

WECC Approved Dynamic Model Library
Version January 2016

NOTES:

WECC needs to input the data to the PSLF program, with conversion to the PSS/E program. Therefore, model data must be submitted that can be input to PSLF.

* The PSLF models are converted to these PSS/E models by PTI's conversion program

Where different variants of the same model exist, the preferred version for submittal to WECC are highlighted in green
These models currently are not converted from PSLF to PSS/E.

EXCITATION SYSTEM MODELS (Volt/Var Control Models)

GE PSLF	PTI PSS/E*	PowerWorld Simulator	IEEE Standard	Status	Comments	Modifications/Actions Needed	PTI/GE/PowerWorld Comments
exac1	EXAC1	EXAC1	AC1A	approved 8/11/06	Brushless AC		Differs from IEEE AC1A -- does not have OEL/UEL inputs and multiplies output by speed.
esac1a	ESAC1A	ESAC1A	AC1A	approved 1/21/11	2005 IEEE standard - updated AC1A with OEL/UEL inputs		In both programs
exac1a	EXAC1A	EXAC1A		approved 8/11/06	exac1 with altered rate feedback source		
exac2	EXAC2	EXAC2		approved 8/11/06	HR Brushless		Differs from IEEE AC2A -- no OEL/UEL inputs; different field current limit; speed multiplier
esac2a	ESAC2A	ESAC2A	AC2A	approved 1/21/11	2005 IEEE standard - updated AC2A		In both programs
exac3	EXAC3	EXAC3		not approved	Not used in WECC database		In both programs
exac3a	ESAC3A	EXAC3A	AC3A	approved 8/11/06	GE Alterrex (rare)		Differs from IEEE AC3A -- no OEL/UEL inputs; different field current limit; speed multiplier/PSS/E Model same as IEEE AC3A model
esac3a	ESAC3A	ESAC3A	AC3A	approved 1/21/11	2005 IEEE standard - updated AC3A		In both programs
exac4	EXAC4	EXAC4	AC4A	approved 8/11/06	Rotating AC with controlled rectifier (Alithyrex) (rare)		Differs from IEEE AC4A -- no OEL/UEL inputs
esac4a	ESAC4A	ESAC4A	AC4A	approved 1/21/11	2005 IEEE standard - updated AC4A		In both programs
esac5a	ESAC5A	ESAC5A	AC5A	approved 1/21/11	Simplified brushless exciter		In both programs
exac6a	EXAC6A	EXAC6A	AC6A	not approved	Alternator, noncontrolled rectifier, lead-lag		Differs from IEEE AC6A -- no OEL/UEL inputs; speed multiplier, not a new model for PSS/E (model already exists)
esac6a	ESAC6A	ESAC6A	AC6A	approved 1/21/11	2005 IEEE standard - updated AC6A		In both programs
esac7b	AC7B	ESAC7B and AC7B	AC7B	approved 1/21/11	2005 IEEE standard - new		In both programs
exac8b	ESAC8B	ESAC8B	ESAC8B	approved 8/11/06	Brushless exciter with PID voltage regulator		Differs from IEEE AC8B -- no exciter upper limit; added input limits and speed multiplier
esac8b	AC8B	ESAC8B, GE and AC8B	AC8B	approved 1/21/11	2005 IEEE standard - updated AC8B		In both programs
exbhc	BBSEX1	EXBBC and BBSEX1		approved 8/11/06	Static with ABB regulator		In both programs
exdc1	IEEEX1	EXDC1 and IEEEX1	DC1A	approved 8/11/06	Rotating DC		Differs from IEEE DC1A -- no UEL inputs; speed multiplier
esdc1a	ESDC1A	ESDC1A	DC1A	approved 1/21/11	2005 IEEE standard - updated DC1A		In both programs
exdc2	EXDC2	EXDC2_GE and EXDC2_PTI		approved 8/11/06	Rotating DC with terminal fed pilot, alternate feedback		In both programs
exdc2a	EXDC2A	EXDC2A and EXDC2_PTI	DC2A	approved 8/11/06	Rotating DC with terminal fed pilot		Differs from IEEE DC2A -- no UEL inputs; speed multiplier
esdc2a	ESDC2A	ESDC2A	DC2A	approved 1/21/11	2005 IEEE standard - updated DC2A		In both programs
exdc4	IEEET4	EXDC4 and IEEET4	DC3A	approved 8/11/06	Rotating, noncontinuous - minor differences between models		If Kr = 0, should convert to IEEEX4 (IEEE DC3A) Model added in PSS/E 32.
esdc3a	DC3A	ESDC3A and DC3A	DC3A	approved 1/21/11	Rotating, noncontinuous		In both programs
esdc4b	DC4B	ESDC4B	DC4B	approved 1/21/11	Rotating DC with PID		In both programs
exeli	EXEL1	EXEL1		approved 8/11/06	Static PI transformer fed excitation system		In both programs
exst1	EXST1	EXST1_GE and EXST1_PTI	ST1A	approved 8/11/06	Static with double lead/lag		Differs from IEEE ST1A -- no OEL/UEL inputs; added Xe fld loading; RFB before field current limiter.
esst1a	ESST1A	ESST1A and ESST1A_GE	ST1A	approved 1/21/11			In both programs
exst2	EXST2	EXST2		approved 8/11/06	SCPT - lead/lag block (Tc, Tb) added		In both programs
