

User's Manual

**Synchronous Machine
AMG 1600UU14 LSEB**

Serial no. 4569892

ABB ref. 7372HD401

Project: ACP-MIRAFLORES
PANAMA

February 2002

4.

Mechanical
Drawings

User's Manual

Synchronous Machine AMG 1600UU14 LSEB

Serial no. 4569892

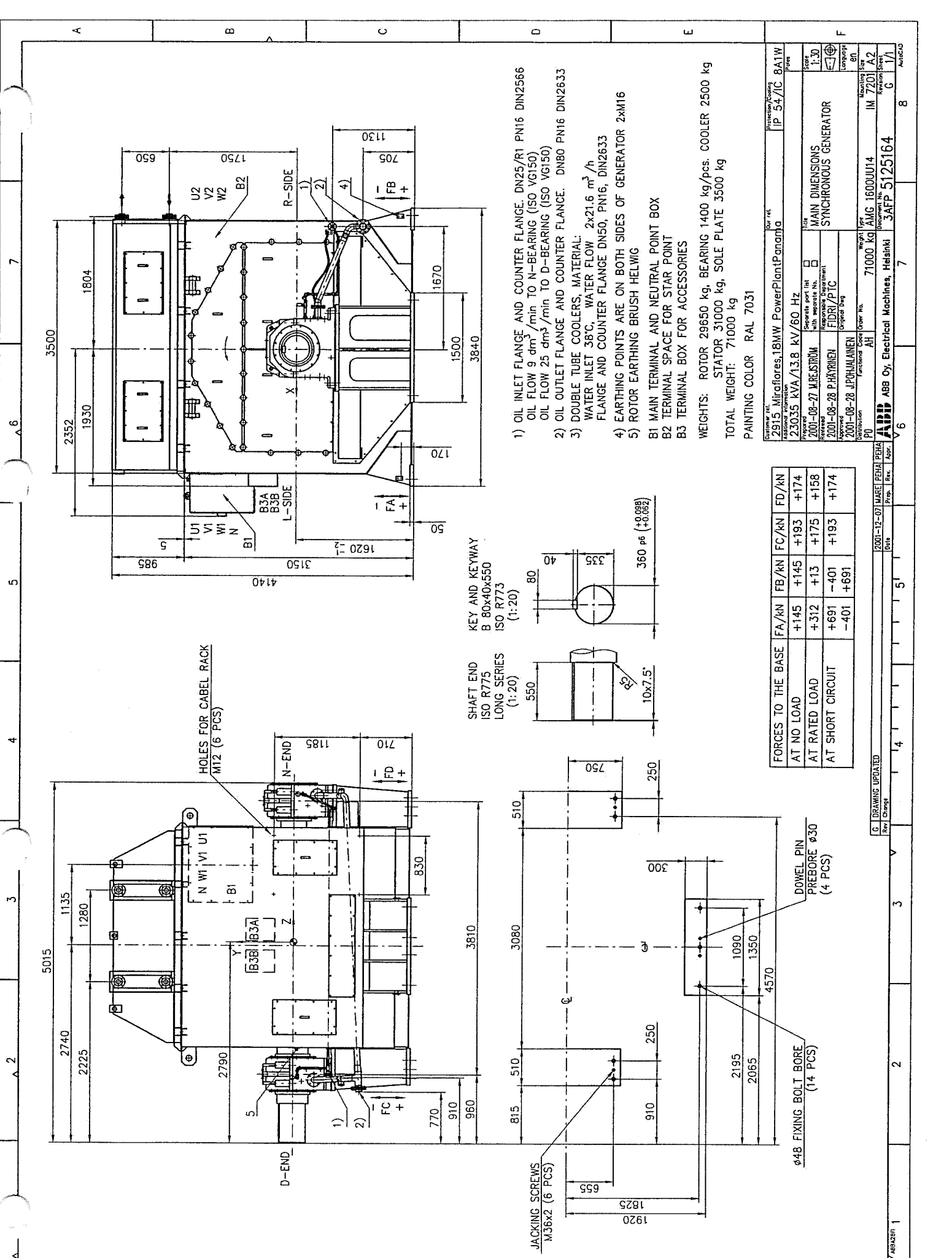
ABB ref. 7372HD401

Project: ACP-MIRAFLORES
PANAMA

February 2002

Contents Mechanical Drawings

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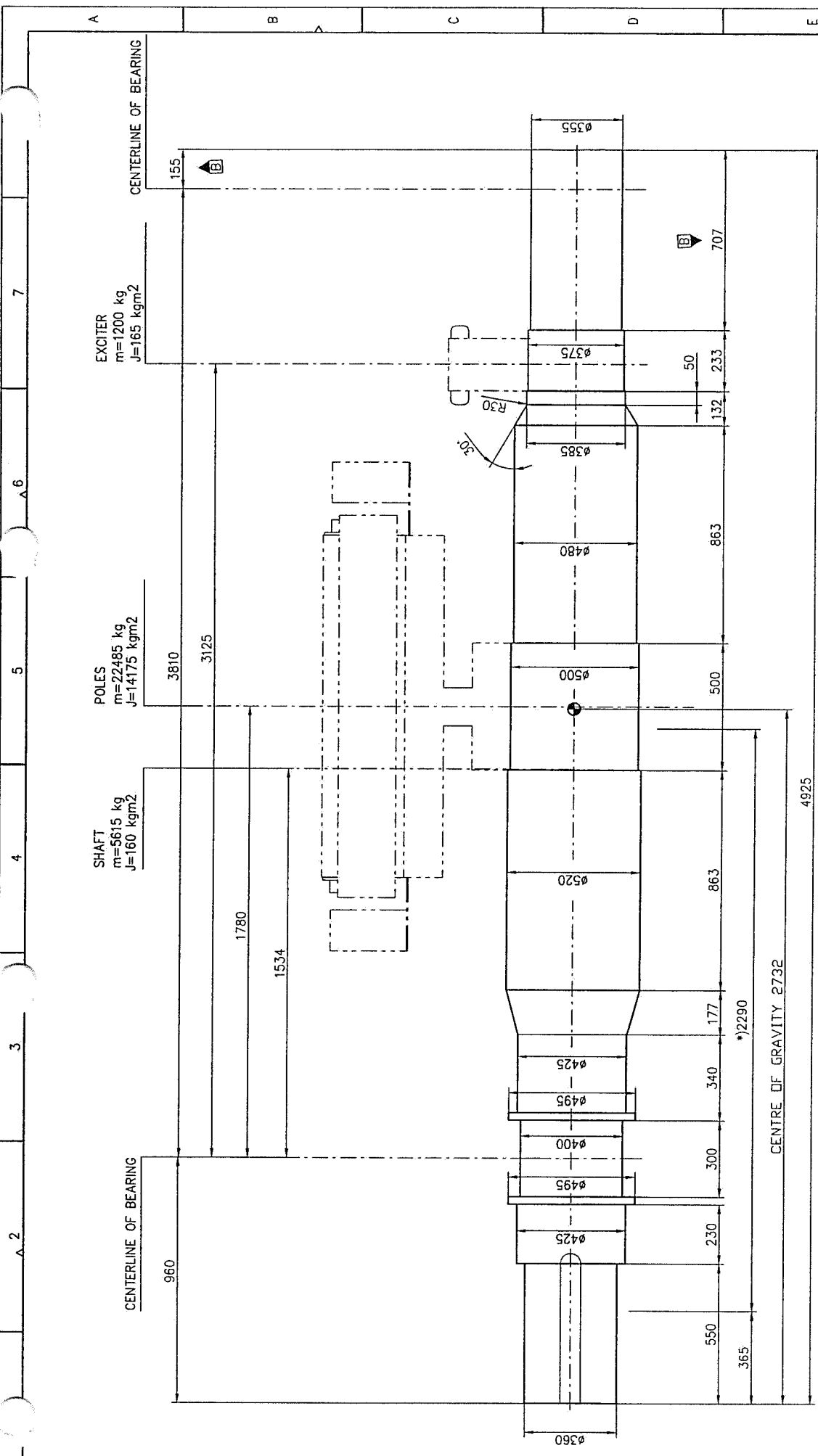
- OIL INLET FLANGE AND COUNTER FLANGE. DN25/R1 PN16 DIN2566
OIL FLOW 9 dm³/min TO N-BEARING (ISO VG150)
OIL FLOW 25 dm³/min TO D-BEARING (ISO VG150)
- OIL OUTLET FLANGE AND COUNTER FLANGE. DN80 PN16 DIN2633
- DOUBLE TUBE COOLERS. MATERIAL: WATER INLET 38°C, WATER FLOW 2x21.6 m³/h FLANGE AND COUNTER FLANGE DN50, PN16, DIN2633
- EARTHING POINTS ARE ON BOTH SIDES OF GENERATOR 2xM16
- ROTOR EARTHING BRUSH HELWIQ
- B1 MAIN TERMINAL AND NEUTRAL POINT BOX
- B2 TERMINAL SPACE FOR STAR POINT
- B3 TERMINAL BOX FOR ACCESSORIES

WEIGHTS: ROTOR 29650 kg, BEARING 1400 kg/pcs. COOLER 2500 kg
 STATOR 31000 kg, SOLE PLATE 3500 kg
 TOTAL WEIGHT: 71000 kg
 PAINTING COLOR RAL 7031

