

Electronic Speedometer

With Inbuilt Ratio Adjustment 338 318-12V, 33 319-24V

Installation Instructions

NOTE 1: This instrument is not calibrated. Where this instrument replaces an existing unit of the same type, the 8-switch combination must be set to that of the displaced unit.

2: The early 24V version of this instrument was made up of a 12V speedometer 338 318 and a 24 to 12 volt reducer 240 060.

The instrument 338 319 is now 24 volt in its own right. Therefore, where this instrument is used to replace an older unit, please ensure that the 24 to 12 volt reducer is taken out of circuit and connect the instrument directly to the 24 volt ignition controlled supply.

One of the following groups of parts is required:

Drive Key (Type to be specified)

"Hall effect" Sender

K46002, K46003, K46004, K46005.

Signal Loom

K72226 (2.5M), K72227 (5M)

K72228 (7.5M), K72229 (10M)

K72230 (12.5M), K72231 (15M)

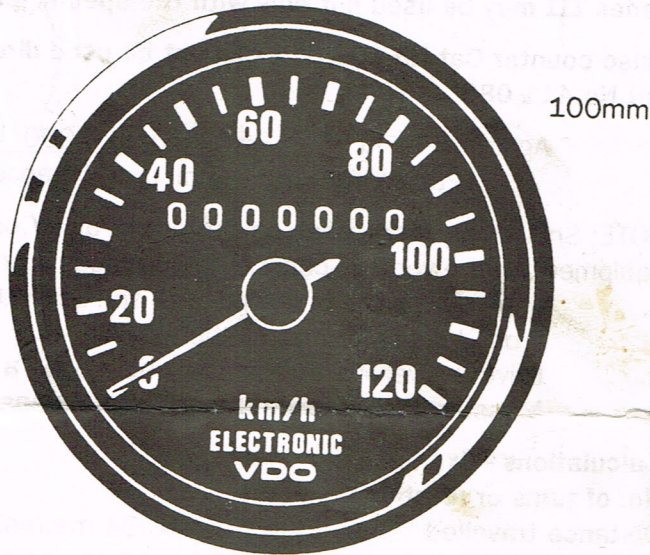
OR

Inductive Sender

340 006 - 3/4"-16 UNF - 42mm

340 007 - M18 x 1.5 - 25mm

Or equivalent



Instrument

Remove the existing speedometer and cable etc.

The existing hole must be enlarged to 101 mm. Ensure sufficient clearance from other equipment.

Roll - Test

A "roll test" on an unladen vehicle fitted with preferably new or near new tyres, must be done to establish -

a) The number of pulses per kilometre produced by the Hall Effect Sender.

Use either VDO TACHOGRAPH CALIBRATOR CAT NO. 105 003 SERIES I, II or III or VDO PULSE COUNTER CAT NO. 105 011.

$$\text{Calculations } K_t = \frac{\text{Count} \times 1000}{\text{Pulses per km} \times \text{Roll test distance}} \quad \text{OR}$$

b) The number of turns of the speedometer drive per kilometre.

This is conducted in the following manner:

1. Draw a circle approximately 150mm on cardboard (similar to a clock face) and graduate equally into 10 sections. Cut a hole in the centre for mounting over the speedometer cable outer casing or gearbox speedometer drive.

2. Make a simple cardboard pointer and push onto inner speedometer cable or speedometer driven gear.

3. Drive the vehicle slowly over a measured distance not shorter than 20 metres. Count the number of turns (R1) of the speedometer cable inner or speedometer gear. Ensure that any corrector box, if fitted, is removed before roll test.

Repeat the procedure to establish an average and confirm the first result. (R2)

5. Calculate the turns per kilometre (TS) as per the following example:

Measured distance (L) = 20 metres

First Result 'R1' = 33.50 turns

Second Result "R2" = 33.24 turns

$$T_s = \frac{R_1 + R_2}{2L} \times 1000$$
$$= \frac{33.50 + 33.24}{2 \times 20} \times 1000$$
$$= \frac{66.74 \times 1000}{40} = 1669$$

Set switches in line with this result i.e. 00001100.

