DCS800 12-pulse serial, serial sequential & excitation parameters e o.docx

1 DCS800 parameters 12-pulse serial / serial sequential

Before starting with the commissioning set all parameters in both armature drives and the excitation drive to default by means of *ApplMacro (99.08)* = **Factory** and *ApplRestore (99.07)* = **Yes**. Check with *MacroSel (8.10)*. For 12-pulse serial set *12P Mode (47.01)* = **Normal**. For serial sequential set *12P Mode (47.01)* = **Sequential**. Set all parameters listed below accordingly in master and slave.

Parameter	**Master**	**Slave**	**Comments**
CommandSel (10.01)	0 = **Local I/O** (def.), 1 = **MainCtrlWord**	3 = **12PLink**	
Off2 (10.08)	4 = **DI4** (def.)	4 = **DI4** (def.)	
E Stop (10.09)	5 = **DI5** (def.)	0 = **NotUsed**	Slave = **NotUsed,** otherwise the E Stop works only as coast stop
M1OvrSpeed (30.16)	xxx rpm, typical 110 % of n_{max}	0 rpm	Slave = 0 rpm, to suppress **F532 MotOverSpeed**
SpeedFbFltSel (30.17)	1 = **Fault** (def.)	0 = **NotUsed**	Slave = **NotUsed,** to suppress **F522 SpeedFb**
OperModeSel (43.01)	4 = **12PSerMaster**	5 = **12PSerSlave**	
12P Mode (47.01)	0 = **Normal** (def.), 2 = **Sequential**	0 = **Normal** (def), 2 = **Sequential**	For 12-pulse serial, for serial sequential
M1SpeedScale (50.01)	xxx rpm	xxx rpm	n_{max} = xxx rpm, set to maximum absolute speed
M1SpeedFbSel (50.03)	0 = **EMF** (def.), 1 = **Encoder**, 2 = **Tacho**	3 = **External**	Slave = **External,** to suppress **F532 MotOverSpeed**
M1EncPulseNo (50.04)	xxx ppr	n.a.	
12P TimeOut (94.03)	³ 15 ms	³ 15 ms	
AdjUDC (97.23)	50 %, 100 % (def.)	50 %, 100 % (def.)	See *
M1NomVolt (99.02)	xxx V	xxx V	0.5 * U_{MotN} = xxx V* or U_{MotN} = xxx V*; used for EMF speed feedback
M1NomCur (99.03)	xxx A	xxx A	I_{MotN} = xxx A
M1BaseSpeed (99.04)	xxx rpm	xxx rpm	n_{Base} = xxx rpm; set to motor base speed
NomMainsVolt (99.10)	xxx V	xxx V	U_{NetN} = xxx V; nominal supply voltage (AC)
M1UseFexType (99.12)	xxx	**NotUsed**	Choose proper field exciter for the master. The slave does not have an exciter.

* depends on the motor configuration (see presentation DCS800 Large DC Drives)

2 Following parameters must match in master and slave

Parameter	Master	Slave	Comments
ArmAlphaMax (20.14)	150° (def.)	150° (def.)	
ArmAlphaMin (20.15)	15° (def.)	15° (def.)	
RevDly (43.14)	xxx ms*	xxx ms*	After a command to change current direction the opposite current has to be reached before *ZeroCurTimeOut (97.19)* has been elapsed, (47.05) > (97.19) > (43.14)
RevVoltMargin (44.21)	xxx %	xxx %	
ZeroCurTimeOut (97.19)	xxx ms*	xxx ms*	After a command to change current direction the opposite current has to be reached before *ZeroCurTimeOut (97.19)* has been elapsed, (47.05) > (97.19) > (43.14)

**RevDly (43.14)* and *ZeroCurTimeOut (97.19)* depending on the discontinuous current limit:

	M1DiscontCurLim (43.08)	*RevDey (43.14)*	Delta	*ZeroCurTimeOut (97.19)*
Default	50 %	5 ms	15	20 ms
	≤ 35 %	10 ms	25	35 ms
	≤ 20 %	15 ms	35	50 ms
	≤ 10 %	20 ms	50	70 ms

