VOLVO

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# I-SHIFT DRIVE MODES

## I-Shift drive modes and software functions

The I-Shift gearbox's functions are optimised with specially adapted drive modes, which make the gearbox even more practical and economical by adapting the gearshift functionality to the current transport conditions.

The driving mode is selected with a button on the gear selector. Fuel saving functions are adjusted according to the selected drive mode. With I-See (optional) speed limits and strategy are adjusted according to the selected drive mode.

### Drive modes

- Economy: Focus on lowering fuel consumption, some reduction in power. Using I-See function.
- Standard: Reasonable fuel consumption without compromising drivability. Using I-See function.
- Performance: Full power, with less focus on fuel consumption.
- Off-road: Agility is prioritised.
- Heavy duty: Optimised for drivability and comfort at high loads (Heavy Equipment Transport).

## ENERGY EFFICIENCY

- Reduces both fuel consumption and carbon dioxide footprint.
- Simplifies drive mode selection.
- Optimised drivability through drive mode selection.

### Sales variants

**Drive mode**

| | |
|---|---|
| **DRM-E** | I-Shift drive mode economy |
| **DRM-BE** | I-Shift drive mode economy, standard and performance |

**Gearbox software functions**

| | |
|---|---|
| **AVO-BAS** | Basic I-Shift software |
| **AVO-ENH** | Enhanced I-Shift software including construction and off-road applications |
| **AVO-HD** | Enhanced I-Shift software including heavy duty, construction and off-road applications |

**Transmission performance mode**

| | |
|---|---|
| **TPM-AUTR** | Transmission performance mode auto return |
| **TPM-MAN** | Transmission performance mode manual |
| **UTPM** | Without drive mode performance, in DRM-BE |

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### Gearbox software with extra functions

**AMSO-BAS** Basic I-Shift gear shifting

**AMSO-AUT** I-Shift manual gear shift available in automatic mode including kick-down function

### I-Shift PTO functions

**APF-BAS** Basic I-Shift PTO functions

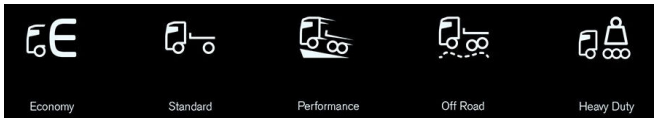
**APF-ENH** Enhanced I-Shift PTO functions (Auto Neutral/Reverse Inhibit / splitbox Connection)

### I-Shift drive modes and software functions

| | DRM-E, AVO-BAS | DRM-BE, AVO-BAS | DRM-BE, AVO-ENH | DRM-BE, AVO-HD |
|---|---|---|---|---|
| Economy | ● | ● | ● | ● |
| Standard | — | ● | ● | ● |
| Performance | — | ●[1] | ●[1] | ● |
| Off-road | — | — | ● | ● |
| Heavy duty | — | — | — | ● |
| I-Shift standard functions | | | | |
| TPM-MAN | — | ● | ● | ● |
| AMSO-BAS | ● | ● | ● | ● |
| APF-BAS | ● | ● | ● | ● |
| I-Shift option functions | | | | |
| TPM-AUTR | — | ○ | ○ | ○ |
| AMSO-AUT | — | ○ | ○ | ○ |
| APF-ENH | ○ | ○ | ○ | ○ |

