POWER TRANSDUCERS

Models: P35-W, P35-VAR, P35-VA

Application:

The transducer is suitable to convert the multiphase active, reactive or apparent power input to an analog DC voltage/current or a digital RS485 output.

Important features:

- Full digital operation (Icom System of Ganz Instruments).
- Preset delivery or on site setting by digital communication.
- True power metering with digital multiplication.
- Plug in terminal blocks with screw.
- DIN rail case.
- EMC protection.

Technical specifications:

- Voltage input range (CF < 2): ..... from 0…5V to 0…600V AC
- Current input range (nominal sinusoidal): ..... 0…1A or 0…5A AC
- Power type: ..... active or reactive or apparent power
- Measuring type: ..... 3 or 4 wires, balanced or unbalanced loads
- Input frequency range: ..... 45…65Hz
- Input isolation: ..... Cat. III. 1kV (Test: 4300V_{eff} 1min)
- Input/output overload: ..... up to 120%

- Analog output range: .. 0..±1mA to 0..±24mA, or 0..±1V to 0..±12V DC
- Output load: ..... max. 500Ohm for current or min. 2kOhm for voltage
- Output limits: ..... max. 20V, or 30mA
- Output setting time: ..... max. 300ms
- Digital output: ..... RS485, Modbus-RTU, 9.6 / 19.2kBaud
- Accuracy (IEC 688): ..... Class 0.2 (at 10%..120% input range)
- Temperature coefficient: ..... max. 100ppm/ºC (Ref: +20ºC)
- Consumption: ..... max. 2W

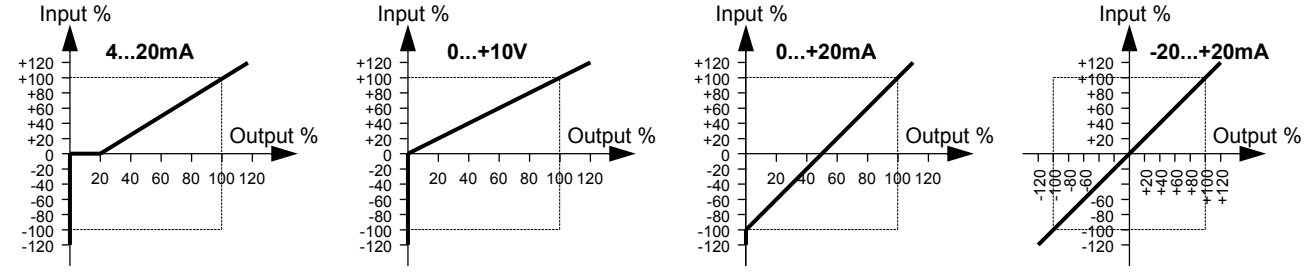
- Wire cross-section of terminals: ..... max. 2.5mm^2
- Working temperature: ..... -20…+60ºC
- Storage temperature: ..... -40…+80ºC
- Humidity: ..... max. 85%
- Vibration (acceleration): ..... max. 2g
- Dimension (HxWxD): ..... 101mm x 35mm x 119mm
- Case protection: ..... IP 20
- Case material: ..... PC-GF
- Weight (with transformer): ..... approx. 0.5kg

Standards: IEC/EN 61010-1
IEC/EN 60688

Measuring types:

W_	active power
VAR_	reactive power
VA_	apparent power
_a	single phase
_b	3 wires balanced
_b1	4 wires balanced
_c	3 wires unbalanced
_d	4 wires unbalanced

Typical transfer characteristics:



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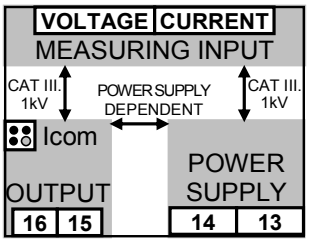
POWER TRANSDUCERS

Power Supply variations:

(Voltage / Isolation)

24V, 115V, 230V, 400V ±15%, 50/60Hz, 1.5W **transformer** / 5kV
5V, 12V, 24V, 48V DC ±20% 2W **converter** / 1kV
100…230V ±15%, 47…440Hz, and **110…300V** DC ±20%, 3W **converter** / 3kV

Isolation scheme:



P35 transducer standard versions:

P35- - **Input** - **Output** - **Power**

Input
Measuring type
3x 110V,5A (Active power)
3x 110V,1A (React. power)

-

Output
Output / Load
0..+20mA / 500 Ohm (max.)
0..+10V / 2 kOhm (min.)

-

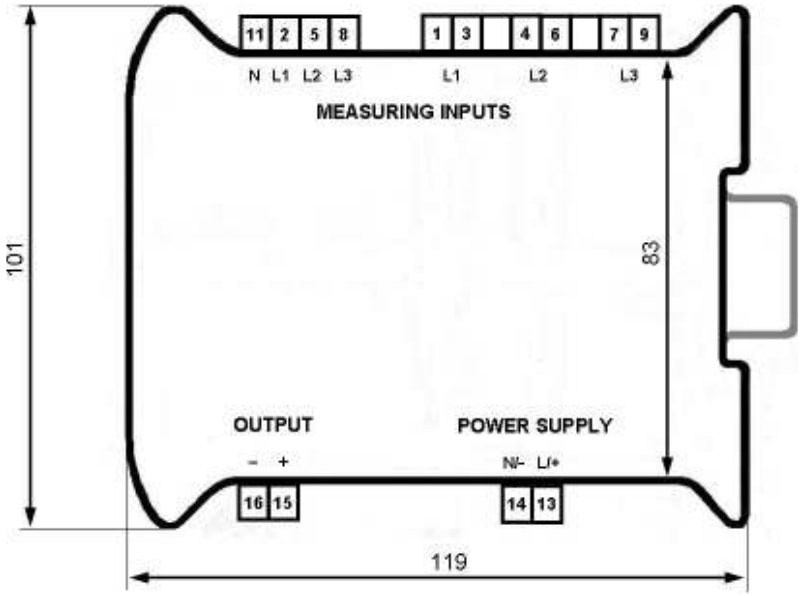
Power Supply (AUX)
Voltage / Isolation
230V AC 1.5W (transformer) / 5kV
24V DC 2W (converter) / 1kV

Ordering examples:

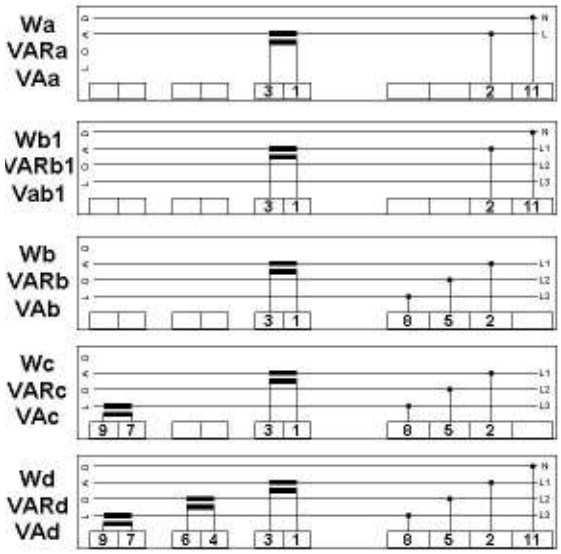
P35-Wc _ Input: 3x 400kV/110V, 500/5A, 0…300MW **_ Output:** 4…20mA **_ Power:** 230V AC transformer
P35-Wd _ Input: 3x 100kV/110V, 100/5A, -15…+15MW **_ Output:** -20…+20mA **_ Power:** 220V DC converter
P35-VARd _ Input: 3x 25kV/110V, 500/1A, 0…20MW **_ Output:** RS485 Modbus **_ Power:** 24V DC converter

Note: On request for extra charge special ranges (Input, Output, Power Supply) are possible.

Outline dimensions and connection diagrams:



The transducer can operate without external current transformers.



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RMS CURRENT TRANSDUCERS

Model: M22-Aeff

Application:

The transducer is suitable to convert the AC true RMS current input to an analog DC voltage/current or a digital RS485 output.

Important features:

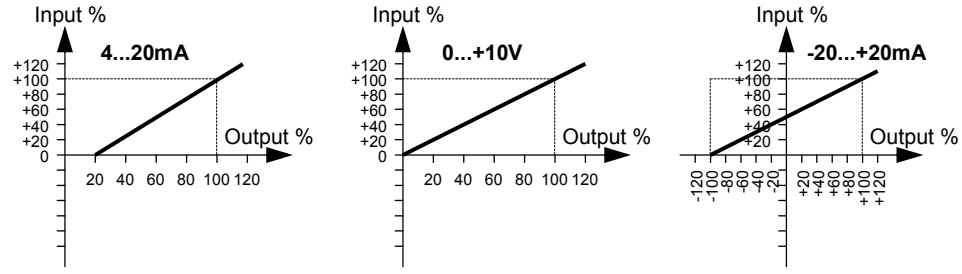
- Full digital operation (Icom System of Ganz Instruments).
- Preset delivery or on site setting by digital communication.
- Automatic zero calibration.
- Plug in terminal blocks with screw.
- DIN rail case.
- EMC protection.

