



FILE LR28020

CAM PROGRAM TIMERS

SYNCHRONOUS MOTOR DRIVEN



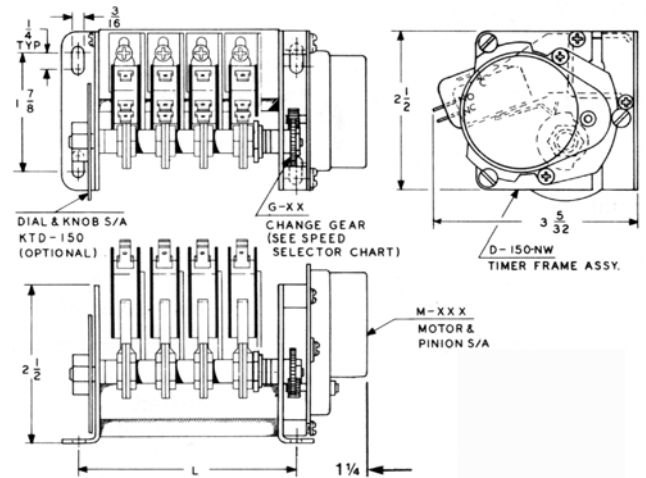
FILE E47690

MADE IN USA



SERIES D-150 The Design It Yourself Timer See Page 2

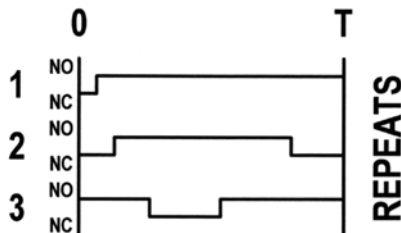
- Interchangeable Motors.
- Interchangeable Gears.
- KTD - 150 Dial Kit.
- Factory Built Frame with Up To 20 Switches.
- Time It Yourself or have us time it and you tweak it.



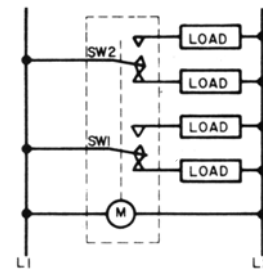
Series	"N" No. of Poles	Sub - Basic Switches			Length L Dim. ± .015
		V1 10 Amp	W2 15 Amp	H2 21 Amp	
D-150	2	D-150 - 2V1	D-150 - 2W2	D-150 - 2H2	2.218
	"n"	D-150 - "n"V1	D-150 - "n"W2	D-150 - "n"H2	1.030+"n"x.594
	20	D-150 - 20V1	D-150 - 20W2	D-150 - 20H2	12.910

When energized a Program Timer repeats continuously and synchronously, a pre-established sequencing of ON/OFF switching events. Also known as Cam or Multi-cam Timer, Cycle or Re-cycle Timer, or Repeat Cycle Timer. One "cycle" is one revolution of the output cam shaft. These may be wired for single revolution and stop operation (see Homing). An external momentary pushbutton wired as shown on Homing will cause the camshaft to rotate 1 revolution only and come to an abrupt halt. During this cycle the cams perform the prescribed sequence of operations. This popular wiring is typified in cup dispensing coffee vending machinery.

TYPICAL TIMING



TYPICAL WIRING



HOW TO ORDER A COMPLETE TIMER :D-150 - "N" (SW)/CYCLE TIME V HZ - SUFFIX

SERIES	NO. OF POLES	SWITCH TYPE	CYCLE TIME	VOLTS	HZ	SUFFIX
D-150	2	V1	AS REQUIRED	L = 24V	5 = 50 HZ	FACTORY
	THRU	W2	BY	D = 120V	6 = 60 HZ	ASSIGNED
	20	H2	CUSTOMER	E = 230V	7 = 50-60 HZ	AS REQUIRED

(SEE GEAR TABLE P2)

EXAMPLE: D-150 - 11W2/60MD6A Series 150, 11 Switches, Rated 15 Amp, 60 Min Cycle, 120 Volt, 60 Hz With Dial.

