EYR 203, 207: novaFlex, Universal controller

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novaFlex, a universal controller of the EY3600 family, is used in HVAC control systems. The EYR 203 has a total of 18 inputs and 10 outputs, while the EYR 207 has 20 inputs and 10 outputs. The cycle time even fast control tasks to be performed. With the **novaNet** supplementary module, the 203 and the 207 can be networked and have communication capability. Any programming (parameterising) is done with a PC using EY3600 CASE software as per IEC 1131-3 (FBD Editor).
With the **novaNet** supplementary module (accessory 374413), **novaFlex** has all assemblies and interfaces needed for operation, for connecting the plant devices and for communication with other stations, with the touch-panel and with the management level.
Using the 'Pt to Pt' supplementary module (accessory 37448), communication with the EYT 250 touch-panel is possible even without **novaNet**.

Type	Description	Weight kg (lb)
EYR 203 F001	**novaFlex** with 6 relays, 3 circuits + 5 AI Ni1000	0,8 (1,8)
EYR 203 F002	**novaFlex** with 1 relay, 5 triacs + 5 AI Ni1000	0,8 (1,8)
EYR 207 F001	**novaFlex** with 6 relays, 6 circuits + 7 AI Ni1000	0,8 (1,8)

Technical details

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

Features

Digital inputs	8 (2 counters)
Digital outputs	2× 0-I
	2× 0-I-II
Analogue inputs	7× Ni/Pt1000 (EYR 207)
	5× Ni/Pt1000 (EYR 203)
	5× 0...10 V
Analogue outputs	4× 0...10 V

Interfaces (communication)

novaNet module	a/b terminals on main pcb
'Pt to Pt' module	
Connection to EYT 250	via RJ11 socket
Control Panel **nova240**	
EYT 240 F001	1× RJ45 socket

nova240 languages:

German, French, English, Italian, Dutch, Spanish, Swedish, Norwegian, Danish, Portuguese, Finnish (for other languages, see 'Accessories')

Permissible ambient temp.	0...45 °C (32...113°F)
Storage and transport temp.	–25...70 °C (–13...158°F)
Humidity	10...90 %rh without condensation
Degree of protection	IP 10
Protection class	I
Ambient class	IEC 60721 3K3
Wiring diagrams: EYR 203	A09605
EYR 207	A10092
Dimension drawing	M09603
Fitting instructions	MV 505769
Declaration of materials used	MD 92.507
Dimensions B × H × D (mm)	235 × 147,5 × 64,5
	9,3 × 5,8 × 2,5 inches
Complies with:-	
Directive 2006/95/EC	EN 60730
EMC directive 2004/108/EC	EN 61000-6-1/ EN 61000-6-2
	EN 61000-6-3/ EN 61000-6-4
Agency USA/Canada [1]	UL-listed: UL 916
	CSA-certified: CSA22.2

Accessories

-**EYT 240**	**nova240** control panel (see Section 92)
-**EYT 250**	Touch-panel (see Section 92)
0501149 002	**novaFlex** microprogram for EYR 203/207, with **nova240** languages: German, French, English, Polish, Slovenian, Hungarian, Romanian, Russian, Czech, Turkish, Slovakian
0367842 002	Connecting lead: **novaFlex** – **nova240**, 1,5 m (4,9 ft)
0367842 003	Connecting lead: **novaFlex** – **nova240**, 2,9 m (9,5 ft)
0367842 004	Connecting lead: **novaFlex** – **nova240**, 6,0 m (19,7 ft)
0367862 001	Connecting lead: **novaFlex** – **nova250**, 1,5 m (4,9 ft)
0367862 002	Connecting lead: **novaFlex** – **nova250**, 2,9 m (9,5 ft)
0367862 003	Connecting lead: **novaFlex** – **nova250**, 6,0 m (19,7 ft)
0367829 001*	Panel bracket for **nova240**
0367883 001	6× empty PROMs 512 KBit (USER-PROM for EYR 203)
0367883 002	5× empty PROMs 1Mbit (USER-PROM for EYR 207)
0374413 001	**novaNet** supplementary module (MV 505770)
0374448 001	'Pt to Pt' supplementary module (for direct connection to EYT 250)

