A compact and motor-driven cam timer, the 324 precisely controls one to twelve load circuits through easily-set screwdriver adjustable cams. Each timer provides a wide range of cycle times through a set of interchangeable gears.

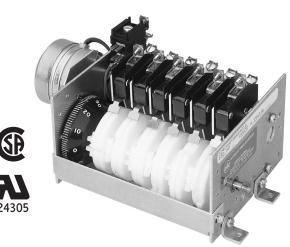
EASY AND PRECISE CAM ADJUSTMENT: With ATC's unique split-cam design, each side of the cam is separately screwdriver-adjustable in either direction: either side determines the precise instant during the cycle when the switch will actuate, the other side determines how long the switch will remain actuated. Adjustments are easy and precise: 1/4 turn of the adjusting screw equals 0.5% of cycle time. A setting disc, calibrated in 1% increments, facilitates program set-up and indicates cycle progress.

ONE TO TWELVE PRECISION SWITCHES: Whether used as a time or sequence programmer, the 324 can be ordered with any number of camoperated switches from one to twelve. Each SPDT precision switch is rated at 10 amps, 120 VAC and is 1/3 hp rated at 120 or 240 VAC.

WIDE RANGE OF CYCLE TIMES: The 324 is available with a variety of synchronous motors. See charts for available timing ranges. Each motor provides an adjustable range of cycle times, with a ratio of over 2.5:1, through a set of interchangeable gears. Changing gears is a simple operation that takes only a few minutes.

ACCURACY: The repeat accuracy and setting accuracy of the 324 are both within \pm 0.25%. Follower fingers precisely track the contour of the cams, accurately operating the precision switches with guick-break action.

SEQUENCE CONTROL: The 324 can be ordered without a motor and with a 1 inch long shaft extension on either or both ends, for use as a rotary cam limit switch.



Precision Switch Cam Programmer

SPECIFICATIONS

CYCLE TIMES	(not field- Choose fro motors an	ON-Delay or OFF-Delay operation convertible). om a variety of interchangeable d gears. for available timing ranges.	LOAD SWITCHES	TYPE: Pr CONTACT AC CONTACT RA MINIMUM CO ACTUATION 1	TION: TING: ONTACT	switches; one for each cam SPDT (Form C) 10 A at 120 VAC (non-inductive). 1/3 HP at 125/250 VAC 1% of cycle time
REPEAT ACCURACY		of cycle time.	DRIVE MOTORS	SPEED:	IIIIE.	choice of 12
SETTING ACCURACY		of cycle time.	DRIVE MOTORS	TYPE:		Synchronous; permanently
CAMS		1 to 12 (or multiples up to 12, by combining timer assemblies); cams				lubricated; integral slip clutch for manual advance; anti-backup to prevent damage to switches
	CUT:	may be factory-set. Standard or 50% cut, as specified		VOLTAGE:		120 VAC, 50 or 60 cycles; 240 VAC, 50 or 60 cycles.
		(standard cams allow contact closure adjustment of 1 to 45% or 55 to 99%		POWER CONSUMPTION	ON:	12 watts max
		50% cut cams allow contact closure adjustment of 12 to 52% or 48 to	,	DUAL DRIVE:	:	two motors may be used, special applications
		88%; custom cams available with 2 or 4 or cuts.		TORQUE-SPE		At cycle times of 30 SEC or longer, the 324 can drive and
	CONSTRUC	TION: Two-inch diameter split type; made of Delrin				switch 12 contacts simultaneously; below 30 SEC, the motor may be limited in its ability to drive or
	MECHANICAI CONTACTS:	L: over 10,000,000 operations over 1,000,000 operations at				switch a number of contacts simultaneously.
·	continuero.	less than 1 amp	TEMPERATURE RA	TING 32	2 to 140	0°F (0 to 60°C)
			WEIGHT	NET: from 1- 3-1/2 lbs. fo		s. for the 3 cam unit up to 2 cam unit
			ENCLOSURES			ase for one model 324 with (See Accessories) (Optional)

