BX8 Operating Manual

15-247 Rev A

Introduction

- Eight full bridges provide mV/V input on 8 independent channels.
- Communication interfaces such as USB port, EtherCAT, RS232 or CANbus are available. Does not support RS-485.
- The device has 8 configurable analog outputs (±10 V and 4-20 mA among others). UART interface serves to control the measuring amplifier via the Raspberry PI (not for versions with EtherCat).
- There are three common types of the BX8.
  - AS, HD15 and HD44. Each have their own Input/Output connectors.
- 8-channel measuring amplifier
- 8x input configurable
  - full, half, quarter bridges, 120- 350- 1000 Ohm, PT1000, ±10V
- Outputs
  - 1x USB Port, 8x Analog output ±10V, 4-20mA configurable, 1x UART, alternatively EtherCat, CANbus/CANopen
- 16x Digital in- and output
- 5x Galvanic isolation: analog-input, analog-output, digital-I/O, UART, USB
- 8x 48kS/s Simultaneous sampling
- 6-wire technology, bridge supply 2.5V, 5.0V, 8.75V configurable
- Automatic configuration of analog and digital filters by specifying the data frequency
- Additional Digital Filters IIR 4th order and FIR 14th order individually configurable
- Step response of the filter configuration available (with PC software)
- Resolution < 20 nV/V
- Versions to connect 1-axis and 3- and 6-axis sensors
- Autonomous calculation of 3 forces and moments of six-axis sensors Two operating hours counters
- Sensors with TEDS supported (readable and writable) Integration of a Raspberry PI in the housing cover of the BX8-AS

Scope

- To ensure the correct installation of BlueDAQ software.
- To ensure the correct installation of the 6 Axis Load Cell to the BX8 Instrumentation to communicate with BlueDAQ.

Abbreviations	
DAQ	Data Acquisition
EXC	Excitation
SIG	Signal
PWR	Power

Description

The 8-channel measuring amplifier BX8 is characterized by particularly high resolution at data frequencies of 1 Hz to 48000 Hz. The 8 channels are acquired simultaneously.

Versions

Type	Sensor Input	Signal-Output
BX8-HD15	8x SubD15HD	1xUSB, UART, Analog, Digital-I/O
BX8-HD15-EC	8x SubD15HD	1xUSB, EtherCat, Analog, Digital-I/O
BX8-HD15-CAN	8x SubD15HD	1xUSB, UART, CAN, Analog, Digital-I/O
BX8-HD44	4x SubD44HD	1xUSB, UART, Analog, Digital-I/O
BX8-HD44-EC	4x SubD44HD	1xUSB, EtherCat, Analog, Digital-I/O
BX8-HD44-CAN	4x SubD44HD	1xUSB, UART, CAN, Analog, Digital-I/O
BX8-AS	1x 24pol M16, screw terminal	1xUSB, UART, Analog, Digital-I/O
BX8-AS-EC	1x 24pol M16, screw terminal	1xUSB, EtherCat, Analog, Digital-I/O
BX8-AS-CAN	1x 24pol M16, screw terminal	1xUSB, UART, CAN, Analog, Digital-I/O
BX8-AS PI-3	1x 24pol M16, screw terminal	like BX8-AS, but with Raspberry PI

Interfaces

Communication interfaces such as USB port or EtherCAT or CANbus are available. The device has 8 configurable analog outputs (±10 V and 4-20 mA among others). UART interface serves to control the measuring amplifier via the Raspberry PI (not for versions with EtherCat).

The interface protocol of USB and UART is identical and described in a separate documentation. The fieldbus protocols EtherCAT and CANopen are standardized in the lower protocol layers and the application layer is described in separate documents.

Software

The Windows programs BlueDAQ multichannel with graphical user interface and the console terminal program BlueDAQ are suitable. A Windows function library (MEGSV8w32.dll) with commented C header is available for self-programming users and a LabVIEW library with wrapper VIs for this DLL for programming with LabVIEW ©.

Features

There are 8 analog inputs available. They are individually configurable as:

– Strain gauge input for full bridges in 4 and 6 wire technology or

– Strain gauge input for half bridges or

– Strain gauge input for quarter bridges 120 ohm, 350 ohm, 1 kOhm or

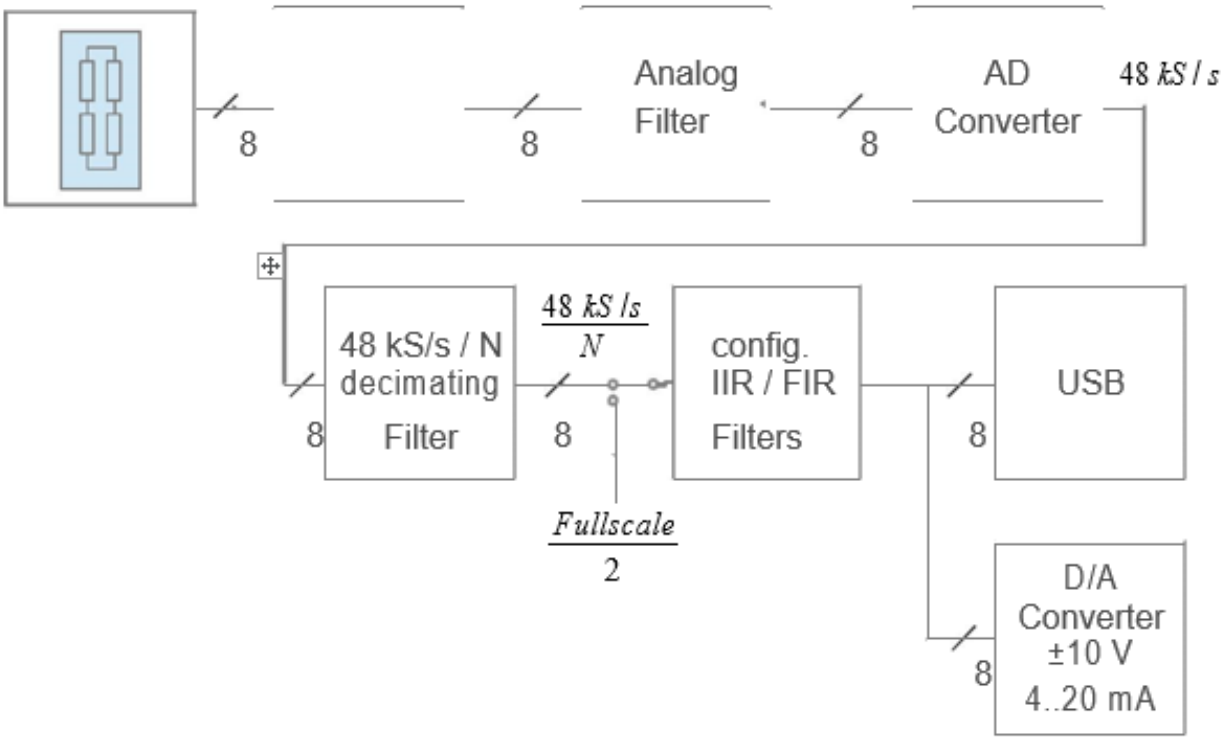
– Single-ended input ±10 V or

– Input for PT1000 temperature sensor

The strain gauge supply voltage can be switched between 8.75 V, 5.00 V and 2.5 V, assigned to input sensitivities 2 mV/V, 3.5 mV/V or 7 mV/V.

Bridge supply voltage	Resulting input sensitivity
8.75 V	2 mV/V
5 V	3.5 mV/V
2.5 V	7 mV/V

Signal Flow


8
8
Analog
Filter
8
AD
Converter
48 kS / s
48 kS/s / N
decimating
Filter
8
48 kS /s
N
8
config.
IIR / FIR
Filters
8
USB
Fullscale
2
D/A
Converter
±10 V
4..20 mA
8

Galvanic isolation

The supply voltage UB+ / 0V is galvanically isolated from the modules for

✓ analog input
✓ analog output

UB+	Supply voltage 12...28V DC
UB-	Ground Supply voltage
GNDE	Ground analog-input
-Us	Negative bridge supply
GNDA	Ground analog-output
GNDD	Ground digital input / output
GNDU	Ground UART port („Raspberry PI Port“)
GNDR	Ground RS232 port (only BX8-AS)

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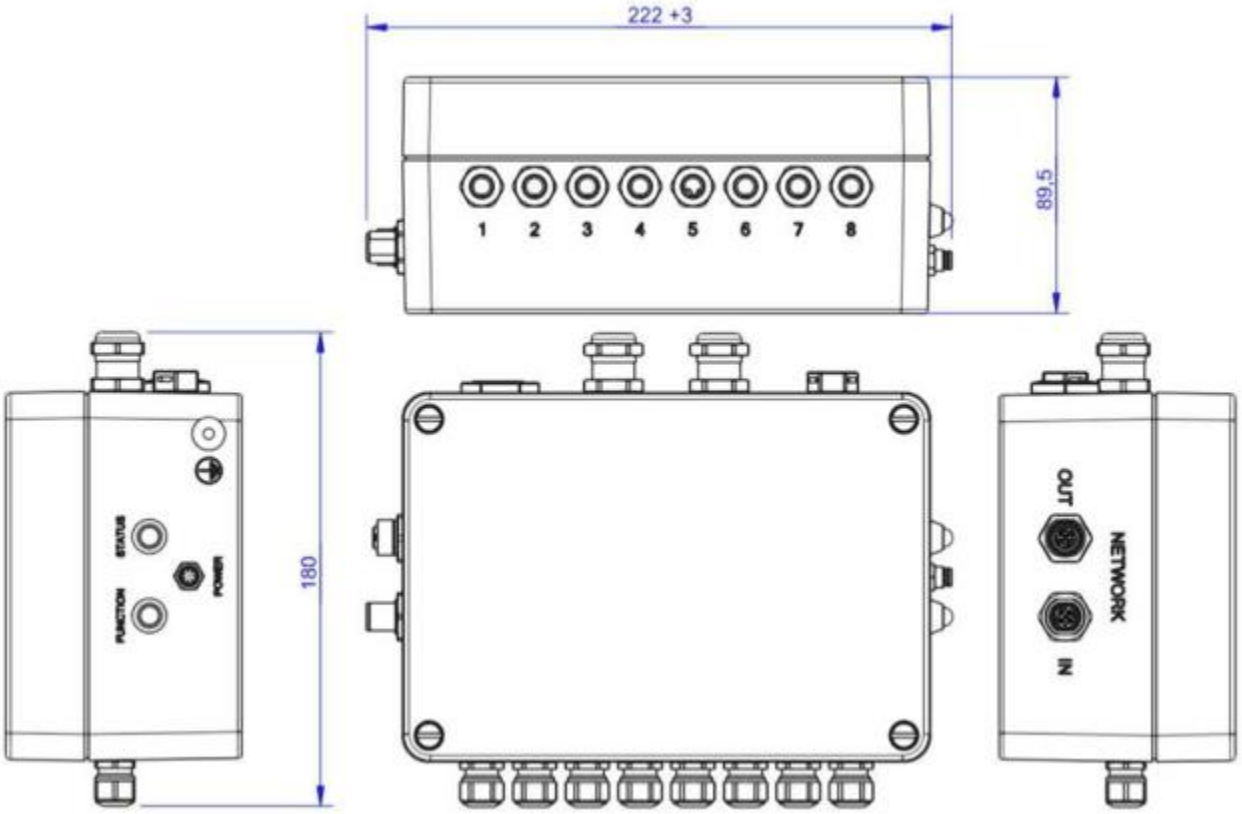
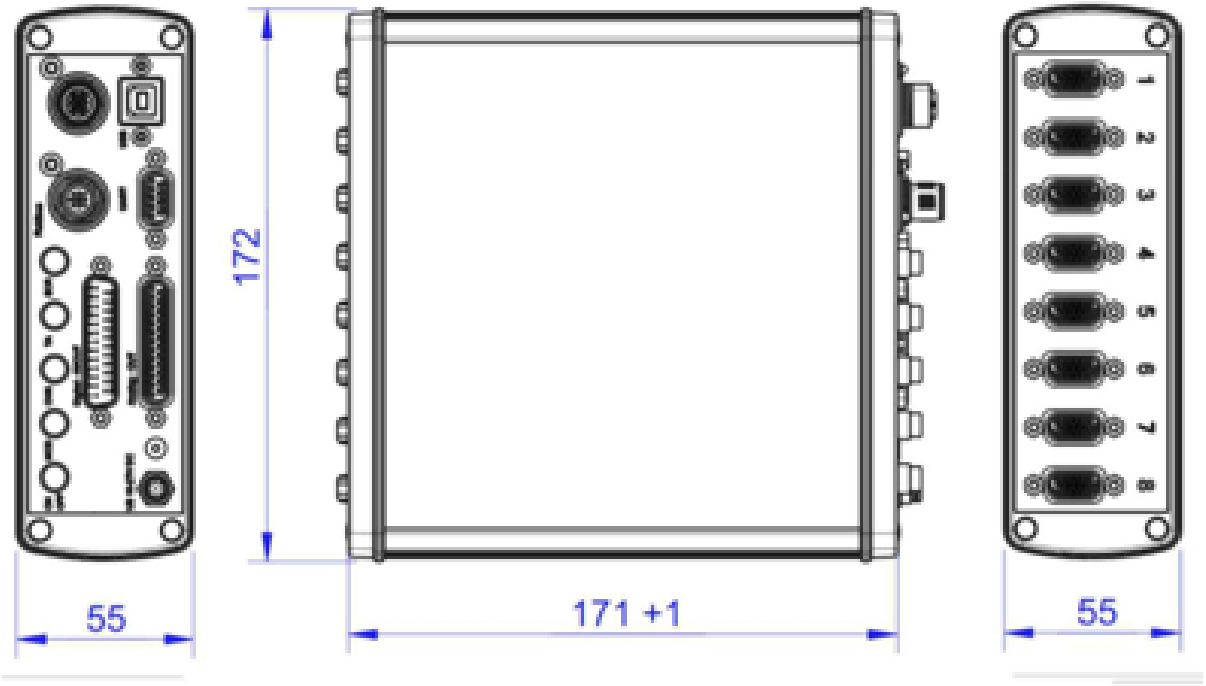
Dimensions

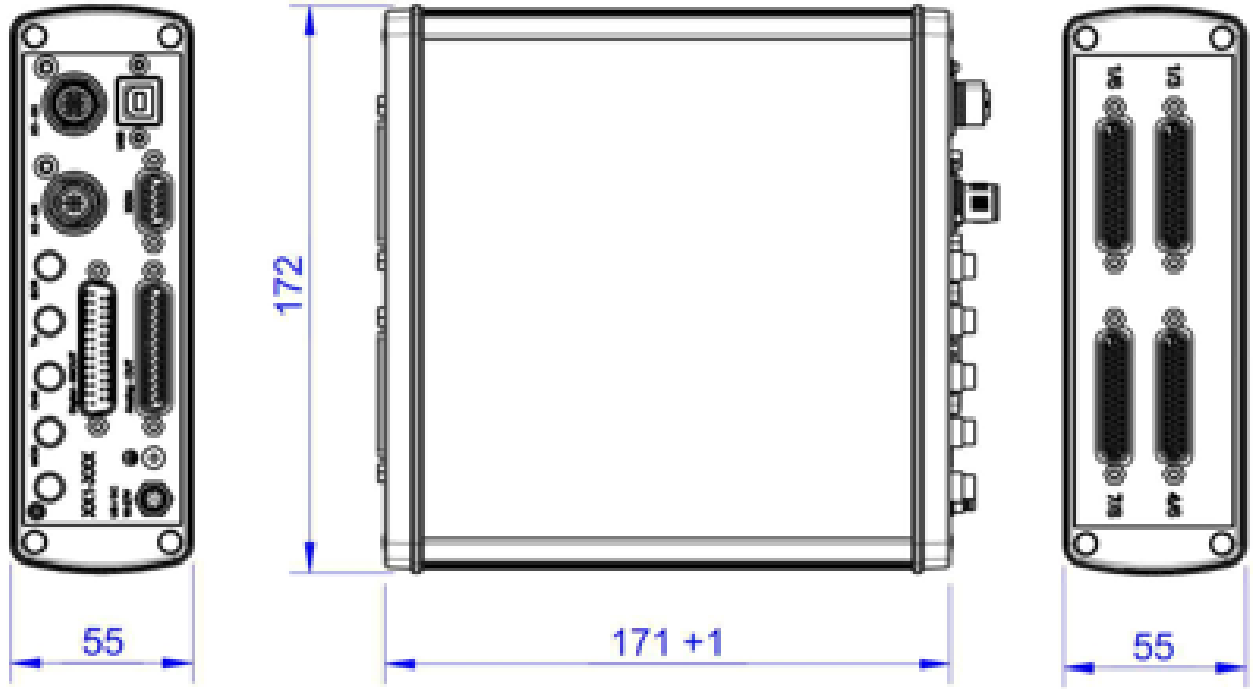
BX8-AS Dimension (Dimensions are in mm)



BX8-HD15 Dimension (Dimensions are in mm)



BX8-HD44 Dimension (Dimensions are in mm)



Specifications

Analog Input

Accuracy class	0.05%
Number of analog inputs	8
Strain gauge bridge input	Quarter, half, full bridge
Input impedance	> 20 MOhm (300pF)
Common mode rejection ratio DC	> 120 dB
Common mode rejection ratio AC 100Hz	> 100 dB
Strain gauge bridge completions	120 Ohm, 350 Ohm, 1 kOhm
Strain gauge bridge supply	2.50 V, 5.00 V, 8.75 Volt
Total current across all channels	200 mA
Max. current per channel at bridge supply 2.5V	40 mA (min. bridge resistance 62,5 Ohm)
Max. current per channel at bridge supply 5V	60 mA (min. bridge resistance 83,3 Ohm)
Max. current per channel at bridge supply	26 mA (min. bridge resistance 336,5 Ohm)
8.75V	
Input sensitivities	7 mV/V, 3.5 mV/V, 2 mV/V
Input voltage, single-ended	±10 V
Input resistance	10 MOhm
Input for PT1000 sensor	-230 °C ... +1500 °C
Excitation voltage PT1000	1.25 V

Digital Input / Digital Output

Number of in-/ outputs	16
Output	TTL (0V 5V), push-pull
total current across all channels	140 mA
Max. load current per output	25 mA
Input	
Max. input voltage	5.5 V
min. input voltage	-0.5 V
Resistance Pullup +5V	10 kOhm
Sampling period	40 msec

Analog Output

Number of analog outputs	8
Configuration of analog outputs	0-10V, ±10V, 0-5V, ±5V, 4-20mA

Supply

Supply voltage	12 V to 28 V
Power	< 12 W

Environmental Data

Operating temperature	0°C to 50 °C (32 to 122 Deg F)
Power	< 12 W

Interfaces

USB	2.0 Full speed
Devices class	Communication Device Class, HID (firmware update only)
UART	Level 3.3V, galvanically isolated; auxiliary voltage 24V DC, 2A
EtherCat	protocol: CoE device profile 404, Mailbox- and Buffered mode. Synchronization: Hardware- Latching
CANbus	CANopen, device profile 404, 4x TxPDOs,

Resolution of Strain Gage Input

The resolution of measuring amplifier depends on the adjusted input sensitivity and the data frequency. The input sensitivity is assigned to the bridge supply voltage: 8.75V with 2.0 mV/V, 5V with 3.5 mV/V, and 2.5V with 7 mV/V.

The excitation voltage with 8.75V is recommended only with sensors of minimum 1kOhm bridge resistance and sufficient construction size. For miniature sensors under 500g weight the bridge supply of 8.75V shall not be applied!

	+Us	10 Hz	50 Hz		100 Hz	1 kHz	5 kHz	8 kHz
3.5 mV/V	5 V	$2.0\ 10^5$	$1.2\ 10^5$		$8.0\ 10^4$	$2.5\ 10^4$	$1.0\ 10^4$	$8.0\ 10^3$
2.0 mV/V	8.75 V	$3.0\ 10^5$	$2.5\ 10^5$		$1.5\ 10^5$	$6.0\ 10^4$	$4.0\ 10^4$	$1.4\ 10^4$

At a data frequency of 10 Hz the measuring range from 0 to +3.5 is quantized in $2.0\ 10^5$ steps.

The noise amplitude is 17.5 nV/V.

At a sensor with rated force of 10 N and rated output of 0.5 mV/V the noise amplitude is

$$10\,N \cdot \frac{0{,}5}{3{,}5} \cdot \frac{1}{2.0\,10^5} = 7{,}14 \cdot 10^{-6}\,N$$

Noise Amplitude at Analog Output

The noise amplitude at the analog output is approx. 25mV (peak values) or 10mV (RMS). It is due to the galvanic isolation of the analog output. The frequency components of the noise signal are predominantly at frequencies above 300 kHz and higher. These can be largely attenuated by the use of oversampling with subsequent digital filtering (eg arithmetic averaging) in the subsequent analog-digital conversion.

Digital Filters

The BX8 adjusts automatically the analog filter and the „decimating“digital input filter. The user provides only the required number of measured values per second (data frequency), which is send via USB-interface or made available to the field bus. Additionally there are two adjustable digital filters: 1x FIR filter and 1x IIR filter. Each of these filter is individually adjustable for any of the 8 input channels. In the measured data signal processing chain, the FIR filter is processed first, followed by the IIR filter.

Finite Impulse Response Filter

The FIR filter is a low pass filter with which the filter order N and the cut-off frequency fg can be set. The cut-off frequency is the frequency at which the signal is already attenuated by -3 db. This corresponds to a factor of approx. 0.7. Frequencies lying above this will continue to be attenuated.

The filter order determines the maximum and minimum adjustable cut-off frequency fg in terms of the data rate Fa, and the steepness of the attenuation range. Higher orders have a steeper slope, i.e. an increase in the signal frequency causes the attenuation to increase faster. The so-called step response is slower at higher orders however, i.e. it always takes N+1 measured values until the filter’s output value corresponds to the input value.

Order	fg/Fa min in Hz	fg/Fa min in Hz
14	0,05	0,190
12	0,06	0,225
10	0,07	0,270
8	0,09	0,340
6	0,12	0,350
4	0,18	0,410

Infinite Impulse Response Filter

The infinite Impulse Response Filter (IIR) of fourth order allows four different filter types:

1) Low pass filter: Sensor signals at low frequency (including DC size with f=0) pass through the filter, signals at a higher frequency are attenuated.
2) High pass filter: Sensor signals at low frequency (including DC size with f=0) are

   Attenuated, signals at a higher frequency pass through the filter. Note: Frequencies above half of the measured data rate cannot be processed. The measuring amplifier includes an analog-to-digital sampling system, which in itself acts as a low pass.

3) Band pass filter: Signals are allowed to pass through within a frequency range, signals which are above or below this range are attenuated.
4) Band stop filter ('Notch filter'): Signals are attenuated within a frequency range, signals which are above or below this range are allowed to pass through.

   The cut-off frequency can be configured for low and high pass filters. The cut-off frequency is the frequency at which the signal is already attenuated by -3 db. This corresponds to a factor of approx. 0.7. Frequencies lying above for low pass and lying below for high pass will continue to be attenuated.

   Two cut-off frequencies can be configured for band pass and band stop filters; the upper and the lower. Attenuation by -3 dB also occurs here. The two cut-off frequencies may not be the same. Signal frequencies lying between these are allowed to pass through for the band pass filter, and are attenuated for the band stop filter.

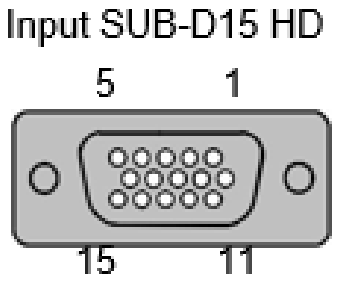
   The maximum (and also the minimum if need be) of each cut-off frequency is dependent on the measured data rate. Cut-off frequencies can be set to (0.49 * measured data rate), i.e. almost to half.

The filters can be individually configured for each channel and also switched on and off. The configuration also remains the same for filters that have been switched off.

Buttons and Indicators

Power-button with LED function	Switch on and off the device (only BX8-HD) Function LED
Mod-button with Led status	a) reset the status LED; b) start the Firmware-updates, if during the Power On activates
CHK button with Check LED	Sensor Test; by pressing the CHK button the sensor signal for the unloaded condition is emulated on the input of the measuring amplifier; for sensors with calibration matrix the documented zero signals of the sensor are Emulated on the inputs.
TA	„Tara“, Set-Zero“: trigger an automatic zero adjustment for all outputs (analog and digital)
ECR-LED	EtherCat EC Run;

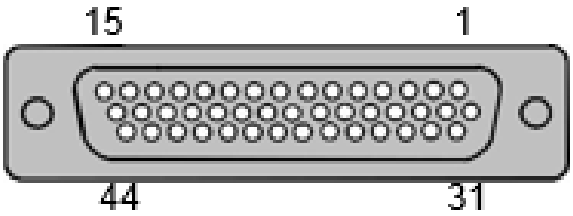
Pin Configuration



Connection of strain gauges, active sensors, TEDS. Activation of the bridge completion with bridge from “HB” (12) to -UD (10).

No	Symbol	Description
1	TEDS	Transducer Electronic Data according to IEEE 1451.4
2	-Us	Negative bridge supply
3	+Us	Positive bridge supply
4	Q350	Quarter bridge completion 350 Ohm
5	+UD	Positive differential input
6	GNDE	Ground, analog input
7	-Uf	Negative sense line (6-wire connection only)
8	+Uf	Positive sense line (6-wire connection only)
9	Q120	Quarter bridge completion 120 Ohm
10	-UD	Negative differential input
11	Q1k	Quarter bridge completion 1000 Ohm
12	HB	Half bridge completion
13	VCCIO	Supply voltage for active sensors (optional)
14	Ue	Analog input voltage, single ended ±10V
15	GNDIO	Ground, supply voltage (optional)
Shield	PE	Earth (housing)

Input Sub-D44 HD



1/3 Channels 1,2,3, Sub-D HD 44			
Pin	**Signal**	**Description**	**Channel**
Shield	PE	Earth (housing)	-
1	TEDS	Transducer Electronic Data according IEEE 1451.4	1
2	US-	Negative bridge supply	1
3	US+	Positive bridge supply	1
4	Q350	Quarter bridge completion 350Ohm	1
5	UD+	Positive differential input	1
6	GNDE	Ground, analog input	1
7	UF-	Negative sense line (6-wire connection only)	1
8	UF+	Positive sense line (6-wire connection only)	1
9	Q120	Quarter bridge completion 120Ohm	1
10	UD-	Negative differential input	1
11	Q1k	Quarter bridge completion 1000Ohm	1
12	HB	Half bridge completion	1
13	UE	Analog input voltage, single ended ±10V	1
14	GNDIO	Not equipped sep.galv. isol. (optional)	1
15	PE	Earth (housing)	-
16	TEDS	Transducer Electronic Data according IEEE 1451.4	2
17	US-	Negative bridge supply	2
18	US+	Positive bridge supply	2
19	Q350	Quarter bridge completion 350Ohm	2
20	UD+	Positive differential input	2
21	GNDE	Ground, analog input	2
22	UF-	Negative sense line (6-wire connection only)	2
23	UF+	Positive sense line (6-wire connection only)	2
24	Q120	Quarter bridge completion 120Ohm	2
25	UD-	Negative differential input	2
26	Q1k	Quarter bridge completion 1000Ohm	2
27	HB	Halt bridge completion	2
28	UE	Analog input voltage, single ended ±10V	2
29	GNDIO	Not equipped sep.galv.isol. (optional)	2

1/3 Channels 1,2,3, Sub-D HD 44			
Pin	**Signal**	**Description**	**Channel**
30	VCCIO	Not equipped sep.galv.isol. (optional)	1,2,3
31	TEDS	Transducer Electronic Data acc. to IEEE 1451.4	3
32	US-	Negative bridge supply	3
33	US+	Positive bridge supply	3
34	Q350	Quarter bridge completion 350Ohm	3
35	UD+	Positive differential input	3
36	GNDE	Ground, analog input	3
37	UF-	Negative sense line (6-wire connection only)	3
38	UF+	Positive sense line (6-wire connection only)	3
39	Q120	Quarter bridge completion 120Ohm	3
40	UD-	Negative differential input	3
41	Q1k	Quarter bridge completion 1000Ohm	3
42	HB	Half bridge completion	3
43	UE	Analog input voltage, single ended ±10V	3
44	GNDIO	Not equipped sep.galv.isol. (optional)	3

The labeling on the front panel is 4/6 for connecting the channels 4 to 6.

4/6 Channels 4,5,6, Sub-D HD 44			
Pin	**Signal**	**Description**	**Channel**
Shield	PE	Earth (housing)	-
1	TEDS	Transducer Electronic Data acc. to IEEE 1451.4	4
2	US-	Negative bridge supply	4
3	US+	Positive bridge supply	4
4	Q350	Quarter bridge completion 350Ohm	4
5	UD+	Positive differential input	4
6	GNDE	Ground, analog input	4
7	UF-	Negative sense line (6-wire connection only)	4
8	UF+	Positive sense line (6-wire connection only)	4
9	Q120	Quarter bridge completion 120Ohm	4
10	UD-	negative bridge supply	4
11	Q1k	Quarter bridge completion 1000Ohm	4
12	HB	Half bridge completion	4
13	UE	Analog input voltage, single ended ±10V	4
14	GNDIO	Not equipped sep.galv.isol. (optional)	4
15	PE	Earth (housing)	-
16	TEDS	Transducer Electronic Data acc. to IEEE 1451.4	5
17	US-	Negative bridge supply	5
18	US+	Positive bridge supply	5

4/6 Channels 4,5,6, Sub-D HD 44			
Pin	**Signal**	**Description**	**Channel**
19	Q350	Quarter bridge completion 350Ohm	5
20	UD+	Positive differential input	5
21	GNDE	Ground, analog input	5
22	UF-	Negative sense line (6-wire connection only)	5
23	UF+	Positive sense line (6-wire connection only)	5
24	Q120	Quarter bridge completion 120Ohm	5
25	UD-	Negative differential input	5
26	Q1k	Quarter bridge completion 1000Ohm	5
27	HB	Half bridge completion	5
28	UE	Analog input voltage, single ended ±10V	5
29	GNDIO	Not equipped sep.galv.isol. (optional)	5
30	VCCIO	Not equipped sep.galv.isol. (optional)	4,5,6
31	TEDS	Transducer Electronic Data acc. to IEEE 1451.4	6
32	US-	Negative bridge supply	6
33	US+	Positive bridge supply	6
34	Q350	Quarter bridge completion 350Ohm	6
35	UD+	Positive differential input	6
36	GNDE	Ground, analog input	6
37	UF-	Negative sense line (6-wire connection only)	6
38	UF+	Positive sense line (6-wire connection only)	6
39	Q120	Quarter bridge completion 120Ohm	6
40	UD-	Negative differential input	6
41	Q1k	Quarter bridge completion 1000Ohm	6
42	HB	Half bridge completion	6
43	UE	Analog input voltage, single ended ±10V	6
44	GNDIO	Not equipped sep.galv.isol. (optional)	6

At the 44-pole SubD socket 1/6 up to 6 channels can be connected. The labeling on the front panel is 1/6 for connecting the channels 1 to 6. The connections are parallel to the input jacks 1/3 and 4/6 .

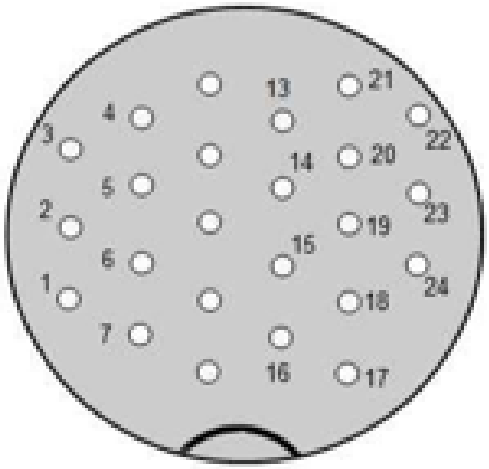
Channels 1,2,3,4,5,6, Sub-D HD 44			
Pin	**Signal**	**Description**	**Channel**
Shield	PE	Earth (housing)	-
1	UF+	Positive sense line (6-wire connection only)	1
2	US+	Positive bridge supply	1
3	UD+	Positive differential input	1
4	UD-	Negative differential input	1
5	US-	Negative bridge supply	1
6	UF-	Negative sense line (6-wire connection only)	1
7	TEDS	Transducer Electronic Data according IEEE 1451.4	1
8	UF+	Positive sense line (6-wire connection only)	2
9	US+	Positive bridge supply	2
10	UD+	Positive differential input	2
11	UD-	Negative differential input	2
12	US-	Negative bridge supply	2
13	UF-	Negative sense line (6-wire connection only)	2
14	TEDS	Transducer Electronic Data according IEEE 1451.4	2
15	PE	Earth (housing)	-
16	UF+	Positive sense line (6-wire connection only)	3
17	US+	Positive bridge supply	3
18	UD+	Positive differential input	3
19	UD-	Negative differential input	3
20	US-	Negative bridge supply	3
21	UF-	Negative sense line (6-wire connection only)	3
22	TEDS	Transducer Electronic Data according IEEE 1451.4	3
23	UF+	Positive sense line (6-wire connection only)	4
24	US+	Positive bridge supply	4
25	UD+	Positive differential input	4
26	UD-	Negative differential input	4
27	US-	Negative bridge supply	4
28	UF-	Negative sense line (6-wire connection only)	4
29	TEDS	Transducer Electronic Data acc. to IEEE 1451.4	4
30	PE	Earth (housing)	-

Channels 1,2,3,4,5,6, Sub-D HD 44			
Pin	**Signal**	**Description**	**Channel**
31	UF+	Positive sense line (6-wire connection only)	5
32	US+	Positive bridge supply	5
33	UD+	positive differential input	5
34	UD-	Negative differential input	5
35	US-	Negative bridge supply	5
36	UF-	Negative sense line (6-wire connection only)	5
37	TEDS	Transducer Electronic Data according IEEE 1451.4	5
38	UF+	Positive sense line (6-wire connection only)	6
39	US+	Positive bridge supply	6
40	UD+	Positive differential input	6
41	UD-	Negative differential input	6
42	US-	Negative bridge supply	6
43	UF-	Negative sense line (6-wire connection only)	6
44	TEDS	Transducer Electronic Data acc. to IEEE 1451.4	6

Channels 7, 8, Sub-D HD 44			
Pin	**Signal**	**Description**	**Channel**
Shield	PE	Earth (housing)	-
1	UE	Analog input voltage, single ended ±10V	1
2	GNDE	Ground, analog input	1
3	UE	Analog input voltage, single ended ±10V	2
4	GNDE	Ground, analog input	2
5	UE	Analog input voltage, single ended ±10V	3
6	GNDE	Ground, analog input	3
7	UE	Analog input voltage, single ended ±10V	4
8	GNDE	Ground, analog input	4
9	UE	Analog input voltage, single ended ±10V	5
10	GNDE	Ground, analog input	5
11	UE	Analog input voltage, single ended ±10V	6
12	GNDE	Ground, analog input	6
13	PE	Earth (housing)	-
14	PE	Earth (housing)	-
15	PE	Earth (housing)	-
16	TEDS	Transducer Electronic Data according IEEE 1451.4	7
17	US-	Negative bridge supply	7
18	US+	Positive bridge supply	7
19	Q350	Quarter bridge completion 350Ohm	7
20	UD+	Positive differential input	7
21	GNDE	Ground, analog input	7
22	UF-	Negative sense line (6-wire connection only)	7
23	UF+	Positive sense line (6-wire connection only)	7
24	Q120	Quarter bridge completion 120Ohm	7
25	UD-	Negative differential input	7
26	Q1k	Quarter bridge completion 1000Ohm	7
27	HB	Half bridge completion	7
28	UE	Analog input voltage, single ended ±10V	7
29	GNDIO	Not equipped sep.galv.isol. (optional)	7
30	VCCIO	Not equipped sep.galv.isol. (optional)	7,8

Channels 7, 8, Sub-D HD 44			
Pin	**Signal**	**Description**	**Channel**
31	TEDS	Transducer Electronic Data according IEEE 1451.4	8
32	US-	Negative bridge supply	8
33	US+	Positive bridge supply	8
34	Q350	Quarter bridge completion 350Ohm	8
35	UD+	Positive differential input	8
36	GNDE	Ground, analog input	8
37	UF-	Negative sense line (6-wire connection only)	8
38	UF+	Positive sense line (6-wire connection only)	8
39	Q120	Quarter bridge completion 120Ohm	8
40	UD-	Negative differential input	8
41	Q1k	Quarter bridge completion 1000Ohm	8
42	HB	Half bridge completion	8
43	UE	Analog input voltage, single ended ±10V	8
44	GNDIO	Not equipped sep.galv.isol. (optional)	8

Input M16 Binder 423



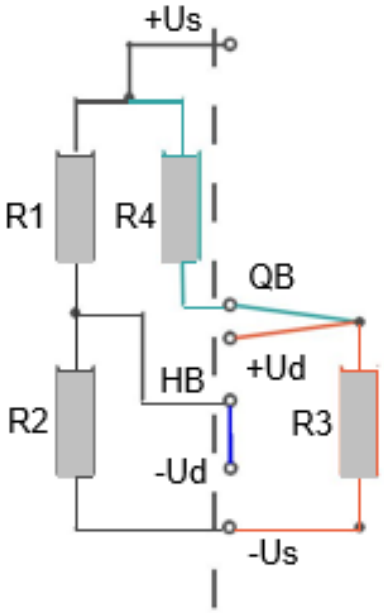
View from the plug-in side

A 6-axis sensor type K6D can be connected to the 16-pin socket of the BX8-AS.

Channels 1,2,3,4,5,6, M16			
Pin	**Signal**	**Description**	**Channel**
Shield	PE	Housing	-
1	US+	Positive bridge supply	1
2	US-	Negative bridge supply	1
3	UD+	Positive bridge output	1
4	UD-	Negative bridge output	1
5	US+	Positive bridge supply	2
6	US-	Negative bridge supply	2
7	UD+	Positive bridge output	2
8	UD-	Negative bridge output	2
9	US+	Positive bridge supply	3
10	US-	Negative bridge supply	3
11	UD+	Positive bridge output	3
12	UD-	Negative bridge output	3
13	US+	Positive bridge supply	4
14	US-	Negative bridge supply	4
15	UD+	Positive bridge output	4
16	UD-	Negative bridge output	4
17	US+	Positive bridge supply	5
18	US-	Negative bridge supply	5

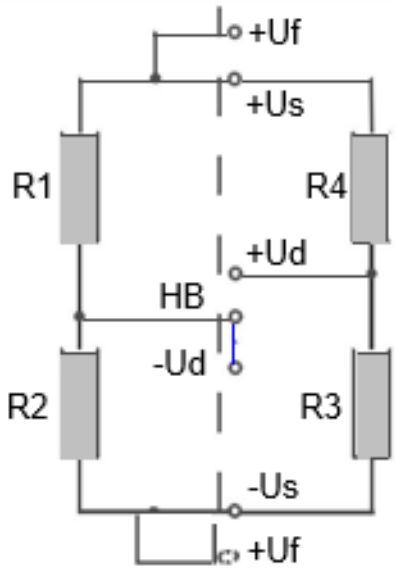
Channels 1,2,3,4,5,6, M16			
19	UD+	Positive bridge output	5
20	UD-	Negative bridge output	5
21	US+	Positive bridge supply	6
22	US-	Negative bridge supply	6
23	UD+	Positive bridge output	6
24	UD-	Negative bridge output	6

Connection strain gauge Quarter Bridge



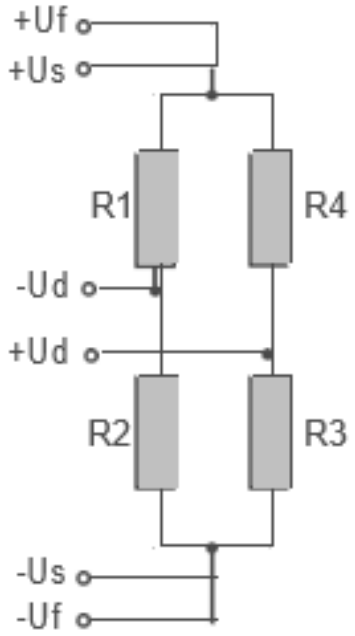
The active strain gauge R3 is connected in the 3-wire technology.
The completion resistors 120 Ohm (QB = Q120), 30 Ohm (QB = Q350) and 1 kOhm (QB = Q1k) are lead out on the connection QB.
The internal half bridge R1, R2 is activated with a wire jumper from HB to -Ud.

