

Service Manual
T250 / T300
T-Pro / TF-Pro

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Machine



Machine elements

1	front panel	8	mains cable holder
2	torch socket/minus	9	mains switch
3	torch control socket	10	mains cable
4	gas connection torch	11	gas connector
5	connector ground cable/plus	12	remote control socket
6	transportation belt	13	accessories belt
7	handle (hoisting point)	14	LorchNet socket

Safety precautions

Requirement

Use and maintenance of welding and cutting machines can be dangerous. Please draw user's attention to follow the safety precautions to avoid injuries. Welding and cutting machines must be used appropriately and only by qualified/trained staff. Please follow safety regulations and use safety precautions in order to prevent accident when working with these machines.

Only qualified workers who are knowledgeable and have been trained to work safely with test instruments and equipment on energized circuits shall be permitted to perform testing work on electrical circuits or equipment where there is danger of injury from accidental contact with energized parts or improper use of the test instruments and equipment.

Use only original spare parts

Replace immediately any components that are not in perfect condition.

Norms

IEC 60974-4 In-service inspection and testing

Testing Lorch machines according to IEC 60974-4

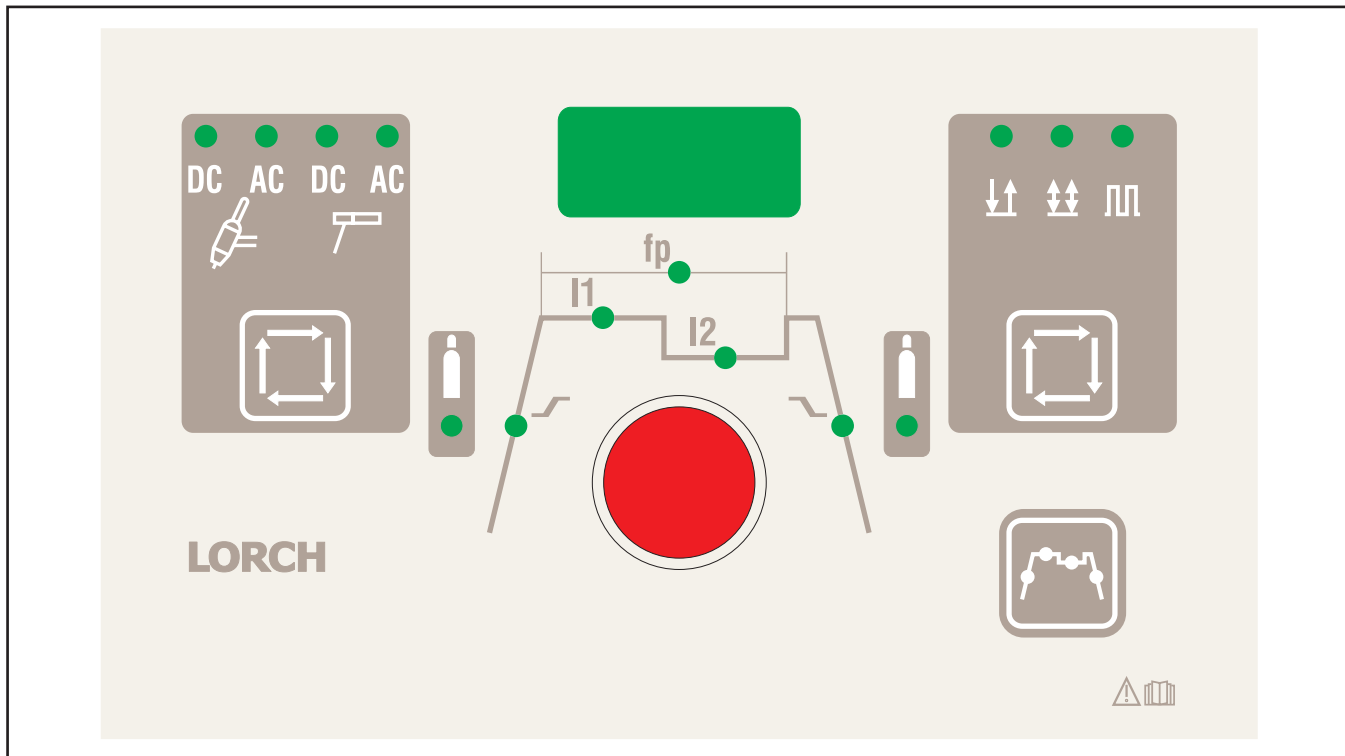
- it is not necessary to disconnect any components of the power unit for the test
- it is recommended to disconnect the torch at water cooled machines
- the machine has to be cleaned properly before the test
- switch to MMA mode (stick electrode) if possible

Common functions



Switching on

When switching on the machine, the fans and the gas valve are switched on as an initial test.



T Series BasicPlus





Gas test, front panel test

- press the upper, right mode button  and the lower, right button main parameter  at the same time
- the gas valve is switched on for 30 seconds and all LEDs of the front panel are on for 4 seconds
- press both buttons again to switch off the gas valve manually


Reset

- press upper left mode button  and the lower, right button main parameter  at the same time
- all LEDs lit up for acknowledge
- all welding- and secondary parameters are reset to their standard values (factory settings)

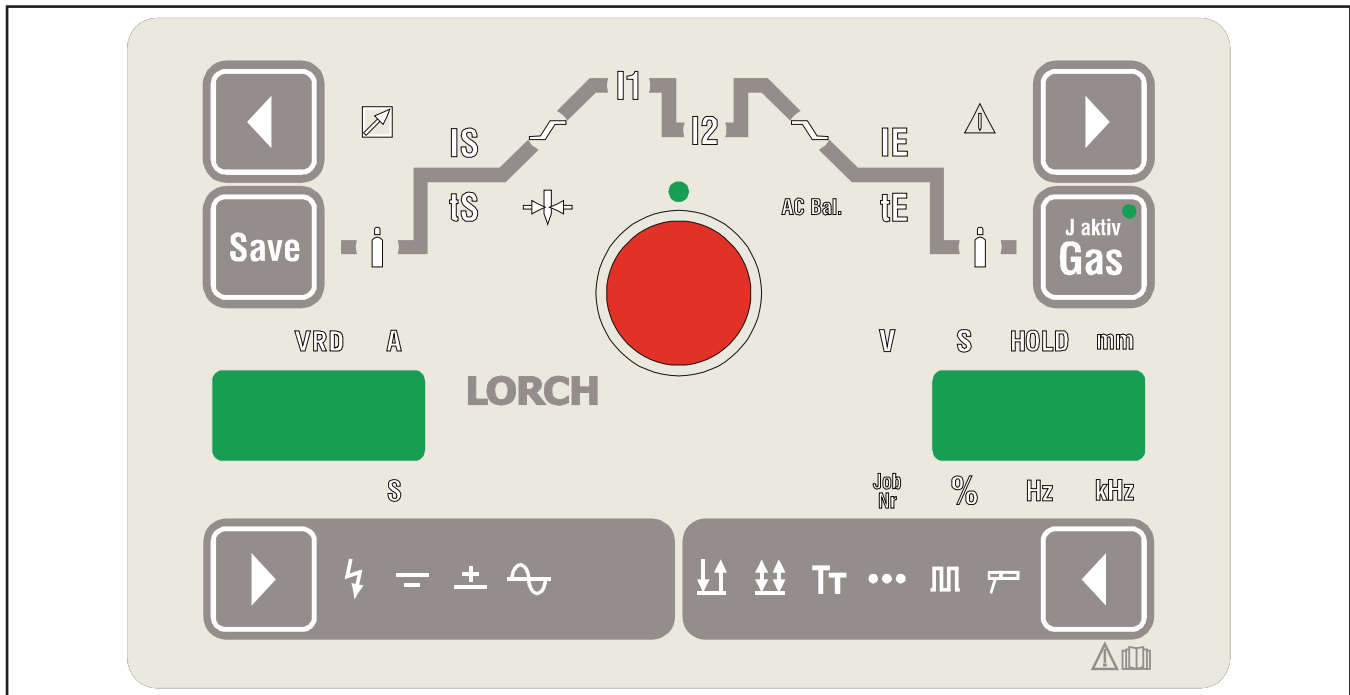
Secondary parameter

- press upper left mode button  and the upper right mode button  at the same time


User-specific menu

- switch the machine off
- press upper left mode button  and keep it pressed
- switch the machine on with the pressed button



T Series ControlPro





Gas test

- press button gas test 
- the gas valve is switched on for 30 sec
- press button gas test again to switch off the gas valve manually



Front panel test

- press button left  and button right  at the same time
- all LEDs of the front panel lit up for about 4 sec

Reset

- press button left  and button Save  at the same time
- all LEDs of the front panel lit up as agnowledge
- all welding- and secondary parameters are reset to their standard values (factory setting)

Master-Reset

- press button left  and button Save  and keep them pressed
- all LEDs of the front panel lit up as agnowledge (Reset)
- after 5 seconds all LEDs lit up twice (Master-Reset)
- all welding- and secondary parameters are reset to their standard values (factory setting)


!!! Caution !!!

all Tiptronic Jobs are deleted !!!

Secondary parameter

- press the lower right mode button  and the button Save 

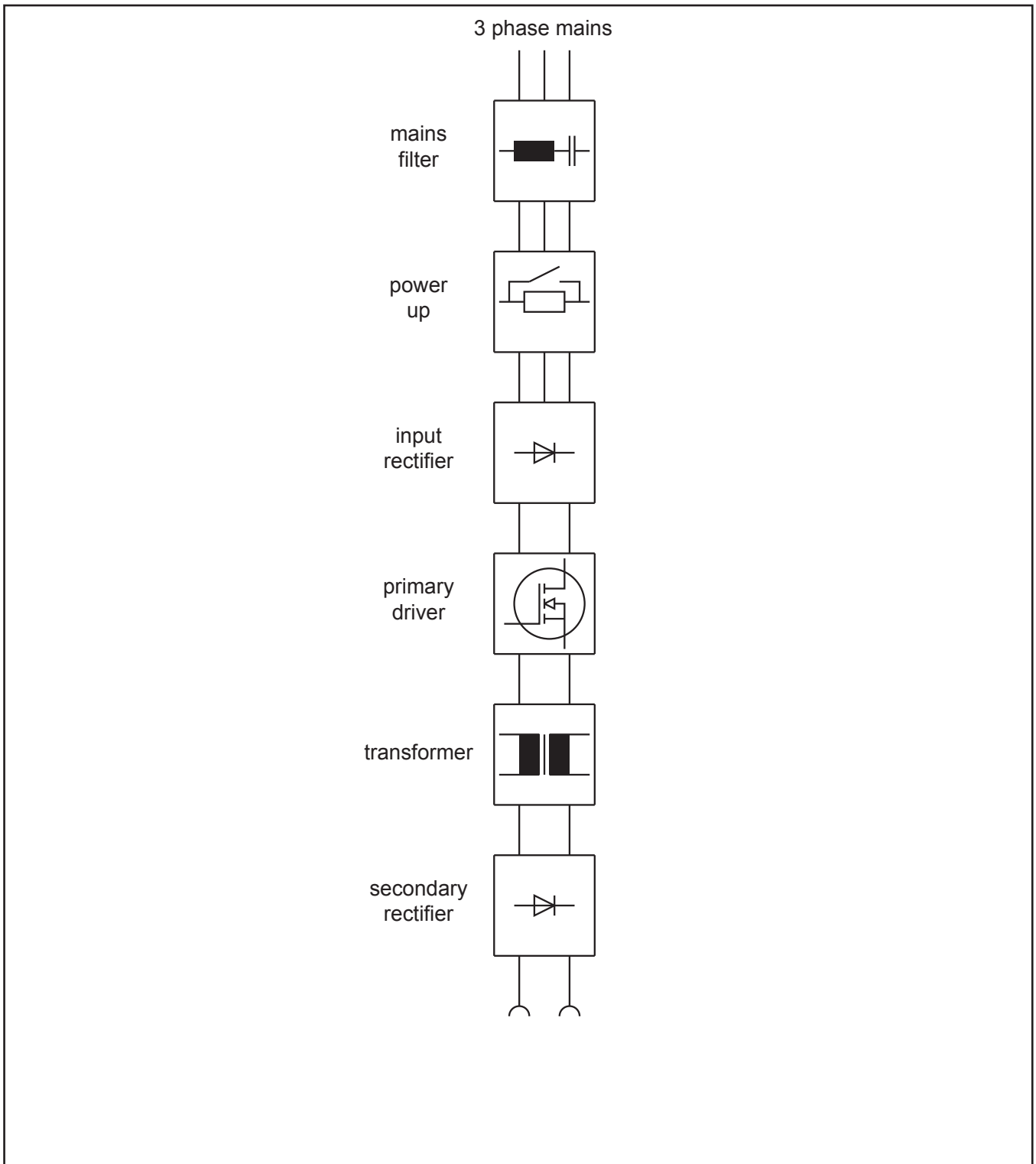
User-specific menu

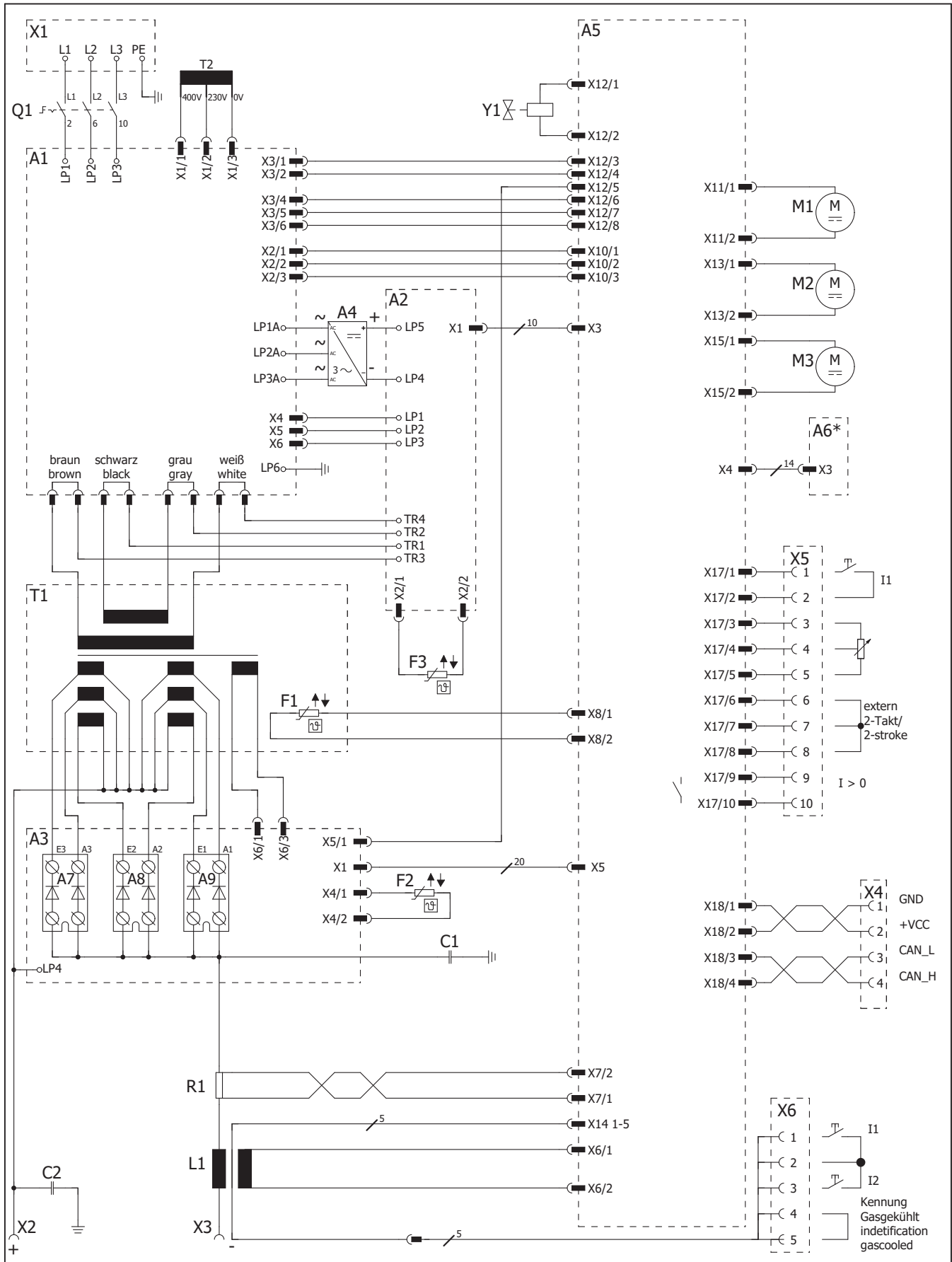
- switch the machine off
- press button left  and keep it pressed
- switch the machine on with the pressed button

Inverter Principle

A welding inverter is an electronically controlled welding power source. At conventional transformer based machines, the mains voltage with 50/60 Hz is directly switched to the welding transformer. At a welding inverter the mains voltage is rectified first and with electronic power switches (MOSFETs or IGBTs) chopped into a frequency of 80 kHz. This allows a very small construction of the welding transformer, because it's driven at this high frequency. The basic structure of a welding inverter is always the same at Lorch power sources:

- mains rectifier
- primary inverter
- transformer
- secondary rectifier





Stromlaufplan / schematic-diagram

LORCH

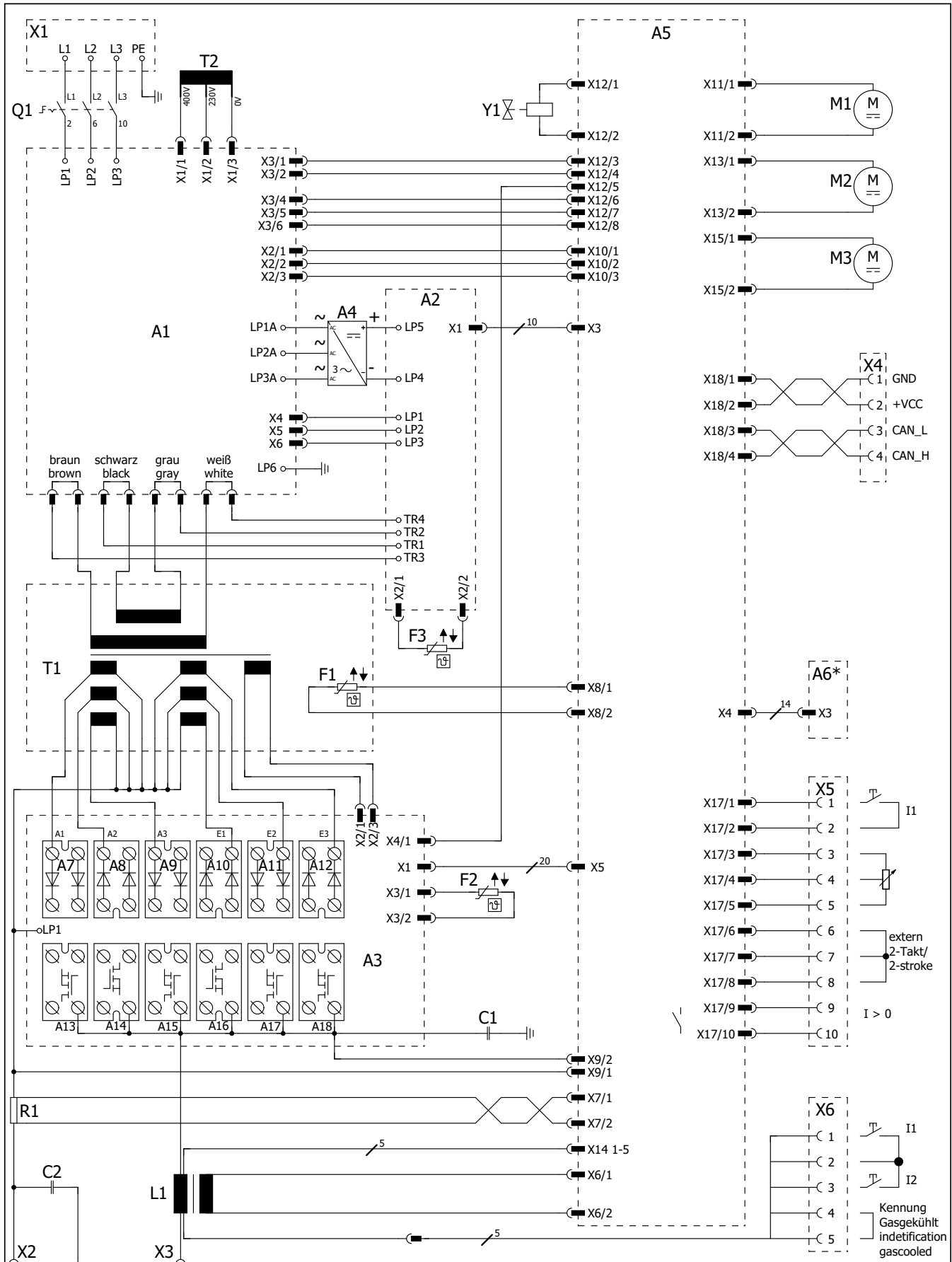
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geändert am/von
changed to/of

05.03.2010
06.02.2012

B.Schieber
F. Becker

T 300 DC BasicPlus / ControlPro
S00.0062.9-02

T 300 DC BasicPlus / ControlPro						
Bez.	MatNr.	Benennung	designation	Обозначение		
Pos.	order no.					
A	1	650.5459.5	E-Baugruppe T-NEFI300 (E)	pc-board T-NEFI300 (E)	Эл.плата T-NEFI300 (E)	
A	1	650.5459.9	E-Baugruppe T-NEFI300 (T)	pc-board T-NEFI300 (T)	Эл.плата T-NEFI300 (T)	
A	2	650.5458.5	E-Baugruppe T-PR300 (E)	pc-board T-PR300 (E)	Эл.плата T-PR300 (E)	
A	2	650.5458.9	E-Baugruppe T-PR300 (T)	pc-board T-PR300 (T)	Эл.плата T-PR300 (T)	
A	3	650.5460.5	E-Baugruppe T-GL300 (E)	pc-board T-GL300(E)	Эл.плата T-GL300 (З)	
A	3	650.5460.9	E-Baugruppe T-GL300 (T)	pc-board T-GL300 (T)	Эл.плата T-GL300 (О)	
A	4	658.1419.0	Gleichrichter B6 36A 1600V	rectifier B6 36A 1600V	Выпрямитель B6 36A 1600V	
A	5	650.5532.5	E-Baugruppe T-MAPRO3 (E)	pc-board T-MAPRO3 (E)	Электронная плата T-MAPRO3 (E)	
A	5	650.5532.9	E-Baugruppe T-MAPRO3 (T)	pc-board T-MAPRO3 (T)	Электронная плата T-MAPRO3 (T)	
A	6*	650.5344.5	E-Baugruppe HT-BF (E)	pc-board HT-BF (E)	Электронная плата HT-BF (E)	
A	6*	650.5344.9	E-Baugruppe HT-BF (T)	pc-board HT-BF (T)	Электронная плата HT-BF (T)	
A	6*	650.5335.5	E-Baugruppe T-BF (E)	pc-board T-BF (E)	Электронная плата T-BF (E)	
A	6*	650.5335.9	E-Baugruppe T-BF (T)	pc-board T-BF (T)	Электронная плата T-BF (T)	
A	7	713.0300.0	Diode 400V 2x100A ISOTOP	diode 400V 2x100A ISOTOP	Диод 400V 2x100A Изотоп	
A	8	713.0300.0	Diode 400V 2x100A ISOTOP	diode 400V 2x100A ISOTOP	Диод 400V 2x100A Изотоп	
A	9	713.0300.0	Diode 400V 2x100A ISOTOP	diode 400V 2x100A ISOTOP	Диод 400V 2x100A Изотоп	
C	1	982.5502.5	BG-Entstörkon. 3x4700pF 400VAC M4-M4	unit prot. cap. 3x4700pF 400VAC	Конд. устр. помех 3x4700pF 400VAC	
C	2	982.5513.0	BG-Entstörkon. 3x4700pF 400VAC M4-M10	unit prot. cap. 3x4700pF 400VAC	Конд. устр. помех 3x4700pF 400VAC	
F	1		Thermosensor Übetragrer	thermal sensor transformer	Датчик температуры трансформатора	
F	2	981.1419.0	BG-Thermosensor 23x7x5 LD3,4	unit thermal sensor 23x7x5 LD3,4	Термодатчик 23x7x5 LD3,4	
F	3	981.1419.0	BG-Thermosensor 23x7x5 LD3,4	unit thermal sensor 23x7x5 LD3,4	Термодатчик 23x7x5 LD3,4	
L	1	665.6252.0	HF - Drossel WA 24000057	HF-inductor WA 24000057	ВЧ- Дроссель WA 24000057	
M	1	981.1473.0	BG-Axialventilator 12V DC 60	BG-Axialventilator 12V DC 60	Осевой вентилятор 12V DC 60	
M	2	981.1473.0	BG-Axialventilator 12V DC 60	BG-Axialventilator 12V DC 60	Осевой вентилятор 12V DC 60	
M	3	981.1473.0	BG-Axialventilator 12V DC 60	BG-Axialventilator 12V DC 60	Осевой вентилятор 12V DC 60	
Q	1	657.0118.0	Schalter 1/0 20A 3ph.	switch 1/0 20A 3ph.	Выключатель 1/0 20A 3ф.	
R	1	665.0519.0	Nebenwiderstand 350A 35mV 0,1mOhm	Shunt resistance 350A 35mV 0,1mOhm	Шунтовое сопротивление 350A	
T	1	655.9075.0	Übertrager WA 13000061	transformer WA 13000061	Трансформатор WA 13000061	
T	2	655.8105.0	Trafo 400 V / 230 V	transformer 400 V / 230 V	Трансформатор 400 В / 230 В	
X	1	661.7604.8	Netzkabel 4G1.5 CEE 16 3C 1FS	Mains cable 4G1.5 CEE 16 3AE1FS	Сетевой кабель 4G1.5 CEE 16 3C 1FS	
X	2	665.7033.0	Einbau-Buchsenteil 35-50 mm²; HF; Ø38	insert sleeve 35-50 mm²; HF; Ø38	Встроенный разъем 35-50 mm²; HF; Ø38	
X	3	665.7033.0	Einbau-Buchsenteil 35-50 mm²; HF; Ø38	insert sleeve 35-50 mm²; HF; Ø38	Встроенный разъем 35-50 mm²; HF; Ø38	
X	4	661.8255.0	Kabelbaum CAN M12Bu 4pol Microfit 18cm	cable loom CAN M12Bu 4pol Microfit 180mm	Кабельный жгут CAN M12Bu 4пол. Microfit	
X	5	661.8210.8	Kabelbaum AMP14B-Microfit10p 230mm	Cable loom AMP14B-Microfit10p 230mm	Кабельный жгут AMP14B-Microfit 10п.	
X	6	661.8256.0	Kabelbaum 5pol Tuchel 5pol Microfit	cable loom 5pol Tuchel 5pol Microfit	Кабельный жгут 5pol Tuchel 5пол	
Y	1	665.3016.0	Magnetventil 24 VDC 2xSchlauch/0°	solenoid valve 24 VDC 2xSchlauch/0°	Электромагнитный клапан 24 VDC	
(E) : Ersatz / spare part / (З) : Запасные части						
(T) : Tausch / replacement / (О) : Обмен						
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Lorch Schweißtechnik GmbH						



