

State of Power Transmission of Gearbox including Drive-off Element and Gearbox Core for all Gearbox Types

State of coupling element							Legend
State of coupling element	State String	Signal qualifier	State Hex	State Dez	Amount of torque transmitted	Distance between friction / meshing elements	
open	open	vld	0H	0	zero	greater zero	X
open_touch	open_touch		1H	1	almost zero	almost zero	(X)
slip_controlled	slip_controlled		2H	2	setpoint dependent	almost zero	- / Ne
slip_micro	slip_micro		3H	3	almost full	almost zero	()
closed	closed		4H	4	full	zero	
not_determined	not_determined		5H	5	unknown	unknown	
hydrodynamic	hydrodynamic		6H	6	velocity dependent	zero	
not_used	not_used		7H... DH	7... 13	-	-	
init		init	EH	14	-	-	
error		error	FH	15	-	-	

not\_determined = in normal operation only. The available sensor information is not sufficient to determine the state of the coupling element. In case of error or must not be confused with erroneous information from the sensors  
Examples for not determined: Clutch with 1 clutch switch only, located in the area where the clutch is for sure closed. If the clutch is not for sure closed it can be open, slipping or still closed. The state the is not\_determined.  
slip\_controlled covers closed loop controlled and open loop controlled

Drive-off element			State of drive-off element (without gearbox core), TrsmDrvOffElmSt								
signal	string value		open	open_touch	slip_controlled	slip_micro	closed	not_determined	hydrodynamic	init	error
	physical value		0	1	2	3	4	5	6	14	15
drive-off element type	clutch	MT	X	-	-	-	X	X	-	X	X
	clutch	AMT	X	(X)	(X)	(X)	X	X	-	X	X
	converter with converter clutch	ATC	-	-	X	X	X	-	X	X	X
	converter without converter clutch	ATC	-	-	-	-	-	-	X	X	X
	clutch	CVT	X	X	X	(X)	X	X	X	X	X
	two clutches	DCT	X	X	X	X	X	-	-	X	X
	Amount of torque transmitted		zero	almost zero	setpoint dependent	almost full	full	unknown	velocity dependent		
Distance between friction / meshing elements		greater zero	almost zero	almost zero	almost zero	zero	unknown	zero			

Gearbox core			State of (clutches in) gearbox core (without drive-off element), TrsmGbxCoreSt								
signal	string value		open	open_touch	slip_controlled	slip_micro	closed	not_determined	hydrodynamic	init	error
	physical value		0	1	2	-	4	5	-	14	15
transmission type	applicable for friction clutch		Y	Y	Y	-	Y	(N)	-	Y	Y
	applicable for dog clutch		Y	N	N	-	Y	Y	-	Y	Y
	manual	MT	X	-	-	-	X	X	-	X	X
	automated manual	AMT	X	-	-	-	X	-	-	X	X
	step shift automatic	ATC	X	X	X	-	X	-	-	X	X
	continuous variable	CVT	-	-	-	-	X	-	-	X	X
	double clutch	DCT	X	-	X	-	X	-	-	X	X
usecase			full decoupling	standstill decoupling	creep control / gearshift slip phase	-	gear engaged	gearshift	-	init	error
Amount of torque transmitted			zero	almost zero	setpoint dependent	-	full	unknown	-		
Distance between friction / meshing elements			greater zero	almost zero	almost zero	-	zero	unknown	-		

Gearbox: All gearbox types, TrsmGbxSt			State of drive-off element (without gearbox core), TrsmDrvOffElmSt								
signal	string value		open	open_touch	slip_controlled	slip_micro	closed	not_determined	hydrodynamic	init	error
	physical value		0	1	2	3	4	5	6	14	15
State of (clutches in) gearbox core (without drive-off element), TrsmGbxCoreSt	open	0	open	open	open	open	open	open	open	init	error
	open_touch	1	open	open_touch	open_touch	open_touch	open_touch	not_determined	open_touch	init	error
	slip_controlled	2	open	open_touch	slip_controlled	slip_controlled	slip_controlled	not_determined	slip_controlled	init	error
	slip_micro	3								init	error
	closed	4	open	open_touch	slip_controlled	slip_micro	closed	not_determined	hydrodynamic	init	error
	not_determined	5	open	not_determined	not_determined	not_determined	not_determined	not_determined	not_determined	init	error
	hydrodynamic	6								init	error
init			14	init	init	init	init	init	init	init	error
error			15	error	error	error	error	error	error	error	error
usecase											
full decoupling											
standstill decoupling											
creep control / gearshift slip phase											
gear engaged											
gearshift											
init											
error											