*) Dimension drawing or wiring diagram are available under the same number

1) Only EYR 203 F001 and EYR 203 F002

Engineering notes
The **novaFlex** universal controller can be fitted in a cabinet by means of a top-hat rail (EN 50022).
The station requires a power supply of 24 V~.
The earthing terminal is connected to the earth connection (PE) and the housing.
The plant devices are connected via screw terminals. The following conditions must be observed:-

Cross-section of wire:	min. 0,8 mm² (AWG 18), max. 2,5 mm² (AWG 13), observing the standards
novaNet:	with twisted cable, max. expansion 200 nF/300 Ω, loading 0,6 nF
Digital inputs:	potential-free contacts, opto-coupler, transistors (open collector) open: > 3,5 V, closed: < 1 V
Digital outputs:	< 250 V~ / 2(2) A at the relay contacts UL/CSA: < 30 V~ /2(2)A 24 V~ / 1A at the triacs
Analogue inputs:	0...10 V d.c.
Analogue outputs:	no external supply. 0...10 V d.c., < 20 mA
Counter:	potential-free contacts, opto-coupler, 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/five inputs: do not require calibration; already take the line resistance into account; and can be used for Ni1000 and Pt1000. The sensors are connected using two-wire technology, with the wires allowed to be up to 55 m (180 ft) long if 0,8 mm² (AWG 18), or 170 m (558 ft) long if 1,5 mm² (AWG 15). The measuring voltage is pulsed so that the sensor does not heat up.
While the inputs were designed for Ni1000 sensors, they can also be used for Pt1000. The type of measurement is chosen via the software.
The linearisation for Pt1000 guarantees negligible deviation in the range –50 to +100 °C (–58...212°F).

For the full measuring range of the Pt1000, the following table applies:-

Temperature		**Absolute difference**	
–100 °C	(–148°F)	–0,05 °C	(–0,09°F)
–50 °C to +100 °C	(–58...212°F)	< ± 0,02 °C	(± 0,04°F)
+150 °C	(302°F)	+0,05 °C	(+0,09°F)
200 °C	(392°F)	+0,11 °C	(+0,2°F)
300 °C	(572°F)	+0,29 °C	(+0,52°F)
400 °C	(752°F)	+0,10 °C	(+0,18°F)
500 °C	(932°F)	–0,31 °C	(–0,56°F)

Important note
The **novaFlex** has 128 MFAs and can store 2 × 1792 entries in the HDB.

Voltage inputs

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

Voltage measurement
The voltage to be measured should be connected between one of the input terminals for voltage (inscribed with 'U') and an earthing terminal. The signal can be with respect to earth. Measurement 0 (2)...10 V is selected via the software.
The maximum permissible voltage (without incurring damage) is < ± 50 V. The range shown, however, is limited to 10 V.
The internal resistance R_i of the input is > 20 kΩ in this case.

Linear correction EYR 203

Linear correction factors a	b	Inputs	Module indicator (AI)
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 a	b	Inputs	Module indicator (AI)
1,280	0,623	0...10 V	0...1
1,600	0,529	2...10 V	0...1

Resistance measurement
The potentiometer should be connected to the U, earth and +5 V [(< 20 mA) terminal 27] terminals. So as not to overload the reference outputs, the lowest potentiometer value should not be less than 1 kΩ. The upper value of 2 kΩ is prescribed in order to guarantee that measurements are stable and free of interference.

Current measurement
Using an external resistor of 50 Ω (EYR 203) and 100 Ω (EYR 207), it is possible to measure current.

Linear correction EYR 203

Linear correction factors a	b	Inputs	Module indicator (AI)
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 a	b	Inputs	Module indicator (AI)
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-coupler transistor (open collector)
Input frequency	< 15 Hz (min. status duration is 32 ms)
Max. output current of inputs	0,4 mA with respect to earth
Debounce time	5 ms
Max. line resistance	1 kΩ
Protected against extraneous voltage	limited to –0,5 and +15 V

Never apply power of below 0,5 V or above 15 V, otherwise damage may occur.

