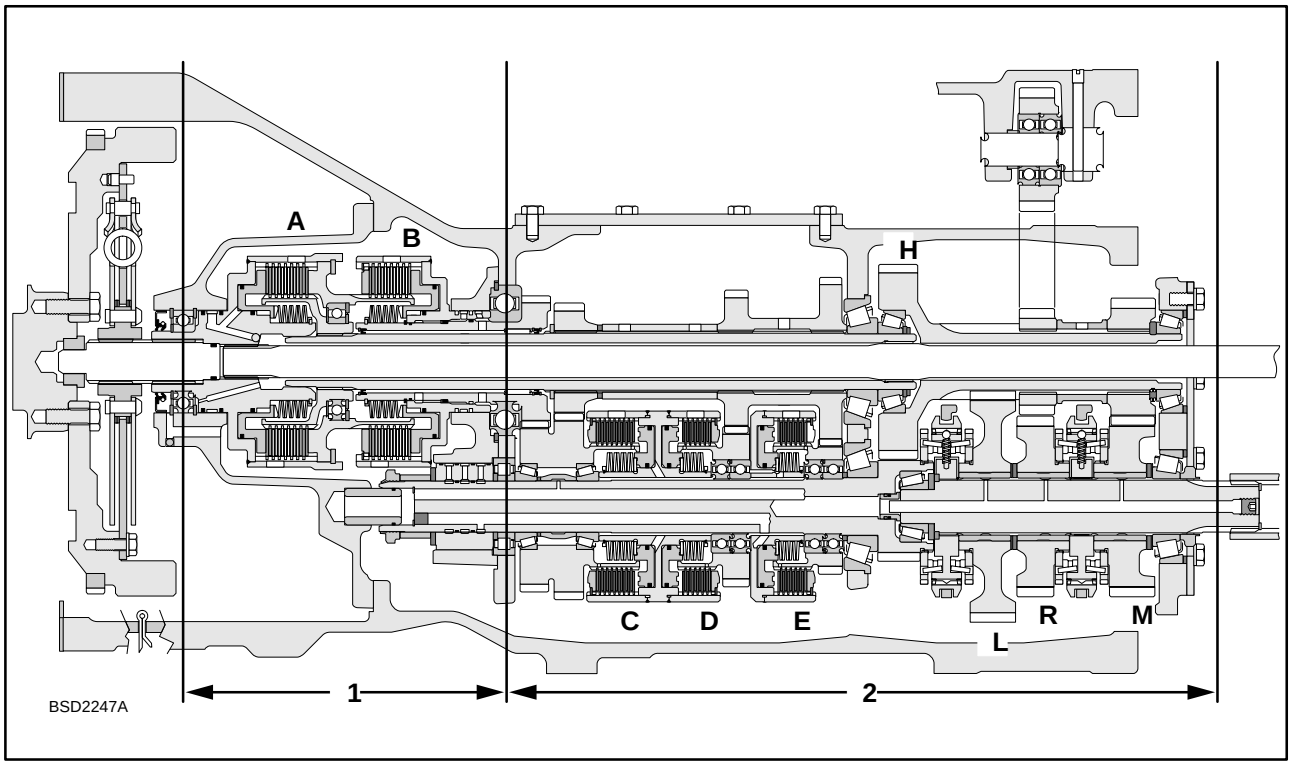
DESCRIPTION AND OPERATION



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The SEMI–POWERSHIFT transmission is subdiviced into a speed (1) and range (2) sections providing 6 speed gears in each of 3 ranges:–

18 forward X 6 reverse ratios on the 40kph option

or

17 forward X 6 reverse ratios on the 30kph option where the18 gear is electronically blocked.

The mechanical components within these transmissions do not differ and the number of gears and therefore the maximum speed of the tractor is controlled by the electronic transmission control module (TCM)

When the optional creeper gear is fitted their are:–

31 forward and 12 reverse ratios on the 40kph option.

30 forward and 12 reverse ratios on the 30kph option.

The speed section of the semi powershift transmission is actuated by 5 multiplate hydraulic clutch packs A, B, C, D and E which provide the 6 speeds for each of three ranges

CLUTCH	C	D	E
A	1	3	5
B	2	4	6

The range section consists of 3 forward and 1 reverse set of constant mesh gears each electro–hydraulically selected giving low (L) medium (M) and high (H) ranges as well as reverse (R)

Clutch design allows shifting from one speed into another when the tractor is moving. Clutches are operated by the control oil from the respective solenoid valves located into the control valve assembly attached to the right side of the transmission housing.