MODEL NUMBER

MODEL NUM	BER	324C
NUMBER OF	SWITCHES	
1	Switch, 3 Cams	01
	Switches, 3 Cams	02
3	Switches, 3 Cams	03
	Switches, 6 Cams	04
5	Switches, 6 Cams	05
6	Switches, 6 Cams	06
	Switches, 9 Cams	07
8	Switches, 9 Cams	08
9	Switches, 9 Cams	09
CYCLE TIME	MOTOR SPEED	
N	o Motor	0
_	rpm	Α
	50 rph	В
1	5 rph	Е
5	rph (120 VAC only)	F
2	.5 rph	G
1	rph	Н
1	/6 rph (120 VAC only)	L
CYCLE TIME	MOTOR PINION	
N	o Motor	0
_	4 Teeth (300-495-01-00)	1
	0 Teeth (300-495-02-00)	2
4	0 Teeth (300-495-03-00)	3
CYCLE TIME	CAM SHAFT GEAR	
	o Motor	0
	0 Teeth (300-495-11-00)	A
	6 Teeth (300-495-12-00)	В
	0 Teeth (300-495-13-00)	C
	5 Teeth (300-495-14-00)	D
	0 Teeth (300-495-17-00)	Е
	5 Teeth (300-495-15-00)	F
_	0 Teeth (300-495-16-00)	G
OPERATION	,	
	epeat Cycle/Stop Cycle	R
	ynamic Brake ¹	
	ternal Drive by user,	
_		_

no motor

Special

м	U.	TΛ	DC
М	0	ГΟ	K)

	1 Motor	1
	2 motors	2
	No motor	3
	Special	0
VOLTAGE	& FREQUENCY	
	120/60	Α
	240/60*	В
	120/50	С
	240/50*	D
	No motor	Х
OPTIONS		
	None	01
	1/4" dia. x 1" long shaft extension	02
	right end (Units with one or no motor)	
	1/4" dia. x 1" long shaft extension	03
	left end (Units with one or no motor)	
	1/4" dia. x 1" long shaft extension	04
	both ends (On motorless units only)	
	Special	00
FEATURES	5	
	Standard (other than cam settings) (Blades)	Х

Standard (other than cam settings)	Χ
(Blades)	
Special	K

NOTES

CAMS

Factory setting cams to 0.25% tolerance, 50% cams allow 12 to 52% or 48 to 88% adjustment of switch actuation. 2, 3, or 4 cuts equally spaced. Have limited adjustability. (Does not include 50% cams with multiple cuts) Multiple cuts, unequally spaced. Multiple cuts over 4. Specially cut or specially molded cams.

CONTACT SWITCH

Switch with Bracket

324-260-82-00

¹For Stop Cycle, or Brake operation, specify a 324 with one more switch than you need for your load circuits. (Do not exceed 12 switches total!) You interwire this switch to the motor according to the installation instruction for the unit.

For prices and further information, consult factory.

TIME CYCLE ORDERING CODES

Select Time Cycle from table; if it is available with more than one motor and gearing combination, pick the combination which would best accommodate potential future speed changes. 3 Digit Speed Code identifies motor.