Connection strain gauge half bridge



The active strain gauges R3 and R4 are connected to +Us, +Ud and -Us.
For very long cable lengths the sense lines +Uf and -Uf can be used.
The internal half bridge R1, R2 is activated with a wire jumper from HB to -Ud.

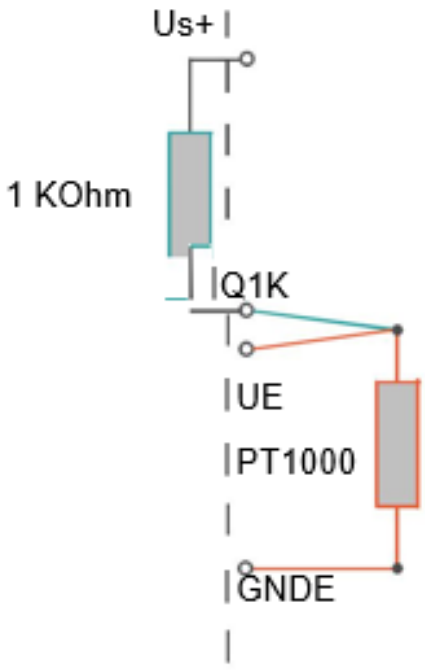
Connection strain gauge full bridge



The active strain gauges R1 to R4 are connected on +Us,, -Us, +Ud, -Ud.

For very long cable lengths the sense lines +Uf and -Uf can be additionally used.

Connection of PT1000



The temperature sensor PT1000 is connected in three-wire technology to the terminals Q1K, UE and GNDE.

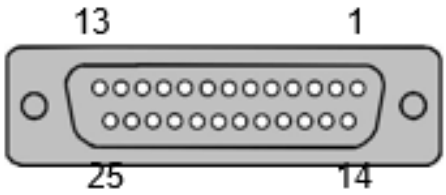
To measure temperature, the input type "PT1000" must be activated once by software.

Connection of the Active Sensors

The single-ended voltage signal of active sensors is applied to Ue and GNDE.

Potentiometric sensors can be supplied via +Us. The energy supply for active sensors can be via galvanic isolated voltage VCCIO and GNDIO.

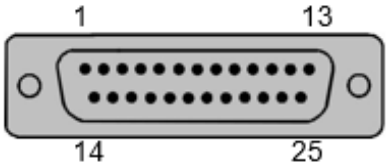
Analog output SUB-D25 socket



Analog outputs voltage or current for channels 1 to 8.

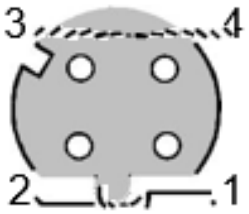
Pin	Signal	Meaning
1	Ua1/ Ia1	Analog output channel 1
2	Ua2/ Ia2	Analog output channel 2
3	Ua3/ Ia3	Analog output channel 3
4	Ua4/ Ia4	Analog output channel 4
5	Ua5/ Ia5	Analog output channel 5
6	Ua6/ Ia6	Analog output channel 6
7	Ua7/ Ia7	Analog output channel 7
8	Ua8/ Ia8	Analog output channel 8
9	-	Internal usage
10	-	Internal usage
11	-	Internal usage
12	OutB-	60kHz frequency -6V Out (optional)
13	-	Internal usage
14	GNDA	Analog GND
15	GNDA	Analog GND
16	GNDA	Analog GND
17	GNDA	Analog GND
18	GNDA	Analog GND
19	GNDA	Analog GND
20	GNDA	Analog GND
21	GNDA	Analog GND
22	-	Internal usage
23	-	Internal usage
24	OutB+	60kHz frequency +6V Out (optional)
25	GNDINT	GNDINT

Digital in- and outputs Sub-D25 plug connector



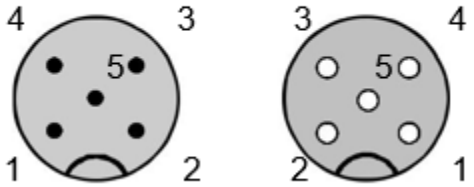
Pin	Name	Meaning
1	VCC	5V voltage supply, digital
2	DGND	Digital ground (GND)
3	DGND	Digital ground (GND)
4	DGND	Digital ground (GND)
5	DGND	Digital ground (GND)
6	DIO 2	Group 1, 1.2
7	DIO 4	Group 1, 1.4
8	DIO 6	Group 2, 2.2
9	DIO 8	Group 2, 2.4
10	DIO 10	Group 3, 3.2
11	DIO 12	Group 3, 3.4
12	DIO 14	Group 4, 4.2
13	DIO 16	Group 4, 4.4
14	DGND	Digital ground (GND)
15	DGND	Digital ground (GND)
16	DGND	Digital ground (GND)
17	DGND	Digital ground (GND)
18	DIO 1	Group 1, 1.1
19	DIO 3	Group 1, 1.3
20	DIO 5	Group 2, 2.1
21	DIO 7	Group 2, 2.3
22	DIO 9	Group 3, 3.1
23	DIO 11	Group 3, 3.3
24	DIO 13	Group 4, 4.1
25	DIO 15	Group 4, 4.3

EtherCat M12 4-pole socket D-coded



Pin	Name	Meaning
1	TD+	Transmit +
2	RD+	Receive +
3	TD-	Transmit -
4	RD-	Receive -
Shield	PE	Earth (housing)

CANbus M12 5-pole socket / plug A-coded

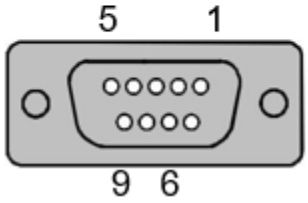


Pin	Name	Meaning
1	Shield	Shielding
2	V+	Power (UB+)
3	V-	GND (0V)
4	CAN_H	Dominant High
5	CAN_L	Dominant Low
	Housing	Shield

UART Port Sub-D9 socket

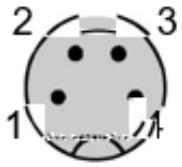
The UART Port is used for connection of Raspberry PI.

The UART Port is not available for variants "EC" with EtherCat.



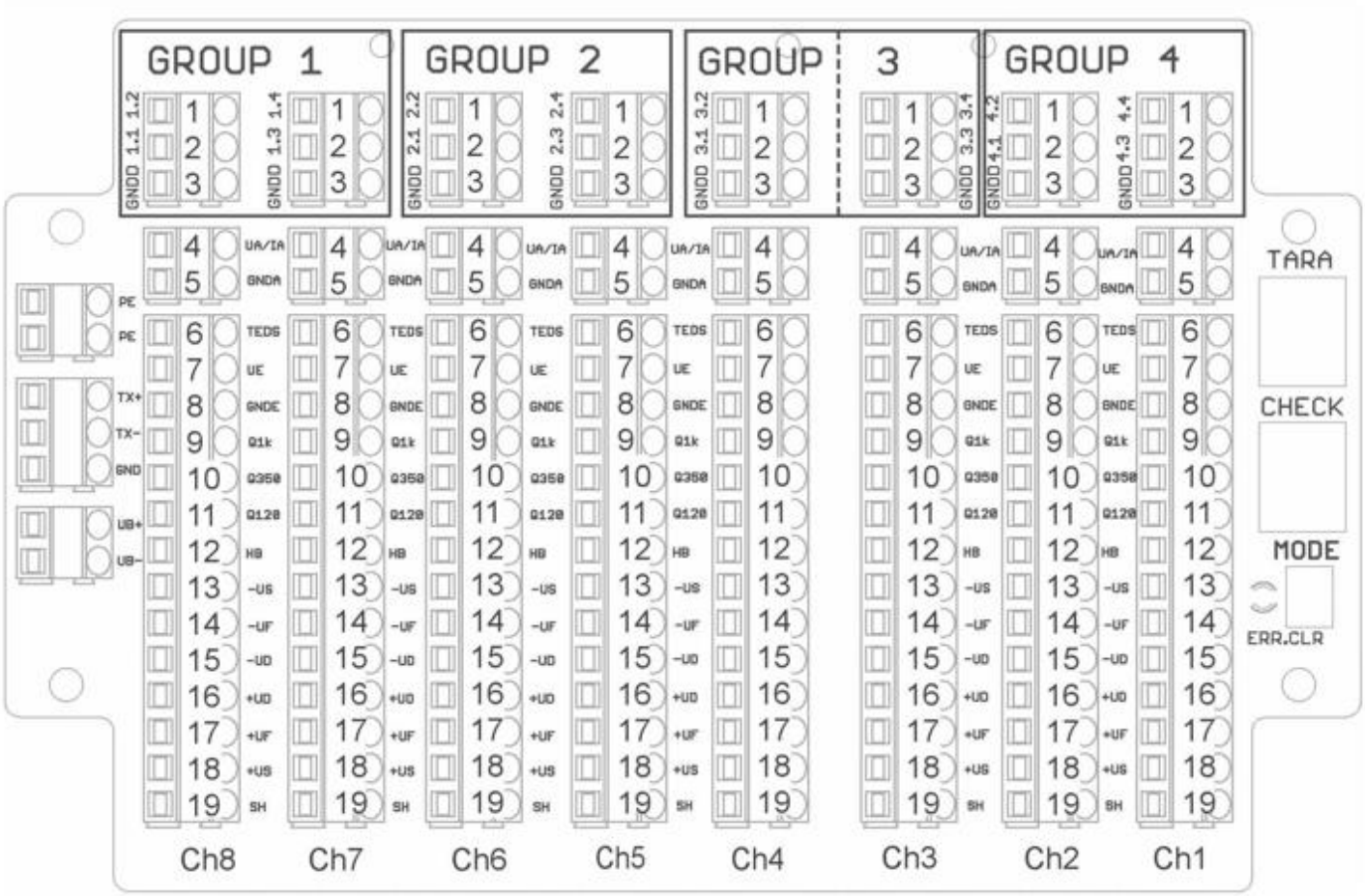
Pin	Name	Meaning
1	UB-	Ground supply voltage
2	RX	Receive data of BX8, 3.3Volt level
3	TX	Transmit data of BX8, 3.3 Volt level
4	/	Internal usage
5	UB-	Ground supply voltage
6	UB+	Supply voltage
7	/	Internal
8	UB+	Supply voltage
9	OFF	BX8 Disable
	Housing	Shield

Voltage supply M8, 4-pole



Pin	Name	Meaning
1	UB+	Positive supply voltage 10-27V, brown
2	PE	Earth (housing) PE, white
3	0V	Negative supply voltage (GND), blue
4	PE	Earth (housing) PE, black

Screw terminal BX8-AS



Pos.	Terminal labelling	Description
1	n.2 / n.4 Group n	Digital In/Out No. 2 / 4 / 6 / 8 / 10 / 12 / 14 / 16
2	n.1 / n.3 Group n	Digital In/Out No. 1 / 3 / 5 / 7 / 9 / 11 / 13 / 15
3	GNDD	Ground, digital In/Out
4	UA/IA	Analog output, current or voltage
5	GNDA	Ground, Analog output
6	TEDS	Transducer Electronic Data according to IEEE 1451.4
7	UE	Voltage, Analog input
8	GNDE	Ground, Analog input
9	Q1k	Quarter bridge completion 1000 Ohm

Pos.	Terminal labelling	Description
10	Q350	Quarter bridge completion 350 Ohm
11	Q120	Quarter bridge completion 120 Ohm
12	HB	Half bridge completion
13	-US	Negative bridge supply
14	-UF	Negative sense line
15	-UD	Negative differential input
16	+UD	Positive differential input
17	+UF	Positive sense line
18	+US	Positive bridge supply
19	SH	Earth, Analog input (shielding)

Connection of the TEDS cables for sensors with transducer elec. datasheet

The 1-wire EEPROM memory module located in the sensor or in the sensors connector is connected with two wires: the ground of the EEPROM to **GNDE** and the signal line (also its supply line) at the **TEDS** side.

TEDS, however, are only supported by BX8 firmware version 1.32 and hardware version 4.0 (devices purchased from 11/2016) and following.

Additional Information

LED Indicators

The LED indicators differ according to the housing versions AS and DS as well as the field bus versions CANopen and EtherCAT. The DS housing is equipped with all the LEDs on the front panel, integrated into the buttons. The green ECR or green FUNCTION LED only has significance for EtherCAT devices.

LED	Color AS	Color DS	Meaning	Position AS	Labeling DS
FUNCTION	yellow	blue	on/off, Bootloader	outside, yellow/green combined	ON OFF
	green	green	EtherCAT-State EC-RUN		ECR
STATUS	red	red	Error state	outside	MOD
CHECK	yellow	yellow	Measuring value-emulation	inside	CHK

For devices with fieldbus (CANopen, EtherCAT), there are two small green LEDs next to the field bus connections. These have the following meaning:

EtherCAT: Link activity

CANopen: Fieldbus switched on

LED indicators STATUS and FUNCTION on EtherCAT devices

Device state	FUNCTION-LED	EC-RUN-LED
EtherCAT State=INIT (not active)	Permanently on	Off
EtherCAT State=PREOP	Off	Blinking
		200ms on
		200ms off
EtherCAT State= SAFEOP	Off	Single flash
		200ms on,
		1s off
EtherCAT State= OP	Off	Permanently on
USB-Bootloader active (EtherCAT	300ms on	Off
not used)	300ms off	

LED Display for Error Condition (all device models)

Error condition	Priority	STATUS LED	Meaning
EtherCAT: State-transition inhibited	1	Blinking 200ms on 200ms off	Requested status transition impossible, e.g. because of invalid settings or invalid hardware settings
EtherCAT: State automatically reset	1	Single flash 200ms on, 1s off	Device switched from operating state to SafeOpError because of a synchronization error
EtherCAT: Application watchdog timeout	1	Double flash 200ms on, 200ms off 200ms on 1sec off	If Watchdog-timer is active: process data frame not received within watchdog time
Measuring application: Sensor error	2	Permanent on	1. A sensor or its cable is defective, for example, the cable Ud+ or Ud- could be interrupted or could have short circuited with one of the cables Us+ or Us-. 2. A measured value is saturated, i.e. the measuring signal lies outside of the measuring range. This could be ascribed to a defective sensor. 3. The maximum value is exceeded for a six-axis sensor.

Measuring application: Error at the digital output	3	Blinks slowly 500ms on 500ms off	Short-circuit at the digital output, i.e. if this is connected as an output and switched to High, it has short-circuited with GNDD, or if it is switched to Low, a voltage >=3 V is applied.
Measuring application: Error at the analog output	4	Blinks very slowly 1s on 1s off	Open current output or overheating of the output driver, for example as a result of a short-circuited voltage output.
Bootloader: Firmware-update failed	1	Permanent on	Checksum error after writing to flash memory during firmware update

FUNCTION LED

The FUNCTION LED lights up permanently in yellow (blue for BX8-HD) during normal operation. It blinks after activating the firmware update function (see Annex A).

In EtherCAT devices, this LED lights up or blinks in green depending on the EtherCAT states (with BX8-HD: separate green LED).

STATUS LED (Red)

The STATUS LED indicates errors that have occurred:

If it lights up permanently in red, an error at the sensor input has occurred. This can be ascribed to three causes:

- A sensor or its cable is defective, for example, the cable Ud+ or Ud- could be interrupted or short circuited with one of the cables Us+ or Us-.
- A measured value is saturated, i.e. the measuring signal lies outside the measuring range. This could be ascribed to a defective sensor.
- The maximum value is exceeded for a six-axis sensor.

If the STATUS LED blinks slowly (approx. 1x/s), an error has occurred at the analog output. This could be an open current output or overheating of the output driver, for example, as a result of a short-circuited output voltage.

If the STATUS LED blinks quickly (approx. 2x/sec), an error has occurred at the digital output, namely a short circuit, i.e. if this is connected as an output and switched to High, it has short-circuited with GNDD, or if it is switched to Low, a voltage >=3 V is connected.

The status display of the error can be cleared by pressing the MODE button (located in the housing) if the error is currently no longer present.

Detailed error information is stored in the device and can be displayed by pressing the keyboard key E in the terminal program.

Digital Inputs and Outputs

The BX8 has 16 configurable 5V TTL compatible digital inputs and outputs (‘DIOs’). These are organized into 4 groups which are identified on the BX8-ASterminal connections as ‘Group 1’ to ‘Group 4’. The respective DIOs are identified here as <GroupNo.>.<DIOno>.

The DIOs can be configured as an input or output function, whereby the DIOs within one group must all have the same data direction.

Digital-I/O Numbers

In the devices and windows API (DLL), the numbers of the DIOs are assigned to the terminal connection identification as follows:

Number in the API and terminal program	Belongs to group	Identification on the terminal board
1	1	1.1
2	1	1.2
3	1	1.3
4	1	1.4
5	2	2.1
6	2	2.2
7	2	2.3
8	2	2.4
9	3	3.1
10	3	3.2
11	3	3.3
12	3	3.4
13	4	4.1
14	4	4.2
15	4	4.3
16	4	4.4

Digital I/O Functions

The following functions can be configured:

No	Function	Data direction	Parameter Device- or DLL-Command (GSV86)Get/ SetDIOtype	Short description
1	General-Purpose Input	Input	0x000004	General input. The logic level can be queried with GetDIOlevel / GSV86getDIOlevel.
2	Sync-Slave Input	Input	0x000002	Input for synchronous measurement data frame transmission in combination with several BX8, whereby the line is connected to the master (see no.18)
3	Zero setting single channel	Input	0x000010	The active input level sets an analog input channel to zero.
4	Zero setting all channels	Input	0x000020	The active input level sets all analog input channels to zero.
5	Reset the maximum and minimum value determination	Input	0x000040	The active input level resets all maximum and minimum values.
6	Trigger Send actual value	Input	0x000080	Triggers the sending of a measured value frame with actual measured values via a USB interface to the inactive-to-active edge of the digital input.

7	Trigger minimum value	Input	0x000100	The maximum value determination is started for the inactive-to-active edge at the digital input (all input channels) and a frame with these maximum values is sent to the USB interface at the active-to-inactive edge.
8	Trigger minimum value	Input	0x000200	The minimum value determination is started for the inactive-to-active edge at the digital input (all input channels) and a frame with these minimum values is sent to the USB interface at the active-to-inactive edge.
9	Trigger mean value	Input	0x000400	A decimating mean value formation is started for the inactive-to-active edge on the digital input (all input channels) and a frame with these mean values is sent to the USB interface at the active-to-inactive edge.
10	Trigger Send actual value	Output	0x000800	While the input level is active, measured value frames with actual measured values are sent via a USB interface at the set data rate.
11	General-Purpose Output	Output	0x001000	General output. The actual logic level can be defined with SetDIOlevel / GSV86setDIOlevel.
12	Threshold output actual value	Output	0x010000	Threshold value output: The output is activated if the assigned measured value is larger than the upper threshold value and is deactivated if it is smaller than the lower threshold value.
13	Threshold output maximum value	Output	0x014000	Threshold value output: The output is activated if the assigned maximum value is larger than the upper threshold value and is deactivated if it is smaller than the lower threshold value.
14	Threshold output minimum value	Output	0x018000	Threshold value output: The output is activated if the assigned minimum value is larger than the upper threshold value and is deactivated if it is smaller than the lower threshold value.

15	Window comparator output actual value	Output	0x012000	Window comparator: The output is activated if the assigned measured value is smaller than the upper threshold value and larger than the lower threshold value; otherwise it is deactivated.
16	Window comparator output maximum value	Output	0x016000	Window comparator: The output is activated if the assigned maximum value is smaller than the upper threshold value and larger than the lower threshold value; otherwise it is deactivated.
17	Window comparator output minimum value	Output	0x01A000	Window comparator: The output is activated if the assigned minimum value is smaller than the upper threshold value and larger than the lower threshold value; otherwise it is deactivated.
18	Sync-Master output	Output	0x020000	Output to the synchronous data frame transmission in combination with several BX8, whereby the line is connected to the slave (s) (see no.2)

Inverting Digital Inputs

The DIOs have pull-up resistances that generate high levels when the input is open. For input trigger functions that are intended to be used with a switch or button, that one must be connected between the DIO and the GNDD terminal. The line must be functionally inverted by software so that the function can be executed when the switch is closed. When using the device interfaces or DLL, the specified value in the above mentioned column 'Value' must be ORed with 0x80000 for this purpose.

The threshold value outputs can also be inverted in this way.

The terms in the above mentioned table mean:

Level	**Non-inverted**		**Inverted**	
Active	Logic 1	= High = 5V	Logic 0	= Low = 0V
Inactive	Logic 0	= Low = 0V	Logic 1	= High = 5V

Only when using the general purpose functions (no. 1 and 10 in the above table) does the inversion have no effect. The functions GSV86get/setDIOlevel and Get/SetDIOlevel always read the level directly, i.e. not inverted.

Further Notes Digital I/O

The **default level** can be defined for digital outputs, i.e. the level that the output should take after restarting and after a reconfiguration. This setting also applies directly, i.e. independent of the inversion state.

The general permanent data transmission should be turned off for measured value-send-trigger functions (no. 6 to 10 in the above-mentioned table). This can be done with the button y in the terminal program.

For functions, that are associated with the acquisition of maximum and minimum values (in the above-mentioned table no. 5,7,8,13,14,16,17) the determination of maximum and minimum values of the firmware should be activated. This can be done with the button m in the terminal program.

Master-Slave Frame Synchronization

When using several BX8s at the same time, the transmission of the measured data frames can be synchronized via digital I / Os. For this, one of the devices must be configured as a master by selecting one of the DIO lines 13 to 16 as a synchronization line and configuring the function of this line as a sync master output (no.18). All other devices are configured as sync slave input (No. 2) on the DIO line connected to the master.

When using the optional BX8 master-slave adapter cable, the synchronization line for all devices is set to DIO no. 16.

The synchronization line always consists of two wires: signal (e.g., DIO 16 <-> DIO 16) and GND = digital reference mass.

Data Acquisition and Bandwidth

The BX8 has a 24-bit sigma delta AD converter that acquires all 8 channels simultaneously (simultaneous sampling). It is set to a fixed single sampling rate of 48000 samples/second (total sampling rate = 48000/s x 8 channels = 384000/s). These are decimated down by a digital anti-aliasing filter to fixed values depending on the selected data rate, whereby all input samples are included in the calculation (output decimation). The cut-off frequencies mentioned in the following table is a result of this input filter, i.e. these apply if:

- The analog input filter is set to the highest value of 11.4 kHz and
- The additional digital filters (see above) are switched off.

In this case, the data frequency also automatically corresponds to the update of the analog output. However, the analog output is updated up to 16000 samples / s. The analog output is switched off from 24000 samples / s and higher.

Data frequency in frames/s	Decimation divisor	-3 dB cut-off frequency in Hz
1	48000	0.4
2	24000	0.8
3	16000	1.2
4	12000	1.6
5	9600	2
6	8000	2.4

Data frequency in frames/s	Decimation divisor	-3 dB cut-off frequency in Hz
8	6000	3.2
10	4800	4
12	4000	4.8
15	3200	6
16	3000	6.4
20	2400	8
24	2000	9.6
25	1920	10
30	1600	12
32	1500	12.8
40	1200	16
48	1000	19.2
50	960	20
60	800	24
75	640	30
80	600	32
96	500	38.4

Data frequency in frames/s	Decimation divisor	-3 dB cut-off frequency in Hz
100	480	40
120	400	48
125	384	50
150	320	60
160	300	64
192	250	76.8
200	240	80
240	200	96
250	192	100
300	160	120
320	150	128
375	128	150
384	125	153.6

Data frequency in frames/s	Decimation divisor	-3 dB cut-off frequency in Hz
400	120	160
480	100	192
500	96	200
600	80	240
640	75	256
750	64	300
800	60	320
960	50	384
1000	48	400
1200	40	480
1500	32	600
1600	30	640
1920	25	768
2000	24	800
2400	20	960
3000	16	1200
3200	15	1280
4000	12	1600
4800	10	1920
6000	8	2400
8000	6	3200
9600	5	3840
12000	4	4800
16000	3	6400
24000	2	9600
48000	1	11400

Note: The configurable maximum data frequency depends on other settings of the device.

When setting the data frequency, the BX8 checks if the desired data frequency is possible and refuses the command, if not. The maximum configurable data frequency can be determined by a read command. Examples of settings that have an impact on the maximum data frequency, are:

- Measured data type
- Bit rate of the UART interface, if activated (if present)
- Digital FIR- and IIR-filters
- Trigger- and threshold functions of the digital I/Os
- Activated six-axis sensor measuring

At the highest data rates of 24000 / s and 48000 / s, the range of functions of the BX8 is limited to digital data transmission.

Data Frames and Bandwidth

The BX8 transmits the measured data in single frames via a serial USB interface, whereby each measured data frame contains samples of all 8 channels that were acquired simultaneously.

The data format for the measured data can be changed. There are 3 different data formats available:

Data type	Description	Maximum data frequency1
INT16	Integer 16-Bit-value in binary offset format. Unscaled raw value.	48000 frames/s
INT24	Integer 24-Bit-value in binary offset format. Unscaled raw value.	24000 frames/s
Float	32-bit floating-point number according to IEEE 754. Measured value has been completely scaled.	12000 frames/s (six-axis sensor = off) 2 12000 frames/s (six-axis sensor = on) 3

Using the example of the strain gauge input with a bridge supply voltage of 8.75 V, the following applies for the integer measured value display INT16 and INT24:

Sensor deviation in mV/V	**Integer measuring value, 16-Bit Hex**	**Integer measuring value, 24-Bit Hex**	**Read value MEGSV8w32.dll:: GSVread and other measuring value -read functions4**
<= -2.1	0x0000	0x000000	-1.05
-2.0	0x0618	0x061862	-1.0
0	0x8000	0x800000	0.0
2.0	0xF9E7	0xF9E79E	1.0
>= 2.1	0xFFFF	0xFFFFFF	1.05

The measuring amplifier is factory-calibrated so that the value for the nominal input sensitivity (here 2.0 mV/V) is as exact as possible.

The multiplication with the scaling value (button ‘n’ in the terminal program) is carried out by external software for the INT data types.

The BX8 independently calculates the completely scaled measured values for the **data type float** either by taking the scaling value (general sensors) into consideration or by multiplying with the coefficient matrix for the activated six-axis sensors or by using the calculation for PT1000 RTDs.

1 This value may be smaller depending on configuration. The BX8 rejects an attempt to set a data frequency that is too high.

2 from Firmware 1.36 and higher

3 from Firmware 1.36 and higher

4 This value doesn't apply for the BX8, if the configured data type is float.

Frequency output 60kHz ±30khz

The measuring signal of the channel 1 can be additionally represented as a frequency modulated square wave signal. It is a differential signal with an amplitude of 6Vpp. The signal can be picked up on the terminals Tx+, Tx- and GND. The connection on GND is optional.

The representation of sensor zero signal is with 60kHz. At maximum positive nominal input detuning of the amplifier the frequency increases to 90kHz. At maximum negative nominal input detuning of the amplifier the frequency sinks to 30kHz.

An user scaling value can be supplied which allows for changing the output scaling.

The total range of the frequency output, however, is set to 28500Hz to 91500Hz (30000-5% from the hub to 90,000 + 5%).

Installation of the 6 Axis Load Cell to the BX8

BX8 Diagram

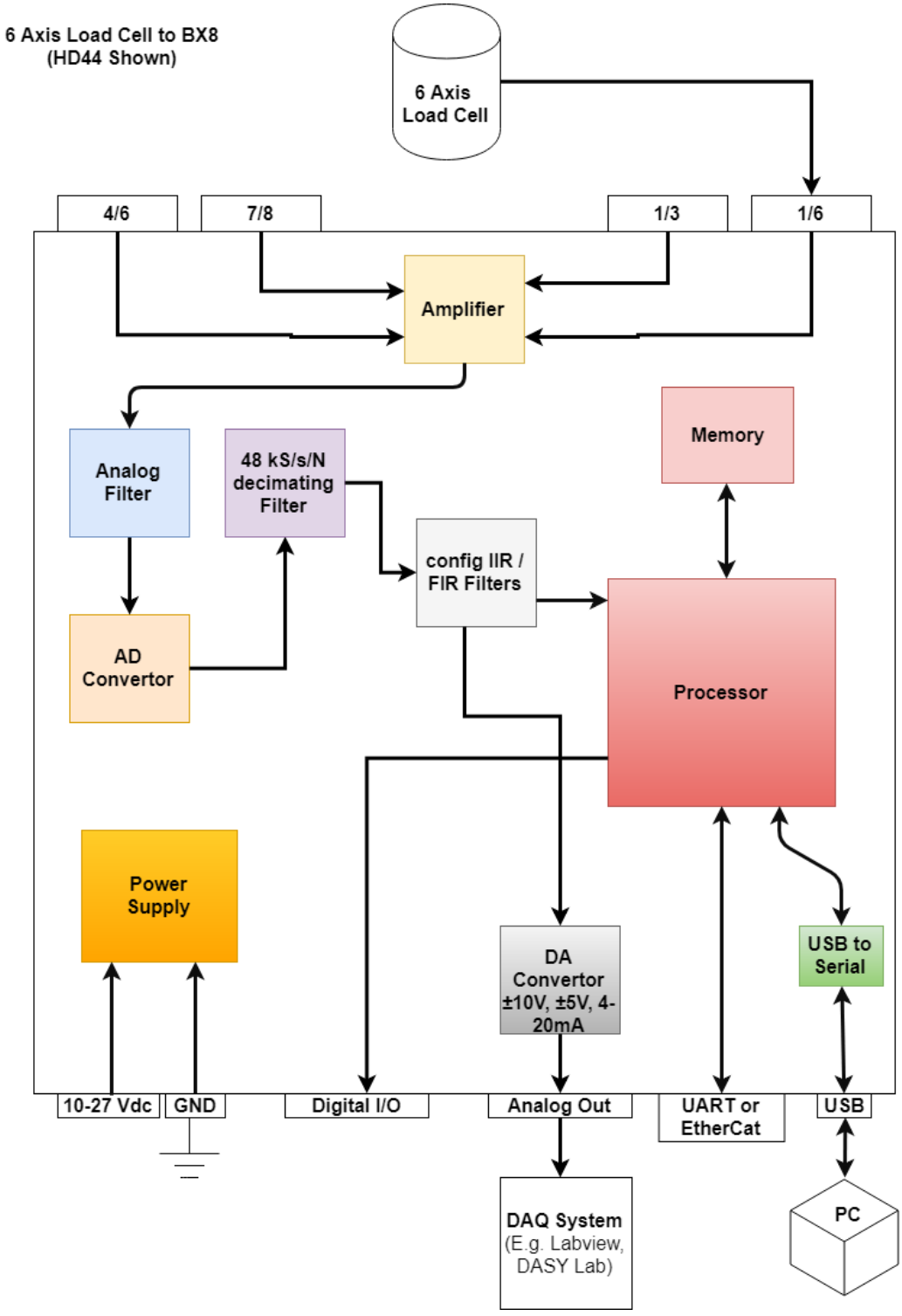


FIGURE 1 - 6 AXIS LOAD CELL TO BX8 (HD44 SHOWN)

