

LAMBDA CONTROLLER - LCA80, LCP80, LCA90, LCP90

Header:

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Revision:

V8.3-0: Added NERNST 450 curve (LSM 11)
 V8.4-0: New version of Lambda controller with Current output 4-20mA
 V8.5-0: Added O2 0.0 curve
 V8.6-0: Added O2 25 curve

ANALOG OUTPUT - CALCULATION FORMULAS

RANGE	LOG 2.5	NERNST 450	LAMBDA 1.0	LINEAR 1.0	RANGE	O2 1.0	O2 4.0	O2 0.0	O2 25
0-5 [V]	Use Table	LSM11 = AO	LAMBDA = AO	0,33xAO+0,66	0-5 [V]	O2 = 7x(AO-1)	O2 = 2x(AO-4)	O2 = AO	O2 = AO(16/25)
0-10 [V]	Use Table	LSM11 = AO	LAMBDA = AO	0,33xAO+0,66	0-10 [V]	O2 = 7x(AO-1)	O2 = 2x(AO-4)	O2 = AO	O2 = AO(16/25)
0-20 [mA]	Use Table	LSM11 = AO	LAMBDA = AO	0,33xAO+0,66	0-20 [mA]	O2 = 7x(AO-1)	O2 = 2x(AO-4)	O2 = AO	O2 = AO(16/25)
4-20 [mA]	Use Table-4	LSM11 = AO-4	LAMBDA = AO-4	0,33xAO-3,33	4-20 [mA]	O2 = 7x(AO-5)	O2 = 2x(AO-8)	O2 = AO-4	O2 = AO(16/25)-4

ANALOG OUTPUT - EXAMPLES TABLE

LAMBDA OUTPUT RANGE	LOG 2.5 0-10 [V] 0-20 [mA]	NERNST 450 0-10 [V] 0-20 [mA]	LAMBDA 1.0 0-10 [V] 0-20 [mA]	LINEAR 1.0 0-10 [V] 0-20 [mA]	O2 [%] OUTPUT RANGE	O2 1.0 0-10 [V] 0-20 [mA]	O2 4.0 4-20 [mA]	O2 0.0 0-10 [V] 0-20 [mA]	O2 25 4-20 [mA]
FAILURE	0,1000	0,1000	0,100	0,100	FAILURE	0,100	0,100	0,100	0,100
0,7166	1,053	1,0000	0,717	0,150	-7,650	0,000	4,175	0,000	4,000
0,7174	1,058	0,9997	0,717	0,152	-7,619	0,000	4,191	0,000	4,000
0,7182	1,062	0,9994	0,718	0,155	-7,590	0,000	4,205	0,000	4,000
0,7190	1,067	0,9991	0,719	0,157	-7,561	0,000	4,220	0,000	4,000
0,7198	1,072	0,9988	0,720	0,159	-7,532	0,000	4,234	0,000	4,000
0,7205	1,076	0,9985	0,721	0,162	-7,503	0,000	4,249	0,000	4,000
0,7213	1,081	0,9982	0,721	0,164	-7,474	0,000	4,263	0,000	4,000
0,7220	1,085	0,9979	0,722	0,166	-7,445	0,000	4,278	0,000	4,000
0,7228	1,090	0,9976	0,723	0,168	-7,416	0,000	4,292	0,000	4,000
0,7235	1,094	0,9973	0,724	0,171	-7,387	0,000	4,307	0,000	4,000
0,7243	1,099	0,9970	0,724	0,173	-7,358	0,000	4,321	0,000	4,000
0,7250	1,103	0,9967	0,725	0,175	-7,329	0,000	4,336	0,000	4,000
0,7258	1,108	0,9964	0,726	0,177	-7,300	0,000	4,350	0,000	4,000
0,7265	1,112	0,9961	0,727	0,180	-7,271	0,000	4,365	0,000	4,000
0,7273	1,117	0,9958	0,727	0,182	-7,242	0,000	4,379	0,000	4,000
0,7280	1,121	0,9955	0,728	0,184	-7,213	0,000	4,394	0,000	4,000
0,7288	1,126	0,9952	0,729	0,186	-7,184	0,000	4,408	0,000	4,000
0,7295	1,130	0,9949	0,730	0,189	-7,155	0,000	4,423	0,000	4,000
0,7303	1,135	0,9946	0,730	0,191	-7,126	0,000	4,437	0,000	4,000
0,7310	1,139	0,9943	0,731	0,193	-7,097	0,000	4,452	0,000	4,000
0,7318	1,144	0,9940	0,732	0,195	-7,068	0,000	4,466	0,000	4,000
0,7325	1,148	0,9937	0,733	0,198	-7,039	0,000	4,481	0,000	4,000
0,7333	1,153	0,9934	0,733	0,200	-7,010	0,000	4,495	0,000	4,000
0,7340	1,157	0,9931	0,734	0,202	-6,981	0,003	4,510	0,000	4,000
0,7348	1,161	0,9928	0,735	0,204	-6,952	0,007	4,524	0,000	4,000
0,7355	1,166	0,9925	0,736	0,207	-6,923	0,011	4,539	0,000	4,000
0,7363	1,170	0,9922	0,736	0,209	-6,894	0,015	4,553	0,000	4,000
0,7370	1,175	0,9919	0,737	0,211	-6,865	0,019	4,568	0,000	4,000
0,7378	1,179	0,9916	0,738	0,213	-6,836	0,023	4,582	0,000	4,000
0,7385	1,184	0,9913	0,739	0,216	-6,807	0,028	4,597	0,000	4,000
0,7393	1,188	0,9910	0,739	0,218	-6,778	0,032	4,611	0,000	4,000
0,7400	1,192	0,9907	0,740	0,220	-6,749	0,036	4,626	0,000	4,000
0,7408	1,197	0,9904	0,741	0,222	-6,720	0,040	4,640	0,000	4,000
0,7415	1,201	0,9901	0,742	0,225	-6,690	0,044	4,655	0,000	4,000
0,7423	1,206	0,9898	0,742	0,227	-6,665	0,049	4,672	0,000	4,000
0,7430	1,210	0,9895	0,743	0,229	-6,622	0,054	4,689	0,000	4,000
0,7438	1,214	0,9892	0,744	0,231	-6,588	0,059	4,706	0,000	4,000
0,7445	1,219	0,9889	0,745	0,234	-6,554	0,064	4,723	0,000	4,000
0,7453	1,223	0,9886	0,745	0,236	-6,520	0,069	4,740	0,000	4,000
0,7460	1,227	0,9883	0,746	0,238	-6,486	0,073	4,757	0,000	4,000