FORCES TO THE BASE	FA/kN	FB/kN	FC/kN	FD/kN
AT NO LOAD	+145	+145	+193	+174
AT RATED LOAD	+312	+13	+175	+158
AT SHORT CIRCUIT	+691	-401	+193	+174
	-401	+691		

Customer ref. 2915 Miraflores, 18MW PowerPlant, Panama
 Additional information IP 54/IC 8A1W
 23035 kVA/13.8 kV/60 Hz
 Frequency 60 Hz
 Pole 2
 Main dimensions MAIN DIMENSIONS
 Synchronous generator SYNCHRONOUS GENERATOR
 2001-08-27 MARESTRUM Separate part list
 2001-08-28 PÄRJÄRIEN Repairing department
 2001-08-28 JIPUJALANEN Original design
 2001-12-07 MARESTRUM
 71000 kg Weight
 AMG 16000U14 Model
 IM 7201 IM 7201
 3AFP 5125164 Part number
 ABB Oy, Electrical Machines, Helsinki 3AFP 5125164
 7 8
 6

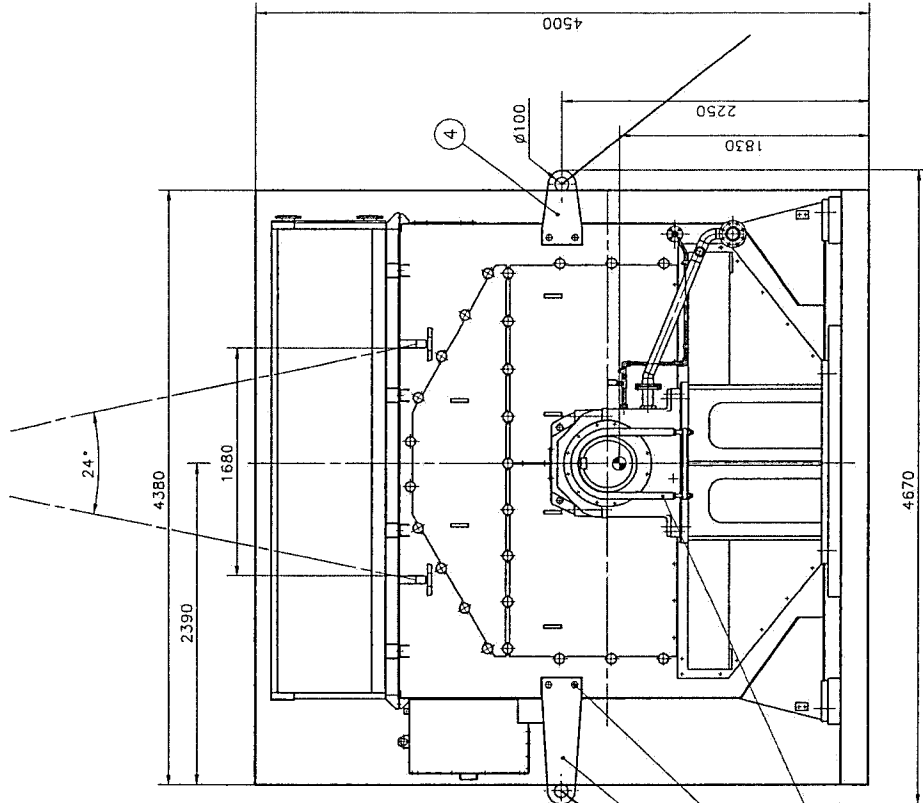
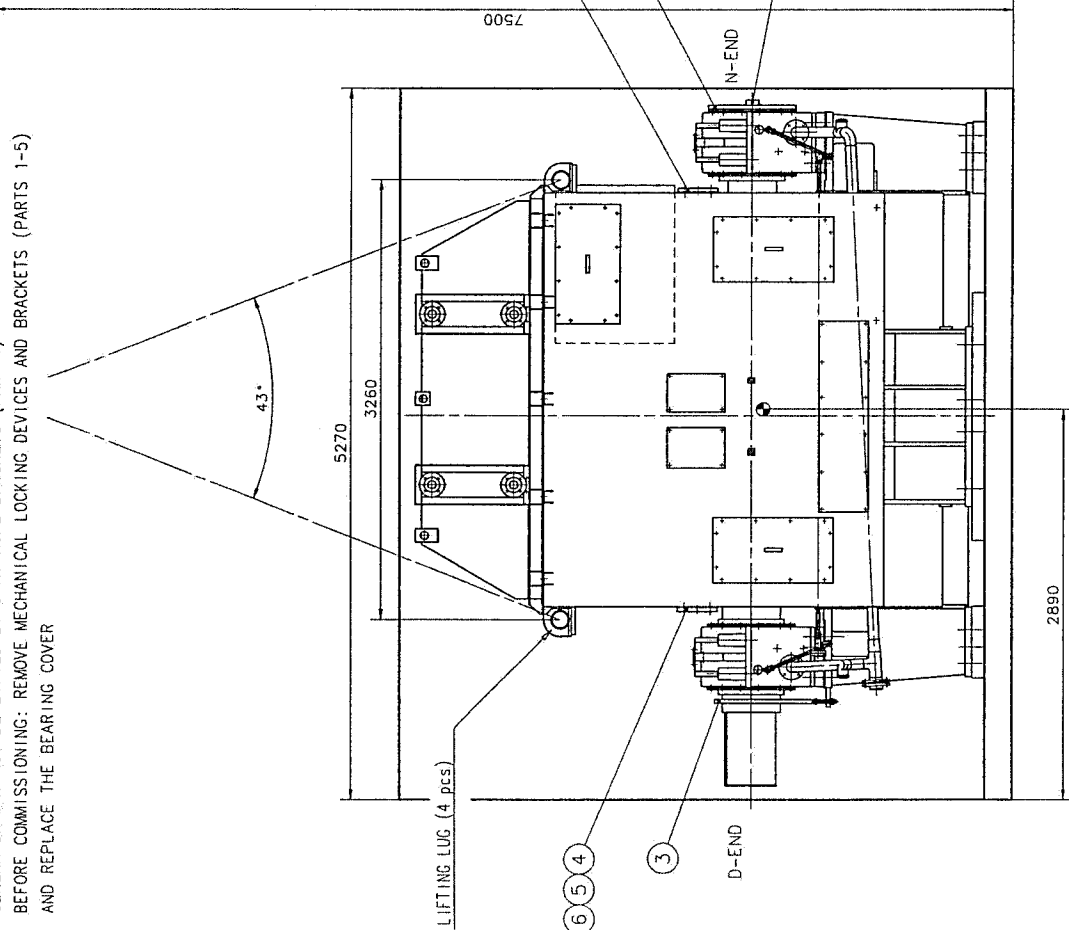
G DRAWING UPDATED
 Rev. Grumpy
 2001-12-07 MARESTRUM
 8/11
 1 4 5 1 4 3 2 1



B DIMENSIONS CHANGED		Date	2000-04-13	2000	JALU	JALU
Rev.	Change	Prep.	Rev.	Scale	Appr.	Scale
1	Original			1:10		
Approved by		Title				
2000-01-18 P.HÄRRIEN		ROTOR DRAWING				
2000-01-18 M.SALU		Separate part list with separate No.		<input type="checkbox"/>		
2000-01-18 M.SALU		Approved by		FIDRI/PT		
2000-01-18 M.SALU		Original only		<input type="checkbox"/>		
Distribution		Functional Code		AR		
Weight		Order No.		AMG 16000U14		
Working Size		Drawing No.		3AFP-5118053		
Revision		Order No.		B 1/1		

TOTAL WEIGHT 29650 kg
 TOTAL INERTIA 14500 kgm²
 *) TORSIONAL STIFFNESS 138 X 10⁶ Nm/rad
 SHAFT MATERIAL: EN 10025-S355 J2G3-OPT.22

RECOMMENDED CRANE LIFTING CAPACITY: 80 METRIC TON
 USE ONLY LIFTING LUGS FOR LIFTING GENERATOR
 GENERATOR MAY NOT BE LIFTED BY STAY ROPE BRACKETS (PART 4)
 BEFORE COMMISSIONING: REMOVE MECHANICAL LOCKING DEVICES AND BRACKETS (PARTS 1-5)
 AND REPLACE THE BEARING COVER

