

KMS

KMS UEGO display

Part nr: 01-01-01-0006



Kronenburg Management Systems

This document contains detailed information about the KMS uego display. Additional information, user manuals, wiring examples and software can be found on our website: <http://kms.vankronenburg.nl> or on the software CD included with the ECU.

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2. Contents of the package


- 1 Display with internal controller (with four connector attached)
- 1 Adapter (for easy ground fitting)
- 1 Welding bung stainless steel (M18 x1,5)
- 1 Instruction manual
- 1 Wide-band lambda sensor (LSU 4.2: Serial nr. <110200, LSU 4.9: Serial nr. >110200)
- 1 Contra connector (to attach the 3 pole connector)

3. Installation of the lambda display

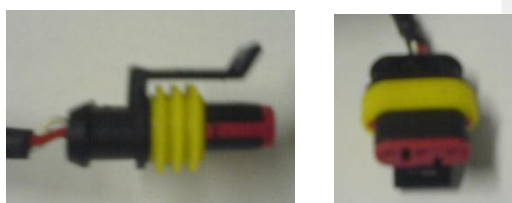
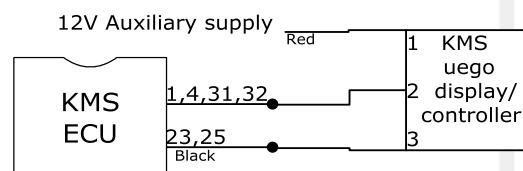
Place your KMS uego display controller in a dry place where temperatures don't exceed 65°C.

Warning: don't place the uego display controller and wires near any 'high powered' cables (sparkplug leads, etc), because of electrical interference.

The KMS uego display has 4 cables with connectors. The function and connection/wiring of these connectors is as follows:

- Single connector: heater ground
Connect to ground (chassis)
- 
- 3 pole connector (superseal): power/ground for the lambda controller display and data output to KMS ECU's → Connect as following:

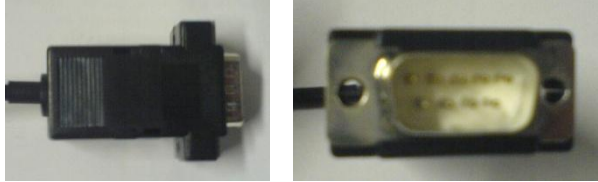
Connector pin	Wire colour	Function	MD35 pin nr	MP25 pin nr
Pin 1	Red	+ 12V	12V Aux supply	12V Aux supply
Pin 2	White	Signal out	31: Lambda signal 1 32: Lambda signal 2	1: Lambda signal 4: Analog aux input
Pin 3	Black	Ground	23: ECU ground	25: ECU ground



- 9 pole connector (sub-D): serial rs232 (MP25 and MD35) or CAN communication (MD35 only) (see also chapter 8 'Ver. Sn' and 'com port')

Communication with the KMS ECU's for additional values (water T, air T, etc.) to be displayed in the lambda display. When you update the firmware of the KMS uego display, this cable has to be connected to your computer .

Connector pin 6: CAN lo/TXD Connector pin 7: CAN high/RXD



- 6 pole connector: to lambda sensor
Connect to wide-band lambda sensor.



4. Installation of the lambda sensor

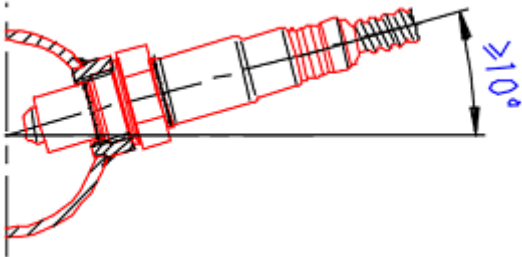
The lambda sensor used for the KMS uego display controller is a 5 wire wideband Lambda sensor. The sensor included in this kit has the following specifications:

- Thread: M18x1,5
- Spanner size: 22 Hexagon
- Maximum continuous operating temperature: 930 °C
- Maximum temperature: 1030 °C (maximum 10 minutes)
- Mounting torque: 60 Nm max
- Sensor warm-up will take about 20 seconds. Accurate measurement is possible when exhaust gas temperature is at room temperature.
- Sensor lifetimes differ for every application, but will dramatically decrease by the following factors:
 - Leaded fuel
 - Contaminants such as silicon, lead, oil, etc. (use sensor-friendly sealants)
 - Exposure to exhaust fumes without any heating control active
 - Incorrect placement in the exhaust that can overheat the sensor (for correct placement see page 5)

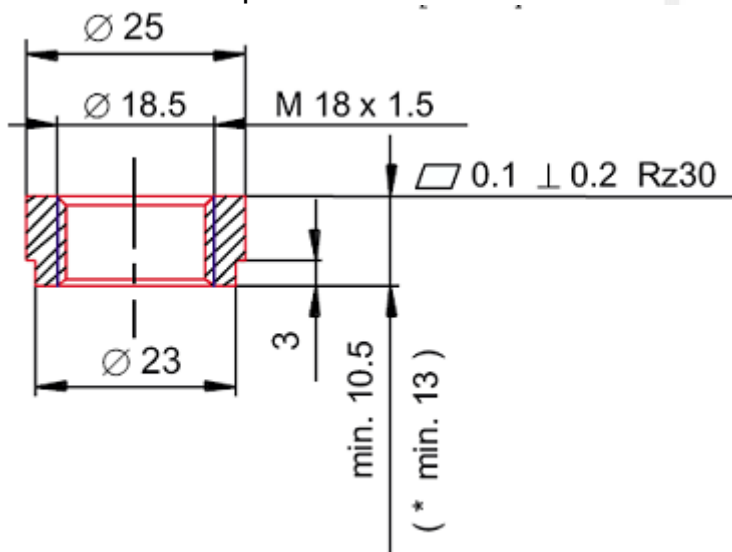
Warning: The Lambda sensors are factory calibrated with a trimming resistor placed in the sensor connector, so the connector must not be cut off.