Stromlaufplan / schematic-diagram

LORCH

erstellt am/von provided to/of	30.03.2010	B.Schieber
geändert am/von changed to/of	06.02.2012	F. Becker

T 300 AC/DC BasicPlus / ControlPro
S00.0063.0-02

T 300 AC/DC BasicPlus / ControlPro

Bez. Pos.	MatNr. order no.	Benennung	designation	Обозначение
A 1	650.5459.5	E-Baugruppe T-NEFI300 (E)	pc-board T-NEFI300 (E)	Эл.плата T-NEFI300 (E)
A 1	650.5459.9	E-Baugruppe T-NEFI300 (T)	pc-board T-NEFI300 (T)	Эл.плата T-NEFI300 (T)
A 2	650.5458.5	E-Baugruppe T-PR300 (E)	pc-board T-PR300 (E)	Эл.плата T-PR300 (E)
A 2	650.5458.9	E-Baugruppe T-PR300 (T)	pc-board T-PR300 (T)	Эл.плата T-PR300 (T)
A 3	650.5461.5	E-Baugruppe T-GWH300 (E)	pc-board T-GWH300 (E)	Эл.плата T-GWH300 (T)
A 3	650.5461.9	E-Baugruppe T-GWH300 (T)	pc-board T-GWH300 (T)	Эл.плата T-GWH300 (E)
A 4	658.1419.0	Gleichrichter B6 36A 1600V	rectifier B6 36A 1600V	Выпрямитель B6 36A 1600V
A 5	650.5532.5	E-Baugruppe T-MAPRO3 (E)	pc-board T-MAPRO3 (E)	Электронная плата T-MAPRO3 (E)
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A 6*	650.5335.5	E-Baugruppe T-BF (E)	pc-board T-BF (E)	Электронная плата T-BF (E)
A 6*	650.5335.9	E-Baugruppe T-BF (T)	pc-board T-BF (T)	Электронная плата T-BF (T)
A 7-12	713.0301.0	Diode 400V 2x100A ISOTOP	diode 400V 2x100A ISOTOP	Диод 400V 2x100A Изотоп
A 13-18	711.0516.0	IGBT-N-Kan 600V 200A Isotop APT200N60J	IGBT-N-Kan 600V 200A Isotop APT200N60J	IGBT-N-Kan 600V 200A Isotop APT200N60J
C 1	982.5502.5	BG-Entstörkon. 3x4700pF 400VAC M4-M4	unit prot. cap. 3x4700pF 400VAC	Конд. устр. помех 3x4700pF 400VAC
C 2	982.5513.0	BG-Entstörkon. 3x4700pF 400VAC M4-M10	unit prot. cap. 3x4700pF 400VAC	Конд. устр. помех 3x4700pF 400VAC
F 1		Thermosensor Übetragrer	thermal sensor transformer	Датчик температуры трансформатора
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F 3	981.1419.0	BG-Thermosensor 23x7x5 LD3,4	unit thermal sensor 23x7x5 LD3,4	Термодатчик 23x7x5 LD3,4
L 1	665.6252.0	HF - Drossel WA 24000057	HF-inductor WA 24000057	ВЧ- Дроссель WA 24000057
M 1	981.1473.0	BG-Axialventilator 12V DC 60	BG-Axialventilator 12V DC 60	Осевой вентилятор 12V DC 60
M 2	981.1473.0	BG-Axialventilator 12V DC 60	BG-Axialventilator 12V DC 60	Осевой вентилятор 12V DC 60
M 3	981.1473.0	BG-Axialventilator 12V DC 60	BG-Axialventilator 12V DC 60	Осевой вентилятор 12V DC 60
Q 1	657.0118.0	Schalter 1/0 20A 3ph.	switch 1/0 20A 3ph.	Выключатель 1/0 20A 3ф.
R 1	665.0519.0	Nebenwiderstand 350A 35mV 0,1mOhm	Shunt resistance 350A 35mV 0,1mOhm	Шунтовое сопротивление 350A
T 1	655.9075.0	Übertrager WA 13000061	transformer WA 13000061	Трансформатор WA 13000061
T 2	655.8105.0	Trafo 400 V / 230 V	transformer 400 V / 230 V	Трансформатор 400 В / 230 В
X 1	661.7604.8	Netzkabel 4G1.5 CEE 16 3C 1FS	Mains cable 4G1.5 CEE 16 3AE1FS	Сетевой кабель 4G1.5 CEE 16 3C 1FS
X 2	665.7033.0	Einbau-Buchsenteil 35-50 mm ² ; HF; Ø38	insert sleeve 35-50 mm ² ; HF; Ø38	Встроенный разъем 35-50 mm ² ; HF; Ø38
X 3	665.7033.0	Einbau-Buchsenteil 35-50 mm ² ; HF; Ø38	insert sleeve 35-50 mm ² ; HF; Ø38	Встроенный разъем 35-50 mm ² ; HF; Ø38
X 4	661.8255.0	Kabelbaum CAN M12Bu 4pol Microfit 18cm	cable loom CAN M12Bu 4pol Microfit 180mm	Кабельный жгут CAN M12Bu 4пол. Microfit
X 5	661.8210.8	Kabelbaum AMP14B-Microfit10p 230mm	Cable loom AMP14B-Microfit10p 230mm	Кабельный жгут AMP14B-Microfit 10п.
X 6	661.8256.0	Kabelbaum 5pol Tuchel 5pol Microfit	cable loom 5pol Tuchel 5pol Microfit	Кабельный жгут 5pol Tuchel 5пол Microfit
Y 1	665.3016.0	Magnetventil 24 VDC 2xSchlauch/0°	solenoid valve 24 VDC 2xSchlauch/0°	Электромагнитный клапан 24 VDC

(E) : Ersatz / spare part / (3): Запасные части
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Lorch Schweißtechnik GmbH

Pc-board T-MAPRO3

The pc-board T-MAPRO3 contains the welding logic-sequence control and process control of the T series.

Change from T-MAPRO2 to T-MAPRO3

Since the 5th of November 2011 the new T-MAPRO3 board is used in all types of T250 and T300 machines. The main enhancement is the ITC function (Intelligent Torch Control) for connecting a TIG PowerMaster torch.

date	serial no.	machine
5.11.2011	0756-2149-0001-7	T 250 DC ControlPro
5.11.2011	0757-2149-0001-4	T 250 AC/DC ControlPro
5.11.2011	0758-2149-0001-1	T 300 DC ControlPro
5.11.2011	0759-2149-0001-8	T 300 AC/DC ControlPro
5.11.2011	0760-2149-0001-4	T 250 DC BasicPlus
5.11.2011	0761-2149-0001-1	T 250 AC/DC BasicPlus
5.11.2011	0762-2149-0001-8	T 300 DC BasicPlus
5.11.2011	0763-2149-0001-5	T 300 AC/DC BasicPlus

Functions

- logic functions of the welding sequence
- generating and monitoring of supply voltages
- control and monitoring power up cycle
- driving power unit
- reading and monitoring of front panel
- driving fans
- monitoring mains- and output (welding) voltage
- managing communications between PC and machine (LorchNet)

Overview processors / integrated circuits

CPLD (Complex Programmable Logic Device)

- clock generator
- drive level to power unit
- system security

DSP (Digital Signal Processor)

- contains main operating system Software
- all functions (see above)

LED display :

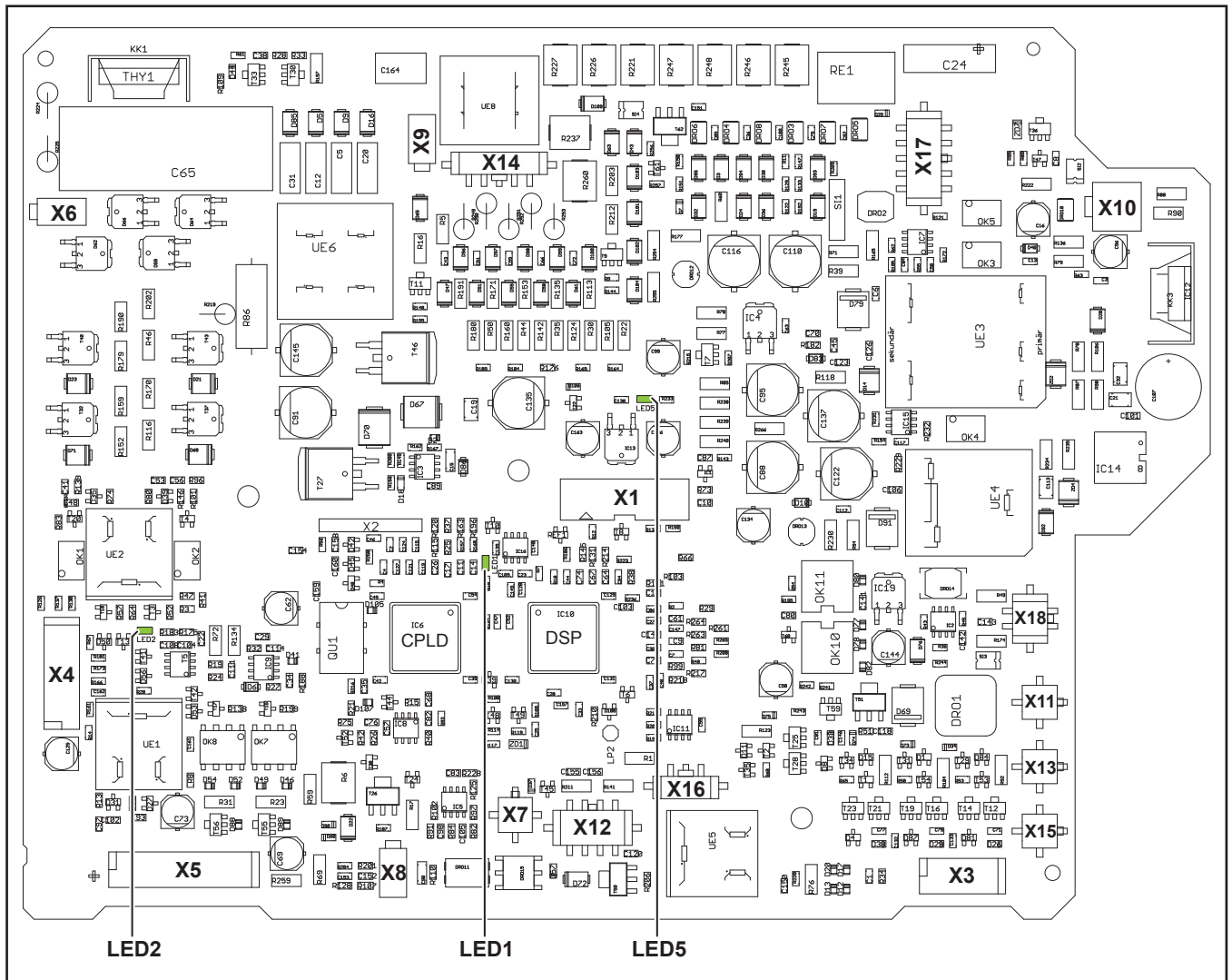
LED	state	designation
1 (green)		status CPLD
2 (green)	on	internal supply voltage +15V DC ok
	off	internal supply voltage +15V DC missing/not ok
5 (green)	on	internal supply voltage +3.3V DC ok
	off	internal supply voltage +3.3V DC missing/not ok
!! CAUTION, the LEDs 3 and 4 are not mounted on the T-MAPRO3 board any more !!		
3 (green)		status DSP
4 (red)	on	error DSP, the DSP detected a malfunction
	off	DSP in normal state

If the LEDs should display a malfunction which can not be remedied by switching the machine off and on again, the pc-board T-MAPRO3 should be exchanged.

Measuring points

designation	measuring point		result
bus voltage	X10/1	+	+325V DC
	X10/3	-	
mains input	X10/2	+	+320V DC
	X10/3	-	
supply fans	X11/1	-	3 - 15V DC
	X11/2	+	
	X13/1	-	3 - 15V DC
	X13/2	+	
	X15/1	-	3 - 15V DC
	X15/2	+	
supply voltage +24V	X5/7	+	+24V DC
	X5/9	-	
supply voltage +15V	X15/2	+	+15V DC
	X5/9	-	
supply voltage +5V	X4/5	+	+5V DC
	X5/9	-	
temperature sensor transformer	X8/1	+	47kΩ at 25°C (or ca. 2.3V)
	X8/2	-	

Picture pc-board T-MAPRO3



Software interlocking of the T-MAPRO board

The configuration of the machine is read by the microprocessor and written into its memory permanently. As soon as this configuration is saved, it cannot be changed or altered thus interlocked permanently. This means that the T-MAPRO board cannot be used in other machines with different machine configurations.

The following configuration features are saved:

config feature	meaning
machine type	DC or AC/DC
power unit	250A or 300A
front panel type	BasicPlus or ControlPro
VRD front panel	front panel with VRD-LED or without VRD-LED
VRD function	VRD function active / inactive

If a new T-MAPRO board is ordered as a spare part, it is shipped with the according operation system software but without any configuration information.

Part numbers T-MAPRO boards

machine type	software v. 2.12	software v. 3.01
T250-T300 BasicPlus	653.0037.5	653.0034.5
T250-T300 ControlPro		653.0035.5
T-Pro/TF-Pro	-	653.0040.5

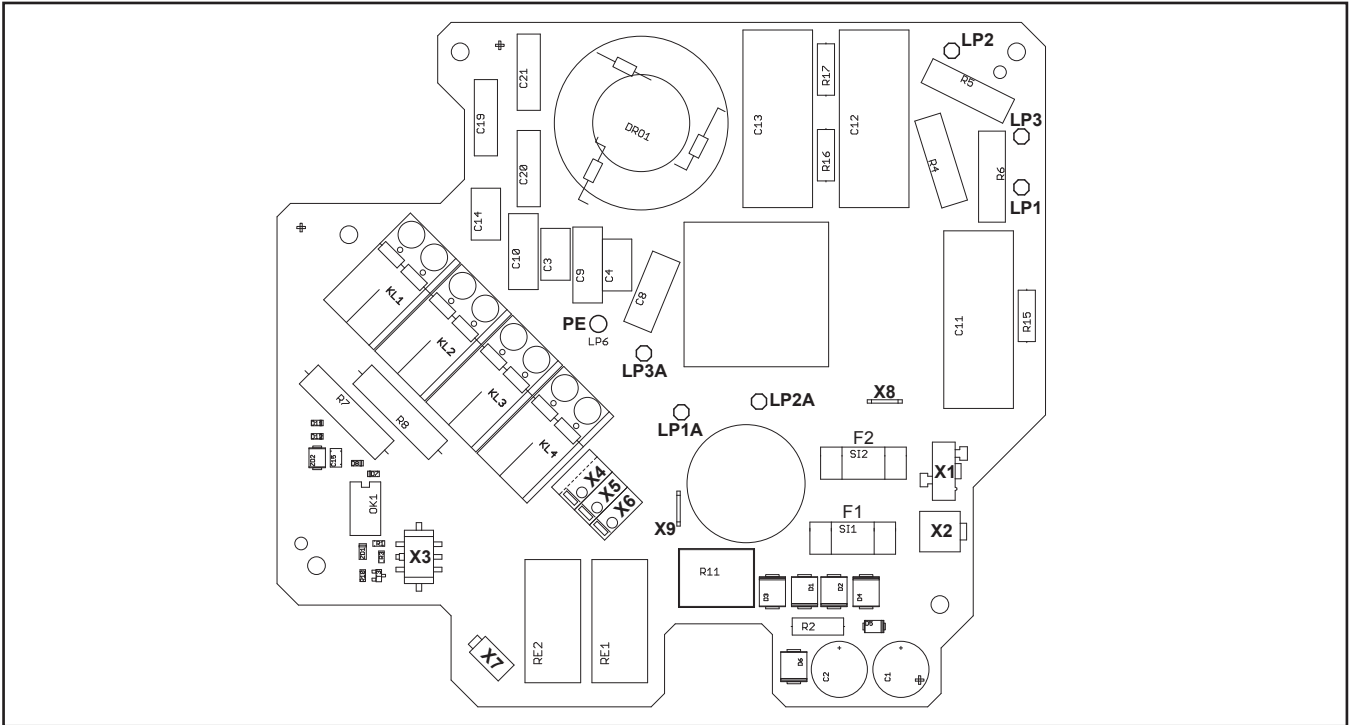
Pc-board T-NEFI300

The pc-board T-NEFI300 is the mains filter and power-up circuit of the T machines.

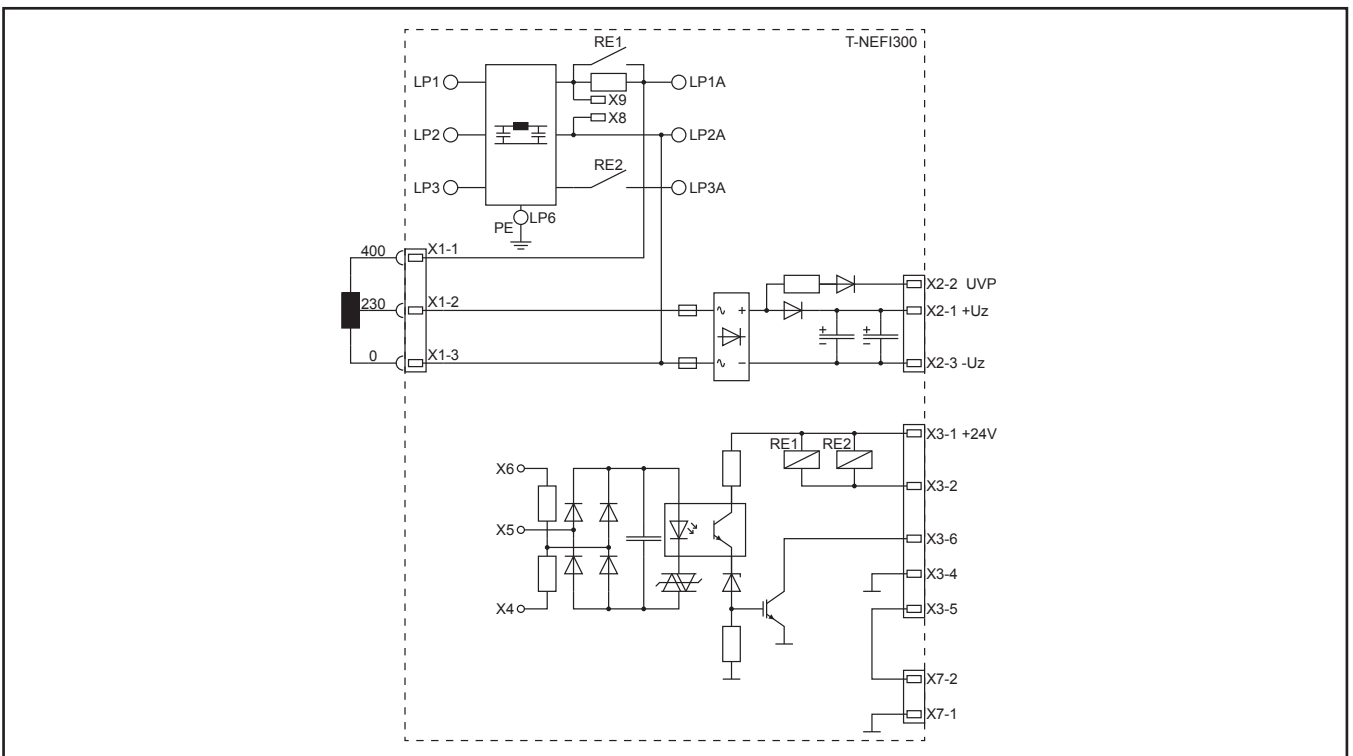
Functions

- mains filter
- power-up
- bus voltage symmetry
- connection control transformer as supply for T-MAPRO

Picture pc-board T-NEFI300



Schematic T-NEFI300



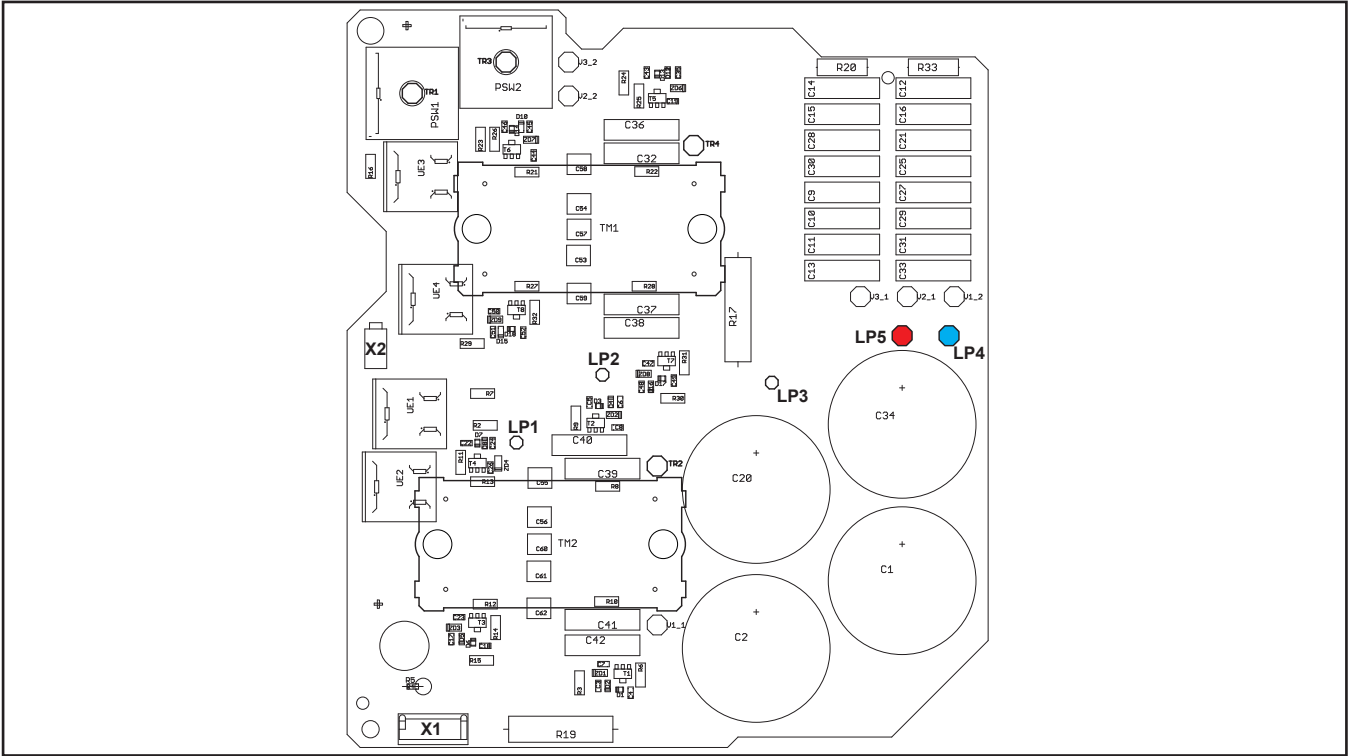
Pc-board T-PR300

The pc-board T-PR300 is the primary driver board of the T machines.