Technical specifications:

- Current input range (nominal sinusoidal): from 0…0.06A to 0…5A AC
- Input dropout voltage: ..... 60mV (at nominal current)
- Input frequency range: ..... 45…65Hz
- Input isolation: ..... Cat. III. 1kV (Test: 4300V_{eff} 1min)
- Input/output overload: ..... up to 120%
- Analog output range: .. 0..±1mA to 0..±24mA, or 0..±1V to 0..±12V DC
- Output load: ..... max. 500Ohm for current or min. 2kOhm for voltage
- Output limits: ..... max. 20V, or 30mA
- Output setting time: ..... max. 300ms
- Digital output: ..... RS485, Modbus-RTU, 9.6 / 19.2kBaud
- Accuracy (IEC 688): ..... Class 0.2 (at 10%..120% input range)
- Temperature coefficient: ..... max. 200ppm/ºC (Ref: +20ºC)
- Consumption: ..... max. 2W
- Wire cross-section of terminals: ..... max. 2.5mm^2
- Working temperature: ..... -20…+60ºC
- Storage temperature: ..... -40…+80ºC
- Humidity: ..... max. 85%
- Vibration (acceleration): ..... max. 2g
- Dimension (HxWxD): ..... 101mm x 22.5mm x 119mm
- Case protection: ..... IP 20
- Case material: ..... PC-GF
- Weight (with transformer): ..... approx. 0.3kg

Standards: IEC/EN 61010-1
IEC/EN 60688

Typical transfer characteristics:



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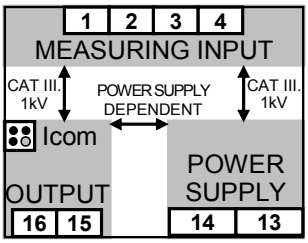
RMS CURRENT TRANSDUCERS

Power Supply variations:

	(Voltage / Isolation)
24V, 115V, 230V ±15%, 50/60Hz, 1.5W **transformer**	/ 5kV
5V, 12V, 24V, 48V DC ±20% 2W **converter**	/ 1kV
100…230V ±15%, 47…440Hz, and **110…300V** DC ±20%, 3W **converter**	/ 3kV

Isolation scheme:



M22-Aeff transducer standard versions:

M22-Aeff - **Input** - **Output** - **Power**

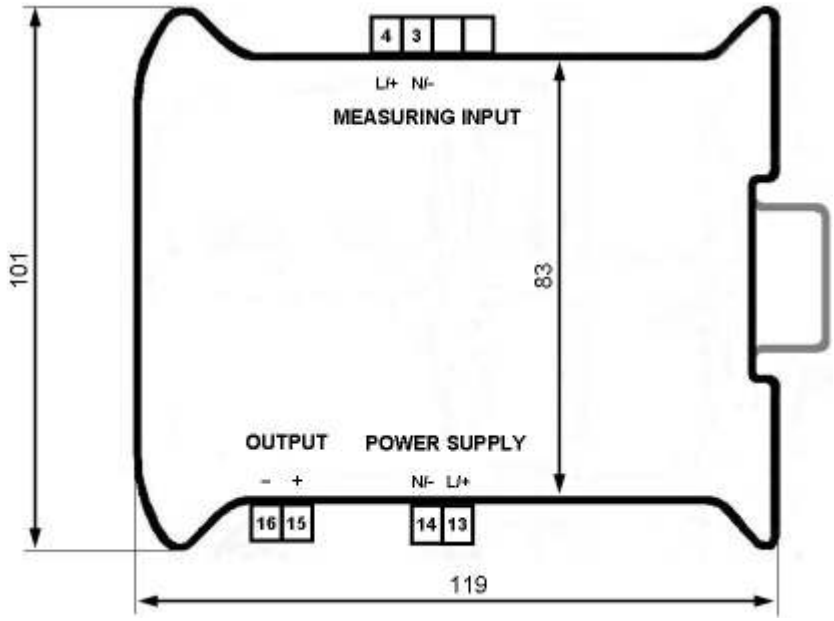
Input		**Output**		**Power Supply** (AUX)
Measuring type		Output / Load		Voltage / Isolation
1A	(AC RMS current)	**0..+20mA** / 500 Ohm (max.)		**230V AC** 1.5W (transformer) / 5kV
5A	(AC RMS current)	**0..+10V** / 2 kOhm (min.)		**24V DC** 2W (converter) / 1kV

Ordering example:

M22-Aeff _ Input: 0…5A AC **_ Output:** 4…20mA DC **_ Power:** 230V AC transformer
M22-Aeff _ Input: 0…1A AC **_ Output:** RS485 Modbus **_ Power:** 110…300V DC converter

Note: On request for extra charge special ranges (Input, Output, Power Supply) are possible.

Outline dimensions and connection diagrams:



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AC CURRENT TRANSDUCERS

Model: M22-A

Application:

The transducer is suitable to convert the AC average current input to an analog DC voltage/current or a digital RS485 output.

Important features:

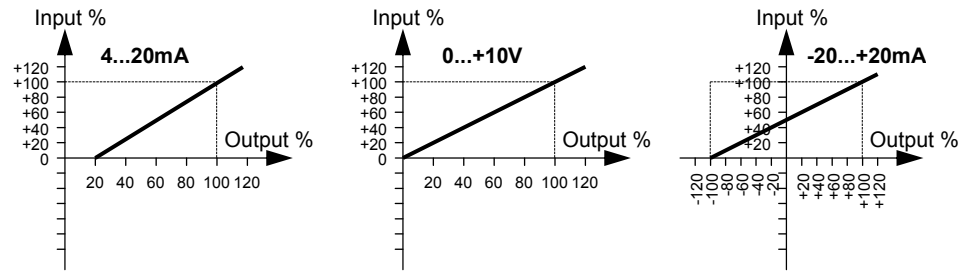
- Full digital operation (Icom System of Ganz Instruments).
- Preset delivery or on site setting by digital communication.
- Automatic zero calibration.
- Plug in terminal blocks with screw.
- DIN rail case.
- EMC protection.

Technical specifications:

- Current input range (nominal sinusoidal): from 0…0.06A to 0…5A AC
- Input dropout voltage: ……..…….…… 60mV (at nominal current)
- Input frequency range: ..... 45…65Hz
- Input isolation: ..... Cat. III. 1kV (Test: 4300V_{eff} 1min)
- Input/output overload: ..... up to 120%
- Analog output range: .. 0..±1mA to 0..±24mA, or 0..±1V to 0..±12V DC
- Output load: ..... max. 500Ohm for current or min. 2kOhm for voltage
- Output limits: ……..... max. 20V, or 30mA
- Output setting time: ..... max. 300ms
- Digital output: ……..….. RS485, Modbus-RTU, 9.6 / 19.2kBaud
- Accuracy (IEC 688): ..... Class 0.2 (at 10%..120% input range)
- Temperature coefficient: ..... max. 200ppm/ºC (Ref: +20ºC)
- Consumption: ..... max. 2W
- Wire cross-section of terminals: ..... max. 2.5mm^2
- Working temperature: ..... -20…+60ºC
- Storage temperature: ..... -40…+80ºC
- Humidity: ..... max. 85%
- Vibration (acceleration): ..... max. 2g
- Dimension (HxWxD): ..... 101mm x 22.5mm x 119mm
- Case protection: ..... IP 20
- Case material: ..... PC-GF
- Weight (with transformer): ..... approx. 0.3kg

Standards: IEC/EN 61010-1
IEC/EN 60688

Typical transfer characteristics:



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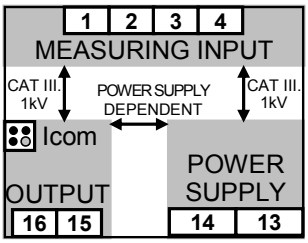
Power Supply variations:

	(Voltage / Isolation)
24V, 115V, 230V ±15%, 50/60Hz, 1.5W **transformer**	/ 5kV
5V, 12V, 24V, 48V DC ±20% 2W **converter**	/ 1kV
100…230V ±15%, 47…440Hz, and **110…300V** DC ±20%, 3W **converter**	/ 3kV

Isolation scheme:



M22-A transducer standard versions:

M22-A - **Input** - **Output** - **Power**

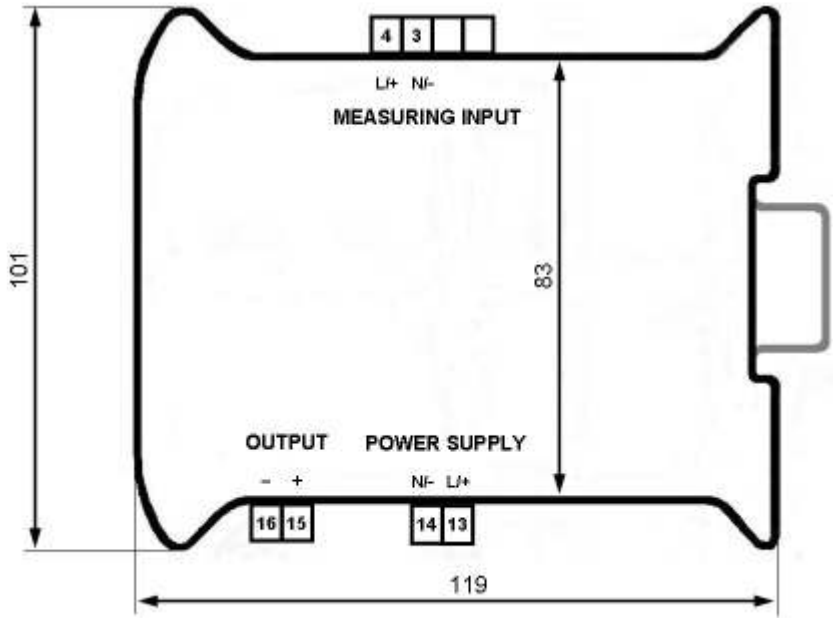
Input		**Output**	**Power Supply** (AUX)
Measuring type		Output / Load	Voltage / Isolation
1A (AC average current)		**0..+20mA** / 500 Ohm (max.)	**230V AC** 1.5W (transformer) / 5kV
5A (AC average current)		**0..+10V** / 2 kOhm (min.)	**24V DC** 2W (converter) / 1kV

Ordering examples:

M22-A _ Input: 0…5A AC **_ Output:** 4…20mA DC **_ Power:** 230V AC transformer
M22-A _ Input: 0…1A AC **_ Output:** RS485 Modbus **_ Power:** 110…300V DC converter

Note: On request for extra charge special ranges (Input, Output, Power Supply) are possible.