**● Standard, ○ Option, — Not available**

**[1]Note! Choice of UTPM gives no Performance drive mode.**




**I-Shift drive modes icons in instrument cluster.**

**DRM-E+AVO-BAS is designed for long haul transport to secure a good fuel economy.**

**DRM-BE+AVO-BAS is the versatile offer for the majority of the transport segments.**

**DRM-BE+AVO-ENH is adapted for construction operations.**

**DRM-BE+AVO-HD is specially tailored for heavier transport operations.**

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# I-SHIFT DRIVE MODES

**I-Shift software functions**

| | DRM-E, AVO-BAS | DRM-BE, AVO-BAS | DRM-BE, AVO-ENH | DRM-BE, AVO-HD |
|---|---|---|---|---|
| Change Direction | — | — | ● | ● |
| Terrain Brake[2] | — | — | ● | ● |
| Enable manual switch (TPM-MAN) | — | ○ | ○ | ○ |
| Auto return to ECO (TPM-AUTR) | — | ● | ● | ● |
| Basic Gear Selection Adjustment (AMSO-BAS) | ● | ● | ● | ● |
| Enhanced Gear Selection Adjustment, incl. Kickdown and Tap to brake (AMSO-AUT) | — | ○ | ○ | ○ |
| Basic PTO Functions (APF-BAS) | ● | ● | ● | ● |
| Enhanced PTO Functions (APF-ENH) | ○ | ○ | ○ | ○ |
| Performance Shift | ● | ● | ● | ● |
| Gearbox Oil Temperature Monitor | ● | ● | ● | ● |
| Heavy Start Engagement | — | ● | ● | ● |
| I-Roll | ● | ● | ● | ● |
| Downhill Cruise Control | ● | ● | ● | ● |
| Launch Control | ● | ● | ● | ● |
| Enhanced Shift Strategy (GCW ≤ 85 t) | ● | ● | ● | ● |
| Heavy Duty GCW Control | — | — | — | ● |
| Seat mounted gear selector, GSS-AGS | ○ | ● | ● | ● |
| Dash mounted gear selector, GSS-4BS | ● | — | — | — |

**● Standard, ○ Option, — Not available**

**[2]For Volvo FH16 or for a Volvo with driven front axle.**

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# I-SHIFT DRIVE MODES

**I-Shift Drive Mode Economy (DRM-E)**
DRM-E is optimised for fleet usage where driver influence is limited. To access I-See functionality, PVT-MAP/ PVT-MTM needs to be added.

This selection restricts the ability to switch between different drive modes. The DRM-E is locked in Economy mode.

**I-Shift Drive Mode Balanced Economy (DRM-BE)**
This is the base which giving ideal selection for most all applications. To optimise further toward a particular vocation, DRM-BE is selected with AVO-BAS, AVO-ENH or AVO-HD.

For customer usages with frequent start and stop like garbage collection, a potential to save fuel is to remove the possibility to access performance driving mode. That variant exists for DRM-BE and is called UTPM.

For DRM-BE with UTPM, the performance drive mode is removed and consequently also the option with TPM-AUTR. Other options in DRM-BE with UTPM are available like AVO-ENH/AMSO-AUT/APF-ENH.

**Basic Vocational Functions (AVO-BAS)**
Allows the driver to choose between the Economy, Standard and Performance driving modes.

**Enhanced Performance – Bad Roads (AVO-ENH)**
This optional package is specially adapted to the specific conditions of the construction and timber transport segments.

The Off-road mode includes various functions that adapt gearshifts and gear selection to poor driving surfaces and hilly gradients. It also includes functions that facilitate starting from a standstill in poor driving conditions.

Off-road mode is designed to minimise the number of gearshifts required. This is useful during off-road driving. It prevents wheels from spinning out when torque is increased after a gearshift, and prevents missed gearshifts, for example if the road gradient changes sharply. High engine power (high revs) is often required when driving uphill.

The driver can also influence the maximum number of down shifts. This is very useful when the driver shifts to a lower gear on a very steep uphill gradient and only want to shift once to a gear strong enough to take the vehicle all the way up. Economy, Standard, Performance and Off-road driving modes are available.

Summary of the functions in the package:

- Engine revs are increased as necessary to provide extra torque when starting off from a standstill.
- Larger margins before upshifts ensure safer driving if the gradient changes.
- Gear selection is adapted to minimise the number of gearshifts and run at slightly higher revs.
- Functions that make it easier to keep the same gear when the accelerator pedal position and road gradient change.
- The package enables multiple downshifts. This facilitates gearshifts when driving up steep slopes.
- Includes a function that speeds up clutch release and makes it easier to rock the vehicle out of trouble if it gets stuck on a soft surface.
- When moving the gear lever, the driver can choose the gear that provides the highest possible engine speed.

This also includes change direction and some combinations terrain brake (FH16 or Volvo with driven front axle.)

**Enhanced Performance – Heavy duty (AVO-HD)**
AVO-HD optimises I-Shift for Heavy Duty Transport with high gross combination weights (>85 tonnes). Regardless of the gross combination weight, the driver can always optimise drivability by selecting or deactivating the Heavy-Duty mode. The functions in the software package also offer benefits for trucks hauling multiple trailers.

