SERVICING INSTRUCTIONS AND ILLUSTRATED PARTS LIST FOR HEWLAND IGTC GEARBOX

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CONTENTS

ILLUSTRATIONS

TECHNICAL SPECIFICATION

The IGTC gearbox is designed for front engine, rear wheel drive GT cars. The unit is produced with six forward gears and reverse.

The drive is taken from the engine via the clutch shaft and transfer gears, through the ratios and on to the output drive flange.

The gear selection mechanism is sequential, with a separate, mechanically interlocked reverse engagement mechanism. The gear change sequence is 1-2-3-4-5-6 with neutral as a half position between 1st and 2nd . Reverse can only be selected whilst in neutral.

Heat treated nickel chrome steel (to Hewland specification) is used to manufacture all gears and shafts. The selector forks are also steel. The unit is lubricated by way of an internal pump and an extensive distribution circuit, with oil being retained by lipped oil seals.
In general configuration, the IGTC is a high tech racing unit, which achieves the maximum effective use of the supplied power.

Dry weight:	**32.5 kg (Gearbox)**
Oil type:	**SAE 80 or 90**
Oil quantity:	**1.25 to 1.75 L (excluding ext. cooler & pipe work)**
Max engine torque:	**670Nm (500 lbft)**
Clutch shaft	**Made to customer requirements**

Recommended Torque Settings:	
Pinion and Layshaft nut:	**150Nm**
Selector barrel nut:	**55Nm**
M10 K-nuts	**35Nm**
M8 K-nuts	**27Nm**

GENERAL NOTES

a/ Read these instructions carefully and with reference to the illustrations.

b/ Before dismantling the gearbox, see that a clean tray is available, in which to place the parts.

c/ Thoroughly clean and inspect all parts before reassembly. Discard any worn or damaged components and replace with new ones.

d/ Use only genuine Hewland parts as replacements. These are manufactured in our workshops to the fine tolerances necessary and are rigorously inspected.

e/ Always ensure that locknuts, and oil seals are in good condition when reassembling.

f/ All studs and screws must be Loctited or wirelocked in position, unless stated otherwise

g/ Bearing Replacement :-
Bearings can only be removed or renewed if the casings have been warmed in an oven, or with a blowlamp. In the latter case, keep the blowlamp moving while heating the casing.
Note: Do not overheat. Test with a spot of water which will bounce off at the correct temperature.
Once a casing is heated, all bearings should be pressed into their respective seatings without delay, thus eliminating the need to reheat. At the correct temperature, fitting the bearings should present no difficulty.
During cooling, or when the casings have cooled, it is advisable to once more lightly press the bearings to ensure that they are correctly seated.

h/ Oil:
Fill the gearbox through the plug hole on top of the maincase. The oil will find it's own level within the gearbox.
Note: Too much oil will not directly cause any harm, but is undesirable as it may induce power loss and overheating of internals.

SEQUENTIAL BARREL SETTING – Requires special tool No. SK-1602

a/ Slide spacers (93;107) onto the selector barrel (74), followed by retaining plate (66), spacer (92)(ensuring that if this spacer has a counter bore, the shoulder is retaining bearing 8), bearing (8), and secure with nut (106). Insert spacer (91), and bearing housing (67), into the bearing carrier (64). Insert the barrel assembly into the bearing carrier (64), locating using dowels (22), and securing using screws (48).

b/ Place bearing (11) onto the detent plunger (2) add the detent spring (1), and insert them into the bearing carrier (64). Add the dowty washer (45), and screw the detent plug (97) in place.

c/ Slide the selector forks (51) onto the barrel (74) and secure using selector pins (52). For the final assembly, Loctite the pins (52) into the forks (51) and wire lock in place.

d/ Insert bearing (14) into the bearing carrier (64). Stack the reverse hub (50), pinion gears (20), hubs (114;122), clutch rings (18), and spacer (75) in place in the bearing carrier (64). Slide the main shaft through the stack. Fit output flange (68), oil feed spacer (54), seal carrier (65). Secure with mainshaft nut (116).Fit into the fork setting fixture SK-1602.

e/ Rotate the barrel to engage first gear. Measure and record the gap between the dog faces of third through to sixth gear. Engage third gear and repeat the measurement for first and second dog faces. It is important that these dimensions are not taken when the selector barrel is in the neutral position.
First, third and fifth gear dog gap measurements will be similar (as will second, fourth and sixth). Any difference between odd and even gear measurements must be corrected by replacing the barrel spacer (107) with one of a relevant thickness.

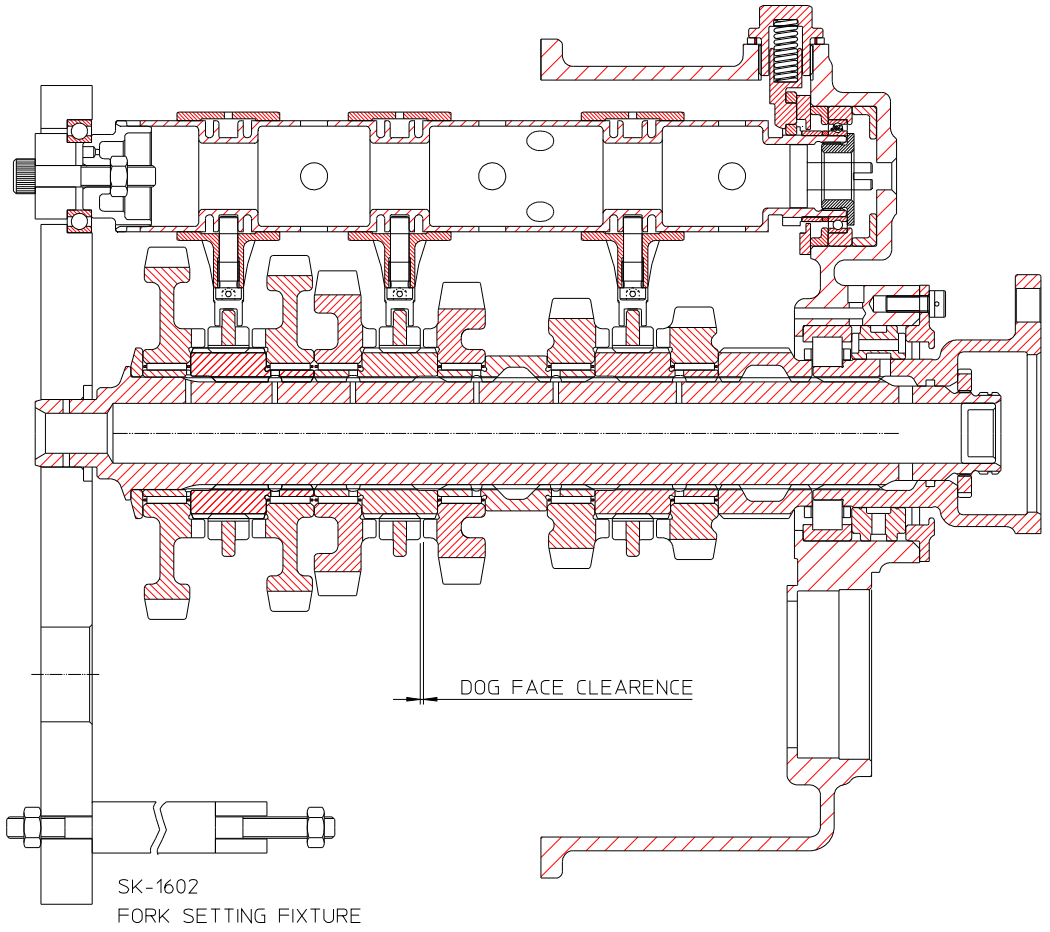


Fig 1

Note:- It is not possible (or necessary) to individually adjust each fork

GEARBOX – ASSEMBLY

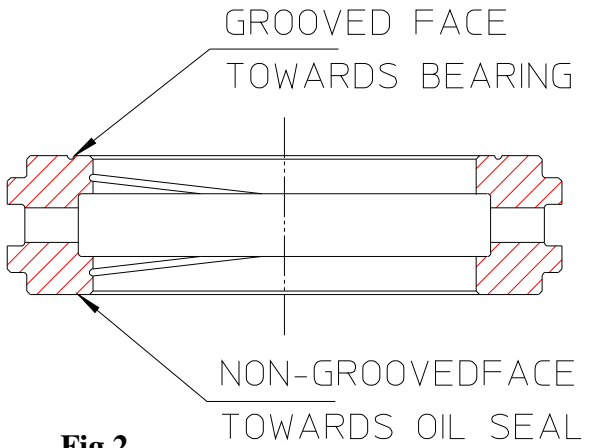


Fig 2

a/ It is assumed that all bearings, oil seals, studs and dowels are already fitted into the casings (see page 5).