3 Limits

Parameter	Master and slave	Comments
Speed		
M1SpeedMin (20.01)	xxx rpm	
M1SpeedMax (20.02)	xxx rpm	
ZeroSpeedLim (20.03)	xxx rpm	Typical 1 % of n_{max} (maximum absolute motor speed) when an encoder is used
Torque		
TorqMax (20.05)	xxx %	Parameters must match in master and slave
TorqMin (20.06)	xxx %	Parameters must match in master and slave
Current		
M1CurLimBrdg1 (20.12)	xxx %	Parameters must match in master and slave
M1CurLimBrdg2 (20.13)	xxx %	Parameters must match in master and slave
Firing angle		
ArmAlphaMax (20.14)	150° (def.)	Parameters must match in master and slave
ArmAlphaMin (20.15)	15° (def.)	Parameters must match in master and slave
Current rise		
CurRefSlope (43.04)	10 %/ms (def.)	Parameters must match in master and slave

4 Converter protections

Parameter	Master and slave	Comments
Armature Overcurrent		
ArmOvrCurLev (30.09)	xxx %	I_{LIM} = xxx A
Reversal fault		
RevDly (43.14)	xxx ms*	After a command to change current direction the opposite current has to be reached before *ZeroCurTimeOut (97.19)* has been elapsed, (47.05) > (97.19) > (43.14)
12P RevTimeOut (47.05)	100 ms (def.)	Active only in 12-pulse master (47.05) > (97.19) > (43.14)
ZeroCurTimeOut (97.19)	xxx ms*	After a command to change current direction the opposite current has to be reached before *ZeroCurTimeOut (97.19)* has been elapsed, (47.05) > (97.19) > (43.14)
Current difference		
DiffCurLim (47.02)	20 %	Active only in the master
DiffCurDly (47.03)	500 ms (def.)	Active only in the master

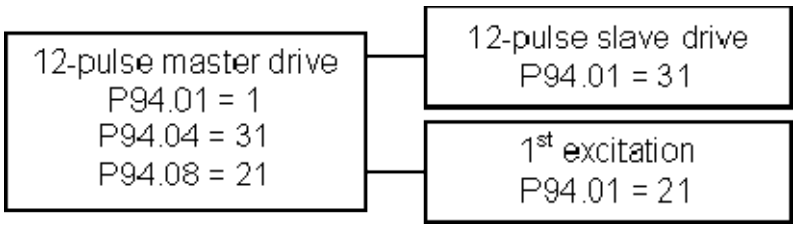
**RevDly (43.14)* and *ZeroCurTimeOut (97.19)* depending on the discontinuous current limit:

	M1DiscontCurLim (43.08)	*RevDey (43.14)*	Delta	*ZeroCurTimeOut (97.19)*
Default	50 %	5 ms	15	20 ms
	≤ 35 %	10 ms	25	35 ms
	≤ 20 %	15 ms	35	50 ms
	≤ 10 %	20 ms	50	70 ms

5 Motor protections

Parameter	Master and slave	Comments
Stall protection		
StallTime (30.01)		
StallSpeed (30.02)		
StallTorq (30.03)		
Armature overvoltage		
ArmOvrVoltLev (30.08)		
Motor thermal model		
M1ModelTime (31.01)		
M1AlarmLimLoad (31.03)		
M1FaultLimLoad (31.04)		
Measured motor temperature		
M1TempSel (31.05)		
M1AlarmLimTemp (31.06)		
M1FaultLimTemp (31.07)		
Klixon		
M1KlixonSel (31.08)		

6 DCSLink



Parameter	Master	Slave	Comments
DCSLinkNodeID (94.01)	1	31	
12P Slave Node (94.04)	31 (def.)	n.a.	

Parameter	Master	Excitation	Comments
DCSLinkNodeID (94.01)	1	21	
M1FexNode (94.08)	21 (def.)	n.a.	

