EYR 203, 207: Universal controller, novaFlex

How energy efficiency is improved

For precise control and regulation functions around the clock

Features

- Universal controllers of the EY3600 system family
- Used for control and regulation in HVAC engineering
- EYR 203: 18 inputs and 10 outputs
- EYR 207: 20 inputs and 10 outputs
- Network and communication capability via novaNet auxiliary module
- Communication with modu250 touch-panel possible via auxiliary module
- Programming/parameterisation via PC with EY3600 CASE software (IEC 1131-3 FBD Editor)
- Control libraries
- Time and calendar function
- Data recording in historical database (HDB)

EYR207F001

Technical data

Power supply		
	Power supply	24 V~, ±20%, 50...60 Hz
	Power consumption	10 VA

Ambient conditions		
	Operating temperature	0...45 °C
	Storage and transport temperature	−25...70 °C
	Humidity	10…90% rh, no condensation

Inputs/Outputs		
	Digital inputs	8 (2 can be used as pulse counters)
	Analogue inputs	5 × 0...10 V 5 × Ni1000/Pt1000 (EYR 203) 7 × Ni1000/Pt1000 (EYR 207)
	Digital outputs	2 × 0-I, 2 × 0-I-II
	Analogue outputs	4 × 0...10 V

Interfaces and communication		
	AS network/novaNet	With auxiliary module on main pcb
	Local operating unit, modu240	1 × RJ-45 socket
	modu250 touch-panel	With auxiliary module (point to point)
	Languages	German, French, English, Italian, Dutch, Spanish, Swedish, Norwegian, Danish, Portuguese, Finnish (for other languages, see accessories)
	MFA	128
	Time commands	320 entries
HDB entries	Digital	1792 (block 1)
	Analogue	1792 (block 2)

Construction		
	Dimensions W x H x D	235 × 147.5 × 64.5 mm
	Weight	0.8 kg

Standards and directives		
	Type of protection	IP 10
	Protection class	I (EN 60730-1)
	Environment class	3K3 (IEC 60721)
CE conformity as per	EMC directive 2004/108/EC	EN 61000-6-1, EN 61000-6-2, EN 61000-6-4 Interference Class A
	Low-voltage directive 2006/95/EC	EN 60730

Overview of types

Type	Properties
EYR203F002	novaFlex with 1 relay, 5 Triacs and 5 Ni1000/Pt1000
EYR207F001	novaFlex with 6 relays and 7 Ni1000/Pt1000

Accessories

Operating units

Type	Description
EY-OP240F001	Local operating unit, modu240
EY-OP250F001	modu250 touch-panel, coloured
EY-OP250F002	modu250 touch-panel, monochrome

Microprogram

Type	Description
0501149002	Microprogram for modu240 languages: German, French, English, Polish, Slovene, Hungarian, Romanian, Russian, Czech, Turkish, Slovakian

Connecting cables

Type	Description
0367842002	Automation station - modu240 1.5 m (4.9 ft)
0367842003	Automation station - modu240 2.9 m (9.5 ft)
0367842004	Automation station - modu240 6.0 m (19.7 ft)
0367862001	novaNet291 or moduNet292 automation station 1.5 m (4.9 ft)
0367862002	novaNet291 or moduNet292 automation station 2.9 m (9.5 ft)
0367862003	novaNet291 or moduNet292 automation station 6.0 m (19.7 ft)

Data memory

Type	Description
0367883001	6× EPROM (empty) (User EPROM)
0367883002	PROM memory, 1 MB empty (user data), pack of 5

Fitting

Type	Description
0367829001	Bracket for front fitting for modu240

Auxiliary modules

Type	Description
0374413001	Auxiliary module, novaNet
0374448001	Auxiliary module, pt. to pt. for direct connection of modu250, distance max. 6 m

Additional information

Fitting instructions	MV 505769
Declaration on materials and the environment	MD 92.507

Description of operation

The EYR 203 and 207 universal controllers are for controlling and regulating operational systems, such as in HVAC.

Intended use

This product is only suitable for the purpose intended by the manufacturer, as described in the "Description of operation" section.

All related product documents must also be adhered to. Changing or converting the product is not admissible.

