

SC99Z



**TECHNICAL
MANUAL**

SETTING UP THE *SWIFT* SC99F

Set all links as prescribed in the link and joint setting sheet supplied when building and preparing your car.

The following details the recommended set up procedure. Recommended dimensions can be found on the set-up sheet and link and joint setting sheet provided.

1. CASTOR

Front castor is adjusted via the inner top wishbone joints only. Do not attempt to adjust via the bottom wishbone. Screw two cap head bolts into the front caliper lugs and measure with a camber gauge across the heads. The castor angle is relative to the car floor hence level the car beforehand.

Example:- Lengthening the front joint and shortening the rear joint of the wishbone increases castor and vice-versa.

2. FRONT BUMP STEER

After the castor is set, check the bumpsteer. There should be no change of wheel alignment from ride height to full bump travel.

Adjust by altering the height of the steering arm joint and washer.

Example:- If toe-in during bump travel, move the joint downwards
If toe-out during bump travel, move the joint upwards.

3. REAR BUMP STEER

Adjust the rear bump steer by adjusting the castor. The castor angle at the rear has no relevance but to achieve zero bumpsteer, hence castor does not require any measuring. Adjust via the inner lower forward wishbone joint.

Example:- If toe-in during bump, lengthen the front joint of the lower wishbone.
If toe-out during bump, shorten the front joint of the lower wishbone.

4. FLAT PATCH

The car can now be placed on a flat area which must be level longitudinally and laterally. The driver should be seated, tyres pressured (ensure tyres are within 5mm circumference) and that the anti-roll bars are disconnected.

5. FRONT PRE-LOAD AND RIDE HEIGHT

The SC99F runs 3mm droop.

Set the pushrod and damper length to the standard settings prescribed in the link setting sheet.

To set the car to run zero droop, first ensure springs compress slightly when the driver sits in the car by winding off any pre-load above zero droop. Then wind the platforms up one 360 degree turn at a time until the dampers are fully extended. The ride height should now be adjusted via the pushrods.

On smooth fast circuits you can run up to one turn of pre-load above zero droop.

For bumpy circuits run 5mm of droop measured at floor. Set using the same methods as for the rear.

6. REAR DROOP AND RIDE HEIGHT

The rear suspension runs 25mm +/-3mm of droop as standard. Set the pushrods and dampers to the lengths prescribed in the link setting sheet. Measure height of rear bottom wishbone ear (with driver on board) and then lift the car with a jack until the dampers are fully extended and re-measure.

The difference in the two measurements gives the droop. Adjust via spring platforms, up giving less droop, down giving more.

The ride height can now be adjusted via the pushrods.

7. FRONT CAMBER

Measure the cambers with the driver on board and ride heights set. Use a camber gauge vertically across the tyres and adjust via shims.

Front shims consist of;

1	x	0.5mm
1	x	1.0mm
1	x	2.0mm
1	x	2.5mm
1	x	5.0mm

8. REAR CAMBER

As for front. Adjust via shims.

Rear shim set consists of;

1	x	0.5mm
1	x	1.0mm
1	x	2.0mm
1	x	3.0mm
1	x	6.0mm

9. TRACKING

Use parallel bars only for setting the tracking. Align the parallel bars with the centreline of the car and measure the distances of the front and rear edges of the tyres.

The difference gives the amount of toe-in. Adjust accordingly.

10. CORNER WEIGHTS

Adjust the corner weights via the rear pushrods only. The driver must be seated and the anti-roll bars disconnected. Lengthening one rear pushrod will transfer the weight diagonally to the opposite front wheel.

Weights should be equal side to side or 5lbs heavy on the inside front wheel.

