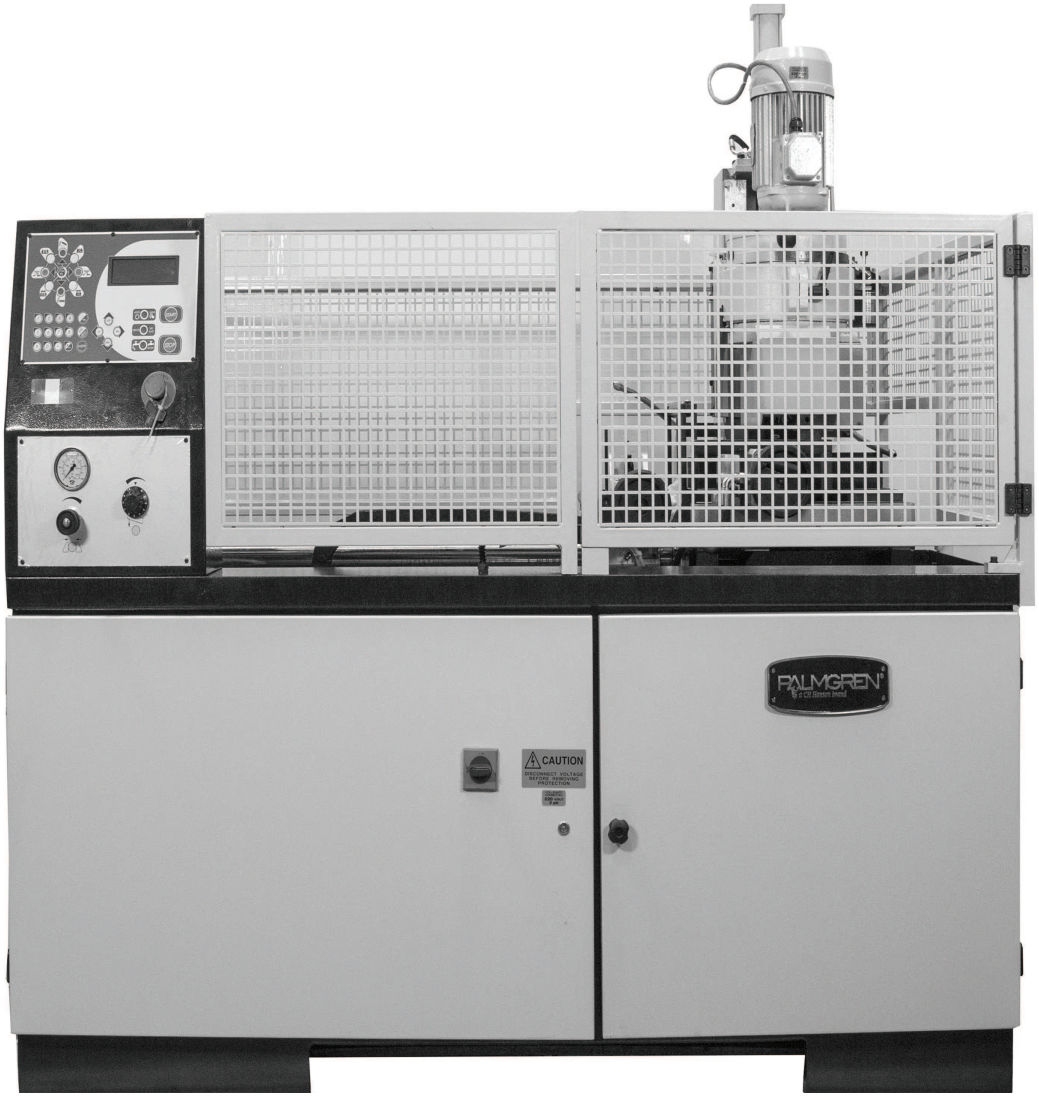
PALMGREN®

14.5” Full Automatic Cold Saw



Model 9683339

9645265.01

PALMGREN®

PLEASE READ AND SAVE THESE INSTRUCTIONS. READ CAREFULLY BEFORE ATTEMPTING TO ASSEMBLE, INSTALL, OPERATE OR MAINTAIN THE PRODUCT DESCRIBED.

PROTECT YOURSELF AND OTHERS BY OBSERVING ALL SAFETY INFORMATION. FAILURE TO COMPLY WITH INSTRUCTIONS COULD RESULT IN PERSONAL INJURY AND/OR PROPERTY DAMAGE! RETAIN INSTRUCTIONS FOR FUTURE REFERENCE.

PLEASE REFER TO BACK COVER FOR INFORMATION REGARDING PALMGREN'S WARRANTY AND OTHER IMPORTANT INFORMATION.

Model #: _____

Serial #: _____

Purch. Date: _____

GETTING STARTED

Save this manual

You will need this manual for the safety warnings and precautions, assembly instructions, operating and maintenance procedures, parts lists and diagrams. Keep your invoice with this manual. Write the invoice number on the inside of the front cover. Keep this manual and invoice in a safe and dry place for future reference.

Structural requirements

Make sure all supporting structures and load attaching devices are strong enough to hold intended loads. If in doubt, consult a qualified structural engineer.

Electrical requirements

This saw does not come with a plug, and can be wired to a plug or directly into the power main. The blue wire is neutral, brown is line wire, and yellow with a green stripe is ground.

The circuit must be configured to provide 230VAC at 14A, 3-phase, 60 Hz.

Tools needed

Standard professional mechanic's hand tool set.

UNPACKING

⚠ WARNING ***Be careful not to touch overhead power lines, piping, lighting, etc. if lifting equipment is used. Cold Saw weighs approximately 1984 lb. (902 kg); proper tools, equipment and qualified personnel should be employed in all phases of unpacking and installation.***

Carton should be handled with care to avoid damage from dropping, bumping, etc. Store and unpack carton with correct side up. Unpack all parts from the container. Check for damage as each piece is removed. Especially check the tubing located at the bottom of the motor for kinks, cuts, or other damage that would be detrimental to coolant flow.

⚠ WARNING ***Never use highly volatile solvents. Non flammable solvents are recommended to avoid possible fire hazard. Avoid getting cleaning solution on paint as it may tend to deteriorate these finishes. Use soap and water on painted components.***

The 9680199 circular saw for ferrous metals is made from a solid casting, carefully machined and provided with mounting holes. The upper surface has been worked using precision machinery to allow the attachment of a sturdy vise with burr-proof jaws.

The numerical control device allows the required length to be preset and provides high repeated-cut precision. The cast-iron blade-holding head is a reduction unit in oil bath built onto the motor. The coolant pump is installed on a tank located inside the machine platform.

The main switch is located on the front panel. Another switch is used to select motor rotation speed and therefore cutting speed. The blade guard protects the operator from ejected shavings and coolant. The machine is supplied with a set of service wrenches.

IMPORTANT: The unpainted steel surfaces have been coated with a protective coating. To ensure proper fit and operation, remove the coating before use. Coating can be easily removed with mild solvents, such as mineral spirits, and a soft cloth. Avoid getting solvent on paint or any of the rubber/plastic parts. Solvents may deteriorate these finishes. Use soap and water on paint, plastic or rubber components. After cleaning, cover all exposed surfaces with a light coating of oil.

Package Contents:

Main unit	1
Length stop assembly	1
• long rod	
• short rod	
• length stop rod	
Roller assembly	1
Roller stand legs	1
Manual	1

Unpack

Remove all packing materials, but leave unit attached to its pallet. Do not discard packing materials until after the machine has been inspected for damage and completeness. Locate loose parts and set aside.

Inspect

After unpacking the unit, carefully inspect for any damage that may have occurred during transit. Check for loose, missing or damaged parts. Shipping damage claims must be filed with the carrier.

All tools should be visually inspected before use, in addition to regular periodic maintenance inspections.

Be sure that the voltage labeled on the unit matches your power supply.

See General Safety Instructions, Cautions and Warnings as shown.

SAFETY RULES

⚠ WARNING ***Completely read and understand this owner's manual before assembly or tool operation. Read and understand the warnings shown on the machine and in this manual. Failure to comply with all of these warnings may cause serious injury or death.***

PROPOSITION 65 WARNING: Some dust created by using power tools contain chemicals known to the state of California to cause cancer, birth defects or other reproductive harm.

Some examples of these chemicals are:

- Lead from lead-based paints
- Crystalline silica from bricks and cement and other masonry products.
- Arsenic and chromium from chemically-treated lumber.

Your risk from these exposures varies, depending on how often you do this type of work. To reduce your exposure to these chemicals: work in a well-ventilated area and work with approved safety equipment. Always wear an **OSHA/NIOSH** approved, properly fitting face mask or respirator when using such tools.

⚠ WARNING ***Always follow proper operating procedures as defined in this manual even if you are familiar with the use of this or similar tools. Remember that being careless for even a fraction of a second can result in severe personal injury.***

- Wear appropriate clothing. The operator's clothing should not be loose or dangling nor should it have parts which could get caught. Sleeves should contain elastic. Belts, rings or chains should not be worn. Long hair should be kept in a net.
- Avoid unstable operating positions. Find a safe and evenly balanced position to operate the machine.
- Keep the work area tidy, untidiness increases the risk of accidents.
- Do not use the power supply cable to disconnect the plug from the socket. Protect the cable from high temperatures, oil or sharp edges. For outdoor use, only use extension cables which comply with current regulations.

PREPARING FOR YOUR JOB

- Wear proper apparel. Do not wear loose clothing, neckties, rings, bracelets or other jewelry which may get caught in moving parts of machine.
- Gloves should always be worn.
- Wear protective hair covering to contain long hair.
- Wear safety shoes with non-slip soles.
- Wear safety glasses complying with United States ANSI Z87.1. Everyday glasses have only impact resistant lenses. They are **NOT** safety glasses. Use guards and eye shields.
- Wear face mask or dust mask if operation is dusty.
- Wear ANSI approved ear protection for extended operation.
- Be alert and think clearly. Never operate power tools when tired, intoxicated or when taking medications that cause drowsiness.
- Focus your attention completely on your work. Looking around, careless actions and other distractions can result in serious injury.
- The removal of guards or tampering with the safety features is strictly forbidden.
- The machine should not be cleaned with liquids under pressure.
- In the event of fire, extinguishers should not be used unless they are Class C or Halon powder type. Always disconnect electric power to the machine in these circumstances.
- Do not insert foreign bodies into the motor cover and do not tamper with the safety microswitches or main switch.
- Take the necessary precautions to prevent the machine being started by other people during loading, adjustment, piece changing or cleaning .

Preparing the work area for your job

- Keep work area clean. Cluttered work areas invite accidents.
- Do not use power tools in dangerous environments or damp or wet locations. Do not expose power tools to rain.
- Work area should be properly lighted.
- Keep visitors at a safe distance from work area.
- Keep children out of workplace. Make workshop childproof.

Maintaining your tool

- Failure to follow the guidelines in this manual can result in serious injury.
- Disconnect power from the machine before performing any service, maintenance, repair or adjustments.
- Follow OSHA lock-out, tag-out procedures to prevent accidental machine starts.
- Consult this manual for the proper use, specific maintenance, and adjustment procedures.
- Keep machine lubricated and clean for safest operation.
- Read and understand warnings posted on the machine and in this manual. Replace the warning labels if they become obscured or removed. Failure to comply with all of these warnings can result in serious injury.
- Before using the machine, check for damaged parts. Check for alignment of moving parts, binding, breakage, mounting issues and any other conditions that may affect operation.
- A guard or other part that is damaged should be properly repaired or replaced. Do not perform makeshift repairs. (Use parts list provided to order repair parts.)
- Use compressed air or a suitable brush to clear chips or debris — do not use your hands.
- Remove adjusting tools. Always check to see that adjusting tools are removed before switching machine on.

Know how to use your tool

⚠ WARNING ***The operation of any tool can result in foreign objects being thrown into the eyes, which can result in severe eye damage. Always wear safety goggles complying with United States ANSI Z87.1. before starting power tool operation.***

Think safety! Safety is a combination of operator common sense and alertness at all times when tool is being used.

- Use the right tool for the job. Do not force a tool or attachment to do a job for which it was not designed.
- Disconnect power before changing the blade.
- Avoid accidental start-up. Make sure that the tool power switch is in the OFF position before plugging in.
- Do not force tool. It will work most efficiently at the rate for which it was designed.
- Keep hands away from moving parts and cutting surfaces.
- Never leave tool running unattended. Turn the power off and do not leave tool until it comes to a complete stop.
- Do not overreach. Keep proper footing and balance.
- Never stand on tool. Serious injury could occur if tool is tipped or if blade is unintentionally contacted.
- Know your tool. Learn the saw's operation, application and specific limitations.
- Use recommended accessories. Use of improper accessories may cause risk of injury to persons.
- Handle work piece correctly. Protect hands from possible injury.
- Turn machine off if it jams. Blade jams when it digs too deeply into work piece. (Motor force keeps it stuck in the work.) Do not remove jammed or cut off pieces until the saw is turned off, unplugged and the blade has stopped.
- Adjust upper guide to just clear work piece.
- Hold work piece firmly against vise.
- DIRECTION OF FEED: Feed work into a blade or cutter against the direction of rotation of the blade or cutter only.

SPECIFICATIONS

The saw features a solid cast iron vise for durability. The saw is equipped with a miter gauge for performing many different operations.

Model	9683339
Description	14.5" Full Auto Cold Saw
Blade Dimensions	14.5"
Blade thickness	0.1"
Arbor diameter	1.26"
Blade speed	25-50 rpm
Machine dimensions	77"x52"x76"
Base footprint	77"x52"
Machine weight	1984 lbs (902 kg)
Miter angle range	135°
Cutting angle	90° right - 45° left
Voltage	230 VAC, 3-phase
Current	16 Amps
HP	3.2 HP
Motor RPM	1400-2800
Max vise opening	10"
Vise height from floor	37.375"
Coolant tank capacity	18 liters

Round Tube Cutting Capacities
@90° (Straight Cut): 5.12"
@45° Left/Right: 5.12"
@ 60° Right: 3-1/2"
Square Tube Cutting Capacities
@ 90° (Straight Cut): 4.72" x 4.72"
@ 45° Left/Right: 4.72" x 4.72"
@ 60° Right: 3-1/2"
Solid Round Cutting Capacities
@ 90° (Straight Cut): 5.12"
@ 45° Left/Right: 5.12"
@ 60° Right: 3-1/2"
Rectangular Tube Cutting Capacities
@ 90° (Straight Cut): 4.72" x 4.72"
@ 45° Left/Right: 4.72" x 4.72"
@60° Right: 3-1/2" x 3-1/2"

ASSEMBLY/INSTALLATION

Location

The saw must be installed on a structurally stable floor. The coolant pump output and inputs may extend below the coolant tank when the saw is at rest. Ensure that coolant flow is not restricted throughout saw movement range. The saw's rest position may be adjusted by changing the set bolt's height.

Position the saw on a clean dry floor.

Machine dimensions

The following figure shows the approximate dimensions of the saw and its parts. When determining a final location for your saw, ensure there is enough clearance for both the operator and for technicians who will service the saw. Also,consider the size of large work pieces that may extend beyond the saw's table and require extra space.

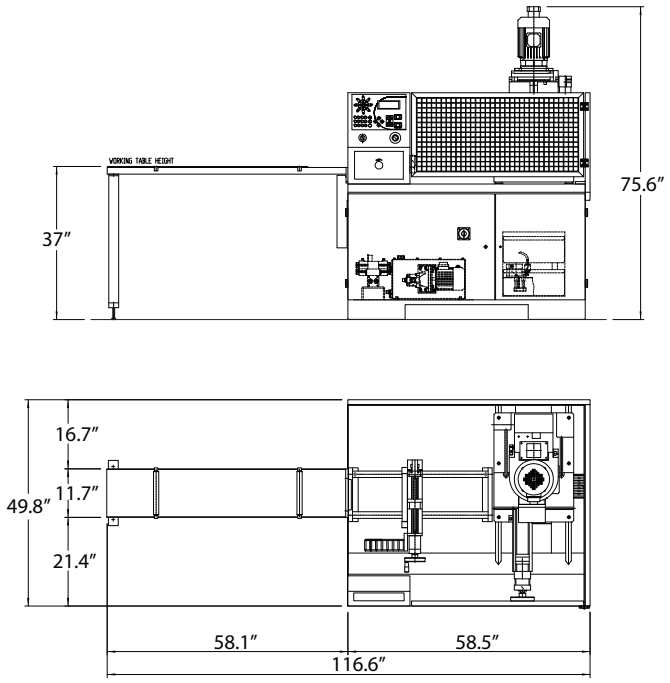


Figure 1. Dimensions

Lifting and setting up the saw

⚠ WARNING ***Make certain that slings, cables, chains, forklifts or other load suspending gear or machines used to move this saw are properly rated to handle the weight. The saw weighs 1984 lb.***

⚠ CAUTION ***The saw must be properly secured and anchored before use. Make sure that it is supported equally on all four corners.***

1. Clear the space around the saw. Leave the saw attached to the pallet.
2. Ensure sufficient space is available for operation.
3. Remove all nuts and/or bolts securing saw to the pallet.
4. The saw can be moved using a forklift as shown in the following figure.

