



Malfunction “Robot Error” on Coatron A4/A6 systems

Spareparts:

21 803 00 CCU board (robotic mainboard)
21 804 00 ADRI board without Alidum sensor
21 802 00 Alidum sensor
21 806 00 Insulation block
21 807 00 Motor X-Axis, Left
21 807 05 Motor Y-Axis, Left
21 807 06 Motor Z-Axis, Left
21 006 01 Coatron mainboard
21 812 00 Flat cable
21 822 00 Gear Pinion
21 814 00 Kit Belt-X drive
21 814 01 Kit Belt-Y drive
21 814 02 Kit Belt-Z drive
21 822 00 Z-Gear pinion
21 805 00 Opto-sensor for X,Y,Z home position

1. XYZ system does not move at all after reboot or only not x,y or z-axis (error 2-19)

Reasons: Defective data cable, Defective gear motor, defective roboterboard, Defect home sensors
Defective flat cable from ADRI board to roboter board

Helpful diagnosis: Run selftest XYZ (see chapter 5)

Fix-1: Check 24V power supply (see PIC 10)

Fix-2: Check selftest of XYZ (see below). If error remain

Fix-3: Check & Replace all data cables. If error remain

Fix-4: Replace ADRI board CAT-No:

CAT-No: 21 804 00

Fix-5: Replace robotic controller board. If error remain

CAT-No: 21 803 00

Fix-6: Check and replace gear motor.

CAT-No: 21 807 00 x-axis

Not official, but helpful:

Check fuses on robotic controller board.

If the fuse burn consistently, then there is probably a shortcut of the power diode (D5,D6,D7 or D8).

The diodes D9,D10,D11 or D12 can be used as spare parts, because they are not used for the system configuration.

2. XYZ-Robot does move, but can't find home position:

Reason: Home position sensors or step wheel sensor defective

Fix-1: Check all cables for electrical connection

Fix-2: Check all screws especially on z-axis.

Fix-3: Check COAX cable of z-axis

Fix-4: Check X-Home on ADRI. If Testpin TP3 is not 5.0V, then replace it (Vishay TCST-2103) or driver IC (74HC14)

Fix-5: Check Y-Home sensor. If Testpin TP4 is not 5.0V, then replace sensor (Teco 21 805 00)

Fix-6: Replace ADRI board. CAT-No: 21 804 00

3. Pump does not move or plunger failed with (error code 2-7)

Reason: Pump is blocked by clogged needle or defect valve or pump itself is defect.

Check-1: Switch off instrument and try to close/open syringe manually. If you can't move at all, than this is a clear indication that needle is clogged or valve is blocking.

Check-2: Remove the all tubes from valve and reboot. Does the system work now? Yes, then needle is clogged

Check-3: Remove the all tubes from valve and reboot. If system works now, then needle is clogged

Check-3: Remove syringe and reboot. If system works now, then valve and/or pump itself must be replaced

Fix-1: Switch off device, move pump manually up/down, switch on. Sometimes it can fix the problem

Fix-2: Remove the all tubes from valve. Have a look into the valve fittings. Are there any particle inside? If yes, remove the particles and check also rinse tank for particles. The valve may be damaged by particles and should be replaced.

Fix-3: Replace or unclog the needle. Additionally update firmware is release is older than older than 2019. Prevent re-clogging by installing new wash position and adjust XYZ coordinates correctly.

Fix-4: Replace valve, if leaky or blocked. Additionally replace rinse solution, if there any particles inside.