The Lambda sensor should be fitted to the exhaust system with the sensor tip in the exhaust gas flow. When fitting the Lambda sensor, the following factors need to be taken into account (*see also appendix*):

- Installation angle should be inclined at least 10° towards horizontal (electrical connection upwards). Thus preventing the collection of liquids between sensor housing and sensor element during the cold start phase.



- For hot applications (temperature of hexagon above 500° C *) the thread boss should be at least 13 mm or longer to avoid overheating of the protection tube welding and to cool down the sensor hexagon. Recommended material for the thread boss in the exhaust pipe : Temperature resistant stainless steel.



- Place the sensor at least 1 meter from the open end of the exhaust system to avoid incorrect readings due to outside oxygen.
- If possible, do not place the sensor near exhaust slip joints. It's possible for some applications to allow air to enter resulting in incorrect readings.

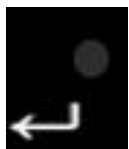
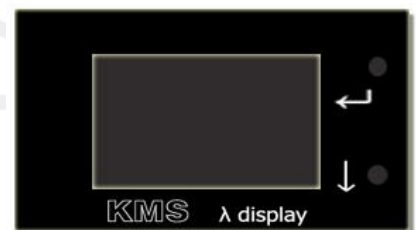
5. AFR ratio

Lambda is a measure of the Air to Fuel Ratio (AFR) that is independent of the type of fuel being used. The following table shows the AFR ratio's for different fuels compared to the lambda value.

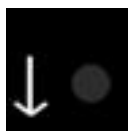
Lambda	Air to fuel ratio				
	Petrol	Diesel	LPG	E85	Methanol
0.65	9.6	9.5	10.1	6.3	4.2
0.70	10.3	10.2	10.9	6.8	4.5
0.75	11.0	10.9	11.6	7.3	4.8
0.80	11.8	11.6	12.4	7.8	5.1
0.85	12.5	12.3	13.2	8.3	5.4
0.90	13.2	13.1	14.0	8.8	5.8
0.95	14.0	13.8	14.7	9.3	6.1
1.00	14.7	14.5	15.5	9.8	6.4
1.05	15.4	15.2	16.3	10.3	6.7
1.10	16.2	16.0	17.1	10.8	7.0
1.15	16.9	16.7	17.8	11.2	7.4
1.20	17.6	17.4	18.6	11.7	7.7
1.25	18.4	18.1	19.4	12.2	8.0
1.30	19.1	18.9	20.2	12.7	8.3
1.35	19.8	19.6	20.9	13.2	8.6
1.40	20.6	20.3	21.7	13.7	9.0
1.45	21.3	21.0	22.5	14.2	9.3
1.50	22.1	21.8	23.3	14.7	9.6
1.55	22.8	22.5	24.0	15.1	9.9
1.60	23.5	23.2	24.8	15.6	10.2

6. Controlling the display

The lambda display has two buttons on the right side of the display. With these two buttons you can control all the options on the display.



This is the 'enter' button. With this button you can confirm the task that is displayed on the device. It's also the button to open the menu of the display.



This is the scrolling button. You can scroll down the menu with this button.



By touching the 'scrolling down button' when you are in the main screen of the display, you can dim the light of your display. This is only temporary and not saved when you start the display again.

7. What do you see on the display?

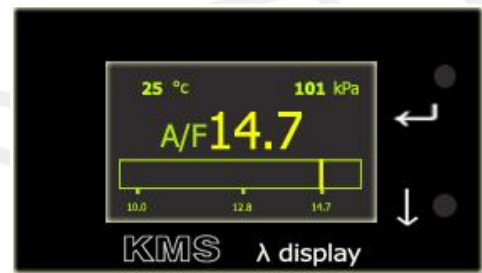
After connecting the display in the right way, the following screen will appear:

The controller will start to warm-up the lambda sensor (850 °C) after displaying this screen. This will take approximately 20 sec.

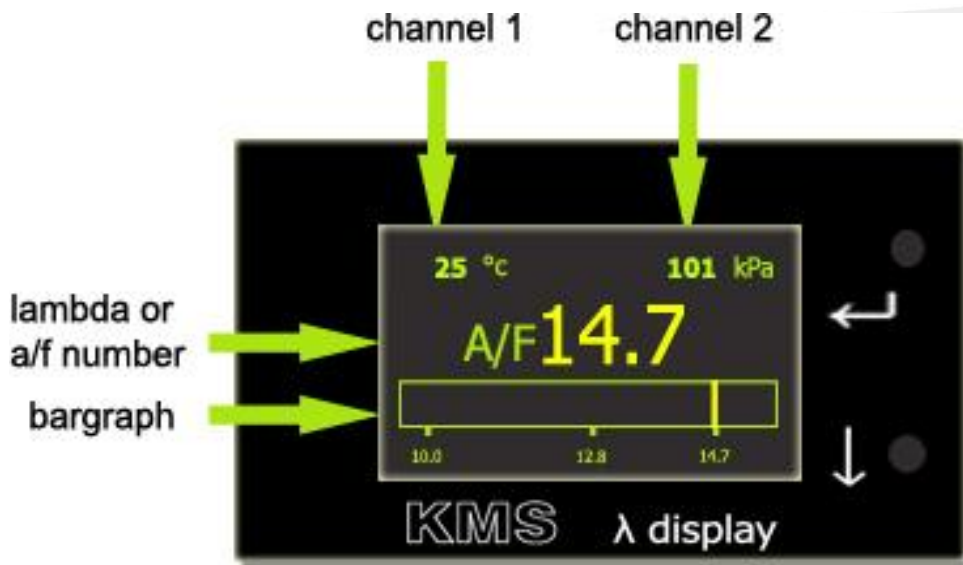


When the sensor is warmed up you can see the air/fuel ratio that your lambda sensor has measured. If your car hasn't run for a while then the display will show you a high number because of the high percentage of oxygen in the exhaust.


