ASSEMBLY
AND
OPERATING
INSTRUCTIONS

MODELS 12C, 15C AND 20

L A P M A S T E R

A. GENERAL

A Lapmaster is a precision lapping machine, which can produce flat surfaces to less than one light band (.0000116") and finishes measured in millionths of an inch. With proper care and maintenance it will serve you indefinitely. These instructions have been prepared to assist you in obtaining maximum effectiveness from your machine.

B. RECEIVING AND UNPACKING

1. Check contents of box with the packing list. In case of shortage notify Crane Packing, Morton Grove, Illinois immediately.
2. Remove rust preventative from coated area.
3. Inspect the Lapmaster and its equipment for evidence of damage en-route. If there is evidence of such damage, note your way-bill accordingly and file claim with the delivering carrier.
4. Check proper oil level in the gearbox.
5. CAUTION: This is a precision machine. Handle it and its component parts with care. The pressure plate has been precision lapped; dropping or rough handling will distort or scratch the lapped surface.

C. INSTALLATION INSTRUCTIONS

1. Voltage and Electrical Equipment

Check the Lapmaster serial number plate to make sure that the voltage corresponds with your current. Standard Lapmaster machines, as shipped, are wired for 110 volt, 60 cycle, 1 phase A.C. current. Your machine, however, may have been wired specially to fit your needs. An assembly drawing of the machine and a wiring diagram accompany each machine.

2. Location of Machine

The Lapmaster should be located, if at all possible, in a room that will be free of foreign particles in the air. The more dust-free the air, the better results you will obtain from your equipment. For "scratch-free" lapping, an air filtered room is highly recommended.

D. CARE OF THE LAP PLATE

1. The Lap Plate has a lapped surface within light band specifications for flatness. Handle it with care to avoid damage.
2. Whenever the conditioning rings and work are placed on the lap plate, avoid nicking or scratching. Remember, the quality of work done by the Lapmaster reflectes the condition of the lap plate.
3. The lap plate should always be kept as clean as possible. Dust and dirt will cause scratches on the work produced by the Lapmaster as well as scratches on the lap plate itself. It is recommended that the lap plate be covered when the machine is not in use to keep it from collecting dust. Its surface and serrations should be thoroughly cleaned at least once a week. See Section "J" Maintenance, for complete cleaning instructions.
4. When utilizing water base vehicles remove the conditioning rings from the lap plate after each shift to prevent cohesion of the conditioning rings to the lap plate.

E. HOW TO DETERMINE AND CONTROL LAP PLATE FLATNESS

(See illustrations showing lap plate conditions)

With the initial starting of the Lapmaster, the position of the conditioning rings with relation to the lap plate should be set for normal. The normal condition exists when the conditioning

rings are equally spaced on the lap plate with respect to the inner and outer periphery of the lap plate. (See illustration "A" Normal Condition of Lap Plate). However, the nature and material of the pieces being lapped may cause an unbalanced wearing condition of the lap plate, whereby the wear toward one periphery may be greater than toward the other periphery. This causes the lap plate to go out of flat. This out of flat condition can be detected by using the straight edge or preferably with the use of a monochromatic light, optical flat and a test plug with which a positive check of the lap plate can be made as often as deemed necessary. As soon as an out of flat condition is noticed, the conditioning rings should be moved to correct this condition. (See diagrams B, C and D on chart showing lap plate conditions.)

1. Straight Edge and Feeler Gauge Method

   This method is used mostly when coarse abrasives are used and when flatness control is not too critical. Remove the conditioning rings from the lap plate, and clean the plate with mineral spirits. Place the straight edge across the diameter of the lap plate. Measurements are taken by slipping the feeler gauge between the lap plate and the straight edge. If the feeler gauge slips under the straight edge at the outer periphery, the plate is convex, and the conditioning rings should be moved inward to correct the condition. To re-position the conditioning rings, loosen the knobs holding the roller yokes and move the conditioning rings to the desired position.

If the feeler gauge slips under the straight edge at the inner periphery, the plate is concave, and the conditioning rings should be moved outward to correct the condition.

2. Monochromatic Light and Test Plug Method

The test plug method is employed when closer tolerances for flatness, size control and parallelity are required. The test plug, which is brass, has a 1/2" hole in the center and is 2-1/2" high. The minimum diameter of the test plug is 3". The maximum diameter is controlled by the size of your optical flat. The optical flat's diameter should be sufficient to cover the diameter of the test plug. The larger the diameter of the test plug, the more accurately the lap plate flatness can be determined. The test plug is lapped for 5 to 7 minutes. The matte finish from lapping is removed by polishing on 4/0 polishing paper. This produces a reflective surface suitable for checking with an optical flat under the monochromatic light. The test plug is then thoroughly cleaned and placed under the monochromatic light with the surface to be measured face up. For best results place a lens tissue on top of the test plug, then place the optical flat on top of the tissue. Gently pull the tissue out while holding the optical flat in place. The thickness and the number of lines that can be seen is an indication of the thickness of the air wedge between the optical flat and the test plug. If the top surface of the optical flat is tapped sharply with the finger, this should dispel the air giving fewer and fatter light bands.

When viewing the light bands, you should imagine a straight line going through the center of the optical flat. (See diagram E). The amount of black light bands that bisect the line indicates the amount of light bands that the plug is out of flat. In diagram E the examples shown are 2 light bands out of flat. To determine if the plug is convex or concave press lightly on one side of the optical flat. If the light band lines move away from your finger (See diagram E) the test plug is convex, which means your lap plate is concave. If the lines move toward your finger, the test plug is concave, which means your lap plate is convex. Once the condition of the lap plate has been determined, the conditioning rings should be adjusted to correct it. The test plug method cannot be used when lapping with abrasives coarser than 23 microns because the surface finish will be too high to permit an optical reading.

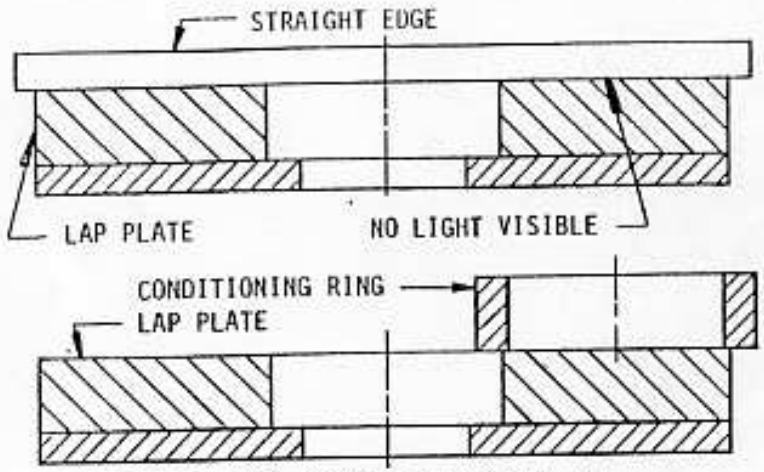
HINTS IN MAKING LAP PLATE CORRECTIONS

1. Do not move the conditioning rings more than 1/4" at any one time. Corrections should be gradual or you may over correct. Your lap plate will not change rapidly and you cannot correct rapidly, it takes time.
2. The lap plate should be checked regularly, preferably every morning before starting for the day's production run. The interval between flatness checks is directly related to the accuracy required by the application.

ILLUSTRATIONS SHOWING LAP PLATE CONDITIONS

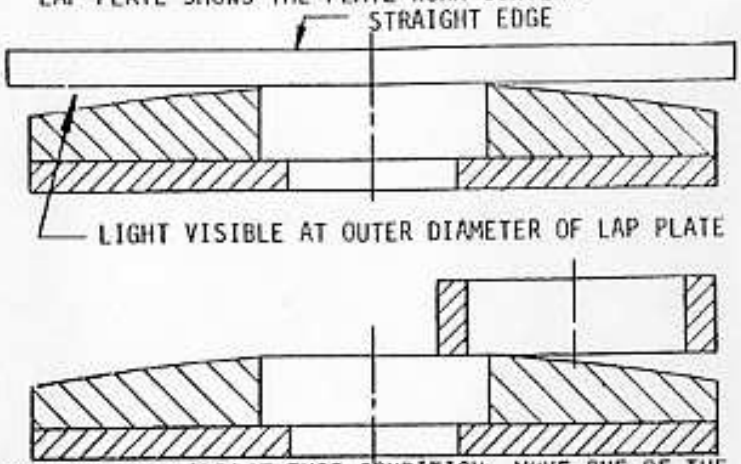
(NOTE: THESE ILLUSTRATIONS ARE HIGHLY EXAGGERATED FOR THE PURPOSE OF CLARITY)

A. NORMAL CONDITION OF LAP PLATE



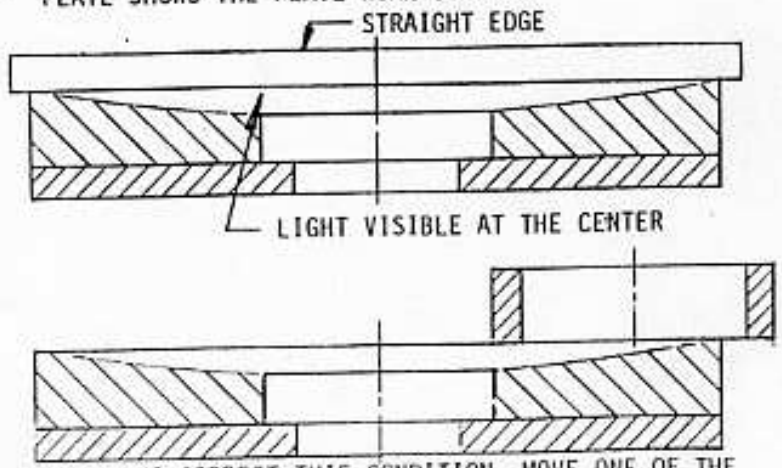
FLAT PLATE: THIS CONDITION REQUIRES NO ADJUSTMENT OF THE CONDITIONING RINGS.