7 D6 / D7 settings

Parameter	Master and slave	Comments
ConvNomVolt (4.04)		Read from *TypeCode (97.01)* or set with *S ConvScaleVolt (97.03)*
ConvNomCur (4.05)		Read from *TypeCode (97.01)* or set with *S ConvScaleCur (97.02)*
ConvType (4.14)		Read from *TypeCode (97.01)*
QuadrantType (4.15)		Read from *TypeCode (97.01)* or set with *S BlockBridge2 (97.07)*
MaxBrdgTemp (4.17)		Read from *TypeCode (97.01)* or set with *S MaxBrdgTemp (97.04)*
TypeCode (97.01)		Normally set by the factory, to change use *ServiceMode (99.06)* = **SetTypeCode**
S ConvScaleCur (97.02)		Automatically taken from type code
S ConvScaleVolt (97.03)		Automatically taken from type code
S MaxBrdgTemp (97.04)		Automatically taken from type code, air entry temperature can be set to 55 °C in hot motor rooms
S BlockBridge2 (97.07)		Automatically taken from type code and thus **Auto**
ServiceMode (99.06)		10 = **SetTypeCode**
Galvanic isolation		
DC / DC transducer	xxx V	E.g. 1 ° 810 V for incoming voltage 270 V to 600 V details see Hardware Manual
AC / AC transducer	xxx A	E.g. 2U2, 2V2, 2W2 for incoming voltage 270 V to 600 V details see Hardware Manual

8 Additional settings

Parameter	Master and slave	Comments
TorqGenMax (20.22)	325 % (def.)	The supply voltage is going down due to high load currents. To prevent regeneration operation at the commutation limit use *TorqGenMax (20.22)*.
SpeedErrFilt (23.06)	0 ms (def.)	Cyclic bridge changes (bridge reversals) can lead to **F533 12PRevTime**, **F534 12PCurDiff** or **F557 ReversalTime**. To prevent the Cyclic bridge changes it is recommended to re-tune the speed controller (making it more stable) and to use the speed error filter times. E.g. set *SpeedErrFilt (23.06) = SpeedErrFilt2 (23.11)* = 10 ms.
SpeedErrFilt2 (23.11)	0 ms (def.)	
M1ArmL (43.09)	0 mH (def.)	Set when the current is instable
RevVoltMargin (44.21)	6 % (def.)	Safety margin for the motor voltage during regenerative mode
MainsCompTime (97.09)	10 ms (def.)	Set when the current is distributed differently on the thyristors (fast disturbances in current)
CompUkPLL (97.12)	0 % (def.)	Set slowly to higher values (e.g. 4), if sync. voltage is disturbed by commutation notches, to be used only with dedicated incoming transformer
DevLimPLL (97.13)	15	Stabilizes the PLL
KpPLL (97.14)	1	
TfPLL (97.15)	10 ms	
Ch0 NodeAddr (70.01)	<number>	AC 800M
Ch3 NodeAddr (70.22)	<number>	DriveWindow
DeviceNumber (99.09)	<name>	DriveWindow, e.g. *Master* and *Slave*

9 Excitation parameters for large field supplies using DCS800-S0x modules

9.1 In the master module:

Parameter	Master	Comments
M1FldMinTrip (30.12)	xxx %	Sets level for **F541 M1FexLowCur**
FldCtrlMode (44.01)	1 = **EMF**	**EMF** controller released, field weakening active - depending on the application
FldMinTripDly (45.18)	2000 ms (def.)	Delays **F541 M1FexLowCur**
DCSLinkNodeID (94.01)	1	
M1FexNode (94.08)	21 (def.)	Use the same node number as in *DCSLinkNodeID (94.01)* of the field exciter
FexTimeOut (94.07)	100 ms (def.)	Causes **F516 M1FexCom**
M1NomFldCur (99.11)	xxx A	I_{FN} = xxx A, rated field current
M1UsedFexType (99.12)	8 = **DCS800-S01**, 9 = **DCS800-S02**	

