




MAGNA GRAIN DRYERS

MODEL 2005 ->



JULY 2005

	Handbook for the use and maintenance of the dryer
	Revision July 2005
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1 INTRODUCTION TO THE MANUAL

1.1 FOREWORD

This manual is provided to give you the necessary operating and maintenance instructions to obtain the best performance and working life for your dryer.

Please read this manual thoroughly. Understand what each control is for and how to use it.

Observe all safety precautions decaled on the machine and noted throughout the manual for safe operation.



DO NOT CARRY OUT MAINTENANCE WORK AND/OR REPAIRS UNTIL THE TRACTOR ENGINE IS STOPPED AND THE PTO DISCONNECTED OR IF AN ELECTRIC DRIVE UNIT THE MAIN POWER SWITCH TURNED TO OFF.



DO NOT UNDER ANY CIRCUMSTANCES ENTER THE DRYER THROUGH THE INSPECTION HATCH UNTIL THE TRACTOR IS TURNED OFF AND THE PTO SHAFT IS COMPLETELY DISCONNECTED OR IF AN ELECTRIC DRIVE UNIT THE MAIN POWER SWITCH TURNED TO OFF. FAILURE TO FOLLOW THIS INSTRUCTION MAY CAUSE SERIOUS INJURY. EXPLANATION – SHOULD THE AGITATOR ARM RECIRCULATE WHILST THE OPERATOR IS ENTERING THE DRYER OR INSIDE THE DRYER

If any assistance or additional information is needed, contact your authorized OPICO dealer.

This manual is divided into the following sections:

- 1) Introduction
- 2) General Information
- 3) Preparing The Dryer For Operation
- 4) Loading And Operation
- 5) Maintenance
- 6) Safety Warnings
- 7) Trouble Shooting
- 8) Storage
- 9) Wiring Diagrams


For safety and to obtain the performance of which these machines are capable we recommend that the operator should read this manual carefully before initial start up at the beginning of each season and when changing to a new crop type.

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ENCLOSED WITH THIS HANDBOOK

- DECLARATION OF CONFORMITY SUPPLIED BY THE MANUFACTURER
- PRODUCT REGISTRATION CARD

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1.3 DEFINITION OF SYMBOLS

Symbols are used in this handbook to highlight parts of its content, which are of special importance for safety, use and maintenance

SYMBOL	MEANING	DESCRIPTION
	ATTENTION	Section of text which includes an instruction that that requires attention
	DANGER	This symbol requires you to pay special attention because your safety is involved
	USE	Explanation of the correct use of the dryer
	MAINTENANCE	Maintenance Instructions

1.4 SAFE WORKING ENVIRONMENT



Read and understand the operators manual before operating the unit



Always disconnect the PTO shaft or if an electric drive unit turn the main power switch to off before adjusting, lubricating, servicing or cleaning



Keep all shields and safety devices in place



Keep children, visitors and untrained personnel away from the machine while in operation




Keep hands, feet and clothing away from moving parts



Keep unit level when operating



DO NOT UNDER ANY CIRCUMSTANCES ENTER THE DRYER THROUGH THE INSPECTION HATCH UNTIL THE TRACTOR IS TURNED OFF AND THE PTO SHAFT IS COMPLETELY DISCONNECTED OR IF AN ELECTRIC DRIVE UNIT THE MAIN POWER SWITCH TURNED TO OFF. FAILURE TO FOLLOW THIS INSTRUCTION MAY CAUSE SERIOUS INJURY. EXPLANATION – SHOULD THE AGITATOR ARM RECIRCULATE WHILST THE OPERATOR IS ENTERING THE DRYER OR INSIDE THE DRYER

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2 GENERAL INFORMATION

2.1 OVERVIEW

All instructions relating to position are as viewed from the front of the dryer looking toward the back of the machine.

2.2 DRYER IDENTIFICATION

The Identification Plate and CE marking of the machine is placed on the left side of the draw-bar.

The identification plate must not be tampered with, covered over or modified in any way.

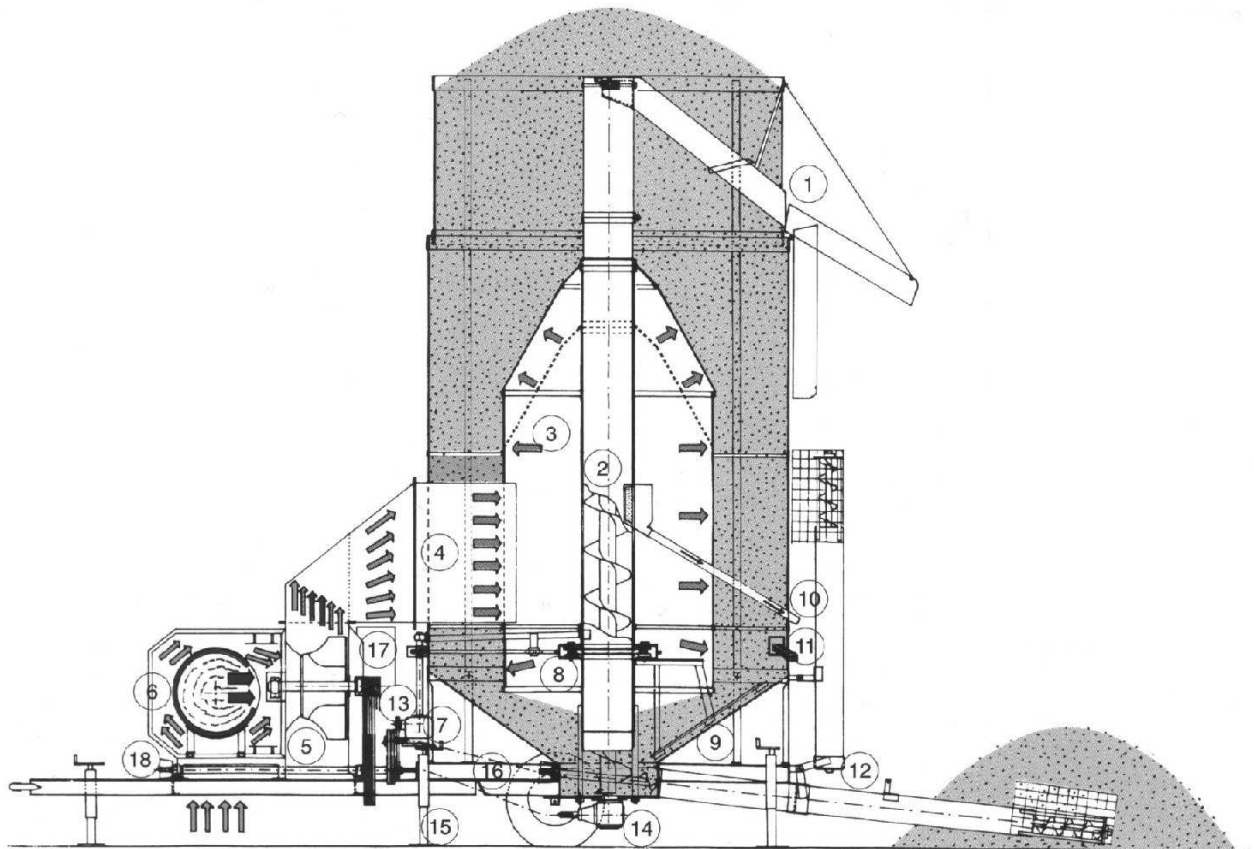
Should the plate become damaged or lost you should request a replacement as soon as reasonable possible.

Picture 2.2 IDENTIFICATION PLATE

		
Viale Tretti Marotti 18 Grisignano di Zocco - Vi - Italy Tel. 0444-414201 Fax 0444-414283		
ESSICCATOIO MOD.		<input type="text"/>
SERIE	N°	<input type="text"/>
ANNO COSTRUZIONE		<input type="text"/>



2.3 DRYER COMPONENTS



Picture 2.3 DRYER COMPONENTS TABLE

- | | |
|-----------------------------|------------------------------|
| 1) Discharge Chute | 10) Grain Cleaner Discharge |
| 2) Vertical Auger | 11) Grain Sampler Outlet |
| 3) Plenum Chamber | 12) Loading Auger |
| 4) Air Duct | 13) Belt Drive |
| 5) Fan | 14) Centre Auger Gearbox |
| 6) Heat Unit | 15) Adjustable Support Jacks |
| 7) Agitator Gearbox | 16) PTO Shaft |
| 8) Agitator Support Rollers | 17) Control Board |
| 9) Agitator Arm | 18) Main Drive Shaft |



2.4 THEORY OF DRYING

2.4.1 HEATING THE GRAIN

Combinable crop drying has two basic stages:

1. The diffusing of internal moisture to the surface of the grain, bean or seed.

Followed by:

2. The removal of the created external moisture by air flow.

The grain temperature largely establishes this rate of diffusion and must be controlled not to exceed a rate that could result in a ruptured seed.

Removal of the exterior moisture is dependant upon air flow and air temperature.

These two stages must be balanced to produce the quality dried crop.

The balance is accomplished quite simply in the Magna Grain Dryer with its uniform circulation, regulated heat and controlled air-flow.

2.4.2 COOLING THE GRAIN



It is very important to cool grain. Grain to be stored should be cooled after drying to within 15 degrees F of atmospheric temperature or 10 degrees F of grain already in the storage bin. Moisture migration from air to grain will occur if the grain is not cooled within these limits.