The image on the right shows the display when everything is ready to use. (*Under normal condition, when the engine hasn't run for a while, environment values like temperature depend on the location where the car stands*)




These displayed settings are the default settings. If you want to change these settings you can adjust them in the menu.



8. The menu

When you push the enter button () you get access to the menu. In the menu you can change the settings of the lambda controller and change the displayed values. You can also change the data-transfer type between the lambda controller and the KMS management system.



By pushing the scroll button () you can scroll through the entire menu. You can select an option by pushing the enter button. The different options in the menu will be described on the following pages.

Exit



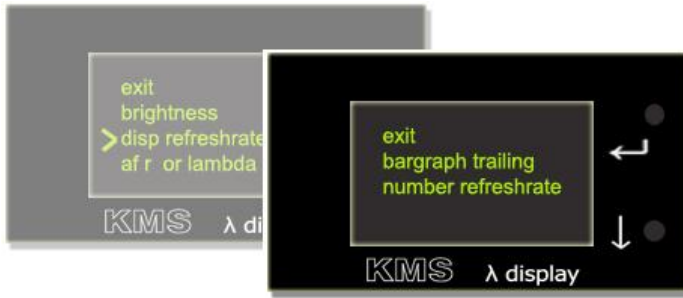
This will lead back to the main display screen.

Brightness



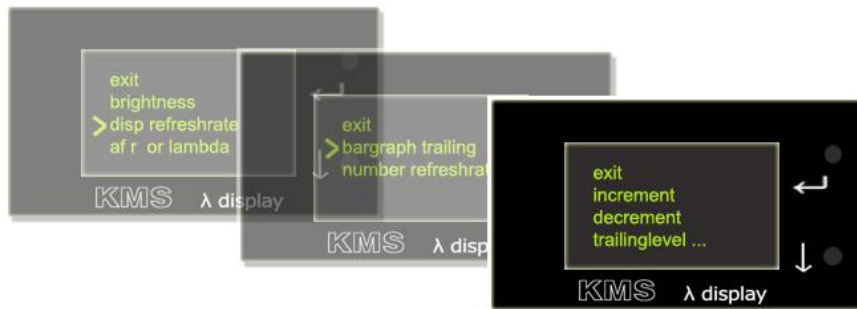
Here you can change the brightness of the screen. If you want to cancel, select 'exit' to go back to the main menu. You can make the screen brighter or darker by selecting (scroll button) and confirming (enter button). When you're done, select 'save and exit' to save settings and return.

Disp refreshrate

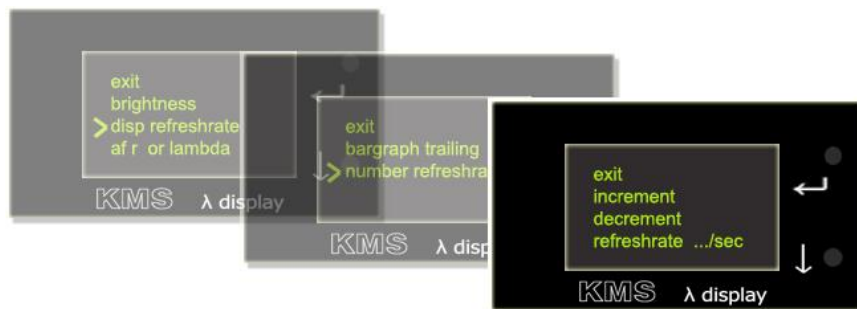


Select the options :

- Exit: cancel and go back to main menu
- Bargraph trailing: speed of tracking along the bargraph
- Number refreshrate: how many times the signal refreshes per second



In the bargraph trailing sub-menu you can increase (increment) or decrease (decrement) the trailinglevel by selecting in the menu. The set trailinglevel will be displayed at 'trailinglevel ...'. For cancelling, select 'exit' to go back to the main menu. Scroll down for 'save and exit'.



In the number refreshrate sub-menu you can increase (increment) or decrease (decrement) the data adjusting time. You can see the set refreshrate at 'refreshrate .../sec'. Select 'exit' to cancel and go back to the main menu or scroll down for 'save and exit'.

Afr or lambda



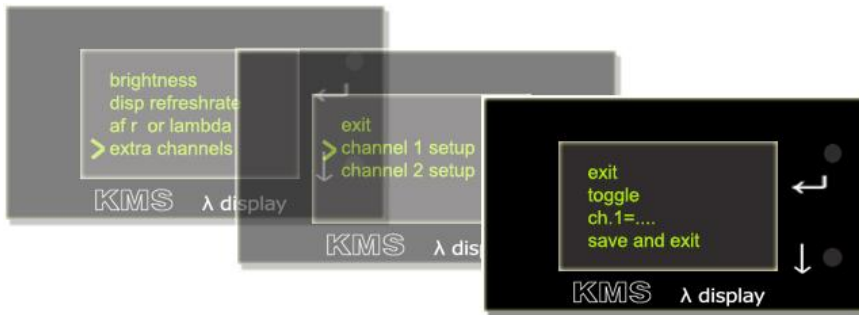
In this menu you can select how the lambda value is displayed (A/F ratio or λ). Scroll down and select 'toggle' to switch between A/F or λ . The selected configuration will be displayed at 'display in ...' and at the main screen display.

