SUPPLEMENT

X-RAY TUBE STATOR COMPATIBILITY TABLES

CONTENTS:

PROPRIETARY AND CONFIDENTIAL

1.0 INTRODUCTION

This supplement contains the X-Ray Tube Stator Compatibility Tables for the Low Speed Starter and the Dual Speed Starter.

2.0 LOW SPEED STARTER TUBE SELECT TABLE

The boost voltage may be set to either 240 VAC (factory default) or 120 VAC. This should be set to 240 VAC, except where specifically noted in Table 1 below. The Low Speed Starter output is at the same frequency as the AC line (50 Hz or 60 Hz).

The Low Speed Starter is a separate sub-assembly within the Indico 100 Generator. The Low Speed Starter part number corresponds to the value of phase-shift capacitors installed. The boost time is selectable to either 1.5 seconds or 2.5 seconds, and the run voltage is selectable to any of 52 VAC, 73 VAC or 94 VAC.

The Low Speed Starter is integrated into the H.V. Auxiliary Board within the CMP 200 and CMP 200 DR generators. The H.V. Auxiliary Board part number corresponds to the AC line voltage and the value of phase-shift capacitors installed. These generators do not use a separate run voltage, instead cycling the boost voltage on/off as required. The boost duty cycle is not hardware-configurable.

TABLE 1: TUBE TYPES (LOW SPEED STARTER)

TUBE TYPE (HOUSING)	TUBE TYPE (INSERT)	RUN VOLTAGE (Indico only)	BOOST TIME (Indico only)	GENER-ATOR	SHIFT CAP.	LSS / HV AUX BRD PART #
CGR (GE) Statorix 200A/240/260 (50/110 Ω stator)	MN640 M641 MN641 M643	94 VAC	2.5 sec	Indico 100	12.5 μF	732752-01
				CMP 200	12.5 μF	Contact factory
CGR (GE) Statorix 550 (50/110 Ω stator)	RN620 RN621	94 VAC	2.5 sec	Indico 100	12.5 μF	732752-01
				CMP 200	12.5 μF	Contact factory
Chirana Rotax KA 125 (20/50 Ω stator)	RIK-T 0.8/2.0 12/50 RIK-T 1.2/2.0 30/50	73 VAC	1.5 sec	Indico 100	33 μF	732752-00
				CMP 200	30 μF	739442-00 739445-00
Chirana Rotax KA 125 (20/20/20 Ω stator)		52 VAC	1.5 sec	Indico 100 only	100 μF, 52 mH Inductor	732752-04
Comet DO7 / DX7 (25/50 Ω stator)	DX7 DX71HS **(See note 1)**	52 VAC	1.5 sec	Indico 100	33 μF	732752-00
				CMP 200	30 μF	739442-00 739445-00
Comet DO9 / DX9 (20/50 Ω stator)	DX9 DX91H / HS DX92H / HS DX93H / HS DX94HS DX96HS DX97HS **(See note 1)**	52 VAC	1.5 sec	Indico 100	33 μF	732752-00
				CMP 200	30 μF	739442-00 739445-00
Comet D010 / DX10 (20/50 Ω stator)	DX10H / HS DX101H / HS DX104HS DX105HS DX106HS **(See note 1)**	52 VAC	1.5 sec	Indico 100	33 μF	732752-00
				CMP 200	30 μF	739442-00 739445-00
Comet XSTAR (25/50 Ω stator)	XSTAR8 (XST-8) XSTAR74 (XST-74)	52 VAC	1.5 sec	Indico 100	33 μF	732752-00
				CMP 200	30 μF	739442-00 739445-00

2.0 LOW SPEED STARTER TUBE SELECT TABLE (cont)

TUBE TYPE (HOUSING)	TUBE TYPE (INSERT)	RUN VOLTAGE (Indico only)	BOOST TIME (Indico only)	GENER-ATOR	SHIFT CAP.	LSS / HV AUX BRD PART #
Dunlee (Philips) DA10 series (20/50 Ω stator)	DU404	52 VAC	1.5 sec	Indico 100	33 μF	732752-00
				CMP 200	30 μF	739442-00 739445-00
Dunlee (Philips) DA350, DA351	DU 1750 DU 3050 DU 2550 DU 33100	See Philips ROT 350, 351				
Dunlee (Philips) DR1400 series (20/50 Ω stator)	DR1429 * DR1436 DR1492 * *** (use PX14xx insert file)**	52 VAC	1.5 sec	Indico 100	33 μF	732752-00
				CMP 200	30 μF	739442-00 739445-00
Dunlee (Picker / Philips) PX1300 series (3" anode) "S" stator (15/30 Ω)	PX1302 PX1312 PX1351	52 VAC	2.5 sec	Indico 100	33 μF	732752-00
				CMP 200	30 μF	739442-00 739445-00
Dunlee (Picker / Philips) PX1400 series (4" anode) "S" stator (15/30 Ω)	PX1402 PX1412 PX1415 PX1425 PX1429 PX1431 PX1436 PX1456 PX1463 PX1482 PX1483 PX1492 PX1494 DU404	52 VAC	2.5 sec	Indico 100	33 μF	732752-00
				CMP 200	30 μF	739442-00 739445-00
GE Maxiray 75 (3" anode) (23/23 Ω equal impedance "E" stator)	MAX75	73 VAC	1.5 sec	Indico 100	45 μF	732752-02
				CMP 200	45 μF	739442-01 739445-01
GE Maxiray 100 (4" anode) (23/23 Ω equal impedance "E" stator)	MAX100	73 VAC	1.5 sec	Indico 100	45 μF	732752-02
				CMP 200	45 μF	739442-01 739445-01
Gilardoni Rotagil S/AS	AR11-30 AR20-50 AR30-00-1 AR30-60 AR30-100 AR40-100 AR9000-1 AR9000-2	52 VAC	1.5 sec	Indico 100	33 μF	732752-00
				CMP 200	30 μF	739442-00 739445-00
Hangzhou Kailong H1076 20/50 Ω stator **(50Hz AC line only)**	KL-H1076X	52 VAC	1.5 sec	Indico 100	33 μF	732752-00
				CMP 200	30 μF	739442-00 739445-00
IAE C30 (25/62 Ω stator)	RTM 70H X20P X22 X40	52 VAC	1.5 sec	Indico 100	33 μF	732752-00
				CMP 200	30 μF	739442-00 739445-00

2.0 LOW SPEED STARTER TUBE SELECT TABLE (cont)

TUBE TYPE (HOUSING)	TUBE TYPE (INSERT)	RUN VOLTAGE (Indico only)	BOOST TIME (Indico only)	GENER-ATOR	SHIFT CAP.	LSS / HV AUX BRD PART #
IAE C52, C52 Super C100 C352 (20/40 Ω stator)	RTC 600HS RTC 700HS RTC 1000HS RTM 78H / HS RTM 90H / HS RTM 92H / HS RTM 101H / HS RTM 102H / HS RTM 780H / HS RTM 782H / HS AP DX104 X40 X50H X50AH	52 VAC	1.5 sec	Indico 100	33 μF	732752-00
					45 μF	732752-02
				CMP 200	30 μF (prefer)	739442-00 739445-00
					45 μF	739442-01 739445-01
Philips ROT350 ROT351 Windings in series (high impedance configuration)	RO 1230 RO 1750 / DU 1750* RO 2050 RO 2550 / DU 2550* RO 3050 / DU 3050* RO 33100 / DU 33100* SRO 2250 * Dunlee tubes GD6 3050 ** ** NAGO tube	52 VAC	1.5 sec	Indico 100	33 μF	732752-00
				CMP 200	45 μF	739442-01 739445-01
Shanghai Ninth Medical	XD51 (RAD74)	52 VAC	1.5 sec	Indico 100	33 μF	732752-00
				CMP 200	30 μF	739442-00 739445-00
Shimadzu CIRCLEX RX80 (7.5/35 Ω stator)	P18DE-85 P38E	52 VAC	1.5 sec	Indico 100	33 μF	732752-00
				CMP 200	30 μF	739442-00 739445-00
		Note: The starter boost voltage is 120 VAC. This is only available with one-tube generators.				
Shimadzu CIRCLEX RX150 (7.5/35 Ω stator)	P18DK	52 VAC	1.5 sec	Indico 100	33 μF	732752-00
				CMP 200	30 μF	739442-00 739445-00
		Note: The starter boost voltage is 120 VAC. This is only available with one-tube generators.				
Siemens Opti 150 "S" stator (14/18 Ω)	20/40 30/52R	52 VAC	2.5 sec	Indico 100	45 μF	732752-02
				CMP 200	45 μF	739442-01 739445-01
Siemens RAY-8(S)_1, RAY-12(S)_1, RAY-14(S)_1		73 VAC	1.5 sec	Indico 100	33 μF	732752-00
				CMP 200	30 μF	739442-00 739445-00

