

Turn Block Manual

AUTOBLOCKS
Modular Automation Solutions



Turn Block Manual
24 & 36 inch Diameter
Doc#: Turn Block Manual
Rev: 5
Date: 12/27/23

Contents

1	Revision Log.....	5
2	Introduction.....	6
2.1	Preface	6
2.2	What's In the Box	7
3	Safety	8
3.1	Introduction	8
3.2	SAFETY WARNINGS	8
3.3	Validity and Responsibility	9
3.4	Limit of Liability.....	9
4	Mechanical.....	9
4.1	Introduction	9
4.2	Mechanical Mounting/Assembly	9
4.3	Maximum Payloads & Table Deflection	10
4.4	Enclosures	11
4.5	Fixtures.....	11
5	Electrical/Controls	12
5.1	Introduction	12
5.2	Control Panel Specifications.....	12
5.3	Electrical Connections	12
5.4	I/O and Communication	15
5.5	Safety Circuits	15
6	Controls/Programming	15
6.1	Control Panel/HMI.....	15
6.2	Quick Start	16
6.3	Process Development/Single Station Mode.....	17
6.4	Light tower	18
7	Machine Specifications.....	18
7.1	Facilities – Turn Block Only.....	22
8	Maintenance & Repair	22
8.1	Introduction	22
8.2	Maintenance Safety	22

8.3	Machine Maintenance	22
8.4	Cleaning	23
9	Troubleshooting Guide.....	23
10	Support	23
10.1	Support Contacts	23
11	Terms and Conditions / Warranty	24

AutoBlocks™ Introduction

AutoBlocks™ revolutionizes custom machine building by introducing a standardized and modular approach. Our modules greatly reduce engineering, risk, and lead times. Each Autoblock is a pre-engineered standard unit that can be combined in unique ways to solve your precision assembly and inspection needs. Our user-friendly software creates a unified platform with centrally controlled operations, part tracking, and safety. Autoblocks modules enable faster system development, lower engineering hours, and reduced risk for our customers. Maintenance is made easier with readily available standard blocks and trained technicians. The modular system allows for future expansion or repurposing of machines based on changing process requirements. Our cost-efficient modules simplify machine integration allowing engineers to focus on process automation instead of the machine building process.

Autoblocks™ can provide solutions for the following processes:

- Soldering
- Screw Fastening
- Dispense
- Induction Soldering/Brazing
- Induction Shrink-Fitting
- Induction Plastic Welding
- Ultrasonic Welding/Heat Staking
- Press Fit
- Pressing/staking
- Vision Inspection
- Sorting

Our team of dedicated engineers and technicians at Autoblocks is not just passionate about automation; we're committed to transcending the boundaries of conventional automation projects. Our approach is rooted in a robust partnership between you, the customer, and us, your trusted machine builders. We meticulously break down each automation project into key milestones, providing you with a transparent roadmap that not only tracks progress but also instills confidence in the final outcome.

To ensure the seamless integration of your new machine and its effective resolution of your specific challenges, we hold targeted meetings at every pivotal juncture in the project. This practice ensures that we are all aligned in optimizing for both performance and efficiency.

Autoblocks'™ Engineering Team excels in crafting turnkey solutions designed to elevate your machine's productivity and reliability to industry-leading levels. This guarantees robust Returns on Investment (ROIs) that stand the test of time. Our automation

expertise is amplified by a unique blend of in-depth knowledge in induction processes and cutting-edge automated solutions.

We take pride in being a certified integrator of an elite roster of providers in robotics, vision, and system equipment, situating us as a leading authority in the field of automation.



1 Revision Log

Revision History			
ID	Revision	Author	Date
1	Initial Draft	Jared Sandman	09/01/23
2	Rev 2	Jared Sandman	09/25/23
3	Rev 5	Jared Sandman	12/27/23
4			
5			

Confidentiality Notice:

This proposal is intended solely for the use of the individual or entity to which it is addressed and may contain information that is proprietary, privileged, company confidential, and/or exempt from disclosure under applicable law. If the reader is not the intended recipient or agent responsible for delivering the message to the intended recipient. You are hereby notified that any dissemination, distribution, or copying of this communication is strictly prohibited. If this communication has been transmitted from a U.S. location, it may also contain data subject to the International Traffic in Arms Regulations or U.S. Export Administration Regulations and cannot be disseminated, distributed, or copied to foreign nationals, residing in the U.S. or abroad, without prior approval of the U.S. Department of State or appropriate export licensing authority. If you have received this communication in error, please notify the sender by reply email or collect telephone call (1-917-557-6858) and delete or destroy all copies of this message, and physically copied made of this message and/or any file attachment(s).

2 Introduction

2.1 Preface

Welcome to the user manual for the Autoblock Turn Table—a remarkable innovation in robotic automation that is set to revolutionize various industries. Designed to optimize efficiency, precision, and convenience, this user manual serves as your comprehensive guide to understanding, operating, and maintaining this cutting-edge piece of technology.

The Autoblock Turn Table represents a significant leap forward in the field of robotics, enabling seamless automation of repetitive tasks, intricate movements, and complex operations. By combining advanced robotics, intelligent algorithms, and intuitive controls, this system empowers users to achieve unprecedented levels of productivity and accuracy. Whether you are a seasoned professional or a novice exploring the world of automation, this user manual is here to assist you at every step. We have meticulously organized this document to provide you with clear instructions, insightful explanations, and troubleshooting advice, ensuring that your experience with the Autoblock Turn Table is smooth and rewarding.

In this user manual, you will find a wealth of information, including:

1. **Introduction:** Gain an overview of the Autoblock Turn Table and its capabilities. Learn about its key features, benefits, and the industries it caters to.
2. **Getting Started:** Follow the step-by-step instructions to install and set up the Autoblock Turn Table. Discover the necessary safety precautions to ensure secure and efficient operation.
3. **Operating Instructions:** Dive into the details of operating the Autoblock Turn Table. Learn how to program it, define movements, configure settings, and optimize performance.
4. **Maintenance and Troubleshooting:** Understand the best practices for maintaining the Autoblock Turn Table, including regular inspections, cleaning procedures, and safety checks. Additionally, learn how to diagnose and resolve common issues that may arise during operation.
5. **Advanced Features and Customization:** Explore the advanced features of the Autoblock Turn Table, such as integration with other robotic systems, compatibility with industry-specific software, and customization options for specific applications.

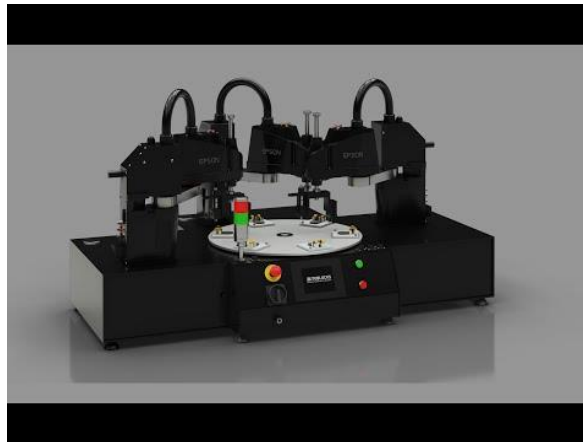
Throughout this user manual, we aim to provide you with comprehensive guidance and support. However, should you have any questions, encounter difficulties, or require further assistance, our dedicated support team is always ready to help. Please refer to the contact information provided in the manual for prompt and reliable assistance.

We are excited to have you embark on this journey of automation with the Autoblock Turn Table. By harnessing the power of this state-of-the-art technology, we believe you will unlock new levels of productivity, precision, and success in your work. Get ready to witness the seamless fusion of robotics and automation and let the Autoblock Turn Table propel your operations to greater heights.