**2.4.3 RECOMMENDED DRYING TEMPERATURES**

CROP TYPE	MOISTURE CONTENT & POINTS OF INTEREST	PLENUM TEMPERATURE	MAXIMUM FINAL GRAIN TEMPERATURE	FINAL STORAGE LEVEL
BARLEY				
Feed		180 - 200°F	120°F	14%
Malting/Seed	Below 21%	120 - 150°F	105°F	
	Above 22%	110 - 130°F	105°F	

If light samples are experienced Maximum Plenum Temperature should not exceed 140°F

**WARNING**

Great care should be taken with the storage of barley grown for malting or seed between the actual harvesting of the material and the drying of it. Harvested crop must only be stored before drying for the minimum amount of time. It is recommended that the crop is stored so that the maximum depth does not exceed 2 feet.

CROP TYPE	MOISTURE CONTENT & POINTS OF INTEREST	PLENUM TEMPERATURE	MAXIMUM FINAL GRAIN TEMPERATURE	FINAL STORAGE LEVEL
OILSEED RAPE				
	Up to 17%	160 - 200°F	120°F	8%

SPECIAL NOTES

1. Plenum temperatures of up to 200°F have been used without apparent oil/quality loss
2. Excessive heat gives slower drying – cooling prolonged
3. Mature crops dry relatively easily
4. Desiccated early crops may contain 30% volume of immature seeds which are less easily dried
5. With moisture content above 17% - for every 2% increase in moisture content, reduce plenum temperature by 10°F for the initial drying period

CROP TYPE	MOISTURE CONTENT & POINTS OF INTEREST	PLENUM TEMPERATURE	MAXIMUM FINAL GRAIN TEMPERATURE	FINAL STORAGE LEVEL
OILSEED RAPE				
Seed	Reduce plenum temperature by 10°F	120 - 150°F	105°F	8%



CROP TYPE	MOISTURE CONTENT & POINTS OF INTEREST	PLENUM TEMPERATURE	MAXIMUM FINAL GRAIN TEMPERATURE	FINAL STORAGE LEVEL
HERBAGE SEEDS (SAFE DRYING AIR TEMPERATURES FOR 90% GERMINATION)				
(Grass Seed)				
PRG/IRG	Up to 25%	130°F	90°F	13%
	Between 25% – 30%	120°F	90°F	13%
	Between 30% – 35%	110°F	90°F	13%
	Between 35% – 40%	100°F	90°F	13%

**NOTES**

- * Always grown for seed
- * Grass seed does not flow easily over 22% moisture content
- * Polish the dryer prior to use with dried barley or other dry grain

BEANS – see Peas/Field Beans

CROP TYPE	MOISTURE CONTENT & POINTS OF INTEREST	PLENUM TEMPERATURE	MAXIMUM FINAL GRAIN TEMPERATURE	FINAL STORAGE LEVEL
LINSEED				
Oil extraction and/or seed	Up to 15%	120 - 150°F	120°F	8%
*For every 2% increase in moisture content reduce plenum temperature by 10°F				
		90 - 120°F	105°F	8%

CROP TYPE	MOISTURE CONTENT & POINTS OF INTEREST	PLENUM TEMPERATURE	MAXIMUM FINAL GRAIN TEMPERATURE	FINAL STORAGE LEVEL
OATS				
Feed		150 - 200°F	130°F	14%
Seed		110 - 150°F	105°F	14%

**NOTE** Oats for feed use can stand plenum temperatures up to 220°F.



CROP TYPE	MOISTURE CONTENT & POINTS OF INTEREST	PLENUM TEMPERATURE	MAXIMUM FINAL GRAIN TEMPERATURE	FINAL STORAGE LEVEL
PEAS/FIELD BEANS				
Processing / Protein		110 - 120°F	105°F	14%
NOTE In general protein is not affected by heat but excessive heat will cause splitting damage				
Seed	Below 24%	90 - 110°F	105°F	14%
Seed	Above 24%	70 – 90°F	105°F	14%
Seed	Above 27%	No heat to 50°F	105°F	14%

DIRECT HARVESTED

1. Can experience handling problems over 25% moisture content
2. Do not use loading auger over 25% moisture content (see below)
3. Special note – clean out the centre auger bin bottom after each load. This crop carries a lot of surface dirt which in the re-circulation process will find its way to the bin bottom well and create an extremely abrasive paste. This will shorten the life of the centre auger dramatically if the recommended cleaning process is not carried out.

DRYING FROM STORE

1. This crop is susceptible to splitting if excessive heat is used
2. Increase temperature in 5°F stages and check for splits to a maximum of 110°F plenum temperature : No heat - 110°F

CROP TYPE	MOISTURE CONTENT & POINTS OF INTEREST	PLENUM TEMPERATURE	MAXIMUM FINAL GRAIN TEMPERATURE	FINAL STORAGE LEVEL
WHEAT				
Feed		180 - 200°F	140°F	14%
Milling	Below 25%	150 - 180°F	120°F	14%
	Above 25%	140 – 170°F	120°F	14%
Seed		100 - 130°F	105°F	14%

SPECIAL NOTES

1. High gluten wheats mean slower drying
2. Wet cereals in general i.e. over 27% moisture content – dry carefully do not exceed Grain Final Safe Temperature. If this is apparent, stop the burner, allow dryer to continue circulating grain until cool, then re-light the burner and complete the drying process.
3. Seed wheat over 27% moisture content – use no heat to a maximum of 105°F plenum until moisture content is below 20%, then continue with care using a plenum temperature of 120°F maximum.



CROP TYPE	MOISTURE CONTENT & POINTS OF INTEREST	PLENUM TEMPERATURE	MAXIMUM FINAL GRAIN TEMPERATURE	FINAL STORAGE LEVEL
LUPINS				
Drying for Seed		no heat to 120°F		

- * Furry seed – may generate fluff in handling
- * Very tough skin
- * Pre-drying treatment – pre-cleaning helpful if not essential

METHOD

1. Polish dryer with barley prior to handling
2. Be careful if moisture content 23% - 24% - augers may not handle
3. Recommended plenum temperatures no heat - 105°F - 120°F **ABSOLUTE MAXIMUM**

**2.4.4 TEMPERATURE CONVERSION CHART**

EG 120°F = 48.9°C OR 120°C = 248°F

0 ~ 90

91 ~ 141

142 ~ 260

°C		°F
-17.8	0	32.0
-15.0	5	41.0
-12.2	10	50.0
-9.4	15	59.0
-6.7	20	68.0
-3.9	25	77.0
-1.1	30	86.0
1.7	35	95.0
4.4	40	104.0
7.2	45	113.0
10.0	50	122.0
10.6	51	123.8
11.1	52	125.6
11.7	53	127.4
12.2	54	129.2
12.8	55	131.0
13.3	56	132.8
13.9	57	134.6
14.4	58	136.4
15.0	59	138.2
15.6	60	140.0
16.1	61	141.8
16.7	62	143.6
17.2	63	145.4
17.8	64	147.2
18.3	65	149.0
18.9	66	150.8
19.4	67	152.6
20.0	68	154.4
20.6	69	156.2
21.1	70	158.0
21.7	71	159.8
22.2	72	161.6
22.8	73	163.4
23.3	74	165.2
23.9	75	167.0
24.4	76	168.8
25.0	77	170.6
25.6	78	172.4
26.1	79	174.2
26.7	80	176.0
27.2	81	177.8
27.8	82	179.6
28.3	83	181.4
28.9	84	183.2
29.4	85	185.0
30.0	86	186.8
30.6	87	188.6
31.1	88	190.4
31.7	89	192.2
32.2	90	194.0

°C		°F
32.8	91	195.8
33.3	92	197.6
33.9	93	199.4
34.4	94	201.2
35.0	95	203.0
35.6	96	204.8
36.1	97	206.6
36.7	98	208.4
37.2	99	210.2
37.8	100	212.0
38.3	101	213.8
38.9	102	215.6
39.4	103	217.4
40.0	104	219.2
40.6	105	221.0
41.1	106	222.8
41.7	107	224.6
42.2	108	226.4
42.8	109	228.2
43.3	110	230.0
43.9	111	231.8
44.4	112	233.6
45.0	113	235.4
45.6	114	237.2
46.1	115	239.0
46.7	116	240.8
47.2	117	242.6
47.8	118	244.4
48.3	119	246.2
48.9	120	248.0
49.4	121	249.8
50.0	122	251.6
50.6	123	253.4
51.1	124	255.2
51.7	125	257.0
52.2	126	258.8
52.8	127	260.6
53.3	128	262.4
53.9	129	264.2
54.4	130	266.0
55.0	131	267.8
55.6	132	269.6
56.1	133	271.4
56.7	134	273.2
57.2	135	275.0
57.8	136	276.8
58.3	137	278.6
58.9	138	280.4
59.4	139	282.2
60.0	140	284.0
60.6	141	285.8

°C		°F
61.1	142	287.6
61.7	143	289.4
62.2	144	291.2
62.8	145	293.0
63.3	146	294.8
63.9	147	296.6
64.4	148	298.4
65.0	149	300.2
65.6	150	302.0
66.1	151	303.8
66.7	152	305.6
67.2	153	307.4
67.8	154	309.2
68.3	155	311.0
68.9	156	312.8
69.4	157	314.6
70.0	158	316.4
70.6	159	318.2
71.1	160	320.0
71.7	161	321.8
72.2	162	323.6
72.8	163	325.4
73.3	164	327.2
73.9	165	329.0
74.4	166	330.8
75.0	167	332.6
75.6	168	334.4
76.1	169	336.2
76.7	170	338.0
77.2	171	339.8
77.8	172	341.6
78.3	173	343.4
78.9	174	345.2
79.4	175	347.0
82.2	180	356.0
85.0	185	365.0
87.8	190	374.0
90.6	195	383.0
93.3	200	392.0
96.1	205	401.0
98.9	210	410.0
101.7	215	419.0
104.4	220	428.0
107.2	225	437.0
110.0	230	446.0
112.8	235	455.0
115.6	240	464.0
118.3	245	473.0
121.1	250	482.0
123.9	255	491.0
126.7	260	500.0



3 PREPARING THE DRYER FOR OPERATION

3.1 SITING THE DRYER



Select a site as level as possible 50 feet (15 metres) from inflammable buildings. It is preferable to set the machine with the fan facing toward the prevailing wind.

