

TURBOPROP and TURBOFAN ENGINE APPLICATION GUIDE



PROPELLER GOVERNORS SYNCHRONIZERS and SYNCHROPHASERS

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S P E C I A L N O T I C E

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For all inquiries related to synchronizer and synchrophaser products in this document contact Ontic.
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New manufacture turboprop governors, spares and replacement parts are still supplied by Woodward.
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Replacement Governors – Turboprop Engines

GOVERNOR	PAGE
1551-005	2
1551-008	5
1551-050	4, 6
1551-020	9
1551-156	5
1551-902	7
1631-028	2, 3, 6, 10
1711-526	6
210492	1
A210492	1
210507	4
A210507	1, 2, 4, 6, 8, 9
B210507	1
D210507	4
210508	4
210528	1
A210528	1
210536	4
A210536	5
210560	7
210561	8
210563	6
210564	8
210570	7, 8
210574	4, 5
A210577	8
210578	6
A210578	2
210589	5
210590	9
A210597	4
210598	9
210599	2
210612	6
210614	9
210615	9
210618	5
210620	9
210623	6, 9
210624	1, 2, 4
210625	5
210626	4
210627	5
210628	5
210631	2, 7
B210631	3, 10, 11
210632	2, 6
A210632	2, 11
210638	2
210641	8
210735	7

GOVERNOR	PAGE
210736	7, 8, 10
210737	8
210738	6, 9
210741	2
210742	7
210743	8
210744	2
210746	6
210749	6
A210765	11
210935	6
210939	2
210940	2
210949	9
210950	1
210952	5
210954	3
210957	9
210961	3
210962	8
210963	1, 4, 7, 10
210965	3
213100	2, 4, 5, 6, 7, 8, 10, 12, 13
213151	2
213156	10
213159	8
213192	1, 6
213350	1, 2, 6, 8, 9, 10
213433	4, 5, 6
213446	2, 4, 6
213447	2, 7, 8, 9, 12
213450	10
B213631	8
213643	9
213720	12, 13
213722	12, 13
213723	12, 13
213729	12
213730	4, 5, 6, 7, 8
213731	5
213733	9
213736	9
213737	9
213746	6
213749	4
213750	4, 10
213759	12
213760	9
213761	6
213762	2, 3

Replacement Governors – Turboprop Engines

213763 10

GOVERNOR	PAGE
213765.....	2, 3, 9
213766.....	2
213767.....	10
213769.....	12
213770.....	1, 2, 4, 5, 6, 8, 9, 10
213771.....	2, 6, 7, 8
213773.....	13
213775.....	2, 8, 9
213779.....	12
213780.....	1, 2, 6, 8, 9, 10
213781.....	4, 5, 6
213784.....	2, 6, 7, 8
213786.....	12, 13
213787.....	12, 13
213788.....	6, 12
213789.....	13
213790.....	12, 13
213791.....	2, 8, 9
213794.....	4, 10
A213796.....	1, 2, 3, 4, 11
C213796.....	6
D213796.....	7
E213796.....	10
F213796.....	10
G213796.....	6
H213796.....	10
K213796.....	3, 7
J213796.....	9
213798.....	12
213799.....	10
C213807.....	7
D213807.....	7
33193.....	2, 3, 6, 10
Blank	
Blank	
5333-004.....	13
5333-005.....	12
5333-006.....	5
5333-007.....	13
5333-008.....	8, 10
5333-009.....	13
5333-010.....	13
5333-012.....	13
5333-022.....	12
5333-028.....	13
5333-030.....	12
5333-032.....	12, 13
5333-038.....	5
5333-040.....	13
5333-042.....	12

