



# Modular Power Supply System PL 500 F8

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User's Manual

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## Modular Power Supply System Series PL5 500 F8

### Floating 3U and 6 U Size

#### General Remarks

The only purpose of this manual is a description of the product. It must not be interpreted as a declaration of conformity for this product including the product and software. **W-IE-NE-R** revises this product and manual without notice. Differences of the description in manual and product are possible. **W-IE-NE-R** excludes completely any liability for loss of profits, loss of business, loss of use or data, interrupt of business, or for indirect, special incidental, or consequential damages of any kind, even if **W-IE-NE-R** has been advised of the possibility of such damages arising from any defect or error in this manual or product. Any use of the product which may influence health of human beings requires the express written permission of **W-IE-NE-R**. Products mentioned in this manual are mentioned for identification purposes only. Product names appearing in this manual may or may not be registered trademarks or copyrights of their respective companies. No part of this product, including the product and the software may be reproduced, transmitted, transcribed, stored in a retrieval system, or translated into any language in any form by any means with the express written permission of **W-IE-NE-R**.

#### Mains Voltage

The PL 500 F8 are equipped with a "World"- mains input, which works properly from 94VAC up to 264VAC and within a frequency range of 47 to 63Hz.

Before connecting to the mains please double-check correspondence.

#### Safety

After connecting the PL 500 F8 to the mains, the mains input module is powered permanently. Filter and storage capacitors of the power factor correction module are charged with about **400VDC**. The DC-On-Signal as well as a power switch at control board (if any installed) operates as a DC on/off switch only and not as a mains breaker. **Therefore it becomes dangerous if the box cover is open. In this case a lot of components on high voltage potential get touchable!**

**Before starting any kind of work inside the power box remove the PL 500 F8 from mains and wait a couple of minutes with your activities! Discharge the primary DC Filtercapacitors by use of a well isolated 22 ohm 10W resistor.**

## Declaration of Conformity

Art. 10.2 of 89/336 and 89/392 / ECC

**W-IE-NE-R**  
**Plein & Baus GmbH**

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declare under our own responsibility that the product

**PL 500 F8**  
**Item: 0P01.xxxx**

to which this declaration relates, is in conformity with the following standards or normative documents :

1. EN 50 081 - 1
2. EN 61 000 3 - 2
3. EN 50 082 - 1
4. EN 60 950

Conditions:

This unit is not a final product and is foreseen for use inside a closed cabinet. The supplying of loads over long distances (>3m) needs possibly additional RF rejection hardware to get in conformity of the definition. Admitted for powering by all mains.

Name and signature of authorized person

Place and Date

Name und Unterschrift des Befugten

Ort und Datum

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Juergen Baus

Techn. Director

Febr. 2000

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## 1 Device description

The PL 500 F8 can control up to 8 different floating outputs. Referring to the ground reference (GND SIGNAL, pin 31 and pin 32 of the 37 pin D-Sub connector) the maximal floating voltage for proper regulation should be not exceed +/-10V for the 2... 7V MEH outputs and also for MDL and MDH grounds. All sense- and power levels have to be in this range. For higher output voltages the floating ranges increase accordingly.

The MDL and MDH are always limited to +/-10V difference between their grounds in respect to the GND SIGNAL.

### 1.1 Commencement of operation

You can put the PL 500 F8 in operation in different ways:

**A:** By computer (through V 24 interface)

**B:** By CANbus (optional)

**C:** By jumpering Pin 8 with Pin 2 or 7 on the 9 DSUB connector

**D:** By alphanumerical control panel with display (optional)

The control board gives also the opportunity to operate special fans and watch for fan fail