Autoblocks Overview:

AutoBlocks™ revolutionizes the world of custom machine building by introducing a standardized and modular approach. Our modules decrease hardware cost and include easy to use software for motion and robotics integration. Autoblocks modules have enable our customers to build more capable systems faster while eliminating expensive hardware and reducing programming hours. Our cost-efficient modules allow your engineers to focus on the critical process automation while keeping the standard automation aspects simple.

Learn more: [Home | Autoblocks](#)



2.2 What's In the Box

For customers that purchase a Turn Block for self-integration the base block ships complete with the power cord. Table, fixtures, station quick connected tables, enclosure, light tower, door switches, part presence sensor, applications kits and machine blocks are all purchased separately. The latest CAD models and instructions are available on the website: www.autoblocks.co

3 Safety

3.1 Introduction

Within this chapter, critical safety information is provided that should be thoroughly read and comprehended by the integrator of the Autoblocks turntable prior to the initial power-on of the machine.

3.2 SAFETY WARNINGS

The following are a list of Warnings that need to be read and understood before attempting to turn on or operate the machine:

1. **WARNING: Electrical Shock 240 Volts** – the machine operates at 240 volts which can present a significant risk of shock or death if an operator is exposed. The machine should be locked out using the main power disconnect and should be unplugged prior to attempting any service of the machine including opening of the control cabinet compartment. It is highly recommended not opening the control cabinet and doing so may void your warranty. Qualified and trained personnel only should be allowed to access the turn block control panel or any other block control/wiring compartments.
2. **WARNING: Electrical Shock 120 Volts** – 120-volt power circuits are provided for each side station of the turn block. Connecting to these circuits should be done by qualified personnel and present the potential for shock, injury or death.
3. **WARNING: Pressurized Air** – The turn block provides a main pneumatic air connection at the rear of the machine which internally provides pressurized air to each station. This pressurized air presents a stored energy hazard and should be checked for leaks and connection strength prior to turning on the main pneumatic air supply. The machine requires the supply to be limited to no more than 100 PSIG using a customer provided air regulator. Over pressure could cause damage or injury to operators and should be checked for integrity on a regular basis by qualified personnel.
4. **WARNING: Motion/Pinch/Impact Hazard.** The turn block can be fitted with worktables, fixtures, and many other types of mechanical customizations. The Turn Block comes prewired for light curtains and cannot be operated without them. The machine must also be equipped with a safety enclosure that prevents the operator from encountering motion-related injuries. The enclosure, light curtains, shields, fixtures, and other customizations must be designed by qualified personnel and all motion related risks shall be address in a risk assessment. See section 3.3.
5. **WARNING: Buring/Melting/Fire Risk.** The turn block is designed to control induction heating power supplies and coils. These power supplies should be setup and operated by qualified personnel. The power level and dwell time

recipes are password protected. Changing the induction recipe by increasing power, dwell time, or both could result in injury or death from over heating or fire.

3.3 Validity and Responsibility

Performing a risk assessment is a crucial task for integrators when working with the Autoblocks Turn Table. In many countries, it is a legal requirement. As the safety of the robot installation depends on how the robot is integrated, including factors such as tool/end effector, obstacles, and other machines, a comprehensive risk assessment is recommended. ISO 12100 and ISO 10218-2 are suggested standards for conducting the risk assessment, and the Technical Specification ISO/TS 15066 can provide additional guidance if desired.

The risk assessment conducted by the integrator should encompass all work tasks throughout the lifespan of the turntable application, including activities like turntable teaching during setup, troubleshooting, maintenance, and normal operation. It is essential to complete the risk assessment before powering on the robot arm for the first time. During this assessment, the integrator must identify appropriate safety configuration settings and determine the need for additional emergency stop buttons or protective measures specific to the robot application.

To ensure unauthorized access is prevented, the integrator must use password protection for the safety configuration.

3.4 Limit of Liability

Please note that any safety information provided in this manual should not be interpreted as a guarantee or warranty from AutoBlocks that the industrial manipulator will not cause any injury or damage, even if the manipulator adheres to all safety instructions.

4 Mechanical

4.1 Introduction

This chapter describes the basics of mounting the parts of the robot system. Electrical installation instructions in this chapter must be observed.

4.2 Mechanical Mounting/Assembly

The Turn Block indexing tables come equipped with many mechanical assembly options for maximum flexibility. These include:

1. Standard ISO 9409-1 output flange for table mounting. See figure 1.
2. An array of threaded holes is provided on the top side of the turntable for further mounting of sensors, fixtures, etc. See Figure 1.
3. A pair of support block struts are provided on left, right, and rear of the table with tapped holes and tool pins. These are utilized to attach standard AutoBlocks configurations but may be utilized for any mechanical feature including enclosures. See Figure 1.
4. Removable threaded feet that may be used for mounting the table to a machine base. Further threaded mounting threaded holes are provided. See figure 3.

4.3 Maximum Payloads & Table Deflection

The Turn Block features a robust aluminum substructure to ensure that components that are bolted to the table are well supported with minimal deflection. Mechanical deflection can be divided into two categories and two types. The first category is the amount of deflection under load associated with the turn block structure not accounting for any deflection in the table plate. This deflection is known and calculated independently of the table plate material, thickness, etc. The second category is table plate deflection and is considered as the amount of deflection associated with the table plate and is additive to the turn block deflection to arrive at the total table deflection under load. When the table is loaded evenly on all sides this is considered a symmetrical load. This type of loading will lead to a deflection of the table that is symmetrical about the table axis and is generally considered a stable deflection that should be considered as a static deflection during the mechanical design stage of development. Asymmetrical loading is when one side of the table plate is loaded causing deflection of one side of the table. This type of loading will cause an asymmetrical deflection such as when a screw driving robot applies a downward force on the table while driving screws.

The Turn Block machine has been designed with high quality precision planetary type gear boxes. These gear boxes and motor sizing provide the following specifications for torque, speed, and backlash:

Mechanical Backlash

< 10 ARC MIN STANDARD GEAR BOX

< 5 ARC MIN PRECISION GEAR BOX

< 3 ARC MIN PRECISION GEAR BOX

Speed & Torque

Maximum Table Speed: 20 RPM

Max Torque at max speed: 5.4 in-lbs.

Reflected Inertia: Contact Autoblocks for calculations.

Direction

Counterclockwise

4.4 Enclosures

Autoblocks systems are easily fitted with extrusion type enclosures with up to 4 door switches and a single light curtain. When manually loading from the front of the machine we recommend using a formed acrylic pie shaped shield in addition to the light curtain. The shield protects the operator from process motion risks while they are loading, and the light curtain pauses the motion of the table only and is designed protect the operator from pinching or other motion injury risks from the table indexing.

When mounting the enclosure, the autoblocks table side/rear mounts may be utilized. When the system includes machine, corner or other blocks they include holes to mount the extrusions. **When designing an enclosure, you will be required to complete a risk assessment to ensure the enclosure protects operators from rick of injury.**

To further enhance safety measures, the turntable rotation speed is adjustable, allowing for controlled movement of the parts. This adjustment enables the parts to exit the enclosure at a safe temperature, mitigating the potential for burns or other hazards.

By incorporating these safety features, the system prioritizes the well-being of operators by effectively containing and isolating the hot components within the enclosure. This ensures a safer working environment and reduces the likelihood of accidents or injuries associated with high-temperature materials.

Contact Autoblocks Sales if you would prefer a turnkey solution with Autoblocks provide one of our standard enclosures.

4.5 Fixtures

To develop reliable and efficient Autoblocks systems it will require the design of a table, table fixtures, and possible other presentation fixturing. **These fixtures need to be carefully considered and designed only by qualified mechanical designers.** The fixtures need to address repeatable mechanical positioning, environmental concerns such as heat/moisture, strength/stiffness, magnetic field absorption, and vibration resonance frequency. They must also provide for ergonomic loading/unload in the case where an operator needs to interact with fixturing. The Turn Block rotates counterclockwise and provides for 4 or 8 standard positions/fixtures.