Outline dimensions and connection diagrams:



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DC CURRENT TRANSDUCERS

Model: M22-ADC

Application:

The transducer is suitable to convert the DC current input to an analog DC voltage/current or a digital RS485 output.

Important features:

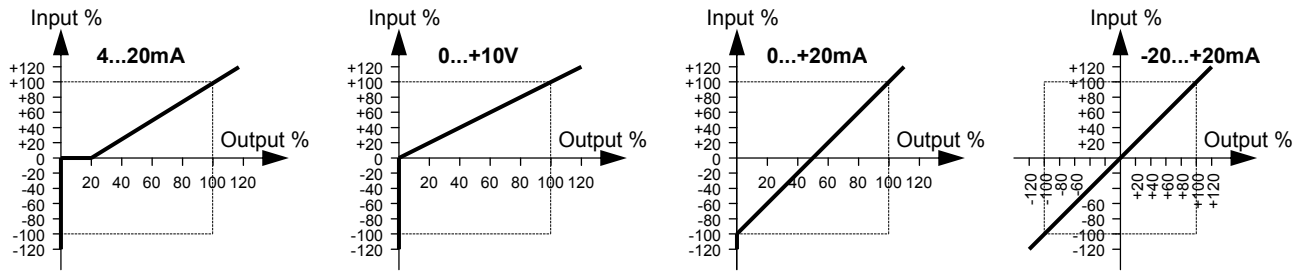
- Full digital operation (Icom System of Ganz Instruments).
- Preset delivery or on site setting by digital communication.
- Automatic zero calibration.
- Plug in terminal blocks with screw.
- DIN rail case.
- EMC protection.

Technical specifications:

- Current input range (nominal): ……..... from 0…±0.06A to 0…±5A DC
- Input dropout voltage: ……..…… 60mV (at nominal current)
- Input isolation: ..... Cat. III. 1kV (Test: 4300V_{eff} 1min)
- Input/output overload: ..... up to 120%
- Analog output range: .. 0..±1mA to 0..±24mA, or 0..±1V to 0..±12V DC
- Output load: ..... max. 500Ohm for current or min. 2kOhm for voltage
- Output limits: ……..... max. 20V, or 30mA
- Output setting time: ..... max. 300ms
- Digital output: ……..….. RS485, Modbus-RTU, 9.6 / 19.2kBaud
- Accuracy (IEC 688): ..... Class 0.2 (at 10%..120% input range)
- Temperature coefficient: ..... max. 200ppm/ºC (Ref: +20ºC)
- Consumption: ..... max. 2W
- Wire cross-section of terminals: ..... max. 2.5mm^2
- Working temperature: ..... -20…+60ºC
- Storage temperature: ..... -40…+80ºC
- Humidity: ..... max. 85%
- Vibration (acceleration): ..... max. 2g
- Dimension (HxWxD): ..... 101mm x 22.5mm x 119mm
- Case protection: ..... IP 20
- Case material: ..... PC-GF
- Weight (with transformer): ..... approx. 0.3kg

Standards: IEC/EN 61010-1
IEC/EN 60688

Typical transfer characteristics:



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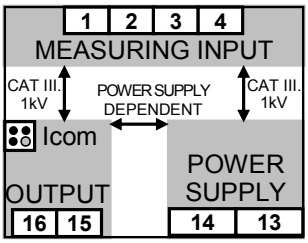
Power Supply variations:

	(Voltage / Isolation)
24V, 115V, 230V ±15%, 50/60Hz, 1.5W **transformer**	/ 5kV
5V, 12V, 24V, 48V DC ±20% 2W **converter**	/ 1kV
100…230V ±15%, 47…440Hz, and **110…300V** DC ±20%, 3W **converter**	/ 3kV

Isolation scheme:



M22-ADC transducer standard versions:

M22-ADC - **Input** - **Output** - **Power**

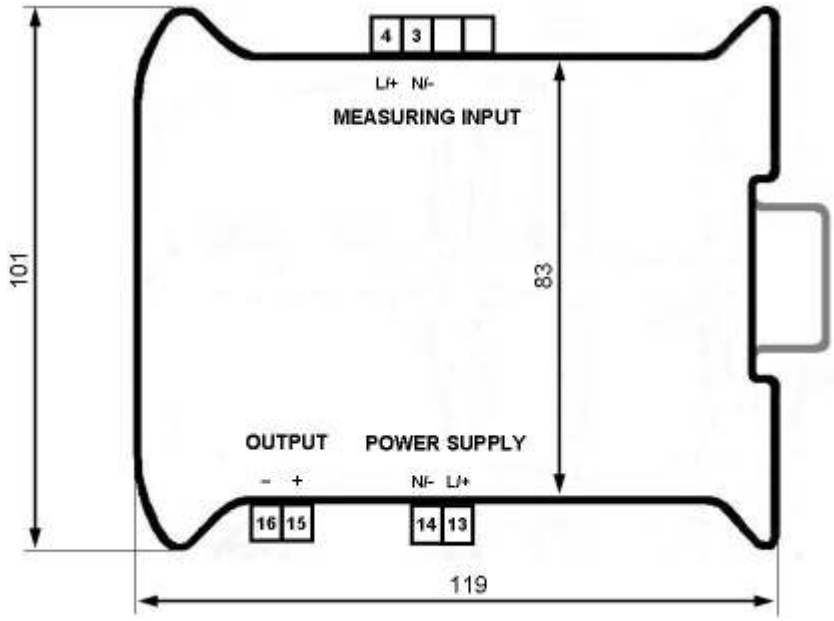
Input		**Output**		**Power Supply** (AUX)
Measuring type	-	Output / Load	-	Voltage / Isolation
±1A (DC current)		**0..+20mA** / 500 Ohm (max.)		**230V AC** 1.5W (transformer) / 5kV
±5A (DC current)		**0..+10V** / 2 kOhm (min.)		**24V DC** 2W (converter) / 1kV

Ordering examples:

M22-ADC _ Input: 0…±5A DC _ **Output:** 4…20mA DC _ **Power:** 230V AC transformer
M22-ADC _ Input: 0…±1A AC _ **Output:** RS485 Modbus _ **Power:** 110…300V DC converter

Note: On request for extra charge special ranges (Input, Output, Power Supply) are possible.

Outline dimensions and connection diagrams:



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FREQUENCY TRANSDUCERS

Model: M22-F

Application:

The transducer is suitable to convert the frequency input to an analog DC voltage/current or a digital RS485 output.

Important features:

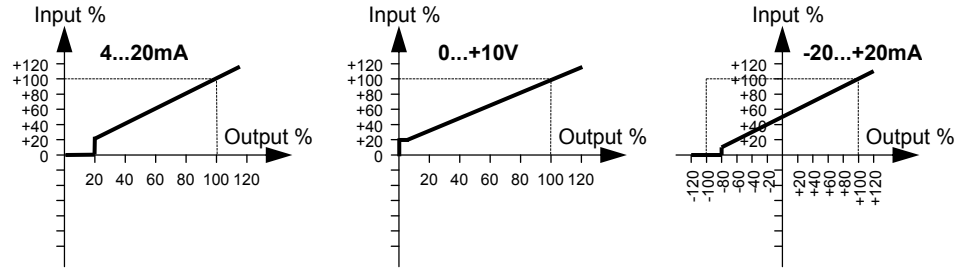
- Full digital operation (Icom System of Ganz Instruments).
- Preset delivery or on site setting by digital communication.
- Time metering with digital reciprocal calculating.
- Plug in terminal blocks with screw.
- DIN rail case.
- EMC protection.

Technical specifications:

- Frequency input range: ..... 16…400Hz
- Voltage input range: ..... 10…600V AC
- Input resistance: 500kOhm
- Input isolation: ..... Cat. III. 1kV (Test: 4300V_{eff} 1min)
- Input/output overload: ..... up to 120%
- Analog output range: .. 0..±1mA to 0..±24mA, or 0..±1V to 0..±12V DC
- Output load: ..... max. 500Ohm for current or min. 2kOhm for voltage
- Output limits: ..... max. 20V, or 30mA
- Output setting time: ..... max. 300ms
- Digital output: ..... RS485, Modbus-RTU, 9.6 / 19.2kBaud
- Accuracy (IEC 688): ..... Class 0.2 (at 10%..120% input range)
- Temperature coefficient: ..... max. 100ppm/ºC (Ref: +20ºC)
- Consumption: ..... max. 2W
- Wire cross-section of terminals: ..... max. 2.5mm^2
- Working temperature: ..... -20…+60ºC
- Storage temperature: ..... -40…+80ºC
- Humidity: ..... max. 85%
- Vibration (acceleration): ..... max. 2g
- Dimension (HxWxD): ..... 101mm x 22.5mm x 119mm
- Case protection: ..... IP 20
- Case material: ..... PC-GF
- Weight (with transformer): ..... approx. 0.3kg

Standards: IEC/EN 61010-1
IEC/EN 60688

Typical transfer characteristics:



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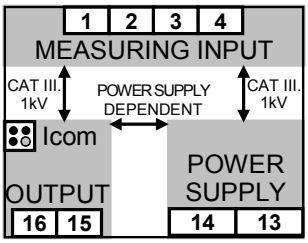
FREQUENCY TRANSDUCERS

Power Supply variations:

(Voltage / Isolation)

24V, 115V, 230V ±15%, 50/60Hz, 1.5W **transformer** / 5kV
5V, 12V, 24V, 48V DC ±20% 2W **converter** / 1kV
100…230V ±15%, 47…440Hz, and **110…300V** DC ±20%, 3W **converter** / 3kV

Isolation scheme:



M22-F transducer standard versions:

