Swiss Made

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ISO 9001

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Operating instructions No 704 E

Rotational speed measuring and switching instruments

Type series FT 1700

General

Rotational speed measuring and switching instruments FT 1700 are microprocessorcontrolled and operate on the period measurement principle, with subsequent reciprocal formation (the computing principle). The number of periods involved in a measurement depends on the level of the input frequency (see Diagram 4-110.964). The advantage of the computing principle is that a high input frequency is not required, even for fine resolution of the measured value.

Safety note

Rotational speed measuring and switching instruments FT 1700 comply with Class of Protection I; they require that a protective ground conductor be connected without fail. They were developed and tested according to IEC Publication 348 and have left the factory in perfect condition. These Operating Instructions contain information and hazard warnings which, when observed, will ensure safety of the relevant instrument and safe operation. If the condition of an instrument is in doubt as a result of electrical, climatic or mechanical overload the instrument must be taken out of service immediately and handed over to the manufacturer or his representative for repair.

General technical data (applies to all instruments)

Housing: Plastic housing for optional mounting on rails in accordance with DIN 46277/3 or 50022, or on mounting plate in accordance with DIN 43660 and 46121, Type of Protection IP 50 to DIN 40050. Terminals with self-lifting connection plates for 2 x 2.5mm2 wire or 2 x 1.5 mm2 stranded conductor; type of protection for terminals: IP 10.

Supply voltages:
AC 230: 230 V +15 %/-20 %, 47 to 63 Hz
AC 115: 115 V +15 %/-20 %, 47 to 63 Hz
DC 24: 18 to 33 V DC

Supply voltage interruptions of 50 ms at a max.undervoltage of 20 % AC or 5 ms at minimum DC voltage can be withstood without instrument malfunction.

Power consumption: AC approx. 6 VA, DC approx. 3 Watts.

Pulse sensor connection (frequency input):

Input voltage: 50 mVeff...40 Veff. Input impedance approx. 200 kOhm.

Potential-free for connection of electromagnetic, Ferrostat, HF sensors and proximity switches according to DIN19234.

Frequency range: 2 Hz...30 kHz

Built-in transmitter power supply: +12 V, rated at 25 mA (up to 35 mA at max. ambient temperature of +50°C).

Pulse output: Floating open-collector output with U_{LO} = 0.4 V max. at 2.5 mA sink current, U_{max} = +24 V.

Further speed measuring and switching instruments may be connected to this output (cascade connection). The frequency entry of the instruments to be connected must meet the following specifications:

- NAMUR entry or
- AC-coupled entry with pull-up resistor = 680 Ohm or
- DC-coupled entry with pull-up resistor = 4,7 kOhm and trigger level U_{LO} = 0,8 V.

Reset input (RES, for startup bridging, only in frequency relay and in speed monitor): Same electrical data as for the frequency input.

Climatic conditions
KVE in accordance with DIN 40040, storage temperature -25 to +65°C, relative air humidity 75 % yearly average, up to 95% during a period of max. 30 days.
Ambient temperature: 0 to 55°C with 25mA max.load on transmitter power supply, 0 to 50°C at 35 mA.
Temperature drift: FTF 1723: max. of 150 ppm/°K
FTW 1713: typ. 150 ppm/°K, max. of 300 ppm/°K but not greater than ± 0.5 % between 0 and 50°C.
Installation
The instrument should be installed at a chemically and physically neutral location. It must not be subjected to direct solar radiation. Any mounting position is permissible.
Connections
The AC line and pulse transmitter are connected at screw terminals as shown in Drawing 4-110.963 The protective ground conductor should be connected to Terminal 3 before the phase and neutral conductor are connected. The instrument may only be operated in the permanently installed state, and the AC power cable must be fitted with a suitable switch. Before switching on, check that the AC line voltage is the same as the instrument voltage.
Caution: Any open-circuit in the protective ground conductor, outside or inside the instrument, will impair safety and can place persons and objects at risk. Deliberate interruption of the protective ground conductor is prohibited.

Test voltages:	Between ground/AC line	2000 V/50 Hz/1 min.
	Between ground/current output	500 V/50 Hz/1 min.

For interference rejection, the transmitter cable shield must be connected to the reference potential of the input amplifier via Terminal 12.