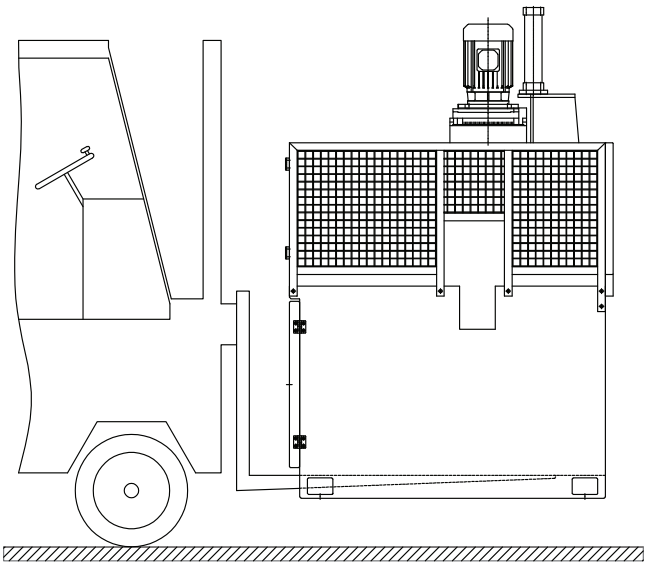


Figure 2. Transport

5. Carefully lift the saw off the pallet. Lift it no higher than necessary to clear the surface on which it is to be installed and pull the pallet out of the way. DO NOT put your hands or feet beneath the saw while moving it or removing the pallet.
6. Place the saw into its final location.
7. Level the saw using shims under the corners needing them. A highly accurate spirit or digital level should used for leveling. It is very important that the saw be properly leveled for accurate performance.

Electrical connection to the mains

NOTE: Install a differential thermomagnetic switch with characteristics suited to the mains.

⚠ WARNING ***Before machine activation check motor for correct voltage wiring.***

Make sure that the power supply voltage corresponds to the voltage on the saw's motor plate. Connect the cable to the power supply line, observing the color codes of the individual wires. Pay particular attention to the earth/ground wire. Connect the machine, make sure that the rotation of the circular blade is in the direction shown by the arrow on the guard.

Assembly: Saw blade installation

1. Remove the saw cover's 3 bolts as shown below.

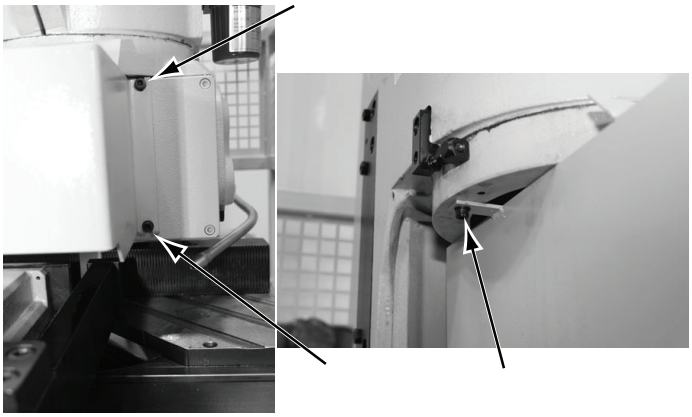


Figure 3. Saw Cover Bolts

2. Unscrew spindle nut and chip breaker/brush's nut and place saw blade on the arbor.

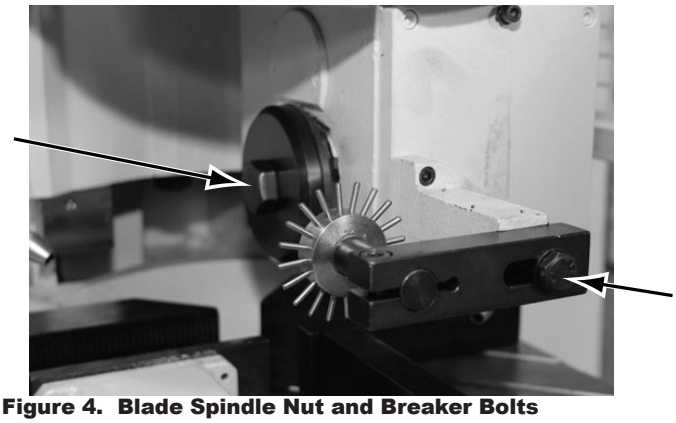


Figure 4. Blade Spindle Nut and Breaker Bolts

3. Adjust chip breaker/brush to mesh with the teeth of the saw blade. Rotate the saw to make sure they mesh well.
4. Tighten spindle nut and chip breaker/brush's nut.
5. Replace saw cover and tighten the 3 securing bolts.

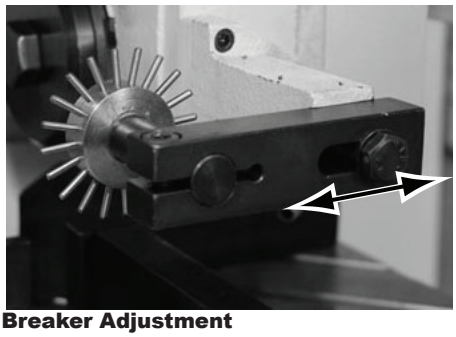


Figure 5. Breaker Adjustment

6. Finish, by tightening all the bolts and reattaching the guard cover.

SET-UP LIST

Complete the following before using the saw:

- Ensure saw blade is installed and in good working order (see "Assembly: Saw blade installation").
- Fill gearbox with oil. See "Replacement of gear box oil" on page 16.
- Fill cooling oil reservoir with oil, see "Cutting coolant" on page 16.

OPERATION

⚠ WARNING ***Always wear safety glasses complying with U.S. ANSI Z87.1 before beginning any power tool operation.***

⚠ WARNING ***To avoid injury from unexpected starting, whenever changing the saw blade or carrying out adjustments, switch the saw off and remove the power cord from the mains outlet. To avoid injury to hands when handling the saw blade, wear gloves whenever necessary.***

⚠ CAUTION ***Do not operate before properly lubricating the saw. Failure to lubricate before using can damage the saw.***

⚠ WARNING ***Power at the main power switch must be set to "O" (OFF) whenever the saw is not actively in use.***

⚠ WARNING ***Do not activate the saw if bolt (269/95) is not tightened.***

⚠ WARNING ***Do not use blades with chipped, missing or insufficiently sharp cutting edges.***

Safety checks to perform before each cut:

- Make sure that the circular blade is fastened securely by means of screw (item 269/95 on "Figure 21. Parts Diagram - Cutting Head" on page 26).
- Check that the hand indicates the required cutting angle.
- Make sure that the piece to be cut is adequately secured in the vise.
- Make sure that the coolant is circulating in the machine.
- Adjust the head stops so that the idle stroke is not too long.
- Use the adjustment screws to position the clamp vise as close as possible to the blade.
- When starting the motor, make sure that the blade rotates in the direction of the arrow.

Fault management

The controller continuously monitors fault status. A detected fault results in the instantaneous interruption of all outputs and is identified on the display. Operation cannot continue until the fault is cleared.

In **Manual/Semiautomatic** mode the **Broken Blade**, **Carriage Open** and **Handle On** faults are not interrupted. These faults block entry to **Automatic** mode. In **Automatic** mode these faults block starting an **Automatic** cycle. Pressing **Stop** returns to **Manual/Semiautomatic** mode to allow manual fault correction.

In **Automatic** mode the **Missing Bar** (material end) fault may be managed depending on the hidden fixed data "Eme.barra" that may have two values:

- **Forward:** The carriage of the fixed mobile jaw is brought in position of zeroing and the jaw is open.
- **Backward**: The carriage remains stopped and the jaw is open.

In both cases, operation is stopped until the fault is reset as instructed by the display.

CONTROLS

The saw control panel is shown below. :

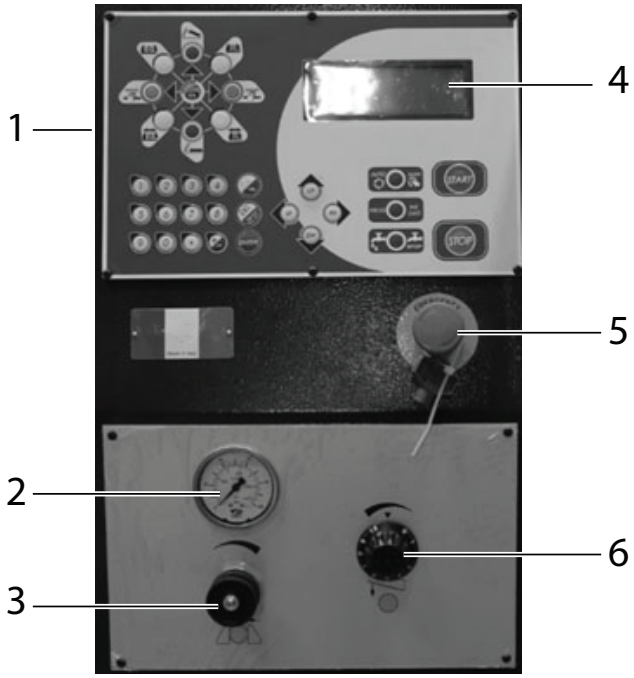


Figure 6. Control Panel

1. Membrane switch keyboard (see **Keyboard Controls** on the next page for descriptions)
2. Vise pressure gauge
3. Vise control
4. Display
5. Emergency Stop On/Off switch
6. Manual cut depth feed rate control

The following figure identifies the components that are controlled via the membrane switches and the program.

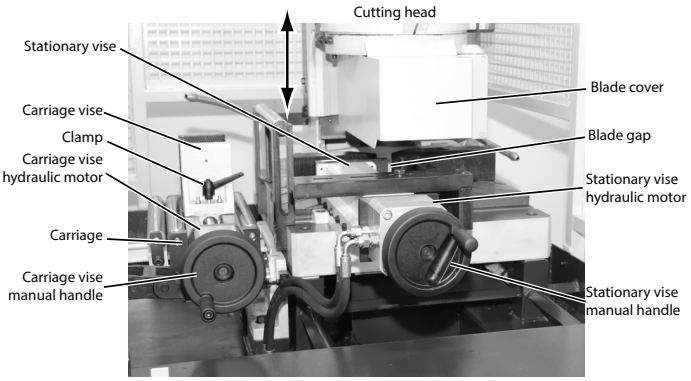
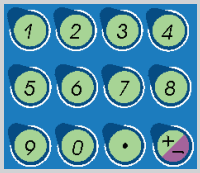
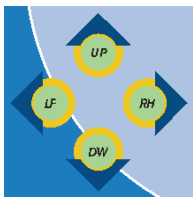
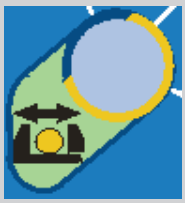


Figure 7. Components

Keyboard Controls	
Control	**Description**
	The numeric keypad allows numeric value entry including decimal point and negative numbers (+/-).
	• UP and DW allow vertical scrolling. • LF and RH provide for horizontal scrolling and to shift fields in “Test I/O” mode.
	Initiates axis position zeroing, the start of the current cycle, the confirmation of the introduction of **Level prog**. in **Manual/ Semiautomatic** mode, before the start of the cycle. When testing the outputs, it changes the status of the output selected.
	Ends zeroing of axis position; exits **Automatic** and **Manual/Semiautomatic** modes; cancels a request and interrupts an in process cycle.
	Selects **Automatic** or **Manual/ Semiautomatic** modes and toggles between them.
	• **Automatic** mode: **Data Programming** mode is active. • **Manual/Semiautomatic** mode: **Fixed Data Entering** mode is active.
	Toggles coolant pump on and off.
	Confirms numeric data entered via the keypad. In **Manual/Semiautomatic** mode the carriage level can be entered.
	• Deletes the entry in the currently active data field. • Enters **Test** mode while in **Manual/ Semiautomatic** mode and upon power ON.
	• **Automatic** mode: Changes carriage speed. • **Manual/Semiautomatic** mode: Changes carriage speed.
	• **Manual/Semiautomatic** mode: Activates the oil pump. • **Automatic** mode: Not active

Keyboard Controls	
Control	**Description**
	• **Manual/Semiautomatic** mode: Raises the saw blade. • **Automatic** mode: Not active
	• **Manual/Semiautomatic** mode: Closes the stationary vise when pressed. • **Automatic** mode: Not active
	• **Manual/Semiautomatic** mode: Advances the carriage at the speed selected by  (Fast/Slow switch) • **Automatic** mode: Not active
	• **Manual/Semiautomatic** mode: Closes the carriage vise when pressed. • **Automatic** mode: Not active
	• **Manual/Semiautomatic** mode: Lowers the blade when pressed. • **Automatic** mode: Not active
	• **Manual/Semiautomatic** mode: Opens the carriage vise when pressed. • **Automatic** mode: Not active
	• **Manual/Semiautomatic** mode: Slowly retracts the carriage when pressed. • Retracts the carriage at the speed selected by  (Fast/Slow switch) • **Automatic** mode: Not active
	• **Manual/Semiautomatic** mode: Opens the stationary vise when pressed. • **Automatic** mode: Not active

Cutting operation:

1. If required, replace the blade as outlined in “Assembly: Saw blade installation” on page 7. See “Blade Selection” on page 13 for blade selection.
2. Adjust the miter angle as required: Fully raise the cutting head, loosen the fastening handle (037/32) to allow rotation of the cutting head, rotate to the desired angle, tighten the fastening handle to secure the cutting head in place.
3. If in **Manual/Semiautomatic** mode: verify the operational settings in “Fixed data” on page 11.
4. Turn the saw on and zero the carriage as follows:

	Press to send the carriage to the start position and perform zeroing.
	Press to skip zeroing.
	Press to access the test functions, see “Test” on page 12.

5. Proceed with the appropriate mode of operation:
   - **Automatic** mode: “Automatic mode” on page 11
   - **Manual/Semiautomatic** mode: below

Manual/Semiautomatic Mode

The operator presses the key to perform the desired action, such as moving the carriage or lowering the blade to make a cut. During use, the activity is stopped by the controller if a failure occurs. In this mode, the oil pump is controlled manually using the OIL key (AGIP BLASIA 220 oil recommended).

This mode allows you to:

- Command the saw using the keys on the upper left side of the keyboard (see “Figure 6. Control Panel” on page 8 and the table “Keyboard Controls” on page 9):
  - open and close the stationary and carriage vises
  - move the carriage toward or away from the blade
  - move the carriage to an accessible position
  - move the arc of the blade to the top or to the bottom;
  - switch OFF/ON the oil pump
- Perform a cutting cycle sequence
  - blade motor switches ON
  - blade lowers and makes cut
  - blade raises and turns off
- Clean the saw: all outputs are deactivated, except the water pump and oil pump (if previously activated).

NOTE: Pressing the **STOP** button interrupts the operation and pressing the **START** button continues it.

NOTE: If a system fault is detected during operation the current action is interrupted.

To perform a cut in this mode proceed as follows:

1. Securely clamp the piece to be cut.
2. If required, press **Oil** to turn on the oil pump.
3. If required, set the depth of cut using the cut depth control (Figure 6, item 6).
4. Press **START**. The blade starts to turn and then descends until it reaches the end of the cutting stroke. It then returns to its upper start position.

NOTE: The blinking message “Cycle correctly performed” is displayed upon completion.

5. If required, to move the carriage for the next cut, press the **ENTER** button. Enter the desired value on the display’s input field. If an invalid value is entered, the entry is ignored.

NOTE: It is not possible to perform an adjustment during operation. Before starting, select LN for slow and VL for fast.

6. If required, set the speed of the carriage using the FAST / SLOW button (hare/turtle).
7. Press **START** to verify that the value entered is within range as set in “Fixed data” on page 11. If an out-of-bounds error is detected, the carriage will remain in position. Otherwise, the carriage moves up to the programmed level and the next cut will be made. The display will show a cycle complete message.
8. If required, wash swarf from the machine by pressing  for about five seconds. The message **Washing Enabling** is displayed. To exit washing, press **STOP**.

NOTE: If a fault is detected, the pump is stopped.

Fixed data

Enter **Fixed Data** mode by pressing 

The operational parameters that can be modified are as follows.