If the dryer is being set on a level concrete slab simply lower the adjustable jacks, raising the wheels slightly off the ground, bringing the machine to a level position. It is important that the central auger is vertical. Use the spirit levels that are positioned on the dryer transport chassis.

If the dryer has been placed straight on to soil then a board of at least 2" x 8" x 12" should be placed under each leg.



3.2 POSITIONING THE TOP FOLD DOWN AUGER



THERE IS A CORRECT METHOD THAT MUST BE FOLLOWED:

Step One: At the rear of the dryer there is a 4mtr long round bar mounted vertically that controls the unloading plate. This is locked in transport position by a large lock screw on the second ring. This screw must be loosened off to allow the bar to float up with the extending sheets.

Step Two: Raise the external extending sheets by approximately 200-300mm, using the top extension winch.

Step Three: First examine the illustration (Fig 3A) Climb the external ladder and stand on the plenum. Using the lever marked 1, pull the over-centre mechanism bringing the folding auger toward the centre of the dryer. Lock the lever in position using the wing nut item number 2.



FAILURE TO FOLLOW STEP TWO WILL RESULT IN MATERIAL DAMAGE TO THE SIDE SHEETS OF THE DRYER.

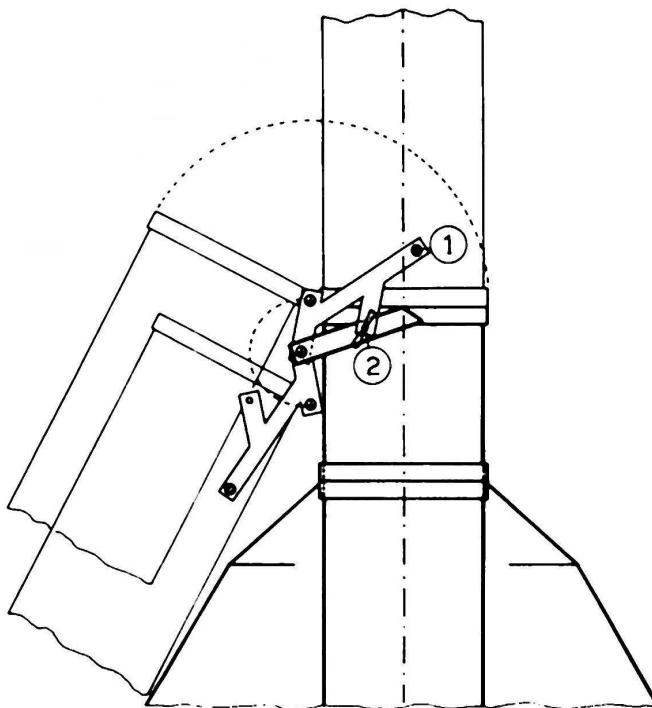


FIG 3A - VERTICAL AUGER HINGE OVER-CENTRE MECHANISM



3.2 POSITIONING THE TOP FOLD DOWN AUGER

Step Four: Continue to raise the side sheets that will carry the folding part of the vertical auger with them until the side sheets are 50-100mm from the top of their movement range.

Step Five: Using the vertical auger winch (beside the control cabinet) **raise** the folding auger into its vertical position. Once the auger is correctly positioned climb the ladder and tighten up the wing nut item 3 in Fig 3b.

Step Six: Continue to raise the external extending sheets fully. Taking care not to apply excessive force. Mount the four safety pins below the extension support bars.

Step Seven: Check that the vertical rod controlling the unloading gate as mentioned in step one is in the correct position and opens/closes freely.

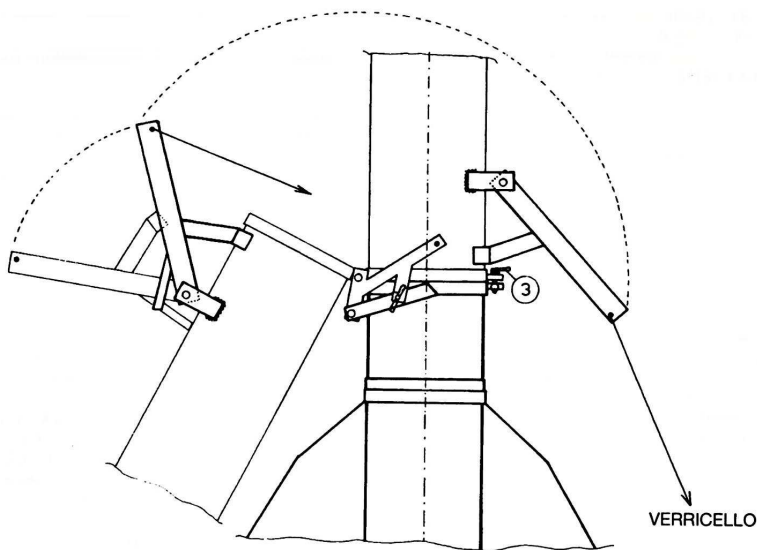


FIG 3B - VERTICAL AUGER FOLDING



DURING WORK THE WINCH WIRE TO THE TOP AUGER SHOULD NOT BE UNDER TENSION.



3.3 PREPARING FOR TRANSPORT



TO PREPARE THE DRYER FOR TRANSPORT FOLLOW ALL THE STEPS ABOVE IN REVERSE ORDER WITH **ONE ADDITIONAL STEP**:

First Step: To start the lowering of the top auger extension pull the wire that is positioned at the rear of the dryer and has at its end a round steel ring. Obviously you need to undo the wing nut item 3 in Fig 3b first.

3.4 LOADING AUGER HOPPER

Using the appropriate winch gently lower the loading auger into the horizontal position. In the process checking that the driving lugs do not directly hit each other. adjust the support feet at the end of the hopper and check the inner/outer auger sections fit properly and are sealed to prevent grain loss.

3.5 DIESEL FUEL SUPPLY

The diesel tank is located on the left hand side of the dryer. The fuel supply to the burner has a filter on the suction side. The filter should be replaced as required, depending on usage and cleanliness of diesel supply.

The fuel pump is factory set at 12 bar pressure for diesel fuel.

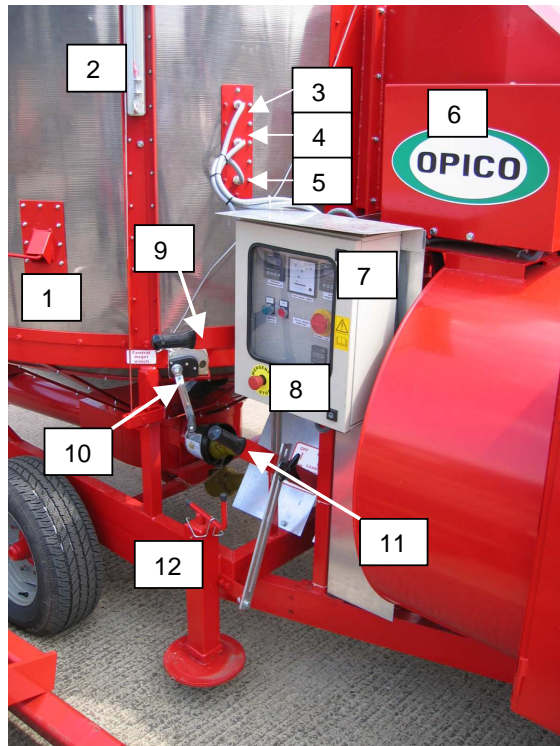
3.6 PTO DRIVE SHAFT

Connect the pto shaft to the tractor. Check that the angle between the pto of the tractor and the input pto of the dryer is as level as possible to minimise pto shaft vibration.

NOTE; the tractor should not be connected to the drawbar of the dryer during dryer operation.



