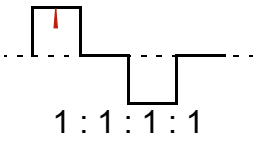
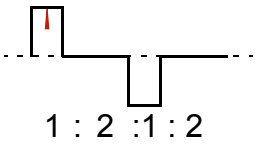
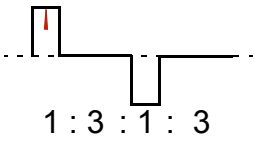
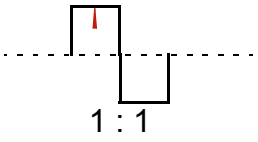
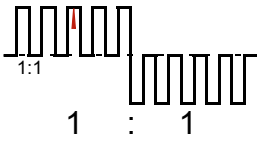
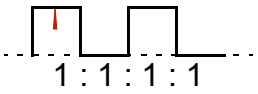
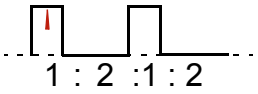
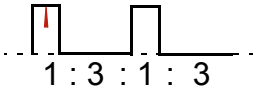
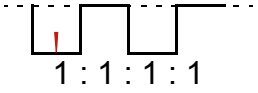
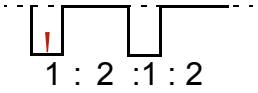
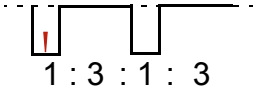
Phoenix Geophysics Ltd. TXU-30 Current Source Available Waveforms

Domain	Ratio ON:OFF	Duty Cycle	Waveform
Time	1:1	50% bipolar	
Time	1:2	33.33% bipolar	
Time	1:3	25% bipolar	
Frequency	—	100% bipolar	
Frequency ($f+9f$)	10:8	55.55% bipolar	
Time	1:1	50% unipolar positive	
Time	1:2	33.33% unipolar positive	
Time	1:3	25% unipolar positive	
Time	1:1	50% unipolar negative	
Time	1:2	33.33% unipolar negative	
Time	1:3	25% unipolar negative	

= Aligned with 2000/01/01 00:00:00 UTC.

PHOENIX Geophysics Limited

3781 Victoria Park Avenue, Unit 3

Toronto, ON, Canada M1W 3K5

www.phoenix-geophysics.com

☎: +1 (416) 491-7340

🖷: +1 (416) 491-7378

✉: mail@phoenix-geophysics.com

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TXU-30 Geophysical Current Source Frequencies

Manual and automatic frequency selection

The TXU-30 Current Source output is adjustable for both frequency domain and time domain methods. In time domain, output can be bipolar or unipolar.

The TXU-30 has a built-in table of frequencies that can be selected manually using the controller. However, Phoenix current source controllers and System 2000.*net* receivers are also capable of automatically transmitting and receiving specific signal frequencies according to a GPS-synchronized schedule. (The built-in frequency table represents only a small subset of the frequencies that are possible using a schedule.)

Schedule files can be created on a PC and the files transferred to the instruments, or a schedule can be created by the instruments in real time, calculated from a small set of parameters. Schedule files created for the TXU-30 specify a waveform, a series of frequencies, a duration for each frequency, and the current for each frequency.

Schedules created by the TXU-30 in real time are determined by a few parameters saved in a file. These schedules specify a waveform, a series of frequencies, a minimum duration for each frequency, a minimum number of cycles for low frequencies, and the requested current. Optionally, an automatic current roll-off can be specified to prevent inductive loads from triggering a fault at higher frequencies.

Phase

For synchronization with other Phoenix GPS-equipped instruments, the phase is such that if the waveform were extended backward in time, the centre of the positive *on* time (or the negative *on* time in unipolar negative) would align with 2000/01/01 00:00:00 UTC.

Frequency

System 2000.*net* instruments derive frequencies from a 921.6 kHz base frequency, and therefore may not be able to produce exactly the requested frequency. Use at least 6 (preferably 8) significant digits when specifying a frequency. The instruments will calculate the closest approximation possible.