AMERICAN CONTROL PRODUCTS

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TECHNICAL BULLETIN

CAM PROGRAM TIMERS

PAGE 1
OF 4

DATE
6/16/04

D-150

REV
A



FILE LR28020



FILE E47690

MODEL D-150 CHANGE - GEAR TABLE

PART NO.	TEETH	M-30	M-10	M-5	M-1	M-1/3	M-1/10	M-1/60
		30 RPM	10 RPM	5 RPM	1 RPM	1/3 RPM	1/10 RPM	1/60 RPM
		SECONDS	SECONDS	SECONDS	SECONDS	MINUTES	MINUTES	MINUTES
G-14	14		7.0	14	70	3.50	11.66	70
G-15	15		7.5	15	75	3.75	12.50	75
G-16	16	2.00	8.0	16	80	4.00	13.33	80
G-17	17	2.126	8.5	17	85	4.25	14.16	85
G-18	18	2.250	9.0	18	90	4.50	15.00	90
G-19	19	2.376	9.5	19	95	4.75	15.83	95
G-20	20	2.500	10.0	20	100	5.00	16.66	100
G-21	21	2.626	11.5	21	105	5.25	17.50	105
G-22	22	2.625	11.0	22	110	5.50	18.33	110
G-23	23	2.876	11.5	23	115	5.75	19.10	115
G-24	24	3.00	12.0	24	120	6.00	20.00	120
G-25	25	3.126	12.5	25	125	6.25	20.80	125
G-26	26	3.250	13.0	26	130	6.50	21.60	130
G-27	27	3.376	13.5	27	135	6.75	22.50	135
G-28	28	3.500	14.0	28	140	7.00	23.30	140
G-29	29	3.626	14.5	29	145	7.25	24.16	145
G-30	30	3.750	15.0	30	150	7.50	25.00	150
G-31	31	3.876	15.5	31	155	7.75	25.80	155
G-32	32	4.00	16.0	32	160	8.00	26.66	160
G-33	33	4.126	16.5	33	165	8.25	27.50	165
G-34	34	4.250	17.0	34	170	8.50	28.33	170
G-35	35	4.376	17.5	35	175	8.75	29.16	175
G-36	36	4.500	18.0	36	180	9.00	30.00	180
G-37	37	4.616	18.5	37	185	9.25	30.83	185
G-38	38	4.750	19.0	38	190	9.50	31.66	190
G-39	39	4.876	19.5	39	195	9.75	32.50	195
G-40	40	5.00	20.0	40	200	10.00	33.33	200
G-41	41	5.126	20.5	41	205	10.25	34.16	205
G-42	42	5.250	21.0	42	210	10.50	35.00	210
G-43	43	5.376	21.5	43	215	10.75	35.83	215
G-44	44	5.500	22.0	44	220	11.00	36.66	220
G-45	45	5.626	22.5	45	225	11.25	37.50	225
G-46	46	5.750	23.0	46	230	11.50	38.33	130
G-47	47	5.876	23.5	47	235	11.75	39.16	235
G-48	48	6.00	24.0	48	240	12.00	40.00	240
G-49	49	6.126	24.5	49	245	12.25	40.83	245
G-50	50	6.250	25.0	50	250	12.50	41.66	250
G-51	51	6.376	25.5	51	255	12.75	42.50	255
G-52	52	6.500	26.0	52	260	13.00	43.33	260
G-53	53	6.626	26.5	53	265	13.25	44.16	265
G-54	54	6.750	27.0	54	270	13.50	45.00	270
G-55	55	6.876	27.5	55	275	13.75	45.83	275
G-56	56	7.00	28.0	56	280	14.00	46.66	280
G-57	57	7.126	28.5	57	285	14.25	47.50	285
G-58	58	7.250	29.0	58	290	14.50	48.33	290
G-59	59	7.376	29.5	59	295	14.75	49.16	295
G-60	60	7.500	30.0	60	300	15.00	50.00	300
G-61	61	7.626	30.5	61	305	15.25	50.83	305
G-62	62	7.750	31.0	62	310	15.50	51.66	310
G-63	63	7.876	31.5	63	315	15.75	52.50	315
G-64	64	8.00	32.0	64	320	16.00	53.33	320
G-65	65	8.126	32.5	65	325	16.25	54.16	325

The above table for the model D-150 illustrates the wide speed select ability. The change from one speed to another is accomplished quickly as each of the change gears mates with the pre-selected motor. The optional progress indicating dial provides a reference point for each of the switches being operated by the cams. Up to 20 switches can be operated in a pre-set sequence and with the indicating dial it is possible to make field adjustments to the operating point. Page 3 of this Technical Bulletin contains Ordering Information and the instructions for adjusting the operating point of the selected cam.

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TECHNICAL BULLETIN**CAM PROGRAM TIMERS****PAGE 2
OF 4****DATE
6/16/04****D-150****REV
A**



FILE LR28020

How To Order a Design It Timer: (F) (S) (M) (G) (D)



FILE E47690

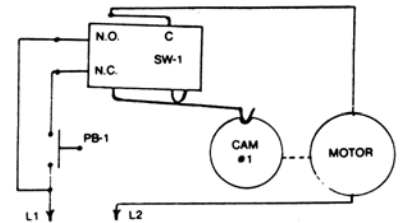
FRAME	SWITCH TYPE	MOTOR FROM TABLE	GEAR FROM TABLE	DIAL KIT
D-150-2	V1	M-30	G-14	OPTIONAL
THRU	W2	THRU	THRU	KTD-150
D-150-20	H2	M-1/60	G-65	

EXAMPLE: D150-5H2 FRAME, M-5 MOTOR, G-43 CHANGE GEAR, KTD-150 OPTIONAL DIAL KIT

How to Wire a Program Timer for Single-Revolution -and Stop "Self Homing " Operation

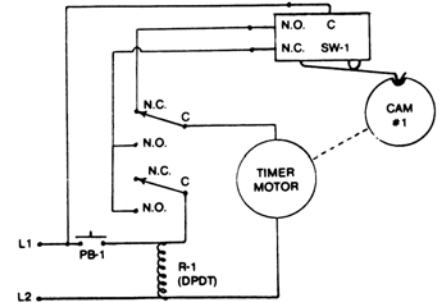
I. For Fast Timers

Closure of pushbutton powers timer long enough to advance cam follower out of notch. Timer's switch then powers timer motor until notch is reached again and motor stops.