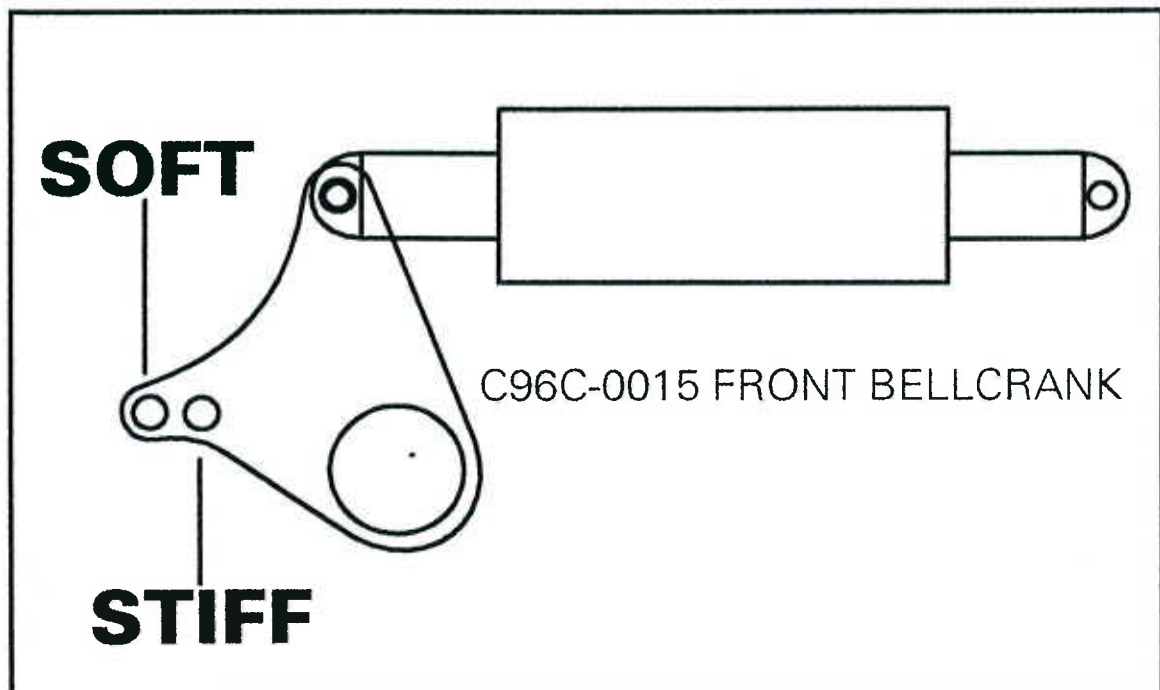
Front pushrod lengths must remain equal on each side.

Once weights are corrected, adjust the anti-roll bar links so that there is no load on the anti-roll bars. This is essential otherwise they will not work properly.

11. FRONT BELLCRANK

The front bellcrank should be set in the stiff position as illustrated .

Cars running treaded tyres are supplied with a very soft slow velocity (SV) bellcranks.

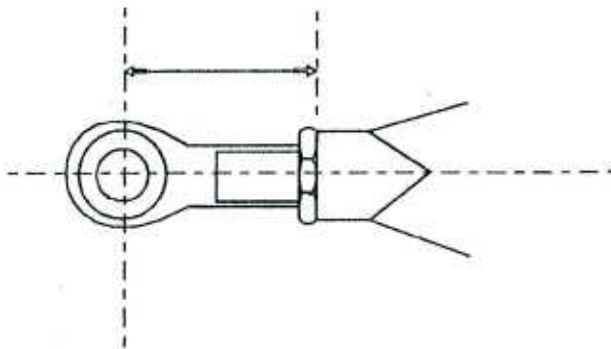


SC99Z ZETEC JOINT AND LINK SETTINGS SHEET

Front Pushrod	707mm
Rear Pushrod	602mm
Front Damper	259mm
Rear Damper	367.5mm
Front Anti-Roll Bar Link	385mm
Rear Anti Roll Bar Link	115mm
Rack Length	391mm

Joints

Measured from eye centre to wishbone bush top



Front Suspension

Top wishbone Inboard	25mm	1.0"
Bottom Wish bone Inboard	32mm	1.25"

Rear Suspension

Lower Wishbone Inboard forward	32mm	1.25"
--------------------------------	------	-------

ENGINEERING THE SC99F



The standard set up should work at most circuits, with only fine adjustments required.

Rear Roll Bar

Stiffening increases corner exit oversteer or corrects exit understeer and visa-versa. To stiffen move sliders inward.

Front Roll Bar

Stiffening improves traction but increases mid to exit understeer and vice-versa. Lowering will cause the opposite.

Rear Camber

Increases will provide additional traction and increase corner exit understeer or correct corner exit oversteer. Decreases will provide the opposite effects.

Front Camber

Increases will improve mid-corner and exit understeer. Decreases will produce the opposite effect. Excessive camber can prolong tyre scrubbing time and reduce braking capability and overheat inside edges.

Front Preload

Increase will improve fast corner stability but will adversely affect the ride and increase slow corner understeer. Use no more than one turn above zero droop.

Front Droop

Use on slow bumpy circuits. It will improve ride especially over kerbs, use 5mm.

Adjustment Order

1. Ride height
2. Roll bars
3. Cambers
4. Pre-loads/Droop

Other adjustments if required:

Toe-ins

At certain circuits the toe-ins may require resetting. For instance, at a very fast circuit where increased stability and reduced steering response is required, you may wish to increase the toe-ins to perhaps 2mm per wheel.

Springs

Spring changes are only advised if you are an experienced driver and team. Really only required on a very bumpy circuit if the ride is poor.

Rear spring limits: 200-450lb/in spring free length 7"

Front spring limits: 150-400lb/in spring free length 6"

Dampers

ZETEC

Front Koni 2812 BA140

Rear Koni 2812 BA233

See sheet for suggested adjustment.

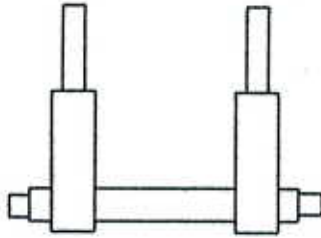
Wet Conditions

Set up as per set-up sheet. Blank NACA ducts and fit lightly scrubbed tyres.

