## Detailed signal content of torque at clutch signals

The signal content as displayed in the following image is set as default. Deviations have to be agreed in close cooperation between engine and transmission experts.

| | | |
|---|---|---|
| LEGEND | X | torque effect of the function to be considerd on the torque signal |
| | - | torque effect of the function NOT to be considerd on the torque signal |
| | X/- 1) | Usually, there is a project specific implementation of the parameters of the idle speed controller. Therefore the consideration of the influence of the idle speed controller on the torque signals needs to be defined in close cooperation of engine and transmission experts |
| | X 2) | Usually, the anti-jerk function is not active when the shift clutch is slipping. The necessity that the “Anti jerk function” is visible on this signal is project-dependent and must be clarified project-specific between the engine experts and the transmission experts. |

| **Torque signal**<br>**Functionality** | Powertrain: Driver Request of Torque at Clutch Fast Path<br>**PtDrvrReqTqCluFast** | Powertrain: Requested Torque at Clutch without Transmission Intervention<br>**PtTqCluReqWoTrsmIntv** | Powertrain: Torque at Clutch<br>**PtTqClu** | Powertrain: Torque at Clutch without Transmission Intervention<br>**PtTqCluWoTrsmIntv** | Powertrain: Requested Torque at Crankshaft Reduced by Ancillary Losses<br>**PtTqCrksftRedByAnclIryLossReq** | Powertrain: Requested Electric Machine Torque<br>**PtEmTqReq** | Engine: Torque at Crankshaft Reduced by Ancillary Losses<br>**EngTqCrksftRedByAnclIryLoss** | Powertrain: Electric Machine Torque<br>**PtEmTq** | Powertrain: Predicted Driver Request of Torque at Clutch at Target Speed<br>**PtDrvrReqTqCluPredEngN** |
|---|---|---|---|---|---|---|---|---|---|
| Driver demand torque by driver pedal | X | X | X | X | X | X | X | X | X |
| Idle speed controller, static part | X/- 1) | X/- 1) | X/- 1) | X/- 1) | X/- 1) | X/- 1) | X/- 1) | X/- 1) | X/- 1) |
| Idle speed controller, dynamic part | X/- 1) | X/- 1) | X/- 1) | X/- 1) | X/- 1) | X/- 1) | X/- 1) | X/- 1) | X/- 1) |
| Cruise Control | X | X | X | X | X | X | X | X | X |
| Vehicle speed limiter | X | X | X | X | X | X | X | X | X |
| Electronic stability control - Engine drag torque control | - | X | X | X | X | X | X | X | X |
| Electronic stability control - Anti slip control slow | - | X | X | X | X | X | X | X | X |
| Electronic stability control - Anti slip control fast | - | X | X | X | X | X | X | X | X |
| Knock control single cylinder | - | - | - | - | - | - not relevant | - | - not relevant | - |
| Knock control limitation/- adaptation | - | X | X | X | X | - not relevant | X | - not relevant | X |
| Soot limitation (only diesel) | - | X | X | X | X | - not relevant | X | - not relevant | X |
| Outside temperature/ altitude | - | X | X | X | X | - not relevant | X | - not relevant | X |
| Limitation for engine protection / electric machine protection | - | X | X | X | X | X | X | X | X |
| Limitation by currently max. possible supercharging torque | - | X | X | X | X | - not relevant | X | - not relevant | X |
| Power on /off damping | - | - | X | X | X | X | X | X | - |
| Anti-jerk function (combustion engine and electric motor) | - | - | X 2) | - | X 2) | X 2) | X 2) | X 2) | - |
| Torque losses (ancillaries and auxillaries, electric machine) | X | X | X | X | X | X | X | X | X |
| Torque influence of the engine inertia /electric machine inertia produced by the increase/decrease of the engine speed/ electric machine speed | - | - | - | - | - | - | - | - | - |
| **TCM-initiated influences** | | | | | | | | | |
| Torque limitation for transmission protection<br>Transmission: **Maximum** Torque at **Clutch** Requested by Transmission for **Gearbox Protection**<br>**TrsmTqCluMaxProtnReq**<br><br>Transmission: **Minimum** Torque at **Clutch** Requested by Transmission for **Gearbox Protection**<br>**TrsmTqCluMaxProtnReq** | - | X | X | X | X | X | X | X | X |
| Transmission request for shift intervention<br>Transmission: Request for Torque at Clutch for Shift Intervention<br>**TrsmTqCluReqForShiftIntv**<br><br>Transmission: Request for Maximum/Minimum Torque at Clutch for Shift Intervention on Fast/Slow Path<br>**TrsmTqCluMax/MinFast/SlowReqForShiftIntv** | - | - | X | - | X | X | X | X | - |
| TCM torque reserve request<br>Transmission: Request for Torque Reserve at Clutch<br>**TrsmTqCluResvReq** | - | - | - | - | - | - | - | - | - |
| Powertrain torque request to EM<br>Powertrain: Electric Machine Relative Torque at Clutch Requested by Powertrain<br>**PtEmTqRelCluReq** | - | - | X | - | - not relevant | X | - not relevant | X | - |
| Torque influence of a TCM-initiated “Transmission clutch speed request”<br>Transmission: Clutch Speed Requested by Transmission<br>**TrsmCluNReq** | - | - | X | - | X | X | X | X | - |
| Torque influence of a TCM-initiated CE speed request<br>Powertrain: Engine Speed Requested by Powertrain<br>**PtEngNReq** | - | - | X<br>depending on engine clutch state | - | X | - | X | - | - |
| Limitation of torque gradient by the TCM<br>Transmission: Clutch Torque Gradient Upper Limit Requested by Transmission<br>**TrsmTqCluGrdtUpprLimReq** | - | X | X | X | X | X | X | X | X |
| Limitation by the torque of the engine clutch<br>Powertrain: Engine Clutch Maximum Torque at Current Clutch Pressure<br>**PtCluEngTqMaxCluPCur** | - | X | X | X | - | - | - | - | X |
| Torque limitation for engine clutch protection<br>Powertrain: Maximum Torque at Engine Clutch Requested by Powertrain Coordinator for Engine Clutch Protection<br>**TrsmTqCluMinProtnReq** | - | - | - | - | X | - | X | - | - |