Programming the parameters (Drawing 4-110.962)
Unless otherwise specified, the instruments of type series FT 1700 are supplied with standard setting parameters:
Pulse transmitter connection and reset input: open*
End-of-range frequency FTW 1713: 0 to 1000 Hz/4* to 20mA
Switching point FTF 1723: 500 Hz
Hysteresis FTF 1723: 1 %
Relay function FTF 1723: Normal*
Startup bridging FTF 1723: 1 s, relay OFF
Power-on-reset FTF1723: ON*
Variables marked * can only be changed after unscrewing the screw at the front and lifting off the front panel.

Dismantling the instruments
All parameters and functions can be set with the front panel lifted off. Further dismantling is only necessary to replace a fault fuse.
Caution: The instrument may only be dismantled with power supply removed. Inside the instrument there are capacitors which remain live even when the supply has been removed. The two Phillips screws at the corners of the housing should be unscrewed. The two snap-on seats on the side of the housing can then be released with a screwdriver and the housing cover can be lifted off forwards. The entire electronics assembly can then be lifted out.

Instrument-related technical data

Frequency-current converter FTW 1713
Programmable parameters:
- End-of-range frequency: Lowest 0.999 Hz, highest 29.9 kHz. Set at the front by means of 4 coding switches (mantissa, 3-decade and exponent)
- Output current range: Optionally 0 to 20 or 4 to 20 mA
- Pulse transmitter connection.

Current output: Floating, maximum load 500 ohms, maximum load voltage 10 V, maximum no-load voltage 20 V. Maximum linearity error 0.2 %, programming by means of OUTPUT jumper according to drawing No. 4-110.962.
Response time (reaction time): This is the sum of the measuring time (Zmax) and computing time (5 ms). If the input frequency is suddenly and fully removed, the output current goes to scale zero in steps, approximating an e function, as soon as the measuring time for the new measured value becomes longer than 2, 4, 8-times the last measuring time.

Frequency relay FTF 1723
Programmable parameters:
- Switching point between 0.002 Hz and 29.9kHz. Set at the front by means of 4 coding switches (mantissa, 3-decade and exponent).
- Hysteresis 1% or 5 % referred to the set value. Set at the front by means of the coding switches. The hysteresis is only effective when the input frequency is increasing.
- Normal or inverse relay function.
- Startup bridging: Time 1 s to 1800 s, relay function ON/OFF.
- Power-on reset: ON/OFF.
- Pulse transmitter connection.

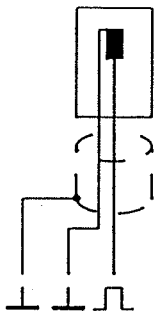
Accuracy of switchingpoint: 0.5 % referred to the set value.
Switching contact: 1 changeover, max.of 250 V, 1A, 50 W.
With an inductive load, an external spark suppressor must be fitted. An LED at the front indicates the control state (active when the switching point has been exceeded). The relay is a monostable device and picks up when the set switching point is exceeded. The inverse function can be programmed by means of an internal RELAY jumper, i.e. the relay drops out when the switching point is exceeded.
Switching delay (reaction time): This is the sum of measuring time (Zmax), computing time and switching delay of the relay (13 ms). If the input frequency is suddenly and fully removed, an indication is given that the frequency has dropped below the switching point after one period of the switching frequency.
Startup bridging and relay function: A startup bridging time and the relay position during this time can be selected by means of coding switches. The relay position is independent of the begins with the enable signal, i.e. opening of the reset input.
Additionally, the time can be started by applying auxiliary power (power-on reset ON, programmable via jumper P.O.R in accordance with drawing No. 4-110.962).

When the bridging time has elapsed, the first positive-going edge at the frequency input starts the first measurement. The relay only goes to the appropriate setting when this measurement is completed.