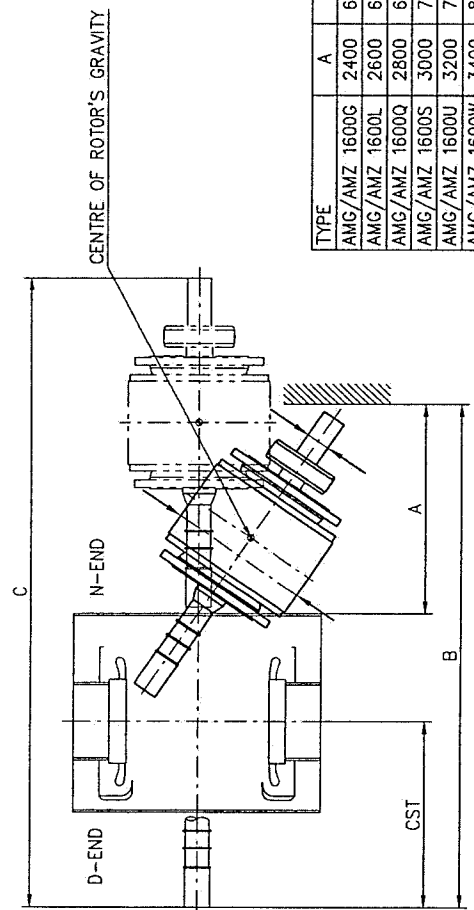
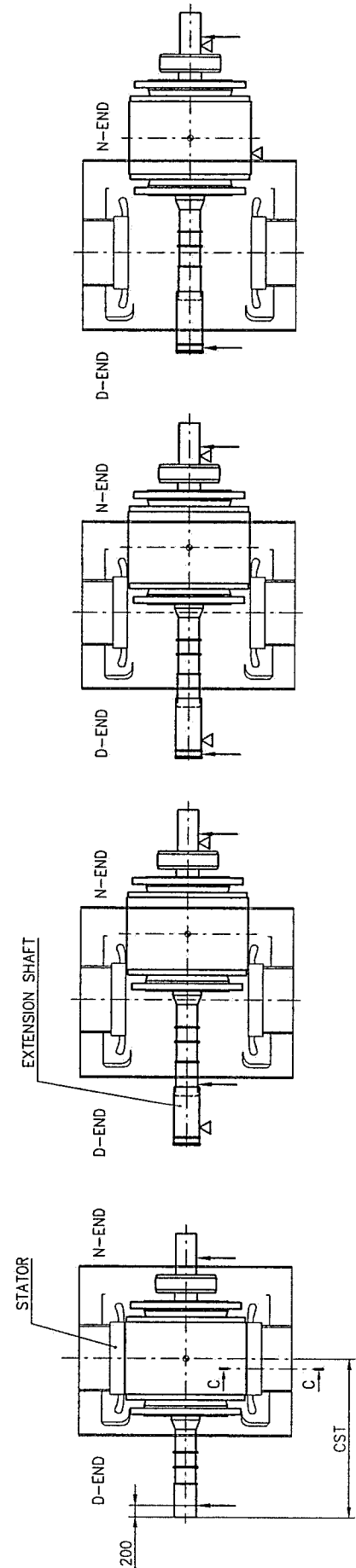


Item No.	Item Name	Quantity	Standard	Material	Quantity
1	5093688B LUKIJUHLAIPPA LOCKING FLANGE	74.0	S-30 4640	STEEL PLATE	1
2	5043331 FOLU M72x200/150 LOCKING SCREW	9.00	M72x200/150		1
3	5118498 KULJETUS TUUKIPAINA TRANSPORT STRAP	23.0	425		1
4	50509184 HAROSKOYDEN KORVA STAY ROPE BRACKET	33.1	30x300x540	STEEL PLATE	2
5	5123894 HAROSKOYDEN KORVA STAY ROPE BRACKET	40	30x300x940	STEEL PLATE	2
6	27885781 FOLHU M30x100/100Y HEX SCREW	0.718	M30x100/100	B. B.	8

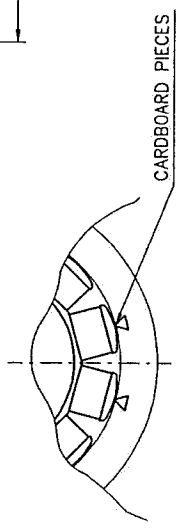
Project No.	Project Name	Scale
2001-11-20 M. KESKINEN	TRANSPORTATION AND HOIST	1:25
2001-11-20 P. JÄRVINEN		
2001-11-20 T. OTTILIN		

Part No.	Part Name	Quantity
AMG 16000U14		1
JAMP 5126059		1

GENERATOR+SOLE PLATES WEIGHT 71000 kg
 TOTAL WEIGHT 73500 kg



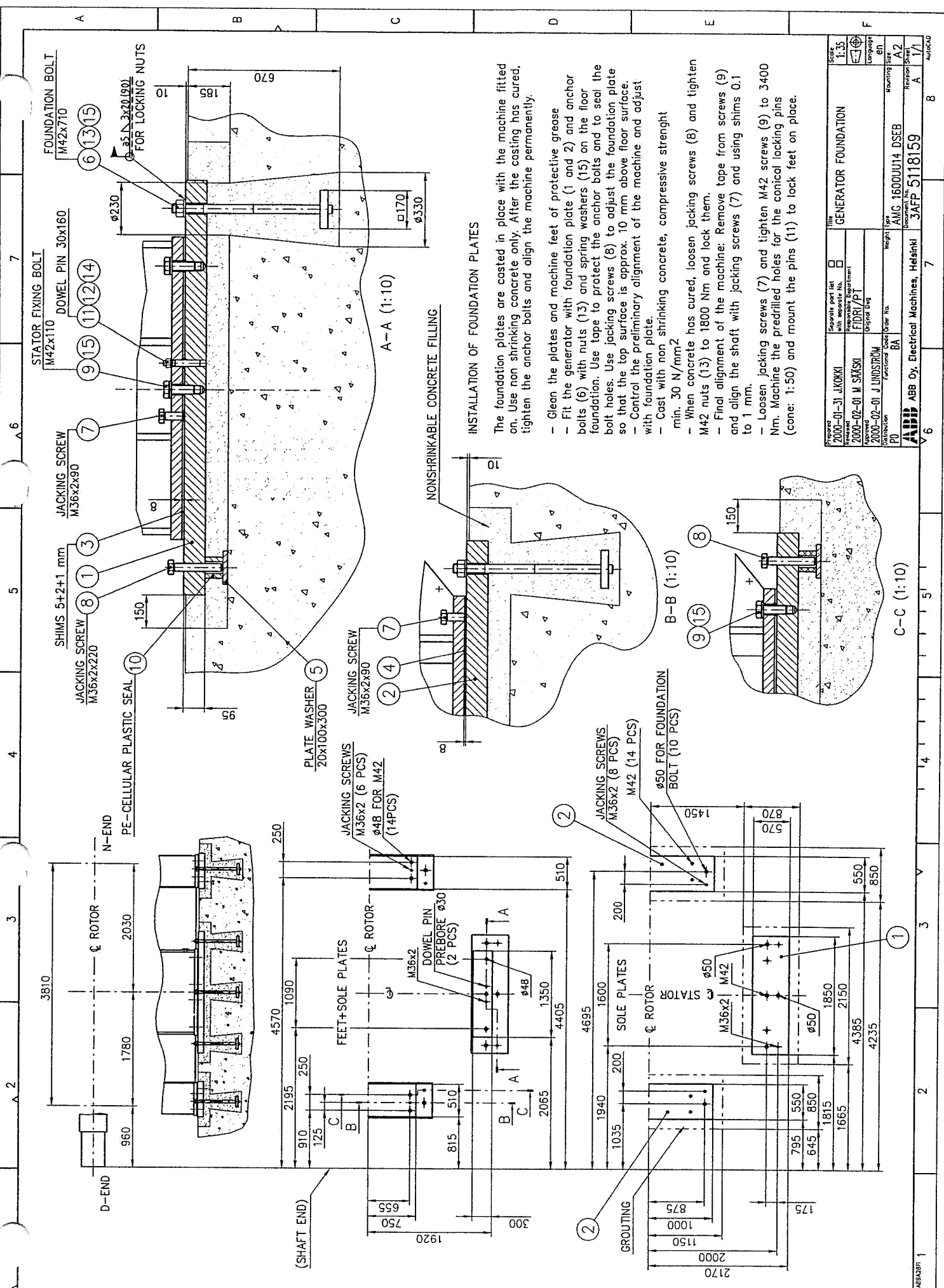
TYPE	A	B	C	CST
AMG/AMZ 1600G	2400	6000	7800	2340
AMG/AMZ 1600L	2600	6400	8200	2440
AMG/AMZ 1600Q	2800	6800	8600	2540
AMG/AMZ 1600S	3000	7200	9000	2640
AMG/AMZ 1600U	3200	7600	9400	2740
AMG/AMZ 1600W	3400	8000	9800	2840
AMG/AMZ 1600Y	3600	8400	10200	2940



C-C (1:25)

↑ = PLACES OF LIFT
 Δ = PLACES OF SUPPORT

Project 2000-11-15 M. SALMI	Separate part list with separate No. <input type="checkbox"/>	Title REMOVING ROTOR	Scale 1:50
Version 2000-11-16 J. KORHONEN	Responsible Department FIDRY/P/IS		Language EN
Drawn 2000-11-16 J. KORHONEN	Original Drawing		Weight kg
Function PI	Order No. AS		Material A2
Company ABB Oy, Electrical Machines, Helsinki			Reaction A
			Accessories A
			Order No. 3AFP 5121809



