CL 460 Multi-channel data logger for strain gauges

- simultaneous measurement with multiple strain gauge sensors
- from 2 up to 16 strain gauge inputs
- up to 7 parameter memory banks
- optional 4 or 8 binary inputs
- optional 4 or 8 relay outputs
- USB connection

Product overview

The CL460 is designed for simultaneous, precise measurement and recording of physical quantities processed into electrical signals via strain gauge bridges, full bridge, strain gauges in the quarter-circle or half-bridge or transducers with 4 ÷ 20 mA current output) in multiple channels. For measurements with strain gauges in the quarter-circle or half-bridge, adapters are required, built-in plugs for individual channels, dedicated for strain gauges with a specific resistance (typically 120Ω or 350Ω).

The results of the measurements are shown on the OLED display. Recorded waveforms are stored on an internal SD memory card. The CL460 has a USB connection that allows you to send recorded waveforms to your computer. In addition, the data logger can be equipped with an RS485 interface supporting the MODBUS RTU protocol. Optionally, the CL460 can have four or eight binary inputs (short circuit to ground) and four or eight relay outputs (with electronic relays) with user defined functions. The data logger is controlled by the program, which parameters can be modified also via USB. These parameters are written in non-volatile memory type EEPROM - switching off the power supply does not cause loss of data. Programmable measuring procedures for measured values allow for averaging measurements, sensor nonlinearity correction, and relay output control.

## Program CL460_PARAM.EXE for communication with the CL460

CL460_PARAM allows to store the parameters of the CL460 in any subdirectory on the computer disk - Parameter files have extension 460. In addition, parameters of the CL460 can be saved in text files (extension TXT). Parameters from any file (with extension 460) can be re-saved in the CL460. CL460_PARAM records waveforms (read from CL460) in text files (TXT extension). These files can be easily loaded into any spreadsheet.

Reare plate of CL 460
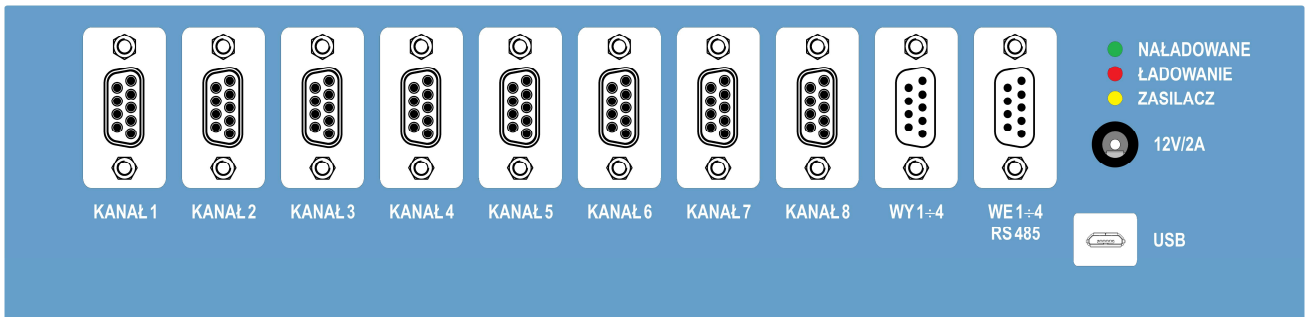
Reare plate CL460 basic version (from 2 up to 8 channels)
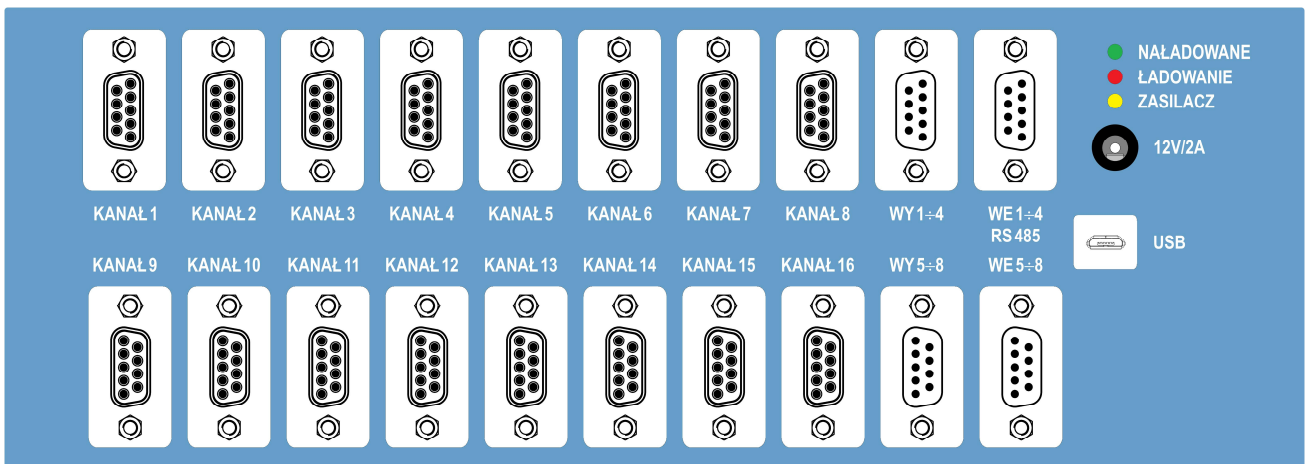
Reare plate CL460 full version (up to 16 channels)

