

MID-GTA-35

Automatic Gyroscopic Tumbler

for Liquid Containers
of up to 35 Kg

User's Manual



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Safety

The following manual contains safety and warning notes.



Caution: *Electric shock may cause death or serious injury.
Do not touch any electric part with wet hands while the machine is running.*



Caution: *Dangerous, may cause injury.*

Complying with the regulations contained in this manual is essential for preserving safety and quality of the machine.

This manual provides important information for correct installation, use and maintenance. Please keep near the machine.

Safe operation regulations:

1. Do not self-repair or refit without permission from the manufacturer. The manufacturer will not be responsible for the consequences of such actions.
2. The machine must be connected to a 230 V socket (different power sources as 220V, 240V or 110V will apply to different markets and country specific sources) correctly dimensioned and grounded according to local laws and regulations.
3. Power must be cut off before maintenance to prevent accidental start-up of the machine.
4. Disconnect the power if the machine is left idle for extended time.
5. Contaminates in the machine must be cleaned up immediately after machine inspection and repair.
6. No fire or explosive materials are allowed within a 5-meter perimeter around the machine.
7. Never perform zero-load running of the machine. Machine operational loading should not exceed 35 kg.
8. Keep children away from the machine when it is running or switched ON.
9. The machine must be installed in a dry and cool area. Long exposure to damp or moist environments would result in rusting, malfunctioning and dangers of power leakage and short circuit. Environmental conditions for proper use of the machine must be respected: temperature from 10 to 40 degrees, relative humidity from 5% to 85% not condensing.

Other remarks:

1. Handling care is advised to avoid accidental injury when loading and unloading the machine. Lifting equipment is recommended where possible.
2. The operators should wear protective gloves to prevent possible injury caused by sharp edges when loading and unloading the liquid container.
3. Maintenance personnel should wear insulated shoes to prevent possible danger of electric shock.
4. For the purpose of fire protection, powder fire extinguisher must be well-found.

Safety devices:

1. Emergency stop button.
2. Door safety switch and lock.
3. Clamping mechanism vertical block.

Main features

This Automatic Gyroscopic Tumbler is the perfect solution for fast and homogeneous mixing of liquid colorant and additive material. This unit automatically clamps the product container adjusting the clamping force and the mixing speed according to the container size.

This machine also applies advanced variable speed control technology. It features the patented bi-directional rotation that achieves efficient homogeneous mixing of product.

The main features of this Automatic Gyroscopic Tumbler are:

- Microcomputer controlled gyroscopic tumbler.
- Patented bi-directional rotation.
- Self adjusting mixing speed based on the real container load.
- Lower container tray can be extracted for easy loading and unloading of the container.
- Real-time operational state visualized on a backlit LCD display. Messages can be visualized in different languages.
- Adjustable mixing time.
- Automatic clamping and unclamping of the liquid container.
- Automatic identification of container size to adjust clamping force in order to prevent liquid container damages.
- Low noise, quiet operation.
- Safety door with lock and emergency stop button specially designed to assure safe operation.
- Rational design, easy to move and service. Each part is easily accessible.
- High manufacturing quality for long term reliability.
- The body and internal mechanism compact design takes limited space where installed and allows full filling of container load for shipment.

Technical specifications



1	Top cover	7	Control panel
2	LCD display	8	Power switch
3	Upper clamping table	9	Latch lock
4	Liquid container position	10	Loading door
5	Lower clamping table	11	External body
6	Lower plate extracting mechanism	12	Adjustable holding feet

Specifications:

Mixing time setting	From 1 to 10 minutes
Container capacity	Up to 25 liters
Container weight	Up to 35 kg
Mixing speed	150RPM for small containers and 100RPM for big containers (both speeds adjustable)
Clamping range	From 60 to 420 mm

Max. container size	H 420 mm x (Diameter) 330 mm
Power supply	Single-phase 230 V 50 Hz, optional 220, 240 or 110 V at 50 or 60Hz
Motor	Single phase 750 W
Net weight	175 Kg
Gross weight	235 Kg
Machine size	H 1060 mm x W 720 mm x D 750 mm
Shipping size	H 1180 mm x W 900 mm x D 810 mm
Noise level	< 70 dB (A)

Notes: If the product's picture, characteristic or diagram is different from the actual machine, please take the actual machine as standard. All descriptions included in this manual are subject to change without further notice.