exst2a	ESST2A	EXST2A	ST2A	approved 8/11/06	lead/lag block (Tc, Tb) is included to match the WECC FM		Differs from IEEE ST2A -- no UEL inputs; added lead/lag.
esst2a	ESST2A	ESST2A	ST2A	approved 1/21/11	2005 IEEE standard - updated ST2A		In both programs
exst3	EXST3	EXST3	ST3	approved 8/11/06			In both programs
exst3a	ESST3A	EXST3A	ST3A	approved 8/11/06	Use for GE Generex		Differs from IEEE ST2A -- no UEL inputs; fewer time constants.
esst3a	ESST3A	ESST3A	ST3A	approved 1/21/11	2005 IEEE standard - updated ST3A		In both programs
exst4b	ESST4B	EXST4B	ST4B	approved 8/11/06	GE EX2000 bus fed potential source, static compound and Generex-PPS or -CPS, and SILCOmatic 5 excitation systems, with proportional plus integral (PI) voltage controller		Differs from IEEE ST2A -- no OEL/UEL inputs
esst4b	ESST4B	ESST4B	ST4B	approved 1/21/11	2005 IEEE standard - updated ST4B		In both programs
esst5b	ST5B	ESST5B and ST5B	ST5B	approved 1/21/11	Variation of ST1A (New IEEE Model)		In both programs
esst6b	ST6B	ESST6B and ST6B	ST6B	approved 1/21/11	Variation of ST4B with field current limit (New IEEE model)		In both programs
esst7b	ST7B	ESST7B and ST7B	ST7B	approved 1/21/11	Static with limiters (Alstom) (New IEEE model)		In both programs
exwtg1	Not converted (1)	EXWTG1		not approved	Excitation system model for wound-rotor induction wind-turbine generator	Should be replaced with generic wind models	We need details of this model This is a crude Vestas V80 model. This model is obsolete; a generic model should be used. PSS/E version 32 has support for all 4 types of generic wind models
exwtge	Not used	EXWTGE		not approved	Excitation (converter) control model for GE wind-turbine generators	Should be replaced with generic wind models	PSS/E version 32 has support for all 4 types of generic wind models
ieeet1	IEEET1	IEEET1		approved 8/11/06	Old type 1		
mexs	Not used			not approved	Manual excitation control with field circuit resistance		
pfgrg	Not used	PFORG		not approved	Power factor / Reactive power regulator		The output of this model feeds into an exciter as the stabilizer input, thus this model can not be used in conjunction with another stabilizer
rexss	REXSYS	REXS		approved 8/11/06	General Purpose Rotating Excitation System Model		
scrx	SCRX	SCRX		approved 8/11/06	intended for use where negative field current may be a problem		
sexs	SEXS	SEXS_GE and SEXS_PTI		not approved	for use where details of the actual excitation system are unknown and/or unspecified		PSS/E has a SEXS (simplified excitation system) model (which is similar to the PSLF sexs model but without the PI control block)
texs	Not converted (9)	TEXS		not approved	Transformer Fed Excitation System Model	replace with esst6b	we don't convert this. Per our notes from previous M&V meetings, this model was not to be used in WECC. Please note that this is not an IEEE standard model. GE developed this model for WECC use. If we have to provide a corresponding PSS/E model, we have to get the block diagram from GEPresentation at March 2012 M&VWG meeting, use OEL1. Has required functionality.
oel1	Not converted (277)	OEL1		approved 4/27/12	Over excitation limiter		
uel1	UEL1	uel1	UEL1	approved 4/27/12	Under excitation limiter		
uel2	UEL2	uel2	UEL2	approved 4/27/12	Under excitation limiter		
w12e	WT2E1	WT2E and WT2E1		approved 8/28/09	Wind Type 2 generic excitation/controller model		
w13e	WT3E1	WT3E and WT3E1		approved 8/28/09	Wind Type 3 generic excitation/controller model (GE Technology)	This model will be phased out by June 2017 and should be replaced with reec_a.	
w14e	WT4E1	WT4E and WT4E1		approved 8/28/09	Wind Type 4 generic excitation/controller model	This model will be phased out by June 2017 and should be replaced with reec_a.	
reec_a	REECAU1, REECA1	REEC_A		approved 3/19/14	Renewable energy electrical control model for Wind type 3/4		
reec_b	REECBU1, REECB1	REEC_B		approved 3/19/14	Renewable energy electrical control model for Photovoltaic		
reec_c	REECCU1	REEC_C		approved 3/18/15	Renewable energy electrical control model for Energy Storage Devices		