Specification

Analog inputs	from 2 to 16 (strain gauge or current 4÷20 mA)
Parameter memory banks	up to 7
Power supply of strain gauges	5,0Vdc (±0,2V) max. 50 mA or 1mA DC (±2%)
Strain gauge resistance	minimum 110Ω maximum 4000Ω
Strain gauge sensitivity	0,5÷92mV/V
Strain gauge resistance in the quarter-circle	minimum 110Ω, maxiimum 4000Ω, typical: 120Ω or 350Ω Each channel requires a quarter adapter (designed for co-operation with strain gauges with one resistance value)
Unit for measurements in the quarter-circle	μm/m
Resolution in the quarter-circle	1 μm/m
Input resistance of the channel configured for current measurement	110÷160Ω
Current measurement range	2,5÷28 mA
Maximum cable length for sensors	< 30,0 meters
Modes of operation of analog-to-digital converters	normal or drift minimization
Sampling frequency	from 1,25 to 2400 samples per second (simultaneous measurement in all channels)

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Resulting time for sudden change of measured signal	4 samples for sinc^4 filter by normal mode, 3 samples for sinc^3 filter by normal mode, 2 samples by drift minimization drift
Resolution of analog-to-digital converters	24 bits
Measurement resolution	2000 plots fot sensor sensitivity 0,5mV/V and maximum measurement speed 50000 plots fot sensor sensitivity 0,5mV/V and minimum measurement speed 4000 plots fot sensor sensitivity 1mV/V and maximum measurement speed 100000 plots fot sensor sensitivity 1mV/V and minimum measurement speed 8000 plots fot sensor sensitivity 2mV/V (or for current measurement) and maximum measurement speed 200000 plots fot sensor sensitivity 2mV/V (or for current measurement) and minimum measurement speed
Measurement error (by 300K)	< 0,0025% (in relation to the full scale)
Temperature measurement error	< 0,015%/10K (in relation to the full scale)
Long-term measurement error	< 0,010%/1000h (in relation to the full scale)
Additional measurement averaging (optional)	from 2 to 32 samples in a moving time window
Nonlinear sensor correction (for full bridge)	up to 14 points
Units displayed	arbitrary (max 5 characters) - entered when entering the parameters of the logger
Start recording the measurement	immediate or after the start level of the recording in selected analog channels, or by slope on selected binary inputs
Completion of measurement recording	by hand or by slope on selected binary inputs
Recording of samples to memory during registration	continuous with the declared sampling rate or write step or save the sample to memory pressing the PROG key or the external button
Display update time	0,2 s
Taring	0÷100% of nominal value
Display	OLED, yellow, 2 lines of 16 alphanumeric characters
Character height	8,9 mm
Maximum indication	±999999
Acoustic signaling	beeper
Memory of recorded waveforms	non-volatile (built-in SD card)
Maximum number of stored waveforms (measurements)	1023
Maximum number of memory samples (limited by SD card capacity)	14531961 for 16 channels 27449260 for 8 channels 49408668 for 4 channels
Binary inputs *(optional)*	4 or 8 - pulled up to 3.3V by R> 10kΩ
Voltage on the undense input	3,3V
Input current dense to ground	< 0,35mA
Low voltage (short circuit)	< 0,5V
High voltage (undense)	> 2,0V
Relay outputs *(optional)*	4 lor 8