GOVERNOR	PAGE
5333-050.....	10
5333-054.....	12
5333-058.....	12
5333-062.....	12
5333-076.....	12
5485-010.....	6, 8, 12, 13
5485-016.....	9
5485-020.....	2, 10, 13
5485-040.....	12
5485-054.....	12
5485-058.....	5
5485-064.....	12
5485-066.....	12
5485-070.....	9
Blank	
6852-902.....	7
6852-910.....	2, 8
6852-914.....	6, 9
6852-920.....	2, 6, 8
6858-008.....	8
8210-002.....	1, 2, 4, 6, 7, 9
8210-003.....	2, 6, 9
8210-004.....	5
8210-006.....	2
8210-007.....	2, 11
8210-009.....	10
8210-011.....	7
8210-018.....	7
8210-020.....	7
8210-021.....	7
8210-024.....	2
8210-025.....	2, 4
8210-027.....	9
8210-033.....	8
8210-034.....	10, 11
8210-035.....	9
8210-041.....	5
8210-042.....	5
8210-046.....	1
8210-050.....	10
8210-051.....	8, 10
8210-052.....	1
8210-053.....	1
8210-056.....	1
8210-060.....	6
8210-061.....	1
8210-063.....	10
8210-068.....	5
8210-076.....	1, 5, 6
8210-077.....	4

Replacement Governors – Turboprop Engines

GOVERNOR	PAGE
8210-079.....	1
8210-085.....	7
8210-103.....	9
8210-104.....	3, 4, 5, 6, 7, 8
8210-108.....	7
8210-109.....	7
8210-115.....	3, 5, 6, 7
8210-121.....	7
8210-133.....	8
8210-135.....	9
8210-137.....	9
8210-140.....	7
8210-151.....	10
8210-153.....	10
8210-160.....	6
8210-161.....	1, 5
8210-162.....	4
8210-163.....	10
8210-164.....	4, 8
8210-167.....	5
8210-168.....	5
8210-172.....	10
8210-176.....	1, 5
8210-178.....	4, 8
8210-179.....	1
8210-180.....	4, 8
8210-181.....	1, 5, 6
8210-188.....	5
8210-189.....	1, 7, 10
8210-193.....	3
8210-198.....	8
8210-209.....	10
8210-212.....	3

GOVERNOR	PAGE
8210-250.....	5
8210-251.....	5
8210-254.....	5
8210-255.....	5
8210-260.....	6, 9
8210-261.....	7
8210-262.....	4
8210-263.....	3, 5, 6, 7, 8
8210-265.....	9
8210-286.....	1, 5, 6
8210-300.....	11
8210-304.....	5
8210-306.....	1
8210-307.....	4, 8
Blank	
8210-388.....	5
8210-389.....	1, 7, 10
8210-393.....	3
8210-398.....	8
8210-399.....	5
8210-400.....	1, 7, 10
8210-403.....	3
8210-404.....	8
8210-406.....	5
8210-407.....	1, 7, 10
8210-410.....	3
8210-411.....	8
8210-502.....	9
Blank	
Blank	
8900-084.....	13
8900-300.....	13
8905-006.....	5
895490-7.....	7
985490-8.....	7

TURBOPROP ENGINE AIRCRAFT

Codes: # = Unavailable, < = Not Current or Alternative, > = Box without Cables, F = Feathering, UF=Unfeathering, S1= Type I Synchronizer, S2 = Type II Synchrophaser, CSU = Constant Speed Unit, OSG = Overspeed Governor, PMP = Pump

