- **OA series : Oscillator and Demodulator**
- **DE series : Two-way Demodulator**
- **For use with differential chokes (half bridges) and differential transformer (LVDTs)**
- **Particularly suitable for OEM applications and for the construction of multi-channel measuring systems**

Construction and operation

The **OA** Modules contain an oscillator for the supply of one or more inductive transducers, a phase-locked demodulator for rectifying the measurement signal and a voltage reference. The oscillator can be designed for various operating frequencies. The power supply can be provided by a symmetrical or unsymmetrical DC voltage, so that a selection is possible within a wide voltage range. Variations in the supply voltage and the external load do not have any effect on the accuracy of the measurement signal.

The **DE** Module contains two demodulators of the type mentioned above. A number of **DE** Modules can be combined with one **OA** Module to form a multi-channel system.

The circuit is accommodated in a black plastic housing. It is encapsulated to withstand the effects of shock and vibration. Square pins are provided for electrical connection. They are suitable for soldering or for the insertion of the module in a 24 pin DIL socket.

Application

The OA and DE Modules are intended for the operation of inductive transducers from various manufacturers. On account of the different electrical characteristics of the transducers, the modules must be wired externally in different ways in order to obtain the best function. Some typical circuit examples are shown on pages 2 and 3.

Tried and tested circuit designs are available for all TWK transducers. Other circuits can be dimensioned by us for transducers from other manufacturers. If required, laboratory prototypes can be supplied on a Eurocard.

Note: The OA and DE Modules are designed for use in multi-channel applications where serveral transducer signals should be processed on one printed circuit board.

It is suggested that the OD 15, OV 15 and OE 30 Modules from the TWK rangeare used for the operation of single inductive transducers(pl. refer to data sheet OD 10220 AE).

Electrical data for the OA and DE Modules

Oscillator circuit (OA-10 Module)

Operating frequency:	10 kHz *
■ Wave shape :	sine-wave
■ Conformity deviation :	1% max.
■ Amplitude :	12.5 V_{p-p}
■ Frequency temperature coefficent :	0.02%/°C max.
■ Amplitude temperature coefficient :	0.005%/°C max.
■ Continuous load capability:	10 mA_{rms} (short-circuit proof)

* Other operating frequencies on request.

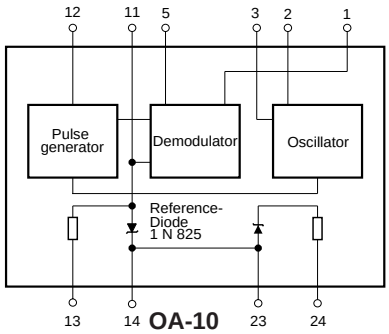
Demodulator circuit (OA and DE Modules)

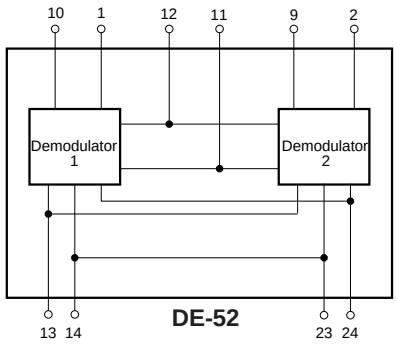
■ Loadability :	5 mA max. (short-circuit proof)
■ Linearity deviation :	0.015% max.
■ Temperature coefficent :	0.002%/°C max.
■ Harmonic ripple :	20mV_{p-p} max.
■ Measuring frequency :	500 Hz with max. 1% deviation

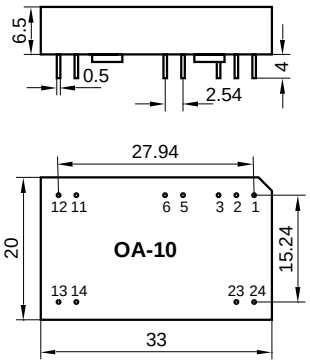
Power supply (for OA and DE Modules)