Installation

Upon initial installation ensure the following requirements are met.

1. Keep the machine in a dry and cool environment.
2. Place machine on solid and leveled ground.
3. Provide the machine with a stable, well grounded and suitable power supply.



Figure 2

Installation procedure:

- Step 1. Carefully remove all shipping material. The shipping nuts located on the bottom of the unit must be removed to unload the machine from the pallet. (Figure 2)
- Step 2. Use a wrench to loosen the nuts on the adjustable feet; rotate the nut to its highest position to enable the 4 wheels to touch the floor. Once all four wheels are on the floor, roll the machine to desired installation position and adjust the four adjustable feet again until they are all leveled with the floor.
- Step 3. Preserve all packing materials and the shipping protection poles for future relocation.

Control panel

The control panel allows the operator to interact with the machine and select their desired function. The control panel is easily accessible and located at the top of the machine body. The control panel utilizes a highly visible LCD display with 5 keys to adjust unit settings.

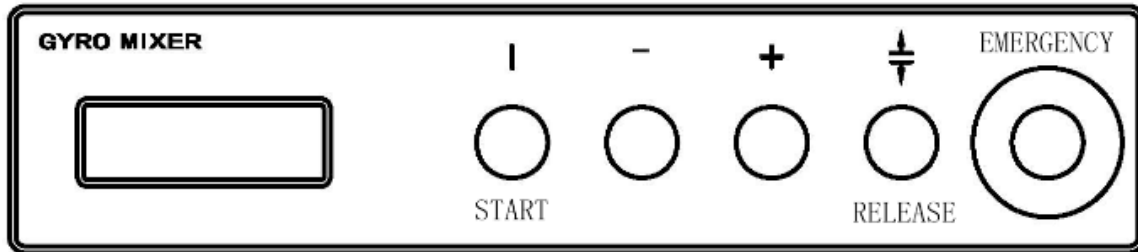


Figure 3

Button functions:

	<p>START mixing cycle.</p> <ul style="list-style-type: none"> - When the EMERGENCY STOP button is activated, pressing the START button for 3 second will disengage the vertical block mechanism that will start a full clamping cycle. This function allows manual operation of the clamping mechanism for inspection or maintenance.
-	<p>DECREASE the mixing time.</p> <ul style="list-style-type: none"> - This button can also be used to terminate a mixing cycle in progress. It must be pressed for 3 seconds to stop mixing. - When a mixing cycle has been started or during the liquid container clamping, pressing this button will select a reduced clamping force for the container. This function avoids damage to small or thin plastic containers.
+	<p>INCREASE the mixing time.</p> <ul style="list-style-type: none"> - This button can also be used to increase the mixing time of an already started cycle. It must be pressed for 3 seconds to set the timer counter to the initial mixing time.
⏏	<p>OPEN the clamping mechanism.</p>
	<p>EMERGENCY STOP button.</p> <ul style="list-style-type: none"> - For any unexpected occasion occurring, pressing this button will immediately stop all machine's movements. After solving the problem, turn the button clockwise to exit the emergency mode and resume normal operation.

This machine provides a "Setup Menu" from where it is possible to check the firmware version, working hours and modify main working parameters such as display language, clamping opening time, clamping force etc.

To access the "Setup Menu" press the EMERGENCY STOP, DECREASE, INCREASE and OPEN buttons together for 3 seconds. When the "Setup menu" is started the installed firmware version number will be visual on the LCD display.

Setup menu button functions:

	Exit the Setup Menu and return to normal machine operation.
-	DECREASE the value of the parameter visualized. - Also used with the INCREASE button to test the clamping force (see details below).
+	INCREASE the value of the parameter visualized. - Also used with the DECREASE button to test the clamping force (see details below).
⏮	Scroll to the next parameter.