The highest frequencies available are 9600 Hz for frequency domain modes; 30 Hz for time domain modes; and 8 Hz for the special FD9 mode $(f + 9f)$.

For best results in frequency domain methods, use frequencies from Table 1 that follows. For time domain methods, use frequencies at or below 30 Hz from the same table.

Frequencies available for manual selection from the controller are shown in Tables 2 and 3.

PHOENIX Geophysics Limited

3781 Victoria Park Avenue, Unit 3

Toronto, ON, Canada M1W 3K5

www.phoenix-geophysics.com

☎: +1 (416) 491-7340

🖷: +1 (416) 491-7378

✉: mail@phoenix-geophysics.com

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Table 1: Recommended frequencies

Frequency (Hz)									
				1024.0000	512.0000	256.0000	128.0000	64.00000	32.00000
								61.44000	30.72000
	7680.000	3840.000	1920.000	960.0000	480.0000	240.0000	120.0000	60.00000	30.00000
				948.1481	474.0741	237.0370	118.5185	59.25926	29.62963
								56.88889	28.44444
			1706.667	853.3333	426.6667	213.3333	106.6667	53.33333	26.66667
								51.20000	25.60000
	6400.000	3200.000	1600.000	800.0000	400.0000	200.0000	100.0000	50.00000	25.00000
		3072.000	1536.000	768.0000	384.0000	192.0000	96.0000	48.00000	24.00000
								47.40741	23.70370
		2844.444	1422.222	711.1111	355.5556	177.7778	88.8889	44.44444	22.22222
					341.3333	170.6667	85.3333	42.66667	21.33333
	5120.000	2560.000	1280.000	640.0000	320.0000	160.0000	80.0000	40.00000	20.00000
				614.4000	307.2000	153.6000	76.8000	38.40000	19.20000
9600.000	4800.000	2400.000	1200.000	600.0000	300.0000	150.0000	75.0000	37.50000	18.75000
				568.8889	284.4444	142.2222	71.1111	35.55556	17.77778
								34.13333	17.06667
8533.333	4266.667	2133.333	1066.667	533.3333	266.6667	133.3333	66.6667	33.33333	16.66667

Frequency (Hz)					Period (s)	Frequency	Period (s)	Frequency	Period (s)
16.00000	8.000000	4.000000	2.000000	1.000000	*1.000000*	0.500000	*2.000000*	0.250000	*4.000000*
15.36000	7.680000	3.840000	1.920000	0.960000	*1.041667*	0.480000	*2.083333*		
15.00000	7.500000	3.750000	1.875000	0.937500	*1.066667*	0.468750	*2.133333*	0.234375	*4.266667*
14.81481	7.407407	3.703704	1.851852	0.925926	*1.080000*	0.462963	*2.160000*		
14.22222	7.111111	3.555556	1.777778	0.888889	*1.125000*	0.444444	*2.250000*		
13.33333	6.666667	3.333333	1.666667	0.833333	*1.200000*	0.416667	*2.400000*	0.208333	*4.800001*
12.80000	6.400000	3.200000	1.600000	0.800000	*1.250000*	0.400000	*2.500000*	0.200000	*5.000000*
12.50000	6.250000	3.125000	1.562500	0.781250	*1.280000*	0.390625	*2.560000*		
12.00000	6.000000	3.000000	1.500000	0.750000	*1.333333*	0.375000	*2.666667*	0.187500	*5.333333*
11.85185	5.925926	2.962963	1.481481	0.740741	*1.350000*	0.370370	*2.700000*	0.185185	*5.400000*
11.11111	5.555556	2.777778	1.388889	0.694444	*1.440000*	0.347222	*2.880000*		
10.66667	5.333333	2.666667	1.333333	0.666667	*1.500000*	0.333333	*3.000000*	0.166667	*5.999999*
10.00000	5.000000	2.500000	1.250000	0.625000	*1.600000*	0.312500	*3.200000*	0.156250	*6.400000*
9.60000	4.800000	2.400000	1.200000	0.600000	*1.666667*	0.300000	*3.333333*	0.150000	*6.666667*
9.37500	4.687500	2.343750	1.171875	0.585938	*1.706667*				
8.88889	4.444444	2.222222	1.111111	0.555556	*1.800000*	0.277778	*3.600000*	0.138889	*7.199999*
8.53333	4.266667	2.133333	1.066667	0.533333	*1.875000*	0.266667	*3.750000*		
8.33333	4.166667	2.083333	1.041667	0.520833	*1.920000*	0.260417	*3.840000*		