3.7 CONTROLS



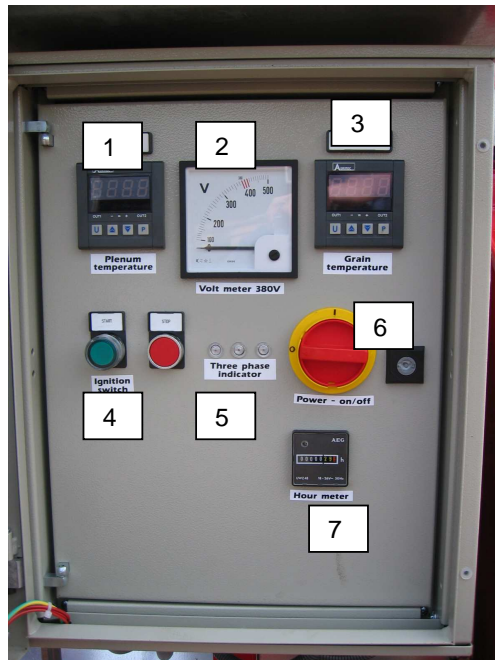
1. Grain sampler
2. Top extension support
3. Grain Temp Probe
4. Plenum Temp Probe
5. Plenum High Limit Probe
6. Generator
7. Control Board
8. Emergency Stop
9. Fan clutch
10. Vertical auger winch
11. Intake auger clutch
12. Jack stand

Picture 3.7 CONTROLS



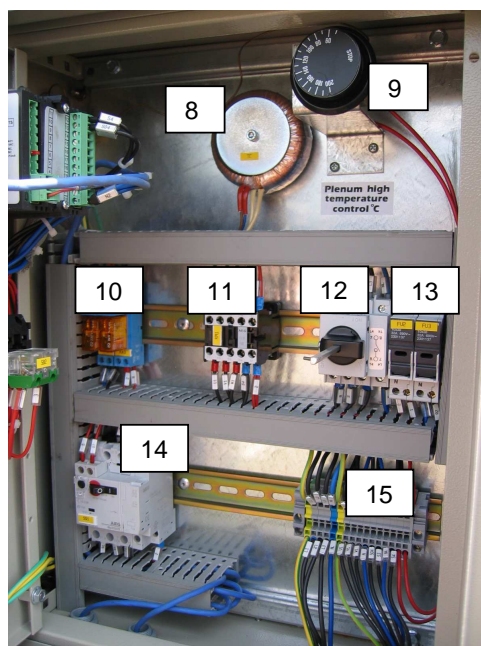
4 DRYER OPERATION

4.1 CONTROL BOARD



1. Plenum Temp Thermostat
2. Volt meter
3. Grain Temp Thermostat
4. Ignition Start/Stop
5. Power indicator
6. Isolator switch
7. Hour clock

Picture 4.1 CONTROL BOARD OUTER



8. Transformer
9. Plenum Safety Thermostat
10. Relay
11. Burner Contactor
12. Isolator switch
13. Fuse
14. Burner Overload
15. Terminal block

Picture 4.2 CONTROL BOARD INNER



4.2 PLENUM & GRAIN TEMPERATURE THERMOSTATS

Recommended operating temperatures - Section 2.4.3



Plenum & Grain thermostats are factory set to operate in °F and have one temp setting.

Press 'P' – the last temperature set point "SP 1" used will appear on the display, using the '↑' key to raise or '↓' key to lower the temperature setting °F. The change will appear on the display, when the desired temperature appears on the display, press 'P' this will save the new setting and return to the current temperature reading on the probe.

When operating, a light above the symbols ' - = + ' will indicate where the actual temperature reading is in relation to the preset temperature. ie If the grain temp setting is 112°F and the grain probe is currently reading 102°F the red light will illuminate above the ' - ' symbol, when the grain temperature reaches the set temperature 112°F a green light will illuminate above the ' = ' symbol.

4.3 PLENUM SAFETY CONTROL


The plenum safety control thermostat is mounted inside the control panel, it safeguards against excessive plenum temperatures, its temperature probe is positioned in the plenum chamber. During operation, the dryer checks the safety thermostat to make certain the plenum temperature falls within the safe operating range. If so, operation continues. Should the thermostat open at any time during operation, power to the control board will be interrupted, halting operation of the dryer.

The safety thermostat operates in °C and should be set approx 30°C above the running Plenum Air Temperature setting (Note; Plenum temperature is °F, see temp conversion chart)

ie Plenum temperature set at 180°F – set safety thermostat at 112°C

4.4 THERMIC SAFETY

The thermic safety indicates if any of the electric motor circuit breakers have tripped. This protects the motor from over loading, ie if an auger was to jam. Check all the circuit breakers and reset any which have tripped – checking the driveline and motor in question.

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4.5 LOADING AND OPERATION



Start the tractor and set pto speed at approximately 450 rpm. Check the diesel tank has sufficient fuel.

Engage the 'loading auger' using the marked lever and proceed to fill the dryer.

Fill the grain bin until the grain is approx 150 - 250mm below the top rim. This amount depends on initial grain moisture, as wet grain is heated it will expand. Leaving space at the top of the dryer provides the additional room needed and prevents the dryer from spilling over. **Disengage** the intake when the dryer is full.

DO NOT LEAVE GRAIN IN THE DRYER OVERNIGHT. Grain that remains in the dryer overnight will absorb moisture and swell. This swelling can cause the vertical auger to jam.

NOTE; The agitator will automatically disengage on Magna 2000 models during loading, this is to reduce the grain recirculation during loading and minimise the loading time.

Engage the 'fan' using the marked lever. To prolong belt life it is recommended that the tractor pto speed is reduced by approximately 40% before engaging the fan drive, engage the lever slowly.

When the belt drive to the fan is engaged, turn the control board power isolator to the 'ON' position and speed-up the pto until 380V is showing on the volt meter. The power indicator lights will illuminate, confirming all three phases are operating.

Set 'Grain & Plenum thermostats' to the required temperatures. Ensure the plenum safety thermostat is set to the correct temperature. These temperature settings can be adjusted at any time during dryer operation.

Start the 'Burner motor', the ignition should complete in 5-10 seconds. It may be necessary to do this two or three times to ensure the burner has started. Allow 30 seconds between each starting attempt. The green start button will illuminate when it is operating.

When the grain has reached the pre-set grain temperature, the burner will shut off automatically. The fan will start cooling the crop.

When the grain has cooled sufficiently, **disengage** the 'Fan' drive.

Open the 'Discharge guillotine' to empty the grain bin.



There is an emergency stop button mounted on the control board.



4.6 HOW TO GET THE BEST PERFORMANCE OUT OF YOUR DRYER

ON THE FIRST DRYING OF EACH DIFFERENT CROP TYPE ON YOUR FARM PROCEED AS FOLLOWS:

Set the finished grain temperature to 125 degrees F that is well above the setting that you will finally use.

Check the finished grain temperature gauge reading from time to time. When the grain temperature has achieved 100 degrees F take your first sample to check for actual grain moisture.

Depending upon altitude, outside air temperature and if it is a dry or wet day you will record approximately between 17% and 20% moisture.

Continue to run the dryer and take a further sample of grain at 102 degrees F. Continue in this fashion until the grain is half a percent above finished moisture content required. So if you are looking for 14% moisture content and you achieve 14½% at 108 degrees F press the button marked P, press the down arrow to bring the temperature from 125 degrees down to 108 degrees. The burner will cut off and the cooling cycle will begin, press P to save this new setting.

When all the grain is cooled take a further sample before emptying the dryer to check the finished moisture content.

If the finished moisture content is below 14% then you can fine-tune the finished grain temperature by decreasing the value locked into the finished grain temperature gauge by 1 degree.

After two or three loads you will achieve the right balance for the particular crop type. At this point write down the plenum temperature you have used and the finishing grain temperature for that particular type as a future record.

The major variable to consider is not moisture content, outside air temperature etc., but rather the plenum temperature used. There is a balance between extra heat and therefore extra fuel usage against time of drying.

The recommendations given in our Crop Drying Recommendations are a good starting point. (Section 2.4.3)

NOTE: WHEN DRYING ANY CROPS FOR SEED OR MALTING YOU MUST NOT USE PLENUM AIR TEMPERATURES HIGHER THAN OUR RECOMMENDATION.



4.7 FUEL NOZZLE SELECTION AND SETTINGS

There are occasions when drying temperatures required will vary significantly from the norm. For example when drying seed crops you may need to use smaller nozzles to achieve the correct temperatures.

In Rape because of crop density overall air flow is reduced, heat retention is increased and again it may be necessary to use smaller nozzles.

