



Service Manual



Genesis RSP Instrument



Genesis RWS Logistics Workstation



Genesis RWS Assay Workstation



Genesis RMP Instrument

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1 About This Manual

Purpose of This Chapter This chapter points out the purpose of the manual, specifies the instruments the manual deals with and for whom the manual is intended. Furthermore, it contains a list with relevant reference documents, explains the symbols, conventions and abbreviations used and offers general information.

Introduction The structure and contents of this manual were compiled based on the results of a worldwide survey between Tecan field service engineers. We hope the manual fits your requirements and would be happy to get any feedback. Just contact the documentation service group of Tecan Schweiz AG.

Applicability The instructions given in this document are applicable for Genesis Instruments type ...

- Genesis RSP
- Genesis RWS Logistics
- Genesis RWS Assay
- Genesis RMP

Purpose of This Document This document serves as a reference guide for Tecan trained and authorized personnel only. It provides all relevant information for installation and servicing of the instrument – with exception of information covered by the respective reference documents (see section '[Reference Documents](#)' later in this chapter).

Target Groups This manual addresses the following target groups:

Target group	Description	Tasks/responsibilities
Field service engineer	Experienced field service engineer who has visited a Tecan service training and has been authorized for servicing the Genesis RSP, RMP and RWS instruments.	<ul style="list-style-type: none"> • Site inspection • Installation • Commissioning • Site acceptance • Maintenance • Repair • Calibration
System integrator	A legal person (e.g. a RO within Tecan group or a distributor) who acts in a legal sense between Tecan Schweiz AG (manufacturer of sub-assembly) and end-user.	<ul style="list-style-type: none"> • Conformity assessment and CE marking (see Section 4.5).

Reference Documents

The following documents are helpful for installation and servicing of the instrument. They are not enclosed with this manual, nevertheless they are part of the service documentation.

Document type	Valid for .../document title	Doc ID
Operating Manual	Genesis RSP and NPS	Doc ID 390 783
	Genesis RMP	I 119 100
	Genesis RWS	Doc ID 391 197
	Carousel	Doc ID 391 209
	Columbus Washer	I 109 004
	Sunrise Reader	I 137 301
	Spectra & Rainbow Readers	I 139 003
Instrument Software Manual	Genesis Instrument	Doc ID 390 791
Installation Manual	Lower DiTi eject option 2	Doc ID 391 276
	Low volume option 1: tube fastening	Doc ID 391 228
	Access option/Signal lamp (RSP, RWS)	Doc ID 392 330
	Door lock V2 (RMP)	Doc ID 391 260
	Alarm device V2 (RMP)	Doc ID 391 255
Form or Checklist	Decontamination Declaration	Doc ID 390 901
	Genesis Maintenance and Service Logbook, including:	Doc ID 390 924
	• Installation Qualification	Doc ID 391 180
	• Operation Qualification	Doc ID 391 182
	• Acceptance Protocol	Doc ID 391 825
	• Daily/Weekly Maintenance Checklist	Doc ID 391 193
	• Preventive Maintenance Checklist	Doc ID 391 181
• Service Checklist	Doc ID 391 183	

Furthermore, you may find following Application Software Manuals useful:

Area of application	Application software	Doc ID
Diagnostics	TOPS	I 117 578
	Logic	Doc ID 391 110
Life Science	FACTS	Doc ID 391 252
	Gemini	Doc ID 391 201

Symbols Used in This Manual

Safety Symbols

The safety symbols are explained in [Chapter 2, 'Safety'](#).

Useful Notes

Useful notes appear as follows:



Note

Gives helpful information about the equipment or regarding proceedings, tentative clarifications etc.

Instrument Overviews

In [Chapter 8, 'Instruments at a Glance'](#) you will find useful illustrations of the instruments giving an overview of the main components.

On the detail drawings and the text passages in this document (mainly in [Chapter 6, 'Replacement of Spare Parts, Repair'](#)), one main part is always designated with the identical item number – for example (8) for LiHa – as on the relevant illustration in chapter 8. Item numbers of their components consist always of the main part item number, a dash and the item number of the component – for example (8-04) for LiHa backplane.

Abbreviations and Acronyms Used in This Manual

FaWa	Fast wash pump
FSE	Field service engineer
FWO	Fast wash option
ILID	Integrated liquid detection
LICOS	Liquid container supervisor
LiHa	Liquid handling arm
MP	Micro plate
MPO	Monitored pump option
PCB	Printed circuit board
PosID	Positive identification option, barcode reader
RMP	Robotic microplate processor
RoMa	Robotic manipulator arm
RSP	Robotic sample processor
RWS	Robotic workstation

2 Safety

Purpose of This Chapter This chapter contains specific rules of behavior and warnings from hazards with regard to installation, setup, maintenance and repair of the Genesis RSP, RMP or RWS instruments.

Significance of These Safety Instructions The safety of users and personnel can only be ensured if these safety instructions and the safety-related warnings in the individual chapters are strictly observed and followed. Therefore, the Service Manual must always be available to all persons performing the tasks described herein.

In addition to the safety instructions given in this Service Manual, the safety instructions pointed out in the Operating Manuals of the Genesis RSP, RMP or RWS instruments apply as well.

2.1 User Qualification

FSE Authorization The field service engineers (FSE) are specially trained personnel. Exclusively FSEs are entitled to perform the maintenance and service work described in this Service Manual. The manufacturer Tecan authorizes the FSEs if they fulfill the following particular qualifications:

- They must have received appropriate service and operator training from Tecan.
- They must be familiar with the good laboratory practice guidelines.
- They must have read and understood the instructions in this Service Manual.

2.2 Notices and Symbols

2.2.1 Warning Notices Used in This Manual

The symbols used for safety-related notices have the following significance:

WARNING Symbols



WARNING

Generally, the triangular warning symbol indicates the possibility of personal injury or even loss of life if the instructions are not followed.

Whenever possible, the symbol indicates the hazard a person is exposed to more specifically. The symbols used in this Service Manual have the following significance:



WARNING
Biological hazard



WARNING
Chemical hazard



WARNING
Radioactive radiation



WARNING
Electrical danger



WARNING
Laser radiation

ATTENTION Symbols

ATTENTIONS appear as follows:



ATTENTION
With the general “STOP” symbol, ATTENTIONS indicate the possibility of equipment damage, malfunctions or incorrect process results, if instructions are not followed.

Other symbols indicate the significance of the ATTENTION more specifically.



ATTENTION
Damage to electronics by electrostatic discharge.
Always follow ESD safety practices.



ATTENTION
Disturbance of functions by electromagnetic RF waves.
Do not use a cellular phone.

2.2.2 Warning Notices Attached to the Product or Its Surroundings

Cellular Phones Prohibited



Do not use cellular phones in the proximity of the instrument.
This symbol is attached to the safety panel of the instrument. The symbol must also be attached to the laboratory door.

Damaged or fallen off symbols (notices or stickers) must be replaced immediately.

2.3 Use of the Product

- Intended Use** The Genesis RSP, RMP or RWS instruments are to be applied and used exclusively in the following application fields. Any other use is considered improper and is strictly forbidden.
- The Genesis RSP is intended for liquid pipetting for generally known laboratory methods according to common safety precautions.
 - The Genesis RMP is intended for fully automated processing of 96-well microplate based ELISA (Enzyme Linked Immuno Sorbent Assay) and ELISA-like tests, starting from sample pipetting and ending with result reading. All ELISA test procedures have to be validated prior to performing routine tests.
 - The Genesis RWS Logistics is intended for pipetting tasks as well as storage, identification and transfer of microplates. It is to be applied for research only. The Genesis RWS Logistics is intended to be part of a liquid handling system and as such installed and put into operation by a trained Tecan or Tecan authorized system integrator.
 - The Genesis RWS Assay is intended for processing of microplate based tests, including liquid handling, incubation, wash, read and data acquisition. It is to be applied for research only. The Genesis RWS Assay is intended to be part of a liquid handling system and as such installed and put into operation by a trained Tecan or Tecan authorized system integrator.

All Genesis instruments are intended for indoor operation and storage only.

- Improper Use** Due to their open architecture, the Genesis RWS Assay and Logistics are not intended for clinical and diagnostic applications. These applications would be carried out by less qualified people, exposing them to dangerous liquids in case of instrument malfunction. Incorrect use of the Genesis RMP may lead to false test results and may cause exposure of the operator to potentially dangerous compounds. Do not attempt to use liquids with undissolved particles as this could result in liquid not being dispensed due to clogged tips.

2.4 Product Safety

Principle

The Genesis RSP, RMP or RWS instruments are designed and built in accordance with the present state-of-the-art technology and the recognized technical safety regulations.

Nevertheless, risks to users, property, and the environment can arise when the instrument is used carelessly or improperly.

The manufacturer has determined all residual dangers emanating from the instrument in all life phases and from the process.

Appropriate warnings in the Operating Manuals of the Genesis RSP, RMP or RWS instruments and in this Service Manual serve to make the user alert to these residual dangers.

2.4.1 Instrument-Related Hazards and Safety Measures

Pay attention to the following safety notices:

WARNING



Electrical shock hazard.

Switch the instrument off and disconnect from mains whenever no power is required to perform service tasks.

ATTENTION



Crimping of the tubing between top cover and case possible.

Secure the top cover from falling down during inspection work.

ATTENTION



Damage to the electronic boards due to electrostatic discharge (ESD).

Always wear a wrist strap when handling the boards.

2.4.2 Other Hazards and Safety Measures

WARNING



- Chemical, biological and radioactive hazards can be associated with the substances used or the samples processed with the Genesis RSP, RMP or RWS instrument.



- The same applies to waste disposal.

Always be aware of possible hazards associated with these substances.



Request a filled out and signed Decontamination Declaration prior to performing any maintenance or repair tasks.

2.4.3 Safety Elements

Removal of Protective Devices

The protective and safety devices installed on the Genesis RSP, RMP or RWS instrument must be neither removed nor disabled during operation.

If such elements were removed, e.g. for maintenance work, operation may only be resumed when all protective and safety devices have been completely installed and checked.

2.5 Decontamination

When to Decontaminate

Apart from regular decontamination, the user must thoroughly decontaminate the instrument according to standard laboratory regulations in the following cases:

- Before any maintenance or service work is performed on the instrument
- Before a Tecan field service engineer (FSE) performs any in-site work on the instrument
- Before the instrument is returned to Tecan (e.g. for repair)
- Prior to storage of the instrument
- Prior to disposal of the instrument or parts of it
- Generally before the instrument or parts of it leave the user's site.

Decontamination Method

The decontamination method must be adapted to the respective application and the substances associated with it. The user takes the full responsibility for the appropriate decontamination of the entire equipment.

WARNING



Biological or chemical hazard and/or radioactive radiation.



- Contamination hazard due to parts of the instrument which are not completely decontaminated.



- Mind that not only the parts having direct contact with chemicals or biological material must be treated, but also the tubing system as well as the whole upstream equipment.

Decontamination Declaration

Before a Tecan FSE carries out any work on the instrument, or before the instrument is returned to Tecan, the owner of the instrument must confirm in writing that the decontamination has been performed properly and in accordance with good laboratory practice guidelines. For this, the owner must enclose a Decontamination Declaration form (Doc ID 390 901), which can be provided by Tecan.



Note: Tecan will refuse any instrument or a part of it, if the decontamination form is not filled in and duly signed.

2.6 General Safety Rules

- Legal Regulations** Legal regulations, such as local, state and federal laws which prescribe the use or application as well as the handling of dangerous materials in connection with the Genesis RSP, RMP or RWS instrument must be strictly followed.
- Duty of Maintenance and Care** The user is responsible for ensuring that the Genesis RSP, RMP or RWS instrument is operated in proper condition only, and that maintenance, service, and repair jobs are performed with care and on schedule.
- Appropriate Behavior** Use exclusively tools suitable for the respective work sequence. Ensure that the tools are in sound condition.
Handling and disposing of waste has to be in accordance with all local, state and federal environmental, health, and safety laws and regulations.
- Spare Parts to Be Used** Use only genuine spare parts for maintenance and repair.
- Modifications** Modifications to the Genesis RSP, RMP or RWS instrument are only permitted with the written approval of the manufacturer. Modifications and upgrades shall only be carried out by an authorized field service engineer. The manufacturer will decline any claim resulting from unauthorized modifications.

3 Product Description

Purpose of This Chapter

This chapter summarizes the technical data of the Genesis instruments and contains an overview of requirements, hardware, software and firmware compatibilities.



Note

For detailed information concerning optional modules as reader, washer, carousel etc., refer to their respective manuals.

Chapter Overview

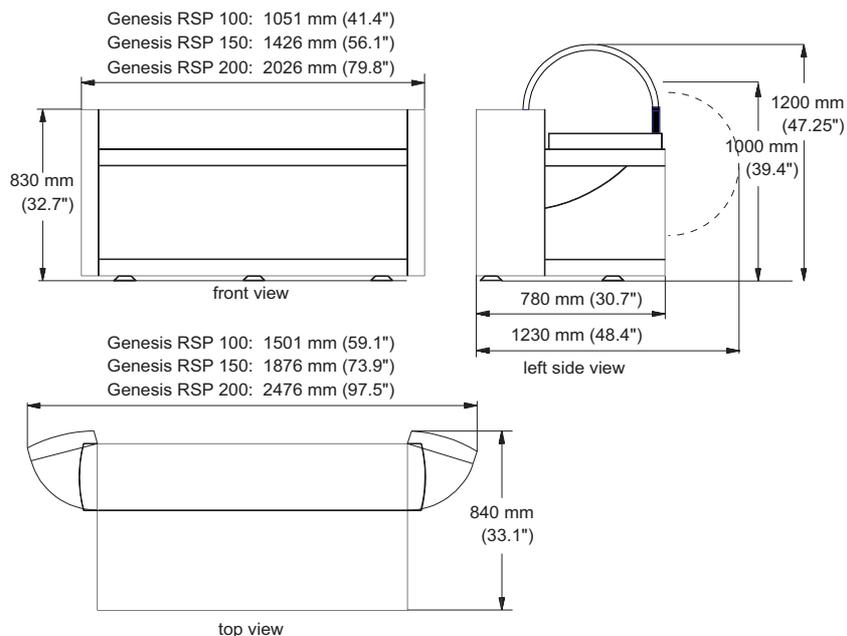
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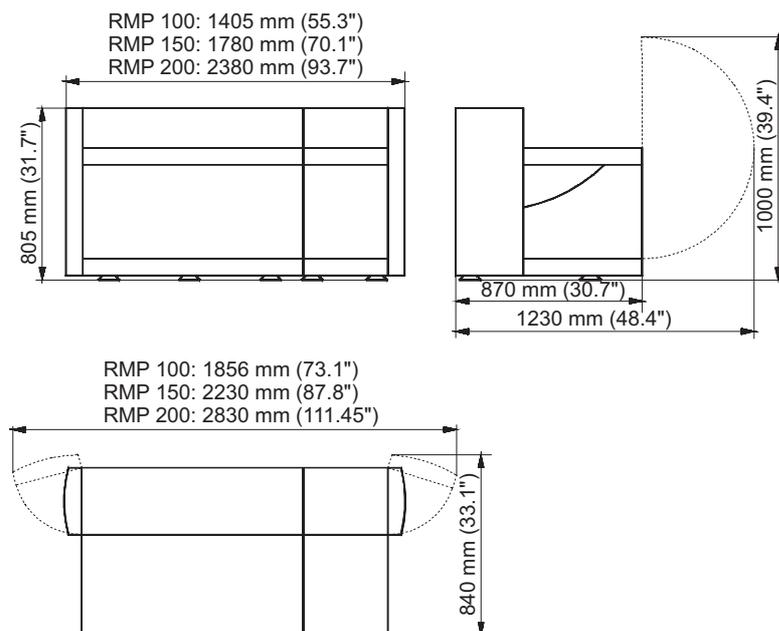
3.1 Technical Data and Requirements

3.1.1 Dimensions and Weights

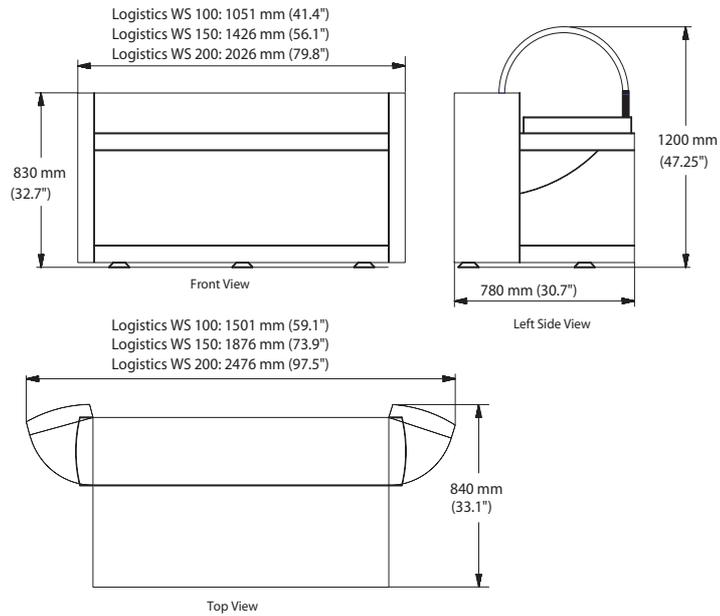
RSP Instrument Dimensions



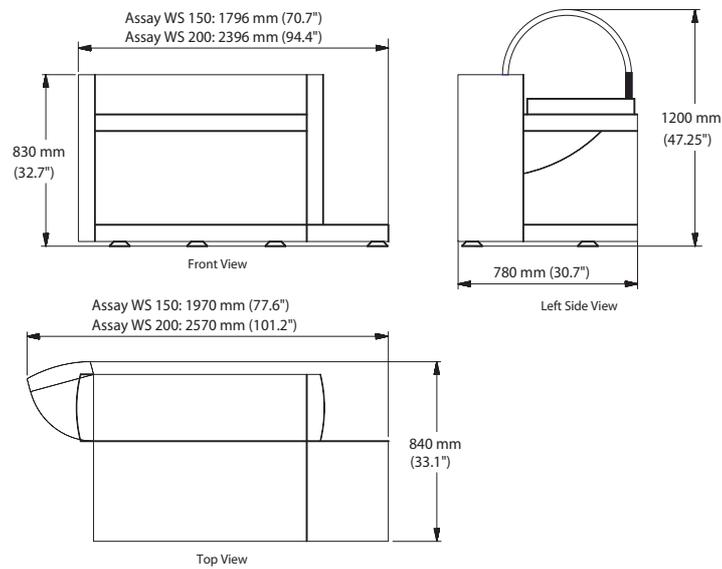
RMP Instrument Dimensions

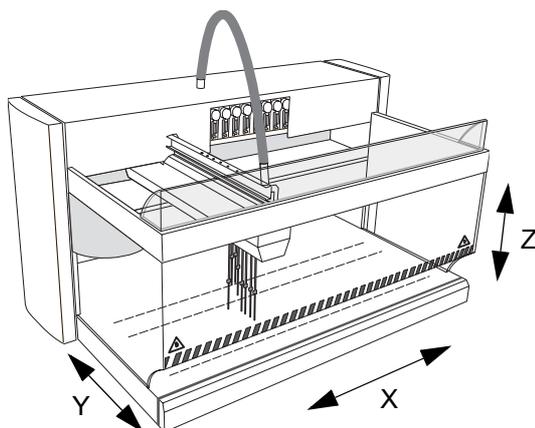


**RWS Logistics
Workstation
Dimensions**



**RWS Assay
Workstation
Dimensions**



**Worktable
Dimensions**

Genesis RSP

		RSP 100	RSP 150	RSP 200
Accessible X-range (X-travel)	mm	745	1120	1720
	inch	29.3	44.1	67.7
Accessible Y-range (Y-travel)	mm	418	418	418
	inch	16.5	16.5	16.5
Grid positions on worktable	pcs.	30	45	69

Genesis RMP

		RMP 100	RMP 150	RMP 200
Accessible X-range (X-travel)	mm	550	925	1525
	inch	21.6	36.4	60
Accessible Y-range (Y-travel)	mm	418	418	418
	inch	16.5	16.5	16.5
Grid positions on worktable	pcs.	24	39	63

Genesis RWS

RWS Logistics		100	150	200
Accessible X-range (X-travel)	mm	745	1120	1720
	inch	29.3	44.1	67.7
Accessible Y-range (Y-travel)	mm	418	418	418
	inch	16.5	16.5	16.5
Grid positions on worktable	pcs.	30	45	69

RWS Assay			150	200
Accessible X-range (X-travel)	mm		925	1525
	inch		36.4	60
Accessible Y-range (Y-travel)	mm		418	418
	inch		16.5	16.5
Grid positions on worktable	pcs.		43	67

Weights
Genesis RSP

		RSP 100	RSP 150	RSP 200
Platform with 4-tip/8-tip LiHa 2	kg	96/103	115/122	165/172
	lb.	212/227	253/269	364/379
RoMa 2	kg	6	6	6
	lb.	13	13	13
PosID 2 option	kg	8	11	14
	lb.	18	24	31
MPO or FWO	kg	2	2	2
	lb.	4.4	4.4	4.4
Packing	kg	35	47	71
	lb.	77	104	156

Genesis RMP

		RMP 100	RMP 150	RMP 200
Platform with LiHa 2, RoMa 2 and PosID 2	kg	166	188	241
	lb.	366	414	531
FWO	kg	2	2	2
	lb.	4.4	4.4	4.4
Packing	kg		43	99
	lb.		95	218

Genesis RWS

Logistics		100	150	200
Platform with 4-tip/8-tip LiHa 2 and RoMa 2	kg	104/111	123/130	173/180
	lb.	229/245	271/287	381/397
PosID 2 option	kg	8	11	14
	lb.	18	24	31

Logistics		100	150	200
MPO or FWO	kg	2	2	2
	lb.	4.4	4.4	4.4
Packing	kg	35	47	71
	lb.	77	104	156

Assay			150	200
Platform with 4-tip/8-tip LiHa 2 and RoMa 2	kg		131/138	181/188
	lb.		289/304	397/414
PosID 2 option	kg		11	14
	lb.		24	31
MPO or FWO	kg		2	2
	lb.		4.4	4.4
Packing	kg		50	74
	lb.		110	163

3.1.2 Supply Ratings

Genesis RSP

Supply ratings		RSP 100	RSP 150/200
Primary voltage	V AC	100–240	100–240
Frequency	Hz	50/60	50/60
Power	VA	800	800
Module type (for power module supplied as of September 2001)		PM 1	PM 4

Genesis RMP

Supply ratings		RMP 100/150/200
Primary voltage	V AC	100–240
Frequency	Hz	50/60
Power	VA	1000

Genesis RWS

Supply ratings		RWS 100	RWS 150/200
		Logistics	Assay/Logistics
Primary voltage	V AC	100–240	100–240
Frequency	Hz	50/60	50/60
Power	VA	800	1200
Module type (for power module supplied as of September 2001)	VA	PM 1	PM 2

3.1.3 Environmental Conditions

Operating Conditions

The Genesis RSP, RMP or RWS instruments are intended for indoor operation and storage only.

		RSP	RMP	RWS
Operating temperature	°C	15–32	18–30	18–30
	°F	59–90	65–86	65–86
Operating humidity relative (non condensing) at 30 °C/86 °F or below	%	30–80	30–80	30–80
Pollution degree		2	2	2
Over voltage category	class	2	2	2

Storage Conditions

Protect the instrument against dust and debris with a cover.

Recommendation: store the instrument in its original packaging. Store all manuals and the Service and Maintenance Logbook with the instrument.

		RSP	RMP	RWS
Storage temperature	°C	1–60	1–60	1–60
	°F	34–140	34–140	34–140
Storage humidity relative (non condensing) at 30 °C/86 °F or below	%	30–80	30–80	30–80

3.1.4 Computer and Software Requirements

Computer Hardware Refer to the Genesis Instrument Software Manual for details on minimum computer requirements.

Software It is strongly recommended to use the latest software versions. Please contact your nearest Tecan representative for more information.

Software	RSP	RMP	RWS Logistics	RWS Assay
Operating System	X	X	X	X
	X	X	X	X
Genesis Instrument Software	X	X	X	X
Logic (Clinical Diagnostics)	X			
Gemini (Life Science)	X		X	X
TOPS (Operating SW)		X		
FACTS (Event scheduling SW)			X	X
TAURUS (Database for Clinical Diagnostics)	X			
Magellan (Data reducing SW)		X		

X = required or available for respective instrument

3.1.5 Additional Data for System Modules

LiHa 2

- 4 or 8 tips (diluters) acting independently
- Variable tip spacing: 9–38 mm
- Arm movement speed: 300–500 mm/s
- Positioning precision: better than 0.4 mm

RoMa 2

- Transports any rack in MP-format
- Arm movement speed: 400 mm/s
- Rotation: 270°

- Lifting force: up to 4 N (transportable mass up to 0.4 kg)
- Software adjustable gripper force: 1–4 N
- Gripper space range 55 to 140 mm

PosID 2

- Laser class 2
- Wave length: 670 nm
- Distinction between sample barcode/no barcode/no tube
- Reads vertically and horizontally
- Movement speed: 400 mm/s
- Barcode types:
 - Code 39 (length 0...32)
 - Code 39 full ASCII
 - Codabar (length 0...32)
 - Code 128 (length 0...32)
 - 2/5 Interleaved (length 0...30, even only)
 - UPC-A (length not settable: 12)
 - UPC-E (length not settable: 8)
 - EAN-8 (length not settable: 8)
 - EAN13 (length not settable: 13)

3.2 Compatibility Matrix

Tecan customer support provides a compatibility matrix which displays the most common configurations that may be installed presently on your customer's systems. Please request your up-to-date copy via expertline-eu@tecan.com.

4 Transport and Installation

Purpose of This Chapter This chapter summarizes the procedures needed for installation of a Genesis RSP, RMP or RWS instrument from site inspection to site acceptance.

Chapter Overview This chapter consists of the following sections:

Section	Title	Page
4.1	Site Inspection	4 – 1
4.2	Transport	4 – 2
4.3	Installation	4 – 3
4.3.1	Unpacking and Positioning	4 – 3
4.3.2	RMP Specific Installation Tasks	4 – 3
4.3.3	RWS Specific Installation Tasks	4 – 13
4.3.4	Further Options and Modules for RSP/RWS	4 – 14
4.3.5	Computer, Software	4 – 15
4.4	Commissioning	4 – 16
4.5	Conformity Assessment and CE Marking for RWS	4 – 18
4.6	Site Acceptance	4 – 18

4.1 Site Inspection

Site Requirements Check the customer’s site for site requirements suitable concerning the respective instrument:



Notice the dimensions and weights of the different instruments (see section 3.1.1).

Delivery Route

- Loading dock present?
- Load capacity and size of elevator sufficient?
- Door and entrance openings, passageway corners: big enough?

Environmental Requirements

- Check according to [Section 3.1.3, ‘Environmental Conditions’](#).

Space

- Enough space to place instrument and possible extensions?
- Enough space to open safety panels and access doors of the instrument?
- Enough walking space around the instrument?
- Space for placing system liquid/waste bottles?
- Enough space for the control computer?

Supply

Notice the power supply requirements (refer to section [Section 3.1.2, 'Supply Ratings'](#))

Check presence of power sockets for

- Instrument
- Computer
- Other modules

Date of Delivery • Determine the date of delivery.

4.2 Transport

General Notes

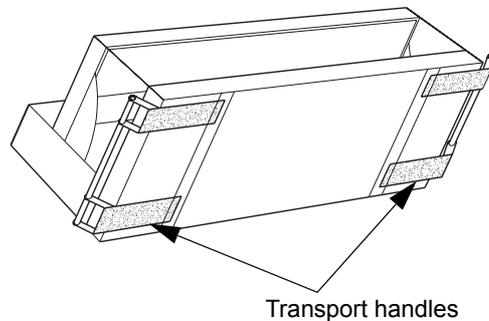
- The Genesis RSP, RMP and RWS are precision instruments. Handle with care. Do not expose to excessive shock.
- Always use original packaging for shipping the instrument.

Visual Check

- Visually check the crate(s) for damage sustained during transportation. If such are found, the customer must immediately file a complaint with the transport agency.
- Tecan instrument packaging is designed to avoid damage during transportation. Please inform Tecan about all occurrences of transportation damages. Such information is important for further improvements.

4.3 Installation

4.3.1 Unpacking and Positioning



- 1 Unpack all components and visually check for any damage. Leave transport paddings and moorings in place.
- 2 Check if the shipment is in compliance with the packing list.
- 3 Lift the instrument onto the assigned work bench and place it as required.

Figure 4-1 Transport handles – seen from below



- For exact positioning: always lift the instrument; do not shift it.
 - Because of the considerable weight of the instrument (see Section 3.1.1, 'Dimensions and Weights'), up to four people are required for lifting the instrument. The center of gravity is at the rear right side of the instrument. Make sure that the two strongest persons lift the rear of the instrument.
 - Use the optional transport handles (see Figure 4-1). Never lift the instrument by the lateral worktable covers. The screws holding the covers are not designed to support the instrument weight.
- 4 Remove all transport paddings and moorings.
Packing material shall be stored for possible shipment of parts to be repaired by manufacturers.

4.3.2 RMP Specific Installation Tasks

Add-On Module Only the RMP 200 has a separate add-on module. RMP 100 and 150 consist of one-piece frames. Therefore, following procedure applies to RMP 200 only.

Refer to Figure 4-2, 'RMP 200' and Figure 4-3, 'Add-on module assembly'.

- 1 Place a spirit level onto the RMP worktable and level horizontally by means of the supports below the instrument frame.
- 2 Connect the add-on module (15) to the right side of the RMP 200.
There are two positioning pins (15-01) in the add-on module frame and two positioning holes in the instrument frame.

While positioning the add-on module, lead the cables for the mains power switch and the control lamp through the upper left part of the add-on module.

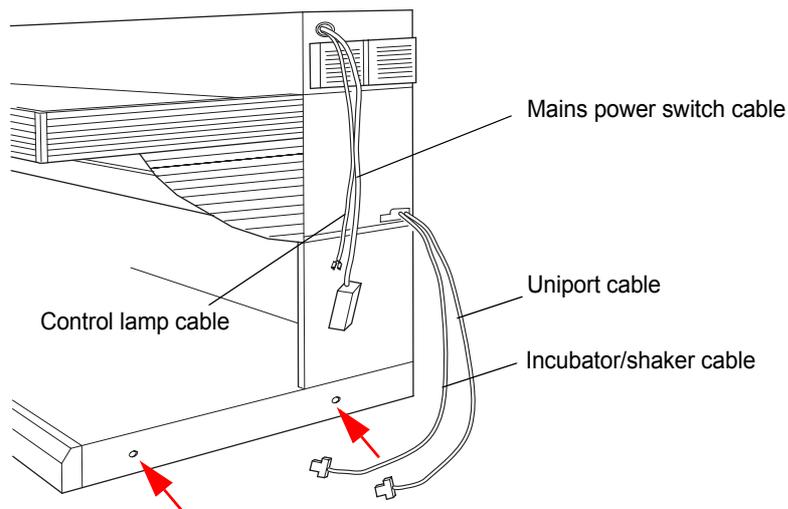


Figure 4-2 RMP 200

- 3 Turn the two left supports (15-02) to their topmost positions, so that they do not touch the work bench. The add-on module is now sitting on its two right supports with the two positioning pins connected to the RMP 200.
- 4 Turn the two left supports down until they touch the work bench.
- 5 Insert the module worktable (15-03).

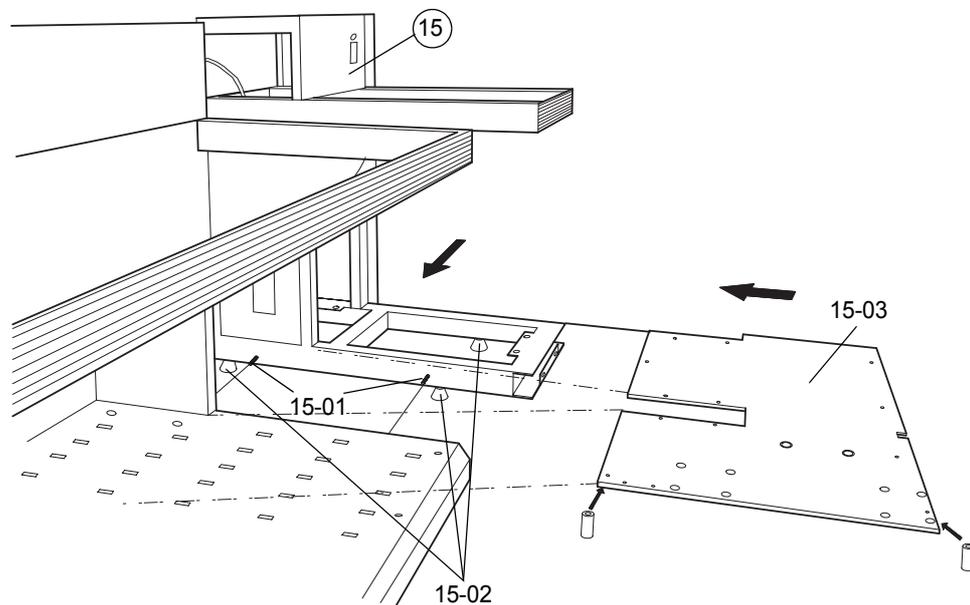


Figure 4-3 Add-on module assembly

- 15 Add-on module
- 15-01 Positioning pin
- 15-02 Support
- 15-03 Module worktable

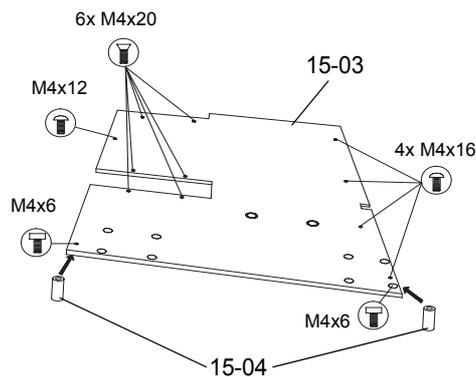


Figure 4-4 Module worktable

- 6 Insert the fixing screws and the two distance washers (15-04) according to [Figure 4-4](#). Tighten the fixing screws.
- 7 Check horizontal alignment with a spirit level; if necessary, adjust by means of the two right supports (15-02).

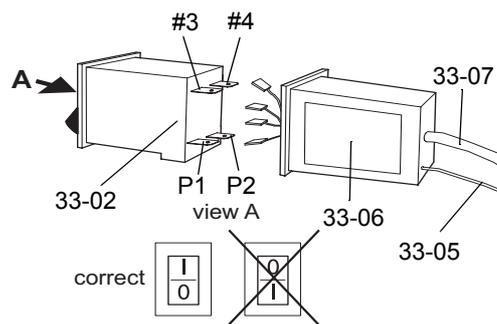
- 15-03 Module worktable
- 15-04 Distance washer



Set the mains power switch to off and disconnect the mains power connection of the instrument before performing any further work!



Observe precautions for handling electrostatic discharge sensitive devices. Wear a wrist strap.



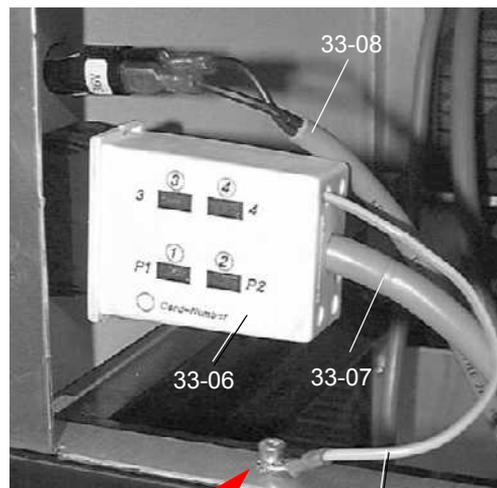
- 8 Open the right access door (6) and install the mains power switch (33-02) into the add-on module. *Note the correct orientation of the switch according to [Figure 4-5](#)!*
- 9 Connect the mains power cable (33-07) to the power switch (33-02) according to the installation diagram (33-06) on the housing.

- 10 Fix the earth cable (33-05) to the add-on module frame as shown in [Figure 4-5](#).

- 11 Connect the control lamp cable (33-08) to the power control lamp in the add-on module.

- 12 Connect the Uniport cable coming from the Optibo to the Uniport (see [Figure 4-6](#), 'Cable connections on Supervisor and Uniport board').

The Uniport is located in the rear part of the add-on module.



- 33-02 Power switch
- 33-05 Earth cable
- 33-06 Installation diagram
- 33-07 Mains power cable
- 33-08 Control lamp cable

Figure 4-5 Electric connections for RMP

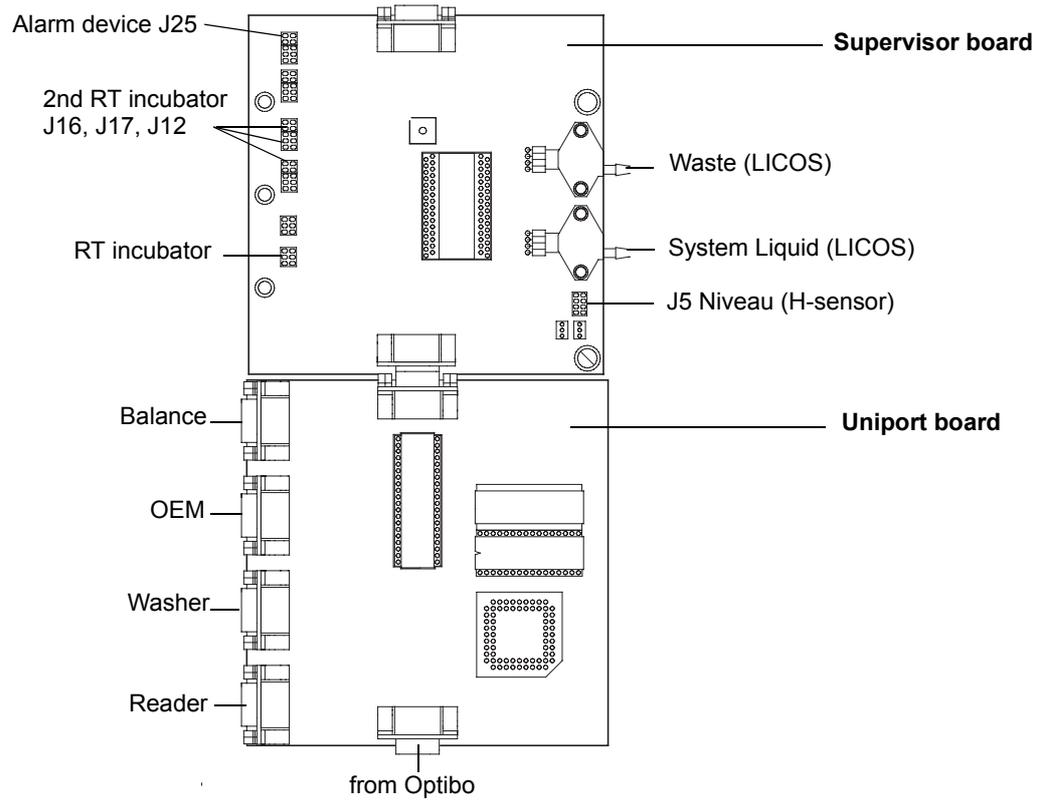


Figure 4-6 Cable connections on Supervisor and Uniport board

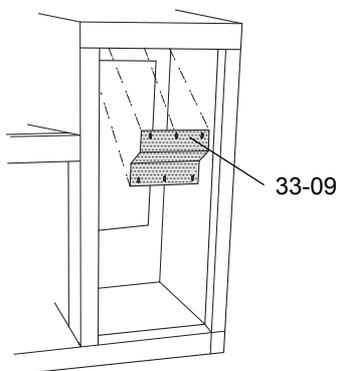


Figure 4-7 Connector sheet

- 13 Fix the connector sheet (33-09).
The connector sheet guarantees a proper electromagnetic compatibility (EMC).

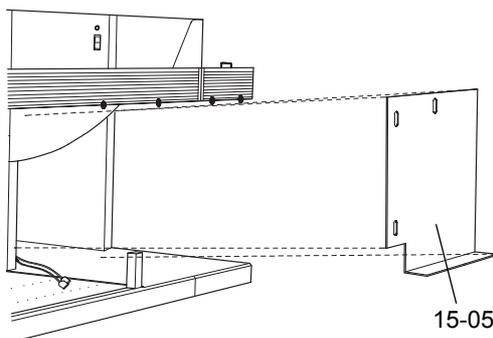
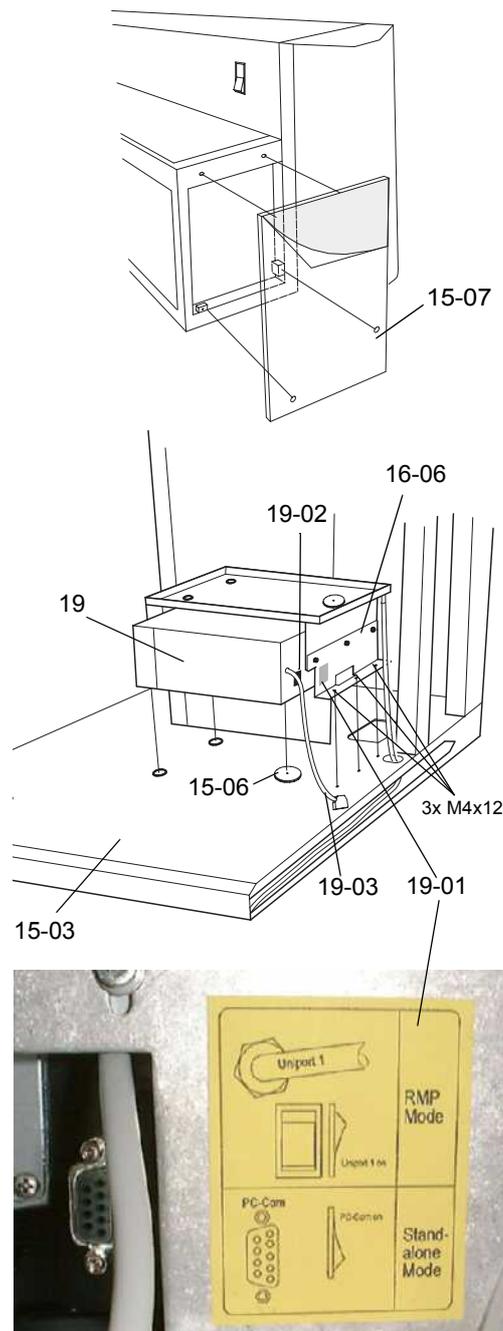


Figure 4-8 Module cover

- 14 Insert and fix the module cover (15-05).

Reader (Option)

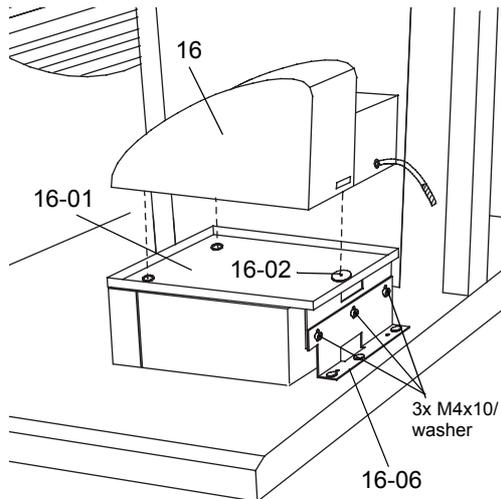


- 1 Remove the frame cover (15-07) from the add-on module in order to get easier access.
- 2 For RMP 200 only:
Lock the adjusting bracket (16-06) in designated place (positioning pins) onto the module worktable (15-03) and fix it with the knurled screws.
- 3 Place the reader (19) onto the module worktable.
- 4 Set selection switch (19-02) into correct position, according to the label (19-01) on the adjusting bracket:
 - TOPS V3.0 and earlier: set switch to “RMP mode”.
 - TOPS V4.0 and later: set switch to “Stand-alone mode”.
- 5 Put a spirit level in X-direction onto the reader housing. If necessary, level horizontally by means of the adjusting wheel (15-06).
- 6 Connect the reader cable (19-03) to the connection cable on the Uniport (TOPS V3.0 and earlier) or to the second PC-com port (TOPS V4.0 and later).

- 15-03 Module worktable
- 15-06 Adjusting wheel
- 15-07 Frame cover
- 16-06 Adjusting bracket
- 19 Reader
- 19-01 Label
- 19-02 Selection switch
- 19-03 Reader cable

Figure 4-9 Reader assembly

Washer (Option)



- 1 If not yet done: remove the frame cover (Figure 4-9, 15-07) from the add-on module in order to get easier access.
- 2 For RMP 200 only:
Screw the positioning rack (16-01) to the adjusting bracket (16-06).
- 3 Place the washer (16) on the positioning rack.
- 4 Check horizontal alignment with a spirit level. If necessary, adjust by means of the adjusting wheel (16-02).

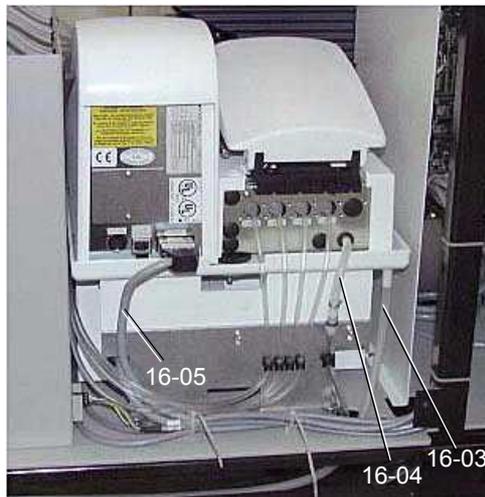


Figure 4-10 Washer assembly

- | | |
|-------|-------------------------------|
| 16 | Washer |
| 16-01 | Positioning rack |
| 16-02 | Adjusting wheel |
| 16-03 | Waste tubing positioning rack |
| 16-04 | Waste tubing washer |
| 16-05 | Washer cable |
| 16-06 | Adjusting bracket |
- 5 Attach the washer cable (16-05) – which is connected to the Uniport – to the washer.
 - 6 Lead the waste tubing (16-03, 16-04) through the module frame.

**Heated Incubator
(Option)**

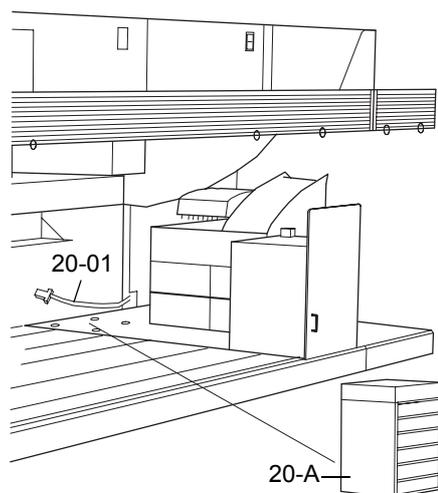
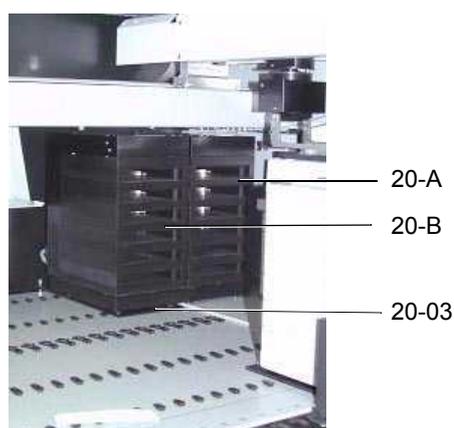
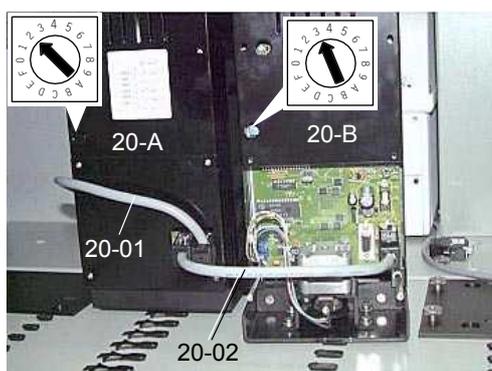


Figure 4-11 Heated incubator 1

Installation of One Heated Incubator

- 1 Connect the incubator cable (20-01) to the incubator 1 (20-A) and the Optibo.
- 2 Place the incubator 1 (20-A) into the respective recesses on the module worktable.
- 3 Check horizontal alignment with a spirit level. If necessary, adjust by means of the supplied special key (see 17-05 in [Figure 4-13](#)).

- 20-A Heated incubator 1
- 20-01 Incubator cable



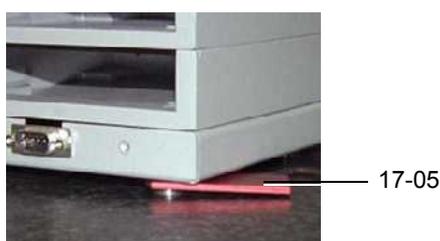
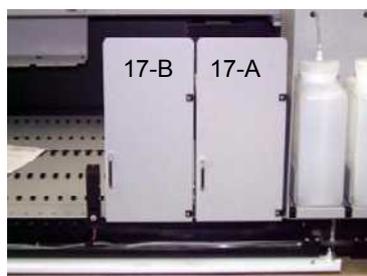
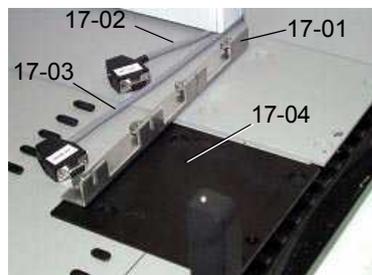
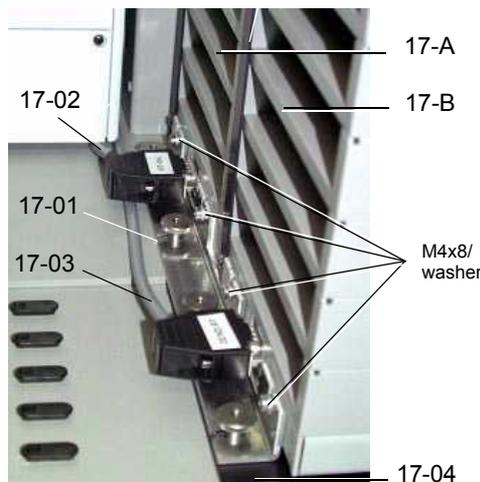
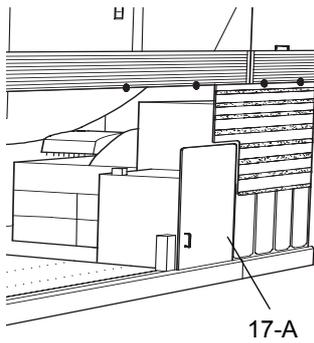
Installation of Two Heated Incubators

- 1 Connect the incubator cable (20-01) to the incubator 1 (20-A) and the Optibo.
- 2 Join the two incubators with the connection cable (20-02).
- 3 Change address switch of incubator 2 (20-B) from #2 (= standard setting) to #3.
- 4 Place the incubator 1 (20-A) into the respective recesses on the module worktable.
- 5 Insert adapter plate (20-03) beneath incubator 1 onto the worktable.
- 6 Place the incubator 2 (20-B) into the recesses on the adapter plate.
- 7 Check horizontal alignment with a spirit level. If necessary, adjust by means of the supplied special key (see 17-05 in [Figure 4-13](#)).

- 20-A Heated incubator 1 (address #2)
- 20-B Heated incubator 2, with shaker (address #3)
- 20-01 Incubator cable
- 20-02 Connection cable
- 20-03 Adapter plate

Figure 4-12 Installation of two heated incubators

Room Temperature Incubator



Installation of One RT Incubator

- 1 Fix the mounting bracket (17-01) with the knurled nuts to the module worktable.
- 2 Place the RT incubator 1 into the recesses on the module worktable and screw it to the mounting bracket.
- 3 Check horizontal alignment with a spirit level. If necessary, adjust by means of the supplied special key (17-05).
- 4 Attach the incubator cable (17-02) – which is connected to the Supervisor board – to the incubator 1 (17-A).

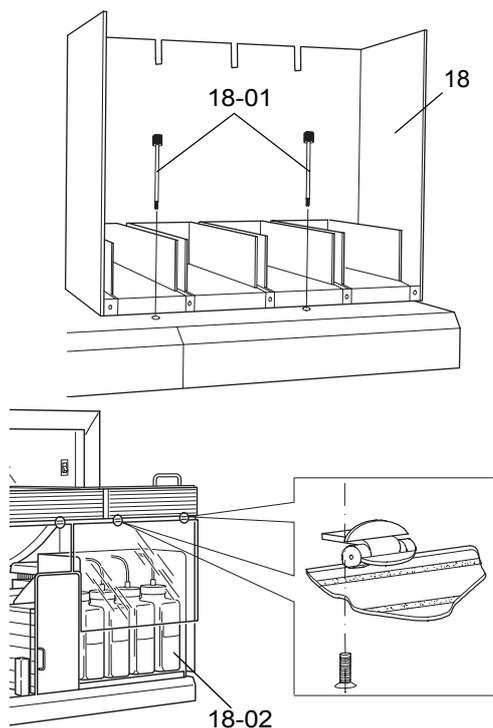
- 17-A Room temperature incubator 1
- 17-B Room temperature incubator 2
- 17-01 Mounting bracket
- 17-02 Incubator cable RT1
- 17-03 Incubator cable RT2
- 17-04 Adapter plate
- 17-05 Special key

Installation of Two RT Incubators (Option)

- 1 Place the adapter plate (17-04) onto the worktable.
- 2 Fix the mounting bracket (17-01) with the knurled nuts to the module worktable and the adapter plate.
- 3 Place the RT incubator 1 into the recesses on the module worktable and screw it to the mounting bracket.
- 4 Place the RT incubator 2 into the recesses on the adapter plate and screw it to the mounting bracket.
- 5 Check horizontal alignment with a spirit level. If necessary, adjust by means of the supplied special key (17-05).
- 6 Attach the incubator cables (17-02, 17-03) – which are connected to the Supervisor board – to the incubators.

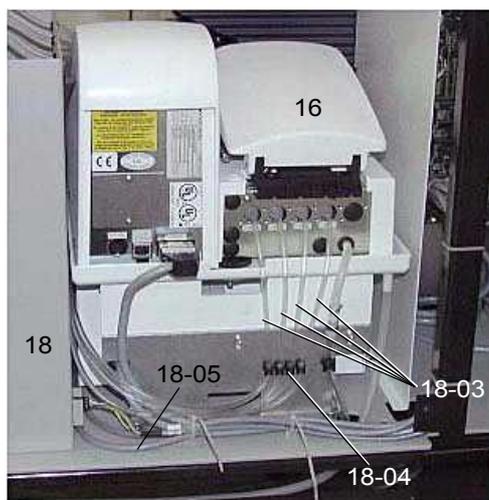
Figure 4-13 Room temperature incubators

Wash Bottle Rack



Recommendation: As the fixing screws (18-01) might get into contact with spilled wash liquid, grease them to prevent from sticking.

- 1 For RMP 200 only:
 - Place the wash bottle rack (18) on the module worktable and insert the fixing screws (18-01), but do not tighten yet.
 - Mount the add-on module safety panel.
 - Make sure the wash bottle rack is aligned parallel to the closed safety panel.
 - Tighten the fixing screws (18-01).
 - Place the bottles (18-02) in the wash bottle rack.



- 16 Washer
- 18 Wash bottle rack
- 18-01 Fixing screws
- 18-02 Bottle
- 18-03 Wash liquid tubing
- 18-04 Tubing clip
- 18-05 Cable

- 2 Connect the wash liquid tubing (18-03) to the bottles and their respective channels at the washer (16).

Make sure for each tubing that the number printed on the wash bottle rack corresponds with the one printed on the rear of the washer.

- 3 Fix the tubing into tubing clip (18-04).
- 4 Attach the cable (18-05) marked “Niveau” – which is connected to the Supervisor board – to the wash bottle rack.
- 5 Install the frame cover (15-07) on the add-on module.

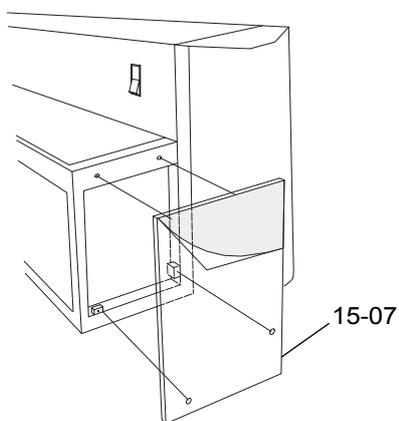
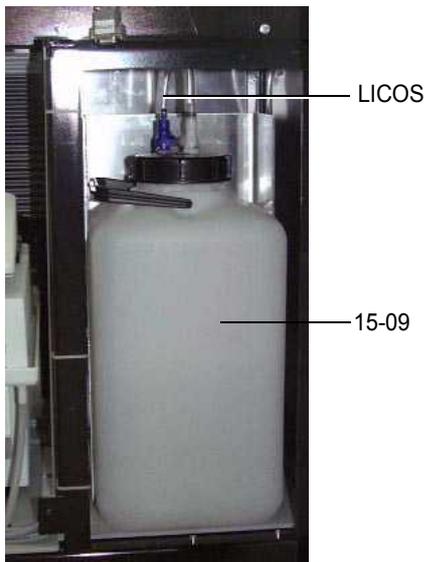
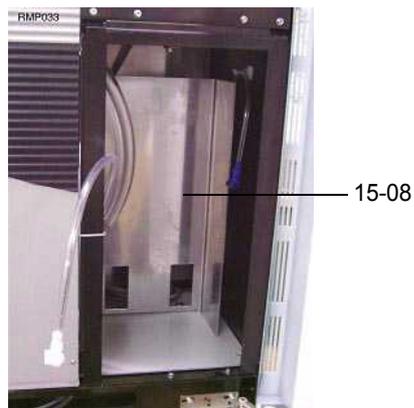


Figure 4-14 Installation of wash bottle rack

LICOS



- 1 For RMP 200 only:
 - Insert the print cover (15-08) and fix it with the knurled nuts.
 - Place the system liquid container (15-09) in the compartment and connect the system liquid tubing (white connector, leading to FWO) and the LICOS tubing (blue connector, leading to Supervisor board) to the container.
 - Lead the fill tubing into the system liquid container.
- 2 Connect waste liquid tubing, leading to the Supervisor board, to LICOS sensor rod. Place LICOS sensor rod into the waste container.

15-08 Print cover

15-09 System liquid container

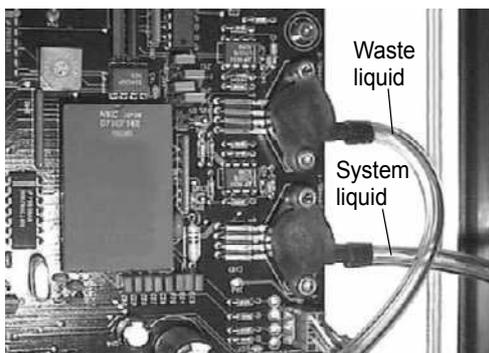


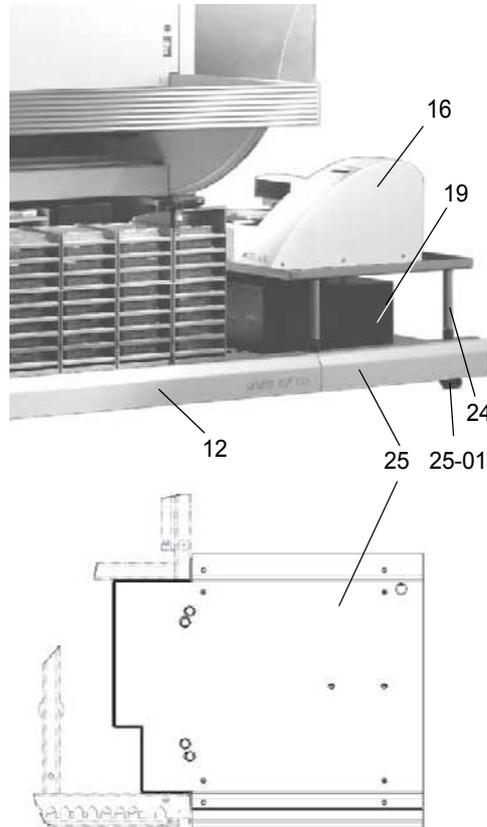
Figure 4-15 Installation of LICOS

Alarm Device

Please refer to Installation Instructions for Alarm Device V2, Doc ID 391 255.

4.3.3 RWS Specific Installation Tasks

Workstation Extension (RWS Assay)



The workstation extension is an option for RWS Assay instruments only. It is used as support for reader and washer.

- 1 Install the workstation extension (25) at the right side of the cut out worktable (12).
- 2 Check horizontal alignment with a spirit level; if necessary, adjust by means of the two right supports (25-01).

- 12 Cut out work table
- 16 Washer
- 19 Reader
- 24 Mounting assembly for washer
- 25 Workstation extension
- 25-01 Support

Figure 4-16 RWS Assay workstation extension

Variable Extension Deck (RWS Logistics)

The variable extension deck is an option for RWS Logistics instruments only. It is used as support for Ultra reader and further external devices.

The variable extension deck can either be placed on the right or on the left side of the instrument.

Reader (Option)

- 1 For RWS Assay:
 - Place the reader (19) onto the workstation extension (25).
- For RWS Logistics:
 - Install the positioning plate on the variable extension deck.
 - Place the Ultra reader onto the positioning plate.
- 2 Connect the reader to the power supply and to PC-com port.

Washer (Option)

For RWS Assay only.

- 1 Install the mounting assembly for washer (24) onto the workstation extension (25).

- 2 Place the washer (16) on top of the mounting assembly.
- 3 Check horizontal alignment with a spirit level. If necessary, adjust by means of the mounting assembly legs.
- 4 Connect the washer to the power supply and to PC-com port.
- 5 Connect wash liquid tubing and waste tubing to the washer and respective liquid containers.

**Heated Incubator
(Option)****Installation of One Heated Incubator**

- 1 Install adapter plate onto worktable.
- 2 Place incubator into respective recesses on the adapter plate.
- 3 Connect the incubator cable to the Optibo/Optibo Power.
- 4 Check horizontal alignment with a spirit level. If necessary, adjust by means of the supplied special key (see 17-05 in [Figure 4-13](#)).

Installation of Up To Four Heated Incubators

Corresponding to the workstation configuration, up to four incubators can be placed at the rear of the worktable.

- 1 Install each incubator as described under [Installation of One Heated Incubator](#).
It depends on the application software, if it is also possible to connect maximal two incubators in series.
- 2 Assure proper address setting for each incubator in compliance with possibly other options ([Refer to Section 6.2.2 Jumper and Address Settings Overview](#)).
Standard setting for one incubator is address #2.

4.3.4 Further Options and Modules for RSP/RWS

**Connecting
Options and
Modules**

- 1 Make sure all options and modules are compatible ([Refer to Section 3.2 Compatibility Matrix](#)).
- 2 Assure proper address settings ([Refer to Section 6.2.2 Jumper and Address Settings Overview](#)).
- 3 Prepare all options and modules according to manufacturers instructions and connect them to Optibo/Optibo Power or Uniport or CANDI board.

LICOS

- 1 Connect LICOS sensor tubing, leading to MPO board, to the LICOS sensor rods.
- 2 Place LICOS sensor rods into respective containers:
 - Tube 1: system liquid container
 - Tube 2: waste container
- 3 Place system liquid container on worktable level to avoid pressure differences within tubing system.

**Access Option/
Signal Lamp** Please refer to Installation Manual ID 392 330

4.3.5 Computer, Software

- 1 Place the computer on the left side of the instrument. Install the computer according to manufacturer's instructions.
- 2 Make sure the instrument is switched off. Install communication cable between computer (COM 2) and instrument (Optibo or Optibo Power).
- 3 Install Genesis instrument software and – if necessary – perform firmware download (refer to Genesis Instrument Software Manual Doc ID 390 791).
- 4 Install respective application software.

4.4 Commissioning

Mechanical Checks

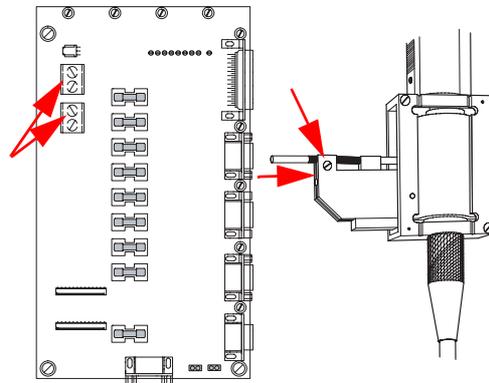
Manually check smooth movement of the LiHa 2 and – if installed – RoMa 2 and PosID 2.

If there is any resistance in the movement, check for dirt residue and clean thoroughly.

Quick Jumper Settings Test

Control CAN-bus resistance to check correct jumper settings (see [Section 6.2.3, 'CAN-Bus Resistance Test'](#)).

Retightening Screws



- 1 Tighten all power cable screws on the Optibo/Optibo Power (left access door).
- 2 Tighten all ILID plug fixing screws.

Figure 4-17 Retightening screws

Make Liquid System Ready for Use



Figure 4-18 Diluter

- 1 Tighten tubing connections and the syringe screw on diluters.
For these tasks, a better result is achieved when the valves with syringes are removed from the diluters.
- 2 Tighten tubing connections on distributors (top cover).
- 3 Mount tips.
- 4 Open worktable front cover (10), remove sealing strip. Place wash station on the worktable. Cut the sealing strip at the appropriate length and reinsert.

Power-on

- 1 Connect the instrument to the mains.
- 2 Set mains power switch to on.

- Check Readiness for Operation**
- 1 According to the document Installation Qualification, Doc ID 391 180, perform Setup & Service software module.
 - 2 Perform calibration process according to document Operation Qualification, Doc ID 391 182.

Cleaning Check the whole system for dirt residue resulting from transport and installation.
Observe appropriate sections in the Operating Manual.

4.5 Conformity Assessment and CE Marking for RWS

Legal Situation Genesis RWS is an open and flexible platform providing our clients with many configuration possibilities. A Genesis RWS instrument is considered as sub-assembly that must be integrated into a complete system. Each system has to be assessed and investigated to comply with particular local requirements.

The openness of the Genesis RWS system makes it impossible to declare it as CE conform and affix the corresponding label.

Responsibility A system integrator is a legal person (e.g. a RO within Tecan group or a distributor) who acts in legal sense between Tecan Schweiz AG (manufacturer of sub-assembly) and the end-user of the system. The system integrator takes the responsibility of a re-manufacturer for the whole system and must fulfill the following points:

- 1 Description of complete system (product)
- 2 Draw up (technical file)
- 3 Assure conformity to local regulations
- 4 Declare Conformity
- 5 Affix CE-marking (within EU-region only)

Tecan Schweiz AG can provide support to help system integrators with points 2, 3, 4 and 5 above.

Safety Standards Please note that Genesis RWS Instruments meet the following:

- Safety requirements for laboratory equipment
EN 61010-1 / UL 3101-1 / CSA C22.2 No 1010-1
except Part 5 and 7, which are met only in part due to the open nature of the instrument
- EMC requirements for laboratory equipment
EN 50081-1, part 1
EN 50082-1, part 1

The above is stated in the manufacturer's declaration.

4.6 Site Acceptance

- Completion**
- 1 In case of a RWS instrument: make a conformity declaration.
 - 2 Fill out the Acceptance Protocol (Doc ID 391 825) and have it signed by the customer.

5 Maintenance

Purpose of This Chapter This chapter summarizes the preventive maintenance activities intended to retain the Genesis RSP, RMP or RWS instrument in a state in which it maintains the required or specified performance.

5.1 Concerning Your Safety

Decontamination Depending on the application, the instrument may be contaminated with compounds hazardous to your health.

WARNING

The instrument may be contaminated. Before performing any maintenance or repair tasks:



- Make sure that the instrument has been decontaminated by an expert according to standard laboratory regulations.
- Request a filled out and signed Decontamination Declaration (Doc ID 390 901)



Unless otherwise noted, always switch off power and disconnect from mains before carrying out any maintenance tasks.

5.2 Consumables

Cleaning Agents



ATTENTION

Strong detergents may dissolve carrier and worktable surface coatings. Use only cleaning agents that are recommended by Tecan and according to table [Cleaning](#) in [Section 5.3.2](#).

Alcohol

Use ethyl-alcohol or 2-Propanol (Isopropanol).

Water

Use distilled or de-ionized water.

Bleach

Use sodium hypochlorite solution, max. 6 %.

Detergent

Use a weak detergent like

- RoboScrub[®], order through Tecan US (order number 70-736 for 16 oz. bottle) or

- CLEAN SYSTEM, order through Tecan-D:
 Daily System Clear = to clean the system daily = order number 30000938 (250 ml),
 Setup Clean = to clean contaminated systems = order number, 30000937 (500 ml),
 Protolyse = to clean the system from proteins = order number 30000939 (1000 ml),
 Carrystop = against carryover = order number 30000940 (1000 ml).

Cleaning Material Use lint-free tissue only.

5.3 Maintenance Schedule

Spare Parts For spare parts list with part numbers refer to [Chapter 7, 'Check Lists Spare Parts'](#).

- Use original Tecan spare parts only.



Note

Spare parts must correspond to the technical requirements laid down by the manufacturer.

5.3.1 Daily/Weekly Maintenance

For daily and weekly maintenance please follow the descriptions in the document Daily/Weekly Maintenance Checklist, Doc ID 391 193. Check off the appropriate boxes as you go through the maintenance tasks.

5.3.2 Half-Yearly Maintenance

Refer to document Preventive Maintenance Checklist, Doc ID 391 181 and check off the appropriate boxes as you go through the maintenance tasks.

General

Task
Print out system information
Run counter read out

Parts to Be Replaced

Part	Interval: 6 month or ...	Refer to ...
ILID cables	after 250,000 Z-moves	Section 6.6.4
DiTi cone and tubing extension	after 250,000 Z-moves	
Washer tubing		

Adjustment

Part	Interval: 6 month or ...	Refer to ...
RoMa 1 Z-brake		Section 6.7.12

Cleaning

Clean every 6 month or when necessary:

Instrument part	Cleaning agent/material
Liquid system, waste system	Water, alcohol, weak detergent
Worktable	Alcohol, weak detergent, bleach 6 %
Metal parts	Alcohol
Arm guide rail, guide rollers of LiHa, RoMa	Alcohol
Z-rods RoMa	Lint-free tissue (do not use any agent)
Z-rods LiHa	Lint-free tissue (do not use any agent)
Carriers	Alcohol, weak detergent, bleach 6 %
Racks	Alcohol, weak detergent, bleach 6 %
Tips	Alcohol, bleach 6 %
DiTi cones	Alcohol
PosID scanner head laser beam output window	Alcohol
Washer manifold	Supplied cleaning needles, water or Ultrasonic bath, water
Reader optic (filter)	Optical cleaning solution (lens tissue recommended)

Test to Be Performed

Perform every 6 month:

Test
Reference position LiHa
Reference position RoMa (for RSP and RWS only)
Check tip adapter function

Fill/flush system
Disposable tips
Liquid detection test
LICOS test
PosID test
Washer: prime each washer channel
Reader: QC test
Door lock test

5.3.3 Yearly Maintenance

Refer to document Preventive Maintenance Checklist, Doc ID 391 181 and check off the appropriate boxes as you go through the maintenance tasks.

General

Perform the half-yearly maintenance tasks as listed in [Section 5.3.2](#).

Parts to be Replaced

Part	Interval: 12 month or ...	Refer to ...
Syringes	after 1 million moves	Section 6.4.3
3-way valve of diluter	after 1 million moves	Section 6.4.3
Tips		
Aspirating tubing		Section 6.4.2
Interconnecting tubing		Section 6.4.2
Pipetting tubing		Section 6.4.2
Waste tubing		Section 6.4.2

Test to Be Performed

Perform every 12 month:

Test
Precision test

6 Replacement of Spare Parts, Repair

Purpose of This Chapter This chapter describes the activities carried out after a failure has occurred, intended to restore an item to a state in which it can perform its required function.

Chapter Overview This chapter consists of the following sections:

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6.1 General Notes on Repair

- Useful References**
- Refer to [Chapter 8, 'Instruments at a Glance'](#) for an overview concerning the location of the most common parts.
 - For spare parts list with part numbers refer to [Chapter 7, 'Check Lists Spare Parts'](#).
 - As [Chapter 7](#) is structured in the sequence of disassembly of an item, it can also be used by experienced FSEs as brief instructions.
 - For electrical diagrams refer to [Chapter 9, 'Diagrams'](#).

- Spare Parts**
- Use original Tecan spare parts only.



Note

Spare parts must correspond to the technical requirements laid down by the manufacturer.

- Disposal of Waste**
- Dispose used items and consumables according to the relevant national environmental, health and safety laws and regulations.

6.1.1 Concerning Your Safety

**Chemical,
Biological and
Radioactive
Hazards**

Depending on the applications, parts of the instrument may have been in contact with biohazardous, poisonous or even radioactive materials. A potential risk may arise from the liquids that have been handled on the instrument.

- Strictly apply appropriate safety precautions according to general laboratory and applicable local, state and federal regulations.



WARNING

Potential Biohazard. The instrument might be contaminated! For servicing, use appropriate personal protective equipment!

- Decontamination**
- For your own and any other affected person's safety, make sure the instrument or parts have been thoroughly decontaminated prior to carrying out any maintenance and repair task on the instrument or before sending it or parts of it for repair:
- Thoroughly clean and decontaminate all relevant parts.
 - Provide a filled-out and signed Decontamination Declaration (Doc ID 390 901).

Electrical Shock Hazard



WARNING

Unless otherwise noted, always switch off power and disconnect from mains before carrying out any tasks described in this chapter.

Electrostatic Sensitive Devices

Discharge static electricity from your body by wearing a wrist strap to protect yourself and sensitive control electronics installed:

- Wear a wrist strap during all installation and maintenance tasks, e.g. when exchanging components.



ATTENTION

Observe precautions for handling electrostatic discharge sensitive devices.

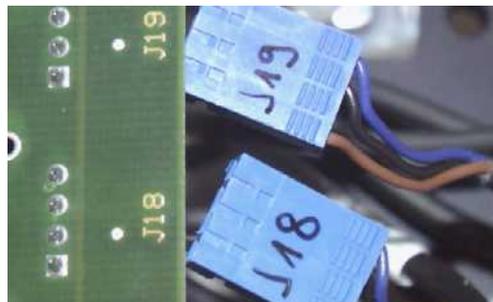
6.1.2 General Repair Tasks

Loctite® 638

- Several set screws are glued with Loctite 638. Use a hot-air apparatus to soften the adhesive before unscrewing these screws.

Disconnecting Cables

- When disconnecting cables, always mark designation (Jxx) on connector using a water resistant pen.



If due to insufficient space, designations are not marked on the PCB use electrical diagrams instead.

Figure 6-1 Connector designation

When replacing any PCB ...

- Make sure the jumpers for CAN-bus resistance are set identically to the replaced PCB (see also [Section 6.2.2, 'Jumper and Address Settings Overview'](#)).
- Control if address switch is set correctly (see [Section 6.2.2, 'Jumper and Address Settings Overview'](#)).
- Check CAN-bus resistance (see [Section 6.2.3, 'CAN-Bus Resistance Test'](#)).

Cleaning

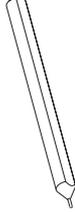
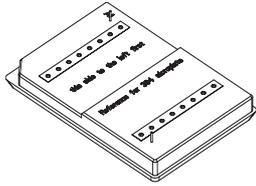
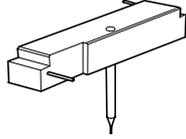
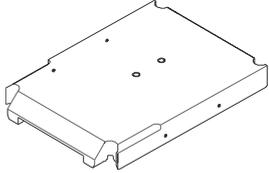
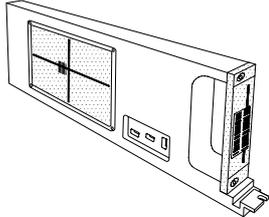
- Wipe off grease residue and thoroughly clean affected instrument parts after any repair task.

6.1.3 Operating Tests after Repair

- Service Checklist**
- After replacing or removing and reinstalling modules or spare parts, carry out the appropriate tests according to Service Checklist Doc ID 391 183 (included in the Genesis Maintenance and Service Logbook).

6.2 Abstract of Important Data

6.2.1 Special Tools

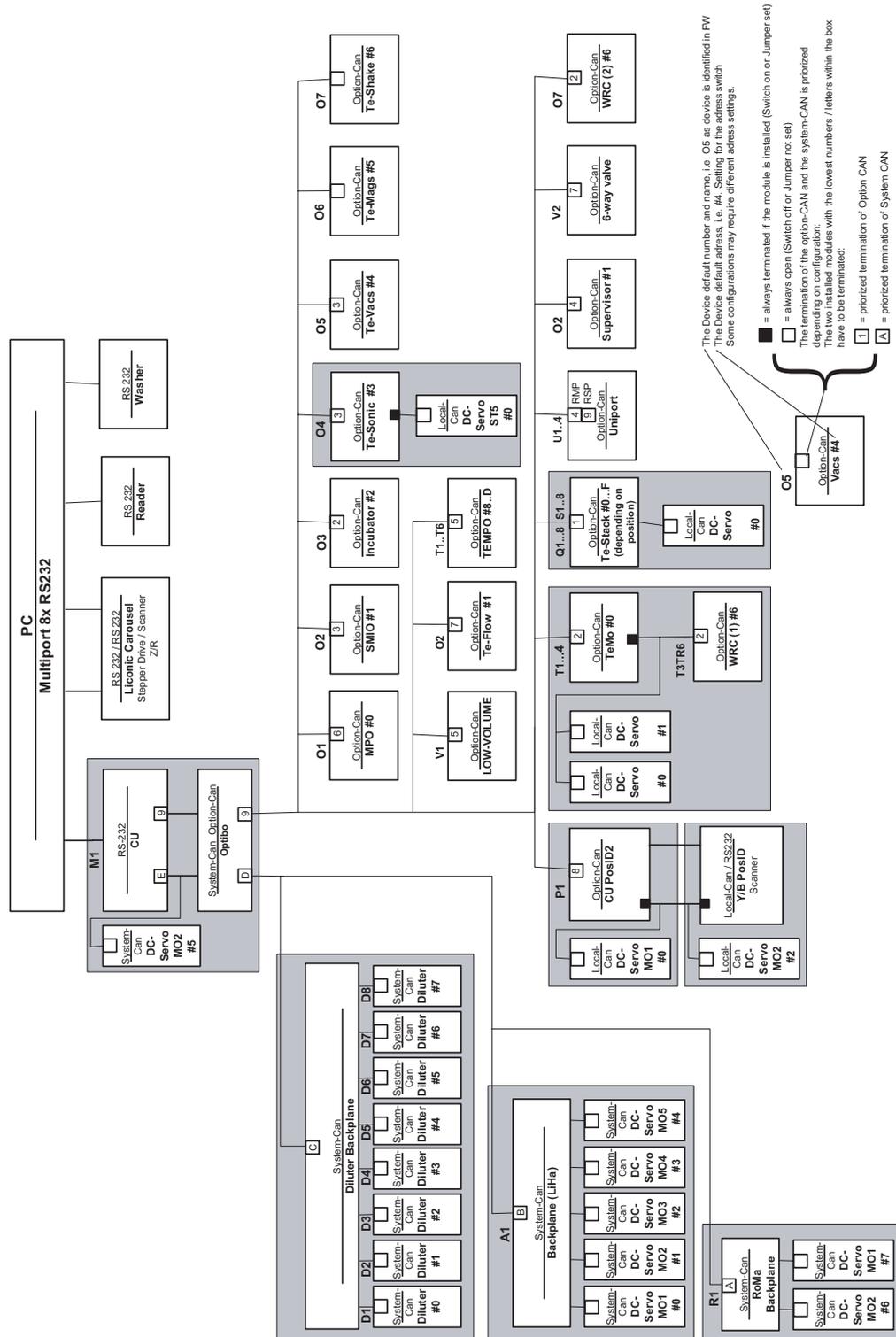
LiHa reference tip	Part No. 612 503	
384 well tip adjustment tool	Part No. 613 103	
RoMa calibration tool	Part No. 612 622	
RoMa teach plate	Part No. 613 101	
PosID service rack	Part No. 613 100	

6.2.2 Jumper and Address Settings Overview

The following communication overview shows ...

- the default address settings on the electronic boards of the different modules,
- on which modules the jumpers have to be set/switched on, or removed/switched off according to the configuration of the instrument:

Communication Overview



Jumper Allocation

PCP	System CAN-bus	Option CAN-bus	Local CAN-bus
Optibo, Optibo Power	J12	J13	—
CU board	J1	J22	
MPO board V2.0	—	J4	—
MPO board V3.1/V4.0	—	J2	—
LiHa backplane	J14	—	—
Dilback	J10	—	—
RoMa 1 backplane	J2	—	—
RoMa 2 backplane	J1	—	—
PosID 1/PosID 2 CU board	—	J8	J6

6.2.3 CAN-Bus Resistance Test

Purpose of this test is to verify whether bus end jumper settings on control electronics are correct.

- Will Be Applicable**
- When commissioning a new instrument.
 - After exchange or new installation of a LiHa 1/LiHa 2, RoMa 1/RoMa 2, PosID 1/PosID 2 or other options as e.g. Te-VacS etc.
 - After exchange or supplemental installation of PCBs.

- Required Special Tools**
- Multimeter

- Test Procedure**
- 1 Switch off the instrument.
 - 2 On the Optibo or Optibo Power (left access door) check the CAN-bus resistance between the respective check points:

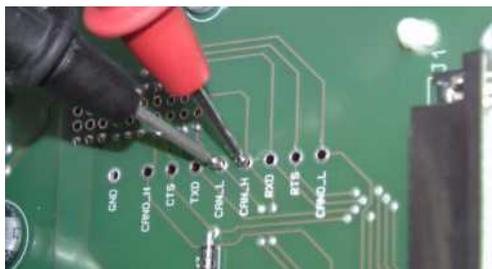


Figure 6-2 Check points for System CAN-bus

- System CAN
Measure resistance between CAN_L and CAN_H.

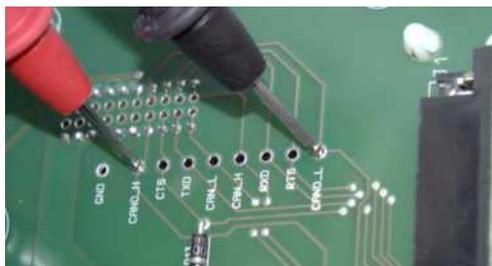


Figure 6-3 Check points for Option CAN-bus

- Option CAN
Measure resistance between CANO_L and CANO_H.

- 3 Correct CAN-bus resistance:

50–65 Ω:	correct number of jumpers
< 50 Ω:	too many jumpers are set
~ 40 Ω:	1 jumper too much
> 65 Ω:	too few jumpers are set
~ 120 Ω:	1 jumper too few

If CAN-bus resistance is not between 50 and 65 Ω: compare jumper settings and CAN-bus connections with '[Communication Overview](#)' in [Section 6.2.2](#), '[Jumper and Address Settings Overview](#)' and correct.

6.2.4 Software Error Messages

Toolbox General Errors

Toolbox error code	Explanation
0	OK (no error)
1	Toolbox not initialized (from V2.1 on: not opened)
2	Toolbox already initialized (from V2.1 on: already open)
3	Toolbox init error (from V2.1 on: error in opening)
4	Communication driver error
5	Incorrect answer string format (cannot extract)
6	Illegal command parameter value
7	Error list contains at least one error
8	No such worktable
9	Open rack database failed
10	Worktable access error (carrier/rack)
11	Evaluation access (not a single position defined)
12	Evaluation access (not a single position is accessible due to Y)
13	Evaluation access (position out of range)
14	Accessing all selected positions not possible
15	No carrier/rack defined
16	Worktable access error (tube)
17	Open comm log file failed
18	No carrier on specified grid position
19	Worktable object creation error
20	Open communication driver failed
21	Close communication driver failed
22	Evaluation access (not a single position is accessible due to X)
23	Genesis DB not open
24	Communication driver not open
25	Plate stuck on gripper
26	Balance initialization error
27	Balance isn't initialized
28	Balance isn't correct tared
29	Measurements not enough linear. Preparing/weighing not possible.
30	Wrong machine type. No balances available.
31	Balance not prepared. Weighing not possible.
32	Error while getting a balance value. Weighing not possible.

Toolbox error code	Explanation
33	Wrong machine type. No low volume support.
34	This machine has no pinch valves
35	No installable easy option available
36	Easy option slot occupied
37	Defined Easy Option module not available
38	The initialization of the serial communication port failed
39	Sending through the serial communication port failed
40	Receiving through the serial communication port failed
41	Command not implemented (for the PosID 1)
42	Command not implemented (for the PosID 2)
43	Difference too big between “prepare weigh” and “weigh” in evaporation
44	Worktable View: nothing selected
45	Worktable View: index out of range
46	Worktable View: ...
47	Worktable View: object not created

Toolbox User Interactions

Toolbox error code	Explanation
90	Abort from user
91	Retry from user
92	User (calling application) handles error
93	Ignore from user
94	“Go to ZBottom” from user

Toolbox Data Errors

Toolbox error code	Explanation
101	Incorrect tip number
102	Data pointer is NULL
103	Individual tip data set (no global data available)
104	Incorrect liquid index
105	Data set not defined
106	Selector out of bounds
107	Not enough space (for complete report)

Toolbox error code	Explanation
108	Invalid diluter number
109	Parameter value(s) out of range
110	Invalid arm ID
111	Invalid number of tips
112	Invalid number of diluters

Toolbox Communication Errors

Toolbox error code	Explanation
201	COM unknown error
202	COM device still busy
203	COM device time-out

Toolbox Device Errors (Ranges)

Toolbox error code range	Device Address	Explanation
300		Common
400	M	CU
500	A	LiHa
527	A	LiHa (tip mounted)
600	O	MPO, Incubator, Supervisor
700	D	Diluter
800	P	PosID
900	R	RoMa
1000	V	Low Volume Option
1100	U	Uniport
10,000	P	PosID extended errors

Common Errors for All Devices

Toolbox error code = Toolbox error code range + Communication driver error code

Examples:

Toolbox error code 807 = 800 + 7 = PosID not initialized

Toolbox error code 528 = 527 + 1 = LiHa (tip mounted) initialization error

Communication driver error code	Explanation
1	Initialization error

Communication driver error code	Explanation
2	Invalid command
3	Invalid operand
4	Invalid command sequence
5	Device not implemented
6	Time-out error
7	Device not initialized
8	Command overflow of CU
15	Command overflow of subdevice

CU Error Codes *Toolbox error code = Toolbox error code range (= 400 for CU) + Communication driver error code*

Communication driver error code	Toolbox error code	Explanation
13	413	No access to serial EEPROM
16	416	Power fail circuit error
17	417	Arm collision avoided between LiHa and RoMa
18	418	Door lock 1 failed
19	419	Door lock 2 failed
20	420	No new device #V node detected
21	421	Device #V node already defined

LiHa Error Codes *Toolbox error code = Toolbox error code range + Communication driver error code*
First number = LiHa (range 500), second number = LiHa tip mounted (range 527)

Communication driver error code	Toolbox error code	Explanation
9	509/536	No liquid detected (MDT, MET)
10	510/537	Drive no load
11	511/538	Not enough liquid (MDT)
12	512/539	Not enough liquid (MET)
13	513/540	Arm collision avoided with PosID
16	516/543	Power fail circuit error
17	517/544	Arm collision avoided with RoMa
18	518/545	Clot limit passed (MCT)

Communication driver error code	Toolbox error code	Explanation
19	519/546	No clot exit detected (MCT)
20	520/547	No liquid exit detected (MDT, MET)
23	523/550	Not yet moved (MDT, MET)
24	524/551	ILID pulse error (MDT, MET, MCT)
25	525/552	Tip not fetched (AGT, ADT)
26	526/553	Tip not mounted (AGT, ADT)
27	527/554	Tip mounted (AGT, ADT)

RoMa Error Codes *Toolbox error code = Toolbox error code range (= 900 for RoMa) + Communication driver error code*

Communication driver error code	Toolbox error code	Explanation
9	909	Plate not fetched (AGR)
10	910	Drive no load
16	916	Power fail circuit error
17	917	Arm collision avoided with LiHa

XP Error Codes *Toolbox error code = Toolbox error code range (= 700 for Diluter) + Communication driver error code*

Communication driver error code	Toolbox error code	Explanation
9	709	Plunger overload
10	710	Valve overload
11	711	Valve in bypass
13	713	No access to EEPROM

PosID 1 Common Errors *Toolbox error code = Toolbox error code range* + Communication driver error code*
**= 800 for Communication driver error codes up to 31 and 10,000 for Communication driver error codes beyond 31*

Communication driver error code	Toolbox error code	Explanation
14	814	Extended error in device occurred (REE reports the extended error code)
36	10,036	EEPROM failure

Communication driver error code	Toolbox error code	Explanation
37	10,037	EEPROM no access (hardware problem; e.g. no chip available)
38	10,038	EEPROM data invalid (e.g. chip empty or invalid data, system adjustment required!)
39	10,039	EEPROM special error (trap for rare error; data is valid!)
40	10,040	Invalid mnemonics
41	10,041	Invalid argument (parameter out-of-range)
42	10,042	Invalid parameter number
43	10,043	Invalid device address
44	10,044	Invalid frame type
45	10,045	Invalid message length

PosID 1 Axis Errors (Ranges)

Communication driver error code ranges	Explanation
100	X-axis offset (arm movement)
200	Y-axis offset (grip movement)
300	B-axis offset (barcode scanner movement)

PosID 1 Common Axis Errors

Communication driver error code:
x = communication driver error code range

Examples:

Communication driver error code 263 = 200 + 63 = Y-axis target not reached

Communication driver error code 1324 = 300 + 1024 = B-axis overload detected

Toolbox error code = Toolbox error code range (10,000 for PosID) + Communication driver error code

Communication driver error code	Toolbox error code	Explanation
x50	10,x50	Unknown axis mnemonic
x51	10,x51	Invalid axis identifier
x52	10,x52	# of sub-axis is out of limit
x55	10,x55	Collision detection is active
x58	10,x58	Time-out calculation error

Communication driver error code	Toolbox error code	Explanation
x59	10,x59	Dynamic read calculation error
x61	10,x61	Initialization: target not reachable
x62	10,x62	Target out-of-range
x63	10,x63	Target not reached
x65	10,x65	Axis movement time-out
1x20	11,x20	CAN over run
1x21	11,x21	No load
1x22	11,x22	No liquid detected
1x23	11,x23	Break point not reached
1x24	11,x24	Overload detected
1x25	11,x25	Delayed action pending (ready to execute)
1x26	11,x26	Delayed action pending (ready to execute)
1x27	11,x27	Command not yet implemented
1x29	11,x29	DC-Servo multiple error

**PosID 1
Miscellaneous
Errors**

Toolbox error code = Toolbox error code range (10,000 for PosID) + Communication driver error code

BCS = Barcode Scanner; HOST = PosID CU

Communication driver error code	Toolbox error code	Explanation
401	10,401	BCS initialization: no ID REQUEST from BCS after ATTENTION from HOST
405	10,405	Unexpected response from BCS after START DECODE
411	10,411	No decoded barcode from BCS
412	10,412	Barcode string length out-of-range
413	10,413	NR (No Read) message from BCS
421	10,421	CMNDNAK (CoMmaND Not Acknowledge) respond from BCS
422	10,422	No ACK or NAK respond from BCS
425	10,425	No respond from BCS
426	10,426	Checksum error detected by BCS
427	10,427	Unexpected respond from BCS
435	10,435	No respond from BCS

Communication driver error code	Toolbox error code	Explanation
436	10,436	Checksum error detected by HOST
437	10,437	Unexpected respond from BCS
438	10,438	No complete respond from BCS
441	10,441	HOST received message from wrong message source
451	10,451	BC type out-of-range
452	10,452	Verify mode out-of-range
455	10,455	Unexpected character in BC string
456	10,456	BC check digit error
460	10,460	Invalid test number
470	10,470	Parameter out-of-range
501	10,501	Invalid field id
502	10,502	Invalid parameter
510	10,510	Invalid sector id
511	10,511	Sector already active
512	10,512	Sector not yet active
513	10,513	Sector parameter out-of-range
514	10,514	Sector limit reached
520	10,520	Invalid fixed field id
521	10,521	Fixed field already active
522	10,522	Fixed field not yet active
523	10,523	Fixed field parameter out-of-range
530	10,530	Unknown carrier state
531	10,531	Invalid carrier code
532	10,532	Invalid carrier code string length
533	10,533	Invalid carrier code type
534	10,534	Invalid carrier placement
535	10,535	Invalid carrier id
536	10,536	Carrier id already active
537	10,537	Carrier id not yet active
538	10,538	Invalid carrier code format
545	10,545	Invalid carrier type
546	10,546	Carrier type already active
547	10,547	Carrier type not yet active
548	10,548	Invalid carrier data id
549	10,549	Carrier is at remove position

Communication driver error code	Toolbox error code	Explanation
550	10,550	Unknown rack/sample state
555	10,555	Invalid rack/sample type
556	10,556	Rack/sample type already active
557	10,557	Rack/sample type not yet active
558	10,558	Invalid rack/sample data id
560	10,560	Move right carrier locked
601	10,601	Invalid port number
602	10,602	Invalid bit number
701	10,701	BC scan task not started
710	10,710	No carrier present
711	10,711	Expected carrier not found
720	10,720	Calibration Y max read
741	10,741	Reload of same carrier
742	10,742	Comparison of 1st rack/sample impossible
743	10,743	Illegal removal of carrier detected
744	10,744	Illegal movement of carrier detected
750	10,750	Previous BC read was equal

PosID 2 Errors

Toolbox error code = Toolbox error code range (= 800 for PosID) + Communication driver error code

Communication driver error code	Toolbox error code	Explanation
9	809	No liquid detected by DC-Servo (error code currently not used)
10	810	Drive with no load detected
11	811	Break point reached
12	812	No access to parameter block
13	813	Collision between LiHa and PosID avoided
14	814	Extended error
16	816	Power fail circuit failure
17	817	Not locked to grid
18	818	Sector not defined
20	820	Barcode scanner failure (communication problem, e.g. wrong answer to ESC sequence)

Communication driver error code	Toolbox error code	Explanation
21	821	Barcode scanner communication error (transmission errors upon OV, FE, PT, VRC cmds)
22	822	Carrier not movable
23	823	Break point not reached
24	824	Carrier not defined
25	825	Rack/sample not defined
26	826	Carrier not loaded (error code currently not used)
27	827	Invalid carrier id barcode
28	828	Carrier not present
29	829	Illegal BCS movement
30	830	BCS failed during initialization (error code currently not used)

Low Volume Option Errors

Toolbox error code = Toolbox error code range (= 1000 for Low Volume Option) + Communication driver error code

Communication driver error code	Toolbox error code	Explanation
9	1009	Selected valve not installed
10	1010	Endless mode not possible
11	1011	Wrong node defined

Incubator Errors

Toolbox error code = Toolbox error code range (= 600 for incubator) + Communication driver error code

Communication driver error coder	Toolbox error code	Explanation
9	609	Shaker not installed
10	610	Shaker position initialization error
11	611	Close door solenoid short or open circuit
12	612	EEPROM checksum error
13	613	EEPROM access error
16	616	Slot temperature overrun
17	617	Temperature sensor short- or open circuit, or suspect
18	618	Shaker fail

Supervisor Errors *Toolbox error = Toolbox error range (= 600 for Supervisor) + Communication driver error*

Communication driver error coder	Toolbox error code	Explanation
12	612	LICOS not calibrated
13	613	EEPROM access error
16	616	Door already open
17	617	Hall sensors not calibrated

Uniport Errors

Spectra/Sunrise Errors

Toolbox error = Toolbox error range (= 1100 for Uniport) + Communication driver error

Communication driver error coder	Toolbox error code	Explanation
16	1116	Lamp low
17	1117	Lamp high
18	1118	Transport error
19	1119	Filter error
20	1120	Checksum error
21	1121	No data uploaded by “D” or “D2” cmd.