AIRCRAFT & ENGINE APPLICATION	RECOMMENDED GOVERNOR	REPLACED OR ALTERNATIVE GOVERNOR	SYNCHRONIZER & SYNCHROPHASER DESCRIPTION
AEROSPATIALE ATR42 PW120, 121	8210-286 PMP	# 8210-076 PMP # 8210-176 PMP < 8210-181 PMP	The CSU and Synchrophaser System for this aircraft is supplied by Hamilton Standard.
	8210-161 OSG	# 8210-061 OSG	
AEROSPATIALE ATR42 PW124	8210-286 PMP 8210-306 PMP	# 8210-079 PMP # 8210-179 PMP < 8210-181 PMP	The CSU and Synchrophaser System for this aircraft is supplied by Hamilton Standard.
	8210-161 OSG		
AIR TRACTOR AT-303 LTP-101	8210-052 CSU	< 8210-053 CSU BETA/Reverse	Single Engine – No synch
	B210507 OSG		
AIR TRACTOR AT-400, 402, 502 PT6-15AG, 34AG	8210-002 CSU		Single Engine – No synch
	A210507 OSG		
AYRES T-11, T-15, T-34 "Turbo Thrush" PT6-11AG, 15AG, 34AG	8210-002 CSU		Single Engine – No synch
	A210507 OSG		
AYRES T-65 "Turbo Thrush" PT6-65	8210-046 CSU		Single Engine – No synch
	A210507 OSG		
BASLER "Turbo DC-3" PT6A-67R	8210-407 CSU	# 8210-189 PMP # 8210-389 PMP < 8210-400 PMP	Type II Synchrophaser System Uses: A213796 Control Box
	210963 OSG (Autofeather)		
BEECH T34C, C-1 PT6-25, 25A	8210-002 CSU		Single Engine – No synch
	210950 OSG		
BEECH 90, A90 "King Air" PT6A-6, 20 (Non-reversing)	210492 CSU (PT6A-6)		Type I Synchronizer System uses: 213350 Control Box or Microprocessor retrofit: 213780 Box Assy > 213770 213192 Flex shaft
	A210492 CSU (PT6A-20)		
	210528 CSUS1 (PT6A-6)		
	A210528 CSUS1 (PT6A-20)		
	A210507 OSG 210624 OSG (Autofeather)		

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AIRCRAFT & ENGINE APPLICATION	RECOMMENDED GOVERNOR	REPLACED OR ALTERNATIVE GOVERNOR	SYNCHRONIZER & SYNCHROPHASER DESCRIPTION
BEECH 90, A90, B90, C90, 99, A99 "King Air" PT6A-20 (Early reversing system)	210599 CSU A210578 CSUS1		Type I Synchronizer System uses: <213350 Control Box or Microprocessor retrofit: 213780 Box Assy > 213770 5485-020 Actuator 213446 Rod End Trimmer 1551-005 Flex shaft
	A210507 OSG 210624 OSG (Autofeather)		
BEECH C90, E90, F90, B99, 100 Military T-44 "King Air" PT6A-20, 20A, 21, 27, 28, 34, 135	8210-002 CSU 8210-025 CSUS2	*Speed Pickup is Optional	Type I Synchrophaser System uses: <6852-920 Control Box or Microprocessor retrofit: 213784 Box Assy > 213771 5485-020 Actuator 213446 Rod End Trimmer 1551-005 Flex shaft
	A210507 OSG 210631 (Autofeather) 210632 OSGS1 *		
BEECH F90, C99, A100 PT6A-28, 34, 135	8210-003 CSU 8210-025 CSUS2	*Speed Pickup is optional	Type II Synchrophaser System uses: #213762 Control Box (Obsolete no repair)
	A210507 OSG 210632 OSGS1 * 210631 OSGS1 * (Autofeather)		
BEECH 200, 200C, 200D A200, B200 Military C-12 PT6A-38, 41, 42	8210-007 CSU 8210-024 CSUS2	< 8210-006 CSU	Retrofit requires: A213796 Control Box 1631-028 Connector 33193 Installation Manual
	A210632 OSG1 * 210638 OSGS1 *	*Speed pickup is optional	
BEECH B100 "King Air" TPE331-6-252B	210939 CSUS1	210741	<213765 Control Box <213766 "Dither Box" (Interim models) A213796 Control Box Type I Synchrophaser System uses: < 6852-910 Control Box or Microprocessor Retrofit: 213791 Box Assy > 213775 213100 Actuator 213447 Rod End Trimmer 213151 Flex Shaft
	210940 CSUS2	210744	