Setup menu parameters:

#	LCD message	Value	Description
1	FIRMWARE	N N.NN	Display the installed firmware version number
2	TOTAL HOURS	NNNNNN	Total machine's mixing time in hours
3	LANGUAGE	ABC...	Select the panel's display language
4	SMALL CONTAINER FORCE	N x Kg	Adjusts small containers clamping force **
5	BIG CONTAINER FORCE	N x Kg	Adjusts big containers clamping force **
6	OPENING TIME	N Sec.	After mixing clamps opening time in seconds
7	INVERT DIRECTION	0/1	Enables (1) or disable (0) the bi-directional rotation
8	SMALL CONTAINER SPEED	NNN RPM	Small containers mixing speed
9	BIG CONTAINER SPEED	NNN RPM	Big containers mixing speed

**** Note:** *Pressing the INCREASE and DECREASE buttons simultaneously for 1 second will start a full clamping cycle. The container will be closed for 8 seconds before opening again. This function should be used to test the clamping force (using a load cell) without starting a real mixing cycle.*

Operation instructions

This equipment is controlled by the built-in microcomputer board. It is designed to be user-friendly and easy to operate.



Figure 6



Figure 7



Figure 8



Figure 9



Figure 10



Figure 11

Standard operation:

1. Turn on the machine using the main switch located on the rear or lateral body panel. After a few seconds LCD display should indicate the status of the machine.
2. If the clamping mechanism is in the vertical position the machine will be instantly ready for operation. If the mechanism is not vertical the LCD will display a message requesting the operator to remove any container and then press the START button to initialize the tumbler. Initialization is performed by slowly rotating the clamping mechanism until the vertical position is reached.
3. If the Emergency stop button is pressed the LCD display will show a warning. In this case, unlock the button to restore normal operation.
4. Open the loading door (Figure 6), hold the hand grip under the lower clamping plate and pull it out (Figure 7), place the liquid container in the center of the clamping plate (Figure 8), push the clamping plate all the way back into the locking position (Figure 9).
5. It is strongly recommended to tie the container handle with a rubber strip to eliminate noise during the mixing cycle.

6. Close the door firmly.
7. Select the required mixing time (INCREASE and DECREASE buttons) and press the START button. The machine will automatically clamp the container (Figure 10) and the mixing operation will begin. A running count-down will be displayed on the panel's LCD.
8. During the clamping and mixing time the door will be locked.
9. During the mixing time it's possible to reset the count-down and stop the machine by pressing the DECREASE button for 3 seconds. It's also possible to add more mixing time pressing the INCREASE button for 3 seconds.
10. When the mixing time countdown reaches zero the machine will stop automatically and the clamping mechanism will release the container. When the machine has terminated these operations a "ready" message will appear on the panel's LCD.
11. Wait until the delayed lock mechanism is released and open the door to unload the container using the hand grip mechanism positioned under the lower clamping plate (Figure 11).



*Before starting any mixing cycle make sure the liquid container is properly sealed and without any damage.
Always use the supplied sponge cushions for large containers.*



If the machine is running abnormally or the liquid container is damaged, press the EMERGENCY STOP button immediately to stop the machine. Carefully inspect the issue before releasing the Emergency button to continue normal operation.

Multiple containers mixing:

When mixing multiple containers simultaneously **DO NOT** use sponge cushions. Containers must be placed within the clamping plate flange edges. (Figures 12 and 13).



Figure 12



Figure 13

Maintenance



Always cut off the power supply when servicing the machine. Detach the power plug to as the internal parts are not insulated.

This heavy-duty machine is designed for long operating times without special need for maintenance. In specific cases where part replacement is required; only trained and authorized personnel will be allowed to service the equipment.

Use only industrial grade grease with lithium content for lubrication.

Frequently run a level balance check on the machine during operation. If high amplitude of vibration along with loud noise occurs, adjust the regulating feet under the machine until the issue is resolved.

Keep the machine clean before and after each mixing cycle. Always clean any liquid spillover, dust, or product remains.



Whenever the machine is switched ON, inspect the safety door lock, switch, and the EMERGENCY STOP button to verify that they are working correctly.





Periodic maintenance:

Opening of the machine body is required for the following periodic maintenance procedures.