6.3 Instrument – Disassembly and Assembly Procedures

This section describes mechanical and electronic exchange routines on instrument level.

6.3.1 Worktable

Spare Parts Worktable

For spare parts list with part numbers refer to [Section 7.1.1, 'Spare Parts Worktable'](#).

Following items can be replaced as spare parts:

- [Worktable](#)
- [Positioning pins](#)
- [Sealing strip](#)

Required Special Tool

- Reference tip for LiHa

Removal of Worktable

Will Be Applicable ...

- If a new or another type of worktable has to be installed.
- If you need to access the PosID/PosID 2 or an older version of PosID/PosID 2 CU board (located underneath the worktable).

Removal

For more information refer to [Section 4.3, 'Installation'](#), inverse order of installation instructions.

- 1 Empty the worktable completely.
- 2 For RMP: detach the module worktable.
- 3 Open the front worktable cover (10).
 - For RMP: remove the door locks (21).
 - For RWS: remove magnet holders.
- 4 Remove all screw caps (tip: use a watch maker screwdriver) and all fixing screws from the worktable.
- 5 Remove the worktable by carefully lifting and pulling forward.

Installation of Worktable

- 1 Carefully install the worktable.
- 2 RSP and RWS: insert the 4 countersunk screws on the rear right and rear left but do not tighten them yet.
RMP: insert the 2 countersunk screw on the rear left but do not tighten them yet.

- 3 Insert but only *slightly* tighten the oval head screws.
- 4 Manually align the worktable, then tighten the front left screw.
This screw will act as a pivot point during the following alignment.
- 5 Install the reference tip onto the LiHa:
 - 4-Tip LiHa: mount reference tip on position 1 (first tip from behind).
 - 8-Tip LiHa: mount reference tip on position 3 (third tip from behind).
- 6 Manually position the reference tip at the edge of the foremost positioning pin in grid position 1 (most left grid). Check the gap between pin and reference tip.

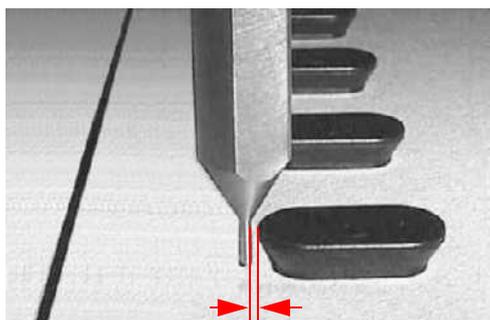


Figure 6-4 Gap between reference tip and positioning pin

- 7 Manually move the LiHa to the rightmost grid position and check the gap between pin and reference tip.
The gap must be the same on either side of the worktable.

- 8 When the worktable is positioned: tighten the fixing screws and insert the screw caps.
- 9 Reinstall all previously removed parts. For detailed information about installing ...
 - RMP door locks: refer to [Section 6.3.2](#).
 - RMP 200 add-on module: refer to [Section 4.3, 'Installation'](#).
 - Reader, washer and incubators: refer to [Section 4.3, 'Installation'](#).
- 10 [Ensure Operating Readiness](#) as described later in this section.

Ensure Operating Readiness

For detailed information refer to the Genesis Instrument Software Manual.

After replacing or reinstalling the worktable or replacing the positioning pins, control – and if necessary carry out – following settings:

Step	Test or Setup
1	LiHa <ul style="list-style-type: none"> • Check reference positions • Adjust scale factors <i>Only necessary if check failed</i> • Adjust reference positions <i>Only necessary if check failed</i> • Set absolute Z • Set individual Z

2	PosID <ul style="list-style-type: none">• Test• PosID adjustment <i>Only necessary if test failed</i>
3	RoMa <ul style="list-style-type: none">• Check reference positions• RoMa setup <i>Only necessary if check failed</i>

6.3.2 Door Locks

RMP For the description of disassembly and assembly procedure for the Genesis RMP door locks, please refer to the document Doc ID 391 260.

RSP, RWS The door lock is part of the access option for RSP and RWS instruments. Please refer to document Doc ID 392 330 for further information.

6.3.3 X-Drive Assembly

The X-drive assembly is installed in the X-bay (5) of the instrument. It consists of one X-motor and a X-belt which drives the LiHa. If the instrument is equipped with a RoMa, a second X-drive assembly is installed which drives the RoMa.

The X-DC-Servo board – which controls the X-motors of the LiHa and RoMa – is described in Section 6.3.5, 'Electronic Boards'.

Spare Parts

For spare parts list with part numbers refer to Section 7.1.3, 'Spare Parts X-Drive Assembly'.

Following items can be replaced as spare parts:

- Belt tensioner
- X-belt (5.5 m)
- X-DC-Servo motor with cable and bracket

Overview X-Drive Assembly for LiHa

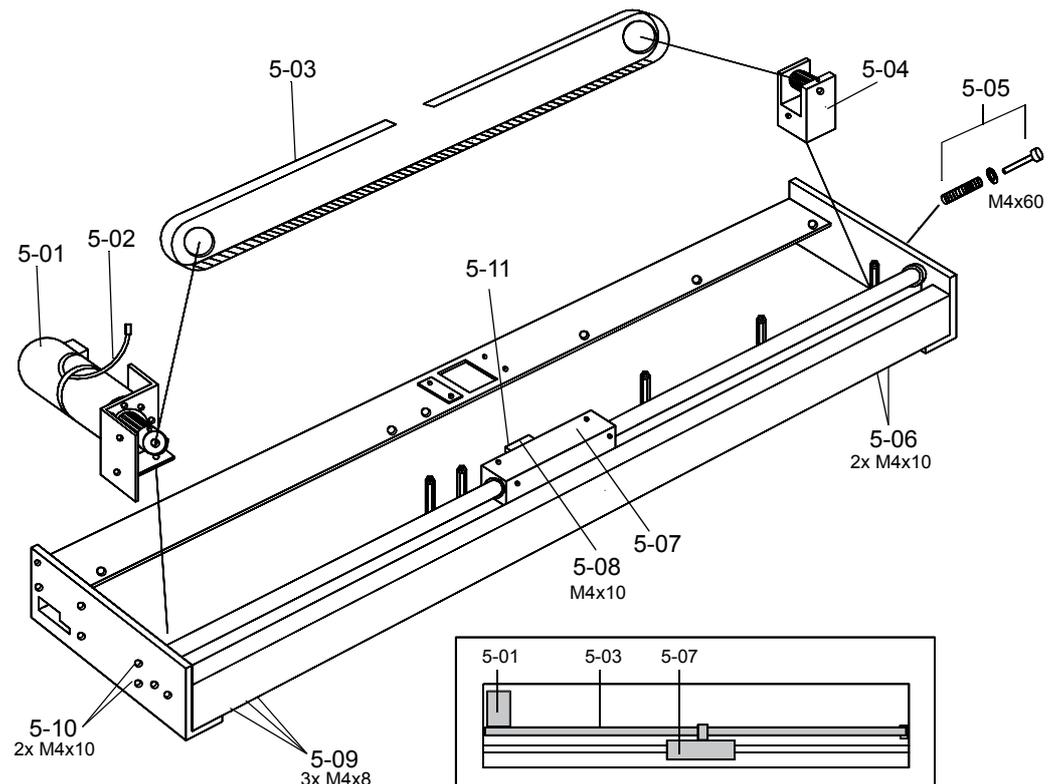


Figure 6-5 X-drive assembly for LiHa

5-01	X-motor LiHa	5-06	Fixing screw/washer for belt take-up
5-02	X-motor cable LiHa (J13)	5-07	X-slide LiHa
5-03	X-belt LiHa	5-08	Fixing screw for X-belt LiHa
5-04	Belt take-up LiHa	5-09	Fixing screw for X-motor LiHa
5-05	Belt tensioner (belt tensioning screw/washer/pressure spring)	5-10	Fixing screw for X-motor LiHa
		5-11	Driver LiHa

Overview X-Drive Assembly for RoMa

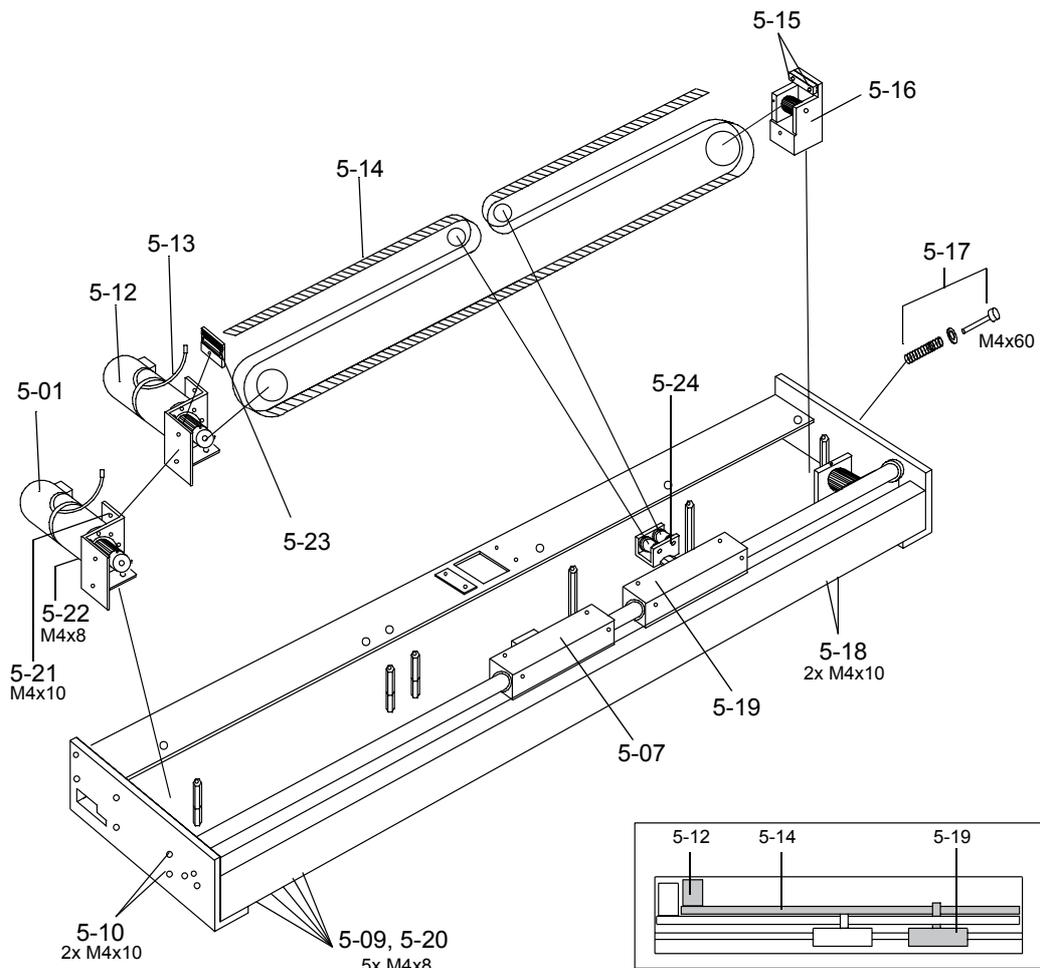


Figure 6-6 X-drive assembly for RoMa

5-01	X-motor LiHa	5-17	Belt tensioner (belt tensioning screw/washer/pressure spring)
5-07	X-slide LiHa	5-18	Fixing screw/washer for belt take-up
5-09	Fixing screw for X-motor LiHa	5-19	X-slide RoMa
5-10	Fixing screw for X-motor LiHa	5-20	Fixing screw for X-motor RoMa
5-12	X-motor RoMa	5-21	Fixing screw for belt lock
5-13	X-motor cable RoMa (J09)	5-22	Fixing screw for X-motor RoMa
5-14	X-belt RoMa	5-23	Belt lock RoMa
5-15	Fixing screw for X-belt RoMa	5-24	Driver RoMa
5-16	Belt take-up RoMa		

Removal of X-Belt For LiHa and RoMa X-Belt

The item numbers mentioned refer to [Figure 6-5, 'X-drive assembly for LiHa'](#) and [Figure 6-6, 'X-drive assembly for RoMa'](#).



Note

In case the instrument is not yet equipped with the new belt tensioner (5-05 or 5-17), we recommend to upgrade the instrument when removing the X-belt.

- 1 Remove the arm of the relevant X-drive.
For LiHa 1 see [Section 6.5.2, 'Complete LiHa 1 Assembly'](#),
for LiHa 2 see [Section 6.6.2, 'Complete LiHa 2 Assembly'](#),
for RoMa 1 see [Section 6.7.2, 'Complete RoMa 1 Assembly'](#)
for RoMa 2 see [Section 6.8.2, 'Complete RoMa 2 Assembly'](#).
- 2 Unscrew and remove the X-bay covers, open right access door (6).
- 3 For RMP instruments only:
 - Remove system liquid container.
 - Unscrew the steel plate supporting the Supervisor/Uniport board (41, 37) in order to get access to the belt tensioning screw (5-17).
- 4 From below the X-bay loosen the respective belt take-up fixing screws (5-06 or 5-18).
- 5 Loosen the respective belt tensioning screw (5-05 or 5-17) to slacken the X-belt tension.
- 6 For LiHa X-belt:
 - Open X-belt fixing screw (5-08), remove X-belt (5-03).
 For RoMa X-belt:
 - Open belt lock (5-23) and X-belt fixing screws (5-15), remove X-belt (5-14).

Installation of X-Belt

For LiHa X-Belt

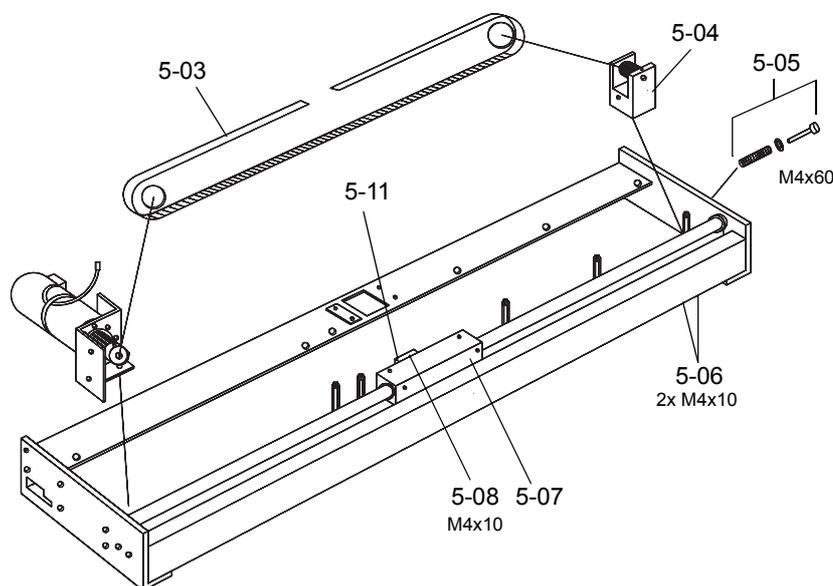
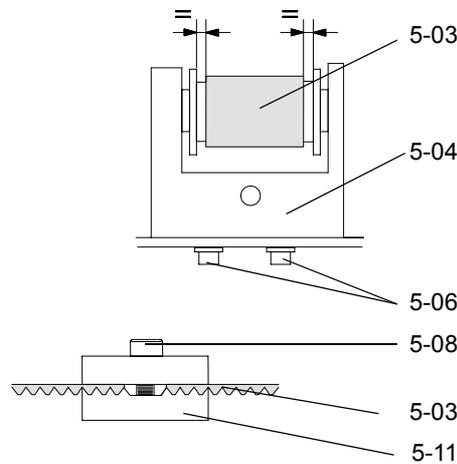


Figure 6-7 Installing X-belt LiHa

5-03	X-belt LiHa	5-06	Fixing screw/washer for belt take-up
5-04	Belt take-up LiHa	5-07	X-slide LiHa
5-05	Belt tensioner (belt tensioning screw/ washer/pressure spring)	5-08	Fixing screw for X-belt LiHa
		5-11	Driver LiHa

- 1 Cut the new belt to required size according to the replaced one.

- 2 If installed: remove belt tensioning screw (5-05).
- 3 Fix – but do not tighten yet – the belt take-up fixing screws (5-06) which should be positioned more likely in the left part of the slotted hole.

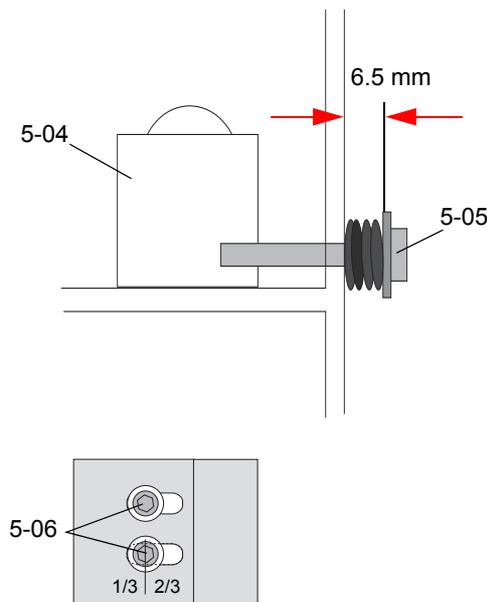


- 4 Lead the X-belt (5-03) over the pulleys as shown in [Figure 6-7](#) and fasten it (fixing screw 5-08) in the driver (5-11).
Make sure the belt is placed correctly over the pulleys ([Figure 6-8](#)).

- 5-03 X-belt LiHa
- 5-04 Belt take-up LiHa
- 5-06 Fixing screw for belt take-up
- 5-08 Fixing screw for X-belt
- 5-11 Driver LiHa

Figure 6-8 X-belt LiHa

- 5 Loosen the fixing screws of the driver (5-11).



- 6 Screw the belt tensioning screw (5-05) with washer and pressure spring into the belt take-up (5-04) until the distance between inner face of the washer and the frame of the instrument is 6.5 mm (this corresponds to a tension of 9 N).

- 5-04 Belt take-up LiHa
- 5-05 Belt tensioning screw
- 5-06 Fixing screw for belt take-up

- 7 Check the position of the belt take-up fixing screws (5-06) in the slotted hole; it should be in the left third of the slot. Otherwise you need to shorten the X-belt.

Figure 6-9 Tensioning the X-belt LiHa

- 8 Tighten the belt take-up fixing screws (5-06) and glue them with Tree Bond 1342.
- 9 Reinstall LiHa (see [Section 6.5.2, 'Complete LiHa 1 Assembly'](#) or [Section 6.6.2, 'Complete LiHa 2 Assembly'](#)) and ensure operating readiness as described in [Section 6.5.10, 'Ensure Operating Readiness'](#) (for LiHa 1) or [Section 6.6.11, 'Ensure Operating Readiness'](#) (for LiHa 2).

For RoMa X-Belt

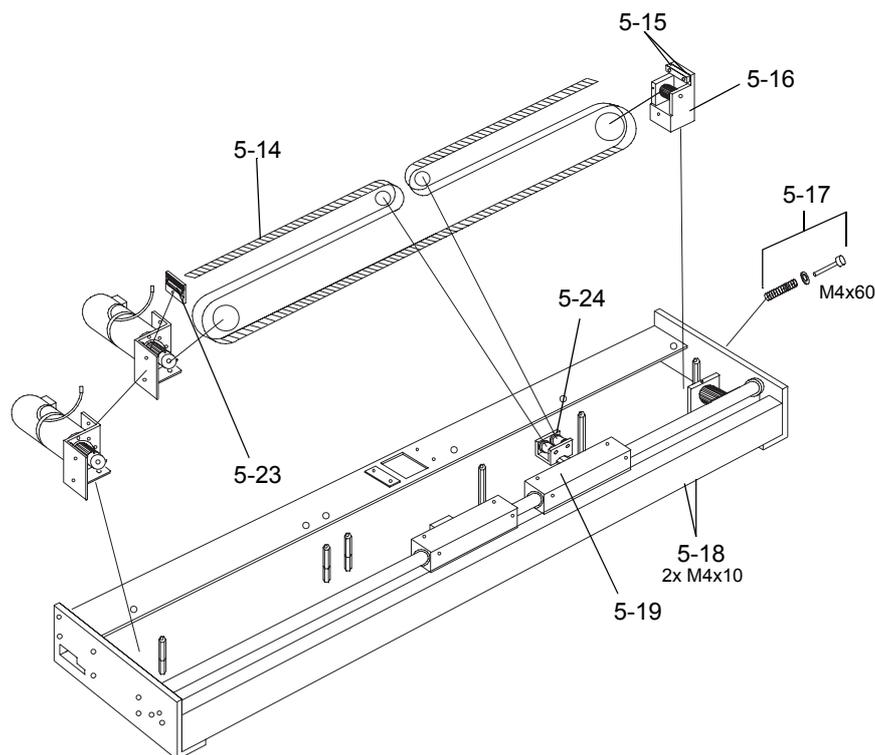


Figure 6-10 Installing X-belt RoMa

5-14	X-belt RoMa	5-18	Fixing screw/washer for belt take-up
5-15	Fixing screw for X-belt RoMa	5-19	X-slide RoMa
5-16	Belt take-up RoMa	5-23	Belt lock RoMa
5-17	Belt tensioner (belt tensioning screw/ washer/pressure spring)	5-24	Driver RoMa

- 1 Cut the new belt to required size according to the replaced one.
- 2 If installed: remove belt tensioning screw (5-17).
- 3 Fix – but do not tighten yet – the belt take-up fixing screws (5-18) which should be positioned more likely in the left part of the slotted hole.
- 4 Fix one end of the X-belt (5-14) in the belt lock (5-23), then lead it over the pulleys as shown in [Figure 6-10](#). Insert the other belt end in the belt take-up (5-16) and fasten the fixing screws (5-15).

Make sure the belt is placed correctly over the pulleys as shown in the upper illustration of [Figure 6-8](#).

- 5 Loosen the fixing screws of the driver (5-24).
- 6 Screw the belt tensioning screw (5-17) with washer and pressure spring into the belt take-up (5-16) until the distance between inner face of the washer and the frame of the instrument is 6.5 mm (this corresponds to a tension of 9 N). (See [Figure 6-11](#), 'Tensioning the X-belt RoMa'.)

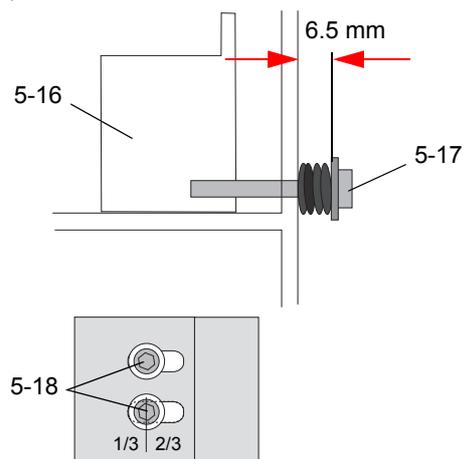


Figure 6-11 Tensioning the X-belt RoMa

- 5-16 Belt take-up RoMa
- 5-17 Belt tensioning screw
- 5-18 Fixing screw for belt take-up

- 7 Check the position of the belt take-up fixing screws (5-18) in the slotted hole; it should be in the left third of the slot. Otherwise you need to shorten the X-belt.

- 8 Tighten the belt take-up fixing screws (5-18) and glue them with Tree Bond 1342.
- 9 For RMP instruments only:
 - Install the steel plate supporting the Supervisor/Uniport board (41, 37).
 - Install system liquid container.
- 10 Install the X-bay covers.
- 11 Reinstall RoMa (see [Section 6.7.2, 'Complete RoMa 1 Assembly'](#) or [Section 6.8.2, 'Complete RoMa 2 Assembly'](#)) and ensure operating readiness as described in [Section 6.7.13, 'Ensuring Operating Readiness'](#) (for RoMa 1) or [Section 6.8.15, 'Ensuring Operating Readiness'](#) (for RoMa 2).

Removal of X-motor

For Instruments without RoMa

The item numbers mentioned refer to [Figure 6-5, 'X-drive assembly for LiHa'](#).

- 1 Release tension of the X-belt as described earlier in this section (see ['Removal of X-Belt'](#), step 1 to 4).

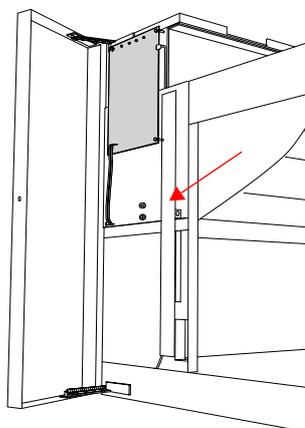


Figure 6-12 Tubing cover

- 2 Remove tubing cove
- 3 which is located in the left service compartment – to access the X-motor fixing screws 5-10 (see [Figure 6-12](#)).
- 4 Carefully disconnect the X-motor cable from the CU board (see [Figure 6-22, 'CU board cable connections'](#)).
- 5 Open fixing screws (5-09, 5-10), remove X-motor (5-01).

Do not attempt to remove motor cable and bracket.

For Instruments with RoMa

The item numbers mentioned refer to [Figure 6-6, 'X-drive assembly for RoMa'](#).

- 1 Release tension of both X-belts as described earlier in this section (see ['Removal of X-Belt'](#), step 1 to 4), irrespective of which X-motor has to be replaced.
- 2 Take the RoMa X-belt (5-14) out of the belt lock (5-23).
- 3 Remove tubing cover – which is located in the left service compartment – to access the X-motor fixing screws (5-10) (see [Figure 6-12, 'Tubing cover'](#)).
- 4 Carefully disconnect both X-motor cables from the CU board (see [Figure 6-22, 'CU board cable connections'](#)).
- 5 Open fixing screws (5-09, 5-10, 5-20), remove complete X-motor assembly.
- 6 Unscrew fixing screw (5-22) to separate the two X-motors (5-01 and 5-12).

Do not attempt to remove motor cable and bracket.

Installation of X-motor

For Instruments without RoMa



The replacement X-motor is delivered with cable and bracket.

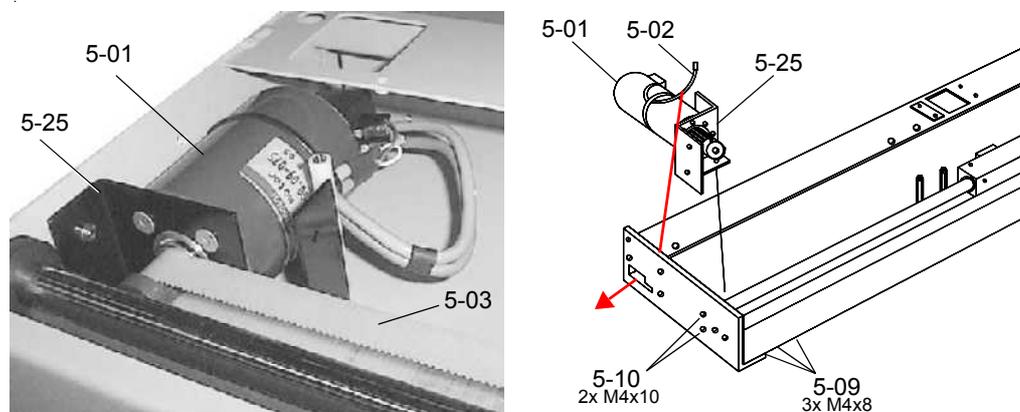


Figure 6-13 Installing X-motor LiHa

5-01	X-motor LiHa	5-09	Fixing screw for X-motor LiHa
5-02	X-motor cable LiHa (J13)	5-10	Fixing screw for X-motor LiHa
5-03	X-belt LiHa	5-25	Motor bracket

- 1 Install the X-motor (5-01) into the X-bay and tighten the fixing screws (5-09, 5-10).
- 2 Lead the X-motor cable through the slot in the X-bay (see arrow in [Figure 6-13](#)) and connect it to the CU board (J13) (see [Figure 6-22, 'CU board cable connections'](#)).
- 3 Install the X-belt (5-03) as described earlier in this section (see ['Installation of X-Belt', 'For LiHa X-Belt'](#)).
- 4 Install the tubing cover in the left service compartment (see [Figure 6-12, 'Tubing cover'](#)).

- 5 Reinstall LiHa (see [Section 6.5.2, 'Complete LiHa 1 Assembly'](#) or [Section 6.6.2, 'Complete LiHa 2 Assembly'](#)) and ensure operating readiness as described in [Section 6.5.10, 'Ensure Operating Readiness'](#) (for LiHa 1) or [Section 6.6.11, 'Ensure Operating Readiness'](#) (for LiHa 2).

For Instruments with RoMa



The replacement X-motor is delivered with cable and bracket.

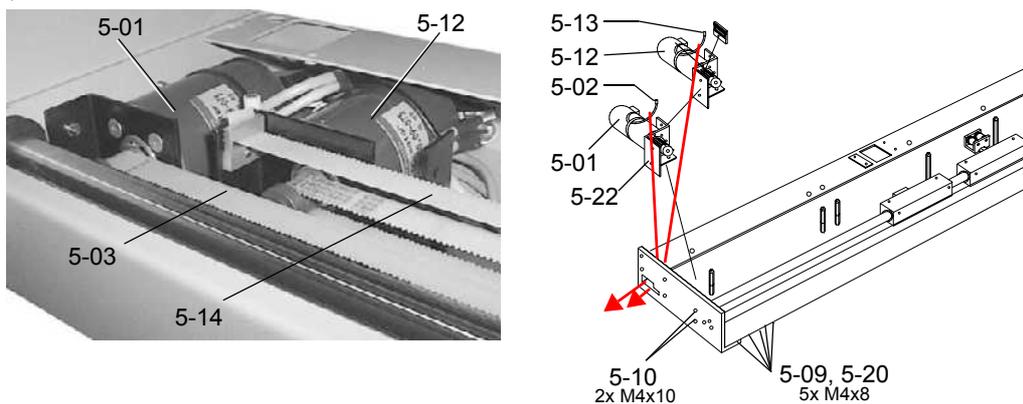


Figure 6-14 Installing the X-motors

5-01	X-motor LiHa	5-12	X-motor RoMa
5-02	X-motor cable LiHa (J13)	5-13	X-motor cable RoMa (J09)
5-03	X-belt LiHa	5-14	X-belt RoMa
5-09	Fixing screw for X-motor LiHa	5-20	Fixing screw for X-motor RoMa
5-10	Fixing screw for X-motor LiHa	5-22	Fixing screw for X-motor RoMa

- 1 Place the two X-motors (5-01) and (5-12) on a plane surface and tighten the fixing screw (5-22).
- 2 Install the X-motor assembly into the X-bay; first tighten the fixing screws (5-09) and (5-20), then the fixing screws (5-10).
- 3 Lead both X-motor cables through the slot in the X-bay (see arrows in [Figure 6-14](#)) and connect them to the CU board (J13 = LiHa, J09 = RoMa) (see [Figure 6-22, 'CU board cable connections'](#)).
- 4 Install the X-belts (5-03, 5-14) as described earlier in this section (see ['Installation of X-Belt'](#)).
- 5 Install the tubing cover in the left service compartment (see [Figure 6-12, 'Tubing cover'](#)).
- 6 Reinstall LiHa (see [Section 6.5.2, 'Complete LiHa 1 Assembly'](#) or [Section 6.6.2, 'Complete LiHa 2 Assembly'](#)).
- 7 Reinstall RoMa (see [Section 6.7.2, 'Complete RoMa 1 Assembly'](#) or [Section 6.8.2, 'Complete RoMa 2 Assembly'](#)).

- 8 Ensure operating readiness as described in
 - [Section 6.5.10, 'Ensure Operating Readiness'](#) (for LiHa 1) or
 - [Section 6.6.11, 'Ensure Operating Readiness'](#) (for LiHa 2) and
 - [Section 6.7.13, 'Ensuring Operating Readiness'](#) (for RoMa 1) or
 - [Section 6.8.15, 'Ensuring Operating Readiness'](#) (for RoMa 2).

6.3.4 Power Modules



Note

- The old generation of power modules for Genesis RSP and RWS are replaced by the power modules PM 1, PM 2 and PM 4 as of September 2001.
- For supply ratings and allocation to the different Genesis instruments refer to [Section 3.1.2, 'Supply Ratings'](#).
- For more information about wiring of the power module see the appropriate wiring diagram in [Section 9.2.1, 'Power Modules'](#).
- Check power rating printed on the type plate of the instrument for correct identification.

Spare Parts Power Modules

For spare parts list with part numbers refer to [Section 7.1.4, 'Spare Parts Power Modules'](#).

Following item can be replaced as spare parts:

- [Power module](#)



The power module as a whole part is a spare part.

For safety reasons no replacement of items is allowed. Do not attempt to perform repairs within this part. Faulty wiring will seriously endanger user and instrument.

Following descriptions are valid for the old and the new types of power modules.

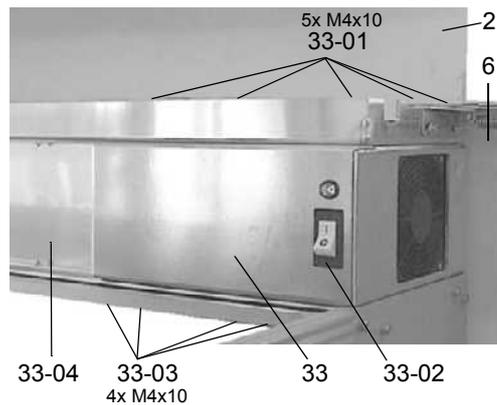


Switch off the mains power and disconnect the mains power connection of the instrument before performing any work!

Removal

The item numbers mentioned refer to [Figure 6-15](#).

- 1 Make sure the instrument is not connected to the mains and the power switch is off.
- 2 Move arm(s) to the middle of the instrument, open top cover (2) and right access door (6).
- 3 Unscrew possibly present panel (33-04) between diluter compartment and power module (33).
- 4 Remove the fixing screws (33-03), the fixing screws and sealing washers (33-01).



- 2 Top cover
- 6 Right access door
- 33 Power module (old generation)
- 33-01 Fixing screws with sealing washers
- 33-02 Power switch
- 33-03 Fixing screws
- 33-04 Panel

Figure 6-15 Power module (old generation) on Genesis RSP instrument

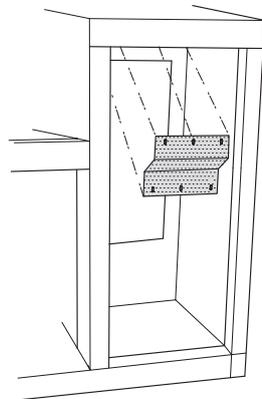
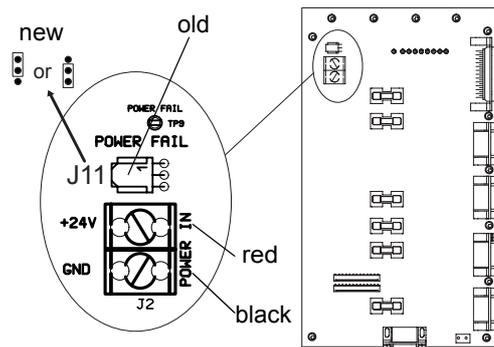


Figure 6-16 Connector shield on RMP instrument

- 5 For RMP:
 - Unscrew the connector sheet (see [Figure 6-16](#)).
 - Unscrew the earth cable (33-05) from instrument frame and disconnect the mains power cable from the power switch (see [Figure 6-18](#), 'Power switch for RMP').
 - Disconnect the control lamp cable from the control lamp (access from the right access door).



- 6 Disconnect the red and black power cables from the Optibo/Optibo Power (see [Figure 6-17](#), 'Connection to Optibo').

- 7 For old generation of power modules: disconnect the power fail cable from the Optibo/Optibo Power.

Note: for the new power modules the jumper J11 must be set on Optibo/Optibo Power.

- 8 Remove the power module by carefully pulling forward.

Figure 6-17 Connection to Optibo

Installation



Switch off the mains power and disconnect the mains power connection of the instrument before performing any work!

- 1 Install in reverse order.
In doing so, observe the directions given hereafter:

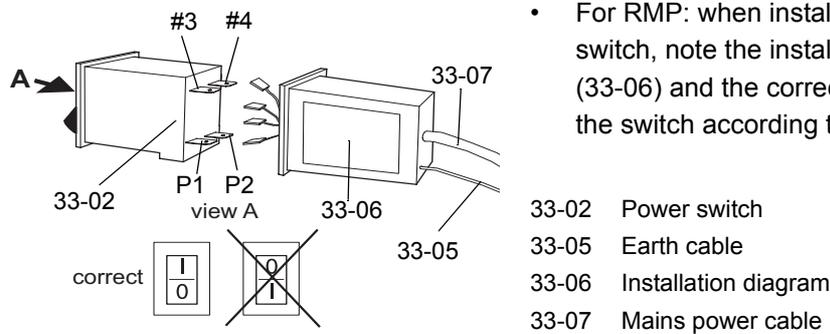


Figure 6-18 Power switch for RMP

- When fixing the power module to its place: tighten the fixing screws (33-03) first, hereafter the fixing screws (33-01).
Do not forget the sealing washers on all top screws (33-01).
(The item numbers mentioned refer to [Figure 6-15](#)).
 - Tip for leading the power cables easily through the cable channel: fix the cables together with a strip of adhesive tape.
Refer to [Figure 6-17](#), 'Connection to Optibo' for correct cable connection.
 - Before connecting the instrument to the mains, make sure the power switch is switched off.
- 2 Ensure operating readiness: control and carry out following settings:
(For detailed information refer to the Genesis Instrument Software Manual.)

Step	Test or Setup
1	Random move <i>Attention: never perform a random move test with a Genesis RMP!</i>
2	Liquid detection

6.3.5 Electronic Boards



ATTENTION

Observe precautions for handling electrostatic discharge sensitive devices. Wear a wrist strap.

Spare Parts Covered in This Section

For spare parts list with part numbers refer to [Section 7.1.5, 'Spare Parts Electronic Boards'](#).

Following items can be replaced as spare parts:

- [Optibo](#)
- [Optibo Power](#)
- [Fuses](#)
- [CU board](#)
- [X-DC-Servo board](#)
- [Supervisor board](#)
- [Uniport board](#)
- [CANDI board](#)
- [SMIO/SAFY](#)

The PosID 1 CU board and the PosID 2 CU board are described in [Section 6.9.3, 'Electronic Boards for PosID 1'](#) and [Section 6.10.3, 'Electronic Boards for PosID 2'](#).

Optibo, Optibo Power

Optibo: for all RSP, all RMP and for RWS 100

Optibo Power: for RWS 150/200



The Optibo is located in the left service compartment. On its rear side it holds the CU board and, plugged into latter, the X-DC-Servo board which controls the X-motor(s) for LiHa and RoMa.

39 Optibo/Optibo Power

Figure 6-19 Optibo or Optibo Power location

Removal

- 1 Make sure the instrument is switched off and the mains power connection is disconnected.

- 2 Disconnect all cables from Optibo/Optibo Power.
Do not forget to disconnect the Diluter cable on the solder side of the PCB.
- 3 Disconnect all cables from the CU board.
- 4 Remove Optibo/Optibo Power fixing screws, take care not to damage the PCBs connected to the Optibo/Optibo Power rear side.
- 5 Disconnect CU board from Optibo/Optibo Power as described later in this section.

Installation

- 1 Make sure the instrument is switched off and the mains power connection is disconnected.
- 2 Make sure the CU board and X-DC-Servo board (address switch must be set to #5) are connected to the Optibo/Optibo Power rear side.
- 3 Control if the jumpers J12 and J13 on Optibo/Optibo Power have been set correctly according to the configuration of the instrument (see [Section 6.2.2, 'Jumper and Address Settings Overview'](#)).
- 4 Install in reverse order.

For correct cable connection see [Figure 6-20, 'Optibo cable connections'](#) and [Figure 6-22, 'CU board cable connections'](#).

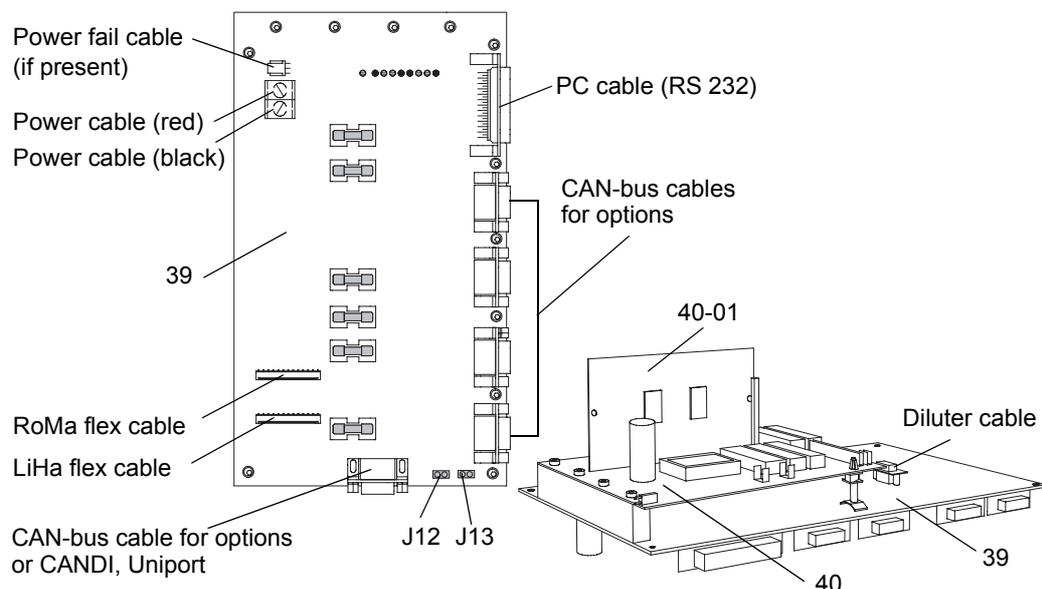


Figure 6-20 Optibo cable connections

- | | |
|-------|------------------------------|
| 39 | Optibo |
| 40 | CU board |
| 40-01 | X-DC-Servo board (LiHa/RoMa) |

- 5 Ensure operating readiness: control and carry out following tests:
(For detailed information refer to the Genesis Instrument Software Manual.)

Step	Test or Setup
1	CAN-bus resistance (see Section 6.2.3)
2	RoMa test
3	FWO pump test
4	PosID test
5	Incubator test
6	Random move <i>Attention: never perform a random move test with a Genesis RMP!</i>

Fuses

The fuses are located on the Optibo or Optibo Power.

See [Figure 6-21, 'Fuses on Optibo and Optibo Power'](#) for correct allocation.

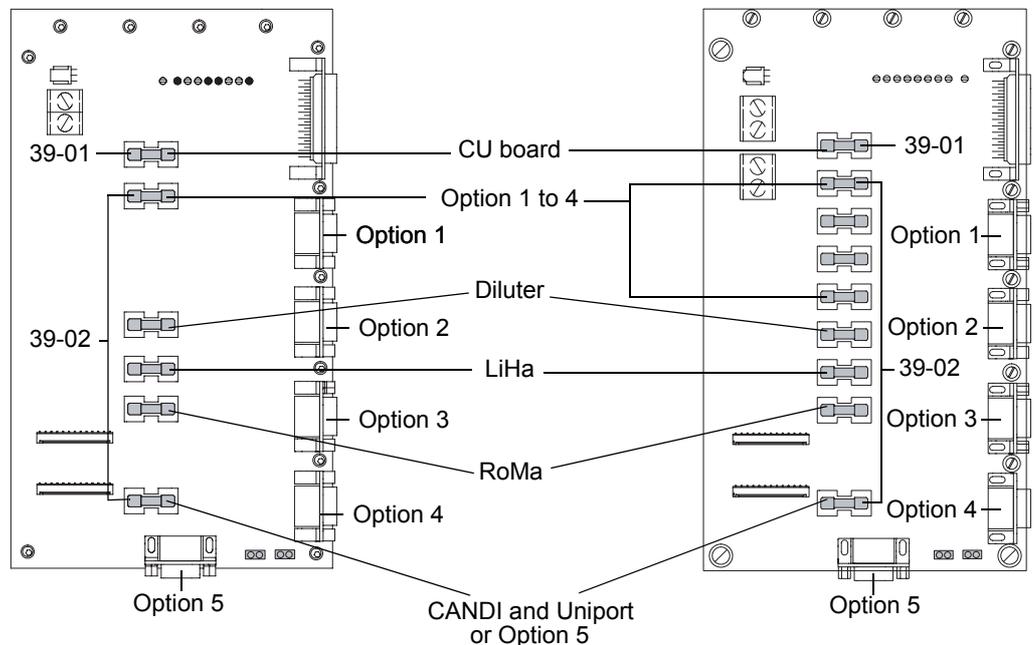


Figure 6-21 Fuses on Optibo and Optibo Power

- 39-01 Fuse 6.3 AT
- 39-02 Fuse 8 AT, sand filled

- 1 Check if all the green LEDs near the fuses are on; otherwise the corresponding fuse is blown.



Use sand filled 8 AT type fuses only – except for the fuse for the CU board, which is 6.3 AT and not sand filled.

CU Board

The CU board is located in the left service compartment. As it is connected to the solder side of the Optibo or Optibo Power, it can only be accessed by removing the Optibo/Optibo Power.

The X-DC-Servo board, which controls the X-motors of the LiHa and RoMa, is plugged into the CU board.

Special Tools

- IC release tool

Removal

- 1 Switch off instrument.
- 2 Remove Optibo/Optibo Power as described earlier in this section (see [Optibo](#), [Optibo Power](#)).
- 3 Unscrew the CU board fixing screws. With a pair of pliers press the barbs on the two board clips, carefully remove the CU board from the Optibo/Optibo Power.
- 4 Remove X-DC-Servo board.
- 5 Use IC release tool to remove the EEPROM (IC6) if you want to install it on the new board (see [Figure 6-22, 'CU board cable connections'](#)).

Use of EEPROM from the replaced CU board ⇒ an error might be carried forward.

Use of new EEPROM ⇒ you loose all settings.

Installation



Spare CU boards may be delivered with an older firmware version. In this case, upgrading of the firmware is necessary.

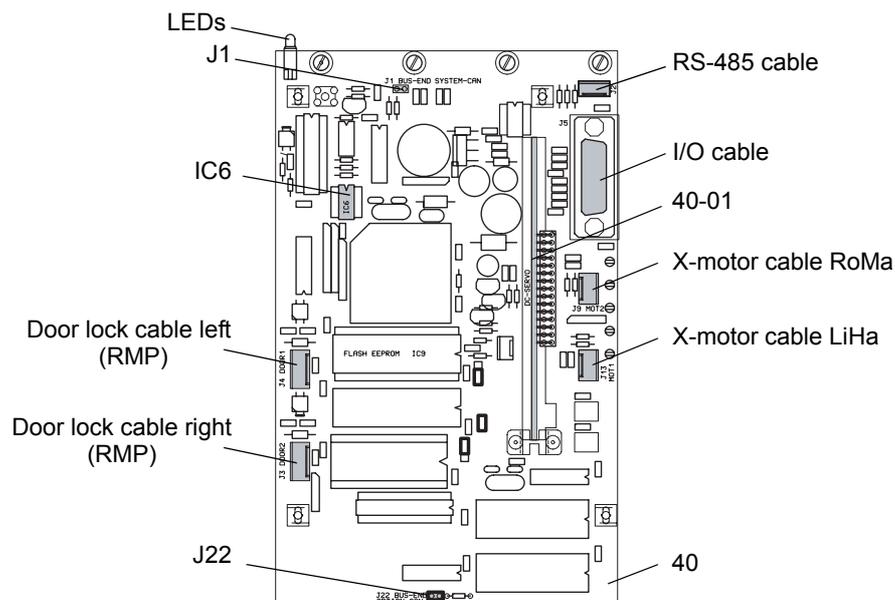


Figure 6-22 CU board cable connections

40 CU board

40-01 X-DC-Servo board

- 1 Control if the jumpers J1 and J22 on the CU board have been set correctly according to the configuration of the instrument (see [Section 6.2.2, 'Jumper and Address Settings Overview'](#)).
- 2 X-DC-Servo board: check if address switch is set to #5.
- 3 Install in reverse order.
Refer to [Figure 6-22, 'CU board cable connections'](#) for correct cable connections.
- 4 Ensure operating readiness: control and carry out following tests:
(For detailed information refer to the [Genesis Instrument Software Manual](#).)

Step	Test or Setup
1	CAN-bus resistance (see Section 6.2.3)
2	' Check Error States ' as described later in this section
3	Check reference positions – LiHa – RoMa
4	Liquid detection test
5	Disposable tips (DiTi eject test)
6	Precision test
7	RoMa
8	FWO pump test
9	LICOS test
10	PosID test
11	Door lock test (RMP only)
12	Random move <i>Attention: never perform a random move test with a Genesis RMP!</i>

Check Error States

- Check the LEDs on the CU board according to the following table:

Green LED	Red LED	Error
blinking	off	Normal operation
stays on or off	stays on or off	Fatal hardware error
blinking	on	Flash not accessible
blinking	blinking	Power fail circuit failure
blinking fast	blinking fast	Firmware download required

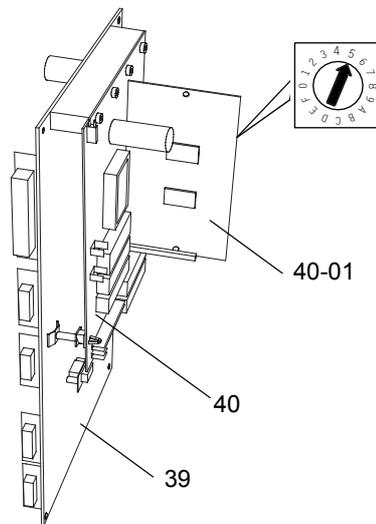
X-DC-Servo Board *The X-DC-Servo board – which controls the X-motors of the LiHa and RoMa – is plugged into the CU board that in turn is connected to the solder side of the Optibo/Optibo Power.*

It is not necessary to remove the Optibo/Optibo Power to access the X-DC-Servo board.

Removal

- From inside of the instrument remove the X-DC-Servo board from the CU board.

Installation



- 1 Set address switch of the X-DC-Servo board to #5.
- 2 From within the instrument, connect the X-DC-Servo board to the CU board.

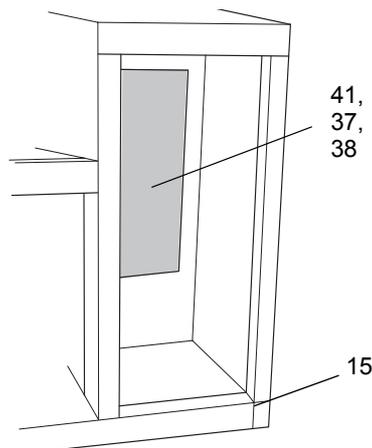
- 39 Optibo/Optibo Power
- 40 CU board
- 40-01 X-DC-Servo board

Figure 6-23 X-DC-Servo board, connected to the CU board

- 3 Ensure operating readiness: control and carry out following test:
(For detailed information refer to the Genesis Instrument Software Manual.)

Step	Test or Setup
1	Random move <i>Attention: never perform a random move test with a Genesis RMP!</i>

Supervisor Board, Uniport Board, CANDI Board

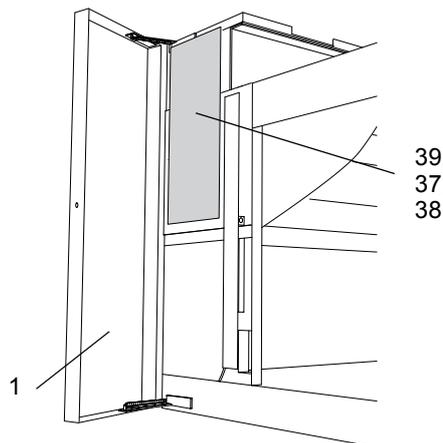


The Supervisor and the Uniport boards are located in the right service compartment of the add-on module. The CANDI board may be installed either in the left service compartment (directly connected to the Optibo/Optibo Power) or in the right service compartment (connected to the Uniport).

- 15 Add-on module
- 37 Uniport board
- 38 CANDI board
- 41 Supervisor board

Figure 6-24 PCB location for RMP instruments

For RSP/RWS Instruments



There is no Supervisor board necessary. The Uniport and CANDI boards may be installed either in the left service compartment (directly connected to the Optibo/Optibo Power) or in the right service compartment (connected via cable to the Optibo/Optibo Power).

- 1 Left access door
- 37 Uniport board
- 38 CANDI board
- 39 Optibo/Optibo Power

Figure 6-25 PCB location for RSP/RWS instruments

Special Tools

- IC release tool

Removal of Supervisor, Uniport, CANDI Board



The Firmware version on the new Supervisor board must be identical with the version on the now installed Supervisor board. Therefore check the Firmware version prior to replacing this PCB.

Default Firmware version on all new Supervisor PCBs is V1.21. However, an EPROM with the Supervisor Firmware V1.11 is enclosed to the delivery of a new board.

- 1 For Supervisor board:
 - If the Firmware version of the installed PCB is different to the one on the new PCB, remove EPROM (IC7) from the installed PCB using an IC release tool.
 - Disconnect LICOS and waste tubing from Supervisor board.

- 2 Disconnect all cables from the PCB to be removed.
- 3 Remove appropriate board fixing screws.
- 4 Carefully disconnect the board from the other connected board and remove it.

Installation

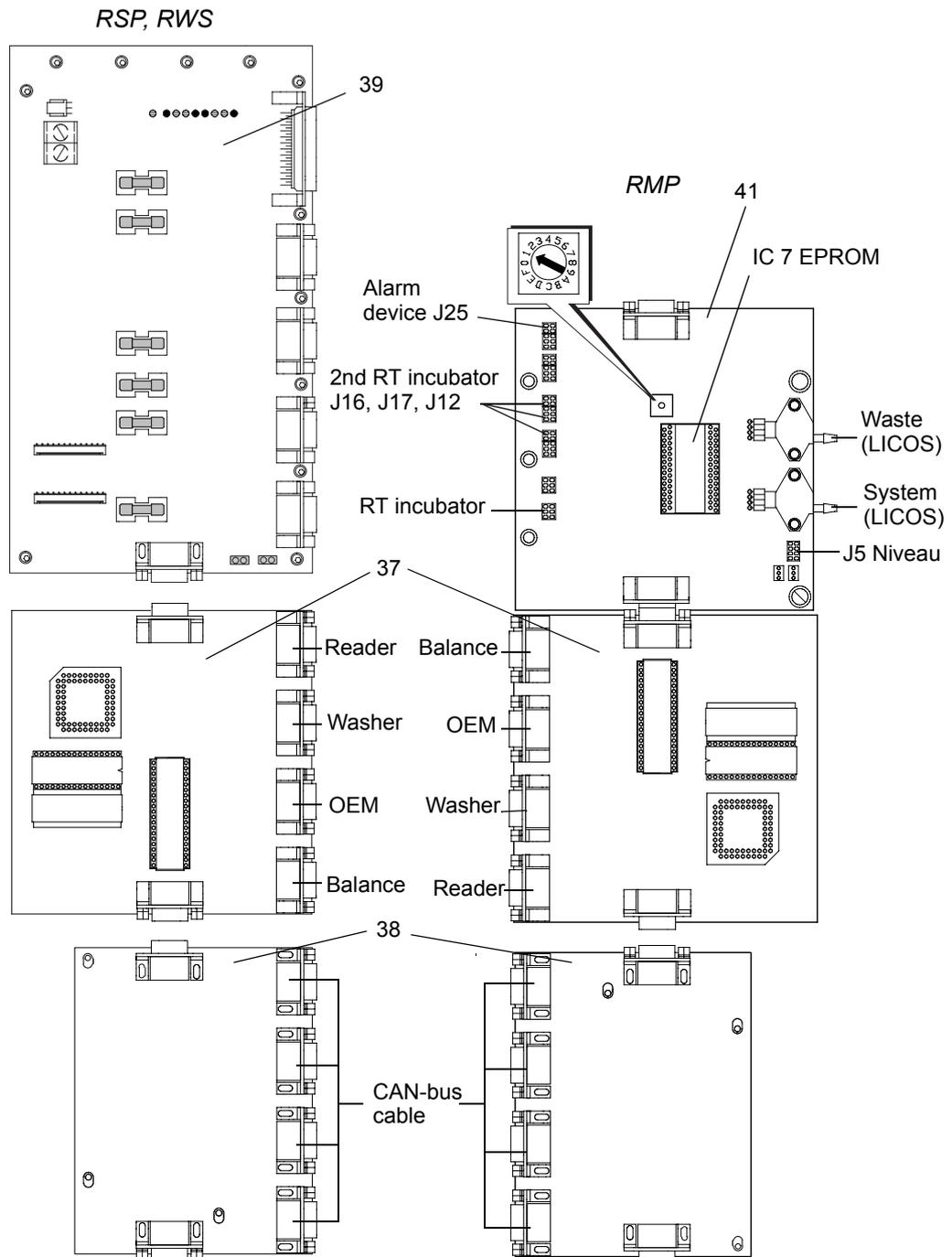


Figure 6-26 Cable connections on Supervisor, Uniport and CANDI boards

37	Uniport board	39	Optibo/Optibo Power
38	CANDI board	41	Supervisor board

- 1 For Supervisor board:
 - If necessary: install the EPROM (IC7) with the correct Firmware version on the PCB.
 - Control if address switch of the Supervisor board is set to #1.
- 2 Install in reverse order.

For correct cable connection refer to the respective diagram in Section 9.2.2, 'Electronic Boards' or to Section Figure 6-26, 'Cable connections on Supervisor, Uniport and CANDI boards'.
- 3 For Uniport:
 - Ensure operating readiness: control and carry out following tests:
(*For detailed information refer to the Genesis Instrument Software Manual.*)

Step	Test or Setup
1	CAN-bus resistance (see Section 6.2.3)
2	Washer test
3	Reader test

SMIO/SAFY

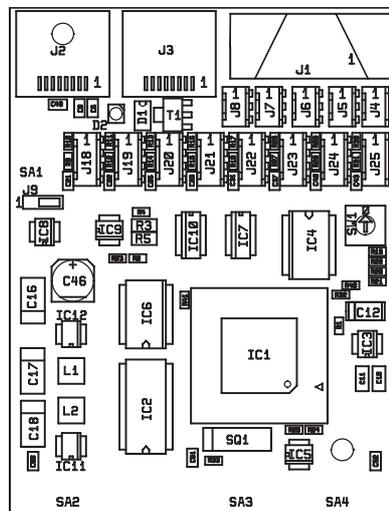


Figure 6-27 SMIO/SAFY

The SMIO/SAFY is located in the right service compartment (connected via cable to the Optibo/Optibo Power).

The SMIO/SAFY is part of the access option for RSP and RWS instruments. Please refer to Document Doc ID 392 330 for further information.

6.4 Liquid System – Disassembly and Assembly Procedures

6.4.1 Overview

Definition of Liquid System

The term “liquid system” refers to all instrument modules and parts which contain or directly influence liquid. These main components are:

- LiHa 1 and LiHa 2 (see [Section 6.5](#) and [Section 6.6](#))
- Tips (refer to respective Instrument Operating Manual)
- Tubing system (see [Section 6.4.2](#))
- Diluter/Dilback (see [Section 6.4.3](#))
- MPO/FWO* (see [Section 6.4.4](#))
- Low volume option* (see [Section 6.4.5](#))
- 6-way valve option* (see [Section 6.4.6](#))



Components marked with an asterisk (*) are optional and therefore not available on all instruments.

Standard Liquid System for RSP and RWS

The following figure shows the main components of a standard liquid system for RSP or RWS instruments with 8 tips and optional FWO/MPO*.

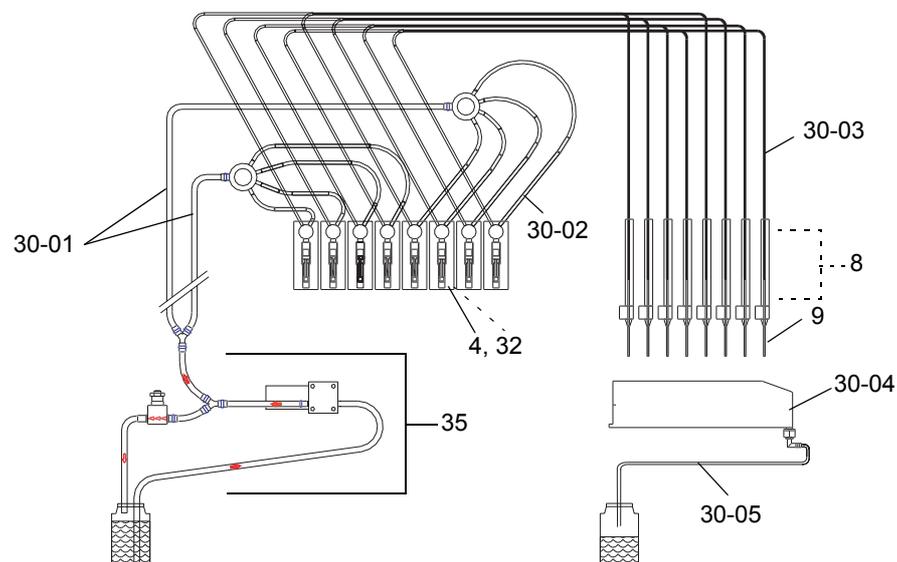


Figure 6-28 Overview of standard liquid system for RSP/RWS with 8 tips and MPO/FWO

4	Diluter	30-03	Pipetting tubing
8	LiHa1, LiHa 2	30-04	Wash station
9	Tips	30-05	Waste tubing
30-01	Aspiration tubing	32	Dilback
30-02	Interconnecting tubing	35	MPO/FWO

Standard Liquid System for RMP

The following figure shows the main components of a standard liquid system for RMP instruments with 8 tips and optional MPO/FWO*.

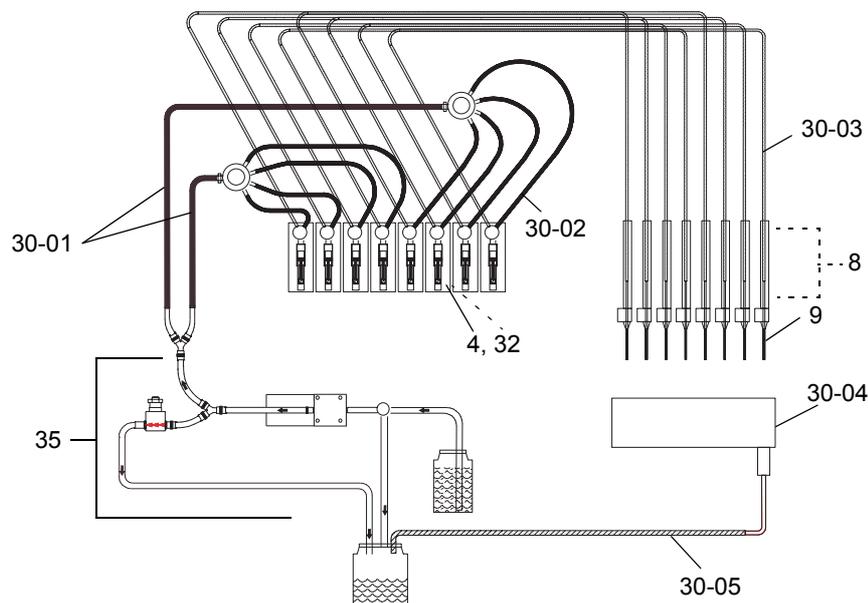


Figure 6-29 Overview of standard liquid system for RMP with 8 tips and MPO/FWO

4	Diluter	30-03	Pipetting tubing
8	LiHa1, LiHa 2	30-04	Wash station
9	Tips	30-05	Waste tubing
30-01	Aspiration tubing	32	Dilback
30-02	Interconnecting tubing	35	MPO/FWO

6.4.2 Tubing System

This section describes the customary tubing system which is available in three material variants: standard, high resistant type A, high resistant type B.

For the MPO/FWO tubing system refer to [Section 6.4.4](#).

For the Low volume option tubing system refer to [Section 6.4.5](#).

For 6-way option tubing system refer to [Section 6.4.6](#).

Spare Parts

For spare parts list with part numbers refer to [Section 7.2.1, 'Spare Parts Tubing Systems'](#).

Following items can be replaced as spare parts:

- Tubing and fittings for [Standard Tubing](#)
- Tubing and fittings for [High Resistant Tubing Type A \(FEP/PVDF\)](#)
- Tubing and fittings for [High Resistant Tubing Type B \(FEP/PP\)](#)

Standard Tubing

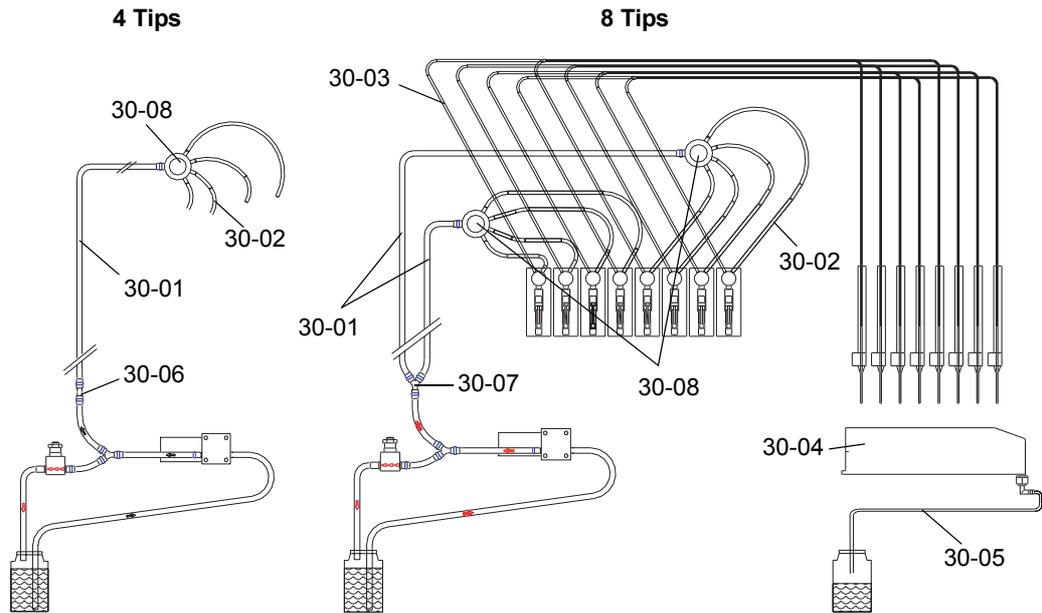


Figure 6-30 Standard tubing

- | | | | |
|-------|------------------------|-------|--------------------|
| 30-01 | Aspiration tubing | 30-05 | Waste tubing |
| 30-02 | Interconnecting tubing | 30-06 | I-connector |
| 30-03 | Pipetting tubing | 30-07 | Y-connector |
| 30-04 | Wash station | 30-08 | Distributor 1 to 4 |

High Resistant Tubing Type A and Type B

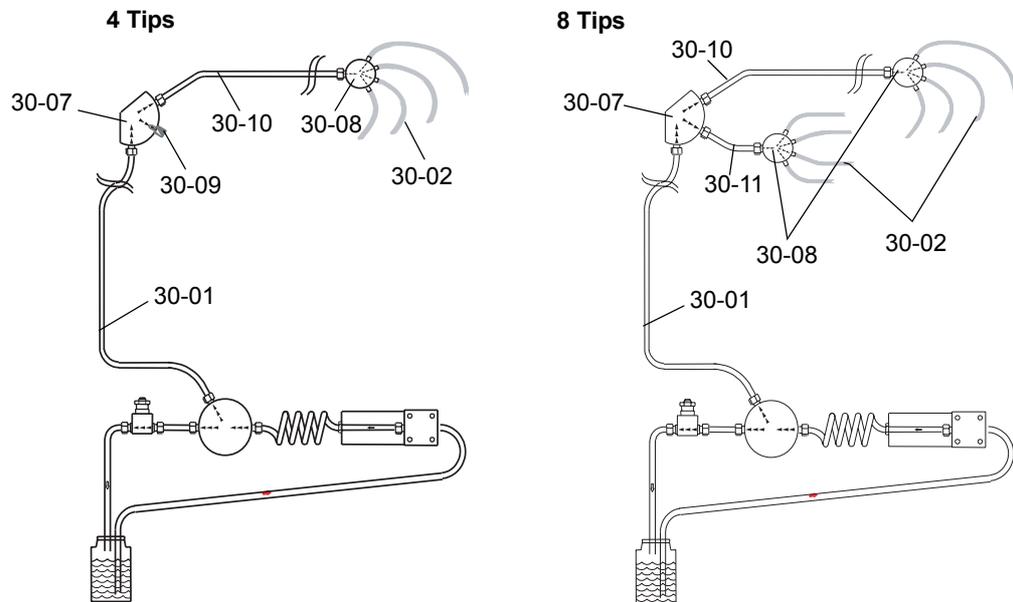


Figure 6-31 High resistant tubing type A and B

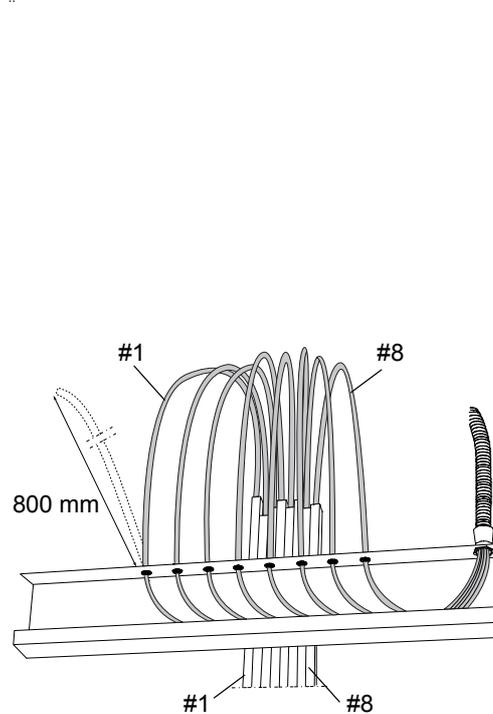
- | | | | |
|-------|------------------------|----------|------------------------------|
| 30-01 | Aspiration tubing | 30-08 | Distributor 1 to 4 |
| 30-02 | Interconnecting tubing | 30-09 | Screw plug |
| 30-07 | Distributor 1 to 2 | 30-10/11 | Tubing to distributor 1 to 4 |

Replacement

WARNING



The liquid system may contain compounds hazardous to your health. Make sure the complete liquid system has been properly decontaminated before you perform any service tasks.



- 1 Empty the liquid system.
- 2 Switch off the instrument.
- 3 Replace relevant tubing.

For detailed descriptions of the exchange routines please refer to the Genesis Maintenance and Service Logbook Doc ID 390 924.

- When replacing the pipetting tubing: diluter #1 (on the far left) is connected to tip #1 (the closest to the back of the instrument), diluter #2 to tip #2 etc.
- Adjust all pipetting tubing length to 800 mm.
Do not cut the remaining tubing, but pull it back and place it in the liquid pan of the instrument.

- 4 **Ensure Operating Readiness:**
 - Tightness check
 - FaWa pump test
 - Precision test

... as described later in this section.

Figure 6-32 Installing the pipetting tubing

Ensure Operating Readiness

Step	Test or Setup
1	– Tightness check: fill/flush system and check all tubing connections – FaWa pump test <i>Necessary after replacement of</i> <ul style="list-style-type: none"> • Pipetting tubing • Interconnecting tubing • Aspiration tubing
2	– Precision test <i>Necessary after replacement of</i> <ul style="list-style-type: none"> • Pipetting tubing • Interconnecting tubing

6.4.3 Diluter and Dilback

Spare Parts

For spare parts list with part numbers refer to [Section 7.2.2, 'Spare Parts Diluter/Dilback'](#).

Following items can be replaced as spare parts:

- Diluters
 - [XP 3000](#)
 - [XP 3000 plus](#)
- Diluter spare part
 - [3-way valve](#)
 - [Syringe with flat caps](#), [Syringe with conical caps](#)
 - [Syringe caps, flat](#), [Syringe caps, conical](#)
- [Dilback-8](#)

Diluter XP 3000, XP 3000 Plus

Diluter type XP 3000 is installed on RSP, RMP and RWS instruments up to serial number 4999.

Diluter type XP 3000 plus is installed on RSP, RMP and RWS instruments with serial numbers ≥ 5000 .

Overview

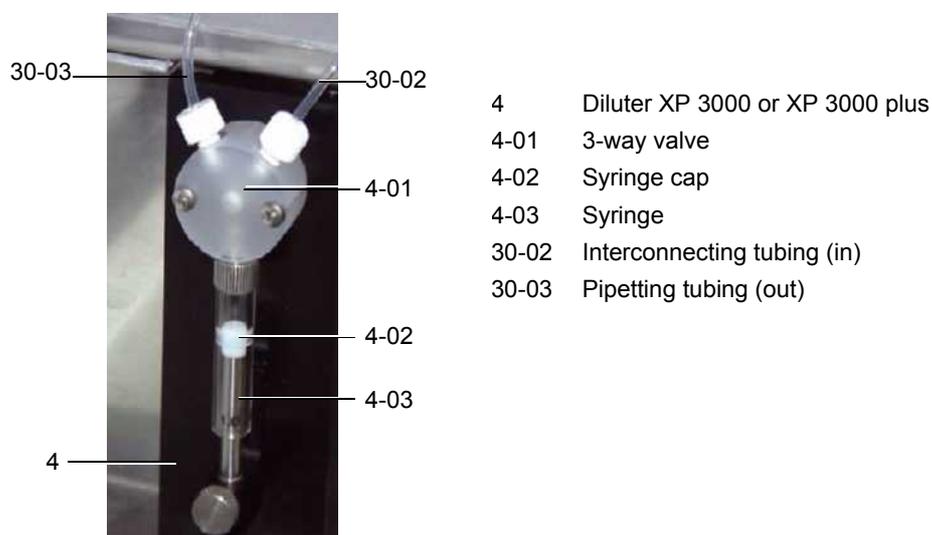


Figure 6-33 Diluter – principal components

Removal

- 1 Empty the liquid system.
- 2 Switch off the instrument.
- 3 Open the top cover (2) of the instrument.

- 4 Disconnect the tubing from the 3-way valve (4-01)



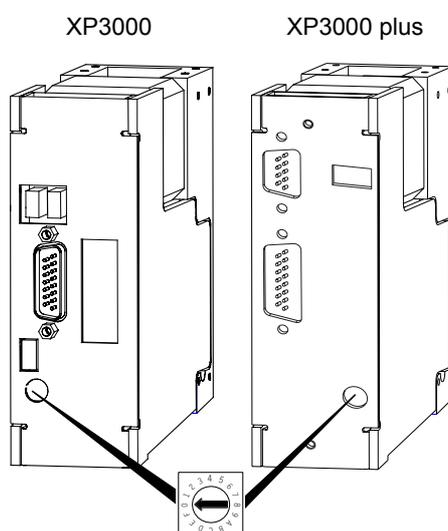
ATTENTION

Observe precautions for handling electrostatic discharge sensitive devices. Wear a wrist strap.

- 5 Unscrew the diluter (4) from the instrument (1 screw M3x12 with washer underneath the diluter).
Make sure not to mistake the steel sheet screws for the diluter screws.
- 6 Carefully pull the diluter out of the instrument.

Installation

- 1 Install in reverse order.
 - Check the CAN-bus address on the backside of the diluter:



Address setting:

Diluter 1	#0
Diluter 2	#1
Diluter 3	#2
Diluter 4	#3
Diluter 5	#4
Diluter 6	#5
Diluter 7	#6
Diluter 8	#7

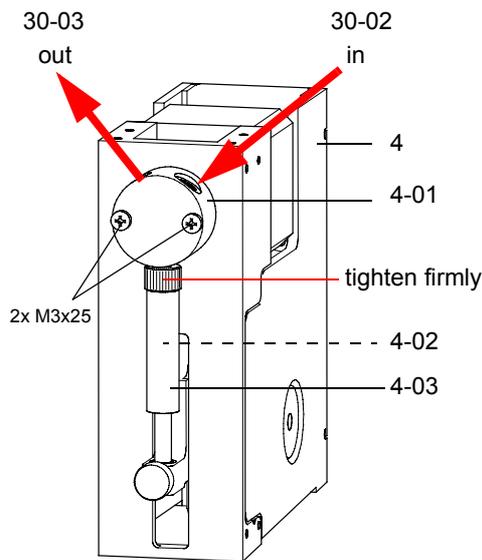
Diluter 1 is the most left diluter.

Figure 6-34 Diluter address settings

- Adjust the distance between the diluters by means of a 0.2 mm thickness gauge.
- 2 Make sure the liquid system is tight (visual check).
 - 3 **Ensure Operating Readiness:**
 - Tightness check
 - FaWa pump test
 - Liquid detection test
 - Precision test
- ... as described later in this section.

3-Way Valve, Syringe and Syringe Cap

Exchange of Diluter Spare Parts



- | | |
|-------|---------------------------------|
| 4 | Diluter XP 3000 or XP 3000 plus |
| 4-01 | 3-way valve |
| 4-02 | Syringe cap (invisible) |
| 4-03 | Syringe |
| 30-02 | Interconnecting tubing (in) |
| 30-03 | Pipetting tubing (out) |

Figure 6-35 Removal and installation of diluter spare parts



Do never replace flat syringe caps by conical ones or vice versa.

After exchange of diluter spare parts **Ensure Operating Readiness:**

- Tightness check
 - FaWa pump test
 - Precision test
- ... as described later in this section.

Dilback-8

Removal

The dilback is positioned in the diluter case behind the diluters.

- 1 Make sure the instrument is switched off and the mains power connection is disconnected.
- 2 Remove all diluters (4) from the instrument.
- 3 Disconnect the cable leading to Optibo/Optibo Power.
- 4 Remove the dilback fixing screws.

Installation

- 1 Make sure the instrument is switched off and the mains power connection is disconnected.
- 2 Install in reverse order.

- Control if jumper J10 has been set correctly according the configuration of the instrument (see 'Communication Overview' in Section 6.2.2, 'Jumper and Address Settings Overview').
 - Connect cable from Optibo/Optibo Power to socket J1.
- 3 **Ensure Operating Readiness:**
- CAN-bus resistance test
 - Precision test
- ... as described later in this section.

Ensure Operating Readiness

Step	Test or Setup
1	CAN-bus resistance (see Section 6.2.3). <i>Necessary after replacement of dilback</i>
2	– Tightness check: fill/flush system and check all tubing connections – FaWa pump test <i>Necessary after replacement of</i> <ul style="list-style-type: none"> • diluter • diluter spare part
3	Liquid detection test <i>Necessary after replacement of diluter</i>
4	Precision test <i>Necessary after replacement of</i> <ul style="list-style-type: none"> • diluter • diluter spare part • dilback

6.4.4 MPO/FWO

WARNING



The liquid system may contain compounds hazardous to your health. Make sure the complete liquid system has been properly decontaminated before you perform any service tasks on the MPO or FWO.

General

Three MPO/FWO material variants: Standard, high resistant type A and type B

Monitored Pump Option (MPO): Fast wash pump with liquid level sensors (LICOS) for RSP and RWS instruments

Fast Wash Option (FWO): Fast wash pump without liquid level sensors for RSP, RWS and RMP instruments*

**For RMP instruments: LICOS is standard – but controlled via the Supervisor Board (see [Figure 6-26](#), 'Cable connections on Supervisor, Uniport and CANDI boards').*

The MPO/FWO contains one of the following fast wash pumps:

- Single head pump for instruments with 4 tips (produced until January 1998).
- Double head pump for instruments with 8 tips (produced until January 1998).
- FaWa pump for instruments with 4 or 8 tips (produced as of February 1998 and with serial numbers ≥ 2880).



In case of a defective single head or double head pump, you need to upgrade the instrument with the FaWa pump.

The fast wash pump is installed below the worktable, on the left side behind the worktable cover ([Figure 6-39](#), item 11).

Spare Parts MPO/FWO

For spare parts list with part numbers refer to [Section 7.2.3](#), 'Spare Parts MPO/FWO'.

Pay attention to the fact that part numbers of items may differ according to the installed tubing system (Standard Material, High Resistant Type A or High Resistant Type B).

Following items can be replaced as spare parts:

- [MPO complete](#)
- [FWO complete](#)
- [FaWa pump](#)
- [Tubing system](#)
[Distributor 1 to 2](#)
[Pressure relief valve](#)
- [LICOS complete](#)
[Level tubing](#)
[Sensor](#)

- MPO board
Connection cable

**Overview
MPO/FWO
for RSP and RWS**

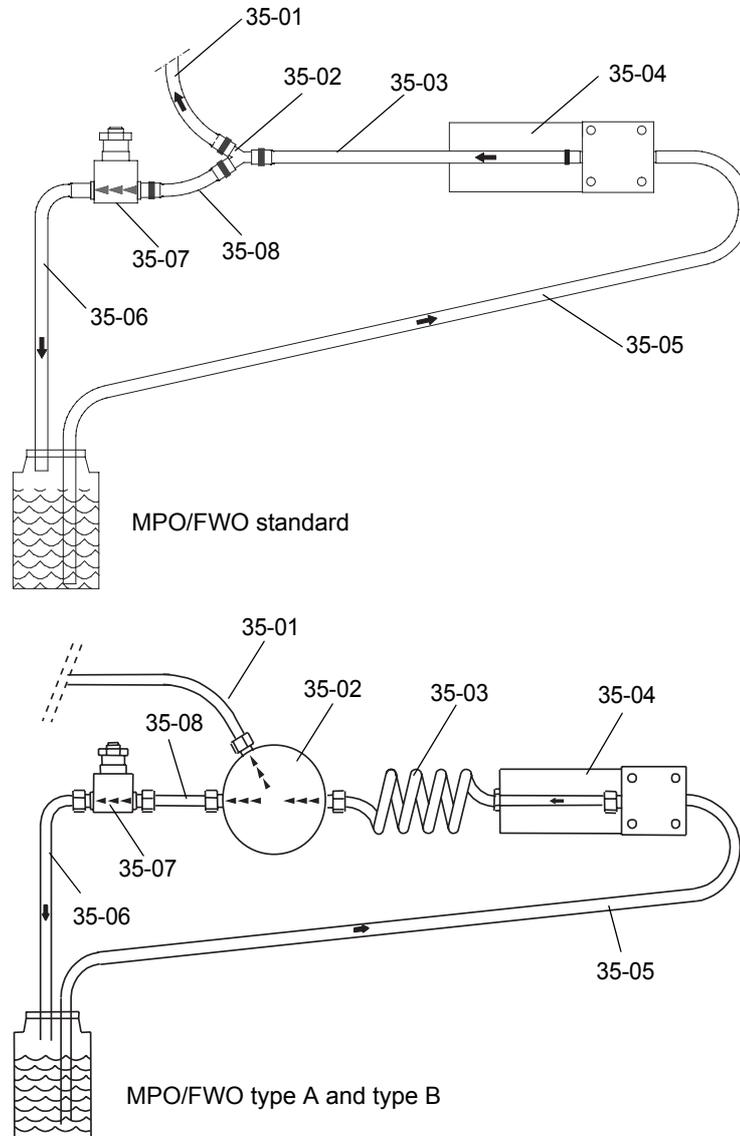


Figure 6-36 MPO/FWO tubing connections for RSP and RWS

- | | | | |
|-------|--------------------|-------|--|
| 35-01 | Aspiration tubing | 35-05 | Aspiration tubing to FaWa pump |
| 35-02 | Distributor 1 to 2 | 35-06 | Waste tubing for pressure relief valve |
| 35-03 | Pressure tubing | 35-07 | Pressure relief valve |
| 35-04 | FaWa pump | 35-08 | Tubing to pressure relief valve |

**Overview FWO
for RMP**

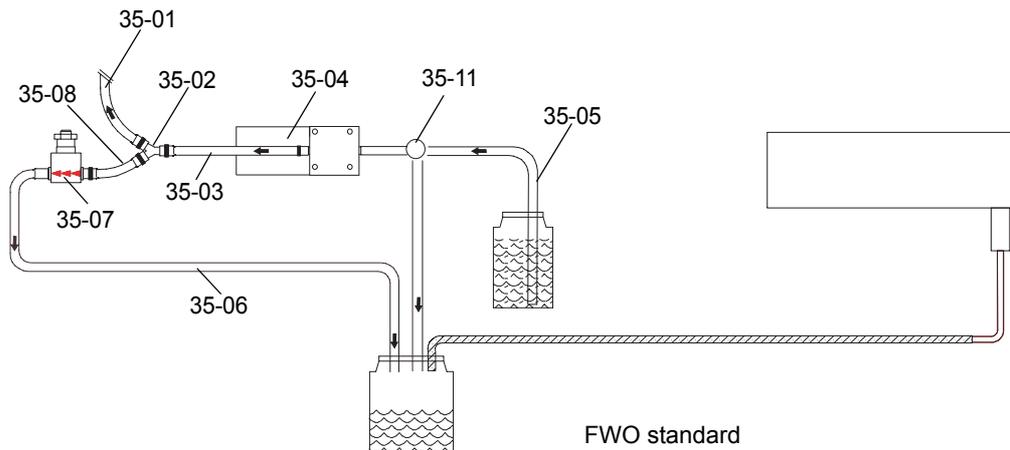
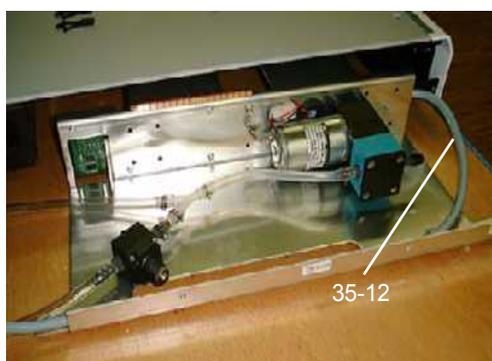
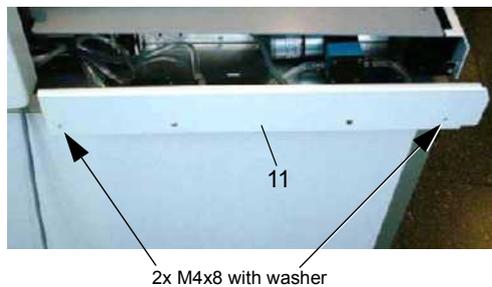


Figure 6-37 FWO tubing connections for RMP

- | | | | |
|-------|--------------------------------|-------|--|
| 35-01 | Aspiration tubing | 35-06 | Waste tubing for pressure relief valve |
| 35-02 | Distributor 1 to 2 | 35-07 | Pressure relief valve |
| 35-03 | Pressure tubing | 35-08 | Tubing to pressure relief valve |
| 35-04 | FaWa pump | 35-11 | Valve |
| 35-05 | Aspiration tubing to FaWa pump | | |

**MPO/FWO
Complete**

Removal of Fast Wash Pump Assembly



- 1 Empty the liquid system.
- 2 Switch off the instrument.
- 3 Remove the two outer screws of the left worktable cover (11).
- 4 Pull the fast wash pump assembly out of the instrument like a drawer (refer to [Figure 6-38, 'Fast wash pump assembly removal'](#)).

