



PRODUCT MANUAL

Digital recorder and PID controller ZEPAREX 565 Type 565

APPLICATION

- as a combination of a recorder and a two-loop PID
- for applications requiring readable write for perfect data analysis
- for regulatory applications - extruders, food processing, heat treatment and healthcare
- For the environment, where mechanical resistance is required pursuant to EN 60068-2-6 (class AH2) and seismic capability of the electrical equipment of the safety system of the nuclear power stations pursuant to IEC 980 (MVZ level SL-2)

Digital recorders and PID controllers Zeparex 565 are rated products pursuant to the Directive 2014/35/EU and 2014/30/EU of the European Parliament and the Council and EU Declaration of Conformity **EU-565000-EN** is issued for them.

DESCRIPTION

Zeparex 565 is a unique combination of digital recorder and two-loop PID controller. The recorder includes a 3.5" display, four universal channels, an internal memory of 50 Mb, and USB data transfer or Ethernet sending and data processing in the Review software. Key benefits include the combination of recording and control, ease of operation and data processing, including a high level of security

Available functions and configurations

- Configure USB to save / restore
- Dual programmer (optional)
- 2 PID control loops (optional)
- Support zirconia probe (optional)
- 30 virtual channels (each configurable as a counter, math unit, totalizer, or communication input)
- Steriliser (optional)
- Relative humidity (optional)
- Customizable start-up screen
- Modbus TCP master/slave (optional)
- EtherNet/IP client/server (optional)
- Web server

Crystal clear, colour display

The TFT 3,5" display offers an incredibly clear visualization of process parameters with a wide selection of configurable views to best suit the application. Views include: Horizontal and vertical (curve), horizontal and vertical bar graphs, numeric values, alarm panel, alarm status, and control loop. Configuration is also possible using the buttons on the instrument panel without a PC connection. The buttons below the screen allow easy scrolling between the configured views

Data Acquisition and Recording

The Zeparex 565's recording function uses a secure UHH format. In addition to several real-time views and historical review on the product, the device is equipped with multiple data archiving using built-in 50MB flash memory, removable USB devices (up to 8GB), or FTP over a specified server.

Four universal input channels provide high accuracy (suitable for Nadcap applications) and parallel sampling at 125 ms. An additional 30 virtual channels can be used to provide math function, counter functions, slave communication, and totalizer functionality within the instrument

PID Control loop

The device Zeparex 565 can provide up to three independent control loops (optional). This control function uses an advanced PID algorithm that ensures high performance and reliability of processes. Functionality includes one of the best auto tuning facilities available along with overshoot inhibition (interruption of the chronological procedure); compensation for power fluctuation using power feedforwards; linear, fan oil and water cooling and cooling.



Heat treatment is one of many processes that often require a variable set point control process over a set period of time. This is achieved by using the set point program. The Zeparex 565 offers an optional dual programmer supporting up to 100 programs locally, each program supporting 25 segments. The Zeparex 565 also provides remote access to further 100 programs that can be accessed through an FTP server or USB flash drive.

TECHNICAL DATA

Zeparex 565 is designed to comply with EN 61140 as an electrical protection class II for use in networks with overvoltage category II and pollution level 2 according to EN 61010-1, the follow-up device must comply with Article 6.3 of this standard.

Measuring range: according to the input signal

Electric strength pursuant to EN 61010-1 Article 6.8.3:

- the input terminals (channel) against the instrument body: 1500 V AC (50/60 Hz), 1 min
- between input terminals (channels) 2500 V AC (50/60 Hz), 1 min

Electric insulation resistance:

Between input terminals (channels)*): 300 V RMS or DC (double insulation)

Between input terminals (channels) and ordinary electronics:

300V RMS or DC (double insulation)

Input terminals (channel) against the body of the device: 300V RMS or DC (double insulation)

*) Note: If Dual Channel mode enabled primary and secondary inputs are not electrically isolated from each other.

