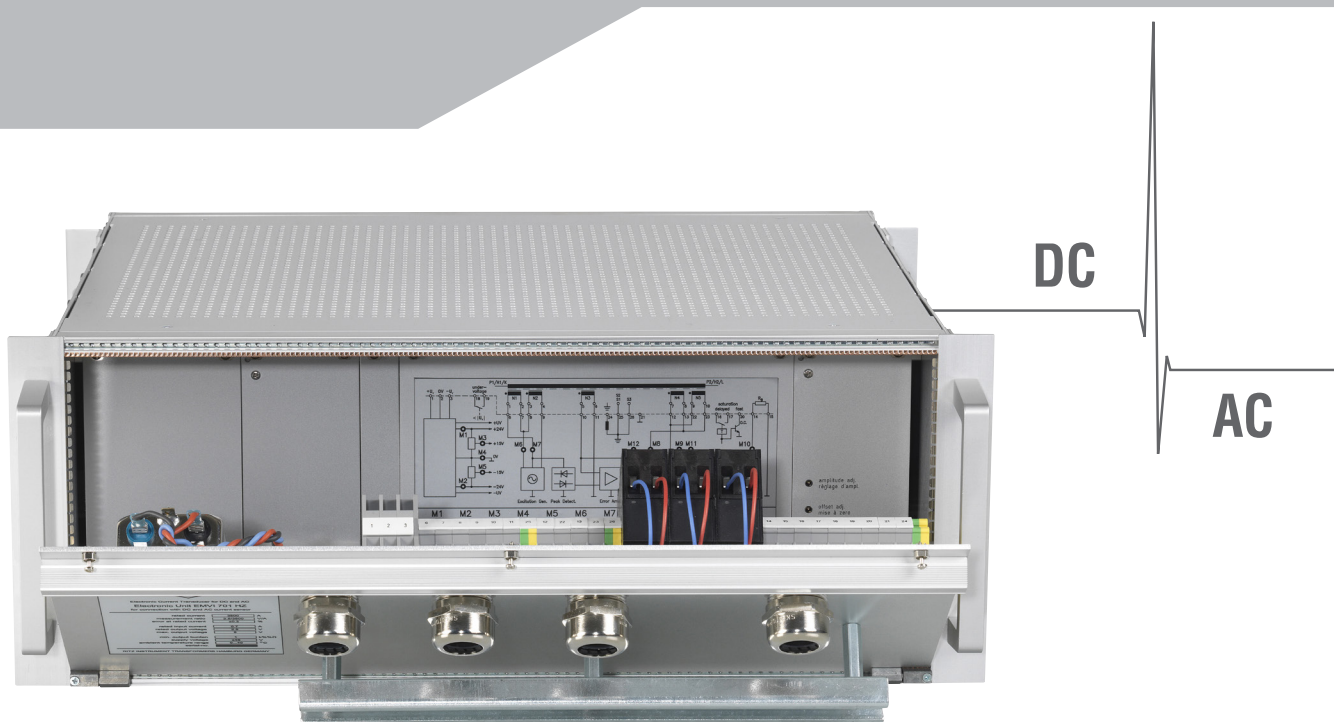




# ELECTRONIC CURRENT TRANSFORMER

## EMVI 7xx

*DC AND AC MEASURING SYSTEM BASED ON ZERO-FLUX PRINCIPLE*



- **High, Medium and Low Voltage Applications**
- **Direct, Alternating and Mixed Currents**
- **Long Distance Between Primary Sensor and Secondary Converter**



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## FEATURES

- High precision DC and AC measurements
- Voltage output - no external shunt necessary
- Saturation and undervoltage detection
- High electromagnetic compatibility (EMC)
- High overload capability

## APPLICATION

The electronic current transformer EMVI 7xx measures direct, alternating and mixed currents for e.g. metering, power quality analysis and protection purposes. Its area of application are high, medium and low voltage installations like Static VAR Compensators, back-to-back stations, DC links and HVDC power transmission systems.