For older versions it may be necessary to remove the worktable cover (11) completely and to unscrew the fast wash pump assembly from the instrument frame.

- 5 Disconnect the tubing and the connection cable (35-12).

- | | |
|-------|----------------------|
| 11 | Left worktable cover |
| 35-12 | Connection cable |

Figure 6-38 Fast wash pump assembly removal

Installation of Fast Wash Pump Assembly

- 1 Install in reverse order:
 - For correct cable connection refer to [Figure 6-42, 'Connections to MPO board V2.0'](#) or [Figure 6-43, 'Connections to MPO board V3.1/V4.0'](#).
 - Tubing connections: refer to [Figure 6-36, 'MPO/FWO tubing connections for RSP and RWS'](#) or [Figure 6-37, 'FWO tubing connections for RMP'](#).
- 2 **Ensure Operating Readiness:**
 - Tightness check
 - FaWa pump test
 - LICOS test

... as described later in this section.

FaWa Pump

Removal

- 1 Remove the fast wash pump assembly from the instrument.
- 2 Remove the tubing from the FaWa pump (35-04, [Figure 6-40](#)).
- 3 Disconnect the pump cable from MPO board (35-13).
- 4 Remove the FaWa pump from the fast wash pump assembly (5 screws, refer to [figure 6-39, 'Fast wash pump assembly, rear side view'](#)).

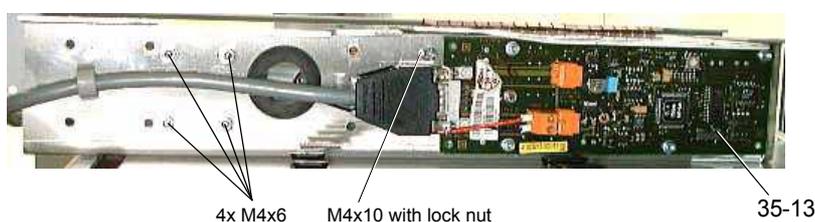


Figure 6-39 Fast wash pump assembly, rear side view

35-13 MPO board

Installation

- 1 Install in reverse order:
 - For correct cable connection refer to [Figure 6-42, 'Connections to MPO board V2.0'](#) or [Figure 6-43, 'Connections to MPO board V3.1/V4.0'](#).
 - Tubing connections: refer to [Figure 6-36, 'MPO/FWO tubing connections for RSP and RWS'](#) or [Figure 6-37, 'FWO tubing connections for RMP'](#).
- 2 **Ensure Operating Readiness:**
 - Tightness check
 - FaWa pump test

... as described later in this section.

Pressure Relief Valve Removal

M3x35 with washer/lock nut

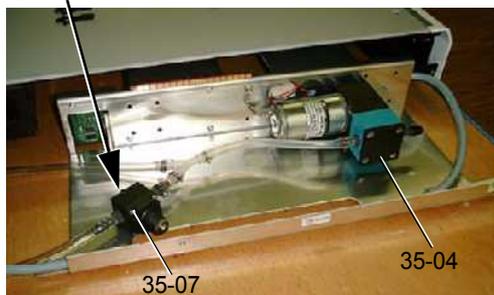


Figure 6-40 Pressure relief valve

- 1 Remove the fast wash pump assembly from the instrument.
- 2 Remove the tubing from the pressure relief valve (35-07).
- 3 Unscrew the pressure relief valve from the fast wash pump assembly.

Make sure not to confuse with the pressure regulating screw. Do not alter the setting of the pressure regulating screw.

- 35-04 FaWa pump
35-07 Pressure relief valve

Installation

- 1 Install in reverse order.
- 2 **Ensure Operating Readiness:**
 - FaWa pump test
... as described later in this section.

MPO/FWO Tubing Removal

- 1 Remove the fast wash pump assembly from the instrument.
- 2 Remove the tubing.

Installation

- 1 Install in reverse order.
 - Tubing connections: refer to [Figure 6-36, 'MPO/FWO tubing connections for RSP and RWS'](#) or [Figure 6-37, 'FWO tubing connections for RMP'](#).

The waste tubing for the pressure relief valve (35-06) may be lead into the waste container to prevent contamination of the system liquid with liquid flowing back over the pressure relief valve.

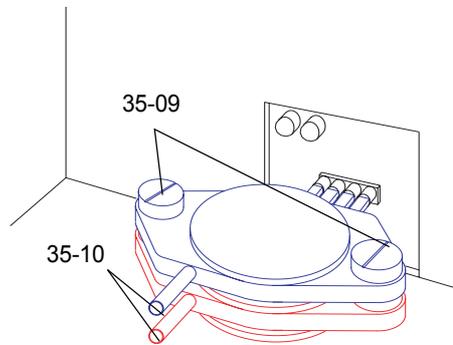
- 2 **Ensure Operating Readiness:**
 - Tightness check
 - FaWa pump test
... as described later in this section.

LICOS Sensors

For RSP/RWS: the LICOS sensors are connected to the MPO board.

For RMP: the Licos sensors are connected to the Supervisor board (refer to [Figure 6-26, 'Cable connections on Supervisor, Uniport and CANDI boards'](#)).

Removal



- 1 Remove the fast wash pump assembly from the instrument.
- 2 Remove the tubing (35-10) from the LICOS sensor.
- 3 Unscrew the LICOS sensor fixing screws and remove the LICOS sensor(s)

- 35-09 Fixing screws
- 35-10 LICOS tubing

Figure 6-41 LICOS sensors

Installation

- 1 Install in reverse order:
 - LICOS sensor on position 1: system liquid
 - LICOS sensor on position 2: waste

Refer to [Figure 6-42, 'Connections to MPO board V2.0'](#) or [Figure 6-43, 'Connections to MPO board V3.1/V4.0'](#).

- 2 [Ensure Operating Readiness](#):
 - FaWa pump test
 - LICOS test

... as described later in this section.

MPO Board

Removal

- 1 Remove the fast wash pump assembly from the instrument. The MPO board is located at the backside of the assembly.
- 2 For MPO: disconnect the LICOS sensors from the MPO board.
- 3 Disconnect the FaWa pump cable and the connection cable.
- 4 Unscrew the MPO board.

Installation

- 1 Install in reverse order:
 - For correct cable connection refer to [Figure 6-42, 'Connections to MPO board V2.0'](#) or [Figure 6-43, 'Connections to MPO board V3.1/V4.0'](#).

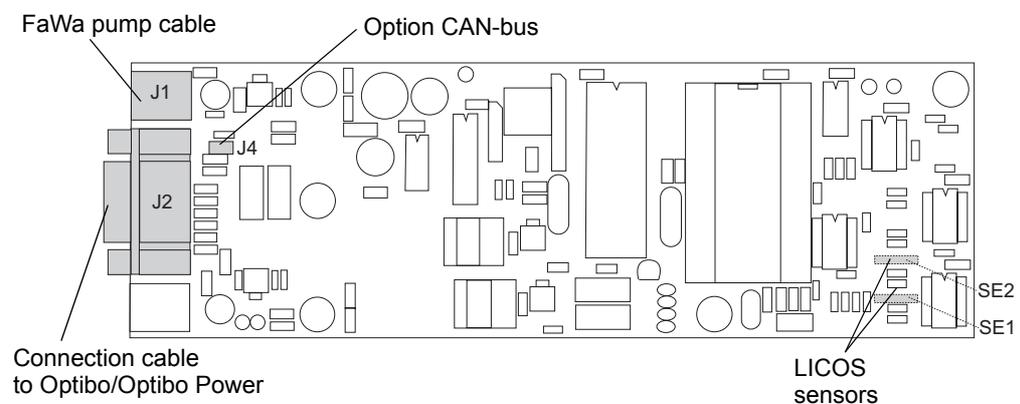


Figure 6-42 Connections to MPO board V2.0

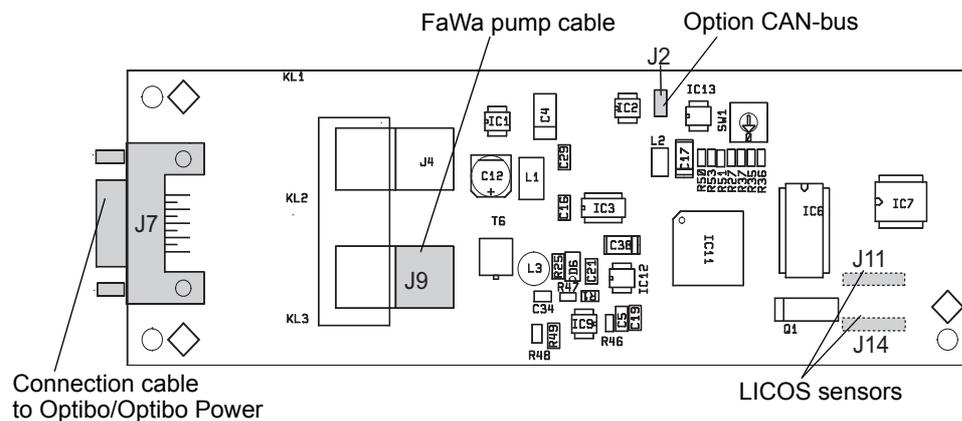


Figure 6-43 Connections to MPO board V3.1/V4.0

2 Ensure Operating Readiness:

- CAN-bus resistance test
 - Tightness check
 - FaWa pump test
 - LICOS Test
- ... as described later in this section.

Ensure Operating Readiness

Step	Test or Setup
1	CAN-bus resistance (see Section 6.2.3). <i>Necessary after replacement of MPO board</i>
2	Tightness check: fill/flush system and check all tubing connections <i>Necessary after replacement of</i> <ul style="list-style-type: none"> • <i>Fast wash pump assembly</i> • <i>FaWa pump</i> • <i>MPO/FWO tubing</i> • <i>LICOS sensor</i> • <i>MPO board</i>
3	FaWa pump test <i>Necessary after replacement of</i> <ul style="list-style-type: none"> • <i>Fast wash pump assembly</i> • <i>FaWa pump</i> • <i>Pressure relief valve</i> • <i>MPO/FWO tubing</i> • <i>LICOS sensor</i> • <i>MPO board</i>
4	LICOS test <i>Necessary after replacement of</i> <ul style="list-style-type: none"> • <i>FaWa pump assembly</i> • <i>LICOS sensor</i> • <i>MPO board</i>

6.4.5 Low Volume Option

The low volume option is available for RSP or RWS instruments. The low volume option 1 – with pinch valve tubing – was supplied until February 2001. The low volume option 2 – with membrane type solenoid valves – is supplied as of October 2000.

Mode of Functioning

The low volume option allows precise and reliable pipetting of low volumes with free dispensing. A droplet is pumped to the tip end by means of the diluter. The solenoid/pinch valve releases the pulse for cutting off the droplet.

Minimum Requirements

CU firmware version – control unit on instrument	Genesis instrument software version	Application software	
		Gemini software version	Logic software version
V1.30 or later	V3.10 or later	V3.00 or later	V2.20 or later

Spare Parts

For spare parts list with part numbers refer to [Section 7.2.4, 'Spare Parts Low Volume Option'](#).

Following items can be replaced as spare parts:

- Low volume option 1:
 - [Pinch valve](#)
 - [Low volume tubing set \(FEP/Tygon\)](#)
 - [Pinch valve tubing \(DMSO resistant\)](#)
 - [Set of nuts](#)
 - [Low volume main board](#)
 - [Fuse \(8 AT\)](#)
- Low volume option 2:
 - [Solenoid valve](#)
 - [Low volume tubing set \(FEP\)](#)
 - [Low volume main board](#)
- [Fuse \(8 AT\)](#)
- Low volume wash station complete:
 - [Wash station low volume \(PP\)](#)
 - [Waste tubing](#)
 - [Fill tubing](#)

Overview

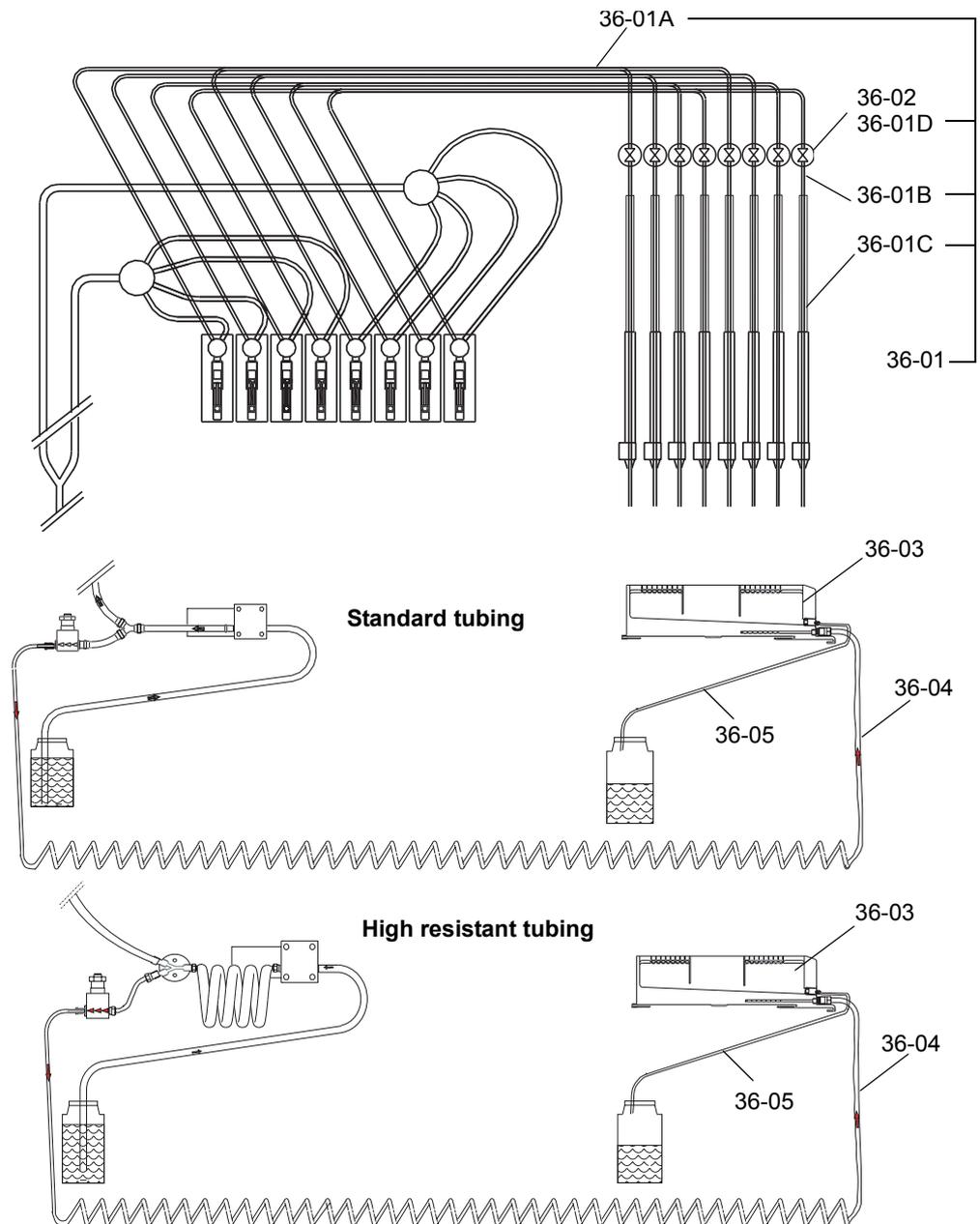
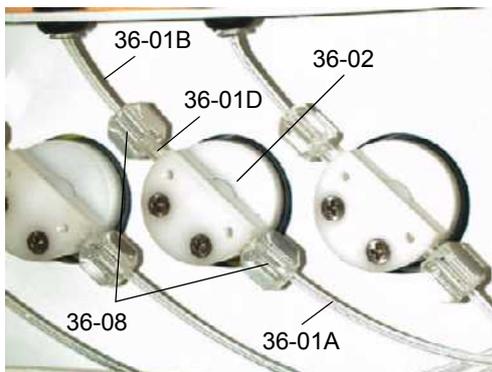


Figure 6-44 Low volume option – principal components

- | | |
|---|---|
| <p>36-01 Tubing set, containing:</p> <p>36-02 Pinch valve (option 1)
Solenoid valve (option 2)</p> <p>36-03 Wash station low volume PP</p> <p>36-04 Fill tubing</p> <p>36-05 Waste tubing</p> | <p>36-01A Pipetting tubing</p> <p>36-01B Pipetting tubing</p> <p>36-01C Support tubing</p> <p>36-01D Pinch valve tubing (option 1 only)</p> |
|---|---|

**Low Volume
Option 1**

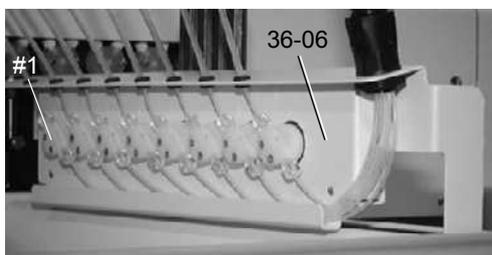
Removal of the Pinch Valve



1 Hold the pinch valve tubing (36-01D) by its nuts (36-08), stretch and pull it off the pinch valve (36-02).

If you have to replace several valves, mark all tubing with their relevant channel number (see [Figure 6-65](#), 'Installing the pipetting tubing').

- 2 Remove the cover (36-06).
- 3 Disconnect the respective valve wires from the distribution block (see [Figure 6-46](#)).
- 4 Unscrew and remove the valve (36-02) from the tubing shelf.



- 36-01A Pipetting tubing A
- 36-01B Pipetting tubing B
- 36-01D Pinch valve tubing
- 36-02 Pinch valve
- 36-06 Cover
- 36-08 Nut

Figure 6-45 Removal of the pinch valve

Installation of the Pinch Valve

- 1 Install in reverse order.
 - Make sure that the pipetting tubing which is connected to diluter #1 (on the far left) and the one which is connected to tip #1 are leading to valve #1 etc.
 - For correct wire connection to the distribution block (36-09) refer to [Figure 6-46](#).

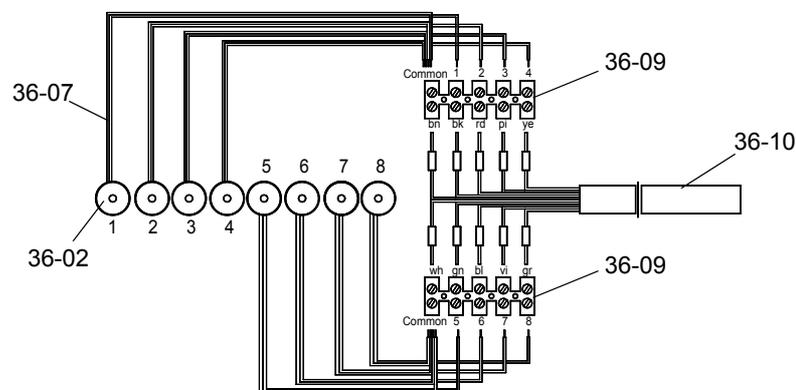


Figure 6-46 Wire connections on distribution block

- 36-02 Pinch valve
- 36-07 Valve wire
- 36-09 Distribution block
- 36-10 Valve cable to low volume main board

- 2 [Ensure Operating Readiness](#):
 - Tightness check
 - FaWa pump test
 - Precision test... as described later in this section.

Low Volume 1 Tubing System



Find more information on low volume tubing installation in document Doc ID 391 228.

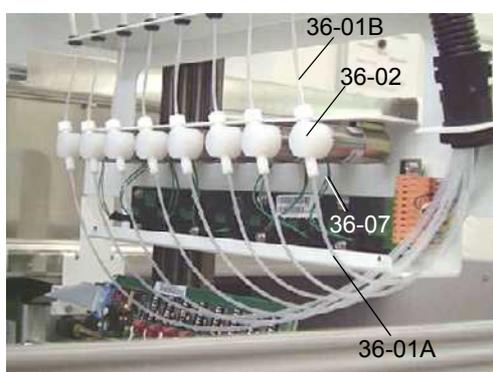
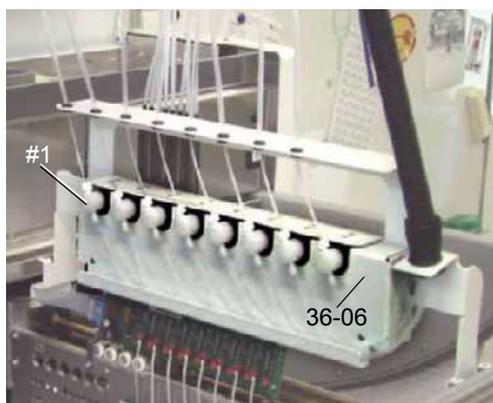
Low Volume Main Board

The procedures for removing and installing of the low volume main board are identical with those for low volume option 2.

- 1 Follow the instructions given for [Low Volume Option 2](#) later in this section.
- 2 [Ensure Operating Readiness](#)
 - CAN-bus resistance test... as described in [Section 6.2.3](#).

Low Volume Option 2

Removal of the Solenoid Valve



- 1 Unscrew the pipetting tubing (36-01A, 36-01B) from the valve (36-02).

If you have to replace several valves, mark all tubing with their relevant channel number (see [Figure 6-65](#), 'Installing the pipetting tubing').

- 2 Remove the cover (36-06).
- 3 Disconnect the valve wires (36-07) from the low volume distributor board.
- 4 Pull the valve (36-02) out of its clip bracket.

36-01A	Pipetting tubing A
36-01B	Pipetting tubing B
36-02	Solenoid valve
36-06	Cover
36-07	Valve wire

Figure 6-47 Removal of the solenoid valve

Installation of the Solenoid Valve

- 1 Install in reverse order.
 - Make sure that the pipetting tubing which is connected to diluter #1 (on the far left) and the one which is connected to tip #1 are leading to valve #1 etc.
- 2 **Ensure Operating Readiness**
 - Tightness check
 - FaWa pump test
 - Precision test

... as described later in this section.

Removal of the Low Volume Main Board

The low volume main board is located in the liquid pan of the instrument.

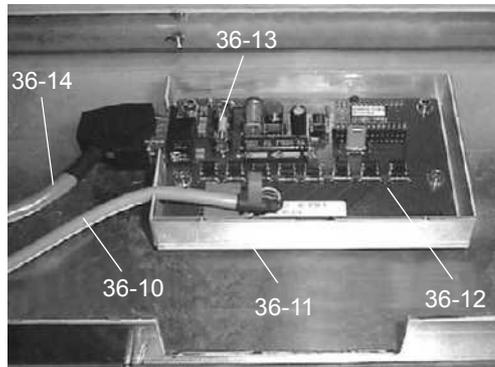


Figure 6-48 Low volume main board

- 1 Open the top cover (2).
- 2 Disconnect the cables from the low volume main board (36-12).
- 3 Unscrew and remove the PCB.

- 36-10 Valve cable
- 36-11 PCB box
- 36-12 Low volume main board
- 36-13 Fuse 8 AT
- 36-14 Cable to Optibo/Optibo Power

Installation of the Low Volume Main Board



Figure 6-49 Low volume main board

- 1 Install in reverse order.
 - Do not forget the spacer rings between the PCB and the box (36-11).
 - If the cables (36-10, 36-14) are too long: wind the surplus around the box as illustrated in [Figure 6-49](#).
- 2 **Ensure Operating Readiness**
 - CAN-bus resistance test
 - ... as described in [Section 6.2.3](#).

**Ensure Operating
Readiness**

Step	Test or Setup
1	CAN-bus resistance (see Section 6.2.3). <i>Necessary after replacement of low volume main board</i>
2	– Tightness check: fill/flush system and check all tubing connections – FaWa pump test – Precision test <i>Necessary after replacement of</i> <ul style="list-style-type: none">• <i>pipetting tubing</i>• <i>pinch valve tubing</i>• <i>pinch valve or solenoid valve</i>

6.4.6 6-Way Valve Option

The 6-way valve is an option for RSP or RWS instruments. This option is available as type A (FEP/PVDF) or type B (FEP/PP, DMSO resistant).

The MPO/FWO for the 6-way valve option is described in [Section 6.4.4, 'MPO/FWO'](#).

Minimum Requirements

6-way valve option	Genesis instrument software version	Gemini application software version
Jan. 2002	V4.2 or later	V3.2 or later

Spare Parts

For spare parts list with part numbers refer to [Section 7.2.5, 'Spare Parts 6-Way Valve Option'](#).

Following items can be replaced as spare parts:

- [6-way valve assembly](#) (valve and board)
- [Aspirating tubing/ fittings](#) (set)
- [Top tubing complete](#) (set)

Standard Configurations

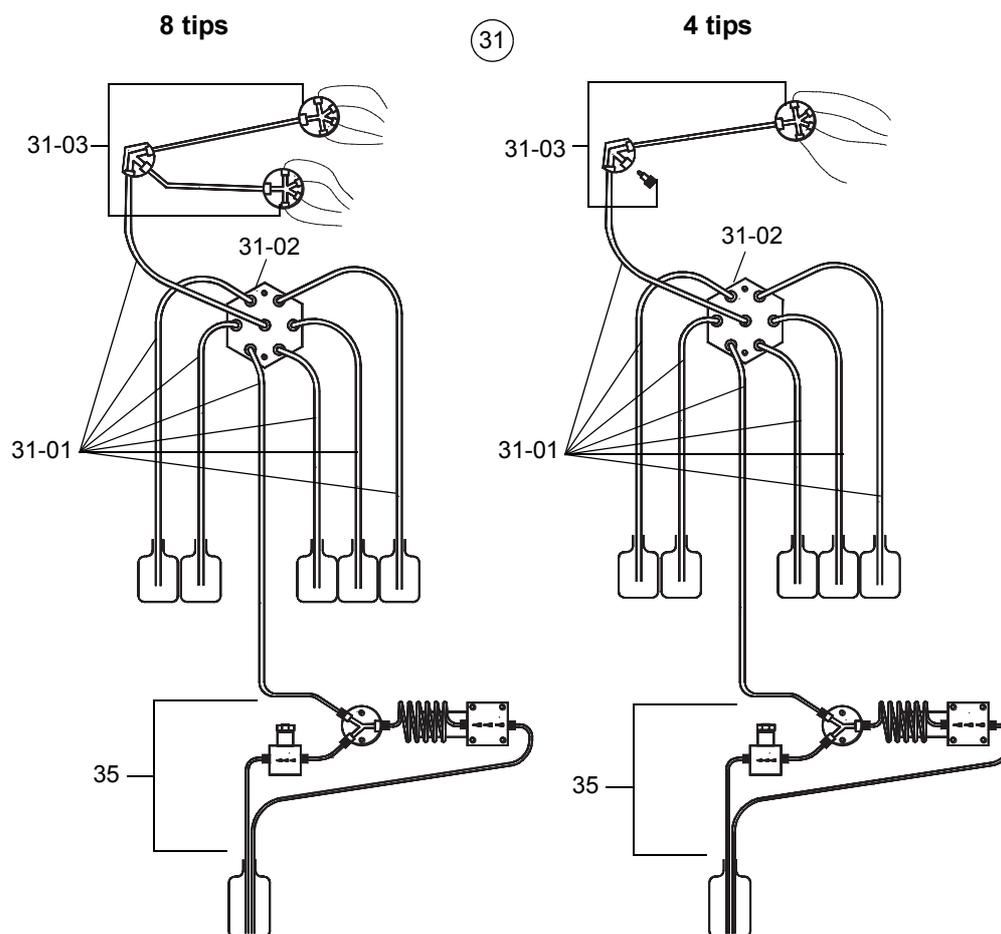


Figure 6-50 Tubing connections for standard configurations

- | | | | |
|-------|--|-------|--|
| 31 | 6-way valve option | 31-03 | Top tubing (set) |
| 31-01 | Aspiration tubing/fittings (set) | 35 | MPO/FWO (see Section 6.4.4) |
| 31-02 | 6-way valve assembly (valve and board) | | |

6-Way Valve Assembly

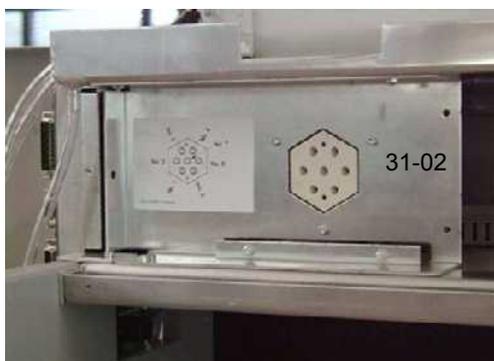


Figure 6-51 Location of the 6-way valve assembly

The 6-way valve assembly (31-02) is located on the left side of the front panel and is hidden by the top cover (2).

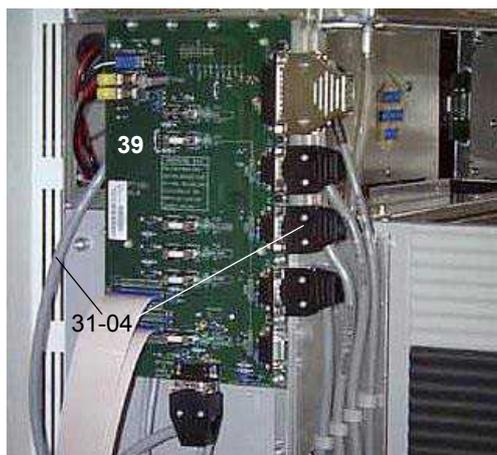
For repair, the complete 6-way valve assembly (31-02) including the electronic board on the back side has to be shipped to Tecan CH.

Removal

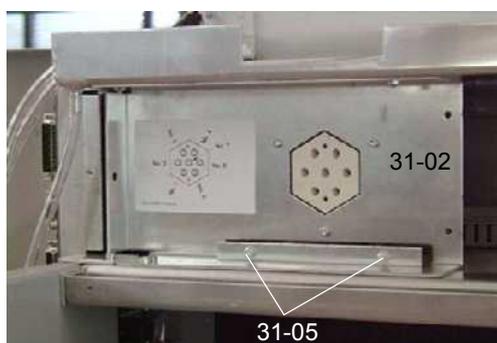
All chemical and biological liquids must be considered to be potentially hazardous agents. Strictly apply appropriate safety precautions according to local, state or federal regulations.



Decontaminate the instrument and assure appropriate safety measures (e.g. wear rubber gloves).



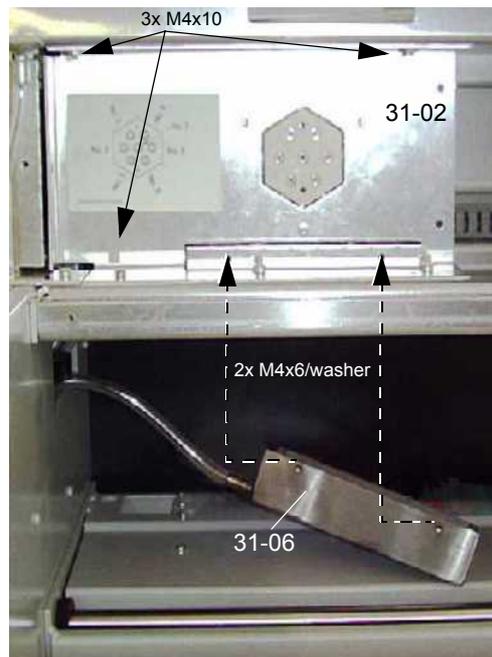
- 1 Empty the liquid system.
For detailed information refer to the Genesis Instrument Software Manual.
- 2 Switch off the instrument.
- 3 Disconnect the respective connection cable (31-04) from the CAN port at the Optibo/Optibo Power (39).
- 4 Disconnect all tubing from the 6-way valve assembly (31-02).
- 5 Remove the collecting pan (fixing screws 31-05).
- 6 Unscrew and remove the 6-way valve assembly from the instrument.



- 31-02 6-way valve assembly
- 31-04 Connection cable 6-way valve
- 31-05 Fixing screws collecting pan
- 39 Optibo/Optibo Power

Figure 6-52 Removal of the 6-way valve assembly

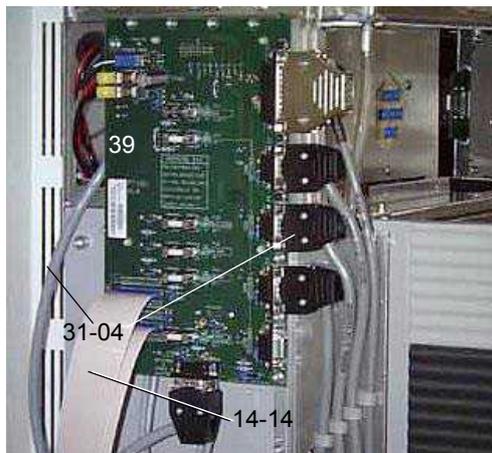
Installation



- 1 Insert the 6-way valve assembly (31-02) into the opening in the front panel and fasten the fixing screws.
- 2 Screw the collecting pan (31-06) to the 6-way valve assembly.

- 31-02 6-way valve assembly
- 31-04 Connection cable
- 31-06 Collecting pan
- 14-14 LiHa X-flex cable

Figure 6-53 Installation of the 6-way valve assembly



- 3 Guide the connection cable (31-04) through the opening in the left side panel and lead it underneath the LiHa X-flex cable (14-14); connect it to a free CAN port on the Optibo/Optibo Power.
- 4 Attach the tubing to the 6-way valve assembly according to [Figure 6-50, 'Tubing connections for standard configurations'](#).
- 5 Ensure operating readiness as described later in this section.

Figure 6-54 Cable connections to Optibo/Optibo Power

Ensure Operating Readiness

After replacing the 6-way valve option or parts of the tubing system, carry out the following tests:

Step	Test or Setup
1	6-way valve switching test
2	Tightness test (6-way valve) <i>This test can only be performed if a FWO or MPO is installed.</i>

6.5 LiHa 1 – Disassembly and Assembly Procedures

Supplied until December 1997.

In some other documents, the LiHa 1 might be designated as LiHa.



We recommend not to replace any spare parts at the customer's site but to replace the complete LiHa 1 assembly by a LiHa 2.

The X-DC-Servo board – which controls the X-motor of the LiHa 1 – is described in [Section 6.3.5, 'Electronic Boards'](#).

The X-belt as well as the X-motor are described in [Section 6.3.3, 'X-Drive Assembly'](#).



ATTENTION

Whenever touching the LiHa 1: observe precautions for handling electrostatic discharge sensitive devices. Wear a wrist strap.

6.5.1 Overview

LiHa 1 in Comparison with LiHa 2

Summary of the most obvious differences between LiHa 1 and LiHa 2:

Item	LiHa 1	LiHa 2
Mechanical design	different from LiHa 2	different from LiHa 1
Lower DiTi eject option	not available	available for LiHa 2 with serial numbers ≥ 4000 (as of January 1999)
Low volume option	available for LiHa 1 with serial numbers ≥ 2000	available for all LiHa 2

Spare Parts LiHa 1 *For spare parts list with part numbers refer to [Section 7.3, 'Spare Parts LiHa 1'](#).*

Following items can be replaced as spare parts:

- Cables:
 - [X-flex cable](#)
 - [ILID cable, ILID flat cable](#)
- Electronic boards:
 - [LiHa backplane](#)
 - [DC-Servo boards](#) for Y-motor, Y-spreading motor and Z-motors
 - [ILID board](#) and [ILID chip](#)

- Belts:
Y-belt, Y-spreading belt
- Motors:
Y-DC-Servo motor, Y-spreading DC-Servo motor
- Tip adapter



We do not recommend to replace the Z-motor at the customer's site. Please return the complete LiHa 1 assembly to Tecan in case of a defective Z-motor.

Location of Spare Parts

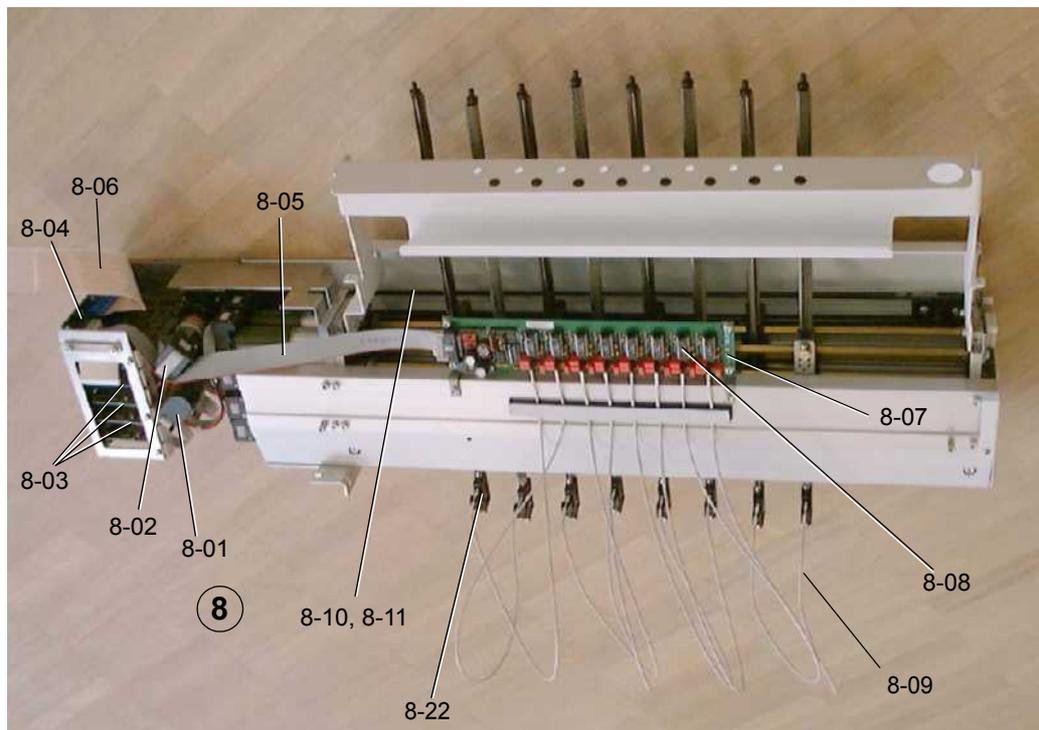


Figure 6-55 LiHa 1 spare parts

8	LiHa 1 assembly	8-06	X-flex cable
8-01	Y-spreading motor	8-07	ILID board
8-02	Y-motor	8-08	ILID chip
8-03	DC-Servo board for Y-motor, Y-spreading motor and Z-motors	8-09	ILID cable
8-04	LiHa backplane	8-10	Y-belt
8-05	ILID flat cable	8-11	Y-spreading belt
		8-22	Tip adapter

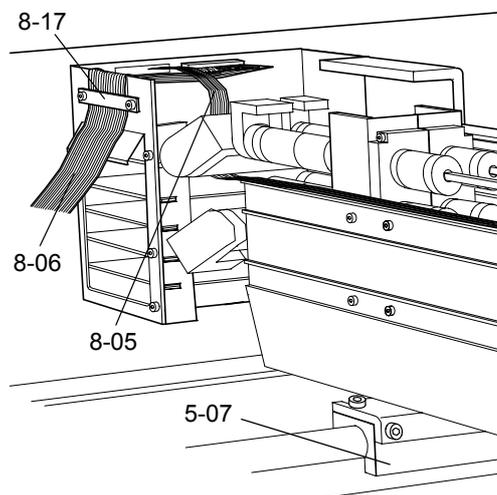
6.5.2 Complete LiHa 1 Assembly

Removal



Pipetting tubing and tips might be contaminated. Decontaminate the instrument and assure appropriate safety measures (e.g. wear rubber gloves).

- 1 Empty the liquid system.
For detailed information refer to the Genesis Instrument Software Manual.
- 2 Switch off the instrument. Remove all tips or DiTi adapter cylinders.
- 3 Remove the pipetting tubing from the Z-rods.
Recommendation: for easier installation, mark the tubing with the relevant channel number (see LiHa 2, [Figure 6-65](#), 'Installing the pipetting tubing').
- 4 Unscrew and remove the front cover, the two lateral covers and the tubing shelf.



- 5 Open the cable fixture (8-17) and disconnect the X-flex cable (8-06) from the LiHa backplane.
- 6 Unscrew LiHa 1 from X-slide (5-07), lift the LiHa 1 assembly off and place it sideways onto the worktable – the side with the ILID-cables pointing upward.

8-05	ILID flat cable
8-06	X-flex cable
8-17	Cable fixture
5-07	X-slide

Figure 6-56 LiHa 1 assembly

- 7 If you want to replace the complete LiHa 1 assembly:
 - Disconnect the X-flex cable (8-06) from the Optibo/Optibo Power and remove the cable from the X-bay (5). For details see [Section 6.5.3](#), 'X-Flex Cable'.

Installation

- 1 Install in reverse order.
 - Clean the contact surface of the guide rail, the guide rollers and the support roller with a lint-free tissue and some ethyl alcohol.
 - To avoid damage to the X-flex cable, make sure it is led under the ILID flat cable (8-05) as shown in [Figure 6-56](#).
- 2 [Ensure Operating Readiness](#):
 - CAN-bus resistance test
 - Reference positions
 - Random move

- Liquid detection test
 - Disposable tips test
 - Precision test
 - Tightness check
- ... as described in [Section 6.5.10](#).

6.5.3 X-Flex Cable

The procedures for removing and installing the X-flex cable are identical with those for LiHa 2.

- 1 Follow the instructions given in [Section 6.6.3, 'X-Flex Cable'](#).
- 2 **Ensure Operating Readiness:**
 - Reference positions
 - Random move
 - Liquid detection test... as described in [Section 6.5.10](#).

6.5.4 ILID Cable

The procedures for removing and installing the ILID cables are identical with those for LiHa 2.

- 1 Follow the instructions given in [Section 6.6.4, 'ILID Cable'](#).
- 2 **Ensure Operating Readiness:**
 - Liquid detection test... as described in [Section 6.5.10](#).

6.5.5 ILID Flat Cable

Removal

Refer to [Figure 6-57, 'Installation of ILID flat cable'](#)

- 1 Remove left cover.
- 2 Disconnect ILID flat cable (8-05) from the ILID board and the LiHa backplane (8-04).

Installation

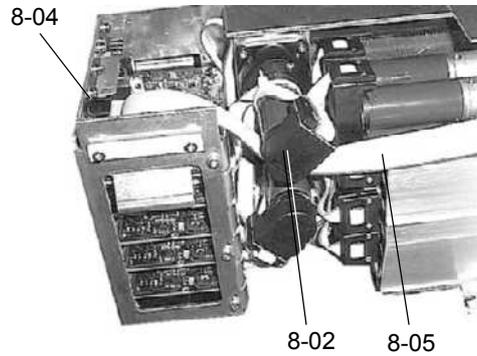


Figure 6-57 Installation of ILID flat cable

- 1 Install in reverse order.
 - Lead the ILID flat cable (8-05) below the Y-motor (8-02) (see [Figure 6-57](#)) to avoid any damages to the cable.
- 2 **Ensure Operating Readiness:**
 - Liquid detection test
 ... as described in [Section 6.5.10](#).

- 8-02 Y-motor
- 8-04 LiHa backplane
- 8-05 ILID flat cable

6.5.6 Electronic Boards for LiHa 1

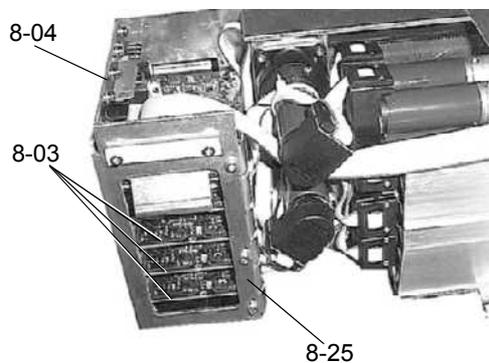
The X-DC-Servo board – which controls the X-motor of the LiHa 1– is described in [Section 6.3.5, 'Electronic Boards'](#).

LiHa Backplane, DC-Servo Boards

The DC-Servo boards which are connected to the LiHa backplane control the Y-motor, the Y-spreading motor and the Z-motors.

Removal

- 1 Remove LiHa 1 assembly from the instrument. Refer to [6.5.2, 'Complete LiHa 1 Assembly'](#).
- 2 Disconnect all cables from LiHa backplane (8-04).



- 3 Unscrew and remove the board cage (8-25) with the DC-Servo boards and the LiHa backplane.
- 4 Remove DC-Servo boards (8-03).
- 5 Unscrew and remove LiHa backplane.

8-03	DC-Servo boards
8-04	LiHa backplane
8-25	Board cage

Figure 6-58 LiHa backplane

Installation

- 1 Install in reverse order.
 - For correct cable connections and address switch settings on the DC-Servo boards refer to LiHa 2, [Figure 6-71, 'LiHa backplane cable connections'](#).
 - For correct motor allocation refer to LiHa 2, [Figure 6-72, 'Motor allocation'](#).
- 2 [Ensure Operating Readiness](#):
 - CAN-bus resistance test
 - Liquid detection test
 - and all tests which are necessary after removal of LiHa 1 assembly
 ... as described in [Section 6.5.10](#).

ILID Board, ILID Chip

The procedures for removing and installing the ILID board and ILID chips are identical with those for LiHa 2.

- 1 Follow the instructions given in [Section 6.6.6, 'Electronic Boards for LiHa 2'](#).
- 2 [Ensure Operating Readiness](#):
 - CAN-bus resistance test
 - Liquid detection test
 ... as described in [Section 6.5.10](#).

6.5.7 Y-Belt and Y-Spreading Belt

Inner belt: for Y-axis

Outer belt: for Y-spreading axis

Removal

- 1 Remove LiHa 1 assembly from the instrument (see [Section 6.5.2, 'Complete LiHa 1 Assembly'](#)).
- 2 Loosen the tensioning screws (8-29) to slacken both belts.
- 3 Open the respective belt lock (8-28) and remove the Y-belt (8-10) or Y-spreading belt.

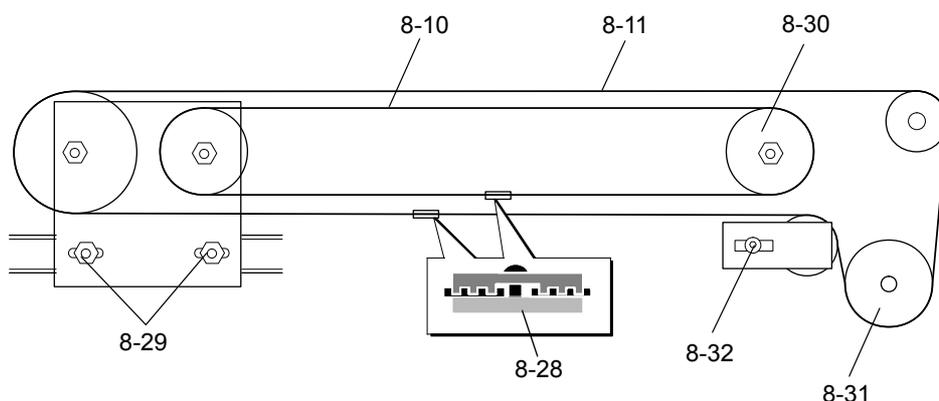


Figure 6-59 Belt removal, view from the right side of the LiHa 1

8-10	Y-belt	8-30	Pulley for Y-motor
8-11	Y-spreading belt	8-31	Pulley for Y-spreading motor
8-28	Belt lock	8-32	Tensioning screw
8-29	Tensioning screws		

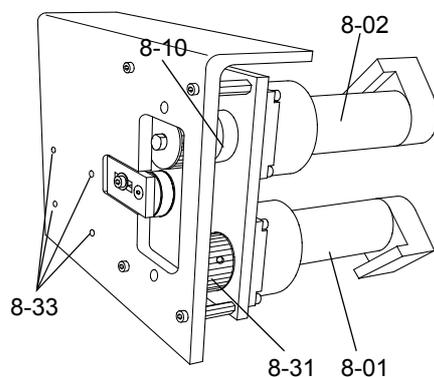
Installation

- 1 Install in reverse order:
 - Belt length: cut the new belt to required size according to the replaced one.
 - Lead the belt according to [Figure 6-59](#) over the pulleys.
 - Tension the belts by means of tensioning screws (8-29) and (8-32).
- 2 [Ensure Operating Readiness](#):
 - Reference positions
 - Random move
 - and all tests which are necessary after removal of LiHa 1 assembly
 ... as described in [Section 6.5.10](#).

6.5.8 Y-Motor and Y-Spreading Motor

Removal

- 1 Remove LiHa 1 assembly from the instrument (see [Section 6.5.2, 'Complete LiHa 1 Assembly'](#)).
- 2 Unscrew and remove the board cage with DC-Servo boards and LiHa backplane (details see [Section 6.5.6, 'Electronic Boards for LiHa 1'](#)).
- 3 Remove Y-belt (8-10) and Y-spreading belt (8-11) (details see [Section 6.5.7, 'Y-Belt and Y-Spreading Belt'](#)).
- 4 Remove the motor bracket fixing screws (8-34).
- 5 Disconnect the relevant motor cable from LiHa backplane.



- 6 Remove pulley from relevant motor.
- 7 Unscrew and remove the relevant motor (8-01 or 8-02).

- | | |
|------|------------------------------|
| 8-01 | Y-spreading motor |
| 8-02 | Y-motor |
| 8-10 | Y-belt |
| 8-31 | Pulley for Y-spreading motor |
| 8-33 | Motor bracket fixing screws |

Figure 6-60 Removal of Y-motor and Y-spreading motor

Installation

- 1 Install in reverse order.
 - When installing the pulley, make sure the set screw is perpendicular to the flat section of the axle. Adjust pulley position according to the other pulleys in this motor assembly: all pulleys must be in the same plane.
 - Make sure the encoder head points in the correct direction as shown in [Figure 6-60](#).
 - For correct motor cable connection refer to LiHa 2, [Figure 6-71, 'LiHa backplane cable connections'](#).
 - Tension the belts (8-10 or 8-11) as described in [Section 6.5.7, 'Y-Belt and Y-Spreading Belt'](#).
- 2 [Ensure Operating Readiness](#):
 - all tests which are necessary after removal of LiHa 1 assembly as described in [Section 6.5.10](#).

6.5.9 Tip Adapter

The procedures for removing and installing the tip adapter are identical with those for LiHa 2.

- 1 Follow the instructions given in [Section 6.6.9, 'Tip Adapter'](#).
- 2 **Ensure Operating Readiness:**
 - Liquid detection test
 - Disposable tips test
 - Precision test
 - Tightness check

... as described in [Section 6.5.10](#).

6.5.10 Ensure Operating Readiness

Required Special Tools

- Reference tip

Tests to Be Performed *For detailed information refer to the Genesis Instrument Software Manual.*

After replacing parts of the LiHa 1, verify – and if necessary carry out – the following settings and tests:

Step	Test or Setup
1	CAN-bus resistance (see Section 6.2.3). <i>Necessary after replacement of</i> <ul style="list-style-type: none"> • LiHa 1 assembly • any PCB
2	– LiHa reference positions – Random move <i>Attention: never perform a random move test with a Genesis RMP!</i> <i>Necessary after replacement of</i> <ul style="list-style-type: none"> • LiHa 1 assembly • any LiHa 1 belt • X-flex cable
3	Liquid detection test <i>Necessary after replacement of</i> <ul style="list-style-type: none"> • LiHa 1 assembly • X-flex cable • ILID cable, flat cable, chip or board • LiHa backplane • Tip adapter

4	– Disposable tips test – Precision test <i>Necessary after replacement of</i> <ul style="list-style-type: none">• <i>LiHa 1 assembly</i>• <i>tip adapter</i>
5	– Tightness check: fill/flush system and check all tubing connections <i>Necessary after replacement of</i> <ul style="list-style-type: none">• <i>LiHa 1 assembly</i>• <i>Tip adapter</i>

6.6 LiHa 2 – Disassembly and Assembly Procedures

Supplied as of January 1998

The X-DC-Servo board – which controls the X-motor of the LiHa 2 – is described in [Section 6.3.5, 'Electronic Boards'](#).

The X-belt as well as the X-motor are described in [Section 6.3.3, 'X-Drive Assembly'](#).



ATTENTION

Whenever touching the LiHa 2: observe precautions for handling electrostatic discharge sensitive devices. Wear a wrist strap.

6.6.1 Overview

LiHa 1 in Comparison with LiHa 2

Summary of the most obvious differences between LiHa 1 and LiHa 2:

Item	LiHa 1	LiHa 2
Mechanical design	different from LiHa 2	different from LiHa 1
Lower DiTi eject option	not available	available for LiHa 2 with serial numbers ≥ 4000 (as of January 1999)
Low volume option	available for LiHa 1 with serial numbers ≥ 2000	available for all LiHa 2

Spare Parts LiHa 2 For spare parts list with part numbers refer to [Section 7.4, 'Spare Parts LiHa 2'](#).

Following items can be replaced as spare parts:

- [LiHa 2 assembly](#)
- Cables:
 - [X-flex cable](#)
 - [ILID cable](#), [ILID flat cable](#)
- Electronic Boards:
 - [LiHa backplane](#)
 - [DC-Servo boards](#) for Y-motor, Y-spreading motor, Z-motors and lower DiTi eject option
 - [ILID board](#) and [ILID chip](#)
- Belts:
 - [Y-belt](#), [Y-spreading belt](#)
- Motors:
 - [Y-DC-Servo motor](#), [Y-spreading DC-Servo motor](#)
- [Tip adapter](#)
- [Lower DiTi eject option 2 \(4/8 tips\)](#)
 - [Solenoid](#)
 - [Upgrade kit](#) (rocker stop and leaf spring)



We do not recommend to replace the Z-motor at the customer's site. Please return the complete LiHa 2 assembly to Tecan in case of a defective Z-motor.

Location of Spare Parts

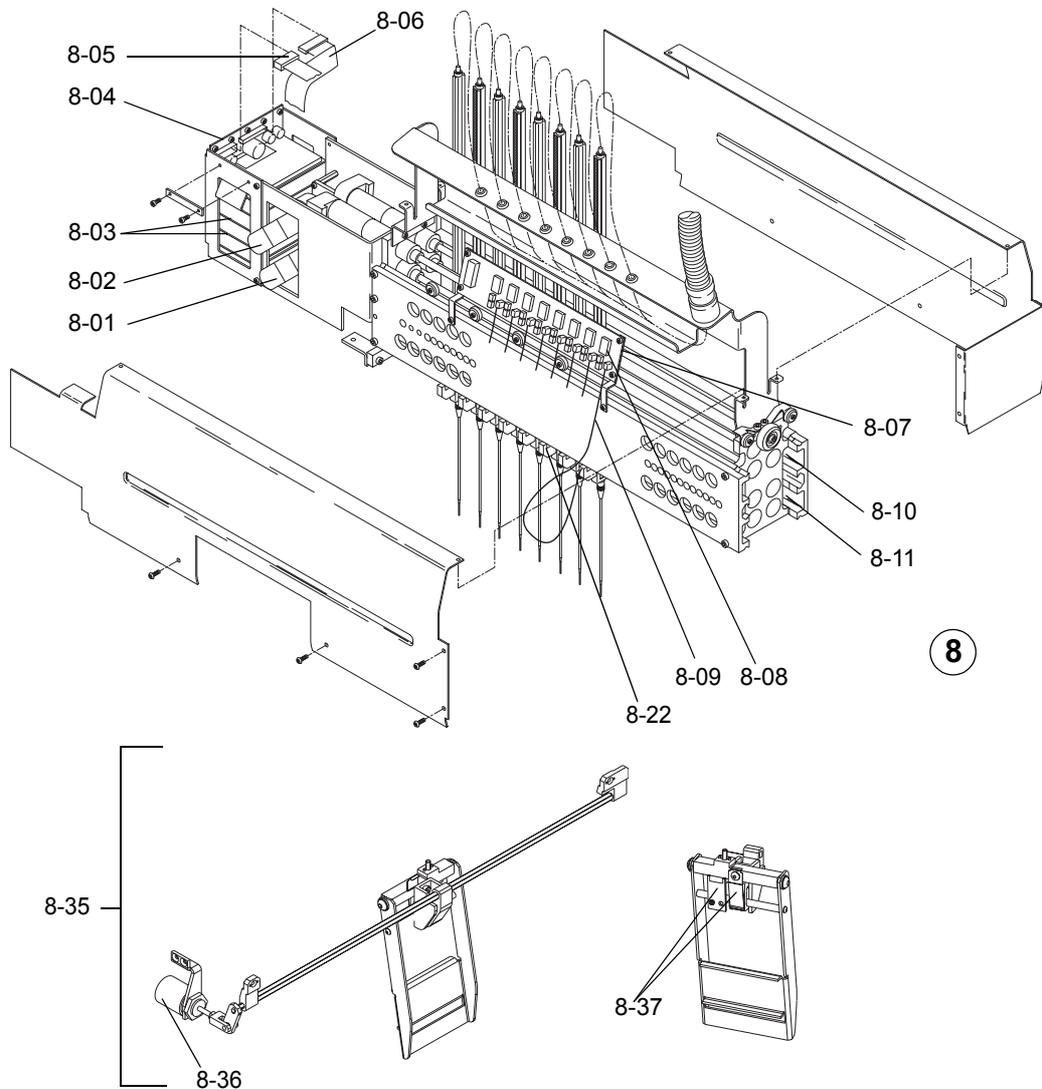


Figure 6-61 LiHa 2 spare parts

8	LiHa 2 assembly	8-08	ILID chip
8-01	Y-spreading motor	8-09	ILID cable
8-02	Y-motor	8-10	Y-belt
8-03	DC-Servo board for Y-motor, Y-spreading motor and Z-motors	8-11	Y-spreading belt
8-04	LiHa backplane	8-22	Tip adapter
8-05	ILID flat cable	8-35	Lower DiTi eject option 2
8-06	X-flex cable	8-36	Solenoid
8-07	ILID board	8-37	Upgrade kit (rocker stop, leaf spring)

6.6.2 Complete LiHa 2 Assembly

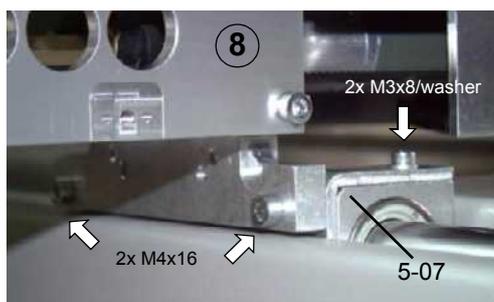
Removal

Refer to [Figure 6-63, 'LiHa 2 assembly'](#)



Pipetting tubing and tips might be contaminated. Decontaminate the instrument and assure appropriate safety measures (e.g. wear rubber gloves).

- 1 Empty the liquid system.
For detailed information refer to the Genesis Instrument Software Manual.
- 2 Switch off the instrument. Remove all tips (9) or DiTi adapter cylinders.
- 3 Remove the pipetting tubing (30-03) from the Z-rods (8-13).
Recommendation: for easier installation, mark tubing with the relevant channel number (see [Figure 6-65, 'Installing the pipetting tubing'](#)).
- 4 Remove all covers (8-15, 8-16) and the tubing shelf (8-12).
- 5 Unscrew LiHa 2 from X-slide (5-07), lift the LiHa 2 assembly off and place it sideways onto the worktable – the side with the ILID-cables (8-09) pointing upward.



8	LiHa 2
5-07	X-slide

Figure 6-62 LiHa 2 X-slide

- 6 If you want to replace the complete LiHa 2 assembly:
 - Disconnect the X-flex cable (8-06) from the Optibo/Optibo Power and remove the cable from the X-bay (5). For details see [Section 6.6.3, 'X-Flex Cable'](#).

If you want to replace spare parts of the LiHa 2:

- Open the cable fixture (8-17) and disconnect the X-flex cable (8-06) from the LiHa backplane (8-04).

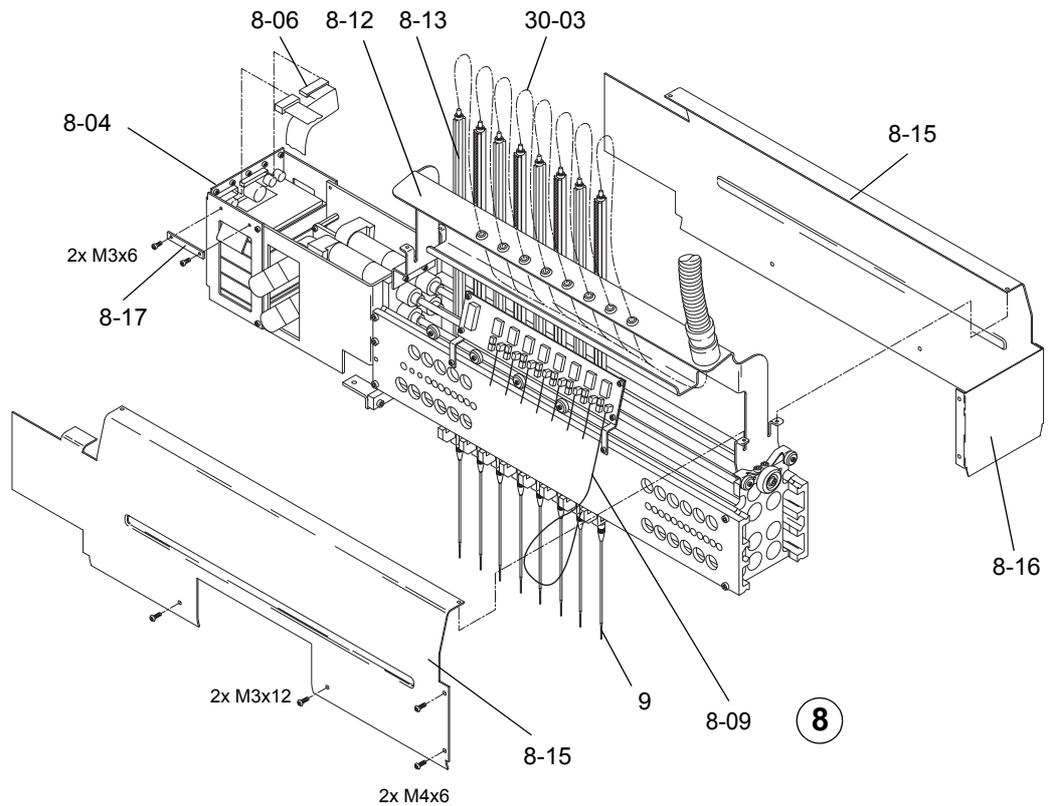


Figure 6-63 LiHa 2 assembly

8	LiHa 2 assembly	8-15	Lateral cover
8-04	LiHa backplane	8-16	Front cover
8-06	X-flex cable	8-17	Cable fixture
8-09	ILID cable	9	Tip
8-12	Tubing shelf	30-03	Pipetting tubing
8-13	Z-rod		

Installation

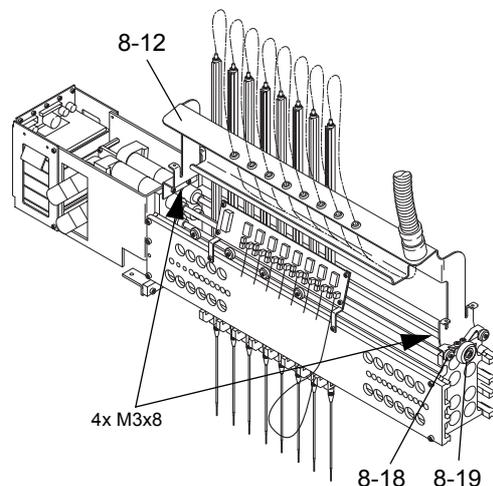
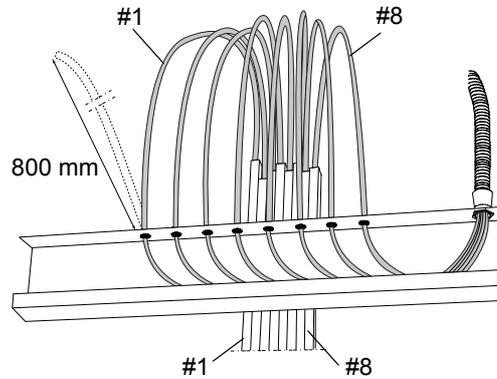


Figure 6-64 Installing the LiHa 2

- 1 Install the X-flex cable as described in [6.6.3, 'X-Flex Cable'](#).
- 2 Clean the contact surface of the guide rail, the guide rollers (8-18) and the support roller (8-19) with a lint-free tissue and some ethyl alcohol.
- 3 Insert LiHa 2 assembly into the guide rail and fix it to the X-slide (5-07).
- 4 Fix the tubing shelf (8-12) to the LiHa 2.

8-12	Tubing shelf
8-18	Guide rollers
8-19	Support roller



- 5 Install front and lateral covers (8-16, 8-15).
- 6 Insert the pipetting tubing (30-03) into the Z-rods (8-13).
Make sure that the pipetting tubing connected to diluter #1 (on the far left) is connected to tip #1. Repeat for #2 to #8.
- 7 Adjust all pipetting tubing length to 800 mm.
Do not cut the remaining tubing, but pull it back and place it in the liquid pan of the instrument.
- 8 **Ensure Operating Readiness:**
 - CAN-bus resistance test
 - Reference positions
 - Random move
 - Liquid detection test
 - Calibrate lower DiTi eject
 - Disposable tips test
 - Tightness check
 - Precision test

... as described in [Section 6.6.11](#).

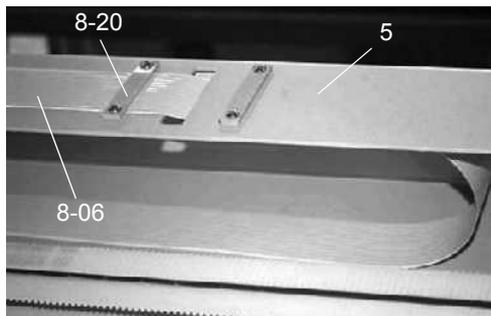
Figure 6-65 Installing the pipetting tubing

6.6.3 X-Flex Cable

Refer to [Figure 6-63, 'LiHa 2 assembly'](#)

Removal

- 1 Remove left cover (8-15).
- 2 Open the cable fixture (8-17) and disconnect the X-flex cable from the LiHa backplane (8-04).
- 3 Disconnect the X-flex cable (8-06) from the Optibo/Optibo Power (refer to [Figure 6-20, 'Optibo cable connections'](#)).



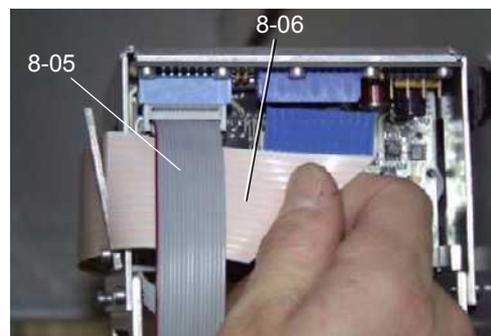
- 4 Unscrew the cable clamp (8-20) in the X-bay and remove X-flex cable by pulling it carefully through the openings the below the Optibo/Optibo Power and the in the X-bay (5).

- | | |
|------|--------------|
| 5 | X-bay |
| 8-06 | X-flex cable |
| 8-20 | Cable clamp |

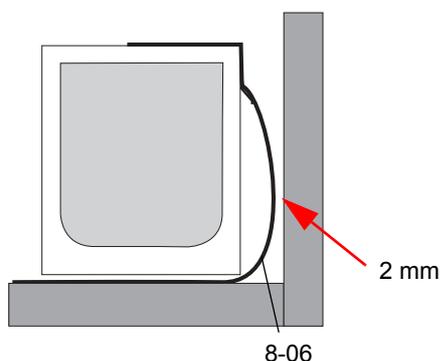
Figure 6-66 X-flex cable

Installation

- 1 Install in reverse order.
 - Normally, the replacement X-flex cable (8-06) is not folded when it is shipped. Fold the new cable according to the cable you have removed.



- To avoid damage to the X-flex cable, lead it under the ILID flat cable (8-05).
- For correct connection to the Optibo/Optibo Power see [Figure 6-20, 'Optibo cable connections'](#).
- Make sure there is a gap of approx. 2 mm between X-flex cable and the frame of the instrument when the LiHa is moved to the very left side.



- | | |
|------|-----------------|
| 8-05 | ILID flat cable |
| 8-06 | X-flex cable |

2 [Ensure Operating Readiness:](#)

- Reference positions
 - Random move
 - Liquid detection test
- ... as described in [Section 6.6.11](#).

Figure 6-67 Installation of X-flex cable

- 3 **Ensure Operating Readiness:**
 - Reference positions
 - Random move
 - Liquid detection test

... as described in [Section 6.6.11](#).

6.6.4 ILID Cable

Removal

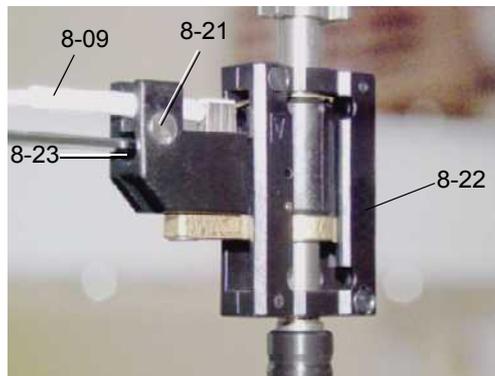
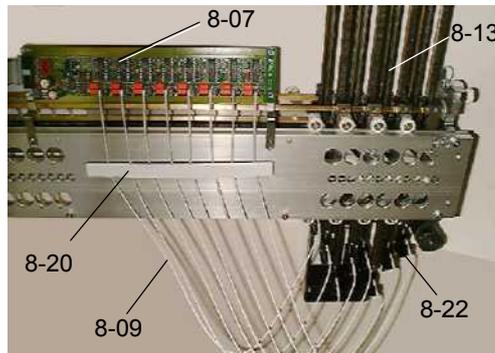


Figure 6-68 Removal of ILID cable

- 1 Remove left cover (8-15).
- 2 Remove Velcro tape (8-20).

- 8-07 ILID board
- 8-09 ILID cable
- 8-13 Z-rod
- 8-20 Velcro tape
- 8-21 Fixing screw
- 8-22 Tip adapter
- 8-23 Set screw

- 3 Loosen fixing screw (8-21) and set screw (8-23); disconnect ILID cable (8-09) from tip adapter.
- 4 Disconnect ILID cable (8-09) from ILID board (8-07).

Installation

- 1 Install in reverse order.
- 2 **Ensure Operating Readiness:**
 - Liquid detection test
 - Calibrate lower DiTi eject
 - Disposable tips test
 - Tightness check
 - Precision test

... as described in [Section 6.6.11](#).

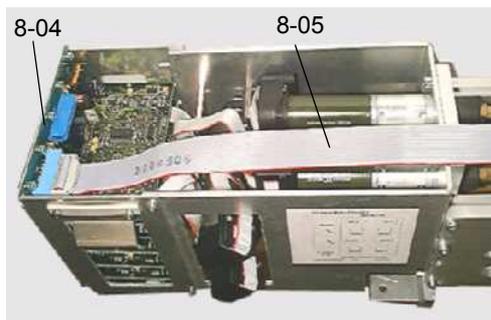
6.6.5 ILID Flat Cable

Removal

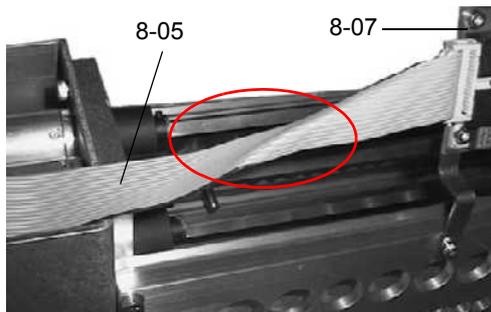
Refer to [Figure 6-69, 'Installation of ILID flat cable'](#)

- 1 Remove left cover (8-15).
- 2 Disconnect ILID flat cable (8-05) from the ILID board (8-07) and the LiHa backplane (8-04).

Installation



- 1 Install in reverse order.
 - When replacing the ILID flat cable, fold it according to [Figure 6-69](#) to avoid any damages to the cable.
- 2 [Ensure Operating Readiness:](#)
 - Liquid detection test
 ... as described in [Section 6.6.11](#)



- 8-04 LiHa backplane
- 8-05 ILID flat cable
- 8-07 ILID board

Figure 6-69 Installation of ILID flat cable

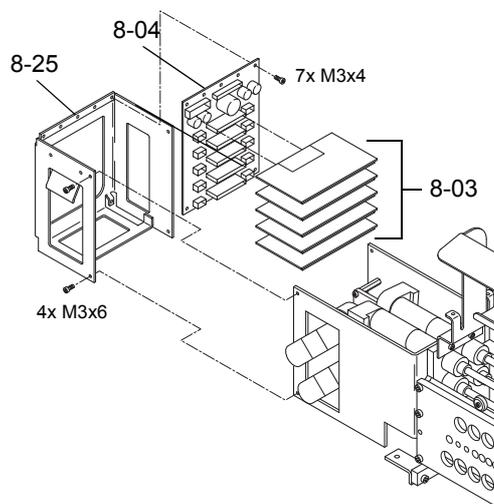
6.6.6 Electronic Boards for LiHa 2

The X-DC-Servo board – which controls the X-motor of the LiHa 2 – is described in Section 6.3.5, 'Electronic Boards'.

LiHa Backplane, DC-Servo Boards

The DC-Servo boards which are connected to the LiHa backplane control the Y-motor, the Y-spreading motor, the Z-motors and the lower DiTi eject option.

Removal



- 1 Remove LiHa 2 assembly from the instrument. Refer to 6.6.2, 'Complete LiHa 2 Assembly'.
- 2 Disconnect all cables from LiHa backplane (8-04).
- 3 Unscrew and remove the board cage (8-25) with the DC-Servo boards and the LiHa backplane.
- 4 Remove DC-Servo boards (8-03).
- 5 Unscrew and remove LiHa backplane.

- | | |
|------|-----------------|
| 8-03 | DC-Servo boards |
| 8-04 | LiHa backplane |
| 8-25 | Board cage |

Figure 6-70 LiHa backplane

Installation

- 1 Install in reverse order.
 - For correct cable connections and address switch settings on the DC-Servo boards refer to Figure 6-71.
 - For correct motor allocation refer to Figure 6-72.
- 2 **Ensure Operating Readiness:**
 - CAN-bus resistance test
 - Liquid detection test
 - and all tests which are necessary after removal of LiHa 2 assembly

... as described in Section 6.6.11

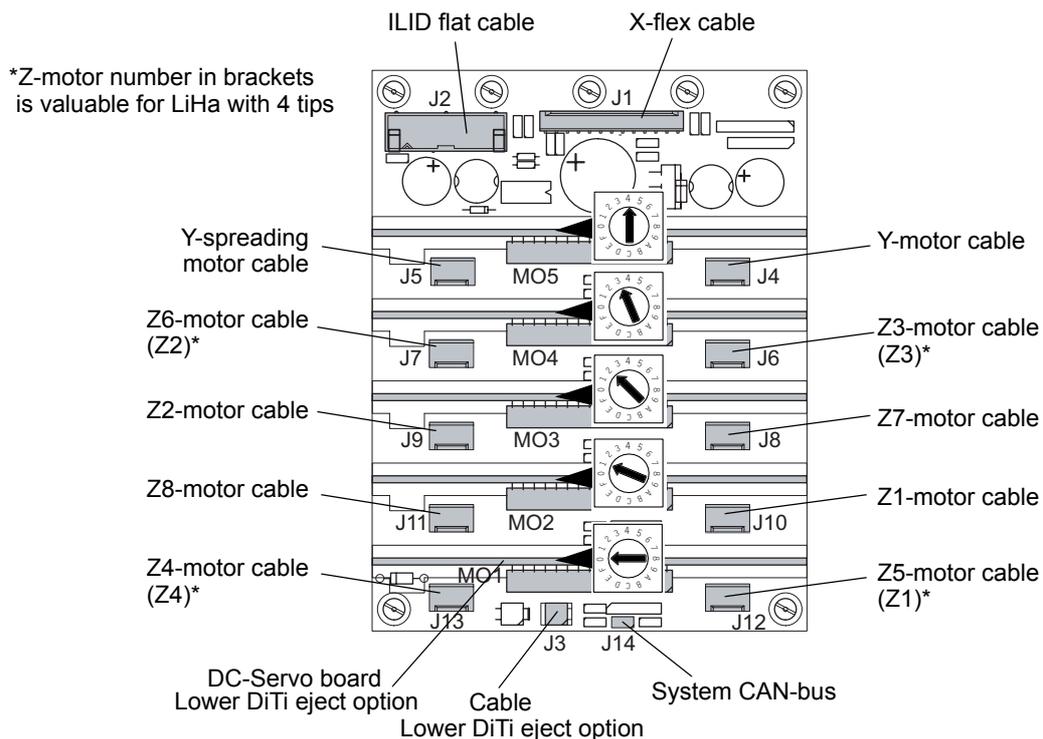


Figure 6-71 LiHa backplane cable connections

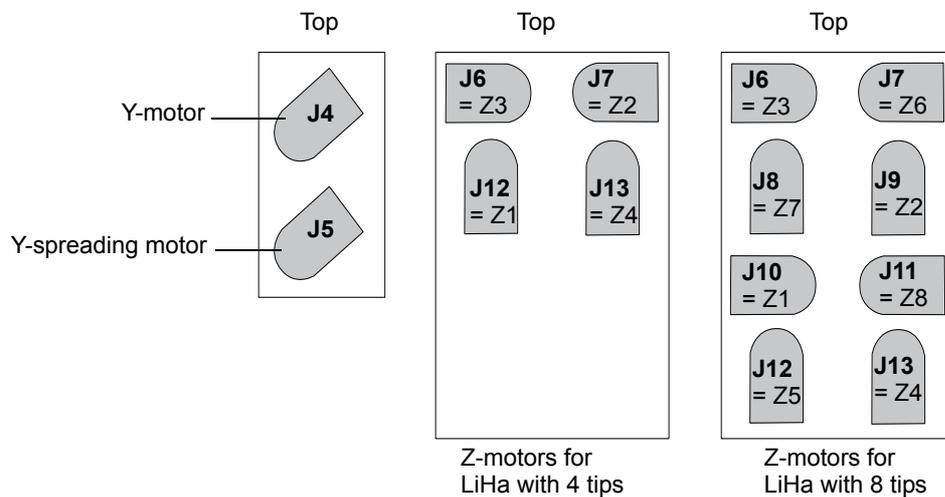
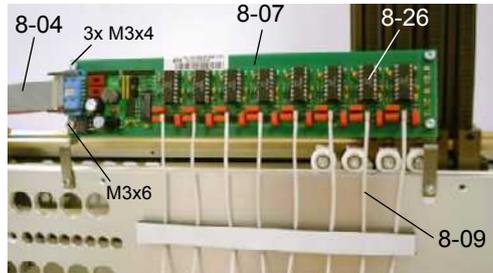


Figure 6-72 Motor allocation

ILID Board

Removal

- 1 Remove left cover.
- 2 Disconnect the ILID flat cable (8-04) and all ILID cables (8-09) from ILID board (8-07).
- 3 Unscrew and remove ILID board.



8-04	ILID flat cable
8-07	ILID board
8-09	ILID cable
8-26	ILID chip

Figure 6-73 Removal of ILID board

Installation

- 1 Install in reverse order.
 - Make sure the two ILID board switches are set according to the number of tips (see Figure 6-74).

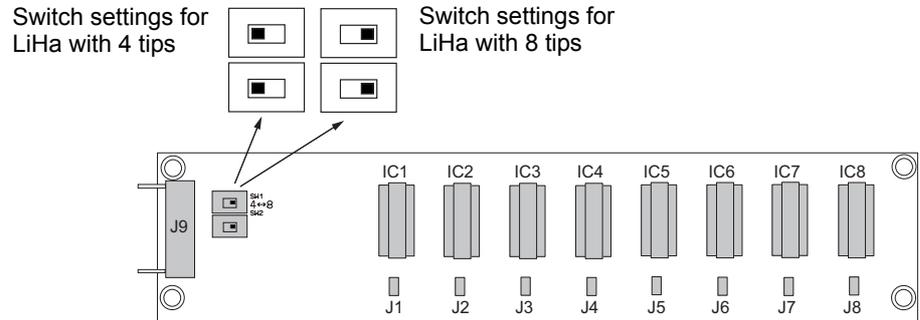


Figure 6-74 ILID board

- 2 **Ensure Operating Readiness:**
 - CAN-bus resistance test
 - Liquid detection test
 - ... as described in [Section 6.6.11](#)

ILID Chip

Removal

- 1 Remove left cover.
- 2 Remove ILID chip with an appropriate tool.

Installation

- 1 Install in reverse order.
- 2 **Ensure Operating Readiness:**
 - Liquid detection test... as described in [Section 6.6.11](#).

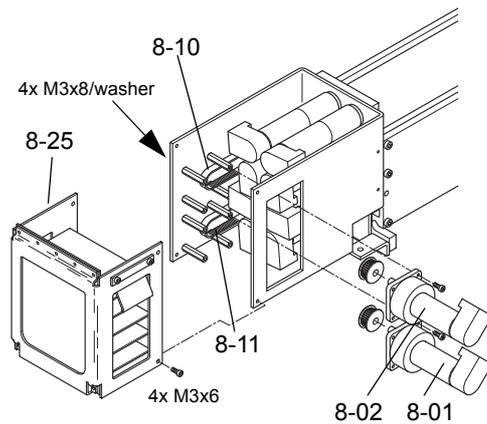
6.6.7 Y-Belt and Y-Spreading Belt

Upper belt: for Y-axis

Lower belt: for Y-spreading axis

Removal

- 1 Remove LiHa 2 assembly from the instrument (see [Section 6.6.2, 'Complete LiHa 2 Assembly'](#)).
- 2 Unscrew and remove the board cage (8-25) with DC-Servo boards and LiHa backplane (details see [Section 6.6.6, 'Electronic Boards for LiHa 2'](#)).



- 3 Unscrew and remove the relevant motor assembly (8-01 or 8-02) to slacken the belt.

8-01	Y-spreading motor
8-02	Y-motor
8-10	Y-belt
8-11	Y-spreading belt
8-25	Board cage

Figure 6-75 Removal of Y-belt

- 4 Refer to [Figure 6-76, 'Belt lock removal'](#):
 - Remove the respective belt lock (8-28) from the Y-slide (8-27) and take the Y-belt (8-10) or Y-spreading belt (8-11) out of the LiHa 2.
 - Open the belt lock (8-28).

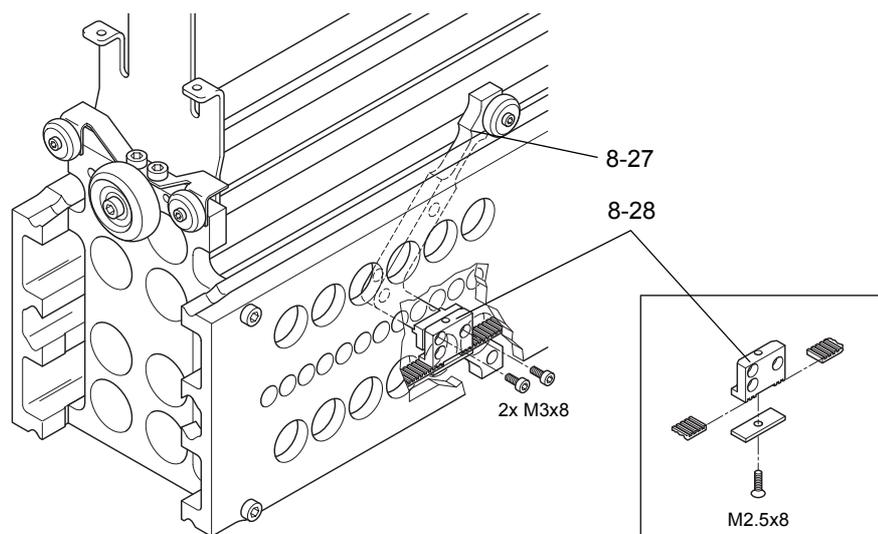


Figure 6-76 Belt lock removal

8-27	Y-slide
8-28	Belt lock

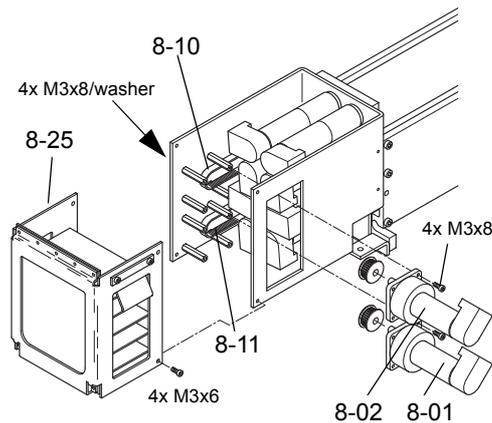
Installation

- 1 Install in reverse order:
 - Belt length: 1290 mm/50.8 inch.
 - For LiHa 2 with 4 tips: fix belt lock to Y-slide #1 and #3 (corresponding to tip #1 and #3).
For LiHa 2 with 8 tips: fix belt lock to Y-slide #3 and #7 (corresponding to tip #3 and 7).
 - Tension the belt by means of pulling back the motor assembly before fastening the motor fixing screws in the slotted holes.
- 2 [Ensure Operating Readiness](#):
 - Reference positions
 - Random move
 - and all tests which are necessary after removal of LiHa 1 assembly... as described in [Section 6.6.11](#).

6.6.8 Y-Motor and Y-Spreading Motor

Removal

- 1 Remove LiHa 2 assembly from the instrument (see [Section 6.6.2, 'Complete LiHa 2 Assembly'](#)).
- 2 Unscrew and remove the board cage (8-25) with DC-Servo boards and LiHa backplane (details see [Section 6.6.6, 'Electronic Boards for LiHa 2'](#)).
- 3 Disconnect the relevant motor cable from LiHa backplane.



- 4 Unscrew and remove the relevant motor assembly (8-01 or 8-02).
- 5 Remove pulley.

- 8-01 Y-spreading motor
- 8-02 Y-motor
- 8-10 Y-belt
- 8-11 Y-spreading belt
- 8-25 Board cage

Figure 6-77 Removal of Y-motor and Y-spreading motor

Installation

- 1 Install in reverse order.
 - Make sure the encoder head points in the correct direction as shown in [Figure 6-77](#).
 - For correct motor cable connection refer to [Figure 6-71, 'LiHa backplane cable connections'](#).
 - Tension the belt (8-10 or 8-11) by means of pulling back the motor assembly before fastening the motor fixing screws in the slotted holes.
- 2 [Ensure Operating Readiness](#):
 - all tests which are necessary after removal of LiHa 2 assembly ... as described in [Section 6.6.11](#).

6.6.9 Tip Adapter

Removal

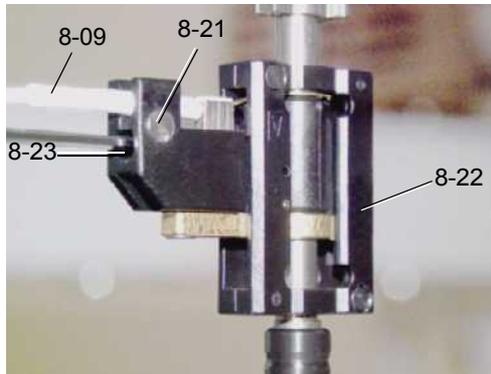


Figure 6-78 Removal of tip adapter

- 1 Loosen fixing screw (8-21) and set screw (8-23); disconnect ILID cable (8-09) from tip adapter.
- 2 Unscrew tip adapter (8-22) from Z-rod.

8-09	ILID cable
8-21	Fixing screw
8-22	Tip adapter
8-23	Set screw

Installation

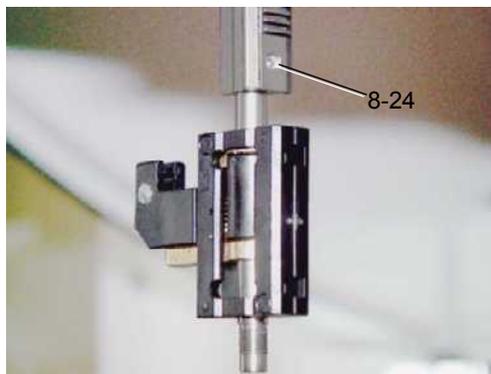


Figure 6-79 Installation of tip adapter

- 1 Install in reverse order.
 - When installing the tip adapter, make sure to tighten the set screw (8-24) onto the provided bore in the tip adapter.
- 2 **Ensure Operating Readiness:**
 - Liquid detection test
 - Calibrate lower DiTi eject
 - Disposable tips test
 - Tightness check
 - Precision test
 - ... as described in [Section 6.6.11](#).

8-24	Set screw
------	-----------

6.6.10 Lower DiTi Eject Option

The lower DiTi eject is an option for RSP and RWS, for RMP only with TOPS 4.0 or later. The option may only be placed on LiHa 2 produced after January 1 1999 and with serial numbers ≥ 4000 .

Lower DiTi Eject Option 1

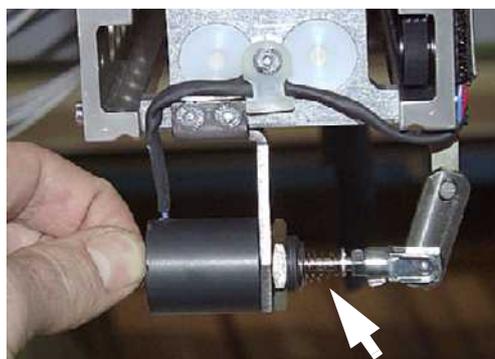


Figure 6-80 Detail of lower DiTi eject option 1

The lower DiTi eject option 1 was supplied until September 2000. In case a lower DiTi eject option 1 is not yet upgraded, we recommend to enhance the option now with the available upgrade kit (see [Spare Parts](#)).