SC99F GENERAL INFORMATION



Rear Anti Roll Bar



Spherical Joints

Loctite all spherical joints in their housings with loctite bearing fit

Gearbox Oil

Fill the gearbox with one litre of gear oil from dry

Oil Tank

From dry, fill the tank with 3.5 litres of oil. Warm-up the engine and stop. Measure level with a stick to the bottom of the tank and top up to eight inches.

Radiators

Radiator bleeds are located at the top of the radiators and are connected direct to the header tank to facilitate automatic bleeding of the radiators.

Brake Balance

Set 2 turns to front from central position. The driver can then fine tune the balance on shake down. For wet conditions, adjust two turns to the rear from preferred dry setting.

CV Grease

80ml outboard, 80 ml inboard for lobro joints. For tripod joints GKN Motorsport grease should be used.

Spring

Front free length	6"	2.25"ID
Rear free length	7"	2.25"ID

Master cylinders

Front brake m/cyl	Dia 0.625 Girling non integral (0.700 with carbon metallic brake pads)
Rear brake m/cyl	Dia 0.700 Girling non integral (0.750 with carbon metallic brake pads)
Clutch	Dia 0.750 Girling integral

Calipers

Front MLB20

Rear MLB20

Tyre Diameters

Tyres should be within 5mm side to side in circumference otherwise corner weights are affected

Wheel Torque

40 Ft lbs

Starting

Always start and warm-up Zetec engines using a jump battery.

Brake Pads

Use Hawke HB108 blue carbon metallic brake pads at the front and rear

Hubs

Front torque setting	140 Ft lbs
Rear torque setting	20 Ft lbs

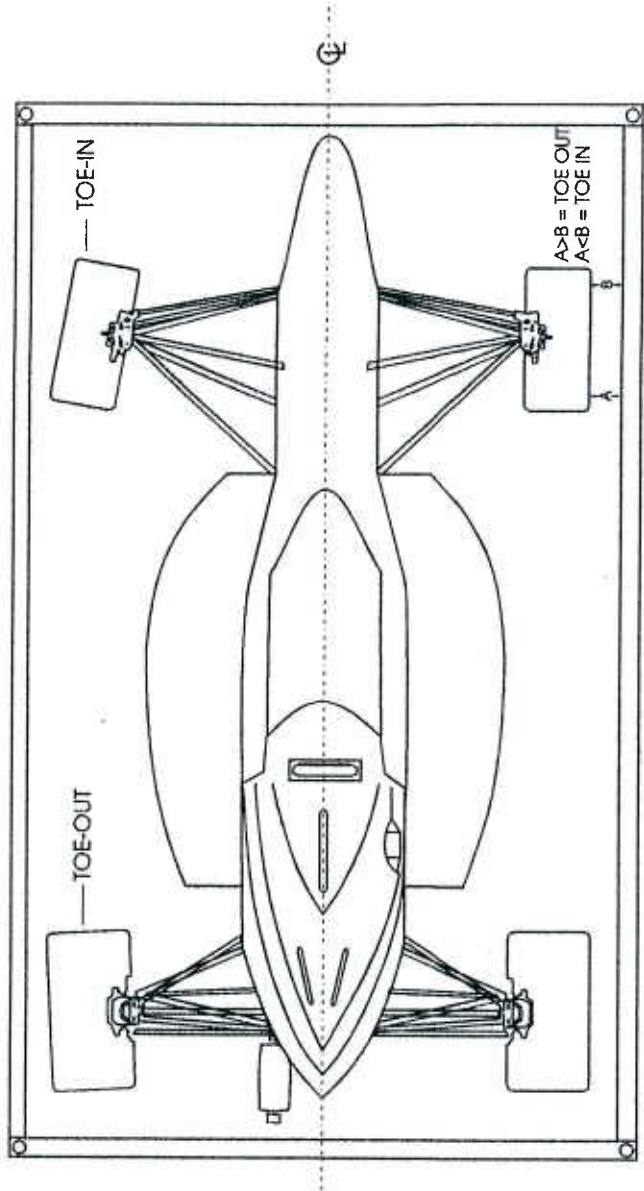
Rack Clevis

Set the rack clevises at 30 degrees to the horizontal.

Data Logging

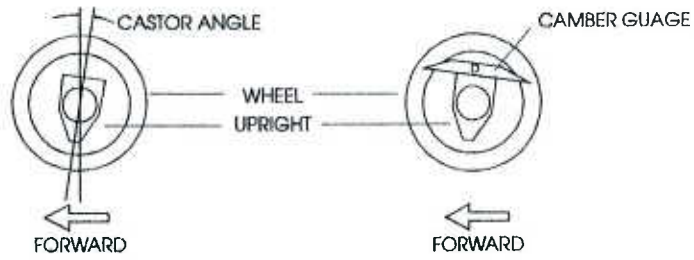
SWIFT recommend the use of a PI System 2+2 data logging system.

