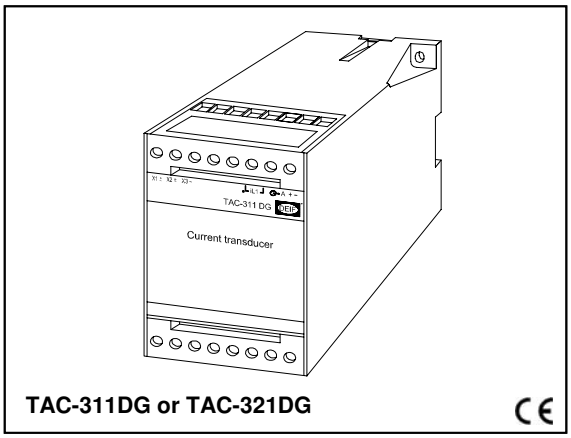
Type TAC-311DG/TAC-321DG

AC current single function transducer

4921220034E

- ***Wide range of standard measuring/output ranges***
- ***Compact design, 55 x 75 mm***
- ***Easily accessible terminals***
- ***Easy identification of unit/function***
- ***Accuracy class 0.5***
- ***35 mm DIN rail or base mounting***



TAC-311DG or TAC-321DG

CE

Application

The current transducers type TAC-311DG or TAC-321DG are transducers for measurement of a sinusoidal AC current converted into a DC current signal proportional to the measured value on a single phase or 3 phase network.

PLCs, PCs, microprocessor control, indicators, alarm units etc. can be operated by the output signal.

Measuring principle

Average measurement.

The transducer consists of a transformer, which gives galvanic insulation between input and output.

The signal is rectified, smoothed and amplified into an A DC output.

The TAC-311DG with zero adjustment needs a constant aux. supply voltage, which also is insulated from output by a transformer.

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Type TAC-311DG/TAC-321DG

Available transducers

Order no. Output

TAC-311DG, aux. supply 24V DC				
Input, std.	**Input, span**	**0-5mA DC**	**0-20mA DC**	**4-20mA DC**
0-1.0A AC	0-0.85/1.2A			1207000005
0-1.3A AC	0-1.10/1.6A			1207000015
0-5.0A AC	0-4.25/6.2A	1207000011		1207000006
0-6.0A AC	0-5.00/7.5A		1207000023	
0-6.5A AC	0-5.50/8.1A			1207000020

TAC-311DG, aux. supply 48-110V DC						
Input, std.	**Input, span**	**0-5mA DC**	**0-10mA DC**	**0-20mA DC**	**4-20mA DC**	**0-10V DC**
0-1.00A AC	0-0.85/1.2A				1207000013	
0-1.00A AC	0-1.00/1.1A					1207000029
0-1.20A AC	0-1.00/1.5A		1207000028			
0-1.30A AC	0-1.10/1.6A				1207000016	
0-5.00A AC	0-4.25/6.2A	1207000012	1207000025		1207000018	
0-6.25A AC	0-5.30/7.8A		1207000026			
0-6.50A AC	0-5.50/8.1A			1207000024	1207000021	
0-7.25A AC	0-6.10/9.0A		1207000027			

TAC-311DG, aux. supply 88-220V DC		
Input, std.	**Input, span**	**4-20mA DC**
0-1.0A AC	0-0.85/1.2A	1207000014
0-1.3A AC	0-1.10/1.6A	1207000017
0-5.0A AC	0-4.25/6.2A	1207000019
0-6.5A AC	0-5.50/8.1A	1207000022

TAC-311DG, aux. supply 110/230V AC			
Input, std.	**Input, span**	**0-5mA DC**	**4-20mA DC**
0-1.0A AC	0-0.85/1.2A	1207000009	1207000001
0-5.0A AC	0-4.25/6.2A	1207000010	1207000002

TAC-311DG, aux. supply 440V AC		
Input, std.	**Input, span**	**4-20mA DC**
0-1.0A AC	0-0.85/1.2A	1207000003
0-5.0A AC	0-4.25/6.2A	1207000004

TAC-321DG, without aux. supply			
Input, std.	**Input, span**	**0-10mA DC**	**0-20mA DC**
0-1.0A AC	0-0.91/1.2A		1207000103
0-5.0A AC	0-4.60/6.2A	1207000102	1207000101

Type TAC-311DG/TAC-321DG

Technical specifications

Measuring current (I_{nom}):

TAC-311DG: 1.0...7.25A AC (≤1.2VA)

TAC-321DG: 0…1A AC (≤ 2.0VA)
0…5A AC (≤ 2.3VA)

Overload: 2 x I_{nom} continuously
10 x I_{nom} for 10s
40 x I_{nom} for 1s

Frequency range: 45...65Hz

Range:

Output TAC-311DG (20...100%): 4...20mA DC
Span adjustment ±20% of FS
Zero adjustment ±20% of 4mA
Output limit < 22.0mA DC

Output TAC-311DG (0...100%): 0...5mA, 0...10mA, 0...20mA DC
0...10V DC
Span adjustment ±20% of FS output
Zero adjustment for all span adjustments

Output TAC-321DG (0...100%): 0...10mA, 0...20mA DC
Span adjustment +10/-20% of FS output

Output load current: Max. 12V

Output load voltage: Max. 1mA

Accuracy: Class 0.5 (-10...15...30...55°C) according to IEC 688

For output 0...10V DC: Class 0.5 (-10...15...30...55°C) at load ≥ 100kΩ
Class 1.0 (-10...15...30...55°C) at load ≥ 10kΩ

Response time/ripple: < 300ms/0.5%pp

Temp. coefficient: Max. 0.1% of full scale per 10°C

TAC-311DG
$\Delta out/\Delta U_{aux}/\Delta F_{aux}/\Delta R_{load}$: Max. 0.1%/Δ10%$U_{aux}$/0.1%(45...65Hz)/0.1% R_{load} max.

TAC-321DG
$\Delta out/\Delta R_{load}$: 0.5% R_{load} max.

Ambient temperature: -10...+55°C (normal)
-25...+70°C (operating)
-40...+70°C (storage)

Galvanic separation: Between inputs, outputs and aux. voltage:
2200V - 50Hz - 1min.

Aux. supply voltage (U_n)
only TAC-311DG: 110/230/440V AC ±20% (max. 2.5VA)
24, 48...110, 88...220V DC -25/+30% (max. 2W)

Connections: Max. 4.0mm^2 (single-stranded)
Max. 2.5mm^2 (multi-stranded)

Materials: All plastic parts are self-extinguishing to UL94 (V1)

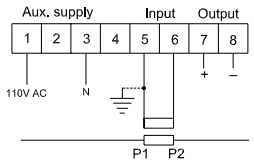
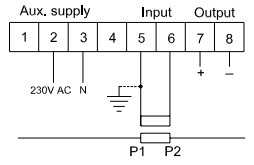
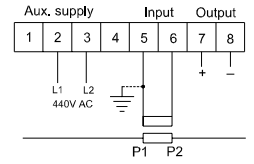
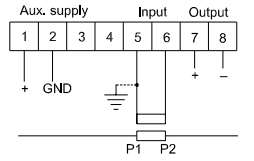
Protection: Case: IP40. Terminals: IP20, to IEC 529 and EN60529

EMC: EN50081-1/2, EN50082-1/2

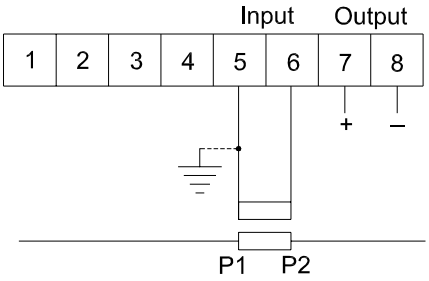
Note: Transducers with V AC supply cannot be connected to supply sources where the frequency in some cases is lower than 35Hz for more than 1min.

Connections – TAC-311DG

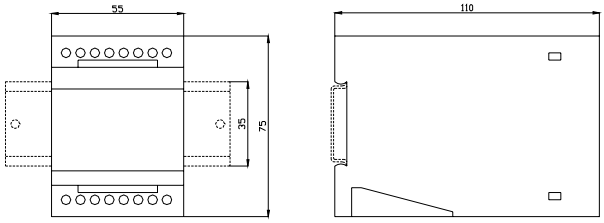
Recommended fuse 2A on aux. supply.

	For aux. supply 110V AC (Please note that transducers with 110V AC supply can also be connected to 230V AC)
	For aux. supply 230V AC (Please note that transducers with 230V AC supply can also be connected to 110V AC)
	For aux. supply 440V AC
	For aux. supply V DC

Connection – TAC-321DG



Mechanical drawing/dimensions (in mm)



Weight:	TAC-311DG	Approx. 0.4 kg
	TAC-321DG	Approx. 0.3 kg

Order specifications

To order a transducer with a standard input, only quote the type and order no.:
Type – Order no.
Example:
TAC-311DG – 1207000018 (see the tables on page 2)

To order a TAC-311DG transducer with a customised input:
Type – Measuring current – Output – Supply
Example:
TAC-311DG – 0…4.5A – 4…20mA – 48…110V DC

To order a TAC-321DG transducer with a customised input:
Type – Measuring current – Output
Example:
TAC-321DG – 0…6A – 0…10mA

Please note that some combinations of input, output and aux. supply are not available as standard.

Due to our continuous development we reserve the right to supply equipment which may vary from the described.

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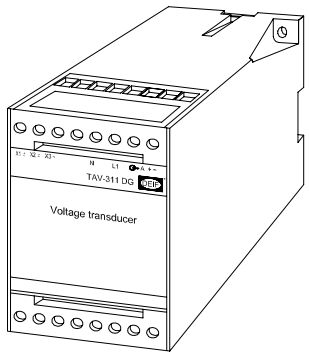
Type TAV-311DG/TAV-321DG

AC voltage single function transducer

4921220032E

- ***Wide range of standard measuring/output ranges***
- ***Compact design, 55 x 75 mm***
- ***Easily accessible terminals***
- ***Easy identification of unit/function***
- ***Accuracy class 0.5***
- ***35 mm DIN rail or base mounting***



TAV-311DG or TAV-321DG

CE

Application

The voltage transducers type TAV-311DG or TAV-321DG are transducers for measurement of a sinusoidal AC voltage converted into a DC current or DC voltage signal proportional to the measured value on a single phase or 3 phase network.

PLCs, PCs, microprocessor control, indicators, alarms units etc. can be operated by the output signal.

Measuring principle

Average measurement.

The transducer consists of a transformer, which gives galvanic insulation between input and output.

The signal is rectified, smoothed and amplified into a V DC or an A DC output.

The TAV-311DG with zero adjustment needs a constant auxiliary supply voltage, which also is insulated from output by a transformer.

DEIF A/S

Available transducers

Order no. Output

TAV-311DG, aux. supply 24V DC				
Input, std.	**Input, span**	**0-5mA DC**	**0-20mA DC**	**4-20mA DC**
0-120V AC	0-105/145V	1207010013		
0-120V AC	0-100/150V			1207010004
0-132V AC	0-110/165V		1207010023	1207010019
0-230V AC	0-192/285V			1207010005
0-440V AC	0-370/550V			1207010006
88-132V AC	88-125/185V	1207010016		
88-132V AC	88-125/143V			1207010007

TAV-311DG, aux. supply 48-110V DC						
Input, std.	**Input, span**	**0-5mA DC**	**0-10mA DC**	**0-20mA DC**	**4-20mA DC**	**0-10V DC**
0-120V AC	0-105/145V	1207010014				
0-120V AC	0-110/133V					1207010027
0-132V AC	0-100/165V		1207010026			
0-132V AC	0-110/165V			1207010024	1207010020	
0-500V AC	0-420/580V				1207010022	
88-132V AC	88-125/185V	1207010017				

TAV-311DG, aux. supply 110/230V AC			
Input, std.	**Input, span**	**0-5mA DC**	**4-20mA DC**
0-100V AC	0-85/125V		1207010018
0-120V AC	0-105/145V	1207010012	
0-120V AC	0-100/150V		1207010001
0-230V AC	0-192/285V		1207010002
0-300V AC	0-250/375V		1207010025
0-440V AC	0-370/550V		1207010003
0-500V AC	0-420/580V		1207010028
88-132V AC	88-125/185V	1207010015	
88-132V AC	88-125/143V		1207010008

TAV-311DG, aux. supply 88-220V DC		
Input, std.	**Input, span**	**4-20mA DC**
0-132V AC	0-110/165V	1207010021

TAV-311DG, aux. supply 440V AC		
Input, std.	**Input, span**	**4-20mA DC**
0-440V AC	0-370/550V	1207010009

TAV-321DG, without aux. supply				
Input, std.	**Input, span**	**0-10mA DC**	**0-20mA DC**	**0-10V DC**
0-100V AC	0-91/125V		1207010102	
0-120V AC	0-110/150V	1207010101	1207010103	1207010106
0-230V AC	0-210/287V		1207010104	1207010107
0-440V AC	0-400/550V		1207010105	1207010108

Technical specifications

Meas. voltage (U_{nom}):

TAV-311DG: 100...500V AC (≤ 0.3VA)

TAV-321DG: 100...440V AC (≤ 2.8VA)

Overload: 1.2 x U_{nom} continuously,
2 x U_{nom} for 10s

Frequency range: 45...65Hz

Range:

Input TAV-321DG: 0…30…120%
0…30% U_n output not linear

Output TAV-311DG (20…100%): 4...20mA DC
Span adjustment ±20% of FS
Zero adjustment ±20% of 4mA
Output limit < 22.0mA DC

Output TAV-311DG (0…100%): 0…5mA, 0...10mA, 0...20mA DC
0...10V DC
Span adjustment ±20% of FS output
Zero adjustment for all span adjustments

Output TAV-321DG (0...100%): 0...10mA, 0...20mA DC
0...10V DC
Span adjustment +10/-20% of FS output

Output load current: Max. 12V TAV-311DG
Max. 8V TAV-321DG

Output load voltage: Max. 1mA

Accuracy: Class 0.5 (-10...15...30...55°C) according to IEC 688
Class 1.0 at U_n ≤ 25%

For output 0...10V DC: Class 0.5 (-10...15...30...55°C) at load ≥ 100kΩ
Class 1.0 (-10...15...30...55°C) at 10kΩ ≤ load < 100kΩ

Response time/ripple: < 300ms/0.5%pp

Temp. coefficient: Max. 0.1% of full scale per 10°C

TAV-311DG
$\Delta out/\Delta U_{aux}/\Delta F_{aux}/\Delta R_{load}$: Max. 0.1%/Δ10%$U_{aux}$/0.1%(45...65Hz) /0.1% R_{load} max.