2.0 LOW SPEED STARTER TUBE SELECT TABLE (cont)

TUBE TYPE (HOUSING)	TUBE TYPE (INSERT)	RUN VOLTAGE (Indico only)	BOOST TIME (Indico only)	GENER-ATOR	SHIFT CAP.	LSS / HV AUX BRD PART #
Toshiba Rotanode	Toshiba x-ray tubes are identified by their "E" number, which is used to represent both the Tube Insert and the complete assembly. The housing number is usually not shown on the identification label. A specific "E" number may be available with several different stator types, each having different starter requirements. Furthermore, a specific stator type may require different starter requirements depending on the housing used. For ease of use, the Toshiba tubes are sorted by Tube Insert Type ("E" number) within this table. The installer must confirm the stator type for the planned tube(s). If the stator type is not identified within the Toshiba documentation, match the stator winding resistance to the appropriate table entry. Contact the factory if the desired Tube Type and stator type / winding resistance are not listed on the same row within this table.					
Toshiba Rotanode XH-121 XH-126 XH-150 XS-AV stator (27.5/58 Ω)	E7132X E7239X E7240X E7242X **(See note 2)**	52 VAC	1.5 sec	Indico 100	33 μF	732752-00
				CMP 200	30 μF	739442-00 739445-00
Toshiba Rotanode XH-112V XS-AG stator (9.4/28.3 Ω)	E7251X	52 VAC	1.5 sec	Indico 100 ***50 or 60 Hz***	45 μF	732752-02
				Indico 100 ***60 Hz only***	33 μF	732752-00
				CMP 200 ***50 or 60 Hz***	45 μF	739442-01 739445-01
				CMP 200 ***60 Hz only***	30 μF	739442-00 739445-00
Toshiba Rotanode XH-106V XH-180 XH-181 XS-AL stator (9.4/28.3 Ω)	E7252X **(See note 2)**	52 VAC	1.5 sec	Indico 100 ***50 or 60 Hz***	45 μF	732752-02
				Indico 100 ***60 Hz only***	33 μF	732752-00
				CMP 200 ***50 or 60 Hz***	45 μF	739442-01 739445-01
				CMP 200 ***60 Hz only***	30 μF	739442-00 739445-00
		Note: The starter boost voltage is 120 VAC (XS-AL stator only). This is only available with one-tube generators.				
Toshiba Rotanode XH-106V XH-180 XH-181 XS-R stator XS-RA stator (27.5/58 Ω)		52 VAC	1.5 sec	Indico 100	33 μF	732752-00
				CMP 200	30 μF	739442-00 739445-00
Toshiba Rotanode XH-157 XS-RB stator (20.2/38 Ω)	E7254X E7255X **(See note 2)**	94 VAC	1.5 sec	Indico 100	33 μF	732752-00
				CMP 200	30 μF	739442-00 739445-00
Toshiba Rotanode XH-121 XH-126 XS-AV stator (27.5/58 Ω)	E7299X **(See note 2)**	52 VAC	1.5 sec	Indico 100	33 μF	732752-00
				CMP 200	30 μF	739442-00 739445-00

2.0 LOW SPEED STARTER TUBE SELECT TABLE (cont)

TUBE TYPE (HOUSING)	TUBE TYPE (INSERT)	RUN VOLTAGE (Indico only)	BOOST TIME (Indico only)	GENER-ATOR	SHIFT CAP.	LSS / HV AUX BRD PART #
Toshiba Rotanode XH-106V XH-181 XS-AL stator (9.4/28.3 Ω)	E7813X **(See note 2)**	52 VAC	1.5 sec	Indico 100 ***50 or 60 Hz***	45 μF	732752-02
				Indico 100 ***60 Hz only***	33 μF	732752-00
				CMP 200 ***50 or 60 Hz***	45 μF	739442-01 739445-01
				CMP 200 ***60 Hz only***	30 μF	739442-00 739445-00
		Note: The starter boost voltage is 120 VAC. This is only available with one-tube generators.				
Toshiba Rotanode XH-121 XS-BA stator (18/47.5 Ω)	E7843X	52 VAC	1.5 sec	Indico 100 ***50 or 60 Hz***	45 μF	732752-02
				Indico 100 ***60 Hz only***	33 μF	732752-00
				CMP 200 ***50 or 60 Hz***	45 μF	739442-01 739445-01
				CMP 200 ***60 Hz only***	30 μF	739442-00 739445-00
Toshiba Rotanode XH-112V XS-AG stator (9.4/28.3 Ω)	E7864X E7869X	52 VAC	1.5 sec	Indico 100 ***50 or 60 Hz***	45 μF	732752-02
				Indico 100 ***60 Hz only***	33 μF	732752-00
				CMP 200 ***50 or 60 Hz***	45 μF	739442-01 739445-01
				CMP 200 ***60 Hz only***	30 μF	739442-00 739445-00
Toshiba Rotanode XH-121 XS-AV stator (27.5/58 Ω)	E7876X	52 VAC	1.5 sec	Indico 100	33 μF	732752-00
				CMP 200	30 μF	739442-00 739445-00
Toshiba Rotanode XH-121 XS-AL stator (9.4/28.3 Ω)	E7884X	52 VAC	1.5 sec	Indico 100 ***50 or 60 Hz***	45 μF	732752-02
				Indico 100 ***60 Hz only***	33 μF	732752-00
				CMP 200 ***50 or 60 Hz***	45 μF	739442-01 739445-01
				CMP 200 ***60 Hz only***	30 μF	739442-00 739445-00
		Note: The starter boost voltage is 120 VAC. This is only available with one-tube generators.				
Toshiba Rotanode XH-121 XS-AV stator (27.5/58 Ω)	E7886X	52 VAC	1.5 sec	Indico 100	33 μF	732752-00
				CMP 200	30 μF	739442-00 739445-00

2.0 LOW SPEED STARTER TUBE SELECT TABLE (cont)

TUBE TYPE (HOUSING)	TUBE TYPE (INSERT)	RUN VOLTAGE (Indico only)	BOOST TIME (Indico only)	GENER-ATOR	SHIFT CAP.	LSS / HV AUX BRD PART #
Varian / Machlett Dynamax (DX) 52 "R" stator (16/50 Ω)	A102 A132 A142	52 VAC	1.5 sec	Indico 100	33 μF	732752-00
				CMP 200	30 μF	739442-00 739445-00
Varian / Machlett Dynamax (DX) 62 "R" stator (23/56 Ω) Dynamax (DX) 62U cfg as "STD" or "R" stator (15/36 Ω)	A192B A196 A197 A256 A272 A282 A286 A292 A482 A486	52 VAC	1.5 sec	Indico 100	33 μF	732752-00
				CMP 200	30 μF	739442-00 739445-00
Varian B100 "STD" stator (16/50 Ω)	A102 A132 / A134* A142 / A144* A145 *** (See note 3)**	52 VAC	1.5 sec	Indico 100	33 μF	732752-00
				CMP 200	30 μF	739442-00 739445-00
Varian B130 B130H B135H B150 Std "R" stator (16/50 Ω)	A152 A182 / A184* A192 / A194* A195 A196 A197 A252 A272 / A274* A277 / A278* A282 / A284 * A286 A292 / A294* A482 G256 G292 *** (See note 3)**	52 VAC	1.5 sec	Indico 100	33 μF	732752-00
				CMP 200	30 μF	739442-00 739445-00
Varian Diamond Std "R" stator (20/50 Ω)	RAD13 RAD14	52 VAC	1.5 sec	Indico 100	33 μF	732752-00
				CMP 200	30 μF	739442-00 739445-00
Varian Emerald Std "R" stator (20/50 Ω)	RAD8 RAD68 RAD74	52 VAC	1.5 sec	Indico 100	33 μF	732752-00
				CMP 200	30 μF	739442-00 739445-00
Varian Sapphire Std "R" stator (20/50 Ω)	RAD21 RAD40 RAD44 RAD56 RAD60 RAD92 RAD94	52 VAC	1.5 sec	Indico 100	33 μF	732752-00
				CMP 200	30 μF	739442-00 739445-00

