Hamworthy HYDROTHERM

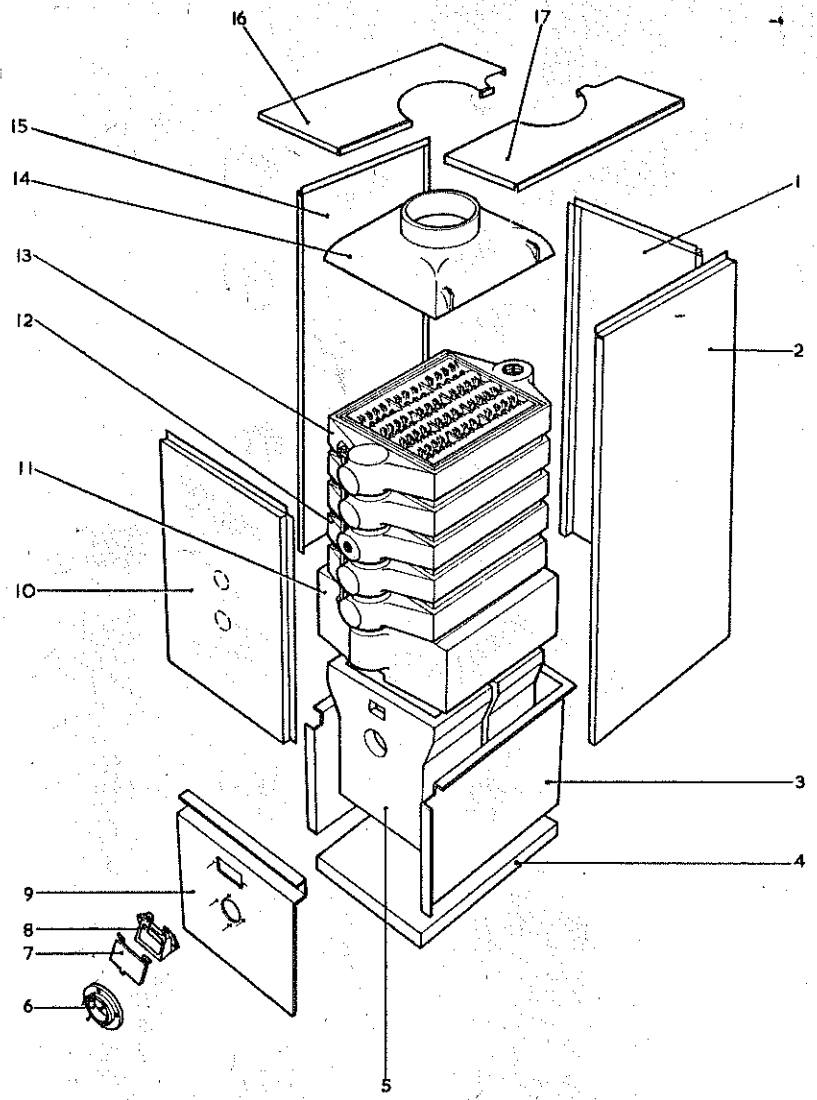
Installers Guide for Oil Fired Boilers

Single OR Series
OR 175. 210. 280. 330. 385.

Multitemp Series
MO 420.-MO 1155.

HAMWORTHY HYDROTHERM Parts List.

Ref No.	Description	Part No.
1	Rear Panel Top	AH20044
2	Side Panel (R.H.)	BH20047
3	Combustion Chamber Box	CH45022
4	Base Plate	AH45008
5	Combustion Chamber	CH45024
6	Burner Mounting	AH10030
7	Door	CH45006
8	Door Mounting Frame	CH45005
9	Front Panel	BH45011
10	Control Panel	BH20046
11	Section Bottom	BH30007
12	Section Middle	BH30001
13	Section Top	BH30004
14	Dome	BH31002
15	Side Panel (L.H.)	BH20048
16	Left Top Panel	AH20013
17	Right Top Panel	AH20014



PUBLICATION No. CDH 3003/4

Hamworthy

HAMWORTHY ENGINEERING LIMITED. COMBUSTION DIVISION
Fleets Corner. Poole. Dorset. BH17 7LA. Telephone : Poole 5123. STD : 020-13 5123. Telex : 41226.