TAV-321DG
$\Delta out/\Delta R_{load}$: 0.5% R_{load} max.

Ambient temperature: -10...+55 °C (nominal)
-25...+70 °C (operating)
-40...+70 °C (storage)

Galvanic separation: Between inputs, outputs and aux. voltage: 2200V - 50Hz - 1min.

Aux. supply voltage (U_n) only TAV-311DG: 110/230-440V AC ±20% (max. 2.5VA)
24, 48...110, 88...220V DC -25/+30% (max. 2W)

Connections: Max. 4.0mm^2 (single-stranded)
Max. 2.5mm^2 (multi-stranded)

Materials: All plastic parts are self-extinguishing to UL94 (V1)

Protection: Case: IP40. Terminals: IP20, to IEC 529 and EN60529

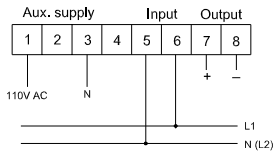
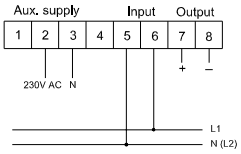
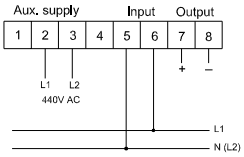
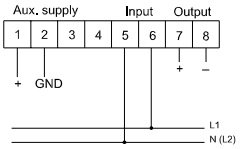
EMC: EN50081-1/2, EN50082-1/2

Note: Transducers with V AC supply cannot be connected to supply sources where the frequency in some cases is lower than 35Hz for more than 1min.

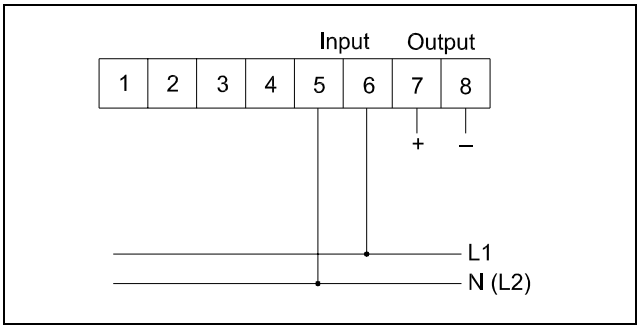
If the measuring frequency in some cases is lower than 35Hz, the transducer cannot be applied.

Connections – TAV-311DG

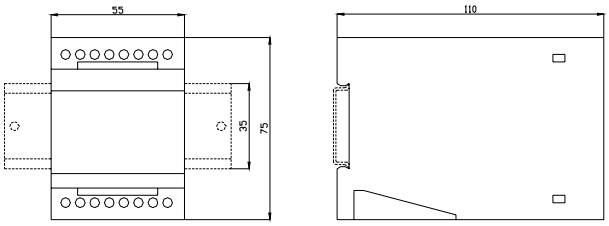
Recommended fuse 2A on aux. supply.

	For aux. supply 110V AC (Please note that transducers with 110V AC supply can also be connected to 230V AC)
	For aux. supply 230V AC (Please note that transducers with 230V AC supply can also be connected to 110V AC)
	For aux. supply 440V AC
	For aux. supply V DC

Connection – TAV-321DG



Mechanical drawing/dimensions (in mm)



Weight:	TAV-311DG	Approx. 0.4 kg
	TAV-321DG	Approx. 0.3 kg

Order specifications

To order a transducer with a standard input, only quote the type and order no.:
Type – Order no.
Example:
TAV-311DG – 1207010022 (see the tables on page 2)

To order a TAV-311DG transducer with a customised input:
Type – Measuring voltage – Output – Supply
Example:
TAV-311DG – 0…450V – 4…20mA – 48…110V DC

To order a TAV-321DG transducer with a customised input:
Type – Measuring voltage – Output
Example:
TAV-321DG – 0…220V – 0…10V

Please note that some combinations of input, output and aux. supply are not available as standard.

Due to our continuous development we reserve the right to supply equipment which may vary from the described.

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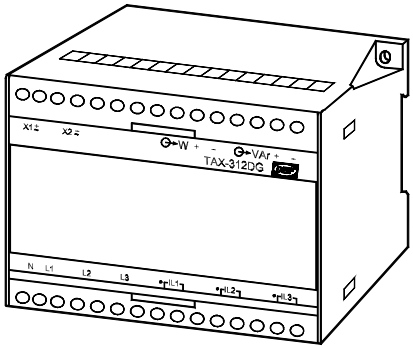
Dual Output Power Transducer

Type TAX-312DG/1

4921240181F

- ***Combined watt and var measurement***
- ***Accuracy class 0.5/1.0***
- ***Voltage up to 690V***
- ***Galvanic separation 4000V***
- ***35 mm DIN rail or base mounting***



TAX-312DG/1

CE

Application

The dual output transducer type TAX-312DG/1 is a power transducer for measurement of active power and reactive power, on a single phase or 3-phase network, providing a separate output for both measurements.

The 2 outputs can be configured for all standard output ranges.

Measuring Principle

The transducer measures current(s) and phase voltage(s). The TDM (Time-Division-Multiplication) principle ensures an accurate measurement of the RMS value of both the active power and the reactive power (U x I x cos-φ) and (U x I x sin-φ), irrespective of wave form. The TAX-312DG/1 is available with the following couplings:

1W/1VAr	single phase[1]
1W3/1VAr3	1 element 3 phase 3 wire, balanced load[1]
1W4/1VAr4	1 element 3 phase 4 wire, balanced load[1]
2W3/2VAr3	2 element 3 phase 3 wire, unbal. load[2]
3W3/3VAr3	3 element 3 phase 3 wire, unbal. load[3]
3W4/3VAr4	3 element 3 phase 4 wire, unbal. load[3]

1) 1 external current transformer
2) 2 external current transformers
3) 3 external current transformers

In order to measure the reactive power of coupling 1VAr and 1VAr4, the voltage input of the transducer is provided with a built-in 90° phase shifter network. To ensure correct measurements in this coupling, the net frequency must be stable and correspond with the information on the transducer type label (50Hz / 60Hz).

Calculation of Measuring Range

3-phase network
Lowest measuring range: $0.5 \times \sqrt{3} \times U \times I$
Highest measuring range: $2 \times \sqrt{3} \times U \times I$
For single phase networks the factor √3 is omitted.

Note: The calibration range of the VAr measurement is equal to 50% of the calibration range of the Watt measurement.

DEIF A/S

Technical specifications

Meas. current (I_n): 0.5…5A AC

overload: 4 x I_n, continuously,
20 x I_n for 10 s (max. 75A)
80 x I_n for 1 s (max. 300A)

load: Max. 0.5VA per phase.

Meas. voltage (U_n): (see supply voltage - AC ranges).

overload: 1.2 x U_n, continuously,
2 x U_n for 10 s

load: 2kΩ/V.

Frequency range: 40...45...65...70Hz.

Outputs: 2 analog outputs, referring to mutual ground.

Range:
Output (0…100%): 0..1mA, 0…5mA, 0..10mA, 0..20mA, 0..1V, 0..10V
Output (20…100)%: 0,2..1mA, 1..5mA, 2..10mA, 4..20mA, 0,2V..1V, 2..10V
Output(-100..0..100%): -1..0..1mA, -5..0..5mA, -10..0..10mA, -20..0..20mA, -1..0..1V, -10..0..10V
Output load current: Max. 10V
Output load voltage: Max. 20mA

Accuracy:
Watt: Class 0.5 (-10..15…30…55°C) according to IEC 688.
Var: Class 1.0 (-10..15…30…55°C) according to IEC 688.

Response time/ ripple: 150ms/1%pp

Temperature coefficient: max. +/-0.2% of full scale per 10°C.

Ambient temperature: -10..+55 °C (nominal)
-25..+70 °C (operating)
40..+70 °C (storage)

Galvanic separation: Between inputs, outputs and aux. voltage: 4000V - 50Hz - 1 min.

Supply voltage (U_n): 57.7-63.5-100-110-127-200-220-230-240-380-400-415-440-450-660-690VAC ±20% (max. 3.5VA)

24-48-110-220V DC -25/+30% (max. 2W).

Climate: HSE, to DIN 40040.

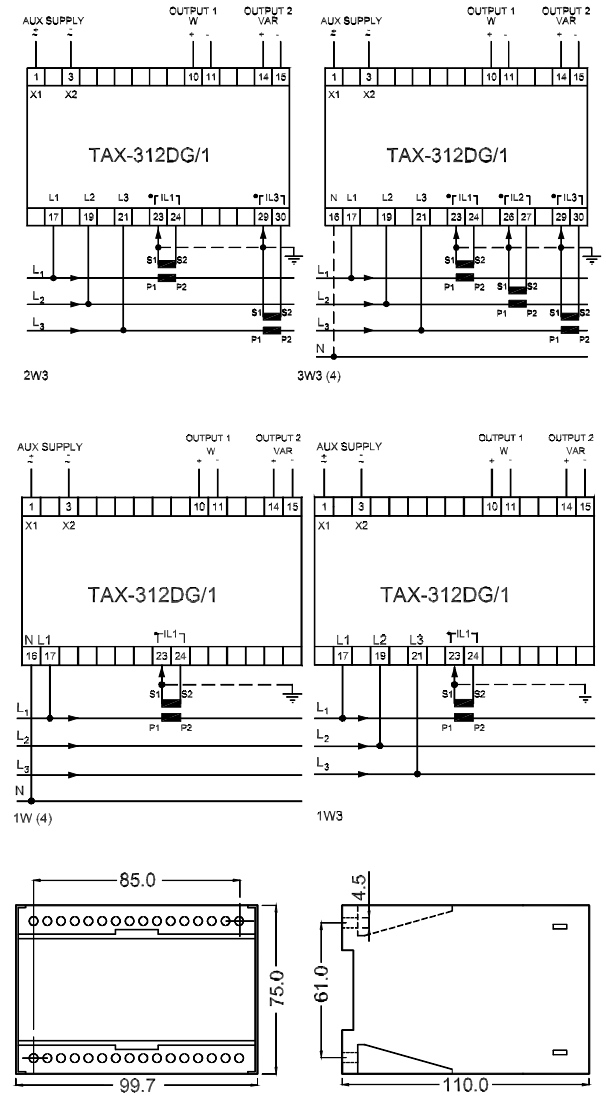
Connections: Max. 4 mm² (single-stranded).
Max. 2.5 mm² (multi-stranded).

Materials: All plastic parts are self-extinguishing to UL94 (V1).

Protection: Case: IP40. Terminals: IP20, to IEC 529 and EN 60529.

The transducer is equipped with a green LED marked "POWER" for indication of power ON.

Connections/dimensions (in mm)



Weight: Approx. 0.650 kg

Order specifications

Type – Coupling – Measuring range (W) – Ct – Measuring voltage – Vt – Nom. frequency (only for coupling 1W/1VAr and 1W4/1VAr4) – Output 1 – Output 2 – Supply

Due to our continous development we reserve the right to supply equipment which may vary from the described.

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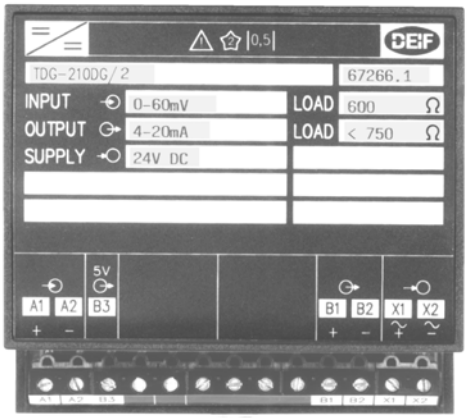
DEIF A/S

Insulation amplifiers
DC/DC amplifiers

Type TDG-210DG

4921220011E



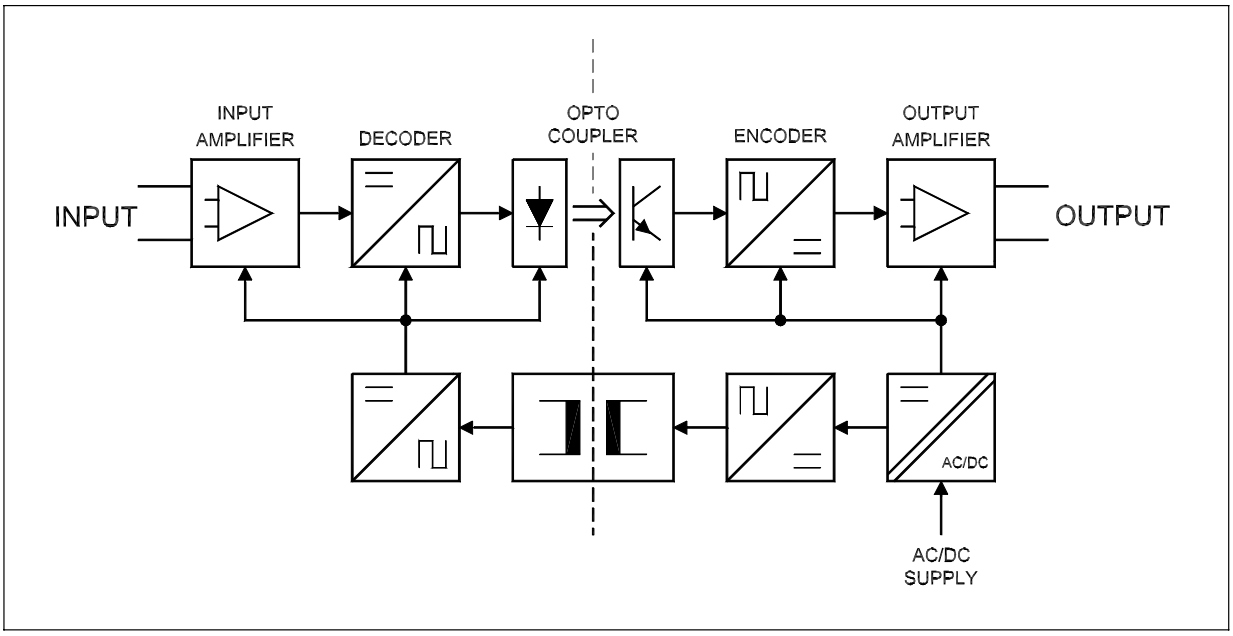
- ***Conversion of measuring signal possible (E.g. –10…0…10mA into 4…20mA)***
- ***Suppression of negative input signals possible***
- ***Aux. voltage: 57.7…440V AC or 24…220V DC***
- ***For mounting on DIN rail***

Application

TDG-210DG is a CE marked DC/DC amplifier with galvanic separation between input and output. It is typically used for:

- **Converting one type of DC signal into another DC signal**
  (E.g. from -10...0...10mA into 4...20mA)
- **Converting potentiometer input into a DC signal**
  (E.g. from 0...1kΩ into 0...10V)
- **Separating a number of earthing points**
  If a cable is connected to earth at more than one point, a measuring error may develop or noise problems may arise if the earth potentials of these vary.
- **Galvanic separation of current signals**
  As measuring equipment connected to the current output of a transducer is connected in series, simultaneous earthing of more than one input of connected measuring equipment will result in short-circuit of the input of intermediate measuring units.
- **Conversion of measuring signal**
  If increasing output is requested at decreasing input, this may be achieved by means of the insulation amplifier, at the same time providing galvanic separation between the 2 measuring circuits.
  (E.g. from 10...0V DC into 0...5mA).
- **Adaption of measuring range**
  The input may be suppressed, i.e. only a part of the range is used.
  (E.g. from 10...20mA to 0...10V DC).
- **Separation of measuring circuits**
  In case of remote transmission of a DC signal - typically a 4...20mA signal to a number of measuring points situated well away from each other - separation into galvanically separated measuring circuits is often requested to isolate a possible fault and confine this to the faulty circuit.
- **Measuring on DC shunts**
  The potential of a DC measuring shunt (0...60mV) is sometimes high when compared to earth. A leakage between the measuring cable and earth will result in a measuring error. The galvanic separation at the same time provides protection against accidental contact to the high potential.
- **Measuring of DC voltages**
  Especially when measuring high DC voltages galvanic separation between input and output is an absolute necessity for safety purposes and due to differences in the potentials of input and output. TDG-210DG is available for measuring of voltages up to 500V DC.