NOTE 1: Comet tube inserts with the prefix "DI" and "DX" are interchangeable.

NOTE 2: Toshiba tube inserts with the suffix "X, "FX", "GX", and "JX" are interchangeable.

NOTE 3: These X-ray tubes incorporate a control grid. Grid control is currently not supported by CPI generators. Connect the grid connection to Ground when using these tubes, and select the insert type within the Generator software corresponding to the equivalent non-grid tube.

3.0 DUAL SPEED STARTER TUBE SELECT TABLE

The Dual Speed Starter (DSS) synthesizes its output frequencies independently of the line frequency and will operate all tubes at 60/180 Hz, unless a particular tube only has published ratings to operate at 150 Hz. In this case, the starter will output 50/150 Hz when set for these tubes.

Unless indicated otherwise within Table 2, setting the switches to the code indicated for the applicable Tube Type selects all required operating parameters. The Dual Speed Starter part number corresponds to the AC line voltage and the configuration of phase-shift capacitors installed.

Reference notes are provided at the end of Table 2. Tube operating parameters for each switch code are contained in Table 3 for reference.

TABLE 2: TUBE TYPES (HIGH SPEED STARTER)

TUBE TYPE (HOUSING)	TUBE TYPE (INSERT)	CODE Switches 1.....5	OPERATING NOTES (SEE TABLE 3 FOR OPERATING PARAMETERS)	OUTPUT FREQ.	H.S. SHIFT CAP.	L.S. SHIFT CAP.	INDICO 100 DSS PART NO.**	CMP 200 DSS PART NO.**
CGR (GE) Statorix 200A/240/260 (50/110 Ω)	MN640 M641 MN641 M643	00111	**LOW SPEED OPERATION ONLY** **(See note 1)** These Dual Speed Starters must be jumper-configured to provide the required 15.5 μF low speed shift capacitance. ***Please see note 9 before attempting to use this Dual Speed Starter configuration***.	50 Hz	N/A	15.5μF	733317-15 735925-15 **(See note 9)**	901297-15 901298-15 **(See note 9)**
CGR (GE) Statorix 200A/240/260 (50/110 Ω)	MS740 MSN740 MSN742 RSN742	00111	**HIGH SPEED OPERATION ONLY** **(See note 1**) For Dual Speed operation, contact factory.	150 Hz	3 μF	15.5μF	733317-15 735925-15 **(See note 9)**	901297-15 901298-15 **(See note 9)**
CGR (GE) Statorix 550 (50/110 Ω)	RN620 RN621	00111	**LOW SPEED OPERATION ONLY** **(See note 1)** These Dual Speed Starters must be jumper-configured to provide the required 15.5 μF low speed shift capacitance. ***Please see note 9 before attempting to use this Dual Speed Starter configuration***.	50 Hz	N/A	15.5μF	733317-15 735925-15 **(See note 9)**	901297-15 901298-15 **(See note 9)**
CGR (GE) Statorix 550 (50/110 Ω)	RSN722	00111	**HIGH SPEED OPERATION ONLY** **(See note 1**) For Dual Speed operation, contact factory.	150 Hz	3 μF	15.5μF	733317-15 735925-15 **(See note 9)**	901297-15 901298-15 **(See note 9)**

3.0 Dual Speed Starter Tube Select Table (cont)

TUBE TYPE (HOUSING)	TUBE TYPE (INSERT)	CODE Switches 1.....5	OPERATING NOTES (SEE TABLE 3 FOR OPERATING PARAMETERS)	OUTPUT FREQ.	H.S. SHIFT CAP.	L.S. SHIFT CAP.	INDICO 100 DSS PART NO.**	CMP 200 DSS PART NO.**
Chirana Rotax KA 125 (20/50 Ω stator, single phase)	RIK-T	10101	**LOW SPEED OPERATION ONLY** **(See note 1)**	60 Hz	N/A	30 μF or 36 μF	733317-01 735925-01 733317-12 735925-12 733317-13 735925-13 **(See note 2**)	901297-12 901298-12 901297-13 901298-13 **(See note 2**)
Comet DO7 / DX7 (25/50 Ω stator)	DX7 DX71HS **(See note 3)**	00000	**LOW SPEED OPERATION ONLY** **(See note 1)**	60 Hz	N/A	30 μF or 36 μF	733317-01 735925-01 733317-12 735925-12 733317-13 735925-13 **(See note 2**)	901297-12 901298-12 901297-13 901298-13 **(See note 2**)
Comet DO9 / DX9 (20/50 Ω stator)	DX9 DX91H / HS DX92H / HS DX93H / HS DX94HS DX96HS DX97HS **(See note 3)**	00000	**LOW SPEED OPERATION ONLY** **(See note 1)**	60 Hz	N/A	30 μF or 36 μF	733317-01 735925-01 733317-12 735925-12 733317-13 735925-13 **(See note 2**)	901297-12 901298-12 901297-13 901298-13 **(See note 2**)

3.0 Dual Speed Starter Tube Select Table (cont)

TUBE TYPE (HOUSING)	**TUBE TYPE (INSERT)**	**CODE Switches 1.....5**	**OPERATING NOTES** (SEE TABLE 3 FOR OPERATING PARAMETERS)	**OUTPUT FREQ.**	**H.S. SHIFT CAP.**	**L.S. SHIFT CAP.**	**INDICO 100 DSS PART NO.****	**CMP 200 DSS PART NO.****
Comet DO10 / DX10 (20/50 Ω stator)	DX10H **(See note 3)**	00000	**LOW SPEED OPERATION ONLY** **(See note 1)**	60 Hz	N/A	30 µF or 36 µF	733317-01 735925-01 733317-12 735925-12 733317-13 735925-13 **(See note 2**)	901297-12 901298-12 901297-13 901298-13 **(See note 2**)
	DX10HS DX104HS **(See note 3)**	00011	None	50/150 Hz	6 µF	30 µF or 36 µF	733317-01 735925-01 733317-12 735925-12 733317-13 735925-13 **(See note 2**)	901297-12 901298-12 901297-13 901298-13 **(See note 2**)
	DX105HS DX106HS **(See note 3)**	10011	None	50/150 Hz	6 µF	30 µF or 36 µF	733317-01 735925-01 733317-12 735925-12 733317-13 735925-13 **(See note 2**)	901297-12 901298-12 901297-13 901298-13 **(See note 2**)
Comet DO700 / DX700 (25/50 Ω stator)	DX700HS **(See note 3)**	10011	None	50/150 Hz	6 µF	30 µF or 36 µF	733317-01 735925-01 733317-12 735925-12 733317-13 735925-13 **(See note 2**)	901297-12 901298-12 901297-13 901298-13 **(See note 2**)