MAINTENANCE

CLEANING AND MAINTENANCE OF BOILER

1. The boiler should be inspected for accumulation If soot of other deposits periodically but at least once every year before the start of the heating season. If soot is found to be present, improper combustion will result. Soot may best be removed with a chemical cleaner available from most plumbing suppliers. Follow manufacturers' directions for use.

2. Dust build-up on the oil burner fan and air passageways must be removed periodically.

3. The nozzle on the oil burner should be replaced at the beginning of each heating season.

4. Remove and replace the oil filter element at the beginning of each heating season.

5. Remove oil filter element from oil pump, by unscrewing large hexagonal nut on top left hand side of oil pump. Clean element and replace carefully at least once per heating season.

6. Withdraw photocell from burner and clean glass weekly.

7. After withdrawing photocell, remove burner arm by unscrewing small nut and loosening knurled nut.

8. Remove H.T. lead as burner arm is withdrawn.

9. Clean nozzle and electrodes weekly; and replace carefully, making sure that burner arm is correctly positioned.

10. **Important**
Switch off and isolate electric supply and oil supply to burner before attemping cleaning or maintenance.

Boiler Size	Nozzle Size	Capacity at 100 lbf./in.^{2} (7,03 Kgf./cm.2)		Working Oil Pressure		Shell Smoke No.	CO^2
		Imp. Gals.	Litres	lbf./in.^{2}	Kgf./cm.^{2}		
OR-175	1.00	1.07	4,85	165	11,62	0	10%
OR-210	1.00	1.28	5,80	195	13,75	0	10%
OR-280	1.65	1.71	7,71	152	10,70	0	10%
OR-330	2.00	2.01	9,10	145	10,20	0	10%
OR-385	2.00	2.35	13.50	200	14,10	0	10%

60% Angle N.S. or equal.

OIL BURNER ADJUSTMENT

The setting of the electrodes and air director plate are important for correct functioning of the burner, and must be as shown in the diagram.

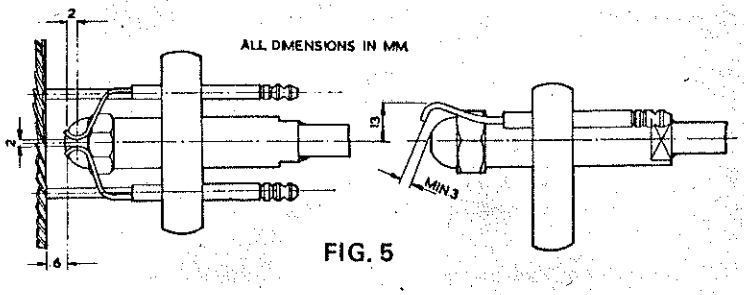


FIG. 5

To remove the burner arm assembly proceed as follows:-

1. Remove the burner cover plate.

2. Release knurled adjustment screw on oil line, and disconnect the adjacent union nut.

3. Remove the H.T. leads.

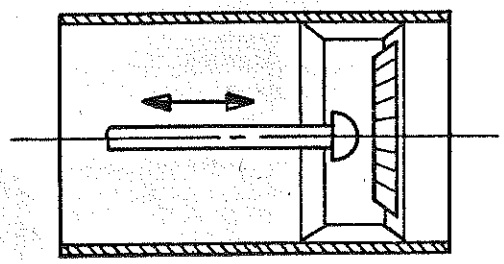
4. Remove the photocell from the combustion head.

5. Remove the burner arm assembly.

To assemble the burner arm proceed in the opposite manner to the previous instructions.

NOTE:- When replacing the burner arm assembly, the air director plate must be located as shown in FIG. 6. The air velocity is controlled by the actual position of the air director.

FIG. 6



Commissioning and Lighting-up Instructions per Module / Battery

1. Check that boiler and system are full of water by momentarily opening pressure relief valve and checking water flows from it.

2. Turn boiler thermostat control knob clockwise as far as it will go to highest setting. If a room thermostat is employed in the system turn this to its highest setting also.

3. Turn on oil supply.

4. Loosed plug above oil suction flexible until oil flows and air is expelled. Re-tighten plug.

5. Fit oil pressure gauge with range 0/300 lbf. per square inch to tapping on face of oil pump above port "B". $^1/_8$ in. BSP.

6. Switch on oil burner electric supply, and burner motor should start immediately.

7. Adjust oil pressure on burner pump by means of the adjusting screw in top right hand side of pump. (See Nozzle Chart for correct pressure).