- Carriage positioning error tolerance
- BrakeUP: deceleration rate of the carriage in the forward direction
- BrakeDown: deceleration rate of the carriage in the backward direction.
- Distance from the forward travel endpoint when the carriage starts to slow down
- Distance from the backward travel endpoint when the carriage starts to slow down
- Blade thickness
- Maximum distance the carriage may travel.
- Minimum distance the carriage may travel
- Power to the blade motor during vertical movement of the cutting head
- User interface language
- Maximum blade height positioning tolerance
- Units (mm/cm/inches)

Set the appropriate value as follows:

- To enter numerical values: Use the arrow buttons to move the cursor to the appropriate field and enter the value using the numerical keypad. When done, press the **ENTER** button.
- To select an item (such as language): Press **ENTER** and scroll through the possible settings.

Automatic mode

Automatic mode performs a cut using a preset program. Up to 10 programs may be configured and stored. During operation, the controller continuously monitors the saw for faults. If a fault is detected, operation stops and a fault message is displayed.

1. To enter **Automatic** mode press  . The following are available:
   - Number (1 tp 10) of the program currently selected (“PROG N :”)
   - Number of the next action to be performed in the automatic cycle (“LIN. N :”)
   - Length of the next piece (“QP”)
   - Actual length at which the carriage is located (“QR”)
   - Number of pieces to complete the program line in progress (“Pz TO BE MADE :”)
   - Number of cut pieces completed for the current line (“Pz MADE :”)
2. Press 1 to enter the material height. Press **ENTER** to save.

In **Automatic** mode, prior to performing a programmed cut, the machine performs calibration of forward and return carriage travel. Upon successful calibration, programmed cuts are performed. For example, to perform two cuts, one of 100 mm and another of 200 mm, the material to be cut is moved 100 mm and cut is performed. The material is then moved 200 mm and the second cut is performed.

In **Automatic** mode, the following actions are available:

- Return to the **Manual/Semiautomatic** mode by pressing  ;
- Press **START** to start the program currently selected.
- Press **STOP** to end the execution of the cycle
- Scroll to the current program number using **UP** or **DW**
- Scroll to the number of the current line using **RH** or **LF**.
- Shift to the programming environment by pressing  .

⚠ CAUTION ***If an interrupted cycle is restarted by pressing* START*, the program asks if you wish to resume it. Pressing* STOP *returns the blade and carriage to the start positions. It is possible to resume a cycle after was interrupted due to a fault or power failure with the key Stop. If the cycle was interrupted due to a Material Missing fault, the cycle restarts from the point at which it was interrupted. If a heading cut was interrupted, the cycle restarts from the beginning.***

Programming

The saw can store up to 10 programs, each with a maximum of 20 configurable fields. To create program:

1. Enter **Programming** mode by pressing  The display shows the number of the currently selected program and the shape, length of cut and the number of pieces.
2. Scroll to the appropriate numeric field using the UP, DW, LF and RH.
3. Enter the appropriate value using the numeric pad.
4. When done press **ENTER**.
5. To return to **Automatic** mode press **STOP**.

Test

If it is necessary to test the saw, the diagnostic tests shown below are available. Press the **TEST** key to enter Test mode, then select the desired test using numeric keys 1 through .5 The test functions available are listed below.

TEST 1 (TEST I/O)	Tests controller inputs and outputs. After selecting **TEST 1**, scroll the number of the outputs to be tested using the left/right arrows, and change their status by pressing **START**. The line **IN :** indicates the status of the inputs detected.
TEST 2 (TEST KEYBOARD)	Tests keyboard functionality, After selecting **TEST 2,** press a key and confirm its function is displayed. NOTE: Test the **STOP** key last by pressing and holding **STOP** and confirming that STOP appears on the display. Releasing the **STOP** key exits the keyboard test.
TEST 3 (ZEROING RAM)	Sets all user program memory (RAM) to zero.
TEST 4	Displays the controller software version.
TEST 5 (CONTRAST)	Tests and adjusts display contrast. Press RH or LF to adjust the contrast as required.

The following tables provide information about the available tests. See “Connector Pinouts” on page 23 for contact information for the specific contact referenced in the **Pin** column.

Input Tests

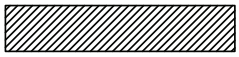
Test	Pin	Input Description
1	41	De-activation of this input interrupts the current cycle and the message **Emergency Button** is displayed.
2	42	Activation of this input interrupts the current cycle and the message **Motor thermal switch** is displayed.
3	43	De-activation of this input interrupts the current cycle and the message **Blade rupture** is displayed.
4	44	De-activation of this input interrupts the current cycle and the message **Carter Open** is displayed.
8	48	De-activation of this input signals that the maximum limit forward of the carriage has been reached.
9	51	De-activation of this input signals that the carriage maximum limit backward has been reached.
10	52	De-activation of this input signals that the blade upper limit has been reached.
11	53	De-activation of this input signals that the blade lower limit has been reached.
12	54	De-activation of this input signals that a clamping jaw piece is missing..
13	55	De-activation of this input interrupts the current cycle and the message **Handle is displayed**.
14	56	Activation of this input interrupts the current cycle and the message **Oil Thermal Switch**
16	58	Activation of this input interrupts the current cycle and the message **Fan/Chip Therm**.

Output Tests

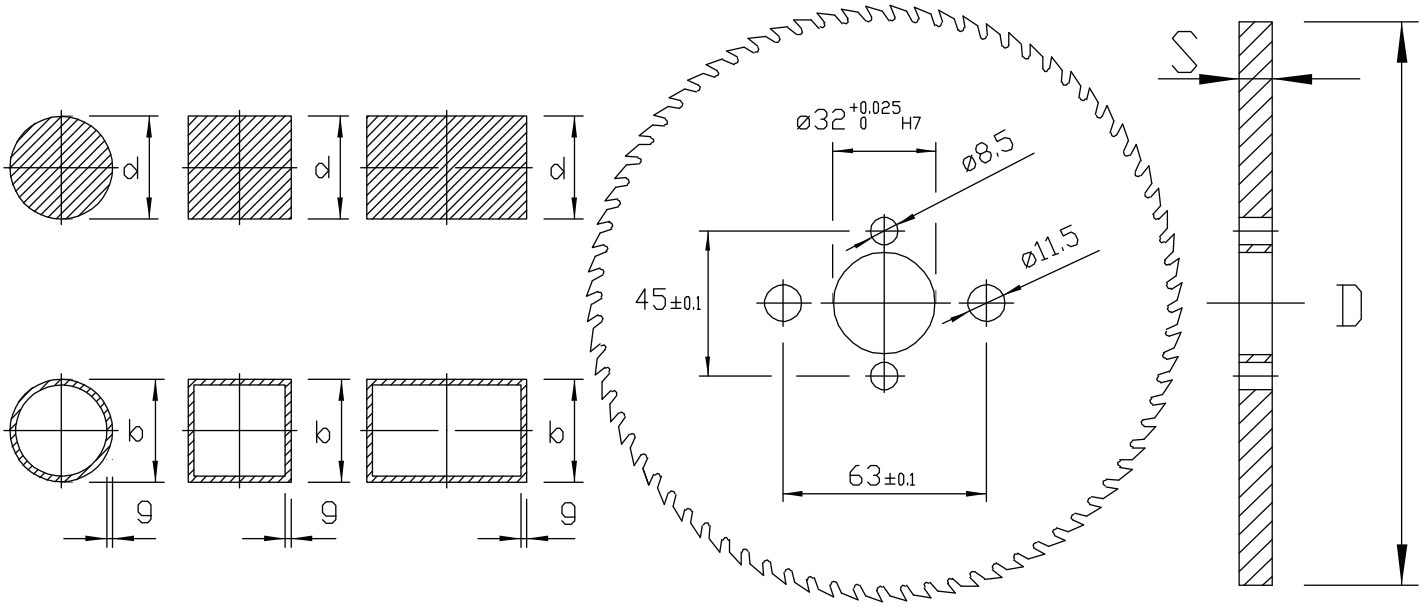
Test	Pin	Output Description
1	21	Command carriage FORWARD SLOW
2	22	Command carriage BACKWARD SLOW
3	23	Not used
4	24	Not used
5	25	Command blade up
6	26	Commands descent of the blade
7	27	Commands activation of the blade motor (enabling)
8	28	Commands activation of the oil pump
9	31	Not used
10	32	Commands opening or closing of the piece-blocking jaw
11	33	Commands activation of the water pump
12	34	Commands carriage fast forward
13	35	Commands carriage fast backward
14	36	Commands chips cleaning.
15	37	Not used
16	38	Not used

BLADE SELECTION

NOTE: Best performance of worm screw worm wheel gearing is guaranteed when circular saw blades with drawing-holes are used.

Cutting Capacity (values in parentheses are in mm)				
Cut				
90º	1.18” (30)	2.56” (65)	2.17” x 2.17” (55 x 55)	1.77” x 2.76” (45 x 70)
45º	1.18” (30)	2.36” (60)	1.97” x 1.97” (50 x 50)	1.57” x 2.36” (40 X 60)

Blade Selection (values in parentheses are in mm)					
Diameter		**9” (229)**	**10” (254)**	**14” (356)**	**14.5” (370)**
Thickness		**0.07” (1.8)**	**0.08” (2)**	**0.12” (3)**	**0.12” (3)**
b=0.39”-3.15” (10-80)	t	0.12” (3)	0.12” (3)	0.12” (3)	0.12” (3)
g<0.08” (2)	z	230	250	350	370
b= 0.39”-3.15” (10-80)	t	0.20” (5)	0.20” (5)	0.20” (5)	0.20” (5)
g=0.08”-0.16” (2-4) d=0.39”-0.71” (10-18)	z	140	160	220	230
b= 0.39”-3.15” (20-80)	t	0.31” (8)	0.31” (8)	0.31” (8)	0.31” (8)
g=0.16”-0.39” (4-10) d=0.71”-1.18” (18-30)	z	90	100	140	150
d=1.18”-1.57” (30-40)	t	0.39” (10)	0.39” (10)	0.39” (10)	0.39” (10)
	z	70	80	110	120
d>1.57” (40)	t			0.47” (12)	0.47” (12)
	z			90	90
NOTE: t = toothing pitch, z = tooth count					



TROUBLESHOOTING GUIDE

Symptom	Possible Cause(s)	Corrective Action
Teeth breaking	Coolant flow problem	Ensure proper coolant flow; hoses unclogged; nozzles pointed correctly, etc. Make sure coolant type is suitable for the saw.
	Material too hard	Check the blade speed and the type of blade you are using. Also be aware of feed pressure.
	Blade not worn-in correctly	With a new blade it is necessary to start cutting at half feeding speed. After the wearing-in period (a cutting surface of about 300 cm^2 for hard materials and about 1000 cm^2 for soft materials) the blade and feed speeds can be raised to normal values.
	Blade with excessively fine tooth pitch	The swarf wedges into the bottom of the teeth causing excessive pressure on the teeth themselves. Use a blade with coarser tooth pitch.
	New blade inserted in a partially completed cut	The surface of the cut may have undergone work hardening. When starting work again, use a lower blade speed and reduced feed pressure. A tooth from the old blade may be left in the cut: check and remove before starting work again.
	Work piece not clamped firmly in place	Any movement of the work piece during cutting can cause broken teeth: check the vises, jaws and clamping pressure.
Rapid tooth wear	Feed speed too slow	The blade runs over the material without removing it: increase feed speed.
	Blade speed too high	The teeth slide over the material without cutting it: reduce the blade speed.
	Insufficient coolant	Check the coolant level and clean coolant lines and nozzles.
	Incorrect fluid concentration	Check and use the correct concentration.
	Material defective	The materials may present altered zones either on the surface, such as oxides or sand, or in section, such as under-cooled inclusions. These zones, which are much harder than the blade, cause the teeth to break. Discard or clean these materials.
Broken blade	Blade speed too high	Reduce blade speed.
	Teeth in contact with material before starting the cut	Always check the position of the blade before starting a new job.
	Insufficient coolant	Check the coolant level and clean coolant lines and nozzles.
Cuts not straight	Feed speed too high	Reduce feed speed.
	Blade not perpendicular to work piece.	Adjust blade tracking according to instructions. If this proves unsuccessful, contact Dayton technical support.
Green pilot lamp not lit when ON button pressed	No incoming power	Check connections at machine and power source.
	Lamp fuse or bulb is out	Replace fuse/bulb.

Symptom	Possible Cause(s)	Corrective Action
Motor will not turn	Emergency stop engaged	Rotate Emergency Stop button to disengage.
	Electrical power supply	Check: the phases; the cables; the plug; the socket. Also check that the motor connections are in place.
	Trigger switch not activating	Check that socket/plug connection from handle to motor is inserted correctly; check micro-switch in trigger.
	Transformer	Check that the voltages are present both on the input and output. Otherwise replace.
	Magnetic contactor	Check that the phases in it are present both on the input and output, that it is not jammed, that it closes when powered and that it is not causing short circuits. Change if any of these problems are found.
	Thermal relay	Make sure it is closed, i.e. check that the phases are present in input and output, that it is not causing short circuits and responds when the reset coil is closed. If it has tripped to protect the motor, check the amperage setting, reset, and check the motor. Change if necessary.
	Motor	Check that it has not burned out, that it turns freely and that there is no moisture in the connection terminal board box. The winding can be rewound or replaced by experienced motor repair personnel.

MAINTENANCE/REPAIR

Cutting coolant

Before use, fill the blade coolant drawer in the lower cabinet with a mixture of water and 5-7% AGIP AQUAMET 700 EP oil (Figure 8).

Figure 8. Coolant Drawer

General safety measures

- Lockable main switch: Open the padlock in the event of machine failure or replacement of the circular blade. The padlock key should be entrusted to a responsible person.
- Use Lock-out/Tag-out procedures before carrying out any work on electrical equipment.
- Only use cables to supply power, which have a cross-section suited to the power of the machine. Contact the manufacturer.
- Restrict key access to authorized personnel only. Do not leave the keys for access to hydraulic or electrical parts or keys to lockable switches within reach of unauthorized personnel.
- Repairs should only be carried out by authorized personnel. To help prevent damage or injury, use only spare parts made by the original manufacturer.

Routine maintenance

Replacement of gear box oil

Used oil should;d be drained into a container labeled to indicate the contents for proper disposal. Remove the oil drain cap and the oil filler cap and allow used oil to drain. Replace the oil drain cap. Fill the gear box with 8 liters of oil (AGIP BLASIA 220 recommended) using the oil feed hole located on the upper part of the gear box, and then replace the oil filler cap .

Lubrication of the mobile parts of the piece clamping vise

Remove the jaw (035/15) (see “Figure 26. Parts Diagram - Horizontal Vise” on page 33) , withdraw vise (005/20) completely by turning hand wheel (072/36) . Clean and grease the parts worked by the vise support (004/20) and vise (005/20).

Cleaning of coolant tank and the swarf collection tray

Empty the swarf collection tray and the coolant tank and keep the waste materials for future disposal. Clean out the shavings and the metallic powder, taking care not to scatter this over the machine especially around the motor and the box containing the electrical equipment. Fill the tank with the amount and liquid stated previously (18 liters).

Adjustment of slides

The slides of the head are tempered and ground. The adjustment has been made by the manufacturer but play may form after some time. This space can be eliminated with a screw (“Figure 24. Parts Diagram - Column” on page 30) .