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AIRCRAFT & ENGINE APPLICATION	RECOMMENDED GOVERNOR	REPLACED OR ALTERNATIVE GOVERNOR	SYNCHRONIZER & SYNCHROPHASER DESCRIPTION
(Continued) BEECH 200, 200C, 200T, A200, B200 Military C-12 PT6A-38, 41, 42 BEECH B100 "King Air" TPE331-6-252B			Type II Synchrophaser System use #213762 Control Box – S2 (Obsolete, no repair) Retrofit requires: A213796 Control Box 1631-028 Connector 33191 Installation Manual <213765 Control Box (Interim Model) A213796 Control Box
BEECH 300 "King Air" PT6A-60A	8210-212 CSUS2 B210631 OSG (Autofeather)		Type II Synchrophaser System use A213796 Control Box
BEECH 1900 PT6A-65	8210-212 CSUS2 210954 OSG 104% Reset (Autofeather) 210965 OSG 106% Reset (Autofeather)		
BEECH 1900D PT6A-67	8210-410 CSUS2 210961 (Autofeather)	# 8210-193 CSUS2 < 8210-393 CSUS2 < 8210-403 CSUS2	
BRIT AEROSPACE "Jet stream 31" TPE331	8210-263 CSUS2	# 8210-104 CSUS2 # 8210-115 CSUS2	Type II Synchrophaser System use K213796 Control Box (For Hartzell Props) K213796 Control Box (For McCauley Props)

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BRIT. AEROSPACE A PW126	8210-307 PMP 8210-164 OSG	# 8210-077 PMP # 8210-178 PMP < 8210-180 PMP	The CSU and Synchrophaser System for this aircraft is supplied by Hamilton Standard.
CASA C-212 "Aviocar" TPE331-10	8210-262 CSUS2	# 8210-104	Type II Synchrophaser System uses: 213730 Control Box
CASA C-235/100 "Persuader" CT7-9C3	8210-162 OSG		
CESSNA 208A, 208B Military U-27A "Caravan I" PT6A-114	8210-002 CSU	# A210597 OSG	Single Engine
	D210507 OSG 106% Reset		
CESSNA 425 "Corsair" PT6A-112	8210-002 CSU 8210-025 CSUS2	*Includes Speed Pickup	Type I Synchronizer Systems uses: < 213433, < 213750 Control Box or Microprocessor Retrofit: 213781 or 213794 Box Assembly > 213770 213100 Actuator 213446 Rod End Trimmer 1551-050 Flex Shaft
	210624 OSGS1 * (Autofeather)		
REIMS CESSNA 406 "Caravan" PT6A-112	8210-002 CSU		Type II Synchrophaser System uses: 213730 Control Box
	210626 OSG (Autofeather)		
CONAIR "Turbine Tracker" PT6A-67	8210-002 CSU		Type II Synchrophaser System uses: A213796 Control Box
	210963 OSG (Autofeather)		
DeHAVILLAND DHC-2 "Turbo-Beaver" PT6A-6, 20 (Reversing)	210508 CSU (PT6A-6)	# 210507 OSG # 210536 OSG	Single Engine
	210574 CSU (PT6A-20)		
	A210507 OSG		