0,7468	1,232	0,9880	0,747	0,240	-6,452	0,078	4,774	0,000	4,000
0,7475	1,236	0,9877	0,748	0,243	-6,418	0,083	4,791	0,000	4,000
0,7483	1,240	0,9874	0,748	0,245	-6,384	0,088	4,808	0,000	4,000
0,7490	1,245	0,9871	0,749	0,247	-6,350	0,093	4,825	0,000	4,000
0,7498	1,249	0,9868	0,750	0,249	-6,329	0,096	4,836	0,000	4,000
0,7505	1,254	0,9865	0,751	0,252	-6,308	0,099	4,846	0,000	4,000
0,7513	1,258	0,9862	0,751	0,254	-6,287	0,102	4,857	0,000	4,000
0,7520	1,262	0,9859	0,752	0,256	-6,266	0,105	4,867	0,000	4,000
0,7528	1,267	0,9856	0,753	0,258	-6,245	0,108	4,878	0,000	4,000
0,7535	1,271	0,9853	0,754	0,261	-6,224	0,111	4,888	0,000	4,000
0,7543	1,275	0,9850	0,754	0,263	-6,203	0,114	4,899	0,000	4,000
0,7550	1,279	0,9847	0,755	0,265	-6,182	0,117	4,909	0,000	4,000
0,7558	1,284	0,9844	0,756	0,267	-6,161	0,120	4,920	0,000	4,000
0,7565	1,288	0,9841	0,757	0,270	-6,140	0,123	4,930	0,000	4,000
0,7573	1,292	0,9838	0,757	0,272	-6,119	0,126	4,941	0,000	4,000
0,7580	1,297	0,9835	0,758	0,274	-6,098	0,129	4,951	0,000	4,000
0,7588	1,301	0,9832	0,759	0,276	-6,077	0,132	4,962	0,000	4,000
0,7595	1,305	0,9829	0,760	0,279	-6,056	0,135	4,972	0,000	4,000
0,7603	1,310	0,9826	0,760	0,281	-6,035	0,138	4,983	0,000	4,000
0,7610	1,314	0,9823	0,761	0,283	-6,014	0,141	4,993	0,000	4,000
0,7618	1,318	0,9820	0,762	0,285	-5,993	0,144	5,004	0,000	4,000
0,7625	1,322	0,9817	0,763	0,288	-5,972	0,147	5,014	0,000	4,000
0,7633	1,327	0,9814	0,763	0,290	-5,951	0,150	5,025	0,000	4,000
0,7640	1,331	0,9811	0,764	0,292	-5,930	0,153	5,035	0,000	4,000
0,7648	1,335	0,9808	0,765	0,294	-5,909	0,156	5,046	0,000	4,000

0,7655	1,339	0,9805	0,766	0,297	-5,888	0,159	5,056	0,000	4,000
0,7663	1,344	0,9802	0,766	0,299	-5,867	0,162	5,067	0,000	4,000
0,7670	1,348	0,9799	0,767	0,301	-5,846	0,165	5,077	0,000	4,000
0,7678	1,352	0,9796	0,768	0,303	-5,825	0,168	5,088	0,000	4,000
0,7685	1,356	0,9793	0,769	0,306	-5,804	0,171	5,098	0,000	4,000
0,7693	1,361	0,9790	0,769	0,308	-5,780	0,174	5,110	0,000	4,000
0,7700	1,365	0,9787	0,770	0,310	-5,757	0,178	5,122	0,000	4,000
0,7708	1,369	0,9784	0,771	0,312	-5,734	0,181	5,133	0,000	4,000
0,7715	1,373	0,9781	0,772	0,315	-5,711	0,184	5,145	0,000	4,000
0,7723	1,378	0,9778	0,772	0,317	-5,688	0,187	5,156	0,000	4,000
0,7730	1,382	0,9775	0,773	0,319	-5,665	0,191	5,168	0,000	4,000
0,7738	1,386	0,9772	0,774	0,321	-5,641	0,194	5,179	0,000	4,000
0,7745	1,390	0,9769	0,775	0,324	-5,618	0,197	5,191	0,000	4,000
0,7753	1,394	0,9766	0,775	0,326	-5,595	0,201	5,202	0,000	4,000
0,7760	1,399	0,9763	0,776	0,328	-5,572	0,204	5,214	0,000	4,000
0,7768	1,403	0,9760	0,777	0,330	-5,549	0,207	5,226	0,000	4,000
0,7775	1,407	0,9757	0,778	0,333	-5,526	0,211	5,237	0,000	4,000
0,7783	1,411	0,9754	0,778	0,335	-5,503	0,214	5,249	0,000	4,000
0,7790	1,415	0,9751	0,779	0,337	-5,480	0,217	5,260	0,000	4,000
0,7798	1,420	0,9748	0,780	0,339	-5,457	0,220	5,272	0,000	4,000
0,7805	1,424	0,9745	0,781	0,342	-5,434	0,224	5,283	0,000	4,000
0,7813	1,428	0,9742	0,781	0,344	-5,410	0,227	5,295	0,000	4,000
0,7820	1,432	0,9739	0,782	0,346	-5,387	0,230	5,306	0,000	4,000
0,7828	1,436	0,9736	0,783	0,348	-5,364	0,234	5,318	0,000	4,000
0,7835	1,440	0,9733	0,784	0,351	-5,341	0,237	5,329	0,000	4,000
0,7843	1,445	0,9730	0,784	0,353	-5,318	0,240	5,341	0,000	4,000
0,7850	1,449	0,9727	0,785	0,355	-5,295	0,244	5,353	0,000	4,000
0,7858	1,453	0,9724	0,786	0,357	-5,272	0,247	5,364	0,000	4,000
0,7865	1,457	0,9721	0,787	0,360	-5,249	0,250	5,376	0,000	4,000
0,7873	1,461	0,9718	0,787	0,362	-5,226	0,253	5,387	0,000	4,000
0,7880	1,465	0,9715	0,788	0,364	-5,202	0,257	5,399	0,000	4,000
0,7888	1,469	0,9712	0,789	0,366	-5,179	0,260	5,410	0,000	4,000
0,7895	1,474	0,9709	0,790	0,369	-5,156	0,263	5,422	0,000	4,000
0,7903	1,478	0,9706	0,790	0,371	-5,133	0,267	5,433	0,000	4,000