9.2 In the excitation module (DCS800-S0x):

Parameter	Excitation	Comments
CommandSel (10.01)	4 = **FexLink**	Control from the master
MotFanAck (10.06)	0 = **NotUsed**	
OvrVoltProt (10.13)	2 = **DI2**	Depending on hardware connection to DCF506
ArmOvrVoltLev (30.08)	500 %	To suppress **F503 ArmOverVolt** if this does not help, increase *M1NomVolt (99.02)*
OperModeSel (43.01)	1 = **FieldConv**	
CurSel (43.02)	8 = **FexCurRef**	Field current reference from the master
M1DiscontCurLim (43.08)	0 %	
RevDly (43.14)	50 ms	
FldCtrlMode (44.01)	0 = **Fix** (def.)	
DCSLinkNodeID (94.01)	21 (def.)	Use the same node number as in *M1FexNode (94.08)* of the armature module
DevLimPLL (97.13)	20 °	To suppress **F514 MainsNotSync**
ZeroCurTimeOut (97.19)	70 ms	To be set longer than *RevDly (43.14)*. Can be increased up to 500 ms in case of field reversal.
M1NomVolt (99.02)	xxx V	U_{FN} = xxx V, rated field voltage
M1NomCur (99.03)	xxx A	I_{FN} = xxx A, rated field current
NomMainsVolt (99.10)	xxx V	U_{NetN} = xxx V; nominal supply voltage (AC)
M1UsedFexType (99.12)	0 = **NotUsed**	

10 Autotunings

10.1 Field current autotuning for field supplies using DCS800-S0x modules:

Only the field current autotuning has to be started directly in the excitation module if a DCS800-S0x is used:

Parameter	Excitation	Comments
ServiceMode (99.06)	2 = **FieldCurAuto**	Give the **On** and **Run** command within 20 s

Note:
This autotuning does not work when started from the DriveWindow Light wizard.

10.2 Armature current autotuning 12-pulse serial:

The 12-pulse serial master drive has to be tuned in 12-pulse mode. Thus the 12-pulse slave fires a freewheeling pass and it is not necessary to shorten the DC output of the 12-pulse slave.

Single motor configuration or double motor configuration (the voltage measurement is over both motors)
Set in the 12-pulse serial master

Parameter	**Master**	**Comments**
12P Mode (47.01)	0 = **Normal**	
AdjUDC (97.23)	50 %	Both motors
ServiceMode (99.06)	1 = **ArmCurAuto**	Give the **On** and **Run** command within 20 s

Do the following after a successful autotuning:

Parameter	**Comments**
M1KpArmCur (43.06)	Multiply by 0.5 and use into 12-pulse master
M1TiArmCur (43.07)	Use directly in 12-pulse master
M1DiscontCurLim (43.08)	Multiply by 0.5 and use into 12-pulse master
M1ArmL (43.09)	Use directly in 12-pulse master
M1ArmR (43.10)	Use directly in 12-pulse master

Double motor configuration (the voltage measurement is over one motor only)
Set in the 12-pulse serial master

Parameter	**Master**	**Comments**
12P Mode (47.01)	0 = **Normal**	
AdjUDC (97.23)	100 %	Only one of two motors
ServiceMode (99.06)	1 = **ArmCurAuto**	Give the **On** and **Run** command within 20 s

Do the following after a successful autotuning:

Parameter	**Comments**
M1KpArmCur (43.06)	Multiply by 0.5 and use into 12-pulse master
M1TiArmCur (43.07)	Use directly in 12-pulse master
M1DiscontCurLim (43.08)	Multiply by 0.5 and use into 12-pulse master
M1ArmL (43.09)	Use directly in 12-pulse master
M1ArmR (43.10)	Use directly in 12-pulse master

Attention:
In case an autotuning is not starting or interrupted **A121 AutotuneFail** is set. The reason for the alarm is shown in *Diagnosis (9.11)*.