B. CONVEX CONDITION: THE STRAIGHT EDGE ON THE LAP PLATE SHOWS THE PLATE WORN CONVEX.



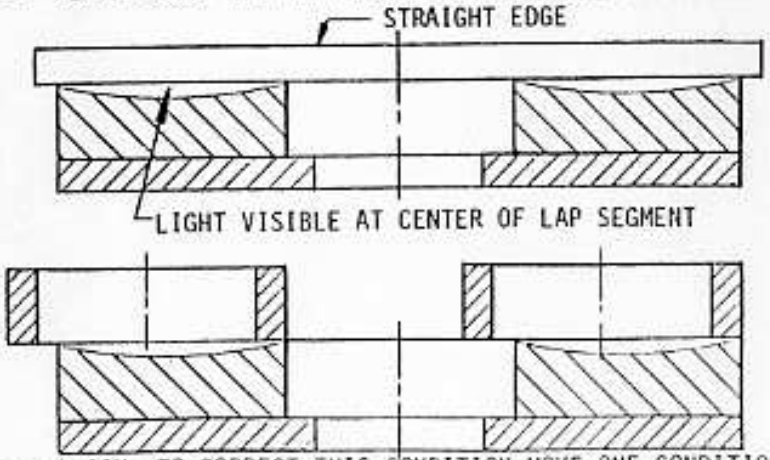
CORRECTION: TO CORRECT THIS CONDITION, MOVE ONE OF THE CONDITIONING RINGS INWARD TOWARD THE CENTER. MORE THAN ONE RING SHOULD BE MOVED IF WEAR IS EXCESSIVE.

C. CONCAVE CONDITION: THE STRAIGHT EDGE ON THE LAP PLATE SHOWS THE PLATE WORN CONCAVE.



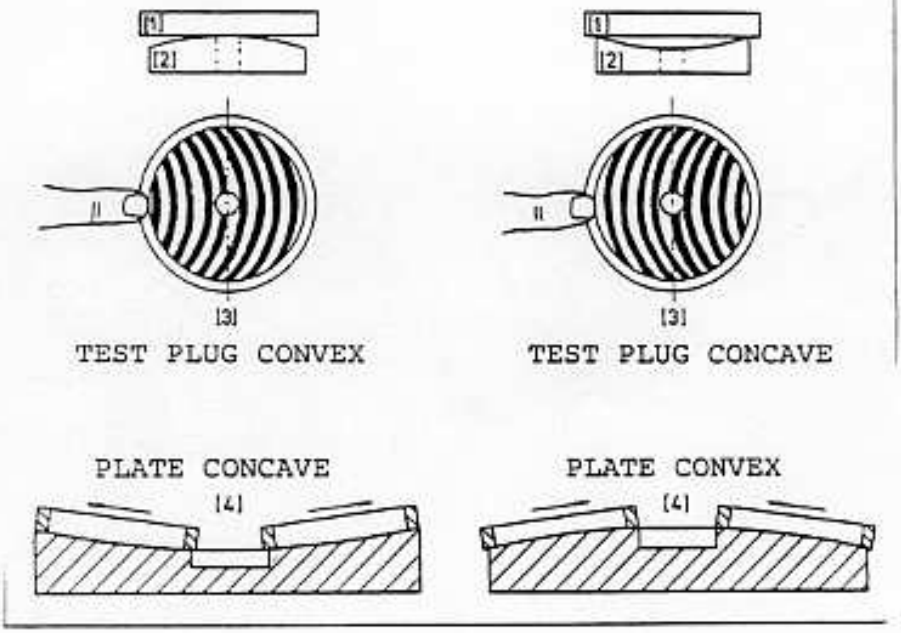
CORRECTION: TO CORRECT THIS CONDITION, MOVE ONE OF THE CONDITIONING RINGS AWAY FROM THE CENTER. MORE THAN ONE RING SHOULD BE MOVED IF WEAR IS EXCESSIVE.

D. DISHED CONDITION: THE STRAIGHT EDGE ON THE LAP PLATE SHOWS THE LAP PLATE IN THE DISHED CONDITION.



CORRECTION: TO CORRECT THIS CONDITION MOVE ONE CONDITIONING RING OUT AND ONE IN. MOVE THE OTHER CONDITIONING RING(S) IN AND OUT IF DISHING IS EXCESSIVE.

DIAGRAM E


[1]
[2]
[3]
TEST PLUG CONVEX
[1]
[2]
[3]
TEST PLUG CONCAVE
PLATE CONCAVE
[4]
PLATE CONVEX
[4]