0,7910	1,482	0,9703	0,791	0,373	-5,110	0,270	5,445	0,000	4,000
0,7918	1,486	0,9700	0,792	0,375	-5,087	0,273	5,457	0,000	4,000
0,7925	1,490	0,9697	0,793	0,378	-5,064	0,277	5,468	0,000	4,000
0,7933	1,494	0,9694	0,793	0,380	-5,041	0,280	5,480	0,000	4,000
0,7940	1,498	0,9691	0,794	0,382	-5,018	0,283	5,491	0,000	4,000
0,7948	1,502	0,9688	0,795	0,384	-4,995	0,286	5,503	0,000	4,000
0,7955	1,506	0,9685	0,796	0,387	-4,971	0,290	5,514	0,000	4,000
0,7963	1,510	0,9682	0,796	0,389	-4,948	0,293	5,526	0,000	4,000
0,7970	1,515	0,9679	0,797	0,391	-4,925	0,296	5,537	0,000	4,000
0,7978	1,519	0,9676	0,798	0,393	-4,902	0,300	5,549	0,000	4,000
0,7985	1,523	0,9673	0,799	0,396	-4,879	0,303	5,560	0,000	4,000
0,7993	1,527	0,9670	0,799	0,398	-4,856	0,306	5,572	0,000	4,000
0,8000	1,531	0,9667	0,800	0,400	-4,830	0,310	5,585	0,000	4,000
0,8009	1,536	0,9664	0,801	0,403	-4,806	0,313	5,597	0,000	4,000
0,8017	1,540	0,9661	0,802	0,405	-4,781	0,317	5,609	0,000	4,000
0,8026	1,545	0,9655	0,803	0,408	-4,757	0,320	5,622	0,000	4,000
0,8034	1,549	0,9649	0,803	0,410	-4,732	0,324	5,634	0,000	4,000
0,8043	1,554	0,9643	0,804	0,413	-4,708	0,327	5,646	0,000	4,000
0,8051	1,558	0,9637	0,805	0,415	-4,684	0,331	5,658	0,000	4,000
0,8060	1,563	0,9631	0,806	0,418	-4,659	0,334	5,670	0,000	4,000
0,8068	1,568	0,9625	0,807	0,420	-4,635	0,338	5,683	0,000	4,000
0,8077	1,572	0,9619	0,808	0,423	-4,610	0,341	5,695	0,000	4,000
0,8085	1,577	0,9613	0,809	0,426	-4,586	0,345	5,707	0,000	4,000
0,8094	1,581	0,9607	0,809	0,428	-4,562	0,348	5,719	0,000	4,000
0,8102	1,586	0,9601	0,810	0,431	-4,537	0,352	5,731	0,000	4,000
0,8111	1,590	0,9595	0,811	0,433	-4,513	0,355	5,744	0,000	4,000
0,8119	1,595	0,9589	0,812	0,436	-4,488	0,359	5,756	0,000	4,000
0,8128	1,600	0,9583	0,813	0,438	-4,464	0,362	5,768	0,000	4,000
0,8136	1,604	0,9577	0,814	0,441	-4,440	0,366	5,780	0,000	4,000
0,8145	1,609	0,9571	0,814	0,444	-4,415	0,369	5,792	0,000	4,000
0,8153	1,613	0,9565	0,815	0,446	-4,391	0,373	5,805	0,000	4,000
0,8162	1,618	0,9559	0,816	0,449	-4,366	0,376	5,817	0,000	4,000
0,8170	1,622	0,9553	0,817	0,451	-4,342	0,380	5,829	0,000	4,000
0,8178	1,626	0,9547	0,818	0,453	-4,318	0,383	5,841	0,000	4,000
0,8185	1,630	0,9541	0,819	0,456	-4,293	0,387	5,853	0,000	4,000
0,8193	1,634	0,9535	0,819	0,458	-4,269	0,390	5,866	0,000	4,000
0,8200	1,638	0,9529	0,820	0,460	-4,244	0,394	5,878	0,000	4,000
0,8209	1,643	0,9523	0,821	0,463	-4,220	0,397	5,890	0,000	4,000
0,8218	1,647	0,9517	0,822	0,465	-4,196	0,401	5,902	0,000	4,000
0,8226	1,652	0,9511	0,823	0,468	-4,171	0,404	5,914	0,000	4,000
0,8235	1,657	0,9505	0,824	0,471	-4,147	0,408	5,927	0,000	4,000
0,8244	1,661	0,9499	0,824	0,473	-4,122	0,411	5,939	0,000	4,000
0,8253	1,666	0,9493	0,825	0,476	-4,098	0,415	5,951	0,000	4,000
0,8261	1,670	0,9487	0,826	0,478	-4,074	0,418	5,963	0,000	4,000
0,8270	1,675	0,9481	0,827	0,481	-4,049	0,422	5,975	0,000	4,000
0,8279	1,680	0,9475	0,828	0,484	-4,025	0,425	5,988	0,000	4,000
0,8288	1,684	0,9469	0,829	0,486	-4,000	0,429	6,000	0,000	4,000
0,8296	1,689	0,9464	0,830	0,489	-3,976	0,432	6,012	0,000	4,000
0,8305	1,693	0,9458	0,831	0,492	-3,952	0,435	6,024	0,000	4,000
0,8314	1,698	0,9440	0,831	0,494	-3,927	0,439	6,036	0,000	4,000
0,8323	1,703	0,9428	0,832	0,497	-3,903	0,442	6,049	0,000	4,000
0,8331	1,707	0,9416	0,833	0,499	-3,880	0,446	6,060	0,000	4,000
0,8340	1,712	0,9404	0,834	0,502	-3,853	0,450	6,074	0,000	4,000
0,8349	1,716	0,9392	0,835	0,505	-3,825	0,454	6,087	0,000	4,000
0,8358	1,721	0,9380	0,836	0,507	-3,798	0,457	6,101	0,000	4,000

0,8366	1,725	0,9368	0,837	0,510	-3,771	0,461	6,115	0,000	4,000
0,8375	1,730	0,9356	0,838	0,513	-3,744	0,465	6,128	0,000	4,000
0,8384	1,734	0,9344	0,838	0,515	-3,716	0,469	6,142	0,000	4,000
0,8393	1,739	0,9332	0,839	0,518	-3,689	0,473	6,156	0,000	4,000
0,8401	1,743	0,9320	0,840	0,520	-3,662	0,477	6,169	0,000	4,000