3.0 Dual Speed Starter Tube Select Table (cont)

TUBE TYPE (HOUSING)	**TUBE TYPE (INSERT)**	**CODE Switches 1.....5**	**OPERATING NOTES** (SEE TABLE 3 FOR OPERATING PARAMETERS)	**OUTPUT FREQ.**	**H.S. SHIFT CAP.**	**L.S. SHIFT CAP.**	**INDICO 100 DSS PART NO.****	**CMP 200 DSS PART NO.****
Dunlee (Philips) DA10 series (20/50 Ω stator)	DU404	00100	None	60/180 Hz	6 μF	30 μF or 36 μF	733317-01 735925-01 733317-12 735925-12 733317-13 735925-13 **(See note 2**)	901297-12 901298-12 901297-13 901298-13 **(See note 2**)
Dunlee (Philips) DA350, DA351	DU 1750 DU 3050 DU 2550 DU 33100 **(See note 6)**	See Philips ROT 350, 351						
Dunlee (Philips) DR1400 (20/50 Ω stator)	DR1429 * DR1436 DR1492 * DR1494 * *** (use PX14xx insert file)**	00100	None	60/180 Hz	6 μF	30 μF or 36 μF	733317-01 735925-01 733317-12 735925-12 733317-13 735925-13 **(See note 2**)	901297-12 901298-12 901297-13 901298-13 **(See note 2**)
Dunlee (Picker / Philips) PX1300 3" anode "S" stator (15/30 Ω)	PX1302 PX1312 PX1351	11100	None	60/180 Hz	6 μF	30 μF or 36 μF	733317-01 735925-01 733317-12 735925-12 733317-13 735925-13 **(See note 2**)	901297-12 901298-12 901297-13 901298-13 **(See note 2**)

3.0 Dual Speed Starter Tube Select Table (cont)

TUBE TYPE (HOUSING)	**TUBE TYPE (INSERT)**	**CODE Switches 1.....5**	**OPERATING NOTES** (SEE TABLE 3 FOR OPERATING PARAMETERS)	**OUTPUT FREQ.**	**H.S. SHIFT CAP.**	**L.S. SHIFT CAP.**	**INDICO 100 DSS PART NO.****	**CMP 200 DSS PART NO.****
Dunlee (Picker / Philips) PX1400 series 4" anode "S" stator (15/30 Ω)	PX1402 PX1412 PX1415 PX1425 PX1429 PX1431 PX1436 PX1456 PX1463 PX1475 PX1482 PX1483 PX1492 PX1494 DU404	10000	Some tube inserts may be suitable for Low Speed operation only. The installer must ensure compatibility by using the appropriate Dunlee data sheets. **(See note 1)**	60/180 Hz	6 μF	30 μF or 36 μF	733317-01 735925-01 733317-12 735925-12 733317-13 735925-13 **(See note 2**)	901297-12 901298-12 901297-13 901298-13 **(See note 2**)
Dunlee (Picker / Philips) PX1400 series 4" anode "Q" stator (6/12 Ω)	PX1402 PX1412 PX1415 PX1424 PX1429 PX1431 PX1436 PX1456 PX1463 PX1472 PX1473 PX1482 PX1483 DU404	10110	Some tube inserts may be suitable for Low Speed operation only. The installer must ensure compatibility by using the appropriate Dunlee data sheets. **(See note 1)**	60/180 Hz	20 μF	60 μF	733317-02 735925-02	901297-02 901298-02
GE Maxiray 75 (3" anode) 23/23Ω equal impedance "E" stator	MAX75	01110	None	60/180 Hz	7.5 μF	36 μF	733317-12 735925-12	901297-12 901298-12
GE Maxiray 100 (4" anode) 23/23 Ω equal impedance "E" stator	MAX100	00101	None	60/180 Hz	7.5 μF	36 μF	733317-12 735925-12	901297-12 901298-12

3.0 Dual Speed Starter Tube Select Table (cont)

TUBE TYPE (HOUSING)	**TUBE TYPE (INSERT)**	**CODE Switches 1.....5**	**OPERATING NOTES** (SEE TABLE 3 FOR OPERATING PARAMETERS)	**OUTPUT FREQ.**	**H.S. SHIFT CAP.**	**L.S. SHIFT CAP.**	**INDICO 100 DSS PART NO.****	**CMP 200 DSS PART NO.****
Gilardoni Rotagil (33/36 Ω)	AR11-30 AR30-60	01101	**LOW SPEED OPERATION ONLY** **(See note 1)**	50 Hz	N/A	30 µF or 36 µF	733317-01 735925-01 733317-12 735925-12 733317-13 735925-13 **(See note 2**)	901297-12 901298-12 901297-13 901298-13 **(See note 2**)
Gilardoni Rotagil A/A5 (33/36 Ω)	AR20-50 AR30-100 AR40-100	01101	None	50/150 Hz	6 µF	30 µF or 36 µF	733317-01 735925-01 733317-12 735925-12 733317-13 735925-13 **(See note 2**)	901297-12 901298-12 901297-13 901298-13 **(See note 2**)
IAE C30 25/62 Ω stator	X20P X22 X40	01010	**LOW SPEED OPERATION ONLY** **(See note 1)**	50 Hz	N/A	30 µF or 36 µF	733317-01 735925-01 733317-12 735925-12 733317-13 735925-13 **(See note 2**)	901297-12 901298-12 901297-13 901298-13 **(See note 2**)
	RTM 70H	01010	None	50/150 Hz	6 µF	30 µF or 36 µF	733317-01 735925-01 733317-12 735925-12 733317-13 735925-13 **(See note 2**)	901297-12 901298-12 901297-13 901298-13 **(See note 2**)

3.0 Dual Speed Starter Tube Select Table (cont)

TUBE TYPE (HOUSING)	**TUBE TYPE (INSERT)**	**CODE Switches 1.....5**	**OPERATING NOTES** (SEE TABLE 3 FOR OPERATING PARAMETERS)	**OUTPUT FREQ.**	**H.S. SHIFT CAP.**	**L.S. SHIFT CAP.**	**INDICO 100 DSS PART NO.****	**CMP 200 DSS PART NO.****
IAE C52 C52 Super C100 C352 20/40 Ω stator	RTM 78H RTM 90H RTM 92H RTM 101H RTM 102H RTM 780H RTM 782H AP DX104 X40 X50H X50AH	11011	**LOW SPEED OPERATION ONLY (See note 1)**	50 Hz	N/A	30 μF or 36 μF	733317-01 735925-01 733317-12 735925-12 733317-13 735925-13 **(See note 2**)	901297-12 901298-12 901297-13 901298-13 **(See note 2**)
IAE C52 C52 Super C100 C352 20/40 Ω stator	RTC 600HS RTC 700HS RTC 1000HS RTM 78HS RTM 90HS RTM 92HS RTM 101HS RTM 102HS RTM 780HS RTM 782HS AP DX104	11011	None	50/150 Hz	5 μF	30 μF	733317-13 735925-13 733317-17 735925-17 **(See note 2**)	901297-13 901298-13