GENERATOR MODELS

GE PSLF	PTI PSS/E*	PowerWorld Simulator	IEEE Standard	Status	Comments	Modifications/Actions Needed	PTI/GE/PowerWorld Comments
gentpf	GENROU/IEEEVC	GENTPF		approved 8/11/06	WECC Model		
genrou	GENROU/IEEEVC	GENROU		approved 8/11/06	Round rotor generator model, use for thermal generator models		

gensal	GENSAL/IEEEVC	GENSAL		un-approved 1/11	Salient pole generator model. Use for Hydro generator models, no longer approved Jan 2011, staff converts to gentpj with KIS=0	No longer approved 2011	
gentpj	GENTPJU1, GENTPJ1	GENTPJ		approved 1/23/09	modified gentpf with improved saturation modeling		Available in PSS/E version 31.2
genc	GENROU/IEEEVC	GENCC		approved 8/11/06	Cross Compound generator model		
genwri	not converted (1)	GENWRI		not approved	Vestas Wind turbine generator, 1 instance in 08HS3 base case	Should be replaced with generic wind models	We need details of this model This will be replaced by generic Type 2 WTG generator model.
gewtg	not used	GEWTG		not approved	GE Wind turbine generator	Should be replaced with generic wind models	We can convert this
pvd1		PVD1		approved 3/19/14	Distributed Photovoltaic system model		
regc_a	REGCAU1	REGC_A		approved 3/19/14	Generator/converter model for Photovoltaic, Wind type 3/4		
wt1g	WT1G1	WT1G and WT1G1		approved 1/21/11	Wind Type 1 generic generator model		
wt2g	WT2G1	WT2G and WT2G1		approved 8/28/09	Wind Type 2 generic generator model		
wt3g	WT3G1	WT3G and WT3G1		approved 8/28/09	Wind Type 3 generic generator model (GE Technology)	This model will be phased out by June 2017 and should be replaced with regc_a.	
wt4g	WT4G1	WT4G and WT4G1		approved 8/28/09	Wind Type 4 generic generator model	This model will be phased out by June 2017 and should be replaced with regc_a.	
gencs	not used	GENCLS		not approved	Used to force a signal, or classical generator model		We have a GENCLS model. The PSLF model gencs does get converted to the PSS/E model GENCL(\$forcing signal (playback) feature not needed in library datasets.)