ANSCHLUSS DER IMPULSGEBER
TRANSMITTER CONNECTIONS
RACCORDEMENT DES TRANSMETTEURS

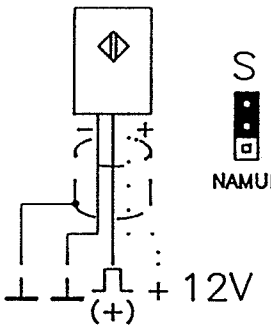
ZUSAMMENSCHALTUNG MEHRERER GERAETE
CONNECTION OF SEVERAL UNITS
RACCORDEMENT DE PLUSIEURS APPAREILS

Elektromagnetischer Geber
Electromagnetic transmitter
Transmetteur électromagnetique

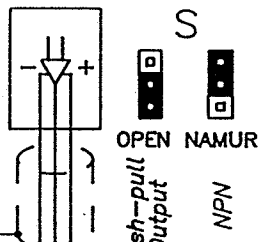


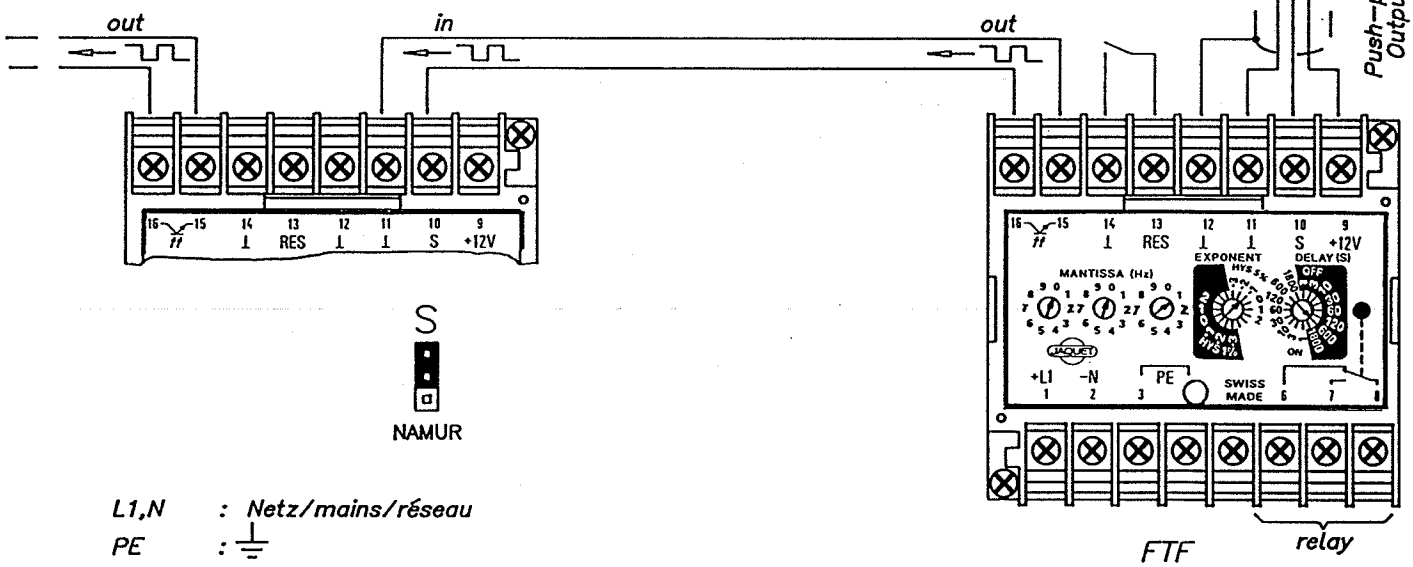
Zweidraht–,HF–,NAMUR–Geber
Two–wire–,HF–,NAMUR–transmitter
transmetteur à deux fils,HF,NAMUR

Näherungsinitiator mit NPN – Ausgang
Proximity switch with NPN – output
Détecteur de proximité avec sortie NPN



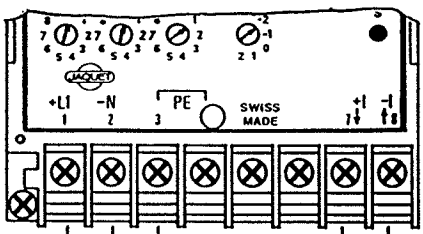
Geber mit Verstärker
Transmitter with amplifier
transmetteur avec amplificateur





S
NAMUR

L1,N : Netz/mains/réseau
PE : ⏚
S ⊓⊔ :
⊥ 0V : } *Geber Transmitter Transmetteur*
+12V :
RES : Reset
⊻ // : ⊓⊔ out



Sicherung	*AC 230V*	*T 32mA*	
Fuse	*AC 115V*	*T 63mA*	
Fusible	*DC 24V*	*T 500mA*	