M22-F - **Input** - **Output** - **Power**

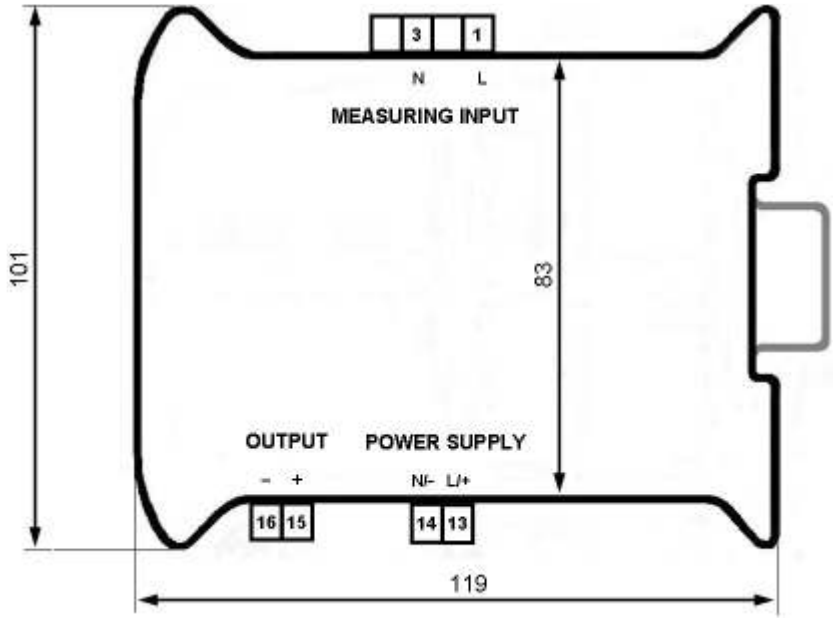
Input		**Output**		**Power Supply** (AUX)
Measuring type	-	Output / Load	-	Voltage / Isolation
45..55Hz (Frequency)		**0..+20mA** / 500 Ohm (max.)		**230V AC** 1.5W (transformer) / 5kV
55..65Hz (Frequency)		**0..+10V** / 2 kOhm (min.)		**24V DC** 2W (converter) / 1kV

Ordering examples:

M22-F _ Input: 45…55Hz, 230V **_ Output:** 4…20mA DC **_ Power:** 230V AC transformer
M22-F _ Input: 16…100Hz, 400V **_ Output:** RS485 Modbus **_ Power:** 110…300V DC converter

Note: On request for extra charge special ranges (Input, Output, Power Supply) are possible.

Outline dimensions and connection diagrams:



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TAP POSITION TRANSDUCERS

Model: M22-TAP

Application:

The transducer is suitable to convert the position (potentiometer) input to an analog DC voltage/current or a digital RS485 output.

Important features:

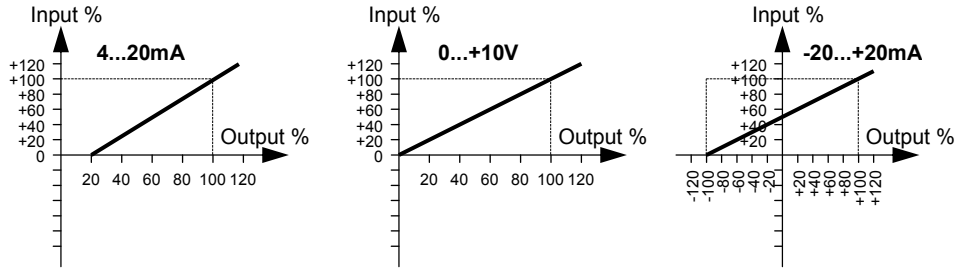
- Full digital operation (Icom System of Ganz Instruments).
- Preset delivery or on site setting by digital communication.
- Automatic zero calibration.
- Plug in terminal blocks with screw.
- DIN rail case.
- EMC protection.

Technical specifications:

- Resistance input range (total resistance): 0…100Ohm to 0…100kOhm
- Measuring voltage: ..... 1V DC
- Measuring system: ..... 3 wires
- Input isolation: ..... Cat. III. 1kV (Test: 4300V_{eff} 1min)
- Input/output overload: ..... up to 120%
- Analog output range: .. 0..±1mA to 0..±24mA, or 0..±1V to 0..±12V DC
- Output load: ..... max. 500Ohm for current or min. 2kOhm for voltage
- Output limits: ..... max. 20V, or 30mA
- Output setting time: ..... max. 300ms
- Digital output: ..... RS485, Modbus-RTU, 9.6 / 19.2kBaud
- Accuracy (IEC 688): ..... Class 0.2 (at 10%..120% input range)
- Temperature coefficient: ..... max. 100ppm/ºC (Ref: +20ºC)
- Consumption: ..... max. 2W
- Wire cross-section of terminals: ..... max. 2.5mm^2
- Working temperature: ..... -20…+60ºC
- Storage temperature: ..... -40…+80ºC
- Humidity: ..... max. 85%
- Vibration (acceleration): ..... max. 2g
- Dimension (HxWxD): ..... 101mm x 22.5mm x 119mm
- Case protection: ..... IP 20
- Case material: ..... PC-GF
- Weight (with transformer): ..... approx. 0.3kg

Standards: IEC/EN 61010-1
IEC/EN 60688

Typical transfer characteristics:



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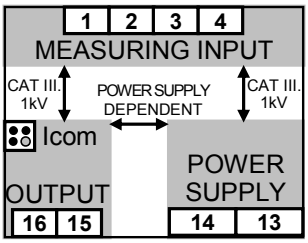
TAP POSITION TRANSDUCERS

Power Supply variations:

	(Voltage / Isolation)
24V, 115V, 230V ±15%, 50/60Hz, 1.5W **transformer**	/ 5kV
5V, 12V, 24V, 48V DC ±20% 2W **converter**	/ 1kV
100…230V ±15%, 47…440Hz, and **110…300V** DC ±20%, 3W **converter**	/ 3kV

Isolation scheme:



M22-TAP transducer standard versions:

M22-TAP - **Input** - **Output** - **Power**

Input
Measuring type
1kOhm (Position)
10kOhm (Position)

-

Output
Output / Load
0..+20mA / 500 Ohm (max.)
0..+10V / 2 kOhm (min.)

-

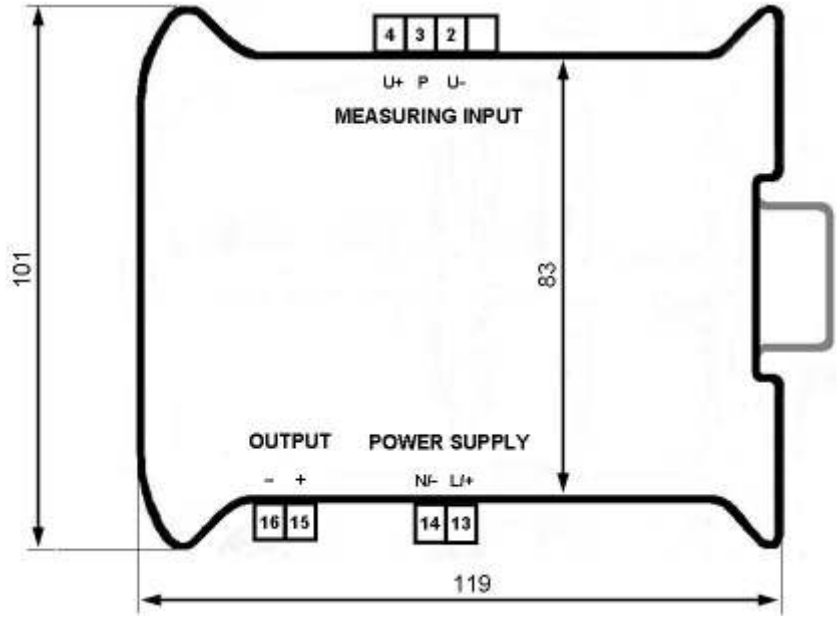
Power Supply (AUX)
Voltage / Isolation
230V AC 1.5W (transformer) / 5kV
24V DC 2W (converter) / 1kV

Ordering examples:

M22-TAP _ Input: 20 x 50Ohm **_ Output:** 4…20mA DC **_ Power:** 230V AC transformer
M22-TAP _ Input: 40…100Ohm **_ Output:** RS485 Modbus **_ Power:** 110…300V DC converter

Note: On request for extra charge special ranges (Input, Output, Power Supply) are possible.

Outline dimensions and connection diagrams:



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POWER TRANSDUCERS

Model: M22-W

Application:

The transducer is suitable to convert the single phase active power input to an analog DC voltage/current or a digital RS485 output.

Important features:

- Full digital operation (Icom System of Ganz Instruments).
- Preset delivery or on site setting by digital communication.
- True power metering with digital multiplication.
- Plug in terminal blocks with screw.
- DIN rail case.
- EMC protection.