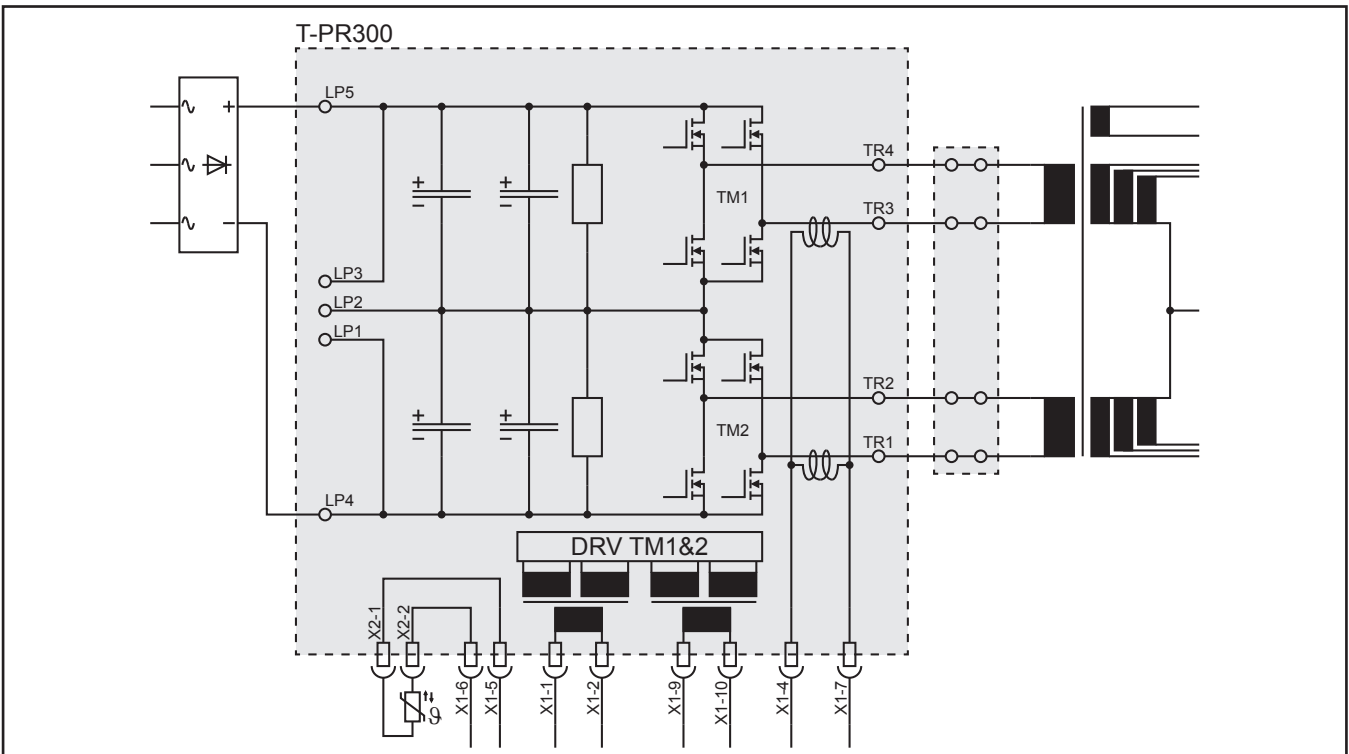
Functions

- bus voltage
- primary driver power unit
- primary current sensor

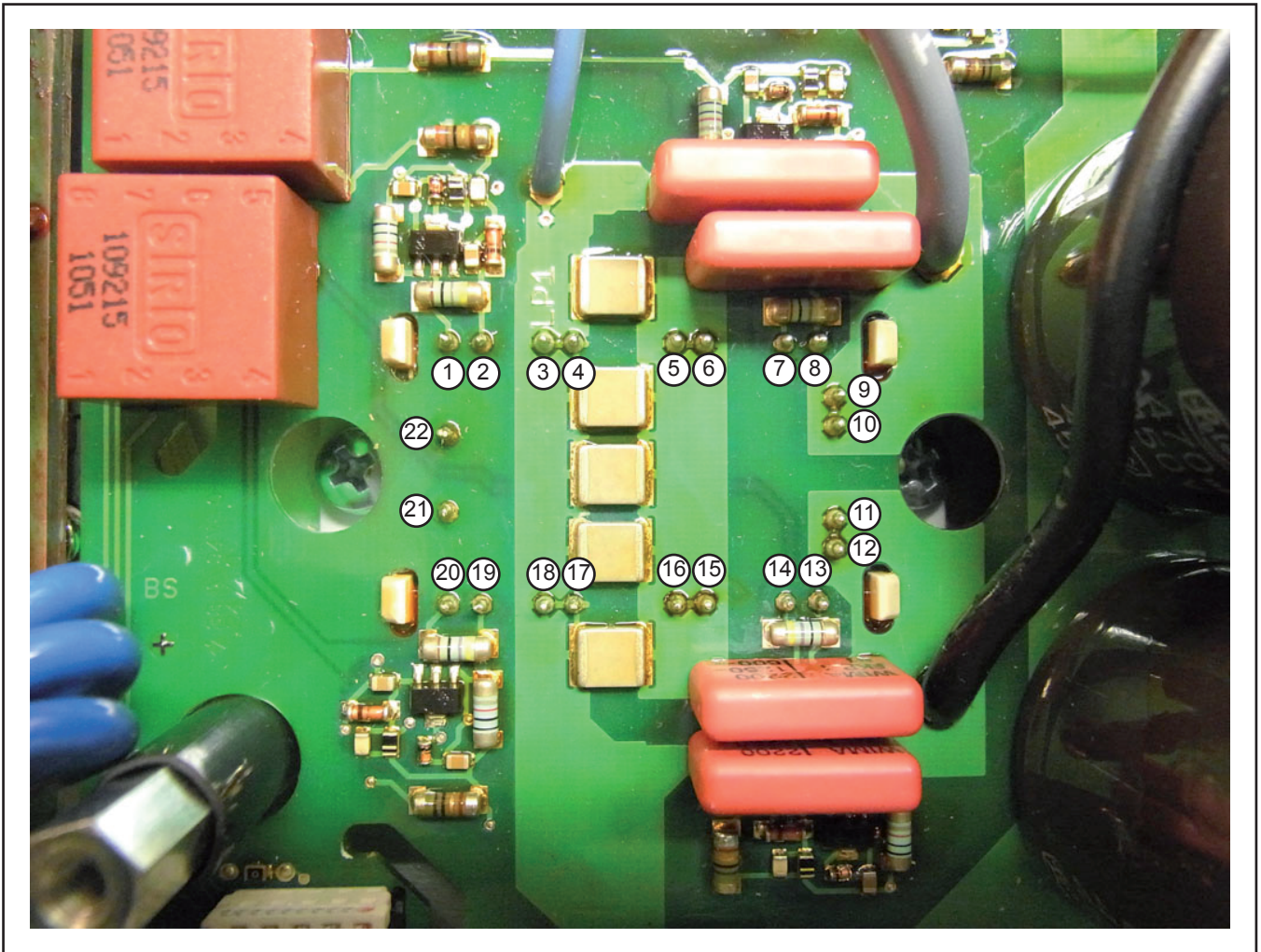
Picture pc-board T-PR300



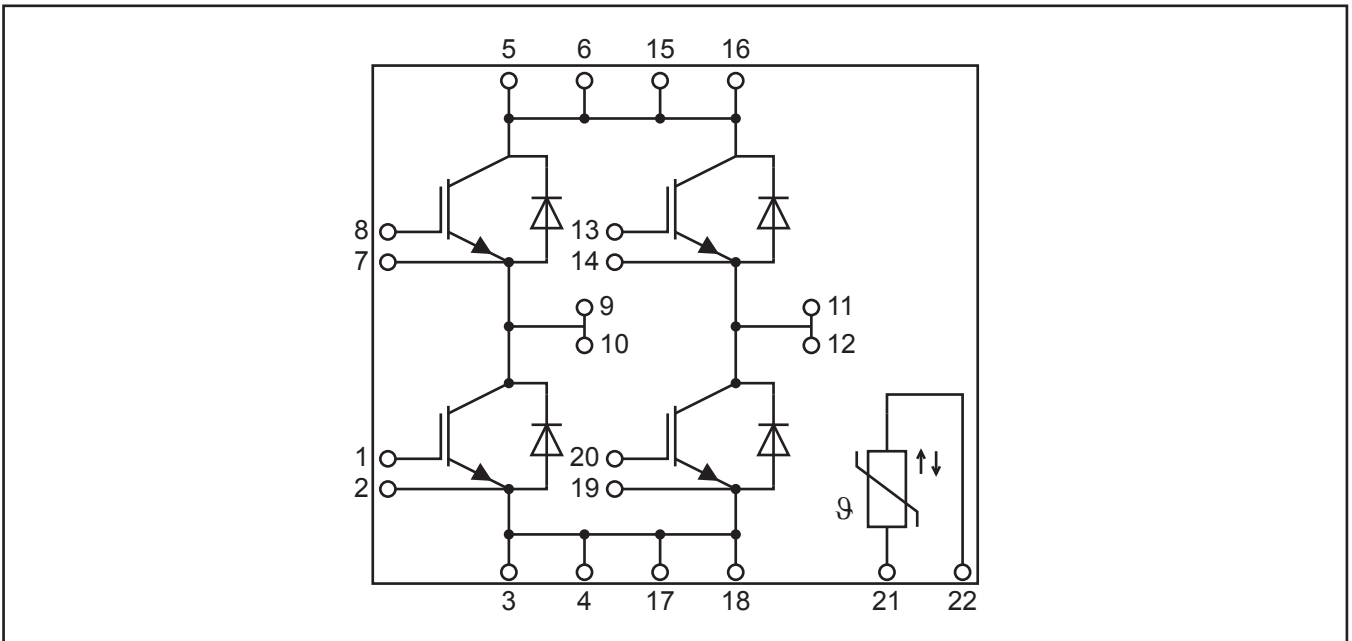
Schematic pc-board T-PR300



Measuring points primary module



Inside diagram primary module



Temperature sensor: ca. 22 kΩ at 25 °C (is not monitored at T250/300)

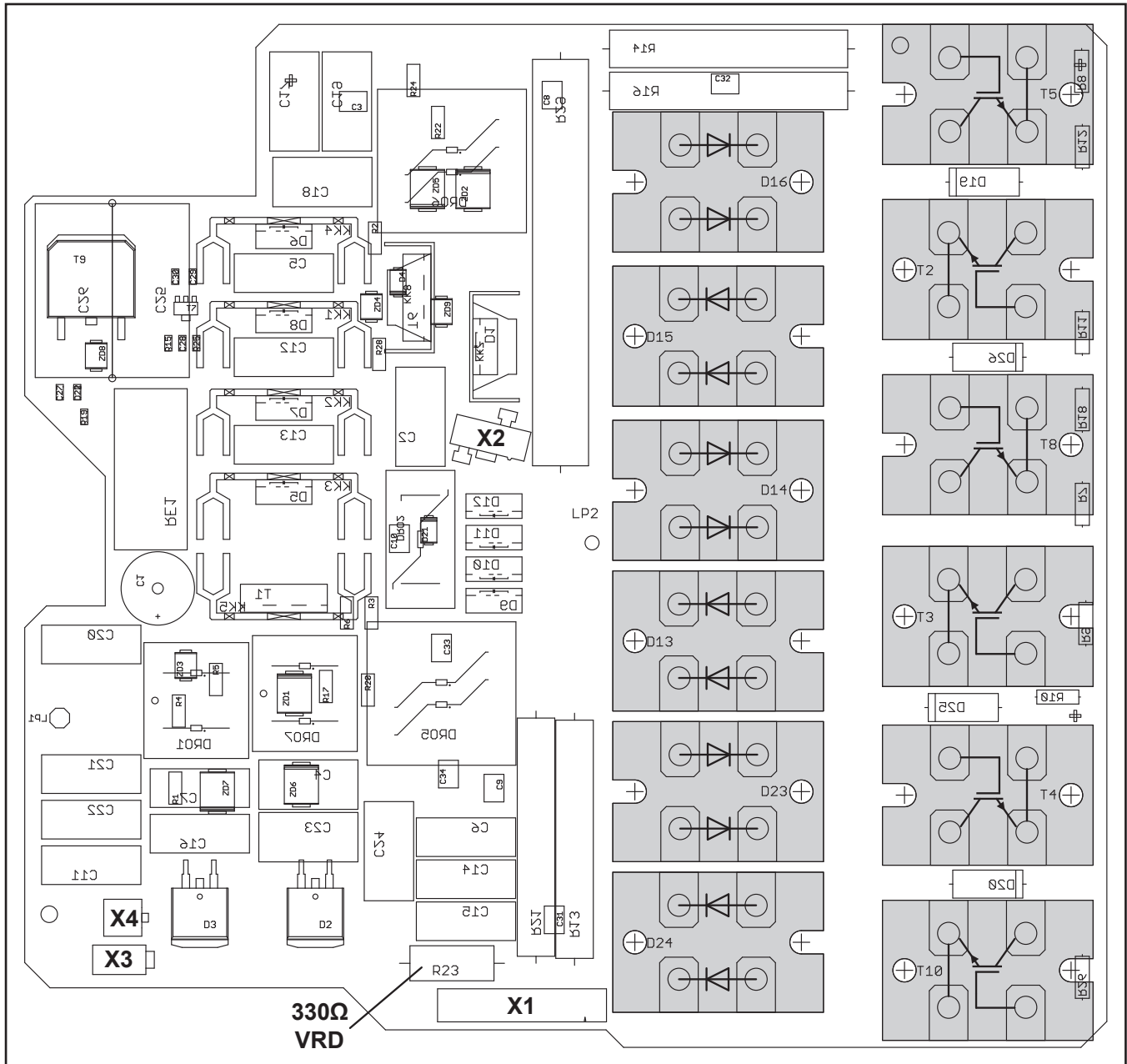
Pc-board T-GWH300

The pc-board T-GWH300 is the secondary rectifier and AC-inverter (AC welding mode) of the AC/DC machines.

Functions

- secondary rectifier
- AC inverter
- voltage doubler (arc stabilizer)
- measuring output voltage

Picture pc-board T-GWH300

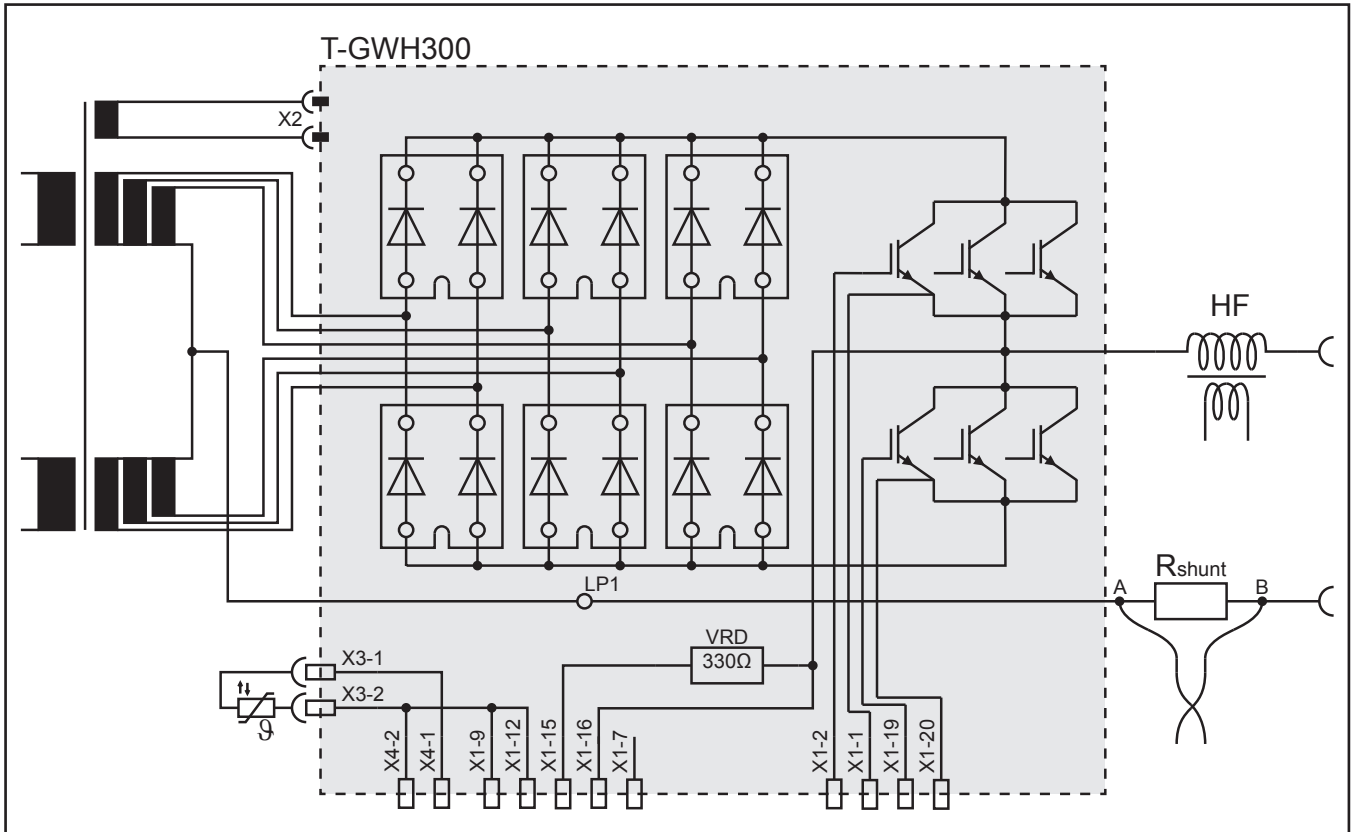


!!! CAUTION !!!

at all positions where cables are attached, the longer screws are used. The rest of the ISOTOP screws are the short ones.



Schematic pc-board T-GWH300



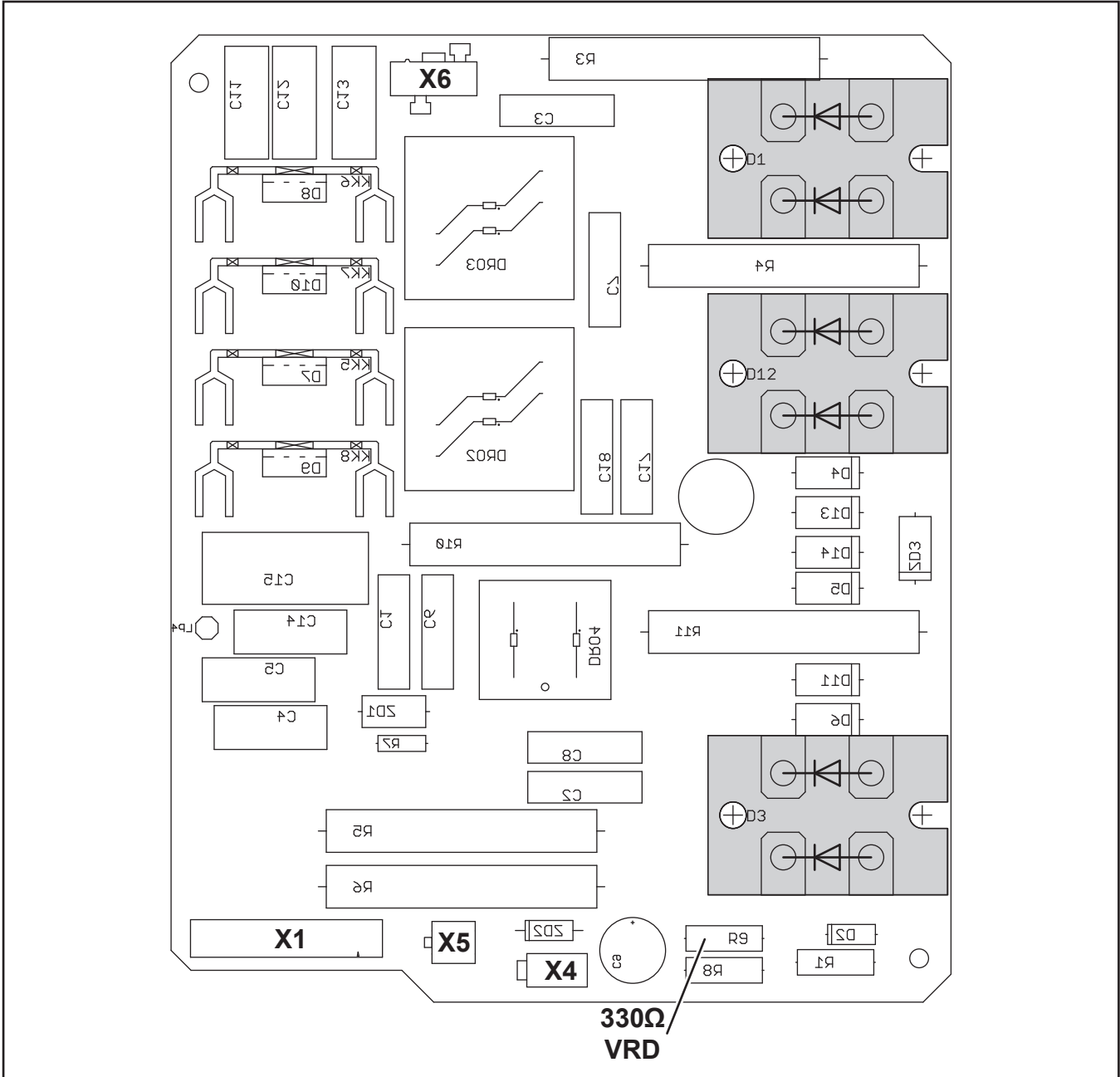
Pc-board T-GL300

The pc-board T-GL300 is the secondary rectifier of the DC machines.

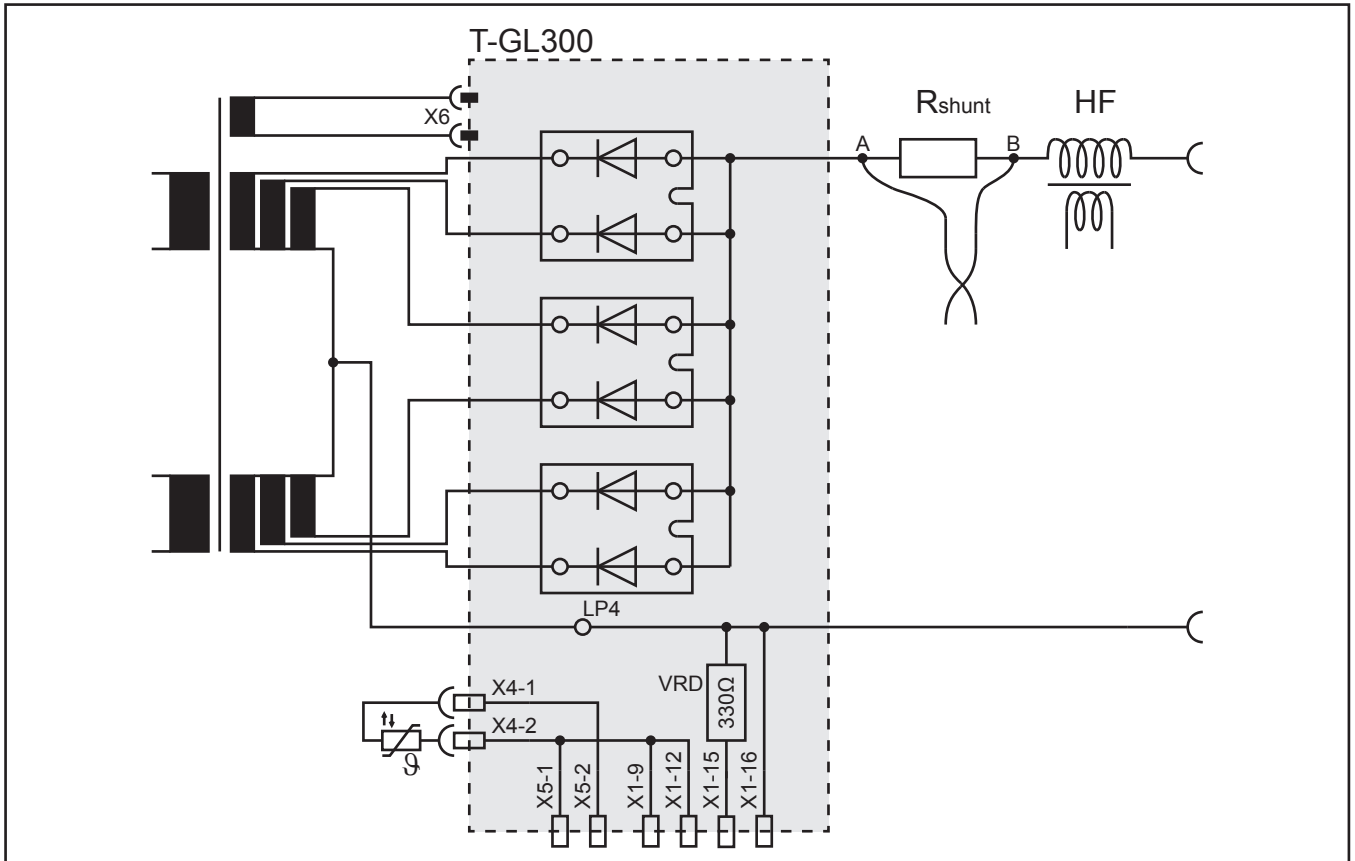
Functions

- secondary rectifier
- voltage doubler (arc stabilizer)
- measuring output voltage

Picture pc-board T-GL300



Schematic pc-board T-GL300



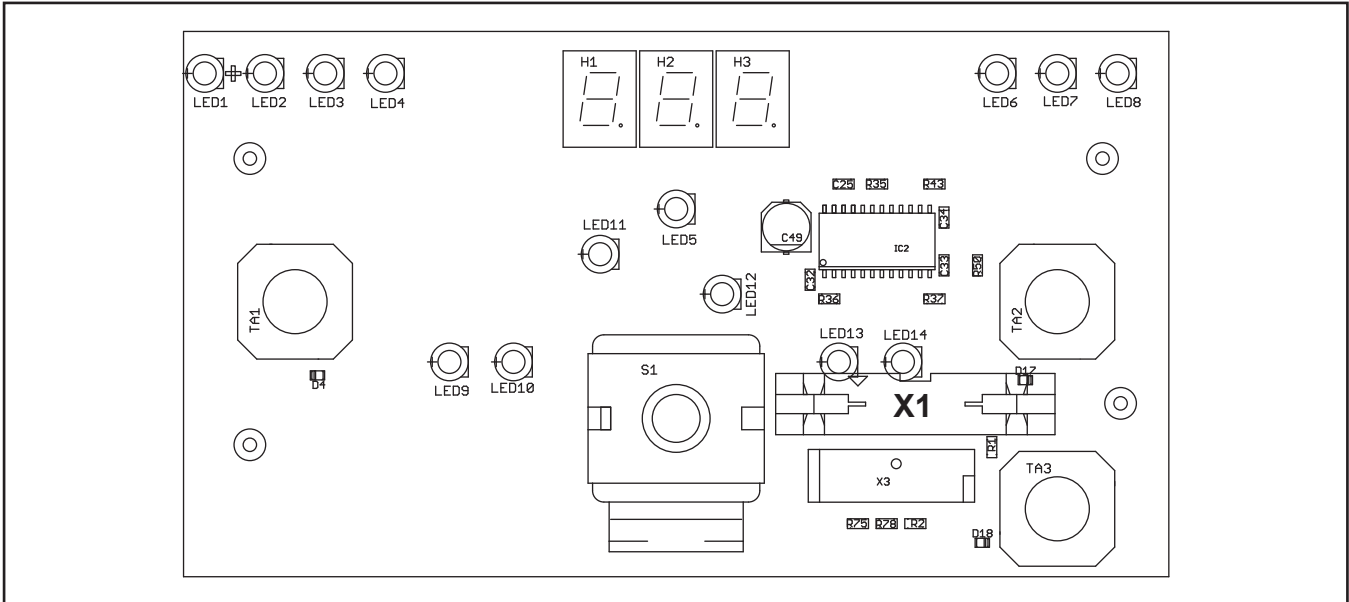
Pc-board HT-BF

The pc-board HT-BF is the front panel with all buttons and displays of the T- BasicPlus machines.