The following tables show the minimum heat rise and give an indication of the air flap rod measurements necessary. The air flap measurements will vary between machines and is for guidance only. (Adjustment details; section 7.3)

Dryer Model – 1200QF

Fan Speed – 1700rpm

Fuel Pressure – 12 Bar (174 psi)

	Low heat nozzle no 1 size	Low heat air opening setting	High heat nozzle no 2 size	High heat air opening setting	Heat rise minimum
	Gallons / Hr	mm	Gallons / HR	mm	F (C)
Barley	6	17	7	23	150 (66)
Barley	5		6		145 (63)
Barley	4	16	5	22	133 (56)
	5	16 -19	7	20 – 23	Factory Set

Dryer Model – 2000QF

Fan Speed – 1620rpm

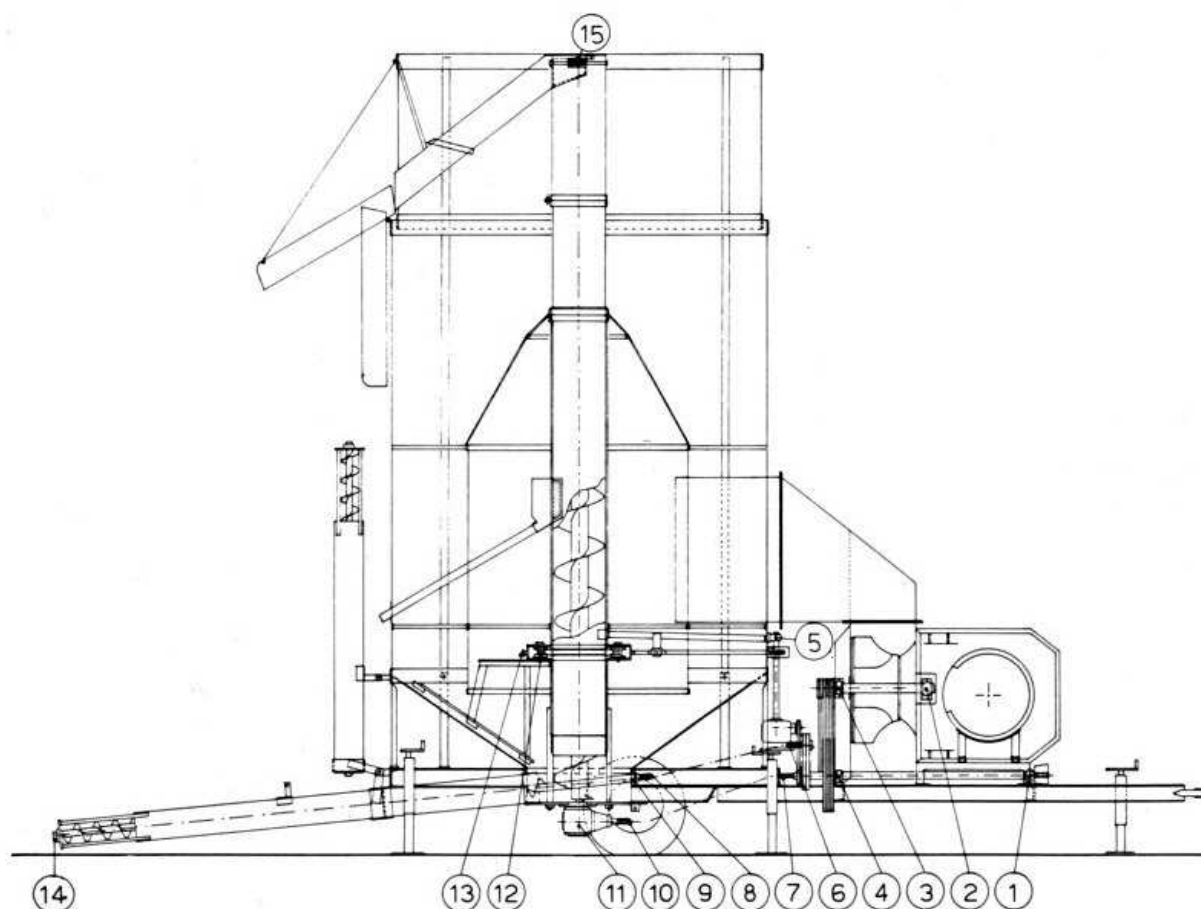
Fuel Pressure – 12 Bar (174 psi)

	Low heat nozzle no 1 size	Low heat air opening setting	High heat nozzle no 2 size	High heat air opening setting	Heat rise minimum	Heat rise maximum
	Gallons / Hr	mm	Gallons / HR	mm	F (C)	F (C)
OSR	8		10		160 (71)	195 (90)
Wheat	8		10			
OSR	6	22	8	16	140 (60)	
	8	17	10	23		Factory Set










5 MAINTENANCE

Please take care not to over grease. Many of the bearings and rollers on this dryer require greasing only once per season. More harm will be done by over enthusiastic application than benefit.















Picture 5.1 **POINTS TO LUBRICATE**

-  MAIN SHAFT SUPPORT AND FAN 1,2,3,4 (GREASE LIGHTLY AT THE END OF EACH SEASON)
-  OTHER SUPPORTS 5,9,14 (GREASE LIGHTLY AT 1 MONTH INTEVALS AND/OR AT THE END OF EACH SEASON)
-  PTO SHAFTS 6,7,8,10: (GREASE ON DAILY BASIS)
-  THE BEARING ROLLERS: (GREASE LIGHTLY EVERY 20 DAYS)
-  CHAIN 13: (GREASE AT THE END OF EACH SEASON)
-  CENTRAL AUGER GEARBOX 11 (CHECK OIL AT END OF EACH SEASON)
-  TOP AUGER SUPPORT 15: (GREASE LIGHTLY EVERY 15 DAYS.)



5.2 END OF THE SEASON OPERATIONS

-  CHECK CHAIN AND CHAIN TIGHTENER TENSION
-  COVER AND PROTECT ALL THE ELECTRIC COMPONENTS FROM HUMIDITY
-  REPLACE THE ROLLER BEARINGS OF THE TIMING BEARING RING, IF NECESSARY
-  CLEAN THE FAN OF THE BURNER 5 (REFER TO THE DRAWING OF THE BURNER)
-  CHECK THE VERTICAL AUGER AND THE VERTICAL TUBE FOR WEAR
-  CHECK THE BELTS' TENSION
-  CHECK THE CONDITION OF THE FURNACE'S REFRACTORY MATERIAL
-  CHECK THE CONDITION OF THE STEEL BOTTOM OF THE FURNACE
-  CHECK THE CONDITION OF THE PROTECTION GUARD OF THE FAN SUPPORT, PLACED AT THE EXIT OF THE FURNACE FIRE MOUTH BETWEEN FURNACE AND FAN
-  CHECK THE CONDITION OF CABLES AND WINCHES
-  CHECK THE CONDITION OF THE PTO SHAFTS AND THEIR SAFETY GUARDS

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6 **SAFETY WARNINGS**

In addition to the design and configuration of equipment, hazard control and accident prevention are dependent upon the awareness, concern, prudence and proper training of personnel in the operation, transport, maintenance and storage of equipment. Lack of attention to safety can result in accident, personal injury, reduction of efficiency and worst of all – loss of life.

Watch for safety hazards and correct deficiencies promptly.

Use the following safety precautions as a general guide to safe operations when using the machine.

Additional safety precautions are used throughout this manual for specific operating and maintenance procedures. Read this manual and review the safety precautions often until you know the limitations.

6.1 **SAFETY PRINCIPLE**

The following are general rules for the users of the machine:



BEFORE USING THE MACHINE CAREFULLY READ ALL PARTS OF THIS MANUAL. REFRAIN FROM USING THE DRYER UNTIL THE ENTIRE MANUAL (AND ALL ITS ATTACHMENTS) ARE UNDERSTOOD.



6.2 WARNINGS AND DANGERS



DO NOT ALLOW ANYONE TO OPERATE THE MACHINE WHO IS NOT IN GOOD PHYSICAL AND MENTAL HEALTH.



KEEP CHILDREN, VISITORS AND ALL UNTRAINED PERSONNEL AWAY FROM THE MACHINE WHILE IN OPERATION.



DO NOT USE THE DRYER WITHOUT ALL THE SAFETY GUARDS IN THE CORRECT POSITION.



DO NOT CARRY OUT MAINTENANCE WORK AND/OR REPAIRS UNTIL THE TRACTOR ENGINE IS STOPPED AND THE PTO DISCONNECTED OR IF AN ELECTRIC DRIVE UNIT THE MAIN POWER SWITCH TURNED TO OFF.



DO NOT UNDER ANY CIRCUMSTANCES ENTER THE DRYER THROUGH THE INSPECTION HATCH UNTIL THE TRACTOR IS TURNED OFF AND THE PTO SHAFT IS COMPLETELY DISCONNECTED OR IF AN ELECTRIC DRIVE UNIT THE MAIN SWITCH TURNED TO OFF. FAILURE TO FOLLOW THIS INSTRUCTION MAY CAUSE SERIOUS INJURY. EXPLANATION – SHOULD THE AGITATOR ARM RECIRCULATE WHILST THE OPERATOR IS ENTERING THE DRYER OR INSIDE THE DRYER



DO NOT ALTER THE DIMENSIONS OR SHAPE OF THE ADJUSTABLE JACK FEET.



DO NOT MOVE THE DRYER WITH TYRES THAT ARE DEFLATED OR NOT SUITABLE FOR SERVICE.



DO NOT MOVE THE MACHINE UNLESS IT IS FULLY IN THE TRANSPORT MODE I.E. WITH THE LOADING AUGER FULLY RAISED FOLD DOWN AUGER FULLY LOWERED AND THE EXTENDING SIDE SHEETS FULLY CLOSED.



DO NOT ALLOW ANY OBSTRUCTION TO THE AIR INLET.



DO NOT THROW ANY TYPE OF OBJECT INTO THE DRYER, THE BURNER UNIT AND THE INLET AIR DUCT.



DO NOT TOUCH THE INSIDE OF THE BURNER BOX ASSEMBLY WHEN IT IS WORKING OR FOR A PERIOD OF AT LEAST ONE HOUR AFTER WORK.



DO NOT CLIMB OR USE THE LADDER WITHOUT FIRST STOPPING THE TRACTOR ENGINE AND DISENGAGING THE PTO SHAFT.



DO NOT ALLOW MORE THAN ONE PERSON TO BE ON THE LADDER AT ANY ONE TIME .



6.3 SAFETY GUARDS AND WARNING LOGOS

For safety the dryer is supplied with the necessary safety guards and warning logos.