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Table 1: Recommended frequencies (continued)

Frequency	Period (s)	Frequency	Period (s)	Frequency	Period (s)	Frequency	Period (s)	Frequency	Period (s)
0.1250000	*8.00000*	0.0625000	*16.00000*	0.0312500	*32.00000*	0.01562500	*64.0000*	0.00781250	*128.000*
0.1200000	*8.33333*	0.0600000	*16.66667*	0.0300000	*33.33333*	0.01500000	*66.6667*	0.00750000	*133.333*
0.1171875	*8.53333*								
0.1111111	*9.00000*	0.0555556	*18.00000*	0.0277778	*36.00000*	0.01388889	*72.0000*	0.00694444	*144.000*
0.1041667	*9.60000*	0.0520833	*19.20000*	0.0260417	*38.40000*	0.01302083	*76.8000*		
0.1000000	*10.00000*	0.0500000	*20.00000*	0.0250000	*40.00000*	0.01250000	*80.0000*	0.00625000	*160.000*
0.0937500	*10.66667*	0.0468750	*21.33333*	0.0234375	*42.66667*				
0.0925926	*10.80000*	0.0462963	*21.60000*	0.0231482	*43.20000*	0.01157407	*86.4000*	0.00578704	*172.800*
0.0833333	*12.00000*	0.0416667	*24.00000*	0.0208333	*48.00001*	0.01041667	*96.0000*	0.00520833	*192.000*
0.0781250	*12.80000*	0.0390625	*25.60000*						
0.0750000	*13.33333*	0.0375000	*26.66667*	0.0187500	*53.33333*	0.00937500	*106.6667*	0.00468750	*213.333*
0.0694444	*14.40000*	0.0347222	*28.80000*	0.0173611	*57.60000*	0.00868056	*115.2000*	0.00434028	*230.400*
0.0666667	*15.00000*	0.0333333	*30.00000*	0.0166667	*59.99999*	0.00833333	*120.0000*	0.00416667	*240.000*
								0.00390625	*256.000*

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Table 2: Manually selectable frequencies (Hz), frequency domain

9600.00	7680.00	6400.00		
4800.00	3840.00	3200.00	2844.44	
2400.00	1920.00	1600.00	1422.22	1200.00
1024.00	960.000	800.000	711.111	600.000
512.000	480.000	400.000	355.555	300.000
256.000	213.333	170.667	150.000	
128.000	106.667	85.3333	75.0000	
64.0000	53.3333	42.6667	37.5000	
32.0000	26.6667	21.3333	18.7500	
16.0000	13.3333	10.6667	9.37500	
8.00000	6.66667	5.33333	4.68750	
4.00000	3.33333	2.66667	2.34375	
2.00000	1.66667	1.33333	1.17188	
1.00000	0.833333	0.666667	0.600000	
0.500000	0.416667	0.333333	0.300000	
0.250000	0.208333	0.166667	0.150000	
0.125000	0.1041667	0.0833333	0.0750000	0.0666667
0.0625000	0.0520833	0.0520833	0.0416667	0.0333333
0.0312500	0.0260417	0.0208333	0.0187500	0.0166667
0.0156250	0.0130208	0.0104167	0.0937500	0.00833333
0.00781250	0.00520833	0.00468750	0.00416667	
0.00390625				

Table 3: Manually selectable frequencies (Hz), time domain

	30.0000	25.0000
16.0000	10.0000	8.33333
8.00000	5.00000	
4.00000	2.50000	
2.00000		
1.00000		
0.500000		
0.250000		
0.125000	0.0666667	
0.06250000	0.03333333	
0.03125000	0.0166667	
0.01562500	0.00833333	
0.00781250		

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