Functions

- operating the machine
- displaying parameters and error messages

Picture pc-board HT-BF



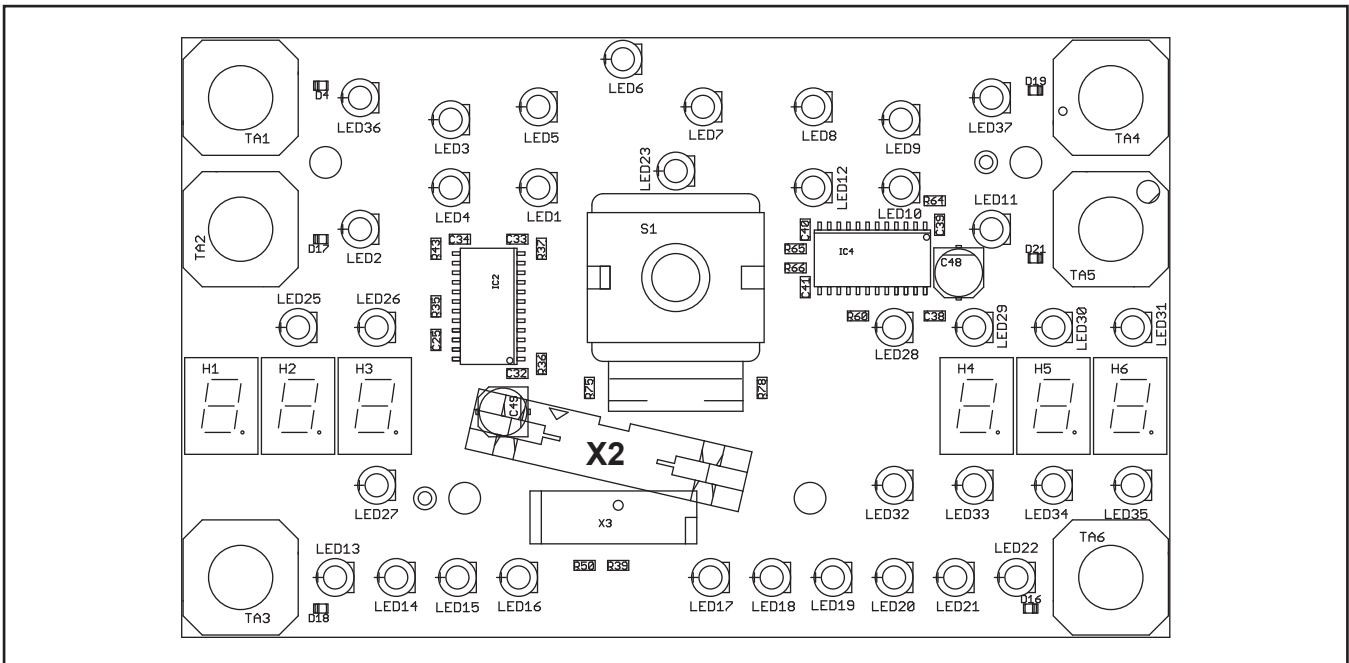
Pc-board T-BF

The pc-board T-BF is the front panel with all buttons and optical displays of the T- ControlPro machines.

Functions

- operation the machine
- display of values, parameters and error messages

Picture pc-board T-BF



Torch-ID

Every TIG PowerMaster torch has an internal ID programmed in the pc-board TC01. The ID is transferred to the T-MAPRO board when switching on the machine. The machine knows each maximum current values of every torch ID, to protect the torch against an overload. The torch protection function "Torch Protection" can be switched on or off with the secondary parameter "tPr".

Programming the ID:

- switch off the machine
- press the upper left button of the front panel and keep it pressed
- switch on the machine with the pressed button (the user-specific menu is now active)
- menu item "C00" (torch ID) is now displayed, choose the correct ID using the encoder knob
- to program the ID, press the button "Save" at the ControlPro frontpanel or the lower right button "main parameter" for the BasicPlus front panel
- switch the machine off and on again

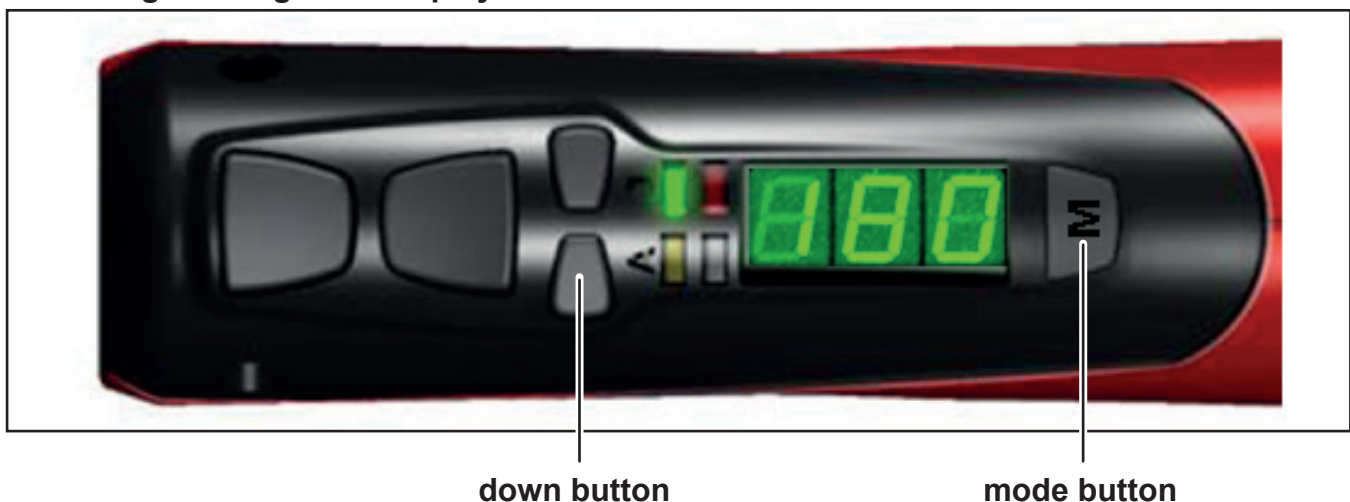
torch type	torch ID	max. current DC	max. current AC
i-LTG 900	9	125A	80A
i-LTG 1700	17	150A	120A
i-LTG 2600	26	200A	160A
i-LTG 2800	28	300A	250A
i-LTW 3000	30	320A	220A
i-LTW 1800	18	350A	250A
i-LTW 1800sc	19	400A	320A
i-LTW 2000	20	220A	165A
i-LTW 4500	45	450A	360A

Diagnosis display TIG PowerMaster torch

The TIG PowerMaster torch has an internal diagnosis display. Different informations can be displayed:

function	remarks
display test	all LEDs and 7-segment displays are lit
temperature	the actual pc-board temperature is shown in °C
supply voltage	the PowerMaster supply voltage is shown (about 12V, resolution 0.1V)
error word	internal error code (this is an internal error code only, it has nothing to do with the error messages of the machine)
torch ID	the programmed ID of the torch is shown

Activating the diagnosis display



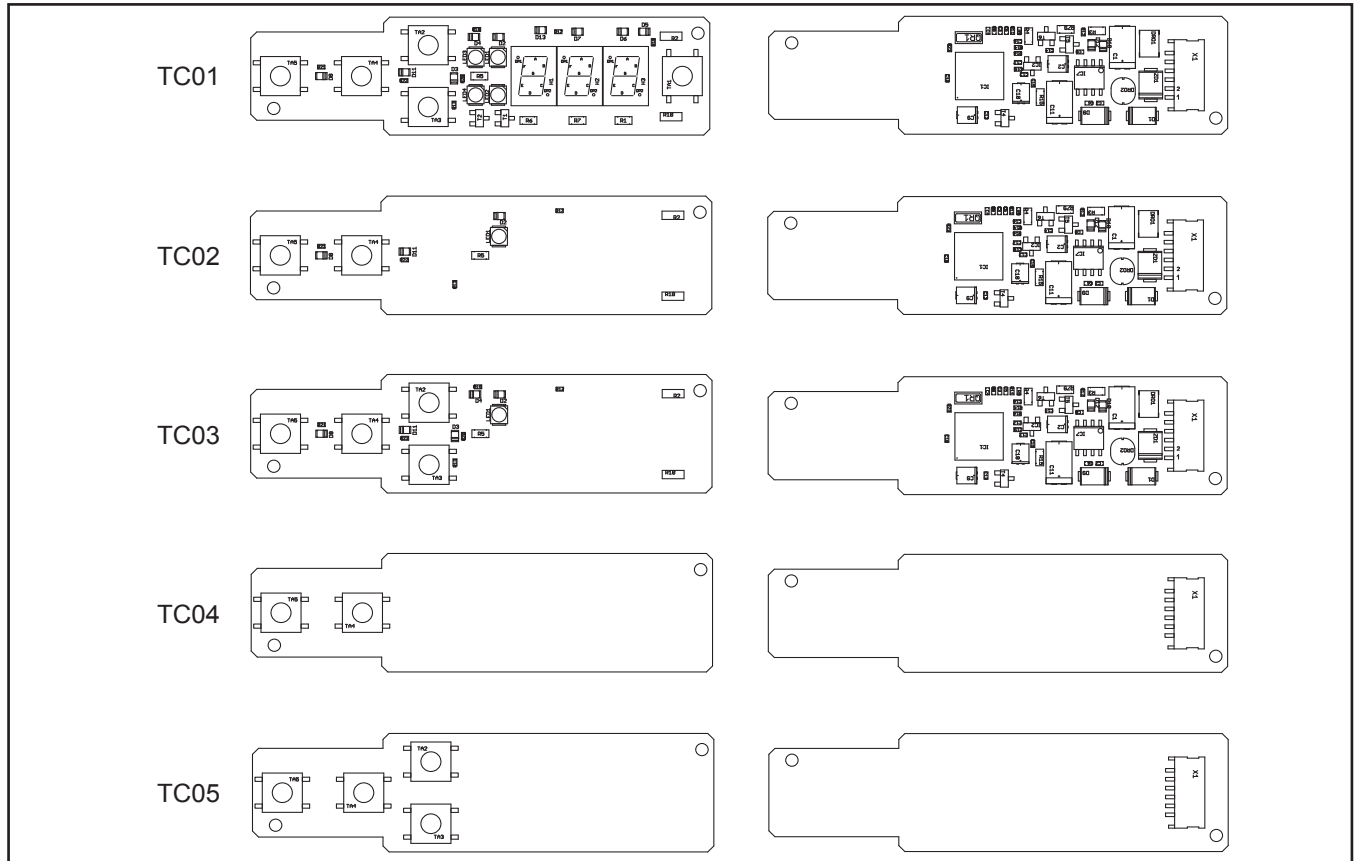
- keep both buttons "mode" and "down" pressed together for about 2 seconds
- release the down button and keep the mode button pressed
- switch through the different functions with the up and down buttons
- release the mode button to end the diagnosis display

Pc-boards TCxx

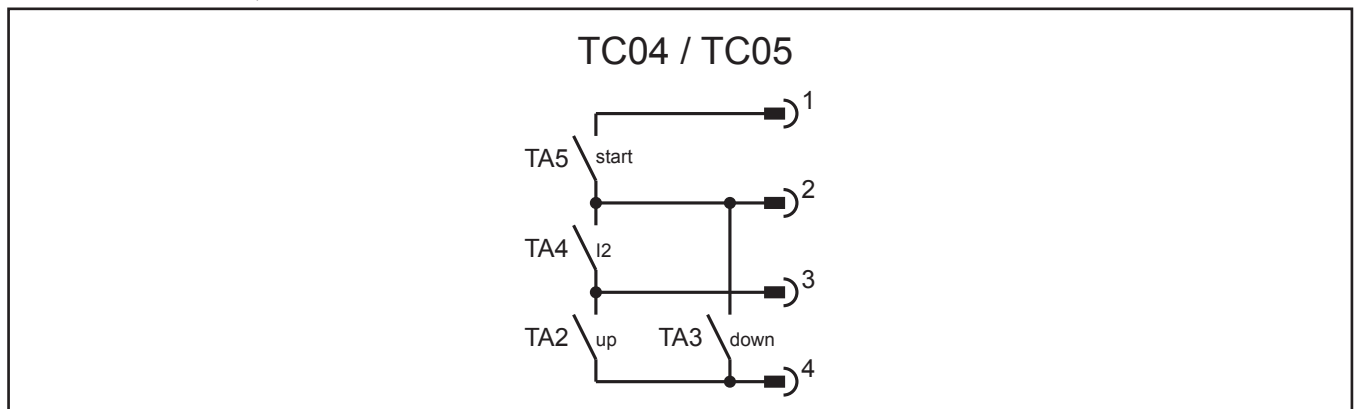
The TIG PowerMaster torches are available in different types:

torch	pc-board	remarks
i-LTG PM, i-LTW PM	TC01	TIG PowerMaster (electronic)
i-LTG-DD, i-LTW-DD	TC02	double-button (electronic)
i-LTG-UD, i-LTW-UD	TC03	up-down (electronic)
a-LTG-DD, a-LTW-DD	TC04	double-button (trigger switches)
a-LTG-UD, a-LTW-UD	TC05	up-down (trigger switches)

Overview pc-board TCxx



Schematic TC04, TC05



Pc-board WUK-CAN

The pc-board WUK-CAN is the control board of the cooling unit. It is present in the external cooling unit WUK6 as well as in the internal unit of the T-Pro and TF-Pro machines.

Functions

- activating water pump and fans
- monitoring flow meter
- LorchNet communication

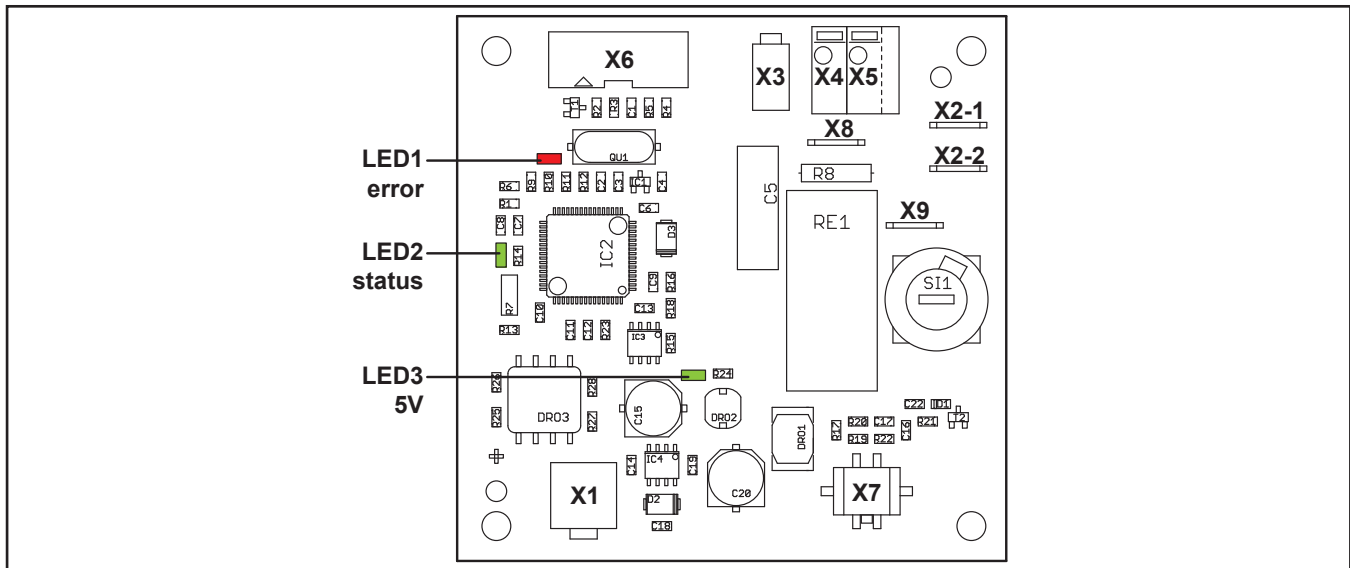
LED display

LED	state	meaning
1 (red)	OFF	status ok
	lit weak	micro controller not programmed
	blinking irregular	error LorchNet
	blinking synchronous with LED2	cooling flowrate is too low (<0.3 l/min)
2 (green)	OFF	status not ok
	blinking	status: blinking with 1 Hz when pump off, blinking with short pulses when pump on, blinking with long pulse
3 (green)	OFF	internal supply voltage 5V not ok
	ON	internal 5V supply voltage ok

Fuse

The fuse (2.5A slow) on the pc-board is for safeguarding the pump and the fans (230V AC).

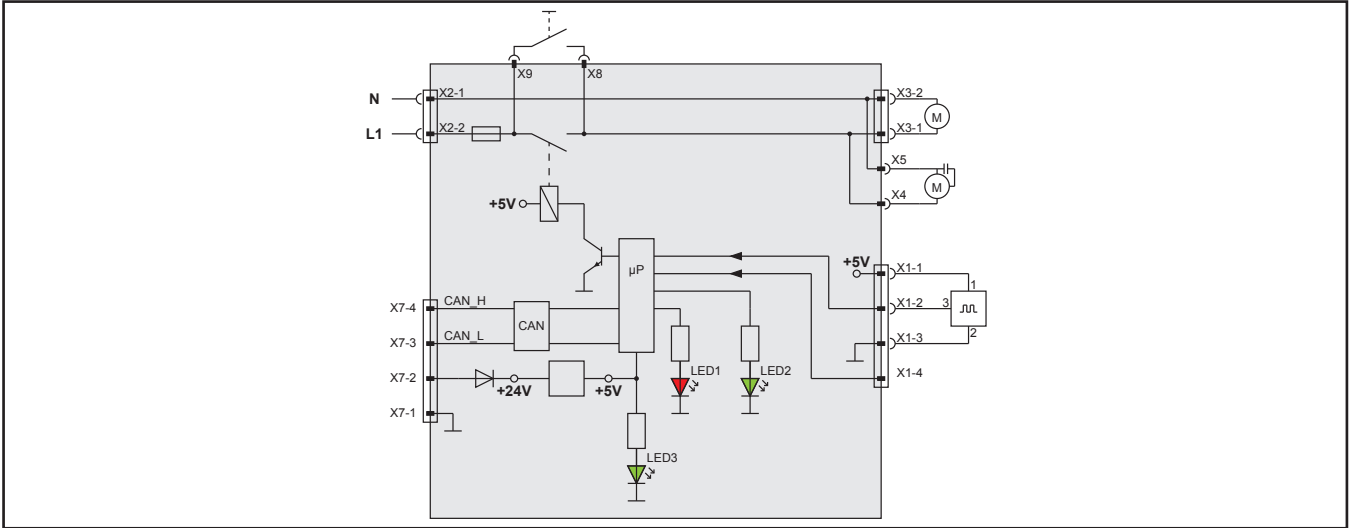
Picture pc-board WUK-CAN



Overview connectors pc-board WUK-CAN

connector	function	connector	function
X1	connector flowmeter	X6	internal programming interface
X2	230V mains supply	X7	connector LorchNet
X3	connector fan	X9	connector mode switch (automatic/manual)
X4	connector pump (phase L1)		
X5	connector pump (neutral)		

Schematic pc-board WUK-CAN



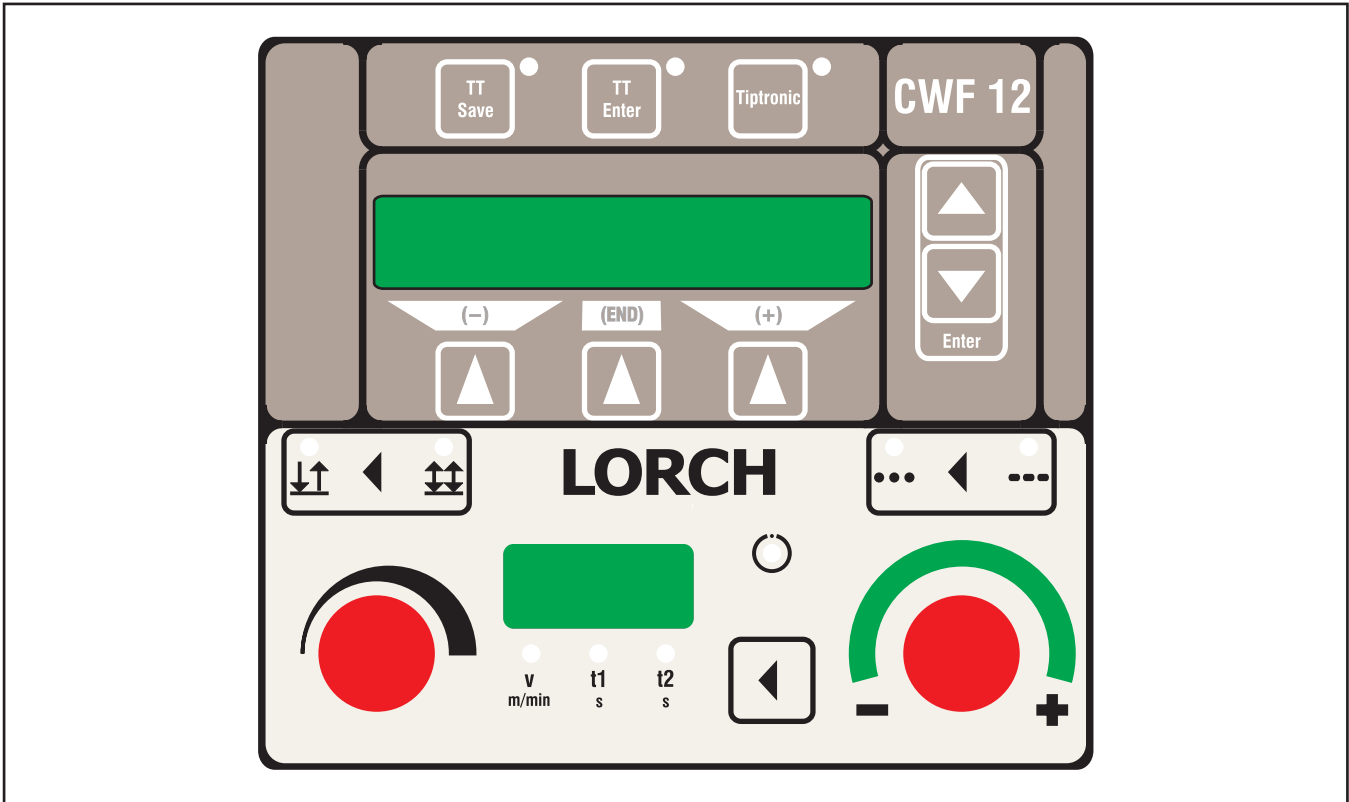
Flowmeter

<p>To open the flow meter, turn the housing halves against each other (bayonet assembly)</p>	
<p>take off the top halve</p>	
<p>take out sealing ring and the turbine</p> <p>!!! CAUTION !!! mind the right flow direction, do not reverse in- and output when mounting the flow meter back into the machine</p>	

Hand control pendant CWF12

The hand control pendant CWF12 is the complete front panel of the Feed system (**C**old **W**ire **F**eeder). The unit consists of front panel pc-board LAC12BF and the adapter pc-board HR910ADP. The communication is made completely via LorchNet (CAN bus).

