



## Flow Analysis System (Models ER180F and ER181F)



- Turns a PC into a FIA data workstation
- No programming required – just plug and play
- Collect signals from one or two\* detectors
- Independently selectable input gains  $\pm 10$  mV to  $\pm 10$  V
- Digital signal processing gives superior signal-to-noise ratio
- TTL or contact closure for triggering\* autosamplers etc.

### Description

The Flow Analysis System is ideal for collection and analysis of data from flow injection analysis (FIA) and similar experiments.

Signals can be recorded from one or two\* detectors with analog voltage 'recorder' or 'integrator' outputs. Many brands and models of detectors are suitable.

### Hardware

The ER180F has two analog input channels, and has analog and digital outputs. The ER181F has one analog input channel and has no analog/digital outputs.

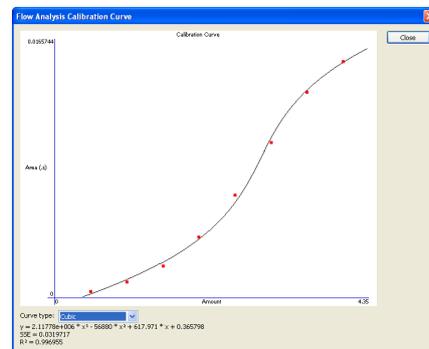
The signals are recorded using a 24 bit sigma-delta convertor with 32 bit internal number handling, on any of the gain ranges selected. Thus you signals will be recorded well beyond the inherent resolution of your detectors.

The system comprises of a hardware unit and Chart® software. Power and interfacing are provided by USB connection to the computer. Detectors and other accessories are connected via a simple screw terminal strip.

A trigger input is available. The ER180F also includes four electrically isolated contact closure controls for controlling external devices.



Peaks automatically detected and displayed in Flow Analysis window



### Software

Chart software, along with the FIA and Event Manager Chart extensions, are included with every Flow Analysis System. It is compatible with Windows XP or later computers. The FIA Chart extension adds FIA signal analysis functionality to Chart, whilst Event Manager is used to switch external equipment on and off via the hardware's digital outputs.

The FIA Chart extension automatically recognizes peaks and these can be assigned as 'Calibration', 'Sample' or 'Excluded'. Manual adjustment of the peak position and selection of new peaks is also possible.

The ER18X hardware can also be used with optional ES280 PowerChrom software for collecting and analyzing chromatography data, and ES500 Chart software for general purpose data recording.