K

² Be sure to specify shaft extension under OPTIONS

^{* 240} V option limited to availability

15 RPM Motor –Q–	for this motor	all slower cycles	5.0	4.8	4.5	4.0	3.6	3.0	One Motor	SEC	1		all slower cycles	20 40	17.5 35		12.5 25			+	+	0 0		+	0	- 0,	Two One	(SEC)	Time Cycle			at 50 cycles	specu	cesulting	OLCONDO	SECONDS				at 60 cycles	speed	resulting	SECONDS							
						_			1 2												_	+			-	1 2					60	55	50	45	40	36	3 2	3 0	8 8	H 8	5 5	45	40	36	3 5	30	Cam Shaft Gear			
High torque permanent magnet. No brake diode required on stop cycle units.									3		MAXIMUN	_ -									ļ	,	υ r	۰ .		ı w	-	MAXIMUN			21.6	19.8	18	16.2	14.4	12.96	10.8	5 5	10.5	5	÷ :	13.5	12	10.8	ي د	0	Motor Pinion 3,	į	Time	Ī
ermanent de require					+	-			4 5	Tota	1 NUMBER	HIS TABLE								H	+	1 c	+	» -	-	4 1	4	NUMBER			A36	A3F	A3E	A3D	A3C	ASB	ASA	DC.A	2 2	2 2	2 2	A3D	A3C	A3B	ASA	٦ŀ	m v o c	,		-
magnet. d on stop									6	Total Number of Contacts	MAXIMUM NUMBER OF CONTACTS SWITCHING TOGETHER	ADDI IES							u	, ,	o r	J -		-		. 6	lotal Number of Contacts	MAXIMUM NUMBER OF CONTACTS SWITCHING TOGETHER			28.8	26.4	24	21.6	19.2	17.28	14.4	24	7.2	2 5	30 .0	18	16	14.4	712	1	Motor Pinion 2,		Time	
cycle unit							_	6	7 8	of Contac	CTS SWIT	TO O OT						Ļ	4 1	+	+		-	· ·	+	. ~	of Contac	CTS SWIT			A2G	A2F	A2E	A2D	A2C	AZB	AZA	DZW.	75.	2 2	200	A2D	A2C	A2B	AZA	٦t	m 0 0 0	,		-
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					_	+	7 6	4 3	10 11		ETHER						7 7	┿	+	+		+		1	+		-	ETHER			A1G	A1F	A1E	A1D	A1C	┞	+	Ald	+	\perp	+	4	A1C	A1B	AIA	٦ŀ	# -			
				=	+	+	\dashv	2	1 12							15	7	\vdash	+	+		+		'	+	1 12	+										21.6	+		3 6	t		24			⊣⊦	Motor Pinion 3,		Time	
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ne 324 imultan	the gr	tersect	orrespo	eed dov	er of co	nat corr	elow. F	eously	umber	he abili		5	i)																			$^{+}$		43.2		H	28.8	╫	t	4 4	t	+	32		+	34	Motor Pinion 2,		Time	
s ability; eously;	ay, the	ion of	nds to	vn the	ntacts	esponc	ick the	is dete	of load	ty of th		CAPALE APALE	; i —			_	_		-11-		01	· -			7.							+	4			⊢	+	DZU	220	פאר	פאר	4		B28	+	71	ш D O C	,		
f to trip	re is no	intersection of the two column	corresponds to the fastest time	ceed down the column that	you ne	ls to the	below. Pick the vertical column	neously is determined in the chart	number of load contacts simulta-	The ability of the 324C to trip a		CAPARII ITIFS		,	speed at 50 cycles	resulting	MINUTES				at 60 cycles	speed	MINUTES								72	1				H		2 0	t	H 8	5 5	1		36	3 50	30	Motor Pinion 1, 24 Tooth		Time	
		\circ	G	_ ₹	<u>e</u>	ğ	<u>8</u>	in d	SS	ಠ		껐뜌	<u> </u>			45	40	2 0	J 0	3 3		45	46	36	20	Shaft	Cam				B16	略	B1E	B1D	B1C	818	BIA	פופ	010	2 5	B10	B1D	بع	818	BIA	76	m D O C	,		
the lim	limitat	olumn	st tim	: =	and	100	풀	ie C	Imu	를			' ව	5	-1	- '	-11-	,, _	2	1																۱ ۵		Ш	11.	1	" "	\neg	땅			- 11				