Suggested Maintenance Schedule

FREQUENCY (working hours)	OPERATION
1000 hrs or monthly	Replace the oil in the gear box with AGIP BLASIA 220 oil (4 liters) or equivalent .
1000 hrs or monthly	Lubricate the mobile parts of the piece clamping vise and the head sliding surfaces using GREASE AGIP MU 2.
50 hrs or every 2 days	Clean coolant tank and check coolant emulsion level.
As required	Adjust slides

Hydraulics

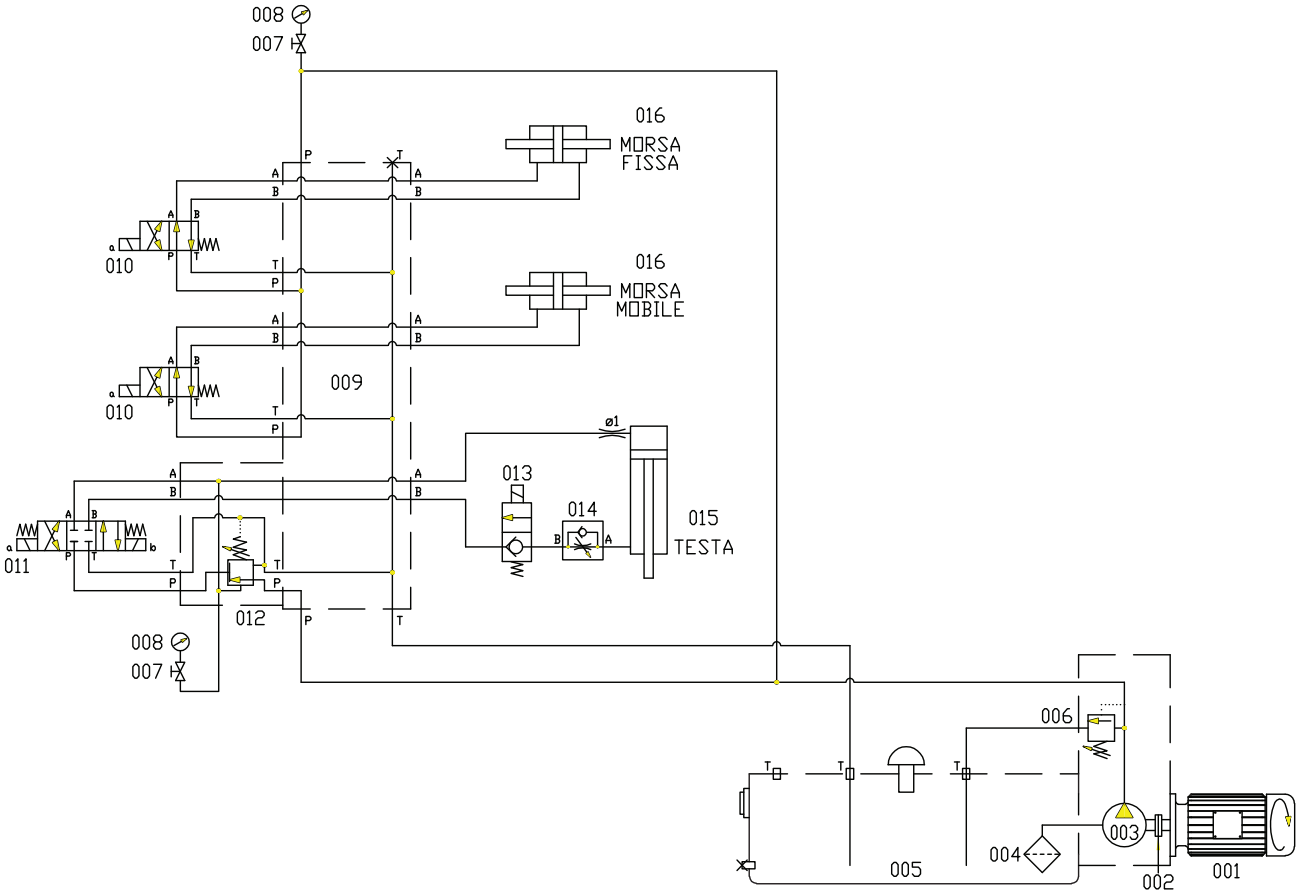


Figure 9. Hydraulic System Schematic

Wiring

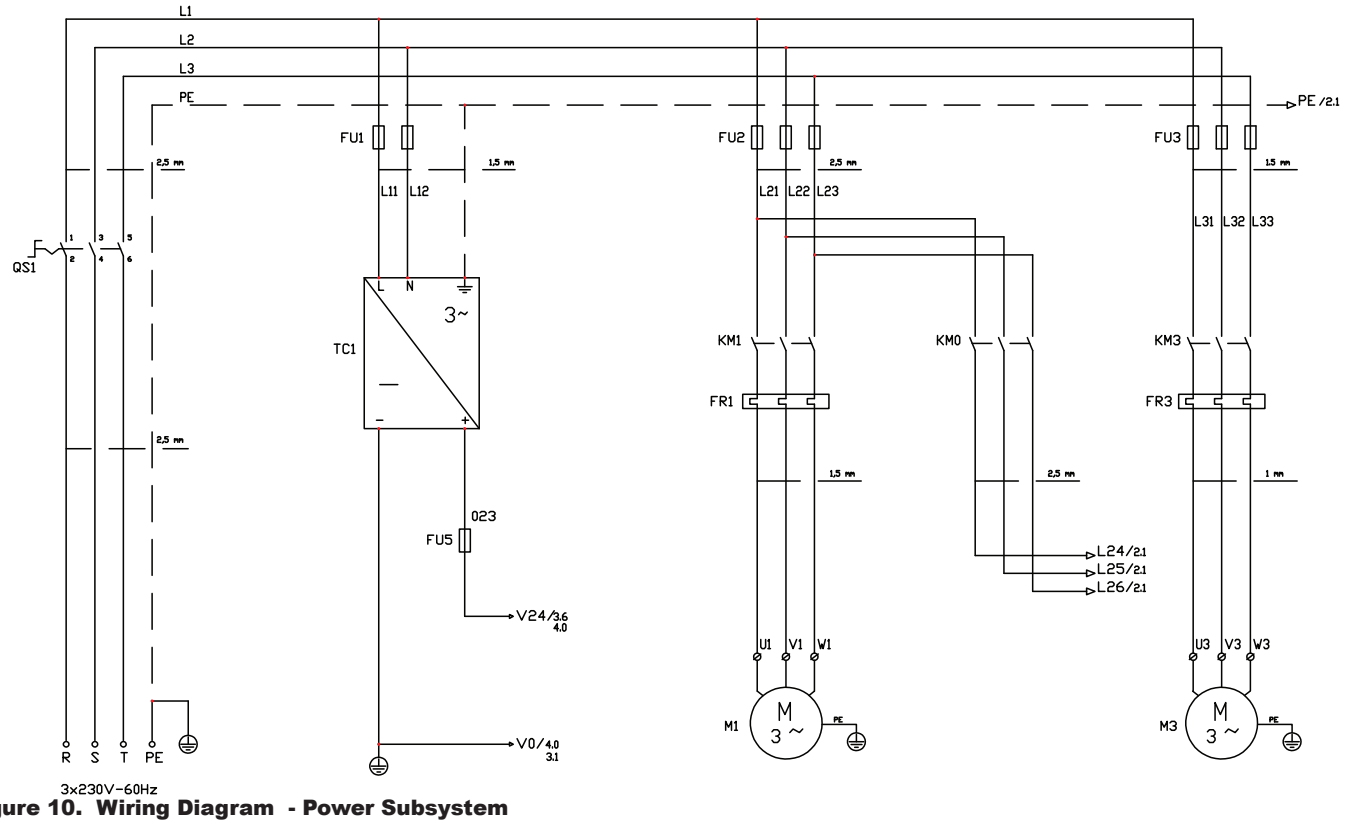


Figure 10. Wiring Diagram - Power Subsystem

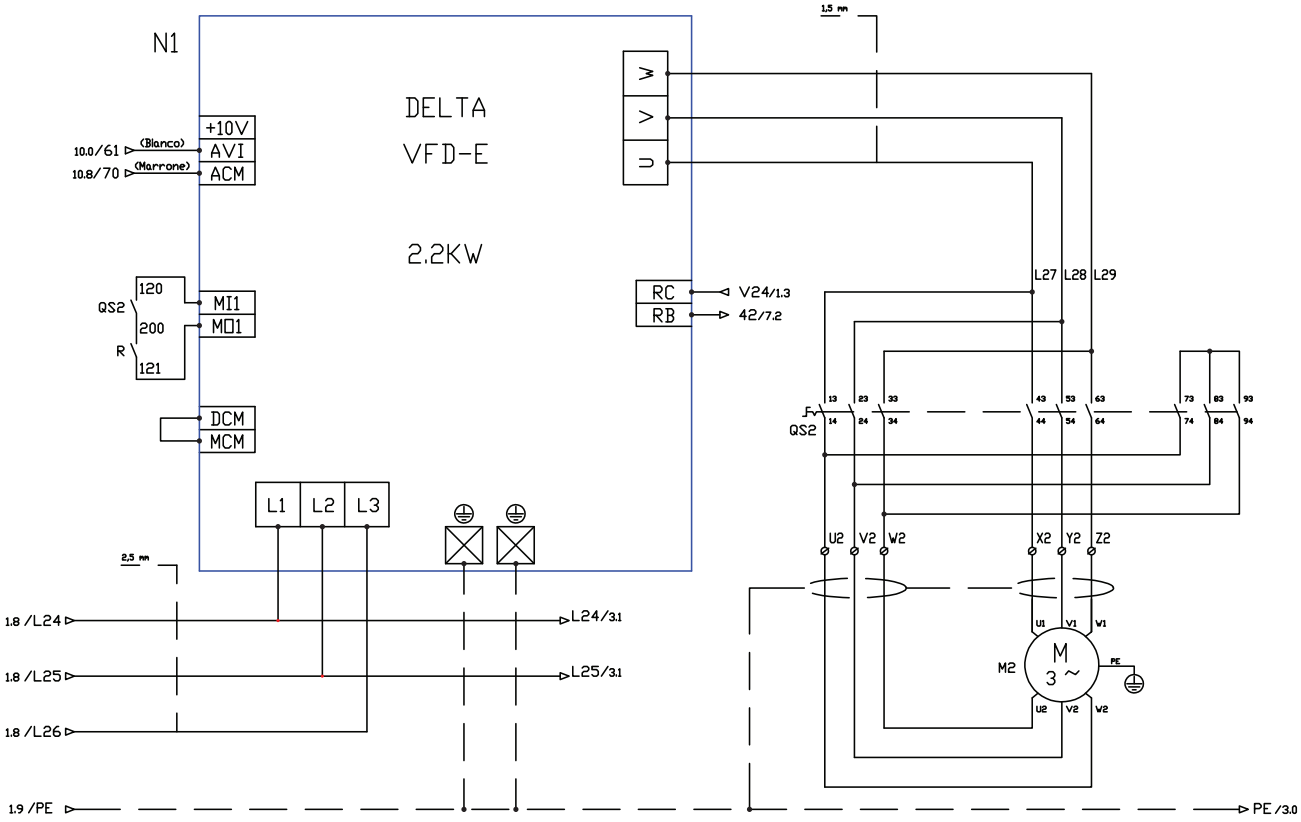


Figure 11. Wiring Diagram - Power Subsystem

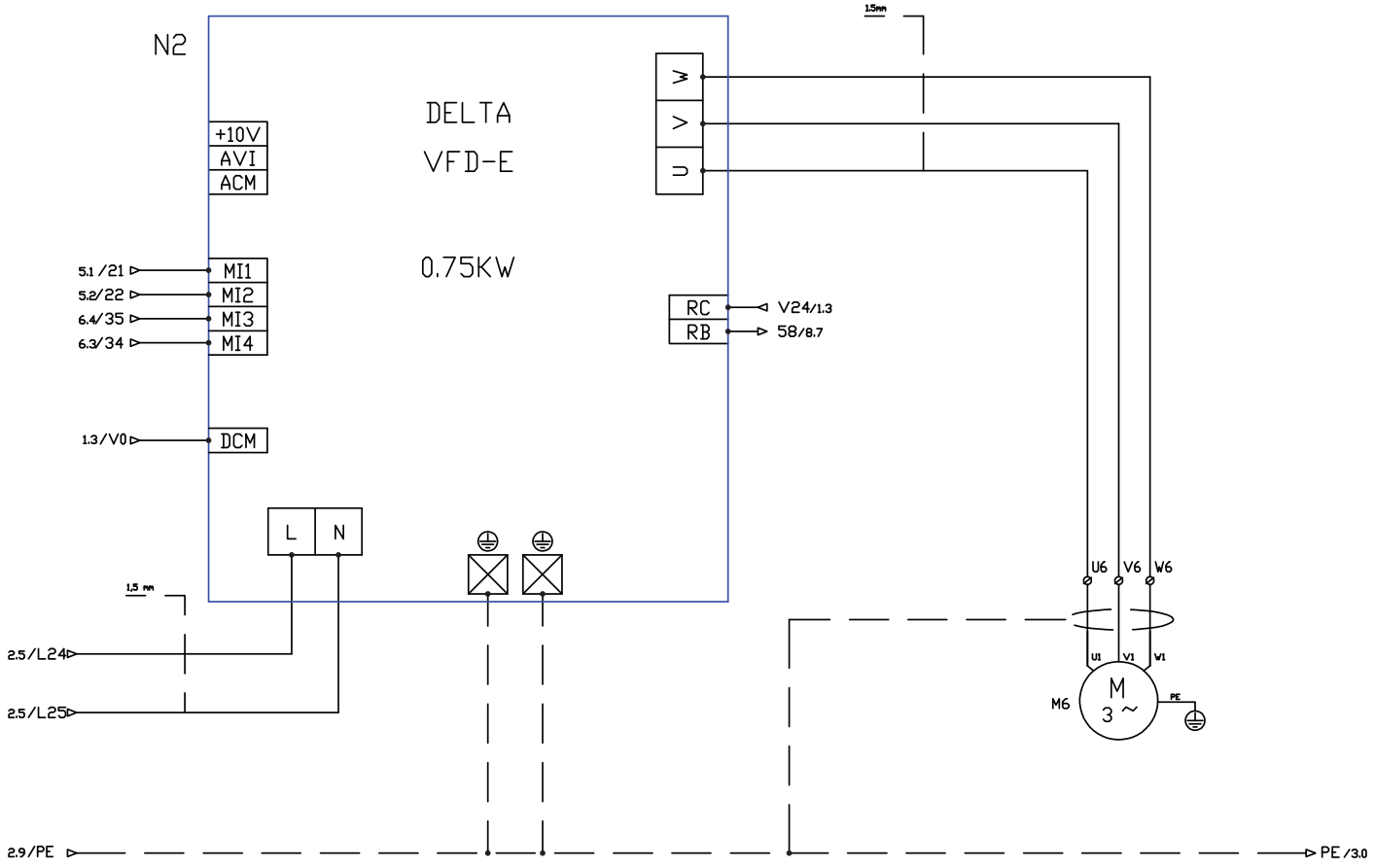


Figure 12. Wiring Diagram - Power Subsystem (continued)