The range gears are operated by two hydraulic cylinders acting on two synchronisers. Hydraulic cylinders are actuated by control oil from the respective solenoid valves located into the control valve assembly attached to the right side of the transmission housing.

When driving the tractor the speed gears and ranges are selected using the controls (2), (3) and (4) on the right side of the operator's seat and displayed in the panel (1).

The upshift button (2) and downshift button (3) are used for shifting through all the speed gears (ratios) within the same range.

When pressing the upshift/downshift button a signal is sent to the transmission control module which analyses the signal and responds by energising and de–energising the relevant pulse width modulation solenoid valve (PWM) which supply oil to the speed clutches.

Signals concerning range changes are also acted on by the transmission control module which powers the relevant solenoid valve located on the transmission side cover sending oil to the control piston attached to the range selector fork.

To shift from one range into another, press and hold the range button (4) while pressing the appropriate upshift or downshift button as required. The range can only be changed when either the lowest or highest speed in that range has been selected. The operator is warned that a range change is required by an audible signal generated by the transmission control unit.

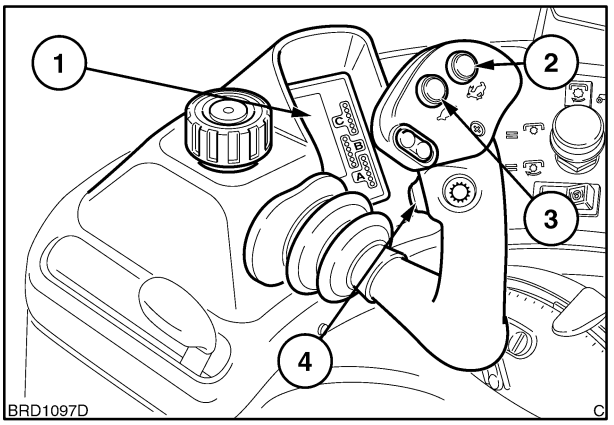
Neutral, forward or reverse direction is selected using the lever (1) on the left hand side of the steering column.

The SEMI–POWERSHIFT transmission is not fitted with a central clutch on the engine flywheel. Consequently, the clutch pedal should not be pressed for speed or range shifting.

However the clutch pedal must be used when changing a range, when under a draft load.

The clutch pedal should be used to stop the tractor, connect implements and operate the tractor in restricted areas.

Typical examples for oil flow during engagement of clutches, lubrication of transmission components and power flows through both the speed and range gears are shown on the following pages:–



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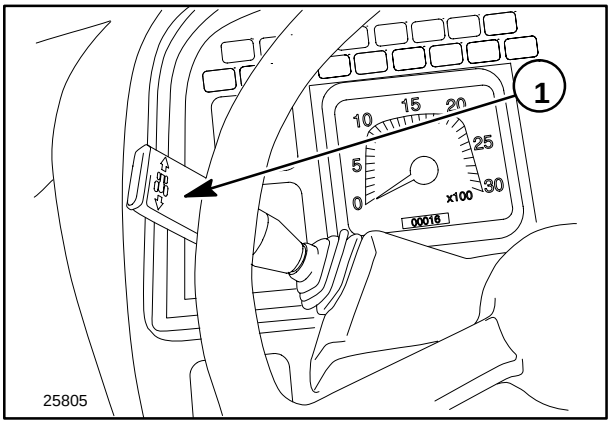