the 324's ability to trip contacts simultaneously; if not, the limit is	in the gray, there is no limitation to	intersection of the two columns is	st time	: =	ber of contacts you need and pro-	that corresponds to the total num-	umn	ne chart	imulta-	trip a			21.6		+	+	14.4		╫		+	13.5	12	10.8	9 2		Pinion	Motor	Time		432	396	360	324	Г	۳	210	╬	360	Ť	т	_	10 240		2 2	Щ.	Motor Pinion :		Time	
<u>w</u> .	n to	olumns is	Ф	•	nd pro-		umn	ne chart	imulta-	trip a			0 21.6 F3G	19.8 F3F	18 F3E	16.2 F3D	14.4 F3C	13.06 F3A	10.0 10.0	16.5	15 131	F30	F3C	-3B		3, D	0 1			5 RP	432 E3G	4	360 E3E	324 E3D	288	2.6.67	+	2 20	360	330	200	270			\perp	180	Motor 0 Pinion 3, D 40 Tooth E		Time	
<u>w</u> .	limitation to	olumns is	st time	•	nd pro-	al num-	umn	ne chart	imulta-	trip a			0 21.6 F3G 28.8	19.8 F3F 26.4	18 F3E 24	16.2 F3D 21.6	14.4 F3C 19.2	13.0C E3B 17.30	10.0 10.0 24	16.5 F3F 24	15 135 20	F3D 18	F3C 16	F3B 14.4	F3A 12	3, D F	0 Motor	·		5 RPH Moto	E3G	4	E3E	E3D	288 E3C	45 27.6C7	22	26	360	330 E3E	300	270 E3D	240 E3C	216 E3B	E DA	180 F3A	mooc	,	Time	
<u>w</u> .	n to	S IS	Ф	speed -	nd pro- resulting —	HOLKS		Gear	Shaft				0 21.6 F3G	19.8 F3F 26.4 F2F	18 F3E 24 F2E	16.2 F3D 21.6 F2D	14.4 F3C	10.8 F3A 14.4 F2A	10.0 E3V 17V 050	18 57 24 626	15 F3E 20 F2E	F3D 18 F2D 2	F3C 16 F2C	F3B 14.4	E34 12 E24	3, D Pinion 2, D	0 Motor 0	<u> </u>	Time	5 RPH Motor—F	E3G	딹	E3E 480	E3D 432	288 E3C 384	239.2 E3D 343.6	+	76	360 E36 480	330 E3E 440	300 E3E 400	270 E3D 360	240	216 E3B 288	E3A 240	180 E34 240				
resulting 45 8.1 speed 50 0	n to HOURS 36 6.48	s is 30 54	E 55 8.25	speed 50 7.5	nd pro- resulting 40 6	HOURS 36 5.4	30 4.5	Gear 40 Tooth	Shaft F			Time	21.6 F36 28.8 F2G 36 F16	19.8 F3F 26.4 F2F 33 F1F	18 F3E 24 F2E 30 F1E	16.2 F3D 21.6 F2D 27 F1D	14.4 E3C 19.2 E2C 24 E1C	13.06 E3B 17.30 E3B 21.6 E1B	10.8 E3.0 14.4 E3.0 18 E1.0	18.5 F36 34 636 30 F16	15 F3E 20 F2E 25 F1E	F3D 18 F2D 22.5 F1D	F3C 16 F2C 20 F1C	F3B 14.4 F2B 18 F1B	E3A 12 E2A 15 E1A	3, D Pinion 2, D 24 D	0 Motor 0 1, 0	C Motor	Time Time	5 RPH Motor-F	E3G 576 E2G	E3F 528 E2F	E3E 480 E2E	E3D 432 E2D	288 E3C 384 E2C	239.2 E3D 343.6 E2D	E3N 34E C E2N	246 120 120 120	360 E3C 480 E2C	330 E3E 440 E2E	300 E3E 400 E2E	270 E3D 360 E2D	240 E3C 320 E2C	216 E3B 288 E2B	E3A 240 E2A	180 E34 240 E24	O Motor O Pinion 2, D Pinoth E 30 Tooth E		Time	
resulting 45 8.1 L3D speed 50 0 135	n to HOURS 36 6.48 L3B	s is 30 5.4 13A	e 55 8.25 L3F	speed 50 7.5 L3E	nd pro- resulting 45 6.75 130	HOIRS 36 5.4 L3B	30 4.5 L3A	Gear 40 Tooth E	Shaft Pinion 3, D	Cam Motor 0		Time 1/6	21.6 F3G 28.8 F2G 36 F1G 43.2 F	19.8 F3F 26.4 F2F 33 F1F	18 F3E 24 F2E 30 F1E	16.2 F3D 21.6 F2D 27 F1D	14.4 E3C 19.2 E2C 24 E1C	13.06 E3B 17.30 E3B 21.6 E1B	10.8 E3.0 14.4 E3.0 18 E1.0	18.5 F36 