1. Open the clamping plates to the maximum allowed extension.
2. Cut off the power source and unplug the power cord.
3. Open the top cover and hook it up with the supplied hook-terminated cable.
4. To open the back panel, carefully unscrew the holding screws slowly to ensure the panel does not drop.

Frequency	Maintenance task
Monthly	Clean the machine externally and internally with a soft cloth and neutral detergent (colorant spills should be cleaned immediately). Dry with a clean cloth
Monthly	Wipe off old lubricants with a cloth. Apply new lubricant to the vertical lifting rods, the guide bars and the spine shafts.

<p>6 months</p>	<p>Lubricate the bevel gears and the vertical positioning ratchet wheel and pawls.</p>		
<p>3 months</p>	<p>Clean the clamping plates and the sponges, avoid spilling any solvent or grease on the plates during daily operation. Lubricate the lower clamping plate guide pillars and hand grip mechanism.</p>		

Note: Use only industrial grade grease with lithium content for lubrication.

Troubleshooting

If problems persist after the foregoing solutions, or new problems occur, please contact your supplier. Please provide the manufacturer with clear and correct model name and factory number, all of which can be found on the serial number label at the back of the machine.

Error messages appearing on the display:

Message	Possible causes	Solution
ERROR 80 Watchdog timeout	Power line problems or damaged control board.	The machine should restart automatically after a panel button is pressed. In case the problem persists, the control board must be replaced.
ERROR 81 Door opened	The door was opened during a mixing cycle or during container clamping.	The door lock should prevent accidental opening of the door when the machine is in operation. Inspect the lock (Figure 16) for damage.
ERROR 85 Block stalled	The motor is jammed or the limit switches are out of position.	Check the motor mechanism (Figure 21), and the correct alignment of the switches.
ERROR 86 Inverter error	The inverter is in ERROR condition or the motor is jammed or damaged.	Turn the machine OFF and ON; check if the error condition is reset. Carefully inspect the source of this error. Also inspect the running sensor positioned behind the motion wheel (Figure 19).

Note: After an error message is displayed on the panel's LCD press any panel button to restart the machine. If an error message appears, take note of the possible causes and inspect them regularly to ensure the error is resolved.



Figure 15



Figure 16

Electrical failures:

<i>Failure</i>	<i>Possible causes</i>	<i>Solution</i>
No backlight on the LCD display	LCD display damaged.	Replace the LCD display.
	No power supply.	Check power plug, cable and switch.
	Burnt fuse.	Replace power FUSE 3 and 4 (Figure 15) with matching components.
	Transformer burnt.	Replace transformer.
Low LCD contrast.	LCD contrast has changed.	Adjust WR1 on the control board for the best contrast ratio.
Door is closed but "Door is open..." appears on the display.	Damaged or incorrectly positioned door switch or door switch shaft.	Check the door switch and lock assembly. Replace component if damaged.
Big and small container sizes are not recognized properly	The container sensor is blocked by material or is damaged (Figure 17).	Clean liquid or product covering the sensor. Replace component if damaged.

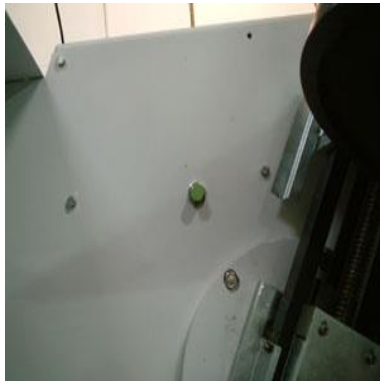


Figure 17

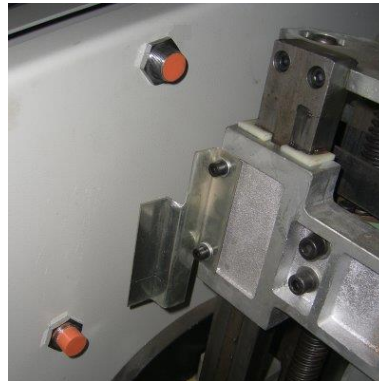


Figure 18



Figure 19

Mechanical failures:

<i>Failure</i>	<i>Possible causes</i>	<i>Solution</i>
Slow mixing speed	The motor belt is not tensioned correctly or is damaged.	Loosen fastening screw on the motor, replace the belt, fasten the motor screws and adjust the tensioner to tighten the belt (Figure 20).
The machine wobbles and is noisy during mixing	Machine is not properly leveled	Level the machine using the adjustable feet.
	Machine components or joint parts of mechanism are loose	Tighten parts and body.
Liquid containers are deformed after clamping	Liquid container is inconsistent with requirements or clamping pressure is too high.	Use standard package container or adjust the clamping pressure (see "Setup menu").

Vertical blocking malfunctioning	The block motor is damaged (Figure 21).	Replace the motor.
	Limit switches on the motor are damaged or incorrectly positioned (Figure 21).	Check and replace component if damaged.
	The motor and switches connecting wire are detached or broken.	Check the wire connections and try to disconnect and connect them again.
	Vertical position sensor is damaged (Figure 18)	Replace the sensor.
	Jammed screw rod rotation resulted from liquid spilled during mixing time.	Clean liquid or dirt from all mechanical parts.

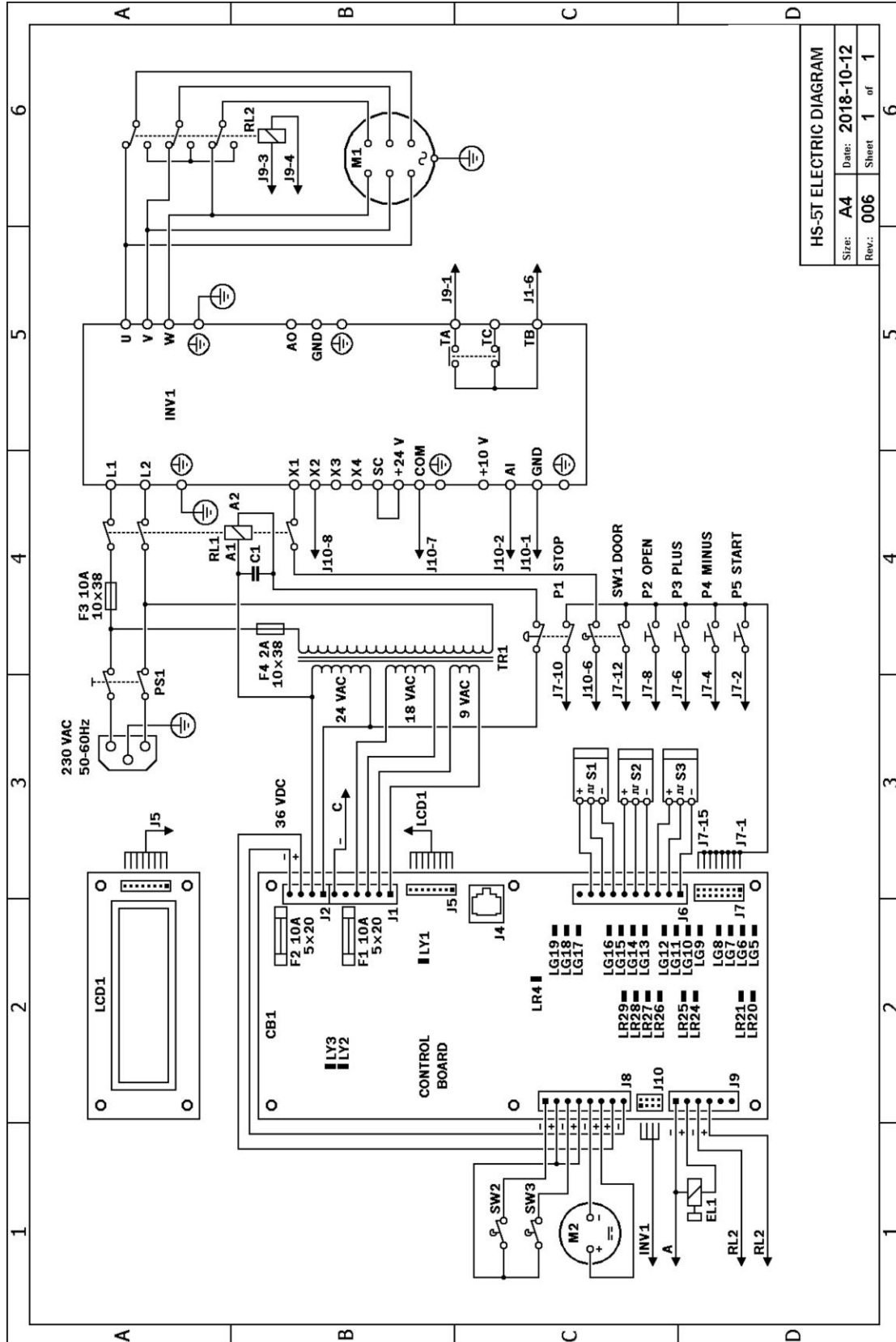


Figure 20



Figure 21

Electric diagram



HS-5T ELECTRIC DIAGRAM		
Size: A4	Date: 2018-10-12	Sheet 1 of 1
Rev.: 006		

Electric diagram parts:

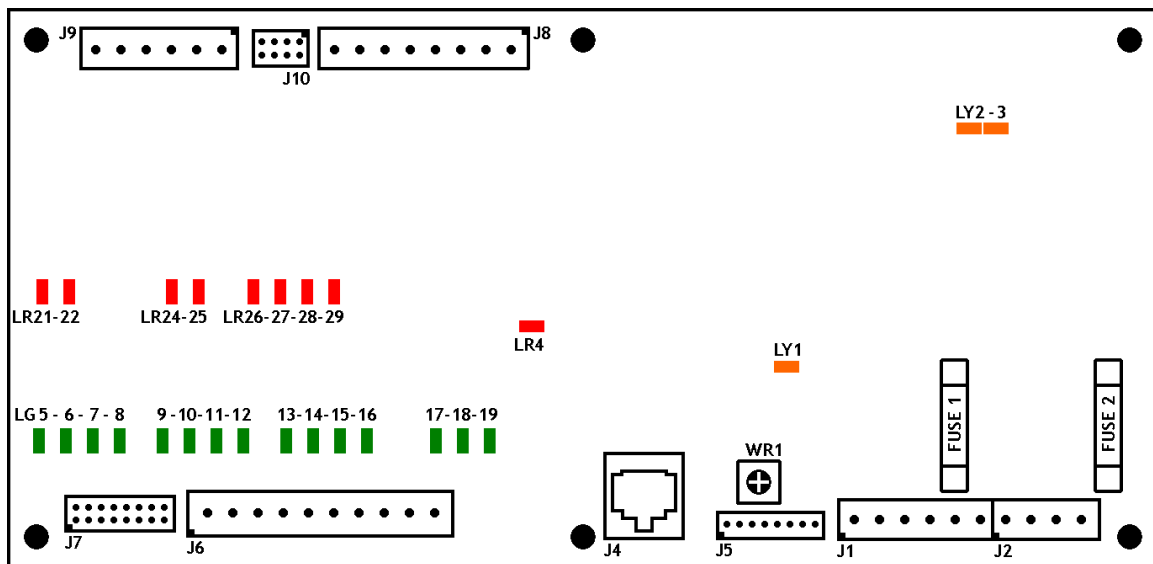
<i>Code</i>	<i>Specifications</i>	<i>Description</i>