BX8-AS Installation

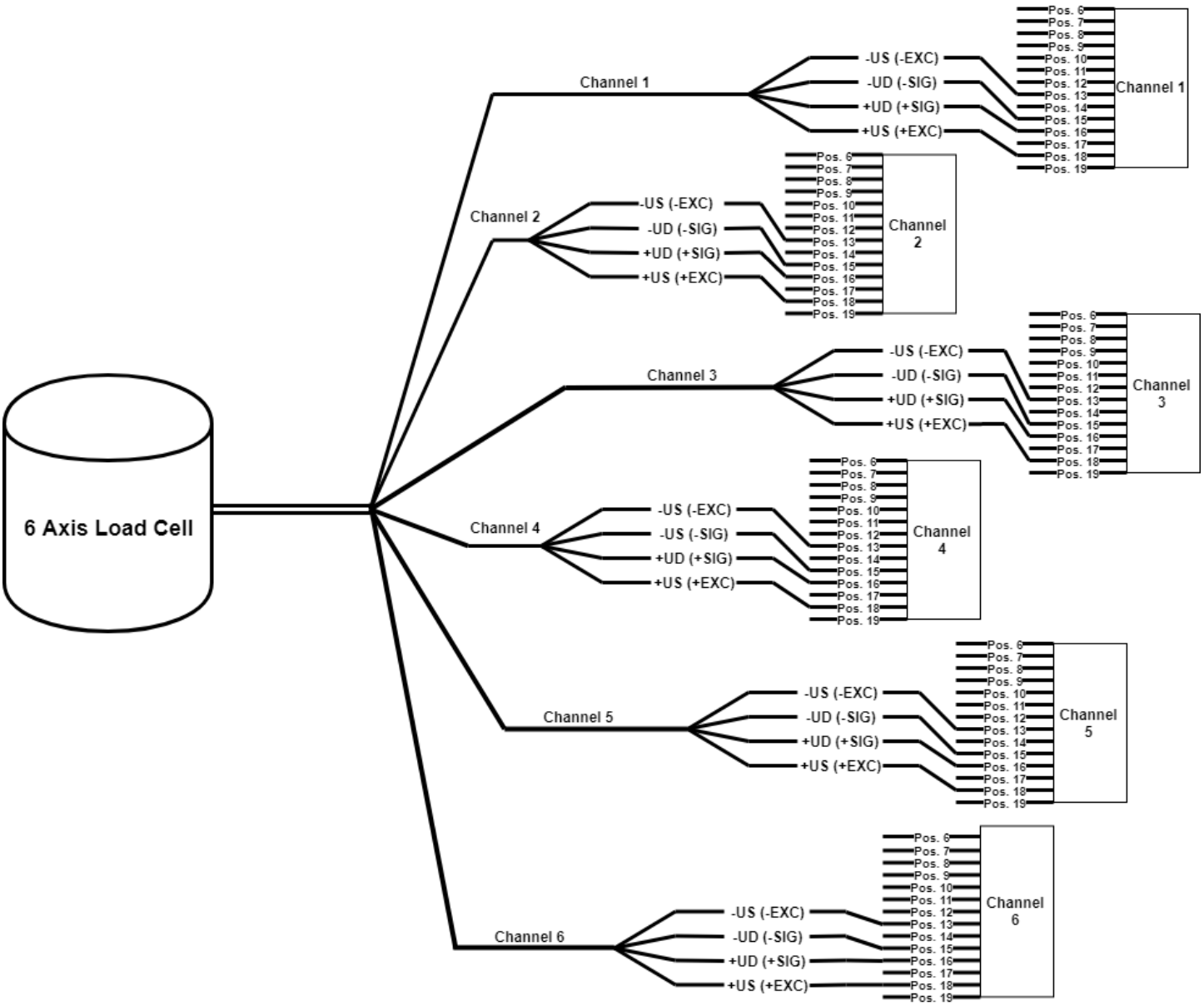


FIGURE 2 – 6 AXIS LOAD CELL TO BX8-AS TERMINAL BLOCK INPUT

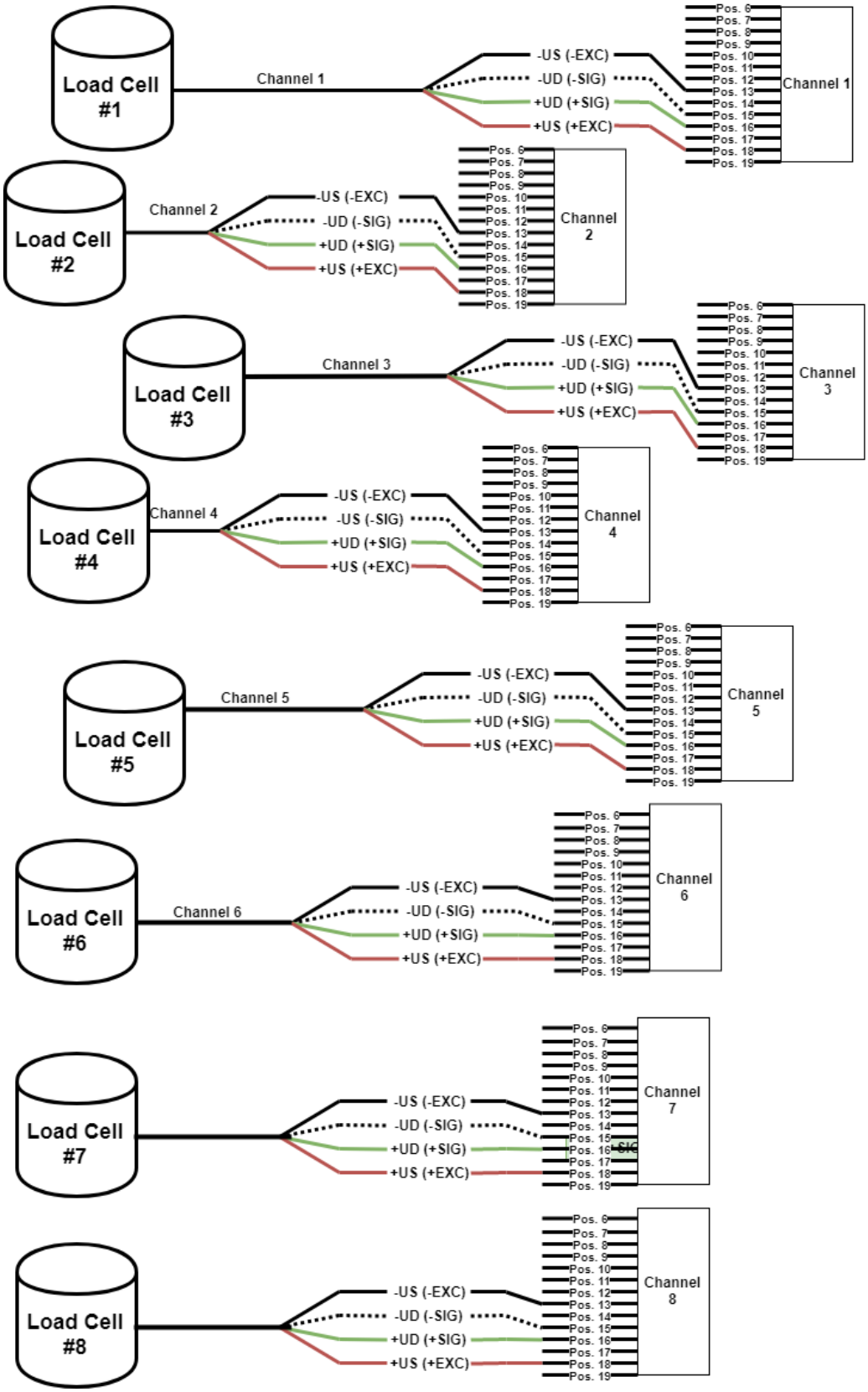


FIGURE 3 - 6 LOAD CELLS TO BX8-AS TERMINAL

****NOTE – Refer to Page 33 for Sense Lines****

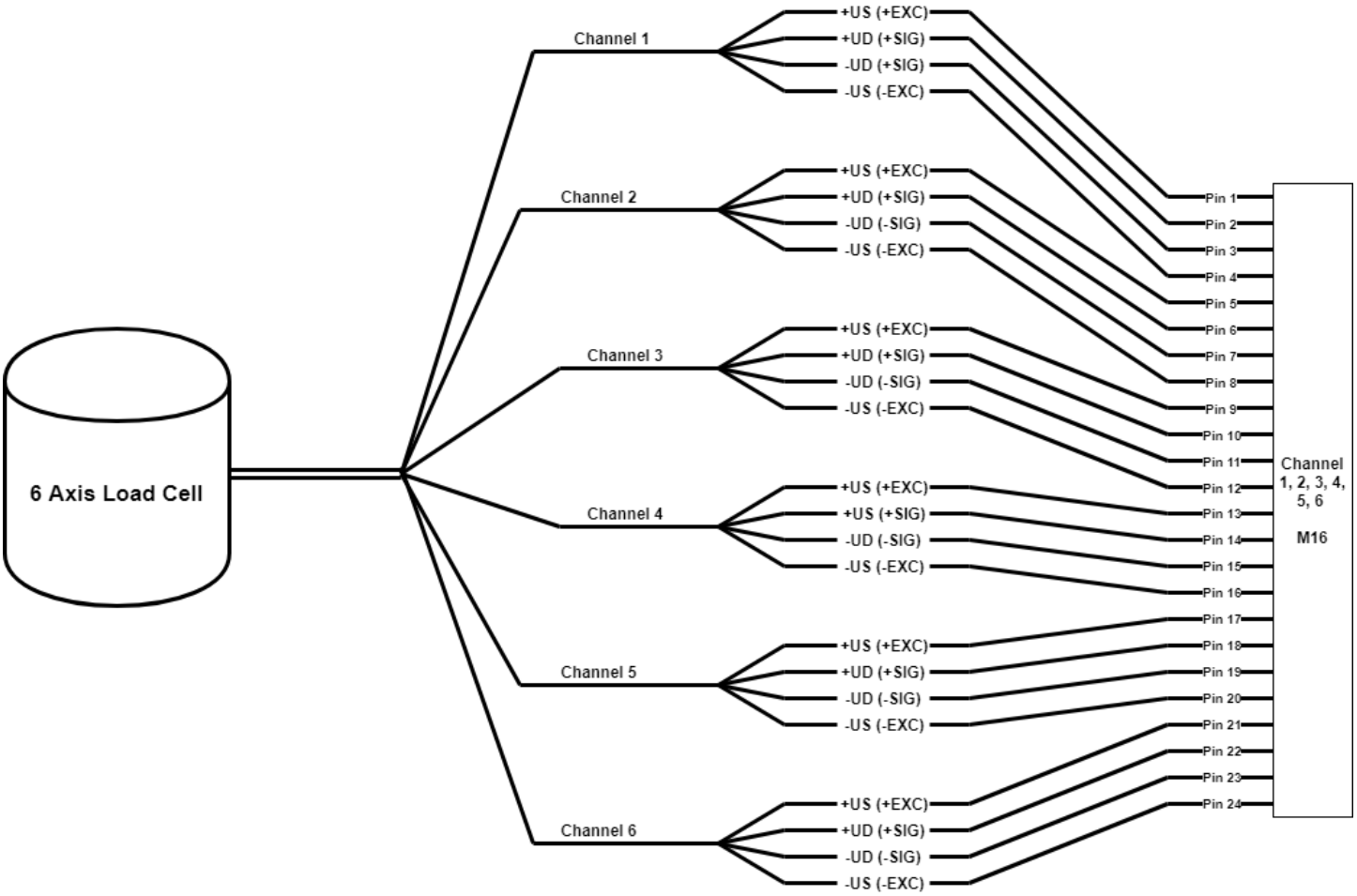


FIGURE 4 - 6 AXIS LOAD CELL TO BX-AS M16 CONNECTOR INPUT

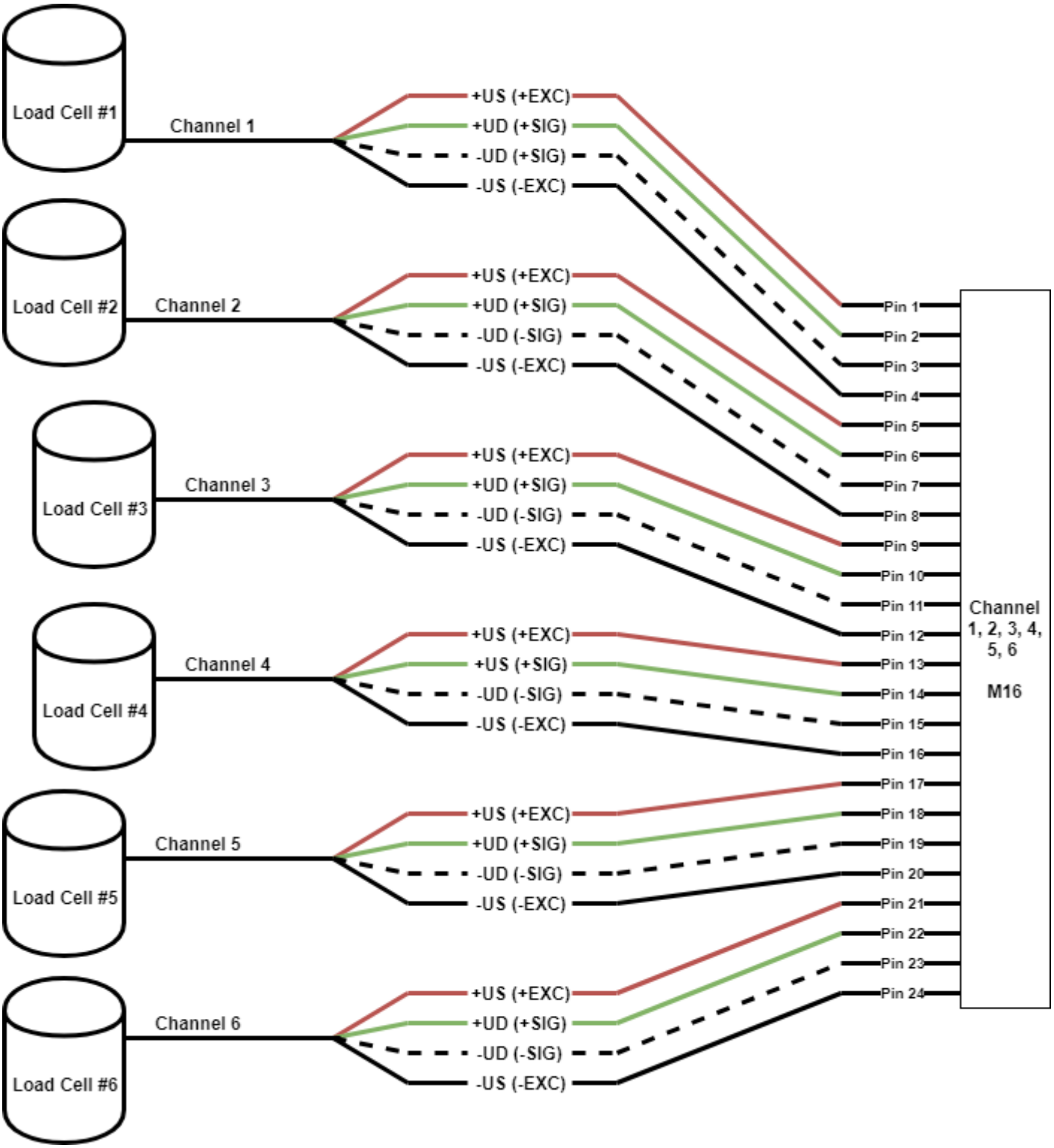


FIGURE 5 - 6 SEPARATE LOAD CELLS TO M16 CONNECTOR

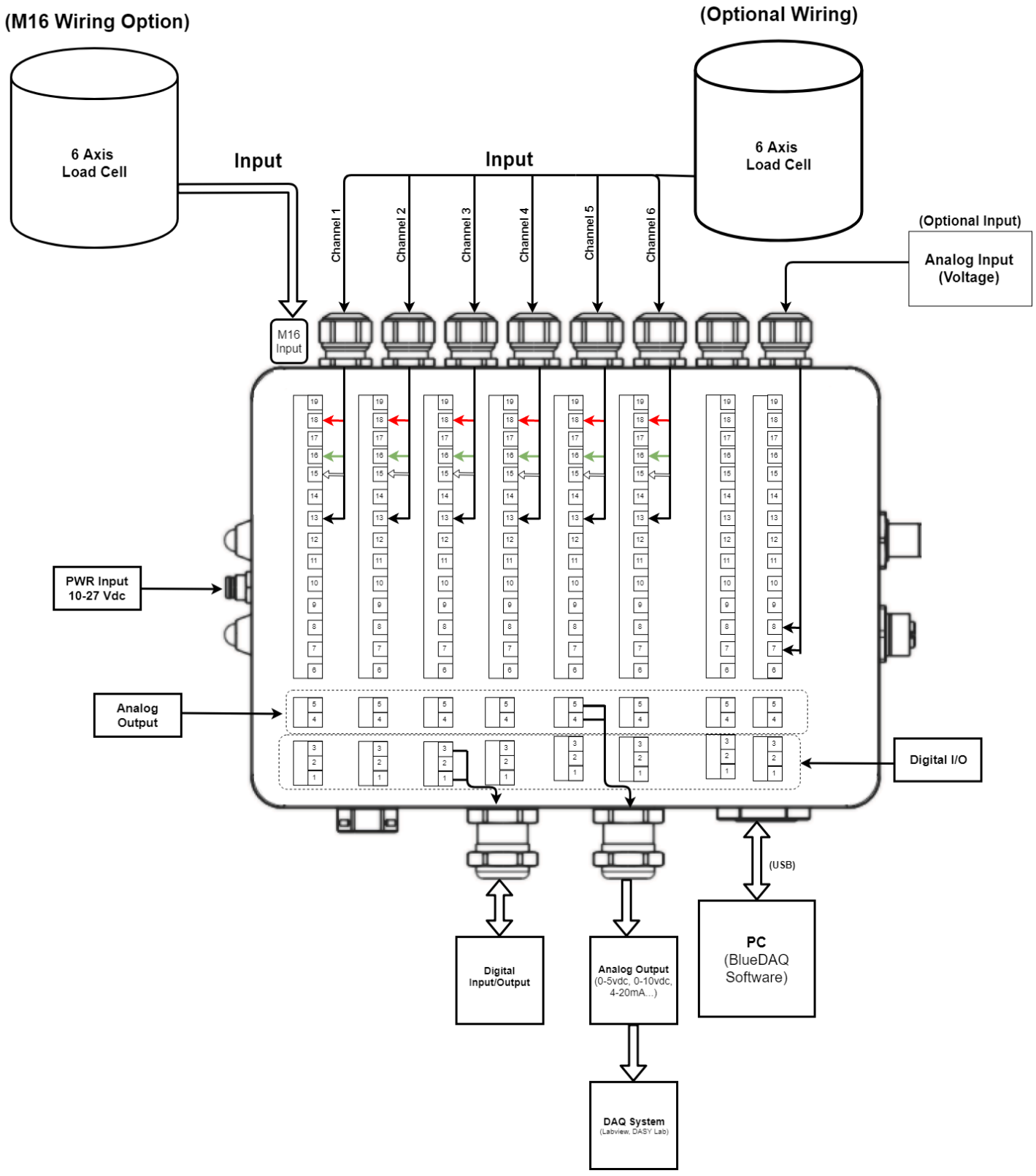


FIGURE 6 - DIAGRAM OF BX8-AS

BX8-HD44 Installation

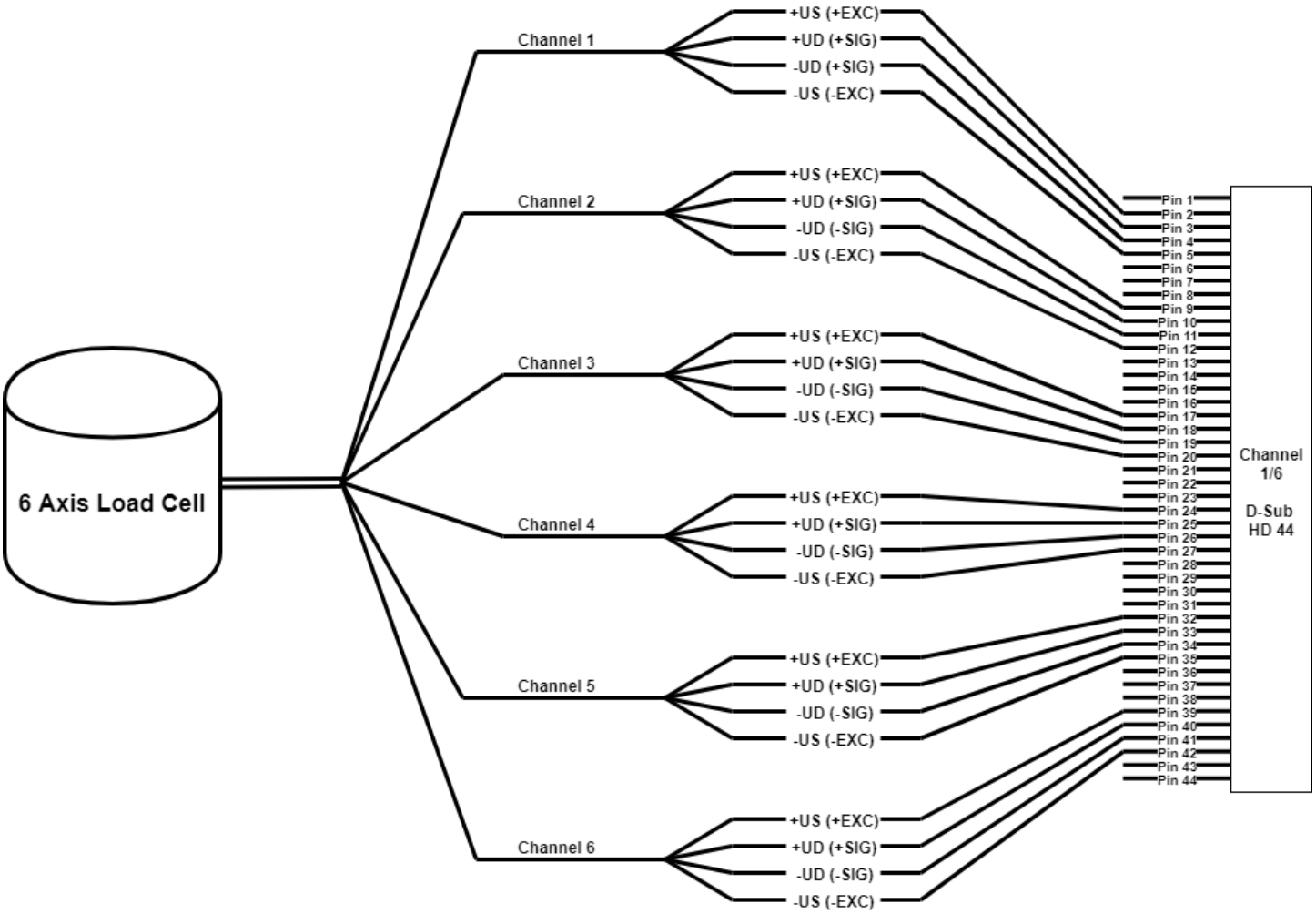


FIGURE 7 - 6 AXIS LOAD CELL TO BX8-HD44 INPUT

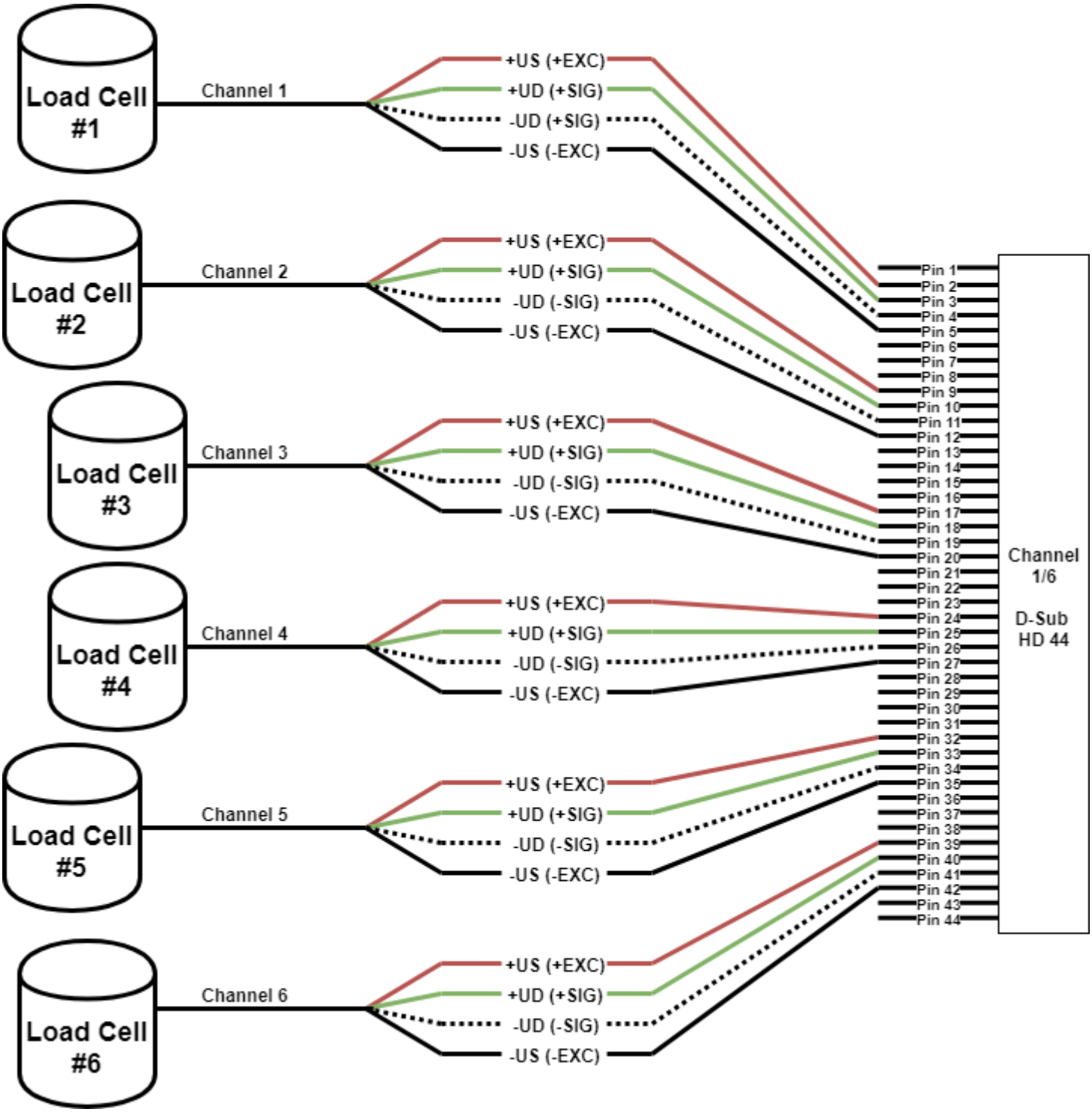


FIGURE 8 - 6 LOAD CELLS TO BXD-HD44 INPUT

****NOTE – Refer to Page 18 for Sense Lines****

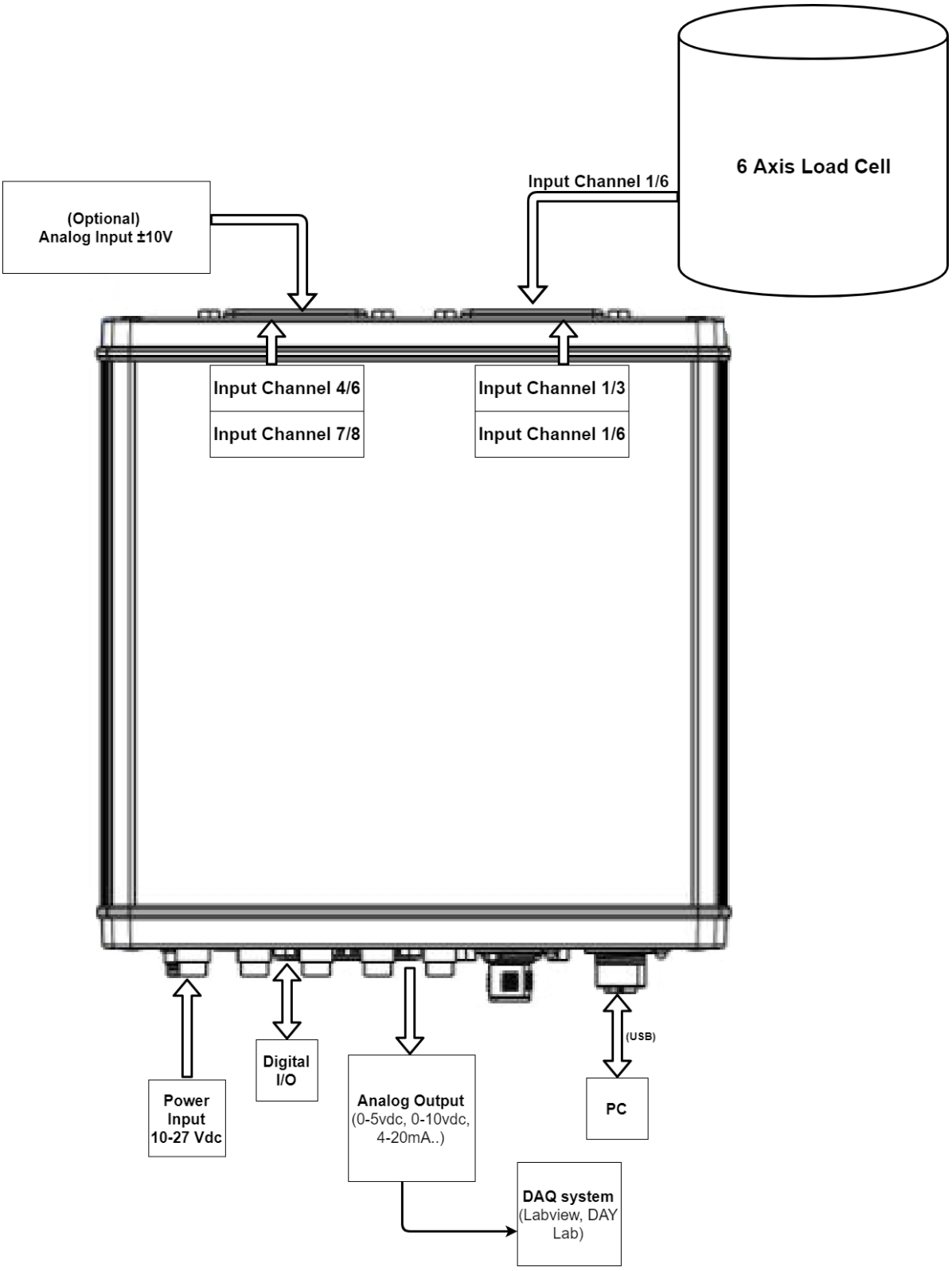


FIGURE 9 – BX8-HD44 DIAGRAM

BX8-HD15 Installation

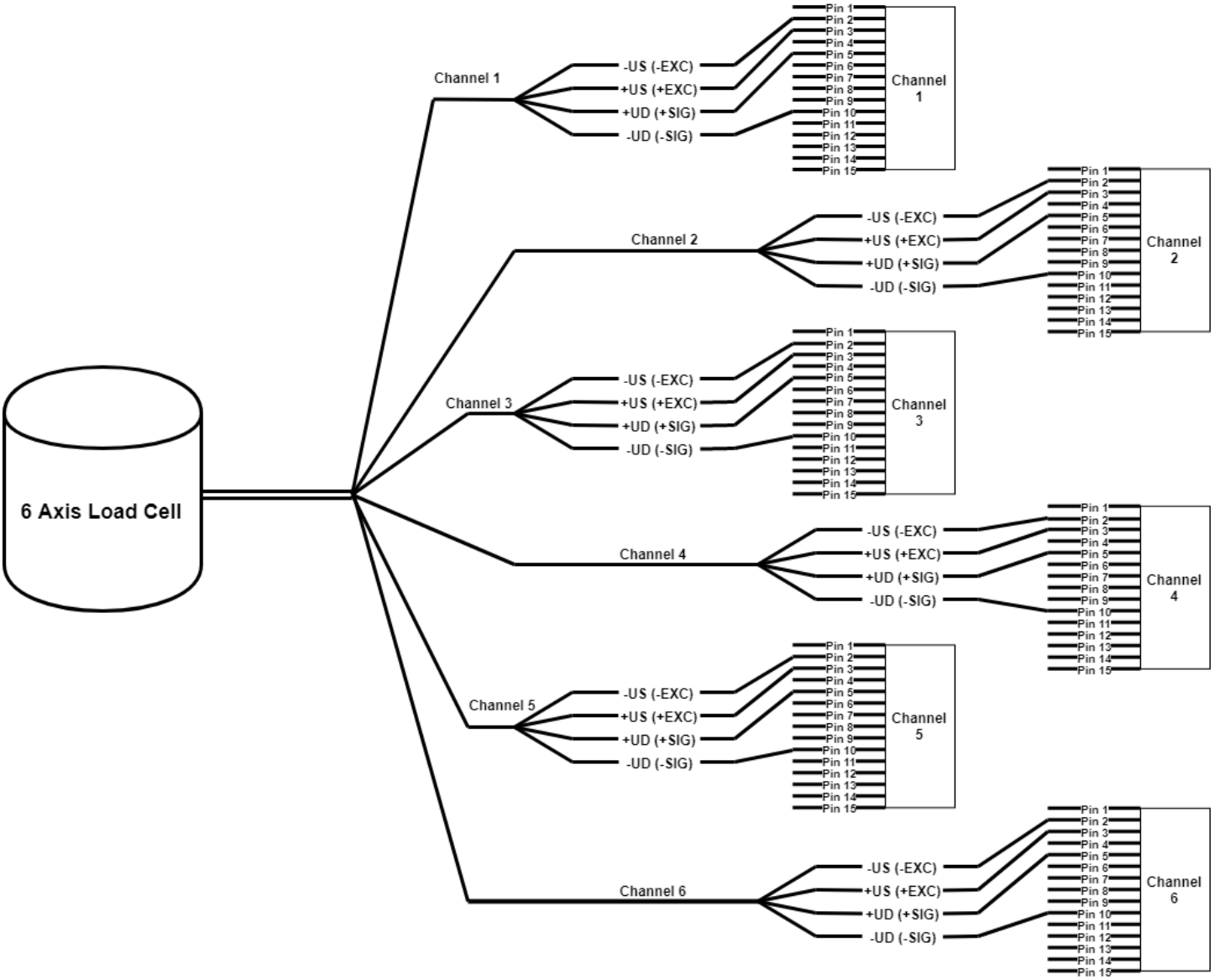


FIGURE 10 - 6 AXIS LOAD CELL TO BX8-HD15

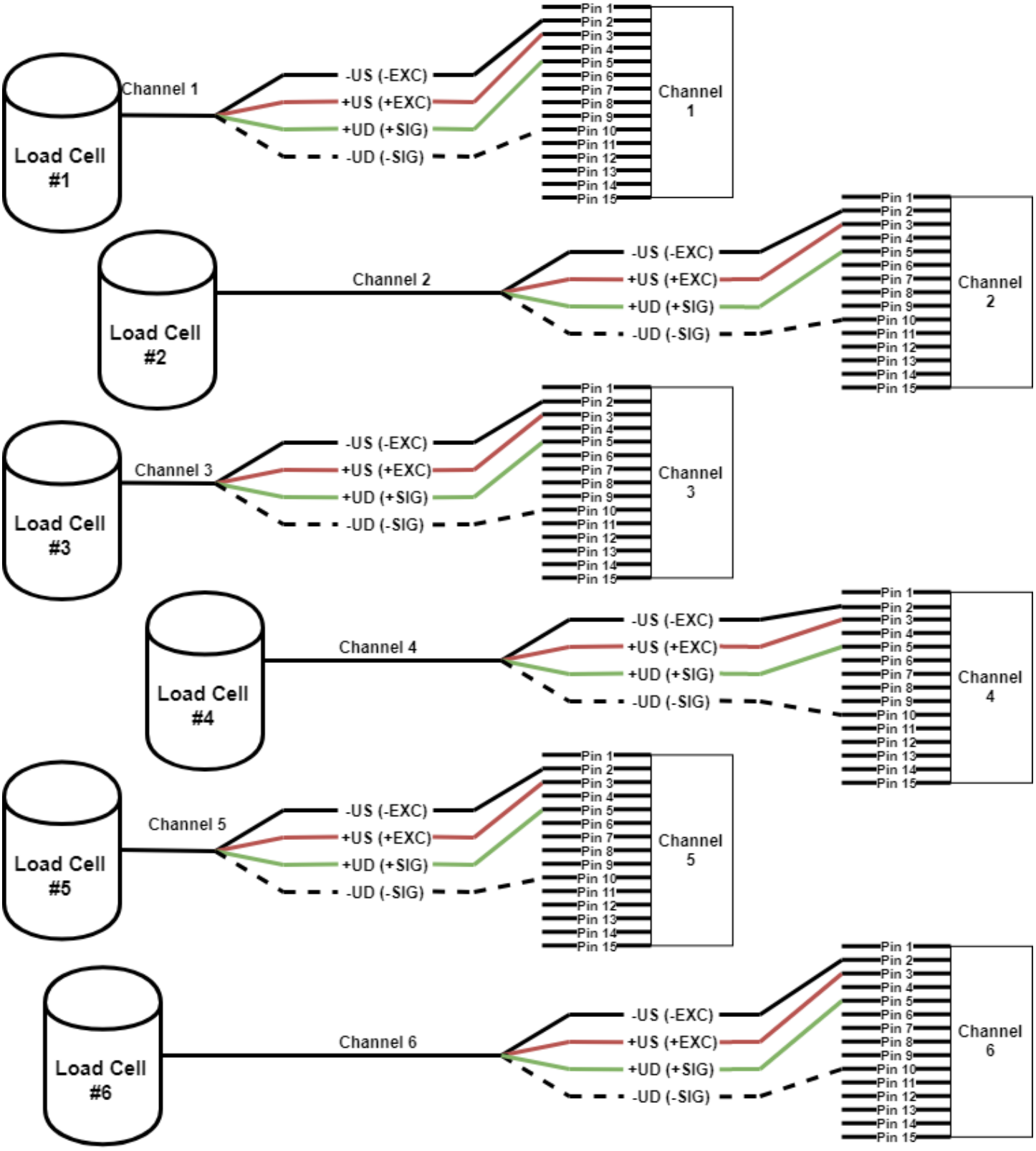


FIGURE 11 - SEPARATE LOAD CELLS TO BX8HD15

NOTE – Refer to Page 17 for Sense Lines

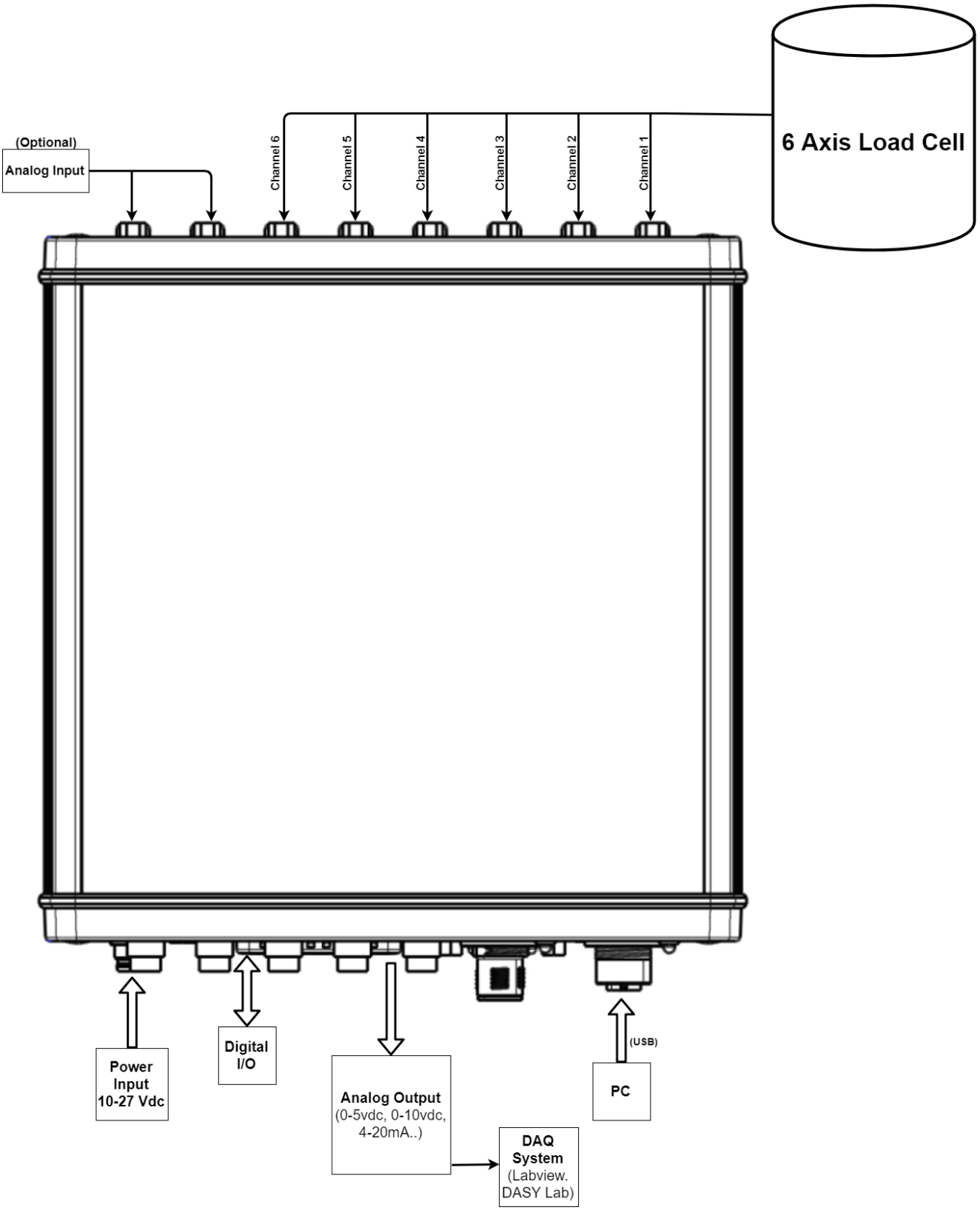


FIGURE 12 - BX8-HD15 DIAGRAM

BlueDAQ Software Installation

1. **Please follow these instructions carefully. DO NOT** connect the amplifier to the PC until instructed to do so. The BlueDAQ PC software is included on a USB Flash Drive with the amplifier or can be downloaded from www.interfaceforce.com

2. Install the software by double-clicking the “setup.exe” file located in the BlueDAQ folder. You may need to “Extract” the contents of the folder first if you downloaded it from the website. Follow the instructions for installation. Once the software completes installation you **MUST** restart your computer.

3. Attach the amplifier to the PC using the supplied USB A-B cable. BSC4, BSC8 and BX8 drivers were installed with the BlueDAQ software and Windows will automatically load them. BSC8D/BX8 must be powered ON using supplied power cable and power switch. 9330 drivers must be installed as described below.

4. When the device is connected in **Communication mode** for the first time, Windows will ask for a driver directory. The installation process is described below. The driver is located on the USB Flash drive supplied with the 9330. The Flash drive **MUST** be connected to the PC or the files copied to the PC before connecting the 9330 to the PC.

5. Enable USB Communication mode. To do this, click the MODE button of the measuring amplifier and select USBmode: Comm in the logger menu.

6. Now you can connect your 9330 to the PC via USB cable. Once connected the driver installation window appears. Select “Install software from a list or specific source (advanced users)” and Click “Next >”.

FIGURE 13 - FOUND NEW HARDWARE WIZARD

7. Click “Search for the best driver in these locations”

8. Check the option “Include this location in the search:” and then click “Browse”. Select the folder: 9330_Com_Driver from the supplied USB drive and Click “Continue >”.