Tables

The standard turn blocks do not include a table. Standard and custom tables are available through Autoblocks, or you may design your own. Table load, deflection, resonance, magnetism, stiffness and reflected inertia criteria all need to be considered when designing a table. Standard tables come with drilled and tapped mounting holes and meet Auto Blocks performance criteria. Typical table materials that may be considered are aluminum, steel, acrylic, and other high strength and ESD safe plastics. Consider definition carefully when selecting materials. **Only qualified mechanical designers who can perform deflection, reflected inertia, and other mechanical considerations should design tables.**

5 Electrical/Controls

5.1 Introduction

This chapter covers the electrical interfaces of the Turn Block tables. This section is important to review and understand prior to powering the machine on, connecting accessories such as robots, controllers, or other items. Improper setup could result in damage to your machine or injury. See section 3.2 for SAFETY WARNINGS.

5.2 Control Panel Specifications

INDUSTRIAL CONTROL PANEL

VOLTAGE	-	240 VAC
PHASE	-	1 PH
FREQUENCY	-	60 HZ
FULL LOAD CURRENT	-	18.82 A
SCCR	-	10 kA rms SYMM, 240V MAX
LARGEST MOTOR LOAD	-	6.1 A
FEEDER PROTECTION	-	20 A
CONTROL VOLTAGE	-	24VDC, 48VDC , 5VDC
SCHEMATIC NUMBER	-	PF-3799(54087)
ENVIRONMENT RATING	-	TYPE 1

5.3 Electrical Connections

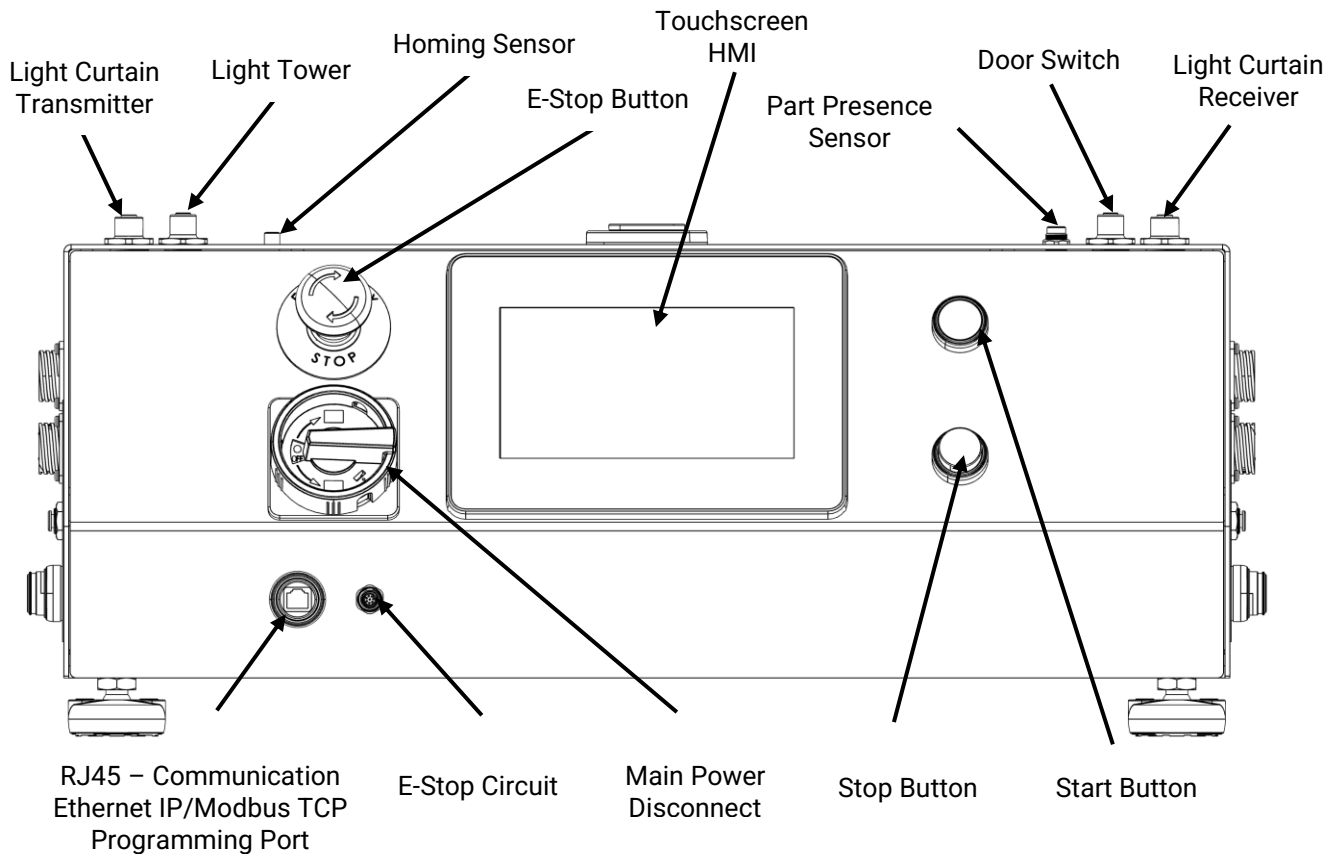
The Turn block has electrical connections on all sides of the machine. The machine is prewired to support safety, I/O, Modbus TCP, Ethernet IP, power, light curtain, part presence, and door switches. A single Keyence light curtain may be plugged into the table with standard OEM cables and no further wiring. Up to 4 door switches may be added in a daisy chain manner with custom wire lengths. These must be ordered

through Autoblocks with wire run lengths being specified. A laser part presence sensor must be added to sense when parts are loaded and unload from the machine. The part presence sensor must be order through Autoblocks with the wire length specified at time of order. The machine also comes prewired and programed for a light tower. The light tower must be ordered from Autoblocks and requires a wire length specification.

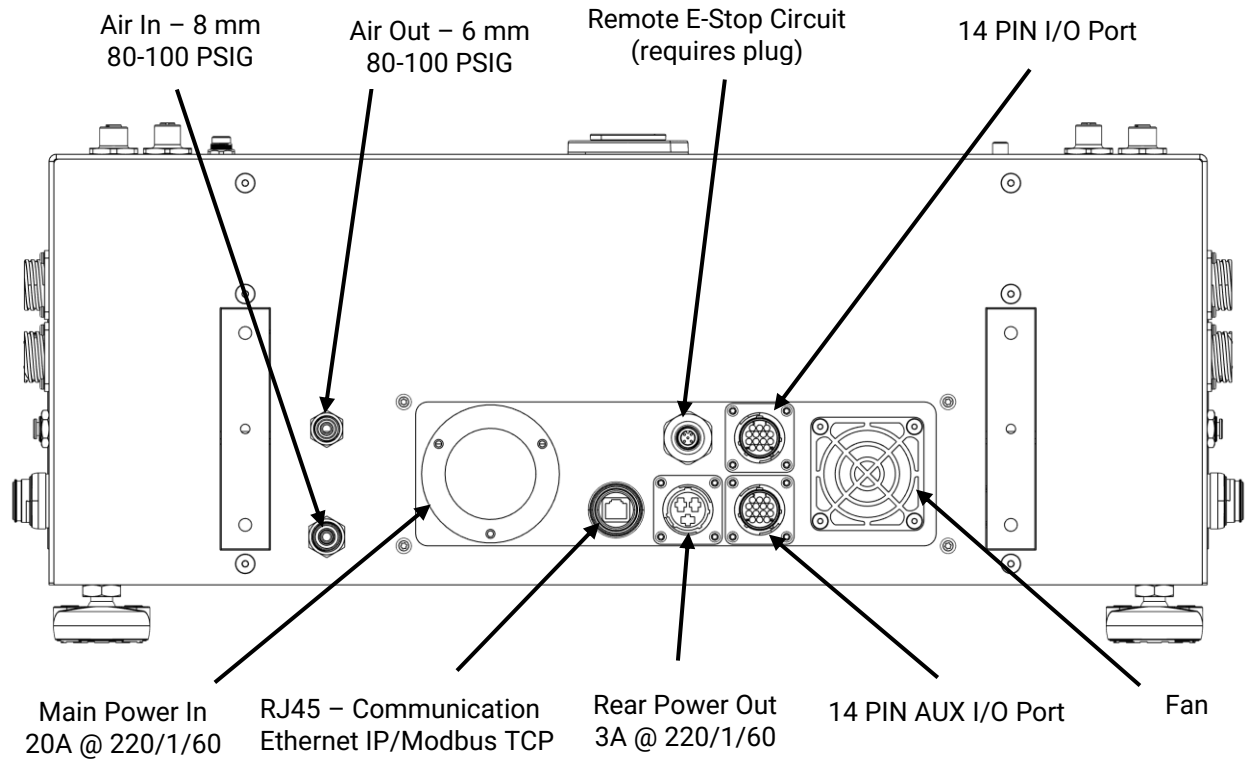
Station power is provided by dedicated circuits with internal circuit breakers sized at 6A each at 240 V. FLA for all three stations is about ~7.5A. This is enough to support 3 Epson T3 robots (2.75 A max) and some small accessories. If more power is required to run more robots or accessories it is recommended that a supplemental power line be run to the largest device along with a circuit breaker added to the DIN rail inside the machine block.

