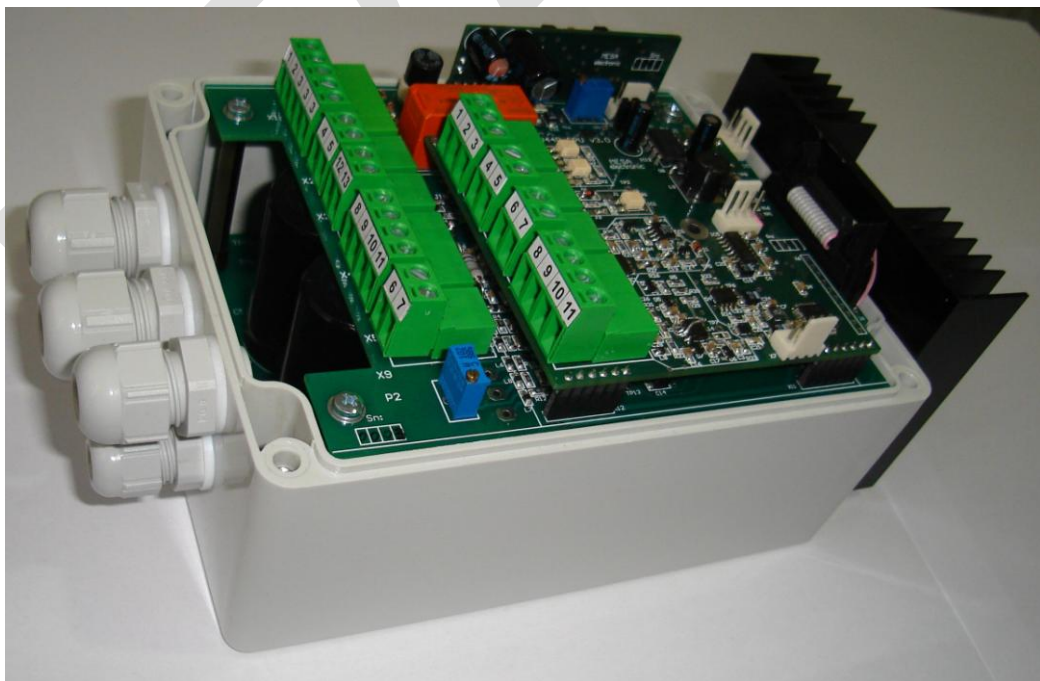


User Manual

Intelligent Power Supply for Lambda probe
and O₂-Probe

NTV44P advance

with terminal **T-300**



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About the contents

The operating manual NTV44P documents structure, measuring technique, function, and installation of the device as well as error diagnostics.

The instructions address all users (owners) and operators of the NTV44P. It must be accessible to these persons and must be read through carefully before using the device.

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1. INTRODUCTION

The NTV 44P is a unique power supply which allows controlling the working temperature of L-Probe to a constant value. Thus, error due to cooling by different gases or ambient temperature changes is completely compensated.

The NTV 44P is available on market in the following Versions:

Basic Version:

- L-Probe input
- Control of working temperature of L-Probe
- Non isolated analogue output 0...1300 mV

Options for Basic Version:

- Calculation of O₂ % in a customer defined range
- Dew Point calculation for fixed process parameters
- Time flushing modus with fix flushing cycle time
- Isolated universal output module with 0 ...1300 mV ; 0 ... 10V;
0 ... 20 mA; 4 ... 20 mA

Advanced Version:

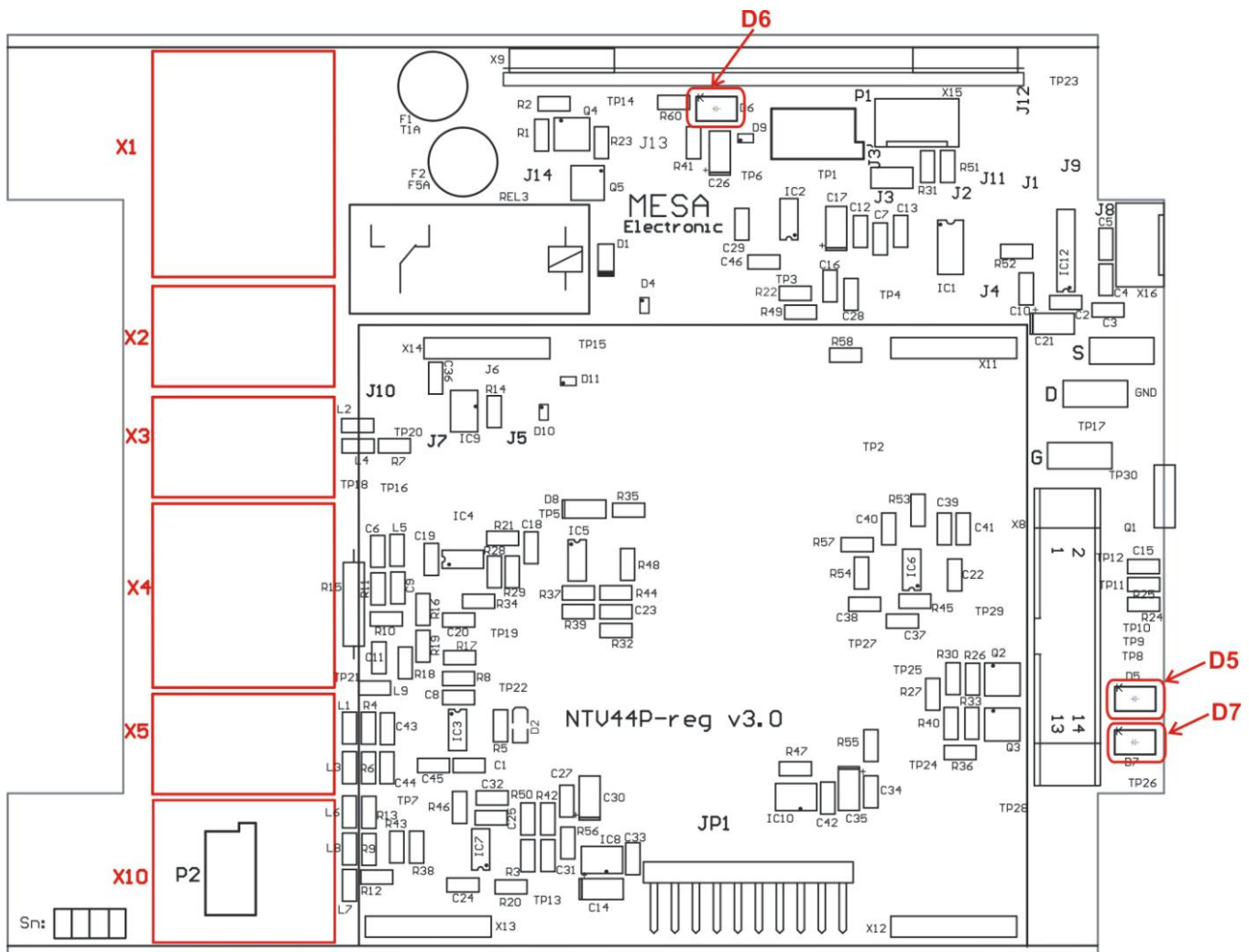
- L-Probe or O₂-Probe input
- Control of working temperature of L-Probe
- Isolated Thermocouple input
- Isolated universal output module with 0 ...1300 mV ; 0 ... 10V;
0 ... 20 mA; 4 ... 20 mA
- One implemented mathematical function like %O₂ or Dew Point or
L-Probe / O₂-Probe conversion
- Two point correction on above mentioned mathematical function
- Four Flushing modes Time flushing, Temperature flushing, mV flushing
and flushing via digital input

Optional you need one T300 Terminal to configuring all mentioned Functions of all your devices.