PSS MODELS

GE PSLF	PTI PSS/E*	PowerWorld Simulator	IEEE Standard	Status	Comments	Modifications/Actions Needed	PTI/GE/PowerWorld Comments
wscst	ST2CUT	WSCST and ST2CUT		approved 8/11/06	Dual input PSS - Old WSCC model		
ps2a	PSS2A	PSS2A	PSS2A, PSS3	approved 8/11/06	Dual input PSS (delta P-omega)		
ieeest	IEEEST	IEEEST	PSS1A	approved 8/11/06	Single input PSS, dual lead lag		
ps2b	PSS2A	PSS2B	PSS2A, PSS3	approved 8/11/06	ps2a + transient stabilizer		
ps1a	IEEEST	PSS1A	PSS1A	not approved	Generic single input PSS - not used in WECC		
ps2b	PSS2B	PSS2B	PSS2B	approved 8/11/06	Dual input PSS - Extra lead/lag (or rate) block added at end (up to 4 lead/lags total)		In both programs
ps3b	PSS3B	PSS3B	PSS3B	approved 8/11/06	Thyripol, Unitrol		In both programs
ps4b	PSS4B	PSS4B	PSS4B	approved 8/11/06	ABB multi-band		In both programs
ps5h		PSSSH		not approved	Siemens H infinity PSS		

LOAD MODELS

GE PSLF	PTI PSS/E*	PowerWorld Simulator	IEEE Standard	Status	Comments	Modifications/Actions Needed	PTI/GE/PowerWorld Comments
alwsec	IEELAR	WSCC assigned to an area		approved 8/11/06	Area load model		
blwsec	IEELBL	WSCC assigned to a bus or load		approved 8/11/06	Bus load model		
cmpldw	CMLDBLU1	CMPLDW and CMPLDWNF (with a separate Distribution Equivalent Model)		approved 1/25/13	Composite Load Model		
ld1pac	ACMTBLU1	LD1PAC		approved 8/11/06	Single-phase AC model (performance based model)		
motor1	CIMTR4	MOTOR1		approved 8/11/06	Induction machine, represented in load flow as generator. Use to represent motor start-up. Should use generic wind model for wind machine		
motorw	CIMWBL	MOTORW		approved 8/11/06	Induction Motor Model		

TURBINE/GOVERNOR MODELS

GE PSLF	PTI PSS/E*	PowerWorld Simulator	IEEE Standard	Status	Comments	Modifications/Actions Needed	PTI/GE/PowerWorld Comments
g2wsec	WSHYDD	G2WSCC and WSHYDD		approved 8/11/06	Use hyg3 for new models		
gast	URGS3T	GAST_GE and URGS3T		approved 8/11/06			
ggov1	GGOV1	GGOV1		approved 8/11/06			
gpwsec	WSHYGP	GPWSCC and WSHYGP		approved 8/11/06	Use hyg3 for new models		
h6b		H6B		approved 8/9/13			
hyg3	WSHYGP	HYG3		approved 8/11/06		Check WSHYGP conversion	
hygov	HYGOV	HYGOV		approved 8/11/06			
hygov4	IEEEG3	HYGOV4		approved 8/11/06		Need new acceptable model in PSS/E	
hygovr		HYGOVR		approved 2008	Added in 2008		
ieeeg1	WSIEG1	IEEEG1 and WSIEG1		approved 8/11/06			
ieeeg3	IEEEG3	IEEEG3		approved 8/11/06	Use hygov 4 for new models		
lcfb1	LCFB1	LCFB1 and LCFB1_PTI		approved 8/11/06			
pidgov	PIDGOV	PIDGOV		approved 8/11/06	Use hyg3 for new models		
tgov1	TGOV1	TGOV1		approved 8/11/06			
ggov2		GGOV2		not approved	new in GE PSLF		We have the new GGOV2 model in a user written format. We will see if this can be given to users as a user model in the next point release. We hope to make it a standard model for the next major release.
ggov3		GGOV3		approved 2010	new in GE PSLF		
wndtge				not approved	Wind turbine and turbine control model for GE wind turbines	Should be replaced with generic wind models	
wt1t	WT12T1	WT1T and WT12T1		approved 1/21/11	Wind Type 1 generic turbine model		
wt1p	WT12A1	WT1P and WT12A1		approved 1/21/11	Wind Type 1 generic Pitch controller model/Pseudo Gov:aerodynamics	This model will be phased out by June 2017 and should be replaced with wt1p_b model.	
wt1p_b	WT12A1	WT1P_b		approved 3/19/14	Wind Type 1 & Type 2 Pitch controller model/Pseudo Gov aerodynamics		
wt2t	WT12T1	WT2T		approved 8/28/09	Wind Type 2 generic turbine model		
wt2p	WT12A1	WT2P		approved 8/28/09	Wind Type 2 generic Pitch controller model/Pseudo Gov:aerodynamics	This model will be phased out by June 2017 and should be replaced with wt1p_b model.	
wt3t	WT3T1	WT3T and WT3T1		approved 8/28/09	Wind Type 3 generic turbine model (GE Technology)	This model will be phased out by June 2017 and should be replaced with wtg*_a models.	