All Turn Block machines must be fitted with light curtains, part presence, light tower and door switches in order to function. Mechanical drawings of the parts presence and door switches are available.

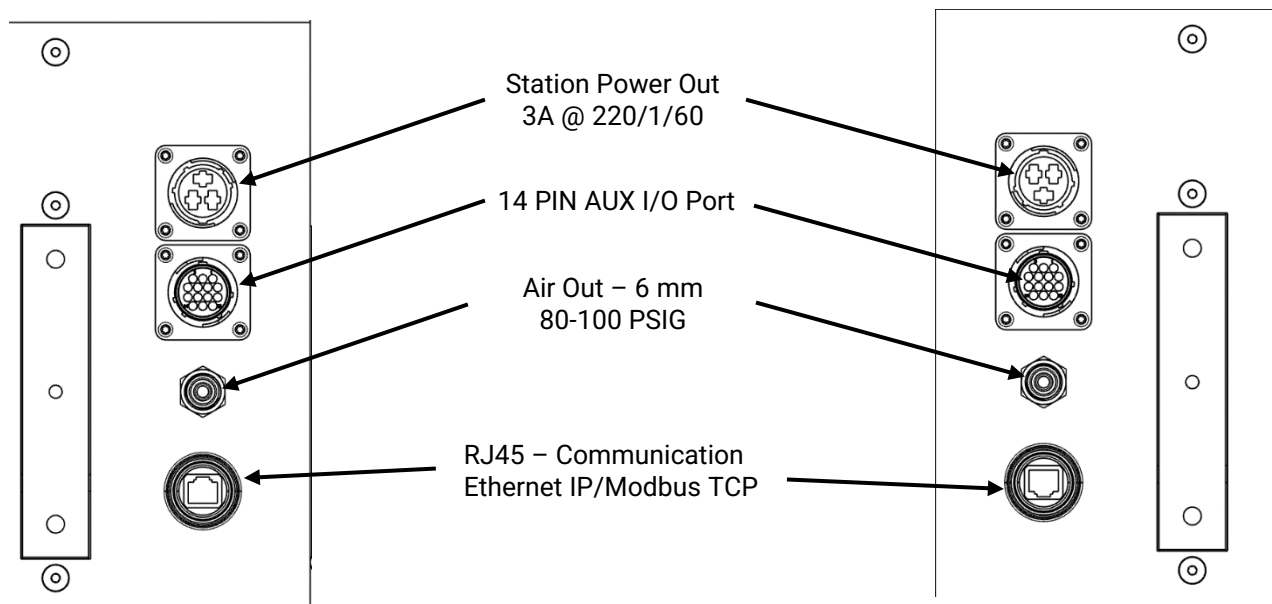
Front Controls & Connections



Rear Utility Connections



Left & Right Station Utility Connections



5.4 I/O and Communication

Sides and rear station I/O connectors are 14 pin and come prewired, labeled and must be purchased from AutoBlocks. Each station connector can support 5 discrete inputs and 3 discrete outputs, 1 analog out 0-10V, 24V e-stop connection. Pig tails are 20" unless specified longer during time of purchase. See below picture. Modbus TCP control is available for Robot program switching, data collection, and expanded communication. Epson Robot machine blocks come all pre-wired harnesses for power, communication, and safety. See latest wiring diagram for PIN out.



5.5 Safety Circuits

Each station is prewired for a 24V safety/e-stop circuit which can be used to cut power to devices such as robots.

6 Controls/Programming

6.1 Control Panel/HMI

The Turn Block comes equipped with a 7" industrial-grade Human-Machine Interface (HMI) touch screen PLC. The HMI offers a user-friendly interface, enabling operators to start/stop the machine, adjust speed, clear faults, and manual run the machine via the maintenance screen. Further machine configurations and safety configurations are provided under password protected machine setup screens. See the quick start guide for basic machine operation. The specific HMI screens may change from time to time as the machine software is revised and improved.

The control panel on the front of the machine includes start and stop buttons on the right-hand side. These are optional and interchangeable with the start/stop buttons on the HMI screen. The left-hand side includes the E-stop button and main power disconnect. The main disconnect features a lock out/tag out feature when the handle is lifted.

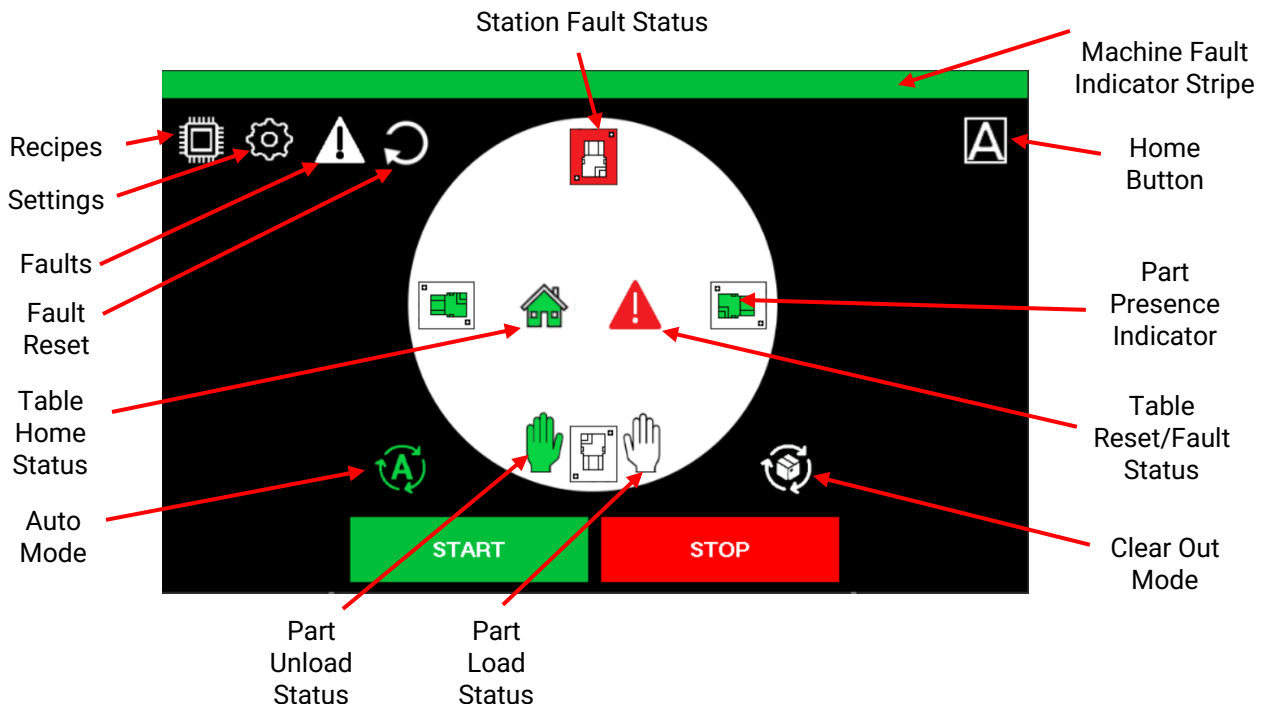
To safeguard against unintended modifications, **when utilizing induction heating the recipe editing is password protected.** WARNING: increasing the heating power may result in melting, overheating, part damage, or in some cases the risk of fire.