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2. INPUTS AND OUTPUTS

2.1 Main board



2.2 Pin assignments of Main board:

X1 Supply

1. L ~230V/50Hz or ~115V/50Hz
2. N
3. PE
3. PE
3. PE

X2 Relay - optional for flushing

4. Relay output N.O.
5. Relay output Comm. (fuse 5A F)

X3 Analogue output

6. +Analogue output
7. -Analogue output

X4 Probe heater

8. +Power Sense
9. +12V
10. 0V
11. -Power Sense

X5 Input from probe

12. +Input of probe
13. -Input of probe

P2/X10 Potentiometer

- 14,15,16, - Optional external offset potentiometer

2.3 Main board LED indication

- LED D5/D7 (see picture above) indicate that NTV 44P is correct supplied with Power

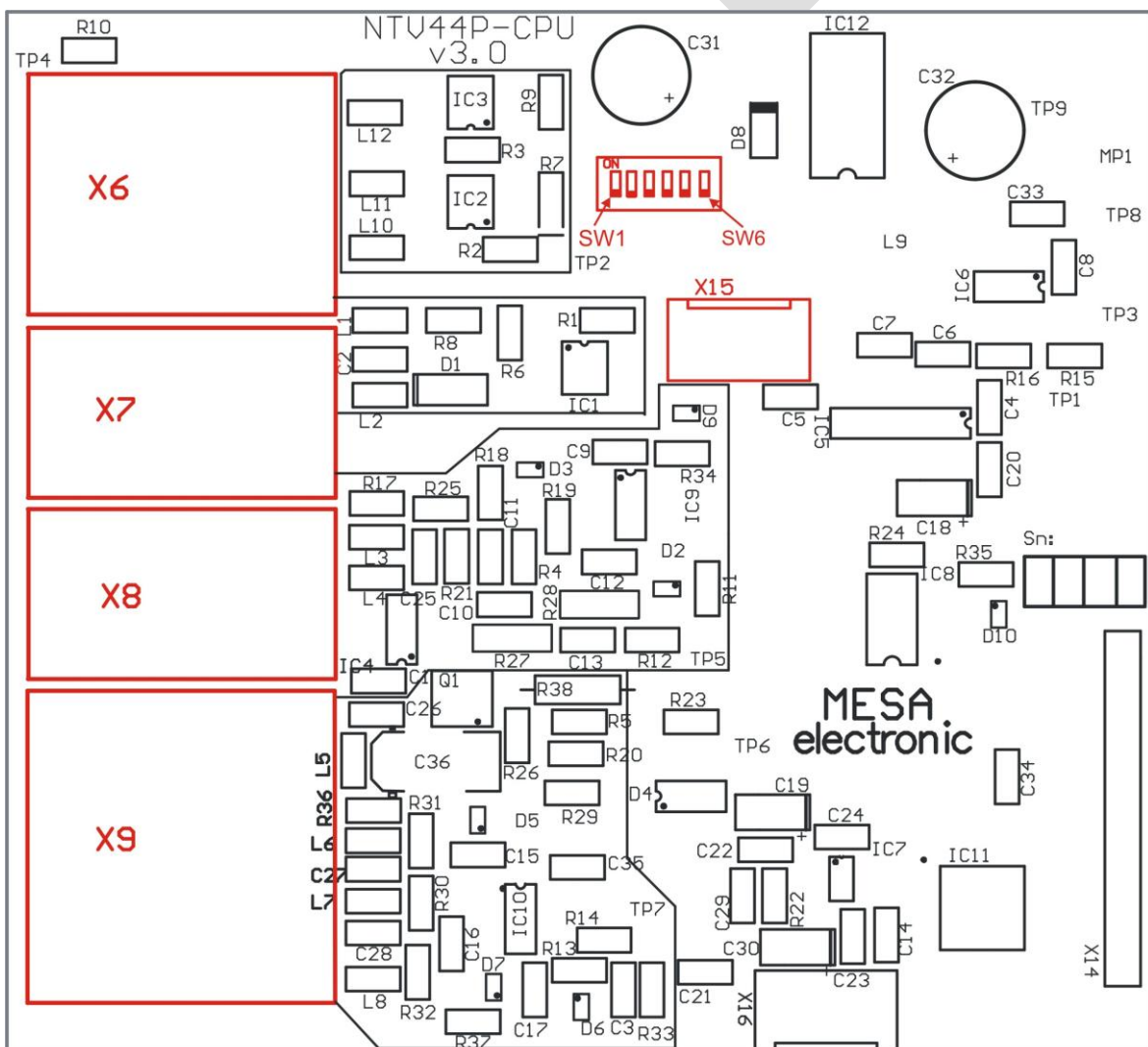
	D5	D7
150V – 180V	OFF	ON
180V – 210V	OFF	OFF
210V – 230V	ON	ON
230V – 250V	ON	OFF