Construction



TDG-210DG requires auxiliary voltage and is fed through a transformer or a 24/48/110/220V DC inverter. The secondary voltage is rectified and fed to the encoder and output amplifier shown to the right of the galvanic interface. The input amplifier and the decoder are fed through a DC/DC inverter. The input signal is amplified and is, through optocouplers, transmitted to theoutput amplifier.

This measuring method combines high accuracy of measurement with long-term stability.

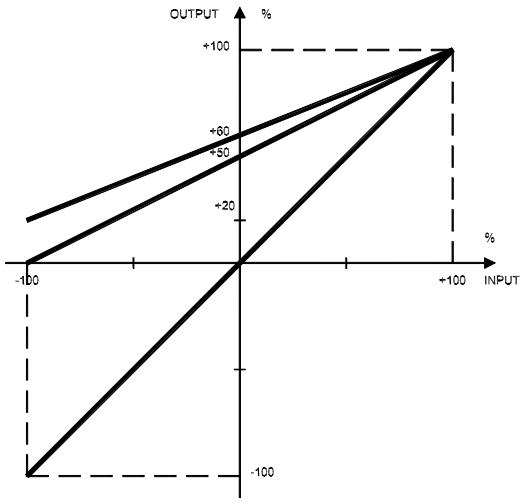
Standard input and output may be set by means of jumpers, whereas special input is factory calibrated.

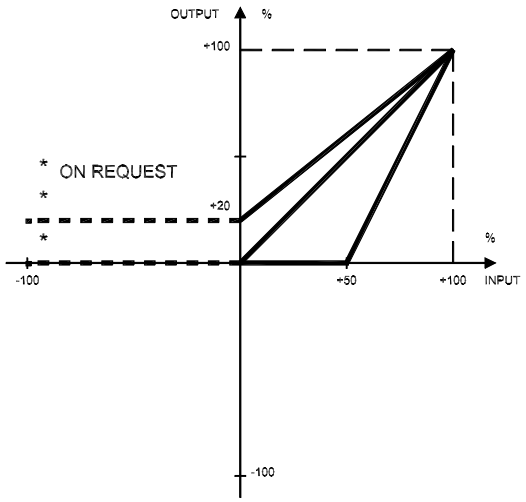
Technical specifications

Current input	Standard	0...1mA	0.2..1mA	0...0.5...1mA	-1...0...1mA
	Standard	0...5mA	1...5mA	0...2.5...5mA	-5...0...5mA
	Standard	0...10mA	2...10mA	0...5...10mA	-10...0...10mA
	Standard	0...20mA	4...20mA	0...10...20mA	-20...0...20mA
	Special - min.	0...0.1mA	0.02...0.1mA	0...0.05...0.1mA	-0.1...0...0.1mA
	Special - max.[1]	0...50mA	10...50mA	0...25...50mA	-50...0...50mA
	Load	0...1V voltage drop for all current inputs			
Voltage input	Standard	0...1V	0.2...1V	0...0.5...1V	-1...0...1V
	Standard	0...10V	2...10V	0...5...10V	-10...0...10V
	Special - min.	0...60mV	12...60mV	0...30...60mV	-60...0...60mV
	Special - max.[1]	0...400V	80...400V	0...200...400V	-400...0...400V
	Load	0...0.1mA input current for all voltage inputs (10kΩ/V)			
Potentiom. input		0…50Ω/10kΩ			
Current output	Standard	(See standard current inputs above)			
	Load	Max. 15V/±15V above output			
	Overload	Max. 200% output current			
	Protection	Protected against open output (max. 25V)			
Voltage output	Standard	(See standard voltage inputs above)			
	Load	Max. 20mA/±20mA from output			
	Overload	Max. 150% output voltage			
	Protection	Protected against short-circuited output (max. 45mA)			
Output (General)	Ripple	Max. 0.5% P-P to IEC 688			
	Response time	Max. <10ms to IEC 688			
	Characteristic	(See back page[1])			
Insulation	Test voltage	2500V AC - 50Hz - 1 min.: between input/output/aux. voltage			
	Operating voltage	600V AC - 50Hz - 850V DC: between input/output/aux. voltage			
Auxiliary voltage	V AC ±20% 45...65Hz	57.7-63.5-100-110-120-127-220-240-380-400-415-440V AC (3.5VA)			
	V DC -20/+30%	24-48-110-220V DC (2.5W) DC/DC inverter built in			
Environments	Temperature	-10...55°C (nominal) -25...70°C (operating), -40...70°C (storage)			
	Climate	Class HSE to DIN 40040			
	EMC	To EN 50081-1/2, EN 50082-1/2, SS4361503 (PL4), IEC 255-22-1 (class 3)			
	Protection	Front: IP53. Terminals: IP20 to IEC 529			
Accuracy	Input/output	Class 0.5% (-10...15...30...55°C) to IEC 688			
Drift	Temperature	Typ. 0.15% per 10°C, max. 0.2% per 10°C			
	Load/output	Max. 0.1% for max. variation of output load			
	Auxiliary voltage	Max. 0.1% per 10% variation of auxiliary voltage			
Connection	Screw terminals	Multi-stranded: Max. 2.5 mm². Single-stranded: Max. 4 mm²			
Materials	Flammability	All plastic materials self-extinguishing to UL94 (V0)			

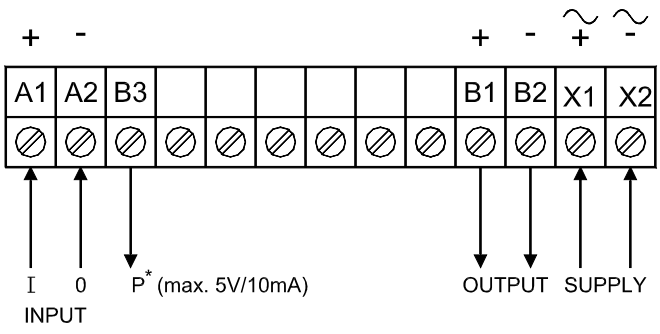
1) Further ranges within the stated minimum and maximum ranges available on request.

Output characteristics

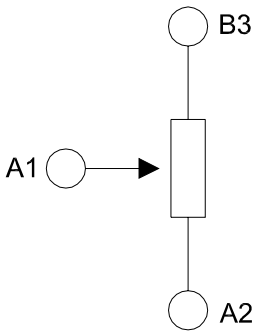




Connections

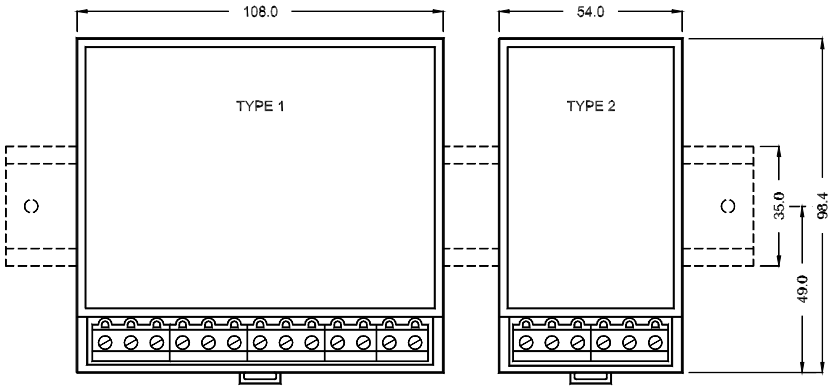


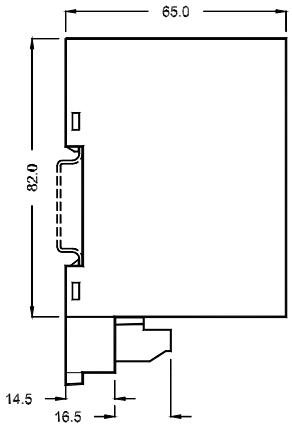
* EXTERNAL POTENTIOMETER



Dimensions

All dimensions in mm





TDG-210DG

Weight: approx. 0.370 kg

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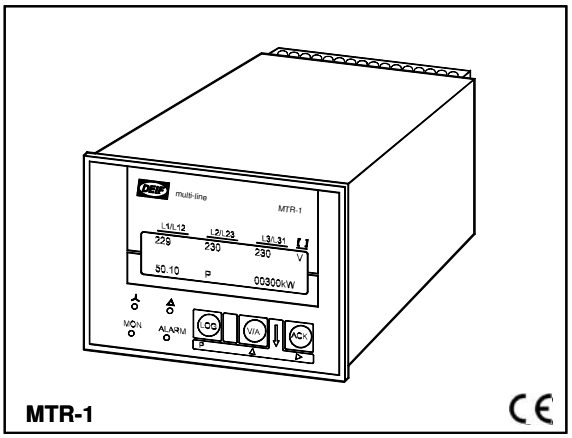
Type MTR-1

multi transducers

multi-line

4921220026I

- ***All 3-phase AC measurements, true RMS***
- ***3 programmable analog outputs*** ***(current can be indicated with signs as function of power direction)***
- ***1 programmable pulse output***
- ***Display showing all measurements***
- ***Optional serial output for all values***
- ***1-, 2- or 3-phase measurements***



MTR-1

Application

The MTR-1 multi transducer is a microprocessor-based measuring unit providing measurement of all electrical values on a single phase or 3-phase network, showing the measurements on the built-in display and transmitting these as:

- 3 analog outputs
  and
- 1 pulse output
  and
- a serial output (option).

The MTR-1 can replace several transducers in all electrical measuring applications, and can be applied both as a normal transducer, where the analog output is connected to a local control system, and as a remote value reading unit, where all measured values are transmitted to the remote control system via the serial interface.

The MTR-1 can measure true RMS values on all network topologies with/without neutral and with both balanced and unbalanced load.

MTR-1 contains all necessary measuring circuits and presents all values on an LC display. Messages are presented in clear text, all measuring values in engineering units.

The MTR-1 is a flexible and menu-programmed unit, enabling the user easily to adapt the unit to the application in question. Programming procedures are password protected.

Standard functions

The unit is designed for measurement on a 3-phase or 1-phase network.

Measured and calculated values

- phase to neutral voltage (3-phase U_{max}, U_{min} and average)
- phase to phase voltage (3-phase U_{max}, U_{min} and average)
- current (3-phase I and average) and direct. current.
- active power
- reactive power
- apparent power
- cos-φ
- frequency

  Each of the 3 analog outputs can be programmed to represent any of the above measurements, and the output signal can be programmed to the required scaling and type.
- energy production (kWh) counter (not for billing purposes)

  The open collector pulse output can be programmed to transmit any fixed number of pulses per produced kWh.

Options

Option A1: Remote value reading
- RS 232 remote value reading of all values measured by MTR-1.
- Siemens 3964, RK512 with standard telegram.

Option A2: Remote value reading
- RS 485 remote value reading of all values measured by MTR-1.
- Modbus standard telegram.

Other communication standards available on request.

Option B0: 12V DC power supply

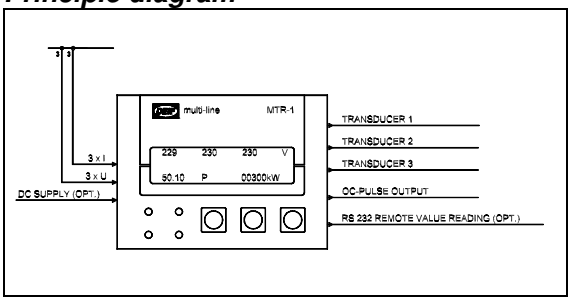
Option B1: 24V DC power supply

Option B2: 48V DC power supply

Option B3: 110V DC power supply

Option B4: 220V DC power supply

Principle diagram



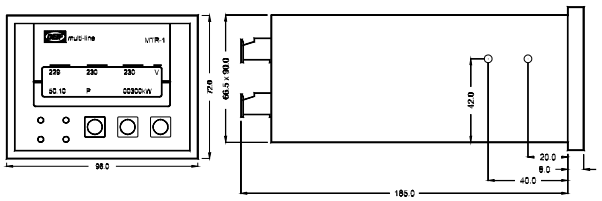
DEIF A/S

Type MTR-1

Technical specifications

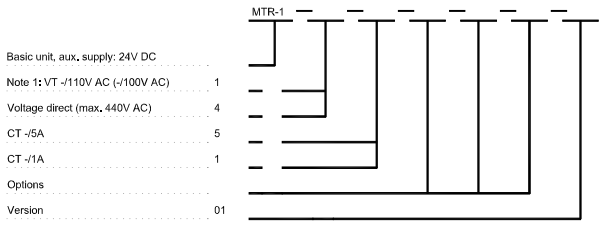
Accuracy:	Class 0.5, to IEC 688 (Modbus class 1.0)
Operating temp.:	-20...70°C (display, however: -20...60°C)
Climate:	Class HSE, to DIN 40040
Measuring voltage:	100/110 (1)..450V AC (4) ±20%. Consumption: max. 0.15VA per phase
Measuring current:	-/1A or -/5A Consumption: max. 0.1VA per phase Overcurrent: max. 20 x I_n for 1 s -/1 A: max. 100 x I_n for 1 s -/5 A: max. 20 x I_n for 1 s
Meas. frequency:	30...70Hz
Auxiliary supply: - Standard: - Optional:	 85...231V AC ±20%, max. 6W 12-24-48-110-220V DC +30/-25%, max. 6W
Open collector output:	Max. 30mA "ON" current. Max. 27V "OFF" voltage.
Fuse:	All voltage inputs should be protected by a 2A fuse
Analog outputs:	(0) 4...20mA or -20...0...20mA: Max. load 400Ω. Max. reading 32MW. See note 1.
Safety:	To EN 61010-1. Installation Cat. III, 300V. Pollution degree 2.
Galvanic separation:	Between open collector output and remaining circuits. Between analog outputs and remaining circuits. Between current inputs and remaining circuits.
EMC:	To EN 50081-1/2 and EN 50082-1/2.
Connections:	Max. 2.5 mm^2 (supply, measuring voltage and measuring current). Max. 1.5 mm^2 (analog outputs, open collector output and optional serial interface).
Protection:	IP21. Front: IP52. To IEC 529 and EN 60529.
Housing:	To DIN 43700.