Fix-5: complete pump, if all previous fixes failed

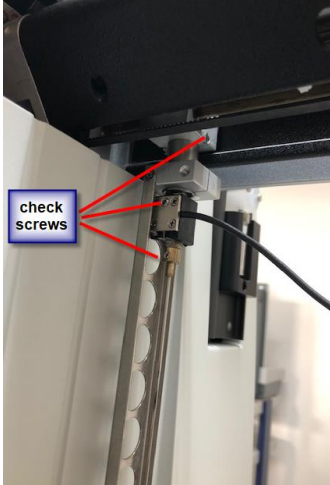
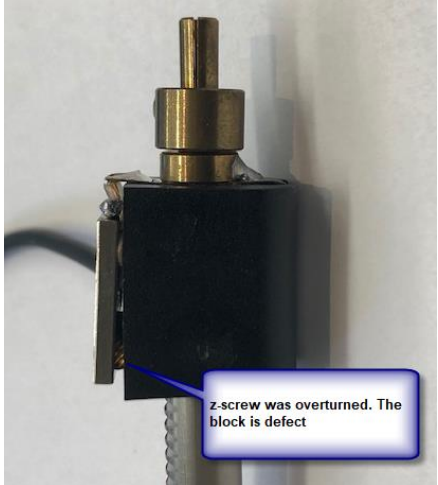
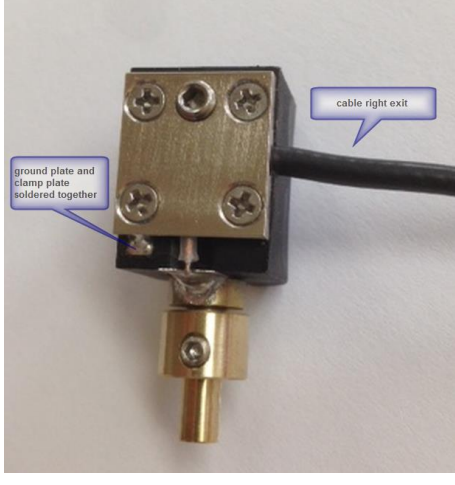
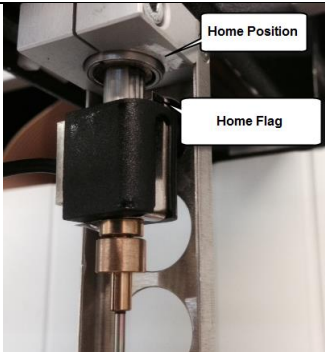
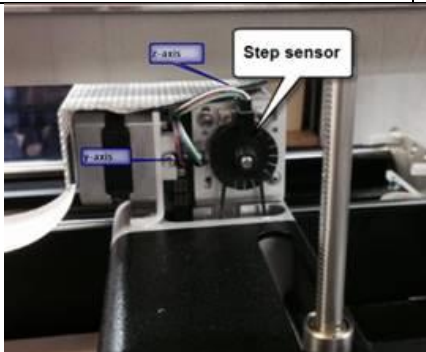
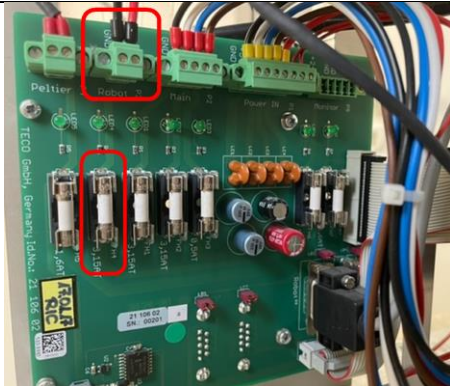


Procedure to unclog needle:

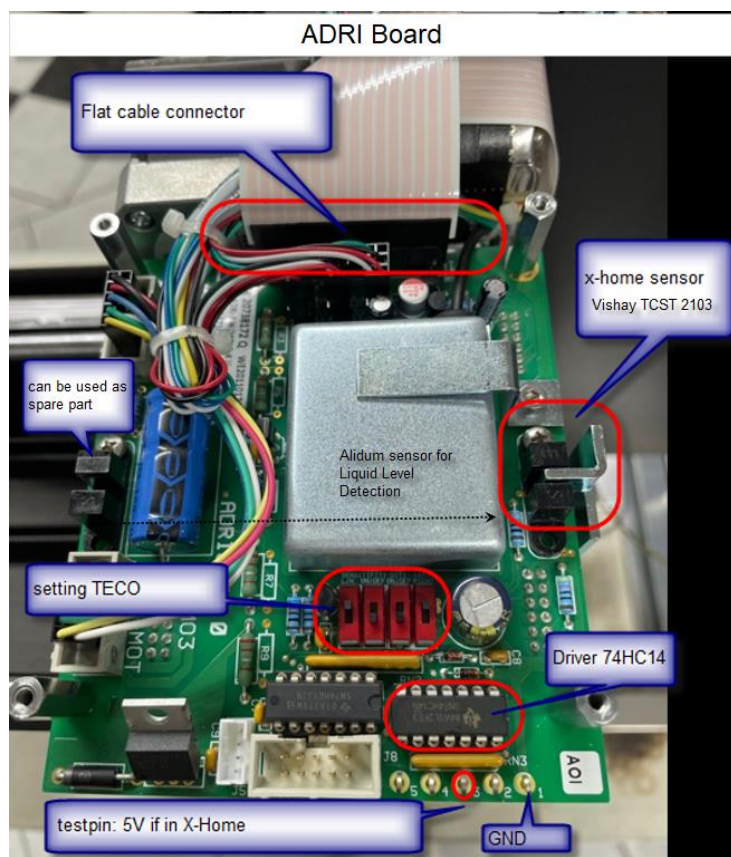
(Try to remove the clot not through small end of the needle, but through the tubing.)