Power supply: max. 9 W

Protection according to EN 60529:

Front panel: IP65
Front panel washable: IP66
Cover: IP10

Operation position pursuant to EN 60051-1: D1

Size of the front bezel: 96 x 96 mm

Panel mounting: 1/4 DIN

Panel cut out dimensions: 92^{+0.8} x 92^{+0.8} mm

Depth behind panel: 90 mm except cabling

Type of operation: continuous

Weight: only device 0,44 kg

Applied materials: panel plastic

Type of connection terminals: screw;

for 1 wire 0,205 to 2,08 mm² (24 AWG to 14 AWG)

for 2 wire 0,205 to 1,31 mm² (16 to 24 AWG) including

Displaying instrument:

Display: colour TFT LCD 1/4 VGA
(320 x 240 pixels) 3,5"

Controls:

Four navigation pushbuttons below the display screen (Page, Scroll, Lower and Raise)

Backup battery:

Type:	Poly-carbonmonofluoride/lithium (BR2330) (PA260195)
Lifetime:	about 3 years
Saved data:	time, date
Date of time (in real time):	Temperature stability 0 to 55 °C $\leq \pm 3,5$ ppm
RTC Aging:	first year to 10 year $\leq \pm 5$ ppm
Support time (RTC):	minimum of 1 year with unit unpowered Zeparex 565

Ethernet communications:

Type:	Ethernet 10/100baseT (IEEE802.3)
Protocols:	TCP/IP master/slave, Modbus, EtherNet/IP client/server
Cable:	Type: category 5 Maximum length: 100 m Termination: RJ45
	Green LED illuminated = link connected
	Amber LED flashing shows link activity

USB port:

Number of ports:	one at rear of instrument
Standard:	USB 1.1
Transmission speeds:	1,5M bit/s (low speed device)
Maximum current:	<100 mA
Peripherals supported:	Flash disk (8 GB max.), Bar code reader, QWERTY keyboard

Alarms: 2 for each channel

(Absolute / minimum, deviation from maximum / minimum, deviation from band, change rate)

Recording (archiving):

Internal memory for storing data:	50 MB
Recording formats:	UHH or CSV
Recording destinations:	Internal memory, FTP server or USB flash disk (up to 8 GB)
Virtual channels:	15 standard + 15 optional (mathematics / summaries / counters)
Mathematical types:	Count, Subtract, Multiply, Divide, Min / Max Group, Min / Max Channel, Channel Diameter, Configuration Revision, Modbus Input
Uploading a group:	1
Basic blocks of tool sets:	Multiplexer, timers, 2 input logic blocks, user values, BCD, 8 input logic blocks

Update / archive rates:

Sample rate Input / Output:	8Hz
Trend update:	8Hz max.
Archive sample value:	Latest value at archive time
Display value:	Latest value at display update time (8 Hz)

Control:

Regulating loops:	Two + advanced control loop
Methods of control:	On / Off, PID, VP, cascade (Advanced loop)
Forward regulation:	Yes

Application:

zircons, relative humidity and steriliser

OPERATION CONDITIONS

The environment is defined by a set of parameters and their degree of severity IE 36 to EN 60721-3-3 and the following operating conditions.

Ambient temperature:	0 to +55 °C
Humidity limits of the environment:	5 % to 85 % without condensation
Vibration pursuant to EN 61131-2:	5 to 150 Hz for 1g, 1 octave per min. < 2000 meters
Altitude:	< 2000 meters
Supply voltage:	100 to 230 V AC $\pm 15\%$; 48 to 62 Hz or 24 V DC (+20 % -15 %)
Fuse type:	without internal fuse
Interrupt protection Standard:	Holdup >10 ms, at 85 V AC (100 to 230 V AC) Holdup >10 ms, at 20,4 V AC (24 V DC)
Power loss:	9 W (max.)
Electromagnetic Compatibility:	Emission: EN 61326-1 class B – light industry for 100 to 230 V AC EN 61326-1 class A – hard industry for 24 V AC (24 V DC) Resistance: EN61326-1 (industry)

METROLOGICAL DATA

Accuracy:	< 0,1% of the measured value
Number of inputs:	analogue 4 (possibility of extension to dual) digital 2
Number of outputs:	digital (logic): max. 2 relay: max. 4 DC output: max. 3

ANALOGUE INPUT SIGNALS

Number of inputs:	4/8
Type of inputs signal:	DC voltage V, mV, dual mV DC current mA, dual mA (required external shunt) Thermocouple, dual thermocouple Resistance (2 / 3 wire) Digital (contact switching)
Input type combination:	freely configurable
Sample rate:	8 Hz (125 ms) 4 Hz (250 ms) if active dual input
Conversion method:	>16 bit, delta sigma
Input ranges:	see table 1 and 2
Noise rejection (48 to 62 Hz):	Series mode > 95 dB Common mode: > 179 dB
Common mode voltage:	250 V AC
Series mode voltage:	280 mV at lowest range 5 V peak to peak at highest range