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AIRCRAFT & ENGINE APPLICATION	RECOMMENDED GOVERNOR	REPLACED OR ALTERNATIVE GOVERNOR	SYNCHRONIZER & SYNCHROPHASER DESCRIPTION
DeHAVILLAND DHC-6 Series 100/200 "Twin Otter" PT6A-20	210574 CSU 210589 CSUS2	92% Reset 70% Reset 70% Reset * Includes Speed Pickup	Type I Synchronizer System use <213433 Control Box or Microprocessor retrofit: 213781 Box Assy > 213770 213100 Actuator 5333-006 Rod End Trimmer 1551-008 Flex shaft
	A210536 OSG 210628 OSG 210627 OSGS1* (Autofeather)		
DeHAVILLAND DHC-6 Series 300 "Twin Otter" PT6A-27	8210-004 CSU	* Includes Speed Pickup	
	8210-304 CSU* *Kenn Borek STC SA02-58 210625 UOSG 210952 OSGS1*		
DeHAVILLAND DHC-7 "Dash 7" PT6A-50	8210-042 CSU	# 8210-041 CSU (Includes Speed Pickup)	Type I, Four-Engine Synchronizer System uses: 213731 Control Box 5485-058 Actuator (Uses 3) 5333-038 Rod End (Uses 3) 1551-156 Shaft (Uses 3)
	210618 OSGS1 8905-006 Autofeather Valve		
DeHAVILLAND "Turbo Buffalo" PT6A-67	8210-406 CSU	# 8210-188 CSU < 8210-388 CSU < 8210-399 CSU	
DeHAVILLAND DHC-8100 "Dash 8" PW120A, 121	8210-286 PMP 8210-161 OSG	# 8210-076 PMP # 8210-176 PMP < 8210-181 PMP # 8210-068 OSG # 8210-168 OSG	The CSU and Synchrophaser System for this aircraft is supplied by Hamilton Standard. Type II Synchrophaser System uses: 213730 Control Box
	DeHAVILLAND DHC-8300 "Dash 8" PW123	8210-286 PMP 8210-167 OSG	
DORNIER 328 TPE331	8210-263 CSU	# 8210-104 CSU # 8210-115 CSU	
DORNIER 328 PW119, 119A	8210-255 CSU	< 8210-254 CSU	
	8210-251 OSG		
	8210-250 PMP		

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EMBRAER EMB-110 "Bandeirante" PT6A-27	8210-003 CSU	* Includes Speed Pickup	Type I Synchronizer Systems uses: < 213350 Control Box or <6852-9 Control Box or <6852-920 Control Box or Microprocessor Retrofit: (Respectively) 213780 Box Assy > 213770 213788 Box Assy > 213771 213784 Box Assy > 213771 213100 Actuator or 5485-010 Actuator 213446 Rod End Trimmer 213192 Flex Shaft
	210623 OSGS1* (Autofeather)		
EMBRAER EMB-111, 121 "Bandeirante" PT6A-28, 34	8210-002 CSU	210623 OSGS1*	
	210623 OSGS1*		
EMBRAER EMB-121B "Bandeirante"	8210-003 CSU	* Includes Speed Pickup	
	210612 OSGS1*		
EMBRAER EMB-120 "Brasilia" PW118	8210-286 PMP	# 8210-076 PMP	The CSU and Synchrophaser System for this aircraft is supplied by Hamilton Standard.
	8210-160 OSG	< 8210-181 PMP # 8210-060	
FAIRCHILD SA26T "Merlin IIA" PT6A-20, 28	210935 CSU Early Reversing	# 210578 CSU	Type I Synchronizer System uses: <213433 Control Box or Microprocessor retrofit: 213781 Box Assy > 213770 213100 Actuator 213446 Rod End Trimmer 1551-050 Flex shaft
	8210-003 CSU		
	A210507 OSG 210632 OSGS1*	*Speed pickup is optional	
FAIRCHILD SA26AT SA226T, SA226AT "Merlin IVA" SA226TC "Metro II" TPE331	8210-260 CSUS1	# 210563 CSUS1	Type II Synchrophaser System uses: < 213730 Control Box # 213761 Control Box (Obsolete, no repair) 213761 Retrofit requires: G213796 Control Box 1631-028 Connector 1711-526 Switch 33193 Installation Manual
		# 210738 CSUS1	
FAIRCHILD SA226TB "Merlin IIIB" SA227AT "Merlin IVC" FAIRCHILD SA226TB "Metro III" TPE331	8210-263 CSUS2	# 210746 CSUS2	G213796 Control Box (PT6A Engines) C213796 Control Box (TPE331 Engines)
		# 210749 CSUS2 # 8210-104 CSUS2 # 8210-115 CSUS2	