b/ To secure bearing (14) into the bearing carrier (64), fit the oil feed spacer (54). Ensure this is in the correct orientation, with the grooved face towards the bearing . If the spacer is not manufactured with a face groove, ensure it is fitted so that the fist part of the oil feed spacer's internal bore, as seen when in position in the casing, has the spiral groove as a left handed thread (**see fig 2**). Assemble the seal carrier (65) and oil seal (78) onto the output flange (68), fit O-ring (81) and insert the assembly into bearing (14), then secure with screws (90).

c/ Assemble the oil pump components (23;24;25;26;89) (**see Fig 5**) and drop the pump into position in the bearing carrier (64). Secure with screws (87). Add the drive gear (109) and the circlip (27).

d/ To assemble the selector rack (104)(**see fig 4**), slide washer (129) onto the end of the rack followed by spring (3), washer stop (108), washer (102) and secure with nut (79). Slide the whole assembly into the selector housing (63) and fit dowty washer (128) and the rack stop (53).

e/ Assemble the barrel driver (101) together with bearing (37), dowel (36), keep plate (103), shifter spindle (105) and drum (4), ensuring that the dowel is located in hole 'X' of the selector barrel driver. Feed the drum shifter into the guide plate (111), insert the springs (35), plungers (34) and pawls (33) into the drum shifter (**see fig 8**). Now close the drum and barrel driver assembly, together with the guide plate assembly, making sure to engage the pawls. Slide the assembly into position in the maincase and secure with screws (88) and k-nuts (80).

f/ Fit the reverse idler spigot (59) into the bearing carrier (64), securing with screws (126). Slide thrust washer (56) onto the spigot followed by bearing (29), reverse idler gear (99), and thrust washer (56) secure in place with circlip (30) (**see fig 6**).

g/ Fit D-ring (127) into the maincase (61). Position the input and output transfer gears (72;73) into the selector housing (63) and with the selector mechanism in place close the selector housing with the maincase using nuts (79), ensuring that the selector rack and the drum shifter engage correctly.

h/ Bearings (10;112) in the central support plate (62), should be fitted the with bearing retaining plate (121), secured with screws (46) (**see fig 9**).

i/ Position the reverse selector fork (100) into the bearing carrier (64) along with the reverse sliding gear (98). Insert the reverse selector rod (60) and secure with screw (48) through the hole in the bearing carrier (**see fig 7**).

j/ Make sure the fork setting procedure has been completed (see page 6). Remove selector forks 1-2 and 3-4 from the selector barrel. Position the reverse hub (50), reverse sliding gear (98), pinion gears 5-6 (20), hub (114), clutch ring (18), bearings (113), bearing inner track (115) and bearing inner track (122), in-line with the mainshaft (69) bore. Position the reverse input gear (55) along with input gears 5-6 (21), layshaft spacer (117) and bearing inner track (123), in-line with the layshaft (125) bore. Fit D-rings (127) and O-rings (38) into the central support plate (62) and place in position on the bearing carrier (64). Reassemble selector forks 1-2 and 3-4 with the selector barrel (74). Now position pinion gears 1 to 4 (20) along with hubs (114), clutch rings (18) and spacer (75). Repeat for the Input gears 1 to 4 (21) and spacers (124;117;118). Insert the quill shaft (70) and wire clip (119) into the layshaft and slide through the stack, tighten nut (31) on to the end, secure with locking ring (32) and ciclip (19).
Ensure that the pinion gears and hubs are lined up, then slide the mainshaft (69) through, secure with nut (116), fit the locking ring (5) and circlip (15). Fit O-ring (82) into clamp plate (58) and secure to the bearing carrier using screws (90). (**see fig 3**).

k/ Offer the bearing carrier, centre support plate, and gear cluster up to the maincase as a complete cartridge, locating the quill shaft into the output transfer gear, the pinion shaft into bearing (94) in the input transfer gear and the barrel driver into the barrel. Secure the maincase, central support plate and bearing carrier together with nuts (94).

l/ Assemble the breather adapter (84), banjo joint (42), banjo bolt (44), plug (85), washers (43) and circlip (16) then screw into position in the maincase. Fit the oil filter (110) with washer (45). Finally fit the magnetic drain plug (40) with washer (45).

CHANGING GEAR RATIOS

a/ Place a drip tray beneath the gearbox, remove the magnetic drain plug (40) and drain the oil.

b/ Remove the M8 nuts (79) securing the bearing carrier (64) and the central support plate (62) to the maincase (61). Remove the complete gear assembly from the maincase. Use a soft hammer to tap the knock off lugs if it doesn't release freely, never use a
screwdriver to lever between joint faces as this may damage the faces and the efficiency of the seals when reassembled.

c/ Remove clamp plate (58) and circlips (15;19). Take off the locking rings (5;32) and undo the pinion shaft and layshaft nuts (31;116).