8. Adjust air damper on burner until a steady clean flame is burning. Ensure that there is no obstruction to the air inlet damper.

9. Switch off burner and remove pressure gauge.

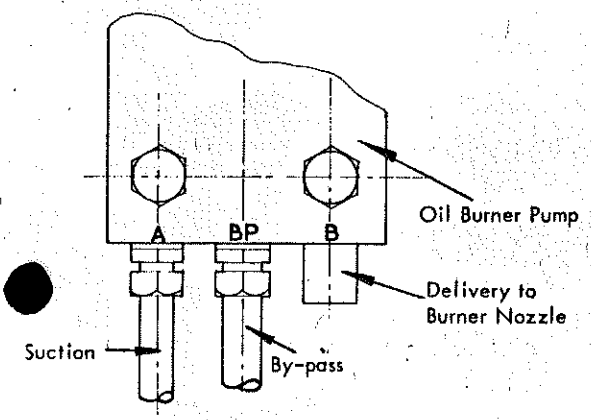
10. Restart burner, set thermostat to medium settings and run until system is warm.

11. To obtain best efficiency adjust draught regulator and air damper on burner to give overfire draught of - 0.01 to 0.02in. WG, with 8% to 10% CO2. measured at boiler outlet (before draught regulator).

12. The refractory combustion chamber should be allowed to dry out by running the burner on/off until the refractory attains a dull red heat (approx. 500°C). Sight through Inspection Door.

13. Turn boiler thermostat to the high limit temperature setting i.e. (180 - 190°F). The boiler control thermostats (not supplied by Hamworthy Engineering) should be adjusted in accordance with the makers instructions and system requirements. Check also that any time switch circuits are energised.

    Before leaving job check all controls to make certain they are operating correctly. Start and stop the burners several times by raising and lowering the termostat settings.



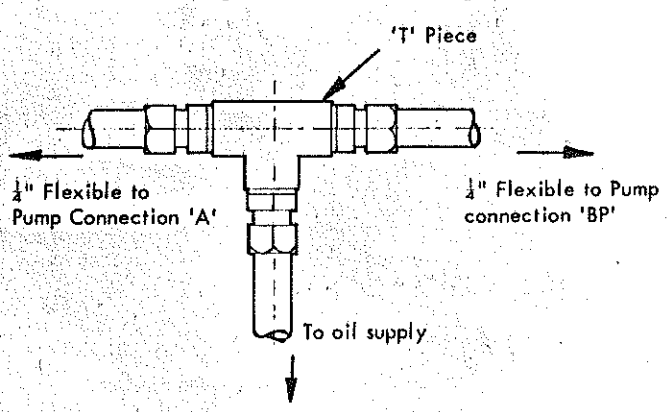


FIG. 4

WARRANTY. Oil fired Boilers

Reference should be made to our printed conditions of sale, which are applicable only if the boiler has been installed in accordance with our Working Instructions. Under no circumstances should the heating sections be separated for installation, or the boiler be left on site without adequate cover. All flue connections should be removeable to allow access from the top to clean the boiler every heating season. The installation should comply with the relevant BSS and 1HVE codes of practice, and a control thermostat and pressure relief valve should be fitted. The rating plate supplied with every contract should be fixed to the outer casing of the left hand boiler on multi-boiler installations.

The boilers must be connected to provide a series water flow through each module.

The burner must be correctly assembled to the boiler front plate as detailed, and set to the pressure and CO_2 and smoke number stated, and good combustion maintained.

The boiler should not be pressurised and all flues should be adequately sized and provided with an appropriate draught regulator. Only 35SR1 fuel should be fired.