Engineering notes

- The novaFlex universal controller can be mounted on a top-hat rail (EN 50022) in a cabinet.
- The station is supplied with 24 V~.
- The ground terminal is connected to the earth connector (PE) and the housing.
- The plant devices are connected using screw terminals. The following conditions must be met:

Conditions for connecting plant devices

Cross-section of the wires	Min. 0.8 mm² (AWG 18), max. 2.5 mm² (AWG 13) in accordance with standards
novaNet	With twisted cable, max. expansion200 nF / 300 Ω, load 0.6 nF/device

Digital inputs	• Potential-free contacts • Opto-couplers • Transistors (open collector) • Open: > 3.5 V • Closed: < 1 V
Digital outputs	< 250 V~/2(2) A to the relay contacts, 24 V~/1A to the Triacs
Analogue inputs	0...10 V=
Analogue outputs	No external voltage; 0...10 V=, < 20 mA
Meters	• Potential-free contacts • Opto-couplers • Transistor (open collector) • Open: > 3.5 V • Closed: < 1 V

Description of inputs/outputs

Temperature measurement

Number of inputs	7 (EYR 207), 5 (EYR 203)
Type of inputs	• Ni1000 (without coding) • Pt1000 (software coding)
Measuring range	• Ni1000: –50...+150 °C (–58…+302 °F), • Pt1000: –100...+500 °C (–148…+932 °F)

The seven or five inputs do not need calibration, already take the line resistance into account and can be used for Ni1000 and Pt1000.

The sensors are connected with two wires. The maximum length of connecting wires with a cross-section of 0.8 mm² (AWG 18) is 55 m (180 ft), or 170 m (558 ft) for a cross section of 1.5 mm² (AWG 15). The measuring voltage is pulsed to ensure that the sensor is not heated up.

While the inputs are primarily designed for Ni1000 sensors, they can also be used for Pt1000. The measurement is selected using the software. The linearisation for Pt1000 ensures that deviations in the range from -50 to +150 °C are negligible.

The following table applies to the complete measuring range of the Pt1000:

Temperature	Absolute difference
-100 °C	-0.05 °C
-50 °C to +100 °C	< ± 0.02 °C
+150 °C	+0.05 °C
200 °C	+0.11 °C
300 °C	+0.29 °C
400 °C	+0.10 °C
500 °C	-0.31 °C

Voltage measurement

Voltage inputs

Number of inputs	5
Type of inputs	Voltage 0 (2)...10 V

The voltage to be measured is connected between one of the input terminals for voltage (labelled U) and a ground terminal. The signal can be referenced to earth. The measurement 0(2)...10 V is selected by the software. The maximum voltage that will not cause permanent damage is < ±50 V. However, the range that can be displayed is restricted to 10 V. The internal resistance R_i of the input is 20 kΩ here.

Linear correction EYR 203

Linear correction factors		Inputs	Module indicator (AI)
a	b		
1.672	-0.107	0...10 V	0...1
2.090	-0.384	2...10 V	0...1

Linear correction EYR 207

Linear correction factors		Inputs	Module indicator (AI)
a	b		
1.280	0.623	0...10 V	0...1
1.600	0.529	2...10 V	0...1

Potentiometer measurement

The potentiometer is connected to the U, ground and 5 V terminals. To avoid overloading the reference outputs, the lowest potentiometer value should not drop below 1 kΩ. The upper value of 2 kΩ is prescribed to guarantee a stable, fault-independent measurement.

Current measurement

Current can be measured with an external resistance of 50 Ω (EYR 203) and 100 Ω (EYR 207).

Linear correction EYR 203

Linear correction factors		Inputs	Module indicator (AI)
a	b		
16.978	-1.093	0...20 mA	0...1
20.650	-1.562	4...20 mA	0...1

Linear correction EYR 207

Linear correction factors		Inputs	Module indicator (AI)
a	b		
6.4	3.115	0...20 mA	0...1
8	3.649	4...20 mA	0...1

Pulse counting

Number of inputs	2 of 8 digital inputs
Type of inputs	• Potential-free contacts • Opto-couplers • Transistor (open collector)
"Contact closed" status	1 Vmax to ground
Input frequency	< 15 Hz (min. status duration 32 ms)
Maximum output current of the inputs	0.4 mA to ground
Debounce time	5 ms
Maximum line resistance	1 kΩ
Protection against external voltage	Limited to -0.5 and 15 V

Never apply voltages below 0.5 V or over 15 V, as otherwise irreparable damage may result.
The pulse is recorded on the falling edge and may be present for an unspecified length of time. The internal counter reading of the novaFlex is queried during every cycle and stored in DW 2 as a dual partial sum. The novaFlex processor then totals it in the software to actual counter reading in DW 6 after no more than 30 seconds. Using the FP (floating point) format, the counter reading can go up to approximately 2.147×10^9.