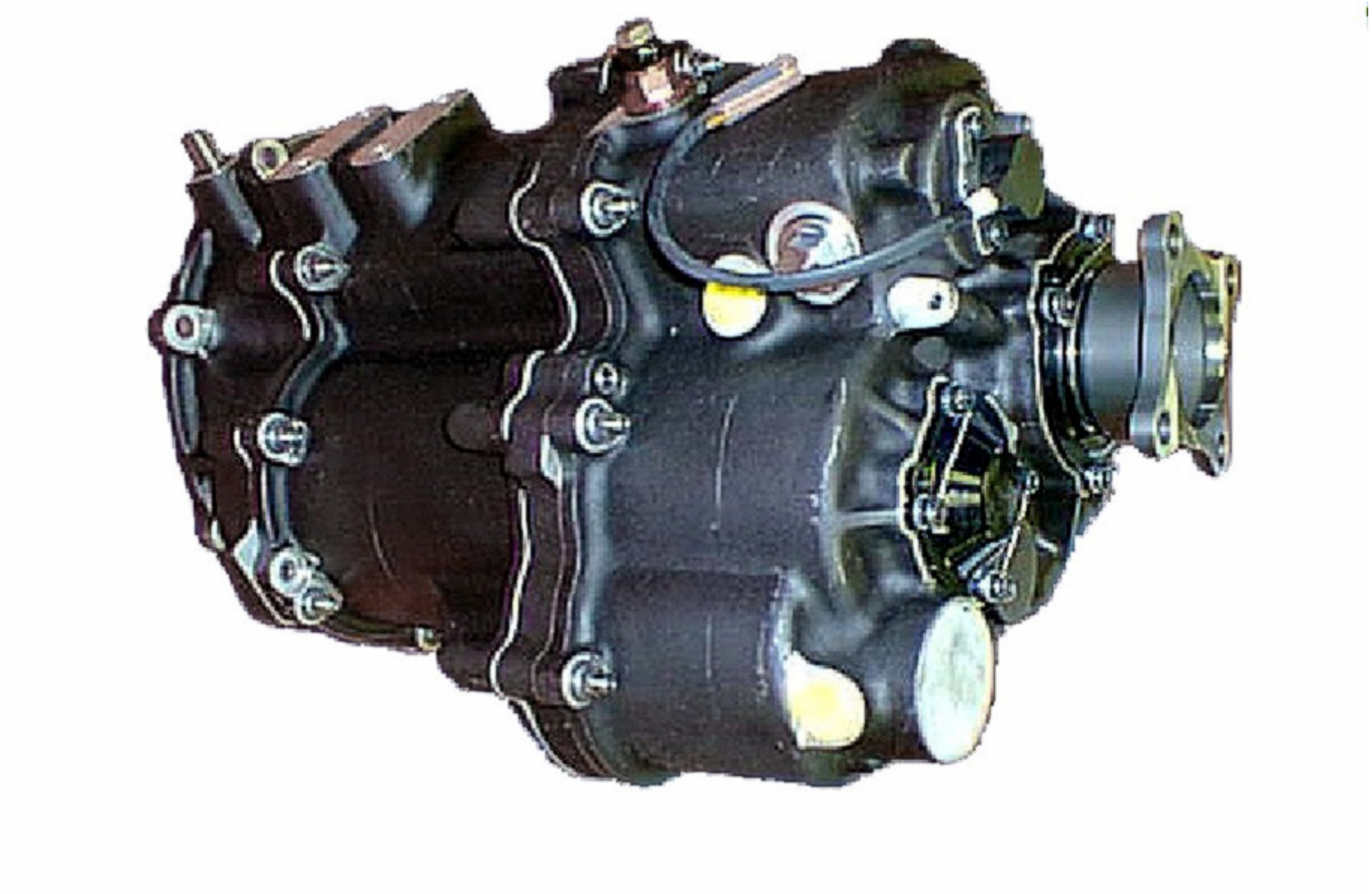
d/ Stand the gear assembly, casing down onto the output flange. Slide the mainshaft (69) out. Remove pinion gears 1 to 4 (20), hubs (114;122), bearings (113), bearing inner track (115), clutch rings (18) and spacers (75). Lift the layshaft out of the input gear stack, then remove input gears 1 to 4 (21) and spacers (117;118;124).

e/ Lift the central support plate (62) from dowels & Rotate around the barrel to allow access to the remaining gears.

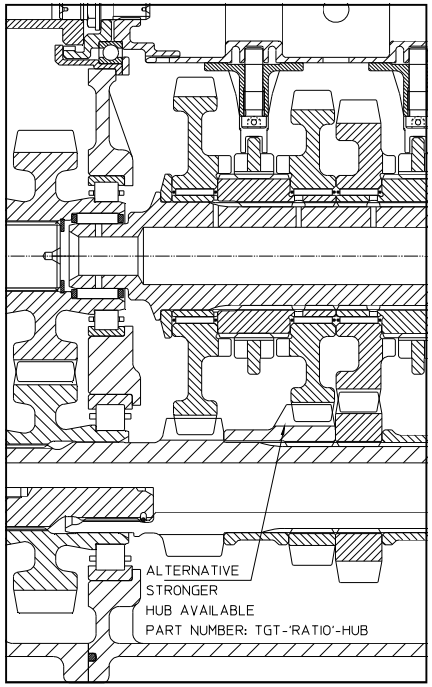
f/ Replace the gears with the required ratios. Gears are supplied in matched pairs, one for the main shaft and one for the layshaft. Each gear is marked with two sets of numbers, the first of these indicates the number of teeth on the input gear, while the second indicates the number of teeth on the pinion gear. It is essential that the gears are correctly paired to these numbers.

g/ Whilst changing ratios it is advisable, as a matter of course, to wash and inspect all components which are to be reused before refitting. Check for wear and cracks, particularly to the clutch rings. Also inspect the selector forks for heavy or uneven wear.

h/ Reassembly is a reversal of disassembly. Take care when refitting the gear assembly into the maincase. Barrel setting must be checked if the pinion shaft (69), hubs (114;122;50) or spacer (75) are replaced.



ILLUSTRATED PARTS LIST



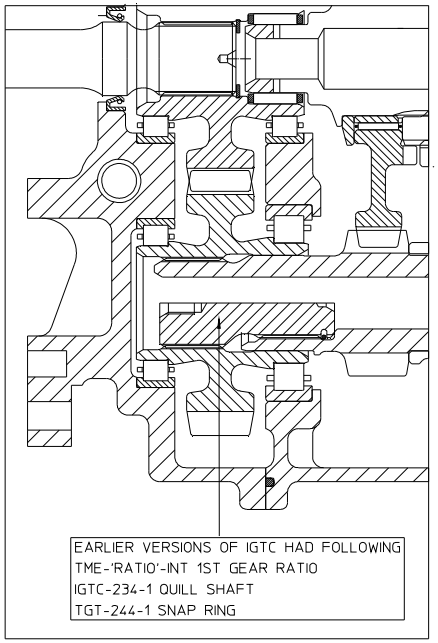
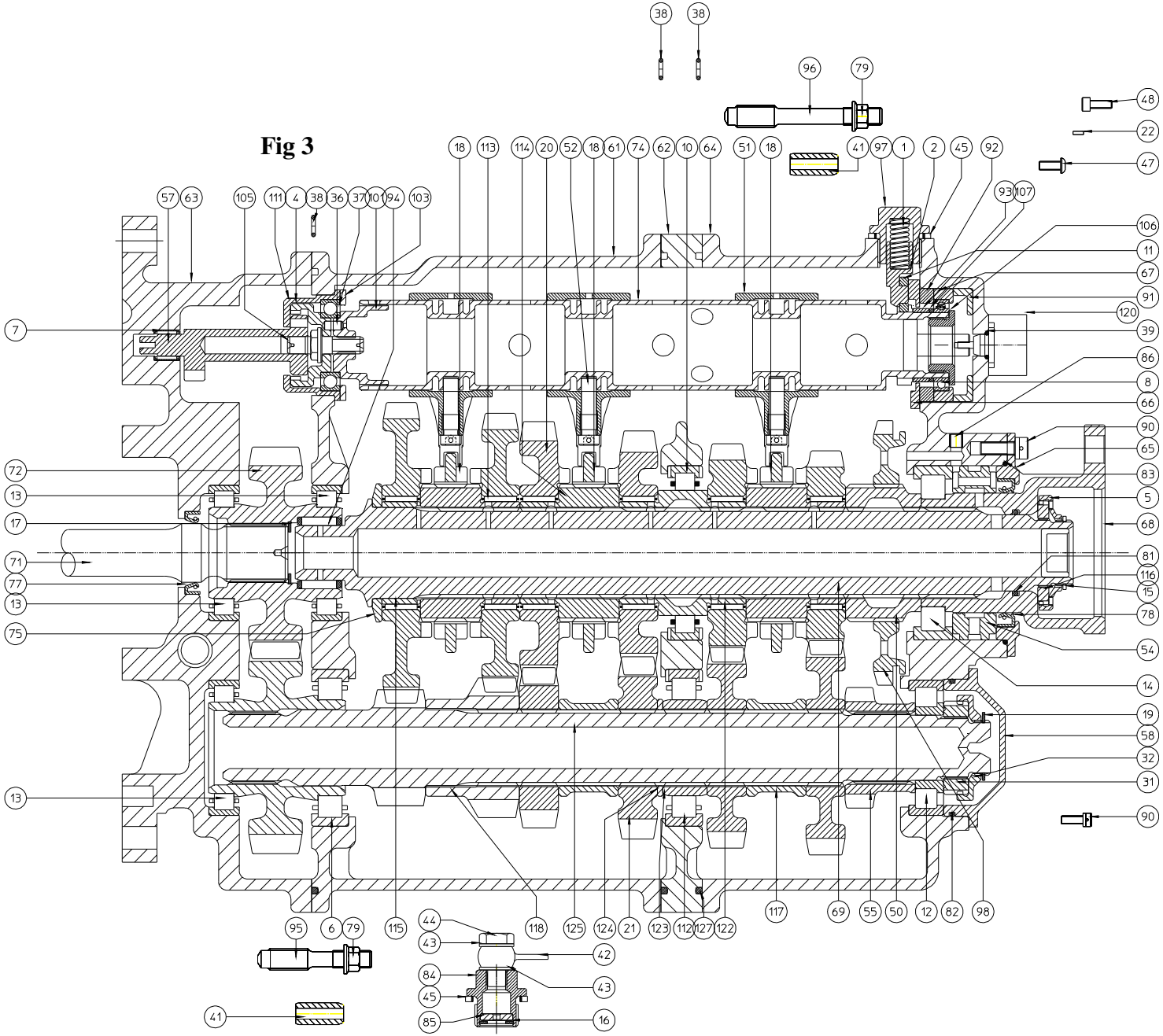
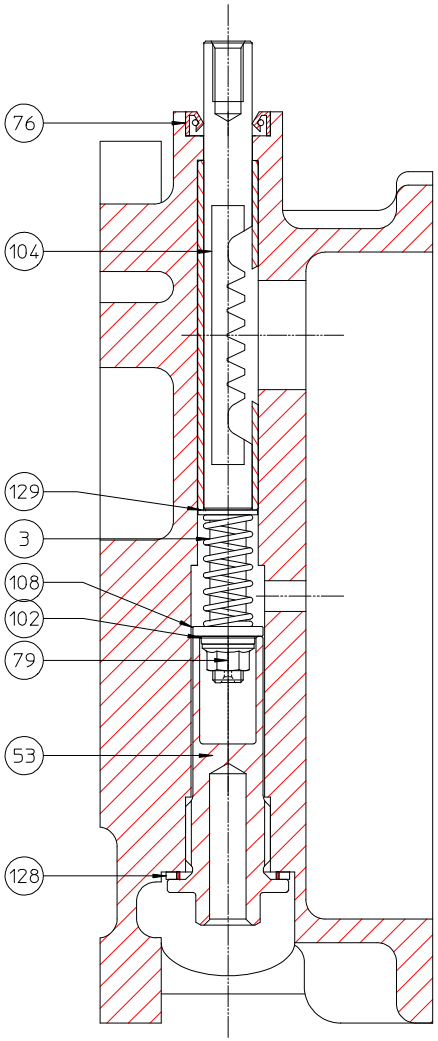