SHOULD THE SAFETY GUARDS BE REMOVED TO CARRY OUT MAINTENANCE OR CLEANING IT IS THE OPERATORS RESPONSIBILITY TO ENSURE THAT THEY ARE REPLACED IN THEIR ORIGINAL POSITION PRIOR TO OPERATING THE DRYER.

6.3.1 EMERGENCY STOP BUTTON

The red emergency button is positioned on the front of the main control panel: if pushed it instantly stops all electrical power to the machine. It is shown in picture 3.7

6.4 RESIDUAL RISKS

Some residual risks cannot be avoided in the natural process of grain drying. The following list is indicative not exhaustive



DO NOT PLACE YOUR HANDS OR ANY OTHER PART OF THE BODY THROUGH THE SAFETY MESH POSITIONED OVER THE LOADING AUGER



BE AWARE OF POSSIBLE DANGER WHILE LOWERING THE LOADING AUGER INTO ITS WORKING POSITION



BE AWARE OF POSSIBLE DANGER WHEN POSITIONING THE DRYER USING THE ADJUSTABLE JACKS



BE AWARE OF POSSIBLE DANGER WHEN ATTACHING THE PTO SHAFT TO THE POWER TAKE OFF OF THE TRACTOR

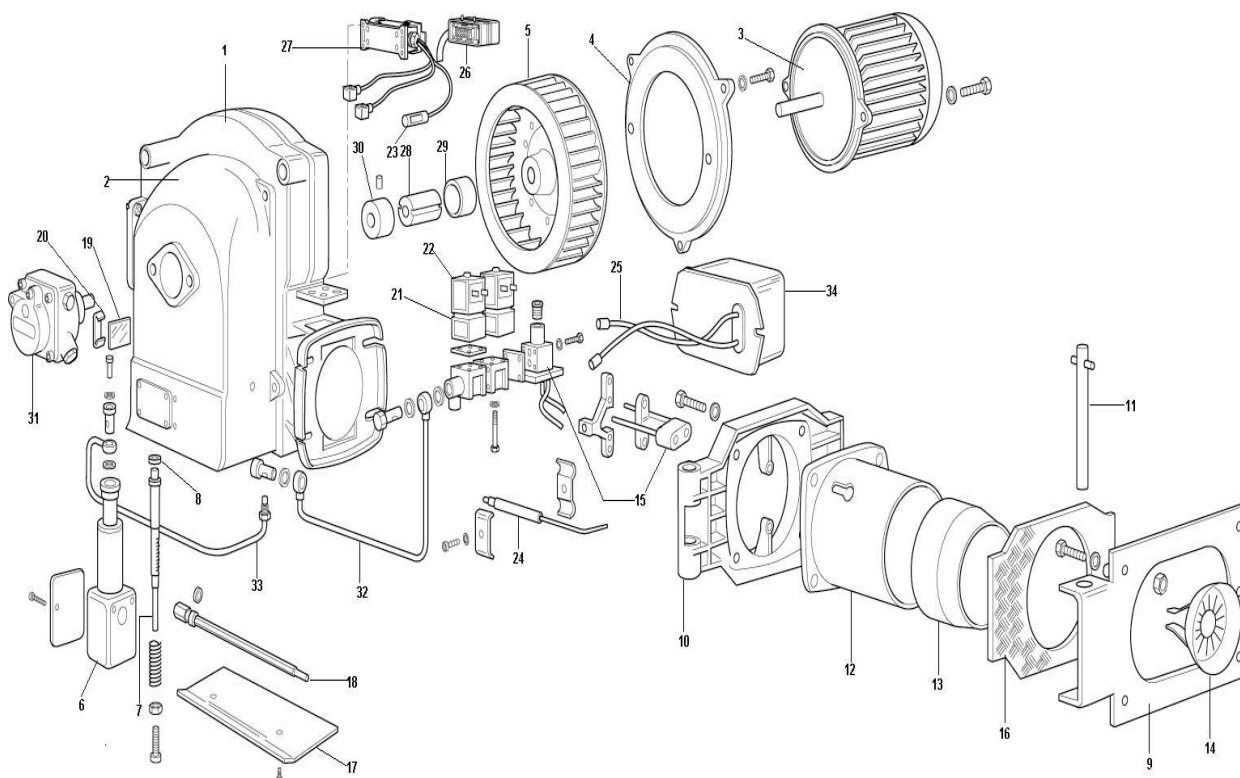
6.5 NOISE LEVELS

The level of acoustic pressure of the Magna mobile dryers has been measured with the machine loaded while working in a open field on the 4 compass points at 1,5 meters distance and at 1,6 meters height from ground. The level is between 77dB(A) and 88 dB(A).



7 TROUBLE SHOOTING

7.1 THE BURNER

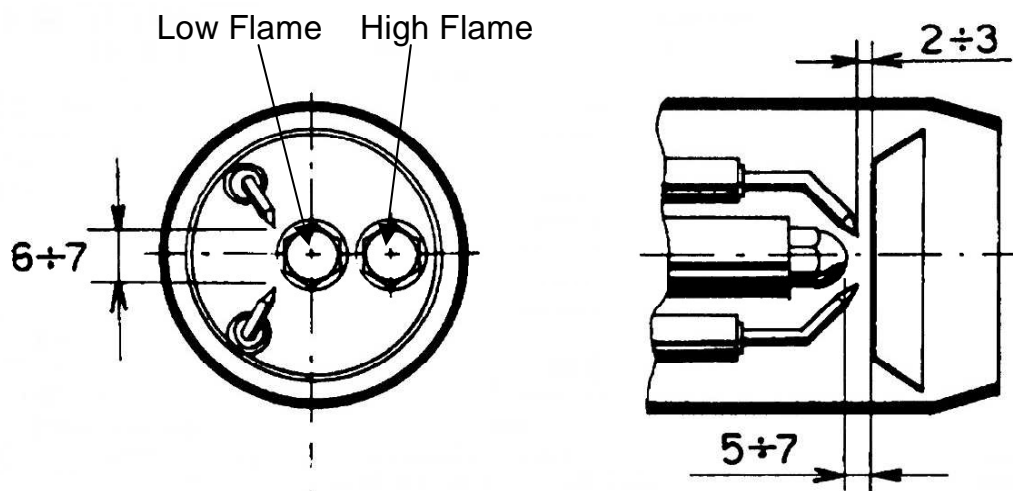


Picture 7.1 BURNER

- | | | |
|----------------------|---------------------------|-------------------------|
| 1) Burner body | 13) Nosepiece | 25) Electrode cable |
| 2) Sucking mouth | 14) Deflector | 26) Multiple socket |
| 3) Motor | 15) Support | 27) Multiple plug |
| 4) Motor flange | 16) Insulating gasket | 28) Joint plug |
| 5) Fan | 17) Hinge | 29) Joint motor side |
| 6) Jack body | 18) Hinge shaft | 30) Joint pump side |
| 7) Shaft | 19) Glass | 31) Pump |
| 8) Gasket | 20) Glass spring | 32) Tube electro valve |
| 9) Connection plaque | 21) Electromagnetic valve | 33) Tube jack |
| 10) Hinge flange | 22) Coil E. V. | 34) Starter transformer |
| 11) Hinge pivot | 23) Photo-resistance | |
| 12) Conveying tube | 24) Electrode ignition | |



7.2 DEFLECTOR AND ELECTRODES POSITION

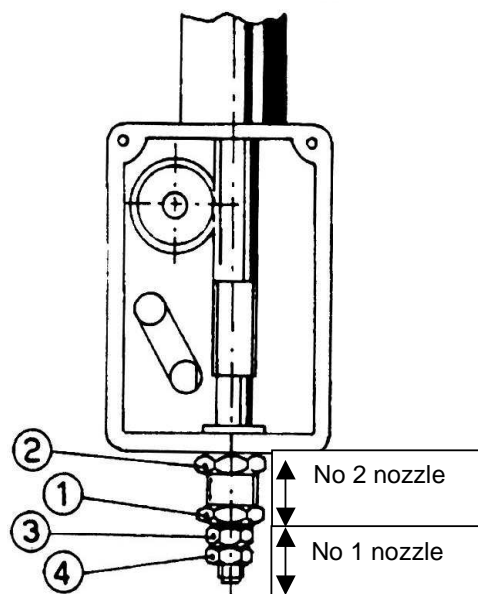


Picture 7.2 DEFLECTOR AND ELECTRODES POSITION

7.3 HEAT UNIT AIR FLAP ADJUSTMENT

- 1) High heat 2° flame calibration air screw
(opens air by turning anticlockwise)
- 2) Screw locking nut – 2° flame air adjustment
- 3) Low heat 1° flame air calibration nut
(open air by turning anticlockwise)
- 4) Nut locking check-nut
1° flame adjustment

N.B.: If only the number 1 air flow is adjusted, no further adjustment is required. If the number 2 adjuster is altered there will be a requirement to also correct the number 1 setting.



Picture 7.3 HEAT UNIT AIR FLAP ADJUSTMENT



7.4 BURNER DOES NOT LIGHT

1. Clean the photocell (23) removing any dust or soot.
2. Check the adjustment of the ignition electrodes (24).
3. Check the start button (11).
4. Check that the emergency button (3) has not been pushed.