**E:** By mainswitch on the rearside (optional)

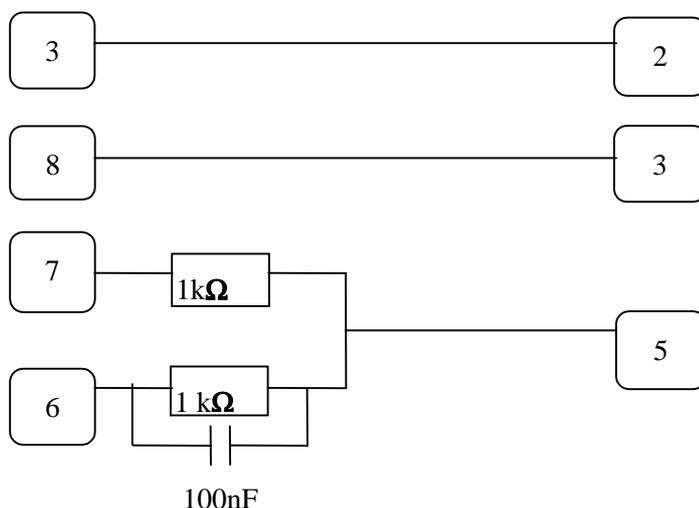
**A:**

### Connection of an Personal Computer and the Power Supply PL 500 F8

All you need is an PC running Windows, the control program PL 500 F8 and a simple adapter.

9 Pin DSUB female  
(PL 500 F8)

9 Pin DSUB male  
(PC)



Note:

If you use Pin 3 and 8 for a serial connection to a computer, you can't use these pins for the „Remote On“ and „Status Out“ functions and you can connect neither the power supply to an alphanumeric control panel (see below D) nor operate with remote on / off (see below C).

## **B:**

### **Control of the Power Supply PL 500 F8 via CAN-Bus (optional)**

The CAN Bus Signals are provided on the 9 Pin DSUB:

CAN\_H: Pin 5

CAN\_L: Pin 9

CAN\_GND: Pin 4

The software protocol is described in a separate document (Part No \*00183)

CANbus is an independent port. It may be used also in combination with the operation modes of A, C, D, and E

## **C:**

### **Control of the Power Supply PL 500 F8 without PC or Control panel (display)**

There is a remote on/off input and a status output function:

Remote On: 9 Pin DSUB: Close a “make” contact or switch between Pin 8 (Serial Data In) and Pin 2 or 7.

Status Output: 9 Pin DSUB: Connect a LED between Pin 3 (Serial Data Out,+) and Pin 1 or 6.

## **D:**

### **Control of the Power Supplies PL 500 F8 with the Alphanumeric Control**

Many power supply parameters may be changed via the alphanumeric control of the connected fan tray.

The general procedure is:

- Switch the POWER and the MODE switch up simultaneously for 5 seconds. The display shows „Config: Wait...“ and „Config: Ready !“. Then release both switches.
- If a sub-menu exists, you may now select the sub-menu item (MODE switch up/down). If no sub-menu exists, you may change the parameter value (MODE switch up/down)

- To change a parameter of a sub-menu, select it (POWER switch up). The selected parameter is flashing now.
- You may alter the parameter now (MODE switch up/down)
- After finishing the parameter programming, leave the submenu or configuration menu (POWER switch down).

Mode	associated parameter submenu	Description
Any Voltage (e.g. +5V or U0)	Ilim	Output Current limit
	Uadj	Output voltage fine adjustment. The same function as the switches in the power supply
	Unom	Output voltage coarse adjustment.
	Imax	Monitoring: Maximum current for good status.
	Umin	Monitoring: Minimum voltage for good status.
	Umax:	Monitoring: Maximum voltage for good status.
Power	Auto Power On No Auto Power On	Automatic switch on of the power supply after come back of the mains
	Switch Off Normal Switch Off Delay	Delayed switch off: You have to push the POWER switch down for 5 seconds until the power supply switches off
OPTIONALLY:		
Fans	Watching x Fans	Display of the number of monitored fans
Fan Temp	Temp Display: °C Temp Display: °F	Select the temperature unit: Celsius or Fahrenheit
Bin Temp x (up to 8 sensors)	PsOff	If the temperature of sensor x is above this limit, the power supply will switch off.
	FanUp	If the temperature of sensor x is above this limit, the fan tray fan speed will increase to full speed.

**E:**

Use “mains switch” at the rear side to start the PL 500 F8.

Also this optional rocker switch acts as a DC on / off switch and doesn't disconnect mains from the unit

## 1.2 Technical Data

- Up to eight independent potential free outputs with >5 kW at 230 VAC
- Fully controlled, programmable trip levels
- Voltage ramp up within (50ms fix) monotony and synchrony,  
Ramp down as fast trip. Output capacitors discharging by crow bar
- Extremely low noise and low ripple
- CE conform EN 50081/82 part 1
- Safety in accordance to EN 60950
- Sinusoidal mains current to EN 61000-3-2

The PL 500 has been constructed to provide external load channels with high power consumption over long distances.