You can easily identify a not upgraded option 1 by the spiral spring on the solenoid axle (see [Figure 6-80](#)).

Lower DiTi Eject Option 2

The lower DiTi eject option 2 is supplied as of October 2000. It includes improved solenoid mounting features and the leaf spring for the rocker which ensures proper working condition during operation.

Minimum Requirements



In case the required firmware is not yet downloaded: disconnect the lower DiTi eject option cable from the LiHa backplane (see J3, [Figure 6-71](#), 'LiHa backplane cable connections') prior to switching on the Genesis instrument.

Minimum requirements as shown in the following table must strictly be followed. Other configuration than stated below would cause burn out of ...

- the solenoid and/or
 - the backplane of LiHa 2 and/or
 - the DC-Servo board (MO1, see [Figure 6-71](#), 'LiHa backplane cable connections')
- ... and thus damage the instrument.

CU firmware version – control unit on instrument	Genesis instrument software version	Application software		
		Gemini software version	Logic software version	TOPS software version
V1.51 or later	V4.02 or later	V3.2 or later	V2.50 or later	V4.0 or later

Spare Parts

See [Section 7.4, 'Spare Parts LiHa 2'](#) for the spare parts list with part numbers.

The following items are available:

- [Lower DiTi eject option 2 \(4/8 tips\)](#)
- [Solenoid](#)
- [Upgrade kit \(rocker stop and leaf spring\)](#)

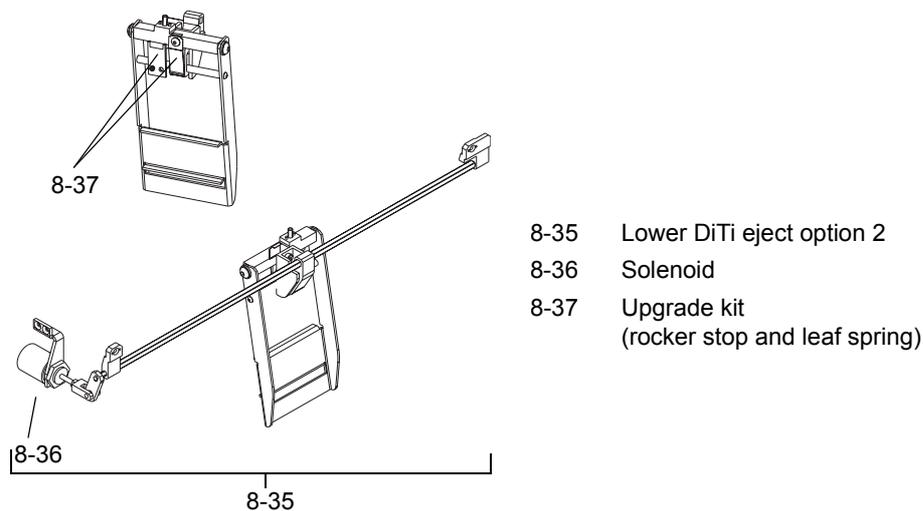


Figure 6-81 Spare parts for lower DiTi eject option

The DC-Servo board which controls the solenoid is described in [Section 6.6.6, 'Electronic Boards for LiHa 2'](#).

Removal of Lower DiTi Eject Option

Following information relates to a LiHa 2 with 8 tips and lower DiTi eject option 2.

For a LiHa 2 with only 4 tips or a lower DiTi eject option 1, the design is slightly different. However, the procedures described in this section remain unaltered.

Refer to [Figure 6-82, 'Removal of lower DiTi eject option 2'](#).

- 1 Remove LiHa 2 assembly as described in [Section 6.6.2, 'Complete LiHa 2 Assembly'](#).
- 2 Disconnect the solenoid cable (8-39) from the socket J3 on the backplane and free the cable from cable holders and Velcro tape.
- 3 Unscrew fixing screw (8-41) from the housing of the 3rd Z-rod (8-13).
- 4 Unscrew fixing screws (8-38) and (8-40), remove the complete lower DiTi eject option assembly.

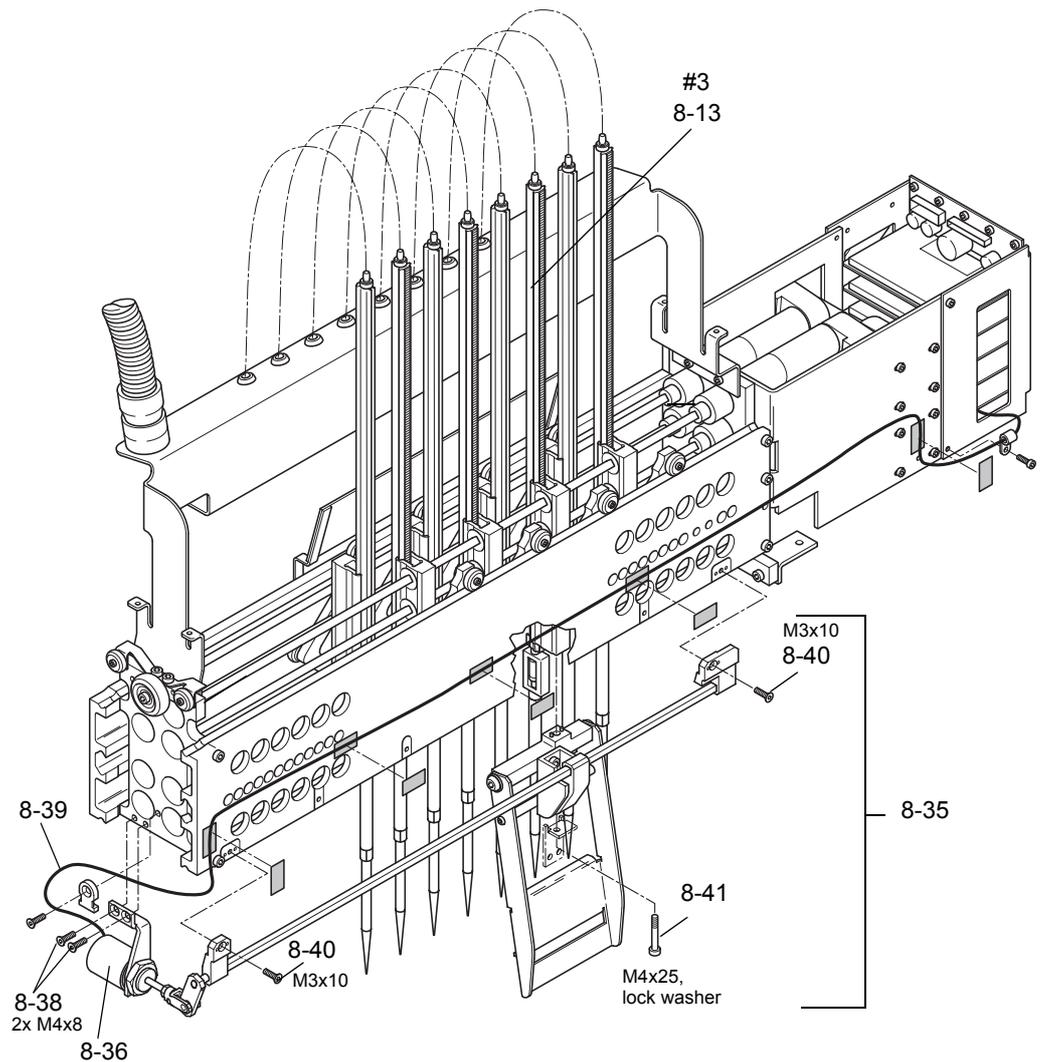


Figure 6-82 Removal of lower DiTi eject option 2

8-13	Z-rod	8-39	Solenoid cable
8-35	Lower DiTi eject option 2	8-40	Fixing screw bearing block
8-36	Solenoid	8-41	Fixing screw rocker assembly
8-38	Fixing screw solenoid holder		

Installation of Lower DiTi Eject Option 2



In case a new lower DiTi eject option 2 has to be assembled prior to installation, refer to Installation Instructions, Doc ID 391 276.

Refer to [Figure 6-82, 'Removal of lower DiTi eject option 2'](#).

- 1 Install in reverse order.
 - Make sure the solenoid holder screws (8-38) are fixed tightly.

- When connecting the solenoid cable (8-39) to the backplane, make sure the cable connector is positioned in the right direction (see [Figure 6-83](#)).



Wrong direction of the cable connector to the socket J3 would cause a short circuit in the solenoid.

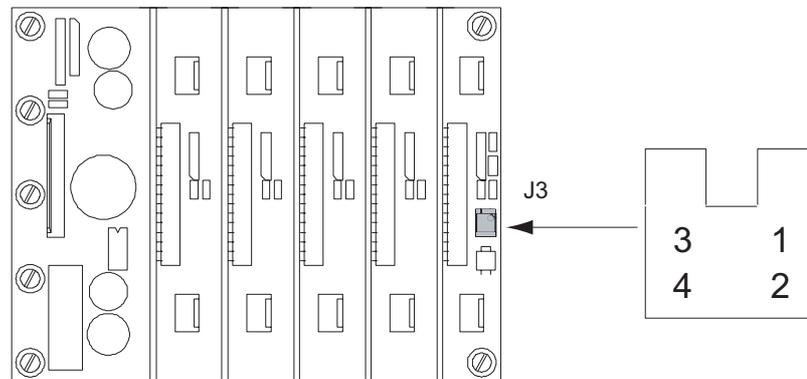


Figure 6-83 Correct connection of solenoid cable to the backplane

- 2 Perform [Rocker Adjustment Procedure](#) as described later in this section.
- 3 [Ensure Operating Readiness](#):
 - Calibrate lower DiTi eject
 - and all tests which are necessary after removal of LiHa 2 assembly ... as described in [Section 6.6.11](#).

Removal of Solenoid

- 1 Remove LiHa 2 assembly as described in [Section 6.6.2, 'Complete LiHa 2 Assembly'](#).
- 2 Disconnect the solenoid cable (8-39) from the socket J3 on the backplane.
- 3 Open and remove link lock (8-42).
- 4 Remove solenoid fork (8-43) and fixing nut (8-44).
- 5 Loosen the solenoid fixing nut (8-45), remove solenoid (8-36) from the solenoid holder (8-50).

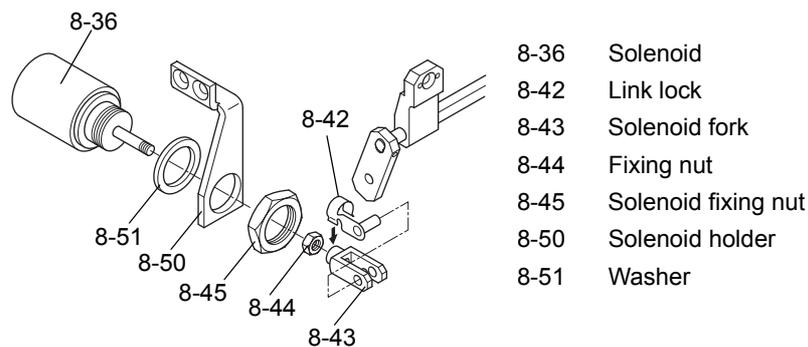


Figure 6-84 Removal of solenoid

Installation of Solenoid

- 1 Install in reverse order.
 - Make sure the solenoid holder screws (Figure 6-82, 8-38) are fixed tightly.
 - When connecting the solenoid cable (8-39) to the backplane, make sure the solenoid cable connector is positioned in the right direction (see Figure 6-83).



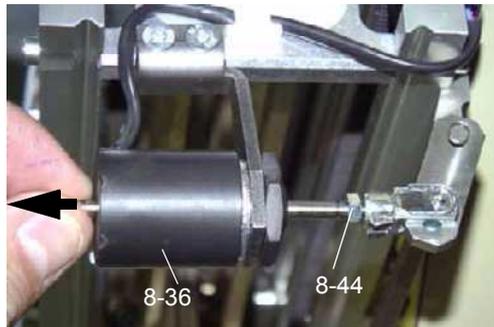
Wrong direction of the solenoid cable connector to the socket J3 would cause a short circuit in the solenoid.

- 2 Perform [Rocker Adjustment Procedure](#) as described later in this section.
- 3 [Ensure Operating Readiness](#)
 - Calibrate lower DiTi eject
 - and all tests which are necessary after removal of LiHa 2 assembly
- 4 ... as described in [Section 6.6.11](#).

Rocker Adjustment Procedure

Perform the rocker adjustment procedure ...

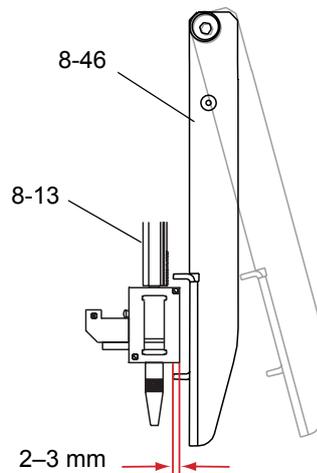
- after installation of the solenoid or the complete lower DiTi eject option,
- whenever the rocker touches the Z-rods on the LiHa 2,
- if DiTis are not ejected.



- 1 Manually pull the solenoid axle back to check the distance between the rocker assembly (8-46) and the Z-rods (8-13):

In the eject position, the overlapping between rocker nose and tip adapter distance must be between 2 and 3 mm.

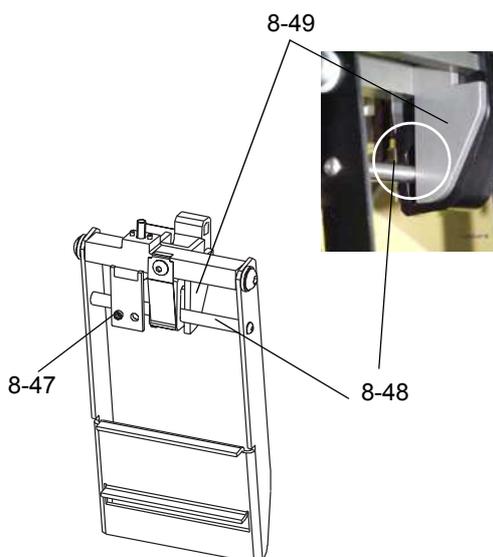
No part of the rocker assembly may touch the Z-rods at any time.



- 8-13 Z-rod
- 8-36 Solenoid
- 8-44 Fixing nut
- 8-46 Rocker assembly

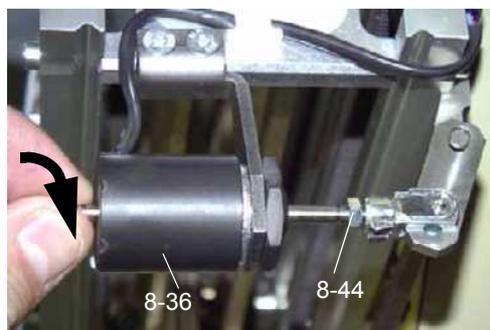
- 2 If necessary adjust the overlapping by means of the set screw (8-47) on the rocker stop:

Figure 6-85 Rocker adjustment



- Turn the set screw (8-47) clockwise to decrease the overlap.
- Turn the set screw counterclockwise to increase the overlap.

- 3 Loosen the fixing nut (8-44).
- 4 Reduce the clearance between rocker shaft (8-48) and moving lever guide (8-49) to an absolute minimum (they may just about to touch):
 - Turn the solenoid axle clockwise to reduce the clearing till the rocker moves away from the moving lever guide.
 - Then turn 1/2 turn only counterclockwise.



- 5 Tighten the fixing nut (8-44).

- 8-36 Solenoid
- 8-44 Fixing nut
- 8-47 Set screw
- 8-48 Rocker shaft
- 8-49 Moving lever guide

Figure 6-86 Rocker adjustment

6.6.11 Ensure Operating Readiness

Required Special Tools

- Reference tip

Tests to Be Performed *For detailed information refer to the Genesis Instrument Software Manual.*

After replacing parts of the LiHa 2, verify – and if necessary carry out – the following settings and tests:

Step	Test or Setup
1	CAN-bus resistance (see Section 6.2.3). <i>Necessary after replacement of</i> <ul style="list-style-type: none"> • LiHa 2 assembly • any PCB

2	<ul style="list-style-type: none"> – LiHa reference positions – Random move <p><i>Attention: never perform a random move test with a Genesis RMP!</i></p> <p><i>Necessary after replacement of</i></p> <ul style="list-style-type: none"> • <i>LiHa 2 assembly</i> • <i>any LiHa 2 belt</i> • <i>X-flex cable</i>
3	<p>Liquid detection test</p> <p><i>Necessary after replacement of</i></p> <ul style="list-style-type: none"> • <i>LiHa 2 assembly</i> • <i>X-flex cable</i> • <i>ILID cable, flat cable, chip or board</i> • <i>LiHa backplane</i> • <i>Tip adapter</i>
4	<ul style="list-style-type: none"> – Calibrate lower DiTi eject – Disposable tips test (DiTi eject test) <p><i>Necessary after replacement of</i></p> <ul style="list-style-type: none"> • <i>LiHa 2 assembly</i> • <i>Tip adapter</i> • <i>Lower DiTi eject option</i>
5	<ul style="list-style-type: none"> – Tightness check: fill/flush system and check all tubing connections – Precision test <p><i>Necessary after replacement of</i></p> <ul style="list-style-type: none"> • <i>LiHa 2 assembly</i> • <i>Tip adapter</i>

6.7 RoMa 1 – Disassembly and Assembly Procedures

Supplied until October 2000.

The X-DC-Servo board – which controls the X-motor of the RoMa – is described in [Section 6.3.5, 'Electronic Boards'](#).

The X-belt as well as the X-motor are described in [Section 6.3.3, 'X-Drive Assembly'](#).

6.7.1 Overview

RoMa 1 in Comparison with RoMa 2

Summary of the most obvious differences between RoMa 1 and RoMa 2:

Item	RoMa 1	RoMa 2
Guide rollers	not pre-tensioned	pre-tensioned
Z-brake	passive, mechanical	active, electromechanical
Side plates	not necessary	necessary for reinforcement
X-support	not adjustable	with adjusting screws

Special Tools

- Reference tip
- Teach plate
- Crimp release tool

RoMa 1 Spare Parts

See [Section 7.5, 'Spare Parts RoMa 1'](#) for the spare parts list with part numbers.

The following items can be replaced as spare parts:

- [RoMa 1 assembly](#)
- Mechanical parts:
 - [Gripper module](#)
 - [Long gripper finger](#)
 - [Short gripper finger](#)
 - [Y-belt](#)
- Electronic boards:
 - [Gripper board](#)
 - [Z/G-DC-Servo board](#)
 - [Y/R-DC-Servo board](#)
 - [RoMa 1 backplane](#)
- Motors:
 - [Rotator motor](#)
 - [Z-DC-Servo motor](#)
 - [Y-DC-Servo motor](#)

- Flex cables:
 - X-flex cable
 - Gripper/Rotator flex cable
- Z-brake

Location of Spare Parts

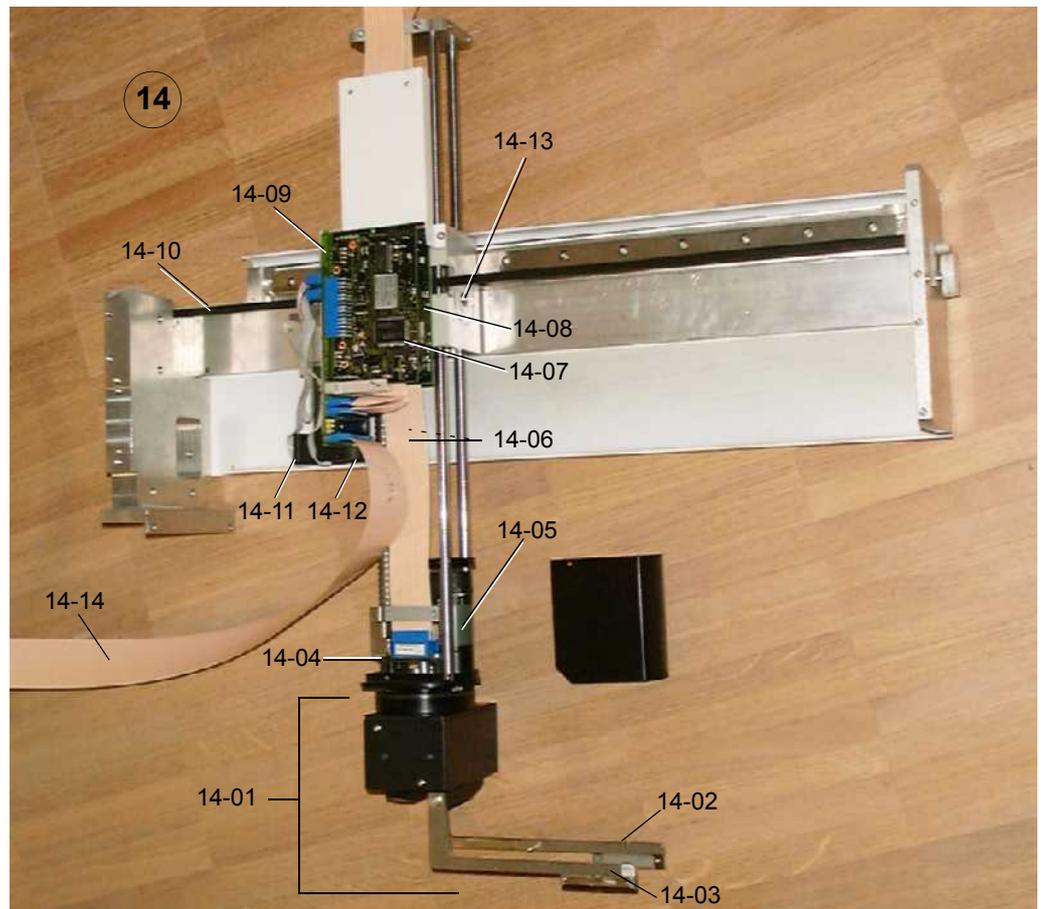


Figure 6-87 RoMa 1 spare parts

14	RoMa 1 assembly	14-01	Gripper module (incl. gripper fingers)
14-02	Long gripper finger	14-03	Short gripper finger
14-04	Gripper board	14-05	Rotator motor
14-06	Gripper/Rotator flex cables	14-07	Z/G-DC-Servo board
14-08	Y/R-DC-Servo board	14-09	RoMa 1 backplane
14-10	Y-Belt	14-11	Y-motor
14-12	Z-motor	14-13	Z-brake
14-14	X-flex cable		

Gripper Module The spare part gripper module (14-01) is a set that includes the following parts:

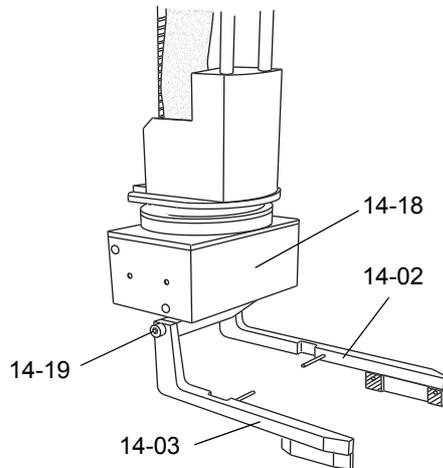


Figure 6-88 Gripper module

- gripper module head (14-18)
- long gripper finger (14-02)
- short gripper finger (14-03)
- fixing screws (14-19)

Gripper Fingers

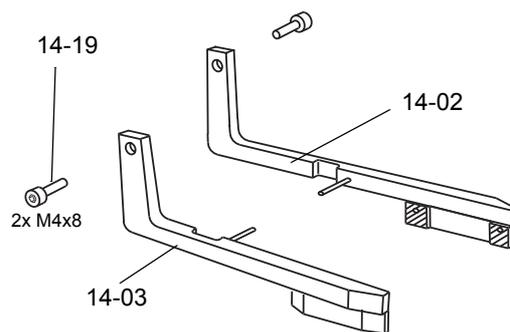


Figure 6-89 Gripper finger

Note that the gripper fingers are not the same length:

- Long gripper finger (14-02): 161 mm
- Short gripper finger (14-03): 131 mm
- Fixing screws (14-19)

6.7.2 Complete RoMa 1 Assembly

Removal

- 1 Disconnect the X-flex cable (14-14) from the Optibo board (left service compartment) and unscrew the respective cable clamp in the X-bay. Also see [Section 6.7.6, 'X-Flex Cable'](#).
- 2 Carefully pull the X-flex cable out of the cable duct.
- 3 Unscrew the RoMa 1 from the X-slide and lift it carefully out of the guide rail (arm guide (7)) and off the X-slide.

Installation

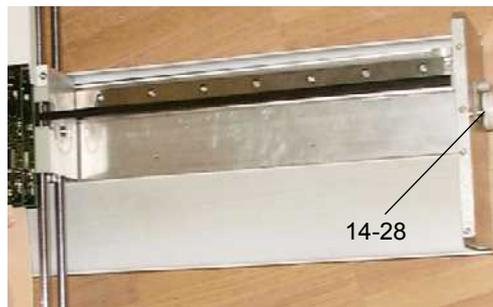


Figure 6-90 Cable clamp in X-bay

- 1 Clean the contact surface of the guide rail and the support roller (14-28) with a lint-free tissue and some ethyl alcohol.

14-28 Support roller

- 2 Install in reverse order.
For correct cable connection on the Optibo see [Figure 6-20, 'Optibo cable connections'](#).
- 3 Ensure operating readiness as described in [Section 6.7.13](#).

6.7.3 Gripper Fingers

The procedures for removing, installing and adjusting the gripper fingers are identical with those for RoMa 2.

- 1 Follow the instructions given in [Section 6.8.4, 'Gripper Fingers'](#).

6.7.4 Gripper Module Head, Gripper Board

The gripper module head (14-18) or the gripper board (14-04) are rather difficult to remove since their fixing screws are not well accessible. Whenever possible, replace the whole RoMa 1 and do not take it apart in the field.

The procedures for removing and installing the gripper module head or the gripper board are identical with those for RoMa 2.

- 1 Follow the instructions given in [Section 6.8.5, 'Gripper Module Head, Gripper Board'](#).
- 2 Ensure operating readiness as described in [Section 6.7.13](#).

6.7.5 Rotator Motor

The rotator motor (14-05) is rather difficult to remove since its fixing screws are not well accessible. Whenever possible, replace the whole RoMa 1 and do not take it apart in the field.

The procedures for removing and installing the rotator motor are identical with those for RoMa 2.

- 1 Follow the instructions given in [Section 6.8.6, 'Rotator Motor'](#).
- 2 Ensure operating readiness as described in [Section 6.7.13](#).

6.7.6 X-Flex Cable

The procedures for removing and installing the X-flex cable are identical with those for RoMa 2.

- 1 Follow the instructions given in [Section 6.8.7, 'X-Flex Cable'](#).
- 2 Ensure operating readiness as described in [Section 6.7.13](#).

6.7.7 Gripper/Rotator Flex Cables

The procedures for removing and installing the gripper/rotator flex cables (14-06) are identical with those for RoMa 2.

- 1 Follow the instructions given in [Section 6.8.8, 'Gripper/Rotator Flex Cables'](#)

Note: Correct connection of the gripper/rotator flex cables:

Gripper board J3 ? RoMa 1 backplane: J5

Gripper board J4 ? RoMa 1 backplane: J6

6.7.8 Y/R- and Z/G-DC-Servo Board

The procedures for removing and installing the DC-servo boards (14-07, 14-08) are practically identical with those for RoMa 2.

- 1 Follow the instructions given in [Section 6.8.9, 'Y/R- and Z/G-DC-Servo Board'](#)
- 2 Ensure operating readiness as described in [Section 6.7.13](#).

6.7.9 RoMa 1 Backplane

Although the RoMa 1 backplane (14-09) differs from the RoMa 2 backplane the procedures for removing and installing are practically identical with those for RoMa 2.

- 1 Follow the instructions given in [Section 6.8.10, 'RoMa 2 Backplane'](#).
 - Refer to [Figure 6-91, 'RoMa 1 backplane connections \(component side: left, solder side: right\)'](#) for correct connections to the RoMa 1 backplane.
- 2 Ensure operating readiness as described in [Section 6.7.13](#).

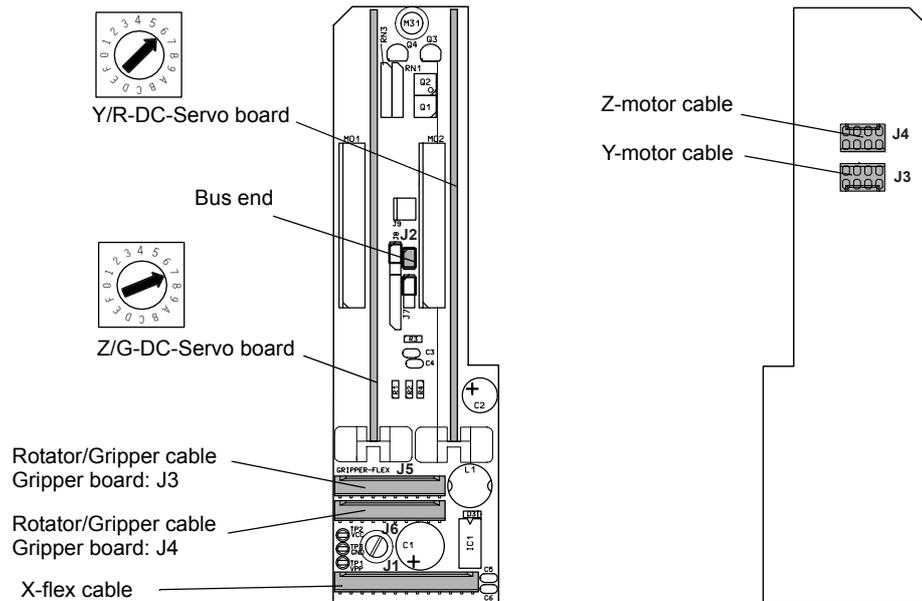


Figure 6-91 RoMa 1 backplane connections (component side: left, solder side: right)

6.7.10 Y-Belt

The procedures for removing and installing the Y-belt (14-10) are identical with those for RoMa 2.

- 1 Follow the instructions given in [Section 6.8.11, 'Y-Belt'](#)
- 2 Ensure operating readiness as described in [Section 6.7.13](#).

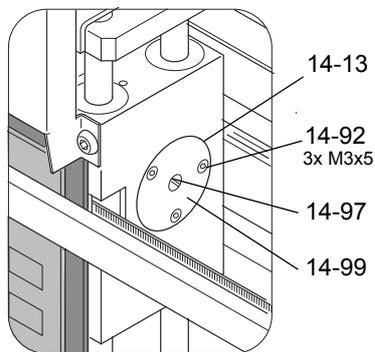
6.7.11 Y- and Z-Motor

The procedures for removing and installing the Y-motor (14-11) and the Z-motor (14-12) are identical with those for RoMa 2.

- 1 Follow the instructions given in
 - [Section 6.8.12, 'Y-Motor'](#)
 - and [Section 6.8.13, 'Z-Motor'](#).
- 2 Ensure operating readiness as described in [Section 6.7.13](#).

6.7.12 Z-Brake

Removal



- 14-13 Z-brake
- 14-92 Fixing screw
- 14-97 Adjustment screw
- 14-99 Pressure flange

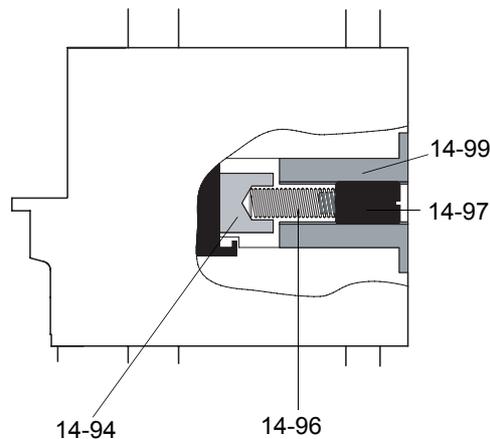
- 1 Unscrew and remove the Z-brake.

Figure 6-92 Z-brake

Installation

- 1 Clean all parts with a 70 % alcohol solvent.
- 2 Replace broken parts.
- 3 Install in reverse order.

Adjusting the Z-Brake



- 14-94 Brake shoe
- 14-96 Pressure spring
- 14-97 Adjustment screw
- 14-99 Pressure flange

For the following test and adjustment the instrument must be switched off and the gripper fingers must be installed.

Figure 6-93 Z-brake adjustment

- 1 Place an object of approx. 400 g on the gripper fingers.
- 2 Check whether the object moves downwards. If so turn the adjustment screw (14-97) clockwise just until the movement stops.
- 3 Repeat the test over the entire length of the Z-drive. Readjust if necessary.
- 4 Secure the adjustment screw with safety lacquer when finished.
- 5 Ensure operating readiness as described in [Section 6.7.13](#).

6.7.13 Ensuring Operating Readiness

Purpose Most of the procedures described in this section require you to remove the entire RoMa before you can replace a damaged part. For this reason the adjustments and tests described below must be carried out after reinstallation.

Required Special Tools

- Reference tip
- RoMa test plate

Tests to Be Performed *For detailed information refer to the Genesis Instrument Software Manual.*

After replacing most parts of the RoMa 1, verify – and if necessary carry out – the following settings and tests:

Step	Test or Setup
1	CAN-bus resistance (see Section 6.2.3). <i>Necessary if entire RoMa or backplane or X-flex cable were replaced.</i>
2	RoMa reference positions <i>Note: It may be necessary to check and readjust the taught positions in the application software as well.</i>
3	RoMa test
4	Random move <i>Attention: never perform a random move test with a Genesis RMP!</i>

After Finishing

- 1 Reinstall all covers you have removed.
- 2 Close service doors and X-bay covers.
- 3 Put objects you removed before back on the worktable.
- 4 Start the Instrument in operating mode.

6.8 RoMa 2 – Disassembly and Assembly Procedures

Supplied as of October 2000.

The X-DC-Servo board – which controls the X-motor of the RoMa – is described in [Section 6.3.5, 'Electronic Boards'](#).

The X-belt as well as the X-motor are described in [Section 6.3.3, 'X-Drive Assembly'](#).

6.8.1 Overview

RoMa 1 in Comparison with RoMa 2

Summary of the most obvious differences between RoMa 1 and RoMa 2:

Item	RoMa 1	RoMa 2
Guide rollers	not pre-tensioned	pre-tensioned
Z-brake	passive, mechanical	active, electromechanical
Side plates	not necessary	necessary for reinforcement
X-support	not adjustable	with adjusting screws

Special Tools

- Mounting bracket
- Reference tip
- Teach plate
- Crimp release tool

RoMa 2 Spare Parts

See [Section 7.6, 'Spare Parts RoMa 2'](#) for the spare parts list with part numbers.

The following items can be replaced as spare parts:

- [RoMa 2 assembly](#)
- Mechanical parts
 - [Gripper module](#)
 - [Long gripper finger](#)
 - [Short gripper finger](#)
 - [Y-belt](#)
- Electronic boards
 - [Gripper board](#)
 - [Z/G-DC-Servo board](#)
 - [Y/R-DC-Servo board](#)
 - [RoMa 2 backplane](#)
- Motors
 - [Rotator motor](#)

- Z-DC-Servo motor
- Y-DC-Servo motor
- Flex cables
 - X-flex cable
 - Gripper/Rotator flex cable
- Z-brake

Location of Spare Parts

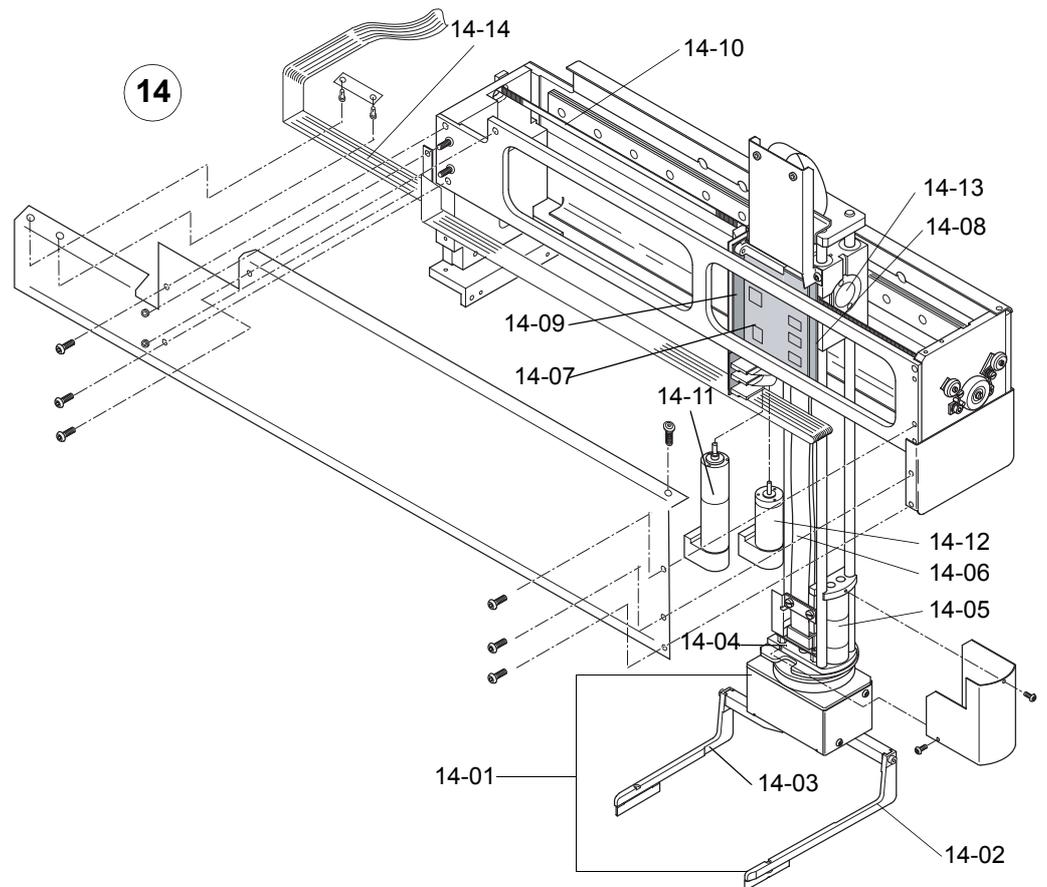


Figure 6-94 RoMa 2 spare parts

14	RoMa 2 Assembly	14-01	Gripper module (incl. gripper fingers)
14-02	Long gripper finger	14-03	Short gripper finger
14-04	Gripper board	14-05	Rotator motor
14-06	Gripper/Rotator flex cables	14-07	Z/G-DC-Servo board
14-08	Y/R-DC-Servo board	14-09	RoMa 2 backplane
14-10	Y-Belt	14-11	Y-motor
14-12	Z-motor	14-13	Z-brake
14-14	X-flex cable		

Gripper Module The spare part gripper module (14-01) is a set that includes the following parts:

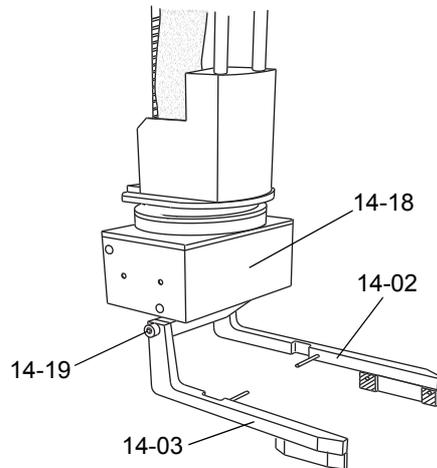


Figure 6-95 Gripper module

- gripper module head (14-18)
- long gripper finger (14-02)
- short gripper finger (14-03)
- fixing screws (14-19)

Gripper Fingers

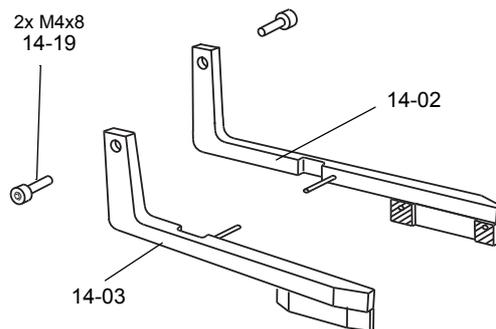


Figure 6-96 Gripper finger

Note that the gripper fingers are not the same length:

- Long gripper finger (14-02): 161 mm
- Short gripper finger (14-03): 131 mm
- Fixing screws (14-19)

6.8.2 Complete RoMa 2 Assembly

Removal

- 1 Disconnect the X-flex cable (14-14) from the Optibo board (left service compartment) and unscrew the respective cable clamp in the X-bay. Also see [Section 6.8.7, 'X-Flex Cable'](#).
- 2 Carefully pull the X-flex cable out of the cable duct.
- 3 Unscrew the RoMa 2 from the X-slide (14-31) and lift RoMa 2 carefully out of the guide rail (14-29) and off the X-slide.

Installation

- 1 Clean the contact surface of the guide rail (14-29) as well as the guide rollers (14-27) and the support roller (14-28) with a lint-free tissue and some ethyl alcohol.
- 2 Insert the mounting bracket (14-26) to press the guide rollers (14-27) apart.

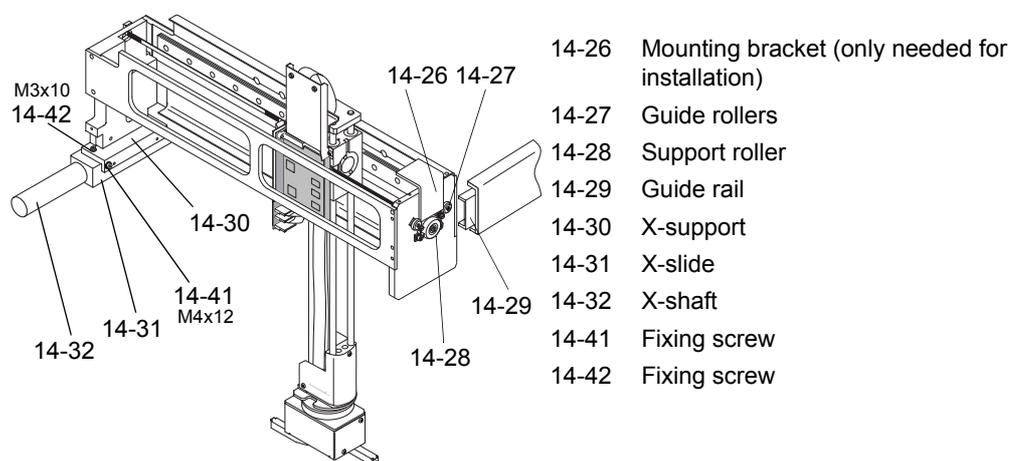


Figure 6-97 Installing the RoMa 2

- 3 Install in reverse order.
For correct cable connection on the Optibo see [Figure 6-20, 'Optibo cable connections'](#).
- 4 Perform the mechanical adjustment according to [Section 6.8.3, 'Mechanical Adjustment After Reinstallation'](#).
- 5 Ensure operating readiness as described in [Section 6.8.15](#).

6.8.3 Mechanical Adjustment After Reinstallation

Why Adjust?

After the RoMa 2 has been installed so far, it must be aligned with the positioning pins on the worktable. The purpose of this alignment is to ensure that the RoMa 2 runs parallel to the positioning pins when it moves in the Y-axis (from back to front and vice versa).



Note

This is only a mechanical pre-adjustment. For further tests and adjustments see [Section 6.8.15, 'Ensuring Operating Readiness'](#)

Installing the Reference Tip

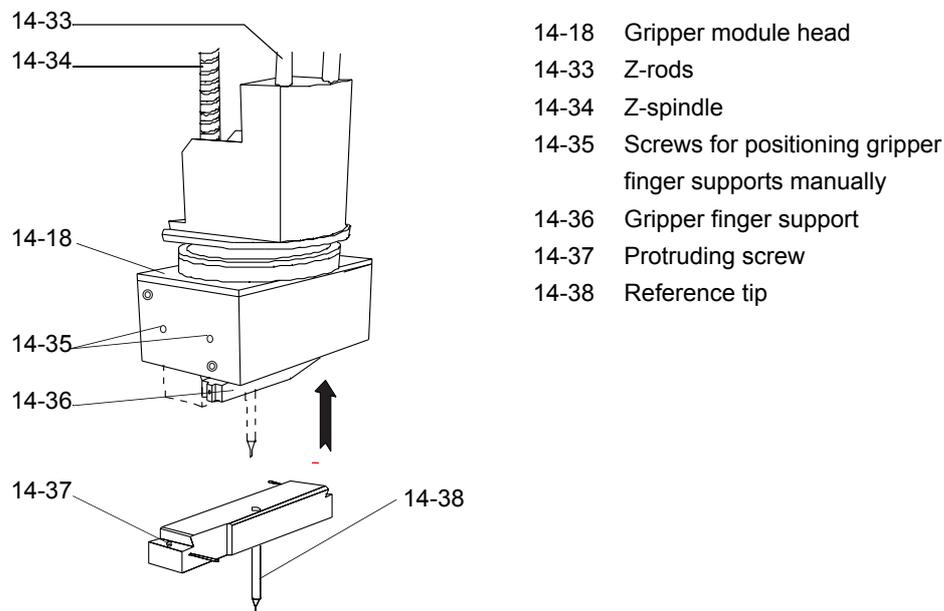


Figure 6-98 Fixing the reference tip to the gripper module

- 1 Move the RoMa 2 by its Z-rods (14-33) to the front center above the worktable.
- 2 Insert the reference tip (14-38) between the two gripper finger supports (14-36):
 - The protruding screw (14-37) must be on the side of the screws (14-35).
 - Turn one of the screws (14-35) until the reference tip can be inserted between the gripper finger supports (17-36).
- 3 Fix the reference tip (14-38) to the gripper module head (14-18) by turning one of the screws (14-35) in the opposite sense. Make sure the reference tip (14-38) is firmly held by the gripper finger supports (14-36).

Alignment in
Y-Axis

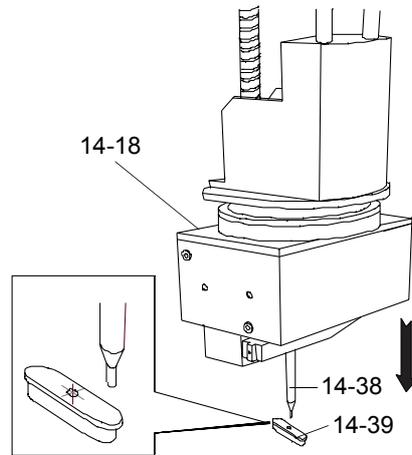
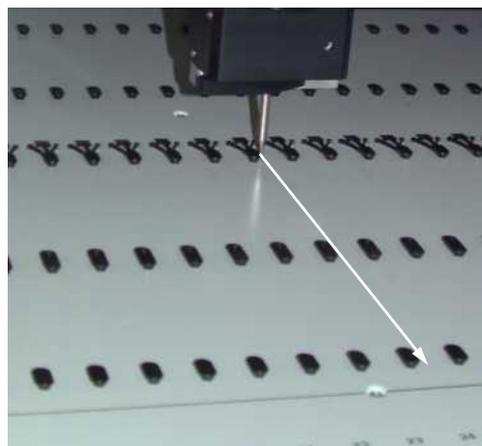
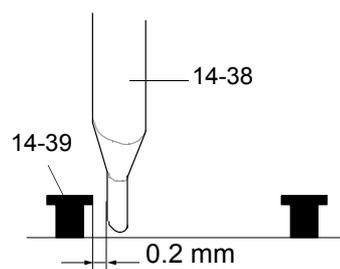


Figure 6-99 Positioning the reference tip

- 1 Pull the gripper module head (14-18) downwards.
- 2 Move the reference tip (14-38) close to the right edge of a positioning pin (14-39) in the third row from the front on the worktable. Distance from positioning pin: approx. 0.2 mm.



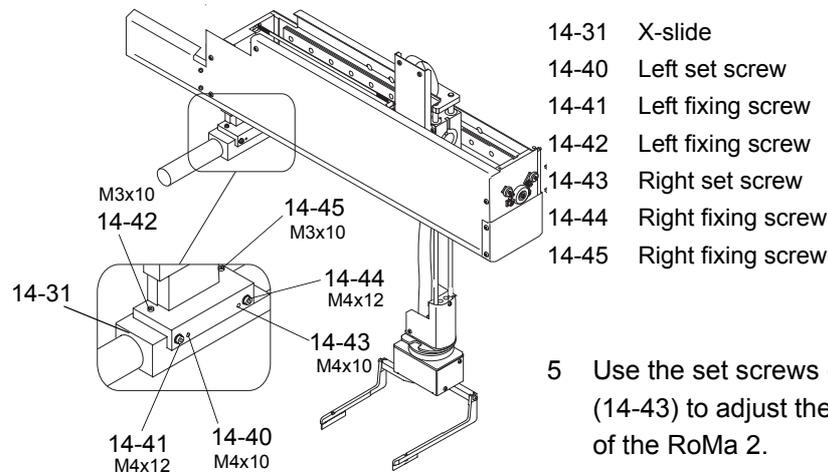
- 3 Firmly hold the X-slide (14-31 in [Figure 6-101](#)) with one hand. Ensure that the RoMa 2 cannot move in the X-axis during the following test.
- 4 Pull the RoMa 2 in the Y-axis (from rear to front) past three positioning pins (14-39) towards the front of the instrument.



The distance between the positioning pins (14-39) and the reference tip (14-38) must not exceed 0.2 mm.

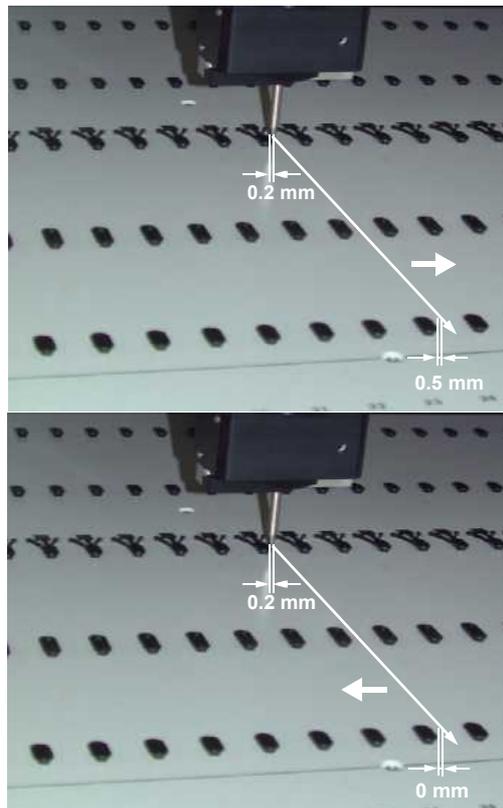
Figure 6-100 Checking the distance positioning pin – reference tip

**Aligning in Y-axis
(Continued)**



5 Use the set screws (14-40) and (14-43) to adjust the moving direction of the RoMa 2.

Figure 6-101 Fixing and adjusting screws on X-support



6 If the RoMa 2 drifts to the right turn the left set screw (14-40) to correct.

7 If the RoMa 2 drifts to the left turn the right set screw (14-43) to correct.

8 Repeat steps 3 to 7 until the RoMa 2 moves parallel to the positioning pins.

9 Tighten the fixing screws when finished (see [Figure 6-101](#)).

10 Remove the reference tip (14-38).

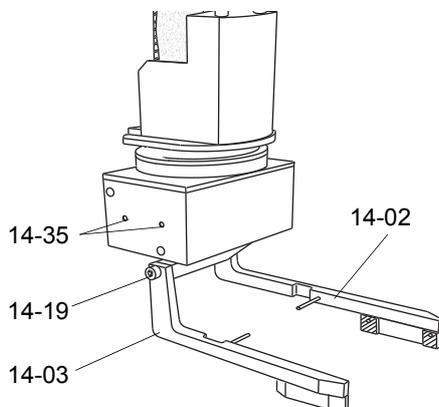
Figure 6-102 Correction of drifts

11 Install the gripper fingers (see [Section 6.8.4](#)).

12 Carry out further steps to ensure operating readiness. See [Section 6.8.15](#) for details.

6.8.4 Gripper Fingers

Removal



- 14-02 Long gripper finger
- 14-03 Short gripper finger
- 14-19 Fixing screw M4 x 8
- 14-35 Screws for moving gripper fingers manually.

- 1 Unscrew and remove the long and short gripper fingers.

Figure 6-103 Gripper fingers

Installation

- 1 Install the short and long gripper fingers (14-02) and (14-03).

Important! Make sure you install them correctly as shown in Figure 6-104.

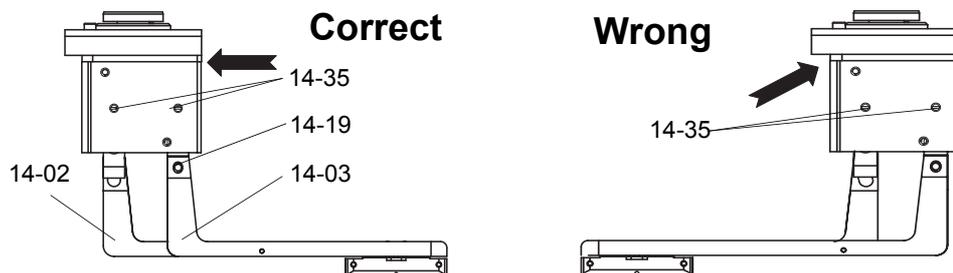


Figure 6-104 Correct installation of the gripper fingers

Adjusting the Gripper Fingers

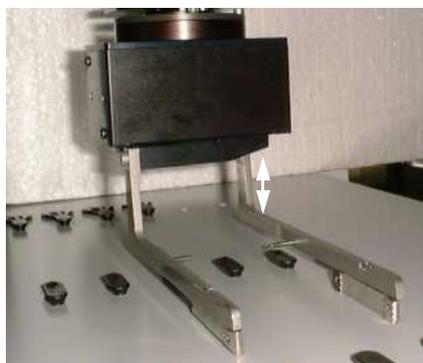


Figure 6-105 Distance between worktable and gripper base

- 1 Carefully pull the gripper module down until one of the gripper fingers just touches the surface of the worktable.
- 2 If the distances of the gripper fingers from the worktable are not equal adjust the height of the long gripper finger. Tolerance limit: 0.5 to 1 mm.
- 3 Tighten the fixing screw of the long gripper finger when finished.

6.8.5 Gripper Module Head, Gripper Board

Recommendation The gripper module head (14-18) or the gripper board (14-04) are rather difficult to remove since their fixing screws are not well accessible. Whenever possible, replace the whole RoMa 2 and do not take it apart in the field.

Overview

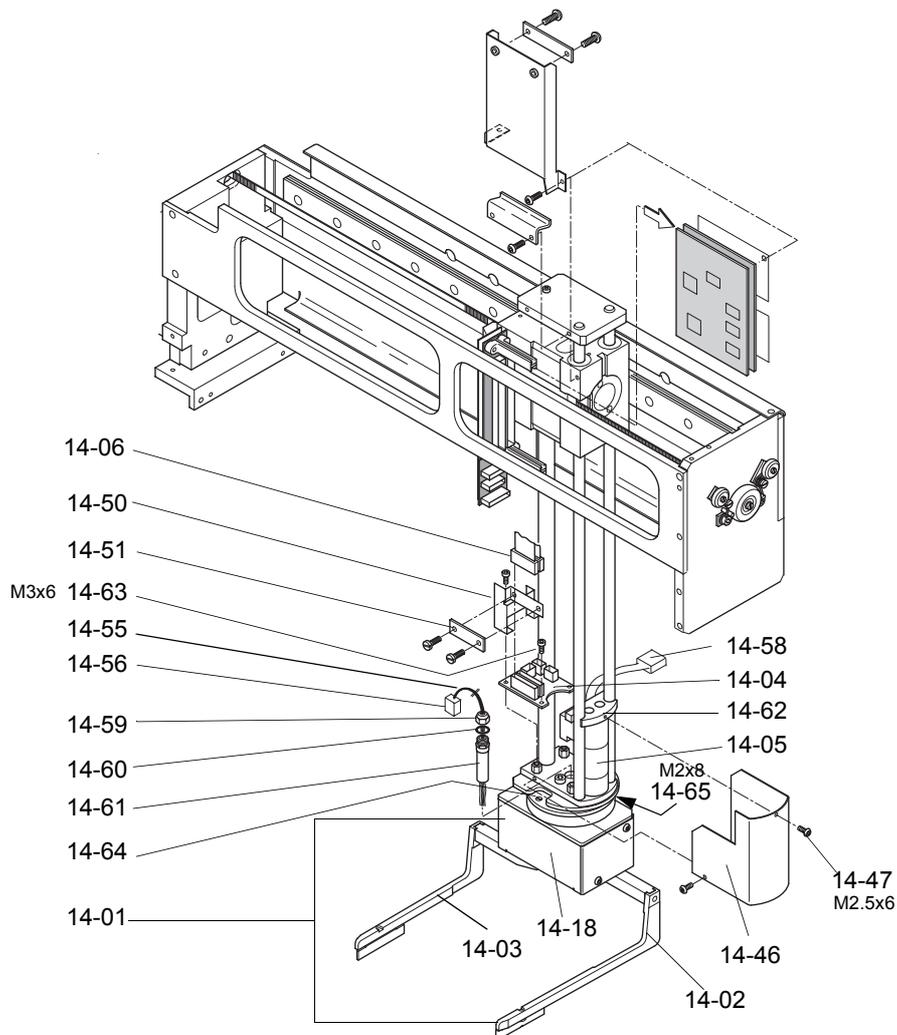


Figure 6-106 Overview of rotator and gripper modules

14-01	Gripper module (incl. gripper fingers!)	14-02	Long gripper finger
14-03	Short gripper finger	14-04	Gripper board
14-05	Rotator motor	14-06	Gripper/Rotator flex cables
14-18	Gripper module head	14-46	Rotator cover
14-47	Fixing screws	14-50	Cable bracket
14-51	Cable clamp	14-55	Gripper motor cable
14-56	Cable connector	14-58	Rotator motor cable
14-59	Cap nut	14-60	O-ring
14-61	Bushing	14-62	Z-stop
14-63	Fixing screws (gripper board)	14-64	Fixing screws (Gripper module)
14-65	Fixing screws (rotator motor)		

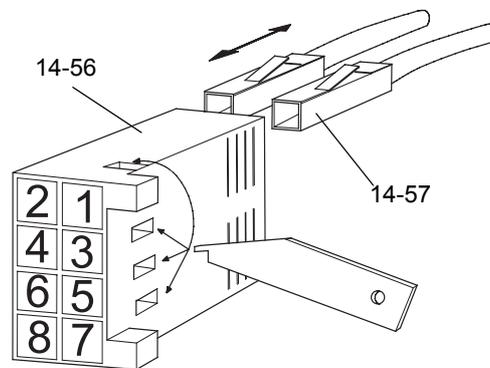
Removal

Disconnecting the Cables

Details see [Figure 6-106](#).

- 1 Unscrew the rotator cover (14-46).
- 2 Remove the cable clamps (14-51).
- 3 Unscrew cable bracket (14-50).
- 4 Disconnect all cables from the gripper board (14-04):
 - Gripper/Rotator flex cables (14-06)
Mark designation (J3, J4) on respective connector!
 - Rotator motor cable (14-58).
 - Gripper motor cable (14-55).

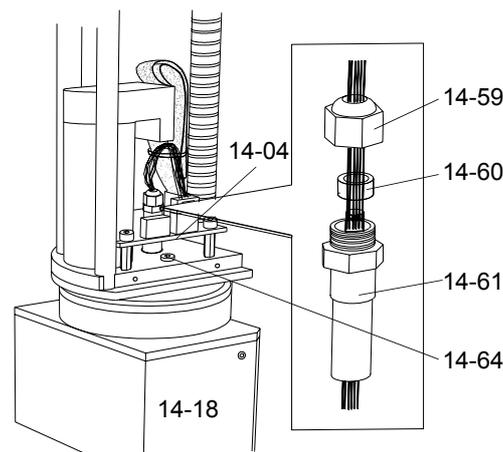
Extracting the Wires



- 5 Use the crimp release tool to extract the individual wires from the connector (14-56). Be careful not to damage the contact bushes (14-57).

Figure 6-107 Gripper motor cable plug

Removing the Gripper Module Head and the Gripper Board

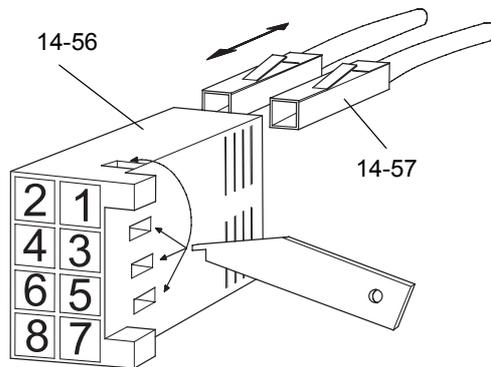


- 6 Remove the cap nut (14-59), the O-ring (14-60) and the bushing (14-61).
Important! Be careful not to damage the individual wires of the gripper cable!
- 7 Unscrew and remove the gripper board (14-04).
- 8 Loosen the screws (14-64) and carefully remove the gripper module head (14-18).

Figure 6-108 Removing the gripper module head

Installation

1 Execute the previous steps 1 to 8 in reverse order.



- Make sure you insert the contact bushes (14-57) correctly into the housing of the connector (14-56).
- Notice the wire colors.

Pin 1	White	Pin 2	Not used
Pin 3	Yellow	Pin 4	Red
Pin 5	Green	Pin 6	Black
Pin 7	Not used	Pin 8	Violet

Figure 6-109 Reassemble connector correctly

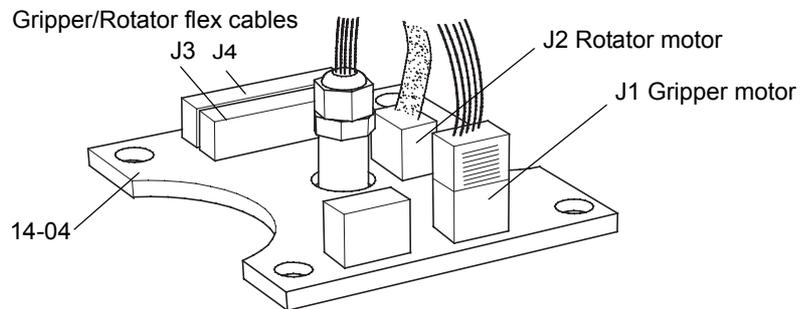


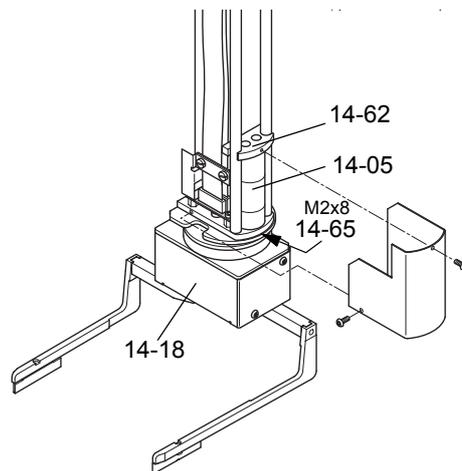
Figure 6-110 Gripper board cable connections

2 Ensure operating readiness according to [Section 6.8.15](#).

6.8.6 Rotator Motor

Recommendation The rotator motor (14-05) is rather difficult to remove since its fixing screws are not well accessible. Whenever possible, replace the whole RoMa 2 and do not take it apart in the field.

Removal



- 1 Remove the gripper module head (14-18) to get access to the fixing screws (14-65) of the rotator motor (14-05). See [Section 6.8.5](#)
- 2 Remove the Z-stop (14-62).
- 3 Unscrew and remove the rotator motor (14-05).

- 14-05 Rotator motor
- 14-18 Gripper module head
- 14-62 Z-stop
- 14-65 Fixing screws

Figure 6-111 Removal of rotator motor

Installation

- 1 Install the rotator motor (14-05).
- 2 Reinstall the gripper module head (14-18) according to section [Section 6.8.5](#).
- 3 Ensure operating readiness according to [Section 6.8.15](#).

6.8.7 X-Flex Cable

- Before You Begin**
- 1 Open the left access door and the X-bay covers if not done yet.
 - 2 Move the RoMa 2 to the right side of the instrument.

Removal

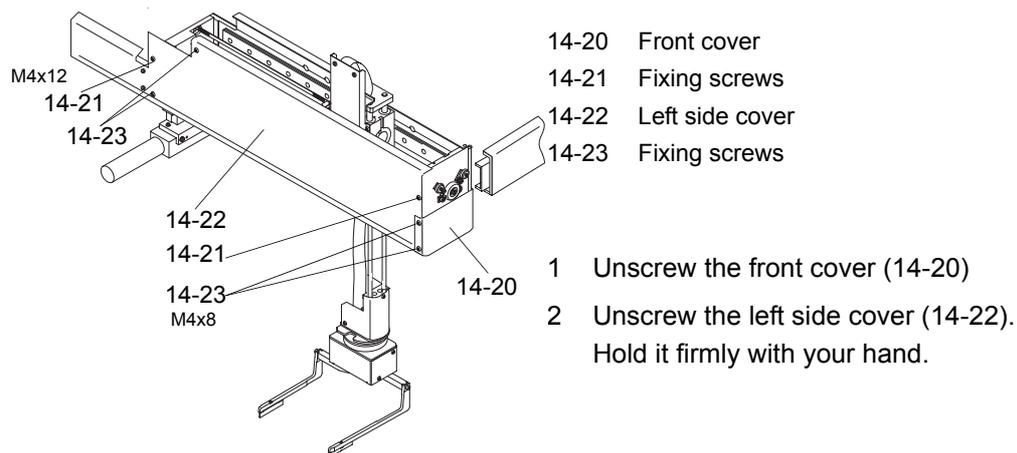


Figure 6-112 Removing the covers

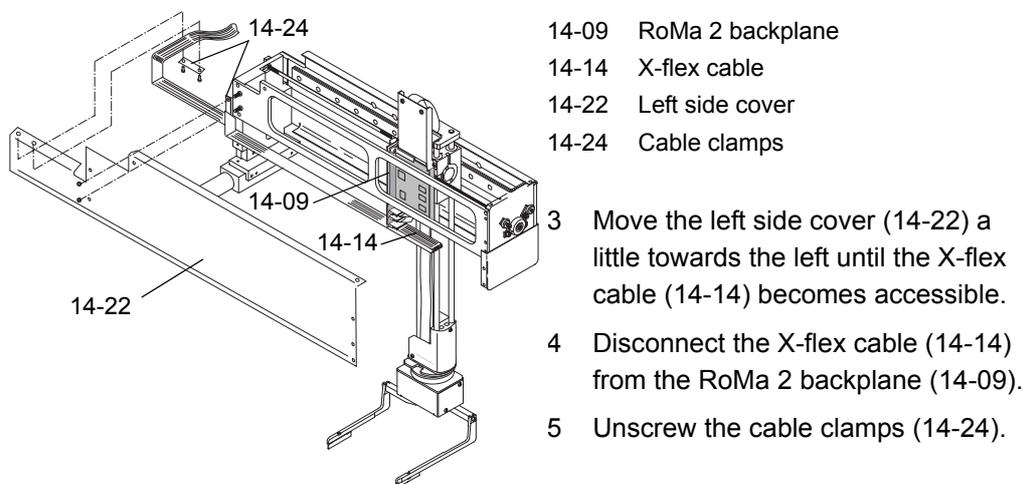


Figure 6-113 Disconnecting the cable

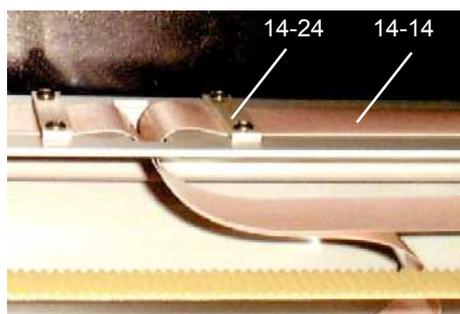


Figure 6-114 Cable clamp in X-bay

- 6 Unscrew the cable clamp (14-24) in the X-bay.

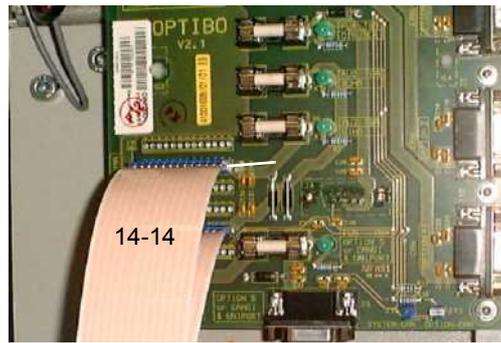


Figure 6-115 Connection of X-flex cable to Optibo board

- 7 Disconnect the X-flat cable from socket J6 on the Optibo board (on the left side).
- 8 Now you can remove the X-flex cable.
 - Carefully pull it through the opening below the Optibo board and the one in the X-bay (see [Figure 6-114](#)).

Preparing the Installation

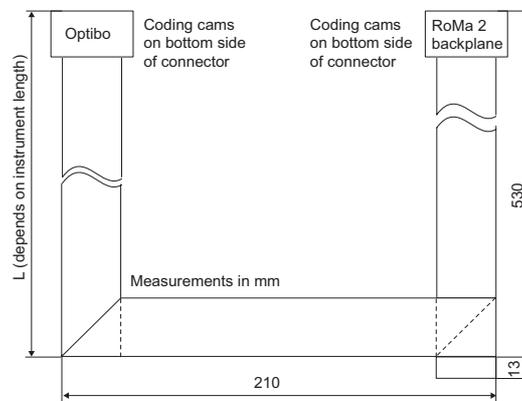
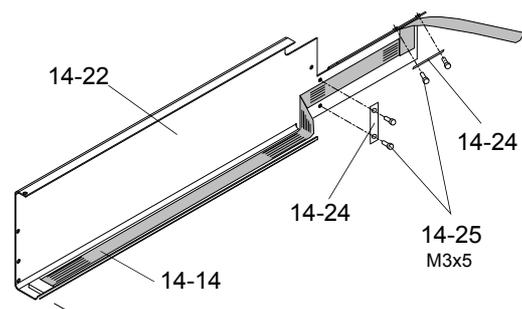


Figure 6-116 Folding the X-flex cable

Normally, the replacement X-flex cable (14-14) is not folded when it is shipped.

- 1 Fold the cable according to the cable you have removed. Also see [Figure 6-116](#).

Installation



- 14-14 X-flex cable
- 14-22 Left side cover
- 14-24 Cable clamps
- 14-25 Fixing screws

- 2 Fix the folded X-flex cable (14-14) to the left side cover (14-22).

Figure 6-117 Fixing the X-flat cable to the side cover

- 3 Connect the cable to the RoMa 2 backplane (14-09). See [Figure 6-125](#), 'RoMa 2 backplane connections (component side: left, solder side: right)'.

Important! Be careful not to overstretch the X-flex cable!

- 4 Screw the side cover to the RoMa 2.
- 5 Move the RoMa 2 to the right half of the instrument.
- 6 Form a loop with the X-flat cable in the X-bay.

Important! The cable must lay flat on the surface of the X-bay. Make sure the cable is neither twisted nor bent too much.

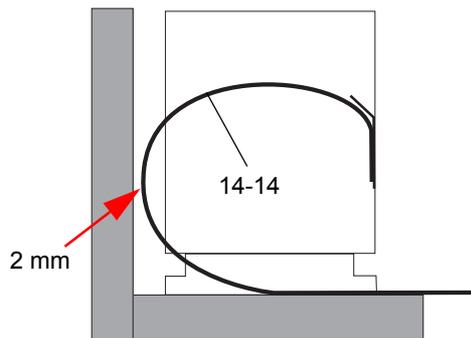
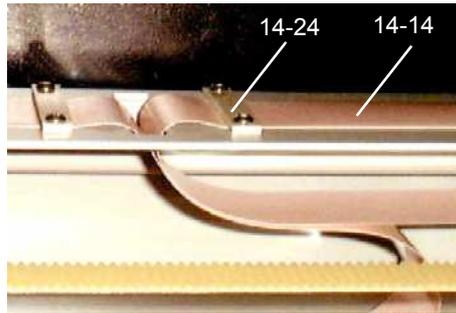


Figure 6-118 Laying the X-flat cable

- 7 Draw the end of the X-flex cable (14-14) through the opening in the middle of the X-bay.
- 8 Fix it with the cable clamp (14-24).
Make sure there is a gap of approx. 2 mm between X-flex cable and the frame of the instrument when the RoMa is moved to the very right side.
- 9 Lead the cable through the cable duct beneath the X-bay, and draw it through the opening below the Optibo board on the left side of the instrument.

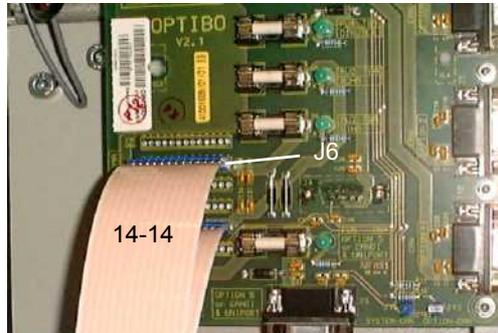


Figure 6-119 Connection of X-flex cable to Optibo board

- 10 Connect the X-flat cable to socket J6 on the Optibo board.

Finishing the Installation

- 1 Move the RoMa 2 several times back and forth and check whether the cable:
 - is not overstretched in any position
 - does not tilt to one side or the other
 - does not get entangled with other parts
 - just touches the right side wall when you move the RoMa 2 to the right side.
- 2 Ensure operating readiness according to [Section 6.8.15](#).
- 3 Reinstall the X-bay covers and close the left access door when finished.

6.8.8 Gripper/Rotator Flex Cables

The gripper/rotator flex cables are two parallel cables – for the rotator motor and for the gripper motor – which are connected to the RoMa backplane and to the gripper board.

Removal

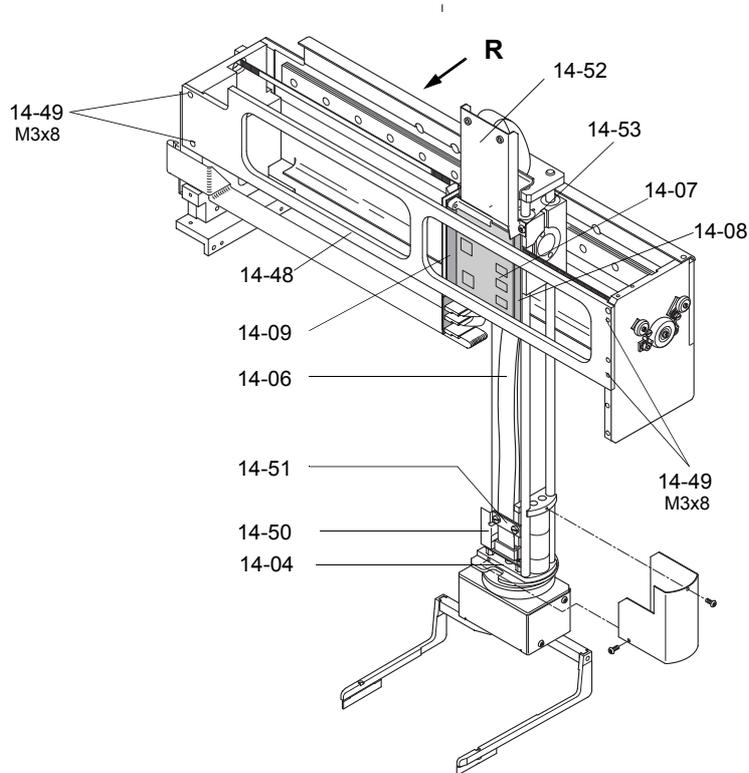


Figure 6-120 Gripper/Rotator flex cables

14-04	Gripper board	14-06	Gripper/Rotator flex cables
14-07	Z/G-DC-Servo board	14-08	Y/R-DC-Servo board
14-09	RoMa backplane	14-48	Left side plate
14-49	Screws	14-50	Cable bracket
14-51	Cable clamp	14-52	Protection bracket
14-53	Teflon foil		

- 1 Lay the RoMa 2 with its right side down (R in Figure 6-120) on a flat, stable surface.
- 2 Remove left side cover (14-22, see Figure 6-112, 'Removing the covers').
- 3 Loosen the screws (14-49) and remove the left side plate (14-48).
- 4 Remove various cable clamps (14-51).
- 5 Unscrew and remove the cable bracket (14-50) and the protection bracket (14-52).
- 6 Remove the Z/G- and Y/R-DC-Servo boards (14-07) and (14-08).
Details see Section 6.8.9, 'Y/R- and Z/G-DC-Servo Board'.
- 7 Disconnect the respective gripper/rotator flex cable (14-06) from the RoMa 2 backplane (14-09) and the gripper board (14-04).

Installation

- 1 Fold the replacement gripper/rotator flex cable according to the cable you have removed.
- 2 Install in reverse order:



Insert the gripper/rotator flex cable properly according to [Figure 6-121](#).

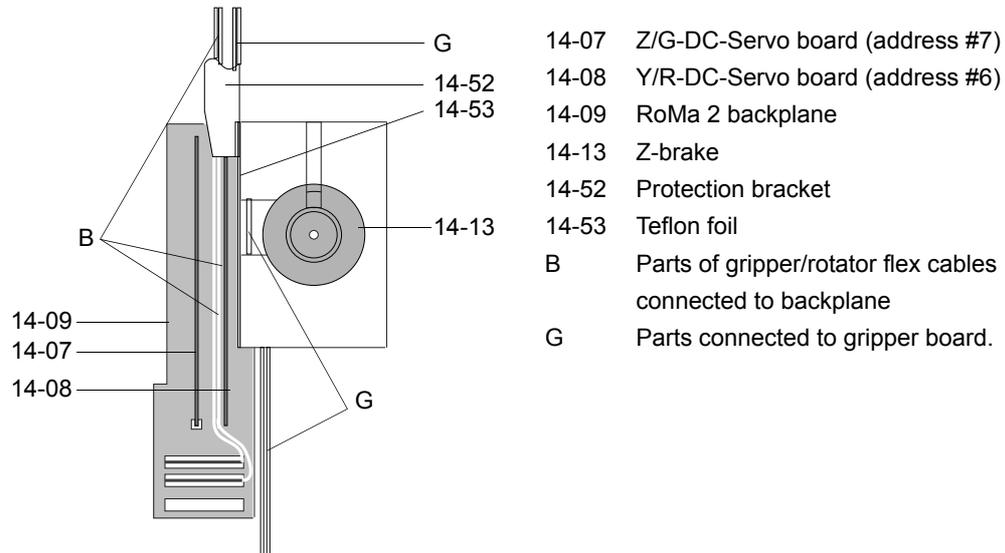


Figure 6-121 Proper laying of the gripper/rotator flex cables

- Insert the gripper/rotator flex cable as shown in [Figure 6-121](#):
The parts (G) that plug into the gripper board must be arranged behind the Teflon foil (14-53).
The parts (B) that plug into the RoMa 2 must be drawn through the space between the Z/G- and Y/R-DC-Servo boards.
 - Correct connection of the gripper/rotator flex cables:
Gripper board J3 ⇒ RoMa 2 backplane: ST5
Gripper board J4 ⇒ RoMa 2 backplane: ST6
- 3 Ensure operating readiness according to [Section 6.8.15](#).

6.8.9 Y/R- and Z/G-DC-Servo Board

Overview

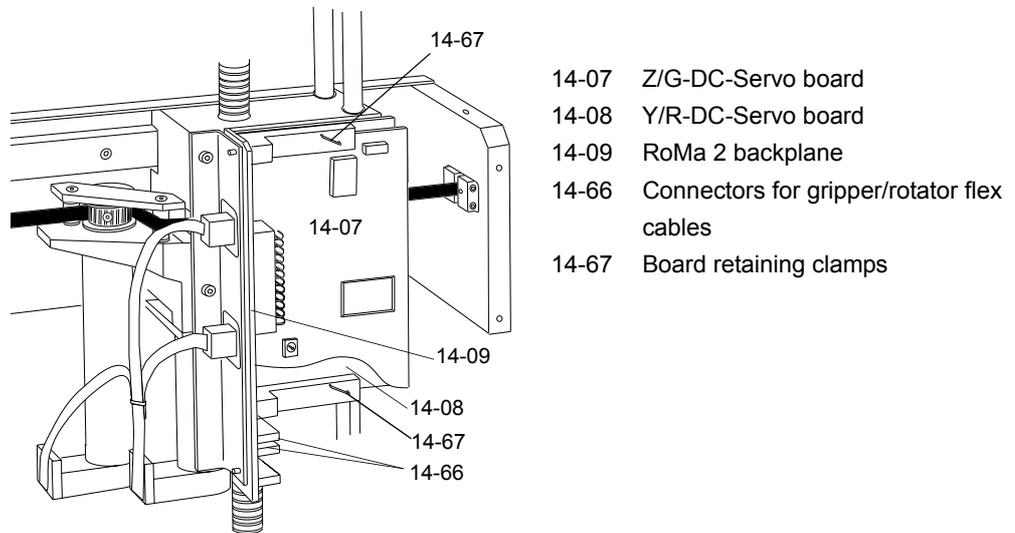


Figure 6-122 DC-Servo boards

Tip: you may remove the left side plate (14-48, see [Figure 6-120](#)) to ease access.



ATTENTION

Be careful not to damage the gripper/rotator flex cables when you remove the boards.

Removing the Z/G-DC Servo Board

- 1 Shift the retaining clamp (14-67).
- 2 Carefully remove the Z/G-DC-Servo board (14-07).

Removing the Y/R-DC-Servo Board

- 3 Shift the retaining clamp (14-67).
- 4 Carefully remove the Y/R-DC-Servo board (14-08).

Installing the Boards

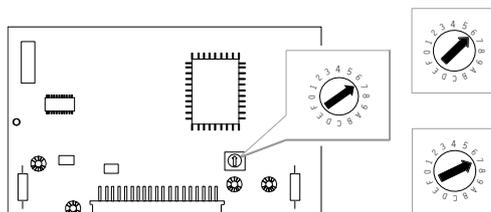


Figure 6-123 Addresses on DC-Servo motor boards

- 1 Make sure the address switches are set correctly:
 - Switch on Y/R-DC-Servo board (14-08, inner board): address #6.
 - Switch on Z/G-DC-Servo board (14-07, outer board): address #7.
- 2 Install in reverse order.
- 3 Ensure operating readiness according to [Section 6.8.15](#).

6.8.10 RoMa 2 Backplane

Removal

- 1 Remove the left side plate (14-48, see [Figure 6-120](#)).
- 2 Disconnect all cables from the RoMa 2 backplane (14-09).
- 3 Remove the Z/G- and Y/R-DC-Servo boards (14-07) and (14-08) according to [Section 6.8.9](#).
- 4 Loosen the fixing screws (14-68) and remove the RoMa 2 backplane (14-09).

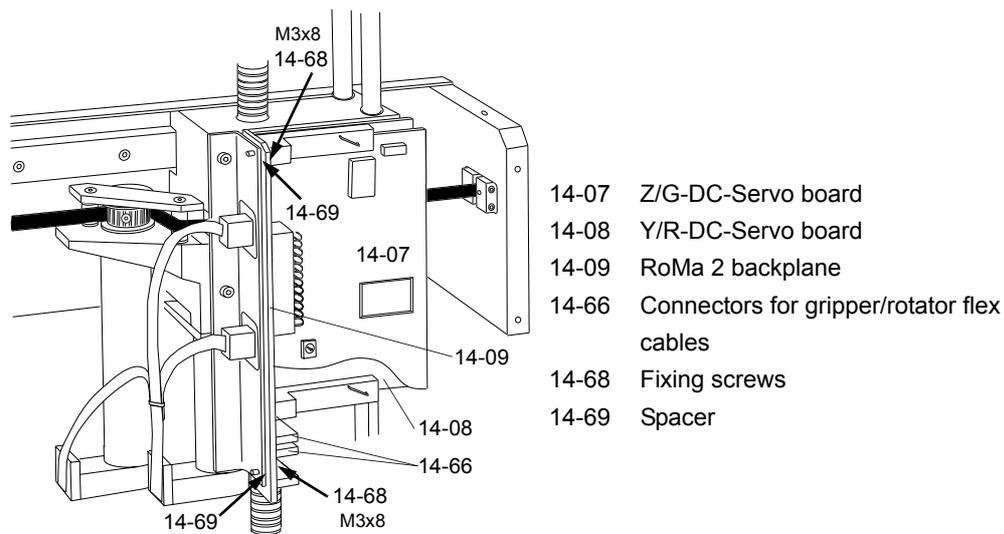


Figure 6-124 Servo motor boards

Installation

- 1 Execute the above steps in reverse order.
 - Refer to [Figure 6-125](#) for correct connections to the RoMa 2 backplane.

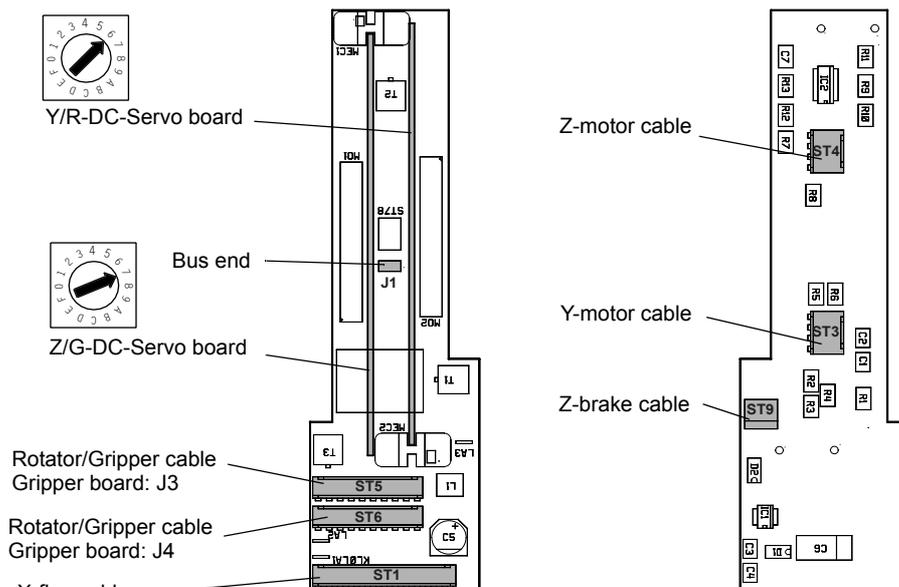


Figure 6-125 RoMa 2 backplane connections (component side: left, solder side: right)

- 2 Ensure operating readiness according to [Section 6.8.15](#).

6.8.11 Y-Belt

Removal

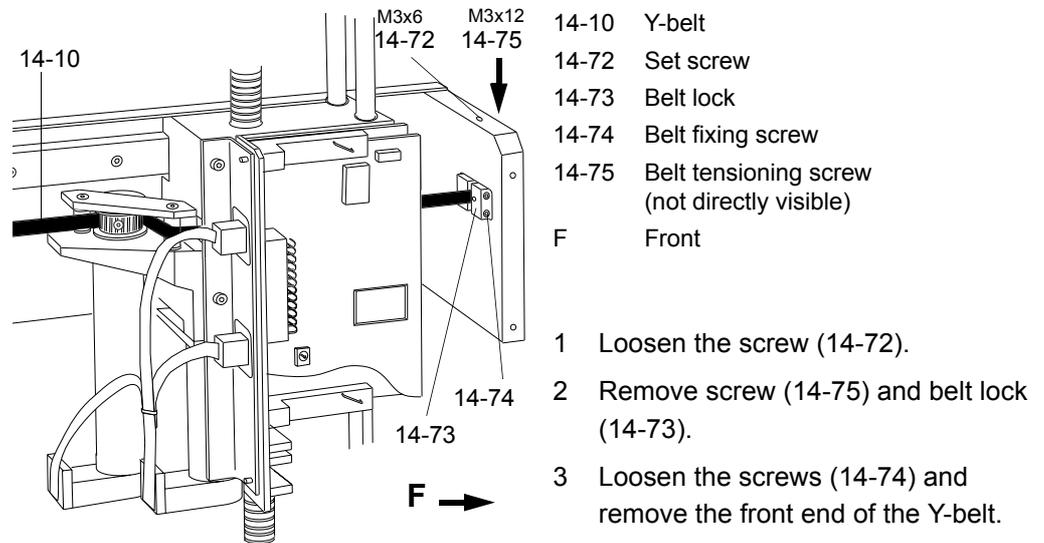


Figure 6-126 Y-belt (at front)

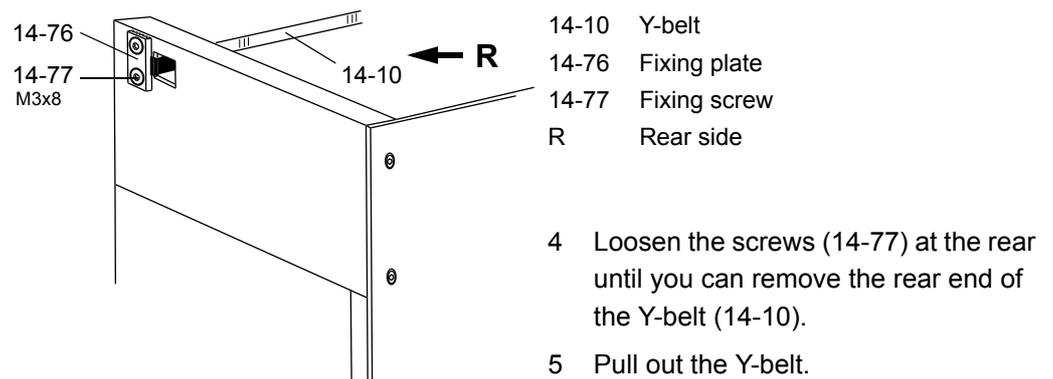


Figure 6-127 Y-belt (at the rear)

Installation

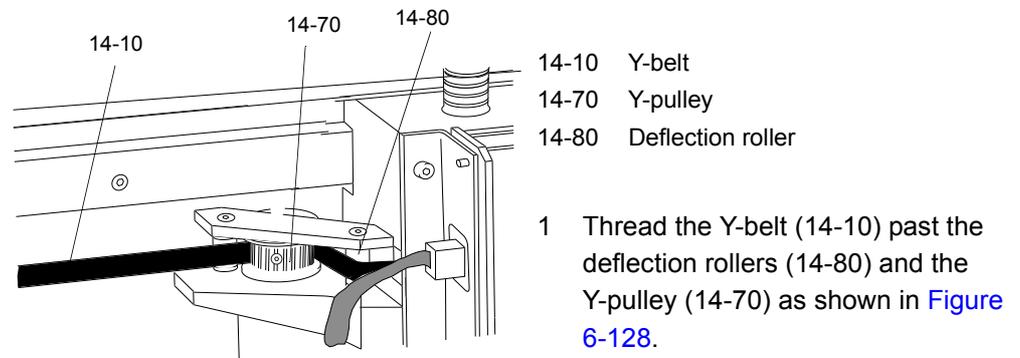


Figure 6-128 Threading in the Y-belt

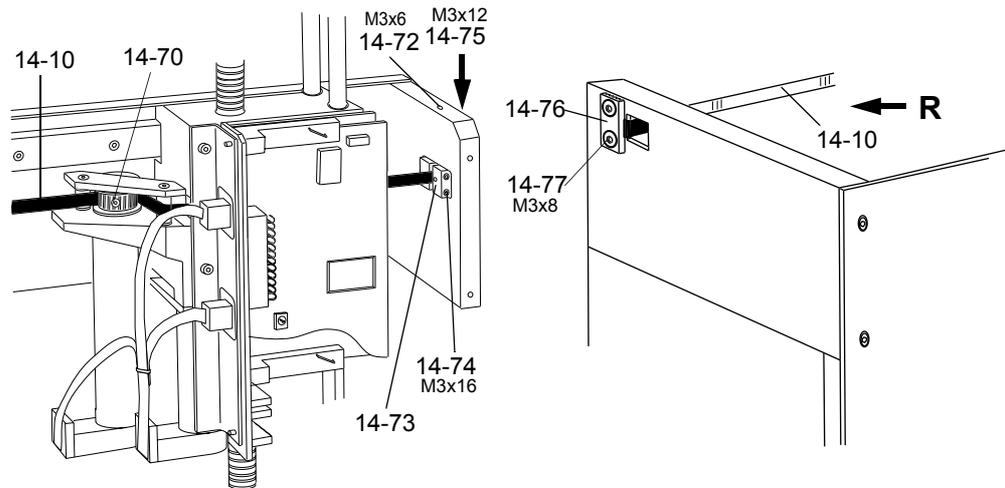


Figure 6-129 Fixing the Y-belt at the front and the rear

14-10	Y-belt	14-72	Set screw
14-73	Y-belt lock	14-74	Fixing screws
14-75	Belt tensioning screw	14-76	Fixing plate at rear
14-77	Fixing screw		

- 2 Fix the Y-belt (14-10) at the rear as shown on the right side of [Figure 6-129](#).
- 3 Fix the Y-belt at the front as shown on the left side of [Figure 6-129](#).
- 4 Tension the Y-belt by turning the screw (14-75, not visible in [Figure 6-129](#)).
- 5 Secure with set screw (14-72) when finished.
- 6 Move the assembly several times back and forth to check:
 - if it moves properly
 - if the belt tension is correct (belt must not slip over a tooth—but do not over-tighten).
- 7 Ensure operating readiness according to [Section 6.8.15](#).