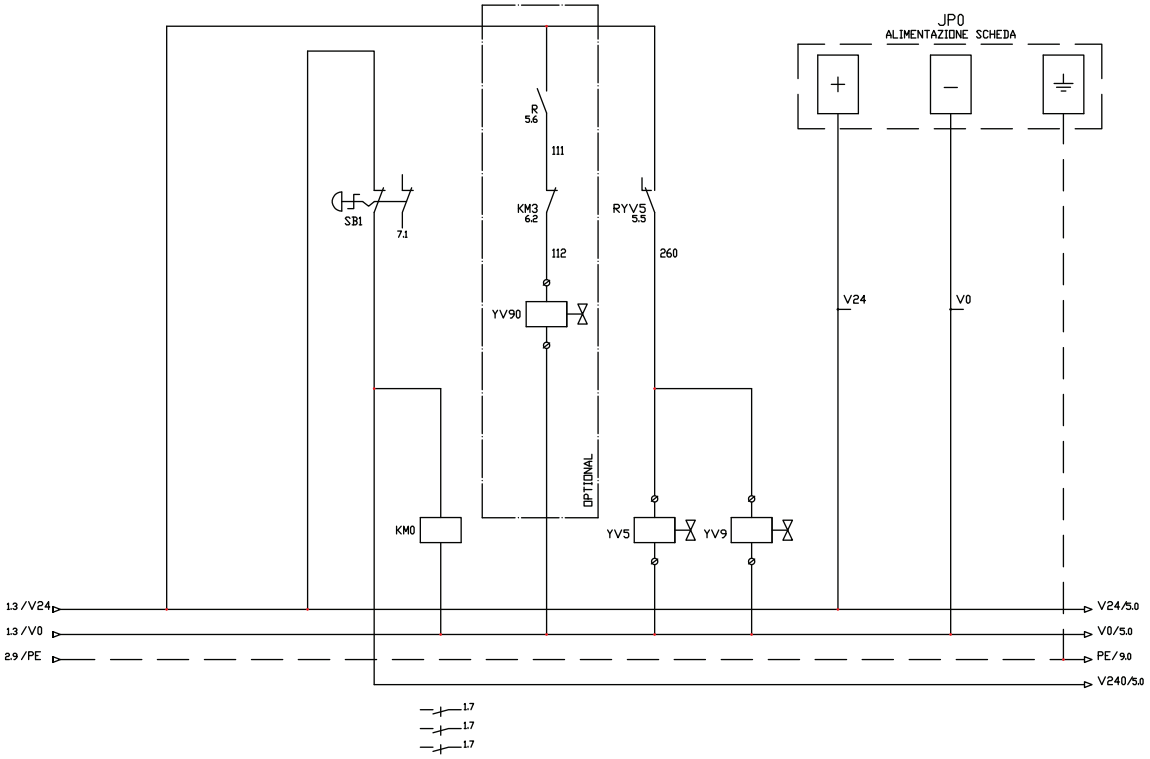


Figure 13. Wiring Diagram - System

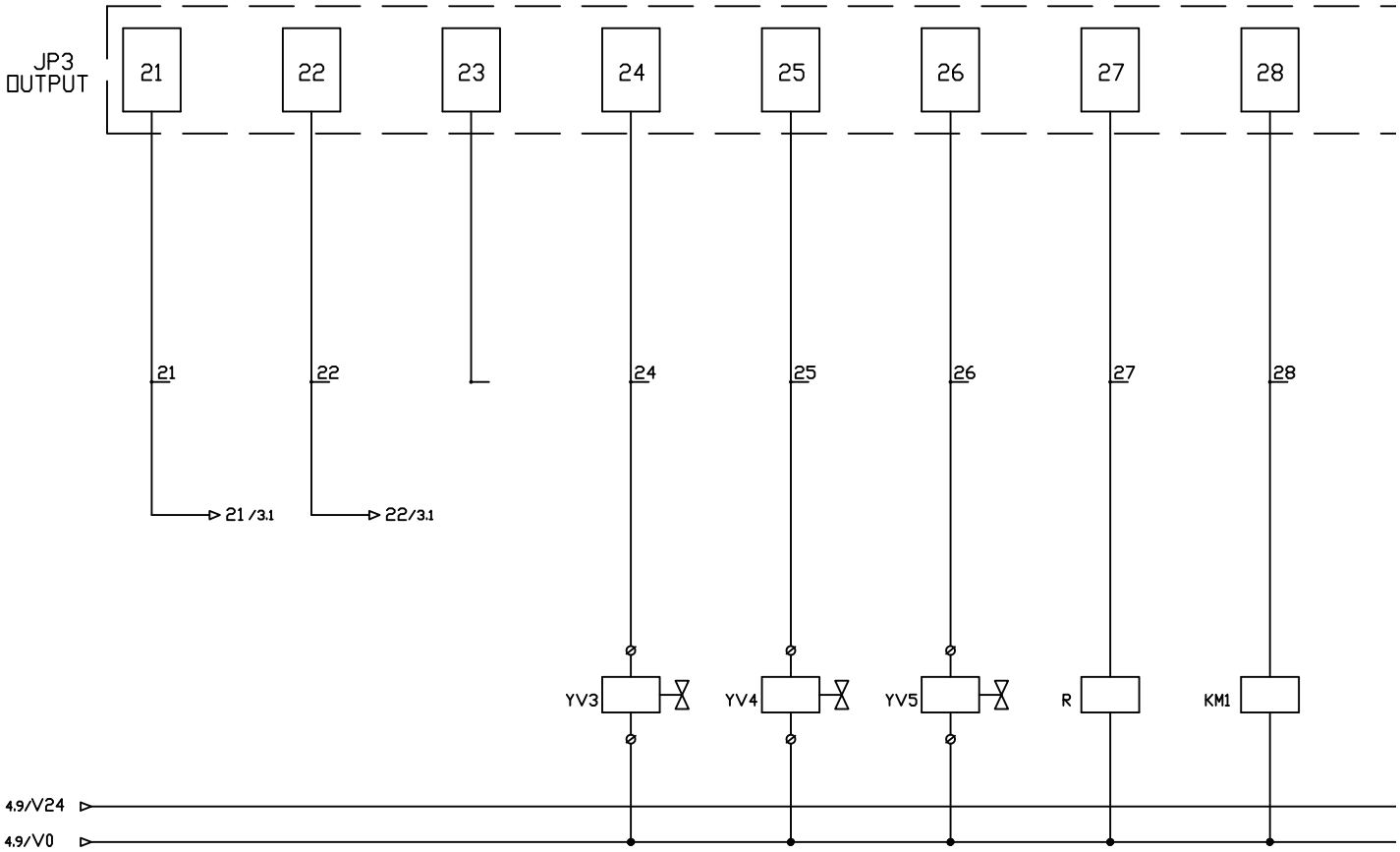


Figure 14. Wiring Diagram - Command Output

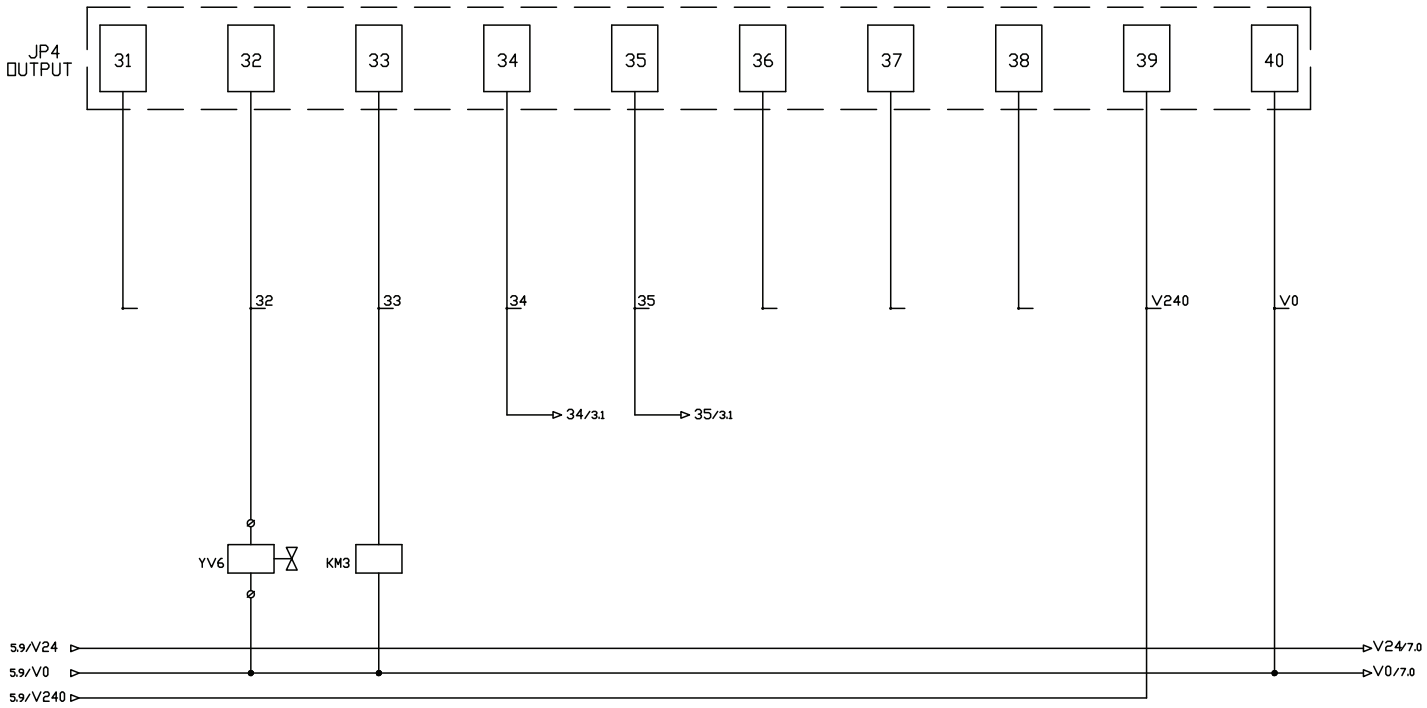


Figure 15. Wiring Diagram - Command Output (continued)

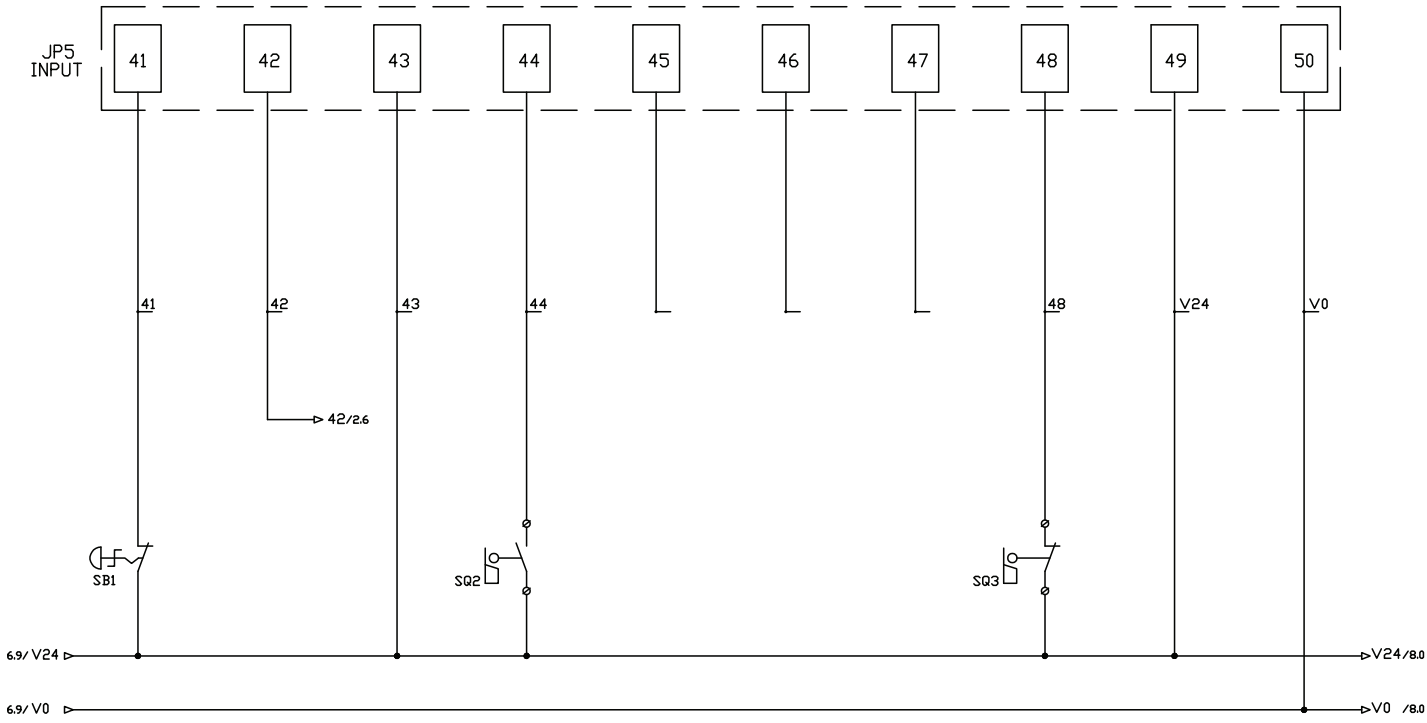


Figure 16. Wiring Diagram - Command Input

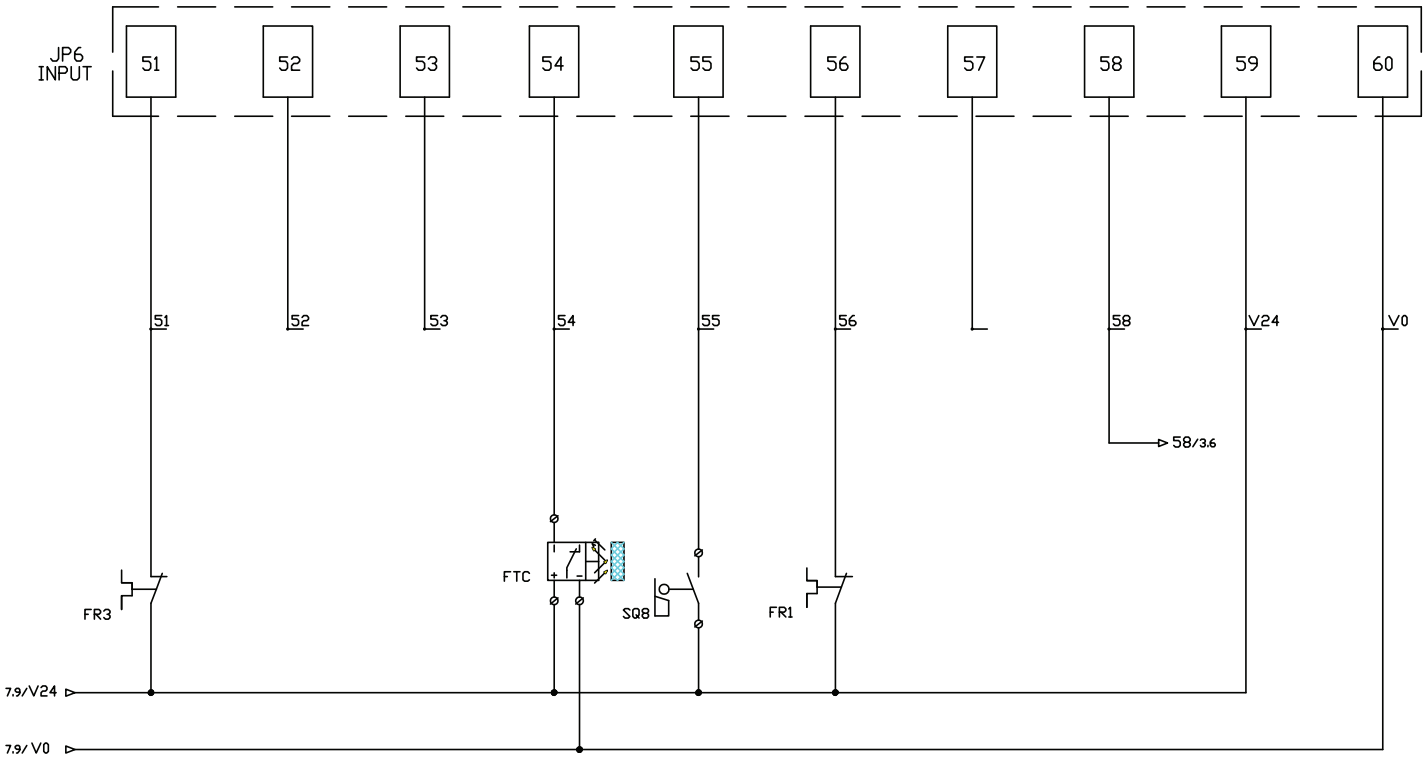


Figure 17. Wiring Diagram - Command Input (continued)

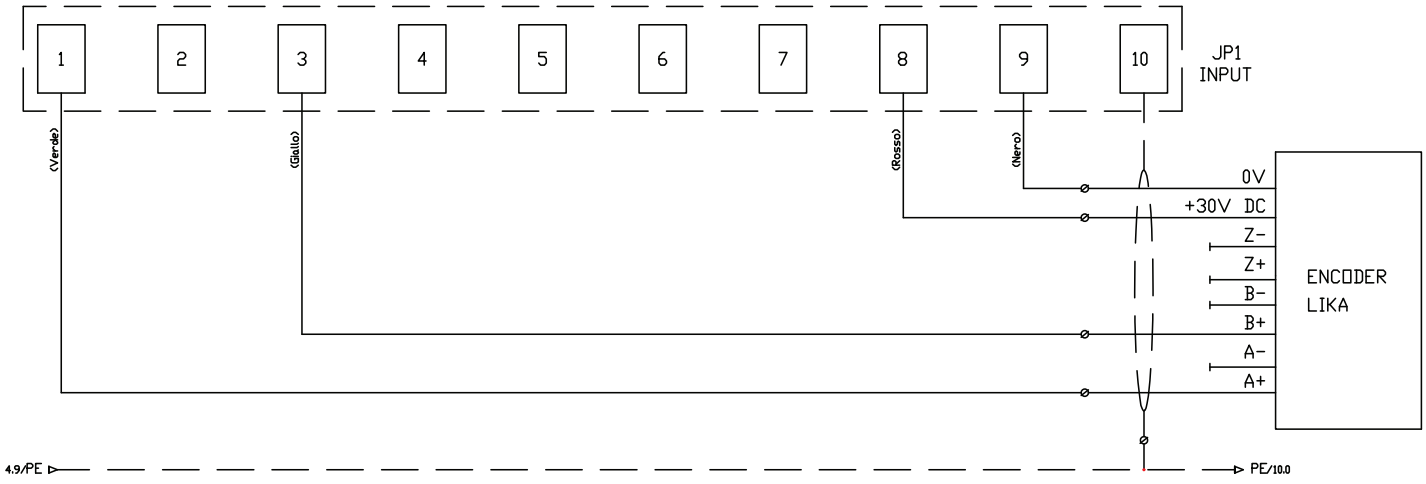


Figure 18. Wiring Diagram - Command Input Encoder

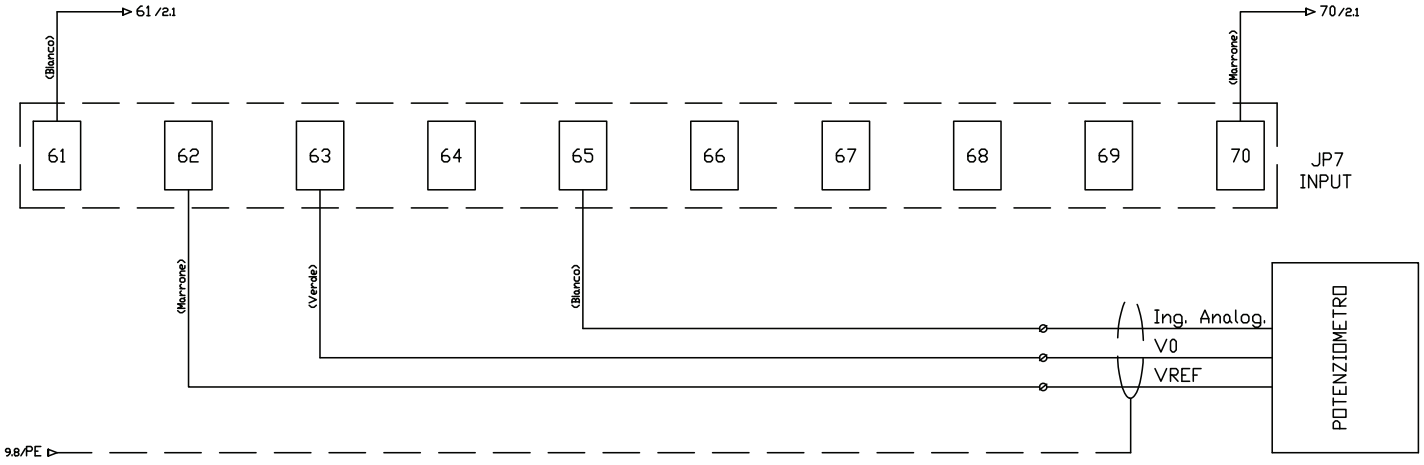


Figure 19. Wiring Diagram _ Analog Command

Connector Pinouts

ANALOG CONNECTOR			
Pin	**Name**	**Function**	**Description**
JP7-61	Sheath	Pin of connection for screen sheath	
JP7-62	Vref	Power supply of potentiometer	
JP7-63	GNDB	0V Power supply	
JP7-64	IN B	Analog input B	Not used
JP7-65	IN A	Analog input A	Eventual blade potentiometer
JP7-66	Sheath	Connection pin of screen sheath	
JP7-67	OUT B-	+/- 10V Axis Y (Ref -)(*)	Not used
JP7-68	OUT B+	+/- 10V Axis Y (Ref +)	Not used
JP7-69	OUT A-	+/- 10V Axis X (Ref -)(*)	Not used
JP7-70	OUT A+	+/- 10V Axis X (Ref +)	Not used
* Connect to GNDB if the differential analog output is not used			