Digital inputs

Number of inputs	8 (2 counters)
Type of inputs	• Potential-free contacts, connected to earth • Opto-couplers • Transistor (open collector)
"Contact closed" status	1 V max. with respect to ground
Maximum output current of the input	0.4 mA to ground
Max. admissible line resistance	1 kΩ
Protection against external voltage	Limited to -0.5 and 15 V

Never apply voltages below 0.5 V or over 15 V, otherwise irreparable damage may result.
The novaFlex universal controller records 8 items of digital information. The inputs to be monitored are connected between the input terminals and ground. The station applies a voltage of approximate-

ly 13 V to the terminal. If the contact is open, this corresponds to a 0 bit. If the contact is closed (bit = 1) 0 V is present, with a current of approximately 0.4 mA. Short-term changes of at least 32 ms between the station queries are stored temporarily and processed during the next cycle.

Digital outputs

Number of outputs	2 × 0-I, 2× 0-I-II
Type of outputs	Variant EYR 207: 6 relays (250 V~/ 2(2) A) Variant EYR 203: 1 relay (250 V~/ 2(2) A) 5 Triacs (24 V~/1(1) A)

Analogue outputs

Number of outputs	4
Type of outputs	4 × 0(2)...10 V=, 20 mA max.

The output voltage is taken from between the corresponding output terminal and a ground terminal. The outputs can supply 0...20 mA. The outputs are protected against static discharges, but not against applied AC or DC. This can irreparably damage the protective diode and the output driver. Therefore, always connect the plant device (e.g. actuator) in the system first. Then check the station to verify that the two cables have no potential (0 V) with respect to the ground and each other. If this is the case, you first connect the ground cable and then the signal cable to their terminals on the station.

User program

The novaFlex features a high-speed operating program. Every 150 ms it reads all inputs, processes the parameterised modules, updates the outputs and handles the necessary communication with other stations or visualisation PCs using the novaNet auxiliary module. Any modifications to the programming of the novaFlex (control loops and parameters) are made using the novaNet automation network.

The novaFlex has a built-in real time clock (RTC) for time programmes. A lithium battery ensures that, if there is a power failure, the user data (FBD data), time programmes and historical data (HDB) are retained in the SRAM. This battery also powers the real time clock. The battery enables the data to be retained and the real time clock to be operated without a power supply for at least 3 years.

The data can be permanently saved using a user EPROM.

Every novaFlex with the novaNet auxiliary module must be given an address (0...127). This is set using coding switches. Up to 128 novaFlex users can be connected to the novaNet.

For the novaFlex, these are the EY-OP240F001 control panel and the EY-OP250F001 and F002 touch panels. The EY-OP 240 control panel is connected to the station via an RJ-45 socket. It makes it possible to handle all the novaFlex data (except the HDB) – reading measured values, alarms and statuses, changing setpoints and issuing positioning commands. The EY-OP 250 touch panel is connected to the station via an RJ-11 socket (Z374448001 point-to-point auxiliary module) or the novaNet. It enables all data to be processed.

Commissioning

When the 24 V~ power supply is being connected, it is essential that the technical earth is connected with the terminal screw provided. The work may only be carried out when the system is disconnected from the electrical supply.

The novaFlex must be disconnected from the power supply before it is opened up. Protective ESD measures must be taken before any interventions.

Before it is connected to the novaNet, every station must receive a unique address. The addresses are divided into ranges. Only the range from 0 to 127 may be used for the novaFlex. This novaFlex number is set using the DIL switch blocks of the auxiliary module.

The AS address can be set using the 8-digit switch block. The last switch is used to set the parity. The parity is set so that the number of switches set to "ON", including the parity switch, is an even number.

Example setting: 8 + 4 + 2 + 1 = 15

Off	On	Wert	Off	On	
□ �		1		×	1
□ ▮		2		×	2
□ ▮		4		×	4
□ ▮		8		×	8
▮ □		16	×		
▮ □		32	×		
▮ □		64	×		
▮ □		Even Parity	×		

Initialisation

Initialisation takes place by pressing the Ini button for half a second. This causes the station to load the microprogram from the user PROM and start operation according to defined initial conditions. Both versions, EYR 207 and EYR 203, have a green LED next to the power supply terminals. It lights up constantly to indicate the operational status (power supply OK).