6.2 Quick Start

This section outlines the startup sequence for a typical autoblocks system. Depending on your configuration, this section may change or require modifications.

FAULTS: When a fault occurs, all parts should be removed from the machine, checked and classified for rework before resetting the machine and continuing production.

1. Check that all connections for air, power, communication, and water are complete, secure and leak tested.
2. Ensure that all safety devices are clear. E-stop is not engaged, doors are closed, light curtain is clear and aligned, and fixtures are all cleared out.
3. Check that air supply is turned on.
4. Turn on the main power disconnect rotary switch on the front of the machine.
5. Power up subordinate blocks such as robots, induction power supply etc. that are not controlled by the turn block power connections.
6. For induction systems turn on the water circulator.
7. When the machine is powered on you will be prompted for a username and password.
8. The machine's home screen will automatically load. See below.



9. Check for and clear any errors. The stripe at the top of the screen will indicate green when the machine is ready and red if there is a fault. If there is a fault press the Fault Reset button on the upper left hand side or check the fault screen for more detailed fault indications.
10. Verify that the table is homed. This is indicated by the home icon shown green.
11. If motor homing is required, press the motor reset button.
12. Select the auto run mode.
13. Press start and the light tower green light will light up indicating the machine is running.
14. The part load light on the HMI should be lit up indicating there is no part in the fixture and its ready to be loaded.
15. Load your first part.
16. The part loaded light on the HMI will light up and the machine will begin indexing.
17. Do not reach into the machine while the table is moving and before the light tower lights up green again indicating its ready to be loaded. If the light curtain is broken the machine will pause then resume.
18. Keep filing the parts in the fixtures until the table presents finished parts for unload.
19. Check that the part load light on the HMI is lit after removing parts and before placing a new set into the fixture. If the part load light fails to come on check that the yellow indicator light on the part presence sensor is off indicating no part present.
20. Load the next set of parts following this routine until the desired batch of parts is complete.
21. Once the last part is loaded press the clear out mode button on the HMI. This will allow the machine to continue to safely index without the need to add parts. The machine tracks the presence/absence of parts and will run stations only when parts and skip the process when parts are not present. This will continue indefinitely until the operator presses the stop or releases the clear out mode button.

6.3 Process Development/Single Station Mode

This section outlines a method to run a single station at a time for process development, troubleshooting or just a single step process.

1. Navigate to the settings->app selection screen.
2. Turn off all station apps except for the single station that should be tested.
3. Step through the quick start steps 1 through 14 from above.
4. After loading a single part and the table begins to index, turn on the clear out mode button.
5. The table will index without the need to add further parts until the part that was loaded reaches the single active station where it will be processed.

6. After a part is processed it will return to the unload station when the machine will stop indexing.
7. Turn off the clear out mode button and remove the finished part.
8. The machine remains in the ready state.
9. Repeat steps 4 through 7 to process a single part for process development or trouble shooting purposes.

6.4 Light tower

The turn block comes prewired for an optional red/green light tower to display the status as outlined below.

Color	Behavior	Description
Green	Solid	Equipment Running
Red	Solid	Major Attention Needed: <ul style="list-style-type: none"> - Alarm - Broken light curtain. - Doors open. - Error/Failure

7 Machine Specifications

General

Model: Turn Block 24

Table Diameter (sold separately): 24"

Standard Repeatability: 10 Arc Min backlash maximum.

Optional Precision Repeatability: 5 Arc Min backlash maximum.

Optional Precision Repeatability: 3 Arc Min backlash maximum.

Direction: Counterclockwise

Indexing positions: 4 and 8

Approximate Size: 24" W x 28" D X 9" H

Approximate Weight: 125 lbs.

Electrical Power: 20 amps @ 240/1/60

Compressed Air: 80-100 PSIG

Speed & Torque

Max. Table Speed: 20 RPM

Max Torque at max speed: 5.4 in-lbs.

Enclosures (Sold Separately or provided by others)

Mounting: Light weight safety enclosure may be mounted table tapped holes.

Door Switches/Interlocks: Up to 4 door switches connect via daisy chain.
Part Presence: Part presence sensor is required for manual loaded systems.
Light Tower: Red/Green light tower quick connect is supported.
Light Curtain: Light curtain connection is provided for Keyence GL-S and GL-R series for plug and play with internal safety relay built in.

Mechanical

Structure: Interlocked aluminum base, pillars, and reinforced gear box support.
Mounting: Support pillars support other machine blocks w/ tool pin interlocks
Cover: Aluminum
Drive: Precision Planetary Gear box
Motor: Closed Loop Servo
Table Mount: ISO 9409-1 output flange
Max Symmetrical Unsupported load: 50 lbs.
Max Unbalanced/Unsupported load: 30 lbs.
Max Supported Load (additional rollers or support blocks required): 300+lbs
Table Materials: Acrylic, Aluminum, Steel, Engineered Plastics.
Main Air Supply In: 8 mm
Station Air supply Lines Out: 6 mm

Electrical

Electrical Power: 20 amps @ 240/1/60
SCCR Rating: 10 kA rms SYMM, 240V MAX
Environment Rating: TYPE 1
Light Curtains: (2) Quick connections for receiver and transmitter.
Door Switches: (1) Quick connect for door sensor circuit.
Part Presence Sensor: (1) Quick connect for door sensor circuit.
Light Tower: (1) Quick connect for red/green light tower.
Station Power: (3) 240V single phase 6 A power circuits for each station. Max FLA 7.5A
Station E-Stop: Each station is prewired for 24V safety circuit.

Communication

Station Digital Outputs: 3 (9 total)
Station Digital Inputs: 5 (15 total)
Analogue Output: (1) 0-10V (3 total)
Communication Protocol: Modbus TCP (4 RJ45 ports)
Bar Code: Prewired for (1) USB type A Bar Code Scanner

Controls

HMI: 7" Resistive Touch Screen PLC

Safety Relay: Built in & prewired for light curtain and door switches.

Circuit Breakers: Internal main, station and motor breakers.

Main Disconnect: Lockable power disconnect on front of machine.

Low Voltage Power Supplies: Built in 24 V and 5 V power supplies.

Homing Sensor: Built in induction homing sensor.

Station Control: 3 dedicated & 1 auxiliary.