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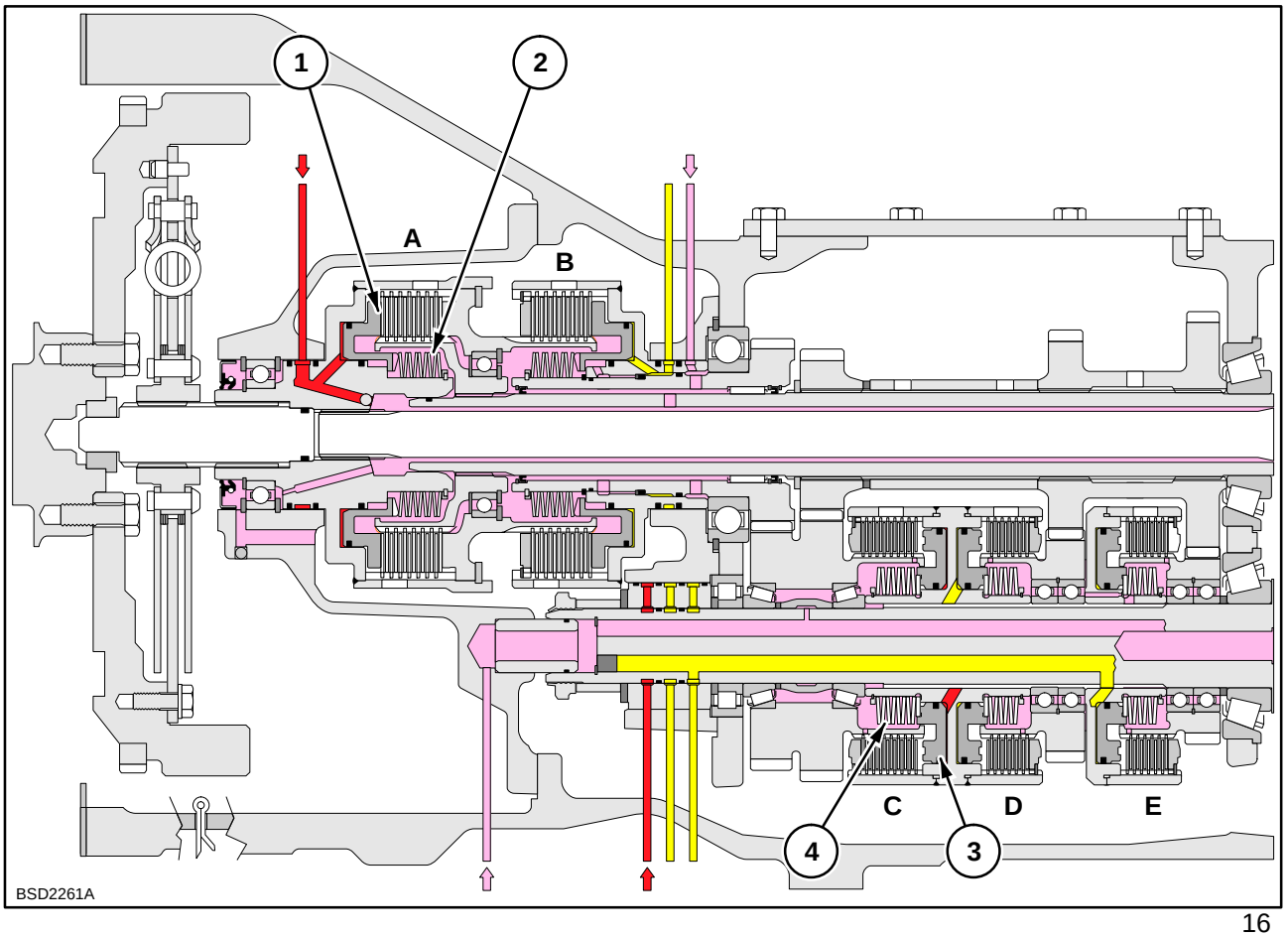