- Switch on instrument. After robot error message , switch off instrument. Now the valve of the pump is in direction of needle.
- Pierce several times through the needle with a 0.3mm metal wire or a nylon rope (like for fishing).
- Now move the syringe completely down. This should make a lot of subpressure and draw the clot into tubing.
- Open tubing, shift syringe back into home and close tubing.
- Repeat step c and d until you can see a clot inside of the syringe
- Remove syringe and clean it from clot.
- After reassemble everything, the needle should work.

Some pictures

		
Pic1 Check tight connections	Pic2 Check, if z-screw was overturned	Pic3: Insulationblock 21 806 00
		SERVICE 1 PRINT REPORT 2 ADJUST XYZ 3 ADJUST TEMPERATURE 4 CHECK OPTIC 5 CHECK ROBOTICS 6 MOVE CUVETTES 7 CLEAN NEEDLE 8 REPLACE RINSE TANK 9 REPLACE NEEDLE 10 REPLACE SYRINGE 11 ADJUST MOTOR 12 CAP PIERCING
Pic4 ADRI board 21 804 00	Pic5 Alidum sensor 21 802 00	Pic6 Check level sensor
		
Pic7 Check Home position and Flag	Pic8 Check: Opto Sensor 21 805 00	
		
Pic9 Check FLAT cable 21 812 00	Pic10 Check 24V	

4. Problems with X-axis (move left/right)



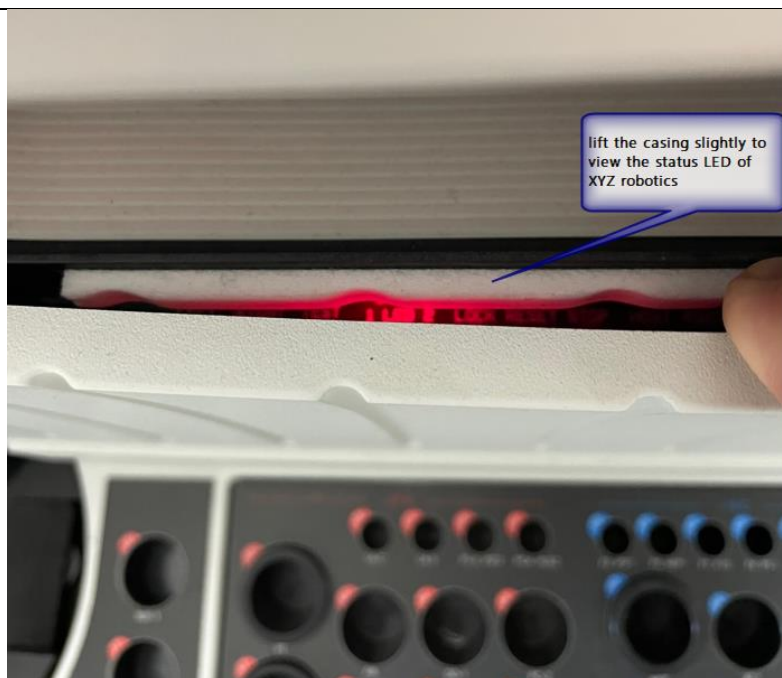
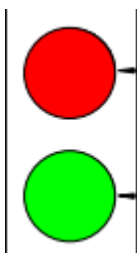
Pic 11: ADRI Board 21 804 00

Problems with X-axis are often located on ADRI board

- 1) Check, that all cables are connected. Especially the flat cable .
- 2) Check, that x-home sensor is free of particles
- 3) Check, testpin TP3 (should change from 0 to 5V DC, when arm moves into x-home)
- 4) Check for correct TECO switch setting
- 5) If, the X movement does still not work, than mostly IC "74HC14" is defective.

5. Selftest of XYZ robotic

During boot up the robotics is running a selftest. The status is indicated by two LEDs (GREEN & RED) on the CCU Board.