■ Supply voltage :	symmetrical ± 11.5 to ±16 VDC, unsymmetrical 23 to 32 VDC
■ Current consumption OA :	15mA on open circuit at 30 VDC
■ Current consumption DE :	5 mA on open circuit at 30 VDC
■ Operating temperature range :	-10 to +70°C
■ Mass :	6 g

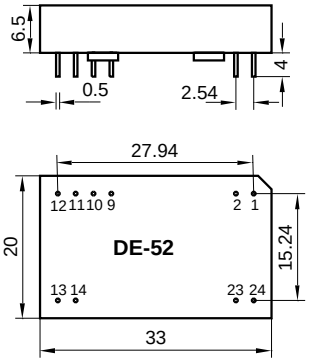
Block diagramms, connections and dimensions







The modules are suited for insertion into a 24 pin DIL socket.



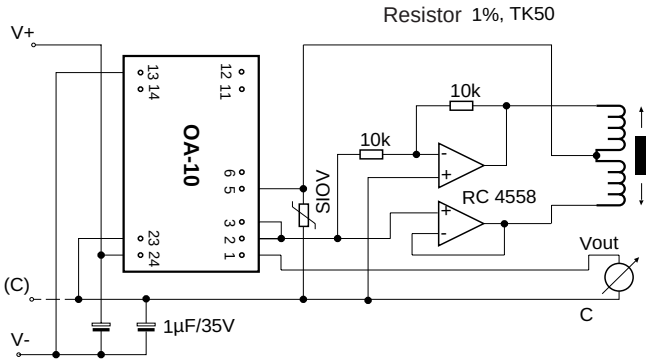
Pin No.	Function
1	Output voltage
2	Oscillator output
3	Oscillator feedback
5	Demodulator input
6	Do not connect
11	Reference voltage, -6.2 V / 1 mA with respect to C
12	Pulse generator output
13	V-, negative voltage supply
14 and 23 internally connnected	C, zero voltage, ground reference potentialis located centrally between V+ and V- when using unsymmetrical supply voltage
24	V+, positive supply voltage

Pin No.	Function
1	Output Signal 1
2	Output Signal 2
9	Demodulator input 2
10	Demodulator input 1
11	Reference voltage input
12	Pulse generator input
13	V-, negative voltage supply
14 and 23 internally connnected	C, zero voltage, ground reference potentialis located centrally between V+ and V- when using unsymmetrical supply voltage
24	V+, positive supply voltage

Basic application circuits for the operation of different inductive transducers

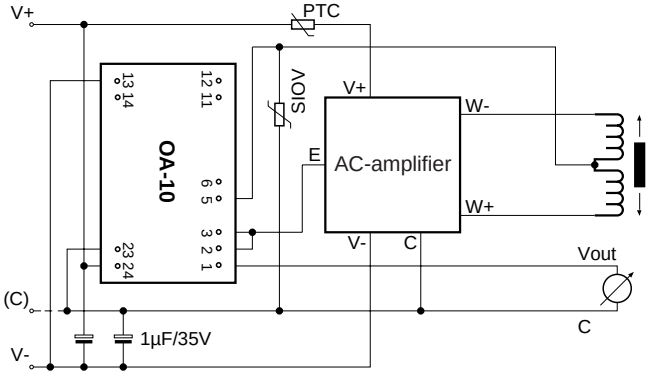
Circuit example 1

OA with differential choke for transducers up to 10 mA current consumption.



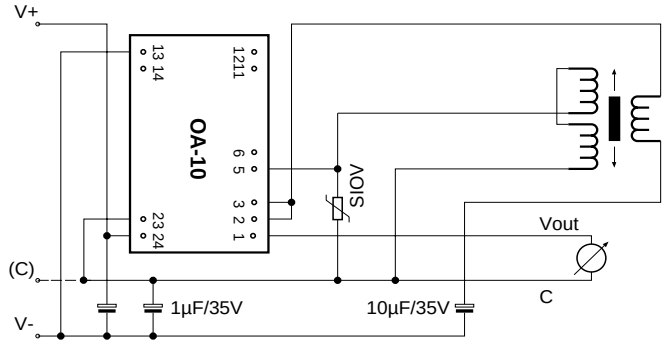
Circuit example 2

OA with differential choke for transducers up to 200 mA current consumption.