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Relay outputs type	C-NO (electronic)
Maximum voltage on relay	50Vdc, 50VAC (amplitude)
Maximum load current	400mA
Active relay resistance	< 2,5Ω
Switched off relay leakage	< 1μA
Time to turn on the relay	< 2,5ms
Time to turn off the relay	< 0,2ms
Types of comparisons	upper alarm, lower alarm, alarm in the interval, alarm outside the interval
Insulation voltage for relays	> 100 V AC
PC connector	USB 2.0
Socket	microUSB type B
Read rate of recorded waveforms via USB	ca. 3 MB/s
Additional serial link (option)	RS485 – MODBUS RTU – slave
Transmission speed	1200, 2400, 4800, 9600, 19200, 38400, 76800
Real time clock	built-in with its own power back up
Power	built-in 8V / 3Ah lithium-ion battery pack
Power consumption	< 500 mA in active state (for 16 channels with strain gauges 350Ω < 300 mA in active state (for 16 channels with strain gauges 350Ω max. 0,1 mA in the off state
Working time between charges	> 5 h (for 16 channels with strain gauges 350Ω) > 8 h (for 8 channels with strain gauges 350Ω)
Battery charging time	to 5 h
Battery charger	external stabilized 12V/min. 2A
Overal dimensions	basic version: 274mm × 72mm × 130mm (szer.×wys.×głęb.) full version: 274mm × 102mm × 130mm (szer.×wys.×głęb.)
Weight	basic version: max. 2,57 kg full version: max. 3,42 kg
Operating temperature range	253K to 323K (-20°C to +50°C)
Relative humidity	20÷80%
Protected	IP40

The factory equipment includes:

1. Data logger CL460	1 piece
2. USB cable	1 piece
3. Battery charger 12V/2A	1 piece
4. Program CL460_PARAM.	1 piece
5. User manual for the data logger and for the program CL460_PARAM.	1 piece
6. Warranty card	1 piece

CL460 possible configurations

Depending on the number of channels and inputs and outputs, the CL460 recorder options are marked as follows:

CL460-Ka-Wb-Pc

where:

a – number of measuring channels (2 to 16),

b – binary inputs and RS485:

  0 – no binary inputs and no RS485 (default),

  4 – 4 binary inputs and one RS485,

  8 – 8 binary inputs and one RS485.

c – relay outputs:

  0 – no relay outputs (default),

  4 – 4 relay outputs,

  8 – 8 relay outputs.

For the number of channels above eight or for eight digital inputs or for eight relay outputs, the data logger is mounted in a full version. It's possible to adapt any measuring channel to current signals 4 ÷ 20 mA (load resistance 110Ω).

Specify the channel numbers to work with sensors with current output 4 ÷ 20 mA - also specify parameters for calibration of these channels (value indicated for 4 mA, value indicated for 20 mA and resolution) by ordering. In the case of ordering quarter-end adapters, specify for each adapter the resistance of the strain gauge to be attached to it.

At customer's request CL460 can be adapted for continuous operation with 230 V AC supply. In this case, the battery is not installed in the data logger, and an external stabilized AC adapter (transformer) is supplied instead of the battery charger with a voltage of 7.5 V and a current of 1.4 A.