II. For Slow Timers

Slower timers may present the problem of excessive hold-down time of the pushbutton. Therefore, a latching relay is used.



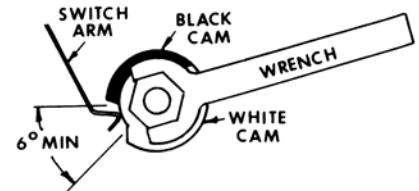
How to Adjust ("Set" or "Time") the Cams of a Program Timer

Always prepare an organized and well thought out Timing Diagram for your machine, process, or equivalent. Stipulate tolerances.

Always let our factory do your "timing" for you. This costs you nothing. We are thoroughly equipped. This is tedious, time-consuming work unless you are exceptionally well equipped.

Always set the cams of Program Timers on a bench set-up before installation into your product, including adequate tests and inspections. Never try to do such timing after installation, other than minor adjustments.

Our cams are fully adjustable. Simply hold camshaft from rotating with one wrench and grasp molded hexagonal hub of cam with another wrench. Rotate cam until switch is heard to click (or better to use a Test Light). Make or buy from us a suitable calibration dial, or use a timing clock.



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TECHNICAL BULLETIN
CAM PROGRAM TIMERS

PAGE 3
OF 4

DATE
6/16/04

D-150

REV
A



FILE LR28020

RATINGS AND OPERATIONAL PARAMETERS



FILE E47690

Motors

- Permanent magnet synchronous inductor type.
- USA industrial standard pear-shaped configuration.
- UL and CSA approved.
- Enclosed construction.
- Rated 3 watts @ 120/60 VAC.
- Torque rating 30 inch-ounces at 1 RPM.
- Stocked and standard at 120/60.
- Also readily available or stocked for 24/60, 230/60, 24/50, 115/50, and 220/50.
- These motors operate at a speed precisely synchronous with frequency of input power.
- Special motors available on request, such as reversible, variable speed, extra fast, extra slow, hi-torque, direct current, etc.
- Corrosion resistant.
- Tough, reliable, long-lived.
- Reasonable life expectancy exceeding 10,000 hours.
- Fast acceleration. Instant stop.
- Our staff filters all incoming orders to ensure adequate motor torque.

Switches (All switches are UL and CSA approved)

V1 – 10 Amperes

- UL rated 10 amperes nominal @ .75 power factor.
- ½ horsepower at 125/250 VAC.
- Enclosed, snap-action, sub-basic size.
- .187 male push-on terminals.
- Form C – SPDT.

W2 – 15 Amperes

- UL rated 15 amperes nominal @ .75 power factor.
- ½ horsepower at 125/250 VAC.
- Enclosed, snap-action, sub-basic size.
- .250 Male push-on terminals.
- Form C – SPDT.

H2 – 21 Amperes

- UL rated 21 amperes nominal @250VAC.
- 1hp @ 125 VAC, 2hp @ 250VAC.
- Enclosed, snap-action, sub-basic size.
- .250 male push-on terminals.
- Form C – SPDT.

E – 25 Amperes

- UL rated 25 amps @ 125,250 or 480 VAC.
- 1 hp @ 125 VAC or 2 hp @ 250 VAC.
- Pilot duty 750 VA @ 125 or 250 VAC.
- Enclosed snap-action, full basic size, # 8 screw terminals.
- Form C – SPDT.
- For restricted uses only.

Life Expectancy

The life of a switch is a function of the type, magnitude, and number of usages under an applied electrical load. At low electrical load 95% survival is expected at 10,000,000 operations, at full electrical load 95% survival is expected at 150,000 operations, subject to inrush considerations and type of load as to resistive, inductive, or capacitive. Particular attention should be given for high inrush applications such as heaters or lamps as might weld, erode, or cavitate switch contacts. We will gladly assist customers in making a selection.

Camshaft Speed (Time per Cycle)	No. of Switch Operations in One Year	
	Continuous Operation	Fifty 40-hour Weeks
1 sec.	31,557,600	7,200,000
15 sec.	2,103,840	480,000
30 sec.	1,051,920	240,000
1 min.	525,960	120,000
15 min.	35,064	8,000
30 min.	17,532	4,000
1 hr.	8,766	2,000
15 hrs.	584	133
30 hrs.	292	67

Cams

Standard Cams

- Molded nylon with approx. 180° cuts, 7/8" diameter.
- Color coded black and white.

Special Cams

- Standard 7/8" diameter or jumbo 1½" diameter.
- Multiple machined cuts – on special order.
 - Symmetrical
 - Asymmetrical

CAUTION: Big cams do NOT promote accuracy!

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CAM PROGRAM TIMERS

PAGE 4
OF 4

DATE
6/16/04

D-150

REV
A