10.3 Armature current autotuning serial sequential:

The serial sequential master drive has to be tuned in 12-pulse mode. Thus the serial sequential slave fires a freewheeling pass and it is not necessary to shorten the DC output of the serial sequential slave.

Single motor configuration or double motor configuration (the voltage measurement is over both motors)
Set in the serial sequential master

Parameter	**Master**	**Slave**	**Comments**
12P Mode (47.01)	0 = **Normal**	0 = **Normal**	After the autotuning is finished set *12P Mode (47.01)* back to **Sequential**
AdjUDC (97.23)	50 %	-	Both motors
ServiceMode (99.06)	1 = **ArmCurAuto**	-	Give the **On** and **Run** command within 20 s

There is a **30° phase shift** in the mains voltage between serial sequential master and serial sequential slave. Do the following after a successful autotuning:

Parameter	**Comments**
M1KpArmCur (43.06)	Multiply by 0.5 and use in the serial sequential master
M1TiArmCur (43.07)	Use directly in the serial sequential master
M1DiscontCurLim (43.08)	Multiply by 0.5 and use in the serial sequential master
M1ArmL (43.09)	Use directly in the serial sequential master
M1ArmR (43.10)	Use directly in the serial sequential master

There is a **no phase shift** in the mains voltage between serial sequential master and serial sequential slave. Do the following after a successful autotuning:

Parameter	**Comments**
M1KpArmCur (43.06)	Multiply by 0.5 and use in the serial sequential master
M1TiArmCur (43.07)	Use directly in the serial sequential master
M1DiscontCurLim (43.08)	Multiply by 2 and use in the serial sequential master
M1ArmL (43.09)	Use directly in the serial sequential master
M1ArmR (43.10)	Use directly in the serial sequential master

Attention:
In case an autotuning is not starting or interrupted **A121 AutotuneFail** is set. The reason for the alarm is shown in *Diagnosis (9.11)*.

Double motor configuration (the voltage measurement over <u>one</u> motor only)
Set in the serial sequential master

Parameter	**Master**	**Slave**	**Comments**
12P Mode (47.01)	0 = **Normal**	0 = **Normal**	After the autotuning is finished set *12P Mode (47.01)* back to **Sequential**
AdjUDC (97.23)	100 %	-	Only one of two motors
ServiceMode (99.06)	1 = **ArmCurAuto**	-	Give the **On** and **Run** command within 20 s

There is a **30° phase shift** in the mains voltage between serial sequential master and serial sequential slave. Do the following after a successful autotuning:

Parameter	**Comments**
M1KpArmCur (43.06)	Multiply by 0.5 and use in the serial sequential master
M1TiArmCur (43.07)	Use directly in the serial sequential master
M1DiscontCurLim (43.08)	Multiply by 0.5 and use in the serial sequential master
M1ArmL (43.09)	Use directly in the serial sequential master
M1ArmR (43.10)	Use directly in the serial sequential master

There is a **no phase shift** in the mains voltage between serial sequential master and serial sequential slave. Do the following after a successful autotuning:

Parameter	**Comments**
M1KpArmCur (43.06)	Multiply by 0.5 and use in the serial sequential master
M1TiArmCur (43.07)	Use directly in the serial sequential master
M1DiscontCurLim (43.08)	Multiply by 2 and use in the serial sequential master
M1ArmL (43.09)	Use directly in the serial sequential master
M1ArmR (43.10)	Use directly in the serial sequential master

Attention:
In case an autotuning is not starting or interrupted **A121 AutotuneFail** is set. The reason for the alarm is shown in *Diagnosis (9.11)*.

11 DriveWindow monitor

Signal	Unit
MotSpeed (1.04)	rpm
ArmVoltAct (1.14)	V
ConvCurAct (1.16)	A
M1FieldCurRel (1.29)	100 % = I_{FN}
ArmCurActSl (1.33)	A
TorqRefUsed (2.13)	100 % = T_N
SpeedRef4 (2.18)	rpm