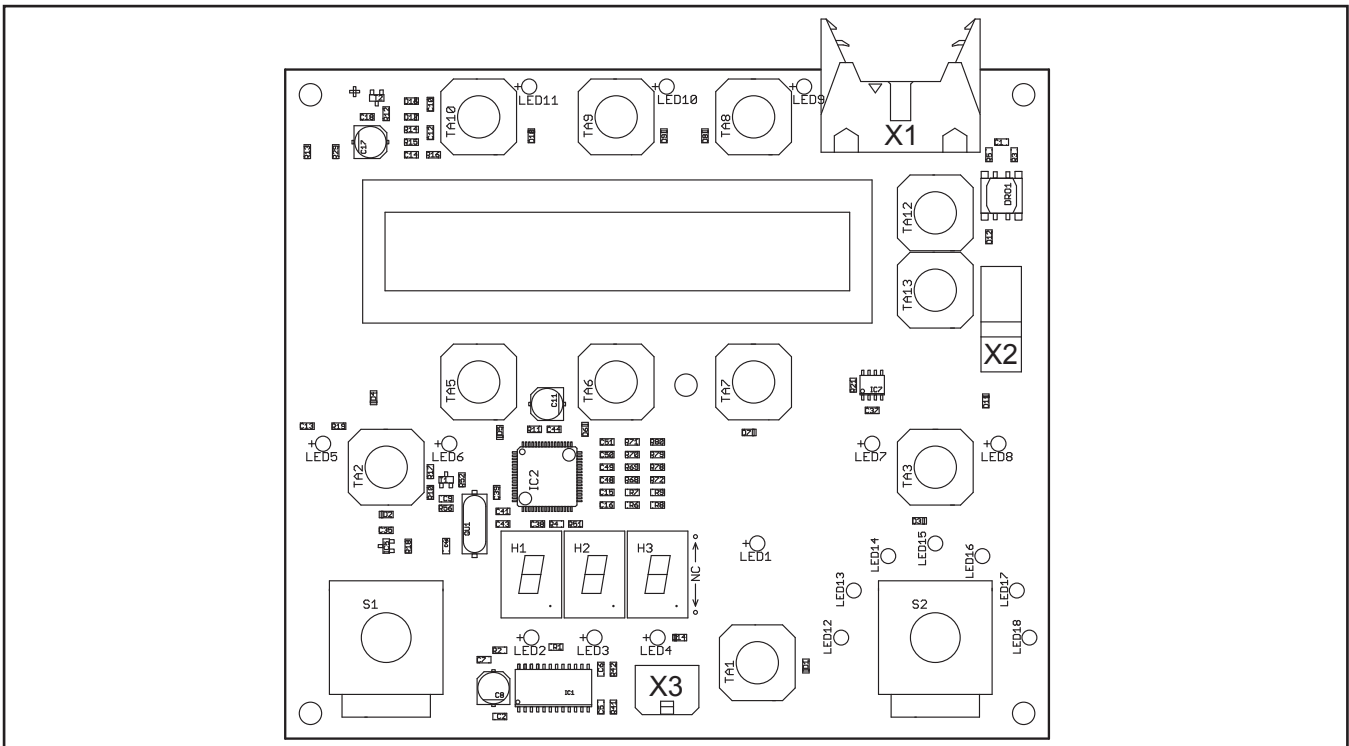
Picture pc-board front panel LAC12



Pc-board LAC12BF

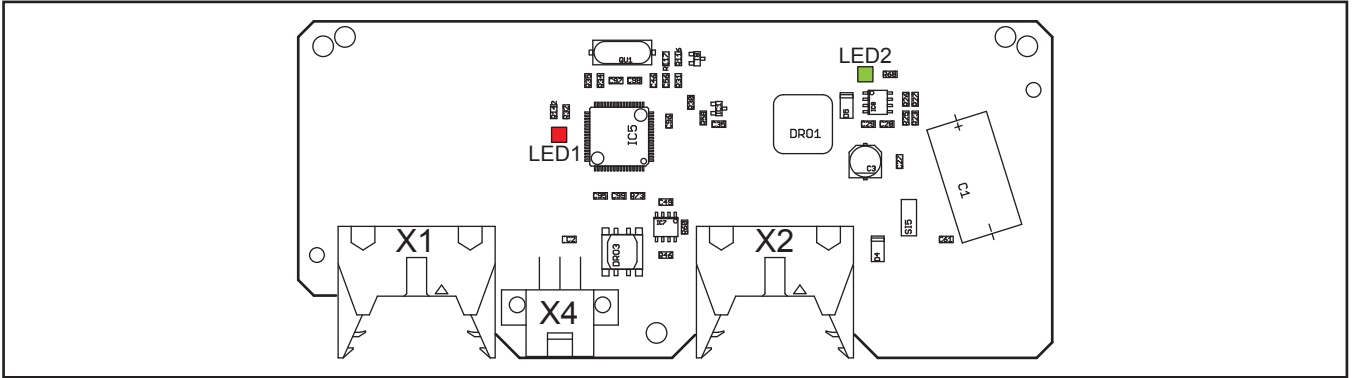
The pc-board LAC12BF is the front panel with all operating elements and optical displays.

Picture pc-board LAC12BF

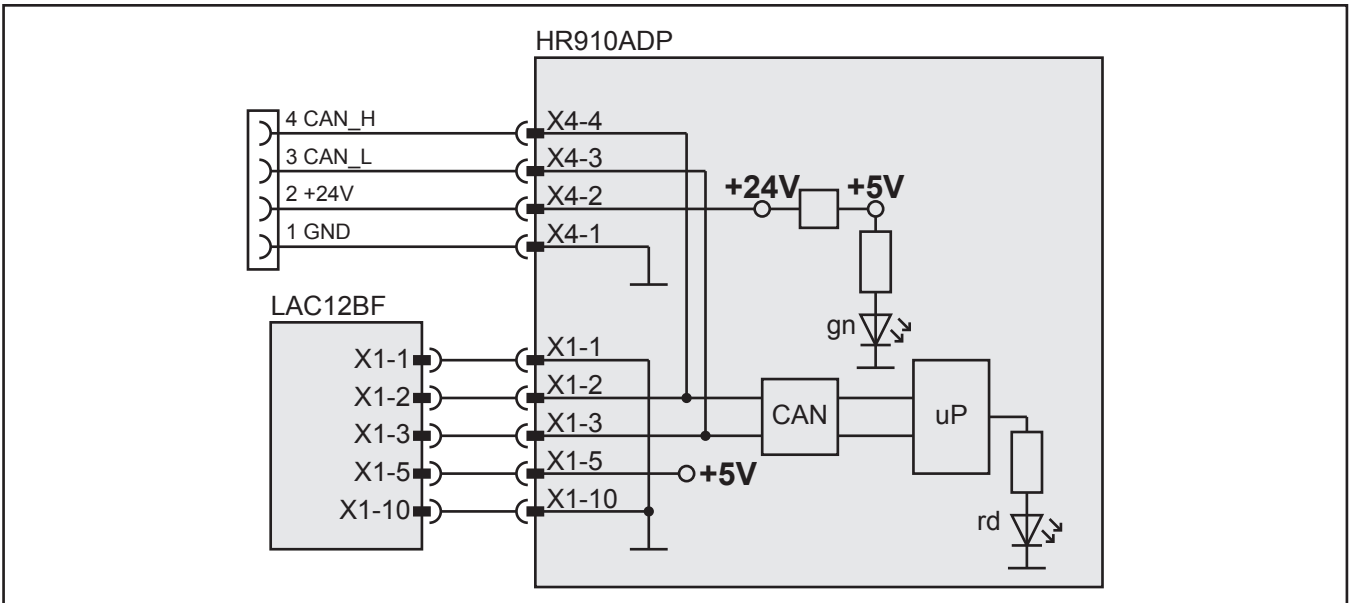


Pc-board HR910ADP

Picture pc-board HR910ADP



Connection diagramm CWF12



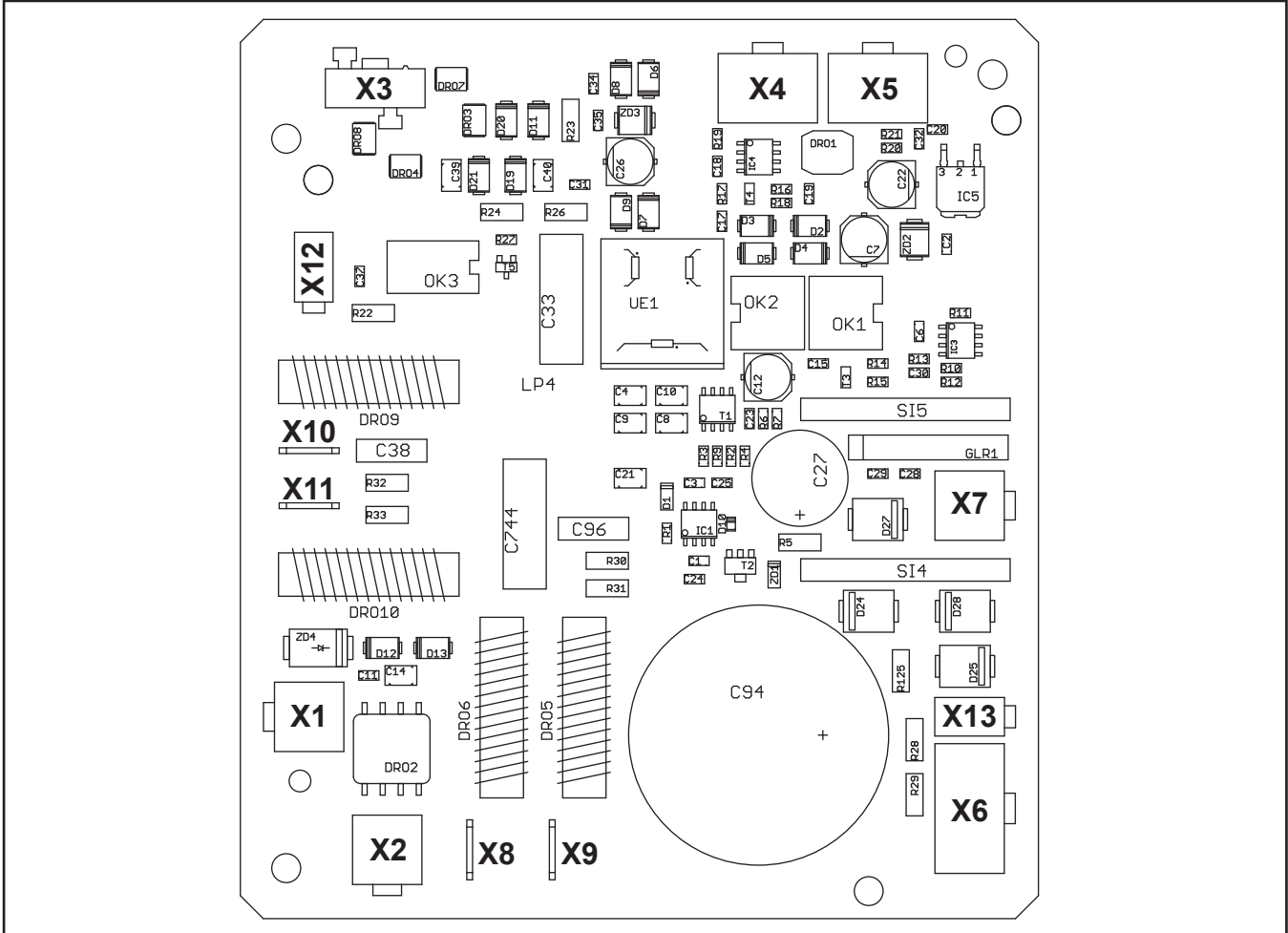
Pc-board KDEVI

The pc-board KDEVI is the power supply of the Feed.

Functions

- creating supply voltages
- wiring motor- and tacho wires
- electrical isolation of CAN bus

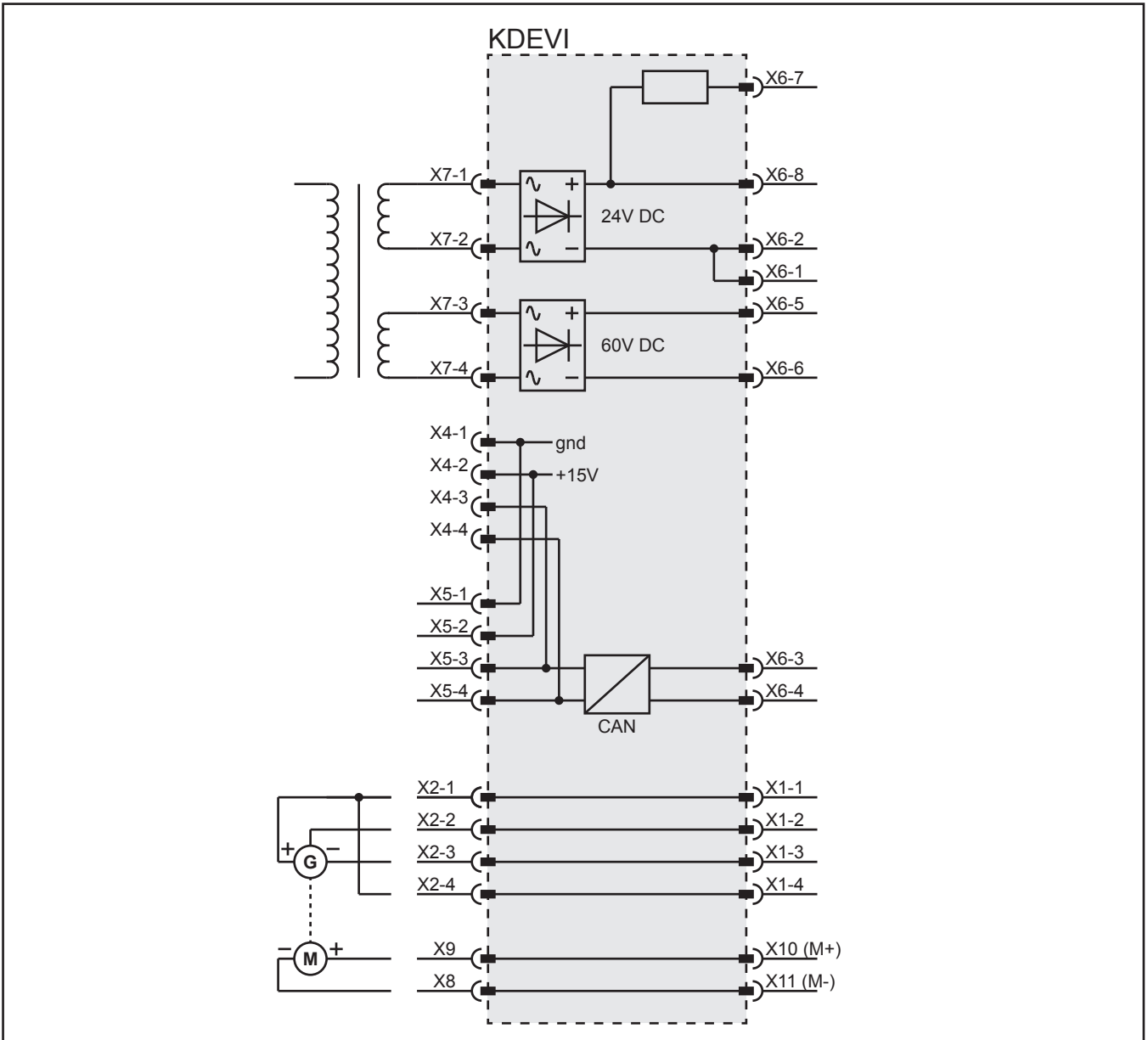
Picture pc-board KDEVI



Measuring points

designation	measuring point		result
supply voltage 24V	X6-8	+	+24V
	X6-1	-	
supply voltage 60V	X6-5	+	+60V
	X6-6	-	
supply voltage control transformer 18V	X7-1	~	18V~
	X7-2	~	
supply voltage control transformer 42V	X7-3	~	42V~
	X7-4	~	

Schematic pc-board KDEVI



Pc-board DMRPP04

The pc-board DMRPP04 is for driving the wire feed motor of the Feed. It is a double pc-board which are connected via flat ribbon cables:

pc-board DMRPP-P: power full-bridge driver for driving the motor

pc-board DMRPP-C04: control logic circuits

Functions

- driving and monitoring the wire feed motor
- driving and monitoring the optional Push-Pull motor
- reading and monitoring operating elements

LED display

normal

LED	state	designation
1 (red)	off	DSP is ok
	lit bright	pc-board is in flash/programming mode: DIP switch 1 = ON
2 (green)	on	internal 5V supply voltage ok
3 (green)	flashing	DSP is working

malfunction

LED	state	designation
1 (red)	lit weak	DSP is not programmed (no operating system)
2 (green)	off	5V supply voltage is not present

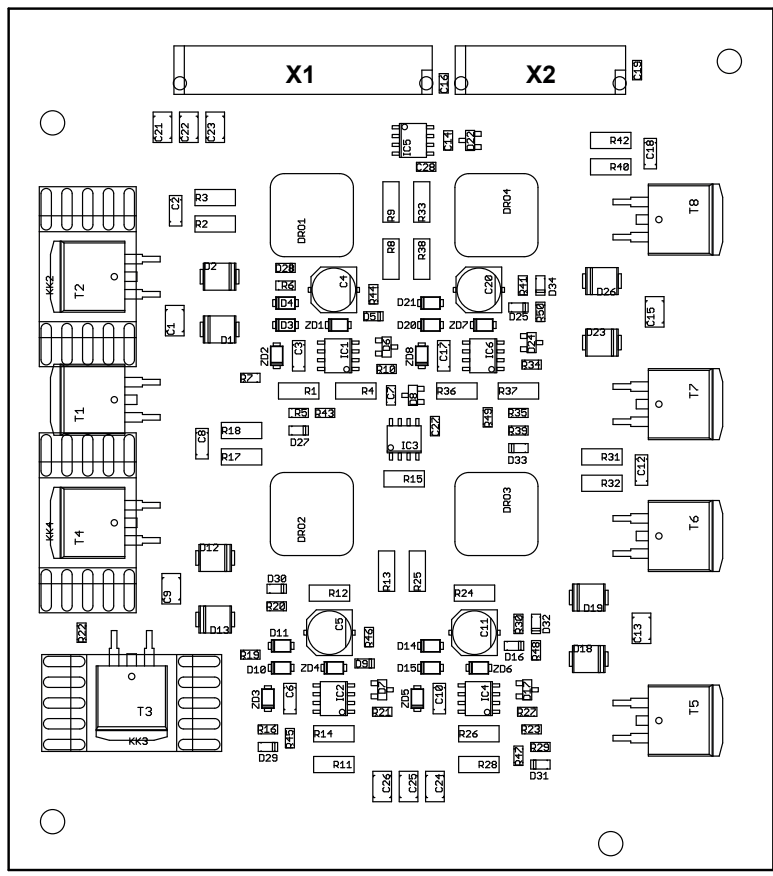
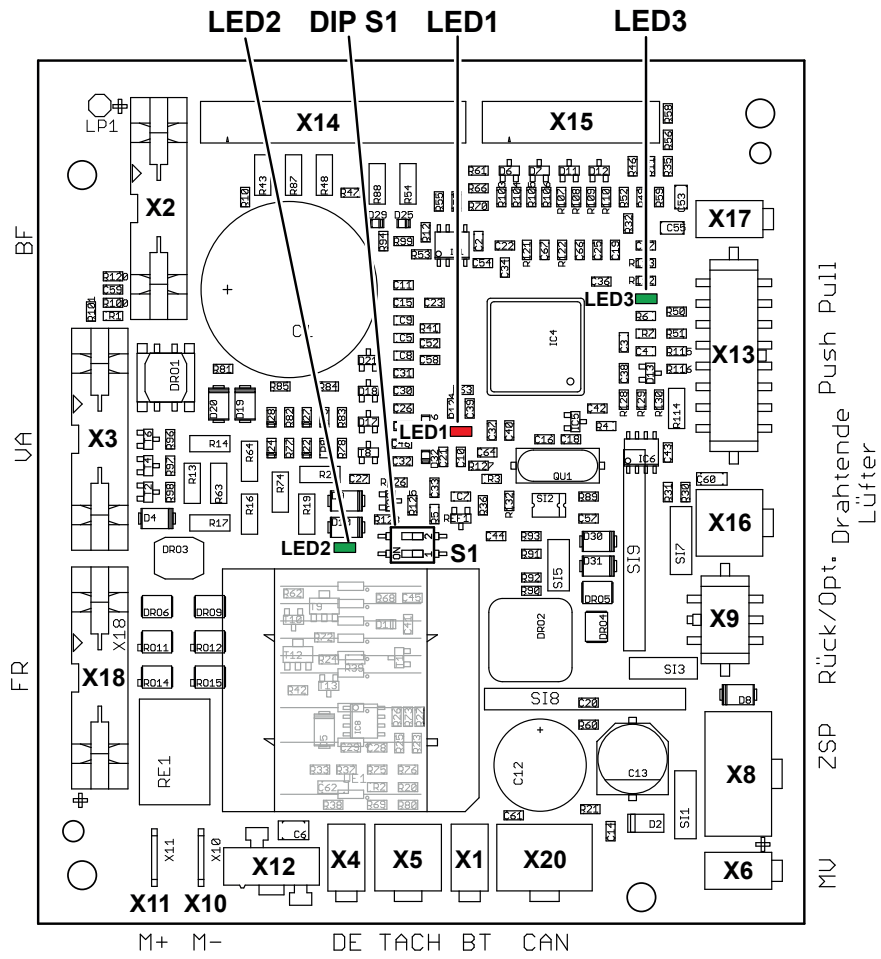
Measuring points

designation	measure point		result
solenoid valve	X6/1 X6/2	+ 0V	+24V DC
supply voltage tacho	X5/1 X5/3	+ gnd	+5V DC
supply wire feed motor	X10 X11	- +	0-42V DC (PWM)
supply voltage CAN interface	X20/1 X20/2	gnd +	+24V DC

DIP switch

DIP switch	setting	function
1	ON	programming modus active
	OFF	normal operation mode
2	-	- not used -

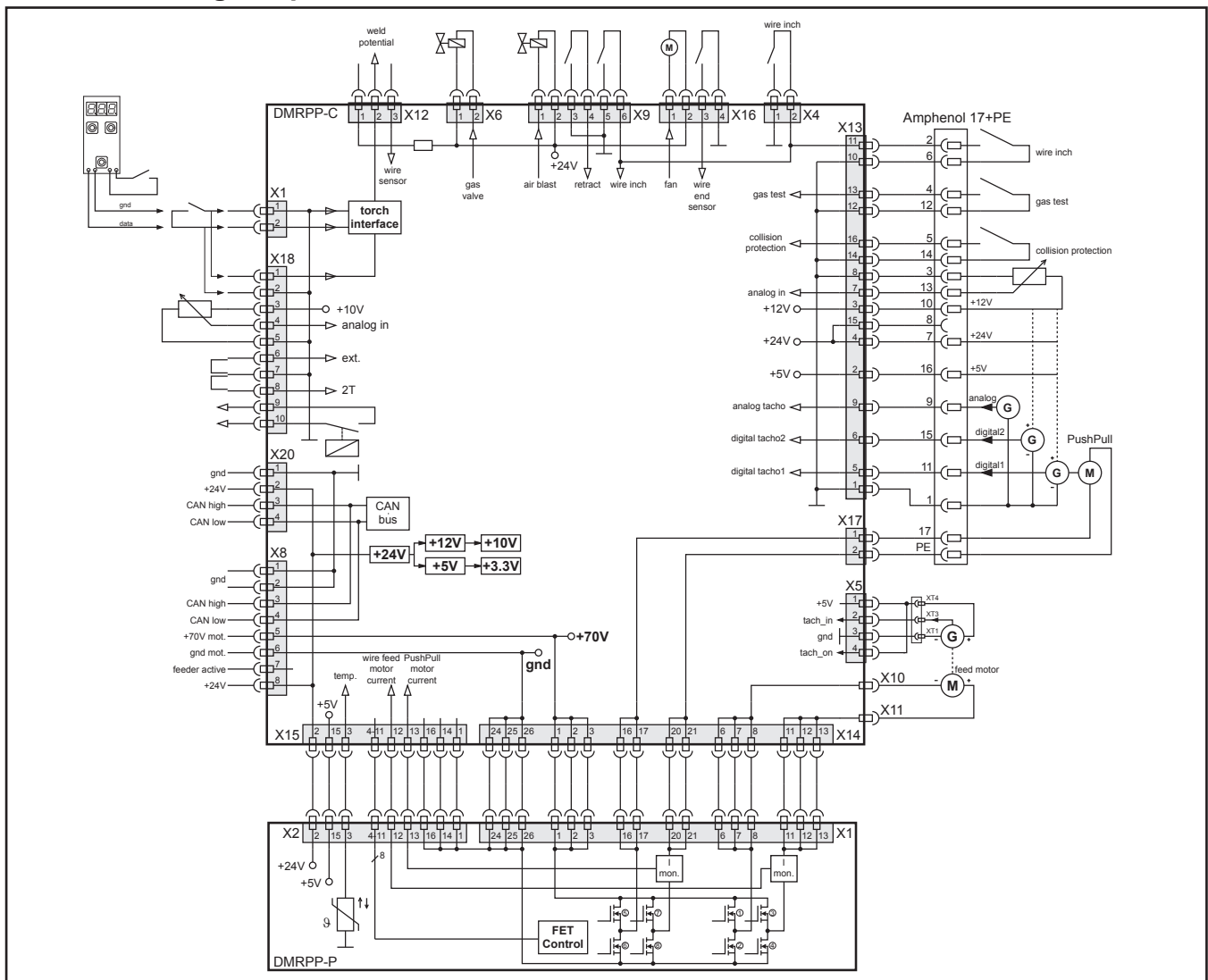
Picture pc-board DMRPP04

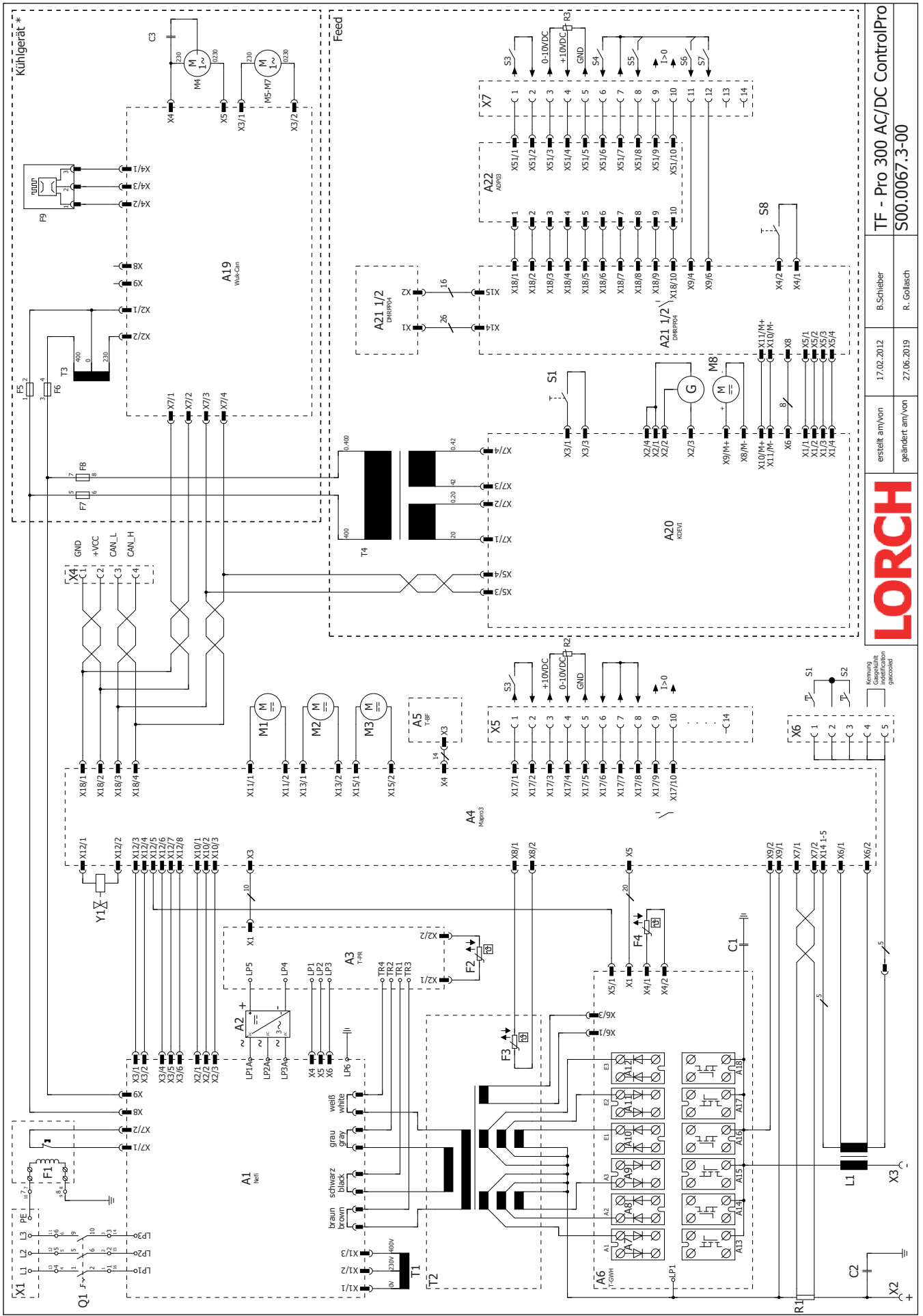


Overview connectors pc-board DMRPP04

connector	designation
X1	torch trigger switch
X2	front panel
X3	volt/amp display
X4	wire inch button
X5	tacho wire feed motor
X6	solenoid valve
X8	control cable (Interpass hose package)
X9	wire inch and retract button
X10	wire feed motor "-" (minus)
X11	wire feed motor "+" (plus)
X12	welding potential (PowerMaster signal compensation)
X13	control cable PushPull
X14	flat ribbon connector motor wires
X15	flat ribbon connector PWM control
X16	wire-end sensor
X17	PushPull motor
X18	remote control interface
X20	CAN bus