\* for the ER180F only



PowerChrom 180 front and back panels

Instrument Connection Port

USB port & power

## Specifications

Analog Inputs																					
Number of input channels:	2 (for ER180F) and 1 (for ER181F)																				
Input configuration:	Single-ended or differential																				
Range settings:	$\pm 10$ , $\pm 5$ , $\pm 2$ , $\pm 1$ V $\pm 500$ , $\pm 200$ , $\pm 100$ , $\pm 50$ , $\pm 20$ , $\pm 10$ mV																				
Maximum input voltage:	$\pm 35$ V																				
Input impedance:	$\sim 2$ M $\Omega$ differential input $\sim 1$ M $\Omega$ to common																				
Low pass antialias filter:	500 Hz, 3rd order Bessel																				
DC offset:	$< \pm 0.5$ mV/ $^{\circ}$ C after 5 minute warm up																				
DC drift:	$< 0.5$ $\mu$ V/ $^{\circ}$ C RTI (typical)																				
CMRR (differential):	better than $-106$ dB @ 1 Hz better than $-140$ dB @ 50 or 60 Hz																				
Channel crosstalk:	better than $-140$ dB @ 100 Hz																				
Noise (rms):	<table border="1"> <thead> <tr> <th>Range</th> <th>@1 /s</th> <th>@10 /s</th> <th>@100 /s</th> </tr> </thead> <tbody> <tr> <td>10 V</td> <td>10 <math>\mu</math>V</td> <td>20 <math>\mu</math>V</td> <td>50 <math>\mu</math>V</td> </tr> <tr> <td>1 V</td> <td>1 <math>\mu</math>V</td> <td>2 <math>\mu</math>V</td> <td>5 <math>\mu</math>V</td> </tr> <tr> <td>100 mV</td> <td>0.1 <math>\mu</math>V</td> <td>0.2 <math>\mu</math>V</td> <td>0.5 <math>\mu</math>V</td> </tr> <tr> <td>10 mV</td> <td>0.1 <math>\mu</math>V</td> <td>0.2 <math>\mu</math>V</td> <td>0.5 <math>\mu</math>V</td> </tr> </tbody> </table>	Range	@1 /s	@10 /s	@100 /s	10 V	10 $\mu$ V	20 $\mu$ V	50 $\mu$ V	1 V	1 $\mu$ V	2 $\mu$ V	5 $\mu$ V	100 mV	0.1 $\mu$ V	0.2 $\mu$ V	0.5 $\mu$ V	10 mV	0.1 $\mu$ V	0.2 $\mu$ V	0.5 $\mu$ V
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Sampling																					
ADC resolution:	24 bit sigma-delta converter																				
System resolution:	1 nV																				
Sampling rates:	1/min to 2000/s (Chart/Scope software)																				
Microprocessor and Data Communication																					
CPU:	MicroChip PIC32MX695F512H																				
Data communication:	USB 2.0 or 1.1 compliant																				

## Pin Out Specification

Pin	Name	Function	Pin	Name	Function
1	TRIG+	Contact closure or TTL	11	CTL1+	Contact closure 1
2	TRIG-	Contact closure or COM	12	CTL1-	Contact closure 1
3	CH1+	Detector 1, signal +	13	CTL1+	Contact closure 2
4	COM	Common	14	CTL1-	Contact closure 2
5	CH1-	Detector 1, signal -	15	CTL1+	Contact closure 3
6	CH2+	Detector 2, signal +	16	CTL1-	Contact closure 3
7	COM	Common	17	CTL1+	Contact closure 4
8	CH2-	Detector 2, signal -	18	CTL1-	Contact closure 4
9	DAC+	Analog output ( $< \pm 10$ V)	19	Aux 1	Reserved for testing
10	COM	Common	20	Aux 2	Reserved for testing

For the ER181R, pins 6 to 20 have no function. Do NOT use.

Output Amplifier	
Output configuration:	Single-ended
Maximum output:	10 V @ 5 mA
Output impedance:	0.1 $\Omega$ typical
Output range:	$\pm 10$ V
Output resolution:	16 bits (0.3125 mV)
Instrument Connection Port	
Type:	20 pin male connector, 3.5 mm spacing. Screw terminal adaptor supplied.
Trigger	
Trigger input signal:	CC or TTL, non isolated.
TTL:	High: 4 V (7 V maximum) Low: 0.5 V. Active low.
Contact closure resistance:	$< 100$ $\Omega$
Digital Output Controls (ER180F only)	
Outputs:	4 contact closures, optically isolated
Maximum switching:	50 mA @ 50 V
On resistance:	20 $\Omega$
Physical Configuration	
Dimensions (w x h x d):	130 x 35 x 170 mm
Weight:	0.5 kg
Power Requirements:	USB compatible (cable supplied)
Operating conditions:	0 to 35 $^{\circ}$ C 0 to 90% humidity (non-condensing)
<i>eDAQ Pty Ltd reserves the right to alter these specifications at any time.</i>	

## Ordering

The Flow Analysis Systems include the ER18X recording hardware unit and PowerChrom software.

The ER18X hardware is available in six configurations:

- ER180R, ER181R: for chromatography data, includes PowerChrom software.
- ER180C, ER181C: for general purpose data recording, includes Chart software.
- ER180F, ER181F: for flow injection analysis data, includes Chart software and FIA/Event Manager extensions.