34 636 30 F16	15 F3E 20 F2E 25 F1E	F3D 18 F2D 22.5 F1D	F3C 16 F2C 20 F1C	F3B 14.4 F2B 18 F1B	E3A 12 E2A 15 E1A	3, D Pinion 2, D 24 D 3,	0 Motor 0 1, 0 Pinion	C Pinion C Motor	Time Time Time	RPH Motor-F	E3G 576 E2G 720	E3F 528 E2F 660	E3E 480 E2E 600	E3D 432 E2D 540	288 E3C 384 E2C 480	239.2 E3D 343.6 E2D 432	E3B 34F C E3B 433	740	360 E36 480 E26 600	330 E3E 440 E2E 550	300 E3E 400 E2E 500	270 E3D 360 E2D 450	240 E3C 320 E2C 400	216 E3B 288 E2B 360	E3B 388 E3B 360	180 E34 240 E24 300	O Motor O Motor D Pinion 2, D Pinion 1, E 30 Tooth E 24 Tooth			
resulting 45 8.1 L3D 10.8 L2D speed 50 0 3E 12 12 12 12 12 12 12 12 12 12 12 12 12	n to 36 6.48 L3B 8.64 L2B	s is 30 5.4 13A 7.2 12A	e 55 8.25 L3F 11 L2F	speed 50 7.5 L3E 10 L2E	nd pro- resulting 45 6.75 130 0 120	HOURS 36 5.4 L3B 7.2 L2B	30 4.5 L3A 6 L2A	Gear 40 Tooth E 30 Tooth E	Shaft Pinion 3, D Pinion 2, D	Cam Motor O Motor O	1	1/6 RPH Moto	21.6 F3G 28.8 F2G 36 F1G 43.2 G3G 57.6	19.8 F3F 26.4 F2F 33 F1F 39.6 G3F 52.8	18 F3E 24 F2E 30 F1E 36 G3E 48	16.2 F3D 21.6 F2D 27 F1D 32.4 G3D 43.2	14.4 F3C 19.2 F2C 24 F1C 28.8 G3C 38.4	10.6 F3A 14.4 F2A 16 F1A 21.6 U3A 26.6	10.0 E3A 14.4 E3A 10 E1A 31.6 C3A 30.0	18 F3C 34 C3C 30 F1C 36 C3C 48	15 F3E 20 F2E 25 F1E 30 63E 40	F3D 18 F2D 22.5 F1D 27 G3D 36	F3C 16 F2C 20 F1C 24 G3C 32	F3B 14.4 F2B 18 F1B 21.6 G3B 28.8	E3A 12 E2A 15 E1A 18 G3A 2A	3, D Pinion 2, D 24 D 3,	0 Motor 0 1, 0 Pinion	C Pinion C Motor	Time Time Time	RPH Motor—F 2.5	E3G 576 E2G 720	E3F 528 E2F 660	E3E 480 E2E 600	E3D 432 E2D 540	288 E3C 384 E2C 480	239.2 E3D 343.6 E2D 432	E3B 34F C E3B 433	740	360 E36 480 E26 600	330 E3E 440 E2E 550	300 E3E 400 E2E 500	270 E3D 360 E2D 450	240 E3C 320 E2C 400	216 E3B 288 E2B 360	E3B 388 E3B 360	180 E34 240 E24 300	O Motor O Pinion 2, D Pinoth E 30 Tooth E		Time	
resulting 40 /2 L3C 9.6 L2C 12 resulting 45 8.1 L3D 10.8 L2D 13.5 speed 50 0 13E 19 12E 15	n to 36 6.48 L3B 8.64 L2B 10.8	s is 30 5.4 13A 7.2 12A 9	e 55 8.25 L3F 11 L2F 13.75	speed 50 7.5 L3E 10 L2E 12.5	nd pro- resulting 45 6.75 130 0 120 11.25	HOURS 36 5.4 L3B 7.2 L2B 9	30 4.5 L3A 6 L2A 7.5	Gear 40 Tooth E 30 Tooth E Tooth	Shaft Pinion 3, D Pinion 2, D	Cam Motor O Motor O	1	1/6 RPH Moto	21.6 F3G 28.8 F2G 36 F1G 43.2 G3G 57.6	19.8 F3F 26.4 F2F 33 F1F 39.6 G3F 52.8	18 F3E 24 F2E 30 F1E 36 G3E 48	16.2 F3D 21.6 F2D 27 F1D 32.4 G3D 43.2	14.4 F3C 19.2 F2C 24 F1C 28.8 G3C 38.4	10.6 F3A 14.4 F2A 16 F1A 21.6 U3A 26.6	10.0 E3A 14.4 E3A 10 E1A 31.6 C3A 30.0	18 F3C 34 C3C 30 F1C 36 C3C 48	15 F3E 20 F2E 25 F1E 30 63E 40	F3D 18 F2D 22.5 F1D 27 G3D 36	F3C 16 F2C 20 F1C 24 G3C 32	F3B 14.4 F2B 18 F1B 21.6 G3B 28.8	E3A 12 E2A 15 E1A 18 G3A 24 G2A	3, D Pinion 2, D 24 D 3, D 2, D	0 Motor 0 1, 0 Pinion 0 Pinion 0	Motor Motor C Motor C	Time Time Time Time	RPH Motor—F 2.5	E3G 576 E2G 720	E3F 528 E2F 660	E3E 480 E2E 600	E3D 432 E2D 540	288 E3C 384 E2C 480	239.2 E3D 343.6 E2D 432	E3B 34F C E3B 433	740	360 E36 480 E26 600	330 E3E 440 E2E 550	300 E3E 400 E2E 500	270 E3D 360 E2D 450	240 E3C 320 E2C 400	216 E3B 288 E2B 360	E3B 388 E3B 360	180 E34 240 E24 300	O Motor O Motor D Pinion 2, D Pinion 1, E 30 Tooth E 24 Tooth		Time	