wt3p	WT3P1	WT3P and WT3P1		approved 8/28/09	Wind Type 3 generic Pitch controller model	This model will be phased out by June 2017 and should be replaced with wtg*_a models.	
wt4t	transient features are inside the WT4E1 model	WT4T		approved 8/28/09	Wind Type 4 generic turbine model	This model will be phased out by June 2017 and should be replaced with wtg*_a.	
wtgr_a	WTDTAU1, WDTDA1	WTGT_A		approved 3/19/14	Drive train model for Wind type 3/4		
wtga_a	WTARAU1, WTARA1	WTGA_A		approved 3/19/14	Aerodynamic model for Wind type 3		
wtgp_a	WTPTAU1, WTPTA1	WTGPT_A		approved 3/19/14	Pitch control model for Wind type 3		
wtgq_a	WTTQAU1, WTTQA1	WTGTRO_A		approved 3/19/14	Torque control model for Wind type 3		

OTHER MODELS

GE PSLF	PTI PSS/E*	PowerWorld Simulator	IEEE Standard	Status	Comments	Modifications/Actions Needed	PTI/GE/PowerWorld Comments
ecompc	COMPC	CCOMP and COMPC		approved 11/20/14	Cross & Joint current compensation model		
ecompc4		CCOMP4		approved 3/17/2015			
Not Used	Not Used	ATRRELAY		approved 3/17/2015	Colstrip Acceleration Trend Relay (ATR)		
colatr	not converted (1)	Not Used		not approved	Colstrip ATR relay		was developed for WECC. We don't have a PSS/E model for this, need details
dcmr	PDCNSU, PDCSNU	For 3-terminal version of PDCI: MTDC_PDCL_CONV_CELILO_E, CONV_CELILO_N_CONV_SYLMAR; For IPP model: MTDC_IPP, CONV_IntMmPP, CONV_Adelanto		approved 8/11/06	new PDCI DC model		We have just developed two new models (north to south and south to north) for the PDGCE needs details for data conversion to PSLF. All of these models originated as user-written models in GE using EPCL. Note: the PDCI model will be going away as the CELILO converters are being replaced. Full documentation describing the IPP model can be found at http://www.powerworld.com/files/clientconf2014/06DC%20Line%20Mode%20of%20IPP.pdf
epdc	CDC6	EPDC and CDC6		approved 8/11/06	Intermountain DC model		
gp1	not converted (4)	GPI		not approved	Generator Protection relay		We don't have a PSS/E model for this, need details
lhfrt	FRQTPAT, FRQDCAT	LHFRT		approved 8/9/13	Low/High frequency ride-through generator protection		
lhvrt	VTGTPAT, VTGDCAT	LHVRT		approved 8/9/13	Low/High voltage ride-through generator protection		
locti	TIOCR1	LOCTI and TIOCR1		approved 8/9/13	Branch overcurrent relay with inverse time characteristic		
lsdt1	LDS3BL	LSDT1 and (LDS3 assigned to a load)		approved 8/11/06	Underfrequency relay		
lsdt2	LVS3BL	LSDT2 and (LVS3 assigned to a load)		approved 8/11/06	Undervoltage relay		
lsdt9	LDS3BL	LSDT9 and (LDS3 assigned to a load)		approved 8/11/06	Underfrequency relay		
ooslen	not converted (11)	OOSLEN		approved 8/11/06	3 zone out of step relay	low priority	We don't convert this. The reason is not because we don't have a model. PSS/E has a double circle or lens out-of-step line relay model called 'CIROS1' (please note that like any other relay model, this also is a generic line-relay model not representing any particular manufacturer). The reason that the data is not converted is probably because the data requirements of the PSLF 'ooslen' model do not match the data requirements of PSS/E 'CIROS1' model. However, this does not prevent the PSS/E users to create a DYN data record and include the CIROS1 model for every occurrence of the PSLF 'ooslen' model.