Extra channels

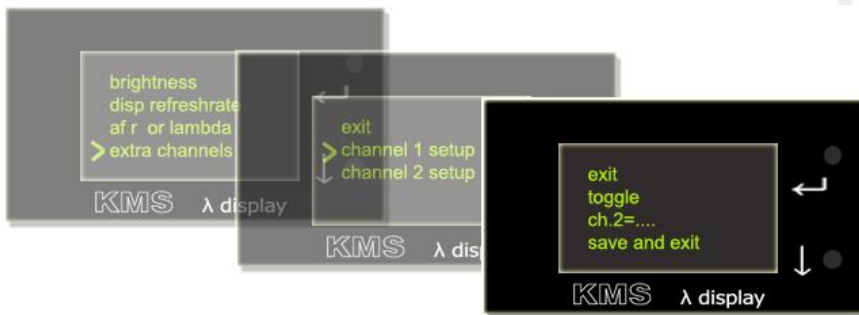


Select the options:

- Exit: cancel and go back to the main menu
- Channel 1 setup: change value in the left top corner of the display main screen
- Channel 2 setup: change value in the right top corner of the main screen

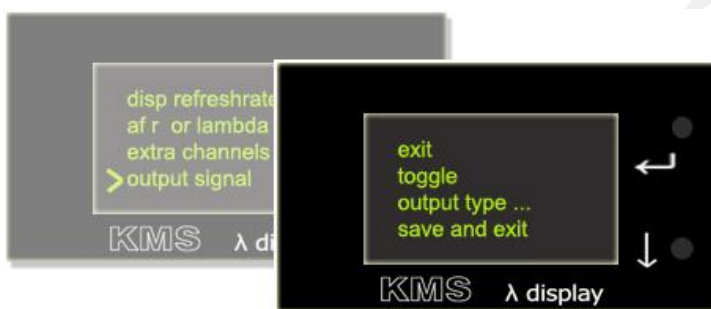


With channel 1 you can choose to display data (air or water temperature in °C or °F) from the KMS ECU or turn the channel off. Select 'toggle' to choose between display options. Select 'exit' to cancel or select 'save and exit' to save settings.



With channel 2 you can choose to display data (boost or oil pressure in kpa or psi) from the KMS ECU or turn the channel off. Select 'toggle' to choose between display options. Select 'exit' to cancel or select 'save and exit' to save settings.

Output signal

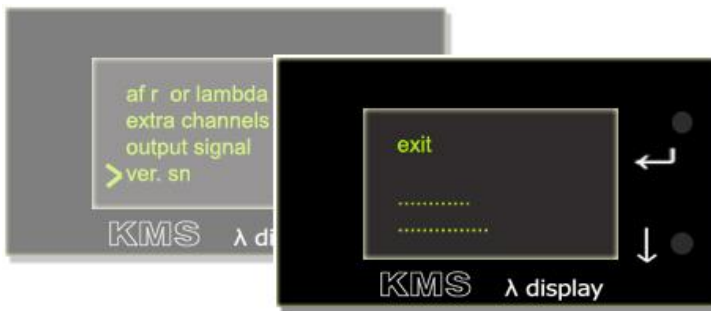


This menu is very important for the data transfer between the lambda controller display and KMS ECU. The output type of the lambda controller display **must be set the same** as the KMS ECU software (see *KMS ECU manuals for setting ECU software*). Select 'toggle' to

choose between output types a, b and c. The selected output type is displayed at 'output type ...'. The different output types stand for the kind of signal they give out. In the appendix you can find a graph with the resolution for the different types of data transfer (type a, b or c).

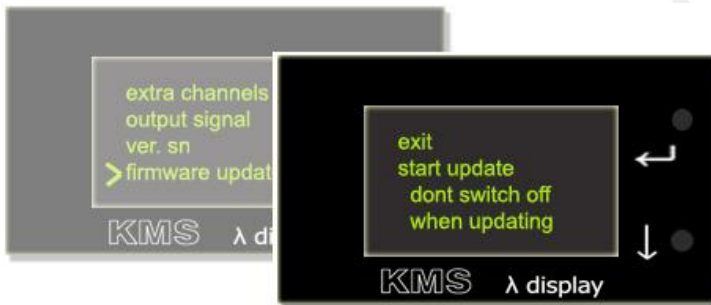
Warning: Type C has an output of 0-10 Volt which gives the highest resolution and is therefore recommended. Some systems can't handle more than 5 Volt, so check if the system can handle this high voltage before the lambda controller is set to type C (KMS ECU's can take up to 10 Volt, thus used for type C).

Ver. Sn



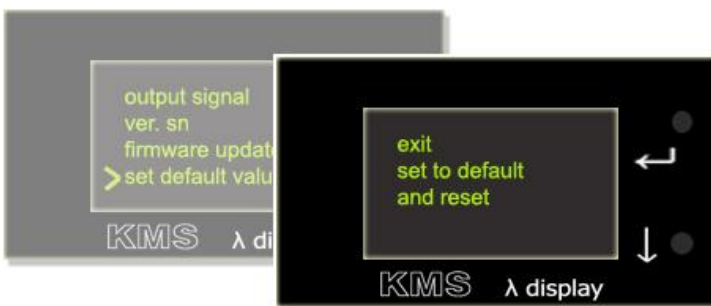
Selecting 'ver. sn' shows you the uego display controller's serial number (6 digits) and version. Early lambda controller displays have an 'a' on the end of the version number (9 digits). This means they only have serial rs232 communication. When the version number ends with a 'c', the display has CAN communication

Firmware update



Updating your uego display controller can be done by selecting 'firmware update'. You must connect the 9 pole connector (sub-D) to your computer before starting the update. Don't switch your controller off during updating because data may be lost. Follow the instructions in the display screen.