- LED D6 (see picture above) indicates the status of the flushing relay:

Green means flushing contact connector X2 Pin 4/5 is closed

Not green means flushing contact connector X2 Pin 4/5 is open

2.4 Upper - CPU board



Pin assignments of CPU board:

X6	Digital outputs for O2% range 17. Common Digital output 18. OUT1 Digital output 19. OUT2 Digital output	X9	Pressure sensor input 24. 0V – supply for sensor 25. - input from sensor 26. + input from sensor 27. +10V – supply for sensor
X7	Digital input 20. 0V Digital input, start flushing 21. +24V Digital input, start flushing	X15	T300 terminal connector
X8	Thermocouple K/S input 22. – thermocouple (white/white) 23. +thermocouple (green/orange)		

2.6. Input / output specification

2.6.1 Inputs:

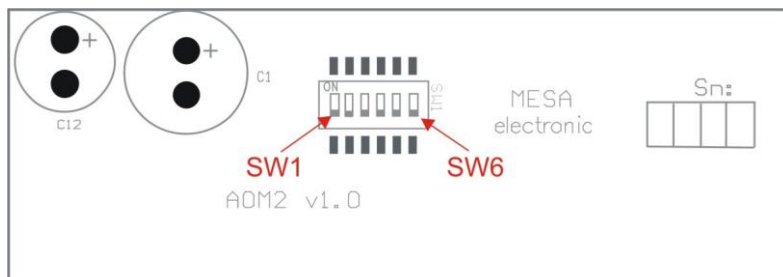
- **L-Probe Input** (X5): from -20 mV... 1300 mV.
- **Thermocouple input** (X7): type S (PtRh-Pt) or K (NiCr-Ni), cold junction compensation on board.
- **Pressure sensor input** (X9): optional - used for compensation of output results.
- **Digital Input** (X6): Electrically isolated digital input for manual start flushing. Can be configure to activate by +24V DC or via external switch - short connection between pins.

	digital output 1		digital output 2	
	optocoupler output	TTL output	TTL output	optocoupler output
SW2	OFF	ON	x	x
SW5	x	x	ON	OFF
SW6	OFF	ON	ON	OFF

	Digital input	
	contact input	+24VDC input
SW1	ON	OFF
SW3	OFF	ON
SW4	ON	OFF

2.6.2 Outputs:

- **Universal analog output (X3).** Can be chosen by selector switch:



	SW1	SW2	SW3	SW4	SW5	SW6
0 - 2.5V	ON	OFF	OFF	ON	OFF	not used
0 - 10V	ON	OFF	OFF	ON	ON	
0 - 20mA	OFF	ON	ON	OFF	OFF	

- **Two Digital outputs (X6)** for indication of current range for auto range O2% output calculation. If more than one range of O2% is enabled, then program automatically define current range in which is result and indicate it by those outputs, see 3.2

Can be configured as: open collector (opto isolated) or standard transistor output: low value is 0.2V and high value is 5V (non opto isolated).

2.6.3 Communication connector

- One standard **RS232 interface** for connection to Terminal T300 in order to configure working of NTV44P device, and to get measurement results and device status in digital way.

3. SCOPE OF FUNCTIONS

NTV44P device can be ordered with possibility to provide one of next calculation:

3.1. L-probe output

Buffered L-probe voltage 0 to 1300 mV. L-probe voltage is electrically isolated and transfer to standard voltage or current signal according to chapter 2.6.2

3.2. O2 [%] calculation

Due to the wide measurement range of O2 [%], this output values are divided in four segments, automatic range of segment is provided according to the measurement results. State of segment position can be seen on two digital outputs (Digital Output 1 & 2) as binary coded values:

Out2	Out1	
0	0	segment 1
0	1	segment 2
1	0	segment 3
1	1	segment 4

During configuration it is necessary to enter the number of segments (1 – without the change of segments) and the min and the max value for corresponding segments. Overlapping of max of and min values between segments provide hysteresis of changing current segment of output. The result value (O2%) can be influenced for arithmetic adaptation of the measured values to the specific conditions of the respective plant with two correction values, which are entered via terminal T300.