Input Impedance:

range 40 mV, 80 mV, 2 V > 100 M Ω
62,5 for input voltages > 5,6 V
667 k Ω for input ranges < 5,6 V

Overvoltage protection:

Continuous: ± 30 V RMS
Transient (<1 ms): ± 200 V
pk-pk between terminals

Open circuit detection:

Type: AC sensor break on each input giving quick response with no associated DC errors
Recognition time: <3 s
Break resistance: min. 5 k Ω
(range 40 mV, 80 mV)
min. 12,5 k Ω (other range)

DC input ranges:

Shunt: 1 Ω to 1 k Ω mounted externally
Additional error due to shunt: 0,1% of input

Input T/C:

Type, range and accuracy: see table 1
Temperature scale: ITS90
Types of cold junction: off, internal, external, remote
Cold junction error: max. 1°C at 25 °C
Cold junction rejection ratio: 40:1 to 25 °C
Interrupt Response Function T/C“:
displays the maximum temperature
displays the minimum temperature
function disabled
(optional for each thermocouple channel)
Remote source of the cold junction:
any input channel

Input RTD

Temperature scale: ITS90
Type, range and accuracy: see table 2
Maximum source current: 200 μ A
Pt100 figures
Range: 0 to 400 Ω (-200 to +850°C)
Resolution: 0,05 °C
Calibration error: $\pm 0,31$ °C $\pm 0,023$ % measurement
in °C at ambient 25 °C
Temperature coefficient: $\pm 0,01$ °C/°C ± 25 ppm/°C
measurement in °C from 25 °C ambient
Measurement noise: 0,05 °C peak-peak with 1,6s
input filter
Linearity error: 0,0033 % (best fit straight line)
Lead resistance: 0 to 22 Ω matched lead resistances
Bulb current: 200 μ A nominal
User configurable linearization curves: up to 32 points

RELAY AND LOGIC OUTPUT SIGNALS

(Output 1, 2 and 3)

Active logic output (output 1 and 2 only):

Voltage on terminals:	+11 V min.; +13 V max.
Output short circuit current:	6 mA min. (steady state); 44 mA max. (switching current)

Inactive logic output (output 1 or 2 only)

Voltage on terminals:	0 V (min.); 300 mV (max.)
Output short circuit current:	0 μ A (min.); 100 μ A (max.)

Active logic output (only output 1)

Input current	
Input at 12 V:	0 mA (min.); 44 mA (max.)
Input at 0 V:	6 mA min. (steady state); 44 mA max. (switching current)
Open circuit input voltage:	11 V (min.); 13 V (max.)
Open circuit resistance (inactive):	500 Ω (min.); ∞ (max.)
Closed circuit resistance (active):	0 Ω (min.); 150 Ω (max.)

Relay Outputs

Power switching contact (resistive):	
Max. 2 A at 230 V RMS \pm 15 %	
Min. 100 mA at 12 V	
Current through terminals: 2 A	

DIGITAL INPUT SIGNALS**Digital input A (logic input / output) and digital input B (contact switching)**

Short-circuit current:	5,5 mA (min.); 6,5 mA (max.)
Open circuit resistance (inactive):	600 Ω (min.); ∞ (max.)
Closed circuit resistance (active):	0 Ω (min.); 300 Ω (max.)

DC OUTPUT (OPTION)

(Output 1, 2 and 3)

Current DC outputs (outputs 1, 2 and 3)

Output range:	configurable within 0 to 20 mA
Load resistance:	500 Ω max.
Calibration accuracy:	< \pm 100 μ A \pm 1 % of reading

Voltage outputs (only output 3)

Output range:	configurable within 0–10 V
Load resistance:	500 Ω min.
Calibration accuracy:	< \pm 50 mV \pm 1 % z of range

General:

Isolation:	Double isolation 300 V AC from instrument and other input/output
Resolution:	>11 bits
Thermal drift:	<100 ppm/ $^{\circ}$ C

DESIGNATION**Data on head label:**

- Trademark of the manufacturer
- Made in Czech Republic
- type and size of the supply voltage, max. input power
- Product ordering number
- protection
- Serial number
- Conformity marking CE

DELIVERY

Unless agreed otherwise with the customer, each delivery includes

- Delivery note
- Zeparex 565 pursuant to the purchase order
- standard accessories
 - mounting holder 2 pcs
 - application software: basic versions i TOOLS (CD-ROM) 1 pcs
- optional accessories
 - shunt resistance (to be ordered for direct current measurement)
 - divider
 - application software according to design
- Accompanying technical documentation in Czech
 - Product manual
 - English instruction manual
 - Product quality and completeness certificate, which also serves as the warranty certificate

If it is established in the purchase contract or agreed otherwise, the following documentation can be also delivered with the product:

- Declaration of Conformity of the supplier pursuant to EN ISO/IEC 17050-1
- EU Declaration of Conformity
- Test report about the seismic and the vibration qualification

PACKING

The device and accessories are delivered in a packing ensuring resistance to the impact of thermal effects and mechanical effects pursuant to controlled packing regulations..