CONNECTOR FOR ENCODER INPUTS		
Pin	**Name**	**Function**
JP1-1	CAX	Channel A axis X
JP1- 2	CAXN	Channel /A axis X
JP1- 3	CBX	Channel B axis X
JP1- 4	CBXN	Channel /B axis X
JP1- 5	CZX	Not used
JP1- 6	CZXN	Not used
JP1- 7	+5V	Encoder power supply voltage
JP1- 8	+12V	Encoder power supply voltage
JP1- 9	GNDB	Mass
JP1- 10	Sheath	Connection pin of screen sheath
N°	Name	Function
11	CAY	Not used
12	CAYN	Not used
13	CBY	Not used
14	CBYN	Not used
15	CZY	Not used
16	CZYN	Not used
17	+5V	Encoder power supply voltage
18	+12V	Encoder power supply voltage
19	GNDB	Mass
20	Sheath	Connection pin of screen sheath

Command INPUTS		
Pin	**Description**	**Test I/O**
JP5-41	Emergency (N.C.)	1
JP5- 42	Motor thermal switch (N.C) 2	
JP5- 43	Blade breakage (n.C.)	3
JP5- 44	Carter open (N.C.)	4
JP5- 45	Not used	5
JP5- 46	Not used	6
JP5- 47	Not used	7
JP5- 48	End of stroke forward carriage	8
JP5- 49	+24 Volt (common of the inputs)	
JP5- 50	Mass	
JP6- 51	End of stroke backwards carriage	9
JP6- 52	End of stroke blade high	10
JP6- 53	End of stroke blade low	11
JP6- 54	Emergency - bar missing	12
JP6- 55	Emergency - handle (n.C.)	13
JP6- 56	Oil thermal switch (n.C.)	14
JP6- 57	Not used	15
JP6- 58	Fan/chips thermal switch(n.C.)	16
JP6- 59	+24 Volt (common of the inputs)	
JP6- 60	Mass	

Command Outputs		
Pin	**Description**	**Test I/O**
JP3-21	Carriage forward slow	1
JP3-22	Carriage backward slow	2
JP3- 23	Not used	3
JP3-24	Opening/closing carriage jaw	4
JP3-25	Blade up	5
JP3-26	Blade down	6
JP3-27	Blade motor activation	7
JP3-28	Oil pump activation	8
JP4-31	Not used	9
JP4-32	Opening/closing fixed jaw	10
JP4-33	Water pump activation	11
JP4-34	Carriage forward fast	12
JP4-35	Carriage backward fast	13
JP4-36	Chips cleaning	14
JP4-37	Not used	15
JP4-38	Not used	16
JP4-29	External power supply +24 volt	
JP4-30	Mass	
JP4-39	External power supply +24 volt	
JP4-40	Mass	
JP4-99	External power supply +24 volt	
JP4- 100	Mass	

Parts List

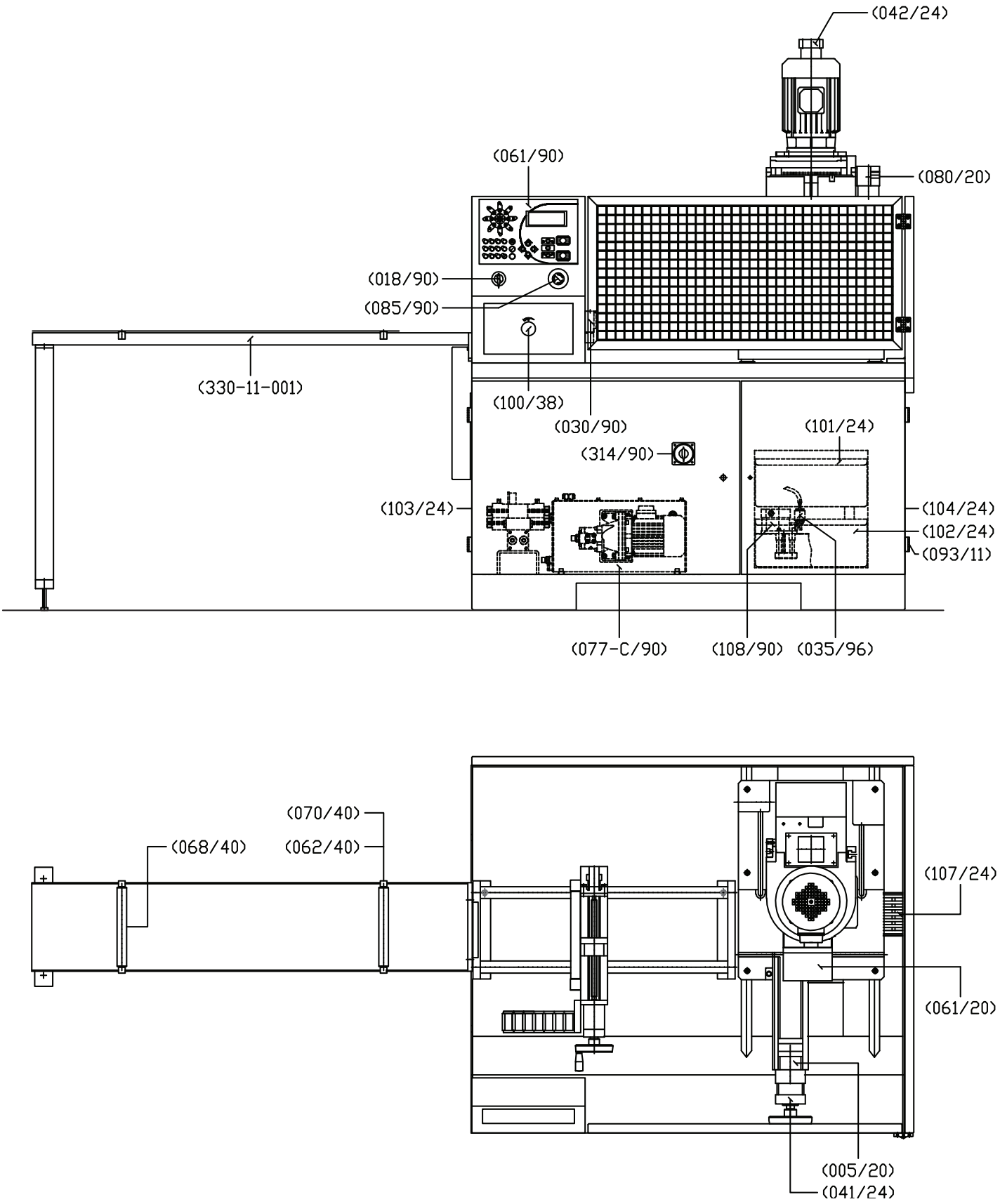


Figure 20. Parts Diagram - System

Item #	Description	Part Number	Qty
005/20	Vise	9645084.01	1
018/90	Commutator VEMER CA0120009R03	9645085.01	1
030/90	Microswitch	9645086.01	1
035/96	Valve EUROPA □3/8□	9645087.01	1
041/24	Vise cylinder	9645088.01	1
042/24	Head cylinder	9645089.01	1
061/20	Disk shelter	9645090.01	1
061/90	MACC-4 controller	9645091.01	1
062/40	Bush Igus GFM 1214-09 Iglidur	9645092.01	4
068/40	Roller	9645093.01	2
070/40	Roller belt block	9645094.01	4
077-C/90	Hydraulic unit	9645095.01	1
080/20	Dropsa pump	9645096.01	1
085/90	Emergency button	9645097.01	1
093/11	Hinge	9645098.01	4
100/38	Regulator	9645099.01	1
101/24	Chip tank	9645100.01	1
102/24	Cooling tank	9645101.01	1
103/24	Door electrical box	9645102.01	1
104/24	Door tanks	9645103.01	1
107/24	Grating recovery piece	9645104.01	1
108/90	Electric pump PA 35 85	9645105.01	1
314/90	Door locking line feeder disconnector	9645106.01	1
330-11-001	Roller table	9645107.01	1

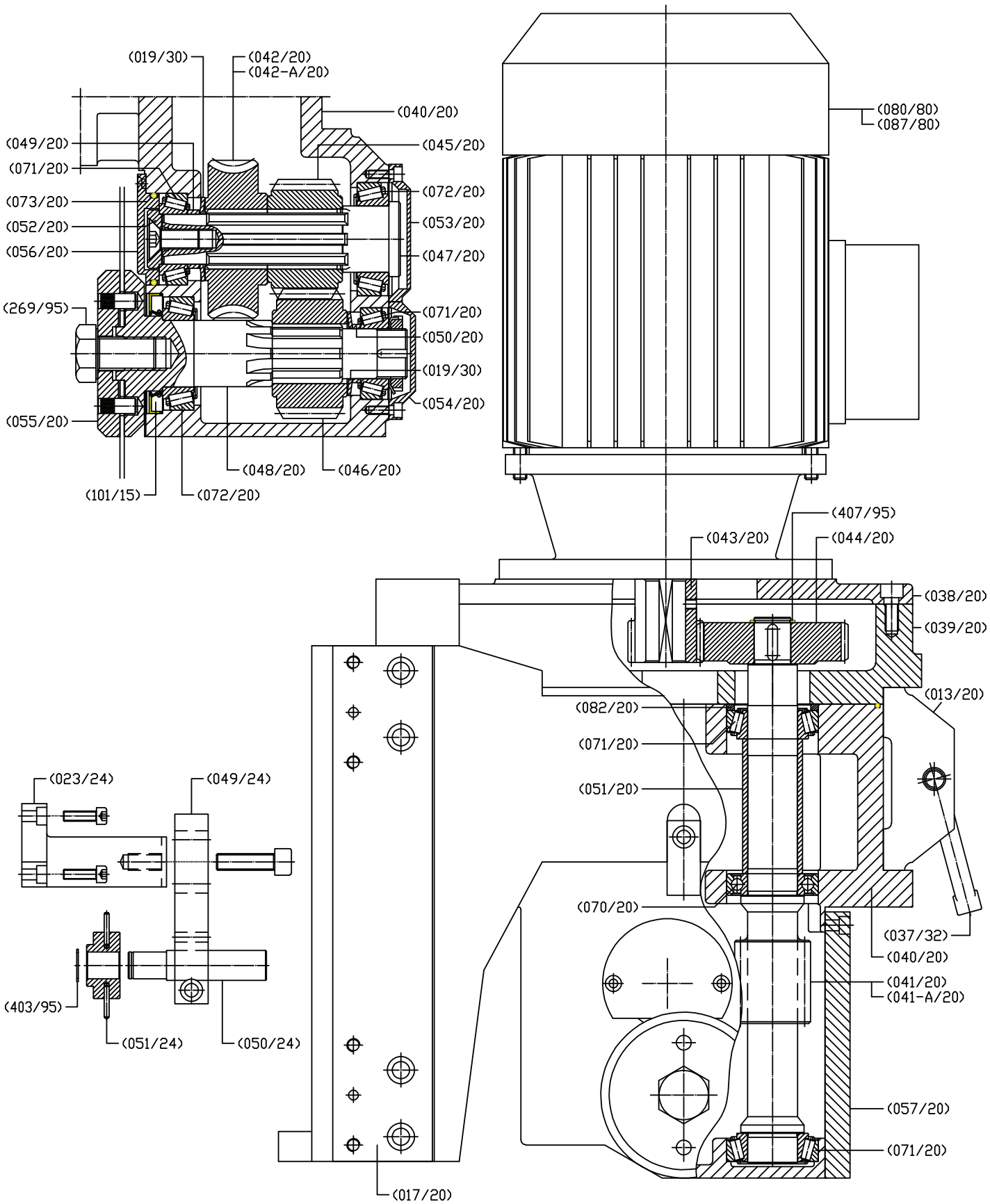


Figure 21. Parts Diagram - Cutting Head

Item	Description	Part Number	Qty
013/20	Head support	9645108.01	1
017/20	Lateral gib carrier	9645109.01	1
019/30	Belleville washer	9645110.01	2
023/24	Support for chip shredder rod	9645111.01	1
037/32	Clamping lever M12x45	*	1
038/20	Motor carrier plate	9645112.01	1
039/20	Head cover	9645113.01	1
040/20	Head	9645114.01	1
041-A/20	Worm shaft screw (two principles)	9645115.01	1
041/20	Worm shaft screw	9645116.01	1
042-A/20	Helical gear (screw two principles)	9645117.01	1
042/20	Helical gear	9645118.01	1
043/20	Driving pinion	9645119.01	1
044/20	Worm screw shaft gear	9645120.01	1
045/20	Shaft helical gear	9645121.01	1
046/20	Shaft disk gear	9645122.01	1
047/20	Helical gear shaft	9645123.01	1
048/20	Disk shaft	9645124.01	1
049/20	Helical gear spacer	9645125.01	1
049/24	Chip breaker bar	9645126.01	1
050/20	Shaft disk spacer gear	9645127.01	1
050/24	Chip shredder wheel pin	9645128.01	1
051/20	Bearing spacer worm screw shaft	9645129.01	1
051/24	Chip breaker roller	9645130.01	1
052/20	Washer	*	1
053/20	Helical gear right shaft flange	9645131.01	1
054/20	Disk shaft flange	9645132.01	1
055/20	Fixing disk flange	9645133.01	1
056/20	Helical gear shaft left flange	9645134.01	1
057/20	Front head cover	9645135.01	1
070/20	Bearing 6006	9645136.01	1
071/20	Bearing 32006X	9645137.01	4
072/20	Bearing 32008XA	9645138.01	2
073/20	O-ring 4187	*	1
080/80	Electric motor	9645139.01	1
087/80	Electric motor	9645140.01	1
101/15	Oil retainer 45/72x8	9645141.01	1
269/95	Screw TE M20x30	*	1
403/95	External snap ring ϕ15	*	1
407/95	Snap ring E ϕ22	*	1