Connection diagram pc-board DMRPP04





TF - Pro 300 AC/DC ControlPro
S00.0067.3-00

erstellt am/von 17.02.2012 B.Schieber
geändert am/von 27.06.2019 R. Gollasch



Klemme
Anschluß
Kabel
Leitung
Kabelschleife
geschaltet

TF - Pro 300 AC/DC ControlPro					
Bez.	MatNr.	Benennung	designation	Обозначение	
Pos.	order no.				
A 1	650.5459.5	E-Baugruppe T-NEFI300 (E)	pc-board T-NEFI300 (E)	Эл.плата T-NEFI300 (E)	
A 1	650.5459.9	E-Baugruppe T-NEFI300 (T)	pc-board T-NEFI300 (T)	Эл.плата T-NEFI300 (T)	
A 2	658.1419.0	Gleichrichter B6 36A 1600V	rectifier B6 36A 1600V	Выпрямитель B6 36A 1600V	
A 3	650.5458.5	E-Baugruppe T-PR300 (E)	pc-board T-PR300 (E)	Эл.плата T-PR300 (E)	
A 3	650.5458.9	E-Baugruppe T-PR300 (T)	pc-board T-PR300 (T)	Эл.плата T-PR300 (T)	
A 4	650.5532.5	E-Baugruppe T-MAPRO3 (E)	pc-board T-MAPRO3 (E)	Электронная плата T-MAPRO3 (E)	
A 4	650.5532.9	E-Baugruppe T-MAPRO3 (T)	pc-board T-MAPRO3 (T)	Электронная плата T-MAPRO3 (T)	
A 5	650.5335.5	E-Baugruppe T-BF (E)	pc-board T-BF (E)	Электронная плата T-BF (E)	
A 5	650.5335.9	E-Baugruppe T-BF (T)	pc-board T-BF (T)	Электронная плата T-BF (T)	
A 6	650.5461.5	E-Baugruppe T-GWH300 (E)	pc-board T-GWH300 (E)	Эл.плата T-GWH300 (E)	
A 6	650.5461.9	E-Baugruppe T-GWH300 (T)	pc-board T-GWH300 (T)	Эл.плата T-GWH300 (E)	
A 7-12	713.0301.0	Diode 400V 2x100A ISOTOP	diode 400V 2x100A ISOTOP	Диод 400V 2x100A Изотоп	
A 13-18	711.0516.0	IGBT-N-Kan 600V 200A Isotop APT200N60J	IGBT-N-Kan 600V 200A Isotop APT200N60J	IGBT-N-Kan 600V 200A Isotop APT200N60J	
A 19	650.5347.5	E-Baugruppe WUK-CAN (E)	pc-board WUK-CAN (E)	Электронная плата WUK-CAN (E)	
A 19	650.5347.9	E-Baugruppe WUK-CAN (T)	pc-board WUK-CAN (T)	Электронная плата WUK-CAN (T)	
A 20	650.5324.5	E-Baugruppe KDEVI (E)	pc-board KDEVI (E)	Электронная плата KDEVI (E)	
A 20	650.5324.9	E-Baugruppe KDEVI (T)	pc-board KDEVI (T)	Электронная плата KDEVI (E)	
A 21	650.5517.5	E-Baugruppe DMRPP (E)	pc-board DMRPP (E)	Кабельный жгут DMRPP04 (E)	
A 21	650.5517.9	E-Baugruppe DMRPP (T)	pc-board DMRPP (Z)	Кабельный жгут DMRPP04 (T)	
A 22	650.5503.5	E-Baugruppe ADP03 (E)	pc-board ADP03 (E)	Электронная плата ADP03 (E)	
C 1	982.5502.5	BG-Entstörkond. 3x4700pF 400VAC	unit prot. cap. 3x4700pF 400VAC M4-M4	Конд. устр. помех 3x4700pF 400VAC	
C 2	982.5513.0	BG-Entstörkond. 3x4700pF 400VAC	unit prot. cap. 3x4700pF 400VAC M4-M10	Конд. устр. помех 3x4700pF 400VAC	
C 3	704.0881.0	Kond. MP 450VAC 6µ3 für 665.5570.0	capacitor 450VAC 6µ3 for 665.5570.0	Конденсатор MP 450VAC 6µ3 665.5570.0	
F 1	570.8058.0	Schutzleiterüberwachung 4*10A Minif.Wago	protective earth monitoring 6² 10A M5 M	Контроль заземляющего провода 6² 10A	
F 2	981.1419.0	BG-Thermosensor 23x7x5 LD3,4	unit thermal sensor 23x7x5 LD3,4	Термодатчик 23x7x5 LD3,4	
F 3		Thermosensor Übertrager	thermal sensor transformer	Датчик температуры трансформатора	
F 4	981.1419.0	BG-Thermosensor 23x7x5 LD3,4	unit thermal sensor 23x7x5 LD3,4	Термодатчик 23x7x5 LD3,4	
F 5	709.0504.0	Feinsicherung 4,0 A TR 5x20 500V AC	fuse 4,0 A TR 5x20 500V AC	Слаботочный предохранитель 4,0A 500V	
F 6	709.0504.0	Feinsicherung 4,0 A TR 5x20 500V AC	fuse 4,0 A TR 5x20 500V AC	Слаботочный предохранитель 4,0A 500V	
F 7	709.0504.0	Feinsicherung 4,0 A TR 5x20 500V AC	fuse 4,0 A TR 5x20 500V AC	Слаботочный предохранитель 4,0A 500V	
F 8	709.0504.0	Feinsicherung 4,0 A TR 5x20 500V AC	fuse 4,0 A TR 5x20 500V AC	Слаботочный предохранитель 4,0A 500V	
F 9	665.3132.0	Strömungswächter ID2 AD6 kpl.	flowmeter ID2 AD6 cpl.	Датчик потока ID2 AD6 компл.	
L 1	665.6252.0	HF - Drossel WA 24000057	HF-inductor WA 24000057	ВЧ- Дроссель WA 24000057	
M 1-3	981.1473.0	BG-Axialventilator 12V DC 60	BG-Axialventilator 12V DC 60	Осевой вентилятор 12V DC 60	
M 4	665.5571.0	Wasserpumpe Typ N 2x Schlauchanschluss	pump type N 2x hose connection	Водяной насос типа N 2x соединения шлангов	
M 5-7	665.5725.0	Axialventilator 230V 119x119x38	axial fan 230V 119x119x38	Осевой вентилятор 230V 119x119x38	
M 8	620.9307.0	Vorschubeinheit VE 42 TYP37 SF Tacho	Feed unit VE 42 TYP37 SF	Блок подачи VE 42 TYP37 SF	
Q 1	657.0121.0	Schalter 3/0 25A 3ph.	Switch 3/0 25A 3ph.	Выключатель 3/0 25A 3ph.	
R 1	665.0519.0	Nebenwiderstand 350A 35mV 0,1m	Shunt resistance 350A 35mV 0,1Ohm	Шунт 350A 35mV 0,1mOhm	
R 2		Schweisstrom	welding electric current	Сварочный ток	
R 3		Drahtvorschubgeschwindigkeit	wire feed speed	Скорость подачи проволоки	
S 1		Brennertaster	torch switch	Кнопка горелки	
S 2		Zweitstromtaste	second current switch	Кнопка вторичного тока	
S 3		Start/Stop	start/stop	Старт/стоп	
S 4		Kennung Drahtvorschubgeschwindigkeit	set wire feed speed	Опознавание Скорость подачи проволоки	
S 5		Kennung 2-Takt	set 2-stroke	Опознавание 2-тактный режим	
S 6		Draht zurück	wire backward	Проволока назад	
S 7		Draht vor	wire forward	Проволока вперед	
S 8		Drahteinlauffaster	wire insert switch	Кнопка ввода проволоки	
T 1	655.8105.0	Trafo 400 V / 230 V	transformer 400 V / 230 V	Трансформатор 400 В / 230 В	
T 2	655.9075.0	Übertrager WA 13000061	transformer WA 13000061	Трансформатор WA 13000061	
T 3	655.8106.0	Spartrafo 400 V / 230 V - 1,5A	saving transformer 400 V / 230 V - 1,5A	Трансформатор 400 В / 230 В - 1,5A	
T 4	655.8023.0	Steuertrafo WA 31000025 Ringkern	control transformer WA 31000025 tor.core	Трансформатор WA 31000025	
X 1	661.7604.4	Netzkabel 4G1.5 CEE 16 4AE	Mains cable 4G1.5 CEE 16 4AE	Сетевой кабель 4G1.5 CEE 16 4AE	
X 2	665.7033.0	Einbau-Buchseinteil 35-50 mm²; HF; Ø38	insert sleeve 35-50 mm²; HF; Ø38	Встроенный разъем 35-50 mm²; HF; Ø38	
X 3	665.7033.0	Einbau-Buchseinteil 35-50 mm²; HF; Ø38	insert sleeve 35-50 mm²; HF; Ø38	Встроенный разъем 35-50 mm²; HF; Ø38	
X 4	661.8255.0	Kabelbaum CAN M12Bu 4pol Microfit	cable loom CAN M12Bu 4pol Microfit 180mm	Кабельный жгут CAN M12Bu 4пол. Microf.	
X 5	661.8210.8	Kabelbaum AMP14B-Microfit10p 230mm	Cable loom AMP14B-Microfit10p 230mm	Кабельный жгут AMP14B-Microfit10п.	
X 6	661.8303.0	Kabelbaum T-PRO	Cable loom T-PRO	Кабельный жгут T-PRO	
X 7	661.8305.0	Kabelbaum T-PRO Feed	Cable loom T-PRO Feed	Кабельный жгут T-PRO Feed	
Y 1	665.3016.0	Magnetventil 24 VDC 2xSchlauch/0°	solenoid valve 24 VDC 2xSchlauch/0°	Электромагнитный клапан 24 VDC	
(E) : Ersatz / spare part / Запасные части					
(T) : Tausch / replacement / Обмен					
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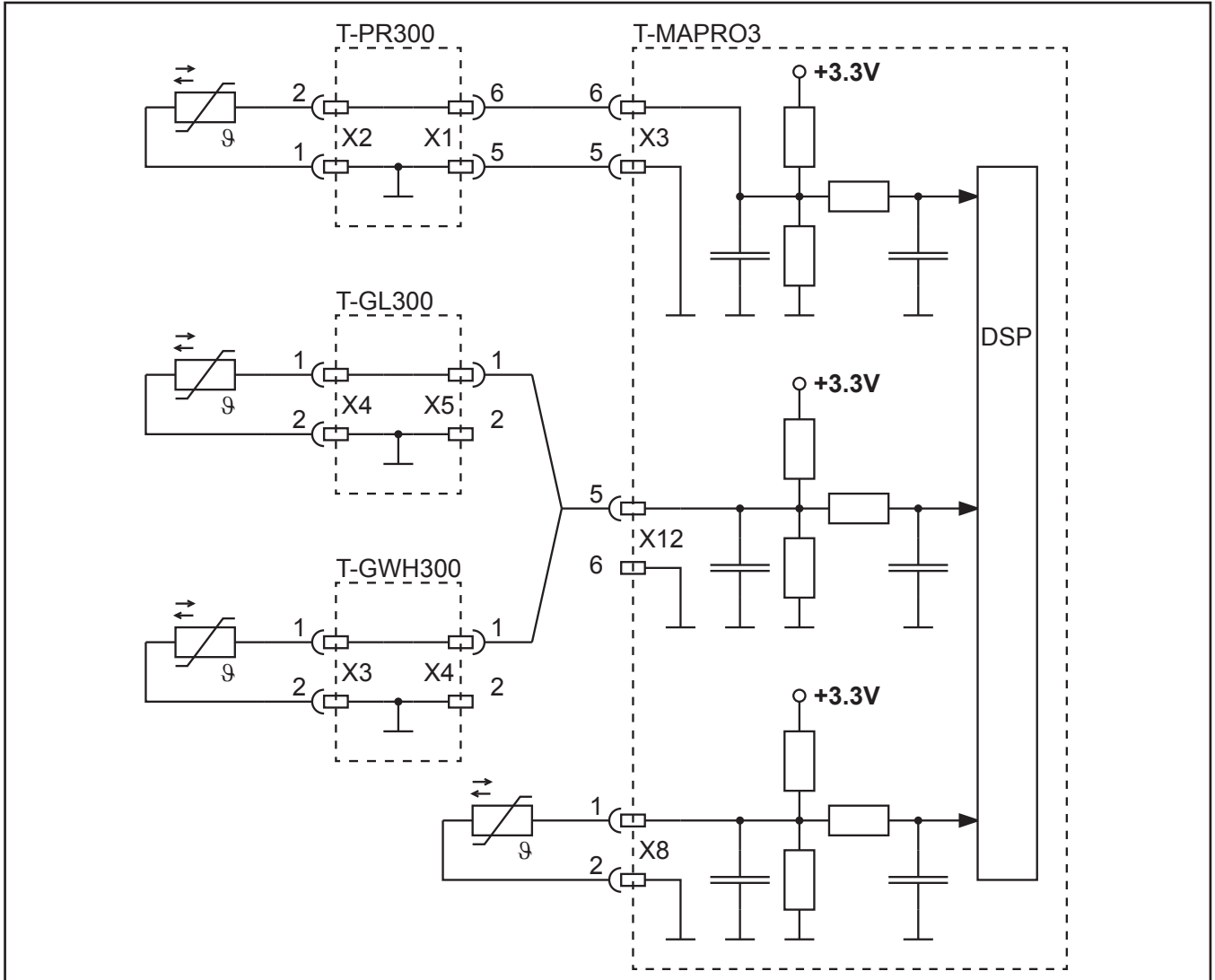
Temperature monitoring

Three temperature sensors are monitored at the T-series:

- transformer
- heatsink primary side
- heatsink secondary side

Each of the three sensors is a NTC resistor (the higher the temperature, the lower the resistance value).

Schematic



As soon as the programmed maximum temperature is exceeded, the machine stops with error code **E01** "over-temperature". Depending on which sensor measured the overtemperature, the respective error code is displayed:

sensor	error message overtemperature	error message faulty sensor
heatsink (secondary side)	E01-01	E13-01
heatsink (primary side)	E01-02	E13-02
transformer	E01-03	E13-03

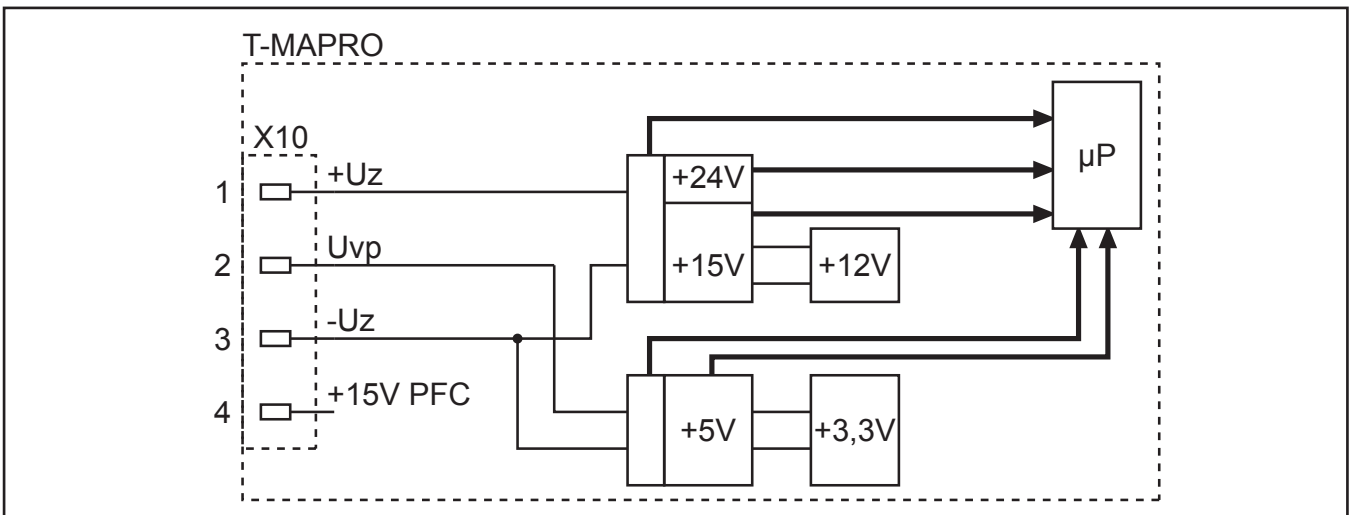
In case of a overtemperature the fans keep running to cool down the machine. As soon as the temperature drops below the programmed minimum limit, the machine is ready for welding again.

If one of the sensors itself is faulty (unusual resistance value or sensor has a loose connection), the machine stops with the respective error code **E13** "temperature sensor".

Supply voltages

The pc-board T-MAPRO is generating and monitoring all supply voltages.

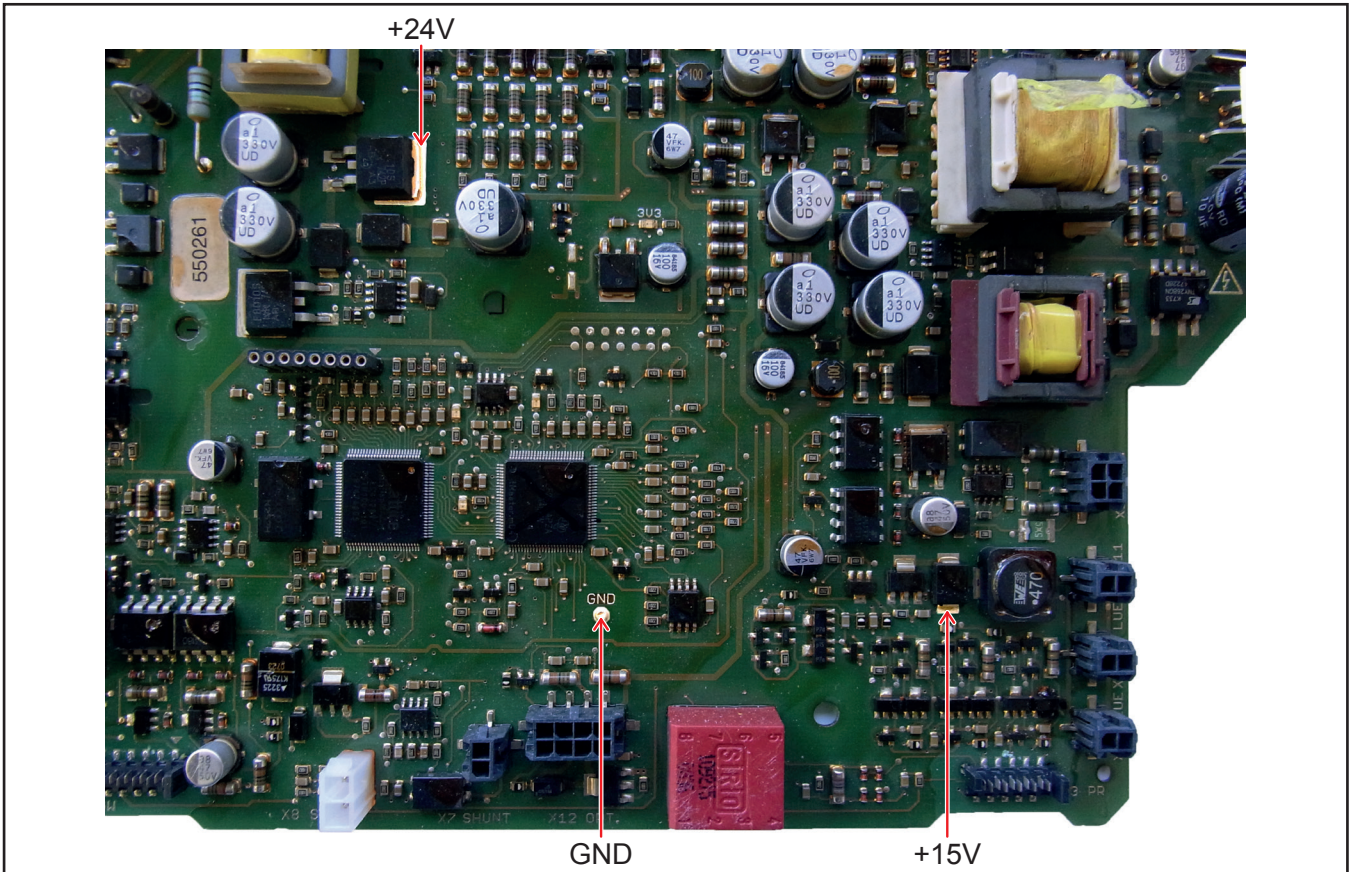
Schematic



If a supply voltage drops below the minimum level or gets higher than the maximum level, the machine will stop and displays **E14-00** "error supply voltage".

supply	limit
+ 24 V DC	< 17V
	> 37V
+15 V DC	< 12V
	> 20V

Measuring points supply voltages pc-board T-MAPRO



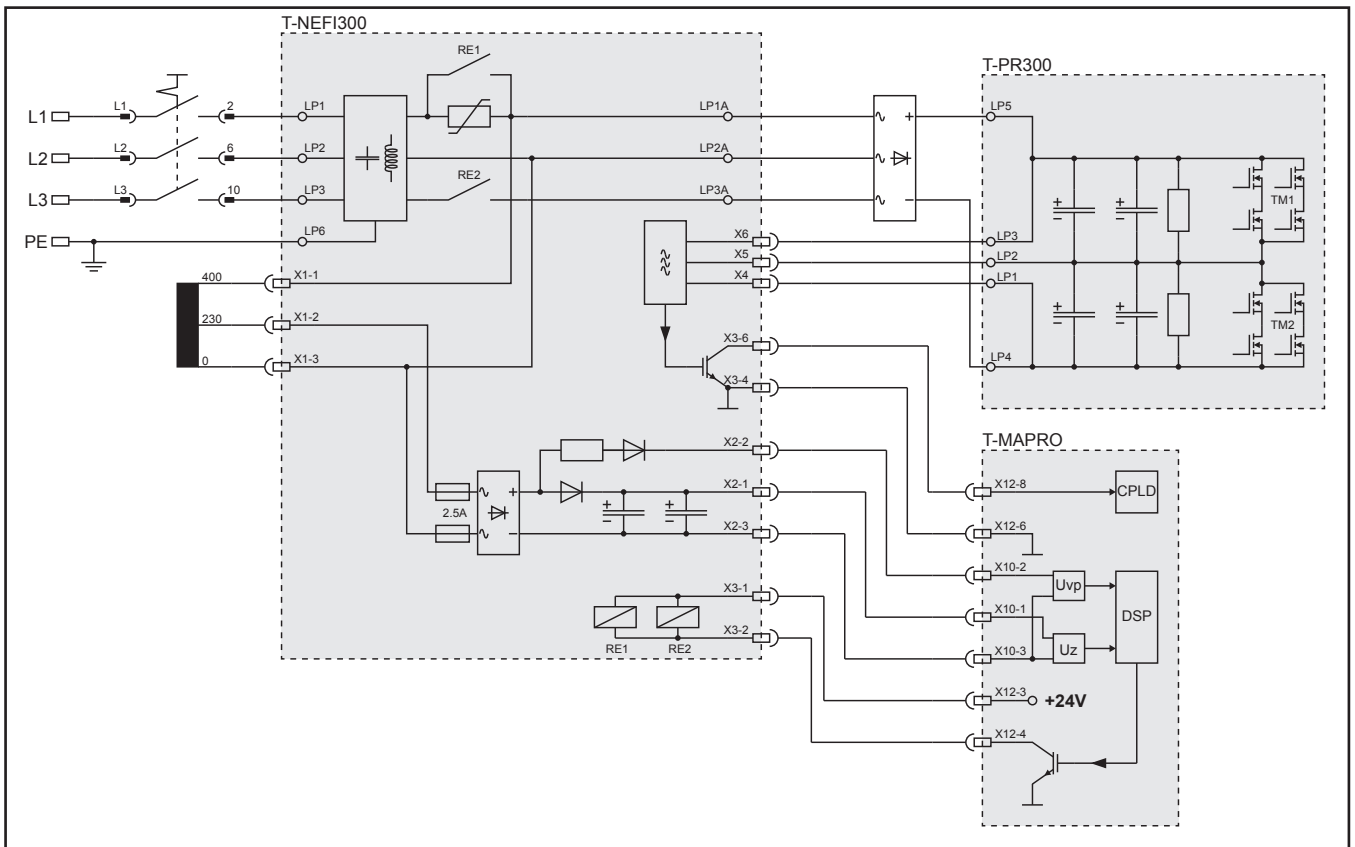
Monitoring bus voltage

The bus voltage is monitored by the pc-board T-MAPRO. As soon as the bus voltage gets too high or too low, the machine will stop and displays the respective error message.

measuring	limit mains (Uvp)	limit bus voltage (Uz)	error message
at start-up	>280V	>414V	E02-00 mains overvoltage
during operation or standby	>440V	>490V	
	<120V		E22-00 mains undervoltage
		<180V	H01 mains undervoltage

The symmetry of both bus voltages at the primary modules TM1 and TM2 are monitored by the CPLD. As soon as the difference between the bus voltages is >40V, the machine stops with the error code **E33-01** "bus voltage symmetry".