6.8.12 Y-Motor

Removal

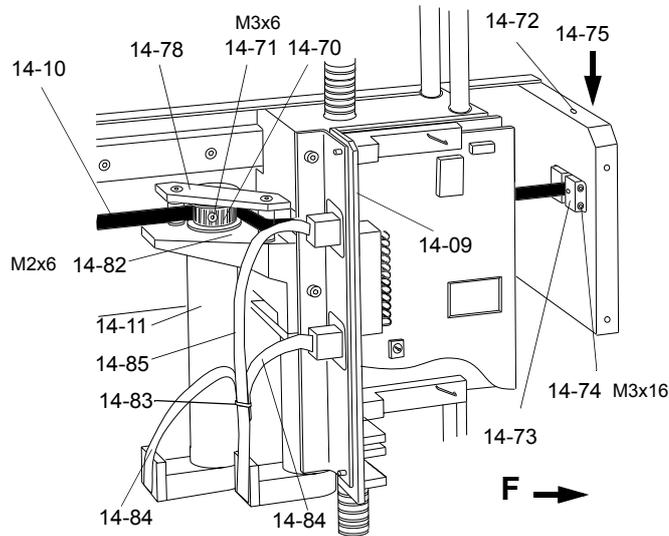


Figure 6-130 Y-motor

14-09	RoMa 2 backplane	14-10	Y-belt
14-11	Y-motor	14-70	Y-pulley
14-71	Set screw	14-72	Y-belt lock fixing screw
14-73	Belt lock	14-74	Fixing screws
14-75	Belt tensioning screw (not visible)	14-78	Mounting plate
14-82	Y-motor fixing screws	14-83	Cable tie
14-84	Y-motor cable	14-85	Z-motor cable
F	Front		

- 1 Cut the cable tie (14-83) and disconnect the motor cables (14-84) and (14-85) from the RoMa 2 backplane (14-09).
- 2 Loosen the screws (14-72) and (14-75) until the screws (14-74) become accessible. This releases the belt tension.
- 3 Unscrew the mounting plate (14-78) and remove the Y-pulley (14-70). Also see [Section 6.8.11](#) for details.
- 4 Unscrew and remove the Y-motor (14-11).

Installation

- 1 Execute the above steps in reverse order.
- 2 Ensure operating readiness according to [Section 6.8.15](#).

6.8.13 Z-Motor

Removal

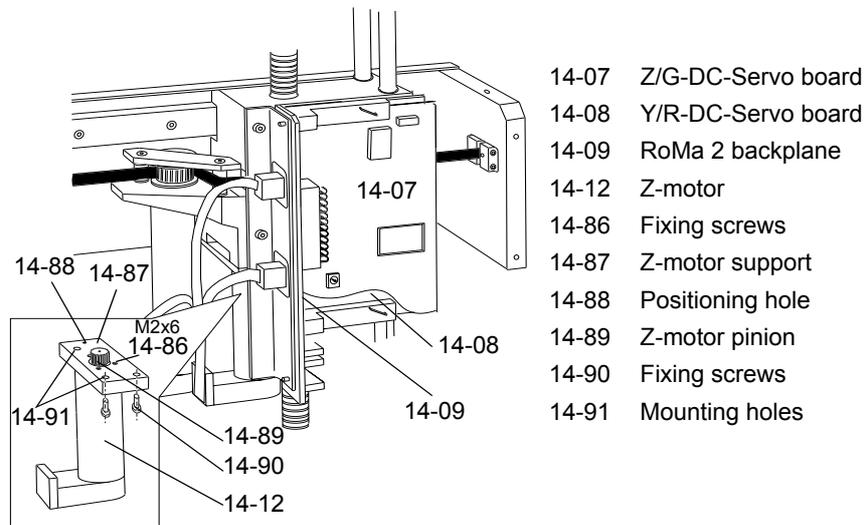


Figure 6-131 Removing the Z-DC motor

- 1 Remove the Z/G- and Y/R-DC-Servo boards (14-07) and (14-08) according to [Section 6.8.9](#).
- 2 Remove the RoMa 2 backplane according to [Section 6.8.10](#).
- 3 Unscrew and remove the Z-motor assembly.
- 4 Remove the Z-motor.

Installation

- 1 Execute the above steps in reverse order.
- 2 Ensure operating readiness according to [Section 6.8.15](#).

6.8.14 Z-Brake

Removal

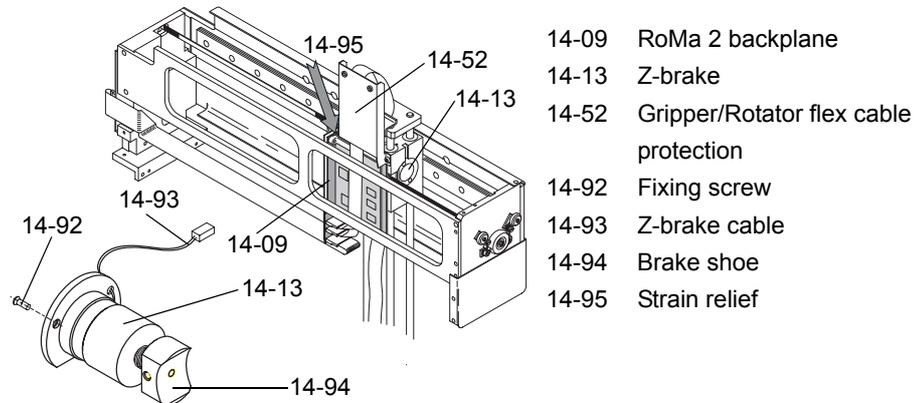
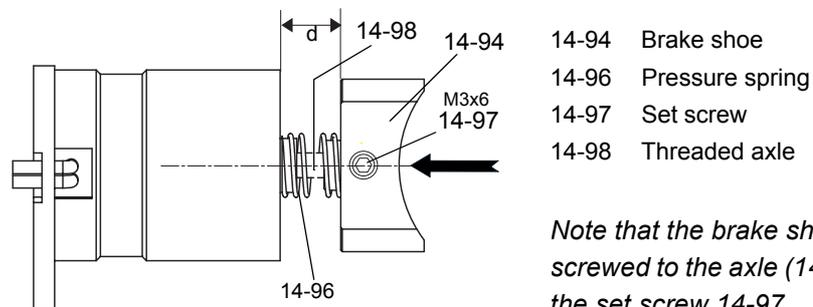


Figure 6-132 Z-brake

- 1 Disconnect the Z-brake cable (14-93) from the RoMa 2 backplane (14-09). The cable is held by the strain relief (14-95) near the gripper/rotator flex cable protection (14-52).
- 2 Unscrew and remove the Z-brake (14-13).

Installation



Note that the brake shoe (14-94) is screwed to the axle (14-98) and fixed with the set screw 14-97.

Figure 6-133 Checking/adjusting the distance *d*

- 1 Press the brake shoe (14-94) in the direction of the black arrow until the stop.
- 2 Check the distance *d* (= 7.25 mm ± 0.2 mm). Adjust it if necessary:
 - Loosen the set screw (14-97).
 - Hold the axle (14-98) with a pair of pliers and turn the brake shoe (14-94) until the distance is correct.
- 3 Fasten the set screw (14-97) when finished.
- 4 Install the Z-brake (14-13) in reverse order.
 - Make sure the parts of the Z-brake cable (14-93) which are covered with shrinkable tubing are fixed well with the cable clamps (see [Figure 6-134](#), 'Fixation of Z-brake cable').

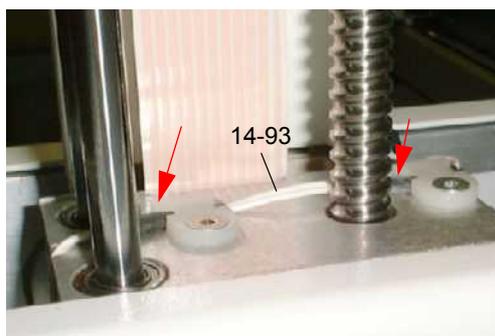


Figure 6-134 Fixation of Z-brake cable

- Refer to [Figure 6-125](#), 'RoMa 2 backplane connections (component side: left, solder side: right)' for connection of the Z-brake cable to the RoMa 2 backplane.
- 5 Ensure operating readiness according to [Section 6.8.15](#).

6.8.15 Ensuring Operating Readiness

Purpose

Most of the procedures described in this section require you to remove the entire RoMa before you can replace a damaged part. For this reason the adjustments and tests described below must be carried out after reinstallation.

Required Special Tools

- Reference tip
- RoMa test plate

Tests to Be Performed

For detailed information refer to the *Genesis Instrument Software Manual*.

After replacing most parts of the RoMa 2, verify – and if necessary carry out – the following settings and tests

Step	Test or Setup
1	CAN-bus resistance (see Section 6.2.3) <i>Necessary if entire RoMa or backplane or X-flex cable were replaced.</i>
2	RoMa reference positions <i>Note: It may be necessary to check and readjust the taught positions in the application software as well.</i>
3	RoMa test
4	Random move <i>Attention: never perform a random move test with a Genesis RMP!</i>

After Finishing

- 1 Reinstall all covers you have removed.
- 2 Close service doors and X-bay covers.
- 3 Put objects you removed before back on the worktable
- 4 Start the Instrument in operating mode.

6.9 PosID 1 – Disassembly and Assembly Procedures

Supplied until October 1997.

In some other documents, the PosID 1 might be designated as PosID.

WARNING



Laser light of Laser Class 2. Avoid exposure. Do not stare into the beam.
Might be harmful for your eyes.

When servicing devices containing a laser, always switch off the instrument first.

Spare Parts PosID 1

For spare parts list with part numbers refer to [Section 7.7](#), 'Spare Parts PosID 1'.

Following items can be replaced as spare parts:

- [X-belt \(3.7 m\)](#)
- [X-DC-Servo motor](#)
- [X-flex cable](#)
- [X-DC-Servo board](#)
- [PosID 1 CU board](#)
- [Y/B-DC-Servo board](#)
- [Y/B board](#)
- [Scanner head](#)
- [B-DC-Servo motor](#)
- [Y-belt](#)
- [Y-DC-Servo motor](#)
- [No tube sensor](#)

6.9.1 Complete PosID 1 Assembly

The removing and installation procedure of the PosID 1 assembly is identical with the procedure for the PosID 2.

- 1 Please follow the descriptions given in [Section 6.10.1](#), 'Complete PosID 2 Assembly'.
- 2 [Ensure Operating Readiness](#) as described in [Section 6.9.7](#).

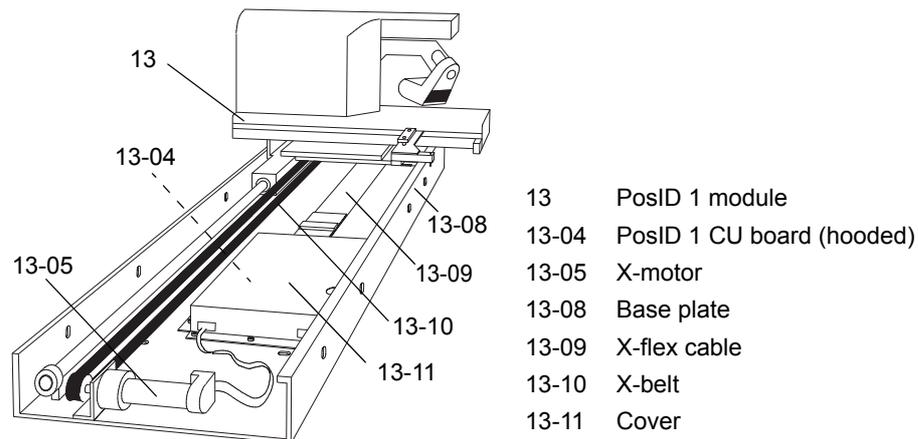


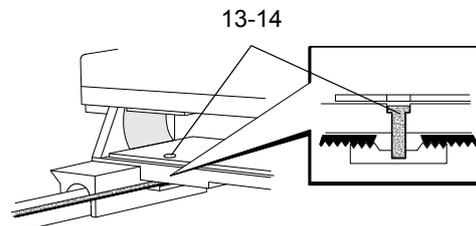
Figure 6-135 PosID 1 assembly

6.9.2 X-Drive Assembly (X-Belt, X-Motor, X-Flex Cable)

For X-DC-Servo board: see [Section 6.9.3, 'Electronic Boards for PosID 1'](#).

X-Belt

Apart from a different design of the X-belt fixture ([Figure 6-136](#)), the removing and installation procedure of the PosID 1 X-belt is identical with the procedure for the PosID 2.



- 1 Please follow the descriptions given for the PosID 2 in [Section 6.10.2, 'X-Drive Assembly \(X-Belt, X-Motor, X-Flex Cable\)'](#).

13-14 X-belt fixing screw

Figure 6-136 X-belt fixture for PosID 1

- 2 [Ensure Operating Readiness](#) as described in [Section 6.9.7](#).

X-Motor

The removing and installation procedure of the PosID 1 X-motor is identical with the procedure for the PosID 2.

- 1 Please follow the descriptions given for the PosID 2 in [Section 6.10.2, 'X-Drive Assembly \(X-Belt, X-Motor, X-Flex Cable\)'](#).
- 2 [Ensure Operating Readiness](#) as described in [Section 6.9.7](#).

X-Flex Cable

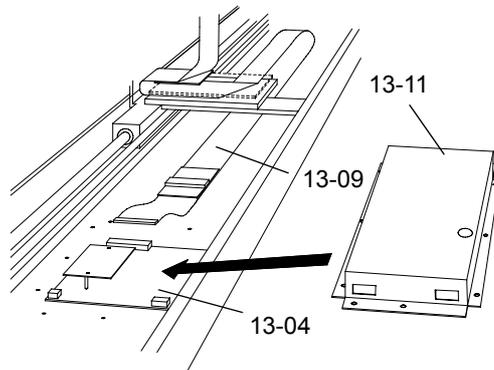


ATTENTION

The replacement X-flex cable for PosID 1 is shipped correctly folded. Do not attempt to refold it in any other manner, as this will damage the flex cable.

Removal

- 1 Remove the worktable (see [Section 6.3.1, 'Worktable'](#)).
- 2 Disconnect communication cable and x-motor cable from PosID 1 CU board (13-04).
- 3 Remove cover (13-11) and disconnect X-flex cable (13-09) from PosID 1 CU board.



- 4 Open and remove all flex cable fixtures.
- 5 Remove casing (see [Figure 6-139, 'Casing fixing screws'](#)).
- 6 Disconnect the X-flex cable (13-09) from Y/B board (see [Figure 6-140](#)).

- 13-04 PosID 1 CU board
- 13-09 X-flex cable
- 13-11 Cover

Figure 6-137 X-flex cable assembly

Installation

- 1 Install in reverse order. Before installing the worktable ...
 - check for correct movement of the X-flex cable, adjust if necessary.
- 2 [Ensure Operating Readiness](#) as described in [Section 6.9.7](#).

6.9.3 Electronic Boards for PosID 1



ATTENTION

Observe precautions for handling electrostatic discharge sensitive devices. Wear a wrist strap.

PosID 1 CU Board, X-DC-Servo Board *The X-DC-Servo board is fixed to the PosID 1 CU board.*

Removal

The item numbers mentioned refer to [Figure 6-137, 'X-flex cable assembly'](#).

- 1 Remove the worktable (see [Section 6.3.1, 'Worktable'](#)).
- 2 Remove cover (13-11) and disconnect all cables from the PosID 1 CU board (13-04).
- 3 Unscrew and remove X-DC-Servo board.
- 4 Unscrew the PosID 1 CU board.
- 5 Use chip pliers to remove the Serial EEPROM (IC7).

Use of EEPROM from the replaced CU board ⇒ an error might be carried forward.

Use of new EEPROM ⇒ you loose all settings.

Installation

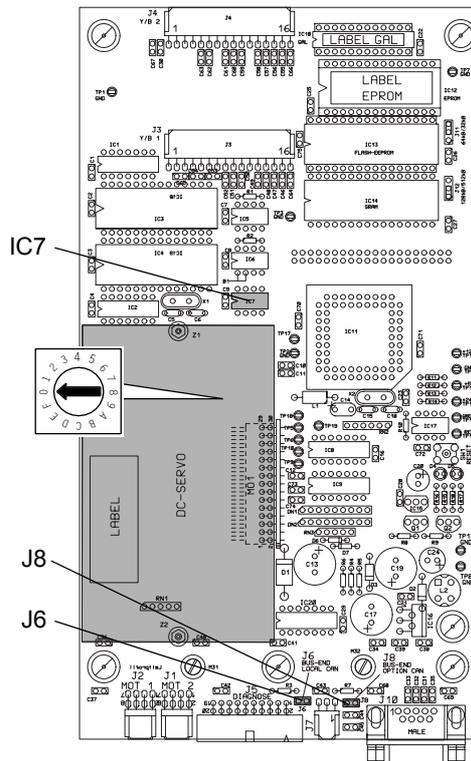


Figure 6-138 PosID 1 CU board

- 1 Make sure the jumper J6 is set.
- 2 Control if jumper J8 has been set correctly according the configuration of the instrument (see ‘[Communication Overview](#)’ in [Section 6.2.2](#), ‘[Jumper and Address Settings Overview](#)’).
- 3 X-DC-Servo board: check if address switch is set to #0.
- 4 Install in reverse order.
- 5 [Ensure Operating Readiness](#) as described in [Section 6.9.7](#).

**Y/B Board,
Y/B-DC-Servo
Board**

The Y/B-DC-Servo board is fixed to the Y/B board.

Removal

The item numbers mentioned refer to [Figure 6-140](#), ‘Y/B board’.

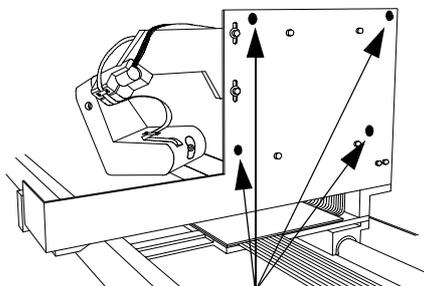


Figure 6-139 Casing fixing screws

- 1 Remove casing (13-15).
- 2 Unscrew and remove Y/B-DC-Servo board (13-16).
- 3 Disconnect all cables from Y/B board (13-17).
- 4 Unscrew and remove Y/B board.

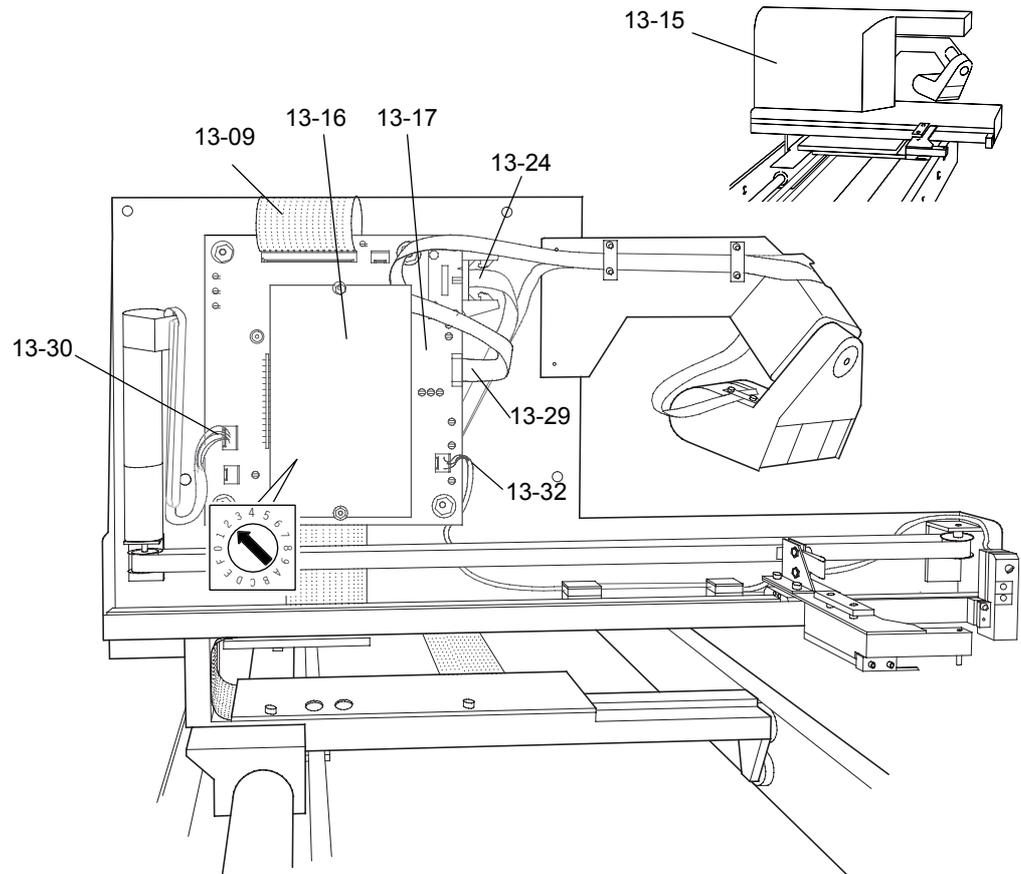


Figure 6-140 Y/B board

13-09	X-flex cable	13-24	B-motor cable
13-15	Casing	13-29	Scanner flex cable
13-16	Y/B-DC-Servo board	13-30	Y-motor cable
13-17	Y/B board	13-32	No tube sensor cable

Installation

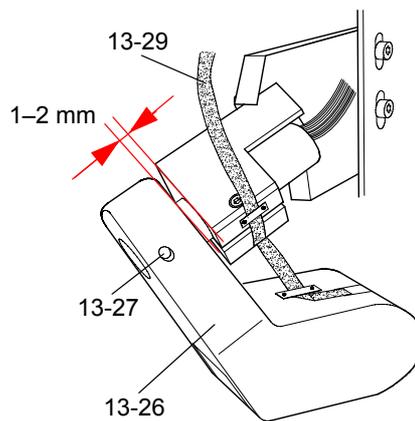
- 1 Install in reverse order.
 - Y/B-DC-Servo board: check if address switch is set to #2.
 - Do not forget the insulation washers between screws and Y/B-DC-Servo board. Do not over-tighten the screws.
 - Before mounting the Y/B board, check if the X-flex cable is correctly installed.
 - Refer to [Figure 6-140](#) for correct cable connection.
- 2 [Ensure Operating Readiness](#) as described in [Section 6.9.7](#).

6.9.4 Scanner Assembly (Scanner Head, B-Motor)

Scanner Head

In some other documents, the scanner head might be referred to as barcode reader head.

Removal

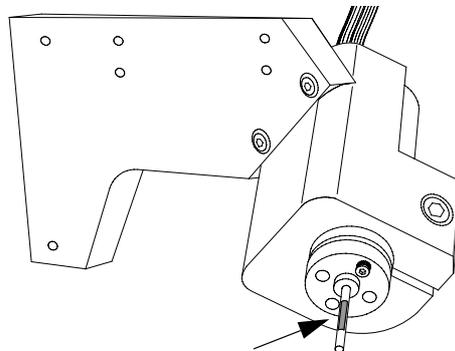


- 1 Remove casing (13-15) (see [Figure 6-139](#), 'Casing fixing screws').
- 2 Disconnect scanner flex cable (13-29) from Y/B board and remove flex cable holders.
- 3 Open set screw (13-27) and remove scanner head (13-26).

- 13-26 Scanner head
13-27 Set screw
13-29 Scanner flex cable

Figure 6-141 Scanner head

Installation



- 1 Manually rotate the B-motor axle that the flat part points towards the front of the instrument (indicated with an arrow in [Figure 6-142](#)).
- 2 Place the scanner head over the axle.
 - Adjust the distance between support and scanner head to 1–2 mm max. ([Figure 6-141](#)).

Figure 6-142 Installation of scanner head

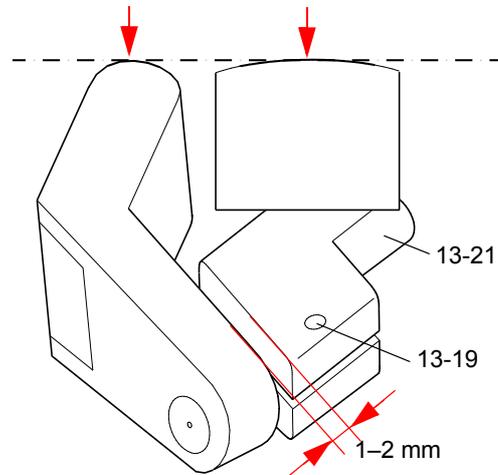
- When fixing, make sure the set screw (13-27) is perpendicular to the flat part of the axle.
- 3 Connect the scanner flex cable to the Y/B board (see [Figure 6-140](#), 'Y/B board') and install the cable fixtures.

When inserting the cable into flex cable plug (J6), make sure the side with visible contacts is facing the board.

- 4 Install casing.
- 5 [Ensure Operating Readiness](#) as described in [Section 6.9.7](#).

B-motor

Removal.



- 1 Remove scanner head as described earlier in this section.
- 2 Disconnect B-motor cable from Y/B board (see [Section Figure 6-140, 'Y/B board'](#))
- 3 Important for reinstallation: notice the correct positioning of the B-motor.
- 4 Loosen the fixing screw (13-19) and pull the B-motor (13-21) out of the support.

- 13-19 B-motor fixing screw
- 13-21 B-motor

Figure 6-143 B-motor and scanner head adjustment

Installation

- 1 Remove possibly present sticker(s) from the new motor body.
- 2 Insert the B-motor (13-21) into the support; pay attention to correct positioning.
- 3 Mount the casing but do not tighten the fixing screws yet.
- 4 Install scanner head as described earlier in this section.
- 5 Turn the scanner head clockwise as far as it will go. Check according to [Figure 6-143](#) that the scanner head is not higher than the casing. If necessary, loosen the B-motor fixing screw (13-19) and adjust the scanner head accordingly.
- 6 Check correct distance (1–2 mm maximal) between scanner head and support; if needed loosen the scanner head set screw (13-27) and readjust (see [Figure 6-141, 'Scanner head'](#)).
- 7 Remove casing and connect B-motor cable to the Y/B board (see [Figure 6-140, 'Y/B board'](#)).
- 8 Install casing.
- 9 [Ensure Operating Readiness](#) as described in [Section 6.9.7](#).

6.9.5 Y-Belt Assembly (Y-Belt, Y-Motor)

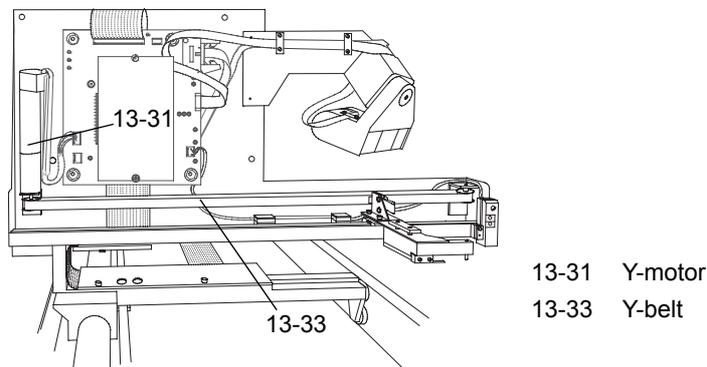


Figure 6-144 Y-belt assembly

Y-Belt (Gripper Belt)

Removal

- 1 Remove casing (13-15) (see [Figure 6-139](#), 'Casing fixing screws').
- 2 Loosen the belt tensioning screws (13-36), remove Y-belt (13-33).

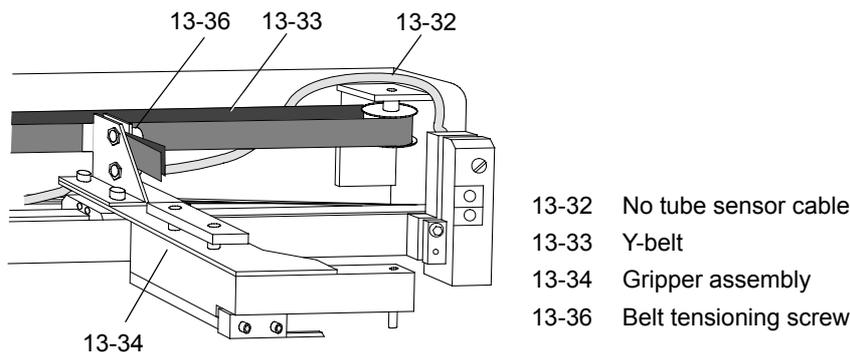


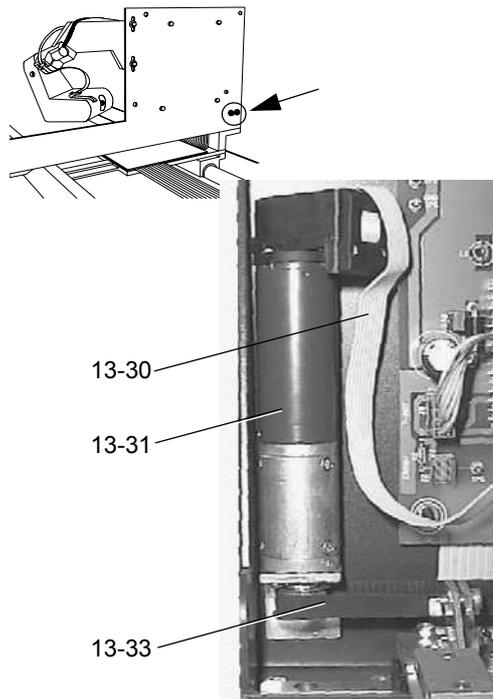
Figure 6-145 Y-belt

Installation

- 1 Place the Y-belt (13-33) over the drive pulley and the idler pulley. Insert Y-belt into belt fixture as shown in [Figure 6-145](#).
- 2 Make sure the belt is exactly horizontal, strain it and tighten the belt tensioning screws (13-36).
- 3 Make sure that the no tube sensor cable (13-32) is placed correctly (see [Figure 6-145](#)).
- 4 Move the gripper assembly (13-34) back and forth; check if the belt runs precisely over the two pulleys.
If it moves (even slightly) up or down or slips off the pulley, adjust either at the belt fixture or the height of the drive pulley as described later in section Y-Motor (Gripper Motor).
- 5 Install casing.
- 6 [Ensure Operating Readiness](#) as described in [Section 6.9.7](#).

**Y-Motor
(Gripper Motor)**

Removal



- 1 Remove casing (13-15) (see [Figure 6-139](#), 'Casing fixing screws').
- 2 Remove Y-belt (13-33) as described earlier in this section.
- 3 Disconnect Y-motor cable (13-30) from Y/B board.
- 4 Open Y-motor fixing screws (indicated with an arrow in [Figure 6-146](#)), remove Y-motor assembly.
- 5 Remove drive pulley (set screw) and bracket from Y-motor (13-31).

- | | |
|-------|---------------|
| 13-30 | Y-motor cable |
| 13-31 | Y-motor |
| 13-33 | Y-belt |

Figure 6-146 Y-motor assembly

Installation

- 1 Install in reverse order.
 - Note the correct orientation of the encoder head (see [Figure 6-146](#)).
 - When installing the drive pulley, adjust the clearance between pulley and bracket to approximately 3 mm.
 - Check if the belt runs precisely over the two pulleys.
If it moves (even slightly) up or down or slips off the pulley, adjust the height of the drive pulley accordingly.
- 2 [Ensure Operating Readiness](#) as described in [Section 6.9.7](#).

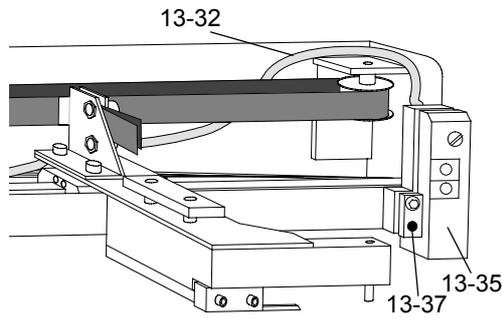
6.9.6 No Tube Sensor

Removal

The item numbers mentioned refer to [Figure 6-147](#), 'No tube sensor'.

- 1 Remove casing (13-15) (see [Figure 6-139](#), 'Casing fixing screws').
- 2 Disconnect no tube sensor cable (13-32) from Y/B board and free cable from holders.
- 3 Open the fixing screw (13-37), remove no tube sensor (13-35).

Installation



- 13-32 No tube sensor cable
- 13-35 No tube sensor
- 13-37 Fixing screw

Figure 6-147 No tube sensor

- 1 Install in reverse order.
 - When installing the no tube sensor cable (13-32), lead it according to [Figure 6-147](#) over the idler pulley bracket and fix it with the cable holders. *Check if neither y-belt nor gripper assembly – if moved back and forth – touch the no tube sensor cable.*
 - When connecting the no tube sensor cable to the Y/B board, tuck the redundant part of the cable behind the board (see [Figure 6-140](#)).
- 2 [Ensure Operating Readiness](#) as described in [Section 6.9.7](#).

6.9.7 Ensure Operating Readiness

Required Special Tool

- PosID service rack (see [Section 6.2.1](#), 'Special Tools')

Tests to Be Performed

For detailed information refer to the Genesis Instrument Software Manual.

After replacing any part of the PosID 1, control – and if necessary carry out – following settings:

Step	Test or Setup
1	CAN-bus resistance (see Section 6.2.3)
2	PosID test
3	PosID adjustment <i>Only necessary if PosID test failed</i>
4	Random move <i>Attention: never perform a random move test with a Genesis RMP!</i>

6.10 PosID 2 – Disassembly and Assembly Procedures

Supplied as of November 1997.

In some other documents, the PosID 2 might be referred to as PosID 2000.



Note

As of February 2001, the PosID 2 CU board – previously installed in the PosID 2 base plate – is located in the left service compartment.



WARNING

Laser light of Laser Class 2. Avoid exposure. Do not stare into the beam. Might be harmful for your eyes.

When servicing devices containing a laser, always switch off the instrument first.

Spare Parts PosID 2

For spare parts list with part numbers refer to [Section 7.8, 'Spare Parts PosID 2'](#).

Following items can be replaced as spare parts:

- [PosID 2 assembly](#)
- [X-belt \(5 m\)](#)
- [X-flex cable](#)
- [X-DC-Servo motor](#)
- [PosID 2 CU board](#)
- [X-DC-Servo board](#)
- [Y/B board](#)
- [Y/B-DC-Servo board](#)
- [DSP decoding board](#)
- [B-DC-Servo motor](#)
- [Scanner head](#)
- [Scanner cable](#)
- [Y-belt](#)
- [Gripper assembly](#)
- [Y-DC-Servo motor](#)
- [No tube sensor](#)

6.10.1 Complete PosID 2 Assembly

Removal

- 1 Remove the worktable (see [Section 6.3.1, 'Worktable'](#)).
- 2 Refer to [Figure 6-148, 'PosID 2 cable connections: new version \(left\) and older version \(right\)'](#):

If PosID 2 CU board is located in the left service compartment (new version):

- Disconnect the PosID 2 connection cable (13-03) and the X-motor cable (13-02) from the PosID 2 CU board.

If the PosID 2 CU board is installed underneath the worktable (older version):

- Disconnect the PosID 2 communication cable (13-01) from the Optibo.

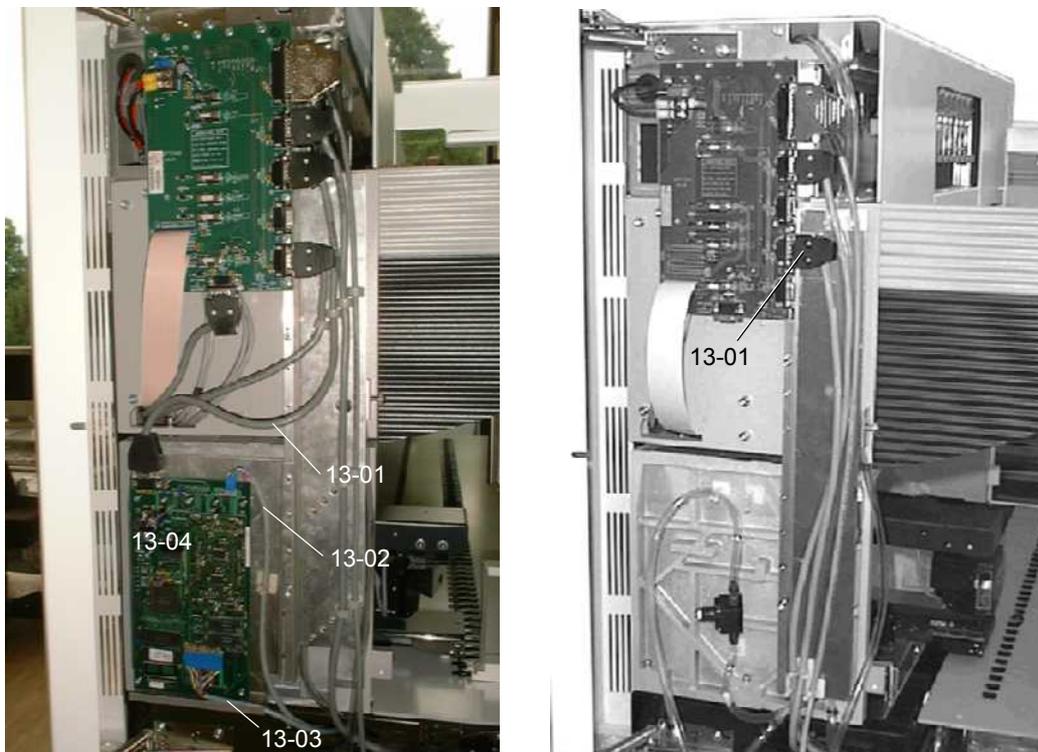


Figure 6-148 PosID 2 cable connections: new version (left) and older version (right)

- 13-01 Communication cable
- 13-02 X-motor cable
- 13-03 Connection cable
- 13-04 PosID 2 CU board

- 3 Remove the PosID 2 assembly fixing screws or fixing nuts.
- 4 Slide the PosID 2 module (13) to the left side.
- 5 Seize the assembly by the base plate (13-08), lift the right side first and then carefully lift the complete PosID 2 assembly out of the instrument.

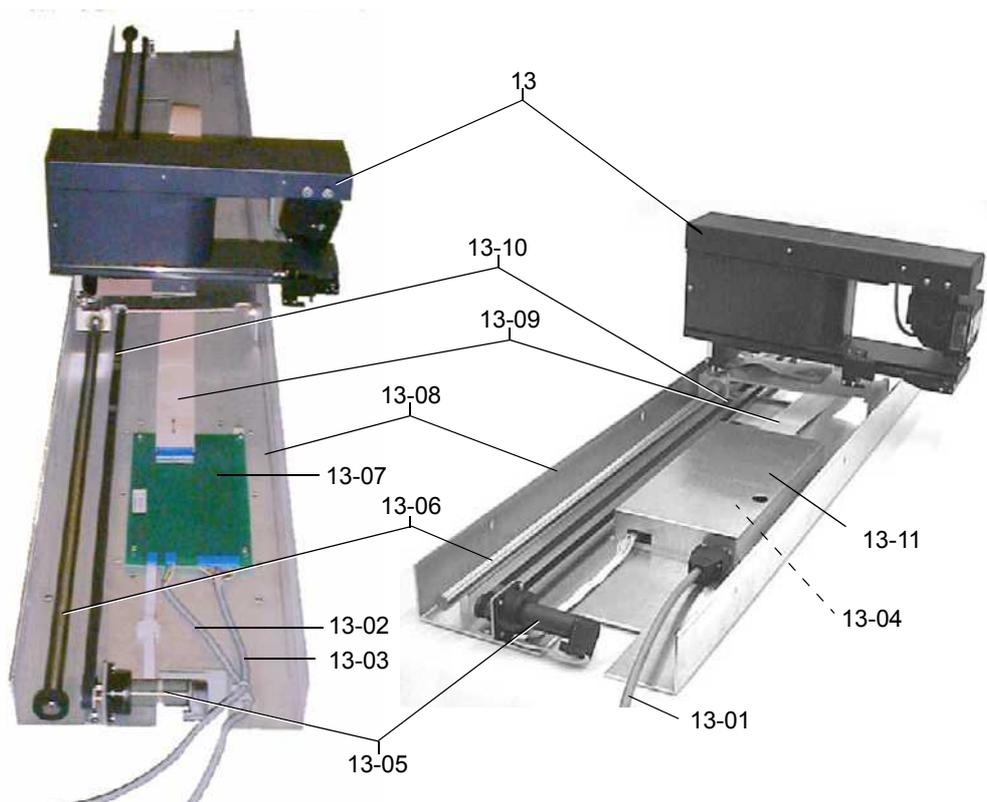


Figure 6-149 PosID 2 assembly: new version (left) and older version (right)

13	PosID 2 module	13-06	X-shaft
13-01	Communication cable	13-07	PosAda board
13-02	X-motor cable	13-08	Base plate
13-03	Connection cable	13-09	X-flex cable
13-04	PosID 2 CU board (hooded)	13-10	X-belt
13-05	X-motor	13-11	Cover

Installation

- 1 Install in reverse order.
Refer to [Figure 6-150, 'Installation of PosID 2 assembly before and after May 2002'](#):
 - For PosID modules produced before May 2002 move the base plate (13-08) to the very left and very back of the instrument before screwing the base plate to the instrument frame.
 - For PosID modules produced after May 2002 move the base plate (13-08) to the very left of the instrument and make sure that a space of 2 mm is left in front and behind the base plate before screwing it into the instrument frame.
- 2 Before installing the worktable ...
 - check for smooth an even motion of the PosID 2 module (13)
 - check for correct movement of the X-flex cable (13-09)
 - make sure that the X-shaft (13-06) and the base plate (13-08) are absolutely clean.
- 3 [Ensure Operating Readiness](#) as described in [Section 6.10.7](#).

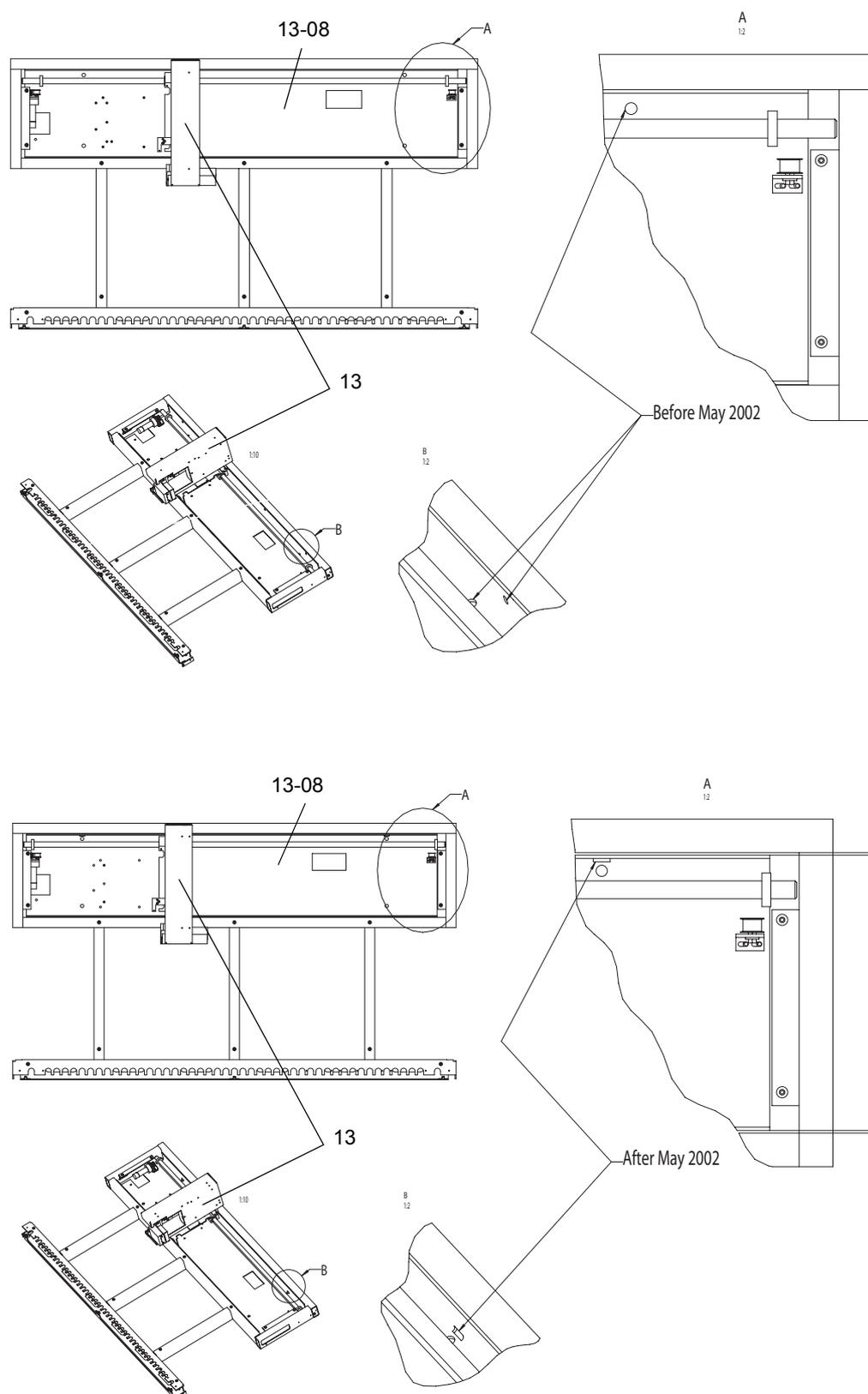


Figure 6-150 Installation of PosID 2 assembly before and after May 2002

- 13 PosID 2 module
- 13-08 Base plate

6.10.2 X-Drive Assembly (X-Belt, X-Motor, X-Flex Cable)

For X-DC-Servo board: see [Section 6.10.3, 'Electronic Boards for PosID 2'](#).

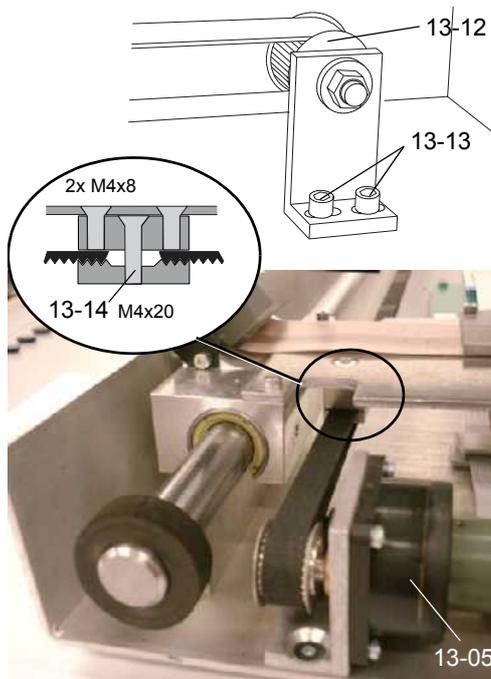
X-Belt

Removal

- 1 Remove the worktable (see [Section 6.3.1, 'Worktable'](#)).
- 2 Loosen the belt tensioning screws (13-13).
- 3 Unscrew X-belt fixture to access the X-belt fixing screw (13-14).
- 4 Remove X-belt.

Installation

- 1 For a new belt: cut the X-belt to the required length:
 PosID 2/100: 1680 mm/66.4 inch
 PosID 2/150: 2430 mm/95.7 inch
 PosID 2/200: 3630 mm/142.9 inch



- 2 Run the X-belt over the idler pulley (13-12) and the drive pulley of the X-motor; insert belt ends into the fixture, tighten the fixing screw (13-14).
- 3 Fasten the X-belt fixture to the X-slide.
- 4 Adjust and tighten the tensioning screws (13-13): the belt must be tight and horizontal, but do not over-tighten.
- 5 **Ensure Operating Readiness** as described in [Section 6.10.7](#).

- 13-05 X-motor
- 13-12 Idler pulley
- 13-13 Tensioning screws
- 13-14 X-belt fixing screw

Figure 6-151 X-drive assembly, details

X-Motor

Removal

- 1 Remove the worktable (see [Section 6.3.1, 'Worktable'](#)).
- 2 Disconnect the X-motor cable from the PosAda board (13-07) for the new version or PosID 2 CU board (13-04) for the older version (see [Figure 6-149, 'PosID 2 assembly: new version \(left\) and older version \(right\)'](#)).
- 3 Loosen the belt tensioning screws (13-13).
- 4 Remove pulley from X-motor assembly, unscrew X-motor (13-05) from bracket.

Installation

- 1 Install in reverse order.
 - Adjust the distance between drive pulley and bracket to approx. 5.5 mm.
- 2 [Ensure Operating Readiness](#) as described in [Section 6.10.7](#).

X-Flex Cable



ATTENTION

Observe precautions for handling electrostatic discharge sensitive devices. Wear a wrist strap.

Removal

- 1 Remove the worktable (see [Section 6.3.1, 'Worktable'](#)).
- 2 Remove casing as shown in [Figure 6-155, 'Y/B board assembly'](#).
- 3 Refer to [Figure 6-149, 'PosID 2 assembly: new version \(left\) and older version \(right\)'](#):
 - For new version: disconnect X-flex cable from PosAda board.
 - For older version: disconnect communication cable and x-motor flex cable from PosID 2 CU board.
 - Remove cover and disconnect X-flex cable from PosID 2 CU board.



Figure 6-152 Flex cable fixtures

- 4 Remove the flex cable fixtures.
- 5 Unscrew the Y/B board fixing screws (see [Figure 6-156](#)) in order to free the X-flex cable.
- 6 Disconnect the X-flex cable from Y/B board.

Installation



Note

The X-flex cable is available in two lengths, for instruments size 100/150 and for instrument size 200.

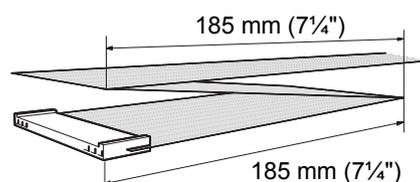


Figure 6-153 X-flex cable for instruments size 100

- 1 For instruments size 100, fold the X-flex cable according to [figure 6-153](#) –on the end where it will be connected to the PosAda (new version) or to the PosID2 CU board (older version).
- 2 Install in reverse order. Before installing the worktable ...
 - check for correct movement of the X-flex cable, adjust if necessary.
- 3 [Ensure Operating Readiness](#) as described in [Section 6.10.7](#).

6.10.3 Electronic Boards for PosID 2



ATTENTION

Observe precautions for handling electrostatic discharge sensitive devices.
Wear a wrist strap.

PosID 2 CU Board, Important X-DC-Servo Board

As of February 2001, the PosID 2 CU board – previously installed in the PosID 2 base plate – is located in the left service compartment.

The X-DC-Servo board is fixed to the PosID 2 CU board.

Removal

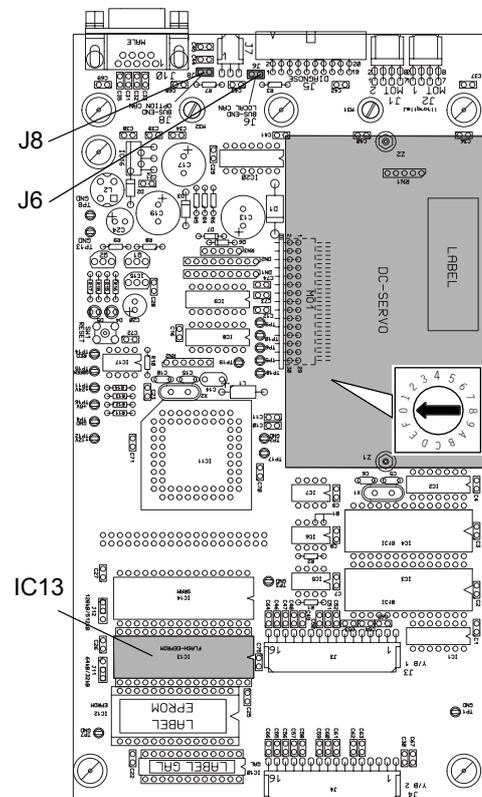


Figure 6-154 PosID 2 CU board

- 1 If CU board is located in the left service compartment:

- Disconnect all cables from the PosID 2 CU board.

If CU board is located in the base plate:

- Remove the worktable (see [Section 6.3.1, 'Worktable'](#)).
- Remove cover and all cables from the PosID 2 CU board.

- 2 Unscrew and remove X-DC-Servo board.
- 3 Unscrew the PosID 2 CU board.
- 4 Use chip pliers to remove the Flash EEPROM (IC13) if you want to install it on the new board.

Use of EEPROM from the replaced CU board ⇒ an error might be carried forward.

Use of new EEPROM ⇒ you loose all settings.

Installation

- 1 Make sure the jumper J6 is set.
- 2 Control if jumper J8 has been set correctly according the configuration of the instrument (see ['Communication Overview'](#) in [Section 6.2.2, 'Jumper and Address Settings Overview'](#)).
- 3 X-DC-Servo board: check if address switch is set to #0.
- 4 Install in reverse order.
- 5 [Ensure Operating Readiness](#) as described in [Section 6.10.7](#).

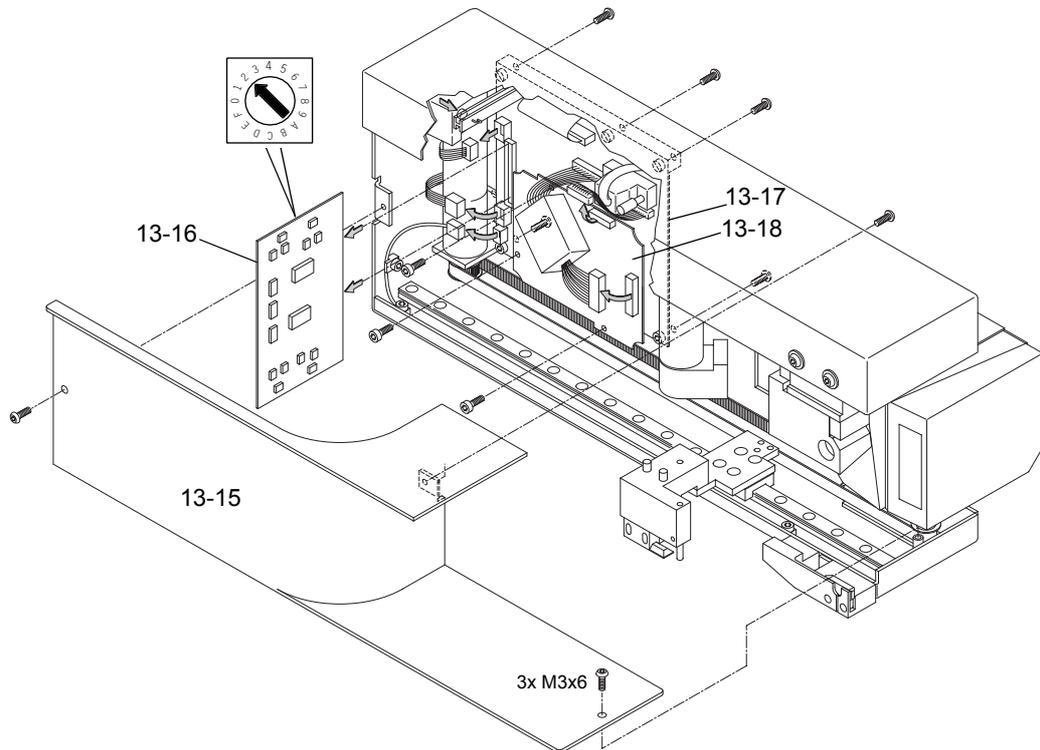
**Y/B Board,
Y/B-DC-Servo
Board**
Removal


Figure 6-155 Y/B board assembly

13-15 Casing

13-16 Y/B-DC-Servo board

13-17 Y/B board

13-18 DSP decoding board

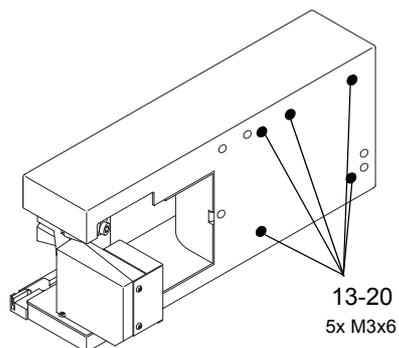


Figure 6-156 Y/B board fixing screws

13-20 Y/B board fixing screws

- 1 Remove casing (13-15).
- 2 Disconnect all cables from Y/B board (13-17).
- 3 On the exterior of the PosID 2, unscrew fixing screws (13-20) and remove Y/B board.
- 4 Remove Y/B-DC-Servo board (13-16).
- 5 Remove DSP decoding board (13-18).

Installation

- 1 Y/B-DC-Servo board: check if address switch is set to #2.
- 2 Install in reverse order.
Refer to [Figure 6-157](#) for correct cable connection.
- 3 [Ensure Operating Readiness](#) as described in [Section 6.10.7](#).

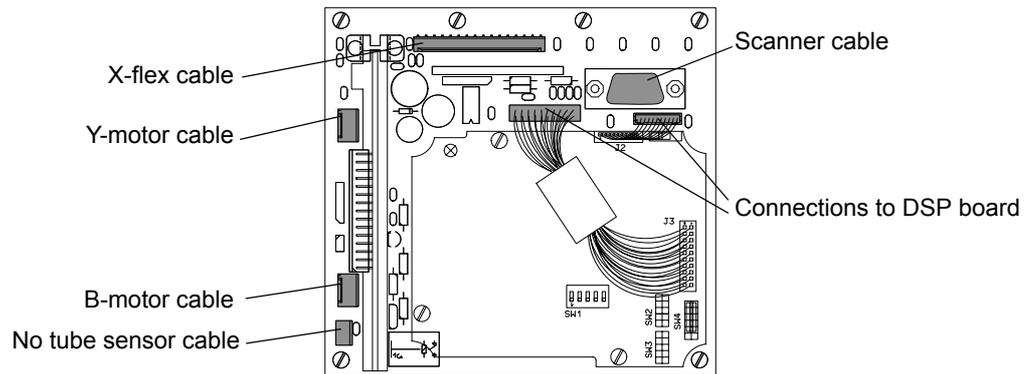


Figure 6-157 Y/B board cable connections

DSP Decoding Board

Removal

The item numbers mentioned refer to [Figure 6-155, 'Y/B board assembly'](#).

- 1 Remove casing (13-15).
- 2 Disconnect cables from DSP decoding board (13-18).
- 3 Remove DSP decoding board.

Installation

- 1 Install in reverse order.
- 2 [Ensure Operating Readiness](#) as described in [Section 6.10.7](#).

6.10.4 Scanner Assembly (B-Motor, Scanner Head and Cable)



ATTENTION

Observe precautions for handling electrostatic discharge sensitive devices. Wear a wrist strap.

B-Motor

Removal

The item numbers mentioned refer to [Figure 6-158, 'B-motor'](#).

- 1 Remove casing (13-15) as shown in [Figure 6-155, 'Y/B board assembly'](#).
- 2 On the exterior of the PosID 2, unscrew the Y/B board fixing screws (13-20) to free the B-motor cable (13-24); disconnect this cable from Y/B board.
- 3 On the exterior of the PosID 2, unscrew fixing screws (13-19) to remove the B-motor assembly.
- 4 Loosen the set screw (13-22), remove gearing assembly.
- 5 Remove bracket (13-23) from B-motor (13-21).

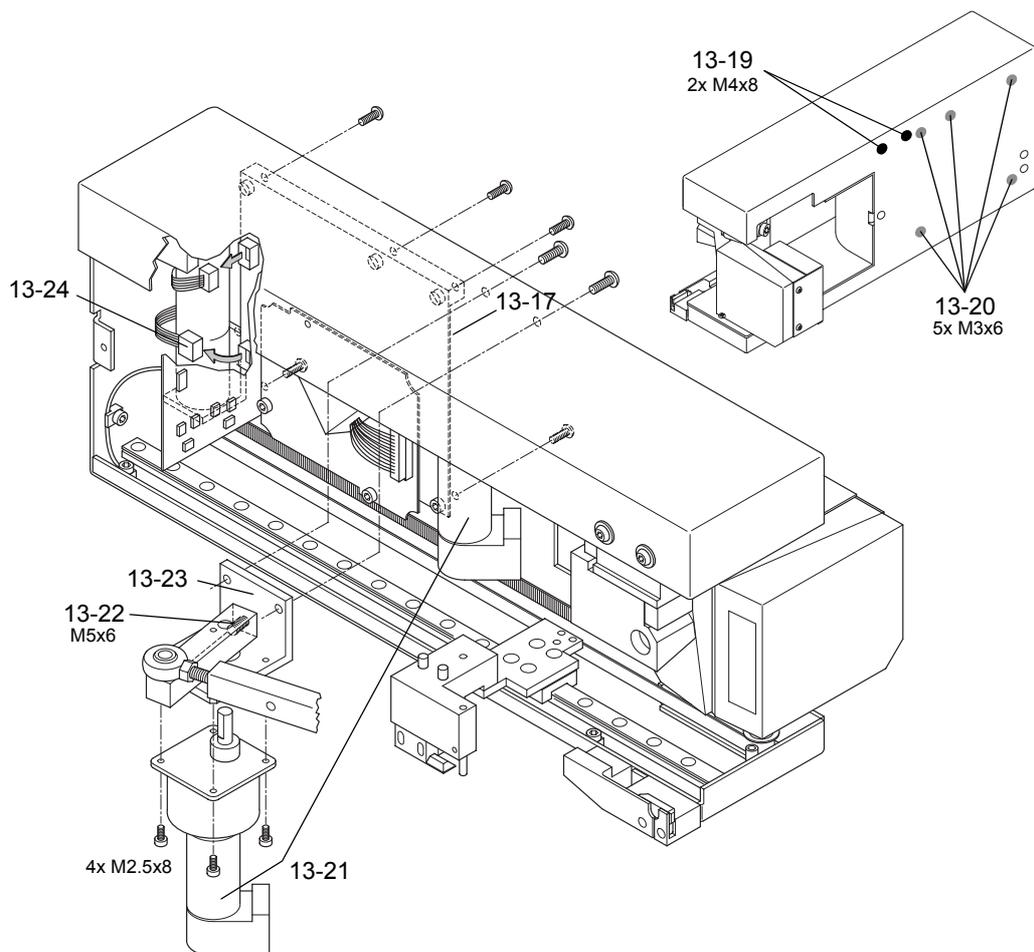


Figure 6-158 B-motor

13-17	Y/B board	13-22	Set screw
13-19	B-motor fixing screws	13-23	Bracket
13-20	Y/B board fixing screws	13-24	B-motor cable
13-21	B-motor		

Installation

- 1 Install in reverse order.
Pay attention to correct positioning of the encoder head as shown in Figure 6-158.
- 2 [Ensure Operating Readiness](#) as described in [Section 6.10.7](#).

Scanner Head, Scanner Cable

Removal

The item numbers mentioned refer to [Figure 6-159](#), 'Scanner head assembly'.

- 1 Remove casing (13-15) as shown in [Figure 6-155](#), 'Y/B board assembly'.
- 2 Remove scanner head housing (13-28).
- 3 Unscrew cable holders as well as the cable connector (13-25); disconnect scanner cable (13-29) from Y/B board.
 - Open fixing screws (13-27) and remove scanner head (13-26).

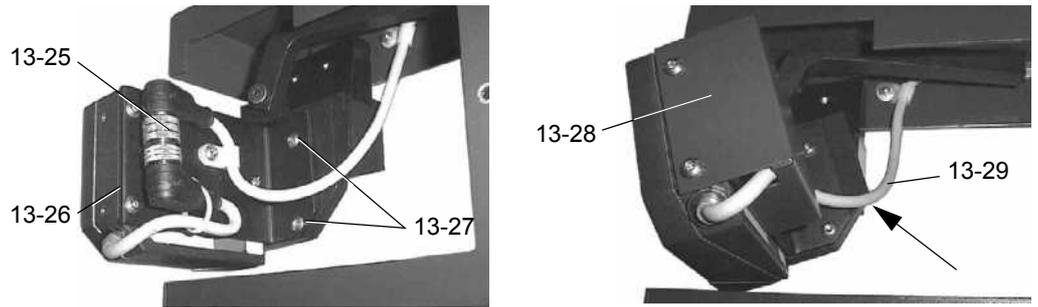


Figure 6-159 Scanner head assembly

- | | | | |
|-------|-----------------|-------|---------------|
| 13-25 | Cable connector | 13-28 | Housing |
| 13-26 | Scanner head | 13-29 | Scanner cable |
| 13-27 | Fixing screws | | |

Installation

- 1 Install in reverse order.
Swivel the scanner head up and down and arrange the cable (13-29) in such a way that it does not touch and stick at the point indicated with an arrow in Figure 6-159.
- 2 [Ensure Operating Readiness](#) as described in [Section 6.10.7](#).

6.10.5 Y-Drive Assembly (Y-Belt, Gripper Assembly, Y-Motor)

Required Special Tool

- Spring balance (5 N).

Y-Belt, Gripper Assembly

Removal

The item numbers mentioned refer to [Figure 6-161, 'Y-drive assembly'](#).

- 1 Remove casing (13-15) as shown in [Figure 6-155, 'Y/B board assembly'](#).
- 2 Loosen the belt tensioning screws (13-36).
- 3 Remove gripper assembly (13-34); remove Y-belt (13-33).

Installation



Figure 6-160 Installation of the Y-belt

- 1 Install in reverse order.
 - Lead Y-belt according to [Figure 6-160](#) around the driver pins.
 - Use a spring balance to tension the Y-belt to 3–5 N.
- 2 [Ensure Operating Readiness](#) as described in [Section 6.10.7](#).

Y-Motor

Removal

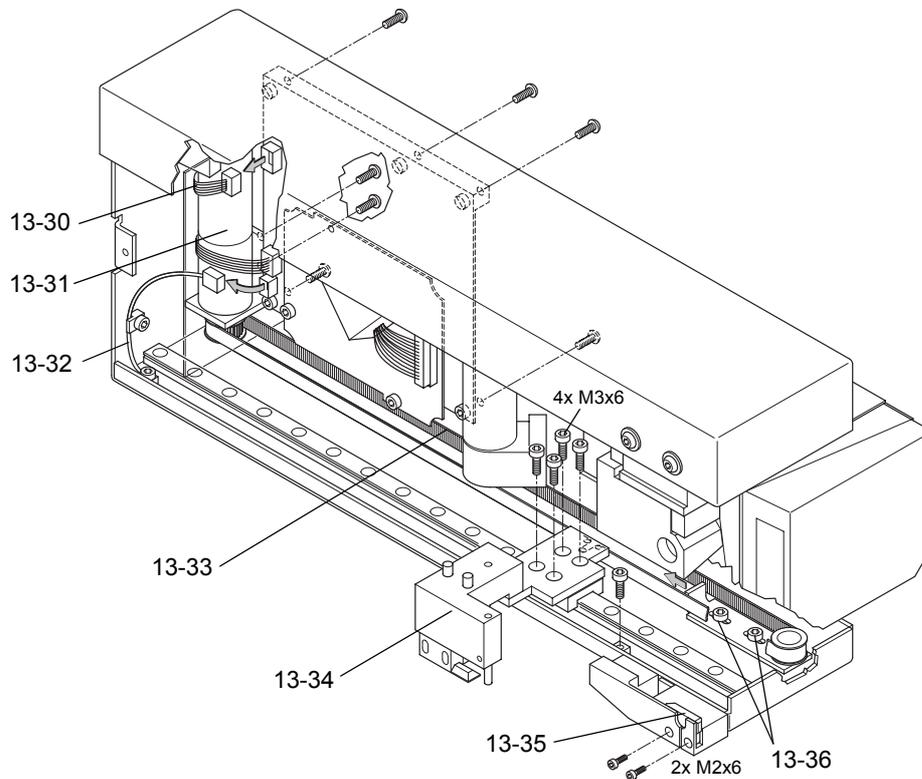


Figure 6-161 Y-drive assembly

- | | | | |
|-------|----------------------|-------|------------------------|
| 13-30 | Y-motor cable | 13-34 | Gripper assembly |
| 13-31 | Y-motor | 13-35 | No tube sensor |
| 13-32 | No tube sensor cable | 13-36 | Belt tensioning screws |
| 13-33 | Y-belt | | |

- 1 Remove casing (13-15) as shown in [Figure 6-155](#), 'Y/B board assembly'.
- 2 Loosen the belt tensioning screws (13-36).
- 3 Disconnect Y-motor cable (13-30) from Y/B board.

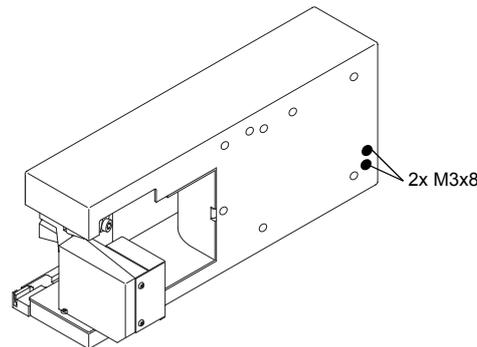


Figure 6-162 Y-motor fixing screws

- 4 On the exterior of the PosID 2, unscrew fixing screws ([Figure 6-162](#)) and remove Y-motor assembly.
- 5 Remove drive pulley (set screw) and bracket from Y-motor (13-31).

Installation

- 1 Install in revers order.
 - Note the correct orientation of the encoder head (see [Figure 6-161](#)).
 - When installing the drive pulley, make sure the set screw is perpendicular to the flat part of the axle.
 - Tension the Y-belt as described earlier in this section (see [Y-Belt, Gripper Assembly](#)).
- 2 [Ensure Operating Readiness](#) as described in [Section 6.10.7](#).

6.10.6 No Tube Sensor

Removal

The item numbers mentioned refer to [Figure 6-161](#), 'Y-drive assembly'.

- 1 Remove casing (13-15) as shown in [Figure 6-155](#), 'Y/B board assembly'.
- 2 Unscrew cable clamps, disconnect no tube sensor cable (13-32) from Y/B board.
- 3 Remove no tube sensor (13-35).

Installation

- 1 Install in reverse order.
- 2 [Ensure Operating Readiness](#) as described in [Section 6.10.7](#)

6.10.7 Ensure Operating Readiness

Required Special Tool

- PosID service rack (see [Section 6.2.1, 'Special Tools'](#))

Tests to Be Performed

For detailed information refer to the Genesis Instrument Software Manual.

After replacing any part of the PosID 2, control – and if necessary carry out – following settings:

Step	Test or Setup
1	CAN-bus resistance (see Section 6.2.3)
2	Check/adjust barcode setting
3	PosID test
4	PosID adjustment <i>Only necessary if PosID test failed</i>
5	Random move <i>Attention: never perform a random move test with a Genesis RMP!</i>

7 Check Lists Spare Parts

Purpose of This Chapter This chapter contains a list of all items which can be replaced at the customers site. It is structured in the sequence of disassembly of an item, therefore, it can also be used by experienced FSEs as brief instructions.

Chapter Overview This chapter consists of the following sections:

Section	Title	Page
7.1	Spare Parts Instrument	7 – 2
7.1.1	Spare Parts Worktable	7 – 2
7.1.2	Spare Parts Door Locks	7 – 3
7.1.3	Spare Parts X-Drive Assembly	7 – 4
7.1.4	Spare Parts Power Modules	7 – 5
7.1.5	Spare Parts Electronic Boards	7 – 7
7.2	Spare Parts Liquid System	7 – 10
7.2.1	Spare Parts Tubing Systems	7 – 10
7.2.2	Spare Parts Diluter/Dilback	7 – 12
7.2.3	Spare Parts MPO/FWO	7 – 14
7.2.4	Spare Parts Low Volume Option	7 – 16
7.2.5	Spare Parts 6-Way Valve Option	7 – 18
7.3	Spare Parts LiHa 1	7 – 20
7.4	Spare Parts LiHa 2	7 – 22
7.5	Spare Parts RoMa 1	7 – 25
7.6	Spare Parts RoMa 2	7 – 27
7.7	Spare Parts PosID 1	7 – 29
7.8	Spare Parts PosID 2	7 – 31

Spare Parts • Use original Tecan spare parts only.



Note

Spare parts must correspond with the technical requirements laid down by the manufacturer.

7.1 Spare Parts Instrument

7.1.1 Spare Parts Worktable

Detailed Description

Refer to [Section 6.3.1, 'Worktable'](#) for more detailed information.

Check List and Spare Parts Numbers

Brief instructions for removal of the worktable spare parts. Install in reverse order.

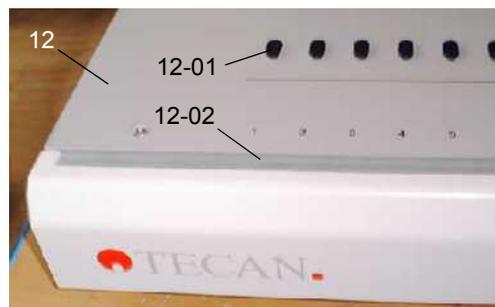


Figure 7-1 Spare parts worktable

Step(s): ⇒ do/remove ...	Spare Part	Item No.	Part No.
<ul style="list-style-type: none"> – Empty worktable – Additional worktable (RMP, RWS) – Door locks, magnet holders (RMP, RWS) – Fixing screws 	Worktable	12	see Order Configuration sheet)
	Positioning pins (set of all pin types)	12-01	619 001
	Sealing strip (200 cm)	12-02	619 003

7.1.2 Spare Parts Door Locks

Detailed Description

For RMP

For the description of disassembly and assembly procedure for the Genesis RMP door locks, please refer to the document Doc ID 391260.

For RSP, RWS

The door lock is part of the access option for RSP and RWS instruments. Please refer to document Doc ID 392 330 for further information.

Spare Parts Numbers

Step(s): ⇒ do/remove ...	Spare Part	Item No.	Part No.
For RMP			
see document Doc ID 391260	Door lock left side	21	750 020
	Door lock right side		750 021
For RSP, RWS			
see document Doc ID 392 330	Door locks (left and right)	21	619 847

7.1.3 Spare Parts X-Drive Assembly

Detailed Description

Refer to [Section 6.3.3, 'X-Drive Assembly'](#) for more detailed information.

Check List and Spare Parts Numbers

Brief instructions for removal of the X-drive spare parts. Install in reverse order.

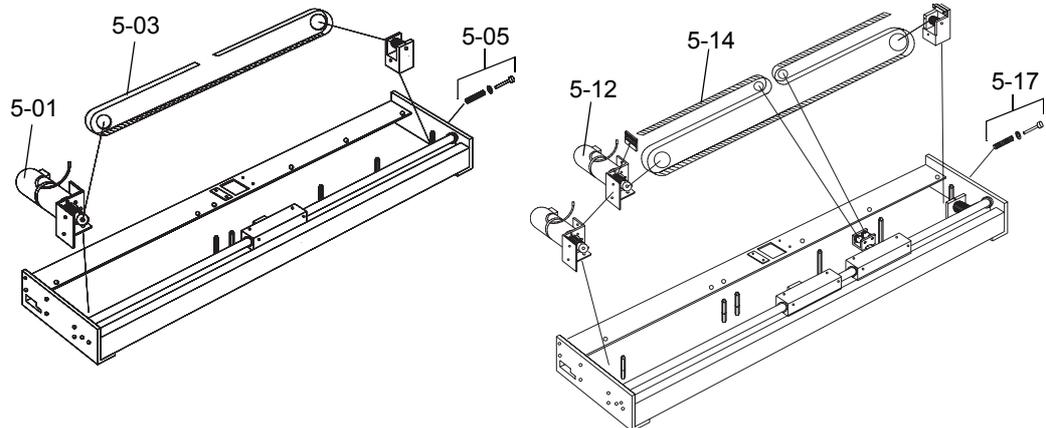


Figure 7-2 Spare parts X-drive assembly LiHa (left) and RoMa (right)

Step(s): ⇨ do/remove ...	Spare Part	Item No.	Part No.
<ul style="list-style-type: none"> – Arm of the relevant X-drive – For RMP instruments only: System liquid container and steel plate supporting the Supervisor/Uniport board – Belt tensioner – Loosen belt take-up fixing screws – X-belt 	<p>Belt tensioner</p> <p>X-belt (5.5 m)</p>	<p>5-05, 5-17</p> <p>5-03, 5-14</p>	<p>619 216</p> <p>619 212</p>
<ul style="list-style-type: none"> – Both X-belts – Tubing cover (left service compartment) – X-motor cables from the CU board – Fixing screws motor assembly – X-motor 	<p>X-DC-Servo motor with cable and bracket</p>	<p>5-01, 5-12</p>	<p>619 320*</p>



Note

Part Numbers marked with an asterisk (*) occur in several modules.

7.1.4 Spare Parts Power Modules

Supply Ratings Refer to [Section 3.1.2, 'Supply Ratings'](#).

Spare Parts Numbers

Power module	Valid for	Part no.
Old generation	RSP 100/150/200, RWS 100	619 324
Old generation	RMP 100/150/200	750 000
Old generation	RWS 150/200	750 003
PM 1	RSP 100, RWS 100	619 843
PM 2	RWS 150/200	619 844
PM 3	RMP 100/150/200	619 845
PM 4	RSP 150/200	619 846

Detailed Description

Refer to [Section 6.3.4, 'Power Modules'](#) for more detailed information.

Check List

Brief instructions for removal of the power module spare parts. Install in reverse order.

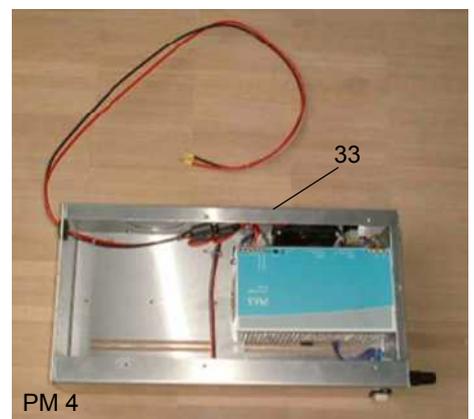
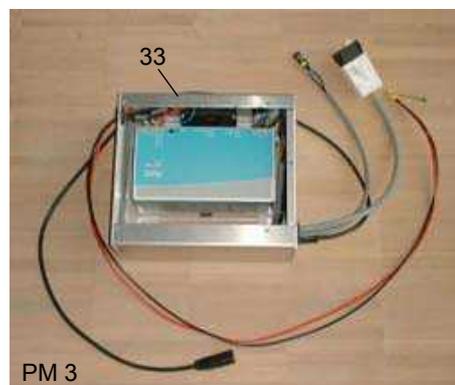
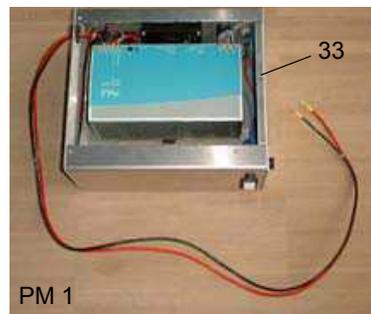


Figure 7-3 Spare parts power modules

Step(s): ⇨ do/remove ...	Spare Part	Item No.	Part No.
For RSP and RWS			
<ul style="list-style-type: none"> – Disconnect instrument from mains, set power switch to off – Possibly present panel between diluter compartment and power module – Power module fixing screws – Cables from Optibo – Power module 	Power module	33	see separate list earlier in this section
For RMP			
<ul style="list-style-type: none"> – Disconnect instrument from mains, set power switch to off – Possibly present panel between diluter compartment and power module – Power module fixing screws – Connector sheet – Earth cable from instrument frame, mains cables from power switch – Cable from control lamp – Cables from Optibo – Power module 	Power module	33	see separate list earlier in this section

7.1.5 Spare Parts Electronic Boards

Detailed Description

Refer to [Section 6.3.5, 'Electronic Boards'](#) for more detailed information.

Check List

Brief instructions for removal of the electronic boards spare parts. Install in reverse order.

Optibo, Optibo Power, Fuses

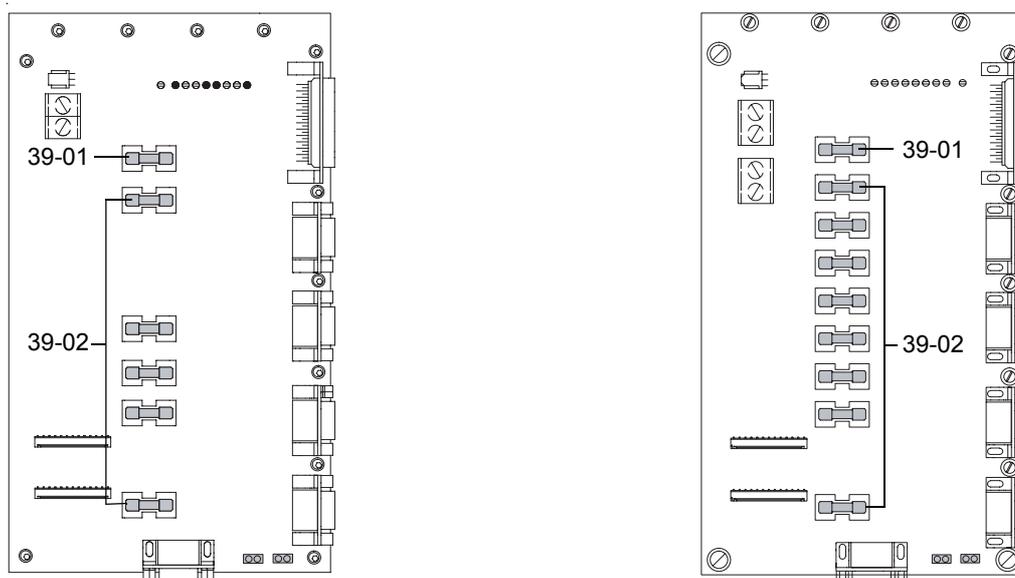


Figure 7-4 Spare parts Optibo/Optibo Power

Step(s): ⇒ do/remove ...	Spare Part	Item No.	Part No.
<ul style="list-style-type: none"> – Switch off instrument, disconnect mains power connection – all cables from Optibo/Optibo Power – all cables from CU board – Fixing screws – CU board 	Optibo Optibo Power	39 39	619 302 619 313
	Fuses 6.3 AT 8 AT	39-01 39-02	619 821 619 822

**CU Board,
X-DC-Servo Board**

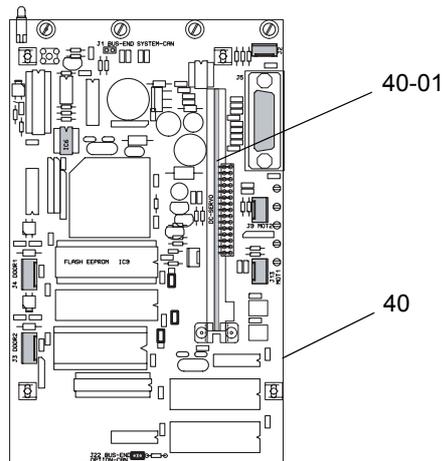


Figure 7-5 Spare parts CU board and X-DC-Servo board

Step(s): ⇒ do/remove ...	Spare Part	Item No.	Part No.
<ul style="list-style-type: none"> – Switch off instrument – Optibo/Optibo Power – CU board – X-DC-Servo board 	CU board	40	619 301
<ul style="list-style-type: none"> – X-DC-Servo board 	X-DC-Servo board	40-01	619 303*



Note

Part Numbers marked with an asterisk (*) occur in several modules.

**Supervisor,
Uniport, CANDI
Board**

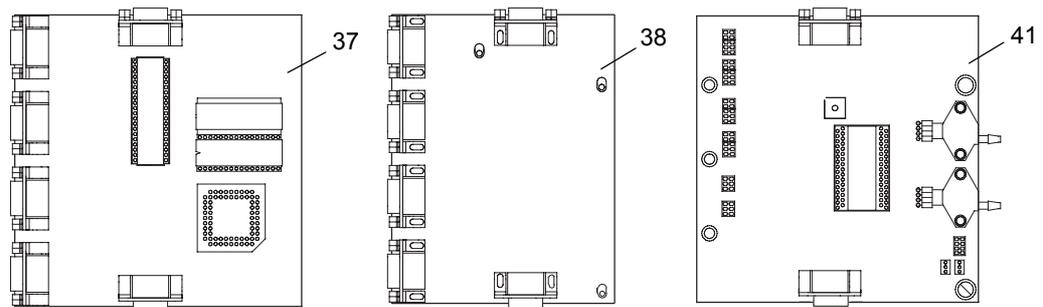


Figure 7-6 Spare parts Uniport, CANDI, Supervisor board

Step(s): ⇒ do/remove ...	Spare Part	Item No.	Part No.
<ul style="list-style-type: none"> – For Supervisor board: LICOS and waste tubing from Supervisor board – All cables from the PCB to be removed – Board fixing screws – Connected PCB 	Uniport board	37	612 004
	CANDI board	38	612 001
	Supervisor board	41	750 011

SMIO/SAFY

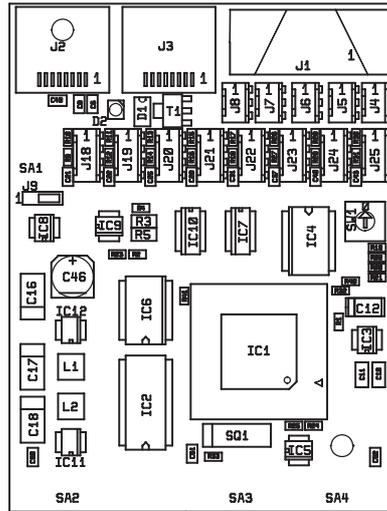


Figure 7-7 SMIO/SAFY

Step(s): ⇒ do/remove ...	Spare Part	Item No.	Part No.
see document Doc ID 392 330	SMIO/SAFY		619 850

7.2 Spare Parts Liquid System

7.2.1 Spare Parts Tubing Systems

Detailed Description

For more detailed description refer to [Section 6.4.2, 'Tubing System'](#).

Standard Tubing

Brief instructions for removal of the spare parts for the tubing system. Install in reverse order.

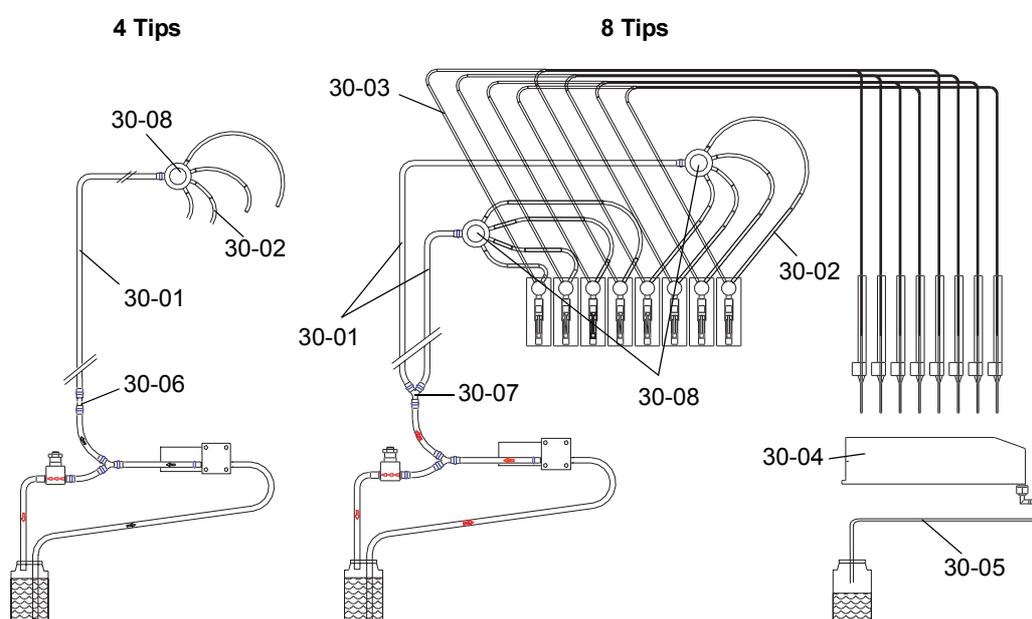


Figure 7-8 Spare parts for standard tubing system

Step(s): ⇒ do/remove ...	Spare Part	Item No.	Part No.
Standard Tubing			
<ul style="list-style-type: none"> – Empty liquid system – Replace relevant tubing 	I-connector	30-06	619 412
	Y-connector	30-07	619 410
	Aspiration tubing (PVC)	30-01	619 401
	Distributor 1 to 4 (POM)	30-08	619 406
	Interconnecting tubing (FEP)	30-02	619 402
	Pipetting tubing (FEP)	30-03	619 403 (100/150) 619 408 (200)
	Waste tubing (PVC)	30-05	619 404
	Wash station (PP)	30-04	613 001

High Resistant Tubing Type A and Type B

Brief instructions for removal of the spare parts for the tubing system. Install in reverse order.