0,8410	1,748	0,9308	0,841	0,523	-3,634	0,481	6,183	0,000	4,000
0,8419	1,752	0,9296	0,842	0,526	-3,607	0,485	6,197	0,000	4,000
0,8428	1,757	0,9284	0,843	0,528	-3,580	0,489	6,210	0,000	4,000
0,8436	1,761	0,9272	0,844	0,531	-3,552	0,493	6,224	0,000	4,000
0,8445	1,766	0,9260	0,845	0,534	-3,525	0,496	6,237	0,000	4,000
0,8454	1,770	0,9248	0,845	0,536	-3,498	0,500	6,251	0,000	4,000
0,8463	1,775	0,9236	0,846	0,539	-3,471	0,504	6,265	0,000	4,000
0,8471	1,779	0,9224	0,847	0,541	-3,443	0,508	6,278	0,000	4,000
0,8480	1,784	0,9212	0,848	0,544	-3,416	0,512	6,292	0,000	4,000
0,8489	1,789	0,9200	0,849	0,547	-3,389	0,516	6,306	0,000	4,000
0,8499	1,793	0,9188	0,850	0,550	-3,360	0,520	6,320	0,000	4,000
0,8508	1,798	0,9176	0,851	0,552	-3,340	0,523	6,330	0,000	4,000
0,8517	1,803	0,9164	0,852	0,555	-3,320	0,526	6,340	0,000	4,000
0,8526	1,808	0,9152	0,853	0,558	-3,300	0,529	6,350	0,000	4,000
0,8536	1,812	0,9140	0,854	0,561	-3,280	0,531	6,360	0,000	4,000
0,8545	1,817	0,9128	0,854	0,564	-3,260	0,534	6,370	0,000	4,000
0,8554	1,822	0,9116	0,855	0,566	-3,240	0,537	6,380	0,000	4,000
0,8563	1,826	0,9104	0,856	0,569	-3,220	0,540	6,390	0,000	4,000
0,8573	1,831	0,9092	0,857	0,572	-3,200	0,543	6,400	0,000	4,000
0,8582	1,836	0,9080	0,858	0,575	-3,180	0,546	6,410	0,000	4,000
0,8591	1,840	0,9068	0,859	0,577	-3,160	0,549	6,420	0,000	4,000
0,8600	1,845	0,9056	0,860	0,580	-3,140	0,551	6,430	0,000	4,000
0,8610	1,850	0,9044	0,861	0,583	-3,120	0,554	6,440	0,000	4,000
0,8619	1,854	0,9032	0,862	0,586	-3,100	0,557	6,450	0,000	4,000
0,8628	1,859	0,9020	0,863	0,588	-3,080	0,560	6,460	0,000	4,000
0,8637	1,864	0,9008	0,864	0,591	-3,060	0,563	6,470	0,000	4,000
0,8647	1,868	0,8996	0,865	0,594	-3,040	0,566	6,480	0,000	4,000
0,8656	1,873	0,8984	0,866	0,597	-3,020	0,569	6,490	0,000	4,000
0,8665	1,878	0,8972	0,867	0,600	-3,000	0,571	6,500	0,000	4,000
0,8674	1,882	0,8960	0,867	0,602	-2,980	0,574	6,510	0,000	4,000
0,8684	1,887	0,8948	0,868	0,605	-2,960	0,577	6,520	0,000	4,000
0,8693	1,892	0,8936	0,869	0,608	-2,940	0,580	6,530	0,000	4,000
0,8702	1,896	0,8924	0,870	0,611	-2,920	0,583	6,540	0,000	4,000
0,8711	1,901	0,8912	0,871	0,613	-2,890	0,587	6,555	0,000	4,000
0,8721	1,905	0,8900	0,872	0,616	-2,859	0,592	6,570	0,000	4,000
0,8730	1,910	0,8888	0,873	0,619	-2,829	0,596	6,585	0,000	4,000
0,8739	1,915	0,8876	0,874	0,622	-2,799	0,600	6,601	0,000	4,000
0,8748	1,919	0,8864	0,875	0,624	-2,769	0,605	6,616	0,000	4,000
0,8758	1,924	0,8852	0,876	0,627	-2,738	0,609	6,631	0,000	4,000
0,8767	1,928	0,8840	0,877	0,630	-2,708	0,613	6,646	0,000	4,000
0,8776	1,933	0,8828	0,878	0,633	-2,678	0,617	6,661	0,000	4,000
0,8785	1,938	0,8816	0,879	0,636	-2,647	0,622	6,676	0,000	4,000
0,8795	1,942	0,8804	0,879	0,639	-2,617	0,626	6,692	0,000	4,000
0,8804	1,947	0,8792	0,880	0,641	-2,587	0,630	6,707	0,000	4,000
0,8813	1,951	0,8780	0,881	0,644	-2,556	0,635	6,722	0,000	4,000
0,8822	1,956	0,8768	0,882	0,647	-2,526	0,639	6,737	0,000	4,000
0,8832	1,960	0,8756	0,883	0,650	-2,496	0,643	6,752	0,000	4,000
0,8841	1,965	0,8744	0,884	0,652	-2,466	0,648	6,767	0,000	4,000
0,8850	1,969	0,8732	0,885	0,655	-2,435	0,652	6,782	0,000	4,000
0,8859	1,974	0,8720	0,886	0,658	-2,405	0,656	6,798	0,000	4,000
0,8869	1,979	0,8708	0,887	0,661	-2,375	0,661	6,813	0,000	4,000
0,8878	1,983	0,8696	0,888	0,663	-2,344	0,665	6,828	0,000	4,000
0,8887	1,988	0,8684	0,889	0,666	-2,314	0,669	6,843	0,000	4,000
0,8896	1,992	0,8672	0,890	0,669	-2,284	0,674	6,858	0,000	4,000
0,8906	1,997	0,8660	0,891	0,672	-2,253	0,678	6,873	0,000	4,000
0,8915	2,001	0,8648	0,891	0,675	-2,223	0,682	6,888	0,000	4,000
0,8924	2,006	0,8636	0,892	0,677	-2,193	0,687	6,904	0,000	4,000
0,8933	2,010	0,8624	0,893	0,680	-2,163	0,691	6,919	0,000	4,000
0,8943	2,015	0,8612	0,894	0,683	-2,132	0,695	6,934	0,000	4,000