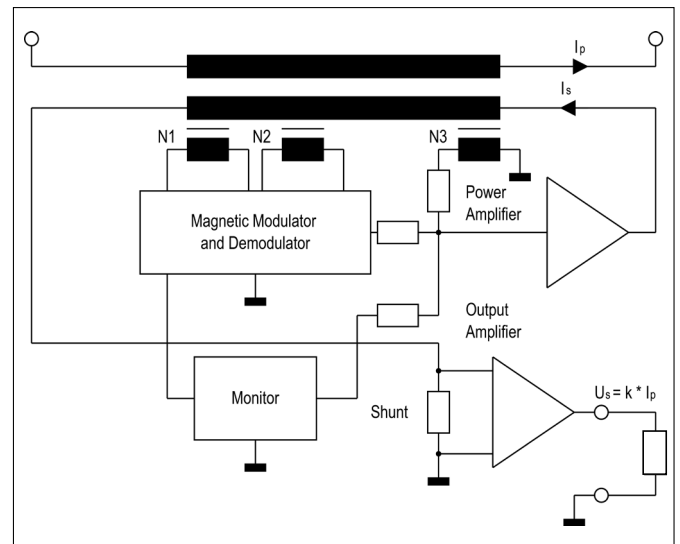
The EMVI 7xx is an alternative to conventional current transformers once the primary current contains DC components and/or higher frequencies.

## DESCRIPTION

The EMVI 7xx is a current measurement system based on the zero-flux principle. The magnetic field caused by the primary current  $I_p$  is compensated by an opposite field of the secondary current  $I_s$ . An electronic control circuit detects the residual field and minimizes it by adjusting  $I_s$ . The secondary current is thus an exact image of the primary current.

To obtain the secondary voltage  $U_s$ , a differential amplifier measures the voltage across a high precision, long-term stable shunt placed in the secondary control loop. The control unit consists of a magnetic modulator and demodulator circuit, a power amplifier and an output stage. Cores N1, N2 and N3 are used to detect the respective magnetic field conditions. The direct component is obtained by demodulating the excitation current of N1 and N2. N3 detects the alternating component of the residual magnetic field. Both signals are fed into the power amplifier, which generates the secondary current  $I_s$ . The operating point of the measuring device is set by the monitor unit. If the primary current is out of range and core saturation occurs, the operating point is re-established automatically as soon as the current returns to measurable values.

## SCHEMATIC CIRCUIT DIAGRAM EMVI 7XX



## TECHNICAL DATA

### General

Type	EMVI 7xx
Application	Metering, power quality analysis, protection purposes
Design	Current sensor, 19" subrack
Functional principle	Zero-flux
Standard	IEC 61869-6 / IEC 60044-8

### Versions <sup>(1)</sup>

EMVI 70x	$U_a$ without galvanic isolation
EMVI 71x	$U_a$ with galvanic isolation

### Electrical Data

#### Input <sup>(2)</sup>

Rated primary current	$I_{pr}$	$\pm 3500$ A
Max. continuous current		$\pm 4500$ A
Thermal current, 1 s		$\pm 63$ kA (peak)
Transient meas. limit		$\pm 14$ kA

#### Output <sup>(2)</sup>

Rated secondary voltage	$U_{sr}$	$\pm 2,5$ V
Max. secondary voltage	$U_{smax}$	$\pm 10$ V
Max. secondary current	$I_{smax}$	10 mA
Rated burden	$R_{br}$	20 k $\Omega$
Burden range	$R_b$	1 k $\Omega$ – $\infty$

#### Accuracy <sup>(2) (3)</sup>

Accuracy class, DC		0,1
Accuracy class, AC		0,2
Accuracy up to 1,5 kHz		$\pm 3$ %
Cutoff frequency (-3 dB)	$f_c$	10 kHz
Rated delay time	$t_{dr}$	< 20 $\mu$ s
Max. linearity error @ 0 – 1,2 $I_{pr}$		$\pm 0,1$ %
Max. linearity error @ 1,2 $I_{pr}$ – 3 $I_{pr}$		$\pm 1,5$ %
Max. linearity error @ 3 $I_{pr}$ – 5 $I_{pr}$		$\pm 10$ %
Max. offset error		< 250 $\mu$ V
Signal-to-noise ratio	SNR	68 dB

### Auxiliary Power Supply <sup>(2)</sup>

Aux. supply voltage	$U_a$	$\pm 48$ V (DC, EMVI 70x) 24 V (DC, EMVI 71x)
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### Current Sensor

#### Sensor Connection

Cable type	HK-FKAR-PIG 150/250 V or similar
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Cable length	up to 450 m
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#### Sensor Options

HV applications	on request
MV applications	GTDSFIE/GSOFE (cast resin insulated)
LV applications	LGSOE (cast resin insulated)

### Monitoring System

Detection	Supply voltage failures, sensor saturation
Delay time, on or off	$\leq 1$ s
Error indication	Relay status through relay contacts
Max. switching current	500 mA
Max. switching voltage	250 V (DC)

### Electrical Isolation

$U_p$ vs. $U_s$	see sensor data
$U_a$ vs. electronics (EMVI 71x)	2000 V (rms)