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Pressure oil

Trapped oil

Lubrication pressure oil

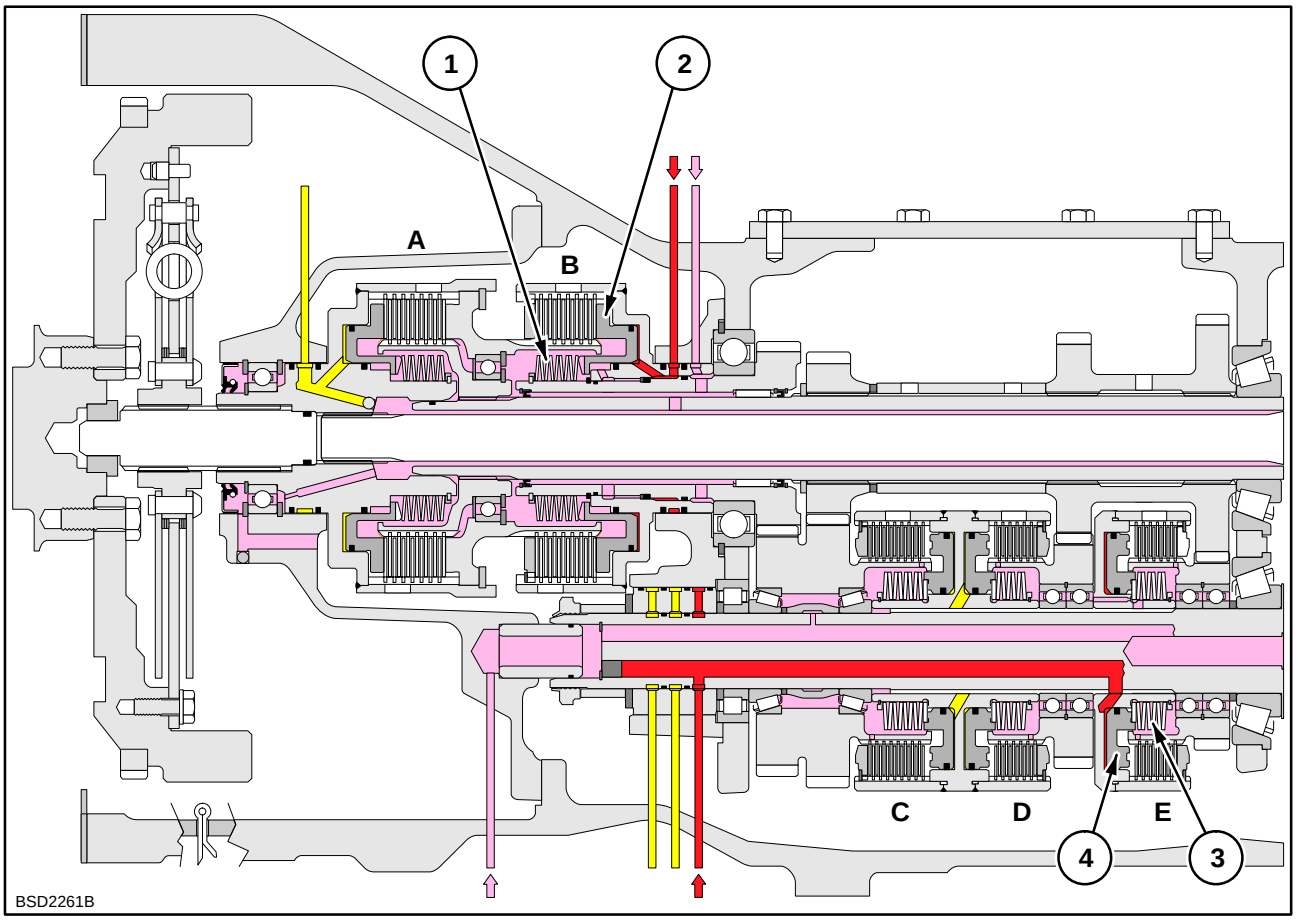
SEMI–POWERSHIFT Transmission Oil Flow with 1st Gear Forward Engaged

When the 1st gear or ratio is selected using the control button (3, Fig. 14), the solenoid valves (6 and 8, Fig. 12) direct oil from the hydraulic pump to clutches A and C, respectively.

Oil reaches the pistons (1 and 3), moves them against the force of the Belleville springs (2 and 4, respectively) and compresses the two clutches A and C. The 1st gear or ratio is engaged.

Pressure oil lubrication is fed to all the SEMI–POWERSHIFT transmission components. Oil pressure is regulated by the valve (32, Fig. 10).

If the clutch pedal is pressed, the solenoid valves (6 and 8) stop sending oil to the clutches A and C and consequently pistons (1 and 3) are pushed away from the clutch discs by the action of the Belleville springs (2 and 4). Clutches are then released.