3.0 Dual Speed Starter Tube Select Table (cont)

TUBE TYPE (HOUSING)	TUBE TYPE (INSERT)	CODE Switches 1.....5	OPERATING NOTES (SEE TABLE 3 FOR OPERATING PARAMETERS)	OUTPUT FREQ.	H.S. SHIFT CAP.	L.S. SHIFT CAP.	INDICO 100 DSS PART NO.**	CMP 200 DSS PART NO.**
Philips ROT 350 ROT 351 **(See note 4)** *** Dunlee tubes (See note 6)** **** NAGO tube**	RO 1230 RO 1750 RO 2050 RO 3050 SRO 2250 DU 1750 * DU 3050 * GD6 3050 **	10010	**LOW SPEED OPERATION ONLY (See note 1)**	60 Hz	N/A	37.5µF	733317-12 735925-12 733317-16 735925-16 733317-17 735925-17 **(See note 2)**	901297-12 901298-12 901297-16 901298-16 **(See note 2)**
Philips ROT 350 ROT 351 **(See note 5)** *** Dunlee tubes (See note 6)**	RO 1230 RO 1750 RO 3050 DU 1750 * DU 3050 *	10010	**LOW SPEED OPERATION ONLY (See note 1)**	60 Hz	N/A	37.5µF	733317-16 735925-16 733317-17 735925-17 **(See note 2)**	901297-16 901298-16
	RO 2050 SRO 2250	10010	None	60/180 Hz	12.5µF	37.5µF		
	RO 2550 RO 33100 SRO 1330 DU 2550 * DU 33100 *	10010	**HIGH SPEED OPERATION ONLY (See note 1**)	180 Hz	12.5µF	37.5µF		
Philips ROT 500 ROT 501 9/11 Ω stator	SRM 0310	01111	None	60/180 Hz	12.5µF	37.5µF	733317-16 735925-16 733317-17 735925-17 **(See note 2)**	901297-16 901298-16
	SRM 1080 SRM 35100	01111	**HIGH SPEED OPERATION ONLY (See note 1**)	180 Hz	12.5µF	37.5µF	733317-16 735925-16 733317-17 735925-17 **(See note 2)**	901297-16 901298-16

3.0 Dual Speed Starter Tube Select Table (cont)

TUBE TYPE (HOUSING)	TUBE TYPE (INSERT)	CODE Switches 1.....5	OPERATING NOTES (SEE TABLE 3 FOR OPERATING PARAMETERS)	OUTPUT FREQ.	H.S. SHIFT CAP.	L.S. SHIFT CAP.	INDICO 100 DSS PART NO.**	CMP 200 DSS PART NO.**
Shanghai Ninth Medical	XD51 (RAD74)	00000	**LOW SPEED OPERATION ONLY (See note 1)**	60 Hz	N/A	30 μF or 36 μF	733317-01 735925-01 733317-12 735925-12 733317-13 735925-13 **(See note 2)**	901297-12 901298-12 901297-13 901298-13 **(See note 2)**
Shimadzu CIRCLEX RX-80 RX-100	P18DE-85 P18DK	11101	**LOW SPEED OPERATION ONLY (See note 1)**	50 Hz	N/A	30 μF	733317-01 735925-01 733317-13 735925-13 **(See note 2)**	901297-13 901298-13
	P38E	11101	None	50/150 Hz	5 μF	30 μF	733317-13 735925-13	901297-13 901298-13
	P38D P38E P38DK	11101	**HIGH SPEED OPERATION ONLY (See note 1)**	150 Hz	5 μF	30 μF	733317-13 735925-13	901297-13 901298-13
Siemens Biangulix (cfg for 150 Hz) "S" stator (two phase only) (14/18 Ω)	BI 125/20/40 BI 125/30/50 BI 150/30/50 BI 150/30/52R	11101	**HIGH SPEED OPERATION ONLY (See note 1)**	150 Hz	5 μF	30 μF	733317-13 735925-13	901297-13 901298-13
Siemens Opti-150 30/52R 150/40/72C 150/12/50 150/40/80 150/30/50 150/40/102C "S" stator (two phase only) (14/18 Ω)		11101	**HIGH SPEED OPERATION ONLY (See note 1)**	150 Hz	5 μF	30 μF	733317-13 735925-13	901297-13 901298-13
Siemens OptiTop 150 150/40/80HC-100L 150/40/80HC-102L "S" stator (two phase only) (14/18 Ω)		11101	**HIGH SPEED OPERATION ONLY (See note 1)**	150 Hz	5 μF	30 μF	733317-13 735925-13	901297-13 901298-13

3.0 Dual Speed Starter Tube Select Table (cont)

TUBE TYPE (HOUSING)	TUBE TYPE (INSERT)	CODE Switches 1.....5	OPERATING NOTES (SEE TABLE 3 FOR OPERATING PARAMETERS)	OUTPUT FREQ.	H.S. SHIFT CAP.	L.S. SHIFT CAP.	INDICO 100 DSS PART NO.**	CMP 200 DSS PART NO.**
Siemens Optilix 150 150/30/50C-100L 150/40/80C-100L "S" stator (two phase only) (14/18 Ω)		11101	**HIGH SPEED OPERATION ONLY (See note 1)**	150 Hz	5 μF	30 μF	733317-13 735925-13	901297-13 901298-13
Siemens SV 125 Siemens Megalix 125/30/82CM-120LW 125/40/82CM-120LW "S" stator (two phase only) (14/18 Ω)		00010	**HIGH SPEED OPERATION ONLY (See note 1)**	150 Hz	6 μF	30 μF	733317-01 735925-01 733317-12 735925-12 733317-13 735925-13 **(See note 2)**	901297-12 901298-12 901297-13 901298-13 **(See note 2)**
Siemens SV 150 SV 150/30/50C-100L SV 150/40/80C-100L "S" stator (two phase only) (14/18 Ω)		11101	**HIGH SPEED OPERATION ONLY (See note 1)**	150 Hz	5 μF	30 μF	733317-13 735925-13	901297-13 901298-13
Siemens RAY-8_1, RAY-8S_1 RAY-12_1, RAY-12S_1 20/50 Ω stator (single phase only)		11111	**LOW SPEED OPERATION ONLY (See note 1)**	60 Hz	N/A	30 μF	733317-01 735925-01 733317-13 735925-13 **(See note 2)**	733317-13 735925-13
Siemens RAY-14_1, RAY-14S_1 20/50 Ω stator (single phase only)		11111	None	60/180 Hz	5 μF	30 μF	733317-13 735925-13	901297-13 901298-13

3.0 Dual Speed Starter Tube Select Table (cont)

TUBE TYPE (HOUSING)	TUBE TYPE (INSERT)	CODE Switches 1.....5	OPERATING NOTES (SEE TABLE 3 FOR OPERATING PARAMETERS)	OUTPUT FREQ.	H.S. SHIFT CAP.	L.S. SHIFT CAP.	INDICO 100 DSS PART NO.**	CMP 200 DSS PART NO.**
Toshiba Rotanode	Toshiba x-ray tubes are identified by their "E" number, which is used to represent both the Tube Insert and the complete assembly. The housing number is usually not shown on the identification label. A specific "E" number may be available with several different stator types, each having different starter requirements. Furthermore, a specific stator type may require different starter requirements depending on the housing used. For ease of use, the Toshiba tubes are sorted by Tube Type ("E" number) within this table. The installer must confirm the stator type for the planned tube(s). If the stator type is not identified within the Toshiba documentation, match the stator winding resistance to the appropriate table entry. Contact the factory if the desired Tube Type and stator type / winding resistance are not listed on the same line within this table.							
Toshiba XH-121 XH-126 XH-150 XS-AV stator (27.5/58 Ω)	E7132X E7239X E7240X E7242X **(See note 7)**	00000	**LOW SPEED OPERATION ONLY** **(See note 1)**	60 Hz	N/A	30 μF	733317-01 735925-01 733317-13 735925-13 **(See note 2**)	901297-13 901298-13
Toshiba XH-112V XS-AG stator (9.4/28.3 Ω)	E7251X **(See note 7)**	10001	None	60/180 Hz	6 μF	30 μF or 36 μF	733317-01 735925-01 733317-12 735925-12 733317-13 735925-13 **(See note 2**)	901297-12 901298-12 901297-13 901298-13 **(See note 2**)
Toshiba XH-106V XH-180 XH-181 XS-AL stator (9.4/28.3 Ω)	E7252X **(See note 7)**	10111	None	60/180 Hz	6 μF	36 μF	733317-12 735925-12 **(See note 10**)	901297-12 901298-12 **(See note 11**)
Toshiba XH-106V XH-180 XH-181 XS-R stator XS-RA stator (27.5/58 Ω)		11001	These Dual Speed Starters must be jumper-configured to provide the required 28 μF low speed shift capacitance. Standard "R" stators that require 6 μF high speed shift capacitance are also supported. ***Please refer to note 9 before attempting to use this Dual Speed Starter configuration***.	60/180 Hz	3 μF	28 μF	733317-15 735925-15 **(See note 9)**	901297-15 901298-15 **(See note 9)**