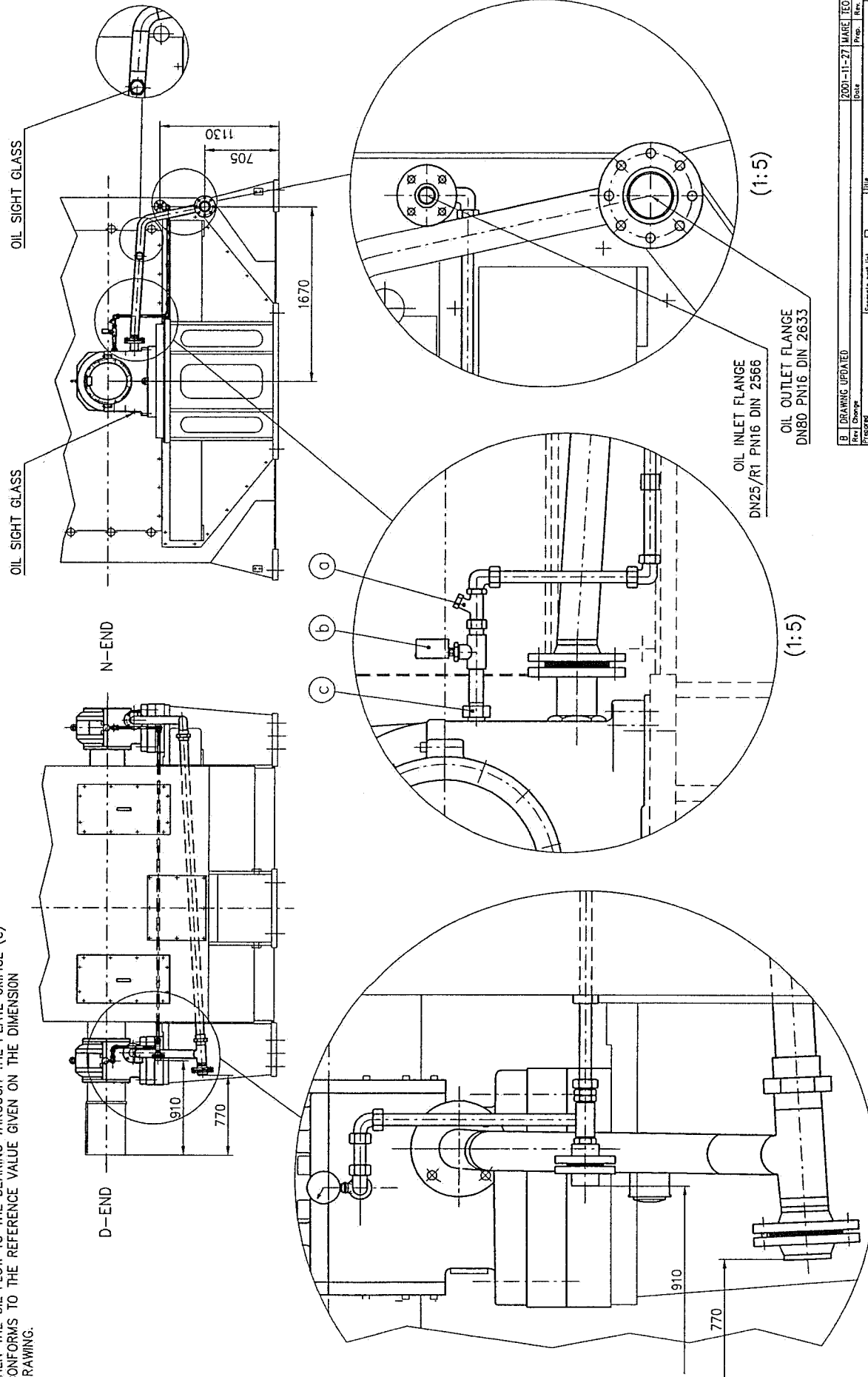
INSTALLATION OF FOUNDATION PLATES

The foundation plates are casted in place with the machine fitted on. Use non shrinking concrete only. After the casting has cured, tighten the anchor bolts and align the machine permanently.

- Clean the plates and machine feet of protective grease
- Fit the generator with foundation plate (1 and 2) and anchor bolts (6) with nuts (13) and spring washers (15) on the floor foundation. Use tape to protect the anchor bolts and to seal the bolt holes. Use jacking screws (8) to adjust the foundation plate so that the top surface is approx. 10 mm above floor surface.
- Control the preliminary alignment of the machine and adjust with foundation plate.
- Cast with non shrinking concrete, compressive strenght min. 30 N/mm²
- When concrete has cured, loosen jacking screws (8) and tighten M42 nuts (13) to 1800 Nm and lock them.
- Final alignment of the machine: Remove tape from screws (9) and align the shaft with jacking screws (7) and using shims 0.1 to 1 mm.
- Loosen jacking screws (7) and tighten M42 screws (9) to 3400 Nm. Machine the predrilled holes for the conical locking pins (cone: 1:50) and mount the pins (11) to lock feet on place.

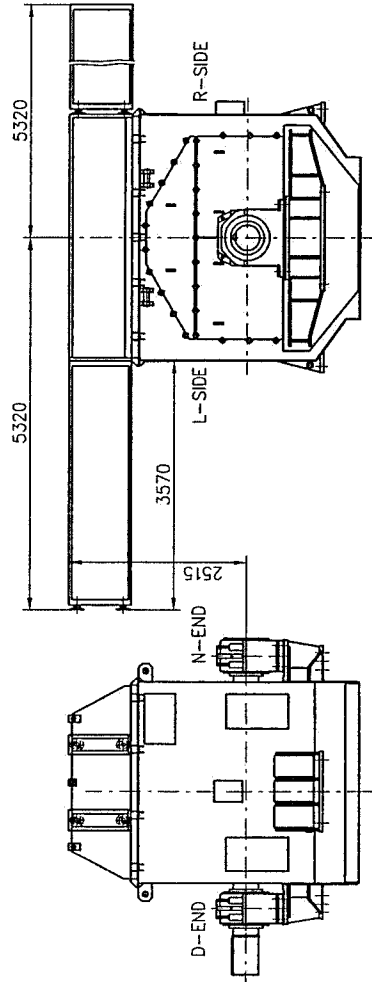
Project No.	2000-01-31 JUKOKKI	Title	GENERATOR FOUNDATION
Scale	1:35	Separate part list with separate No.	
Revision	2000-02-01 M. SAKSI	Department	FIBRI/PT
Approved	2000-02-01 J. UNDIKROM	Original Date	
Distribution	Functional Code	Weight	Part
PU	BA	AMG. 1600UJ14 DSEB	Mounting Site
		3AFP 5118159	Revision
			A
			1/1
			8

NOTE. AFTER STARTING THE OIL CIRCULATION SYSTEM, THE PRESSURE (INDICATED BY MANOMETER (b)) IS ADJUSTED BY MEANS OF THE REDUCTION VALVE (c) TO INDICATE THE VALUE 125 ± 25 kPa. THEN THE OIL FLOW TO THE BEARING THROUGH THE PLATE ORIFICE (c) CONFORMS TO THE REFERENCE VALUE GIVEN ON THE DIMENSION DRAWING.

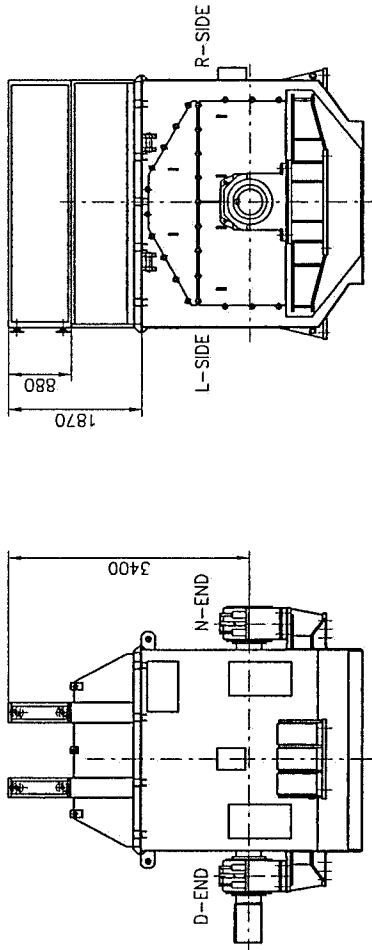


B. DRAWING UPDATED		2000-11-27	MAREL	TEOT	TEOT
Rev.	Change	Date	Prep.	Rev.	Appr.
Prepared		2000-03-29		P. HÄYRINEN	
with separate list		2000-03-29		SÄÄSKI	
Responsible Department		2000-03-29		LINDSTRÖM	
Original User		2000-03-29		LINDSTRÖM	
Approved		2000-03-29		LINDSTRÖM	
Function		2000-03-29		LINDSTRÖM	
PU		2000-03-29		LINDSTRÖM	
Functional Code		2000-03-29		LINDSTRÖM	
Order No.		2000-03-29		LINDSTRÖM	
Weight		2000-03-29		LINDSTRÖM	
Type		2000-03-29		LINDSTRÖM	
AMG		2000-03-29		LINDSTRÖM	
1600		2000-03-29		LINDSTRÖM	
3AFP		2000-03-29		LINDSTRÖM	
5118750		2000-03-29		LINDSTRÖM	
ABB Oy, Electrical Machines, Helsinki		2000-03-29		LINDSTRÖM	
Revision		2000-03-29		LINDSTRÖM	
B		2000-03-29		LINDSTRÖM	
Sheet		2000-03-29		LINDSTRÖM	
1/1		2000-03-29		LINDSTRÖM	
Drawing Size		2000-03-29		LINDSTRÖM	
A2		2000-03-29		LINDSTRÖM	
Scale		2000-03-29		LINDSTRÖM	
1:25		2000-03-29		LINDSTRÖM	
Title		2000-03-29		LINDSTRÖM	
LUBRICATION OF BEARINGS		2000-03-29		LINDSTRÖM	