Voltages, currents, temperatures and output power are controlled by internal processor and illegal modes as well as failure will be detected.

A fast sense circuit and a delayed remote-sense compensation guarantees continuously and stable operation, even with long inductive wiring to the loads.

A control board with display for data and diagnostic is optionally available for installation near to the PL 500 F8, preferably in the 19" power bin. Connection has to be achieved by use of the V24 loop.

Optional programming and monitoring can be done by CANbus interface.

### Module cage formats

6 U box: max. 10 modules, up to 5.6kW output power

Connections / plugs: 10 pins 250A, 8 pins 150A

Size (WxHxD): 434 mm x 260 mm x 255mm

3 U box: max. 5 modules, up to 2kW output power

Connection / plugs: 10 pins 250A, 8 pins 150A

Size (WxHxD): 434mm x 132mm x 255mm

3U box with alternative C or H input, 6U box suitable for all inputs. Plugs until 16A input current, above 16A terminals with 2m power cord, fixed . Available output power depends on input voltage and is listed above for the full mains voltage range.

### Mains input

**C/E** Sinussoidal: CE EN 60555, IEC 555 pow. fact.0,95(230VAC), 92..264 VAC, 10/20A

**H/K** Sinussoidal: CE EN 60555, IEC 555 pow. fact.0,95(230VAC), 92..264 VAC, 15/30A

Inrush current: limited by softstart circuit, max 1.1 fold nominal input current

**Isolation** Inp.-out.: **CE** acc. to EN 60950, ISO 380, VDE 0805, UL 1950, C22.2.950

**Output power** with different mains inputs:

**C** 700...2100W, **E** 1400...4000W, **H** 1000...3000W, **K** 2100...6000W

### DC Output of different modules

#### 1.3 DC Output and floating range of different modules

The listed “floating range” refers always to the GND SIGNAL of the 37 pin Sub D connector !

min. to max. range	floating range	max. output	(with C, E, H, K mains input)
2 - 7,0V	+/- 10V	115A / 550W	type MEH
4 - 10,0V	+/- 15V	85A / 650W	type MEH
7 - 16V	+/- 20V	46A / 550W	type MEH
12 - 30V	+/- 30V	23A / 550W	type MEH
30 - 60V	+/- 70V	13,5A / 650W	type MEH

**Note:** The max. floating range of MEH modules is to understand that all output levels have to be inside the voltage range. Also if outputs should operate in +/- or other cascading condition.

2 - 7.0V	+/- 10V	(±)20A/140W(280W)	type MDH
7 - 24V	+/- 10V	(±)11.5A/140W.(280W)	type MDL
7 - 30V	+/- 10V	(±) 7.4A/180W.(360W)	type MDL

**Note:** The max. floating range of MDL and MDH modules concerns only the difference between grounds. The + or – outputs are not concerned.

#### 1.4 Regulation

Static:

MEH 550W/650W <25mV (± 100% load, ± full mains range)

MDH 20A: <0.1% (± 100% load, ± full mains range)

MDL (11.5A/7.4A) <0.1% (± 100% load, ± full mains range)

Dynamic:

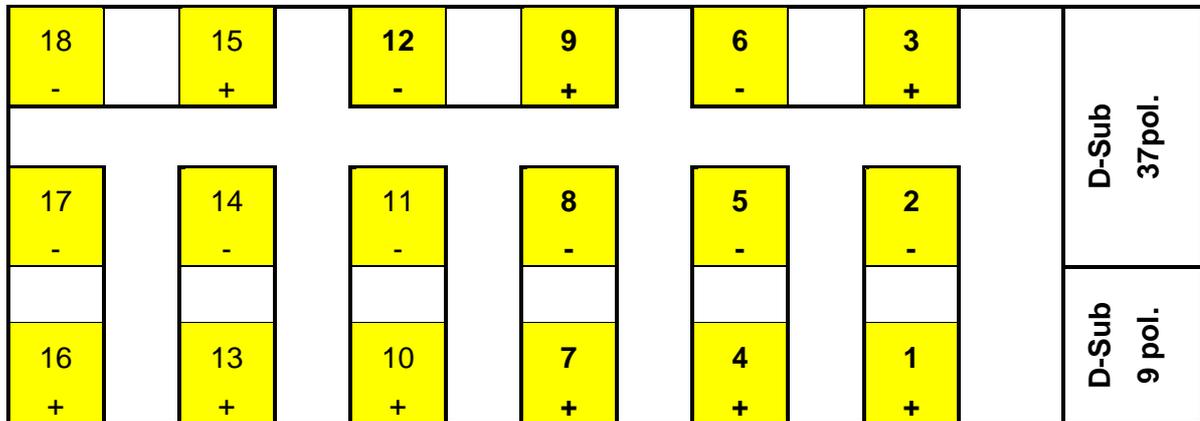
MEH, MDH: < 100mV (± 25% load)

MDL (11.5A/7.4A): <0,7% (± 25% load)

Recovery time $\pm 25\%$ load: (Power Supply terminals)	within $\pm 1\%$	within $\pm 0,1\%$
Modules 550W	0,2ms	0,5ms
Modules 650W	0,5ms	1,0ms
MDL (11.5A/7.4A):	0,0ms	1,0ms
Recovery time $\pm 25\%$ load: (Load side with 25m cable length)	within $\pm 1\%$	within $\pm 0,1\%$
Modules 550W	0,2ms	0,5ms
Modules 650W	0,5ms	1,0ms
MDL (11.5A/7.4A):	0,0ms	1,0ms
<b>Sense compensation range:</b>	up to maximum module voltage range	
Noise and ripple, 50cm wire:	$< 10\text{mV}_{\text{pp}}$	(0-20MHz) $3\text{mV}_{\text{rms}}$ (0-2MHz)
10m wire:	$< 3\text{mV}_{\text{pp}}$	(0-300MHz)
Conditions, at load site:	Parallel (X) $\geq 330\mu\text{F}$ and $\geq 1\mu\text{F}$ ceramic, 100nF HF- conducting to case (Y)	
<b>Electromagnetic Compatibility</b>		
Emission :	<b>CE</b>	EN 50081-1 with mains input C or E,
Immunity:	<b>CE</b>	EN 50082-1 or 2
Operation temperature:	0...50°C without derating,	storage: -30°C till 85°C
Temp.- Coefficient:	$< 0.2\% / 10\text{K}$	
Stability (Condition const.):	$< 5\text{mV}$ or 0.1% within 24 h, $< 25\text{mV}$ or 0.5% within 6 month	
Current limiting:	100% of nominal values, programmable to lower values via interface or display tableau.	
Voltage rise:	monotony, synchrony, within 50 ms (factory settings),	
Voltage off:	discharge of output capacitors after DC off.	
Over voltage protection:	Factory settings to 125% of nominal values	
Status control:	within 5ms if $> 2\%$ deviation from nominal or programmed values, after overload, overheat, overvoltage, undervoltage	
Interlock input (option):	High level or open: All outputs DC off	
AC-fail and Sys-Reset:	Generation according to VME Specification, optional	
Temperatur limits:	110°C heat sink, 70°C ambient intern	
M T B F at 40° ambient:	$> 65.000\text{h}$ (blower), electronics $> 100.000\text{h}$	

### 1.5 Power Supply PL 500 F8 Connectionscheme

#### POWER CONNECTOR



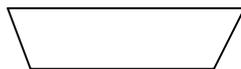
Pin 10, 11, 13...18    6mm, 120A                      Pin 1...9+12,    8mm, 240A

**Polarity:**      Pin No.: 1,3,4,7,9,10,13,15,16                      + positive  
                          Pin No.: 2,5,6,8,11,12,14,17,18                      - negative

#### SIGNAL extern                      D-SUB (9)

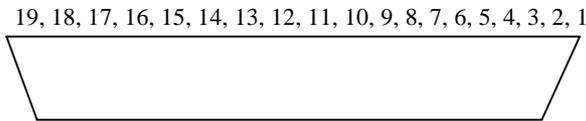
**Pins:**

5, 4, 3, 2, 1



9, 8, 7, 6

- 15 V	Pin 1
- 15 V	Pin 6
+ 15 V	Pin 2
+ 15 V	Pin 7
TXD	Pin 3
RXD	Pin 8
CAN GND	Pin 4
CAN_L	Pin 9
CAN_H	Pin 5