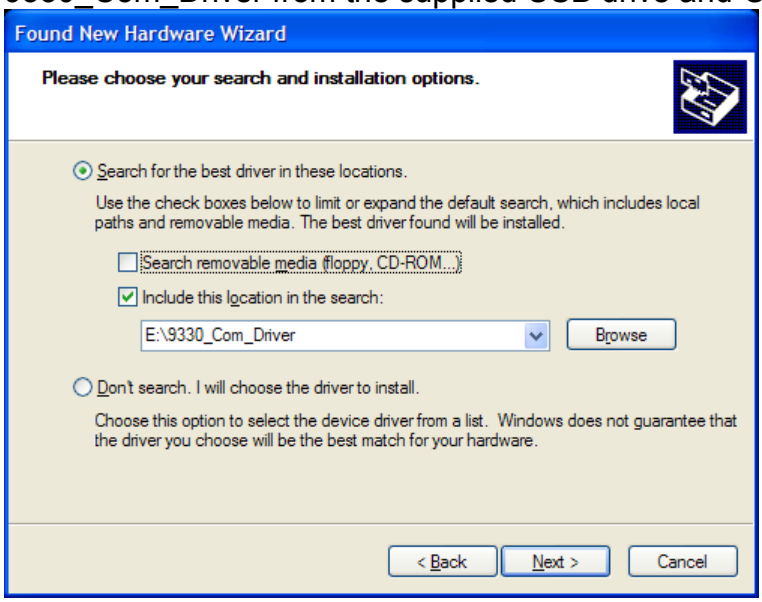


FIGURE 14 - NEW HARDWARE WIZARD

9. In the dialogue window “Hardware installation” click “Continue installation”.

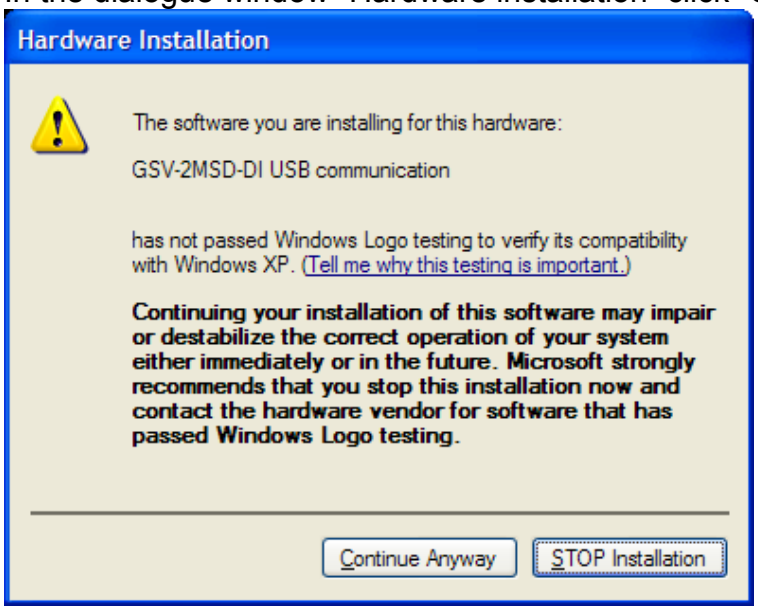


FIGURE 15 - HARDWARE INSTALLATION

10. The driver was installed successfully. Click “Finish”.

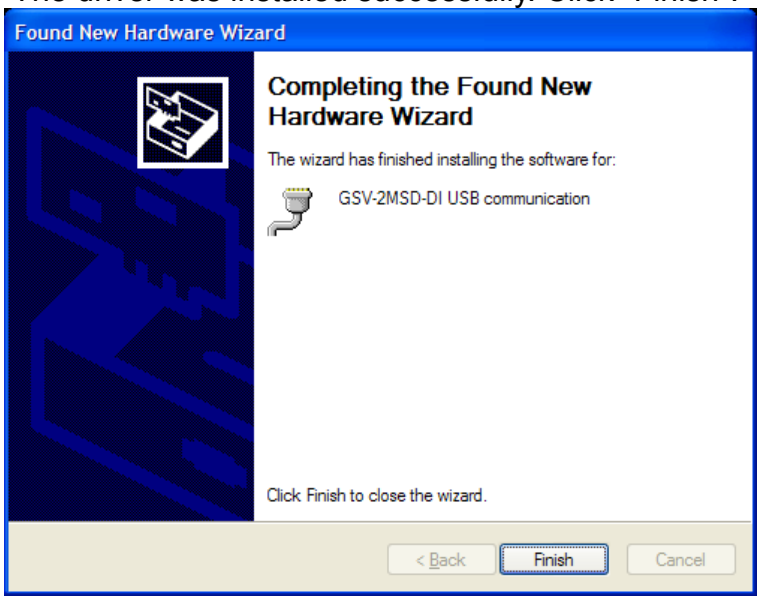


FIGURE 16 - HARDWARE INSTALL FINISH

COM Ports

Once windows is finished installing the device navigate to Device Manager and check for a new **USB Serial Port** (COMX) where X is the assigned port number. Remember this number. In the examples below it is COM6 or COM28

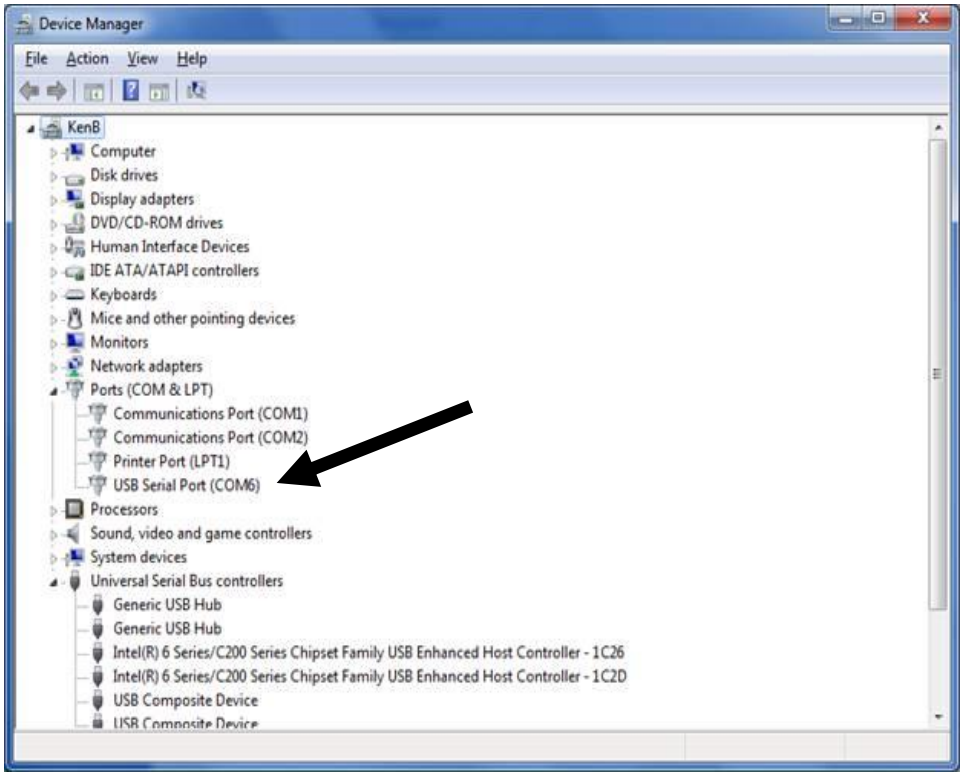


FIGURE 17 - EXAMPLE OF BSC4

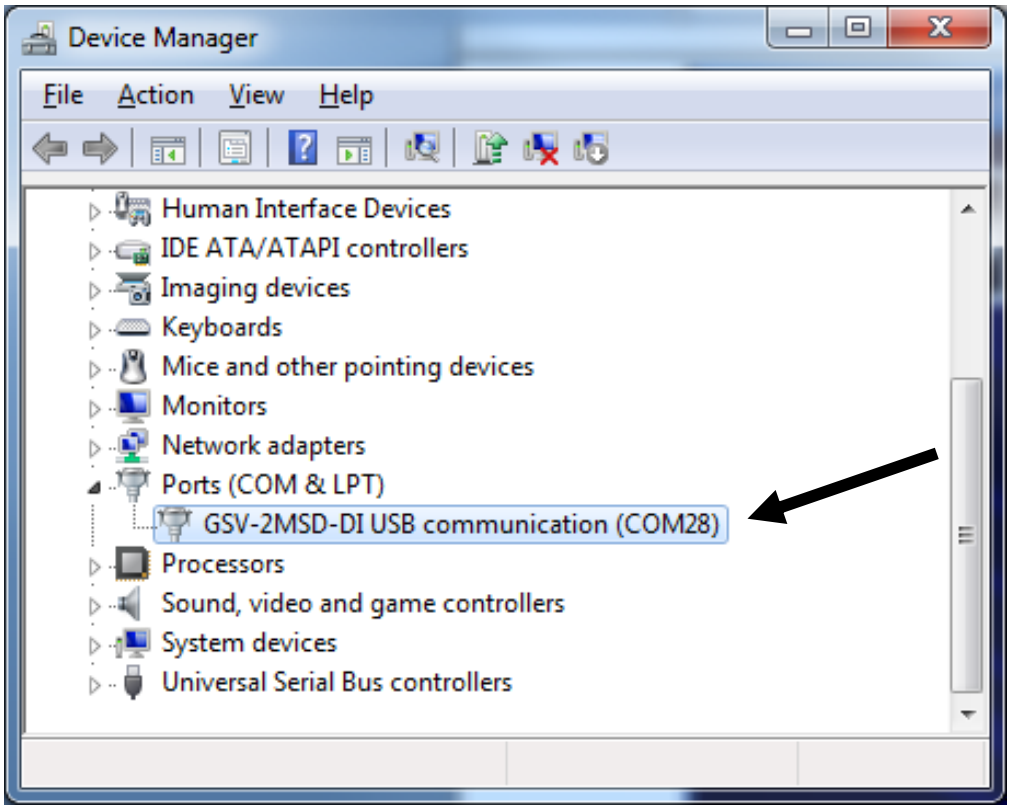


FIGURE 18 - EXAMPLE OF 9330 COMPORT

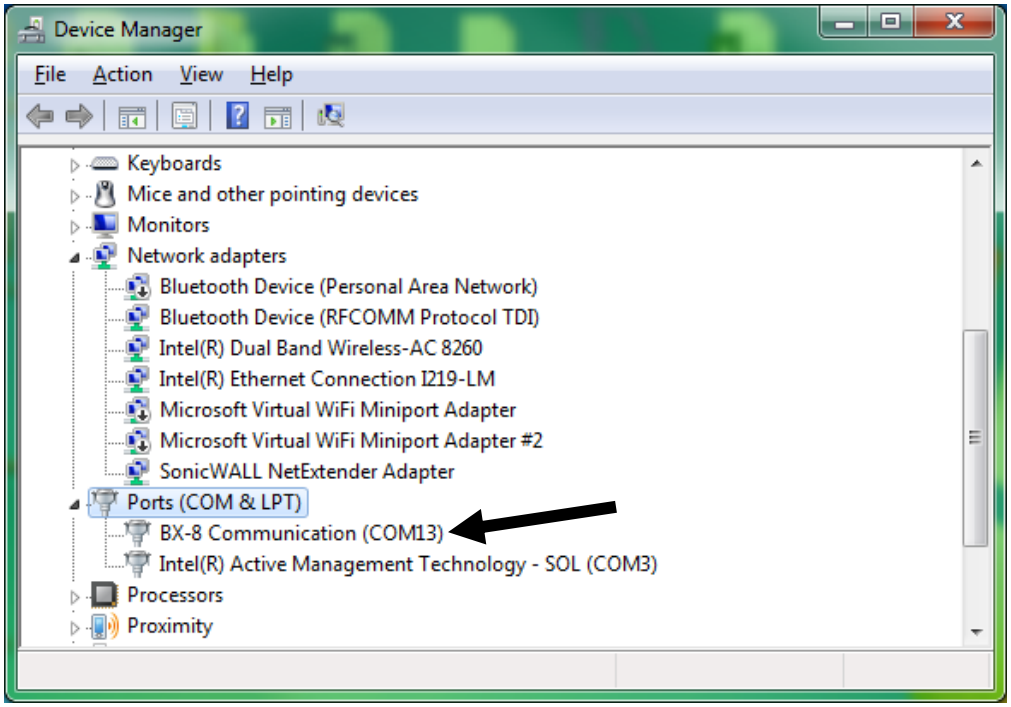


FIGURE 19 - EXAMPLE OF BX8 COMPORT

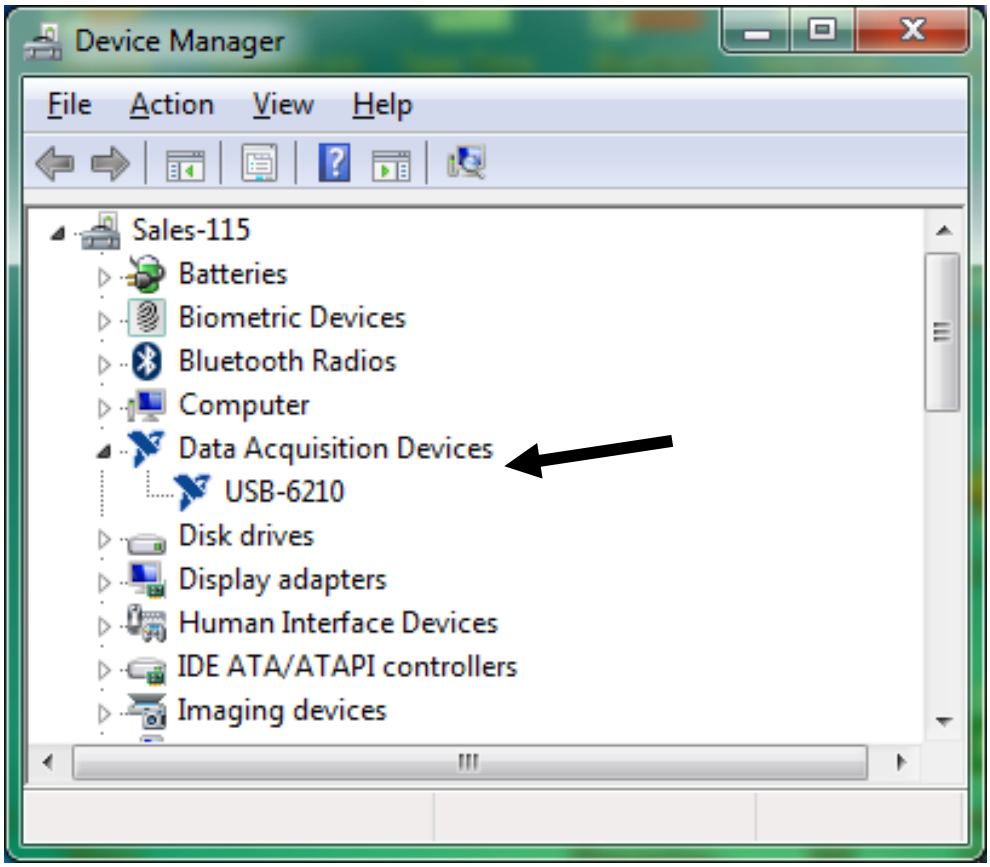


FIGURE 20 - BSC8D INSTALLS AS A DATA ACQUISITION DEVICE

BlueDAQ – Adding a New Channel

1. Adding a New Channel

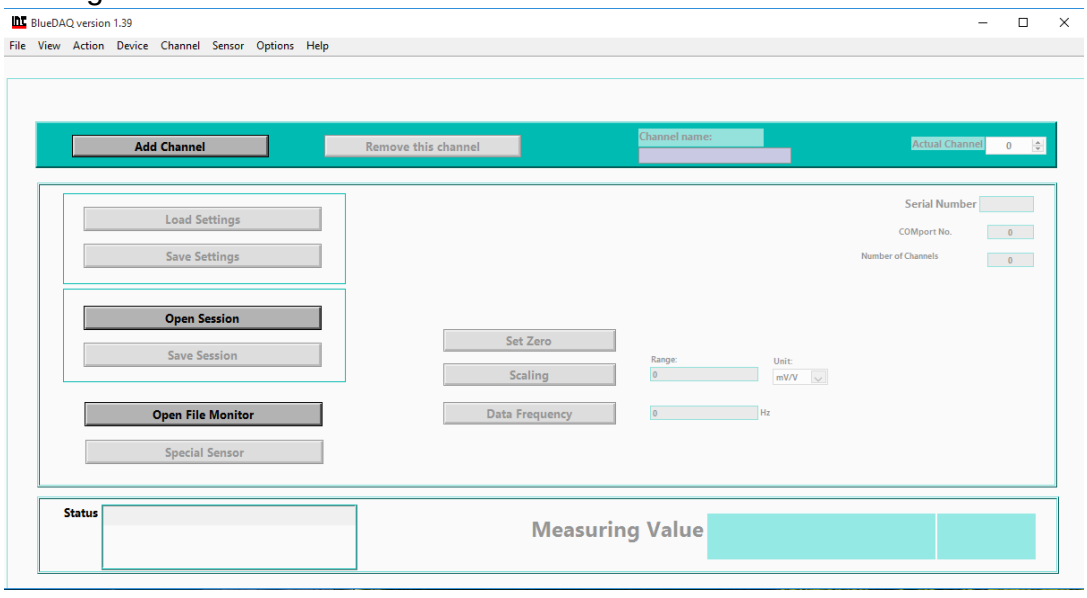


FIGURE 21 - MAIN MENU

2. Under Devicetype, select the device. In this example we are using a BX8.

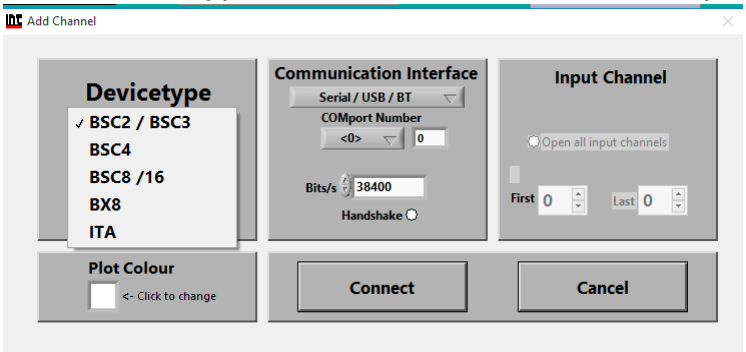


FIGURE 22 - ADD CHANNEL MENU

3. Under Communication Interface, select the correct COM port. In this Example our COMport Number is COM9.

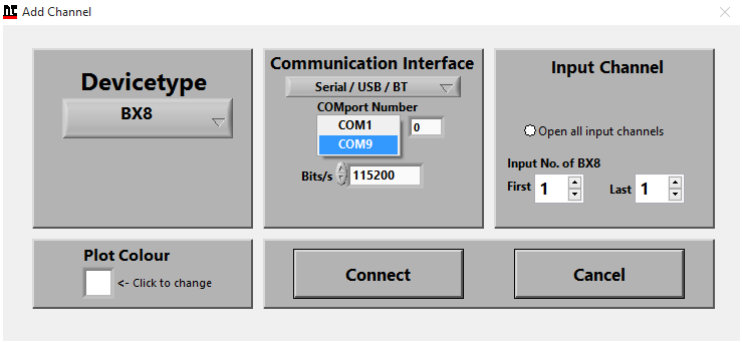


FIGURE 23 - ADD CHANNEL MENU

4. Under Input Channel, select how many channels. In this example we are using a 6 Axis Load Cell, so we will select Last 6.

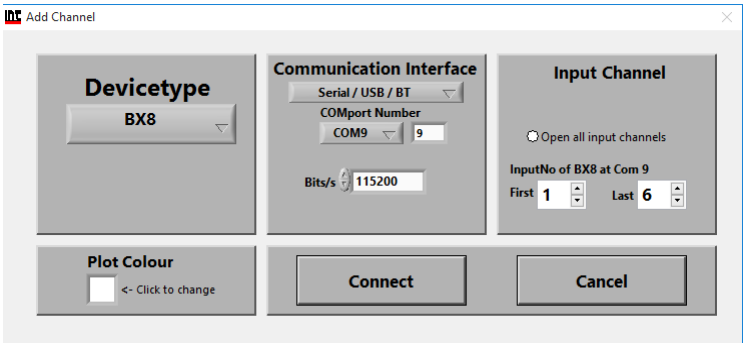


FIGURE 24 - ADD CHANNEL MENU

5. Click Connect

FIGURE 25 - CONNECT

Adding a Sensor with a .Dat File

1. Under the Sensor Option, Click on Multi-axis

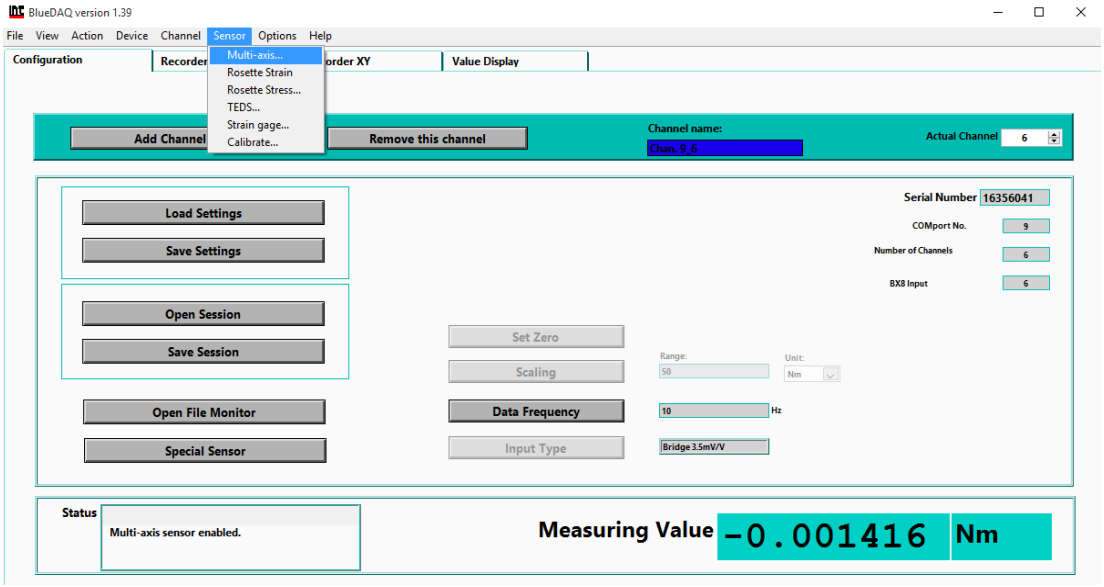


FIGURE 26 -SENSOR DROPDOWN MENU

2. If this is a new Sensor, Click on the Remove button to remove the previous sensor.

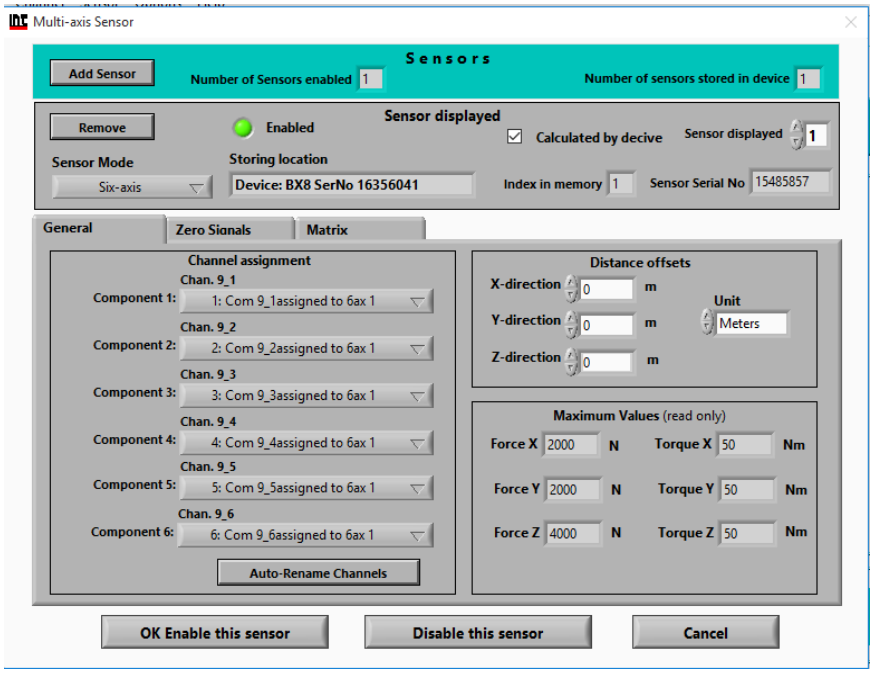


FIGURE 27 - SENSOR MENU

3. Once the Remove button has been clicked, the Channel assignment will reset.

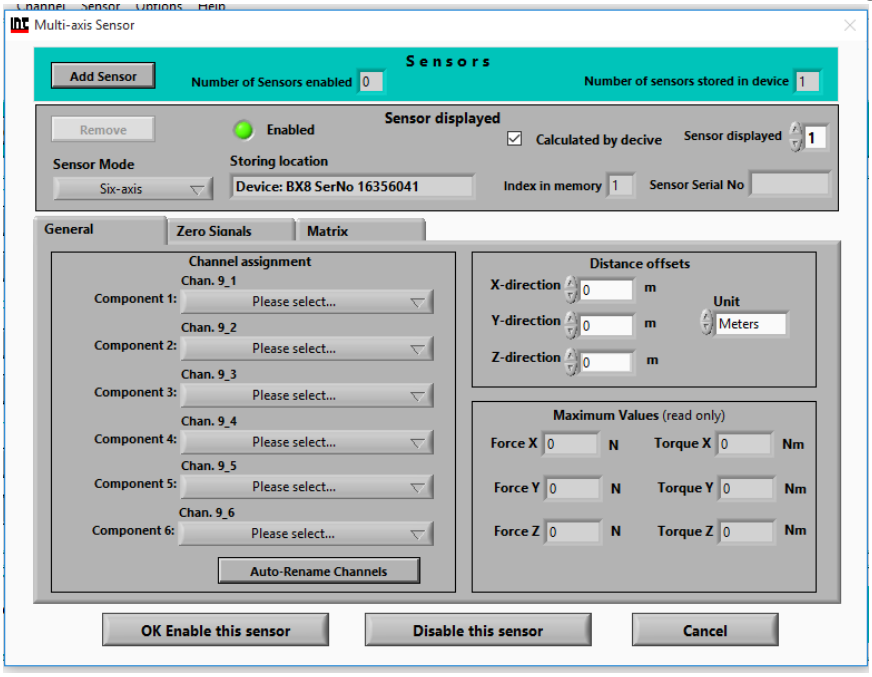


FIGURE 28 - SENSOR MENU, REMOVE BUTTON

4. Click on Add Sensor and Open File / Dir..

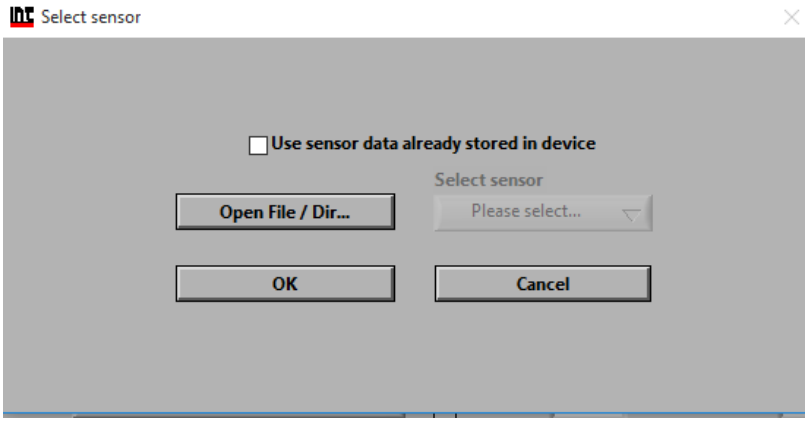


FIGURE 29 - ADD SENSOR MENU

5. In this Example, the Multi-Axis SN is 15485857, so 15485851.dat will be selected.

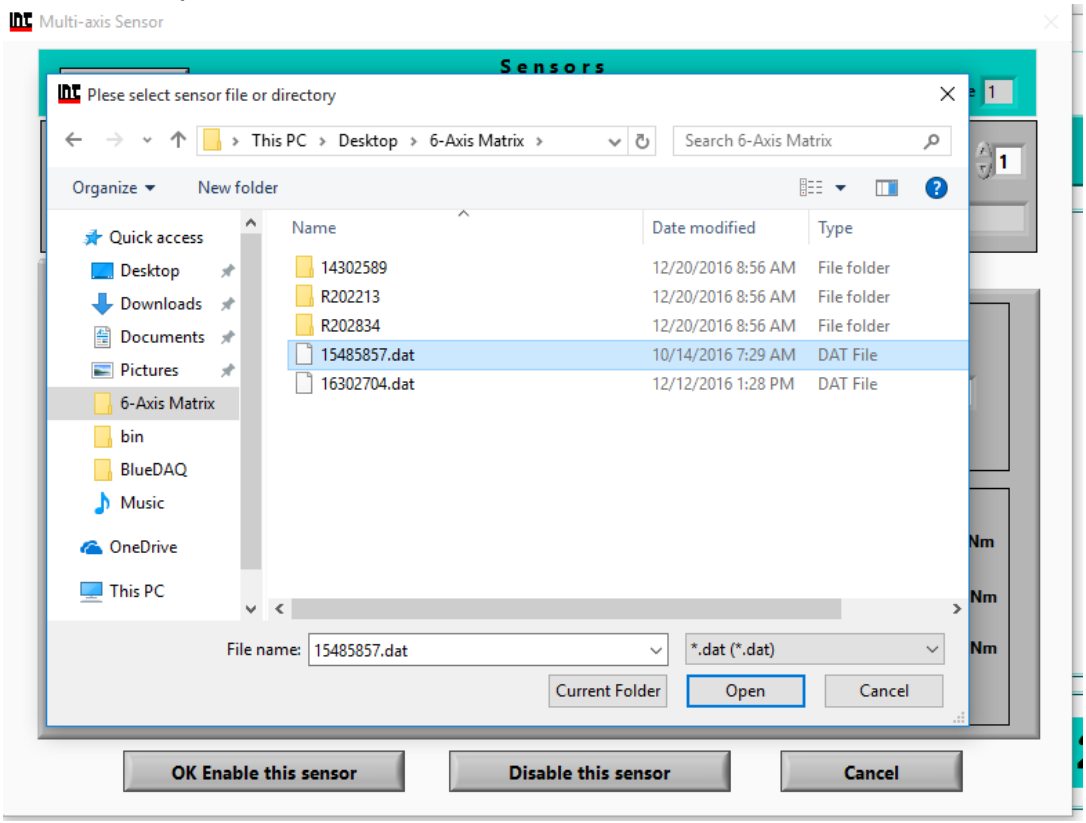


FIGURE 30 - SELECTING THE CORRECT DATA FILE

6. Click OK after selection.

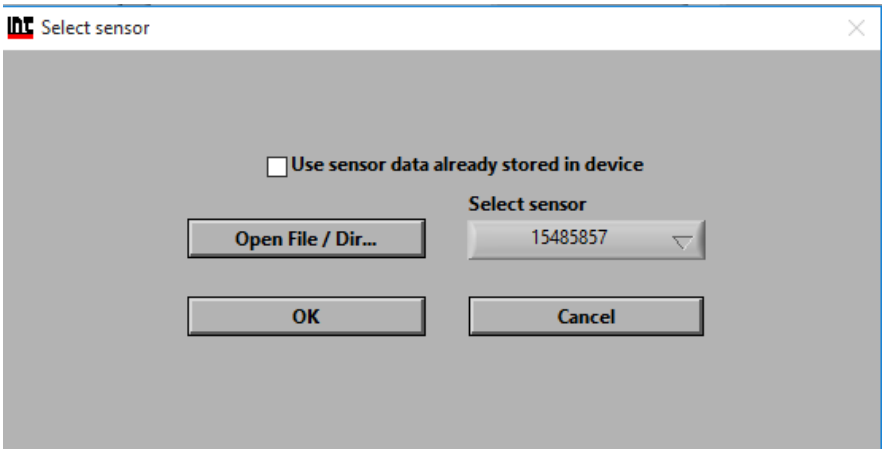


FIGURE 31 - SENSOR DATA SELECTED

7. Verify the Sensor Serial is correct.

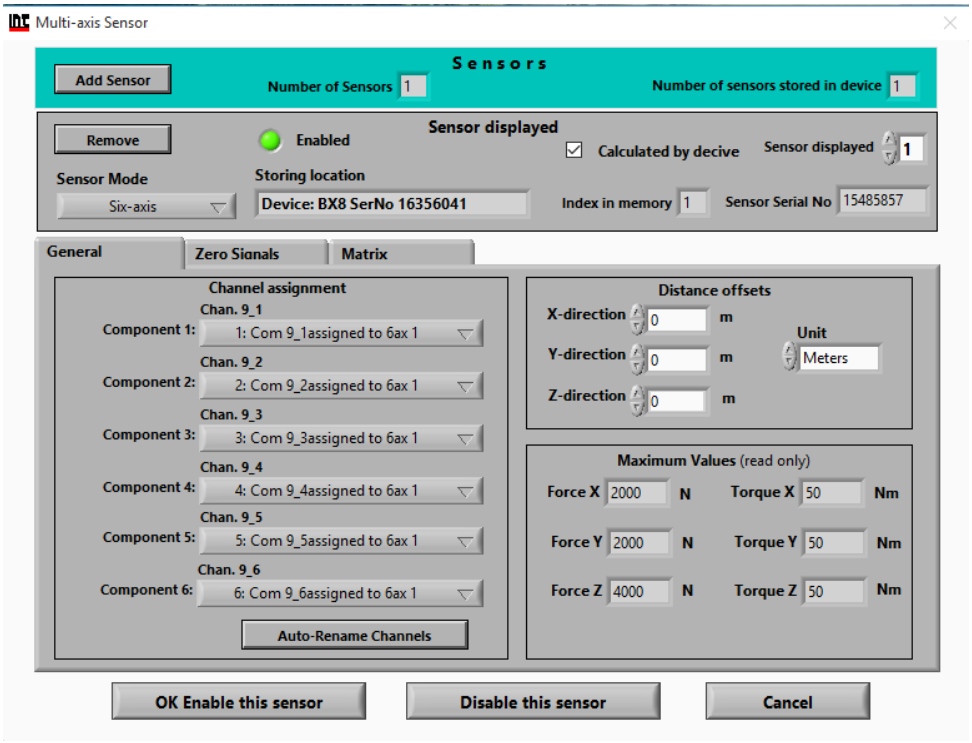


FIGURE 32 - ADD SENSOR MENU - FILE SELECTED

8. Click Auto-Rename Channels to properly assign channels.

FIGURE 33 – AUTO-RENAME CHANNELS

9. The default Channels will change from Chan X_X to ForceX or Torque, depending on the .dat file used.

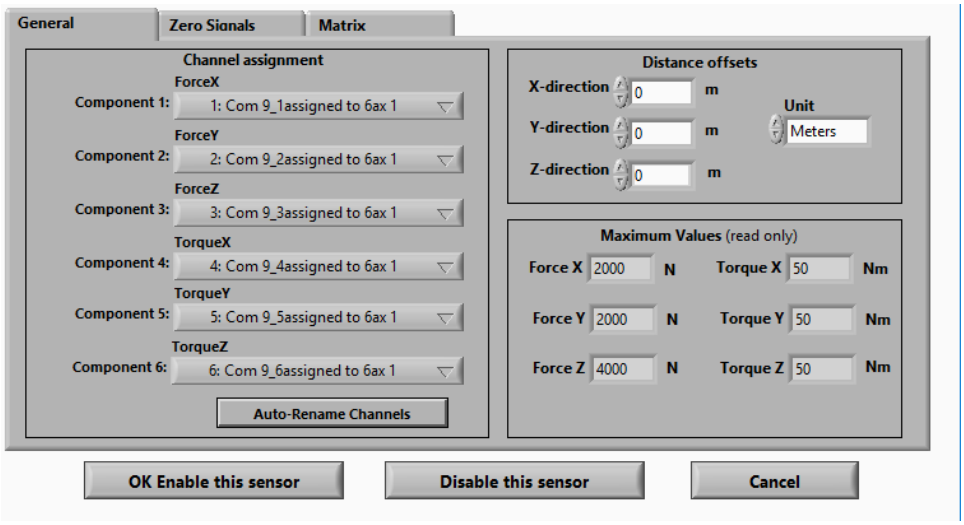


FIGURE 34 - AUTO-RENAME CHANNELS CLICKED

10. Click OK Enable this sensor

FIGURE 35 – ENABLE THIS SENSOR

11. Select Overwrite existing and OK.

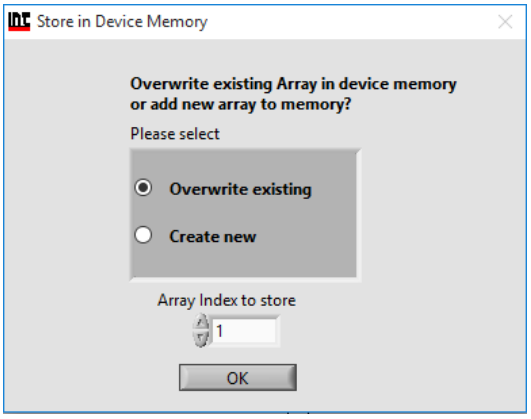


FIGURE 36 - OVERWRITE

12. Enter password (if required), enter the correct pass and click OK.

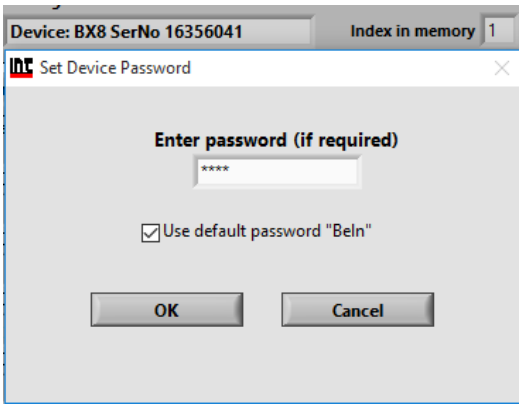


FIGURE 37 – PASSWORD REQUIRED

Adding a Sensor Manually without a .Dat File

1. Run BlueDAQ from the start menu. After the program launches click “ADD CHANNEL”

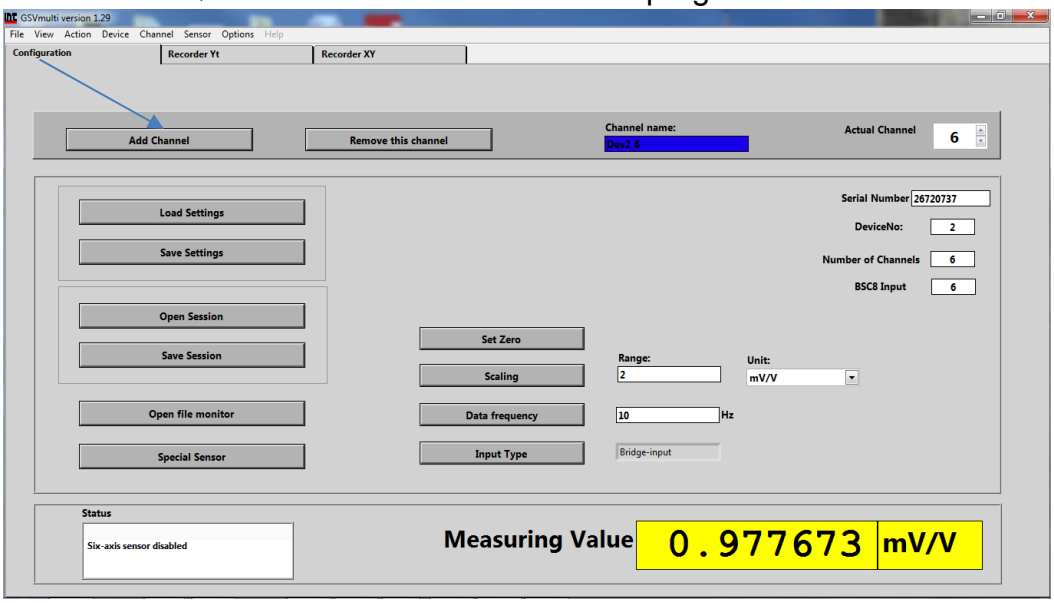
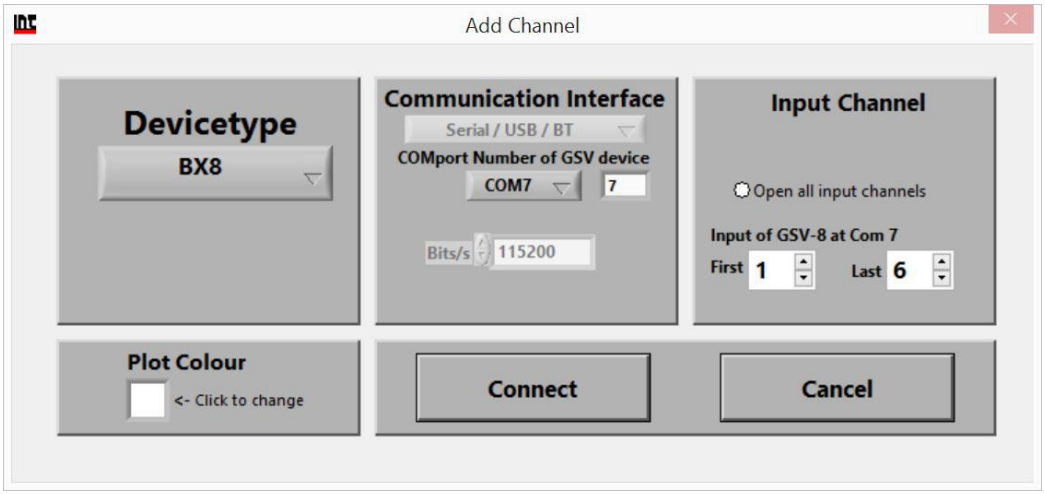


FIGURE 38 - ADD CHANNEL

2. In the Add Channel dialog box
   2.1. Click Devicetype drop-down and select BSC4, BSC8, BX8, or BSC2 (9330)

3. Click the Device dropdown box and select the device, select the COM Port (See Device Manager if unknown) and open the correct amount of input channels (First = 1 and Last = total # of channels for device). For Model 9330, you will not be allowed to change the number of channels. If using the BSC8/BX8 with a 6-axis sensor then stop after opening 6 channels and proceed to step 6.12.



4. Click Connect

FIGURE 39 - ADD CHANNEL MENU

5. BSC8 has a slightly different add channel box. Select Dev1 instead of Com port. Please remember to open the needed amount of input channels.