TRANSPORT

The device may be transported on conditions corresponding to the set of combinations of classes IE 21 pursuant to EN 60721-3-2 (i.e. by airplanes and trucks, in premises that are ventilated and protected against atmospheric conditions, airplanes are only assumed to be heated by airborne overflow cargo spaces).

STORAGEThe device may be stored on conditions corresponding to the set of combinations of classes IE 12 pursuant to EN 60721-3-1 but with ambient temperature between -20 and 70 $^{\circ}$ C and humidity between 5 to 85% (i.e. in places without a special threat of an attack with biological agents, with vibrations of small significance and not situated close to sources of dust and sand.)**ORDERING ZEPAREX 565**

The purchase order shall specify

- Name
- Product ordering number
- Whether an optional accessory is required
- Request for other documentation pursuant to article. DELIVERY
- Number of pieces

EXAMPLE OF PURCHASE ORDER**Standard design:**

Digital recorder and PID regulator
 ZEPAREX 565
 565 VH X X LRR XX TS SV XXXXX ENG XXX
 XXXXX XXXXX XX XX
 1 pcs

TABLE 1 - TYPE AND RANGE OF TERMOCOUPLES AND RESISTANCE SENSORS

Type T/C	Overall range [°C]	Standard	Maximum linearization error [°C]
B	0 to +1820	EN 60584-1	for range 0 to 400 = 1,7 for range 400 to 1820 = 0,03
C	0 to +2300	Hoskins	0,12
D	0 to +2495	Hoskins	0,08
E	-270 to +1000	EN 60584-1	0,03
G2	0 to +2315	Hoskins	0,07
J	-210 to +1200	EN 60584-1	0,02
K	-270 to +1372	EN 60584-1	0,04
L	-200 to +900	DIN 43710:1985 (dle IPTS68)	0,02
N	-270 to +1300	EN 60584-1	0,04
R	-50 to +1768	EN 60584-1	0,04
S	-50 to +1768	EN 60584-1	0,04
T	-270 to +400	EN 60584-1	0,02
U	-200 to +600	DIN43710:1985	0,08
NiMo / NiCo	-50 to +1410	ASTM E1751-95	0,06
Ni / NiMo	0 to +1406	Ipsen	0,14
Platinel	0 to +1370	Engelhard	0,02
Pt20%Rh / Pt40%Rh	0 to +1888	ASTM E1751-95	0,07
Type RTD	Overall range[°C]	Standard	Maximum linearization error [°C]
Cu10	-20 to +400	General Electric Co.	0,02
Cu53	-70 to ± 200	RC21-4-1966	0,01
JPT100	-220 to +630	JIS C1604:1989	0,01
Ni100	-60 to +250	DIN43760:1987	0,01
Ni120	-50 to +170	DIN43760:1987	0,01
Pt100	-200 to +850	EN 60751	0,01

TABLE 2 - VOLTAGE AND RESISTANCE RANGE - ACCURACY AND RESOLUTION

Range (DCV)	Resolution	Maximum error (at 25°C)	Maximum ripple when changing ambient temperature by 1°C
-40 mV to 40 mV	1,9 µV	4,6 µV + 0,053% of reading	13 ppm
-80mV to 80mV	3,2 µV	7,5 µV + 0,052% of reading	13 ppm
-2V to 2V	82 µV	420 µV + 0,044% of reading	13 ppm
-3V to 10V	500 µV	1,5 mV + 0,063% of reading	45 ppm
Range (RTD)	Resolution	Maximum error (at 25°C)	Maximum ripple when changing ambient temperature by 1°C
0 Ω to 400 Ω	20 mΩ	120 mΩ + 0,023% of reading	25 ppm