0,8952	2,019	0,8600	0,895	0,686	-2,102	0,700	6,949	0,000	4,000
0,8961	2,024	0,8588	0,896	0,688	-2,072	0,704	6,964	0,000	4,000
0,8971	2,028	0,8576	0,897	0,691	-2,041	0,708	6,979	0,000	4,000
0,8981	2,033	0,8564	0,898	0,694	-2,011	0,713	6,995	0,000	4,000
0,8990	2,038	0,8552	0,899	0,697	-1,981	0,717	7,010	0,000	4,000
0,9000	2,042	0,8540	0,900	0,700	-1,950	0,721	7,025	0,000	4,000
0,9011	2,047	0,8528	0,901	0,703	-1,930	0,724	7,035	0,000	4,000
0,9021	2,053	0,8516	0,902	0,706	-1,909	0,727	7,045	0,000	4,000
0,9032	2,058	0,8504	0,903	0,710	-1,889	0,730	7,056	0,000	4,000
0,9042	2,063	0,8492	0,904	0,713	-1,868	0,733	7,066	0,000	4,000
0,9053	2,068	0,8480	0,905	0,716	-1,848	0,736	7,076	0,000	4,000
0,9063	2,073	0,8468	0,906	0,719	-1,828	0,739	7,086	0,000	4,000
0,9074	2,078	0,8456	0,907	0,722	-1,807	0,742	7,096	0,000	4,000
0,9084	2,083	0,8444	0,908	0,725	-1,787	0,745	7,107	0,000	4,000
0,9095	2,088	0,8432	0,909	0,729	-1,766	0,748	7,117	0,000	4,000
0,9105	2,093	0,8420	0,911	0,732	-1,746	0,751	7,127	0,000	4,000
0,9116	2,098	0,8408	0,912	0,735	-1,726	0,753	7,137	0,000	4,000
0,9126	2,103	0,8396	0,913	0,738	-1,705	0,756	7,147	0,000	4,000
0,9137	2,108	0,8384	0,914	0,741	-1,685	0,759	7,158	0,000	4,000
0,9147	2,113	0,8372	0,915	0,744	-1,664	0,762	7,168	0,000	4,000
0,9158	2,118	0,8360	0,916	0,747	-1,644	0,765	7,178	0,000	4,000
0,9168	2,123	0,8348	0,917	0,750	-1,624	0,768	7,188	0,000	4,000
0,9179	2,128	0,8336	0,918	0,754	-1,603	0,771	7,198	0,000	4,000
0,9189	2,133	0,8324	0,919	0,757	-1,583	0,774	7,209	0,000	4,000
0,9200	2,138	0,8312	0,920	0,760	-1,562	0,777	7,219	0,000	4,000

0,9210	2,143	0,8300	0,921	0,763	-1,542	0,780	7,229	0,000	4,000
0,9221	2,148	0,8288	0,922	0,766	-1,522	0,783	7,239	0,000	4,000
0,9231	2,152	0,8276	0,923	0,769	-1,501	0,786	7,249	0,000	4,000
0,9242	2,157	0,8264	0,924	0,773	-1,481	0,788	7,260	0,000	4,000
0,9252	2,162	0,8252	0,925	0,776	-1,460	0,791	7,270	0,000	4,000
0,9263	2,167	0,8240	0,926	0,779	-1,440	0,794	7,280	0,000	4,000
0,9273	2,172	0,8228	0,927	0,782	-1,420	0,797	7,290	0,000	4,000
0,9284	2,177	0,8216	0,928	0,785	-1,399	0,800	7,300	0,000	4,000
0,9294	2,182	0,8204	0,929	0,788	-1,379	0,803	7,311	0,000	4,000
0,9305	2,187	0,8192	0,930	0,792	-1,358	0,806	7,321	0,000	4,000
0,9315	2,192	0,8180	0,932	0,795	-1,338	0,809	7,331	0,000	4,000
0,9326	2,197	0,8168	0,933	0,798	-1,318	0,812	7,341	0,000	4,000
0,9336	2,202	0,8156	0,934	0,801	-1,297	0,815	7,351	0,000	4,000
0,9347	2,206	0,8144	0,935	0,804	-1,277	0,818	7,362	0,000	4,000
0,9357	2,211	0,8132	0,936	0,807	-1,256	0,821	7,372	0,000	4,000
0,9368	2,216	0,8120	0,937	0,810	-1,236	0,823	7,382	0,000	4,000
0,9378	2,221	0,8108	0,938	0,813	-1,216	0,826	7,392	0,000	4,000
0,9389	2,226	0,8094	0,939	0,817	-1,195	0,829	7,402	0,000	4,000
0,9399	2,231	0,8078	0,940	0,820	-1,175	0,832	7,413	0,000	4,000
0,9410	2,236	0,8060	0,941	0,823	-1,154	0,835	7,423	0,000	4,000
0,9420	2,241	0,8040	0,942	0,826	-1,134	0,838	7,433	0,000	4,000
0,9431	2,245	0,8018	0,943	0,829	-1,114	0,841	7,443	0,000	4,000
0,9441	2,250	0,7994	0,944	0,832	-1,093	0,844	7,453	0,000	4,000
0,9452	2,255	0,7968	0,945	0,836	-1,073	0,847	7,464	0,000	4,000
0,9462	2,260	0,7940	0,946	0,839	-1,052	0,850	7,474	0,000	4,000
0,9472	2,264	0,7910	0,947	0,842	-1,032	0,853	7,484	0,000	4,000
0,9481	2,269	0,7878	0,948	0,844	-1,012	0,855	7,494	0,000	4,000
0,9491	2,273	0,7844	0,949	0,847	-0,991	0,858	7,504	0,000	4,000
0,9500	2,277	0,7808	0,950	0,850	-0,970	0,861	7,515	0,000	4,000
0,9511	2,282	0,7770	0,951	0,853	-0,943	0,865	7,528	0,000	4,000
0,9523	2,288	0,7730	0,952	0,857	-0,916	0,869	7,542	0,000	4,000
0,9534	2,293	0,7680	0,953	0,860	-0,889	0,873	7,555	0,000	4,000
0,9545	2,298	0,7650	0,955	0,864	-0,862	0,877	7,569	0,000	4,000
0,9556	2,303	0,7620	0,956	0,867	-0,836	0,881	7,582	0,000	4,000