3.3. Dew Point calculation

With this function Dew Point can be calculated and converted to appropriate analogue signal to the output in the defined ranges. For this conversion a thermocouple measurement of temperature is needed. It is also necessarily to specify values for H2% and CO% like constant through T300 terminal. The result value (Dew Point) can be influenced for arithmetic adaptation of the measured values to the specific conditions of the respective plant with two correction values, which are entered via terminal T300, option 3.8, see chapter 6.

3.4. L-probe - O₂ probe computer:

When used as an L-probe to O₂-probe computer the voltage signal of an L-probe is converted into an equivalent voltage signal of a conventional zirconium dioxide probe. For this conversion a thermocouple measurement of temperature is needed.

The result signal (O₂-probe voltage) can be influenced for arithmetic adaptation of the measured values to the specific conditions of the respective plant with two correction values, which are entered via terminal T300.

4. NTV44P FLUSHING SYSTEM, PARAMETERS AND EXPLANATION

Flushing of probe is activated with the relay inside NTV44P. Origin for start flushing should be defined inside "NTV Settings" menu of T300 terminal. There can be more than one origin of start flushing (even all four). Time of flushing is defined also in parameter.

During, and after flushing last value of output voltage is retained. Time after flushing while output is constant is named "recovery time", and also should be defined as parameter.

Origin of Flushing inside "Flush Config" parameter:

- **Time Flushing.** Period between two flushing is defined as "**Flushing Cycle**" in minutes. Duration of flushing is defined in "**Flush Time**" parameter in seconds. Recovery time is defined in parameter "**Flush Recover**" in seconds also.
- **Pushbutton or digital input Flushing.** If 24 V are available on Digital output X6, flushing is performed all the time. After end of input voltage, "**Flush Time**" and "**Flush Recover**" is the same as for previous origin.
- **Voltage Flushing.** If Voltage of Probe is less than defined in "**Flush mV**", flushing is started. Duration of flushing and recovery time is defined apart in "**Flush mV time**" and "**Flush mV recover**".
- **Temperature Flushing.** All the time while temperature is less than defined in "**Flush Temper**" parameter, flushing of probe is performed. There is no additional recover time, and voltage of probe is not holded.

No matter of current configuration, flushing can be started immediately via Terminal command.

5. CORRECTION OF OUTPUT RESULT

Automatic two point correction mechanism is provided for all versions of device output calculations. User should only enter known values of measurement results in one or two measurement point, using Terminal T300, option 7.1, see next chapter. Device itself chooses right correction point, and sets measured and correction values. If more than two correction point is entered, device will manage correction to obtain best results. Via menu option 7.2 by Terminal T300 , all correction data can be cleared at once.

6. MENU STRUCTURE WITH TERMINAL T300

Screens after reset:

Welcome screen two seconds:

```
MESA electronic
NTV44P
T300
v1.0
```

Language Selection:

```
Language
1: German
2: English
```

Main Menu:

```
1:Measurements
2:Errors, Reset
3:NTV Settings
4:Start Flushing
5:T300 Settings
6:NTV Version
7:Correction
```

```
Main Menu:
1: Measurements
2: Errors, Reset
3: NTV Settings
```

(Scroll Up/down on Array key)
Can select with number,
ENTER - select, 'C' level up

Menu structure:

Main Menu:

```
Probe Input
1023.4 mV

<enter>
```

1:Measurements

```
1:Main Results
2:Non Corr result
3:Probe input
4:Junct.Temp.
(5:Temperature)
```

Corrected result depend on main function
Main result before correction
Voltage of probe input
Ambient temperature inside NTV44P
Measurement of temperature, if temperature function is required

2:Errors, Reset

```
1:Errors T300
2:Errors NTV44P
3:Reset device
```

Show existing error one per one, until press 'C'
Show existing error one per one, until press 'C'
Perform Reset of NTV44P