Dimensions (in mm)



Weight: approx. 0.5 kg Panel cut-out: 68 x 92 mm +0.5

Order specifications



	Type	Voltage	CT	Options	Version
Example: MTR-1-4-1-B1	MTR-1	Direct	-/1A	B1	

Note 1: If max. reading is more than 32MW, please add version 01 in order specifications, and if Vt is more than 65kV, please also add version 01 in order specifications.

Due to our continuous development we reserve the right to supply equipment which may vary from the described.

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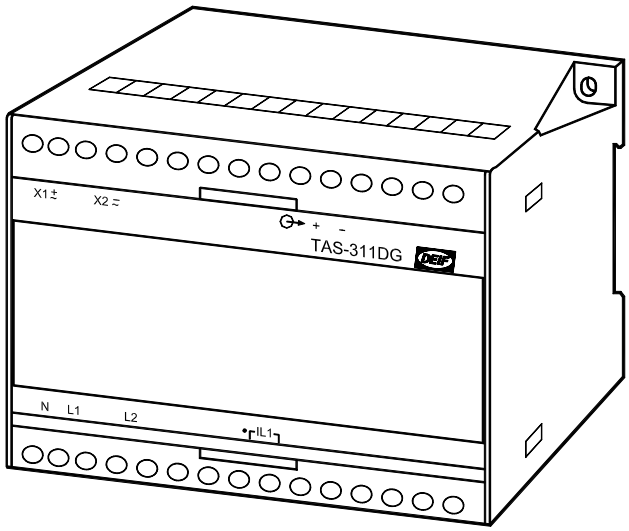
DEIF A/S

Selectable AC-transducer

Type TAS-311DG

4921220038E



- *Measures voltage, current, frequency or phase angle on AC networks*
- *Class 0.5 (IEC-688) measurement*
- *Supply and measuring voltage up to 690V*
- *Easy configuration via PC-interface possible*
- *Non-linear output characteristics possible*

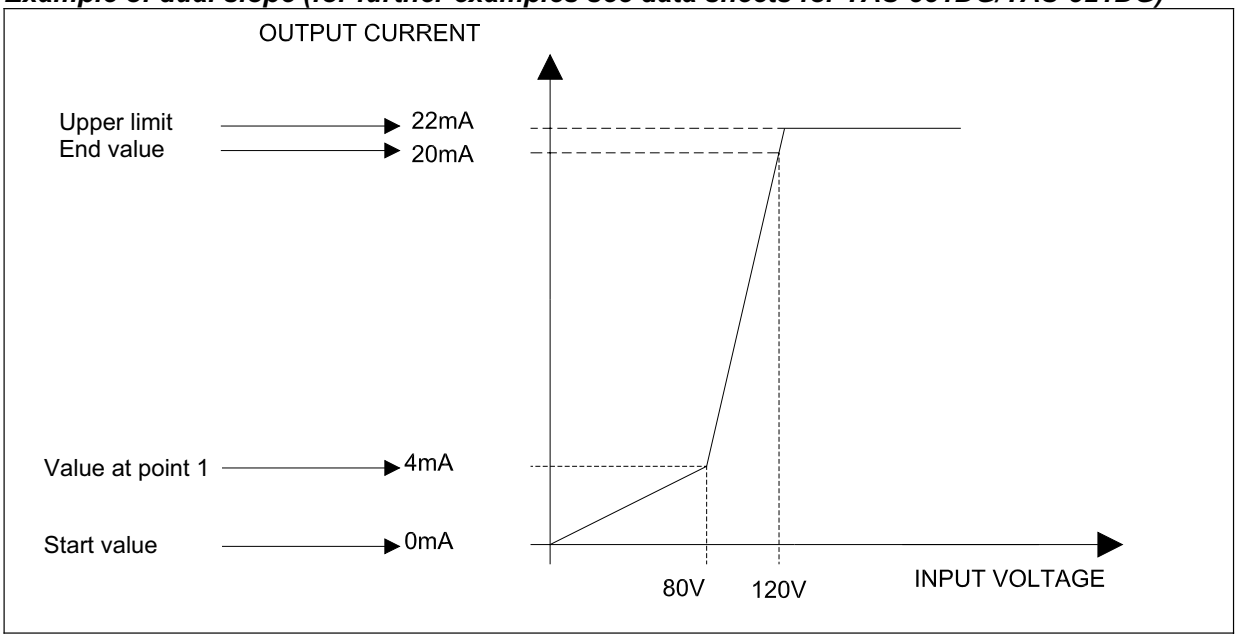
CE

Application

TAS-311DG is a micro-controller based AC-transducer with 1 analogue output for measurement of RMS-voltages, RMS-current, phase angle or frequency on an AC-network. TAS-311DG can be delivered pre-configured or it can be delivered un-configured for customer configuration through the PC-interface. The PC-configuration software allows free choise of voltage, current, phase angle or frequency measurement including configuration of the measuring range and output range without any mechanical settings or adjustments inside the transducer. The transducer holds no mechanical moving parts like potentiometers and therefore the calibration stability is excellent.

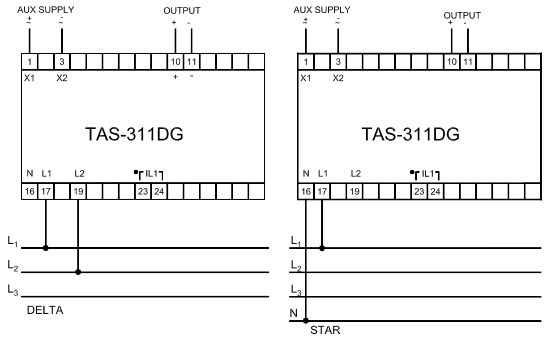
TAS-311DG can be configured as a normal linear transducer or with up to three slopes giving the possibility for a higher resolution in one or two ranges of the measurement. See figure below for an example of two slopes. Upper and lower output limitations can also be configured.

Example of dual slope (for further examples see data sheets for TAS-331DG/TAS-321DG)

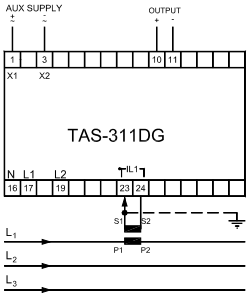


Connection diagram

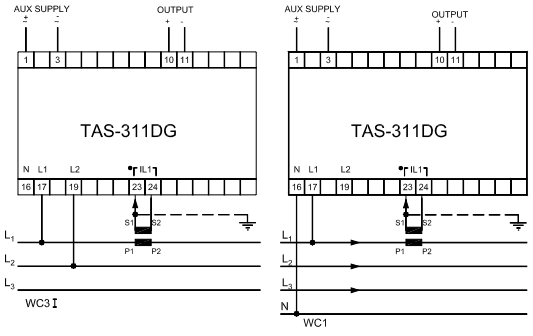
VOLTAGE/FREQUENCY



CURRENT



PHASE ANGLE



Coupling	17	19	23/24
WC3 I	L1	L2	L1
WC3 II	L2	L3	L1
WC3 III	L3	L1	L1

General technical specifications

Accuracy:	Voltage/current:	Class 0.5 (-10…15…30…55°C) according to IEC 688
	Frequency:	Class 0.2 of f max. (-10…15…30…55°C) according to IEC 688
	Phase angle:	Class 1.0 (-10…15…30…55°C) according to IEC 688
Meas. current (In):	0.75/1.5/3.0/6.0A	Meas. range (In): 0…200%
Overload, currents:	20A max., continuously 75A max. for 10 s 240A max. for 1 s	
Load:	Max. 0.5VA	
Meas. voltage (Un):	73/140/254/400V phase to neutral	Meas. range (Un): 1…120%
	127/240/440/690 phase to phase	Meas. range (Un): 1…120%
Overload, voltages:	1.2 x U_n max., continuously 2 x U_n max. for 10 s	
Load:	Min. 480kΩ	
Frequency range:	30…45…65…80Hz	
Indication:	Red LED function:	
	(The LED is located behind the front plate) Calibration error = flash frequency 5Hz Configuration error = flash frequency 1Hz	
Output:	1 analogue output	
Standard range:	Output (0...100%):	0...1mA, 0…5mA, 0...10mA, 0...20mA, 0...1V, 0...5V, 0...10V
	Output (10...100%):	0.1...1mA, 0.5...5mA, 1...10mA, 2...20mA, 0.1...1V, 0.5...5V, 1...10V
	Output (20...100%):	0.2...1mA, 1...5mA, 2...10mA, 4...20mA, 0.2...1V, 1...5V, 2...10V
	Output (-100...0...100%):	-1...0...1mA, -5...0...5mA, -10...0...10mA, -20...0...20mA, -1...0..1V, -5...0...5V, -10...0...10V
	Other ranges possible	
Limit:	Max. ±120% of nominal output	
Output load:	Current: Max. 10V (max. 1kΩ) Voltage: Max. 20mA	
Output cable:	Max. length 30m	
$\Delta out/\Delta R_{load}$:	10V, 5V, 1V, 20mA ranges according to IEC 688 10mA, 5mA, 1mA ranges ±0.5%	
Ambient temperature:	-10…55°C (nominal) -25…70°C (operating) -40…70°C (storage)	
Temperature coefficient:	Max. ±0.2% of full scale per 10°C	
Response time:	Current/voltage:	<105ms in the range 0...90% of nominal input according to IEC 688 <300ms in the range 0...30% of nominal input <85ms in the range 30...100% of nominal input
	Frequency:	<75ms, typical value 50ms
	Phase angle:	<275ms, typical value 200ms
Ripple:	Twice the class index (peak to peak measurement) according to IEC 688	
Galvanic separation:	Between inputs, outputs and aux. supply: 3750V-50Hz-1 min.	
Supply voltage:	57.7-63.5-100-110-127-200-220-230-240-380-400-415-440-450-480-660-690VAC ±20% 24-48-110-220VDC -25/+30%	
Consumption:	(Aux. supply) 3.5VA/2W	
Climate:	HSE, to DIN 40040	
EMC:	According to EN 61000-6-1/2/3/4	
Protection:	Housing: IP40. Terminals: IP20 to IEC 529 and EN 60529	
Connections:	Max. 2.5mm² multi-stranded Max. 4.0mm² single-stranded	
Materials:	All plastic parts are self-extinguishing to UL94 (V1)	

Specific technical specifications

Voltage:	Measuring voltage:	57...690VAC	
	Start value:	0…67% of end value	
	End value:	100…120% of measuring voltage	
	Connection:	Star connection (UL1-N):	57V…400VAC
		Delta connection (UL1-L2):	100V…690VAC
Current:	Measuring current:	0.5...8A	
	Start value:	0...67% of end value	
	End value:	100% of measuring current	

Specific technical specifications, continued

Frequency:	Measuring range:	20Hz...80Hz
	Start value:	20Hz...76Hz
	End value:	40Hz...80Hz
	Measuring span:	4Hz ≤ end value - start value
	Connection:	Star connection (UL1-N): 57V…400VAC Meas. range (Un): 30...120% Delta connection (UL1-L2): 100V…690VAC Meas. range (Un): 30...120%
Phase angle:	Reference:	Delta phi = 180°, Sine wave Un and Inom (Inom = 1A or 5A) Voltage influence 1.5% between 50…120% Un Current influence 1.5% between 50…150% Inom 2.5% between 20…50% Inom
	Measuring range:	0°…60° / 360° electrical degrees
	Start value:	-359.9°…360°
	End value:	-359.9°…360°
	Measuring span:	60° ≤ difference between start and end values ≤360°
	Connection:	WC1: (IL1 and UL1-N) or (IL2 and UL2-N) or (IL3 and UL3-N): 57…400VAC WC3 I: (IL1 and UL1-L2): 100…690VAC WC3 II: (IL1 and UL2-L3): 100…690VAC WC3 III: (IL1 and UL3-L1): 100…690VAC Meas. range (Un): 30...120%

Order specifications (examples)

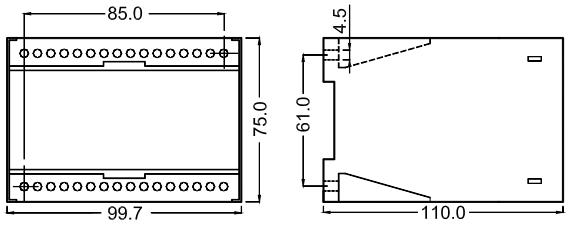
The examples below are order specifications for pre-configured transducers. For un-configured transducers only auxiliary voltage must be specified.

Type	TAS-311DG			
Measurement:	Voltage	Current	Frequency	Phase angle
Measuring range:	0kV…8kV…12kV	0…120A	45…50…55Hz	-90°…-60°…0°…60°…90° 0…0.5cap…1…0.5…0ind
Connection:	Delta (phase-phase)	NA	Star (phase-neutral)	WC3 I
VT ratio:	10kV/100V	NA	-	-
Input voltage:	0…80…120V	NA	400VAC	400V
CT ratio:	NA	100/1A	NA	500/5A
Input current:	NA	1.2A	NA	5A
Transfer curve:	Dual slope	Single slope	Single slope	Triple slope
Output start value:	0mA	4mA	4mA	-10V
Threshold 1:	4mA	-	-	-8V
Mid value:	12mA	-	12mA	0V
Threshold 2:	-	-	-	8V
Output end value:	20mA	20mA	20mA	10V
Output lower limit:	0mA	0mA	4mA	-12V
Output upper limit:	22mA	24mA	21.5mA	12V
Auxiliary voltage:	100VAC	110VDC	400VAC	220VDC

PC-configuration kit containing connection cable and software for customer configuration must be ordered separately.