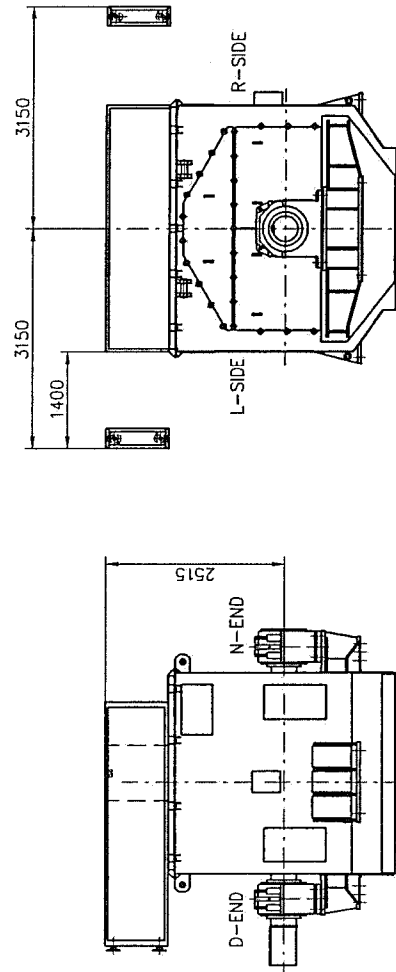
1. SIDEWARDS



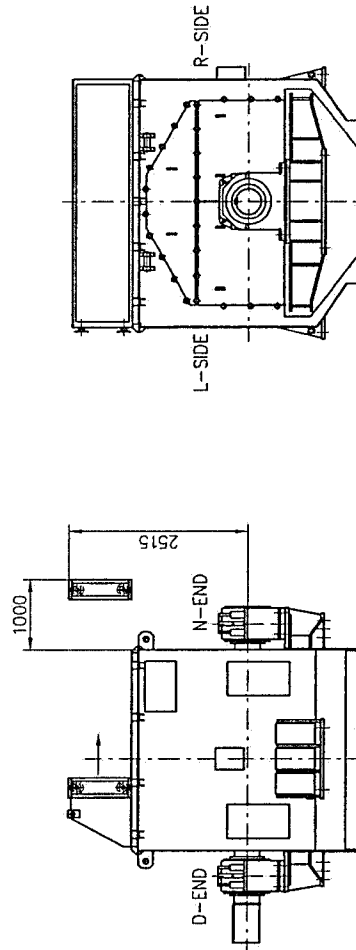
2. UPWARDS



3. TURNING TO THE SIDE



4. REMOVAL AT N-END



Project	2000-11-26 M. REUSTROM	Separate part list	<input type="checkbox"/>	Part No.	COOLER DISASSEMBLY
Approved	2000-11-26 T. OTTELIN	Revision No.		Document No.	ALTERNATIVES
Drawn	2000-11-26 T. OTTELIN	Revision Description		Weight	AMG-AMZ 1600
Checked	2000-11-26 T. OTTELIN	Original Date		Material	3AFP 5126134
Distribution	AS	Functional Code	AS	Revision	A
PO				Sheet	1/1
ABB Oy Electrical Machines, Helsinki					
V 6 7 8					

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AMG 1600UU14 LSEB**

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ABB ref. 7372HD401

Project: ACP-MIRAFLORES
PANAMA

February 2002

5.

Electrical Drawings

- 5.1 *Original drawings*
- 5.2 *BWSC revised drawings*

User's Manual

**Synchronous Machine
AMG 1600UU14 LSEB**

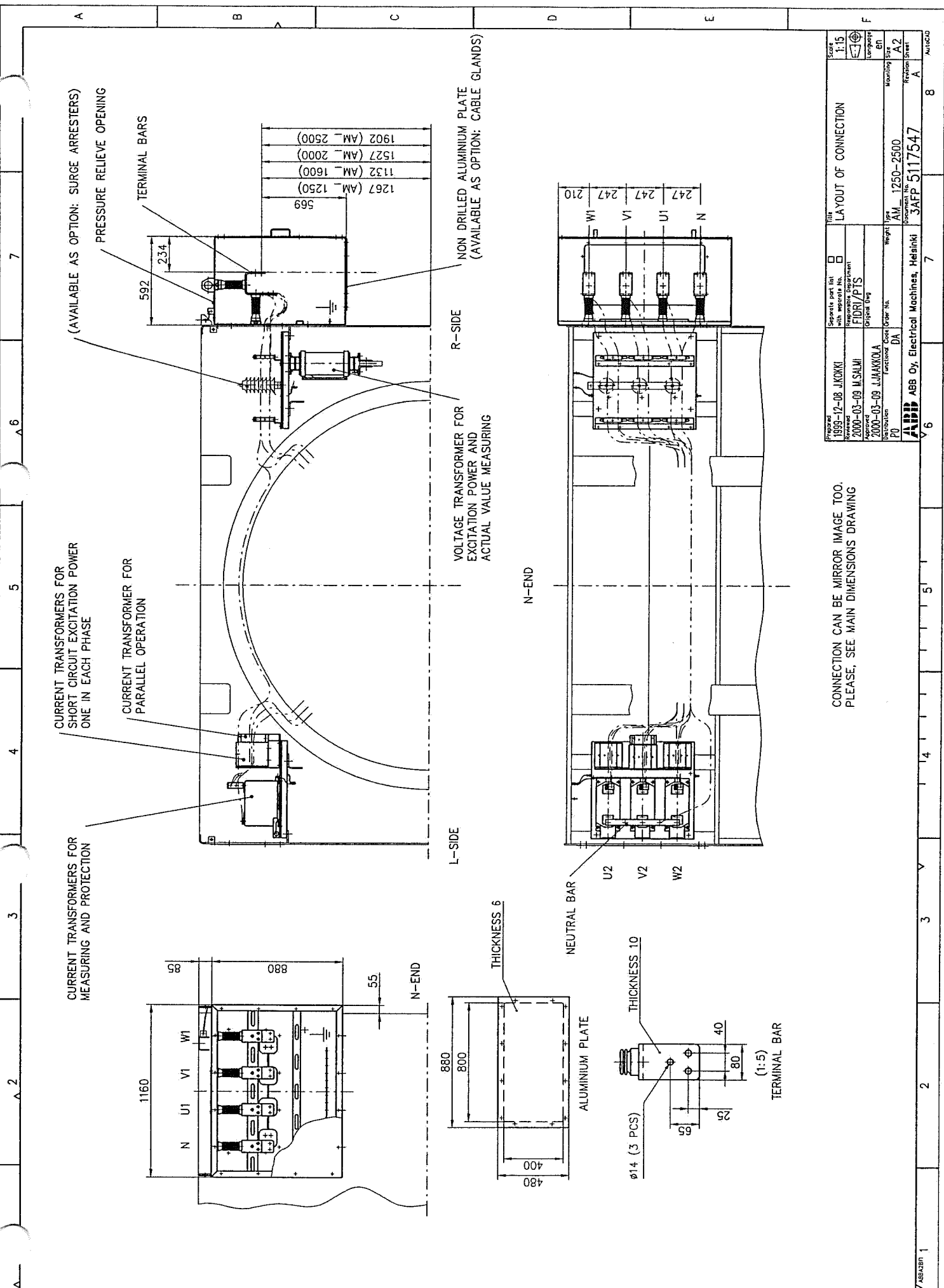
Serial no. 4569892
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PANAMA

February 2002

**Contents
Electrical Drawings**

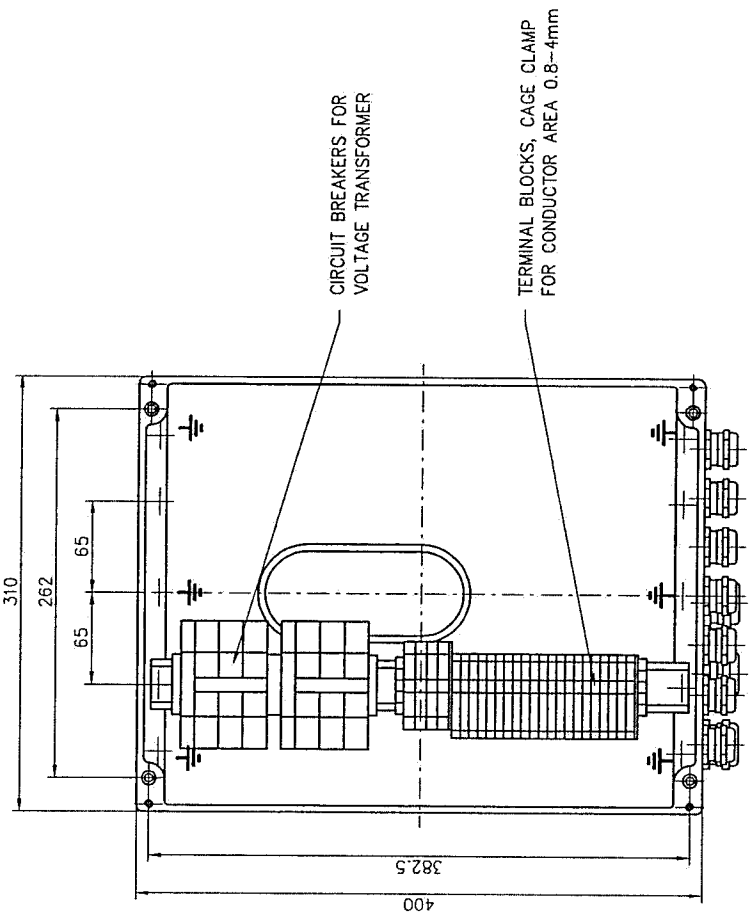
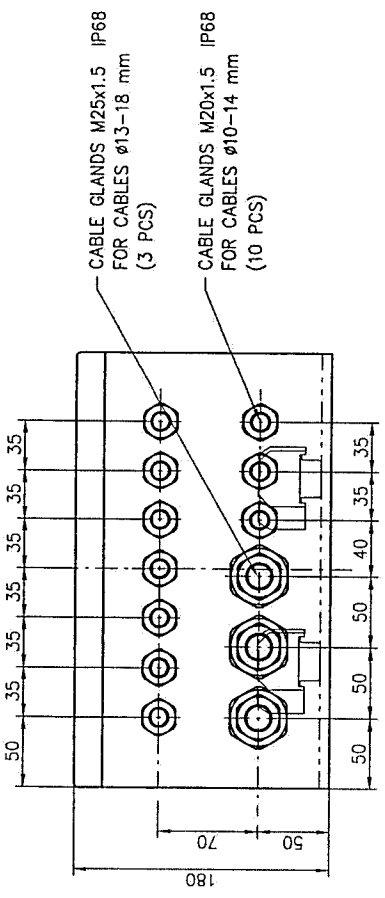
Main Connection Diagram	5125912
Layout of Connection	5117547
Terminal Box for Accessories	5126145
Exciter Rotor with Diode Bridge	5122424
AVR.....	6-1103-91-120