Lift the casing slightly to view the status LED

Selftest begins after switch-on = the RED1 + GREEN1 is blinking 1 per sec.

After 10sec the self test is finished and result is shown.

LED 1/LED2	MODE OF OPERATION Blinking (on once per sec)	DETECTION OF LOST STEPS Rapid Blinking (on twice per sec)	DETECTION OF HARDWARE PROBLEMS (remains lit)
Red	Self Test OK	Detected X-axis	Problem on X-axis
Green	Normal mode OK	Detected Y-axis	Problem on Y-axis
Red & Green	Firmware download	Detected Z-axis	Problem on Z-axis

Normal operation:

RED=Off GREEN=Blinking 1 per sec → self test passed

Abnormal operation:

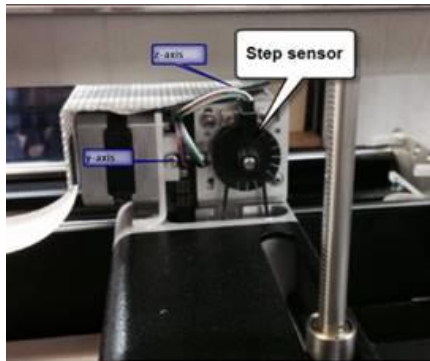
Err1 No or rapid blinking directly at switch on → CCU board 21 803 00 defect
Err2 Rapid blinking → Step loss. Permanent lit → motor problems
Err3 Permanent lit → motor problems

Recommend service

Err1 No or rapid blinking directly at switch on → follow Err3

Err2 Rapid blinking → Step loss.

- Check step sensor (z-axis, CAT= 21 805 00)
<https://www.alldatasheet.com/datasheet-pdf/pdf/26411/VISHAY/TCST2103.html>
- Defect opto-sensors (Vishay TCST-2103) or defect driver IC (74HC14) on ADRI Board
- Special tip: Unplug and replug cable of z-axis sensor
- Replace ADRI board