### Insulation level <sup>(2)</sup>

Highest voltage for equipment	$U_m$	14,5 kV
Power frequency withstand		50 kV (50 Hz, 1 min)
Lightning impulse withstand		125 kV (1,2/50 $\mu$ s)

### Service conditions

Climate conditions	3K5 (IEC 60721-3-3)
Operating temperature (electronics)	0 – 55 °C
Operating temperature (sensor)	-40 – 50 °C
Storage temperature	-40 – 80 °C

### Mechanical Data

Size (L x W x H, electronics)	483 x 370 x 177 mm
Weight (electronics)	approx. 16 kg

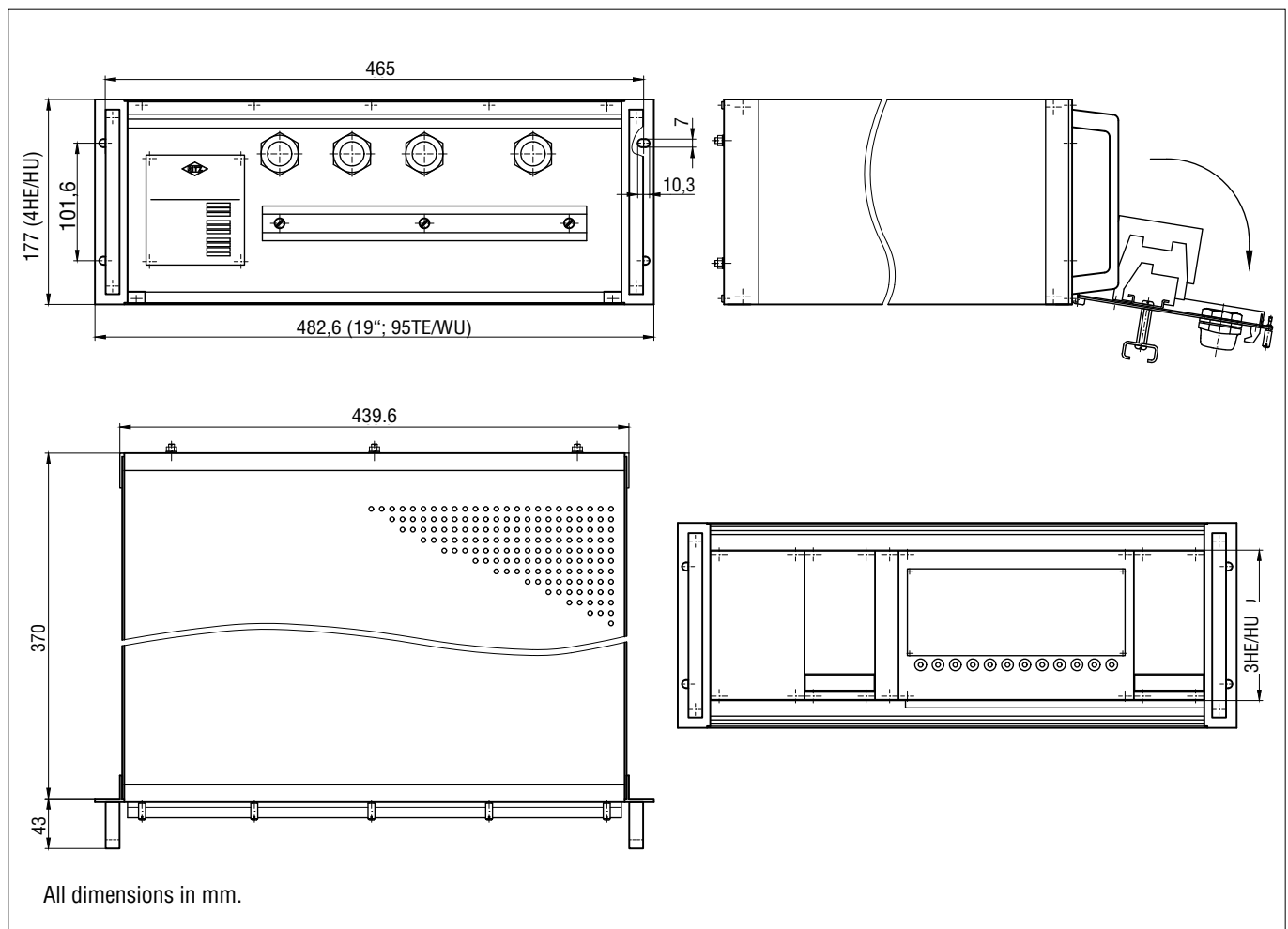
### NOTES:

(1) Both versions are available with one, two or four outputs

(2) Example value, other values on request

(3) The quoted error percentages refer to  $U_{sr}$

### OUTLINE DRAWING



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