CB1	Control board	Tumbler main control board
INV1	SE021-0.75K	Single-phase inverter
LCD1	LCD 2 x 16 Characters	Front panel LCD display with backlight
M1	Motor 380VAC 50Hz	3-Phases 750W 1390RPM motor
M2	Motor 24VDC	Vertical block motor and gear box (160mm/S)
EL1	Solenoid 24VDC	Front door lock mechanism
S1	PNP 24VDC Proximity sensor	Speed detector reads the belt wheel
S2	PNP 24VDC Proximity sensor	Big/small container and upper clamping limit detector
S3	PNP 24VDC Proximity sensor	Container plates vertical position detector
SW1	2 x NO Safety switch	Door closed detection
SW2	1 x NO Limit switch	Vertical block activated
SW3	1 x NO Limit switch	Vertical block released
P1	2 x NC Emergency button	Front panel emergency button
P2	1 x NO Pushbutton	Front panel OPEN button
P3	1 x NO Pushbutton	Front panel PLUS button
P4	1 x NO Pushbutton	Front panel MINUS button
P5	1 x NO Pushbutton	Front panel START button
PS1	2 x NO Power switch	Main power switch
FUSE1	10A 5x20 Fuse	24 VDC line protection (control board)
FUSE2	10A 5x20 Fuse	Vertical block motor protection (control board)
FUSE3	10A 10x38 Fuse	Inverter protection
FUSE4	2A 10x38 Fuse	Transformer protection
TR1	100VA Transformer	Input: 230VAC 50Hz (optional 220 - 240VAC 50/60Hz) Output: 24V 45VA, 18V 45VA, 9V 10VA
C1	470KnF 400VL capacitor	Noise reduction filtering
R1	100Ω 100W resistor	Optional inverter brake resistor
RL1	24VAC Power contactor	Safety contactor cuts power to inverter
RL2	24VDC 3x 250VAC 10A relay	Star/Triangle AC motor control