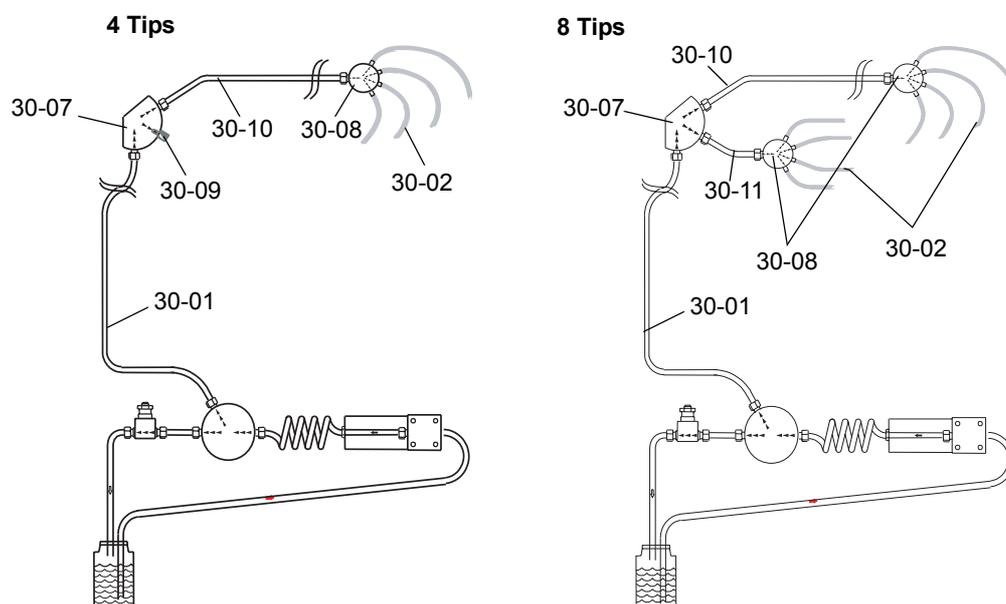


Figure 7-9 Spare parts for high resistant tubing system type A and B

Step(s): ⇒ do/remove ...	Spare Part	Item No.	Part No.
High Resistant Tubing Type A (FEP/PVDF)			
– Empty liquid system – Replace relevant tubing	Aspiration tubing (FEP)	30-01	619 486 (100) 619 487 (150) 619 488 (200)
	Distributor 1 to 2 (PVDF)	30-07	619 484
	Screw plug (PVDF)	30-09	619 806
	Tubing to distributor (FEP)	30-10	619 495
		30-11	619 496
	Distributor 1 to 4 (PVDF)	30-08	619 482
High Resistant Tubing Type B (FEP/PP)			
– Empty liquid system – Replace relevant tubing	Aspiration tubing (FEP)	30-01	619 486 (100) 619 487 (150) 619 488 (200)
	Distributor 1 to 2 (PP)	30-07	619 804
	Screw plug (PP)	30-09	619 807
	Tubing to distributor (FEP)	30-10	619 495
		30-11	619 496
	Distributor 1 to 4 (PP)	30-08	619 803

7.2.2 Spare Parts Diluter/Dilback

Detailed Description

For more detailed description refer to [Section 6.4.3, 'Diluter and Dilback'](#).

Check List and Spare Parts Numbers

Brief instructions for removal of the spare parts for the diluter and dilback. Install in reverse order.

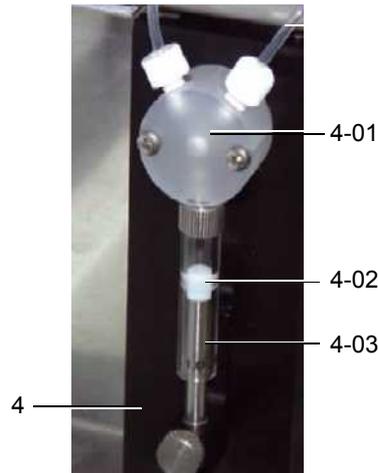


Figure 7-10 Spare parts for low volume option



If syringes with flat caps are used on a validated Genesis instrument, use for replacement also syringes with flat caps.

Do never replace flat syringe caps by conical ones or vice versa.

Step(s): ⇒ do/remove ...	Spare Part	Item No.	Part No.
Diluter XP 3000 and XP 3000 plus			
– Empty liquid system – Interconnecting and pipetting tubing from diluter – Diluter fixing screw – Pull diluter out of the instrument	XP 3000 XP 3000 plus	4 4	725 813 729 556
Diluter XP 3000 and XP 3000 plus spare parts			
	3-way valve	4-01	727 789
	Syringe with flat caps	4-03	
	0.25 ml		619 423
	0.5 ml		619 424
	1.0 ml		619 425
	2.5 ml		619 426
	5.0 ml		619 427

Step(s): ⇒ do/remove ...	Spare Part	Item No.	Part No.
	Syringe caps, flat (set of 8 pieces) for syringe 0.25 ml for syringe 0.5 ml for syringe 1.0 ml for syringe 2.5 ml for syringe 5.0 ml	4-02	619 428 619 429 619 430 619 431 619 432
	Syringe with conical caps 0.25 ml 0.5 ml 1.0 ml	4-03	619 530 619 531 619 532
	Syringe caps, conical (set of 8 pieces) for syringe 0.25 ml for syringe 0.5 ml for syringe 1.0 ml	4-02	619 533 619 534 619 535
Dilback-8			
<ul style="list-style-type: none"> – All diluters – Cable to Optibo/Optibo Power – Dilback fixing screw 	Dilback-8		619 304

7.2.3 Spare Parts MPO/FWO

Detailed Description

For more detailed description refer to [Section 6.4.4, 'MPO/FWO'](#).

Check List and Spare Parts Numbers

Brief instructions for removal of the spare parts for the MPO/FWO. Install in reverse order.

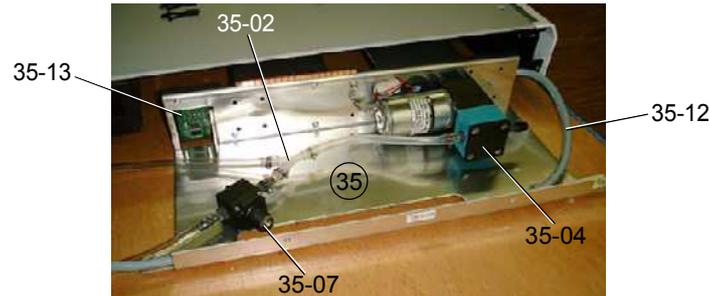


Figure 7-11 Spare parts for MPO/FWO (standard tubing system)

Step(s): ⇒ do/remove ...	Spare Part	Item No.	Part No.
Standard Material			
<ul style="list-style-type: none"> – Empty liquid system – Left worktable cover – FaWa pump assembly – Tubing and connection cable 	MPO complete FWO complete	35 35	612 702 612 704
<ul style="list-style-type: none"> – FaWa pump assembly – Tubing – Pump cable from MPO board – Fixing screws 	FaWa pump	35-04	619 509
<ul style="list-style-type: none"> – FaWa pump assembly – Tubing – Fixing screw 	Tubing system Distributor 1 to 2 Pressure relief valve	35-02 35-07	619 434** 619 410 619 540
High Resistant Type A			
<ul style="list-style-type: none"> – Empty liquid system – Left worktable cover – FaWa pump assembly – Tubing and connection cable 	MPO complete FWO complete	35 35	619 542 619 543 (6-way valve option) 619 525 619 527 (6-way valve option)
<ul style="list-style-type: none"> – FaWa pump assembly – Tubing – Pump cable from MPO board – Fixing screws 	FaWa pump	35-04	619 538

Step(s): ⇒ do/remove ...	Spare Part	Item No.	Part No.
<ul style="list-style-type: none"> – FaWa pump assembly – Tubing 	Tubing system		612 121* ⁽¹⁰⁰⁾ 612 122* ⁽¹⁵⁰⁾ 612 123* ⁽²⁰⁰⁾
<ul style="list-style-type: none"> – Fixing screw 	Distributor 1 to 2 Pressure relief valve	35-02 35-07	619 485 619 541 619 529 (6-way valve option)
High Resistant Type B			
<ul style="list-style-type: none"> – Empty liquid system – Left worktable cover – FaWa pump assembly – Tubing and connection cable 	MPO complete	35	619 544 619 545 (6-way valve option)
	FWO complete	35	619 510 619 526 (6-way valve option)
<ul style="list-style-type: none"> – FaWa pump assembly – Tubing – Pump cable from MPO board – Fixing screws 	FaWa pump	35-04	619 539
<ul style="list-style-type: none"> – FaWa pump assembly – Tubing 	Tubing system		612 124*** ⁽¹⁰⁰⁾ 612 125*** ⁽¹⁵⁰⁾ 612 126*** ⁽²⁰⁰⁾
<ul style="list-style-type: none"> – Fixing screw 	Distributor 1 to 2 Pressure relief valve	35-02 35-07	619 805 619 540 619 528 (6-way valve option)
LICOS			
<ul style="list-style-type: none"> – FaWa pump assembly – Tubing from LICOS sensor – Fixing screws 	LICOS complete Level tubing Sensor		619 418 619 514 619 501
MPO Board			
<ul style="list-style-type: none"> – FaWa pump assembly – all cables from MPO board – LICOS from MPO board 	Connection cable	35-12	619 415 ^(100/150) 619 416 ⁽²⁰⁰⁾ 619 312
<ul style="list-style-type: none"> – Fixing screws 	MPO board	35-13	

**Set containing all necessary MPO/FWO tubing, distributor 1 to 2 and pressure relief valve. For spare part numbers of the individual items refer to the detailed spare parts list from customer support.

***Set containing all necessary MPO/FWO tubing. For spare part numbers of the individual items refer to the detailed spare parts list from customer support.

7.2.4 Spare Parts Low Volume Option

Detailed Description

For more detailed description refer to [Section 6.4.5, 'Low Volume Option'](#).

Check List and Spare Parts Numbers

Brief instructions for removal of the spare parts for the low volume option 1 and 2. Install in reverse order.

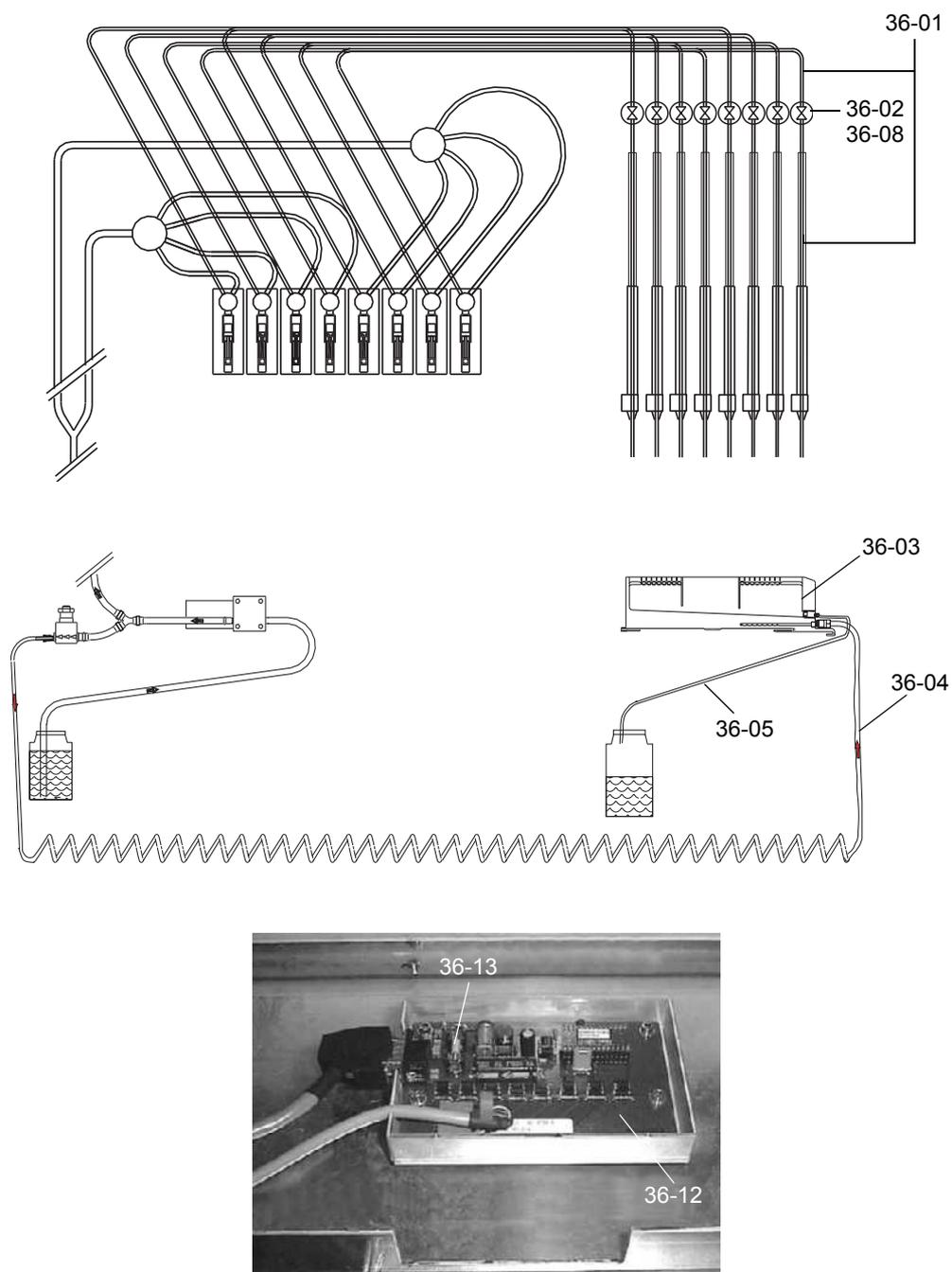


Figure 7-12 Spare parts for low volume option

Step(s): ⇒ do/remove ...	Spare Part	Item No.	Part No.
Low Volume Option 1			
– Pinch valve tubing – Cover – Valve wires from distribution block – Pinch valve	Pinch valve	36-02	612 806
	Low volume tubing set (FEP/Tygon)	36-01	612 805****
	Pinch valve tubing (DMSO resistant)		619 462
	Set of nuts	36-08	619 465
– Cables from low volume board – fixing screws	Low volume main board	36-12	612 813
	Fuse (8 AT)	36-13	2003126
Low Volume Option 2			
– Pipetting tubing from the solenoid valve – Cover – Valve wires from distributor board – Solenoid valve	Solenoid valve	36-02	612 814
	Low volume tubing set (FEP)	36-01	612 811****
– Cables from low volume board – fixing screws	Low volume main board	36-12	612 813
	Fuse (8 AT)	36-13	2003126
Low Volume Wash Station			
	Wash station low volume (PP)	36-03	613 033
	Waste tubing	36-05	619 491
	Fill tubing	36-04	619 490

****Set containing pipetting tubing, support tubing and – for option 1 only – pinch valve tubing.

7.2.5 Spare Parts 6-Way Valve Option

Detailed Description

For more detailed description refer to [Section 6.4.6, '6-Way Valve Option'](#).

Check List and Spare Parts Numbers

Brief instructions for removal of the spare parts for the 6-way valve option. Install in reverse order.

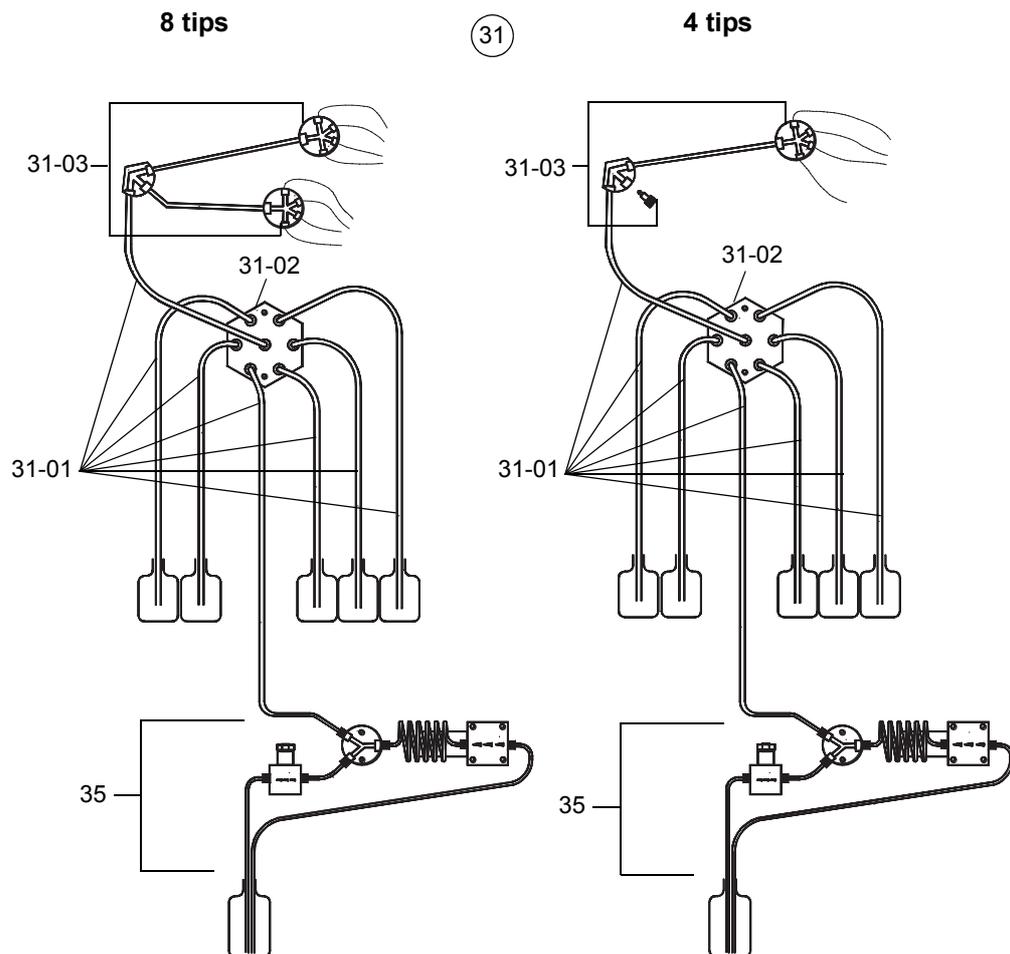


Figure 7-13 Spare parts for 6-way valve option (standard configurations)

Step(s): ⇒ do/remove ...	Spare Part	Item No.	Part No.
<ul style="list-style-type: none"> – Empty liquid system – Connection cable from Optibo Power) – All tubing from 6-way valve option – Collecting pan 	6-way valve assembly (valve and board)	31-02	612 118
	Aspirating tubing/ fittings	31-01	619 536**
	Top tubing complete (FEP/PVDF) (FEP/PP)	31-03	612 120** 612 119**

**Set; for spare part numbers of the individual items refer to the detailed spare parts list from customer support.

7.3 Spare Parts LiHa 1

Detailed Description

For more detailed description refer to [Section 6.5, 'LiHa 1 – Disassembly and Assembly Procedures'](#).

Check List and Spare Parts Numbers

Brief instructions for removal of the LiHa 1 spare parts. Install in reverse order.

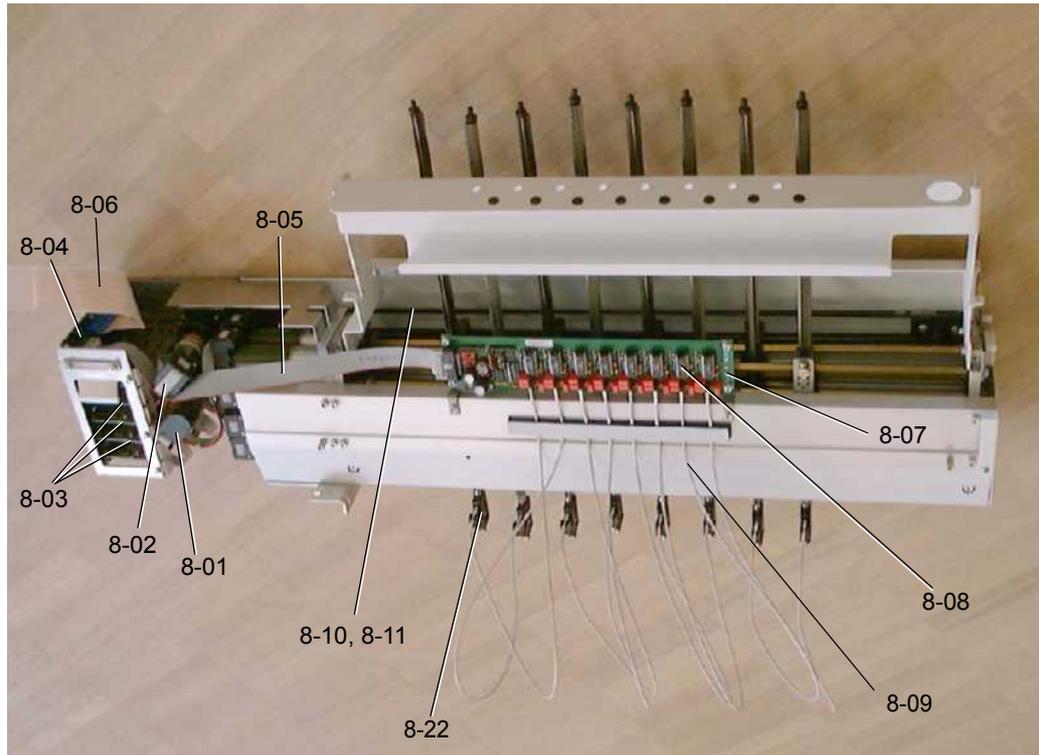


Figure 7-14 LiHa 1 spare parts

Step(s): ⇒ do/remove ...	Spare Part	Item No.	Part No.
Cables			
<ul style="list-style-type: none"> – Left cover – X-flex cable from LiHa backplane, Optibo/Optibo Power and X-bay 	X-flex cable	8-06	619326 (100) 619327 (150) 619328 (200)
<ul style="list-style-type: none"> – Left cover – ILID cable from tip adapter and ILID board 	ILID cable	8-09	619 310
<ul style="list-style-type: none"> – Left cover – ILID flat cable from ILID board and LiHa backplane 	ILID flat cable	8-05	619 233

Step(s): ⇒ do/remove ...	Spare Part	Item No.	Part No.
Electronic Boards			
<ul style="list-style-type: none"> – Complete LiHa 1 assembly from instrument – All cables from LiHa backplane – Board cage, DC-Servo boards 	DC-Servo boards LiHa backplane	8-03 8-04	619 303* 619 311
<ul style="list-style-type: none"> – Left cover – All cables from ILID board – ILID board 	ILID board for 4 tips for 8 tips	8-07	619 307 619 308
<ul style="list-style-type: none"> – Left cover – ILID chip from ILID board 	ILID chip	8-08	619 309
Belts			
<ul style="list-style-type: none"> – Complete LiHa 1 assembly from instrument – Loosen tensioning screws – Belt lock 	Y-belt, Y-spreading belt (set of 2 x 2 m)	8-10, 8-11	619 215
Motors			
<ul style="list-style-type: none"> – Complete LiHa 1 assembly from instrument – Board cage – Y- and Y-spreading belt – Motor bracket – Y- or Y-spreading motor cable from LiHa backplane – Pulley – Motor fixing screws 	Y-DC-Servo motor, Y-spreading DC-Servo motor	8-02, 8-01	619 321*
Tip Adapter			
<ul style="list-style-type: none"> – ILID cable from tip adapter – Tip adapter 	Tip adapter	8-22	619 211


Note

Part Numbers marked with an asterisk (*) occur in several modules.

7.4 Spare Parts LiHa 2

Detailed Description

For more detailed description refer to [Section 6.6, 'LiHa 2 – Disassembly and Assembly Procedures'](#).

Check List and Spare Parts Numbers

Brief instructions for removal of the LiHa 2 spare parts. Install in reverse order.

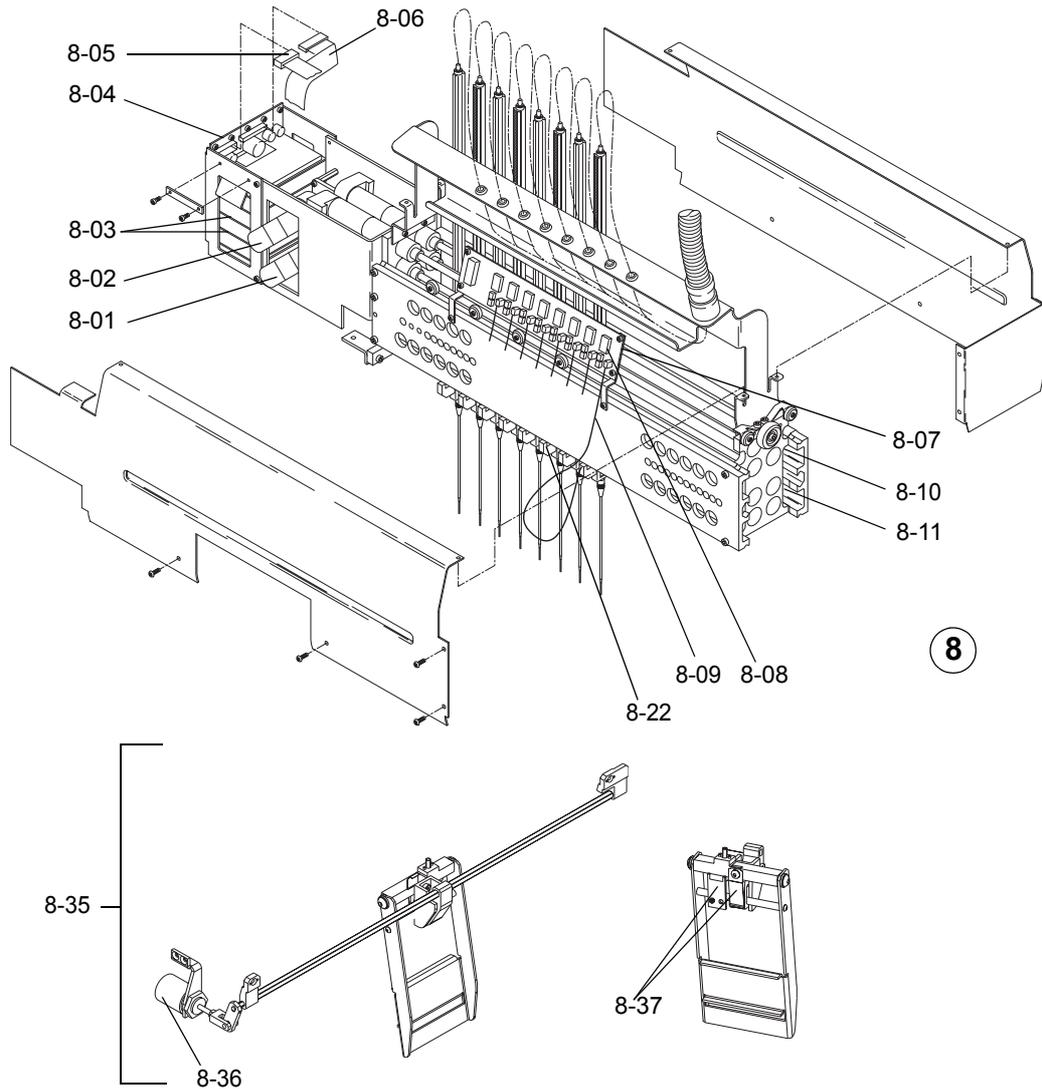


Figure 7-15 LiHa 2 spare parts



Note

Part Numbers marked with an asterisk (*) occur in several modules.

Step(s): ⇒ do/remove ...	Spare Part	Item No.	Part No.
Complete LiHa 2 Assembly			
<ul style="list-style-type: none"> – Pipetting tubing, covers, tubing shelf – Unscrew LiHa 2 from X-slide, lift off – X-flex cable from Optibo/Optibo Power and X-bay 	LiHa 2 assembly for 4 tips for 8 tips	8	619 204 619 208
Cables			
<ul style="list-style-type: none"> – Left cover – X-flex cable from LiHa backplane, Optibo/Optibo Power and X-bay 	X-flex cable	8-06	619326 ⁽¹⁰⁰⁾ 619327 ⁽¹⁵⁰⁾ 619328 ⁽²⁰⁰⁾
<ul style="list-style-type: none"> – Left cover – ILID cable from tip adapter and ILID board 	ILID cable	8-09	619 310
<ul style="list-style-type: none"> – Left cover – ILID flat cable from ILID board and LiHa backplane 	ILID flat cable	8-05	619 233
Electronic Boards			
<ul style="list-style-type: none"> – Complete LiHa 2 assembly from instrument – All cables from LiHa backplane – Board cage, DC-Servo boards 	DC-Servo boards LiHa backplane	8-03 8-04	619 303* 619 311
<ul style="list-style-type: none"> – Left cover – All cables from ILID board – ILID board 	ILID board for 4 tips for 8 tips	8-07	619 307 619 308
<ul style="list-style-type: none"> – Left cover – ILID chip from ILID board 	ILID chip	8-08	619 309
Belts			
<ul style="list-style-type: none"> – Complete LiHa 2 assembly from instrument – Board cage – Y- or Y-spreading motor – Belt lock 	Y-belt, Y-spreading belt (set of 2 x 2 m)	8-10, 8-11	619 215
Motors			

Step(s): ⇨ do/remove ...	Spare Part	Item No.	Part No.
<ul style="list-style-type: none"> – Complete LiHa 2 assembly from instrument – Board cage – Y- or Y-spreading motor cable from LiHa backplane – Motor assembly – Pulley 	Y-DC-Servo motor, Y-spreading DC-Servo motor	8-02, 8-01	619 321*
Tip Adapter			
<ul style="list-style-type: none"> – ILID cable from tip adapter – Tip adapter 	Tip adapter	8-22	619 211
Lower DiTi Eject Option			
<ul style="list-style-type: none"> – Complete LiHa 2 assembly from instrument – Solenoid cable from backplane – Fixing screws 	Lower DiTi eject option 2 (4/8 tips)	8-35	612 550
<ul style="list-style-type: none"> – Complete LiHa 2 assembly from instrument – Solenoid cable from backplane – Link lock, solenoid fork, fixing nuts 	Solenoid	8-36	619 520
<ul style="list-style-type: none"> – Rocker stop, leaf spring 	Upgrade kit	8-37	619 250

7.5 Spare Parts RoMa 1

Detailed Description

For more detailed description refer to [Section 6.7, 'RoMa 1 – Disassembly and Assembly Procedures'](#).

Check List and Spare Parts Numbers

Brief instructions for removing the spare parts. Install in reverse order.

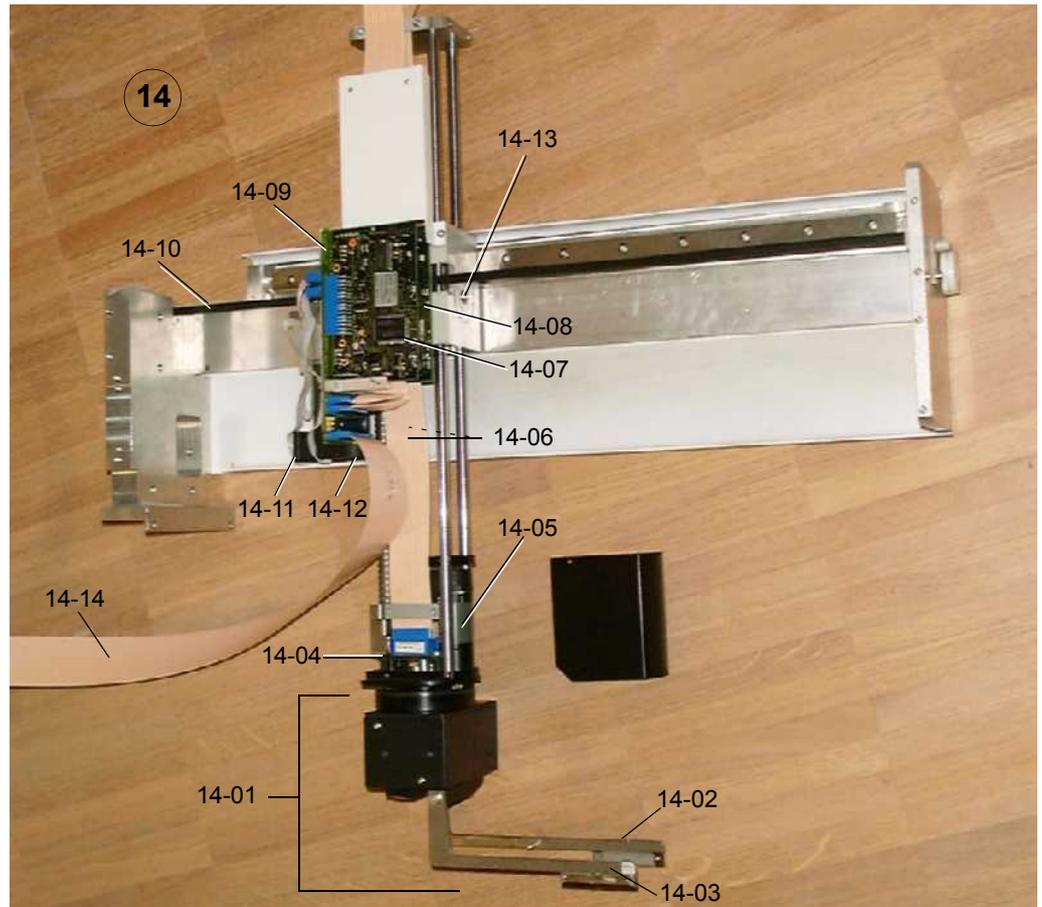


Figure 7-16 RoMa 1 spare parts

Step(s): ⇒ do/remove ...	Spare Part	Item No.	Part No.
Complete RoMa 1 Assembly			
– X-flex cable from Optibo/ Optibo Power and cable duct – Unscrew and lift out module	RoMa 1 assembly	14	612 600
Mechanical parts			
– Long gripper finger	Long gripper finger	14-02	619 511
– Short gripper finger	Short gripper finger	14-03	619 512

Step(s): ⇨ do/remove ...	Spare Part	Item No.	Part No.
<ul style="list-style-type: none"> – Rotator cover – Cables from gripper board – Wires gripper connector – Gripper board 	Gripper module	14-01	612 601
<ul style="list-style-type: none"> – Release belt tension – Fixing elements back/front 	Y-belt	14-10	619 513
Cables			
<ul style="list-style-type: none"> – Front and left side cover – Cable clamps 	X-flex cable	14-14	619 340 ⁽¹⁰⁰⁾ 619 341 ⁽¹⁵⁰⁾ 619 342 ⁽²⁰⁰⁾
<ul style="list-style-type: none"> – RoMa 1 assembly – Left side cover – Various brackets & clamps – Y/R- & Z/G-DC-Servo boards – Disconnect cable 	Gripper/Rotator flex cable	14-06	619 344
Electronic boards			
<ul style="list-style-type: none"> – Rotator cover – Cables from gripper board – Wires gripper connector 	Gripper board	14-04	619 300
<ul style="list-style-type: none"> – Disconnect cables – Retaining clamps 	Z/G-DC-Servo board Y/R-DC-Servo board	14-07 14-08	619 303* 619 303*
<ul style="list-style-type: none"> – Disconnect cables – Z/G-DC-Servo board – Y/R-DC-Servo board 	RoMa 1 backplane	14-09	619 343
Motors			
<ul style="list-style-type: none"> – Gripper board – Gripper module 	Rotator motor	14-05	619 345
<ul style="list-style-type: none"> – Disconnect cables – Y/R-DC-Servo board, Z/G-DC-Servo board 	Z-DC-Servo motor	14-12	619 346
<ul style="list-style-type: none"> – Release Y-belt tension – Y-pulley 	Y-DC-Servo motor	14-13	619 323
Z-brake			
Replace	Z-brake	14-13	619 891

**Note**

Part Numbers marked with an asterisk (*) occur in several modules.

7.6 Spare Parts RoMa 2

Detailed Description

For more detailed description refer to [Section 6.8, 'RoMa 2 – Disassembly and Assembly Procedures'](#).

Check List and Spare Parts Numbers

Brief instructions for removing the spare parts. Install in reverse order.

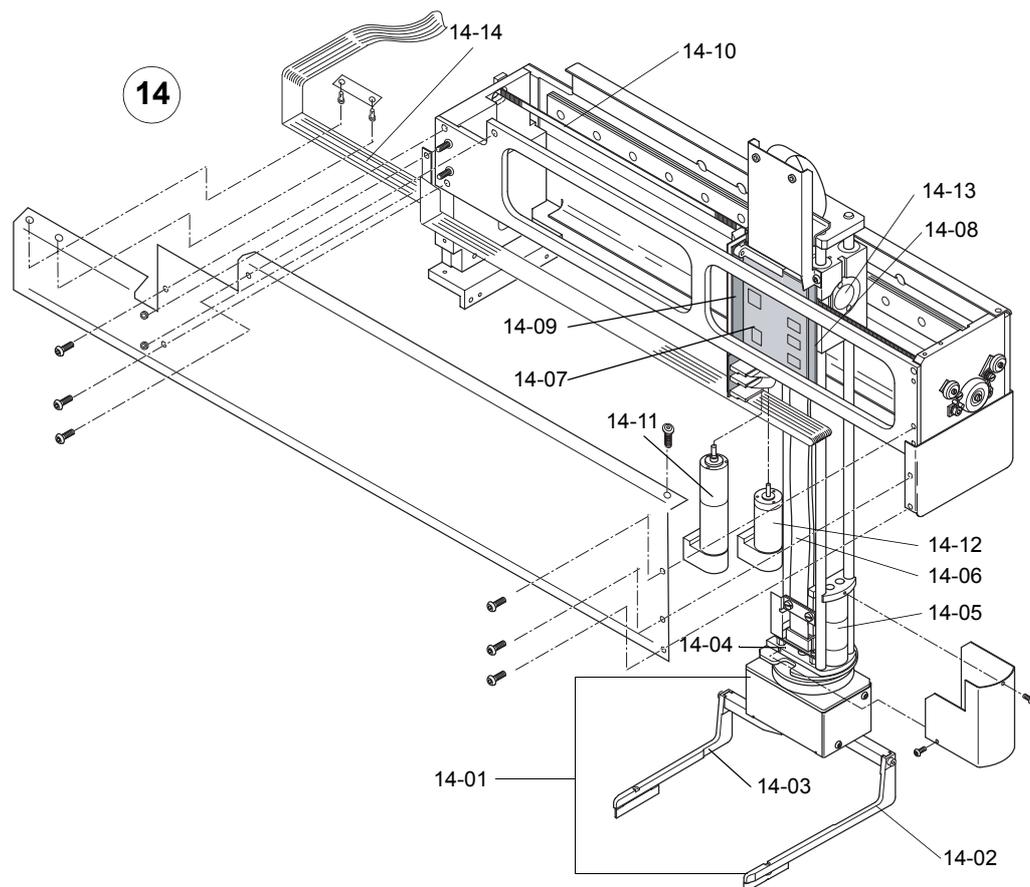


Figure 7-17 RoMa 2 spare parts

Step(s): ⇒ do/remove ...	Spare Part	Item No.	Part No.
Complete RoMa 2 Assembly			
– X-flex cable from Optibo/ Optibo Power and cable duct – Unscrew and lift out module	RoMa 2 assembly	14	612 630
Mechanical parts			
– Long gripper finger	Long gripper finger	14-02	692 511
– Short gripper finger	Short gripper finger	14-03	692 512

Step(s): ⇨ do/remove ...	Spare Part	Item No.	Part No.
<ul style="list-style-type: none"> – Rotator cover – Cables from gripper board – Wires gripper connector – Gripper board 	Gripper module	14-01	612 601
<ul style="list-style-type: none"> – Release belt tension – Fixing elements back/front 	Y-belt	14-10	619 513
Cables			
<ul style="list-style-type: none"> – Front and left side cover – Cable clamps 	X-flex cable	14-14	619 340 ⁽¹⁰⁰⁾ 619 341 ⁽¹⁵⁰⁾ 619 342 ⁽²⁰⁰⁾
<ul style="list-style-type: none"> – RoMa 2 assembly – Left side cover – Left side plate – Various brackets & clamps – Y/R- & Z/G-DC-Servo boards – Disconnect cable 	Gripper/Rotator flex cable	14-06	619 344
<ul style="list-style-type: none"> – Rotator cover – Cables from gripper board – Wires gripper connector 	Gripper board	14-04	619 300
<ul style="list-style-type: none"> – Disconnect cables – Retaining clamps 	Z/G-DC-Servo board Y/R-DC-Servo board	14-07 14-08	619 303* 619 303*
<ul style="list-style-type: none"> – Disconnect cables – Z/G-DC-Servo board – Y/R-DC-Servo board 	RoMa 2 backplane	14-09	612 633
Motors			
<ul style="list-style-type: none"> – Gripper board – Gripper module 	Rotator motor	14-05	619 345
<ul style="list-style-type: none"> – Disconnect cables – Y/R-DC-Servo board, Z/G-DC-Servo board 	Z-DC-Servo motor	14-11	619 346
<ul style="list-style-type: none"> – Release Y-belt tension – Y-pulley 	Y-DC-Servo motor	14-12	619 323
Z-brake			
<ul style="list-style-type: none"> – Disconnect cable – Unscrew – (Check shoe distance before reinstalling!) 	Z-brake	14-13	612 632

**Note**

Part Numbers marked with an asterisk (*) occur in several modules.

7.7 Spare Parts PosID 1

Detailed Description

For more detailed information, refer to [Section 6.9, 'PosID 1 – Disassembly and Assembly Procedures'](#).

Check List and Spare Parts Numbers

Brief instructions for removal of the PosID 1 spare parts. Install in reverse order.

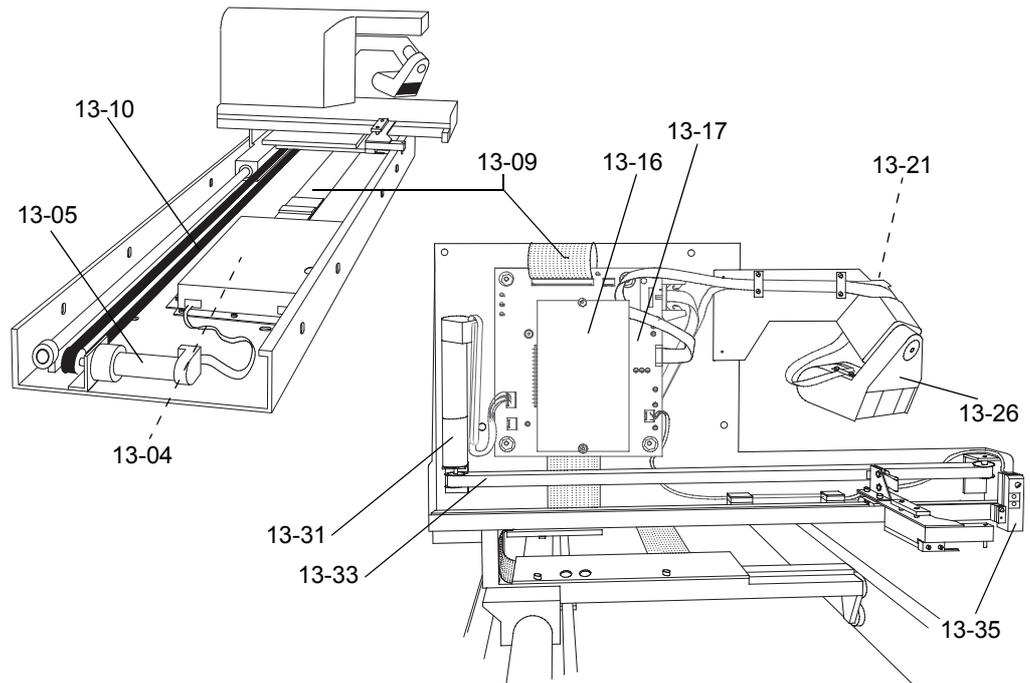


Figure 7-18 Spare parts PosID 1



Note

Part Numbers marked with an asterisk (*) occur in several modules.

Step(s): ⇒ do/remove ...	Spare Part	Item No.	Part No.
X-Drive Assembly			
<ul style="list-style-type: none"> – Worktable – X-belt tension – Belt fixing screw 	X-belt (3.7 m)	13-10	619 506
<ul style="list-style-type: none"> – Worktable – X-belt tension – X-motor cable from PosID CU board – X-motor bracket – Pulley 	X-DC-Servo motor	13-05	619 321*

Step(s): ⇨ do/remove ...	Spare Part	Item No.	Part No.
<ul style="list-style-type: none"> – Worktable – X-flex cable from PosID 1 CU board – Flex cable fixtures – Casing – X-flex cable from Y/B board 	X-flex cable	13-09	619 329 ⁽¹⁰⁰⁾ 619 330 ⁽¹⁵⁰⁾ 619 331 ⁽²⁰⁰⁾
Electronic Boards			
<ul style="list-style-type: none"> – Worktable – Cover and all cables from PosID 1 CU board – X-DC-Servo board – Fixing screws 	X-DC-Servo board PosID 1 CU board	13-04	619 303* 619 306
<ul style="list-style-type: none"> – Casing – Y/B-DC-Servo board – all cables from Y/B board – Fixing screws 	Y/B-DC-Servo board Y/B board	13-16 13-17	619 303* 619 332
Scanner Assembly			
<ul style="list-style-type: none"> – Casing – Scanner flex cable from Y/B Board – Flex cable holders – Set screw 	Scanner head	13-26	619 505
<ul style="list-style-type: none"> – Scanner head – B-motor cable from Y/B board – B-motor fixing screws 	B-DC-Servo motor	13-21	619 322
Y-Drive Assembly			
<ul style="list-style-type: none"> – Casing – Y-belt tension 	Y-belt	13-33	619 507
<ul style="list-style-type: none"> – Casing – Y-belt – Y-motor cable from Y/B board – Y-motor fixing screws – Motor assembly – Pulley, Bracket 	Y-DC-Servo motor	13-31	619 321
No tube sensor			
<ul style="list-style-type: none"> – Casing – No tube sensor cable from Y/B Board and cable holders – No tube sensor fixing screws 	No tube sensor	13-35	619 333

7.8 Spare Parts PosID 2

Detailed Description

Refer to [Section 6.10, 'PosID 2 – Disassembly and Assembly Procedures'](#)

- for more detailed information
- concerning the older version of PosID 2 CU (located underneath the worktable)

Check List and Spare Parts Numbers

Brief instructions for removal of the PosID 2 spare parts. Install in reverse order.

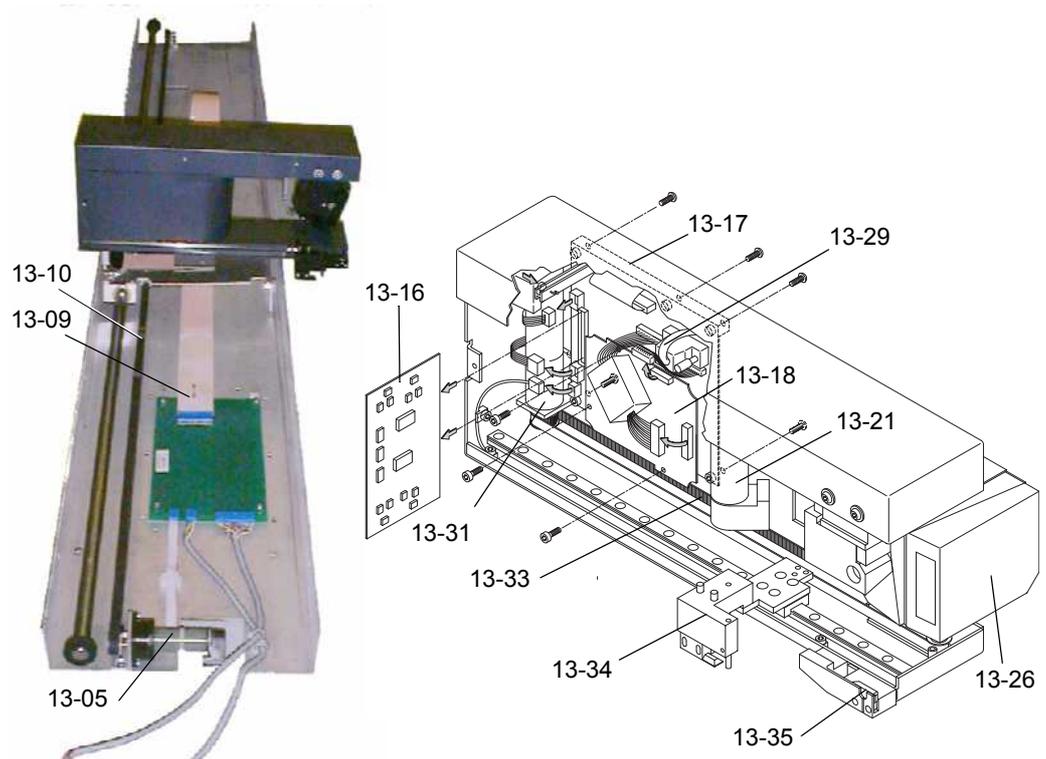


Figure 7-19 Spare parts PosID 2



Note

Part Numbers marked with an asterisk (*) occur in several modules.

Step(s): ⇒ do/remove ...	Spare Part	Item No.	Part No.
PosID 2 Assembly			
– Worktable – Connection cable and X-motor cable at PosID 2 CU board – PosID 2 assembly fixing screws	PosID 2 assembly		612 411 (100) 612 412 (150) 612 413 (200)

Step(s): ⇨ do/remove ...	Spare Part	Item No.	Part No.
X-Drive Assembly			
<ul style="list-style-type: none"> – Worktable – X-belt tension – Belt fixing screw 	X-belt (5 m)	13-10	619 611
<ul style="list-style-type: none"> – Worktable – X-belt tension – X-motor cable from PosAda – Pulley – X-motor bracket 	X-DC-Servo motor	13-05	619 321*
<ul style="list-style-type: none"> – Worktable – Casing – Flex cable fixtures – Flex cable from PosAda and Y/B board – Y/B board fixing screws 	X-flex cable	13-09	619 602 (100/ 150) 619 604 (200)
Electronic Boards			
<ul style="list-style-type: none"> – Open left Access Door 	X-DC-Servo board		619 303*
<ul style="list-style-type: none"> – Open left Access Door – Cables from PosID 2 CU board – X-DC-Servo board 	PosID 2 CU board		619 600
<ul style="list-style-type: none"> – Casing – Cables from Y/B board – Y/B board fixing screws – Y/B-DC-Servo board – DSP decoding board 	Y/B-DC-Servo board Y/B board	13-16 13-17	619 303* 619 605
<ul style="list-style-type: none"> – Casing – Cables from DSP decoding board – Fixing screws 	DSP decoding board	13-18	619 607
Scanner Assembly			
<ul style="list-style-type: none"> – Casing – Fixing screws and B-motor cable from Y/B board – B-motor fixing screws – Gearing assembly and bracket 	B-DC-Servo motor	13-21	619 601
<ul style="list-style-type: none"> – Casing – Housing – Cable holders – Scanner cable from Y/B Board and cable connector – Fixing screws 	Scanner cable Scanner head	13-29 13-26	619 609 619 610

Step(s): ⇒ do/remove ...	Spare Part	Item No.	Part No.
Y-Drive Assembly			
<ul style="list-style-type: none"> – Casing – Y-belt tension – Gripper fixing screws 	Gripper assembly Y-belt	13-34 13-33	619 622 619 612
<ul style="list-style-type: none"> – Casing – Y-belt tension – Y-motor cable from Y/B board – Y-motor fixing screws – Motor assembly – Pulley, Bracket 	Y-DC-Servo motor	13-31	619 323*
No tube sensor			
<ul style="list-style-type: none"> – Casing – Cable clamp and no tube sensor fixing screws – No tube sensor cable from Y/B Board 	No tube sensor	13-35	619 606



Note

Part Numbers marked with an asterisk () occur in several modules.*

8 Instruments at a Glance

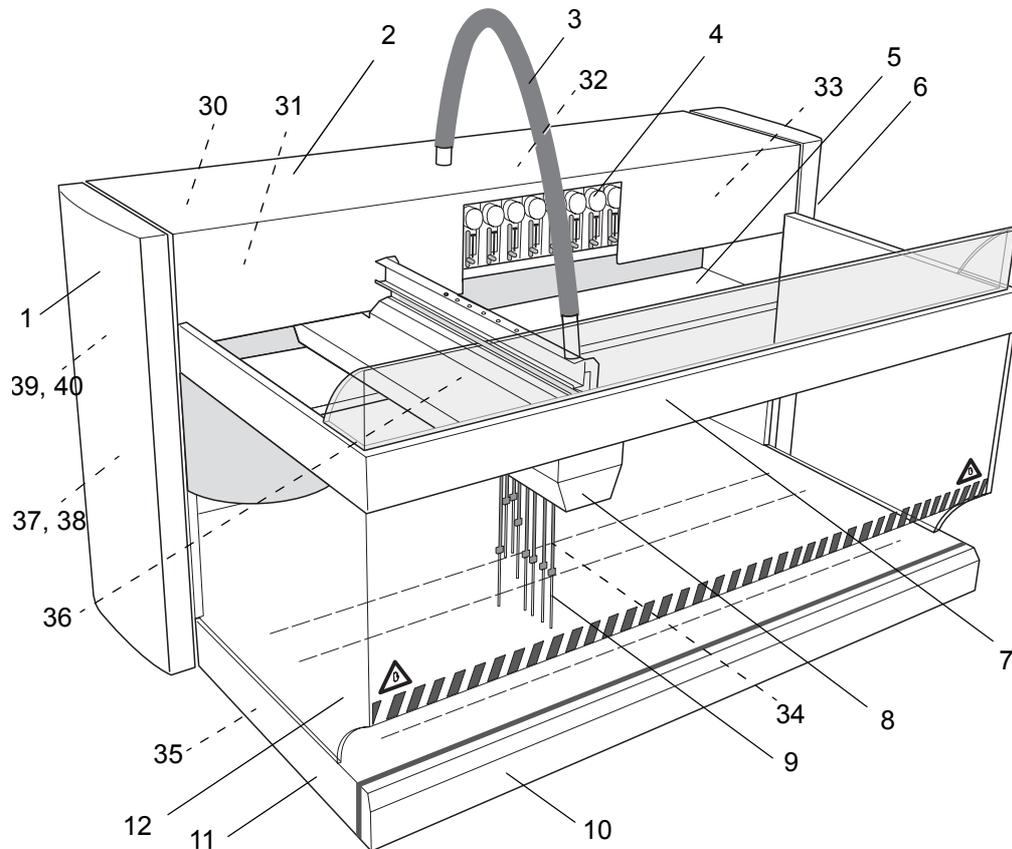
Purpose of This Chapter This chapter contains overviews of the Genesis RSP, RMP and RWS instruments and indicates their main components with item numbers.

Throughout this document, these main components are always designated with the same item numbers – for example (8) for LiHa – in the detail drawings and the text passages.

Chapter Overview This chapter consists of the following sections:

Section	Title	Page
8.1	Genesis RSP	8 – 2
8.2	Genesis RMP	8 – 3
8.3	Genesis RWS Logistics	8 – 4
8.4	Genesis RWS Assay	8 – 5

8.1 Genesis RSP



Visible Items

1 Access door (left)	8 LiHa 1, LiHa 2
2 Top cover	9 Tips
3 Tubing guide	10 Worktable cover (front)
4 Diluter	11 Worktable cover (left)
5 X-bay	12 Worktable
6 Access door (right)	
7 Arm guide	

Not Illustrated or Hooded Items

30 Tubing system	36 Low volume option*
31 6-way valve option	37 Uniport board*
32 Dilback	38 CANDI board*
33 Power supply/Power module	39 Optibo
34 Lower DiTi eject option*	40 CU board
35 FWO*/MPO*	

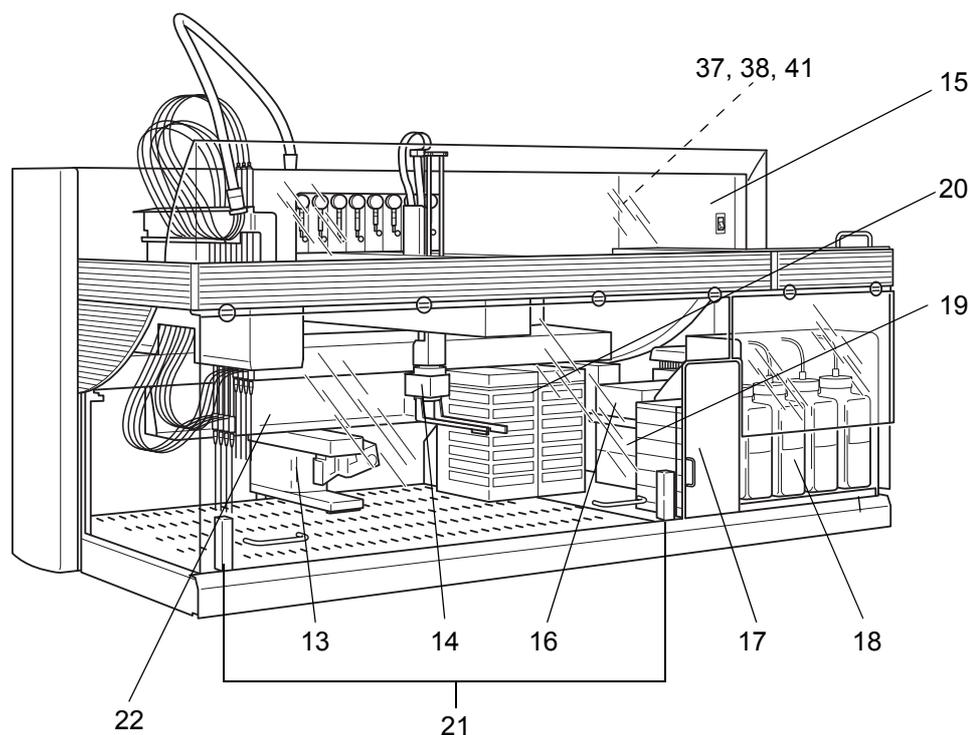


Note

Items marked with an asterisk (*) are optional components and therefore not available on all instruments.

The instrument may be equipped with more standard or optional items which are shown on the overview of the other instruments.

8.2 Genesis RMP



Note

Indicated with item numbers are only these items which are – compared with the Genesis RSP – additionally or with a different location.

Visible Items

13 PosID 1/PosID 2*	18 Wash bottle rack
14 RoMa1, RoMa 2	19 Reader*
15 Add-on module*	20 Heated incubator*
16 Washer*	21 Door lock assembly
17 RT-incubator	22 Shelf*

Not Illustrated or Hooded Items

37 Uniport board*
38 CANDI board*
41 Supervisor

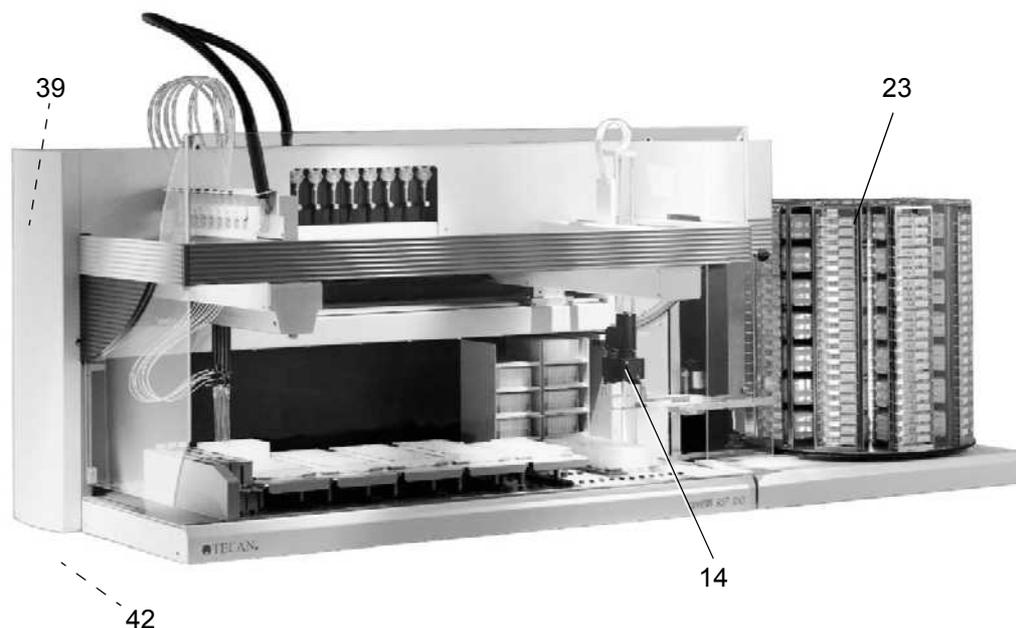


Note

Items marked with an asterisk (*) are optional components and therefore not available on all instruments.

The instrument may be equipped with more standard or optional items which are shown on the overview of the other instruments.

8.3 Genesis RWS Logistics



Note

Indicated with item numbers are only these items which are – compared with the Genesis RSP or RMP – additionally or substitutional.

Visible Items

- 14 RoMa 1/RoMa 2
- 23 Carousel*

Not Illustrated or Hooded Items

- 39 Optibo/Optibo Power
- 42 Variable extension deck*

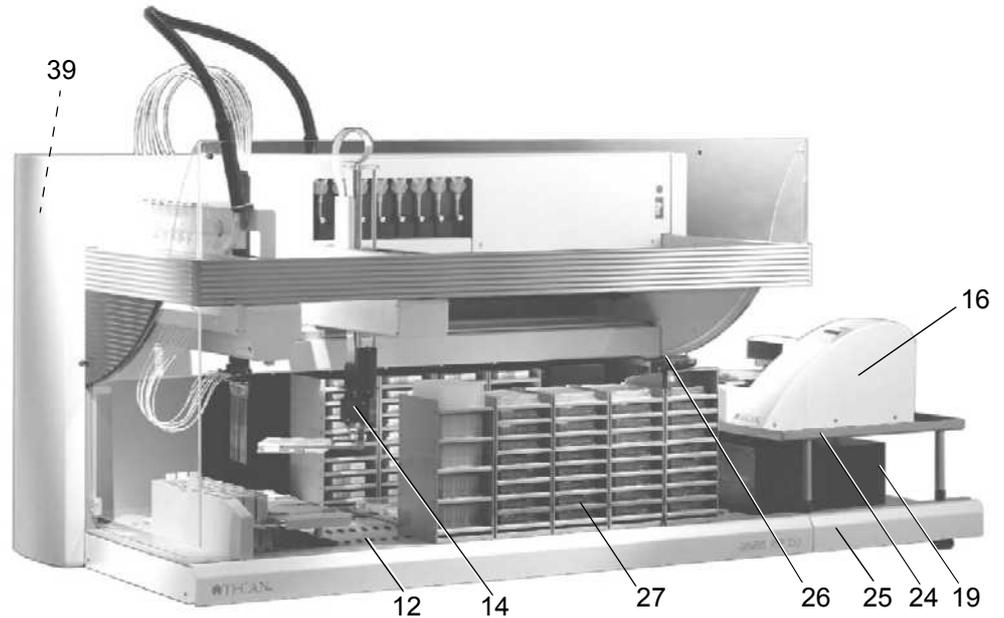


Note

Items marked with an asterisk (*) are optional components and therefore not available on all instruments.

The instrument may be equipped with more standard or optional items which are shown on the overview of the other instruments.

8.4 Genesis RWS Assay



Note

Indicated with item numbers are only these items which are – compared with the Genesis RSP or RMP – additionally or substitutional.

Visible Items

- 12 Cut out worktable
- 14 RoMa 1/RoMa 2
- 16 Washer*
- 19 Reader*
- 24 Mounting assembly for washer*
- 25 Workstation extension*
- 26 Barcode reader*
- 27 On-deck plate hotel*

Hooded Item

- 39 Optibo Power



Note

Items marked with an asterisk (*) are optional components and therefore not available on all instruments.

The instrument may be equipped with more standard or optional items which are shown on the overview of the other instruments.

9 Diagrams

Purpose of This Chapter This chapter contains the relevant diagrams for the instruments covered in this document.

Chapter Overview This chapter consists of the following sections:

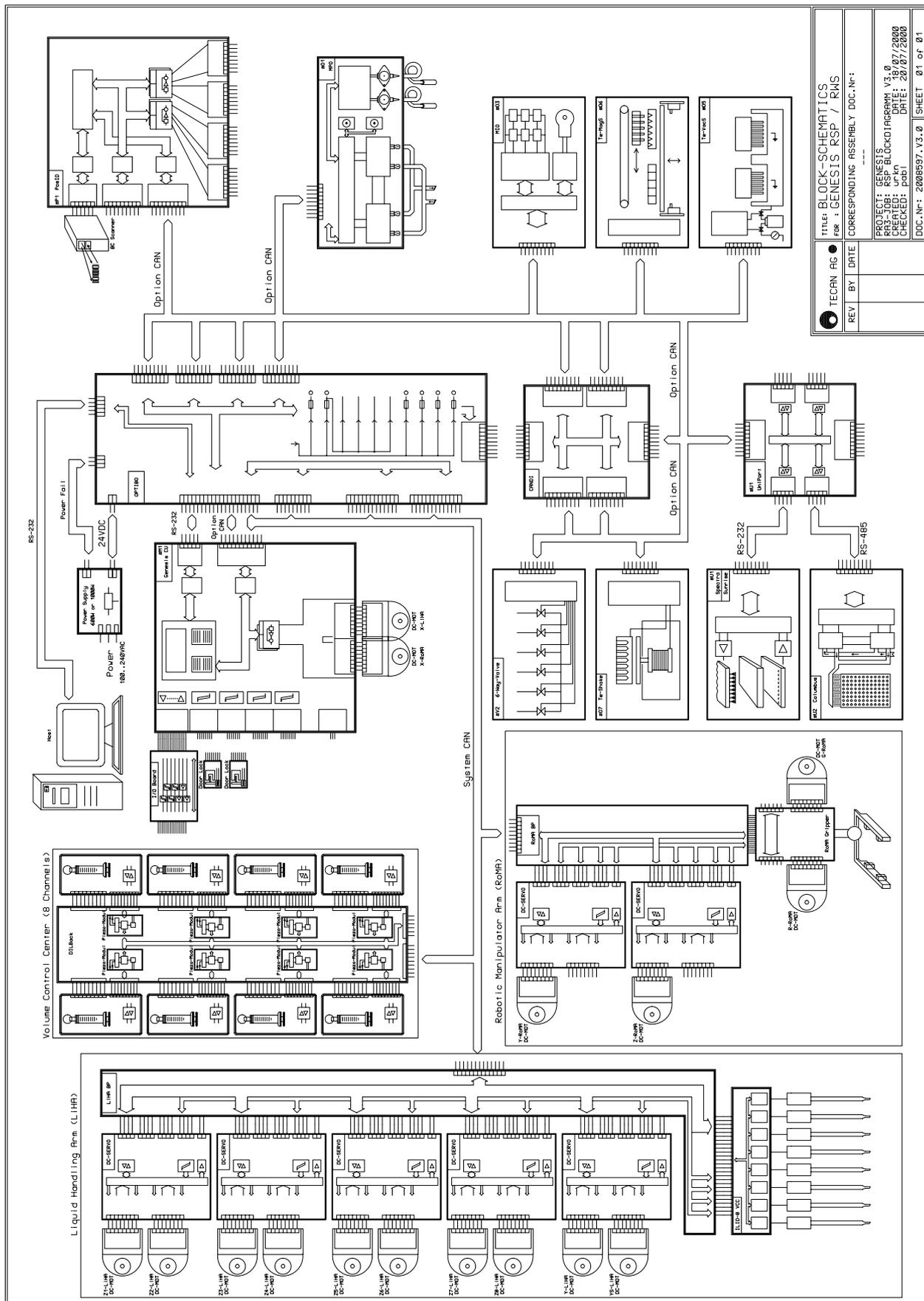
Section	Title	Page
9.1	Genesis RSP, RMP and RWS	9 – 1
9.2	Instrument	9 – 5
9.2.1	Power Modules	9 – 5
9.2.2	Electronic Boards	9 – 12
9.3	Liquid System	9 – 40
9.3.1	MPO/FWO	9 – 40
9.3.2	Diluter/Dilback	9 – 44
9.3.3	Low Volume Option	9 – 48
9.4	LiHa 1 and LiHa 2	9 – 51
9.5	RoMa 1 and RoMa 2	9 – 56
9.6	PosID 1 and PosID 2	9 – 64

9.1 Genesis RSP, RMP and RWS

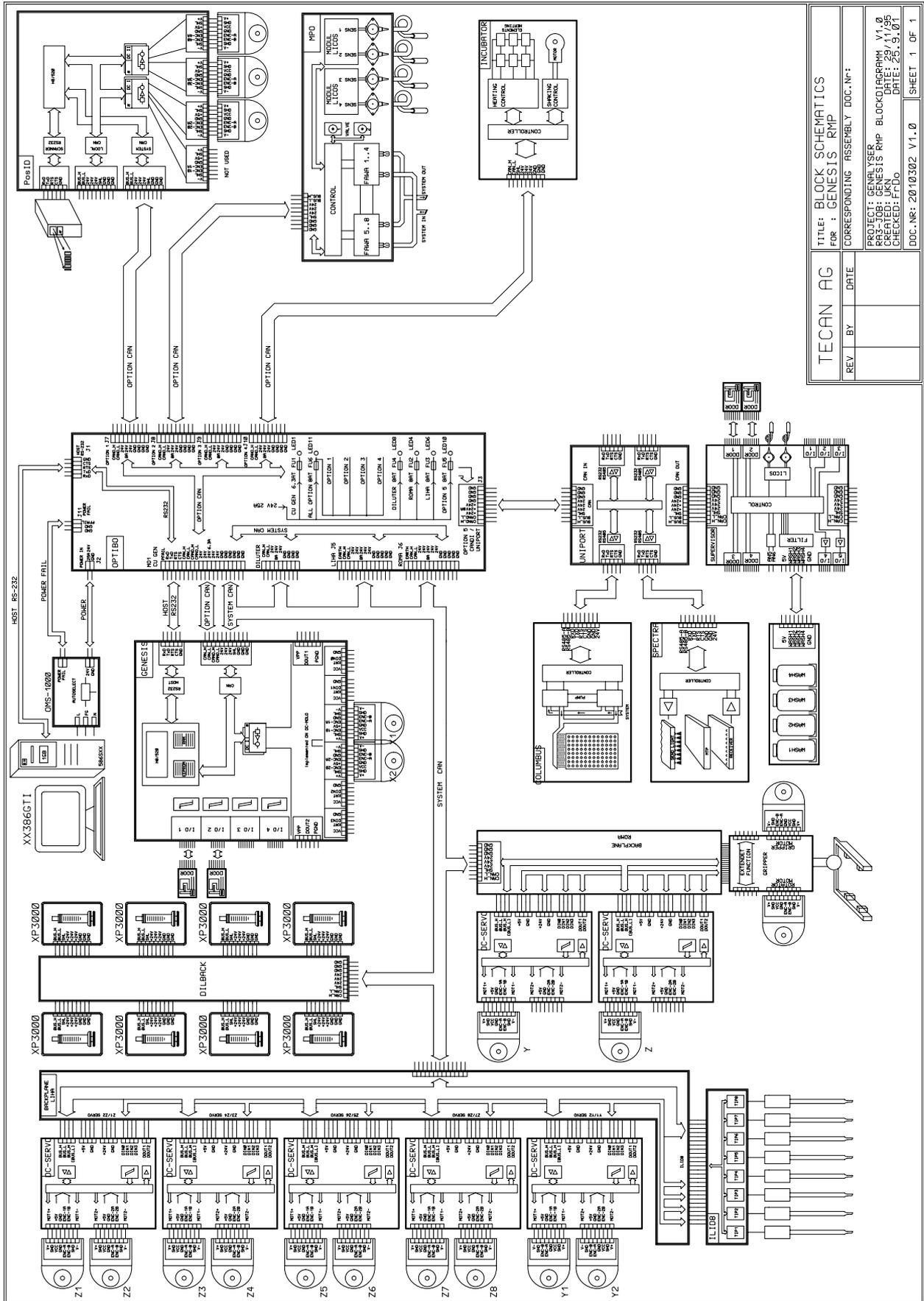
Find the following diagrams filed hereafter:

Drawing No	Title	Valid for	Page
2008597 V3.0 p.1	Block schematics	RSP, RWS	9 – 2
2010302 V1.0 p.1	Block schematics	RMP with TOPS 3.01	9 – 3
2010301 V1.0 p.1	Communication overview	RSP, RWS, RMP	9 – 4

2008597 V3.0 p.1 Block schematics

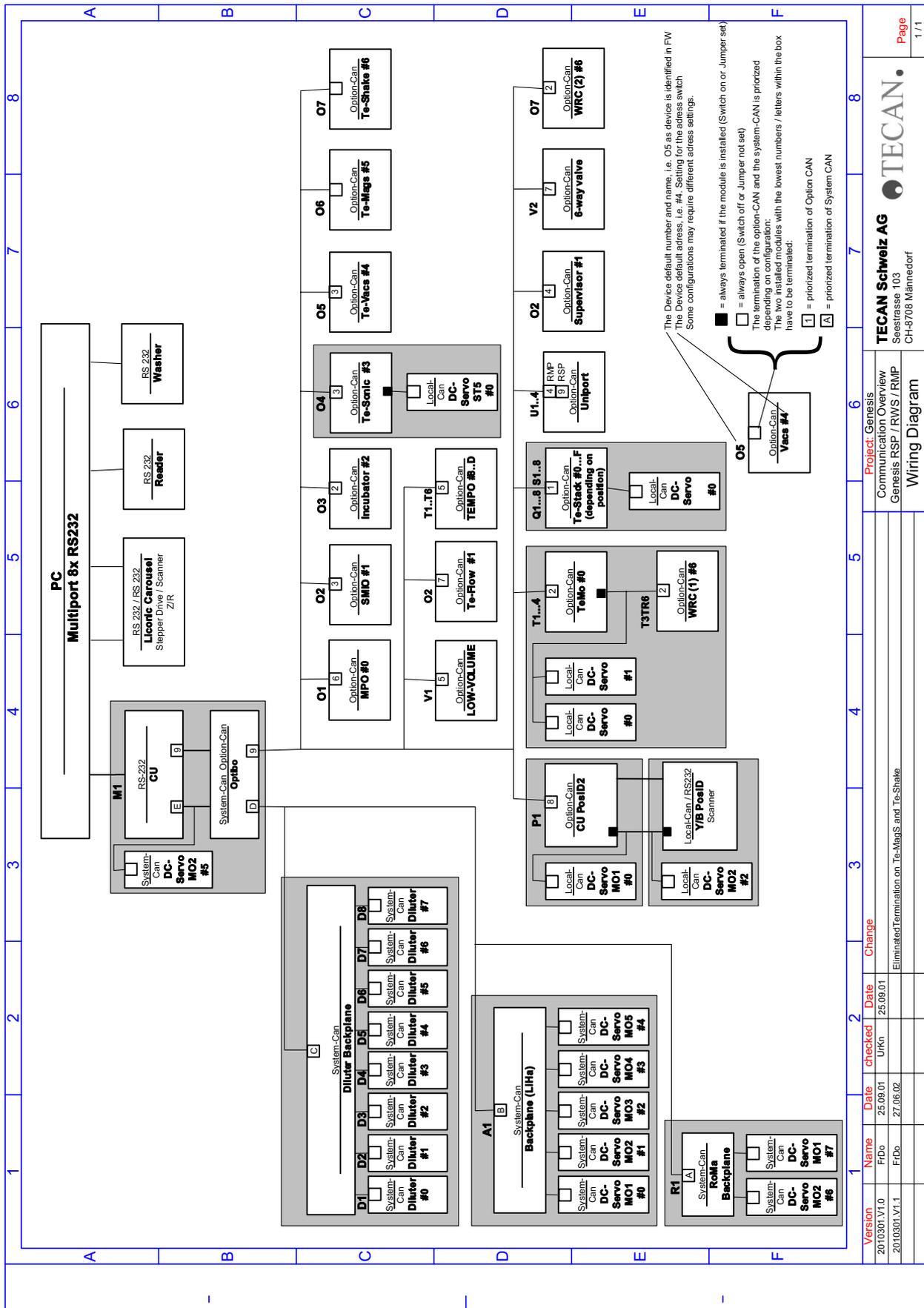


2010302 V1.0 p.1 Block schematics



TECAN AG		TITLE: BLOCK SCHEMATICS FOR : GENESIS RMP	
REV	BY	DATE	CORRESPONDING ASSEMBLY DOC-NR:
PROJECT: GENALYSER		BLOCKDIAGRAM V1.0	
R33-JOB: GENESIS RMP		DATE: 26/11/05	
CREATED: JKN		DATE: 26/11/05	
CHECKED: FTB		DATE: 26/11/05	
DOC-NR: 2010302 V1.0		SHEET 1 OF 1	

2010301 V1.0 p.1 Communication overview



9.2 Instrument

9.2.1 Power Modules

Find the following diagrams filed hereafter:

Old Generation

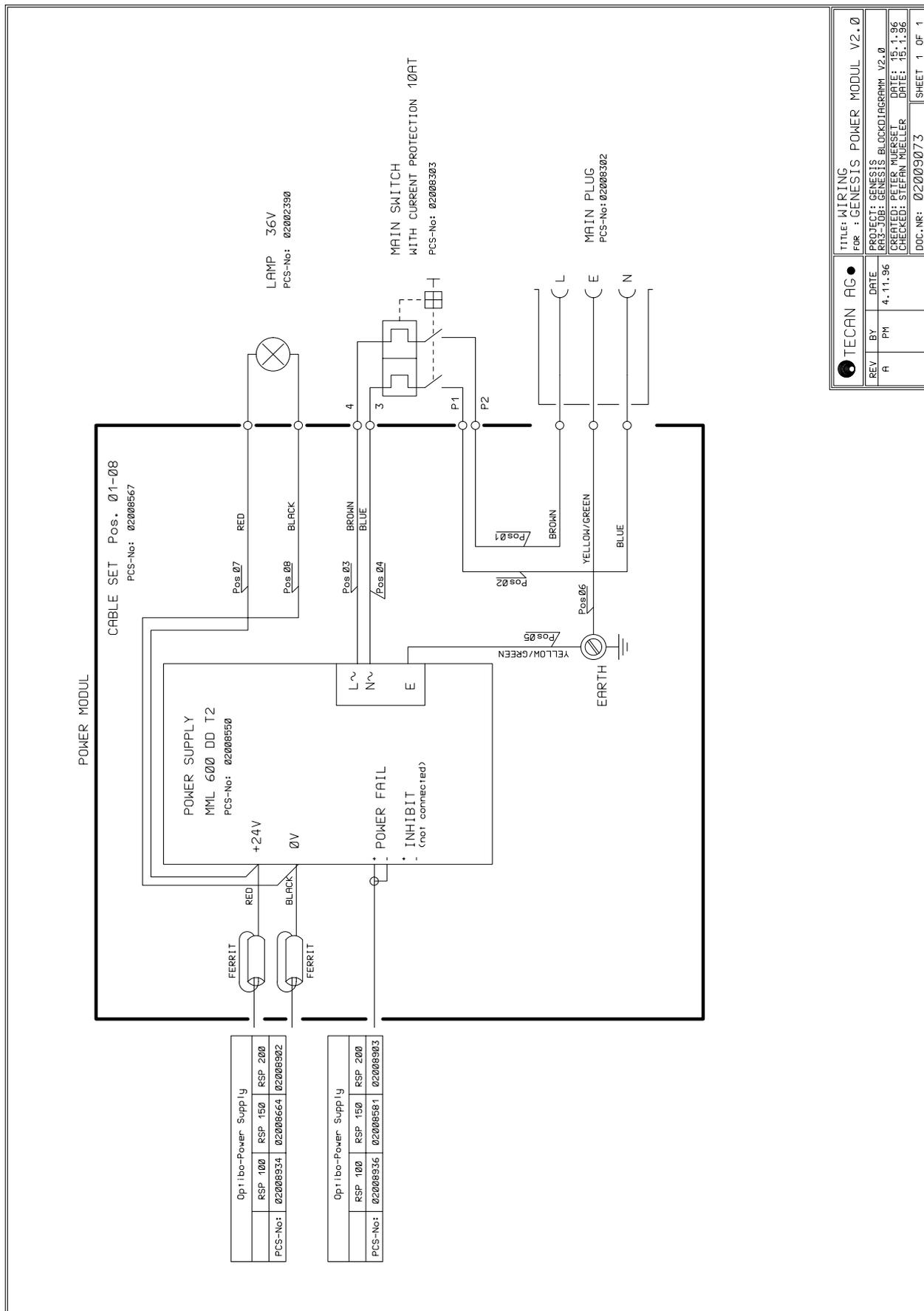
Drawing No	Title	Valid for	Page
2009073 V2.0	Wiring diagram	RSP RWS 100	9 – 6
2008920 V1.1	Wiring diagram	RMP	9 – 7
2009559 V1.0	Wiring diagram	RWS 150/200	9 – 8

PM 1, 2, 3 and 4

Drawing No	Title	Valid for	Page
2010233 V2.0	Wiring diagram	RSP/RWS 100 (PM 1) RSP 150/200 (PM 4)	9 – 9
2010235 V2.0	Wiring diagram	RMP (PM 3)	9 – 10
2010234 V2.0	Wiring diagram	RWS 150/200 (PM 2)	9 – 11

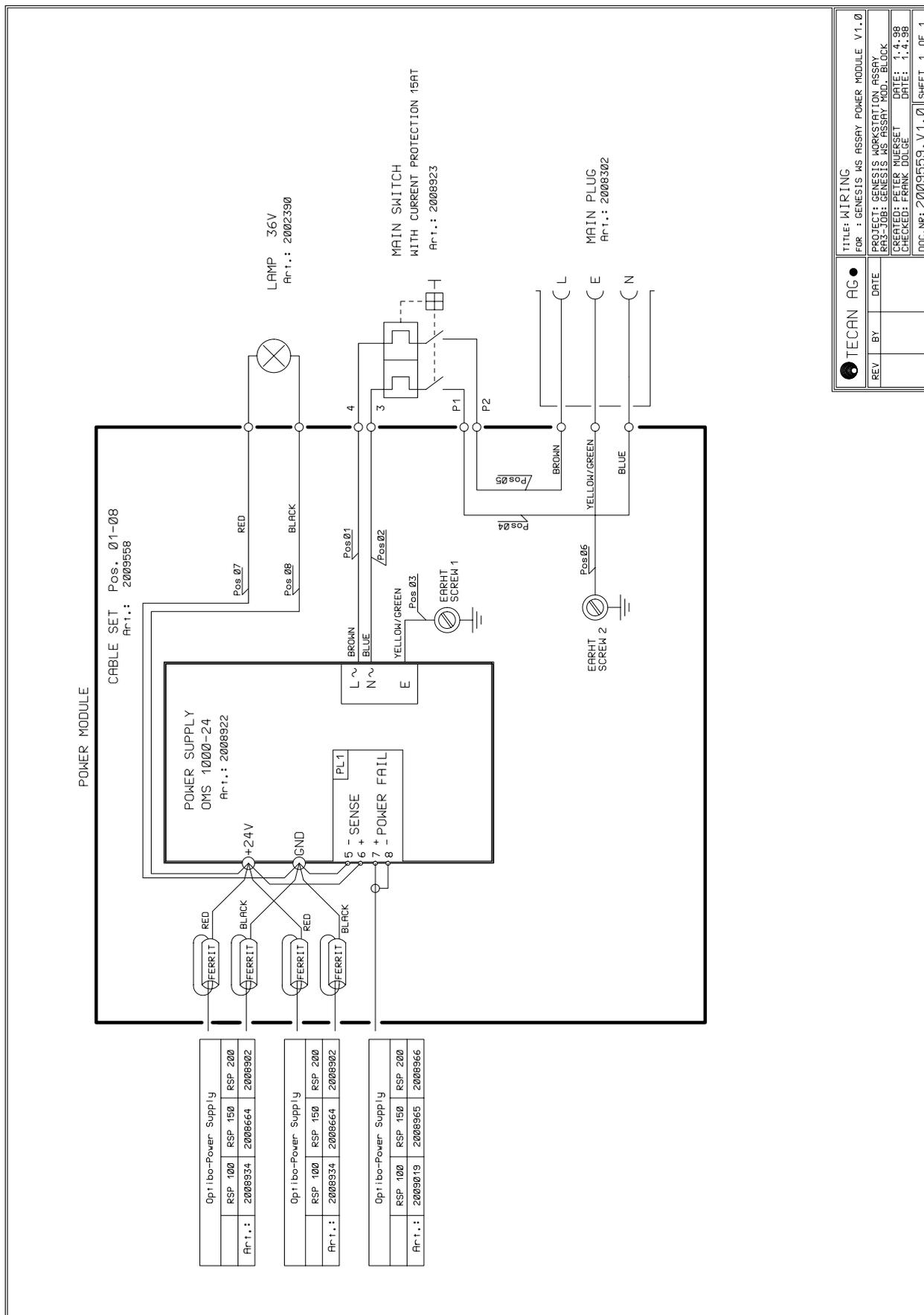
2009073 V2.0

Wiring diagram



2009559 V1.0

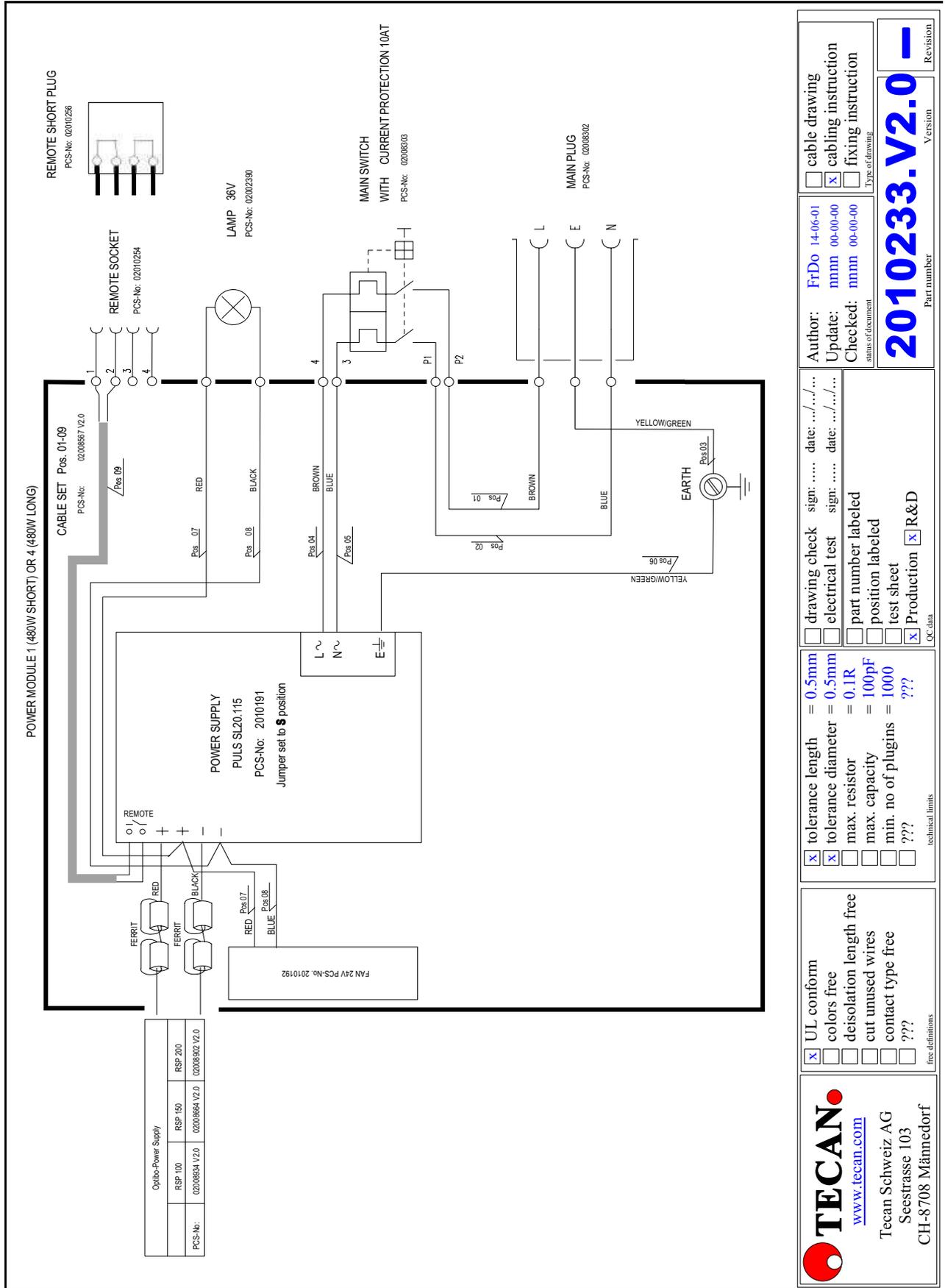
Wiring diagram



TECAN AG		TITLE: WIRING	
REV	BY	DATE	FOR : GENESIS WS ASSAY POWER MODULE V1.0
			PROJECT: GENESIS WORKSTATION ASSAY
			RAS-JOB: GENESIS WS ASSAY MOD. BLOCK
			CREATED: PETER NULSET DATE: 1.4.98
			CHECKED: FRANK DOLGE DATE: 1.4.98
			DOC. NR: 2009559, V1.0 SHEET 1 OF 1