7.5 DIESEL SUPPLY FAILURE

1. Check the fuel supply lines to ensure that there are no air leaks.
2. Check the line filter.
3. Check the diesel circuits and ensure that the electric valve is working correctly; a click should be heard near it.
4. Disassemble and clean the jets.
5. Check that the adjustable high limit rotary dial is not in itself cutting off the burner.

7.6 SMOKE OR EXCESS DIESEL FUMES

1. There is insufficient air for a correct burn. Adjust the air flow calibration as in paragraph 7.3.
2. If the nozzles are more than one year old they should be replaced.
3. The nozzles are dirty and need to be cleaned.
4. Check that the nozzle's are correctly screwed into the nozzle holder.
5. Ensure that the swirl plate inside the nozzle head is tight.
6. You may need to reduce the low flame nozzle to a smaller GPM size.

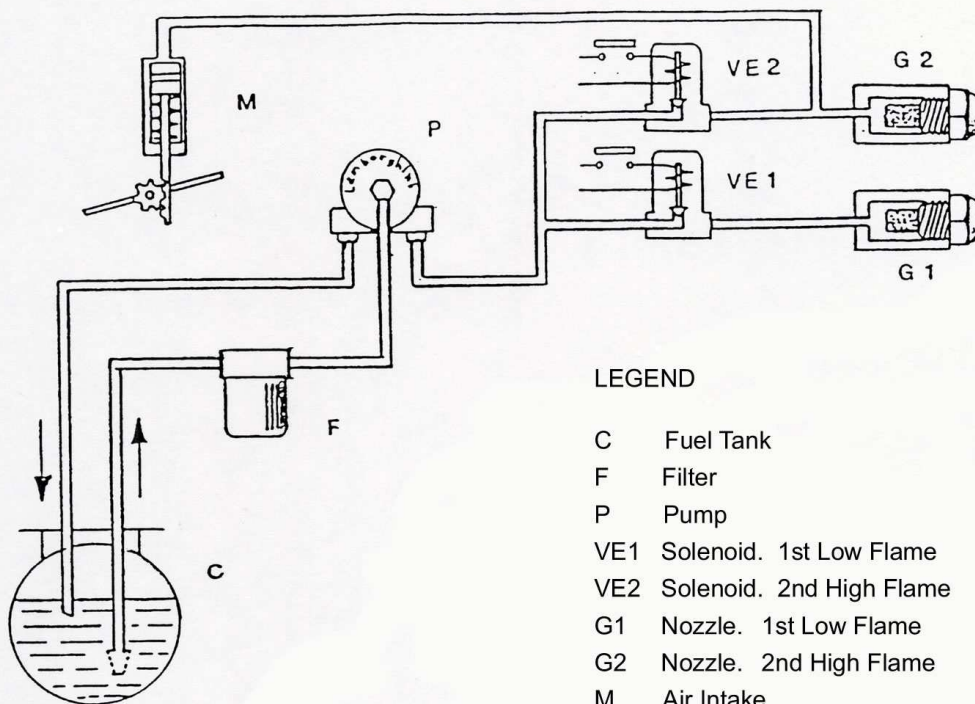
7.7 THE AIR MIXTURE IS TOO LEAN AND THE FLAME VERY BRIGHT IN COLOUR

1. There is too much air for a correct burn – adjust the air-flow as in paragraph 7.3 by decreasing the air-flap aperture.
2. The diesel burner pump is producing too little pressure - adjust the pump to a pressure of 12 bar.



7.8 FUEL CURCUIT

FUEL CIRCUIT



8 STORAGE



FOR OVER WINTER STORAGE IT IS ADVISABLE TO KEEP THE DRYER IN A COVERED AND DRY PLACE. SUITABLY PROTECT THE CONTROL PANEL AND THE DIESEL BURNER UNIT.



WHETHER THE MACHINE IS IN TRANSPORT MODE OR FULLY EXTENDED REMOVE THE WEIGHT FROM THE TYRES USING THE ADJUSTABLE JACKS.



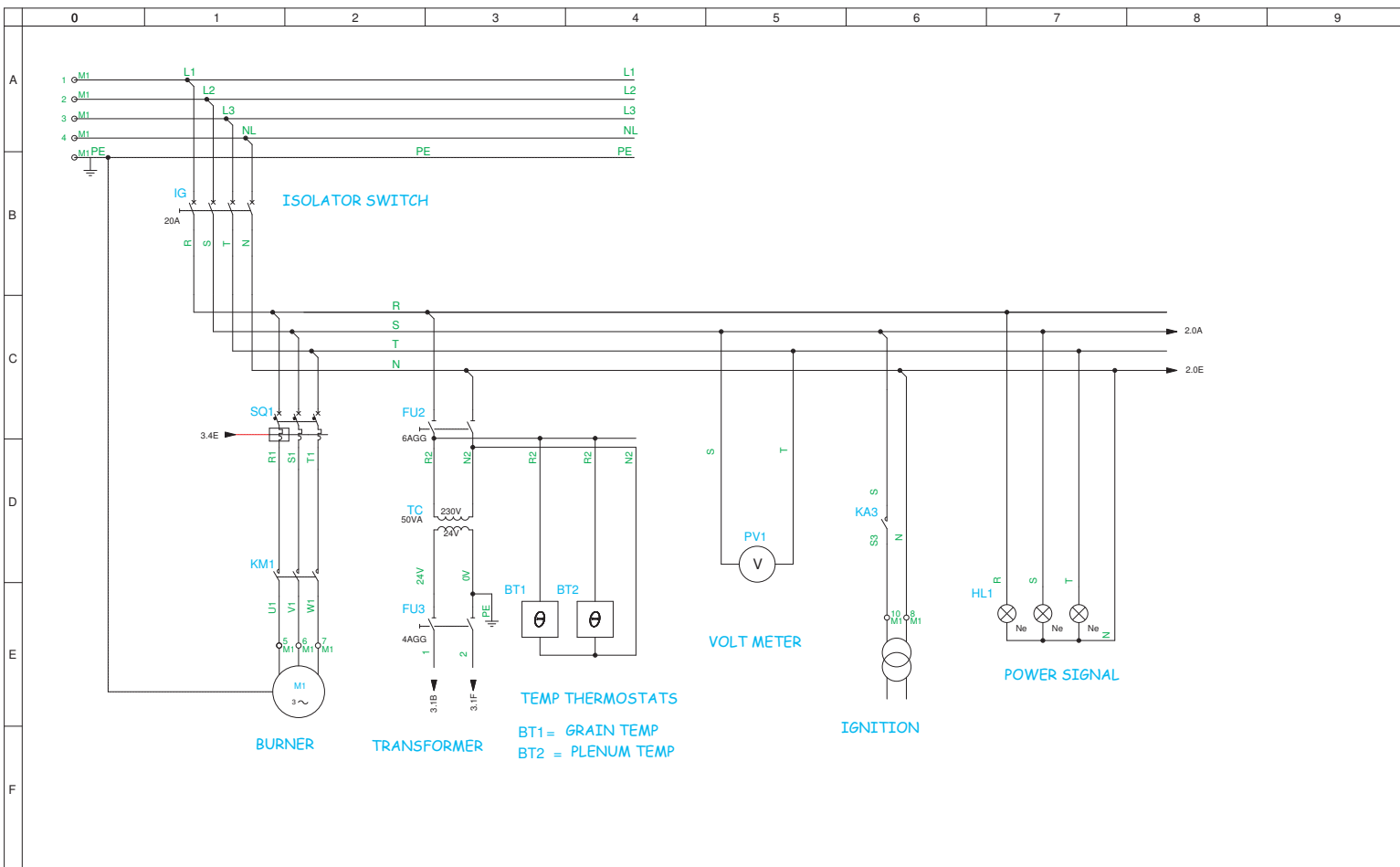
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9 WIRING DIAGRAMS

III



<div> <div>due bi automazi</div> <div>di Luigi Benetollo</div> <div>Via Noalese, 64 35010 Vigonza (PADOVA) Italy</div> <div>tel. +39 049 9802267 fax. +39 049 9802712</div> <div>P.I. 03250410283</div> <div>e-mail: duebiaut@tin.it</div> </div>	DITTA		AGRIMEC		FOGLIO	1	COMMESSA	DATA
	TIPO		AS / OPICO N 2000		NUMERO FOGLI	1/4	CODICE	DIS.
	DENOMINAZIONE		CIRCUITO POTENZA		NUMERAZIONE TIPO	A PLOTTER	PEZZI	---
								VISTO