repc_a	REPCAU1, REPCA1	REPC_A		approved 3/19/14	Power Plant Controller for Photovoltaic, Wind type 3/4		
scmov		SCMOV		not approved	Series capacitor MOV and bypass model		In PSLF
stcon	not converted (2)	STCON		not approved	Static synchronous condenser		We don't convert this. This model, per our notes from the previous M&V meetings, was not to be used in WECC. This also is a generic model not representing any particular manufacturer. PSS/E also has two generic static condenser models - the CSTAT (use of this requires a generator model in load flow), and the CSTCNT (use of this requires a FACTS device model in load flow). We can not convert the PSLF STCON to PSS/E CSTAT or the CSTCNT models because the data requirements are different.
svwsc	CSVGN5, CSVGN6	SVCWSC, CVSGN5 and CVSGN6		un-approved 2012	Static Var Source model, replace with appropriate generic model	No longer approved 2012	
svsmo1	SVSMO1U2, SVSMO1T2	SVSMO1		approved 1/21/11	Generic Static Var Source model (continuous control)		
svsmo2	SVSMO2U2, SVSMO2T2	SVSMO2		approved 8/26/11	Generic Static Var Source model (discrete control)		
svsmo3	SVSMO3U2, SVSMO3T2	SVSMO3		approved 8/26/11	Generic STATCOM model (continuous control)		
msr1	SWSHNT	MSC1 and SWSHNT		approved 1/21/11	Mechanically Switched Shunt model, links to svsmo models		
msr1		msr1		approved 3/17/2015	Mechanically Switched Reactor		
msr1		msr1		not approved	Model Spec: only was approved 3/17/15.		
tiohrs		TIOCRS		approved 8/9/13	Over-current relay		
tlin1	not converted (114)	TLIN1		approved 8/11/06	under frequency or under voltage line relay	Investigate better method for pump (Generator) tripping	We don't convert this, because PSS/E does not have the under frequency or under voltage line relay model. Our consulting group has a user written model and we can include it in PSS/E. We will add this in our list of task to do. As an interim solution we can check if we can make this available as a user written model before it becomes a PSS/E standard model. However, given the fact that this also is a generic model, the data requirements of the PSLF 'tlin1' may not match the data requirements of the PSS/E model, and hence we may not be able to convert from the PSLF to the corresponding PSS/E model. Nonetheless, a model can be made available for WECC PSS/E users.
vswsc	CSVGN5	VWSC		approved 8/11/06	Static Var Source model		

The **fmata**, **vmata**, and **monit** PSLF metering models were removed from the Approved Dynamic Models list in June 2015 due to the fact that different manufacturers have different monitoring mechanisms, thus making it impossible to convert these models from one software program to another. Even though these models aren't approved, it's okay to use them in the WECC MDF since they provide metering functions only.