Circuit example 3

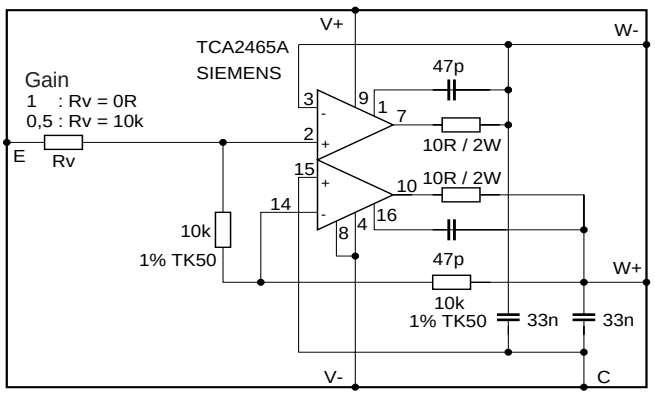
OA with differential transformer for transducers up to 10 mA current consumption.



Connection (C) is not required for an unsymmetrical supply voltage.

Circuit example 4

AC-amplifier for transducers up to 200 mA current comsumption.

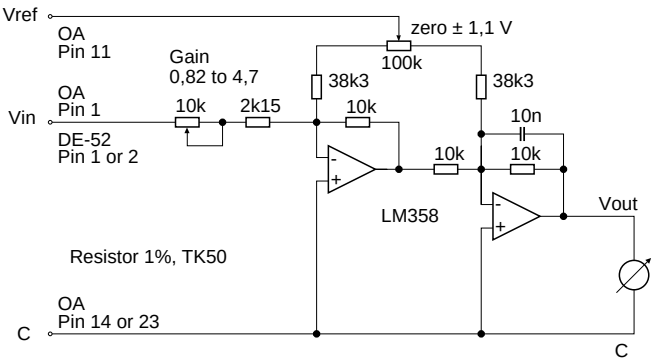


Connection (C) is not required for an unsymmetrical supply voltage.

Output circuits for processing the measuring signal

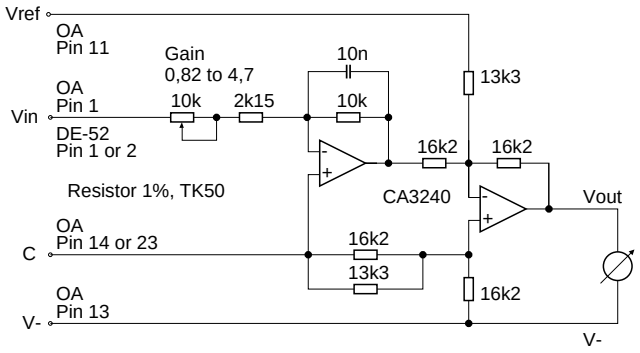
Circuit 5

Amplifier, output signal referred to C. The gain and zero point are adjustable. The output signal is symmetrical with reference to C.