Select the appropriate drive-key and fit the Hall Effect Sender directly to the speedometer drive of the gear-box. OR

c) The number of pulses produced by the Inductive Sender. Use only VDO Tachograph Calibrator Cat No. 105 003 Series I or II in the lower connector.

Caution:

Remove ignition controlled power wire prior to connecting the tachograph calibrator. Failure to remove this wire will result in damage to the tachograph calibrator.

Series III may be used but only with the special lead supplied.

Pulse counter Cat No.105 011 can not be used directly. Could be used with inductive interface Cat No.411 088

$$\text{Again } K_t = \frac{\text{Count} \times 1000}{\text{Pulses per km} \times \text{Roll test distance}}$$

NOTE: Should the Tachograph calibrator or Pulse Counter not count pulses due to the interference of other equipment on the vehicle, conduct a "turn count" on the wheels fitted to the rear or drive axle:-

1. Mark the centre of the point of contact with the ground of one of the wheels. Also place a mark on the ground opposite that on the wheel.
2. Drive the vehicle so that the wheel does a minimum of 5 complete rotations.
3. Measure the distance that the vehicle has travelled to complete this number of rotations of the wheel.

Calculations - Example

$$\begin{aligned} \text{No. of turns or rotations} &= 5 \\ \text{Distance travelled} &= 16.34 \text{ metres.} \\ T_w &= \frac{1000 \times \text{No. of turns of Test}}{\text{Distance Travelled}} \\ \text{Number of Turns/Km} &= \frac{1000 \times 5}{16.34} \\ &= 306 \end{aligned}$$

Do not refer this figure to the table.

$$K_t = T_w \times R \times P$$

Where T_w is number of turns of wheel/km

R is the diff ratio of the vehicle.

P is the number of pulses per revolution of the tail shaft. (For a ROAD RANGER gear box this is 16).

$$\text{Thus } K_t = \frac{306 \times 4.11 \times 16}{20123} \text{ I/km}$$

Set the switches in line with this result i.e. 11111110.

Connection

Connect the loom to the sender and route the loom from the sender to the instrument. Connect the loom to the instrument as per diagram. Connect power to the instrument through the ignition switch ensuring correct polarity.

NOTE: Use shielded cable or twisted pair to connect speedometer to the inductive sender.

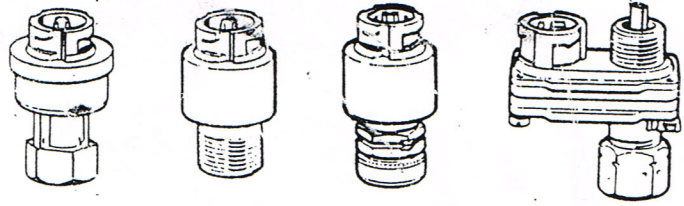
Calibration

The instrument may now be calibrated by setting the 8-switch combination on the rear in accordance with the table attached.