Set default values



When selecting 'set to default and reset', you can set your UEGO display controller back to its original settings and reset the device.

Com port



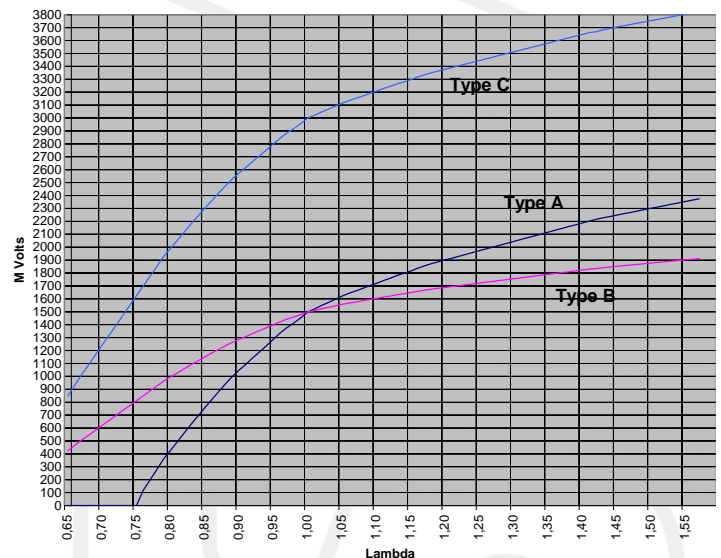
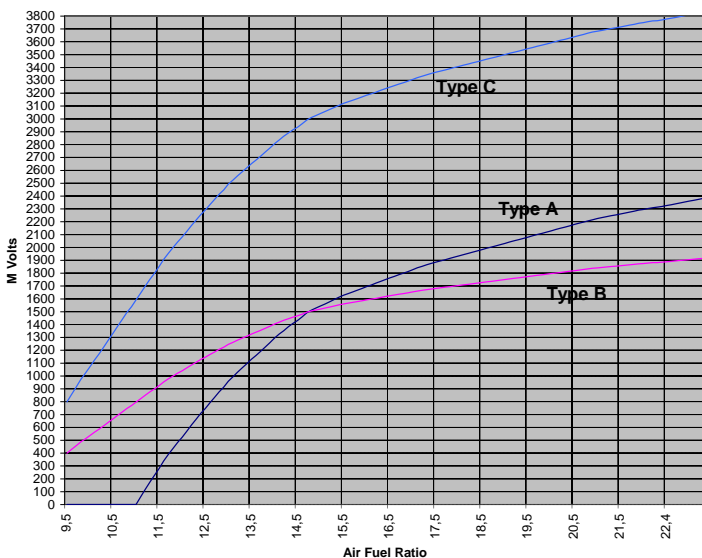
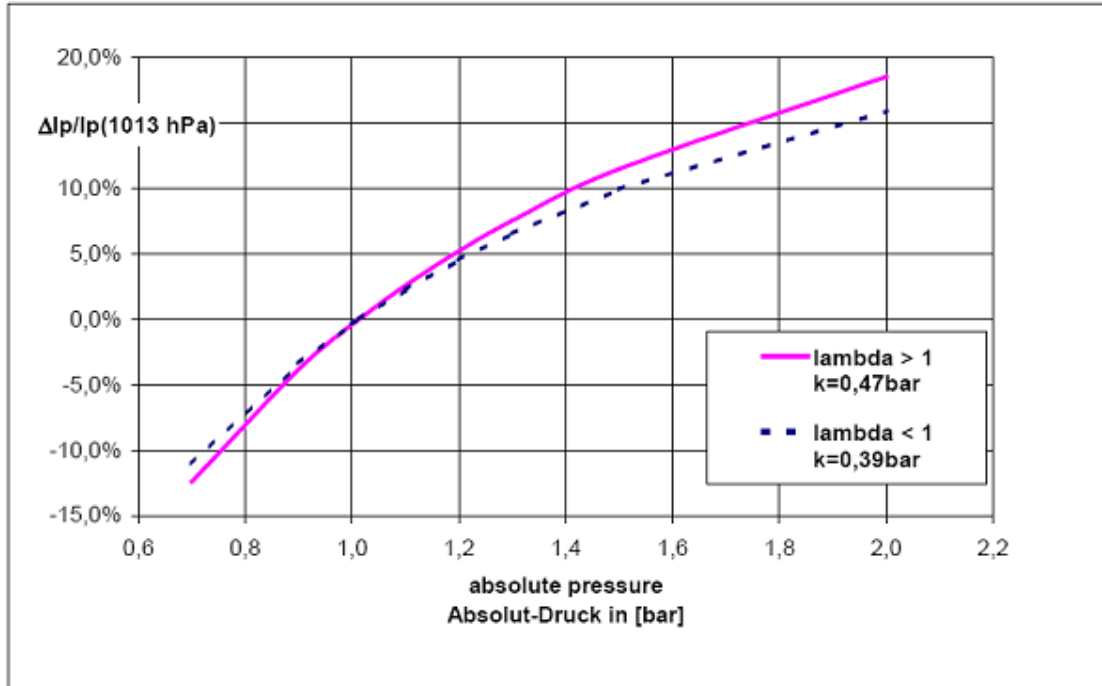
By selecting 'toggle' you can choose between serial rs232 and CAN communication. Serial communication can be used for the MP25 and earlier MD35's (version nr must end with 'a'). CAN communication can be used for later MD35's (version nr must end with 'c') and selected dependent on the necessary speed.

