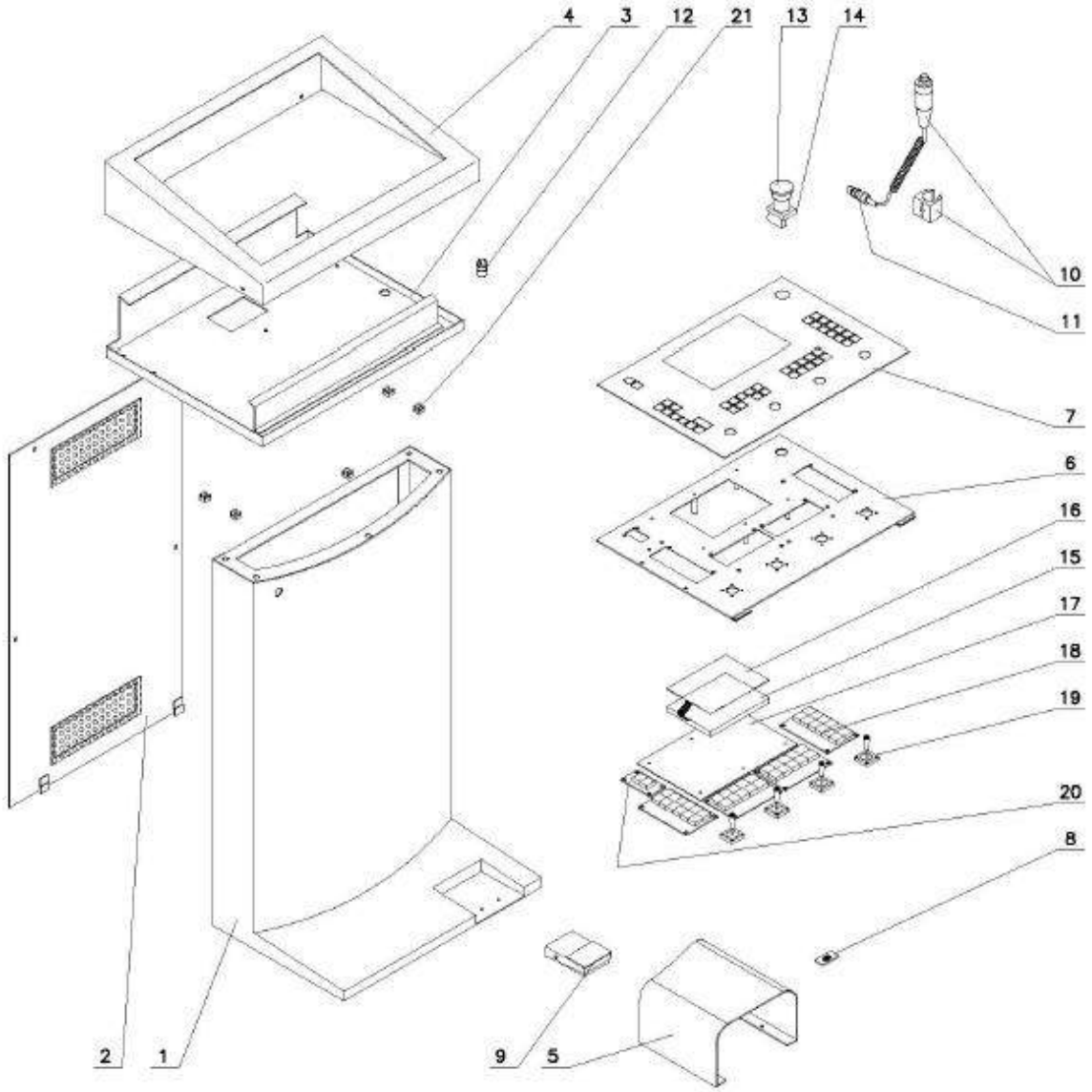

E9014

POSITION.	CODE	DESCRIPTION	QUANTITY
1	901481	SUPPORT	1
2	901482	COVER	1
3	901483	SUPPORT	1
4	901484	COVER	1
5	901485	PROTECTION	1
6	901488	SUPPORT	1
7	901489	PANEL	1
8	901490	PLATE	1
9	FS/1.1	SCOPY PEDAL	1
10	2CUE 71A 04	X-RAY HENDLE DOUBLE SWITCH + SUPPORT	1
11	930963-517	MAS 4100 JACK PLUG	1
12		4 POLES FEMALE PANEL PLUG	1
13	ZB5 AT4	EMMERGENCY SWITCH CAP	1
14	AZ 102	EMMERGENCY SWITCH HOLDER	1
15		LCD 5,4'' ¼ VGA	1
16		TOUCH SCREEN	1
17	K901501	CONTROL PANEL BOARD	1
18	K901500	PCB CONSOLE KEYBOARD	4
19	RKJXC-010KBX2-CP-PCB	JOYSTICK	4
20	K901502	PCB ON/OFF BAORD	1
21		SCREW NUT	5
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