The pulse is measured on the falling flank and can remain for any length of time. The internal counter value of the **novaFlex** is interrogated every cycle and is stored in DW 2 as a dual partial sum. The totalling to the actual counter value is done by the software after no more than 30 sec by the processor of the **novaFlex** in the DW 6.
Using the FP (floating point) format, the counter value can be a maximum of approx. $2{,}147 \times 10^9$.

Digital inputs

Number of inputs	8 (2 counters)
Type of inputs	potential-free contacts, wired with respect to earth opto-coupler transistor (open collector)
Status of 'closed contacts'	1 V max. with respect to earth
Max. output current of input	0,4 mA with respect to earth
Max. line resistance	1 kΩ
Protected against extraneous voltage	limited to –0,5 and +15 V

The **novaFlex** universal controller captures 8 pieces of digital information. The inputs to be monitored are connected between the input terminals and earth. The station applies a voltage of approx. 13 V at the terminal. When the contacts are open, it denotes Bit = 0. When the contacts are closed (denoting Bit = 1), the voltage is nought and a current of approx. 0,4 mA flows. Brief changes of at least 32 ms are buffered between the station's polling and then processed at the next cycle.

Digital outputs

Number of outputs	2× 0-I 2× 0-I-II	
Type of outputs	Variant F001	6 relays (250 V~ / 2(2)A) UL/CSA (30 V~ / 2(2)A)
	Variant EYR 203 F002	1 relay (250 V~ / 2(2)A) UL/CSA (30 V~ / 2(2)A) 5 triacs (24 V~ / 1(1)A)

Analogue outputs

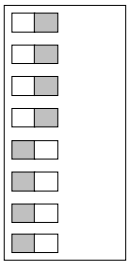
Number of outputs	4
Type of outputs	4× 0(2)...10 V d.c., 20 mA max.

The output voltage is measured between the relevant output terminal and an earth terminal. Outputs can provide 0...20 mA. The outputs are protected against static discharges, but not against direct or alternating current. These can damage the protective diode and the output driver. Therefore, the plant device (e.g. valve drive) should always be connected first in the system. Then a check should be made at the station to ensure that neither of the two lines has any potential at all (0 V) with respect to earth and to each other. If this is the case, the earth lead should be connected first, then the signal lead to its terminal at the station.

The **novaFlex** has a fast operating program. It reads all the inputs, processes the parameterised modules, updates the outputs and, using the **novaNet supplementary module**, effects the necessary communication with other stations or visualisation PCs. Any programming changes to the **novaFlex** (control loops and parameters) are effected via the **novaNet** automation net.
A real-time clock for the time programmes is integrated in the novaFlex. A lithium battery ensures that the user data (FBD data), time programmes and historical data (HDB) are retained in the SRAM in the event of a power failure. The real-time clock also runs off this lithium battery.
The battery makes it possible to retain the data and run the real-time clock for at least 10 years without power applied.
The data can be saved permanently using a USER-PROM.
Each **novaFlex** with **novaNet supplementary module** requires an address (0...127), which is set via coding switches. Up to 128 novaFlex subscribers can be connected to the novaNet.

The EYT 240 F001, EYT 250 F001 and EYT 250 F002 control panels are available for the novaFlex. The EYT 240 is linked to the station via an RJ-45 socket. It enables the operator to use all data (with the exception of the HDB) of the **novaFlex** (i.e. to read out measured values, alarms and statuses, to change setpoints and to issue positioning commands).
The EYT 250 is linked to the station via an RJ-11 socket (supplementary module 'Pt. to Pt.', accessory no. 374448001) or via novaNet. It enables all data to be used.