9. Fault tracing

Problem	Cause	Solution
Display doesn't start	<ul style="list-style-type: none">- Power is below 11 Volt- Ground is not correctly connected	<ul style="list-style-type: none">- Check power supply, minimum of 11 Volt- Check the wiring and maybe reconnect
Extra channels not visible	<ul style="list-style-type: none">- No connection between ECU and controller	<ul style="list-style-type: none">- Check if com-cable is connected to the KMS management ECU
Lambda values stays on 1,00 or A/F ratio 14,7	<ul style="list-style-type: none">- Lambda sensor broken- lambda sensor wiring damaged	<ul style="list-style-type: none">- Renew lambda sensor- Repair broken wire
I/O error reading	<ul style="list-style-type: none">- Controller wires constructed near 'high powered cables' (magnetical interference)- Power supply too low	<ul style="list-style-type: none">- Change the place of you controller/wires- Check power supply, minimum of 11 Volt

Appendix

Make sure that the lambda sensor isn't influenced by any pressure differences. These pressure differences may cause a few percentage of deviation in measurement. So don't place the lambda sensor before the turbo in the exhaust and watch out for back pressure from your exhaust (see chart below for pressure differences).



— kms Controller Type A m.Volt
— kms Controller Type B m.Volt
— KmsController Type C m.Volt

lambda	kms Controller Type A m.Volt	kms Controller Type B m.Volt	kmsControllerType C m.Volt	lambda	kms Controller Type A m.Volt	kms Controller Type B m.Volt	kmsControllerType C m.Volt
0,65	0	424	847	1,58	2385	1917	3833
0,66	0	465	931	1,59	2396	1922	3843
0,67	0	507	1014	1,60	2406	1927	3853
0,68	0	543	1086	1,61	2417	1932	3863
0,69	0	582	1165	1,62	2428	1936	3873
0,70	0	621	1241	1,63	2438	1941	3883
0,71	0	659	1318	1,64	2449	1946	3893
0,72	0	697	1394	1,65	2459	1951	3903
0,73	0	735	1470	1,66	2470	1956	3913
0,74	0	773	1547	1,67	2480	1961	3923
0,75	0	812	1623	1,68	2491	1966	3932
0,76	118	850	1699	1,69	2500	1970	3940
0,77	199	888	1776	1,70	2508	1974	3949
0,78	281	926	1852	1,71	2514	1977	3955
0,79	364	965	1931	1,72	2521	1981	3961
0,80	429	996	1992	1,73	2528	1984	3967
0,81	497	1028	2056	1,74	2534	1987	3973
0,82	564	1060	2119	1,75	2541	1990	3980
0,83	632	1091	2183	1,76	2547	1993	3986
0,84	695	1121	2242	1,77	2554	1996	3992
0,85	760	1152	2304	1,78	2561	1999	3998
0,86	821	1181	2361	1,79	2567	2002	4004
0,87	882	1209	2419	1,80	2574	2005	4011
0,88	943	1238	2476	1,81	2580	2008	4017
0,89	999	1264	2529	1,82	2587	2012	4023
0,90	1050	1288	2576	1,83	2594	2015	4029
0,91	1095	1309	2619	1,84	2600	2018	4035
0,92	1146	1333	2667	1,85	2607	2021	4042
0,93	1192	1355	2710	1,86	2613	2024	4048
0,94	1240	1377	2755	1,87	2620	2027	4054
0,95	1289	1401	2802	1,88	2626	2030	4060
0,96	1338	1423	2846	1,89	2633	2033	4066
0,97	1380	1443	2887	1,90	2640	2036	4073
0,98	1416	1460	2921	1,91	2646	2039	4079
0,99	1455	1479	2958	1,92	2653	2043	4085
1,00	1500	1500	3000	1,93	2659	2046	4091
1,01	1523	1511	3022	1,94	2666	2049	4097
1,02	1550	1523	3047	1,95	2673	2052	4104
1,03	1573	1534	3068	1,96	2679	2055	4110
1,04	1598	1546	3092	1,97	2686	2058	4116
1,05	1622	1558	3115	1,98	2692	2061	4122
1,06	1643	1567	3135	1,99	2699	2064	4128
1,07	1662	1576	3153	2,00	2706	2067	4135
1,08	1681	1585	3171	2,01	2712	2070	4141
1,09	1702	1595	3190	2,02	2719	2074	4147
1,10	1720	1604	3207	2,03	2725	2077	4153
1,11	1742	1614	3228	2,04	2732	2080	4159
1,12	1760	1623	3245	2,05	2738	2083	4166
1,13	1781	1632	3265	2,06	2745	2086	4172
1,14	1798	1640	3281	2,07	2752	2089	4178
1,15	1816	1649	3298	2,08	2758	2092	4184
1,16	1837	1659	3317	2,09	2765	2095	4190
1,17	1856	1668	3335	2,10	2771	2098	4197
1,18	1873	1675	3351	2,11	2778	2101	4203
1,19	1887	1682	3364	2,12	2785	2105	4209
1,20	1901	1689	3378	2,13	2791	2108	4215
1,21	1916	1696	3391	2,14	2798	2111	4221
1,22	1930	1702	3405	2,15	2804	2114	4228
1,23	1944	1709	3418	2,16	2811	2117	4234
1,24	1959	1716	3432	2,17	2818	2120	4240
1,25	1973	1723	3445	2,18	2824	2123	4246
1,26	1987	1729	3459	2,19	2831	2126	4252
1,27	2002	1736	3472	2,20	2837	2129	4259
1,28	2016	1743	3486	2,21	2844	2132	4265
1,29	2030	1750	3499	2,22	2850	2136	4271
1,30	2045	1756	3513	2,23	2857	2139	4277
1,31	2059	1763	3526	2,24	2864	2142	4283
1,32	2073	1770	3540	2,25	2870	2145	4290
1,33	2088	1777	3553	2,26	2877	2148	4296
1,34	2102	1783	3567	2,27	2883	2151	4302
1,35	2116	1790	3580	2,28	2890	2154	4308
1,36	2131	1797	3594	2,29	2897	2157	4314
1,37	2145	1804	3607	2,30	2903	2160	4321
1,38	2159	1810	3621	2,31	2910	2163	4327
1,39	2174	1817	3634	2,32	2916	2167	4333
1,40	2188	1824	3648	2,33	2923	2170	4339
1,41	2202	1831	3661	2,34	2929	2173	4345
1,42	2215	1834	3668	2,35	2936	2176	4352
1,43	2227	1841	3682	2,36	2943	2179	4358
1,44	2238	1846	3692	2,37	2949	2182	4364
1,45	2248	1852	3704	2,38	2956	2185	4370
1,46	2259	1857	3714	2,39	2962	2188	4376
1,47	2269	1862	3724	2,40	2969	2191	4383
1,48	2280	1867	3734	2,41	2978	2195	4391
1,49	2291	1872	3744	2,42	2984	2198	4397
1,50	2301	1877	3754	2,43	2992	2202	4405
1,51	2312	1882	3764	2,44	2997	2204	4409
1,52	2322	1887	3774	2,45	3005	2208	4417
1,53	2333	1892	3784	2,46	3009	2210	4421
1,54	2343	1897	3794	2,47	3017	2214	4427
1,55	2354	1902	3804	2,48	3025	2218	4435
1,56	2364	1907	3813	2,49	3034	2222	4443
1,57	2375	1912	3823				