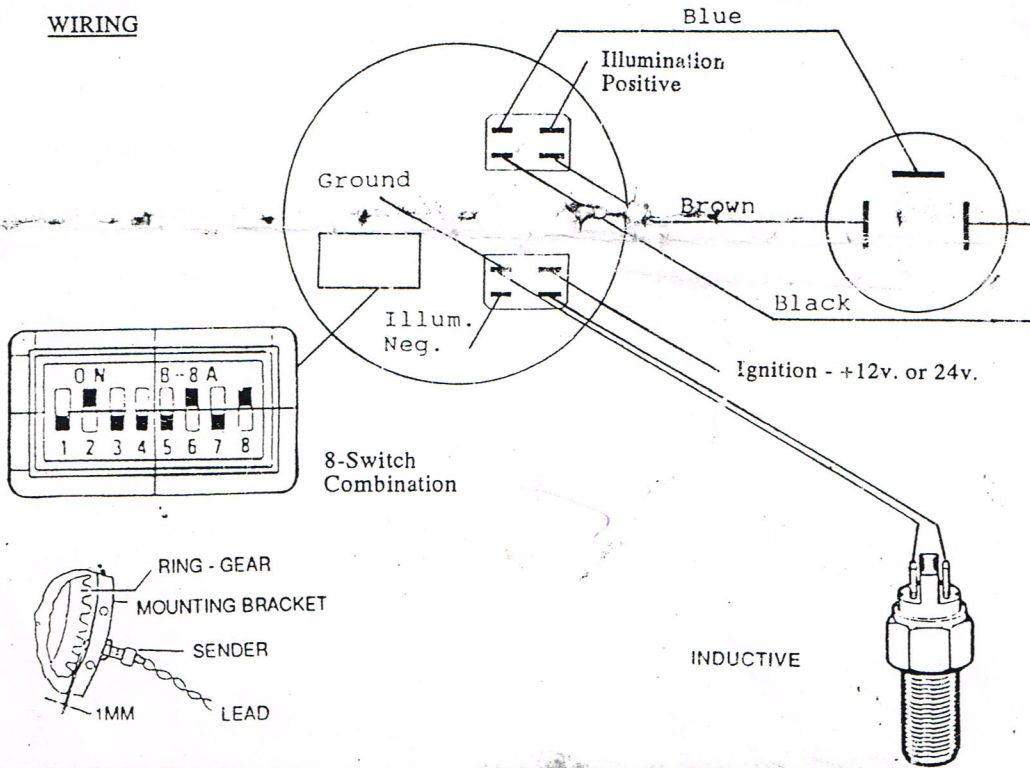
1 means ON—0 means OFF

The left hand column shows pulses per kilometre K_{HE} obtained from (a), the centre column shows turns per kilometre T_s obtained from (b) and the right hand column shows pulse per kilometre K_t obtained from (c).