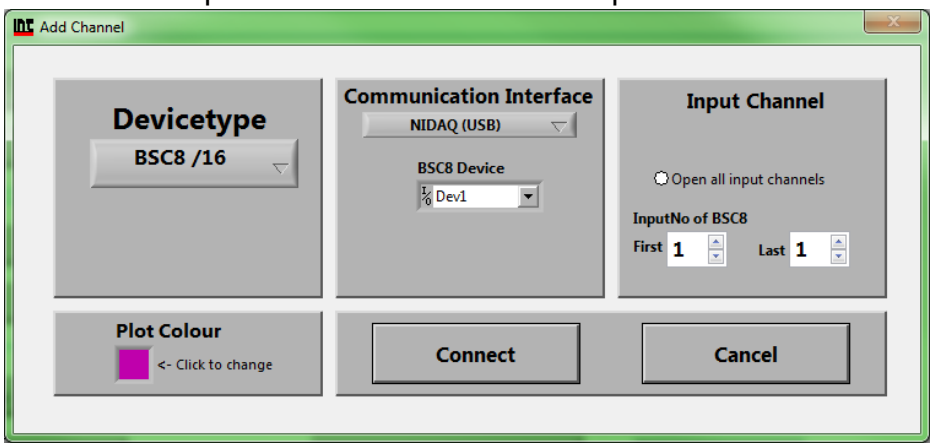


FIGURE 40 - EXAMPLE BSC8 DEVICE

6. Each channel must now be scaled using the "SCALING" dialog box. Each channel must be scaled independently. If the BSC8 was purchased with Interface load cells and a System Setup and Scaling then the scaling values will be taken from the "Load Cell / BSC8 Digital Bridge Amplifier Calibration Certificate"

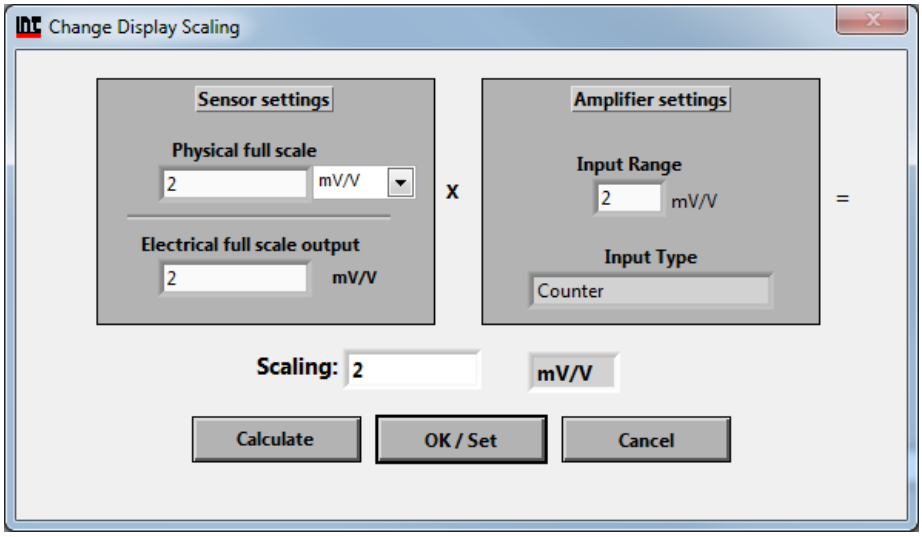


FIGURE 41 - EXAMPLE OF SCALING

6.1. Physical full scale is typically the capacity of the sensor.

6.2. Electrical full scale output is the output of the sensor at the Physical full scale.

6.3. Input Range is always 2 mV/V and should not be changed.

7. Example scaling using Load Cell / BSC8 Digital Bridge Amplifier Calibration Certificate”

ADVANCED FORCE MEASUREMENT

INTERFACE • 7401 E. BUTHERUS DRIVE, SCOTTSDALE, AZ 85260 USA • (800) 947-5598 • (480) 948-5555 • FAX (480) 948-1924
www.interfaceforce.com • gen@interfaceforce.com

Load Cell / BSC8 Digital Bridge Amplifier Calibration Certificate

The sensitivity of the following instrument was programmed or adjusted using a reference mV/V source.

Customer: [redacted]
Address: [redacted]

S.O.: [redacted]
P.O.: [redacted]

Interface, Inc. Model: BSC8D-C12 Serial: R256149

Calibration conditions: Temperature (° F): 74 R.H. (%): 32
mV/V Standard: Interface Model CX-0610 #: 704E NIST Trace: 656414
Calibration Due: Cal Due: 09-Jun-15 *Uncertainty of Standard: 0.001% RDG*

Excitation: 5 VDC

Mode Simulated	Standard (mV/V)	Measured Amplifier Net Reading
Compression	2.0001	102.833

The above sensitivity of the Amplifier is intended for use with the following transducer which, when interconnected, will produce the outputs listed below, based on straight line sensitivity of the Amplifier and best fit line (SEB) outputs of the transducer.

Transducer Mfg: Interface Model: LBS-100-864 Serial: T667819
Transducer–Amplifier Interconnection polarity (Normal [CT Cable] / Reversed [CC Cable]): normal

Mode	Transducer Output (mV/V)	Reference Force (lbf)	Net Reading at Reference Force
Compression	1.94492	100	99.995

Channel: 1

Important: Zero or offset adjustments may be altered by the user without affecting this calibration. Span or gain adjustments must not be disturbed.

Calibration by: Tin Nguyen Date: 20-Feb-15

Results relate to above serial numbers only. Do not reproduce this report except in full or with Interface, Inc. written approval.

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FIGURE 42 - CALIBRATION DATA SHEET – AMPLIFIER CALIBRATION CERTIFICATE

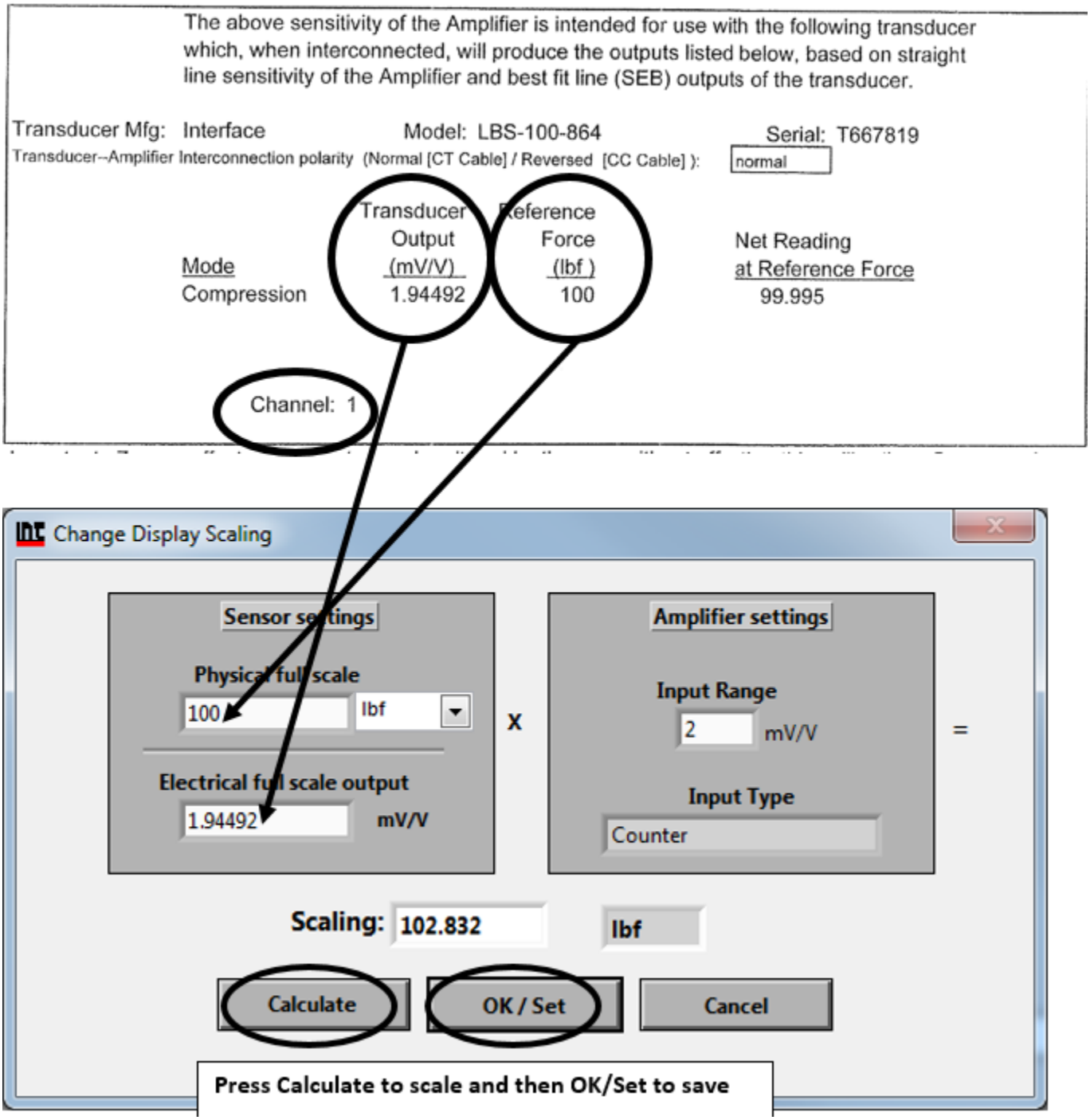

FIGURE 43 - SCALING USING CALIBRATION CERTIFICATE

6 Example scaling a channel using model WMC-100 load cell with 100 lbf capacity and 1.9587 mV/V output. After entering the values into the dialog box you must click “Calculate” and then “OK/Set”.

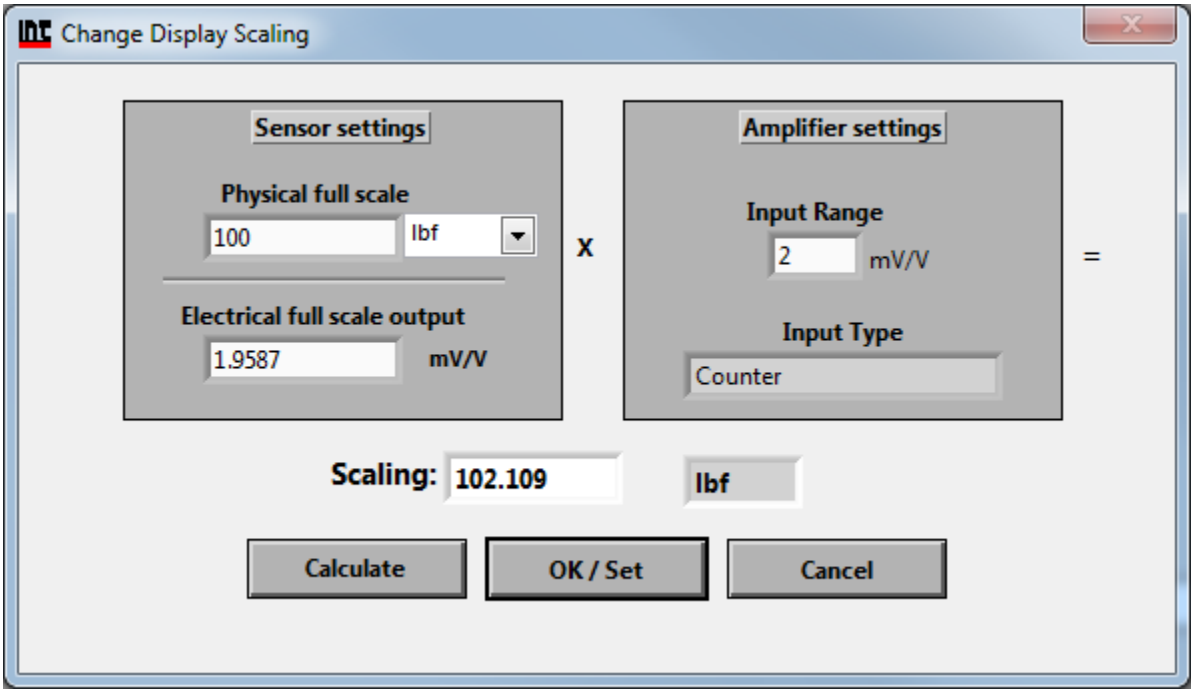

FIGURE 44 - EXAMPLE OF CALIBRATION FOR A WMC-100 LOAD CELL

7 Once each channel has been scaled the software is ready to take measurements. You can now skip to step 6.16.

8 For Six-Axis sensors only. Click “Special Sensor”

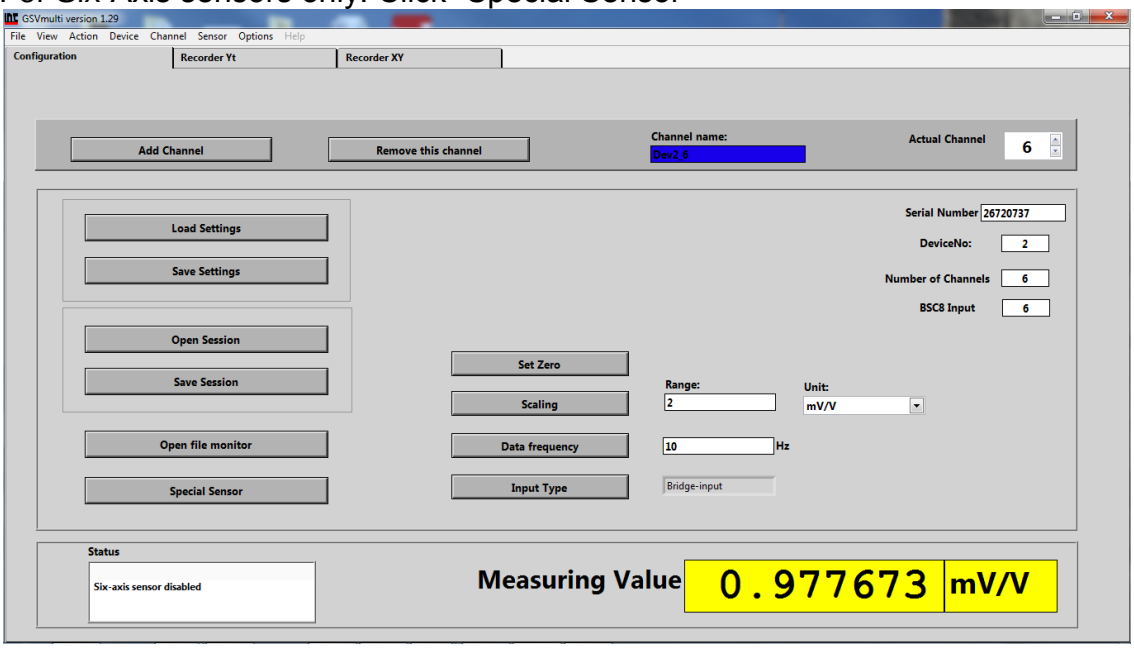

FIGURE 45 - 6 AXIS SENSORS

9 Select sensor type “Multidimensional sensor” and click OK

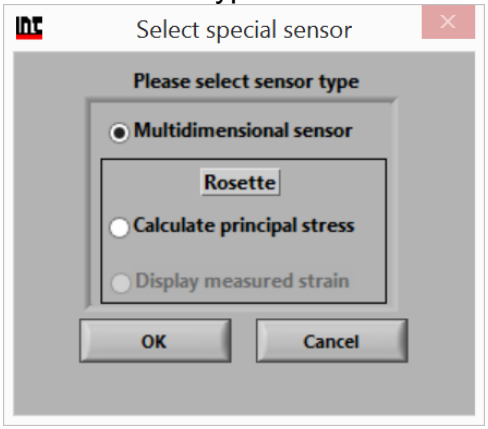

FIGURE 46 - MULTIDIMENSIONAL SENSOR

10 Select Add Sensor. You will be prompted to map the program to the location of the Matrix.

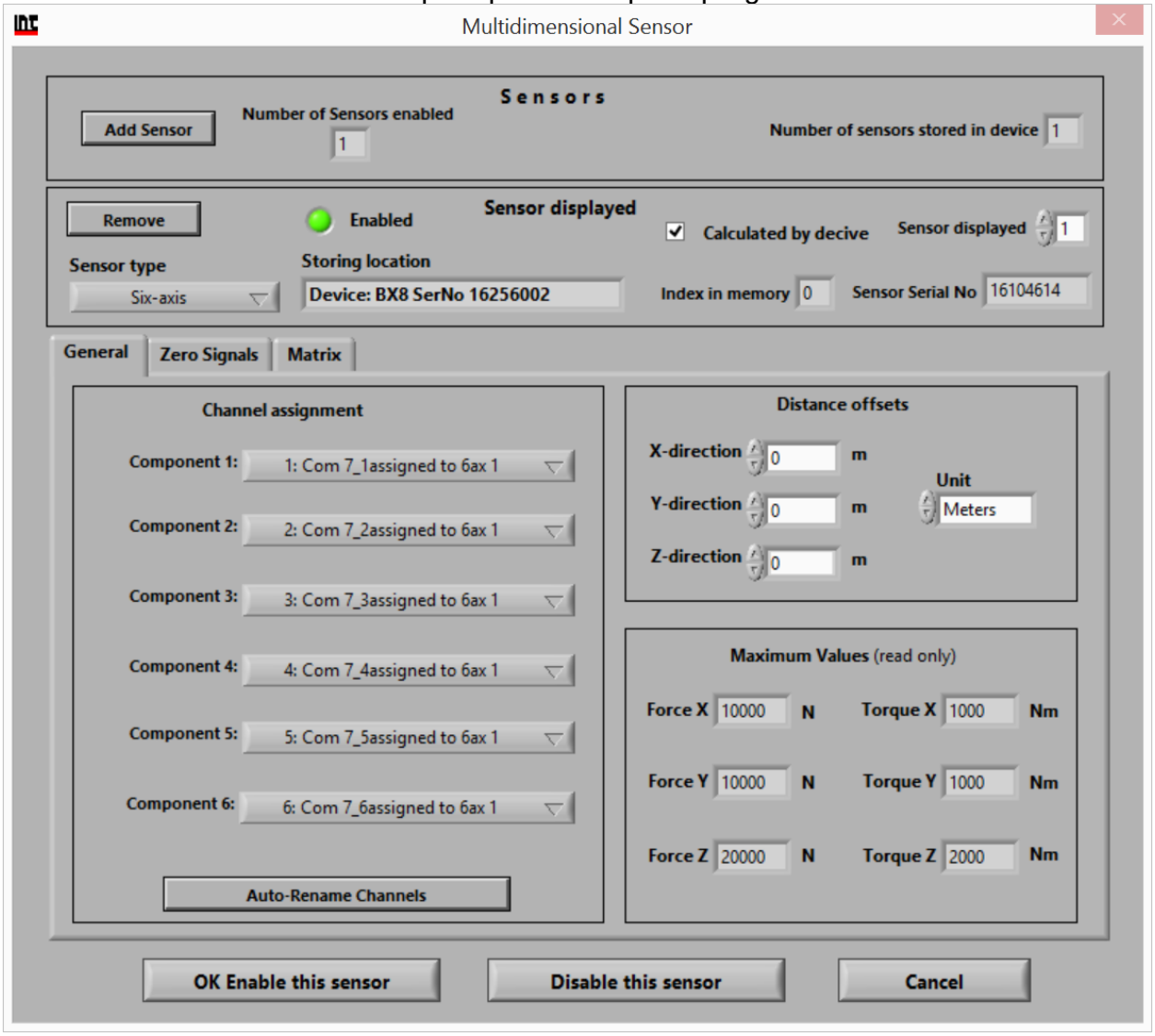

FIGURE 47 - ADD SENSOR

11 Select Change Dir.. and select the folder containing the calibration matrix. This folder is located on the USB flash drive and will be labeled with the transducer serial number.

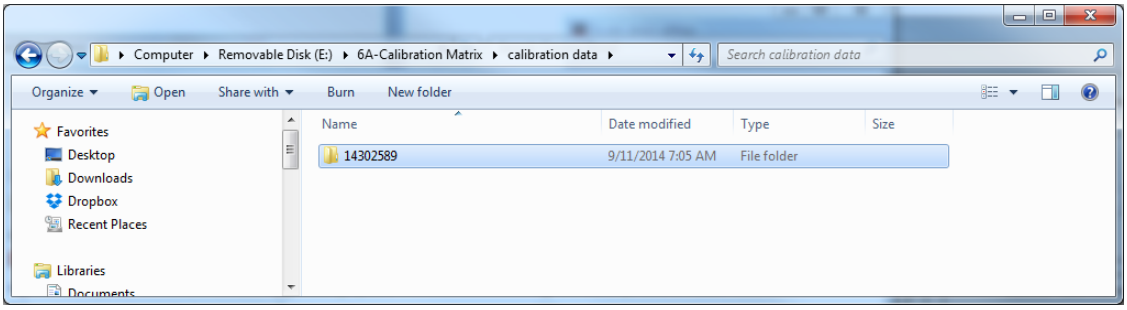

FIGURE 48 - FILE LOCATION

12 Click “Auto-Rename Channels” and then “OK Enable this sensor

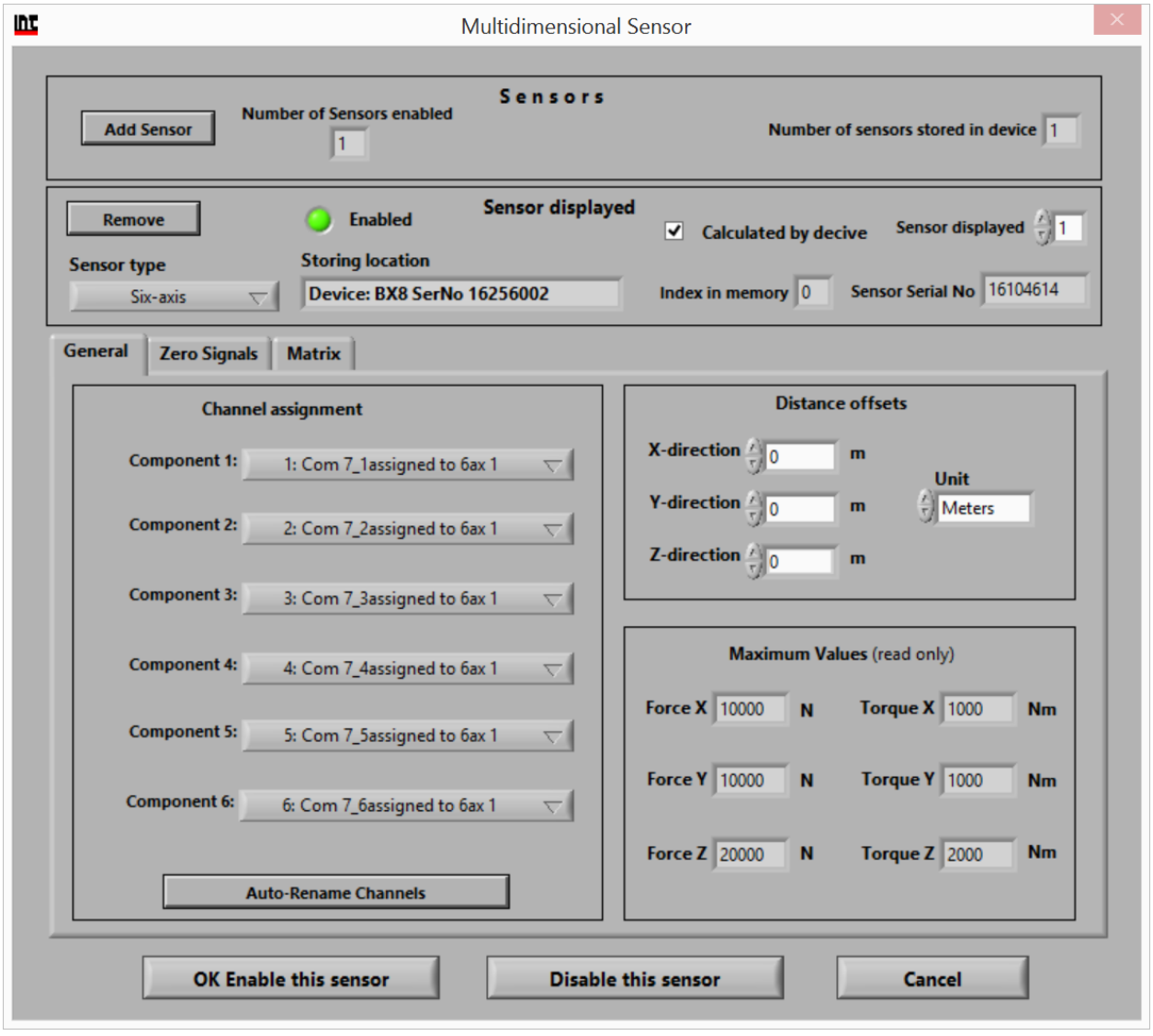

FIGURE 49 - AUTO-RENAME

13 Add the distance offsets for geometry correction. The origin is at the top center surface of the sensor. For example, if the loads are applied 2” from the top surface then the Z-Direction offset would be entered as 2 inch.
14 The software is now ready to use. You should **“Save Session”** and then you can “**Load Session”** next time the software runs so you won’t have to repeat the channel and scaling or matrix adding process each time the software is opened.
15 When “Load Session” is clicked the settings from the last Session are used. You can also Save and Load Settings