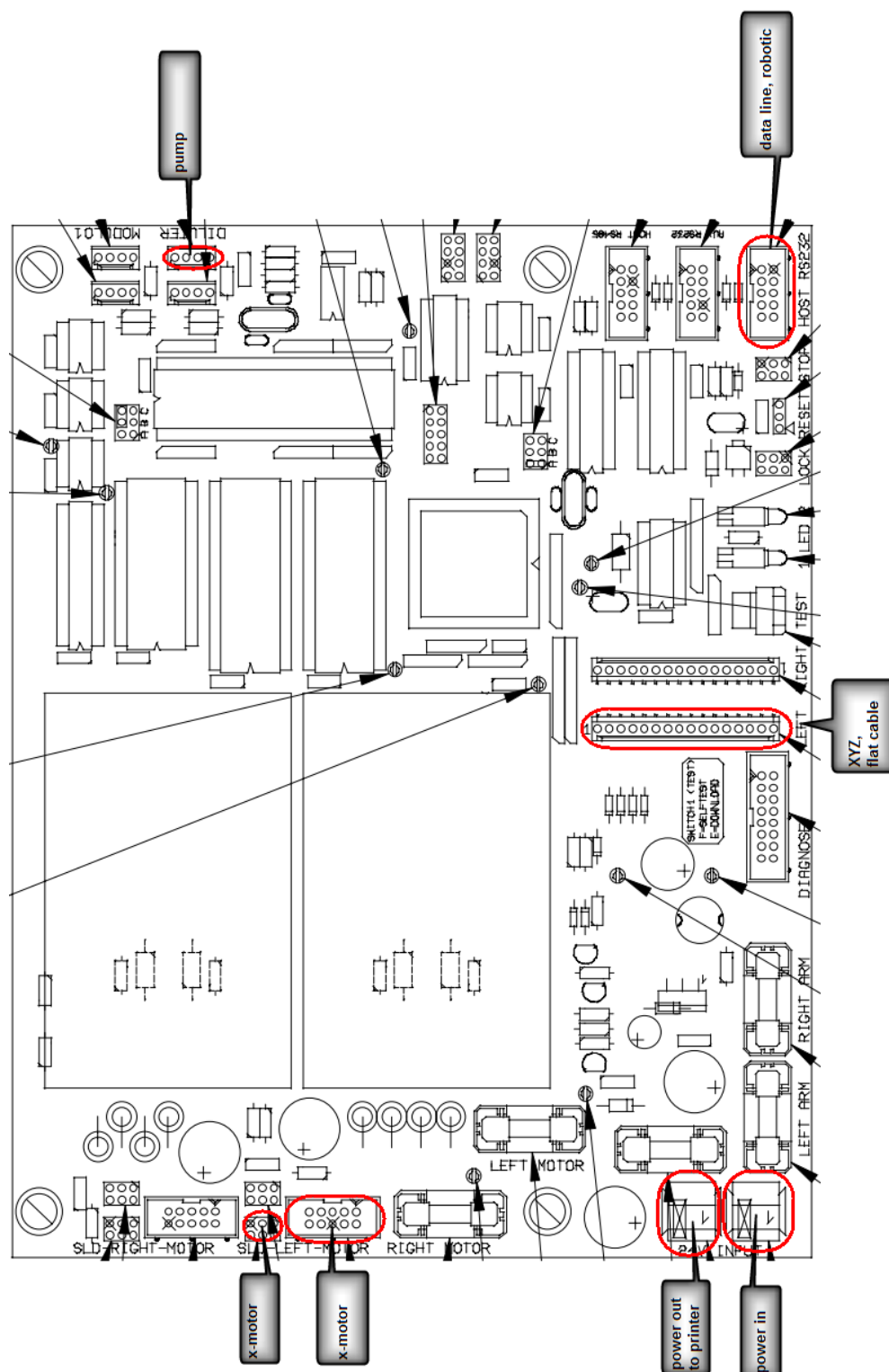
Err3 Permanent lit → motor problems

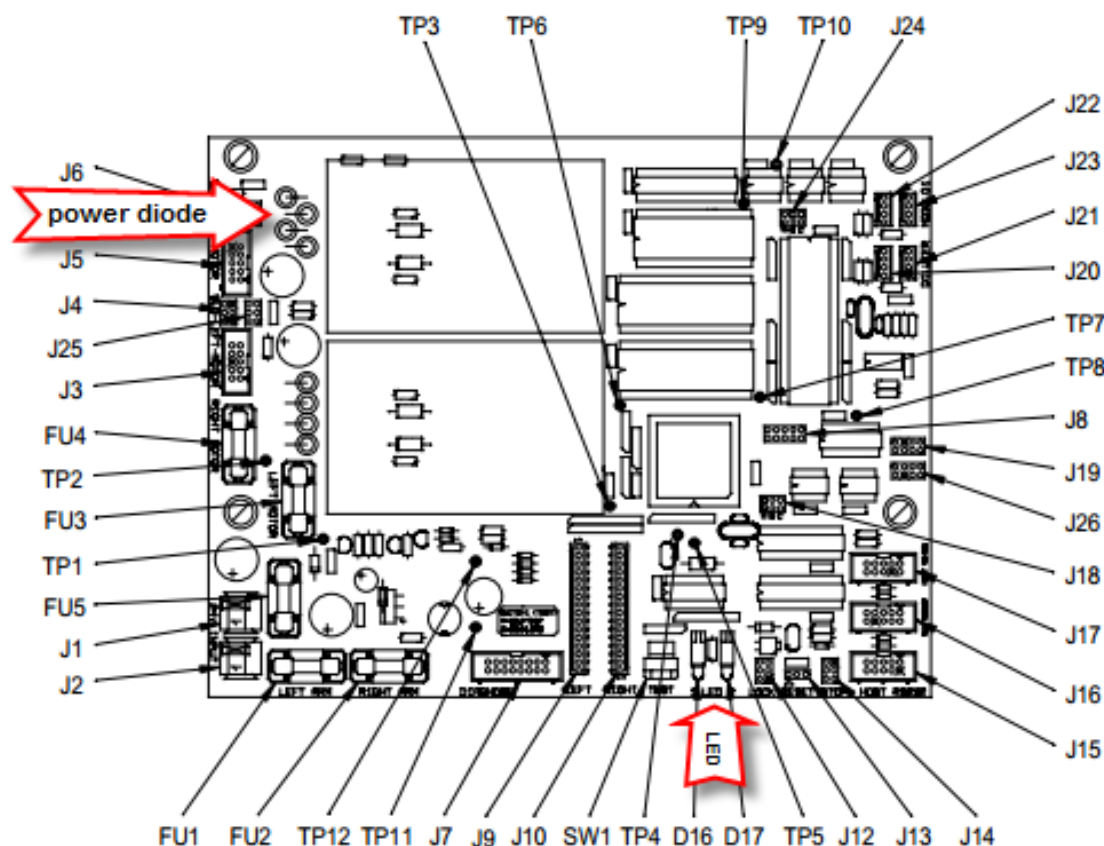
- Robotic is not powered with 24V
 - a. Fuse FH4 on fuse-board is blown
 - b. Fuse FU1, FU2 or FU3 on CCU board (CAT 21 803 00) is blown