Fig 3

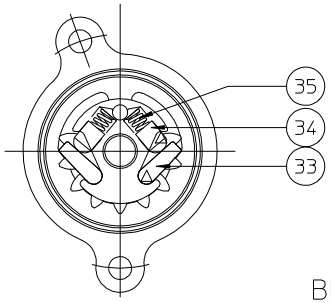




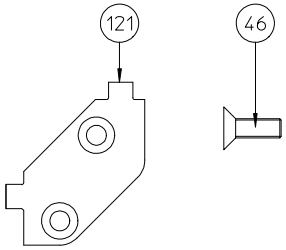
SELECTOR ASSEMBLY

Fig 4

Fig 8

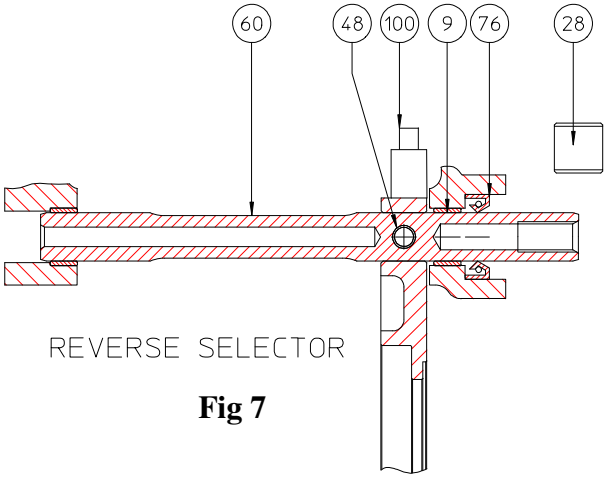


USE 'X' HOLE



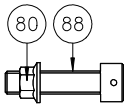
BEARING RETAINING PLATE

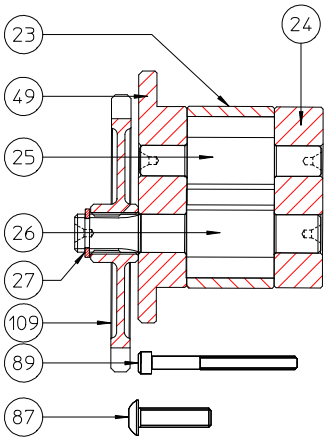
Fig 9



REVERSE SELECTOR

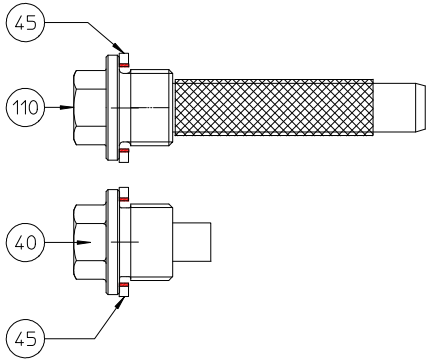
Fig 7

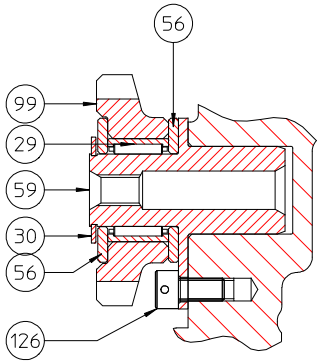




OIL PUMP

Fig 5





REVERSE IDLER

Fig 6

Item No	Stock code	Description	Qty Per
1	102-205-11	SPRING	1
2	102-260-4	DETENT PLUNGER	1
3	102-260-9	SPRING	1
4	105-260-4	GEAR SHAFT DRUM	1
5	95-02-042	LOCKING RING	1
6	BEA-017	ROLLER BEARING	1
7	BEA-035	NEEDLE ROLLER BEARING	1
8	BEA-037	BALL BEARING	1
9	BEA-038	BUSH	2
10	BEA-041	ROLLER BEARING	1
11	BEA-059	PLAIN BEARING	1
12	BEA-066	ROLLER BEARING	1
13	BEA-093	ROLLER BEARING	3
14	BEA-095	ROLLER BEARING	1
15	CIR-017	CIRCLIP	1
16	CIR-031	CIRCLIP	1
17	CIR-038	CIRCLIP	1
18	DGB-232-S	CLUTCH RING	3
19	DGB-239-0	EXTERNAL CIRCLIP	1
20	DGN-233	PINION GEARS	6
21	DGN-235	INPUT GEARS	5
22	DOW-012	DOWEL	2
23	FGB-265-2	OIL PUMP BODY	1
24	FGB-265-2A	PUMP END COVER	1
25	FGB-265-4	IDLER ROTOR	1
26	FGB-265-5	DRIVING ROTOR	1
27	FGB-265-5A	CIRCLIP	1
28	HC-202-8	PLUG	1
29	HC-237-2	NEEDLE ROLLER BEARING	1
30	HC-239-0	CIRCLIP	1
31	HP-M-3018	LAYSHAFT NUT	1
32	HP-M-4026	LOCKING RING	1
33	HP-M-7017	PAWL	2