Distance Offset

1. To change the distance of the origin, this setting may be access in the sensor option

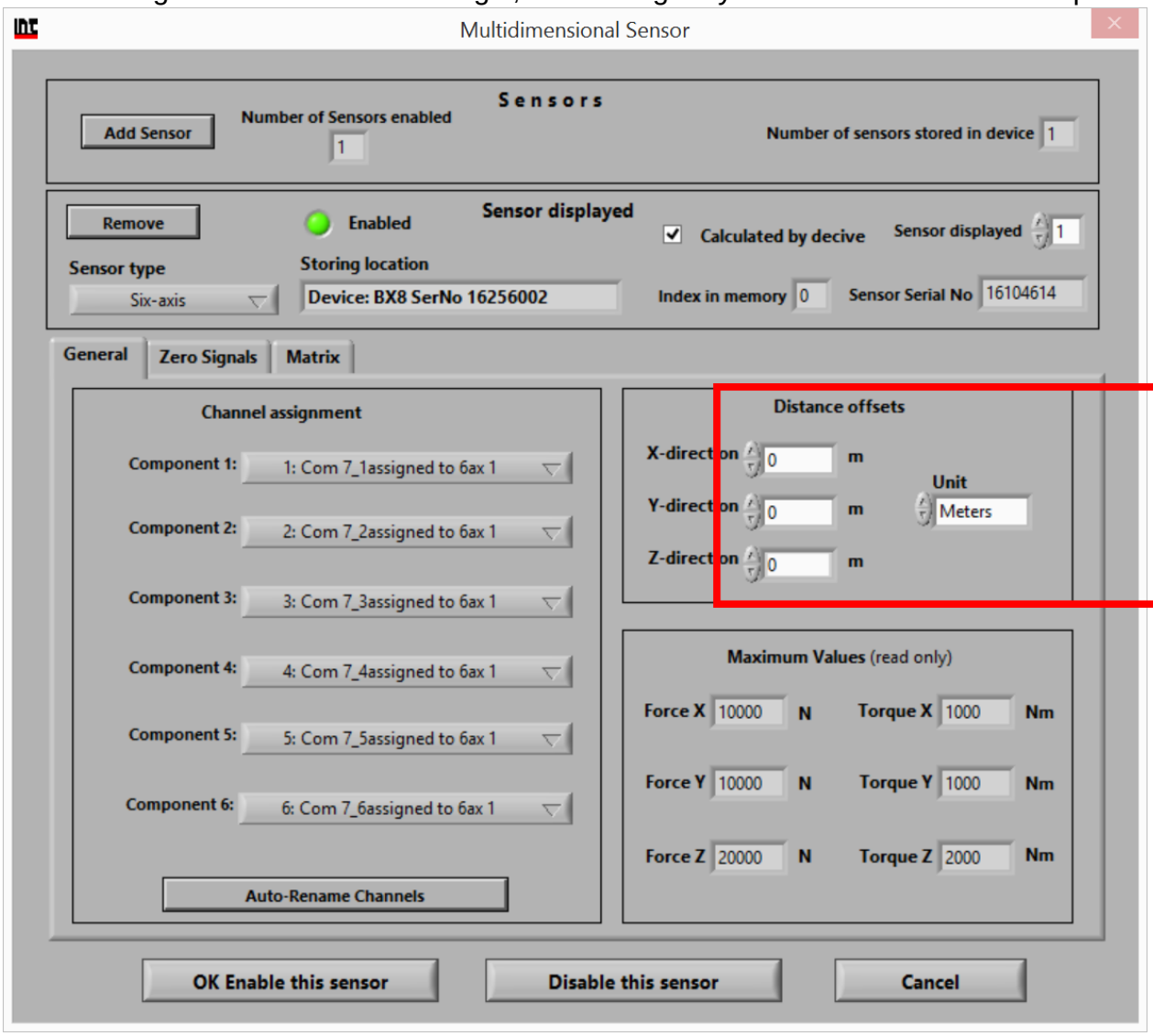

FIGURE 50 - DISTANCE OFFSET

2. Select the corresponding direction and the distance.
3. Can be set in meters or millimeters.

Measurement and Recording

4. Click Set All Zero before measuring

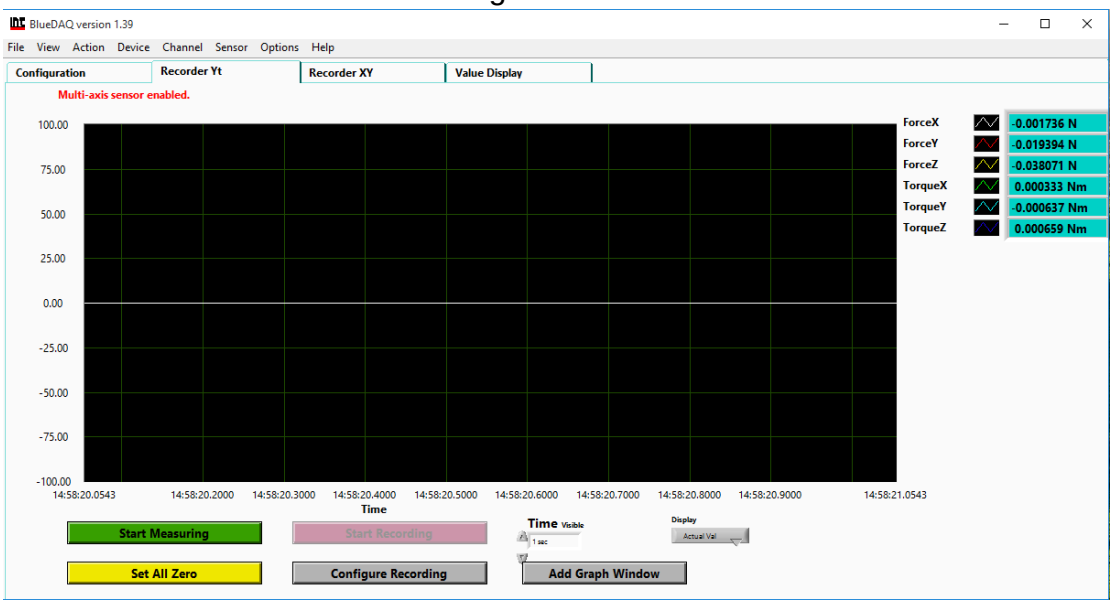

FIGURE 51 - ZERO VALUES

5. Click YES

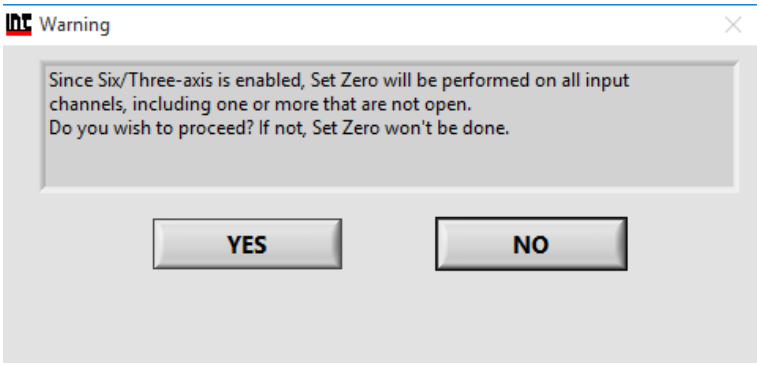

FIGURE 52 – PROCEED WITH ZERO RESET

6. Click OK to Start Measuring

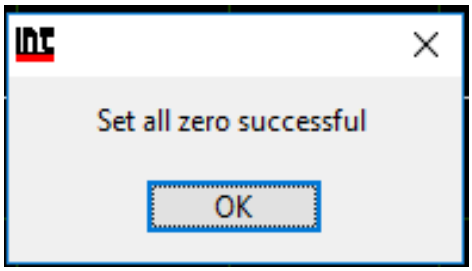

FIGURE 53 - SUCCESSFUL ZERO

7. Click Start Measuring

FIGURE 54 - MEASUREMENT

8. Recording Options are available.

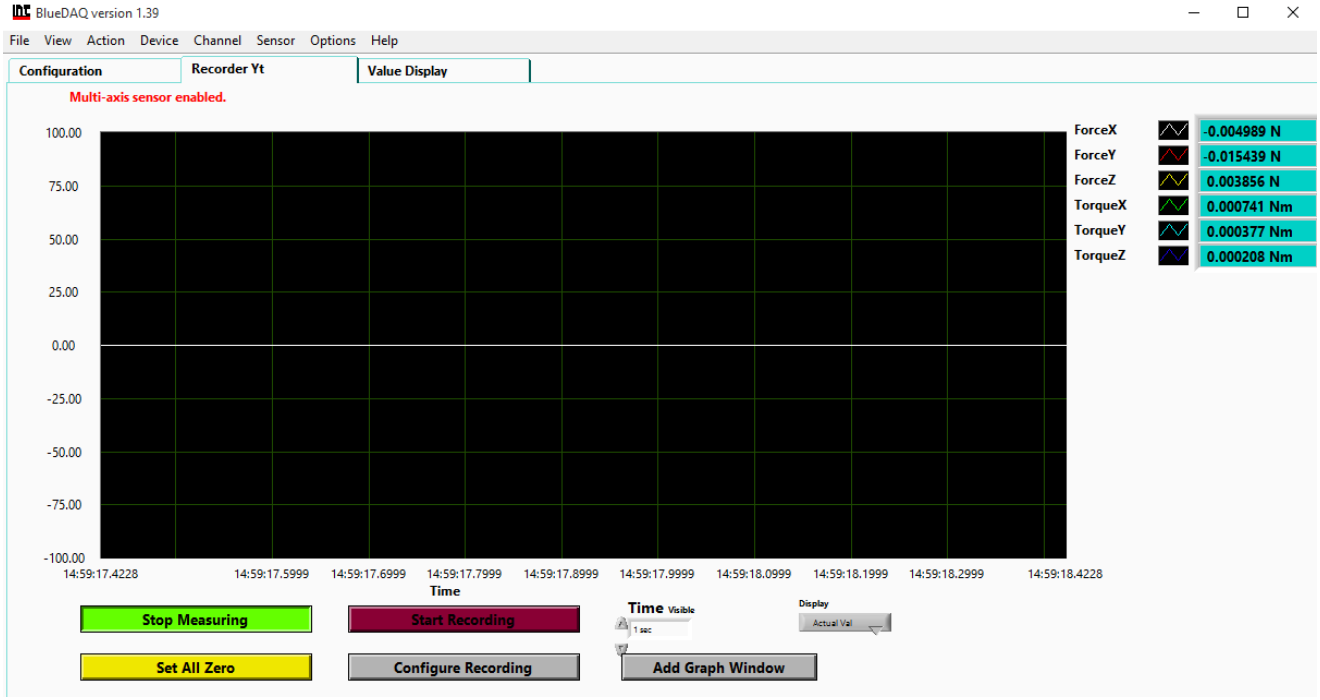

FIGURE 55 - MEASUREMENT INITIATED

9. Recorder Tab, measurements of all Axis.

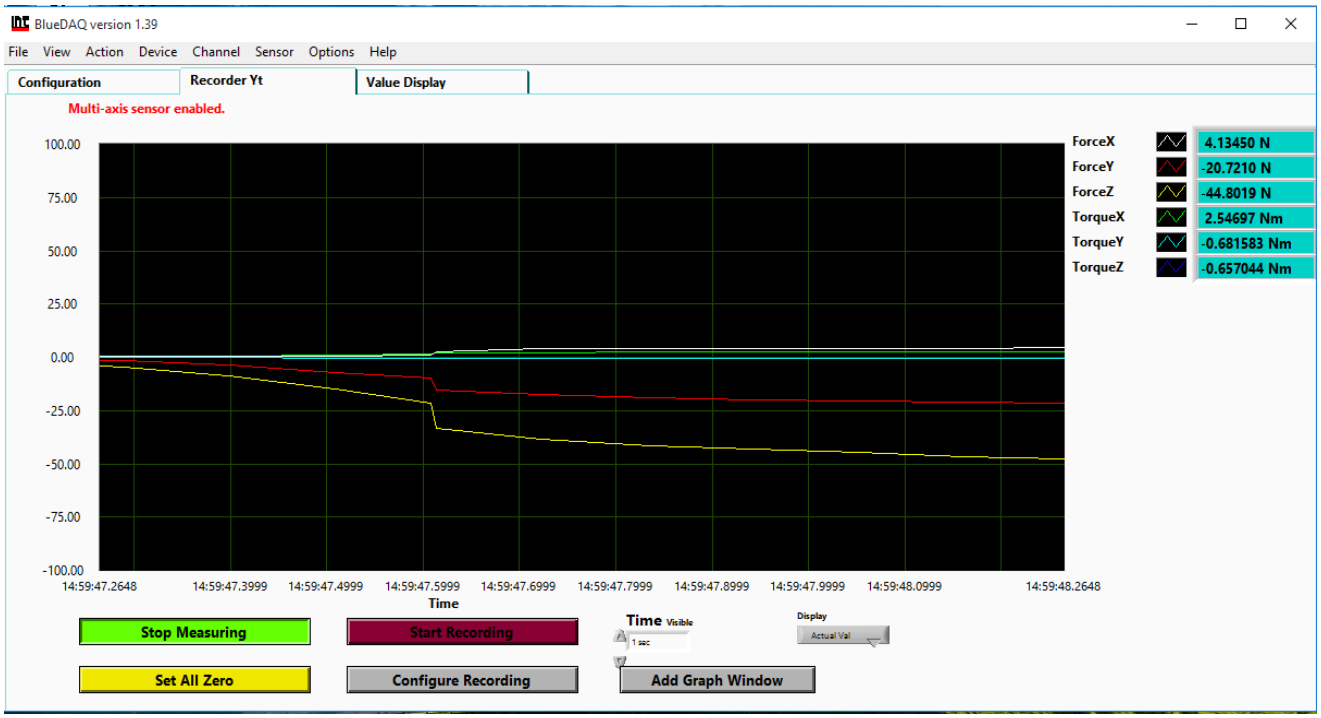

FIGURE 56 - VALUES MEASURED

10. Value Display shows values in each Axis.

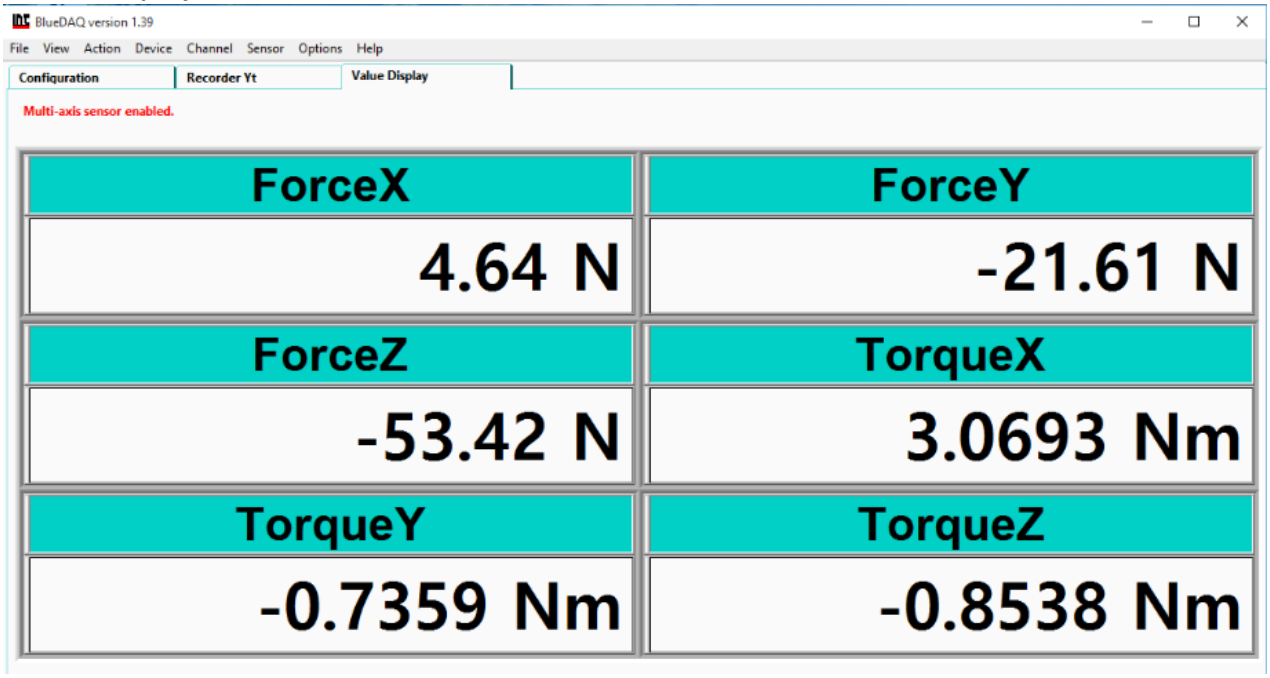

FIGURE 57 - VALUE DISPLAY SCREEN

BlueDAQ Menus

File

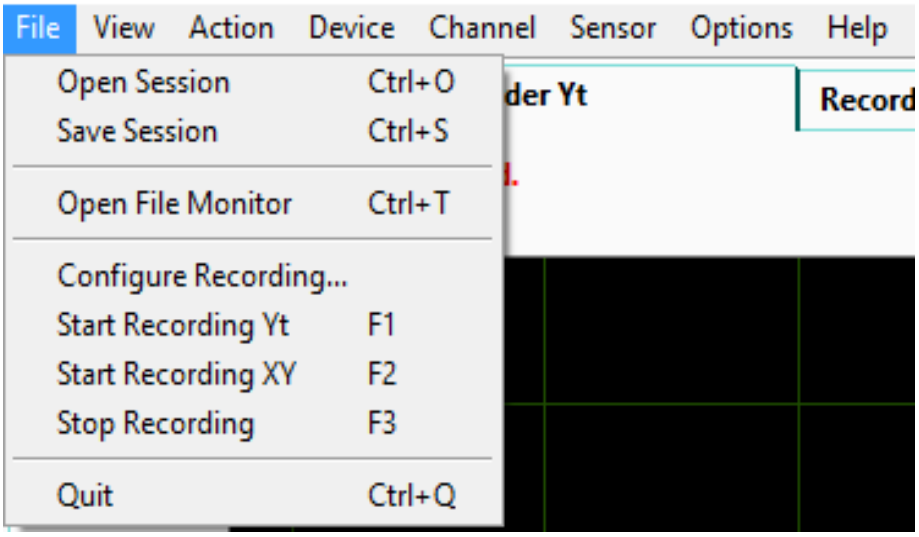

FIGURE 58 - FILE

1. Open Session allows you to open a previous session and start where you left off.

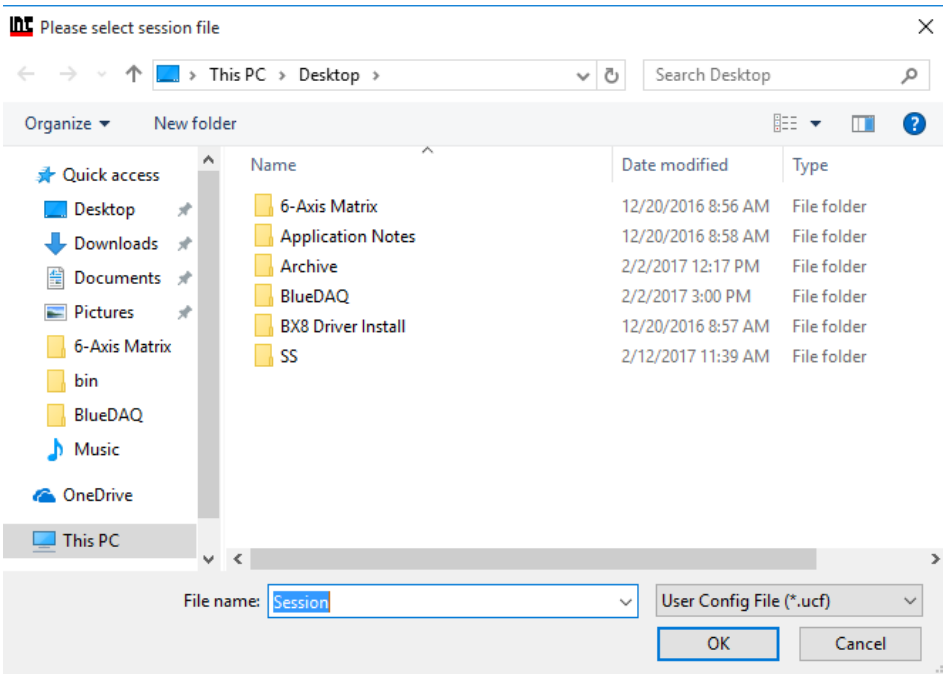

FIGURE 59 - OPEN SESSION

2. Save Session allows you to save your session

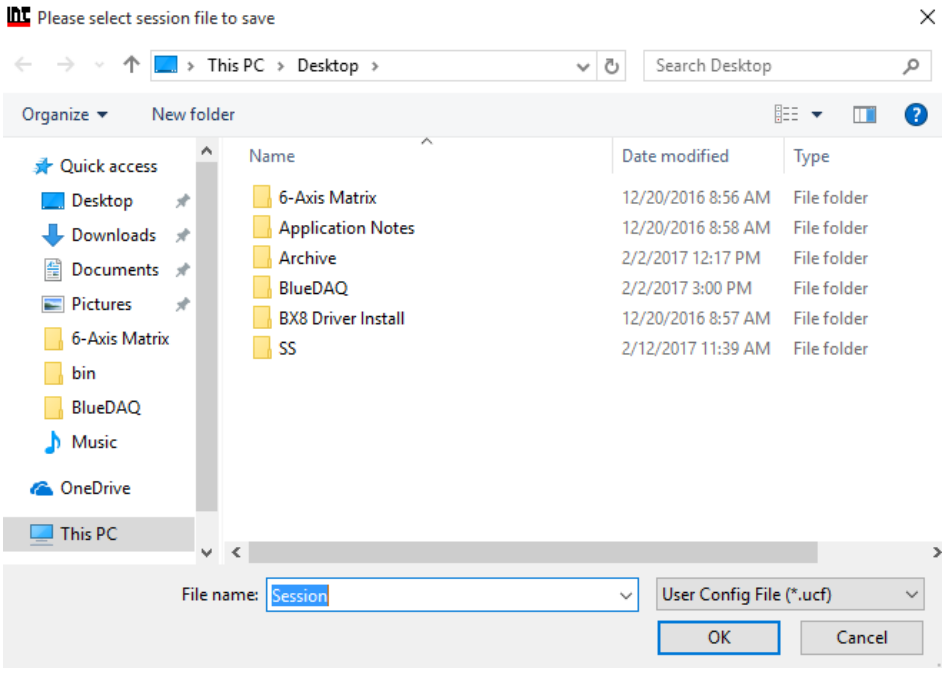

FIGURE 60 - SAVE SESSION

3. Open File Monitor allows you to open previous monitor file.

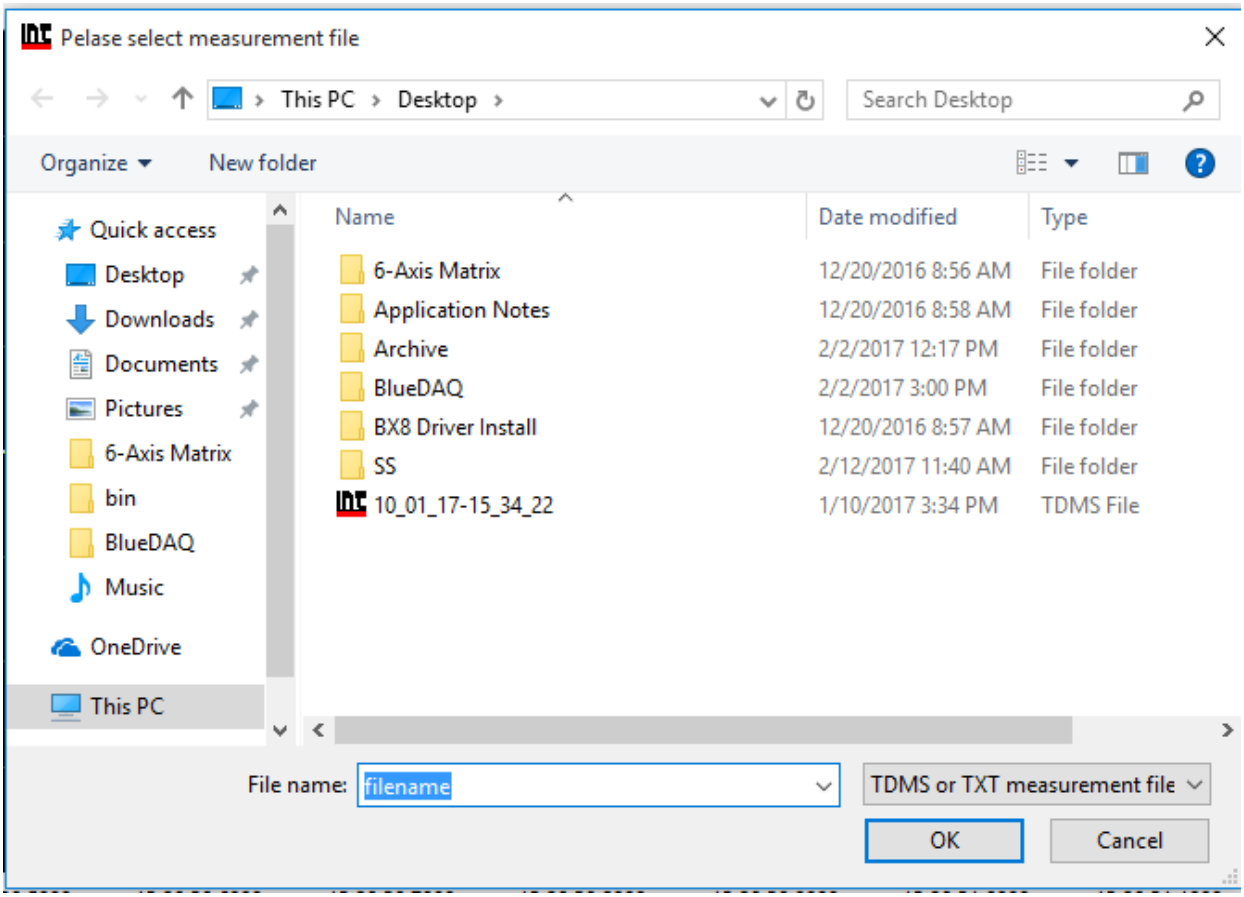

FIGURE 61 - OPEN FILE MONITOR

4. Configure Recording
   4.1. Save Memory Data, allows you to save data of the recorded value.
      4.1.1. All available values
      4.1.2. Number of values
      4.1.3. Available Last Time
      4.1.4. Data Available

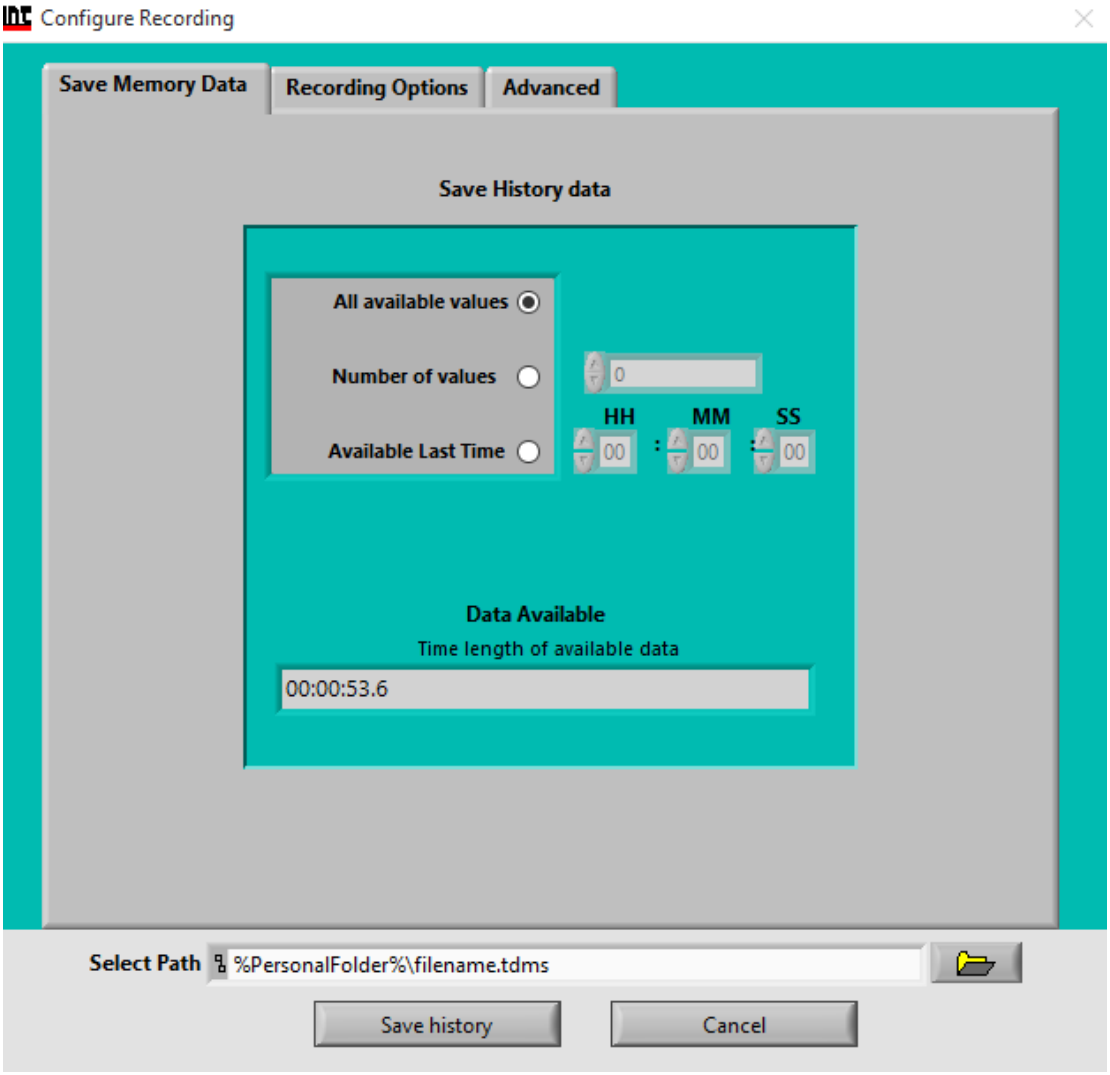

FIGURE 55 - SAVE MEMORY DATA

4.2. Recording Options

4.2.1. Manually allows you to choose the run and stop time of recording.

4.2.2. Automatically will choose the run and stop time.

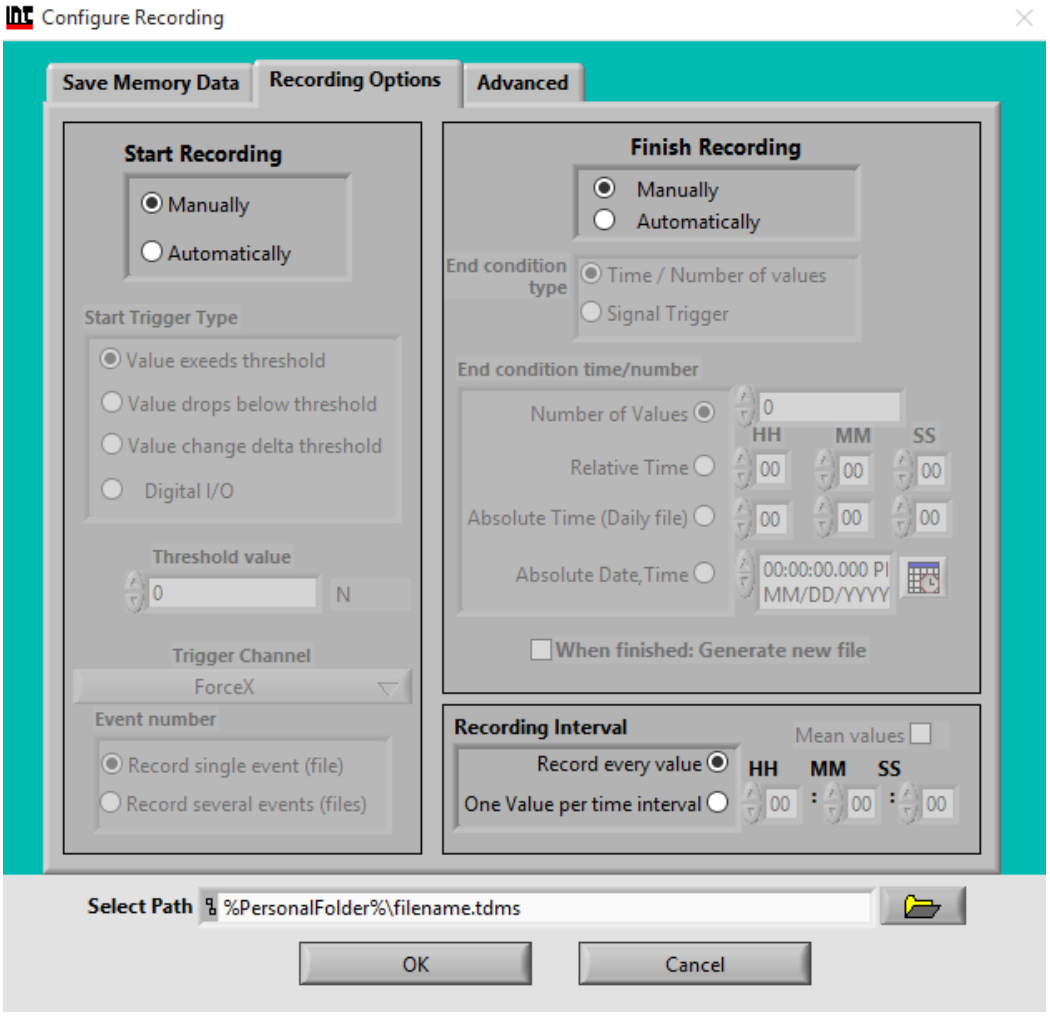

FIGURE 62 - RECORDING OPTIONS

4.3. Advanced

4.3.1. Allows you to choose the timestamp, record hidden channels and create a second file with filters.

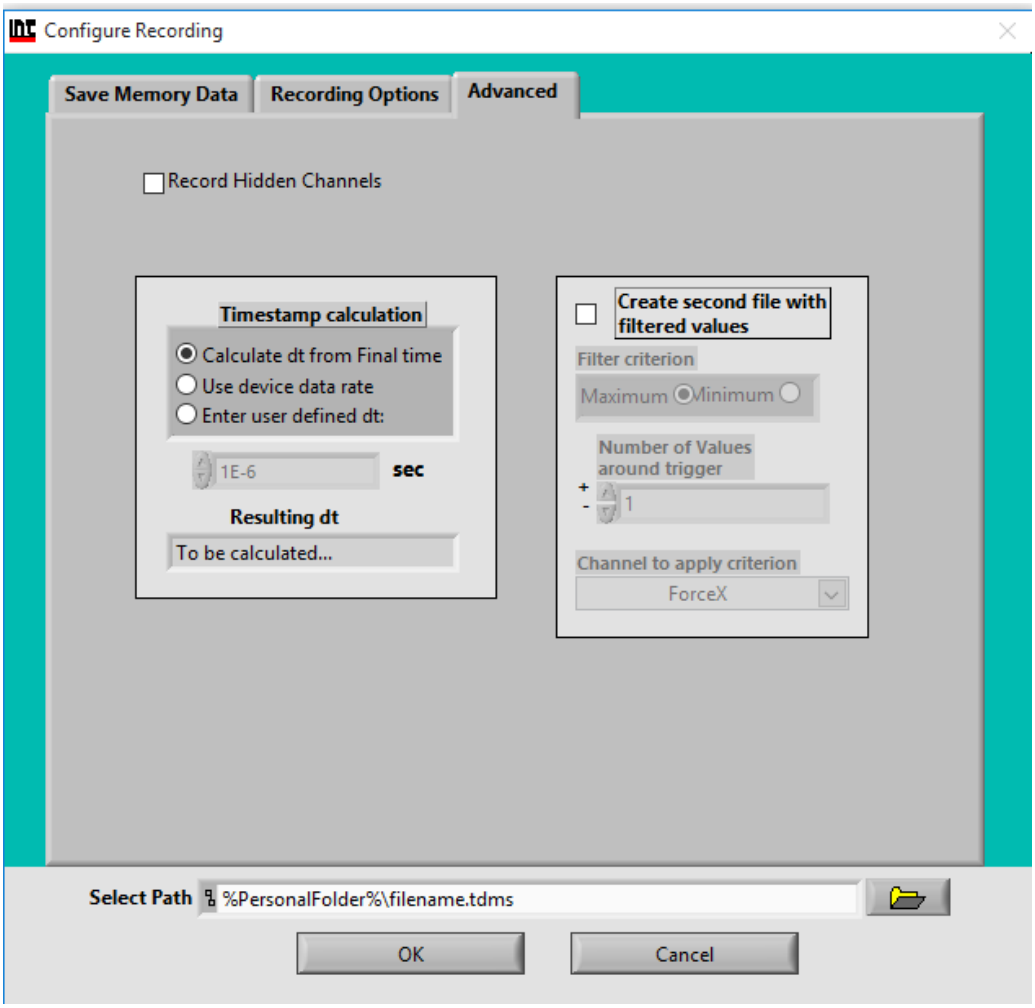

FIGURE 63 - ADVANCED

View

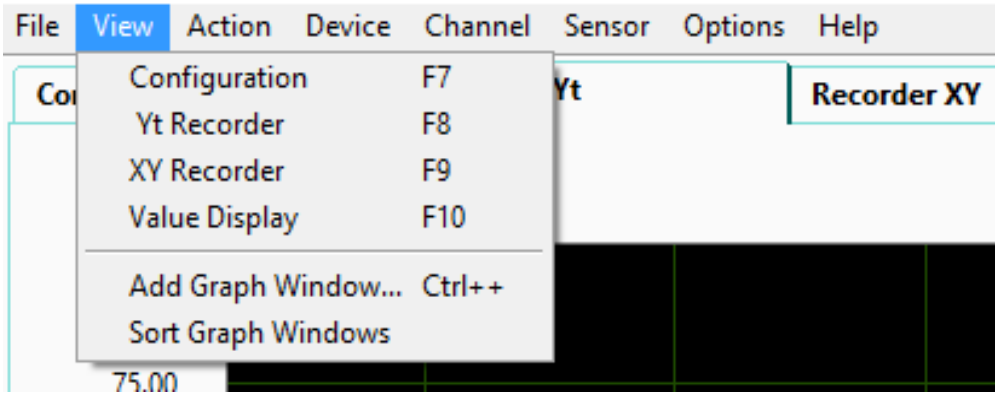

FIGURE 64 – VIEW

1. Configuration
   1.1. Allows configurations of Axis to be viewed.

2. Yt Recorder
   2.1. Shows only the Yt Axis

3. XY Recorder
   3.1. Shows only the XY Axis

4. Value Display
   4.1. Shows all Axis and values

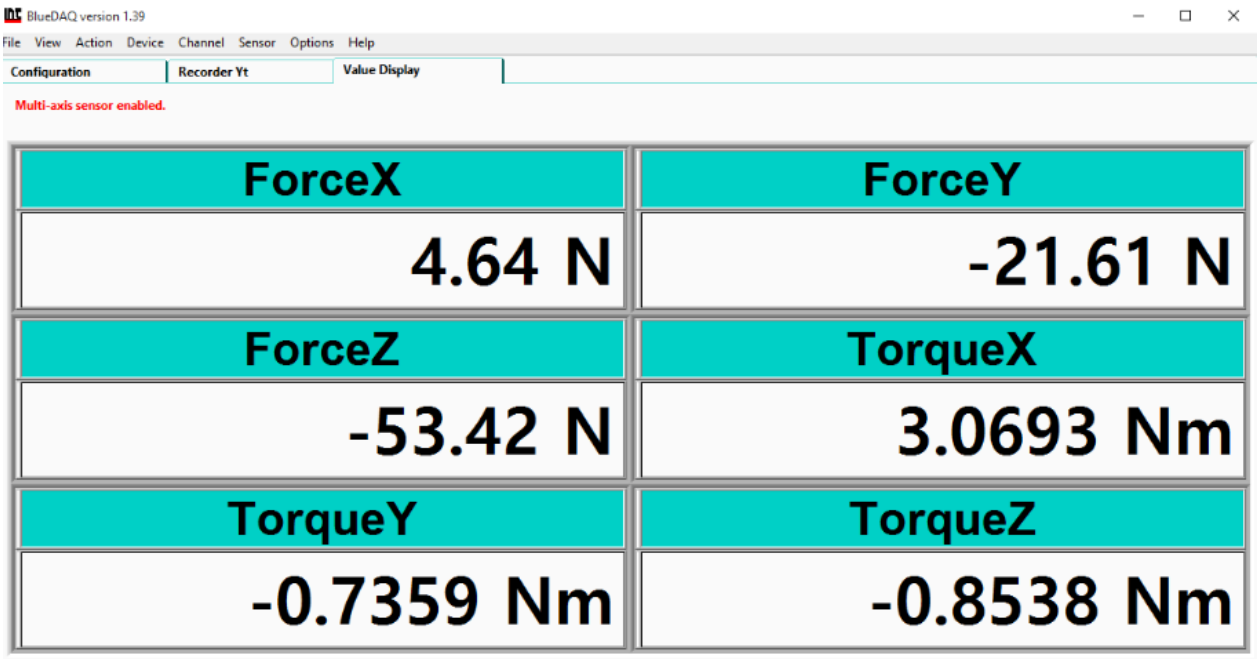

FIGURE 65 - VALUE DISPLAY

5. Add Graph Window

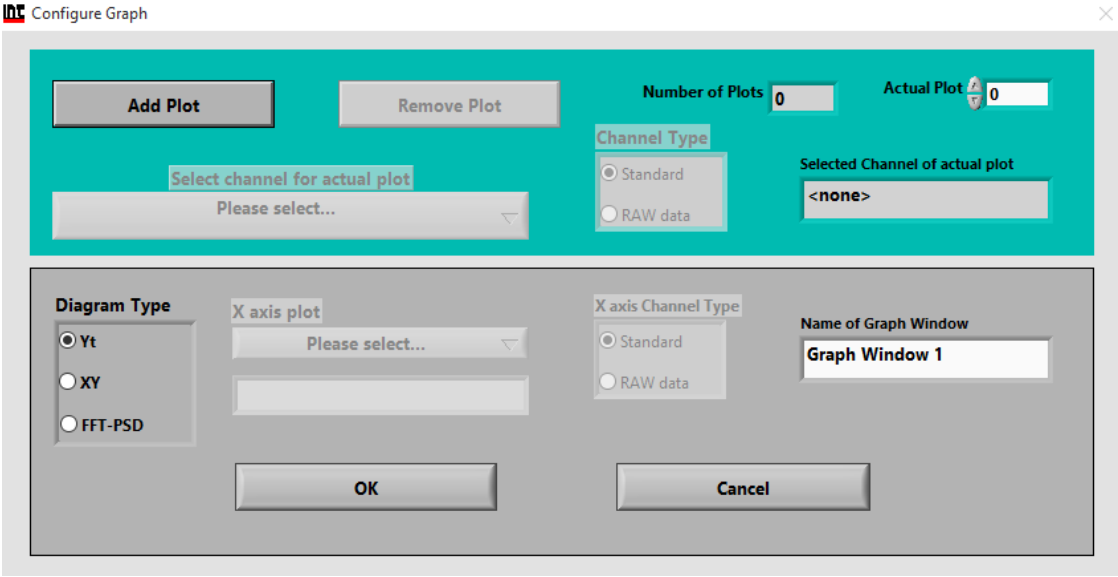

FIGURE 66 - ADD GRAPH WINDOW

5.1. Add Plot

5.1.1. Allows you to add an Axis to the graph.

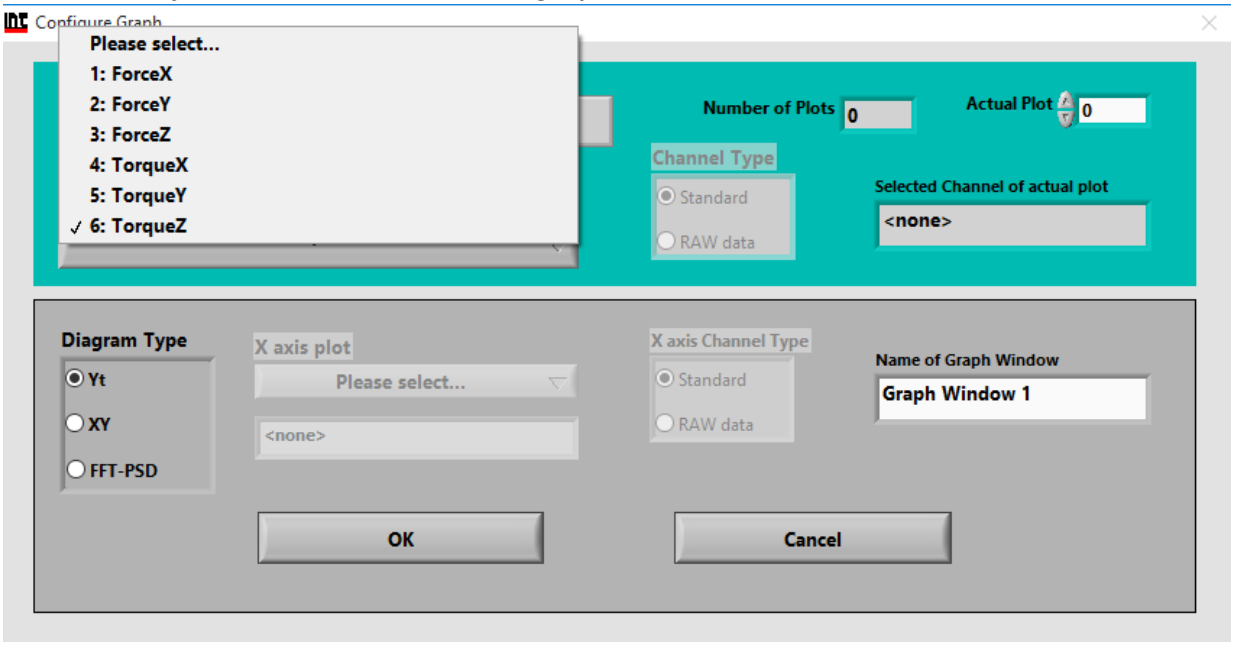

FIGURE 67 - ADD PLOT

6. Sort Graph windows

6.1. Sort between graphs

Action

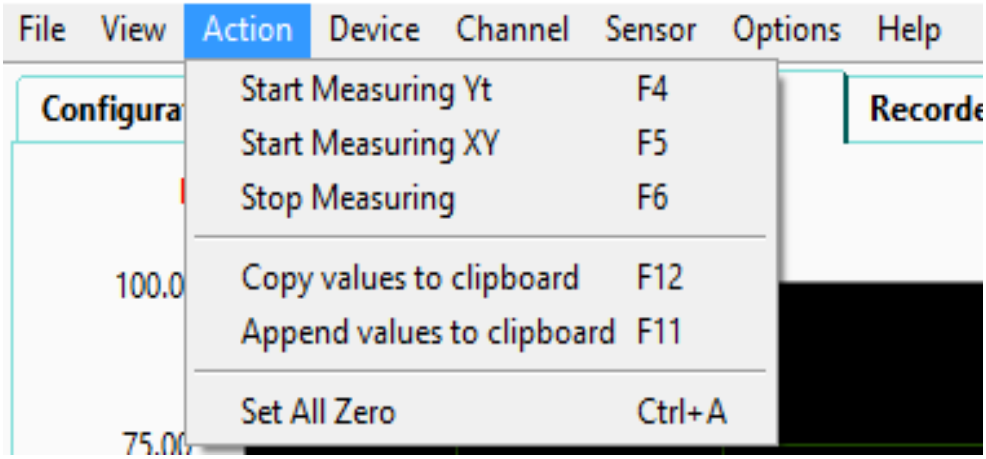

FIGURE 68 - ACTION

1. Start Measuring Yt - Measures only the Yt axis.
2. Start Measuring XY - Measures only the XY Axis.
3. Stop Measuring - Stops measurement.
4. Copy Values to clipboard - Copies the last data measured.
5. Append values to clipboard - Add values to be copied.
6. Set All Zero - Sets all Values to Zero.

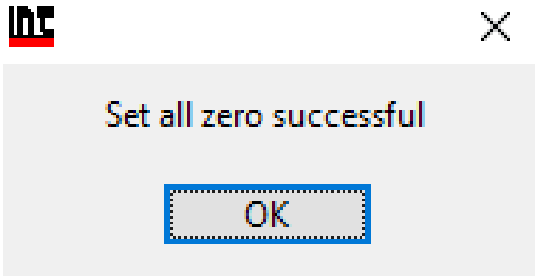

FIGURE 69 - SET ALL ZERO

Device

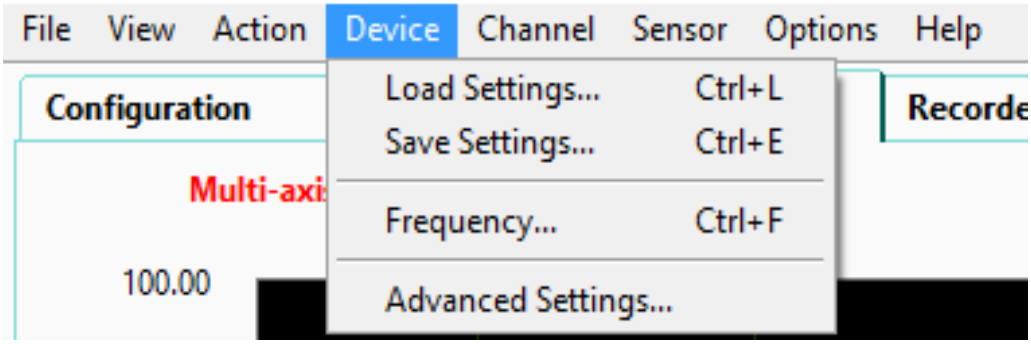

FIGURE 70 – DEVICE

1. Load Settings

1.1. Load Settings from a Custom or Previous Setting

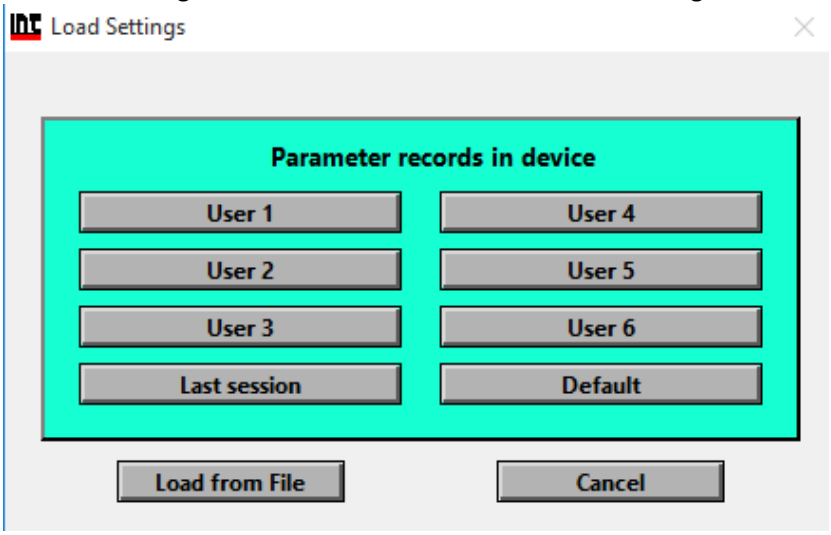

FIGURE 71 - LOAD SETTINGS

1.2. Load from File

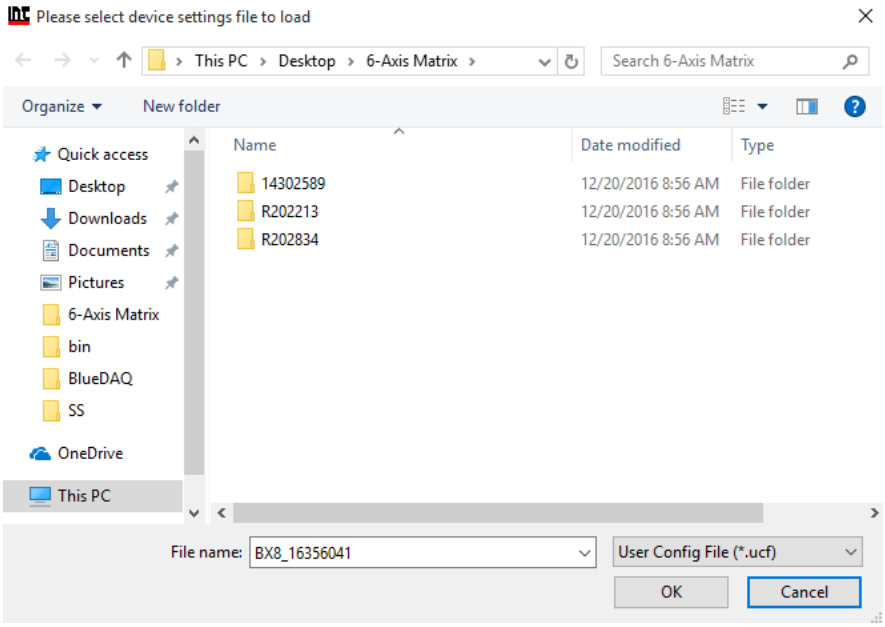

FIGURE 72 - LOAD FROM FILE

2. Save Settings - Save current settings.

3. Frequency - Frequency rate of each record value per second.

3.1. Using low settings such as 1Hz or 0.1Hz may provide a stable reading, but slower refresh rate.

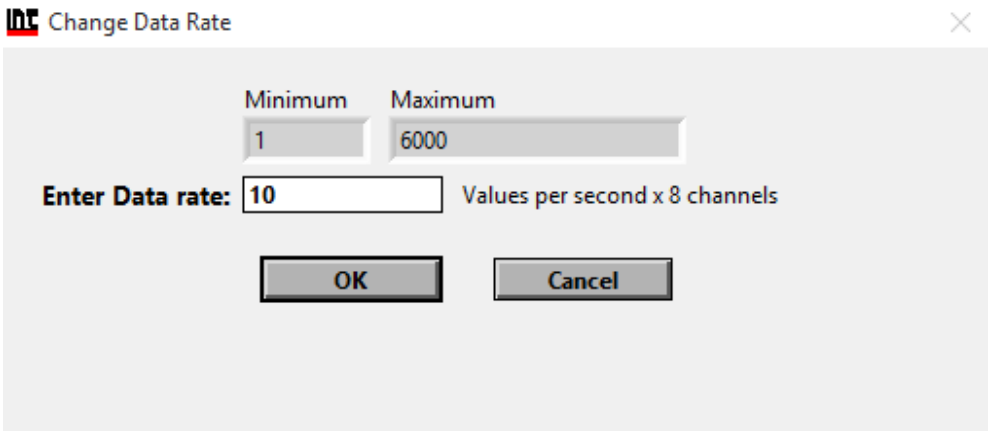

FIGURE 73 - FREQUENCY

4. Advanced Settings

4.1. Filter

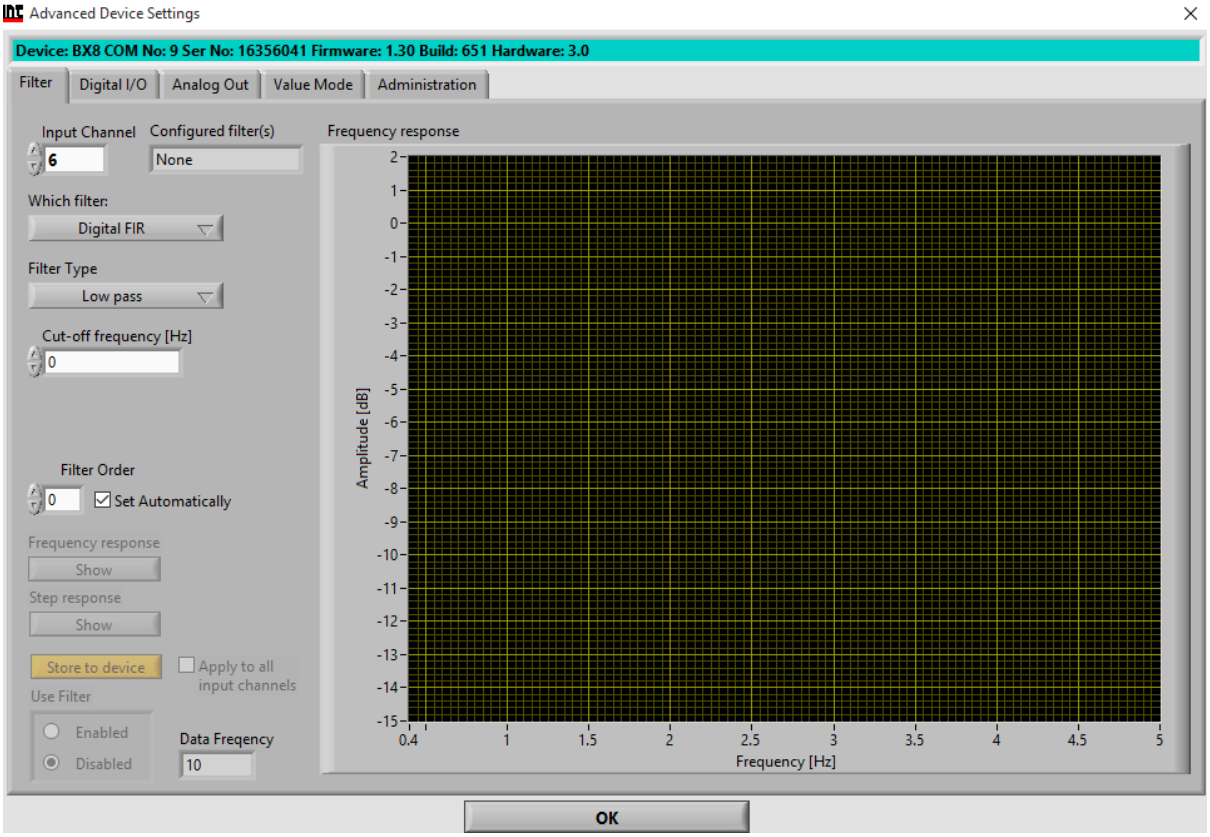

FIGURE 74 - FILTER

4.1.1. Input Channel – Digital Filters are individually configurable for each of the 8 analog input channels. Select input channel here. Do this first, if the filter is not yet configured.