Measure output of power supply before and after fuse FH4. Burnt fuses are mostly caused by defect robot board or defect X-axis motor (left /right move)

- Check & Replace all data cables, especially the flat cable for x-axis (CAT21 812 00)
- shortcut of the power diodes board (D5,D6,D7 or D8).on CCU
The diodes D9,D10,D11 or D12 can be used as spare parts, because they are not used for the system configuration.
- CCU mainboard is defect (CAT 21 803 00)
Replace this board especially when selftest failed (see below page-2).
- Gear motor x-axis defective (CAT-No: 21 807 00)

Overview of CCU board: CAT= 21803 00

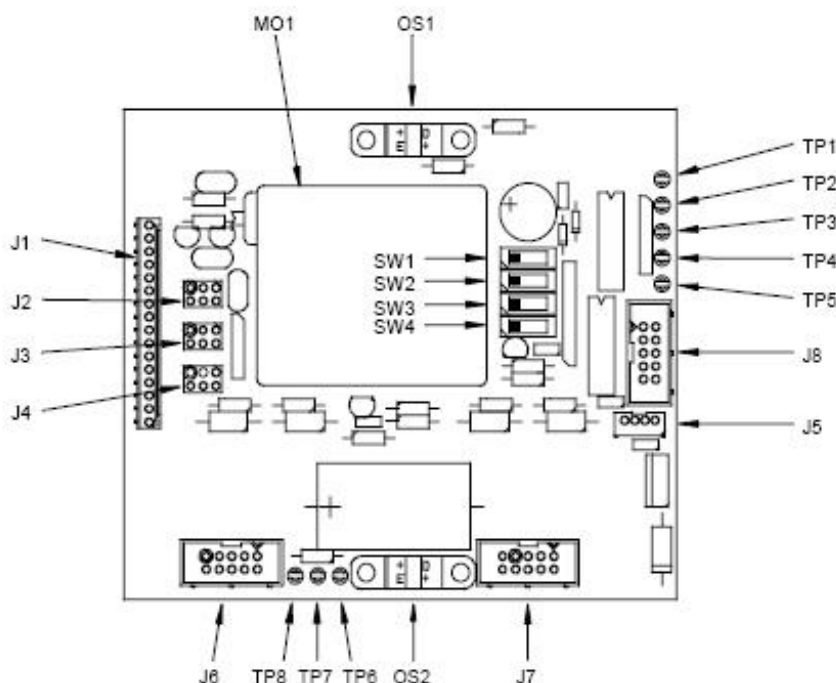




- J1: 24 VDC Input (parallel to J2)
- J2: 24 VDC Output (parallel to J1)
- J3: Left X-motor Connector
- J4: Left X-motor Step Loss Detection Connector
- J5: Right X-motor Connector
- J6: Right X-motor Step Loss Detection Connector
- J7: Diagnostic Device Connector
- J8: Emulator Connector
- J9: Left Flex Cable Connector
- J10: Right Flex Cable Connector
- J11: X Initialization Sensor Connector Right
- J12: Cover Lock Connector (not implemented)
- J13: Reset Switch Connector (not implemented)
- J14: Stop Switch Connector (not implemented)
- J15: RS 232 C External Computer Connector
- J16: RS 232 C Auxiliary Device Connector
- J17: RS 485 / 422 External Computer Connector
- J18: Selector Jumper for RS 232 C or RS 485 / RS 422 to host
- J19: I/O Connector Left Arm
- J20: RS 485 Diluter Bus (terminator)
- J21: RS 485 Diluter Bus Connector
- J22: RS 485 Modulo-1 Bus (terminator)
- J23: RS 485 Modulo-1 Bus Connector
- J24: Configuration Selector (not implemented)
- J25: X Initialization Sensor Connector Left
- J26: I/O Connector Right Arm
- FU1: Left Arm Fuse
- FU2: Right Arm Fuse
- FU3: Left X-motor Fuse
- FU4: Right X-motor Fuse
- FU5: 5 VDC Fuse
- D16: LED - 1
- D17: LED - 2
- SW1: Address Switch (16 position)