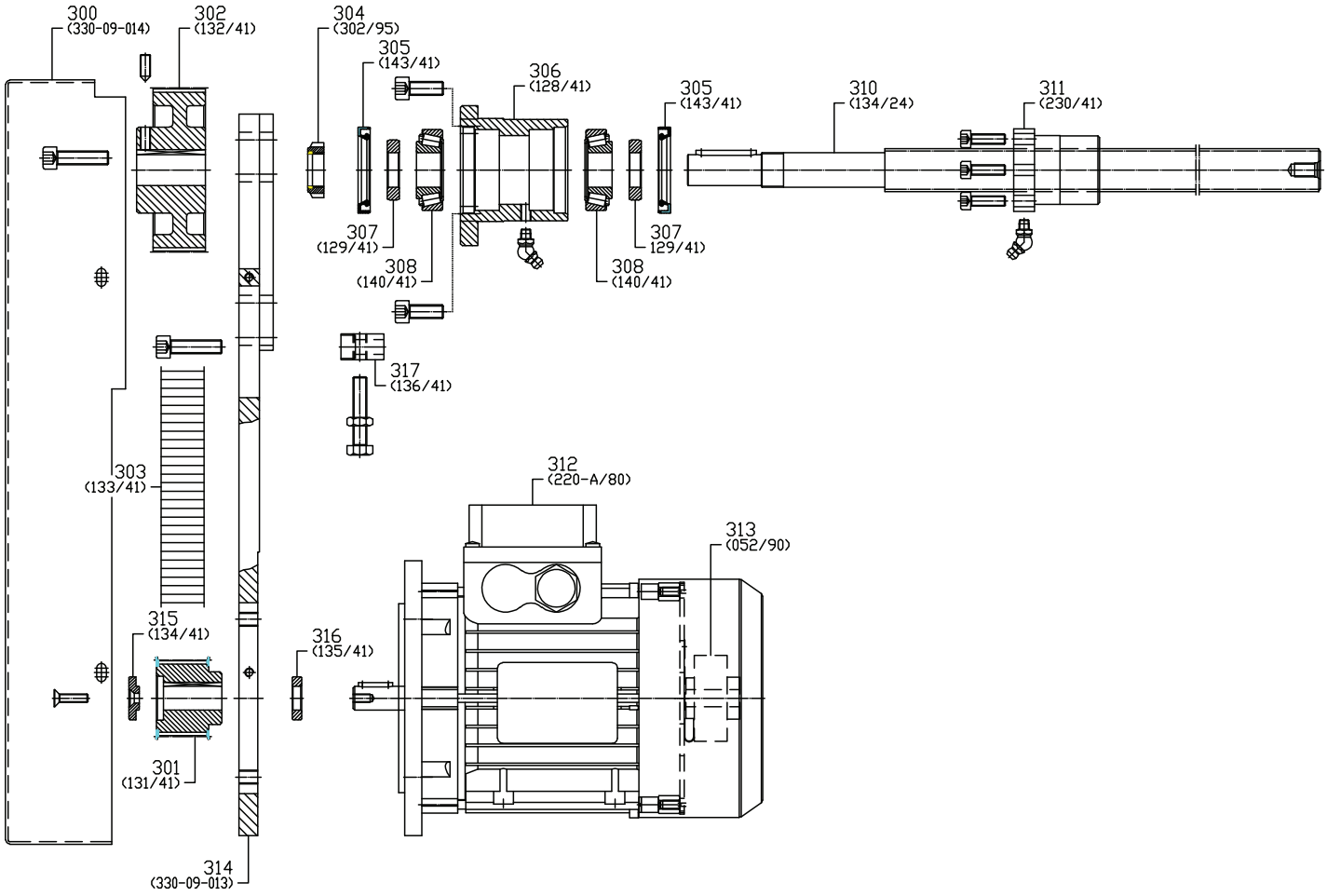


Figure 22. Parts Diagram - Carriage Feed System

Item	Description	Part Number	Qty
300	Material feed pulleys cover	9645229.01	1
301	Material feed motor pulley (for motor gr. 71)	9645230.01	1
302	Material feed idle pulley	9645231.01	1
303	Belt 835-5M-25	9645232.01	1
304	Self locking nut normal type M 20x1	9645233.01	1
305	Rotating shaft circlips A 35/50x7	9645234.01	2
306	Ballscrew's bearings bush	9645235.01	1
307	Ballscrew's bearings spacer	9645236.01	2
308	"Tapered roller bearing SKF 30204 □20/47x15, 25"	9645237.01	2
310	Ballscrew (600mm stroke)	9645238.01	1

Item	Description	Part Number	Qty
310	Ballscrew (1000mm stroke)	9645239.01	1
311	Ball screw nut FKDI 2505-4.OP	9645240.01	1
312	Electric motor Gr. 71 4 poli 0, 55kW B5	9645241.01	1
313	Encoder Lika C50-H-1024-ZCU410L5	9645242.01	1
314	Material feed motor support	9645243.01	1
315	Motor pulley washer	9645244.01	1
316	Motor pulley inner spacer	9645245.01	1
317	Belt tightening plate	9645246.01	1

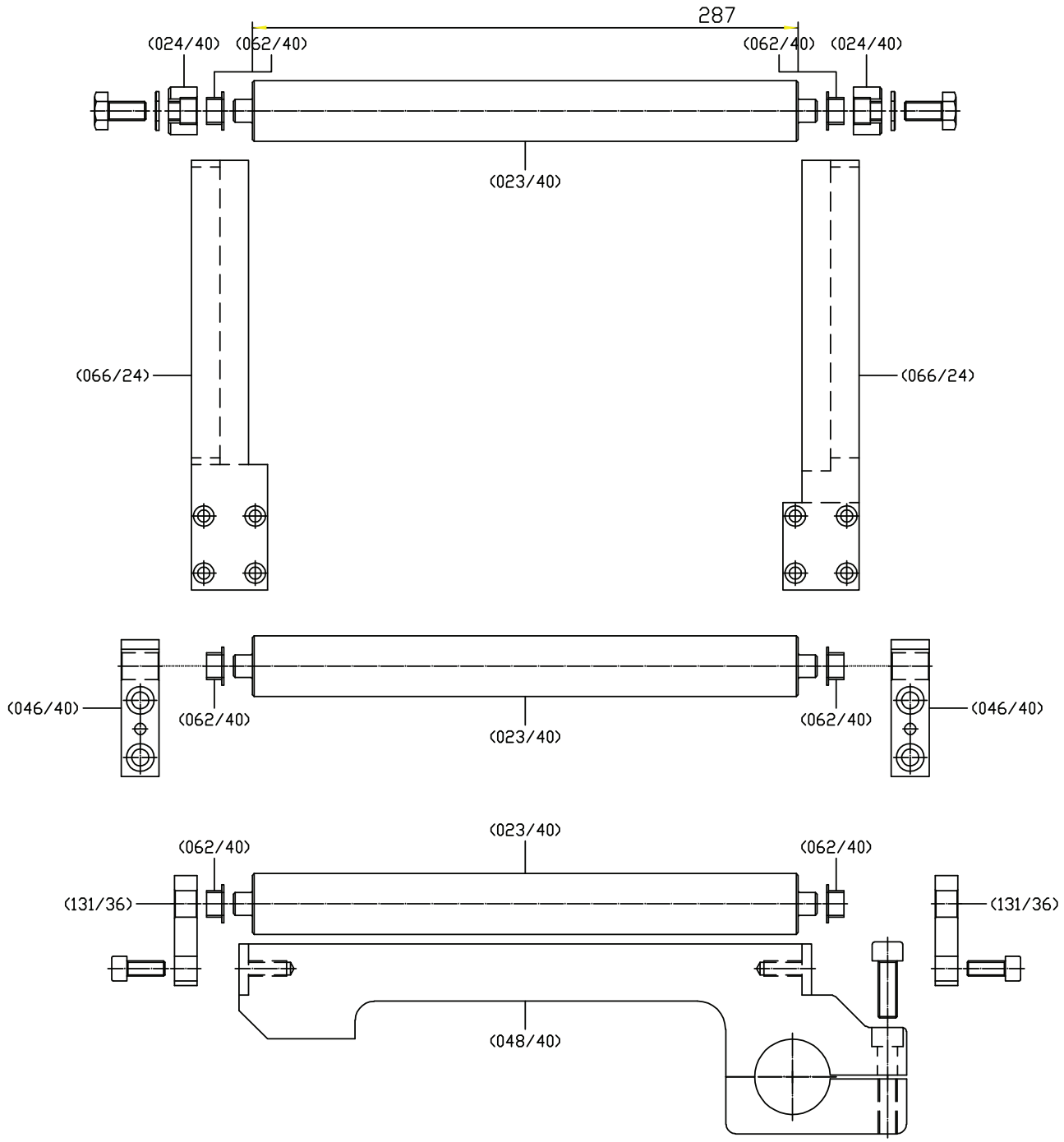


Figure 23. Diagram - Carriage Roller

Code	Description	Part Number	Qty
023/40	Roller	9645166.01	3
024/40	Roller bracket bushing	9645167.01	2
046/40	Bracket roller carriage	9645168.01	2
048/40	Support movable roller	9645169.01	1
062/40	Bush Igus GFM 1214-09 IGLIDUR	9645170.01	6
066/24	Support adjustable roller	9645171.01	1+1
131/36	Block movable roller	9645172.01	2

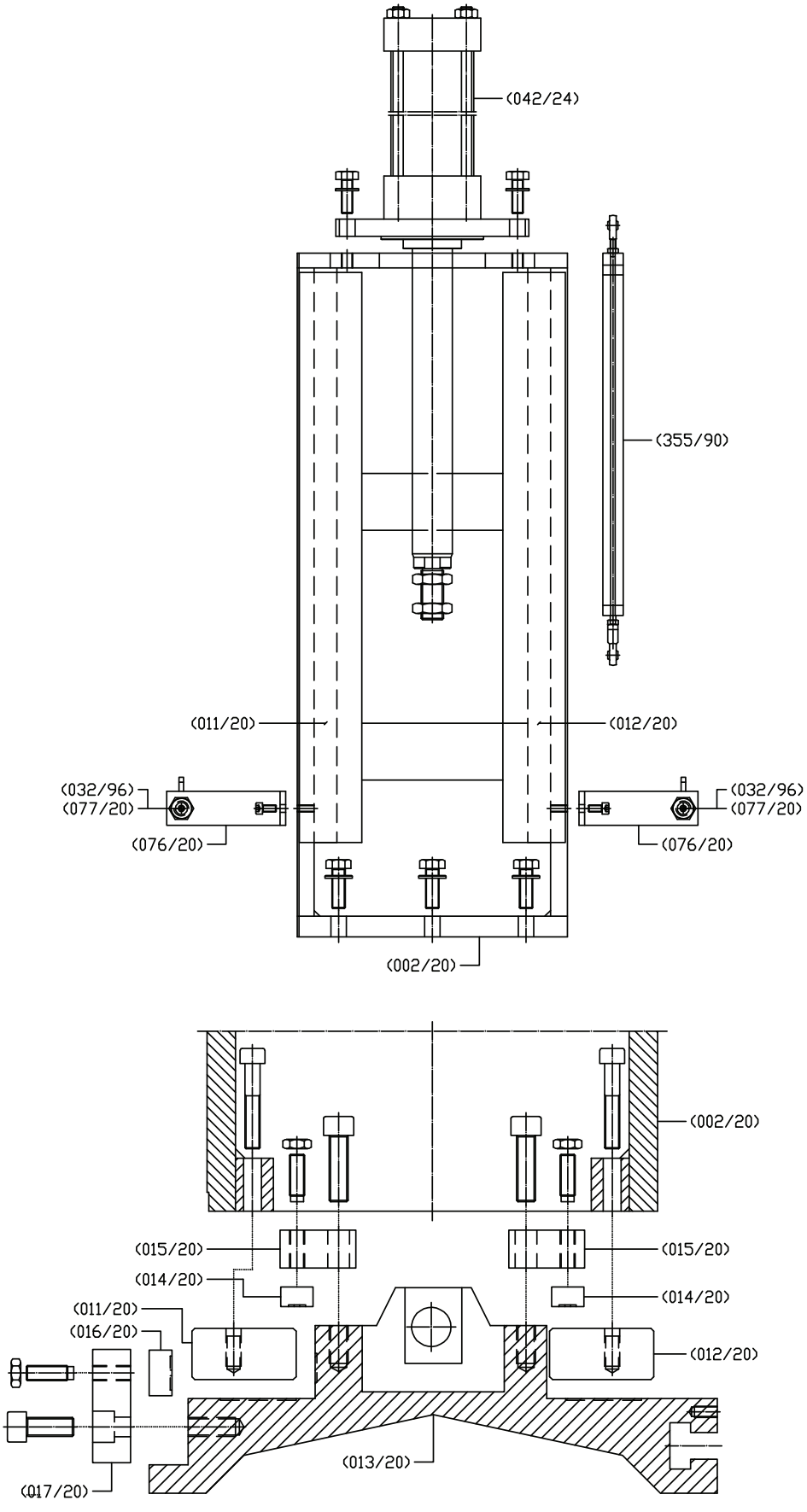


Figure 24. Parts Diagram - Column

Code	Description	Part Number	Qty
002/20	Column	9645142.01	1
011/20	Left-guide	9645143.01	1
012/20	Right-guide	9645144.01	1
013/20	Head bearing	9645145.01	1
014/20	Rear gib	9645146.01	2
015/20	Rear gib carrier	9645147.01	2
016/20	Lateral gib	9645148.01	1
017/20	Lateral gib carrier	9645149.01	1
022/90	Microswitch ERSCE E100-00-AI	9645150.01	2
032/96	”Valve “”MINI”” M-F 1/4” Gas	9645151.01	2
042/24	Head cylinder	9645152.01	1
076/20	Aerator support	9645153.01	2
077/20	Aerator	9645154.01	2
083/20	Clamping lever M10x45	*	2
355/90	Linear potentiometer (250 mm stroke)	9645155.01	1

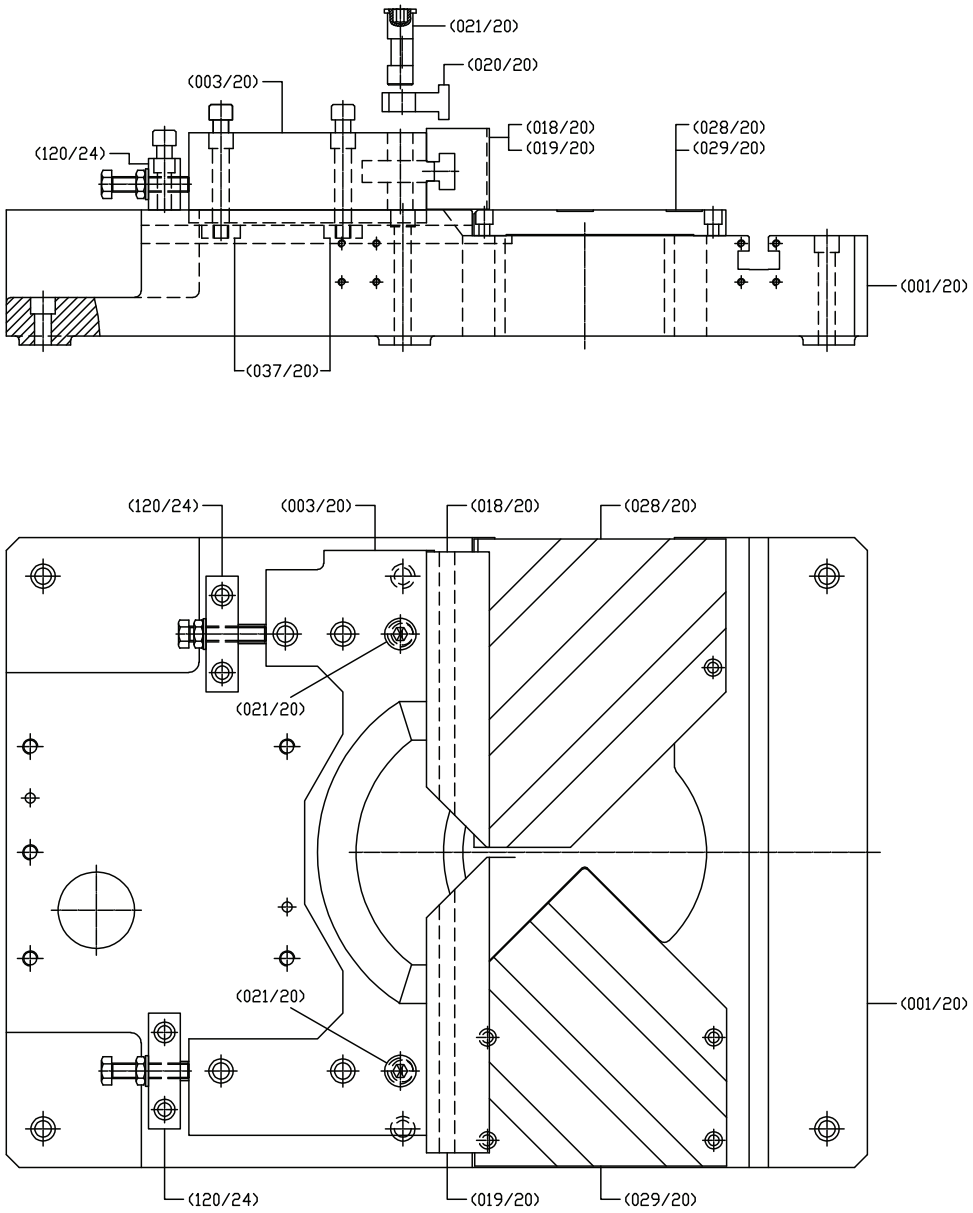


Figure 25. Parts Diagram - Bench

Code	Description	Part Number	Q.ty
001/20	Bench	9645156.01	1
003/20	Counter-Vise	9645157.01	1
018 /20	Countervise right jaw	9645158.01	1
019 /20	Pin fixing jaw	9645159.01	1
020/20	Pin fixing countervise jaw	9645160.01	2
021/20	Cam countervise jaw	9645161.01	2
028/20	Right brace plate	9645162.01	1
029/20	Left plate brace	9645163.01	1
037/20	Countervise plate	9645164.01	4
120/24	Adjustment sleeve	9645165.01	2