LAPMASTER CAPACITY CHART FIGURED WITHOUT WORKHOLDERS

MODEL	12"		15"		20"		20"		24"		24"		700		700		36"		36"		48"		84"	
NO C/R	3 Holder		3 Holder		3 Holder		4 Holder		3 Holder		4 Holder		3 Holder		4 Holder		3 Holder		4 Holder		4 Holder		4 Holder	
I.D. C/R	4½"		5¼"		7½"		8½"		8½"		8½"		10⅝"		9⅝"		14½"		12⅝"		17"		29½"	
DIA. PART	C/R	Load	C/R	Load	C/R	Load	C/R	Load	C/R	Load	C/R	Load	C/R	Load	C/R	Load	C/R	Load	C/R	Load	C/R	Load	C/R	Load
½	235	705	330	990	741	2223	578	2312	1300	3900	920	3680	1541	4623	1174	4696								
5/8	145	435	226	678	452	1356	350	1400	820	2460	580	2320	986	2958	751	3004								
¾	100	300	156	468	314	942	244	976	560	1680	400	1600	685	2055	497	1988	1200	3600	1000	4000				
7/8	70	210	115	345	230	690	167	748	410	1230	290	1160	479	1437	365	1460	940	2820	740	2960				
1	55	165	87	261	176	528	137	548	310	930	220	880	367	1101	277	1108	700	2100	560	2240				
1⅛	42	126	68	204	139	417	109	436	245	735	170	680	290	870	221	884	550	1650	440	1760				
1¼	35	105	56	168	113	339	88	352	195	585	135	540	234	702	178	712	450	1350	350	1400				
1⅜	28	84	47	141	93	279	65	260	160	480	110	440	194	582	147	588	370	1110	295	1180				
1½	23	69	39	117	78	234	55	220	130	390	90	360	163	489	125	540	300	900	245	980				
1⅝	19	57	32	96	60	180	46	184	110	330	80	320	139	417	106	424	250	750	191	764				
1¾	17	51	28	84	51	153	40	160	90	270	65	260	119	357	82	328	220	660	175	700				
1⅞	14	42	23	69	45	135	35	140	80	240	55	220	104	312	71	284	190	570	150	600				
1	13	39	21	63	40	120	37	128	70	210	55	220	90	270	62	248	165	495	130	520	235	940	342	1368
1⅛	11	33	19	57	37	111	27	108	60	180	45	180	81	243	55	220	145	435	115	460	200	800	303	1212
1¼	9	27	16	48	31	93	24	96	55	165	40	160	65	195	49	196	130	390	100	400	180	720	270	1080
1⅜	8	24	15	45	28	84	21	84	55	165	35	140	58	174	44	176	115	345	90	360	160	640	250	1000
1½	8	24	13	39	25	75	20	80	45	135	32	128	52	156	40	160	105	315	80	320	145	580	242	968
1⅝	7	21	12	36	23	69	19	76	41	123	29	116	47	141	36	144	90	270	70	280	131	524	198	792
1¾	7	21	11	33	21	63	16	64	38	114	26	104	43	129	33	132	85	255	65	260	120	480	180	720
1⅞	5	15	9	27	19	57	15	60	34	102	24	96	39	117	30	120	75	225	60	240	109	436	165	660
1	5	15	9	27	19	57	14	56	31	93	22	88	36	108	27	108	70	210	55	220	100	400	152	608
1⅛	5	15	8	24	16	48	12	48	29	87	20	80	33	99	25	100	60	180	55	220	92	368	139	516
1¼	4	12	8	24	15	45	12	48	26	78	19	76	31	93	23	92	55	165	48	192	85	340	129	516
1⅜	4	12	7	21	14	42	10	40	24	72	17	68	29	87	22	88	55	165	44	176	79	316	120	480
1½	4	12	7	21	13	39	10	40	22	66	16	64	26	78	20	80	55	165	41	164	70	280	111	444
1⅝	3	9	7	21	12	36	9	36	21	63	14	56	25	75	19	76	48	144	38	152	62	248	104	416
1¾	3	9	5	15	11	33	8	32	20	60	13	52	23	69	17	68	45	138	35	140	60	240	97	388
1⅞	3	9	5	15	10	30	8	32	19	57	13	52	21	63	16	64	42	126	33	132	54	216	91	364
2	2	6	5	15	9	27	7	28	17	51	12	48	20	60	15	60	39	117	31	124	51	204	85	340
2⅛	2	6	4	12	9	27	7	28	16	48	11	44	18	57	14	56	37	111	29	116	47	188	80	320
2¼	1	3	4	12	8	24	6	24	15	45	10	40	18	54	13	52	34	102	27	108	45	180	68	272
2⅜	1	3	4	12	8	24	6	24	14	42	9	36	17	51	13	52	32	96	26	104	42	168	64	256
2½	1	3	4	12	8	24	5	20	13	39	9	36	16	48	12	48	31	93	24	96	40	160	60	240
2⅝	1	3	3	9	7	21	5	20	12	36	8	32	15	45	11	44	29	87	23	92	38	152	57	228
2¾	1	3	3	9	7	21	5	20	12	36	8	32	14	42	11	44	27	81	21	84	36	144	54	216
2⅞	1	3	3	9	7	21	5	20	11	33	8	32	13	39	10	40	26	78	21	84	34	136	51	150
3	1	3	3	9	6	18	4	16	10	30	7	28	13	39	10	40	24	72	20	80	32	128	49	147
3⅛	1	3	3	9	6	18	4	16	9	27	7	28	12	36	9	36	23	69	18	76	31	124	46	184
3¼	1	3	3	9	5	15	4	16	9	27	7	28	11	33	9	36	22	66	17	68	29	116	44	176
3⅜	1	3	2	6	5	15	4	16	9	27	6	24	11	33	8	32	21	63	16	64	28	112	42	168
3½	1	3	1	3	5	15	4	16	8	24	5	20	10	30	8	32	20	60	16	64	26	104	40	160
3⅝	1	3	1	3	4	12	3	12	8	24	5	20	10	30	7	28	19	57	15	60	25	100	38	152
3¾	1	3	1	3	4	12	3	12	8	24	5	20	9	27	7	28	18	54	14	56	24	96	37	148
3⅞	1	3	1	3	4	12	3	12	7	21	5	20	9	27	7	28	17	51	14	56	23	92	35	140
4	1	3	1	3	4	12	3	12	7	21	5	20	9	27	6	24	16	48	13	52	22	88	34	136
4⅛	1	3	1	3	4	12	2	8	7	21	4	16	8	24	6	24	15	45	12	48	21	84	31	124
4¼	1	3	1	3	3	9	2	8	6	15	4	16	7	21	5	20	14	42	11	44	20	80	29	116
4⅜	1	3	1	3	3	9	1	4	5	15	4	16	7	21	5	20	13	39	10	40	19	76	27	108
4½	1	3	1	3	3	9	1	4	5	15	3	12	6	18	5	20	12	36	9	36	16	64	25	100
4⅝	1	3	1	3	2	6	1	4	4	12	3	12	6	18	4	16	11	33	8	32	15	60	23	92
4¾	1	3	1	3	1	3	1	4	4	12	3	12	5	15	4	16	10	30	8	32	14	56	21	84
4⅞	1	3	1	3	1	3	1	4	4	12	2	8	5	15	4	16	9	27	8	32	13	52	20	80
5			1	3	1	3	1	4	3	9	1	4	4	12	2	8	8	24	6	24	11	44	17	68
5⅛			1	3	1	3	1	4	2	6	1	4	4	12	2	8	7	21	5	20	9	36	15	60
5¼			1	3	1	3	1	4	2	6	1	4	3	9	1	4	6	18	5	20	8	32	13	52
5⅜			1	3	1	3	1	4	1	3	1	4	3	9	1	4	5	15	4	16	8	32	12	48
5½			1	3	1	3	1	4	1	3	1	4	2	6	1	4	5	15	4	16	7	28	11	44
5⅝					1	3	1	4	1	3	1	4	1	3	1	4	4	12	3	12	7	28	10	40
5¾					1	3	1	4	1	3	1	4	1	3	1	4	4	12	3	12	5	20	9	36
5⅞					1	3	1	4	1	3	1	4	1	3	1	4	4	12	3	12	5	20	8	32
6					1	3	1	4	1	3	1	4	1	3	1	4	3	9	2	8	5	20	7	28
6⅛					1	3	1	4	1	3	1	4	1	3	1	4	3	9	1	4	4	16	7	28
6¼					1	3			1	3	1	4	1	3	1	4	2	6	1	4	4	16	6	24
6⅜					1	3			1	3	1	4	1	3	1	4	2	6	1	4	4	16	6	24
6½					1	3			1	3	1	4	1	3	1	4	1	3	1	4	3	12	5	20
6⅝									1	3	1	4	1	3	1	4	1	3	1	4	3	12	5	20
6¾									1	3	1	4	1	3	1	4	1	3	1	4	3	12	5	20
6⅞									1	3	1	4	1	3	1	4	1	3	1	4	2	8	4	16
7									1	3			1	3	1	4	1	3	1	4	2	8	4	16
7⅛									1	3			1	3	1	4	1	3	1	4	1	4	4	16
7¼									1	3			1	3	1	4	1	3	1	4	1	4	3	12
7⅜									1	3			1	3	1	4	1	3	1	4	1	4	3	12
7½									1	3			1	3	1	4	1	3	1	4	1	4	2	8
7⅝													1	3			1	3	1	4	1	4	2	8
7¾													1	3			1	3	1	4	1	4	2	8
7⅞													1	3			1	3	1	4	1	4	1	4
8													1	3			1	3	1	4	1	4	1	4
8⅛																	1	3	1	4	1	4	1	4
8¼																								
8⅜																								
8½																								
8⅝																								
8¾																								
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Page

CRITICAL INSTRUCTIONS

NOTE:

TO BE ASSURED OF UNIFORM CONDITIONING OF THE LAP PLATE AND UNIFORM LAPPING OF THE PART BEING LAPPED, THE FEED TRACK WIRES SHOULD BE IN CONTACT WITH THE CONDITIONING RINGS AS THEY ROTATE. THIS ALLOWS THE ABRASIVE SLURRY TO BE DISTRIBUTED UNIFORMLY TO THE INNER AND OUTER LAND AREA OF THE LAP PLATE BY FLOWING DOWN THE SIDE OF THE CONDITIONING RINGS ONTO THE LAP.

THE POINT OF CONTACT OF THE FEED TRACK WIRES SHOULD BE JUST ABOVE THE SERRATIONS IN THE CONDITIONING RINGS, BUT NOT SO HIGH THAT THE ABRASIVE WOULD BE IN THE PATH OF THE ROLLER YOKE BEARINGS.

F. LAPMASTER START-UP

1. Before placing anything on the lap plate, and with power plugged in, check operation of switch and timing clock to see that they are function properly.
2. Fill the tank with Lapmaster Lapping Vehicle to within 1-1/2" of top of tank. The oil base vehicle has been pre-mixed in our laboratory and is ready for use as supplied. The water base vehicles are to be diluted per the manufacturer's directions.
3. Add 8 to 10 ounces of the proper Lapmaster lapping compound per gallon of vehicle (2 ounces per quart). (See Paragraph H for proper selection of compound.)
4. Run machine two minutes before placing work inside the conditioning rings to allow compound to be distributed over entire area of lap plate.
5. The use of a phenolic work holder to separate parts eliminates any piling up or knocking together. The work holder can be drilled or sawed to accommodate any shape part. The parts should be allowed to float within the hole containing it. Consult a Lapmaster accessories catalog for available thicknesses.
6. After loading the work holder, put the felt pad on top of the pieces and the pressure plate on top of the pad. Use of the felt pad is recommended if pieces are not of uniform thickness (within .005")

G. SELECTING THE PROPER LAPPING COMPOUND

A number of standard compounds for fine or coarse finishes plus additional special compounds for specific applications are available

for sale and are carried in stock. The following chart will help to choose the best compound for your application.

MATERIAL	ABRASIVE	MICRO-INCH FINISH MATTE
300 Series S.S.	1700	5 to 6
400 Series S.S.	1700	4 to 5
300 Series S.S.	2320	23 to 27
Carbide	3800	4 to 5
Carbide	3600	6 to 7
Carbide	3280	10 to 12
Tool Steel - Hard	1700	3 to 4
52100 Steel - Hard	1700	2.5 to 3.5
52100 Steel - Hard	2320	12 to 13
Meehanite C. I.	1700	7 to 8
Meehanite C.I.	2400	14 to 16
Cast Iron	1700	8 to 9
Cast Iron	1950	5 to 6
Cast Iron	1800	6 to 7
Cast Iron	2080	55 to 65
Cast Iron	2400	14 to 17
Cast Iron	2320	23 to 27
Cast Iron	2220	35 to 50
Cast Iron	2280	30 to 35
Brass	1700	5 to 6
Ceramic (Alumina)	3800	10 to 15
Ceramic (Alumina)	3600	15 to 20
Nitralloy - Hard	1700	3 to 4
Stellite	1400	6 to 7

MATERIAL	ABRASIVE	MICRO-INCH FINISH MATTE
Stellite	2400	10 to 11
Ferrite	1700	16 to 18
Ferrite	2400	26 to 30
Aluminum	1700	7 to 9
Aluminum	2320	30 to 35
Aluminum	2220	43 to 48
Glass	1700	13 to 14
Pyrex	1700	11 to 12
Quartz	1700	7 to 8

The figures are taken with the parts in the matte finish condition. If they are polished on 4/0 polishing paper you can generally expect a reduction in surface finish of 2 to 3 points on hardened materials and 10 to 12 points on soft materials that have been lapped with the coarser abrasive.