0,9568	2,308	0,7590	0,957	0,870	-0,809	0,884	7,596	0,000	4,000
0,9579	2,313	0,7560	0,958	0,874	-0,782	0,888	7,609	0,000	4,000
0,9590	2,318	0,7530	0,959	0,877	-0,755	0,892	7,623	0,000	4,000
0,9601	2,323	0,7490	0,960	0,880	-0,728	0,896	7,636	0,000	4,000
0,9613	2,328	0,7440	0,961	0,884	-0,701	0,900	7,650	0,000	4,000
0,9624	2,333	0,7380	0,962	0,887	-0,674	0,904	7,663	0,000	4,000
0,9635	2,339	0,7310	0,964	0,891	-0,647	0,908	7,676	0,000	4,000
0,9646	2,344	0,7225	0,965	0,894	-0,620	0,911	7,690	0,000	4,000
0,9658	2,349	0,7130	0,966	0,897	-0,593	0,915	7,703	0,000	4,000
0,9669	2,354	0,7028	0,967	0,901	-0,567	0,919	7,717	0,000	4,000
0,9680	2,359	0,6920	0,968	0,904	-0,540	0,923	7,730	0,000	4,000
0,9698	2,367	0,6808	0,970	0,909	-0,513	0,927	7,744	0,000	4,000
0,9715	2,374	0,6692	0,972	0,915	-0,486	0,931	7,757	0,000	4,000
0,9733	2,382	0,6572	0,973	0,920	-0,459	0,934	7,771	0,000	4,000
0,9750	2,390	0,6448	0,975	0,925	-0,432	0,938	7,784	0,000	4,000
0,9768	2,398	0,6320	0,977	0,930	-0,405	0,942	7,797	0,000	4,000
0,9785	2,406	0,6188	0,979	0,936	-0,378	0,946	7,811	0,000	4,000
0,9803	2,413	0,6052	0,980	0,941	-0,351	0,950	7,824	0,000	4,000
0,9820	2,421	0,5916	0,982	0,946	-0,324	0,954	7,838	0,000	4,000
0,9838	2,429	0,5780	0,984	0,951	-0,298	0,958	7,851	0,000	4,000
0,9855	2,437	0,5644	0,986	0,957	-0,271	0,961	7,865	0,000	4,000
0,9873	2,444	0,5508	0,987	0,962	-0,244	0,965	7,878	0,000	4,000
0,9890	2,452	0,5372	0,989	0,967	-0,217	0,969	7,892	0,000	4,000
0,9908	2,460	0,5236	0,991	0,972	-0,190	0,973	7,905	0,000	4,000
0,9925	2,467	0,5100	0,993	0,978	-0,163	0,977	7,919	0,000	4,000
0,9943	2,475	0,4956	0,994	0,983	-0,136	0,981	7,932	0,000	4,000
0,9960	2,483	0,4820	0,996	0,988	-0,109	0,984	7,945	0,000	4,000
0,9970	2,487	0,4740	0,997	0,991	-0,082	0,988	7,959	0,000	4,000
0,9980	2,491	0,4660	0,998	0,994	-0,055	0,992	7,972	0,000	4,000
0,9990	2,496	0,4580	0,999	0,997	-0,029	0,996	7,986	0,000	4,000
1,0000	2,500	0,4500	1,000	1,000	0,000	1,000	8,000	0,000	4,000
1,0025	2,504	0,4300	1,003	1,008	0,040	1,006	8,020	0,040	4,026
1,0050	2,507	0,4100	1,005	1,015	0,080	1,011	8,040	0,080	4,051
1,0075	2,511	0,3900	1,008	1,023	0,120	1,017	8,060	0,120	4,077
1,0100	2,514	0,3700	1,010	1,030	0,160	1,023	8,080	0,160	4,102
1,0125	2,518	0,3500	1,013	1,038	0,200	1,029	8,100	0,200	4,128
1,0150	2,522	0,3300	1,015	1,045	0,240	1,034	8,120	0,240	4,154
1,0175	2,525	0,3100	1,018	1,053	0,280	1,040	8,140	0,280	4,179
1,0200	2,529	0,2900	1,020	1,060	0,320	1,046	8,160	0,320	4,205
1,0220	2,532	0,2720	1,022	1,066	0,360	1,051	8,180	0,360	4,230
1,0240	2,534	0,2550	1,024	1,072	0,400	1,057	8,200	0,400	4,256
1,0260	2,537	0,2390	1,026	1,078	0,440	1,063	8,220	0,440	4,282
1,0280	2,540	0,2240	1,028	1,084	0,480	1,069	8,240	0,480	4,307
1,0300	2,543	0,2100	1,030	1,090	0,520	1,074	8,260	0,520	4,333
1,0320	2,546	0,1970	1,032	1,096	0,560	1,080	8,280	0,560	4,358
1,0340	2,548	0,1850	1,034	1,102	0,600	1,086	8,300	0,600	4,384
1,0360	2,551	0,1740	1,036	1,108	0,640	1,091	8,320	0,640	4,410
1,0380	2,554	0,1640	1,038	1,114	0,680	1,097	8,340	0,680	4,435
1,0400	2,557	0,1550	1,040	1,120	0,720	1,103	8,360	0,720	4,461
1,0420	2,560	0,1470	1,042	1,126	0,760	1,109	8,380	0,760	4,486
1,0440	2,562	0,1400	1,044	1,132	0,800	1,114	8,400	0,800	4,512
1,0460	2,565	0,1340	1,046	1,138	0,840	1,120	8,420	0,840	4,538
1,0480	2,568	0,1290	1,048	1,144	0,880	1,126	8,440	0,880	4,563
1,0500	2,571	0,1250	1,050	1,150	0,920	1,131	8,460	0,920	4,589
1,0520	2,574	0,1220	1,052	1,156	0,960	1,137	8,480	0,960	4,614

3,8700	4,463	0,0000	3,870	9,610	15,300	3,186	15,650	15,300	13,792
3,9000	4,474	0,0000	3,900	9,700	15,338	3,191	15,669	15,338	13,816
3,9300	4,485	0,0000	3,930	9,790	15,375	3,196	15,688	15,375	13,840
3,9600	4,496	0,0000	3,960	9,880	15,413	3,202	15,706	15,413	13,864
3,9900	4,507	0,0000	3,990	9,970	15,450	3,207	15,725	15,450	13,888