On-board LED diagnostic

The machine's control board has been designed to support a quick and intuitive debug of all the machine's functions. In particular a set of LEDs identifies the status of all the devices electrically connected to the board.

The LEDs colors are related to the specific associated function:

- Yellow** = On-board power source
- Red** = Output controls (motors, solenoids, relays etc.)
- Green** = Input signals (sensors, switches, buttons etc.)



Code	Color	Conn.	Pin #	Description
LY1	Yellow	N/A		5 VDC Power source for the board internal logic
LY2	Yellow	J1	5 - 6	24 VDC Power source
LY3	Yellow	J2	3 - 4	36 VDC Vertical block motor power source
LR4	Red	N/A		CPU activity monitor
LG5	Green	J7	1 - 2	OPEN front panel button
LG6	Green	J7	3 - 4	DECREASE front panel button
LG7	Green	J7	5 - 6	INCREASE front panel button
LG8	Green	J7	7 - 8	START front panel button
LG9	Green	J7	9 - 10	EMERGENCY STOP button
LG10	Green	J7	11 - 12	Door switch
LG11	Green	J7	13 - 14	Not used
LG12	Green	J7	15 - 16	Not used
LG13	Green	J6	2 - 3	Vertical position sensor

LG14	Green	J6	5 - 6	Big (ON) or small (OFF) container sensor. Clamping opening limit (OFF).
LG15	Green	J6	8 - 9	Motor running/speed sensor
LG16	Green	J6	10 - 9	Not used
LG17	Green	J9	3 - 4	Vertical block released (OUT) limit switch
LG18	Green	J9	1 - 2	Vertical block inserted (IN) limit switch
LG19	Green	N/A		Not used
LR20	Red	J9	3 - 4	Star / triangle AC motor connection
LR21	Red	J9	5 - 6	Not used
LR24	Red	J10	8 - 7	Inverter ON command
LR25	Red	J10	6 - 5	Inverter direction setting
LR26	Red	J9	1 - 2	Lock solenoid control
LR27	Red	J8	5 - 6	DC vertical block motor insertion (IN) direction
LR28	Red	J8	5 - 6	DC vertical block motor release (OUT) direction
LR29	Red	J8	5 - 6	DC vertical block motor solid state current control

Spare parts and tools

With each machine a set of standard spare parts and mechanical tools are supplied:

<i>Item</i>	<i>Quantity</i>
Sponge cushion (8 mm) for the container	1
Sponge cushion (12 mm) for the container	1
Hook terminated cable for top cover holding	1
Lubricant kettle	1
10A 10x38 Fuse (power source)	1
2A 10x38 Fuse (power source)	1
Rubber belt for liquid container	1
8-10mm Open-end wrench	1
19-22mm Open-end wrench	1
4mm Allen (hexagonal) key	1
This user's manual	1