Netz
mains
réseau
Phase (+)
Null/neutre/neutre (–)
Erde/ground/terre ⏚

out
+ –

FTW

Aendg.:

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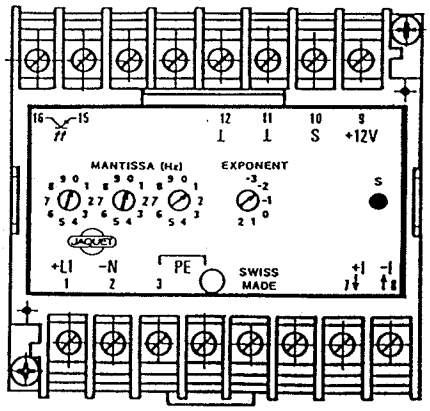
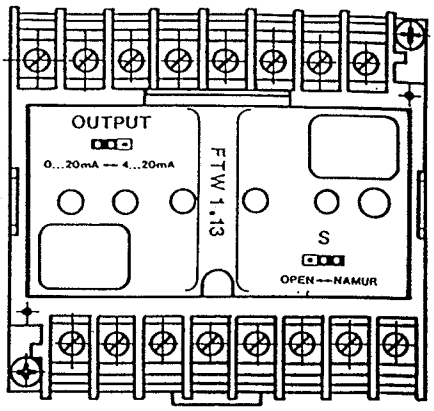
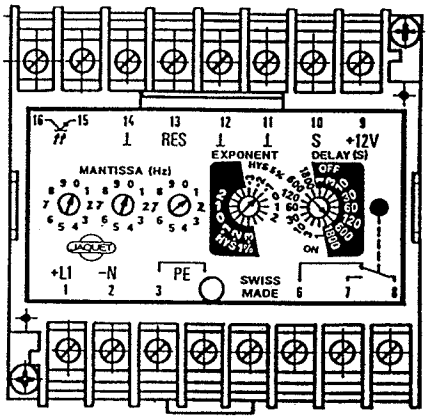
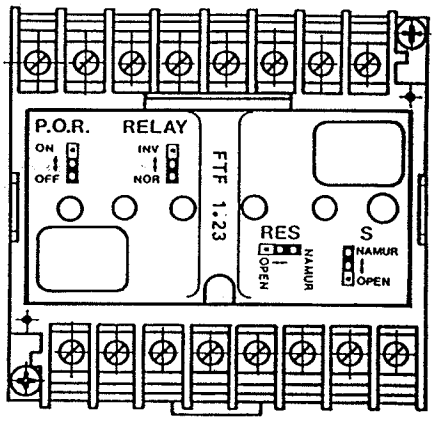
FTW 1713