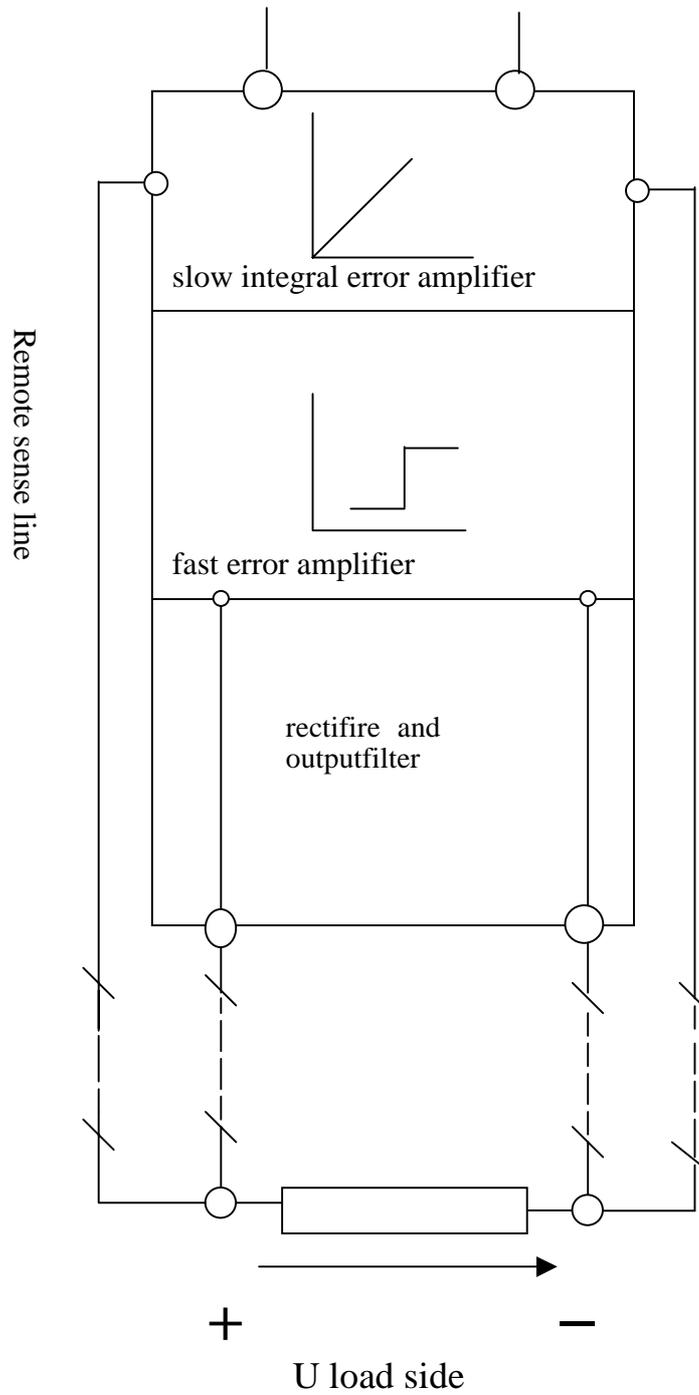
**SIGNAL extern****D-Sub (37)****Pins:**