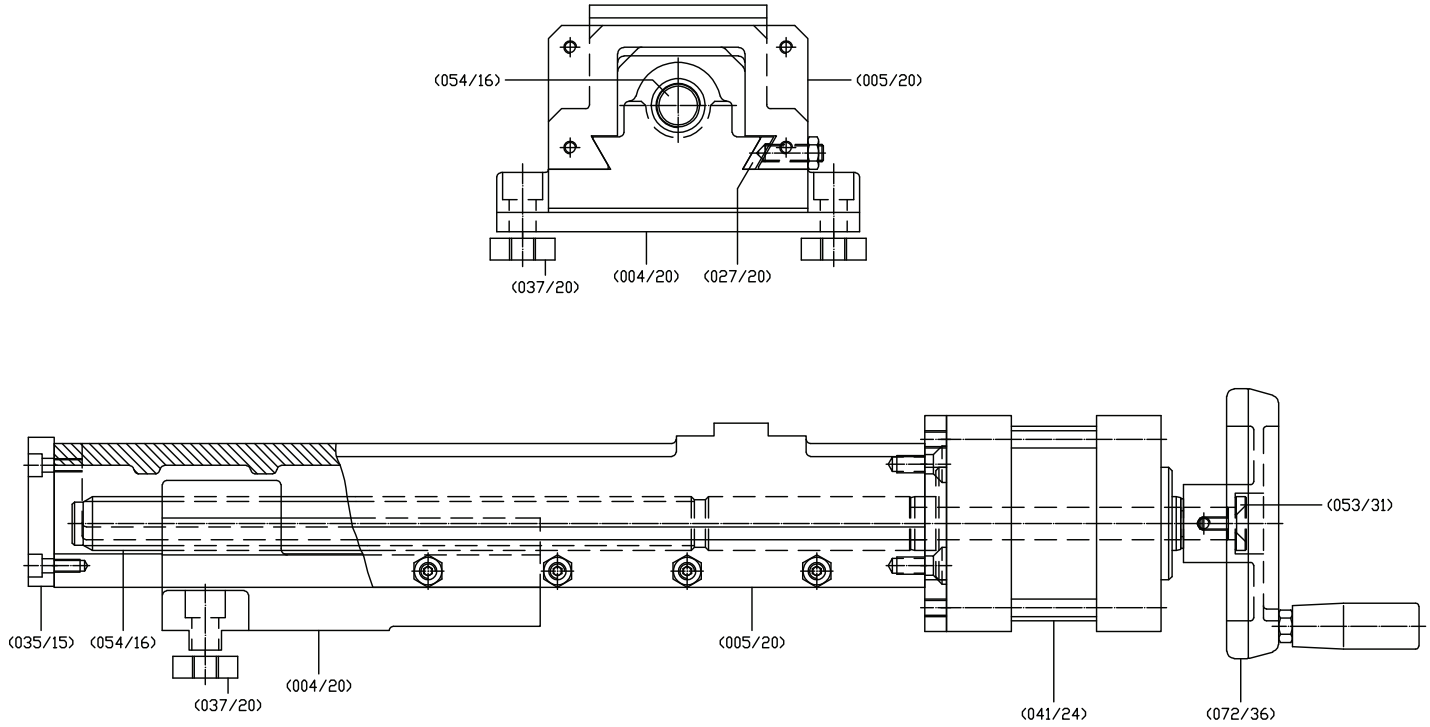


Figure 26. Parts Diagram - Horizontal Vise

Code	Description	Part Number	Qty
004/20	Vise support	9645173.01	1
005/20	Vise	9645174.01	1
027/20	Vise gib	9645175.01	1
035/15	Vise jaw	9645176.01	1
037/20	Countervise fixing plate	9645177.01	2
041/24	Vise cylinder	9645178.01	1
053/31	Vise handwheel washer	9645179.01	1
054/16	Vise screw	9645180.01	1
072/36	Vise handwheel	9645181.01	1

Figure 27.

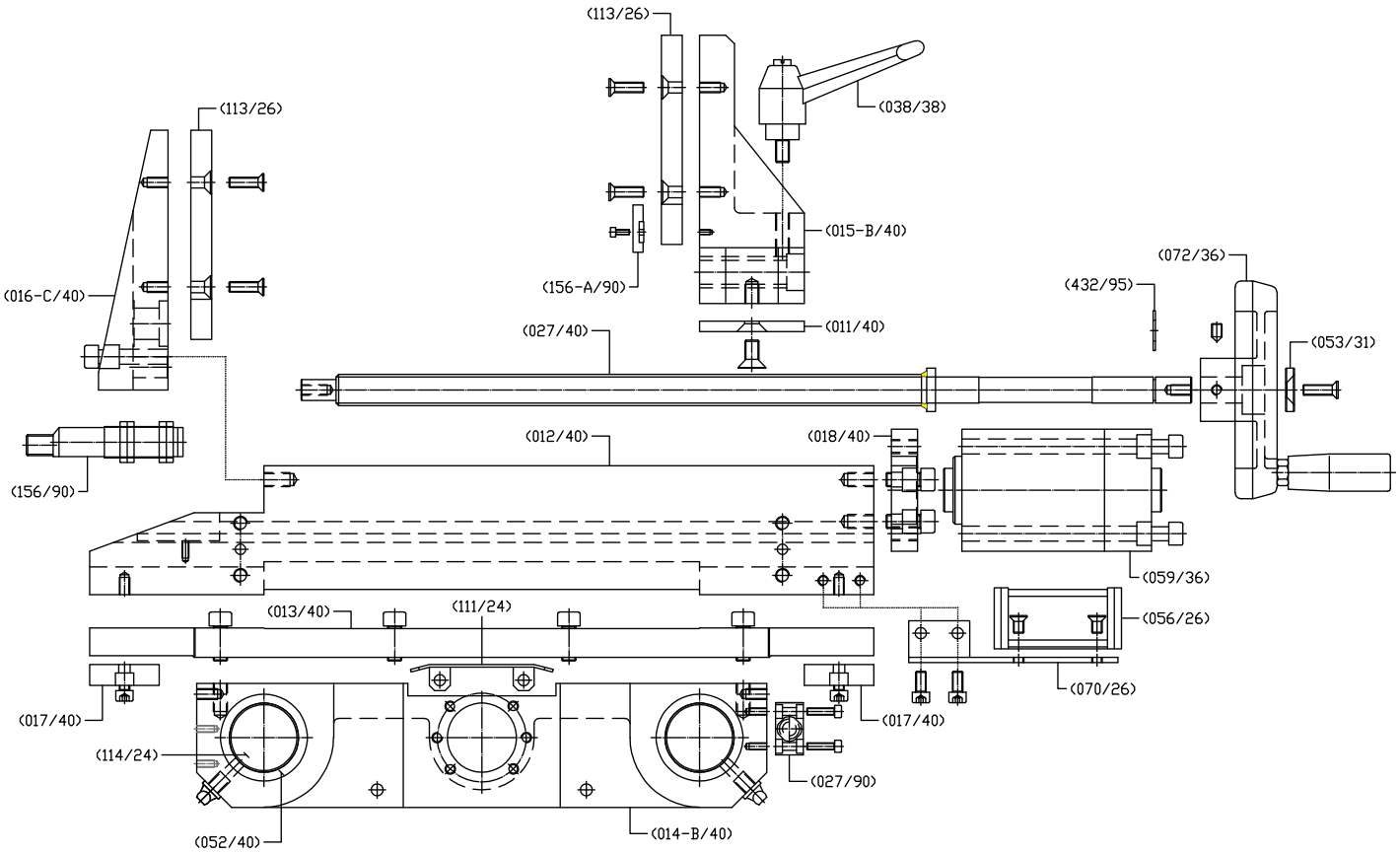


Figure 28. Parts Diagram - Carriage Group

Code	Description	Part Number	Qty
011/40	Sliding plate vice	9645182.01	1
012/40	Carriage slide	9645183.01	1
013/40	Guide plate sled carriage	9645184.01	1
014-B/40	Carriage chariot	9645185.01	1
015-B/40	Carriage vice	9645186.01	1
016-C/40	Carriage countervice	9645187.01	1
017/40	Carriage slide plate	9645188.01	2
018/40	Support plate cylinder carriage	9645189.01	1
027/40	Carriage vice screw	9645190.01	1
027/90	Microswitch	9645191.01	1
038/38	Clamping lever M8x13	9645192.01	1
052/40	Oil retainer □40/50x7	9645193.01	4

Code	Description	Part Number	Qty
053/31	Vice handwheel washer	9645194.01	1
113/26	Carriage countervice jaw	9645195.01	1
113/26	Carriage vice jaw	9645196.01	1
056/26	Cable chain	9645197.01	1
059/36	Vice cylinder	9645198.01	1
070/26	Upper cable chain support	9645199.01	1
072/36	Vice handwheel	9645200.01	1
114/24	Carriage bar	9645201.01	2
156-A/90	Reflecting □36	9645202.01	1
156/90	Photoelectric polar. DAT S5-5-B3-32	9645203.01	1
432/95	Safety ring RS 12	9645204.01	1

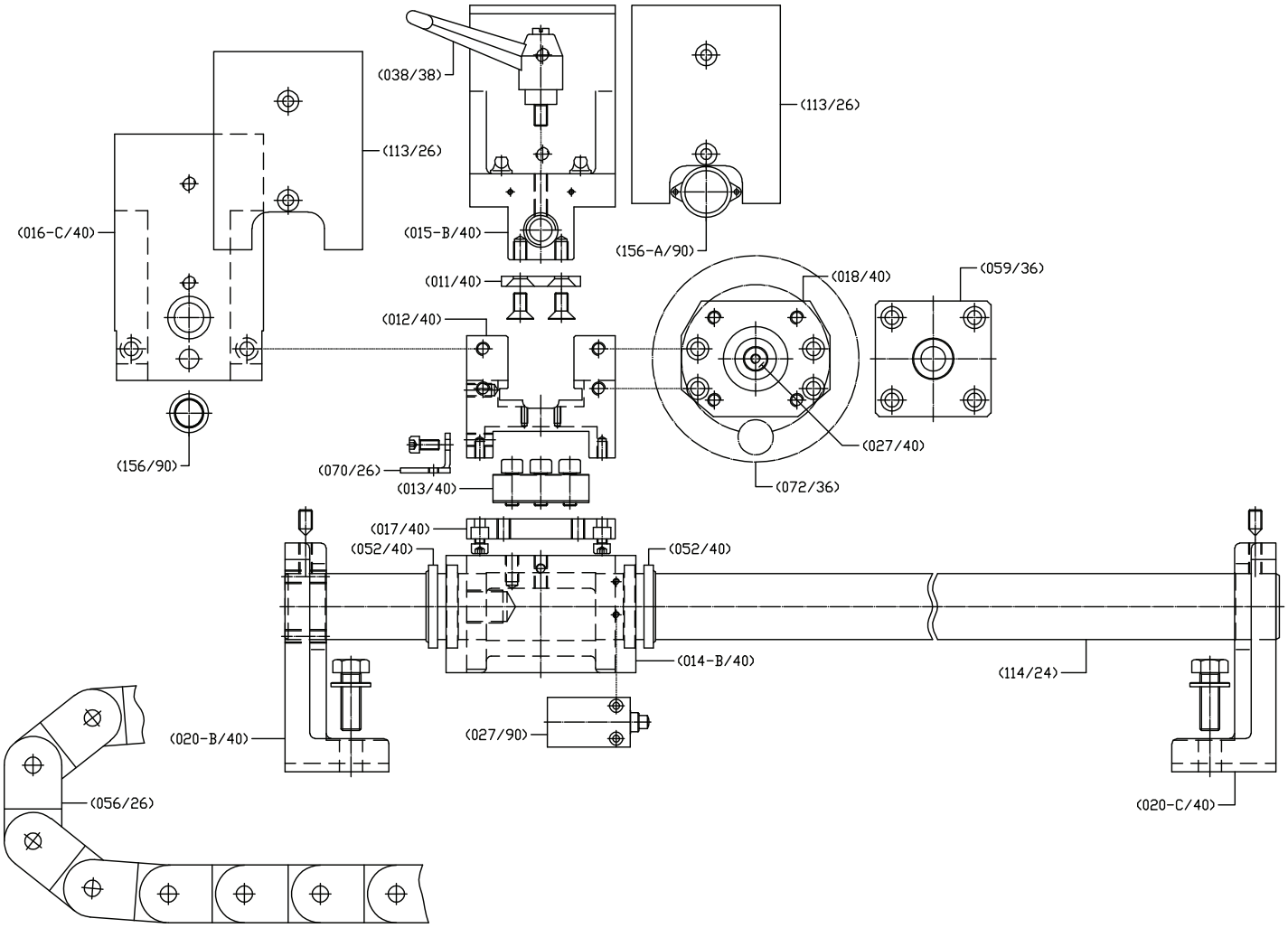


Figure 29. Parts Diagram - Carriage Group (continued)

Code	Description	Part Number	Qty
011/40	Sliding plate vice	9645205.01	1
012/40	Carriage slide	9645206.01	1
013/40	Guide plate sled carriage	9645207.01	1
014-B/40	Carriage chariot	9645208.01	1
015-B/40	Carriage vice	9645209.01	1
016-C/40	Carriage countervice	9645210.01	1
017/40	Carriage slide plate	9645211.01	2
018/40	Support plate cylinder carriage	9645212.01	1
020-B/40	Carriage support	9645213.01	1
020-C/40	Carriage support	9645214.01	1
027/40	Carriagevice screw	9645215.01	1
027/90	Microswitch	9645216.01	1
038/38	Clamping lever M8x13	9645217.01	1
052/40	Oil retainer ϕ40/50x7	9645218.01	4

Code	Description	Part Number	Qty
113/26	Carriage countervice jaw	9645219.01	1
113/26	Carriage vice jaw	9645220.01	1
056/26	Cable chain	9645221.01	1
059/36	Vice cylinder	9645222.01	1
070/26	Upper cable chain support	9645223.01	1
072/36	Vice handwheel	9645224.01	1
111/24	Screw balls cover	9645225.01	1
114/24	Carriage bar	9645226.01	2
156-A/90	Reflecting ϕ36	9645227.01	1
156/90	Photoelectric polar. DAT S5-5-B3-32	9645228.01	1

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C.H. Hanson / Palmgren warrants their products to be free of defects in material or workmanship. This warranty does not cover defects due directly or indirectly to misuse, abuse, normal wear and tear, failure to properly maintain the product, heated, ground or otherwise altered, or used for a purpose other than that for which is was intended.

The warranty does not cover expendable and/or wear part (i.e. v-belts, screws, abrasives, jaws), damage to tools arising from alteration, abuse or use other than their intended purpose, packing and freight. The duration of this warranty is expressly limited to the terms noted below beginning from the date of delivery to the original user.

The Palmgren branded items carry the following warranties on parts:

All vises, clamps, positioning tables, tombstones, jack screws and vise accessories - LIFETIME.

All bench grinders, drill presses, tapping machines, band saws, lathes, milling machines, arbor presses, abrasive finishing machines and work stands - 3 YEARS.

The obligation of C.H. Hanson / Palmgren is limited solely to the repair or replacement, at our option, at its factory or authorized repair agent of any part that should prove inoperable. Purchaser must lubricate and maintain the product under normal operating conditions at all times. Prior to operation become familiar with product and the included materials, i.e. warnings, cautions and manuals.

Failure to follow these instructions will void the warranty.

This warranty is the purchaser's exclusive remedy against C.H. Hanson for any inoperable parts in its product. Under no circumstances is C.H. Hanson liable for any direct, indirect, incidental , special or consequential damages including loss of profits in any way elated to the use or inability to use our products. This warranty gives you specific legal rights which may vary from state to state.

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