The novaNet auxiliary module has a yellow LED to indicate telegram traffic when it is sent on the novaNet. If the station stops working or an error is detected in the RAM, this is picked up by the watchdog and the station is restarted with the data in the PROM. If this happens, no telegrams are sent out for the time being, which means that the yellow Send LED stops flashing. If this LED does not light up at all, then an incorrect or defective EPROM is connected, or none at all. In this case, the station will no longer work. In standalone mode (without novaNet) the Send LED flashes rapidly (roughly 7 times per second), because dummy telegram is sent for every cycle.

During the initial commissioning, or when the station is reset manually, the microprogram and the user data are also loaded again. As soon as this is completed, the yellow Send LED flashes again in time with the outgoing telegrams.

MFA reference to terminals

EYR 203, 207 connection	MFA	KC	EYR 203	Terminals EYR 203	EYR 207	Terminals EYR 207
Ni1000/Pt1000			**GND**	**Input**	**GND**	**Input**
	00	51	36	37	42	43
	01	51	34	35	40	41
	02	51	32	33	38	39
	03	51	30	31	36	37
	04	51	28	29	34	35
	05	51	–		34	33
	06	51	–		34	32
Analogue input			**GND**		**GND**	**U**
U 0...10 V	08	50	25	26	29	30
U 0...10 V	09	50	23	24	27	28
U 0...10 V	10	50	21	22	25	26
U 0...10 V	11	50	19	20	23	24
U 0...10 V	12	50	17	18	21	22
Analogue out			**GND**		**GND**	**U**
0-10 V	20	82	10	11	14	15
0-10 V	21	82	10	12	14	16
0-10 V	22	82	15	13	19	17
0-10 V	23	82	15	14	19	18
Pulse counter with			**GND**		**GND**	**Input**
Digital In 52	50	C1	38	39	44	45
Digital In 53	51	C1	38	40	44	46
Digital In			**GND**		**GND**	**Input**
	52-31	10	38	39	44	45
	53-31	10	38	40	44	46
	54-31	10	38	41	44	47
	55-31	10	38	42	44	48
	56-31	10	47	43	53	49

SAUTER

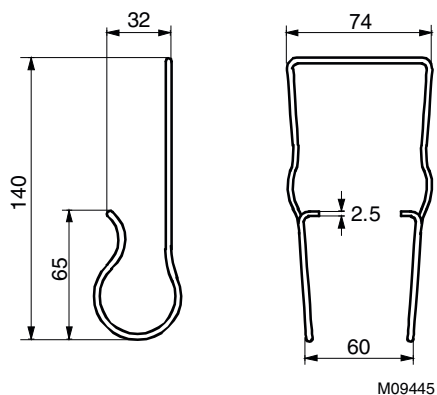| EYR 203, 207 connection	MFA	KC	EYR 203	Terminals EYR 203	EYR 207	Terminals EYR 207
	57-31	10	47	44	53	50
	58-31	10	47	45	53	51
	59-31	10	47	46	53	52
Digital Out			**COM**			
0-I	32	20				1+2
0-I	33	20				3+4
0-I	34	20				5+6
0-II	34	20				7+8
0-I	35	20				9+10
0-II	35	20				11+12
Digital Out EYR203F002			**COM**			
0-I (relay)	32	20		1+2		
0-I (Triac)	33	20	LS	4		
0-I	34	20	LS	5		
0-II (Triacs)	34	20	LS	6		
0-I	35	20	LS	8		
0-II (Triacs)	35	20	LS	9		