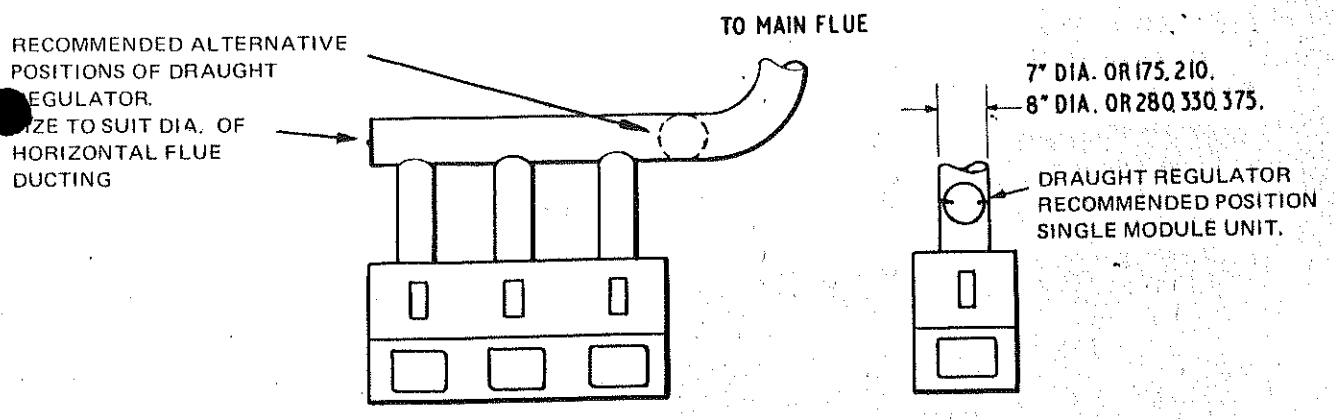


FIG. 2

TYPICAL BOILERHOUSE LAYOUT

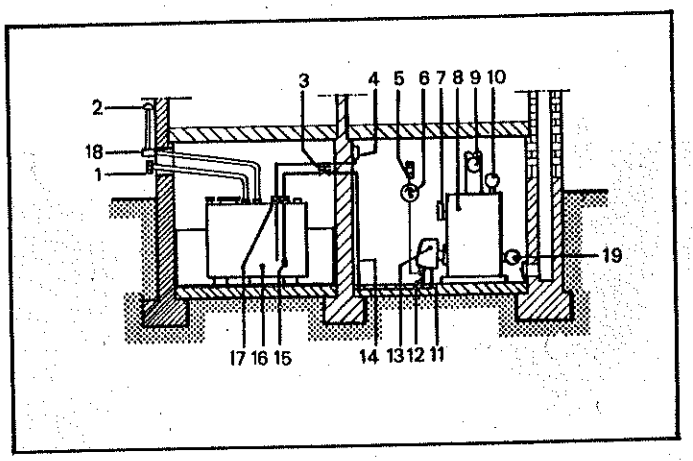
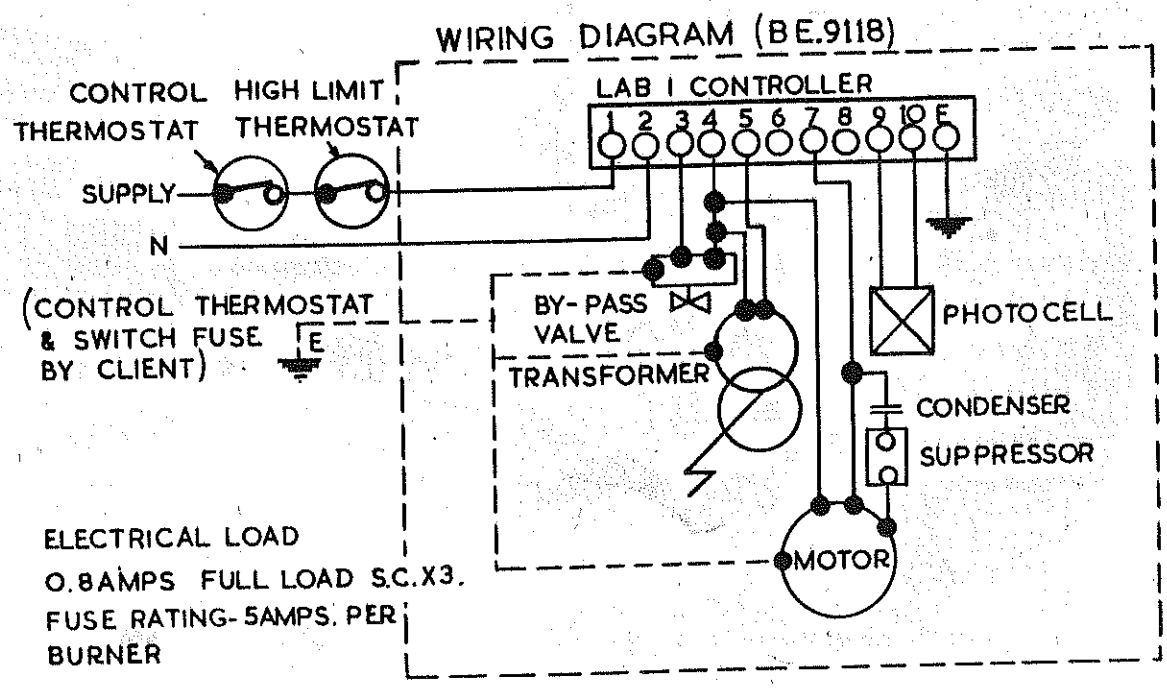