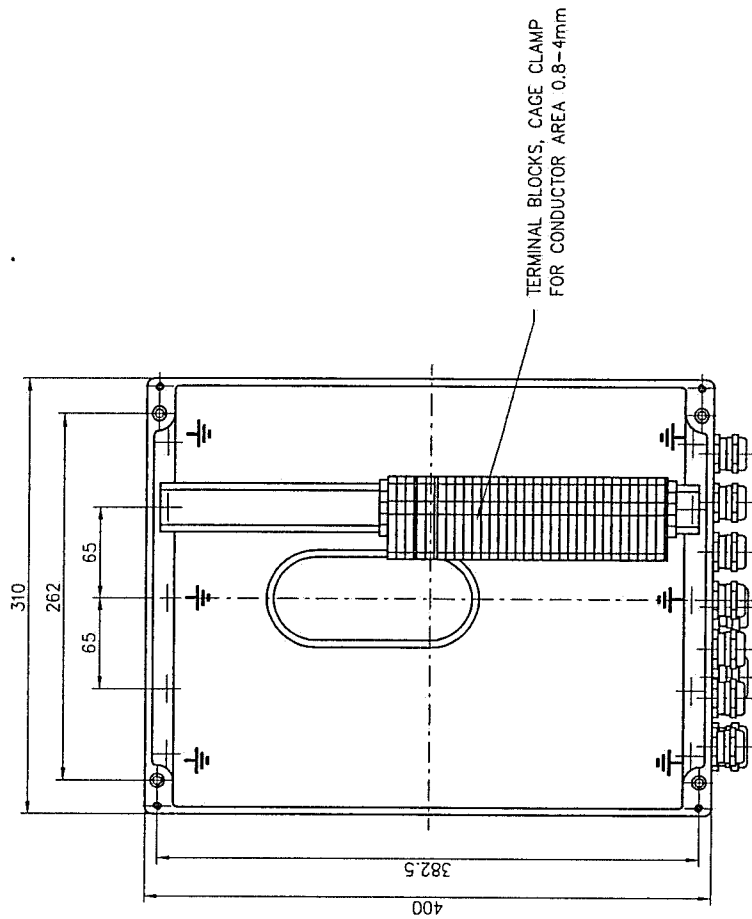
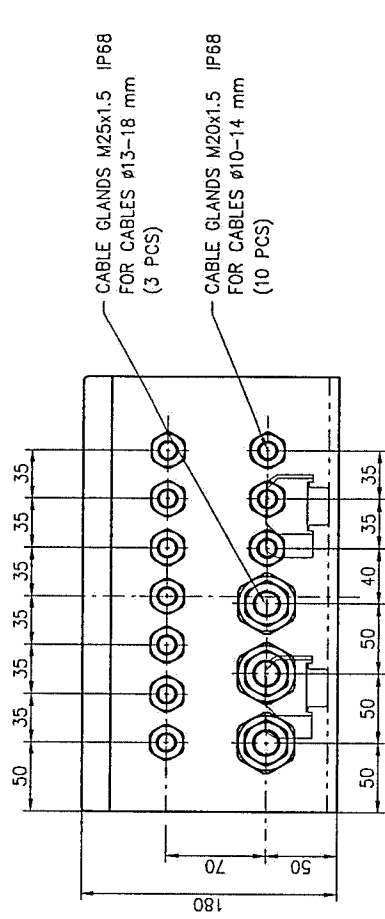


CONNECTION CAN BE MIRROR IMAGE TOO.
PLEASE, SEE MAIN DIMENSIONS DRAWING

Project No.	1999-12-08 JIKOKKI	Separate part list with separate No.	<input type="checkbox"/>	Title	LAYOUT OF CONNECTION	Scale	1:15
Approved	2000-03-09 M.SALMI	Drawn	FIDRI/PTS	Drawn		Checked	
Approved	2000-03-09 J.JAANKOLA	Original No.		Weight	AM 1250-2500	Mounting Size	A2
Distribution	PO	Functional Code	DA	Document No.	3AFP 5117547	Revision	A
ABB Oy, Electrical Machines, Helsinki				AUGUST 2000			

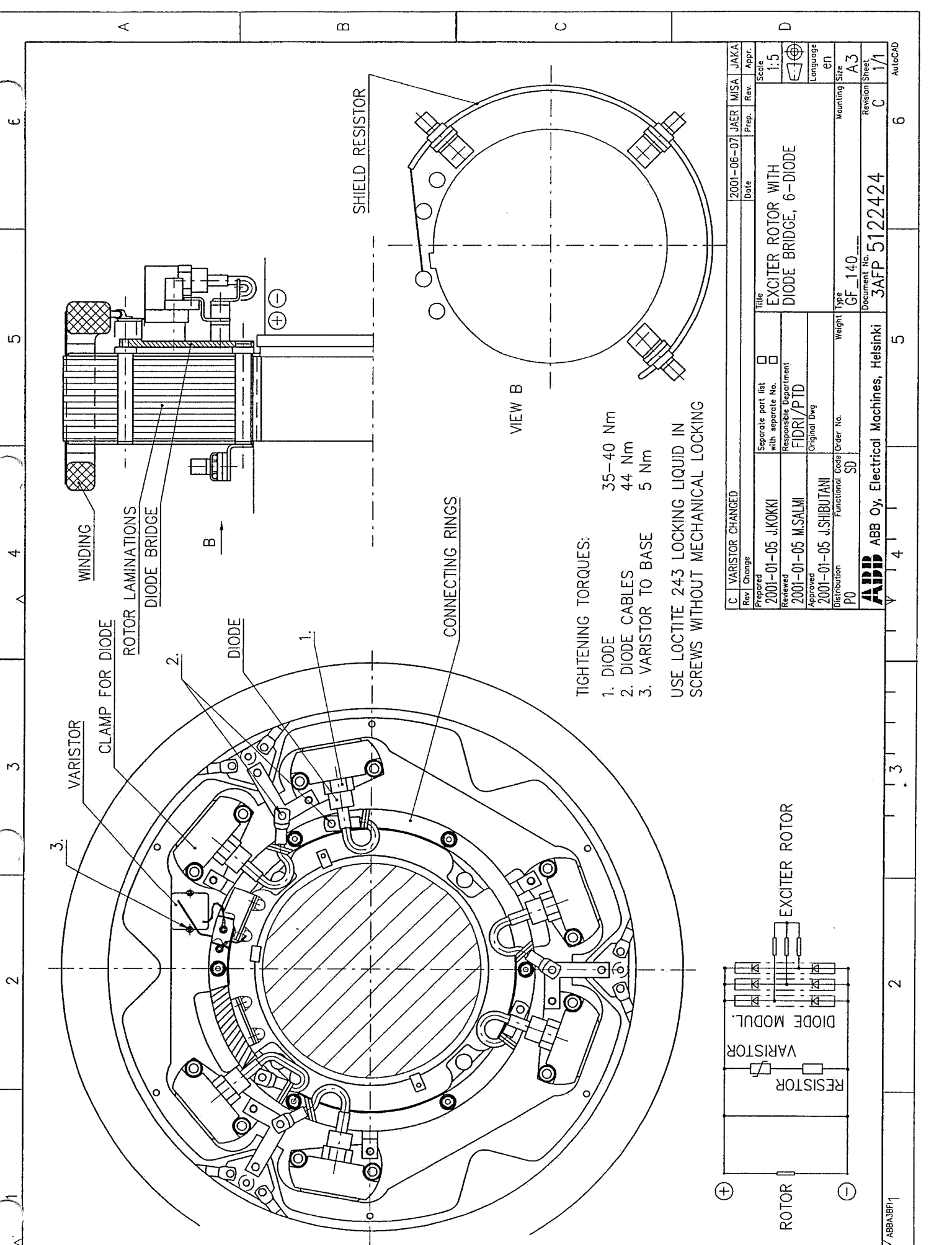


B3A



B3B

B. DRAWING UPDATED		2001-11-27	MARE	TEOT	TEOT
Rev.	Change	Date	Proc.	Rev.	Appr.
Prepared	2001-11-27 M. RESTRÖM			Score	1:25
Checked	2001-11-27 TOTTELIN			Responsible department	TERMINAL BOX FOR ACCESSORIES
Approved	2001-11-27 TOTTELIN			Original Draw	
Revision	Functional Code	Order No.	Scale	Mounting Size	A2
			8:6	Relation Sheet	B
				Quantity	1/1
				Material	
				Manufacturer	
				Project No.	ABB Oy, Electrical Machines, Helsinki 3AFP 5126145