Dimensions

All dimensions in mm



Weight: approx. 0.600 kg

Mounting instructions

TAS-311DG is designed for panel mounting, being mounted on a 35 mm DIN rail, or by means of two 4 mm screws.

The design of the transducer makes mounting of it close to similar equipment possible, however make sure there is min. 50 mm between the top and bottom of the transducer and other equipment. The DIN rail must always be placed horizontally when several transducers are mounted on the same rail.

Due to our continuous development we reserve the right to supply equipment which may vary from the described.

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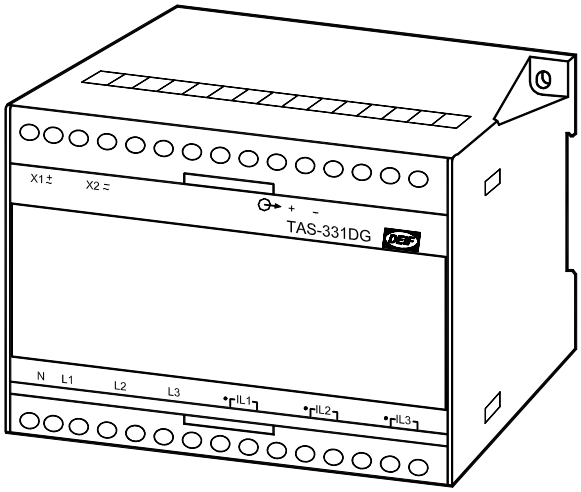
DEIF A/S

Selectable AC-transducer

Type TAS-331DG

4921220036E



- ***Measures power or reactive power on 3-phase AC networks***
- ***Class 0.5 (IEC-688) measurement***
- ***Supply and measuring voltage up to 690V***
- ***Easy configuration via PC-interface possible***
- ***Non-linear output characteristics possible***

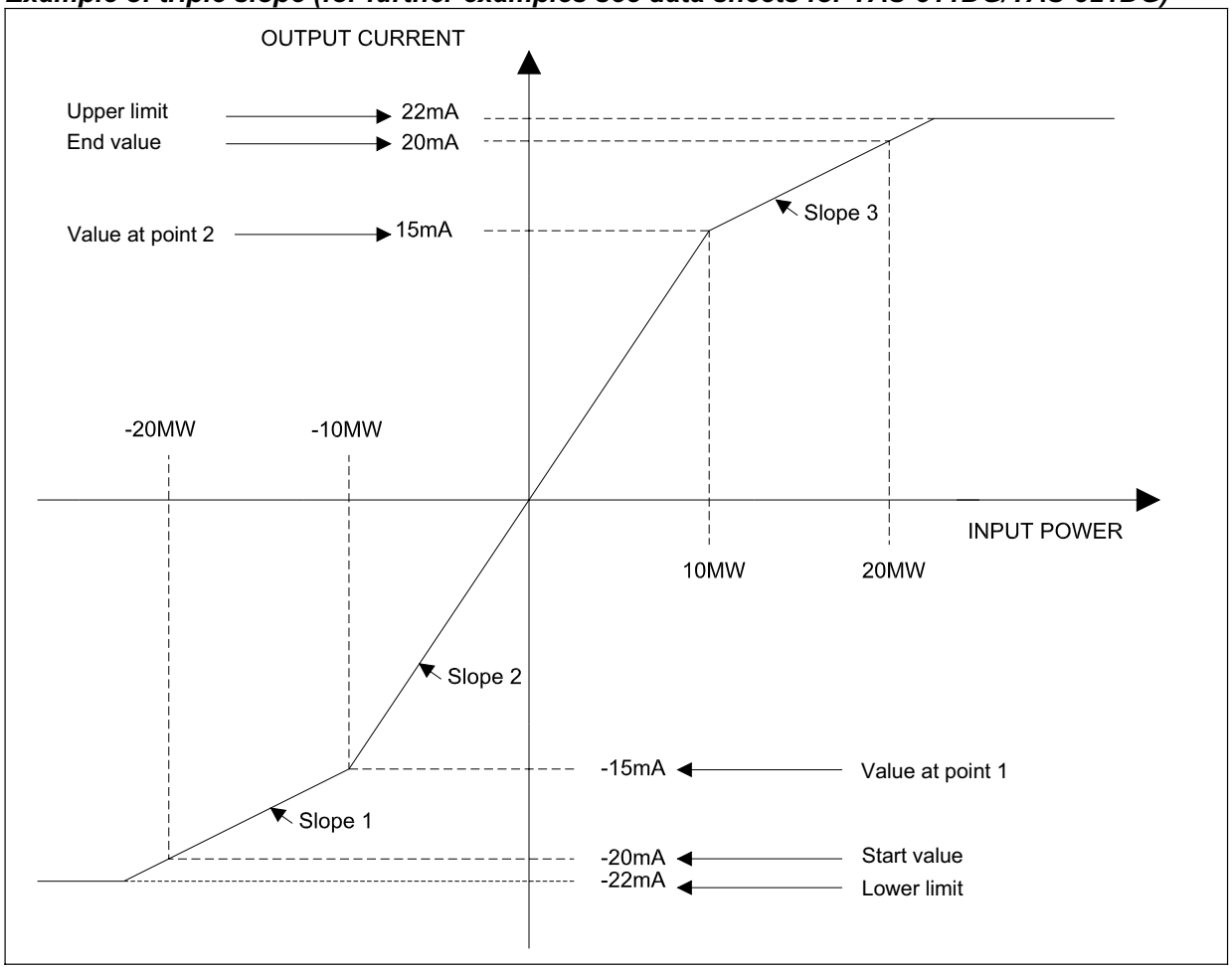
CE

Application

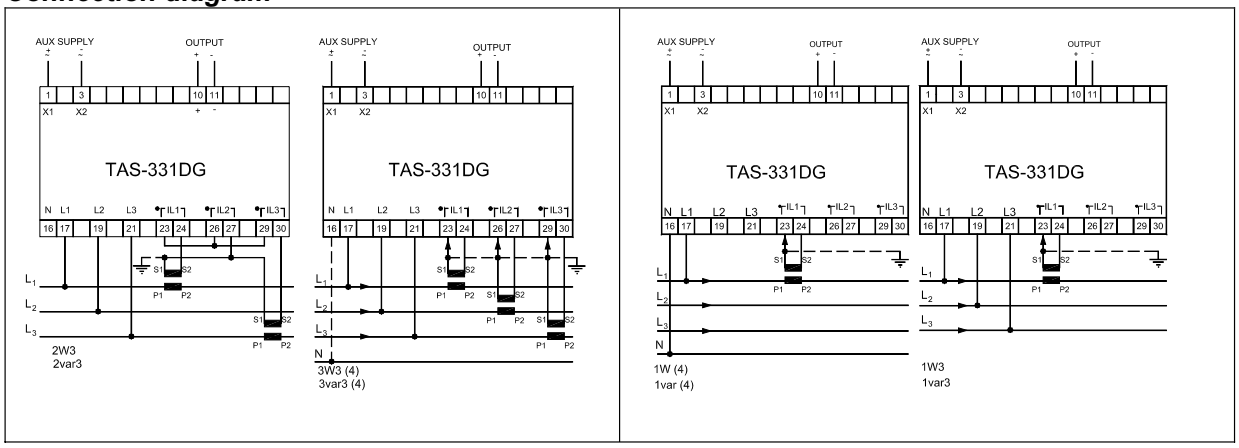
TAS-331DG is a micro-controller based AC-transducer with 1 analogue output for measurement of power or reactive power on an AC-network. TAS-331DG can be delivered pre-configured to the desired measuring value and range or it can be delivered un-configured for customer configuration through the PC-interface. The PC-configuration makes free adjustment of the full input range and output range possible without any mechanical settings or adjustments inside the transducer. The transducer holds no mechanical moving parts like potentiometers and therefore the calibration stability is excellent. TAS-331DG will check the wiring for faults when starting up and indicate possible faults on a LED.

TAS-331DG can be configured as a normal linear transducer or with up to three slopes giving the possibility for a higher resolution in one or two ranges of the measurement. See figure below for an example of three slopes. Upper and lower output limitations can also be configured.

Example of triple slope (for further examples see data sheets for TAS-311DG/TAS-321DG)



Connection diagram



Technical specifications

Accuracy:	Class 0.5 (-10…15…30…55°C) according to IEC 688
Influence, phase angle:	≤ ±0.75°
Meas. current (In):	0.75/1.5/3.0/6.0A Meas. range (In): 0…200%
Overload, currents:	20A max., continuously 75A max. for 10 s 240A max. for 1 s
Load:	Max. 0.5VA per phase
Meas. voltage (Un):	73/140/254/400V phase to neutral Meas. range: 30…120%U_n (57...400V) 127/240/440/690 phase to phase Meas. range: 30…120%U_n (100...690V)
Overload, voltages:	1.2 x U_n max., continuously 2 x U_n max. for 10 s
Load:	Min. 480kΩ
Frequency range:	30…45…65…80Hz Note: For fundamental frequency (1. harmonic) outside 20Hz…80Hz the input is fixed to 0
Indication:	Red LED function: (The LED is located behind the front plate) Incorrect wiring = constant light, only active for coupling 1W3, 2W3, 3W3(4) and 1var3, 2var3, 3var3(4). Check at power up, in case of doubt disconnect supply and reconnect Calibration error = flash frequency 5Hz Configuration error = flash frequency 1Hz
Output:	1 analog output
Standard range:	Output (0...100%): 0...1mA, 0…5mA, 0...10mA, 0...20mA, 0...1V, 0...5V, 0...10V Output (10...100%): 0.1...1mA, 0.5...5mA, 1...10mA, 2...20mA, 0.1...1V, 0.5...5V, 1...10V Output (20...100%): 0.2...1mA, 1...5mA, 2...10mA, 4...20mA, 0.2...1V, 1...5V, 2...10V Output (-100...0...100%): -1...0...1mA, -5...0...5mA, -10...0...10mA, -20...0...20mA, -1...0..1V, -5...0...5V, -10...0...10V Other ranges possible
Limit:	Max. ±120% of nominal output
Output load:	Current: Max. 10V (max. 1kΩ) Voltage: Max. 20mA
Output cable:	Max. length 30m
$\Delta out/\Delta R_{load}$:	10V, 5V, 1V, 20mA ranges according to IEC 688 10mA, 5mA, 1mA ranges ±0.5%
Ambient temperature:	-10…55°C (nominal) -25…70°C (operating) -40…70°C (storage)
Temperature coefficient:	Max. ±0.2% of full scale per 10°C
Response time:	Coupling 2W3/2var3, 3W3/3var3, 3W4/3var4 <225ms, typically 200ms Coupling 1W/1var, 1W4/1var4 <150ms, typically 125ms Coupling 1W3/1var3 <125ms, typically 100ms
Ripple:	Twice the class index (peak to peak measurement) according to IEC 688
Galvanic separation:	Between inputs, outputs and aux. supply: 3750V-50Hz-1 min.
Supply voltage:	57.7-63.5-100-110-127-200-220-230-240-380-400-415-440-450-480-660-690VAC ±20% 24-48-110-220VDC -25/+30%
Consumption:	(Aux. supply) 3.5VA/2W
Climate:	HSE, to DIN 40040
EMC:	According to EN 61000-6-1/2/3/4
Protection:	Housing: IP40. Terminals: IP20 to IEC 529 and EN 60529
Connections:	Max. 2.5mm² multi-stranded Max. 4.0mm² single-stranded
Materials:	All plastic parts are self-extinguishing to UL94 (V1)

Order specifications (examples)

The examples below are order specifications for pre-configured transducers. For un-configured transducers only auxiliary voltage must be specified.

	Example of active power transducer:	Example of reactive power transducer:
Type	TAS-331DG	TAS-331DG
Measuring range:	0…2MW	0…1Mvar (2Mvar) [1]
Coupling [2]:	1W3	1var3
VT ratio:	10kV/100V	10kV/100V
Measuring voltage:	100V	100V
CT ratio:	100/5A	100/5A
Transfer curve:	Single slope	Dual slope
Output start value:	4mA	4mA
Value at point 1:	-	20mA corresponding to 1Mvar [1]
Output end value:	20mA	20mA corresponding to 2Mvar [1]
Output lower limit:	4mA	4mA
Output upper limit:	21.5mA	20mA must be equal to end value [1]
Auxiliary voltage:	110V DC	110V DC

[1] As the transducer for measurement of reactive power is configured at 50% var in proportion to the active power, the function “dual slope” is activated. This method can be used to ensure that the dynamic range of the current input is not exceeded on the var transducer.

[2] At coupling 1W4/1var4 L-L voltage must be stated when ordering.

Check of the chosen measuring range is within the configuration range of the transducer.

$$0.375A = < \frac{\text{Primary power}}{1.73 \times \text{measuring voltage} \times \text{Vt ratio} \times \text{Ct ratio}} = <6A$$

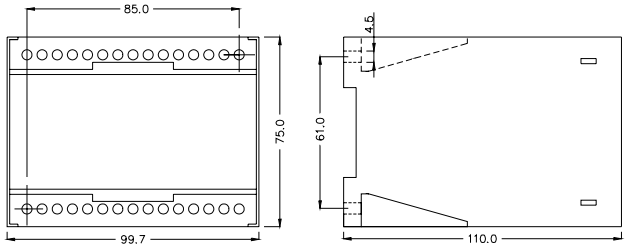
At 1W / 1var coupling the factor 1.73 is left out of the above calculation.

If I (current) is beyond 0.375A…6A another Ct with a larger or smaller ratio is chosen.

PC-configuration kit containing connection cable and software for customer configuration must be ordered separately.

Dimensions

All dimensions in mm



Weight: approx. 0.650 kg

Mounting instructions

TAS-331DG is designed for panel mounting, being mounted on a 35 mm DIN rail, or by means of two 4 mm screws.

The design of the transducer makes mounting of it close to similar equipment possible, however make sure there is min. 50 mm between the top and bottom of the transducer and other equipment. The DIN rail must always be placed horizontally when several transducers are mounted on the same rail.

Due to our continuous development we reserve the right to supply equipment which may vary from the described.