3.0 Dual Speed Starter Tube Select Table (cont)

TUBE TYPE (HOUSING)	**TUBE TYPE (INSERT)**	**CODE Switches 1.....5**	**OPERATING NOTES** (SEE TABLE 3 FOR OPERATING PARAMETERS)	**OUTPUT FREQ.**	**H.S. SHIFT CAP.**	**L.S. SHIFT CAP.**	**INDICO 100 DSS PART NO.****	**CMP 200 DSS PART NO.****
Toshiba XH-157 XS-RB stator (20.2/38 Ω)	E7254X E7255X **(See note 7)**	10101	None	60/180Hz	6 μF	30 μF or 36 μF	733317-01 735925-01 733317-12 735925-12 733317-13 735925-13 **(See note 2**)	901297-12 901298-12 901297-13 901298-13 **(See note 2**)
Toshiba XH-121 XH-126 XS-AV stator (27.5/58 Ω)	E7299X **(See note 7)**	00000	**LOW SPEED OPERATION ONLY** **(See note 1)**	60 Hz	N/A	30 μF	733317-01 735925-01 733317-13 735925-13 **(See note 2**)	901297-13 901298-13
Toshiba XH-106V XH-181 XS-AL stator (9.4/28.3 Ω)	E7813X **(See note 7)**	10111	None	60/180 Hz	6 μF	36 μF	733317-12 735925-12 **(See note 10**)	901297-12 901298-12 **(See note 11**)
Toshiba XH-121 XS-BA stator (18/47.5 Ω)	E7843X	00000	**LOW SPEED OPERATION ONLY** **(See note 1)**	60 Hz	N/A	30 μF or 36 μF	733317-01 735925-01 733317-12 735925-12 733317-13 735925-13 **(See note 2**)	901297-12 901298-12 901297-13 901298-13 **(See note 2**)
Toshiba XH-112V XS-AG stator (9.4/28.3 Ω)	E7864X E7869X	10001	None	60/180 Hz	6 μF	30 μF or 36 μF	733317-01 735925-01 733317-12 735925-12 733317-13 735925-13 **(See note 2**)	901297-12 901298-12 901297-13 901298-13 **(See note 2**)

3.0 Dual Speed Starter Tube Select Table (cont)

TUBE TYPE (HOUSING)	TUBE TYPE (INSERT)	CODE Switches 1.....5	OPERATING NOTES (SEE TABLE 3 FOR OPERATING PARAMETERS)	OUTPUT FREQ.	H.S. SHIFT CAP.	L.S. SHIFT CAP.	INDICO 100 DSS PART NO.**	CMP 200 DSS PART NO.**
Toshiba XH-121 XS-AV stator (27.5/58 Ω)	E7876X	00000	**LOW SPEED OPERATION ONLY** **(See note 1)**	60 Hz	N/A	30 μF	733317-01 735925-01 733317-13 735925-13 **(See note 2**)	901297-13 901298-13
Toshiba XH-121 XS-AL stator (9.4/28.3 Ω)	E7884X	10111	**LOW SPEED OPERATION ONLY** **(See note 1)**	60 Hz	N/A	36 μF	733317-12 735925-12 **(See note 10**)	901297-12 901298-12 **(See note 11**)
Toshiba XH-121 XS-AV stator (27.5/58 Ω)	E7886X	00000	**LOW SPEED OPERATION ONLY** **(See note 1)**	60 Hz	N/A	30 μF	733317-01 735925-01 733317-13 735925-13 **(See note 2**)	901297-13 901298-13
Varian/Machlett Dynamax 52 Std "R" stator (16/50 Ω)	A102 A132 A142	01000	None	60/180 Hz	6 μF	30 μF or 36 μF	733317-01 735925-01 733317-12 735925-12 733317-13 735925-13 **(See note 2**)	901297-12 901298-12 901297-13 901298-13 **(See note 2**)
Varian/Machlett Dynamax 62 "STD" stator (23/56 Ω) Dynamax 62U configured as "STD" or "R" (15/36 Ω)	A192B A196 A197 A256 A272 A282 A286 A292 A482 A486	00000	None	60/180 Hz	6 μF	30 μF or 36 μF	733317-01 735925-01 733317-12 735925-12 733317-13 735925-13 **(See note 2**)	901297-12 901298-12 901297-13 901298-13 **(See note 2**)

3.0 Dual Speed Starter Tube Select Table (cont)

TUBE TYPE (HOUSING)	**TUBE TYPE (INSERT)**	**CODE Switches 1……..5**	**OPERATING NOTES** (SEE TABLE 3 FOR OPERATING PARAMETERS)	**OUTPUT FREQ.**	**H.S. SHIFT CAP.**	**L.S. SHIFT CAP.**	**INDICO 100 DSS PART NO.****	**CMP 200 DSS PART NO.****
Varian B100 Std "R" stator (16/50 Ω)	A102 A132 / A134* A142 / A144* A145 *** (See note 8)**	01000	**(Insert A145 only):** **LOW SPEED OPERATION ONLY** **(See note 1)**	60/180 Hz	6 μF	30 μF or 36 μF	733317-01 735925-01 733317-12 735925-12 733317-13 735925-13 **(See note 2**)	901297-12 901298-12 901297-13 901298-13 **(See note 2**)
Varian B100 "Q" stator (8/15 Ω)	A102 A132 / A134* A142 / A144* A145 *** (See note 8)**	11010	**(Insert A145 only):** **LOW SPEED OPERATION ONLY** **(See note 1)**	60/180 Hz	20 μF	60 μF	733317-02 735925-02	901297-02 901298-02
Varian B130 B130H B135H B150 Std "R" stator (16/50 Ω)	A152 A182 / A184* A192 / A194* A195 A196 A197 A272 / A274* A277 / A278* A282 / A284 * A286 A292 / A294* A482 G256 G292 *** (See note 8)**	00000	None	60/180 Hz	6 μF	30 μF or 36 μF	733317-01 735925-01 733317-12 735925-12 733317-13 735925-13 **(See note 2**)	901297-12 901298-12 901297-13 901298-13 **(See note 2**)

3.0 Dual Speed Starter Tube Select Table (cont)

TUBE TYPE (HOUSING)	TUBE TYPE (INSERT)	CODE Switches 1……..5	OPERATING NOTES (SEE TABLE 3 FOR OPERATING PARAMETERS)	OUTPUT FREQ.	H.S. SHIFT CAP.	L.S. SHIFT CAP.	INDICO 100 DSS PART NO.**	CMP 200 DSS PART NO.**
Varian B130 B130H B135H B150 "Q" stator (6/11 Ω)	A152 A182 / A184* A192 / A194* A195 A196 A197 A252 A272 / A274* A277 / A278* A282 / A284 * A286 A292 / A294* A482 G256 G292 *** (See note 8)**	00110	None	60/180 Hz	20 μF	60 μF	733317-02 735925-02	901297-02 901298-02
Varian B160 B160H B165H "R" Stator (16/50 Ω)	G1077 G1078 G1080 G1082 / G1084* G1086 / G1087* G1092 / G1094* *** (See note 8)**	11110	None	60/180 Hz	6 μF	30 μF or 36 μF	733317-01 735925-01 733317-12 735925-12 733317-13 735925-13 **(See note 2)**	901297-12 901298-12 901297-13 901298-13 **(See note 2)**
Varian B180 / B180H B185 / B185H "R" Stator (16/50 Ω)	G1582 G1592 G1593	11110	None	60/180 Hz	6 μF	30 μF or 36 μF	733317-01 735925-01 733317-12 735925-12 733317-13 735925-13 **(See note 2)**	901297-12 901298-12 901297-13 901298-13 **(See note 2)**
Varian B199 "S" Stator (15/18 Ω)	SG1096	01001	None	50/150 Hz	5 μF	30 μF	733317-13 735925-13 733317-17 735925-17 **(See note 2)**	901297-13 901298-13