Technical specifications:

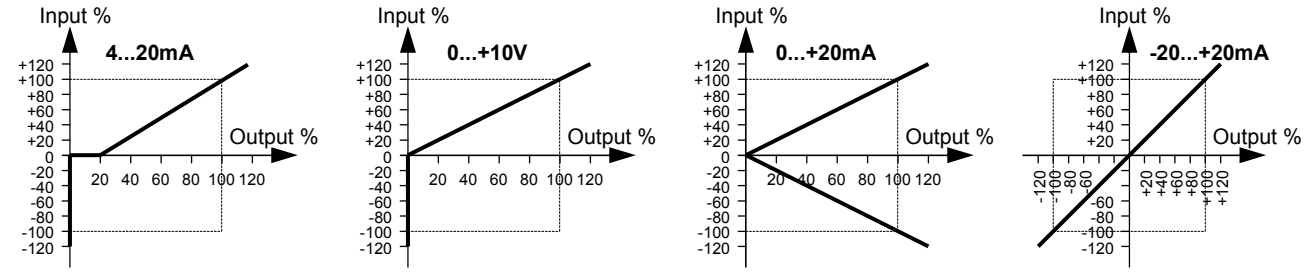
- Voltage input range (CF < 2): ..... from 0…5V to 0…600V AC
- Current input range (nominal sinusoidal): from 0…0.015A to 0…5A AC
- Current input dropout voltage: ..... 15mV (at nominal current)
- Input frequency range: ..... 45…65Hz
- Input isolation: ..... Cat. III. 1kV (Test: 4300V_{eff} 1min)
- Input/output overload: ..... up to 120%

- Analog output range: .. 0..±1mA to 0..±24mA, or 0..±1V to 0..±12V DC
- Output load: ..... max. 500Ohm for current or min. 2kOhm for voltage
- Output limits: ..... max. 20V, or 30mA
- Output setting time: ..... max. 300ms
- Digital output: ..... RS485, Modbus-RTU, 9.6 / 19.2kBaud
- Accuracy (IEC 688): ..... Class 0.2 (at 10%..120% input range)
- Temperature coefficient: ..... max. 200ppm/ºC (Ref: +20ºC)
- Consumption: ..... max. 2W

- Wire cross-section of terminals: ..... max. 2.5mm^2
- Working temperature: ..... -20…+60ºC
- Storage temperature: ..... -40…+80ºC
- Humidity: ..... max. 85%
- Vibration (acceleration): ..... max. 2g
- Dimension (HxWxD): ..... 101mm x 22.5mm x 119mm
- Case protection: ..... IP 20
- Case material: ..... PC-GF
- Weight (with transformer): ..... approx. 0.3kg

Standards: IEC/EN 61010-1
IEC/EN 60688

Typical transfer characteristics:



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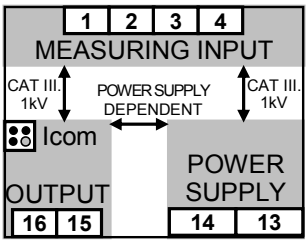
Power Supply variations:

	(Voltage / Isolation)
24V, 115V, 230V ±15%, 50/60Hz, 1.5W **transformer**	/ 5kV
5V, 12V, 24V, 48V DC ±20% 2W **converter**	/ 1kV
100…230V ±15%, 47…440Hz, and **110…300V** DC ±20%, 3W **converter**	/ 3kV

Isolation scheme:



M22-W transducer standard versions:

M22-W - **Input** - **Output** - **Power**

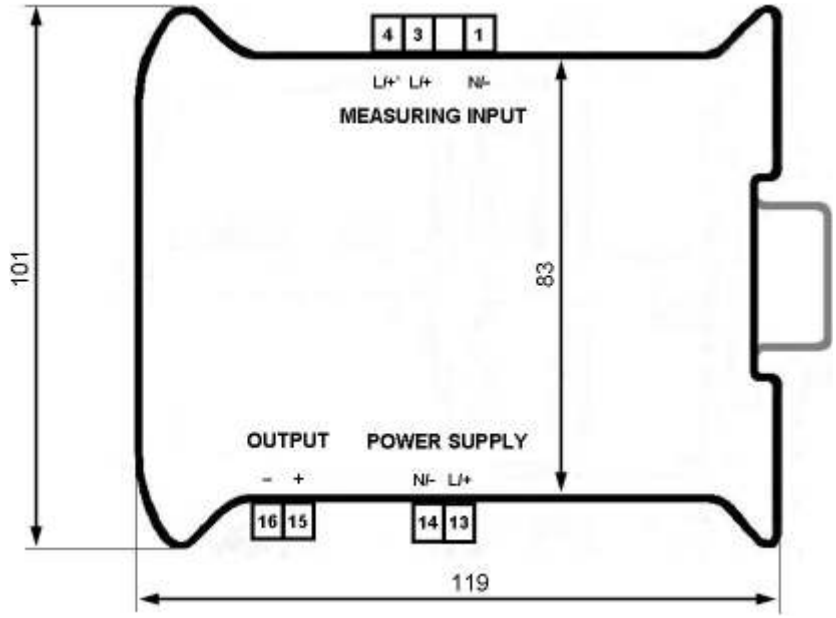
Input		**Output**		**Power Supply** (AUX)
Measuring type	-	Output / Load	-	Voltage / Isolation
110V,1A (AC active power)		**0..+20mA** / 500 Ohm (max.)		**230V AC** 1.5W (transformer) / 5kV
250V,5A (AC active power)		**0..+10V** / 2 kOhm (min.)		**24V DC** 2W (converter) / 1kV

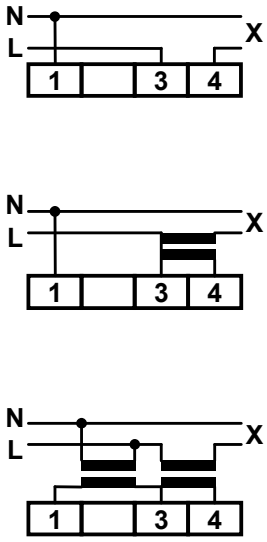
Ordering examples:

M22-W _ Input: 230V, 5A, 0…1kW **_ Output:** 4…20mA **_ Power:** 230V AC transformer
M22-W _ Input: 100kV/110V, 100/5A, -10…+10MW **_ Output:** -20…+20mA **_ Power:** 24V DC converter
M22-W _ Input: 400V, 50/5A, 0…20kW **_ Output:** RS485 Modbus **_ Power:** 110…300V DC converter

Note: On request for extra charge special ranges (Input, Output, Power Supply) are possible.

Outline dimensions and connection diagrams:





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RESISTANCE TRANSDUCERS

Model: M22-R

Application:

The transducer is suitable to convert the resistance input to an analog DC voltage/current or a digital RS485 output.

Important features:

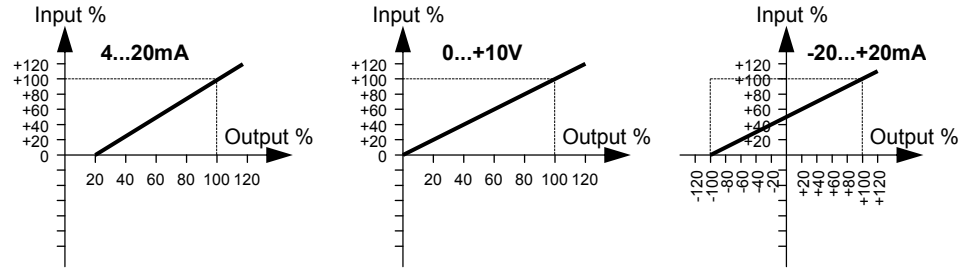
- Full digital operation (Icom System of Ganz Instruments).
- Preset delivery or on site setting by digital communication.
- Automatic zero calibration.
- Plug in terminal blocks with screw.
- DIN rail case.
- EMC protection.

Technical specifications:

- Resistance input range: ..... from 0…100Ohm to 0…100kOhm
- Measuring current range: ..... 24uA…22mA
- Measuring system: ..... 4 wires
- Input isolation: ..... Cat. III. 1kV (Test: 4300V_{eff} 1min)
- Input/output overload: ..... up to 120%
- Analog output range: .. 0..±1mA to 0..±24mA, or 0..±1V to 0..±12V DC
- Output load: ..... max. 500Ohm for current or min. 2kOhm for voltage
- Output limits: ..... max. 20V, or 30mA
- Output setting time: ..... max. 300ms
- Digital output: ..... RS485, Modbus-RTU, 9.6 / 19.2kBaud
- Accuracy (IEC 688): ..... Class 0.2 (at 10%..120% input range)
- Temperature coefficient: ..... max. 100ppm/ºC (Ref: +20ºC)
- Consumption: ..... max. 2W
- Wire cross-section of terminals: ..... max. 2.5mm^2
- Working temperature: ..... -20…+60ºC
- Storage temperature: ..... -40…+80ºC
- Humidity: ..... max. 85%
- Vibration (acceleration): ..... max. 2g
- Dimension (HxWxD): ..... 101mm x 22.5mm x 119mm
- Case protection: ..... IP 20
- Case material: ..... PC-GF
- Weight (with transformer): ..... approx. 0.3kg

Standards: IEC/EN 61010-1
IEC/EN 60688

Typical transfer characteristics:



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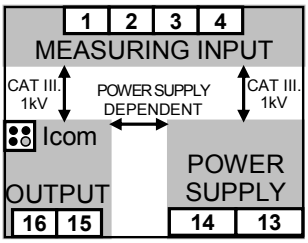
Power Supply variations:

	(Voltage / Isolation)
24V, 115V, 230V ±15%, 50/60Hz, 1.5W **transformer**	/ 5kV
5V, 12V, 24V, 48V DC ±20% 2W **converter**	/ 1kV
100…230V ±15%, 47…440Hz, and **110…300V** DC ±20%, 3W **converter**	/ 3kV

Isolation scheme:



M22-R transducer standard versions:

M22-R - **Input** - **Output** - **Power**

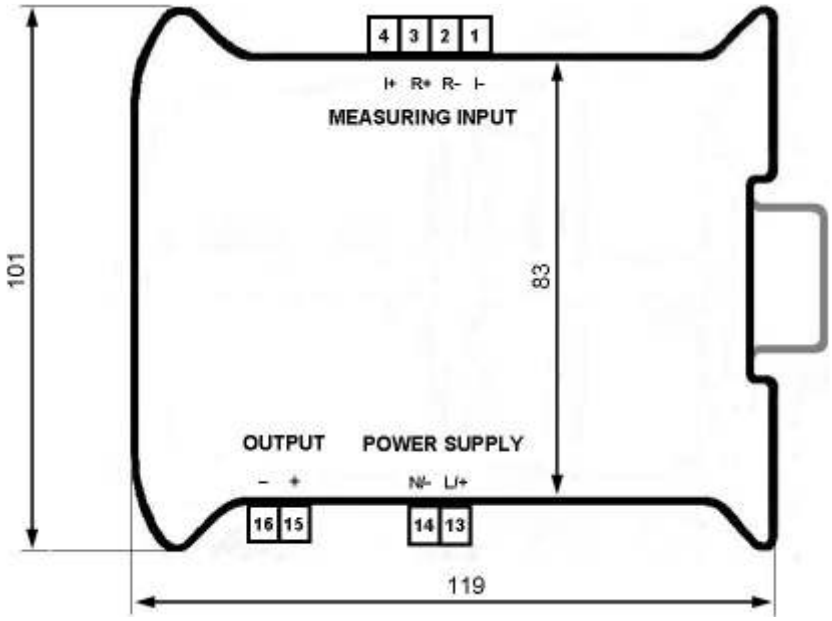
Input		**Output**		**Power Supply** (AUX)
Measuring type	-	Output / Load	-	Voltage / Isolation
1kOhm (Resistance)		**0..+20mA** / 500 Ohm (max.)		**230V AC** 1.5W (transformer) / 5kV
10kOhm (Resistance)		**0..+10V** / 2 kOhm (min.)		**24V DC** 2W (converter) / 1kV

Ordering examples:

M22-R _ Input: 0…1kOhm **_ Output:** 4…20mA DC **_ Power:** 230V AC transformer
M22-R _ Input: 0…100Ohm **_ Output:** RS485 Modbus **_ Power:** 110…300V DC converter

Note: On request for extra charge special ranges (Input, Output, Power Supply) are possible.