- TP1: Test Point (VPP 24VDC)
- TP2: Test Point (Power GND)
- TP3: Test Point (VCC 5VDC)
- TP4: Test Point (GND)
- TP5: Test Point (CCU Reset)
- TP6: Test Point (VPG 1.5 VDC nominal, 12.5 VDC for firmware download)
- TP7: Test Point (GND)
- TP8: Test Point (VCC 5VDC)
- TP9: Test Point (GND)
- TP10: Test Point (VCC 5VDC)
- TP11: Test Point (VCC 5VDC)
- TP12: Test Point (GND)

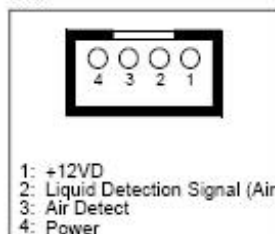
ADRI board:



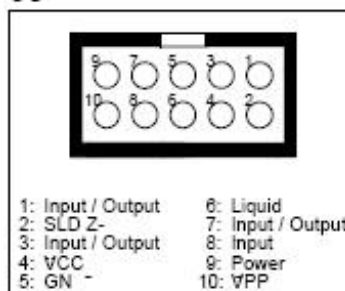
CodeDescription

- J1: Flex Cable
- J2: Optical Switch Connector (Y-
- J3: Optical Switch Connector (Step Loss
- J4: Optical Switch Connector (Step Loss
- J5: DITI Connector (Power /
- J6: Y-axis Motor
- J7: Z-axis Motor
- J8: Switchable Input / Output
- MO1 ALIDUM (Adaptive Liquid Level
- OS1 Optical Switch X-axis (Left Arm X-axis
- OS2 Optical Switch X-axis (Right Arm X-axis
- SW1- Selector Switches (see
- TP1 Test Point
- TP2 Test Point (VCC
- TP3 Test Point (X-axis Initialization
- TP4 Test Point (Y-axis Initialization
- TP5 Test Point (Liquid Detection
- TP6 Test Point (Power
- TP7 Test Point (VPP
- TP8 Test Point

J5



J8



Selector

SW1	Arm Left ☐ Right ☒
SW2	DITI Enabl ☐ Disabl ☒
SW3	ALIDUM Switching by Enabl ☐ Disabl ☒
SW4	Value for Sensitivi High ☐ Very ☒

Standard settings for a left arm



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Service for XYZ error code-20,21,22 ("Step Loss")

- Replace 21 814 00 Kit Belt-X drive
- Replace 21 814 01 Kit Belt-Y drive
- Replace 21 822 00 Z-Pinion
- Replace 21 812 00 Flatcable
- Replace 21 813 01 X-Pulley (Umlenkrolle)
- Replace 21 813 00 Y-Pulley (Umlenkrolle)
- Clean all wheels, rollers and guide rails with alcoholic solution and lubricate with silica oil. Apply only a very thin film.

Teco CAT.	PN (Tecan)	Description
21 802 00	20739256	Sensor Alidum Level
21 813 00	20739765	Pulley Y-Idler Assy
21 813 01	30071112	PULLEY X-IDLER ASSY RSP SPR
21 822 00	20722415	Gear Pinion Z
21 807 06	30031272	MOTOR RSP Z ARM H-TORQUE
21 814 00	20738870	Kit Belt X Drive RSP L520 (3.310 FT)
21 814 01	20738876	Kit Belt Y Drive RPS 150
21 814 02	20738878	Kit Belt Z Drive RSP 85T
21 807 00	20739763	MOTOR ASSY X-AXIS
21 823 00	20973263	Z-Bearing
21 809 00	20729370	Valve, 3P, 1/4-28, XE/XC/XLP/SVP
21 810 02	20739046	PCBA XE RS-232/RS-485 Spare
21 803 00	20739717	PCBA RSP V4.2 CCU 1-Arm Spare
21 804 00	20739419	PCBA ADRI-9 V2.0
21 810 00	30045657	MOTOR VALVE ASSY XE 3P SPARE
21 805 00	20737945	Sensor Optical RSP9000
21 812 00	20739435	Flatcable Flex Left Arm RSP



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