SWIFT SC99Z
racing car constructors
WHEEL ALIGNMENT



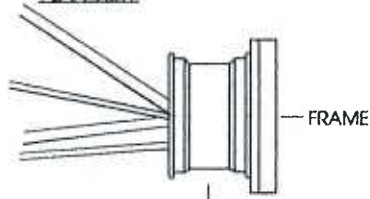
PARALLEL BARS LINKED AT FRONT AND REAR.
ALIGN BARS WITH CENTER LINE OF CAR.

CASTOR ANGLE



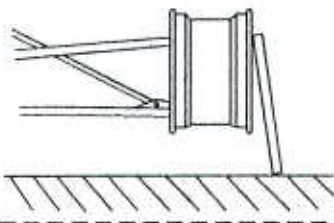
BUMPSTEER

FULL DROOP TRAVEL
PLAN VIEW

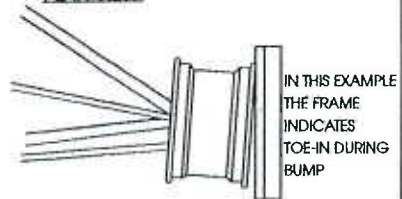


BARE WHEEL

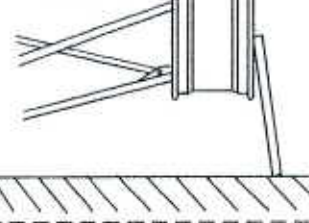
FRONT VIEW



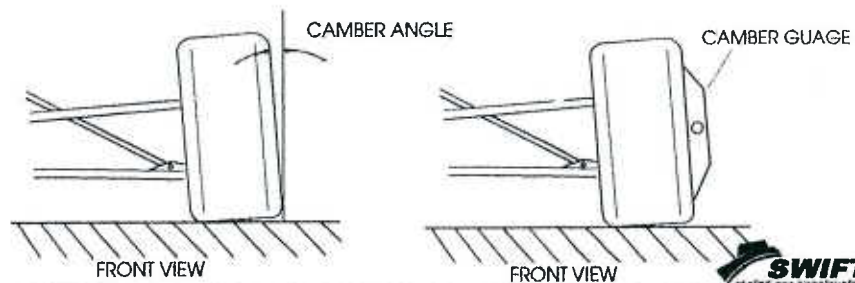
FULL BUMP TRAVEL
PLAN VIEW



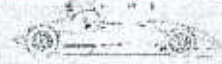
FRONT VIEW



CAMBER ANGLE



COMPONENT LIFE



For the following listing, half a season is considered to be 10 races and 10 tests, a full season 20 races and 20 tests.

Wishbone joints:	Replace after half a season.
Pushrod joints:	Replace after half a season.
Roll bar link joints:	Replace after one season.
Brake Discs:	Replace after half a season.
Hubs:	Crack test after one season.
Springs:	Replace after one season.
Caliper piston seals:	Replace after half a season.
Clutch seals:	Replace after half a season.
Gearbox dog rings:	Replace as required.
Dampers:	Check and re-valve after half a season.
Steering column:	Replace after one season.
Clutch release bearing:	Replace after half a season.
Electrical switches	Replace after half a season

Check and replace all other components as necessary.

SWIFT SC99F-Z

ZETEC WIRING LOOM

NOTE: MASTER SWITCH POSITIVE

A REV COUNTER 3 WAY MILEX SOCKET

- | | | |
|----|-------|----------------------------|
| 1. | RED | SUPPLY FROM STARTER BUTTON |
| | RED | SUPPLY TO RAIN LIGHT |
| 2. | BROWN | GROUND EARTH POINT |
| 3. | GREEN | SIGNAL FROM ENGINE LOOM |

B IGNITION SWITCH 6.3 RECEPTORS

- | | | | |
|----|--------|-------|---------------------------------|
| 1. | SUPPLY | RED | FROM MASTER SWITCH |
| | | RED | TO STARTER BUTTON |
| 2. | OUTPUT | BLACK | TO ENGINE LOOM |
| | | PINK | FEED TO ALTERNATOR REGULATOR D+ |

C. STARTER BUTTON

- | | | | |
|----|--------|-------|----------------------|
| 1. | SUPPLY | RED | FROM REV COUNTER |
| | | RED | FROM IGNITION SWITCH |
| 2. | OUTPUT | WHITE | TO STARTER SOLENOID |

D. RAIN LIGHT SWITCH

- | | | | |
|----|--------|--------|------------------|
| 1. | SUPPLY | RED | FROM REV COUNTER |
| 2. | OUTPUT | ORANGE | TO RAIN LIGHT |

ALTERNATOR REGULATOR

- | | | |
|----|-------|---------------------------|
| D+ | PINK | TO FUEL RELAY |
| | PINK | FEED FROM IGNITION SWITCH |
| DF | BLUE | ALTERNATOR EXCITATION |
| D- | BROWN | CHASSIS GROUND |