Note: Limited to 2000 mV in the case of dual input

TABLE 3 – DESING OF DIGITAL RECORDER AND PID CONTOLLER TYPE 565

SPECIFICATIONS								
ZEPAREX 565	Digital recorder and PID controller, display 3,5" TFT 1/4 VGA							
565	1	2	3	4	5	6	7	8
9	10	11	12	13	14			

TABLE 4: INDIVIDUAL PRODUCT VARIATIONS

1 POWER SUPPLY	
VH	100–230 V AC ±15 % at 48–62 Hz
VL	24 V AC (+10 % –15 %) at 48–62 Hz or 24 V DC (+20 % –15 %)
2 CONTOLLER	
X	None (default)
C	2 control loops
A	Advanced regulating loop (includes 2 control loops)
3 PROGRAMMER	
X	None (default)
P	Dual programmer
4 OUTPUT OPTIONS 1-2-3	
LRR	Logic/Relay/Relay (default)
LRD	Logic/Relay/Iso DC output
LLR	Logic/Logic/Relay
RDD	Relay/Iso DC/Iso DC
DDD	Iso DC/Iso DC/Iso DC
LDD	Logic/Iso DC/Iso DC
5 APPLICATION BLOCKS	
XX	None
ZC	Zirconia
RH	Humidity
ST	Steriliser
6 COMMUNICATION PROTOCOLS	
TS	Modbus TCP/IP slave (default)
TM	Modbus TCP/IP master
ES	EtherNet/IP* client/server
TE	Modbus TCP Master a Ethernet/IP*

7 BEZEL	
SV	Silver (standard)
WD	Washable front frame
8 TOOLKIT BLOCKS	
XXXXX	None
BASIC	Basic toolkit blocks
9 LANGUAGE	
ENG	English (default)
FRA	French
GER	German
ITA	Italian
SPA	Spanish
10 OEM SECURITY	
XXX	None
OEM	Security activated
11 DESIGNATION	
XXXXX	Without proper labels
12 SPECIAL	
XXXXX	Default
13 DUAL INPUT CHANNELS	
XX	None
5	5 inputs activated
6	6 inputs activated
7	7 inputs activated
8	8 inputs activated
14 SUPPORT DUAL TERMOCOUPLE	
XX	None
TC	Support dual T/C activated

INSTALLATION AND CONNECTION

The device is mounted in a panel made of steel sheet 3 to 25 mm with two holders as shown below. Mount the holders on the top and bottom of the device cover.

FIGURE 1: SECURING INSTRUMENT

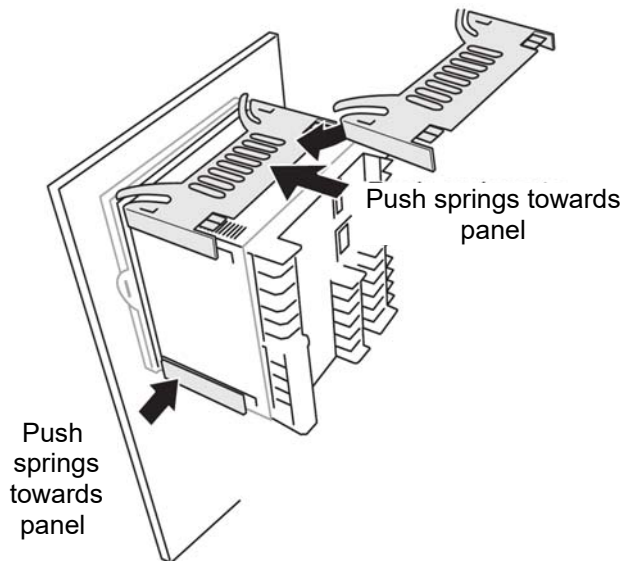
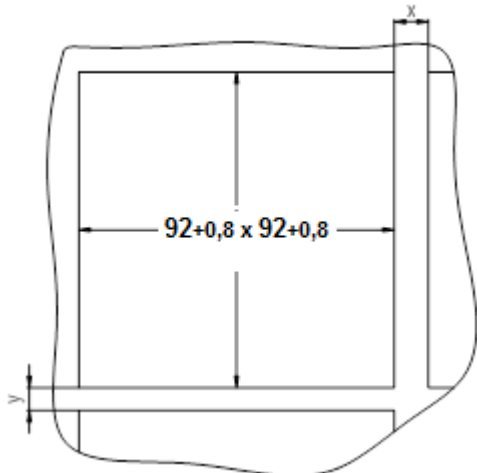
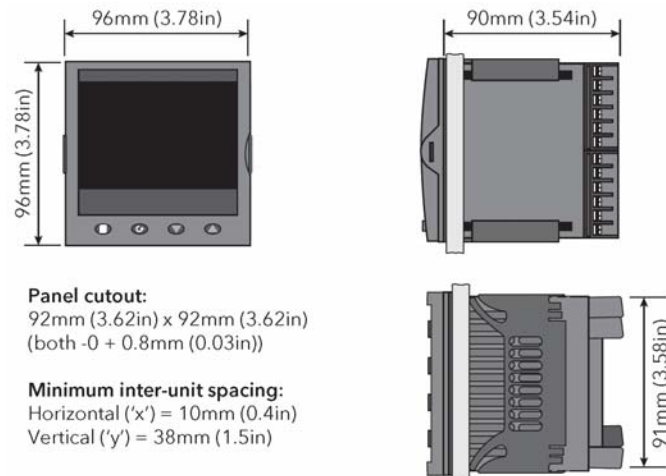