Item No	Stock code	Description	Qty Per
34	HP-M-7018	PLUNGER	2
35	HP-M-7018-A	SPRING	2
36	HP-M-7022	DOWEL	1
37	HP-M-8008	BALL BEARING	1
38	HP-M-8014	O-RING	3
39	HP-M-8017	O'RING	1
40	HP-M-9004	MAGNETIC DRAIN PLUG	1
41	HP-M-9015	DOWEL	6
42	HP-M-9037	BANJO JOINT	1
43	HP-M-9038	SEALING WASHER	2
44	HP-M-9039	BANJO BOLT	1
45	HP-M-9042	DOWTY WASHER	4
46	HP-M-9047	SKT CSK SCREW	2
47	HP-M-9062	SKT BUTTON HEAD SCREW	2
48	HP-N-9006	SOCKET HEAD SCREW	3
49	HP-O-1005	OIL PUMP FRONT COVER	1
50	IGT-228	REVERSE HUB	1
51	IGT-250	SELECTOR FORK	3
52	IGT-250-1	SELECTOR FORK PIN	3
53	IGTA-203-2	SELECTOR RACK STOP	1
54	IGTA-221-3	OIL FEED SPACER	1
55	IGTA-237-1	REVERSE INPUT GEAR	1
56	IGTA-237-3	THRUST WASHER	2
57	IGTA-260-6	DRUM SHIFTER	1
58	IGTB-202-1	CLAMP PLATE	1
59	IGTB-237-1	REVERSE IDLER SPIGOT	1
60	IGTB-246-1	REVERSE SELECTOR ROD	1
61	IGTC-201	MAINCASE	1
62	IGTC-202	CENTRAL SUPPORT PLATE	1
63	IGTC-203	SELECTOR HOUSING	1
64	IGTC-204	BEARING CARRIER	1
65	IGTC-204-1	SEAL CARRIER	1

Item No	Stock code	Description	Qty Per
66	IGTC-204-2	BRG RETAINING PLATE	1
67	IGTC-204-3	BEARING HSG	1
68	IGTC-218	OUTPUT FLANGE	1
69	IGTC-221	MAINSHAFT	1
71	IGTC-239	CLUTCH SHAFT	1
72	IGTC-240	INPUT TRANSFER GEAR	1
73	IGTC-241	OUTPUT TRANSFER GEAR	1
74	IGTC-260	SELECTOR BARREL	1
75	IGTD-221-1	MAINSHAFT SPACER	1
76	LIP-015	OIL SEAL	2
77	LIP-018	OIL SEAL	1
78	LIP-024	OIL SEAL	1
79	NUT-004	KAYNUT	19
80	NUT-005	K-NUT	2
81	ORI-028	O-RING	1
82	ORI-043	O-RING	1
83	ORI-122	O-RING	1
84	PLU-017	BANJO ADAPTOR PLUG	1
85	PLU-018	PLUG	1
86	SCR-003	GRUB SCREW	2
87	SCR-034	SCREW - BUTTONHEAD	3
88	SCR-068	SOCKET HEAD SCREW	2
89	SCR-076	SKT CAP SCREW	4
90	SGT-244-13	SKT CAP SCREW	8
91	SPA-026	SPACER	1
92	SPA-027	SPACER	1
93	SPA-028	SPACER	1
94	ST-221-1	NEEDLE CAGE	1
95	STU-036	STUD HP-M-9010	9
96	STU-037	STUD HP-M-9011	9
97	TE-202-1	DETENT PLUNGER PLUG	1

Item No	Stock code	Description	Qty Per
98	TE-231	REVERSE SLIDING GEAR	1
99	TE-237-1	REVERSE IDLER GEAR	1
100	TE-249-1	REVERSE SELECTOR FORK	1
101	TE-260-1	SELECTOR BARREL DRIVER	1
102	TE-260-11	SELECTOR RACK WASHER	1
103	TE-260-2	KEEP PLATE	1
104	TE-260-3	SELECTOR RACK	1
105	TE-260-4	SHIFTER SPINDLE	1
106	TE-260-5	SELECTOR BARREL BOLT	1
107	TE-260-7	SELECTOR BARREL SPACER	1
108	TE-260-8	WASHER - STOP	1
109	TE-265-9	OIL PUMP DRIVEN GEAR	1
110	TE-266	OIL FILTER	1
111	TE-270-13	GUIDE PLATE	1
112	TGT-201-6	ROLLER BEARING	1
113	TGT-226-1	NEEDLE ROLLER BEARING	6
114	TGT-227	HUB	3
115	TGT-229-1	BEARING INNER TRACK	1
116	TGT-230	MAINSHAFT NUT	1
117	TGT-234-8	LAYSHAFT SPACER	2
118	TGT-234-8A	LAYSHAFT SPACER	1
119	TGT-244-1	WIRE CLIP	1
120	TGT-260-3	ROTARY POTENTIOMETER	1
121	TGTA-208-1	BEARING RETAINING PLATE	1
122	TGTA-229-2	BEARING INNER TRACK	1
123	TGTA-234-1	BEARING INNER TRACK	1
124	TGTA-234-2	LAYSHAFT SPACER	1
125	IGTC-234	LAYSHAFT	1
126	TPT-244-13R	SOCKET HEAD SCREW	2
127	VG-201-9	D-RING STRIP	1
128	WSH-010	DOWTY WASHER	1
129	WSH-024	SELECTOR RACK WASHER	1