Outline dimensions and connection diagrams:



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RMS VOLTAGE TRANSDUCERS

Model: M22-Veff

Application:

The transducer is suitable to convert the AC true RMS voltage input to an analog DC voltage/current or a digital RS485 output.

Important features:

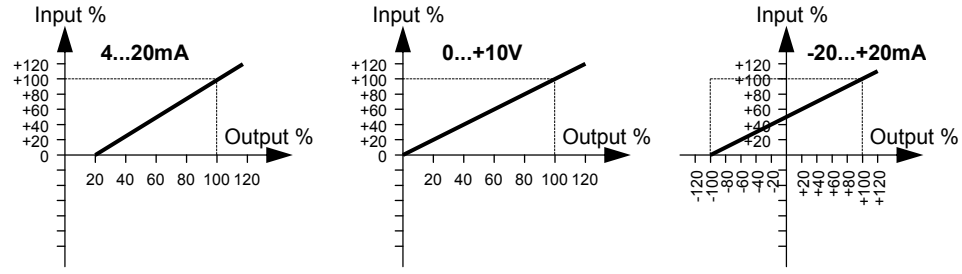
- Full digital operation (Icom System of Ganz Instruments).
- Preset delivery or on site setting by digital communication.
- Automatic zero calibration.
- Plug in terminal blocks with screw.
- DIN rail case.
- EMC protection.

Technical specifications:

- Voltage input range (nominal sinusoidal): from 0…5V to 0…600V AC
- Input resistance: 1MOhm
- Input frequency range: ..... 45…65Hz
- Input isolation: ..... Cat. III. 1kV (Test: 4300V_{eff} 1min)
- Input/output overload: ..... up to 120%
- Analog output range: .. 0..±1mA to 0..±24mA, or 0..±1V to 0..±12V DC
- Output load: ..... max. 500Ohm for current or min. 2kOhm for voltage
- Output limits: ..... max. 20V, or 30mA
- Output setting time: ..... max. 300ms
- Digital output: ..... RS485, Modbus-RTU, 9.6 / 19.2kBaud
- Accuracy (IEC 688): ..... Class 0.2 (at 10%..120% input range)
- Temperature coefficient: ..... max. 100ppm/ºC (Ref: +20ºC)
- Consumption: ..... max. 2W
- Wire cross-section of terminals: ..... max. 2.5mm^2
- Working temperature: ..... -20…+60ºC
- Storage temperature: ..... -40…+80ºC
- Humidity: ..... max. 85%
- Vibration (acceleration): ..... max. 2g
- Dimension (HxWxD): ..... 101mm x 22.5mm x 119mm
- Case protection: ..... IP 20
- Case material: ..... PC-GF
- Weight (with transformer): ..... approx. 0.3kg

Standards: IEC/EN 61010-1
IEC/EN 60688

Typical transfer characteristics:



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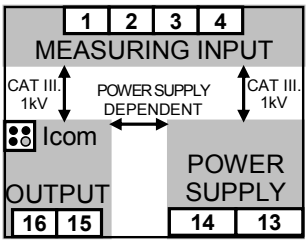
Power Supply variations:

	(Voltage / Isolation)
24V, 115V, 230V ±15%, 50/60Hz, 1.5W **transformer**	/ 5kV
5V, 12V, 24V, 48V DC ±20% 2W **converter**	/ 1kV
100…230V ±15%, 47…440Hz, and **110…300V** DC ±20%, 3W **converter**	/ 3kV

Isolation scheme:



M22-Veff transducer standard versions:

M22-Veff - **Input** - **Output** - **Power**

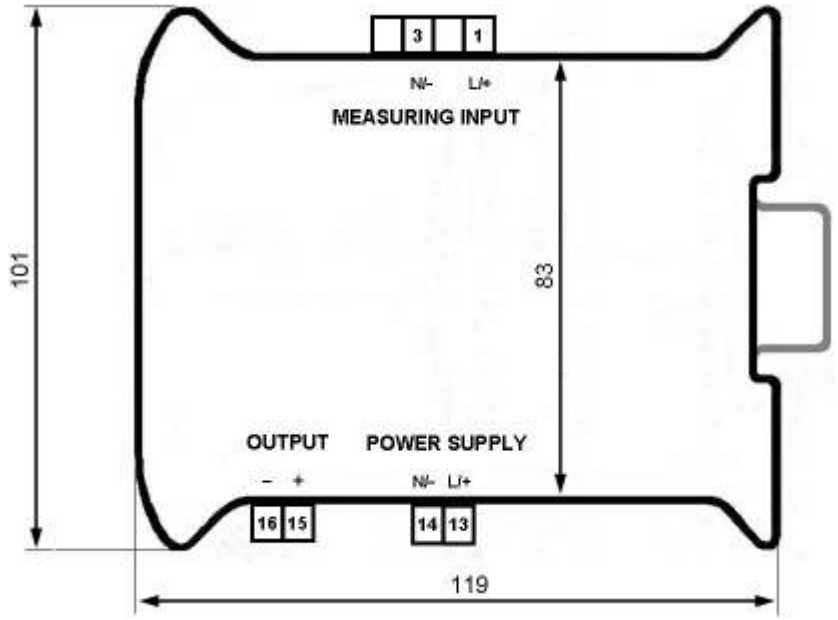
Input		**Output**		**Power Supply** (AUX)
Measuring type		Output / Load		Voltage / Isolation
110V (AC RMS voltage)		**0..+20mA** / 500 Ohm (max.)		**230V AC** 1.5W (transformer) / 5kV
250V (AC RMS voltage)		**0..+10V** / 2 kOhm (min.)		**24V DC** 2W (converter) / 1kV

Ordering examples:

M22-Veff _ Input: 0…500V AC **_ Output:** 4…20mA DC **_ Power:** 230V AC transformer
M22-Veff _ Input: 0…230V AC **_ Output:** RS485 Modbus **_ Power:** 110…300V DC converter

Note: On request for extra charge special ranges (Input, Output, Power Supply) are possible.

Outline dimensions and connection diagrams:



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AC VOLTAGE TRANSDUCERS

Model: M22-V

Application:

The transducer is suitable to convert the AC average voltage input to an analog DC voltage/current or a digital RS485 output.

Important features:

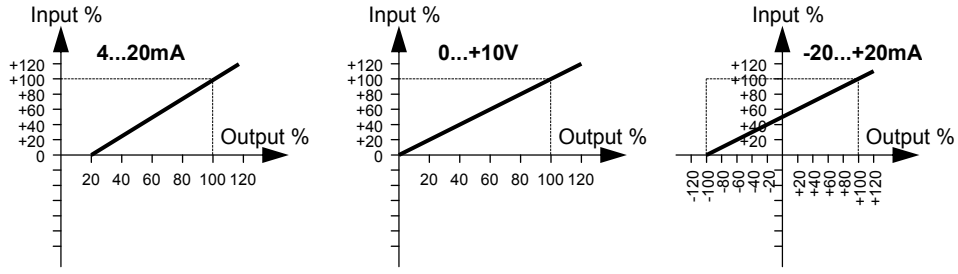
- Full digital operation (Icom System of Ganz Instruments).
- Preset delivery or on site setting by digital communication.
- Automatic zero calibration.
- Plug in terminal blocks with screw.
- DIN rail case.
- EMC protection.