FIGURE 2: PANEL CROSS-SECTION



Minimum recommended spacing between units	
x	= 10 mm
y	= 38 mm

FIGURE 3 – DIMENSION DRAWING



The electrical connection may be only realized by qualified workers.

Rear Panel Terminal Arrangement - See Figure 4.

For a further description of the connection and commissioning, refer to the installation manual included with the delivery.

COMMISSIONING

After the installation of the Zeparex 565 into the panel, connection of the follow-up (evaluation) device to the supply voltage and the settlement period of the converter, the equipment is prepared for operation

OPERATION AND MAINTENANCE

The operation shall be performed pursuant to the operation manual.

Replace battery with Panasonic BR2330/BE only. Use of another battery may present a risk of fire or explosion.

Caution! Battery may explode if mistreated. Do not recharge, disassemble or dispose of in fire.

SPARE PARTS

Spare parts are not delivered by the manufacturer.

WARRANTY

The warranty period is 24 months from the receiving of the product by the customer, unless established otherwise in the contract. Rejection of defects shall be enforced in writing at the manufacturer within the warranty period. The rejecting side shall identify the product name, ordering and manufacturing numbers, date of issue and number of the delivery note, clear description of the occurring defect and the subject of the claim. If the rejecting side is invited to send the device for repair, it shall do so in the original package of the manufacturer and/or in another package ensuring safe transport.

The warranty shall not apply to defects caused by unauthorized intervention into the device, its forced mechanical damage or failure to comply with operation conditions of the product and the product manual.

REPAIRS

The device shall be repaired by the manufacturer. They shall be sent for repair in the original or equal package without accessories.