air fuel ratio	kms Controller Type A m. Volt	kms Controller Type B m. Volt	kmsControllerType C m. Volt		air fuel ratio	kms Controller Type A m. Volt	kms Controller Type B m. Volt	kmsControllerType C m. Volt
9,5	0	399	797		23,3	2390	1919	3637
9,6	0	429	856		23,4	2397	1922	3644
9,7	0	457	914		23,5	2403	1925	3650
9,8	0	486	972		23,6	2411	1929	3657
9,9	0	511	1021		23,7	2418	1932	3664
10,0	0	536	1072		23,8	2425	1935	3671
10,1	0	563	1126		23,9	2433	1939	3678
10,2	0	586	1172		24,0	2440	1942	3685
10,3	0	613	1226		24,1	2446	1945	3691
10,4	0	640	1279		24,2	2454	1949	3698
10,5	0	666	1333		24,3	2461	1952	3905
10,6	0	693	1386		24,4	2469	1956	3912
10,7	0	720	1440		24,5	2476	1959	3919
10,8	0	747	1493		24,6	2482	1962	3925
10,9	0	770	1539		24,7	2490	1966	3931
11,0	0	796	1593		24,8	2498	1970	3939
11,1	61	823	1646		24,9	2501	1972	3945
11,2	118	850	1699		25,0	2508	1974	3949
11,3	175	876	1753		25,1	2512	1976	3952
11,4	227	899	1799		25,2	2516	1978	3957
11,5	281	926	1852		25,3	2521	1981	3961
11,6	339	954	1907		25,4	2526	1983	3965
11,7	390	978	1955		25,5	2530	1985	3970
11,8	436	999	1998		25,6	2534	1987	3973
11,9	483	1021	2043		25,7	2539	1989	3978
12,0	524	1041	2081		25,8	2543	1991	3982
12,1	571	1063	2125		25,9	2548	1993	3986
12,2	618	1085	2170		26,0	2553	1995	3991
12,3	663	1106	2212		26,1	2557	1998	3995
12,4	708	1127	2254		26,2	2561	1999	3999
12,5	747	1146	2291		26,3	2566	2002	4003
12,6	791	1168	2332		26,4	2570	2004	4008
12,7	833	1186	2373		26,5	2575	2006	4012
12,8	876	1206	2413		26,6	2580	2008	4016
12,9	913	1224	2447		26,7	2584	2010	4020
13,0	959	1246	2492		26,8	2588	2012	4024
13,1	994	1262	2524		26,9	2593	2014	4029
13,2	1030	1279	2557		27,0	2597	2016	4033
13,3	1063	1294	2589		27,1	2602	2019	4037
13,4	1095	1309	2619		27,2	2607	2021	4042
13,5	1131	1326	2652		27,3	2611	2023	4045
13,6	1160	1340	2680		27,4	2615	2025	4050
13,7	1192	1355	2710		27,5	2620	2027	4054
13,8	1225	1371	2742		27,6	2624	2029	4058
13,9	1259	1387	2774		27,7	2629	2031	4063
14,0	1294	1403	2806		27,8	2633	2033	4066
14,1	1325	1418	2836		27,9	2638	2035	4071
14,2	1352	1432	2865		28,0	2642	2038	4075
14,3	1383	1445	2890		28,1	2647	2040	4079
14,4	1409	1457	2914		28,2	2651	2042	4084
14,5	1431	1468	2935		28,3	2655	2044	4087
14,6	1459	1481	2962		28,4	2660	2046	4092
14,7	1491	1496	2992		28,5	2665	2048	4096
14,8	1512	1505	3011		28,6	2669	2050	4101
14,9	1528	1513	3027		28,7	2674	2052	4105
15,0	1544	1521	3042		28,8	2679	2055	4109
15,1	1561	1529	3058		28,9	2682	2056	4113
15,2	1578	1537	3073		29,0	2687	2059	4117
15,3	1595	1545	3090		29,1	2692	2061	4122
15,4	1613	1553	3106		29,2	2696	2063	4126
15,5	1629	1561	3121		29,3	2701	2065	4130
15,6	1641	1566	3133		29,4	2705	2067	4134
15,7	1655	1573	3146		29,5	2709	2069	4138
15,8	1668	1579	3158		29,6	2714	2071	4143
15,9	1681	1585	3171		29,7	2719	2074	4147
16,0	1696	1592	3185		29,8	2723	2076	4151
16,1	1708	1598	3196		29,9	2727	2078	4155
16,2	1722	1604	3207		30,0	2732	2080	4159