3:NTV Settings

Show **and edit** current value of parameters

```
Corr. Temp
937 °C
<enter>=Edit
<C>=Exit
```

Edit of the parameter
start after Pressing
ENTER

```
1:Configuration
1:Probe
2:Output
(3:TC)
```

Select input/output configuration and ranges
Select type of input probe, can be L or O2 probe
Select range of outputs according chapter 2.6.2
Type of TC probe S or K if Temperature is measurement

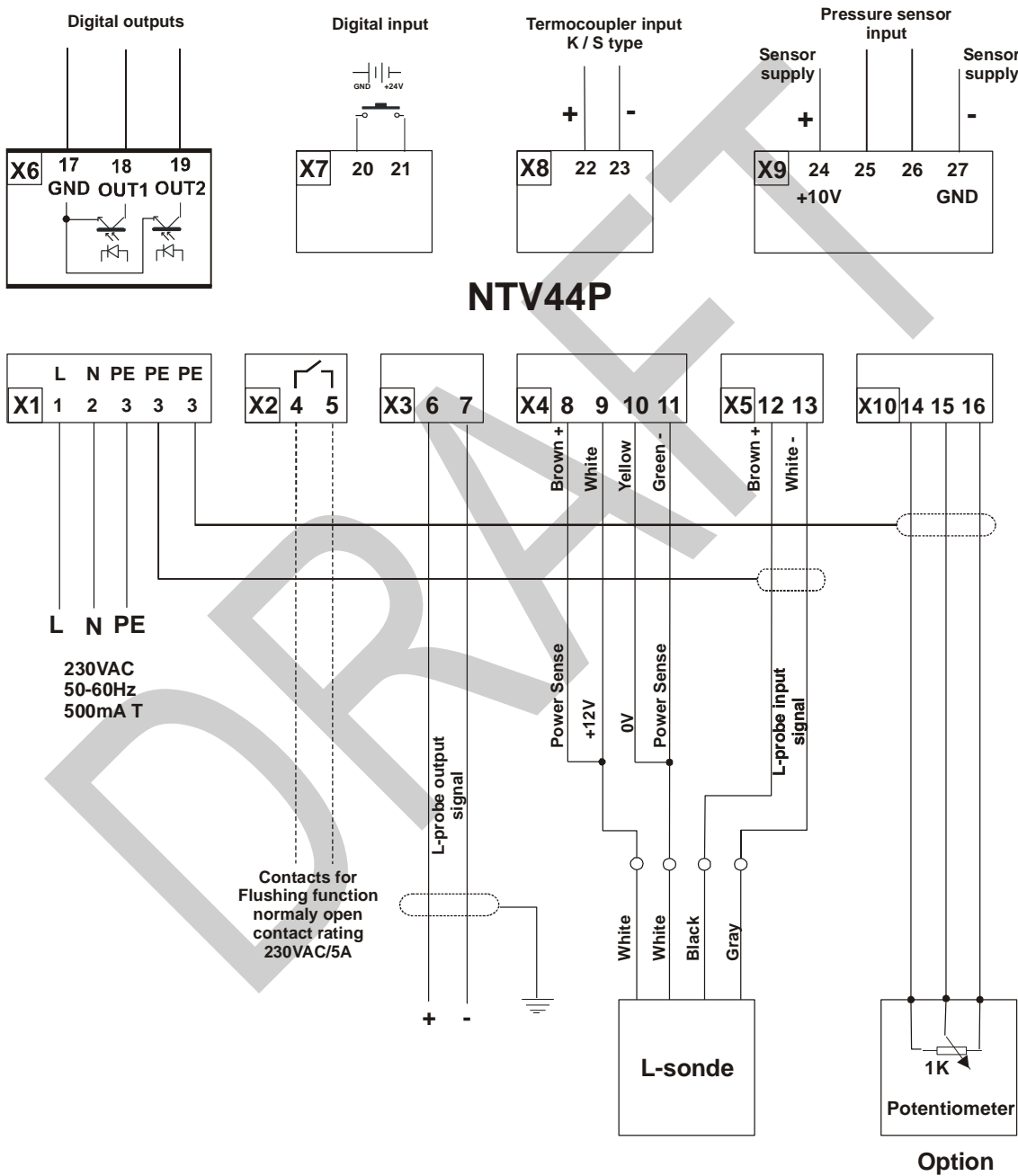
2:L Probe

Parameters of L and O2 probe

1:Value K1	
2:Value K2	
3:Out Ranges	Values needed for scaling of output signal
1:O2mV min	Range for L or O2 probe output
2:O2mV max	Default range is 0mV to 1300mV
or	
1:DewPoint min	Range for Dew point probe output
2:DewPoint max	Default range is -30'C to +30'C
or	
1:O2% No. range	Number of range for O2% calculation, can be 1 to 4 if range is 1, then there is no auto range All O2% boundaries must be from 10-29% to 21%, Always for O2%
2:O2%min1	Always for O2%
3:O2%max1	Always for O2%
4:O2%min2	Exist if O2% number of range is greater than one
5:O2%max2	
6:O2%min3	
7:O2%max3	
8:O2%min4	
9:O2%max4	
4:Enable Flush	Enabling particular origin of flushing
1:Time Flushing	enable time flushing
2:Button Flush.	enable start flushing by digital input
3:mV Flush	enable flushing by voltage of probe
4:Flush_Temper.	enable flushing by temperature measurement result
(5:Time Flushing)	If Time flushing is enabled
1:Flush Cycle	Flush cycle time in min.
2:Flush Time	Duration of flushing in sec.
3:Flush Recover	Recovery time after flushing in sec.
(6:mV Flushing)	If mV flushing is enabled
1:Flush mV	mV of Probe for start flushing
2:Flush mV time	Duration of flushing due to mV in sec.
3:Flush_mV_recov	Recovery time after flushing in sec.
(7:Flush_Temper.)	(Temperature in °C for comparison to start flushing), if Temperature flushing is enabled
(8:Fix Values)	Values needed for Dew Point calculation