Circuit 6

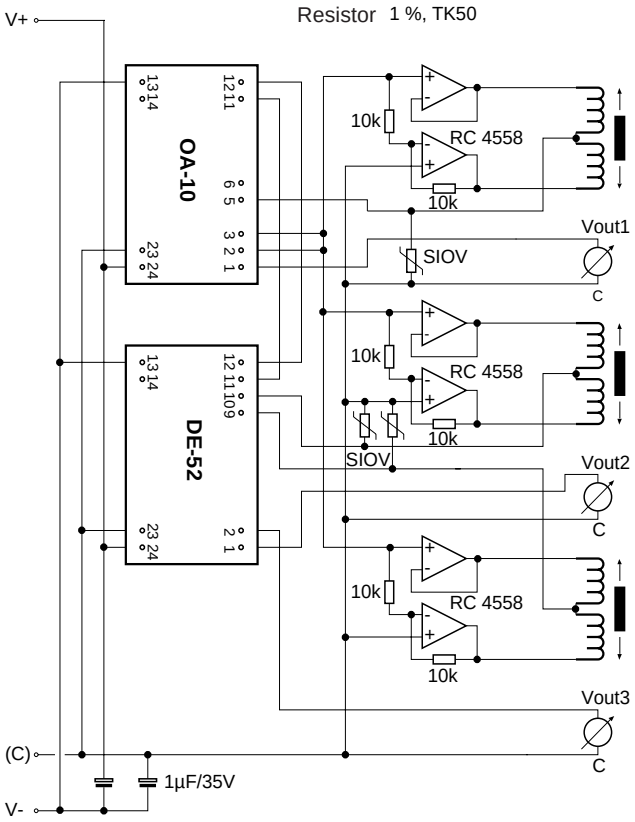
Amplifier, output signal referred to V-. The output signal is 0 to 10 V, the mid-point being fixed at 5 V. The gain is adjustable. The output signal is measured with respect to V-. Particularly suitable for unsymmetrical supply voltages,



Basic circuits for the operation of a number of transducers

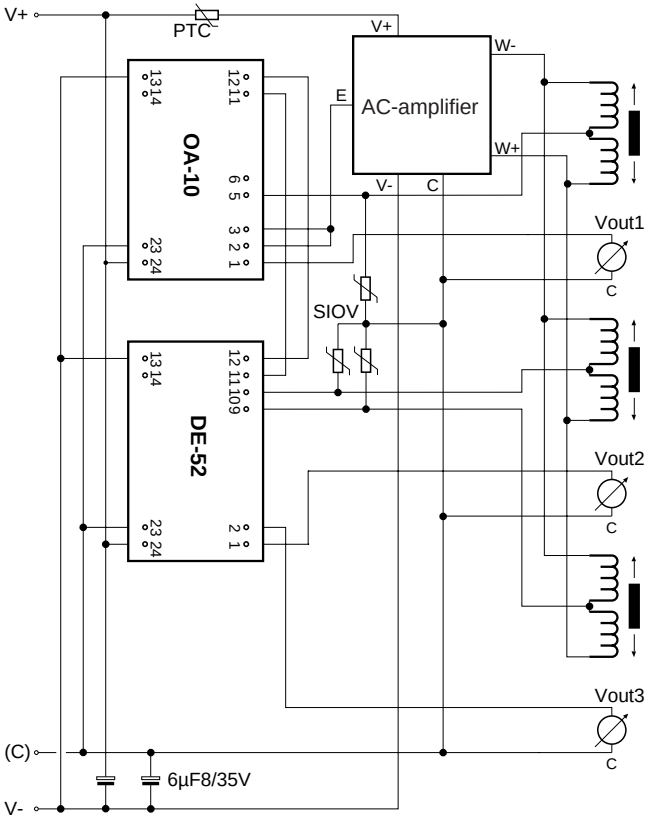
Circuit 7

OA and DE-52 with three differential chokes (current consumption up to 10 mA each). Additional DE-52 modules can be implemented.