16,3	1736	1611	3222		30,1	2736	2082	4164
16,4	1750	1617	3235		30,2	2741	2084	4168
16,5	1762	1624	3247		30,3	2746	2086	4172
16,6	1775	1629	3259		30,4	2750	2088	4176
16,7	1788	1636	3271		30,5	2754	2090	4180
16,8	1800	1641	3282		30,6	2759	2092	4185
16,9	1813	1647	3294		30,7	2763	2095	4189
17,0	1827	1654	3308		30,8	2768	2097	4194
17,1	1841	1661	3321		30,9	2773	2099	4198
17,2	1852	1666	3332		31,0	2777	2101	4202
17,3	1864	1672	3343		31,1	2781	2103	4206
17,4	1876	1677	3353		31,2	2786	2105	4210
17,5	1886	1681	3363		31,3	2790	2107	4215
17,6	1896	1686	3372		31,4	2795	2109	4219
17,7	1904	1690	3380		31,5	2799	2111	4223
17,8	1914	1695	3390		31,6	2804	2113	4227
17,9	1924	1700	3399		31,7	2808	2116	4231
18,0	1934	1704	3409		31,8	2813	2118	4236
18,1	1944	1709	3418		31,9	2818	2120	4240
18,2	1953	1713	3426		32,0	2821	2122	4244
18,3	1963	1718	3436		32,1	2825	2124	4248
18,4	1973	1723	3445		32,2	2831	2126	4252
18,5	1983	1727	3455		32,3	2835	2128	4257
18,6	1993	1732	3464		32,4	2840	2131	4261
18,7	2002	1736	3472		32,5	2845	2133	4265
18,8	2012	1741	3482		32,6	2848	2135	4269
18,9	2022	1746	3491		32,7	2853	2137	4273
19,0	2032	1750	3501		32,8	2858	2139	4278
19,1	2042	1755	3510		32,9	2862	2141	4282
19,2	2052	1760	3519		33,0	2867	2143	4287
19,3	2060	1764	3528		33,1	2871	2145	4290
19,4	2071	1768	3537		33,2	2875	2147	4295
19,5	2081	1773	3546		33,3	2880	2149	4299
19,6	2091	1778	3556		33,4	2885	2152	4303
19,7	2101	1783	3565		33,5	2889	2154	4308
19,8	2109	1787	3573		33,6	2893	2156	4311
19,9	2119	1791	3583		33,7	2898	2158	4316
20,0	2129	1796	3592		33,8	2901	2160	4320
20,1	2139	1801	3602		33,9	2904	2162	4324
20,2	2149	1806	3611		34,0	2908	2162	4325
20,3	2159	1810	3619		34,0	2912	2166	4332
20,4	2168	1814	3629		34,1	2915	2166	4332
20,5	2178	1819	3638		34,1	2918	2167	4334
20,6	2188	1824	3648		34,2	2922	2168	4337
20,7	2197	1829	3657		34,3	2925	2171	4341
20,8	2206	1833	3667		34,4	2929	2173	4345
20,9	2215	1838	3676		34,5	2934	2175	4350
21,0	2224	1841	3682		34,6	2939	2177	4354
21,1	2231	1844	3688		34,7	2943	2179	4358
21,2	2239	1848	3695		34,7	2947	2181	4362
21,3	2246	1851	3702		34,9	2952	2183	4365
21,4	2253	1854	3708		35,0	2955	2185	4371
21,5	2260	1858	3715		35,1	2957	2186	4371
21,6	2267	1861	3722		35,1	2961	2188	4375
21,7	2275	1865	3730		35,2	2965	2189	4379
21,8	2282	1868	3736		35,3	2970	2192	4383
21,9	2290	1872	3744		35,4	2973	2194	4388
22,0	2296	1874	3749		35,5	2978	2195	4390
22,1	2303	1878	3755		35,5	2981	2197	4394
22,2	2309	1881	3763		35,6	2985	2199	4398
22,3	2314	1882	3764		35,7	2992	2202	4404
22,3	2319	1885	3770		35,8	2995	2203	4407
22,4	2325	1888	3777		35,9	2998	2205	4410
22,5	2332	1891	3783		36,0	3004	2208	4416
22,6	2339	1895	3790		36,1	3008	2209	4419
22,7	2346	1898	3797		36,2	3012	2211	4423
22,8	2354	1902	3804		36,3	3016	2213	4427
22,9	2361	1905	3810		36,4	3022	2216	4432
23,0	2367	1908	3816		36,5	3028	2219	4438
23,1	2375	1912	3823		36,6	3034	2222	4443
23,2	2382	1915	3830					