Putting into operation
When connecting the 24 V~ power supply, the technical earth must be linked with the terminal screw provided.
Work should always be carried out with the power supply switched off.
Before being incorporated into **novaNet**, every station must be given a clear (unique) address. The address area is split up into ranges. For **novaFlex**, only the range from 0 to 127 can be used. This **novaFlex number** is binary coded using the block of DIL switches of the **novaNet supplementary module**.



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

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Numbers 0...127 are available for **novaFlex**.
The AS address can be set using the block of eight switches. The last switch is used to set the parity, which should be set so that the number of switches at 'On', including parity, is even.

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

novaFlex must be removed from the power supply before being opened. ESD protective measures must be taken before carrying out any work.

Initialisation
Initialisation is effected by shorting the **Ini** button for approx. ½ second. This causes the station to load the microprogram from the USER-PROM and to commence operation under defined starting conditions.

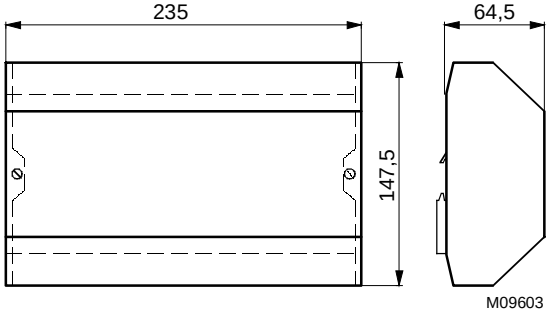
Both versions, EYR 203 and EYR 207, have a green LED next to the connection terminals. When lit continuously, it indicates that power is on.

The **novaNet supplementary module** has a yellow LED which indicates the telegram traffic when sending on the **novaNet**. If the station has stopped or if a fault has been detected in the RAM, this is noted by the watchdog, and the station is then re-started with the PROM data. In this case, no telegrams are sent for a short period, so the yellow LED stops flashing. If this LED does not light up at all, either the PROM is faulty or there is no PROM at all, therefore, the station is no longer operable.
In stand-alone mode (without **novaNet**), the 'Send' LED flashes quickly (approx. 7 times per second), since an empty telegram (dummy) is sent every cycle.
When the station is put into operation for the first time, or if it is manually reset, the microprogram and the user data are read in afresh. As soon as this has been concluded, the yellow 'Send' LED flashes again at the same rate as the outgoing telegrams.

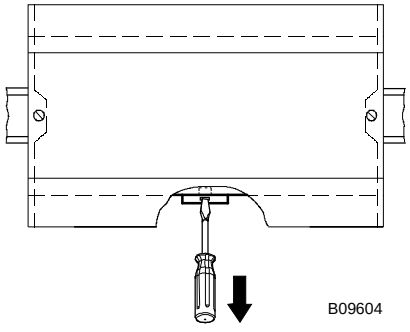
Reference of MFA to terminals

EYR 207, EYR 203 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
Analog 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
Analog 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
	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		1+2
0-I	33	20	1	3		3+4
0-I	34	20	4	5		5+6
-II				6		7+8
0-I	35	20	7	8		9+10
-II				9		11+12
Digital Out EYR 203 F002			**COM**			
0-I (relay)	32	20		1+2		
0-I (triac)	33	20	Ls	4		
0-I	34	20	Ls	5		
-II (triacs)				6		
0-I	35	20	Ls	8		
-II (triacs)				9		