Technical specifications:

- Voltage input range (nominal sinusoidal): from 0…5V to 0…600V AC
- Input resistance: 1MOhm
- Input frequency range: ..... 45…65Hz
- Input isolation: ..... Cat. III. 1kV (Test: 4300V_{eff} 1min)
- Input/output overload: ..... up to 120%
- Analog output range: .. 0..±1mA to 0..±24mA, or 0..±1V to 0..±12V DC
- Output load: ..... max. 500Ohm for current or min. 2kOhm for voltage
- Output limits: ..... max. 20V, or 30mA
- Output setting time: ..... max. 300ms
- Digital output: ..... RS485, Modbus-RTU, 9.6 / 19.2kBaud
- Accuracy (IEC 688): ..... Class 0.2 (at 10%..120% input range)
- Temperature coefficient: ..... max. 100ppm/ºC (Ref: +20ºC)
- Consumption: ..... max. 2W
- Wire cross-section of terminals: ..... max. 2.5mm^2
- Working temperature: ..... -20…+60ºC
- Storage temperature: ..... -40…+80ºC
- Humidity: ..... max. 85%
- Vibration (acceleration): ..... max. 2g
- Dimension (HxWxD): ..... 101mm x 22.5mm x 119mm
- Case protection: ..... IP 20
- Case material: ..... PC-GF
- Weight (with transformer): ..... approx. 0.3kg

Standards: IEC/EN 61010-1
IEC/EN 60688

Typical transfer characteristics:



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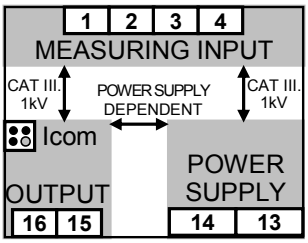
AC VOLTAGE TRANSDUCERS

Power Supply variations:

	(Voltage / Isolation)
24V, 115V, 230V ±15%, 50/60Hz, 1.5W **transformer**	/ 5kV
5V, 12V, 24V, 48V DC ±20% 2W **converter**	/ 1kV
100…230V ±15%, 47…440Hz, and **110…300V** DC ±20%, 3W **converter**	/ 3kV

Isolation scheme:



M22-V transducer standard versions:

M22-V - **Input** - **Output** - **Power**

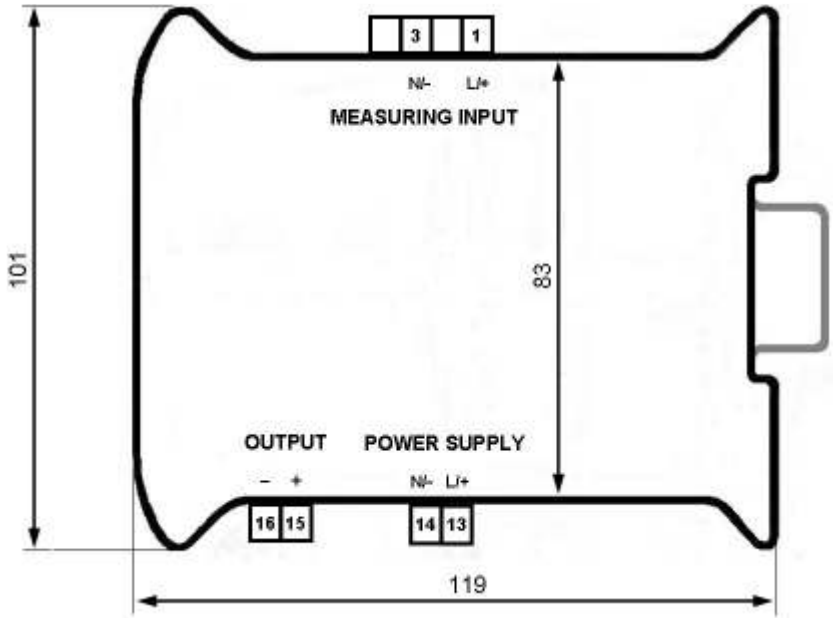
Input		**Output**		**Power Supply** (AUX)
Measuring type	-	Output / Load	-	Voltage / Isolation
110V (AC average voltage)		**0..+20mA** / 500 Ohm (max.)		**230V AC** 1.5W (transformer) / 5kV
250V (AC average voltage)		**0..+10V** / 2 kOhm (min.)		**24V DC** 2W (converter) / 1kV

Ordering examples:

M22-V _ Input: 0…500V AC **_ Output:** 4…20mA DC **_ Power:** 230V AC transformer
M22-V _ Input: 0…230V AC **_ Output:** RS485 Modbus **_ Power:** 110…300V DC converter

Note: On request for extra charge special ranges (Input, Output, Power Supply) are possible.

Outline dimensions and connection diagrams:



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DC VOLTAGE TRANSDUCERS

Model: M22-VDC

Application:

The transducer is suitable to convert the DC voltage input to an analog DC voltage/current or a digital RS485 output.

Important features:

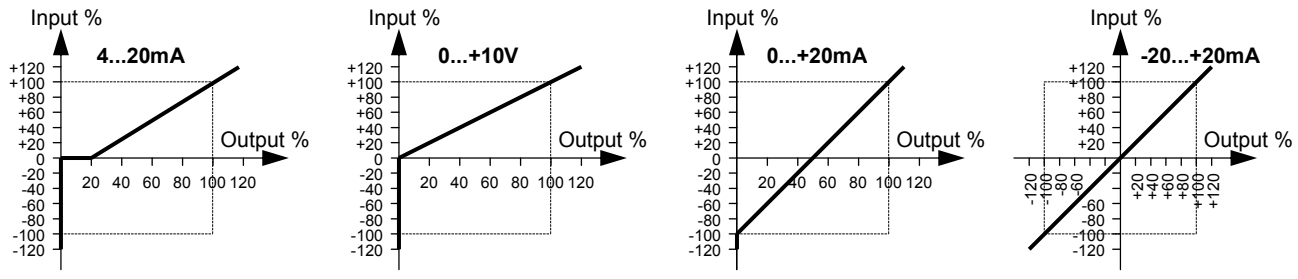
- Full digital operation (Icom System of Ganz Instruments).
- Preset delivery or on site setting by digital communication.
- Automatic zero calibration.
- Plug in terminal blocks with screw.
- DIN rail case.
- EMC protection.

Technical specifications:

- Voltage input range (nominal): …..... from 0…±0.06V to 0…±600V DC
- Input resistance: 1MOhm
- Input isolation: ..... Cat. III. 1kV (Test: 4300V_{eff} 1min)
- Input/output overload: ..... up to 120%
- Analog output range: .. 0..±1mA to 0..±24mA, or 0..±1V to 0..±12V DC
- Output load: ..... max. 500Ohm for current or min. 2kOhm for voltage
- Output limits: ..... max. 20V, or 30mA
- Output setting time: ..... max. 300ms
- Digital output: ..... RS485, Modbus-RTU, 9.6 / 19.2kBaud
- Accuracy (IEC 688): ..... Class 0.2 (at 10%..120% input range)
- Temperature coefficient: ..... max. 100ppm/ºC (Ref: +20ºC)
- Consumption: ..... max. 2W
- Wire cross-section of terminals: ..... max. 2.5mm^2
- Working temperature: ..... -20…+60ºC
- Storage temperature: ..... -40…+80ºC
- Humidity: ..... max. 85%
- Vibration (acceleration): ..... max. 2g
- Dimension (HxWxD): ..... 101mm x 22.5mm x 119mm
- Case protection: ..... IP 20
- Case material: ..... PC-GF
- Weight (with transformer): ..... approx. 0.3kg

Standards: IEC/EN 61010-1
IEC/EN 60688

Typical transfer characteristics:



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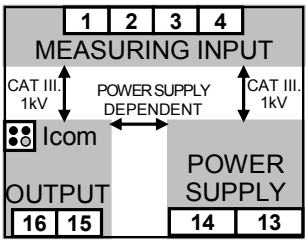
DC VOLTAGE TRANSDUCERS

Power Supply variations:

	(Voltage / Isolation)
24V, 115V, 230V ±15%, 50/60Hz, 1.5W **transformer**	/ 5kV
5V, 12V, 24V, 48V DC ±20% 2W **converter**	/ 1kV
100…230V ±15%, 47…440Hz, and **110…300V** DC ±20%, 3W **converter**	/ 3kV

Isolation scheme:



M22-VDC transducer standard versions:

M22-VDC - Input - Output - Power

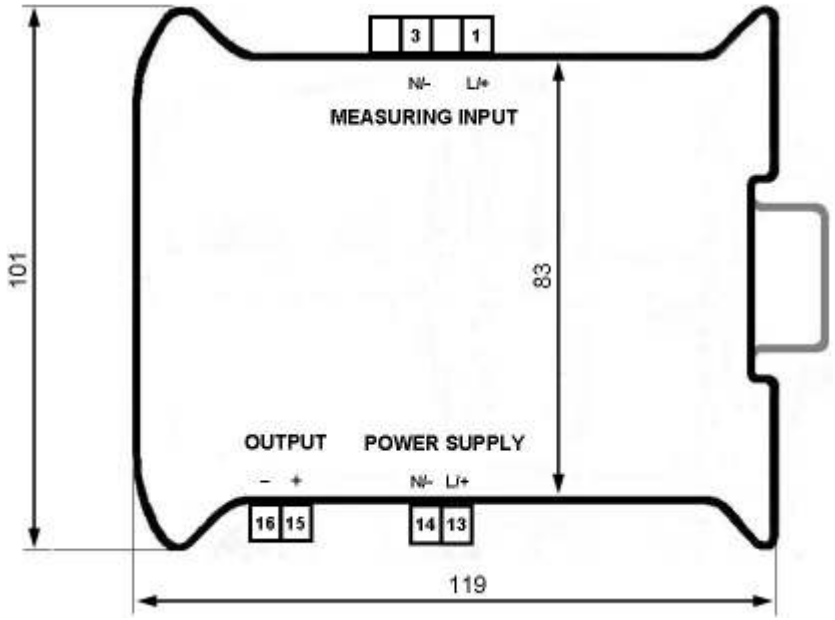
Input	-	Output	-	Power Supply (AUX)
Measuring type		Output / Load		Voltage / Isolation
±60mV (DC voltage)		**0..+20mA** / 500 Ohm (max.)		**230V AC** 1.5W (transformer) / 5kV
±250V (DC voltage)		**0..+10V** / 2 kOhm (min.)		**24V DC** 2W (converter) / 1kV

Ordering examples:

M22-VDC _ Input: 0…±500V DC **_ Output:** 4…20mA DC **_ Power:** 230V AC transformer
M22-VDC _ Input: 0…±60mV DC **_ Output:** RS485 Modbus **_ Power:** 110…300V DC converter

Note: On request for extra charge special ranges (Input, Output, Power Supply) are possible.

