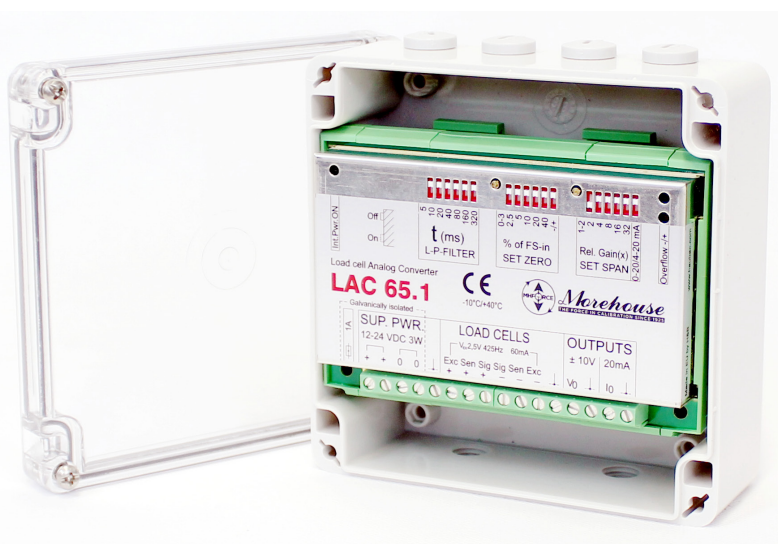


# Operation and Instruction Manual

## Load Cell Amplifier for Controllers (LAC)



## General Specifications

### Scope:

The Load Cell Amplifier Controller is a highly reliable device that can link analog transducers to various analog equipment. The LAC produces voltage and current loop outputs, allowing a wide range of filter, offset, and gain settings to suit any industrial application. Because of the AC load cell excitation and the galvanically isolated power supply, the LAC rejects unwanted influences and disturbances better than any comparable device. These features and the ratiometric design (including the add-on optional modules) ensure high accuracy and reliability.

### Analog input:

Up to six load cells (each  $>350\Omega$ ) may be connected. The low load cell supply voltage (2.5 VAC) minimizes warm-up errors. The AC load cell supply (425 Hz carrier), ratiometric voltage loop design, and sense inputs allow long load cell cables ( $>10$  m) to be used even in electrically hostile environments.

### Low pass filter:

Sixty-four steps of filter settings ranging from 0.25 to 32 Hz can be selected.

### Off-set:

Positive and negative compensation ( $\pm 80\%$  FS) can be set in 32 steps and fine trimmed.

### Gain:

It can be set in 32 steps and fine-trimmed over the range of 1-64x. LED lamps show over- or under-range signals.

### Output:

Both voltage output (0 -  $\pm 10$  VDC) and current loop output (0 - 20 mA or 4 - 20 mA) are produced by load cell signals over the range 0 -  $\pm 0.17$  mV/V up to 0 -  $\pm 3.3$  mV/V FS as required. Even load cell signals over the range 0 -  $\pm 0.08$  mV/V up to 0 -  $\pm 0.017$  mV/V FS can be accommodated by removing an internal zero  $\Omega$  resistor.

### Module output:

A ratiometric analog output is available at a connector on the side of the LAC. The module output provides signal, reference and supply voltages for up to four optional add-on modules connected in line.

### Set points:

The optional add-on module (part no. 65.200) comprises two set-points isolated C-form contact reed-relay outputs. Four modules can be arranged in a line to give up to 8 setpoints.

### Power supply:

The power supply can be any regulated source 12-24 VDC +10/-15% max. 3 Watt. Galvanic isolation of the power supply from the input/output terminals is provided.

### Mechanics:

The basic LAC is composed of a PC Board measuring 110 x 72 x 16 mm, including the row of 16 terminal blocks (5.08 mm spacing) and EMI-protecting chassis. The LAC is supplied in a 112.5 mm long, standard Phoenix<sup>TM</sup> module UMK allowing any standard DIN-rail mountings. If add-on modules are required, a UMK-BE 45 mm standard element is added per module. The LAC can also be wall-mounted directly.