37, 36, 35, 34, 33, 32, 31, 30, 29, 28, 27, 26, 25, 24, 23, 22, 21, 20

U3 Sense +	Pin 1	U0 Sense -	Pin 29
U3 Sense -	Pin 20	SYSFAIL	Pin 11
U5 Sense -	Pin 2	GND	Pin 30
U5 Sense +	Pin 21	ACFAIL	Pin 12
U1 Sense +	Pin 3	<b>GND SIGNAL</b>	Pin 31
U1 Sense -	Pin 22	SYSRES	Pin 13
U6 Sense -	Pin 4	<b>GND SIGNAL</b>	Pin 32
U6 Sense +	Pin 23	RESERVED	Pin 14
U2 Sense +	Pin 5	RESERVED	Pin 33
U2 Sense -	Pin 24	TEMP 7	Pin 15
U7 Sense -	Pin 6	TEMP 6	Pin 34
U7 Sense +	Pin 25	TEMP 5	Pin 16
U4 Sense-	Pin 7	TEMP 4	Pin 35
U4 Sense +	Pin 26	TEMP 3	Pin 17
VX Sense	Pin 8	TEMP 2	Pin 36
VX Sense	Pin 27	TEMP 1	Pin 18
VW Sense	Pin 9	TEMP 0	Pin 37
VW Sense	Pin 28	TEMP RETURN	Pin 19
U0 Sense +	Pin 10		

## 2 Block diagram

90 (94) ... 264 VAC input

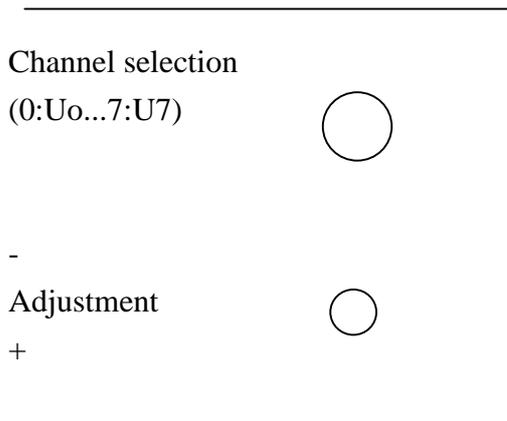


### 3 Air Cooling

In order to produce a proper working condition it is very important, that the cooling air can pass the device without any handicap. The air intake comes from the bottom and will leave the equipment from its top, so it must be assured that the airflow doesn't hit any hindrance.

### 4 Adjustments

All output voltages can be adjusted manually via the two rotary switches situated on the power supply top.



Mode Selection	Function
0-7	Adjust Voltage of U0-U7
A	CAN Address (low, Bit 0-3)
B	CAN Address (high, Bit 4-6)
C	CAN General Call Address (low, Bit 0-3)
D	CAN General Call Address (high, Bit 4-6)
E	CAN Transmission Speed Index

## 5 CANbus (optional)

### CAN Transmission Speed Index

Index	Max. Distance	Bit Rate	Type
0	10 m	1.6 Mbit/s	high- speed  (needs termination)
1	40 m	1.0 Mbit/s	
2	130 m	500 kbit/s	
3	270 m	250 kbit/s	
4	530 m	125 kbit/s	
5	620 m	100 kbit/s	low-speed
6	1.300m	50 kbit/s	
7	3.300 m	20 kbit/s	
8	6.700 m	10 kbit/s	
9	10.000 m	5 kbit/s	

For software protocol see separate manual No. \*00183

## 6 Power bin

A suitable range of 19" racks equipped with PL 500 counter part connectors and guiding bars for bearing the power boxes is available. Cooling air intake can be from front or bottom side in standard power bins. Also when a control board with display will installed either bottom or front intake may select.

For the power plugs 1 to 9 and 12 are M8 studs and for 10, 11 and 13 to 18 are M6 studs foreseen.

Sense- and control connectors (9 pin and 37 pin) are wired to a terminal board

### 6.1 Power Supply PL 500 F8, Connection scheme

Rear view to power bin connectors / terminal studs

18 -	15 +	12 -	9 +	6 -	3 +	D-Sub 37pol.
17 -	14 -	11 -	8 -	5 -	2 -	
16 +	13 +	10 +	7 +	4 +	1 +	

## 6.2 Power Supply PL 500 F8, Sense control terminals

### 7 Example for pinning

Due to the long range of different configurations there are no pin out fixed.

The real pin assignment is given by the type stickers on rear side of the power box PL 500.

One is showing voltages and currents with respect to the output number 0... 7, the other gives the pin number in correspondence to the output numbers.

Each output has a pair of contacts (+/-, floating).

U0	3.7V/100A ( 1/ 2)	U1	(10/11)
U2	(15/18)	U3	4.3V/100A ( 7/ 8)
U4	3.7V/100A ( 4/ 5)	U5	(13/14)
U6	(16/17)	U7	6V/100A ( 9/12)