H. SUGGESTIONS FOR CLEANING WORK AFTER LAPPING

The method that we recommend is, in our opinion, the simplest and least expensive way of cleaning parts. In using this method, the parts are placed in a small wire tray or basket and pressure sprayed with mineral spirits. Final cleaning is then made with compressed air to insure removal of all compound residue and to help evaporate the mineral spirits.

NOTE: Clean parts immediately after lapping to avoid setting of residue. Mineral spirits evaporates very slowly and because of its high flash point, is not considered a fire hazard. Mineral spirits can be obtained at your local industrial supply company.

A vapor degreaser of the type using Perchlorethylene or Trichlorethylene may be used in cleaning the lapped parts. It is important to wash the lapped parts as described above with mineral spirits before degreasing to insure the removal of all heavy deposits of compound residue. The parts as they come from the degreaser will be clean, dry and ready for use.

Parts should always be cleaned as soon as practical after lapping as the removal of compound, vehicle and spent material is easier when done immediately.

I. MAINTENANCE

1. Lubricating the Lapmaster

Your Lapmaster has been properly lubricated before leaving the factory and should not need any additional oil. Should you need to add oil to the main gear reducer, use Mobil 600 Cylinder Oil or Mobil Vactra No. 4. All other parts may be lubricated with any good SAE 30 oil. On pneumatic lift Lapmasters, use Velocite Mobil No. 6 for airline lubrication.

2. Cleaning

You will obtain top performance from your Lapmaster if the lap plate is kept clean. Dirt and grit should never be allowed to build up in the lap plate serrations or in the sump. By following the suggestions outlined below, you should avoid any trouble which could result from an improperly cleaned machine.

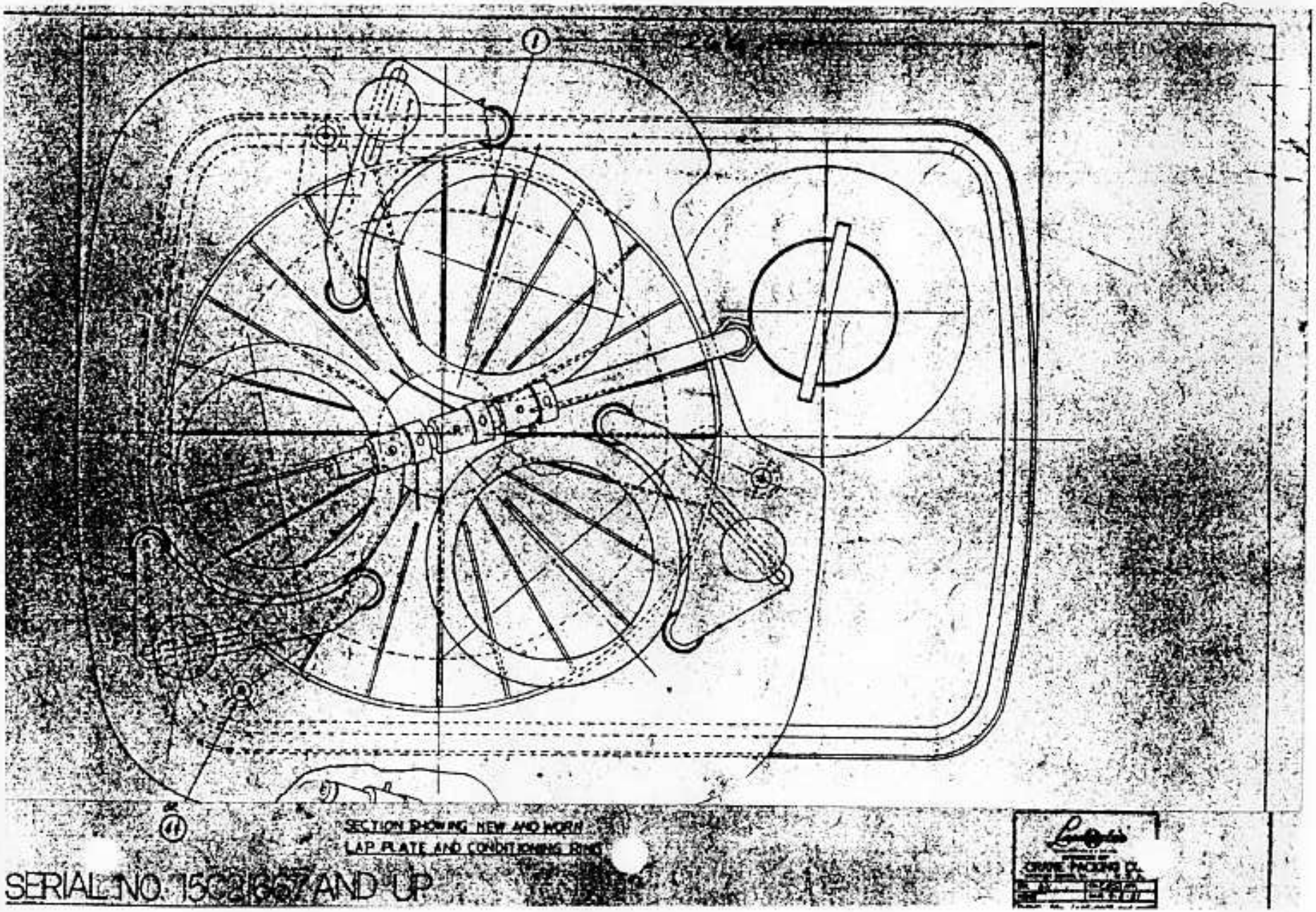
a. At the end of each working day, the lap plate should be cleaned with a paper towel or cloth rag moistened with a suitable, non-flammable solvent.