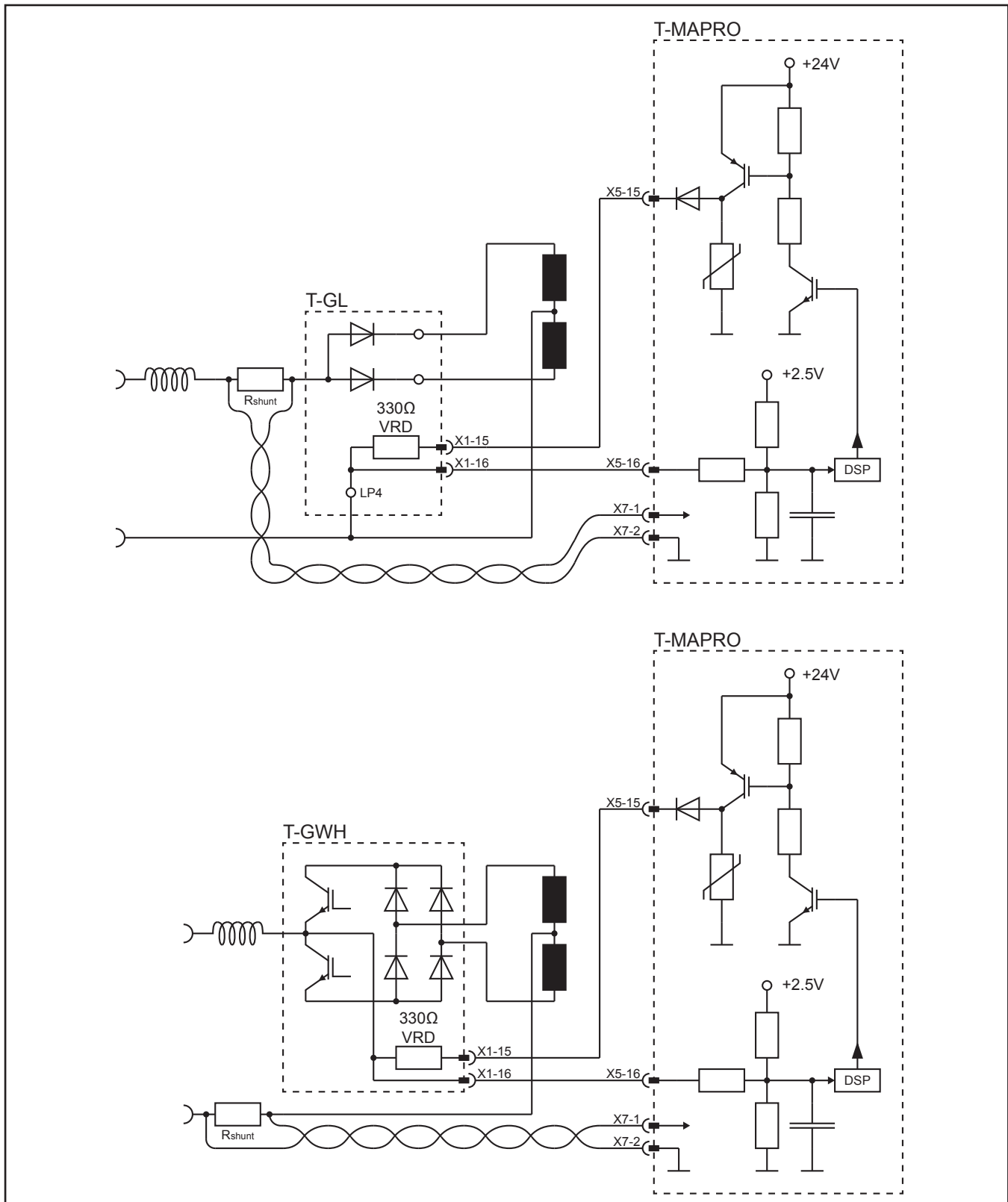
Schematic



Monitoring output voltage

The output voltage (welding voltage) is measured directly by the DSP. If the voltage is >100V for longer than 300ms, the machine will stop and displays **E06-00** "overvoltage secondary".

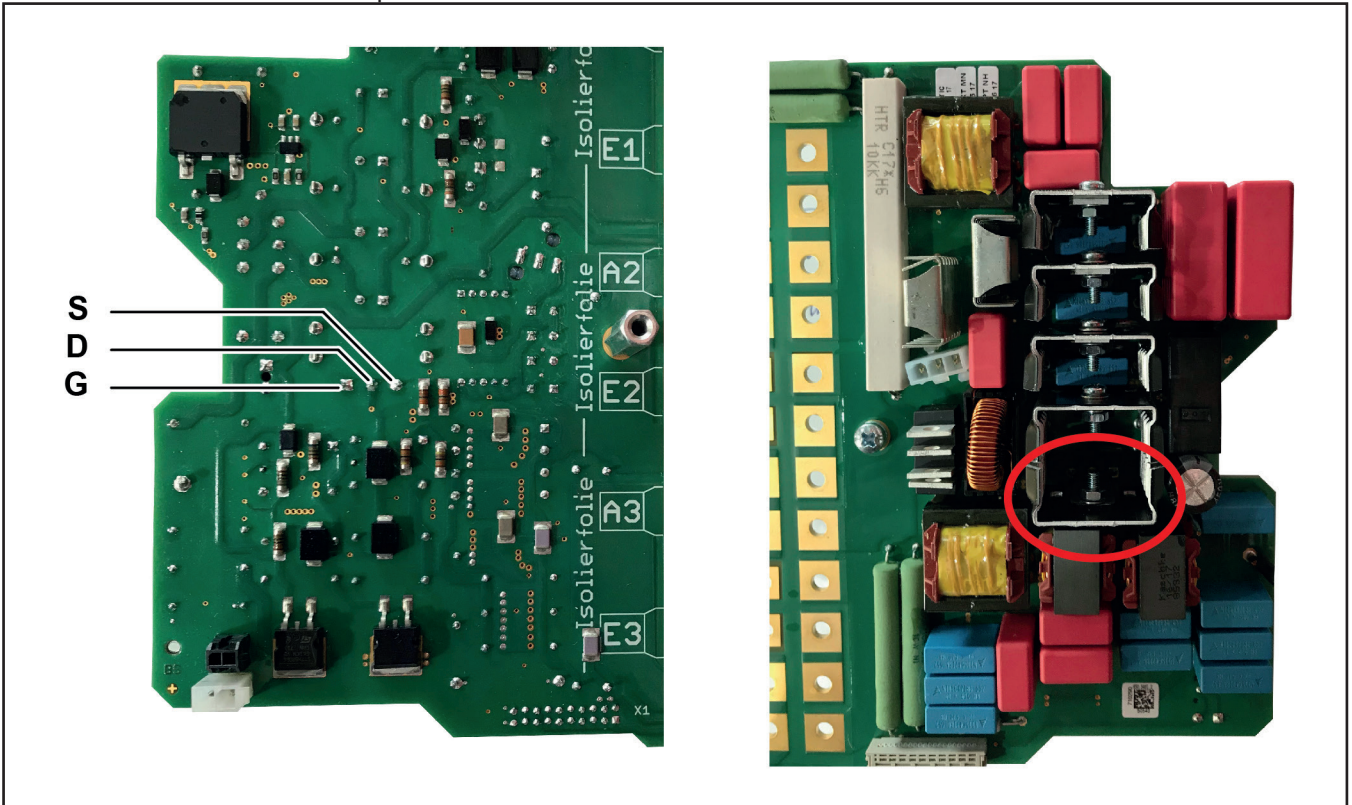
Schematic



When switching on the machine, during initialisation, the VRD function is tested. The 24V of the T-MAPRO are applied to the output socket via a 330 ohm resistor. If the voltage should drop below 17V, the machine stops with the error code **E25-00** "Error VRD".

Measuring point pc-board T-GWH300

In addition to a short circuit in the output diodes or the IGBTs, an E25 error message can also be a cause of a short-circuited MOSFET on the pc-board T-GWH300.

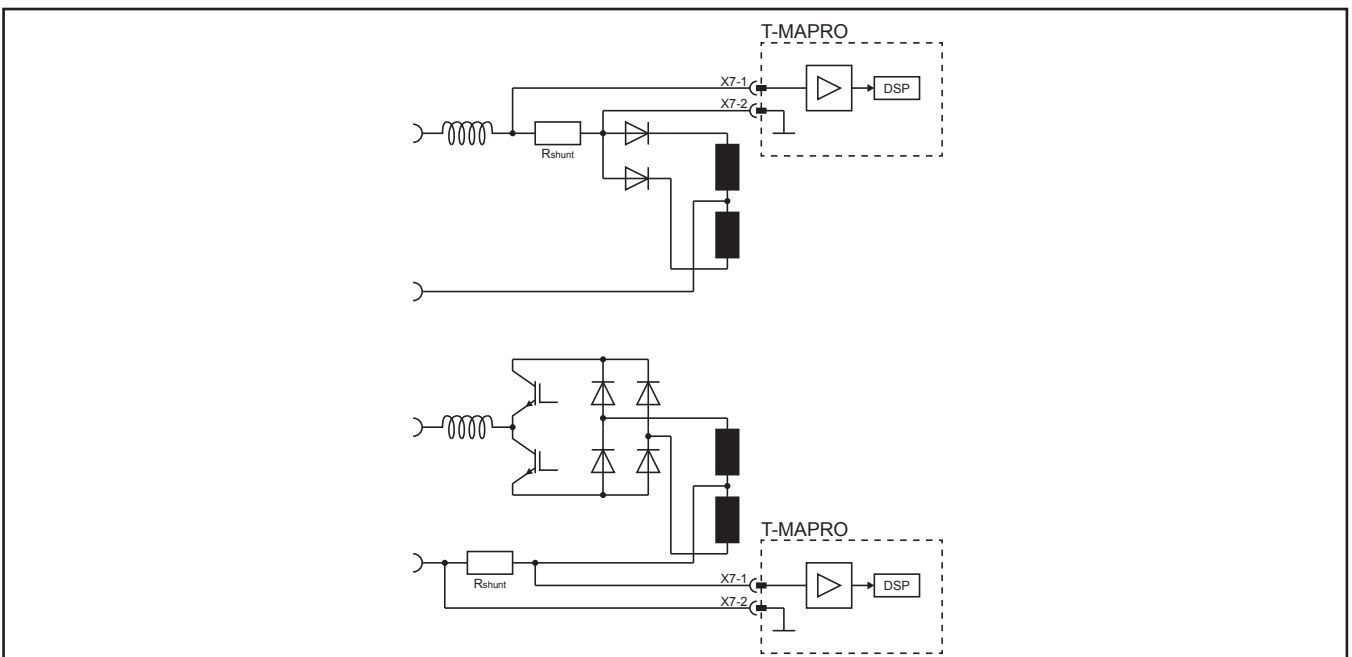


Measurement between source “S” and drain “D” must be high resistance. In the event of an error, there is a short circuit between the two pins.

Monitoring output current

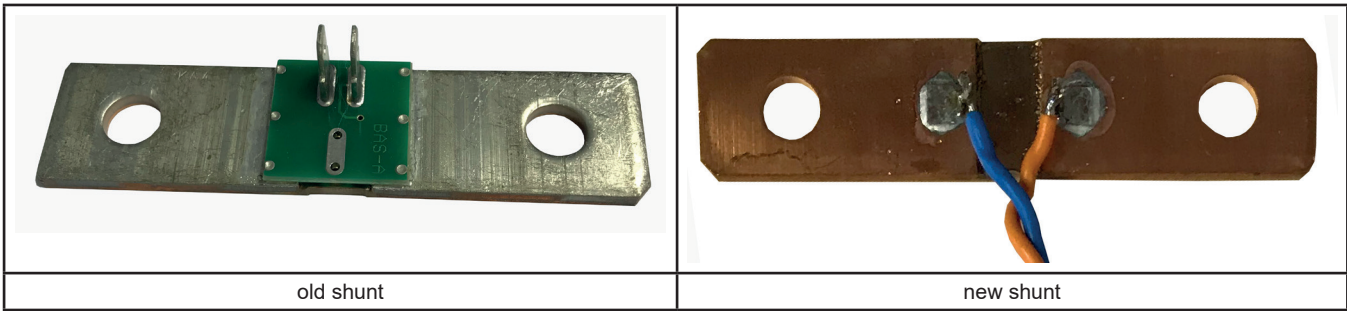
The output current (welding current) is measured via a shunt resistor directly by the DSP. After switching on the machine (during initialisation) the DSP is measuring the voltage offset of the shunt resistor. If the offset is too high, the error code **E15-00** “error current sensor” is displayed.

Schematic



New Shunt resistor

Since June 2020 (from serial number 60xx-3024-xxxx-x) a new shunt resistor is used where the connecting wires are now directly soldered to the shunt. Also new spare part kits were generated (including a mounting instruction): 666.0014.0

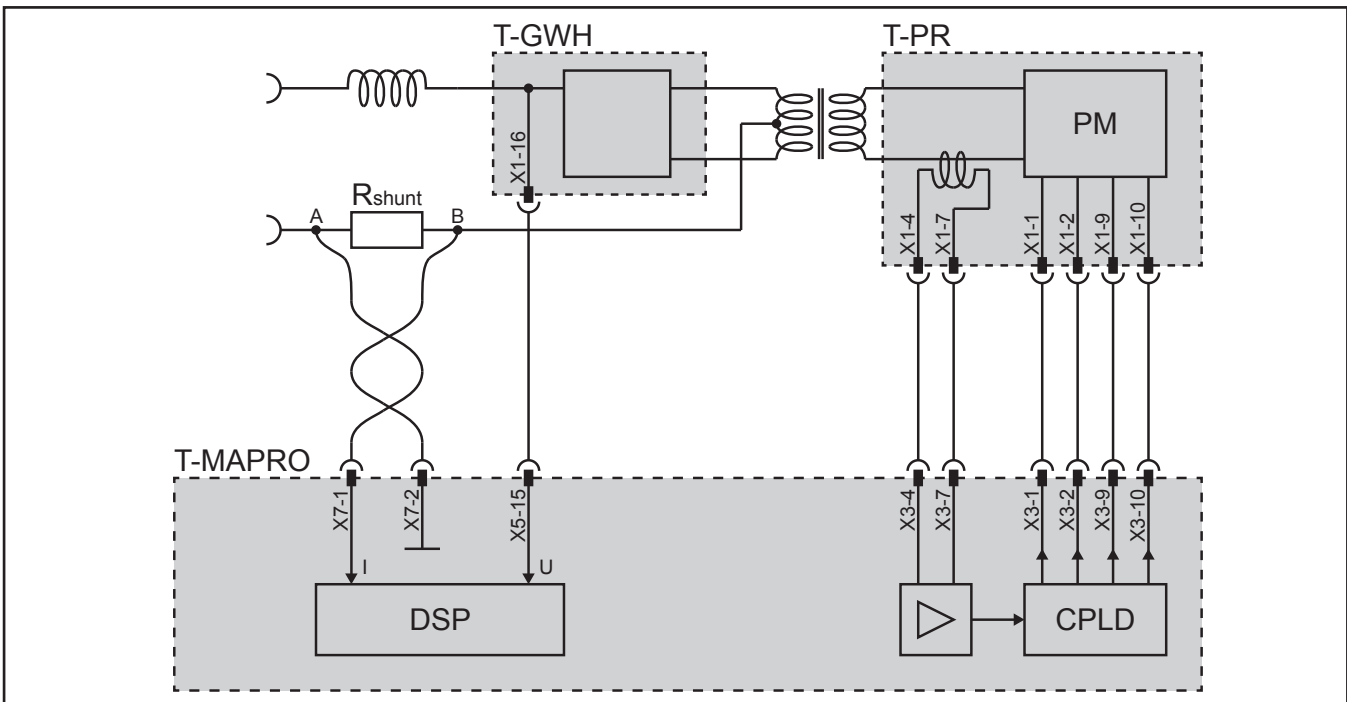


Driving the power unit

When switching on the machine, during initialisation, the power unit is tested with briefly clocking it primarily, then the output voltage on the secondary side is measured. If neither voltage (secondary) nor current (primary) can be measured, the machine stops with the error code **E09-00** "Current / Voltage measuring".

At AC/DC machines the AC inverter is also tested. Whenever the output polarity is changed, the arc needs to be ignited new. When during the polarity switch a current is measured constantly below 6A, the machine stops with the error code **E09-01** "Current / Voltage measuring AC".

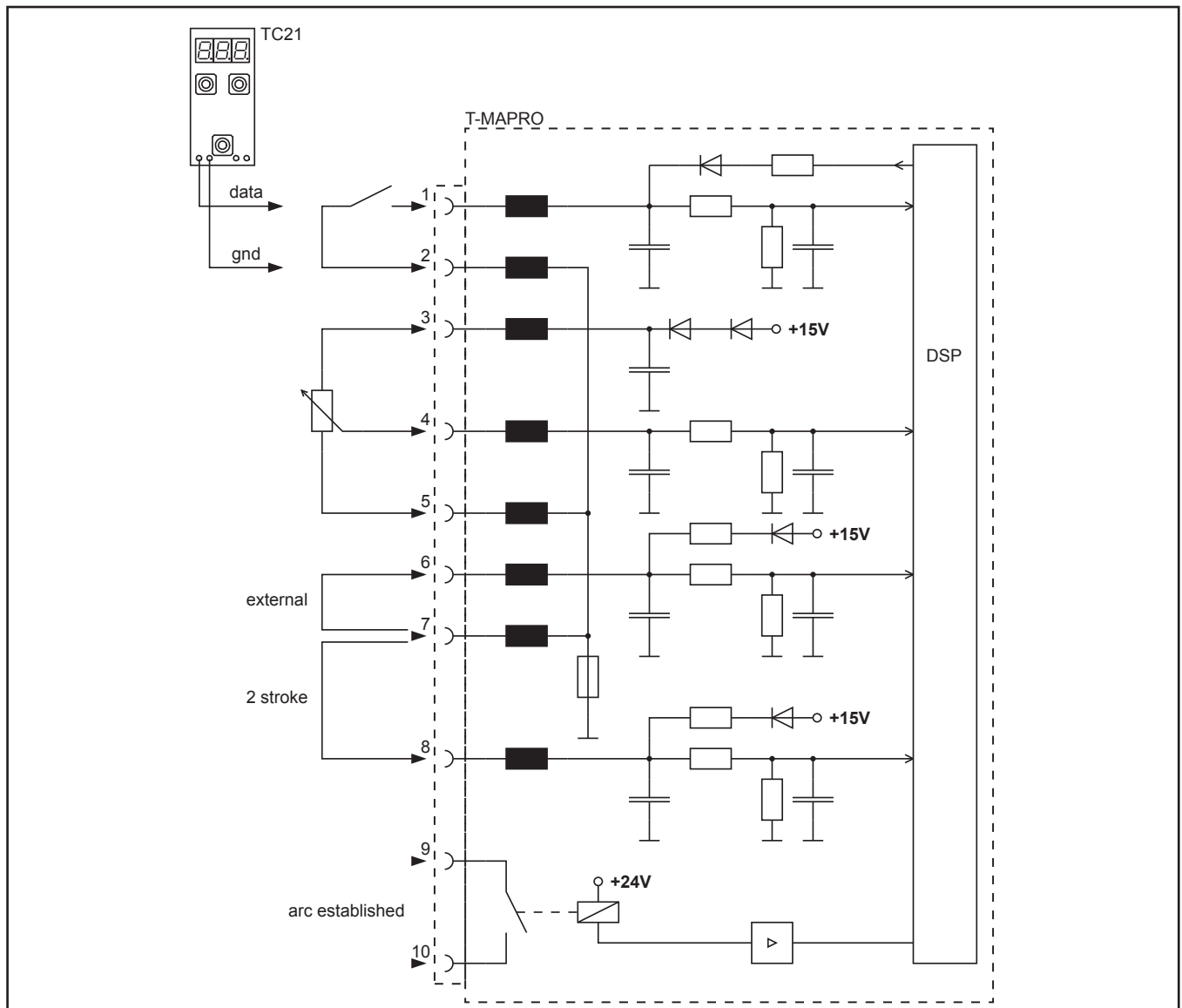
Schematic



Remote control interface

The remote control interface is for connecting a hand or foot remote control. It is also possible to use the interface for a small automation application. If the start contact is closed during switching on the machine, the error code **E10-00** "error torch/remote control" is displayed.

Schematic



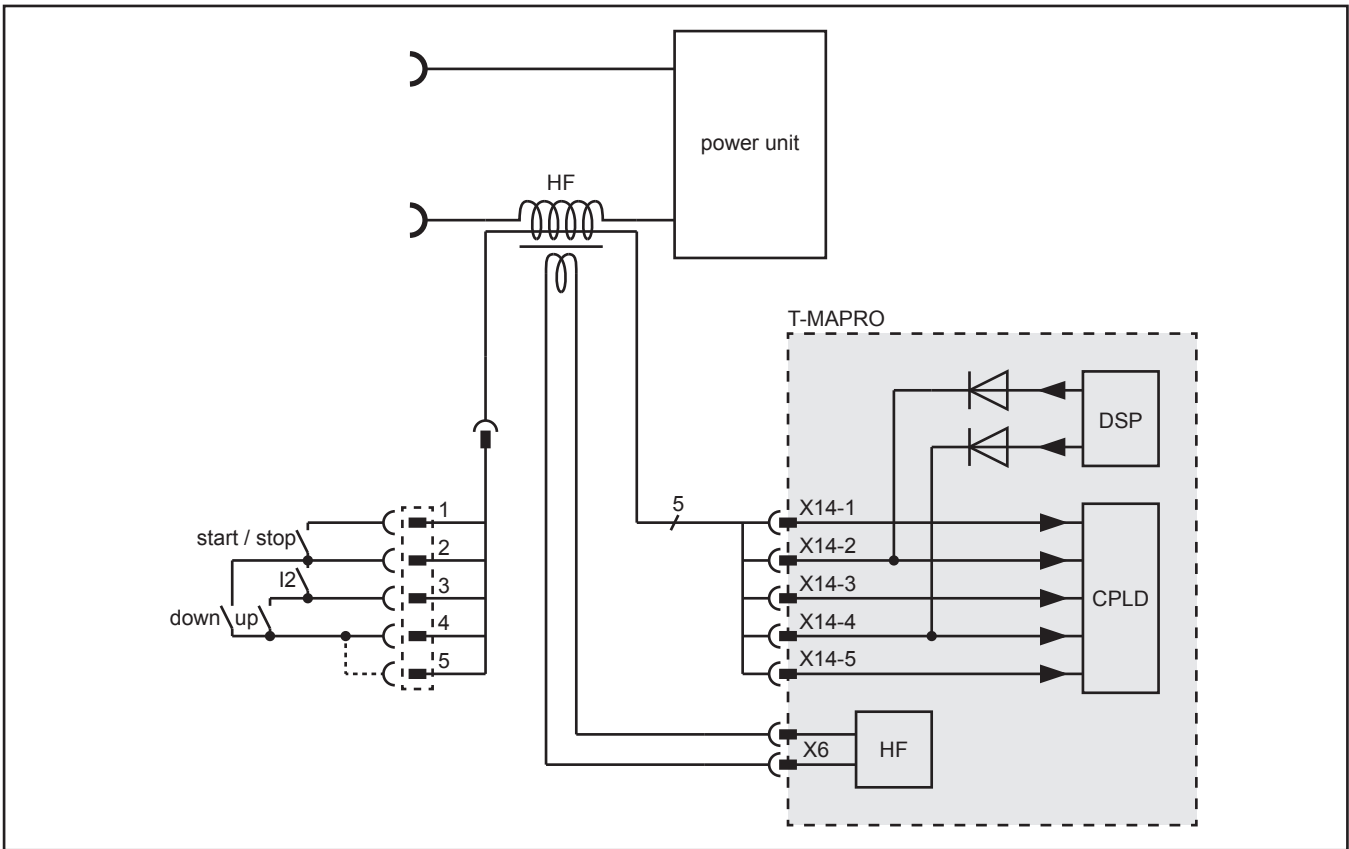
Signal overview

Signal	pin	designation
weld start	1 and 2	as soon as pin 1 and 2 are connected, the machine starts (same function as pressing the torch trigger switch)
weld energy	4	analog input for setting the weld energy (e.g. with an potentiometer) 0V = minimum setting of the actual welding program 15V = maximum setting of the actual welding program ! CAUTION ! this analog input is only valid if the identification "external" on pin 6 and 7 is active
identification "external"	6	as soon as pin 6 is connected to pin 7, the analog input on pin 4 is valid
ground	7	gnd for the identification signals on pins 6 and 8
identification "2 stroke"	8	as soon as pin 8 is connected to pin 7, the machine operates in 2-stroke mode at "weld start"
arc established	9 and 10	potential free relay contact (closing contact) as soon as welding current is flowing, this relay contact is connecting pin 9 to 10 maximum contact load: 1A

Torch control socket

The signals of the torch buttons are directly monitored by the T-MAPRO. The control wires are routed through the windings of the HF coil, that means that the wires of the control socket have HF potential !
If the start contact is closed during switching on the machine, the error code **E10-00** "error torch/remote control" is displayed.