1999 ZETEC GEAR RATIO CHART

Using Hewland LD200 10/31 CW&P (Euro Avon)

BRANDS HATCH	(INDY)	15:36	19:33	22:29	21:24
	(G.P.)	15:36	19:33	22:29	24:27
DONINGTON	(CLUB)	15:36	19:32	21:29	24:27
			19:31		
	(G.P.)	16:34	19:32	21:29	21:24
			19:31		
KNOCKHILL		15:35	18:34	20:30	21:25
OULTON PARK		15:36	19:33	21:29	21:24
OULTON PARK (FOSTERS)		15:36	19:33	21:29	21:24
		15:35			
PEMBREY		15:36	18:32	21:29	21:24
SILVERSTONE	(NATIONAL)	15:36	19:33	22:29	24:27
	(G.P.)	15:36	19:33	22:29	24:26
	(INT.)	15:36	18:33	21:29	24:27
SNETTERTON		16:34	19:32	22:29	24:26
THRUXTON		15:36	19:32	22:28	23:24
CASTLE COMBE		15:36	19:31	22:29	24:26
			20:32		
CROFT		15:36	19:33	21:29	21:24
KIRKISTOWN		16:34	18:29	19:25	24:27
SPA		16:35	20:31	23:29	23:24

FUEL PUMP

VIOLET TERMINAL A FROM FUEL PUMP RELAY
BROWN TERMINAL B TO CHASSIS GROUND

FUEL PUMP RELAY

RED TERMINAL 30 FROM MASTER SWITCH
VIOLET TERMINAL 87 TO FUEL PUMP
YELLOW TERMINAL 85 FROM ENGINE LOOM
PINK TERMINAL 86 FROM ALTERNATOR

ENGINE LOOM

FORD 8 WAY

2. BLACK IGNITION SWITCH SUPPLY TO COIL
7. YELLOW TO FUEL PUMP RELAY
6. GREEN REV COUNTER SIGNAL
4. RED ECU SUPPLY
3. RED HEGO SENSOR
5. BROWN EARTH

STARTER SOLENOID

WHITE FROM STARTER BUTTON

ALTERNATOR

RED 6mm RING ALTERNATOR OUTPUT
BLUE 6.3 RECEPTOR TO REGULATOR

RAIN LIGHT

ORANGE LAMP SUPPLY

MASTER SWITCH

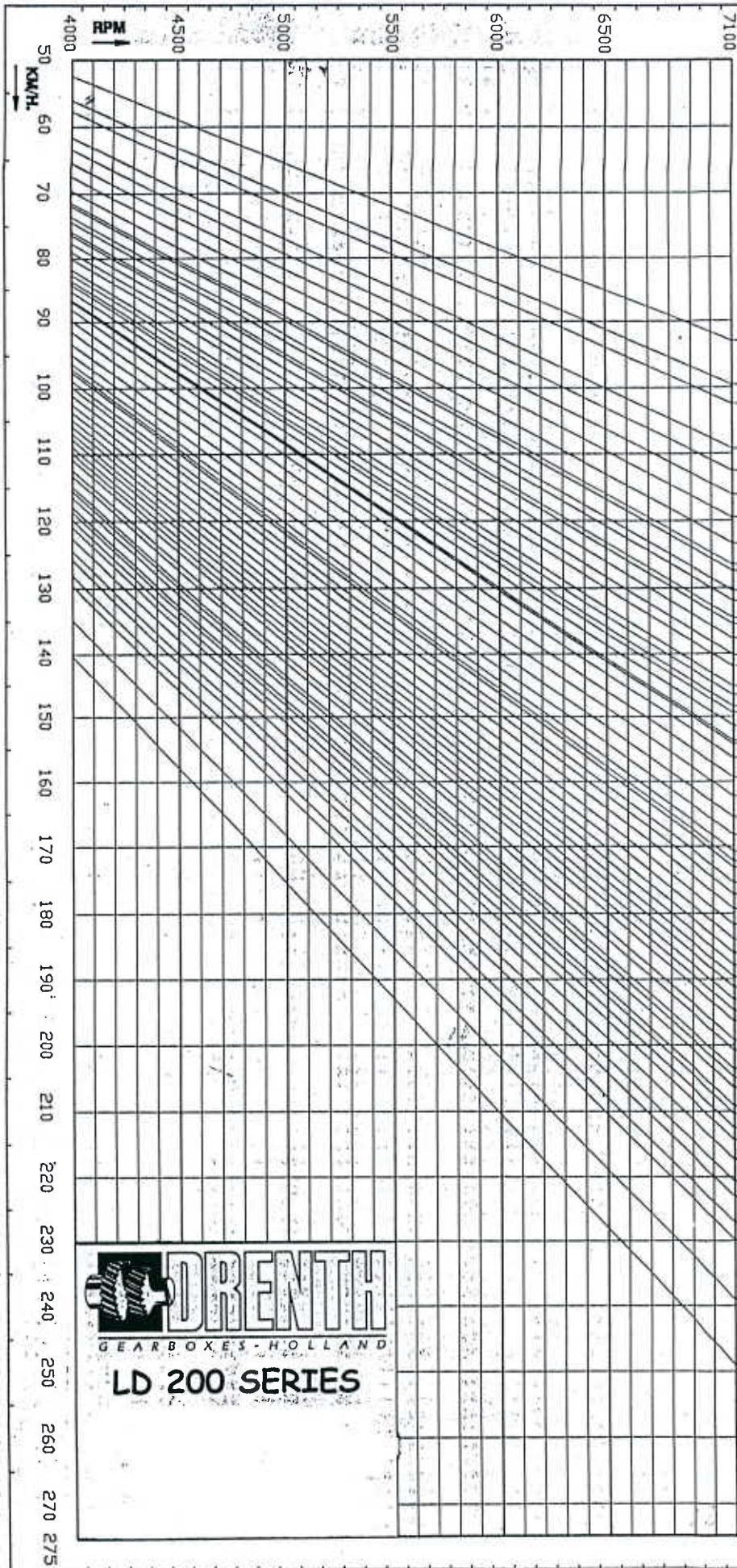
1. INPUT FROM BATTERY POSITIVE
2. OUTPUT TO STARTER MOTOR
 RED OUTPUT TO CHASSIS LOOM AND INPUT FROM
 ALTERNATOR