Disposal
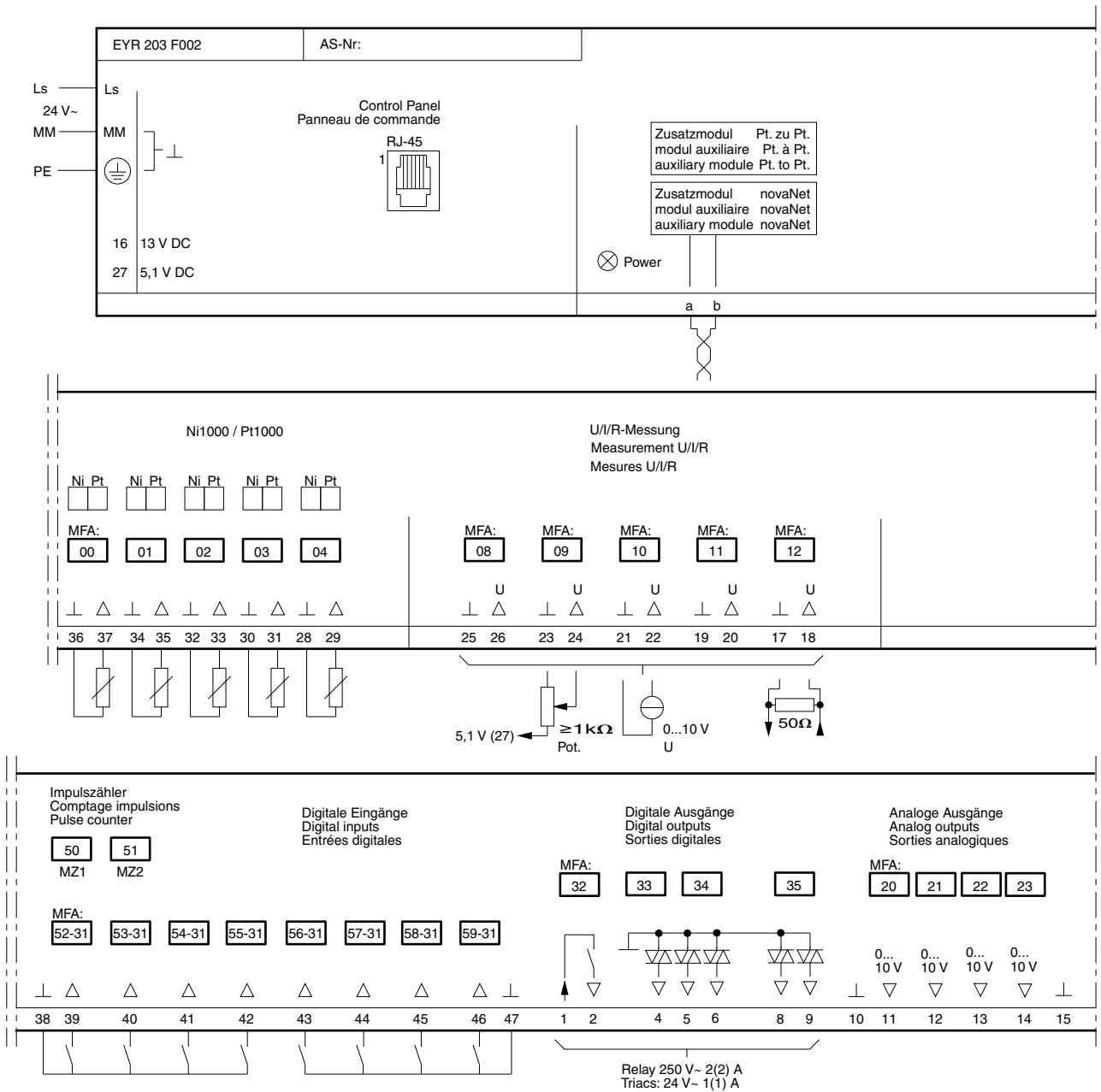
When disposing of the product, observe the currently applicable local laws.

More information on materials can be found in the Declaration on materials and the environment for this product.

Dimension drawing	Top-hat rail mounting

Accessories

M09445
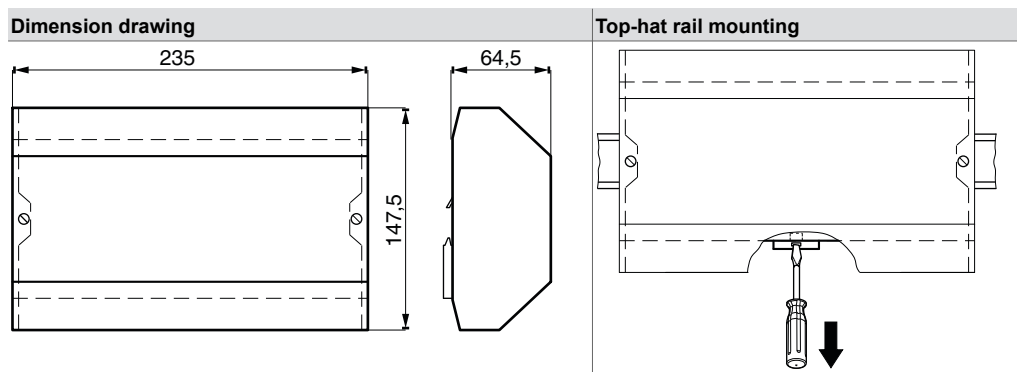
EYR 203 connection diagram

EYR 203 F002 | AS-Nr:

Ls
24 V~
MM
PE

Ls
MM
⊥

16 13 V DC
27 5,1 V DC

Control Panel
Panneau de commande
RJ-45

Zusatzmodul   Pt. zu Pt.
modul auxiliaire   Pt. à Pt.
auxiliary module Pt. to Pt.

Zusatzmodul   novaNet
modul auxiliaire   novaNet
auxiliary module novaNet

⊗ Power

a   b

Ni1000 / Pt1000

Ni Pt   Ni Pt   Ni Pt   Ni Pt   Ni Pt

MFA:
00   01   02   03   04

⊥ △ ⊥ △ ⊥ △ ⊥ △ ⊥ △

36 37 34 35 32 33 30 31 28 29

U/I/R-Messung
Measurement U/I/R
Mesures U/I/R

MFA: MFA: MFA: MFA: MFA:
08   09   10   11   12

U   U   U   U   U
⊥ △   ⊥ △   ⊥ △   ⊥ △   ⊥ △

25 26 23 24 21 22 19 20 17 18

5,1 V (27) ← ≥1kΩ   0...10 V   50Ω
Pot.   U

Impulszähler
Comptage impulsions
Pulse counter

50   51
MZ1 MZ2

MFA:
52-31 53-31 54-31 55-31 56-31 57-31 58-31 59-31

⊥ △ △ △ △ △ △ △ △ ⊥

38 39 40 41 42 43 44 45 46 47

Digitale Eingänge
Digital inputs
Entrées digitales

Digitale Ausgänge
Digital outputs
Sorties digitales

MFA:
32   33   34   35

Analoge Ausgänge
Analog outputs
Sorties analogiques

MFA:
20   21   22   23

0...   0...   0...   0...
10 V   10 V   10 V   10 V

↑ ▽   ▽ ▽ ▽   ▽ ▽   ⊥ ▽ ▽ ▽ ▽ ⊥

1 2   4 5 6   8 9   10 11 12 13 14 15

Relay 250 V~ 2(2) A
Triacs: 24 V~ 1(1) A

Bei einer zwingenden Erfüllung der Industrienorm
(EN 61000-6-2), dürfen die Fühlerleitungen nicht länger
als 30 m sein.

En cas de respect obligatoire de la norme industrielle
(EN 61000-6-2), les liaisons de sondes ne doivent pas
être supérieures à 30 m.

If the industry standard (EN 61000-6-2) has to be met,
the sensor leads should not exceed 30 metres in length.

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EYR 207 connection diagram

EYR 207

EYR 207 F001 | AS-Nummer / AS number

Ls
24 V~
MM
PE

Ls
MM
⏚

20 | 13 V DC
31 | 5,1 V DC

Control Panel
RJ-45
1

Zusatzmodul	Pt. zu Pt.
modul auxiliaire	Pt. à Pt.
auxiliary module	Pt. to Pt.

Zusatzmodul	novaNet
modul auxiliaire	novaNet
auxiliary module	novaNet

⊗ Power

a   b

Ni1000/Pt1000

U/I/R-Messung
Measurement U/I/R
Mesures U/I/R

Ni Pt   Ni Pt   Ni Pt   Ni Pt   Ni Pt   Ni Pt   Ni Pt

MFA:
00   01   02   03   04   05   06

MFA:
08   09   10   11   12

U   U   U   U   U

43 42 41 40 39 38 37 36 35 34 33 32

30 29 28 27 26 25 24 23 22 21

5,1 V (31) ← ≥ 1 kΩ
Pot.