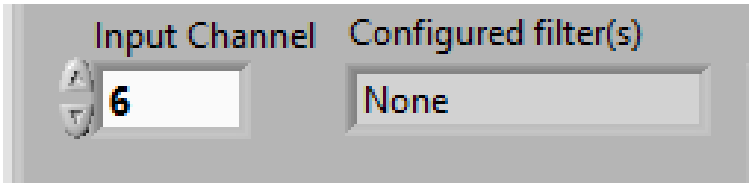

FIGURE 75 - INPUT CHANNEL

4.1.2. Which Filter

FIGURE 76 - WHICH FILTER

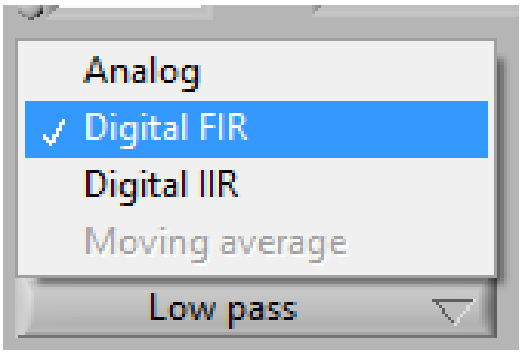

FIGURE 77 - FILTERS

A. Analog is the frontend low-pass filter

B. FIR is a Finite-Impulse-Response digital Low pass filter

C. IIR is an Infinite-Impulse-Response digital filter with selectable type.

4.1.3. Filter Type – Can only set if “Which filter” is set to IIR.

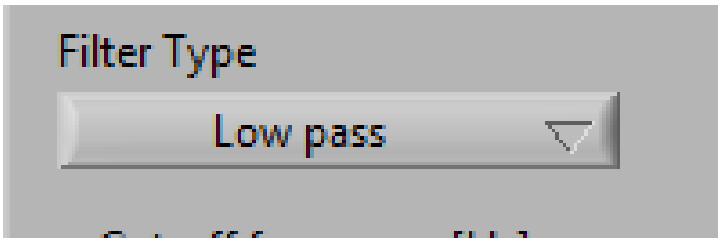

FIGURE 78 - FILTER TYPE

A. Low Pass frequencies above Cut-off are damped.

B. High Pass, frequencies below Cut-off are damped.

C. Band Pass, frequencies below Lower Cut-off and above Upper Cut-off are damped.

D. Band Stop, frequencies between Lower and Upper Cut-off are damped.

4.1.4. Cut-off frequency (Hz)

A. Cut-off frequency in Hz, where the signal is damped by -3dB. Lower Cut-off with Band pass and Band stop type.

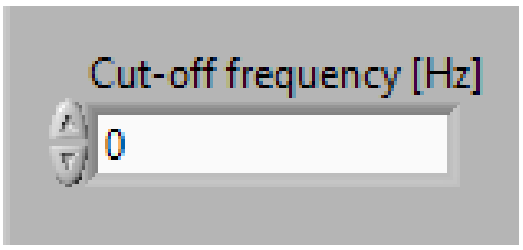

FIGURE 79 - CUT OFF FREQUENCY

4.1.5. Filter Order

A. Settable for FIR Filter only
B. Higher order leads to steeper damping characteristics, but slower step response.
C. Lower cut-off frequency is possible with higher order, higher cut-off with lower order.

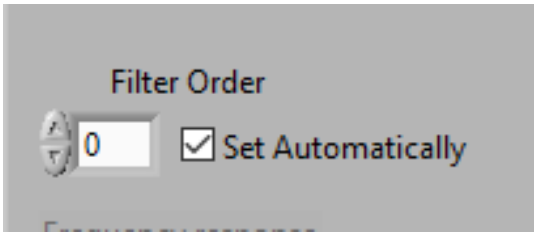

FIGURE 80 - FILTER ORDER

4.1.6. Frequency response

A. Calculate filter and show results in frequency domain of sine waves at the input of different frequencies if successful.
B. Especially with IIR High pass. Band pass and Band stop, observe the graph carefully for instability: A stable freq. response of an IIR filter is generally continuous and should never exceed 0dB.

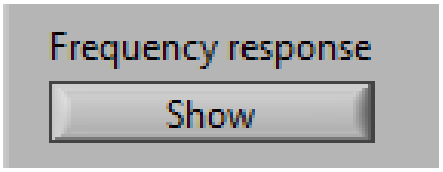

FIGURE 81 - FREQUENCY RESPONSE

4.1.7. Step response

A. Show filter output signal in time domain of standard step from 0 to nominal value at the input at time=0.
B. Useful for determining settling time, e.g. for high-order FIR filter.

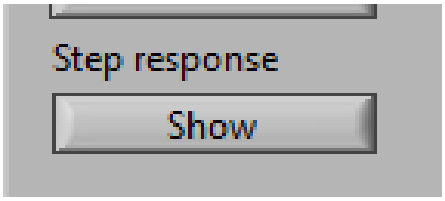

FIGURE 82 - STEP RESPONSE

4.1.8. Store to device

A. Calculate filter and store all necessary information in the device if the calculation is successful. The same settings will be stored for all 8 inputs if “Apply to all input channels” is checked.

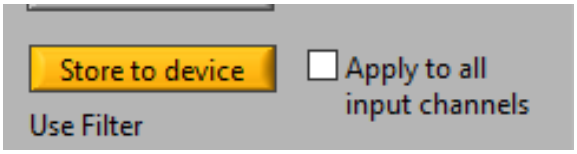

FIGURE 83 – STORE TO DEVICE

4.1.9. Use Filter

A. Enable or disable this filter. Even if disabled, all other filter settings will remain stored in device (if no error occurred), if they are already stored.

B. This filter will be enabled/disabled for all 8 inputs channels if “Apply to all channels” is checked.

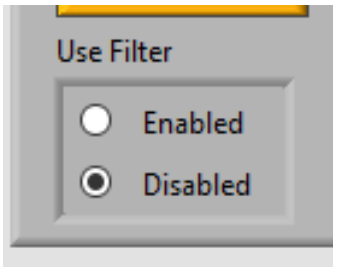

FIGURE 84 - USE FILTER

4.2. Digital I/O

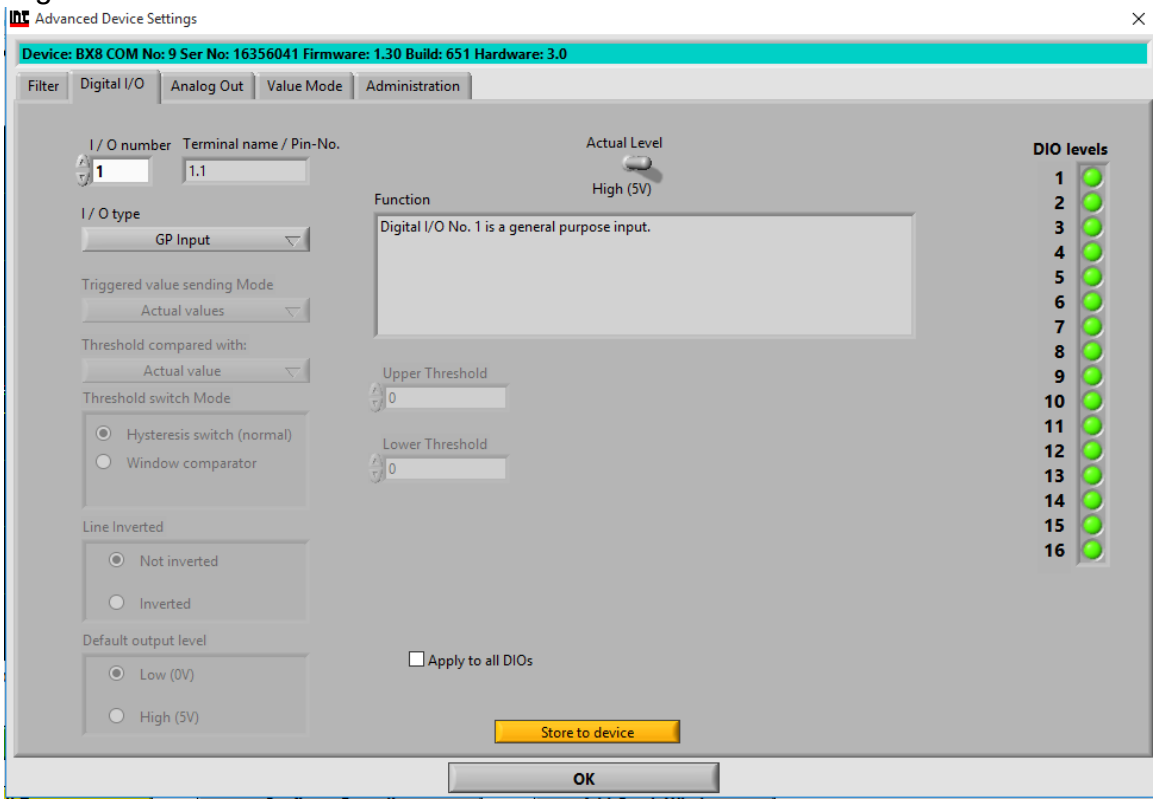

FIGURE 85 - DIGITAL I/O

4.3. I/O number

4.3.1. Devices can have up to 16 digital I/O lines. Enter number of digital I/O here.

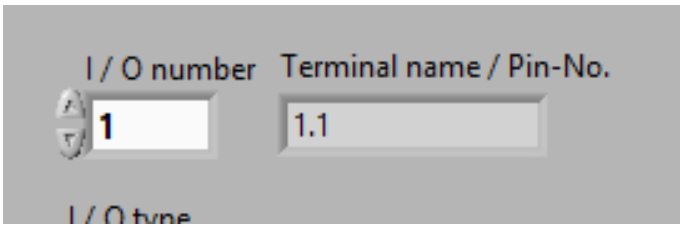

FIGURE 86 - I/O NUMBER

4.3.2. I/O type

A. GP Input – "General Purpose" Input

B. Tare Single – Zero out.

C. Tare All – Zero all.

D. Reset Max/Min

E. Trigger Send value
- Actual Values
- Maximum Values
- Minimum Values
- Mean Values

F. GP Output – "General Purpose" Output

G. Threshold Switch

4.3.3. Threshold switch Mode – Only Activated if Threshold Switch is selected in I/O type.

A. Hysteresis switch (normal) – Digital output becomes active if measuring value of corresponding channel is above ON-threshold. It becomes inactive if measuring value of corresponding channel is blow OFF-threshold.

B. Window comparator – Digital output becomes active if measuring value of corresponding channel is between upper and lower threshold, otherwise inactive.

4.3.4. Line Inverted

A. Not inverted – Active level is logical high = 5V. Inactive logical low is 0V.

B. Inverted – Active level is logical low – 0V. Inactive logical high is 5V.

4.3.5. Default output level – Level which digital I/O will output by default. That applies to all DIO output types after power-on, before a set output condition occurs.

A. E.g. set output level command if GP output type.

4.4. Analog Out

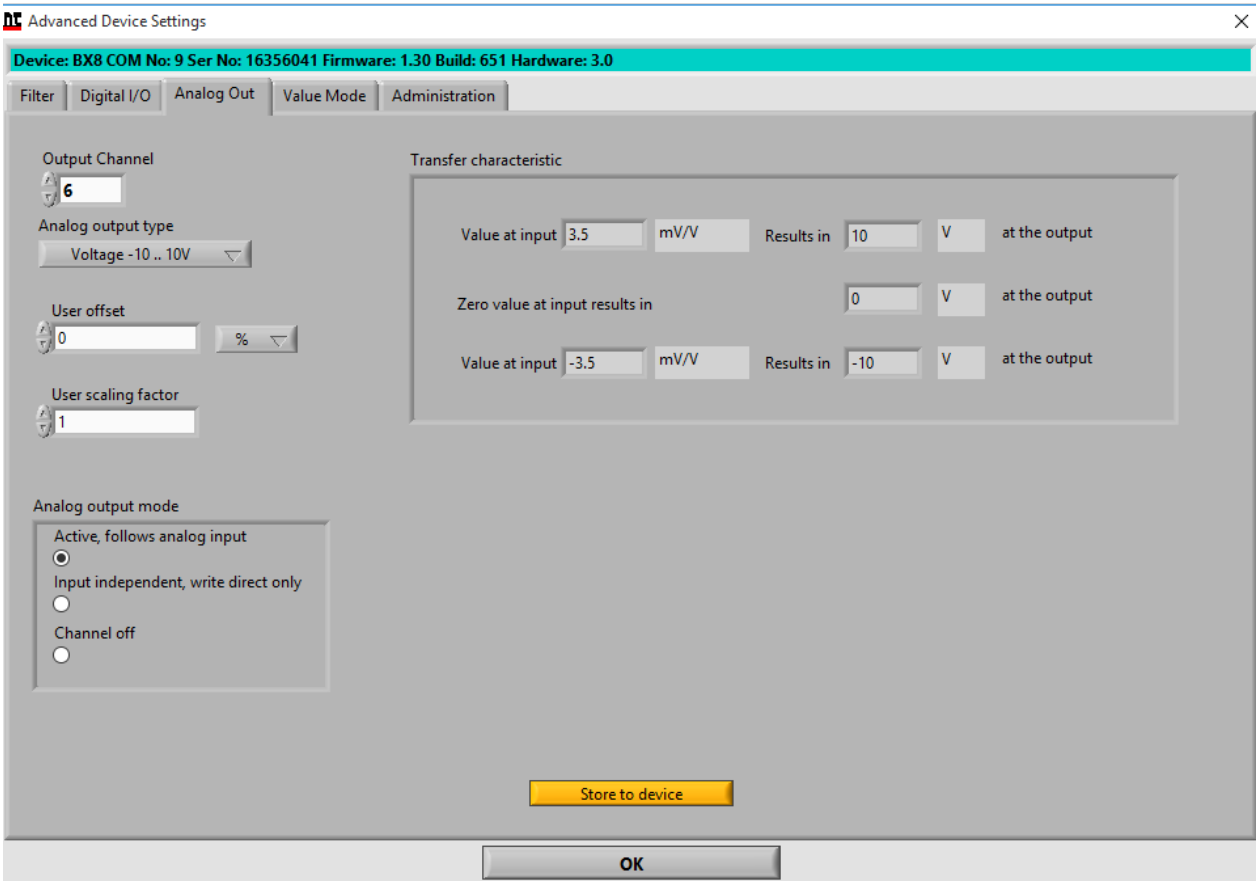

FIGURE 87 - ANALOG OUT

4.4.1. Output Channel – Analog output type, voltage or current.

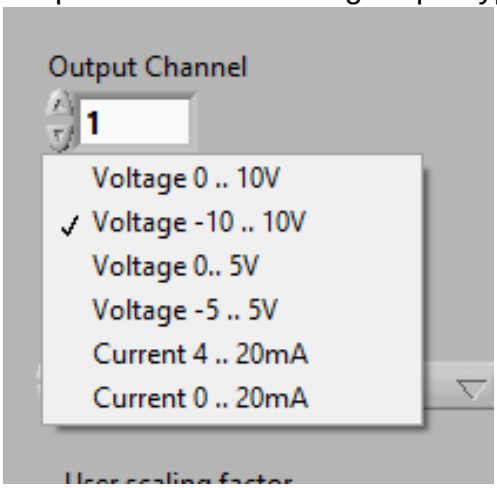

FIGURE 88 - OUTPUT CHANNEL

4.4.2. User offset – Additional offset in percent, which defines output value at zero analog input value.

A. E.g. if set to 50%, analog out value will be half of the positive range.
B. 2.5V at 0-5V or ±5V.

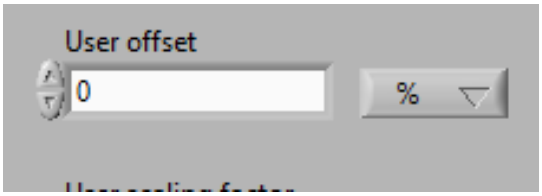

FIGURE 89 - USER OFFSET

4.4.3. User scaling factor – Scaling factor to adapt analog input physical values to analog output.

A. If using User offset, set User offset first, then User scaling.

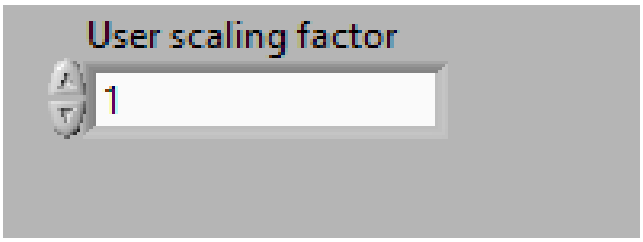

FIGURE 90 - USER SCALING FACTOR

4.4.4. Analog output mode

A. Active, follows analog input – Output value depends on setting and analog input value of the same input channel number.
B. Input independent, write direct only – Use analog output DAC directly.
C. Channel off – Channel switch is off.

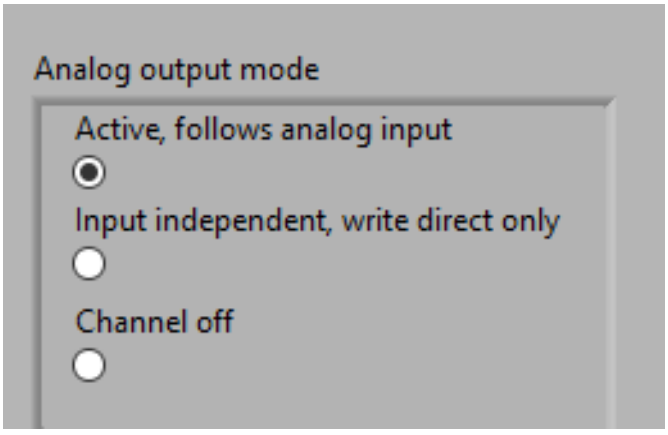

FIGURE 91 - ANALOG OUTPUT MODE

4.5. Value Mode

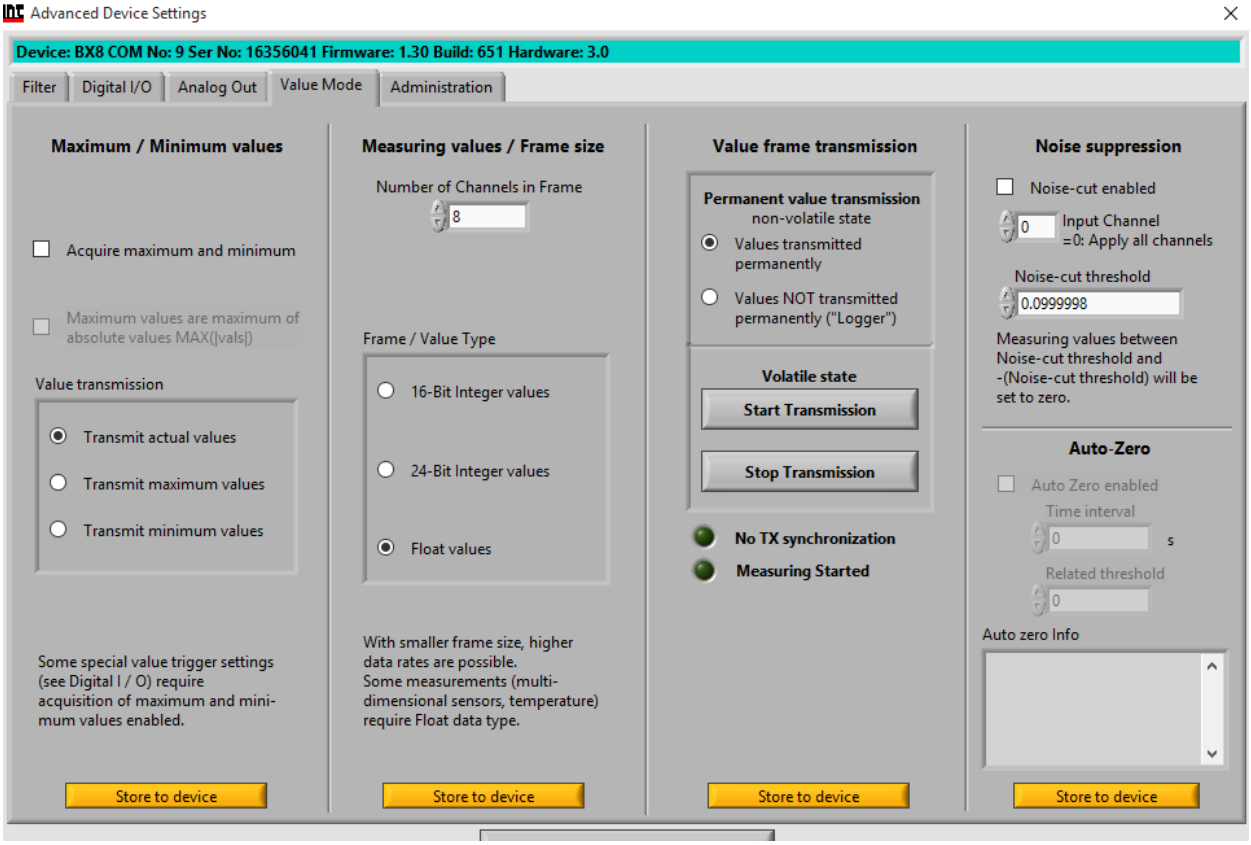

FIGURE 92 - VALUE MODE

4.5.1. Acquire maximum and minimum – Max/Min value determination enabled. This is a precondition for other max/min settings, also for some threshold and value-trigger modes.

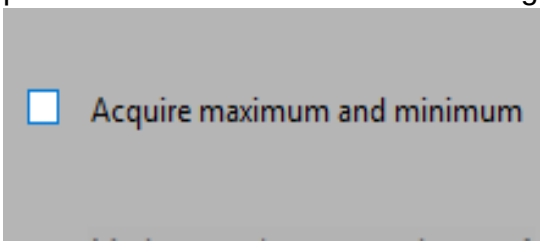

FIGURE 93 - ACQUIRE MAX AND MIN

4.5.2. Maximum values are maximum of absolute values MAX(|vals|) – Only active if "Acquire maximum and minimum" is checked. Replaces the maximum value register with that maxima of the absolute values, so that both positive maximum and negative maximum values are determined.

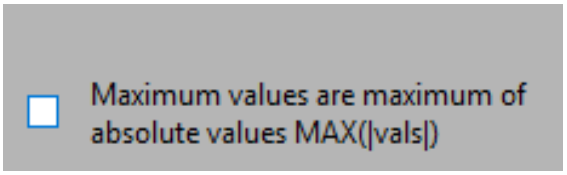

FIGURE 94 - MAX VALUES ARE MAXIMUM OF ABSOLUTE VALUES

4.5.3. Value transmission – Which values are in the value frame: All channels are either actual values, maximum values or minimum values.

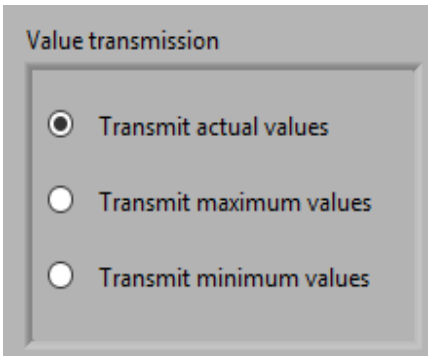

FIGURE 95 - VALUE TRANSMISSION

4.5.4. Number of Channels in Frame – Number of input channel values in the measuring data frame. With smaller numbers, higher data frequencies are possible.

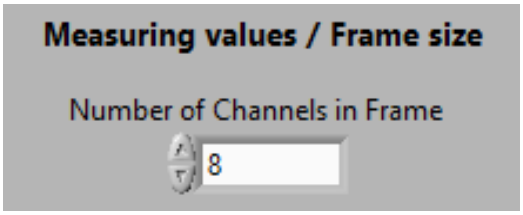

FIGURE 96 - MEASURING VALUES / FRAME SIZE

4.5.5. Frame / Value Type – Data type of measuring values in the value-frame that device transmits.

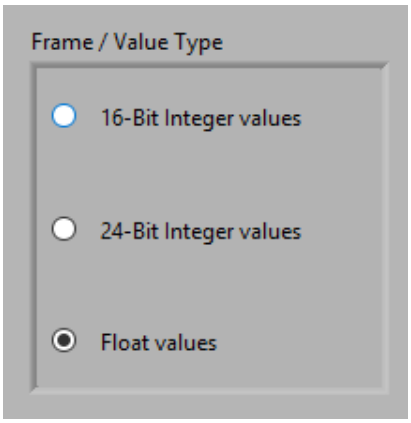

FIGURE 97 - FRAME / VALUE TYPE

4.5.6. Value frame transmission

A. Values transmitted permanently – After power-on, the device transmits measuring values continuously.
B. Values NOT transmitted permanently – After power-on, the device transmits measuring values on request.

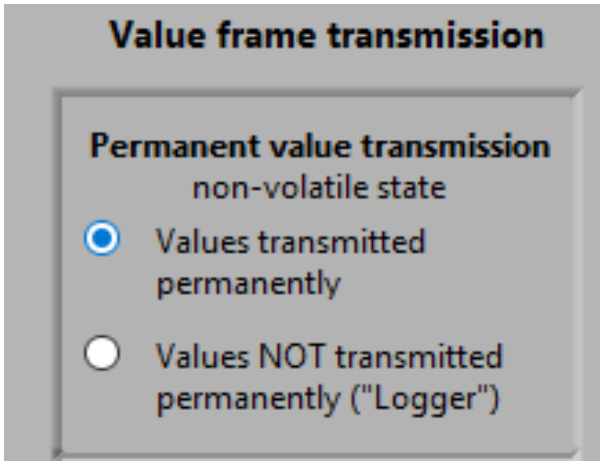

FIGURE 98 - VALUE FRAME TRANSMISSION

4.5.7. Volatile state

A. Start transmission of measuring values, if permanent value transmission is off. State not stored in non-volatile memory.
B. Stop Transmission of measuring values, if permanent value transmission is on. State not stored in non-volatile memory.

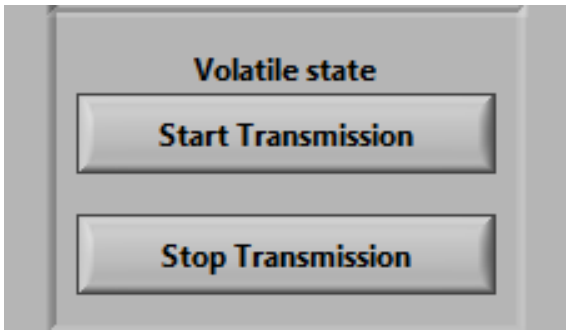

FIGURE 99 - VOLATILE STATE

4.5.8. Noise suppression

A. Noise-cut enabled – If measuring values are between Noise-cut threshold and (Noise-cut threshold), they will be set to 0.000000000, so that the noise around zero will be suppressed. Set checkbox to enable this feature.

B. Input Channel = 0: Apply all channels – Input channel to be used with Noise-cut. Set to 0: Use the same threshold for all inputs.

C. Noise-cut threshold – If measuring values are between Noise-cut threshold and (Noise-cut threshold), they will be set to 0.000000000, so that the noise around zero will be suppressed.

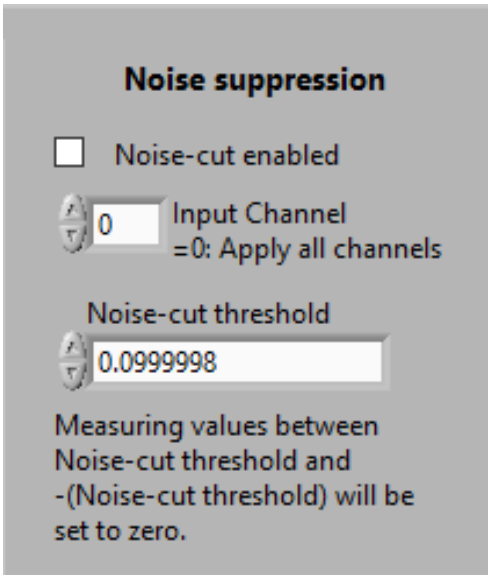

FIGURE 100 - NOISE SUPPRESSION

4.5.9. Auto-Zero enabled – Every (Time interval) seconds, an automatic set-zero routine will be performed.

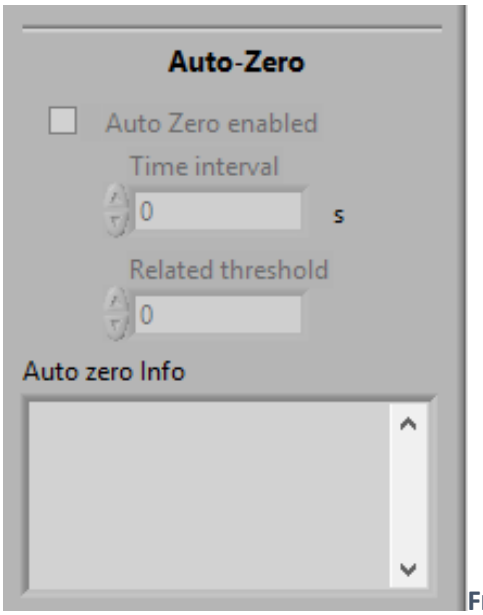

FIGURE 101 - AUTO-ZERO

4.6. Administration

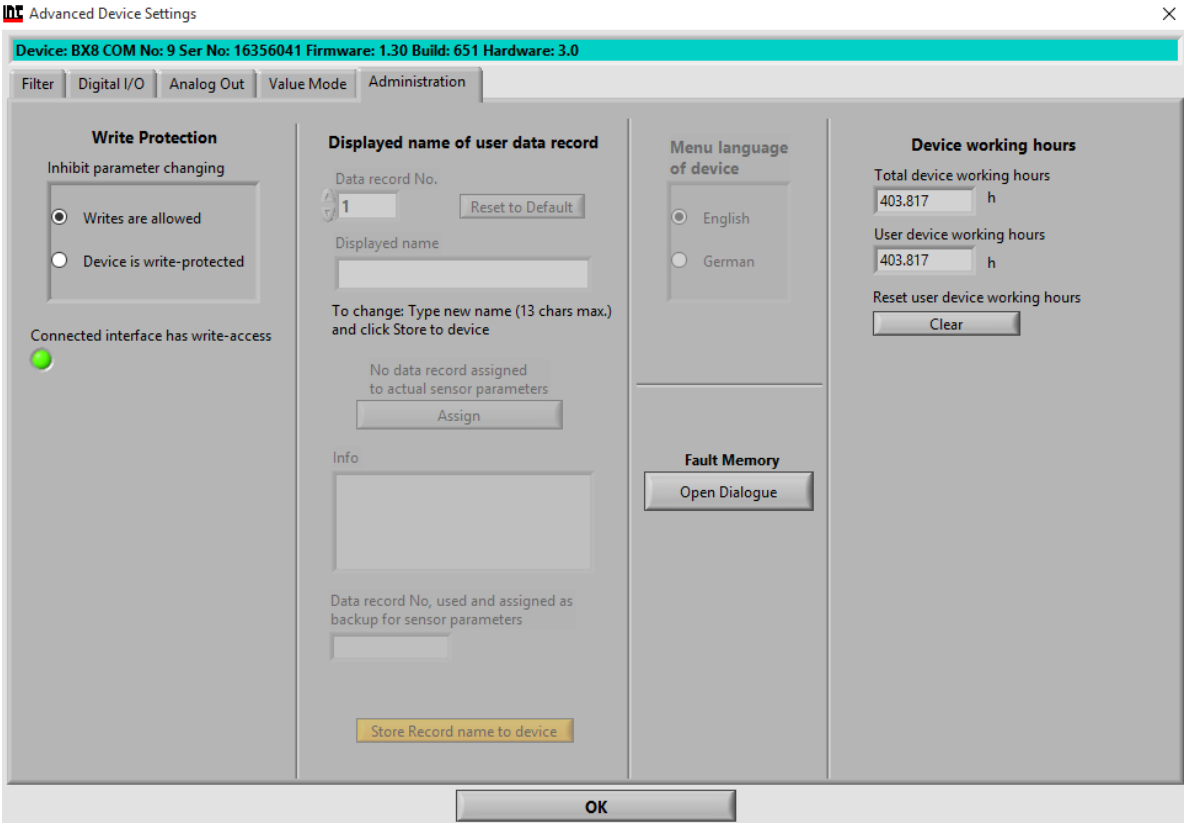

FIGURE 102 - ADMINISTRATION

4.6.1. Write Protection

A. Inhibit parameter changing – If the device is write-protected, the device parameters are secured from unintentional changing. To disable write-protection, a device-depended password must be entered.

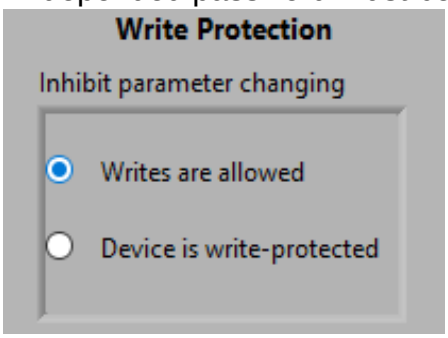

FIGURE 103 - WRITE PROTECTION

4.6.2. Displayed name of user data record

A. Data record No. – Six different parameter records can be saved and restored; in the main window with “Save Settings” and “Load Settings”. User-defined names for each

data record can be viewed and changed here. Parameter record number (1 to 6) can be set by this, to view and change its name.

B. Displayed name – Name of the parameter record.

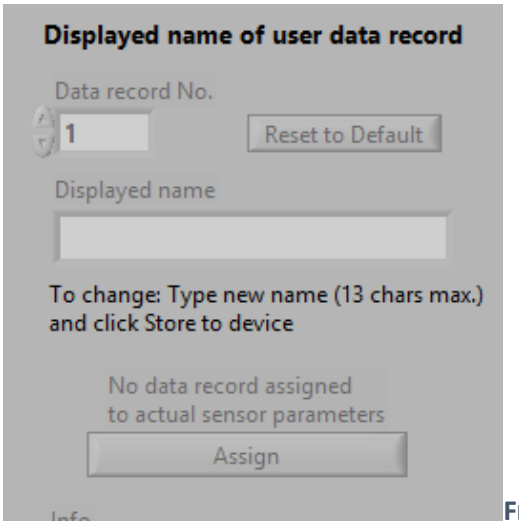

FIGURE 104 - DISPLAYED NAME OF USER DATA RECORD

4.6.3. Menu language of device

A. English
B. German

FIGURE 105 - MENU LANGUAGE OF DEVICE

4.6.4. Fault memory – Some devices are capable of storing faults that are related to external connections. E.g. broken sensor cable or value saturated.

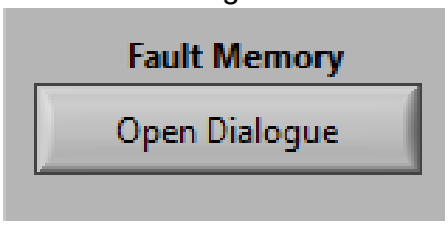

FIGURE 106 - FAULT MEMORY

4.6.5. Device working hours – Some devices count their working hours. This displays the absolute working hours, which can't be reset.

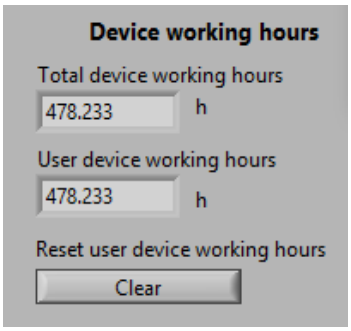

FIGURE 107 - DEVICE WORKING HOURS

Channel

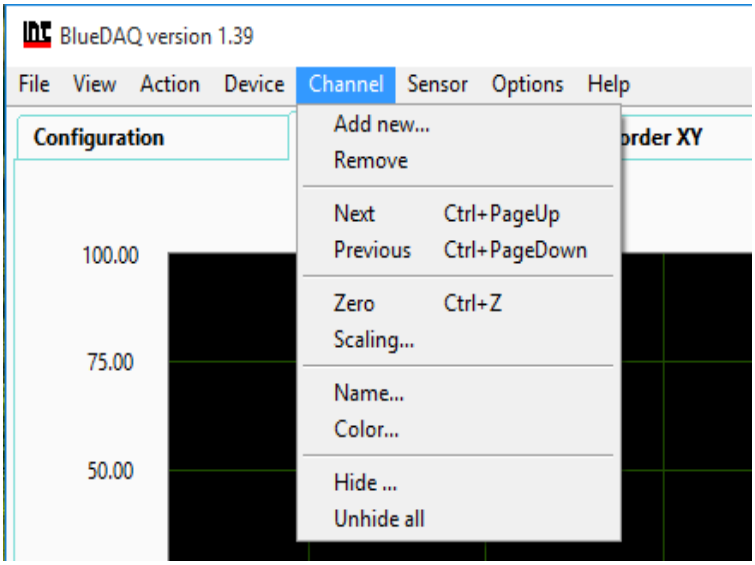

FIGURE 108 - CHANNEL

1. Add new

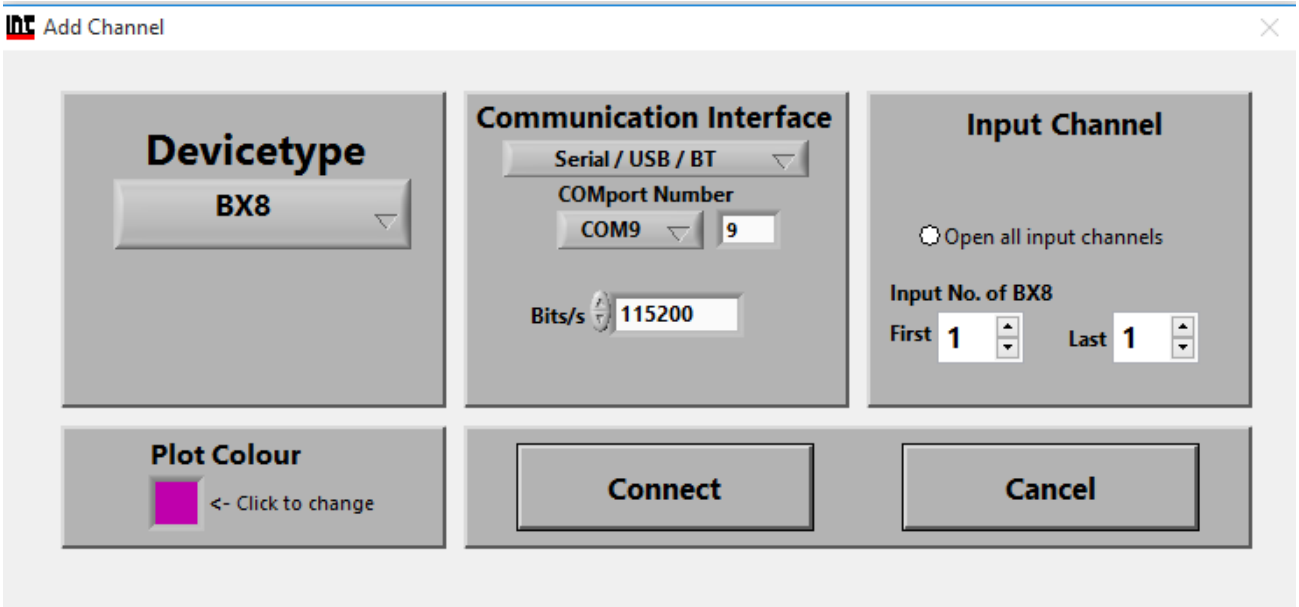

FIGURE 109 - ADD NEW

1.1. Devicetype

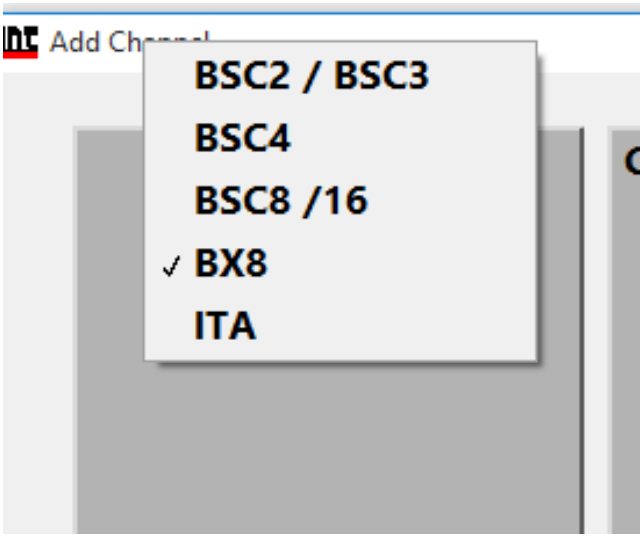

FIGURE 110 – DEVICETYPE

1.2. Communication Interface

1.2.1. Bits/s – Communication Bitrate. If you aren't sure which Bitrate is appropriate to your device, leave this at 115200.