4,0200	4,518	0,0000	4,020	10,000	15,482	3,212	15,741	15,482	13,908
4,0500	4,529	0,0000	4,050	10,000	15,513	3,216	15,757	15,513	13,928
4,0800	4,540	0,0000	4,080	10,000	15,545	3,221	15,772	15,545	13,948
4,1100	4,550	0,0000	4,110	10,000	15,576	3,225	15,788	15,576	13,969
4,1400	4,561	0,0000	4,140	10,000	15,608	3,230	15,804	15,608	13,989
4,1700	4,571	0,0000	4,170	10,000	15,639	3,234	15,820	15,639	14,009
4,2000	4,582	0,0000	4,200	10,000	15,671	3,239	15,835	15,671	14,029
4,2300	4,592	0,0000	4,230	10,000	15,702	3,243	15,851	15,702	14,049
4,2600	4,602	0,0000	4,260	10,000	15,734	3,248	15,867	15,734	14,069
4,2900	4,612	0,0000	4,290	10,000	15,765	3,252	15,883	15,765	14,090
4,3200	4,623	0,0000	4,320	10,000	15,797	3,257	15,898	15,797	14,110
4,3500	4,633	0,0000	4,350	10,000	15,828	3,261	15,914	15,828	14,130
4,3800	4,643	0,0000	4,380	10,000	15,860	3,266	15,930	15,860	14,150
4,4100	4,652	0,0000	4,410	10,000	15,891	3,270	15,946	15,891	14,170
4,4400	4,662	0,0000	4,440	10,000	15,923	3,275	15,961	15,923	14,190
4,4700	4,672	0,0000	4,470	10,000	15,954	3,279	15,977	15,954	14,211
4,5000	4,682	0,0000	4,500	10,000	15,986	3,284	15,993	15,986	14,231
4,5300	4,691	0,0000	4,530	10,000	16,017	3,288	16,009	16,017	14,251
4,5600	4,701	0,0000	4,560	10,000	16,049	3,293	16,024	16,049	14,271
4,5900	4,710	0,0000	4,590	10,000	16,080	3,297	16,040	16,080	14,291
4,6200	4,720	0,0000	4,620	10,000	16,112	3,302	16,056	16,112	14,311
4,6500	4,729	0,0000	4,650	10,000	16,143	3,306	16,072	16,143	14,332
4,6800	4,739	0,0000	4,680	10,000	16,175	3,311	16,087	16,175	14,352
4,7100	4,748	0,0000	4,710	10,000	16,206	3,315	16,103	16,206	14,372
4,7400	4,757	0,0000	4,740	10,000	16,238	3,320	16,119	16,238	14,392
4,7700	4,766	0,0000	4,770	10,000	16,269	3,324	16,135	16,269	14,412
4,8000	4,775	0,0000	4,800	10,000	16,301	3,329	16,150	16,301	14,432
4,8300	4,784	0,0000	4,830	10,000	16,332	3,333	16,166	16,332	14,452
4,8600	4,793	0,0000	4,860	10,000	16,364	3,338	16,182	16,364	14,473
4,8900	4,802	0,0000	4,890	10,000	16,395	3,342	16,198	16,395	14,493
4,9200	4,811	0,0000	4,920	10,000	16,427	3,347	16,213	16,427	14,513
4,9500	4,820	0,0000	4,950	10,000	16,458	3,351	16,229	16,458	14,533
4,9800	4,829	0,0000	4,980	10,000	16,490	3,356	16,245	16,490	14,554
5,0100	4,837	0,0000	5,010	10,000	16,522	3,360	16,261	16,522	14,574
5,0400	4,846	0,0000	5,040	10,000	16,554	3,365	16,277	16,554	14,595
5,0700	4,855	0,0000	5,070	10,000	16,586	3,369	16,293	16,586	14,615
5,1000	4,863	0,0000	5,100	10,000	16,618	3,374	16,309	16,618	14,636
5,1300	4,872	0,0000	5,130	10,000	16,651	3,379	16,325	16,651	14,656
5,1600	4,880	0,0000	5,160	10,000	16,683	3,383	16,341	16,683	14,677
5,1900	4,889	0,0000	5,190	10,000	16,715	3,388	16,357	16,715	14,697
5,2200	4,897	0,0000	5,220	10,000	16,747	3,392	16,373	16,747	14,718
5,2500	4,905	0,0000	5,250	10,000	16,779	3,397	16,389	16,779	14,738
5,2800	4,914	0,0000	5,280	10,000	16,811	3,402	16,406	16,811	14,759
5,3100	4,922	0,0000	5,310	10,000	16,843	3,406	16,422	16,843	14,780
5,3400	4,930	0,0000	5,340	10,000	16,875	3,411	16,438	16,875	14,800
5,3700	4,938	0,0000	5,370	10,000	16,907	3,415	16,454	16,907	14,821
5,4000	4,946	0,0000	5,400	10,000	16,939	3,420	16,470	16,939	14,841
5,4650	4,964	0,0000	5,465	10,000	16,972	3,425	16,486	16,972	14,862
5,5300	4,981	0,0000	5,530	10,000	17,004	3,429	16,502	17,004	14,882
5,5950	4,998	0,0000	5,595	10,000	17,036	3,434	16,518	17,036	14,903
5,6600	5,014	0,0000	5,660	10,000	17,068	3,438	16,534	17,068	14,923
5,7250	5,031	0,0000	5,725	10,000	17,100	3,443	16,550	17,100	14,944
5,7900	5,047	0,0000	5,790	10,000	17,132	3,447	16,566	17,132	14,964
5,8550	5,064	0,0000	5,855	10,000	17,164	3,452	16,582	17,164	14,985
5,9200	5,080	0,0000	5,920	10,000	17,196	3,457	16,598	17,196	15,006
5,9850	5,095	0,0000	5,985	10,000	17,228	3,461	16,614	17,228	15,026