FIG. 3

1. Filler connection
2. Vent pipe
3. Tank shut-off valve
4. Oil gauge
5. Fuse element
6. Control switch
7. High limit thermostat
8. Hydrotherm boiler
9. Primary flue and regulator
10. Water flow connection
11. Wire-reinforced oil hoses
12. Isolating valve
13. Oil burner
14. Suction pipe
15. Non-return valve
16. Oil tank
17. Combination tank fitting
18. Safety overfill tee
19. Water return connection



INSTALLATION

1. Locate boilers so that length of ducting to chimney is kept to a minimum. The following minimum clearance from combustible materials must be maintained:

Side	—	6in.
Rear	—	6in.
Front	—	24in. (for servicing)

2. If boilers are to be installed in a closed room without windows, adequate air for combustion must be provided by two openings; one located about 6in. below the ceiling, the other about 6in. off the floor.

3. Provide good level and fire resistant foundation, preferably a 3in. high alumina base with the following dimensions:-

   For "A" Battery : 50in. wide by 38in. deep.
   For "B" Battery : 70in. wide by 38in. deep.

   Ensure that adequate protection from radiation is given to any waterproof membrane.

   Mark centrelines 21in. apart on foundation for each boiler unit.

4. Remove crates and move units with skids into appropriate position on foundation.

5. Remove boiler unit from skids.

6. Move boiler units into installation position on 21 in. centrelines and connect supply and return pipework to give a series water flow.

7. If prefabricated headers are furnished with the heating plant assemble piping in accordance with instructions packed in fitting carton.

8. Installer to supply and fit in the system flow a control thermostat per module, unless a common sensing point is used with the Hamworthy boiler sequence control panel.

9. Installer to fit a pressure relief valve, gauges and thermostats in the flow system pipework.

10. Connect expansion tank to supply header. All pipework should be arranged to give a series flow pattern through each module.

11. Ensure cast sections seated on chamber box. Connect water feed line to return header.

12. Check proper seating of flue header. Check all joints sealed with furnace cement to assure air tight flue ways. The flue ducting should be independently supported and be removeable from the boiler for cleaning access.

13. Mount draught controls in accordance with manufacturer's recommendations. Install common ducting which should slope upwards to the chimney at least ¼in. per foot and must be inserted into, but not beyond, the inside wall of chimney flue.

    NOTE:- Where a chimney pull in excess of 0.08in. WG is anticipated a main draught stabiliser should be supplied by the installer, to suit the diameter of the common flue header.

Model No.	Ducting Size
Or-175-210	7in. dia. (39 sq.in)
OR-280-385	8in. dia. (50 sq. in)
MO-420,560	10in. dia. (79 sq. in.)
MO-660, 770	11in. dia. (95 sq. in)
MO-840, 990	12in. dia. (113 sq. in.)
MO-1155	15in. (177 sq. in.)

14. Fill system with water in accordance with standard practice.

15. Unpack casing and assemble around heating plant as shown on guide in casing carton.

16 All electric wiring to be in accordance with I.E.E. regulations. Supply to be 200-250v/ 1/50 cycles.

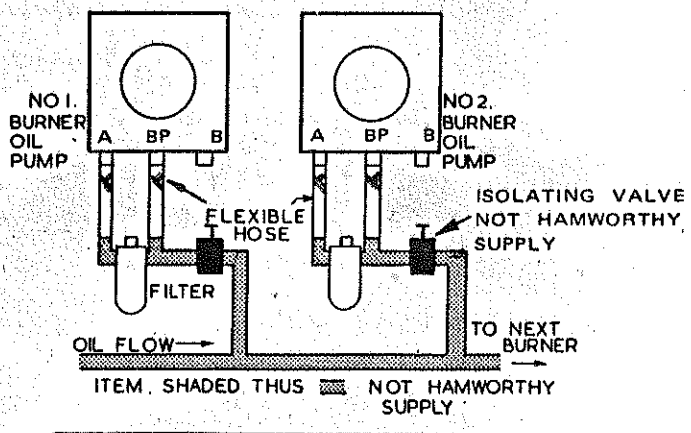
17 Install fuel oil supply system. For typical piping arrangements, see Fig. 1.