CROWN WHEEL AND PINION:

10 / 31

TYRE CIRCUMFERENCE:

1740 mm



D	Z1	Z2	RATIO
D	12	31	2.583
D	14	36	2.571
D	12	29	2.417
D	15	36	2.400
D	15	35	2.333
D	14	31	2.214
D	16	35	2.188
D	16	34	2.125
D	13	27	2.077
D	14	29	2.071
D	17	35	2.059
D	14	28	2.000
D	15	30	2.000
D	16	32	2.000
D	17	34	2.000
D	17	33	1.941
D	16	31	1.938
D	14	27	1.929
D	18	34	1.889
D	16	30	1.875
D	15	28	1.867
D	14	26	1.857
D	18	33	1.833
D	16	29	1.813
D	15	27	1.800
D	18	32	1.778
D	17	30	1.765
D	19	33	1.737
D	15	26	1.733
D	17	29	1.706
D	19	32	1.684
D	15	25	1.667
D	17	28	1.647
D	19	31	1.632
D	16	26	1.625
D	18	29	1.611
D	15	24	1.600
D	20	32	1.600
D	17	27	1.588
D	19	30	1.579
D	16	25	1.563
D	18	28	1.556
D	20	31	1.550
D	17	26	1.529
D	16	24	1.500
D	18	27	1.500
D	20	30	1.500
D	19	28	1.474
D	17	25	1.471
D	18	26	1.444
D	16	23	1.438
D	21	30	1.429
D	19	27	1.421
D	20	28	1.400
D	18	25	1.389
D	21	29	1.381
D	19	26	1.368
D	22	30	1.364
D	17	23	1.353
D	20	27	1.350
D	18	24	1.333
D	21	28	1.333
D	22	29	1.319
D	19	25	1.316
D	20	26	1.300
D	21	27	1.286
D	18	23	1.278
D	22	28	1.273
D	19	24	1.263
D	23	29	1.261
D	20	25	1.250
D	21	26	1.238
D	22	27	1.227
D	18	22	1.222
D	23	28	1.217
D	19	23	1.211
D	20	24	1.200
D	21	25	1.190
D	23	27	1.174
D	24	28	1.167
D	19	22	1.158
D	21	24	1.143
D	22	25	1.136
D	24	27	1.125
D	26	29	1.115
D	19	21	1.105
D	20	22	1.100
D	24	26	1.083
D	25	27	1.080
D	28	30	1.071
D	19	20	1.053
D	25	26	1.040
D	24	24	1.000
D	25	25	1.000
D	25	24	0.960