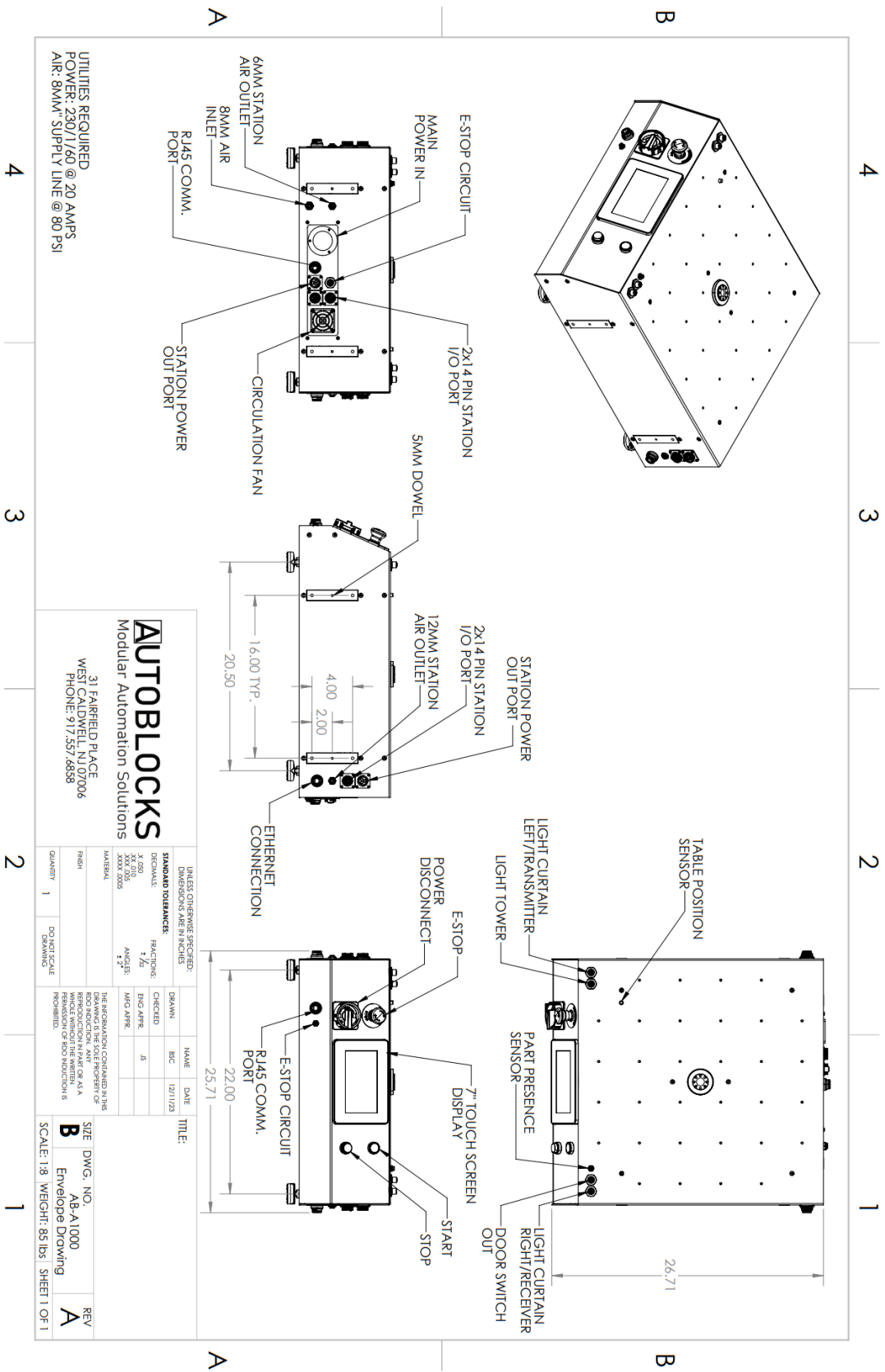
Accessories: Controlled by Robots or PLC directly

Robots: Up to 3 simultaneous controlled.

Vision Systems: Controlled by Robot or PLC directly.

Software

Programming Specifications: IEC 61131-3



AUTOBLOCKS
Modular Automation Solutions
31 FAIRFIELD PLACE
WEST CALDWELL, NJ 07006
PHONE: 917.557.6838

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES		NAME	DATE	TITLE:
STANDARD DIMENSIONS:		DRAWN	BIC	12/11/23
FINISH:	FRAC/DIG:	CHECKED		
1/16	1/32	ENG APPR:	5	
1/8	1/64	MFG APPR:		
1/4	1/32			
3/8	1/16			
1/2	1/8			
3/4	3/16			
1	1/4			
1 1/4	5/16			
1 1/2	3/8			
2	1/2			
3	5/8			
4	3/4			
5	7/8			
6	1			
8	1 1/8			
10	1 1/4			
12	1 1/2			
16	1 3/4			
20	2			
24	2 1/4			
30	3			
36	3 1/2			
42	4			
48	4 1/2			
54	5			
60	5 1/2			
72	6 1/2			
84	7 1/2			
96	8 1/2			
108	9 1/2			
120	10 1/2			
132	11 1/2			
144	12 1/2			
156	13 1/2			
168	14 1/2			
180	15 1/2			
192	16 1/2			
204	17 1/2			
216	18 1/2			
228	19 1/2			
240	20 1/2			
252	21 1/2			
264	22 1/2			
276	23 1/2			
288	24 1/2			
300	25 1/2			
312	26 1/2			
324	27 1/2			
336	28 1/2			
348	29 1/2			
360	30 1/2			
372	31 1/2			
384	32 1/2			
396	33 1/2			
408	34 1/2			
420	35 1/2			
432	36 1/2			
444	37 1/2			
456	38 1/2			
468	39 1/2			
480	40 1/2			
492	41 1/2			
504	42 1/2			
516	43 1/2			
528	44 1/2			
540	45 1/2			
552	46 1/2			
564	47 1/2			
576	48 1/2			
588	49 1/2			
600	50 1/2			
612	51 1/2			
624	52 1/2			
636	53 1/2			
648	54 1/2			
660	55 1/2			
672	56 1/2			
684	57 1/2			
696	58 1/2			
708	59 1/2			
720	60 1/2			
732	61 1/2			
744	62 1/2			
756	63 1/2			
768	64 1/2			
780	65 1/2			
792	66 1/2			
804	67 1/2			
816	68 1/2			
828	69 1/2			
840	70 1/2			
852	71 1/2			
864	72 1/2			
876	73 1/2			
888	74 1/2			
900	75 1/2			
912	76 1/2			
924	77 1/2			
936	78 1/2			
948	79 1/2			
960	80 1/2			
972	81 1/2			
984	82 1/2			
996	83 1/2			
1008	84 1/2			
1020	85 1/2			
1032	86 1/2			
1044	87 1/2			
1056	88 1/2			
1068	89 1/2			
1080	90 1/2			
1092	91 1/2			
1104	92 1/2			
1116	93 1/2			
1128	94 1/2			
1140	95 1/2			
1152	96 1/2			
1164	97 1/2			
1176	98 1/2			
1188	99 1/2			
1200	100 1/2			

7.1 Facilities – Turn Block Only

Utility Requirements

Approximate Size: 24" W x 28" D X 9" H

Approximate Weight: 125 lbs.

Electrical Power: 20 amps @ 240/1/60

Compressed Air: 80-100 PSIG

8 Maintenance & Repair

8.1 Introduction

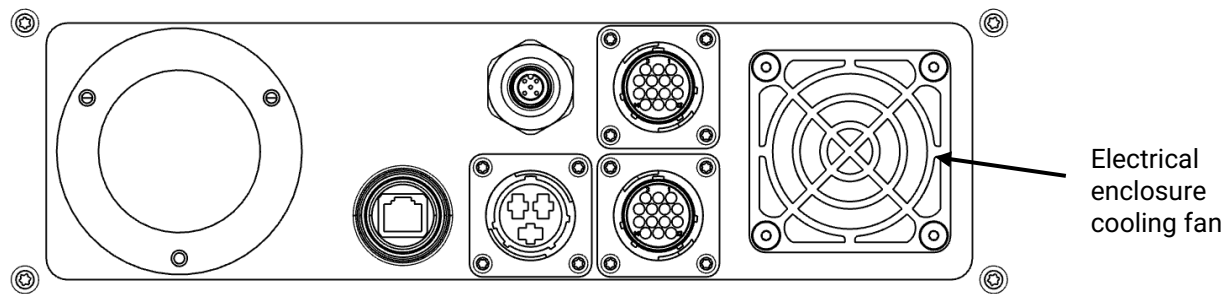
To ensure safe maintenance and repair work, it is imperative to follow all safety instructions provided in this manual. Repairs should only be carried out by authorized system integrators or by AutoBlocks personnel. In the event parts need to be returned, please adhere to the guidelines specified in the service manual for proper handling and return procedures.