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AIRCRAFT & ENGINE APPLICATION	RECOMMENDED GOVERNOR	REPLACED OR ALTERNATIVE GOVERNOR	SYNCHRONIZER & SYNCHROPHASER DESCRIPTION
GOVERNMENT A/C FACTORIES (GAF) N22-B, N24-A "Nomad" 250-B17	8210-140 CSU	# 8210-020 CSU < 8210-021 CSU < 8210-018 CSU	
	8210-085 OSG	# 8210-011 OSG	Allison S/B TP CEB 1204 Requires OSG Retrofit
GRUMMAN S2-(T) "Turbo-Tracker" PT6A-67R	8210-407 CSUS2 210963 OSG (Autofeather)	# 8210-189 CSUS2 < 8210-389 CSUS2 < 8210-400 CSUS2	Type II Synchronizer System use C213807 Control Box
GULFSTREAM 680T 680V "Turbo Commander" TPE331-43A	210570 CSU		Type I Synchronizer System use <6852-902 Control Box or Microprocessor retrofit: 213784 Box Assy > 213771 213100 Actuator 213447 Rod End Trimmer 1551-902 Flex shaft
GULFSTREAM 680W "Turbo Commander" TPE331-4BL	210736 CSU 8210-261 CSUS1 If Engine has WGC Fuel Cont	# 210560 CSU # 210742 CSUS1 (Topless) 895490-7 # 8210-108 CSU	Type II Synchrophaser system uses: < 213730 Control Box
GULFSTREAM 690D "Turbo Commander" TPE331-5-254K	8210-109 CSUS1 8210-263 CSUS2	# 210735 CSUS1 (Topless) 985490-8 # 8210-108 CSUS2 # 8210-115 CSUS2	
GULFSTREAM 695A "Turbo Commander" TPE331-10-501K	8210-263 CSUS2	# 8210-104 CSUS2 # 8210-115 CSUS2	
ISRAELI AIRCRAFT INDUST. (IAI LTD) 101/102, 201 "Arava" PT6-34, 36	8210-002 CSU 210631 OSG (Autofeather)		
JETSTREAM 31/32 TPE331	8210-263 CSU	< 8210-115	K213796 < D213796
JETSTREAM 41 TPE331-14	8210-121 CSU		D213807

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AIRCRAFT & ENGINE APPLICATION	RECOMMENDED GOVERNOR	REPLACED OR ALTERNATIVE GOVERNOR	SYNCHRONIZER & SYNCHROPHASER DESCRIPTION
JETSTREAM ATP PW124A/126	8210-164 OSG 8210-307 PMP	< 8210-178 PMP < 8210-180 PMP	
MITSUBISHI MU-2B, M 2D TPE331	210570 CSU TPE331-25AA 210737 CSU TPE331-25AB	# 210561 # 210736 These aircraft require 6858-0 Pickup Adapter	Type I Synchronizer System use <213350 Control Box or < 6852-910 Control Box or < 6852-920 Control Box or Microprocessor Retrofit: (Respectively) 213780 Box Assy > 213770 213791 Box Assy > 213775 213784 Box Assy > 213771 213100 Actuator or 5485-010 Actuator 213447 Rod End Trimmer (MU-2B) 5333-008 Rod End Trimmer (MU-2D, J, K, L, M, 2B-40,60) 213159 Flex Shaft
MITSUBISHI MU-2DP, -2F, -2G TPE331-1-151	210736 CSU 210564 CSUS1 210743 CSUS2		
MITSUBISHI MU-2B-40, -60 TPE331-10-501M	8210-263 CSUS2	< 8210-104 CSU	Type II Synchrophaser System uses: 213730 Control Box
NORD 262A Frakes Conversion PT6A-45	8210-133 CSU B213631 OSG	# 8210-033 CSU	
PIAGGIO P-180 "Avanti" PT6A-66	8210-411 CSU 210962 OSG	# 8210-198 CSU < 8210-398 CSU < 8210-404 CSU	
PIAGGIO P166 LTP-101	8210-051 CSU 210641		
PILATUS PC-6/B-H2 PC-6/B1-H2 "Turbo-Porter" PT6A-6, 20	A210577 CSU A210507 OSG		

