



i ELM3704-0000 | 4-channel multi-functional input, 24 bit, 10 ksps

The EtherCAT Terminals from the ELM series were developed in order to enable the high-quality measurement of common electrical signals in the industrial environment. Flexibly usable measurement modules are especially useful in laboratory and testing technology environments. Therefore the ELM370x multifunction modules feature an input circuit that can be set to over 30 different types of electrical connection via EtherCAT: from voltages of $\pm 60\text{ V}$ to $\pm 20\text{ mV}$, thus supporting thermocouples and IEPE, a current of $\pm 20\text{ mA}$, a resistance measurement of $5\text{ k}\Omega$ and thus also temperature RTDs (PT100, etc.), measuring bridges and potentiometers, and all of this with a 2- to 6-wire connection, depending on the type. Thus, most electrical measuring tasks can be solved with just a single module. There is a choice of different connection types: The ELM3704-0001 with its high-quality LEMO connectors is mainly designed for laboratory use, where sensor configurations are changed on a daily basis, but a stable and reliable plug connection is nevertheless required. The 6-pin version with push-in (ELM3704-0000/ELM3702-0000) on the other hand is ideal for industrial use where a plug is unplugged less frequently for maintenance purposes and fast wiring is much more important.

The other ELM3x0x modules are price-optimised versions of the ELM370x universal module and thus ideal for use in machines with planned and foreseeable usage scenarios in which the measurement method of an analog input channel does not need to be changed at runtime. In return, they may have advanced features, like the ELM360x modules (IEPE evaluation), which offer a switchable feed.

Features	ELM370x
Strain gauge	quarter bridge ($350\ \Omega + 120\ \Omega$), half bridge ($\pm 16\text{ mV/V}$), full bridge ($\pm 32\text{ mV/V}$), internal bridge completion and supply adjustable $0 \dots 5\text{ V}$ (2-/3-/4-/5-/6-wire connection)
Voltage measurement	$\pm 60/30/10/5/2.5/1.25\text{ V}$, $\pm 640/320/160/80/40/20\text{ mV}$, $0 \dots 5/10\text{ V}$ (2-wire connection)
Current measurement	$\pm 20\text{ mA}$, $0/4 \dots 20\text{ mA}$, NAMUR NE43 (2-wire connection)
IEPE measurement	current feed 2 mA , acquisition of the modulated AC voltage, AC/DC coupling (parameterisable high-pass)
Potentiometer measurement	potentiometer $\geq 1\text{ k}\Omega$, supply integrated and adjustable $0 \dots 5\text{ V}$
Resistance measurement	$0 \dots 5\text{ k}\Omega$ (2-/3-/4-wire connection)
Temperature measurement (RTD)	PT100, PT200, PT500, PT1000, Ni100, Ni120, Ni1000, diverse KT/KTY (types see documentation) (2-/3-/4-wire connection)
Temperature measurement (thermocouple)	type K, J, L, E, T, N, U, B, R, S, C; internal cold junction measurement (2-wire connection)

Technical data	ELM3704-0000
Number of channels	4
Technology	multi-function
Signal type	differential
Connection technology	2-/3-/4-/5-/6-wire
Connection type	push-in, service plug 6-pin
Max. sampling rate	max. $100\ \mu\text{s}/10\text{ ksps}$ (per channel, simultaneously)
Oversampling factor	$n = 1 \dots 100$ selectable (max. 10 ksamples/s)
Internal resistance	$> 500\text{ k}\Omega$ (30 V); $> 4\text{ M}\Omega$ (others); $150\ \Omega$ (current)
Measuring error	typ. $\pm 100\text{ ppm}/\pm 0.01\%$ relative to the respective full scale value @ $23\text{ }^\circ\text{C}$ in some measuring ranges, see documentation
Temperature coefficient	typ. $< 10\text{ ppm/K}$ in some measuring ranges, see documentation
Functional diagnostics	yes
Connection diagnostics	broken wire/short-circuit
Distributed clocks	yes, accuracy $\ll 1\ \mu\text{s}$
Current consumption power contacts	–

Current consumption E-bus	typ. 400 mA
Weight	approx. 350 g
Operating/storage temperature	0...+55 °C/-25...+85 °C
Thermal dissipation	typ. 3 W
Special features	ExtendedRange 107 %, free numeric filter, TrueRMS, integrator/differentiator, non-linear scaling, PeakHold
Approvals/markings	CE, UL

Accessories	
ZS9100-0002	shield connection for ELM series, shield diameter 7...16 mm
ZS9100-0003	shielding hood for EtherCAT measurement modules with push-in connector (ELM3xxx-0000), to provide shielding against external interference and temperature stabilisation at the measuring points when measuring temperature; black, scope of supply: shielding hood, screws, tie wraps

i Product announcement	estimated market release 2nd quarter 2019
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