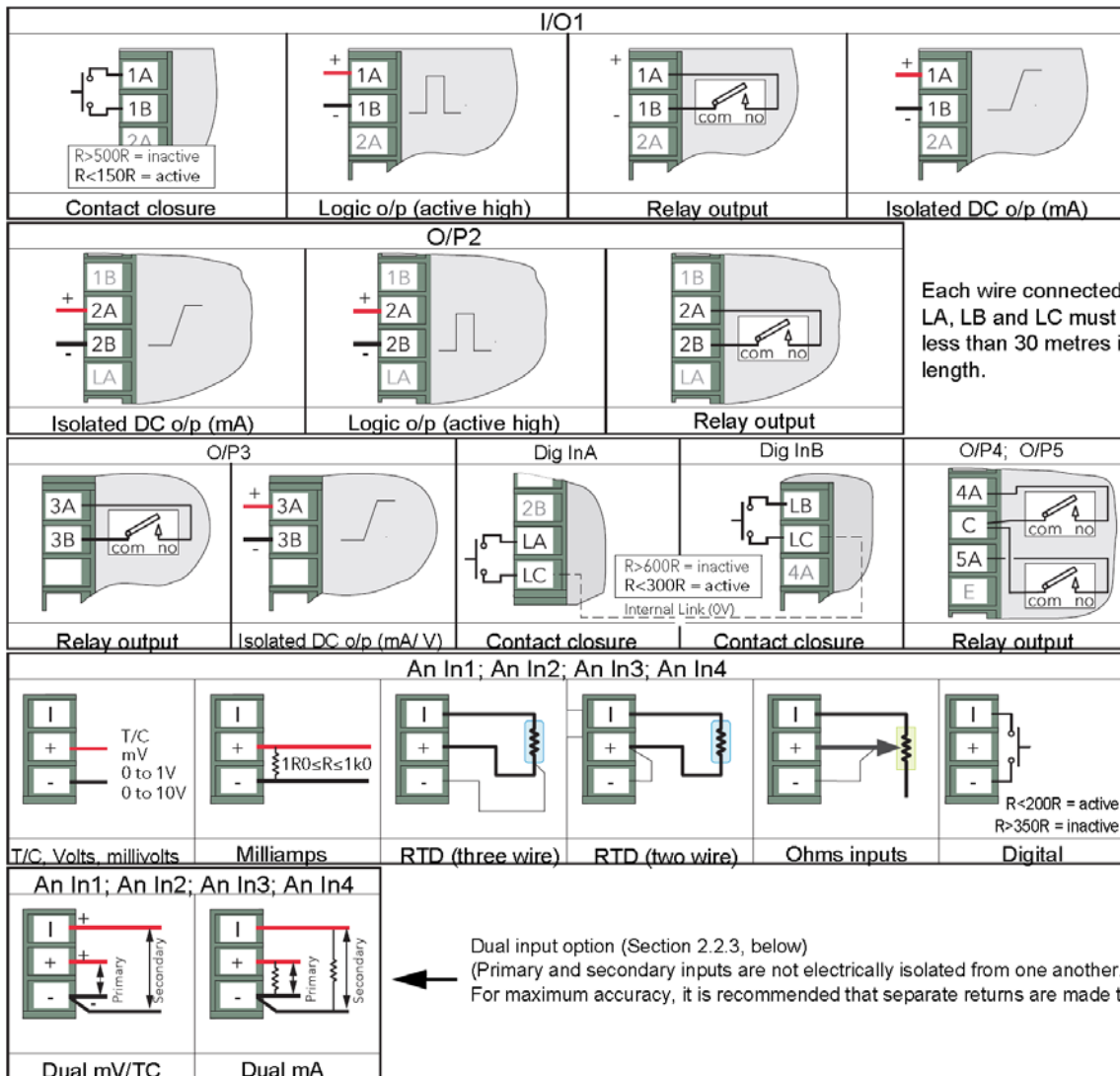
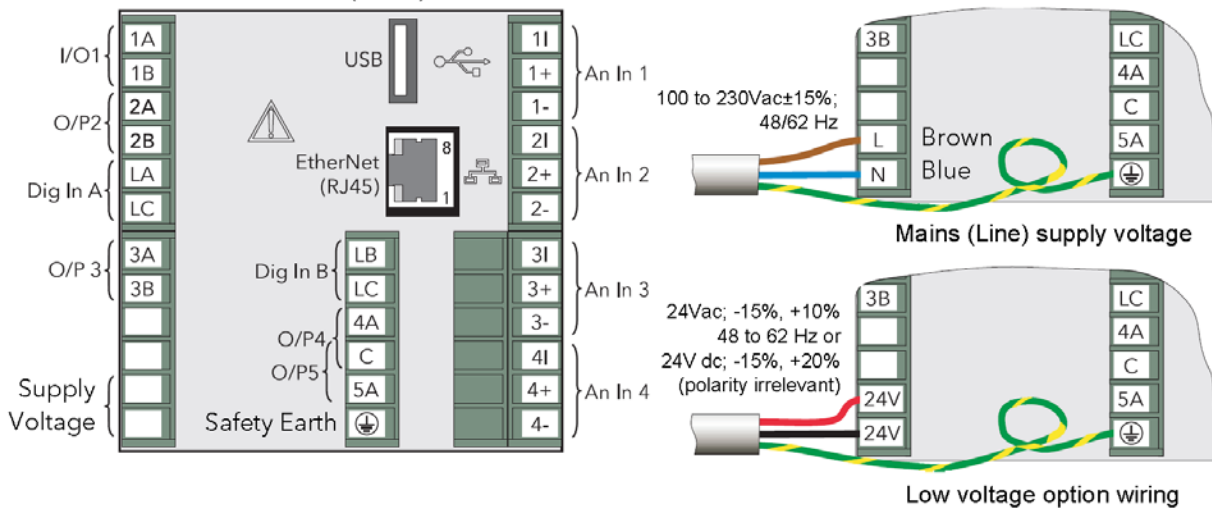
DISABLING AND LIQUIDATION

The product and its package do not include any parts that could impact the environment.