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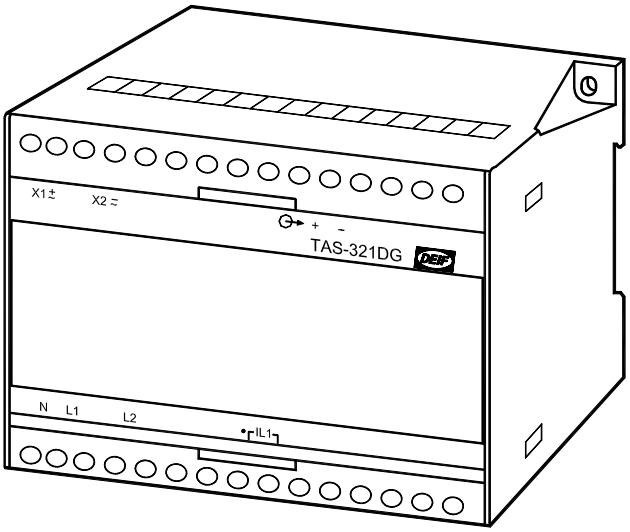
DEIF A/S

Selectable AC-transducer

Type TAS-321DG

4921220040D



- ***Bi-directional current measurement on AC networks***
- ***Power measurement using 2 phases on 3-phase networks***
- ***Class 0.5 (IEC-688) measurement***
- ***Supply and measuring voltage up to 690V***
- ***Easy configuration via PC-interface possible***
- ***Non-linear output characteristics possible***

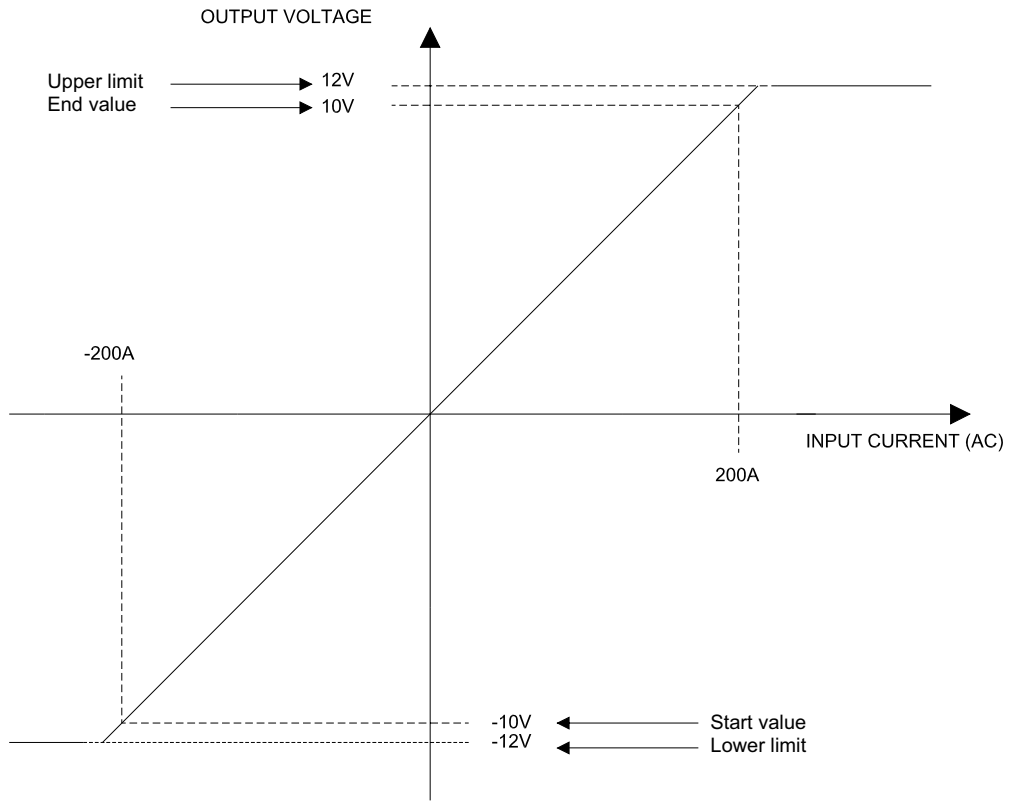
CE

Application

TAS-321DG is a micro-controller based AC-transducer with 1 analogue output for measurement of bi-directional current. The sign for current direction is based on the measured power direction. Furthermore the transducer can be used for measurement of active power or reactive power on a 3-phase network where only 2 phases are available for the measurement. TAS-321DG can be delivered pre-configured or it can be delivered un-configured for customer configuration through the PC-interface.

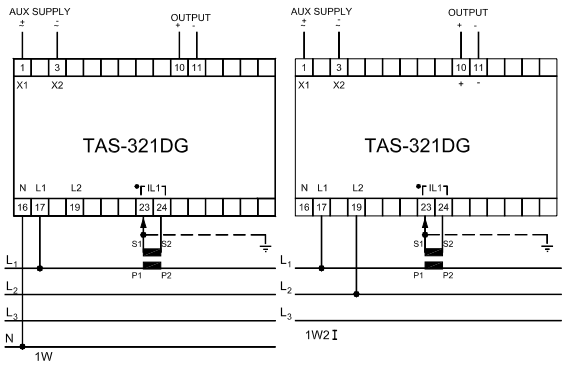
TAS-321DG can be configured as a normal linear transducer or with up to three slopes giving the possibility for a higher resolution in one or two ranges of the measurement. Upper and lower output limitations can also be configured.

Example of single slope (for further examples see data sheets for TAS-311DG/TAS-331DG)

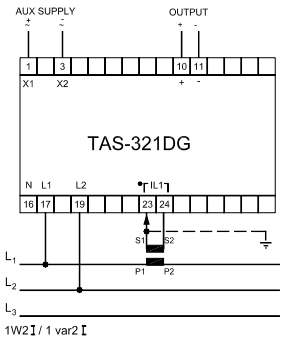


Connection diagram

CURRENT



POWER



Coupling	17	19	23/24
1W2 I / 1var2 I	L1	L2	L1
1W2 II / 1var2 II	L2	L3	L1
1W2 III / 1var2 III	L3	L1	L1

General technical specifications

Accuracy:	Current/power:	Class 0.5 (-10…15…30…55°C) according to IEC 688
Influence, phase angle:	≤ ±0.75°	
Meas. current (In):	0.75/1.5/3.0/6.0A	Meas. range (In): 0…200%
Overload, currents:	20A max., continuously 75A max. for 10 s 240A max. for 1 s	
Load:	Max. 0.5VA	
Meas. voltage (Un):	73/140/254/400V phase to neutral 127/240/440/690 phase to phase	Meas. range (Un): 30…120% (57…400V) Meas. range (Un): 30…120% (100…690V)
Overload, voltages:	1.2 x U_n max., continuously 2 x U_n max. for 10 s	
Load:	Min. 480kΩ	
Frequency range:	30…45…65…80Hz Note: For fundamental frequency (1. harmonic) outside 20Hz...80Hz the input is fixed at 0	
Indication:	Red LED function: (The LED is located behind the front plate) Calibration error = flash frequency 5Hz Configuration error = flash frequency 1Hz	
Output:	1 analogue output	
Standard range:	Output (0...100%): Output (10...100%): Output (20...100%): Output (-100...0...100%): Other ranges possible	0...1mA, 0…5mA, 0...10mA, 0...20mA, 0...1V, 0...5V, 0...10V 0.1...1mA, 0.5...5mA, 1...10mA, 2...20mA, 0.1...1V, 0.5...5V, 1...10V 0.2...1mA, 1...5mA, 2...10mA, 4...20mA, 0.2...1V, 1...5V, 2...10V -1...0...1mA, -5...0...5mA, -10...0...10mA, -20...0...20mA, -1...0..1V, -5...0...5V, -10...0...10V
Limit:	Max. ±120% of nominal output	
Output load:	Current: Max. 10V (max. 1kΩ) Voltage: Max. 20mA	
Output cable:	Max. length 30m	
$\Delta out/\Delta R_{load}$:	10V, 5V, 1V, 20mA ranges according to IEC 688 10mA, 5mA, 1mA ranges ±0.5%	
Ambient temperature:	-10…55°C (nominal) -25…70°C (operating) -40…70°C (storage)	
Temperature coefficient:	Max. ±0.2% of full scale per 10°C	
Response time:	<150ms, typically 125ms	
Ripple:	Twice the class index (peak to peak measurement) according to IEC 688	
Galvanic separation:	Between inputs, outputs and aux. supply: 3750V-50Hz-1 min.	
Supply voltage:	57.7-63.5-100-110-127-200-220-230-240-380-400-415-440-450-480-660-690VAC ±20% 24-48-110-220VDC -25/+30%	
Consumption:	(Aux. supply) 3.5VA/2W	
Climate:	HSE, to DIN 40040	
EMC:	According to EN 61000-6-1/2/3/4	
Protection:	Housing: IP40. Terminals: IP20 to IEC 529 and EN 60529	
Connections:	Max. 2.5mm² multi-stranded Max. 4.0mm² single-stranded	
Materials:	All plastic parts are self-extinguishing to UL94 (V1)	

Specific technical specifications

Current:	Measuring current:	0.5...8A	
	Start value:	-100...+67% of end value	
	End value:	100% of measuring current	
Current/power:	Connection	1W note only current:	(IL1 and UL1-N) or (IL2 and UL2-N) or (IL3 and UL3-N): 57...400VAC
		1W2 I:	(IL1 and UL1-L2): 100…690VAC
		1W2 II:	(IL1 and UL2-L3): 100…690VAC
		1W2 III:	(IL1 and UL3-L1): 100…690VAC

Order specifications (examples)

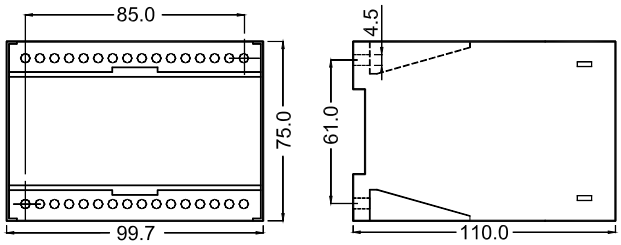
The examples below are order specifications for pre-configured transducers. For un-configured transducers only auxiliary voltage must be specified.

Type	TAS-321DG	
Measurement:	Bi-directional current	Power
Measuring range:	-120…0…120AAC	0…20MW
Coupling:	1W	1W2 II
VT ratio:	-	10kV/100V
Input voltage:	400VAC	100VAC
CT ratio:	100/1A	100/5
Input current:	-1.2…0…1.2A	NA
Transfer curve:	Single slope	Single slope
Output start value:	-10V	4mA
Threshold 1:	-	-
Mid value:	0	12mA
Threshold 2:	-	-
Output end value:	10V	20mA
Output lower limit:	-12V	4mA
Output upper limit:	12V	21.5mA
Auxiliary voltage:	110VDC	400VAC

PC-configuration kit containing connection cable and software for customer configuration must be ordered separately.

Dimensions

All dimensions in mm



Weight: Approx. 0.600 kg

Mounting instructions

TAS-321DG is designed for panel mounting, being mounted on a 35 mm DIN rail, or by means of two 4 mm screws.

The design of the transducer makes mounting of it close to similar equipment possible, however make sure there is min. 50 mm between the top and bottom of the transducer and other equipment. The DIN rail must always be placed horizontally when several transducers are mounted on the same rail.

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DEIF A/S

Temperature transducers

Type TEMAX-3

4921220022C

TEMAX-3.4B

- *2 wire transducer for remote monitoring of 2, 3 or 4 temperatures*
- *Protected against R.F. magnetic fields*
- *Read-out of highest output*
- *Plug-in PCBs*
- *Protection: IP65*

CE

Available types

Type	TEMAX-3.2B	TEMAX-3.3B	TEMAX-3.4B
For sensors	2 Pt100Ω sensors	3 Pt100Ω sensors	4 Pt100Ω sensors

Introduction

TEMAX-3 is intended for monitoring of 2 to 4 temperatures. TEMAX-3.2B and TEMAX-3.3B may later on at our factory be upgraded to 3 or 4 measuring points (type TEMAX-3.3B and TEMAX-3.4B respectively). The temperature transducers type TEMAX-3 are CE classified for residential, commercial and light industry plus industrial environment.

Application

TEMAX-3 is applied to monitor inputs from 2, 3 or 4 Pt100Ω resistance sensors, indicating the highest temperature on its built-in 240° indicating instrument.

Operating principle

TEMAX-3 is a 2 wire transducer with an output signal of 4...20mA.

The term "2-wire transducer" refers only to the output signal as the power for the electronics is transmitted through the two output wires and not by means of a separate auxiliary voltage (4 wire principle). TEMAX-3 is placed near the measuring points and the two output wires carry the power to supply the electronics as well as the output signal.

The output current can be considered as two components: a constant 4mA for the amplifier etc. of the transducer and a variable signal of 0...16mA, which changes proportionally to the measured input signal. The input signal corresponds to the output 4...20mA.

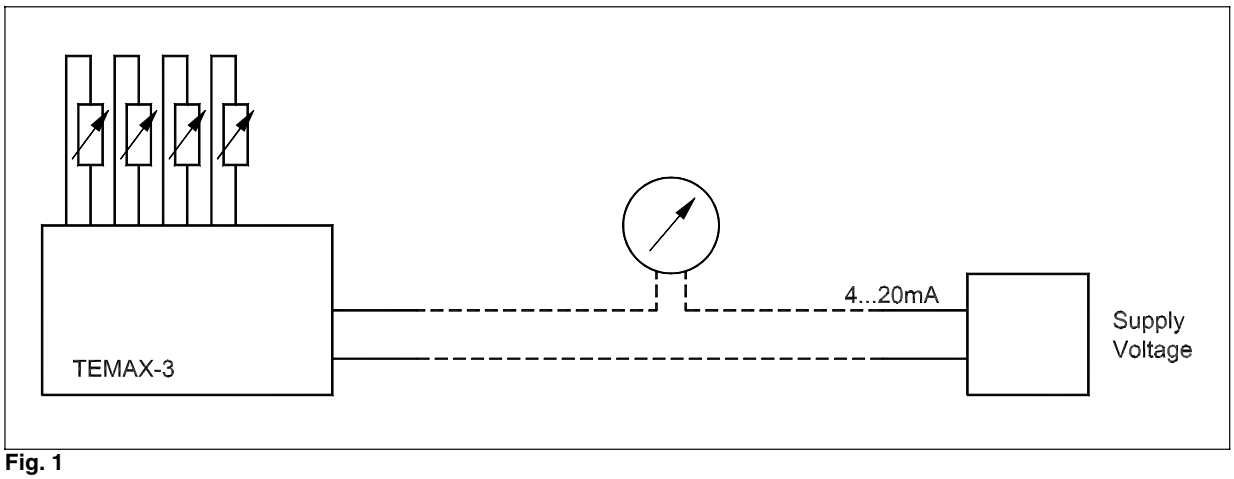


Fig. 1

Indicating instruments, recorders, controllers etc. can be connected as shown in series with the output circuit and the supply voltage.

The output current is proportional to the temperature and independent of varying supply voltage, lead resistance and load within the specified limits.