CROWN WHEEL AND PINION: 10/31
TYRE CIRCUMFERENCE: 1740 mm

	4000 RPM		4500 RPM		5000 RPM		5500 RPM		6000 RPM		6500 RPM		7000 RPM		7100 RPM	
	KM/H	RPM-DROP	KM/H	RPM-DROP	KM/H	RPM-DROP	KM/H	RPM-DROP	KM/H	RPM-DROP	KM/H	RPM-DROP	KM/H	RPM-DROP	KM/H	RPM-DROP
12 - 31	52		59		65		72		78		85		91		93	
14 - 36	52	-19	59	-21	65	-23	72	-25	79	-28	85	-30	92	-32	93	-33
12 - 29	56	-256	63	-288	70	-320	77	-352	84	-384	91	-416	98	-448	99	-455
15 - 36	56	-28	63	-31	70	-35	77	-38	84	-42	91	-45	98	-49	100	-49
15 - 35	58	-114	65	-129	72	-143	79	-157	87	-171	94	-186	101	-200	102	-203
14 - 31	61	-215	68	-242	76	-269	84	-296	91	-323	99	-349	106	-376	108	-382
16 - 35	62	-49	69	-55	77	-61	85	-67	92	-73	100	-80	108	-86	109	-87
16 - 34	63	-118	71	-132	79	-147	87	-162	95	-176	103	-191	111	-206	113	-209
13 - 27	65	-93	73	-104	81	-116	89	-127	97	-139	105	-150	114	-162	115	-164
14 - 29	65	-11	73	-12	81	-13	89	-15	98	-16	106	-17	114	-19	115	-19
17 - 35	65	-24	74	-28	82	-31	90	-34	98	-37	106	-40	115	-43	116	-43
14 - 28	67	-118	76	-132	84	-147	93	-162	101	-176	109	-191	118	-206	120	-209
15 - 30	67	0	76	0	84	0	93	0	101	0	109	0	118	0	120	0
16 - 32	67	0	76	0	84	0	93	0	101	0	109	0	118	0	120	0
17 - 34	67	0	76	0	84	0	93	0	101	0	109	0	118	0	120	0
17 - 33	69	-121	78	-136	87	-152	95	-167	104	-182	113	-197	121	-212	123	-215
16 - 31	70	-8	78	-9	87	-9	96	-10	104	-11	113	-12	122	-13	123	-13
14 - 27	70	-19	79	-21	87	-23	96	-25	105	-28	114	-30	122	-32	124	-33
18 - 34	71	-84	80	-95	89	-105	98	-116	107	-126	116	-137	125	-147	127	-149
16 - 30	72	-30	81	-33	90	-37	99	-41	108	-44	117	-48	126	-52	128	-51
15 - 28	72	-18	81	-20	90	-22	99	-25	108	-27	117	-29	126	-31	128	-32
14 - 26	73	-21	82	-23	91	-26	100	-28	109	-31	118	-33	127	-36	129	-36
18 - 33	73	-52	83	-58	92	-65	101	-71	110	-78	119	-84	129	-91	130	-92
16 - 29	74	-46	84	-52	93	-57	102	-63	111	-69	121	-75	130	-80	132	-82
15 - 27	75	-28	84	-31	94	-35	103	-38	112	-42	122	-45	131	-49	133	-49
18 - 32	76	-50	85	-56	95	-63	104	-69	114	-75	123	-81	133	-88	134	-89
17 - 30	76	-30	86	-33	95	-37	105	-41	115	-44	124	-48	134	-52	135	-53
19 - 33	78	-64	87	-72	97	-80	107	-88	116	-96	126	-104	136	-112	138	-114
15 - 26	78	-8	87	-9	97	-10	107	-11	117	-12	126	-13	136	-14	138	-14
17 - 29	79	-64	89	-72	99	-80	109	-89	118	-97	128	-105	138	-113	140	-114
19 - 32	80	-51	90	-58	100	-64	110	-71	120	-77	130	-84	140	-90	142	-91
15 - 25	81	-42	91	-47	101	-53	111	-58	121	-63	131	-68	141	-74	143	-75
17 - 28	82	-48	92	-54	102	-60	112	-65	123	-71	133	-77	143	-83	145	-85
19 - 31	83	-38	93	-43	103	-47	114	-52	124	-57	134	-62	144	-66	147	-67
16 - 26	83	-16	93	-18	104	-20	114	-22	124	-24	135	-26	145	-28	147	-29
18 - 29	84	-34	94	-39	105	-43	115	-47	125	-52	136	-56	146	-60	148	-61
15 - 24	84	-28	95	-31	105	-35	116	-38	126	-42	137	-45	147	-49	149	-49
20 - 32	84	0	95	0	105	0	116	0	126	0	137	0	147	0	149	0
17 - 27	85	-30	95	-33	106	-37	117	-41	127	-44	138	-48	148	-52	151	-53
19 - 30	85	-24	96	-26	107	-29	117	-32	128	-35	139	-38	149	-41	151	-42
16 - 25	86	-42	97	-47	108	-53	119	-58	129	-63	140	-68	151	-74	153	-75
18 - 28	87	-18	97	-20	108	-22	119	-25	130	-27	141	-29	152	-31	154	-32
20 - 31	87	-14	98	-16	109	-18	120	-20	130	-22	141	-23	152	-25	154	-25
17 - 26	88	-54	99	-61	110	-67	121	-74	132	-81	143	-88	154	-94	156	-96