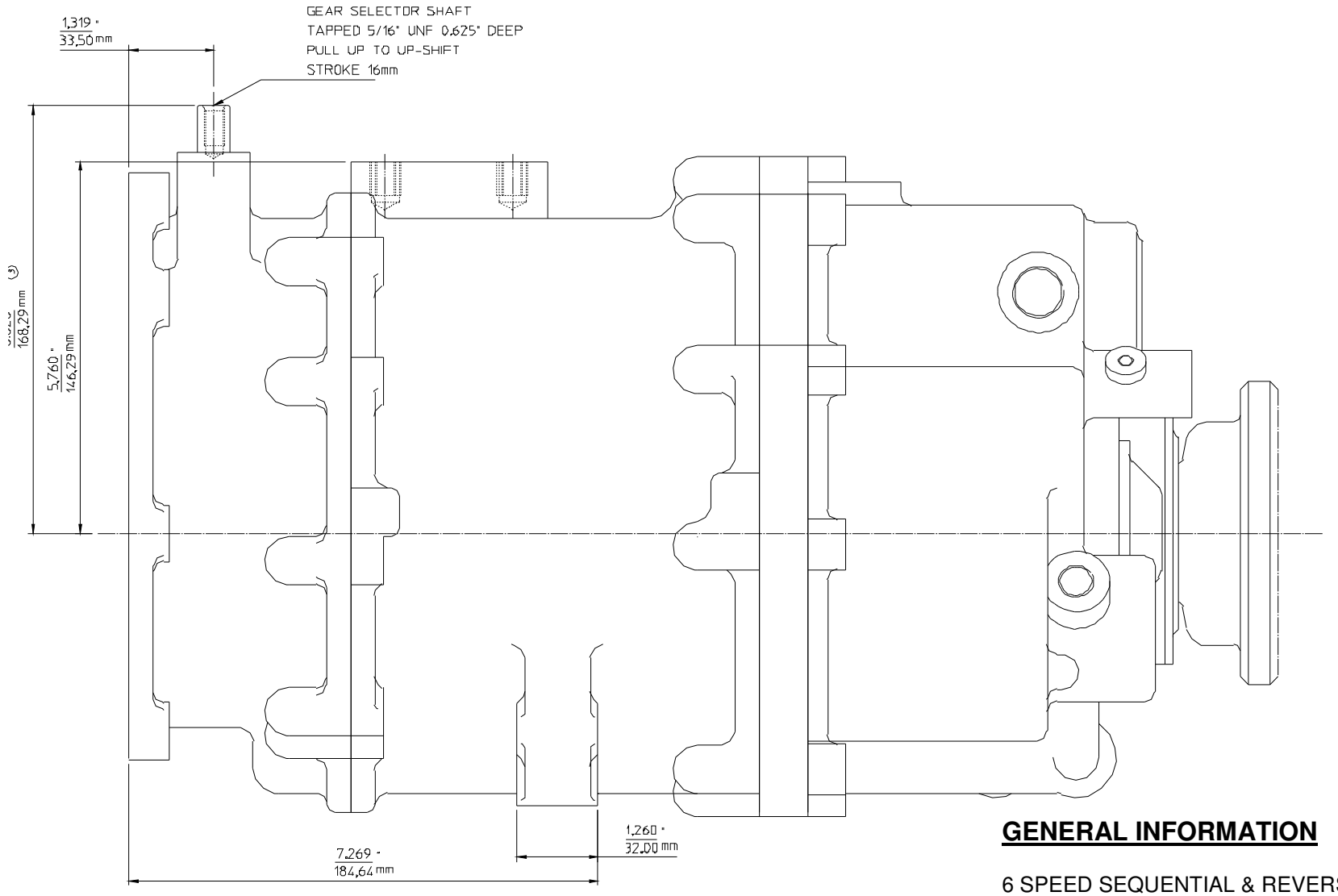


Fig 10-A

GENERAL INFORMATION

6 SPEED SEQUENTIAL & REVERSE
INCORPORATING INPUT TRANSFER GEARING

TRANSFER GEAR RATIOS 23/32, 24/31, 23/28, 23/26, 27/28, 24/24

DGN STANDARD RATIOS, 1ST GEAR INTEGRAL LAYSHAFT, LOWEST LOOSE SECOND 14/32