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Pressure oil

Trapped oil

Lubrication pressure oil

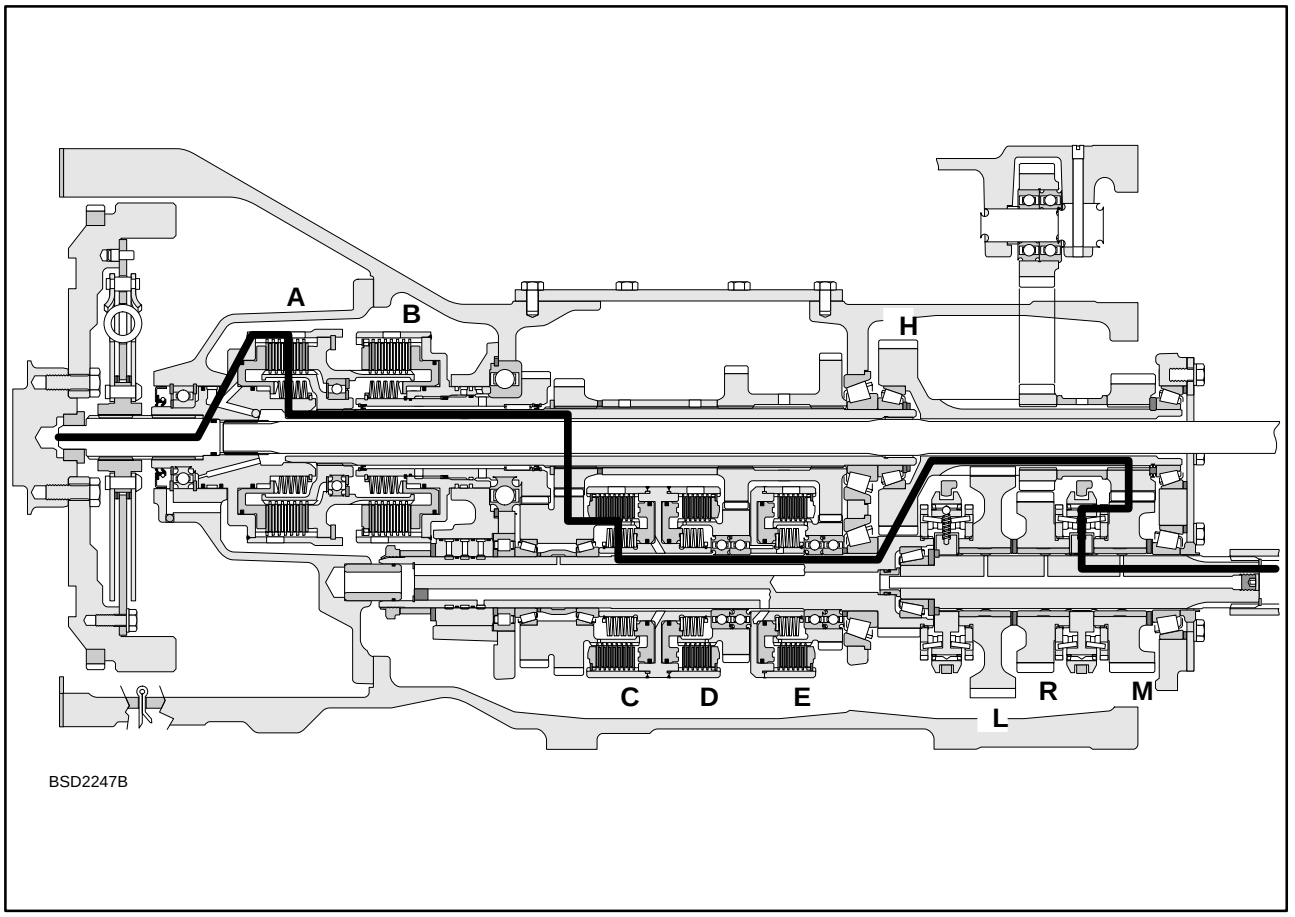
SEMI–POWERSHIFT Transmission Oil Flow with 6th Gear Forward Engaged

When the 6th gear or ratio is selected using the control buttons (2 and 3, Fig. 14), the solenoid valves (7 and 10, Fig. 12) direct oil from the hydraulic pump to clutches B and E, respectively.

Oil reaches the pistons (2 and 4), moves them against the force of the Belleville springs (1 and 3, respectively) and compresses the two clutches B and E. The 6th gear or ratio is engaged.

Pressure oil lubrication is fed to all the SEMI–POWERSHIFT transmission components. Oil pressure is regulated by the valve (32, Fig. 10).

If the clutch pedal is pressed, the solenoid valves (7 and 10) stop sending oil to the clutches B and E and consequently pistons (2 and 4) are pushed away from the clutch discs by the action of the Belleville springs (1 and 3). Clutches are then released.