resulting 45 8.1 L3D 10.8 L2D speed 50 0 3E 12 12 12 12 12 12 12 12 12 12 12 12 12	n to 36 6.48 L3B 8.64 L2B 10.8	s is 30 5.4 13A 7.2 12A 9	e 55 8.25 L3F 11 L2F 13.75	speed 50 7.5 L3E 10 L2E 12.5	nd pro- resulting 45 6.75 130 0 120 11.25	HOURS 36 5.4 L3B 7.2 L2B 9	30 4.5 L3A 6 L2A 7.5	Gear 40 Tooth E 30 Tooth E Tooth	Shaft Pinion 3, D Pinion 2, D	Cam Motor O Motor O 1.	C C Pinion	1/6 RPH Moto	21.6 F36 28.8 F26 36 F16 43.2 636 57.6 626 72	19.8 F3F 26.4 F2F 33 F1F 39.6 G3F 52.8 G2F 66	18 F3E 24 F2E 30 F1E 36 G3E 48 G2E 60	16.2 F3D 21.6 F2D 27 F1D 32.4 G3D 43.2 G2D 54	14.4 F3C 19.2 F2C 24 F1C 28.8 G3C 38.4 G2C 48.	12.0C E3B 17.20 E3B 31.6 E4B 3E 93 C3B 34.E6 C3B 43.3	10 F30 24 UZU 30 F10 31 G C30 388 C30 36	16.5 F3F 22 F2F 27.5 F1F 33 U3F 44 U2F 55	15 F3E 20 F2E 25 F1E 30 63E 40 62E 50	F3D 18 F2D 22.5 F1D 27 G3D 36 G2D 45	F3C 16 F2C 20 F1C 24 G3C 32 G2C 40	F3B 14.4 F2B 18 F1B 21.6 G3B 28.8 G2B 36	E3A 12 E2A 15 E1A 18 G3A 24 G2A 30	3, D Pinion 2, D 24 D 3, D 2, D 1,	0 Motor 0 1, 0 Pinion 0 Pinion 0 Pinion	Motor C Motor C Motor	Time Time Time	RPH Motor-F	E3G 576 E2G 720	E3F 528 E2F 660	E3E 480 E2E 600	E3D 432 E2D 540	288 E3C 384 E2C 480	239.2 E3D 343.6 E2D 432	E3B 34F C E3B 433	740	360 E36 480 E26 600	330 E3E 440 E2E 550	300 E3E 400 E2E 500	270 E3D 360 E2D 450	240 E3C 320 E2C 400	216 E3B 288 E2B 360	E3B 388 E3B 360	180 E34 240 E24 300	O Motor O Motor D Pinion 2, D Pinion 1, E 30 Tooth E 24 Tooth		Time	
resulting 40 /2 L3C 9.6 L2C 12 resulting 45 8.1 L3D 10.8 L2D 13.5 speed 50 0 13E 19 12E 15	n to 36 6.48 L3B 8.64 L2B 10.8	s is 30 5.4 13A 7.2 12A 9	e 55 8.25 L3F 11 L2F 13.75	speed 50 7.5 L3E 10 L2E 12.5	nd pro- resulting 45 6.75 130 0 120 11.25	HOURS 36 5.4 L3B 7.2 L2B 9	30 4.5 L3A 6 L2A 7.5	Gear 40 Tooth E 30 Tooth E Tooth	Shaft Pinion 3, D Pinion 2, D 24	Cam Motor O Motor O 1.	C C Pinion	1/6 RPH Moto	21.6 F36 28.8 F26 36 F16 43.2 636 57.6 626 72	19.8 F3F 26.4 F2F 33 F1F 39.6 G3F 52.8 G2F 66	18 F3E 24 F2E 30 F1E 36 G3E 48 G2E 60	16.2 F3D 21.6 F2D 27 F1D 32.4 G3D 43.2 G2D 54	14.4 F3C 19.2 F2C 24 F1C 28.8 G3C 38.4 G2C 48.	