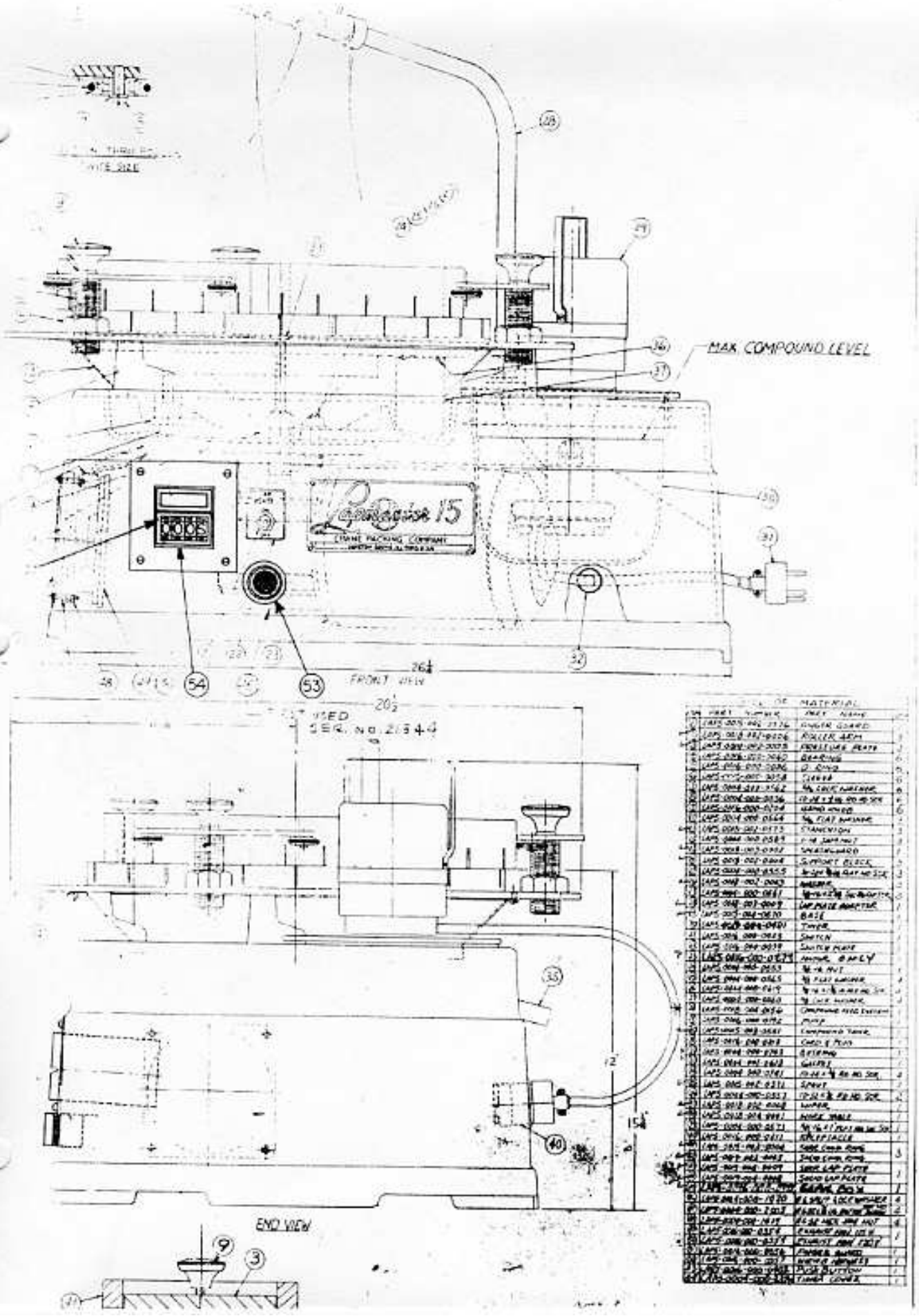
CAUTION: DO NOT POUR CLEANING SOLVENTS ON THE LAP PLATE

After cleaning, the lap plate should be covered. This

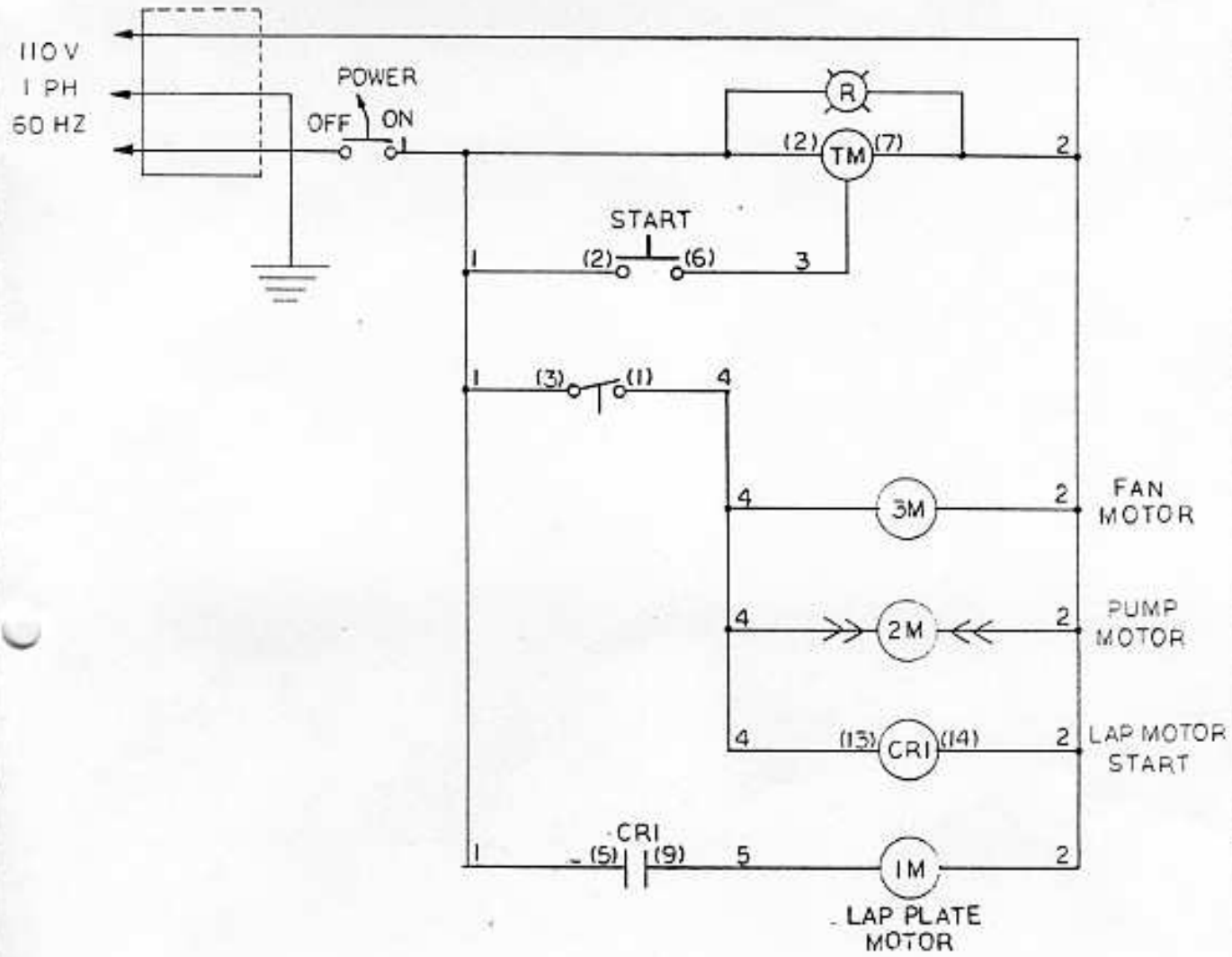
will prevent dust and dirt from collecting on the surface and will ensure a clean plate in the morning.

b. If the machine is to be shut down for any significant length of time, we suggest that the lap plate be thoroughly cleaned and covered. Conditioning rings should also be cleaned and stored in a container.


1
SECTION SHOWING NEW AND WORN
LAP PLATE AND CONDITIONING RING
SERIAL NO. 1502167 AND UP


MAK COMPOUND LEVEL
Compactor 15
CRANE PACKING COMPANY
FRONT VIEW
USED
SER. NO. 21544
END VIEW

LAP5-0018-0010204



SERIAL NO. 15C 21667 AND UP

SHEET	OF	DET.	QTY.	DESCRIPTION OR STOCK SIZE	MAT'L.

TOLERANCES: UNLESS OTHERWISE SPECIFIED			DR: SYED	APP: M.B.L.	SCALE
FRACTIONS ±	DECIMALS ±	ANGLES ± 0° 30'	CH.:	DATE: 1-20-89	

REVISIONS | CH. | DR. | DATE

John Crane
CRANE PACKING COMPANY
6400 W. OAKTON ST.
MORTON GROVE, ILL.

WIRING DIAGRAM FOR 12" AND 15" LAPMASTER "C" SERIES WITH SYRELEC DIGITAL TIMER, COOLING FAN, AND 1/3 H.P. THERMALLY PROTECTED LAP PLATE MOTOR

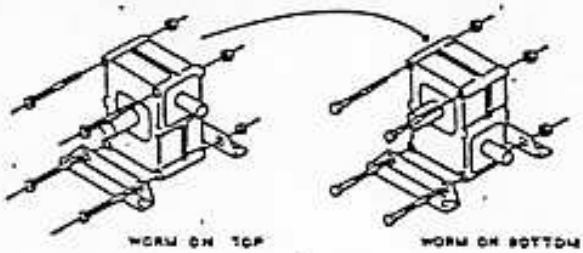
LAP5-0018-0010204

MORSE ED/GED SERIES

Installation, Lubrication & Maintenance Instructions

INSTALLATION:
Morse ED/GED Series wormgear reducers and gearmotors are factory filled with a synthetic hydrocarbon lubricant for maximum performance under a wide range of operating conditions. The unit may be installed in any mounting position without relocating fill or drain plugs.

The Morse Flexmount System offers universal mounting capability with a simple bolt/bracket design.



Stock ED/GED Units are shipped in the T-mounting position. To convert these units to B, V, or other mounting positions, simply remove the mounting capscrews and nuts and reposition the mounting brackets to the desired location.

NOTE: ALWAYS REPLACE ALL MOUNTING CAPSCREWS AND NUTS BEFORE OPERATING UNIT.

When installing Morse ED/GED Series reducers and gearmotors, proper care should be taken to align couplings, sprockets, sheaves, and external gearing. Misaligned couplings can cause excessive loads on reducer shafts and bearings. Caution should be taken to locate sprockets, sheaves, gears, etc., as close to the reducer housing as possible to minimize overhung loads. Avoid interference fits on shaft accessories since bearings and gears could be damaged.

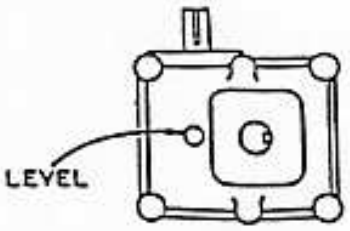
All components of the drive, including the prime mover, the reducer/gearmotor and the driven load should be securely fastened in place after proper alignment and leveling of all elements.

LUBRICATION:
No oil change is necessary with Morse ED/GED units. Maintain proper oil level should leakage occur. Replace oil only when performing maintenance that requires gearbox disassembly.

Use Mobil SHC 634 wormgear lubricant.

Approximate oil capacities and proper oil level are shown below:

Model #	CAPACITY (oz)
13	7
15	7.5
18	12
20	14
25	32



Oil Level-In This Position Only

Morse ED/GED Series wormgear reducers/gearmotors should be inspected regularly for evidence of oil leakage, noise, or vibration to ensure maximum performance and life.

OIL LEAKAGE - Check housing bolts and tighten if necessary. Replace oil seals if required.