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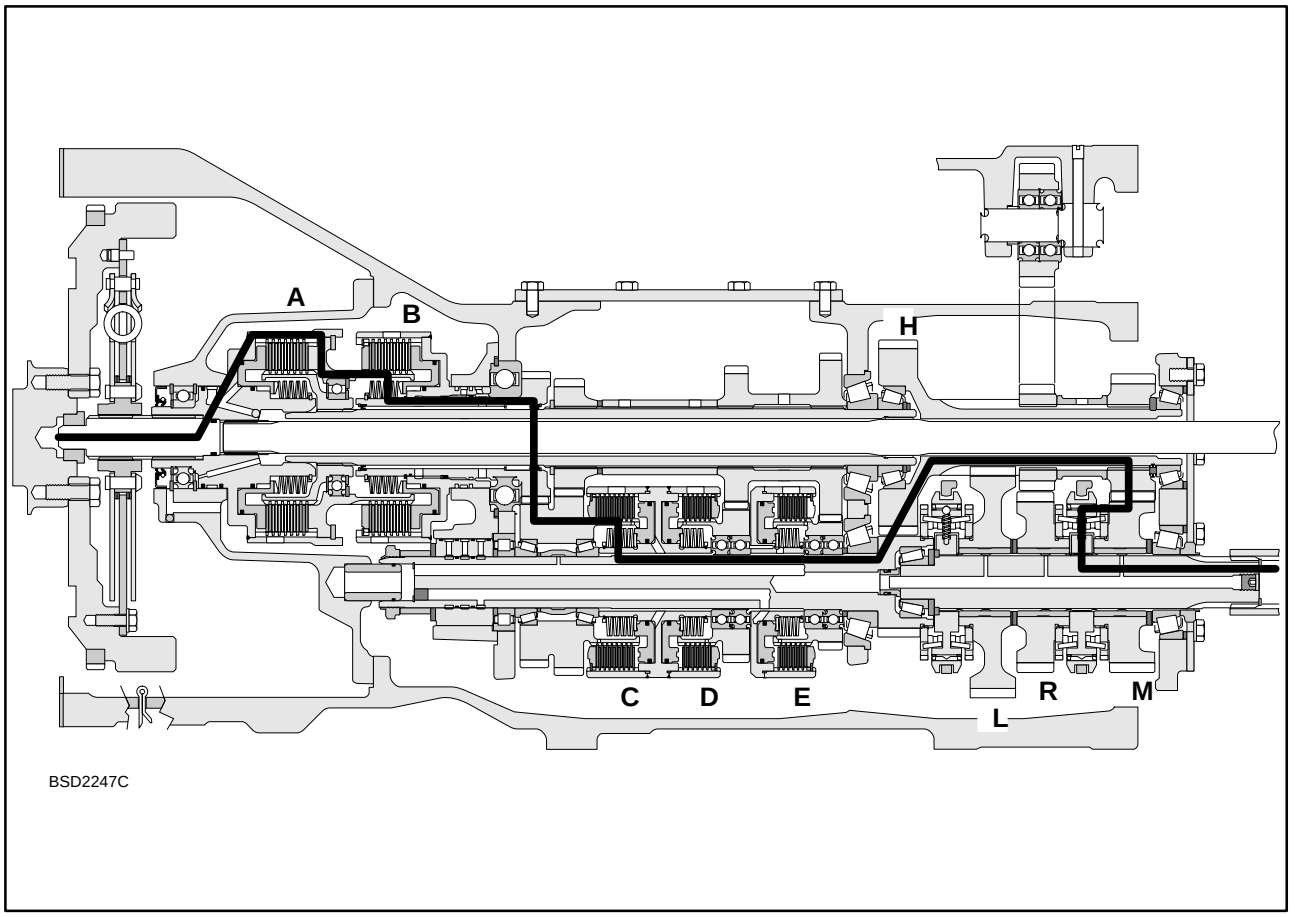
Power Flow 1st Gear Medium Range–Forward