HALL EFFECT



WIRING



SWITCH SETTING								Hall Effect			SWITCH SETTING								Hall Effect			Inductive										
1	2	3	4	5	6	7	8	Pulses Km	Turns Km	Impulses Km	1	2	3	4	5	6	7	8	Pulses Km	Turns Km	Impulses Km	1	2	3	4	5	6	7	8	Pulses Km	Turns Km	Impulses Km
1	1	1	1	1	1	1	1	2509	313	10039	1	1	1	0	1	0	1	1	2976	372	11906											
0	1	1	1	1	1	1	1	2519	314	10078	0	1	1	0	1	0	1	1	2990	373	11962											
0	0	1	1	1	1	1	1	2529	316	10118	1	0	1	0	1	0	1	1	3004	375	12018											
0	0	1	1	1	1	1	1	2539	317	10158	0	0	1	0	1	0	1	1	3018	377	12075											
1	1	0	1	1	1	1	1	2549	318	10199	1	1	0	0	1	0	1	1	3033	378	12132											
0	1	0	1	1	1	1	1	2560	320	10240	0	1	0	0	1	0	1	1	3047	380	12190											
0	0	0	1	1	1	1	1	2570	321	10281	1	0	0	0	1	0	1	1	3062	382	12248											
0	0	0	1	1	1	1	1	2580	322	10322	0	0	0	0	1	0	1	1	3076	384	12307											
1	1	1	0	1	1	1	1	2591	323	10364	1	1	1	1	0	0	1	1	3091	386	12367											
0	1	1	0	1	1	1	1	2601	325	10406	0	1	1	1	0	0	1	1	3106	388	12427											
1	0	1	0	1	1	1	1	2612	326	10448	1	0	1	1	0	0	1	1	3121	390	12487											
1	0	0	1	0	1	1	1	2622	327	10491	0	0	1	1	0	0	1	1	3137	392	12549											
1	1	0	0	1	1	1	1	2633	329	10534	1	1	0	1	0	0	1	1	3152	394	12610											
0	1	0	0	1	1	1	1	2644	330	10578	0	1	0	1	0	0	1	1	3168	396	12673											
1	0	0	0	1	1	1	1	2655	331	10622	1	0	0	1	0	0	1	1	3184	398	12736											
1	0	0	0	1	1	1	1	2666	333	10666	0	0	0	1	0	0	1	1	3200	400	12800											
1	1	1	1	0	1	1	1	2677	334	10711	1	1	1	0	0	0	1	1	3216	402	12864											
1	0	1	1	1	0	1	1	2689	336	10756	0	1	1	1	0	0	1	1	3232	404	12929											
1	0	1	1	1	0	1	1	2700	337	10801	1	0	1	0	0	0	1	1	3248	406	12994											
1	0	0	1	1	0	1	1	2711	338	10847	0	0	1	0	0	0	1	1	3265	408	13061											
1	1	1	0	1	0	1	1	2723	340	10893	1	1	0	0	0	0	1	1	3282	410	13128											
1	0	1	0	1	0	1	1	2735	341	10940	0	1	0	0	0	0	1	1	3298	412	13195											
1	0	0	1	0	1	1	1	2746	343	10987	1	0	0	0	0	0	1	1	3316	414	13264											
1	0	0	1	0	1	1	1	2758	344	11034	0	0	0	0	0	0	1	1	3333	416	13333											
1	1	1	0	1	0	1	1	2770	346	11082	1	1	1	1	1	1	0	1	3350	418	13403											
0	1	1	0	0	1	1	1	2782	347	11130	0	1	1	1	1	1	0	1	3368	421	13473											
1	0	1	0	1	0	1	1	2794	349	11179	1	0	1	1	1	1	0	1	3386	423	13544											
0	0	0	1	0	1	1	1	2807	350	11228	0	0	1	1	1	1	0	1	3404	425	13617											
1	1	1	0	0	1	1	1	2819	352	11277	1	1	0	1	1	1	0	1	3422	427	13689											
0	1	0	0	0	1	1	1	2831	353	11327	0	1	0	1	1	1	0	1	3440	430	13763											
1	0	0	0	0	1	1	1	2844	355	11377	1	0	0	1	1	1	0	1	3459	432	13837											
0	0	0	0	0	1	1	1	2857	357	11428	0	0	0	1	1	1	0	1	3478	434	13913											
0	1	1	1	1	1	0	1	2869	358	11479	1	1	1	0	1	1	0	1	3497	437	13989											
0	1	1	1	1	1	0	1	2882	360	11531	0	1	1	0	1	1	0	1	3516	439	14065											
1	0	1	1	1	1	0	1	2895	361	11583	1	0	1	0	1	1	0	1	3535	441	14143											
0	0	1	1	1	1	0	1	2909	363	11636	0	0	1	0	1	1	0	1	3555	444	14222											
1	1	0	1	1	1	0	1	2922	365	11689	1	1	0	0	1	1	0	1	3575	446	14301											
0	1	0	1	1	1	0	1	2935	366	11746	0	1	0	0	1	1	0	1	3595	449	14382											
1	0	0	1	1	1	0	1	2949	368	11797	1	0	0	0	1	1	0	1	3615	451	14463											
0	0	0	1	1	0	1	1	2962	370	11851	0	0	0	0	1	1	0	1	3636	454	14545											