Outline dimensions and connection diagrams:



19-4983-07-001-VDCE

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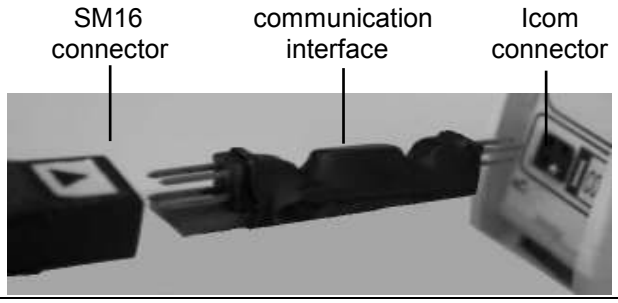
The GMS or the Icom connector is on the front panel.
The analog output transducers use a communication interface to connect SM16 Ganz Monitor:



TRANSDUCERS TYPE **P35**

Memory Function Table

User Settings by SM16 Ganz Monitor System

GMS

sw: 7

(January 2012)
19-4999-09-001-E

GANZ

Instrument informations: 10

B8	8 - - - - - - 1
MEM:040=	[_ _ _ # # #]

Only readable memory cell.

Software version of the transducer.

B16	1 6 - - - - - 1
MEM:042=	[_ # # # # #]

Only readable memory cell.

Serial number of the transducer.

Gain setting: 3

B16	1 6 - - - - - 1
MEM:247=	[_ # # # # #]

Gain value. (00000 ... 65535)

This is a virtual potenciometer from null gain (00000) to max. gain (65535).
By changing this number may be to setting the analog output value (fine tuning).

Device settings: 8

B16	1 6 - - - - - 1
MEM:248=	[_ # # # # #]

Only readable memory cell.
SIGN

Device input value.

B8	8 - - - - - - 1
MEM:247=	[_ _ _ # # #]

Power supply meter gain. (000 ... 255)

This is a virtual potenciometer from null gain (000) to max. gain (255).
By changing this number may be setting the gain of the inside supply voltage measuring circuit (fine tuning).

B16	1 6 - - - - - 1
MEM:242=	[_ 0 0 1 0 9]

Device energy constant, don't changed.

Modbus communication settings: 5

B1	8 7 6 5 4 3 2 1
MEM:036=	▒▒ ○ ● # # # #

Fix bits (don't changed)

CRC using: ○ : disable ● : enable
Parity bit: ○ : disable ● : enable
Speed: ○ : 9.6kBaud ● : 19.2kBaud
Response: ○ : disable ● : enable

By numbers: (response enabled)

no CRC no parity	with CRC no parity	no CRC with parity	with CRC with parity	
↓	↓	↓	↓	
024	025	026	027	← 9.6kBaud
028	029	030	031	← 19.2kBaud

This description can be printed on both sides and is stackable:

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Zero value setting for analog output: 2

B16	1 6 - - - - - 1
MEM:246=	[_ # # # # #]

SIGN

Null value. (-32768 ... +32767)

This is a virtual potentiometer (relative number) from minus to plus, which can be used to adjust the analog output voltage or current at zero input signal.

Zero offset tuning for analog output:

B8	8 - - - - - - 1
MEM:246=	[_ _ _ # # #]

Output offset fine tuning. (000 ... 255)

May be to setting the zero of the analog output device, if the input pins are shorted, and the zero value (MEM:246 /B16,Sign) =00000.

Modbus network setting: 4

B8	8 - - - - - - 1
MEM:034=	[_ _ _ # # #]

Valid Network Address of instrument. (for Modbus interface)

System settings: 6

B1	8 7 6 5 4 3 2 1
MEM:248=	# # # # # # # #

Only readable memory cell.

Power type bits: 2 1:
- ○ ○ other
- ○ ● active
- ● ○ reactive
- ● ● apparent

Output selection: ○ : power ● : energy
Controller mode: ○ : slave ● : master
Analog output: ○ : disable ● : enable
Display driver: ○ : disable ● : enable
Measuring type: ○ : DC ● : AC
Impulse output: ○ : disable ● : enable

Communication interface information: 11

B8	8 - - - - - - 1
MEM:100=	[_ _ _ # # #]

Only readable memory cell.

Software version of the communication interface.

B16	1 6 - - - - - 1
MEM:038=	[_ # # # # #]

Only readable memory cell.

Serial number of the last Ganz Monitor which change content any memory cell of the transducer.

Other informations: 9

B8	8 - - - - - - 1
MEM:041=	[_ _ _ # # #]

Only readable memory cell.

Input type: 053= multiphase power

B16	1 6 - - - - - 1
MEM:044=	[_ # # # # #]

Only readable memory cell.

Calibration constant at the nominal input.

B16	1 6 - - - - - 1
MEM:250=	[_ # # # # #]

Only readable memory cell.

Output value to the analog output.

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M22 and P35 series transducers MODBUS-RTU communication protocol

The RS485 network communication is a Query-Response type. The Query command is transmitted from the Master to an established Slave and is generally followed by a Response message.

Reading of the registers (Function code: 03h)

Reading the measuring data:								
Frame of query	**Network address**	**Function code**	**Register addr.** high	low	**Number of reg.** high	low	**CRC (if used)** low	high
Decimal (hexa)	**XXX** (xxh)	**003** (03h)	**000** (00h)	**050** (32h)	**000** (00h)	**001** (01h)	**XXX** (xxh)	**XXX** (xxh)
Frame of response	**Network address**	**Function code**	**Byte count**	**Measuring data** high	low	**CRC (if used)** low	high	
Decimal (hexa)	**XXX** (xxh)	**003** (03h)	**002** (02h)	**XXX** (xxh)	**XXX** (xxh)	**XXX** (xxh)	**XXX** (xxh)	

The measuring data is in 16 bit binary format (without the decimal point information).
In case of AC type measuring the data is from 00000 (0000h) to +65535 (FFFFh), in positive binary format.
In case of DC type measuring the data is from -32768 (8000h) to +32767 (7FFFh), in 2.complement format.
The decimal point and the measuring unit informations are on the label of the instrument.

Setup (write) of the parameters (Function code: 10h)

Setup the network address of instrument:											
Frame of query	**Network address**	**Function code**	**Register addr.** high	low	**Number of reg.** high	low	**Byte count**	**New network address**		**CRC (if used)** low	high
Decimal (hexa)	**XXX** (xxh)	**016** (10h)	**000** (00h)	**010** (0Ah)	**000** (00h)	**001** (01h)	**002** (02h)	**000** (00h)	**XXX** (xxh)	**XXX** (xxh)	**XXX** (xxh)
Frame of response	**Old net. address**	**Function code**	**Register addr.** high	low	**Number of reg.** high	low	**CRC (if used)** low	high			
Decimal (hexa)	**XXX** (xxh)	**016** (10h)	**000** (00h)	**010** (0Ah)	**000** (00h)	**001** (01h)	**XXX** (xxh)	**XXX** (xxh)			

The network address of the instrument can be set up to 247 (decimal). The default value is 247.

Setup the communication parameters:											
Frame of query	**Network address**	**Function code**	**Register addr.** high	low	**Number of reg.** high	low	**Byte count**	**Communication parameters**		**CRC (if used)** low	high
Decimal (hexa)	**XXX** (xxh)	**016** (10h)	**000** (00h)	**008** (08h)	**000** (00h)	**001** (01h)	**002** (02h)	**000** (00h)	**XXX** (xxh)	**XXX** (xxh)	**XXX** (xxh)
Frame of response	**Network address**	**Function code**	**Register addr.** high	low	**Number of reg.** high	low	**CRC (if used)** low	high			
Decimal (hexa)	**XXX** (xxh)	**016** (10h)	**000** (00h)	**008** (08h)	**000** (00h)	**001** (01h)	**XXX** (xxh)	**XXX** (xxh)			

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M22 and P35 series transducers MODBUS-RTU communication protocol

The instrument can use 16 bit Cyclical Redundancy Checking method and even parity bit if they are enabled. The communication parameters are defined by the following number. The default value of the control number is 009.

Communication settings	no CRC no parity	with CRC no parity	no CRC with parity	with CRC with parity
9600 Baud	**008** (08h)	**009** (09h)	**010** (0Ah)	**011** (0Bh)
19200 Baud	**012** (0Ch)	**013** (0Dh)	**014** (0Eh)	**015** (0Fh)

The default values are resettable by shorting the reset pins inside the box (over the quartz on the interface modul) for a few second. All the writable registers of the instrument are readable too. (See the „Reading of the registers" frame.)

Report slave identification (Function code: 11h)

Reading the identification numbers of instrument:										
Frame of query	**Network address**	**Function code**	**CRC (if used)** low	high						
Decimal (hexa)	**XXX** (xxh)	**017** (11h)	**XXX** (xxh)	**XXX** (xxh)						
Frame of response	**Network address**	**Function code**	**Byte count**	**Type of instr.**	**Status** run	**Serial number** high	low	**Software version**	**CRC (if used)** low	high
Decimal (hexa)	**XXX** (xxh)	**017** (11h)	**005** (05h)	**050** (32h)	**255** (FFh)	**XXX** (xxh)	**XXX** (xxh)	**XXX** (xxh)	**XXX** (xxh)	**XXX** (xxh)

Error message from slave to master

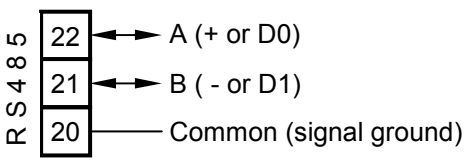
Error message:					
Frame of response	**Network address**	**Function code**	**Error code**	**CRC (if used)** low	high
Decimal (hexa)	**XXX** (xxh)	**XXX** (xxh)	**XXX** (xxh)	**XXX** (xxh)	**XXX** (xxh)

When a slave device receives a not valid Query, it does transmit an error Response. The function code of the error message is the original+128 (decimal) of the received code (the msb bit=1 in the hexa format).
The used error codes are the following:

Error code	Meaning
001 (01h)	**Illegal function** (not exist function code)
002 (02h)	**Illegal register address** (the register is not accessed)
003 (03h)	**Illegal data value** (the Query is incomplete or too long)
004 (04h)	**Slave device failure** (operation error, or input overload)

Bus connector:

The RS485 interface uses 2 wire (+ Ground) cabling system by a 3 point srew connector. When the device is driving the Modbus lines, the RS 485 LED is lighting. The instrument does not contain line termination resistors.



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