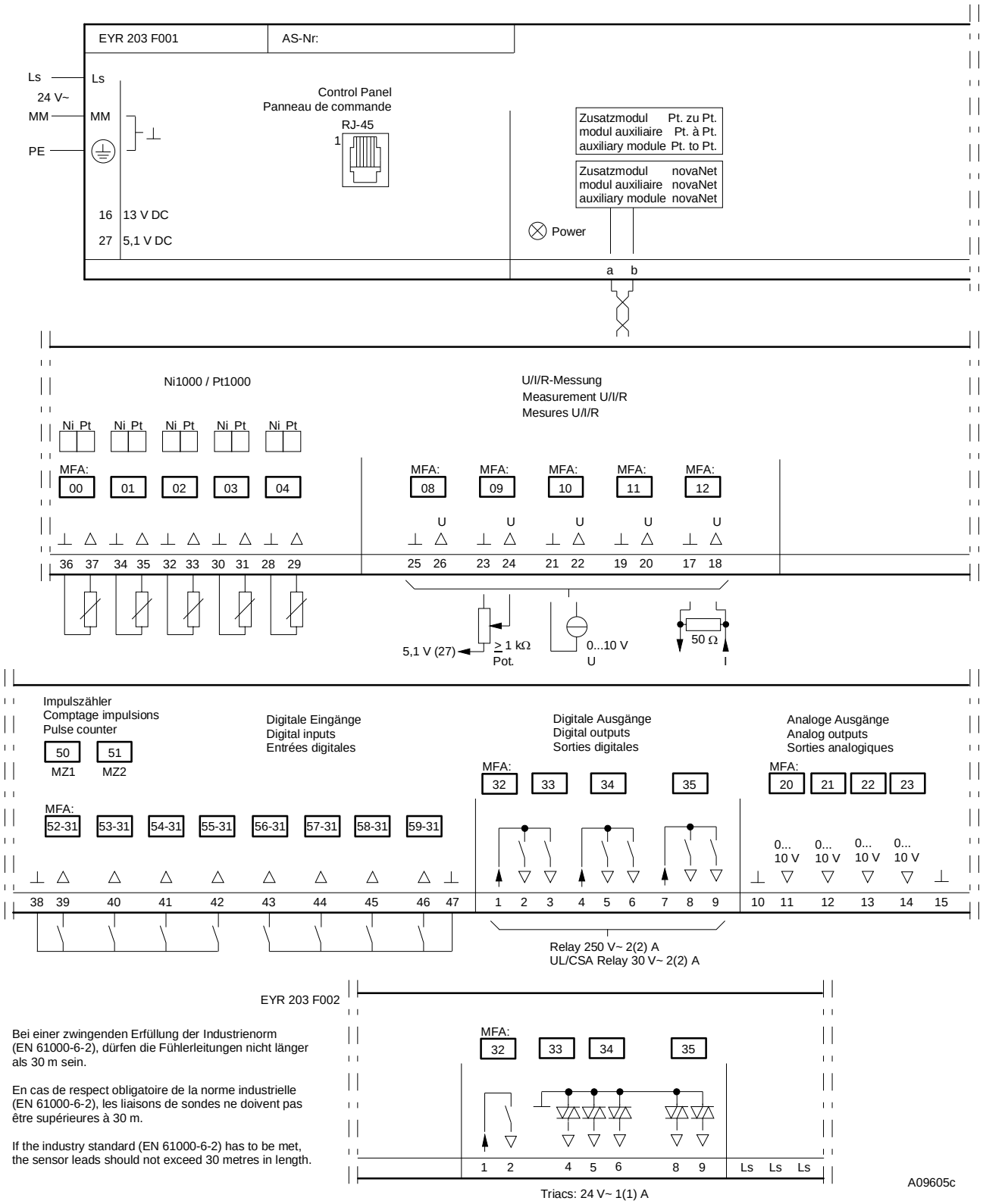
Dimension drawing



Fitting to top-hat rail



Wiring diagram, EYR 203

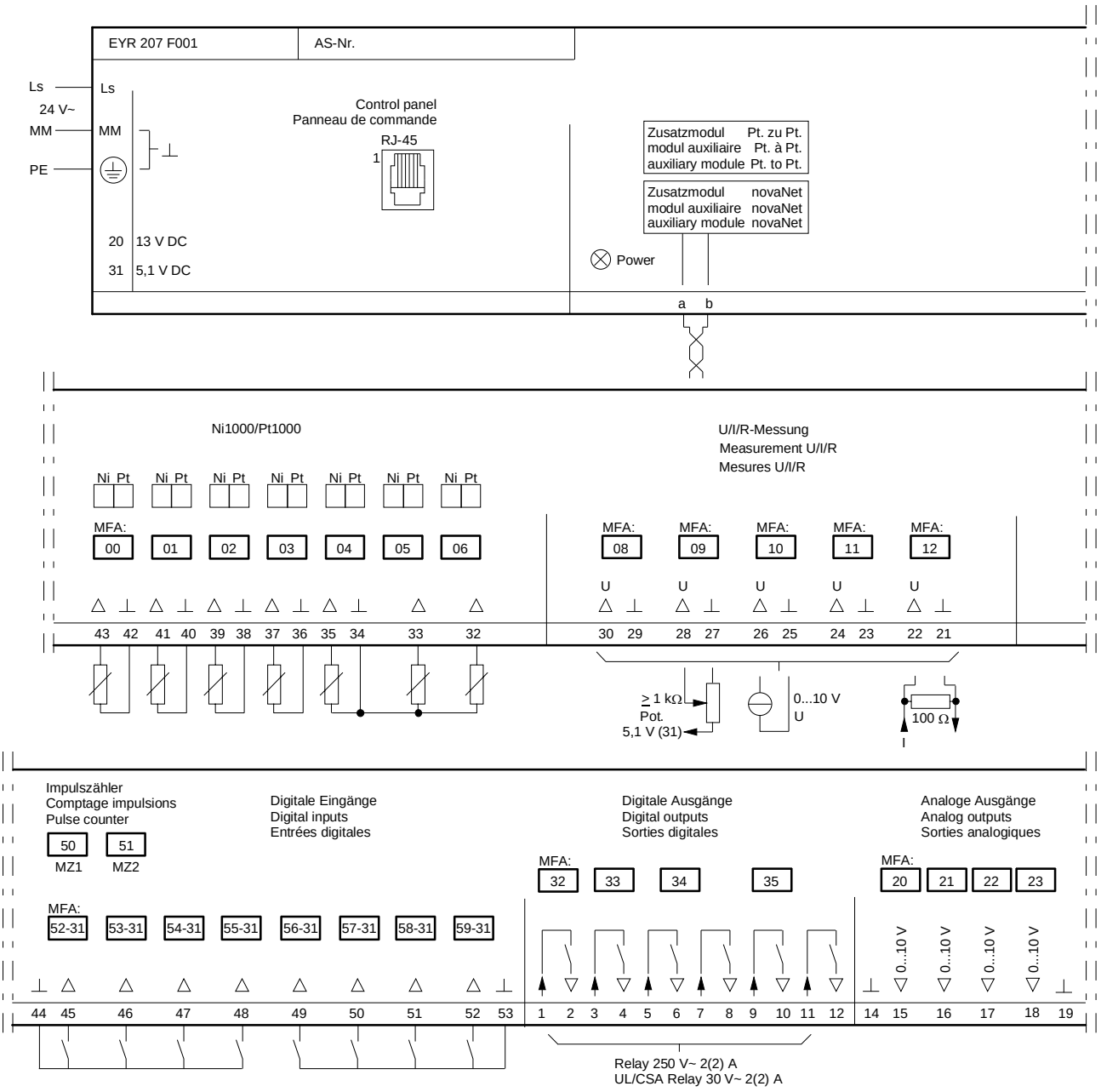


Bei einer zwingenden Erfüllung der Industrienorm (EN 61000-6-2), dürfen die Fühlerleitungen nicht länger als 30 m sein.

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.

Wiring diagram, EYR 207



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Accessories

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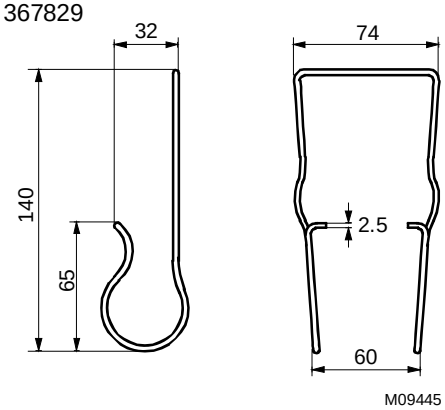

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