12.0C E3B 17.20 E3B 31.6 E4B 3E 93 C3B 34.E6 C3B 43.3	10 F30 24 UZU 30 F10 31 G C30 388 C30 36	16.5 F3F 22 F2F 27.5 F1F 33 U3F 44 U2F 55	15 F3E 20 F2E 25 F1E 30 63E 40 62E 50	F3D 18 F2D 22.5 F1D 27 G3D 36 G2D 45	F3C 16 F2C 20 F1C 24 G3C 32 G2C 40	F3B 14.4 F2B 18 F1B 21.6 G3B 28.8 G2B 36	E3A 12 E2A 15 E1A 18 G3A 24 G2A 30	3, D Pinion 2, D 24 D 3, D 2, D 1, D 1	0 Motor 0 1, 0 Pinion 0 Pinion 0 Pinion 0	Motor C Motor C Motor C	Time Time Time Time	RPH Motor—F 2.5	E3G 576 E2G 720	E3F 528 E2F 660	E3E 480 E2E 600	E3D 432 E2D 540	288 E3C 384 E2C 480	239.2 E3D 343.6 E2D 432	E3B 34F C E3B 433	740	360 E36 480 E26 600	330 E3E 440 E2E 550	300 E3E 400 E2E 500	270 E3D 360 E2D 450	240 E3C 320 E2C 400	216 E3B 288 E2B 360	E3B 388 E3B 360	180 E34 240 E24 300	O Motor O Motor D Pinion 2, D Pinion 1, E 30 Tooth E 24 Tooth		Time	
resulting 40 /2 L3C 9.6 L2C 12 resulting 45 8.1 L3D 10.8 L2D 13.5 speed 50 0 13E 19 12E 15	n to 36 6.48 L3B 8.64 L2B 10.8	s is 30 5.4 13A 7.2 12A 9	e 55 8.25 L3F 11 L2F 13.75	speed 50 7.5 L3E 10 L2E 12.5	nd pro- resulting 45 6.75 130 0 120 11.25	HOURS 36 5.4 L3B 7.2 L2B 9	30 4.5 L3A 6 L2A 7.5	Gear 40 Tooth E 30 Tooth E Tooth	Shaft Pinion 3, D Pinion 2, D 24	Cam Motor O Motor O 1.	C C Pinion	1/6 RPH Moto	21.6 F36 28.8 F26 36 F16 43.2 G36 57.6 G26 72 G16 108 H36	19.8 F3F 26.4 F2F 33 F1F 39.6 G3F 52.8 G2F 66 G1F 99 H3F	18 F3E 24 F2E 30 F1E 36 G3E 48 G2E 60 G1E 90 H3E	16.2 F3D 21.6 F2D 27 F1D 32.4 G3D 43.2 G2D 54 G1D 81 H3D	14.4 F3C 19.2 F2C 24 F1C 28.8 G3C 38.4 G2C 48 G1C 72 H3C	10.0 F3A 14.4 F2A 10 F1A 21.0 U3A 20.0 U2A 30 U1A F3A /2	100 F30 24 UZU 30 F10 30 USU 46 UZU 00 UIU 30 USU	10.5 F3F 22 F2F 27.5 F1F 33 W3F 44 W2F 35 W1F 82.5 M3F	15 F3E 20 F2E 25 F1E 30 G3E 40 G2E 50 G1E 75 H3E	F3D 18 F2D 22.5 F1D 27 G3D 36 G2D 45 G1D 67.5 H3D	F3C 16 F2C 20 F1C 24 G3C 32 G2C 40 G1C 60 H3C	F3B 14.4 F2B 18 F1B 21.6 G3B 28.8 G2B 36 G1B 54 H3B	E3A 12 E2A 15 E4A 18 E3A 24 E3A 30 E4A 45 H3A	3, D Pinion 2, D 24 D 3, D 2, D 1, D 3, D 20 Tooth E 30 Tooth E 30 Tooth E 40 Tooth E	O Motor O 1, O Pinion O Pinion O Pinion O Pinion O	Motor C Motor C Motor C Motor C	Time Time Time Time Time	RPH Motor—F 2.5 RPH Motor—G 1	E3G 576 E2G 720	E3F 528 E2F 660	E3E 480 E2E 600	E3D 432 E2D 540	288 E3C 384 E2C 480	239.2 E3D 343.6 E2D 432	E3B 34F C E3B 433	740	360 E36 480 E26 600	330 E3E 440 E2E 550	300 E3E 400 E2E 500	270 E3D 360 E2D 450	240 E3C 320 E2C 400	216 E3B 288 E2B 360	E3B 388 E3B 360	180 E34 240 E24 300	O Motor O Motor D Pinion 2, D Pinion 1, E 30 Tooth E 24 Tooth		Time	
resulting 40 /2 L3C 9.6 L2C 12 resulting 45 8.1 L3D 10.8 L2D 13.5 speed 50 0 13E 19 12E 15	n to 36 6.48 L3B 8.64 L2B 10.8	s is 30 5.4 13A 7.2 12A 9	e 55 8.25 L3F 11 L2F 13.75	speed 50 7.5 L3E 10 L2E 12.5	nd pro- resulting 45 6.75 130 0 120 11.25	HOURS 36 5.4 L3B 7.2 L2B 9	30 4.5 L3A 6 L2A 7.5	Gear 40 Tooth E 30 Tooth E Tooth	Shaft Pinion 3, D Pinion 2, D 24	Cam Motor O Motor O 1.	