The 2, 3 or 4 temperatures are measured by means of Pt100Ω sensors connected in 2 wire couplings. Each sensor forms part of a wheatstone bridge, whose diagonal voltage is amplified by an operational amplifier.

The 2, 3 or 4 amplifier outputs are compared and the signal representing the highest temperature is selected. This signal controls an output amplifier which converts the signal into the 4...20mA constant current output.

Output under fault conditions

If one of the sensors or its leads is/are broken, TEMAX-3 will give an output higher than 20mA (max. 32mA).

In this case there will be no temperature measurement but a clear indication of fault.

If one of the sensors or the input leads is/are short-circuited, the other measurements remain unaffected but no typical change of the output signal will occur. However, such faults are not typical. Pt100Ω sensors are very reliable, and if they do fail, it is usually caused by physical damage resulting in an open circuit condition.

A short-circuit fault can only be detected by periodical activation of the push-buttons. At the actual point the meter will indicate less than 0°C.

Installation

In order to fully utilize the 2-wire system, the transducer should be placed near the measuring points to gain the following advantages:

- Noise suppression — The signal is transmitted at a high level and a relative insensitivity to noise and interference is thus achieved.
- Simple wiring — Only 2 wires are to be drawn from the transducer to the switchboard.

The Pt100Ω sensors are connected to the TEMAX-3 in "2-wire couplings". The resistance in the sensor leads is in series with the Pt100Ω sensor, and an error would consequently occur, if not allowed for. To avoid this error, the TEMAX-3 is adjusted to a fixed resistance of 0.35Ω for each sensor.

The mentioned 0.35Ω corresponds to 2 x 15 m - 1.5 mm² or 2 x 10 m - 1.0 mm^2 wires, etc.

In order to simplify the TEMAX-3, it is not provided with variable lead compensations and check resistors. The lead resistance should be as close as possible to the mentioned 0.35Ω to ensure highest achievable accuracy.

Deviations from the 0.35Ω will cause an error of +1°C per +0.38Ω, without recalibration.

Mechanical construction

The transducer is housed in a polycarbonate case (to IP65, i.e. protected against water jets) with a transparent cover and 4 watertight push-buttons.

The case is fitted with 5 PG9 cable glands and has an internal terminal block for connection of up to 4 mm² wires.

All electrical components are protected against mechanical damage and dust by means of the thermoplastic case with plug-in PCBs and a metal cover plate.

The transducer is furthermore equipped with a built-in indicating instrument, 48 x 48 mm with 240° scale.

Electrical construction

TEMAX-3 consists of a base board plus 4-6 plug-in PCBs, which are individually calibrated, facilitating service and repair in the event of faulty function:

- Amplifiers for the Pt100Ω sensors (2-4 PCBs)
- Voltage supply and output amplifier (1 PCB)
- Built-in push-button function (1 PCB)

General technical specifications

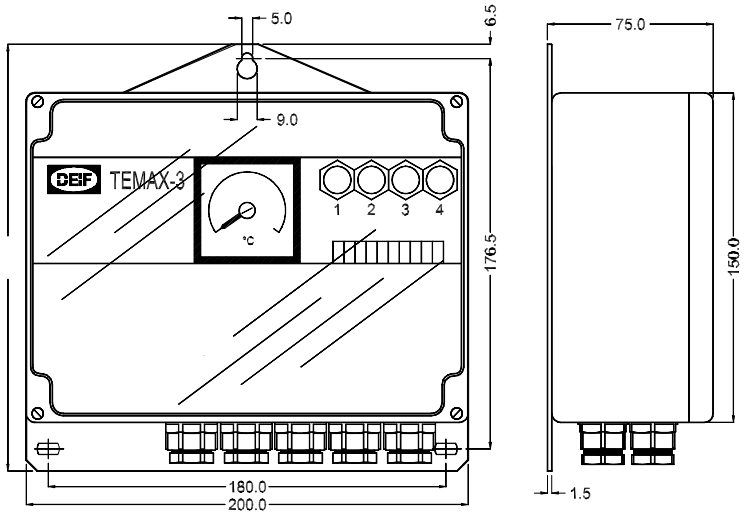
Temperature:	-10...55°C (nominal) -25...70°C (operating) -40...70°C (storage).
Temperature drift:	Max. 0.2% per 10°C.
Test voltage:	2000V AC - 50Hz - 1 min. between mounting plate and input/output. 500V AC - 50Hz - 1 min. between inner screen and input/output.
R.F. electromagnetic fields:	To IEC 801-3 (27...1000MHz, 10V per meter).
Climate:	Class HSE, to DIN 40040.
EMC:	To EN 50081-1/2, EN 50082-1/2, SS4361503 (PL4) and IEC 255-22-1 (class 3).
Protection:	Case: IP65, to IEC 529 and EN 60529.
Materials:	Case: light grey polycarbonate. With 5 PG9 glands and internal terminal block.
Connections:	Cable diametre: 4...10 mm. Wire diametre: max. 4 mm². Extra terminals are provided for looping of any screens from the input/output cables.
Mounting:	For base mounting. Position as required, however, vertical mounting recommended to reduce any ingress of liquid and dust etc. via the cable glands.

Technical specifications

Measuring range:	0...150°C or 0...200°C (other ranges on request).
Temperature sensor:	Pt100Ω, 2 wire.
Lead compensation:	Adjusted for lead resistance 0.35Ω corresponding to a pair of 15 m - 1.5 mm^2 or 10 m - 1 mm^2 copper connecting leads.
Lead compensation resistance:	None.
Maximum continuous overload:	Max. 36V DC (refers to all inputs and output).
Output:	4...20mA constant current. The temperature of any input can be read on the built-in instrument.
Maximum output:	32mA on extended input (e.g. open circuit or disconnected sensor).
Ripple on output:	Max. 0.5% pp at V_S = 2 V_{pp} (10...400Hz).
Output non-linearity:	Max. 0.1%.
Accuracy:	Class 1.0 (1%) ±0.5°C (-10...15...30...55°C), to IEC 688 and EN 60688.
Comparison accuracy:	0.5°C.
Auxiliary voltage (V_S):	13...36V DC at 0.1 V_{pp} ripple. 14...36V DC at 2 V_{pp} ripple.
Max. ripple (V_R):	5 V_{pp}.
Load on output (R_L):	Depends on the aux. voltage V_S: $ax.R = \frac{V - (0.5\,V + 13)}{0.02}$ (OHMS)
Aux. voltage influence:	Max. 0.1% from 13...36V DC at 0.1V_{pp} ripple.
Response time:	Approx. 1 s for 100% change of input, approx. 2.5 s on initial energisation (for deviation 0.5%).

Dimensions

All dimensions in mm.



Weight: approx. 1.200 kg

TEMAX-3.4B (TEMAX-3.3B, TEMAX-3.2B)

Order specifications

	Type	**Measuring range**
Example:	TEMAX-3.3B	0…200°C

Due to our continuous development we reserve the right to supply equipment which may vary from the described.

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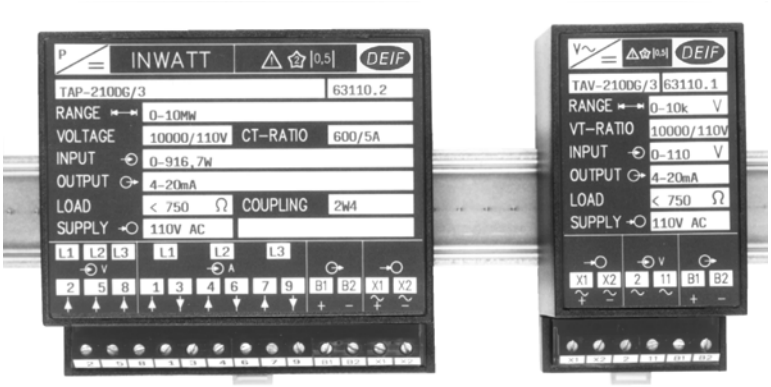
DEIF A/S

Transducers for AC measurement

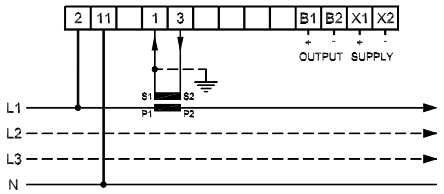
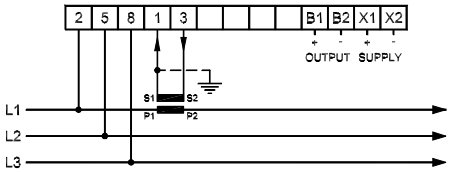
Types TAP, TAQ, TMF, TAA, TAV, TAC

4921220002E



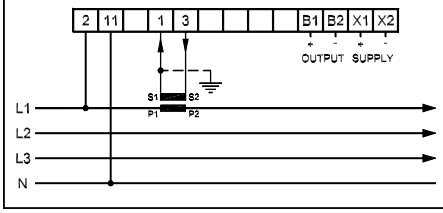
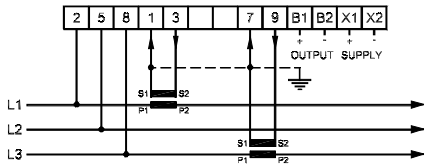
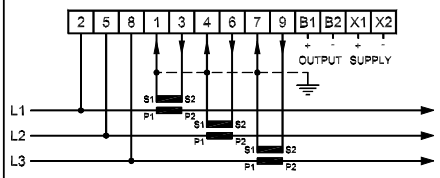
- ***Measurement of:***
  watt, var, frequency, phase angle, voltage, current
- ***Accuracy class 0.5***
- ***For mounting on DIN rail***
- ***Compact design***
- ***Aux. voltage: 57.7...440V AC or 24...220V DC***
- ***According to IEC 688***

CE

Transducer type	 *Watt*	
Type	**TAP-210DG/3. 1W**	**TAP-210DG/3, 1W3**
Measuring	**Single phase network**	**3-Phase 3 wire network Balanced load**
Connection diagrams for DEIF transducers for DIN rail mounting **Numbering of terminals according to DIN 43807**		
Measuring principle	Time-Division-Multiplication (TDM) RMS measurement	
Measuring voltage (U_{nom})	57.7..440V AC ±20% (0..120% U_{nom} with separate U_{aux}). (≤ 0.5VA per phase)	
Measuring current (I_{nom})	0.5..10A AC. Measuring range: 0..120% I_{nom} (≤ 0.3VA per phase)	
Measuring range	0..P_{nom} / -P_{nom}..0..+P_{nom}	
Measuring frequency	45..65Hz (300..500Hz)	
Overloads Voltages	1.2 x U_{nom}, cont. / 2 x U_{nom} for 10 s	
Overloads Currents	2 x I_{nom}, cont. / 10 x I_{nom} for 10 s (max. 75A) / 40 x I_{nom} for 1 sec (max. 300A)	
Output (0..100%)	0..1mA, 0..5mA, 0..10mA, 0..20mA, 0..1V, 0..10V	
Output (20..100%)	0.2..1mA, 1..5mA, 2..10mA, 4..20mA, 0.2..1V, 2..10V	
Output (-100%..0..+100%)	-1..0..+1mA, -5..0..+5mA, -10..0..+10mA, -20..0..+20mA, -1..0...+1V, -10..0..+10V	
Output loads	Current Output: max. 15V, voltage Output: max. 20mA	
Accuracy	Class 0.5 (-10..15..30..55°C) according to IEC 688	
Response time/ripple	<150 ms / 1%$_{pp}$ according to IEC 688	
Δout / ΔU_{aux} / Δf_{aux} / ΔR_{load}	Max. 0.1%/ Δ10% U_{aux} / 0.1%/45..65Hz / 0.1%/ ΔR_{load}-max.	
Temperature coefficient	Typically 0.15% per 10°C. Max. 0.2% per 10°C	
Ambient temperature	-10..+55°C (nominal). –25..+70°C (operating). -40..+70°C (storage)	
Auxiliary supply (U_{aux}) (45..65Hz)	57.7 - 63.5 - 100 - 110 - 120 - 127 - 220 - 230 - 240 - 380 - 415 - 440V AC ±20% (3.5VA)	
Test voltage	2000V - 50Hz - 1 min.	
EMC	According to EN 50081-1/2, EN 50082-1/2, SS4361503 (PL4), IEC 255-4 (class 3). CE marked	
Climate	Class HSE, according to DIN 40040	
Protection	Case: IP52. Terminals: IP20. According to IEC 529 and EN 60529	
Terminals	Screw Terminals. Multi-stranded: 2.5 mm² / single-stranded: 4.0 mm²	
Case type See rear page	1	1

Order specifications

Type	**TAP-210DG/3 INWATT**	**TAP-210DG/3 INWATT**
Connection (See drawing)	1W	1W3
Measuring range	x	x
Current transformer (I_{pri} : I_{sec})	x	x
Measuring voltage (U_{nom})	x	x
Voltage transformer (U_{pri} : U_{sec})	x	x
Auxiliary voltage (U_{aux})	x	x
Output signal	x	x

TAP-210DG/3, 1W4	TAP-210DG/3, 2W	TAP-210DG/3, 2W4
3-Phase 4-wire network Balanced load	**3-Phase 3 wire network Unbalanced load**	**3-Phase 4-wire network Unbalanced load**
		

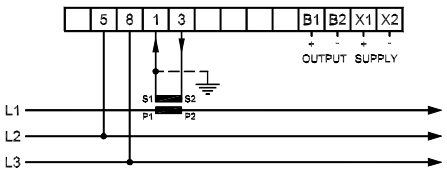
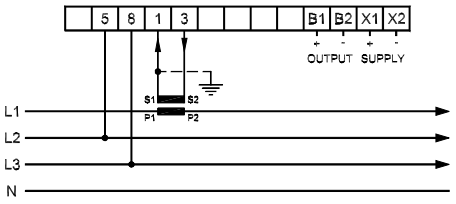
24 - 48 - 110 - 220V DC -25/+30% (≤ 2.5W)

for residential, commercial and light industry plus industrial environment

1	1	1

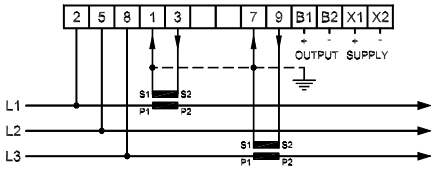
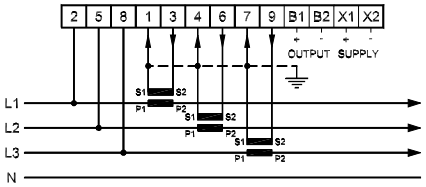
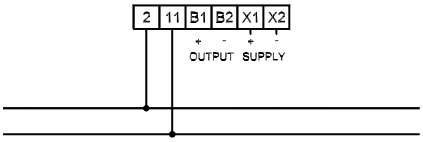
TAP-210DG/3 INWATT	TAP-210DG/3 INWATT	TAP-210DG/3 INWATT
1W4	2W	2W4
x	x	x
x	x	x
x	x	x
x	x	x
x	x	x
x	x	x