2010233 V2.0

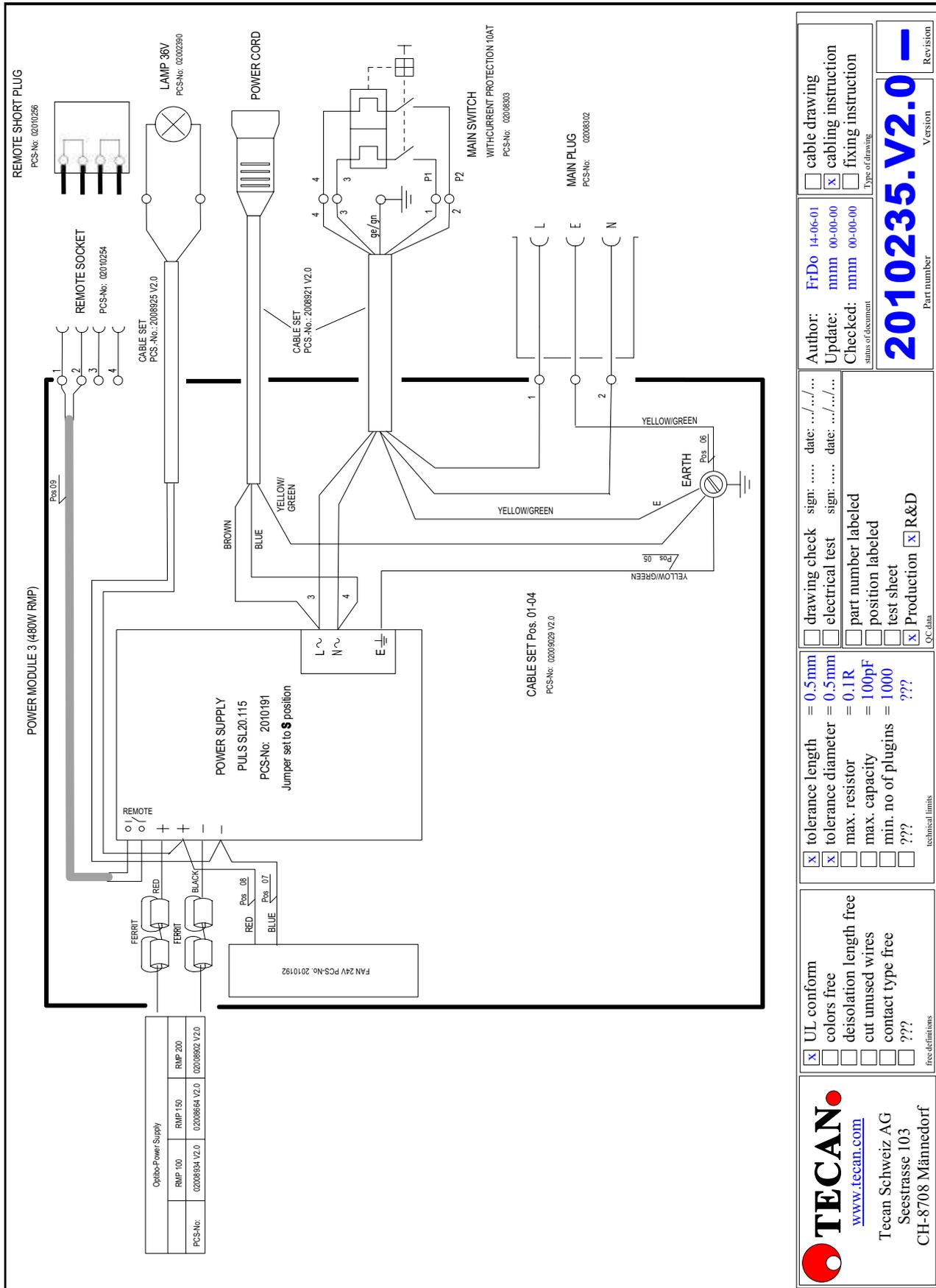
Wiring diagram



<input type="checkbox"/> drawing check <input checked="" type="checkbox"/> electrical test <input type="checkbox"/> part number labeled <input type="checkbox"/> position labeled <input checked="" type="checkbox"/> test sheet <input checked="" type="checkbox"/> Production <input type="checkbox"/> R&D		Author: FrDo 14-06-01 Update: mmm 00-00-00 Checked: mmm 00-00-00 <small>status of document</small>		Part number <h1>2010233.V2.0</h1> Version Revision	
<input checked="" type="checkbox"/> tolerance length = 0.5mm <input checked="" type="checkbox"/> tolerance diameter = 0.5mm <input type="checkbox"/> max. resistor = 0.1R <input type="checkbox"/> max. capacity = 100pF <input type="checkbox"/> min. no of plugins = 1000 <input type="checkbox"/> ??? <small>technical limits</small>		<input checked="" type="checkbox"/> UL conform <input type="checkbox"/> colors free <input type="checkbox"/> deisolation length free <input type="checkbox"/> cut unused wires <input type="checkbox"/> contact type free <input type="checkbox"/> ??? <small>free definitions</small>		 Tecan Schweiz AG Seestrasse 103 CH-8708 Männedorf	

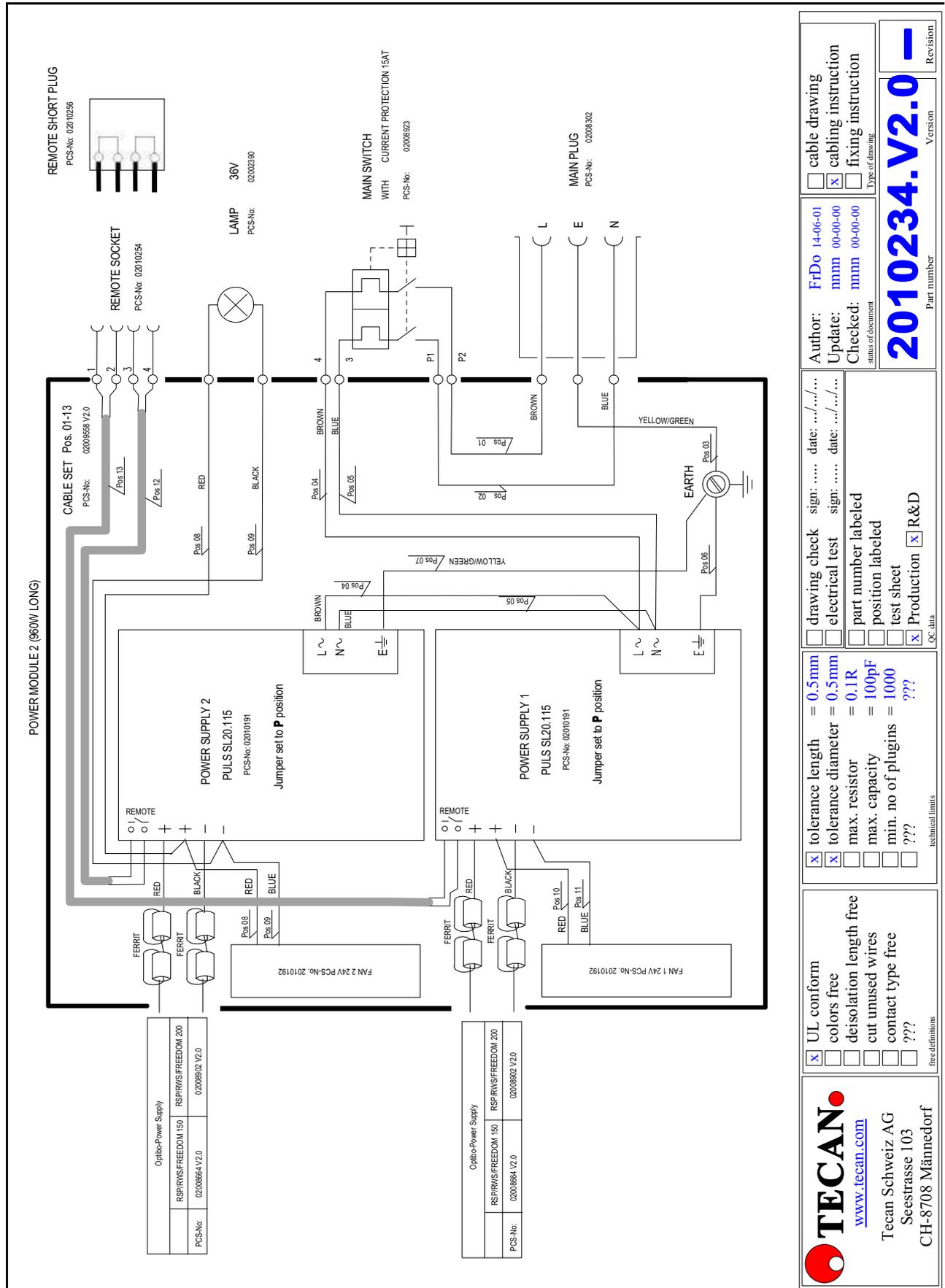
2010235 V2.0

Wiring diagram



2010234 V2.0

Wiring diagram



<p>TECAN. www.tecan.com Tecan Schweiz AG Seestrasse 103 CH-8708 Männedorf</p>		<p>UL conform <input checked="" type="checkbox"/> colors free <input type="checkbox"/> desolation length free <input type="checkbox"/> cut unused wires <input type="checkbox"/> contact type free <input type="checkbox"/> ??? <input type="checkbox"/> free definitions</p>		<p>tolerance length = 0.5mm <input checked="" type="checkbox"/> tolerance diameter = 0.5mm <input checked="" type="checkbox"/> max. resistor = 0.1R <input type="checkbox"/> max. capacity = 100pF <input type="checkbox"/> min. no of plugins = 1000 <input type="checkbox"/> ??? <input type="checkbox"/> technical limits</p>		<p>drawing check sign: date: .././../... <input type="checkbox"/> electrical test sign: date: .././../... <input type="checkbox"/> part number labeled <input type="checkbox"/> position labeled <input type="checkbox"/> test sheet <input type="checkbox"/> Production <input checked="" type="checkbox"/> R&D <input type="checkbox"/> QC data</p>		<p>Author: FrDo 14-06-01 Update: mmm 00-00-00 Checked: mmm 00-00-00 status of document</p>		<p>Part number 2010234.V2.0 Version Revision</p>	
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9.2.2 Electronic Boards

Find the following diagrams filed hereafter:

Optibo, Optibo Power

Drawing No	Title	Valid for	Page
2008908 V2.0A	Schematics	Optibo	9 – 14
2008908 V2.0C	Assembly component side	Optibo	9 – 15
2008908 V2.0C	Assembly solder side	Optibo	9 – 16
2009554 V2.1B	Schematics	Optibo Power	9 – 17
2009554 V2.1B	Assembly component side	Optibo Power	9 – 18
2009554 V2.1B	Assembly solder side	Optibo Power	9 – 19

CU Board

Drawing No	Title	Valid for	Page
2008996 V2.0B p.1	Schematics	CU board	9 – 20
2008996 V2.0B p.2	Schematics	CU board	9 – 21
2008996 V2.0B p.1	Assembly component side	CU board	9 – 22

DC-Servo Board

Drawing No	Title	Valid for	Page
2008980 V.2.0A	Schematics	DC-Servo board	9 – 23
2008980 V.2.0A	Assembly upper side	DC-Servo board	9 – 24
2008980 V.2.0A	Assembly lower side	DC-Servo board	9 – 25

Supervisor Board

Drawing No	Title	Valid for	Page
2008798 V1.2B p.1	Schematics	Supervisor board	9 – 26
2008798 V1.2B p.2	Schematics	Supervisor board	9 – 27
2008798 V1.2B	Assembly component side	Supervisor board	9 – 28

Uniport Board

Drawing No	Title	Valid for	Page
2008557 V1.1B p.1	Schematics	Uniport board	9 – 29
2008557 V1.1B p.2	Schematics	Uniport board	9 – 30
2008557 V1.1B p.3	Schematics	Uniport board	9 – 31
2008557 V1.1B	Assembly component side	Uniport board	9 – 32
2008557 V1.1B	Assembly solder side	Uniport board	9 – 33

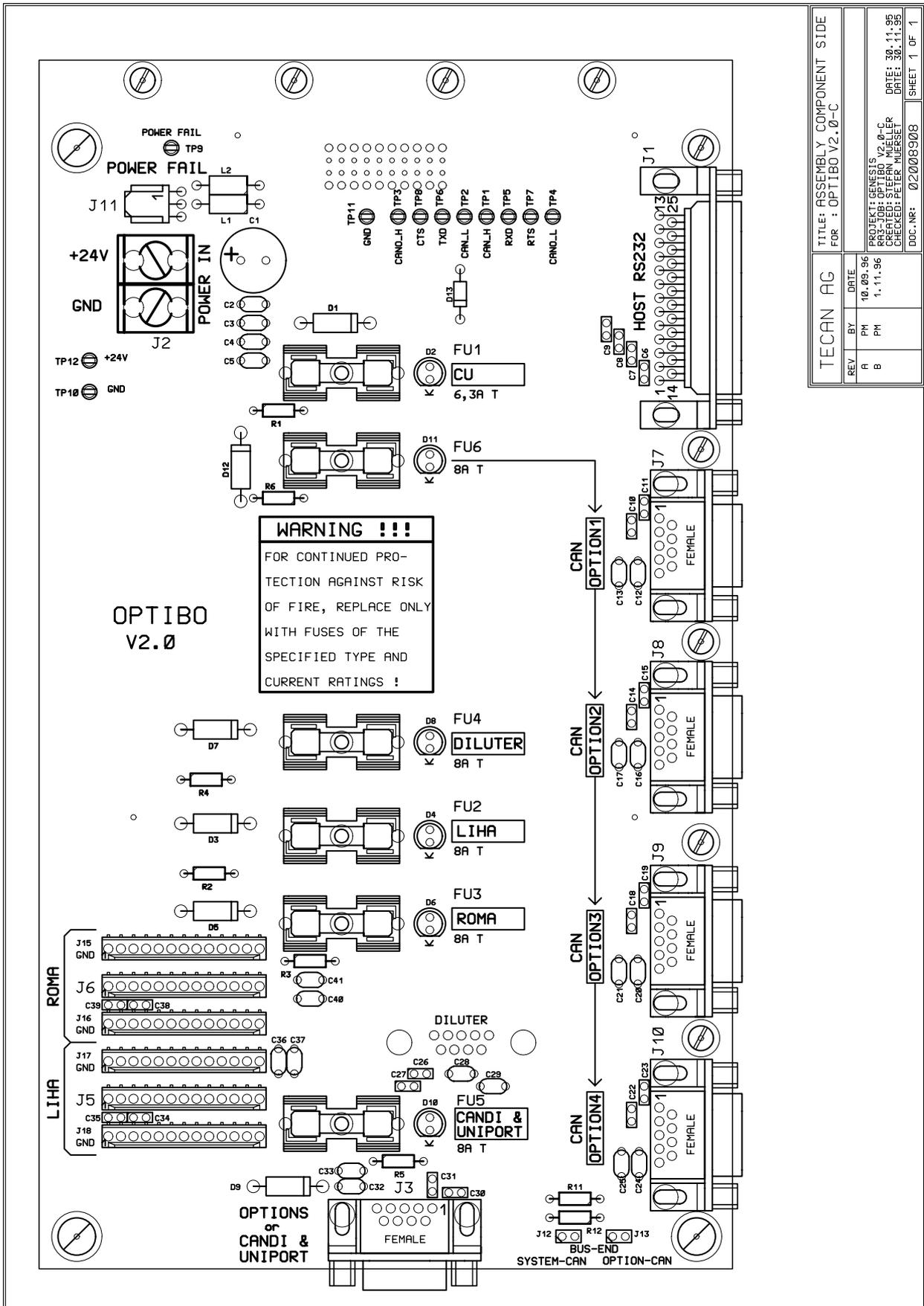
CANDI Board

Drawing No	Title	Valid for	Page
2009007 V.2.0A	Schematics	CANDI board	9 – 34
2009007 V.2.0A	Assembly component side	CANDI board	9 – 35

SMIO/SAFY

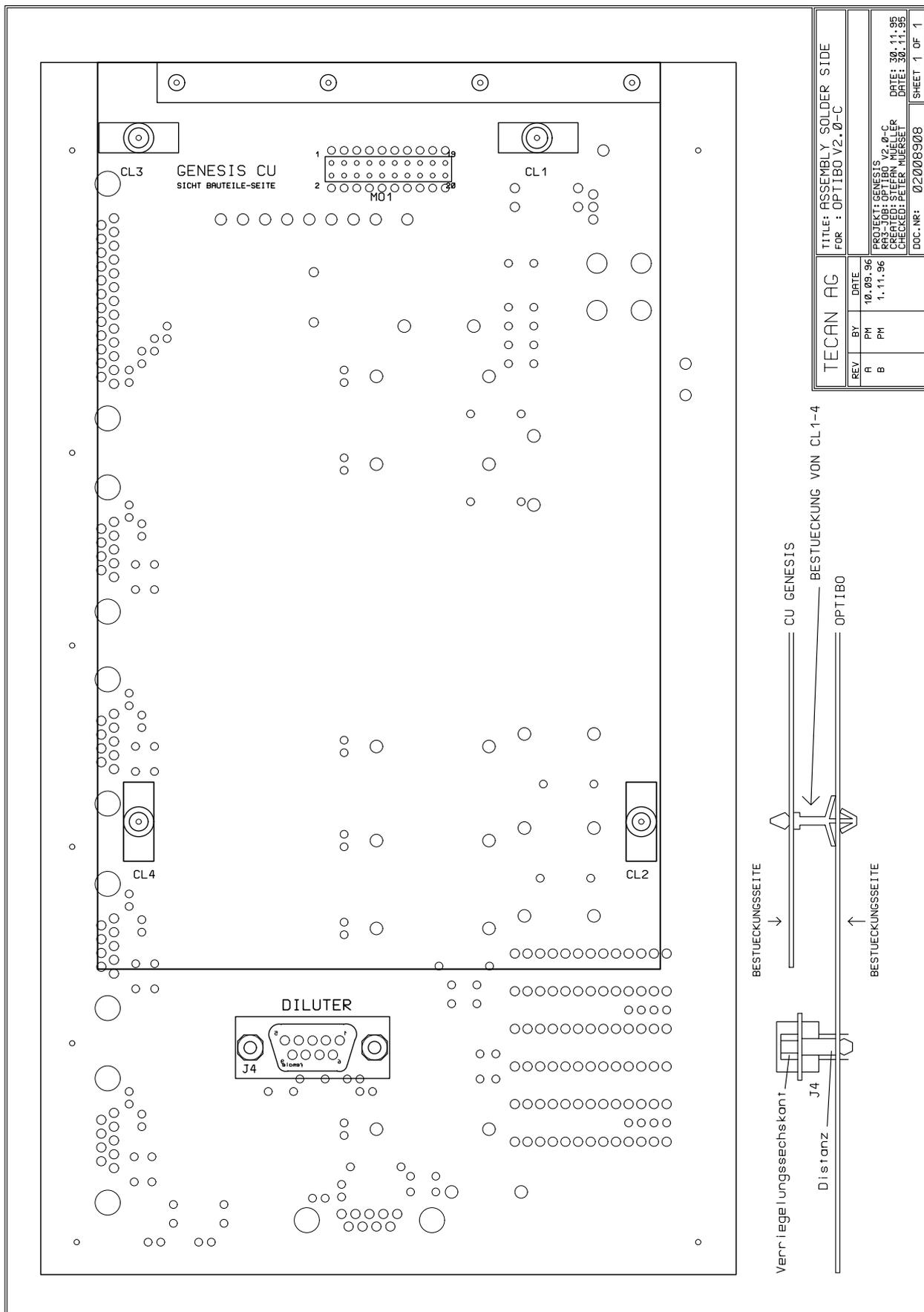
Drawing No	Title	Valid for	Page
2010219 V1.0	Block schematics	SMIO/SAFY	9 – 36
2010219 V1.0	Schematics	SMIO/SAFY	9 – 36
2009706V.1.2A p.2	Schematics	SMIO/SAFY	9 – 38
2009706 V.1.2A	Assembly	SMIO/SAFY	9 – 39

2008908 V2.0C Assembly component side

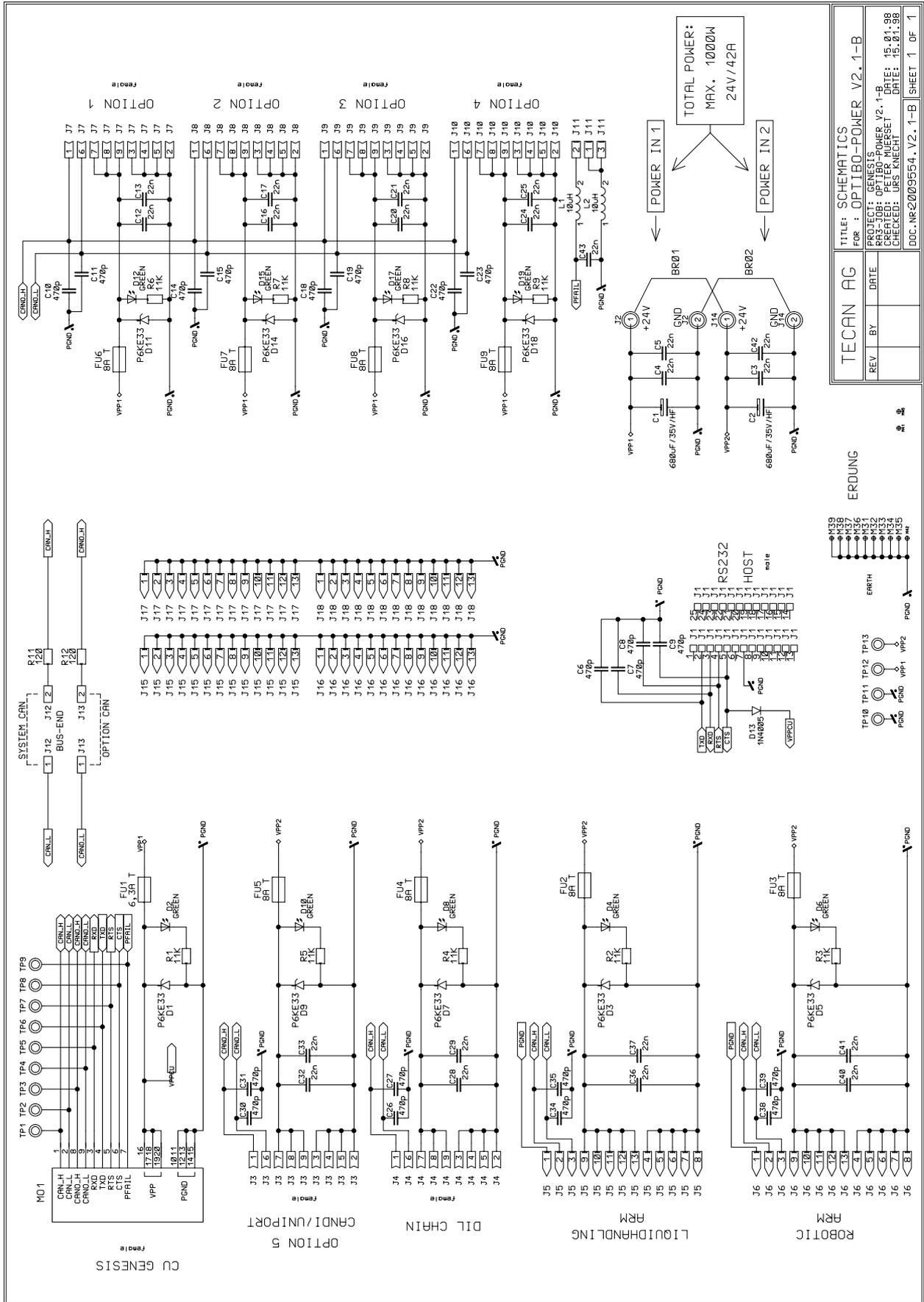


TECAN AG		TITLE: ASSEMBLY COMPONENT SIDE FOR : OPTIBO V2.0-C	
REV	BY	DATE	
A	PH	10.09.96	
B	PH	1.11.96	
		PROJEKT: GENESIS V2.0-C	DATE: 30.11.95
		RAS-JOB: OPTIBO V2.0-C	DATE: 30.11.95
		CHECKED: PETER MUESER	
		DOC. NR.: 02008908	SHEET 1 OF 1

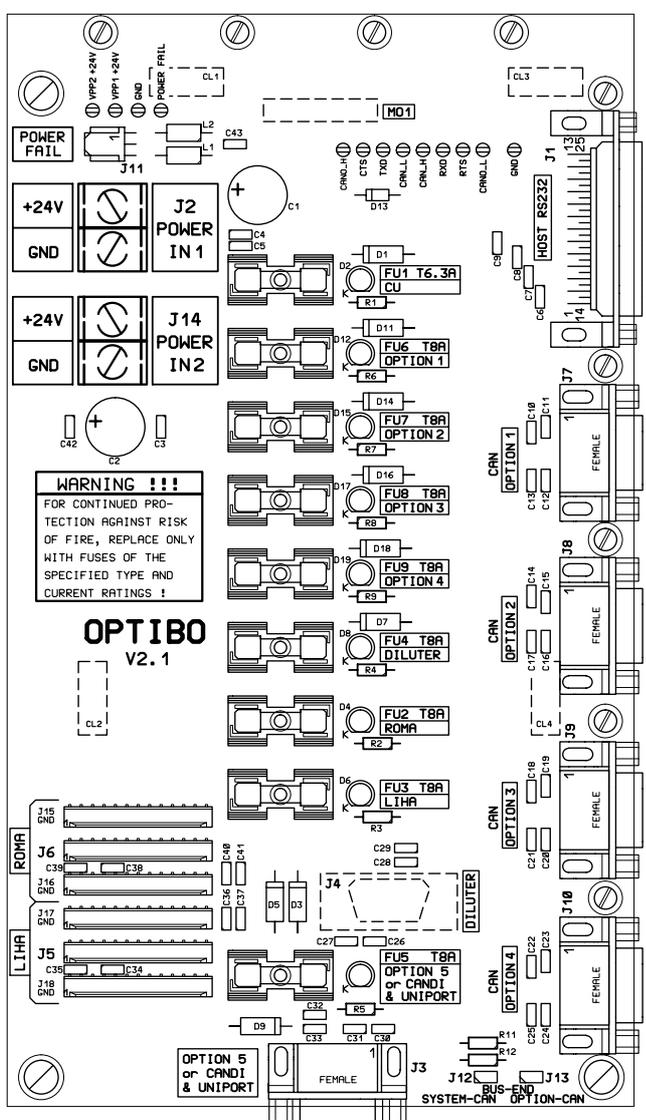
2008908 V2.0C Assembly solder side



2009554 V2.1B Schematics

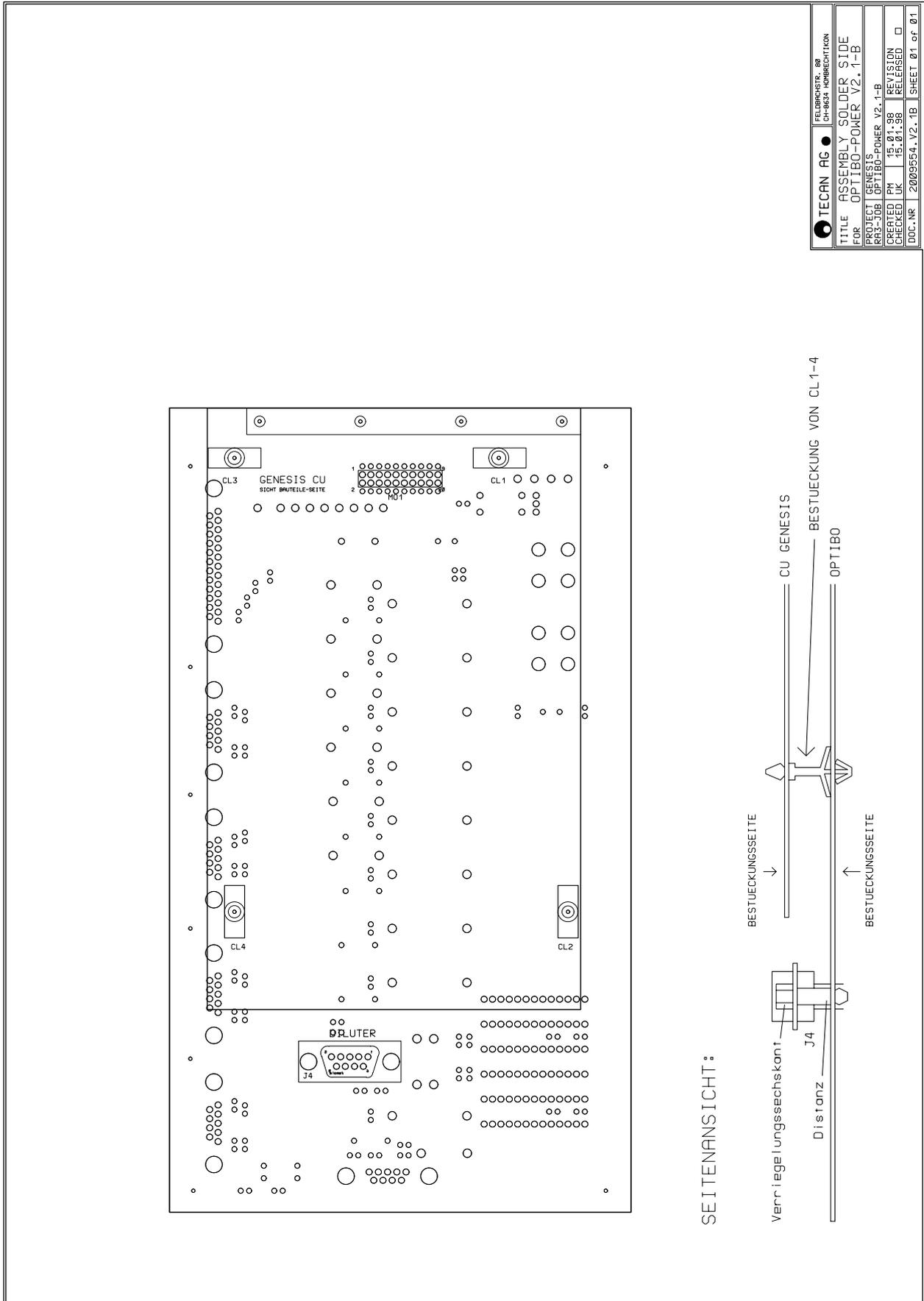


TECAN AG	FELDRICHTR. 88
	CH-8634 HOBRECHT/KON
TITLE ASSEMBLY COMPONENT SIDE	
FOR OPTIBO-POWER V2.1-B	
PROJECT GENESIS	OPTIBO-POWER V2.1-B
R&D-JOB	OPTIBO-POWER V2.1-B
CREATED PM	15.01.98
CHECKED UK	15.01.98
DOC.NR.	2009554_V2.1B SHEET 01 of 01

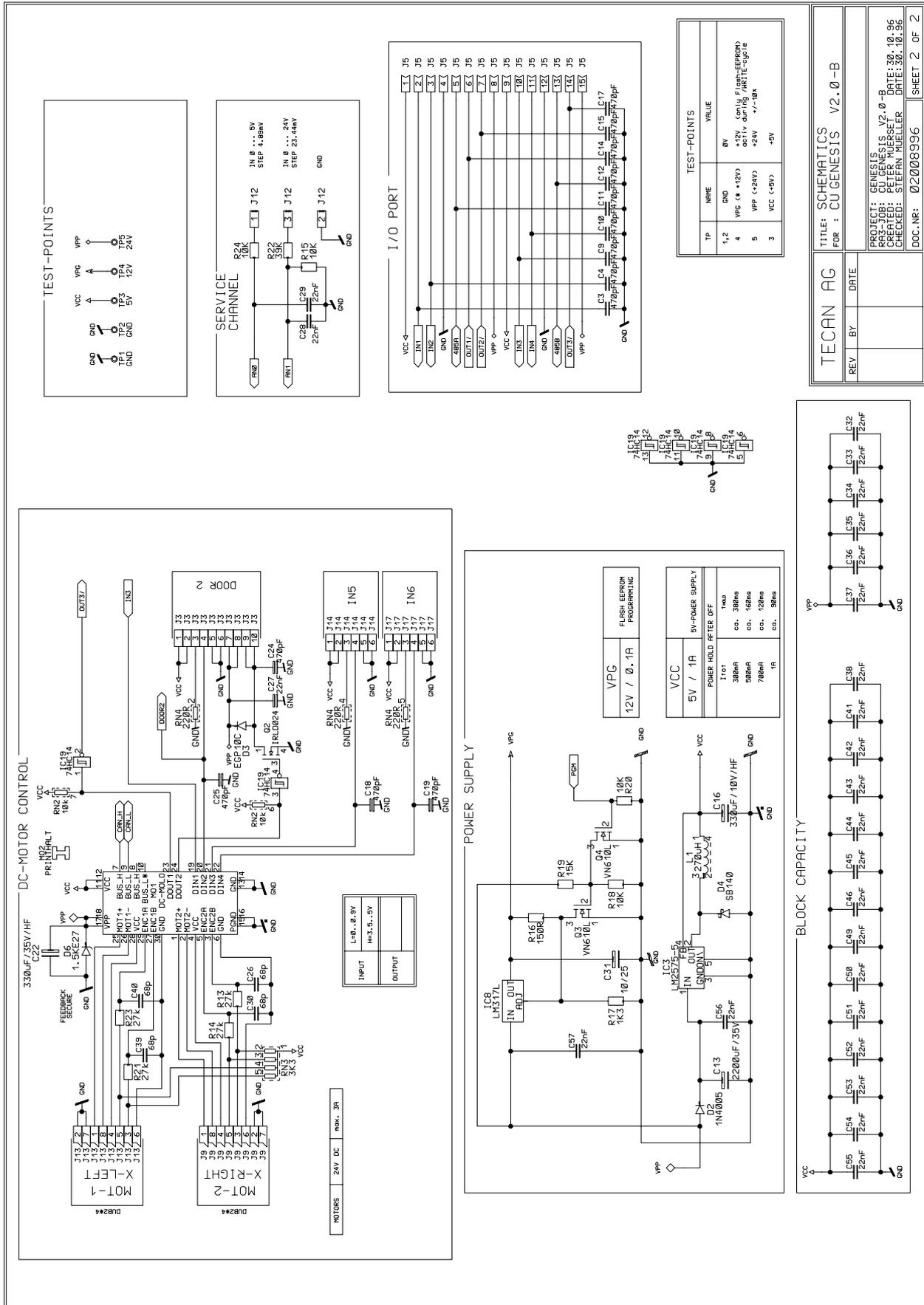


2009554 V2.1B

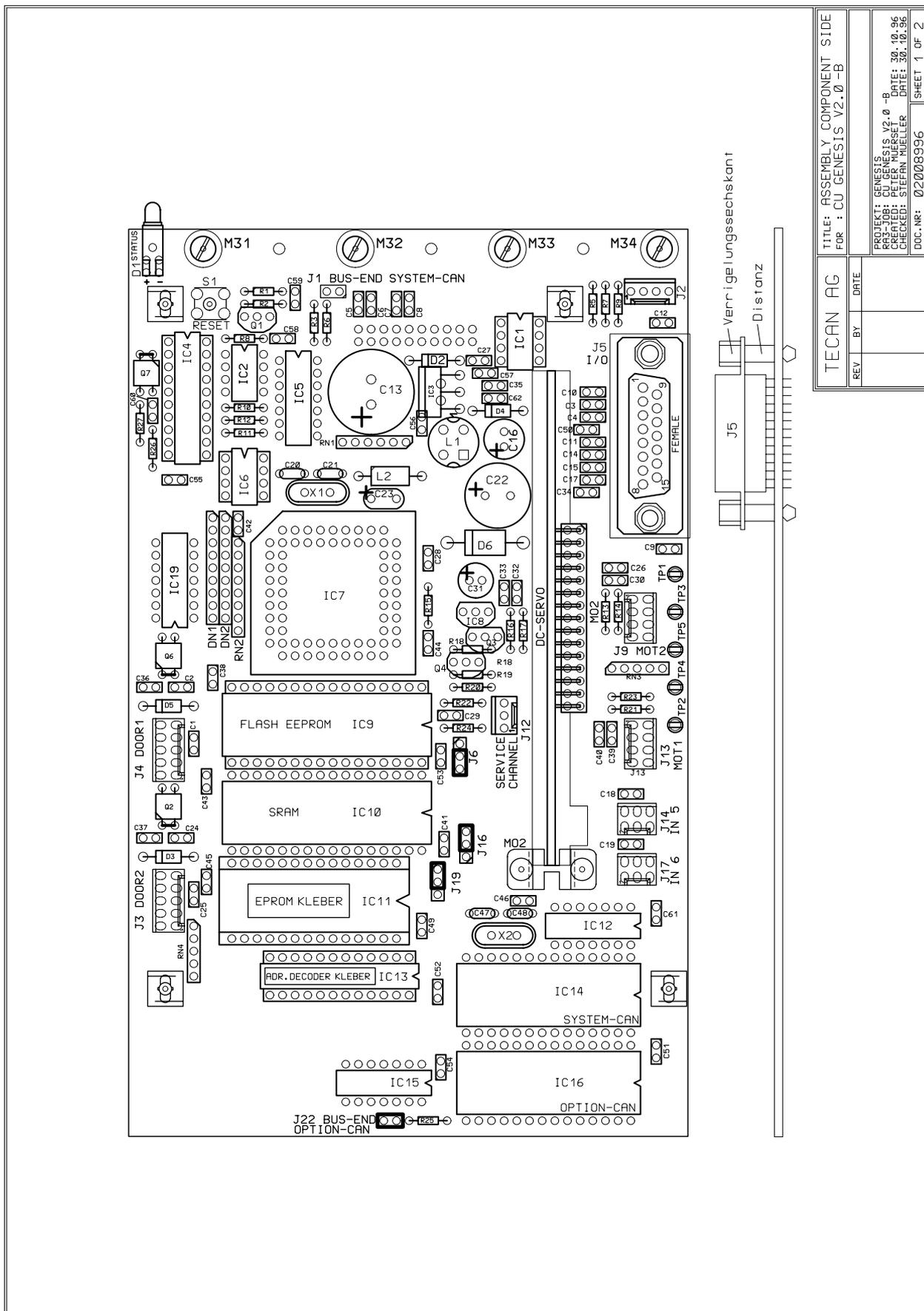
Assembly solder side

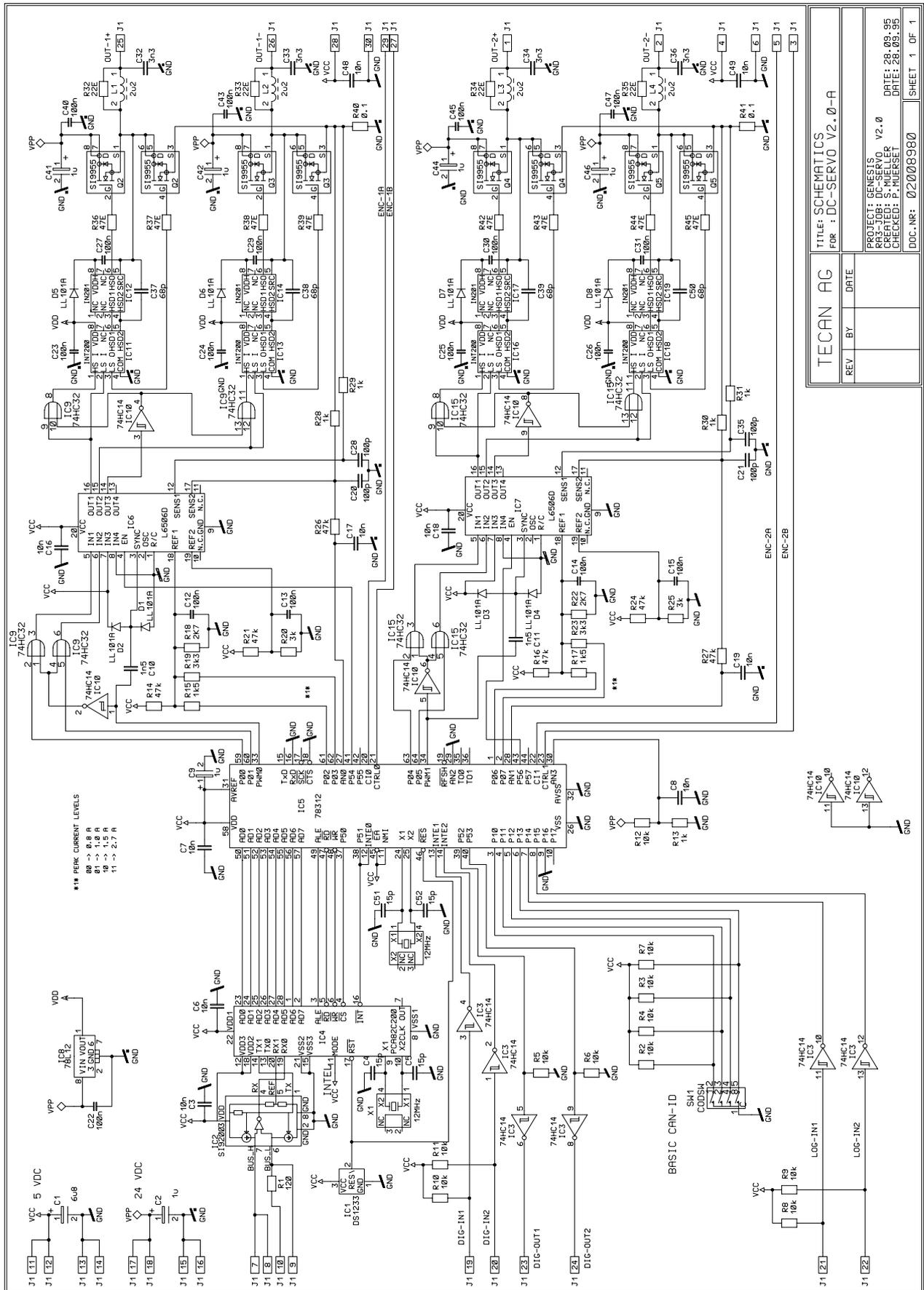


2008996 V2.0B p.2 Schematics

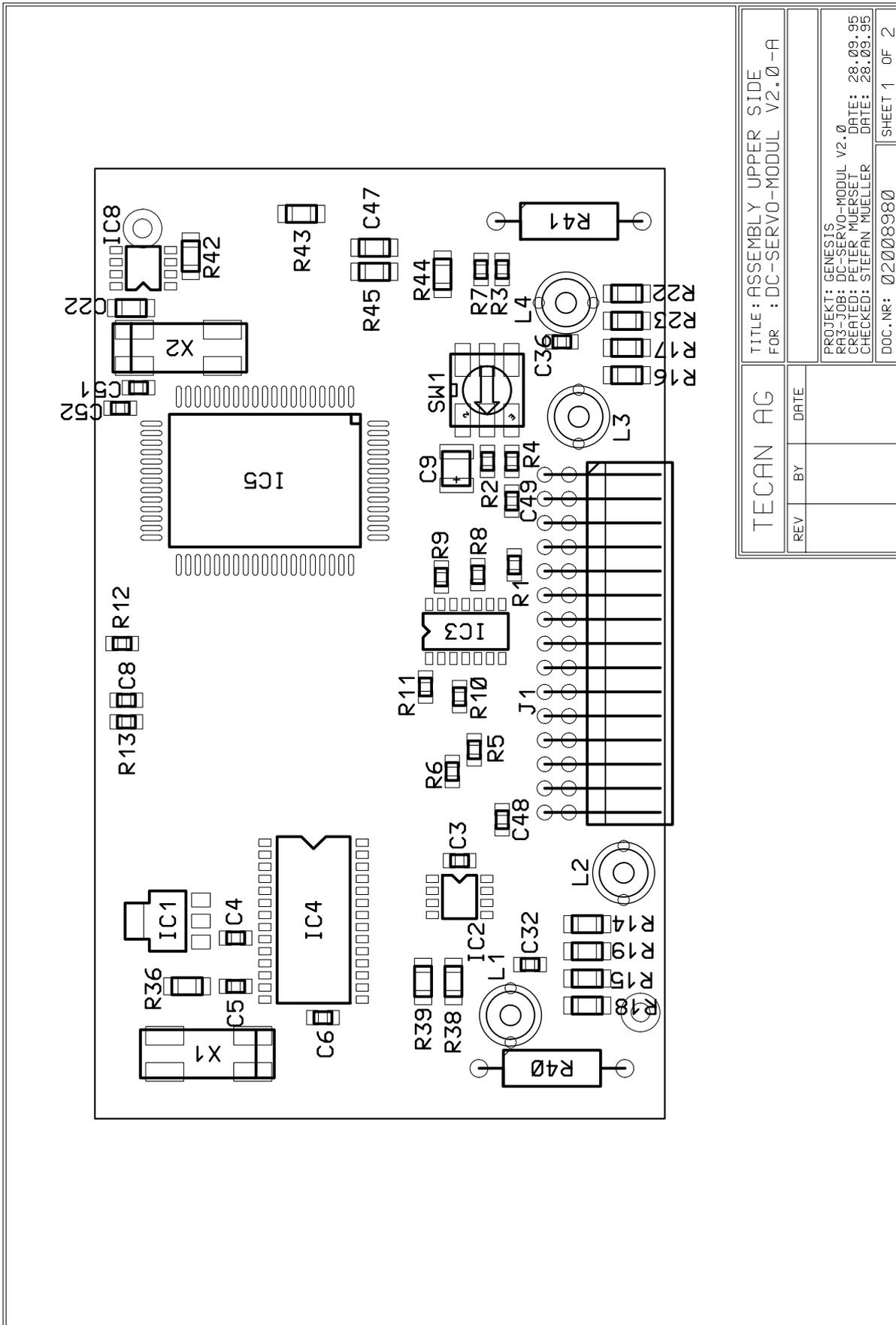


2008996 V2.0B p.1 Assembly component side



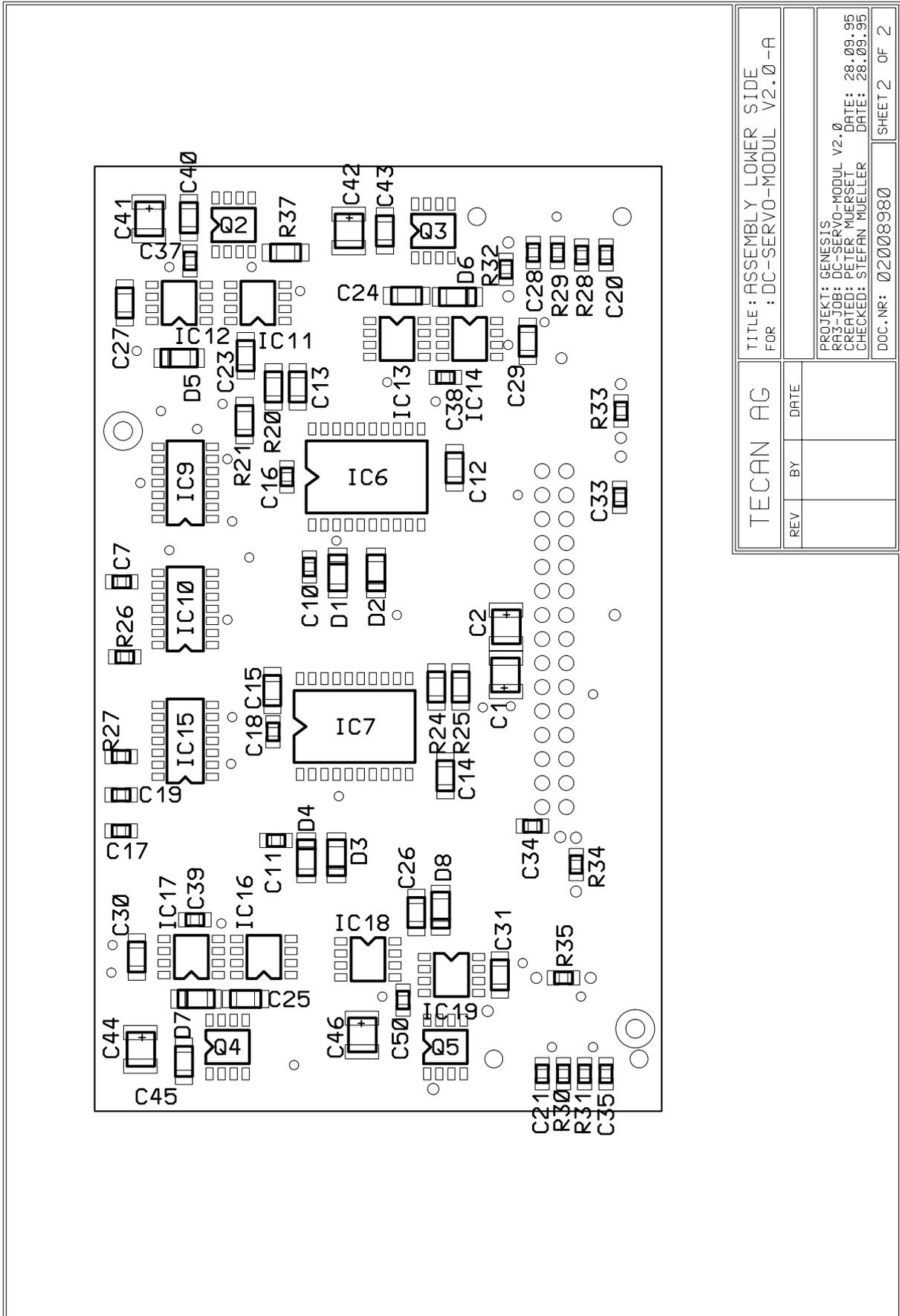


2008980 V.2.0A Assembly upper side



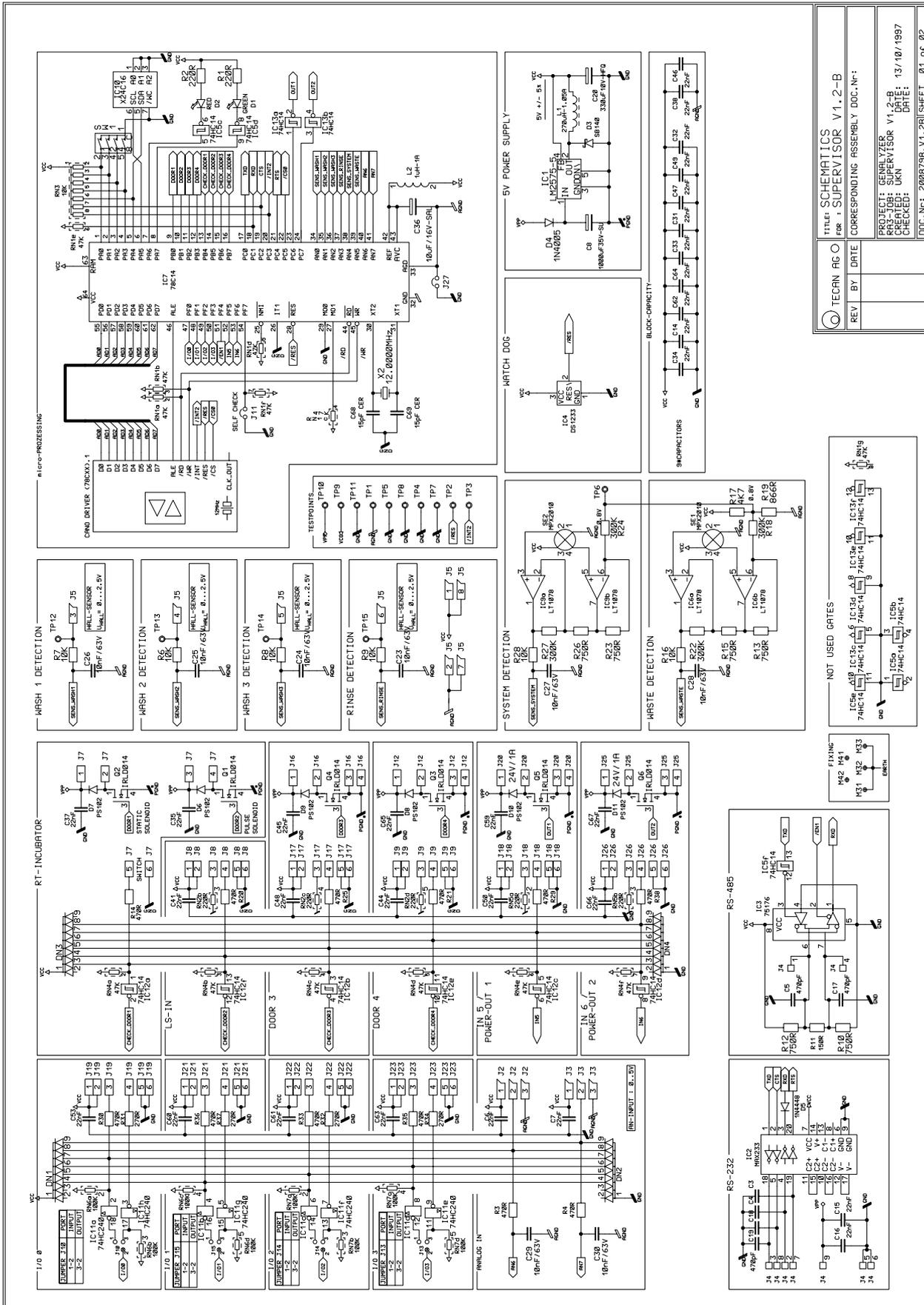
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REV	BY	DATE	FOR : DC-SERVO-MODUL V2.0 -A
			PROJEKT : GENESIS
			R43-JOB : DC-SERVO-MODUL V2.0
			CREATED : PETER MUESER
			DATE : 28.09.95
			CHECKED : STEFAN MUELLER
			DATE : 28.09.95
			DOC.NR: 02008980
			SHEET 1 OF 2

2008980 V.2.0A Assembly lower side



TECAN AG		TITLE: ASSEMBLY LOWER SIDE FOR : DC-SERVO-MODUL V2.0-A	
REV	BY	DATE	
PROJEKT: GENESIS RFS-JOB: DC-SERVO-MODUL V2.0 CREATED: PETER MUERSET CHECKED: STEFAN MUELLER DATE: 28.09.95 DATE: 28.09.95			DOC. NR: 02008980 SHEET 2 OF 2

2008798 V1.2B p.1 Schematics

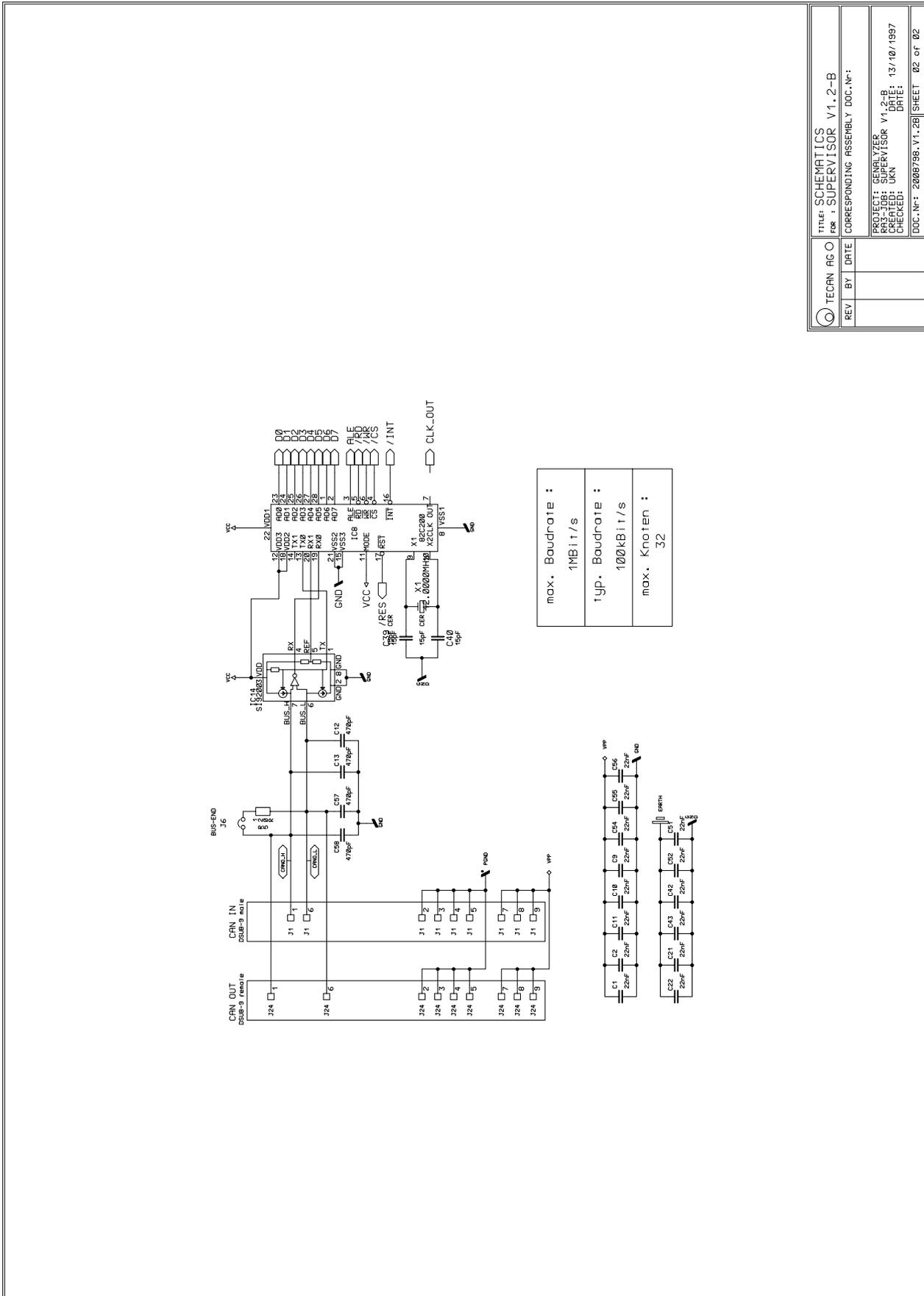


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REV	BY	DATE	CORRESPONDING ASSEMBLY DOC-Nr:
PROJECT: GENALYZER		V1.2-B	
R33-JOB: SUPERVISOR		DATE: 13/10/1997	
CHECKED: UKN		DRAWN: UKN	
DOC-Nr: 2008798-V1.2B		SHEET 01 of 02	

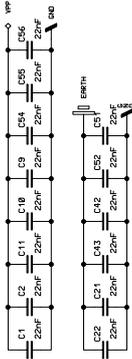
NOT USED GATES

IC50	74HC14	1	IC50	74HC14	14
IC51	74HC14	2	IC52	74HC14	13
IC53	74HC14	3	IC54	74HC14	12
IC55	74HC14	4	IC56	74HC14	11
IC57	74HC14	5	IC58	74HC14	10
IC59	74HC14	6	IC60	74HC14	9
IC61	74HC14	7	IC62	74HC14	8
IC63	74HC14	8	IC64	74HC14	7
IC65	74HC14	9	IC66	74HC14	6
IC67	74HC14	10	IC68	74HC14	5
IC69	74HC14	11	IC70	74HC14	4
IC71	74HC14	12	IC72	74HC14	3
IC73	74HC14	13	IC74	74HC14	2
IC75	74HC14	14	IC76	74HC14	1

2008798 V1.2B p.2 Schematics

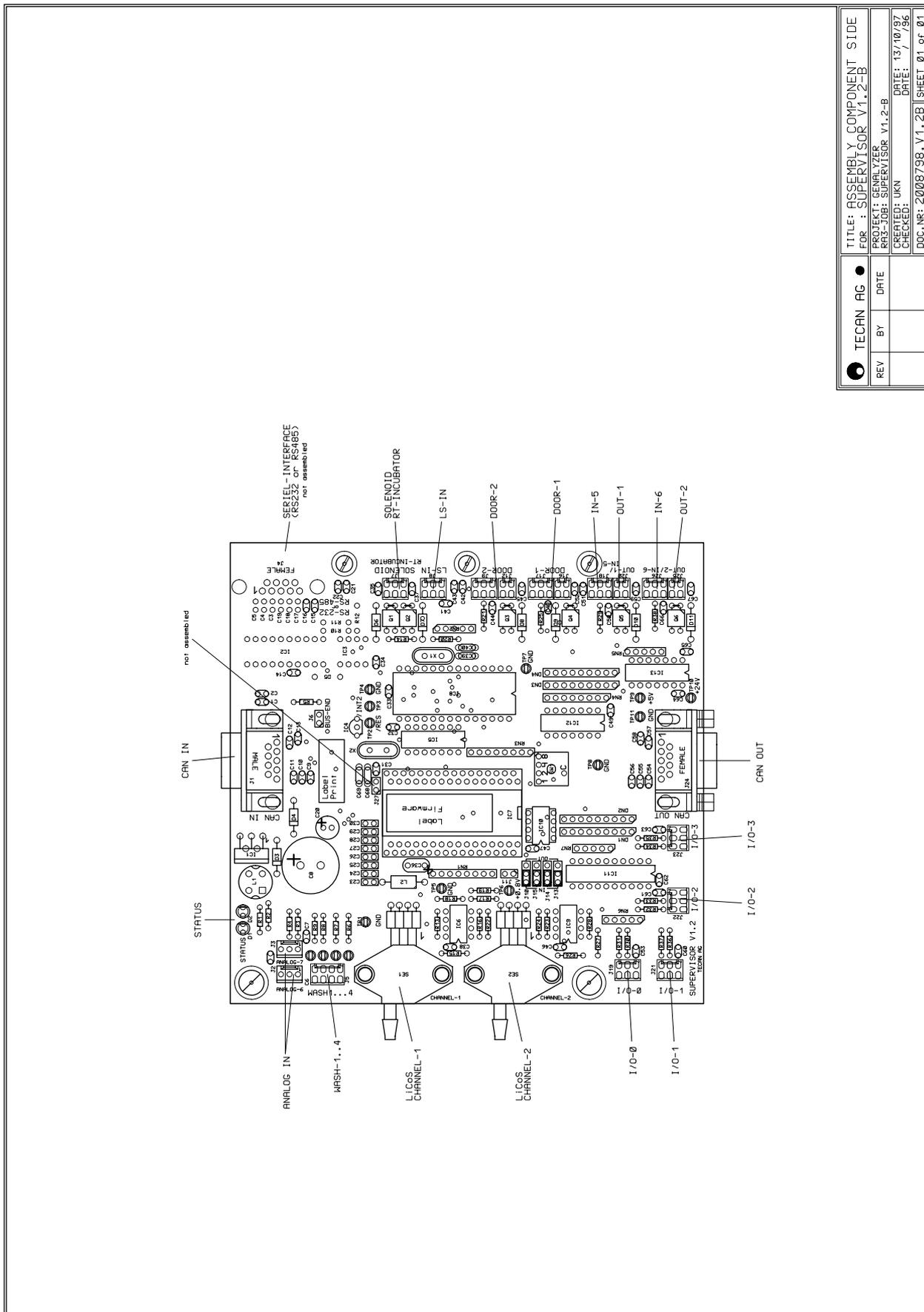


max. Baudrate :	1MBit/s
Typ. Baudrate :	100KBit/s
max. Knoten :	32



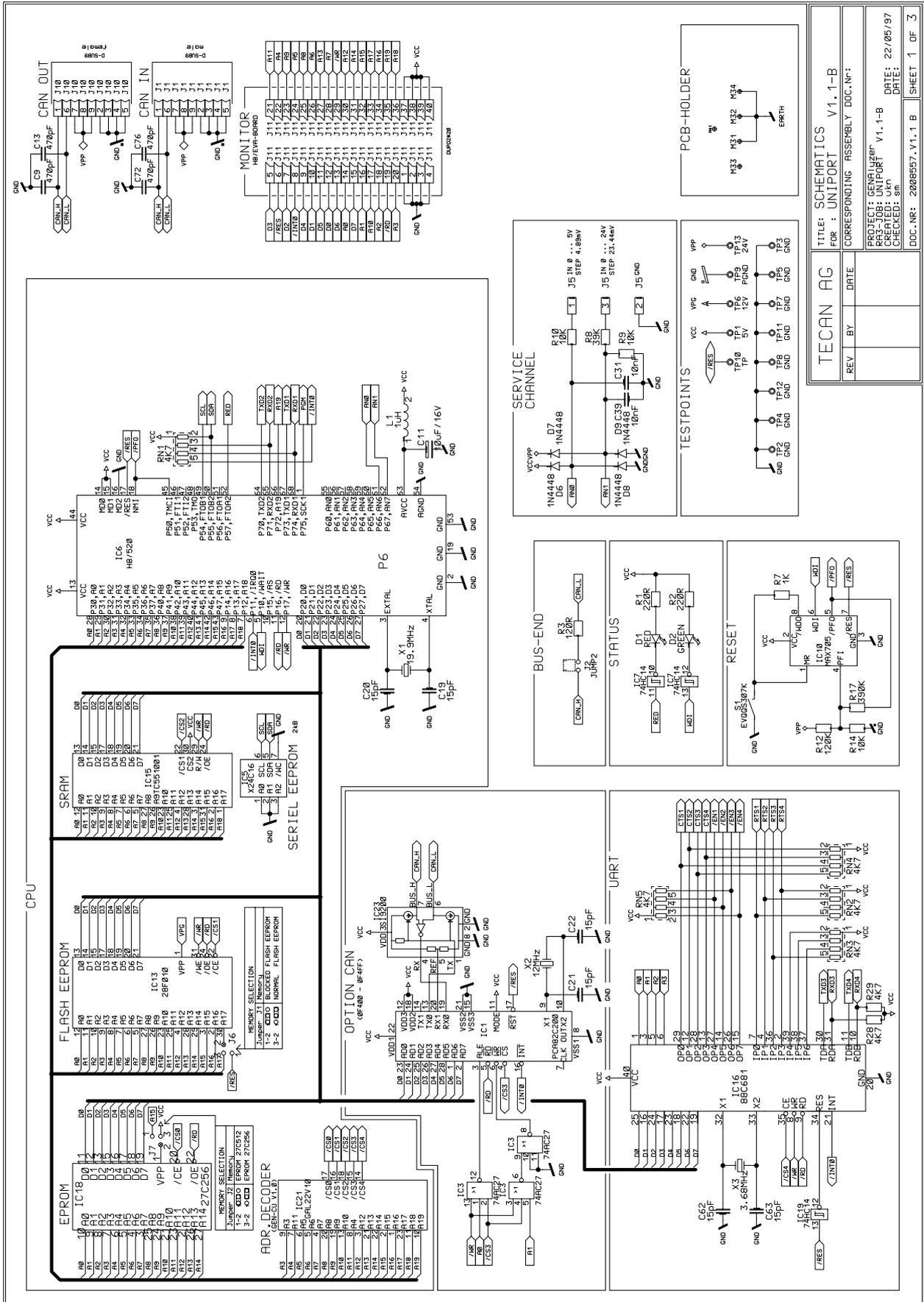
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REV	BY	DATE
		CORRESPONDING ASSEMBLY DOC.Nr.:
		PROJECT: GENALYZER DESIGNER: SUPERVISOR V1.2-B CREATED: DKN CHECKED: DKN DATE: 13/10/1997
		DOC.Nr: 2008798.V1.2B
		SHEET 02 of 02

2008798 V1.2B Assembly component side



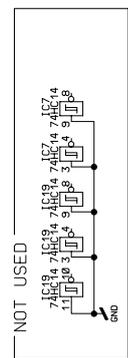
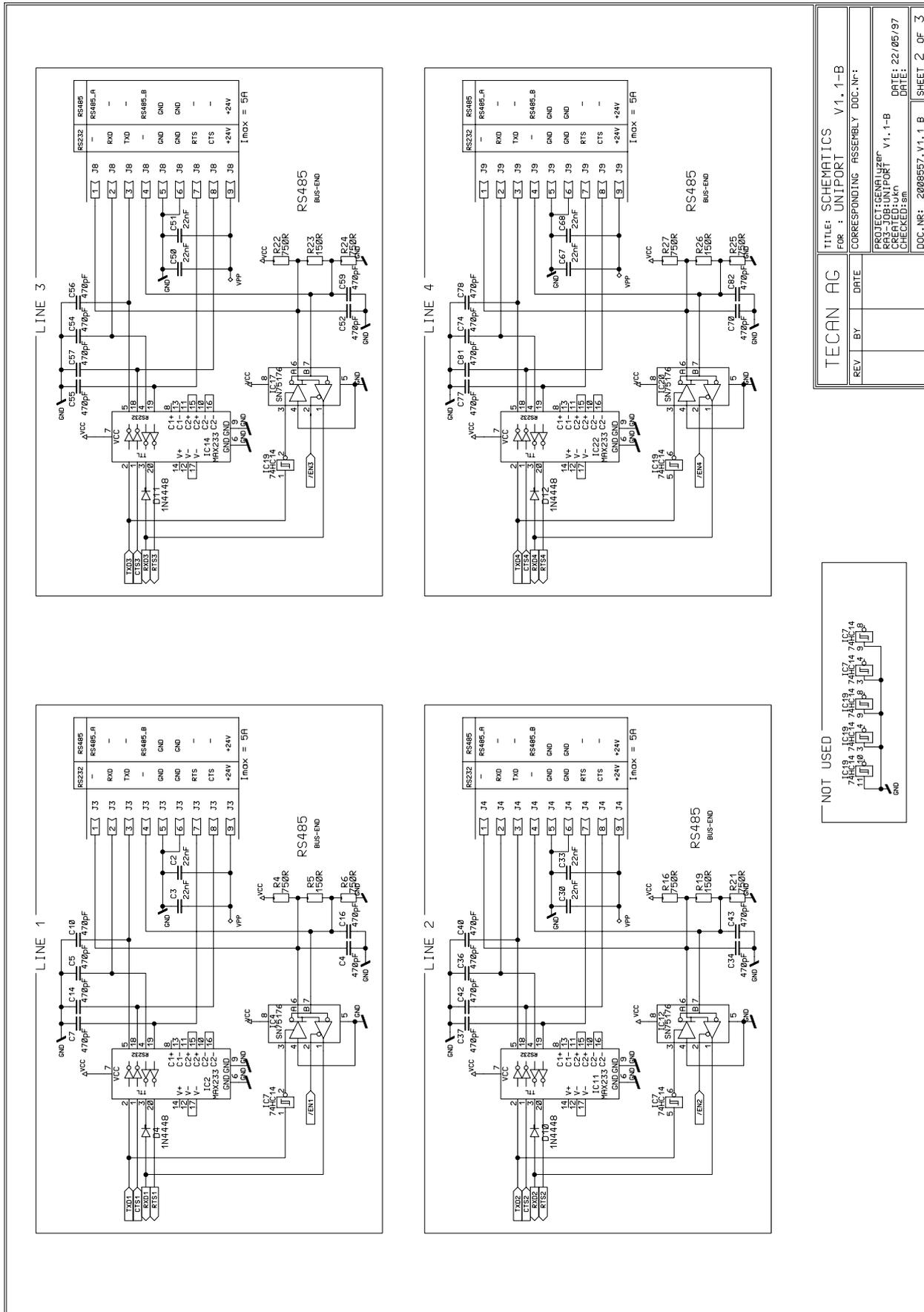
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FOR : SUPERVISOR V1.2-B		PROJECT: GENETEC	
REV	BY	DATE	DATE: 13/10/97
			DATE: / /96
		CREATED: UKN	CHECKED:
		DOC. NR: 2008798.V1.2B	SHEET 01 of 01

2008557 V1.1B p.1 Schematics



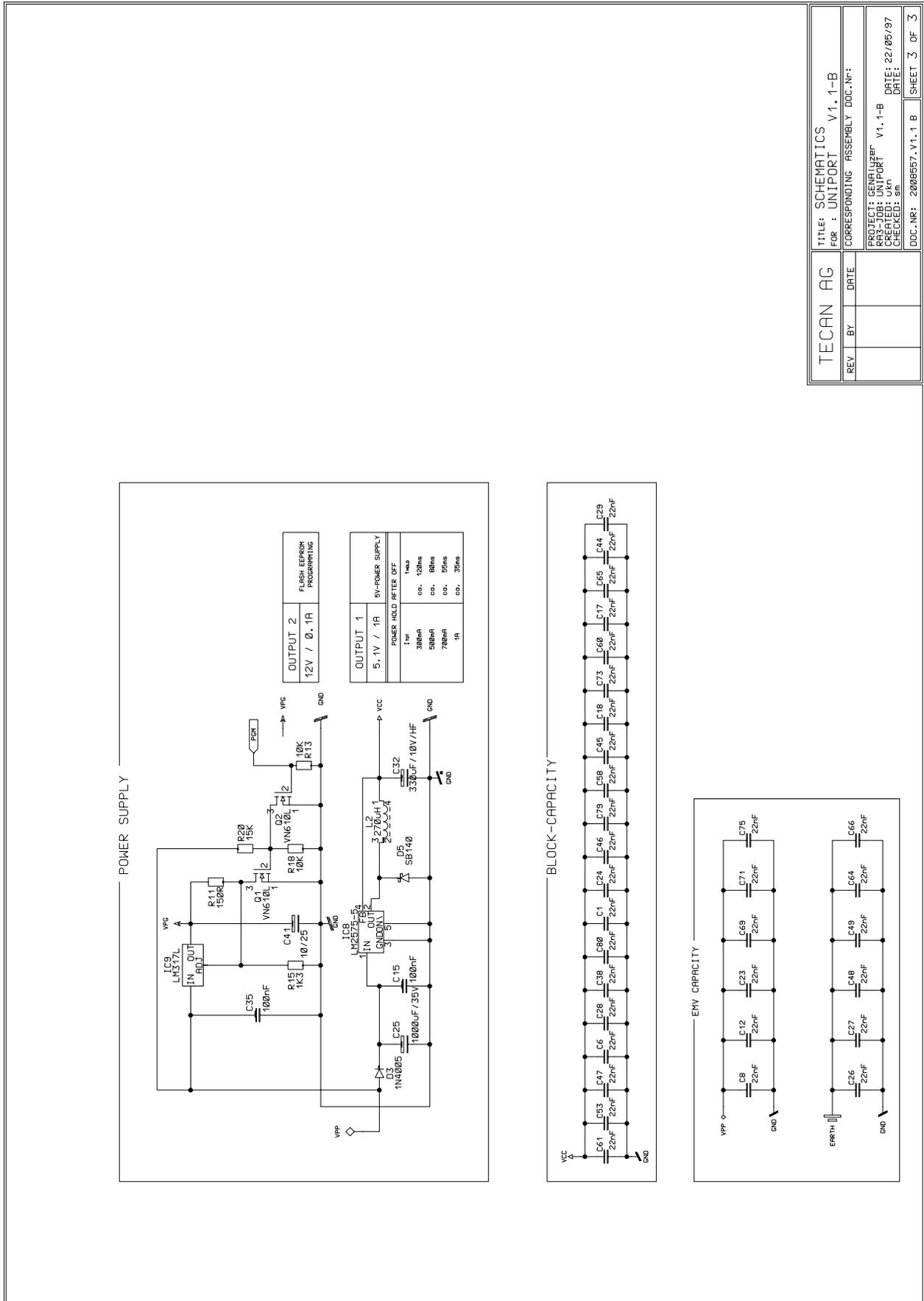
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REV	BY	DATE	FOR : UNIPORT
CORRESPONDING ASSEMBLY DOC-Nr:		PROJECT: GENALZEP	
		R33-JOB: UNIPORT	
		DATE: 22/05/97	
		CREATED: jkn	
		CHECKED: sm	
DOC-Nr: 2008557.V1.1 B		SHEET 1 OF 3	

2008557 V1.1B p.2 Schematics



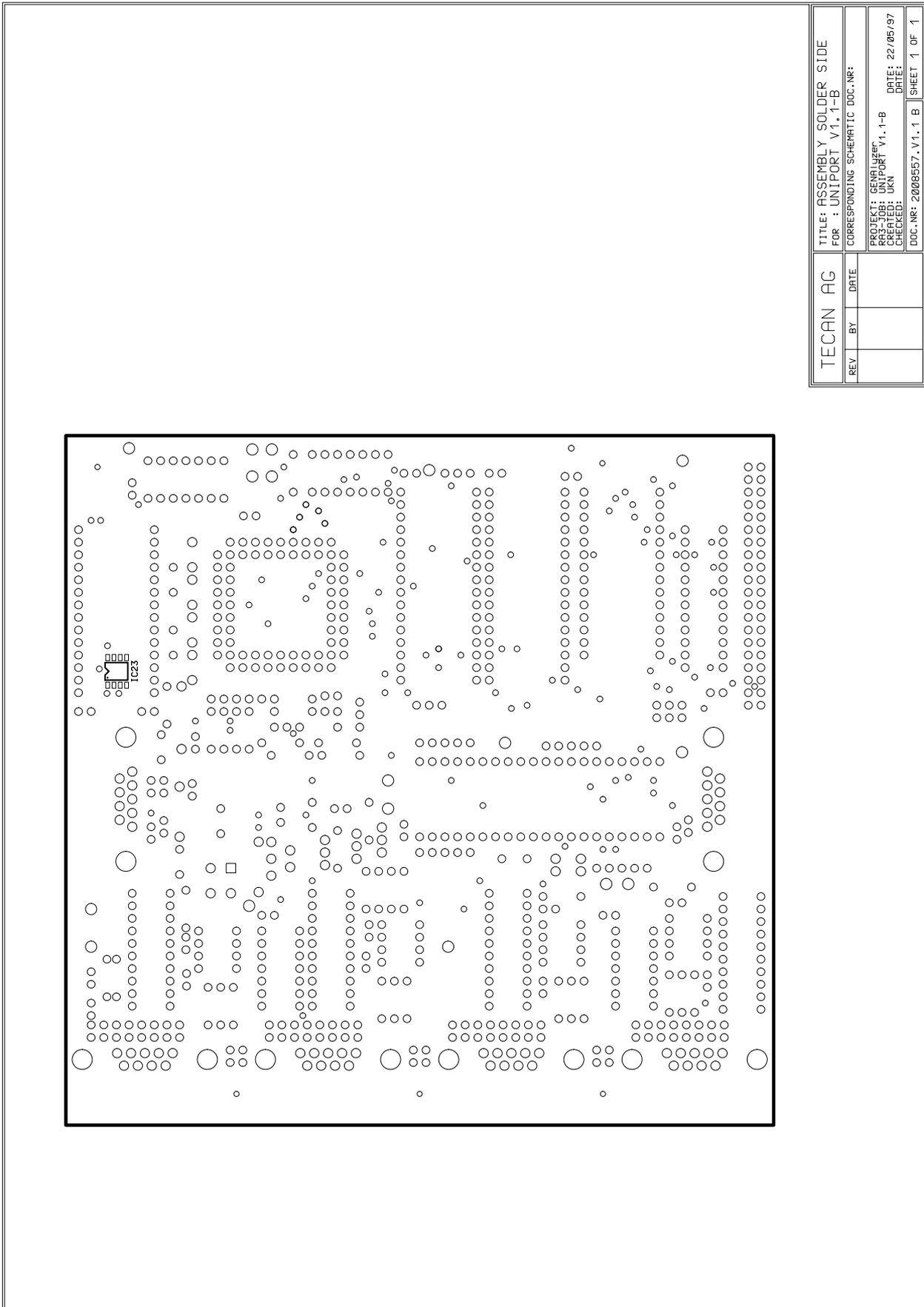
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REV	BY	DATE	For: UNIPORT
			(CORRESPONDING ASSEMBLY DOC-Nr.)
			(PROJECT) (ENCL) ZEP
			R32-TOB:UNIPORT V1.1-B
			DATE: 22/05/97
			CREATED:ukn
			CHECKED:sm
			DOC-NR: 2008557.V1.1 B
			SHEET 2 OF 3

2008557 V1.1B p.3 Schematics



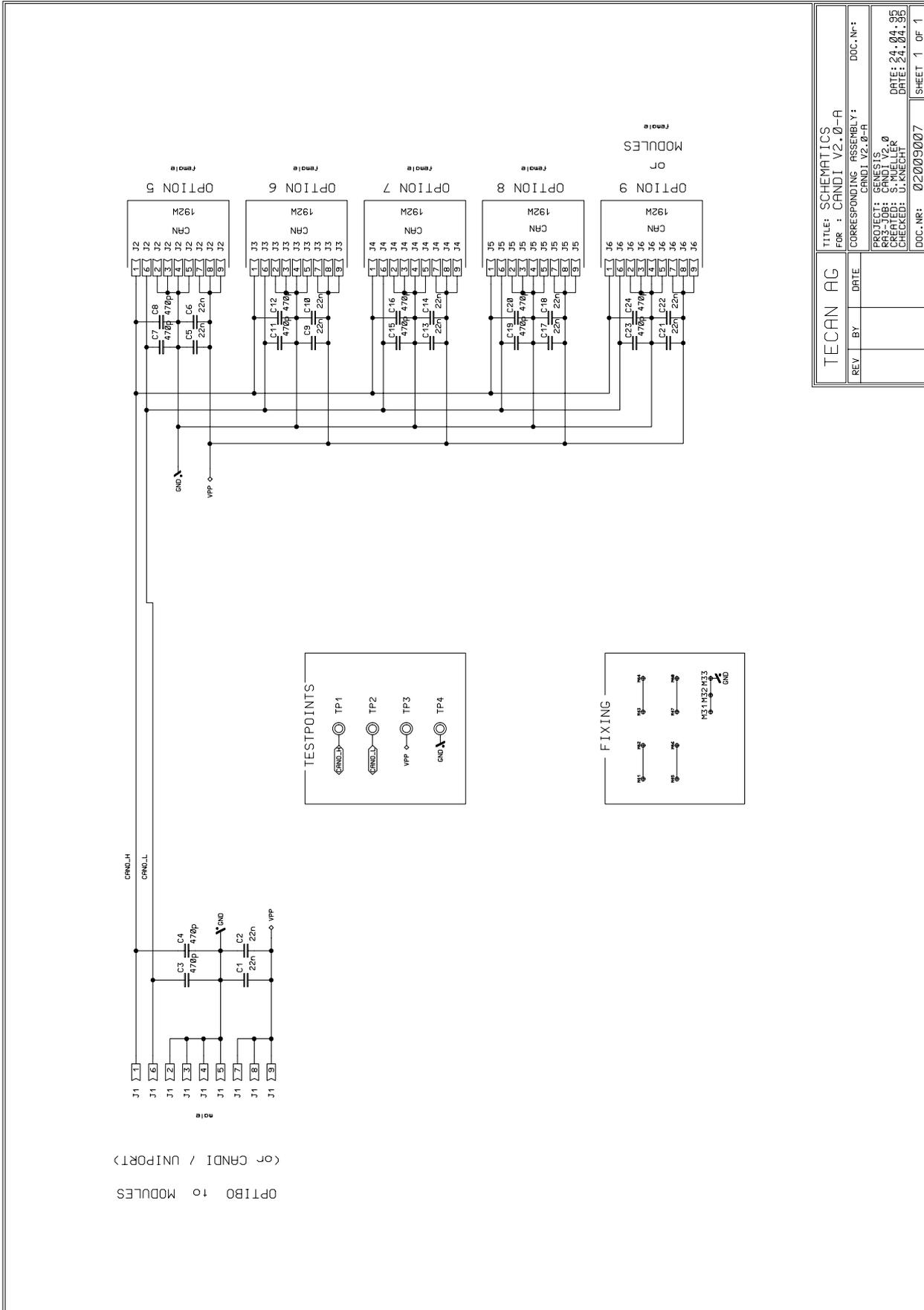
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		FOR: UNIPORT	
REV	BY	DATE	CORRESPONDING ASSEMBLY DOC.N°:
		PROJECT: GENIALSERV V1.1-B	
		RIS-JOB: UNIPORT	
		CREATED: ukh DATE: 22/05/97	
		CHECKED: sm	
		DOC-NR: 2008557.V1.1.B SHEET 3 OF 3	

2008557 V1.1B Assembly solder side



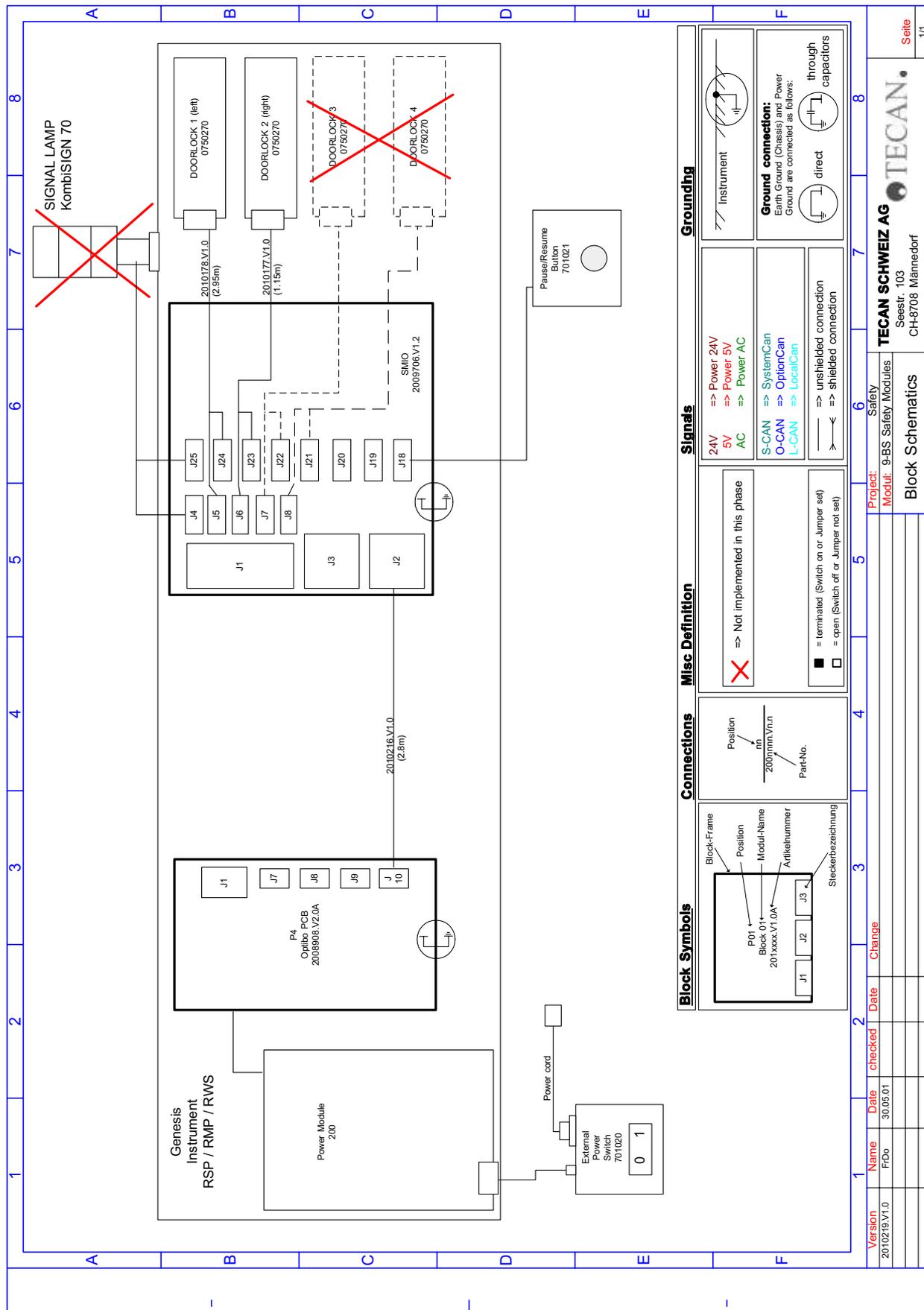
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REV	BY	DATE	CORRESPONDING SCHEMATIC DOC. NR:
			PROJEKT: GENAUZER RAS-JOB: UNIPORT V1.1-B DATE: 22/05/97 CHECKED: UKN
			DOC. NR: 2008557_V1.1_B SHEET 1 OF 1