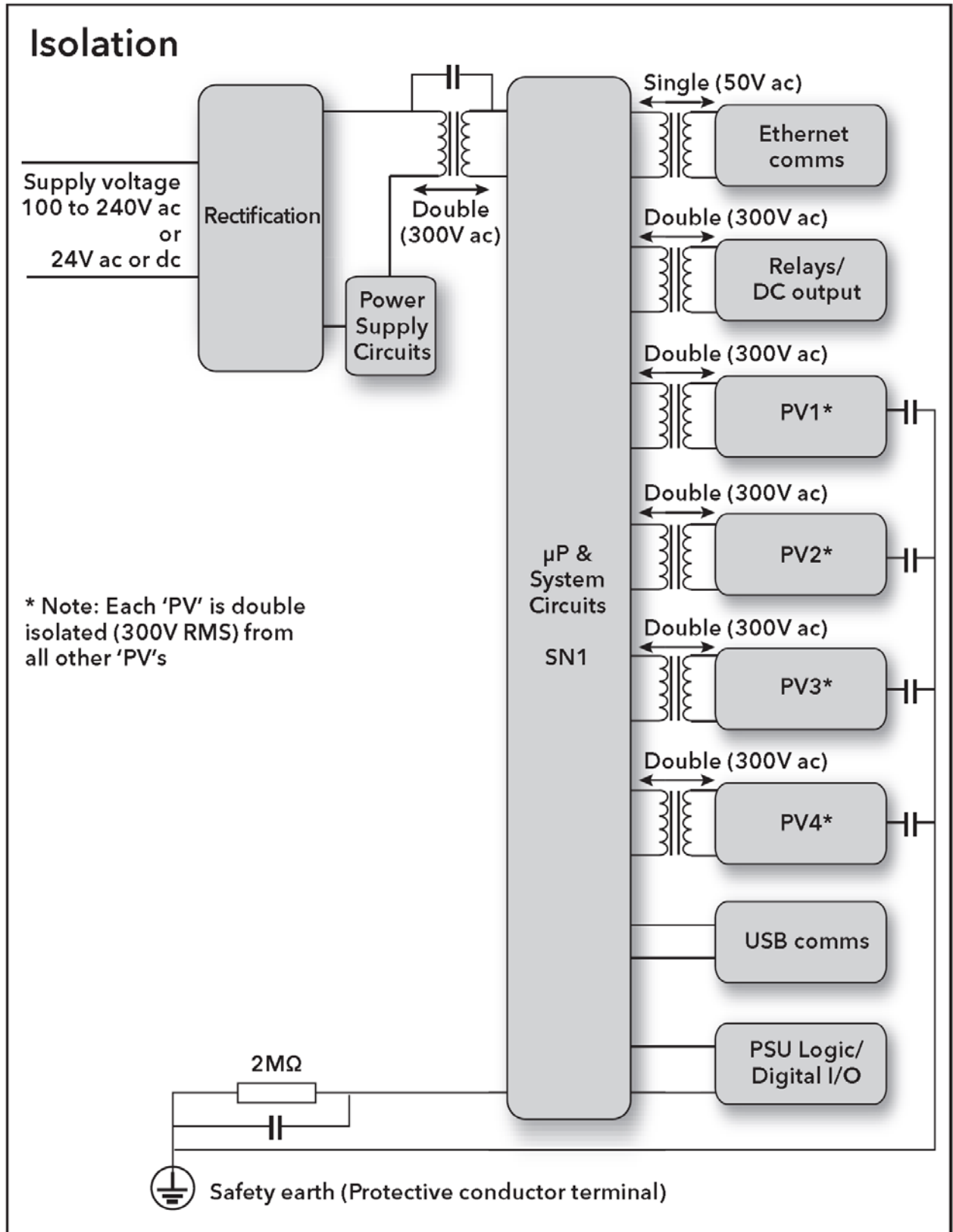
Products that are withdrawn from operation, including their packages (with the exception of products marked as electrical equipment for the purposes of return withdrawal and separate salvage of electrical waste), may be disposed of to sorted or unsorted waste pursuant to the type of waste.

The manufacturer realizes free return withdrawal of marked electrical equipment (from 13.8.2005) from the consumer and points out the danger connected with their illegal disposal. The package of the sensor can be recycled completely. Metal parts of the products are recycled, non-recyclable plastic materials and electrical waste shall be disposed of in accordance with applicable legislation.

FIGURE 4 – ARRANGEMENT OF THE TERMINALS



OBRÁZEK 5 – SCHEMA OF ISOLATION



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