OIL TEMPERATURE - Check reducer temperature for undue rise above levels normally encountered and not accountable for by a rise in ambient. Low or high oil levels and abnormal loading are possible sources.

SOUND LEVEL AND VIBRATION - A change in sound level or excessive vibration can indicate low oil level, abnormal loading or worn elements.

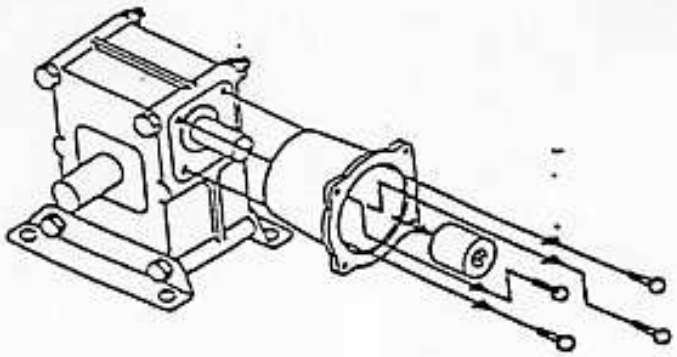
DIRT ACCUMULATION - Excessive accumulation of dirt or grease will affect the proper cooling of the unit.

CONVERSION OF GED REDUCER TO AN ED

A Morse GED Reducer can be used as an ED by completing the following steps:

1. Slip motor coupling off reducer input worm.
2. Remove the motor adapter (held by four socket head capscrews).
3. Press the oil seal into the reducer housing until flush with the outside surface.
4. Apply sealastic to the appropriate size setscrews and install into the 4 tapped holes normally used to retain the motor adapter.

FRAME SIZE	SOCKET HEAD SETSCREW SIZE
25	3/8-16 x 1/2" Length
20, 18, 15	5/16-18 x 1/2" Length



SPARE PARTS

MODEL 12" • SERIES C

PRICE SHEET NO. LP-12-C • EFFECTIVE: 2-18-91

REQ'D	PART	NEW PART NUMBER	PRICE
1	30 Minute Timer (Ser. No. C16775 to 17515)	LAP5-0021-000-0083	$ 170.00 ea.
1	30 Minute Timer	LAP5-0016-000-0034	208.00 ea.
1	Digital Timer (Ser. No. C17516 & Up)	LAP5-0016-000-0401	170.00 ea.
1	Lap Plate, Serrated	LAP5-0012-003-0209	276.00 ea.
1	Lap Plate, Solid	LAP5-0012-003-0208	249.00 ea.
3	Conditioning Rings, Solid	LAP5-0012-002-0204	51.00 ea.
3	Conditioning Rings, Serrated	LAP5-0012-002-0205	61.00 ea.
1	Lap Plate Bolt	LAP5-0004-000-0573	1.62 ea.
1	Teflon Washer	LAP5-0017-001-1667	1.10 ea.
1	Granite Lap Plate	LAP5-0017-002-1383	On Request
3	Pressure Plates	LAP5-0016-002-0053	54.00 ea.
1	Ceramic Lap Plate, Solid	LAP5-0017-003-1116	700.00 ea.
3	Ceramic Conditioning Rings, Serrated	LAP5-0017-002-0694	241.00 ea.
1	Alloy Lead Polishing Plate	LAP5-0017-003-0841	On Request
3	Ceramic Cond. Ring Less Metal Ring	LAP5-0017-001-1690	159.00 ea.
3	Micarta Conditioning Rings, Serrated	LAP5-0017-002-0667	72.00 ea.
1	Aluminum Polishing Plate	LAP5-0017-003-1443	573.00 ea.
1	12" Straight Edge	LAP5-0016-000-0070	32.00 ea.
1	Diamond Coated Cond. Ring	LAP5-0016-000-0318	On Request
1	Lap Plate, Glass	LAP5-0017-003-1899	519.00 ea.
3	Roller Yoke	LAP5-0015-002-0572	8.85 ea.
3	Roller Yoke Hand Knobs	LAP5-0016-000-0204	4.70 ea.
Set 6 ea.	Roller Bearings, Sleeve & Drive Rings	LAP5-0016-000-0061	83.00/Set
6	Roller Bar Bearings	LAP5-0016-000-0060	9.00 ea.
6	Sleeve for Roller Bar Bearings	LAP5-0015-002-0058	2.60 ea.
6	Drive Rings	LAP5-0016-000-0036	1.40 ea.
1	Vinyl Machine Cover	LAP5-0016-000-0033	18.75 ea.
1	Spare Orifice Tube (Three Feed)	LAP5-0017-004-1722	94.00 ea.
1	Spare Orifice Tube (Single Feed)	LAP5-0016-003-0254	54.00 ea.
1	Spare Compound Container	LAP5-0015-003-0551	32.00 ea.
1	Spare Compound Pump Assy for operation on 110 volt, 50 or 60 cycle, single phase	LAP5-0016-000-0192	229.00 ea.
1	Drive Motor (⅓ H.P. 115/230v. 1ph 60 Hz.)	LAP5-0016-000-0273	151.00 ea.
1	Gear Reducer	LAP5-0016-000-0322	309.00 ea.
	Operating Manual (Specify Ser. No.)	LAP5-0004-000-2161	50.00 ea.
1	Operating Manual Serial Nos. 15001-16625	LAP5-0004-000-2160	50.00 ea.
1	Stainless Steel Polishing Plate	LAP5-0017-003-1907	1,659.00 ea.
3	Stainless Steel Conditioning Ring	LAP5-0017-002-0974	220.00 ea.
3	Stainless Steel Roller Yoke	LAP5-0017-001-2007	30.00 ea.
3	Metal Back Up Ring	LAP5-0017-002-2023	98.00 ea.
3	Concentric Groove Pressure Plate	LAP5-0017-002-1798	205.00 ea.
3	Single Weight Pressure Plate	LAP5-0015-002-0060	60.00 ea.
1	Diamond File	LAP5-0016-000-0392	35.00 ea.
3	Feed Wire	LAP5-0004-001-1649	3.50 ea.
1	Pump Impeller	LAP5-0016-000-0317	25.50 ea.

Terms: Prices are net 30 days Shipments: F.O.B. Factory Minimum Order: $35.00

WARRANTY: Seller warrants for a period of six months following original shipment by Seller that its products are free from defects in materials or workmanship furnished by Seller. Seller will repair or at its option replace free of charge any product found by it within six months of original shipment to be defective in breach of said warranty upon return thereof transportation prepaid to the location specified by Seller. No returns will be accepted without prior written authorization by Seller.

The foregoing is Seller's sole warranty and Buyer's exclusive remedy and IS IN LIEU OF ALL OTHER WARRANTIES, REPRESENTATIONS OR GUARANTEES, EXPRESS OR IMPLIED (WHICH ARE HEREBY EXCLUDED), INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Without limiting the foregoing, in no event shall Seller be liable for loss of use or profits or for any other special, indirect or consequential damages, or for defects in design or engineering whether performed by it or by others, or for any amounts in excess of Seller's net price of the product in question whether such amounts are claimed to result from breach of contract or warranty, negligence, strict liability or otherwise.

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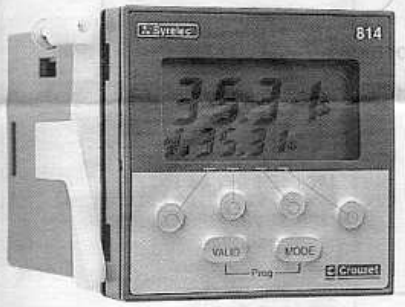
Phone 1 (708) 967-2975
SALES OFFICES IN ALL PRINCIPAL CITIES

Crouzet

Syrelec

NT 001 / 01 98

TIMER 814



Généralités

- FONCTIONS :
  A, B, C, D, Di, H
- 11 gammes de temporisation :

99,99 s	999,9 s
9999 s	99 min 59 s
99,99 min	999,9 min
9999 min	99 h 59 min
99,99 h	999,9 h
9999 h	

(NOTA : la gamme 99,99 s est inhibée pour les modes clignotants D et Di)

- Affichage simultané et permanent de la valeur courante et de la valeur de présélection (pile interne, durée de vie minimum de 10 ans à 20°C)
- Affichage comptant (Up) ou décomptant (Down)
- Entrée contact
- Sortie relais 8 A/250 VAC (10A UL)
- Alimentation : 24 V~ ⎓/110.240 V~ ou 12 V ⎓/24.48 V~ ⎓ (tolérance + 10 % - 15 %)
- Degré de protection façade IP 64

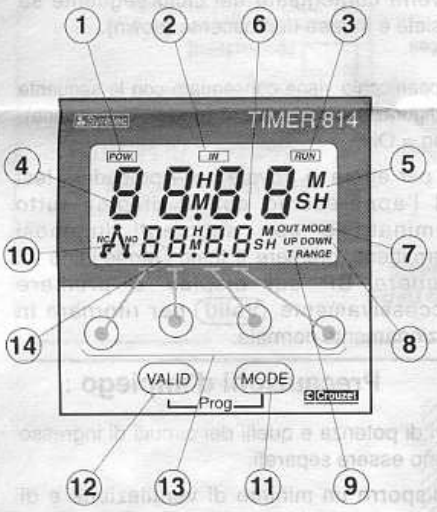
General

- *FUNCTIONS :*
  A, B, C, D, Di, H
- *11timing ranges :*

99.99 s	*999.9 s*
9999 s	*99 min 59 s*
99.99 min	*999.9 min*
9999 min	*99 h 59 min*
99.99 h	*999.9 h*
9999 h	