2009007 V.2.0A Schematics

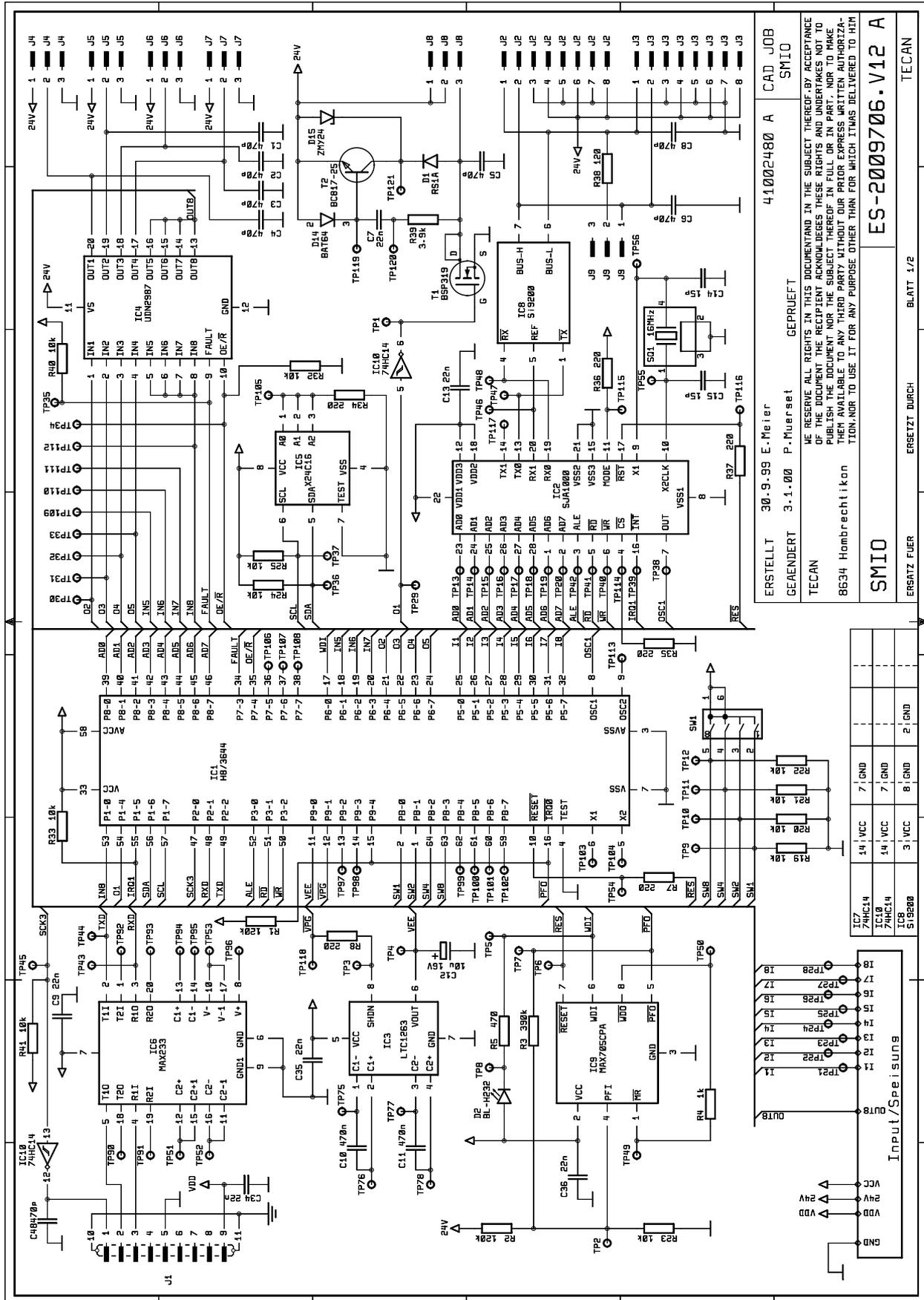


2010219 V1.0

Block schematics



2009706V.1.2A p.1 Schematics



41002480 A CAD JOB SMIO

30.9.99 E.Meier
 3.1.00 P.Muersel
 GEPRUEFT

TECAN
 8634 Hombrechtikon
 SMIO

ERSTELLT
 GEANDERT
 TECAN
 8634 Hombrechtikon
 SMIO

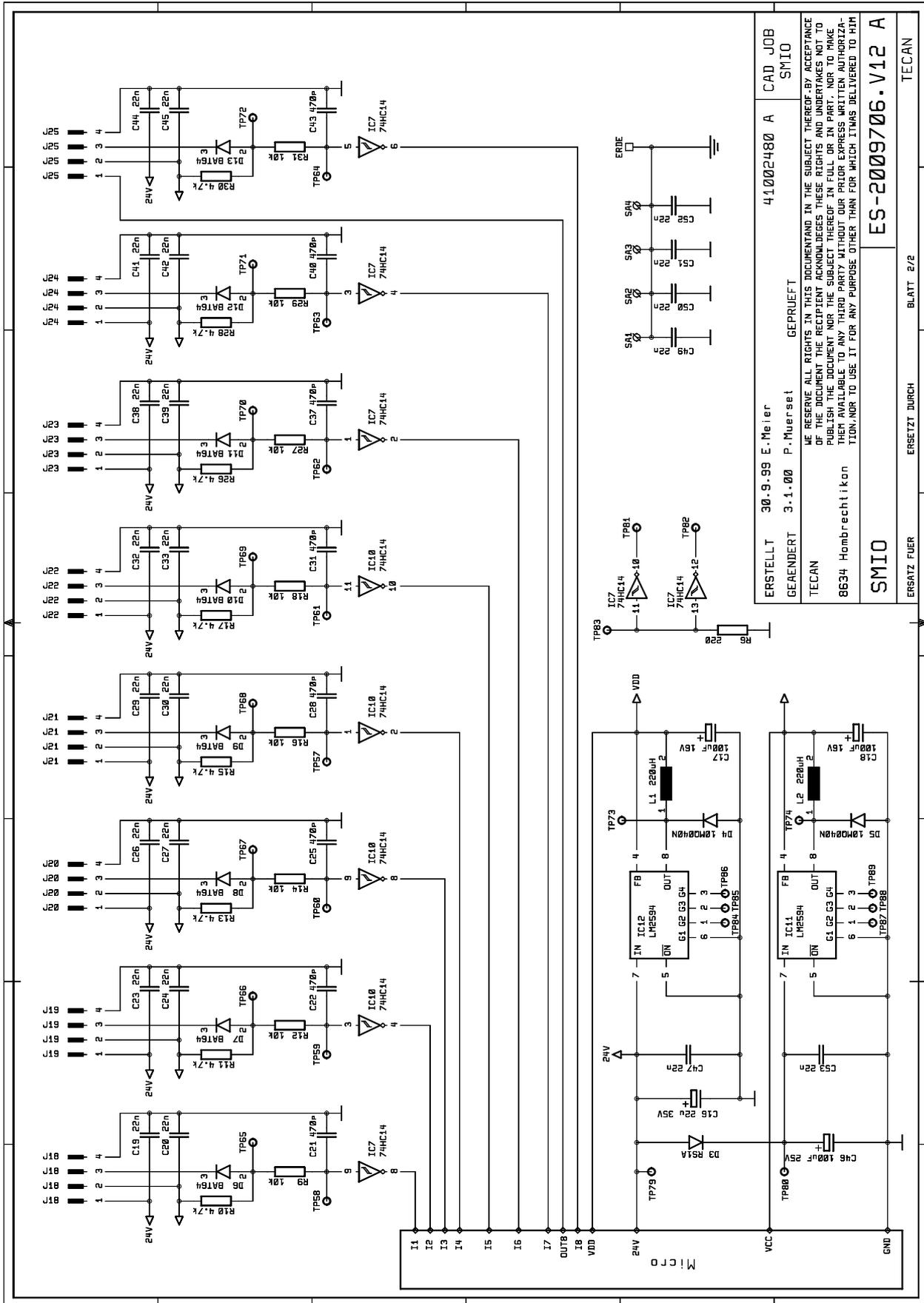
41002480 A CAD JOB SMIO

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ES-2009706.V12 A

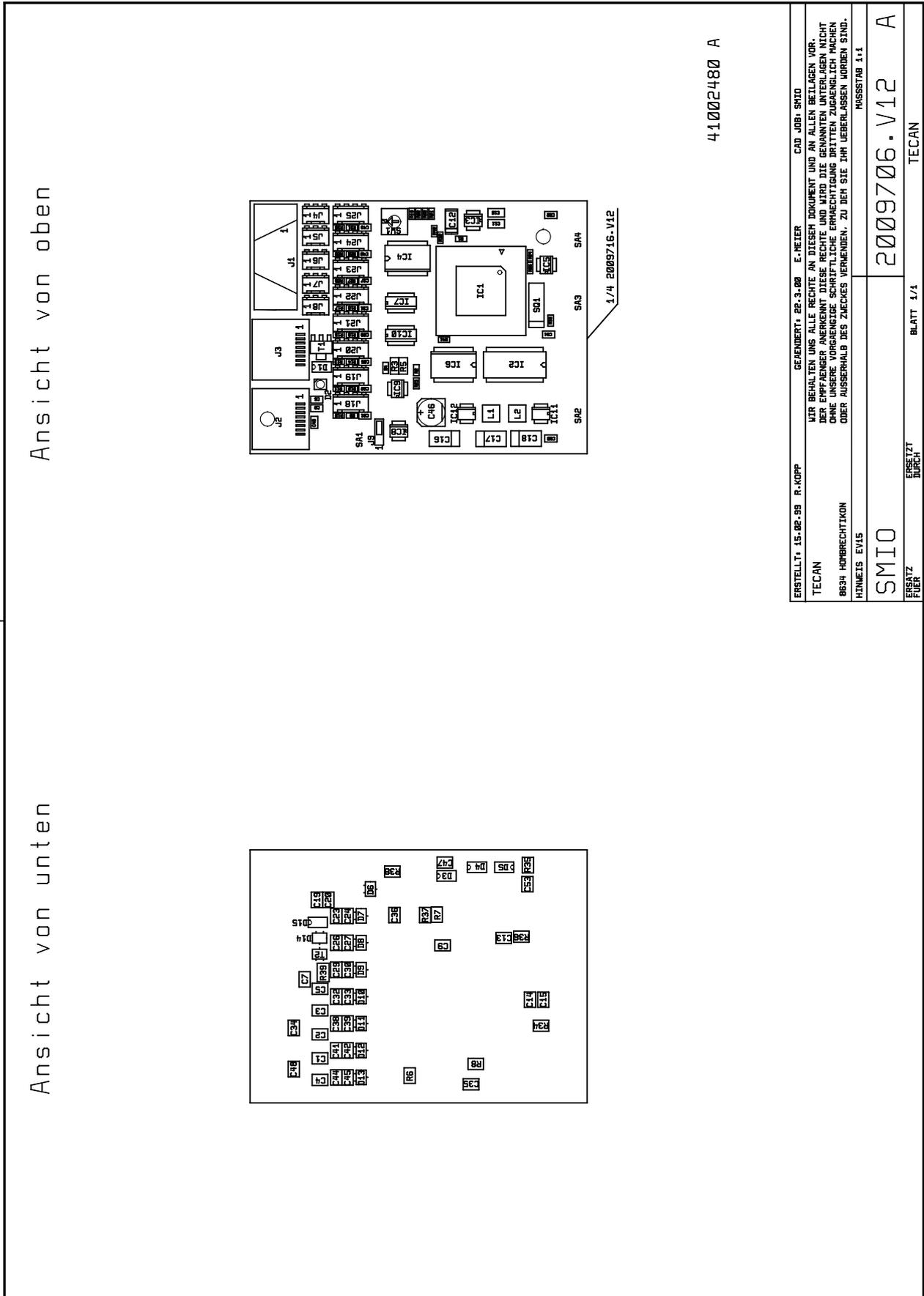
ERSETZT DURCH BLATT 1/2
 TECAN

2009706V.1.2A p.2 Schematics



ERSTELLT	30.9.99 E.Meier	P.Muerstet	41002480 A	CAD JOB	SMIO
GEAENDERT	3.1.00		GEPRUEFT		
<p>WE RESERVE ALL RIGHTS IN THIS DOCUMENT IN THE SUBJECT THEREOF. BY ACCEPTANCE OF THE DOCUMENT THE RECIPIENT ACKNOWLEDGES THESE RIGHTS AND UNDERTAKES NOT TO PUBLISH THE DOCUMENT NOR THE SUBJECT THEREOF IN FULL OR IN PART, NOR TO MAKE THEM AVAILABLE TO ANY THIRD PARTY WITHOUT OUR PRIOR EXPRESS WRITTEN AUTHORIZATION. NOR TO USE IT FOR ANY PURPOSE OTHER THAN FOR WHICH IT WAS DELIVERED TO HIM.</p>					
<p>8634 Hombrechtikon</p>					
<p>SMIO</p>					
<p>ES-2009706.V12 A</p>					
ERSATZ FUER			BLATT 2/2		
ERSATZT DURCH			TECAN		

2009706 V.1.2A Assembly



9.3 Liquid System

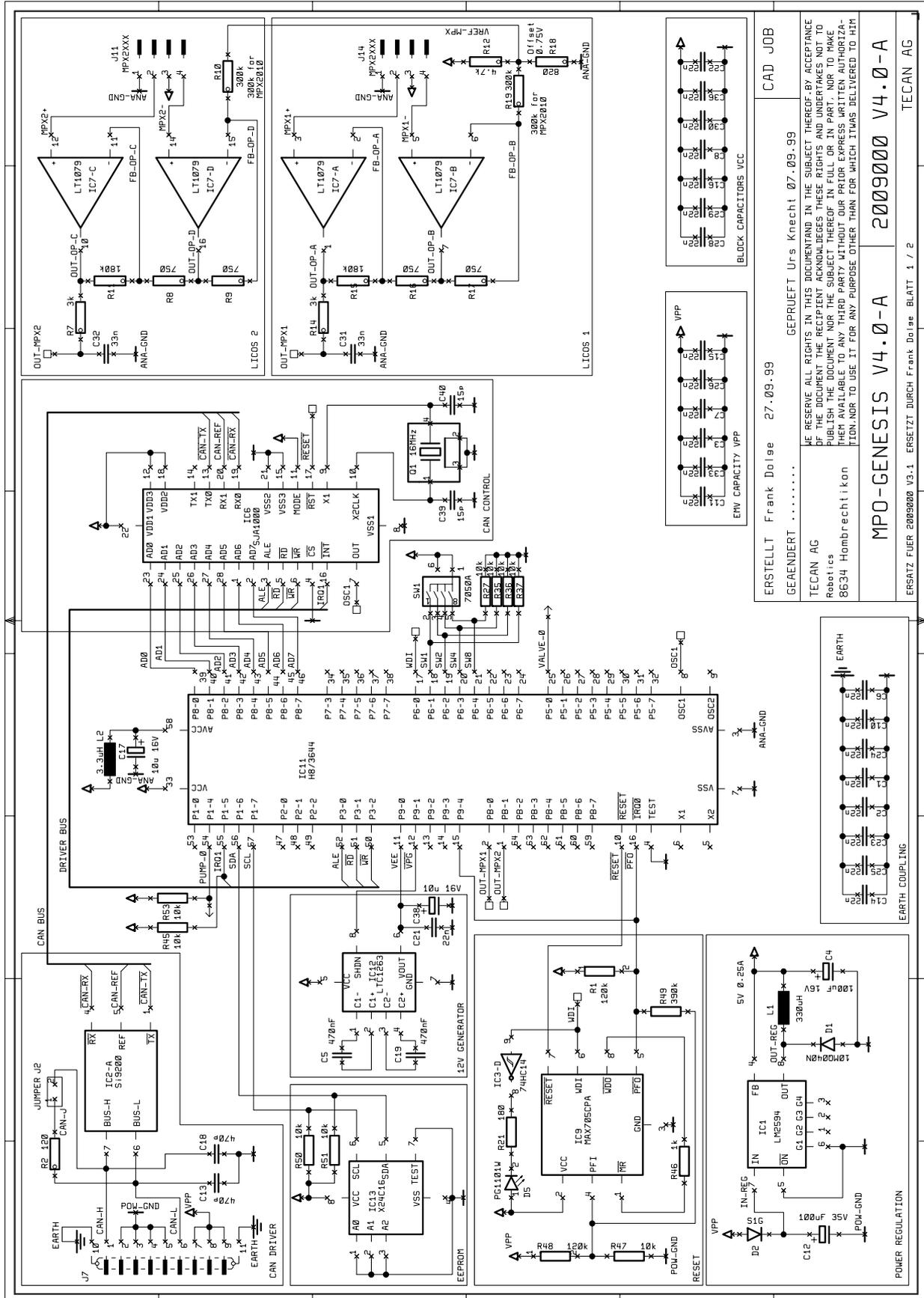
9.3.1 MPO/FWO

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MPO Board

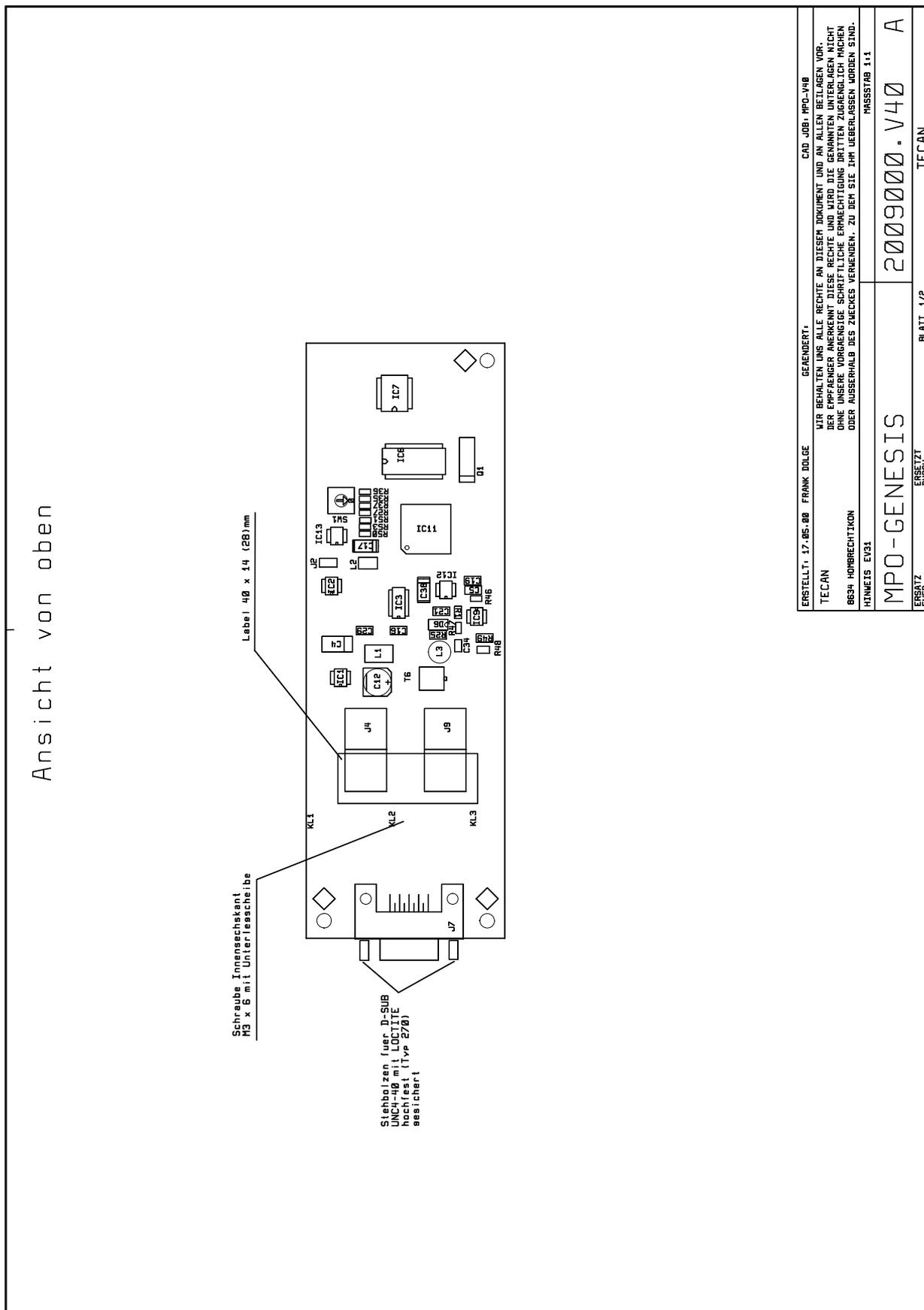
Drawing No	Title	Valid for	Page
2009000 V4.0A p.1	Schematics	MPO board V4.0	9 – 41
2009000 V4.0A	Assembly component sides	MPO board V4.0	9 – 42
2009000 V4.0A	Assembly solder side	MPO board V4.0	9 – 43

2009000 V4.0A p.1 Schematics

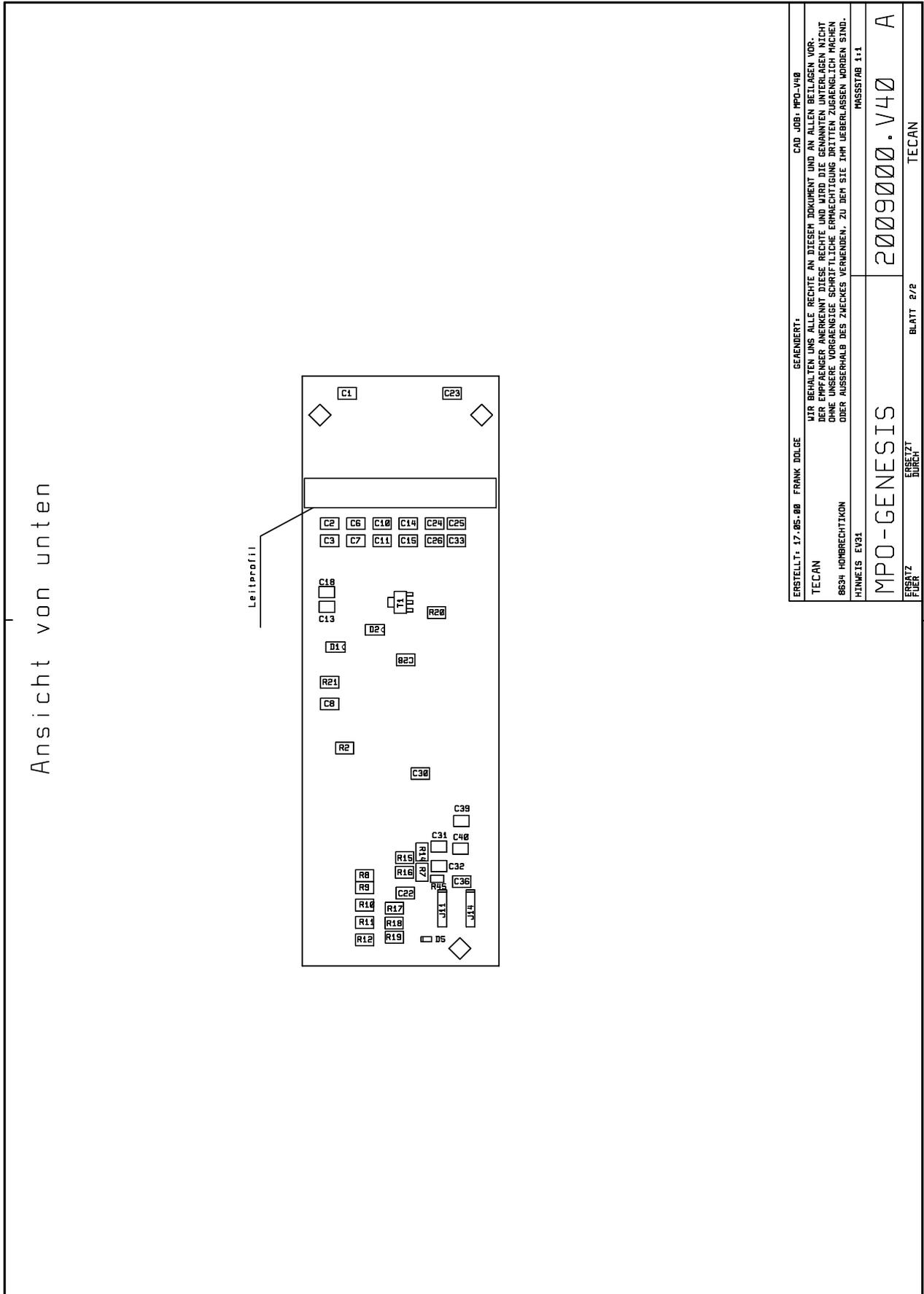


2009000 V4.0A

Assembly component sides



2009000 V4.0A Assembly solder side



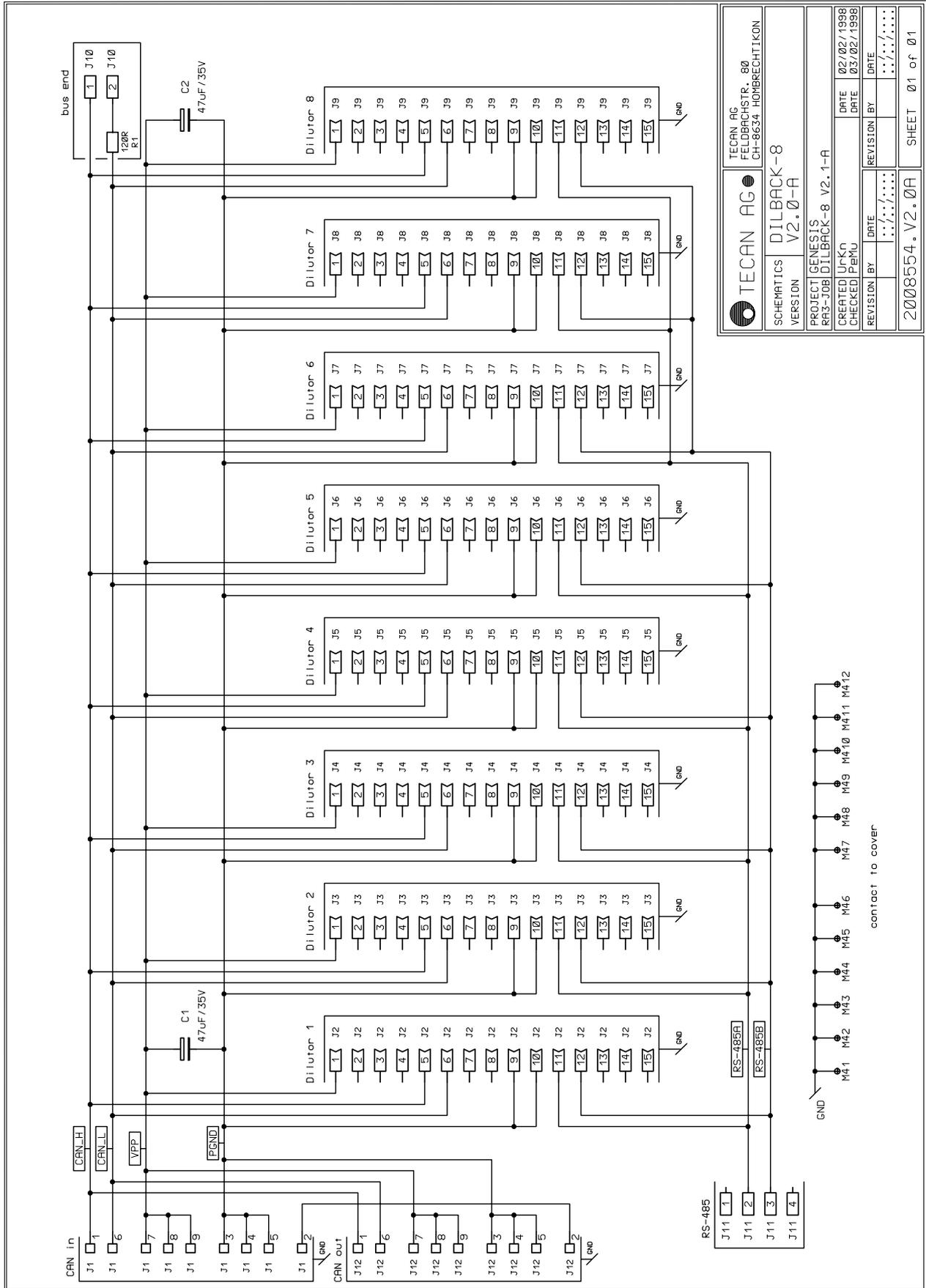
9.3.2 Diluter/Dilback

Find the following diagrams filed hereafter:

Dilback

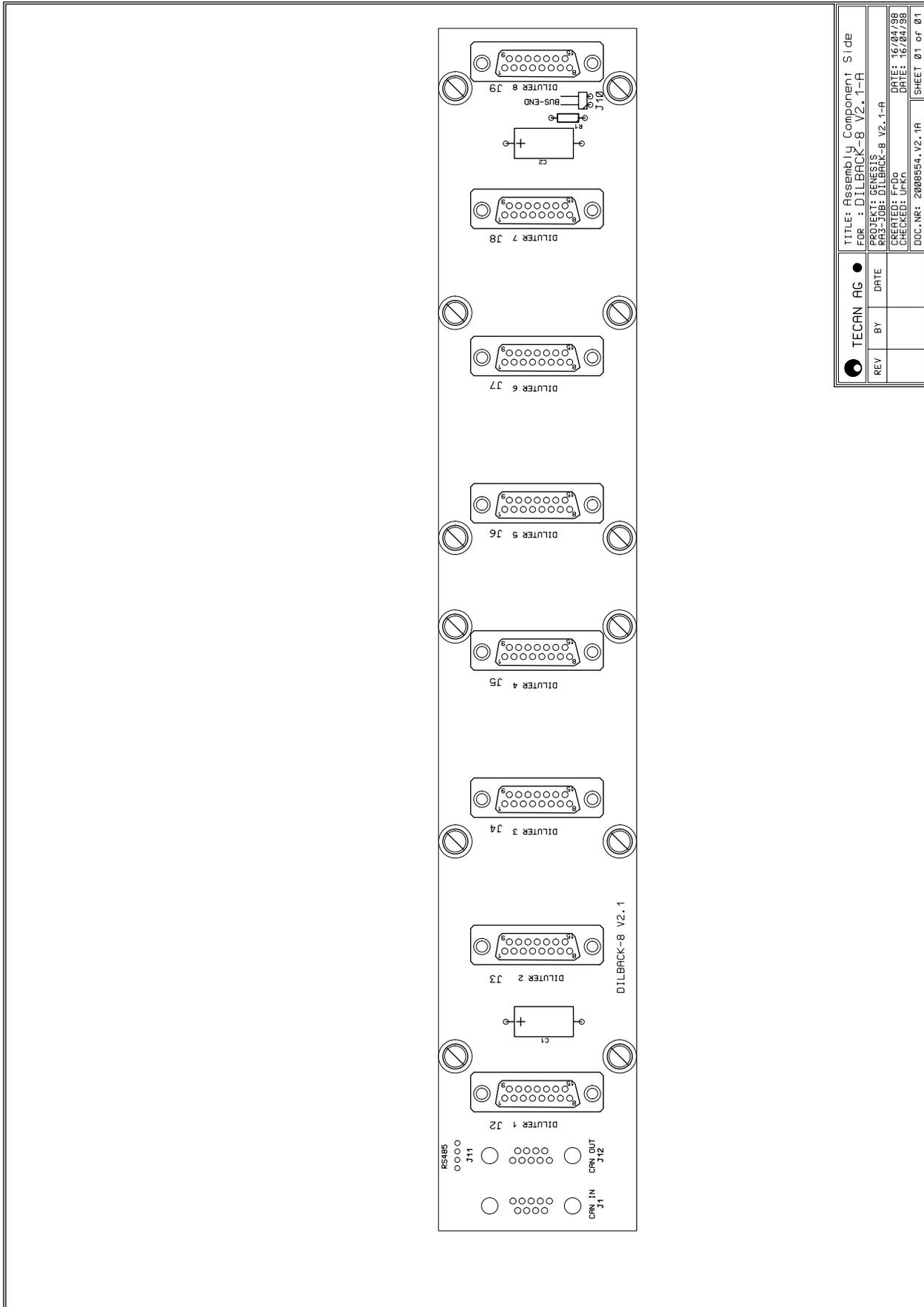
Drawing No	Title	Valid for	Page
2008554 V.2.0A	Schematics	Dilback-8	9 – 45
2008554 V.2.1A	Assembly component side	Dilback-8	9 – 46
2008554 V.2.1A	Assembly solder side	Dilback-8	9 – 47

2008554 V.2.0A Schematics

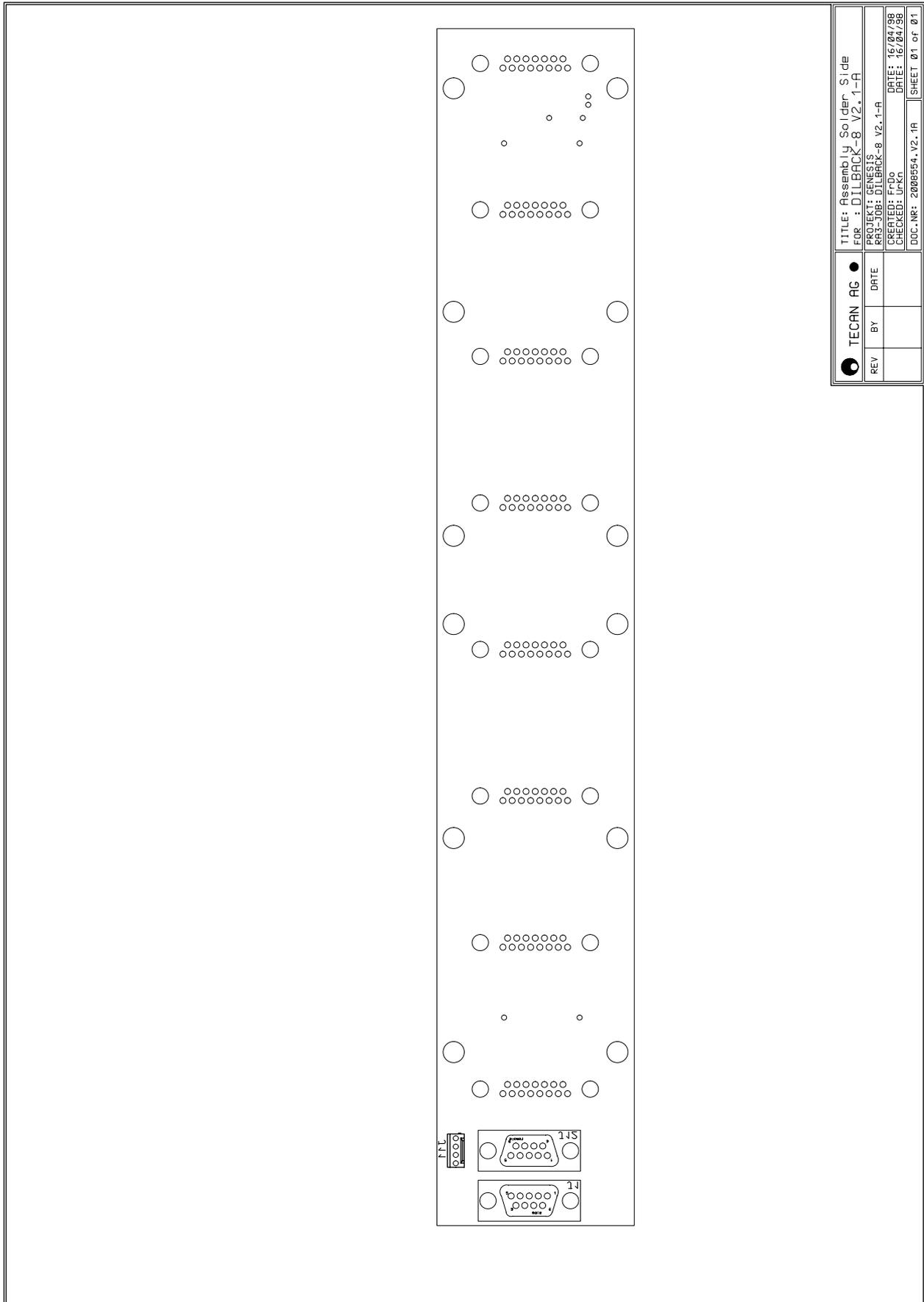


		TECAN AG FELDBACHSTR. 80 CH-8634 HÖRBRICHTLICHON	
SCHEMATICS VERSION V2.0-A		PROJECT GENESIS RAS-JOB DILBACK-8 V2.1-A	
DATE 02/02/1998 CHECKED P.M.U.		DATE 02/02/1998 CHECKED P.M.U.	
REVISION BY	DATE	REVISION BY	DATE
2008554.V2.0A		SHEET 01 of 01	

2008554 V.2.1A Assembly component side



2008554 V.2.1A Assembly solder side



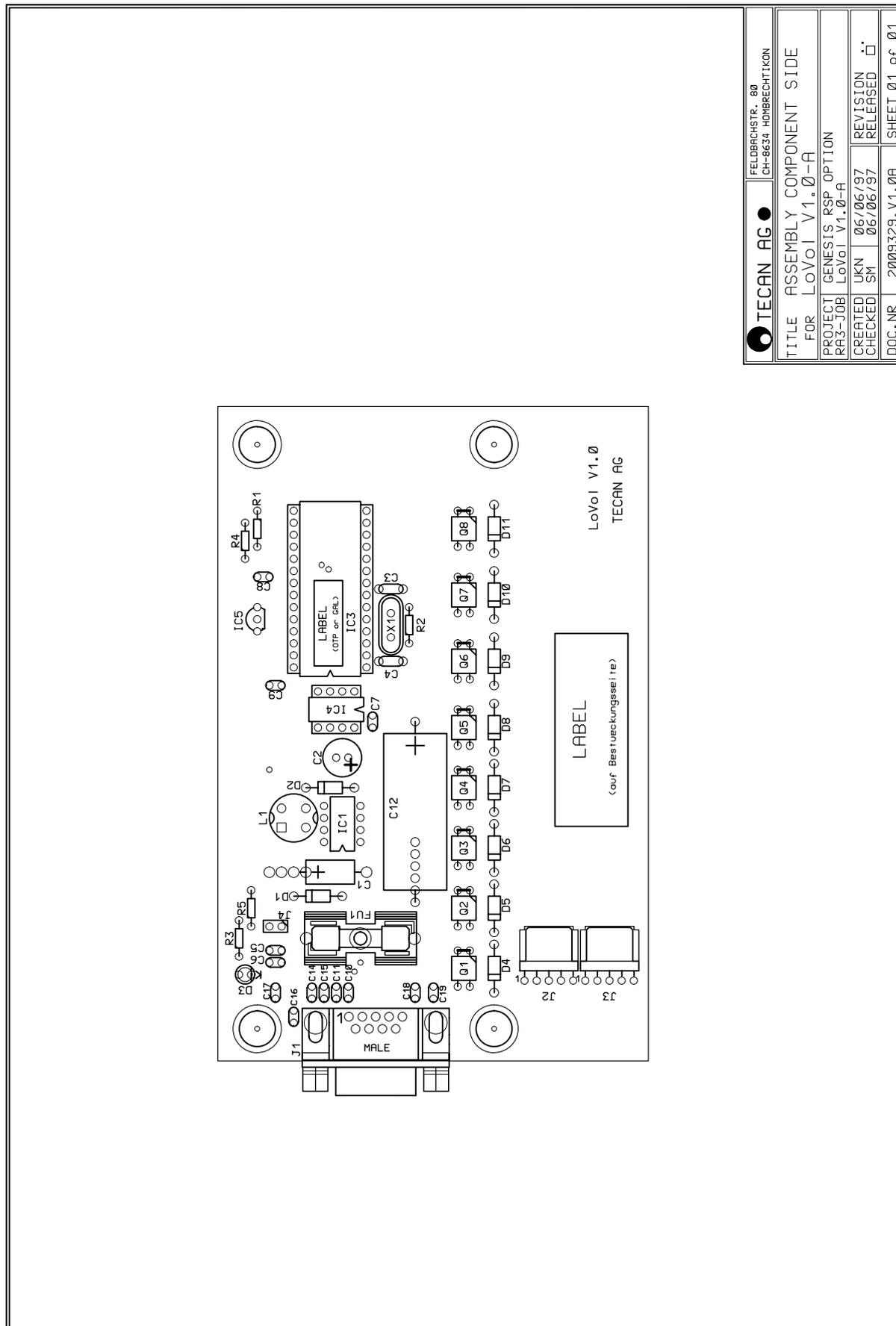
9.3.3 Low Volume Option

Find the following diagrams filed hereafter:

Low Volume Main Board

Drawing No	Title	Valid for	Page
2009329 V.1.0A	Schematics	Low volume option 1 and 2	9 – 49
2009329 V.1.0A	Assembly component side	Low volume option 1 and 2	9 – 50

2009329 V.1.0A Assembly component side



	FELOBRUCHSTR. 60 CH-8634 HORBRECHTIKON
TITLE ASSEMBLY COMPONENT SIDE	
FOR LoVoI V1.0-A	
PROJECT GENESIS RSP OPTION	
RR3-JOB LoVoI V1.0-A	
CREATED UKN 06/06/97	REVISION
CHECKED SM 06/06/97	RELEASED <input type="checkbox"/>
DOC.NR 2009329.V1.0A	SHEET 01 of 01

9.4 LiHa 1 and LiHa 2

Find the following diagrams filed hereafter:

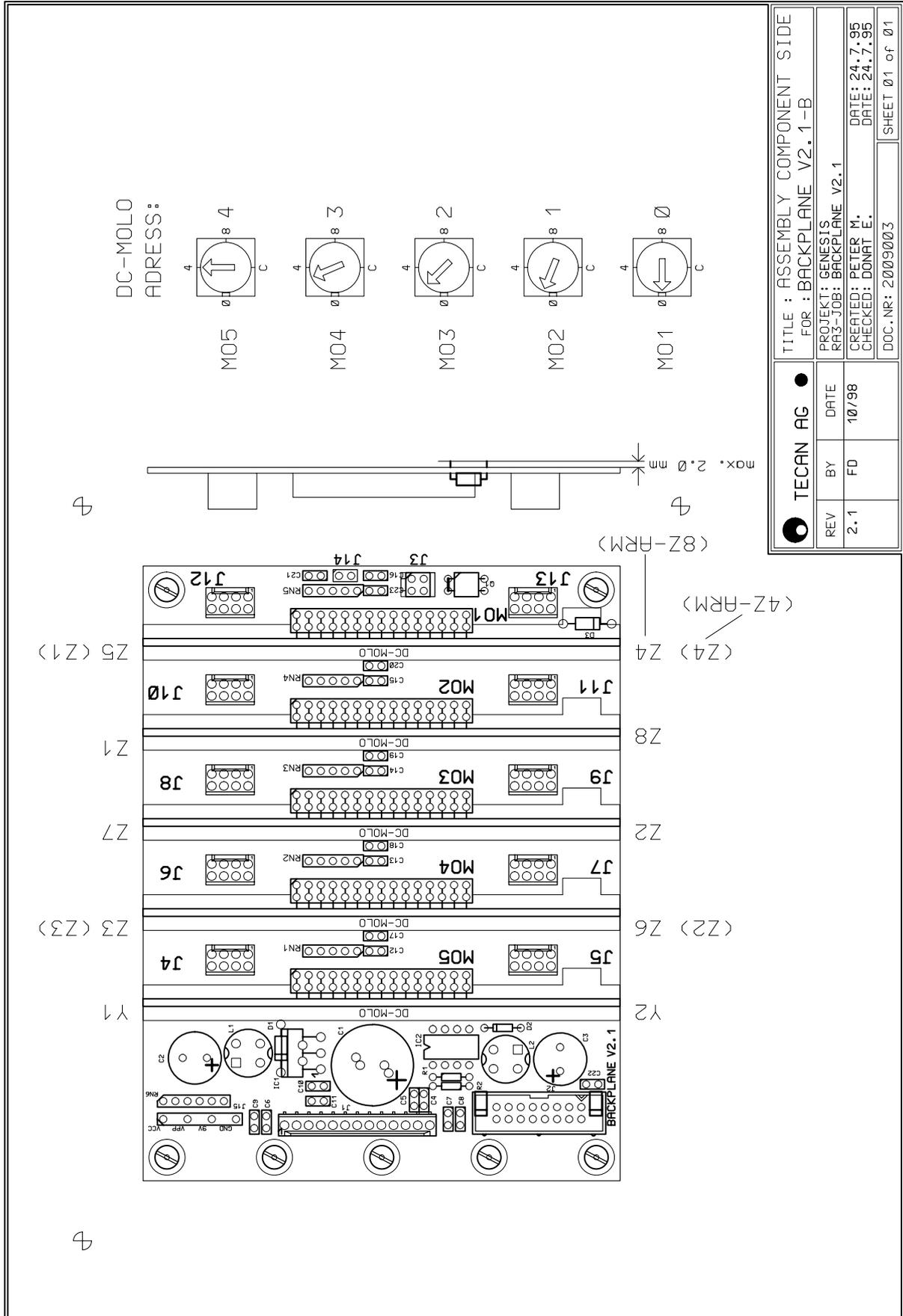
LiHa 2 Backplane

Drawing No	Title	Valid for	Page
2009003 V.2.1A	Schematics	LiHa 1 and 2	9 – 52
2009003 V.2.1B	Assembly component side	LiHa 1 and 2	9 – 53

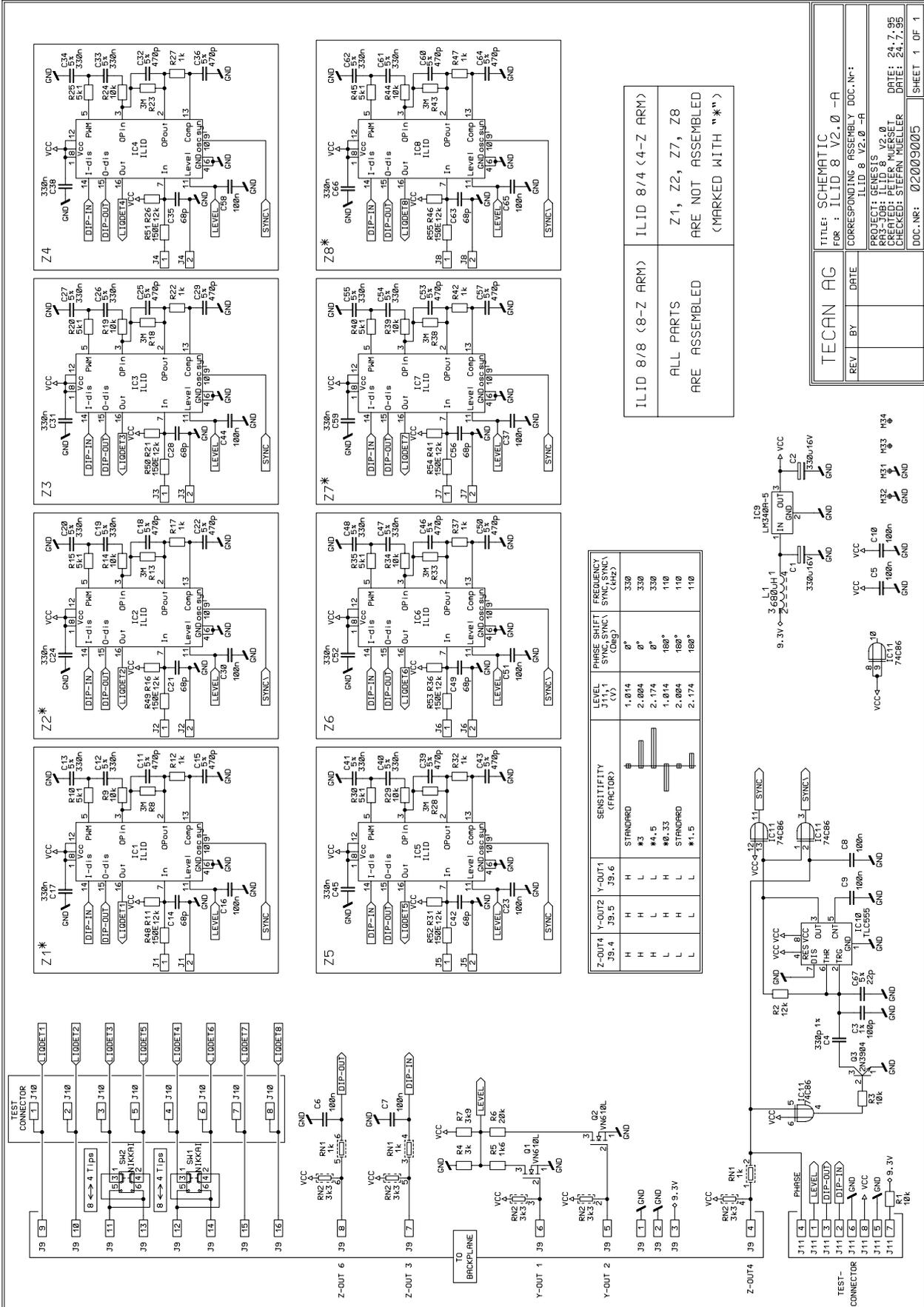
ILID Board

Drawing No	Title	Valid for	Page
2009005 V.2.0A	Schematics	LiHa 1 and 2	9 – 54
2009005 V.2.0B	Assembly component side	LiHa 1 and 2	9 – 55

2009003 V.2.1B Assembly component side



2009005 V.2.0A Schematics

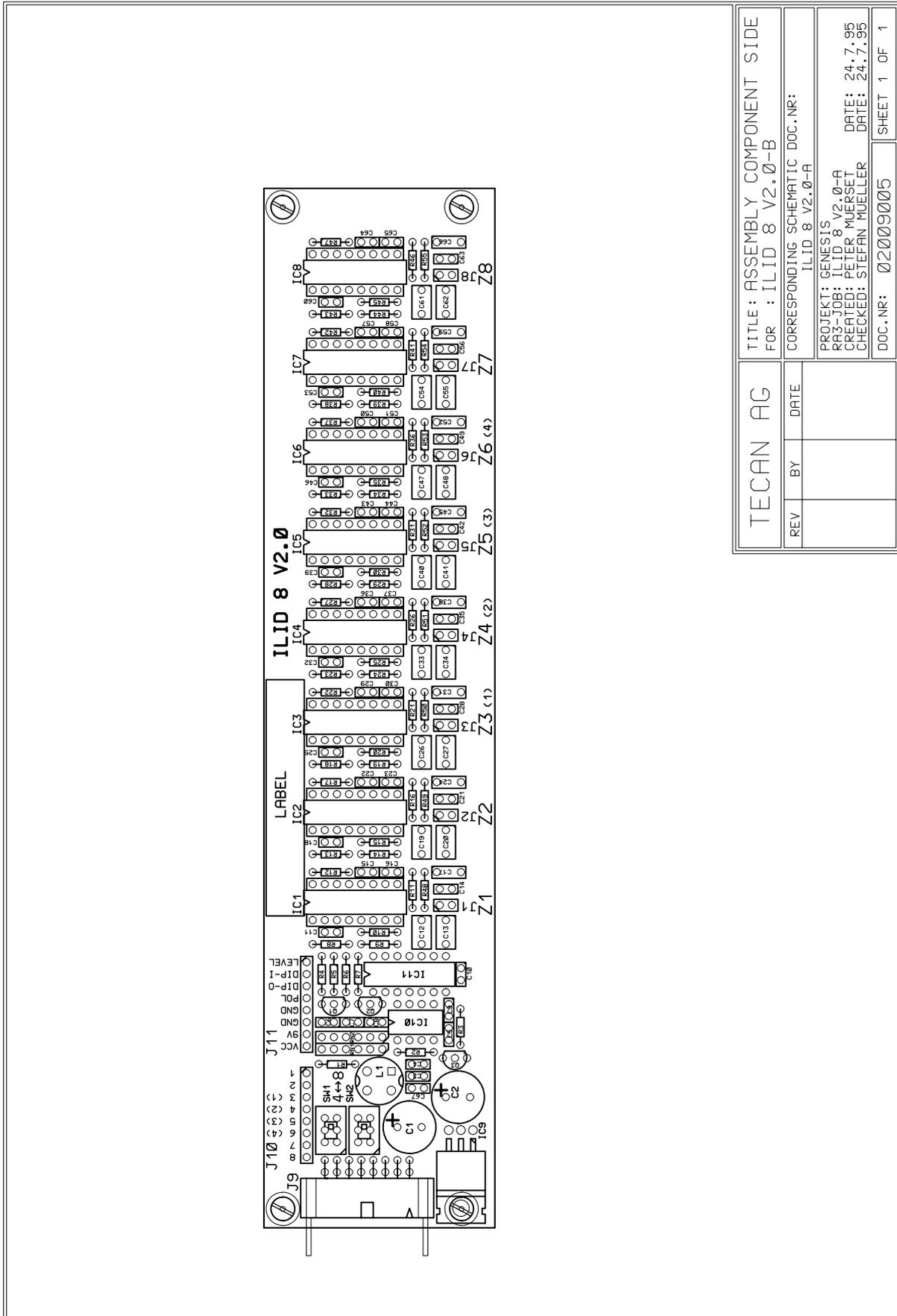


ILID 8/8 (8-Z ARM)
ALL PARTS
ARE ASSEMBLED

ILID 8/4 (4-Z ARM)
Z1, Z2, Z7, Z8
ARE NOT ASSEMBLED
(MARKED WITH "*")

TECAN AG	
REV	DATE
TITLE: SCHEMATIC FOR: ILID 8 V2.0 -A	
CORRESPONDING ASSEMBLY DOC.NR.: ILID 8 V2.0 -A	
PROJECT: ILID 8	V2.0
DRAWN: PETER MUESSLER	DATE: 24.7.95
CHECKED: STEFAN MUELLER	
DOC.NR.: 02009005	SHEET 1 OF 1

2009005 V.2.0B Assembly component side



9.5 RoMa 1 and RoMa 2

Find the following diagrams filed hereafter:

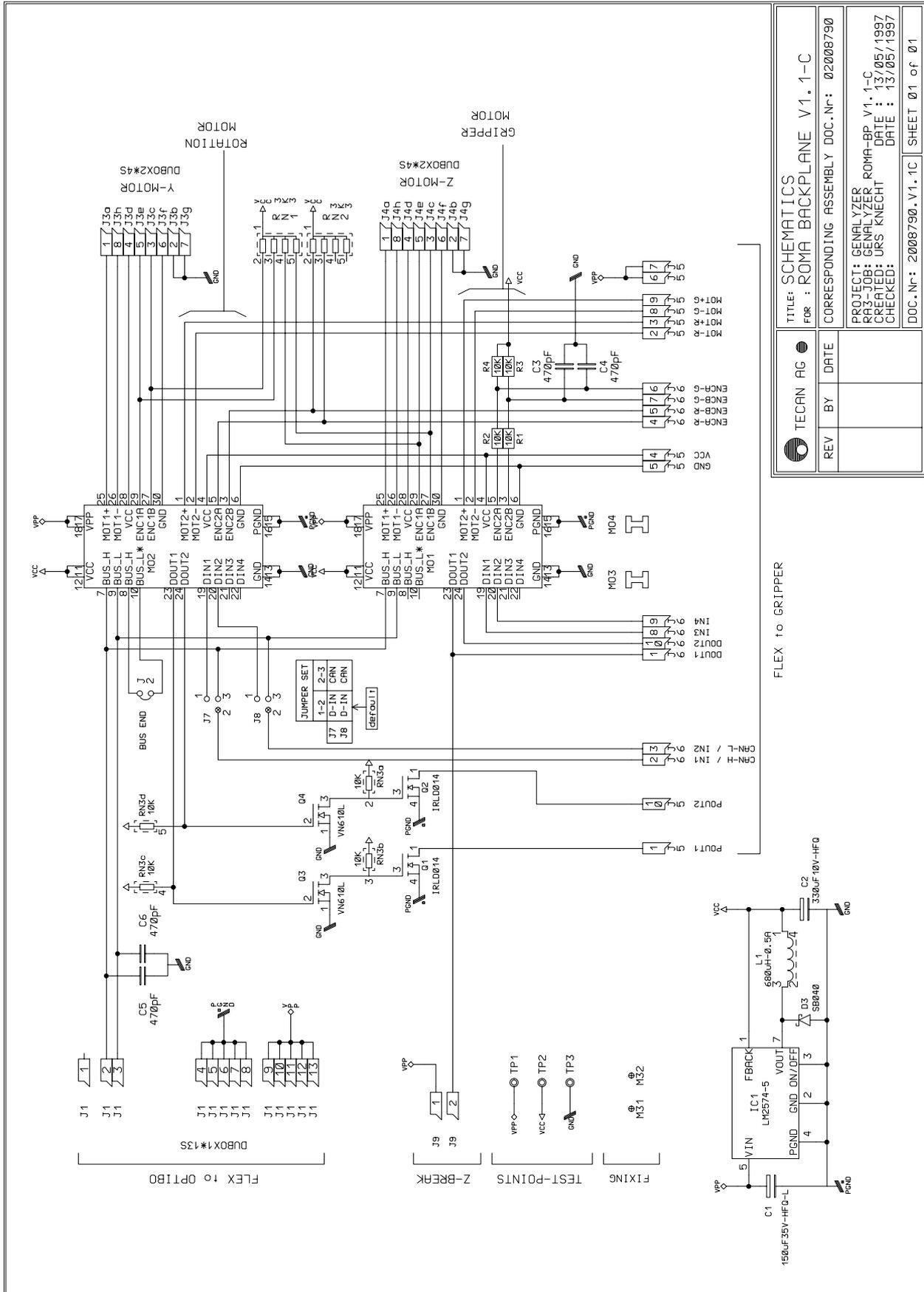
RoMa Backplane

Drawing No	Title	Valid for	Page
2008790 V.1.1C	Schematics	RoMa 1	9 – 57
2008790 V.1.1C	Assembly component side	RoMa 1	9 – 58
2008790 V.1.1C	Assembly solder side	RoMa 1	9 – 59
2008783 V1.2A	Schematics	RoMa 2	9 – 60
2008783 V1.2A	Assembly	RoMa 2	9 – 61

Gripper Board

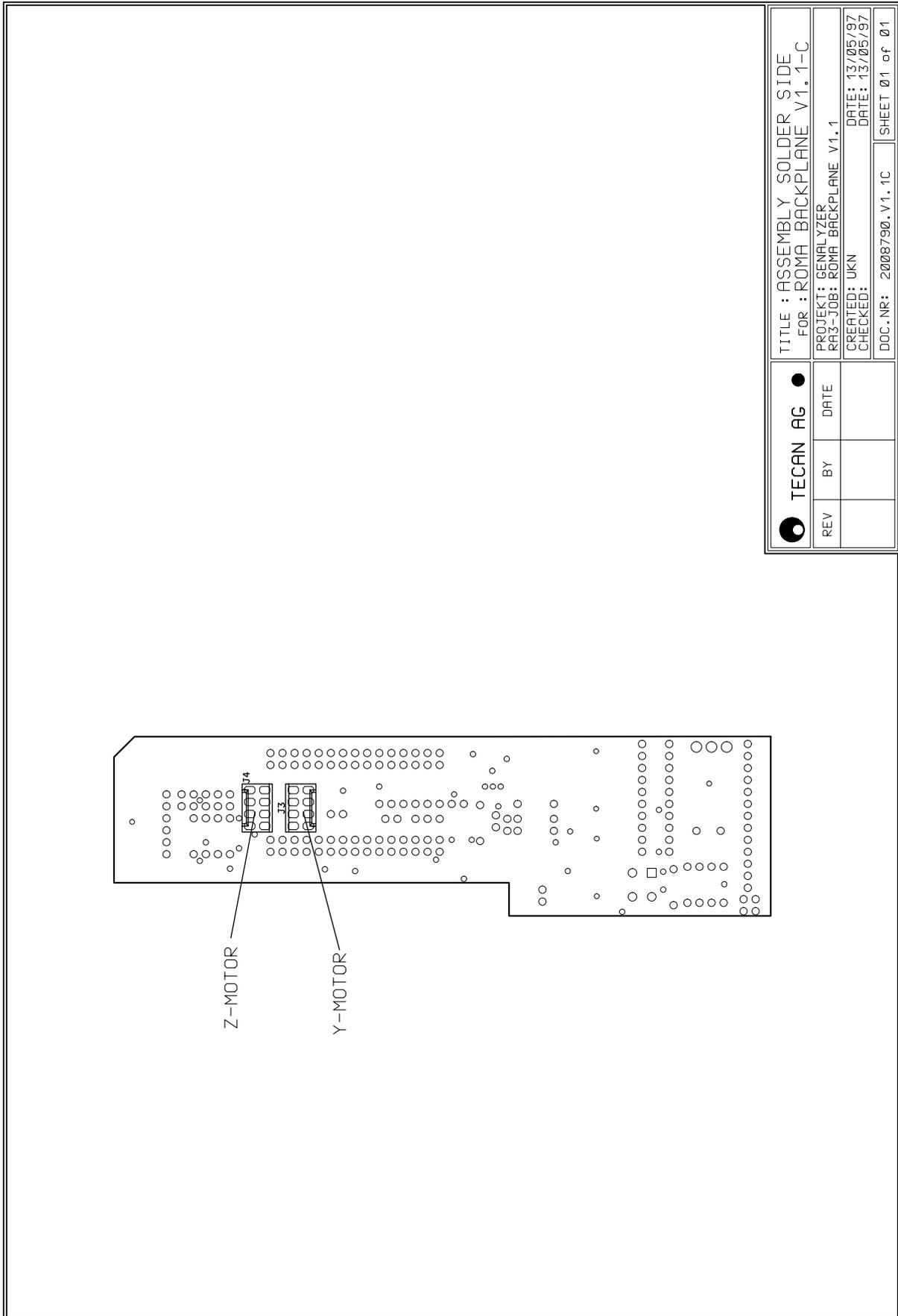
Drawing No	Title	Valid for	Page
2008794 V.1.0A	Schematics	RoMa 1 and 2	9 – 62
2008794 V.1.0A	Assembly component side	RoMa 1 and 2	9 – 63

2008790 V.1.1C Schematics



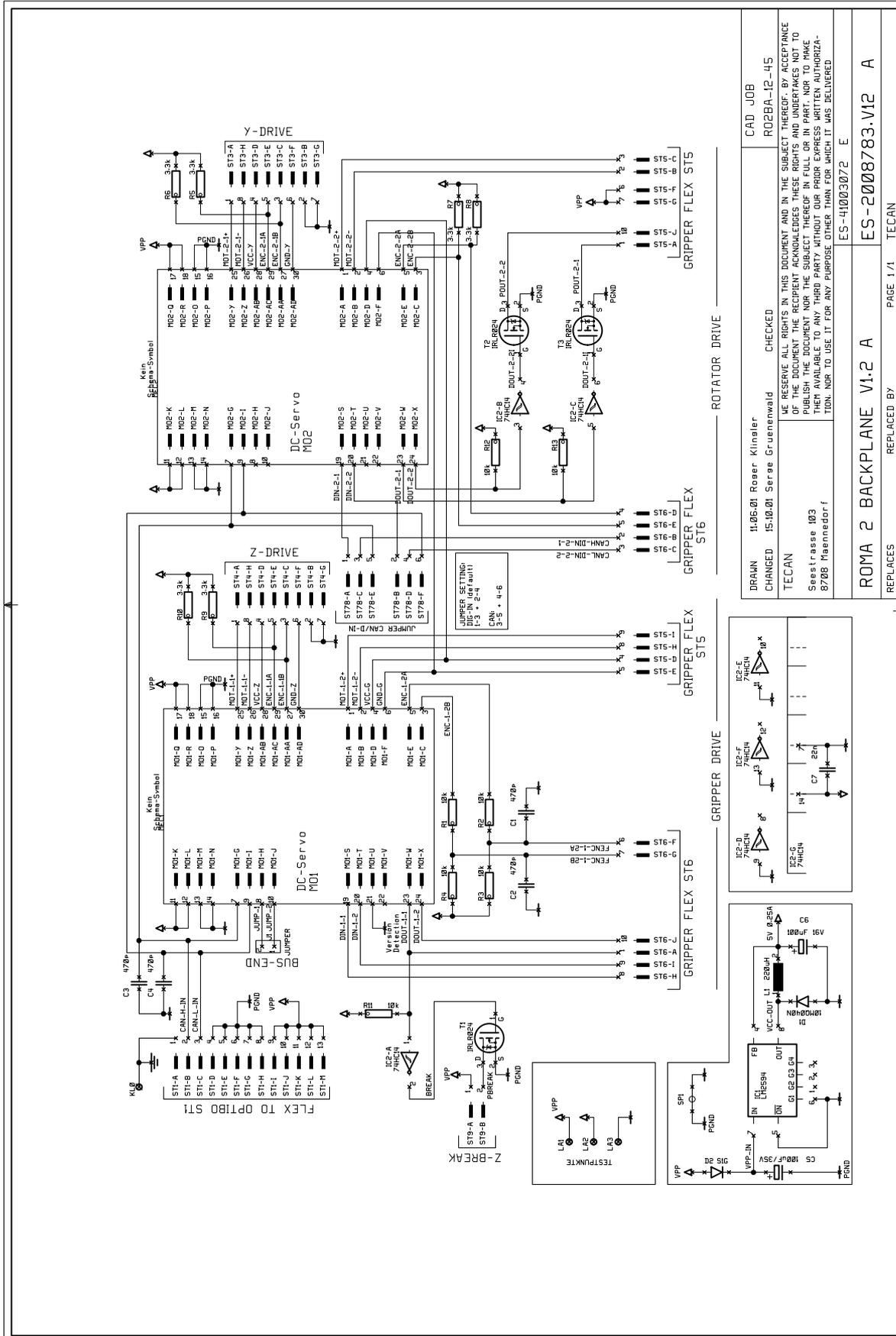
TECAN AG		TITLE: SCHEMATICS	
		FOR : ROMA BACKPLANE V1.1-C	
REV	BY	DATE	CORRESPONDING ASSEMBLY DOC.Nr.: 02008790
			PROJECT: GENALYZER
			PR3-JOB: GENALYZER ROMA-BP V1.1-C
			CREATED: UKS KNECHT
			DATE : 13/05/1997
			CHECKED:
			DOC.Nr.: 2008790.V1.1C
			SHEET 01 of 01

2008790 V.1.1C Assembly solder side

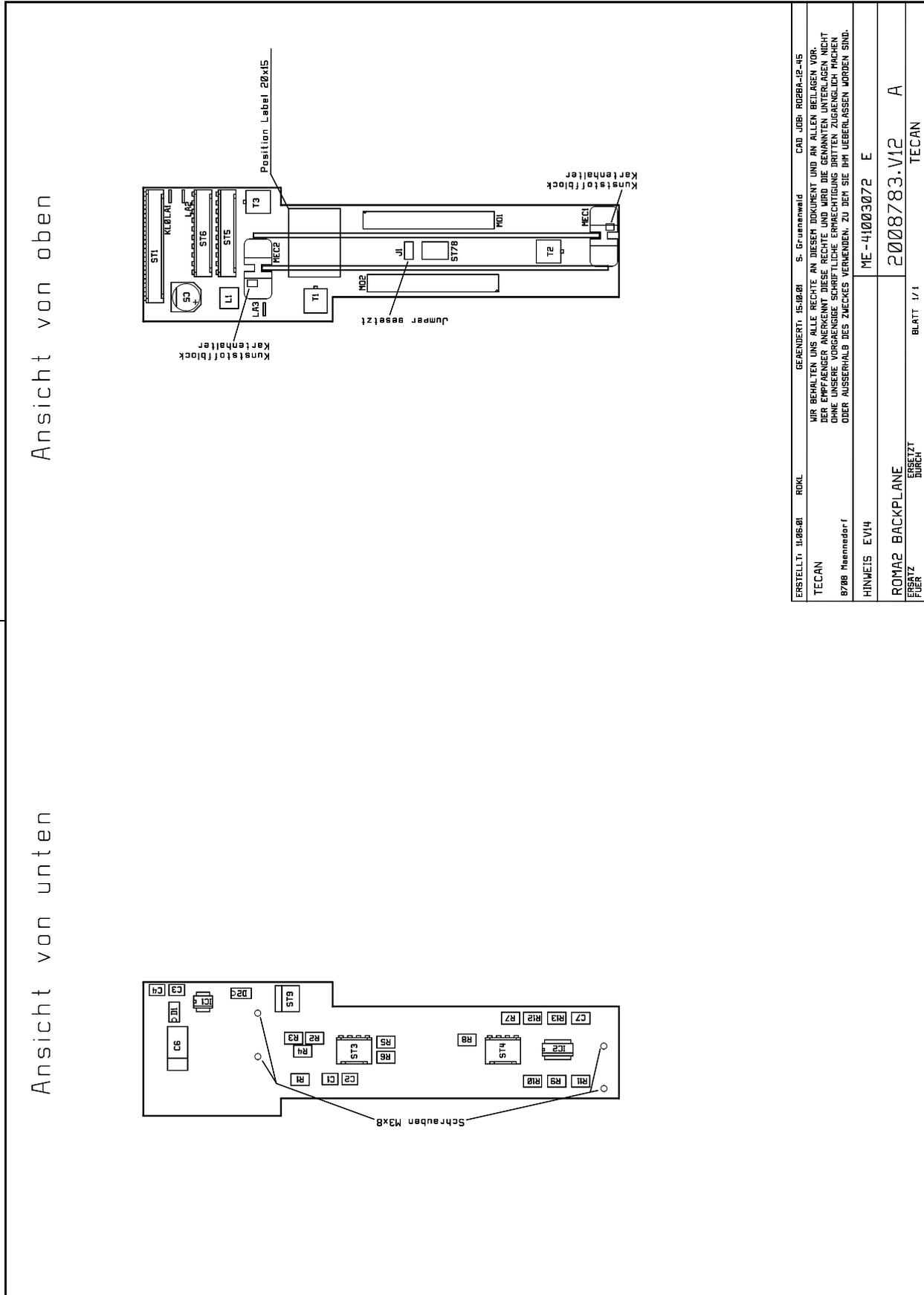


		TITLE : ASSEMBLY SOLDER SIDE FOR : ROMA BACKPLANE V1.1-C	
		PROJEKT: GENALYZER RAS-JOB: ROMA BACKPLANE V1.1	
REV	BY	DATE	DATE: 13/05/97 DATE: 13/05/97
DOC.NR: 2008790.V1.1C			SHEET 01 of 01

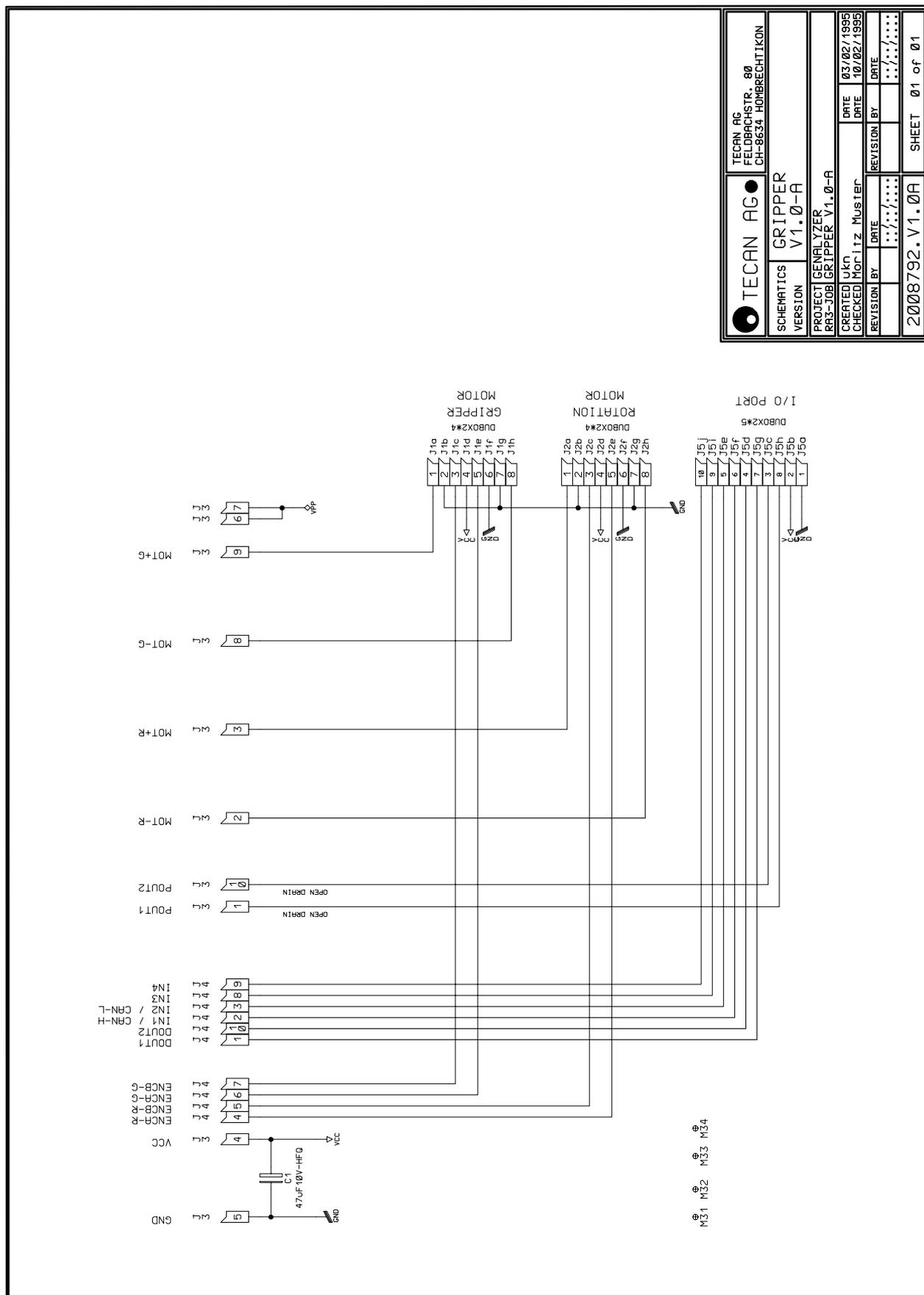
2008783 V1.2A Schematics



2008783 V1.2A Assembly



2008794 V.1.0A Schematics



TECAN AG		TECAN AG FELDBACHSTR. 80 CH-8634 HÖMBRECHTILIKON	
SCHEMATICS		GRIPPER	
VERSION		V1.0-A	
PROJECT GENALYZER			
RWS-JOB GRIPPER V1.0-A			
CREATED	Ukn	DATE	03/02/1996
CHECKED	Moritz Muster	DATE	10/02/1996
REVISION BY	...	REVISION BY	DATE
...
2008792.V1.0A		SHEET 01 of 01	

9.6 PosID 1 and PosID 2

Find the following diagrams filed hereafter:

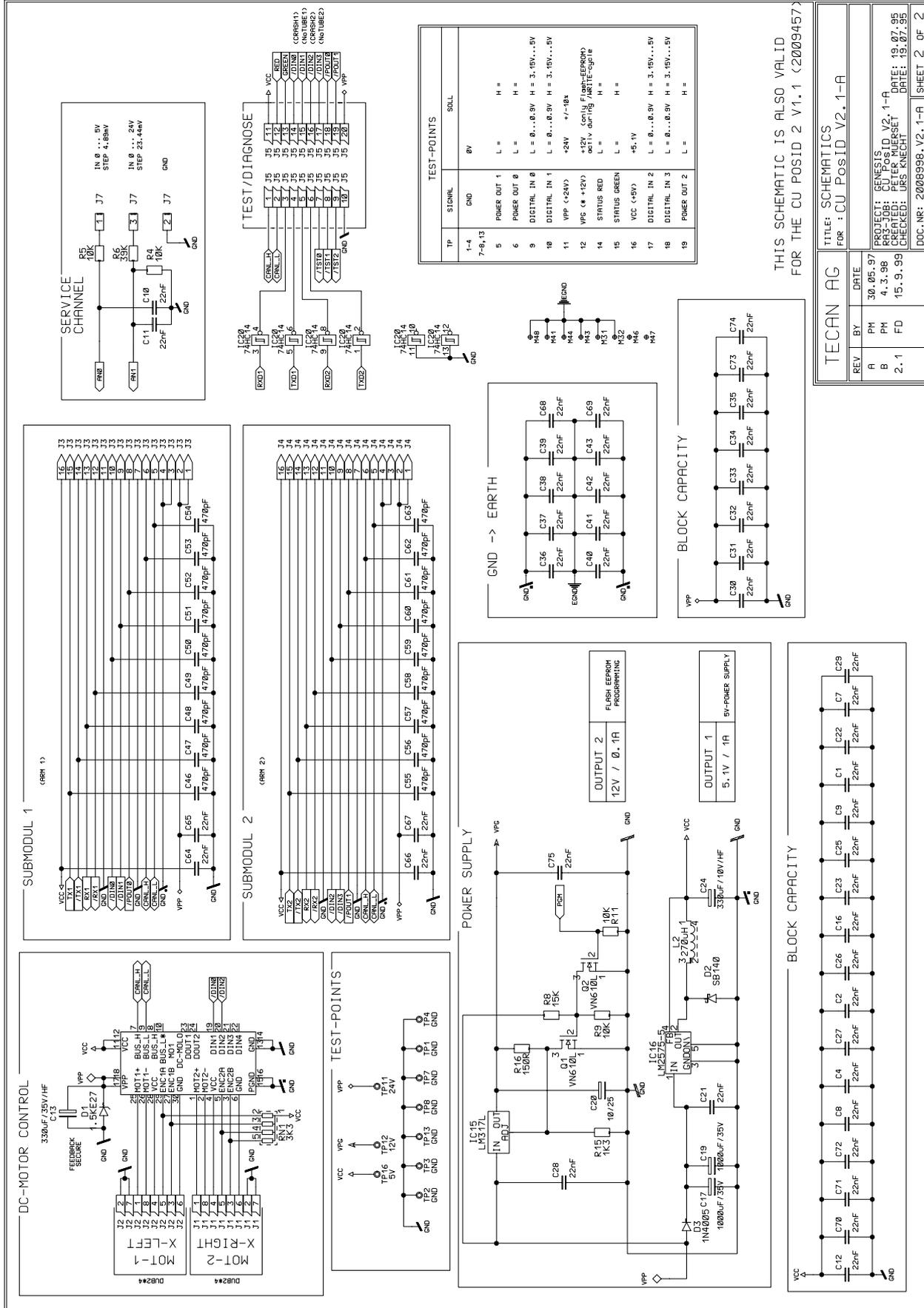
PosID CU Board

Drawing No	Title	Valid for	Page
2008998 V2.1A p.1	Schematics	PosID 1and 2	9 – 65
2008998 V2.1A p.2	Schematics	PosID 1and 2	9 – 66
2008998 V2.1A	Assembly component side	PosID 1and 2	9 – 67

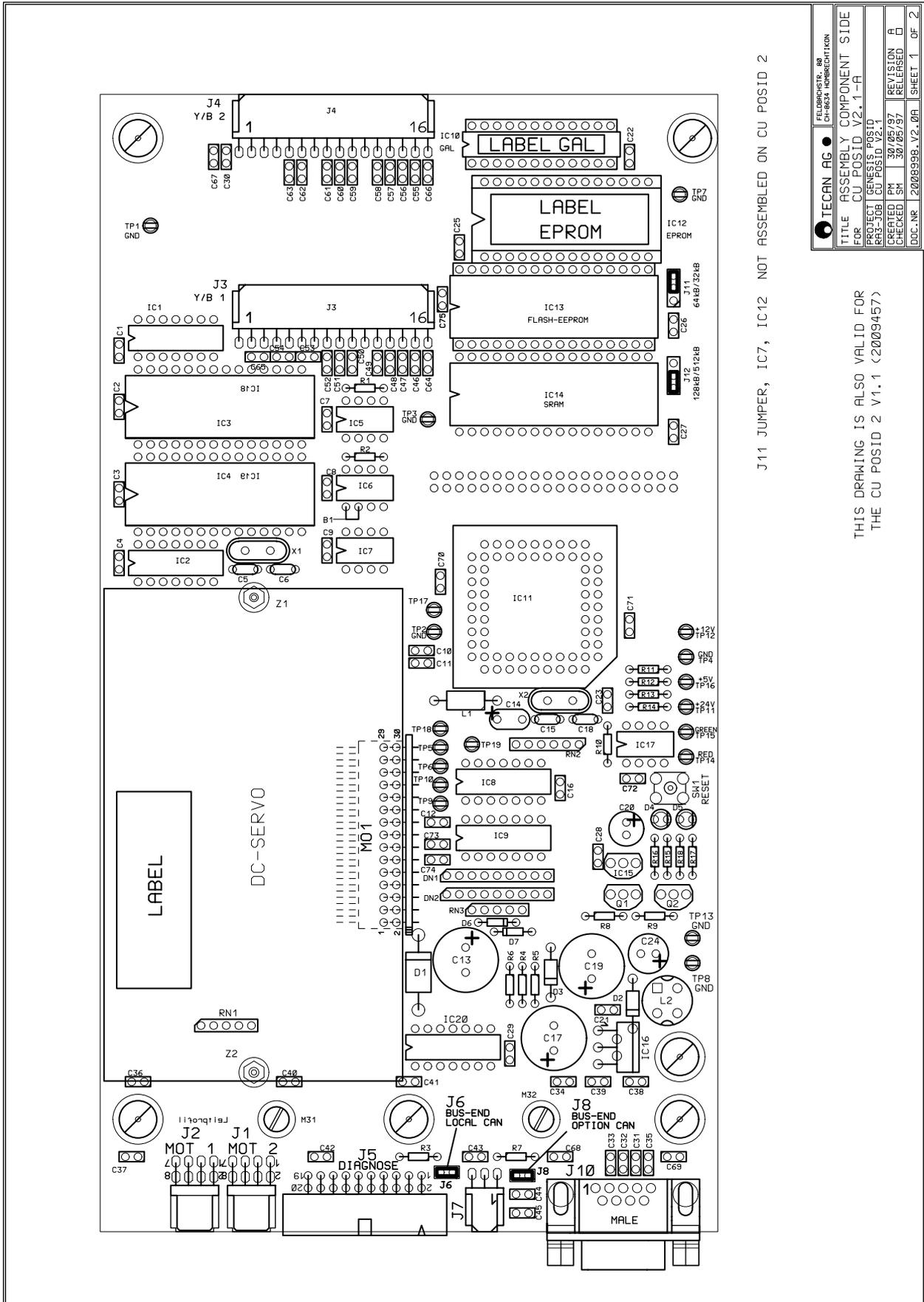
Y/B Board

Drawing No	Title	Valid for	Page
2008518 V1.0B	Schematics	PosID 1and 2	9 – 68
2008519 V1.0B	Assembly	PosID 1and 2	9 – 69
2009458 V1.0A	Schematics	PosID 1and 2	9 – 70
2009458 V1.0A	Assembly	PosID 1and 2	9 – 71

2008998 V2.1A p.2 Schematics



2008998 V2.1A Assembly component side

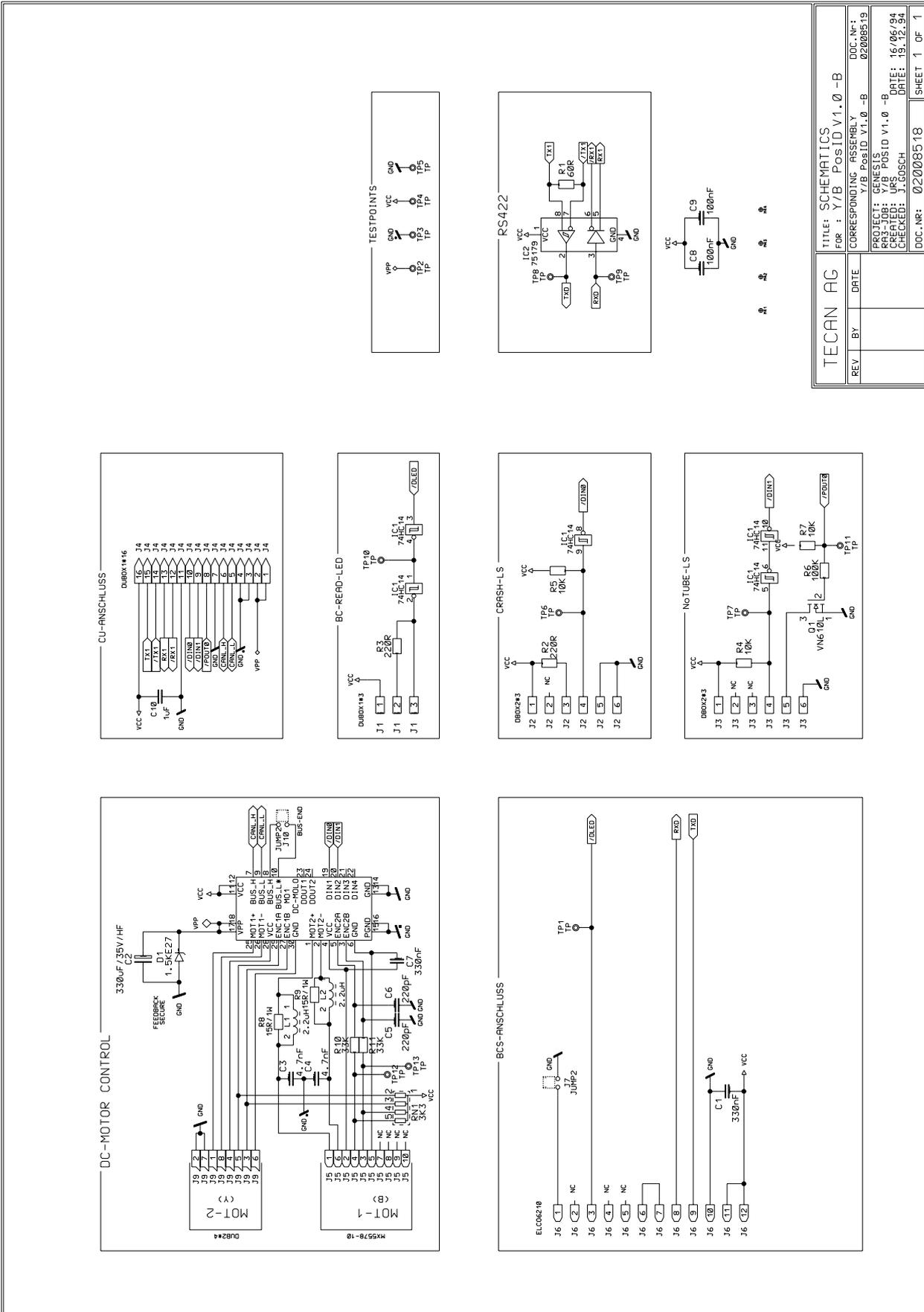


J11 JUMPER, IC7, IC12 NOT ASSEMBLED ON CU POSID 2

TECAN AG	FELDRICHTR. 88
	CH-8634 HORBREITEN
TITLE ASSEMBLY COMPONENT SIDE	
FOR CU POSID V2.1-A	
PROJECT GENESIS POSID	
RAS-JOB CU POSID V2.1	
CREATED PM 30/05/97	REVISION A
CHECKED SM 30/05/97	RELEASED
DOC.NR. 2008998.V2.0A	SHEET 1 OF 2

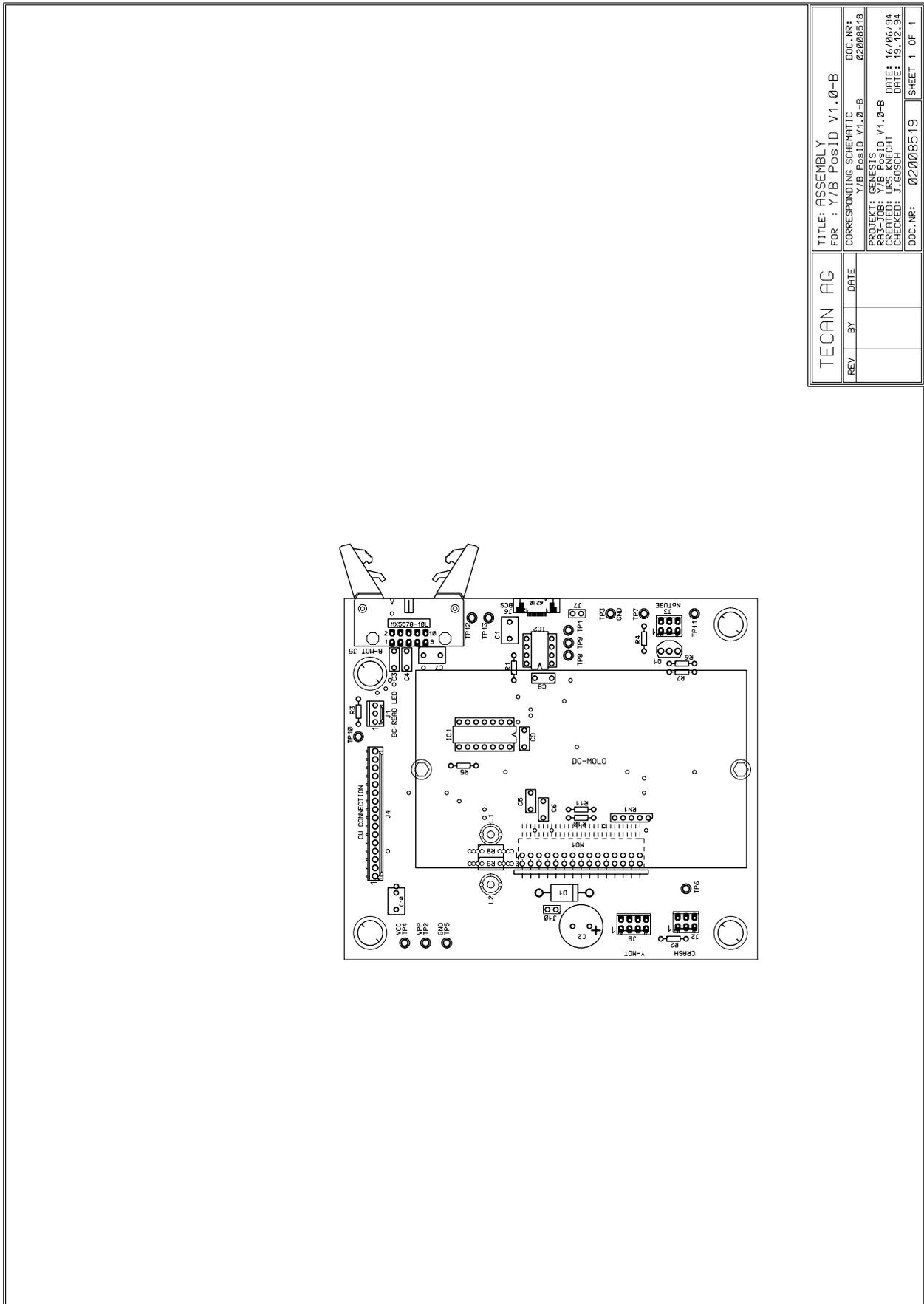
THIS DRAWING IS ALSO VALID FOR THE CU POSID 2 V1.1 (2009457)

2008518 V1.0B Schematics

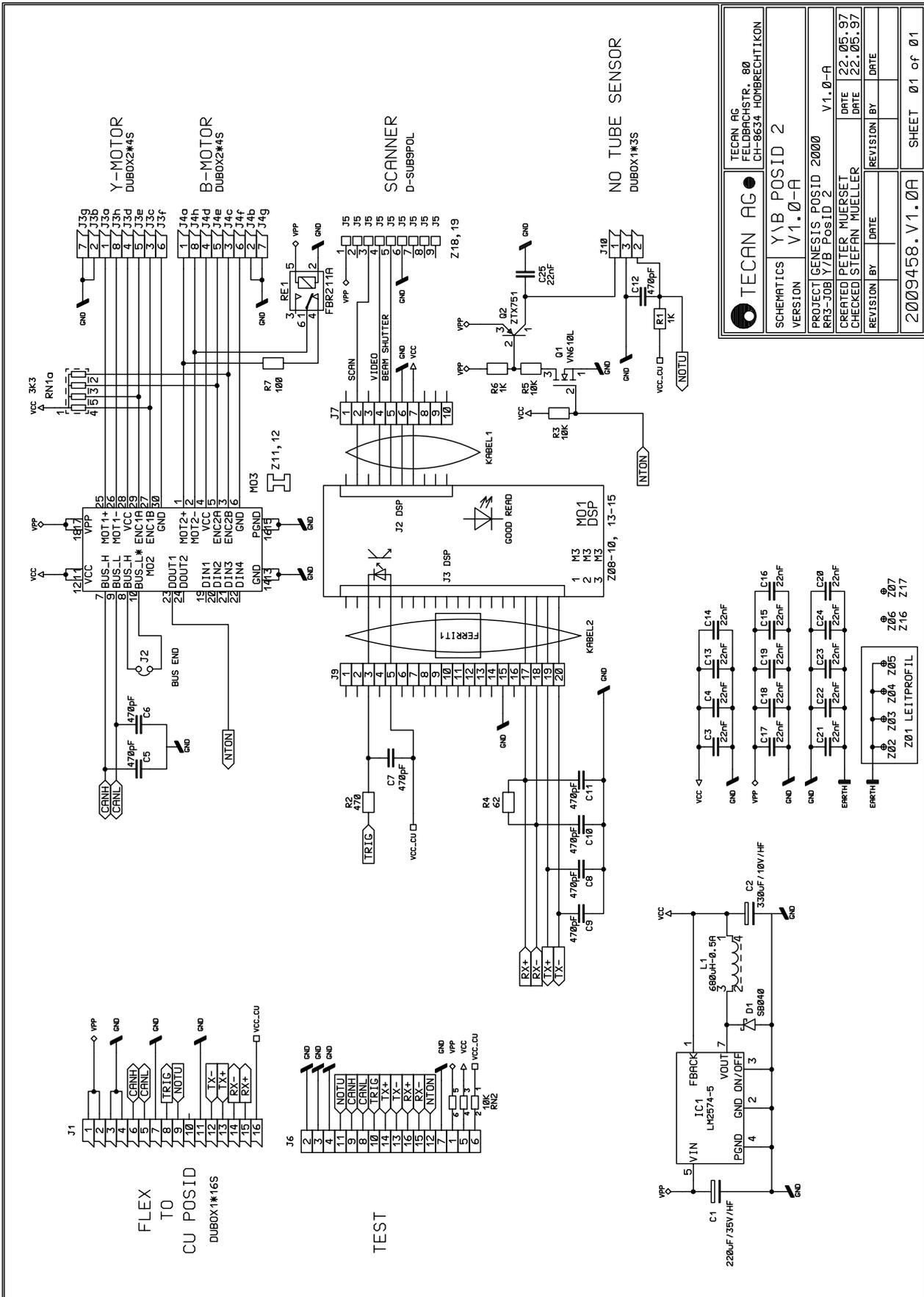


TECAN AG		TITLE: SCHEMATICS	
REV	BY	DATE	FOR : Y/B_PosID V1.0 -B
			DOC-NR.: 02008519
			PROJECT: GENESIS
			Y/B_PosID V1.0 -B
			DATE: 16/06/94
			CREATED: JRS
			CHECKED: J.GOSCH
			DOC-NR.: 02008518
			SHEET 1 OF 1

2008519 V1.0B Assembly



TECAN AG		TITLE: ASSEMBLY FOR : Y/B PosID V1.0-B	
REV	BY	DATE	CORRESPONDING SCHEMATIC Y/B PosID V1.0-B
			DOC.NR: 02008519
			PROJECT: Y/B PosID V1.0-B
			DESIGNER: URS KNECHT
			DATE: 16/06/94
			CHECKED: J.GOSCH
			DATE: 19.12.94
			DOC.NR: 02008519
			SHEET 1 OF 1



2009458 V1.0A Assembly