### Low pass filter:

By combining the six DIP-switches the low-pass filter time constant can be set in 64 steps of 10 ms over the range 5 to 640 ms equivalent to 45 ms to 5.8 s settling time.

**Low Pass Filter**

DIP-switches ON		None	1	2	3	4	5	6	All
Time constant $\tau$	ms	5	10	20	40	80	160	320	640
Settling to $\approx 0.01\%$	ms	45	90	180	360	720	1440	2880	5760
Cut off frequency	Hz	32	16	8	4	2	1	0.5	0.25

### Zero set:

The six DIP-switches permit the off-set to be coarsely set in steps of 2.5% of 3.2 mV/VIN over the range + or - 80%. The 25 turn pot-meter permits trimming to <0.002%.

**Zero Set**

DIP-switches ON		Pot.	None	1	2	3	4	5	All	Pol.
Relative off-set	%	0 - 3	0	2.5	5	10	20	40	80	+/-
Input at 0V <sub>OUT</sub>	mV/V	0 - 0.1	0	0.08	0.15	0.3	0.6	1.2	2.4	+/-

### Gain:

The five DIP-switches permit the relative gain factor to be set in steps of 2 over the range 1 to 64 (Optionally 64 to 128). The 25 turn pot-meter permit trimming to any gain factor  $<0.001x$ . The  $I_{OUT}$  range can be set to 0-20 mA or 4-20 mA .

Gain										
DIP-switches ON		Pot.	None	1	2	3	4	5	All	$I_{OUT}$ range
Rel. gain factor	f	1 - 2 x	1 x	2 x	4 x	8 x	16 x	32 x	64 x	0 - 20 or
Input at $10V_{OUT}$	mV/V	-	$>3.3$	2.7	1.8	1.1	0.6	0.3	0.17	4 - 20 mA

## Technical Data

The LAC meets the CE regulations regarding EMI and EMR and the relevant parts of EN45501 for weighing scales in precision class (III).

Specifications	Load Cell Amplifier for Controllers	
	Model: LAC 65.1	Notes
<b>Load Cell Input</b>		
Excitation voltage :	2.5 VAC 425 Hz	≤60 mA
Input off-set range for 0 V <sub>OUT</sub>	0 - ± 2.6 mV/V	
Standard input gain range for 10 V <sub>OUT</sub>	0.17 - > 3.3 mV/V	
Optional input gain range for 10 V <sub>OUT</sub>	0.08 - 0.17 mV/V	
Input signal resolution	≈50 nV	
<b>Analog Output</b>		
Voltage output (V <sub>OUT</sub> )	± 10 VDC	R <sub>L</sub> ≥ 500Ω
Current loop output (I <sub>OUT</sub> )	0 - 20 mA or 4 - 20 mA	R <sub>L</sub> ≥ 500Ω
<b>Output Tracking</b>		
Off-set deviation between V <sub>OUT</sub> and I <sub>OUT</sub>	<2% FS.	
Gain deviation between V <sub>OUT</sub> and I <sub>OUT</sub> :	<2% FS.	
<b>Linearity</b>		
Max deviation 0 - Full scale	<50 ppm FS.	
<b>Influences</b>		
Drift 5 min. upon power ON	<20 ppm FS.	
Approved temperature range	-10°C to +40°C.	
Storage temperature range	-20°C to +60°C.	
Temperature effect on Off-set	<30 ppm/°C.	(Average)
Temperature effect on Gain	<15 ppm/°C.	(Average)
<b>Rejects</b>		
EMI (26-1000 MHz) at field strength	>10 V/m	(level 3)
Burst (Transients) to meet	IEC 801-4	(level 2)
Electrostatic discharge to meet	IEC 801-2	(level 3)
Mechanical protected to meet	IP 40	DIN 40 050
<b>Power Supply</b>		
Regulated DC source	12 - 24 VDC ≤ 3 Watt	+10/ -15%
Isolation between Power source and LAC	>10 M Ω	<1 nF
Permitted voltage on Power source		>0.5 kV

The technical data given here are typical values serving as product descriptions only and must not be interpreted as guaranteed characteristics in legal sense.

**NOTE:** Do not apply capacitors over any of the load cell wires. Even small capacitors will affect the signal voltage wave form leading to measuring errors.