0...10 V
U

100 Ω
I

Impulszähler
Comptage impulsions
Pulse counter

Digitale Eingänge
Digital inputs
Entrées digitales

Digitale Ausgänge
Digital outputs
Sorties digitales

Analoge Ausgänge
Analog outputs
Sorties analogiques

50   51
MZ1 MZ2

MFA:
52-31 53-31 54-31 55-31 56-31 57-31 58-31 59-31

MFA:
32   33   34   35

MFA:
20   21   22   23

0...   0...   0...   0...
10 V   10 V   10 V   10 V

44 45 46 47 48 49 50 51 52 53

1 2 3 4 5 6 7 8 9 10 11 12

14 15 16 17 18 19

Relay 250 V~ 2(2) A

Bei einer zwingenden Erfüllung der Industrienorm
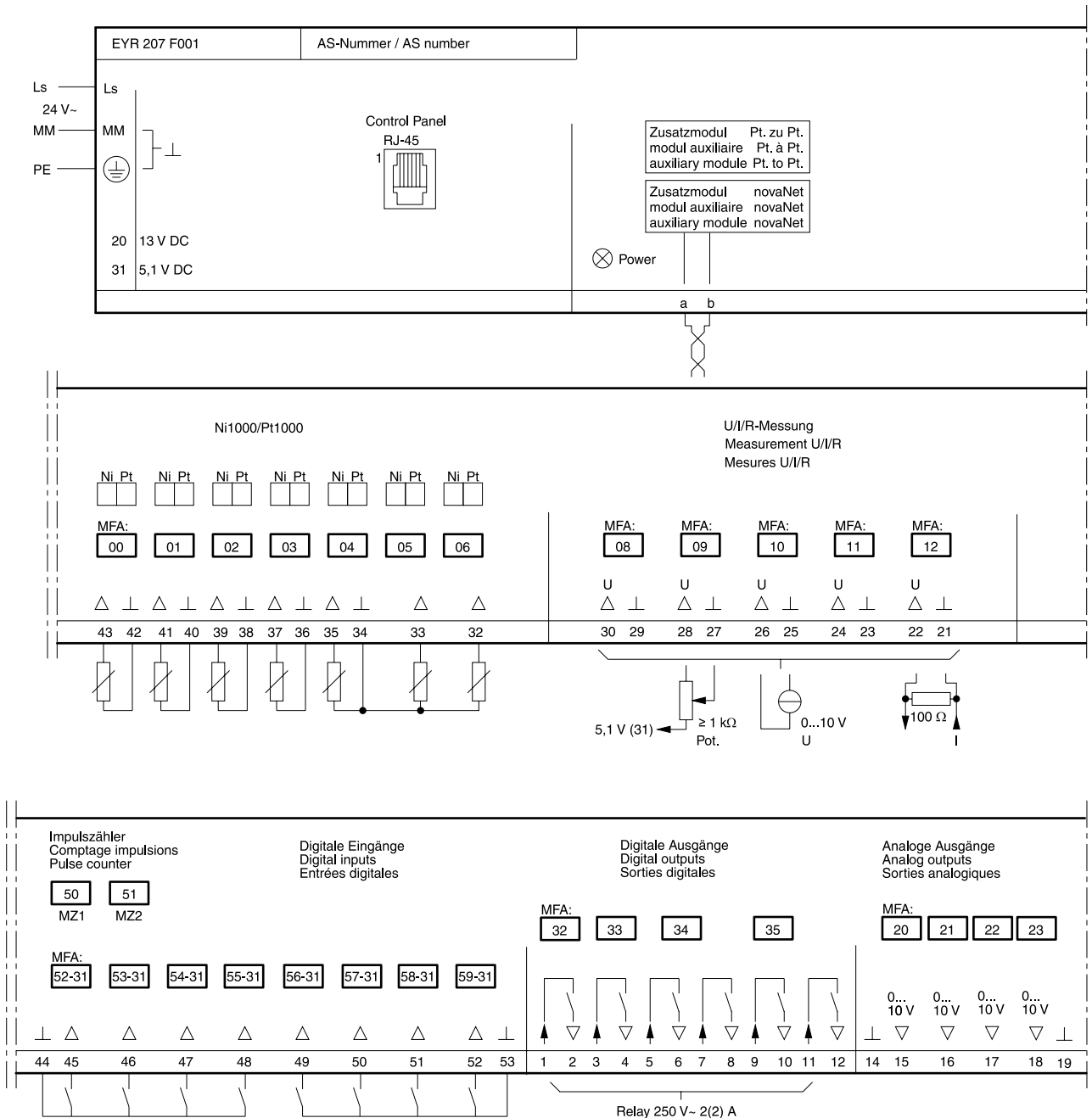(EN 61000-6-2), dürfen die Fühlerleitungen nicht länger
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