(NOTE : the 99.99 s range is inhibited for the D1 and Di Cyclic modes)

- *Simultaneous and constant display of the current value and pre-selection value (internal battery, minimum life span 10 years at 20°C)*
- *Up count (Up) or down count (Down) display*
- *Contact input*
- *8 A/250 VAC relay output (10A UL)*
- *Power supply : 24 V~ ⎓/ 110.240 V~ or12 V ⎓/24.48 V~ ⎓ (tolerance + 10 % - 15 %)*
- *Front panel protection rating IP 64*

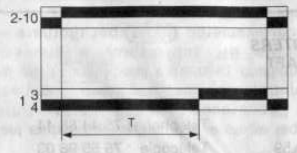
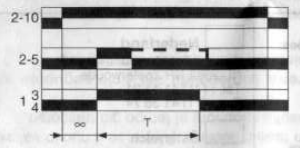
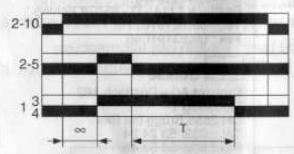
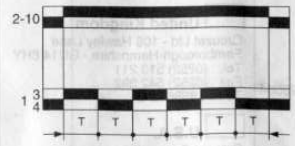
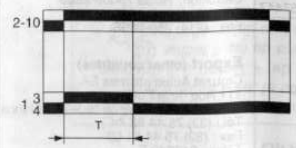


Légende de l'afficheur

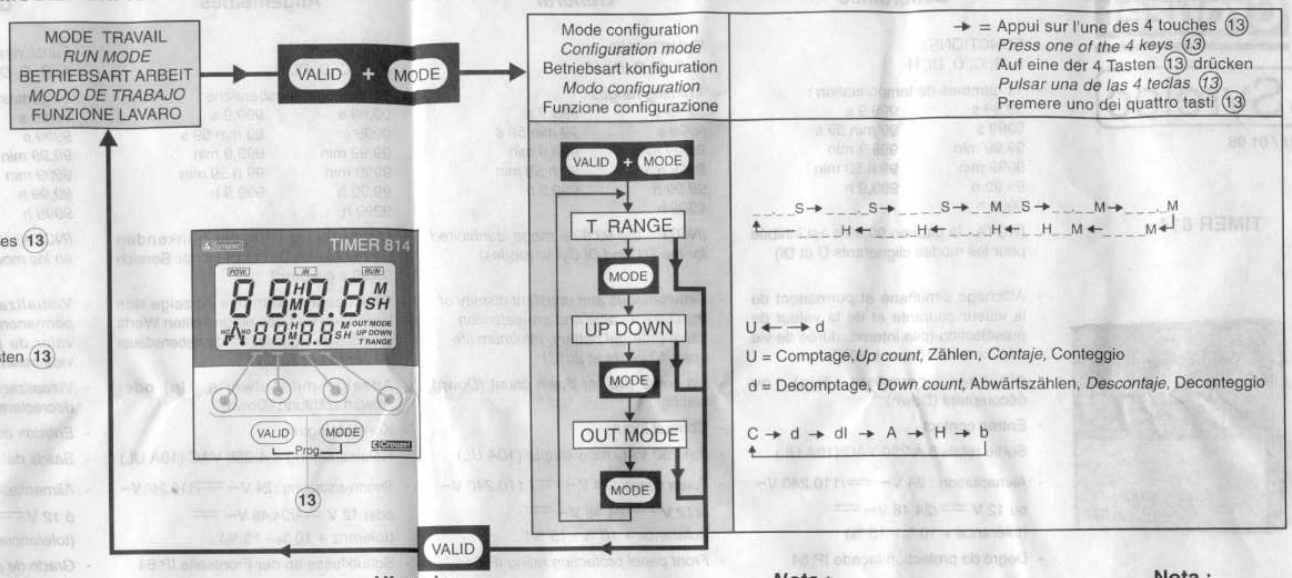
1 Symbole d'alimentation
2 Symbole du contact de commande fermé
3 Symbole clignotant en cours de temporisation
4 Affichage de la valeur courante (4 chiffres)
5 Unité de temps
6 Séparation des unités de temps
7 Modes de fonctionnement
8 Mode croissant (Up), décroissant (Down)
9 Gamme de temps
10 Symbole d'état du relais inverseur (NC = Normally Closed, NO = Normally Opened)
11 Etape suivante
12 Validation de la configuration
13 Incrémentation du temps T
14 Affichage de la présélection du temps T (4 chiffres)

Readout legends

1 Power supply symbol
2 Closed control contact symbol
3 Flashing symbol during time delay
4 Current value readout (4 digits)
5 Unit of time
6 Separation of units of time
7 Operating modes
8 Increasing (Up) or decreasing (Down) mode
9 Time range
10 Changeover relay status symbol (NC = Normally Closed, NO = Normally Opened)
11 Next stage
12 Configuration validation
13 Incrementation of time T
14 Display of time pre-selection T (4 digits)

Modes de fonctionnement	*Operating modes*	Betriebsarten	Modos de funcionamiento	Sistemi di funzionamento
Diagramme des fonctions : 2-10 } ~ ⎓ ***Functions diagram :*** 11 2-10 } **Funktionsdiagramm :** 2-5 Start ***Diagrama de funciones :*** 1 3 4 **Diagramma delle funzioni :**	**FONCTIONS** T : temporisation variable ∞ : indéfini	***FUNCTION*** *T : variable time* *∞ : indefinite*	**FUNKTION** T : zeitverzögerung ∞ : unbestimmt	***FUNCIONES*** *T : temporización variable* *∞ : indefinido*	**FUNZIONE** T : temporizzazione variable ∞ : indefinito
	**A** Retard à la mise sous tension	***A*** *Delay on energisation*	**A** Ansprechverzögerung	***A*** *Retardo a la conexión*	**A** Ritardo alla messa sotto tensione
	**b** Calibrateur	***b*** *Timing on impulse* *(one-shot)*	**b** Impulsformer	***b*** *Calibrador*	**b** Partenza ad impulso
	**C** Temporisation à l'ouverture	***C*** *Timing after impulse* *(delay off)*	**C** Rückfallverzögerung	***C*** *Temporización a la apertura*	**C** Temporizzazione all'apertura
	**d** Double temporisation Cycles répétitifs Démarrage pause	***d*** *Cyclic* *Repetitive cycle* *Start-pause*	**d** Taktgeber Wiederholzyklus Anlauf-Pause	***d*** *Doble temporización* *Ciclos repetidos* *Arranque-espera*	**d** Doppia temporizzazione Ciclo ripetitivo Avvio-pausa
	**dI** Double temporisation Cycles répétitifs Démarrage impulsion	***dI*** *Cyclic* *Repetitive cycle* *Start-pulse*	**dI** Taktgeber Wiederholzyklus Anlauf-Impuls	***dI*** *Doble temporización* *Ciclos repetidos* *Arranque-Impulsion*	**dI** Doppia temporizzazione Ciclo ripetitivo Avvio-impulsi
	**H** Temporisation à la mise sous tension	***H*** *Timing on energisation*	**H** Einschaltwischend einstellbar	***H*** *Temporización a la conexión*	**H** Temporizzazione alla messa sotto tensione

CONFIGURATION DE L'APPAREIL/*CONFIGURATION MODE*/KONFIGURATION DES GERÄTS/*CONFIGURACION DEL APARATO*/CONFIGURAZIONE DELL' APPARECHIO



- Incrémentation de la valeur T par l'appui sur l'une des 4 touches (13) correspondant à chaque Digit.

- *Incrementation of value T by pressing one of the 4 keys (13) corresponding to each digit.*

- Inkrementierung des Wertes durch Druck auf eine der vier tasten (13) die den einzelnen Stellen entsprechen

- *Incremento del valor T al pulsar una de las 4 teclas (13) que corresponden a cada dígito.*

- Incremento del valore T premendo uno dei quattro tasti (13) correspondenti ad ogni digitazione.

Nota :

a) Pour programmer, commuter le switch sur le côté de l'appareil en position "ON".

b) En cours de fonctionnement de la minuterie le changement de la valeur de temporisation :
- est immédiatement pris en compte si vous êtes en affichage croissant (Up) et que la nouvelle valeur est supérieure au temps déjà écoulé,
- sera pris en compte dans le prochain cycle si vous êtes en affichage décroissant (down).

c) L'appareil est livré dans la configuration suivante : 01.00 s, d (down), C (mode), Prog = ON.

d) Si par erreur vous rentrez dans la procédure test de l'appareil avec à l'écran l'apparition de tout l'afficheur ou de segments clignotants, pressez sur (Mode) jusqu'à obtenir Bp à l'écran, puis appuyez sur (Valid) pour revenir en fonctionnement normal.