6,0500	5,111	0,0000	6,050	10,000	17,260	3,466	16,630	17,260	15,047
6,1150	5,127	0,0000	6,115	10,000	17,293	3,470	16,646	17,293	15,067
6,1800	5,142	0,0000	6,180	10,000	17,325	3,475	16,662	17,325	15,088
6,2450	5,157	0,0000	6,245	10,000	17,357	3,480	16,678	17,357	15,108
6,3100	5,172	0,0000	6,310	10,000	17,389	3,484	16,694	17,389	15,129
6,3750	5,187	0,0000	6,375	10,000	17,421	3,489	16,710	17,421	15,149
6,4400	5,202	0,0000	6,440	10,000	17,453	3,493	16,727	17,453	15,170
6,5050	5,216	0,0000	6,505	10,000	17,485	3,498	16,743	17,485	15,190
6,5700	5,231	0,0000	6,570	10,000	17,517	3,502	16,759	17,517	15,211
6,6350	5,245	0,0000	6,635	10,000	17,550	3,507	16,775	17,550	15,232
6,7000	5,259	0,0000	6,700	10,000	17,582	3,512	16,794	17,587	15,256
6,7650	5,273	0,0000	6,765	10,000	17,625	3,518	16,812	17,625	15,280
6,8300	5,287	0,0000	6,830	10,000	17,662	3,523	16,831	17,662	15,304
6,8950	5,301	0,0000	6,895	10,000	17,699	3,528	16,850	17,699	15,327
6,9600	5,314	0,0000	6,960	10,000	17,737	3,534	16,868	17,737	15,351
7,0250	5,328	0,0000	7,025	10,000	17,774	3,539	16,887	17,774	15,375
7,0900	5,341	0,0000	7,090	10,000	17,811	3,544	16,906	17,811	15,399
7,1550	5,354	0,0000	7,155	10,000	17,848	3,550	16,924	17,848	15,423
7,2200	5,368	0,0000	7,220	10,000	17,886	3,555	16,943	17,886	15,447
7,2900	5,382	0,0000	7,290	10,000	17,923	3,560	16,962	17,923	15,471
7,3600	5,395	0,0000	7,360	10,000	17,960	3,566	16,980	17,960	15,495
7,4300	5,409	0,0000	7,430	10,000	17,998	3,571	16,999	17,998	15,518
7,5000	5,423	0,0000	7,500	10,000	18,035	3,576	17,017	18,035	15,542
7,6250	5,447	0,0000	7,625	10,000	18,072	3,582	17,036	18,072	15,566
7,7500	5,470	0,0000	7,750	10,000	18,110	3,587	17,055	18,110	15,590
7,8750	5,493	0,0000	7,875	10,000	18,147	3,592	17,073	18,147	15,614
8,0000	5,516	0,0000	8,000	10,000	18,184	3,598	17,092	18,184	15,638
8,1250	5,539	0,0000	8,125	10,000	18,221	3,603	17,111	18,221	15,662

8,2500	5.561	0,0000	8,250	10,000	18,259	3,608	17,129	18,259	15,686
8,3750	5.583	0,0000	8,375	10,000	18,296	3,614	17,148	18,296	15,709
8,5000	5.604	0,0000	8,500	10,000	18,333	3,619	17,167	18,333	15,733
8,6250	5.625	0,0000	8,625	10,000	18,371	3,624	17,185	18,371	15,757
8,7500	5.646	0,0000	8,750	10,000	18,408	3,630	17,204	18,408	15,781
8,8750	5.667	0,0000	8,875	10,000	18,445	3,635	17,223	18,445	15,805
9,0000	5.687	0,0000	9,000	10,000	18,483	3,640	17,241	18,483	15,829
9,1250	5.707	0,0000	9,125	10,000	18,520	3,646	17,260	18,520	15,853
9,2500	5.727	0,0000	9,250	10,000	18,557	3,651	17,279	18,557	15,877
9,3750	5.746	0,0000	9,375	10,000	18,594	3,656	17,297	18,594	15,900
9,5000	5.766	0,0000	9,500	10,000	18,632	3,662	17,316	18,632	15,924
9,6250	5.785	0,0000	9,625	10,000	18,669	3,667	17,335	18,669	15,948
9,7500	5.803	0,0000	9,750	10,000	18,706	3,672	17,353	18,706	15,972
9,8750	5.822	0,0000	9,875	10,000	18,744	3,678	17,372	18,744	15,996
10,0000	5.840	0,0000	10,000	10,000	18,780	3,683	17,390	18,780	16,019
10,2500	5.876	0,0000	10,000	10,000	18,816	3,688	17,408	18,816	16,042
10,5000	5.911	0,0000	10,000	10,000	18,853	3,693	17,426	18,853	16,066
10,7500	5.945	0,0000	10,000	10,000	18,889	3,698	17,445	18,889	16,089
11,0000	5.978	0,0000	10,000	10,000	18,926	3,704	17,463	18,926	16,112
11,2500	6.011	0,0000	10,000	10,000	18,962	3,709	17,481	18,962	16,136
11,5000	6.043	0,0000	10,000	10,000	18,998	3,714	17,499	18,998	16,159
11,7500	6.074	0,0000	10,000	10,000	19,035	3,719	17,517	19,035	16,182
12,0000	6.104	0,0000	10,000	10,000	19,071	3,724	17,536	19,071	16,206
12,1250	6.119	0,0000	10,000	10,000	19,108	3,730	17,554	19,108	16,229
12,2500	6.134	0,0000	10,000	10,000	19,144	3,735	17,572	19,144	16,252
12,3750	6.149	0,0000	10,000	10,000	19,180	3,740	17,590	19,180	16,275
12,5000	6.164	0,0000	10,000	10,000	20,990	3,999	18,495	20,000	17,434