1400
124

F/S

1

1

SWITCH SETTING								Hall Effect			Inductive			SWITCH SETTING								Hall Effect			Inductive							
1	2	3	4	5	6	7	8	Pulses	Turns	Impulses	1	2	3	4	5	6	7	8	Pulses	Turns	Impulses	1	2	3	4	5	6	7	8	Pulses	Turns	Impulses
								Km	Km	Km									Km	Km	Km									Km	Km	Km
1	1	1	1	0	1	0	1	3657	457	14628	1	1	1	0	1	0	1	0	7356	919	29425											
0	1	1	1	0	1	0	1	3678	459	14712	0	1	1	0	1	0	1	0	7441	930	29767											
0	0	1	1	0	1	0	1	3699	462	14797	1	0	1	0	1	0	1	0	7529	941	30117											
0	0	1	1	0	1	0	1	3720	465	14883	0	0	1	0	1	0	1	0	7619	952	30476											
0	1	0	1	0	1	0	1	3742	467	14970	1	1	0	0	1	0	1	0	7710	963	30843											
0	1	0	1	0	1	0	1	3764	470	15058	0	1	0	0	1	0	1	0	7804	975	31219											
0	0	0	1	0	1	0	1	3786	473	15147	1	0	0	0	1	0	1	0	7901	987	31604											
0	0	0	1	0	1	0	1	3809	476	15238	0	0	0	0	1	0	1	0	8000	1000	32000											
0	1	1	1	0	0	1	0	3832	479	15329	1	1	1	1	0	0	1	0	8101	1012	32405											
0	1	1	1	0	0	1	0	3855	481	15421	0	1	1	1	0	0	1	0	8205	1025	32820											
0	1	0	1	0	0	1	0	3878	484	15515	1	1	0	1	0	0	1	0	8311	1038	33246											
0	0	0	1	0	0	1	0	3902	487	15609	0	0	1	1	0	0	1	0	8421	1052	33684											
0	1	1	0	0	0	1	0	3926	490	15705	1	1	0	1	0	0	1	0	8533	1066	34133											
0	1	1	0	0	0	1	0	3950	493	15802	0	1	0	1	0	0	1	0	8648	1081	34594											
0	1	0	0	0	0	1	0	3975	496	15909	1	0	0	1	0	0	1	0	8767	1095	35068											
0	0	0	0	0	0	1	0	4000	500	16000	0	0	0	0	1	0	1	0	8888	1111	35555											
0	1	1	1	1	1	0	0	4025	503	16100	1	1	1	0	0	0	1	0	9014	1126	36056											
0	1	1	1	1	1	0	0	4050	506	16202	0	1	1	0	0	0	1	0	9142	1124	36571											
0	0	1	1	1	1	0	0	4076	509	16305	1	0	1	0	0	0	1	0	9275	1159	37101											
0	0	1	1	1	1	0	0	4102	512	16410	0	0	1	0	0	0	1	0	9411	1176	37467											
0	1	1	0	1	1	0	0	4129	516	16516	1	1	0	0	0	0	1	0	9552	1194	38208											
0	1	0	1	1	1	0	0	4155	519	16623	0	1	0	0	0	0	1	0	9696	1212	38787											
0	1	0	1	1	1	0	0	4183	522	16732	1	0	0	0	0	0	1	0	9846	1230	39384											
0	1	1	1	1	1	0	0	4210	526	16842	0	0	0	0	0	0	1	0	10000	1250	40000											
0	1	1	1	1	1	0	0	4238	529	16953	1	1	1	1	1	1	0	0	10158	1269	40634											
0	0	1	1	1	1	0	0	4266	533	17066	0	1	1	1	1	1	0	0	10322	1290	41290											
0	1	1	0	1	1	0	0	4295	536	17182	1	0	1	1	1	1	0	0	10491	1311	41967											
0	1	0	1	1	1	0	0	4324	540	17297	0	0	1	1	1	1	0	0	10666	1333	42666											
0	1	1	0	1	1	0	0	4353	544	17414	1	1	0	1	1	1	0	0	10847	1355	43389											
0	0	1	0	0	1	0	0	4383	547	17534	0	1	0	1	1	1	0	0	11034	1379	44137											
0	0	0	0	0	1	0	0	4413	551	17655	1	0	0	1	1	1	0	0	11228	1403	44912											
0	0	0	0	0	1	0	0	4444	555	17777	0	0	0	1	1	1	0	0	11428	1428	45714											
0	1	1	1	1	1	0	0	4475	559	17902	1	1	1	0	1	1	0	0	11636	1454	46545											
0	1	1	1	1	1	0	0	4507	563	18028	0	1	1	0	1	1	0	0	11851	1481	47407											
0	1	0	1	1	1	0	0	4539	567	18156	1	0	1	0	1	1	0	0	12075	1509	48301											