AVO-HD also includes AVO-ENH functions (Off-road mode) but the functions in Off-road are only active when the Heavy-Duty mode is inactive. This also includes change direction and some combinations terrain brake (FH16 or Volvo with driven front axle.)

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**Change Direction**

Enables fast change of driving direction in, for instance, manoeuvring situations by Change Direction functionality. Change Direction is to select reverse gear at lower vehicle speed and be able to use the accelerator pedal to brake the vehicle and start reversing without letting the foot of the accelerator pedal. The opposite way applies, i.e. reversing the vehicle and then pushes the gear selector into A/M and use accelerator pedal to come into forward driving. Pressing the accelerator pedal more makes the event of changing driving direction to occur faster. Change Direction is activated up to 30 km/h.

Note! Change Direction requires AVO-ENH or AVO-HD.

**Terrain Brake**

Terrain Brake gives improved off-road agility for Volvo FH16 or for a Volvo with driven front axle.

With this function, the driver controlling the vehicle better. For instance, rolling off a stone in terrain is made in a controlled manner by the driver activation.

Terrain Brake means that the brake is applied when the accelerator pedal is released and consequently holds the truck in the position inhibiting free rolling. Terrain Brake can be engaged below 4 km/h, i.e. at low speeds. Applied Terrain brake force is controlled by the retarder brake lever position on the steering column.

Note! Terrain Brake requires AVO-ENH or AVO-HD.

**Transmission Performance Mode Auto Return (TPM-AUTR)**

Selecting Performance drive mode activates the auto-return function, which switches the vehicle back to Economy drive mode after the acceleration event is completed and certain conditions are fulfilled.

**Enable manual switch (TPM-MAN)**

Transmission performance mode MAN. Enable a manual switch between Economy and Performance mode.

**Basic Gear Selection Adjustment (AMSO-BAS)**

Allows the driver to adjust gear selection with the gear lever buttons during engine braking in automatic mode (gear selector position A).

**Enhanced Gear Selection Adjustment, incl. Kickdown (AMSO-AUT)**

This function allows both the automatically selected starting gear and the driving gear in automatic mode to be adjusted by activating the plus/minus button on the gear lever.

The kick-down function selects a gear for maximum acceleration. When the kickdown switch on the accelerator pedal is engaged, the system changes the gearshift strategy to maximise vehicle acceleration. When suitable (e.g. depending on engine speed), this leads to a downshift.

Tap to brake functions when cruise control is off, retarder stalk in A position and the driver performs a gentle tap on the brake pedal to activate auxiliary braking as an alternative to using the retarder stalk.

**Basic PTO Functions (APF-BAS)**

Facilitates power take-off operation. Pre-defined splitter gear positions determine which splitter gear is used when one or two gearbox power take-offs are engaged.

Because gear selection is matched to the engine speed limit, it is possible to set parameters for the software. The gear selection is then adapted to any engine speed limits imposed by body-builder functions.

**Enhanced PTO Functions (APF-ENH)**

Several functions that aid power take-off operation. I-Shift's power take-off functions make it possible to activate the properties listed below by having the software parameters adjusted at an authorised workshop.

- Auto Neutral: On command, the driveline is disconnected from the body builder control unit, regardless of the gear lever's position, when Auto Neutral is activated.
- Reverse Inhibit: When the body builder control unit issues the Reverse Inhibit command, the reverse gears are blocked by the transmission system.
- Connection of splitter box: It allows the connection of a splitter box for operation of high-capacity power take-offs. Direct gear is activated when the body builder module is put in splitter box mode. It is also possible to use all high range gears. Look into the body builder instructions.

**Performance Shift**

It gives faster, gentler shifts through intelligent utilisation of the engine's compression brake (VEB brakes), the vehicle's clutch and a special gearbox brake.

Automatic selection of the correct starting gear (first – sixth is is gear)is included. The choice of starting gear is determined by gross vehicle weight and road gradient.

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**Gearbox Oil Temperature Monitor**
Continuously shows the gearbox oil temperature in the information display.

**Heavy Start Engagement**
For start-up with high revs in Performance mode in first gear, resulting in higher starting torque. This function raises the revs to facilitate heavy starts. This is useful, for instance, if the truck is stuck in soft ground.