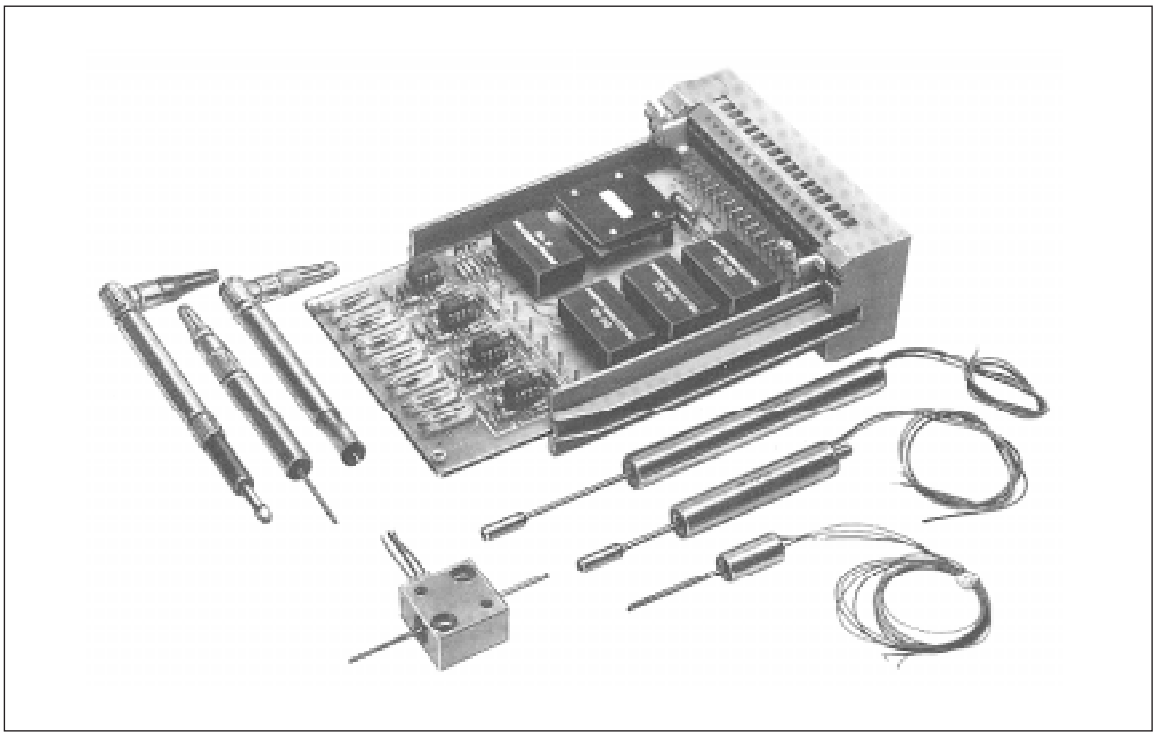


Circuit 8

OA and DE-52 with three differetial transformers (total current consumption up to 200 mA). Additional DE-52 modules can be implemented.



Multi-channel measurement processing with the OA-10 and DE-52 Modules



Construction and function

A simple and economical multi-channel measurement processor can be realised on one Eurocard using the OA-10 and the DE-52 Modules. At one card with a 32-way connector strip a maximum of seven inductive transducers can be connected.

The oscillator in the OA-10 Module supplies the necessary alternating voltage of 10kHz which, amplified by an AC amplifier, excites the connected displacement transducers.

Three DE-52 Modules each with two demodulators and one demodulator in the OA-10 Module supply the demodulated direct voltage signals from the seven connected displacement transducers. These direct voltage signals are converted as required to various voltage or current values; e.g. 0 to 5 V or 0 to 20 mA.

Also, the sensitivity (gain) can be separately adjusted for each channel by trimmers on the card. If required, a zero-point offset is also possible using trimmers (± 10% of the measuring range).

When fully equipped, the card is then fitted with 14 trimmers. The supply voltage can be specified as required for 24 VDC or ±15 VDC.

If the card is assembled for fewer than seven transducers, the number of DE-52 Demodulator Modules is reduced.

Order code of complete Eurocards

Example: OUK 10 - 1 - 7 - 24 A 01
1. 2. 3. 4. 5. 6. 7.