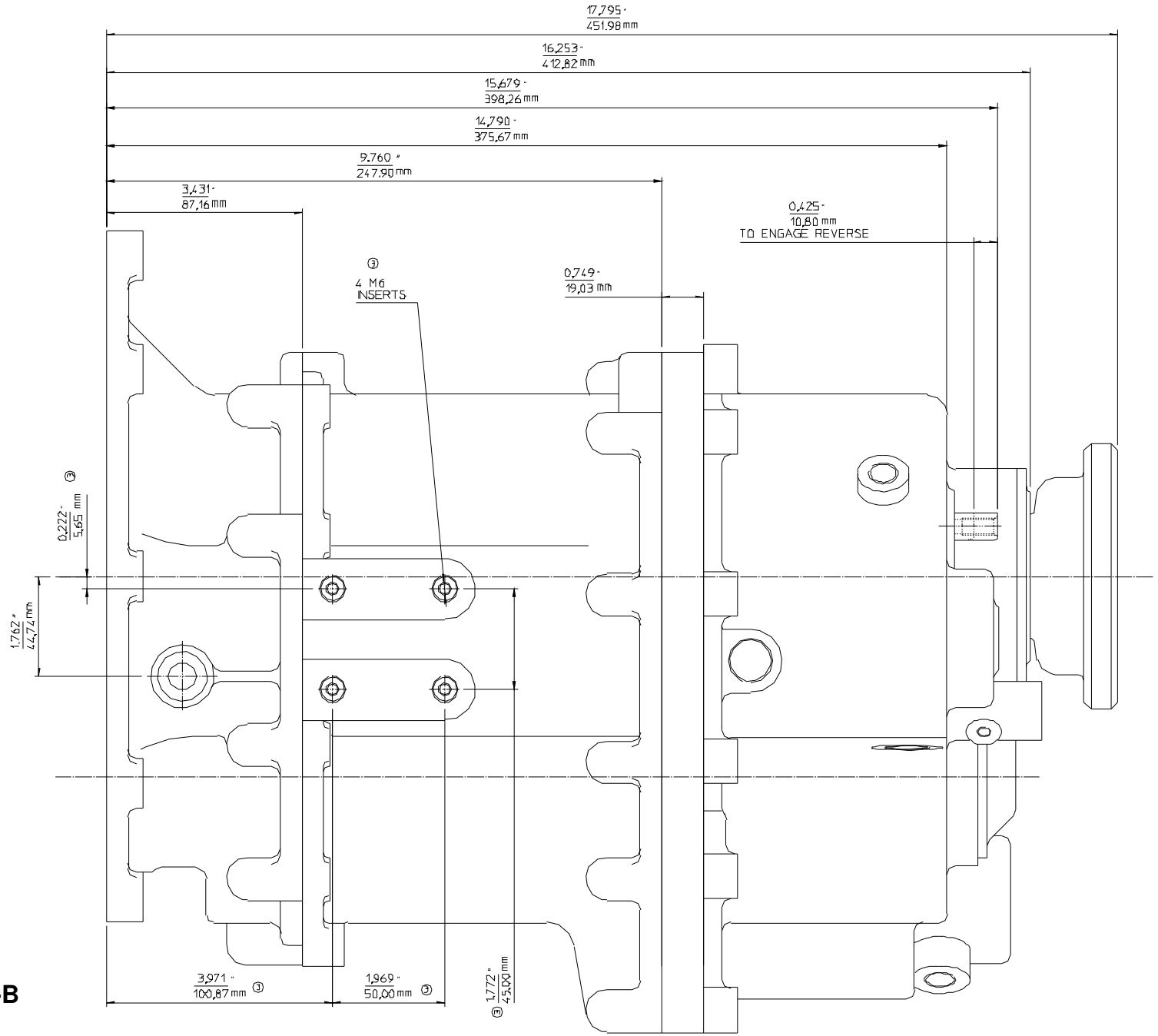


Fig 10-B

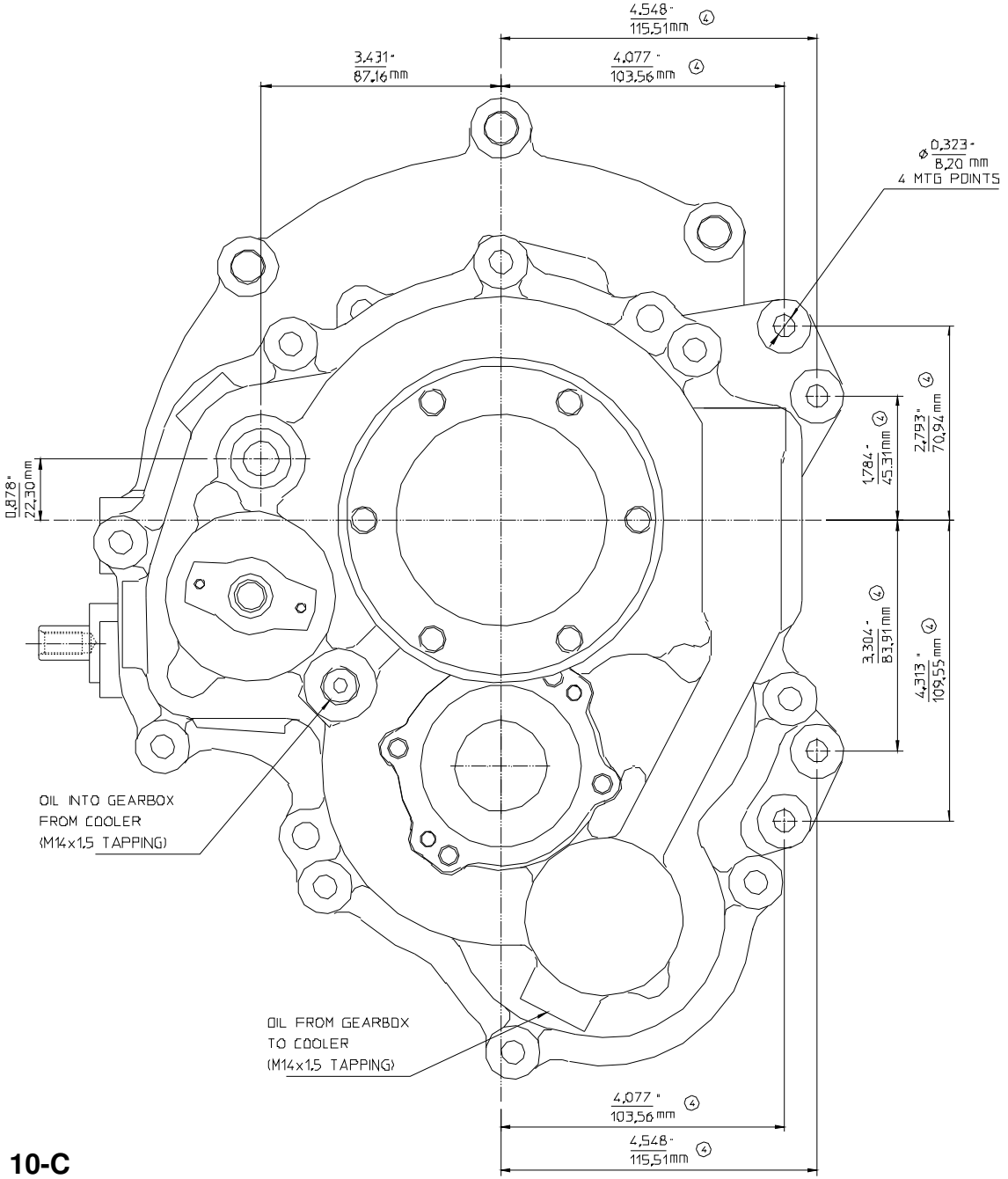


Fig 10-C

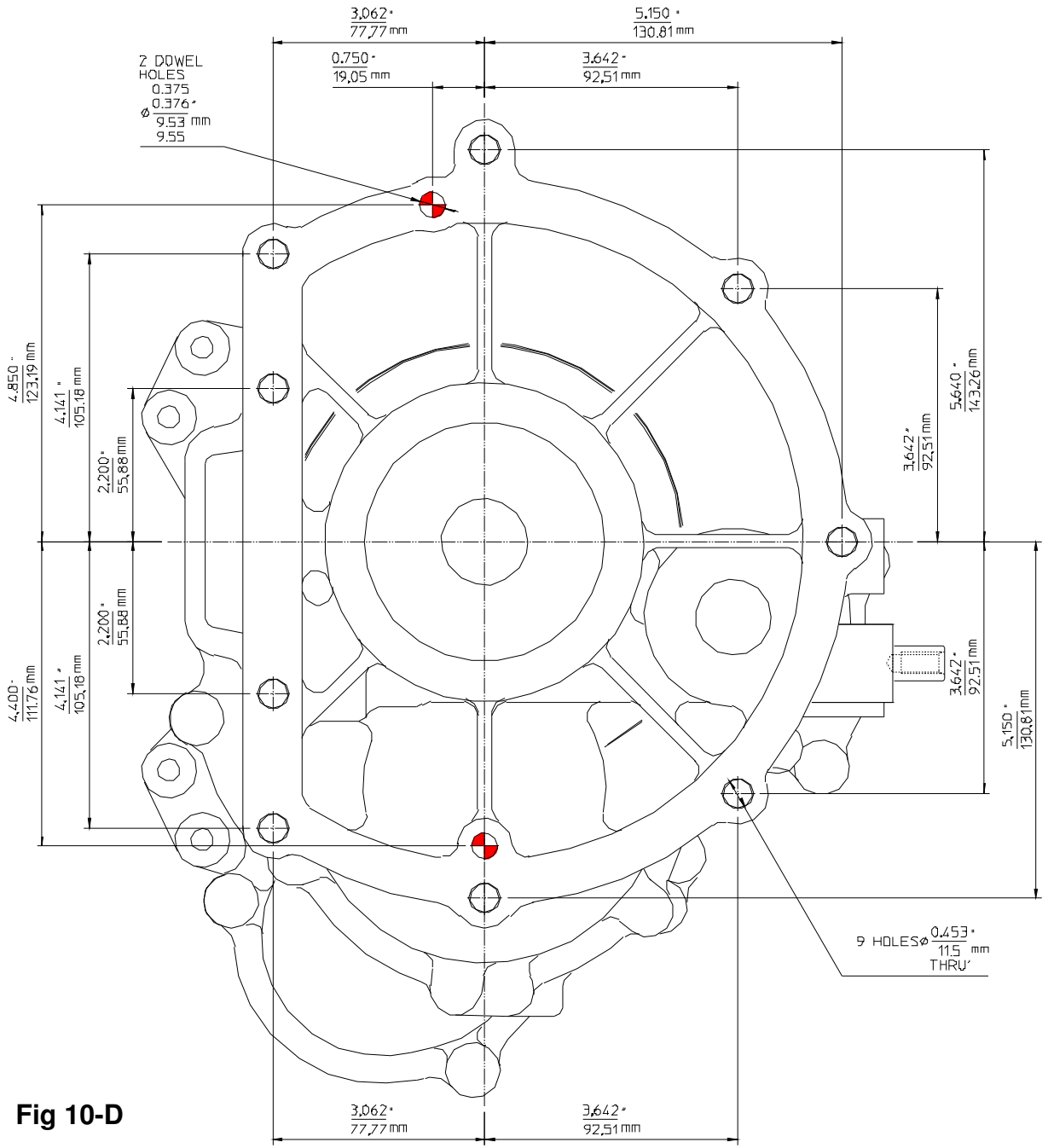
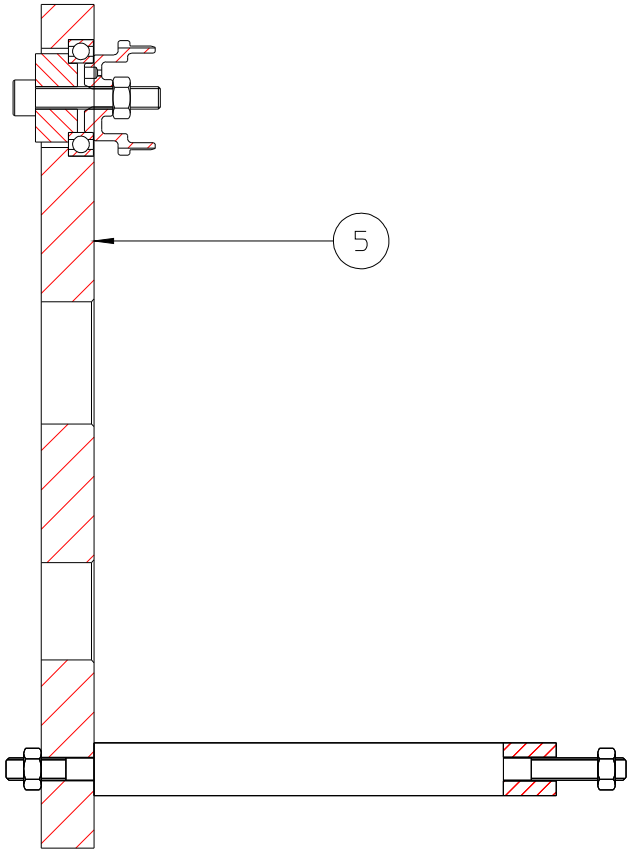
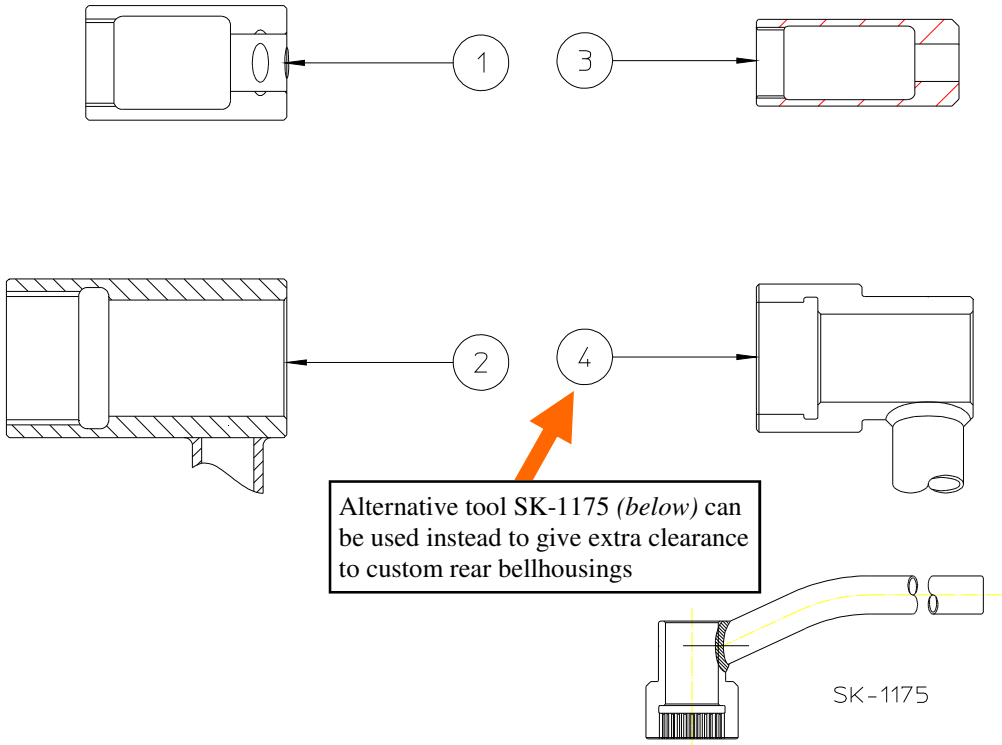