Note :

a) To program, simply set the switch on the side of the unit to the "ON" position.

b) During operation of the timer, change of time delay values :
- *taken into account immediately if your display is on the up count (Up) and if the new value is greater than the time that has already elapsed,*
- *will be taken into account in the next cycle if you are on a down count display (down).*

c) The unit is supplied with the following configuration : 01.00 s, d (down), C (mode), Prog = ON.

d) If, inadvertently, you enter the unit test procedure with the entire screen or certain segments of the screen flashing, press the (Mode) push-button until Bp is obtained on the screen, then press (Valid) to return to normal operation.

Hinweis :

a) Zum Pogrammieren stellen Sie den Schalter an der Geräteseite auf "ON"

b) Wenn der Zeitverzögerer eingeschaltet ist, wird die Änderung des Verzögerungswerts :
- sofort berücksichtigt, wenn die Aufwärtsanzeige (Up) eingestellt ist und wenn der neue Wert grösser ist als die bereits abgelaufene Zeit,
- im nächsten Zyklus berücksichtigt, wenn die Abwärtsanzeige (down) eingestellt ist.

c) Das Gerät wird in folgender Konfiguration geliefert : 01.00 s, d (down), C (Betriebsart), Prog = ON.

d) Wenn Sie irrtümlich die Testprozedur des Gerätes einschalten, und wenn auf dem Display die gesamte Anzeite oder blinkende Segmente erscheinen, (Mode) drücken, bis auf dem Display Bp erscheint, dann (Valid) betätigen, um in den Normalbetrieb zurückzukehren.

Nota :

a) Para programar, conmutar el interruptor del costado del aparato en la posición "ON".

b) Durante el funcionamiento del temporizador, el cambio del valor de temporización :
- *es tomado inmediatamente en consideración si usted está en modo de visualización creciente (Up) y el nuevo valor es superior al tiempo que ya ha transcurrido,*
- *será tomado en consideración en el próximo ciclo si usted está en modo de visualización decreciente (down).*

c) El aparato se suministra con la configuración siguiente : 01.00 s, d (down), C (mode), Prog = ON.

d) Si por error se entra en el procedimiento de prueba del aparato, y están todo el visualizador o segmentos intermitentes, pulse (Mode) hasta obtener Bp en la pantalla, y después pulse (Valid) para volver al funcionamiento normal.

Nota :

a) Per programmare, commutare su "ON" lo switch posto sul lato dell apparecchio.

b) Durante il funzionamento del temporizzatore, il cambio di valore della temporizzazione :
- viene immediatamente conteggiato se siete in fase crescente (Up) e se il nuovo valore risulta superiore al tempo già trascorso,
- verrà conteggiato nel ciclo seguente se siete è in fase decrescente (down).

c) L'apparecchio viene consegnato con la seguente configurazione : 01.00 s, d (down), C (funzione), Prog = ON.

d) Se per errore vi trovate nella procedura test del l'apparecchio con il display tutto illuminato o con segmenti luminosi intermittenti, premere il tasto (Mode) fino ad ottenere BP sul display e premere successivamente (Valid) per ritornare in funzionamento normale.

Précautions d'emploi :

- Les câbles de puissance et des circuits d'entrée devront être séparés.
- Un minimum de ventilation et de protection aux vibrations doit être respecté.
- Cet appareil contient une pile lithium, ne pas incinérer l'appareil.

Utilization precautions :

- *The power cables and input circuits must be separate*
- *A minimum requirement for ventilation and protection from vibration must be provided*
- *This equipment contains a lithium battery, do not incinerate the unit.*

Vorsichtsmassnahmen :

- Die leitungen der Versorgungsspannung und die Eingangskreise müssen getrennt veriegt werden.
- Es ist für eine ausreichende Belüftung sowie für Vorkehrungen zur Vermeidung von Vibrationen zu sorgen.
- Dieses Gerät enthält eine Lithiumbatterie, das Gerät darf nicht verbrannt werden.

Precauciones de utilización :

- *Los cables de la alimentación deben estar separados de los cables de los circuitos de las entradas.*
- *Un mínimo de ventilación y de protección a las vibraciones, debe ser respetado.*
- *Este aparato contiene una pila de litio : no incinerar el aparato*

Precauzioni d'impiego :

- I cavi di potenza e quelli dei circuiti di ingresso devono essere separati.
- Predisporre un minimo di ventilazione e di protezione contro le vibrazioni.
- L'apparecchio contiene una pila al litio, non bruciare l'apparecchio.

Encombrement et montage

A - Découpe panneau
15 - Joint
16 - Vis de positionnement
17 - Cadre de montage en facade

Dimensions and assembly

A - Panel cut out
15 - Seal
16 - Positioning screw
17 - Frame for panel-mounting

Abmessungen und Montage

A - Frontplattenausschnitt
15 - Dichtung
16 - Positionierschraube
17 - Befestigungsrahmen bei Tafeleinbau

Dimensiones y montaje

A - Perforación del panel
15 - Junta
16 - Tornillo de posicionamiento
17 - Marco para montaje frontal

Ingrombro e montaggio

A - Foratura pannello
15 - Guarnizione di tenuta
16 - Vite di posizionamento
17 - Staffa di fissaggio frontale

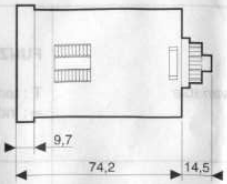
15 - Joint
16 - Vis de positionnement
17 - Cadre de montage en façade
18 - Panneau épaisseur 1 à 3,5 mm

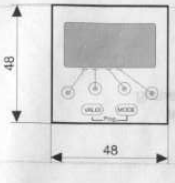
15 - *Seal*
16 - *Positioning screw*
17 - *Frame for panel-mounting*
18 - *Panel thickness 1 to 3.5 mm*

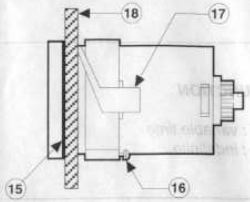
15 - Dichtung
16 - Positionierschraube
17 - Befestigungsrahmen bei Tafeleinbau
18 - Tafeldicke 1 bis 3,5 mm

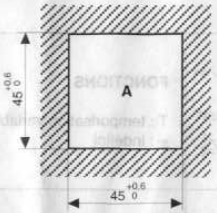
15 - *Junta*
16 - *Tornillo de posicionamiento*
17 - *Marco para montaje frontal*
18 - *Espesor del panel de 1 a 3,5 mm*

15 - Guarnizione di tenuta
16 - Vite di posizionamento
17 - Staffa di fissaggio frontale
18 - Spessore pannello 1 a 3,5 mm



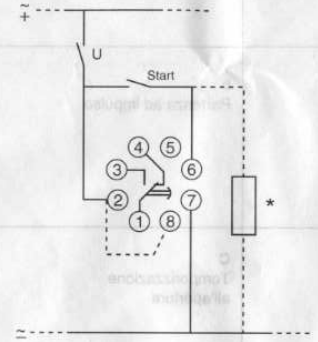






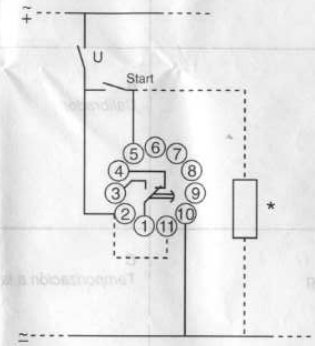
Utilisation - Branchement / *Wiring - Diagram* / Anschlußmoglichkeiten
***Utilización - Conexionado* / Utilizzazione - Collegamento**

*** Possibilité de connecter une charge / *Possibility to connect a load* / Moglichkeit eine Last zu Schalten**
*** *Posibilidad de conectar una carga* / Possibilita di collegare una carrica**



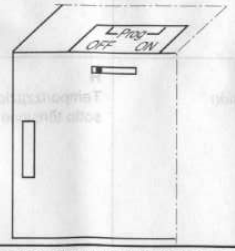
8 broches, *8 pins*, 8 kontakte, *8contactos*, 8 spine

Modèle *Model* Modell *Modelo* Modello	Tension *Voltage* Spannung *Tensión* Tensione	Branchement *Connection* Anschluss *Conexión* Allacciamento		
		2	8	7
24V~ ⎓ et 110-240V~ 88 857 005	24V~ ⎓	+	●	–
	110-240V~	●		●
12V ⎓ et 24-48V~ ⎓ 88 857 003	12V ⎓	+	●	–
	24-48V~ ⎓	+		–



11 broches, *11 pins*, 11 kontakte, *11 contactos*, 11 spine

Modèle *Model* Modell *Modelo* Modello	Tension *Voltage* Spannung *Tensión* Tensione	Branchement *Connection* Anschluss *Conexión* Allacciamento		
		2	11	10
24V~ ⎓ et 110-240V~ 88 857 105	24V~ ⎓	+	●	–
	110-240V~	●		●
12V ⎓ et 24-48V~ ⎓ 88 857 103	12V ⎓	+	●	–
	24-48V~ ⎓	+		–



OFF = Programmation inhibée
OFF = Programming inhibited
OFF = Programmierung blockiert
OFF = Programacion inhibida
OFF = Programmazione disabilitata

Réseau commercial international
International sales organisation
Internationales Vertiebsnetz
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