See rear page for calculation of measuring range for watt/var transducers

Transducer type	 *Var*	
Type	**TAQ-210DG/3, 1VAR3**	**TAQ-210DG/3, 1VAR4**
Measuring	**3-Phase 3-wire network Balanced load**	**3-Phase 4-wire network Balanced load**
Connection diagrams for DEIF transducers for DIN rail mounting **Numbering of terminals according to DIN 43807**		
Measuring principle	Time-Division-Multiplication (TDM) RMS measurement	
Measuring voltage (U_{nom})	57.7..440V AC ±20% (0..120% U_{nom} with separate U_{aux}), (≤ 0.5VA per phase)	
Measuring current (I_{nom})	0.5..10A AC. Measuring range: 0..120% I_{nom} (≤ 0.3VA per phase)	
Measuring range	0..Q_{nom} / -Q_{nom}..0..+Q_{nom}	
Measuring frequency	45..65Hz (300..500Hz)	
Overloads Voltages	1.2 x U_{nom}, cont. / 2 x U_{nom} for 10 s	
Overloads Currents	2 x I_{nom}, cont. / 10 x I_{nom} for 10 s (max. 75A) / 40 x I_{nom} for 1 sec (max. 300A)	
Output (0..100%)	0..1mA, 0..5mA, 0..10mA, 0..20mA, 0..1V, 0..10V	
Output (20..100%)	0.2..1mA, 1..5mA, 2..10mA, 4..20mA, 0.2..1V, 2..10V	
Output (-100%..0..+100%)	-1..0..+1mA, -5..0..+5mA, -10..0..+10mA, -20..0..+20mA, -1..0..+1V, -10..0..+10V	
Output loads	Current Output: max. 15V, voltage Output: max. 20mA	
Accuracy	Class 0.5 (-10..15..30..55°C) according to IEC 688	
Response time/ripple	<150 ms / $1\%_{pp}$ according to IEC 688	
Δout / ΔU_{aux} / Δf_{aux} / ΔR_{load}	Max. 0.1%/ Δ10% U_{aux} / 0.1%/45..65Hz / 0.1%/ ΔR_{load}-max.	
Temperature coefficient	Typically 0.15% per 10°C. Max. 0.2% per 10°C	
Ambient temperature	-10..+55°C (nominal). -25..+70°C (operating). -40..+70°C (storage)	
Auxiliary supply (U_{aux}) (45..65Hz)	57.7 - 63.5 - 100 - 110 - 120 - 127 - 220 - 230 - 240 - 380 - 415 - 440V AC ±20% (≤3.5VA)	
Test voltage	2000V - 50Hz - 1 min.	
EMC	According to EN 50081-1/2, EN 50082-1/2, SS4361503 (PL4), IEC 255-4 (class 3). CE marked	
Climate	Class HSE, according to DIN 40040	
Protection	Case: IP52. Terminals: IP20. According to IEC 529 and EN 60529	
Terminals	Screw Terminals. Multi-stranded: 2.5 mm² / single-stranded: 4.0 mm²	
Case type See rear page	1	1

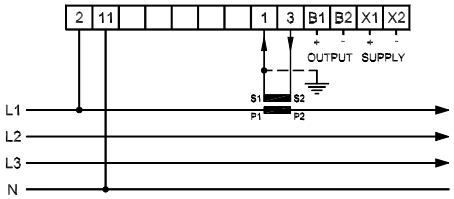
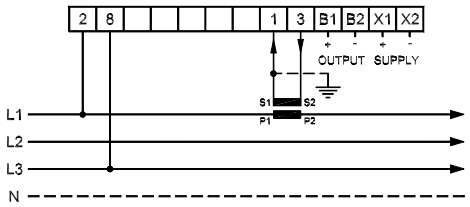
Order specifications

Type	**TAQ-210DG/3 INWATT**	**TAQ-210DG/3 INWATT**
Connection (See drawing)	1VAR3	1VAR4
Measuring range	x	x
Current transformer (I_{pri} : I_{sec})	x	x
Measuring voltage (U_{nom})	x	x
Voltage transformer (U_{pri} : U_{sec})	x	x
Auxiliary voltage (U_{aux})	x	x
Output signal	x	x

		Hz ⎓ *Frequency*
TAQ-210DG/3, 2VAR	**TAQ-210DG/3, 2VAR4**	**TMF-210DG/2**
3-Phase 3-wire network Unbalanced load	**3-Phase 4-wire network Unbalanced load**	**Mains frequency**
		
		Crystal controlled one-shot
		57.7..440V AC ±20% (≤ 0.5VA)
		———
		f_{nom} ±3Hz, ±5Hz, ±10Hz
		f_{nom} 50Hz, 55Hz, 60Hz
		———
		Class 0.2 of f_{max}.
		350 ms / 0.5%$_{pp}$
		Typ. 0.05% per 10°C, max. 0.1% per 10°C
24 - 48 - 110 - 220V DC -25/+30% (≤ 2.5W)		(≤ 2VA/2W)
for residential, commercial and light industry plus industrial environment		
1	1	1

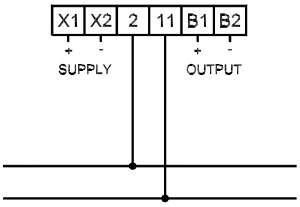
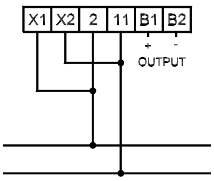
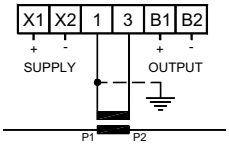
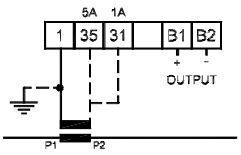
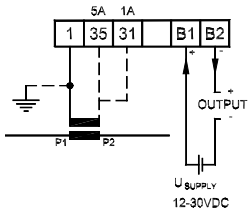
TAQ-210DG/3 INWATT	TAQ-210G/3 INWATT	TMF-210DG/2
2VAR	2VAR4	
x	x	x
x	x	
x	x	x
x	x	x
x	x	x
x	x	x

See rear page for calculation of measuring range for watt/var transducers

Transducer type	*Phase angle*	
Type	**TAA-210DG/2, WC1**	**TAA-210DG/2, WC3**
Measuring	**3-Phase network 4-wire**	**3-Phase network 3- or 4-wire**
Connection diagrams for DEIF transducers for DIN rail mounting **Numbering of terminals according to DIN 43807**		
Measuring principle	Zero crossing detection. NOTE: Output proportional to phase angle (φ)	
Measuring voltage (U_{nom})	57.7..440V AC ±20% (≤ 0.5VA)	
Measuring current (I_{nom})	-/1A - -/5A. Measuring range: 20..120% I_{nom} (class 0.5) 5..20% (class 1) (≤ 0.3VA)	
Measuring range	0.5 cap...1..0.5 ind. / 0.7 cap...1..0.3 ind. / 0..1 cap. / 0..1 ind.	
Measuring frequency	45..65Hz (300..500Hz)	
Overloads Voltages	1.2 x U_{nom}, cont. / 2 x U_{nom} for 10 s	
Overloads Currents	2 x I_{nom}, cont. / 10 x I_{nom} for 10 s (max. 75A) / 40 x I_{nom} for 1 sec (max. 300A)	
Output (0..100%)	0..1mA, 0..5mA, 0..10mA, 0..20mA, 0..1V, 0..10V	
Output (20..100%)	0.2..1mA, 1..5mA, 2..10mA, 4..20mA, 0.2..1V, 2..10V. With separate aux. voltage	
Output (-100%..0..+100%)	-1..0..+1mA, -5..0..+5mA, -10..0..+10mA, -20..0..+20mA, -1..0..+1V, -10..0..+10V	
Output loads	Current Output: max. 15V, voltage Output: max. 20mA	
Accuracy	Class 0.5 (-10..15..30..55°C) according to IEC 688	
Response time/ripple	<300 ms / 1%$_{pp}$ according to IEC 688	
Δout / ΔU_{aux} / Δf_{aux} / ΔR_{load}	Max. 0.1%/ Δ10% U_{aux} / 0.1%/45..65Hz / 0.1%/ ΔR_{load}-max.	
Temperature coefficient	Typically 0.15% per 10°C. Max. 0.2% per 10°C	
Ambient temperature	-10..+55°C (nominal). -25..+70°C (operating). -40..+70°C (storage)	
Auxiliary supply (U_{aux}) (45..65Hz)	57.7 - 63.5 - 100 - 110 - 120 - 127 - 220 - 230 - 240 - 380 - 415 - 440V AC ±20% (≤2VA)	
Test voltage	2000V - 50Hz - 1 min.	
EMC	According to EN 50081-1/2, EN 50082-1/2, SS4361503 (PL4), IEC 255-4 (class 3). CE marked	
Climate	Class HSE, according to DIN 40040	
Protection	Case: IP52. Terminals: IP20. According to IEC 529 and EN 60529	
Terminals	Screw Terminals. Multi-stranded: 2.5 mm² / single-stranded: 4.0 mm²	
Case type See rear page	1	1

Order specifications

Type	**TAA-210DG/2**	**TAA-210DG/2**
Connection (See drawing)	WC1	WC3
Measuring range	x	x
Current transformer (I_{pri} : I_{sec})	x	x
Measuring Voltage (U_{nom})	x	x
Voltage transformer (U_{pri} : U_{sec})	x	x
Auxiliary voltage (U_{aux})	x	x
Output signal	x	x

Voltage		*Current*		
TAV-210DG/3	**TAV-220DG/3**	**TAC-210DG/3**	**TAC-220DG/3**	**TAC-230DG/2**
AC voltage With aux. supply	No sep. aux. supply	Wiith aux. supply	**AC current** No aux. supply	2-wire transducer
				
Average measurement				
57.7..440V AC (0.5VA)	57.7..440V AC (4.5VA)	————		
————		0.5..10A (≤ 0.3VA)	-/1A & -/5A (≤ 2VA)	
80..120%/0..120% U_{nom}	0...30..120% U_{nom}	0..100% I_{nom}	0..100% I_{nom} (standard) or 0..120% I_{nom}	
			————	
————		As TAA-210DG	1.5 x I_{nom} cont./10 x I_{nom} - 5 s/40 x I_{nom} - 1sec	
	0..25..100%	As TAA-210DG	0..5mA/10mA/20mA	————
	————	As TAA-210DG	————	4..20mA
————	————		————	
			Max. 15V	U_{supply} - 10V
<500 ms / 1%$_{RMS}$	<200 ms / 1%$_{RMS}$		<300 ms / 1%$_{pp}$ - IEC 688	
			≤1% Δout/ ΔR_{load}-max.	As TAA-210DG
24-48-110-220VDC -25/+30%(≤2W)	To terminals 2 - 11	As TAA-210DG	NONE	U_{supply} = 12..30V DC
for residential, commercial and light industry plus industrial environment				
2	2	2	2	2

TAV-210DG/3	TAV-220DG/3	TAC-210DG/3	TAC-220DG/3	TAC-230DG/2
x	x	x	x	x
		x	x	x
x	x			
x		x		
x	x	x	x	

Calculation of measuring range for watt/var transducers

U = Nominal mains voltage. 3-phase network: Between 2 phases (e.g. 3 x 10kV).
Single phase network: Between phase and neutral.

I = Primary rated current (rated value, e.g. 500/1).

	Lowest measuring range	**Highest measuring range**
3-Phase network	0.5 x √3 x U x I	2 x √3 x U x I
Single phase network	0.5 x U x I	2 x U x I

Standard measuring ranges: 1 - 1.2 - 1.5 - 2 - 2.5 - 3 - 4 - 5 - 6 - 7.5 - 8 and multiples of 10 and 100 thereof.

Example

3-phase network, balanced load:	3 x 10kV	
Voltage transformer:	10k/100	
Current transformer:	500/1A	
Lowest Measuring range:	W = 0.5 x √3 x 10.000 x 500 = 4.3MW	Nearest higher standard range: 5.0MW
Highest Measuring range:	W = 2 x √3 x 10.000 x 500 =17.3MW	Nearest lower standard range: 15.0MW
Possible ranges:	5 - 6 - 7.5 - 8 - 10 - 12 - 15MW. Could be chosen according to calculated current consumption, power factor and a suitable deflection or output.	

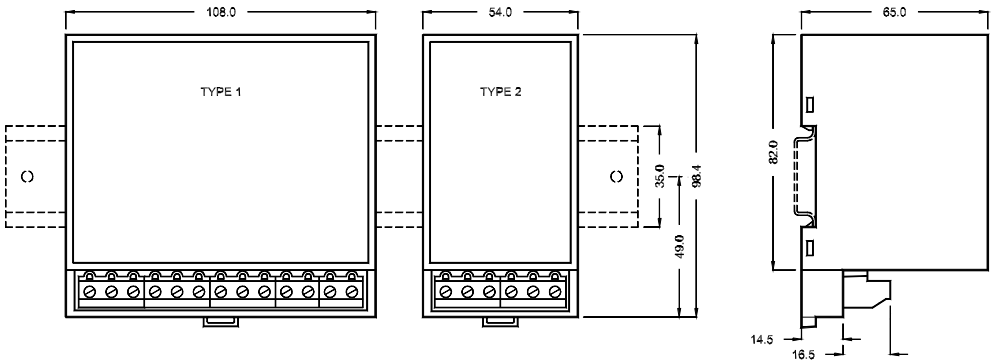
Note: The Measuring range of a VAR transducer should be ≥50% of the selected measuring range of the corresponding WATT transducer, e.g. WATT transducer: -12...0...12MW, VAR transducer: -6...0...6Mvar or higher.

Order specifications for above example

Type		**TAP-210DG/3**
Connection	(See drawing)	1W3
Measuring range		-15..0..+15MW
Current transformer	(I_{pri} : I_{sec})	500/1A
Measuring Voltage	(U_{nom})	3 x 10kV
Voltage transformer	(U_{pri} : U_{sec})	10k/100
Auxiliary voltage	(U_{aux})	220V AC
Output signal		-10..0..+10V

Dimensional details

All dimensions in mm



Weight: max. 0.5 kg max. 0,.35 kg

Transducers for DIN rail mounting Recommended distance between mounted transducers: 30 mm

Due to our continous development we reserve the right to supply equipment which may vary from the described.

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