1:Fix CO%	Concentration of CO% in working gas
2:Fix H2%	Concentration of H2% in working gas
4:Start Flushing	Start flushing Immediate
5:T300 Settings	Settings of T300
1:Language	Choose current language
1:German	
2:English	
3:Clock	Show and Set time
6:NTV44 Version	Read Identification and Version strings of NTV44P
1:Company	
2:SW-Version	
3:Serial No.	
4:Product Check	
(7:Correction)	Present if any correction is possible
1:Correct	Enter Correction of output results
2:Clear Corr.	Clear correction of output
3:Corr .Temp	Correction of Temperature measurements if need

New O2-Corr.
923.4 mV
<enter>=Edit
<C>=Exit

7.CONNECTION DIAGRAM



8. TECHNICAL DATA

Construction:

Macrolon housing for wall mounting

Dimensions / Weight:

160 x 120 x 90 mm / 2.5kg

Protection type:

IP64 according to DIN40050

Connection:

Pluggable terminal blocks

Wire cross section max 2.5mm²

L-probe connection:

1m connection cable with plug and coupler

Input measuring probe:

-20 ...1300mV DC

Temperature measuring probe:

-Thermocouple S or K type

Digital output:

-Two optocoupler or TTL, max 10mA per output.

Digital Input:

-Contact or +24V DC digital input for start flushing.

Output supply unit:

Heating voltage for L-probe

- 12 V DC in constant voltage mode

- max 15V DC in temperature mode

Limited current to 2.3A max

Output measuring signal:

- Voltage output 0...1300mV DC or 0 ... 10V DC

- Current output 0...20mA or 4...20mA

Operating conditions:

Operating temperature 0°C...+50°C

Storage temperature -10°C...+70°C

5...95% relative humidity, non-condensing

Auxiliary voltage:

- 230 VAC $\pm 10\%$; 50...50 Hz or
- 115 VAC $\pm 10\%$; 50...50 Hz

Power consumption:

Approx.60VA

Fuse:

Main power – “European” fuse 500mA, slow blow

Flushing relay –“European” fuse 5A, fast blow

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