8.2 Maintenance Safety

Following maintenance and repair work, it is essential to perform thorough checks to verify that the required safety level is maintained. These checks must comply with the applicable national or regional work safety regulations. Additionally, it is crucial to test the proper functioning of all safety functions. The primary objective of maintenance and repair work is to ensure the continued operation of the system. In the event of a fault, the aim is to restore the system to its operational state. Repair work involves not only the actual repairs but also troubleshooting to identify and resolve any issues.

8.3 Machine Maintenance

The Turn Block requires minimal maintenance for years of precision performance. The motor, gear box, and controls require zero planned maintenance. The one item that should be checked at least once a year will be the enclosure cooling fan at the rear of the Turn Block. This should be cleared of dust and debris which will build up over time and may require more frequent cleaning in dusty environments. The fan comes with a dust filter built in. Maintenance of the other AutoBlocks, Robots, or other subsystems will be covered by manuals dedicated to those components or covered by their OEM manuals.



8.4 Cleaning

Everyday Cleaning: To remove dust, dirt, or oil from the machine, you can use a cloth along with one of the following cleaning agents: water, isopropyl alcohol, 10% ethanol alcohol, or 10% naphtha.

Additional Cleaning: For enhanced cleaning of your machine, AutoBlocks recommends utilizing 70% isopropyl alcohol (rubbing alcohol). Gently wipe the robot with a twisted microfiber cloth dampened with 70% isopropyl alcohol. Allow the 70% isopropyl alcohol to remain on the robot's surface for 5 minutes, and then proceed with the standard cleaning procedure. **CAUTION: DO NOT USE BLEACH. It is crucial to avoid the use of bleach in any diluted cleaning solution.**

9 Troubleshooting Guide

Click here for the latest troubleshooting guide that is updated on regular basis:

[Support | Autoblocks](#)

10 Support

10.1 Support Contacts

The following is a list of contact people for support before and after the sale.

Service Contact:

- Phone Number: +1(917) 557 -6858
- Email: info@autoblocks.co
- Location: New Jersey, USA

Warranty: 12 months of mechanical spare parts replacement against manufactured defects not including labor. See section 10 for warranty terms and conditions.

11 Terms and Conditions / Warranty

THESE TERMS AND CONDITIONS OF SALE GOVERN ALL SALES OF GOODS AND SERVICES BY AUTOBLOCKS INC., TO THE EXCLUSION OF OTHER TERMS AND CONDITIONS, EXCEPT AS OTHERWISE AGREED IN WRITING.

As used in these Terms and Conditions, “**Seller**” means AutoBlocks Inc., a New Jersey corporation; “**Buyer**” means the person or entity listed on the Purchase Order as the purchaser of Seller’s Products; “**Products**” means the products and/or services (including product design, integration or consulting, plus any other consulting, training or other service concerning the use, application or implementation of any Products) listed on the Purchase Order.

1. ACCEPTANCE; TERMS AND CONDITIONS. A QUOTATION IS NOT AN OFFER CAPABLE OF ACCEPTANCE BY BUYER. ONLY PURCHASE ORDERS SUBMITTED BY BUYER ARE CAPABLE OF BEING ACCEPTED BY SELLER, AND A PURCHASE ORDER IS NOT EFFECTIVE UNTIL SELLER’S AUTHORIZED REPRESENTATIVE ACCEPTS IT IN WRITING. BY SUBMITTING A PURCHASE ORDER, BUYER EXPRESSLY ACCEPTS THESE TERMS AND CONDITIONS.

2. PRICES.

(A) Prices quoted in the Purchase Order are net prices and do not include any sales, use, goods and services, value added, privilege, excise or similar taxes, whether local, state or federal, or any applicable customs or duties applicable taxes. All taxes are Buyer’s sole responsibility.

(B) Unless Seller otherwise agrees in writing, Seller’s prices are subject to change without advance notice at any time prior to Seller’s acceptance of a Purchase Order.

(C) All prices are **FOB: Fairfield, NJ**, in each case which constitutes delivery to Buyer. The risk of loss of the Products during transport shall be on the Buyer.

(D) All prices are in USD.

3. PAYMENT TERMS. Unless otherwise stated on the Purchase Order or quote, all amounts are due net 30 days following the date of the Purchase Order or invoice date, if Seller issues an invoice. For orders that exceed \$20,000, 50% of the purchase price is due upon Seller’s acceptance of the Purchase Order; 30% is due at delivery of the Products; and 20% is due at Buyer’s acceptance of the Products.

4. DELIVERY. Unless otherwise provided in the Purchase Order or agreed to in writing by Buyer and Seller, time is NOT of the essence with respect to any delivery or work schedule. Seller will make reasonable commercial efforts to maintain the shipping schedule stated in a Purchase Order that Seller accepts.

5. CANCELLATION. A Purchase Order accepted by Seller is final. Buyer may not cancel, suspend, or modify a Purchase Order without Seller’s prior written consent. If Buyer requests to cancel, suspend or modify a Purchase Order, and Seller consents, then: (a) Seller may retain any partial payment Buyer has paid in respect of the Purchase Order as liquidated damages; and (b) Buyer shall pay Seller 100% of the amount of all applicable costs seller incurred prior to the cancellation of the Purchase Order and a reasonable allowance for profits. Payment is due within thirty days of the invoice date.

6. LIMITATION OF LIABILITY. Seller’s liability for all claims, damages, losses, and injuries arising out of or relating to the Seller’s performance under or breach of any of these Terms and Conditions will not exceed the amounts paid by Buyer under the Purchase Order. IN NO EVENT, WHETHER IN CONTRACT, TORT OR OTHERWISE, WILL SELLER BE LIABLE TO BUYER FOR LIQUIDATED, INDIRECT, EXEMPLARY, INCIDENTAL, SPECIAL OR CONSEQUENTIAL DAMAGES, EXPENSES OR COSTS, INCLUDING BUT NOT LIMITED TO: (1) LOSS OF PROFITS, BUSINESS OR GOODWILL; (2) LOSS OF USE OF EQUIPMENT OR FACILITIES; OR (3) LOSS RESULTING FROM UNUSABLE MACHINERY OR FACILITY DOWNTIME, HOWSOEVER CAUSED AND EVEN IF THE POTENTIAL FOR SUCH DAMAGES WAS DISCLOSED AND/OR KNOWN.

7. DISCLAIMER OF WARRANTY. THE SELLER DOES NOT WARRANT THE MERCHANTABILITY OF ITS PRODUCTS AND DOES NOT WARRANT THE FITNESS OF THE PRODUCTS FOR A PARTICULAR PURPOSE. THE SELLER DOES NOT MAKE, AND HEREBY DISCLAIMS AND EXCLUDES, ANY WARRANTY, EXPRESS OR IMPLIED, OTHER THAN THE WARRANTY CONTAINED IN SECTION 8 OF THESE TERMS AND CONDITIONS. THERE ARE NO WARRANTIES EXPRESS OR IMPLIED BEYOND THAT WHICH IS DESCRIBED BELOW.