WINDING
 ROTOR LAMINATIONS
 DIODE BRIDGE

CLAMP FOR DIODE
 ROTOR LAMINATIONS
 DIODE BRIDGE
 DIODE

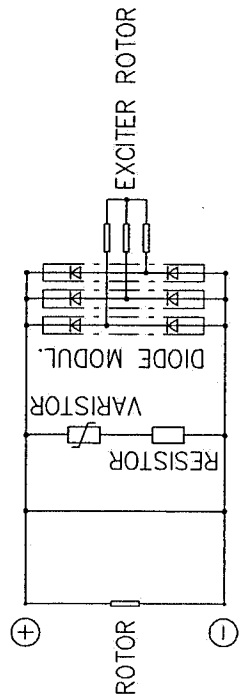
SHIELD RESISTOR

CONNECTING RINGS

VIEW B

TIGHTENING TORQUES:
 1. DIODE 35-40 Nm
 2. DIODE CABLES 44 Nm
 3. VARISTOR TO BASE 5 Nm

USE LOCTITE 243 LOCKING LIQUID IN
 SCREWS WITHOUT MECHANICAL LOCKING



Rev. Change	2001-06-07	JAER	MISA	JAKA
Prepared	2001-01-05	J.KOKKI		
Reviewed	2001-01-05	M.SALMI		
Approved	2001-01-05	J.SHIBUTANI		
Distribution	P0			
Separate part list with separate No.	<input type="checkbox"/>			
Responsible Department	FIDRI/PTD			
Original Dwg				
Functional Code	SD			
Order No.				
Weight	GF_140			
Mounting Size	A3			
Language	EN			
Scale	1:5			
Appr.				
Date	2001-06-07	JAER	MISA	JAKA
Prep.				
Rev.				
Appr.				
Scale	1:5			
Language	EN			
Mounting Size	A3			
Revision	C			
Sheet	1/1			
AutCAD				

ABB
 ABB Oy, Electrical Machines, Helsinki

Document No. 3AFP 5122424

ABBA39F1

BASLER MOUNTING PLATE

DRAWING	PAGE	TITLE	REVISION	DATE	NOTE
6-1103-91-120	00	COVER SHEET	J	14-10-99	FOL-01 / FOL-05
6-1103-91-120	01	INTERCONNECT	F	14-10-99	RESISTOR R5
6-1103-91-120	02	AUXILIARY TERMINALS	D	19-03-97	X2
6-1103-91-120	03	PLATE/TOP VIEW-SIDE VIEW/EQUIPED	C	18-11-96	18-11-96
6-1103-91-120	04	SUPPORT PLATE-TOP VIEW/SIDE VIEW-EQUIPED	B	14-10-96	6-1103-91-120
6-1103-91-120	05	EQUIPEMENT LIST	I	14-10-99	ITEMS 9-11-12-19 TO 25

**BASLER ELECTRIC
INTERNATIONAL**
LUSSEMBURG (LUXEMBOURG)

ORGINE
DRAWN P.A.
CHECK J.P.R.
DATE 14-10-99

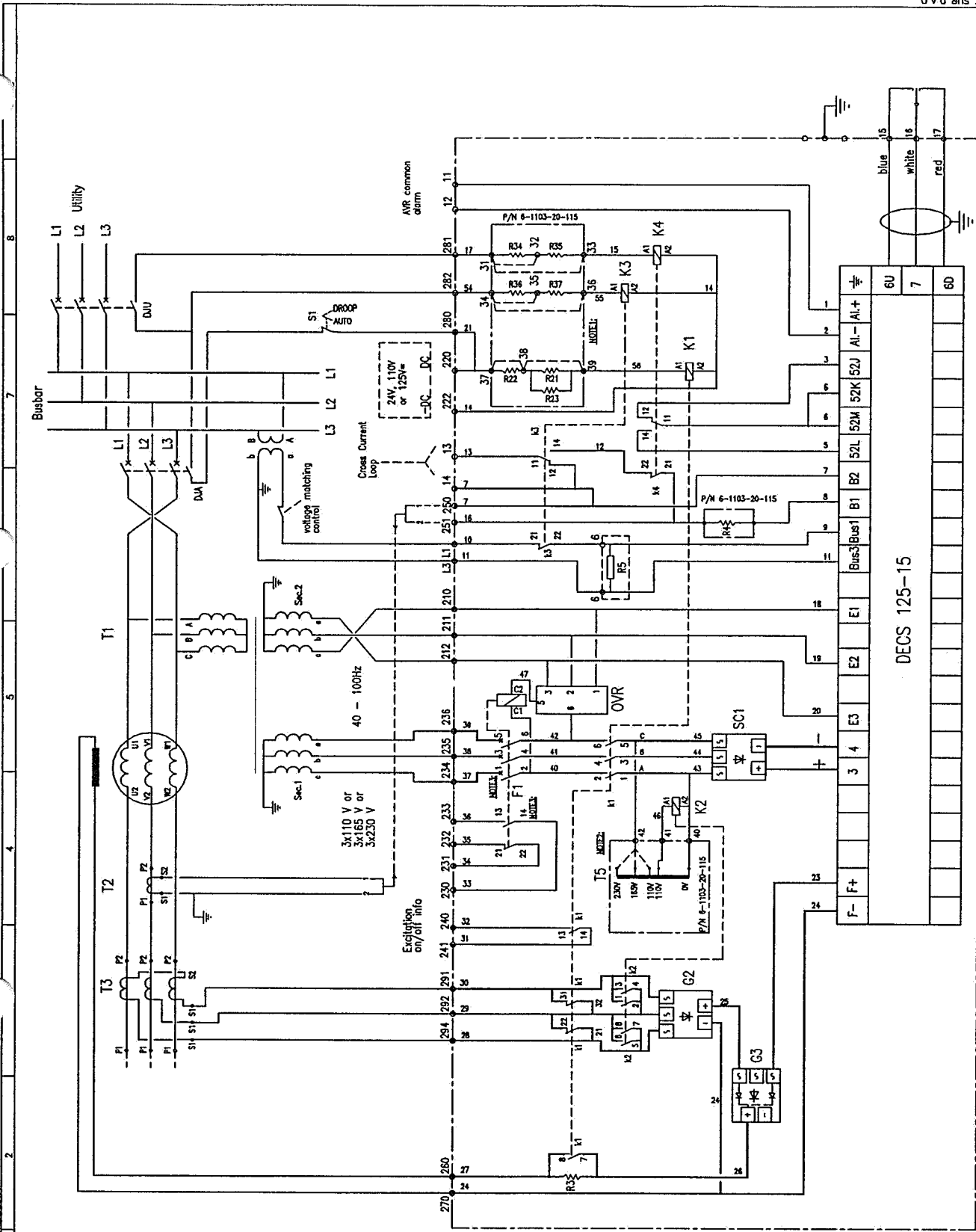
J
I
H

ABB INDUSTRY OY
BASLER MOUNTING PLATE

COVER SHEET
6-1103-91-120

J
J
00

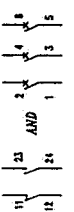




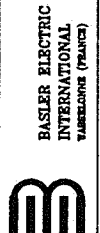
E1: wires between terminals and 33 } for 24Vdc and 38 }
 wires between terminals and 32 } for 110Vdc and 39 }
 wires between terminals and 32 } for 110Vdc and 39 }
 wires between terminals and 32 } for 125dc and 38 }

E2: w. 45 on terminal 42 for 110V, 57 or 250V operation.

E3: for the SIEMENS circuit-breaker, use following marking:



E4: R21, R22, R23, R24, R25, R26 and R27 wired on the reference plate P/N 6-1103-20-116