**I-Roll**
Automatic activation and deactivation of a freewheel function in order to cut fuel consumption, which can be reduced by up to several per cent. I-Roll is used when neither engine power nor engine braking is needed, for instance in downhills. When driving with cruise control, I-Roll may run at roughly 1–3 km/h below the pre-set speed, which saves fuel. The longer the vehicle drives using I-Roll, the more fuel is saved.

**Downhill Cruise Control**
Downhill Cruise Control sets a maximum speed to control the vehicle speed in a down-hill.

Downhill Cruise Control primarily uses the auxiliary brakes such as the Volvo Engine Brake or the retarder to make sure that the selected speed is not exceeded. Only when required, the wheel brakes are applied.

The driver can still use the brake pedal to further lower the speed without deactivating the system.

**Tap To Brake**
Works when cruise control is off and retarder stalk is in A position. A gentle tap on the brake pedal activates auxiliary braking as an alternative to the retarder stalk being in position 1, 2 or 3.

**Launch Control**
Optimises gear selection and EBS functions when manoeuvring at low speeds. Manoeuvring is facilitated because the EBS brakes are automatically engaged when the truck changes direction. This also ensures that the Auto Hold is activated.

It is possible to drive the vehicle forward with the idle regulator. This saves unnecessary downshifts and makes it easier to adjust the vehicle's speed, for instance when driving in traffic queues.

**Enhanced Shift Strategy[4]**
By interacting with EBS [5] and ECS [6], both starting and manoeuvring are made easier.

This brake mode maximises VEB/VEB+/retarder braking effects by automatically selecting the appropriate gear so the engine runs at high revs. This function compensates for the engine brake when changing gears in brake mode.

When changing gears during engine braking, the wheel brakes are activated to compensate for the braking moment. This raises braking power and provides smoother gearshifts.

Interaction with the braking systems increases safety by preventing the truck from accelerating during gearshifts on steep slopes when braking mode is activated.

**Heavy Duty GCW Control[7]**
Optimises gear selection for high gross combination weights (according to heavy haulage document). This function improves drivability and fuel economy in the Heavy Duty Transport segment. Heavy Duty GCW Control gives the driver access to the HD (Heavy Duty) driving mode.

In HD mode, first gear is used as the starting gear and gear selection is adapted to heavier gross combination weights.

The gearshifts generally occur at higher revs. HD is activated and deactivated by pressing and holding the modes button on the gear selector for about 3 seconds. The chosen driving mode remains selected when the engine is turned off.

Among other functions, DRM-BE-AVO-HD selects the starting gear based on the gross combination weight, helping to reduce clutch wear. The entire gear range is utilised, and the gears are changed consistently at high revs to maintain torque and driving comfort.

When driving with low gross combination weights or without a load, it is easy to deactivate the HD driving mode and return to Economy mode. After this, the driver can switch between available drive modes. This ensures a comfortable and fuel-efficient driving experience.

**Heavy Mode**
Heavy mode function for trucks with I-Shift - having rear axle RTH3815 - regardless of emission class is as follows:

- For driving without load, all drive modes can be used.
- For driving with load, all drive modes - except Economy - can be used. When driving downhill with load - the gearbox shifts down, corresponding to retarder lever position 3. The purpose of downshift is to raise the engine speed to provide more engine braking power to the truck.

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# I-SHIFT DRIVE MODES

[4] Full functionality requires EBS-MED.

[5] EBS = Disc Brakes with Electronically controlled Brake System (EBS-STD/ EBS-MED)

[6] ECS = Electronically Controlled Suspension (SUSPL-EC).

[7] Available only with certain engine/gearbox combinations.

## Customer parameters

I-Shift also has many options for setting customer parameters that optimise the vehicle's driving properties in special applications and special transport segments. For instance, the starting gear can be optimised according to the transport conditions. Power take-off operation can also be customised.

Customised settings and reprogramming of I-Shift are carried out at authorised workshops using the Volvo Tech Tool.

## Volvo Tech Tool

I-Shift's software packages can easily be installed and changed with the help of Volvo's analysis and programming tool, Volvo Tech Tool. This is done by authorised dealers and workshops, where the software packages can be further customised with optional functions and customer parameters.

Volvo retains the right to modify design and specifications without prior notification.