16 - 24	90	-78	101	-88	112	-98	123	-108	135	-118	146	-127	157	-137	159	-139
18 - 27	90	0	101	0	112	0	123	0	135	0	146	0	157	0	159	0
20 - 30	90	0	101	0	112	0	123	0	135	0	146	0	157	0	159	0
19 - 28	91	-71	103	-80	114	-89	126	-98	137	-107	149	-116	160	-125	162	-127
17 - 25	92	-8	103	-9	115	-11	126	-12	137	-13	149	-14	160	-15	163	-15
18 - 26	93	-72	105	-81	117	-90	128	-100	140	-109	152	-118	163	-127	166	-129
16 - 23	94	-19	105	-22	117	-24	129	-27	141	-29	152	-31	164	-34	166	-34
21 - 30	94	-25	106	-28	118	-31	130	-34	141	-38	153	-41	165	-44	167	-44
19 - 27	95	-21	107	-24	118	-26	130	-29	142	-32	154	-34	166	-37	168	-38
20 - 28	96	-60	108	-68	120	-75	132	-83	144	-90	156	-98	168	-105	171	-107
18 - 25	97	-32	109	-36	121	-40	133	-44	145	-48	158	-52	170	-56	172	-57
21 - 29	98	-23	110	-26	122	-29	134	-32	146	-34	159	-37	171	-40	173	-41
19 - 26	98	-37	111	-41	123	-46	135	-50	148	-55	160	-60	172	-64	175	-65
22 - 30	99	-14	111	-16	123	-18	136	-19	148	-21	161	-23	173	-25	175	-25
17 - 23	100	-32	112	-36	124	-40	137	-43	149	-47	162	-51	174	-55	177	-56
20 - 27	100	-9	112	-10	125	-11	137	-12	150	-13	162	-14	175	-15	177	-15
18 - 24	101	-50	114	-56	126	-63	139	-69	152	-75	164	-81	177	-88	179	-89
21 - 28	101	0	114	0	126	0	139	0	152	0	164	0	177	0	179	0
22 - 29	102	-46	115	-52	128	-57	141	-63	153	-69	166	-75	179	-80	181	-82
19 - 25	102	-7	115	-8	128	-9	141	-10	154	-11	166	-12	179	-13	182	-13
20 - 26	104	-49	117	-55	130	-61	142	-67	155	-73	168	-79	181	-85	184	-86
21 - 27	105	-44	118	-50	131	-56	144	-61	157	-67	170	-72	183	-78	186	-79
18 - 23	105	-25	119	-28	132	-31	145	-34	158	-37	171	-40	184	-43	187	-44
22 - 28	106	-16	119	-18	132	-20	146	-22	159	-24	172	-26	185	-28	188	-28
19 - 24	107	-30	120	-34	133	-38	147	-42	160	-45	173	-49	187	-53	189	-54
23 - 29	107	-7	120	-8	134	-9	147	-10	160	-11	174	-12	187	-13	190	-13
24 - 30	108	-35	121	-39	135	-43	148	-48	162	-52	175	-57	189	-61	191	-62
20 - 25	108	0	121	0	135	0	148	0	162	0	175	0	189	0	191	0
21 - 26	109	-38	122	-43	136	-48	150	-53	163	-58	177	-63	190	-67	193	-68
22 - 27	110	-35	123	-40	137	-44	151	-49	165	-53	178	-57	192	-62	195	-63
18 - 22	110	-17	124	-19	138	-21	152	-23	165	-25	179	-27	193	-29	196	-29
23 - 28	111	-16	124	-18	138	-20	152	-22	166	-24	180	-26	194	-28	196	-28
19 - 23	111	-23	125	-26	139	-28	153	-31	167	-34	181	-37	195	-40	198	-40
20 - 24	112	-35	126	-39	140	-44	154	-48	168	-53	182	-57	196	-61	199	-62
21 - 25	113	-32	127	-36	141	-40	156	-44	170	-48	184	-52	198	-56	201	-57
23 - 27	115	-56	129	-63	143	-71	158	-78	172	-85	186	-92	201	-99	204	-100
24 - 28	115	-25	130	-28	144	-31	159	-34	171	-37	188	-40	202	-43	205	-44
19 - 22	116	-30	131	-34	145	-38	160	-42	175	-45	189	-49	204	-53	207	-54
21 - 24	118	-53	133	-59	147	-66	162	-72	177	-79	192	-86	206	-92	209	-93
22 - 25	119	-23	133	-26	148	-29	163	-31	178	-34	193	-37	207	-40	210	-41
24 - 27	120	-40	135	-45	150	-51	165	-56	180	-61	195	-66	210	-71	213	-72
26 - 29	121	-34	136	-39	151	-43	166	-47	181	-52	196	-56	211	-60	214	-61
19 - 21	122	-37	137	-41	152	-46	168	-50	183	-55	198	-60	213	-64	216	-65
20 - 22	122	-19	138	-22	153	-24	168	-26	184	-29	199	-31	214	-33	217	-34
24 - 26	124	-62	140	-69	155	-77	171	-85	187	-92	202	-100	218	-108	221	-109
25 - 27	125	-12	140	-14	156	-15	172	-17	187	-19	203	-20	218	-22	221	-22
28 - 30	126	-32														