A and C Clutches Engaged

1. A Clutch
2. B Clutch
3. C Clutch
4. D Clutch
5. E Clutch
6. High Range
7. Low Range
8. Reverse Range
9. Medium Range



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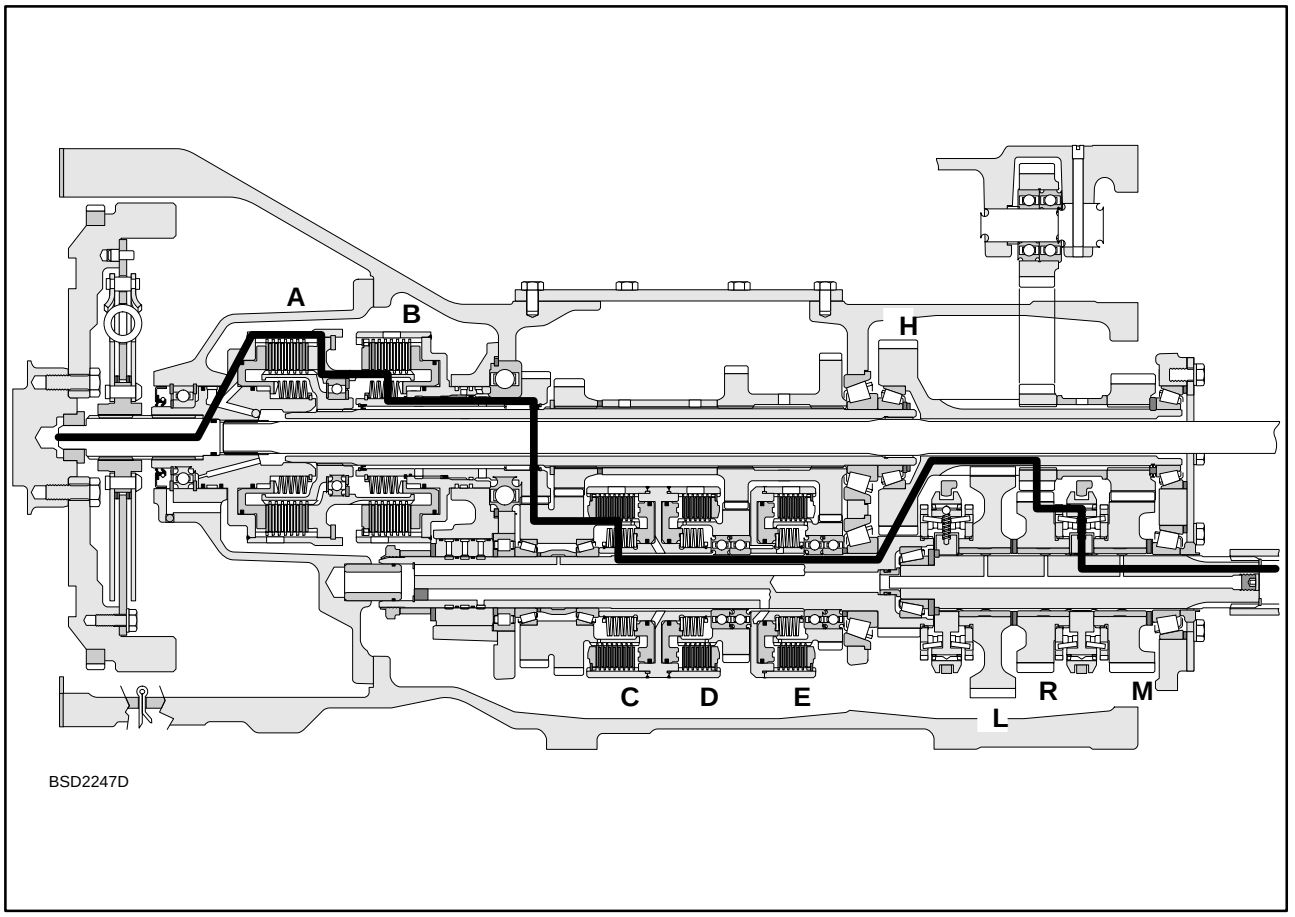
Power Flow 2nd Gear Medium Range–Forward

B and C Clutches Engaged

1. A Clutch
2. B Clutch
3. C Clutch
4. D Clutch
5. E Clutch
6. High Range
7. Low Range
8. Reverse Range
9. Medium Range



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Power Flow 2nd Gear Medium Range–Reverse

B and C Clutches Engaged

1. A Clutch
2. B Clutch
3. C Clutch
4. D Clutch
5. E Clutch
6. High Range
7. Low Range
8. Reverse Range
9. Medium Range

NOTE: *Reverse gears are only available in Medium Range.*