Possible values			Gearbox type						
Gearbox state			All	ATC w/o CC	ATC w CC	DCT	AMT	MT	CVT
open	0		Y	Y	Y	Y	Y	Y	Y
open_touch	1		Y	Y	Y	Y	Y	N	Y
slip_controlled	2		Y	Y	Y	Y	Y	N	Y
slip_micro	3		Y	N	Y	Y	Y	N	Y
closed	4		Y	N	Y	Y	Y	Y	Y
not_determined	5		Y	(N)	(N)	(N)	Y	Y	Y
hydrodynamic	6		Y	Y	Y	N	N	N	Y
CC = Converter clutch									
w = with, w/o = without									

ATC without converter clutch, TrsmGbxSt			state drive-off element = converter, TrsmDrvOffElmSt							
signal	string value		(open)	(open_touch)	(slip_controlled)	(slip_micro)	(closed)	(not_determined)	hydrodynamic	usecase
	physical value		0	1	2	3	4	5	6	
state of gearbox core TrsmGbxCoreSt	open	0							open	full decoupling
	open_touch	1							open_touch	standstill decoupling
	slip_controlled	2							slip_controlled	creep control / gearshift slip phase
	slip_micro	3								
	closed	4							hydrodynamic	gear engaged
	(not_determined)	5							(not_determined)	(gearshift)
	hydrodynamic	6								

Gearbox state	Used
open	Y
open_touch	Y
slip_controlled	Y
slip_micro	N
closed	N
not_determined	(N)
hydrodynamic	Y

ATC with converter clutch, TrsmGbxSt			state drive-off element = converter in parallel to converter clutch, TrsmDrvOffElmSt							
signal	string value		(open)	(open_touch)	slip_controlled	slip_micro	closed	(not_determined)	hydrodynamic	
	physical value		0	1	2	3	4	5	6	
state of gearbox core TrsmGbxCoreSt	open	0			open	open	open		open	
	open_touch	1			(open_touch)	(open_touch)	open_touch		open_touch	
	slip_controlled	2			slip_controlled	slip_controlled	slip_controlled		slip_controlled	
	slip_micro	3								
	closed	4			slip_controlled	slip_micro	closed		hydrodynamic	
	(not_determined)	5			(not_determined)	(not_determined)	(not_determined)		(not_determined)	
	hydrodynamic	6								
usecase										
full decoupling										
standstill decoupling										
creep control / gearshift slip phase										
gear engaged										
(gearshift)										

Gearbox state	Used
open	Y
open_touch	Y
slip_controlled	Y
slip_micro	Y
closed	Y
not_determined	(N)
hydrodynamic	Y

DCT, TrsmGbxSt			state of drive-off element = one of the two clutches, TrsmDrvOffElmSt									
signal	string value		open	open_touch	slip_controlled	slip_micro	closed	(not_determined)	hydrodynamic			usecase
	physical value		0	1	2	3	4	5	6			
state of gearbox core TrsmGbxCoreSt	open	0	open	open	open	open	open					full decoupling
	open_touch	1										(standstill decoupling)
	slip_controlled	2										(creep control / gearshift slip phase)
	slip_micro	3										
	closed	4	open	open_touch	slip_controlled	slip_micro	closed					gear engaged
	(not_determined)	5										(gearshift)
	hydrodynamic	6										

Gearbox state	Used
open	Y
open_touch	Y
slip_controlled	Y
slip_micro	Y
closed	Y
not_determined	(N)
hydrodynamic	N

AMT including MT with automatically acutated clutch, TrsmGbxSt			state of drive-off element = clutch - (Continuous) clutch position or drive train reaction available, TrsmDrvOffElmSt									
signal	string value		open	open_touch	slip_controlled	slip_micro	closed	(not_determined)	hydrodynamic			
	physical value		0	1	2	3	4	5	6			usecase
state of gearbox core TrsmGbxCoreSt	open	0	open	open	open	open	open					full decoupling
	open_touch	1										(standstill decoupling)
	slip_controlled	2										(creep control / gearshift slip phase)
	slip_micro	3										
	closed	4	open	open_touch	slip_controlled	slip_micro	closed					gear engaged
	(not_determined)	5	open				not_determined					(gearshift)
	hydrodynamic	6										

Gearbox state	Used
open	Y
open_touch	Y
slip_controlled	Y
slip_micro	Y
closed	Y
not_determined	Y
hydrodynamic	N

MT, TrsmGbxSt			state of drive-off element = clutch (Availability of states open and closed depends on available sensor information), TrsmDrvOffElmSt									
signal	string value		open	(open_touch)	(slip_controlled)	(slip_micro)	closed	not_determined	(hydrodynamic)			usecase
	physical value		0	1	2	3	4	5	6			
state of gearbox core TrsmGbxCoreSt	open	0	open				open	open				full decoupling
	open_touch	1										(standstill decoupling)
	slip_controlled	2										(creep control / gearshift slip phase)
	slip_micro	3										
	closed	4	open									gear engaged
	(not_determined)	5	open				closed	not_determined				gearshift
	hydrodynamic	6					not_determined	not_determined				