0	0	0	1	1	1	0	0	4571	571	18285	0	0	1	0	1	1	0	0	12307	1538	49230											
0	1	1	0	1	1	0	0	4604	575	18417	0	1	0	0	1	1	0	0	12549	1568	50196											
0	1	1	0	1	1	0	0	4637	579	18550	0	1	0	0	1	1	0	0	12800	1600	51200											
0	1	0	0	1	1	0	0	4671	583	18686	1	0	0	0	1	1	0	0	13061	1632	52244											
0	1	0	0	1	1	0	0	4705	588	18823	0	0	0	0	1	1	0	0	13333	1666	53333											
0	1	1	1	1	1	0	0	4740	592	18962	0	1	1	1	0	1	0	0	13617	1702	54466											
0	0	1	1	1	1	0	0	4776	597	19104	0	1	1	1	0	1	0	0	13913	1739	55652											
0	1	0	1	1	1	0	0	4812	601	19248	1	0	1	1	0	1	0	0	14222	1777	56888											
0	1	0	1	1	1	0	0	4848	606	19393	0	0	1	1	0	1	0	0	14545	1818	58181											
0	1	0	1	1	1	0	0	4885	610	19541	1	1	0	1	0	1	0	0	14883	1860	59534											
0	0	1	0	1	1	0	0	4923	615	19692	0	1	0	1	0	1	0	0	15238	1904	60952											
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0	1	0	0	0	0	0	1	5000	625	20000	0	0	0	1	0	1	0	0	16000	2000	64000											
0	1	1	1	1	1	1	0	5039	629	20157	1	1	1	1	0	0	1	0	16410	2051	65641											
0	0	1	1	1	1	1	0	5079	634	20317	0	1	1	0	0	1	0	0	16842	2105	67368											
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0	1	1	1	1	1	1	0	5203	650	20813	1	1	0	0	0	1	0	0	18285	2285	73142											
0	0	1	0	1	1	1	0	5245	655	20983	0	1	0	0	0	1	0	0	18823	2352	75294											
0	1	0	0	1	1	1	0	5289	661	21157	1	0	0	0	0	1	0	0	19393	2424	77575											
0	0	0	0	1	1	1	0	5333	666	21333	0	0	0	0	0	1	0	0	20000	2500	80000											
0	1	1	1	1	1	1	0	5378	672	21512	1	1	1	1	1	0	0	0	20645	2580	82580											
0	1	0	1	1	1	1	0	5423	677	21694	0	1	1	1	1	0	0	0	21333	2666	85333											
0	1	0	1	1	1	1	0	5470	683	21880	1	0	1	1	1	0	0	0	22066	2758	88275											
0	0	0	1	1	1	1	0	5517	689	22068	0	0	1	1	1	0	0	0	22857	2857	91428											
0	1	1	0	1	1	1	0	5565	695	22260	1	1	1	0	1	1	0	0	23703	2962	94814											
0	1	1	0	1	1	1	0	5614	701	22456	0	1	0	1	1	0	0	0	24615	3076	98461											
0	1	0	0	1	1	1	0	5663	707	22654	1	0	0	1	1	0	0	0	25600	3200	102400											
0	0	0	0	1	1	1	0	5714	714	22857	1	0	0	1	1	0	0	0	26666	3333	106666											
0	1	1	1	1	1	0	1	5765	720	23063	1	1	1	0	1	0	0	0	27826	3478	111300											
0	0	1	1	1	1	0	0	5818	727	23272	0	1	1	0	1	0	0	0	29090	3636	116360											
0	1	0	1	1	1	1	0	5871	733	23486	1	0	1	0	1	0	0	0	30476	3809	121900											
0	0	1	1	1	1	1	0	5925	740	23703	0	0	1	0	1	0	0	0	32000	4000	128000											
0	1	1	0	1	1	1	0	5981	747	23925	1	1	0	0	1	0	0	0	33684	4210	134700											
0	0	1	0	1	1	1	0	6037	754	24150	0	0	1	0	0	1	0	0	35555	4444	142220											
0	1	0	0	1	1	1	0	6095	761	24380	1	0	0	0	1	0	0	0	37647	4705	150550											
0	0	0	0	1	1	1	0	6153	769	24615	0	0	0	0	1	0	0	0	40000	5000	160000											
0	1	1	1	1	1	0	0	6213	776	24854	1	1	1	1	0	0	0	0	42666	5333	170660											
0	0	1	1	1	1	0	0	6274	784	25098	0	1	1	1	0	0	0	0	45714	5714	182800											
0	1	0	1	1	1	1	0	6336	792	25346	1	0	1	1	0	0	0	0	4923													