Schematic

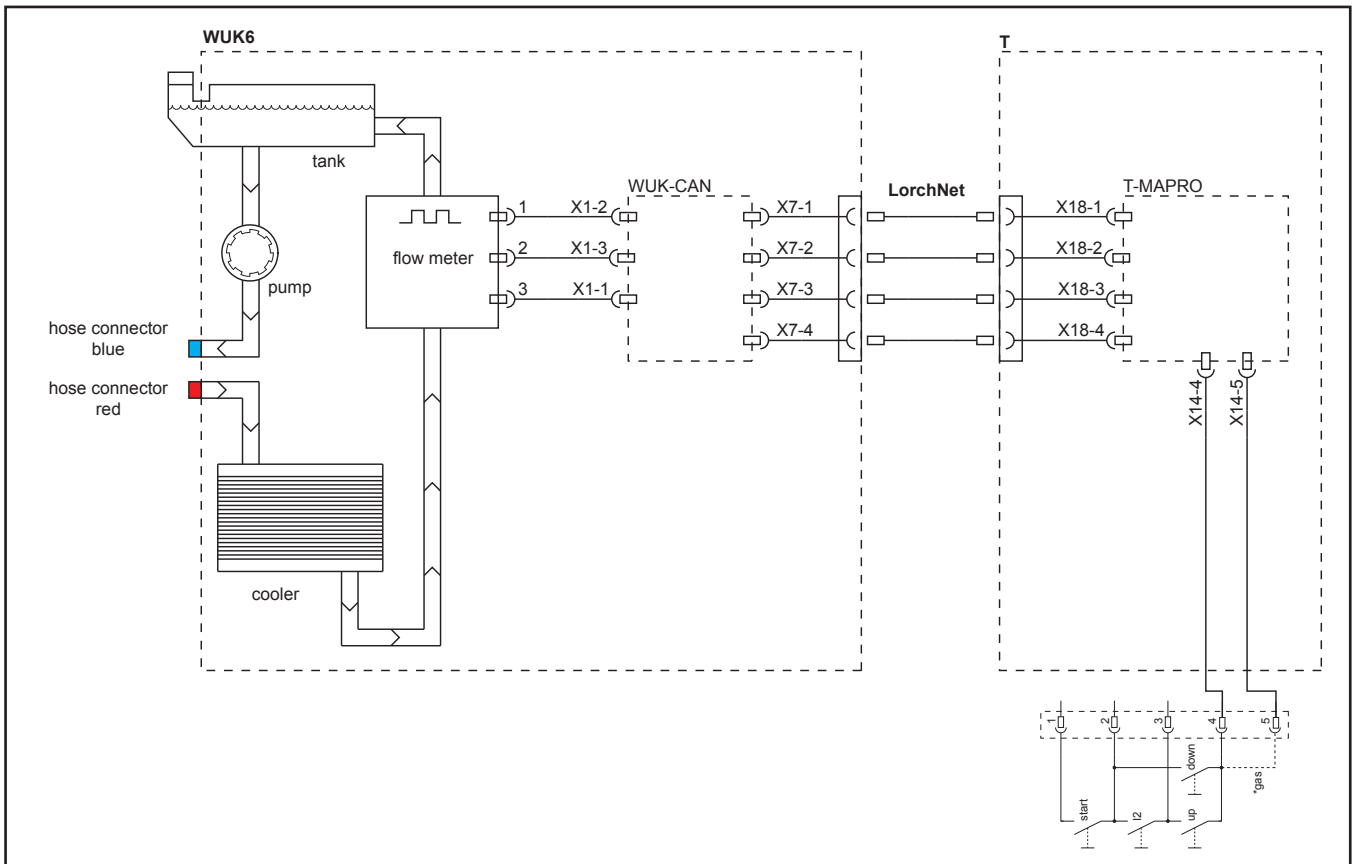


If the HF voltage cannot be changed up by the T-MAPRO board, the machine stops with the error code **E19-00** "HF ignition device".

Cooling unit

If a water-cooled torch is connected to the machine (pins 4 and 5 of the torch control plug are open), a feedback signal from the external cooler is expected via LorchNet. If the actual flowrate is too low (<0,3 l/min) or if no cooling unit is connected, the machine will stop and displays **E05-00** „error cooling unit“.

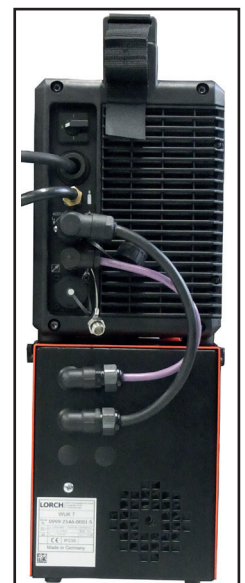
Schematic



Change from WUK6 to WUK7

Since week6 in 2016 the new WUK7 is produced in series. The WUK7 does not have a mains switch any more. The mains supply is now coming via the T-power source. Therefore all T-machines were equipped with an additional mains connection socket. Because of the changes, all T-machines have new part numbers as well as new serial number prefixes.

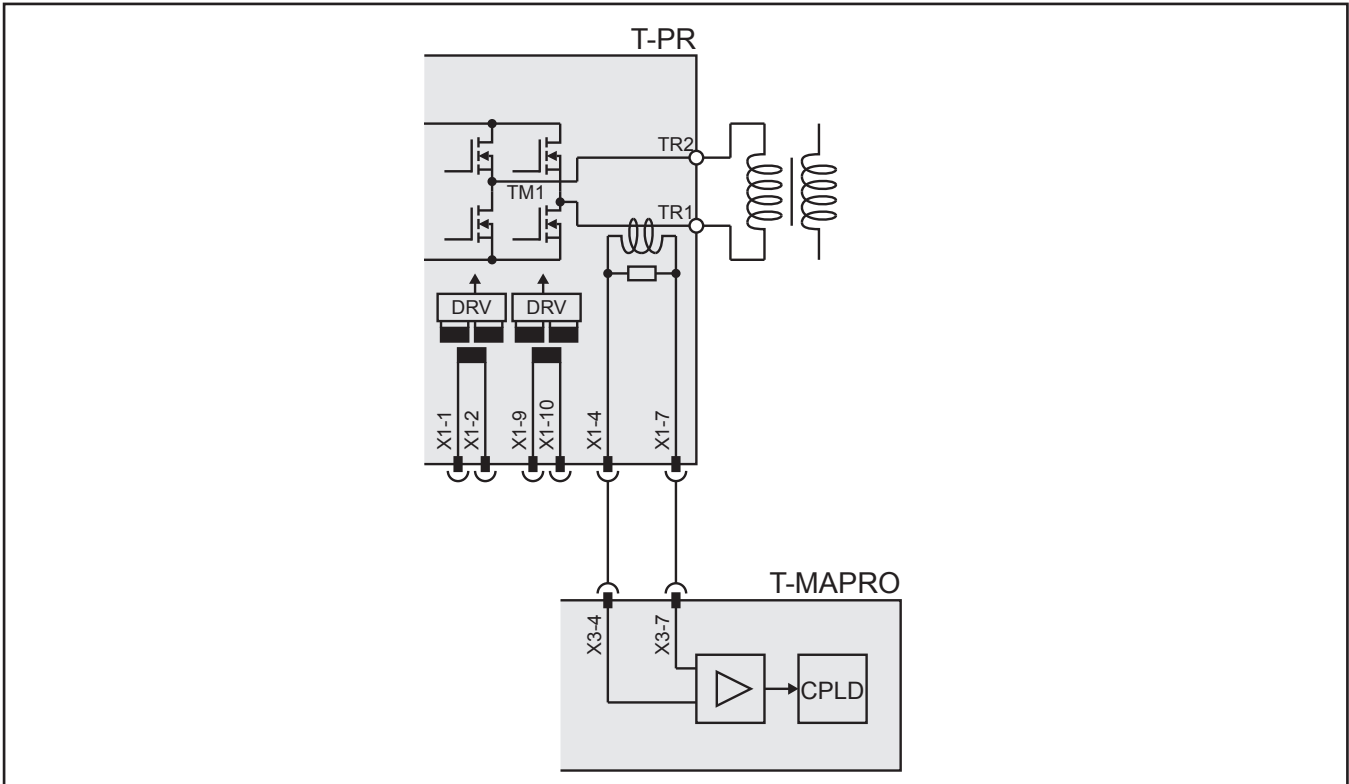
Type		serial no. prefix "new" (WUK7)	serial no. prefix "old" (WUK6)
T250 AC/DC	BasicPlus	6053	0761
	ControlPro	6054	0757
T250 DC	BasicPlus	6055	0760
	ControlPro	6056	0756
T300 AC/DC	BasicPlus	6057	0763
	ControlPro	6058	0759
T300 DC	BasicPlus	6059	0762
	ControlPro	6060	0758



Monitoring primary input current

The mains input current of the machine is measured at the pc-board T-PR300 and monitored by the T-MAPRO. As soon as the input current gets too high, the machine will stop and displays **E16-00** "primary overcurrent".

Schematic



Plastic insulation foil HF transformer

Since April 29 2019, an additional insulating film (663.2577.0) has been used between the retaining plate and the HF choke attachment used. This protects against HF flashovers caused by metal dust, some of which are part of a fault message E16 resulted.

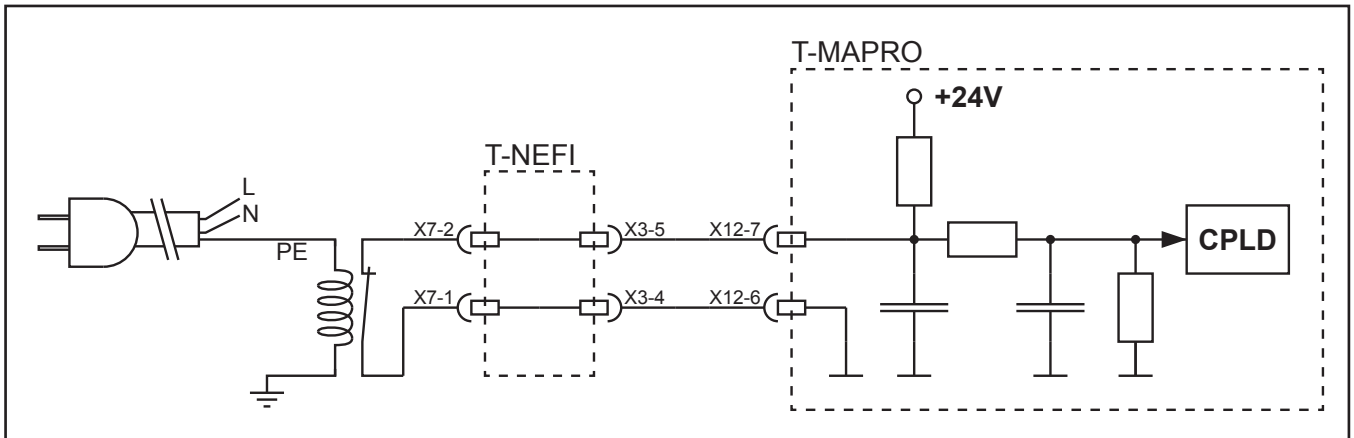


PE (protective earth) monitoring (optinal feature)

For the T250/300 an optional PE monitoring feature is possible. For this feature additional hardware components are necessary, which need to be mounted into the machine.

A necessary requirement for the retrofit is the T-MAPRO3. At machines that don't have the T-MAPRO3 board inside, cannot be retrofitted with the PE monitoring.

Schematic



The PE monitoring can be activated or de-activated in the user specific menu (menu item C07).

In normal state the reed switch contact is closed, as soon as a current >15A is flowing via the PE wire of the mains cable, the reed contact opens, the machine stops and displays the error code **E04-01** "PE monitoring".

Warning messages power source

Warning messages are information messages indicating a malfunction. The machine remains operable with eventually limitations. The malfunction must be rectified as soon as possible.

code	designation	cause	remarks
H01	undervoltage	Supply voltage (Uz) too low <180V DC.	Check mains supply and supply transformer. details see page 39.
H03	fans	Fan faulty or at least 2 fans not working/connected.	check fans, the fans are only tested during initialisation when switching on the machine
H05	EEProm checksum	Data from EEPROM have a wrong checksum.	switch machine off and on again
H06	EEProm read-write error	EEProm memory access error during reading/writing.	switch machine off and on again exchange T-MAPRO if necessary
H10	torch protection	No ID received from torch at active "torch protection" function.	- check torch connection - check torch ID see page 24 for details

Error messages power source

In case of an error message an acute fault is present, so that every running process is stopped immediately. In most cases the machine must be switched off and on again to reset the error message.

code	designation	cause	remarks
E01-01	Overtemperature heatsink (secondary side)	Machine is overheated, the temperature of the heatsink has reached the maximum limit.	Let the machine cool down in standby (fans keep running). details see page 37.
E01-02	Overtemperature heatsink (primary side)		
E01-03	Overtemperature transformer	Machine is overheated, the temperature of the transformer has reached the maximum limit.	
E02-00	Mains overvoltage	Supply/mains voltage is too high.	check supply and mains voltage details see page 39.
E04-01	PE (protective earth) monitoring	A current >15A was flowing via the PE wire of the mains cable.	check worklead and ground clamp details see page 47.
E05-00	Cooling unit	- cooling unit not connected/switched on - faulty connection cable (LorchNet) between power source and cooling unit - flowmeter (inside cooling unit) blocked/faulty - faulty pc-board WUK-CAN (inside cooling unit) - wrong identification bridge at torch control plug (pins 4 and 5)	- connect/switch on cooling unit - check connection cable (LorchNet) - check flowmeter, exchange if necessary - check pc-board WUK-CAN, exchange if necessary - check pins 4 and 5 in torch control plug: 4 + 5 connected = gas cooled 4 + 5 open = water cooled details see page 45.
E06-00	Overvoltage secondary	More than 100V was measured at the output (welding sockets) for longer than 300 ms.	- check wiring of the power unit - exchange T-MAPRO if necessary details see page 40.
E09-00	Current / voltage measuring	The machine cannot measure neither voltage nor current, although the power unit is driven.	- check shunt and Shunt wires - check 10 pin flat ribbon cable between T-MAPRO X3 and T-PR300 X1 - check 20 pin flat ribbon cable between T-MAPRO X5 and T-GL/GWH300 X1 - exchange T-MAPRO if necessary details see page 40 and page 41.
E09-01	Current / voltage measuring AC	In AC mode a permanent current below <6A is measured.	- check shunt and Shunt wires - check 20 pin flat ribbon cable between T-MAPRO X5 and T-GL/GWH300 X1 - exchange T-MAPRO if necessary details see page 41.
E10-00	Torch/remote control	At switching on the machine, a closed start contact was recognized.	- check torch control plug - check wiring of the remote control socket details see page 43 and page 44.
E10-01	Overtemperature PowerMaster torch	The temperature of the TIG PM-torch is too high.	regard the duty cycle of the torch details see page 23.
E12-00	Malfunction power unit	The driving of the power unit is faulty, communication between CPLD and DSP is interfered (jitter).	Switch the machine off and on again, if the error code is permanent, exchange the pc-board T-MAPRO.

code	designation	cause	remarks
E13-01	Temperature sensor heatsink (secondary side)	A rise of the temperature could not be measured after some welding time, eg. a loose connection at the sensor wires.	<ul style="list-style-type: none"> - check sensor wires to T-PR300 (X2) - check sensor wires to T-GL300 (X4) resp. T-GWH300 (X3) - check sensor wires to T-MAPRO (X8) details see page 37.
E13-02	Temperature sensor heatsink (primary side)		
E13-03	Temperature sensor Transformer		
E14-00	Supply voltages	<ul style="list-style-type: none"> - internal supply voltage 15V is outside limits (<12V, >20V) - internal supply voltage 24V is outside limits (<17V, >37V) 	<ul style="list-style-type: none"> - check cable between T-MAPRO (X10) and T-NEFI300 (X2) - check busvoltage - exchange T-MAPRO if necessary details see page 38.
E15-00	Current sensor	At switching on the machine a current is measured (offset from shunt too high)	<ul style="list-style-type: none"> - check shunt and Shunt wires - check connector X7 from T-MAPRO details see page 41.
E16-00	Primary overcurrent	Safety-shutdown, primary input current is too high: <ul style="list-style-type: none"> - short circuit in primary module - short circuit at secondary diodes - short circuit at IGBTs of sec. AC-bridge - loose contact at connecting terminals of primary transformer leads - internal HF-flashover (inside machine) 	<ul style="list-style-type: none"> - check primary module (IGBT short circuit) check T-PR300, exchange if necessary - check secondary diodes - check IGBTs of sec. AC-bridge - check transformer leads - check 10 pin flat ribbon cable between T-MAPRO X3 and T-PR300 X1 details see page 46.
E19-00	HF ignition device	Ignition voltage cannot be generated	<ul style="list-style-type: none"> - check primary HF winding at T-MAPRO X6 - check T-MAPRO, exchange if necessary
E22-00	Mains undervoltage	mains voltage too low (<120V AC)	<ul style="list-style-type: none"> - check mains voltage - check power-up relays and PTC resistor details see page 39.
E25-00	Error VRD	A too low VRD-voltage (<17V) is measured at switching on the machine (during initialisation).	<ul style="list-style-type: none"> - check output sockets are free (nothing connected to them) - check output diodes - check IGBTs (AC machines only) details see page 40.
E30-00	Machine identification	At switching on the machine, the machine identification could not be read.	<ul style="list-style-type: none"> - check 10 pin flat ribbon cable between T-MAPRO X3 and T-PR300 X1 - check 20 pin flat ribbon cable from T-MAPRO X5 and T-GL/GWH X1
E30-03	Front panel identification	At switching on the machine, the front panel type could not be read.	Check 14 pin flat ribbon cable between front panel and T-MAPRO.
E33-01	Bus voltage symmetry	The difference of the bus voltages of both power units is >40V.	<ul style="list-style-type: none"> - check bus voltages - check wiring between T-NEFI300 (X4, X5, X6) and T-PR300 - check wiring between T-NEFI300 (X3) and T-MAPRO (X12) details see page 39.

Error messages cold wire feeder (Feed)

The cold wire feeder has its own error messages that are only displayed at the front panel of the LAC12.

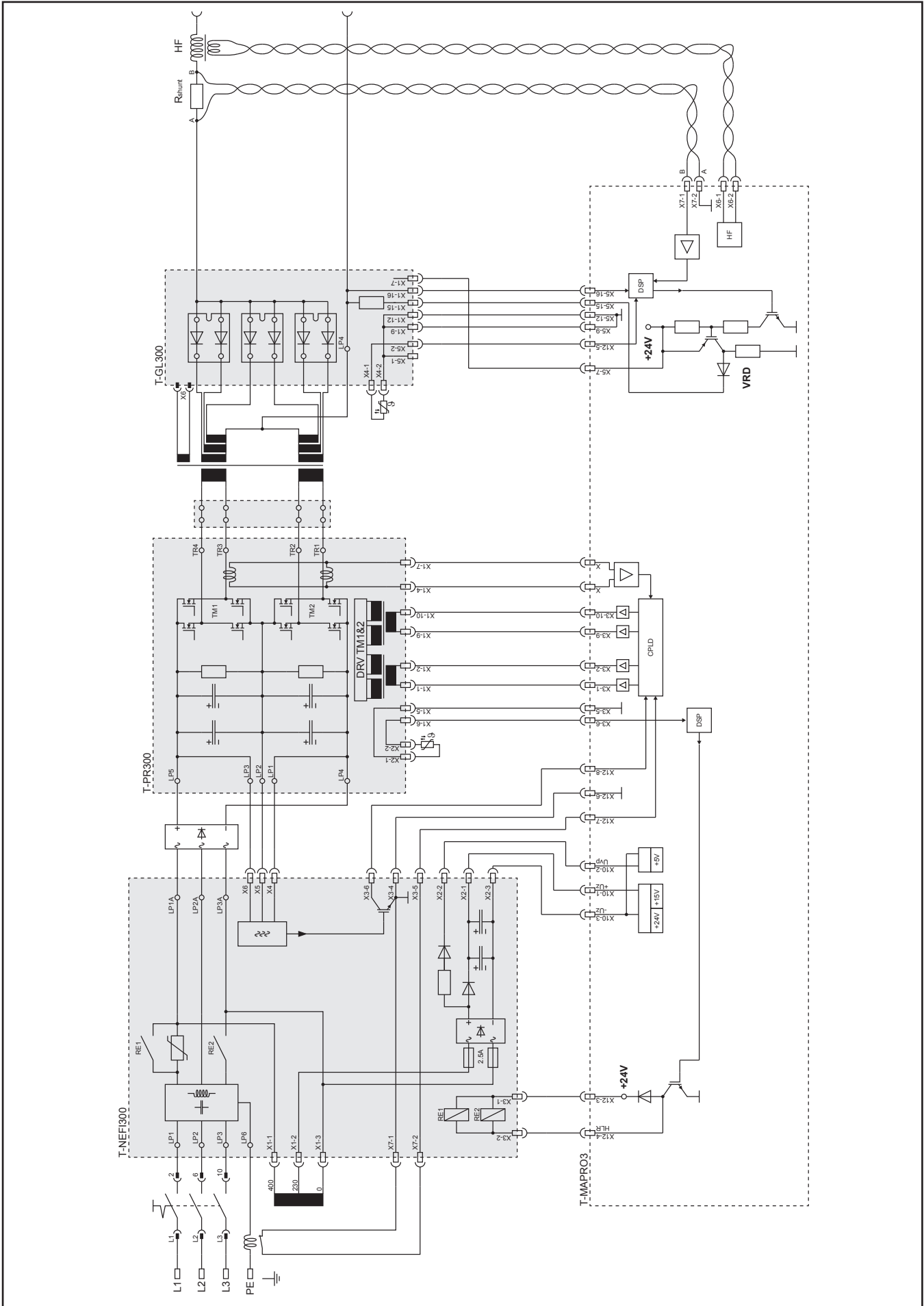
code	designation	cause	remarks
E01	Overtemperature	The maximum temperature of the pc-board DMRPP04 was exceeded (>100°C).	<ul style="list-style-type: none"> - let the Feed cool down - the actual temperature can be displayed in menu Extras, Diagnosis - when the temperature drops below 60°C, the error message disappears
E07-00	EEPROM checksum error	The data of the EEPROM memory have a wrong checksum.	switch machine off and on again, replace pc-board DMRPP04 if necessary
E07-02	EEPROM error	Error during reading/writing of the EEPROM memory.	switch machine off and on again, replace pc-board DMRPP04 if necessary
E08-01	Motor overvoltage	The supply voltage of the motor is too high (60V > 130V)	<ul style="list-style-type: none"> - check control transformer T4 (Feed) and its wiring - check wiring of pc-board KDEVI
E08-03	Motor overcurrent	The current consumption of the wire feed motor is too high.	<ul style="list-style-type: none"> - check wire feed motor and its wiring - the actual motor current can be displayed in menu Extras, Diagnosis
E08-04	Push-Pull motor overcurrent	The current consumption of the Push-Pull motor is too high.	<ul style="list-style-type: none"> - check Push-Pull motor and its wiring - the actual Push-Pull motor current can be displayed in menu Extras, Diagnosis
E08-05	Tacho encoder motor	<ul style="list-style-type: none"> - The signal of the tacho encoder is missing or wrong - Motor is not running 	<ul style="list-style-type: none"> - check the wiring of the tacho encoder - check the wire feed motor and its wiring, exchange the motor if necessary
E08-06	Tacho encoder Push-Pull motor	<ul style="list-style-type: none"> - The signal of the Push-Pull tacho encoder is missing or wrong - Push-Pull motor is not running - wrong type of Push-Pull torch selected 	<ul style="list-style-type: none"> - check wiring of the Push-Pull torch - select the correct type of Push-Pull torch in Menu Extras
E08-12	Calibration	<ul style="list-style-type: none"> - Calibration of the Push-Pull torch is wrong - no wire fitted 	<ul style="list-style-type: none"> - check torch and torch control leads - check pressure lever of the Push-Pull feed unit - fit the wire correctly
E11	Remote control socket	The start contact is closed during switching on the machine.	check the remote control and the wiring of the remote control socket
E13	Temperature sensor	The temperature sensor (NTC resistor on pc-board DMRPP04) is faulty or has a too high resistance value.	<ul style="list-style-type: none"> - check flat ribbon cable between pc-boards DMRPP-P and DMRPP-C04 - check wiring of the DMRPP04 - switch machine off and on again, exchange DMRPP04 if necessary - the actual temperature can be displayed in menu Extras, Diagnosis
E14	Op. voltages error	The 12V supply voltage of the pc-board DMRPP04 drops below 8V.	<ul style="list-style-type: none"> - check control transformer T4 (Feed) and its wiring - check pc-board KDEVI and its wiring - check pc-board DMRPP04 and its wiring
E36	Error SyncPuls	SyncPuls is activated but no valid parameters are present.	<ul style="list-style-type: none"> - LorchNet is disconnected or faulty - check LorchNet connections
E38	Parameter conflict	The parameter values are out of range. For example the parameter values of TipTronic jobs.	set valid parameter values

Warning messages cold wire feeder (Feed)

Additionally to the error messages, the Feed has own warning messages that are displayed at the LAC12 front panel.

message	cause	remarks
Synergy not active	No LorchNet connection was detected with an active synergy function or no synergy parameter had been received from the power source.	Check LorchNet connections and the software version of the power source.
SyncPuls not active	The set pulse frequency of the power source for active SyncPuls is higher than the maximum pulse frequency of the cold wire feed device. (Result: SyncPuls is deactivated)	Set the pulse frequency of the power source to maximum 5 Hz.
SyncPuls active	With an activated SyncPuls the normal pulse mode or spot welding cannot be selected.	To use the pulse mode or the spot welding mode, the SyncPuls must be deactivated first.
Function blocked	The lock function in menu Extras was enabled.	Deactivate the lock function in menu Extras.

Schematic T-DC



Schematic T-AC/DC