C C Pinion	1/6 RPH Moto	2 21.6 F36 28.8 F26 36 F16 43.2 636 57.6 626 72 616 108 H36 144	19.8 F3F 26.4 F2F 33 F1F 39.6 G3F 52.8 G2F 66 G1F 99 H3F 132	18 F3E 24 F2E 30 F1E 36 G3E 48 G2E 60 G1E 90 H3E 120	16.2 F3D 21.6 F2D 27 F1D 32.4 G3D 43.2 G2D 54 G1D 81 H3D 108	14.4 F3C 19.2 F2C 24 F1C 28.8 G3C 38.4 G2C 48 G1C 72 H3C 96	10.0 F38 14.4 F28 10 F18 21.0 U38 20.0 U28 30 U18 M38 72 M28	10 F30 24 UZU 30 F10 316 G30 30 G30 36 G40 U30 73 U30 IZU	10.5 F3F 22 F2F 27.5 F1F 33 USF 44 UZF 35 USF 82.5 USF 110	15 F3E 20 F2E 25 F1E 30 63E 40 62E 50 61E 75 H3E 100	F3D 18 F2D 22.5 F1D 27 G3D 36 G2D 45 G1D 67.5 H3D 90	F3C 16 F2C 20 F1C 24 G3C 32 G2C 40 G1C 60 H3C 80	F3B 14.4 F2B 18 F1B 21.6 G3B 28.8 G2B 36 G1B 54 H3B 72	E3A 12 E2A 15 E1A 18 E3A 2A E2A 30 E1A A5 H3A 60	3, D Pinion 2, D 24 D 3, D 2, D 1, D 3, D 2,	O Motor O 1, O Pinion O Pinion O Pinion O Pinion O Pinion	Motor Motor C Motor C Motor C Motor C Motor	Time Time Time Time Time	RPH Motor—F 2.5 RPH Motor—G 1	E3G 576 E2G 720	E3F 528 E2F 660	E3E 480 E2E 600	E3D 432 E2D 540	288 E3C 384 E2C 480	239.2 E3D 343.6 E2D 432	E3B 34F C E3B 433	740	360 E36 480 E26 600	330 E3E 440 E2E 550	300 E3E 400 E2E 500	270 E3D 360 E2D 450	240 E3C 320 E2C 400	216 E3B 288 E2B 360	E3B 388 E3B 360	180 E34 240 E24 300	O Motor O Motor D Pinion 2, D Pinion 1, E 30 Tooth E 24 Tooth		Time	
resulting 40 /2 L3C 9.6 L2C 12 resulting 45 8.1 L3D 10.8 L2D 13.5 speed 50 0 13E 19 12E 15	n to 36 6.48 L3B 8.64 L2B 10.8	s is 30 5.4 13A 7.2 12A 9	e 55 8.25 L3F 11 L2F 13.75	speed 50 7.5 L3E 10 L2E 12.5	nd pro- resulting 45 6.75 130 0 120 11.25	HOURS 36 5.4 L3B 7.2 L2B 9	30 4.5 L3A 6 L2A 7.5	Gear 40 Tooth E 30 Tooth E Tooth	Shaft Pinion 3, D Pinion 2, D 24	Cam Motor O Motor O 1.	C C Pinion	1/6 RPH Moto	2 21.6 F36 28.8 F26 36 F16 43.2 636 57.6 626 72 616 108 H36 144	19.8 F3F 26.4 F2F 33 F1F 39.6 G3F 52.8 G2F 66 G1F 99 H3F 132	18 F3E 24 F2E 30 F1E 36 G3E 48 G2E 60 G1E 90 H3E 120	16.2 F3D 21.6 F2D 27 F1D 32.4 G3D 43.2 G2D 54 G1D 81 H3D 108	14.4 F3C 19.2 F2C 24 F1C 28.8 G3C 38.4 G2C 48 G1C 72 H3C 96	10.0 F38 14.4 F28 10 F18 21.0 U38 20.0 U28 30 U18 M38 72 M28	10 F30 24 UZU 30 F10 316 G30 30 G30 36 G40 U30 73 U30 IZU	10.5 F3F 22 F2F 27.5 F1F 33 USF 44 UZF 35 USF 82.5 USF 110	15 F3E 20 F2E 25 F1E 30 63E 40 62E 50 61E 75 H3E 100	F3D 18 F2D 22.5 F1D 27 G3D 36 G2D 45 G1D 67.5 H3D 90	F3C 16 F2C 20 F1C 24 G3C 32 G2C 40 G1C 60 H3C 80	F3B 14.4 F2B 18 F1B 21.6 G3B 28.8 G2B 36 G1B 54 H3B	E3A 12 E2A 15 E1A 18 E3A 2A E2A 30 E1A A5 H3A 60	3, D Pinion 2, D 24 D 3, D 2, D 1, D 3, D 20 Tooth E 30 Tooth E 30 Tooth E 40 Tooth E	O Motor O 1, O Pinion O Pinion O Pinion O Pinion O Pinion O	Motor Motor C Motor C Motor C Motor C Motor C	Time Time Time Time Time	RPH Motor—F 2.5	E3G 576 E2G 720	E3F 528 E2F 660	E3E 480 E2E 600	E3D 432 E2D 540	288 E3C 384 E2C 480	239.2 E3D 343.6 E2D 432	E3B 34F C E3B 433	740	360 E36 480 E26 600	330 E3E 440 E2E 550	300 E3E 400 E2E 500	270 E3D 360 E2D 450	240 E3C 320 E2C 400	216 E3B 288 E2B 360	E3B 388 E3B 360	180 E34 240 E24 300	O Motor O Motor D Pinion 2, D Pinion 1, E 30 Tooth E 24 Tooth		Time	