DIVIETO DI APPLICAZIONE RIPRODUZIONE DIVULGAZIONE NEI TERMINI DI LEGGE

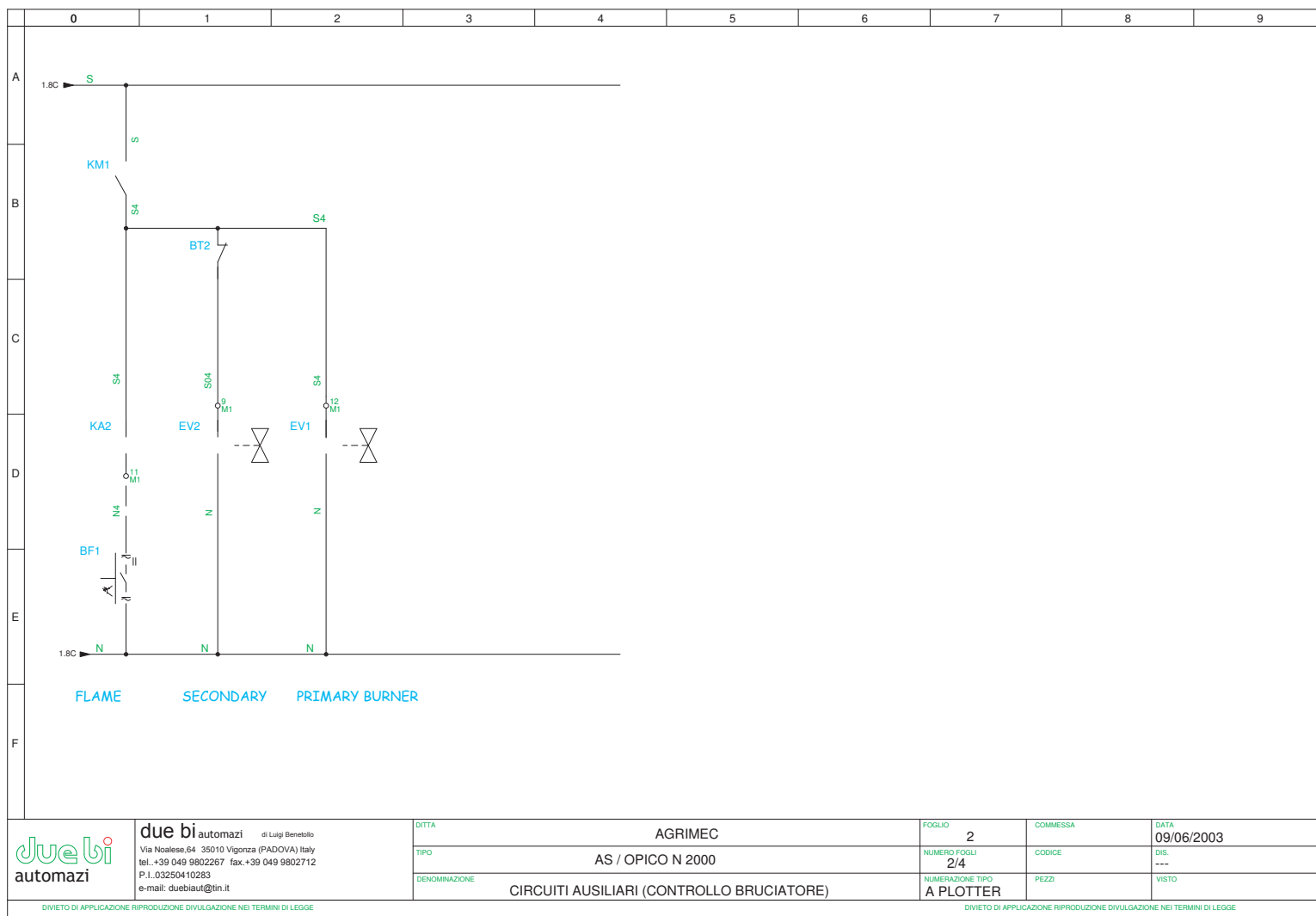
DIVIETO DI APPLICAZIONE RIPRODUZIONE DIVULGAZIONE NEI TERMINI DI LEGGE

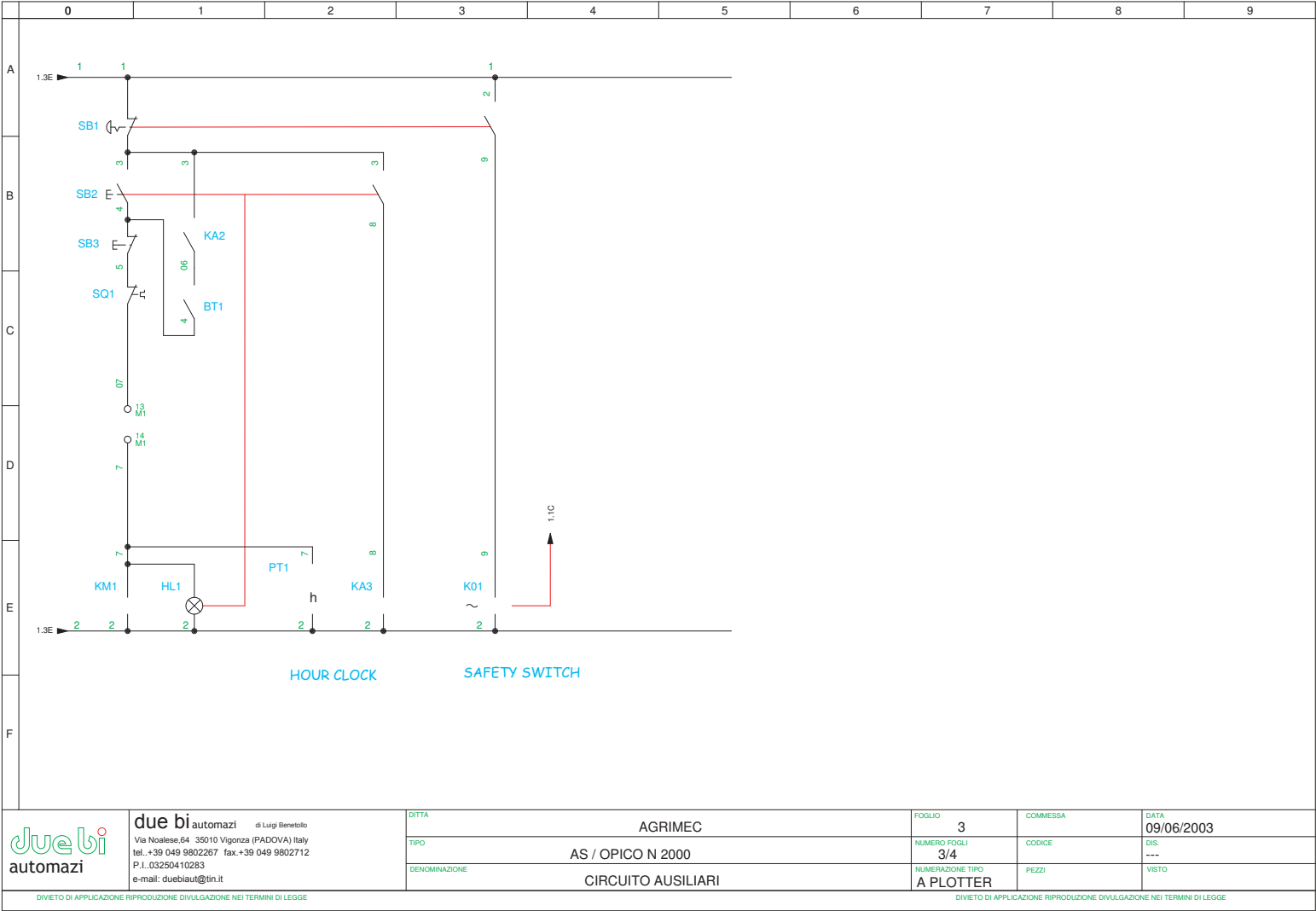


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	TIPO			AS / OPICO N 2000		NUMERO FOGLI	3/4	CODICE	DIS
	DENOMINAZIONE			CIRCUITO AUSILIARI		NUMERAZIONE TIPO	A PLOTTER	PEZZI	VISTO
	DIPETTO DI APPLICAZIONE RIPRODUZIONE DIVULGAZIONE NEI TERMINI DI LEGGE					DIPETTO DI APPLICAZIONE RIPRODUZIONE DIVULGAZIONE NEI TERMINI DI LEGGE			

	0	1	2	3	4	5	6	7	8	9	
A											
B											
C	<div><div><div><div><div>PE</div><div>L1</div><div>L2</div><div>L3</div><div>NL</div><div>PE</div><div>U1</div><div>V1</div><div>W1</div><div>N</div><div>S04</div><div>S3</div><div>N4</div><div>S4</div><div>07</div><div>7</div></div><div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div><div>6</div><div>7</div><div>8</div><div>9</div><div>10</div><div>11</div><div>12</div><div>13</div><div>14</div></div></div></div></div>										
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<div><div><div><div>due bi</div><div>automazi</div></div><div><div>di Luigi Benetollo</div><div>Via Noalese,64 35010 Vigonza (PADOVA) Italy</div><div>tel. +39 049 9802267 fax. +39 049 9802712</div><div>P.I. 03250410283</div><div>e-mail: duebiaut@tin.it</div></div></div></div>		<div><div>DITTA</div><div>AGRIMEC</div><div>TIPO</div><div>AS / OPICO N 2000</div><div>DENOMINAZIONE</div><div>MORSETTIERA</div></div>				<div><div>FOGLIO</div><div>4</div><div>NUMERO FOGLI</div><div>4/4</div><div>NUMERAZIONE TIPO</div><div>A PLOTTER</div></div>		<div><div>COMMESSA</div><div></div><div>CODICE</div><div></div><div>PEZZI</div><div></div></div>		<div><div>DATA</div><div>09/06/2003</div><div>DIS.</div><div>---</div><div>VISTO</div><div></div></div>	
<div><div>DIVIETO DI APPLICAZIONE RIPRODUZIONE DIVULGAZIONE NEI TERMINI DI LEGGE</div><div>DIVIETO DI APPLICAZIONE RIPRODUZIONE DIVULGAZIONE NEI TERMINI DI LEGGE</div></div>											