TURBOPROP ENGINE AIRCRAFT

Codes: # = Unavailable, < = Not Current or Alternative, > = Box without Cables, F = Feathering, UF=Unfeathering, S1= Type I Synchronizer, S2 = Type II Synchrophaser, CSU = Constant Speed Unit, OSG = Overspeed Governor, PMP = Pump

AIRCRAFT & ENGINE APPLICATION	RECOMMENDED GOVERNOR	REPLACED OR ALTERNATIVE GOVERNOR	SYNCHRONIZER & SYNCHROPHASER DESCRIPTION
PILATUS PC-6/C1-H2 PT6A	8210-002 CSU		
	A210507 CSU		
PILATUS PC-6/B2-H2	8210-260 CSU	# 210738 CSU	
PILATUS PC-7 PT6A-25A	8210-035 CSU		
	210615		
PILATUS PC-9 PT6A-62	8210-135 CSU		
	210957		
PILATUS PC-12 PT6A-67B	8210-137 CSU		
	210949 OSG		
PIPER PA-31T, T1, T2, T1040 "Cheyenne I, II, IIXL" PT6A-11, 28, 135	8210-003 CSU	*Speed Pickup is Optional **Includes Speed Pickup	Type I Synchronizer System uses: < 213350 Control Box or < 6852-914 Control Box or Microprocessor Retrofit: (Respectively) 213780 Box Assy > 213770 213791 Box Assy > 213775 5485-016 Actuator 5485-070 Actuator 213447 Rod End Trimmer 1551-120 Flex Shaft Early Cheyennes had EMI Filters. # 213733 and # 213736 are replaced by 213737 Filter. Type II Synchronizer system uses: #213760 Control Box (Obsolete, No repair) Retrofit with 213643 Kit J213796 Control Box
	210590 OSGS1* 210598 OSGS1**		
PIPER PA-31T, T2, T104 "Cheyenne IIXL" PT6A-11, 28, 135	8210-003 CSUS2	*Speed Pickup is Optional **Includes Speed Pickup	
	210614 OSGS1* 210623 OSGS1** (Autofeather)		
PIPER PA-42 Cheyenne III, IV PT6A-41, 61	8210-027 CSUS2	**Includes Speed Pickup	
	210620 OSGS1**		
PIPER PA-42-1000 Cheyenne 400LS TPE331-14A/14B	8210-265 CSUS2	# 8210-103 CSUS2	
RAYTHEON JPATS T6 Texan PT6A-68	8210-502 PIU		

TURBOPROP ENGINE AIRCRAFT

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AIRCRAFT & ENGINE APPLICATION	RECOMMENDED GOVERNOR	REPLACED OR ALTERNATIVE GOVERNOR	SYNCHRONIZER & SYNCHROPHASER DESCRIPTION
SAAB 340A, 340B (equipped with Dowty Propellers) CT7-5A series CT7-9B	8210-153 CSUS2	# 8210-050 CSUS2 # 8210-051 CSUS2 # 8210-151 CSUS2	Type II Synchronizer System uses: # 213763 Control Box (Obsolete, No Repair) Retrofit requires: F213796 Control Box 1631-028 Connector 33193 Installation Manual # 213767 Control Box (Convert to < 213799) #E213796 Control Box (Convert to F213796) < 213799 Control Box F213796 Control Box
	8210-163 OSG	# 8210-063 CSUS2	
SAAB 340B Ham-Std Propellers CT7-9B		8210-172 OSG	The CSU & Synchrophaser System for this aircraft is supplied by Hamilton Standard.
SHORTS SC7 "Skyvan" TPE331-2-201A	210736 CSU	8210-172 OSG	Type I Synchronizer System uses: # 213750 Control Box or Microprocessor Retrofit: 213794 Box Assy > 213750 213100 Actuator 5333-008 Rod End Trimmer 213450 Flex Shaft
SHORTS SD3-30 SD3-60 PT6-45, 65 "Sherpa" Military PT6A-45R	8210-209 CSU	# 8210-009 CSU	Type I Synchronizer System uses: # 213350 Control Box or Microprocessor Retrofit: 213780 Box Assy > 213770 5485-020 Actuator 5333-050 Rod End Trimmer 213156 Flex Shaft
	B210631 OSGS1	# 8210-189 CSUS2	
SHORTS SD360-300 PT6-67R	8210-407 CSUS2	# 8210-189 CSUS2 < 8210-389 CSUS2 < 8210-400 CSUS2	Type II Synchrophaser System Use H213796 Control Box
	210963 OSG	# B210631	
SHORTS "Super Sherpa" PT6A-65AR	8210-034 CSUS2		Type II Synchrophaser System Use H213796 Control Box
	B210631 OSG		