Fig 10-D

GEARBOX TOOLS

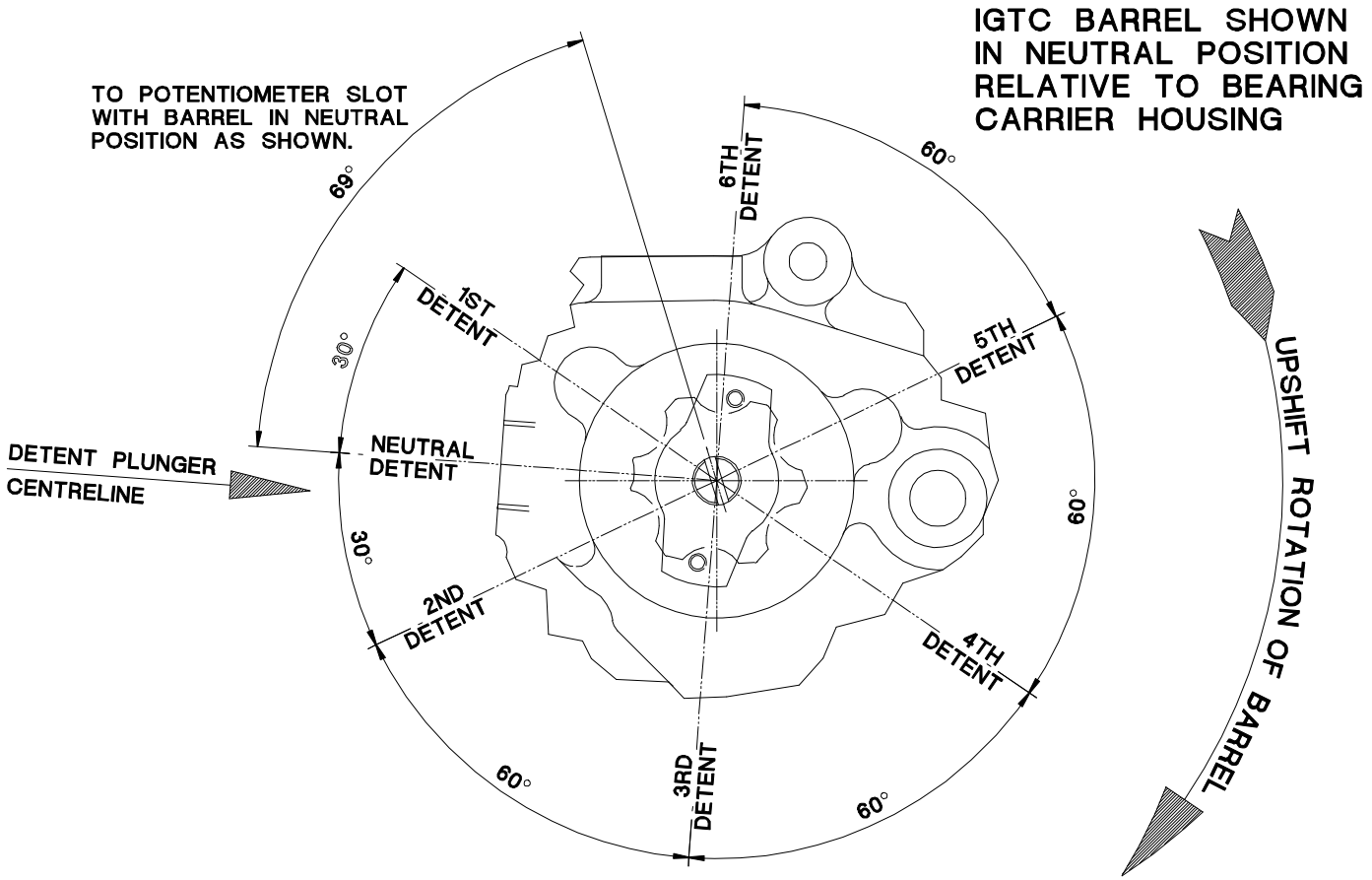




Item No	Stock Code	Description	Qty Per
1	SK-1105-B	MAINSHAFT SOCKET	1
2	SK-1105-C	MAINSHAFT SPANNER	1
3	SK-1175-C	LAYSHAFT SOCKET	1
4	SK-1427	LAYSHAFT SPANNER	1
5	SK-1602	FORK SETTING JIG	1

IGTC Technical Bulletin No.001

POSITION OF GEAR INDICATOR POTENTIOMETER



Manual Modification History

09/12/2011	Page 12 - View added regarding earlier versions of IGTC
16/12/2011	Page 20 - Alternative reaction bar shown in tooling
23/02/2012	Page 12 - Figure 3 updated to show later layshafts.
	Page 15 - Item 70 deleted, Item 125 changed from TME-234 to IGTC-234