DRWH	DATE	IF	RESISTOR
P.N.	14-10-98	E	NOTE 3
CHECK	J.P.R.	D	NOTE 3

ABB INDUSTRY OY
 BASLER MOUNTING PLATE

INTERCONNECT
 6-1103-91-120

Rev. F 01

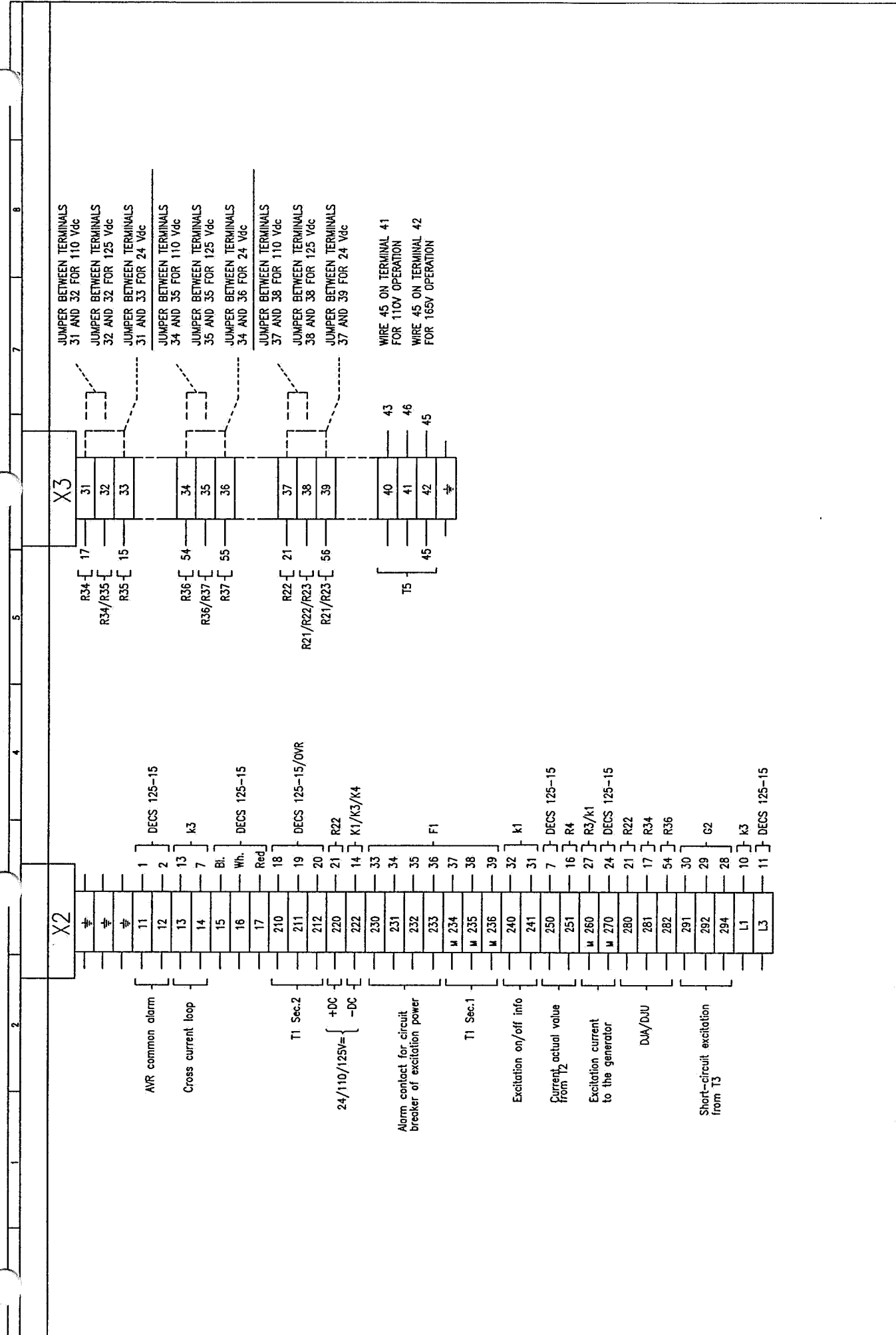
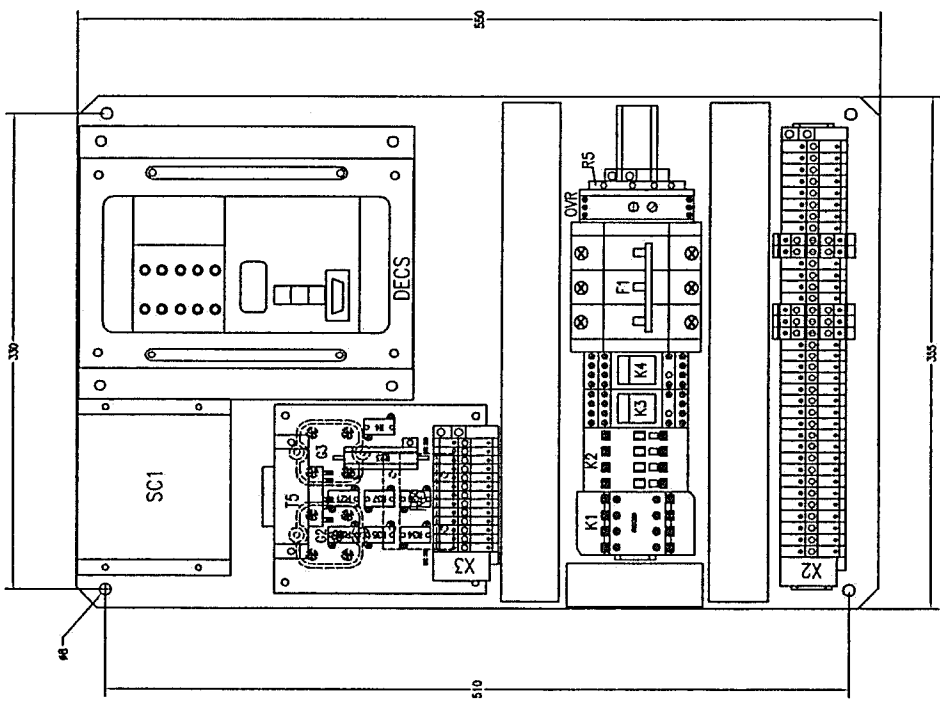
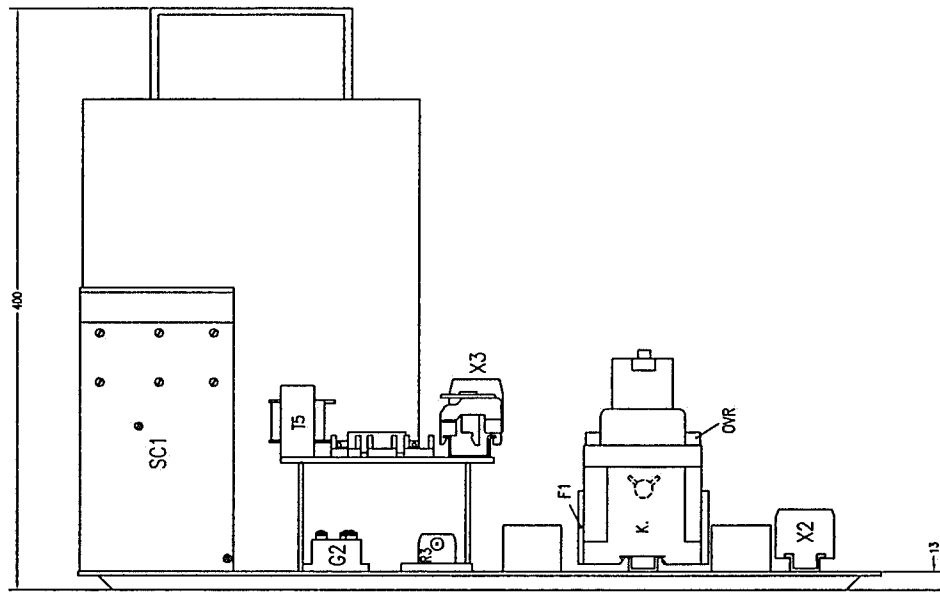


ABB INDUSTRY OY		AUXILIARY TERMINALS	
BASLER MOUNTING PLATE		6-1103-91-120	
ORIGINE	DATE	REV.	DATE
DRAWN P.N.	19-03-97	D	02
CHECK J.P.R.			



BASLER ELECTRIC INTERNATIONAL
WASSELONGE (FRANCE)



BASLER ELECTRIC
INTERNATIONAL
WILHELMSHOFEN (FRANCE)

ORIGINE:
DRAWN
P.N.

CHECK	DATE	C	18-11-96
J.P.R.	18-11-96	B	6-1103-91-120
		A	1st ISSUE

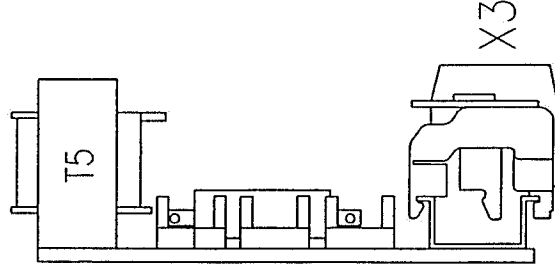
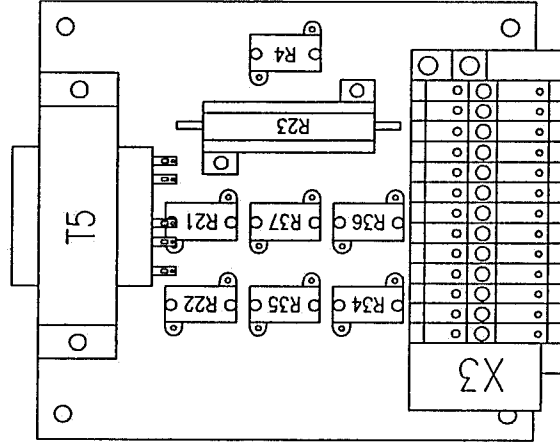
ABB INDUSTRY OY
BASLER MOUNTING PLATE

PLATE-TOP VIEW/SIDE VIEW-EQUIPED
6-1103-91-120
REV C
PAGE 03

2 4 5 7 8

SUPPORT PLATE

REP.	VAL.	TYPE
R4	0.56Ω	RCH10
R21	3300Ω	RCH10
R22	47Ω	RCH10
R23	330Ω	WH50
R34	470Ω	RCH10
R35	2200Ω	RCH10
R36	470Ω	RCH10
R37	2200Ω	RCH10



B
 BASLER ELECTRIC
 INTERNATIONAL
 VALKENBURG (THE NETHERLANDS)

ORIGINE:
 DRAWN P.J.N.
 CHECK J.P.R.
 DATE 14-10-96
 C B A
 6-1103-91-120
 1st ISSUE

ABB INDUSTRY OY
 BASLER MOUNTING PLATE

SUPPORT PLATE-TOP VIEW/SIDE VIEW-EQUIPED
 6-1103-91-120
 Rev. B
 DWG. 04