3.0 Dual Speed Starter Tube Select Table (cont)

TUBE TYPE (HOUSING)	**TUBE TYPE (INSERT)**	**CODE Switches 1.....5**	**OPERATING NOTES** (SEE TABLE 3 FOR OPERATING PARAMETERS)	**OUTPUT FREQ.**	**H.S. SHIFT CAP.**	**L.S. SHIFT CAP.**	**INDICO 100 DSS PART NO.****	**CMP 200 DSS PART NO.****
Varian Diamond, Emerald Std "R" stator (20/50 Ω)	RAD8 RAD12 RAD68 RAD74	00000	**LOW SPEED OPERATION ONLY** **(See note 1)**	60 Hz	N/A	30 μF or 36 μF	733317-01 735925-01 733317-12 735925-12 733317-13 735925-13 **(See note 2**)	901297-12 901298-12 901297-13 901298-13 **(See note 2**)
Varian Diamond, Emerald Std "R" stator (20/50 Ω)	RAD13 RAD14 RAD68	00000	None	60/180 Hz	6 μF	30 μF or 36 μF	733317-01 735925-01 733317-12 735925-12 733317-13 735925-13 **(See note 2**)	901297-12 901298-12 901297-13 901298-13 **(See note 2**)
Varian Sapphire Std "R" stator (20/50 Ω)	RAD21 RAD40 RAD44 RAD56 RAD60 RAD92 RAD94	10100	None	60/180 Hz	6 μF	30 μF or 36 μF	733317-01 735925-01 733317-12 735925-12 733317-13 735925-13 **(See note 2**)	901297-12 901298-12 901297-13 901298-13 **(See note 2**)

3.0 Dual Speed Starter Tube Select Table (cont)

THE DUAL SPEED STARTER USES MODULATION STRATEGIES TO OBTAIN THE DESIRED OUTPUTS. MEASURED VOLTAGES MAY NOT AGREE WITH THOSE LISTED IN THE TABLE. HOWEVER, THE CURRENTS FLOWING IN THE STATOR WINDINGS ARE EQUIVALENT TO THOSE THAT WOULD EXIST IF THE STATOR WAS EXCITED WITH THESE VOLTAGES.

****** Dual Speed Starter part numbers 733317-XX (Indico 100) and 901297-XX (CMP 200 DR) are used in 400 VAC 3ϕ generators / power supplies and in 480 VAC 3ϕ generators / power supplies with a line adjusting transformer.

Dual Speed Starter part numbers 735925-XX (Indico 100) and 901298-XX (CMP 200 DR) are used in 230 VAC 1ϕ generators / power supplies and in 480 VAC 3ϕ direct input generators / power supplies (using no line adjusting transformer).

Where more than one Dual Speed Starter part number is referenced for a particular tube type, any of these (applicable to the generator and input voltage) is acceptable. For 2-tube systems using different tube types, both tube types must be considered.

NOTE 1: Tube types designated as low speed only or high speed only must be programmed for low speed only or high speed only operation. Refer to the section ***Tube Selection*** within Chapter 3 of the applicable generator service manual for details. For some tubes listed as high speed only, the starter may be capable of low speed operation but the Manufacturer's data sheet for the Insert lists high speed only. In other cases, the limitation is due to operational limitations of the Dual Speed Starter itself.

NOTE 2: Dual Speed Starters 733317-01 / 735925-01 (Indico 100 only) provide 6 μF of high speed and 31 μF of low speed shift capacitance. Dual Speed Starters 733317-13 / 735925-13 may be used in place of Dual Speed Starter "-13" in all cases and are preferred.

Dual Speed Starters 733317-12 / 735925-12 (Indico 100) and 901297-12 / 901298-12 (CMP 200 DR) are universal configurations, providing either 6 μF or 7.5 μF of high speed and either 36 μF or 37.5 μF of low speed shift capacitance. Capacitor selection is made automatically by relays located on the Dual Speed Starter.

Dual Speed Starters 733317-13 / 735925-13 (Indico 100) and 901297-13 / 901298-13 (CMP 200 DR) are universal configurations, providing either 5 μF or 6 μF of high speed and 30 μF of low speed shift capacitance. Capacitor selection is made automatically by relays located on the Dual Speed Starter.

Dual Speed Starters 733317-16 / 735925-16 (Indico 100) and 901297-16 / 901298-16 (CMP 200 DR) are special configurations, providing either 6 μF or 12.5 μF of high speed and either 31.5 μF or 37.5 μF of low speed shift capacitance. Capacitor selection is made automatically by relays located on the Dual Speed Starter. These starters are intended for used in place of Dual Speed Starter "-13" in two-tube systems that include both a standard "R" stator (requiring 6 μF of high speed capacitance) and a tube requiring 12.5μF of high speed shift capacitance (Philips ROT 350//500).

Dual Speed Starters 733317-17 / 735925-17 (Indico 100 only) are special configurations, providing either 5 μF or 12.5 μF of high speed and either 30 μF or 37.5 μF of low speed shift capacitance. Capacitor selection is made automatically by relays located on the Dual Speed Starter. These starters may be used in place of Dual Speed Starter configuration -13 in two-tube systems that include both a tube requiring 5μF of high speed shift capacitance (typically IAE tubes) and a tube requiring 12.5μF of high speed shift capacitance (Philips ROT350/500). **Do not use these starters with Siemens tubes due to high-speed shift capacitor voltage limitations.**

NOTE 3: Comet tube inserts with the prefix "DI" and "DX" are interchangeable.

NOTE 4: Philips SRO Housing with the windings connected in series (high impedance configuration).

NOTE 5: Philips SRO Housing with the windings connected in parallel (low impedance configuration).

NOTE 6: Dunlee tube inserts with the prefix "DU" and Philips tube inserts with the prefix "RO" are interchangeable. Select the corresponding Philips insert type within the Generator software when using Dunlee tubes.

NOTE 7: Toshiba tube inserts with the suffix "X, "FX", "GX", and "JX" are interchangeable.

NOTE 8: These X-ray tubes incorporate a control grid. Grid control is currently not supported by CPI generators. Connect the grid connection to Ground when using these tubes, and select the insert type within the Generator software corresponding to the equivalent non-grid tube.

NOTE 9: Dual Speed Starters 733317-15 / 735925-15 (Indico 100) and 901297-15 / 901298-15 (CMP 200 DR) have jumper selectable phase shift capacitance that allows selection of 15.5 μF or 28 μF low speed shift capacitors for operation with CGR (GE) Statorix or Toshiba E7252 (XS-R/RA stator) tubes, respectively, as per table 2. **By default, this starter is typically factory set to the 28 μF position. Confirm proper configuration per the section "configuring dual speed starter 733317-15 / 735925-15" in chapter 2 before proceeding.**

(Indico 100 only): If configured for 28 μF of low speed capacitance, these Dual Speed Starters also support tubes listed in Table 2 as requiring Dual Speed Starters 733317-13 / 735925-13 and requiring 6 μF of high speed capacitance. For two-tube operation, this configuration will support: a) these tubes and the Toshiba E7252X/XS-RA (high and low speed) simultaneously, or, b) these tubes and a CGR Statorix tube (high-speed only) simultaneously. The Toshiba and CGR tubes can be supported simultaneously if one or both of these tubes are operated in high-speed mode only.

(CMP 200 DR only): If configured for 28 μF low speed capacitance, these Dual Speed Starters also support tubes listed in Table 2 as requiring Dual Speed Starters 901297-13 / 901298-13 and requiring 6 μF of high speed capacitance.

NOTE 10: **(Indico 100 only):** Toshiba tubes listed as requiring Dual Speed Starter 733317-12 / 735925-12 may also operate satisfactorily using Dual Speed Starters 733317-13 / 735925-13, which provide a reduced low speed start capacitance of 30 μF. The installer must verify correct low speed operation if these alternate Dual Speed Starters is used. The Dual Speed Starter "-12" is preferred.