OIL BURNERS

19 Install oil burner on each boiler unit and connect oil flexibles, valves and filters as shown in Fig. 1.

20 Connect thermostats and mains connections as shown in wiring diagram BE 9118

FIG. 1



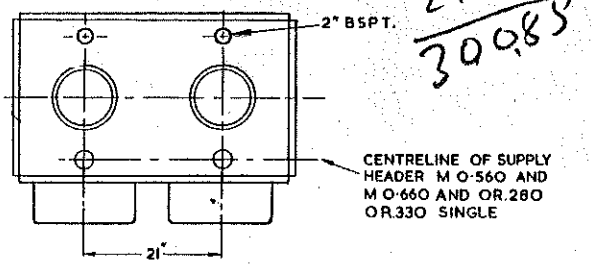
MODEL SINGLE BOILER and	FUEL OIL SUPPLY LINE SIZE
MO-420, 560, 660	½in. (12,7 mm.)
MO-770,840,990,1155	¾in. (19,05 mm.)

For larger installations consult Hamworthy Engineering for recommended fuel oil supply piping system.

RATING AND DIMENSION DATA

MODEL	TOTAL FIRING RATE		ELCO JUNIOR	NUMBER OF BURNERS	BOILER INPUT		CASING	DIMENSIONS 'A'	'B'	'C'	'D'	RECOMMENDED CHIMNEY SIZE		WEIGHT	
	GPH	LPH			Btu/hr.	Kg/cal.		ins. / mm.	ins. / mm.	ins. / mm.	ins. / mm.	in. x in. x ft	mm x mm x m	lbf.	Kg.
OR.175	1.06	4,820	10s.	1	175,000	44,0	Single	48½ / 1232	23⅜ / 606,4	7 / 177,8	21 / 533,4	8x8x15	203x203x4,5	535	39,0
OR.210	1.28	5,820	10s.	1	210,000	55,8	Single	" / "	" / "	7 / 177,8	21 / 533,4	"	"	535	39,0
OR.280	1.71	7,778	10s.	1	280,000	70,5	Single	" / "	" / "	8 / 203,2	21 / 533,4	"	"	610	44,0
OR.330	2.00	9,092	10s.	1	330,000	83,0	Single	" / "	" / "	8 / 203,2	21 / 533,4	"	"	674	49,2
OR.385	2 35	10,34	10s.	1	385,000	97,0	Single	" / "	" / "	8 / 203,2	21 / 533,4	"	"	739	53,4
MO.420	2.56	11,61	10s.	2	420,000	102,8	'A' Battery	" / "	" / "	7 / 177,8	42 / 1066,8	8x8x20	203x203x6,1	1070	78,0
MO.560	3.42	15,55	10s.	2	560,000	141,8	'A' Battery	" / "	" / "	4 / 203,2	42 / 1066,8	12x12x20	304x304x6,1	1180	86,0
MO.660	4.00	18,184	10s.	2	660,000	166,0	'A' Battery	" / "	" / "	8 / "	42 / 1066,8	"	"	1280	93,2
MO.770	4.70	21,30	10s.	2	770,000	193,5	'A' Battery	" / "	" / "	8 / "	42 / 1066,8	"	304x403x6,1	1410	102,0
MO.840	5.12	22,80	10s.	3	840,000	212,0	'B' Battery	" / "	" / "	8 / "	63 / 1600,2	"	"	1755	128,0
MO.990	6.00	27,276	10s.	3	990,000	248,0	'B' Battery	" / "	" / "	8 / "	63 / 1600,2	"	"	1905	139
MO.1155	7.05	32,00	10s.	3	1,555,000	292,0	'B' Battery	" / "	" / "	8 / "	63 / 1600,2	16x16x20	403x403x6,1	2100	153,0

TYPICAL 'A' BATTERY



TYPICAL 'B' BATTERY