1. Current or voltage output:

   OUK = card for voltage output
   OIK = card for current output

2. Frequency of excitation voltage:
   10 = 10 kHz
   (other frequencies on request)

3. TWK-Transducers to be connected:

1 =	IW 10/4, IT 108/4 IW 101/5	**5** =	--
		6 =	IW 120/60
2 =	IW 10/8, IT 108/8 IW 101/10, IW 120/12	**7** =	IW 120/150
		8 =	--
3 =	--	**9** =	ID 36
4 =	IW 101/15, IW 120/24	**10** =	other transducers

4. Number of transducers (1 to 7)
   7 = seven transducers

5. Supply voltages: **24** = 24 VDC
   30 = ± 15 VDC

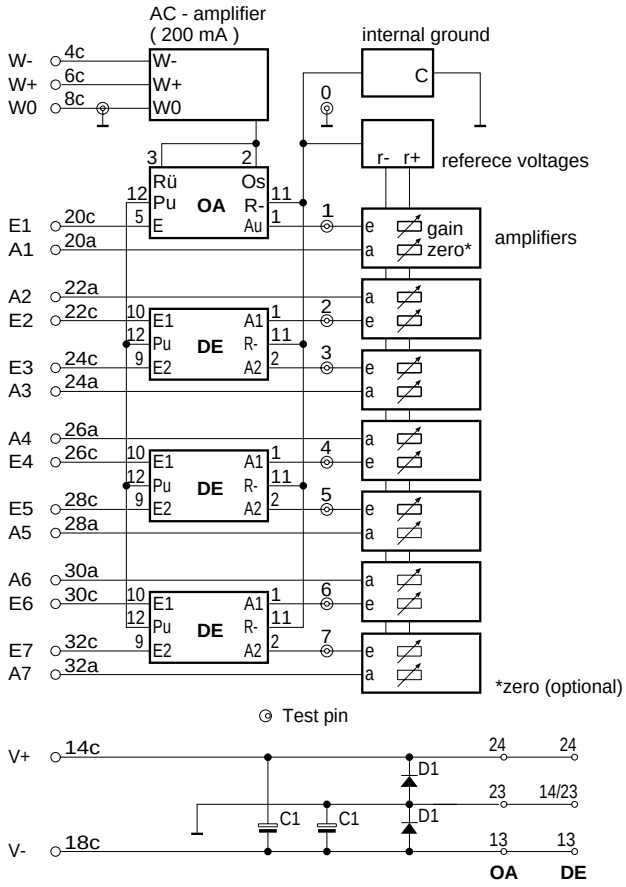
6. Output signals:
   A = 0 to 5 VDC **D** = 0 to 20 mA
   B = 0 to 10 VDC **E** = 4 to 20 mA
   C = ± 10 VDC

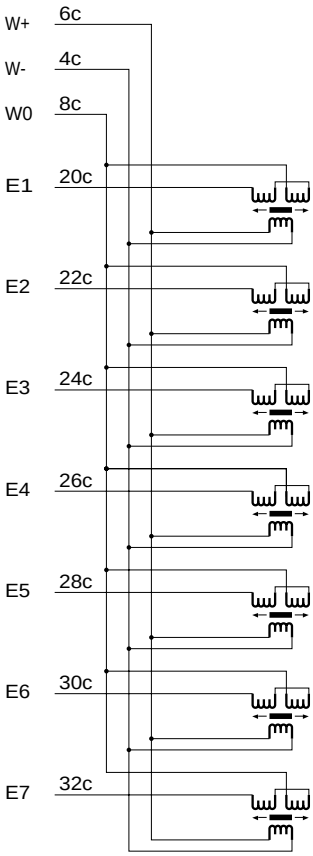
7. Electrical and mechanical variations:
   00 = The two last figures define the exact version according to an internal company register.

Block diagrams and connections for two Eurocards (examples only)

Card OUK for 7 LVDT transducers, measuring signals 0 to 10 VDC

E : Transducer signal
A : Measuring signal output with reference to V-
W + and W - :
Transducer excitation





Card OIK for 7 half-bridge transducers, measuring signals 0 to 20 mA

E : Transducer signal
A : Measuring signal output with reference to V-
W + and W - :
Transducer excitation