NOTE 11: **(CMP 200 DR only):** Toshiba tubes listed as requiring Dual Speed Starter 901297-12 / 901298-12 may also operate satisfactorily using Dual Speed Starters 901297-13 / 901298-13, which provide a reduced low speed start capacitance of 30 μF. The installer must verify correct low speed operation if this alternate "-13" Dual Speed Starter is used. The Dual Speed Starter "-12" is preferred.

3.1 DUAL SPEED STARTER TUBE CODES

Tube operating parameters for each tube type are selected by setting switches to the applicable Code, as indicated in Table 2. For reference, operating parameters applicable to each Code are contained in Table 3 below.

Reference notes are provided at the end of Table 3.

TABLE 3: TUBE TYPE CODES (HIGH SPEED STARTER)

CODE Switches 1.....5	TUBE TYPE (CODE)	H.S. START VOLTS	H.S. RUN VOLTS	H.S. BOOST TIME	H.S. FREQ.	H.S. BRAKE VOLTS	H.S. BRAKE TIME	L.S. START VOLTS	L.S. RUN VOLTS	L.S. BOOST TIME	L.S. FREQ. Hz	H.S. SHIFT CAP.	APPLICABLE DSS TYPES (See note 1)
00000	0	400 V	100 V	1.4 sec	180 Hz	100 V	3.0 sec	240 V	60 V	1.4 sec	60 Hz	6 μF	-01, -12, -13, -15, -16
10000	1	400 V	100 V	1.9 sec	180 Hz	100 V	3.0 sec	240 V	70 V	1.9 sec	60 Hz	6 μF	-01, -12, -13, -15, -16
01000	2	400 V	100 V	1.0 sec	180 Hz	100 V	3.0 sec	240 V	60 V	1.0 sec	60 Hz	6 μF	-01, -12, -13, -15, -16
11000	3	400 V	100 V	5.0 sec	180 Hz	150 V	3.0 sec	240 V	70 V	5.0 sec	60 Hz	6 μF	-01, -12, -13, -15, -16
00100	4	420 V	70V	1.6 sec	180 Hz	120 V	3.0 sec	240 V	50 V	1.6 sec	60 Hz	6 μF	-01, -12, -13, -15, -16
10100	5	400 V	100 V	2.3 sec	180 Hz	100 V	3.0 sec	240 V	50 V	2.3 sec	60 Hz	6 μF	-01, -12, -13, -15, -16
01100	6	240 V	120 V	4.5 sec	180 Hz	120 V	3.0 sec	240 V	70 V	4.5 sec	60 Hz	6 μF	-01, -12, -13, -15, -16
11100	7	240 V	120 V	2.3 sec	180 Hz	100 V	3.0 sec	240 V	50 V	2.3 sec	60 Hz	6 μF	-01, -12, -13, -15, -16
00010	8	400 V	90 V	3.0 sec	150 Hz	100 V	3.0 sec	240 V	100 V	1.5 sec	50 Hz	6 μF	-01, -12, -13, -15, -16
10010	9	280 V	60 V	1.5 sec	180 Hz	80 V	3.0 sec	180 V	50 V	1.5 sec	60 Hz	12.5 μF	-12 (LS only), -16, -17 (HS/LS)
01010	10	440 V	100 V	0.8 sec	150 Hz	120 V	1.8 sec	220 V	50 V	0.6 sec	50 Hz	6 μF	-01, -12, -13, -15, -16
11010	11	290 V	70 V	0.8 sec	180 Hz	60 V	3.0 sec	150 V	50 V	0.8 sec	60 Hz	20 μF	-02 (HS/LS), -16,-17 (LS only)
00110	12	290 V	60 V	1.3 sec	180 Hz	60 V	3.0 sec	150 V	50 V	1.3 sec	60 Hz	20 μF	-02
10110	13	340 V	60 V	1.0 sec	180 Hz	100 V	3.0 sec	240 V	70 V	3.0 sec	60 Hz	20 μF	-02
01110	14	400 V	90 V	0.9 sec	180 Hz	80 V	2.0 sec	230 V	70 V	0.9 sec	60 Hz	7.5 μF	-12
11110	15	400 V	100 V	5.0 sec	180 Hz	150 V	3.0 sec	240 V	70 V	5.0 sec	60 Hz	6 μF	-01, -12, -13, -15, -16

CODE Switches 1.....5	TUBE TYPE (CODE)	H.S. START VOLTS	H.S. RUN VOLTS	H.S. BOOST TIME	H.S. FREQ.	H.S. BRAKE VOLTS	H.S. BRAKE TIME	L.S. START VOLTS	L.S. RUN VOLTS	L.S. BOOST TIME	L.S. FREQ. Hz	H.S. SHIFT CAP.	APPLICABLE DSS TYPES (See note 1)
00001	16	LS only	n/a	n/a	n/a	n/a	n/a	320V	50 V	1.0 sec	60 Hz	n/a	Reserved
10001	17	440 V	120 V	1.2 sec	180 Hz	90 V	3.0 sec	240 V	60 V	0.6 sec	60 Hz	6 μF	-01, -12, -13, -15, -16
01001	18	400 V	100 V	2.8 sec	150 Hz	120 V	3.0 sec	180 V	60 V	2.8 sec	50 Hz	5 μF	-13, -17
11001	19	320 V	130 V	2.0 sec	180 Hz	130 V	3.0 sec	240 V	60 V	2.0 sec	60 Hz	3 μF	-15 (HS / LS) -01, -12, -13 (LS only)
00101	20	400 V	90 V	1.0 sec	180 Hz	80 V	3.0 sec	230 V	70 V	1.0 sec	60 Hz	7.5 μF	-12
10101	21	420 V	100 V	2.2 sec	180 Hz	150 V	3.0 sec	240 V	80 V	1.8 sec	60 Hz	6 μF	-01, -12, -13, -15, -16
01101	22	340 V	60 V	1.4 sec	150 Hz	120 V	4.0 sec	220 V	60 V	1.5 sec	50 Hz	6 μF	-01, -12, -13, -15, -16
11101	23	360 V	90 V	1.6 sec	150 Hz	80 V	3.0 sec	150 V	50 V	1.6 sec	50 Hz	5 μF	-13
00011	24	420 V	80 V	1.8 sec	150 Hz	150 V	3.0 sec	240 V	80 V	1.8 sec	50 Hz	6 μF	-01, -12, -13, -15, -16
10011	25	420 V	80 V	2.2 sec	150 Hz	150 V	3.0 sec	240 V	80 V	1.8 sec	50 Hz	6 μF	-01, -12, -13, -15, -16
01011	26	400 V	80 V	1.0 sec	150 Hz	120 V	3.0 sec	240 V	80 V	1.0 sec	50 Hz	5 μF	Reserved
11011	27	440 V	100 V	1.1 sec	150 Hz	120 V	1.8 sec	220 V	80 V	1.1 sec	50 Hz	5 μF	-13, -17
00111	28	450 V	150 V	3.0 sec	150 Hz	120 V	3.0 sec	240 V	90 V	3.0 sec	50 Hz	3 μF	-15
10111	29	220 V	60 V	1.2 sec	180 Hz	80 V	3.0 sec	130 V	50 V	1.3 sec	60 Hz	6 μF	-01, -12, -13, -15, -16
01111	30	420 V	50 V	1.8 sec	180 Hz	150 V	3.0 sec*	240 V	50 V	1.8 sec	60 Hz	12.5 μF	-16, -17 * (LS braking 1.2 sec)
11111	31	330V	80 V	1.4 sec	180 Hz	70V	3.0 sec	240 V	80 V	1.4 sec	60 Hz	5 μF	-13

NOTE 1: Tube Type codes should only be used with the applicable DSS types specified in this table.
Refer to Table 2 for DSS Part Numbers applicable to each Tube Type (Housing and Insert).