8. WARRANTY OF GOODS MANUFACTURED BY SELLER.

Subject to the limitations and conditions set forth below, Seller warrants to Buyer that the Products will be of merchantable quality and free from defects in material or workmanship under normal use and prescribed maintenance (the “**Warranty**”). This Warranty extends only to the Buyer (i.e., the original purchaser) and is not transferable; any

purported transfer is void. The Warranty begins on the delivery date and ends on the delivery date's one-year anniversary (the "Warranty Period").

9. **EXCLUSIVE REMEDY.** Buyer's exclusive remedy for Seller's breach of the Warranty is, in Seller's sole discretion, either (a) repair by Seller, (b) replacement by Seller of non-conforming goods with conforming goods, F.O.B. Fairfield, NJ [with transportation prepaid to U.S. destination or domestic port] or (c) Seller providing, F.O.B. Fairfield, NJ [with transportation prepaid to U.S. destination or domestic port], a part or item of equipment to replace any part or item of equipment which is proved to have been defective. The seller has the option of requiring the return of any defective material transportation prepaid to establish a claim.

10. **LIMITATIONS OF WARRANTY.**

(A) Seller will not be liable for breach of the Warranty: (i) unless the Products have been properly installed, used, maintained and serviced, in each compliance with instructions for use or maintenance of the machine as instructed by Seller and/or as set forth in the operating instructions; (ii) for normal wear and tear; (iii) negligence, misuse or neglect; (iv) unless Buyer informs Seller in writing within 10 days of the discovery of the defect within the Warranty Period; and/or (v) with respect to Products or component parts or accessories that Seller did not manufacture. Buyer is responsible for keeping proper records of operation and maintenance during the Warranty Period in the form of log sheets and shall provide copies to Seller upon its request.

(C) For Component Preparation Services, Seller is not liable for damaging Buyer's parts.

(D) Seller makes no representation regarding compliance with any state, provincial, or local law, rules, regulations, building code or ordinance relating to the installation or operation of the Equipment.

(E) There are no third-party beneficiaries of the Warranty.

(F) Seller has not authorized any party to make any representation or warranty other than the Warranty.

11. **WARRANTY OF OTHER MANUFACTURER'S PRODUCTS.** The Warranty does not include any components, parts or accessories that Seller did not manufacture, including but not limited to bearings, valves, seals and electrical components. SELLER MAKES NO WARRANTY, EXPRESSED OR IMPLIED, INCLUDING, WITHOUT LIMITATION, AS TO THE MERCHANTABILITY OF GOODS MANUFACTURED BY ITS SUPPLIERS.

12. **FIELD SERVICE ASSISTANCE.**

(A) All requests for field service must be confirmed by a Purchase Order. One day of service including travel time from Seller's offices to a customer's facility and return is included in our minimum service charge of \$2500.00.

(B) Additional days of field service are billed at \$1300 per additional day after the first day. For example, billing for three days of installation would include \$2500 for travel day(s) and first day of field service, plus \$1300 x (2) for each additional day of field service plus the airfare, accommodations, and meals for 3 days of service.

(C) In addition to daily rates for service, Buyer shall reimburse Seller for all actual travel and living expenses incurred by Seller and its representatives, from the time Seller's representative(s) leave his/her home base to the time of return to that base.

(D) All services rates quoted in this Section 12 are exclusive of materials and replacement parts. Materials and replacement parts will be replaced at the usual cost of individual items. 13. **RIGGING AND LIFTING.** AutoBlocks will not rig or lift any equipment of any kind. The customer must provide and pay for a certified rigger to safely move any heavy equipment.

14. **ELECTRICIAN.** AutoBlocks will not disconnect, connect, or work on any voltage above 240V. A certified electrician must be supplied by the site to work on any systems above 240V with AutoBlocks' supervision.

15. **SHIPPING AND DELIVERY.** Unless otherwise provided in the Purchase Order or in any other agreement between Buyer and Seller, time shall NOT be of the essence with respect to any delivery or work schedule hereunder. Seller will make reasonable commercial efforts to maintain the shipping schedule agreed upon at time Seller accepts the Purchase Order, but is not liable for any damages, losses, or charges arising out of delays in shipment or other non-performance, including delays caused by (a) strikes, fires, disasters, riots, or acts of God; (b) Buyer's acts or omissions, (c) shortages of labor, fuel, power, materials, supplies, transportation, or facilities, (d) government actions, or (e) subcontractor or supplier delays.

16. **INDEMNITY.** Buyer shall indemnify and hold harmless Seller, its agents, and employees, from and against all suits, actions, legal or administrative proceedings, claims, demands, judgments, liabilities, losses, damages, interest, attorney fees, costs and expenses arising out of or related to (a) the Products, (b) Buyer's negligence or breach of these Terms and Conditions or the negligence or breach of these Terms and Conditions of anyone acting under Buyer's direction or control.

17. **ASSIGNMENT AND DELEGATION.** Buyer shall not assign its rights or delegate its obligations under a Purchase Order or these Terms and Conditions to any other person without the written consent of Seller. Any attempted assignment or delegation by Buyer in violation of this Section 15 is void. The seller may assign its rights, delegate its performance, and/or subcontract all or part of the Products subject to a Purchase Order.

18. **TITLE.** Title to the Products will transfer to Buyer on the earlier of full payment and delivery. If delivery occurs prior to full payment, Seller shall retain a security interest in the Products until the Seller receives payment in full.

19. **COMPLIANCE WITH LAWS.** Buyer acknowledges that the Products may be subject to export and other foreign trade controls restricting resales and/or transfers to other countries and parties, including, but not limited to, licensing requirements under applicable laws and regulations of the United States (together, "Trade Control Laws"). Buyer shall: (a) not export, re-export, transfer, or otherwise dispose of the Products directly or indirectly, except as permitted by applicable Trade Control Laws; (b) not do anything that would cause the Seller or its affiliates to breach applicable Trade Control Laws; and (c) shall protect, indemnify and hold harmless the Seller and its affiliates from any fines, damages, costs, losses, liabilities, penalties, and expenses incurred by the Seller as a result of Buyer's failure to comply with this Section 17.

20. **GOVERNING LAW; JURISDICTION.** The laws of the State of New Jersey (without regard to its conflicts of laws principles), including its Uniform Commercial Code, govern the Purchase Order and these Terms and Conditions. Buyer consents to the exclusive jurisdiction of the state and federal courts in Essex County, New Jersey, and agree that venue in Essex County, New Jersey is proper for the resolution of any disputes arising under the Purchase Order or these Terms and Conditions.

21. **SEVERABILITY.** In the event that a court of competent jurisdiction finds that any provision of the Purchase Order or these Terms and Conditions is declared invalid or unenforceable for any reason, then that provision will be severed from the remainder of this Agreement, which will remain in full force and effect.

22. **NO WAIVER.** None of the provisions of the Purchase Order or these Terms and Conditions can be waived except in a writing signed by Seller. No failure by Seller to exercise any right under Purchase Order or these Terms and Conditions operates as a waiver of any right, and no single or partial exercise of any right precludes any other or further exercise of that right or the exercise of any other rights.

23. **NO THIRD-PARTY BENEFICIARIES.** Nothing in Purchase Order or these Terms and Conditions is intended or shall be construed to give any other person any legal or equitable right, remedy or claim under or in respect of Purchase Order or these Terms and Conditions or any provision contained herein, other than indemnitees and permitted assignees or delegates under these Terms and Conditions.

24. **RELATIONSHIP OF THE PARTIES.** The relationship of Buyer and Seller under the Purchase Order or these Terms and Conditions is solely that of independent contractors.

25. **COMPLETE AGREEMENT.** The Purchase Order and these Terms and Conditions contain the complete understanding existing between Seller and Buyer and supersede all prior written or verbal agreements or understandings (including all negotiations, term sheets, letters of intent and prior drafts of this Agreement) relating to the subject matter hereof. Neither the Purchase Order nor these Terms and Conditions Agreement may be amended or otherwise modified except by a writing signed by authorized representatives of the Seller and Buyer.