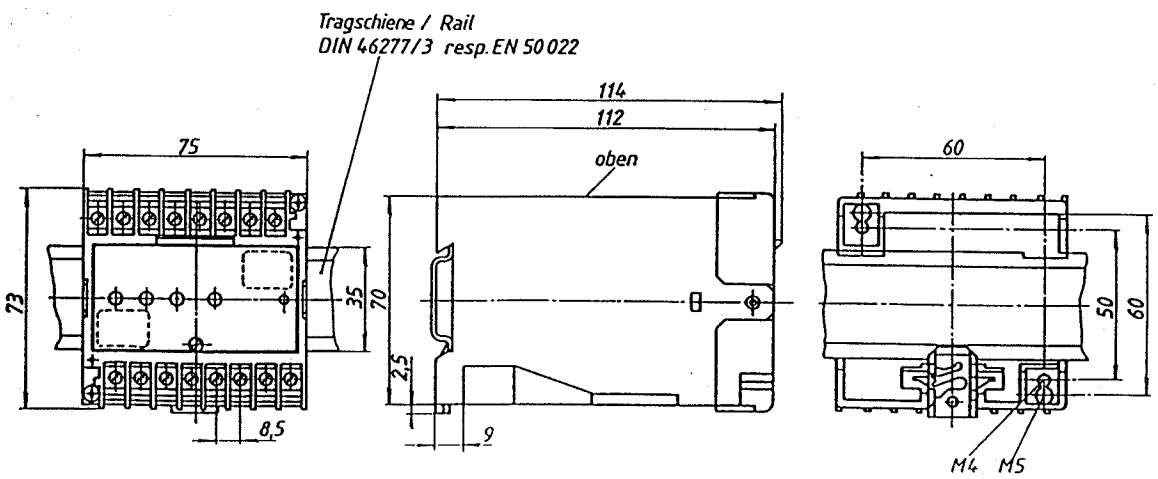


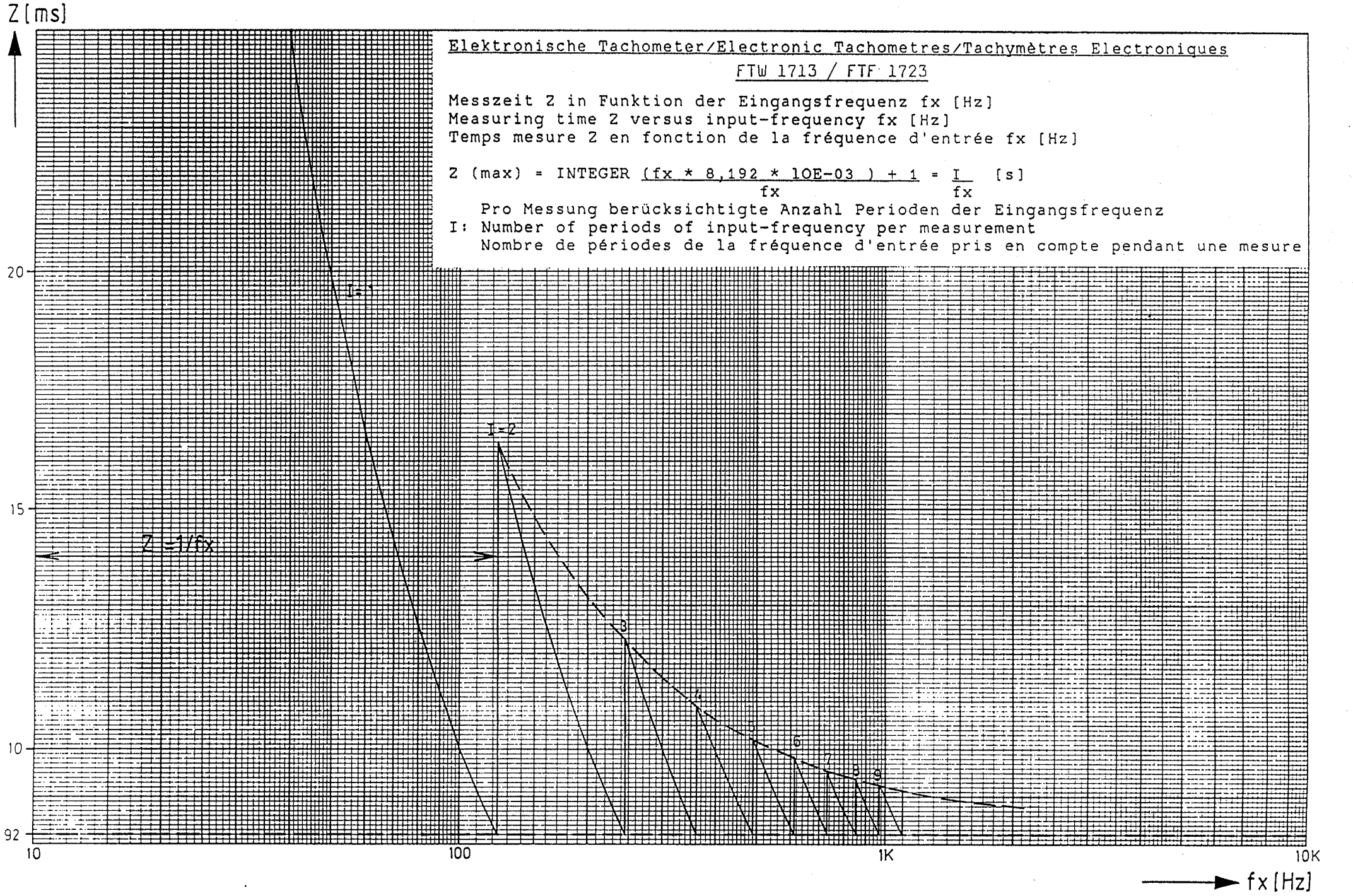
FTF 1723





Massbild / Dimensions FT 1700





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