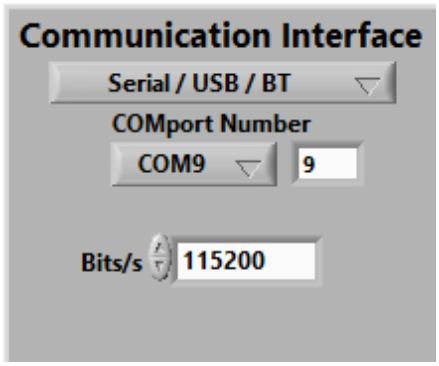

FIGURE 111 - COMMUNICATION INTERFACE

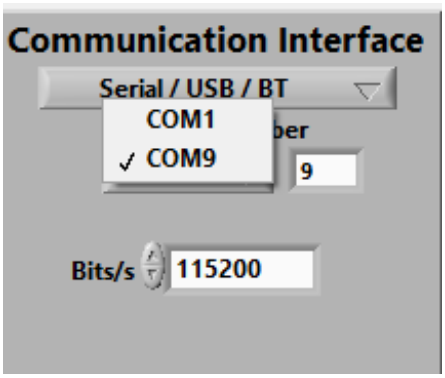

FIGURE 112 - COMMUNICATION INTERFACE COM

1.2.2. Input Channel

1.2.3. Open all input channels will open all 8 inputs.

1.2.4. Input No. of BX8 – The amplifier has several inputs. Select the desired input(s) here. If opening several inputs, enter lowest channel-No. to open here.

A. First
B. Last

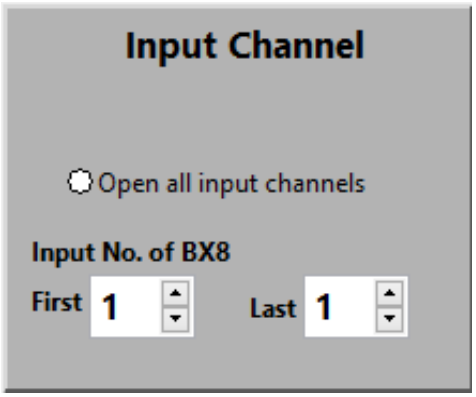

FIGURE 113 - INPUT CHANNEL

1.3. Connect and Cancel

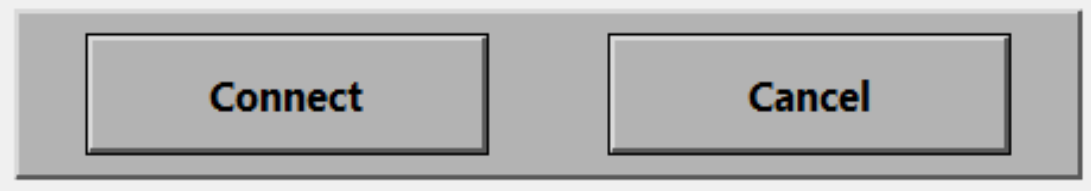

FIGURE 114 - CONNECT AND CANCEL

2. Channel Scaling

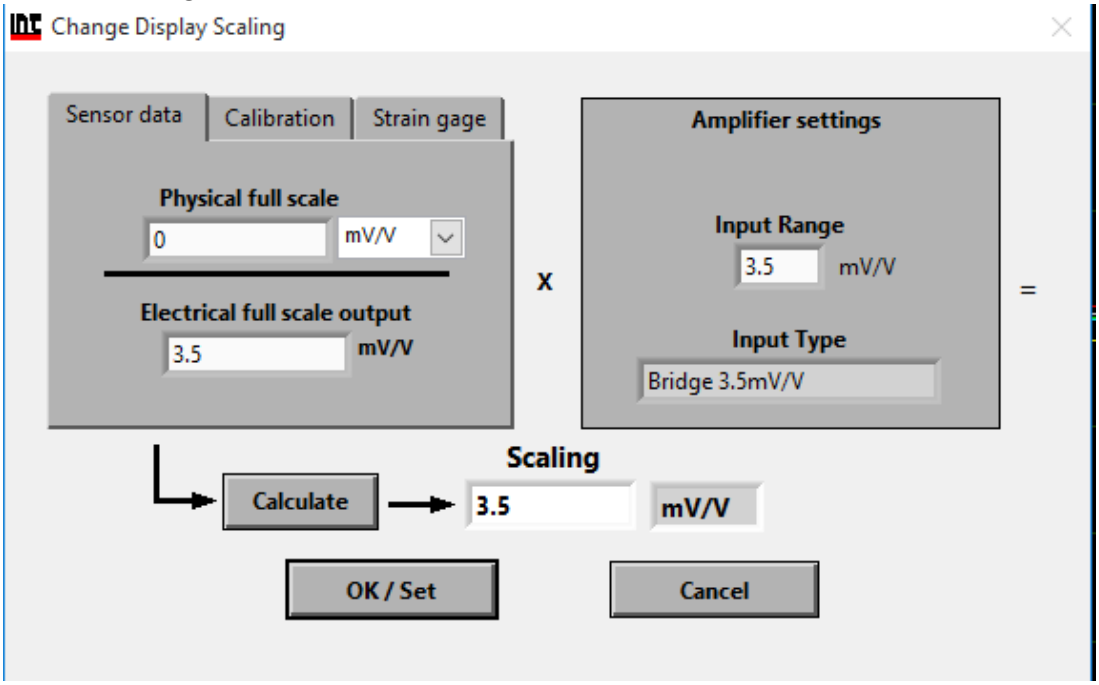

FIGURE 115 - CHANNEL SCALING

Sensor

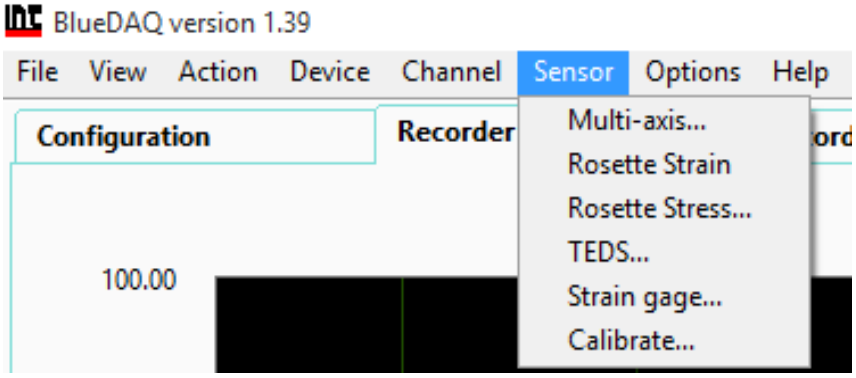

FIGURE 116 – SENSOR MENU

1. Multi-axis – Refer to **step 5.**

2. Rosette Strain – Arrangement of two or more strain gauges.

3. Rosette Stress

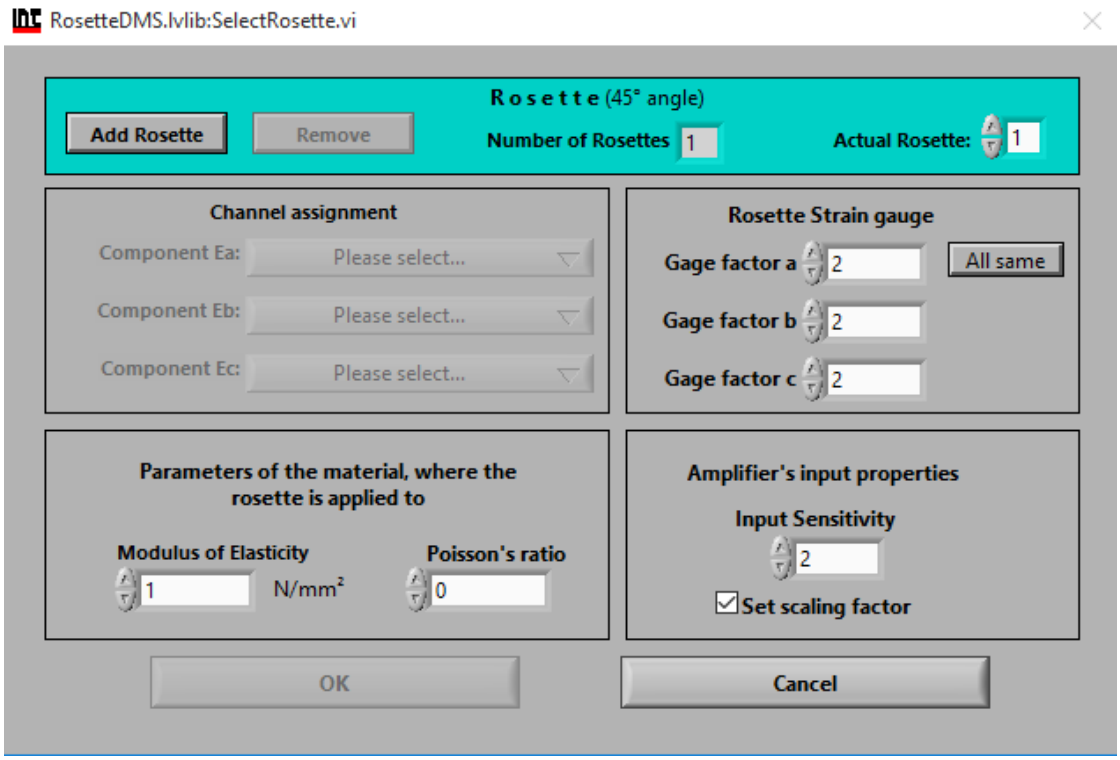

FIGURE 117 - ROSETTE STRESS

4. Add Rosette / Remove

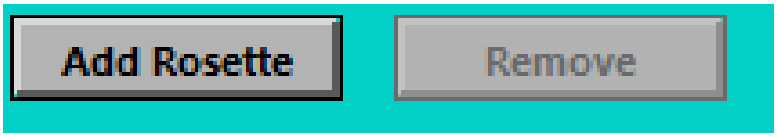

FIGURE 118 - ADD ROSETTE

5. Number of Rosettes – Number of included rosette strain gauges which are configured already.

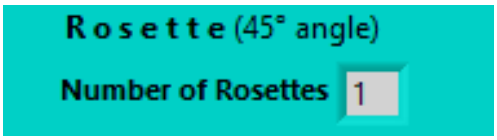

FIGURE 119 - NUMBER OF ROSETTES

Actual Rosette – If you have configured more than one rosette strain gauge, here you can switch between the different rosette stain gauge settings.

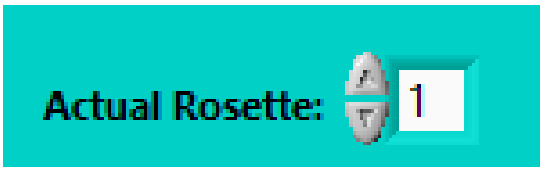

FIGURE 120 - ACTUAL ROSETTE

Component Ea: - The Rosette-Strain gauge consists of three single strain gauges which are arranged at an angle of 45° to each other. Choose here for the physical channel of your measuring amplifier where the single strain gauge Epsilon A is connected to. The resulting angle value of Phi refers to the longitudinal axis of this single strain gauge.

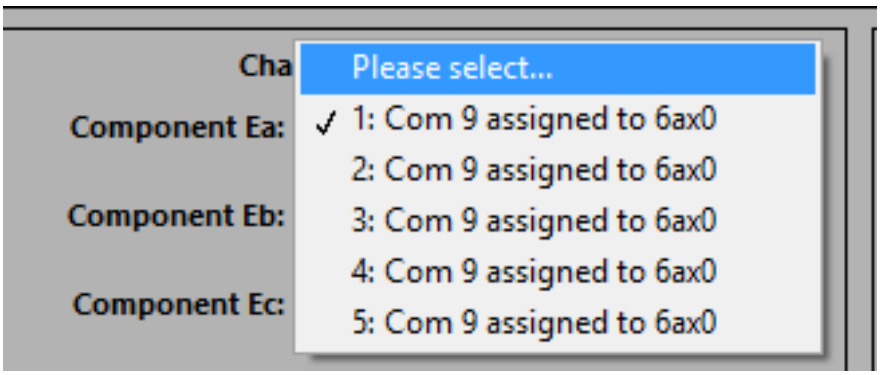

FIGURE 121 - COMPONENT EA

6. Parameters of the material, where the rosette is applied to

6.1. Modulus of Elasticity – Enter the elastic modulus of the material, whose stress shall be determined in Newtown per square millimeters. The elastic modulus of an object is defined as the slope of its stress-strain curve in the elastic deformation region of the material to be measured. Since this parameter is very significant for the stress calculation, it should be entered as exact as possible. Please multiply the values in lb/in^2 with 0.0068971125763 to get the modulus in N/mm^2.

6.2. Poisson's ratio – Enter the Poisson's ratio of the material whose stress shall be determined. The Poisson's ratio is the ratio when a sample object is stretched of the contraction or transverse strain (perpendicular to the applied load), to the extension or axial strain. Since this parameter is a little less significant for the stress calculation, an approximate value may be entered.

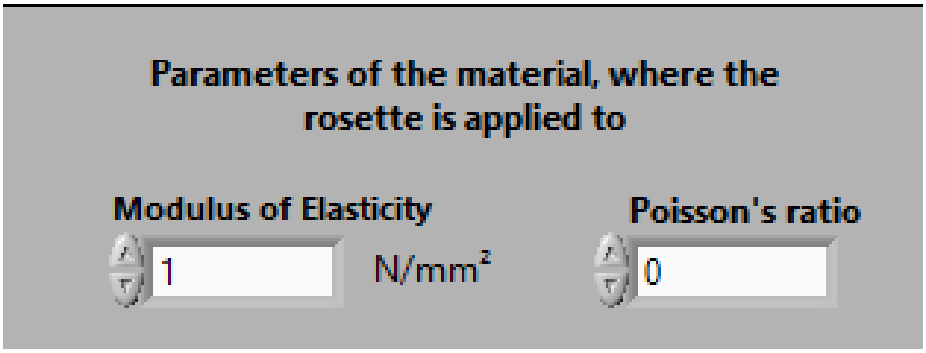

FIGURE 122 - PARAMETERS OF THE MATERIAL

6.3. Gage factor – Enter the gage factor for the single strain gauge. The gauge factor is the ratio of relative change in an electrical resistance to the mechanical strain epsilon. If all three gauge factors are equal, enter the value and then press "All Same".

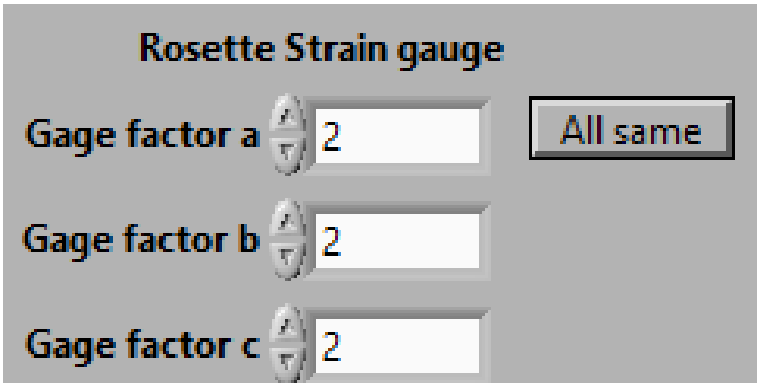

FIGURE 123 - ROSETTE STRAIN GAUGE

6.4. Amplifier's input properties

6.4.1. Input Sensitivity – Change this value if it doesn't match the input sensitivity of the measuring amplifier where the strain ages are connected to. Normally the value shown is the correct value, some GSV-2 or GSV-4 measuring amplifiers do communicate the correct value to the program. Together with the gauge factor, this value will be used to calculate the correct scaling factor automatically after the OK button is pressed. NOTE: The strain gauges must be wired in a quarter bridge configuration in order to calculate the scaling factor correctly.

6.4.2. Set Scaling factor – Uncheck this checkbox if you are sure that the scaling factors of the channels where the three strain gauges are connected to are already correct. If checked, the new scaling factor will be calculated automatically according to the gauge factors and the input sensitivity settings. NOTE: the strain gauges must be wired in a quarter bridge configuration in order to calculate the new scaling.

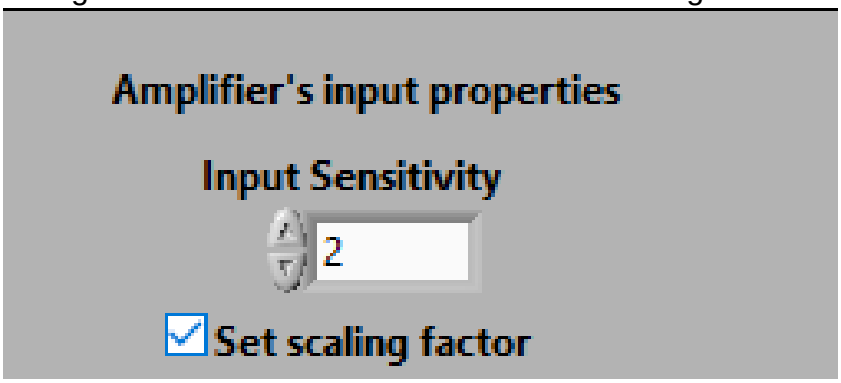

FIGURE 124 - AMPLIFIER'S INPUT PROPERTIES

7. TEDS – Transducer Electronic Data Sheet

8. Strain gage

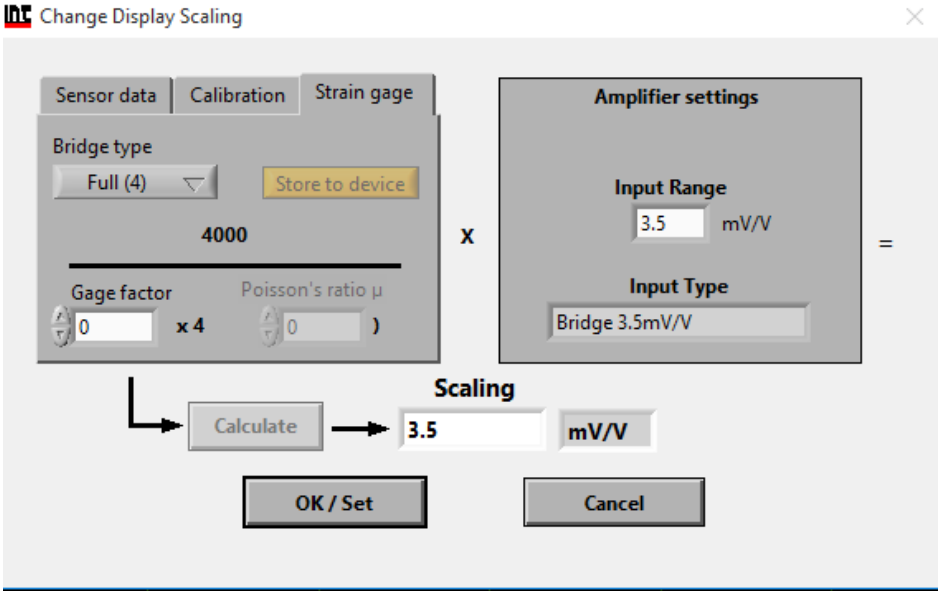

FIGURE 125 - STRAIN GAGE

9. Calibrate

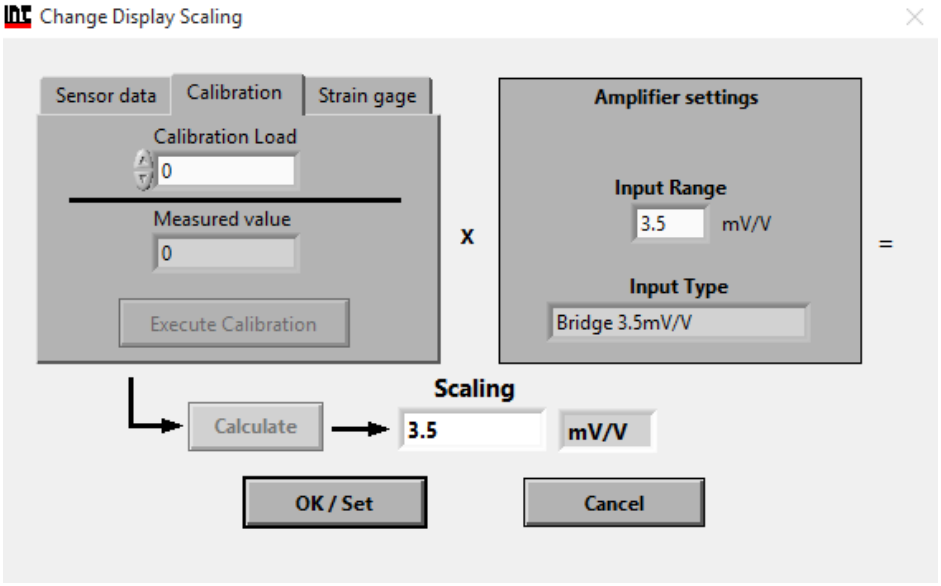

FIGURE 126 - CALIBRATE

Options

1. Hardware

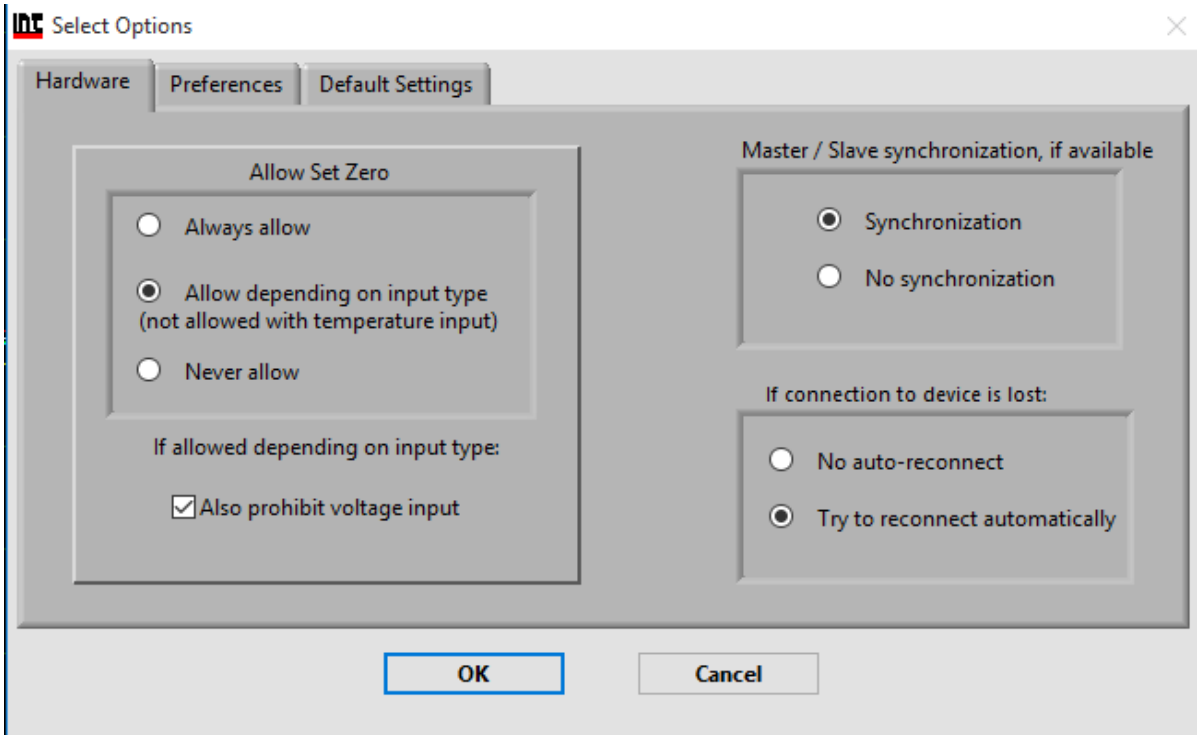

FIGURE 127 - HARDWARE

2. Preferences

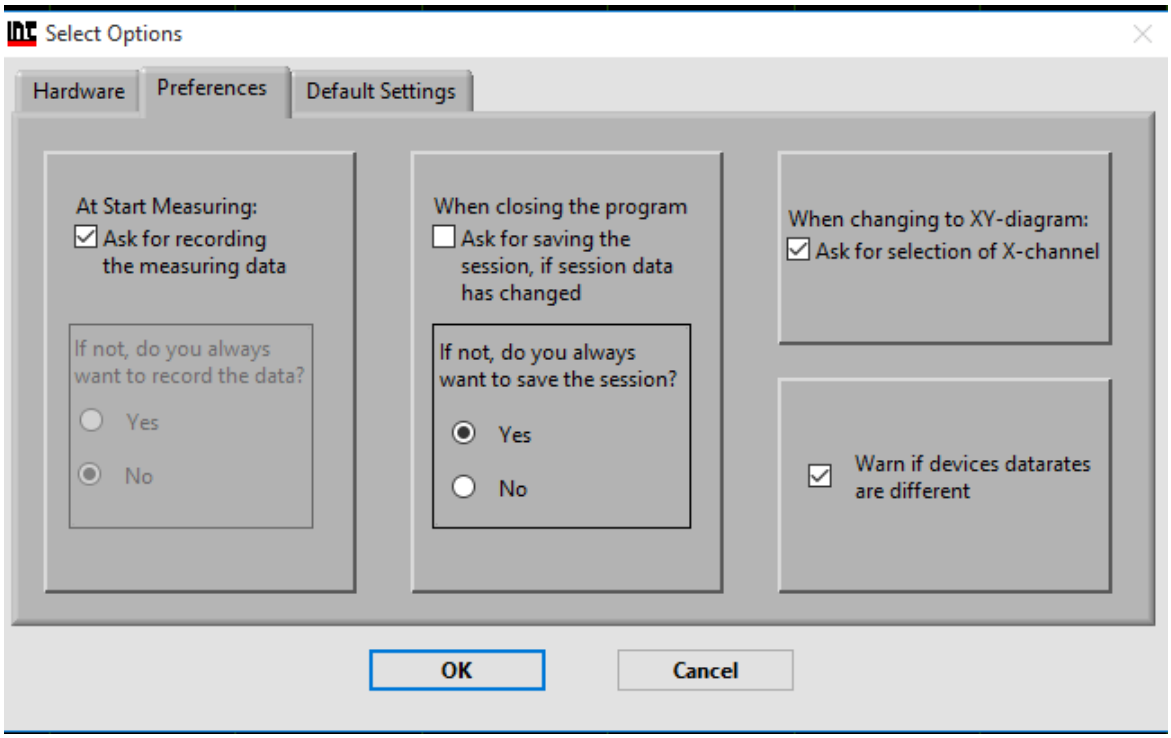

FIGURE 128 - PREFERENCES

3. Default Settings

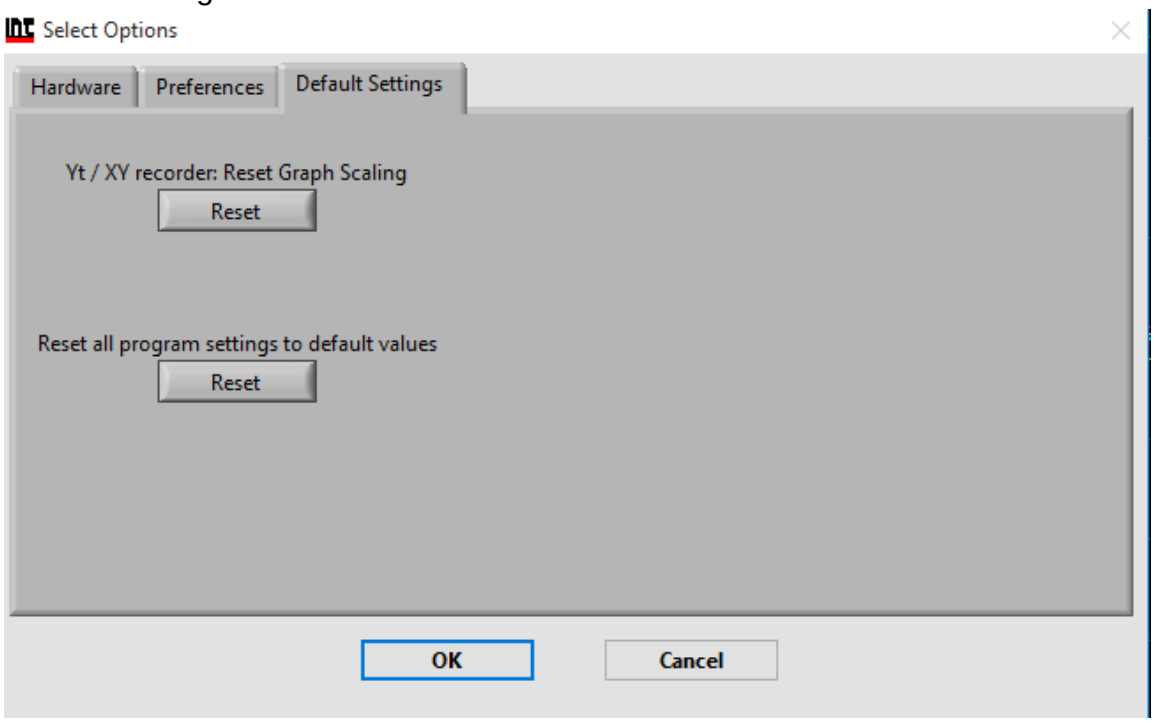

FIGURE 129 - DEFAULT SETTINGS

Help

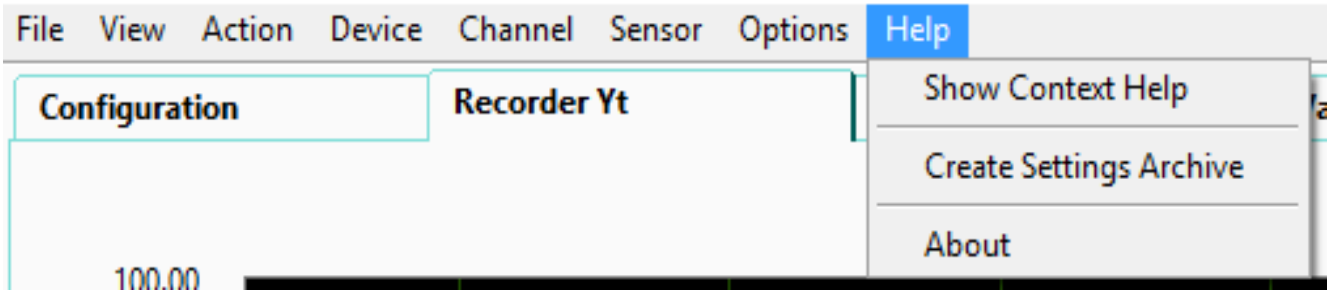

FIGURE 130 - HELP

1. Show Context Help

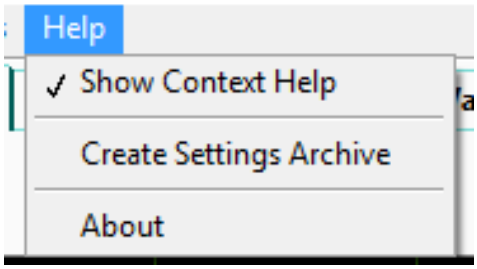

FIGURE 131 - SHOW CONTEXT HELP

2. A box will appear on the corner with a definition of each function.

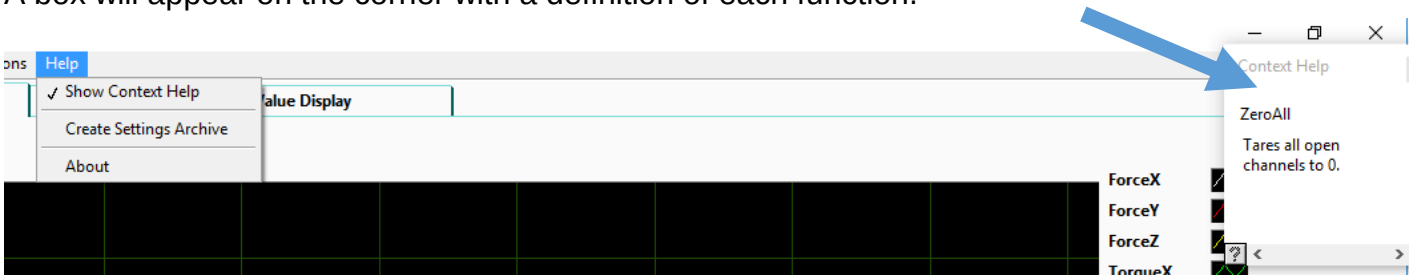

FIGURE 132 - CONTEXT HELP POPUP

3. Create Settings Archive

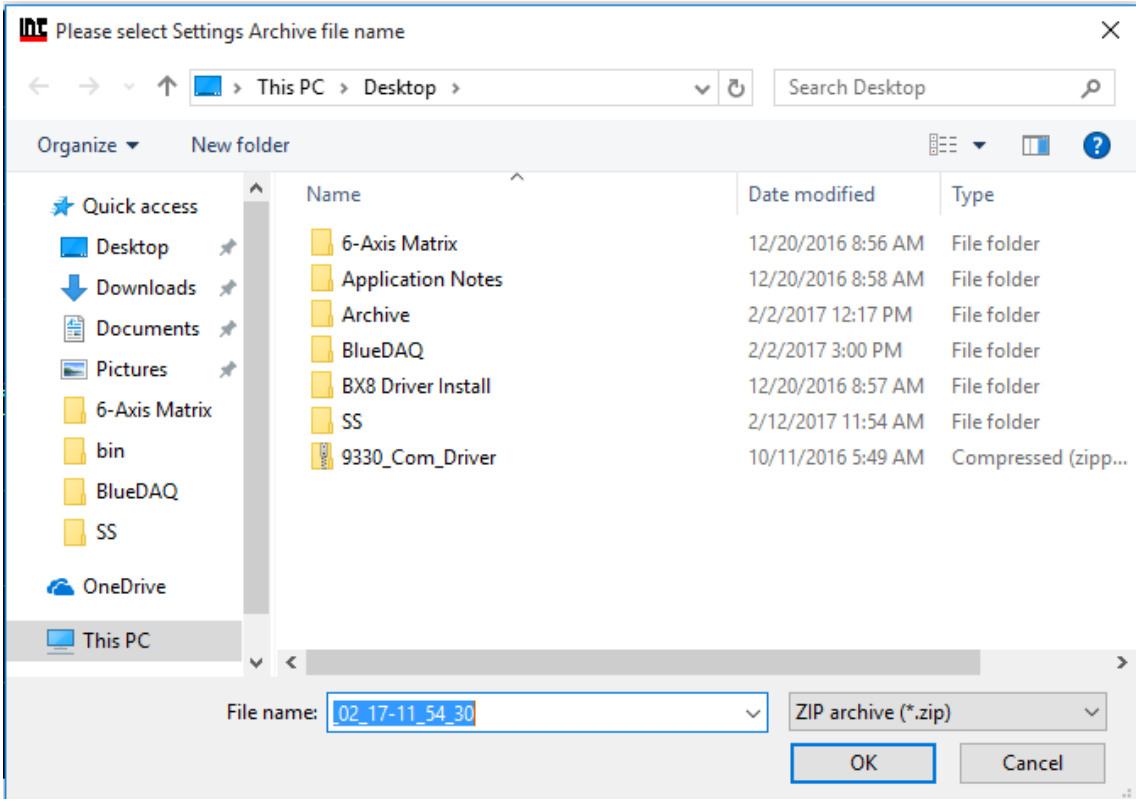

FIGURE 133 - CREATE SETTINGS ARCHIVE

4. About lets you know the BlueDAQ version number.

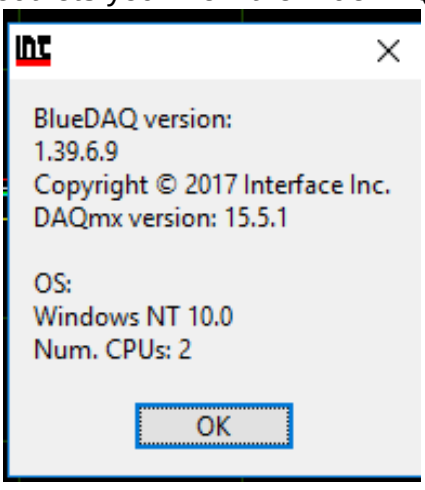

FIGURE 134 – ABOUT

Warranty

All Telemetry products from Interface Inc., ('Interface') are warranted against defective material and workmanship for a period of (1) one year from the date of dispatch. If the 'Interface' product you purchase appears to have a defect in material or workmanship or fails during normal use within the period, please contact your Distributor, who will assist you in resolving the problem. If it is necessary to return the product to 'Interface' please include a note stating name, company, address, phone number and a detailed description of the problem. Also, please indicate if it is a warranty repair. The sender is responsible for shipping charges, freight insurance and proper packaging to prevent breakage in transit. 'Interface' warranty does not apply to defects resulting from action of the buyer such as mishandling, improper interfacing, operation outside of design limits, improper repair or unauthorized modification. No other warranties are expressed or implied. 'Interface' specifically disclaims any implied warranties of merchantability or fitness for a specific purpose. The remedies outlined above are the buyer's only remedies. 'Interface' will not be liable for direct, indirect, special, incidental or consequential damages whether based on the contract, tort or other legal theory.
Any corrective maintenance required after the warranty period should be performed by 'Interface' approved personnel only.

Revision History		
Author	**Revision**	**Release Date**
PB	15-247 Rev A	01/02/2019