TURBOPROP ENGINE AIRCRAFT

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AIRCRAFT & ENGINE APPLICATION	RECOMMENDED GOVERNOR	REPLACED OR ALTERNATIVE GOVERNOR	SYNCHRONIZER & SYNCHROPHASER DESCRIPTION
SCHAEFFER DC-3 DC-3-65TP	8210-034 CSUS2		Type II Synchrophaser System use A213796 Control Box
	B210631 OSG		
SOCATA TBM700 PT6-64	8210-007 CSU		
	A210632 OSG		
SOLOY CONVERSION Cessna 185, 206, 207 Allison 250	8210-300 CSU	# A210765 CSU	

TURBOFAN SYNCHRONIZERS

Codes: # = Unavailable, < = Not Current or Alternative Model

AIRCRAFT	CONTROL BOX	ACTUATOR	ROD END	MISCELLANEOUS
AEROSPATIALE S/N 601	213787 < 213723	213100	5333-042	
BEECHJET	213787 < 213723	213100	5333-032	
CANADAIR Challenger	213769	5485-064	5333-062	
CESSNA 500 S/N 1-136 No Reverse	213693 < 213787 < 213723	5485-066	213447	
CESSNA 500 S/N 137 and up CESSNA 501, 550, 551 No Reverse	213693 < 213787 < 213723	5485-066	5333-030	
CESSNA 500 S/N 303 and up CESSNA 501, 550, 551 With Reverse	213693 < 213787 < 213723	5485-066	5333-005	
CESSNA 560	213693 < 213787 < 213723	5485-066	5333-005	
DASSAULT Falcon 20	213790 # 213720	5485-066	5333-022	
DOUGLAS DC-9, MD-80	213779 < 213723 213729 < 213759	5485-010 # 5485-040	5333-076 < 5333-058 # 5333-054	
GULFSTREAM G-II, GIII	213788	5485-054	5333-030	
GULFSTREAM GIV	213798	5485-054	5333-030	
HANSA JET	213786 < 213722	5485-010	5333-032	
IAI WESTWIND 1121A, 1121B, 1123	213786 < 213722	5485-010	5333-005	

TURBOFAN SYNCHRONIZERS

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AIRCRAFT	CONTROL BOX	ACTUATOR	ROD END	MISCELLANEOUS
LEARJET 23, 24, 24A (OSG Signal)	213789 < 213773 #8900-084	5485-010	Uniball in Fuel Control Lever 5333-007 (10-32 Thread) 5333-010 (1/4-28 Thread) Uniball in Rod End 5333-004 (10-32 Thread) 5333-009 (1/4-28 Thread)	
LEARJET (OSG Signal) 24B, 24D, 25	213789 # 8900-084	5485-010	5333-012	
LEARJET 23, 24, 24B, 24D, 24E, 24F, 25, 28, 29 (Tach Generator Signal)	213786 < 213722	5485-010 5485-020	5333-012 (1/2-28 Thread) 5333-007 (10-32 Thread)	
MITSUBISHI MU-300	213787 < 213723	213100	5333-032	
ROCKWELL Saberliner 40, 60, 70	213722 < 213786	5485-010	5333-028	8900-300 Filter
ROCKWELL Saberliner 75A, 80	213790 # 213720	5485-010	5333-040	